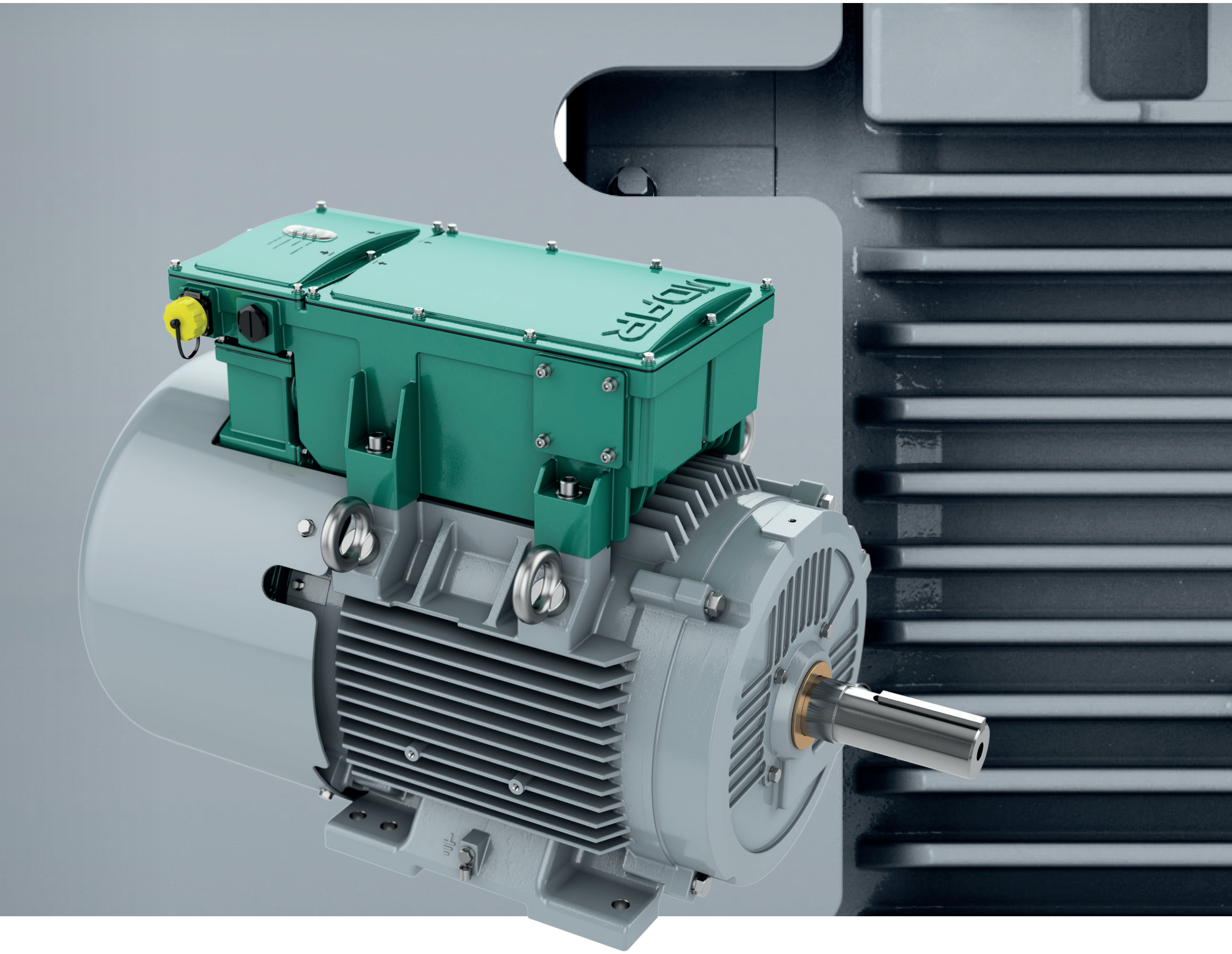
INSTALLATION, OPERATION, MAINTENANCE AND PROGRAMING MANUAL



VIDAR
An ITT Company

Table of Contents

1 Introduction and Safety

1.1 Introduction

Purpose of this manual

The purpose of this manual is to provide necessary information for:

- Installation
- Operation
- Maintenance
- Programming

CAUTION:
Failure to observe the instructions contained in this manual could result in personal injury and/or property damage and may void the warranty. Read this manual carefully before installing and using the product.

NOTICE:
Save this manual for future reference and keep it readily available.

1.1.1 Requesting other information

Special versions can be supplied with supplementary instruction leaflets. See the sales contract for any modifications or special version characteristics. For instructions, situations, or events that are not considered in this manual or in the sales documents, please contact the nearest VIDAR representative.

Always specify the exact product type and serial number when requesting technical information or spare parts.

1.2 Safety

WARNING:

- Risk of electrical shock. VIDAR contains capacitors and power electronics that remain energized after input power is removed. Always disconnect all power sources, apply lockout/tagout, wait at least 1 minute, and verify zero voltage before opening covers.
- Risk of arc flash. During installation, commissioning, or maintenance, wear appropriate arc-flash PPE (per NFPA 70E or local regulations) and maintain safe distance from live components.
- Residual voltage. Terminals and drive electronics can hold dangerous charge even when the motor is at standstill. Always verify zero volts with a calibrated meter before accessing the terminal box.
- Induced voltage hazard. Rotating the VIDAR shaft, either manually or under external force, can generate back-EMF and produce voltage at the terminals. Never turn the shaft unless all power and control connections are isolated and zero voltage is confirmed.

WARNING:

- Unexpected start hazard. VIDAR can automatically restart when power is reapplied. Before performing any work, engage the Safe Torque Off (STO) function, isolate control wiring, and confirm absence of residual energy.
- Rotating hazard. Never operate or test VIDAR with guards, shields, or covers removed. Contact with shafts, couplings, or cooling fans can cause serious injury.
- Electric shock and burn hazards. Wear proper PPE (insulating gloves, eye protection, flame-resistant clothing) when working near live or recently energized components; surfaces may be hot.
- Hot surfaces. The motor housing, fan, and power converter can reach elevated temperatures during operation. Allow the unit to cool before touching or performing maintenance.
- Overload and overheating. Operating above rated voltage, current, ambient-temperature or altitude limits can overheat electronics or windings, leading to fire or catastrophic failure. Adhere strictly to nameplate ratings and derating guidelines.
- EMI and grounding. Improper grounding can generate interference that disrupts nearby control systems. Ground the motor frame, terminal box, and control panel per NEC/IEC requirements.
- Hazardous-area installation. VIDAR is certified to Class I, Division 2 (Groups A, B, C, D, T4). Only install in areas matching these classifications and per local codes. Do not open the product while it is energized and in an explosive gas atmosphere.

CAUTION:

- Use only VIDAR-approved parts. Installing non-VIDAR components or making unauthorized modifications voids safety certifications and warranty.
- Proper installation practice. Follow all mechanical alignment, mounting, and wiring instructions: segregate power and control cables, use screened wiring where specified, and torque terminals per values shown.
- Storage and handling. Protect the unit from shock, moisture, and contaminants during transport and storage. Do not lift by conduit boxes or cables.
- Control-wiring polarity. Incorrect analog/digital input wiring can cause erratic behavior or failure. Follow the wiring diagrams precisely and verify terminal identifications before applying power.

1.2.1 Safety terminology and symbols

About safety messages

It is extremely important that you read, understand, and follow the safety messages and regulations carefully before handling the product. They are published to help prevent these hazards:

- Personal accidents and health problems
- Damage to the product
- Product malfunction

Hazard levels

Hazard level	Indication
DANGER:	A hazardous situation which, if not avoided, will result in death or serious injury
WARNING:	A hazardous situation which, if not avoided, could result in death or serious injury
CAUTION:	A hazardous situation which, if not avoided, could result in minor or moderate injury
NOTICE:	A potential situation which, if not avoided, could result in undesirable conditions

Hazard categories

Hazard categories can either fall under hazard levels or let specific symbols replace the ordinary hazard level symbols.

Electrical hazards are indicated by the following specific symbol:

ELECTRICAL HAZARD:

These are examples of other categories that can occur. They fall under the ordinary hazard levels and may use complementing symbols:

- Crush hazard
- Cutting hazard
- Arc flash hazard

1.2.2 Environmental safety

WARNING:
Hazardous-area installation. VIDAR is certified to Class I, Division 2 (Groups A, B, C, D, T4). Only install in areas matching these classifications and per local codes. Do not open the product while it is energized and in an explosive gas atmosphere.

Waste and emissions regulations

Observe these safety regulations regarding waste and emissions:

- Appropriately dispose of all waste.
- Handle and dispose of the processed lubrication or grease in compliance with applicable environmental regulations.
- Clean up all spills in accordance with safety and environmental procedures.

1.2.3 Recycling guidelines

Always follow local laws and regulations regarding recycling.

1.2.4 User safety

General safety rules

These safety rules apply:

- Always keep the work area clean.
- Avoid all electrical dangers. Pay attention to the risks of electric shock or arc flash hazards.
- Always bear in mind the risk of rotating equipment hazards, electrical accidents, and burn injuries.

Safety equipment

Use safety equipment according to the company regulations. Use this safety equipment within the work area:

- Hardhat
- Safety goggles, preferably with side shields
- Protective shoes
- Protective gloves
- Hearing protection
- First-aid kit
- Safety devices

Electrical Connections

WARNING:

- Electrical connections must be made by certified electricians in compliance with all international, national, state and local regulations.
- Equipment and piping surfaces may exceed 130ºF (54ºC) in operating process plants. Clear visual warnings or other indicators should alert personnel to surfaces that may reach a potentially unsafe temperature. Do not touch hot surfaces. Allow VIDAR operating at a high temperature to cool sufficiently before performing maintenance. If touching a hot surface cannot be avoided, personnel should wear appropriate gloves, clothing, and other protective gear as necessary. Local law may provide specific guidance regarding exposure of personnel to unsafe temperatures.

Noise

WARNING:

The noise level of the product is lower than 85 dB. However, the noise level of 70 dB may be exceeded in some installations. Make sure that you understand the noise level requirements in the environment where the VIDAR is installed. Failure to do so may result in hearing loss or violation of local laws.

1.2.4.1 Precautions before work

Observe these safety precautions before you work with the product or are in connection with the product:

- Provide a suitable barrier around the work area, for example, a guard rail.
- Make sure that all safety guards are in place and secure.
- Make sure that you have a clear path of retreat.
- Make sure that the product cannot roll or fall over and injure people or damage property.
- Make sure that the lifting equipment is in good condition.
- Use a lifting harness, a safety line, and a breathing device as required.
- Allow all system and VIDAR components to cool before you handle them.
- Make sure that the product has been thoroughly cleaned.
- Disconnect and lock out power before you service the VIDAR.
- Check the explosion risk before you weld or use electric hand tools.

1.2.4.2 Precautions during work

Observe these safety precautions when you work with the product or are in connection with the product:

CAUTION:
Failure to observe the instructions contained in this manual could result in personal injury and/or property damage, and may void the warranty. Read this manual carefully before installing and using the product.

- Never work alone.
- Always wear protective clothing and hand protection.
- Stay clear of suspended loads.
- Always lift the product by its lifting device.
- Beware of the risk of a sudden start.

1.3 Hazard Area Considerations and Intended Use

Special care must be taken in potentially explosive environments to ensure that the equipment is properly operated and maintained. VIDAR is certified to Class 1, Division 2 (Groups A, B, C, D, T4). Only install in areas matching these classifications and per local codes. Compliance is fulfilled only when you operate the unit within its intended use. When you install or maintain hazardous area approved products, always comply with the directive and applicable standards.

Personnel requirements

These are the personnel requirements for products in potentially explosive atmospheres:

- All work on the product must be carried out by certified electricians and/or VIDAR-authorized technicians. Special rules apply to installations in explosive atmospheres.
- All users must know about the risks of electric current and the chemical and physical characteristics of the gas, the vapor, or both present in hazardous areas.
- Any maintenance for hazardous area approved products must conform to international and national standards.

VIDAR disclaims all responsibility for work done by untrained and unauthorized personnel.

Product and product handling requirements

These are the product and product handling requirements for hazardous area approved products in potentially explosive atmospheres:

- Only use the product in accordance with the motor nameplate and ratings.
- Before you start work on the product, make sure that the product and the control panel are isolated from the power supply and the control circuit, so they cannot be energized.
- Do not open the product while it is energized and in an explosive gas atmosphere.
- Do not modify the equipment without approval from an authorized VIDAR representative.
- Only use parts that are provided by an authorized VIDAR representative.

Code	Maximum permissible surface temperature in °C | °F
T1	450 | 842
T2	300 | 572
T3	200 | 392
T4	135 | 275
T5	Option not available
T6	Option not available

WARNING:

- When VIDAR unit is installed in a potentially explosive atmosphere, the instructions in this manual must be followed. Personal injury and/or equipment damage may occur if these instructions are not followed. If there is any question regarding these requirements or if the equipment is to be modified, please contact a VIDAR representative before proceeding.
- Particular care must be taken when the electrical power source to the equipment is energized.
- Do not open the product while it is energized and in an explosive gas atmosphere.
- Lock out VIDAR power to prevent electric shock, accidental start-up and physical injury.
- All equipment being installed must be properly grounded to prevent unexpected static electric discharge.
- Alignment procedures must be followed to prevent unintended contact of rotating parts. Follow coupling manufacturer’s installation and operation procedures.
- Service temperature in a hazardous classified environment is limited to the area classification specified on the VIDAR nameplate (reference Table 1 in the Safety section).
- The coupling used in a hazardous area classified environment must be properly certified.
- The coupling guard used in a hazardous classified environment must be properly certified.
- Bearings must be lubricated properly in order to prevent excess heat generation, sparks and premature failure.
- Shaft grounding rings or brushes should not be used.
- The preventive maintenance section must be adhered to in order to keep the applicable hazardous are classification of the equipment. Failure to follow these procedures will void the hazardous area classification for the equipment.
- Cooling systems, such as VIDAR cooling fan must be regularly inspected and cleaned for proper air flow and cooling performance.
- Rotate shaft by hand to ensure it rotates smoothly and there is no rubbing which could lead to excess heat generation, sparks and premature failure.

- Do not insulate or allow the VIDAR to accumulate a dust layer as this can result in excess heat generation, sparks and premature failure.
- Check for magnetism on the VIDAR shaft and demagnetize the shaft if there is any detectable magnetism. Magnetism will attract ferritic objects to the impeller, seals and bearings which can result in excess heat generation, sparks and premature failure.
- Do not apply additional paint or coatings to the VIDAR when in a hazardous classified area. Static electric discharge can be initiated when contacting or rubbing surfaces with excessive coating thickness.
- Potential electrostatic charging hazard. Do not rub, clean, or blast equipment with dry cloth or dry media.
- Move equipment to a safe/non-hazardous environment for repairs or use spark resistant tools and work methods.

1.4 Product warranty

Coverage

VIDAR undertakes to remedy faults in products from VIDAR under these conditions:

- The faults are due to defects in design, materials, or workmanship.
- The faults are reported to a VIDAR representative within the warranty period.
- The product is used only under the conditions described in this manual.
- All service and repair work is done by VIDAR-authorized personnel.
- Only approved spare parts and accessories authorized by VIDAR are used in CSA Class 1 Division 2 equipment.

Limitations

The warranty does not cover faults caused by these situations:

- Deficient maintenance
- Improper installation
- Modifications or changes to the product and installation made without consulting VIDAR
- Incorrectly executed repair work
- Normal wear and tear

VIDAR assumes no liability for these situations:

- Bodily injuries
- Material damages
- Economic losses

Warranty claim

VIDAR products are high-quality products with expected reliable operation and long life. However, should the need arise for a warranty claim, then contact your VIDAR representative.

2 Product Description

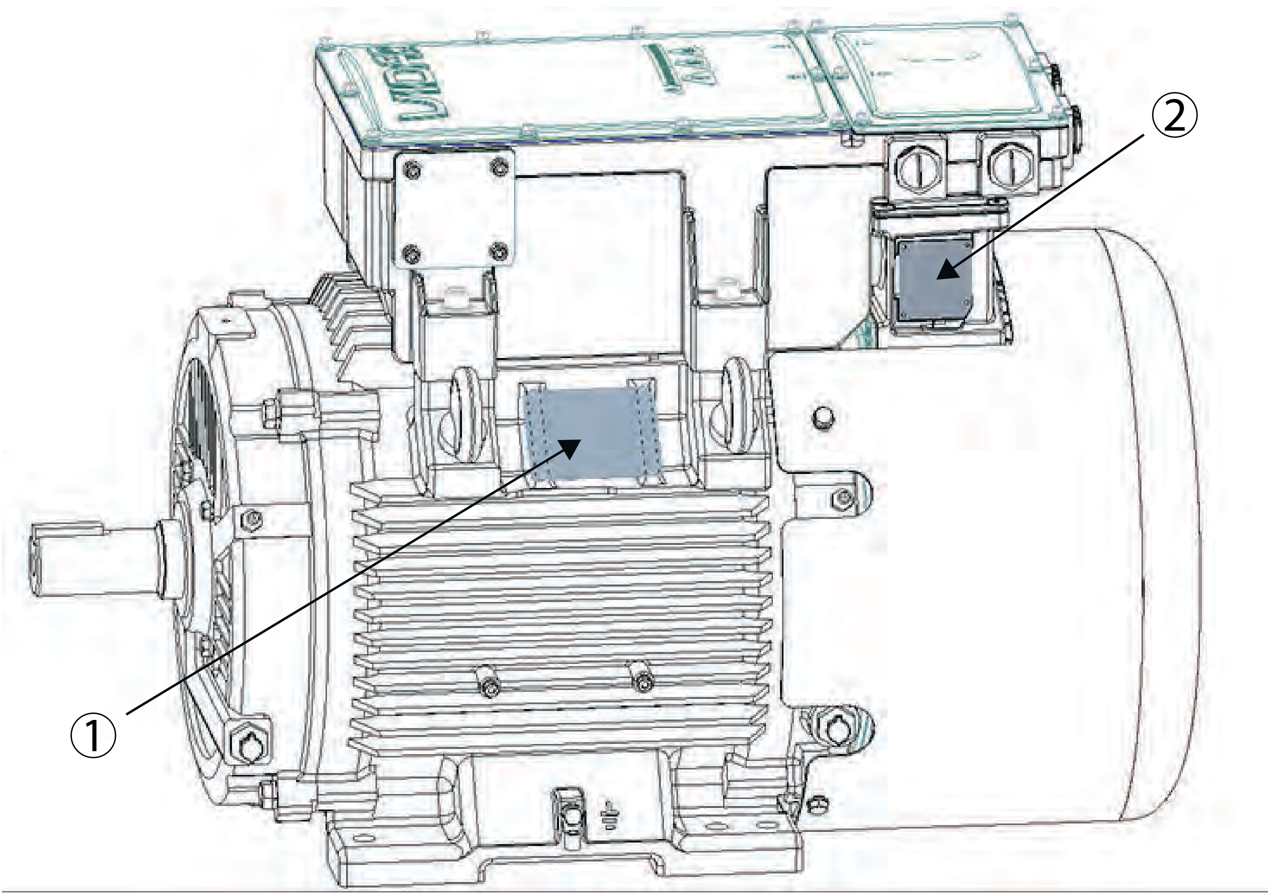
2.1 Confirm VIDAR model

After receiving VIDAR, check the following to ensure safe use:

1. Inspect the unit after unpacking to ensure that it was not damaged during shipment. Make sure that the part number printed on the package matches the part number indicated on the nameplate.
2. Make sure that the mains voltage is within the range indicated on the nameplate. Install the VIDAR according to the instructions in this manual.
3. Before applying power, make sure that all main three phases and ground wire are connected. Also, ensure that all the field wiring is connected.
4. When wiring, make sure that the wiring of input terminals *R/L1, S/L2, T/L3* is correct to prevent damage to the product.
5. When power is applied, use the digital keypad to set parameters. When performing a trial run, first jog the unit for rotation and then start at a low speed and gradually increase it to the desired level.

2.1.1 Nameplate information

VIDAR



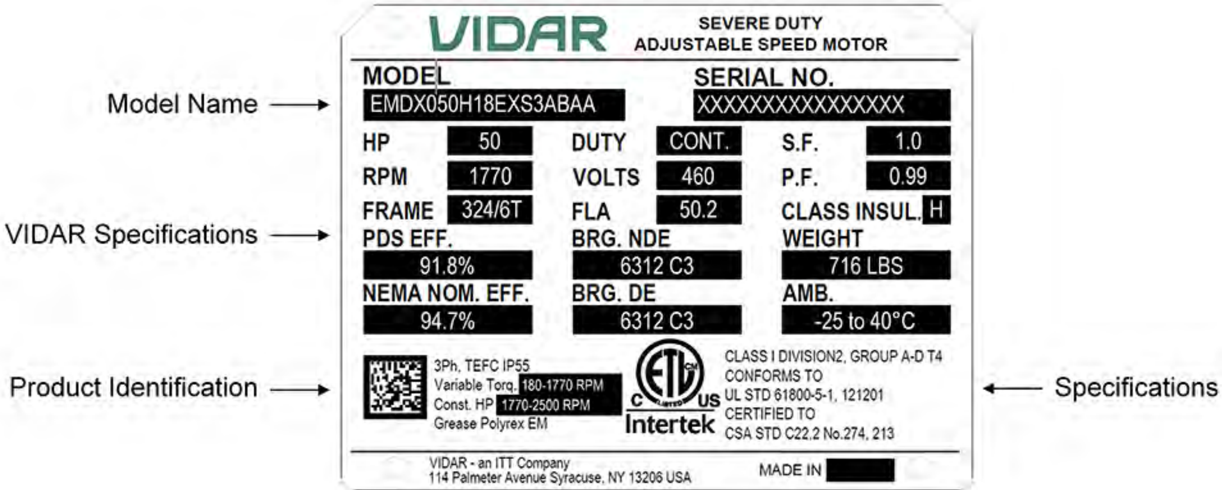


Figure 1: Model and serial number nameplate (Placed at Position 1 marked on the above product drawing)

Power converter

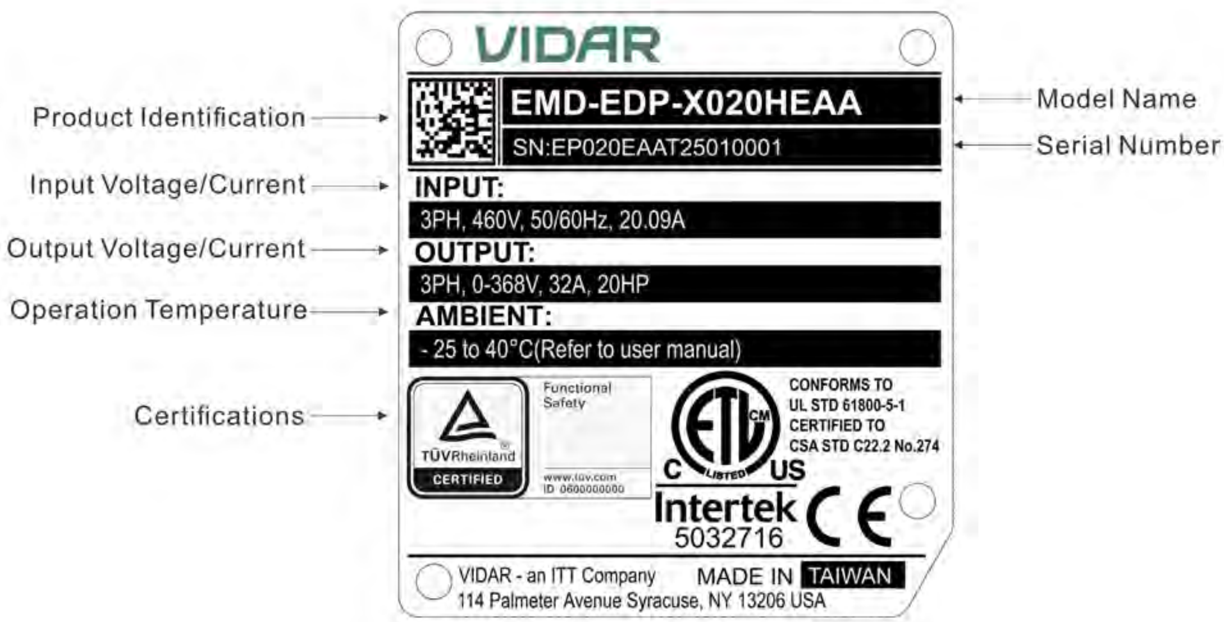


Figure 2: Power converter nameplate (Placed at Position 2 marked on the above product drawing)

2.1.2 Model name

VIDAR

<table>
<tr><th></th><th>[1]</th><th>[2]</th><th>[3]</th><th>[4]</th><th>[5]</th><th>[6]</th><th>[7]</th><th>[8]</th><th>[9]</th><th>[10]</th><th>[11]</th><th>[12]</th></tr>
<tr><th>Example</th><th>EMD</th><th>X</th><th>050</th><th>H</th><th>18</th><th>E</th><th>X</th><th>S</th><th>3</th><th>A</th><th>B</th><th>AA</th></tr>
<tr><th colspan="2">Definition</th><th colspan="11">Description</th></tr>
<tr><td>1</td><td>Series</td><td colspan="11">EMD = Embedded Motor Drive</td></tr>
<tr><td>2</td><td>Product type</td><td colspan="11">X: Severe Duty</td></tr>
<tr><td>3</td><td>Rated power</td><td colspan="11">020: 20HP 025: 25HP
030: 30HP 040: 40HP
050: 50HP 060: 60HP
075: 75HP</td></tr>
<tr><td>4</td><td>Power unit</td><td colspan="11">H: HP
K: kW</td></tr>
<tr><td>5</td><td>Rated speed</td><td colspan="11">18: 1770 rpm
36: 3550 rpm</td></tr>
<tr><td>6</td><td>Rate voltage</td><td colspan="11">E: 460 V
D: 380 V</td></tr>
<tr><td>7</td><td>Sensor</td><td colspan="11">X: Sensorless</td></tr>
<tr><td>8</td><td>Cooling</td><td colspan="11">S: IC411
F: IC416</td></tr>
<tr><td>9</td><td>Shaft type</td><td colspan="11">3: Single key with screw hole</td></tr>
<tr><td>10</td><td>Install</td><td colspan="11">A: Foot (B3)
E: C-face (B34)</td></tr>
<tr><td>11</td><td>Bearing</td><td colspan="11">B: Ball bearing
R: Roller bearing</td></tr>
<tr><td>12</td><td>Customization</td><td colspan="11">AA: VIDAR assembly
XS: Spare part</td></tr>
</table>

Power coverter, terminal box

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Example	**EMD**	**EDP**	**X**	**050**	**H**	**E**	**AA**

Definition		**Description**
[1]	Series	EMD = Embedded Motor Drive
[2]	Part	EDP: Power converter TB: Terminal BOX
[3]	Product type	X: Severe Duty
[4]	Rated Power	020: 20HP 025: 25HP 030: 30HP 040: 40HP 050: 50HP 060: 60HP 075: 75HP
[5]	Power Unit	H: HP K: kW
[6]	Rated Voltage	E: 460 V D: 380 V
[7]	Customization	AA: VIDAR assembly XS: Spare part

2.1.3 Serial number

VIDAR

Example	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
	D	**020**	**36**	**AA**	**T**	**23**	**49**	**0001**

	Definition	Description
[1]	Part	D: VIDAR
[2]	Rated Power	020: 20HP 025: 25HP 030: 30HP 040: 40HP 050: 50HP 060: 60HP 075: 75HP
[3]	Rated Speed	18: 1770 rpm 36: 3550 rpm 15: 1480 rpm 30: 2950 rpm
[4]	Product type	AA: VIDAR assembly XS: Spare part
[5]	Production Factory	T: Taiwan
[6]	Production Year	2023
[7]	Production Week	49
[8]	Production Number	0001

Power converter, terminal box

Example	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
	EP	**020**	**E**	**AA**	**T**	**23**	**49**	**0001**

Definition		Description
[1]	Part	EP: Power converter TB: Terminal Box
[2]	Rated Power	020: 20HP 025: 25HP 030: 30HP 040: 40HP 050: 50HP 060: 60HP 075: 75HP
[3]	Rated Voltage	E: 460V D: 380V
[4]	Product type	AA: VIDAR assembly XS: Spare part
[5]	Production Factory	T: Taiwan
[6]	Production Year	2023
[7]	Production Week	49
[8]	Production Number	0001

3 Mechanical Installation

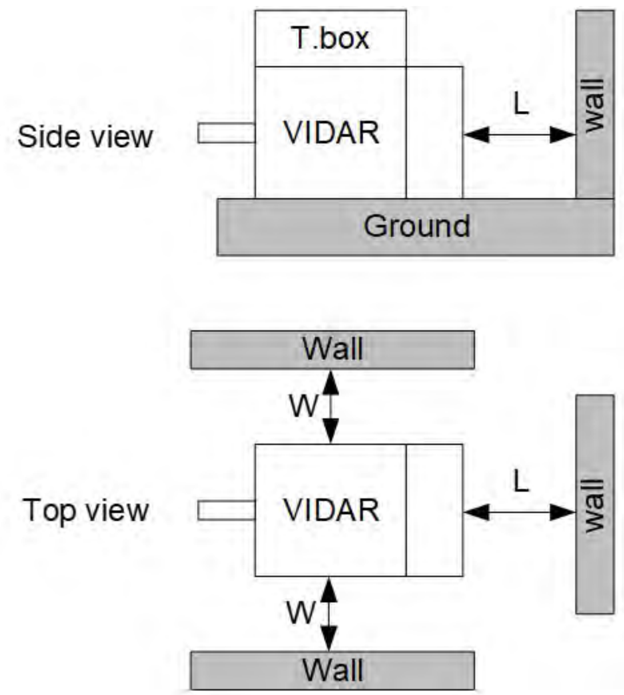
3.1 Installation environment

The product installation environment affects the product performance, durability and other service life.

3.2 Mounting clearance

- Prevent fiber particles, scraps of paper, shredded wood, sawdust, metal particles, etc. from adhering to the heat sink.
- The installation of the VIDAR must ensure that the environment is open and have clean circulating air. A clean and circulating environment means air without polluting substances and dust.

The appearances shown in the following figures are for reference only. The actual VIDAR may look different.



NOTICE:

1. The mounting clearances stated in the figure is for installing the VIDAR in an open area (as shown in the figure above).
2. The layout of the space surrounding the VIDAR should prioritize the requirements for air flow clearance.
    - L: It is recommended to maintain 2 to 3 times the intake area to ensure the inlet air field pressure drop.
    - W: Use 2 to 3 times the height of the fins to ensure the performance of the flow field diffusion
3. To replace the power converter without removing the entire VIDAR motor a minimum clearance is required.

Table 1: Minimum mounting clearance

NEMA Frame	Air Flow Clearance		Power Converter Replacement
	L (in.)	W (in.)	L (in.)
254/6	4	2	12
284/6	4	2	12
324/6	6	3	16
364/5	6	3	16

NOTICE:
The minimum mounting clearances L and W for air flow clearance stated in the table above apply to VIDAR installation. Failure to follow the minimum mounting clearances may cause the fan to malfunction and heat dissipation problems.

3.2.1 Mounting considerations

1. Before mounting, ensure that the mounting location is flat and able to carry the VIDAR in both strength and rigidity.
2. Mark the locations of the four mounting holes on the mounting surface. Refer to Section 3.5 Appearance and dimensions on page 23 for dimensions of the mounting holes.
3. Drill the mounting holes on the mounting surface.
4. Position the VIDAR onto the mounting surface at the correct location.
5. Use a torque wrench to mount the VIDAR with the torque value recommended in the table below.

Table 2: Recommended Torque

Frame	Recommended Screw	Qty.	Recommended Torque
254/6 284/6	Size: 3/8-16 UNC Strength: SAE 5	4	367–380 kg-cm (318–331 lb-in.) (36–37 Nm)
324/6 364/5	Size: 1/2-13 UNC Strength: SAE 5	4	806–841 kg-cm (700–730 lb-in.) (79–82 Nm)

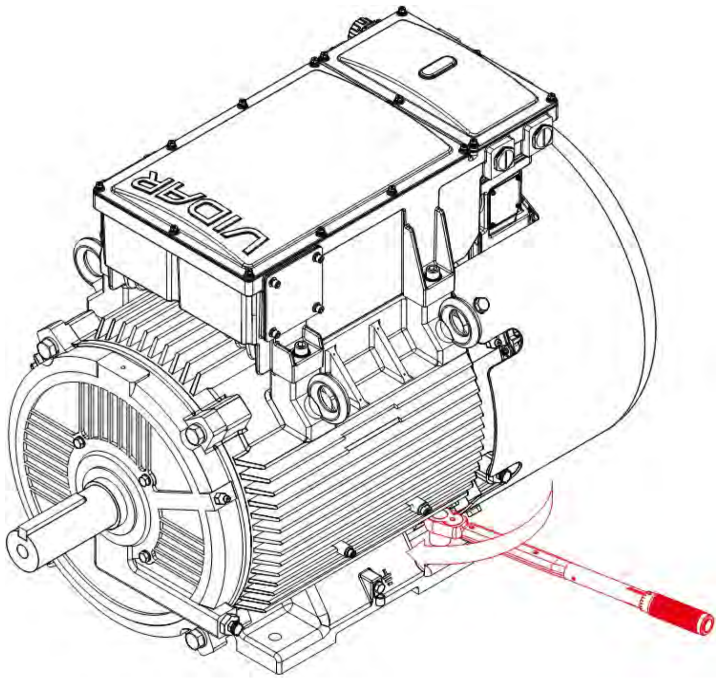


Figure 3: Example of torque wrench usage

3.3 Power dissipation

Airflow Rate for Cooling	**Power Dissipation for AC Motor Drive**
Model	**Power Dissipation (kW)**
	VIDAR Total Loss (kW)
EMDX020H18EXS3ABAA	1.75
EMDX020H36EXS3ABAA	1.75
EMDX025H18EXS3ABAA	2.07
EMDX025H36EXS3ABAA	2.07
EMDX030H18EXS3ABAA	2.49
EMDX030H36EXS3ABAA	2.49
EMDX040H18EXS3ABAA	2.95
EMDX040H36EXS3ABAA	2.95
EMDX050H18EXS3ABAA	3.69
EMDX050H36EXS3ABAA	3.69
EMDX060H18EXS3ABAA	4.43
EMDX060H36EXS3ABAA	4.43
EMDX075H18EXS3ABAA	5.53
EMDX075H36EXS3ABAA	5.53

- The heat dissipation shown in the table is for installing single drive in a confined space.
- When installing multiple drives, volume of heat dissipation should be the heat dissipated for single drive × the number of the drives.
- Heat dissipation for each model is calculated by rated voltage, current and default carrier.

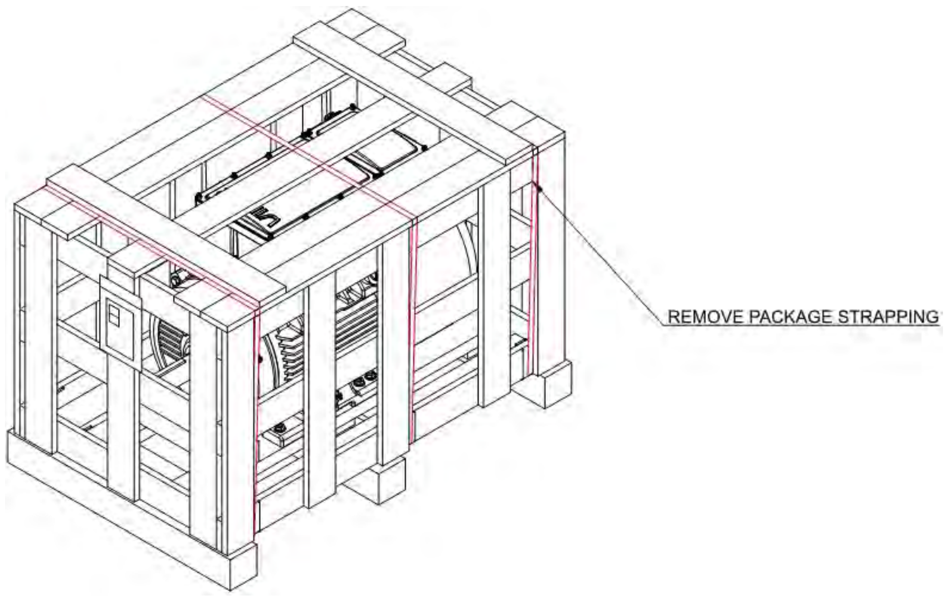
3.4 Transportation and installation

To ensure that the VIDAR functions normally without risk of damage before installation, it should be kept in the original packaging during transportation or storage, and make sure the surrounding environmental conditions meet the specifications provided in this manual.

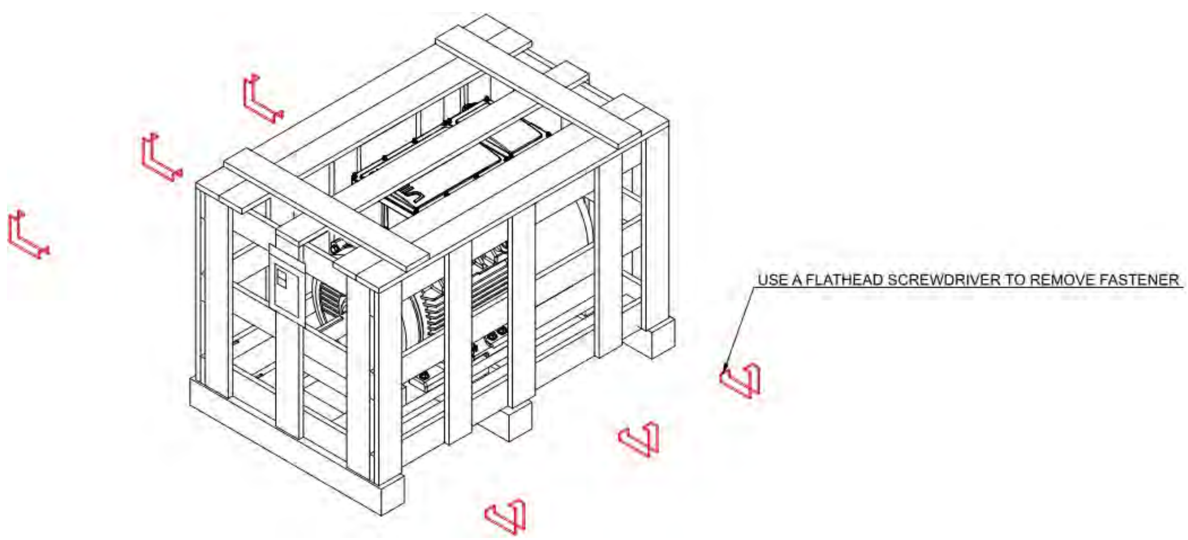
3.4.1 Unpack the product

Follows the following steps for unpacking:

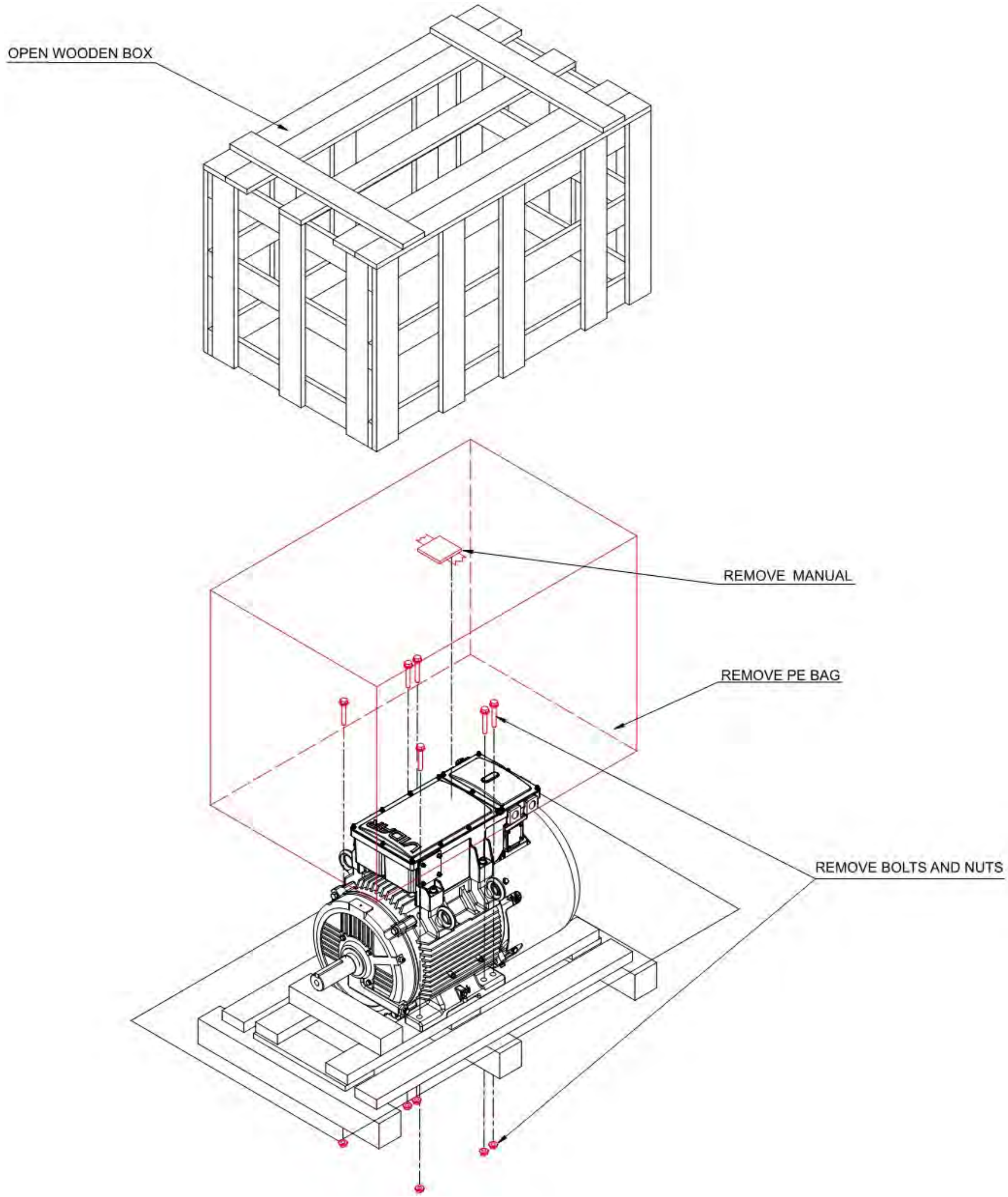
1. Remove the package strapping.



2. Use a flathead screwdriver to remove the fastener.



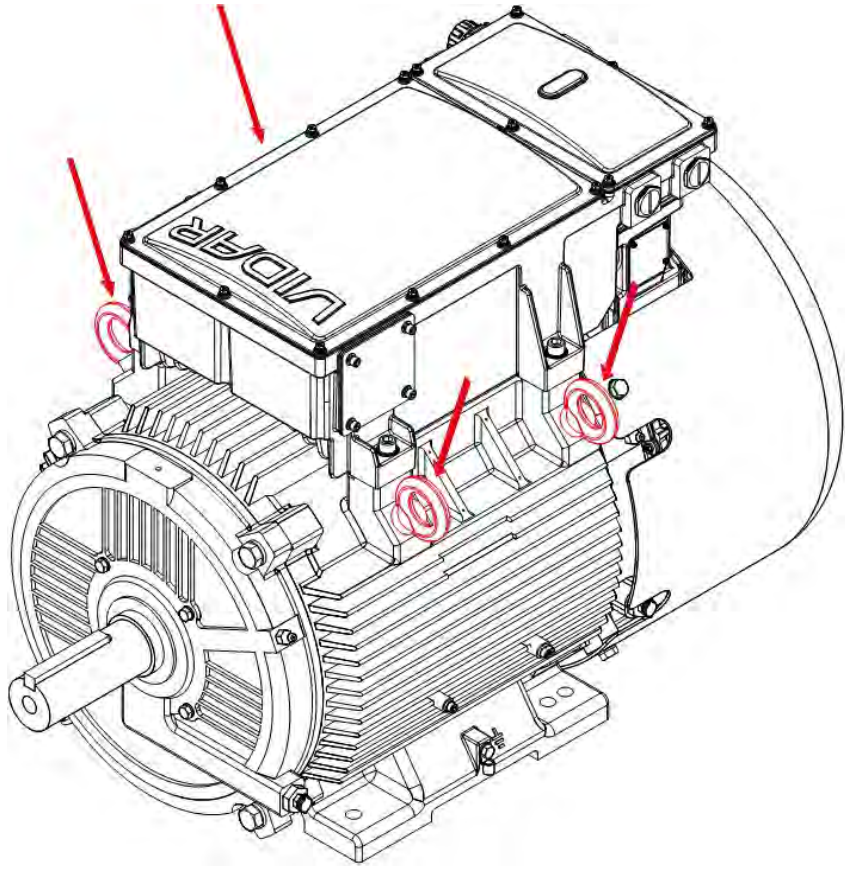
3. Open the wooden box, remove the PE bag, manual, bolts and nuts.



3.4.2 The lifting hook

The arrows indicate the location of the lifting eye bolts, as shown in the figures below.

(Frame 364/5 is shown as example in the following figures.)



Lifting indication

(Frame 364/5 is shown as example in the following figures.)

1. Use appropriate lifting hooks and slings for lifting VIDAR. Using a spreader bar is optional.
2. Make sure lifting hooks are securely latched to the lifting eye bolts on VIDAR. Minimum two lifting eye bolts in diagonal position must be used for lifting.
3. The lifting slings must be long enough such that they do not rub against the terminal box. It's recommended to have 30 degree or less angle between the slings and vertical plane.
4. When lifting VIDAR with conduit box option, use two lifting eyes in diagonal positions as shown in below image.

WARNING:
Only lift the VIDAR motor with lifting eye bolts

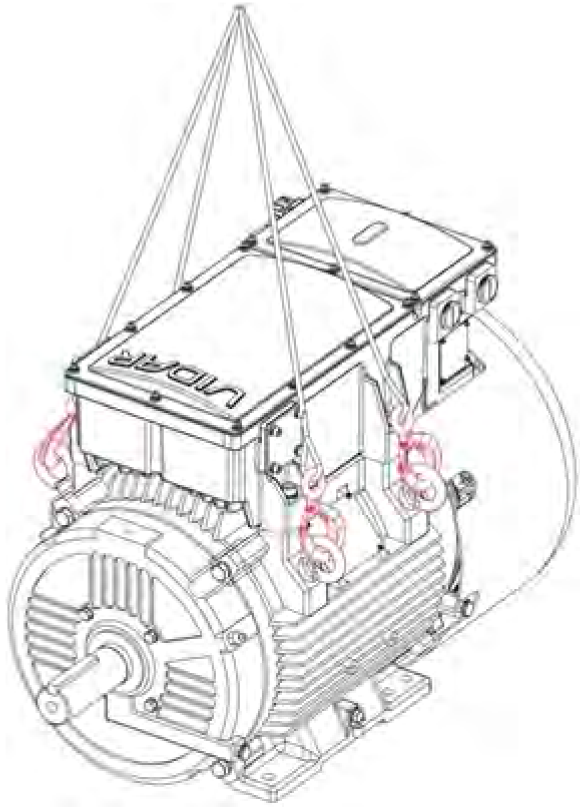


Figure 4: Example of four sling lifting

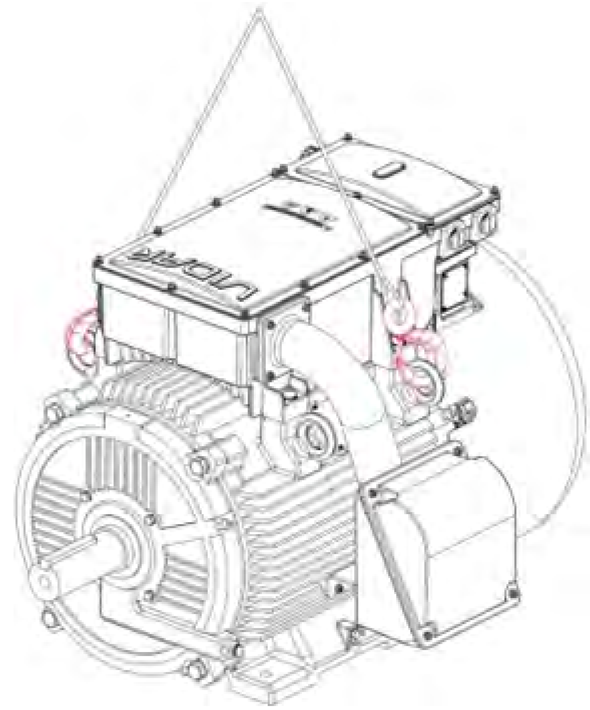


Figure 5: Example of two sling lifting

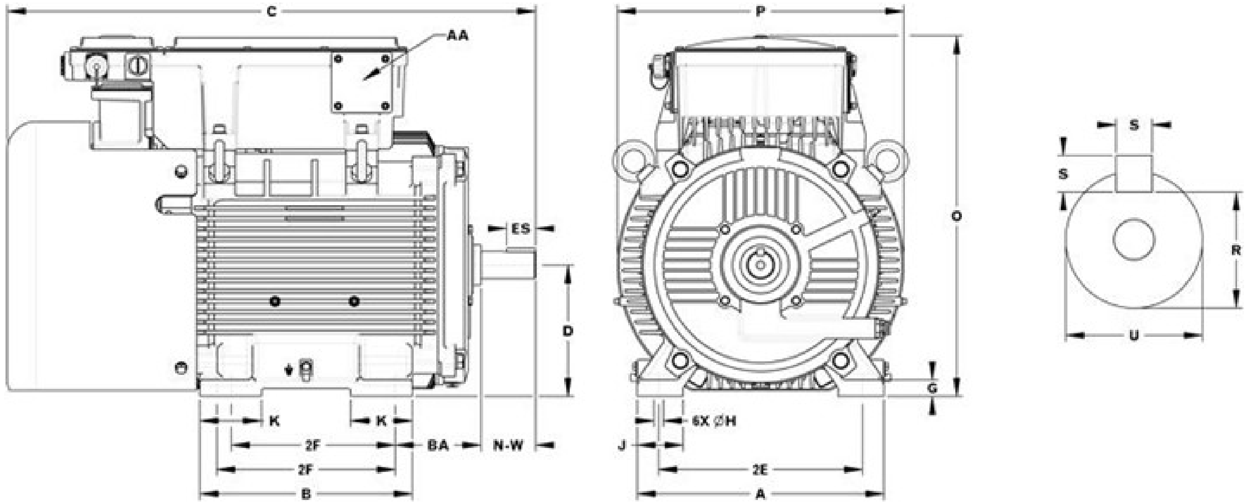
3.4.3 Weight list

Weight

Model	NEMA Frame	Weight (lbs)	Weight with F1/F2 Conduit Box (lbs)
EMDX020H18EXS3ABAA	254/6T	364	377
EMDX020H36EXS3ABAA	254/6T	321	334
EMDX025H18EXS3ABAA	284/6T	459	472
EMDX025H36EXS3ABAA	284/6TS	507	520
EMDX030H18EXS3ABAA	284/6T	507	520
EMDX030H36EXS3ABAA	284/6TS	551	564
EMDX040H18EXS3ABAA	324/6T	551	572
EMDX040H36EXS3ABAA	324/6TS	635	656
EMDX050H18EXS3ABAA	324/6T	633	654
EMDX050H36EXS3ABAA	324/6TS	716	737
EMDX060H18EXS3ABAA	364/5T	800	830
EMDX060H36EXS3ABAA	364/5TS	890	920
EMDX075H18EXS3ABAA	364/5T	888	918
EMDX075H36EXS3ABAA	364/5TS	981	1011

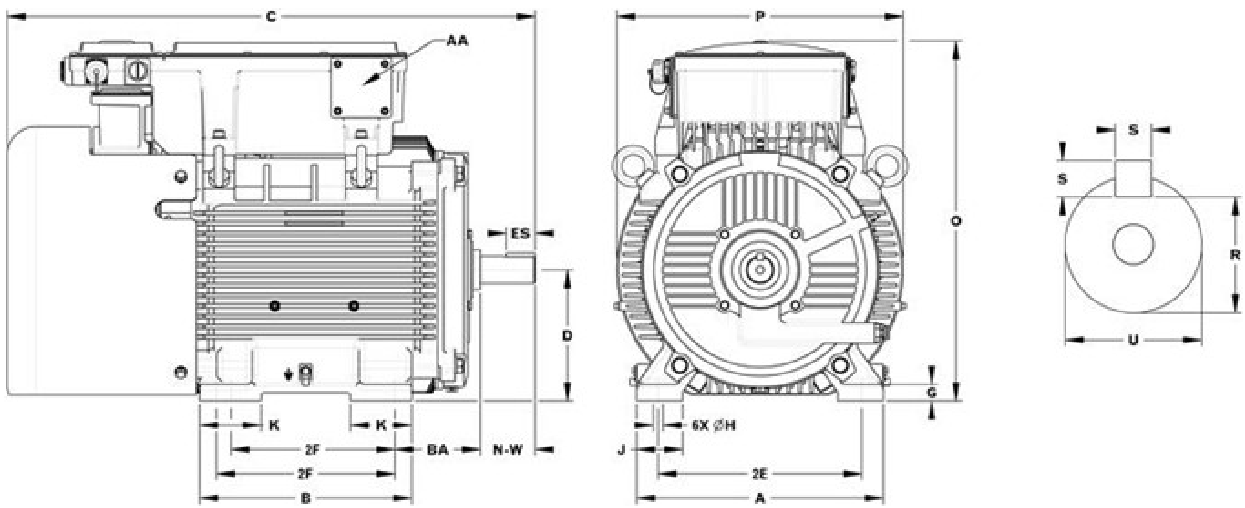
3.5 Appearance and dimensions

20HP 1800/3600RPM 254/6T



EMDX020H18EXS3ABAA, EMDX020H36EXS3ABAA

Unit in. (mm)										
Frame	**2E**	**2F**		**H**	**BA**	**AA**	**A**	**B**	**C**	**D**
254/6T	10.000	8.250	10.000	0.530	4.250	1.5 NPT	12.130	11.810	28.320	6.250
	(254.00)	(209.55)	(254.00)	(13.50)	(107.95)	(38.10)	(308.00)	(300.00)	(724.55)	(158.70)
	G	J	O	K	P	S	R	ES	N-W	U
	0.740	2.360	18.400	3.740	13.780	0.380	1.416	2.910	4.000	1.625
	(18.70)	(33.00)	(467.30)	(95.00)	(350.00)	(9.52)	(35.97)	(73.91)	(101.60)	(41.28)



25-30HP 1800RPM 284/6T

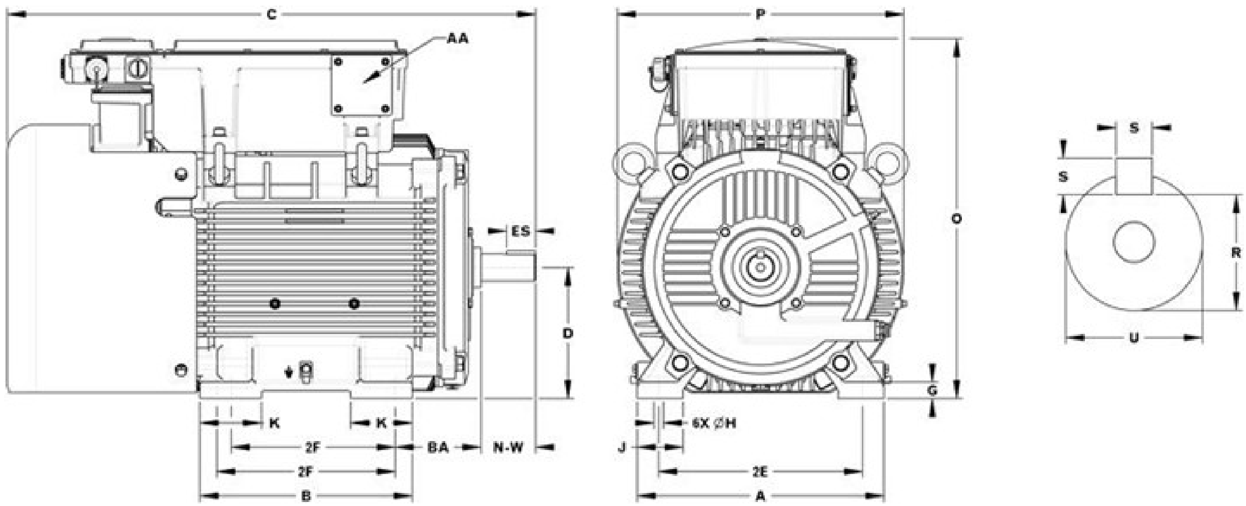
EMDX025H18EXS3ABAA, EMDX030H18EXS3ABAA

Unit in. (mm)										
Frame	**2E**	**2F**		**H**	**BA**	**AA**	**A**	**B**	**C**	**D**
284/6T	11.000	9.500	11.000	0.530	4.750	1.5 NPT	12.760	12.600	31.670	7.000
	(297.40)	(241.30)	(279.40)	(13.50)	(120.65)	(38.10)	(324.00)	(320.00)	(804.42)	(177.80)
	G	J	O	K	P	S	R	ES	N-W	U
	0.740	2.360	20.170	3.740	15.590	0.500	1.591	3.280	4.625	1.875
	(18.70)	(33.00)	(512.20)	(95.00)	(395.99)	(12.70)	(40.41)	(83.31)	(117.48)	(47.62)

25-30HP 3600RPM 284/6TS

EMDX025H36EXS3ABAA, EMDX030H36EXS3ABAA

Unit in. (mm)										
Frame	**2E**	**2F**		**H**	**BA**	**AA**	**A**	**B**	**C**	**D**
284/6TS	11.000	9.500	11.000	0.530	4.750	1.5 NPT	12.760	12.600	30.300	7.000
	(297.40)	(241.30)	(279.40)	(13.50)	(120.65)	(38.10)	(324.00)	(320.00)	(769.50)	(177.80)
	G	J	O	K	P	S	R	ES	N-W	U
	0.740	2.360	20.170	3.740	15.590	0.380	1.416	1.910	3.250	1.625
	(18.70)	(33.00)	(512.20)	(95.00)	(395.99)	(9.52)	(35.97)	(48.51)	(82.55)	(41.28)



40-50HP 1800RPM 324/6T

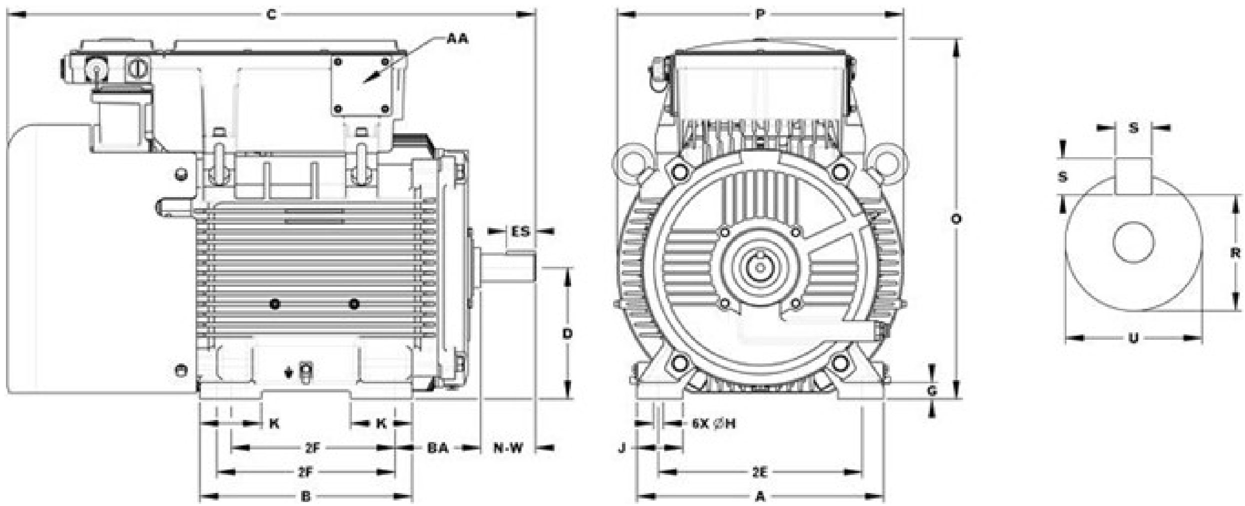
EMDX040H18EXS3ABAA, EMDX050H18EXS3ABAA

Unit in. (mm)										
Frame	**2E**	**2F**		**H**	**BA**	**AA**	**A**	**B**	**C**	**D**
324/6T	12.500	10.500	12.000	0.660	5.250	2.0 NPT	14.880	13.780	35.220	8.000
	(317.50)	(266.70)	(304.80)	(16.80)	(133.40)	(50.80)	(378.00)	(350.00)	(894.70)	(203.20)
	G	J	O	K	P	S	R	ES	N-W	U
	1.110	2.760	22.870	4.330	17.650	0.500	1.845	3.910	5.250	2.125
	(28.20)	(70.00)	(580.00)	(110.00)	(448.40)	(12.70)	(46.86)	(99.31)	(133.35)	(53.98)

40-50HP 3600RPM 324/6TS

EMDX040H36EXS3ABAA, EMDX050H36EXS3ABAA

Unit in. (mm)										
Frame	**2E**	**2F**		**H**	**BA**	**AA**	**A**	**B**	**C**	**D**
324/6TS	12.500	10.500	12.000	0.660	5.250	2.0 NPT	14.880	13.780	33.720	8.000
	(317.50)	(266.70)	(304.80)	(16.80)	(133.40)	(50.80)	(378.00)	(350.00)	(856.60)	(203.20)
	G	J	O	K	P	S	R	ES	N-W	U
	1.110	2.760	22.870	4.330	17.650	0.500	1.591	2.030	3.750	1.875
	(28.20)	(70.00)	(580.00)	(110.00)	(448.40)	(12.70)	(40.40)	(51.56)	(95.25)	(47.63)



60-75HP 1800RPM 364/5T

EMDX060H18EXS3ABAA, EMDX075H18EXS3ABAA

Unit in. (mm)										
Frame	**2E**	**2F**		**H**	**BA**	**AA**	**A**	**B**	**C**	**D**
364/5T	14.000	11.250	12.250	0.660	5.880	3.0 NPT	16.930	14.570	38.370	9.000
	(355.60)	(285.75)	(311.15)	(16.80)	(149.35)	(76.20)	(430.00)	(370.00)	(974.70)	(228.60)
	G	J	O	K	P	S	R	ES	N-W	U
	1.140	3.150	24.730	4.210	19.660	0.625	2.020	4.280	5.880	2.375
	(29.00)	(80.00)	(628.10)	(4.21)	(19.66)	(15.88)	(51.30)	(108.72)	(149.35)	(60.33)

60-75HP 3600RPM 364/5TS

EMDX060H36EXS3ABAA, EMDX075H36EXS3ABAA

Unit in. (mm)										
Frame	2E	2F		H	BA	AA	A	B	C	D
364/5TS	14.000	11.250	12.250	0.660	5.880	3.0 NPT	16.930	14.570	36.240	9.000
	(355.60)	(285.75)	(311.15)	(16.80)	(149.35)	(76.20)	(430.00)	(370.00)	(920.50)	(228.60)
	G	J	O	K	P	S	R	ES	N-W	U
	1.140	3.150	24.730	4.210	19.660	0.500	1.591	2.030	3.750	1.875
	(29.00)	(80.00)	(628.10)	(4.21)	(19.66)	(12.70)	(40.40)	(51.56)	(95.25)	(47.63)

3.6 Appearance and Dimensions for conduit box option

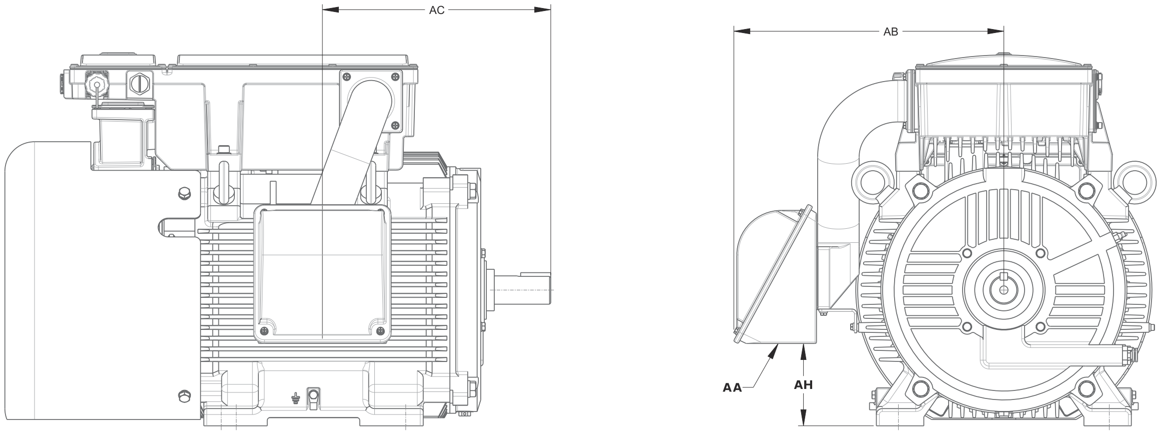


Figure 6:

NOTICE:
F1 Conduit Box shown for reference, for F2 the conduit box will be on the right-hand side from the motor shaft end.

Unit in. (mm)						
F1 Part Number	**F2 Part Number**	**Frame**	**AA**	**AB**	**AC**	**AH**
EMDX020H18EXS3AB01	EMDX020H18EXS3AB02	254/6T	1.50	11.15	12.91	5.1
EMDX020H36EXS3AB01	EMDX020H36EXS3AB02		(38.10)	(283.21)	(327.91)	(129.54)
EMDX025H18EXS3AB01	EMDX025H18EXS3AB02	284/6T	NPT	12.03	14.61	6.75
EMDX030H18EXS3AB01	EMDX030H18EXS3AB02			(305.56)	(371.09)	(171.45)
EMDX025H36EXS3AB01	EMDX025H36EXS3AB02	284/6TS			13.24	
EMDX030H36EXS3AB01	EMDX030H36EXS3AB02				(336.30)	
EMDX040H18EXS3AB01	EMDX040H18EXS3AB02	324/6T	2.00	14.52	16.21	5.28
EMDX050H18EXS3AB01	EMDX050H18EXS3AB02		(50.80)	(368.81)	(411.73)	(134.11
EMDX040H36EXS3AB01	EMDX040H36EXS3AB02	324/6TS	NPT		14.71	
EMDX050H36EXS3AB01	EMDX050H36EXS3AB02				(373.63)	
EMDX060H18EXS3AB01	EMDX060H18EXS3AB02	364/5T	3.00	17.8	17.39	5.42
EMDX075H18EXS3AB01	EMDX075H18EXS3AB02		(76.20)	(452.12)	(441.71)	(137.67)
EMDX060H36EXS3AB01	EMDX060H36EXS3AB02	364/5TS	NPT		15.26	
EMDX075H36EXS3AB01	EMDX075H36EXS3AB02				(387.60)	

3.7 Conduit box installation

1. **Remove Cover Plate**

   Remove the terminal box cover per 4.3.1 Terminal box cover on page 34.
2. **Install Conduit-tube and Bracket**

   Secure the L-shaped bracket to the conduit.

   Install conduit-tube by first aligning bracket slotted holes to motor frame holes. Loosely tighten the screws of L-shape bracket. Then align four holes of conduit flange with terminal box holes, as illustrated in the images below, and tighten all the screws. Make sure that gasket is properly seated between the terminal box and conduit flange.

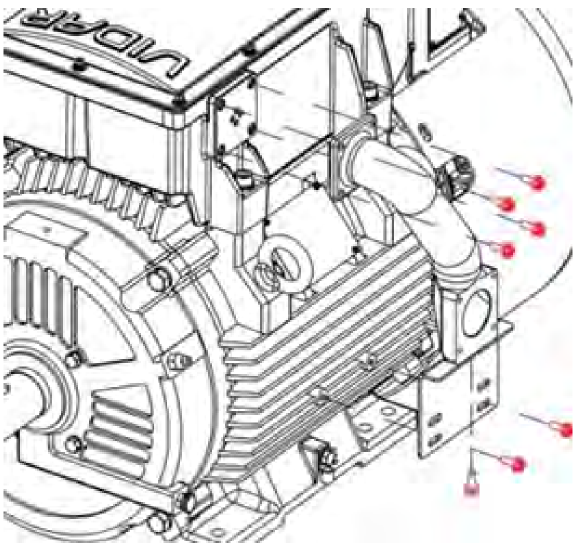


Figure 7: Frame 254/6 and 284/6

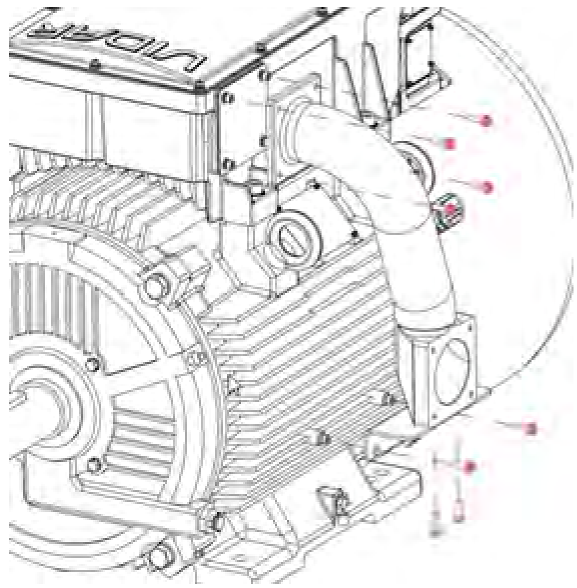


Figure 8: FRAME 324/6 and 364/5

NOTICE:

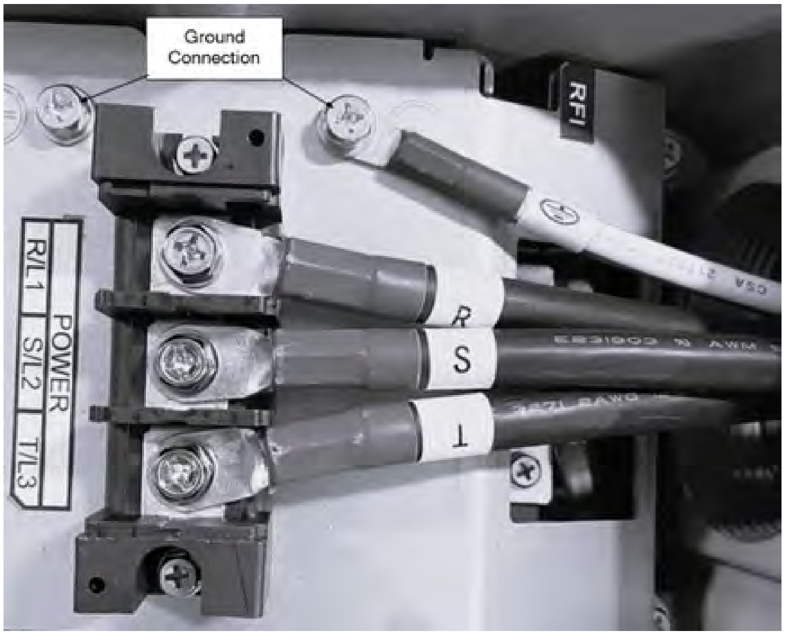
For Frames 254/6 and 284/6, one of the four screws in the conduit flange is obstructed by the conduit-tube bend. Use a 10mm open-end wrench to tighten this screw.

---

3. **Install Conduit Box and Gasket**

   With the conduit-tube and L-shaped bracket in place, install the conduit box and gasket in the desired orientation. Align the holes of conduit flange and conduit box and tighten the screws.
4. **Connect Mains Wire Harness**

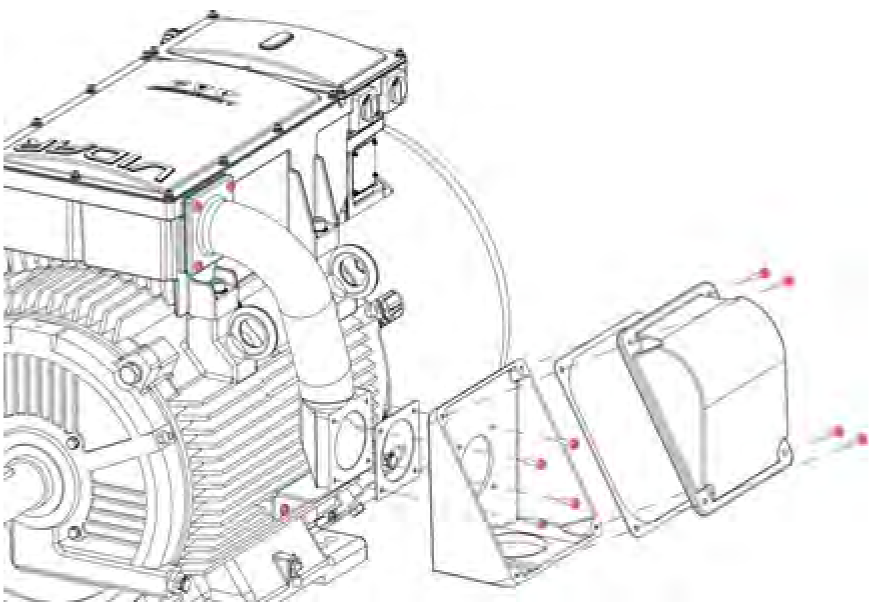
   - Remove the terminal box cover per 4.3.1 Terminal box cover on page 34.
   - Route one end of the R, S, T and Ground wires from the terminal box through the conduit-tube to the conduit box.
   - Connect the wire labeled R to R/L1 terminal, the wire labeled S to the S/L2 terminal and the wire labeled T to T/L3 terminal per 4.3.2 Main circuit wiring on page 37.
   - Attach the ground wire to the designated ground connection (see image below).



5. **Install Conduit Box Cover**

   Complete the necessary electrical connections inside the conduit box.

   After completing the electrical connections, install the conduit box cover and gasket by aligning the mounting holes and securing it in place as shown in below figure.



6. **Reinstall Terminal Box Cover**

   Once all electrical connections are complete, reinstall the terminal box cover. Make sure the gasket is properly seated.
7. **Torque Specifications**
   - Tighten all conduit box hardware, M6 screws, to **35 in-lbs**.
   - Tighten all terminal box cover, M5 screws, to **26 in-lbs**.
8. **Refer to Section 4 Electrical Wiring to connect VIDAR to main input power.**

4 Electrical Wiring

4.1 Safety precautions

DANGER:

- Fasten all screws to required torque to prevent sparks caused by screws loosening due to vibration.
- Ensure proper insulation of the main circuit wiring in accordance with the relevant safety regulations.

Main input power terminals

CAUTION:

- Three-phase AC input power only. R/L1, S/L2 and T/L3 has no phase-sequence requirement, it can be connected in any sequence.
- Use voltage and current within the specifications in 10.1 Specifications on page 278.
- When using a general GFCI (Ground Fault Circuit Interrupter), select a current sensor with sensitivity of 200 mA or above and not less than 0.1-second operation time to avoid nuisance tripping
- To comply with UL standards, connect VIDAR to a three-phase three-wire Delta (Δ) power system, or three-phase four-wire Wye (Y) power system.

Outer terminals for main circuit

CAUTION:

- When the VIDAR output terminals U/T1, V/T2, and W/T3 are connected to the motor terminals U/T1, V/T2, and W/T3 respectively, the motor will rotate counterclockwise (as viewed on the shaft end of the motor in Figure *Motor rotation*, shown below) upon a forward operation command.

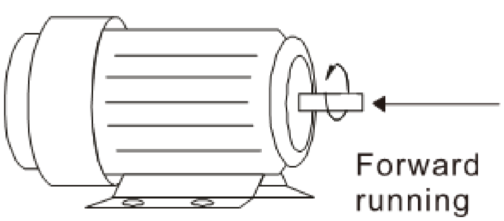


Figure 9: Motor rotation

Analog Input Terminals (AI1, AI2 and ACM)

CAUTION:

- Analog input signals are easily affected by external noise. Use twisted-pair shielded wiring and keep it as short as possible with proper grounding. If the noise is inductive, connecting the shield to the ACM terminal can reduce interference.

- If the analog input signals are affected by noise from the VIDAR, connect a capacitor and a ferrite core as shown in Figure *Ferrite core*, shown below:

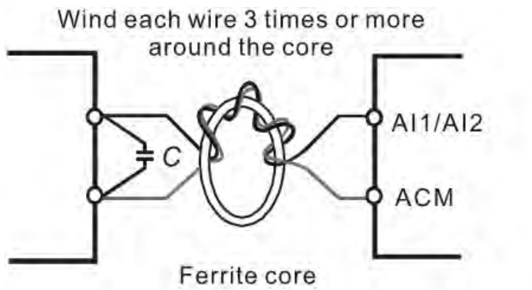


Figure 10: Ferrite core

Digital Inputs (MI1–MI6 and COM)

CAUTION:

- The *COM* terminal is a common terminal of the photo-coupler in all wiring methods.
- When the photo-coupler uses the internal power supply, the switch connection for Sink and Source modes are as below:
  - MI-DCM: Sink mode
  - MI-+24V: Source mode
- When the photo-coupler uses the external power supply, remove the short-circuit cable between +24V and COM terminals. Connect the +/- terminal of the external power supply to the MI or COM terminal to determine the Sink or Source mode.

4.2 System wiring diagram

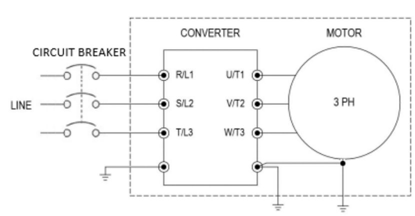


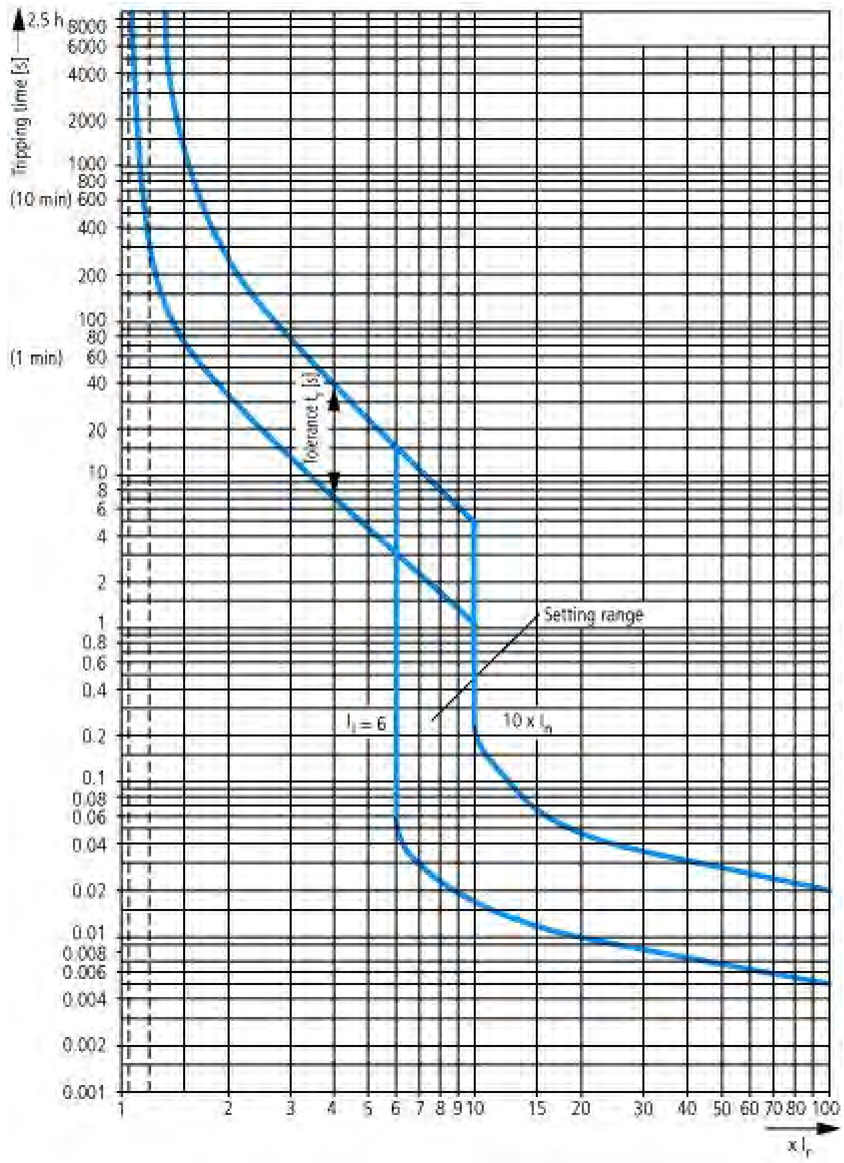
Figure 11: Power input terminal

Power input terminal	Supply power according to the rated power specifications indicated in the manual
Fuse/Circuit Breaker	Refer to Section 4.2.1 Overcurrent protection on page 32

4.2.1 Overcurrent protection

- Circuit breaker specifications lower than the table below are allowed.
- For installation in the United States, branch circuit protection must be provided in accordance with the National Electrical Code (NEC) and any applicable local codes. Use UL classified circuit breaker to fulfill this requirement.
- For installation in Canada, branch circuit protection must be provided in accordance with Canadian Electrical Code and any applicable provincial codes. Use UL classified circuit breaker to fulfill this requirement.
- The electrical characteristics of circuit breaker tested for 65kA SCCR are shown in the Illustration below. Other circuit breakers may be used with the drive if they provide the same electrical characteristics.

Frame	Model	Rated Input Current (A)	Circuit Breaker Rating Current (A)	Circuit Breaker Rating Voltage (V)	Short-Circuit Total Breaktime *	Short-Circuit Breaking Capacity (kA)
1	EMDX020H36EXS3ABAA	20.1	40	480	Refer to the electrical characteristics of circuit breaker shown in the Illustration below.	65
	EMDX020H18EXS3ABAA	20.3	40	480		65
2	EMDX025H36EXS3ABAA	25.2	50	480		65
	EMDX025H18EXS3ABAA	25.1	50	480		65
	EMDX030H36EXS3ABAA	30.3	63	480		65
	EMDX030H18EXS3ABAA	30.1	63	480		65
3	EMDX040H36EXS3ABAA	40.2	80	480		65
	EMDX040H18EXS3ABAA	40.1	80	480		65
	EMDX050H36EXS3ABAA	50.2	100	480		65
	EMDX050H18EXS3ABAA	50.1	100	480		65
4	EMDX060H36EXS3ABAA	60.6	125	480		65
	EMDX060H18EXS3ABAA	60.3	125	480		65
	EMDX075H36EXS3ABAA	75.5	160	480		65
	EMDX075H18EXS3ABAA	75.4	160	480		65
NOTE: * without current-limiting						



Tripping time [s]
2.5 h
8000
6000
4000
2000
1000
800
(10 min) 600
400
200
100
80
(1 min) 60
40
20
10
8
6
4
2
1
0.8
0.6
0.4
0.2
0.1
0.08
0.06
0.04
0.02
0.01
0.008
0.006
0.004
0.002
0.001
Tolerance t_i [s]
Setting range
I_i = 6
10 x I_n
1 2 3 4 5 6 7 8 9 10 15 20 30 40 50 60 70 80 100
x I_r

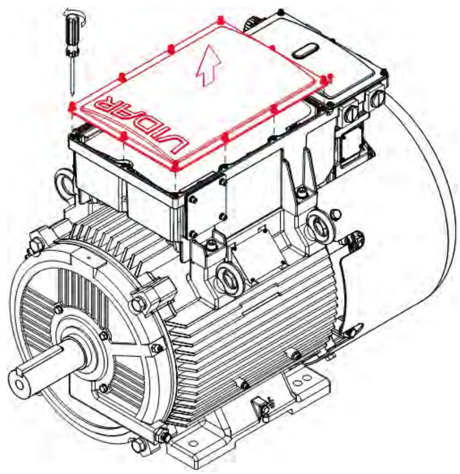
4.3 Main circuit terminals

4.3.1 Terminal box cover

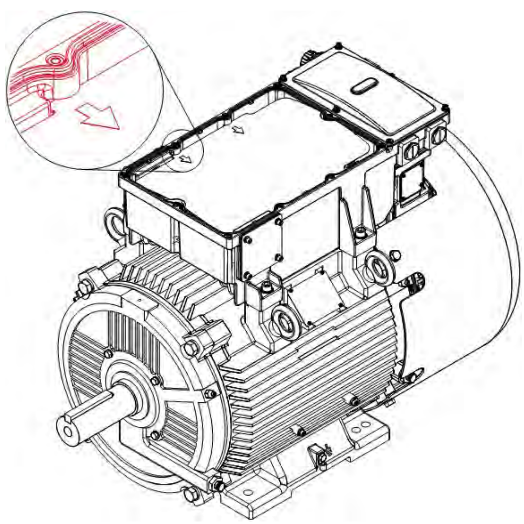
NOTICE:
The VIDAR appearances shown in the figures are for reference only, actual appearance may vary by frame size.

1. Unscrew the ten hex-head cap screws surrounding the terminal box cover. Vertically lift the top cover of terminal box.

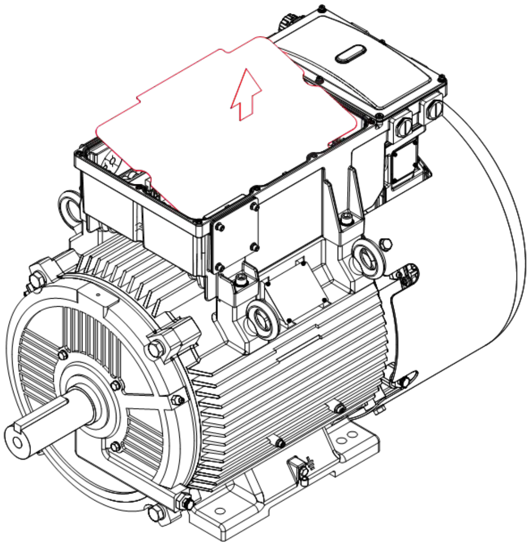
   Screw torque: 27.65–29.95 kg-cm / (24–26 lb-in.) / (2.71–2.94 Nm)



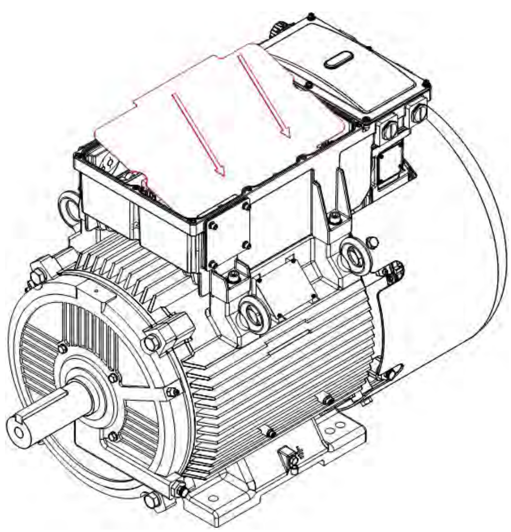
2. Remove the debris cover by pushing one side inward to release it from the grooved edge.



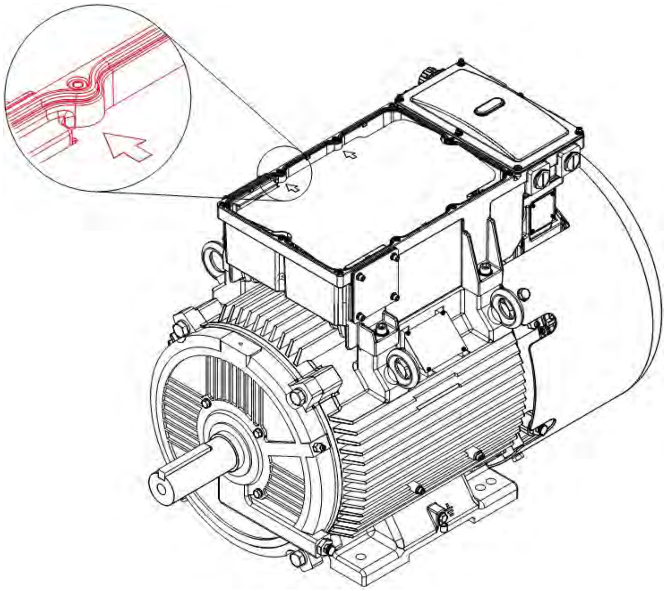
3. After the debris cover is detached from one side of the terminal box, remove the cover. Refer to Section 4.3.3 Main circuit terminal specification on page 37 and 4.2 System wiring diagram on page 31 for further wiring information.



4. When wiring is complete install the debris cover by placing one edge of the cover into the grooved edge on one side of the terminal box.

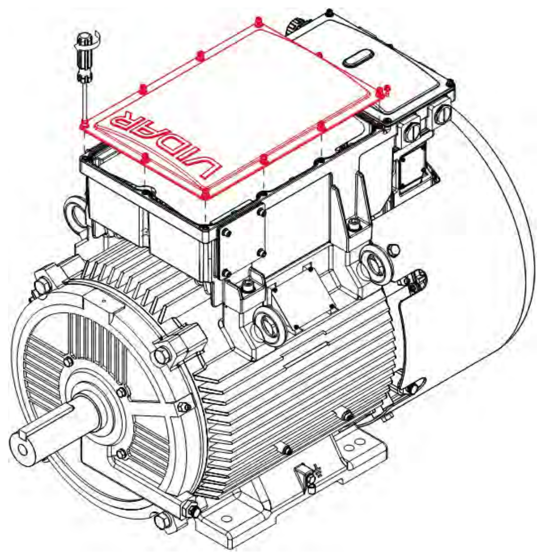


5. Push the debris cover inward and lock the edge of the cover into the grooved edge on the opposite side of the terminal box.



6. Verify the terminal box gasket is in the correct position and properly fitted in the gasket groove.
   a) Align the two positioning holes of the terminal box with the positioning pins of the top cover.
   b) Torque the terminal box hex-head cap screws to the required torque.

   Screw torque: 27.65–29.95 kg-cm / (24–26 lb-in.) / (2.71–2.94 Nm)



4.3.2 Main circuit wiring

Applicable for all frame models.

Input: three-phase power

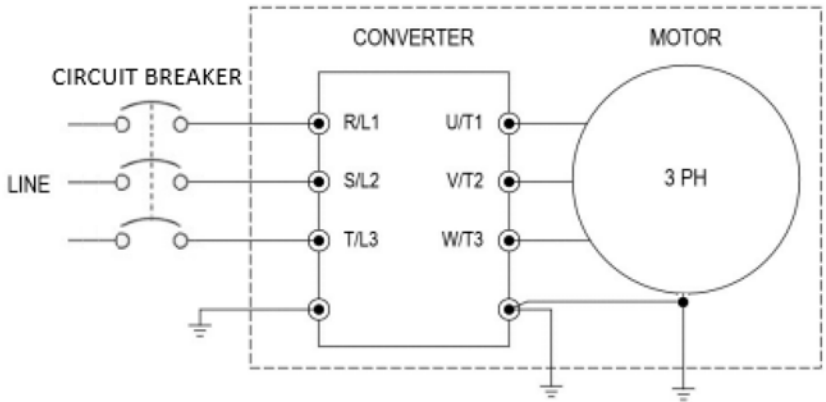


Figure 12: Main circuit terminal

Terminal	Description
R/L1, S/L2, T/L3	Power input terminal (three-phase)
⏚	Ground connection, comply with local regulations

4.3.3 Main circuit terminal specification

- Use the specified ring lug for main circuit terminal wiring. See following two figures for ring lug specifications. For other types of wiring, use the wires that comply with the local regulations.
- After crimping the wire to the ring lug (must be UL approved), install heat shrink tube rated at a minimum of 600 V_{AC} insulation (UL and CSA approved recognized component (YDPU2/8) over the live part. See Figure below.

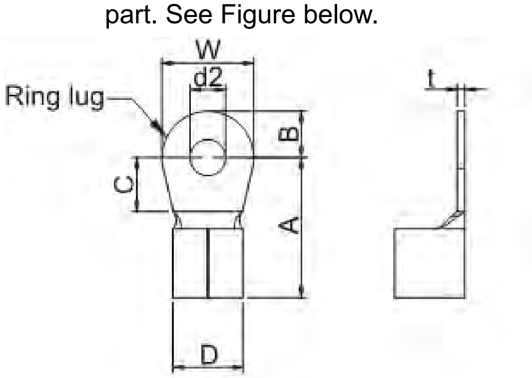


Figure 13: Ring lug

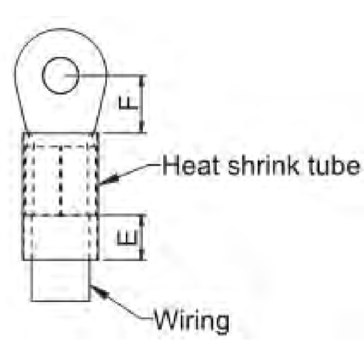


Figure 14: Heat shrink tube

4.3.4 Terminal specifications

The part number of the ring lugs in the table below are for reference only. Select ring lugs compatible with the conductor size and terminal hardware listed in the Table below.

Table 3: Ring lug kit part numbers (reference only).

Frame	AWG/MCM	Kit P/N	A (MAX)	B (MAX)	C (MIN)	D (MAX)	d2 (MIN)	E (MIN)	F (MIN)	W (MAX)	t (MAX)
254/6	12 AWG	RNBS5-4	0.476 (12.1)	0.142 (3.6)	0.240 (6.1)	0.220 (5.6)	0.169 (4.3)	0.512 (13.0)	0.275 (7.0)	0.283 (7.2)	0.039 (1.0)
		RNB5-5	0.563 (14.3)	0.185 (4.7)	0.327 (8.3)	0.220 (5.6)	0.209 (5.3)	0.512 (13.0)	0.275 (7.0)	0.374 (9.5)	0.039 (1.0)
284/6	8 AWG	RNBM8-5	0.701 (17.8)	0.236 (6.0)	0.366 (9.3)	0.283 (7.2)	0.209 (5.3)	0.512 (13.0)	0.299 (7.6)	0.472 (12.0)	0.047 (1.2)
		RNBS8-6	0.701 (17.8)	0.236 (6.0)	0.366 (9.3)	0.283 (7.2)	0.252 (6.4)	0.512 (13.0)	0.299 (7.6)	0.472 (12.0)	0.047 (1.2)
324/6	6 AWG	RNBS14-6	0.98 (25.0)	0.33 (8.5)	0.52 (13.3)	0.37 (9.5)	0.24 (6.2)	0.51 (13.0)	0.47*4 (12.0)	0.67 (17.0)	0.06 (1.5)
	4 AWG	RNBS22-6	1.18 (30.0)	0.31 (8.0)	0.33 (8.5)	0.47 (12.0)	0.24 (6.2)	0.51 (13.0)	0.47*4 (12.0)	0.71 (18.0)	0.06 (1.7)
364/5	6 AWG	RNBS14-6	0.98 (25.0)	0.33 (8.5)	0.52 (13.3)	0.37 (9.5)	0.24 (6.2)	0.51 (13.0)	0.47*4 (12.0)	0.67 (17.0)	0.06 (1.5)
	4 AWG	RNBS22-6	1.07 (27.1)	0.33 (8.5)	0.52 (13.3)	0.47 (12.0)	0.24 (6.2)	0.51 (13.0)	0.47*4 (12.0)	0.67 (17.0)	0.06 (1.7)
	2 AWG	RNBS38-6	1.18 (30.0)	0.43 (11.0)	0.33 (8.5)	0.53 (13.5)	0.24 (6.2)	0.51 (13.0)	0.47*4 (12.0)	0.71 (18.0)	0.07 (1.8)

NOTICE:

1. AWG: Refer to the tables below for the wire specifications of each frame model
2. Frame 254/6, F(MAX.) = 0.433 inch (11 mm)
3. Frame 284/6, F(MAX.) = 0.512 inch (13 mm)
4. Frame 324/6 and 364/5, F(MAX.) = 0.59 inch (15 mm)

Frame 254/6

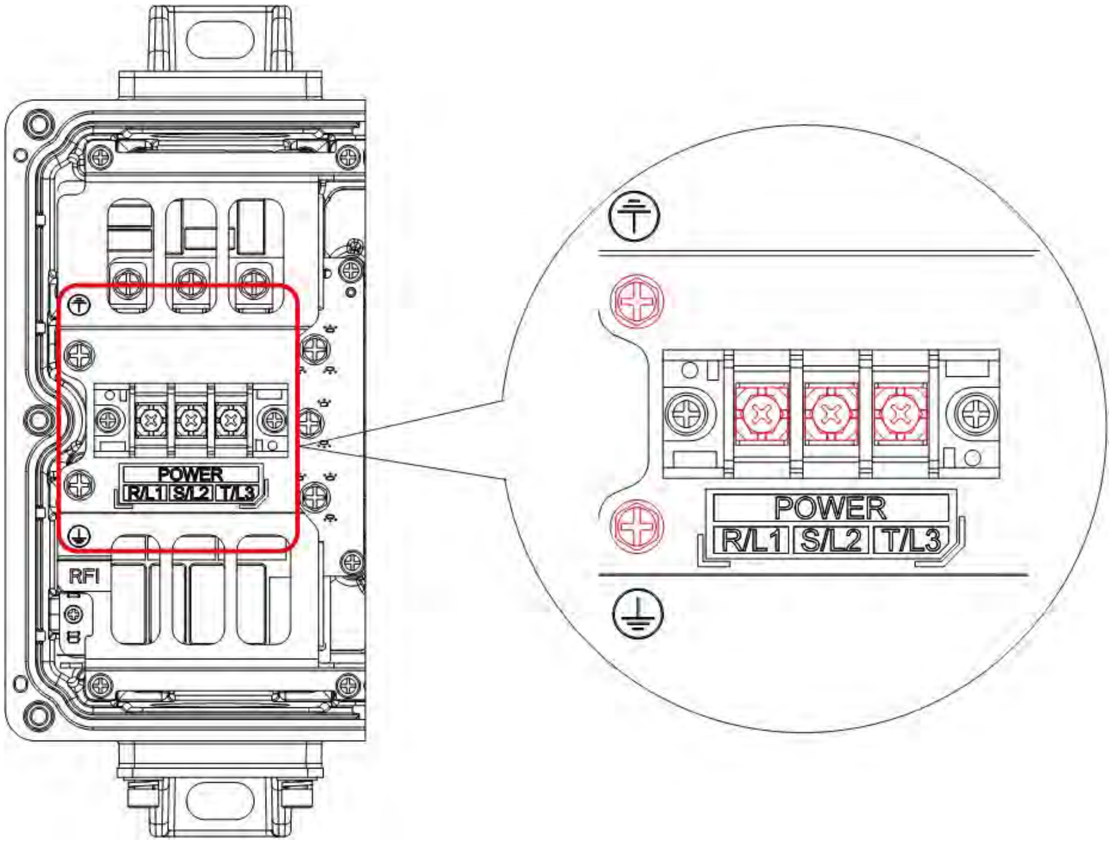


Figure 15: Frame 254/6

For installations in environments with an ambient temperature (Ta) of 40°C, use copper conductors rated for 600V and with a minimum temperature rating of 90°C.

- For environments where the ambient temperature exceeds 40°C, use copper conductors rated for 600V and with a temperature rating of 90°C or higher.
- To comply with UL installation requirements, copper conductors must be used. Wire sizing should be based on a 75°C temperature rating, in accordance with UL standards.
- Do not reduce the wire gauge when using high-temperature-rated conductors.

Table 4: Wire specifications

Model	Main Circuit Terminals R/L1, S/L2, T/L3			Ground Terminal		
	Max. Wire Gauge	Min. Wire Gauge	Screw Spec. and Torque (±10%))	Max. Wire Gauge	Min. Wire Gauge	Screw Spec. and Torque (±10%))
EMDX020H36EXS3ABAA EMDX020H18EXS3ABAA	4.0 mm^2 (12 AWG)	4.0 mm^2 (12 AWG)	15 kg-cm (13.02 lb-in.) (1.47 Nm)	4.0 mm^2 (12 AWG)	4.0 mm^2 (12 AWG)	25 kg-cm (21.7 lb-in.) (2.45 Nm)

Frame 284/6

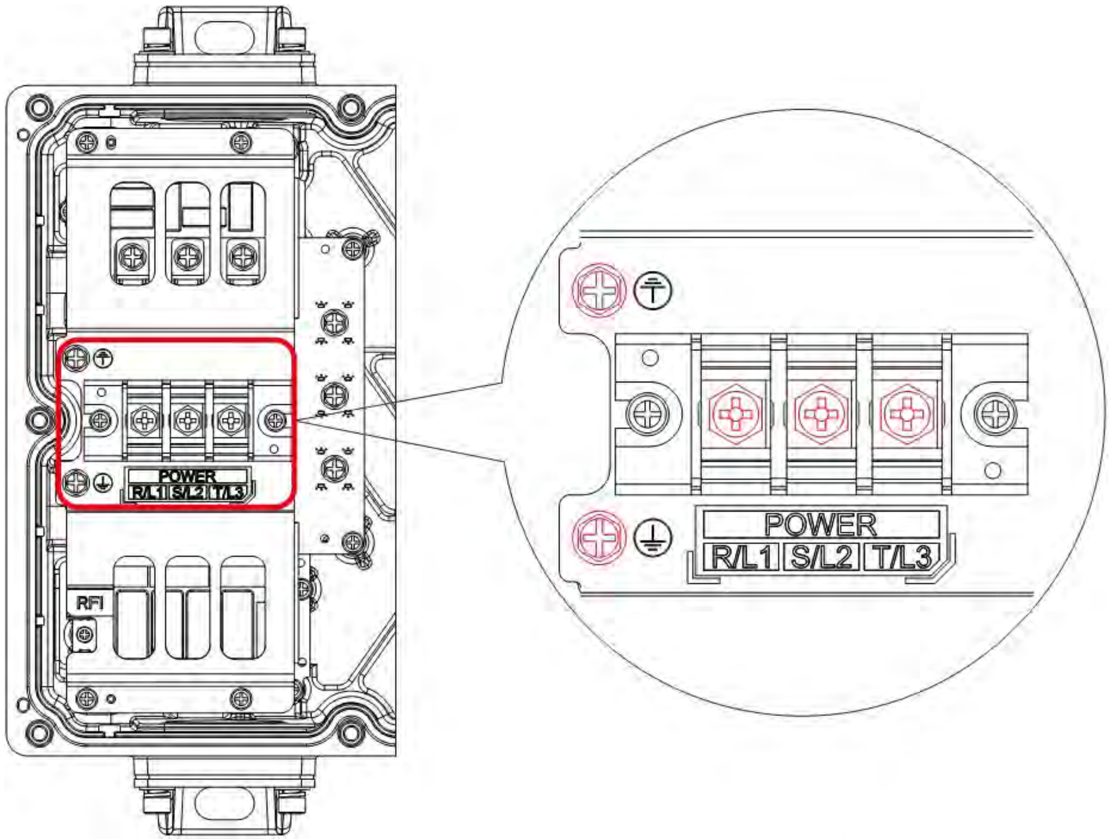


Figure 16: Frame 284/6

- For installations in environments with an ambient temperature (Ta) of 40°C, use copper conductors rated for 600V and with a minimum temperature rating of 90°C.
- For environments where the ambient temperature exceeds 40°C, use copper conductors rated for 600V and with a temperature rating of 90°C or higher.
- To comply with UL installation requirements, copper conductors must be used. Wire sizing should be based on a 75°C temperature rating, in accordance with UL standards.
- Do not reduce the wire gauge when using high-temperature-rated conductors.

Table 5: Wire specifications

Model	Main Circuit Terminals R/L1, S/L2, T/L3			Ground Terminal		
	Max. Wire Gauge	Min. Wire Gauge	Screw Spec. and Torque (±10%))	Max. Wire Gauge	Min. Wire Gauge	Screw Spec. and Torque (±10%))
EMDX025H36EXS3ABAA	10.0 mm^2 (8 AWG)	10.0 mm^2 (8 AWG)	37.5 kg-cm (32.6 lb-in.) (3.7 Nm)	10.0 mm^2 (8 AWG)	10.0 mm^2 (8 AWG)	25 kg-cm (21.7 lb-in.) (2.45 Nm)
EMDX025H18EXS3ABAA						
EMDX030H36EXS3ABAA						
EMDX030H18EXS3ABAA						

Frame 324/6

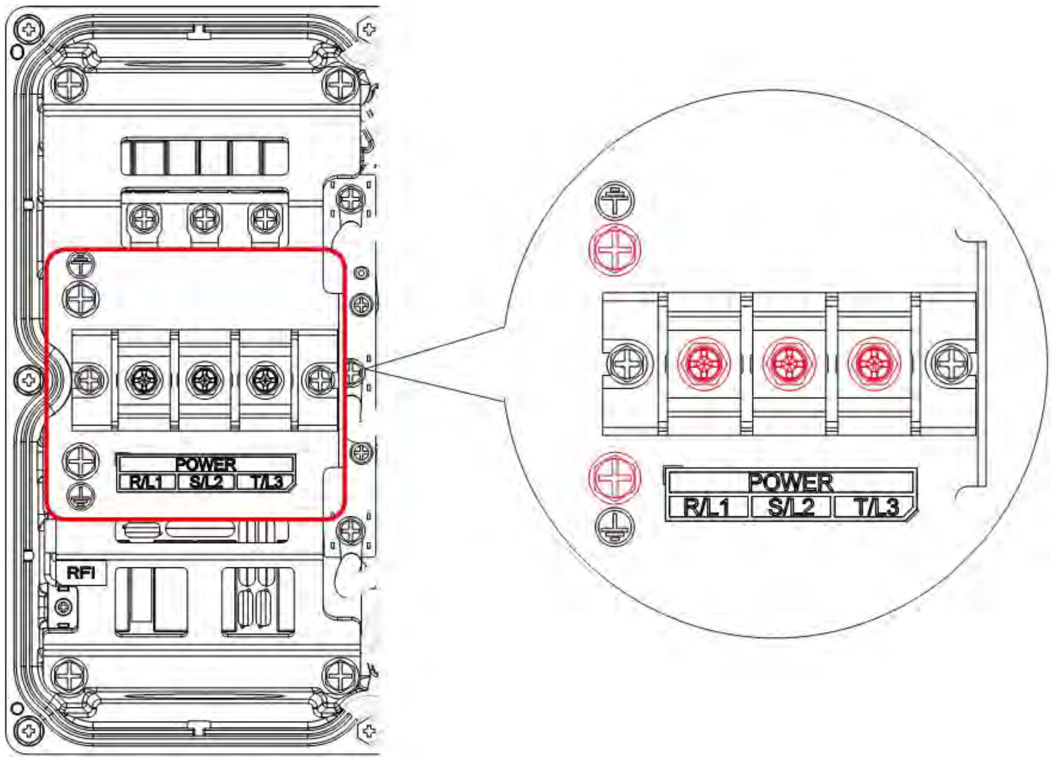


Figure 17: Frame 324/6

- For installations in environments with an ambient temperature (Ta) of 40°C, use copper conductors rated for 600V and with a minimum temperature rating of 90°C.
- For environments where the ambient temperature exceeds 40°C, use copper conductors rated for 600V and with a temperature rating of 90°C or higher.
- To comply with UL installation requirements, copper conductors must be used. Wire sizing should be based on a 75°C temperature rating, in accordance with UL standards.
- Do not reduce the wire gauge when using high-temperature-rated conductors.

Table 6: Wire specifications

Model	Main Circuit Terminals R/L1, S/L2, T/L3			Ground Terminal		
	Max. Wire Gauge	**Min. Wire Gauge**	**Screw Spec. and Torque (±10%))**	**Max. Wire Gauge**	**Min. Wire Gauge**	**Screw Spec. and Torque (±10%)**
EMDX040H18EXS3ABAA EMDX040H36EXS3ABAA EMDX050H18EXS3ABAA EMDX050H36EXS3ABAA	25 mm^2 (4 AWG)	25 mm^2 (4 AWG)	27.5 kg-cm (23.90 lb-in.) (2.70 Nm)	25 mm^2 (4 AWG)	16 mm^2 (6 AWG)	35.69 kg-cm (30.98 lb-in.) (3.5 Nm)

Frame 364/5

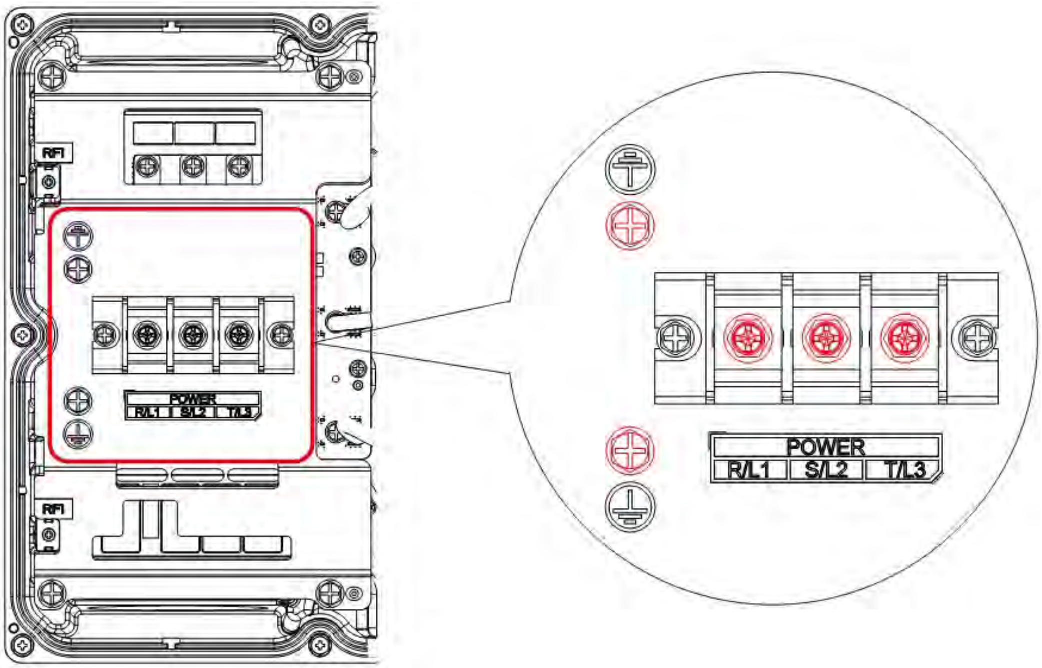


Figure 18: Frame 364/5

- For installations in environments with an ambient temperature (Ta) of 40°C, use copper conductors rated for 600V and with a minimum temperature rating of 90°C.
- For environments where the ambient temperature exceeds 40°C, use copper conductors rated for 600V and with a temperature rating of 90°C or higher.
- To comply with UL installation requirements, copper conductors must be used. Wire sizing should be based on a 75°C temperature rating, in accordance with UL standards.
- Do not reduce the wire gauge when using high-temperature-rated conductors.

Table 7: Wire specifications

Model	Main Circuit Terminals R/L1, S/L2, T/L3			Ground Terminal		
	Max. Wire Gauge	**Min. Wire Gauge**	**Screw Spec. and Torque (±10%))**	**Max. Wire Gauge**	**Min. Wire Gauge**	**Screw Spec. and Torque (±10%))**
EMDX060H18EXS3ABAA EMDX060H36EXS3ABAA EMDX075H18EXS3ABAA EMDX075H36EXS3ABAA	35 mm^2 (2 AWG)	35 mm^2 (2 AWG)	27.5 kg-cm (23.90 lb-in.) (2.70 Nm)	35 mm^2 (2 AWG)	16 mm^2 (6 AWG)	35.69 kg-cm (30.98 lb-in.) (3.5 Nm)

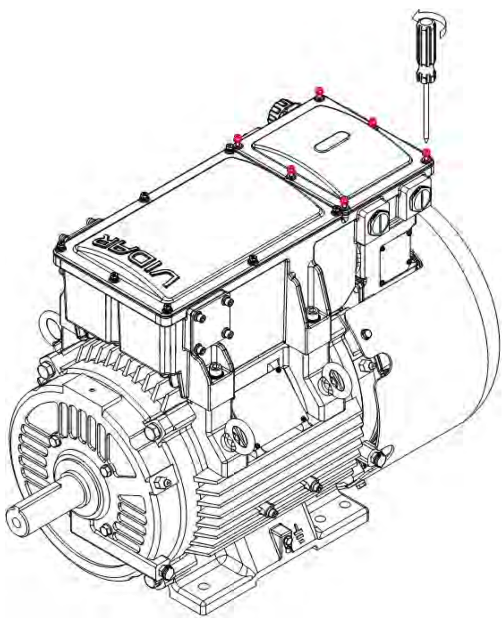
4.4 Control circuits

4.4.1 Application Control Board (ACB) cover removal

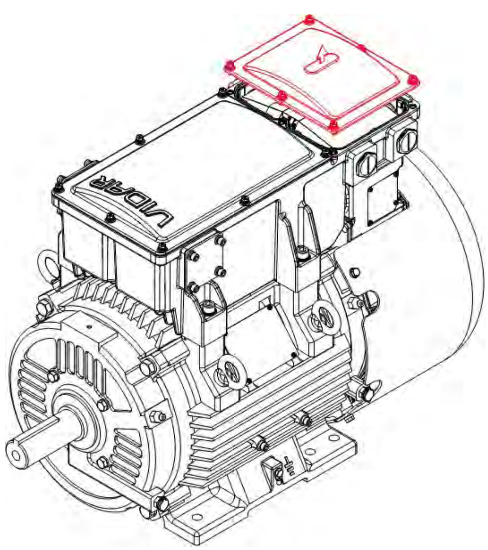
NOTICE:
The VIDAR images shown in the following figures are for reference only; actual units may vary in appearance. Frame 254/6 is used as an example in the illustrations below.

1. Loosen the M5 screw.

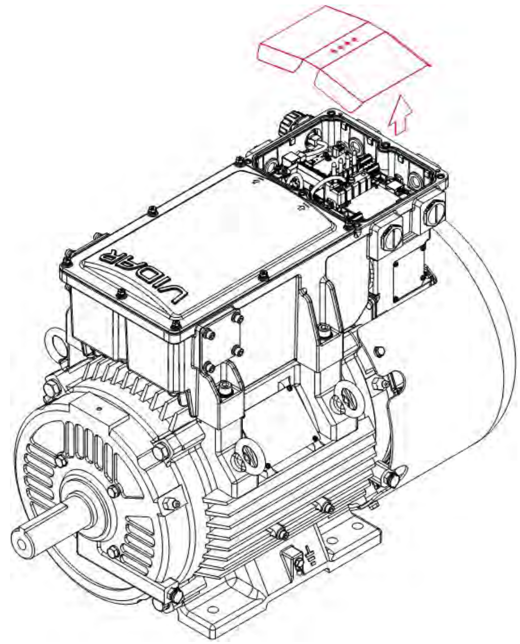
   Screw torque: 27.65–29.95 kg-cm / (24–26 lb-in.) / (2.71–2.94 Nm)



2. Remove the cover.



3. Remove the debris cover.



4.4.2 Control wiring diagram

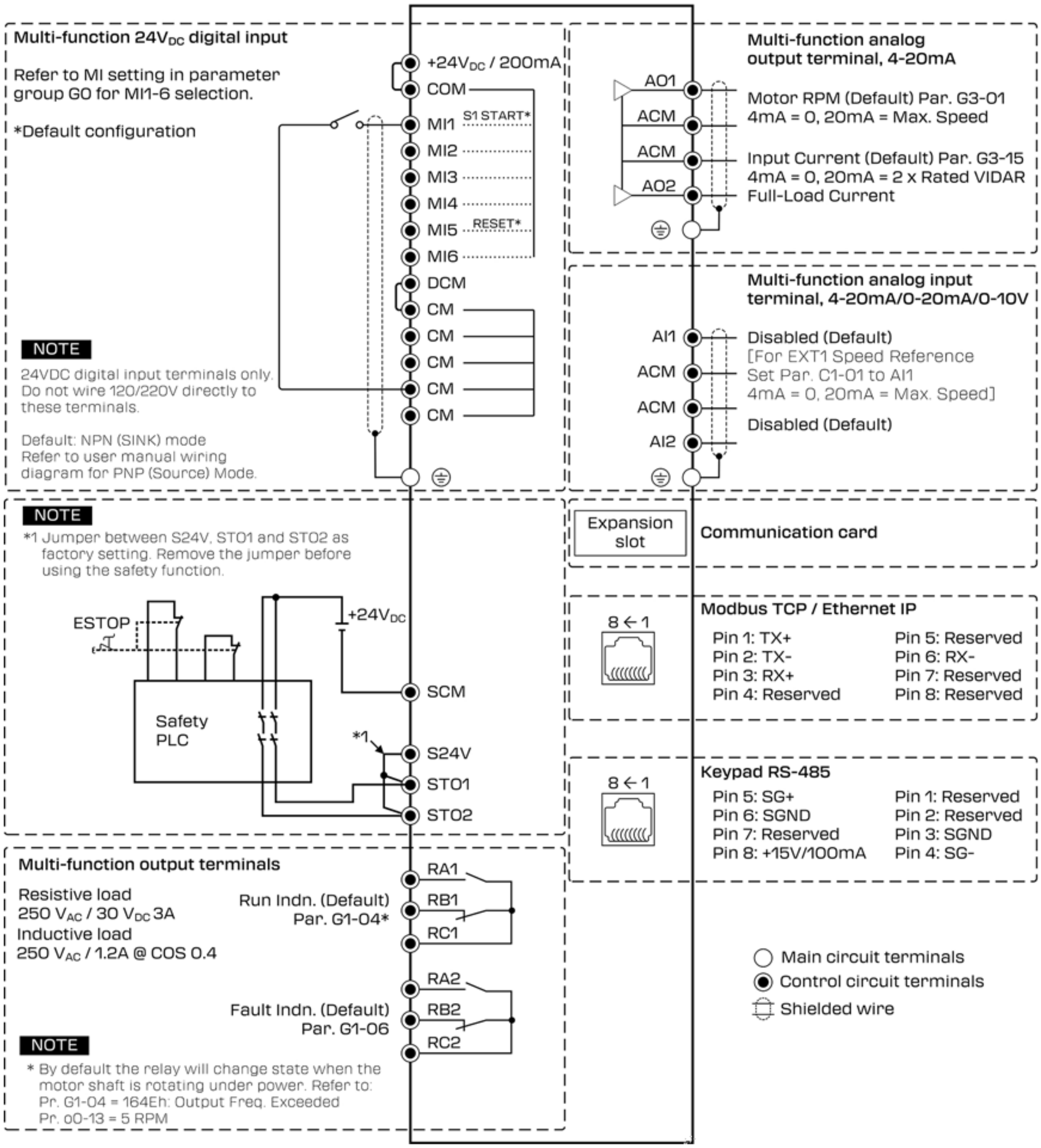


Figure 19: Wiring

4.4.3 SINK (NPN) / SOURCE (PNP) mode

SINK (NPN) / SOURCE (PNP)

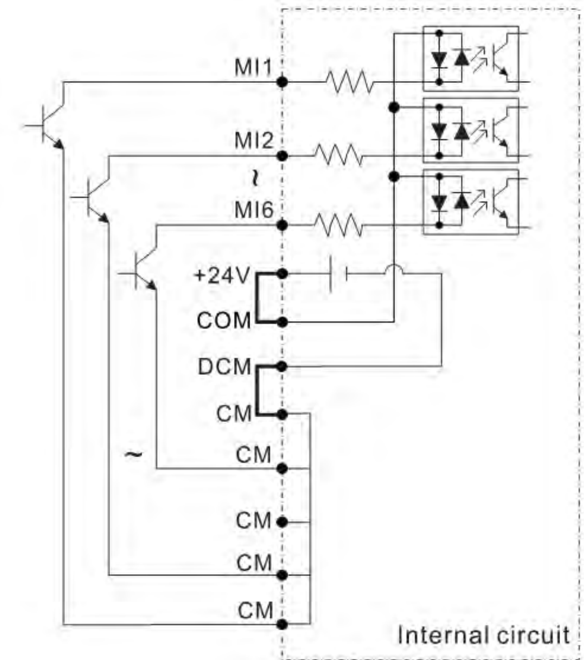


Figure 20: Sink mode with internal power (+24V_{DC})

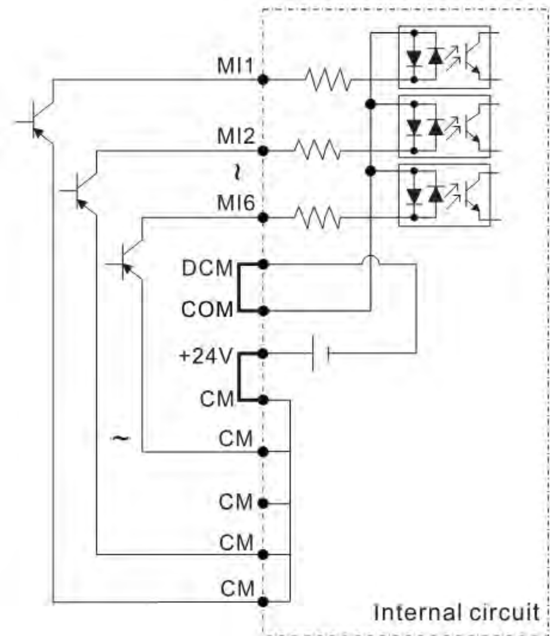


Figure 21: Source mode with internal power (+24V_{DC})

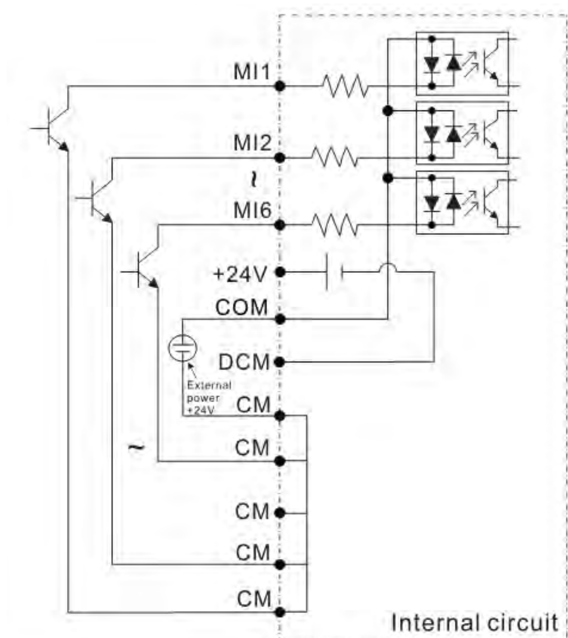


Figure 22: Sink mode with external power

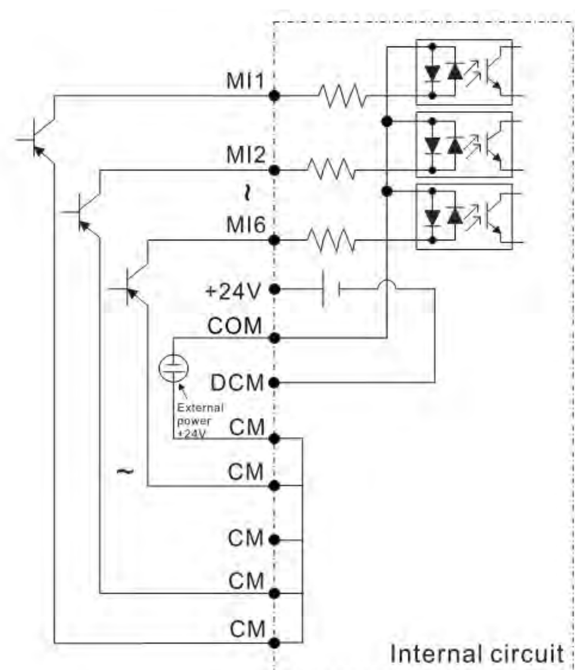


Figure 23: Source mode with external power

4.4.4 Control terminal specification

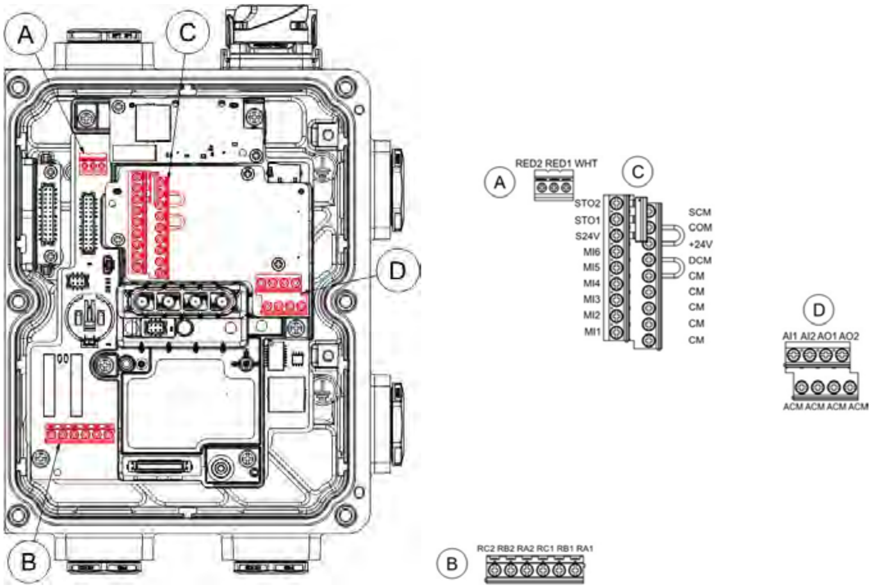


Figure 24: Terminal wiring

Terminal Name	Group	Conductor	Stripping Length (mm)	Max. Wire Gauge	Min. Wire Gauge	Tightening Torque (±10%))
RTD Terminal	A	Solid Strand	6–7	0.5 mm^2 (20 AWG)	0.2 mm^2 (24 AWG)	2.04 kg-cm (1.77 lb-in.) (0.2 Nm)
Relay Terminals	B	Solid Strand	6–7	1.5 mm^2 (16 AWG)	0.2 mm^2 (24 AWG)	4.59 kg-cm (3.98 lb-in.) (0.45 Nm)
Control Terminal	C	Solid Strand	6–7	0.75 mm^2 (18 AWG)	0.2 mm^2 (24 AWG)	5 kg-cm (4.3 lb-in.) (0.49 Nm)
Control Terminal	D	Solid Strand				

Wiring precautions

- The default for +24V-COM, and DCM-CM are short-circuited, as shown in the figure above. The setting for +24V-COM, DCM-CM short-circuit is SINK mode (NPN), refer to Section 4.4.2 Control wiring diagram on page 45 for wiring details.
- STO1 and STO2 to S24V are short-circuited, as shown in the figure above. Use the S24V power supply from Group C for STO only. Do NOT use it for other purposes.
- Tighten terminal screws using a flathead screwdriver with the following dimensions: Group A: 2.5 mm wide × 0.4 mm thick, and Groups B, C, D: 3.0 mm wide × 0.6 mm thick.
- When wiring with bare conductors, ensure the wire strands are neatly twisted and properly aligned to pass cleanly through the terminal openings.

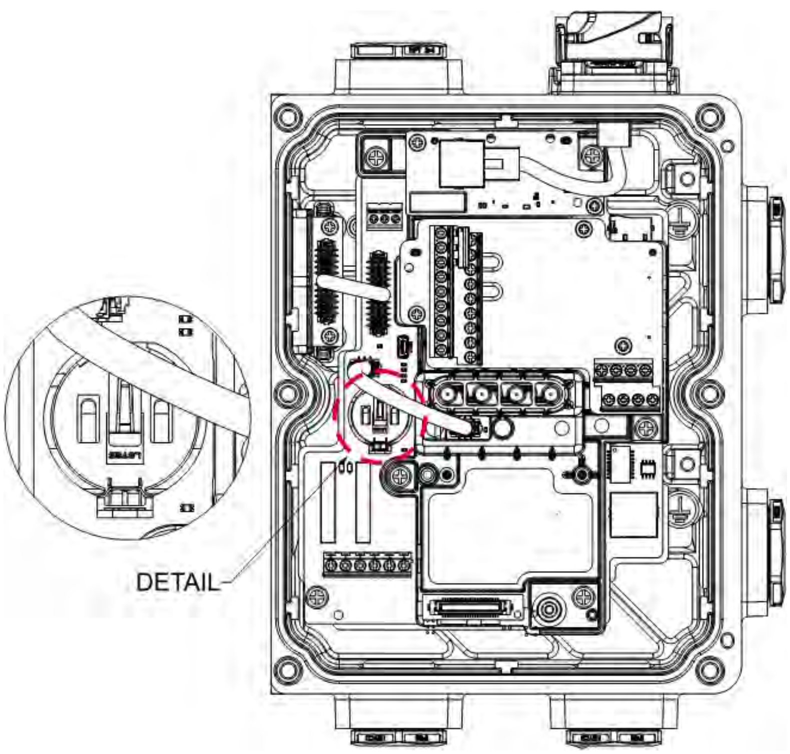
Terminals Name	Terminal Function	Descriptions
+24V	+24V power supply	+24 V_{DC} ± 10% 200 mA For DI/O use
COM	Digital control signal common (Sink)	Multi-function input common terminal
MI1 | MI6	Multi-function Input Selection 1–6	MI1–MI6 support three-wire / two-wire control Refer to the MI setting in Parameter Group G0 for MI1–MI6 function selection. Source Mode: ON: activation voltage ≥ 15 V_{DC} OFF: cut-off voltage ≤ 5 V_{DC} Sink Mode: ON: activation voltage ≤ 9 V_{DC} OFF: cut-off voltage ≥ 19 V_{DC}
DCM	Digital signal common	Digital signal common
CM	Extended digital signal common	Extended digital signal common
RA1	Multi-function relay output 1 (N.O.) a	Two programmable type-C relay output terminals. Refer to Parameter G1-04 (Default: Run Indication) and G1-06 (Default: Fault Indication). Resistive Load 3 A (N.O.) / 3 A (N.C.) 250 V_{AC} 3 A (N.O.) / 3 A (N.C.) 30 V_{DC} Inductive Load (COS 0.4) 1.2 A (N.O.) / 1.2 A (N.C.) 250 V_{AC} 1.2 A (N.O.) / 1.2 A (N.C.) 30 V_{DC}
RB1	Multi-function relay output 1 (N.C.) b	
RC1	Multi-function relay common (Relay)	
RA2	Multi-function relay output 2 (N.O.) a	
RB2	Multi-function relay output 2 (N.C.) b	
RC2	Multi-function relay common (Relay)	
AI1 | AI2	Analog voltage frequency command	• The two analog input formats both support 0–20 mA / 4–20 mA (AI1 / AI2 default) and 0–10 V Voltage type input resistance: 20 kΩ; Current type input resistance: 250 Ω
AO1 | AO2	Multi-function analog voltage output	• The two analog inputs both support 0–+10V / 0–20 mA / 4–20 mA • Under voltage mode (0–10 V), the max. output current is 2 mA Voltage type load limit: > 5 kΩ; Current type load limit: < 500 Ω
ACM	Analog Signal Common	Analog signal common terminal
STO1	Default short circuit of STO1-STO2-S24V (disable STO function). Only provide Source trigger mode. Built-in STO/SIL2 according to IEC61800-5-2, EN 61508 SIL2/ EN ISO 13849-1 PLd STO1–SCM; STO2–SCM ON: voltage ≥ 15 V_{DC} STO1–SCM; STO2–SCM OFF: voltage ≤ 5 V_{DC} S24V–SCM only use for STO1 and STO2 circuit	
STO2		
S24V		

Terminals Name	Terminal Function		Descriptions
SCM	STO1, STO2 and S24V common		
RJ45_KPD	PIN1, 2, 7: Reserve	PIN3, 6: SGND	PIN4: SG-
	PIN5: SG+	PIN8: +15V/100 mA	
RJ45_EIP	PIN1: TX+	PIN2: TX-	PIN3: RX+
	PIN6: RX-	PIN4, 5, 7, 8: Reserve	
WHT	RTD temperature detector – white wire		Use only with three-wire RTD temperature detector
RED1	RTD temperature detector – red wire		
RED2	RTD temperature detector – red wire		

4.4.5 Perpetual calendar lithium battery installation

To ensure the perpetual calendar function is normal, thoroughly check and install the Hi-Temp CR2032 battery and set the time before use. Follow the following steps to install the battery:

1. Refer to Section 4.4.1 Application Control Board (ACB) cover removal on page 43 to remove the cover.
2. Install the battery. The battery holder is located on the upper left half of the device. Insert the Hi-Temp CR2032 battery and press it down. Ensure that it lies flat in the battery holder and is secured under the latch.



3. Install the debris cover.
4. Install the ACB cover and tighten the M5 screws.

   Screw torque: 27.65–29.95 kg-cm / (24–26 lb-in.) / (2.71–2.94 Nm)

NOTICE:
Refer to Section 4.4.1 Application Control Board (ACB) cover removal on page 43 to remove the top cover to replace the original battery. To release the battery, press down the battery latch, which will pop up. Remove the battery and proceed with Step 2–4.

4.5 Safe torque off

4.5.1 STO Basic function

This function disables IGBT switching via dual-channel inputs (STO1 and STO2), preventing the motor from generating torque and enabling a safe stop in accordance with functional safety requirements.

VIDAR STO function complies with the following regulations:

- EN 13849-1 Category 3 PL d
- EN 61508 SIL2
- EN IEC 62061 SIL CL 2
- EN 60204-1 Category 0

4.5.2 STO specification

Refer to the table below for the safe parameters of STO function:

Item	Definition	Standard	Performance
S.F.F	Safe Failure Fraction	EN 61508	SPS(1oo1): 99.92% STO(1oo2): 98.86%
HFT	Hardware Fault Tolerance	EN 61508	SPS(1oo1): 0 STO(1oo2): 1
SIL	Safety Integrity Level	EN 61508	SIL 2
		EN IEC 62061	SILCL 2
PFH	Average frequency of dangerous failure [h-1]	EN 61508	$8.22^{*}\text{-}10^{-10}$
PFD_{av}	Probability of Dangerous Failure on Demand	EN 61508	$3.94^{*}\text{-}10^{-4}$
Category	Category	EN ISO13849-1	Category 3
PL	Performance level	EN ISO13849-1	d
$MTTF_d$	Mean time to dangerous failure	EN ISO13849-1	High (25139)
DC	Diagnostic Coverage	EN ISO13849-1	Medium
PTI	Proof Test Interval	EN 61508	20 years
Phase deviation	The Max. acceptable phase deviation time between STO1 and STO2	N/A	550 ms
PST	Process Safety Time	EN 61508	6 ms
Demand Mode	Mode of operation	EN 61508	High demand mode
DTI	Diagnostic Test Interval	EN 61508	SPS(1oo1): 6 ms SPS(1oo2): 30s
MT	Mission Time	EN ISO 13849-1	20 years
MTTR	Mean Time to Restoration	EN ISO 13849-1	0 hours
Tape A/B	Classification of subsystem	EN 61508	Type A
MRT	Mean Repair Time	EN ISO 13849-1	0 hours

NOTICE:

1. Periodic test pulses with the pulse duration (low-level) less than 1 ms and the pulse interval (T) greater than 10 ms will be ignored.
2. If any of the SPS fault occurs during the operation, the drive shall stop output current and remain in safe state.

4.5.3 STO Terminals function

The table below is the operation principle and display description after STO1 / STO2 signal input:

Signal	**Status**			
STO1–SCM	ON	OFF	ON	OFF
STO2–SCM	ON	ON	OFF	OFF
Drive Output Status	Ready to output	STO1 mode Torque output off	STO2 mode Torque output off	STO mode Torque output off
Fault Displays	No fault displays	STO1	STO2	STO
RESET	N.A	Reset	Reset	Reset

- STO means that Channel 1 and Channel 2 enable Safe Torque Off at the same time.
- STO1 indicates that the difference between Channel 1 and Channel 2 is too large, and Channel 1 is active. Check the external wiring.
- STO2 indicates that the difference between Channel 1 and Channel 2 is too large, and Channel 2 is active. Check the external wiring.
- STL1 indicates Channel 1 internal circuit detected abnormal. The system executes fault corrective actions to ensure that the drive remains in a safe status.
- STL2 indicates Channel 2 internal circuit detected abnormal. The system executes fault corrective actions to ensure that the drive remains in a safe status.
- STO1–SCM / STO2–SCM ON: means STO1–SCM / STO2–SCM input voltage > 15 V_{DC} power
- STO1–SCM / STO2–SCM OFF: means STO1–SCM / STO2–SCM input voltage < 5 V_{DC} power

4.5.4 STO Internal circuit

The following fault exclusion measures in accordance with EN ISO 13849-2:

- Separate multicore cables
- Individually shielded with earth (GND) connection

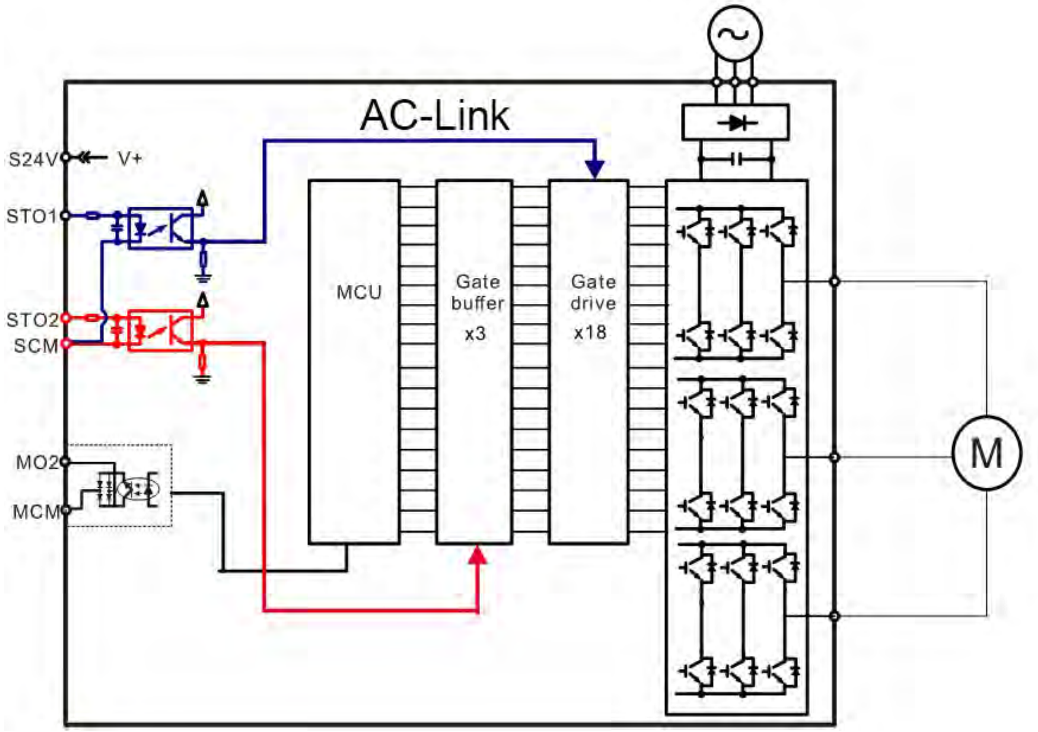


Figure 25: Internal STO circuit

In the figure below, the default setting for S24V-STO1-STO2 is short-circuited:

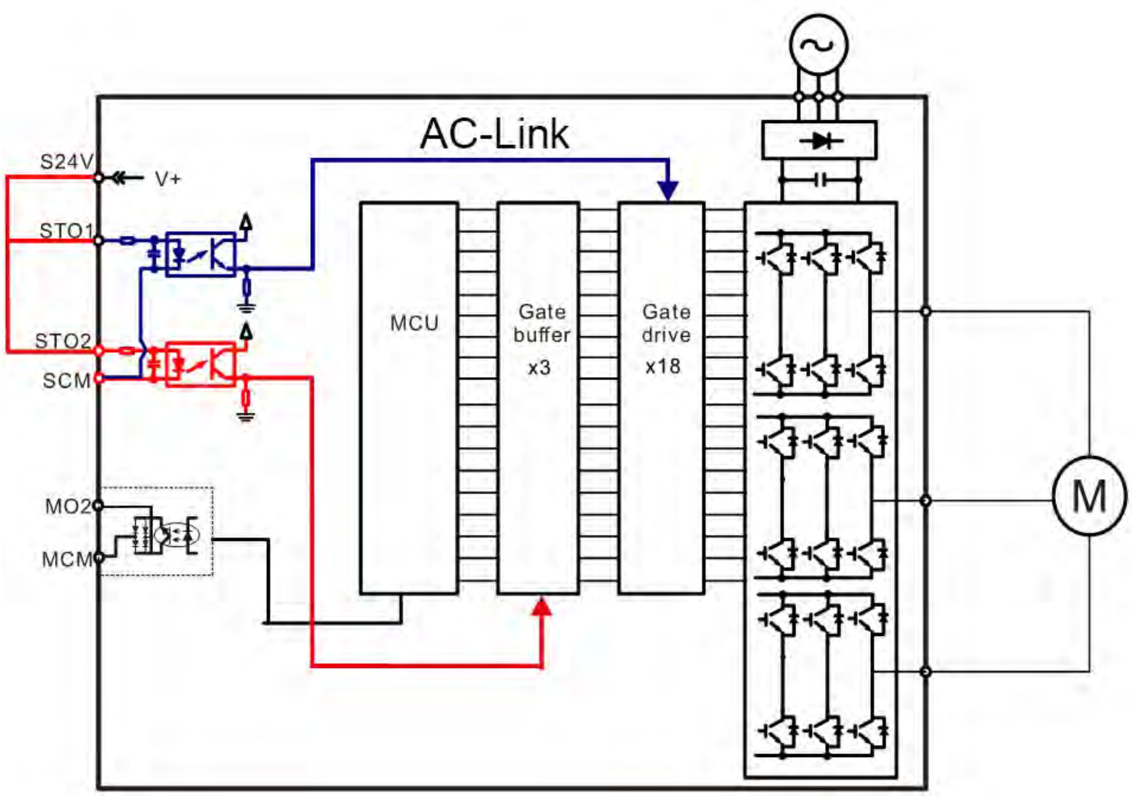


Figure 26: Default setting for S24V-STO1-STO2 is short-circuited

4.5.5 STO Control loop wiring

STO control loop wiring

1. Default wiring
    - The S24V-STO1-STO2 terminals are short circuited together as default. To connect the STO1 and STO2 to an external E-STOP switch refer to sections 2 and 3 below.
    - The STO1 and STO2 terminal must be connected to the external individual E-STOP switch. When the E-STOP button is pressed, the two E-STOP switches must be disconnected at the same time.

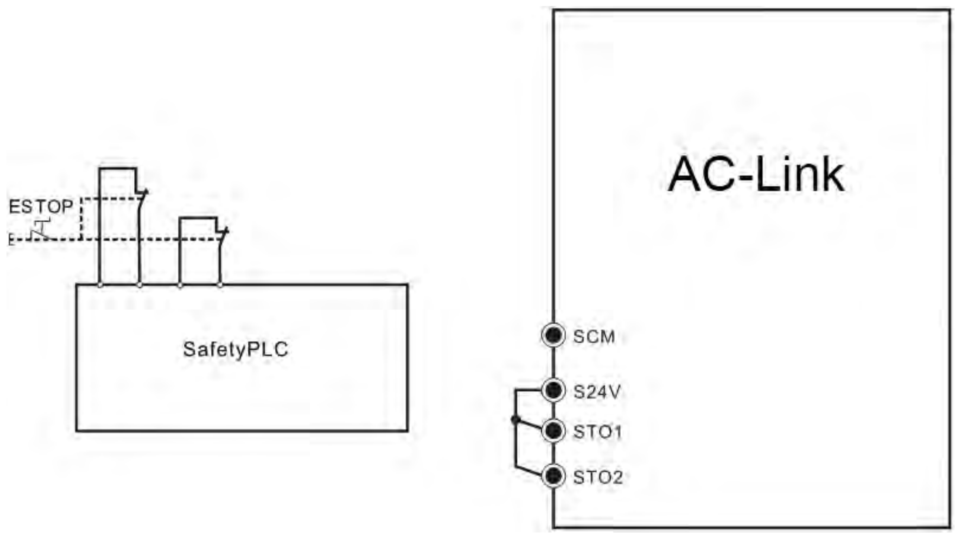


Figure 27: Default wiring

2. Built-in 24V power wiring
    - Remove the short-circuit of S24V-STO1-STO2.
    - As shown in the figure below, the ESTOP switch must be closed in normal situation so the drive can output normally.
    - In STO mode, the ESTOP switch is turned ON, the drive stops output, and the keypad displays STO.
    - With this connection, the SCM does not need to be wired (empty connection). Connect 24V Safety dedicated power terminal, do NOT use the general +24V terminal power supply.
    - The STO1 and STO2 terminal must be connected to the external individual E-STOP switch. When the E-STOP button is pressed, these two E-STOP switches must be disconnected at the same time.

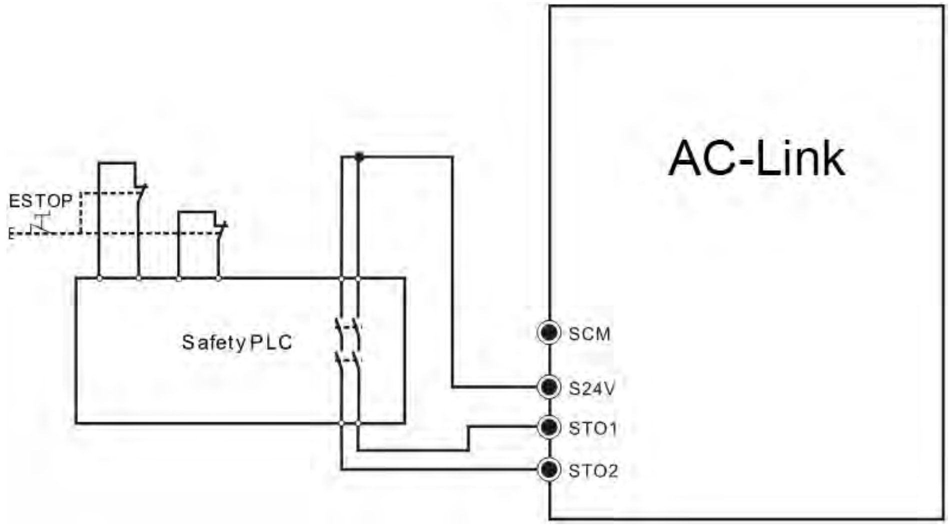


Figure 28: Built in 24V power wiring

3. External 24V power wiring
    - Remove the short-circuit of S24V-STO1-STO2.
    - As shown in the figure below, the ESTOP switch must be closed in normal situations so the drive can output normally.
    - In STO mode, the ESTOP switch is turned ON, the drive stops output, and the keypad displays STO.
    - With this connection, the SCM must be connected to the negative terminal of the external power supply to form a power supply circuit.
    - External 24V is from external SELV/PELV.
    - The STO1 and STO2 terminal must be connected to the external individual E-STOP switch. When the E-STOP button is pressed, these two E-STOP switches must be disconnected at the same time.

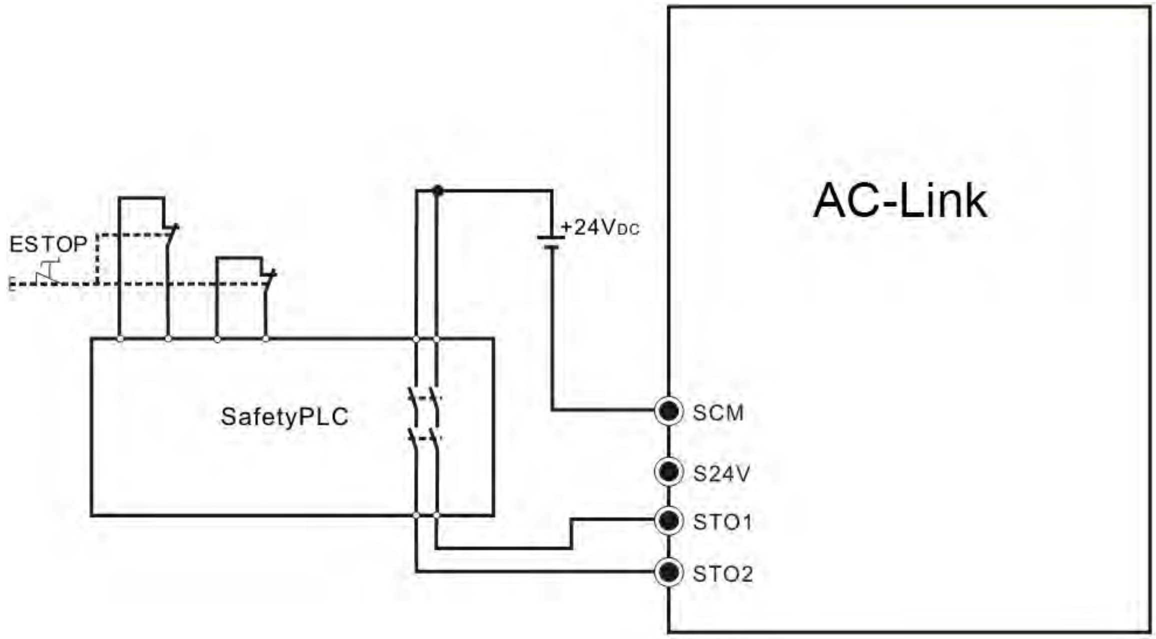


Figure 29: External 24V power wiring

4.5.6 STO Parameters and fault codes

- Pr.H0-14 sets the reset method of STO fault. Refer to Description Group H - Fault and Protection for more details.
- Refer to Description Group O - Monitor and Recorder for detailed description of fault records.
- Refer to 9.2 Warning codes and troubleshooting on page 197 for fault treatment.

Pr.	Parameter Name
o4-00	Fault Code REC 1
o4-19	Fault Code REC 2
o5-00	Fault Code REC 3
o5-19	Fault Code REC 4
o6-00	Fault Code REC 5
o6-19	Fault Code REC 6

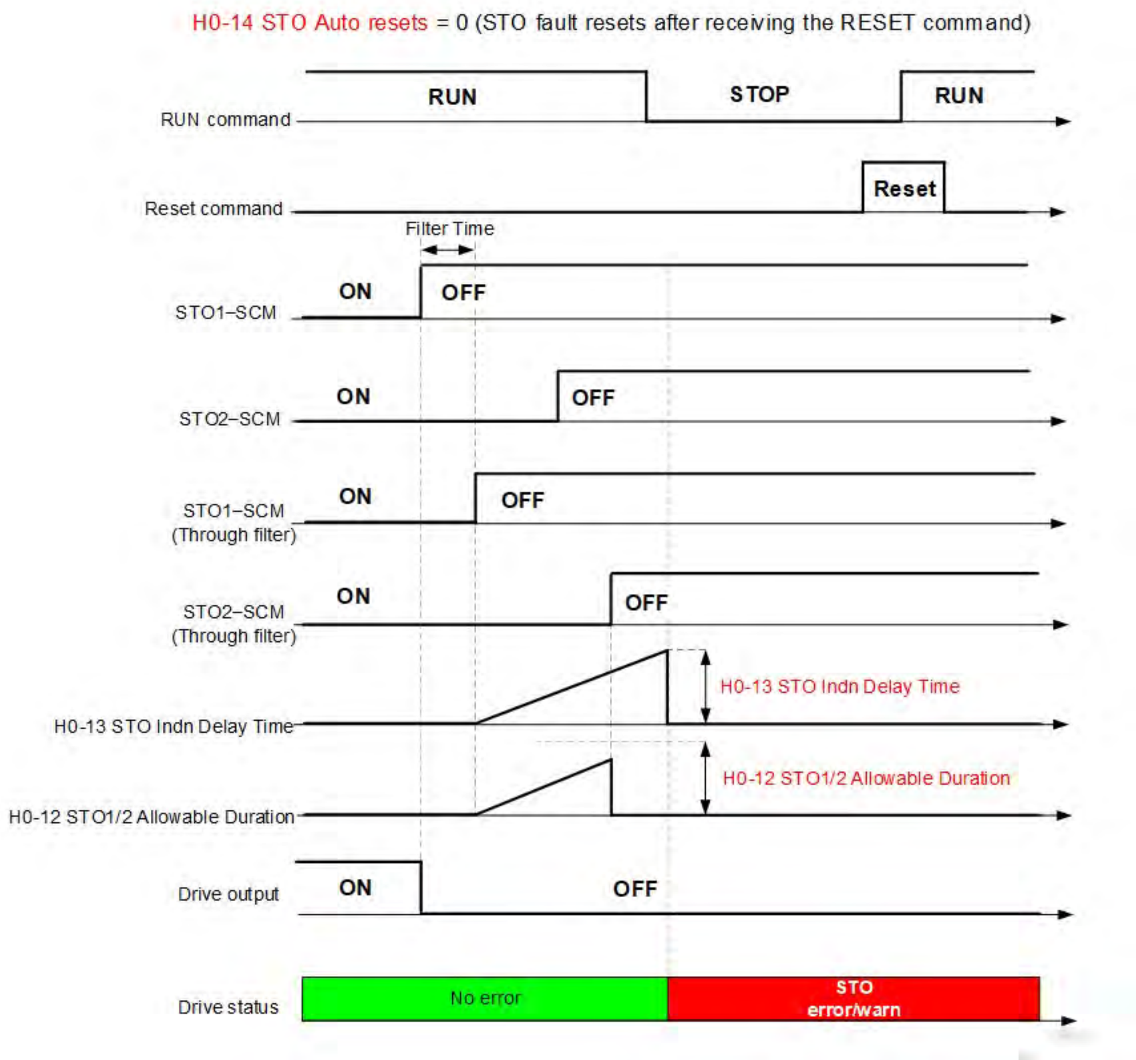
4.5.7 STO Operating sequential diagram

The STO1 and STO2 circuits must be conducted (ON: default short-circuit of STO terminal) when the STO function is under general operation, and then the drive can operate normally. If any one of the STO circuit is disconnected (OFF), the drive is unable to run, or stop running. The following sequence diagrams describe the signal status under different conditions:

1. **Pr.H0-14 STO Auto Reset = 0 Disable, manual-reset is valid**

   The STO function is triggered after the drive runs, STO1 changes from ON (conducting) to OFF (non-conducting), the drive stops output immediately, and starts counting after the filter time, and then the STO2 is OFF. When the counting time of two circuits of STO are less than then allowable difference time of STO1 / STO2 (Pr.H0-12), and the STO indication delay time (Pr.H0-13) is reached, the drive displays STO fault message.

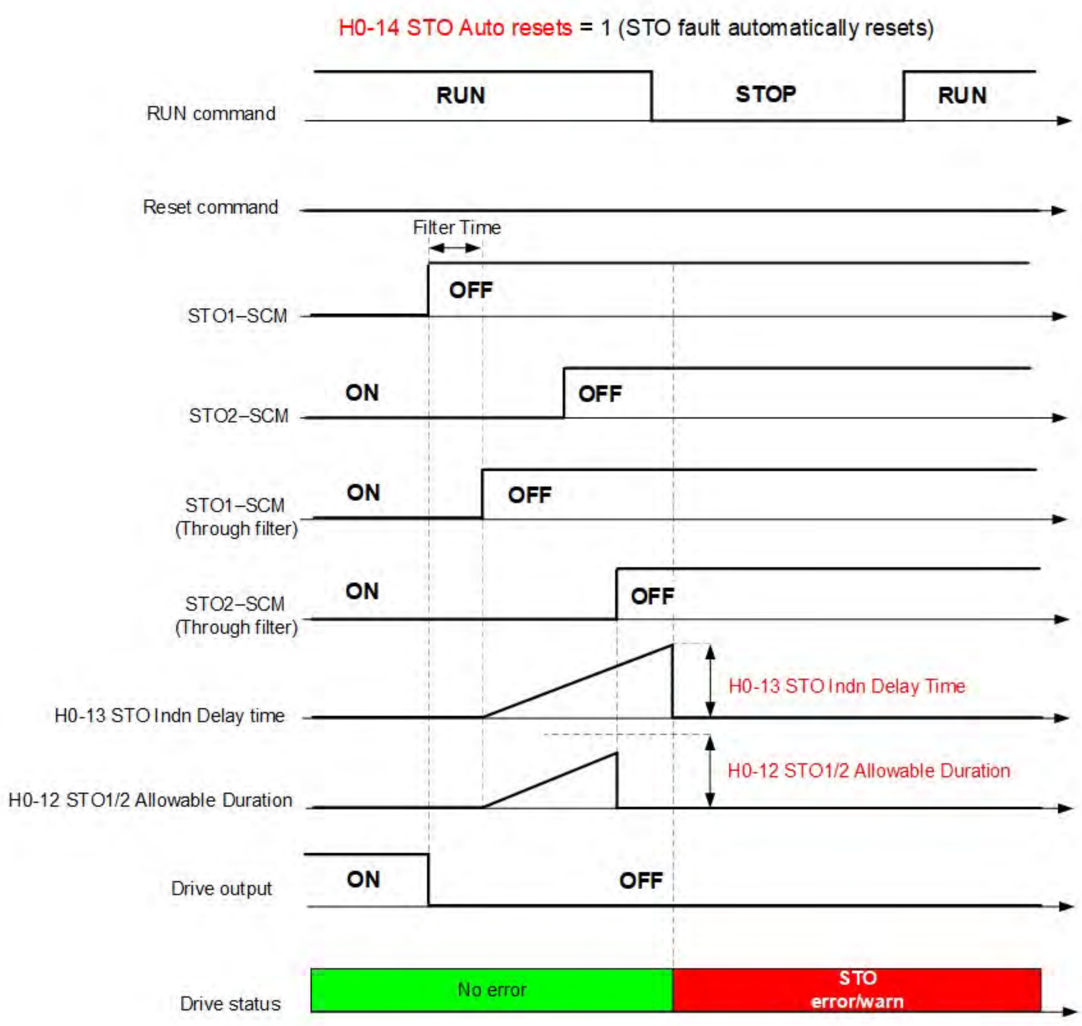
   Since the STO fault message is invalid under the manual RESET command when the two STO channels are both OFF (non-conductive), the drive still cannot run after receiving the RUN command.



2. **Pr.H0-14 STO Auto Reset = 1 Enable, auto-reset is valid**

   The STO function is triggered after the drive runs, STO1 changes from ON (conducting) to OFF (non-conducting), the drive stops output immediately, and starts counting after the filter time, and then the STO2 is OFF. When the counting time of two circuits of STO are less than then allowable difference time of STO1 / STO2 (Pr.H0-12), and the STO indication delay time (Pr.H0-13) is reached, the drive displays STO fault message.

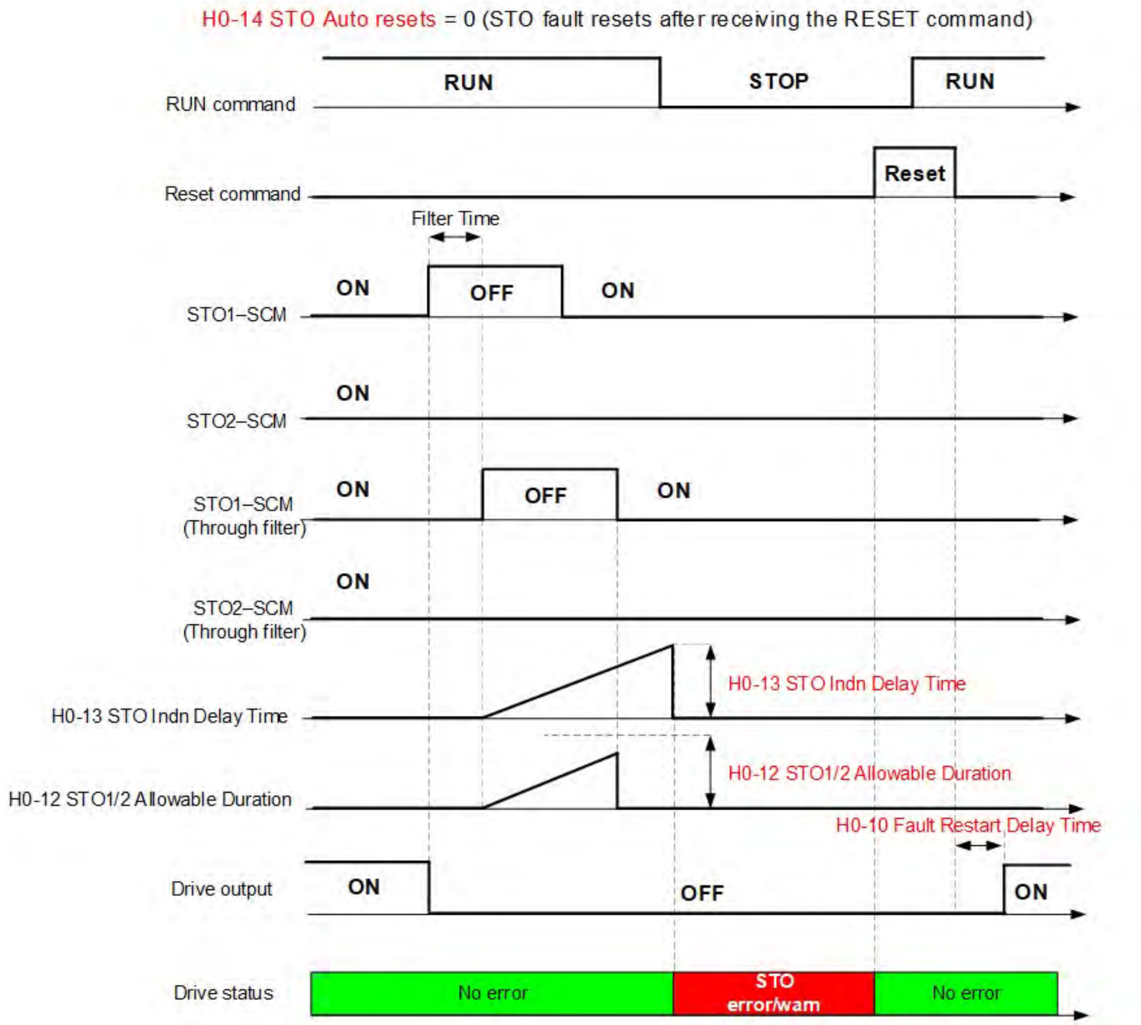
Since the STO fault message is invalid under the manual RESET command when the two STO channels are both OFF (non-conductive), VIDAR still cannot run after receiving the RUN command.



3. **Pr.H0-14 STO Auto Reset = 0 Disable, manual-reset is valid**

The STO function is triggered after the drive runs, the original STO1 is OFF (non-conductive) only for a brief time and then turns back to ON (conductive). When it is OFF, the drive stops outputting immediately. When the counting time of two circuits of STO are less than then allowable difference time of STO1 / STO2 (Pr.H0-12), and the STO indication delay time (Pr.H0-13) is reached, the drive displays STO fault message.

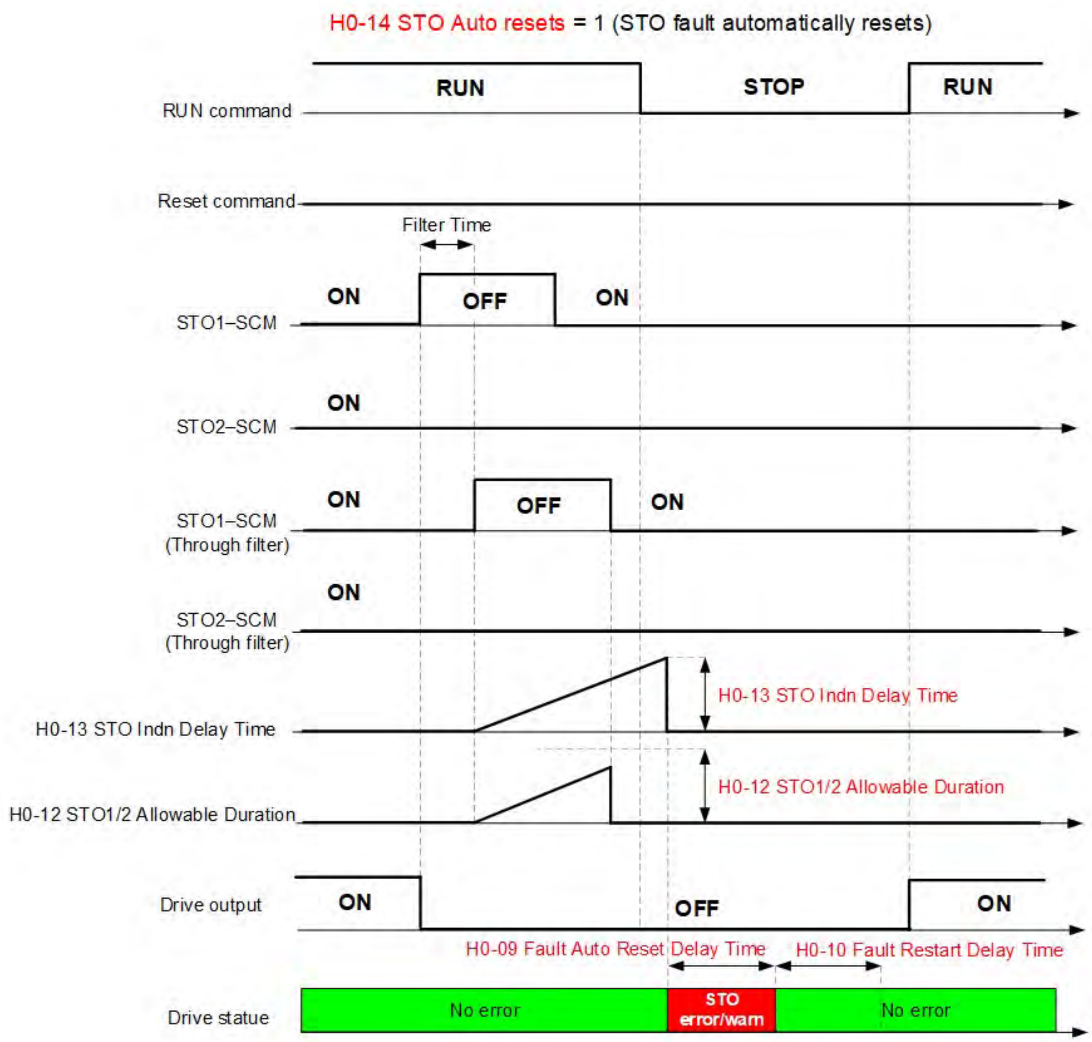
Since the STO fault message is valid under the manual RESET command when the two STO channels are both ON (conductive), the drive clears the fault message, after the RESET command and the Fault Restart Delay Time (Pr.H0-10) is reached, the drive receives the RUN command and resumes to operate.



4. **Pr.H0-14 STO Auto Reset = 1 Enable, auto-reset is valid**

The STO function is triggered after the drive runs, the original STO1 is OFF (non-conductive) only for a brief time and then turns back to ON (conductive). When it is OFF, the drive stops outputting immediately. When the counting time of two circuits of STO are less than then allowable difference time of STO1 / STO2 (Pr.H0-12), and the STO indication delay time (Pr.H0-13) is reached, the drive displays STO fault message.

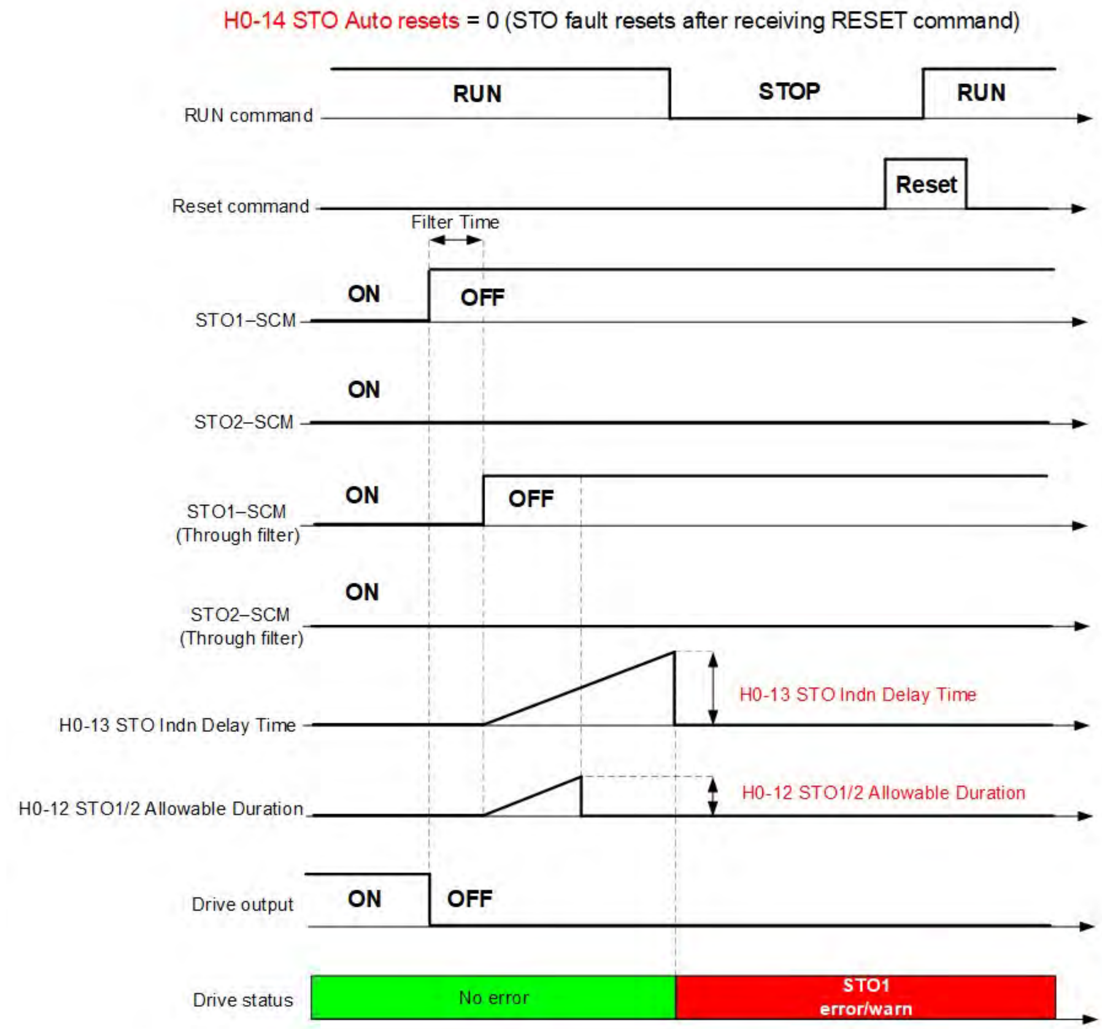
Since the STO fault message is valid under the auto RESET command when the two STO channels are both ON (conductive), the drive clears the fault message when the Fault Auto Reset Delay Time (Pr.H0-09) is reached. And then the Fault Restart Delay Time (Pr.H0-10) is reached, the drive receives the RUN command and resumes to operate.



5. **Pr.H0-14 STO Auto Reset = 0 Disable, manual-reset is valid**

   The STO function is triggered after the drive runs, STO1 changes from ON (conducting) to OFF (non-conducting), the drive stops output immediately, and starts counting after the filter time. When the counting time of two circuits of STO are less than then allowable difference time of STO1 / STO2 (Pr.H0-12), and the STO indication delay time (Pr.H0-13) is reached, the drive displays STO1 fault message.

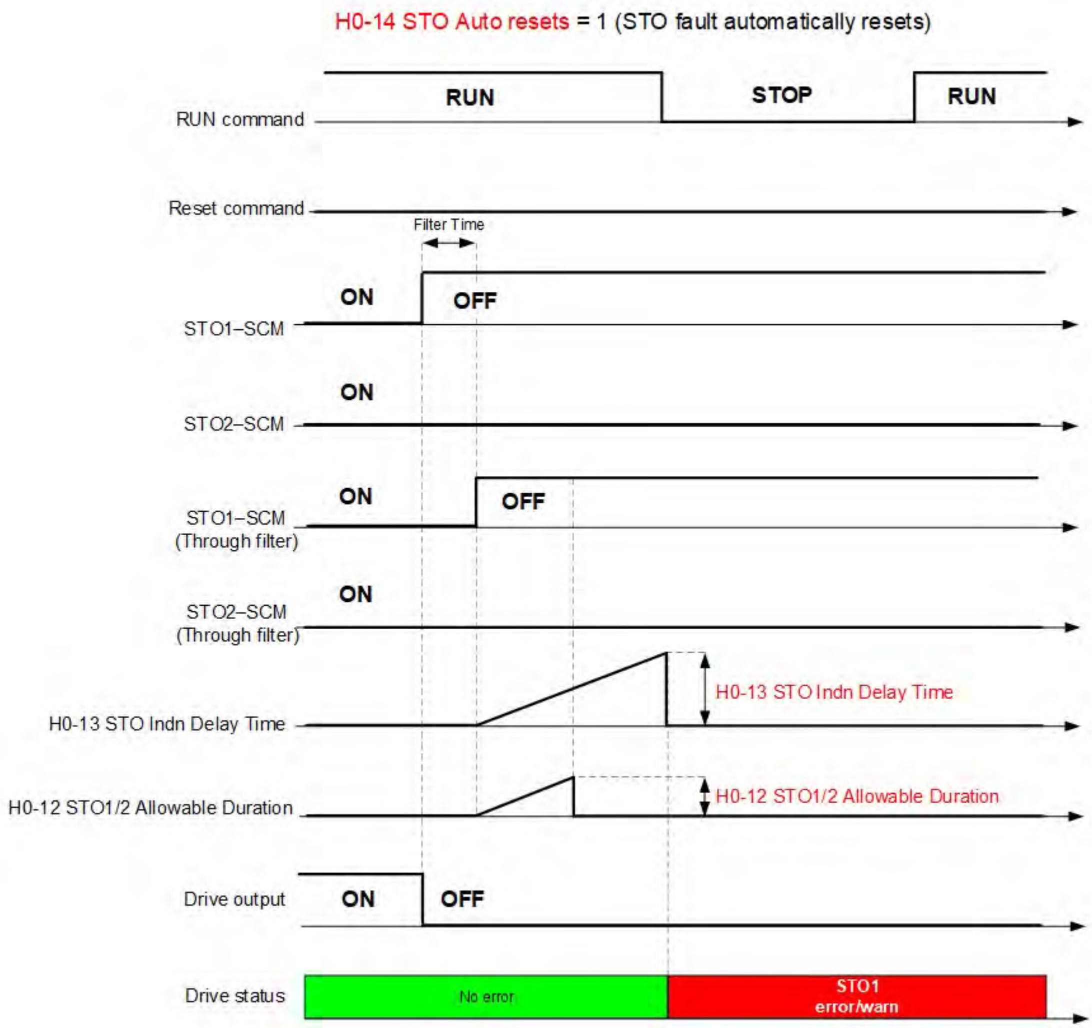
   Since the STO1 fault message is invalid under the manual RESET command when the STO1 is OFF (non-conductive), the drive still cannot run after receiving the RUN command.



6. **Since the STO1 fault message is invalid under the manual RESET command when the STO1 is OFF (non-conductive), the drive still cannot run after receiving the RUN command = 1 Enable, auto-reset is valid**

   The STO function is triggered after the drive runs, STO1 changes from ON (conducting) to OFF (non-conducting), the drive stops output immediately, and starts counting after the filter time. When the counting time of two circuits of STO are less than then allowable difference time of STO1 / STO2 (Pr.H0-12), and the STO indication delay time (Pr.H0-13) is reached, the drive displays STO1 fault message.

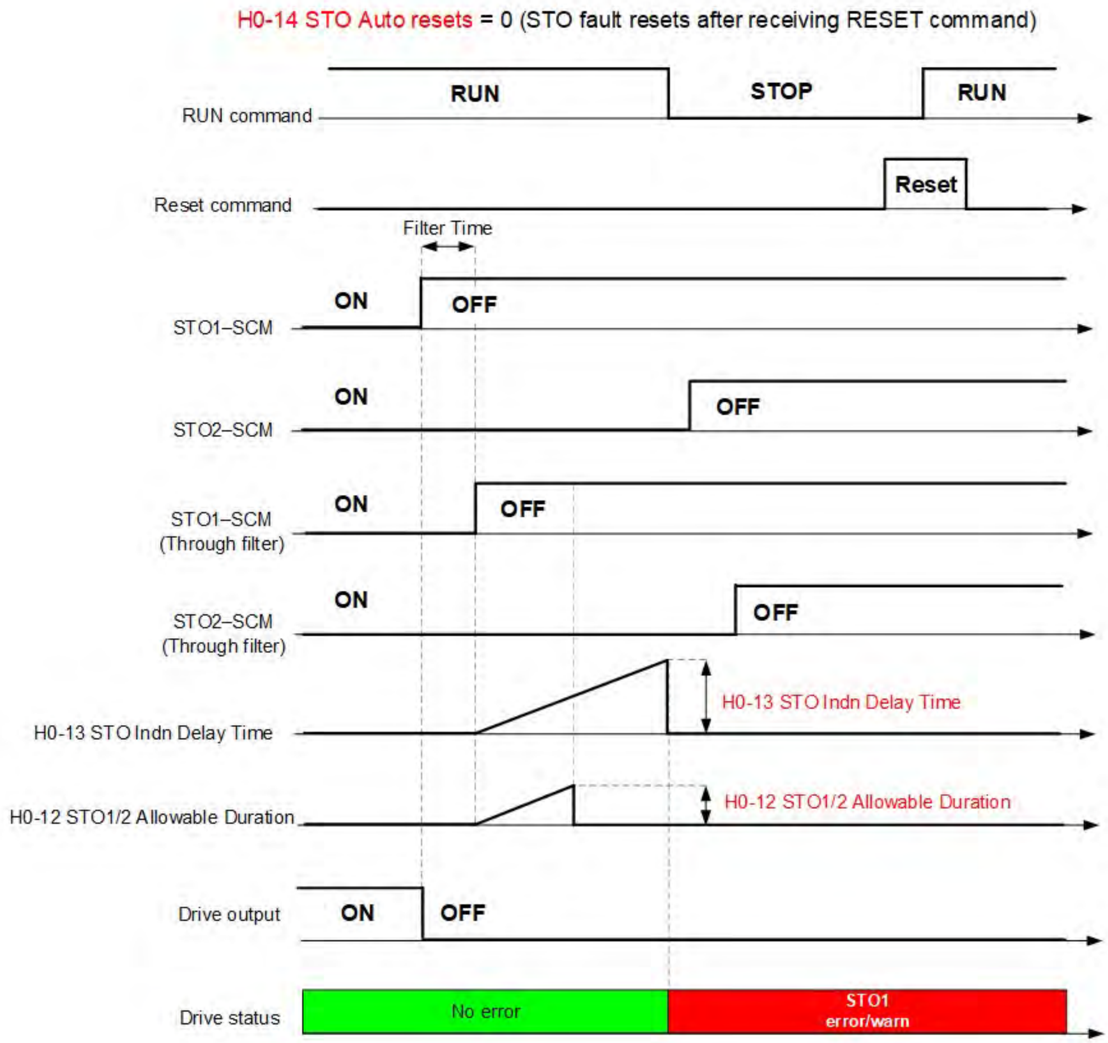
   Since the STO1 fault message is invalid under the auto RESET command when the STO1 is OFF (non-conductive), the drive still cannot run after receiving the RUN command.



7. **Pr.H0-14 STO Auto Reset = 0 Disable, manual-reset is valid.**

   The STO function is triggered after the drive runs, STO1 changes from ON (conducting) to OFF (non-conducting), the drive stops output immediately, and starts counting after the filter time. When the counting time of two circuits of STO are less than then allowable difference time of STO1 / STO2 (Pr.H0-12), and the STO indication delay time (Pr.H0-13) is reached, the drive displays STO1 fault message.

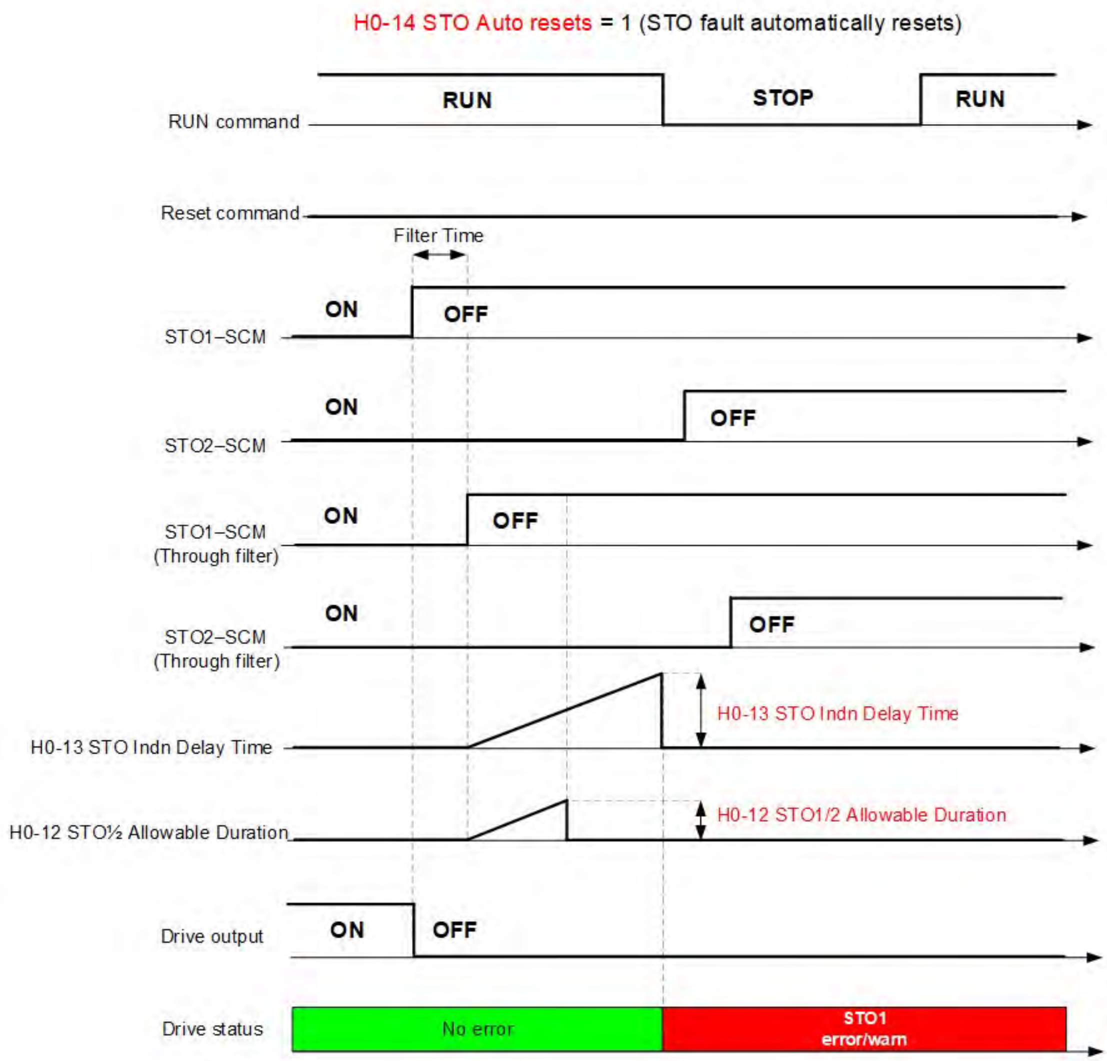
   Since the STO1 fault message is invalid under the manual RESET command when the two STO channels are both OFF (non-conductive), the drive still cannot run after receiving the RUN command.



8. **Pr.H0-14 STO Auto Reset = 1 Enable, auto-reset is valid**

   The STO function is triggered after the drive runs, STO1 changes from ON (conducting) to OFF (non-conducting), the drive stops output immediately, and starts counting after the filter time. When the counting time of two circuits of STO are less than then allowable difference time of STO1 / STO2 (Pr.H0-12), and the STO indication delay time (Pr.H0-13) is reached, the drive displays STO1 fault message.

   Since the STO1 fault message is invalid under the auto RESET command when the two STO channels are both OFF (non-conductive), the drive still cannot run after receiving the RUN command.



4.5.8 STO offline test

VIDAR is applicable for applications of long-term continuous operation. According to EN 61800-5-2 Clause 6.2.2.1.4 Note 2, an offline test based on SIL3, PLe/Cat.3 level is required for every three months.

- Offline test: test once every 3 months
- Test method:

  Connect STO1 and STO2 to SCM[*1] simultaneously to check whether the STO function works normally (if the STO safety circuit is connected with an ESTOP switch, you can press the ESTOP switch to fulfill this required condition). If VIDAR displays STO fault on the keypad, STO channels are operating normal. If the STO fault is not displayed - STO is not functionally properly, and VIDAR technical support should be contacted.

NOTICE:
[*1]SCM: Safety common ground.

4.6 RFI jumper and leakage current

4.6.1 Ground systems

Isolating main power from ground: When the power distribution system for the drive is a floating ground system (IT) or an asymmetric ground system (Corner Grounded TN Systems), you must remove the RFI jumper. Voltage of any phase to the ground for either system may be larger than the voltage specifications of the drive's built-in surge absorber and common-mode capacitance. In this case, connecting RFI jumper to the ground may cause damage to the drive.

Floating ground system (IT systems)

A floating ground system is also called an IT system, an ungrounded system, or a high impeddance / resistance (greater than 30 Ω grounded system.

1. Remove the RFI jumper to disconnect the ground cable from the internal capacitor and surge absorber.

Asymetric ground system (corner grounded TN systems)

CAUTION:
Do not remove the RFI jumper while power to the input terminal of the drive is ON. In the following four situations, you must remove the RFI jumper. This is to prevent the system from grounding through the RFI and filter capacitors and damaging the drive.

<table>
<tr><th colspan="2">You must remove the RFI jumper for an asymmetric ground system</th></tr>
<tr><td>1. Grounding at a corner in a triangle configuration

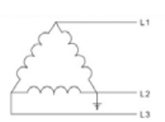



Figure 30:</td><td>2. Grounding at midpoint in a polygonal configuration

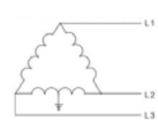



Figure 31:</td></tr>
<tr><td>3. Grounding at one end in a single-phase configuration

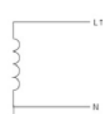



Figure 32:</td><td>4. No stable neutral grounding in a three-phase autotransformer configuration

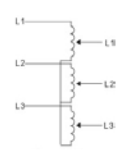
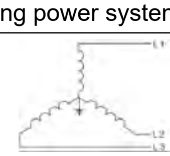



Figure 33:</td></tr>
<tr><td colspan="2">You can use the RFI jumper for symemetrical grounding power system</td></tr>
<tr><td>An internal ground is formed through a ground capacitor which reduces electromagnetic radiation. The requirements for electromagnetic compatibility are more stringent. In the application of power system using symemetrical grounding, you can install an EMC filter. Refer to the figure on the right for the symmetrical grounding power system.</td><td>
Figure 34:</td></tr>
</table>

4.6.2 RFI Jumper removal caution

1. VIDAR contains a built-in EMC filter, the RFI jumper screw connects the filter capacitors to ground to form a return path for high frequency noise in order to isolate the noise from contaminating the mains power. Removing the RFI jumper screw strongly reduces the effect of the built-in EMC filter. Although a VIDAR complies with the international standards for leakage current, an installation with several VIDARS with built-in EMC filters can trigger the Residual Current Device (RCD). Removing the RFI jumper screw may help triggering the Residual Current Device (RCD), but the EMC performance of each VIDAR is no longer guaranteed
2. VIDAR contains Varistors / MOVs that are connected from phase to phase and from phase to ground to prevent VIDAR from unexpected stop or damage caused by mains surges or voltage spikes. Because the Varistors / MOVs from phase to ground are connected to ground with the RFI jumper screw, removing the RFI jumper screw disables the protection

4.6.3 RFI Jumper removal

RFI jumper

(The VIDAR appearances shown in the figures are for reference only, actual appearance may vary by frame size).

Applicable models: EMDX020H18EXS3ABAA, EMDX020H36EXS3ABAA, EMDX025H18EXS3ABAA, EMDX025H36EXS3ABAA, EMDX030H18EXS3ABAA, EMDX030H36EXS3ABAA, EMDX040H18EXS3ABAA, EMDX040H36EXS3ABAA, EMDX050H18EXS3ABAA, EMDX050H36EXS3ABAA

1. Follow Section 4.3.1 Terminal box cover on page 34 to remove the top cover of the terminal box, and then unscrew and remove the screw.

   Screw torque: 8–10 kg-cm / (6.9–8.7 lb-in.) / (0.8–1.0 Nm)

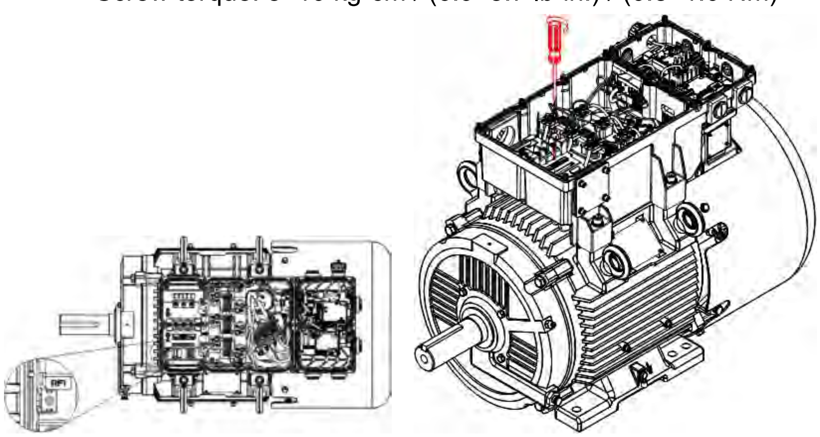


Figure 35:

Applicable models: EMDX060H18EXS3ABAA, EMDX060H36EXS3ABAA, EMDX075H18EXS3ABAA, EMDX075H36EXS3ABAA

1. Follow Section 4.3.1 Terminal box cover on page 34 to remove the top cover of the terminal box, and then unscrew and remove both screws.

   Screw torque: 8–10 kg-cm / (6.9–8.7 lb-in.) / (0.8–1.0 Nm)

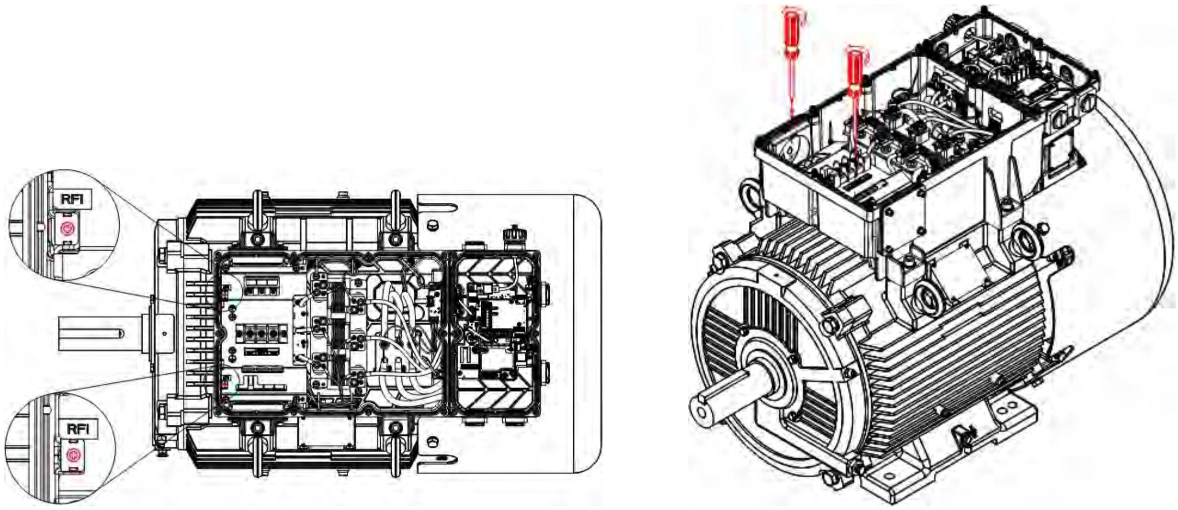


Figure 36:

4.7 Electromagnetic interference prevention

When operating a VIDAR, harmonic noise is generated on both the input and output sides, which can introduce electromagnetic interference (EMI) into the power supply network and nearby electrical equipment. Although the VIDAR is typically installed in industrial environments where high levels of EMI are expected, it can act not only as a source of noise but also as a receiver of electromagnetic disturbances.

VIDAR has been EMC-optimized during design and complies with the EN 61800-3 standard for adjustable speed electrical power drive systems. Proper installation is critical to minimizing EMC-related issues. To ensure long-term, stable operation of the power system, VIDAR must be correctly wired and grounded. The following measures are recommended to reduce EMC interference.

4.7.1 Grounding

Depending on the equipment configuration, different grounding terminals may be used as grounding electrodes. Always use a dedicated grounding wire to safely direct leakage current to earth ground. Due to variations in grounding resistance, potential differences may exist between grounding points and the earth, as described by Ohm’s Law.

Signal Grounding and Frequency Considerations:

The effectiveness of signal grounding depends on the frequency of the noise:

- Below 10 kHz: Use single-point grounding. All signal grounds are connected to a common point, which is then connected to earth or a designated grounding reference.
- Above 10 kHz: Use multi-point grounding. Each signal ground is independently connected to earth to minimize high-frequency interference.

Skin Effect and Grounding Conductors

At higher frequencies, alternating current tends to flow near the surface of a conductor—a phenomenon known as the skin effect. This reduces the effective cross-sectional area and increases resistance. To mitigate this:

- Use braided or strip conductors with high strand count instead of single-core wires.
- Increase the effective surface area of grounding conductors to improve high-frequency current flow.

4.7.2 Electrostatic shielding

Electrostatic shielding is used to prevent external electric fields from interfering with sensitive equipment, and to stop internal electric fields from affecting nearby devices. This is achieved by enclosing the source or the sensitive components in a conductive material that is connected to ground. The grounded conductor acts as a barrier, redirecting electric field lines and isolating the internal circuitry from external interference. Electrostatic shielding is essential in many electronic and measurement systems.

4.7.3 Wiring and cable

The Shielded Twisted Pair (often abbreviated as STP) is a copper wire. This type of wire is twisted with each other in two pairs and wrapped in an insulating sleeve. The metal mesh (usually copper) outside the twisted pair can shield the transmission line from external electromagnetic field interference and serve as a ground.

Cable construction

- Outer Jacket: Typically, rubber or synthetic material for insulation and mechanical protection.
- High-Voltage Cables: Include a resin-based filler for insulation between conductors.
- Low-Voltage Cables: Use internal wrapping (e.g., ribbon) to secure conductors and fill gaps.

Shielding functions

- Electromagnetic Containment: The shielding layer prevents the magnetic field generated by high current from affecting nearby components.

Ground fault protection

- Ground Fault Protection: In the event of insulation failure, the shielding layer directs leakage current safely to ground.

5 Operation Interface

5.1 Digital keypad

EMD-AC-KP-CC01 (Optional)

Figure 37: Digital keypad

- Communication Interface: RS-485 interface, RJ45 (socket)
- Communication protocol: Modbus RTU: 115200 bps, 8, N, 2
- Installation method: Refer to the following instructions to connect the keypad to the VIDAR keypad connector.
- The keypad connector cable lead is 16ft (5m) in length.
- When the external keypad connector cable is not used, be sure to fasten on the waterproof cover.

WARNING:
Hazardous-area installation. VIDAR, VIDAR keypad and VIDAR keypad extension cable is certified to Class 1, Division 2 (Groups A, B, C, D, T4). Only the VIDAR keypad extension cable

part number EMD-AC-KCC-05A can be used to connect to the external VIDAR RJ45 connector in a Class 1, Division 2 (Groups A, B, C, D, T4) hazardous-area.

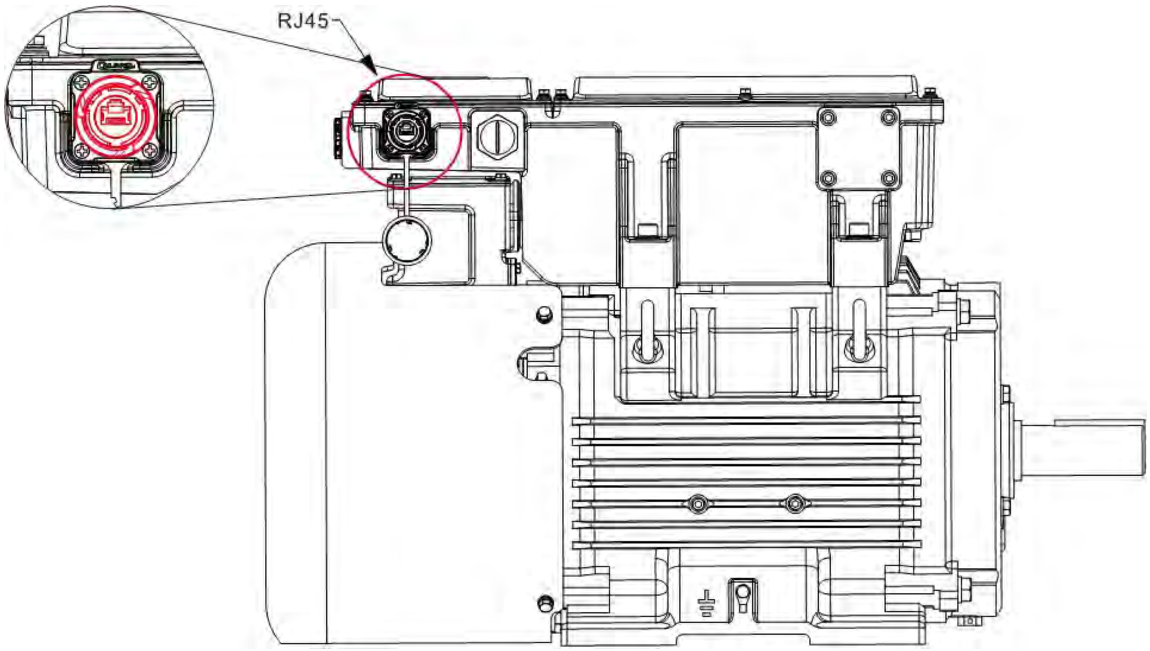


Figure 38: Keypad connector

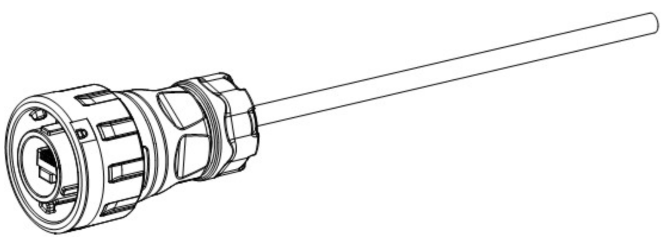
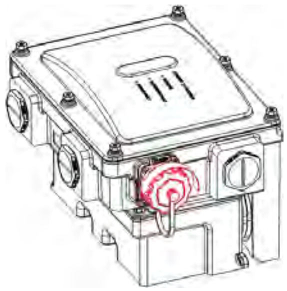
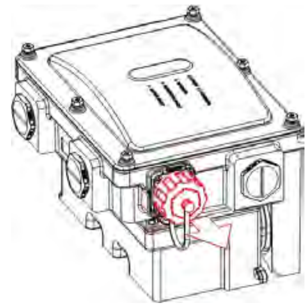


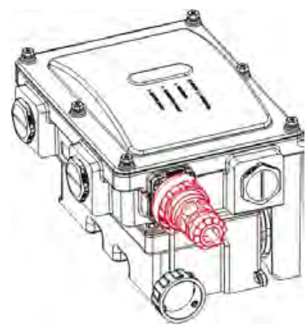
Figure 39: Keypad connector cable

Install the Digital Keypad

1. Remove the waterproof cover on the VIDAR.

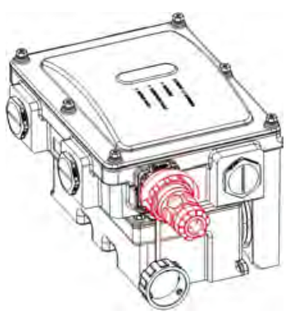
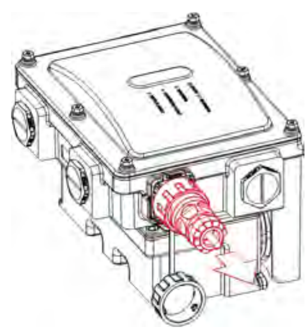



2. Install the RJ45 waterproof connector.

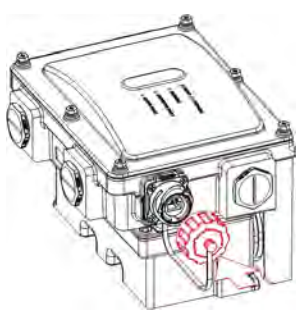
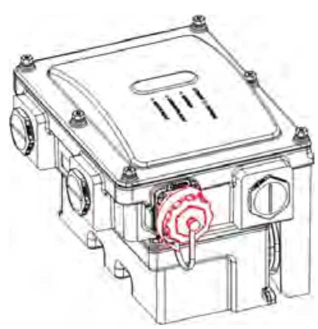



Detach the digital keypad

1. Remove the RJ45 waterproof connector

2. Fasten on the waterproof cover of the VIDAR.

5.1.1 Dimensions

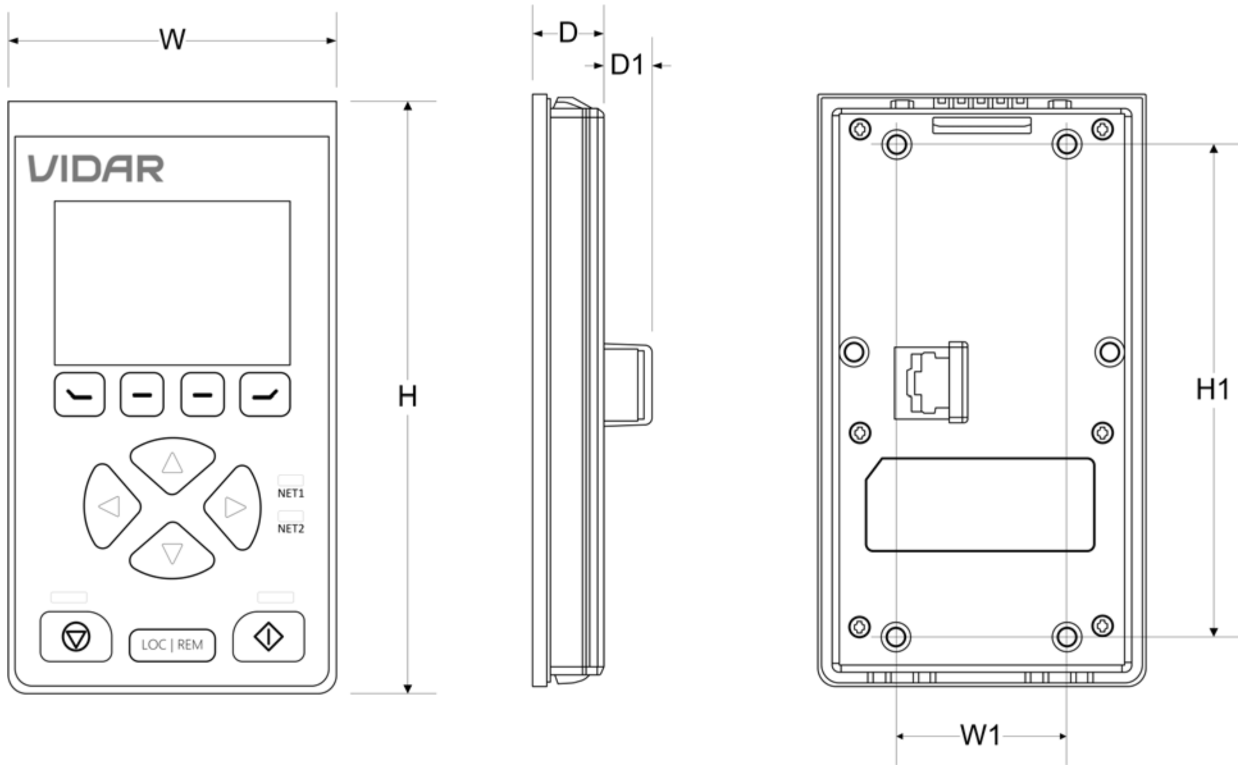


Figure 40: Digital keypad dimensions

	W	W1	H	H1	D	D1	d
KPV-CC01	74	38	132.5	110.4	15.7	11	M4xP0.7

5.1.2 Description of digital keypad

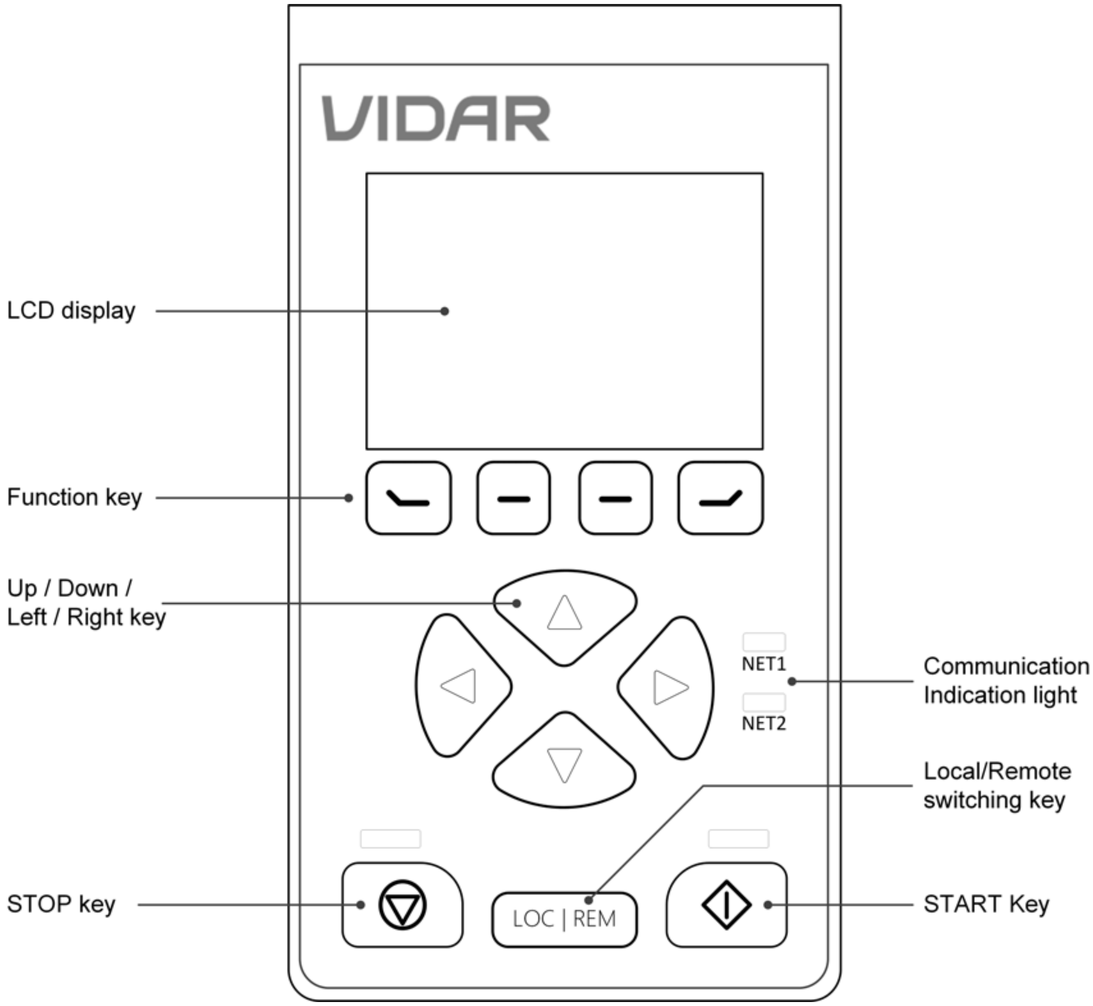


Figure 41: Digital keypad description

5.1.3 Keypad function descriptions

Operation key

Key	Name	Function Description
	START key	START key 1. Only valid when the source of operation command is the keypad. 2. Operates VIDAR according to the function setting. 3. Allowed repeated operation during the STOP process.
	STOP key	1. This key has the highest priority when the command is from the keypad. 2. When it receives the STOP command, regardless of whether VIDAR is in operation or stop status, VIDAR executes the "STOP" command.
	LOCAL/REMOTE key	1. The default function of this key is Local / Remote switching function. 2. Use Pr.A4-00 to change this key to an AUTO mode switching key. 3. Press the AUTO key at STOP, the setting switches to AUTO speed source and AUTO operation source. 4. Successful mode switching for the KPV-CC01 displays Local, Remote or AUTO mode on the screen.
	Up key	1. In the numeric value setting mode, use the UP/DOWN key to increase and decrease the values. 2. In the menu/text selection mode, navigates through the options.
	Down key	1. In the numeric value setting mode, use the UP/DOWN key to increase and decrease the values. 2. In the menu/text selection mode, navigates through the options.
	Left key	1. In the numeric value setting mode, use the Left key to move the cursor.
	Right key	1. In the numeric value setting mode, use the Right key to move the cursor. 2. When the keypad is locked, press ESC and the Right key for 3 seconds to unlock the keypad.

Function key

The following functions of each key are displayed in the bottom of the screen and vary with the displayed content.

Key	Functions	Descriptions
	ESC	**Delete Key** When the function list displays "ESC" on the screen, this key is defined as "Delete and return to previous page". The previous value will remain the same.
	Func	**Function selection key** When the function list displays "Func" on the screen, press this key to go to the function selection page. Menu: 1. Pr Management 2. I/O monitor 3. Keypad lock 4. Startup Wizard 5. Option cards 6. Fault record 7. PLC Function 8. Backup 9. VIDAR Information 10. Keypad setting 11. SD card management
	Back	When the function list displays Back on the screen, this key is defined as "Return to previous page".
	No	When the function list displays "No" on the screen, this key is defined as "No".
	Fwd / Rev	**Forward / Reverse direction switching key** When the function list displays "Fwd / Rev" on the screen, the second function key from the left is defined as "Operation direction switching key". 1. The Fwd/Rev function only controls the operation direction of the VIDAR, NOT the activation. 2. Fwd is forward direction; Rev is Reverse direction.
	Home	**Home key** When the function list displays "Home" on the screen, press the second function key from the left key to go to Home page.
	Default	**Return to default key** When the function list displays "Default" on the screen, press the second function key from the left to set the parameter value back default.
	JOG	**JOG operation key** When the function list displays "JOG" on the screen, the second function key from the right is defined as JOG operation.
	Add	**Add parameter into the user industry application list** When the function list displays "Add" on the screen, press the second function key from the right to add the parameter displayed on the screen into the user industry application parameter list.
	Next	**Go to next page** When the function list displays "Next" on the screen, press the second function key from the right to go to next page.
	ErrDisp	**Go back to the error display page** When the function list displays "ErrDisp" on the screen, press the second function key from the right to see detailed information of the error.
	ENTER	**Confirm function key** When the function list displays "ENTER" on the screen, this key is defined as "Confirm".
	Select	**Select function key**

Key	Functions	Descriptions
		When the function list displays "Select" on the screen, press this key to go to next level of the chosen function.
	Edit	**Edit function key** When the function list displays "Edit" on the screen, press this key to edit the content on the displayed page.
	F set	**Frequency setting key** When the function list displays "Freq set" on the screen, press this key on Home page to execute Speed command setting.
	Yes	**Yes key** When the function list displays "Yes" on the screen, this key is defined as "Yes".
	RPM Set	**RPM setting key** Press this key on Home page to set Speed command (RPM).
	REF Set	**PID reference setting key** Press this key on Home page to set PID reference setpoint.
	Reset	**Reset key** When a fault occurs, press this key to reset the fault.

5.1.4 LED Function descriptions

5.1.4.1 LED Indication light function descriptions

LED Indication Light	Descriptions	
	Operation LED	**LED ON:** 1. VIDAR is running
	STOP / Error LED	**LED ON:** 1.VIDAR is in STOP status 2. VIDAR is in OFF status **LED FLASHES:** 1. VIDAR is in FAULT status

5.1.5 Display discription

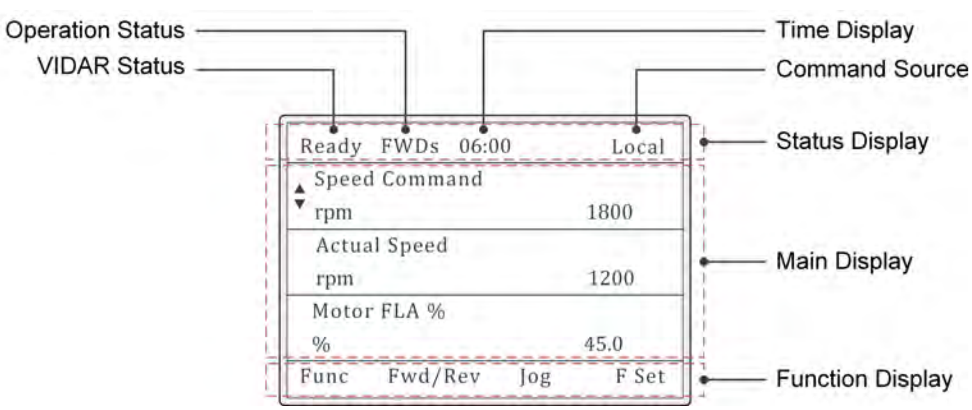


Figure 42:

5.1.5.1 Status display

Keypad status information support list:

Status	Descriptions
VIDAR Status	Display current executing function, for example: Error, Ready, dEb, Sleep...etc.
Operation Status	Display the VIDAR current operating status, for example: FWDs, FWDn, FWDa, FWDd
Time display	Display current time (hour: minute)
Command Source	Display current command source: HAND, OFF, AUTO, Local, Remote

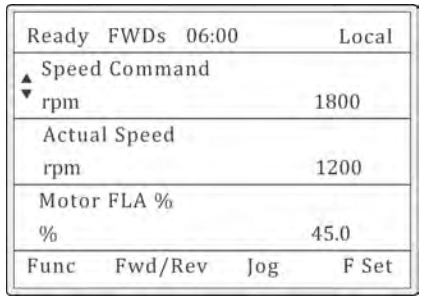
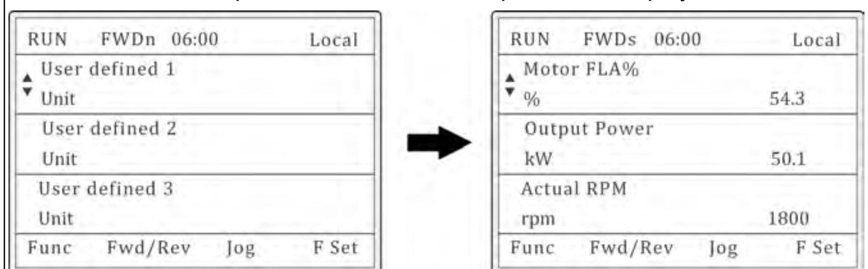
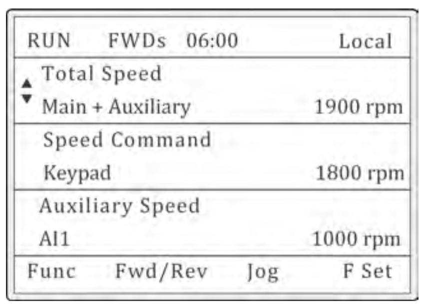
Keypad status instruction:

VIDAR Status	Name	Descriptions
Error	Fault	When a fault occurs to the VIDAR, the status column displays Error.
RUN	Operation	When the VIDAR is in operation, the status column displays Run.
Ready	Ready	When the VIDAR is ready, the status column displays Ready.
dEb	Deceleration Energy Backup	When the VIDAR executes dEb function, the status column displays dEb.
Sleep	Sleep	When the VIDAR is in sleep, the status column displays Sleep.
Stall	Stall function	When the VIDAR is in stall, the status column displays Stall.
PHeat	Pre-heat	When the motor executes pre-heating, the status column displays PHeat.
Fire	FireMode	When the VIDAR is in FireMode, the status column displays Fire.

Operation status

Drive Status	Name	Descriptions
FWDs	Stop status + forward operation	The VIDAR is STOP and the operation direction is FWD, the operation status displays FWDs.
REVs	Stop status + reverse operation	The VIDAR is STOP and the operation direction is REV, the operation status displays REVs.
FtoR	FWD switch to REV	Switching from forward to reverse deceleration (follows REVa to reverse)
RtoF	REV switch to FWD	Switching from reverse to forward deceleration (follows FWDa to forward)
FWDn	FWD normal speed	When the VIDAR operates in FWD constant speed, the operation status displays FWDn.
FWDa	FWD acceleration	When the VIDAR is in FWD acceleration, the operation status displays FWDa.
FWDd	FWD deceleration	When the VIDAR is in FWD deceleration, the operation status displays FWDd.
REVn	REV normal speed	When the VIDAR operates in REV constant speed, the operation status displays REVn.
REVa	REV acceleration	When the VIDAR is in REV acceleration, the operation status displays REVa.
REVd	REV deceleration	When the VIDAR is in REV deceleration, the operation status displays REVd.
JOGf	JOG forward	When the VIDAR is in JOG forward, the operation status displays JOGf.
JOGr	JOG reverse	When the VIDAR is in JOG reverse, the operation status displays JOGr.

5.1.5.2 Monitoring screen

<table>
<tr><th>Monitoring Screen</th><th>Description</th></tr>
<tr><td>Main screen</td><td>The main screen displays Speed Command, Actual Speed and Full Load Amps %. Use the up/down keys to move the cursor or press ENTER to go to the speed setting page.

</td></tr>
<tr><td>User-defined screen</td><td>There are 3 user-defined display lines. Use the up/down keys to move the cursor and press ENTER to edit the parameter displayed.

</td></tr>
<tr><td>Master and auxiliary speed screen</td><td>This page provides monitoring Master and auxiliary speed simultaneously.

</td></tr>
</table>

5.1.5.3 EMD-AC-KP-CC01 Function list

The EMD-AC-KP-CC01 supports the following characters: A B C D E F G H I J K L M N O P Q R S T U V W X Y Z a b c d e f g h i j k l m n o p q r s t u v w x y z 0 1 2 3 4 5 6 7 8 9 __ ー # & % @

Table 8: Keypad function

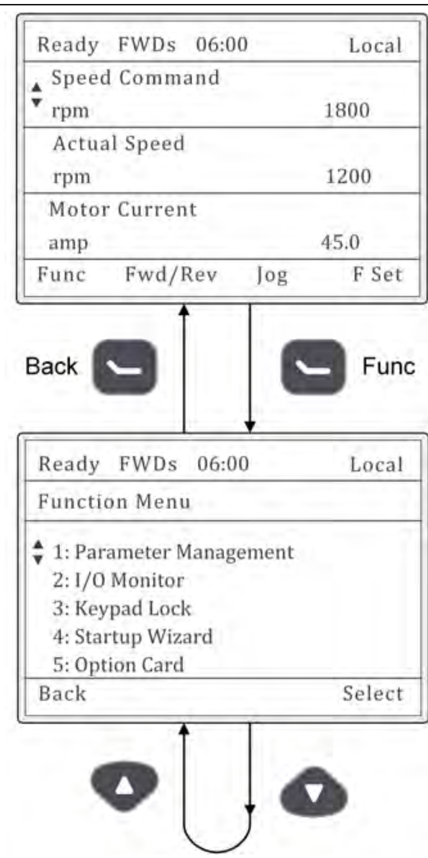
Function Name	Function Menu	Descriptions
Keypad function	1. Pr Management 2. I/O Monitor 3. Keypad Lock 4. Startup Wizard 5. Option Card 6. Fault Record 7. PLC Function 8. Backup 9. VIDAR Information 10. Keypad Setting 11. SD Card Management	

Table 9: Parameter Management - Parameter Setting

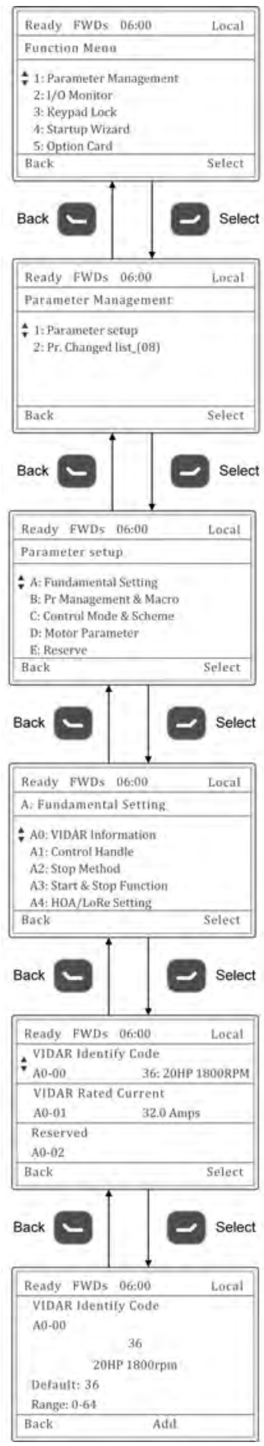
Function Name	Function Menu	Description
Parameter Management	Parameter Setup	1. This function displays and sets the VIDAR parameter groups. 2. Use up/ down keys to select the parameter group, and press Select to enter the parameter sub-group and parameter list. 

Table 10: Pr. changed list_(XX)

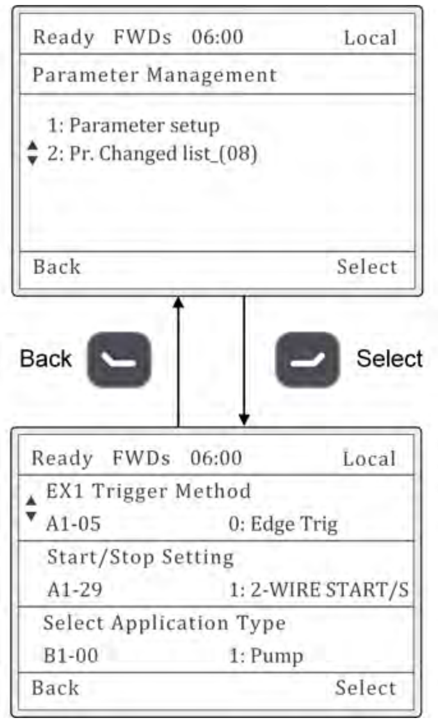
Function Name	Function Menu	Description
Parameter Management	Pr. changed list_(XX)	1. This function displays parameters that are modified, you can directly enter the parameter setting page and change setting value. 2. Pr. changed list_(08): it means there are 8 parameters that have been modified. 

Table 11: I/O monitor - Digital I/O status

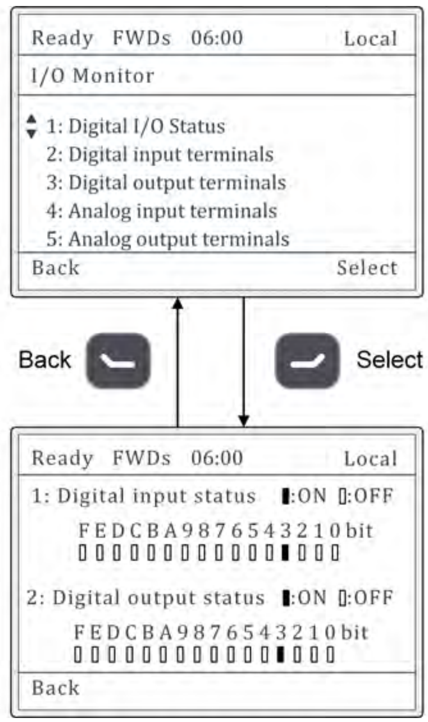
Function Name	Function Menu	Description
I/O monitor	Digital I/O status	Displays the status of the digital input and output terminals. The status bits read from right to left. For example on the digital input terminal status bit 0 represents MI1, bit 1 represents MI2 and so on. 

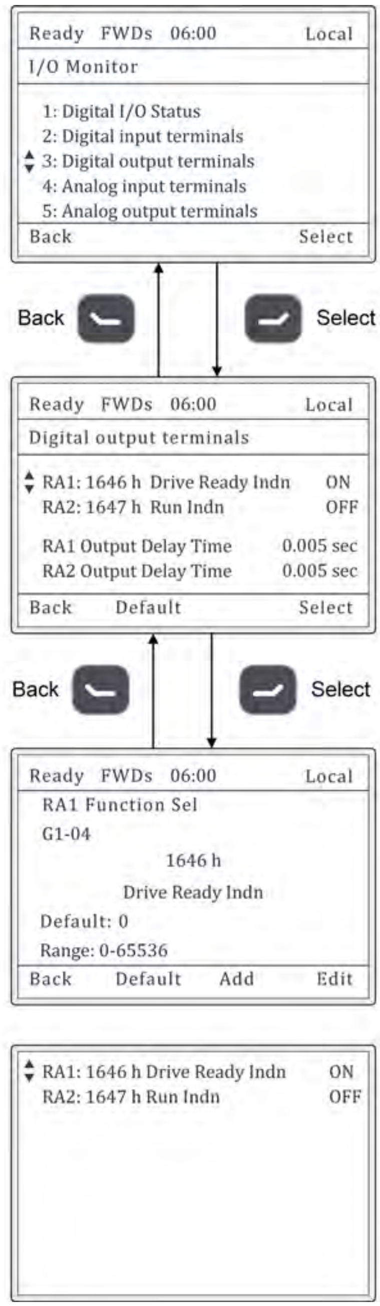
Table 12: Multi-function digital input terminals

Function Name	Function Menu	Description
I/O monitor	Digital input terminals (multi-function)	1. Displays the information of digital input terminal function setting, ON/ OFF status, respond time, N.O./ N.C. modes and virtual input 2. Press Select to enter the parameter setting page and change the setting value. 

Table 13: Multi-function digital output terminals

<table>
<tr><th>Function Name</th><th>Function Menu</th><th>Description</th></tr>
<tr><td>I/O monitor</td><td>Digital output terminals (multi-function)</td><td>

1. Displays the information of digital output terminal function setting, ON/ OFF status, output delay time, N.O./ N.C. modes and virtual input.
2. Press Select to enter the parameter setting page and change the setting value.



</td></tr>
</table>

Table 14: Multi-function analog input terminals

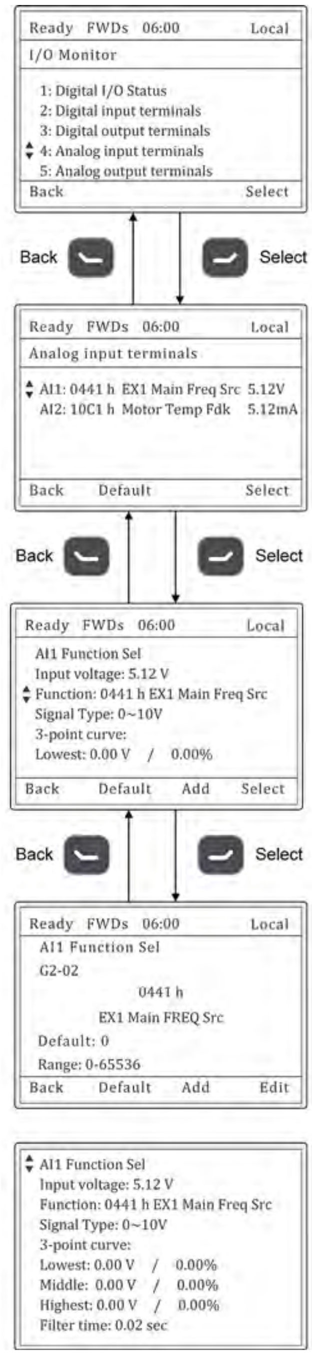
Function Name	Function Menu	Description
I/O monitor	Analog input terminals (multi-function)	1. Displays the information of analog input terminal function setting, current input value, filter time, three-point setting and signal type. 2. Press Select to enter the parameter setting page and change the setting value. 

Table 15: Multi-function analog output terminals

Function Name	Function Menu	Description
I/O monitor	Analog output terminals (multi-function)	1. Displays the information of analog output terminal function setting, current output value, signal type, bias, gain and reverse enable. 2. Press Select to enter the parameter setting page and change the setting value. 

Table 16: Keypad lock

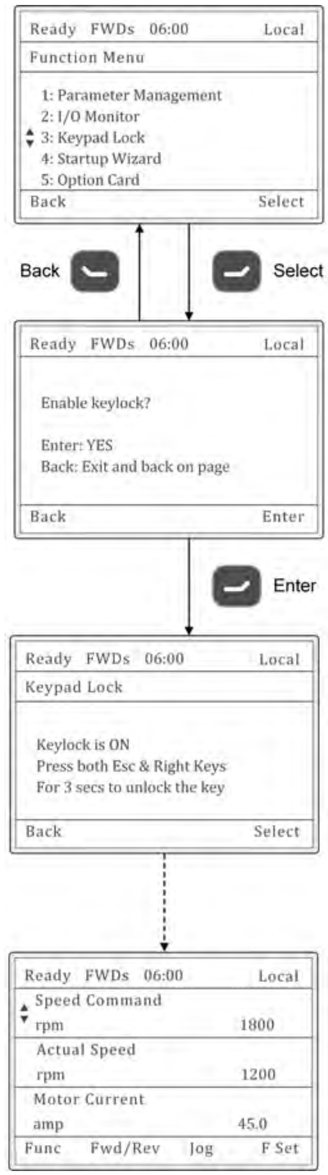
Function Name	Function Menu	Description
Keypad lock		1. This function locks the keys on the keypad. 2. The main screen does not display lock status after the keypad is locked but shows “Keypad lock is enabled” when you press any key under lock status. Press [ESC + right key] for three seconds to unlock the keypad. 

Table 17: Startup Wizard

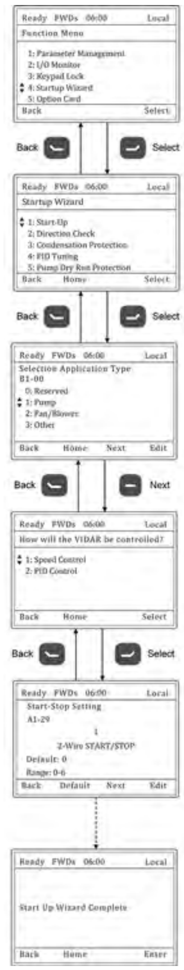
Function Name	Function Menu	Description
Startup Wizard	Start-Up	Select 4: Startup Wizard and 1: Start-Up for basic Speed Control or PID set up. 

Table 18: Option Card

Function Name	Function Menu	Description
Option Card		1. Display currently used option card. 2. Press Select to read further information. 

Table 19: Fault record

Function Name	Function Menu	Description
Fault record		1. Displays up to 30 fault records. 2. Press Select to read further information of the fault records. 

Table 20: Detailed fault records

Function Name	Function Menu	Description
Fault Record	Detailed fault records	1. Displays up to 6 fault records with details. 2. Press Select to read further information of the fault records. 

Table 21: Fire mode warning records

<table>
<tr><th>Function Name</th><th>Function Menu</th><th>Description</th></tr>
<tr><td>Fault Record</td><td>Fire mode warning records</td><td>
1. Displays up to 6 warning records in Fire-Mode.
2. Press Select to read further information of the warning records.


</td></tr>
</table>

Table 22: Fire mode fault records

Function Name	Function Menu	Description
Fault Record	Fire mode fault records	1. Displays up to 6 fault records in FireMode. 2. Press Select to read further information of the fault records. 

Table 23: PLC Function -

Function Name	Function Menu	Description
PLC Function	No Function	The PLC function is disabled for VIDAR.

Table 24: Parameter backup

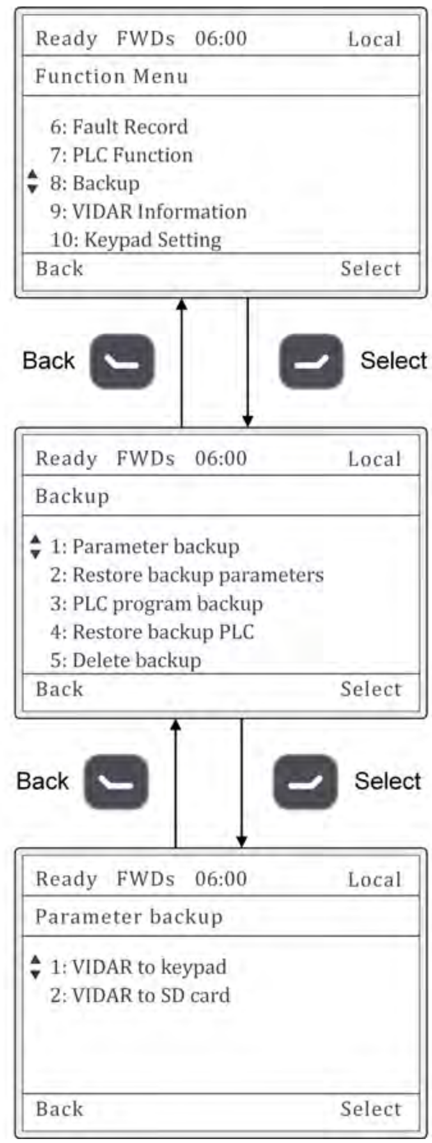
Function Name	Function Menu	Description
Backup	Parameter backup	1. Displays the function combination of copy parameter: 1. Copy to Keypad. 2. Copy to SD card. 2. Option 1: Copy to Keypad, saves up to 4 parameter files. 3. Option 2: Copy to SD card, save the parameters in SD card. 

Table 25: Restore backup parameters

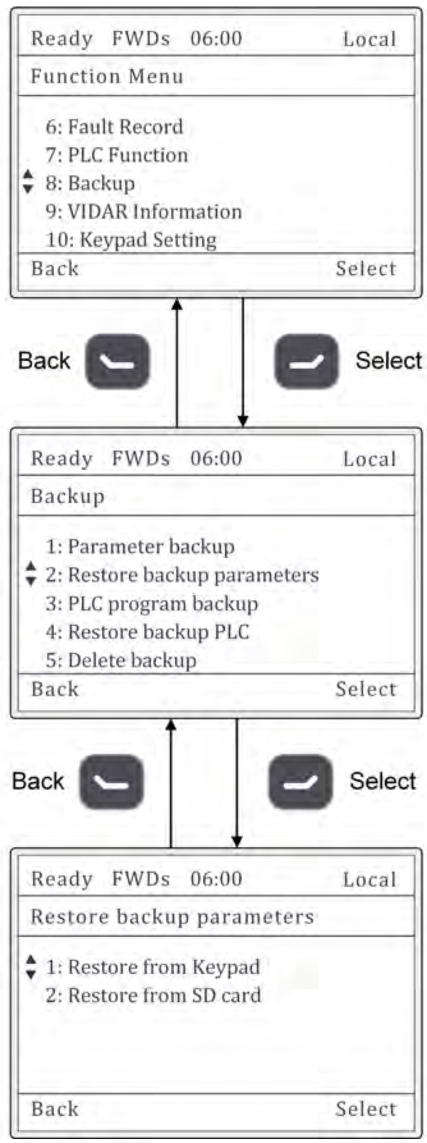
<table>
<tr><th>Function Name</th><th>Function Menu</th><th>Description</th></tr>
<tr><td>Backup</td><td>Restore backup parameters</td><td>1. Displays the function combination of restore parameter backup: 1. From Keypad. 2. From SD card.
2. Option 1: Restore from Keypad, recover 4 files parameter settings that are stored in the Keypad.
3. Option 2: Restore from SD card, recover all parameter settings that are stored in the SD card.

</td></tr>
</table>

Table 26: Delete backup

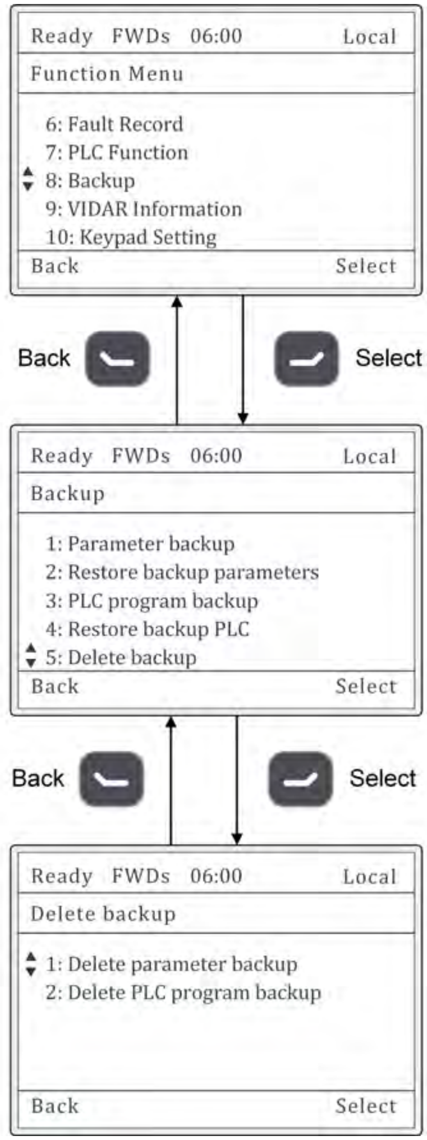
Function Name	Function Menu	Description
Backup	Delete backup	This function selects the parameter backup to be deleted. 

Table 27: VIDAR Information

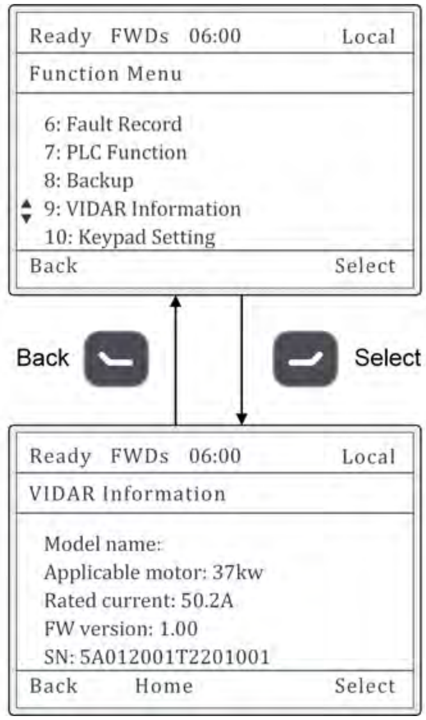
Function Name	Function Menu	Description
VIDAR Information		This function displays the VIDAR information. 

Table 28: Keypad Settings - Select language

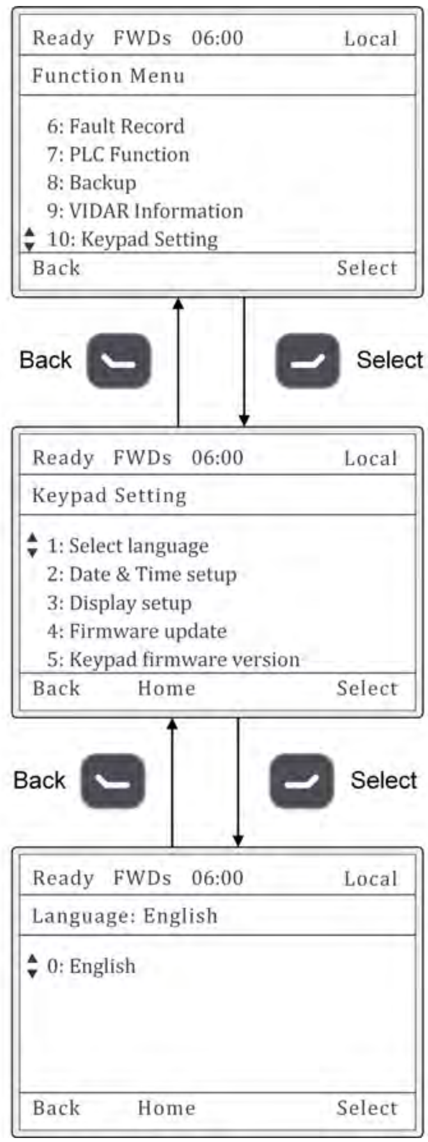
Function Name	Function Menu	Description
Keypad Setting	Select language	This function sets the keypad language. 

Table 29: Date and Time setup

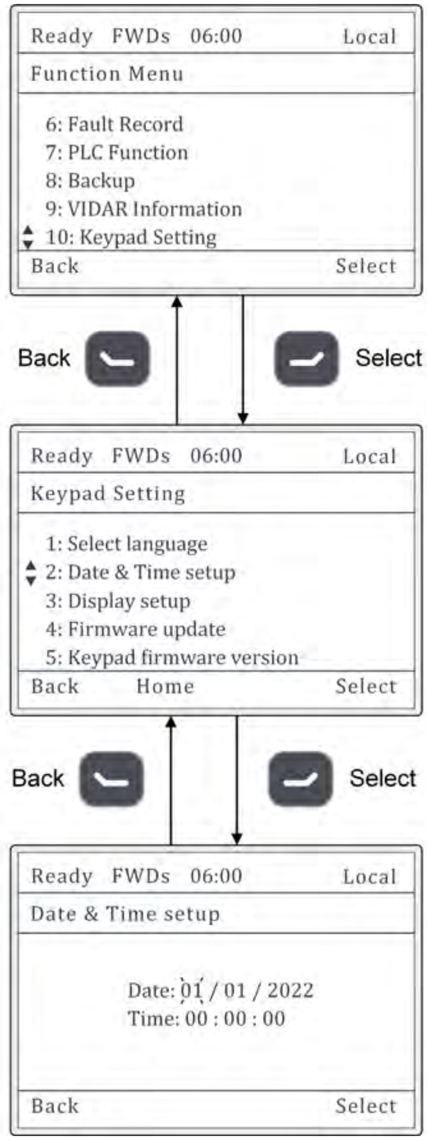
Function Name	Function Menu	Description
Keypad Setting	Date and Time setup	1. This function sets the keypad date and time. 

Table 30: Display setup

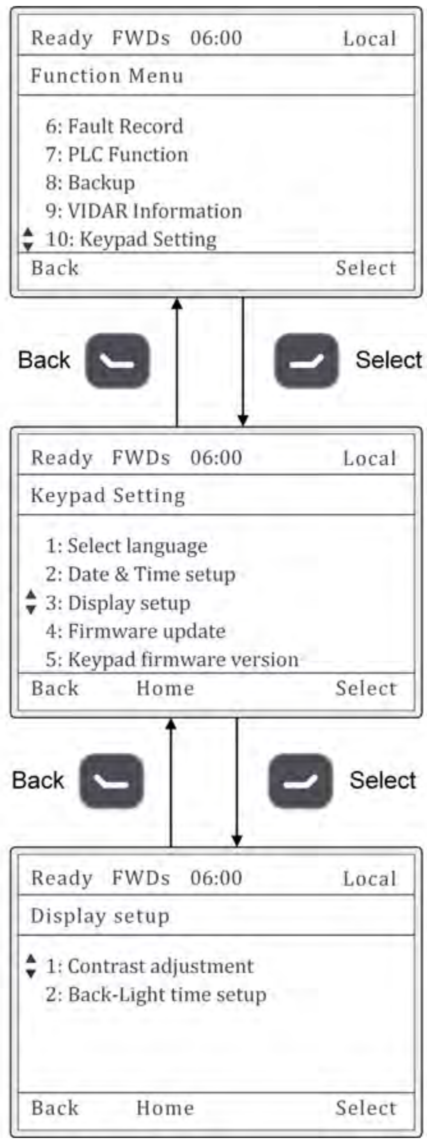
Function Name	Function Menu	Description
Keypad Setting	Display setup	This function sets the keypad display: 1. Contrast 2. Backlight 

Table 31: Firmware update

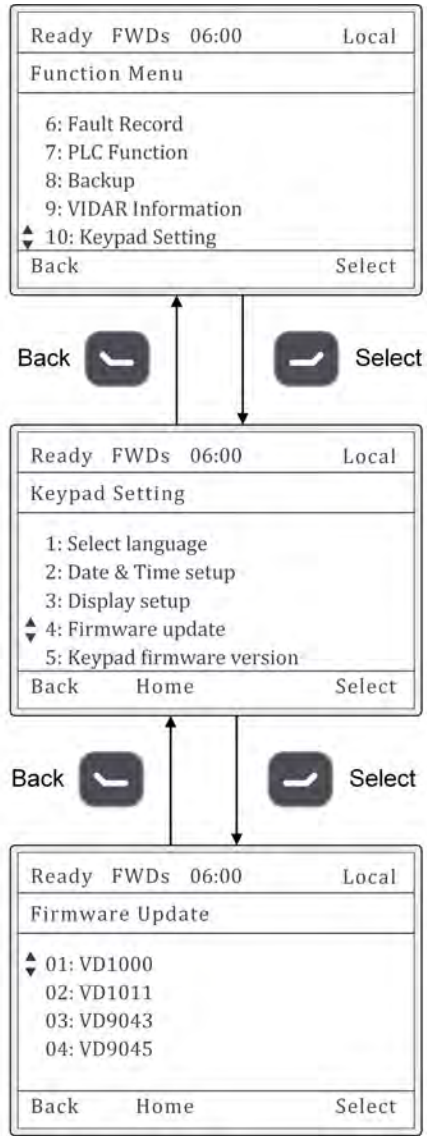
Function Name	Function Menu	Description
Keypad Setting	Firmware update	1. This function updates the drive firmware. 

Table 32: Keypad firmware version

<table>
<tr><th>Function Name</th><th>Function Menu</th><th>Description</th></tr>
<tr><td>Keypad Setting</td><td>Keypad firmware version</td><td>1. This function displays the keypad firmware version and the product serial number.

</td></tr>
</table>

Table 33: SD Card Management - Capacity status

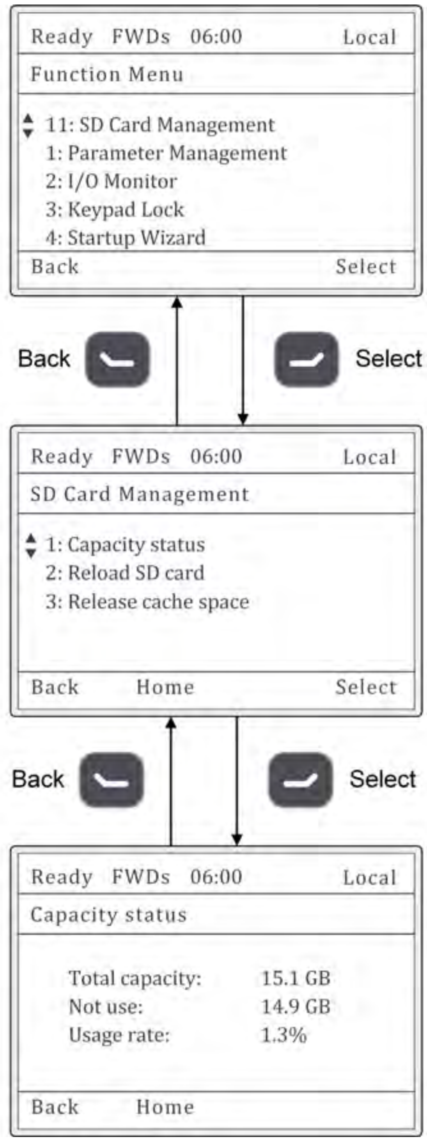
Function Name	Function Menu	Description
SD Card Management	Capacity status	This function displays the capacity information of the current inserted SD card. 

Table 34: SD Card Management - Capacity status

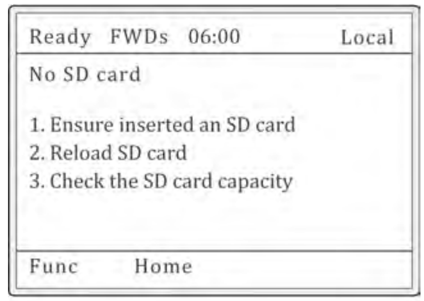
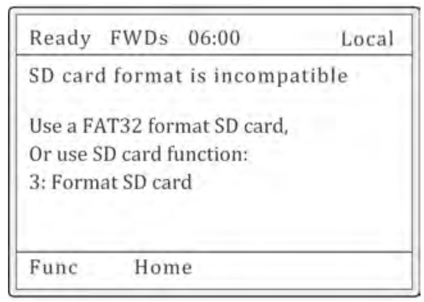
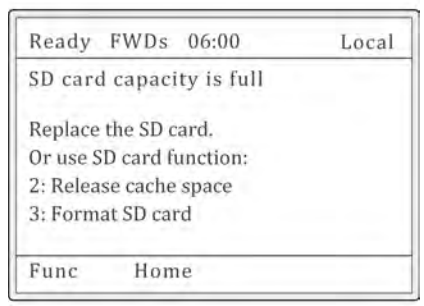
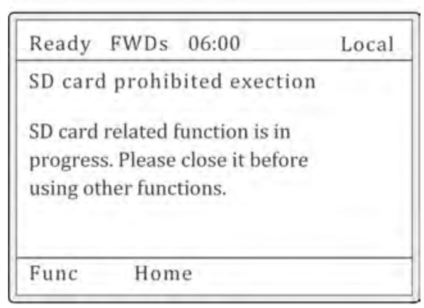
Function Name	Function Menu	Description
SD Card Management	Capacity status	2. The following are warning messages for SD card function. Follow the indications shown on the display for further operation.    

Table 35: SD Card Management - Reload SD card

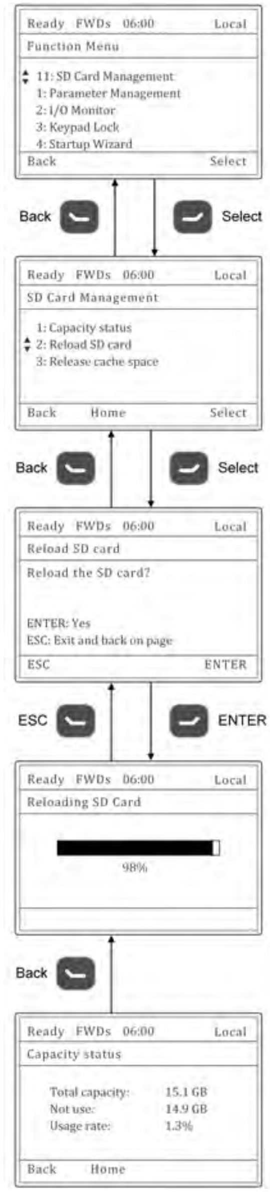
Function Name	Function Menu	Descriptions
SD Card Management	Reload SD card	Reload the SD card information. When the SD card is inserted after the VIDAR starts, execute the reload function first, then the SD card function can be operated. 

Table 36: SD Card Management - Release cache space

Function Name	Function Menu	Descriptions
SD Card Management	Release cache space	This function releases cache space. Releasing cache space could erase the cache file in the SD card and reduce the usage rate of the SD card. 

5.1.5.4 Operation flow

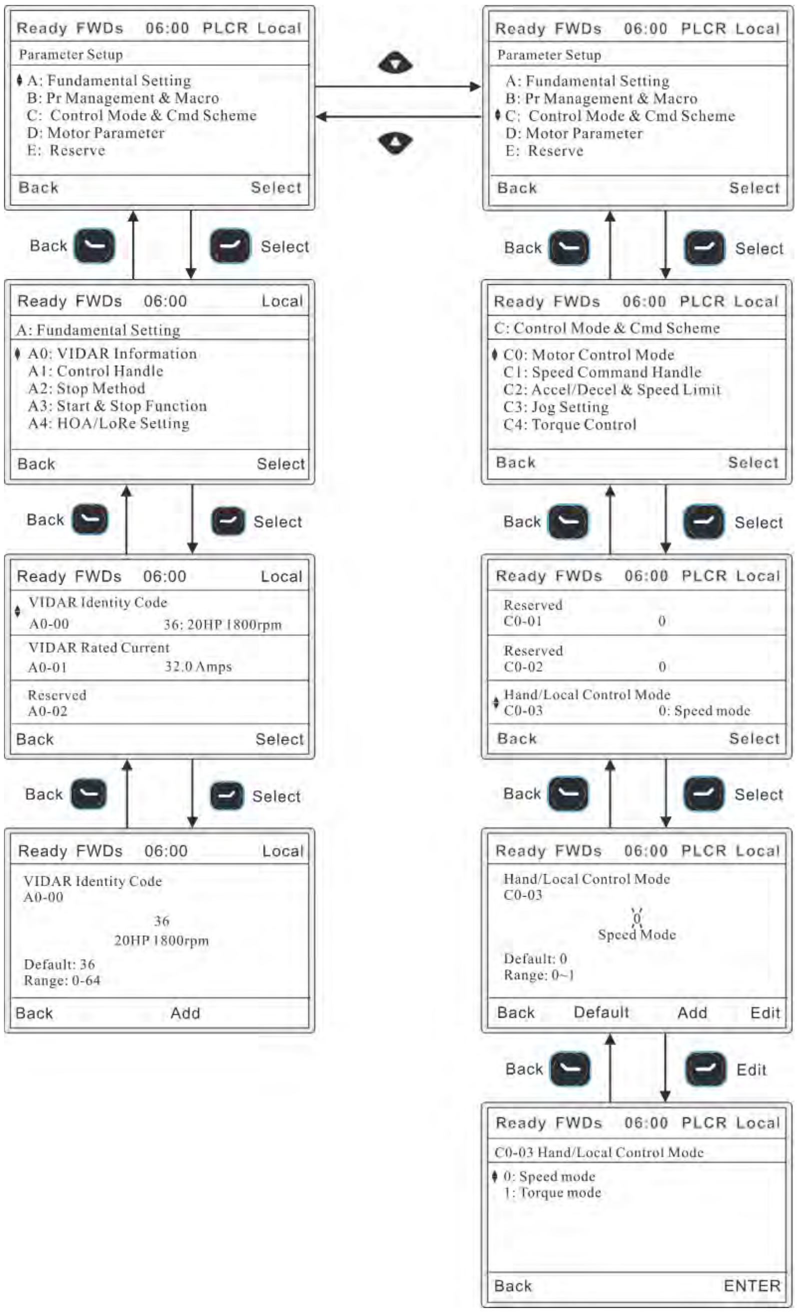
<table>
<tr><td colspan="2">The names and definitions of the 4 function keys are different according to the functional requirements of current display page and are fixedly displayed in the bottom column of the screen</td></tr>
<tr><td>On the main page, the names and definitions are as below:

</td><td>On the parameter setting page, the names and definitions are as below:

</td></tr>
</table>

NOTICE:
refer to 5.1.3 Keypad function descriptions on page 73 of EMD-AC-KP-CC01 for the available functions of each key.

5.1.5.4.1 Function (Func) operation flow



5.2 SD Card

5.2.1 Using precautions

1. Turn off the power before inserting or removing the SD card.
2. Format the SD card with exFAT before use.

5.2.2 SD Card installation

Install the SD card as shown in the figure below.

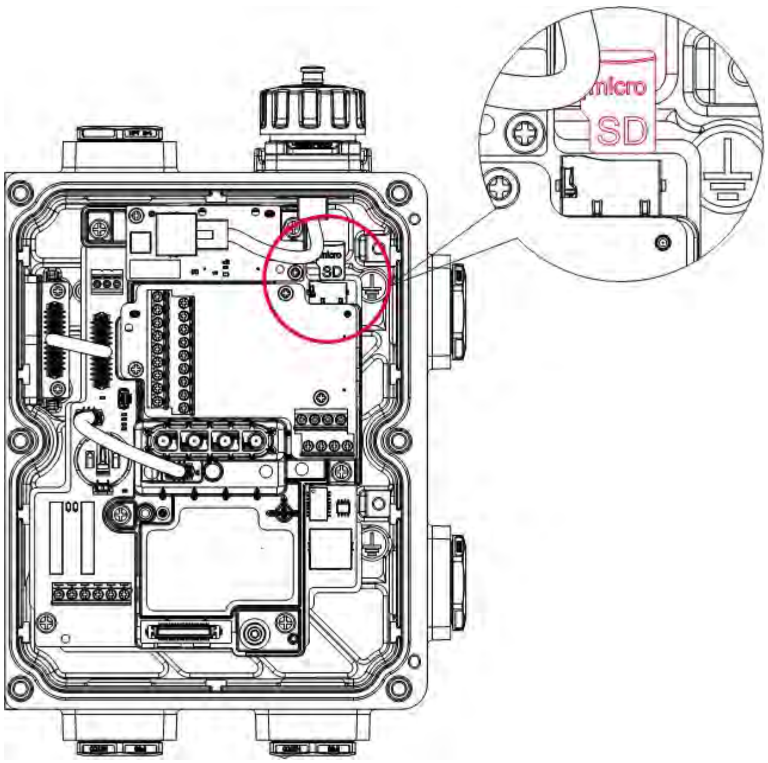


Figure 43: SD Card installation

5.2.3 SD Card folder name setup

VIDAR supports storing firmware in SD card and performing firmware update. The SD card internal folder name is generated as follows:

1. Turn off the drive power first, and then insert the formatted SD card into the slot on the control board.
2. After rebooting the drive, an ITT folder is automatically created in the SD card. The LOGFOLD and TEMPFOLD folders will be created in the ITT folder at the same time.
3. When using the SD card to store the firmware, you must first create a folder named *Firmware* in the SD card in the path: <SD card drive letter>\ITT\Firmware.
4. When using the SD card to store the parameter backup, you must first create a folder named *PARM* in the SD card in the path: <SD card drive letter>\ITT\PARM.
5. When executing copy parameter, it automatically copies to the corresponding folder. For example, when VIDAR performs copy parameter to SD card, it automatically points to the folder *ITT/PARM*.
6. When executing restore parameter, it automatically points to the corresponding folder. For example, when VIDAR performs restoring parameter from the SD card, it automatically points to the folder *ITT/PARM*.
7. The number of characters in folder name and backup file name is limited to eight English letters or numbers.

6 Initial Operation and Startup

6.1 Installation checklist

Before you begin to field-program your VIDAR Motor, the following activities are expected to have been completed.

☐ The Pump, Fan/Blower, or Other driven load has been installed, aligned, and prepared for start-up.

☐ The VIDAR Motor has been mounted properly [Refer to Section 3 Mechanical Installation].

☐ Supply power has been properly wired to the main power input terminals and ground lug [Refer to section 4-3 in Section 4 Electrical Wiring].

☐ External control connections have been wired to the appropriate control circuit terminals to meet specific customer requirements [Refer to section 4-4 in Section 4 Electrical Wiring].

☐ Connect the digital keypad to the VIDAR RJ45 waterproof connector [Refer to Section 5 Operation Interface].

Once these steps are completed, power up the VIDAR.

6.2 Basic startup

- The VIDAR's default mode of operation utilizes Local Speed Control functionality. The VIDAR motor will run in Local Speed Control, using a connected keypad, without setting any parameters or configurations. An externally connected VIDAR keypad set to local mode can be used for the Start/Stop command, and for setting the operating Speed prior to any other programming.
- Configuring VIDAR for Remote Control operation can be performed using the VIDAR Startup Wizard, also available from the Function Menu. You may also setup the VIDAR manually setting the applicable parameters as noted alongside the Startup Wizard settings.
- This chapter will guide you, step by step as you progress, how to configure VIDAR for remote control operation using the Startup Wizard or by setting the specific parameters referenced next to the wizard screens.

WARNING:

Unexpected start hazard. VIDAR can automatically start when power is applied if the keypad is in REMOTE mode. Before running the Startup Wizard, place the keypad in LOCAL mode using the LOC | REM button and press the STOP button.

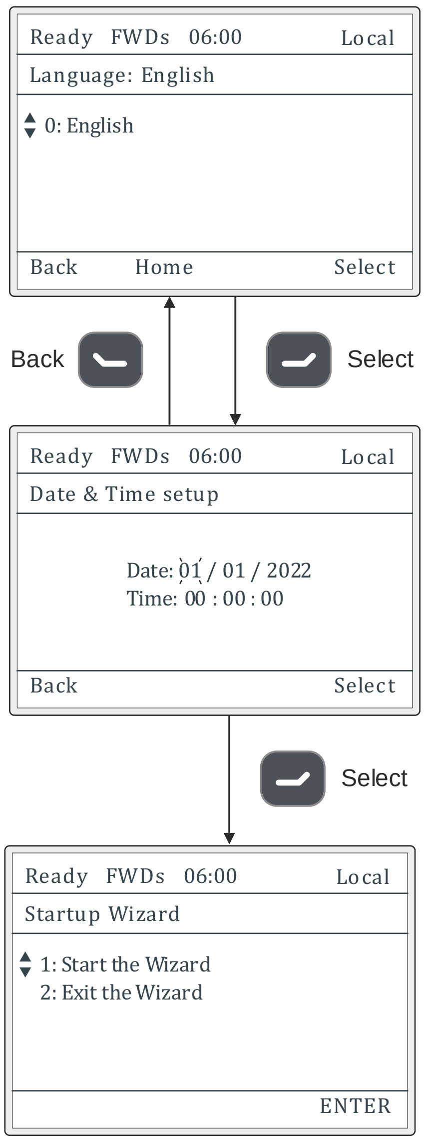
CAUTION:

When main power is first applied to a VIDAR, before running the Startup Wizard, verify the keypad is set to LOCAL control mode. If the keypad is in REMOTE control mode, press the LOC | REM button on the keypad to set the keypad to local mode.

6.3 First power-up

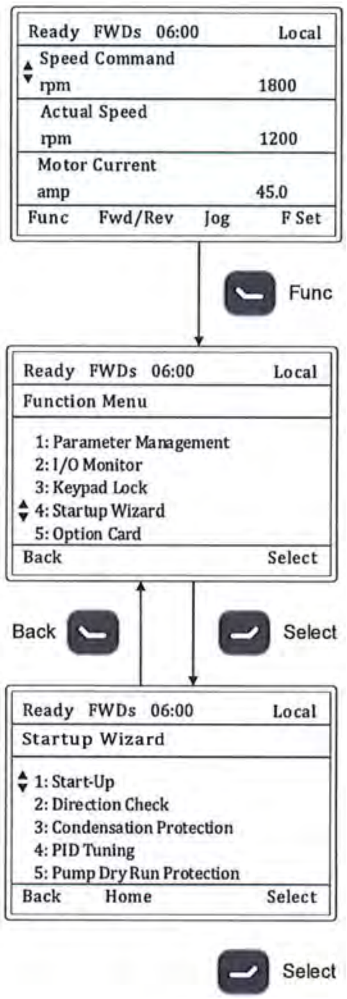
When main power is applied to a VIDAR for the first time, the keypad will prompt you to complete the following steps:

- 1. Select Language
  2. Set the Date and Time
  3. Select "Start" or "Exit" the Wizard
- The Keypad Screen Shots that follow will show step by step, how to configure this functionality.



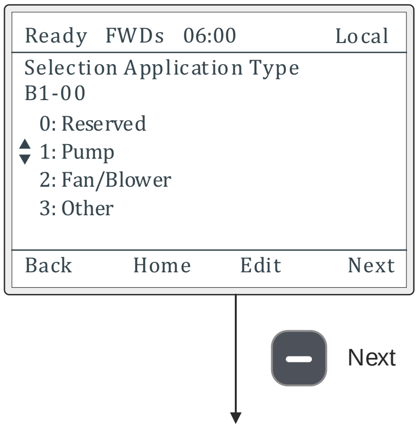
6.4 Startup wizard

- On first startup, selecting "1: Start the wizard" will continue the process for Remote Control operation.
- Alternatively, if the VIDAR had previously been started, or if the "Home" screen button has been pressed, the Startup Wizard can also be selected as follows:

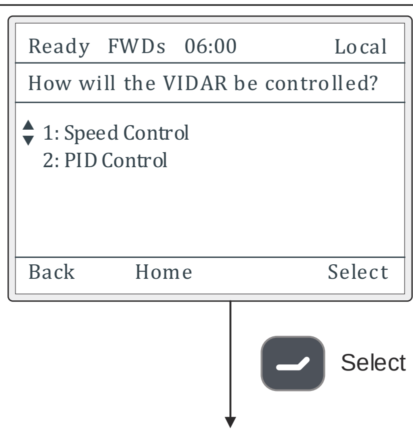


6.5 Speed control

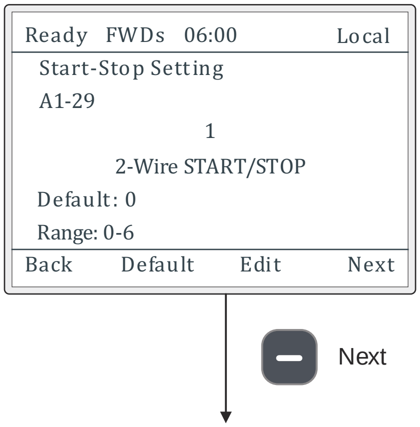
1. Select Application Type

Keypad Screen	Button Sequence	Description
	• Edit • Arrow Up/ Down • Select • Next	The Wizard sets B1-00 to the selected value and changes the following parameters based on the selection. **1: Pump** C2-00: 5s C2-01: 5s **2: Fan/Blower** C2-00: 20s C2-01: 20s C2-08: 5s C2-11: 5s **3: Other** C2-00: 20s C2-01: 20s C2-08: 5s C2-11: 5s

2. Select Operating Mode

Keypad Screen	Button Sequence	Description
	• Arrow Up/ Down • Select	Select Speed Control

3. Select Start and Stop Source

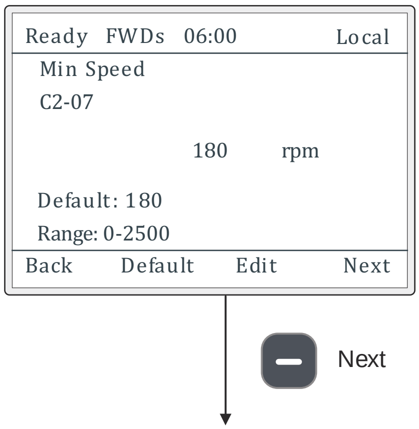
Keypad Screen	Button Sequence	Description
	• Edit • Arrow Up/ Down • Select • Next	The Wizard sets A1-29 to the selected value and changes the following parameters based on the selection. **1: 2-WIRE START/STOP** A1-00: 0: External 1 A1-01: 1: S1 START A1-02: 2: MI1 A1-05: 0: Edge Triggered **2: 3-WIRE START/STOP** A1-00: 0: External 1 A1-01: 4: S1 START, S2 STOP A1-02: 2: MI1 A1-03: 3: MI2 **3: MOTOR CONTACTOR** A1-00: 0: External 1 A1-01: 1: S1 START A1-02: 2: MI1 A1-05: 0: Level Triggered **4: FWD/REV** A1-00: 0: External 1 A1-01: 3: S1 FWD, S2 REV A1-02: 2: MI1 A1-03: 3: MI2 **5: KEYPAD** A1-00: 0: External 1 A1-01: 7: Keypad **6: ETHERNET** A1-00: 0: External 1 A1-01: 9: Ethernet

4. Select Speed Reference (Setpoint) Source

Keypad Screen	Button Sequence	Description
Ready FWDs 06:00 Local EX1 Main Speed Source C1-01 1 COM1 (Keypad) Default: 1 Range: 0-18 Back Default Edit Next Next	• Edit • Arrow Up/ Down • Select • Next	**1: COM1 (Keypad)** This is the default setting when configuring VIDAR speed reference source for the first time. **3: EtherNET** Speed setpoint set using Ethernet IP or Modbus TCP/IP Communications.
Ready FWDs 06:00 Local EX1 Main Speed Src C1-01 6: Reserved 7: AI1 8: AI2 9: Reserved Back Default Edit Next Next Ready FWDs 06:00 Local AI1 Signal Type G2-03 2 4-20mA Default: 2 Range: 0-2 Back Default Edit Next Next	• Edit • Arrow Up/ Down • Select • Next	**7: AI1 or 8: AI2** Speed setpoint using one of the analog inputs. Select AI1 or AI2. Once AI1 or AI2 is selected, the Next screen offers selection of AI type. For AI1 or AI2, the Wizard sets G2-03 or G2-22 to the selected value. Selections include: 0: 0-10 V 1: 0-20mA 2: 4-20mA (Default) For the selected analog AI1 or AI2, by default, VIDAR will set the minimum and maximum values as follows. The minimum of the signal (0V, 0mA, or 4mA) corresponds to 0 RPM. The maximum of the signal (10V or 20mA) corresponds to the VIDAR maximum speed set in C2-17. By default, the maximum speed is 1770 RPM for 1800 RPM VIDARs and 3550 RPM VIDARs.

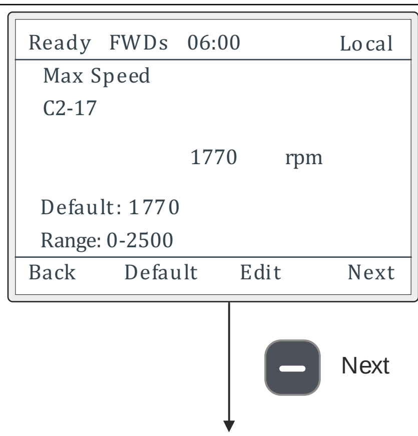
5. Set the Minimum Speed

By default, the minimum speed is set to 10% of the typical motor synchronous speed required for motor cooling. Some applications such as pumps, only develop pressure at the square of the operating speed ($p = 1/2 * \rho * v^2$). Caution should be taken to make sure that the minimum speed is set high enough to prevent the pump from “dead heading” or experience flow below the allowable minimum flow. Increase the minimum speed based on the requirements of the driven load to prevent operation below minimum flow.

Keypad Screen	Button Sequence	Description
	• Edit • Arrow Up/ Down/Lett/ Right • Select • Next	The Wizard sets C2-27 to the selected value. **For 1800 RPM MOTOR** Default: 180 Range: 0-2500 RPM **For 3600 RPM MOTOR** Default: 360 Range: 0-4500 RPM

6. Set the Maximum Speed

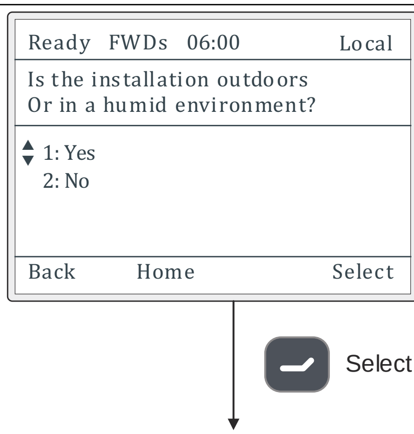
By default, the maximum speed is set to the motor nameplate speed. Some applications such as pumps develop pressure at the square of the operating speed ($p = 1/2 * \rho * v^2$), and the Power consumed at the cube of the speed ($P = k * v^3$). Caution should be taken to make sure that the maximum speed is within all limits of the system to prevent damage that may occur.

Keypad Screen	Button Sequence	Description
	• Edit • Arrow Up/ Down/Lett/ Right • Select • Next	The Wizard sets C2-17 to the selected value. **For 1800 RPM MOTOR** Default: 1770 Range: 0-2500 RPM **For 3600 RPM MOTOR** Default: 3550 • Range: 0-4500 RPM

7. Enable Condensation Protection

Condensation Protection is typically used for outdoors installations or in humid environments to keep the motor warm and dry when it is not running. When condensation protection is enabled, VIDAR is connected to 460V mains, and VIDAR is not running VIDAR will inject DC pulse current into the motor windings to generate heat without generating shaft rotation. By default, VIDAR condensation protection will turn on if the motor winding temperature drops below 25°C. Refer to parameter section J4 for additional information.

NOTICE:
If 460V main power is disconnected condensation protection will be disabled.

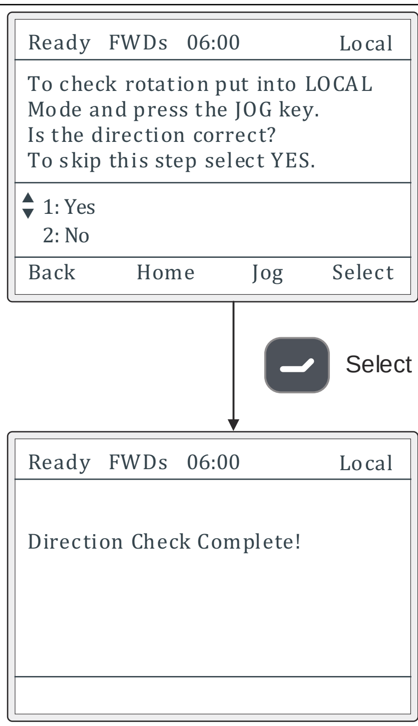
Keypad Screen	Button Sequence	Description
	• Arrow Up/ Down • Select • Next	The Wizard sets J4-00 to the selected value. **1: Yes** J4-00: 1: Enabled **2: No** J4-00: 0: Disabled

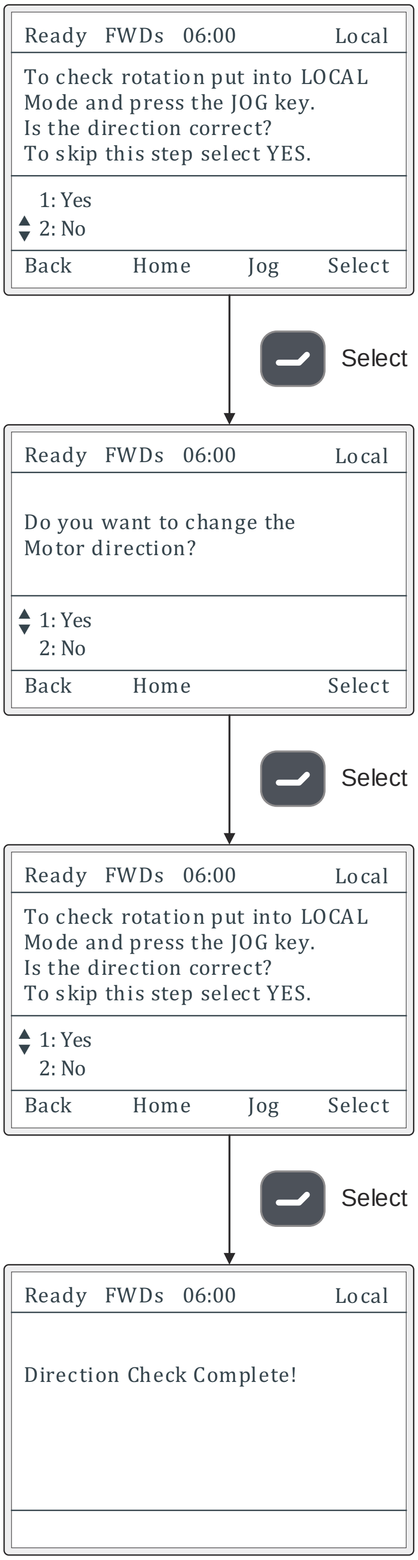
8. Check Motor Rotation

Jogging the motor for correct rotation can be accomplished through the Direction Check function. Pressing the JOG button will rotate the motor at 90 RPM and will continue to do so while the button is pressed while confirming the rotation to be correct (or incorrect). If incorrect the VIDAR will prompt you to correct the rotation.

NOTICE:

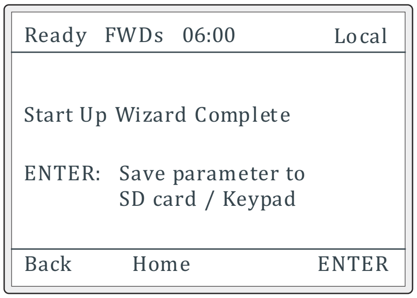
The VIDAR is factory wired to always rotate in a conventional clockwise rotation (viewed from the NDE). There is no need to change any wiring on the motor. Changing direction accomplished by an internal VIDAR parameter.

Keypad Screen	Button Sequence	Description
	• LOC | REM • Jog • Arrow Up/ Down • Select	**1: Yes** Direction Check Complete

Keypad Screen	Button Sequence	Description
	• Arrow Up/ Down • Select • Arrow Up/ Down • Select • LOC | REM • Jog • Arrow Up/ Down • Select	**2: No** Proceeds to next screen The Wizard sets A1-28 to the new value. **1: Yes** A1-28: 1: UWV **2: No** Direction Check Complete

9. Startup Wizard Complete

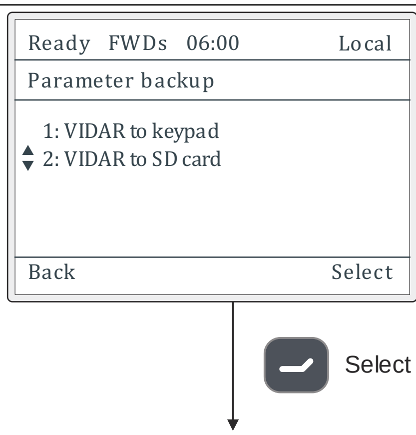
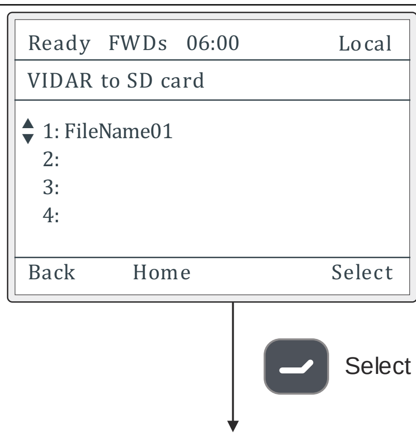
- Once the Startup Wizard is complete, the "Home" button will exit the Wizard and return to the main Home screen. The VIDAR is ready to operate as configured through the Wizard when in Remote.
- To store programmed parameters to the Keypad or to an internal SD card, press the "ENTER" button.

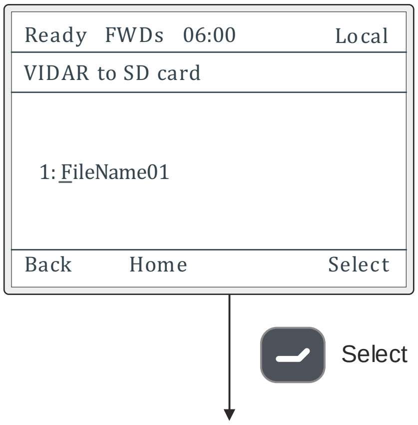
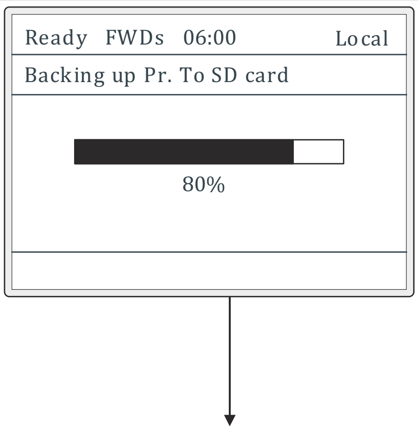
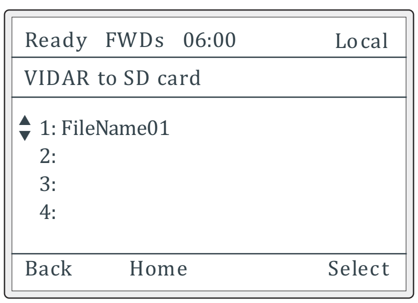
Keypad Screen	Button Sequence	Description
	Home or ENTER	**Home** Returns to the Main Monitoring Screen. **ENTER** Proceeds to next screen

10. Parameter backup (Keypad or SD card)

- The VIDAR allows the user to store all programmed parameters to the keypad, or to an internal SD card, which can be used as a backup file for download to the VIDAR.
- Saving the parameters will copy existing parameters from the VIDAR to the Keypad, and/or SD card. This provides two purposes:
    1. Provides a backup or the settings if settings are inadvertently changed, or if reprogramming is required.
    2. If you have more than one VIDAR with the same or similar programming, you can program one unit, save to the keypad or SD card, then move the keypad or SD card to a sister unit to download all the settings.

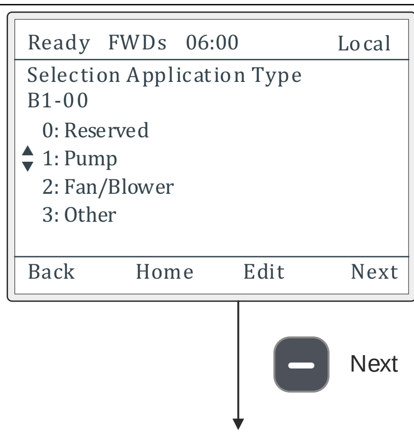
NOTICE:
The parameters to be downloaded must be for the same VIDAR frame size and base speed as the source VIDAR.

Keypad Screen	Button Sequence	Description
	• Arrow Up/ Down • Select	**Home** Returns to the Main Monitoring Screen. **Select** Proceeds to next screen
	• Arrow Up/ Down • Select	**Home** Returns to the Main Monitoring Screen. **Select** Proceeds to next screen. Up to 4 separate parameter files can be saved to each keypad

Keypad Screen	Button Sequence	Description
	• Arrow Up/ Down/Left/ Right • Enter	**FileName** To rename the file, use the up or down arrows to find the letter to use and the right or left arrows to go to the next letter position. **Enter** Once File Name is complete, press Enter.
	•	Wait for the parameter backup process to complete.
	• Home	**Home** Returns to the Main Monitoring Screen.

6.6 PID Control

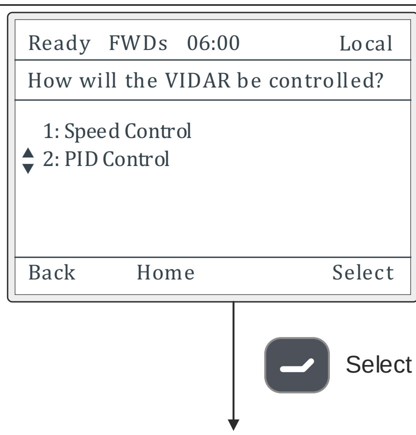
1. Select Application Type

<table>
<tr><th>Keypad Screen</th><th>Button Sequence</th><th>Description</th></tr>
<tr><td>
</td><td>

- Edit
- Arrow Up/ Down
- Select
- Next

</td><td>The Wizard sets B1-00 to the selected value and changes the following parameters based on the selection.
1: Pump
C2-00: 5s
C2-01: 5s
2: Fan/Blower
C2-00: 20s
C2-01: 20s
C2-08: 5s
C2-11: 5s
3: Other
C2-00: 20s
C2-01: 20s
C2-08: 5s
C2-11: 5s</td></tr>
</table>

2. Select Operating Mode

<table>
<tr><th>Keypad Screen</th><th>Button Sequence</th><th>Description</th></tr>
<tr><td>
</td><td>

- Arrow Up/ Down
- Select

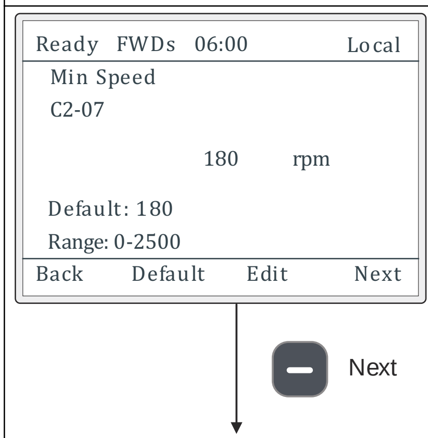
</td><td>Select PID Control</td></tr>
</table>

3. Select Start and Stop Source

Keypad Screen	Button Sequence	Description
Ready FWDs 06:00 Local Start-Stop Setting A1-29 1 2-Wire START/STOP Default: 0 Range: 0-6 Back Default Edit Next Next	• Edit • Arrow Up/ Down • Select • Next	The Wizard sets A1-29 to the selected value and changes the following parameters based on the selection. **1: 2-WIRE START/STOP** A1-00: 0: External 1 A1-01: 1: S1 START A1-02: 2: MI1 A1-05: 0: Edge Triggered **2: 3-WIRE START/STOP** A1-00: 0: External 1 A1-01: 4: S1 START, S2 STOP A1-02: 2: MI1 A1-03: 3: MI2 **3: MOTOR CONTACTOR** A1-00: 0: External 1 A1-01: 1: S1 START A1-02: 2: MI1 A1-05: 0: Level Triggered **4: FWD/REV** A1-00: 0: External 1 A1-01: 3: S1 FWD, S2 REV A1-02: 2: MI1 A1-03: 3: MI2 **5: KEYPAD** A1-00: 0: External 1 A1-01: 7: Keypad **6: ETHERNET** A1-00: 0: External 1 A1-01: 9: Ethernet

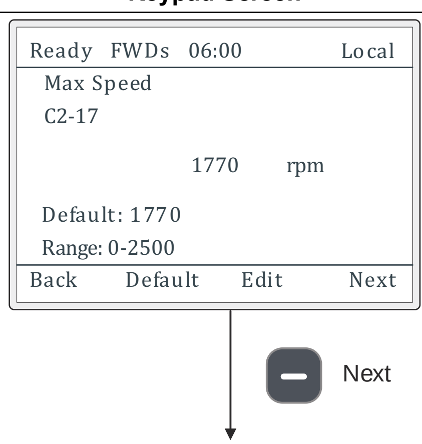
4. Set the Minimum Speed

By default, the minimum speed is set to 10% of the typical motor synchronous speed required for motor cooling. Some applications such as pumps, only develop pressure at the square of the operating speed ($p = 1/2 * \rho * v^2$). Caution should be taken to make sure that the minimum speed is set high enough to prevent the pump from “dead heading” or experience flow below the allowable minimum flow. Increase the minimum speed based on the requirements of the driven load to prevent operation below minimum flow.

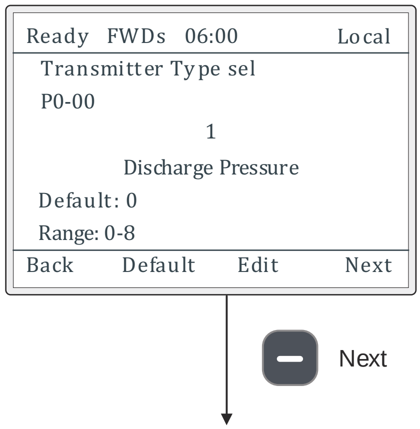
Keypad Screen	Button Sequence	Description
	• Edit • Arrow Up/ Down/Lett/ Right • Select • Next	The Wizard sets C2-27 to the selected value. **For 1800 RPM MOTOR** Default: 180 Range: 0-2500 RPM **For 3600 RPM MOTOR** Default: 360 Range: 0-4500 RPM

5. Set the Maximum Speed

By default, the maximum speed is set to the motor nameplate speed. Some applications such as pumps develop pressure at the square of the operating speed ($p = 1/2 * \rho * v^2$), and the Power consumed at the cube of the speed ($P = k * v^3$). Caution should be taken to make sure that the maximum speed is within all limits of the system to prevent damage that may occur.

Keypad Screen	Button Sequence	Description
	• Edit • Arrow Up/ Down/Lett/ Right • Select • Next	The Wizard sets C2-17 to the selected value. **For 1800 RPM MOTOR** Default: 1770 Range: 0-2500 RPM **For 3600 RPM MOTOR** Default: 3550 Range: 0-4500 RPM

6. Select Transmitter Type

Keypad Screen	Button Sequence	Description
	• Edit • Arrow Up/ Down • Select • Next	The Wizard sets P0-00 to the selected value and changes the following parameters based on the selection. **1: Discharge Pressure** P0-29: 3.00 PID P Gain P0-30: 1.5 PID I Time **2: Suction Pressure** P0-19: 1: PID err = PID Fdk – PID Ref P0-29: 3.00 PID P Gain P0-30: 1.5 PID I Time **3: Differential Pressure** P0-29: 3.00 PID P Gain P0-30: 1.5 PID I Time **4: Flow** P0-29: 1.00 PID P Gain P0-30: 30.0 PID I Time **5: Discharge Level** P0-29: 1.00 PID P Gain P0-30: 30.0 PID I Time **6: Suction Level** P0-19: 1: PID err = PID Fdk – PID Ref P0-29: 1.00 PID P Gain P0-30: 30.0 PID I Time **7: Temperature** P0-29: 1.00 PID P Gain P0-30: 30.0 PID I Time **8: Other** P0-29: 1.00 PID P Gain P0-30: 30.0 PID I Time

7. Select PID Analog Input Feedback Source

<table>
<tr><th>Keypad Screen</th><th>Button Sequence</th><th>Description</th></tr>
<tr><td>Ready FWDs 06:00 Local
PID Fdk1 Src
P0-04
7
AI1
Default: 0
Range: 0-8
Back Default Edit Next

Next</td><td>• Edit
• Arrow Up/ Down
• Select
• Next</td><td>The Wizard sets P0-04 to the selected value and changes the following parameters based on the selection.
Process Feedback Source using one of the analog inputs. Select AI1 or AI2.
1: AI1
2: AI2</td></tr>
<tr><td>Ready FWDs 06:00 Local
AI1 Signal Type
G2-03
2
4-20mA
Default: 2
Range: 0-2
Back Default Edit Next

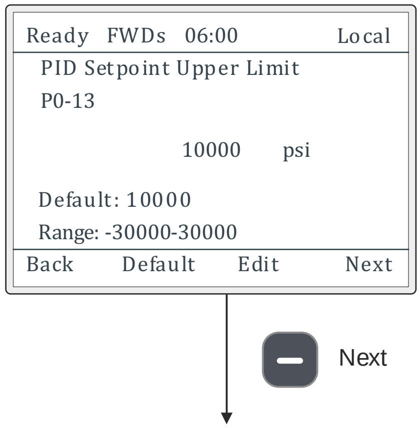
Next</td><td>• Edit
• Arrow Up/ Down
• Select
• Next</td><td>The Next screen offers selection of AI type.
For AI1 / AI2, the Wizard sets G2-03 / G2-22 to the selected value. Selections include:
0: 0-10 V
1: 0-20mA
2: 4-20mA (Default)</td></tr>
</table>

8. Select the PID Process Unit (PSI, GPM, Ft, etc.)

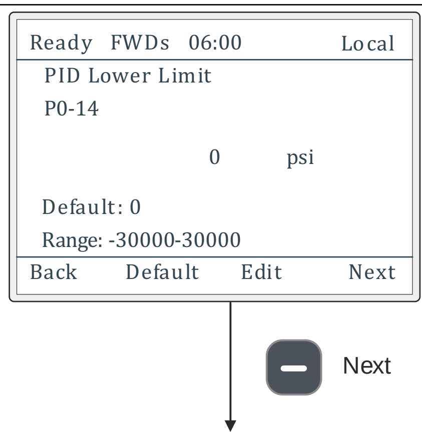
<table>
<tr><th>Keypad Screen</th><th>Button Sequence</th><th>Description</th></tr>
<tr><td>Ready FWDs 06:00 Local
PID Unit
P0-11
17
PSI
Default: 0
Range: 0-37
Back Default Edit Next

Next</td><td>• Edit
• Arrow Up/ Down
• Select
• Next</td><td>The Wizard sets P0-11 to the selected value and changes the following parameters based on the selection.
<table>
<tr><th colspan="3">Selections include:</th></tr>
<tr><td>0: Hz</td><td>13: lb/h</td><td>26: ftWG</td></tr>
<tr><td>1: rpm</td><td>14: ft/s</td><td>27: psi</td></tr>
<tr><td>2: %</td><td>15: ft/m</td><td>28: atm</td></tr>
<tr><td>3: m/s</td><td>16: m</td><td>29: L/s</td></tr>
<tr><td>4: kW</td><td>17: ft</td><td>30: L/m</td></tr>
<tr><td>5: HP</td><td>18: degC</td><td>31: L/h</td></tr>
<tr><td>6: ppm</td><td>19: degF</td><td>32: m3/s</td></tr>
<tr><td>7: 1/m</td><td>20: mbar</td><td>33: m3/h</td></tr>
<tr><td>8: kg/s</td><td>21: bar</td><td>34: GPM</td></tr>
<tr><td>9: kg/m</td><td>22: Pa</td><td>35: CFM</td></tr>
<tr><td>10: kg/h</td><td>23: kPa</td><td>36: kg</td></tr>
<tr><td>11: lb/s</td><td>24: mWG</td><td>37: kg/cm2</td></tr>
<tr><td>12: lb/m</td><td>25: inWG</td><td></td></tr>
</table></td></tr>
</table>

9. Select the Upper Limit Transmitter Scaling

Keypad Screen	Button Sequence	Description
	• Edit • Arrow/Up/ Down /Left/ Right • Select • Next	The Wizard sets P0-13 to the selected value based on the selection. The Setpoint Upper Limit of the feedback signal (10V or 20mA) out of the transmitter corresponds to the transmitters maximum output range from the transmitters rating plate.

10. Select the Lower Limit Transmitter Scaling

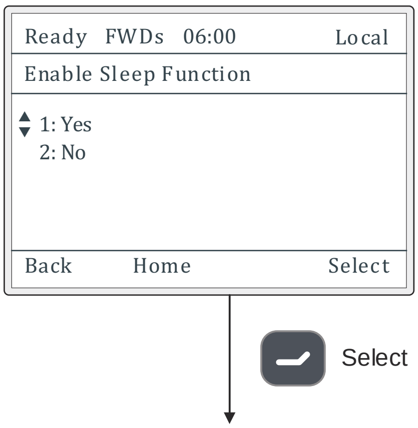
Keypad Screen	Button Sequence	Description
	• Edit • Arrow/Up/ Down /Left/ Right • Select • Next	• The Wizard sets P0-14 to the selected value based on the selection. • • The Setpoint Lower Limit of the feedback signal (0V, 0mA or 4mA) out of the transmitter corresponds to the transmitters minimum output range from the transmitters rating plate. This is typically 0.

11. PID Setpoint Source

Keypad Screen	Button Sequence	Description
Ready FWDs 06:00 Local PID 1 ref1 Src P0-02 1 COM1 (Keypad) Default: 1 Range: 0-16 Back Default Edit Next Next	• Edit • Arrow Up/ Down • Select • Next	The Wizard sets P0-02 to the selected value and configures the setpoint to be sourced in one of two ways. **1: COM1 (Keypad)** This is the default setting when PID Control was previously selected in step 2
Ready FWDs 06:00 Local PId1 Ref1 Src P0-02 6: Reserved 7: AI1 8: AI2 9: Reserved Back Default Edit Next Next Ready FWDs 06:00 Local AI1 Signal Type G2-22 2 4-20mA Default: 2 Range: 0-2 Back Default Edit Next Next	• Edit • Arrow Up/ Down • Select • Next	**7: AI1 or 8: AI2** **Note: You cannot select the same AI that is used for PID feedback source in step 7.** Select AI1 or AI2. You must pick the other AI selection. Once AI1 or AI2 is selected, the Next screen offers selection of AI type. For AI1 / AI2, the Wizard sets G2-03 / G2-22 to the selected value. Selections include: 0: 0-10 V 1: 0-20mA 2: 4-20mA (Default)

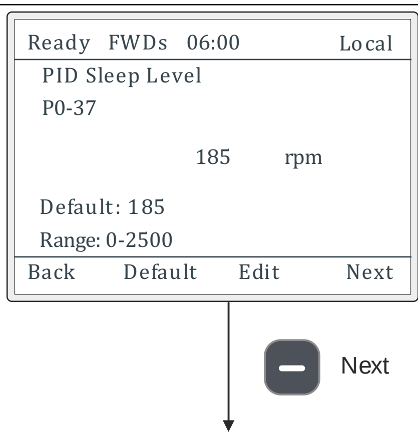
6.7 PID Sleep Function

1. Enable Sleep Function (optional)

Keypad Screen	Button Sequence	Description
	• Arrow Up/ Down • Select	The Wizard sets P0-36 to the selected value. **1: Yes** P0-36: 1: Motor Speed Goes to the next screen. **2: No** P0-36: 0: Disabled Jump ahead to the Condensation Pro-tectection Selection

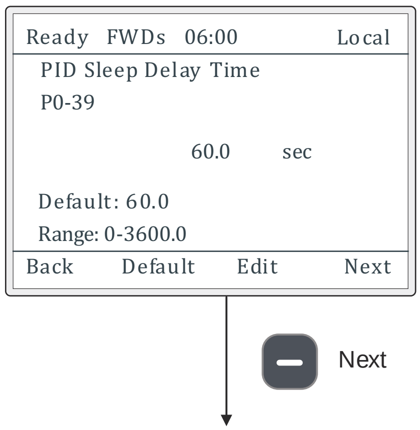
2. Set Sleep Speed Value

This is the low-speed level used to put the VIDAR to sleep. This value must be higher than the motor minimum speed set in step 4: Parameter C2-27.

Keypad Screen	Button Sequence	Description
	• Edit • Arrow/Up/ Down /Left/ Right • Next	The Wizard sets P0-37 to the selected value. **For 1800 RPM MOTOR** Default: 185* set higher than minimum speed in C2-27. **For 3600 RPM MOTOR** Default: 365* set higher than minimum speed in C2-27. *These must be set higher than motor minimum speed in C2-27.

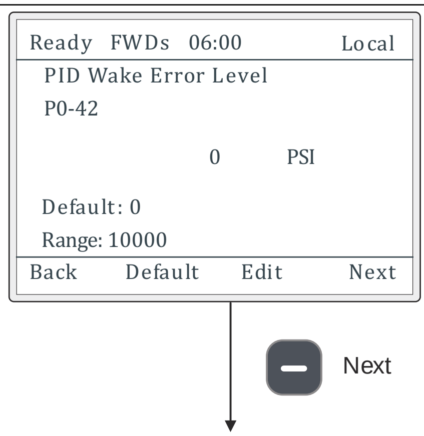
3. Set Sleep Delay Time

This is the delay time once the low-speed level is achieved before the VIDAR goes to sleep. This value can be adjusted based on the application. For smaller systems this value can be reduced to prevent overshooting the setpoint, or for larger systems, increased to make sure the setpoint is achieved.

<table>
<tr><th>Keypad Screen</th><th>Button Sequence</th><th>Description</th></tr>
<tr><td>
</td><td>• Edit
• Arrow/Up/ Down /Left/ Right
• Next</td><td>The Wizard sets P0-39 to the selected value.</td></tr>
</table>

4. Set Wake Up Value

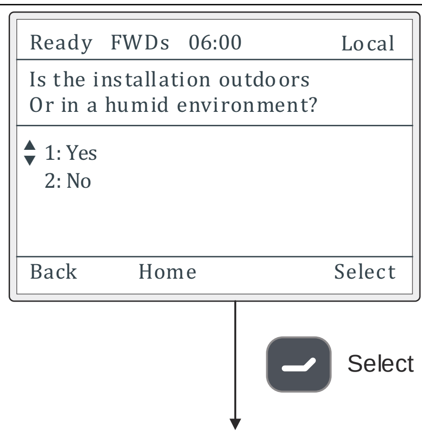
- • This is the real value in the assigned PID units, above or below, the PID setpoint before the VIDAR wakes up and starts running again. Depending on the application. The transmitter type selection determines if the Wake Level is above or below the setpoint.
- Examples:
  1. Discharge Pressure - If the pressure setpoint is set for 100 PSI discharge pressure, and the Wake Error Level is set for 10 PSI. VIDAR will maintain constant pressure to meet the setpoint. If motor speed reduces to the PID Sleep Level (185 RPM), VIDAR will go to sleep until the pressure decreases by 10 PSI. Therefore, at 90 PSI, the VIDAR will wake up and start running again.
  2. Suction Level - If the level setpoint in a suction side tank setpoint is set for 20 ft level, and the Wake Error Level is set for 10 Ft, VIDAR will maintain constant level to meet the setpoint. If motor speed reduces to the PID Sleep Level (185 RPM), VIDAR will go to sleep until the level increases by 10 Ft. Therefore, at 30 Feet, the VIDAR will wake up and start running again.

Keypad Screen	Button Sequence	Description
	• Edit • Arrow/Up/ Down /Left/ Right • Next	The Wizard sets P0-42 to the selected value. This is the value in the assigned PID units, above or below, the PID setpoint before the VIDAR wakes up and starts running again.

5. Enable Condensation Protection

Condensation Protection is typically used for outdoors installations or in humid environments to keep the motor warm and dry when it is not running. When condensation protection is enabled, VIDAR is connected to 460V mains, and VIDAR is not running VIDAR will inject DC pulse current into the motor windings to generate heat without generating shaft rotation. By default, VIDAR condensation protection will turn on if the motor winding temperature drops below 25°C. Refer to parameter section J4 for additional information.

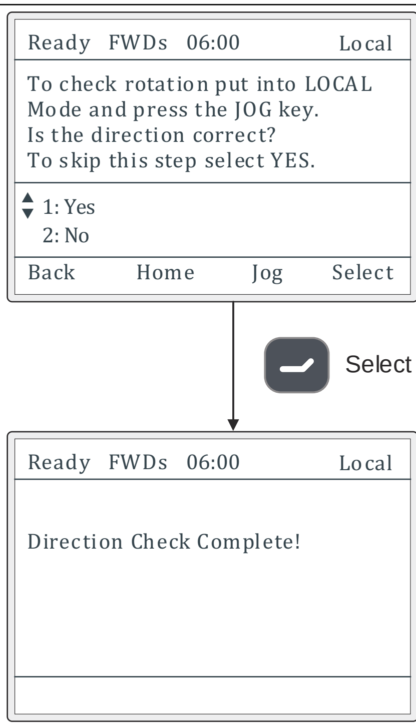
NOTICE:
If 460V main power is disconnected condensation protection will be disabled

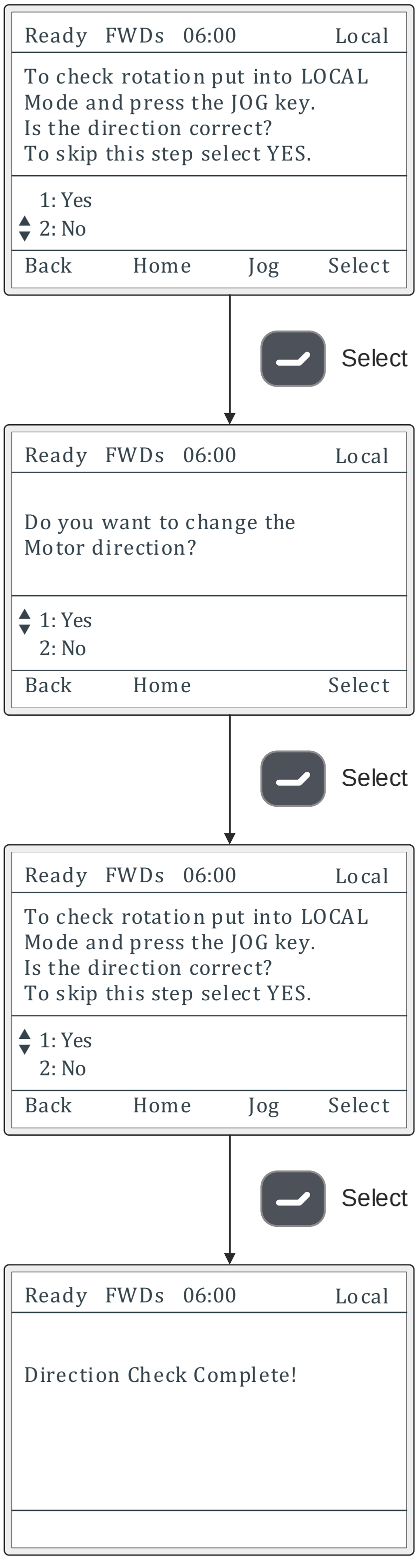
Keypad Screen	Button Sequence	Description
	• Arrow Up/ Down • Select • Next	The Wizard sets J4-00 to the selected value. **1: Yes** J4-00: 1: Enabled **2: No** J4-00: 0: Disabled

6. Check Motor Rotation

Jogging the motor for correct rotation can be accomplished through the Direction Check function. Pressing the JOG button will rotate the motor at 90 RPM and will continue to do so while the button is pressed while confirming the rotation to be correct (or incorrect). If incorrect the VIDAR will prompt you to correct the rotation.

NOTICE:
The VIDAR is factory wired to always rotate in a conventional clockwise rotation (viewed from the NDE). There is no need to change any wiring on the motor. Changing direction accomplished by an internal VIDAR parameter.

Keypad Screen	Button Sequence	Description
	• LOC | REM • Jog • Arrow Up/ Down • Select	**1: Yes** Direction Check Complete

Keypad Screen	Button Sequence	Description
	• Arrow Up/ Down • Select • Arrow Up/ Down • Select • LOC | REM • Jog • Arrow Up/ Down • Select	**2: No** Proceeds to next screen The Wizard sets A1-28 to the new value. **1: Yes** A1-28: 1: UWV **2: No** Direction Check Complete

7. Startup Wizard Complete

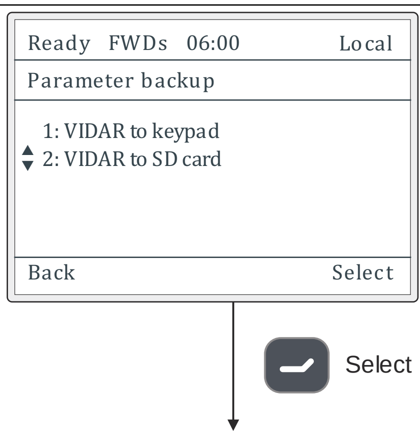
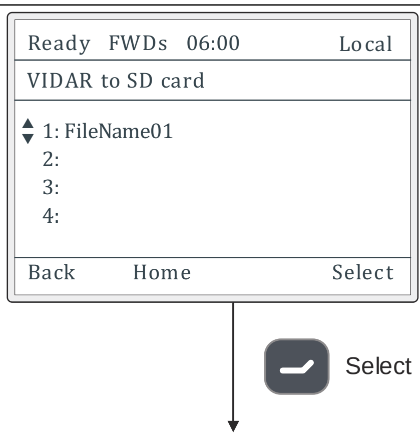
- Once the Startup Wizard is complete, the "Home" button will exit the Wizard and return to the main Home screen. The VIDAR is ready to operate as configured through the Wizard when in Remote.
- To store programmed parameters to the Keypad or to an internal SD card, press the "ENTER" button.

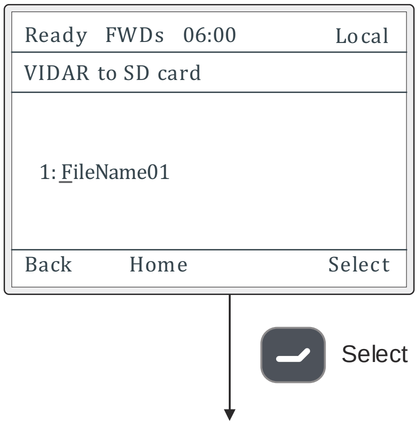
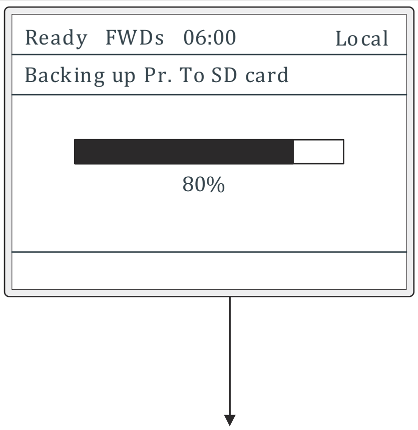
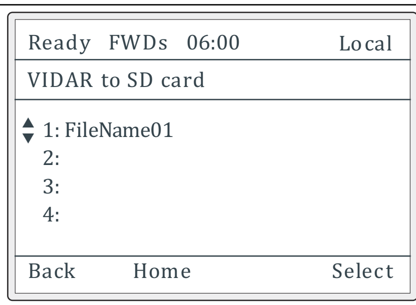
Keypad Screen	Button Sequence	Description
Ready FWDs 06:00 Local Start Up Wizard Complete ENTER: Save parameter to SD card / Keypad Back Home ENTER	• Home or ENTER	**Home** Returns to the Main Monitoring Screen. **ENTER** Proceeds to next screen

8. Parameter backup (Keypad or SD card)

- The VIDAR allows the user to store all programmed parameters to the keypad, or to an internal SD card, which can be used as a backup file for download to the VIDAR.
- Saving the parameters will copy existing parameters from the VIDAR to the Keypad, and/or SD card. This provides two purposes:
    1. Provides a backup or the settings if settings are inadvertently changed, or if reprogramming is required.
    2. If you have more than one VIDAR with the same or similar programming, you can program one unit, save to the keypad or SD card, then move the keypad or SD card to a sister unit to download all the settings.

NOTICE:
The parameters to be downloaded must be for the same VIDAR frame size and base speed as the source VIDAR.

Keypad Screen	Button Sequence	Description
	• Arrow Up/ Down • Select	**Home** Returns to the Main Monitoring Screen. **Select** Proceeds to next screen
	• Arrow Up/ Down • Select	**Home** Returns to the Main Monitoring Screen. **Select** Proceeds to next screen. Up to 4 separate parameter files can be saved to each keypad

Keypad Screen	Button Sequence	Description
	• Arrow Up/ Down/Left/ Right • Enter	**FileName** To rename the file, use the up or down arrows to find the letter to use and the right or left arrows to go to the next letter position. **Enter** Once File Name is complete, press Enter.
		Wait for the parameter backup process to complete.
	• Home	**Home** Returns to the Main Monitoring Screen.

6.8 Pump Dry Run Protection

The Pump Dry Run Protection detects when a pump is running-dry or is operating with no fluid in the pump. The Pump Dry Run Protection works by automatically collecting the power against a closed discharge valve at three speeds, 33%, 60% and 100% as shown in figure 1 below. Once the shut-off or zero flow load curve is established VIDAR will fault if the power falls below 95% (default set in parameter U3-16) of the shut-off power load curve for a period of 5 seconds (default in parameter U3-18).

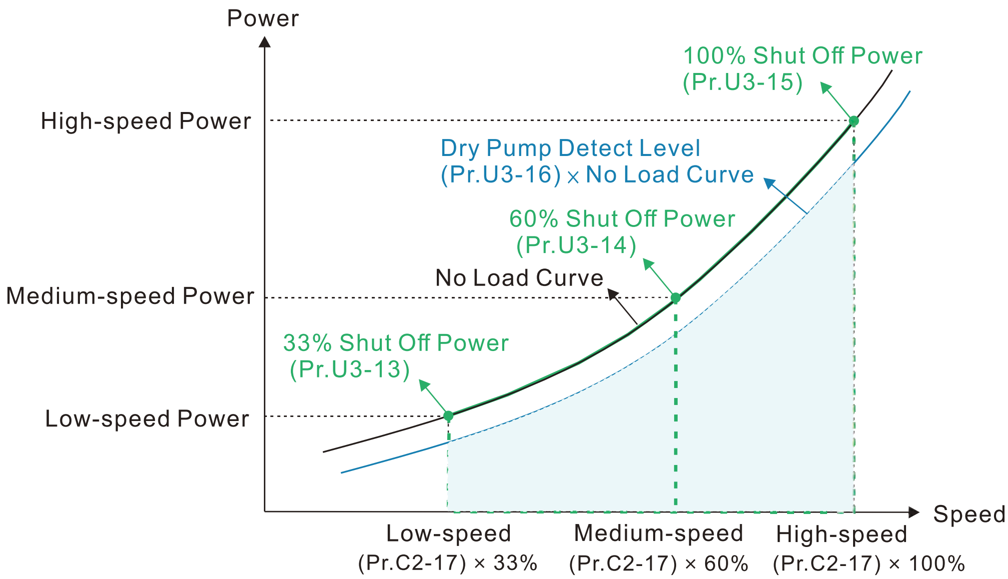
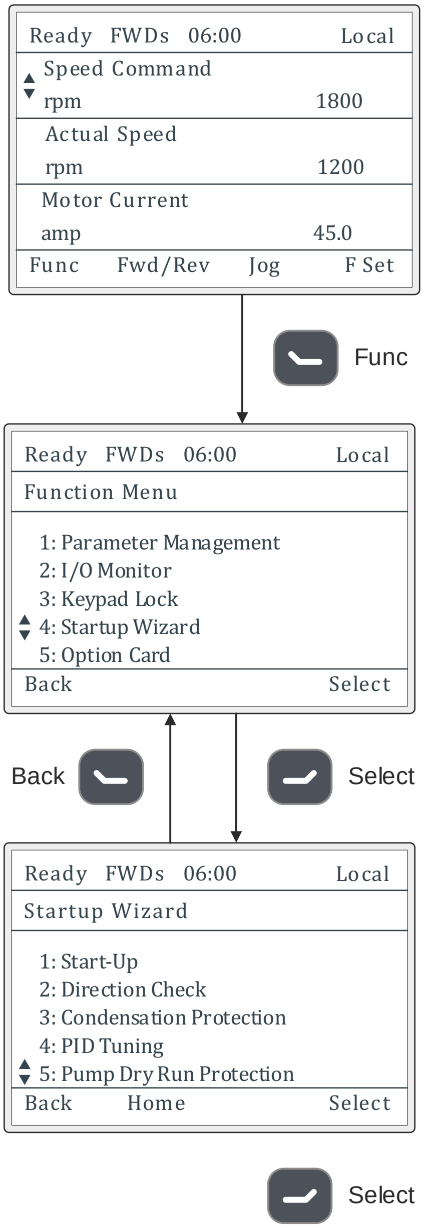


Figure 44:

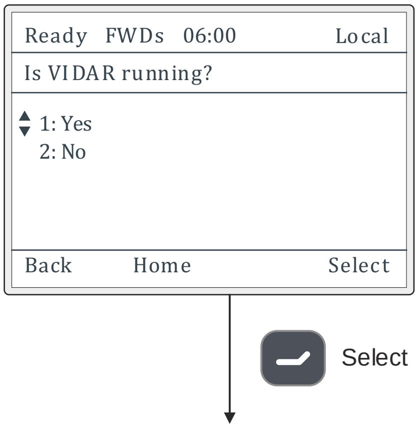
CAUTION:

- The Pump Dry Run Protection requires the pump to be operated against a closed discharge for up to maximum of 35 seconds to collect the required operating points. Prior to executing this function:
- All Suction and Discharge piping should be secure and ready for Pump startup.
- Pump and motor aligned and coupled with coupling guard intact.
- Suction line needs to be completely flooded, and all air vented completely from the pump through to the discharge side.
- Discharge valve or isolation valve and any bypass piping need to be completely closed.
- For seal-less pumps having liquid lubricated bearings consult with the manufacturer verify if the pump can be run for 35 seconds against a closed discharge valve with the liquid that is to be pumped at the speeds noted above.

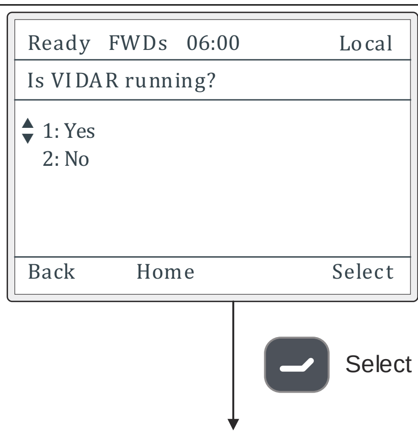
1. Select Pump Dry Run Protection in the Startup Wizard menu

Keypad Screen	Button Sequence	Description
	• Func • Arrow Up/ Down • Select • Arrow Up/ Down • Select	From the Home screen go to the Start-up Wizard and select Pump Dry Run Protection.

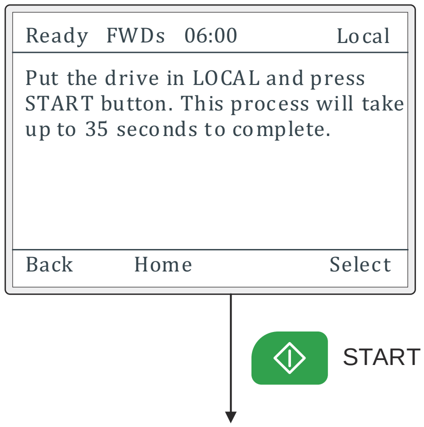
2. Confirm VIDAR is NOT running.

Keypad Screen	Button Sequence	Description
	• Arrow Up/ Down • Select • LOC | REM (if yes selected) • Stop (if running)	**1: Yes** If yes is selected, the Pump must not be runnng to enable dry run protection. To Stop the pump put the keypad in Local using the LOC | REM buttom and press the Stop key. **2: No** • Proceeds to next screen.

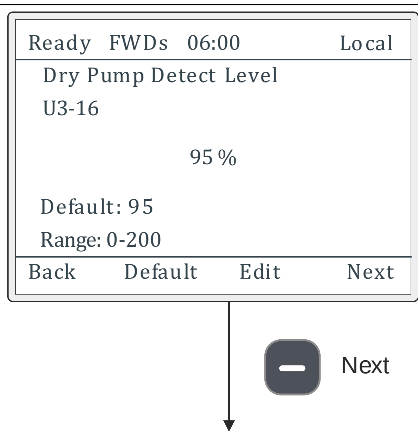
3. Enable Autotune.

Keypad Screen	Button Sequence	Description
	• Arrow Up/ Down • Select • Start (if priming required) • Stop (to end priming) • Next)	The Wizard sets U3-11 to the selected value. **1: Yes** U3-11: 1: Enable Proceeds to next screen. **2: No** If no is selected: • First prime the pump using the keypad in Local at a fixed speed. • Stop the Pump and close the discharge valve. Press the Next button to proceed to the next screen.

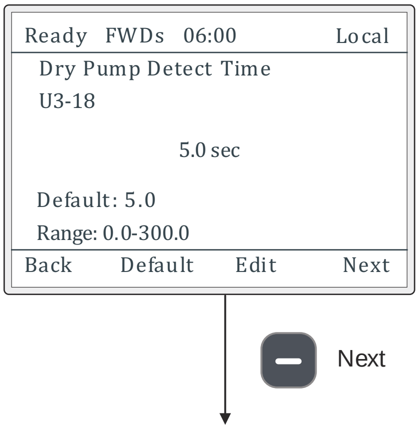
4. Start Autotune

Keypad Screen	Button Sequence	Description
	• LOC | REM (if not in Local) • START	Once start is pressed, the VIDAR tune function is initiated and the drive will stat and ramp up the motor and the ramp up will stop briefly at 33%, 60% and 100% of the motor nameplate speed. It will automatically stop when the function is completed.

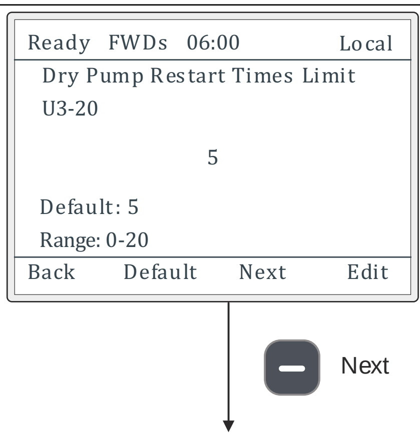
5. Review Dry Pump Detect Level

Keypad Screen	Button Sequence	Description
	• Edit • Arrow Left/ Right/ • Up/Down • Next	The Wizard sets U3-16 to the new value. The Dry Pump Detection % level is for “fine tuning” the Dry Run fault feature. Normally this parameter requires no adjustment. When adjustment may be required this value should only be changed in increments of 1% at a time. • If the Dry Run Fault does not trip the drive against a closed discharge valve, increase the % value until the drive faults. • If the Dry Run Fault does trips the drive prematurely with an open discharge valve, decrease the % value until the drive runs without faulting.

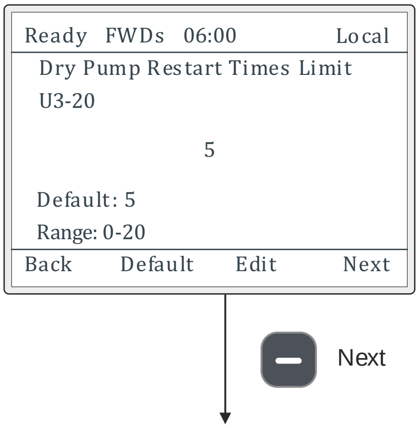
6. Review Dry Run Detect Time

Keypad Screen	Button Sequence	Description
	• Edit • Arrow Left/ Right/ • Up/Down • Next	The Wizard sets U3-18 to the new value. The Dry Pump Detection Time is the time delay prior to activation of the Dry Pump Detection fault. When adjustment may be required this value should only be changed in increments of 1 second at a time. • If the Dry Run Fault is intermittent where it does not fault consistently against a closed discharge valve, increase the time value until the drive faults consistently. • If the Dry Run Fault trips prematurely with an open discharge valve, increase the time value intil the drive runs without faulting.

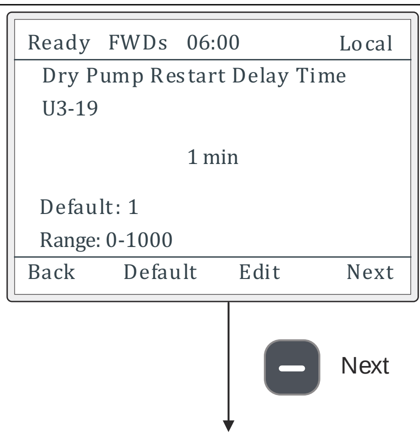
7. Enable auto-restart on dry run fault.

Keypad Screen	Button Sequence	Description
	• Arrow Up/ Down • Select	VIDAR can be configured to “Auto-Rest” and “Auto-Restart” the motor up to a set number of times. **1: Yes** H0-04: 1: Enable Proceeds to next screen. **2: No** Exits the Pum[p Dry Run Protection Wizard.

8. Set Dry Pump Restart limit.

Keypad Screen	Button Sequence	Description
	• Edit • Arrow • Left/Right/ • Up/Down • Next	The Wizard sets U3-20 to the selected value. VIDAR can be configured to “Auto-Reset” the fault and “Auto-Restart” the motor up to a set number of times. **Next** Proceeds to next screen

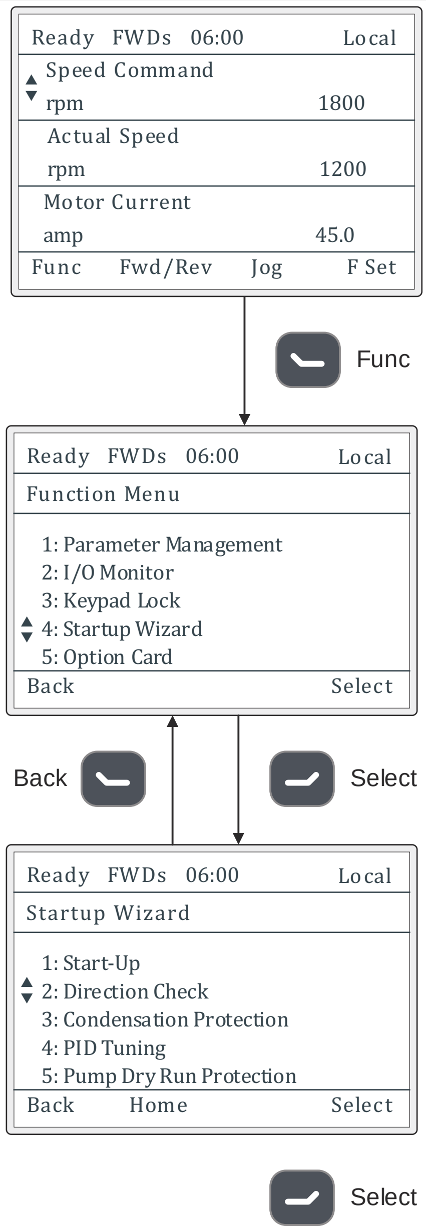
9. Set Dry Pump Restart Delay Time.

Keypad Screen	Button Sequence	Description
	• Edit • Arrow • Left/Right/ • Up/Down • Next	The Wizard sets U3-19 to the selected value. The time delay before VIDAR "Auto-Restart" takes effect to restart the motor after the "Auto-Rest" of the fault. **Next** Exits the Pum[p Dry Run Protection Wizard.

6.9 Direction Check

In cases where confirmation of motor rotation check is needed after the VIDAR has been set up, there is a separate Wizard to guide you thorough the direction check procedure.

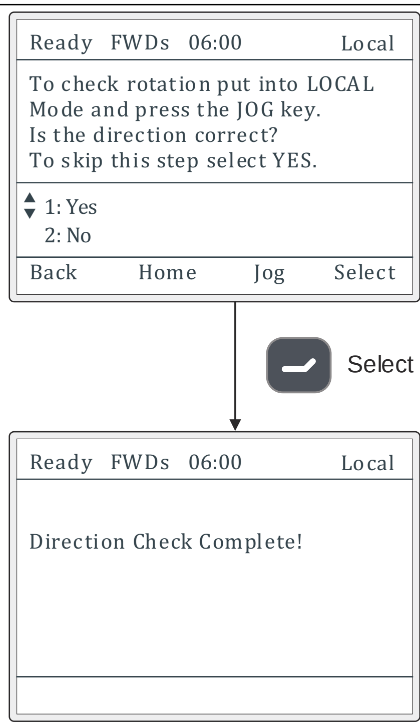
1. Select Direction Check in the Startup Wizard menu

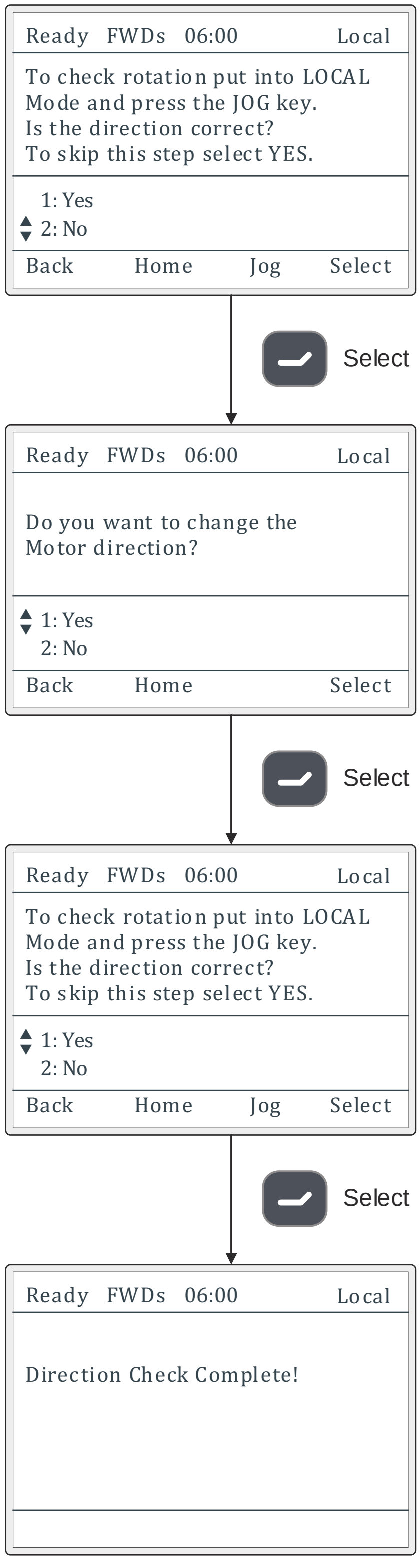
Keypad Screen	Button Sequence	Description
	• Func • Arrow Up/ Down • Select • Arrow Up/ Down • Select	From the Home screen go to the Start-up Wizard and select Direction Check.

2. Check Motor Rotation

Jogging the motor for correct rotation can be accomplished through the Direction Check function. Pressing the JOG button will rotate the motor at 90 RPM and will continue to do so while the button is pressed while confirming the rotation to be correct (or incorrect). If incorrect the VIDAR will prompt you to correct the rotation.

NOTICE:
The VIDAR is factory wired to always rotate in a conventional clockwise rotation (viewed from the NDE). There is no need to change any wiring on the motor. Changing direction accomplished by an internal VIDAR parameter.

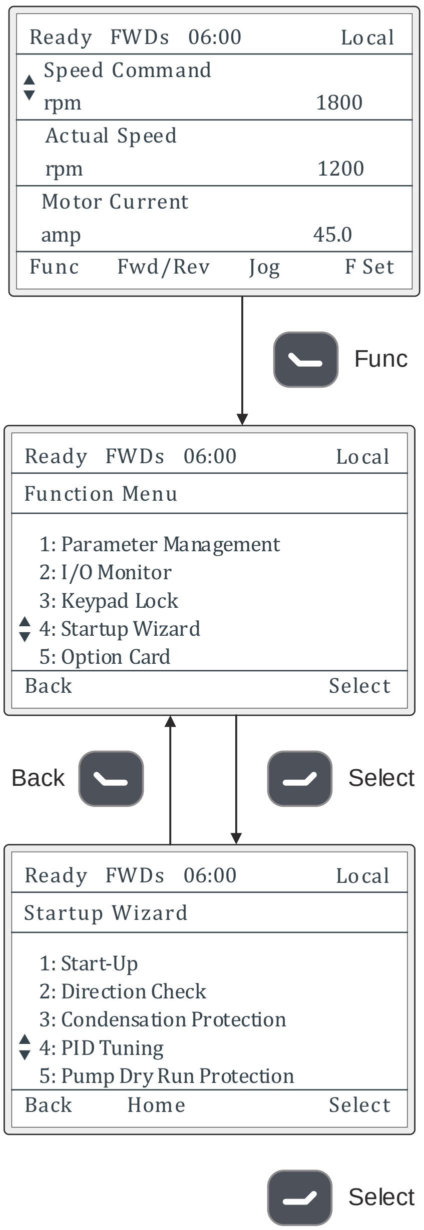
Keypad Screen	Button Sequence	Description
	• LOC | REM • Jog • Arrow Up/ Down • Select	**1: Yes** Direction Check Complete

Keypad Screen	Button Sequence	Description
	• Arrow Up/ Down • Select • Arrow Up/ Down • Select • LOC | REM • Jog • Arrow Up/ Down • Select	**2: No** Proceeds to next screen The Wizard sets A1-28 to the new value. **1: Yes** A1-28: 1: UWV **2: No** Direction Check Complete

6.10 PID Tuning

- VIDAR utilizes onboard PID control when running in any Process Control Mode. The two primary controlling functions are the Proportional Gain and the Integration time. The interaction of these properly configured settings allows for the running speed of the pump to quickly stabilize when the pump is turned on, and when there are gradual or rapid changes in the systems demand.
- The Tuning parameter settings that are associated by default with the Control Mode selected while using the Process Control. The PID Tuning may result in an unstable response from the VIDAR. The Proportional Gain and the Integration Time will need to be "Fine Tuned" to alleviate this condition. Every pumping system is unique, and this is very common.
- Following are a few “Rules of thumb” that can be followed as you adjust the parameters settings. You will need to access the PID Tuning Wizard or go into the parameters to accomplish this.

1. Select PID Tuning in the Startup Wizard menu

<table>
<tr><th>Keypad Screen</th><th>Button Sequence</th><th>Description</th></tr>
<tr><td>
</td><td>• Func
• Arrow Up/ Down
• Select
• Arrow Up/ Down
• Select</td><td>From the Home screen go to the Start-up Wizard and select PID Tuning.</td></tr>
</table>

2. Adjust the PID P Gain and PID I Time.

These are in order of what to adjust first. After each adjustment you should wait a few minutes for the reaction to take effect.

NOTICE:
These tuning parameters can be adjusted while the Pump is running for real time responses.

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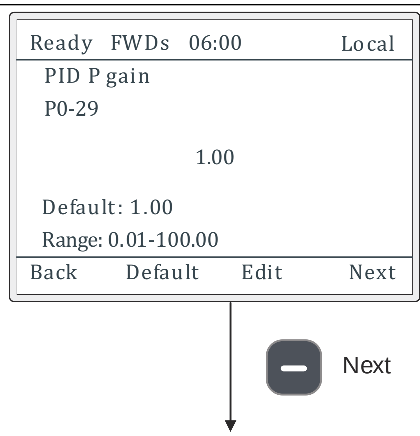
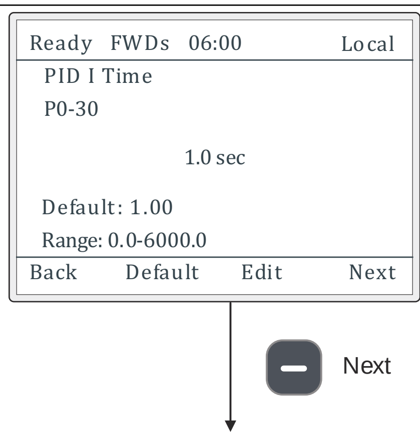
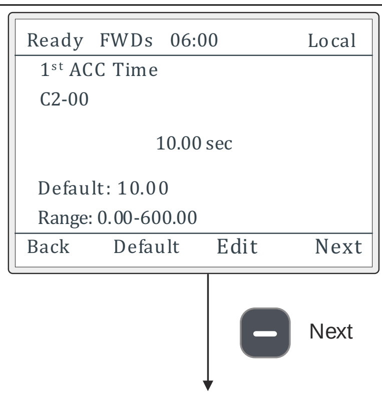
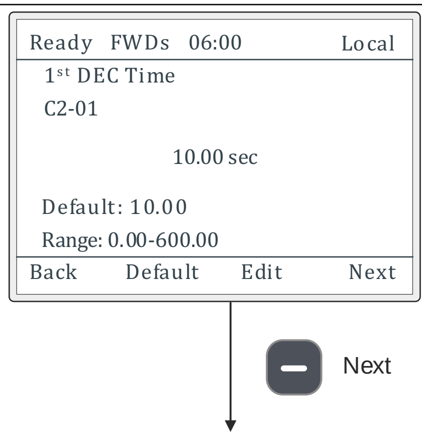
1. Rapid speed swings, or oscillations known as “Hunting” may be occurring. The audible "whining" of the drive as it increases/decreases in speed by a large RPM value can be heard. The Integral time will need to be increase. This should be done in increments of 0.5 seconds at a time.
2. When "Hunting" occurs as an "Overshoot" only, with the speed then coming down gradually, then the Proportional gain will need to be lowered. This should be done in decrements of 0.2 to 0.5.
3. When “Hunting” occurs only an “Undershoot” then the Proportional Gain should be increased. This should be done in increments of 0.2 to 0.5.
4. When there is minimal "Hunting" but still a lengthy time period before stable speed is achieved to maintain the process set-point, the Integral Time should be decreased. This should be in decrements of 0.5 seconds at a time.

Keypad Screen	Button Sequence	Description
	• Edit • Arrow Up/ Down • Select • Next	Adjust PID P gain by increasing or decreasing the PID P gain for desired system response. The Wizard sets P0-29 to the selected value.
	• Edit • Arrow Up/ Down • Select • Next	Adjust PID I Time by increasing or decreasing the PID I Time for desired system response. The Wizard sets P0-30 to the selected value.

3. Adjust the Acceleration and Deceleration Ramp Times.

In addition to the PID P gain and PID I Time parameters, the PID Tuning Wizard will also provide access to the Acceleration Time Ramp and Deceleration Time Ramp Rates. The Ramp Rates refer to the slope of the Acceleration and Deceleration Timed from 0 RPM to Full Rated Speed. The default settings do not normally need to be adjusted unless there is a need to slow down the motors during initial ramp up or subsequent ramp down. For optimal PID control, the default settings should be adequate. If there is a need to adjust the ramp rates, the Next screen will allow adjustment.

Keypad Screen	Button Sequence	Description
	• Edit • Arrow Up/ Down • Select • Next	Adjust ACC Time by increasing or decreasing the ACC Time for desired system response. The Wizard sets C2-00 to the selected value.
	• Edit • Arrow Up/ Down • Select • Next	Adjust DEC Time by increasing or decreasing the DEC Time for desired system response. The Wizard sets C2-01 to the selected value.

7 VIDAR Communication Network

7.1 Modbus Communication

7.1.1 Modbus specification

Item		Specifications
Interface		RS-485
Sync Method		Asynchronous
Communication Parameters	Transmission Speed	115.2 Kbps
	Data length	8-bit
	Parity bit	None (N)
	Stop bit	2-bit
Communication Protocol		Modbus RTU

- When using the communication interface, the diagram below shows the communication port pin definitions.

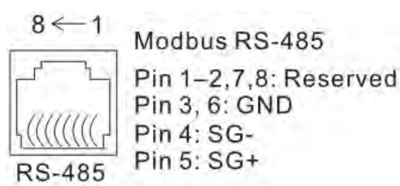


Figure 45: RS-485

- Default communication format of the port:

1. Modbus RTU mode
2. 115200 bps transmission speed
3. 8 data bits
4. No Parity (NONE)
5. 2 stop bits

7.1.2 Realated parameters

Modbus

NOTICE:
ϟ means that you can set this parameter during operation.

	Pr.	Comm. Address	Parameter Name	Description	Default
ϟ	n1-01	0x1581	Modbus Address	Defines the Modbus communication address 1–254	1
ϟ	n1-04	0x1584	Modbus Timeout Check Time	Defines communication time-out when the VIDAR does not receive any signal in the setting time. Set the timeout check time as 0.0 sec. to disable the timeout detection. 0.0–100.0 sec.	0.0
ϟ	n1-05	0x1585	Modbus Timeout Disposal	Defines the VIDAR behavior after communication time-out when the control command source or the frequency command source is Modbus. 0: Continue OPER 1: Warning & continue OPER 2: Fault & ramp to stop 3: Fault & coast to stop	0
ϟ	n1-06	0x1586	Modbus Response Delay Time	Defines the delay time of the VIDAR responding to the previous Modbus package. 0.0–200.0 ms	2.0
ϟ	n1-07	0x1587	Modbus MO Mask	Define whether Modbus address 2640H (Digital output terminal MO2–MO1 status) is enabled. 0: Disable 1: Enable bit0–1: Relay1–2 bit2–15: Reserve	0
ϟ	n1-08	0x1588	Modbus AO Mask	Define whether Modbus address 26A0H/26A1H (AFM1 / AFM2 output percentage %) is enabled. 0: Disable 1: Enable bit0–1: AO1–2 bit2–15: Reserve	0

1. Communication data frame - RTU mode

START	A silent interval of more than 3.5 char
Address	Communication address: 8-bit binary address
Function	Command code: 8-bit binary command
DATA (n-1)	Contents of data:
…….	n×8-bit data, n ≤ 16
DATA 0	
CRC Check Low	CRC checksum:
CRC Check High	one 16-bit CRC checksum consists of 2 8-bit binary characters
END	A silent interval of more than 3.5 char

2. Communication Address (Address)

00H: Broadcast to all VIDAR units

01H: VIDAR at address 01

0FH: VIDAR at address 15

10H: VIDAR at address 16, and so on, up to address 254 (FEH)

Command code:	Functions
03H	Read data from register
06H	Write single register
10H	Write data burst (can write at most 20 data burst sets of data simultaneously).

03H: Read data from register

Example: Reading two data burst from register address 2102H. VIDAR address is 01H.

Table 37: RTU mode

Command Message				Response Message	
Address		01H		Address	01H
Function		03H		Function	03H
Starting data register (word)	High Byte	21H		Number of register (count by byte)	04H
	Low Byte	02H			
Number of register (count by word)	High Byte	00H		Content of register address 2102H	17H
	Low Byte	02H			70H
CRC Check Low		6FH		Content of register address 2103H	00H
CRC Check High		F7H			00H
				CRC Check Low	FEH
				CRC Check High	5CH

4. Command code: 10H, write data burst

Command code: 10H, write data burst (can write at most 20 sets of data simultaneously).

For example: change the VIDAR (address 01H) multi-speed Pr. C1-23 = 750 (02EEH), Pr. C1-24 = 600 (0258H).

Command Message			Response Message	
ADR	01H		ADR	01H
CMD	10H		CMD	10H
Target register	04H		Target register	04H
	57H			57H
Number of register (count by word)	00H		Number of register (count by word)	00H
	02H			02H
Quantity of data (byte)	04H		CRC Check Low	F1H
The first data content	02H		CRC Check High	28H
	EEH			
The second data content	02H			
	58H			
CRC Check Low	E4H			
CRC Check High	A2H			

5. RTU mode (CRC Check):

CRC check is from Address to Data content. It is calculated by the following steps

Step 1: Load a 16-bit register (called CRC register) with FFFFH.

Step 2: Exclusive OR the first 8-bit byte of the command message with the low order byte of the 16-bit CRC register and put the result in the CRC register.

Step 3: Examine the LSB of CRC register.

Step 4: If the LSB of the CRC register is 0, shift the CRC register one bit to the right (logical right shift), filling the most significant bit (MSB) with 0. If the LSB is 1, first shift the CRC register one bit to the right, then XOR the CRC register with the polynomial value 0xA001. Repeat Step 3.

Step 5: Repeat step 3 and 4 until you perform eight shifts. This processes a complete 8-bit byte.

Step 6: Repeat step 2 through 5 for the next 8-bit byte of the command message. Continue doing this until all bytes are processed. The final contents of the CRC register are the CRC value. When transmitting the CRC value in the message, the upper and lower bytes of the CRC value must be swapped, that is, the lower order byte is transmitted first.

7.1.3 Address list

RTU

- Read one or multiple parameters: 01h (station 01) + 03h (function code 03h) + 00xxh–26xxh (Modbus address) + xxxxh (read data length) + CRC (checksum)
- Write in one parameter: 01h (station 01) + 06h (function code 06h) + 00xxh–26xxh (Modbus address) + xxxxh (write in value) + CRC (checksum)
- Write in 20 parameters: 01h (station 01) + 10h (function code 10h) + 00xxh–26xxh (Modbus address) + 0014h (word data length) + 0028h (byte data length) + xxxxh (the first write in value) + xxxxh (the 20th writes in value) + CRC (checksum)

1. Control command (20xx)

Control command (20xx)						
Function Name	**Modbus Address**	**Attribute**	**Size**	**Function Description**		
Operation command	2000H	R/W	U16	bit1–0	00b: Disable	1: Once the VIDAR receives one command, it remains in the operation status specified by the command and will not change the operation status until it receives another new command.
					01B: Stop	2: The function is only valid when the operation command source is set as communication (Pr. A1-01 or A1-08 = 8).
					10b: Run	3. bit1–0 are recommended to return to 01b (Stop) after reset
					11b: JOG Enable	
				bit3–2	Reserve	
				bit5–4	00b: Disable	
					01b: FWD	
					10b: REV	
					11b: Change direction	
				bit7–6	00b: 1st acceleration / deceleration	1: To enable this function, you need to set 2000h bit12 as 1 first.
					01b: 2nd acceleration / deceleration	2: By reading 2367h, you can get the currently executed step speed.
					10b: 3rd acceleration / deceleration	
					11b: 4th acceleration / deceleration	
				bit11–8	0000b: Main speed	

Control command (20xx)						
Function Name	**Modbus Address**	**Attribute**	**Size**	**Function Description**		
					0001b: 1st Step Speed	
					0010b: 2nd Step Speed	
					0011b: 3rd Step Speed	
					0100b: 4th Step Speed	
					0101b: 5th Step Speed	
					0110b: 6th Step Speed	
					0111b: 7th Step Speed	
					1000b: 8th Step Speed	
					1001b: 9th Step Speed	
					1010b: 10th Step Speed	
					1011b: 11th Step Speed	
					1100b: 12th Step Speed	
					1101b: 13th Step Speed	
			U16		1110b: 14th Step Speed	
					1111b: 15th Step Speed	
				bit12	1: Enable function of bit6–11	
				bit15–13	Reserve	
Frequency command	2001H	R/W		Frequency command (xxx.xx Hz, Dot: 2)		
Fault reset	2002H	R/W		bit0	Reserved	
				bit1	1: Reset	Used to clear the fault status.
				bit2	Reserved	
				bit15–3	Reserve	
PID setpoint	2020H	RW		PID setpoint value		
PID feed-back	2021H	RW		PID feed-back value		
PID track reference	2022H	RW		PID track reference value		

2. Error data (21XX)

Error data (21XX)						
Function Name	**Modbus Address**	**Attribute**	**Size**	**Function Description**		
Error state	2100H	R	U16	bit7–0	Fault code	Display the current error status.
				bit15–8	Warning code	Display the current warning status.
Operation status	2101H	R		bit1–0	VIDAR operation and stop status	Used to check the drive operation status and control the LED display of operation status
					00b: Stop	RUN light OFF / STOP light ON
					01b: Stopping	RUN light flashes / STOP light ON
					10b: Stand by	RUN light ON / STOP light flashes
					11b: Operation	RUN light ON / STOP light OFF
				bit2	JOG operation status	
				bit4–3	VIDAR operation direction	Used to check the drive operation direction to control the LED display of the operation direction status
					00b: FWD	REV light OFF / FWD light ON
					01b: REV → FWD	REV light flashes / FWD light ON
					10b: FWD → REV	REV light ON / FWD light flashes
					11b: REV	REV light ON / FWD light OFF
				bit6–5	Reserve	
				bit7	The VIDAR is controlled by external terminals	
				bit8	The VIDAR speed command source is this communication channel	
				bit9	The VIDAR speed command source is the external terminals	
				bit10	The VIDAR is controlled by this communication channel	
				bit11	Parameter lock status 1b: Parameter locked	To check whether the drive parameter is locked. If bit11 = 1b, the parameter is read as 0.
			U16	bit12	Reserve	
				bit15–13	HOA and LOC / REM action source status	1. The upper unit checks current frequency and control source through this bit. Use 2119H bit10 to check whether the
					000b: HOA mode OFF	
					001b: HOA mode HAND-ON	

Error data (21XX)				
Function Name	**Modbus Address**	**Attribute**	**Size**	**Function Description**
				010b: HOA mode AUTO-ON 011b: LOC/REM mode LOC-ON 100b: LOC/REM mode REM-ON command source is communication. 2. The upper unit can use 2002H bit4–3 to enable the active source of HAND/AUTO or LOC/REM.
Frequency command	2102H	R		1: Speed mode → Speed command, 2: Torque mode → speed limit (Unit: Hz)
Output frequency	2103H	R		Filter depth is related to Pr.o0-05 (Unit: Hz)
Output current	2104H	R		1. When output current (xx.xx) is larger than 655.35 Amp, it automatically changes to one decimal place (xxx.x). (Unit: A) 2. Decimal places can be referred by the high byte of 211FH.
DC CLAMP bus voltage	2105H	R		The VIDAR DC CLAMP bus voltage (Unit: V_{DC})
Output voltage	2106H	R		The VIDAR output voltage (Unit: %)
Multi-step speed	2107H	R		VIDAR's current running speed step given by multi-step speed command (0 is main speed)
Counter value	2109H	R		The present counter value of MI
Output power factor angle	210AH	R		VIDAR's output power factor angle (0.0–180.0°)
Output torque	210bH	R		VIDAR's output torque (percentage is based on the motor rated torque) (Unit: %)
Actual speed	210CH	R		Motor actual speed (Unit: rpm)
Output power	210FH	R		VIDAR output power (Unit kWh)
Keypad output current display value	211FH	R		bit7–0: Reserve bit9–8: Decimal point of A page bit15–10: Reserve

3. User Variable (22xx)

User Variable (22xx)				
Function Name	**Modbus Address**	**Attribute**	**Size**	**Function Description**
Output current	2200H	R	U16	Display the current outputs from the drive to the motor (Unit: A)
Counter value	2201H	R		Display the counter value (Unit: CNT)
Actual output frequency	2202H	R		Display VIDAR's actual output frequency (Unit: Hz)
DC CLAMP bus voltage	2203H	R		Display VIDAR's DC CLAMP bus voltage (Unit: V_{DC})
Output voltage	2204H	R		Display VIDAR's output voltage of U, V, W (Unit: V_{AC})
Output power factor angle	2205H	R		Display VIDAR's output power factor angle (Unit: deg)
Output power	2206H	R		Display VIDAR's output power (Unit: kWh)
Actual speed	2207H	R		Display the motor's actual speed (Unit: rpm)
Output torque	2208H	R		Display the VIDAR estimated output torque, the motor rated torque is 100.0% (Unit: %)
PID feedback	220AH	R		Display the PID feedback value (Unit: %)
AI1 percentage	220bH	R		Display signal of AI1 analog input terminal (Unit: %)
AI2 percentage	220CH	R		Display signal of AI2 analog input terminal (Unit: %)
IGBT temperature	220EH	R		Display temperature of the drive IGBT module (Unit: °C)

4. Status monitor read only (23xx)

Status monitor read only (23xx)					
Function Name	**Modbus Address**	**Attribute**	**Size**	**Function Description**	
VIDAR status (Low word)	2300H	R	U16	bit1–0	VIDAR operation status 00b: VIDAR stops (keypad RUN light OFF/ STOP light ON) 01b: VIDAR stopping (keypad RUN light flashes / STOP light ON) 10b: VIDAR standby (keypad RUN light ON / STOP light flashes) 11b: VIDAR operating (keypad RUN light ON / STOP light OFF) NOTE: this bit is used to detect the VIDAR operating status, to control the LED display for the operation status.
				bit3–2	Operation Direction 00b: The VIDAR is in FWD run status (Keypad REV light OFF / FWD light ON) 01b: The VIDAR runs from current REV direction to target FWD direction (keypad REV light flashes / FWD light ON) 10b: The VIDAR runs from current FWD direction to target REV direction (keypad REV light ON / FWD light flashes) 11b: The VIDAR is in REV direction (keypad REV light ON / FWD light OFF) NOTE: this bit is used to detect the VIDAR operating direction, to control the LED display for the running direction.
				bit4	JOG Operation Status 1b: JOG active
				bit7–5	VIDAR HOA and LOC/ REM operation source status 000b: HOA mode OFF 001b: HOA mode HAND-ON 010b: HOA mode AUTO-ON 011b: LOC/ REM mode LOC-ON 100b: LOC/ REM mode REM-ON
				bit8	VIDAR ready status 1b: Ready Active - VIDAR is ready to receive command
				bit9	VIDAR output status 1b: VIDAR is outputting

Status monitor read only (23xx)					
Function Name	**Modbus Address**	**Attribute**	**Size**	**Function Description**	
			U16	bit10	Command reach status (speed reach, torque reach) 1b: Command reaches active
				bit11	Reserved
				bit12	VIDAR quick stop status 1b: Quick stop active
				bit13	VIDAR Halt status 1b: VIDAR pauses
				bit14	VIDAR fault status 1b: VIDAR fault is triggered
				bit15	VIDAR warning status 1b: VIDAR warning is triggered
VIDAR status (High word)	2301H	R		bit0	VIDAR status (High word) Acceleration/ deceleration status 0b: Dec – the motor speed is decelerating 1b: Acc – the motor speed is accelerating
				bit1	FireMode Status 1b: FireMode active
				bit2	VIDAR dEb status 1b: dEb active
				bit3	Preheat output status 1b: Preheat output active
				bit4	Dry pump curve auto-tune 1b: Dry pump curve auto-tuning is processing
				bit5–11	Reserve
				bit12	Parameter Lock Status 1b: Parameter is locked
				bit13	Parameters read-only status 1b: Parameters are read-only
				bit14	Enable parameter copy function 1b: VIDAR is copying or resuming parameters
				bit15	Reserve
Speed command	2302H	R		Speed command (Unit: Hz, Dot: 2)	
Current output speed	2303H	R		Motor actual operating speed (Unit: Hz, Dot: 2)	
Fault code	2304H	R		Fault code that occurs to the VIDAR	
Warning code	2305H	R		Warning code that occurs to the VIDAR	
Error status	2306H	R		Error status (0b: does not trigger errors, 1b: error triggered)	
				bit0	Low voltage warning (Lv)
				bit1	Overheat warning

Status monitor read only (23xx)					
Function Name	**Modbus Address**	**Attribute**	**Size**	**Function Description**	
				bit2	PID feedback error
				bit3	Reserve
				bit4	Over-voltage warning
				bit5	Over-current stall prevention
				bit6	Over-voltage stall prevention
			U16	bit7	Under current output
				bit15–8	Reserve
Current control mode	2308H	R		1: Speed mode, 2: Torque mode	
Motor actual speed rpm (low word)	230AH	R		The motor speed estimated by the VIDAR, the unit is rpm	
Motor actual speed rpm (high word)	230bH	R		The motor speed estimated by the VIDAR, the unit is rpm	
Motor actual speed Hz	230CH	R		The motor speed estimated by the VIDAR, the unit is Hz	
Output current	2310H	R		Unit: A, Dot: 2	
U-phase current	2312H	R		Unit: %, Dot: 0	
V-phase current	2314H	R		Unit: %, Dot: 0	
W-phase current	2316H	R		Unit: %, Dot: 0	
Clamp bus voltage (XXX.X V)	2322H	R		Clamp bus voltage (XXX.X V, Dot: 1)	
Output voltage	2324H	R		Output voltage (XXX.X V, Dot: 1)	
Motor PF Angle	2327H	R		Motor PF Angle (XXX.X, Dot: 1) (0.0–180.0 degree)	
Output power	2328H	R		Display the output power of U, V and W (XXXX kW)	
kWh	232AH	R		kWh display (XXXX.X, Dot: 1)	
Fan speed	2330H	R		VIDAR fan speed (XXX%)	
Capacitor temperature	2331H	R		The MAX. capacitor temperature (XXX.X°C, Dot: 1)	
IGBT temperature	2332H	R		The MAX. power model IGBT temperature (XXX.X°C, Dot: 1)	
Actual torque command	2336H	R		Actual torque command (XXX.X%, Dot: 1)	
Output torque	2337H	R		The output positive and negative torque calculated by the VIDAR (XXX.X Nt-m, Dot: 1).	
Average output torque	2338H	R		The average output positive and negative torque calculated by the VIDAR (XXX.X Nt-m, Dot: 1).	

Status monitor read only (23xx)				
Function Name	**Modbus Address**	**Attribute**	**Size**	**Function Description**
Process PID Output frequency	2340H	R		Process PID output frequency, the unit is Hz
Process PID target value	2341H	R		PID target value (XXX.XX %, Dot: 2)
Process PID compensation	2342H	R		PID offset (XXX.XX%, Dot: 2)
PWM Carrier Frequency	2366H	R		VIDAR operation carrier frequency (X.X kHz, Dot: 1)
Multi-step speed status	2367H	R		VIDAR currently executed step speed from the multi-step speed command (0 represents main speed)

5. Remote IO (26xx)

Remote IO (26xx)				
Function Name	**Modbus Address**	**Attribute**	**Size**	**Function Description**
Digital input terminal MI6–MI1 status	2600H	R	U16	Each bit corresponds to different terminal input contact MI1–MI6 correspond to bit0–bit5
Digital input terminal MI6–MI1 CPU Pin status	2608H	R		Each bit corresponds to different terminal ACB Pin MI1–MI6 correspond to bit0–bit5
Digital output terminal MO2–MO1 status	2640H	R		Each bit corresponds to different terminal output contact MO1–MO2 correspond to bit0–bit1
Digital output terminal MO2–MO1 ACB Pin status	2648H	R		Each bit corresponds to different terminal ACB Pin MO1–MO2 correspond to bit0–bit1
AI1 Proportional value	2660H	R		Analog input signal AI1 percentage
AI2 Proportional value	2661H	R		Analog input signal AI2 percentage
AFM1 output value	2680H	R		AFM1 output percentage (%)
AFM2 output value	2681H	R		AFM2 output percentage (%)
AFM1 output percentage (%)	26A0H	R/W		AFM1 output percentage (%)
AFM2 output percentage (%)	26A1H	R/W		AFM2 output percentage (%)

6. 60xxh Output message (Upper unit → VIDAR)

60xxh Output message (Upper unit → VIDAR)						
Index	**Attr.**	**Size**	**Description**			**Speed Mode**
			bit	**Def.**	**Auth.**	
6000H	W	U16	0	Ack	4	0: fcmd =0 1: fcmd = Fset (Fpid)
			1	Dir	4	0: FWD command 1: REV command
			2	Re-serve		
			3	Halt	3	0: Continue operating to the target speed 1: Temporarily stop according to the deceleration setting
			4	Lock	4	0: Continue operating to the target speed 1: Frequency stops at current frequency
			5	JOG	4	0: JOG OFF Edge 0 → 1: JOG RUN (Ack OFF valid)
			6	QStop	2	Quick Stop
			7	Ser-vo_ON	1	0: Servo OFF 1: Servo ON
			14–8	Re-serve		
			15	RST	1	Edge 0 → 1: Clear fault codes
6001H	RW			Mode		0: Speed mode
6002H	RW			Speed		Speed command (Unsigned)
6003H	RW			Torque Limit		Torque limit (Signed)
6007H	RW			Speed Limit		Speed limit (Unsigned)

7. 61xxh Input message (VIDAR → Upper unit)

61xxh Input message (VIDAR → Upper unit)					
Index	**Attr.**	**Size**	**Description**		**Speed Mode**
			bit	**Def.**	
6100h	R	U16	0	Arrive	0: Frequency command is not reached 1: Frequency command reached
			1	Dir	0: FWD command 1: REV command
			2	Warn	0: No warning 1: Warning event
			3	Error	0: No fault 1: Fault event
			4	Re-serve	
			5	JOG	0: JOG OFF 1: JOG ON
			6	QStop	Quick Stop
			7	Ser-vo_ON	0: PWM OFF 1: PWM ON
			15–8	Re-serve	
6101h	R			Mode	Active current
6102h	R			Actual Velocity	Active current output command (Unit: 0.01 Hz)
6106h	R			Actual Torq	Active current (signed) (Unit: 0.1%)

8. Detailed status monitor (90xxH – Read only)

Detailed status monitor (90xxH – Read only)				
Function Name	**Modbus Address**	**Attribute**	**Size**	**Function Description**
Frequency Reference	9000H	R	U16	Frequency reference for speed controller (XXX.XX Hz, Dot: 2)
Motor actual speed without filter Hz	9001H			The motor speed estimated by the VIDAR which value is not pass through filter, the unit is (XXX.XX Hz, Dot: 2), and positive value is forward direction, negative value is reverse direction.
Motor actual speed with filter Hz	9002H			The motor speed estimated by the VIDAR and pass through the low-pass filter with setting pr o0-05. The value also has sign, it same as 9001H.
IGBT U-R temperature	9003H			The U-R phase power model IGBT temperature (XXX.X°C, Dot: 1)
IGBT U-S temperature	9004H			The U-S phase power model IGBT temperature (XXX.X°C, Dot: 1)
IGBT U-T temperature	9005H			The U-T phase power model IGBT temperature (XXX.X°C, Dot: 1)
Capacitor U-phase temperature	9006H			The U-phase capacitor temperature (XXX.X°C, Dot: 1)
IGBT V-R temperature	9007H			The V-R phase power model IGBT temperature (XXX.X°C, Dot: 1)
IGBT V-S temperature	9008H			The V-S phase power model IGBT temperature (XXX.X°C, Dot: 1)
IGBT V-T temperature	9009H			The V-T phase power model IGBT temperature (XXX.X°C, Dot: 1)
Capacitor V-phase temperature	900AH			The V-phase capacitor temperature (XXX.X°C, Dot: 1)
IGBT W-R temperature	900bH			The W-R phase power model IGBT temperature (XXX.X°C, Dot: 1)
IGBT W-S temperature	900CH			The W-S phase power model IGBT temperature (XXX.X°C, Dot: 1)
IGBT W-T temperature	900DH			The W-T phase power model IGBT temperature (XXX.X°C, Dot: 1)
Capacitor W-phase temperature	900EH			The W-phase capacitor temperature (XXX.X°C, Dot: 1)
Ctrl MCU temperature	900FH			The mcu of control board temperature (XXX.XX°C, Dot: 2)
Ctrl PCB temperature	9010H			The pcb of control board temperature (XXX.XX°C, Dot: 2)
Ctrl Ta temperature	9011H			The environment of control board temperature (XXX.XX°C, Dot: 2)
Motor KTY84 temperature	9012H			The motor temperature from KTY84 (XXX.X°C, Dot: 1)

Detailed status monitor (90xxH – Read only)				
Function Name	**Modbus Address**	**Attribute**	**Size**	**Function Description**
Motor RTD temperature	9013H			The motor temperature from RTD (XXX.X°C, Dot: 1)
ACB Ntc temperature	9014H			The acb temperature from ntc (XXX.X °C, Dot: 1)
Damp R Temperature	9015H			The damping resistor temperature from ntc (XXX.X°C, Dot: 1)
Time Data Year	9016H			The year of real time clock.
Time Data Month and Day	9017H			The month and day of real time clock.
Time Data Hour and Min	9018H			The hour and minutes of real time clock.
Time Data Second	9019H			The second of real time clock.
ACB T temperature	901AH			The acb temperature from special ic named SHT3X-ARP (XXX.X°C, Dot: 1)
ACB Relative Humidity	901BH			The relative humidity of ACB board (XXX.X %, Dot: 1)
Input Current	901CH			The input current of Delta. (XX.XX Arms, Dot:2

7.1.4 Exception response

When the VIDAR is using the communication connection, if an error occurs, the VIDAR responds to the error code and sets the highest bit (bit 7) of the command code to 1 (function code bitwise OR 80H) then responds to the control system to signal that an error occurred. Refer to the table of error codes for communication error for reference. Example:

RTU mode:	
Address	01H
Function	86H
Exception code	02H
CRC Check Low	C3H
CRC Check High	A1H

Fault code	**Descriptions**
1	Function code is not supported or unrecognized.
2	Address is not supported or unrecognized.
3	Data is incorrect or unrecognized.
4	Failure to execute this function code

7.2 EtherNet/IP communication

7.2.1 EtherNet/IP implicit messaging

EtherNet/IP Implicit Messaging, a cyclic data exchange, assigns read/ write data address settings using map register of EtherNet/IP host controller (scanner) on VIDAR and reads/ writes address data value with fixed length at one time using map register.

The scanner identifies the device and establishes connections using EDS files of EtherNet/IP devices. Generally speaking, the EDS file of the device is built-in in the vendor's master operating software.

EtherNet/IP implicit messaging supports user-defined address communication. You can add data into cyclic data exchange table by yourself. But not all device suppliers support this function. To ensure that you can work on this function normally, choose Implicit Messaging Communication Address

IP address that implicit messaging currently supports

The IP address that implicit messaging currently supports, and their definitions are shown in the table below:

Implicit Messaging **Fixed Address Definition**	**Function**	**Size (word)**	**Description**
I/O Connection	Input	32	Mapping to input buffer register data
		1	Mapping to input buffer register length
	Output	32	Mapping to output buffer register data
		1	Mapping to output buffer register length
	Configuration	128	Mapping to setting object address
		1	Mapping to setting object length
I/O Connection Listen only	Input	32	Mapping to input buffer register data (the same as I/O Connection)
		1	Mapping to input buffer register length (the same as I/O Connection)
	Output	0	
		0	
	Configuration	0	
		0	

Functions of 32 addresses in IN / OUT registe

The functions of 32 addresses in IN / OUT register are described in sequence in the table below.

Dynamic mapping address can be set through configuration data.

IN			OUT		
Attribute	**Mapping Address**	**Description**	**Attribute**	**Mapping Address**	**Description**
R	IN 0 return value	Fixed 2100H (warn / fault)	RW	OUT 0 setting value	Set 2000H (control word)
R	IN 1 return value	Fixed 2101H (status)	RW	OUT 1 setting value	Set 2001H (frequency command)
R	IN 2 return value	Fixed 2102H (frequency command)	RW	OUT 2 setting value	Set 2002H (EXT)

IN			OUT		
Attribute	**Mapping Address**	**Description**	**Attribute**	**Mapping Address**	**Description**
R	IN 3 return value	Fixed 2103H (output frequency)	RW	OUT 3 setting value	Reserved
R	IN 4 return value	Fixed 2104H (output current)	RW	OUT 4 setting value	Set 6000H (control word)
R	IN 5 return value	Fixed 2105H (Clamp bus voltage)	RW	OUT 5 setting value	Set 6001H (control mode)
R	IN 6 return value	Fixed 2106H (output voltage)	RW	OUT 6 setting value	Set 6002H (frequency command)
R	IN 7 return value	Fixed 2107H (current speed of multi-step speed)	RW	OUT 7 setting value	Set 6003H (torque limit)
R	IN 8 return value	Fixed 2108H (reserved)	RW	OUT 8 setting value	Set 6004H (position command L)
R	IN 9 return value	Fixed 2109H (count value)	RW	OUT 9 setting value	Set 6005H (position command H)
R	IN 10 return value	Fixed 210AH (output power factor angle)	RW	OUT 10 setting value	Set 6006H (torque command)
R	IN 11 return value	Fixed 210BH (output torque)	RW	OUT 11 setting value	Set 6007H (speed limit)
R	IN 12 return value	Fixed 210CH (motor actual speed)	RW	OUT 12 setting value	Reserved
R	IN 13 return value	Fixed 210DH (PG feedback pulse number)	RW	OUT 13 setting value	Reserved
R	IN 14 return value	Fixed 210EH (PG2 pulse command number)	RW	OUT 14 setting value	Reserved
R	IN 15 return value	Fixed 210FH (output power)	RW	OUT 15 setting value	Reserved
R	IN 16 return value	Fixed 6100H (status word)	RW	OUT 16 setting value	Dynamical mapping address Out 16
R	IN 17 return value	Fixed 6101H (current mode)	RW	OUT 17 setting value	Dynamical mapping address Out 17
R	IN 18 return value	Fixed 6102H (current speed)	RW	OUT 18setting value	Dynamical mapping address Out 18
R	IN 19 return value	Fixed 6103H (reserved)	RW	OUT 19 setting value	Dynamical mapping address Out 19
R	IN 20 return value	Fixed 6104H (current position L)	RW	OUT 20 setting value	Dynamical mapping address Out 20
R	IN 21 return value	Fixed 6105H (current position H)	RW	OUT 21 setting value	Dynamical mapping address Out 21
R	IN 22 return value	Fixed 6106H (current torque)	RW	OUT 22 setting value	Dynamical mapping address Out 22
R	IN 23 return value	(Reserved)	RW	OUT 23 setting value	Dynamical mapping address Out 23
R	IN 24 return value	(Reserved)	RW	OUT 24 setting value	Dynamical mapping address Out 24
R	IN 25 return value	Returns content value of dynamic mapping address In 25	RW	OUT 25 setting value	Dynamical mapping address Out 25
R	IN 26 return value	Returns content value of dynamic mapping address In 26	RW	OUT 26 setting value	Dynamical mapping address Out 26
R	IN 27 return value	Returns content value of dynamic mapping address In 27	RW	OUT 27 setting value	Dynamical mapping address Out 27

IN			OUT		
Attribute	**Mapping Address**	**Description**	**Attribute**	**Mapping Address**	**Description**
R	IN 28 return value	Returns content value of dynamic mapping address In 28	RW	OUT 28 setting value	Dynamical mapping address Out 28
R	IN 29 return value	Returns content value of dynamic mapping address In 29	RW	OUT 29 setting value	Dynamical mapping address Out 29
R	IN 30 return value	Returns content value of dynamic mapping address In 30	RW	OUT 30 setting value	Dynamical mapping address Out 30
R	IN 31 return value	Returns content value of dynamic mapping address In 31	RW	OUT 31 setting value	Dynamical mapping address Out 31

Configuration register

Configuration register controls 128 addresses. For detailed setting values, see the table below.

Index	Attribute	Description	Index	Attribute	Description
0	R	IN 0 mapping address Fixed 2100H (warn / fault)	64	R	OUT 0 mapping address Fixed 2000H (control word 1, only used in speed mode)
1	R	IN 1 mapping address Fixed 2101H (status)	65	R	OUT 1 mapping address Fixed 2001H (frequency command 1)
2	R	IN 2 mapping address Fixed 2102H (frequency command)	66	R	OUT 2 mapping address Fixed 2002H (EXT)
3	R	IN 3 mapping address Fixed 2103H (output frequency)	67	R	OUT 3 mapping address Reserved for the fixed, default is 0xFFFF
4	R	IN 4 mapping address Fixed 2104H (output current)	68	R	OUT 4 mapping address Fixed 6000H (control word 2, can be used for any control modes)
5	R	IN 5 mapping address Fixed 2105H (Clamp bus voltage)	69	R	OUT 5 mapping address Fixed 6001H (control mode)
6	R	IN 6 mapping address Fixed 2106H (output voltage)	70	R	OUT 6 mapping address Fixed 6002H (frequency command 2)
7	R	IN 7 mapping address Fixed 2107H (current speed of multi-step speed)	71	R	OUT 7 mapping address Fixed 6003H (torque limit)
8	R	IN 8 mapping address Fixed 2108H (reserved)	72	R	OUT 8 mapping address Fixed 6004H (position command L)
9	R	IN 9 mapping address Fixed 2109H (count value)	73	R	OUT 9 mapping address Fixed 6005H (position command H)

Index	Attribute	Description	Index	Attribute	Description
10	R	IN 10 mapping address Fixed 210AH (output power factor angle)	74	R	OUT 10 mapping address Fixed 6006H (torque command)
11	R	IN 11 mapping address Fixed 210BH (output torque)	75	R	OUT 11 mapping address Fixed 6007H (speed limit)
12	R	IN 12 mapping address Fixed 210CH (motor actual speed)	76	R	OUT 12 mapping address Reserved for the fixed, default is 0
13	R	IN 13 mapping address Fixed 210DH (PG feedback pulse number)	77	R	OUT 13 mapping address Reserved for the fixed, default is 0
14	R	IN 14 mapping address Fixed 210EH (PG2 pulse command number)	78	R	OUT 14 mapping address Reserved for the fixed, default is 0
15	R	IN 15 mapping address Fixed 210FH (output power)	79	R	OUT 15 mapping address Reserved for the fixed, default is 0
16	R	IN 16 mapping address Fixed 6100H (status word)	80	RW	OUT 16 mapping address Can be modified, default is 0xFFFF
17	R	IN 17 mapping address Fixed 6101H (current mode)	81	RW	OUT 17 mapping address Can be modified, default is 0xFFFF
18	R	IN 18 mapping address Fixed 6102H (current speed)	82	RW	OUT 18 mapping address Can be modified, default is 0xFFFF
19	R	IN 19 mapping address Fixed 6103H (reserved)	83	RW	OUT 19 mapping address Can be modified, default is 0xFFFF
20	R	IN 20 mapping address Fixed 6104H (current position L)	84	RW	OUT 20 mapping address Can be modified, default is 0xFFFF
21	R	IN 21 mapping address Fixed 6105H (current position H)	85	RW	OUT 21 mapping address Can be modified, default is 0xFFFF

Index	Attribute	Description	Index	Attribute	Description
22	R	IN 22 mapping address Fixed 6106H (current torque)	86	RW	OUT 22 mapping address Can be modified, default is 0xFFFF
23	R	IN 23 mapping address Reserved for the fixed, default is 0xFFFF	87	RW	OUT 23 mapping address Can be modified, default is 0xFFFF
24	R	IN 24 mapping address Reserved for the fixed, default is 0xFFFF	88	RW	OUT 24 mapping address Can be modified, default is 0xFFFF
25	RW	IN 25 mapping address Can be modified, default is 0xFFFF	89	RW	OUT 25 mapping address Can be modified, default is 0xFFFF
26	RW	IN 26 mapping address Can be modified, default is 0xFFFF	90	RW	OUT 26 mapping address Can be modified, default is 0xFFFF
27	RW	IN 27 mapping address Can be modified, default is 0xFFFF	91	RW	OUT 27 mapping address Can be modified, default is 0xFFFF
28	RW	IN 28 mapping address Can be modified, default is 0xFFFF	92	RW	OUT 28 mapping address Can be modified, default is 0xFFFF
29	RW	IN 29 mapping address Can be modified, default is 0xFFFF	93	RW	OUT 29 mapping address Can be modified, default is 0xFFFF
30	RW	IN 30 mapping address Can be modified, default is 0xFFFF	94	RW	OUT 30 mapping address Can be modified, default is 0xFFFF
31	RW	IN 31 mapping address Can be modified, default is 0xFFFF	95	RW	OUT 31 mapping address Can be modified, default is 0xFFFF
32–63	R	IN 0–IN 31 initial setting value	96–127	RW	OUT 0–OUT 31 initial setting value

7.2.2 EtherNet/IP Explicit messaging

Before using this function, see 7.2.3 EtherNet/IP Service and Object on page 179 to check the objects that the VIDAR supports and make sure that you have understood the read and write methods of explicit messaging. The host controller can directly map to the drive's setting value using mapping address of object class. The object class code of the drive is 0x300, and the explicit messaging formula of parameter address is as follows:

EIP Communication Data Type:

Object class Instance Attribute:

0x300 + 0x01 + Pr. Modbus Address

Example:

To write commands into Pr.A1-08 (EX2 OPER Cmd Src), use the following method:

A1-08 Modbus Address = 0x0048

The explicit messaging would be displayed as:

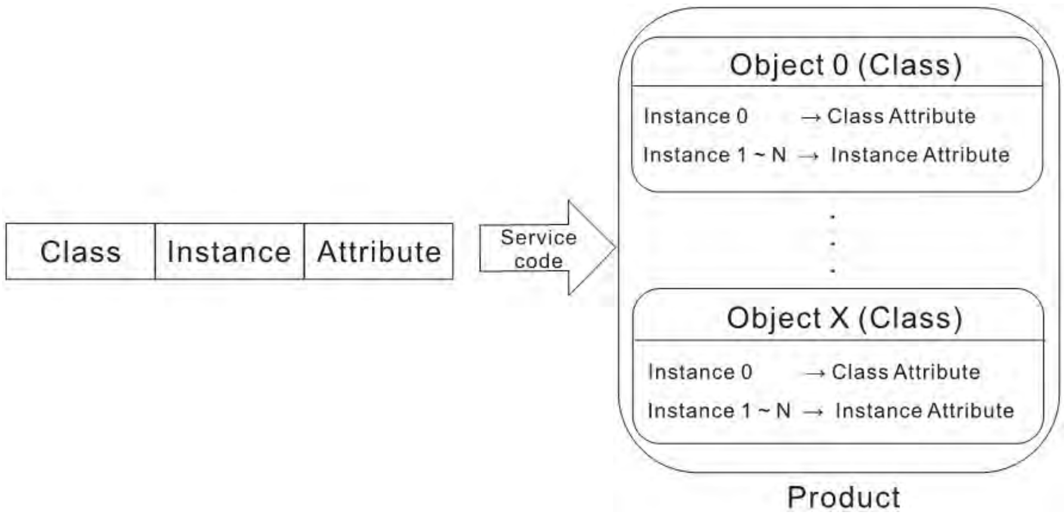
Object class + Instance + Attribute = 0x301 + 0x01 + 0x0048

NOTICE:
For detailed descriptions of parameters, see the user manual of the drive. For details on the objects of EtherNet/IP communication parameters, see 7.2.3 EtherNet/IP Service and Object on page 179

7.2.3 EtherNet/IP Service and Object

A-1 Object

EtherNet/IP uses Object as a set of parameters. Each Object defines parameters according to Class, Instance and Attribute. Instance 0 defines basic information of each Object, such as version and length. Instance 1 to Instance N are parameters that are required to establish connections or status. You can use Service Code that each object supports to read/write drive's parameters and specifications. See the diagram below.



NOTICE:
For details on the EtherNet/IP Object that the drive supports, see following sections. For the setting method, see Section 6-2-3 <EtherNet/IP Explicit Messaging>.

A-2 Supported object

A-3 Supported data type

A-4 Identity Object (Class Code: 0x01)

A-4-1 Service code

8 Maintenance and Inspections

8.1 Precautions

CAUTION:

1. When a fault occurs, wait for five seconds after the fault is cleared before pressing RESET with the input terminal keypad.
2. Before opening the cover for the maintenance, the drive must first be switched off and make sure the LED indicator has been OFF for at least one minute for all models.
3. Only qualified personnel can work on maintenance or replace parts. (Remove metal items such as watch, rings, and other metal items before operation, and use insulated tools only.)
4. Never modify the internal components or wiring.
5. The performance and the surrounding environment should meet the standard specifications. There should be no abnormal noise, vibration, or odor.

- VIDAR has various warnings and protections against errors such as over-voltage, low voltage, or over-current. Once an error occurs, the protections activate, VIDAR stops output and activates the error contacts, and the motor coasts to stop. Refer to the error display from VIDAR and look up the corresponding causes and solutions. The fault record is stored in VIDAR internal memory. You can read it from the digital keypad or through the communications by accessing the parameters.
- VIDAR contains a large number of electronic components including ICs, resistors, capacitors, transistors, motor, and cooling fans. These components do not last forever. Even under normal circumstances, they will eventually become error-prone if use exceeds their lifespan. Therefore, you must perform periodic preventive maintenance to identify defective and worn out parts, and eliminate the causes of malfunctions in VIDAR at an early stage. At the same time, parts that have exceeded their product life should be replaced to ensure safe operation.
- Visual checks should be done regularly to monitor the operation of VIDAR, and to make sure nothing unusual happens. Check the situations listed in this Chapter.

8.2 Maintenance and inspections

Stop the VIDAR operation, turn off the power and remove the cover before the maintenance. Even if the power has been turned off, a charge may still remain in the filter capacitors with hazardous voltages which takes a certain time to discharge. To avoid danger, strictly follow the waiting time mentioned in the precautions after the VIDAR is powered off before performing the inspection.

Always check for power using a secondary method of equipment/tester at VIDAR before starting any services/maintenances.

Precautions:

1. Operations must be conducted by professional personnel using appropriate tools and protective equipment to avoid injury to personnel or damage to equipment.
2. The motor temperature is relatively high after shutting down; be aware of the heat to avoid burns.
3. Maintenance must be thoroughly documented with a formal record, clearly listing the maintenance times and personnel. Failure to properly maintain the equipment will affect warranty rights.

Ambient environment

Check Item	Methods and Criterion	Maintenance Period		
		Daily	**Half Year**	**One Year**
Check the ambient temperature, humidity, vibration and if there is any dust, gas, oil or water drops.	Visual inspection and measurement with equipment with standard specifications	□		
Check for any dangerous objects in the surroundings	Visual inspection	□		

Voltage

Check Item	Methods and Criterion	Maintenance Period		
		Daily	**Half Year**	**One Year**
If the voltage of the main circuit and control circuit are correct	Measure with multi-meter with standard specifications	□		

Mechanical Parts

Check Item	Methods and Criterion	Maintenance Period		
		Daily	**Half Year**	**One Year**
Check for any abnormal sounds or vibrations	Visual and auditory inspection		□	
Check for any loose screws	Tighten the screws		□	
Check for deformed or damaged parts	Visual inspection		□	
Check for any color changed due to overheating	Visual inspection		□	
Check for any dust or dirt	Visual inspection		□	
Check for the elasticity and if there is any damage on the gasket	Visual inspection			□

Main Circuit - Terminal and wiring

Check Item	Methods and Criterion	Maintenance Period		
		Daily	**Half Year**	**One Year**
Check for any loose or missing screws	Tighten the screws		□	
If there is any deformed, cracked, or damaged machinery / insulation, or any color change due to overheating and aging.	Visual inspection		□	
Check for any dust or dirt	Visual inspection		□	
Check for wiring insulation damage or color changed	Visual inspection		□	

Control Circuit - PCB and Connector

Check Item	Methods and Criterion	Maintenance Period		
		Daily	Half Year	One Year
Check for any loose screws and connectors	Tighten the screws		□	
Check for any peculiar odors or color changed	Visual inspection and smell		□	
Check for any cracking, damage, deformation or corrosion	Visual inspection		□	

Cooling System - Cooling Fan

Check Item	Methods and Criterion	Maintenance Period		
		Daily	Half Year	One Year
Check for any abnormal sounds or vibrations	Visual, auditory inspection and turn the fan by hand to check for smooth rotation (turn off the power before the inspection)		□	
Check if the C-clip has loosen	Tighten the screws		□	
Check for any color changed due to overheating	Visual inspection		□	

NOTICE:

1. If the surface of the fan blades is obviously damaged or cracked, replace the fan with a new one.
2. Do not directly grab the fan blade and pull it out. This will cause the fan blade to be deformed or damaged, and affect the heat dissipation and noise. Refer to 8.6 Fan kit disassembly on page 192 for instructions on replacing fan kit.
3. When replacing VIDAR or bearings, the fan must be replaced at the same time.

Cooling System - Ventilation Channel

Check Item	Methods and Criterion	Maintenance Period		
		Daily	Half Year	One Year
Check for any obstruction around the ventilation channel	Visual and auditory inspection	□		

NOTICE:
Use chemically neutral cloth to clean and use a dust cleaner to remove dust when necessary.

Motor-Drain Valve

Check Item	Methods and Criterion	Maintenance Period		
		Daily	Half Year	One Year
Clean and ensure there are no clogs from dirt or debris.	Visual and clean by hand.		□	

NOTICE:
Operators must wear waterproof gloves to avoid injury from contact with dirty water.

Motor-Shaft

Check Item	Methods and Criterion	Maintenance Period		
		Daily	Half Year	One Year
Perform anti-rust lubrication on the shaft, including the drive end and non drive end.	Lubricating with tool brush		□	

Motor- Bearing

Check Item	Methods and Criterion	Maintenance Period
1. Preparation: Clean the grease inlet nozzle first, then open the drain hole (note: automatic drain valve may lose elasticity due to environmental contamination, causing improper grease discharge). 2. Greasing during shutdown method (preferred method): Greasing shall preferably be performed during motor shutdown and power-off. While injecting grease, manually and slowly rotate the shaft to allow the new grease to distribute evenly within the rolling elements of the bearing. 3. If shutdown is not feasible: Set the motor speed to 500 rpm and perform greasing at low speed. Avoid greasing while the motor is running at high speed, as this may cause grease to leak through the INPRO SEAL gaps. 4. After greasing: Run the motor for 10-30 minutes, to allow ant excess grease to be discharged through the drain outlet.	Operate by hand with a bearing grease gun	Refer to the table based on operating time.

NOTICE:

1. Grease Type: Exxon-Mobil-polyrex-EM.

   Be sure to use the correct grease type.
2. Although there is an automatic drain device at the drain hole, to prevent malfunction caused by long-term dirt accumulation (normally opens at 1–5 psi pressure), the drain hole should be actively loosened to facilitate the drainage of excess grease.
3. The bearing housing of a new motor has already been filled with sufficient grease. Do NOT add additional grease at the initial installation, or it may be overfilled. The excess grease may overflow from both sides of the bearing, seep out along the flanges and pose uncertain risks to the motor's operational lifespan.
4. After prolonged use, when customers replenish grease, ensure the grease type (Exxon-Mobil-polyrex-EM) matches exactly. Do NOT mix different types of grease. When adding grease, do so in stages through the grease inlet hole while motor is operating.

Refer to the table below for replenishment intervals and amounts, which can be adjusted based on usage conditions.

5. The calculation bases of the above table are as following:
    1. Ambient average temperature: 30°C (consider the daily average temperature & average temperature in half a year).
    2. Operating speed: 100% rated speed.
    3. Environmental cleanliness: Normal cleanliness.
    4. Force on bearing: 10% of the radial and axial limits.
6. Replenishment interval: If the operation speed is low, the replenishment interval can be extended (the interval is inversely proportional to speed). Regardless of the operation total time and frequency, the shortest of the two should be used as the replenishment base. If the usage frequency is low, (take Frame 4 high speed model as an example), 2670 hrs, use 8 hours per day, 20 days per month = 16.6 months is longer than 6 months, based on the "take shorter one" principle, use 6 months as the replenishment cycle. In the same example specification, 2670 hrs, use 24 hrs per day, 30 days per month = 3.7 months, which is less than 6 months, based on the *take shorter one* principle, use 3.7 months as the replenishment cycle.
7. When the motor is running, ensure personnel stay away from rotating parts and do not touch them. Operators must wear gloves when checking the terminal box installation to avoid touching any live components, and ensure the motor wiring is secure without any electrical leakage.
8. Lubricants will age and deplete faster as temperatures rise. If the bearing operating temperature exceeds 70°C, it is recommended to halve the lubrication interval for every additional 15°C. The maximum operating temperature for bearings is 95°C; protection should be reduced if exceeded, and forced shutdown is necessary if it exceeds 110°C.
9. Bearings require regular maintenance and documentation according to specifications. Failure to comply with maintenance procedures may void the warranty if bearing damage occurs due to lack of maintenance.

	Unit	**254/6**		**284/6**				**324/6**				**364/5**			
Rated Power	HP	20	20	25	25	30	30	40	40	50	50	60	60	75	75
	kW	14.92	14.92	18.65	18.65	22.38	22.38	29.84	29.84	37.3	37.3	44.76	44.76	55.95	55.95
Rated Speed	rpm	3550	1770	3550	1770	3550	1770	3550	1770	3550	1770	3550	1770	3550	1770
D.E. Bearing		**6310C3**						**6312C3**				**6314C3**			
N.D.E. Bearing		**6208C3**		**6310C3**				**6312C3**				**6314C3**			
Supply	g	30	30	30	30	30	30	30	30	30	30	50	50	50	50
Replenishment Interval	hr	-	-	-	-	-	-	3600	-	3600	-	2670	-	2670	-
	month	6	6	6	6	6	6	6	6	6	6	6	6	6	6

8.3 Motor knock down inspection

For motors running continuously, 24 hours a day, a complete knock-down inspection should be made every two years. For motors running for shorter periods, for example, 8 to 12 hours/day, knock-down inspection should be made every 3 to 4 years, depending on the operation environment

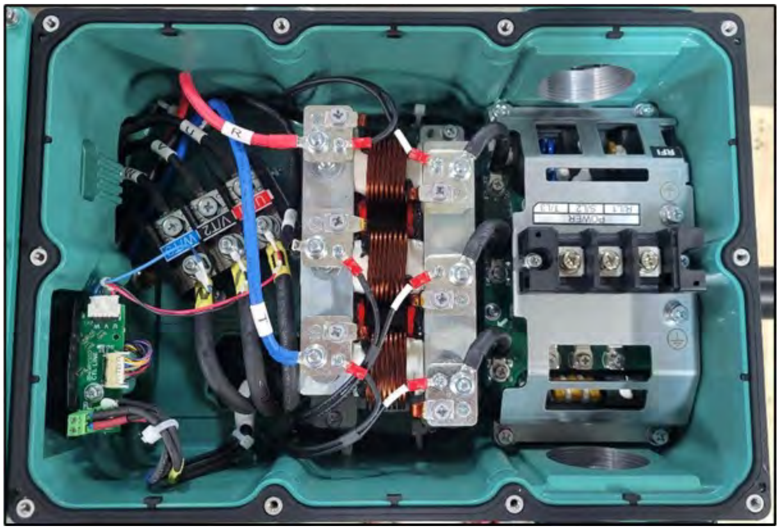
The motor knock-down inspection includes the following items:

1. Clean the motor: for both inside and outside of the motor.
    1. Wipe off dirt, dust, oil (or grease), water or other liquids from exterior surfaces of motor. These materials may be carried into the winding and cause overheating and/or contamination and insulation breakdown.
    2. Remove dirt, dust or other debris from ventilating air inlets and exhaust ports. Never operate a motor with air passage clogged or blocked, the motor will be severely overheated.
    3. If windings are generally coated with oil, grease or other contamination, disassemble the motor and clean thoroughly with solvents.

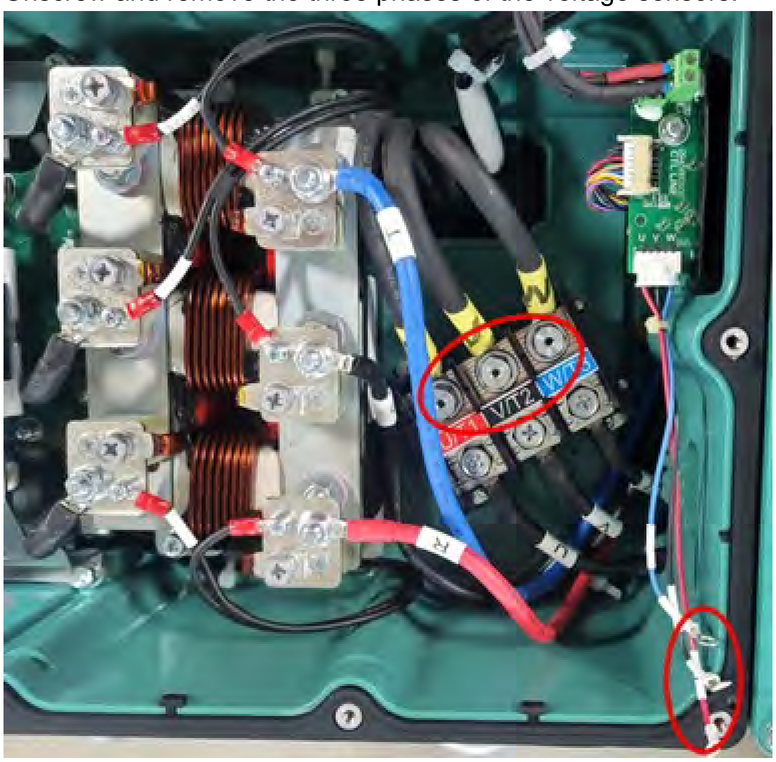
    - Use solvents with high flash naphtha or mineral spirits.
    - Wipe the motor with solvent-dampened cloth or use soft bristle brush to clean windings.
    - Never soak the motor directly with solvent.
    - Before reassemble, the windings must be heated and thoroughly dried by electric oven or other methods.
    - After cleaning and drying the motor, recheck the insulation resistance. If the readings are below safe operating levels, a re-treatment may be required.
2. Inspect the insulation material and winding for discoloration and possible overheating.
3. Inspect the pressure plate on the rotor end for damages or loosening.
4. Inspect all bearings for signs of excessive wear, corrosion or overheating. Replace if necessary.

8.4 Motor megging procedure

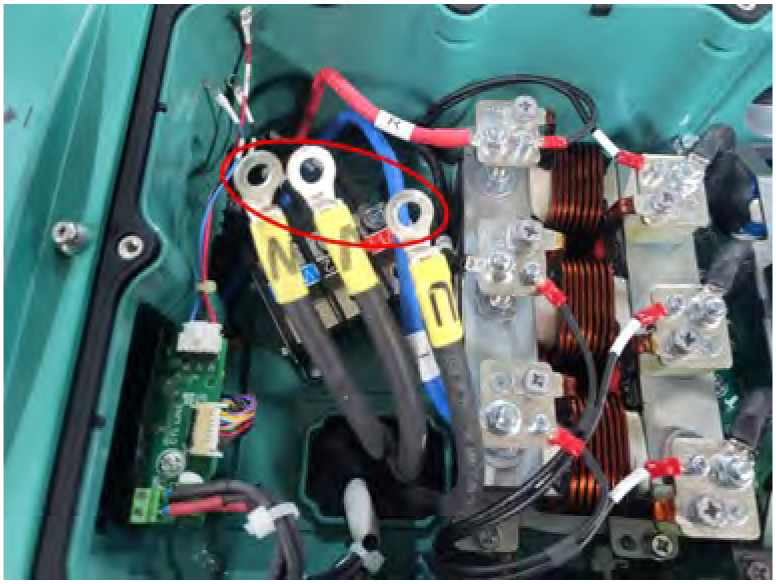
1. Take the terminal box cover off of the VIDAR.



2. Unscrew and remove the three phases of the voltage sensors.

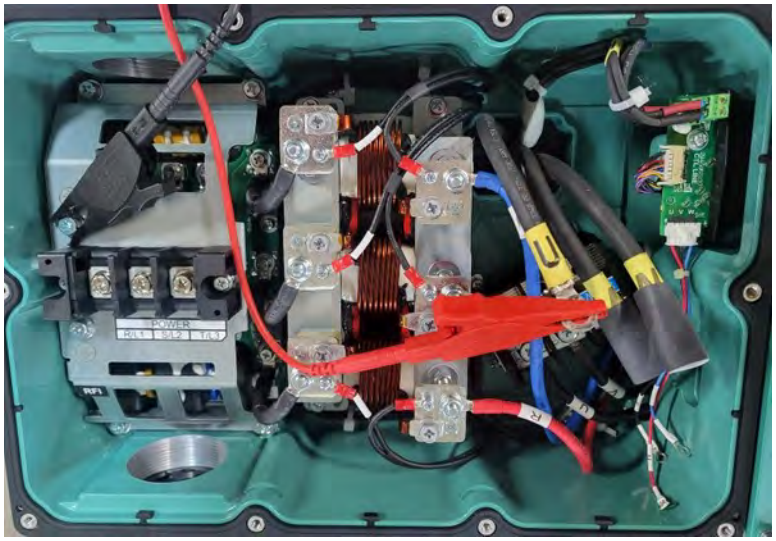


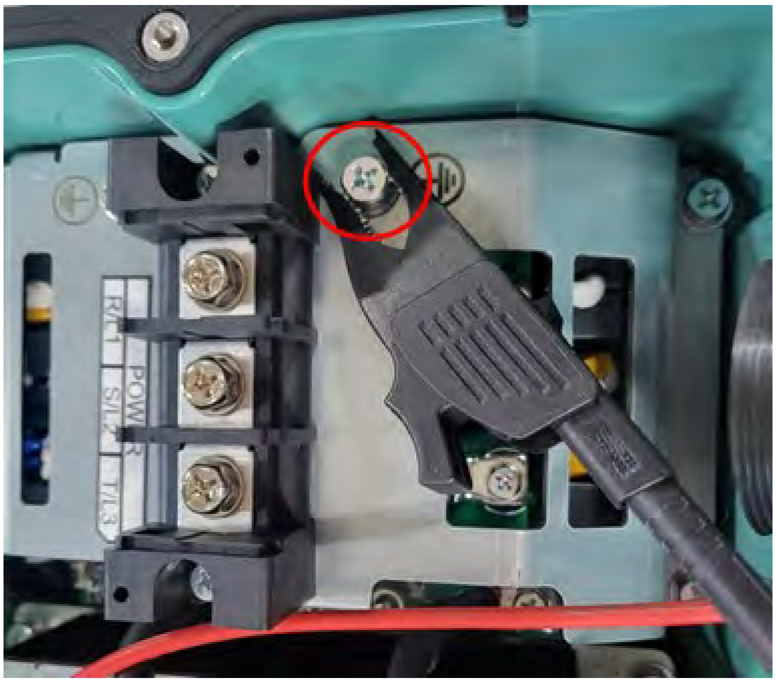
3. Disconnect all three leads: U, V, W, that supply the motor's three winding phases.



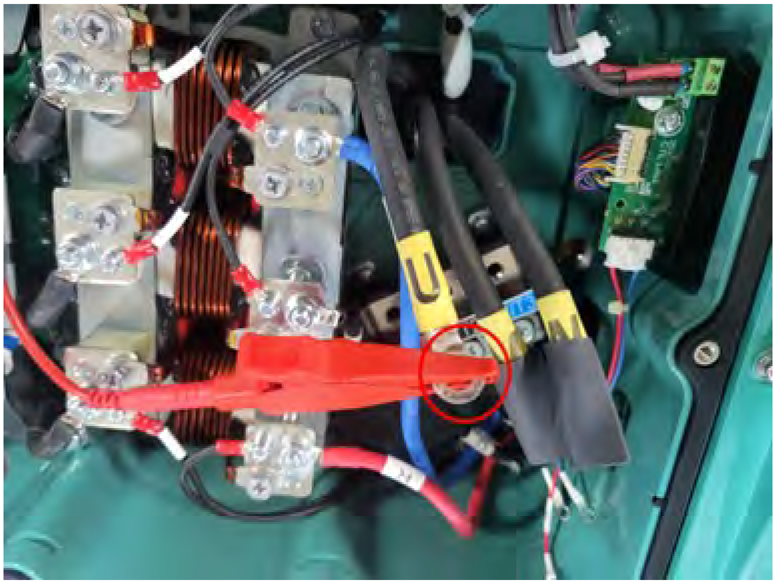
4. Isolate and insulate the motor wires to ensure they do not make contact with the motor terminal block or anything else.

5. Attach the Megger's Black lead to a grounded connection.





6. Attach the Megger's Red Lead to U, V or W motor phase.



7. Select 1000VDC on the Megger motor insulation tester.

8. Hold down the yellow button until the resistance measurement no longer increases.

9. OL (Open Loop) with GΩ is a passing result.
   a) The rule may be stated: Insulation resistance should be approximately 100 megohm for each 1,000 volts of operating voltage, with a minimum value of 100 megohm.
   b) Repeat the test on each phase.

   c) Each Phase should have similar results.
10. Record the results in the Test Report for that specific motor's serial number.

AC Motor Winding	Resistance Ω
U-GND	XΩ
V-GND	XΩ
W-GND	XΩ

11. Results:
    a) If motor megging results are more than 100MΩ, the motor insulation is in good condition.
    b) If motor megging results are less than 50MΩ, the motor should be monitored for insulation breakdown.

8.5 Storage

8.5.1 Introduction

The intent of these storage instructions is to establish the minimum standards (requirements) for the referenced motors. For motors that will not be put into service soon, the following precautions should be taken to protect the motor while in storage.

8.5.2 Storage inspection records

Records of all scheduled maintenance during storage must be maintained.

NOTICE:
For storage over two years, it is recommended to inspect the VIDAR and if necessary, completely disassemble the motor for thorough inspection and cleaning before startup.

8.5.3 Storage area

To ensure proper maintenance of the motor, the motor should be stored in a clean, dry, heated warehouse. The storage area should be free of ambient vibration.

Where indoor storage is not available, motor should be loosely covered with a tarpaulin plastic cover or similar type of protective cloth. Covering should extend to the ground and must not tightly wrap the motor to maintain good ventilation. When storage period is longer than 90 days, indoor storage is mandatory.

When there is no available heating device in the warehouse, use extra space heaters or other types of reliable heating methods to keep the temperature of motor above dewpoint temperature of the surrounding air. For critical motors, an alarm signal of warm should be supplied, if these heating methods become inoperative.

The VIDAR internal preheat function should be turned on for 24 hours to minimize any possible condensation within the unit, this should be done before operating the VIDAR.

8.5.4 Storage maintenance

To keep the motors always in good condition, the following maintenance procedures should be taken periodically.

1. Visual Inspection

   The motors should be inspected for signs of unusual dirt built up, rust, or general deterioration.

   For long term storage, the shaft extension, mounting flange of the motor and other exposed-machined surfaces should be coated with anticorrosive coatings. The anticorrosive coatings should be examined periodically. If there is a scratch on the coating, surfaces must be repaired and recoated.
2. Megger Stator
3. Measure the insulation resistance every three months during the storage. The insulation resistance between the winding and earthed stator frame should be at least as shown below:
   - >10 M Ω with 1000 V Meggermeter

     Record the resistance values and pay attention to its variation. When the resistance value has changed significantly, check the storage environment and make necessary improvements.

When the resistance value is less than the above value, dry the equipment until the resistance value goes up to the above mentioned before starting operation. The winding surface is best dried with warm dry air at about 60°C or put in a heated oven. Self-drying can be used if necessary, that is, powering the VIDAR and enabling the preheat function for 24 hours, powering down and rechecking the meg ohm reading of the stator to confirm a operational value >10 meg ohms.

4. Bearings

    1. Grease-lubricated bearings

    Grease lubricated motors are shipped with proper amount of grease in each bearing. If the motor is placed in storage for more than three months, it is recommended to turn the shaft over slowly by hand 30 revolutions. (you must wear gloves when turning the shaft) or by suitable wrench at least once in every three months. This will disperse the grease and prevent damage to the bearing balls caused by uneven grease distribution or long-term imbalance force.

8.5.5 Storage inspection records

Records of all scheduled maintenance during storage must be maintained.

NOTICE:
For storage over two years, it is recommended to inspect the VIDAR and if necessary, completely disassemble the motor for thorough inspection and cleaning before startup.

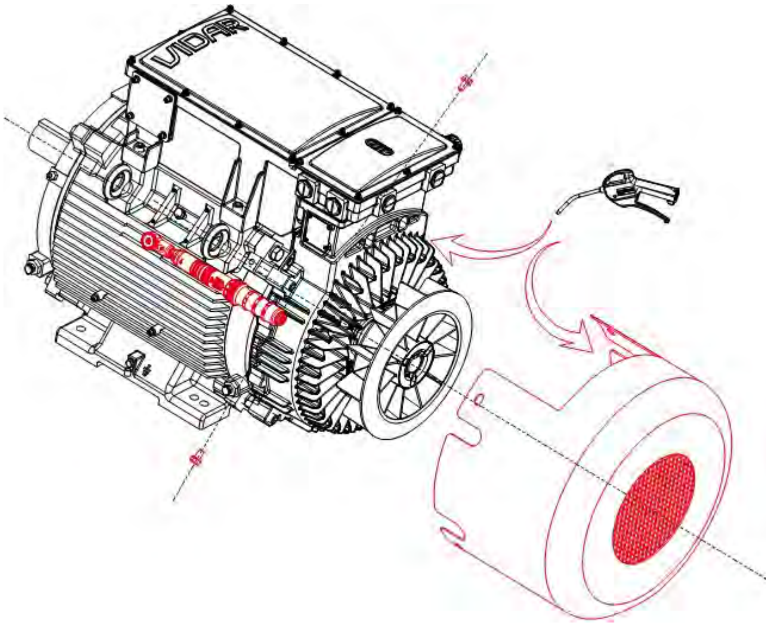
8.6 Fan kit disassembly

Follow the description below to detach the fan kit from the motor for replacement or repairment:

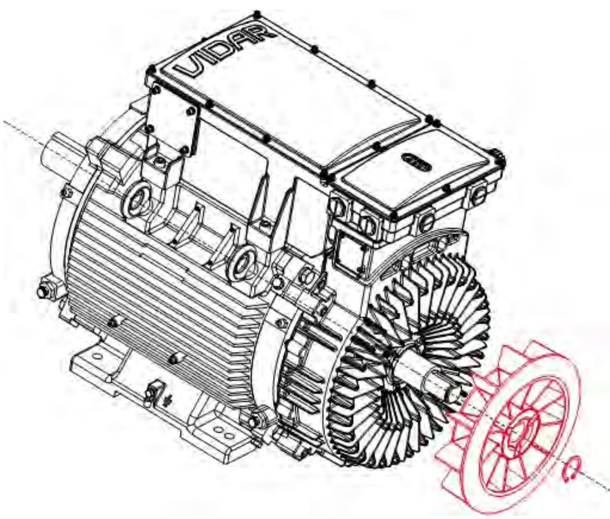
1. Use a wrench to unscrew the four bolts surrounding the motor cowls (refer to the following table for the bolt torque). Then the motor cowl can be detached backward along the axial direction.

Frame	Screw Size	Torque
1	M6	66–76 kg-cm / (58–66 lb-in.) / 6.5–7.5 Nm)
2	M8	153–163 kg-cm / (133–142 lb-in.) / (15–16 Nm)
3	M8	153–163 kg-cm / (133–142 lb-in.) / (15–16 Nm)
4	M10	306–326 kg-cm / (266–283 lb-in.) / (30–32 Nm)

2. After disassembly, use a vacuum and stiff bristle brush to clean the dust and debris from the motor cowling and the motor.



3. Use a Snap ring pliers to remove the C-clip and detach the fan backward along the axial direction.
4. After the fan has been replaced or repaired, put the fan back on the motor shaft and push it axially inward to the end. (Pay attention to the internal and external direction of the fan.)
5. Use a Snap ring pliers to re-install the C-clip back into the groove on the shaft to prevent the fan from falling off.



6. Put back the motor cowl and tighten back the four bolts loosened from Step 1. Refer to the table listed in Step 1 for the tightening torque.

9 Warning Codes and Troubleshooting

9.1 Alarm list

9.1.1 VIDAR warning codes

ID No.	Warning Name	ID No.	Warning Name
0	No record	114	Dry pump warning (dvn)
7	Save error 1 (SE1)	123	Deceleration energy backup error (dEb)
8	Save error 1 (SE2)	140	SD memory error (SDiv)
9	IGBT overheating warning (oH1)	142	AI2 analog signal loss (Ai2L)
10	Capacitor overheating warning (oH2)	146	Monitor signal 1 trigger (BX1n)
12	AI1 analog signal loss (Ai1L)	147	Monitor signal 2 trigger (BX2n)
13	Under current (uC)	148	Monitor signal 3 trigger (BX3n)
15	Run disable (RuDs)	149	Monitor signal 4 trigger (BX4n)
16	Safe torque off (STO)	150	Monitor signal 5 trigger (BX5n)
17	Over speed warning (oSPd)	151	Monitor signal 6 trigger (BX6n)
18	Deviation warning (dAvE)	152	Monitor signal 7 trigger (BX7n)
20	Over-torque 1 (ot1)	153	Monitor signal 8 trigger (BX8n)
21	Over-torque 1 (ot2)	154	Battery low voltage (RtLv)
22	Motor overheating (oH3)	155	Overload (oLn)
30	Copy model error 3 (SE3)	161	Asynchronous (ASYN)
31	Under load (ULD)	171	Low Ac Voltage (Lvac)
32	Overload (OLD)	172	ACB NTC Open (ANTo)
34	Low voltage (LV)	174	KTY84 Open (KTYo)
35	Fan speed abnormal (FanA)	175	RTD Open (RTDo)
101	InnerCOM timeout (ictn)	176	RTD overheating (OH3r)
105	Estimated speed reverse (SpdR)	177	ACB RH OPEN (ARHo)
111	Dry pump curve auto-tuning (DtUn)	178	ACB T OPEN (Ato)
112	Leakage warning (LEKn)	180	ACB relative humidity warning (ARHw)
113	Low pressure warning (LPSn)		

9.1.2 VIDAR Fault codes

ID No.	Fault Name	ID No.	Fault Name
0	No record	67	Short-circuit endplate (OCCe)
1	Over-current during acceleration (ocA)	68	Reverse direction of the speed feedback (SdRv)
2	Over-current during deceleration (ocd)	69	Over speed rotation feedback (SdOr)
3	Over-current during steady operation (ocn)	70	Large deviation of speed feedback (SdDe)
4	Ground fault (GFF)	72	STO Loss 1 (STL1)
5	IGBT short circuit between upper bridge and lower bridge (occ)	76	Safe torque off (STO)
6	Over-current at stop (ocS)	77	STO Loss 2 (STL2)
7	Over-voltage during acceleration (ovA)	78	STO Loss 3 (STL3)

ID No.	Fault Name	ID No.	Fault Name
8	Over-voltage during deceleration (ovd)	87	Overload protection at low speed (oL3)
9	Over-voltage at constant speed (ovn)	88	Model ID change (IDCH)
10	Over-voltage at stop (ovS)	94	Initializing power board communication error when power ON (POCF)
11	Low-voltage during acceleration (LvA)	95	Board identification error during power-on initialization (IDDE)
12	Low-voltage during deceleration (Lvd)	97	AI2 loss (Ai2L)
13	Low-voltage at constant speed (Lvn)	111	Inner communication time-out (ictE)
16	IGBT overheating (oH1)	118	Monitor signal 1 trigger (BX1e)
17	Capacitor overheating (oH2)	119	Monitor signal 2 trigger (BX2e)
18	Thermal 1 open (tH1o)	120	Monitor signal 3 trigger (BX3e)
19	Thermal 2 open (tH2o)	121	Monitor signal 4 trigger (BX4e)
21	Overload (oL)	122	Monitor signal 5 trigger (BX5e)
24	Motor overheating (oH3)	123	Monitor signal 6 trigger (BX6e)
25	Interupt Error (INTR)	124	Monitor signal 7 trigger (BX7e)
26	Over-torque 1 (ot1)	125	Monitor signal 8 trigger (BX8e)
27	Over-torque 2 (ot2)	132	Under load protection (ULD)
28	Under current (uC)	133	Overload protection (OLD)
30	EEPROM write error (cF1)	141	Large amount leakage error (LEKE)
31	EEPROM read error (cF2)	142	High pressure error (HPS)
42	Over-current motor (OCm)	143	Low pressure error (LPSE)
43	Over-current endplate (OCe)	144	Dry pump error (dynE)
48	AI1 loss (Ai1L)	145	Dry pump auto-tune error (dAUE)
49	External Fault (EF)	161	STO Loss 4 (STL4)
50	Emergency stop (EF1)	162	STO Loss 5 (STL5)
52	Password is locked (Pcod)	163	STO Loss 6 (STL6)
66	Short-circuit motor (OCCm)	201	CTB Watchdog (CBWD)
164	Gate Buffer U (GBFU)	209	Safety MCU 5V2 error (STOC)
165	Gate Buffer V (GBFV)	210	Safety MCU STD error (STOS)
166	Gate Buffer W (GBFW)	220	Parameter copy write failure (CWF)
167	Safety MCU Comm CRC error (StCE)	221	FPGA Watch Dog Fault (FWDF)
168	Safety MCU Comm TimeOut (StTO)	222	Chopper SW OH (CSOH)
170	Firmware Version Mismatch (CBNM)	223	Ready Signal Fault (RDF)
171	Control Board Burn TimeOut(CBBT)	224	PLL fault (PLLF)
172	Coefficient of CTB Mismatch (CBCM)	225	Current Offset Fault (COF)
182	RTD overheating (OH3r)	226	Clamp SW Fault (CSF)
204	Safety MCU ROM (ROMF)	227	Current sensor abnormal (CSAF)
205	Safety MCU time-out (STOT)	228	Ver of CTB & FPGA mismatch (CFNM)
206	Safety MCU WatchDog (STOW)	229	Clamp Resistor Over Heat (CROH)
207	Safety MCU 24V error (STOF)	231	OVD Broken (OvdB)
208	Safety MCU 6V error (STOB)	234	Low Ac Voltage (Lvac)
		242	ACB Relative Humidity Fault (RHf)

9.1.3 Digital keypad fault codes

Fault code	Causes
Erk1	The data flash read or write operation does not respond within one second.
Erk3	Fail to write data to Flash (read error after write operation)
Erk4	Flash has not been written; the keypad parameter value has been set exceeding the defined range
Erk8	The structure of the received communication packet is wrong, the attempted retransmission failed, and the fault occurred three times in a row
Erk9	Communication time-out at start (the digital keypad cannot connect with the VIDAR within 9 seconds after power-on)
Erk10	Communication time-out (the digital keypad cannot connect with the VIDAR within 6 seconds during normal communication)
Erk11	The VIDAR does not support the communication of backup and restore function
Erk12	Parameters are not unlocked while restoring backup
Erk13	The VIDAR modes (normal mode, restore mode and backup mode) error while restoring back-up
Erk14	When restoring the backup, switch the modes of the VIDAR. If the switching command fails, the keypad retransmits up to 3 times, each time at an interval of 1 second; if it still fails, the Erk14 fault shows. When switching the VIDAR modes while restoring the backup, the VIDAR replies “In progress” during the switching process and the digital keypad waits for up to 20 seconds. If the VIDAR is still in progress, the Erk14 fault shows.
Erk15	Failed to verify the file compatibility with the VIDAR while restoring the backup
Erk16	Failed to verify the file size with the VIDAR while restoring the backup
Erk17	Failed to write data while restoring the backup
Erk18	Check the file size is empty while restoring the backup
Erk19	SD card is invalid / unavailable in the SD card displaying screen.
Erk20	The VIDAR does not support the SD card function in the SD card displaying screen
Erk23	The file size exceeds the upper limit (24440 bytes) during parameter backup

9.2 Warning codes and troubleshooting

ID No. 7 - Save error 1 (SE1)

ID No.	Warning Name	Descriptions
7	Save error 1 (SE1)	Keypad COPY error 1: Keypad copy time-out
Action and Reset		
Action Condition		“SE1” warning occurs when the keypad does not transmit the COPY command to the VIDAR and does not transmit any data to the VIDAR again in 10 sec. at the time you copy the parameters to the VIDAR.
Action Time		10 sec.
Warning Setting Parameter		N/A
Reset Method		Manual reset
Reset Condition		Immediately reset
Record		No
Cause		**Corrective Actions**
Communication connection error		The causes of error are mostly communication problems between the keypad and control board. Potential causes include communication signal interference and the unacceptable communication command to the Slave. It is recommended to rule out communication quality factors first. Check if the error occurs randomly or only occurs when copying certain parameters (the error displays on the upper right corner of the copy page).
Keypad error		
Control board error		

ID No. 8 - Save error 2 (SE2)

ID No.	Warning Name	Descriptions
8	Save error 2 (SE2)	Keypad COPY error 2: parameter writing error
Action and Reset		
Action Condition		If the copied parameter is incorrect when coping parameters to the VIDAR, SE2 warning occurs.
Action Time		No
Warning Setting Parameter		N/A
Reset Method		Manual reset
Reset Condition		Immediately reset
Record		No
Cause		**Corrective Actions**
Copy parameters using upload files with large version differences		When the Slave compares the parameter copy data and finds that the data is wrong (wrong status such as exceeding the parameter upper and lower limit, etc.), the SE2 warning occurs. If the SE2 warning occurs, it is recommended to use the same version of firmware to upload and download parameters. If the warning still exists, contact VIDAR Technical Support.
Malfunction caused by interference		Verify the wiring and grounding of the main circuit, control circuit and the encoder for effective anti-interference performance.

ID No. 9 - IGBT over-heating warning (oH1)

ID No.	Warning Name	Descriptions
9	IGBT over-heating warning (oH1)	The VIDAR detects over-heating of IGBT which exceeds the protection level of oH1 warning. (When Pr. H4-00 is higher than the IGBT over-heating level, the VIDAR shows oH1 error without displaying oH1 warning.)
Action and Reset		
Action Condition		Pr. H4-00
Action Time		Immediately acts when IGBT temperature is higher than Pr. H4-00
Warning Setting Parameter		N/A
Reset Method		Auto-reset
Reset Condition		The VIDAR auto-resets when IGBT temperature is lower than oH1 warning level minus (–) 5°C
Record		No
Cause		**Corrective Actions**
Check if the ambient temperature is too high.		1. Reduce the ambient temperature. 2. Change the installed place if there are heating objects in the surroundings. 3. Install / add cooling fan or air conditioner to lower the ambient temperature .
Check if there is any obstruction on the heat sink or if the fan is running, or damaged		Remove the obstruction or replace the cooling fan.
Insufficient ventilation space		Increase ventilation space of the VIDAR.
Check if the VIDAR matches the corresponding load.		1. Decrease load. 2. Replace with a VIDAR with larger capacity.

ID No. 10 - Capacitor overheating warning (oH2)

ID No.	Warning Name	Descriptions
10	Capacitor overheating warning (oH2)	The VIDAR has detected the capacitors are overheating and the temperature exceeds the warning protection level
Action and Reset		
Action Condition		oH2 error level minus (–) 5°C
Action Time		The oH2 warning occurs when the temperature sensor of capacitor detects the temperature is higher than oH2 warning level
Warning Setting Parameter		N/A
Reset Method		Auto-reset
Reset Condition		The VIDAR auto-resets when the capacitor temperature is lower than oH2 warning level minus (–) 10°C
Record		No
Cause		**Corrective Actions**
Check if the ambient temperature is too high.		1. Check the ambient temperature. 2. Change the installed location if there are heating objects in the surroundings.
Check if there is any obstruction on the heat sink or if the fan is not spinning, or damaged		Remove the obstruction or replace the cooling fan.
Insufficient ventilation space		Increase ventilation space of the VIDAR.
Check if the VIDAR matches the corresponded loading.		1. Decrease loading. 2. Replace VIDAR with larger capacity.
The VIDAR has run 100% or more of the rated output for a long time		Replace the VIDAR with a larger capacity model.
Unstable power		Install reactor(s).
The load changes frequently		Reduce the changes of the load.

ID No. 12 - AI1 analog signal loss (Ai1L)

<table>
<tr><th>ID No.</th><th>Warning Name</th><th colspan="2">Descriptions</th></tr>
<tr><td>12</td><td>AI1 analog signal loss
(Ai1L)</td><td colspan="2">Analog input current loss (including all analog 4–20mA signals)</td></tr>
<tr><td colspan="4">Action and Reset</td></tr>
<tr><td colspan="2">Action Condition</td><td colspan="2">When the analog input (Pr.G2-03 = 2) is lower than 3.6 mA (only detects analog input 4–20 mA)</td></tr>
<tr><td colspan="2">Action Time</td><td colspan="2">The action condition is observed for 0.1s</td></tr>
<tr><td colspan="2">Warning Setting Parameter</td><td colspan="2">Pr.G2-11
AI1 signal loss action:
0: Disable
1: Warn & Continue OPER
2: Fault & Ramp to Stop
3: Fault & Auto-Decel
4: Fault & Coast to Stop
5: Fault & by Quick Stop Time</td></tr>
<tr><td colspan="2" rowspan="2">Reset Method</td><td>Auto</td><td>It is “Warning” when Pr.G2-11 = 1, and the warning will be automatically cleared when the analog input signal is ≥ 4 mA.</td></tr>
<tr><td>Manual</td><td>It is “Fault” when Pr.G2-11 = 2–5, which must be reset manually.</td></tr>
<tr><td colspan="2">Reset Condition</td><td colspan="2">Immediately reset</td></tr>
<tr><td colspan="2">Record</td><td colspan="2">It is “Fault” when Pr.G2-11 = 2–5 and will be recorded.</td></tr>
<tr><td colspan="2">Cause</td><td colspan="2">Corrective Actions</td></tr>
<tr><td colspan="2">Loose or broken AI1 wiring</td><td colspan="2">Tighten the terminals again.
Replace with a new cable.</td></tr>
<tr><td colspan="2">External device error</td><td colspan="2">Replace with new device.</td></tr>
<tr><td colspan="2">Hardware failure</td><td colspan="2">If the Ai1L error still occurs after checking all the wiring, return ACB circuit board to the factory for repair.</td></tr>
</table>

ID No. 13 - Under current (uC)

ID No.	Warning Name	Descriptions	
13	Under current (uC)	Low current	
Action and Reset			
Action Condition		Pr.H2-12	
Action Time		Pr.H2-13	
Warning Setting Parameter		Pr.H2-14 0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to stop 4: Fault & by Quick Stop Time	
Reset Method		Auto	"Warning" occurs when Pr.H2-14 = 0. The "Warning" automatically clears when the output current is > (Pr.H2-12 × 105%).
		Manual	"Error" occurs when Pr.H2-14 = 1–4. You must reset manually.
Reset Condition		Immediately reset	
Record		Does not record when Pr.H2-14 = 0 and uC displays "Warning"	
Cause		**Corrective Actions**	
Motor load disconnection		Examine the mechanical connection of the motor and its load.	
Improper setting for the low current protection		Set the proper settings for Pr.H2-12, Pr.H2-13 and Pr.H2-14.	
Low load		Check the load status. Make sure the VIDAR capacity matches the load.	

ID No. 15 - Run disable (RuDs)

ID No.	Warning Name	Descriptions
15	Run disable (RuDs)	When enabling Pr.A1-21, the corresponded MI terminal is OFF and receiving a RUN command
Action and Reset		
Action Condition		The corresponded MI terminal of Pr.A1-21 is OFF and receiving a RUN command
Action Time		Immediately act
Warning Setting Parameter		N/A
Reset Method		Auto resets when the MI terminal is ON
Reset Condition		Immediately reset
Record		No
Cause		**Corrective Actions**
Incorrect wiring or the function signal has not input		Check whether the wiring and upper unit function output is correct.

ID No. 17 - Over speed warning (oSPd)

ID No.	Warning Name	Descriptions
17	Over speed warning (oSPd)	Over speed warning
Action and Reset		
Action Condition		The motor speed > Pr.H8-03
Action Time		Pr.H8-04
Warning Setting Parameter		Pr.H8-05 0: Warning & continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to stop 4: Fault & by Quick Stop Time
Reset Method		The oSPd warning automatically clears when the VIDAR stops
Reset Condition		The oSPd warning automatically clears when the VIDAR stops
Record		No
Cause		**Corrective Actions**
Improper bandwidth setting for ASR speed controller		Increase the bandwidth setting for ASR speed controller.
Improper parameter setting for Pr.H8-03		Check the setting value for Pr.H8-03

ID No. 18 - Deviation warning (dAvE)

ID No.	Warning Name	Descriptions
18	Deviation warning (dAvE)	Over speed deviation warning
Action and Reset		
Action Condition		The motor speed differs from the speed profile by Pr.H8-00
Action Time		Pr.H8-01
Warning Setting Parameter		Pr.H8-02 0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to stop 4: Fault & by Quick Stop Time
Reset Method		The dAvE warning automatically clears when the VIDAR stops
Reset Condition		The dAvE warning automatically clears when the VIDAR stops
Record		No
Cause		**Corrective Actions**
Improper setting for ASR parameter acceleration/ deceleration		Set proper bandwidth setting for ASR speed controller and accel./ decel. time.
Motor locked		Remove the causes of motor locked.
Improper parameter setting for Pr.H8-00		Check the setting value for Pr.H8-00

ID No. 20 - Over-torque 1 (ot1)

ID No.	Warning Name	Descriptions
20	Over-torque 1 (ot1)	Over-torque during running
Action and Reset		
Action Condition		Pr.H5-04
Action Time		Pr.H5-05
Warning Setting Parameter		Pr.H5-00 (ot Action) = 0 0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to stop 4: Fault & by Quick Stop Time
Reset Method		The ot1 warning automatically clears when the output current is < (Pr.H5-04 × 95%)
Reset Condition		The ot1 warning automatically clears when the output current is < (Pr.H5-04 × 95%)
Record		No
Cause		**Corrective Actions**
Incorrect parameter setting		Reset Pr.H5-04 and Pr.H5-05.
Mechanical failure (E.g., over-torque, mechanical lock)		Rule out the causes of malfunction.
The load is too large		Reduce the load. Replace the VIDAR with a larger capacity model.
Accel./Decel. time and working cycle are too short		Increase the setting values for Pr.C2-00–Pr.C2-07 (accel./decel. time)
The VIDAR capacity is too small		Replace the VIDAR with a larger capacity model.
Overload during low-speed operation		Decrease low-speed operation time. Enlarge the VIDAR capacity.

ID No. 21 - Over-torque 2 (ot2)

ID No.	Warning Name	Descriptions
21	Over-torque 2 (ot2)	Over-torque during normal speed
Action and Reset		
Action Condition		Pr.H5-06
Action Time		Pr.H5-07
Warning Setting Parameter		Pr.H5-02 (Normal speed ot action) = 0 0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to stop 4: Fault & by Quick Stop Time
Reset Method		The ot2 warning automatically clears when the output current is < (Pr.H5-06 × 95%)
Reset Condition		The ot2 warning automatically clears when the output current is < (Pr.H5-06 × 95%)
Record		No
Cause		**Corrective Actions**
Incorrect parameter setting		Reset Pr. H5-06 and Pr. H5-07.
Mechanical failure (E.g., over-torque, mechanical lock)		Rule out the causes of malfunction.
The load is too large		Reduce the load. Replace the VIDAR with a larger capacity model.
Accel./Decel. time and working cycle are too short		Increase the setting values for Pr. C2-00–Pr. C2-07 (accel./decel. time)
The VIDAR capacity is too small		Replace the VIDAR with a larger capacity model.
Overload during low-speed operation		Decrease low-speed operation time. Enlarge the VIDAR capacity.

ID No. 22 - Motor overheating (oH3)

ID No.	Warning Name	Descriptions
22	Motor overheating (oH3)	Motor overheating warning. The VIDAR detects the temperature inside the motor is too high
Action and Reset		
Action Condition		The KTY84 temperature is > Pr. H6-04. The KTY84 temperature is > Pr. H6-07 and Pr. H6-09 = 0
Action Time		Pr. H6-05 Pr. H6-08
Warning Setting Parameter		The oH3 is automatically cleared when the temperature is < Pr. H6-04 level after maintaining Pr. H6-05 KTY warning delay time. Pr. H6-09 0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to stop 4: Fault & by Quick Stop Time The oH3 is automatically cleared when Pr. H6-09 = 0 and the temperature is < Pr. H6-07 level after maintaining Pr. H6-08 KTY OH detect time.
Reset Method		When the temperature is < Pr. H6-04 level after maintaining Pr. H6-05 KTY warning delay time, the oH3 warning is automatically cleared. When Pr. H6-09 = 0 and the temperature is < Pr. H6-07 level after maintaining Pr. H6-08 KTY OH detect time, the oH3 warning is automatically cleared.
Reset Condition		When the temperature is < Pr. H6-04 level after maintaining Pr. H6-05 KTY warning delay time, the oH3 warning is automatically cleared. When Pr. H6-09 = 0 and the temperature is < Pr. H6-07 level after maintaining Pr. H6-08 KTY OH detect time, the oH3 warning is automatically cleared.
Record		No
Cause		**Corrective Actions**
Motor locked		Clear the motor lock status.
The load is too large		Reduce the load. Replace the VIDAR with a larger capacity model.
Ambient temperature is too high		Change the installed location if there are heating devices in the surroundings. Install / add cooling fan or air conditioner to lower the ambient temperature.
Motor cooling system error		Check the cooling system.
Operates at low speed too long		Decrease low-speed operation time. Enlarge the VIDAR capacity.
Accel./Decel. time and working cycle are too short		Increase the setting values for Pr. C2-00–Pr. C2-07 (accel./decel. time)

ID No. 30 - Copy model error 3 (SE3)

ID No.	Warning Name	Descriptions
30	Copy model error 3 (SE3)	Keypad COPY error 3: copy model error
Action and Reset		
Action Condition		"SE3" warning occurs when different VIDAR identity codes are found during copying parameters.
Action Time		Immediately act when the error is detected
Warning Setting Parameter		N/A
Reset Method		Manual reset
Reset Condition		No
Record		No
Cause		**Corrective Actions**
Keypad copy between different power range VIDARs		It is mainly to prevent parameter copies between different HP/models. Use the same model ID to upload and download parameter copying.

ID No. 31 - Under load (ULD)

ID No.	Warning Name	Descriptions
31	Under load (ULD)	The load does not reach the user defined loading curve and triggers under load protection.
Action and Reset		
Action Condition		Pr. H7-19–H7-28
Action Time		Pr. H7-18
Warning Setting Parameter		Pr. H7-16 0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to stop 4: Fault & by Quick Stop Time
Reset Method		The warning is automatically cleared when the load is higher than the setting loading curve.
Reset Condition		The warning is automatically cleared when the load is higher than the setting loading curve.
Record		No
Cause		**Corrective Actions**
Incorrect settings that trigger the protection		Check if the setting for Pr. H7-19–H7-28 corresponds to the exact loading.

ID No. 32 Overload (OLD)

ID No.	Warning Name	Descriptions
32	Overload (OLD)	The load is higher than the user defined loading curve and triggers overload protection.
Action and Reset		
Action Condition		The loading condition is higher than Pr. H7-05–H7-14 loading curve
Action Time		Pr. H7-04
Warning Setting Parameter		Pr. H7-02 0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to stop 4: Fault & by Quick Stop Time
Reset Method		The warning is automatically cleared when the load is lower than the setting loading curve.
Reset Condition		The warning is automatically cleared when the load is lower than the setting loading curve.
Record		Yes
Cause		**Corrective Actions**
Incorrect settings that trigger the protection		Check if the setting for Pr. H7-05–H7-14 is correct.

ID No. 34 Low voltage (LV)

ID No.	Warning Name	Descriptions
34	Low voltage (LV)	Before the VIDAR operates, it detects that the CLAMP Bus voltage is lower than Pr. H1-02 setting value
Action and Reset		
Action Condition		CLAMP Bus voltage is lower than Pr. H1-02 setting value
Action Time		Immediately act when CLAMP Bus voltage is lower than Pr. H1-02
Warning Setting Parameter		N/A
Reset Method		Auto-reset
Reset Condition		It can be reset after the CLAMP Bus voltage exceeds Pr. H1-02 + 60 V_{DC}
Record		No
Cause		**Corrective Actions**
Power-off		Improve power grid supply condition.
Power voltage changes		Adjust voltage to match the power range of the VIDAR.

ID No. 35 - Fan speed abnormal (FanA)

ID No.	Warning Name	Descriptions
35	Fan speed abnormal (FanA)	Power Converter Internal Fan speed is abnormal
Action and Reset		
Action Condition		The measured fan speed differs from the command by more than 15% over 3s
Action Time		Immediately act
Warning Setting Parameter		N/A
Reset Method		Auto-reset
Reset Condition		Pr. H4-03 and Pr. H4-04 are set to zero
Record		No
Cause		**Corrective Actions**
Hardware failure		Check if FanA occurs after cycling the power. If yes, return Power Converter to the factory for repair.

ID No. 101 Inner communication time-out (ictn)

ID No.	Warning Name	Descriptions
101	Inner communication time-out (ictn)	The communication between ACB and CONTROL PCB is failed
Action and Reset		
Action Condition		The communication between ACB and CONTROL PCB is failed
Action Time		Software detection
Warning Setting Parameter		No
Reset Method		Auto-reset
Reset Condition		The communication between ACB and CONTROL PCB are connected
Record		No
Cause		**Corrective Actions**
The cable is loose		Re-insert the cable connections between the OVD circuit board and power converter. Re-insert the cable connections between the OVD and ACB circuit boards.

ID No. 105 - Estimated speed reverse (SpdR)

ID No.	Warning Name	Descriptions
105	Estimated speed reverse (SpdR)	Estimated speed is in a reverse direction with user command direction
Action and Reset		
Action Condition		Software detection
Action Time		Pr. H8-06
Warning Setting Parameter		Pr. H8-07 0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to stop 4: Fault & by Quick Stop Time
Reset Method		Manual reset
Reset Condition		Immediately resets
Record		No
Cause		**Corrective Actions**
The motor runs in reverse direction		Check if the motor is stopped when started. Under low-speed VIDAR operation, a transient overload may cause the actual speed to drop to 0 rpm. If this condition persists longer than the threshold defined by Pr.H8-06, the drive issues an SpdR warning. As a corrective measure, consider increasing the value of Pr.H8-06 to extend the tolerance window.

ID No. 111 - Dry pump curve auto-tuning (DtUn)

ID No.	Warning Name	Descriptions
111	Dry pump curve auto-tuning (DtUn)	Dry pump curve auto-tuning is processing.
Action and Reset		
Action Condition		When running Pr.U3-11 dry pump curve auto-tuning, the keypad displays “DtUn”
Action Time		No
Warning Setting Parameter		N/A
Reset Method		When auto-tuning is finished and no error occurs, the warning automatically clears
Reset Condition		When auto-tuning is finished, and no error occurs
Record		No
Cause		**Corrective Actions**
The dry pump curve is running auto-tuning		When the auto-tuning is finished, the warning automatically clears.

ID No. 112 - Leakage warning (LEKn)

ID No.	Warning Name	Descriptions
112	Leakage warning (LEKn)	Triggers when detecting large amount of water leakage
Action and Reset		
Action Condition		The feedback pressure is lower than Plow and the load current is larger than Pr.U3-03 setting Plow = [Target pressure × (1 – Pr.U3-01%)]
Action Time		Pr.U3-02
Warning Setting Parameter		Pr.U3-04 0: Warning & Continue OPER
Reset Method		Automatically reset after the triggered condition is cleared
Reset Condition		When the drive output rated current percentage is < Pr.U3-03 level × 0.9
Record		No
Cause		**Corrective Actions**
The pipe outlet is broken		Check if the pipes are damaged.
Pressure sensor error		Maintain the pressure sensor.

ID No. 113 - Low pressure warning (LPSn)

ID No.	Warning Name	Descriptions
113	Low pressure warning (LPSn)	The warning occurs when the pressure is lower than the set pressure
Action and Reset		
Action Condition		The feedback pressure is lower than Plow Plow = [Target pressure × (1 – Pr.U3-08%)]
Action Time		Pr.U3-09
Warning Setting Parameter		Pr.U3-10 0: Warning & Continue OPER
Reset Method		Automatically reset after the triggered condition is cleared
Reset Condition		Immediately reset
Record		No
Cause		**Corrective Actions**
Unable to establish water pressure		Check if the pipe has leakage, or if there is no water from the source.
Pressure sensor broken		Replace the pressure sensor.

ID No. 114 - Dry pump warning (dyn)

ID No.	Warning Name	Descriptions
114	Dry pump warning (dyn)	The warning occurs when the drive detects dry pump
Action and Reset		
Action Condition		The corresponded power of the target frequency is below the dry pump curve
Action Time		Pr.U3-18
Warning Setting Parameter		Pr.U3-21 0: Warning & Coast to Stop 1: Warning & Ramp to Stop
Reset Method		Automatically resets after the triggered condition is cleared
Reset Condition		Auto-reset
Record		No
Cause		**Corrective Actions**
Pipe has leakage or has no water		Check if the pipe is damaged, or if there is no water from the source.

ID No. 123 - Deceleration energy backup error (dEb)

ID No.	Warning Name	Descriptions
123	Deceleration energy backup error (dEb)	Deceleration energy backup error
Action and Reset		
Action Condition		Software detection
Action Time		No
Warning Setting Parameter		Pr. J2-00 0: Disable 1: FOC Decel, stop after restore 2: FOC Decel, run after restore
Reset Method		Auto-reset
Reset Condition		Immediately reset
Record		No
Cause		**Corrective Actions**
Momentary power loss, or too low and unstable power voltage because of sudden heavy load.		Check the power grid supply.
Unexpected power shut down or power loss		Check the power grid supply.

ID No. 140 - SD card function error (SDiv)

ID No.	Warning Name	Descriptions
140	SD card function error (SDiv)	The SD card is not inserted, or the disk format does not match when using the SD card memory function
Action and Reset		
Action Condition		Auto-detect
Action Time		Immediately act
Warning Setting Parameter		No
Reset Method		Manual reset
Reset Condition		No
Record		Yes
Cause		**Corrective Actions**
The SD card does not use exFAT32 format		Format the SD card to exFAT32 by a PC.
Use the SD card memory function		Check if the SD card memory function is used and if the SD card is correctly inserted.

ID No. 142 - AI2 analog signal loss (Ai2L)

ID No.	Warning Name	Descriptions	
142	AI2 analog signal loss (Ai2L)	Analog input current loss (including all analog 4–20 mA signals)	
Action and Reset			
Action Condition		When the analog input (Pr. G2-22 = 2) is lower than 3.6 mA (only detects analog input 4–20 mA)	
Action Time		The action condition is attained for 0.1s	
Warning Setting Parameter		Pr. G2-30 AI2 signal loss action: 0: Disable 1: Warning & Continue OPER 2: Fault & Ramp to Stop 3: Fault & Auto-Decel 4: Fault & Coast to Stop 5: Fault & by Quick Stop Time	
Reset Method		Auto	It is “Warning” when Pr. G2-30 = 1, and the warning will be automatically cleared when the analog input signal is ≥ 4 mA.
		Manual	It is “Fault” when Pr. G2-30 = 2–5, which must be reset manually.
Reset Condition		Immediately reset	
Record		It is “Fault” when Pr. G2-30 = 2–5 and will be recorded.	
Cause		**Corrective Actions**	
Loose or broken AI2 wiring		Tighten the terminals again. Replace with a new cable.	
External device error		Replace with a new analog device.	
Hardware failure		If the Ai2L error still occurs after checking all the wiring, return ACB circuit board to the factory for repair.	

ID No. 146 - Monitor signal 1 trigger (BX1n)

ID No.	Warning Name	Descriptions
146	Monitor signal 1 trigger (BX1n)	Sets the monitor signal source Pr. o2-01 according to the trigger condition, and the monitoring signal meets the trigger condition.
Action and Reset		
Action Condition		Meet Pr. o2-02 trigger condition
Action Time		Immediately act
Warning Setting Parameter		Pr. o2-03 0: Disable 1: Warning 2: Fault and ramp stop 3: Fault and coast stop
Reset Method		Manual reset
Reset Condition		Does not meet Pr. o2-02 trigger condition
Record		Records when Pr. o2-03 = 2 or 3
Cause		**Corrective Actions**
Incorrect settings that trigger the protection		Check if the setting for Pr. o2-01, o2-02 and o2-03 is correct.

ID No. 147 - Monitor signal 2 trigger (BX2n)

ID No.	Warning Name	Descriptions
147	Monitor signal 2 trigger (BX2n)	Sets the monitor signal source Pr. o2-08 according to the trigger condition, and the monitoring signal meets the trigger condition.
Action and Reset		
Action Condition		Meet Pr. o2-09 trigger condition
Action Time		Immediately act
Warning Setting Parameter		Pr. o2-10 0: Disable 1: Warning 2: Fault and ramp stop 3: Fault and coast stop
Reset Method		Manual reset
Reset Condition		Does not meet Pr. o2-09 trigger condition
Record		Records when Pr. o2-10 = 2 or 3
Cause		**Corrective Actions**
Incorrect settings that trigger the protection		Check if the setting for Pr. o2-08, o2-09 and o2-10 is correct.

ID No. 148 - Monitor signal 3 trigger (BX3n)

ID No.	Warning Name	Descriptions
148	Monitor signal 3 trigger (BX3n)	Sets the monitor signal source Pr. o2-15 according to the trigger condition, and the monitoring signal meets the trigger condition.
Action and Reset		
Action Condition		Meet Pr. o2-16 trigger condition
Action Time		Immediately act
Warning Setting Parameter		Pr. o2-17 0: Disable 1: Warning 2: Fault and ramp stop 3: Fault and coast stop
Reset Method		Manual reset
Reset Condition		Does not meet Pr. o2-16 trigger condition
Record		Records when Pr. o2-17 = 2 or 3
Cause		**Corrective Actions**
Incorrect settings that trigger the protection		Check if the setting for Pr. o2-15, o2-16 and o2-17 is correct.

ID No. 149 - Monitor signal 4 trigger (BX4n)

ID No.	Warning Name	Descriptions
149	Monitor signal 4 trigger (BX4n)	Sets the monitor signal source Pr. o2-22 according to the trigger condition, and the monitoring signal meets the trigger condition.
Action and Reset		
Action Condition		Meet Pr. o2-23 trigger condition
Action Time		Immediately act
Warning Setting Parameter		Pr. o2-24 0: Disable 1: Warning 2: Fault and ramp stop 3: Fault and coast stop
Reset Method		Manual reset
Reset Condition		Does not meet Pr. o2-23 trigger condition
Record		Records when Pr. o2-24 = 2 or 3
Cause		**Corrective Actions**
Incorrect settings that trigger the protection		Check if the setting for Pr. o2-22, o2-23 and o2-24 is correct.

ID No. 150 - Monitor signal 5 trigger (BX5n)

ID No.	Warning Name	Descriptions
150	Monitor signal 5 trigger (BX5n)	Sets the monitor signal source Pr. o2-29 according to the trigger condition, and the monitoring signal meets the trigger condition.
Action and Reset		
Action Condition		Meet Pr. o2-30 trigger condition
Action Time		Immediately act
Warning Setting Parameter		Pr. o2-31 0: Disable 1: Warning 2: Fault and ramp stop 3: Fault and coast stop
Reset Method		Manual reset
Reset Condition		Does not meet Pr. o2-30 trigger condition
Record		Records when Pr. o2-31 = 2 or 3
Cause		**Corrective Actions**
Incorrect settings that trigger the protection		Check if the setting for Pr. o2-29, o2-30 and o2-31 is correct.

ID No. 151 - Monitor signal 6 trigger (BX6n)

ID No.	Warning Name	Descriptions
151	Monitor signal 6 trigger (BX6n)	Sets the monitor signal source Pr. o2-36 according to the trigger condition, and the monitoring signal meets the trigger condition.
Action and Reset		
Action Condition		Meet Pr. o2-37 trigger condition
Action Time		Immediately act
Warning Setting Parameter		Pr. o2-38 0: Disable 1: Warning 2: Fault and ramp stop 3: Fault and coast stop
Reset Method		Manual reset
Reset Condition		Does not meet Pr. o2-37 trigger condition
Record		Records when Pr. o2-38 = 2 or 3
Cause		**Corrective Actions**
Incorrect settings that trigger the protection		Check if the setting for Pr. o2-36, o2-37 and o2-38 is correct.

ID No. 152 - Monitor signal 7 trigger (BX7n)

ID No.	Warning Name	Descriptions
152	Monitor signal 7 trigger (BX7n)	Sets the monitor signal source Pr. o2-43 according to the trigger condition, and the monitoring signal meets the trigger condition.
Action and Reset		
Action Condition		Meet Pr. o2-44 trigger condition
Action Time		Immediately act
Warning Setting Parameter		Pr. o2-45 0: Disable 1: Warning 2: Fault and ramp stop 3: Fault and coast stop
Reset Method		Manual reset
Reset Condition		Does not meet Pr. o2-44 trigger condition
Record		Records when Pr. o2-45 = 2 or 3
Cause		**Corrective Actions**
Incorrect settings that trigger the protection		Check if the setting for Pr. o2-43, o2-44 and o2-45 is correct.

ID No. 153 - Monitor signal 8 trigger (BX8n)

ID No.	Warning Name	Descriptions
153	Monitor signal 8 trigger (BX8n)	Sets the monitor signal source Pr. o2-50 according to the trigger condition, and the monitoring signal meets the trigger condition.
Action and Reset		
Action Condition		Meet Pr. o2-51 trigger condition
Action Time		Immediately act
Warning Setting Parameter		Pr. o2-52 0: Disable 1: Warning 2: Fault and ramp stop 3: Fault and coast stop
Reset Method		Manual reset
Reset Condition		Does not meet Pr. o2-51 trigger condition
Record		Records when Pr. o2-52 = 2 or 3
Cause		**Corrective Actions**
Incorrect settings that trigger the protection		Check if the setting for Pr. o2-50, o2-51 and o2-52 is correct.

ID No. 154 - Battery low voltage (RtLv)

ID No.	Warning Name	Descriptions
154	Battery low voltage (RtLv)	Insufficient voltage of the external battery
Action and Reset		
Action Condition		The battery voltage is lower than 2.4 V
Action Time		1 second
Warning Setting Parameter		Pr. J6-00 0: No warning 1: Warning after power on 2: Warning each hour 3: Warning each day
Reset Method		Immediately resets or automatically clears when the level returns to 2.4V
Reset Condition		Immediately resets or automatically clears when the level returns to 2.4V
Record		Yes
Cause		**Corrective Actions**
Insufficient battery voltage		Replace with a new battery.
Battery detection abnormal		If the warning cannot be cleared after replacing the battery and the warning still exists after restarting the VIDAR, return ACB circuit board to the factory for repair.

ID No. 155 - Overload (oLn)

ID No.	Warning Name	Descriptions
155	Overload (oLn)	When the torque equivalent current during VIDAR operation is higher than the rated torque at its corresponding speed, the oLn warning displays
Action and Reset		
Action Condition		When the torque equivalent current during VIDAR operation is higher than the rated torque at its corresponding speed
Action Time		1 ms
Warning Setting Parameter		N/A
Reset Method		Manual reset
Reset Condition		The warning automatically clears when the current is lower than the load level
Record		No
Cause		**Corrective Actions**
The VIDAR torque equivalent current is higher than the rated torque at its corresponding speed. Note that the allowable continuous current will be lower when the VIDAR operates at lower speed		Reduce the load. The continuous oLn warning will eventually trigger the oL fault. This warning can be ignored if it is a transient behavior.

ID No. 161 - Asynchronous (ASYN)

ID No.	Warning Name	Descriptions
161	Asynchronous (ASYN)	Carrier frequency is not synchronized between MCU and FPGA
Action and Reset		
Action Condition		When detecting asynchronous
Action Time		Immediately act when detecting asynchronous
Warning Setting Parameter		N/A
Reset Method		Auto-reset
Reset Condition		It can be reset after detecting synchronous
Record		No
Cause		**Corrective Actions**
Malfunction caused by interference		Improve power supply quality.
Hardware failure		Check if the fault continues after cycling the power. If yes, return power converter to the factory for repair.

ID No. 171- Low AC Voltage (Lvac)

ID No.	Warning Name	Descriptions
171	Low AC Voltage (Lvac)	Before the VIDAR operates, it detects that the AC input line voltage (RMS) is lower than Pr. H1-15 setting value
Action and Reset		
Action Condition		AC input voltage is lower than Pr. H1-15 setting value
Action Time		Immediately act when AC input voltage is lower than Pr. H1-15
Warning Setting Parameter		N/A
Reset Method		Auto-reset
Reset Condition		It can be reset after the AC input voltage exceeds Pr. H1-15 setting value
Record		No
Cause		**Corrective Actions**
Power-off		Improve power supply quality.
Power voltage changes		Adjust line voltage to match the voltage range of the VIDAR.

ID No. 172 - ACB NTC open (ANTo)

ID No.	Warning Name	Descriptions
172	ACB NTC Open (ANTo)	The circuit of ACB NTC is open
Action and Reset		
Action Condition		The circuit of ACB NTC is open
Action Time		Software detection
Warning Setting Parameter		No
Reset Method		Auto-reset
Reset Condition		The circuit open condition removed
Record		No
Cause		**Corrective Actions**
Hardware failure		If the ANTo error still occurs after checking, return ACB circuit board to the factory for repair.

ID No. 174 - KTY84 Open (KTYo)

ID No.	Warning Name	Descriptions
174	KTY84 Open (KTYo)	The circuit of KTY84 is open
Action and Reset		
Action Condition		The circuit of KTY84 is open
Action Time		Software detection
Warning Setting Parameter		No
Reset Method		Auto-reset
Reset Condition		The circuit open condition removed
Record		No
Cause		**Corrective Actions**
The cable is loose		Re-install the cable.
Hardware failure		If the KTYo error still occurs after checking, exchange failed KTY84 connection with spare KTY84.

ID No. 175 - RTD Open (RTDo)

ID No.	Warning Name	Descriptions
175	RTD Open (RTDo)	The circuit of RTD is open
Action and Reset		
Action Condition		The circuit of RTD is open
Action Time		Software detection
Warning Setting Parameter		No
Reset Method		Auto-reset
Reset Condition		The circuit open condition removed
Record		No
Cause		**Corrective Actions**
Improper setting for Pr. H6-11		If the RTD is not installed, Pr. H6-11 should be 0: Disable.
The cable is loose		Re-install the cable.
Hardware failure		If the RTDo error still occurs after checking, return RTD to the factory for repair.

ID No. 176 - RTD Overheating (OH3r)

ID No.	Warning Name	Descriptions
176	RTD Overheating (OH3r)	RTD overheating warning.
Action and Reset		
Action Condition		The RTD temperature is > Pr. H6-16. The RTD temperature is > Pr. H6-19 and Pr. H6-21 = 0
Action Time		Pr. H6-17 Pr. H6-20
Warning Setting Parameter		The oH3r is automatically cleared when the temperature is < Pr. H6-16 level after maintaining Pr. H6-17 RTD warning delay time. Pr. H6-21 0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to stop 4: Fault & by Quick Stop Time The oH3r is automatically cleared when Pr. H6-21 = 0 and the temperature is < Pr. H6-19 level after maintaining Pr. H6-20 RTD OH detect time.
Reset Method		When the temperature is < Pr. H6-16 level after maintaining Pr. H6-17 RTD warning delay time, the oH3r warning is automatically cleared. When Pr. H6-21 = 0 and the temperature is < Pr. H6-19 level after maintaining Pr. H6-20 RTD OH detect time, the oH3r warning is automatically cleared.
Reset Condition		When the temperature is < Pr. H6-16 level after maintaining Pr. H6-17 RTD warning delay time, the oH3r warning is automatically cleared. When Pr. H6-21 = 0 and the temperature is < Pr. H6-19 level after maintaining Pr. H6-20 RTD OH detect time, the oH3r warning is automatically cleared.
Record		No
Cause		**Corrective Actions**
Motor locked		Clear the motor lock status.
Motor speed is too high		Reduce the speed.
Motor bearing abnormality.		Check if the bearing is worn out and needs replacement.
Insufficient bearing grease.		Check if the bearing grease needs to be added.Lubricants will age and deplete faster as temperatures rise.

ID No. 177 - ACB RH Open (ARHo)

ID No.	Warning Name	Descriptions
177	ACB RH Open (ARHo)	When the feedback voltage of the humidity sensor is higher than [100% humidity + max. allowable tolerance] or lower than [0% humidity + max. allowable tolerance] for 0.2s, the ARHo warning occurs.
Action and Reset		
Action Condition		The feedback voltage is > [100% humidity + max. allowable tolerance] or the feedback voltage is < [0% humidity + max. allowable tolerance] for 0.2 s
Action Time		Software detection
Warning Setting Parameter		No
Reset Method		Auto-reset
Reset Condition		The circuit open condition removed
Record		No
Cause		**Corrective Actions**
Hardware failure		If the ARHo error still occurs, return ACB circuit board to the factory for repair.

ID No. 178 - ACB T Open (ATo)

ID No.	Warning Name	Descriptions
178	ACB T Open (ATo)	When the feedback voltage of the temperature sensor is higher than [130°C + max. allowable tolerance] or lower than [-45°C + max. allowable tolerance] for 0.2s, the ATo warning occurs.
Action and Reset		
Action Condition		The feedback voltage is > [130°C + max. allowable tolerance] or the feedback voltage is < [-45°C + max. allowable tolerance] for 0.2s
Action Time		Software detection
Warning Setting Parameter		No
Reset Method		Auto-reset
Reset Condition		The circuit open condition removed
Record		No
Cause		**Corrective Actions**
Hardware failure		If the ATo error still occurs, return the ACB circuit board to the factory for repair.

ID No. 180 - relative humidity warning (ARHw)

ID No.	Fault Name	Descriptions
180	ACB relative humidity warning (ARHw)	When the relative humidity exceeds the set warning level and remains for a specified duration time.
Action and Reset		
Action Condition		When the relative humidity exceeds the warning level set in Pr.H6-25 and remains above that level for a duration time longer than the detection time set in Pr.H6-26, the VIDAR will display warning ARHw.
Action Time		Pr.H6-26
Fault Treatment Parameter		N/A
Reset Method		Auto reset
Reset Condition		The warning is automatically cleared when the relative humidity drops below Pr.H6-25 and remains for more than 5 seconds. When the humidity sensor failure is detected, this warning will be automatically cleared.
Record		No
Cause		Corrective Actions
Improper parameter setting		Adjust the detection level and detection time to avoid false triggering.
Humidity sensor malfunction		Change the ACB board.

9.3 Fault codes and troubleshooting

ID No. 1 - Over-current during acceleration (ocA)

ID No.	Fault Name	Descriptions
1	Over-current during acceleration (ocA)	Output current exceeds 2 times of rated current during acceleration. When ocA occurs, the VIDAR disables the output immediately, the motor coasts to a stop, and the display shows an ocA error.
Action and Reset		
Action Condition		200% of the rated current
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Reset in 5 sec. after the fault is cleared
Record		Yes
Cause		**Corrective Actions**
Acceleration time is too short		1. Increase the acceleration time. 2. Adjust the accel/decel time (Pr.C2-00–C2-07) 3. Set over-current stall prevention function (Pr. H2-05–H2-07) 4. Replace the VIDAR with a larger capacity model
Short circuit at IGBT module		Enable diagnosis mode (Pr. U1-14) to detect the failure of IGBT or motor
Short circuit at motor output due to poor insulation wiring		Check the motor cable and remove causes of the short circuit or replace the cable before turning on the power.
Check for possible burnout or aging insulation of the motor		Check the motor insulation value with a megger. Replace the motor if the insulation is poor.
The load is too large		Check if the output current exceeds the VIDAR's rated current. If yes, replace VIDAR with a larger capacity model.
Malfunction caused by interference		Verify the wiring of the control circuit and wiring/grounding of the main circuit to prevent interference.
Improper parameter settings for the speed tracking function		Confirm the control parameters are the same as the default value
Incorrect combination of control mode and used motor		Confirm the motor model number is correct
Short circuit at motor output due to poor insulation wiring		Check the motor cable and remove causes of the short circuits or replace the cable before turning on the power.

ID No. 2 - Over-current during deceleration (ocd)

ID No.	Fault Name	Descriptions
2	Over-current during deceleration (ocd)	Output current exceeds 2 times of rated current during deceleration. When ocd occurs, the VIDAR disables the output immediately, the motor coasts to a stop, and the display shows an ocd error.
Action and Reset		
Action Condition		200% of the rated current
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Reset in 5 sec. after the fault is cleared
Record		Yes
Cause		**Corrective Actions**
Deceleration time is too short		1. Increase the deceleration time 2. Adjust the accel/decel time (Pr.C2-00–C2-07) 3. Set over-current stall prevention function (Pr. H2-05–H2-07) 4. Replace the VIDAR with a larger capacity model
Short circuit at IGBT module		Enable diagnosis mode (Pr. U1-14) to detect the failure of IGBT or motor
Short circuit at motor output due to poor insulation wiring		Check the motor cable and remove causes of the short circuit or replace the cable before turning on the power.
Check for possible burnout or aging insulation of the motor		Check the motor insulation value with a megger. Replace the motor if the insulation is poor.
The load is too large		Check if the output current exceeds the VIDAR's rated current. If yes, replace the VIDAR with a larger capacity model.
Impulsive change of the load		Reduce the load or increase the capacity of VIDAR.
Malfunction caused by interference		Verify the wiring of the control circuit and wiring/grounding of the main circuit to prevent interference.
Improper parameter settings for the speed tracking function		Confirm the control parameters are same as the default value
Incorrect combination of control mode and used motor		Confirm the motor model number is correct

ID No. 3 - Over-current during steady operation (ocn)

ID No.	Fault Name	Descriptions
3	Over-current during steady operation (ocn)	Output current exceeds 2 times of rated current at constant speed. When ocn occurs, the VIDAR disables the output immediately, the motor coasts to a stop, and the display shows an ocn error.
Action and Reset		
Action Condition		200% of the rated current
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Reset in 5 sec. after the fault is cleared
Record		Yes
Cause		**Corrective Actions**
Short circuit at IGBT module		Enable diagnosis mode (Pr. U1-14) to detect the failure of IGBT or motor
Short circuit at motor output due to poor insulation wiring		Check the motor cable and remove causes of the short circuit or replace the cable before turning on the power.
Check for possible burnout or aging insulation of the motor		Check the motor insulation value with a megger. Replace the motor if the insulation is failed.
The load is too large		Check if the output current exceeds the VIDAR's rated current. If yes, replace the VIDAR with a larger capacity model.
Impulsive change of the load		Reduce the load or increase the capacity of VIDAR.
Malfunction caused by interference		Verify the wiring of the control circuit and wiring/grounding of the main circuit to prevent interference.
Improper parameter settings for the speed tracking function		Confirm the control parameters are same as the default value
Incorrect combination of control mode and used motor		Confirm the motor model number is correct

ID No. 5 - IGBT short circuit between upper bridge and lower bridge (occ)

ID No.	Fault Name	Descriptions
5	IGBT short circuit between upper bridge and lower bridge (occ)	Short-circuit is detected between upper bridge and lower bridge of the IGBT module
Action and Reset		
Action Condition		Hardware protection
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Reset after the fault is cleared
Record		Yes
Cause		**Corrective Actions**
IGBT error		Enable diagnosis mode (Pr. U1-14) to detect the failure of IGBT or motor. Cycle the power, if occ still exists, please replace the failed power converter , and return the failed converter to the factory.
Short-circuit detecting circuit error		

ID No. 6 - Over-current at stop (ocS)

ID No.	Fault Name	Descriptions
6	Over-current at stop (ocS)	Over-current or hardware failure in current detection at stop.
Action and Reset		
Action Condition		200% of the rated current
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Reset in 5 sec. after the fault is cleared
Record		Yes
Cause		**Corrective Actions**
Malfunction caused by interference		Verify the wiring of the control circuit and wiring/grounding of the main circuit to prevent interference.
Hardware failure		Check if ocS still exists after cycling the power. If yes, set Pr.U1-14 to 1 and run the VIDAR to examinate whether the power converter or motor is damaged.

ID No. 7 - Over-voltage during acceleration (ovA)

ID No.	Fault Name	Descriptions
7	Over-voltage during accelera-tion (ovA)	Clamp Bus over-voltage during acceleration. When ovA occurs, the VIDAR disables the output, the motor coasts to a stop, and the display shows an ovA error.
Action and Reset		
Action Condition		880 V_{DC}
Action Time		Immediately acts when CLAMP Bus voltage is higher than the condition
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Reset only when CLAMP Bus voltage is lower than over-voltage condi-tion
Record		Yes
Cause		**Corrective Actions**
Input line voltage is too high or too much harmonic		Check if the input voltage is within the rated VIDAR input voltage range and check for possible voltage spikes.
Clamp circuit is failed		If the error occurs repeatedly, replace thepower converter, and return the faulty one to the factory.
Malfunction caused by interference		Verify the wiring of the control circuit and wiring/ grounding of the main circuit to prevent interference.

ID No. 8 - Over-voltage during deceleration (ovd)

ID No.	Fault Name	Descriptions
8	Over-voltage during deceleration (ovd)	Clamp bus over-voltage during deceleration. When ovd occurs, the VIDAR disables the output immediately, the motor coasts to stop, and the display shows an ovd error.
Action and Reset		
Action Condition		860 V_{DC}
Action Time		Immediately acts when CLAMP Bus voltage is higher than the condition
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Reset only when CLAMP Bus voltage is lower than over-voltage condition
Record		Yes
Cause		**Corrective Actions**
Power voltage is too high or too much harmonic		Check if the input voltage is within the rated VIDAR input voltage range and check for possible voltage spikes.
Deceleration time is too short		Check if the over-voltage warning occurs after deceleration stops. When the warning occurs, increase the acceleration time.
Malfunction caused by interference		Verify the wiring of the control circuit and wiring/ grounding of the main circuit to prevent interference.

ID No. 9 - Over-voltage at constant speed (ovn)

ID No.	Fault Name	Descriptions
9	Over-voltage at constant speed (ovn)	Clamp bus over-voltage at constant speed. When ovn occurs, the VIDAR disables the output immediately, the motor coasts to a stop, and the display shows an ovn error.
Action and Reset		
Action Condition		860 V_{DC}
Action Time		Immediately acts when CLAMP Bus voltage is higher than the condition
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Reset only when CLAMP Bus voltage is lower than over-voltage condition
Record		Yes
Cause		**Corrective Actions**
Power voltage is too high or too much harmonic		Check if the input voltage is within the rated VIDAR input voltage range and check for possible voltage spikes.
Malfunction caused by interference		Verify the wiring of the control circuit and wiring/ grounding of the main circuit to prevent interference.

ID No.10 - Over-voltage at stop (ovS)

ID No.	Fault Name	Descriptions
10	Over-voltage at stop (ovS)	Over-voltage at stop
Action and Reset		
Action Condition		860 V_{DC}
Action Time		Immediately acts when CLAMP Bus voltage is higher than the condition
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Reset only when CLAMP Bus voltage is lower than over-voltage condition
Record		Yes
Cause		**Corrective Actions**
Power voltage is too high or too much harmonic		Check if the input voltage is within the rated VIDAR input voltage range and check for possible voltage spikes.
Malfunction caused by interference		Verify the wiring of the control circuit and wiring/ grounding of the main circuit to prevent interference.

ID No. 11 - Low voltage during acceleration (LvA)

ID No.	Fault Name	Descriptions
11	Low voltage during acceleration (LvA)	CLAMP Bus voltage is lower than Pr. H1-02 setting value during acceleration
Action and Reset		
Action Condition		Pr. H1-02
Action Time		Immediately act when CLAMP Bus voltage is lower than Pr. H1-02
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		It can be reset after the CLAMP Bus voltage exceeds Pr. H1-02 + 60 V_{DC}
Record		Yes
Cause		**Corrective Actions**
Power-off		Improve power supply condition.
Power voltage changes		Adjust voltage to the power range of the VIDAR.
Start up the motor with large capacity		Check the power system. Enlarge the capacity of power equipment.
The load is too large		Reduce the load. Enlarge the VIDAR capacity. Increase the acceleration time.

ID No. 12 - Low voltage during deceleration (Lvd)

ID No.	Fault Name	Descriptions
12	Low voltage during deceleration (Lvd)	CLAMP Bus voltage is lower than Pr. H1-02 setting value during deceleration
Action and Reset		
Action Condition		Pr. H1-02
Action Time		Immediately act when CLAMP Bus voltage is lower than Pr. H1-02
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		It can be reset after the CLAMP Bus voltage exceeds Pr. H1-02 + 60 V_{DC}
Record		Yes
Cause		**Corrective Actions**
Power-off		Improve power supply condition.
Power voltage changes		Adjust voltage to the power range of the VIDAR.
Start up the motor with large capacity		Check the power system. Enlarge the capacity of power equipment.
Sudden load		Reduce the load. Enlarge the VIDAR capacity.

ID No. 13 - Low voltage at constant speed (Lvn)

ID No.	Fault Name	Descriptions
13	Low voltage at constant speed (Lvn)	CLAMP Bus voltage is lower than Pr. H1-02 setting value at constant speed
Action and Reset		
Action Condition		Pr. H1-02
Action Time		Immediately act when CLAMP Bus voltage is lower than Pr. H1-02
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		It can be reset after the CLAMP Bus voltage exceeds Pr. H1-02 + 60 V_{DC}
Record		Yes
Cause		**Corrective Actions**
Power-off		Improve power supply condition.
Power voltage changes		Adjust voltage to the power range of the VIDAR.
Start up the motor with large capacity		Check the power system. Enlarge the capacity of power equipment.
Sudden load		Reduce the load. Enlarge the VIDAR capacity.

ID No. 16 - IGBT overheating (oH1)

ID No.	Fault Name	Descriptions
16	IGBT overheating (oH1)	IGBT temperature exceeds the protection level
Action and Reset		
Action Condition		When Pr.H4-00 is higher than the IGBT overheating protection level, oH1 error occurs instead of oH1 warning.
Action Time		IGBT temperature exceeds the protection level for more than 1 second, oH1 error occurs.
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Resets only when IGBT temperature is lower than the oH1 error level
Record		Yes
Cause		**Corrective Actions**
Check if there is any obstruction on the heat sink or if the fan is running		Remove the obstruction or replace the cooling fan.
Insufficient ventilation space		Increase ventilation space of the VIDAR.
Check if the VIDAR matches the corre-sponded loading.		1. Reduce the load. 2. Decrease the carrier. 3. Replace the VIDAR with a larger capacity model.
The VIDAR has run 100% or more of the rated output for a long time		Replace the VIDAR with a larger capacity model.

ID No. 17 - Capacitor overheating (oH2)

ID No.	Fault Name	Descriptions
17	Capacitor overheating (oH2)	The VIDAR has detected the capacitors are overheat and the tempera-ture exceeds Pr. H4-01 warning protection level
Action and Reset		
Action Condition		When Pr.H4-01 is higher than the capacitor overheating protection lev-el, oH2 error occurs instead of oH2 warning.
Action Time		Capacitor temperature exceeds the protection level for more than 1 second, oH2 error occurs.
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Resets when the capacitor temperature is lower than the oH2 warning
Record		Yes
Cause		**Corrective Actions**
Check if there is any obstruction on the heat sink or if the fan is running		Remove the obstruction or replace the cooling fan.
Insufficient ventilation space		Increase ventilation space of the VIDAR.
Check if the VIDAR matches the corre-sponded loading.		1. Reduce the load. 2. Decrease the carrier. 3. Replace the VIDAR with a larger capacity model.
The VIDAR has run 100% or more of the rated output for a long time		Replace the VIDAR with a larger capacity model.
Unstable power		Install reactor(s).
The load changes frequently		Reduce the changes of the load.

ID No. 18 - Thermal 1 open (tH1o)

ID No.	Fault Name	Descriptions
18	Thermal 1 open (tH1o)	When the IGBT temperature = 200°C or -200°C, it will not update the value but will count for 3 sec. based on the 250 ms of regular interruption. If it counts over 12 times, then tH1o error will show on the keypad.
Action and Reset		
Action Condition		The IGBT temperature is not updated for over 3 sec.
Action Time		1 ms
Fault Treatment Parameter		No
Reset Method		Manual reset (if the IGBT temperature value can be updated)
Reset Condition		Reset only when the fault is cleared
Record		Yes
Cause		**Corrective Actions**
The VIDAR runs at a high temperature environment, and operates for a long time		1. Cool down the ambient temperature. 2. Temporarily shut down the VIDAR .

ID No. 19 - Thermal 2 open (tH2o)

ID No.	Fault Name	Descriptions
19	Thermal 2 open (tH2o)	When the CAP temperature = 200°C or -200°C, it will not update the value but will count for 3 sec. based on the 250 ms of regular interruption. If it counts over 12 times, then tH2o error will show on the keypad.
Action and Reset		
Action Condition		The CAP temperature is not updated for over 3 sec.
Action Time		1 ms
Fault Treatment Parameter		No
Reset Method		Manual reset (if the CAP temperature value can be updated)
Reset Condition		Reset only when the fault is cleared
Record		Yes
Cause		**Corrective Actions**
The VIDAR runs at a high temperature environment, and operates for a long time		1. Cool down the ambient temperature. 2. Temporarily shut down the VIDAR

ID No. 21 - Overload (oL)

ID No.	Fault Name	Descriptions
21	Overload (oL)	The VIDAR detects excessive drive output current. The overload capacity sustains for 2 minute when the VIDAR outputs 120% of the VIDAR's rated output current.
Action and Reset		
Action Condition		Based on overload curve and derating curve
Action Time		When the load is higher than the protection level and exceeds allowable time, the oL protection activates
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Reset in 5 sec. after the fault is cleared
Record		Yes
Cause		**Corrective Actions**
The load is too large		Reduce the load.
Accel./Decel. time and working cycle are too short		Increase the setting values for Pr. C2-00–Pr. C2-07 (accel./decel. time)
The capacity of the VIDAR is too small		Replace the VIDAR with a larger capacity model.
Overload during low-speed operation		Decrease low-speed operation time. Enlarge the VIDAR's capacity.

ID No. 24 - Motor overheating (oH3)

ID No.	**Fault Name**	**Descriptions**
24	Motor overheating (oH3)	Motor overheating, when KTY84 temperature is > Pr. H6-07 setting value, the fault treatment acts according to Pr. H6-09.
Action and Reset		
Action Condition		KTY84 temperature > Pr.06-07 setting
Action Time		Pr.06-08
Fault Treatment Parameter		Pr. H6-09 0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to stop 4: Fault & by Quick Stop Time
Reset Method		When Pr. H6-09 = 0 and the temperature is < Pr. H6-07 level after maintaining Pr. H6-08 KTY OH detect time, the oH3 warning is automatically cleared. It is “Fault” when Pr. H6-09 = 1–4, which must be reset manually.
Reset Condition		KTY84 temperature < Pr.06-07 setting and keep Pr.06-08 time
Record		Records when Pr. H6-09 = 1–4 and oH3 displays “Fault”
Cause		**Corrective Actions**
Motor locked		Clear the motor lock status.
The load is too large		Reduce the load. Enlarge the VIDAR capacity.
Ambient temperature is too high		Change the installation location if there are heating devices in the surroundings. Install / add cooling fan or air conditioner to lower the ambient temperature.
Motor cooling system error		Check the cooling system to make it work normally.
Operates at low speed too long		Decrease low-speed operation time. Enlarge the VIDAR capacity.
Accel./Decel. time and working cycle are too short		Increase the setting values for Pr. C2-00–Pr. C2-07 (accel./decel. time)

ID No. 25 - Interrupt Error (INTR)

ID No.	Fault Name	Descriptions
25	Interrupt Error (INTR)	A critical processor exception was detected, causing the program to stop execution.
Action and Reset		
Action Condition		Software detection
Action Time		Immediately act
Fault Treatment Parameter		N/A
Reset Method		Software failure and cannot be reset. Cycle the power.
Reset Condition		N/A
Record		Yes
Cause		Corrective Actions
Illegal memory access (e.g., null or uninitialized pointer).		1. Cycle the system power to clear all the temporary fault conditions. 2. If the fault occurs again, record the firmware version, fault code and triggering condition, then contact technical support.
A bus fault, usage fault, or Memory manage fault that was not properly handled and escalated into a hard fault.		
Stack overflow or corrupted memory area resulting in an invalid return address. Interrupt service routine (ISR) taking excessive time or recursive function calls.		
Invalid response or malfunction from external modules such as DMA, FPGA, or communication peripherals.		

ID No. 26 - Over-torque 1 (ot1)

ID No.	Fault Name	Descriptions	
26	Over-torque 1 (ot1)	When output current exceeds the over-torque detection level (Pr. H5-04) and exceeds over-torque detection time (Pr. H5-05), and when Pr.H5-00 is set to 1–4, the ot1 error displays.	
Action and Reset			
Action Condition		Pr. H5-04	
Action Time		Pr. H5-05	
Fault Treatment Parameter		Pr. H5-00 0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to stop 4: Fault & by Quick Stop Time	
Reset Method		Auto	When Pr. H5-00 = 0, ot1 is “Warning”. The ot1 warning automatically clears when the output current is < (Pr. H5-04 × 95%)
		Manual	“Error” occurs when Pr. H5-00 = 1–4. You must reset manually.
Reset Condition		Immediately reset	
Record		Records when Pr. H5-00 = 1–4, ot1 is “Fault”	
Cause		**Corrective Actions**	
Incorrect parameter setting		Reset Pr. H5-04 and Pr. H5-05.	
Mechanical failure (e.g. mechanical lock)		Remove the causes of malfunction.	
The load is too large		Reduce the load. Replace the VIDAR with a larger capacity model.	
Accel./Decel. time and working cycle are too short		Increase the setting values for Pr. C2-00–Pr. C2-07 (accel./decel. time)	
The VIDAR capacity is too small		Replace the VIDAR with a larger capacity model.	
Overload during low-speed operation		Decrease low-speed operation time. Enlarge the VIDAR capacity.	

ID No. 27 - Over-torque 2 (ot2)

<table>
<tr><th>ID No.</th><th>Fault Name</th><th colspan="2">Descriptions</th></tr>
<tr><td>27</td><td>Over-torque 2
(ot2)</td><td colspan="2">When in the constant speed, the output current exceeds the over-torque detection level (Pr. H5-06) and exceeds over-torque detection time (Pr. H5-07), and when Pr.H5-02 is set to 1–4, the ot2 error displays.</td></tr>
<tr><td colspan="4">Action and Reset</td></tr>
<tr><td colspan="2">Action Condition</td><td colspan="2">Pr. H5-06</td></tr>
<tr><td colspan="2">Action Time</td><td colspan="2">Pr. H5-07</td></tr>
<tr><td colspan="2">Fault Treatment Parameter</td><td colspan="2">Pr. H5-02
0: Warning & Continue OPER
1: Fault & Ramp to Stop
2: Fault & Auto-Decel
3: Fault & Coast to stop
4: Fault & by Quick Stop Time</td></tr>
<tr><td colspan="2" rowspan="2">Reset Method</td><td>Auto</td><td>When Pr. H5-00 = 0, ot2 is “Warning”. The ot2 warning automatically clears when the output current is < (Pr. H5-06 × 95%)</td></tr>
<tr><td>Manual</td><td>It is “Fault” when Pr. H5-02 = 1–4, which must be reset manually.</td></tr>
<tr><td colspan="2">Reset Condition</td><td colspan="2">Immediately reset</td></tr>
<tr><td colspan="2">Record</td><td colspan="2">Records when Pr. H5-00 = 1–4, ot2 is “Fault”</td></tr>
<tr><td colspan="2">Cause</td><td colspan="2">Corrective Actions</td></tr>
<tr><td colspan="2">Incorrect parameter setting</td><td colspan="2">Reset Pr. H5-15 and Pr. H5-16.</td></tr>
<tr><td colspan="2">Mechanical failure
(e.g. mechanical lock)</td><td colspan="2">Remove the causes of malfunction.</td></tr>
<tr><td colspan="2">The load is too large</td><td colspan="2">Reduce the load.
Replace the VIDAR with a larger capacity model.</td></tr>
<tr><td colspan="2">Accel./Decel. time and working cycle are too short</td><td colspan="2">Increase the setting values for Pr. C2-00–Pr. C2-07 (accel./decel. time)</td></tr>
<tr><td colspan="2">The VIDAR capacity is too small</td><td colspan="2">Replace the VIDAR with a larger capacity model.</td></tr>
<tr><td colspan="2">Overload during low-speed operation</td><td colspan="2">Decrease low-speed operation time.
Enlarge the VIDAR capacity.</td></tr>
</table>

ID No. 28 - Under current (uC)

<table>
<tr><th>ID No.</th><th>Fault Name</th><th colspan="2">Descriptions</th></tr>
<tr><td>28</td><td>Under current
(uC)</td><td colspan="2">Low current</td></tr>
<tr><th colspan="4">Action and Reset</th></tr>
<tr><td colspan="2">Action Condition</td><td colspan="2">Pr. H2-12</td></tr>
<tr><td colspan="2">Action Time</td><td colspan="2">Pr. H2-13</td></tr>
<tr><td colspan="2">Fault Treatment Parameter</td><td colspan="2">Pr. H2-14
0: Warning & Continue OPER
1: Fault & Ramp to Stop
2: Fault & Auto-Decel
3: Fault & Coast to stop
4: Fault & by Quick Stop Time</td></tr>
<tr><td colspan="2" rowspan="2">Reset Method</td><td>Auto</td><td>“Warning” occurs when Pr. H2-14 = 0. The “Warning” is automatically cleared when the output current is > (Pr. H2-12 × 105%).</td></tr>
<tr><td>Manual</td><td>“Error” occurs when Pr. H2-14 = 1–4. You must reset manually.</td></tr>
<tr><td colspan="2">Reset Condition</td><td colspan="2">Immediately reset</td></tr>
<tr><td colspan="2">Record</td><td colspan="2">Records when Pr. H2-14 = 1–4 and uC displays “Fault”</td></tr>
<tr><th colspan="2">Cause</th><th colspan="2">Corrective Actions</th></tr>
<tr><td colspan="2">Motor cable disconnection</td><td colspan="2">Troubleshoot the connection between the motor and the load.</td></tr>
<tr><td colspan="2">Improper setting of low-current protection</td><td colspan="2">Reset Pr. H2-12, Pr. H2-13, and Pr. H2-14 to proper settings.</td></tr>
<tr><td colspan="2">The load is too low</td><td colspan="2">Check the load status.
Make sure the VIDAR capacity matches the load.</td></tr>
</table>

ID No. 30 - EEPROM write error (cF1)

ID No.	Fault Name	Descriptions
30	EEPROM write error (cF1)	Internal EEPROM cannot be programmed
Action and Reset		
Action Condition		When the firmware detects failure of parameter EEPROM write in, the cF1 fault occurs.
Action Time		cF1 acts immediately when the VIDAR detects the fault
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Immediately reset
Record		Yes
Cause		**Corrective Actions**
Internal EEPROM write in error		1. Press RESET key or reset the parameter to the default setting, if the error occurs repeatedly, replace the ACB board, and return the faulty one to the factory. 2. Reset parameters to default, if the error occurs repeatedly, replace the ACB board, and return the faulty one to the factory. Cycle the power, if the error occurs repeatedly, replace the ACB board, and return the faulty one to the factory.

ID No. 31 - EEPROM read error (cF2)

ID No.	Fault Name	Descriptions
31	EEPROM read error (cF2)	Internal EEPROM cannot be read
Action and Reset		
Action Condition		When the firmware detects parameter data error, the cF2 fault occurs.
Action Time		cF2 acts immediately when the VIDAR detects the fault
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Immediately reset
Record		Yes
Cause		**Corrective Actions**
Parameter EEPROM cannot be read		1. Press RESET key or reset the parameter to the default setting, if the error occurs repeatedly, replace the ACB board, and return the faulty one to the factory. 2. Reset parameters to default, if the error occurs repeatedly, replace the ACB board, and return the faulty one to the factory. 3. Cycle the power, If the error occurs repeatedly, replace the ACB board, and return the faulty one to the factory.

ID No. 42 - Over-current at motor side (OCm)

ID No.	Fault Name	Descriptions
42	Over-current at motor side (OCm)	When Pr.U1-14 is set to a non-zero value, the VIDAR will automatically check for hardware abnormalities at the power converter and motor side when an overcurrent protection event occurs. If this error occurs, it indicates a short circuit on the motor side.
Action and Reset		
Action Condition		200% of the rated current
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Cannot reset
Reset Condition		Cannot reset
Record		Yes
Cause		**Corrective Actions**
Short circuit at motor output due to poor insulation wiring		Set U1-14 to “1” and restart the VIDAR. If the VIDAR fault trips on OCm again, check the motor and remove causes of the short circuits..
Check for possible burnout or aging insulation of the motor		Check the motor insulation value with meg ohm meter. Replace the motor if the insulation is poor.

ID No. 43 - Over-current at power converter side (OCe)

ID No.	Fault Name	Descriptions
43	Over-current at power converter side (OCe)	When Pr.U1-14 is set to a non-zero value, the VIDAR will automatically check for hardware abnormalities at the power converter and motor side when an overcurrent protection event occurs. If this error occurs, it indicates a short circuit on the power converter side.
Action and Reset		
Action Condition		200% of the rated current
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Cannot reset
Reset Condition		Cannot reset
Record		Yes
Cause		**Corrective Actions**
Short circuit at IGBT module		Enable diagnosis mode (Pr. U1-14) to detect the failure of IGBT or motor

ID No. 48 - AI1 Loss (Ai1L)

<table>
<tr><th>ID No.</th><th>Fault Name</th><th colspan="2">Descriptions</th></tr>
<tr><td>48</td><td>AI1 Loss
(Ai1L)</td><td colspan="2">Analog input current loss (including all analog 4–20 mA signals)</td></tr>
<tr><th colspan="4">Action and Reset</th></tr>
<tr><td colspan="2">Action Condition</td><td colspan="2">When the analog input (Pr. G2-03 = 2) is lower than 3.6 mA (only detects analog input 4–20 mA)</td></tr>
<tr><td colspan="2">Action Time</td><td colspan="2">The action condition is attained for 0.1s</td></tr>
<tr><td colspan="2">Fault Treatment Parameter</td><td colspan="2">Pr. G2-11
AI1 signal loss action:
0: Disable
1: Warning & Continue OPER
2: Fault & Ramp to Stop
3: Fault & Auto-Decel
4: Fault & Coast to Stop
5: Fault & by Quick Stop Time</td></tr>
<tr><td colspan="2" rowspan="2">Reset Method</td><td>Auto</td><td>It is “Warning” when Pr. G2-11 = 1, and the warning will be automatically cleared when the analog input signal is ≥ 4 mA.</td></tr>
<tr><td>Manual</td><td>It is “Fault” when Pr. G2-11 = 2–5, which must be reset manually.</td></tr>
<tr><td colspan="2">Reset Condition</td><td colspan="2">Immediately reset</td></tr>
<tr><td colspan="2">Record</td><td colspan="2">It is “Fault” when Pr. G2-11 = 2–5 and will be recorded.</td></tr>
<tr><th colspan="2">Cause</th><th colspan="2">Corrective Actions</th></tr>
<tr><td colspan="2">Loose or broken AI1 wiring</td><td colspan="2">Tighten the terminals again.
Replace with a new cable.</td></tr>
<tr><td colspan="2">External device error</td><td colspan="2">Replace external device.</td></tr>
<tr><td colspan="2">Hardware failure</td><td colspan="2">If the Ai1L error still occurs after checking all the wiring, replace the ACB board, and return the faulty one to the factory.</td></tr>
</table>

ID No. 49 - External Fault (EF)

ID No.	Fault Name	Descriptions
49	External Fault (EF)	External fault. When the VIDAR decelerates based on the setting of Pr. A1-33, the EF fault displays on the keypad.
Action and Reset		
Action Condition		Pr. A1-32 = 2–7 and the MI terminal is ON
Action Time		Immediately act
Fault Treatment Parameter		Pr. A1-33 0: Coast to stop 1: Ramp to stop 2: By EF decel Time 3: Auto-Decel
Reset Method		Manual reset
Reset Condition		Manual reset only after the external fault is cleared (terminal status is recovered)
Record		Yes
Cause		**Corrective Actions**
External fault		Press RESET key after the fault is cleared.

ID No. 50 - Emergency stop (EF1)

ID No.	Fault Name	Descriptions
50	Emergency stop (EF1)	When the contact of MIx = EF1 is ON, the output stops immediately and displays EF1 on the keypad. The motor coasts to a stop
Action and Reset		
Action Condition		Pr. A2-03 = 2–7 and the MI terminal is ON
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Manual reset only after the external fault is cleared (terminal status is recovered)
Record		Yes
Cause		**Corrective Actions**
Emergency stop		Verify if the system is back to normal condition, and then press RESET key to go back to the default.

ID No. 52 - Password is locked (Pcod)

ID No.	Fault Name	Descriptions
52	Password is locked (Pcod)	Entering the wrong password three consecutive times
Action and Reset		
Action Condition		Entering the wrong password three consecutive times
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Power-off
Record		Yes
Cause		**Corrective Actions**
Incorrect password input through Pr. b0-02		1. Input the correct password after rebooting the VIDAR. 2. If you forget the password, input 9999 and press ENTER, and repeat it again. (You need to finish the above process within 10 seconds. If you do not finish it within 10 seconds, try again.) 3. The parameter settings return to the default when the “Input 9999” process is finished.

ID No. 66 - Short-Circuit at motor side (OCCm)

ID No.	Fault Name	Descriptions
66	Short-Circuit at motor side (OCCm)	When Pr.U1-14 is set to a non-zero value, the VIDAR will automatically check for hardware abnormalities at the motor side when an short-circuit protection event occurs. If this error occurs, it indicates a short circuit on the motor side.
Action and Reset		
Action Condition		Hardware protection
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Cannot reset
Reset Condition		Cannot reset
Record		Yes
Cause		**Corrective Actions**
Short circuit at motor output due to poor insulation wiring		Set U1-14 to “1” and restart the VIDAR. If the VIDAR fault trips on OCm again, check the motor and remove causes of the short circuits..
Check for possible burnout or aging insulation of the motor		Check the motor insulation value with meg ohm meter. Replace the motor if the insulation is poor.

ID No. 67 - Short-Circuit at power converter side (OCCe)

ID No.	Fault Name	Descriptions
67	Short-Circuit at power converter side (OCCe)	When Pr.U1-14 is set to a non-zero value, the VIDAR will automatically check for hardware abnormalities at the power converter side when an short-circuit protection event occurs. If this error occurs, it indicates a short circuit on the power converter side.
Action and Reset		
Action Condition		Hardware protection
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Cannot reset
Reset Condition		Cannot reset
Record		Yes
Cause		**Corrective Actions**
Short circuit at IGBT module		Enable diagnosis mode (Pr. U1-14) to detect the failure of IGBT or motor

ID No. 68 - Reverse direction of the speed feedback (SdRv)

ID No.	Fault Name	Descriptions
68	Reverse direction of the speed feedback (SdRv)	Rotating direction is different from the commanding direction detected by the sensorless
Action and Reset		
Action Condition		Software detection
Action Time		Pr. H8-06
Fault Treatment Parameter		Pr. H8-07 0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to stop 4: Fault & by Quick Stop Time
Reset Method		Manual reset
Reset Condition		Immediately reset
Record		Records when Pr. H8-07 = 1–4, SdRv is “Fault”
Cause		**Corrective Actions**
The motor cable is abnormal or broken		Check if the cable functional or replace the cable
Malfunction caused by interference		Verify the wiring of the control circuit and wiring/grounding of the main circuit to prevent interference.

ID No. 69 - Over speed rotation feedback (SdOr)

ID No.	Fault Name	Descriptions
69	Over speed rotation feedback (SdOr)	Over speed rotation detected by sensorless control
Action and Reset		
Action Condition		Pr. H8-03
Action Time		Pr. H8-04
Fault Treatment Parameter		Pr. H8-05 0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to stop 4: Fault & by Quick Stop Time
Reset Method		Manual reset
Reset Condition		Immediately reset
Record		Records when Pr. H8-05 = 1–4, SdOr is “Fault”
Cause		**Corrective Actions**
The setting of ASR bandwidth of speed controller is incorrect		Increase the bandwidth of ASR speed controller
Malfunction caused by interference		Verify the wiring of the control circuit and wiring/ grounding of the main circuit to prevent interference.

ID No. 70 - Large deviation of speed feedback (SdDe)

ID No.	Fault Name	Descriptions
70	Large deviation of speed feedback (SdDe)	A large deviation between the rotating speed and the command detected by the sensorless control
Action and Reset		
Action Condition		Pr. H8-00
Action Time		Pr. H8-01
Fault Treatment Parameter		Pr. H8-02 0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to stop 4: Fault & by Quick Stop Time
Reset Method		Manual reset
Reset Condition		Immediately reset
Record		Records when Pr. H8-02 = 1–4, SdDe is “Fault”
Cause		**Corrective Actions**
Improper parameter setting for abnormal rotating slip function		Reset proper setting for Pr. H8-00 and Pr. H8-01.
Improper parameter setting for ASR and acceleration/deceleration		Reset ASR parameters. Adjust acceleration/ deceleration time.
The acceleration/deceleration time is too short		Adjust acceleration / deceleration time.
Motor shaft locked		Remove causes of the motor shaft lock.
Incorrect parameter setting for torque limit (Pr. F2-16–F2-19)		Adjust the setting to proper value
Malfunction caused by interference		Verify the wiring of the control circuit and wiring/grounding of the main circuit to prevent interference.

ID No. 72 - STO Loss 1 (STL1)

ID No.	**Fault Name**	**Descriptions**
72	STO Loss 1 (STL1)	STO1–SCM1 internal loop detection error
Action and Reset		
Action Condition		Hardware detection
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Hardware failure and cannot be reset. Cycle the power.
Reset Condition		No
Record		Yes
Cause		**Corrective Actions**
STO1 and SCM1 short circuit lines are not connected		Connect the short circuit line.
Hardware failure		Make sure all the wiring is correct and cycle the power. If stl1 still exists, replace a new power converter and a new ACB Board, and return the failed parts to the factory.

ID No. 76 - Safe torque off (STO)

ID No.	Fault Name	Descriptions
76	Safe torque off (STO)	Safety Torque Off function activates
Action and Reset		
Action Condition		Hardware detection
Action Time		Immediately act
Fault Treatment Parameter		Pr. H0-11 0: STO Fault 1: Fault at Run; Warning at Stop 2: STO Warning 3: No STO Display at Stop
Reset Method		Pr. H0-14 = 0, manually reset. Pr. H0-14 = 1, auto reset
Reset Condition		Channel 1 and Channel 2 return to no action level
Record		Yes
Cause		**Corrective Actions**
The switch action of STO1/SCM1 and STO2/SCM2 (OPEN)		Check whether the wiring and upper unit function output is correct.

ID No. 77 - STO Loss 2 (STL2)

ID No.	Fault Name	Descriptions
77	STO Loss 2 (STL2)	STO2–SCM2 internal loop detection error
Action and Reset		
Action Condition		Hardware detection
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Hardware failure and cannot be reset. Cycle the power.
Reset Condition		No
Record		Yes
Cause		**Corrective Actions**
STO2 and SCM2 short circuit lines are not connected		Connect the short circuit line.
Hardware failure		Make sure all the wiring is correct and cycle the power. If stl2 still exists, replace a new power converter and a new ACB Board, and return the failed parts to the factory.

ID No. 78 - STO Loss 3 (STL3)

ID No.	Fault Name	Descriptions
78	STO Loss 3 (STL3)	STO channel 1 circuit detection error, checked by online monitoring.
Action and Reset		
Action Condition		Hardware detection
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Hardware failure and cannot be reset. Cycle the power.
Reset Condition		No
Record		Yes
Cause		**Corrective Actions**
Hardware failure		Make sure all the wiring is correct and cycle the power. If the STL3 still exists, return to the factory for repair.

ID No. 87 - Overload protection at low speed (oL3)

ID No.	Fault Name	Descriptions
87	Overload protection at low speed (oL3)	Low speed and high current protection
Action and Reset		
Action Condition		Software detection
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Immediately reset
Record		Yes
Cause		**Corrective Actions**
Power module overload		1. Reduce the load. 2. Increase the speed 3. Increase the acceleration time.

ID No. 88 - Model ID change (IDCH)

ID No.	Fault Name	Descriptions
88	Model ID change (IDCH)	A fault occurs due to power board ID change
Action and Reset		
Action Condition		Software detection
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Immediately reset
Record		Yes
Cause		**Corrective Actions**
Hardware ID circuit error		Cycle the power after manual reset, If the fault still exists, return to the factory for repair.
Model ID error		Check if the model name matches with Pr. A0-00 (refer to description in Section 1-1) and cycle the power after manually reset. If the fault still exists, return to the factory for repair.

ID No. 94 - Inner communication error when power ON (POCF)

ID No.	Fault Name	Descriptions
94	Inner communication error when power ON (POCF)	Inner communication (between ACB and CONTROL PCB) error when power ON
Action and Reset		
Action Condition		The inner communication is failed when power ON
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		No
Reset Condition		No
Record		Yes
Cause		**Corrective Actions**
Malfunction caused by interference		Verify the wiring of the control circuit and wiring/grounding of the main circuit to prevent interference.
The cable is loose		Re-install the cable and cycling the power. if POCF occurs after cycling the power. If yes, return to the factory for repair.
Hardware failure		Check if POCF occurs after cycling the power. If yes, return to the factory for repair.

ID No. 95 - Board identification error during power-on initialization (IDDE)

ID No.	Fault Name	Descriptions
95	Board identification error during power-on initialization (IDDE)	Board identification error during power-on initialization
Action and Reset		
Action Condition		Internal identification error
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		No
Reset Condition		No
Record		Yes
Cause		**Corrective Actions**
Hardware failure		Check if IDDE occurs after cycling the power. If yes, return to the factory for repair.

ID No. 97 - AI2 Loss (Ai2L)

ID No.	Fault Name	Descriptions	
97	AI2 Loss (Ai2L)	Analog input current loss (including all analog 4–20mA signals)	
Action and Reset			
Action Condition		When the analog input (Pr. G2-22 = 2) is lower than 3.6 mA (only detects analog input 4–20 mA)	
Action Time		The action condition is attained for 0.1s	
Fault Treatment Parameter		Pr. G2-30 AI2 signal loss action: 0: Disable 1: Warning & Continue OPER 2: Fault & Ramp to Stop 3: Fault & Auto-Decel 4: Fault & Coast to Stop 5: Fault & by Quick Stop Time	
Reset Method		Auto	It is “Warning” when Pr. G2-30 = 1, and the warning will be automatically cleared when the analog input signal is ≥ 4 mA.
		Manual	It is "Fault” when Pr. G6-30 = 2–5, which must be reset manually.
Reset Condition		Immediately reset	
Record		It is “Fault” when Pr. G2-30 = 2–5 and will be recorded.	
Cause		**Corrective Actions**	
Loose or broken AI2 wiring		Tighten the terminals again. Replace with a new cable.	
External device error		Replace device.	
Hardware failure		If the Ai2L error still occurs after checking all the wiring, return to the factory for repair.	

ID No. 111 - Inner communication time-out (ictE)

ID No.	Fault Name	Descriptions
111	Inner communication time-out (ictE)	The communication between ACB and CTB has failed for more than 10 seconds.
Action and Reset		
Action Condition		The communication between ACB and CTB are failed.
Action Time		10 seconds
Fault Treatment Parameter		No
Reset Method		Manual Reset
Reset Condition		The communication between ACB and CTB are connected
Record		Yes
Cause		**Corrective Actions**
The cable is loose		Re-install the cable.

ID No. 118 - Monitor signal 1 trigger (BX1e)

ID No.	Fault Name	Descriptions
118	Monitor signal 1 trigger (BX1e)	Sets the monitor signal source Pr. o2-01 according to the trigger condition, and the monitoring signal meets the trigger condition.
Action and Reset		
Action Condition		Meet Pr. o2-02 trigger condition
Action Time		Immediately act
Fault Treatment Parameter		Pr. o2-03 0: Disable 1: Warning 2: Fault and ramp stop 3: Fault and coast stop
Reset Method		Manual reset
Reset Condition		Does not meet Pr. o2-02 trigger condition
Record		Records when Pr. o2-03 = 2 or 3
Cause		**Corrective Actions**
Incorrect settings that trigger the protection		Check if the setting for Pr. o2-01, o2-02 and o2-03 is correct.

ID No. 119 - Monitor signal 2 trigger (BX2e)

ID No.	Fault Name	Descriptions
119	Monitor signal 2 trigger (BX2e)	Sets the monitor signal source Pr. o2-08 according to the trigger condition, and the monitoring signal meets the trigger condition.
Action and Reset		
Action Condition		Meet Pr. o2-09 trigger condition
Action Time		Immediately act
Fault Treatment Parameter		Pr. o2-10 0: Disable 1: Warning 2: Fault and ramp stop 3: Fault and coast stop
Reset Method		Manual reset
Reset Condition		Does not meet Pr. o2-09 trigger condition
Record		Records when Pr. o2-10 = 2 or 3
Cause		**Corrective Actions**
Incorrect settings that trigger the protection		Check if the setting for Pr. o2-08, o2-09 and o2-10 is correct.

ID No. 120 - Monitor signal 3 trigger (BX3e)

ID No.	Fault Name	Descriptions
120	Monitor signal 3 trigger (BX3e)	Sets the monitor signal source Pr. o2-15 according to the trigger condition, and the monitoring signal meets the trigger condition.
Action and Reset		
Action Condition		Meet Pr. o2-16 trigger condition
Action Time		Immediately act
Fault Treatment Parameter		Pr. o2-17 0: Disable 1: Warning 2: Fault and ramp stop 3: Fault and coast stop
Reset Method		Manual reset
Reset Condition		Does not meet Pr. o2-16 trigger condition
Record		Records when Pr. o2-17 = 2 or 3
Cause		**Corrective Actions**
Incorrect settings that trigger the protection		Check if the setting for Pr. o2-15, o2-16 and o2-17 is correct.

ID No. 121 - Monitor signal 4 trigger (BX4e)

ID No.	Fault Name	Descriptions
121	Monitor signal 4 trigger (BX4e)	Sets the monitor signal source Pr. o2-22 according to the trigger condition, and the monitoring signal meets the trigger condition.
Action and Reset		
Action Condition		Meet Pr. o2-23 trigger condition
Action Time		Immediately act
Fault Treatment Parameter		Pr. o2-24 0: Disable 1: Warning 2: Fault and ramp stop 3: Fault and coast stop
Reset Method		Manual reset
Reset Condition		Does not meet Pr. o2-23 trigger condition
Record		Records when Pr. o2-24 = 2 or 3
Cause		**Corrective Actions**
Incorrect settings that trigger the protection		Check if the setting for Pr. o2-22, o2-23 and o2-24 is correct.

ID No. 122 - Monitor signal 5 trigger (BX5e)

ID No.	Fault Name	Descriptions
122	Monitor signal 5 trigger (BX5e)	Sets the monitor signal source Pr. o2-29 according to the trigger condition, and the monitoring signal meets the trigger condition.
Action and Reset		
Action Condition		Meet Pr. o2-30 trigger condition
Action Time		Immediately act
Fault Treatment Parameter		Pr. o2-31 0: Disable 1: Warning 2: Fault and ramp stop 3: Fault and coast stop
Reset Method		Manual reset
Reset Condition		Does not meet Pr. o2-30 trigger condition
Record		Records when Pr. o2-31 = 2 or 3
Cause		**Corrective Actions**
Incorrect settings that trigger the protection		Check if the setting for Pr. o2-29, o2-30 and o2-31 is correct.

ID No. 123 - Monitor signal 6 trigger (BX6e)

ID No.	Fault Name	Descriptions
123	Monitor signal 6 trigger (BX6e)	Sets the monitor signal source Pr. o2-36 according to the trigger condition, and the monitoring signal meets the trigger condition.
Action and Reset		
Action Condition		Meet Pr. o2-37 trigger condition
Action Time		Immediately act
Fault Treatment Parameter		Pr. o2-38 0: Disable 1: Warning 2: Fault and ramp stop 3: Fault and coast stop
Reset Method		Manual reset
Reset Condition		Does not meet Pr. o2-37 trigger condition
Record		Records when Pr. o2-38 = 2 or 3
Cause		**Corrective Actions**
Incorrect settings that trigger the protection		Check if the setting for Pr. o2-36, o2-37 and o2-38 is correct.

ID No. 124 - Monitor signal 7 trigger (BX7e)

ID No.	Fault Name	Descriptions
124	Monitor signal 7 trigger (BX7e)	Sets the monitor signal source Pr. o2-43 according to the trigger condition, and the monitoring signal meets the trigger condition.
Action and Reset		
Action Condition		Meet Pr. o2-44 trigger condition
Action Time		Immediately act
Fault Treatment Parameter		Pr. o2-45 0: Disable 1: Warning 2: Fault and ramp stop 3: Fault and coast stop
Reset Method		Manual reset
Reset Condition		Does not meet Pr. o2-44 trigger condition
Record		Records when Pr. o2-45 = 2 or 3
Cause		**Corrective Actions**
Incorrect settings that trigger the protection		Check if the setting for Pr. o2-43, o2-44 and o2-45 is correct.

ID No. 125 - Monitor signal 8 trigger (BX8e)

ID No.	Fault Name	Descriptions
125	Monitor signal 8 trigger (BX8e)	Sets the monitor signal source Pr. o2-50 according to the trigger condition, and the monitoring signal meets the trigger condition.
Action and Reset		
Action Condition		Meet Pr. o2-51 trigger condition
Action Time		Immediately act
Fault Treatment Parameter		Pr. o2-52 0: Disable 1: Warning 2: Fault and ramp stop 3: Fault and coast stop
Reset Method		Manual reset
Reset Condition		Does not meet Pr. o2-51 trigger condition
Record		Records when Pr. o2-52 = 2 or 3
Cause		**Corrective Actions**
Incorrect settings that trigger the protection		Check if the setting for Pr. o2-50, o2-51 and o2-52 is correct.

ID No. 132 - Under load protection (ULD)

ID No.	Fault Name	Descriptions
132	Under load protection (ULD)	The load does not operate according to the user defined loading curve and triggers under load protection.
Action and Reset		
Action Condition		The loading condition is lower than Pr. H7-15 L/F underload curve or Pr. H7-19–H7-28 Underload L/F Speed Set
Action Time		Pr. H7-18
Fault Treatment Parameter		Pr. H7-16 0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to stop 4: Fault & by Quick Stop Time
Reset Method		Manual reset
Reset Condition		Immediately reset
Record		Yes
Cause		**Corrective Actions**
Incorrect settings that trigger the protection		Check if Pr. H7-15 or H7-19–H7-28 is set properly.

ID No. 133 - Overload protection (OLD)

ID No.	Fault Name	Descriptions
133	Overload protection (OLD)	The load is higher than the user defined loading curve and triggers overload protection.
Action and Reset		
Action Condition		The loading condition is higher than Pr. H7-01 L/F overload curve or Pr. H7-05–H7-14 Overload L/F Speed Set
Action Time		Pr. H7-04
Fault Treatment Parameter		Pr. H7-02 0: Warning & Continue OPER 1: Fault & Ramp to stop 2: Fault & Auto-decel 3: Fault & Coast to stop 4: Fault & by Quick stop time
Reset Method		Manual reset
Reset Condition		Immediately reset
Record		Yes
Cause		**Corrective Actions**
Incorrect settings that trigger the protection		Check if Pr. H7-01 or H7-05–H7-14 is set properly.

ID No. 141 - Large amount leakage error (LEKE)

ID No.	Fault Name	Descriptions
141	Large amount leakage error (LEKE)	Triggers when detecting large amount water leakage
Action and Reset		
Action Condition		The feedback pressure is lower than Plow and the load current is larger than Pr.U3-03 setting Plow = [Target pressure × (1 – Pr.U3-01%)]
Action Time		Pr.U3-02
Fault Treatment Parameter		Pr.U3-04 1: Fault & Coast to Stop 2: Fault & Ramp to Stop
Reset Method		Manual reset
Reset Condition		When the VIDAR output rated current percentage is < Pr.U3-03 level × 0.9
Record		Yes
Cause		**Corrective Actions**
The pipe outlet is broken		Check if the pipes are damaged.
Pressure sensor error		Maintain pressure sensor.

ID No. 142 - High pressure error (HPS)

ID No.	Fault Name	Descriptions
142	High pressure error (HPS)	The pressure feedback is higher than the set water pressure warning level
Action and Reset		
Action Condition		The feedback pressure is higher than Phigh Phigh = [Target pressure × (1 + Pr.U3-05%)]
Action Time		Pr.U3-06
Fault Treatment Parameter		Pr.U3-07 1: Fault & Coast to Stop 2: Fault & Ramp to Stop
Reset Method		Manual reset
Reset Condition		The feedback pressure is lower than Phgih × 0.9
Record		Yes
Cause		**Corrective Actions**
The water pressure cannot be reduced		Check if the water outlet valve of the pipeline is open.
Pressure sensor broken		Replace the pressure sensor.

ID No. 143 - Low pressure error (LPSE)

ID No.	Fault Name	Descriptions
143	Low pressure error (LPSE)	The pressure feedback is lower than the set water pressure warning level
Action and Reset		
Action Condition		The feedback pressure is lower than Plow Plow = [Target pressure × (1 – Pr.U3-08%)]
Action Time		Pr.U3-09
Fault Treatment Parameter		Pr.U3-10 1: Fault & Coast to Stop 2: Fault & Ramp to Stop
Reset Method		Manual reset
Reset Condition		The feedback pressure is higher than Plow × 1.1
Record		Yes
Cause		**Corrective Actions**
Unable to establish water pressure		Check if the pipe has leakage, or if there is no water from the source.
Pressure sensor broken		Replace the pressure sensor.

ID No. 144 - Dry pump error (dynE)

ID No.	Fault Name	Descriptions
144	Dry pump error (dynE)	Fault occurs when the VIDAR detects dry pump
Action and Reset		
Action Condition		The corresponded power of the target frequency is below the dry pump curve
Action Time		Pr.U3-18
Fault Treatment Parameter		Pr.U3-21 0: Warning & Coast to Stop 1: Warning & Ramp to Stop
Reset Method		Manual reset
Reset Condition		Immediately reset
Record		Yes
Cause		**Corrective Actions**
Pipe has leakage or has no water		Check if the pipe is damaged, or if there is no water from the source.

ID No. 145 - Dry pump auto-tune error (dAUE)

ID No.	Fault Name	Descriptions
145	Dry pump auto-tune error (dAUE)	1. The high-speed power tuning value is < the low-speed power tuning value. 2. Any of the high-speed or low-speed tuning value exceeds the VIDAR rated power. 3. The auto-tuning time exceeds Pr.U3-12 setting. If any of the above condition is met, the VIDAR stops with the STOP command and displays dAUE.
Action and Reset		
Action Condition		Power tuning value does not meet the dry pump detection curve routine.
Action Time		Immediately act
Fault Treatment Parameter		Fault & Coast to Stop
Reset Method		Manual reset
Reset Condition		Immediately reset
Record		Yes
Cause		**Corrective Actions**
The value measured automatically by the dry pump curve is abnormal		Measure the load auto-tuning curve again, set Pr.U3-11 = 1 to execute dry pump curve autotune.
There is water in the pump system		Close the pump outlet and inlet.
The auto-tuning time exceeds the set value		Check whether Pr.U3-12 setting value is appropriate.

ID No. 161 - STO Loss 4 (STL4)

ID No.	Fault Name	Descriptions
161	STO Loss 4 (STL4)	STO channel 2 circuit detection error, checked by online monitoring.
Action and Reset		
Action Condition		Hardware detection
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Hardware failure and cannot be reset. Cycle the power.
Reset Condition		No
Record		Yes
Cause		**Corrective Actions**
Hardware failure		Make sure all the wiring is correct and cycle the power. If the STL4 still exists, return ACB circuit board to the factory for repair.

ID No. 162 - STO Loss 5 (STL5)

ID No.	Fault Name	Descriptions
162	STO Loss 5 (STL5)	STO1, STO2 are not connect to same level. The time threshold is 500ms.
Action and Reset		
Action Condition		Hardware detection
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Hardware failure and cannot be reset. Cycle the power.
Reset Condition		No
Record		Yes
Cause		**Corrective Actions**
STO1/STO2 are not same voltage level		Check STO1 and STO2 are connected to SCM or S24V.
Hardware failure		Make sure all the wiring is correct and cycle the power. If the STL5 still exists, return ACB circuit board to the factory for repair.

ID No. 163 - STO Loss 6 (STL6)

ID No.	Fault Name	Descriptions
163	STO Loss 6 (STL6)	STO1, STO2 are not connect to same level. And the STO internal circuit is broken. The time threshold is 500ms.
Action and Reset		
Action Condition		Hardware detection
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Hardware failure and cannot be reset. Cycle the power.
Reset Condition		No
Record		Yes
Cause		**Corrective Actions**
STO1/STO2 are not same voltage level		Check STO1 and STO2 are connected to SCM or S24V.
Hardware failure		Make sure all the wiring is correct and cycle the power. If the STL6 still exists, return ACB circuit board to the factory for repair.

ID No. 164 - Gate Buffer U-phase (GBFU)

ID No.	Fault Name	Descriptions
164	Gate Buffer U-phase (GBFU)	When STO2 is connected to SCM, and gate buffer U-phase is still at high level, the GBFU error occurs.
Action and Reset		
Action Condition		Hardware detection
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Hardware failure and cannot be reset. Cycle the power.
Reset Condition		No
Record		Yes
Cause		**Corrective Actions**
Hardware failure		Make sure all the wiring is correct and cycle the power. If the GBFU still exists, return the power converter to the factory for repair.

ID No. 165 - Gate Buffer V-phase (GBFV)

ID No.	Fault Name	Descriptions
165	Gate Buffer V-phase (GBFV)	When STO2 is connected to SCM, and gate buffer V-phase is still at high level, the GBFV error occurs.
Action and Reset		
Action Condition		Hardware detection
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Hardware failure and cannot be reset. Cycle the power.
Reset Condition		No
Record		Yes
Cause		**Corrective Actions**
Hardware failure		Make sure all the wiring is correct and cycle the power. If the GBFV still exists, return the power converter to the factory for repair.

ID No. 166 - Gate Buffer W-phase (GBFW)

ID No.	Fault Name	Descriptions
166	Gate Buffer W-phase (GBFW)	When STO2 is connected to SCM, and gate buffer W-phase is still at high level, the GBFW error occurs.
Action and Reset		
Action Condition		Hardware detection
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Hardware failure and cannot be reset. Cycle the power.
Reset Condition		No
Record		Yes
Cause		**Corrective Actions**
Hardware failure		Make sure all the wiring is correct and cycle the power. If the GBFW still exists, return the power converter to the factory for repair.

ID No. 167 - Safety MCU communication CRC error (StCE)

ID No.	Fault Name	Descriptions
167	Safety MCU communication CRC error (StCE)	When the safety MCU sends the data to Main MCU, but the CRC value is still wrong, the StCE error occurs.
Action and Reset		
Action Condition		Hardware detection
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Hardware failure and cannot be reset. Cycle the power.
Reset Condition		No
Record		Yes
Cause		**Corrective Actions**
Hardware failure		Make sure all the wiring is correct and cycle the power. If the StCE still exists, return ACB circuit board to the factory for repair.

ID No. 168 - Safety MCU communication Time-Out (StTO)

ID No.	Fault Name	Descriptions
168	Safety MCU communication Time-Out (StTO)	The main MCU does not receive data from the safety MCU for over 80 ms after power-on.
Action and Reset		
Action Condition		Hardware detection
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Hardware failure and cannot be reset. Cycle the power.
Reset Condition		No
Record		Yes
Cause		**Corrective Actions**
Hardware failure		Make sure all the wiring is correct and cycle the power. If the StTO still exists, return ACB circuit board to the factory for repair.

ID No. 170 - Firmware Version Mismatch (CBNM)

ID No.	Fault Name	Descriptions
170	Firmware Version Mismatch (CBNM)	Firmware version of ACB and CONTROL PCB are mismatched
Action and Reset		
Action Condition		Firmware version of ACB and CONTROL PCB are mismatched
Action Time		No
Fault Treatment Parameter		No
Reset Method		No
Reset Condition		No
Record		Yes
Cause		**Corrective Actions**
Firmware version mismatched		Check the firmware version of ACB and CONTROL PCB, and then upload the correct firmware.

ID No. 171 - Control Board Burn TimeOut (CBBT)

ID No.	Fault Name	Descriptions
171	Control Board Burn TimeOut (CBBT)	When burning the control board, whether through an SD card or USB, a timeout during the burning process will result in a CBBT display.
Action and Reset		
Action Condition		Software detection
Action Time		No
Fault Treatment Parameter		No
Reset Method		No
Reset Condition		No
Record		Yes
Cause		**Corrective Actions**
Malfunction caused by interference		Verify the wiring of the control circuit and wiring/ grounding of the main circuit to prevent interference.
The cable is loose		Re-install the cable and cycle the power. If CBBT occurs after cycling the power return ACB circuit board to the factory for repair.
Hardware failure		Check if CBBT occurs after cycling the power. If yes, return power converter to the factory for repair.

ID No. 172 - Coefficient of CTB Mismatch (CBCM)

ID No.	Fault Name	Descriptions
172	Coefficient of CTB Mismatch (CBCM)	Control board coefficient mismatch
Action and Reset		
Action Condition		After the model parameters are set, the control board parameters did not update the coefficients accordingly within the specified action time.
Action Time		1 sec
Fault Treatment Parameter		No
Reset Method		Hardware failure and cannot be reset. Cycle the power.
Reset Condition		No
Record		Yes
Cause		**Corrective Actions**
Hardware failure		Check if fault continuous after cycling the power. If yes, return power converter to the factory for repair.

ID No. 182 - Motor overheating (oH3r)

ID No.	Fault Name	Descriptions
182	Motor overheating (oH3r)	Motor overheating, when RTD temperature is > Pr. H6-19 setting value, the fault treatment acts according to Pr. H6-21.
Action and Reset		
Action Condition		RTD temperature > Pr.06-19 setting
Action Time		Pr.06-20
Fault Treatment Parameter		Pr. H6-21 0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to stop 4: Fault & by Quick Stop Time
Reset Method		When Pr. H6-21 = 0 and the temperature is < Pr. H6-19 level after maintaining Pr. H6-20 RTD OH detect time, the oH3r warning is automatically cleared. It is “Fault” when Pr. H6-09 = 1–4, which must be reset manually.
Reset Condition		RTD temperature < Pr.06-19 setting and keep Pr.06-20 time
Record		Records when Pr. H6-09 = 1–4 and oH3r displays “Fault”
Cause		**Corrective Actions**
Motor locked		Clear the motor lock status.
Motor speed is too high		Reduce the speed.
Motor bearing abnormality.		Check if the bearing is worn out and needs replacement.
Insufficient bearing grease.		Check if the bearing grease needs to be added.Lubricants will age and deplete faster as temperatures rise.

ID No. 201 - CTB Watchdog (CBWD)

<table>
<tr><th>ID No.</th><th>Fault Name</th><th>Descriptions</th></tr>
<tr><td>201</td><td>CTB Watchdog
(CBWD)</td><td>A Watchdog fault is triggered when the system detects an abnormal condition at the system level. Typical examples include, but are not limited to, interrupted execution where a task stalls at fall load, out-of-bounds pointer access, and memory-related errors.</td></tr>
<tr><th colspan="3">Action and Reset</th></tr>
<tr><td colspan="2">Action Condition</td><td>Software detection</td></tr>
<tr><td colspan="2">Action Time</td><td>Immediately act</td></tr>
<tr><td colspan="2">Fault Treatment Parameter</td><td>N/A</td></tr>
<tr><td colspan="2">Reset Method</td><td>Software failure and cannot be reset. Cycle the power.</td></tr>
<tr><td colspan="2">Reset Condition</td><td>N/A</td></tr>
<tr><td colspan="2">Record</td><td>Yes</td></tr>
<tr><th colspan="2">Cause</th><th>Corrective Actions</th></tr>
<tr><td colspan="2">Illegal memory access (e.g. null or un-initialized pointer).</td><td rowspan="3">1. Cycle the system power to clear temporary fault conditions.
2. If the fault occurs again, record the firmware version, fault code and triggering condition, and then contact the technical support.</td></tr>
<tr><td colspan="2">Stack overflow or memory corruption leading to an invalid return address, as well as interrupt service routine (ISR) taking excessive time or recursive function calls.</td></tr>
<tr><td colspan="2">Invalid response or malfunction from external modules, such as DMA, FPGA or communication peripherals.</td></tr>
</table>

ID No. 204 - Safety MCU ROM Error (ROMF)

<table>
<tr><th>ID No.</th><th>Fault Name</th><th>Descriptions</th></tr>
<tr><td>204</td><td>Safety MCU ROM Error
(ROMF)</td><td>The safety MCU will calculate the safety ROM data with CRC32. When the CRC32 data is different from the pre-calculated data, the keypad panel will show ROMF error.</td></tr>
<tr><th colspan="3">Action and Reset</th></tr>
<tr><td colspan="2">Action Condition</td><td>Hardware detection</td></tr>
<tr><td colspan="2">Action Time</td><td>Immediately act</td></tr>
<tr><td colspan="2">Fault Treatment Parameter</td><td>No</td></tr>
<tr><td colspan="2">Reset Method</td><td>Hardware failure and cannot be reset. Cycle the power.</td></tr>
<tr><td colspan="2">Reset Condition</td><td>No</td></tr>
<tr><td colspan="2">Record</td><td>Yes</td></tr>
<tr><th colspan="2">Cause</th><th>Corrective Actions</th></tr>
<tr><td colspan="2">Hardware failure</td><td>Make sure all the wiring is correct and cycle the power. If the ROMF still exists, return the ACB circuit board to the factory for repair.</td></tr>
</table>

ID No. 205 - Safety MCU execution time-out (STOT)

ID No.	Fault Name	Descriptions
205	Safety MCU execution time-out (STOT)	The safety MCU will detect the execution time, and if the time is higher than or lower than the setting, the keypad will display STOT error.
Action and Reset		
Action Condition		Hardware detection
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Hardware failure and cannot be reset. Cycle the power.
Reset Condition		No
Record		Yes
Cause		**Corrective Actions**
Hardware failure		Make sure all the wiring is correct and cycle the power. If the STOT still exists, return ACB circuit board to the factory for repair.

ID No. 206 - Safety MCU watch dog (STOW)

ID No.	Fault Name	Descriptions
206	Safety MCU watch dog (STOW)	The safety MCU detects watch dog fault.
Action and Reset		
Action Condition		Hardware detection
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Hardware failure and cannot be reset. Cycle the power.
Reset Condition		No
Record		Yes
Cause		**Corrective Actions**
Hardware failure		Make sure all the wiring is correct and cycle the power. If the STOW still exists, return ACB circuit board to the factory for repair.

ID No. 207 - Safety MCU 24V Voltage (STOF)

ID No.	Fault Name	Descriptions
207	Safety MCU 24V Voltage (STOF)	The safety MCU detects the 24V voltage is out of the setting value.
Action and Reset		
Action Condition		Hardware detection
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Hardware failure and cannot be reset. Cycle the power.
Reset Condition		No
Record		Yes
Cause		**Corrective Actions**
Hardware failure		Make sure all the wiring is correct and cycle the power. If the STOF still exists, return ACB circuit board to the factory for repair.

ID No. 208 - Safety MCU 6V Voltage (STOB)

ID No.	Fault Name	Descriptions
208	Safety MCU 6V Voltage (STOB)	The safety MCU detects the 6V voltage is out of the setting value.
Action and Reset		
Action Condition		Hardware detection
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Hardware failure and cannot be reset. Cycle the power.
Reset Condition		No
Record		Yes
Cause		**Corrective Actions**
Hardware failure		Make sure all the wiring is correct and cycle the power. If the STOB still exists, return ACB circuit board to the factory for repair.

ID No. 209 - Safety MCU 5V2 Voltage (STOC)

ID No.	Fault Name	Descriptions
209	Safety MCU 5V2 Voltage (STOC)	The safety MCU detects the 5V2 voltage is out of the setting value.
Action and Reset		
Action Condition		Hardware detection
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Hardware failure and cannot be reset. Cycle the power.
Reset Condition		No
Record		Yes
Cause		**Corrective Actions**
Hardware failure		Make sure all the wiring is correct and cycle the power. If the STOC still exists, return ACB circuit board to the factory for repair.

ID No. 210 - Safety MCU 5V1 Voltage (STOS)

ID No.	Fault Name	Descriptions
210	Safety MCU 5V1 Voltage (STOS)	The safety MCU detects the 5V1 voltage is out of the setting value.
Action and Reset		
Action Condition		Hardware detection
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Hardware failure and cannot be reset. Cycle the power.
Reset Condition		No
Record		Yes
Cause		**Corrective Actions**
Hardware failure		Make sure all the wiring is correct and cycle the power. If the STOS still exists, return ACB circuit board to the factory for repair.

ID No. 220 - Parameter Copy Write Failure (CWF)

ID No.	Fault Name	Descriptions
220	Parameter Copy Write Failure (CWF)	Power loss when VIDAR is doing parameter copy
Action and Reset		
Action Condition		VIDAR detects the condition that parameter copy is not completed
Action Time		Software detection
Fault Treatment Parameter		No
Reset Method		Manual-reset
Reset Condition		Immediately reset
Record		No
Cause		**Corrective Actions**
Power loss in parameter copy process		Perform parameter copy again.

ID No. 221 - FPGA Watch Dog Fault (FWDF)

ID No.	Fault Name	Descriptions
221	FPGA Watch Dog Fault (FWDF)	Insufficient computing resources
Action and Reset		
Action Condition		When detecting computing resource is not enough
Action Time		Immediately acts when detecting computing resource is not enough
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Reset only when fault is cleared
Record		Yes
Cause		**Corrective Actions**
Incorrect firmware version		Confirm firmware version is correct
Hardware failure		Check if fault continuous after cycling the power. If yes, return power converter to the factory for repair.

ID No. 222 - Chopper SW OH (CSOH)

ID No.	Fault Name	Descriptions
222	Chopper SW OH (CSOH)	Chopper switch over-heat
Action and Reset		
Action Condition		When detecting chopper switch over-heat
Action Time		Software detection
Fault Treatment Parameter		No
Reset Method		Auto-reset
Reset Condition		When detecting chopper switch not over-heating
Record		No
Cause		**Corrective Actions**
Hardware failure		If VIDAR stop after showing the CSOH warning and trigger OV error after power cycling, return power converter to the factory for repair.
Bad quality of input grid voltage		Improve power supply condition.

ID No. 223 - Ready signal Fault (RDF)

ID No.	Fault Name	Descriptions
223	Ready signal Fault (RDF)	Gate driver IC loss power
Action and Reset		
Action Condition		When detecting gate driver IC loss power
Action Time		Immediately acts when detecting gate driver IC loss power
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Reset only when fault is cleared
Record		Yes
Cause		**Corrective Actions**
Malfunction caused by interference		Check if fault continuous after cycling the power. If yes, return power converter to the factory for repair.
Hardware failure		

ID No. 224 - Phase-Lock-Loop Fault (PLLF)

ID No.	Fault Name	Descriptions
224	Phase-Lock-Loop Fault (PLLF)	Grid voltage PLL failed
Action and Reset		
Action Condition		When detecting PLL failure
Action Time		Immediately acts when detecting PLL failure
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Reset only when fault is cleared
Record		Yes
Cause		**Corrective Actions**
Power voltage is too high/low or too much harmonic		1. Make sure the power voltage is within the specification 2. Check if there is excessive harmonic distortion in the power grid.

ID No. 225 - Current Offset Fault (COF)

ID No.	Fault Name	Descriptions
225	Current Offset Fault (COF)	Current feedback offset is incorrect
Action and Reset		
Action Condition		When detecting current feedback offset is incorrect
Action Time		Immediately acts when detecting current feedback offset is incorrect
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Reset only when fault is cleared
Record		Yes
Cause		**Corrective Actions**
Malfunction caused by interference		Check if the fault continues after cycling the power. If yes, return power converter to the factory for repair.
Hardware failure		

ID No. 226 - Clamp SW Fault (CSF)

ID No.	Fault Name	Descriptions
226	Clamp SW Fault (CSF)	When the clamp switch is detected to be continuously ON for a long time, the CSF fault is triggered to prevent the component from being damaged.
Action and Reset		
Action Condition		The clamp switch has been continuously ON for a long time
Action Time		When detecting clamp switch has been continuously ON for 1ms
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Reset only when the fault is cleared
Record		Yes
Cause		**Corrective Actions**
Power voltage is too high/ low or too much harmonic		1. Make sure the power voltage is within the specification. 2. Check if there is excessive harmonic distortion in the power grid.

ID No. 227 - Current sensor abnormal fault (CSAF)

ID No.	Fault Name	Descriptions
227	Current sensor abnormal fault (CSAF)	When the analog digital value of the current sensor in each phase is out of setting range at idle state, VIDAR will show the CSAF fault.
Action and Reset		
Action Condition		The analog digital value of each phase is over 33094 or lower than 32440 at idle state
Action Time		1 ms
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Reset only when the fault is cleared
Record		Yes
Cause		**Corrective Actions**
The analog digital value is out of range at idle state		Re-power the VIDAR and check if the CSAF fault still exists. If yes, return the VIDAR power converter to the factory for repair.

ID No. 228 - Ver of CONTROL PCB & FPGA mismatch (CFNM)

ID No.	Fault Name	Descriptions
228	Ver of CONTROL PCB & FPGA mismatch (CFNM)	The FPGA and MCU firmware versions do not match
Action and Reset		
Action Condition		CONTROL PCB and FPGA firmware versions are mismatched
Action Time		Immediately act
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		CONTROL PCB and FPGA firmware versions are matched
Record		Yes
Cause		**Corrective Actions**
Do not update all firmware completely		Update all the firmware files again.

ID No. 229 - Clamp Resistor Over Heat (CROH)

ID No.	Fault Name	Descriptions
229	Clamp Resistor Over Heat (CROH)	When detecting clamp resistor over-heat, VIDAR shows CROH.
Action and Reset		
Action Condition		Clamp resistor temperature is higher than the protection level
Action Time		1 ms
Fault Treatment Parameter		N/A
Reset Method		Manual reset
Reset Condition		Reset only when the fault is cleared
Record		Yes
Cause		**Corrective Actions**
dEb operation will increase the clamp resistor temperature		The VIDAR is not able to perform another dEb operation in a short period of time. It can continue to operate normally when the resistor temperature decreases.

ID No. 231 - OVD Broken (OvdB)

ID No.	Fault Name	Descriptions
231	OVD Broken (OvdB)	OVD Broken
Action and Reset		
Action Condition		The feedback of output voltage sensor is abnormal
Action Time		Immediately
Fault Treatment Parameter		No
Reset Method		Manual reset
Reset Condition		Set Pr.A3-00 to zero
Record		Yes
Cause		**Corrective Actions**
Hardware failure		Check if the OvdB occurs when starting again after cycling the power. If yes, return OVD circuit board to the factory for repair.

ID No. 234 - Low AC voltage (Lvac)

ID No.	Fault Name	Descriptions
234	Low AC voltage (Lvac)	When VIDAR operates, it detects that the AC input line voltage (RMS) is lower than Pr. H1-15 setting value. When Lvac occurs, the VIDAR disables the output immediately, the motor Coasts to a stop, and the display shows an Lvac error.
Action and Reset		
Action Condition		AC input voltage is lower than Pr. H1-15 setting value
Action Time		Immediately act when AC input voltage is lower than Pr. H1-15
Fault Treatment Parameter		N/A
Reset Method		Auto-reset
Reset Condition		It can be reset after the AC input voltage exceeds Pr. H1-15 setting value
Record		No
Cause		**Corrective Actions**
Power-off		Improve power supply condition.
Power voltage changes		Adjust voltage to the power range of the VIDAR.

ID No. 242 - ACB Relative Humidity Fault (ARHf)

ID No.	Fault Name	Descriptions
242	ACB Relative Humidity Fault (ARHf)	When the relative humidity exceeds the set detection level and remains for a specified duration time.
Action and Reset		
Action Condition		When the relative humidity exceeds the detection level set in Pr.H6-27 and remains above that level for a duration time longer than the detection time set in Pr.H6-28, the VIDAR will display ARHf and coasts to stop.
Action Time		Pr.H6-28
Fault Treatment Parameter		N/A
Reset Method		Manual reset
Reset Condition		The fault is automatically cleared when the relative humidity drops below Pr.H6-27 and remains for more than 5 seconds. When the humidity sensor failure is detected, this fault will be automatically cleared.
Record		Yes
Cause		Corrective Actions
Improper parameter setting		Adjust detection level and detection time to avoid false triggering.
Humidity sensor malfunction		Change the ACB board.

10 Specification

10.1 Specifications

10.1.1 460V Models

Frame	Model Name	Center High	Rated Power		Rated Torque	Rated Speed	Input Current[1]	PDS Eff.[1,2]	VIDAR Weight[3]
		(in.)	(HP)	(kW)	(Nm)	(rpm)	(A)	(%)	(lbs)
254/6	EMDX020H36EXS3ABAA	6.25	20	15	40.8	3550	20.1	90%	320
	EMDX020H18EXS3ABAA		20 / 10	15 / 7.5	81.5	1770 / 1180	20.3 / 10.4	90%	363
284/6	EMDX025H36EXS3ABAA	7.0	25	18.7	51.0	3550	25.2	91%	458
	EMDX025H18EXS3ABAA		25 / 15	18.7 / 10	101.9	1770 / 1180	25.1 / 15.6	92%	507
	EMDX030H36EXS3ABAA		30	22	61.1	3550	30.3	91%	507
	EMDX030H18EXS3ABAA		30 / 20	22 / 15	122.3	1770 / 1180	30.1 / 20.8	92%	551
324/6	EMDX040H36EXS3ABAA	8.0	40	30	81.5	3550	40.2	92%	551
	EMDX040H18EXS3ABAA		40 / 25	30 / 18.7	163.1	1770 / 1180	40.1 / 26.0	93%	634
	EMDX050H36EXS3ABAA		50	37	101.9	3550	50.24	92%	634
	EMDX050H18EXS3ABAA		50 / 30	37 / 22	203.8	1770 / 1180	50.1 / 31.2	93%	716
364/5	EMDX060H36EXS3ABAA	9.0	60	45	122.3	3550	60.6	93%	800
	EMDX060H18EXS3ABAA		60 / 40	45 / 30	244.6	1770 / 1180	60.3 / 41.6	93%	890
	EMDX075H36EXS3ABAA		75	55	152.9	3550	75.5	93%	888
	EMDX075H18EXS3ABAA		75 / 50	55 / 37	305.7	1770 / 1180	75.4 / 51.5	93%	981
Rated Input Voltage		Three-phase, 460 V (Line-Line rms > +10%, < -5%), 60 Hz							
Cooling Method		TEFC / Self-cooling fan							
Power Factor		0.99 to 0.98 at 100% rated load							
Overload Interval		150% of rated current for 3 seconds in every 45 seconds 120% of rated current for 60 seconds in every 198 seconds							

1. Values are average subject to tolerances.
2. PDS Eff. - Power Drive System Efficiency is the combined motor and power converter efficiency as defined by IEC 61800-9.
3. Approximate weight subject to change after manufacturing.

10.1.2 General Features

Control Characteristics	Control Method	PMFOC Sensorless
	PMA SynRM Motor Torque and Speed Feedback Accuracy	Torque accuracy: 5% (of rated point) Speed accuracy: 1% (of rated point) Torque ripple: 5% (of rated point)
	Max. Output Frequency (Hz)	300.00 Hz
	Frequency Output Accuracy	Digital command: ±0.01%, -10°C – +40°C Analog command: ±0.1%, 25±10°C
	Output Frequency Resolution	Digital command: 0.1 Hz Analog command: 0.05 × max. output frequency / 60 Hz (±11 bit)
	Speed Setting Signal	0 – +10V, 4–20 mA, 0–20 mA
	Accel. / Decel. Time	0.1–600 seconds
	Main Control Function	Momentary power loss ride thru, Speed search, Over-torque detection, Torque limit, Accel./Decel. time switch, S-curve Accel./Decel., 3-wire sequence, Auto-Tuning, Dwell, JOG frequency, Frequency upper/lower limit settings, Fault Restart, PID Control (with Sleep function), Modbus TCP/IP and Ethernet IP communication (Refer to Chapter 6 *Initial Operation and Adjustment*)
Protection Characteristics	Motor-Temperature Protection	1 Primary / 1 Back-up KTY84 Temperature Sensor; Fault temperature 145°C
	Over-Current Protection	200% of rated current, < 10μs no damage to the power modules
	Over-Voltage Protection	Faults when clamp voltage exceeds 850V
	Converter-Temperature Protection	Power Converter fault temperature 120°C
	Power Supply UVLO	360 V_{DC} turn on / 300 V_{DC} LVDO
	Stall Prevention	Stall prevention during acceleration, deceleration and running
	Restart after Instantaneous Power Failure	Auto-restart internal of fault: setting range 0–6000 sec. Number of times of restart after fault: setting range 0–10
	Grounding Leakage Current Protection	Leakage current is higher than 50% of rated current
	Protection Level	IP55 for VIDAR assembly, IP66 for Terminal box and power converter assembly
Speed Turndown		10:1 Variable Torque Load Low Speed VIDAR minimum continuous speed 180 rpm High Speed VIDAR minimum continuous speed 360 rpm
Maximum Speed		2500 RPM for 1770 RPM models 4500 RPM for 3550 RPM models
Certifications		VIDAR Assembly: UL 121201; CSA 22.2 No.213 Class 1 Div.2 Groups A-D T4 Power Converter: CSA C22.2 No.274-17; EN IEC 61800-3 (Cat 3); UL 61800-5-1 Motor: CSA 22.2 No.100, UL 1004-1, UL 1004-6
STO		Safe Torque Off SIL2

10.1.3 Environment for operation, storage and transportation

Item	Specification		
Pollution degree	IEC60364-1 Pollution degree 2, indoor and outdoor use.		
Environment	Surrounding Temperature	Operation	-25 to 40°C (derating to 50°C; includes direct sun exposure, see Figure 46: Ambient temperature derating curve on page 281)
		Storage	-25 to 60°C
	Humidity (%)	Operation	Outdoors 100% RH (Condensing)
		Storage/ Transportation	5 to 95% (Non-condensing)
	Atmospheric Pressure	Operation	86-106 kPa
	Altitude	Operation	If the VIDAR is installed at an altitude of 0–1000 m, follow normal operation restrictions. If it is installed at an altitude of 1000–2000 m, decrease 1% of rated current or lower 0.5°C of temperature for every 100 m increase in altitude. (see Figure 47: Altitude derating curve on page 282) Maximum altitude for Corner Grounded is 2000 m.
OVC	Over voltage category III		
Package	Storage / Transportation		ISTA procedure 3E
Vibration	VIDAR: IEC 60721-3-3 3M11, IEC 60068-2-6 Power Converter and Terminal box: IEC60721-3-3 3M12, IEC 60068-2-6		
Shock	VIDAR: IEC 60721-3-3 3M4, IEC 60068-2-27 Power Converter and Terminal box: IEC 60721-3-3 3M7, IEC 60068-2-27		

10.1.4 Operation noise level

According to EN 61800-5-1, operators working in an environment above 70dB must take appropriate hearing protection.

Frame	RPM	Noise Level dB(A)*[1]
254/6	3600	81.1
254/6	1800	72.1
284/6	3600	84.8
284/6	1800	72.8
324/6	3600	84.8
324/6	1800	79.7
364/5	3600	85.0
364/5	1800	82.5

NOTICE:

*[1] The noise level value is not measured in anechoic chamber.

10.2 Derating curve

Ambient temperature derating curve

Condition	**Operating Environment**
High Temperature	Temperature derating decreases rated current by 1.2% for every 1°C above 40°C.

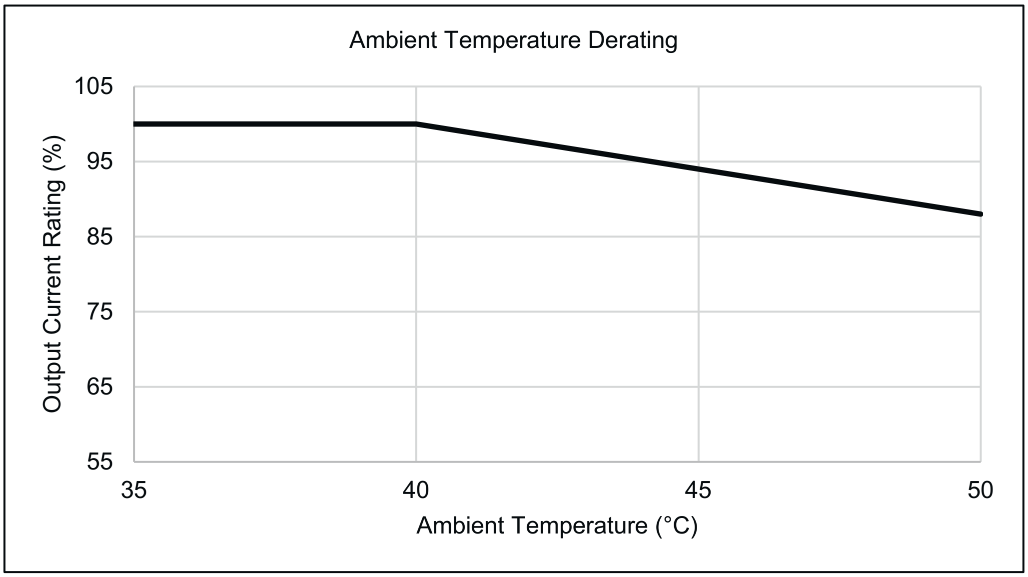


Figure 46: Ambient temperature derating curve

The rated output for different ambient temperatures:

Ambient Temperate (°C)	40°C	45°C	50°C
Output Current / Rated Current (%)	100	94	88

Altitude derating curve

Condition	Operating Environment
High Altitude	Altitude derating decreases rated current by 1% or lower 0.5°C of maximum ambient temperature for every 100m above 1000m up to 2000m. For applications above 2000m contact the factory.

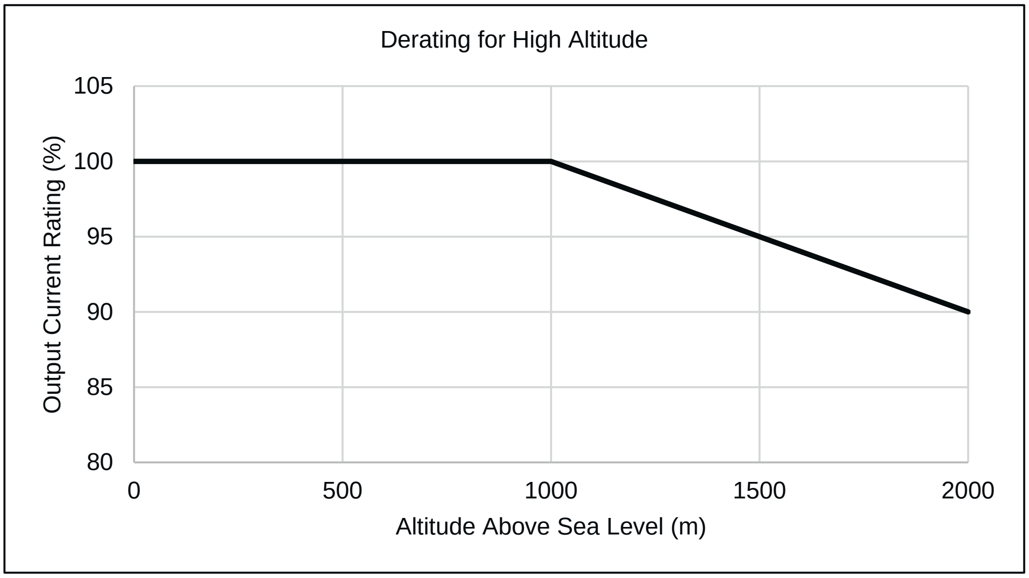


Figure 47: Altitude derating curve

The rated output current derating (%) for different altitudes above sea level at 40°C.

Altitude above Sea Level (meter)	0	1000	1500	2000
Output Current / Rated Current (%)	100	100	95	90

The rated ambient temperature for different altitudes above sea level to achieve 100% rated current.

Altitude above Sea Level (meter)	0	1000	1500	2000
Ambient Temperate (°C)	40	40	37.5	35
Output Current / Rated Current (%)	100	100	100	100

11 Summary of Parameter Settings

11.1 Summary of Parameter Settings

This chapter provides summary of parameter settings for user to gather the parameter setting ranges, factory settings and set parameters. The parameters can be set, changed and reset by the digital keypad.

NOTICE:

1. 🗲The parameter can be set during operation.
2. ✻ Level 3 security parameters, enter password to unlock this parameter.
3. For more detail on parameters, refer to Chapter 12 *Description of Parameter Settings*.

11.1.1 Group A

A0 - VIDAR information

	Pr.	Parameter Name	Setting Range	Default
	A0-00 (0x00)	VIDAR Identity Code	3-165	Read only
	A0-01 (0x01)	VIDAR Rated Output Current	0-6000.0 A	Read only
	A0-02 (0x02)	VIDAR Rated Input Current	0-6000.0 A	Read only
	A0-04 (0x04)	ACB FW Version	0–65535	Read only
	A0-06 (0x06)	ACB FW Date Code	0–65535	Read only
	A0-07 (0x07)	CTL FW Version	0–65535	Read only
	A0-09 (0x09)	CTL FW Date Code	0–65535	Read only
	A0-10 (0x0A)	FPGA Version	0–65535	Read only
	A0-11 (0x0B)	Safety MCU Version	Read only	Read only

A1 - Control handler

	Pr.	Parameter Name	Setting Range	Default
	A1-00 (0x40)	EX1/EX2 Switch Src	0: External 1 1: External 2 2–7: MI1–MI6	0
	A1-01 (0x41)	EX1 OPER Cmd Src	0: Disabled 1: S1 Start 2: S1 Start, S2 Dir 3: S1 FWD, S2 REV 4: S1 Start, S2 Stop 5: S1 Start, S2 Stop, S3 Dir 6: S1 FWD, S2 REV, S3 Stop 7: COM1 (Keypad) 8: COM1 (Modbus) 9: EtherNet 10: EX. COM	1
	A1-02 (0x42)	EX1 S1 Src	0: Disabled 1: Reserved 2–7: MI1–MI6	2
	A1-03 (0x43)	EX1 S2 Src	0: Disabled 1: Reserved 2–7: MI1–MI6	0
	A1-04 (0x44)	EX1 S3 Src	0: Disabled 1: Reserved 2–7: MI1–MI6	0
	A1-05 (0x45)	EX1 S1 Trigger Method	0: Edge Triggered 1: Level Triggered	1
	A1-06 (0x46)	EX1 S2 Trigger Method	0: Edge Triggered 1: Level Triggered	1
	A1-07 (0x47)	EX1 S3 Trigger Method	0: Edge Triggered 1: Level Triggered	1

	Pr.	Parameter Name	Setting Range	Default
	A1-08 (0x48)	EX2 OPER Cmd Src	0: Disabled 1: S1 Start 2: S1 Start, S2 Dir 3: S1 FWD, S2 REV 4: S1 Start, S2 Stop 5: S1 Start, S2 Stop, S3 Dir 6: S1 FWD, S2 REV, S3 Stop 7: COM1 (Keypad) 8: COM1 (Modbus) 9: EtherNet 10: EX. COM	0
	A1-09 (0x49)	EX2 S1 Src	0: Disabled 1: Reserved 2–7: MI1–MI6	0
	A1-10 (0x4A)	EX2 S2 Src	0: Disabled 1: Reserved 2–7: MI1–MI6	0
	A1-11 (0x4B)	EX2 S3 Src	0: Disabled 1: Reserved 2–7: MI1–MI6	0
⚡	A1-12 (0x4C)	EX2 S1 Trigger Method	0: Edge Triggered 1: Level Triggered	1
⚡	A1-13 (0x4D)	EX2 S2 Trigger Method	0: Edge Triggered 1: Level Triggered	1
⚡	A1-14 (0x4E)	EX2 S3 Trigger Method	0: Edge Triggered 1: Level Triggered	1
⚡	A1-15 (0x4F)	Halt Decel Method	0: Ramp to stop 1: By Quick Stop Time	0
	A1-16 (0x50)	Halt MI Src	0: Disabled 1: Reserved 2–7: MI1–MI6	0
	A1-17 (0x51)	Lock MI Src	0: Disabled 1: Reserved 2–7: MI1–MI6	0
	A1-21 (0x55)	Run Enable MI Src	0: Disabled 1: Reserved 2–7: MI1–MI6	0
	A1-22 (0x56)	Run Disabled Stop Method	0: Coast to stop 1: Ramp to stop 2: Quick Stop	0

	Pr.	Parameter Name	Setting Range	Default
	A1-23 (0x57)	Run Enable Indn	0: Disabled 1–2: Relay1–2	0
	A1-24 (0x58)	OPER Cmd by Kpd Indn	0: Disabled 1–2: Relay1–2	0
	A1-25 (0x59)	Forward Cmd Indn	0: Disabled 1–2: Relay1–2	0
	A1-26 (0x5A)	Reverse Cmd Indn	0: Disabled 1–2: Relay1–2	0
	A1-27 (0x5B)	FWD / REV Direction Setting	0: EnableEnabled FWD/ REV 1: FWD only 2: REV only	1
	A1-28 (0x5C)	Forward Phase Sel	0: UVW 1: UWV	0
	A1-29 (0x5D)	Start/Stop Setting	0: Reserved 1: 2-WIRE START/STOP 2: 3-WIRE START/STOP 3: MOTOR CONTACTOR START/ STOP 4: FWD/REV 5: Keypad 6: EtherNET	0
	A1-32 (0x60)	External Fault MI Src	0: Disabled 1: Reserved 2–7: MI1–MI6	0
	A1-33 (0x61)	External Fault Stop Method	0: Coast to stop 1: Ramp to stop 2: Stop by ExtFault Dec Time	0
	A1-34 (0x62)	External Fault Decel Time	0.0–6000.0 sec. 0.00–600.00 sec.	10.0 or 10.00

A2 - Stop method

	Pr.	Parameter Name	Setting Range	Default
	A2-00 (0x80)	Stop Method	0: Ramp to stop 1: Coast to stop	0
	A2-01 (0x81)	Quick Stop Ref DI	0: Disabled 1: Reserved 2–7: MI1–MI6	0
	A2-02 (0x82)	Quick Stop Method	0: Quick Stop 1: Coast to stop 2: Reserved 3: Ramp to stop	0
	A2-03 (0x83)	Emergency Stop Ref Src	0: Disabled 1: Reserved 2–7: MI1–MI6	0

A3 - Start and stop function

	Pr.	Parameter Name	Setting Range	Default
	A3-00 (0xC0)	Spd Search Func.	0: Disabled 1: Enabled	1
	A3-01 (0xC1)	Init Position Method	0-1	1
	A3-10 (0xCA)	DCI Kp Gain	0.000–60.000 pu	0.100
	A3-11 (0xCB)	DCI Ki Gain	0.000–60.000 pu	0.050
	A3-20 (0xD4)	Pulse Inject Curr Thresh-old	0–300%	100

A4 - HOA / LeRe setting

	Pr.	Parameter Name	Setting Range	Default
	A4-00 (0x100)	HOA/ LoRe Sel.	0: HOA 1: LOC/REM	1
	A4-01 (0x101)	HOA Switch Src Sel	0: Keypad 1: External terminal	0
	A4-02 (0x102)	HAND MI Src	0: Disabled 1: Reserved 2–7: MI1–MI6	0
	A4-03 (0x103)	AUTO MI Src	0: Disabled 1: Reserved 2–7: MI1–MI6	0
⚡	A4-04 (0x104)	AUTO Lock MI Src	0: Disabled 1: Enabled 2–7: MI1–MI6	0
⚡	A4-05 (0x105)	AUTO Lock Mode	0: Off Disabled 1: Hand Disabled 2: Hand & Off Disabled	0
⚡	A4-06 (0x106)	AUTO Initial Speed Cmd	0: Hand Speed Cmd 1: Auto Speed Cmd	0
⚡	A4-08 (0x108)	HAND Initial Speed Cmd	0: Auto Speed Cmd 1: Hand Speed Cmd	0
	A4-10 (0x10A)	Loc/Rem Sel Src	0: Remote 1: Local 2–7: MI1–MI6 8–19: Disabled 20: Keypad	20
⚡	A4-11 (0x10B)	REM Lock MI Src	0: Disabled 1: Enabled 2–7: MI1–MI6	0
⚡	A4-12 (0x10C)	Keypad STOP Enable	0: Disabled 1: Enabled	0
⚡	A4-13 (0x10D)	REM Initial Speed Cmd Src	0: Loc Speed Cmd 1: Rem Speed Cmd	0
⚡	A4-15 (0x10F)	LOC Initial Speed Cmd	0: Loc Speed Cmd 1: Loc Speed Cmd	0
	A4-17 (0x111)	Loc/Rem Switch Action	0: Always stop 1: Remote Start Cmd 2: Local Start Cmd 3: Start Cmd before Switch	0

11.1.2 Group B

Management and macro

B0 - Pr management

	Pr.	Parameter Name	Setting Range	Default
ϟ	B0-00 (0x200)	Access Permission	0: Normal 1: Advanced	0
	B0-01 (0x201)	Parameter Reset	0: Reserve 5: Reset kWh 9: Reset 50 Hz default 10: Reset 60 Hz default	0
ϟ	B0-02 (0x202)	Password Setting	0–65535	0
ϟ	B0-03 (0x203)	Password	0–65535	0
ϟ	B0-04 (0x204)	Read-Only Password Setting	0–65535	0
ϟ	B0-05 (0x205)	Read-Only Password	0–65535	0
	B0-06 (0x206)	Failed password attempts	0–3	Read only
	B0-07 (0x207)	Parameter Lock Status	bit0: Parameter hidden bit1: Parameter read-only bit2: Reserve bit3: Over PW attempts limit bit4: FireMode parameter lock	Read only
✻	B0-12 (0x20D)	PR CTRL Bit	bit0: Disable the ‘force unlock’ function bit0 = 0: OFF (allow forced unlock) bit0 = 1: ON (not allow forced unlock)	0

B1 - Application macro

	Pr.	Parameter Name	Setting Range	Default
✗	B1-00 (0x240)	MACRO Sel	0: Reserved 1: Pump 2: Fan/Blower 3: Other	0

B2 - Pr Modified REC 1-10

	Pr.	Parameter Name	Setting Range	Default
	B2-00 (0x280)	REC 1 Pr Address	0–65535	Read only
	B2-01 (0x281)	REC 1 Original Setting	0–65535	Read only
	B2-02 (0x282)	REC 1 New Setting	0–65535	Read only
	B2-03 (0x283)	REC 1 Year	0–65535	Read only
	B2-04 (0x284)	REC 1 Date	0–1231	Read only
	B2-05 (0x285)	REC 1 Time	0–2359	Read only
	B2-06 (0x286)	REC 2 Pr Address	0–65535	Read only
	B2-07 (0x287)	REC 2 Original Setting	0–65535	Read only
	B2-08 (0x288)	REC 2 New Setting	0–65535	Read only
	B2-09 (0x289)	REC 2 Year	0–65535	Read only
	B2-10 (0x28A)	REC 2 Date	0–1231	Read only
	B2-11 (0x28B)	REC 2 Time	0–2359	Read only
	B2-12 (0x28C)	REC 3 Pr Address	0–65535	Read only
	B2-13 (0x28D)	REC 3 Original Setting	0–65535	Read only
	B2-14 (0x28E)	REC 3 New Setting	0–65535	Read only
	B2-15 (0x28F)	REC 3 Year	0–65535	Read only

	Pr.	Parameter Name	Setting Range	Default
	B2-16 (0x290)	REC 3 Date	0–1231	Read only
	B2-17 (0x291)	REC 3 Time	0–2359	Read only
	B2-18 (0x292)	REC 4 Pr Address	0–65535	Read only
	B2-19 (0x293)	REC 4 Original Setting	0–65535	Read only
	B2-20 (0x294)	REC 4 New Setting	0–65535	Read only
	B2-21 (0x295)	REC 4 Year	0–65535	Read only
	B2-22 (0x296)	REC 4 Date	0–1231	Read only
	B2-23 (0x297)	REC 4 Time	0–2359	Read only
	B2-24 (0x298)	REC 5 Pr Address	0–65535	Read only
	B2-25 (0x299)	REC 5 Original Setting	0–65535	Read only
	B2-26 (0x29A)	REC 5 New Setting	0–65535	Read only
	B2-27 (0x29B)	REC 5 Year	0–65535	Read only
	B2-28 (0x29C)	REC 5 Date	0–1231	Read only
	B2-29 (0x29D)	REC 5 Time	0–2359	Read only
	B2-30 (0x29E)	REC 6 Pr Address	0–65535	Read only
	B2-31 (0x29F)	REC 6 Original Setting	0–65535	Read only
	B2-32 (0x2A0)	REC 6 New Setting	0–65535	Read only
	B2-33 (0x2A1)	REC 6 Year	0–65535	Read only
	B2-34 (0x2A2)	REC 6 Date	0–1231	Read only
	B2-35 (0x2A3)	REC 6 Time	0–2359	Read only
	B2-36 (0x2A4)	REC 7 Pr Address	0–65535	Read only

	Pr.	Parameter Name	Setting Range	Default
	B2-37 (0x2A5)	REC 7 Original Setting	0–65535	Read only
	B2-38 (0x2A6)	REC 7 New Setting	0–65535	Read only
	B2-39 (0x2A7)	REC 7 Year	0–65535	Read only
	B2-40 (0x2A8)	REC 7 Date	0–1231	Read only
	B2-41 (0x2A9)	REC 7 Time	0–2359	Read only
	B2-42 (0x2AA)	REC 8 Pr Address	0–65535	Read only
	B2-43 (0x2AB)	REC 8 Original Setting	0–65535	Read only
	B2-44 (0x2AC)	REC 8 New Setting	0–65535	Read only
	B2-45 (0x2AD)	REC 8 Year	0–65535	Read only
	B2-46 (0x2AE)	REC 8 Date	0–1231	Read only
	B2-47 (0x2AF)	REC 8 Time	0–2359	Read only
	B2-48 (0x2B0)	REC 9 Pr Address	0–65535	Read only
	B2-49 (0x2B1)	REC 9 Original Setting	0–65535	Read only
	B2-50 (0x2B2)	REC 9 New Setting	0–65535	Read only
	B2-51 (0x2B3)	REC 9 Year	0–65535	Read only
	B2-52 (0x2B4)	REC 9 Date	0–1231	Read only
	B2-53 (0x2B5)	REC 9 Time	0–2359	Read only
	B2-54 (0x2B6)	REC 10 Pr Address	0–65535	Read only
	B2-55 (0x2B7)	REC 10 Original Setting	0–65535	Read only
	B2-56 (0x2B8)	REC 10 New Setting	0–65535	Read only
	B2-57 (0x2B9)	REC 10 Year	0–65535	Read only

	Pr.	Parameter Name	Setting Range	Default
	B2-58 (0x2BA)	REC 10 Date	0–1231	Read only
	B2-59 (0x2BB)	REC 10 Time	0–2359	Read only

B3 - Pr Modified REC 11-20

	Pr.	Parameter Name	Setting Range	Default
	B3-00 (0x2C0)	REC 11 Pr Address	0–65535	Read only
	B3-01 (0x2C1)	REC 11 Original Setting	0–65535	Read only
	B3-02 (0x2C2)	REC 11 New Setting	0–65535	Read only
	B3-03 (0x2C3)	REC 11 Year	0–65535	Read only
	B3-04 (0x2C4)	REC 11 Date	0–1231	Read only
	B3-05 (0x2C5)	REC 11 Time	0–2359	Read only
	B3-06 (0x2C6)	REC 12 Pr Address	0–65535	Read only
	B3-07 (0x2C7)	REC 12 Original Setting	0–65535	Read only
	B3-08 (0x2C8)	REC 12 New Setting	0–65535	Read only
	B3-09 (0x2C9)	REC 12 Year	0–65535	Read only
	B3-10 (0x2CA)	REC 12 Date	0–1231	Read only
	B3-11 (0x2CB)	REC 12 Time	0–2359	Read only
	B3-12 (0x2CC)	REC 13 Pr Address	0–65535	Read only
	B3-13 (0x2CD)	REC 13 Original Setting	0–65535	Read only
	B3-14 (0x2CE)	REC 13 New Setting	0–65535	Read only
	B3-15 (0x2CF)	REC 13 Year	0–65535	Read only
	B3-16 (0x2D0)	REC 13 Date	0–1231	Read only
	B3-17 (0x2D1)	REC 13 Time	0–2359	Read only
	B3-18 (0x2D2)	REC 14 Pr Address	0–65535	Read only
	B3-19 (0x2D3)	REC 14 Original Setting	0–65535	Read only

	Pr.	Parameter Name	Setting Range	Default
	B3-20 (0x2D4)	REC 14 New Setting	0–65535	Read only
	B3-21 (0x2D5)	REC 14 Year	0–65535	Read only
	B3-22 (0x2D6)	REC 14 Date	0–1231	Read only
	B3-23 (0x2D7)	REC 14 Time	0–2359	Read only
	B3-24 (0x2D8)	REC 15 Pr Address	0–65535	Read only
	B3-25 (0x2D9)	REC 15 Original Setting	0–65535	Read only
	B3-26 (0x2DA)	REC 15 New Setting	0–65535	Read only
	B3-27 (0x2DB)	REC 15 Year	0–65535	Read only
	B3-28 (0x2DC)	REC 15 Date	0–1231	Read only
	B3-29 (0x2DD)	REC 15 Time	0–2359	Read only
	B3-30 (0x2DE)	REC 16 Pr Address	0–65535	Read only
	B3-31 (0x2DF)	REC 16 Original Setting	0–65535	Read only
	B3-32 (0x2E0)	REC 16 New Setting	0–65535	Read only
	B3-33 (0x2E1)	REC 16 Year	0–65535	Read only
	B3-34 (0x2E2)	REC 16 Date	0–1231	Read only
	B3-35 (0x2E3)	REC 16 Time	0–2359	Read only
	B3-36 (0x2E4)	REC 17 Pr Address	0–65535	Read only
	B3-37 (0x2E5)	REC 17 Original Setting	0–65535	Read only
	B3-38 (0x2E6)	REC 17 New Setting	0–65535	Read only
	B3-39 (0x2E7)	REC 17 Year	0–65535	Read only
	B3-40 (0x2E8)	REC 17 Date	0–1231	Read only

	Pr.	Parameter Name	Setting Range	Default
	B3-41 (0x2E9)	REC 17 Time	0–2359	Read only
	B3-42 (0x2EA)	REC 18 Pr Address	0–65535	Read only
	B3-43 (0x2EB)	REC 18 Original Setting	0–65535	Read only
	B3-44 (0x2EC)	REC 18 New Setting	0–65535	Read only
	B3-45 (0x2ED)	REC 18 Year	0–65535	Read only
	B3-46 (0x2EE)	REC 18 Date	0–1231	Read only
	B3-47 (0x2EF)	REC 18 Time	0–2359	Read only
	B3-48 (0x2F0)	REC 19 Pr Address	0–65535	Read only
	B3-49 (0x2F1)	REC 19 Original Setting	0–65535	Read only
	B3-50 (0x2F2)	REC 19 New Setting	0–65535	Read only
	B3-51 (0x2F3)	REC 19 Year	0–65535	Read only
	B3-52 (0x2F4)	REC 19 Date	0–1231	Read only
	B3-53 (0x2F5)	REC 19 Time	0–2359	Read only
	B3-54 (0x2F6)	REC 20 Pr Address	0–65535	Read only
	B3-55 (0x2F7)	REC 20 Original Setting	0–65535	Read only
	B3-56 (0x2F8)	REC 20 New Setting	0–65535	Read only
	B3-57 (0x2F9)	REC 20 Year	0–65535	Read only
	B3-58 (0x2FA)	REC 20 Date	0–1231	Read only
	B3-59 (0x2FB)	REC 20 Time	0–2359	Read only

B4 - Factory parameters (reserved)

11.1.3 Group C

C - Control mode and Cmd scheme

C0 - Control mode selection

	Pr.	Parameter Name	Setting Range	Default
	C0-03 (0x403)	Hand/ Local Control Mode	0: Speed mode 1: Torque mode	0
	C0-04 (0x404)	EX1 Control Mode Source	0: Digital keypad 1: RS-485 2–3: Reserved 4: MI selection	0
	C0-05 (0x405)	EX1 Control Mode	0: Speed mode 1: Torque mode	0
	C0-06 (0x406)	EX2 Control Mode Source	0: Digital keypad 1: RS-485 2–3: Reserved 4: MI selection	0
	C0-07 (0x407)	EX2 Control Mode	0: Speed mode 1: Torque mode	0
	C0-08 (0x408)	Torque/ Speed Mode Switch MI Source	0: Speed mode 1: Torque mode 2–7: MI1–MI6 (MI = ON: Torque mode; MI = OFF: Speed mode)	0

C1 - FREQ Cmd handle

	Pr.	Parameter Name	Setting Range	Default
	C1-00 (0x440)	EX1 Main and Aux Speed Math	0: Main FREQ 1: Aux FREQ 2: ADD 3: SUB 4: MULTI 5: DIV 6: MAX 7: MIN	0

	Pr.	Parameter Name	Setting Range	Default
	C1-01 (0x441)	EX1 Main Speed Src	0: Disabled 1: COM1 (Keypad) 2: COM1 (Modbus) 3: EtherNet 4: Reserved 5–6: Reserved 7–8: AI1–AI2 9–15: Reserved 16: Up/down keys 17: Reserved 18: PID	1
	C1-02 (0x442)	EX1 Aux Speed Src	0: Disabled 1: COM1 (Keypad) 2: COM1 (Modbus) 3: EtherNet 4: Reserved 5–6: Reserved 7–8: AI1–AI2 9–15: Reserved 16: Up/down keys 17: Reserved 18: PID	0
	C1-03 (0x443)	EX1 Aux Speed Gain	-200.0–200.0%	100.0
	C1-04 (0x444)	EX2 Main & Aux Speed Math	0: Main FREQ 1: Aux FREQ 2: ADD 3: SUB 4: MULTI 5: DIV 6: MAX 7: MIN	0

	Pr.	Parameter Name	Setting Range	Default
	C1-05 (0x445)	EX2 Main Speed Src	0: Disabled 1: COM1 (Keypad) 2: COM1 (Modbus) 3: EtherNet 4: COM2 (Ext. COM) 5–6: Reserve 7–8: AI1–AI2 9–15: Reserve 16: Up/down keys 17: Reserve 18: PID	1
	C1-06 (0x446)	EX2 Aux Speed Src	0: Disabled 1: COM1 (Keypad) 2: COM1 (Modbus) 3: EtherNet 4: Reserved 5–6: Reserved 7–8: AI1–AI2 9–15: Reserved 16: Up/down keys 17: Reserved 18: PID	0
	C1-07 (0x447)	EX2 Aux Speed Gain	-200.0–200.0%	100.0
	C1-08 (0x448)	Keypad Speed Cmd	0–8985	180/360
	C1-09 (0x449)	Communication Speed Cmd	0–8985	Read only
	C1-10 (0x44A)	Zero-speed Behavior	0: Output ready 1: Min speed 2: Speed lower limit	1
	C1-13 (0x44D)	Speed Cmd Up Key MI Src	0: Disabled 1: Enabled 2–7: MI1–MI6	0
	C1-14 (0x44E)	Speed Cmd Down Key MI Src	0: Disabled 1: Enabled 2–7: MI1–MI6	0
	C1-15 (0x44F)	Up/Down Accel/ Decel Method	0: Accel/ Decel time 1: Up/Down Accel/Decel rate	0
	C1-16 (0x450)	Up/Down Accel/ Decel Rate	0.001–1.000	0.001

	Pr.	Parameter Name	Setting Range	Default
↯	C1-17 (0x451)	Up/Down Accel/ Decel Rate Unit	0: Hz/ms 1: Hz/100ms	0
	C1-18 (0x452)	Multi Speed Mode	0: 15 Speed 1: 4 Speed	0
	C1-19 (0x453)	Multi Speed MI Src 1	0: Disabled 1: Reserved 2–7: MI1–MI6	0
	C1-20 (0x454)	Multi Speed MI Src 2	0: Disabled 1: Reserved 2–7: MI1–MI6	0
	C1-21 (0x455)	Multi Speed MI Src 3	0: Disabled 1: Reserved 2–7: MI1–MI6	0
	C1-22 (0x456)	Multi Speed MI Src 4	0: Disabled 1: Reserved 2–7: MI1–MI6	0
↯	C1-23 (0x457)	Multi Speed 1	0–8985	0
↯	C1-24 (0x458)	Multi Speed 2	0–8985	0
↯	C1-25 (0x459)	Multi Speed 3	0–8985	0
↯	C1-26 (0x45A)	Multi Speed 4	0–8985	0
↯	C1-27 (0x45B)	Multi Speed 5	0–8985	0
↯	C1-28 (0x45C)	Multi Speed 6	0–8985	0
↯	C1-29 (0x45D)	Multi Speed 7	0–8985	0
↯	C1-30 (0x45E)	Multi Speed 8	0–8985	0
↯	C1-31 (0x45F)	Multi Speed 9	0–8985	0
↯	C1-32 (0x460)	Multi Speed 10	0–8985	0
↯	C1-33 (0x461)	Multi Speed 11	0–8985	0
↯	C1-34 (0x462)	Multi Speed 12	0–8985	0
↯	C1-35 (0x463)	Multi Speed 13	0–8985	0

	Pr.	Parameter Name	Setting Range	Default
	C1-36 (0x464)	Multi Speed 14	0–8985	0
	C1-37 (0x465)	Multi Speed 15	0–8985	0
	C1-38 (0x466)	Negative Speed Cmd Define	0: Always 0 1: Direction	0
	C1-39 (0x467)	AI Res Switch MI Src	0: Disabled 1: Enabled 2–7: MI1–MI6	0
	C1-40 (0x468)	AI Res Switch Max Speed	0–8985	1770/ 3550
	C1-41 (0x469)	AI Res Switch Delay	0.000–65.000 sec.	0.000
	C1-42 (0x46A)	Speed Unit Sel	0: RPM 1: Hz	0

C2 - Accel / decel and speed limit

	Pr.	Parameter Name	Setting Range	Default
	C2-00 (0x480)	Accel Time 1	0.0–6000.0 sec./ 0.00–600.00 sec.	10.0 / 10.00
	C2-01 (0x481)	Decel Time 1	0.0–6000.0 sec./ 0.00–600.00 sec.	10.0 / 10.00
	C2-02 (0x482)	Accel Time 2	0.0–6000.0 sec./ 0.00–600.00 sec.	10.0 / 10.00
	C2-03 (0x483)	Decel Time 2	0.0–6000.0 sec./ 0.00–600.00 sec.	10.0 / 10.00
	C2-04 (0x484)	Accel Time 3	0.0–6000.0 sec./ 0.00–600.00 sec.	10.0 / 10.00
	C2-05 (0x485)	Decel Time 3	0.0–6000.0 sec./ 0.00–600.00 sec.	10.0 / 10.00
	C2-06 (0x486)	Accel Time 4	0.0–6000.0 sec./ 0.00–600.00 sec.	10.0 / 10.00
	C2-07 (0x487)	Decel Time 4	0.0–6000.0 sec./ 0.00–600.00 sec.	10.0 / 10.00
	C2-08 (0x488)	Start of Accel S-curve Time	0.00–25.00 sec.	0.0
	C2-09 (0x489)	End of Accel S-curve Time	0.00–25.00 sec.	0.0
	C2-10 (0x48A)	Start of Decel S-curve Time	0.00–25.00 sec.	0.0
	C2-11 (0x48B)	End of Decel S-curve Time	0.00–25.00 sec.	0.0

	Pr.	Parameter Name	Setting Range	Default
🗲	C2-12 (0x48C)	Accel/ Decel 1/4 Switch Speed	0–8985	0
	C2-13 (0x48D)	Accel/ Decel Time unit	0: 0.01 second 1: 0.1 second	0
🗲	C2-14 (0x48E)	Quick Stop Time	0.0–6000.0 sec./ 0.00–600.00 sec.	10.0 / 10.00
	C2-15 (0x48F)	Accel/ Decel Switch MI Src 1	0: OFF 1: ON 2–7: MI1–MI6	0
	C2-16 (0x490)	Accel/ Decel Swtich MI Src 2	0: OFF 1: ON 2–7: MI1–MI6	0
🗲	C2-17 (0x491)	Max. OPER Speed	0–8985	1770/ 3550
🗲	C2-18 (0x492)	Speed Upper Limit	Speed lower limit –8985	2500/ 4500
🗲	C2-19 (0x493)	Speed Lower Limit	0–Speed upper limit	0
	C2-20 (0x494)	Start Speed	0.00–motor's max. operation speed	0
✻	C2-21 (0x495)	Skip Speed 1 Upper Limit	Skip Speed 1 lower limit–motor's max. operation speed	915
✻	C2-22 (0x496)	Skip Speed 1 Lower Limit	0.00–Skip speed 1 upper limit	885
✻	C2-23 (0x497)	Skip Speed 2 Upper Limit	Skip speed 2 lower limit–motor's max. operation speed	1805
✻	C2-24 (0x498)	Skip Speed 2 Lower Limit	0.00–Skip speed 2 upper limit	1795
✻	C2-25 (0x499)	Skip Speed 3 Upper Limit	Skip speed 3 lower limit–motor's max. operation speed	8
✻	C2-26 (0x49A)	Skip Speed 3 Lower Limit	0.00–Skip speed 3 upper limit	8
	C2-27 (0x49B)	Min Speed	0–motor's max. operation speed	180/360

C3 - JOG setting

	Pr.	Parameter Name	Setting Range	Default
🗲	C3-00 (0x4C0)	JOG Speed Cmd	0.00–Max. OPER Speed	90
🗲	C3-01 (0x4C1)	JOG Accel Time	0.0–6000.0 sec./ 0.00–600.00 sec.	5.0/ 5.00

	Pr.	Parameter Name	Setting Range	Default
⚡	C3-02 (0x4C2)	JOG Decel Time	0.0–6000.0 sec./ 0.00–600.00 sec.	5.0/ 5.00
	C3-03 (0x4C3)	JOG MI Src	0: Disabled 1: Reserved 2–7: MI1–MI6	0
⚡	C3-04 (0x4C4)	JOG Indn	0: Disabled 1–2: Relay1–2	0

C4 - Torque command

	Pr.	Parameter Name	Setting Range	Default
⚡	C4-00 (0x500)	EX1 Main / AUX Torque Calculation	0: Main torque command 1: Auxiliary torque command 2: ADD 3: SUB 4: MULTI 5: MAX 6: MIN	0
	C4-01 (0x501)	EX1 Main Torque Command Source	0: Disabled 1: Digital keypad 2: RS-485 3–6: Reserved 7–8: AI1–AI2	1
	C4-02 (0x502)	EX1 Auxiliary Torque Command Source	0: Disabled 1: Digital keypad 2: RS-485 3–6: Reserved 7–8: AI1–AI2	0
⚡	C4-03 (0x503)	EX2 Main / AUX Torque Calculation	0: Main torque command 1: Auxiliary torque command 2: ADD 3: SUB 4: MULTI 5: MAX 6: MIN	0
	C4-04 (0x504)	EX2 Main Torque Command Source	0: Disabled 1: Digital keypad 2: RS-485 3–6: Reserved 7–8: AI1–AI2	1

	Pr.	Parameter Name	Setting Range	Default
	C4-05 (0x505)	EX2 Auxiliary Torque Command Source	0: Disabled 1: Digital keypad 2: RS-485 3–6: Reserved 7–8: AI1–AI2	0
	C4-06 (0x506)	Torque Command	-300.0–300.0% (- Pr.C4-13–Pr.C4-13)	0.0
	C4-07 (0x507)	Torque Trace Type	0: Ramp profile (Trapezoidal) 1: S-curve profile	0
	C4-08 (0x508)	Torque Slope	0.0–6000.0 %/sec.	100.0
	C4-09 (0x509)	Torque S-curve Time	0.00–25.00 sec.	0.50
	C4-10 (0x50A)	Speed Limit Selection	0: by FWD/ REV speed limit parameter 1: by speed command source and speed limit parameter 2: by speed command source	0
	C4-11 (0x50B)	Torque Mode FWD Speed Limit	0–120%	10
	C4-12 (0x50C)	Torque Mode REV Speed Limit	0–120%	10
	C4-13 (0x50D)	Maximum Torque Command	0.0–300.0%	100.0

11.1.4 Group D

D - Motor parameter

D5 - SM paramter and autotune

Pr.	Parameter Name	Setting Range	Default
D5-01 (0x781)	SM Rated power	Read only	Read only
D5-02 (0x782)	SM Rated Current	Read only	Read only
D5-03 (0x783)	SM Rated Voltage	Read only	Read only
D5-04 (0x784)	SM Rated Speed	Read only	Read only
D5-05 (0x785)	SM Pole Number	Read only	Read only

The pole number for the SM rotor.

11.1.5 Group E

E - Reserve

11.1.6 Group F

F - FOC

F0 - Reserve

F1 - SM FOC

	Pr.	Parameter Name	Setting Range	Default
✻	F1-00 (0xB00)	IF/HFI Sel	0: HFI 1: IF	0
✻ ⚡	F1-01 (0xB01)	IF Cmd	0–150%	20
✻ ⚡	F1-02 (0xB02)	HFI PLL BW Gain	0.01–600.00%	2.00
✻ ⚡	F1-03 (0xB03)	Speed Observer Filter BW	0–65535 Hz	10
✻ ⚡	F1-04 (0xB04)	IF/HFI to SM Switch FREQ	0.00–599.00 Hz	Depending on the models
✻ ⚡	F1-05 (0xB05)	SM to IF/HFI Switch FREQ	0.00–599.00 Hz	Depending on the models
✻ ⚡	F1-06 (0xB06)	HFI Injection FREQ	0–1200 Hz	500
✻ ⚡	F1-07 (0xB07)	HFI Injection Amplitude	0.00–100.00%	20.00
✻ ⚡	F1-08 (0xB08)	Observer Low Speed Gain	10–1000%	Depending on the models
✻ ⚡	F1-09 (0xB09)	Observer High Speed Gain	10–1000%	Depending on the models
✻ ⚡	F1-10 (0xB0A)	PLL P Gain	10–1000%	Depending on the models
✻ ⚡	F1-11 (0xB0B)	PLL I Gain	10–1000%	Depending on the models
✻ ⚡	F1-16 (0xB10)	SMFOC Id Min Pct	0–100%	Depending on the models
✻ ⚡	F1-17 (0xB11)	SMFOC PreFobEn Pct	0–100%	75

F2 - ASR setting

	Pr.	Parameter Name	Setting Range	Default
	F2-00 (0xB40)	Motor Inertia	0.1–6000.0 kg-cm^2	Depending on the models
	F2-01 (0xB41)	System Inertia	1–60000 pu	Depending on the models
	F2-02 (0xB42)	ASR Gain Calculation Sel	0: Gain 1: Bandwidth	1
	F2-03 (0xB43)	ASR High/ Low BW Switch FREQ	0.00–Max. operation frequency (Hz)	40.00
	F2-04 (0xB44)	ASR Zero-Speed BW	0.1–750.0 Hz	2.0
	F2-05 (0xB45)	ASR Low-Speed BW	0.1–750.0 Hz	2.0
	F2-06 (0xB46)	ASR High-Speed BW	0.1–750.0 Hz	2.0
	F2-07 (0xB47)	ASR Zero-Speed Gain	0.1–750.0 Hz	3.0
	F2-08 (0xB48)	ASR Zero-Speed Integral Time	0.001–10.000 sec.	0.100
	F2-09 (0xB49)	ASR Low-Speed Gain	0.1–750.0 Hz	3.0
	F2-10 (0xB4A)	ASR Low-Speed Integral Time	0.001–10.000 sec.	0.100
	F2-11 (0xB4B)	ASR High-Speed Gain	0.1–750.0 Hz	3.0
	F2-12 (0xB4C)	ASR High-Speed Integral Time	0.001–10.000 sec.	0.100
	F2-13 (0xB4D)	ASR PDFF Gain	0.00–1.00 pu	Depending on the models
	F2-14 (0xB4E)	ASR Speed Feedforward Gain	0.00–100.00 pu	0.00
	F2-15 (0xB4F)	ASR Torque Cmd Filter Time	0.0–6000.0 ms	1.0
	F2-16 (0xB50)	FWD Motoring Torque Limit	0.00–300.00%	200.00
	F2-17 (0xB51)	FWD Regenerating Torque Limit	0.00–300.00%	200.00
	F2-18 (0xB52)	REV Motoring Torque Limit	0.00–300.00%	200.00
	F2-19 (0xB53)	REV Regenerating Torque Limit	0.00–300.00%	200.00

	Pr.	Parameter Name	Setting Range	Default
✻ 〃	F2-20 (0xB54)	AMR BW	0.1–750.0 Hz	Depending on the models
✻ 〃	F2-21 (0xB55)	AMR Voltage Limit	0–100%	Depending on the models
✻ 〃	F2-22 (0xB56)	AMR Kp Gain	0.00–3.00	Depending on the models
✻ 〃	F2-23 (0xB57)	AMR Ki Gain	0.00–3.00	Depending on the models
✻ 〃	F2-24 (0xB58)	SMFOC AMR Id Filter Coefficient	0–1000	Depending on the models

F3 - ACR setting

	Pr.	Parameter Name	Setting Range	Default
✻ 〃	F3-00 (0xB80)	ACR Gain Calculation Sel	0: ACR BW 1: BW Calculated by CF	1
✻ 〃	F3-01 (0xB81)	ACR BW	100–3000 Hz	300
✻ 〃	F3-02 (0xB82)	ACR d-Axis Kp Gain	0.01–100.00 pu	1.00
✻ 〃	F3-03 (0xB83)	ACR d-Axis Ki Gain	0.01–100.00 pu	1.00
✻ 〃	F3-04 (0xB84)	ACR q-Axis Kp Gain	0.01–100.00 pu	1.00
✻ 〃	F3-05 (0xB85)	ACR q-Axis Ki Gain	0.01–100.00 pu	1.00
✻	F3-06 (0xB86)	ACR Anti-Integral End Gain	0.00–5.00 pu	1.00

11.1.7 Group G

G - IO setting

G0 - MI setting

	Pr.	Parameter Name	Setting Range	Default
	G0-00 (0xCC0)	MI Mode Sel	0: Low Active 1: High Active	0
	G0-01 (0xCC1)	MI Status	0: Inactive 1: Active	Read only
	G0-02 (0xCC2)	Virtual MI Function	0: Inactive 1: Active	0
	G0-03 (0xCC3)	Virtual MI Level Setting	0: Low 1: High	0
	G0-05 (0xCC5)	MI1 Function Sel	0040h: EX1/ EX2 Switch Src 0042h: EX1 S1 Src	0
	G0-07 (0xCC7)	MI2 Function Sel	0043h: EX1 S2 Src 0044h: EX1 S3 Src	0
	G0-09 (0xCC9)	MI3 Function Sel	0049h: EX2 S1 Src 004Ah: EX2 S2 Src	0
	G0-11 (0xCCB)	MI4 Function Sel	004Bh: EX2 S3 Src 0050h: Halt MI Src	0
	G0-13 (0xCCD)	MI5 Function Sel	0051h: Lock MI Src 0055h: Run Enable MI Src	0
	G0-15 (0xCCF)	MI6 Function Sel	0060h: External Fault MI Src 0081h: Quick Stop MI Src	0
			0083h: Emergency Stop MI Src 0102h: HAND MI Src 0103h: AUTO MI Src 0104h: HOA Lock MI Src 010Ah: LoRe Swich Src 010Bh: LOC Lock Mode 0408h: C0-08 Torque/Speed Switch 044Dh: FREQ Cmd Up Key MI Src 044Eh: FREQ Cmd Down Key MI Src 0453h: Multi Speed MI Src 1 0454h: Multi Speed MI Src 2 0455h: Multi Speed MI Src 3 0456h: Multi Speed MI Src 4 048Fh: Accel/Decel Switch MI Src 1 0490h: Accel/Decel Switch MI Src 2	

	Pr.	Parameter Name	Setting Range	Default
			04C3h: JOG MI Src 0F40h: Fault Reset MI Src 0F44h: Fault Restart MI Src 12C0h: Preheat MI Src 1302h: FireMode MI Src 1304h: FireMode Direction MI Src 1344h: Time Function 1 MI Src 1345h: Time Function 2 MI Src 1346h: Time Function 3 MI Src 1892h: P-PID1 Setpoint Freeze Src 1894h: P-PID1 Multi Setpoint Src 1 1895h: P-PID1 Multi Setpoint Src 2 18A1h: P-PID1 Output Freeze Src 18ACh: P-PID1 Track Enable Src	
	G0-06 (0xCC6)	MI1 Response Time	0.000–30.000 sec.	0.05
	G0-08 (0xCC8)	MI2 Response Time	0.000–30.000 sec.	0.05
	G0-10 (0xCCA)	MI3 Response Time	0.000–30.000 sec.	0.05
	G0-12 (0xCCC)	MI4 Response Time	0.000–30.000 sec.	0.05
	G0-14 (0xCCE)	MI5 Response Time	0.000–30.000 sec.	0.05
	G0-16 (0xCD0)	MI6 Response Time	0.000–30.000 sec.	0.05

G1 - MO setting

	Pr.	Parameter Name	Setting Range	Default
	G1-00 (0xD00)	MO Mode Sel	bit0: Relay1 bit1: Relay2 bit2–15: Reserved	0000 0000 0000 0000
	G1-01 (0xD01)	Virtual MO Function	bit0: Relay1 bit1: Relay2 bit2–15: Reserved	0000 0000 0000 0000
	G1-02 (0xD02)	Virtual MO Level Setting	bit0: Relay1 bit1: Relay2 bit2–15: Reserved	0000 0000 0000 0000
	G1-03 (0xD03)	MO Status	bit0: Relay1 bit1: Relay2 bit2–15: Reserved	Read only
	G1-04 (0xD04)	RY1 Function Sel	0057h: Run EnableEnabled Indn 0058h: OPER Cmd by Kpd Indn	164Eh

	Pr.	Parameter Name	Setting Range	Default
🗲	G1-06 (0xD06)	RY2 Function Sel	0059h: Forward Cmd Indn 005Ah: Reverse Cmd Indn	0F41h
			04C4h: JOG indn 0D01h: Virtual MO Function 0D7Eh: AI Level in Range Indn 0F41h: Fault Indn 0F42h: Warning Indn 0F4Fh: STO Output logic A 0F50h: STO Output logic B 0F51h: Fault Output Indn 1 0F52h: Fault Output Indn 2 0F53h: Fault Output Indn 3 0F54h: Fault Output Indn 4 0F85h: Lv Fault Indn 0FC9h: oc Stall Prev Indn 0FCFh: Low Current Indn 1042h: Drive oH warning Indn 1081h: ot Indn 1083h: Normal Speed ot Indn 10CAh: Motor Temp 1 OH Indn 10D6h: Motor Temp 2 OH Indn 10D8h: RH DO Select	
			1103h: L/F Overload Indn 1111h: L/F Underload Indn 11C0h: UVW MC Action Indn 1249h: dEb Output Indn 12C7: Preheat Indn 132Bh: FireMode Indn 1587h: Modbus MO Mask 15D2h: EtherNet MO Mask 1646h: Drive Ready Indn 1647h: Run Indn 1649h: Output Amp Exceed Indn 164Ah: Output Amp under Indn 164Ch: At Target Speed Indn 164Eh: Output FREQ Exceed Indn 164Fh: Output FREQ under Indn 1652h: At Output FREQ 1 Indn 1655h: At Output FREQ 2 Indn 1656h: 0 Hz Cmd Indn at Run 1657h: 0 Hz Cmd Indn 1659h: 0 Hz Output Indn at Run 165Ah: 0 Hz Output Indn 16C4h: Monitor 1 Trigger Indn 16CEh: Monitor 2 Trigger Indn 16D8h: Monitor 3 Trigger Indn 16E2h: Monitor 4 Trigger Indn	

	Pr.	Parameter Name	Setting Range	Default
			16ECh: Monitor 5 Trigger Indn 16F6h: Monitor 6 Trigger Indn 1700h: Monitor 7 Trigger Indn 170Ah: Monitor 8 Trigger Indn 18AFh: P-PID1 Fdk Error Indn	
	G1-05 (0xD05)	RY1 Response Time	0.000–30.000 sec.	1.050
	G1-07 (0xD07)	RY2 Response Time	0.000–30.000 sec.	1.050

G2 - AI setting

	Pr.	Parameter Name	Setting Range	Default
	G2-00 (0xD40)	Virtual AI Function	bit0: AI1 bit1: AI2 bit2–15: Reserved	0000 0000 0000 0000
	G2-02 (0xD42)	AI1 Function Sel	0441h: C1-01 EX1 Main FREQ Src 0442h: C1-02 EX1 Aux FREQ Src	0
	G2-21 (0xD55)	AI2 Function Sel	0445h: C1-05 EX2 Main FREQ Src 0446h: C1-06 EX2 Aux FREQ Src 0501h: C4-01 EX1 Main Torque Src 0502h: C4-02 EX1 Aux Torque Src 0504h: C4-04 EX2 Main Torque Src 0505h: C4-05 EX2 Aux Torque Src 0D7Bh: G2-59 AI Comparator Src 1303h: J5-03 FireMode FREQ Src 1882h: P0-02 P-PID Ref 1 Src 1883h: P0-03 P-PID Ref 2 Src 1884h: P0-04 P-PID Fdk 1 Src 1885h: P0-05 P-PID Fdk 2 Src 18ADh: P0-45 Tracking Reference Selection	0
	G2-03 (0xD43)	AI1 Signal Type	0: 0–10 V 1: 0–20 mA 2: 4–20 mA	2
	G2-04 (0xD44)	AI1 Filter Time	0.00–20.00 sec.	0.01
	G2-05 (0xD45)	AI1 Low Value	0–10 V: 0.00–10.00 V 0–20 mA: 0.00–20.00 mA 4–20 mA: 4.00–20.00 mA	0.00 0.00 4.00
	G2-06 (0xD46)	AI1 Low %	-100.00–100.00%	0.00

	Pr.	Parameter Name	Setting Range	Default
	G2-07 (0xD47)	AI1 Mid Value	0–10 V: 0.00–10.00 V 0–20 mA: 0.00–20.00 mA 4–20 mA: 4.00–20.00 mA	5.00 10.00 12.00
	G2-08 (0xD48)	AI1 Mid %	-100.00–100.00%	50.00
	G2-09 (0xD49)	AI1 High Value	0–10 V: 0.00–10.00 V 0–20 mA: 0.00–20.00 mA 4–20 mA: 4.00–20.00 mA	10.00 20.00 20.00
	G2-10 (0xD4A)	AI1 High %	-100.00–100.00%	100.00
	G2-11 (0xD4B)	AI1 Signal Loss Action	0–6 0: Disabled 1: Warn & Continue OPER 2: Fault & Ramp to Stop 3: Reserved 4: Fault & Coast to Stop 5: Fault & by Quick Stop Time 6: Warning & FREQ Lower Limit OPER	0
	G2-12 (0xD4C)	Virtual AI1 Input	0.00–100.00%	0.00
	G2-13 (0xD4D)	AI1 Display	-100.00–100.00%	Read only
	G2-22 (0xD56)	AI2 Signal Type	0: 0–10 V 1: 0–20 mA 2: 4–20 mA	2
	G2-23 (0xD57)	AI2 Filter Time	0.00–20.00 sec.	0.01
	G2-24 (0xD58)	AI2 Low Value	0–10 V: 0.00–10.00 V 0–20 mA: 0.00–20.00 mA 4–20 mA: 4.00–20.00 mA	0.00 0.00 4.00
	G2-25 (0xD59)	AI2 Low %	-100.00–100.00%	0.00
	G2-26 (0xD5A)	AI2 Mid Value	0–10 V: 0.00–10.00 V 0–20 mA: 0.00–20.00 mA 4–20 mA: 4.00–20.00 mA	5.00 10.00 12.00
	G2-27 (0xD5B)	AI2 Mid %	-100.00–100.00%	50.00
	G2-28 (0xD5C)	AI2 High Value	0–10 V: 0.00–10.00 V 0–20 mA: 0.00–20.00 mA 4–20 mA: 4.00–20.00 mA	10.00 20.00 20.00
	G2-29 (0xD5D)	AI2 High %	-100.00–100.00%	100.00

	Pr.	Parameter Name	Setting Range	Default
	G2-30 (0xD5E)	AI2 Signal Loss Action	0: Disabled 1: Warn & Continue OPER 2: Fault & Ramp to Stop 3: Reserved 4: Fault & Coast to Stop 5: Fault & by Quick Stop Time 6: Warning & FREQ Lower Limit OPER	0
	G2-31 (0xD5F)	Virtual AI2 Input	0.00–100.00%	0.00
	G2-32 (0xD60)	AI2 Display	-100.00–100.00%	Read only
	G2-59 (0xD7B)	AI Comparator Src	0–6: Reserve 7–8: AI1–AI2	0
	G2-60 (0xD7C)	AI Comparator High Level	-100.0–100.0%	50.0
	G2-61 (0xD7D)	AI Comparator Low Level	-100.0–100.0%	10.0
	G2-62 (0xD7E)	AI Level in Range Indn	0: Disabled 1–2: Relay 1–2	0

G3 - AO setting

	Pr.	Parameter Name	Setting Range	Default
	G3-00 (0xD80)	Virtual AO Function	bit0: AO1 bit1: AO2 bit2–15: Reserved **NOTICE:** Refer to Description Group G - IO Setting Pr.G3-01 and Pr.G3-15 for analog output scaling values.	0000 0000 0000 0000

<table>
<tr><th></th><th>Pr.</th><th>Parameter Name</th><th>Setting Range</th><th>Default</th></tr>
<tr><td></td><td>G3-01
(0xD81)</td><td>AO1 Function Sel</td><td rowspan="3">0D80h: G3-00 Virtual AO Function
10C2h: H6-02 Motor Temp 1 AO Sel
10CEh: H6-14 Motor Temp 2 AO Sel
1588h: n1-08 Modbus AO Mask
15D3h: n5-18 EtherNet AO Mask
165Bh: o0-27 FREQ Cmd AO Sel
165Ch: o0-28 FREQ Profile AO Sel
165Dh: o0-29 Motor RPM AO Sel
165Eh: o0-30 Input Current AO Sel
165Fh: o0-31 Output Current AO Sel
1660h: o0-32 Output Voltage AO Sel
1661h: o0-33 Torque Cmd AO Sel
1662h: o0-34 Output Torque AO Sel
1663h: o0-35 Output Power AO Sel
1664h: o0-36 Power Factor AO Sel</td><td>165Dh</td></tr>
<tr><td></td><td>G3-15
(0xD8F)</td><td>AO2 Function Sel</td><td>165Eh</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>G3-02
(0xD82)</td><td>AO1 Signal Type</td><td>0: 0–10 V
1: 0–20 mA
2: 4–20 mA</td><td>2</td></tr>
<tr><td></td><td>G3-03
(0xD83)</td><td>AO1 Filter Time</td><td>0.00–20.00 sec.</td><td>0.05</td></tr>
<tr><td></td><td>G3-04
(0xD84)</td><td>AO1 Bias</td><td>-100.00–100.00%</td><td>0.00</td></tr>
<tr><td></td><td>G3-05
(0xD85)</td><td>AO1 Gain</td><td>-500.0–500.0%</td><td>100.0</td></tr>
<tr><td></td><td>G3-06
(0xD86)</td><td>AO1 Output Method</td><td>0: Absolute Value
1: 0% Negative; 0–100% Positive
2: 0–50% Negative; 50–100% Positive</td><td>0</td></tr>
<tr><td></td><td>G3-07
(0xD87)</td><td>Virtual AO1 Output</td><td>0.00–100.00 PCT</td><td>0.00</td></tr>
<tr><td></td><td>G3-16
(0xD90)</td><td>AO2 Signal Type</td><td>0: 0–10 V
1: 0–20 mA
2: 4–20 mA</td><td>2</td></tr>
<tr><td></td><td>G3-17
(0xD91)</td><td>AO2 Filter Time</td><td>0.00–20.00 sec.</td><td>0.05</td></tr>
<tr><td></td><td>G3-18
(0xD92)</td><td>AO2 Bias</td><td>-100.00–100.00%</td><td>0.00</td></tr>
</table>

	Pr.	Parameter Name	Setting Range	Default
🗲	G3-19 (0xD93)	AO2 Gain	-500.0–500.0%	100.0
🗲	G3-20 (0xD94)	AO2 Output Method	0: Absolute Value 1: 0% Negative; 0–100% Positive 2: 0–50% Negative; 50–100% Positive	0
🗲	G3-21 (0xD95)	Virtual AO2 Output	0.00–100.00 PCT	0.00

11.1.8 Group H

H - Fault and protection

H0 - Fault handle

	Pr.	Parameter Name	Setting Range	Default
✓	H0-00 (0xF40)	Fault Reset MI Src	0: Disabled 1: EnableEnabled 2–7: MI1–MI6	6
✓	H0-01 (0xF41)	Fault Indn	0: Disabled 1–2: Relay1–2	2
✓	H0-02 (0xF42)	Warning Indn	0: Disabled 1–2: Relay1–2	0
	H0-03 (0xF43)	Fault Auto Reset Allowed Sel	bit 0: ocA/ocd/ocn bit 1: ovA/ovd/ovn/ovs bit 2: LvA/Lvd/Lvn bit 3: Occm/Ocm bit 4: oH1/oH2 bit 5: EF bit 6: EF1 bit 7: oL bit 8: FSF bit 9: oH3 bit 10: ot1/ot2 bit 11: uC bit 12: AI Loss bit 13: GFF bit 14: Lvac bit 15: PLL	1100 0000 0000 1001
	H0-04 (0xF44)	Fault Restart MI Src	0: Disabled 1: Enabled 2–7: MI1–MI6	1
	H0-05 (0xF45)	Auto Reset Config 2	bit0: POCF bit1: CSF bit2: SdRv	0000 0000 0000 0111
	H0-06 (0xF46)	Fault Restart No.	0–10 times	10
	H0-07 (0xF47)	Fault Restart No. Remain	0–10	Read only
✓	H0-08 (0xF48)	Fault Restart No. Reset Time	0.0–600.0 sec.	60.0

	Pr.	Parameter Name	Setting Range	Default
🗲	H0-09 (0xF49)	Fault Auto Reset Delay Time	1.0–600.0 sec.	1.0
🗲	H0-10 (0xF4A)	Fault Restart Delay Time	1.0–600.0 sec.	1.0
🗲	H0-14 (0xF4E)	STO Auto Reset	0: Disabled 1: Enabled	0
🗲	H0-15 (0xF4F)	STO Output Logic A	0: Disabled 1–2: Relay1–2	0
🗲	H0-16 (0xF50)	STO Output Logic B	0: Disabled 1–2: Relay1–2	0
🗲	H0-17 (0xF51)	Fault Option1 Mo Sel	0: Disabled 1–2: Relay1–2	0
🗲	H0-18 (0xF52)	Fault Option2 Mo Sel	0: Disabled 1–2: Relay1–2	0
🗲	H0-21 (0xF55)	Fault Option 1	0–65535	0
🗲	H0-22 (0xF56)	Fault Option 2	0–65535	0

H1 - Voltage protection

	Pr.	Parameter Name	Setting Range	Default
	H1-02 (0xF82)	Lv Fault Level	300.0–440.0 V_{DC}	300.0
🗲	H1-05 (0xF85)	Lv Fault Indn	0: Disabled 1–2: Relay1–2	0
	H1-06 (0xF86)	Restart after Power Loss	0: Disabled 1: Enabled	1
🗲	H1-07 (0xF87)	Power Loss Time Allowed	0.0–20.0 sec.	2.0
✻	H1-15 (0xF8F)	Low AC Voltage Level	0.0–414.0 V	368.0

H2 - Current protection

	Pr.	Parameter Name	Setting Range	Default
	H2-00 (0xFC0)	GFF Detect Level	0–200%	60
	H2-03 (0xFC3)	Stall Prev Function Sel	0: Basic OC Stall 1: Smart OC Stall	0
	H2-04 (0xFC4)	Output Current Limit	0–190% (100% corresponds to the drive's continuous current)	170
🗲	H2-05 (0xFC5)	ocA Stall Prev Level	0–190%	150

	Pr.	Parameter Name	Setting Range	Default
𝓝	H2-07 (0xFC7)	ocn Stall Prev Level	0–190%	150
𝓝	H2-08 (0xFC8)	ocn Stall Prev Decel Sel	0: Current Decel Time 1: Decel Time 1 2: Decel Time 2 3: Decel Time 3 4: Decel Time 4 5: By Quick Stop Time	5
	H2-09 (0xFC9)	oc Stall Prev Indn	0: Disabled 1–2: Relay1–2	0
𝓝	H2-10 (0xFCA)	Smart oc P Gain	0–65535	Depending on the model power
𝓝	H2-11 (0xFCB)	Smart oc I Gain	0.000–65.535	Depending on the model power
𝓝	H2-12 (0xFCC)	Low Current Detect Level	0.0–100.0%	0.0
𝓝	H2-13 (0xFCD)	Low Current Detect Time	0.00–360.00 sec.	0.00
𝓝	H2-14 (0xFCE)	Low Current Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Reserved 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	0
𝓝	H2-15 (0xFCF)	Low Current Indn	0: Disabled 1–2: Relay1–2	0

H3 - Reserve

H4 - Drive heat protection

	Pr.	Parameter Name	Setting Range	Default
𝓝	H4-00 (0x1040)	IGBT oH Warning Level	0–115°C	105
𝓝	H4-01 (0x1041)	Cap oH Warning Level	0–95°C	Depending on the models
𝓝	H4-02 (0x1042)	Drive oH Warning Indn	0: Disabled 1–2: Relay1–2	0
✻ 𝓝	H4-03 (0x1043)	Fan Control Sel	0: By fan duty command (Pr.H4-04) 1: By power converter ambient temperature	1
✻	H4-04 (0x1044)	Fan Speed Setting	0–100	0

H5 - Motor over torque protection

	Pr.	Parameter Name	Setting Range	Default
	H5-00 (0x1080)	ot Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Reserved 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	0
	H5-01 (0x1081)	ot Indn	0: Disabled 1–2: Relay1–2	0
	H5-02 (0x1082)	Normal Speed ot Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Reserved 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	0
	H5-03 (0x1083)	Normal Speed ot Indn	0: Disabled 1–2: Relay1–2	0
	H5-04 (0x1084)	ot Level	0–250% (100% = motor rated current)	0
	H5-05 (0x1085)	ot Detect Time	0.0–10.0 sec.	0.1
	H5-06 (0x1086)	N-Speed ot Level	0–250% (100% = motor rated current)	0
	H5-07 (0x1087)	N-Speed ot Detect Time	0.0–10.0 sec.	0.1

H6 - Motor heat protection

	Pr.	Parameter Name	Setting Range	Default
	H6-00 (0x10C0)	Motor Temp 1 (KTY84)	-40.0–300.0°C	Read only
	H6-02 (0x10C2)	Motor Temp 1 AO Sel	0: Disabled 1–2: AO1–AO2	0
	H6-04 (0x10C4)	Motor Temp 1 Warning Level	0.0–150.0°C (Motor Temp.1 over-heating detection level)	130.0
	H6-05 (0x10C5)	Motor Temp 1 Warning Delay Time	0.0–600.0 sec.	60.0
	H6-07 (0x10C7)	Motor Temp 1 OH Detect Level	0.0 (Motor Temp 1 Warning Level)–150.0°C	145.0
	H6-08 (0x10C8)	Motor Temp 1 OH Detect Time	0.0–600.0 sec.	3.0

	Pr.	Parameter Name	Setting Range	Default
	H6-09 (0x10C9)	Motor Temp 1 OH Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Reserved 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	3
↯	H6-10 (0x10CA)	Motor Temp 1 OH Indn	0: Disabled 1–2: Relay1–2	0
	H6-11 (0x10CB)	RTD Enable	0: Disabled 1: Enabled	0
	H6-12 (0x10CC)	Motor Temp 2 (RTD)	-40.0–300.0°C	Read only
↯	H6-14 (0x10CE)	Motor Temp 2 AO Sel	0: Disabled 1–2: AO1–AO2	0
↯	H6-16 (0x10D0)	Motor Temp 2 Warning Level	0.0–150.0°C	95.0
↯	H6-17 (0x10D1)	Motor Temp 2 Warning Delay Time	0.0–600.0 sec.	60.0
↯	H6-19 (0x10D3)	Motor Temp 2 OH Detect Level	0.0 (Motor Temp 2 Warning Lev-el)–110.0°C	110.0
↯	H6-20 (0x10D4)	Motor Temp 2 OH Detect Time	0.0–600.0 sec.	3.0
	H6-21 (0x10D5)	Motor Temp 2 OH Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Reserved 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	3
↯	H6-22 (0x10D6)	Motor Temp 2 OH Indn	0: Disabled 1–2: Relay1–2	0
↯	H6-24 (0x10D8)	RH DO Select	0: Disabled 1–2: Relay1–2	0
↯	H6-25 (0x10D9)	RH Warning Level	0.0-100.0%	90.0
↯	H6-26 (0x10DA)	RH Warning Delay	0.0-600.0 sec.	60.0
↯	H6-27 (0x10DB)	RH Det Level	0.0-100.0%	0
↯	H6-28 (0x10DC)	RH Det Time	0.0-600.0 sec.	3.0

H7 - Overload / underload handle

	Pr.	Parameter Name	Setting Range	Default
	H7-00 (0x1100)	Load Compare Src	0: Output Amp/ motor rated Amp 1: Output torque/ motor rated torque 2: Output power/ motor rated power 3: Output power/ driver rated power	0
	H7-01 (0x1101)	L/F Overload Curve Sel	0: Disabled 1: User Defined 2: 1.5th power curve 3: 2nd power curve 4: 3rd power curve	0
	H7-02 (0x1102)	L/F Overload Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Reserved 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	0
	H7-03 (0x1103)	L/F Overload Indn	0: Disabled 1–2: Relay1–2	0
	H7-04 (0x1104)	L/F Overload Detect Time	0.0–600.0 sec.	10.0
	H7-05 (0x1105)	Overload Speed Set 1	0.00–H7-06	75
	H7-06 (0x1106)	Overload Speed Set 2	H7-05–H7-07	75
	H7-07 (0x1107)	Overload Speed Set 3	H7-06–H7-08	75
	H7-08 (0x1108)	Overload Speed Set 4	H7-07–H7-09	75
	H7-09 (0x1109)	Overload Speed Set 5	H7-08–8985	75
	H7-10 (0x110A)	Overload L/F Load Set 1	0.0–200.0%	150.0
	H7-11 (0x110B)	Overload L/F Load Set 2	0.0–200.0%	150.0
	H7-12 (0x110C)	Overload L/F Load Set 3	0.0–200.0%	150.0
	H7-13 (0x110D)	Overload L/F Load Set 4	0.0–200.0%	150.0
	H7-14 (0x110E)	Overload L/F Load Set 5	0.0–200.0%	150.0

	Pr.	Parameter Name	Setting Range	Default
	H7-15 (0x110F)	L/F Underload Curve Sel	0: Disabled 1: User Defined 2: 1.5th power curve 3: 2nd power curve 4: 3rd power curve	0
	H7-16 (0x1110)	L/F Underload Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Reserved 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	0
	H7-17 (0x1111)	L/F Underload Indn	0: Disabled 1–2: Relay1–2	0
	H7-18 (0x1112)	L/F Underload Detect Time	0.0–600.0 sec.	10.0
	H7-19 (0x1113)	Underload L/F Speed Set 1	0.00–H7-20	75
	H7-20 (0x1114)	Underload L/F Speed Set 2	H7-19–H7-20	75
	H7-21 (0x1115)	Underload L/F Speed Set 3	H7-20–H7-22	75
	H7-22 (0x1116)	Underload L/F Speed Set 4	H7-21–H7-23	75
	H7-23 (0x1117)	Underload L/F Speed Set 5	H7-22–8985	75
	H7-24 (0x1118)	Underload L/F Load Set 1	0.0–200.0%	10.0
	H7-25 (0x1119)	Underload L/F Load Set 2	0.0–200.0%	15.0
	H7-26 (0x111A)	Underload L/F Load Set 3	0.0–200.0%	25.0
	H7-27 (0x111B)	Underload L/F Load Set 4	0.0–200.0%	30.0
	H7-28 (0x111C)	Underload L/F Load Set 5	0.0–200.0%	30.0

H8 - Speed Fdk protection

	Pr.	Parameter Name	Setting Range	Default
	H8-00 (0x1140)	Speed Deviation Detect Level	0–50%	50
	H8-01 (0x1141)	Speed Deviation Detect Time	0.0–10.0 sec.	0.5

	Pr.	Parameter Name	Setting Range	Default
	H8-02 (0x1142)	Speed Deviation Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Reserved 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	0
	H8-03 (0x1143)	Over Speed Detect Level	0–120%	115
	H8-04 (0x1144)	Over Speed Detect Time	0.0–10.0 sec.	0.5
	H8-05 (0x1145)	Over Speed Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Reserved 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	0
	H8-06 (0x1146)	Direction Error Detect Time	0.0–10.0 sec.	1.5
	H8-07 (0x1147)	Direction Error Action	0: Warning & Continue OPER 1: Fault & Ramp to Stop 2: Fault & Auto-Decel 3: Fault & Coast to Stop 4: Fault & by Quick Stop Time	3

11.1.9 Group J

J - Application function

J0 - Additional Function

	Pr.	Parameter Name	Setting Range	Default
	J0-00 (0x11C0)	UVW MC Action Indn	0: Disabled 1–2: Relay1–2	0
	J0-06 (0x11C6)	Over Flux Act Level	-40.0–100.0°C	10.0
	J0-07 (0x11C7)	Over Flux Dead Band	0.0–100.0°C	15.0
	J0-08 (0x11C8)	Over Flux Id Cmd	0–100%	50
	J0-09 (0x11C9)	Force Over Flux Sel	0: Disabled 1: Enabled	0

J2 - dEb function

	Pr.	Parameter Name	Setting Range	Default
	J2-00 (0x1240)	dEb Function Sel	0: Disabled 1: FOC Decel, stop after restore 2: FOC Decel, run after restore	0
	J2-01 (0x1241)	dEb Action Bias Level	0.0–200.0 V_{DC}	150.0
	J2-02 (0x1242)	dEb Reset Bias Level	0.0–200.0 V_{DC}	50.0
	J2-03 (0x1243)	dEb Function Reset Time	0.0–25.0 sec.	3.0
	J2-04 (0x1244)	dEb P Gain	0.00–655.35	0.50
	J2-05 (0x1245)	dEb I Gain	0.000–65.535	0.100
	J2-07 (0x1247)	FOC dEb Torque Feedforward	0–100%	80
	J2-08 (0x1248)	FOC dEb Coast Stop Speed	0–8985	450 rpm
	J2-09 (0x1249)	dEb Output Indn	0: Disabled 1–2: Relay1–2	0
	J2-10 (0x124A)	dEb Filter Bandwidth	0-4000 Hz	500

J4 - Preheat function

	Pr.	Parameter Name	Setting Range	Default
	J4-00 (0x12C0)	Preheat Enable	0: Disabled 1: Enabled 2–7: MI1–MI6	0
	J4-01 (0x12C1)	Preheat Delay Time	10–3000 sec.	600
	J4-02 (0x12C2)	Preheat Cmd Sel	0: Current 1: Motor temperature (KTY-84)	1
	J4-03 (0x12C3)	Preheat Current Cmd	0–100%	50
	J4-04 (0x12C4)	Preheat Motor Temp Cmd	0.0–40.0°C	25.0
	J4-06 (0x12C6)	Preheat Time	0–100%	70
	J4-07 (0x12C7)	Preheat Indn	0: Disabled 1–2: Relay1–2	0

J5 - Fire mode

	Pr.	Parameter Name	Setting Range	Default
	J5-00 (0x1300)	FireMode Status	bit 0: FireMode enabled 0 = FireMode is disabled 1 = FireMode is enabled bit 1: FireMode active 0 = FireMode is inactive 1 = FireMode is active bit 2: FireMode direction is forward 0 = FireMode direction is not forward 1 = FireMode direction is forward bit 3: FireMode direction is reverse 0 = FireMode direction is not reverse 1 = FireMode direction is reverse bit 4: FireMode stop mode is active 0 = FireMode stop mode is inactive 1 = FireMode stop mode is active bit 5: FireMode Pr lock status 0 = Unlock 1 = Lock	Read only

	Pr.	Parameter Name	Setting Range	Default
			bit 6: Run enableEnable 0 = Not allow to Run 1 = Allow to Run bit 7–15: Reserved	
	J5-01 (0x1301)	FireMode	0: Disabled 1: EnableEnabled, Limited OPER 2: EnableEnabled, Unlimited OP-ER	0
	J5-02 (0x1302)	FireMode MI Src	0: Disabled 1: Reserved 2–7: MI1–MI6	0
	J5-03 (0x1303)	FireMode FREQ Src	0: Disabled 1–6: Reserved 7–8: AI1–AI2 9–15: Reserved 16: Multi Speed 17: FireMode Speed Cmd 18: Up/Down Keys 19: STOP 20: PID	0
	J5-04 (0x1304)	FireMode Direction MI Src	0: FWD 1: REV 2–7: MI1–MI6	0
	J5-05 (0x1305)	FireMode Speed Cmd	0–8985	885
	J5-06 (0x1306)	FireMode Control bits	bit 0: RUN Enabled bit 1: Start Enabled bit 2: FireMode Lock bit 3–bit15: Reserve	0
	J5-07 (0x1307)	FireMode Fault Handle	0: Manual reset 1: Automatic reset	0
	J5-08 (0x1308)	FireMode Auto Reset Times	1–5	5
	J5-09 (0x1309)	FireMode Auto Reset De-lay	5.0–120.0 sec.	5.0
	J5-10 (0x130A)	FireMode Log 1 Start Date	0–31129999	Read only
	J5-11 (0x130C)	FireMode Log 1 Start Time	0–245959	Read only
	J5-12 (0x130E)	FireMode Log 1 End Date	0–31129999	Read only

	Pr.	Parameter Name	Setting Range	Default
	J5-13 (0x1310)	FireMode Log 1 End Time	0–245959	Read only
	J5-14 (0x1312)	FireMode Log 1 Fault Code	0–65535	Read only
	J5-15 (0x1313)	FireMode Log 1 Warning Code	0–65535	Read only
	J5-16 (0x1314)	FireMode Log 1 Warranty Fault	0–65535	Read only
	J5-17 (0x1315)	FireMode Log 2 Start Date	0–31129999	Read only
	J5-18 (0x1317)	FireMode Log 2 Start Time	0–245959	Read only
	J5-19 (0x1319)	FireMode Log 2 End Date	0–31129999	Read only
	J5-20 (0x131B)	FireMode Log 2 End Time	0–245959	Read only
	J5-21 (0x131D)	FireMode Log 2 Fault Code	0–65535	Read only
	J5-22 (0x131E)	FireMode Log 2 Warning Code	0–65535	Read only
	J5-23 (0x131F)	FireMode Log 2 Warranty Fault	0–65535	Read only
	J5-24 (0x1320)	FireMode Log 3 Start Date	0–31129999	Read only
	J5-25 (0x1322)	FireMode Log 3 Start Time	0–245959	Read only
	J5-26 (0x1324)	FireMode Log 3 End Date	0–31129999	Read only
	J5-27 (0x1326)	FireMode Log 3 End Time	0–245959	Read only
	J5-28 (0x1328)	FireMode Log 3 Fault Code	0–65535	Read only
	J5-29 (0x1329)	FireMode Log 3 Warning Code	0–65535	Read only
	J5-30 (0x132A)	FireMode Log 3 Warranty Fault	0–65535	Read only
	J5-31 (0x132B)	FireMode Indn	0: Disabled 1–2: Relay1–2	0

J6 - Time function

	Pr.	Parameter Name	Setting Range	Default
	J6-00 (0x1340)	Low Battery Action	0: No Detection 1: Warning Once 2: Warning per hour 3: Warning per day	1
	J6-01 (0x1341)	Time Function1	0–1023	0
	J6-02 (0x1342)	Time Function2	0–1023	0
	J6-03 (0x1343)	Time Function3	0–1023	0
	J6-04 (0x1344)	Time Function 1 Select	0: Disabled 1: Enabled 2–7: MI1–MI6	0
	J6-05 (0x1345)	Time Function 2 Select	0: Disabled 1: Enabled 2–7: MI1–MI6	0
	J6-06 (0x1346)	Time Function 3 Select	0: Disabled 1: Enabled 2–7: MI1–MI6	0
	J6-07 (0x1347)	Timer 1 Configuration	bit0: Monday bit1: Tuesday bit2: Wednesday bit3: Thursday bit4: Friday bit5: Saturday bit6: Sunday bit7: Activation 1 bit8: Activation 2 bit9: Activation 3 bit10: Activation 4 bit11: Exception bit12: Holiday bit13: Workday	0
	J6-10 (0x134B)	Timer 2 Configuration		0
	J6-13 (0x134F)	Timer 3 Configuration		0
	J6-16 (0x1353)	Timer 4 Configuration		0
	J6-19 (0x1357)	Timer 5 Configuration		0
	J6-22 (0x135B)	Timer 6 Configuration		0
	J6-25 (0x135F)	Timer 7 Configuration		0
	J6-28 (0x1363)	Timer 8 Configuration		0
	J6-31 (0x1367)	Timer 9 Configuration		0
	J6-34 (0x136B)	Timer 10 Configuration		0

	Pr.	Parameter Name	Setting Range	Default
	J6-08 (0x1348)	Timer 1 Start Time	00:00–23:59	00:00
	J6-09 (0x1349)	Timer 1 Duration	00:00:00–07:00:00	00:00:00
	J6-11 (0x134C)	Timer 2 Start Time	00:00–23:59	00:00
	J6-12 (0x134D)	Timer 2 Duration	00:00:00–07:00:00	00:00:00
	J6-14 (0x1350)	Timer 3 Start Time	00:00–23:59	00:00
	J6-15 (0x1351)	Timer 3 Duration	00:00:00–07:00:00	00:00:00
	J6-17 (0x1354)	Timer 4 Start Time	00:00–23:59	00:00
	J6-18 (0x1355)	Timer 4 Duration	00:00:00–07:00:00	00:00:00
	J6-20 (0x1358)	Timer 5 Start Time	00:00–23:59	00:00
	J6-21 (0x1359)	Timer 5 Duration	00:00:00–07:00:00	00:00:00
	J6-23 (0x135C)	Timer 6 Start Time	00:00–23:59	00:00
	J6-24 (0x135D)	Timer 6 Duration	00:00:00–07:00:00	00:00:00
	J6-26 (0x1360)	Timer 7 Start Time	00:00–23:59	00:00
	J6-27 (0x1361)	Timer 7 Duration	00:00:00–07:00:00	00:00:00
	J6-29 (0x1364)	Timer 8 Start Time	00:00–23:59	00:00
	J6-30 (0x1365)	Timer 8 Duration	00:00:00–07:00:00	00:00:00
	J6-32 (0x1368)	Timer 9 Start Time	00:00–23:59	00:00
	J6-33 (0x1369)	Timer 9 Duration	00:00:00–07:00:00	00:00:00
	J6-35 (0x136C)	Timer 10 Start Time	00:00–23:59	00:00
	J6-36 (0x136D)	Timer 10 Duration	00:00:00–07:00:00	00:00:00
	J6-37 (0x136F)	Activation 1 Start Date	01:01–31:12	01:01

	Pr.	Parameter Name	Setting Range	Default
	J6-38 (0x1370)	Activation 1 End Date	01:01–31:12	01:01
	J6-39 (0x1371)	Activation 2 Start Date	01:01–31:12	01:01
	J6-40 (0x1372)	Activation 2 End Date	01:01–31:12	01:01
	J6-41 (0x1373)	Activation 3 Start Date	01:01–31:12	01:01
	J6-42 (0x1374)	Activation 3 End Date	01:01–31:12	01:01
	J6-43 (0x1375)	Activation 4 Start Date	01:01–31:12	01:01
	J6-44 (0x1376)	Activation 4 End Date	01:01–31:12	01:01
	J6-45 (0x1377)	Exception Enable Number	0–12	3
	J6-46 (0x1378)	Exception Type	bit0: Exception 1 bit1: Exception 2 bit2: Exception 3 bit3: Exception 4 bit4: Exception 5 bit5: Exception 6 bit6: Exception 7 bit7: Exception 8 bit8: Exception 9 bit9: Exception 10 bit10: Exception 11 bit11: Exception 12	0
	J6-47 (0x1379)	Exception 1 Start Date	01:01–31:12	01:01
	J6-48 (0x137A)	Exception 1 Duration Days	0–60 day	0
	J6-49 (0x137B)	Exception 2 Start Date	01:01–31:12	01:01
	J6-50 (0x137C)	Exception 2 Duration Days	0–60 day	0
	J6-51 (0x137D)	Exception 3 Start Date	01:01–31:12	01:01
	J6-52 (0x137E)	Exception 3 Duration Days	0–60 day	0
	J6-53 (0x137F)	Exception 4 Start Date	01:01–31:12	01:01

	Pr.	Parameter Name	Setting Range	Default
	J6-54 (0x1380)	Exception 5 Start Date	01:01–31:12	01:01
	J6-55 (0x1381)	Exception 6 Start Date	01:01–31:12	01:01
	J6-56 (0x1382)	Exception 7 Start Date	01:01–31:12	01:01
	J6-57 (0x1383)	Exception 8 Start Date	01:01–31:12	01:01
	J6-58 (0x1384)	Exception 9 Start Date	01:01–31:12	01:01
	J6-59 (0x1385)	Exception 10 Start Date	01:01–31:12	01:01
	J6-60 (0x1386)	Exception 11 Start Date	01:01–31:12	01:01
	J6-61 (0x1387)	Exception 12 Start Date	01:01–31:12	01:01

11.1.10 Group N

Group N - communication

N1 - Modbus

	Pr.	Parameter Name	Setting Range	Default
	n1-00 (0x1580)	Modbus Decoding Meth-od	0: VIDAR Defined 2K 1: VIDAR Defined 6K	0
	n1-01 (0x1581)	Modbus Address	1–254	1
	n1-02 (0x1582)	Modbus COM Baud Rate	0: 4.8 Kbps 1: 9.6 Kbps 2: 19.2 Kbps 3: 38.4 Kbps 4: 57.6 Kbps 5: 76.8 Kbps 6: 115.2 Kbps	Read only
	n1-03 (0x1583)	Modbus Package Format	0: 7, N, 2 (ASCII) 1: 7, E, 1 (ASCII) 2: 7, O, 1 (ASCII) 3: 7, E, 2 (ASCII) 4: 7, O, 2 (ASCII) 5: 8, N, 1 (ASCII) 6: 8, N, 2 (ASCII) 7: 8, E, 1 (ASCII) 8: 8, O, 1 (ASCII) 9: 8, E, 2 (ASCII) 10: 8, O, 2 (ASCII) 11: 8, N, 1 (RTU) 12: 8, N, 2 (RTU) 13: 8, E, 1 (RTU) 14: 8, O, 1 (RTU) 15: 8, E, 2 (RTU) 16: 8, O, 2 (RTU)	Read only
	n1-04 (0x1584)	Modbus Timeout Check Time	0.0–100.0 sec.	0.0
	n1-05 (0x1585)	Modbus Timeout Disposal	0: Continue OPER 1: Warning & continue OPER 2: Fault & ramp to stop 3: Fault & coast to stop	0
	n1-06 (0x1586)	Modbus Response Delay Time	0.0–200.0 ms	2.0

	Pr.	Parameter Name	Setting Range	Default
	n1-07 (0x1587)	Modbus MO Mask	0: Disabled 1: Enabled bit0–1: Relay1–2 bit2–14: Reserve	0
	n1-08 (0x1588)	Modbus AO Mask	0: Disabled 1: Enabled bit0–1: AO1–2 bit2–10: Reserve	0

N5 - EtherNET

	Pr.	Parameter Name	Setting Range	Default
	n5-00 (0x15C0)	EtherNET Decoding Method	0: VIDAR Defined 2K 1: VIDAR Defined 6K	0
	n5-01 (0x15C1)	EtherNET IP Configuration	0: Static IP 1: DHCP 2: BOOTP	0
	n5-02 (0x15C2)	EtherNET IP Address 1	0–223	1
	n5-03 (0x15C3)	EtherNET IP Address 2	0–255	0
	n5-04 (0x15C4)	EtherNET IP Address 3	0–255	0
	n5-05 (0x15C5)	EtherNET IP Address 4	0–255	0
	n5-06 (0x15C6)	EtherNET Mask Address 1	0–255	0
	n5-07 (0x15C7)	EtherNET Mask Address 2	0–255	0
	n5-08 (0x15C8)	EtherNET Mask Address 3	0–255	0
	n5-09 (0x15C9)	EtherNET Mask Address 4	0–255	0
	n5-10 (0x15CA)	EtherNET Gateway Address 1	0–223	1
	n5-11 (0x15CB)	EtherNET Gateway Address 2	0–255	0
	n5-12 (0x15CC)	EtherNET Gateway Address 3	0–255	0
	n5-13 (0x15CD)	EtherNET Gateway Address 4	0–255	0
	n5-14 (0x15CE)	EtherNET Password	0–4294967295	0

	Pr.	Parameter Name	Setting Range	Default
	n5-15 (0x15D0)	EtherNET Reset	0: Disabled 1: Reset	0
	n5-16 (0x15D1)	EtherNET Control Word	bit0: Enable IP filter bit1: Enable Internet parameters bit2: Enable Login Password	0
	n5-17 (0x15D2)	EtherNET MO Mask	0: Disabled 1: Enabled bit0–1: Relay1–2 bit2–3: MO1–MO2 bit4–8: Reserve bit9–14: MO10–MO15	0
	n5-18 (0x15D3)	EtherNET AO Mask	0: Disabled 1: Enabled bit0–1: AO1–2	0
	n5-19 (0x15D4)	EtherNET Status	bit0: Enable IP filter bit1: Enable internet parameters bit2: Enable login password	Read only

11.1.11 Group O

Monitor and recorder

o0 - Status monitor

	Pr.	Parameter Name	Setting Range	Default
	o0-00 (0x1640)	Status Display 1	0: Display motor current (unit: Amp) 1: Display counter value (Unit: CNT) 2: Display the motor's actual output frequency (Unit: Hz) 3: Display the clamp bus voltage (Unit: V_{DC}) 4: Display the drive output voltage (Unit: V_{AC}) 5: Display the drive output power angle (Unit: deg) 6: Display the drive output power (Unit: kW)7: Display the motor speed rpm (r) (Unit: rpm)8: Display the drive estimated output torque, motor's rated torque is 100% (Unit: %) 9: Display the clamp bus Analog to digital (AD) value (unit AD) (Unit: AD) 11: Display AI1 analog input terminal signal (Unit: %)12: Display AI2 analog input terminal signal (Unit: %)16: The digital input status (ON / OFF)17: The digital output status (ON / OFF)18: Display multi-step speed 19: The corresponding ACB digital input pin status20: The corresponding ACB digital output pin status 21: Display the drives's MAX IGBT temperature (Unit: °C) 22: Display the drives's MAX capacitance temperature (Unit: °C)23: Display the control MCU ambient temperature (Unit: °C)24: Display the PCB3 ambient temperature (Unit: °C)25: Display the control board ambient temperature (Unit: °C)34: Operation speed of fan (Unit: %)36: Present operating carrier frequency of the drive (Unit: Hz)38: drive status	0
	o0-01 (0x1641)	Status Display 2		0
	o0-02 (0x1642)	Status Display 3		0

	Pr.	Parameter Name	Setting Range	Default
			39: Display the drive estimated output torque (Unit: Nt-m) 41: kWh (Unit: kWh)42: PID reference (Unit: %)43: PID feedback (Unit: %)44: PID output speed command (Unit: Hz)46: KTY84 (Unit: °C)48: RTD (Unit: °C) 52: Input voltage frequency (Unit: Hz) 53: ACB Relative Humidity (Unit: %) 54: ACB T Temperature (Unit: °C) 55: Display the VIDAR output power (Unit: HP) 56: Over Load (Unit: %) 57: Output Load % (Unit: %) 58: Display input current (unit: Amp)	
⚡ ✻	o0-03 (0x1643)	Current Display Filter Time	0.001–65.535 sec.	0.100
⚡	o0-04 (0x1644)	Clamp bus Voltage Display Filter Time	0.001–65.535 sec.	0.050
⚡	o0-05 (0x1645)	Status Display Filter Time	0.001–65.535 sec.	0.100
⚡	o0-06 (0x1646)	Drive Ready Indn	0: Disabled 1–2: Relay1–2	0
⚡	o0-07 (0x1647)	Run Indn	0: Disabled 1–2: Relay1–2	0
⚡	o0-08 (0x1648)	Output Amp Detection Level	0.0–200.0%	0.0
⚡	o0-09 (0x1649)	Output Amp Exceed Indn	0: Disabled 1–2: Relay1–2	0
⚡	o0-10 (0x164A)	Output Amp under Indn	0: Disabled 1–2: Relay1–2	0
⚡	o0-11 (0x164B)	Target Speed Width	0.1–5.0%	0.3
⚡	o0-12 (0x164C)	At Target Speed Indn	0: Disabled 1–2: Relay1–2	0
⚡	o0-13 (0x164D)	Speed Detection Level	0–8985	5
⚡	o0-14 (0x164E)	Speed Exceed Indn	0: Disabled 1–2: Relay1–2	1

	Pr.	Parameter Name	Setting Range	Default
	o0-15 (0x164F)	Speed under Indn	0: Disabled 1–2: Relay1–2	0
	o0-16 (0x1650)	Speed Reached Level 1	0–8985	885
	o0-17 (0x1651)	Speed Reached Range 1	0–8985	30
	o0-18 (0x1652)	Speed Reached 1 Indn	0: Disabled 1–2: Relay1–2	0
	o0-19 (0x1653)	Speed Reached Level 2	0–8985	750
	o0-20 (0x1654)	Speed Reached Range 2	0–8985	30
	o0-21 (0x1655)	Speed Reached 2 Indn	0: Disabled 1–2: Relay1–2	0
	o0-22 (0x1656)	Zero Speed (Speed Cmd)	0: Disabled 1–2: Relay1–2	0
	o0-23 (0x1657)	Zero Speed including STOP (Speed Cmd)	0: Disabled 1–2: Relay1–2	0
	o0-24 (0x1658)	Zero Speed Status	0.1–5.0%	0.1
	o0-25 (0x1659)	Zero Speed (Motor Speed)	0: Disabled 1–2: Relay1–2	0
	o0-26 (0x165A)	Zero Speed including STOP (Motor Speed)	0: Disabled 1–2: Relay1–2	1
	o0-27 (0x165B)	Speed Cmd AO Sel	0: Disabled 1–2: AO1–AO2	0
	o0-28 (0x165C)	Speed Profile AO Sel	0: Disabled 1–2: AO1–AO2	0
	o0-29 (0x165D)	Motor RPM AO Sel	0: Disabled 1–2: AO1–AO2	0
	o0-30 (0x165E)	Motor Input Current (A) AO Sel	0: Disabled 1–2: AO1–AO2	2
	o0-31 (0x165F)	Motor Current (A) AO Sel	0: Disabled 1–2: AO1–AO2	0
	o0-32 (0x1660)	Output Voltage (V) AO Sel	0: Disabled 1–2: AO1–AO2	0
	o0-34 (0x1662)	Output Torque AO Sel	0: Disabled 1–2: AO1–AO2	0
	o0-35 (0x1663)	Output Power AO Sel	0: Disabled 1–2: AO1–AO2	0
	o0-36 (0x1664)	Power Factor AO Sel	0: Disabled 1–2: AO1–AO2	0

	Pr.	Parameter Name	Setting Range	Default
	o0-37 (0x1665)	Recent 1Hr OPER kW-hour	0.0–6553.5 kW-hour	Read only
	o0-38 (0x1666)	Cumulative OPER kW-hour	0.0–999.9 kW-hour	Read only
	o0-39 (0x1667)	Cumulative OPER MW-hour	0–999 MW-hour	Read only
	o0-40 (0x1668)	Cumulative OPER GW-hour	0–999 GW-hour	Read only
	o0-41 (0x1669)	Cumulative OPER Minutes	0–60 min	0
	o0-42 (0x166A)	Cumulative OPER Hours	0–24 hr	0
	o0-43 (0x166B)	Cumulative OPER Days	0–65535 day	0
	o0-44 (0x166C)	Drive Output Efficiency	0.0–99.9%	Read only
	o0-45 (0x166D)	Drive Output PF Angle	-90.0–90.0 deg	Read only
	o0-46 (0x166E)	Drive Output Apparent Power	0.0–6553.5 kVA	Read only
	o0-47 (0x166F)	Drive Output Active Power	0.0–6553.5 kW	Read only
	o0-48 (0x1670)	Drive Output Reactive Power	0.0–6553.5 kVar	Read only

O1 - Signal and recorder function

	Pr.	Parameter Name	Setting Range	Default
	o1-00 (0x1680)	Signal Sampling Rate	0: 1 kHz 1: 2 kHz 2: 5 kHz 3: 10 kHz	0
	o1-01 (0x1681)	Channel 1 Signal Sel	0: Signal Address 1–150 (Number of Signal List)	0
	o1-02 (0x1682)	Channel 1 Signal Address	0–0xFFFFFFFF	0

	Pr.	Parameter Name	Setting Range	Default
	o1-03 (0x1683)	Channel 1 Data Type	0: UBYTE 1: SBYTE 2: UWORD 3: SWORD 4: ULONG 5: SLONG 6: FLOAT	0
	o1-04 (0x1684)	Channel 1 Filter Time	0.0–6553.5 ms	0.0
	o1-05 (0x1685)	Channel 2 Signal Sel	0–150	0
	o1-06 (0x1686)	Channel 2 Signal Address	0–0xFFFFFFFF	0
	o1-07 (0x1687)	Channel 2 Data Type	0–6	0
	o1-08 (0x1688)	Channel 2 Filter Time	0.0–6553.5 ms	0.0
	o1-09 (0x1689)	Channel 3 Signal Sel	0–150	0
	o1-10 (0x168A)	Channel 3 Signal Address	0–0xFFFFFFFF	0
	o1-11 (0x168B)	Channel 3 Data Type	0–6	0
	o1-12 (0x168C)	Channel 3 Filter Time	0.0–6553.5 ms	0.0
	o1-13 (0x168D)	Channel 4 Signal Sel	0–150	0
	o1-14 (0x168E)	Channel 4 Signal Address	0–0xFFFFFFFF	0
	o1-15 (0x168F)	Channel 4 Data Type	0–6	0
	o1-16 (0x1691)	Channel 4 Filter Time	0.0–6553.5 ms	0.0
	o1-17 (0x1692)	Channel 5 Signal Sel	0–150	0
	o1-18 (0x1693)	Channel 5 Signal Address	0–0xFFFFFFFF	0
	o1-19 (0x1694)	Channel 5 Data Type	0–6	0
	o1-20 (0x1696)	Channel 5 Filter Time	0.0–6553.5 ms	0.0

	Pr.	Parameter Name	Setting Range	Default
	o1-21 (0x1697)	Channel 6 Signal Sel	0–150	0
	o1-22 (0x1698)	Channel 6 Signal Address	0–0xFFFFFFFF	0
	o1-23 (0x1699)	Channel 6 Data Type	0–6	0
	o1-24 (0x169B)	Channel 6 Filter Time	0.0–6553.5 ms	0.0
	o1-25 (0x169C)	Channel 7 Signal Sel	0–150	0
	o1-26 (0x169D)	Channel 7 Signal Address	0–0xFFFFFFFF	0
	o1-27 (0x169E)	Channel 7 Data Type	0–6	0
	o1-28 (0x16A0)	Channel 7 Filter Time	0.0–6553.5 ms	0.0
	o1-29 (0x16A1)	Channel 8 Signal Sel	0–150	0
	o1-30 (0x16A2)	Channel 8 Signal Address	0–0xFFFFFFFF	0
	o1-31 (0x16A3)	Channel 8 Data Type	0–6	0
	o1-32 (0x16A5)	Channel 8 Filter Time	0.0–6553.5 ms	0.0
	o1-33 (0x16A6)	Recorder Function	0: Disabled 1: One-Time Record 2: Continuously Record	0
	o1-34 (0x16A7)	Recorder Trigger Method	0: Src A 1: Src A Reverse 2: Src A and Src B 3: Src A or Src B 4: Src A xor Src B	0
	o1-35 (0x16A8)	Recorder Trigger Src A	1–8 Monitor No.	1
	o1-36 (0x16AA)	Recorder Trigger Src B	1–8 Monitor No.	1
	o1-37 (0x16AB)	Recorder Time Setting	20–600 sec.	20
	o1-38 (0x16AC)	Recorder 1 Channel Src	0–8 Channel No.	1
	o1-39 (0x16AD)	Recorder 2 Channel Src	0–8 Channel No.	2

	Pr.	Parameter Name	Setting Range	Default
	o1-40 (0x16AF)	Recorder 3 Channel Src	0–8 Channel No.	3
	o1-41 (0x16B0)	Recorder 4 Channel Src	0–8 Channel No.	4
	o1-42 (0x16B1)	Recorder 5 Channel Src	0–8 Channel No.	5
	o1-43 (0x16B2)	Recorder 6 Channel Src	0–8 Channel No.	6
	o1-44 (0x16B4)	Recorder 7 Channel Src	0–8 Channel No.	7
	o1-45 (0x16B5)	Recorder 8 Channel Src	0–8 Channel No.	8

O2 - Monitor function

	Pr.	Parameter Name	Setting Range	Default
	o2-00 (0x16C0)	Monitor Trigger Status	0–0x00FF	Read only
	o2-01 (0x16C1)	Monitor 1 Channel Src	1–8 Channel No.	1
	o2-02 (0x16C2)	Monitor 1 Trigger Method	0: Disabled 1: Low 2: High 3: Abs Low 4: Abs High 5: Low & High 6: Abs Low & Abs High 7: Hysteresis	0
	o2-03 (0x16C3)	Monitor 1 Trigger Action	0: Disabled 1: Warning 2: Error and Ramp Stop 3: Error and Coast Stop	0
	o2-04 (0x16C4)	Monitor 1 Trigger Indn	0: Disabled 1–2: Relay1–2	0
	o2-05 (0x16C5)	Monitor 1 Upper Limit	-21474836.00–21474836.00	0.00
	o2-06 (0x16C7)	Monitor 1 Lower Limit	-21474836.00–21474836.00	0.00
	o2-07 (0x16C9)	Monitor 1 Hysteresis	0.00–100000.00	0.00
	o2-08 (0x16CB)	Monitor 2 Channel Src	1–8 Channel No.	2
	o2-09 (0x16CC)	Monitor 2 Trigger Method	0–7	0

	Pr.	Parameter Name	Setting Range	Default
	o2-10 (0x16CD)	Monitor 2 Trigger Action	0–3	0
	o2-11 (0x16CE)	Monitor 2 Trigger Indn	0: Disabled 1–2: Relay1–2	0
	o2-12 (0x16CF)	Monitor 2 Upper Limit	-21474836.00–21474836.00	0.00
	o2-13 (0x16D1)	Monitor 2 Lower Limit	-21474836.00–21474836.00	0.00
	o2-14 (0x16D3)	Monitor 2 Hystersis	0.00–100000.00	0.00
	o2-15 (0x16D5)	Monitor 3 Channel Src	1–8 Channel No.	3
	o2-16 (0x16D6)	Monitor 3 Trigger Method	0–7	0
	o2-17 (0x16D7)	Monitor 3 Trigger Action	0–3	0
	o2-18 (0x16D8)	Monitor 3 Trigger Indn	0: Disabled 1–2: Relay1–2	0
	o2-19 (0x16D9)	Monitor 3 Upper Limit	-21474836.00–21474836.00	0.00
	o2-20 (0x16DB)	Monitor 3 Lower Limit	-21474836.00–21474836.00	0.00
	o2-21 (0x16DD)	Monitor 3 Hystersis	0.00–100000.00	0.00
	o2-22 (0x16DF)	Monitor 4 Channel Src	1–8 Channel No.	4
	o2-23 (0x16E0)	Monitor 4 Trigger Method	0–7	0
	o2-24 (0x16E1)	Monitor 4 Trigger Action	0–3	0
	o2-25 (0x16E2)	Monitor 4 Trigger Indn	0: Disabled 1–2: Relay1–2	0
	o2-26 (0x16E3)	Monitor 4 Upper Limit	-21474836.00–21474836.00	0.00
	o2-27 (0x16E5)	Monitor 4 Lower Limit	-21474836.00–21474836.00	0.00
	o2-28 (0x16E7)	Monitor 4 Hystersis	0.00–100000.00	0.00
	o2-29 (0x16E9)	Monitor 5 Channel Src	1–8 Channel No.	5
	o2-30 (0x16EA)	Monitor 5 Trigger Method	0–7	0

	Pr.	Parameter Name	Setting Range	Default
	o2-31 (0x16EB)	Monitor 5 Trigger Action	0–3	0
	o2-32 (0x16EC)	Monitor 5 Trigger Indn	0: Disabled 1–2: Relay1–2	0
	o2-33 (0x16ED)	Monitor 5 Upper Limit	-21474836.00–21474836.00	0.00
	o2-34 (0x16EF)	Monitor 5 Lower Limit	-21474836.00–21474836.00	0.00
	o2-35 (0x16F1)	Monitor 5 Hystersis	0.00–100000.00	0.00
	o2-36 (0x16F3)	Monitor 6 Channel Src	1–8 Channel No.	6
	o2-37 (0x16F4)	Monitor 6 Trigger Method	0–7	0
	o2-38 (0x16F5)	Monitor 6 Trigger Action	0–3	0
	o2-39 (0x16F6)	Monitor 6 Trigger Indn	0: Disabled 1–2: Relay1–2	0
	o2-40 (0x16F7)	Monitor 6 Upper Limit	-21474836.00–21474836.00	0.00
	o2-41 (0x16F9)	Monitor 6 Lower Limit	-21474836.00–21474836.00	0.00
	o2-42 (0x16FB)	Monitor 6 Hystersis	0.00–100000.00	0.00
	o2-43 (0x16FD)	Monitor 7 Channel Src	1–8 Channel No.	7
	o2-44 (0x16FE)	Monitor 7 Trigger Method	0–7	0
	o2-45 (0x16FF)	Monitor 7 Trigger Action	0–3	0
	o2-46 (0x1700)	Monitor 7 Trigger Indn	0: Disabled 1–2: Relay1–2	0
	o2-47 (0x1701)	Monitor 7 Upper Limit	-21474836.00–21474836.00	0.00
	o2-48 (0x1703)	Monitor 7 Lower Limit	-21474836.00–21474836.00	0.00
	o2-49 (0x1705)	Monitor 7 Hystersis	0.00–100000.00	0.00
	o2-50 (0x1707)	Monitor 8 Channel Src	1–8 Channel No.	8
	o2-51 (0x1708)	Monitor 8 Trigger Method	0–7	0

	Pr.	Parameter Name	Setting Range	Default
	o2-52 (0x1709)	Monitor 8 Trigger Action	0–3	0
	o2-53 (0x170A)	Monitor 8 Trigger Indn	0: Disabled 1–2: Relay1–2	0
	o2-54 (0x170B)	Monitor 8 Upper Limit	-21474836.00–21474836.00	0.00
	o2-55 (0x170D)	Monitor 8 Lower Limit	-21474836.00–21474836.00	0.00
	o2-56 (0x170F)	Monitor 8 Hystersis	0.00–100000.00	0.00

O4 - Fault record 1-2

	Pr.	Parameter Name	Setting Range	Default
	o4-00 (0x1780)	Fault Code REC 1	0–65535	Read only
	o4-01 (0x1781)	OPER Time at Fault REC 1	0–2359 hr/min	Read only
	o4-02 (0x1782)	OPER Days at Fault REC 1	0–65535 day	Read only
	o4-03 (0x1783)	Date of Fault REC 1	0–1231 month/day	Read only
	o4-04 (0x1784)	Time of Fault REC 1	0–2359 hr/min	Read only
	o4-05 (0x1785)	SPD Cmd at Fault REC 1	0.00–8985	Read only
	o4-06 (0x1786)	Motor Speed at Fault REC 1	0–8985	Read only
	o4-07 (0x1787)	Motor Current at Fault REC 1	0.0–6553.5 A	Read only
	o4-08 (0x1788)	Output Voltage at Fault REC 1	0.0–6553.5 V_{AC}	Read only
	o4-09 (0x1789)	Clamp bus voltage at Fault REC 1	0.0–6553.5 V_{DC}	Read only
	o4-10 (0x178A)	IGBT Temp at Fault REC 1	-3276.8–3276.7°C	Read only
	o4-11 (0x178B)	Cap Temp at Fault REC 1	-3276.8–3276.7°C	Read only
	o4-12 (0x178C)	Fan Speed at Fault REC 1	0–65535%	Read only
	o4-13 (0x178D)	Input Voltage at Fault REC 1	0.0–6553.5 V_{AC}	Read only

	Pr.	Parameter Name	Setting Range	Default
	o4-14 (0x178e)	PCB3 at Fault REC 1	-327.68–327.67°C	Read only
	o4-15 (0x178F)	Output Torque at Fault REC 1	0.0–6553.5%	Read only
	o4-16 (0x1790)	MI Status at Fault REC 1	0000h–FFFFh	Read only
	o4-17 (0x1791)	Rly Status at Fault REC 1	0000h–FFFFh	Read only
	o4-18 (0x1792)	Drive Status at Fault REC 1	0000h–FFFFh	Read only
	o4-19 (0x1793)	Fault Code REC 2	0–65535	Read only
	o4-20 (0x1794)	OPER Time at Fault REC 2	0–2359 hr/min	Read only
	o4-21 (0x1795)	OPER Days at Fault REC 2	0–65535 day	Read only
	o4-22 (0x1796)	Date of Fault REC 2	0–1231 month/day	Read only
	o4-23 (0x1797)	Time of Fault REC 2	0–2359 hr/min	Read only
	o4-24 (0x1798)	SPD Cmd at Fault REC 2	0–8985	Read only
	o4-25 (0x1799)	Motor Speed at Fault REC 2	0–8985	Read only
	o4-26 (0x179A)	Motor Current at Fault REC 2	0.0–6553.5 A	Read only
	o4-27 (0x179B)	Output Voltage at Fault REC 2	0.0–6553.5 V_{AC}	Read only
	o4-28 (0x179C)	Clamp bus voltage at Fault REC 2	0.0–6553.5 V_{DC}	Read only
	o4-29 (0x179D)	IGBT Temp at Fault REC 2	-3276.8–3276.7°C	Read only
	o4-30 (0x179E)	Cap Temp at Fault REC 2	-3276.8–3276.7°C	Read only
	o4-31 (0x179F)	Fan Speed at Fault REC 2	0–65535%	Read only
	o4-32 (0x17A0)	Input Voltage at Fault REC 2	0.0–6553.5 V_{AC}	Read only
	o4-33 (0x17A1)	PCB3 at Fault REC 2	-327.68–327.67°C	Read only
	o4-34 (0x17A2)	Output Torque at Fault REC 2	0.0–6553.5%	Read only

	Pr.	Parameter Name	Setting Range	Default
	o4-35 (0x17A3)	MI Status at Fault REC 2	0000h–FFFFh	Read only
	o4-36 (0x17A4)	Rly Status at Fault REC 2	0000h–FFFFh	Read only
	o4-37 (0x17A5)	Drive Status at Fault REC 2	0000h–FFFFh	Read only

O5 - Fault record 3-4

	Pr.	Parameter Name	Setting Range	Default
	o5-00 (0x17C0)	Fault Code REC 3	0–65535	Read only
	o5-01 (0x17C1)	OPER Time at Fault REC 3	0–2359 hr/min	Read only
	o5-02 (0x17C2)	OPER Days at Fault REC 3	0–65535 day	Read only
	o5-03 (0x17C3)	Date of Fault REC 3	0–1231 month/day	Read only
	o5-04 (0x17C4)	Time of Fault REC 3	0–2359 hr/min	Read only
	o5-05 (0x17C5)	SPD Cmd at Fault REC 3	0–8985	Read only
	o5-06 (0x17C6)	Motor Speed at Fault REC 3	0–8985	Read only
	o5-07 (0x17C7)	Motor Current at Fault REC 3	0.0–6553.5 A	Read only
	o5-08 (0x17C8)	Output Voltage at Fault REC 3	0.0–6553.5 V_{AC}	Read only
	o5-09 (0x17C9)	Clamp bus voltage at Fault REC 3	0.0–6553.5 V_{DC}	Read only
	o5-10 (0x17CA)	IGBT Temp at Fault REC 3	-3276.8–3276.7°C	Read only
	o5-11 (0x17CB)	Cap Temp at Fault REC 3	-3276.8–3276.7°C	Read only
	o5-12 (0x17CC)	Fan Speed at Fault REC 3	0–65535%	Read only
	o5-13 (0x17CD)	Input Voltage at Fault REC 3	0.0–6553.5 V_{AC}	Read only
	o5-14 (0x17CE)	PCB3 at Fault REC 3	-327.68–327.67°C	Read only
	o5-15 (0x17CF)	Output Torque at Fault REC 3	0.0–6553.5%	Read only

	Pr.	Parameter Name	Setting Range	Default
	o5-16 (0x17D0)	MI Status at Fault REC 3	0000h–FFFFh	Read only
	o5-17 (0x17D1)	Rly Status at Fault REC 3	0000h–FFFFh	Read only
	o5-18 (0x17D2)	Drive Status at Fault REC 3	0000h–FFFFh	Read only
	o5-19 (0x17D3)	Fault Code REC 4	0–65535	Read only
	o5-20 (0x17D4)	OPER Time at Fault REC 4	0–2359 hr/min	Read only
	o5-21 (0x17D5)	OPER Days at Fault REC 4	0–65535 day	Read only
	o5-22 (0x17D6)	Date of Fault REC 4	0–1231 month/day	Read only
	o5-23 (0x17D7)	Time of Fault REC 4	0–2359 hr/min	Read only
	o5-24 (0x17D8)	SPD Cmd at Fault REC 4	0–8985	Read only
	o5-25 (0x17D9)	Motor Speed at Fault REC 4	0–8985	Read only
	o5-26 (0x17DA)	Motor Current at Fault REC 4	0.0–6553.5 A	Read only
	o5-27 (0x17DB)	Output Voltage at Fault REC 4	0.0–6553.5 V_{AC}	Read only
	o5-28 (0x17DC)	Clamp bus voltage at Fault REC 4	0.0–6553.5 V_{DC}	Read only
	o5-29 (0x17DD)	IGBT Temp at Fault REC 4	-3276.8–3276.7°C	Read only
	o5-30 (0x17DE)	Cap Temp at Fault REC 4	-3276.8–3276.7°C	Read only
	o5-31 (0x17DF)	Fan Speed at Fault REC 4	0–65535%	Read only
	o5-32 (0x17E0)	Input Voltage at Fault REC 4	0.0–6553.5 V_{AC}	Read only
	o5-33 (0x17E1)	PCB3 at Fault REC 4	-327.68–327.67°C	Read only
	o5-34 (0x17E2)	Output Torque at Fault REC 4	0.0–6553.5%	Read only
	o5-35 (0x17E3)	MI Status at Fault REC 4	0000h–FFFFh	Read only
	o5-36 (0x17E4)	Rly Status at Fault REC 4	0000h–FFFFh	Read only

	Pr.	Parameter Name	Setting Range	Default
	o5-37 (0x17E5)	Drive Status at Fault REC 4	0000h–FFFFh	Read only

O6 - Fault record 5-6

	Pr.	Parameter Name	Setting Range	Default
	o6-00 (0x1800)	Fault Code REC 5	0–65535	Read only
	o6-01 (0x1801)	OPER Time at Fault REC 5	0–2359 hr/min	Read only
	o6-02 (0x1802)	OPER Days at Fault REC 5	0–65535 day	Read only
	o6-03 (0x1803)	Date of Fault REC 5	0–1231 month/day	Read only
	o6-04 (0x1804)	Time of Fault REC 5	0–2359 hr/min	Read only
	o6-05 (0x1805)	SPD Cmd at Fault REC 5	0–8985	Read only
	o6-06 (0x1806)	Motor Speed at Fault REC 5	0–8985	Read only
	o6-07 (0x1807)	Motor Current at Fault REC 5	0.0–6553.5 A	Read only
	o6-08 (0x1808)	Output Voltage at Fault REC 5	0.0–6553.5 V_{AC}	Read only
	o6-09 (0x1809)	Clamp bus voltage at Fault REC 5	0.0–6553.5 V_{DC}	Read only
	o6-10 (0x180A)	IGBT Temp at Fault REC 5	-3276.8–3276.7°C	Read only
	o6-11 (0x180B)	Cap Temp at Fault REC 5	-3276.8–3276.7°C	Read only
	o6-12 (0x180C)	Fan Speed at Fault REC 5	0–65535%	Read only
	o6-13 (0x180D)	Input Voltage at Fault REC 5	0.0–6553.5 V_{AC}	Read only
	o6-14 (0x180E)	PCB3 at Fault REC 5	-327.68–327.67°C	Read only
	o6-15 (0x180F)	Output Torque at Fault REC 5	0.0–6553.5%	Read only
	o6-16 (0x1810)	MI Status at Fault REC 5	0000h–FFFFh	Read only
	o6-17 (0x1811)	Rly Status at Fault REC 5	0000h–FFFFh	Read only

	Pr.	Parameter Name	Setting Range	Default
	o6-18 (0x1812)	Drive Status at Fault REC 5	0000h–FFFFh	Read only
	o6-19 (0x1813)	Fault Code REC 6	0–65535	Read only
	o6-20 (0x1814)	OPER Time at Fault REC 6	0–2359 hr/min	Read only
	o6-21 (0x1815)	OPER Days at Fault REC 6	0–65535 day	Read only
	o6-22 (0x1816)	Date of Fault REC 6	0–1231 month/day	Read only
	o6-23 (0x1817)	Time of Fault REC 6	0–2359 hr/min	Read only
	o6-24 (0x1818)	SPD Cmd at Fault REC 6	0–8985	Read only
	o6-25 (0x1819)	Motor Speed at Fault REC 6	0–8985	Read only
	o6-26 (0x181A)	Motor Current at Fault REC 6	0.0–6553.5 A	Read only
	o6-27 (0x181B)	Output Voltage at Fault REC 6	0.0–6553.5 V_{AC}	Read only
	o6-28 (0x181C)	Clamp bus voltage at Fault REC 6	0.0–6553.5 V_{DC}	Read only
	o6-29 (0x181D)	IGBT Temp at Fault REC 6	-3276.8–3276.7°C	Read only
	o6-30 (0x181E)	Cap Temp at Fault REC 6	-3276.8–3276.7°C	Read only
	o6-31 (0x181F)	Fan Speed at Fault REC 6	0–65535%	Read only
	o6-32 (0x1820)	Input Voltage at Fault REC 6	0.0–6553.5 V_{AC}	Read only
	o6-33 (0x1821)	PCB3 at Fault REC 6	-327.68–327.67°C	Read only
	o6-34 (0x1822)	Output Torque at Fault REC 6	0.0–6553.5%	Read only
	o6-35 (0x1823)	MI Status at Fault REC 6	0000h–FFFFh	Read only
	o6-36 (0x1824)	Rly Status at Fault REC 6	0000h–FFFFh	Read only
	o6-37 (0x1825)	Drive Status at Fault REC 6	0000h–FFFFh	Read only

11.1.12 Group P

P - PID function

P0 - Process PID

	Pr.	Parameter Name	Setting Range	Default
	P0-00 (0x1880)	Pressure Transmitter Type Sel	0: Reserved 1: Discharge Pressure 2: Suctioon Pressure 3: Differential Pressure 4: Flow 5: Dischage Level 6: Suction Level 7: Temperture 8: Other	0
	P0-01 (0x1881)	PID Function	0: Disabled 1: Enabled After Run	0
	P0-02 (0x1882)	PID Ref1 Src	0: Disabled 1: COM1 (Keypad) 2: COM1 (Modbus) 3–6: Reserved 7–8: AI1–AI2 9–15: Reserved 16: Multi Setpoint	0
	P0-03 (0x1883)	PID Ref2 Src	0–16	0
	P0-04 (0x1884)	PID Fdk1 Src	0: Disabled 1: Reserved 2: COM1 (Modbus) 3–6: Reserve 7–8: AI1–AI2	0
	P0-05 (0x1885)	PID Fdk2 Src	0–8	0
	P0-06 (0x1886)	PID Ref Math	0: Ref1 1: Ref1 + K*Ref2 2: Ref1 – K*Ref2 3: Ref1*K*Ref2 4: Ref1/K*Ref2 5: MIN(Ref1, Ref2) 6: MAX(Ref1, Ref2)	0

	Pr.	Parameter Name	Setting Range	Default
			7: AVE(Ref1, Ref2) 8: K*sqrt(Ref1) 9: K*sqrt(Ref1-Ref2) 10: K*sqrt(Ref1+Ref2) 11: sqrt(Ref1)+K*sqrt(Ref2) 12: (Ref1 – K*Ref2)^2 13: (Ref1)^2 +K* (Ref2)^2	
	P0-07 (0x1887)	PID Ref Math Gain	-300.00–300.00	1.00
	P0-08 (0x1888)	PID Fdk Math	0: Fdk1 1: Fdk1 + K*Fdk2 2: Fdk1 – K*Fdk2 3: Fdk1*K*Fdk2 4: Fdk1/K*Fdk2 5: MIN(Fdk1, Fdk2) 6: MAX(Fdk1, Fdk2) 7: AVE(Fdk1, Fdk2) 8: K*sqrt(Fdk1) 9: K*sqrt(Fdk1-Fdk2) 10: K*sqrt(Fdk1+Fdk2) 11: sqrt(Fdk1)+K*sqrt(Fdk2) 12: (Fdk1 – K*Fdk2)^2 13: (Fdk1)^2 +K* (Fdk2)^2	0
	P0-09 (0x1889)	PID Fdk Math Gain	-300.00–300.00	1.00
	P0-10 (0x188A)	PID Decimal Point	0: No Decimal Point 1: One Decimal Point 2: Two Decimal Point 3: Three Decimal Point	1
	P0-11 (0x188B)	PID Unit	0: Hz 1: rpm 2: % 3: m/s 4: kW 5: HP 6: ppm 7: 1/m 8: kg/s 9: kg/m 10: kg/h 11: lb/s 12: lb/m	27

	Pr.	Parameter Name	Setting Range	Default
			13: lb/h 14: ft/s 15: ft/m 16: m 17: ft 18: degC 19: degF 20: mbar 21: bar 22: Pa 23: kPa 24: mWG 25: inWG 26: ftWG 27: psi 28: atm 29: L/s 30: L/m 31: L/h 32: m3/s 33: m3/h 34: GPM 35: CFM 36: kg 37: kg/cm^2	
	P0-12 (0x188C)	PID Setpoint	-30000–30000 (PID unit)	0
	P0-13 (0x188D)	PID Setpoint Upper Limit	-30000–30000 (PID unit)	10000
	P0-14 (0x188E)	PID Setpoint Lower Limit	-30000–30000 (PID unit)	0
	P0-15 (0x188F)	PID Setpoint Accel Time	0.0–1800.0 sec.	0.0
	P0-16 (0x1890)	PID Setpoint Decel Time	0.0–1800.0 sec.	0.0
	P0-17 (0x1891)	PID Fdk Filter Time	0.000–30.000 sec.	0.000
	P0-18 (0x1892)	PID Setpoint Freeze Src	0: Disabled 1: Enabled 2–7: MI1–MI6 8–25: Reserved 26–28: Time Function 1–3 29–30: Reserved 31–38: Monitor 1–8	0

	Pr.	Parameter Name	Setting Range	Default
	P0-19 (0x1893)	PID Error OPER	0: PID err = PID Ref – PID Fdk 1: PID err = PID Fdk – PID Ref	0
	P0-20 (0x1894)	PID Multi Setpoint Src1	0: Switch Bit OFF 1: Switch Bit ON 2–7: MI1–MI6 8–25: Reserve 26–28: Time Function 1–3 29–30: Reserve 31–38: Monitor 1–8	0
	P0-21 (0x1895)	PID Multi Setpoint Src2		0
	P0-22 (0x1896)	PID Multi Setpoint 1	-30000–30000 PID unit	0
	P0-23 (0x1897)	PID Multi Setpoint 2	-30000–30000 PID unit	0
	P0-24 (0x1898)	PID Multi Setpoint 3	-30000–30000 PID unit	0
	P0-25 (0x1899)	PID Multi Setpoint 4	-30000–30000 PID unit	0
	P0-27 (0x189B)	PID Output Upper Limit	0–9000	1770/ 3550
	P0-28 (0x189C)	PID Output Lower Limit	0–9000	Equal to Parm. C2-27
	P0-29 (0x189D)	PID P Gain	0.01–100.00	1.00
	P0-30 (0x189E)	PID I Time	0.0–6000.0 sec.	1.0
	P0-31 (0x189F)	PID D Time	0.000–10.000 sec.	0.000
	P0-32 (0x18A0)	PID Derivative Filter	0.0–10.0 sec.	0.0
	P0-33 (0x18A1)	PID Output Freeze Src	0: Disabled 1: Enabled 2–7: MI1–MI6 8–25: Reserved 26–28: Time Function 1–3 29–30: Reserved 31–38: Monitor 1–8	0
	P0-34 (0x18A2)	PID Setpoint Deadband	0–10000	0
	P0-35 (0x18A3)	PID Deadband Delay	0.0–3600.0 sec.	0.0

	Pr.	Parameter Name	Setting Range	Default
	P0-36 (0x18A4)	PID Sleep Ref Src	0:Disabled 1: Motor Speed 2: By PID Feedback	0
	P0-37 (0x18A5)	PID Sleep Level	Pr.P0-27–Pr.P0-28	185/365 Depending on the models
	P0-38 (0x18A6)	PID Sleep Fdk Range	0.00–100.00%	0.00
	P0-39 (0x18A7)	PID Sleep Delay Time	0.0–3600.0 sec.	15.0
	P0-40 (0x18A8)	PID Sleep Boost Time	0.0–3600.0 sec.	0.0
	P0-41 (0x18A9)	PID Sleep Boost Value	0–30000 PID unit	0
	P0-42 (0x18AA)	PID Wake Error Level	0–10000 PID unit	0
	P0-43 (0x18AB)	PID Wake Delay Time	0.00–60.00 sec.	0.50
	P0-44 (0x18AC)	PID Wake Type	0: Bi-directional error 1: Positive error 2: Negative error	1
	P0-45 (0x18AD)	PID Track Enable Src	0: Disabled 1: Enabled 2–7: MI1–MI7 8–25: Reserved 26–28: Time Function 1–3 20–30: Reserved 31–38: Monitor 1–8	0
	P0-46 (0x18AE)	PID Track Ref Src	0: Disabled 1: Reserved 2: COM1 (Modbus) 3–6: Reserved 7–8: AI1–AI2	0
	P0-47 (0x18AF)	PID Output Delay Time	0.000–30.000 sec.	0.000
	P0-48 (0x18B0)	PID Fdk Error Indn	0: Disabled 1–2: Relay1–2	0

11.1.13 Group U

U - Industry

U0 - Reserve

U1 - FPGA Control

	Pr.	Parameter Name	Setting Range	Default
✻	U1-00 (0x1B40)	Mains FREQ	40–80 Hz	60
✻ 𝓁	U1-01 (0x1B41)	PLL Kp	0.0–1000.0	1.0
✻ 𝓁	U1-02 (0x1B42)	PLL Ki	0.0–1000.0	100.0
✻ 𝓁	U1-03 (0x1B43)	PLL SSI	0.0–5000.0	100.0
✻ 𝓁	U1-04 (0x1B44)	PLL Filter	1.0–200.0 Hz	10.0
✻	U1-05 (0x1B45)	Deadtime 1	0.5–5.0 us	2.0
✻	U1-06 (0x1B46)	Deadtime 2	0.1–5.0 us	1.0
✻	U1-07 (0x1B47)	Deadtime 3	0.1–5.0 us	1.0
✻	U1-08 (0x1B48)	Deadtime 4	0.1–5.0 us	1.0

	Pr.	Parameter Name	Setting Range	Default
✻	U1-09 (0x1B49)	Fault EN bit	bit0: Watchdog bit 1: Iu Low bit 2: Iu High bit 3: Iv Low bit 4: Iv High bit 5: Iw Low bit 6: Iw High bit 7: Vr Low bit 8: Vr High bit 9: Vs Low bit 10: Vs High bit 11: Vt Low bit 12: Vt High bit 13: Vclamp High bit 14: MCU Trip EN bit 15: Dset Trip EN	41087
✻	U1-10 (0x1B4A)	Current Limit Protection	100–300% (Rated motor current)	Depending on the models
✻	U1-14 (0x1B4E)	Detection Mode Selection	0: No detection 1: Detection mode 1 2: Detection mode 2	2
✻ ⚡	U1-15 (0x1B4F)	FPGA Mode Selection	0–65535	48164

U3 - Pump protection

	Pr.	Parameter Name	Setting Range	Default
	U3-00 (0x1BC0)	Pressure Protection Function	0: Disabled 1: Enabled	0
	U3-01 (0x1BC1)	Heavy Leakage Detect Level	0–85%	85
	U3-02 (0x1BC2)	Heavy Leakage Detect Time	0.0–300.0 sec.	15.0
	U3-03 (0x1BC3)	Heavy Leakage Current Level	0–100%	20
	U3-04 (0x1BC4)	Heavy Leakage Treatment	0: Warning & Continue OPER 1: Fault & Coast to Stop 2: Fault & Ramp to Stop	0
	U3-05 (0x1BC5)	Hi-Pressure Alarm Level	0–50%	25
	U3-06 (0x1BC6)	Hi-Pressure Alarm Detect Time	0.0–300.0 sec.	5.0

	Pr.	Parameter Name	Setting Range	Default
	U3-07 (0x1BC7)	Hi-Pressure Alarm Treatment	1: Fault & Coast to Stop 2: Fault & Ramp to Stop	0
	U3-08 (0x1BC8)	Lo-Pressure Alarm Level	0–50%	25
	U3-09 (0x1BC9)	Lo-Pressure Alarm Detect Time	0.0–300.0 sec.	5.0
	U3-10 (0x1BCA)	Lo-Pressure Alarm Treatment	0: Warning & Continue OPER 1: Fault & Coast to Stop 2: Fault & Ramp to Stop	0
	U3-11 (0x1BCB)	Dry Pump Curve Autotune	0: Disabled 1: Enabled	0
	U3-12 (0x1BCC)	Dry Pump Autotune Max. Time	0.0–600.0 sec.	40.0
	U3-13 (0x1BCD)	33% Shut-off Power	0.00–Rated Power*1.2	0.00
	U3-14 (0x1BCE)	60% Shut-off Power	0.00–Rated Power*1.2	0.00
	U3-15 (0x1BCF)	100% Shut-off Power	0.00–Rated Power*1.2	0.00
	U3-16 (0x1BD0)	Dry Pump Detect Level	0–200%	95
	U3-17 (0x1BD1)	Dry Pump Detect Function	0: Disabled 1: Enabled	0
	U3-18 (0x1BD2)	Dry Pump Detect Time	0.0–300.0 sec.	5.0
	U3-19 (0x1BD3)	Dry Pump Restart Delay Time	0–1000 min.	1
	U3-20 (0x1BD4)	Dry Pump Restart Times Limits	0–20	5
	U3-21 (0x1BD5)	Dry Pump Alarm Treatment	0: Warning & Coast to Stop 1: Warning & Ramp to Stop	0

12 Description of Parameter Settings

12.1 Descriptions of Parameter Settings

A. Fundamental Setting

B. Pr Management and Macro

C. Control Mode and Cmd Scheme

D. Motor Parameter

E. Reserved

F. FOC

G. IO Setting

H. Fault & Protection

J. Application Function

L. Reserved

N. Communication

o. Monitor and Recorder

P. PID Function

U. Industry

A. Fundamental Setting

⌿ You can edit this parameter during operation.

A0. VIDAR Information

A0-00	VIDAR Identity Code

(0x00) Default: Read only

Settings Read only

A0-01	VIDAR Rated Output Current

(0x01) Default: Read only

Settings Read only

A0-02	VIDAR Rated Input Current

(0x02) Default: Read only

Settings Read only

📖 Pr. A0-00 displays the VIDAR identity code. You can also identify the model by reading the current value from Pr. A0-01 or the barcode on the VIDAR.

📖 The VIDAR protection level is mainly based on Pr. A0-01.

Model	Identity Code	Voltage	Power (kW)	Power (HP)	Motor Cont. Current	Input Current
EMDX020H18EXS3ABAA	36	460V	15	20	32.0	20.09
EMDX020H36EXS3ABAA	37	460V	15	20	32.0	20.09
EMDX025H18EXS3ABAA	40	460V	18.5	25	41.0	25.12
EMDX025H36EXS3ABAA	41	460V	18.5	25	40.5	25.12
EMDX030H18EXS3ABAA	43	460V	22	30	49.0	30.14
EMDX030H36EXS3ABAA	44	460V	22	30	49.5	30.14
EMDX040H18EXS3ABAA	48	460V	30	40	62.5	40.19
EMDX040H36EXS3ABAA	49	460V	30	40	62.5	40.19
EMDX050H18EXS3ABAA	52	460V	37	50	78.0	50.24
EMDX050H36EXS3ABAA	53	460V	37	50	78.0	50.24
EMDX060H18EXS3ABAA	56	460V	45	60	94.5	60.28
EMDX060H36EXS3ABAA	57	460V	45	60	94.5	60.28
EMDX075H18EXS3ABAA	60	460V	55	75	117.5	75.35
EMDX075H36EXS3ABAA	61	460V	55	75	117.5	75.35

A0-04	ACB FW Version	
(0x04)		Default: Read only
	Settings	Read only

A0-06	ACB FW Date Code	
(0x06)		Default: Read only
	Settings	Read only

📖 Pr. A0-03 and A0-05 display the current ACB firmware version and its date code.

A0-07	CTL FW Version	
(0x07)		Default: Read only
	Settings	Read only

A0-09	CTL FW Date Code	
(0x09)		Default: Read only
	Settings	Read only

📖 Pr. A0-06 and A0-08 display the current CTB version and its date code.

A0-10	FPGA Version	
(0x0A)		Default: Read only
	Settings	Read only

📖 Pr. A0-10 displays the current FPGA version.

A0-11	Safety MCU Version	
(0x0B)		Default: Read only
	Settings	Read only

📖 Pr. A0-11 displays the current Safety MCU version.

A1. Control Handle

A1-00 EX1/EX2 Switch Src

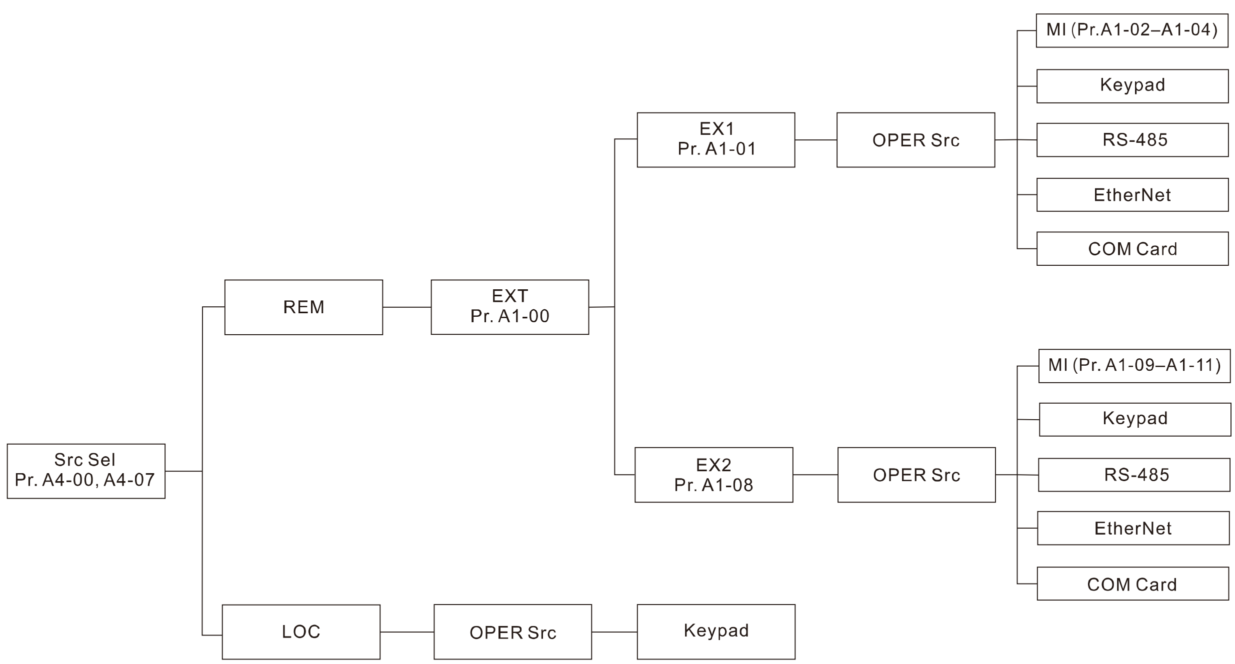
(0x40) Default: 0

Settings 0: External 1

1: External 2

2–7: MI1–MI6

- As shown in the operation command source in the figure below, there are two sources of EX1/ EX2 for external control of the drive, which can be switched through parameter setting or MI terminal.
- The relevant parameters for EX1 channel are Pr. A1-01–A1-07, and that for EX2 channel are Pr. A1-08–A1-14.
- When the switching source is set to 0, the EX1 channel will be used; if it is set to 1, the EX2 channel will be used.
- When the switching source is set as MI terminal, for example: MI1, the EX1 channel will be used for MI1 OFF and the EX2 channel will be used for MI1 ON.
- This parameter is set to select the switching source of EX1/ EX2, NOT the source selection of EX1/ EX2 operation command.



A1-01 EX1 OPER Cmd Src

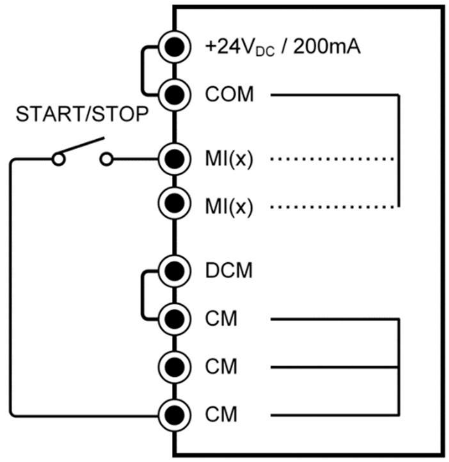
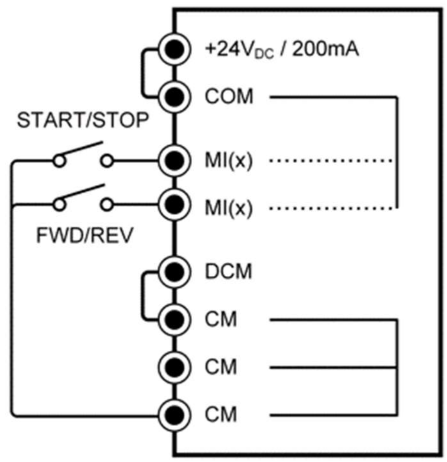
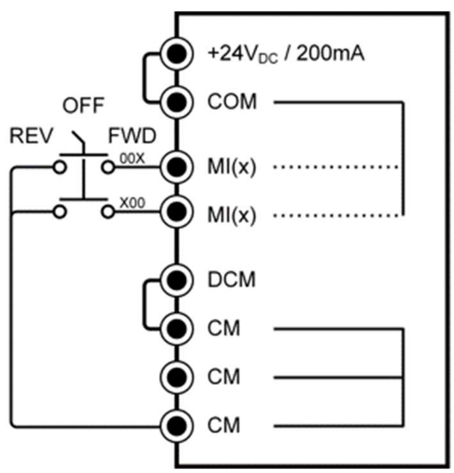
(0x41) Default: 1

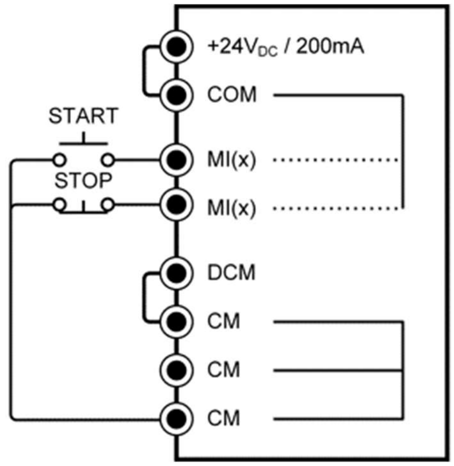
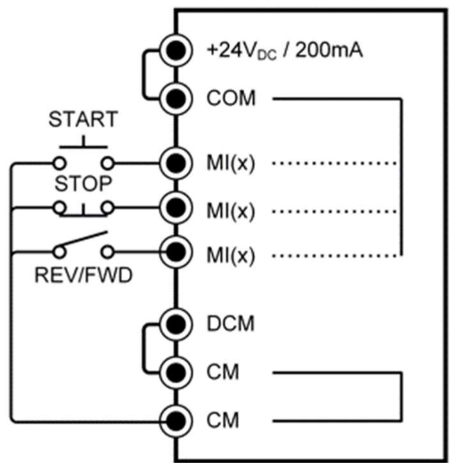
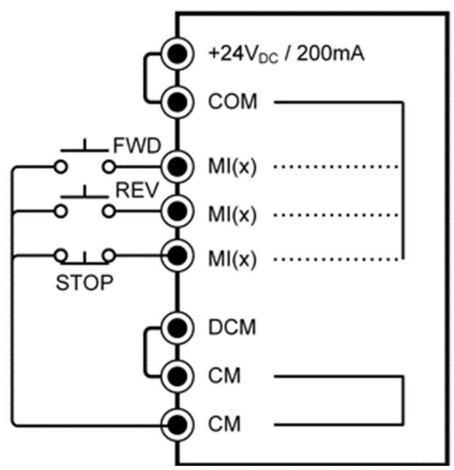
A1-08 EX2 OPER Cmd Src

(0x48) Default: 0

Settings 0: Disabled
1: S1 Start
2: S1 Start, S2 Dir
3: S1 FWD, S2 REV
4: S1 Start, S2 Stop
5: S1 Start, S2 Stop, S3 Dir
6: S1 FWD, S2 REV, S3 Stop
7: COM1 (Keypad)
8: COM1 (Modbus)
9: EtherNet
10: EX. COM

- This parameter sets the configuration of the terminals which control the operation, there are six different control modes, including single-wire, two-wire, and three-wire control modes.
- Refer to Pr. A4-00 HOA/ LoRe selection, when it is set as AUTO or REM mode, Pr. A1-01 and A1-08 set the VIDAR operation command source. Refer to the drive operation roadmap shown in the figure 1 and figure 2 below.

A1-01/ A1-08	External Terminal Control Circuits
Setting value: 1 2-wire operation control **S1 START**	 To complete the setup,configure the following parameters. **A1-00:** 0: External 1 **A1-01:** 1: S1 START **A1-02:** 2: MI(x) **A1-05:** 0: Edge Triggered
Setting value: 2 2-wire operation control **S1 Start, S2 Dir**	 To complete the setup,configure the following parameters. **A1-00:** 0: External 1 **A1-01:** 2: S1 Start, S2 Dir **A1-02:** 2: MI(x) **A1-03:** 3: MI(x) **A1-05:** 0: Edge Triggered **A1-06:** 0: Edge Triggered
Setting value: 3 2-wire operation control **S1 FWD, S2 REV**	 To complete the setup,configure the following parameters. **A1-00:** 0: External 1 **A1-01:** 3: S1 FWD, S2 REV **A1-02:** 2: MI(x) **A1-03:** 3: MI(x) **A1-05:** 0: Edge Triggered **A1-06:** 0: Edge Triggered

A1-01/ A1-08	External Terminal Control Circuits	
Setting value: 4 2-wire operation control **S1 Start, S2 Stop**		To complete the setup,configure the following parameters. **A1-00:** 0: External 1 **A1-01:** 4: S1 Start, S2 Stop **A1-02:** 2: MI(x) **A1-03:** 3: MI(x) **A1-05:** 0: Edge Triggered **A1-06:** 0: Edge Triggered
Setting value: 5 3-wire operation control **S1 Start, S2 Stop,** **S3 Dir**		To complete the setup,configure the following parameters. **A1-00:** 0: External 1 **A1-01:** 5: S1 Start, S2 Stop, S3 Dir **A1-02:** 2: MI(x) **A1-03:** 3: MI(x) **A1-04:** 4: MI(x) **A1-05:** 0: Edge Triggered **A1-06:** 0: Edge Triggered **A1-07:** 0: Edge Triggered
Setting value: 6 3-wire operation control **S1 FWD, S2 REV,** **S3 Stop**		To complete the setup,configure the following parameters. **A1-00:** 0: External 1 **A1-01:** 6: S1 FWD, S2 REV, S3 Stop **A1-02:** 2: MI(x) **A1-03:** 3: MI(x) **A1-04:** 4: MI(x) **A1-05:** 0: Edge Triggered **A1-06:** 0: Edge Triggered **A1-07:** 0: Edge Triggered

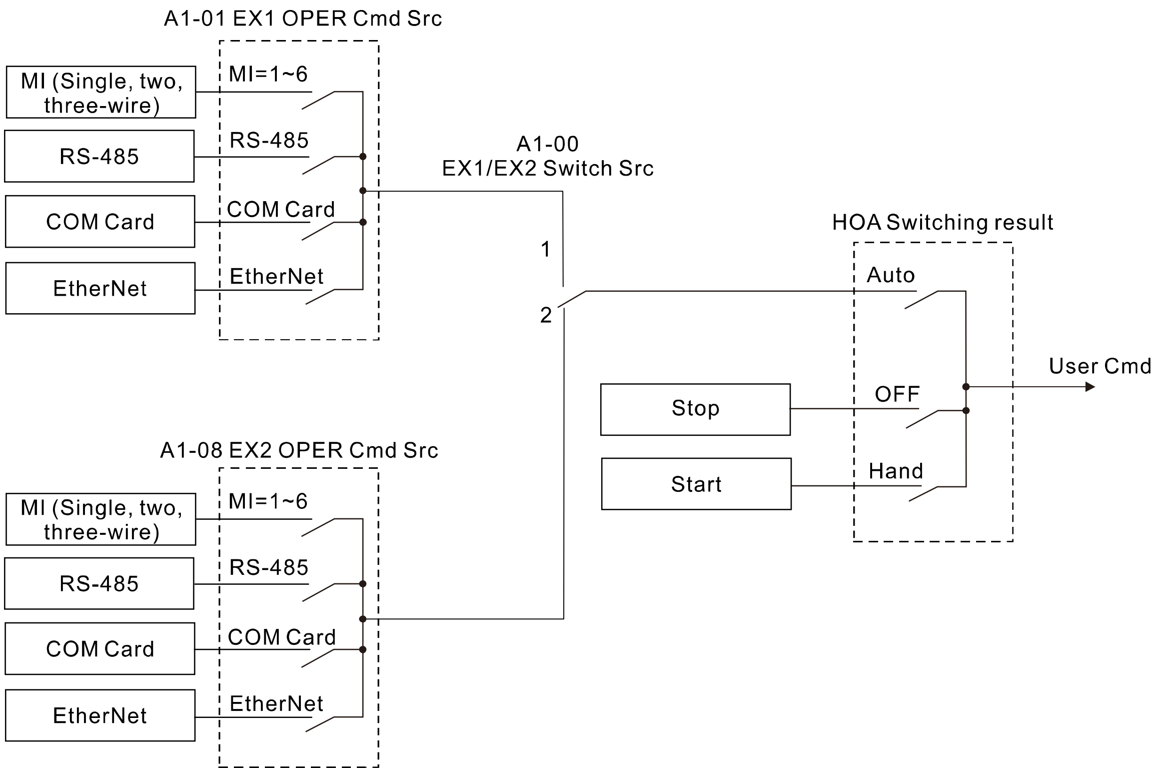


Figure 1 Drive Operation Roadmap (HOA)

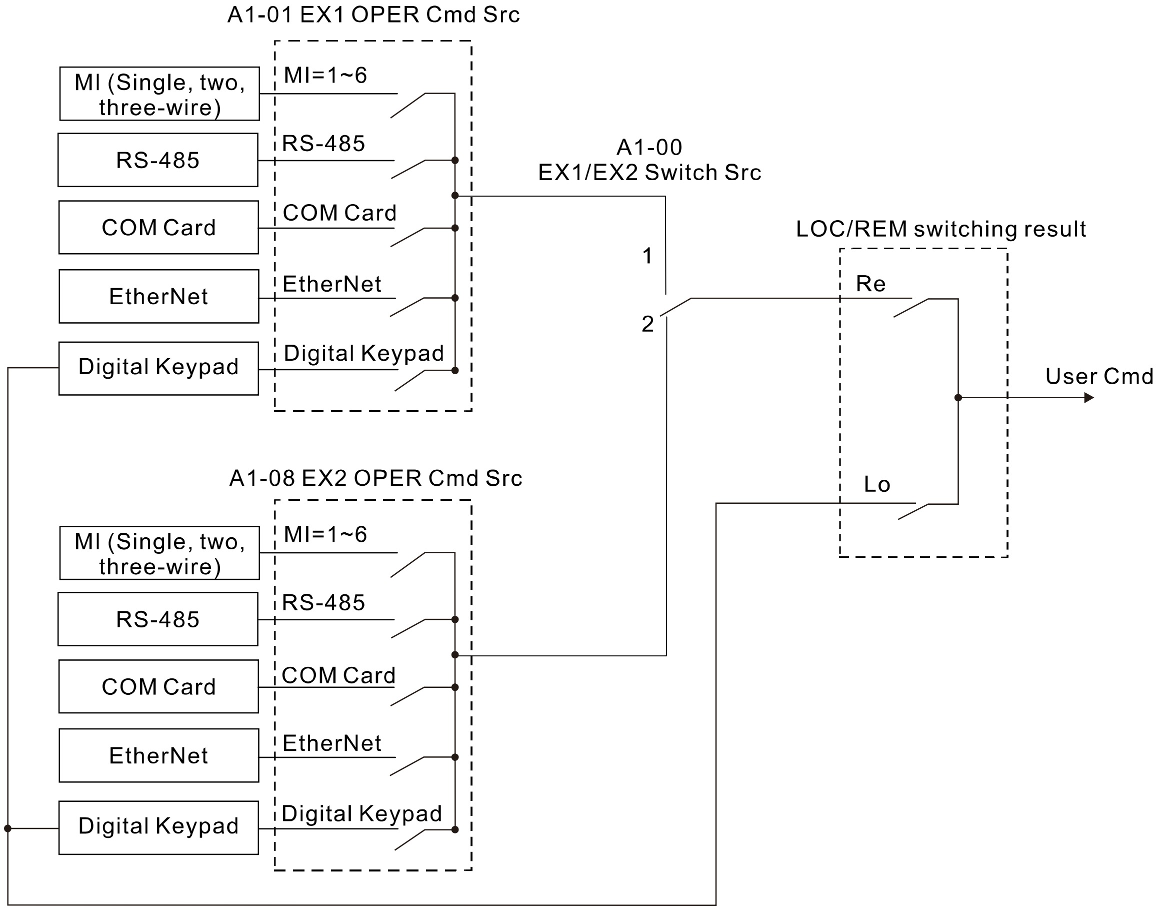


Figure 2 Drive operation diagram (LoRe)

📖 Continuing from the above, when the operation command source is set as communication, for example, the set value is 8: 2000H, the position writes in 2 for the drive to run; 1 for the drive to stop.

A1-01	Communication Control
Setting value: 8–10	**2000H** bit0–1: Run/ Stop/ JOG bit4–5: FWD/ REV **2002H** bit1: Reset
Setting value: 8–10	**6000H** bit1: DIR bit3: HALT bit4: LOCK bit5: JOG

	bit7: Servo ON bit15: Reset

A1-02 EX1 S1 Src

(0x42) Default: 2

A1-09 EX2 S1 Src

(0x49) Default: 0

Settings 0: Disabled
1: Reserved
2–7: MI1–MI6

- Selects terminal for external control source 1.
- MI1–MI6 are I/O board multi-function input terminals.

A1-03 EX1 S2 Src

(0x43) Default: 0

A1-10 EX2 S2 Src

(0x4A) Default: 0

Settings 0: Disabled
1: Reserved
2–7: MI1–MI6

- Selects terminal for external control source 2.
- Refer to description of Pr. A1-02 and A1-09.

A1-04 EX1 S3 Src

(0x44) Default: 0

A1-11 EX2 S3 Src

(0x4B) Default: 0

Settings 0: Disabled
1: Reserved
2–7: MI1–MI6

- Selects terminal for external control source 3.
- Refer to description of Pr. A1-02 and A1-09.

A1-05 EX1 S1 Trigger Method

(0x45) Default: 1

⌁ A1-12 EX2 S1 Trigger Method

(0x4C) Default: 1

Settings 0: Edge Triggered

1: Level Triggered

- 🕮 Selects starting signal for external control source 1.
- 🕮 The edge trigger means that the switch starts when detecting the rising edge process from OFF to ON; the level trigger means that the switch starts when detecting the process from OFF to ON and it must stay in the ON position.
- 🕮 The trigger method is only valid at RUN command, and the STOP command is always level triggered. Take option 1 of Pr. A1-01/ A1-08 as an example, when you choose edge triggered, the status of MI changes from OFF to ON as a RUN command; when you choose level triggered, the MI status is ON as a RUN command. No matter which trigger method is selected, when the MI status is OFF, it is regarded as a STOP command.
- 🕮 Option 4–6 of Pr. A1-01/ A1-08 do not support level triggered.

⌁ A1-06 EX1 S2 Trigger Method

(0x46) Default: 1

⌁ A1-13 EX2 S2 Trigger Method

(0x4D) Default: 1

Settings 0: Edge Triggered

1: Level Triggered

- 🕮 Selects starting signal for external control source 2.
- 🕮 Refer to description of Pr. A1-05 and A1-12.

⌁ A1-07 EX1 S3 Trigger Method

(0x47) Default: 1

⌁ A1-14 EX2 S3 Trigger Method

(0x4E) Default: 1

Settings 0: Edge Triggered

1: Level Triggered

- 🕮 Selects starting signal for external control source 3.
- 🕮 Refer to description of Pr. A1-05 and A1-12.

⌁ A1-15 Halt Decel Method

(0x4F) Default: 0

Settings 0: Ramp to stop
1: By Quick Stop Time

- When the Halt enables, it decelerates to 0 and enters zero-speed control; when the Halt disables, it returns to the target speed set by the user.
- 0: It decelerates based on the setting for Pr. C2-00–C2-07 (Accel / Decel time 1–4).
- 1: the Halt decelerates based on the setting for Pr. C2-14 (Quick stop time).

A1-16 Halt MI Src

(0x50) Default: 0

Settings 0: Disabled
1: Reserved
2–7: MI1–MI6

- Selects the Halt MI source.

A1-17 Lock MI Src

(0x51) Default: 0

Settings 0: Disabled
1: Reserved
2–7: MI1–MI6

- Selects the Lock MI source.
- When the Lock enables, it locks the current output speed and stops following the speed command; when the Lock disables, it unlocks the current output speed and continues following the target speed command.
- When Halt and Lock are enabled at the same time, the Halt has higher priority than Lock.

A1-21 Run Enable MI Src

(0x56) Default: 0

Settings 0–1: Disabled
2–7: MI1–MI6

- Selects the run enable MI source.
- The default of the Run Enable MI Source is OFF, that is, the drive is not limited to the on-off state of this function.
- When the Run Enable MI Source is specified, this function is enabled.

- Run Enable determines whether the actual operation is valid or not. When the drive is stopped and the Run Enable function is ON but not enabled (MI OFF), the keypad displays Run Disabled warning message; when the Run Enable function is ON and enabled (MI ON), the keypad clears the warning and gives the run command, and then the drive can run.
- Continuing from the above, after the drive starts to run after issuing the run command, if the Run Enable function is switched off (MI OFF), the drive stops according to the stop method set in Pr. A1-22, and only resumes to run when the Run Enable function is enabled again.

A1-22 Run Disable Stop Method

(0x57) Default: 0

Settings 0: Coast to stop

1: Ramp to stop

2: Quick Stop

- 0: The AC motor drive stops output immediately, and the motor coasts to stop according to the load inertia.
  - Use "ramp to stop" for the safety of personnel or to prevent material from being wasted in applications where the motor must stop immediately after the drive stops. You must set the deceleration time accordingly.
  - If idling is allowed or the load inertia is large, use "coast to stop". For example: blowers, punching machines and pumps.
- 1: it decelerates based on the setting for Pr. C2-00–C2-07 (Accel / Decel time 1–4).
- 2: it decelerates based on the setting for Pr. C2-14 (Quick stop time).

A1-23 Run Enable Indn

(0x58) Default: 0

Settings 0: Disabled

1–2: Relay1–Relay2

- Relay 1–2 are I/O board multi-function (contact, photo coupler) output terminals.
- When the VIDAR is in Run Enable status, the specified MO contact activates.

A1-24 OPER Cmd by Kpd Indn

(0x59) Default: 0

Settings 0: Disabled

1–2: Relay1–Relay2

- When the drive operation command source is digital keypad, the specified MO contact activates.

A1-25 Forward Cmd Indn

(0x5A) Default: 0

Settings 0: Disabled
1–2: Relay1–Relay2

- When the drive is not in STOP and operates in FWD direction, the specified MO contact activates.

A1-26 Reverse Cmd Indn

(0x5B) Default: 0

Settings 0: Disabled
1–2: Relay1–Relay2

- When the drive is not in STOP status and operates in REV direction, the specified MO contact activates.

A1-27 FWD / REV Direction Setting

(0x5C) Default: 1

Settings 0: Forward & Reverse
1: FWD only
2: REV only

- This parameter avoids damage to the equipment caused by the motor forward and reverse operation due to mis-operation. Use this parameter to limit the motor operation direction to forward or reverse. When the load of the motor only allows one running direction, this parameter limits the running direction of the motor to avoid equipment caused by user mis-operation.
- During PID control operation, this parameter is disregarded, and VIDAR runs in forward direction only. When PID control is not active, the parameter setting remains.

A1-28 Forward Phase Sel

(0x5D) Default: 0

Settings 0: UVW
1: UWV

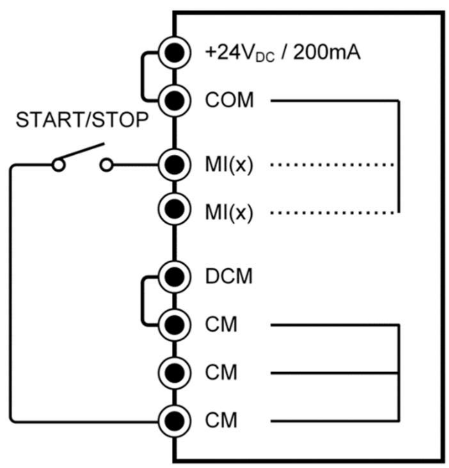
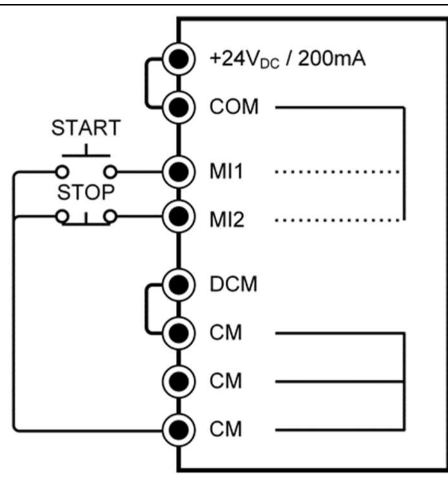
- Switches the motor operation direction. If the phase sequence of the motor wiring is wrong, which makes the motor rotate in the wrong direction and cannot be re-wired, use this parameter to change the motor operation direction.

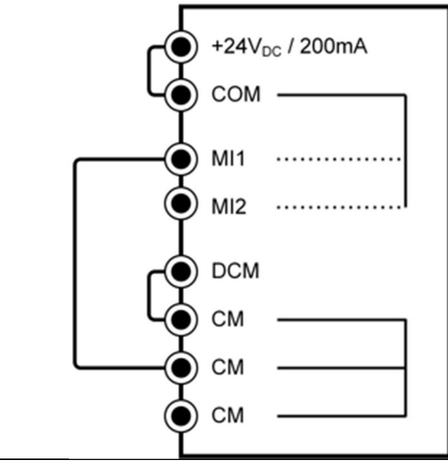
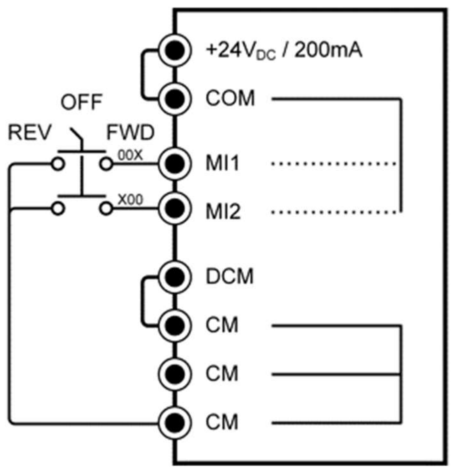
A1-29 Start/Stop Setting

(0x5E) Default: 0

Settings	0: Reserved	
	1: 2-WIRE START/STOP	
	2: 3-WIRE START/STOP	
	3: MOTOR CONTACTOR START/STOP	
	4: FWD/REV	
	5: Keypad	
	6: EtherNET	

📖 Select Start/Stop Setting.

A1-29	External Terminal Control Circuits
Setting value: 1 2-wire operation control **START/STOP**	 The following parameters are automatically set based on the A1-29 selection. **A1-00:** 0: External 1 **A1-01:** 1: S1 START **A1-02:** 2: MI(x) **A1-05:** 0: Edge Triggered
Setting value: 2 3-wire operation control **START/STOP**	 The following parameters are automatically set based on the A1-29 selection. **A1-00:** 0: External 1 **A1-01:** 2: S1 START, S2 STOP **A1-02:** 2: MI(x) **A1-03:** 3: MI(x) **A1-05:** 0: Edge Triggered **A1-06:** 0: Edge Triggered

A1-29	External Terminal Control Circuits	
Setting value: 3 2-wire operation control **MOTOR CONTACTOR START/STOP**		The following parameters are automatically set based on the A1-29 selection. **A1-00:** 0: External 1 **A1-01:** 3: MOTOR CONTACTOR START/STOP **A1-02:** 2: MI(x) **A1-05:** 1: Level Triggered
Setting value: 4 2-wire operation control **FWD/REV**		The following parameters are automatically set based on the A1-29 selection. **A1-00:** 0: External 1 **A1-01:** 4: FWD/REV **A1-02:** 2: MI(x) **A1-03:** 3: MI(x) **A1-05:** 0: Edge Triggered **A1-06:** 0: Edge Triggered

A1-32 External Fault MI Src

(0x61) Default: 0

Settings	0: Disabled
	1: Reserved
	2–7: MI1–MI6

- Selects the External Fault MI source.

A1-33 External Fault Stop Method

(0x62) Default: 0

Settings	0: Coast to stop
	1: Ramp to stop
	2: Stop by ExtFault DecTime

- 0: The motor coasts to stop according to the load inertia.
- 1: It decelerates based on the setting for Pr. C2-00–C2-07 (Accel / Decel time 1–4).
- 2: The drive stops according to the External Fault Deceleration Time set int Pr. A1-34.

⌁ A1-34 External Fault Decel Time

(0x63) Default: 10.0 / 10.00

Settings	0.0–6000.0 sec.
	0.00–600.00 sec.

- Sets the deceleration time after the external fault occurs.

A2. Stop Method

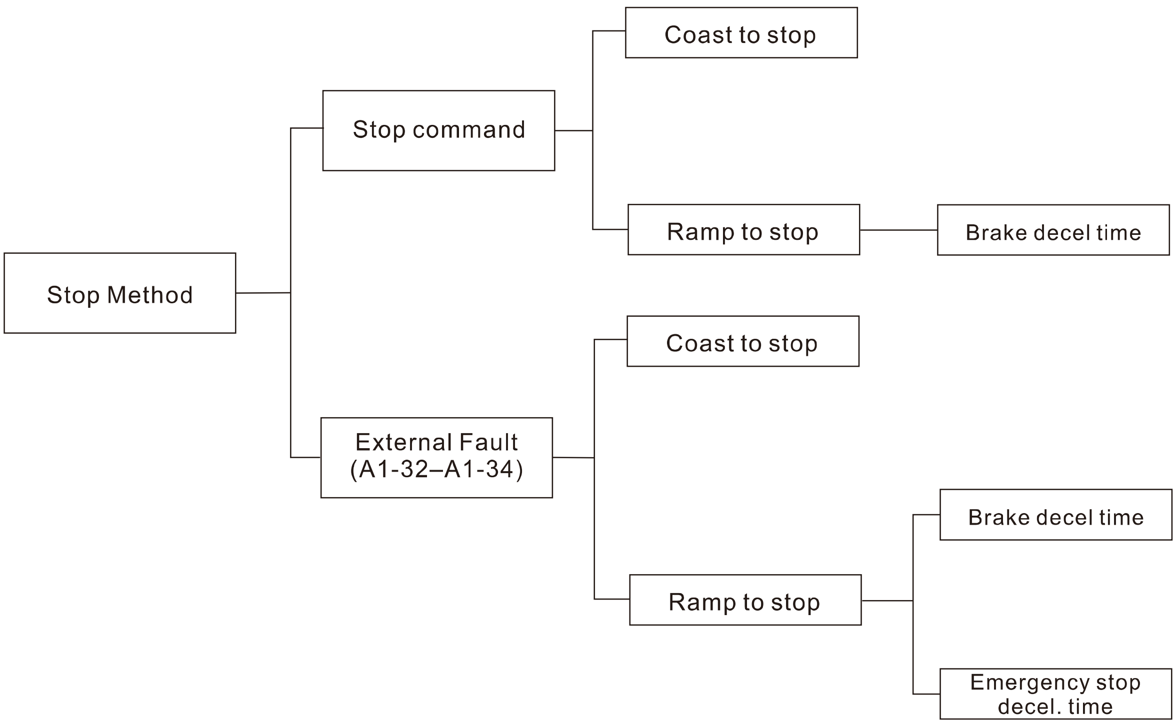
A2-00 Stop Method

(0x80) Default: 0

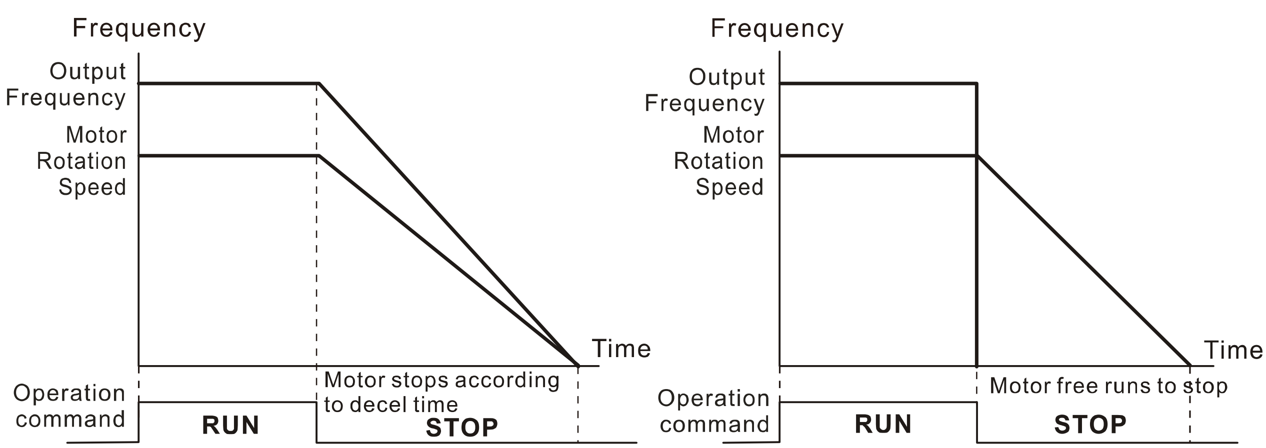
Settings 0: Ramp to stop

1: Coast to stop

📖 Refer to the figure below for the VIDAR stop method:



📖 Determines how the motor is stopped when the AC motor drive receives the Stop command.



Ramp to stop and Coast to stop

- Setting 0: The AC motor drive decelerates to 0 RPM or the minimum output speed (Pr. C2-27) according to the set deceleration time (for example, Pr. C2-01 Decel Time 1), and then to stop.
- Setting 1: The AC motor drive stops output immediately, and the motor coasts to stop according to the load inertia.
  - ☑ Use "ramp to stop" for the safety of personnel or to prevent material from being wasted in applications where the motor must stop immediately after the drive stops. You must set the deceleration time accordingly.
  - ☑ If idling is allowed or the load inertia is large, use "coast to stop".
    For example: blowers, punching machines and pumps.

A2-01 Quick Stop MI Src

(0x81) Default: 0

Settings 0: Disabled
1: Reserved
2–7: MI1–MI6

- Selects the quick stop MI source.
- MI1–MI6 are I/O board multi-function input terminals.

A2-02 Quick Stop Method

(0x82) Default: 0

Settings 0: Quick Stop
1: Coast to stop
2: Reserved
3: Ramp to stop

- 0: The drive decelerates the motor to 0 RPM according to Pr. C2-14 Quick Stop Time.
- Refer to Pr. A2-00 for the rest of descriptions.

A2-03 Emergency Stop Ref Src

(0x83) Default: 0

Settings 0: Disabled
1: Reserved
2–7: MI1–MI6

- Selects the emergency stop MI source.
- Refer to Pr. A2-00 for the rest of descriptions.

A2-04	Emergency Stop Ref Src	
(0x84)		Default: 0
	Settings	0: Disabled
		1: Reserved
		2–7: MI1–MI6

A3. Start & Stop Function

A3-00 Spd Search Func.

(0xC0) Default: 1

Settings 0: Disabled

1: Enabled

- The speed tracking function is most applicable for large inertia loading system, such as ~~punch,~~ pumps, and fans. If the motor is rotating with a large inertia load without control and the speed tracking function is not enabled, it will take a long time for the load to stop rotating before the motor runs; after enabling this function, the motor can run immediately without waiting for the load to stop. After tracking to the load speed, it can be used as the initial speed for further acceleration and deceleration.

A3-01 Init Position Method

(0xC1) Default: 1

Settings 0–1

0: DC injection (DCI)

1: High-frequency injection (HFI)

- This parameter selects the motor starting method. There are two options available:
  0: DC injection (DCI): Suitable for applications where the motor does not require extremely fast starting and the load is relatively light.
  1: High-frequency injection (HFI): Recommended for applications requiring rapid starting or heavy load.
- The default setting is HFI. Adjust this parameter according to the specific startup requirements of your applications.

✓ A3-10 DCI Kp Gain

(0xCA) Default: 0.100

Settings 0.000–60.000 pu

✓ A3-11 DCI Ki Gain

(0xCB) Default: 0.050

Settings 0.000–60.000 pu

- This parameter sets the controller PI gain when the DC brake function activates.
- Kp gain adjusts the current transient response, Ki gain adjusts the current steady-state response.

A3-20 Pulse Inject Curr Threshold

(0xD4) Default: 100

Settings 0–300%

📖 Based on the motor rated current, the angle range is estimated when the pulse current reaches this level, and the rotor does not rotate during the detection process.

📖 The parameter affects the value of the pulse during the angle detection. The larger the pulse, the higher the accuracy of rotator’s position. But a larger pulse might cause oc.

📖 Increase the parameter when the running direction and the command are opposite during start-up. If oc occurs at start-up, then decrease the parameter.

📖 Refer to Chapter 6 Initial Operation and Adjustment for detailed motor adjustment procedure.

A4. HOA / LoRe Setting

A4-00 HOA/ LoRe Sel.

(0x100) Default: 1

Settings 0: HOA

1: LOC/REM

0: Standard HOA (Hand-Off-Auto) function, refer to Figure 1 below.

1: LOC/REM (Local/ Remote) function, refer to Figure 2 below.

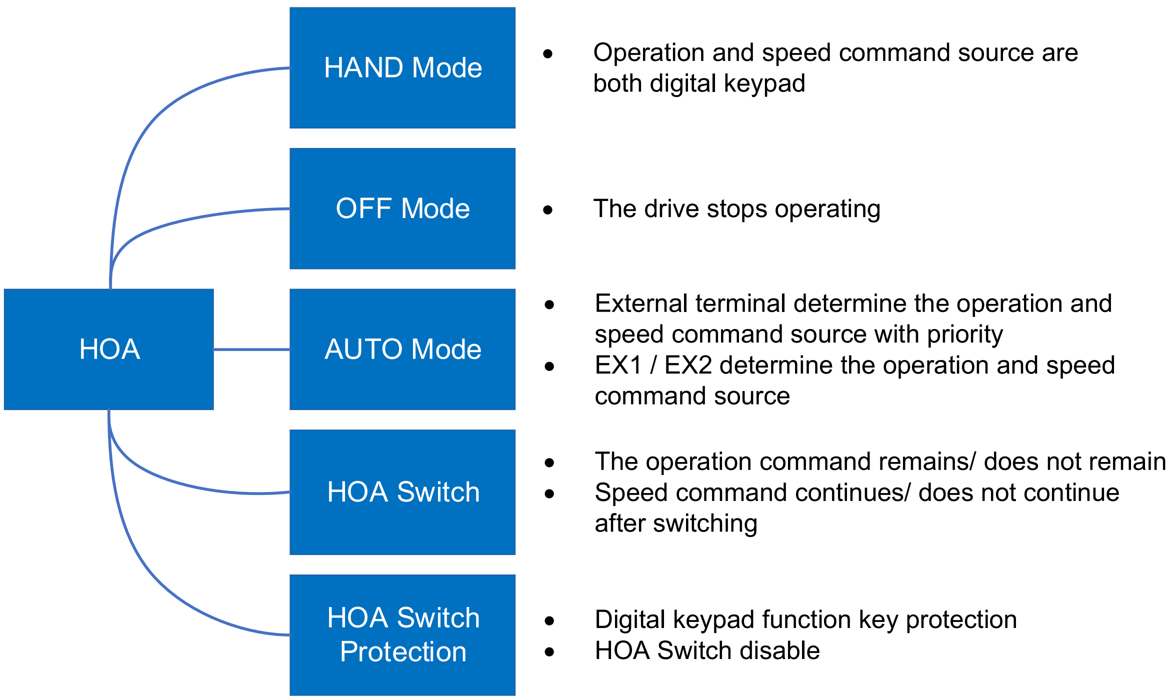


Figure 1: HOA function

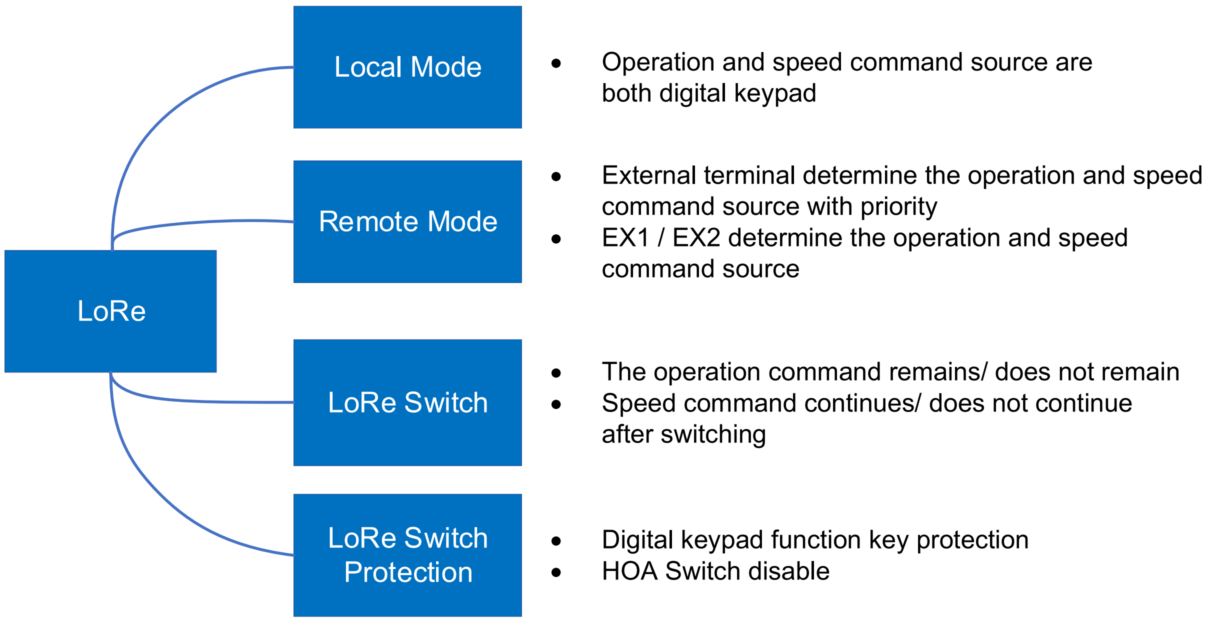


Figure 2: LoRe function

📖 Setting 0:

1. HAND mode: The speed command and operation command sources are fixed to the keypad. When executing key function ( ) and the operation LED is ON, it means that the drive is operating. Refer to Section 4-1-3 for detailed keypad function.
2. OFF mode:
   - The drive executes STOP command. When executing key function ( ) and the STOP LED is ON, it means that the drive is Stopped or is stopping.
   - In OFF mode, the keypad can give the JOG command; but it cannot give JOG command in AUTO and HAND modes.
   - During JOG operation, you cannot switch to AUTO or OFF modes, nor can it perform general operation in HAND mode. It will return to OFF mode when the JOG deceleration is completed.
3. In AUTO mode: When the MI multi-speed function is not enabled, the speed command and operation source operate according to the setting of Pr. A1-00 (EX1/ EX2 Switch Source), such as Pr. C1-01 (EX1 Main Speed Source) and Pr. A1-01 (EX1 Operation Command Source). When executing key function (LOC | REM the operation LED is ON (the Lo/Re AUTO key for keypad on the left has no indication light), it means that the drive has switched to AUTO mode (you can check from the keypad screen), and it can only operate after setting the above parameters.
4. In AUTO mode, when the drive is powered off and on again or the drive has an error, it remains in AUTO mode; when the above situations occur in HAND and OFF modes, it is OFF mode.

5. When setting as 0, the HOA function can only be switched by the keypad; when setting as 1, you can switch the LoRe function through Pr. A4-05.

📖 Setting 1:

1. Local mode: (The status is displayed on keypad synchronously), the speed command and operation command sources are fixed to keypad. When executing key function ( ) and the operation LED is ON, it means that the drive is operating.
2. Remote mode:
   - When the InnerPLC mask and MI multi-speed function are not enabled, the speed command and operation source operate according to the setting of Pr. A1-00 (EX1/ EX2 Switch Source), such as Pr. C1-01 (EX1 Main Speed Source) and Pr. A1-01 (EX1 Operation Command Source). When executing key ( ) y LOC | REM heck the current LoRe mode through keypad, and it can only operate after setting the above parameters.
   - When the drive is powered off and on again or the drive has an error, it remains in Remote mode. Refer to description of Pr. A4-05.
3. The keypad can issue JOG commands under Local mode; in the Remote mode, if the operation source is the keypad, it can also issue the JOG command.

📖 When the drive is not connected to any keypad, you can switch the HOA and LoRe functions by setting communication parameters.

📖 In HAND (Local) mode, the speed command and operation sources are fixed to the keypad; the operation source cannot set to keypad under AUTO mode, but it can be set to keypad under Remote mode.

📖 When you set the operation source to digital keypad in Remote mode, after you switch back to AUTO mode, the operation source will change to disable.

✓ **A4-01** HOA Switch Src Sel

(0x101) Default: 0

Settings	0: Keypad
	1: External terminal

📖 To choose the switch source of HOA (Hand-Off-Auto) mode. When Pr.A4-01 set to 1: External terminal, the HOA mode is decided by the status of Pr.A4-02 and Pr.A4-03.

📖 When Pr.A4-01 set to 0 from 1, the default mode is OFF mode.

A4-02 HAND MI Src

(0x102) Default: 0

Settings 0: Disabled
1: Reserved
2–7: MI1–MI6

A4-03 AUTO MI Src

(0x103) Default: 0

Settings 0: Disabled
1: Reserved
2–7: MI1–MI6

- When A4-01 set to 1: External terminal, the HOA mode is decided by the status of Pr. A4-02 and A4-03.

	HAND MI off	HAND MI off
AUTO MI off	OFF	HAND
AUTO MI on	AUTO	OFF

A4-04 AUTO Lock MI Src

(0x104) Default: 0

Settings 0: Disabled
1: Enabled
2–7: MI1–MI6

- Prevents accidental switching to MI sources out of the AUTO mode. You can enable this function by setting parameters or by the MI terminal.
- MI1–MI6 are I/O board multi-function input terminals.

A4-05 AUTO Lock Mode

(0x105) Default: 0

Settings 0: Off Disabled
1: Hand Disabled
2: Hand & Off Disabled

- 0: When switching from AUTO to OFF mode, the drive remains at AUTO status and does not switch. The drive is able to switch from AUTO to OFF mode if you switch from AUTO to HAND mode first, and then switch to OFF mode.

- 1: When switching from AUTO to HAND mode, the drive remains at AUTO status and does not switch. To switch from AUTO to HAND mode, you can switch from AUTO to OFF mode first, and then switch to HAND mode.
- 2: When switching from AUTO to HAND or OFF mode, the drive remains at AUTO status and does not switch. Disable the function (Pr. A4-04 AUTO Lock MI Source) first before switching the mode.
- 1 or 2: When the lock mode is triggered under HAND mode, the drive stops according to the set stop method and will be in OFF mode after stop.

A4-06 AUTO Initial Speed Cmd

(0x106) Default: 0

Settings 0: Hand Speed Cmd
1: Auto Speed Cmd

- 0: The speed command maintains the speed command before switching and runs with the changed speed command after it is changed. It should be noted that this method is only applicable to occasions that the speed command source is the keypad or a non-periodic update communication command, it is not applicable to analog input or periodic update communication commands.
- 1: The speed command is set according to the speed command source in AUTO mode, if the switched source is set as the keypad, it runs according to the speed command from the keypad.

A4-08 HAND Initial Speed Cmd

(0x108) Default: 0

Settings 0: Auto Speed Cmd
1: Hand Speed Cmd

- 0: The speed command maintains the speed command before switching and runs with the changed speed command after it is changed. It should be noted that this method is only applicable to occasions that the speed command source is the keypad or a non-periodic update communication command, it is not applicable to analog input or periodic update communication commands.
- 1: The speed command source is fixed to keypad in HAND mode.
- The drive issues operation command simultaneously in HAND mode. If the drive is in operation status before switch, it will not stop after switch; if it is in stop status before switch, it will start operation after switch.

A4-10 Loc/Rem Sel Src

(0x10A) Default: 20

Settings 0: Remote
1: Local
2–7: MI1–MI6
8–19: Reserved
20: Keypad

- Local/ Remote can be switched through parameter setting, MI terminals or keypad.
- In LoRe mode, the default of LoRe switching source is Keypad, you can directly switch Local/ Remote mode when connecting to keypad.
- MI1–MI6 are I/O board multi-function input terminals.
- When setting MI terminals, MI ON is local, and MI OFF is remote.
- 20: If the drive is in Local mode before rebooting the power, then it automatically switches to Remote mode after power is ON. Other settings are not limited to this.

⚡ A4-11 Remote Lock MI Src

(0x10B) Default: 0

Settings 0: Disabled
1: Enabled
2–7: MI1–MI6

- Prevents accidental switching to MI sources out of the Remote mode. You can enable this function by setting parameters or by the MI ON.
- If it is in Local mode before the Remote Lock function is enabled, it will force to switch to Remote mode after enabling this function and will return to the previous mode when the function is disabled.

⚡ A4-12 Keypad STOP Enable

(0x10C) Default: 0

Settings 0: Disabled
1: Enabled

- This parameter is only available in LoRe mode.
- When the drive operation source is the Keypad, it performs OFF command and is not affected by this parameter.
- When the drive operation source is not the Keypad, it performs OFF command and will be affected by this parameter; when setting this parameter to 1, the drive stops.

⌁ A4-13 Remote Initial Speed Cmd

(0x10D) Default: 0

Settings 0: Loc Speed Cmd

1: Rem Speed Cmd

- 0: The speed command maintains the speed command before switching and runs with the changed speed command after it is changed. It should be noted that this method is only applicable to occasions that the speed command source is the keypad or a non-periodic update communication command, it is not applicable to analog input or periodic update communication commands.
- 1: The speed command is set according to the speed command source in Remote mode, if the switched source is set as the Keypad, it runs according to the speed command from the keypad.

⌁ A4-15 Local Initial Speed Cmd

(0x10F) Default: 0

Settings 0: Rem Speed Cmd

1: Loc Speed Cmd

- 0: The speed command maintains the speed command before switching and runs with the changed speed command after it is changed. It should be noted that this method is only applicable to occasions that the speed command source is the keypad or a non-periodic update communication command, it is not applicable to analog input or periodic update communication commands.
- 1: The speed command source is fixed to Keypad in Local mode.

A4-17 Loc/Rem Switch Action

(0x111) Default: 0

Settings 0: Always stop
1: Remote Start Cmd
2: Local Start Cmd
3: Start Cmd before Switch

- Selects the switch action for LoRe operation command.
- 0: LoRe switch will force to stop
- 1: When switching to Local, the operation command continues to operate from the Remote source setting.
- 2: When switching to Remote, the operation command continues to operate from the Local source setting. If the source of the Remote operation command is MI ON after switching, the Local operation command continues to the Remote mode.
- 3: If the operation command is communication or keypad after LoRe switch, it operates according to the parameter setting after switching.

A5. Reserved.

B. Pr Management & Macro

b0. Pr Management

✍ b0-00 Access Permission

(0x200) Default: 0

Settings 0: Normal

1: Advanced

- The drive parameter definition is divided into normal and advanced parameters according to the access permission, the differences are shown in the following table.
- The default of the parameter access permission for new machines is normal parameter, you can set this parameter according to your need.
- This parameter does not record after power off.
- The access permission of the parameter is marked on the upper left of the parameter number in the user manual. When the star symbol ∗ appears, it means that the parameter is an advanced parameter, otherwise it is a normal parameter.

Access Permission	Display Pr. Inf.	Set Pr.	Functions	Pr. Qty
0: Normal	Normal	Normal	For example, F2-00–F2-19 are advanced parameters, they will not show when the access permission is set as normal.	General
1: Advanced	Normal and advanced parameters	Normal and advanced parameters	For example, F2-00–F2-19 are advanced parameters, they will show when the access permission is set as advanced.	More

b0-01 Parameter Reset

(0x201) Default: 0

Settings 0: Reserve

5: Reset kWh

9: Reset 50 Hz default

10: Reset 60 Hz default

- 9 or 10: Reset to default. If the password function is enabled (Pr.b0-02 and b0-04), it must be decoded first (Pr.b0-03 and b0-05). You can only reset to default after clearing the previous set password.
- 5: You can return the kWh displayed value to 0 even during drive operation.

⌿ b0-02 Password Setting

(0x202)

⌿ b0-04 Read-Only Password Setting

(0x204) Default: 0

Settings	0–65535
	0: No password protection or password is entered correctly (b0-03/ b0-05)

- The first-level password of the parameter is b0-02 (Password Setting), and the second-level password is b0-04 (Read-only Password Setting).
- This parameter is for setting the password protection. Password can be set directly the first time. After setting, the password protection is activated. At this time, if you want to change any of the parameter settings, you must enter the correct password in Pr.b0-03/ b0-05 to deactivate the password temporarily, this parameter becomes 0 and you can set any parameter. The password protection function is automatically established after rebooting the drive.
- When you enter the correct password in Pr.b0-03/ b0-05, the drive temporarily unlocks the password and then sets this parameter to 0 to cancel the password protection. Otherwise, password protection is always reactivated after you reboot the motor drive.

⌿ b0-03 Password

(0x203)

⌿ b0-05 Read-Only Password

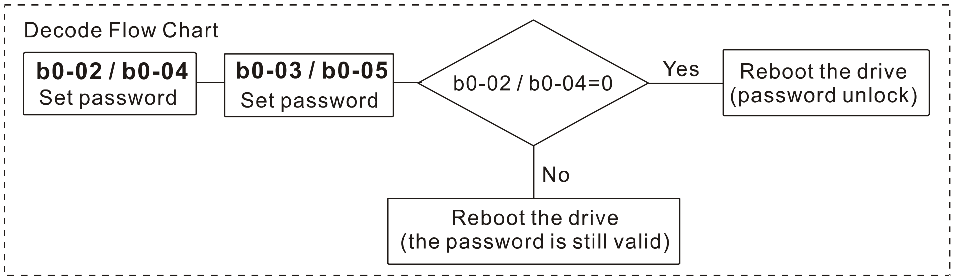
(0x205) Default: 0

Settings	0–65535

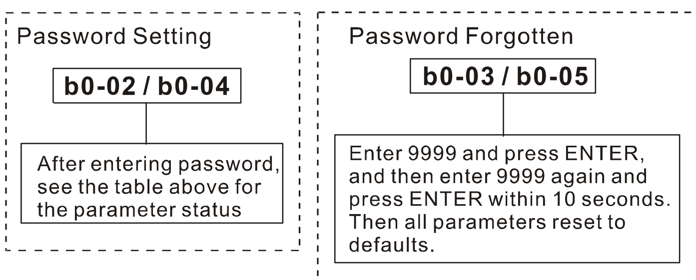
- The first-level password of the parameter is b0-02 (Password Setting), and the second-level password is b0-04 (Read-only Password Setting).
- The parameter locking function allows the project developer to use the drive to manage the personnel who operate the equipment hierarchically.
- The parameter locking function distinguishes between the first and second levels. After setting the first level (Pr.b0-02 Password setting), the parameter value is read as 0, and you cannot read the actual parameter value. The parameters can only be read after setting the second level (Pr.b0-04 Read-only password setting).

Pr Lock Level	Pr Lock Method	Pr Status	Decode Method	Access Permission
1st level locked	Set Pr.b0-02 Password Setting	The Pr attribute becomes read-only and displays 0. (Only Pr.b0-03 and b0-05 can be set)	Enter password in Pr.b0-03	Low (e.g. end-user)
2nd level locked	Set Pr.b0-04 Read-Only Password Setting	The parameter attribute is read-only, other functions are normal. (Only Pr.b0-02, b0-03 and b0-05 can be set)	Enter read-only password in b0-05	Medium (e.g. distributors)
Unlock	N/A	The drive operates and displays normally.	N/A	Normal (for example: equipment manufacturer)

- 🕮 The unlock method for the first level locking is entering the same password as Pr.b0-02 into Pr.b0-03; and to unlock the second level, enter the same password as Pr.b0-04 into Pr.b0-05.
- 🕮 When the parameters are not locked, you can set the first or second level parameter locking function according to your needs. If you need to use both the parameters' functions of the first and the second level, the second level should be locked first (the access permission is medium), and then lock the first level (the access permission is low); otherwise, the second level cannot be locked if you lock the first level firs.
- 🕮 Under parameter locked status, the unlock principle is the same as above. When the first and second level parameters need to be used at the same time, you can unlock the second level directly; if only the first level parameters are unlocked, then the second level needs to be unlocked again.
- 🕮 The first and second level parameter lock functions can be used together, when the functions are enabled:
  - You can unlock the first or second level parameters respectively according to the above methods.
  - Directly enter the password of the second level to unlock the first and the second level parameters.
  - Regardless of unlocking the first or the second level parameters, if you enter the wrong password three times during the process, the drive pops up a parameter unlock failure message, indicating that the fault cannot be reset manually. You must power off and reboot the drive and enter the correct password again to complete the unlock.
  - Refer to the table above for the access permission and parameter status corresponding to each level after unlocking.
- 🕮 Password Decode Flow Chart



- After the parameter lock function is enabled, be sure to write down the password to avoid problems in the future.
- The parameter lock function is used to prevent personnel from setting other parameters by accident.
- The keypad copy function works normally only when the password protection is deactivated (temporarily or permanently) Password set in Pr.b0-02 and b0-04 cannot be copied to the keypad. When copying parameters from the keypad to the motor drive, set the password in b0-02 and b0-04 manually again in the motor drive to activate password protection.
- If you forget the password, clear the password setting by input 9999 in Pr.b0-03 / b0-05 and press the ENTER key, then enter 9999 again and press ENTER within 10 seconds (if the above action takes more than 10 seconds, repeat the process again). After decoding, all the settings return to default.
- Password Function Flow Chart



b0-06 Failed Password Attempts

(0x206) Default: Read only

Settings 0–3

- When the b0-03/ b0-05 input password is different from the b0-02/ b0-04 password, and the number of errors reaches the upper limit set by this parameter, the drive shows the parameter unlock failure fault code, and this fault cannot be reset manually (even after you enter the correct password again). You must power off and reboot the drive to clear this fault, and then enter the correct password to unlock the parameter locked/ read-only status.

b0-07 Parameter Lock Status

(0x207) Default: Read only

Settings bit0: Parameter hidden

bit1: Parameter read-only

bit2: Reserve

bit3: Over PW attempts limit

bit4: FireMode parameter lock

- Use the password function (Pr.b0-02–b0-05) to protect the parameter information. When the password is set in Pr.b0-02 or b0-04, the corresponding bit0 or bit1 will be ON. When Pr.b0-03 or b0-05 unlocks parameter more than 3 times (not included), bit3 will be ON.
- When using the fire mode password function, Pr. J5-06 bit2 is ON, the corresponding bit4 for b0-07 will be ON.

bit	4	3	2	1	0
Parameter Lock Status	FireMode parameter lock	Over PW attempts limit	Reserved	Parameters read-only	Parameter hidden
Description	When Pr.J5-06 is enabled, the bit is ON.	When the password fails to unlock for over 3 times, this bit is ON.	N/A	When Pr.b0-04 is enabled, this bit is ON.	When Pr.b0-02 is enabled, this bit is ON.

∗ b0-12 PR CTRL Bit

(0x20D) Default: 0

Settings bit0: Disable the 'force unlock' function

bit0 = 0: OFF (allow forced unlock)

bit0 = 1: ON (not allow forced unlock)

- Parameter setting of the drive is highly related to the industry process. Enabling the password function (Pr.b0-02–b0-07) can protect the confidentiality of the drive parameter settings on the device from exposed, but it cannot prevent personnel from resetting the drive parameters by mistake, causing the device to be paralyzed and unable to operate normally. To avoid the above misoperation, you may consider enabling this function.
- bit0 = 0 OFF: Parameters can be forced unlock. When the password function is enabled but the password is lost, refer to description in Pr.b0-03 / b0-05 to unlock and reset the parameters to the default value.

- 🕮 bit0 = 1 ON: Parameters cannot be forced unlock. When the password function is enabled but the password is lost, you cannot unlock the parameter. Pay extra attention on the use and keep the password properly.
- 🕮 The drive parameter settings are user’s intellectual property. Regardless of whether the force unlock function is enabled or not, users should take responsibility for protecting the password when using the password function. If the password is lost, VIDAR cannot and has no right to unlock the password and must replace the control board if necessary to allow the drive to operate.

b1 Application Macro

b1-00 MACRO Sel

(0x206) Default: 0

Settings 0: Reserved

1: Pump

2: Fan/Blower

3: Other

📖 VIDAR integrates the commonly used parameters for fans and pumps into application macros for facilitate user operations. Setting value 1: Pump

The following table lists the relevant Pump application parameters:

Pr. Correspondence	Parameter Name	Setting Value
C2-00	Accel Time 1	5 sec.
C2-01	Decel Time 1	5 sec.
C2-08	Start of Accel S-curve Time	0 sec.
C2-09	End of Accel S-curve Time	0 sec
C2-10	Start of Decel S-curve Time	0 sec
C2-11	End of Decel S-curve Time	0 sec

📖 Setting value 2: Fan/ Blower

Pr. Correspondence	Parameter Name	Setting Value
C2-00	Accel Time 1	20 sec.
C2-01	Decel Time 1	20 sec.
C2-08	Start of Accel S-curve Time	5 sec.
C2-09	End of Accel S-curve Time	5 sec
C2-10	Start of Decel S-curve Time	5 sec
C2-11	End of Decel S-curve Time	5 sec

📖 Setting value 3: Other

Pr. Correspondence	Parameter Name	Setting Value
C2-00	Accel Time 1	20 sec.
C2-01	Decel Time 1	20 sec.
C2-08	Start of Accel S-curve Time	5 sec.
C2-09	End of Accel S-curve Time	5 sec
C2-10	Start of Decel S-curve Time	5 sec
C2-11	End of Decel S-curve Time	5 sec

b2. Pr Modified REC 1–10

b2-00 REC 1 Pr Address

(0x280) Default: Read only

b2-01 REC 1 Original Setting

(0x281) Default: Read only

b2-02 REC 1 New Setting

(0x282) Default: Read only

b2-03 REC 1 Year

(0x283) Default: Read only

b2-04 REC 1 Date

(0x284) Default: Read only

b2-05 REC 1 Time

(0x285) Default: Read only

Settings 0–2359

- The parameter modified record provides 20 groups, each group corresponds to 6 parameters (Pr. b2-00–b2-59, Pr. b3-00–b3-59). It records the parameter address, original setting, new setting and time.
- When the parameter is changed, the first record is stored in Pr. b2-00–b2-05; when another parameter is changed, the latest record is retained in Pr. b2-00–b2-05, the previous record is pushed backwards to Pr. b2-06–b2-11 and so on.
- When the parameters reset to the default (Pr. b0-01), all the parameter modified records (Pr. b2-00–b2-59, Pr. b3-00–b3-59) return to 0.

b2-06 REC 2 Pr Address

(0x286) Default: Read only

b2-07 REC 2 Original Setting

(0x287) Default: Read only

b2-08 REC 2 New Setting

(0x288) Default: Read only

b2-09 REC 2 Year

(0x289) Default: Read only

b2-10 REC 2 Date

(0x28A) Default: Read only

b2-11 REC 2 Time

(0x28B) Default: Read only

b2-12 REC 3 Pr Address

(0x28C) Default: Read only

b2-13 REC 3 Original Setting

(0x28D) Default: Read only

b2-14 REC 3 New Setting

(0x28E) Default: Read only

b2-15 REC 3 Year

(0x28F) Default: Read only

b2-16 REC 3 Date

(0x290) Default: Read only

b2-17 REC 3 Time

(0x291) Default: Read only

b2-18 REC 4 Pr Address

(0x292) Default: Read only

b2-19 REC 4 Original Setting

(0x293) Default: Read only

b2-20 REC 4 New Setting

(0x294) Default: Read only

b2-21 REC 4 Year

(0x295) Default: Read only

b2-22 REC 4 Date

(0x296) Default: Read only

b2-23 REC 4 Time

(0x297) Default: Read only

b2-24 REC 5 Pr Address

(0x298) Default: Read only

b2-25 REC 5 Original Setting

(0x299) Default: Read only

b2-26 REC 5 New Setting

(0x29A) Default: Read only

b2-27 REC 5 Year

(0x29B) Default: Read only

b2-28 REC 5 Date

(0x29C) Default: Read only

b2-29	REC 5 Time	
(0x29D)		Default: Read only
b2-30	REC 6 Pr Address	
(0x29E)		Default: Read only
b2-31	REC 6 Original Setting	
(0x29F)		Default: Read only
b2-32	REC 6 New Setting	
(0x2A0)		Default: Read only
b2-33	REC 6 Year	
(0x2A1)		Default: Read only
b2-34	REC 6 Date	
(0x2A2)		Default: Read only
b2-35	REC 6 Time	
(0x2A3)		Default: Read only
b2-36	REC 7 Pr Address	
(0x2A4)		Default: Read only
b2-37	REC 7 Original Setting	
(0x2A5)		Default: Read only
b2-38	REC 7 New Setting	
(0x2A6)		Default: Read only
b2-39	REC 7 Year	
(0x2A7)		Default: Read only
b2-40	REC 7 Date	
(0x2A8)		Default: Read only
b2-41	REC 7 Time	
(0x2A9)		Default: Read only
b2-42	REC 8 Pr Address	
(0x2AA)		Default: Read only
b2-43	REC 8 Original Setting	
(0x2AB)		Default: Read only
b2-44	REC 8 New Setting	
(0x2AC)		Default: Read only
b2-45	REC 8 Year	
(0x2AD)		Default: Read only

b2-46 REC 8 Date
(0x2AE) Default: Read only

b2-47 REC 8 Time
(0x2AF) Default: Read only

b2-48 REC 9 Pr Address
(0x2B0) Default: Read only

b2-49 REC 9 Original Setting
(0x2B1) Default: Read only

b2-50 REC 9 New Setting
(0x2B2) Default: Read only

b2-51 REC 9 Year
(0x2B3) Default: Read only

b2-52 REC 9 Date
(0x2B4) Default: Read only

b2-53 REC 9 Time
(0x2B5) Default: Read only

b2-54 REC 10 Pr Address
(0x2B6) Default: Read only

b2-55 REC 10 Original Setting
(0x2B7) Default: Read only

b2-56 REC 10 New Setting
(0x2B8) Default: Read only

b2-57 REC 10 Year
(0x2B9) Default: Read only

b2-58 REC 10 Date
(0x2BA) Default: Read only

b2-59 REC 10 Time
(0x2BB) Default: Read only

Settings 0–2359

📖 Refer to description of Pr. b2-00–b2-05.

b3. Pr Modified REC 11–20

b3-00 REC 11 Pr Address
(0x2C0) Default: Read only

b3-01 REC 11 Original Setting
(0x2C1) Default: Read only

b3-02 REC 11 New Setting
(0x2C2) Default: Read only

b3-03 REC 11 Year
(0x2C3) Default: Read only

b3-04 REC 11 Date
(0x2C4) Default: Read only

b3-05 REC 11 Time
(0x2C5) Default: Read only

b3-06 REC 12 Pr Address
(0x2C6) Default: Read only

b3-07 REC 12 Original Setting
(0x2C7) Default: Read only

b3-08 REC 12 New Setting
(0x2C8) Default: Read only

b3-09 REC 12 Year
(0x2C9) Default: Read only

b3-10 REC 12 Date
(0x2CA) Default: Read only

b3-11 REC 12 Time
(0x2CB) Default: Read only

b3-12 REC 13 Pr Address
(0x2CC) Default: Read only

b3-13 REC 13 Original Setting
(0x2CD) Default: Read only

b3-14 REC 13 New Setting
(0x2CE) Default: Read only

b3-15 REC 13 Year
(0x2CF) Default: Read only

b3-16 REC 13 Date
(0x2D0) Default: Read only

b3-17 REC 13 Time
(0x2D1) Default: Read only

b3-18 REC 14 Pr Address
(0x2D2) Default: Read only

b3-19 REC 14 Original Setting
(0x2D3) Default: Read only

b3-20 REC 14 New Setting
(0x2D4) Default: Read only

b3-21 REC 14 Year
(0x2D5) Default: Read only

b3-22 REC 14 Date
(0x2D6) Default: Read only

b3-23 REC 14 Time
(0x2D7) Default: Read only

b3-24 REC 15 Pr Address
(0x2D8) Default: Read only

b3-25 REC 15 Original Setting
(0x2D9) Default: Read only

b3-26 REC 15 New Setting
(0x2DA) Default: Read only

b3-27 REC 15 Year
(0x2DB) Default: Read only

b3-28 REC 15 Date
(0x2DC) Default: Read only

b3-29 REC 15 Time
(0x2DD) Default: Read only

b3-30 REC 16 Pr Address
(0x2DE) Default: Read only

b3-31 REC 16 Original Setting
(0x2DF) Default: Read only

b3-32 REC 16 New Setting

(0x2E0) Default: Read only

b3-33 REC 16 Year

(0x2E1) Default: Read only

b3-34 REC 16 Date

(0x2E2) Default: Read only

b3-35 REC 16 Time

(0x2E3) Default: Read only

b3-36 REC 17 Pr Address

(0x2E4) Default: Read only

b3-37 REC 17 Original Setting

(0x2E5) Default: Read only

b3-38 REC 17 New Setting

(0x2E6) Default: Read only

b3-39 REC 17 Year

(0x2E7) Default: Read only

b3-40 REC 17 Date

(0x2E8) Default: Read only

b3-41 REC 17 Time

(0x2E9) Default: Read only

b3-42 REC 18 Pr Address

(0x2EA) Default: Read only

b3-43 REC 18 Original Setting

(0x2EB) Default: Read only

b3-44 REC 18 New Setting

(0x2EC) Default: Read only

b3-45 REC 18 Year

(0x2ED) Default: Read only

b3-46 REC 18 Date

(0x2EE) Default: Read only

b3-47 REC 18 Time

(0x2EF) Default: Read only

b3-48 REC 19 Pr Address
(0x2F0) Default: Read only

b3-49 REC 19 Original Setting
(0x2F1) Default: Read only

b3-50 REC 19 New Setting
(0x2F2) Default: Read only

b3-51 REC 19 Year
(0x2F3) Default: Read only

b3-52 REC 19 Date
(0x2F4) Default: Read only

b3-53 REC 19 Time
(0x2F5) Default: Read only

b3-54 REC 20 Pr Address
(0x2F6) Default: Read only

b3-55 REC 20 Original Setting
(0x2F7) Default: Read only

b3-56 REC 20 New Setting
(0x2F8) Default: Read only

b3-57 REC 20 Year
(0x2F9) Default: Read only

b3-58 REC 20 Date
(0x2FA) Default: Read only

b3-59 REC 20 Time
(0x2FB) Default: Read only

Settings 0–2359

Refer to description of Pr. b2-00–b2-05.

b4. Factory Parameters (Reserved)

C. Control Mode & Cmd Scheme

C0. Control Mode Selection

C0-03 Hand/ Local Control Mode

(0x403) Default: 0

Settings 0: Speed mode

1: Torque mode

C0-04 EX1 Control Mode Source

(0x404) Default: 0

Settings 0: Digital keypad

1: RS-485

2–3: Reserve

4: MI selection

C0-05 EX1 Control Mode

(0x405) Default: 0

Settings 0: Speed mode

1: Torque mode

C0-06 EX2 Control Mode Source

(0x406) Default: 0

Settings 0: Digital keypad

1: RS-485

2–3: Reserve

4: MI selection

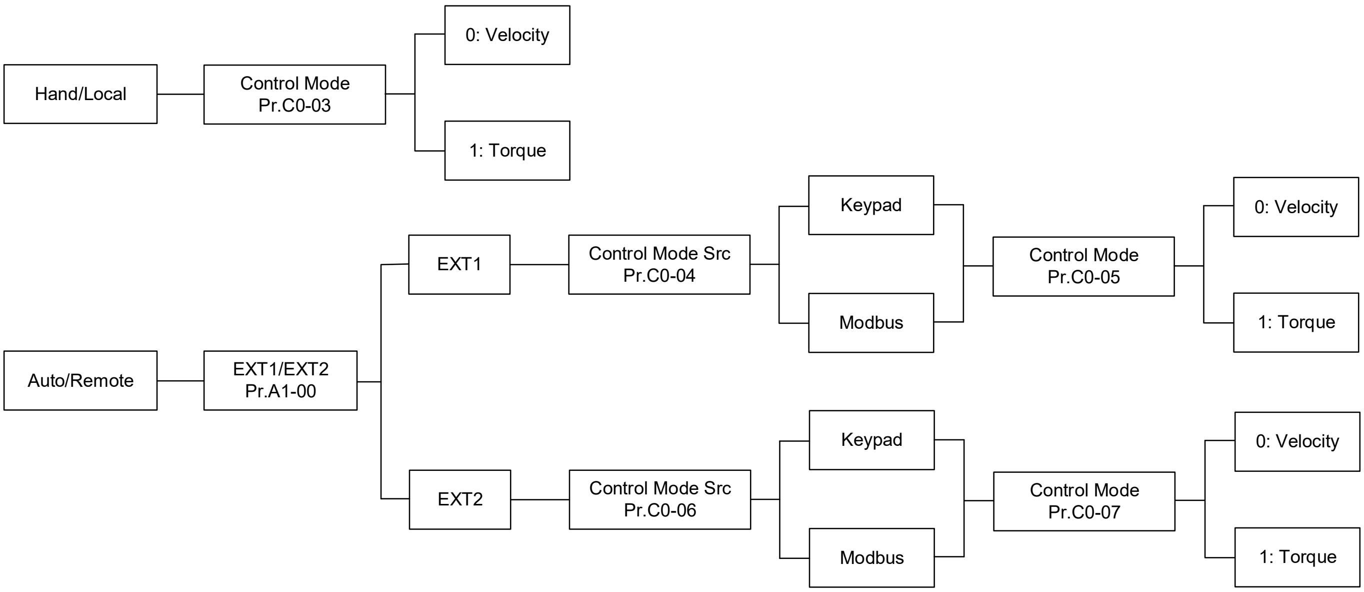
C0-07 EX2 Control Mode

(0x407) Default: 0

Settings 0: Speed mode

1: Torque mode

📖 Refer to the diagram below for the setting of Pr.C0-03–Pr.C0-07.



C0-08 Torque/ Speed Mode Switch MI Source

(0x408) Default: 0

Settings 0: Speed mode
1: Torque mode
2–7: MI1–MI6
(MI = ON: Torque mode; MI = OFF: Speed mode)

📖 When the control mode source is selected as MI, the final control mode will be determined based on the setting of Pr.C0-08.

C1. Speed Cmd Handle

C1-00 EX1 Main and Aux Speed Math

(0x440) Default: 0

C1-04 EX2 Main and Aux Speed Math

(0x444) Default: 0

Settings 0: Main FREQ
1: Aux FREQ
2: ADD
3: SUB
4: MULTI
5: DIV
6: MAX
7: MIN

- Selects the mathematical operation method of the main and auxiliary speed.
- Pr. C1-00 = 0 Main speed: It means EX1 has only main speed and no auxiliary speed. Similarly, if Pr. C1-00 = 1, it means that EX1 has only auxiliary speed but no main speed.
- Use Pr.C1-01 and C1-02 to select EX1 main and auxiliary speed source; use Pr. C1-05 and C1-06 for EX2 main and auxiliary speed source selection.

C1-01 EX1 Main Speed Src

(0x441) Default: 1

C1-05 EX2 Main Speed Src

(0x445) Default: 1

Settings 0: Disabled
1: COM1 (Keypad)
2: COM1 (Modbus)
3: EtherNet
4: Reserved
5–6: Reserved
7–8: AI1–AI2
9–15: Reserved
16: Up/down keys
17: Reserved
18: PID

📖 This parameter selects EX1/ EX2 main speed source.

📖 For example, when selection AI source (AI1–AI2):
Set Pr. C1-01 = 7 (AI1) as the main speed source; Pr. G2-03 = 1, AI1 signal type is 0–10 V; Pr. C2-17 maximum operation speed = 900 rpm, AI input 0–100% corresponds to 0.00 Hz in Pr. C2-17. When the AI1 input 5V (50%), the main speed command is 900 rpm × 50% = 450 rpm.

📖 16: When setting the Up/Down terminal as the main speed source, you can set the MI source for speed up and down. When you set MI1 as the speed up command source and MI1 is ON, the speed command increases according to the parameter setting in Up/ Down mode; when you set MI2 as the speed down command source and MI2 is ON, the speed command decreases according to the parameter setting in Up/ Down mode. If both MI sources of speed up and down are the same (MI1 = MI2 = ON or OFF), the speed command remains.

📖 18: When selecting PID as the main speed source, the speed command source is the output of the PID function.

C1-02 EX1 Aux Speed Src

(0x442) Default: 0

C1-06 EX2 Aux Speed Src

(0x446) Default: 0

Settings
0: Disabled
1: COM1 (Keypad)
2: COM1 (Modbus)
3: EtherNet
4: COM2 (Ext. COM)
5–6: Reserved
7–8: AI1–AI2
9–15: Reserved
16: Up/down keys
17: Reserved
18: PID

📖 This parameter selects EX1/ EX2 auxiliary speed source.

✓ C1-03 EX1 Aux Speed Gain

(0x443) Default: 100.0

⌁ C1-07 EX2 Aux Speed Gain

(0x447) Default: 100.0

Settings	-200.0–200.00%

- This parameter sets the EX1/ EX2 auxiliary speed gain.
- For example: Pr. C1-00 = 2 (ADD), Pr. C1-01 = 1 (Keypad), Pr. C1-02 = 7 (AI1), Pr. C1-03 = 10% and Pr. C2-17 = 2500 rpm
  Main speed: Keypad speed command 1000 rpm
  Auxiliary speed: AI1 = 5V, 2500 rpm × 10% = 250 rpm
  EX1 speed command = main speed + auxiliary speed = 1000 + 250 = 1250 rpm

⌁ C1-08 Keypad Speed Cmd

(0x448) Default: 180/360
Depending on the models

Settings	0–8985 rpm

- This parameter displays the speed command setting value of the main page when the speed command source is Digital Keypad. Meanwhile, you can enter this parameter setting page to set the speed command on the main page as well.

C1-09 Communication Speed Cmd

(0x449) Default: Read only

Settings	0–8985 rpm

- This parameter displays the last speed command setting value before power-off when the speed command source is Modbus.
- To run directly with the set value before the last power-off after the VIDAR reboots, the VIDAR needs to record the speed command set before the power-off and use this recorded speed command as the initial value of the speed command after power-on.

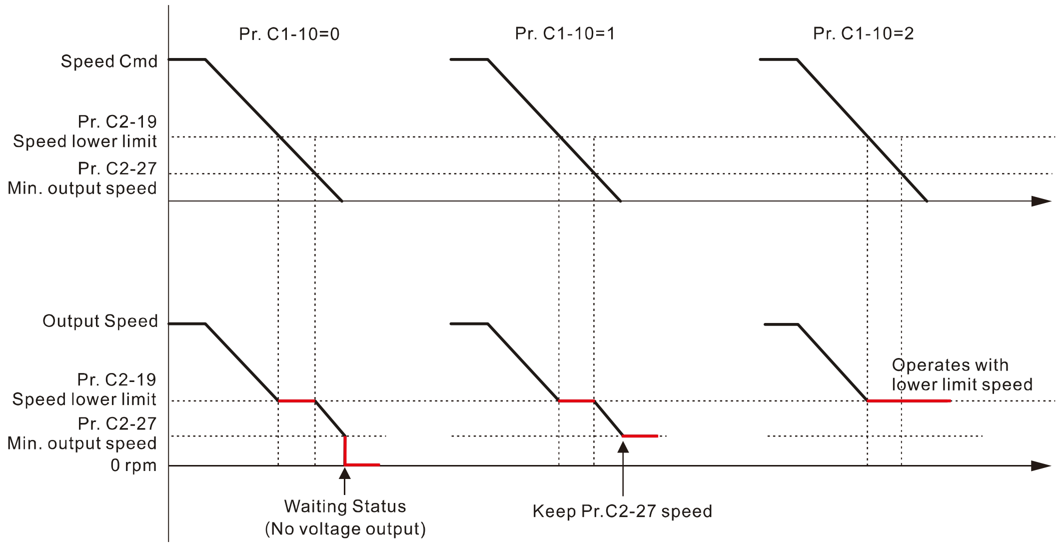
⌁ C1-10 Zero-speed Behavior

(0x44A) Default: 1

Settings	0: Standby
	1: Min speed
	2: Speed lower limit

- When the VIDAR speed command is < Min. speed (Pr. C2-27), the VIDAR activates according to the setting for this parameter.

- 0: the VIDAR is in standby status (there is no voltage output from U, V and W)
- 1: the VIDAR operates according to Min. Speed (Pr.C2-27).
- 2: the VIDAR operates according to Speed lower limit (Pr.C2-19).
- Speed command < Pr. C2-27 Min. speed:



C1-13 Speed Cmd Up Key MI Src

(0x44D) Default: 0

C1-14 Speed Cmd Down Key MI Src

(0x44E) Default: 0

Settings 0: Disabled
1: Enable
2–7: MI1–MI6

- You can choose up key or down key as the main speed source.
- Use this parameter to select the MI source for speed up and down command. For example:
  Pr. C1-13 = 2 (MI1): when the MI1 terminal is ON, sets the speed up command with Up/Down mode.
  Pr. C1-14 = 3 (MI2): when the MI2 terminal is ON, sets the speed down command with Up/Down mode.

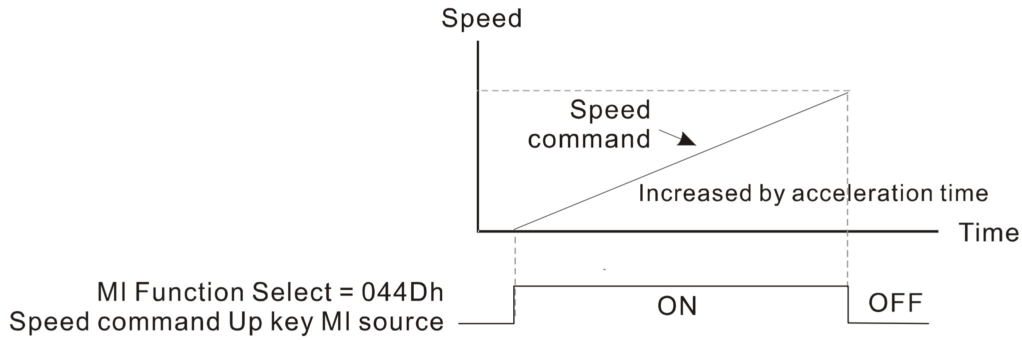
C1-15 Up/Down Accel/ Decel Method

(0x44F) Default: 0

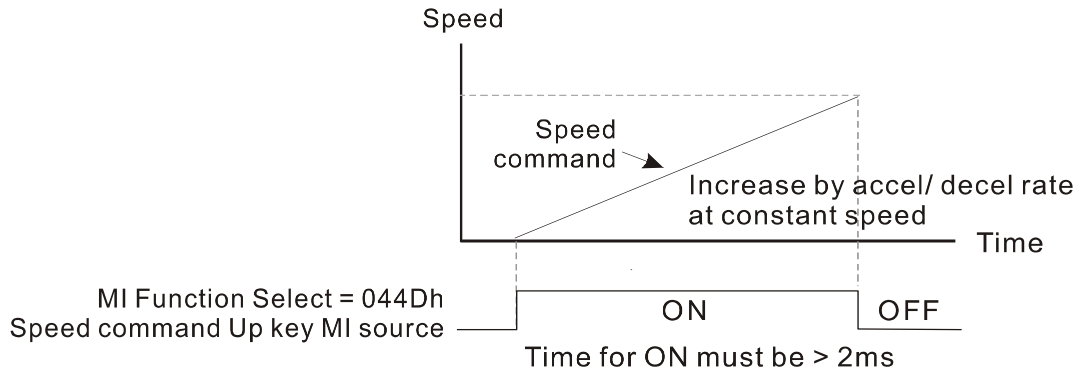
Settings 0: Accel/ Decel time
1: Up/Down Accel/Decel rate

- This parameter determines the up and down mode of the speed command of the up/ down terminal.

📖 Pr.C1-15 = 0 (Accel/ Decel time): The up/down terminal increases / decreases the speed command (F) according to the setting for acceleration or deceleration time (refer to Pr.C2-00–C2-07).



📖 Pr.C1-15 = 1 (Up/ Down Accel/ Decel Rate): The up/ down terminal increases/ decreases the speed command (F) according to the setting of Pr.C1-16 and Pr.C1-17.



✎ C1-16 Up/Down Accel/ Decel Rate

(0x450) Default: 0.001

Settings 0.001–1.000 Hz/ms

✎ C1-17 Up/Down Accel/ Decel Rate Unit

(0x451) Default: 0

Settings 0: Hz/ms

1: Hz/100ms

📖 When selecting up/down accel/ decel rate for the up/down mode, the speed up/ down command is determined by the up/ down acceleration and deceleration rate and its units.

C1-18 Multi Speed Mode

(0x452) Default: 0

Settings 0: 15 Speed

1: 4 Speed

📖 Use this parameter to select 16 speed or 4 speed for the multi-speed mode.

C1-19 Multi Speed MI Src 1

(0x453) Default: 0

C1-20 Multi Speed MI Src 2

(0x454) Default: 0

C1-21 Multi Speed MI Src 3

(0x455) Default: 0

C1-22 Multi Speed MI Src 4

(0x456) Default: 0

Settings 0: Disabled

1: Reserved

2–7: MI1–MI6

Use Pr.C1-19–C1-22 to select the multi-speed MI source. Sets the operated speed through the MI terminal (use Pr.C1-18 to select 4 speed or 15 speed).

C1-23 Multi Speed 1

(0x457) Default: 0

C1-24 Multi Speed 2

(0x458) Default: 0

C1-25 Multi Speed 3

(0x459) Default: 0

C1-26 Multi Speed 4

(0x45A) Default: 0

C1-27 Multi Speed 5

(0x45B) Default: 0

C1-28 Multi Speed 6

C1-29 Multi Speed 7

(0x45D) Default: 0

C1-30 Multi Speed 8

(0x45E) Default: 0

C1-31 Multi Speed 9

(0x45F) Default: 0

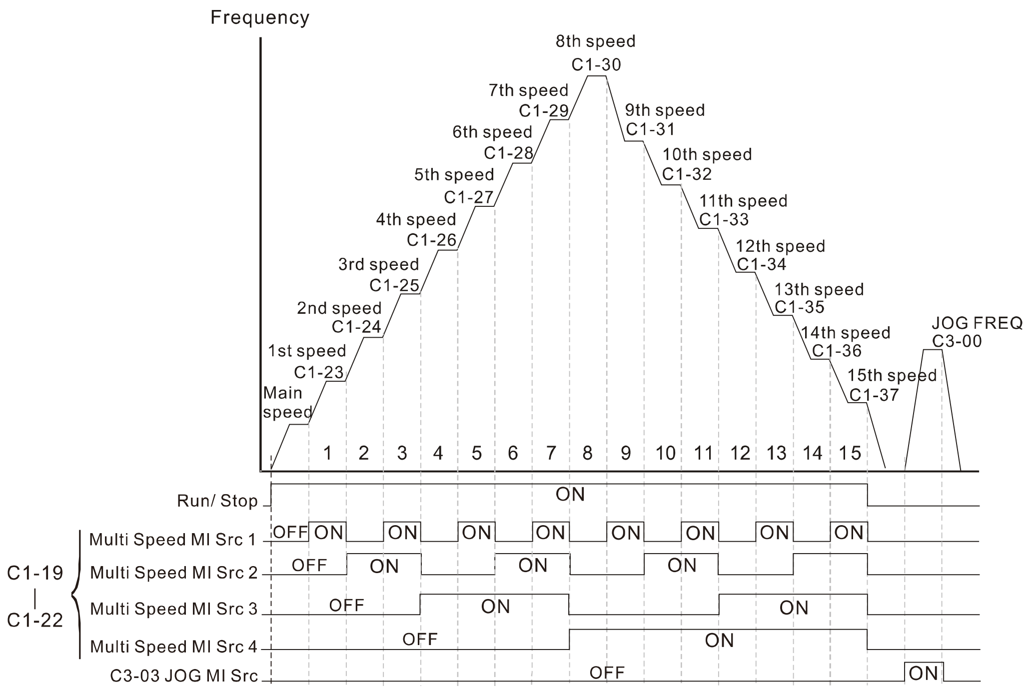
C1-32 Multi Speed 10

(0x460) Default: 0

C1-33 Multi Speed 11	
(0x461)	Default: 0
C1-34 Multi Speed 12	
(0x462)	Default: 0
C1-35 Multi Speed 13	
(0x463)	Default: 0
C1-36 Multi Speed 14	
(0x464)	Default: 0
C1-37 Multi Speed 15	
(0x465)	Default: 0
Settings 0–8985 rpm	

- Sets Multi speed 1–15 separately with Pr.C1-23–C1-37.
- Explanation for the timing diagram of the multi-step speed and multi speed MI source:

  Related parameters:
  - Pr.C1-23–C1-37: Multi speed 1–15
  - Pr.C1-19–C1-22: Multi speed MI Src 1–4
  - The figure below shows the multi-speed via external terminals sequence and the multi-speed switching combination.



Multi-speed and Multi Speed MI Source Action Sequence

⌁ C1-38 Negative Speed Cmd Define

(0x466) Default: 0

Settings 0: Always 0 rpm

1: Direction

- This parameter defines the action when AI is set as negative speed command.
- For the analog input (AI) speed source that has positive/ negative speed commands and accepts forward/ reverse command, it operates according to Pr.C1-38 setting.
  When Pr.C1-38 = 0, the negative speed command is not accepted and will be regarded as 0 rpm command. The VIDAR operation direction is determined by the forward/ reverse command.
  When Pr.C1-38 = 1, the negative speed command is accepted. The positive and negative signals of the speed command determine the VIDAR operating in forward/ reverse direction and the forward/ reverse command is invalid at this moment.
- For example: when the analog input speed command is -600 rpm:
  Pr.C1-38 = 0: the VIDAR operates according to the setting for Pr.C1-10 Zero-speed Behavior.
  Pr.C1-38 = 1: the VIDAR operates in reverse for 600 rpm.

C1-39 AI Res Switch MI Src

(0x467) Default: 0

Settings 0: Disabled

1: Enable

2–7: MI1–MI6

- Use Pr.C1-39 to enable or disable the AI resolution switch function, or to select the MI terminal that is going to enable.

⌁ C1-40 AI Res Switch Max Speed

(0x468) Default: 1770/3550

Depending on the models

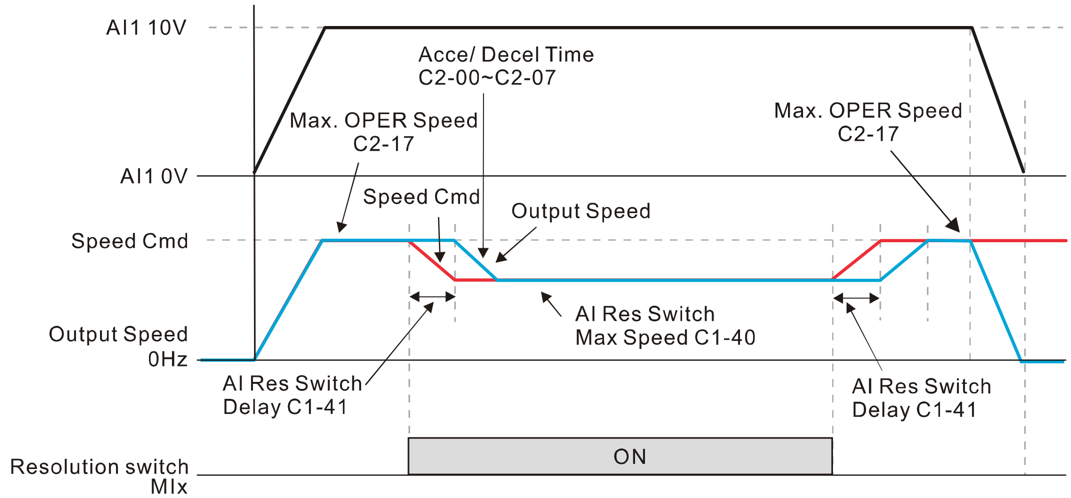
Settings 0–8985 rpm

⌁ C1-41 AI Res Switch Delay

(0x469) Default: 0.000

Settings 0.000–65.000 sec.

- Complements the unstable speed or positioning caused by insufficient analog input resolution, use it with Pr.C1-39 enabling the AI resolution switch function.



C1-42 Speed Unit Sel

(0x46A) Default: 0

Settings 0: RPM

1: Hz

📖 Selects the speed unit of the parameters. For example: Pr.C1-23–C1-37.

📖 In addition to the parameters, the unit of speed setting on keypad is also decided by Pr.C1-41. Except the speed unit of the parameters, Pr.C1-42 also sets the speed unit on the keypad.

C2. Accel / Decel & Speed Limit

C2-00 Accel Time 1
(0x480)

C2-01 Decel Time 1
(0x481)

C2-02 Accel Time 2
(0x482)

C2-03 Decel Time 2
(0x483)

C2-04 Accel Time 3
(0x484)

C2-05 Decel Time 3
(0x485)

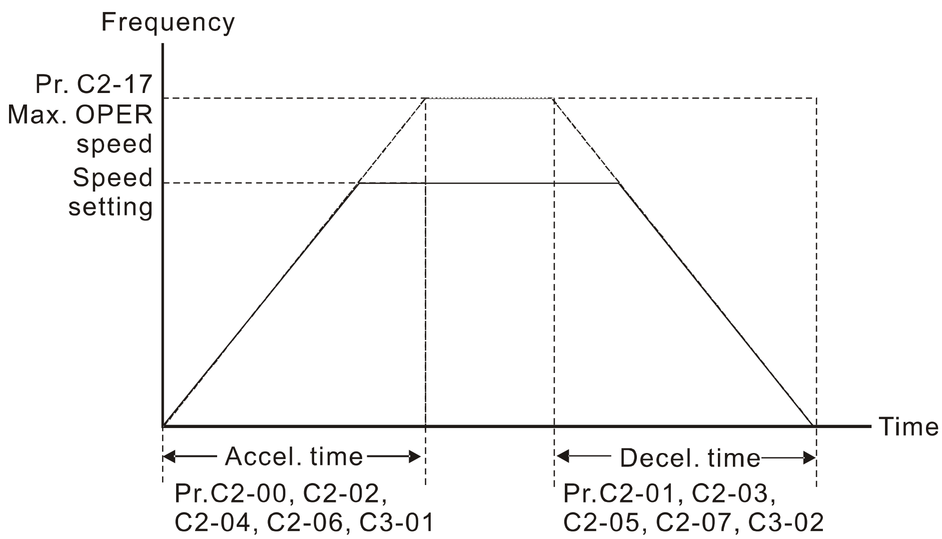
C2-06 Accel Time 4
(0x486)

C2-07 Decel Time 4
(0x487)

Default: 10.00 / 10.0

Settings Pr.C2-13 = 0: 0.00–600.00 sec.
Pr.C2-13 = 1: 0.0–6000.0 sec.

- The acceleration time determines the time required for the VIDAR to ramp from 0 rpm to the maximum operation speed (Pr.C2-17). The deceleration time determines the time required for the VIDAR to decelerate from the maximum operation speed (Pr.C2-17) down to 0 rpm.



Acceleration / Deceleration Time

- 🕮 The deceleration time is invalid when using auto-deceleration setting.
- 🕮 With the enabled torque limits and stall prevention functions, the actual acceleration and deceleration time are longer than the set acceleration/ deceleration time.
- 🕮 Setting the acceleration and deceleration time too short may trigger the VIDAR protection function (Pr.H2-05 Over-current Stall Prevention during Acceleration; therefore, the actual acceleration/ deceleration time will be longer than the set acceleration/ deceleration time.
- 🕮 Setting the acceleration time too short may cause motor damage or trigger VIDAR protection due to over-current during the VIDAR acceleration.
- 🕮 Setting the deceleration time too short may cause motor damage or trigger VIDAR protection due to over-current during the VIDAR deceleration.
- 🕮 The default is Accel/ Decel Time 1 (Pr.C2-00, C2-01). You can select the other Accel/ Decel Time 2–4 (Pr.C2-02–C2-07) of the VIDAR by setting the multi-function terminal and its digital status. There are four acceleration and deceleration selections in total.
- 🕮 When you use this function with the S-curve acceleration/ deceleration (Pr.C2-08–Pr. C2-11), the actual acceleration and deceleration time are longer than the setting.

⌁ C2-08 Start of Accel S-curve Time

(0x488) Default: 0.0

⌁ C2-09 End of Accel S-curve Time

(0x489) Default: 0.0

⌁ C2-10 Start of Decel S-curve Time

(0x48A) Default: 0.0

⌁ C2-11 End of Decel S-curve Time

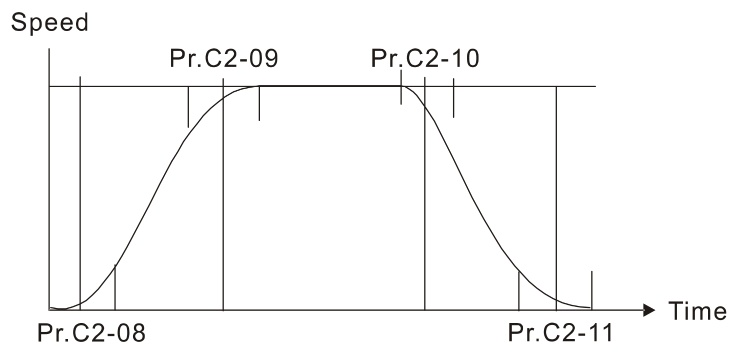
(0x48B) Default: 0.0

Settings 0.00–25.00 sec.

- 🕮 Using the S-curve acceleration/ deceleration time can reduce the impact of the VIDAR when it starts to accelerate or stop.
- 🕮 The acceleration and deceleration curve adjusts the acceleration and deceleration S-curve. When enabled, the VIDAR produces a different acceleration and deceleration curve according to the acceleration and deceleration time.
- 🕮 The S-curve function is invalid when you set the acceleration and deceleration time to 0.
- 🕮 When Pr.C2-00, C2-02, C2-06 and C2-06 ≥ Pr.C2-08 and C2-09, the actual acceleration time is as follows:

  The actual acceleration time = Pr.C2-00, C2-02, C2-04, C2-06 + (Pr.C2-08 + C2-09) ÷ 2

- When Pr.C2-01, C2-03, C2-07 and C2-06 ≥ Pr.C2-10 and C2-11, the actual deceleration time is as follows:
  The actual deceleration time = Pr.C2-01, C2-03, C2-05, C2-07 + (Pr.C2-10 + C2-11) ÷ 2

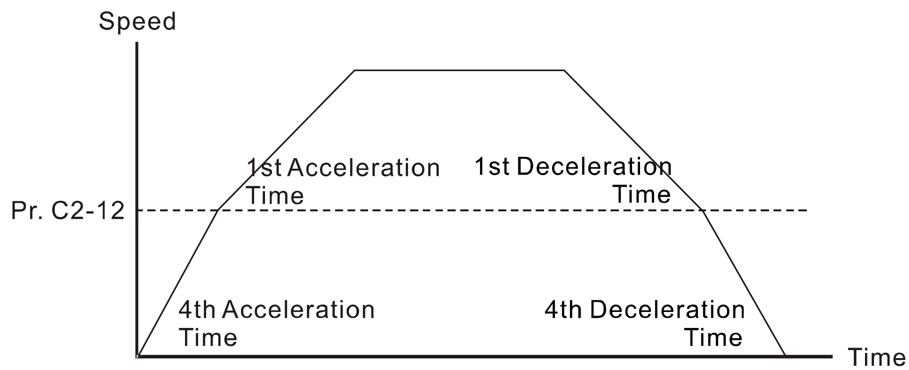


C2-12 Accel/ Decel 1/4 Switch Speed

(0x48C) Default: 0

Settings 0–8985 rpm

- This function does not require the external terminal switching function; it switches the acceleration and deceleration time automatically according to the Pr.C2-12 setting. If you set the external terminal, the external terminal has priority over Pr.C2-12.
- Use this parameter to set the switch speed between acceleration and deceleration slope. The First / Fourth Accel. / Decel. slope is calculated by the Max. Operation Speed (Pr.C2-17) ÷ acceleration / deceleration time.
  Example:
  When the Max. Operation Speed (Pr.C2-17) = 1200 rpm, and Accel/ Decel 1/4 Switch Speed (Pr.C2-12) = 600 rpm:
  a. If Acceleration Time 1 (Pr.C2-00) = 10 sec., Acceleration Time 4 (Pr.C2-06) = 6 sec., then the acceleration time is 3 sec. for 0–600 rpm and 5 sec. for 600–1200 rpm.
  b. If Deceleration Time 1 (Pr.C2-01) = 8 sec., Deceleration Time 4 (Pr.C2-07) = 2 sec., then the deceleration time is 4 sec. for 1200–600 rpm and 1 sec. for 600–0 rpm.



1st/4th Acceleration/Deceleration Speed Switching

C2-13 Accel/ Decel Time unit

(0x48D) Default: 0

Settings 0: 0.01 sec.
1: 0.1 sec.

📖 Selects the numerical unit of the acceleration/ deceleration time.

⌁ C2-14 Quick Stop Time

(0x48E) Default:
5.0 (for pumps)/
15.0 (for fans/ blowers)

Settings Pr.C2-13 = 0: 0.00–600.00 sec.
Pr.C2-13 = 1: 0.0–6000.0 sec.

📖 When using quick stop, Pr.C2-14 determines the time required for the VIDAR to decelerate from the maximum operation speed (Pr.C2-17) down to 0.00 Hz.

C2-15 Accel/ Decel Switch MI Src 1

(0x48F) Default: 0

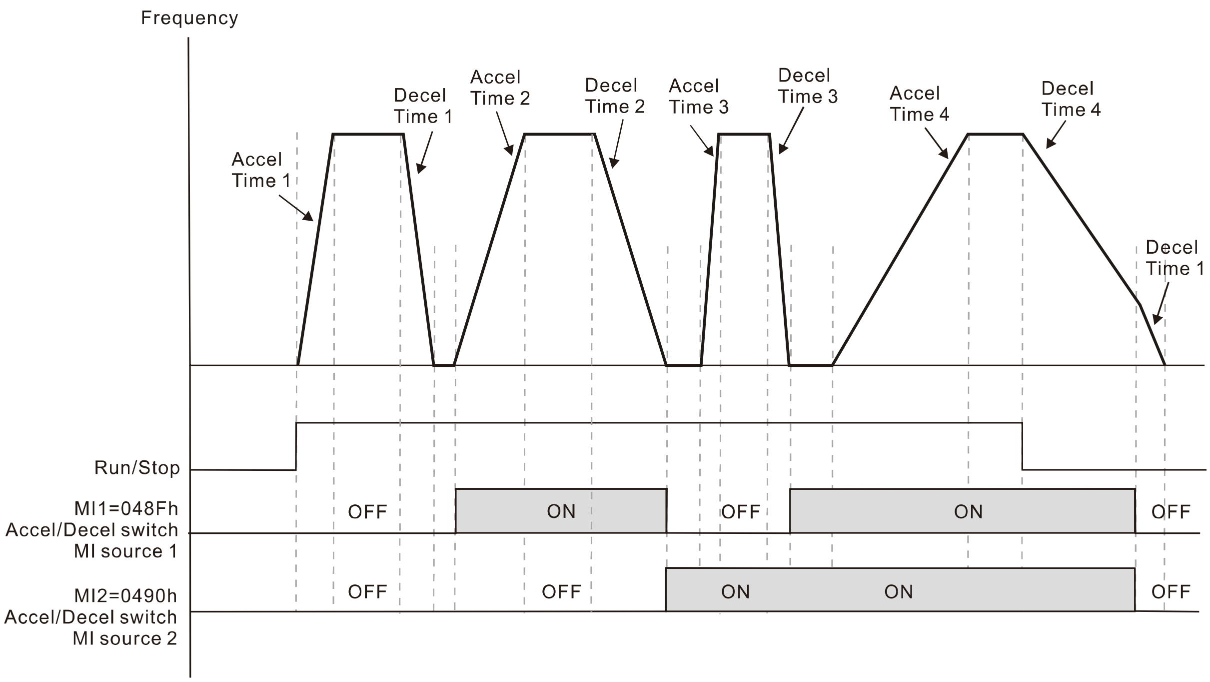
C2-16 Accel/ Decel Switch MI Src 2

(0x490) Default: 0

Settings 0: OFF
1: ON
2–7: MI1–MI6

📖 Use Pr.C2-15–C2-16 to select the acceleration/ deceleration switch MI source. You can select the acceleration and deceleration time (Pr.C2-00–C2-07) of the VIDAR from the digital status of the MI terminals.

MI Source 1 Status	MI Source 2 Status	Accel/ Decel Time Selection
OFF	OFF	Accel/ Decel Time 1 (Pr.C2-00–C2-01)
ON	OFF	Accel/ Decel Time 2 (Pr.C2-02–C2-03)
OFF	ON	Accel/ Decel Time 3 (Pr.C2-04–C2-05)
ON	ON	Accel/ Decel Time 4 (Pr.C2-06–C2-07)



C2-17 Max Speed

(0x491)

Default: 1770/3550
Depending on the models

Settings 0~8985rpm

Set the maximum operation speed of the VIDAR. All the VIDAR speed command sources (analog inputs 0–10 V, 4–20 mA, 0–20 mA, ±10 V) are scaled to correspond to the speed range.

C2-18 Speed Upper Limit

(0x492)

Default: 2500/4500
Depending on the models

Settings Speed lower limit–8985 (rpm)

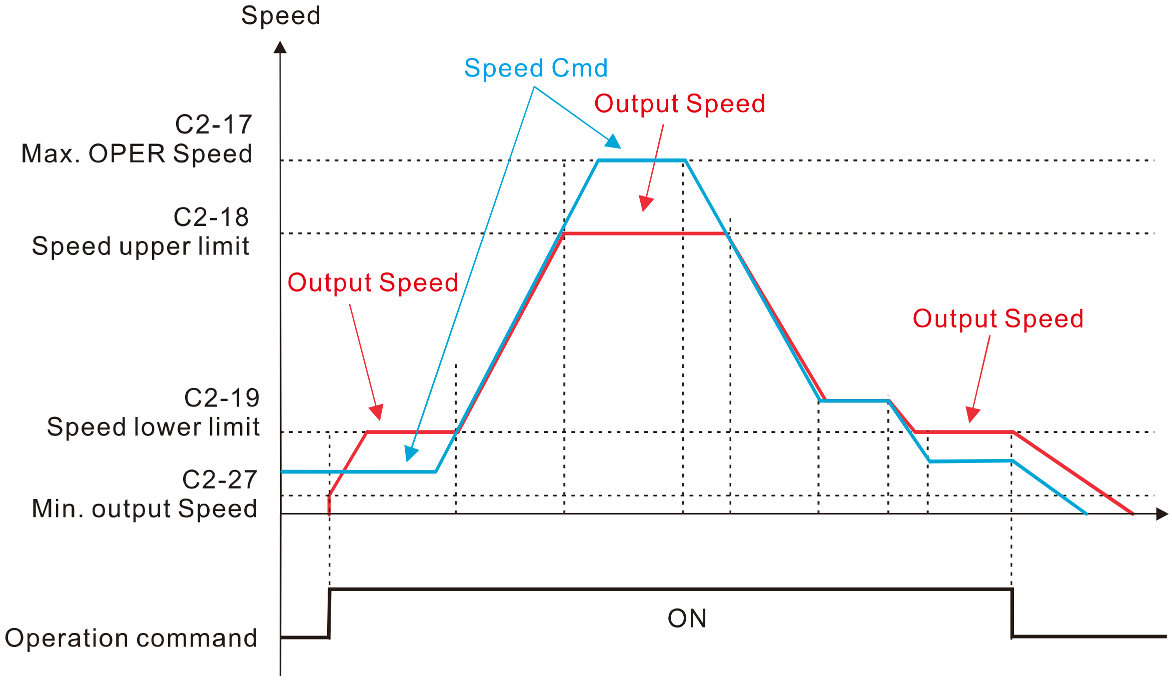
C2-19 Speed Lower Limit

(0x493)

Default: 0

Settings 0–Speed upper limit (rpm)

- If the speed command setting is higher than the upper limit (Pr.C2-18), the VIDAR runs with the speed upper limit. If the speed command setting is lower than the lower limit (Pr.C2-19) but higher than the minimum speed (Pr.C2-27), the VIDAR runs with the speed lower limit. (Pr.C2-18 setting value must be > Pr.C2-19 setting value).



- Use the speed upper and lower limit settings to prevent operator misuse, overheating caused by the motor's operating at a too low speed, or mechanical wear due to a too high speed.
- If the speed upper limit setting is 1000 rpm and the speed setting is 1200 rpm, the maximum operation speed is 1000 rpm.
- If the speed lower limit setting is 100 rpm and the minimum speed setting (Pr.C2-27) is 10 rpm, then the VIDAR operates at 100 rpm when the Speed command is higher than Pr.C2-27 but lower than 100 rpm. If the Speed command is lower than Pr.C2-27 (Min. Speed), the VIDAR selects the action according to Pr.C1-10 (Zero-speed Behavior).

C2-20 Start Speed

(0x494) Default: 0

Settings	0.00–motor's max. operation speed (rpm)

- When the starting speed is larger than the minimum speed, the VIDAR starts when the starting speed reaches the speed command.
- Refer to Pr.C2-27 for the relation between the minimum speed, speed lower limit, start speed, speed

command and the actual motor speed.

✱ **C2-21**	Skip Speed 1 Upper Limit	
(0x495)		Default: 915
	Settings	Skip speed 1 lower limit–motor's max. operation speed (rpm)

✱ **C2-22**	Skip Speed 1 Lower Limit	
(0x496)		Default: 885
	Settings	0.00–Skip speed 1 upper limit (rpm)

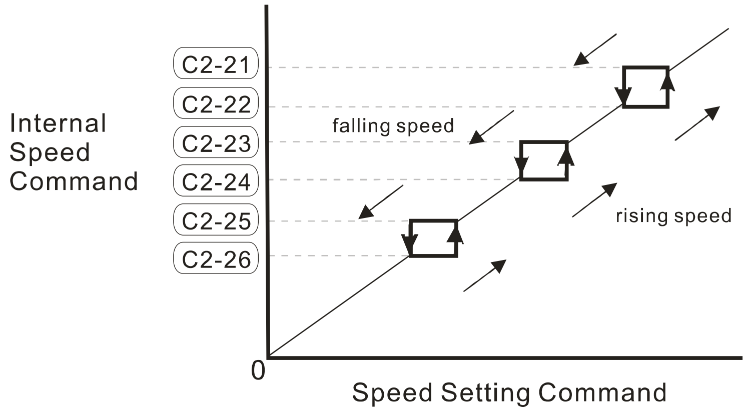
✱ **C2-23**	Skip Speed 2 Upper Limit	
(0x497)		Default: 1805
	Settings	Skip speed 2 lower limit–motor's max. operation speed (rpm)

✱ **C2-24**	Skip Speed 2 Lower Limit	
(0x498)		Default: 1795
	Settings	0.00–Skip speed 2 upper limit (rpm)

✱ **C2-25**	Skip Speed 3 Upper Limit	
(0x499)		Default: 8
	Settings	Skip speed 3 lower limit–motor's max. operation speed (rpm)

✱ **C2-26**	Skip Speed 3 Lower Limit	
(0x49A)		Default: 8
	Settings	0.00–Skip speed 3 upper limit (rpm)

- 🕮 Sets the skip speed ranges for the VIDAR. Provides three sets of skip speed parameters for setting, and the range of the three sets of skip speed setting ranges are allowed to overlap. However, between the same set of skip speed, the lower limit value must be smaller than the upper limit value.
- 🕮 The skip speed is useful when a motor has resonance vibration at a specific speed bandwidth. Skipping this speed avoids the vibration. There are three speed skip zones available.
- 🕮 You can set the Speed command within the range of skip speed. Then the motor speed is limited to the lower limit of skip speed ranges.
- 🕮 During acceleration and deceleration, the motor speed still passes through the skip speed ranges.



C2-27 Min Speed

(0x49B)

Default: 180/360

Depending on the models

Settings	0-motor's max. Operation speed (rpm)

📖 When the VIDAR executes the stop action and the speed planning command is lower than the minimum speed, it is regarded as the completion of the stop, and the VIDAR is in the stop output control status. When the speed command is set as 0 for zero-speed control and the speed planning command is lower than the minimum speed, it is regarded as entering zero-speed operation. Refer to Pr.C1-10 for zero-speed operation description.

📖 Relation between speed command upper and lower limits/ start speed and minimum speed:

a. If the speed command is less than min. speed when starting up, the VIDAR directly enters zero-speed operation at start, if it is during the operation, the VIDAR enters zero-speed operation after decelerating to the min. speed. For zero-speed operation behavior, refer to Pr.C1-10 Zero-speed Behavior.

b. When starting up the VIDAR, if the speed command is larger than the min. speed and the start speed is larger than the min. speed, the VIDAR operates with the start speed; if the speed command is larger than the min. speed and the start speed is less than the min. speed, the VIDAR operates with the minimum speed.

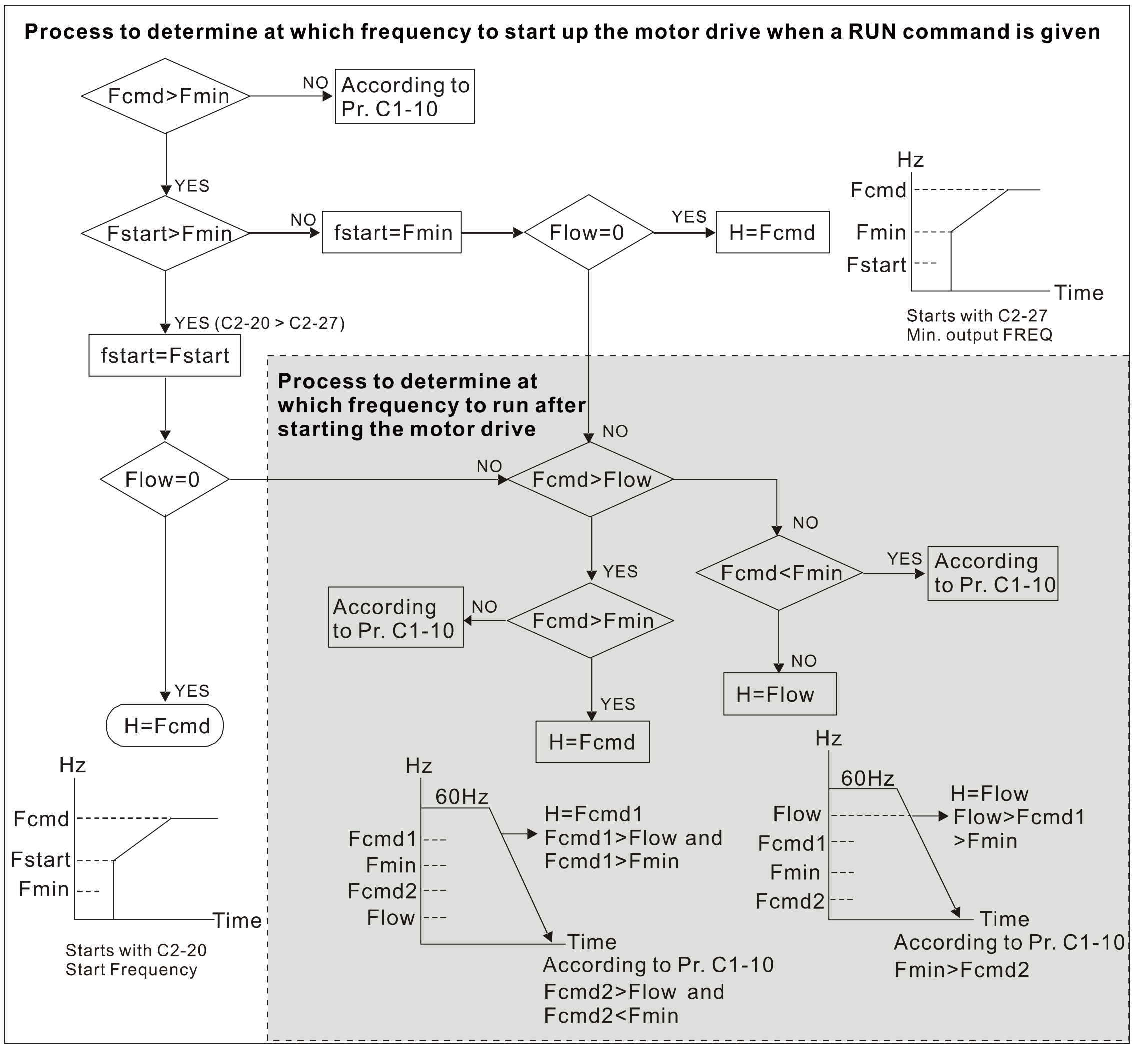
c. If the speed lower limit is larger than min. speed, when the speed command less than min. speed, the VIDAR operates according to the speed lower limit.

d. Refer to the diagram below for the relation between speed upper and lower limits/ start speed and minimum speed.
   Fcmd: speed command
   Fstart: start-up speed (Pr.C2-20)

fstart: actual start-up speed of the VIDAR

Fmin: min. speed (Pr.C2-27)

Flow: speed lower limit (Pr.C2-19)



- When Fcmd > Fmind and Fcmd < Fstart:
  If Fcmd > Flow, the VIDAR runs directly by Fcmd. If Flow ≥ Fcmd, the VIDAR runs with Fcmd, and then rises to Flow according to acceleration time.
- The VIDAR's speed goes directly to 0 when decelerating to Fmin.

C3. JOG Setting

⌁ C3-00 JOG Speed Cmd

(0x4C0) Default: 90

Settings 0.00–Max. operation speed (rpm)

⚡ C3-01 JOG Accel Time

(0x4C1) Default: 5.00 / 5.0

⚡ C3-02 JOG Decel Time

(0x4C2) Default: 5.00 / 5.0

Settings Pr.C2-13 = 0: 0.00–600.00 sec.

Pr.C2-13 = 1: 0.0–6000.0 sec.

C3-03 JOG MI Src

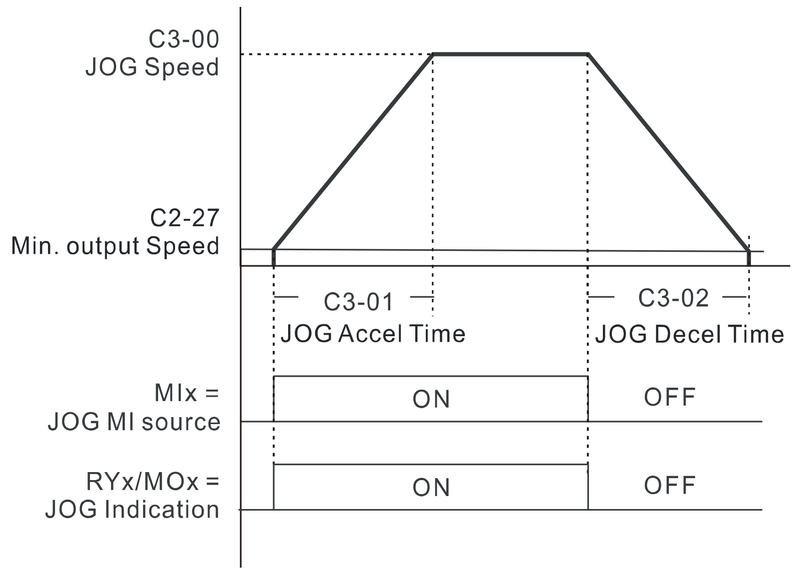
(0x4C3) Default: 0

Settings 0: Disabled

1: Reserved

2–7: MI1–MI6

- When using JOG function, you can select the MI source by setting MI terminal to 04C3h (JOG MI source), Pr.C3-03 (JOG MI Source) or using the F2 key on the keypad.
- When the switch of JOG MI terminal is ON, the VIDAR accelerates from 0 Hz to the JOG speed (Pr.C3-00). When the switch of JOG MI terminal is OFF, the VIDAR decelerates from the JOG speed to stop.
- The VIDAR does not execute JOG command during normal operation. If the VIDAR receives a normal operation command as the operation source during the JOG operation, the VIDAR executes normal operation.
- The JOG acceleration/ deceleration time (Pr.C3-01, C3-02) is the time for the VIDAR accelerates from 0.0 Hz to Pr.C3-00 JOG speed.
- The JOG MI terminal is valid when the source of the operation command is the external terminal.
- The JOG operation can only be executed when the VIDAR stops.



C3-04 JOG Indn

(0x4C4) Default: 0

Settings 0: Disabled

1–2: Relay1–Relay2

- This parameter selects the JOG indication source.
- When the VIDAR executes JOG command, the selected contact is ON.

C4. Torque Command

✎ C4-00 EX1 Main/ AUX Torque Calculation

(0x500) Default: 0

✎ C4-03 EX2 Main/ AUX Torque Calculation

(0x503) Default: 0

Settings 0: Main torque command
1: Auxiliary torque command
2: ADD
3: SUB
4: MULTI
5: MAX
6: MIN

📖 Selects the mathematical operation method of the main and auxiliary torque.

C4-01 EX1 Main Torque Command Source

(0x501) Default: 1

C4-04 EX2 Main Torque Command Source

(0x504) Default: 1

Settings 0: Disabled
1: Digital keypad
2: RS-485
3–6: Reserve
7–8: AI1–AI2

📖 When the torque command source is set as keypad or Modbus, the torque command refers to the setting of Pr.C4-06.

📖 When the torque command source is set as analog inputs, the torque command is calculated by multiplying the AI percentage through Pr.C4-13.

C4-02 EX1 Auxiliary Torque Command Source

(0x502) Default: 0

C4-05 EX2 Auxiliary Torque Command Source

(0x502) Default: 0

Settings 0: Disabled
1: Digital keypad
2: RS-485

3–6: Reserve
7–8: AI1–AI2

📖 This parameter selects EX1 / EX2 auxiliary torque source.

C4-06 Torque Command

(0x506) Default: 0.0

Settings -300.0–300.0%
(-Pr.C4-13–Pr.C4-13)

📖 When the torque command source is set as keypad or Modbus, the torque command refers to the setting of Pr.C4-06.

C4-07 Torque Trace Type

(0x507) Default: 0

Settings 0: Ramp profile (Trapezoidal)
1: S-curve profile

📖 Sets the curve type for the torque command.

📖 When Pr.C4-07 = 0, the slope of torque command is determined by Pr.C4-08.

C4-08 Torque Slope

(0x508) Default: 100.0

Settings 0.0–6000.0 %/sec.

📖 Sets the slope of the torque command.
For example, when Pr.C4-08 = 10%/sec., and the torque command is 50.0%, it takes 5 seconds for the torque command to increase from 0.0% to 50.0%.

C4-09 Torque S-curve Time

(0x509) Default: 0.50

Settings 0.00–25.00 sec.

📖 Provides smooth torque command; the longer the set value, the smoother the S-curve trajectory.

C4-10 Speed Limit Selection

(0x50A) Default: 0

Settings 0: by FWD/ REV speed limit parameter
1: by speed command source and speed limit parameter
2: by speed command source

📖 Speed limit function: when using torque control mode, if the torque command is greater than the load, the motor accelerates until the motor speed equals to the speed limit. At this time, it switches to speed control mode and stops acceleration.

- When Pr.C4-10 = 0, the speed limit is determined by Pr.C4-11 and Pr.C4-12.
- When Pr.C4-10 = 1, the speed limit of the running direction of the torque command is set by the speed command; while the limit of the opposite direction is determined by Pr.C4-11 or Pr.C4-12.
- When Pr.C4-10 = 2, the speed limit is determined by the speed command.

C4-11 Torque Mode FWD Speed Limit

(0x50B) Default: 10

Settings 0–120%

- 100% corresponds to the setting of Pr.C2-17.
- Sets the speed limit for forward operation in torque mode.

C4-12 Torque Mode REV Speed Limit

(0x50C) Default: 10

Settings 0–120%

- 100% corresponds to the setting of Pr.C2-17.
- Sets the speed limit for reverse operation in torque mode.

C4-13 Maximum Torque Command

(0x50D) Default: 100.0

Settings 0.0–300.0%

- Sets the maximum value for the final torque command of the VIDAR; the final torque command does not exceed the setting of this parameter.
- The torque command calculated by the mathematical operation methods (Pr.C4-00, Pr.C4-03) will be further limited by this parameter.

d. Motor Parameter

d5. SM Parameter

d5-01 SM Rated Power

(0x781) Default: Read only

Settings	Read only

📖 The rated power for the SM.

d5-02 SM Rated Current

(0x782) Default: Read only

Settings	Read only

📖 The rated current for the SM.

d5-03 SM Rated Voltage

(0x783) Default: Read only

Settings	Read only

📖 The rated voltage for the SM.

d5-04 SM Rated Speed

(0x784) Default: Read only

Settings	Read only

📖 The rated speed for the SM.

d5-05 SM Pole Number

(0x785) Default: Read only

Settings	Read only

📖 The pole number for the SM rotor.

F. FOC

∗ F1. SM FOC

∗: Level 3 Security parameter, enter password to unlock this parameter.

∗ F1-00 IF/HFI Sel

(0xB00) Default: 0

Settings 0: HFI

1: IF

📖 When choosing HFI as low-frequency operation method, the related parameters are Pr.F1-02, F1-06 and F1-07.

∗ F1-01 IF Cmd

(0xB01) Default: 20

Settings 0–150%

📖 Sets the current command when the drive operates in the low-speed area (the area whose frequency command is less than Pr.F1-04 is the low-speed area). When starting with heavy load or the forward and reverse operation stalls with load, increase setting for Pr.F1-01; if the starting current is too large or causes oc stall, decrease this parameter.

∗ F1-02 HFI PLL BW Gain

(0xB02) Default: Depending on the models

Settings 0.01–600.00%

📖 This parameter affects the speed response when HFI starts. If you need fast response or rapid acceleration, increase this parameter; if there is speed wave or current oscillation, decrease it.

∗ F1-03 Speed Observer Filter BW

(0xB03) Default: 10

Settings 0–65535 Hz

📖 Sets the speed observer bandwidth, a higher setting value makes the response of speed observer faster, but the noise will also increase.

∗ F1-04 IF/HFI to SM Switch FREQ

(0xB04) Default: Depending on the models

Settings 0.00–599.00 Hz

✻ F1-05 SM to IF/HFI Switch FREQ

(0xB05) Default: Depending on the models

Settings 0.00–599.00 Hz

- Sets the frequency for switching from low frequency to high frequency and sets the switch point for high and low frequencies of the speed observer.
- Sets the frequency for switching from high frequency to low frequency and sets the switch point for high and low frequencies of the speed observer.
- If the switch frequency is too low, the motor does not generate enough back-EMF to let the speed observer measure the right position and speed of the rotor when running at the switch frequency.
- If the switch frequency is too high, the active range of I/F is too wide, which generates a larger current without energy saving. (If the current value for Pr.F1-01 is too high, the high switch frequency makes the drive continue to output with Pr.F1-01 setting value.)

✻ F1-06 HFI Injection FREQ

(0xB06) Default: 500

Settings 0–1200 Hz

- If the motor has high-frequency excitation noise, decrease setting for this parameter. HFI frequency should not be set higher than 1/10 of the carrier frequency.

✻ F1-07 HFI Injection Amplitude

(0xB07) Default: Depending on the models

Settings 0.00–100.00%

- This parameter affects the starting performance of HFI. if the HFI cannot be started or has low-frequency speed oscillation, an increase in setting for this parameter; however, this will make the high-frequency excitation noise more obvious.

✻ F1-08 Observer Low Speed Gain

(0xB08) Default: Depending on the models

Settings 10–1000%

- Sets the observer gain when the observer speed is less than 1/5 of the motor rated speed.
- Increase setting for this parameter to enhance the loading capacity at start.

✻ F1-09 Observer High Speed Gain

(0xB09) Default: Depending on the models

Settings	10–1000%

- 🕮 Sets the observer gain when the observer speed is larger than or equal to 1/5 of the motor rated speed.
- 🕮 Increase setting for this parameter to enhance the loading capacity at high-speed area and the observer response.
- 🕮 When there is speed oscillation at high-speed area, decrease setting for this parameter.

✻ F1-10 PLL P Gain

(0xB0A) Default: Depending on the models

Settings	10–1000%

- 🕮 Increase setting for this parameter to enhance the loading capacity at high-speed area and the observer response.
- 🕮 When the motor speed has high-frequency fluctuations, decrease setting for this parameter.

✻ F1-11 PLL I Gain

(0xB0B) Default: Depending on the models

Settings	10–1000%

- 🕮 Decrease setting for this parameter to enhance the speed response during acceleration and deceleration.

✻ F1-16 SMFOC Id Min Pct

(0xB10) Default: Depending on the models

Settings	0–100%

- 🕮 Set the minimum id command.
- 🕮 The stability will be improved when the Id command increases.

F1-17 SMFOC PreFobEn Pct

(0xB11) Default: 75

Settings 0–100%

- This parameter is used for the high-speed estimator to start estimation earlier by a certain percentage of the value set in Pr.F1-04.
- For example, if Pr.F1-04 is set to 45 Hz and Pr.F1-17 is set to 75%, then 45 Hz × 0.75 = 33.75 Hz. The high-speed estimator will start operating at 33.75 Hz.
- If the percentage is set too low, the controller may fail at the switching point; if it is set too high, the controller may be unstable or malfunctioned.

F2. ASR Setting

F2-00 Motor Inertia

(0xB40) Default: Depending on the models

Settings 0.1–6000.0 kg-cm^2

📖 The VIDAR motor rotor inertia .

F2-01 System Inertia

(0xB41) Default: Depending on the models

Settings 1–60000 pu

📖 The rotor inertia corresponded to the system.

📖 Perform the operation test with load, run the motor in acceleration, deceleration and steady speed and observe the values. If values between speed feedback and speed command are close, steady-state error is small and overshoot is within acceptable value, then Pr.F2-01 inertia is a more suitable selection for the system under test.

📖 If the Iq current command from ASR has high-frequency glitch, then decrease the setting. If the response time of sudden loading is too slow, then increase the setting.

F2-02 ASR Gain/ Bandwidth Calculation Sel

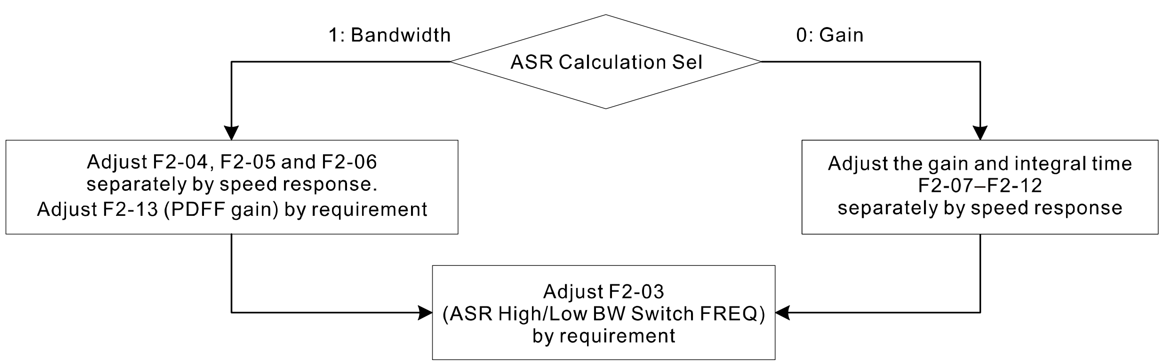
(0xB42) Default: 1

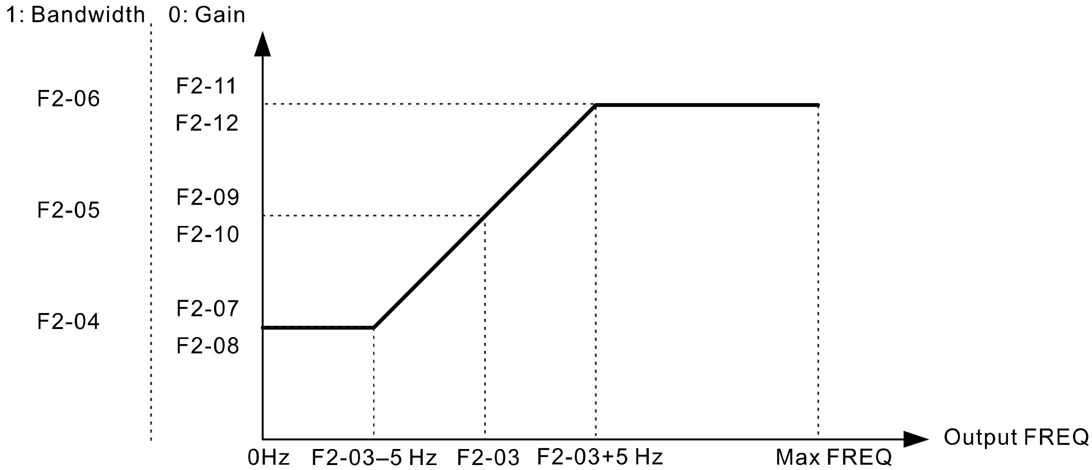
Settings 0: Gain

1: Bandwidth

📖 1: Bandwidth, use Pr.F2-04–F2-06 for adjustment.

📖 0: Gain, use Pr.F2-07–F2-12 for adjustment.





F2-03 ASR High/ Low BW Switch FREQ

(0xB43) Default: 40.00

Settings 0.00–Max. operation frequency (Hz)

- Sets the low-speed and high-speed ASR switching point in the FOC area. It provides flexibility to meet two needs: in the high-speed region of the estimator switch point it has a high response, and in the low-speed region of the estimator switch point it has a lower response. The recommended switching point is higher than Pr.F1-04.
- A low setting does not cover Pr.F1-04. If the setting is too high, the high-speed range is too narrow.

F2-04 ASR Zero-Speed BW

(0xB44) Default: Depending on the models

Settings 0.1–750.0 Hz

F2-05 ASR Low-Speed BW

(0xB45) Default: Depending on the models

Settings 0.1–750.0 Hz

F2-06 ASR High-Speed BW

(0xB46) Default: Depending on the models

Settings 0.1–750.0 Hz

- When setting F2-02 as 1: Bandwidth, you can adjust Pr.F2-04–F2-06 separately by speed response. The larger the setting value, the faster the response.
- When the holding torque is required at zero speed or stable frequency output is required at extremely

low speed, properly increase setting for ASR zero speed bandwidth.

- When the output frequency oscillates at low-speed or the response is slow, increase setting for ASR low speed bandwidth.
- When the output current fluctuates severely at high speed and causes the machine to vibrate, decrease setting for ASR high speed bandwidth.

F2-07 ASR Zero-Speed Gain

(0xB47) Default: 3.0

Settings 0.1–750.0

F2-08 ASR Zero-Speed Integral Time

(0xB48) Default: 0.100

Settings 0.001–10.000 sec.

F2-09 ASR Low-Speed Gain

(0xB49) Default: 3.0

Settings 0.1–750.0

F2-10 ASR Low-Speed Integral Time

(0xB4A) Default: 0.100

Settings 0.001–10.000 sec.

F2-11 ASR High-Speed Gain

(0xB4B) Default: 3.0

Settings 0.1–750.0

F2-12 ASR High-Speed Integral Time

(0xB4C) Default: 0.100

Settings 0.001–10.000 sec.

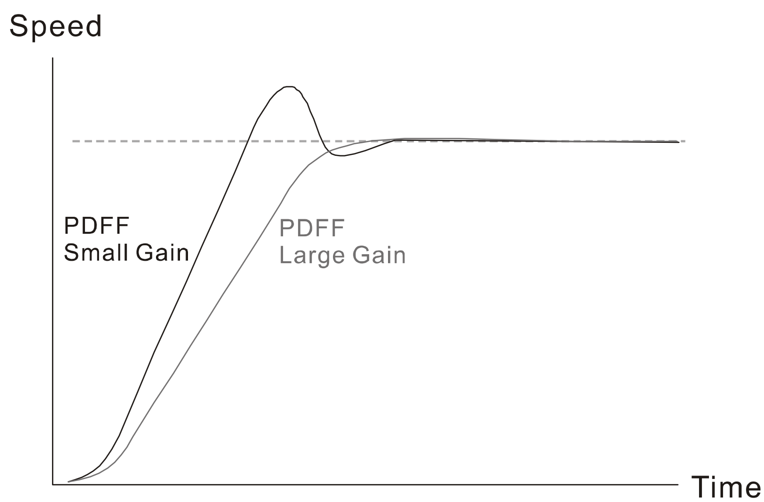
- When setting F2-02 as 0: Gain, you can adjust Pr.F2-07–F2-12 separately by speed response.
- The larger the setting value of gain, the faster the response, but fluctuation and oscillation may easily occur.
- The smaller the setting value of time, the faster the response, but fluctuation and oscillation may easily occur.

F2-13 ASR PDFF Gain

(0xB4D) Default: Depending on the models

Settings	0.00–1.00 pu

- When Pr.F2-02 is set to 1, this parameter is valid.
- If it is set to 0 pu, the control structure is pure IP control, which has the characteristics of a second-order system. Under the same bandwidth design, it has the advantages of fast response and anti-noise, but it will overshoot easily. If it is set to 1 pu, the control structure is pure PI control, which has the characteristics of a first-order system. The response is slower under the same bandwidth design, but it will not overshoot easily.
- To suppress speed overshoot, you can set the parameter to 0 first, and then increase the setting value to "a condition with best acceleration and without overshoot" when the acceleration time meets your application, but overshoot occurs.
- Increasing the setting improves the overshoot of speed tracking, but an excessive value may reduce the transient response.
- Increasing the setting enhances the system stiffness in high-speed steady state and reduce the speed transient fluctuation at a sudden loading.
- Ensure that you set Pr.F2-01 system inertia correctly to get excellent improvement of the speed response.



F2-14 ASR Speed Feedforward Gain

(0xB4E) Default: 0.00

Settings	0.00–100.00 pu

- The function enables when Pr.F2-02 = 0: Gain.
- Increase the setting for this parameter to reduce command tracking difference and improve the speed response. Use this function for speed tracking applications.
- Ensure that you set Pr.F2-01 system inertia correctly to get excellent improvement of the speed response.

F2-15 ASR Torque Cmd Filter Time

(0xB4F) Default: 1.0

Settings 0.0 – 6000.0 ms

- When the time constant setting is too large, the control is stable, but the control response is slow. When the time constant setting is too small, the control response is faster, but the control may be unstable. For optimal setting, adjust the setting based on the control stability or the control response.

F2-16 FWD Motoring Torque Limit

(0xB50) Default: 200.00

F2-17 FWD Regenerating Torque Limit

(0xB51) Default: 200.00

F2-18 REV Motoring Torque Limit

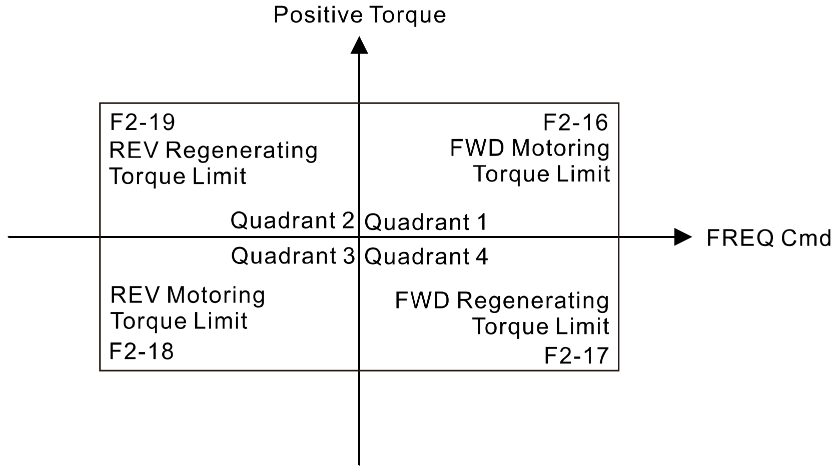
(0xB52) Default: 200.00

F2-19 REV Regenerating Torque Limit

(0xB53) Default: 200.00

Settings 0.00–300.00%

- Pr.F2-16–F2-19 limit the output torque and only apply to and SMFOC control modes, the percentage base value is the motor rated torque.
- The calculation equation for the motor rated torque: $T(N-M)=\frac{P(Watt)}{\omega(rad/s)}$, P(W) value = Pr.d1-01; ω (rad/s) = Pr.d1-04, $\frac{RPM\times 2\pi}{60}=rad/s$.



F2-20 AMR BW

(0xB54) Default: Depending on the models

Settings	0.1–750.0 Hz

📖 Sets the response speed of excitation axis (d-axis) control command, the time constant of control command is $1/[(F2-20) \times 2\pi]$ sec.

F2-21 AMR Voltage Limit

(0xB55) Default: Depending on the models

Settings	0–100%

📖 Sets the voltage limit of excitation axis (d-axis) control command, 100% corresponds to the current input grid voltage.

📖 When the back EMF reaches this voltage limit, it enters the flux weakening control.

F2-22 AMR Kp Gain

(0xB56) Default: Depending on the models

Settings	0.00–3.00

F2-23 AMR Ki Gain

(0xB57) Default: Depending on the models

Settings	0.00–3.00

📖 Active Magnetic Regulator Kp / Ki. Affects the response of magnetic regulation in the low magnetic area.

- If entering the low magnetic area and the input voltage plummets (e.g., an unstable power net causes instant insufficient voltage, or a sudden load that makes input voltage drop), which causes the ACR diverge and oc, then increase the gain. If the Id value of a spur creates large noise in high-frequency output current, decrease the gain to reduce the noise, but it will also slow down the response.

✻ F2-24 SMFOC AMR Id Filter Coefficient

(0xB58) Default: 15

Settings 0–1000

- Sets the filter coefficient of Active Magnetic Regulator Id current in the flux weakening area.

∗ F3. ACR Setting

∗: Level 3 Security parameter, enter password to unlock this parameter.

∗ F3-00 ACR Gain Calculation Sel

(0xB80) Default: 1

Settings 0: ACR BW

1: BW Calculated by CF

- 0: ACR bandwidth calculation gain, use Pr.F3-01 as a fixed bandwidth value.
- 1: Bandwidth calculated by carrier frequency, keep the set value 1 for general user that does not need high torque response.

∗ F3-01 ACR BW

(0xB81) Default: 300

Settings 100–3000 Hz

- When setting F3-00 as 0: ACR BW, you can adjust Pr.F3-01 separately by current response. The larger the setting value, the faster the response. The converged time constant for current control is $1/([(F3-01)\times 2\pi]$ sec.

∗ F3-02 ACR d-Axis Kp Gain

(0xB82) Default: 1.00

Settings 0.01–100.00 pu

- For adjusting the transient response of excitation axis (d-axis), the larger the setting value, the faster the response. If you set the value too large, it may cause current oscillation.

∗ F3-03 ACR d-Axis Ki Gain

(0xB83) Default: 1.00

Settings 0.01–100.00 pu

- For adjusting the response of excitation axis (d-axis) in steady state, the larger the setting value, the faster the response. If you set the value too large, it may cause current oscillation.

∗ F3-04 ACR q-Axis Kp Gain

(0xB84) Default: 1.00

Settings 0.01–100.00 pu

- For adjusting the transient response of torque axis (q-axis), the larger the setting value, the faster the response. If you set the value too large, it may cause current oscillation.

✻ ⚡ **F3-05** ACR q-Axis Ki Gain

(0xB85) Default: 1.00

Settings 0.01–100.00 pu

📖 For adjusting the response of torque axis (q-axis) in steady-state, the larger the setting value, the faster the response. If you set the value too large, it may cause current oscillation.

✻ **F3-06** ACR Anti-wind up Gain

(0xB86) Default: 1.00

Settings 0.00–5.00 pu

📖 Anti-windup gain controls how quickly the integrator stops accumulating error when the output is saturated. A higher value means faster correction of windup, improving recovery and stability after saturation.

G. IO Setting

G0. MI Setting

G0-00 MI Mode Sel

(0xCC0) Default: 0

Settings 0: Low Active

1: High Active

G0-01 MI Status

(0xCC1) Default: Read only

Settings 0: Inactive

1: Active

- The displayed parameter format of MI mode selection and MI status is 000000b–111111b. The bits from right (bit0) to left (bit5) correspond to MI1–MI6 respectively.
- MI mode selection defines the corresponding input meaning of MI signal as action (1) / no action (0).
- Take low active as an example, when MIx status is OFF, Pr.G0-01 MIx displays 0; when MIx status is ON, Pr.G0-01 MIx displays 1.

MI status	G0-00 MI Mode Sel	
	Low Active	High Active
ON	Action	No action
OFF	No action	Action

- The entity and virtual MI signals determine the MI enable status through the response time and mode selection (level setting). Refer to Figure 1 - MI signal processing diagram for the MI action logic.

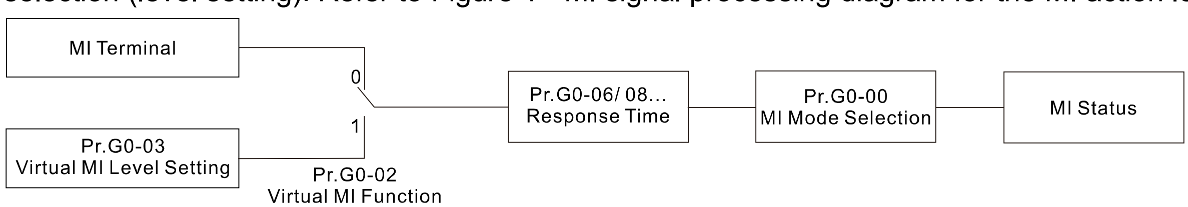


Figure 1 - MI signal processing diagram

G0-02 Virtual MI Function

(0xCC2) Default: 0

Settings 0: Inactive

1: Active

G0-03 Virtual MI Level Setting

(0xCC3) Default: 0

Settings 0: Low

1: High

- The function of virtual MI is the same as that of the entity MI terminals, the difference is that the former can set the action of the virtual MI through parameters. Refer to description of Pr.G0-00/ G0-01 for the action logic.
- The displayed parameter format of virtual MI function and level setting is 000000b–111111b. The bits from right (bit0) to left (bit5) correspond to MI1–MI6 respectively.

G0-05 MI1 Function Sel

(0xCC5) Default: 0

G0-07 MI2 Function Sel

(0xCC7) Default: 0

G0-09 MI3 Function Sel

(0xCC9) Default: 0

G0-11 MI4 Function Sel

(0xCCB) Default: 0

G0-13 MI5 Function Sel

(0xCCD) Default: 0

G0-15 MI6 Function Sel

(0xCCF) Default: 0

Settings 0040h: A1-00 EX1/ EX2 Switch Src

0042h: A1-02 EX1 S1 Src

0043h: A1-03 EX1 S2 Src

0044h: A1-04 EX1 S3 Src

0049h: A1-09 EX2 S1 Src

004Ah: A1-10 EX2 S2 Src

004Bh: A1-11 EX2 S3 Src

0050h: A1-16 Halt MI Src

0051h: A1-17 Lock MI Src

0055h: A1-21 Run Enable MI Src

0060h: A1-32 External Fault MI Src

0081h: A2-01 Quick Stop MI Src

0083h: A2-03 Emergency Stop MI Src
0102h: A4-02 HAND MI Src
0103h: A4-03 AUTO MI Src
0104h: A4-04 HOA Lock MI Src
010Ah: A4-10 LoRe Switch Src
010Bh: A4-11 LOC Lock Mode
0408h: C0-08 Torque/Speed Switch
044Dh: C1-13 FREQ Cmd Up Key MI Src
044Eh: C1-14 FREQ Cmd Down Key MI Src
0453h: C1-19 Multi Speed MI Src 1
0454h: C1-20 Multi Speed MI Src 2
0455h: C1-21 Multi Speed MI Src 3
0456h: C1-22 Multi Speed MI Src 4
048Fh: C2-15 Accel/Decel Switch MI Src 1
0490h: C2-16 Accel/Decel Switch MI Src 2
04C3h: C3-03 JOG MI Src
0F40h: H0-00 Fault Reset MI Src
0F44h: H0-04 Fault Restart MI Src
12C0h: J4-00 Preheat MI Src
1302h: J5-02 FireMode MI Src
1304h: J5-04 FireMode Direction MI Src
1344h: J6-04 Time Function 1 MI Src
1345h: J6-05 Time Function 2 MI Src
1346h: J6-06 Time Function 3 MI Src
1892h: P0-18 P-PID1 Setpoint Freeze Src
1894h: P0-20 P-PID1 Multi Setpoint Src 1
1895h: P0-21 P-PID1 Multi Setpoint Src 2
18A1h: P0-33 P-PID1 Output Freeze Src
18ACh: P0-44 P-PID1 Track Enable Src

📖 There are two methods for MI function selection, one is to specify the function through MI, and the other is to specify the MI by functions, no matter which method is used, the two sides are synchronous. For example, Pr.G0-05 MI1 function selection is set to A1-00 EX1/EX2 switch source (MI assigned function), the setting of the corresponding Pr.A1-00 will also be changed and assigned to MI1 (the function is assigned to MI).

📖 The same MIx function can only be defined and selected as one single function. If the same MIx function is set repeatedly, the last setting will prevail, and the same MIx function previously set repeatedly returns to the default value. For example, A1-00 EX1/EX2 switch source indicates that MI1 is specified first, and then A1-02 EX1 S1 source indicates that MI1 is also specified, then the latter setting replaces the former, and the former will restore to the default value.

📖 Refer to the list for MI function selection. For example, setting 0040h means MI function selection A1-00 EX1/EX2 switch source. For its function description, refer to the detailed description of each parameter group.

⚡ **G0-06** MI1 Response Time

(0xCC6) Default: 0.05

⚡ **G0-08** MI2 Response Time

(0xCC8) Default: 0.05

⚡ **G0-10** MI3 Response Time

(0xCCA) Default: 0.05

⚡ **G0-12** MI4 Response Time

(0xCCC) Default: 0.05

⚡ **G0-14** MI5 Response Time

(0xCCE) Default: 0.05

⚡ **G0-16** MI6 Response Time

(0xCD0) Default: 0.05

Settings 0.000–30.000 sec.

📖 The MI response time setting can effectively avoid the bouncing phenomenon of the MI terminal.

📖 This function is to delay and confirm the digital input terminal signal. The time for delay is also the time for confirmation. The confirmation prevents interference that could cause error in the input to the digital terminals. But in the meanwhile, it delays the response time though confirmation improves accuracy.

📖 When MI signal changes (for example from low to high), it is regarded as transitioning to High only when the High status remains for the time longer than the MI response time. Refer to Figure 1 - MI signal processing diagram in Pr.G0-00 for the MI action logic.

G1. MO Setting

⚡ G1-00 MO Mode Sel

(0xD00) Default: R1: ON, R2: OFF

Settings b0: Relay1 = ON (RA-RC Close at Active)

b1: Relay2 = OFF (RA-RC Open at Active)

⚡ G1-01 Virtual MO Function

(0xD01) Default: 0

Settings 0: Disabled

1: Enabled

⚡ G1-02 Virtual MO Level Setting

(0xD02) Default: 0

Settings 0: Inactive

1: Active

G1-03 MO Status

(0xD03) Default: Read only

Settings 0: Inactive

1: Active

- MO mode selection refers to the behavior of the MO switch. You can choose RA-RC to be closed when Pr.G1-03 is set as 0: Inactive, or that to be opened when Pr.G1-03 is set as 1: Active. For example: When RY1 function is selected as forward command indication and the drive frequency command is forward, RY1 activates. If the MO mode is set as 0, then RA-RC will be closed when it activates.
- The parameter format of MO mode selection is 0000 0000 0000 0000b–1111 1111 1111 1111b. The bits from the right to the left (bit0–bit1) correspond to RY1–RY2 respectively, and the bits from right (bit2) to left (bit15) is reserved.

  MO status displays the action status of the MO source. For example: RY1 is set as Forward command indication, it activates when the drive frequency command is forward and Pr.G1-03 bit0 displays as 1; bit0 is inactive when the drive operates with reverse command and Pr.G1-03 bit0 displays as 0.
- The MO status refers to the active status of MO source. For example, set RY1 as forward command indication, it activates when the drive frequency command is forward and Pr.G1-03 bit0 displays 1; the MO inactivates when the drive frequency command is reverse and Pr.G1-03 bit0 displays 0.
- The function of virtual MI is the same as that of the entity MI terminals, the difference is that the former can be turned on and off by setting parameters.

- When the virtual MO function is enabled (for example, Pr.G1-01 = 11b) and the virtual MO level is set as active (for example, Pr.G1-02 = 11b), then the status of RY1 and RY2 is ON.
- Pay extra attention that when the MOx function is defined before enabling the virtual MO function, after the virtual MO is enabled, the corresponding MO parameters settings (RY1 Pr.G1-04, RY2 Pr.G1-06) will be automatically replaced by the changed 0D01h virtual MO function.

G1-04 RY1 Function Sel

(0xD04) Default: 164Eh

G1-06 RY2 Function Sel

(0xD06) Default: 0F41h

Settings
0057h: A1-23 Run Enable Indn
0058h: A1-24 OPER Cmd by Kpd Indn
0059h: A1-25 Forward Cmd Indn
005Ah: A1-26 Reverse Cmd Indn
04C4h: C3-04 JOG indn
0D01h: G1-01 Virtual MO Function
0D7Eh: G2-62 AI Level in Range Indn
0F41h: H0-01 Fault Indn
0F42h: H0-02 Warning Indn
0F4Fh: H0-15 STO Output logic A
0F50h: H0-16 STO Output logic B
0F51h: H0-17 Fault Output Indn 1
0F52h: H0-18 Fault Output Indn 2
0F53h: H0-19 Fault Output Indn 3
0F54h: H0-20 Fault Output Indn 4
0F85h: H1-05 Lv Fault Indn
0FC9h: H2-09 oc Stall Prev Indn
0FCFh: H2-15 Low Current Indn
1042h: H4-02 Drive oH warning Indn
1081h: H5-01 ot Indn
1083h: H5-03 Normal Speed ot Indn
10CAh: H6-10 Motor Temp 1 OH Indn
10D6h: H6-22 Motor Temp 2 OH Indn

10D8h: RH DO Select
1103h: H7-03 L/F Overload Indn
1111h: H7-17 L/F Underload Indn
11C0h: J0-00 UVW MC Action Indn
1249h: J2-09 dEb Output Indn
12C7h: J4-07 Preheat Indn
132Bh: J5-31 FireMode Indn
1587h: n1-07 Modbus MO Mask
15D2h: n5-17 EtherNet MO Mask
1646h: o0-06 Drive Ready Indn
1647h: o0-07 Run Indn
1649h: o0-09 Output Amp Exceed Indn
164Ah: o0-10 Output Amp under Indn
164Ch: o0-12 At Target Speed Indn
164Eh: o0-14 Output FREQ Exceed Indn
164Fh: o0-15 Output FREQ under Indn
1652h: o0-18 At Output FREQ 1 Indn
1655h: o0-21 At Output FREQ 2 Indn
1656h: o0-22 0 Hz Cmd Indn at Run
1657h: o0-23 0 Hz Cmd Indn
1659h: o0-25 0 Hz Output Indn at Run
165Ah: o0-26 0 Hz Output Indn
16C4h: o2-04 Monitor 1 Trigger Indn
16CEh: o2-11 Monitor 2 Trigger Indn
16D8h: o2-18 Monitor 3 Trigger Indn
16E2h: o2-25 Monitor 4 Trigger Indn
16ECh: o2-32 Monitor 5 Trigger Indn
16F6h: o2-39 Monitor 6 Trigger Indn
1700h: o2-46 Monitor 7 Trigger Indn
170Ah: o2-53 Monitor 8 Trigger Indn
18AFh: P0-47 P-PID1 Fdk Error Indn

- There are two methods for MO function selection, one is to specify the function through MO, and the other is to specify the MO by functions, no matter which method is used, the two sides are synchronous. For example, Pr.G1-04 RY1 function selection is set to A1-23 Run enable indication (MO assigned function), the setting of the corresponding Pr.A1-23 will also be changed and assigned to MO1 (the function is assigned to MO).
- The same MOx function can only be defined and selected as one single function. If the same MOx function is set repeatedly, the last setting will prevail, and the same MOx function previously set repeatedly returns to the default value. For example, A1-25 Forward command indication indicates that RY1 is specified first, and then A1-26 Reverse command indication indicates that RY1 is also specified, then the latter setting replaces the former, and the former will restore to the default value.
- Refer to the list for MO function selection. For example, setting 0057h means MO function selection A1-23 Run enable indication. For its function description, refer to the detailed description of each parameter group.

G1-05 RY1 Response Time

(0xD05) Default: 1.050

G1-07 RY2 Response Time

(0xD07) Default: 1.050

Settings 0.000–30.000 sec.

- This function is to delay and confirm the digital output terminal signal. The time for delay is also the time for confirmation. It prevents high frequency changes of the digital terminal output; however, the response time will also be delayed. For example, MOx function is set as reverse command indication, when the drive frequency command changes from forward command to reverse command, the MOx output status will change from OFF to ON after the MOx response time.

G2. AI Setting

G2-00 Virtual AI Function

(0xD40) Default: 0

Settings 0: Disabled

1: Enabled

- When the virtual AI function is enabled, the AI input value is replaced by the virtual AI level (Pr.G2-12 and G2-31) setting.
- The parameter format of virtual AI function is 00b–11b. The bits from right (bit0) to left (bit1) correspond to AI1–AI2 respectively, and the others bit are reserved.

G2-02 AI1 Function Sel

(0xD42) Default: 0

G2-21 AI2 Function Sel

(0xD55) Default: 0

Settings 0441h: C1-01 EX1 Main FREQ Src

0442h: C1-02 EX1 Aux FREQ Src

0445h: C1-05 EX2 Main FREQ Src

0446h: C1-06 EX2 Aux FREQ Src

0501h: C4-01 EX1 Main Torque Src

0502h: C4-02 EX1 Aux Torque Src

0504h: C4-04 EX2 Main Torque Src

0505h: C4-05 EX2 Aux Torque Src

0D7Bh: G2-59 AI Comparator Src

1303h: J5-03 FireMode FREQ Src

1882h: P0-02 P-PID Ref 1 Src

1883h: P0-03 P-PID Ref 2 Src

1884h: P0-04 P-PID Fdk 1 Src

1885h: P0-05 P-PID Fdk 2 Src

18ADh: P0-45 Tracking Reference Selection

- Sets the analog input corresponding drive function setting source.
- There are two methods for AI function selection, one is to specify the function through AI, and the other is to specify the AI by functions, no matter which method is used, the two sides are synchronous. For example, Pr.G2-02 AI1 function selection is set to C1-01 EX1 main frequency source (AI assigned function), the setting of the corresponding Pr.C1-01 will also be changed and assigned to AI1 (the

function is assigned to AI).

- 🕮 The same AIx function can only be defined and selected as one single function. If the same AIx function is set repeatedly, the last setting will prevail, and the same AIx function previously set repeatedly returns to the default value. For example, C1-01 EX1 main frequency source indicates that AI1 is specified first, and then C1-02 EX1 auxiliary frequency source indicates that AI1 is also specified, then the latter setting replaces the former, and the former will restore to the default value.
- 🕮 Refer to the list for AI function selection. For example, setting 0441h means AI function selection C1-01 EX1 main frequency source. For its function description, refer to the detailed description of each parameter group.

G2-03 AI1 Signal Type

(0xD43) Default: 2

G2-22 AI2 Signal Type

(0xD56) Default: 2

Settings 0: 0–10 V
1: 0–20 mA
2: 4–20 mA

- 🕮 Sets the analog input signal type and range.

G2-04 AI1 Filter Time

(0xD44) Default: 0.01

G2-23 AI2 Filter Time

(0xD57) Default: 0.01

Settings 0.00–20.00 sec.

- 🕮 The analog signal input by the control terminal often contains noise, which affects the stability of the control. Use an input filter to eliminate this noise.
- 🕮 When the time constant setting is too large, the control is stable, but the control response is slow. When the time constant setting is too small, the control responses faster but it may be unstable. For optimal setting, adjust the setting based on the control stability or the control response.

G2-05 AI1 Low Value
(0xD45)

G2-24 AI2 Low Value
(0xD58)

Settings		Default:
	0–10 V: 0.00–10.00 V	0.00
	0–20 mA: 0.00–20.00 mA	0.00
	4–20 mA: 4.00–20.00 mA	4.00

G2-06 AI1 Low %
(0xD46)

G2-25 AI2 Low %
(0xD59) Default: 0.00

Settings -100.00–100.00%

G2-07 AI1 Mid Value
(0xD47)

G2-26 AI2 Mid Value
(0xD5A)

Settings		Default:
	0–10 V: 0.00–10.00 V	5.00
	0–20 mA: 0.00–20.00 mA	10.00
	4–20 mA: 4.00–20.00 mA	12.00

G2-08 AI1 Mid %
(0xD48) Default: 50.00

G2-27 AI2 Mid %
(0xD5B) Default: 50.00

Settings -100.00–100.00%

G2-09 AI1 High Value
(0xD49)

G2-28 AI2 High Value
(0xD5C)

Settings		Default:
	0–10 V: 0.00–10.00 V	10.00
	0–20 mA: 0.00–20.00 mA	20.00
		20.00
	4–20 mA: 4.00–20.00 mA	

G2-10 AI1 High %

(0xD4A) Default: 100.00

G2-29 AI2 High %

(0xD5D) Default: 100.00

Settings -100.00–100.00%

- When the parameter AI signal type is the voltage type 0–10V analog input, the setting unit is voltage (V); when the signal type is current 0–20 mA or 4–20 mA input, the setting unit is current (mA).
- If the analog input is set as frequency command, 100% corresponds to Fmax (Pr.C2-17 maximum operation frequency).
- The voltage can only be input from low voltage to high voltage between AI1–AI2, which is low value ≤ mid value ≤ high value. There is no limit for the corresponding percentage, you can set it freely, and the calculation is linear between two points.
- When the voltage input is lower than the low value, the output percentage equals to the low percentage. For example, when Pr.G2-05 = 1 V and Pr.G2-06 = 10%, all of the output below 1V (including) is 10%.

G2-11 AI1 Signal Loss Action

(0xD4B) Default: 0

G2-30 AI2 Signal Loss Action

(0xD5E) Default: 0

Settings 0: Disabled
1: Warn & Continue OPER
2: Fault & Ramp to Stop
3: Reserved
4: Fault & Coast to Stop
5: Fault & by Quick Stop Time
6: Warning & FREQ Lower Limit OPER

- The signal loss function is only valid when the AI signal type is selected as 4–20 mA. When the AI signal type is set as 4–20 mA loss, the AI signal is regarded as loss when it is lower than 3.6 mA and regarded as not loss when it returns to 4 mA.

G2-12 Virtual AI1 Input

(0xD4C) Default: 0.00

G2-31 Virtual AI2 Input

(0xD5F) Default: 0.00

Settings 0.00–100.00%

- When the virtual AI function is enabled, the virtual AI input takes place of the actual input value.

G2-13 AI1 Display

(0xD4D)

G2-32 AI2 Display

(0xD60) Default: Read only

Settings -100.00–100.00%

- Displays the current AI signal percentage.

G2-59 AI Comparator Src

(0xD7B) Default: 0

Settings 0–6: Reserve
7–8: AI1–AI2

- Sets the analog input source.

G2-60 AI Comparator High Level

(0xD7C) Default: 50.0

Settings -100.0–100.0%

- Sets the high level of analog input.

G2-61 AI Comparator Low Level

(0xD7D) Default: 10.0

Settings -100.0–100.0%

- Sets the low level of analog input.

G2-62 AI Level in Range Indn

(0xD7E) Default: 0

Settings 0: Disabled
1–2: Relay 1–2

- When the analog signal is higher than the high level, Pr.G2-62 starts the corresponding output; when the analog signal is lower than the low level, it stops the corresponding output.

G3. AO Setting

G3-00 Virtual AO Function

(0xD80) Default: 0

Settings 0: Disabled
1: Enabled

📖 The parameter format of virtual AO function is 00b–11b. The bits from right (bit0) to left (bit1) correspond to AO1–AO2 respectively, and the others bit are reserved.

G3-07 Virtual AO1 Output

(0xD87) Default: 0.00

G3-21 Virtual AO2 Output

(0xD95) Default: 0.00

Settings 0.00–100.00%

📖 When the virtual AO function is enabled, the AO output value is replaced by the virtual AO level (Pr.G3-07, G3-21) setting.

G3-01 AO1 Function Sel

(0xD81) Default: 165Dh

G3-15 AO2 Function Sel

(0xD8F) Default: 165Eh

Settings 0D80h: G3-00 Virtual AO Function
10C2h: H6-02 Motor Temp 1 AO Sel
10CEh: H6-14 Motor Temp 2 AO Sel
1588h: n1-08 Modbus AO Mask
15D3h: n5-18 EtherNet AO Mask
165Bh: o0-27 FREQ Cmd AO Sel
165Ch: o0-28 FREQ Profile AO Sel
165Dh: o0-29 Motor RPM AO Sel
165Eh: o0-30 Input Current AO Sel
165Fh: o0-31 Output Current AO Sel
1660h: o0-32 Output Voltage AO Sel
1661h: o0-33 Torque Cmd AO Sel
1662h: o0-34 Output Torque AO Sel
1663h: o0-35 Output Power AO Sel
1664h: o0-36 Power Factor AO Sel

✓ G3-02 AO1 Signal Type

(0xD82) Default: 2

✓ G3-16 AO2 Signal Type

(0xD90) Default: 2

Settings 0: 0–10 V

1: 0–20 mA

2: 4–20 mA

📖 Sets the analog output signal type and range.

✓ G3-03 AO1 Filter Time

(0xD83) Default: 0.05

✓ G3-17 AO2 Filter Time

(0xD91) Default: 0.05

Settings 0.00–20.00 sec.

📖 When the control signal is unstable, set the filter time to reduce the output signal fluctuation.

✓ G3-04 AO1 Bias

(0xD84) Default: 0.00

✓ G3-18 AO2 Bias

(0xD92) Default: 0.00

Settings -100.00–100.00%

📖 Signal type is 0–10V, take the output frequency as an example:
10V × (output frequency ÷ Pr.C2-17) × Pr.G3-05 + (10V × Pr.G3-04)

📖 Signal type is 0–20 mA, take the output frequency as an example:
20 mA × (output frequency ÷ Pr.C2-17) × Pr.G3-05 + (20 mA × Pr.G3-04)

📖 Signal type is 4–20 mA, take the output frequency as an example:
4 mA + 16 mA × (output frequency ÷ Pr.C2-17) × Pr.G3-05 + (16 mA × Pr.G3-04)

📖 Sets the corresponding value when analog output 0%.

G3-05 AO1 Gain

(0xD85) Default: 100.0

G3-19 AO2 Gain

(0xD93) Default: 200.0

Settings -500.0–500.0%

Adjusts the signal level of the analog signal outputs from the drive to the analog meter.

G3-06 AO1 Output Method

(0xD86) Default: 0

G3-20 AO2 Output Method

(0xD94) Default: 0

Settings 0: Absolute Value

1: 0% Negative; 0–100% Positive

2: 0–50% Negative; 50–100% Positive

Sets the positive and negative range of the control signal indicated by the output signal range.

H. Fault & Protection

H0. Fault Handle

✎ H0-00 Fault Reset MI Src

(0xF40) Default: 6

Settings 0: Disabled
1: Enabled
2–7: MI1–MI6

📖 Sets the corresponding fault handle function of multi-function terminals.

✎ H0-01 Fault Indn

(0xF41) Default: 2

Settings 0: Disabled
1–2: Relay1–Relay2

📖 Sets the corresponding fault indication of multi-function terminals.

✎ H0-02 Warning Indn

(0xF42) Default: 0

Settings 0: Disabled
1–2: Relay1–Relay2

📖 Sets the corresponding warning indication of multi-function terminals.

H0-03 Fault Auto Reset Allowed Sel

(0xF43) Default: 1100 0000 0000 1001

Settings bit 0: ocA/ ocd/ ocn
bit 1: ovA/ ovd/ ovn/ ovs
bit 2: LvA/ Lvd/ Lvn
bit 3: Occm/Ocm
bit 4: oH1/ oH2
bit 5: EF
bit 6: EF1
bit 7: oL
bit 8: FSF
bit 9: oH3
bit 10: ot1/ ot2
bit 11: uC

bit 12: AI Loss

bit 13: GFF

bit 14: Lvac

bit 15: PLL

📖 Sets the selection of fault restart type. To restart after fault, you cannot set Pr.H0-04 to 0.

H0-04 Fault Restart MI Src

(0xF44) Default: 1

Settings 0: Disabled

1: Enabled

2–7: MI1–MI6

📖 Sets the fault restart function and enable it through external terminals.

H0-05 Auto Reset Config 2

(0xF45) Default: 0000 0000 0000 0111

Settings bit 0: POCF

bit 1: CSF

bit 2–15: SdRv

📖 Sets the auto reset configuration. To restart after fault, you cannot set Pr.H0-04 to 0.

H0-06 Fault Restart No.

(0xF46) Default: 10

Settings 0–10 times

📖 After a fault occurs, the AC motor drive can reset and restart automatically up to 10 times. If Pr.H0-06 is set to 0, there is no upper limit for auto restart time.

📖 If the number of faults exceeds Pr.H0-06 setting, the drive does not reset and restart until you press "RESET" manually and execute the operation command again.

H0-07 Fault Restart No. Remain

(0xF47) Default: Read only

Settings 0–10

📖 Displays the remaining fault auto reset times of the drive.

📖 There are two reset conditions for H0-07 reset:

- 📖 When the number of resets is used up, the automatic restart will not activate and Pr. H0-07 returns to the setting value of Pr. H0-06.

📖 If the number of resets has not been used up, the time of Pr. H0-08 will be counted after the latest automatic restart. After the counting is completed, Pr. H0-07 returns to the setting value of Pr. H0-06.

✓ H0-08 Fault Restart No. Reset Time

(0xF48) Default: 60.0

Settings 0.0–600.0 sec.

📖 Sets the longest reset time of the fault auto restart time.

✓ H0-09 Fault Auto Reset Delay Time

(0xF49) Default: 1.0

Settings 1.0–600.0 sec.

📖 Sets the delay time before fault auto reset.

✓ H0-10 Fault Restart Delay Time

(0xF4A) Default: 1.0

Settings 1.0–600.0 sec.

📖 Sets the delay time before fault auto restart.

✓ H0-14 STO Auto Reset

(0xF4E) Default: 0

Settings 0: Disabled

1: Enabled

📖 Determines whether the STO fault can be auto reset.

✓ H0-15 STO Output Logic A

(0xF4F) Default: 0

Settings 0: Disabled

1–2: Relay1–Relay2

📖 Sets the corresponding STO output logic A of multi-function terminals.

✓ H0-16 STO Output Logic B

(0xF50) Default: 0

Settings 0: Disabled

1–2: Relay1–Relay2

📖 Sets the corresponding STO output logic B of multi-function terminals.

✎ **H0-17** Fault Option1 Mo Sel

(0xF51) Default: 0

✎ **H0-18** Fault Option2 Mo Sel

(0xF52) Default: 0

Settings 0: Disabled

1–2: Relay1–Relay2

📖 Set the corresponding fault output indication 1–2 of multi-function terminals, use these parameters with Pr.H0-21–H0-22.

✎ **H0-21** Fault Option 1

(0xF55) Default: 0

✎ **H0-22** Fault Option 2

(0xF56) Default: 0

Settings 0–65535

📖 Set the fault output code Pr.H0-21–H0-22, when the corresponding fault code occurs, it outputs the corresponding fault indication Pr.H0-17–H0-18.

H1. Voltage Protection

H1-02 Lv Fault Level

(0xF82) Default: 300.0

Settings 300.0–440.0 V_{DC}

- Sets the judging level of low voltage. When the drive Clamp bus voltage is lower than the low voltage level, the Lv fault is triggered to stop output and coast to stop.

H1-05 Lv Fault Indn

(0xF85) Default: 0

Settings 0: Disabled

1–2: Relay1–Relay2

- Sets the corresponding low voltage fault indication of multi-function terminals.

H1-06 Restart after Power Loss

(0xF86) Default: 1

Settings 0: Disabled

1: Enabled

- Determines if the VIDAR will restart automatically when the power recovers after the power loss.

H1-07 Power Loss Time Allowed

(0xF87) Default: 2.0

Settings 0.0–20.0 sec.

- Determines the maximum time of allowable power loss. If the duration of a power loss exceeds this parameter setting, the AC motor drive stops output after the power recovers.
- The function of restart after loss is valid when the AC motor drive displays “Lv” during the maximum allowable power loss time. If the AC motor drive powers off due to overload which even does not exceed the allowed power loss duration, Pr.H1-06 is invalid after the power recovers.

H2. Current Protection

H2-00 GFF Detect Level

(0xFC0) Default: 60

Settings 0–200%

📖 100% corresponds to the drive light load rated current.

H2-03 Stall Prev Function Sel

(0xFC3) Default: 0

Settings 0: Basic OC Stall

1: Smart OC Stall

📖 A comparison between basic stall prevention and smart stall prevention:

Type	Over-current (oc)		
	Descriptions	Action	Pr.
Basic	Frequency maintains during acceleration	Acceleration stops	H2-05
	Frequency decreases at constant speed	Frequency gradually decreases	H2-07
Smart	Frequency decreases during accel./ decel.	Frequency gradually decreases	H2-05
	Frequency decreases at constant speed	Frequency gradually decreases	H2-07

📖 If you use smart over-current stall prevention for industries that require fast response, you can adjust the value of Smart OV PID controller (Pr.H1-11–H1-13).

Basic Over-current Stall Prevention

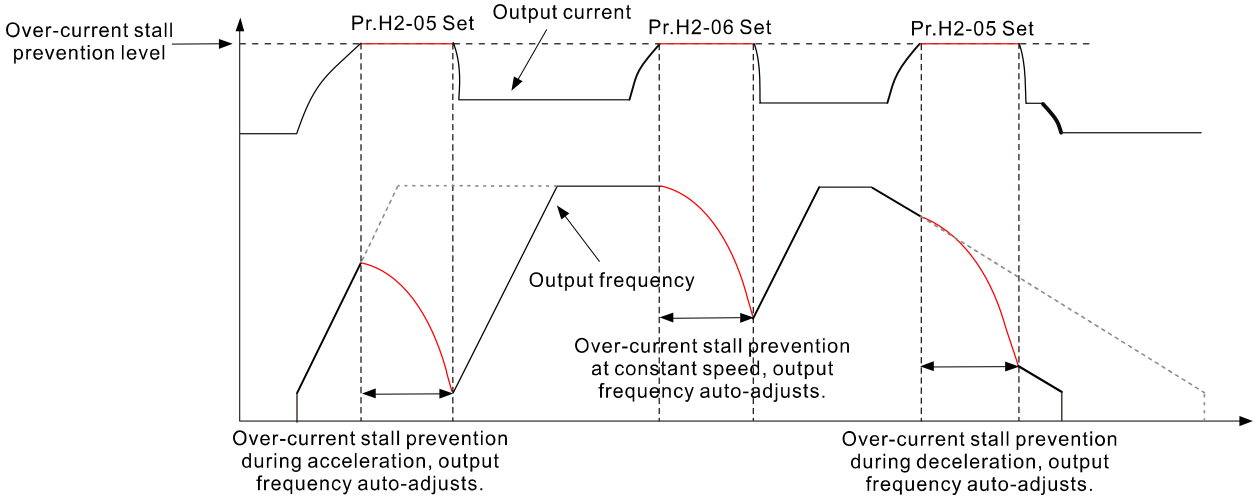
📖 When the output current exceeds the over-current stall prevention level (Pr.H2-05) during acceleration, the output frequency stops accelerating. The output frequency continues to accelerate when the output current drops below the stall prevention level to protect the drive.

📖 When the output current exceeds the over-current stall prevention level during operation (Pr.H2-07), the output frequency decreases according to the setting for acceleration/ deceleration time selection for over-current stall prevention at constant speed (Pr.H2-07). When the output current drops below the stall prevention level, the output frequency accelerates to the target frequency according to its previous set acceleration time to protect the drive.

Smart Over-current Stall Prevention

📖 The smart over-current stall prevention adopts closed-loop control. It takes the setting for Pr.H2-05 (over-current stall prevention during acceleration) as target command during acceleration / deceleration and takes setting for Pr.H2-07 (over-current stall prevention during operation) as target command at constant speed. When the output current exceeds the stall prevention level, the Smart

OC PI controller (Pr.H2-10, H2-11) decreases the output frequency gradually according to the closed-loop response until the current drops below the stall prevention level and returns to target frequency based on the previous setting when the current is lower than the stall prevention level. If the output current is still higher than the stall prevention level during the adjustment, the output frequency decreases to the minimum output frequency.



H2-04 Output Current Limit

(0xFC4) Default: 170

Settings 0–190% (100% corresponds to the drive continuous current)

- Sets the maximum output current of the drive, determines the drive output current limit with Pr.F2-16–F2-19. When the control mode is PMFOC and SynRM FOC, and the drive output current reaches the set current limit, the output frequency automatically decreases as the over-current stall prevention action.
- This parameter is NOT applicable for VF and SVC control modes.

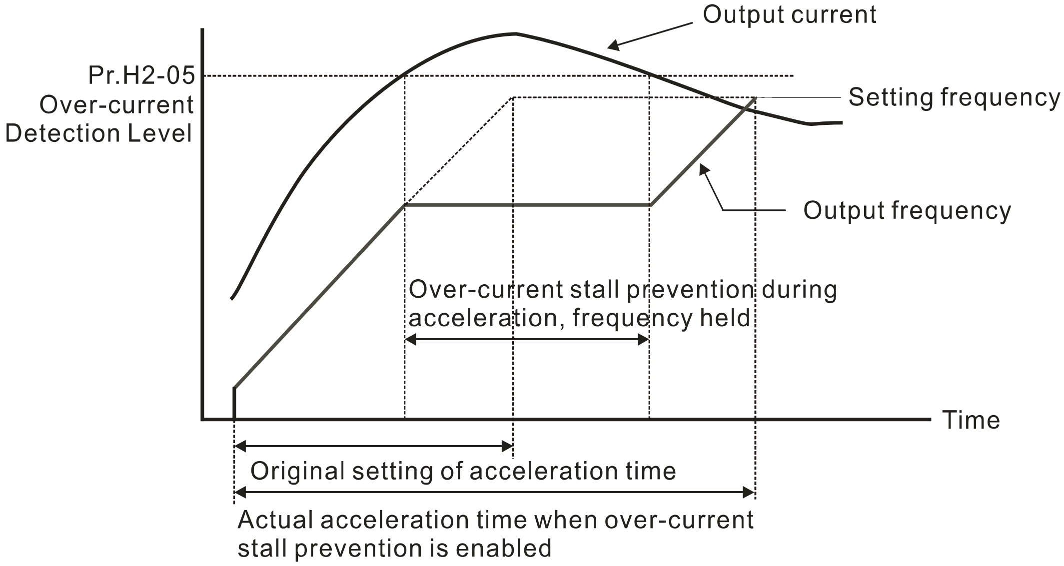
✓ H2-05 ocA Stall Prev Level

(0xFC5) Default: 150

Settings 0–190%

- If the motor load is too large or the drive acceleration time is too short, the output current of the drive may be too high during acceleration, and it may cause motor damage or trigger the drive protection functions (oL, oc, etc.). Use this parameter to prevent these situations.
- As the following figure shown, the drive output current may increase abruptly and exceed the setting of Pr.H2-05 during acceleration. In this case, the drive stops accelerating and keeps the output frequency constant, and then continues to accelerate until the output current decreases.

📖 When the over-current stall prevention occurs because the motor capacity is too small or operates in the default, decrease Pr.H2-05 setting value.



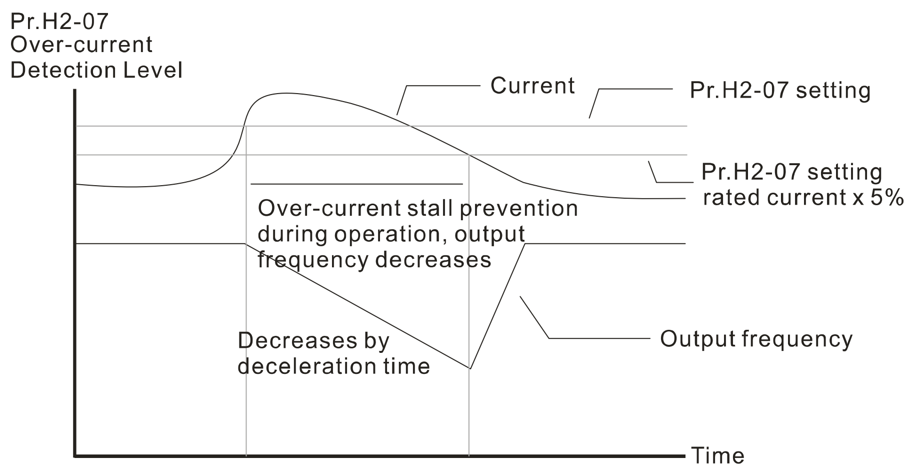
H2-07 ocn Stall Prev Level

(0xFC7) Default: 150

Settings 0–190%

📖 This is a protection for the drive to decrease output frequency automatically when the motor over-loads abruptly during constant motor operation.

📖 If the output current exceeds the setting value for Pr.H2-07 when the drive is operating, the drive decelerates according to the Pr.H2-08 setting to prevent the motor from stalling. The lower limit for the over-current stall prevention is determined by Pr.C2-19.



Over-current stall prevention during operation

H2-08 ocn Stall Prev Decel Sel

(0xFC8) Default: 5

Settings
- 0: Current Decel Time
- 1: Decel Time 1
- 2: Decel Time 2
- 3: Decel Time 3
- 4: Decel Time 4
- 5: By Quick Stop Time

Selects the deceleration time when over-current stall prevention occurs at constant speed.

H2-09 oc Stall Prev Indn

(0xFC9) Default: 0

Settings
- 0: Disabled
- 1–2: Relay1–Relay2

Sets the corresponding over-current stall prevention indication of multi-function terminals.

H2-10 Smart oc P Gain

(0xFCA) Default: Depending on the models

Settings 0–65535

Sets the proportional gain of smart over-current stall prevention.

H2-11 Smart oc I Gain

(0xFCB) Default: Depending on the models

Settings 0.000–65.535

Sets the integral gain of smart over-current stall prevention.

H2-12 Low Current Detect Level

(0xFCC) Default: 0.0

Settings 0.0–100.0%

100% corresponds to the drive light load rated current.

H2-13 Low Current Detect Time

(0xFCD) Default: 0.00

Settings	0.00–360.00 sec.

H2-14 Low Current Action

(0xFCE) Default: 0

Settings	0: Warning & Continue OPER
	1: Fault & Ramp to Stop
	2: Reserved
	3: Fault & Coast to Stop
	4: Fault & by Quick Stop Time

- When the drive output current is lower that the set level in Pr.H2-12, and the low current output time exceeds the detect time of Pr.H2-13, the drive activates according to Pr.H2-14. It can be used with MO terminal 0FCFh (low current output).
- The low current detection does not activate when the drive is in sleep mode or standby mode.
- Pr.H2-12 low current detect level is based on the drive rated current, the equation is: Pr.A0-01 (drive rated current) × Pr.H2-12 (Low current detect level) % = Low current detection level (A).

H2-15 Low Current Indn

(0xFCF) Default: 0

Settings	0: Disabled
	1–2: Relay1–Relay2

- Sets the corresponding low current indication of multi-function terminals.

H3. Reserve

H4. Power Converter Thermal Protection

∗: Level 3 Security Parameters, enter password to unlock this parameter.

✔ H4-00 IGBT oH Warning Level

(0x1040) Default: 105

Settings 0–115°C

📖 When the IGBT temperature is higher than Pr.H4-00 setting value, the drive gives the overheat warning.

✔ H4-01 Cap oH Warning Level

(0x1041) Default: Depending on the models

Settings 0–95°C

📖 When the capacitance temperature is higher than Pr.H4-01 setting value, the drive gives the overheat warning.

✔ H4-02 Drive oH Warning Indn

(0x1042) Default: 0

Settings 0: Disabled
1–2: Relay1–Relay2

📖 Sets the corresponding drive overheat warning indication of multi-function terminals.

∗ ✔ H4-03 Fan Control Sel

(0x1043) Default: 1

Settings 0: By fan duty command (Pr.H4-04)
1: By power converter ambient temperature

📖 Sets the fan running conditions.

∗ H4-04 Fan Speed Setting

(0x1044) Default: 0

Settings 0–100%

📖 Sets the fan speed of the drive.

H5. Motor Over Torque Protection

H5-00 ot Action

(0x1080) Default: 0

Settings 0: Warning & Continue OPER
1: Fault & Ramp to Stop
2: Reserved
3: Fault & Coast to Stop
4: Fault & by Quick Stop Time

- The over-torque protection is activated when Pr.H5-00 is not set to 0.

H5-01 ot Indn

(0x1081) Default: 0

Settings 0: No Function Disabled
1–2: Relay1–Relay2

- Sets the corresponding over torque indication of multi-function terminals.

H5-02 Normal Speed ot Action

(0x1082) Default: 0

Settings 0: Warning & Continue OPER
1: Fault & Ramp to Stop
2: Reserved
3: Fault & Coast to Stop
4: Fault & by Quick Stop Time

- The over-torque protection at constant speed is activated when Pr.H5-02 is not set to 0.
- "Normal Speed" means that the VIDAR is operating at the setting speed, the VIDAR is not accelerating or decelerating.

H5-03 Normal Speed ot Indn

(0x1083) Default: 0

Settings 0: No Function Disabled
1–2: Relay1–Relay2

- Sets the corresponding over-torque indication at constant speed multi-function terminals.
- "Normal Speed" means that the VIDAR is operating at the setting speed, the VIDAR is not accelerating or decelerating.

⌁ H5-04 ot Level

(0x1084) Default: 0

Settings	0–250%

100% corresponds to the motor rated current.

⌁ H5-05 ot Detect Time

(0x1085) Default: 0.1

Settings	0.0–10.0 sec.

⌁ H5-06 N-Speed ot Level

(0x1086) Default: 0

Settings	0–250%

100% corresponds to the motor rated current.

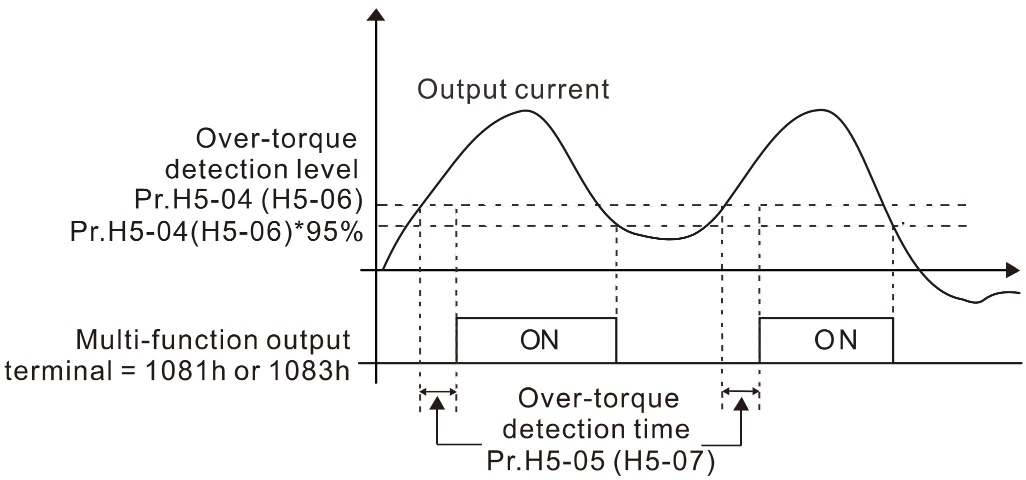
"N-Speed" means that the VIDAR is operating at the setting speed, the VIDAR is not accelerating or decelerating.

H5-07 N-Speed ot Detect Time

(0x1087) Default: 0.1

Settings	0.0–10.0 sec.

- When the output current exceeds the over torque detect level (Pr.H5-04, H5-06) and the over torque detect time (Pr.H5-05, H5-07), the over-torque detection activates according to the setting for Pr.H5-00 or H5-02.
- When Pr.H5-00 or H5-02 is set to 0, after the over-torque is detected, the drive displays ot1/ ot2 warning and continues operating until the output current is smaller than 5% of the over-torque detect level, then the warning is released.
- When Pr.H5-00 or H5-02 is set to 1–4, after the over-torque is detected, the drive shows ot1/ ot2 fault and stops running according to the set stop method until the fault is reset manually.
- "N-Speed," it means that the VIDAR is operating at setting speed, the VIDAR is not at accelerating or decelerating.



H6. Motor Thermal Protection

H6-00 Motor Temp 1 (KTY84)

(0x10C0) Default: Read only

Settings -40.0–300.0°C

H6-11 RTD Enable

(0x10CB) Default: 0

Settings 0: Disabled

1: Enabled

H6-12 Motor Temp 2 (RTD)

(0x10CC) Default: Read only

Settings -40.0–300.0°C

- Display the temperature of the motor that currently connected to the AC motor drive.
- The motor temperature 2 indicates the NDE (Non-Drive End) bearing temperature, and it will be always zero when Pr.H6-11 is set to 0: Disabled.

H6-02 Motor Temp 1 AO Sel

(0x10C2)

H6-14 Motor Temp 2 AO Sel

(0x10CE) Default: 0

Settings 0: Disabled

1–2: AO1–AO2

- Use this parameter to select analog output terminals that are defined as “Motor temperature”.
- Motor temperature -40.0°C–150.0°C correspond to 0%–100%

H6-04 Motor Temp 1 Warning Level

(0x10C4) Default: 130.0

H6-16 Motor Temp 2 Warning Level

(0x10D0) Default: 95.0

Settings 0.0–150.0°C (Motor Temp.1 / 2 overheating detection level)

- Setting 0 to Disabled the function.
- When the motor temperature is higher than the warning level for the delay time of Pr.H6-05/ H6-17, the VIDAR shows over-heating warning OH3 / OH3r.
- When the motor temperature is lower than the warning level for the delay time of Pr.H6-05/ H6-16, the warning is automatically cleared.

⌿ H6-05 Motor Temp 1 Warning Delay Time

(0x10C5) Default: 60.0

⌿ H6-17 Motor Temp 2 Warning Delay Time

(0x10D1) Default: 60.0

Settings 0.0–600.0 sec.

📖 Sets the warning delay time of the motor temperature level.

⌿ H6-07 Motor Temp 1 OH Detect Level

(0x10C7) Default: 145.0

Settings 0.0 (Motor Temp 1 Warning Level)–150.0°C

⌿ H6-19 Motor Temp 2 OH Detect Level

(0x10D3) Default: 110.0

Settings 0.0 (Motor Temp 2 Warning Level)–110.0°C

📖 When the motor temperature is higher than the detecting level (Pr.H6-07, H6-19) for the delay time of Pr.H6-08 / H6-20, the VIDAR activates according to the set treatment of Pr.H6-09 / H6-21.

📖 If Pr.H6-09 / H6-21 = 0: Warning & Continue OPER, it shows OH3 / OH3r warning code and continues operating. When the temperature is lower than the detected level (Pr.H6-07 / H6-19) for the delay time of Pr.H6-08 / H6-20, the warning code is automatically cleared.

📖 If Pr.H6-09 / H6-21 ≠ 0, it shows OH3 / OH3r warning code and stops according to the set stop method in Pr. H6-09 / H6-21. When the temperature is lower than the detecting level (Pr.H6-07 / H6-19) for the delay time of Pr.H6-08 / H6-20, the fault code can be manually cleared.

⌿ H6-08 Motor Temp 1 OH Detect Time

(0x10C8)

⌿ H6-20 Motor Temp 2 OH Detect Time

(0x10D4) Default: 3.0

Settings 0.0–600.0 sec.

📖 Sets the motor temperature level detect time when the temperature reaches the overheat protection.

H6-09 Motor Temp 1 OH Action

(0x10C9)

H6-21 Motor Temp 2 OH Action

(0x10D5) Default: 3

Settings 0: Warning & Continue OPER

1: Fault & Ramp to Stop

2: Reserved

3: Fault & Coast to Stop

4: Fault & by Quick Stop Time

📖 The overheat protection is activated when this parameter is not set to 0.

⚡ H6-10 Motor Temp 1 OH Indn

(0x10CA)

⚡ H6-22 Motor Temp 2 OH Indn

(0x10D6) Default: 0

Settings 0: Disabled

1–2: Relay 1–2

📖 Sets the overheat indication of multi-function terminals.

H6-24 RH DO Select

(0x10D8) Default: 0

Settings 0: Disabled

1–2: Relay 1–2

📖 Sets the corresponding relative humidity warning indication of multi-function terminals.

H6-25 RH Warning Level

(0x10D9) Default: 90.0

Settings 0.0–100.0%

📖 Set Pr.H6-25 as 0 to disable the function.

📖 When the relative humidity is higher than the warning level for the delay time of Pr.H6-26, the VIDAR shows RH warning ARHw.

📖 When the relative humidity is lower than the warning level for 5 seconds, the warning is automatically cleared.

H6-26 RH Warning Delay

(0x10DA) Default: 60.0

Settings 0.0–600.0 sec.

📖 Sets the warning delay time of the RH warning level.

H6-27 RH Det Level

(0x10DB) Default: 0

Settings 0.0–100.0%

📖 Set Pr.H6-27 as 0 to disable the function.

📖 When the relative humidity exceeds the detection level set in Pr.H6-27 and remains above that level for a duration time longer than the detection time set in Pr.H6-28, the VIDAR will display fault ARHf and coast to stop.

H6-28 RH Det Time

(0x10DC) Default: 3.0

Settings 0.0–600.0 sec.

📖 Sets the fault detection time of the RH detection level.

H7. Overload/ Underload Handle

H7-00 Load Compare Src

(0x1100) Default: 0

Settings 0: Output Amp/ motor rated Amp

1: Output torque/ motor rated torque

2: Output power/ motor rated power

3: Output power/ driver rated power

- Through different load compare sources, it provides user-defined derating conditions to prevent and reduce drive stopping due to overload.

H7-01 L/F Overload Curve Sel

(0x1101) Default: 0

Settings 0: Disabled

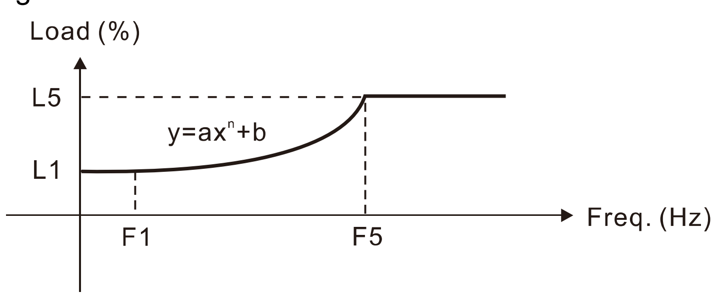
1: User Defined

2: 1.5th power curve

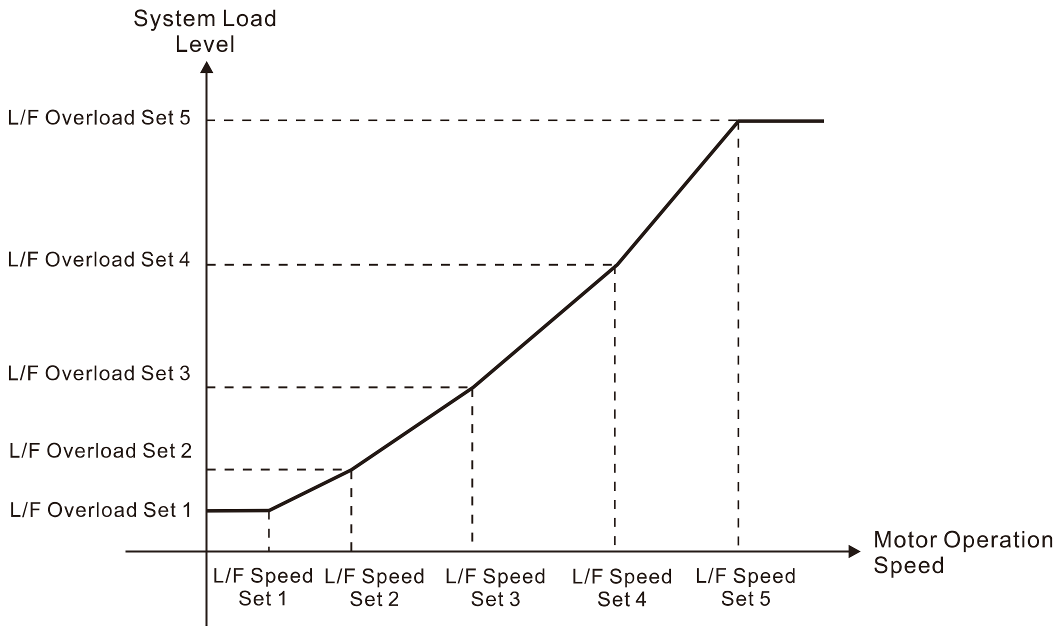
3: 2nd power curve

4: 3rd power curve

- Pr.H7-01 selects user-defined or built-in curves.
- When selecting a power type curve, the final curve is determined with reference to the setpoint 1 and setpoint 5 set by the user (that affects the coefficients a and b in the figure below), as shown in the following figure.



- When selecting user defined curve, the overload level is set using the overload parameters. The proportional relation is as shown in the following figure.



H7-02 L/F Overload Action

(0x1102) Default: 0

Settings 0: Warning & Continue OPER
1: Fault & Ramp to Xtop
2: Reserved
3: Fault & Coast to Stop
4: Fault & by Quick Stop Time

- The L/F overload protection is activated when this parameter is not set to 0.
- Setting 0: The drive decelerates according to the current deceleration time until the overload condition is cleared.

H7-03 L/F Overload Indn

(0x1103) Default: 0

Settings 0: Disabled
1–2: Relay 1–2

- Sets the overload indication of multi-function terminals.

H7-04 L/F Overload Detect Time

(0x1104) Default: 10.0

Settings 0.0–600.0 sec.

- When the system load is larger than the overload curve and remains in the speed range of Pr.H7-05–

H7-09 for the detect time more than Pr.H7-04, the drive executes the overload condition according to Pr.H7-02.

✍ H7-05 Overload L/F Speed Set 1

(0x1105) Default: 75

Settings 0.00–H7-06 (rpm)

✍ H7-06 Overload L/F Speed Set 2

(0x1106) Default: 75

Settings H7-05–H7-07 (rpm)

✍ H7-07 Overload L/F Speed Set 3

(0x1107) Default: 75

Settings H7-06–H7-08 (rpm)

✍ H7-08 Overload L/F Speed Set 4

(0x1108) Default: 75

Settings H7-07–H7-09 (rpm)

✍ H7-09 Overload L/F Speed Set 5

(0x1109) Default: 75

Settings H7-08–8985 (rpm)

📖 Setpoints are related in order of magnitude (the drive performs interpolation processing on the speed value internally), the relation between the speed parameter settings should be Setpoint 5 ≥ Setpoint 4 ≥ Setpoint 3 ≥ Setpoint 2 ≥ Setpoint 1.

✍ H7-10 Overload L/F Load Set 1

(0x110A)

✍ H7-11 Overload L/F Load Set 2

(0x110B)

✍ H7-12 Overload L/F Load Set 3

(0x110C)

✍ H7-13 Overload L/F Load Set 4

(0x110D)

✍ H7-14 Overload L/F Load Set 5

(0x110E) Default: 150.0

Settings 0.0–200.0%

📖 Set the load according to the speed of Pr.H7-05–H7-09.

H7-15 L/F Underload Curve Sel

(0x110F) Default: 0

Settings 0: Disabled
1: User Defined
2: 1.5th power curve
3: 2nd power curve
4: 3rd power curve

📖 Pr.H7-15 selects user-defined or built-in curves.

H7-16 L/F Underload Action

(0x1110) Default: 0

Settings 0: Warning & Continue OPER
1: Fault & Ramp to Xtop
2: Reserved
3: Fault & Coast to Stop
4: Fault & by Quick Stop Time

📖 The L/F underload protection is activated when this parameter is not set to 0.

✎ H7-17 L/F Underload Indn

(0x1111) Default: 0

Settings 0: Disabled
1–2: Relay 1–2

📖 Sets the underload indication of multi-function terminals.

✎ H7-18 L/F Underload Detect Time

(0x1112) Default: 10.0

Settings 0.0–600.0 sec.

📖 When the system load is less than the underload curve and within the speed range of Pr.H7-19–H7-23 for the detect time that exceeds Pr.H7-18, the drive executes the underload conditions according to Pr.H7-16.

✎ H7-19 Underload L/F Speed Set 1

(0x1113) Default: 75

Settings 0.00–H7-20 (rpm)

✎ H7-20 Underload L/F Speed Set 2

(0x1114) Default: 75

Settings H7-19–H7-21 (rpm)

⌁ **H7-21**	Underload L/F Speed Set 3	
(0x1115)		Default: 75
	Settings	H7-20–H7-22 (rpm)

⌁ **H7-22**	Underload L/F Speed Set 4	
(0x1116)		Default: 75
	Settings	H7-21–H7-23 (rpm)
⌁ **H7-23**	Underload L/F Speed Set 5	
(0x1117)		Default: 75
	Settings	H7-22–8985 (rpm)

📖 Setpoints are related in order of magnitude (the drive performs interpolation processing on the speed value internally), the relation between the speed parameter settings should be Setpoint 5 ≥ Setpoint 4 ≥ Setpoint 3 ≥ Setpoint 2 ≥ Setpoint 1.

⌁ **H7-24**	Underload L/F Load Set 1	
(0x1118)		Default: 10.0
⌁ **H7-25**	Underload L/F Load Set 2	
(0x1119)		Default: 15.0
⌁ **H7-26**	Underload L/F Load Set 3	
(0x111A)		Default: 25.0
⌁ **H7-27**	Underload L/F Load Set 4	
(0x111B)		Default: 30.0
⌁ **H7-28**	Underload L/F Load Set 5	
(0x111C)		Default: 30.0
	Settings	0.0–200.0%

📖 Set the load according to the frequency of Pr.H7-24–H7-28.

H8. Speed Feedback Protection

⌿ **H8-00** Speed Deviation Detect Level

(0x1140) Default: 50

Settings 0–50%

📖 This parameter is valid only in FOC mode.

⌿ **H8-01** Speed Deviation Detect Time

(0x1141) Default: 0.5

Settings 0.0–10.0 sec.

⌿ **H8-02** Speed Deviation Action

(0x1142) Default: 0

Settings 0: Warning & Continue OPER
1: Fault & Ramp to Stop
2: Reserved
3: Fault & Coast to Stop
4: Fault & by Quick Stop Time

📖 The speed deviation protection is activated when this parameter is not set to 0.

⌿ **H8-03** Over Speed Detect Level

(0x1143) Default: 115

Settings 0–120%
0: Disabled

📖 This parameter is valid only in FOC mode.

⌿ **H8-04** Over Speed Detect Time

(0x1144) Default: 0.5

Settings 0.0–10.0 sec.

⚡ H8-05 Over Speed Action

(0x1145) Default: 0

Settings	0: Warning & Continue OPER
	1: Fault & Ramp to Stop
	2: Reserved
	3: Fault & Coast to Stop
	4: Fault & by Quick Stop Time

📖 The over speed protection is activated when this parameter is not set to 0.

⚡ H8-06 Direction Error Detect Time

(0x1146) Default: 1.5

Settings	0.0–10.0 sec.
	0: Disabled

⚡ H8-07 Direction Error Action

(0x1147) Default: 3

Settings	0: Warning & Continue OPER
	1: Fault & Ramp to Stop
	2: Fault & Auto-Decel
	3: Fault & Coast to Stop
	4: Fault & by Quick Stop Time

📖 The direction error protection is activated when this parameter is not set to 0.

J. Application Function

J0. Additional Function

✐ J0-00 UVW MC Action Indn

(0x11C0) Default: 0

Settings 0: Disabled
1–2: Relay1–Relay2

- Selects terminals that control the action of the UVW electromagnetic contactor, and it needs to be used with MI function = 0055h Run Enable.
- When the MI terminal = Run Enable activates, the selected terminal contact in Pr.J0-00 activates.

✐ J0-06 Over Flux Act Level

(0x11C6) Default: 10.0

Settings -40.0–100.0°C

- When the motor temperature 1 (KTY84) is lower than this level, the over flux condition meets.

✐ J0-07 Over Flux Dead Band

(0x11C7) Default: 15

Settings 0.0–100.0°C

- When the motor temperature 1 (KTY84) is larger than Pr. J0-06 + Pr. J0-07 during over flux, the over flux condition will be canceled.

✐ J0-08 Over Flux Id Cmd

(0x11C8) Default: 30

Settings 0–100%

- Set the minimum Id command when the over flux condition meets; however, if the set value is limited by the thermal protection, it takes the limited value from thermal protection as the Id command.
- Set Pr.J0-08 as 0 to disable the over flux function.

✐ J0-09 Force Over Flux Sel

(0x11C9) Default: 0

Settings 0: Disabled
1: Enabled

- When setting Pr.J0-09 as 1 (Enabled), the minimum Id command will be Pr.J0-08, it does not follow Pr.J0-06 action level and the thermal protection rule.

J2. dEb Function

⌁ J2-00 dEb Function Sel

(0x1240) Default: 0

Settings 0: Disabled
1: FOC Decel, stop after restore
2: FOC Decel, run after restore

- dEb (Deceleration Energy Backup) lets the motor decelerate to stop when momentary power loss occurs. When the power loss is instantaneous, use this function to let the motor decelerate to zero speed. Once the power recovers, the drive restarts the motor after the dEb return time.
- Lv return level = Pr.H1-02 + 60.0V.
- Lv level: Default = Pr.H1-02 (Lv Fault Level)
- During dEb operation, other protection such as ov, oc, occ and EF may interrupt it, and these error codes are recorded.
- The following explains the dEb action:
  When the AC voltage drops below the dEb setting level, the dEb function starts to work, and the drive executes auto-deceleration.

⌁ J2-01 dEb Action Bias Level

(0x1241) Default: 150.0

Settings 0.0–200.0 V_{DC}

- dEb action level = AC voltage – 200V + Pr.J2-01 dEb action (Bias) level

⌁ J2-02 dEb Reset Bias Level

(0x1242) Default: 50.0

Settings 0.0–200.0 V_{DC}

- Prevents action vibration caused by dEb action level = reset level.
- dEb reset level = AC voltage – Pr.J2-02 dEb Reset Bias Level.

⌁ J2-03 dEb Function Reset Time

(0x1243) Default: 3.0

Settings 0.0–25.0 sec.

- When the voltage returns to above the dEb reset level, the drive remains operating at constant speed, and then accelerates/ decelerates to the target speed after the counting. The time of this process is still the dEb action time.

✓ J2-04 dEb P Gain

(0x1244) Default: 0.50

Settings 0.00–655.35

- Sets the PI gain of the Clamp bus voltage controller when the dEb function activates.
- If the Clamp bus voltage drops too fast, or the speed oscillation occurs during deceleration after the dEb function activates, adjusts the proportional gain and integral gain.
- When the external inertia is large or the friction force is large, the corresponding energy change is more severe. Adjust the gain value to avoid Lv fault occurs at the beginning.
- When the Clamp bus voltage fluctuates violently during the control process, decrease the gain value to avoid oc or ov fault occur during the process.
- Proportional gain: Increase the P gain to quicken the control response, but the oscillation may occur if the setting is too large.

✓ J2-05 dEb I Gain

(0x1245) Default: 0.100

Settings 0.000–65.535

- Integral gain: Use the I gain to decrease the steady-state error to zero and increase the setting to quicken the response speed.
- If the Clamp bus voltage fluctuates greatly and violently, the adjustment process will trigger the protection, and the integral value can be decreased.

✓ J2-07 FOC dEb Torque Feedforward

(0x1247) Default: 80

Settings 0–100%

- The feedforward control parameter that improves the PI controller response speed in the FOC dEb function.

✓ J2-08 FOC dEb Coast Stop Speed

(0x1248) Default: 450

Settings 0–8985 rpm

- When the motor speed is lower than the speed set in Pr.J2-08 during dEb actuation, the motor coasts to stop.
- When Pr.J2-08 = 0, this function is disabled.

J2-09	dEb Output Indn	
(0x1249)		Default: 0
	Settings	0: Disabled
		1–2: Relay1–Relay2

📖 The output indication when dEb activates.

J2-10	dEb Filter Bandwidth	
(0x124A)		Default: 500
	Settings	0–4000 Hz

📖 Pr.J2-10 affects the power filter used in the dEb state. Setting a higher value allows the dEb to respond faster, while a lower value results in a slower response.

J4. Preheat Function

✎ J4-00 Preheat MI Src

(0x12C0) Default: 0

Settings 0: Disabled
1: Enabled
2–7: MI1–MI6

- Selects the preheat MI source. You can enable this function by setting parameters or by the MI terminal.
- When the preheat function is enabled (Pr.J4-00 ≠ 0), and the enabling method is set as MI terminal and MI = ON), the function activates according to Pr.J4-03 and J4-06.

J4-01 Preheat Delay Time

(0x12C1) Default: 600

Settings 10–3000 sec.

- The delay time after the motor stops and before the preheating function executes.

J4-02 Preheat Cmd Sel

(0x12C1) Default: 1

Settings 0: Current
1: Motor temperature (KTY-84)

- When setting Pr.J4-02 = 0 (Current) as the preheat command, the drive executes preheating function when the KTY-84 temperature is lower than Pr.J4-04.
- When setting Pr.J4-02 = 1 (motor temperature), it uses Pr.J4-04 as the target temperature for temperature control and uses Pr.J4-03 as the current limit.

✎ J4-03 Preheat Current Cmd

(0x12C3) Default: 50

Settings 0–100%

- When a motor drive is not in operation (STOP) and is placed in a cold and humid environment, enabling the preheating function to output DC current to heat up the motor can prevent the invasion of humidity into the motor, which creates condensation and effects the normal function of the motor .
- When Pr.J4-02 is set as 0: Current, Pr.J4-03 is used as the current limit.
- Sets the output current level from the drive to the motor after enabling the preheating. The percentage of the preheating DC current is 100% of the rated current of the drive. When set to 0%, there is no output current.

📖 Therefore, when you set this parameter, slowly increase the percentage to reach the desired preheating temperature.

✎ J4-04 Preheat Motor Temp Cmd

(0x12C3) Default: 25.0

Settings 0.0–40.0°C

📖 When Pr.J4-02 is set as 1: motor temperature, Pr.J4-04 is used as the command for temperature control.

✎ J4-06 Preheat Time

(0x12C6) Default: 70

Settings 0–100%

📖 Sets the motor output current cycle percentage of preheating. 0–100% corresponds to 0–10 seconds. When set to 0%, there is no output current. When set to 100%, there is a continuous output.

📖 For example, when set to 50%, the time for the motor output current in one cycle is 5 seconds each for ON and OFF, and after the drive stops (STOP), it automatically feeds the continuous periodic DC preheating motor.

📖 When Pr.J4-02 is set as 1: motor temperature, it does not refer to the setting of Pr.J4-06 and the motor output cycle percentage works in the same way as Pr.J4-06=100%

📖 When the preheat MI source is the MI terminal, the preheating command (MI ON) enables the preheating function and continues to operate periodically with the MI signal until the drive runs (RUN) or the preheat command stops preheating (MI OFF), or the parameter turns off preheating function (Pr.J4-00, J4-03 and J4-06 are all set to 0).

📖 Preheat function starts: When Pr.J4-00, J4-03 and J4-06 are not set to 0, the preheat function starts.

📖 Preheating function: When the AC motor drive is in operation (RUN) or stops operating (STOP), set the above parameters (when Pr.J4-00 Preheat MI Source is set as MI, and MI is ON), the Preheat function is enabled whenever the motor drive is in STOP status and lasts for the time set in Pr.J4-01.

Sequential Diagram of the Preheating Function

1. Preheating function description

   Set Pr.J4-00, J4-03 and J4-06 not to zero (50% in the diagram, when Pr.J4-00 source selection is set as MI and MI is ON), if the AC motor drive is in STOP status and lasts for the time of Pr.J4-01, the preheating is enabled to output DC current. At the same time, MO (Preheat output indication) is ON, and the sequence of preheat goes from ON (5 sec.) to OFF (5 sec.). When the preheating function is enabled and the drive is in operation (RUN), the preheat function stops temporarily and the MO is OFF. The preheat function restarts when the drive stops (STOP) for the time of Pr.J4-01.

J4-07 Preheat Indn

(0x12C7) Default: 0

Settings	0: Disabled
	1–2: Relay1–Relay2

Selects preheat indication output signal. When the function activates, the corresponding output terminal activates.

J5. FireMode

J5-00 FireMode Status

(0x1300) Default: Read only

Settings bit 0: FireMode enabled
- 0 = FireMode is disabled
- 1 = FireMode is enabled

bit 1: FireMode active
- 0 = FireMode is inactive
- 1 = FireMode is active

bit 2: FireMode direction is forward
- 0 = FireMode direction is not forward
- 1 = FireMode direction is forward

bit 3: FireMode direction is reverse
- 0 = FireMode direction is not reverse
- 1 = FireMode direction is reverse

bit 4: FireMode stop mode is active
- 0 = FireMode stop mode is inactive
- 1 = FireMode stop mode is active

bit 5: FireMode parameter lock status
- 0 = Unlock
- 1 = Lock

bit 6: Run enable
- 0 = Not allow to Run
- 1 = Allow to Run

bit 7–15: Reserved

📖 Displays the FireMode status. For example, when the FireMode is ON and operates in forward direction, bit0–2 is ON.

J5-01 FireMode

(0x1301) Default: 0

Settings 0: Disabled
1: Enable, Limited OPER
2: Enable, Unlimited OPER

📖 Setting 0: FireMode function is disabled.

- Setting 1: FireMode function is enabled. When a high priority fault occurs during the fire, the drive automatically resets and operates with a limit. (Refer to description of Pr.J5-07–J5-09.)
- Setting 2: FireMode function is enabled. When a high priority fault occurs during the fire, the drive automatically resets and operates without limit. (Refer to description of Pr.J5-07–J5-09.)
- The fire mode is used to force the drive to operate from normal mode to the fire mode when an emergency or fire drill event occurs, so as to help resolve on-site incidents.
- When the drive switches from normal mode to the fire mode and is in operation, the drive operates at its maximum capacity and limit, which means that the drive protection such as LVx low voltage will be ignored, so the drive could continue operating to perform its function.
- From the above, when the drive is in fire mode and the fire mode record 1–3 warranty error code is recorded (0 for no record), the original warranty condition of the drive will be invalid. That is, the after-sales service will be handled out of the warranty.
- Refer to description in Pr.J5-07 Table 2 for high/ low priority.
- If there is a low priority fault before running in fire mode, the drive automatically clears the fault and runs after operating in fire mode.
- If there is a high priority fault before running in fire mode, the fire mode fault treatment is set to auto reset. When the fault state ends after the fire mode operation, the drive automatically clears the fault and continues operating.
- If there is a high-priority fault before running in fire mode, and the fire mode error treatment is set to manual reset, then the fault must be manually reset after running in fire mode before running.
- During the fire mode operation, any behavior and state of HOA/ Local Remote will be ignored and controlled in speed mode. After the fire mode is released, it returns to the current state of HOA/ Local Remote, including the motor control method.

J5-02 FireMode MI Src

(0x1302) Default: 0

Settings 0: Disabled
1: Reserved
2–7: MI1–MI6

- When the fire mode is enabled and the specified MI source is ON, the drive FireMode operates.

J5-03 FireMode Speed Src

(0x1303) Default: 0

Settings 0: Disabled
1–6: Reserved

7–8: AI1–AI2
9–15: Reserved
16: Multi Speed
17: FireMode Speed Cmd
18: Up/Down Keys
19: STOP
20: PID

- Selects FireMode speed source.
- Setting 7–8: Operates according to the AIx signal corresponded value. AI signal 0–10V/ 4–20 mA, 0 rpm corresponds to the maximum operation speed (Pr.C2-17).
- 16: Operates according to multi-speed setting Pr.C1-18–C1-37.
- 17: Operates according to FireMode speed command Pr.J5-05.
- 18: Operates according to Up/ Down terminals Pr.C1-13–C1-15.
- 19: Does not run when the fire mode activates.
- 20: Operates according to PID function (refer to Parameter Group P).

J5-04 FireMode Direction MI Src

(0x1304) Default: 0

Settings 0: FWD
1: REV
2–7: MI1–MI6

- Selects FireMode direction MI source, through parameter setting direction or MI terminals to switch the selection. When setting MI1 = OFF, the direction is forward; MI1 = ON, the direction is reverse.

J5-05 FireMode Speed Cmd

(0x1305) Default: 885

Settings 0–8985 rpm

- When FireMode is enabled (Pr.J5-01 ≠ 0) and the FireMode MI source is specified (for example, Pr.J5-02 = 2, MI1), and the FireMode speed source is set as FireMode speed command (Pr.J5-03 = 17), FireMode speed command (Pr.J5-05) is set as 900 rpm; when MI1 ON, the drive is in FireMode and operates to 900 rpm.

J5-06 FireMode Control bits

(0x1306) Default: 0

Settings bit 0: RUN Enable
bit 1: Start Enable
bit 2: FireMode Lock
bit 3–15: Reserved

- The FireMode can be used with RUN Enable function (refer to description of Pr.A1-21).
- bit 0: When the bit is OFF, the FireMode operation is not affected by the RUN Enable function (ON or OFF); when the bit is ON, the FireMode operation is affected by the RUN enable function and the digital keypad displays “Run Disabled” warning message. The MI source specified in Pr.A1-21 must be ON, then the “Run Disabled” message of the digital keypad disappears, and the drive goes into FireMode when the fire occurs.
- As above, when the RUN Enable function is switched from ON to OFF during the FireMode operation, the digital keypad displays “Run Disabled” warning message, but the FireMode will be still operating.
- When the drive switches from FireMode back to normal mode operation, regardless of whether the drive operates with RUN Enable function, it ramps to stop.
- When the FireMode is in progress, for the fire protection priority and safety consideration, all parameters of the drive are not accepted to be changed, so as to ensure that the drive controls the fire field through the fire protection system and is not interfered by other factors.
- bit 2: The FireMode parameters (Pr.J5-01–J5-09, J5-31) can only be edited when the bit is OFF in normal mode; the parameters cannot be edited when the bit is ON.

J5-07 FireMode Fault Handle

(0x1307) Default: 0

Settings 0: Manual reset
1: Automatic reset

J5-08 FireMode Auto Reset Times

(0x1308) Default: 5

Settings 1–5

J5-09 FireMode Auto Reset Delay

(0x1309) Default: 5.0

Settings 5.0–120.0 sec.

- During the FireMode operation, when a low priority fault occurs, the drive does not stop and continues operating. If a high priority fault occurs, the drive handles the fault according to Pr.J5-07–J5-09 (Table

1). Refer to description in Table 2 for the high/ low priority.

- Enable the FireMode (Pr.J5-01 = 1) and set the FireMode fault treatment as automatic reset (Pr.J5-07 = 1), when the drive is in FireMode and a high priority fault occurs, the drive stops and waits for the fault returning to normal level (for example, ov fault occurs if the voltage exceeds), there will be a limit according to the reset times setting (Pr.J5-08) to automatically reset the fault, the drive restarts after the delay time (Pr.J5-09) and operates to the speed command specified in FireMode.
- As above, when the reset time reaches the setting value, for example 5 times (Pr.J5-08), when the sixth fault occurs, the drive stops and does not auto reset the fault. In this case, you must manually reset the fault.
- Enable the FireMode (Pr.J5-01 = 2) and set the FireMode fault treatment as automatic reset (Pr.J5-07 = 1), when the drive is in FireMode and a high priority fault occurs, the drive stops and waits for the fault returning to normal level (for example, ov fault occurs if the voltage exceeds), the drive will auto reset the fault without limit and restarts after the delay time (Pr.J5-09) and operates to the frequency command specified in FireMode. **It is important to note that the unlimited automatic fault reset will not stop until the FireMode stops or the drive is damaged and cannot operate, it also affects the product warranty.**

Table 1 - Fault treatment parameters under FireMode

J5-01 (FireMode)	J5-07 = 1 Automatic reset (FireMode Fault Handle)	J5-08 (FireMode Auto Reset Times)	J5-09 (FireMode Auto Reset Delay)
0: Disabled	X	X	X
1: Enabled, Limited OPER	V	V	V
2: Enabled, Unlimited OPER	V	X	V

- When FireMode is in progress, the fault message in Table 2 will be detected, recorded, and handled with or without stopping the drive.
- When a low priority fault occurs during FireMode operation, regardless of the setting of Pr.J5-07, the drive does not stop and continues operating.
- When a high priority fault occurs during FireMode operation, the drive resets the fault through Pr.J5-07. In all the faults, the high priority fault*[1] can only be manually reset, but the high priority fault*[2] cannot be reset through manually/ automatic reset mode. It can only be cleared by rebooting the drive, and the fault must be cleared before the drive restarts.

Table 2 - Fault detection under each mode. (V means detectable)

Code	Fault Name	Normal Mode	FireMode	
			High Priority	Low Priority
1	Over-current during acceleration (ocA)	V	V	
2	Over-current during deceleration (ocd)	V	V	
3	Over-current during steady operation (ocn)	V	V	
4	Ground fault (GFF)	V		V
5	IGBT short circuit between upper bridge and lower bridge (occ)	V	V	
6	Over-current at stop (ocS)	V	V	
7	Over-voltage during acceleration (ovA)	V	V	
8	Over-voltage during deceleration (ovd)	V	V	
9	Over-voltage at constant speed (ovn)	V	V	
10	Over-voltage at stop (ovS)	V	V	
11	Low-voltage during acceleration (LvA)	V		V
12	Low-voltage during deceleration (Lvd)	V		V
13	Low-voltage at constant speed (Lvn)	V		V
16	IGBT overheating (oH1)	V		V
17	Capacitor overheating (oH2)	V		V
18	Thermal 1 open (tH1o)	V		V
19	Thermal 2 open (tH2o)	V		V
21	Overload (oL)	V		V
24	Motor overheating	V		V
26	Over torque during running (ot1)	V		V
27	Over torque at normal speed (ot2)	V		V
28	Under current (uC)	V		V
30	EEPROM write error (cF1)	V		V
31	EEPROM read error (cF2)	V	V[*1]	
42	Over-current motor (OCm)	V	V[*2]	
43	Over-current endplate (OCe)	V	V[*2]	
48	AI1 loss (Ai1L)	V		V
49	External fault (EF)	V		V
50	Emergency stop (EF1)	V		V
52	Password is locked (Pcod)	V		V
66	Short-circuit motor (OCCm)	V	V[*2]	
67	Short-circuit endplate (OCCe)	V	V[*2]	
68	Reverse direction of the speed feedback (SdRv)	V		V
69	Over speed rotation feedback (SdOr)	V		V

Code	Fault Name	Normal Mode	FireMode	
			High Priority	Low Priority
70	Large deviation of speed feedback (SdDe)	V		V
72	STO loss (STL1)	V	V*2	
76	Safe Torque Off (STO)	V	V*1	
77	STO loss 2 (STL2)	V	V*2	
78	STO loss 3 (STL3)	V	V*2	
87	Overload protection at low frequency (oL3)	V		V
88	Model ID Change (IDCH)	V	V*1	
94	Power on communication failed (POCF)	V		V
95	Power ID data error (IDDE)	V		V
97	AI2 loss (Ai2L)	V		V
118	Monitor signal 1 trigger (BX1e)	V		V
119	Monitor signal 2 trigger (BX2e)	V		V
120	Monitor signal 3 trigger (BX3e)	V		V
121	Monitor signal 4 trigger (BX4e)	V		V
122	Monitor signal 5 trigger (BX5e)	V		V
123	Monitor signal 6 trigger (BX6e)	V		V
124	Monitor signal 7 trigger (BX7e)	V		V
125	Monitor signal 8 trigger (BX8e)	V		V
132	Under load protection (ULD)	V		V
133	Overload protection (OLD)	V		V
141	Large amount leakage error (LEKE)	V		V
142	High pressure error (HPS)	V		V
143	Low pressure error (LPSE)	V		V
144	Dry pump error (dyne)	V		V
145	Dry pump auto-tune error (dAUE)	V		V
161	STO loss 4 (STL4)	V	V*2	
162	STO loss 5 (STL5)	V	V*2	
163	STO loss 6 (STL6)	V	V*2	
164	Gate buffer U (GBFU)	V	V*2	
165	Gate buffer V (GBFV)	V	V*2	
166	Gate buffer W (GBFW)	V	V*2	
167	Safety MCU Comm CRC error (StCE)	V	V*2	
168	Safety MCU Comm Timeout (StTO)	V	V*2	
170	Version of ACB and CTB mismatch (CBNM)	V		V

Code	Fault Name	Normal Mode	FireMode	
			High Priority	Low Priority
171	Control board burn timeout (CBBT)	V		V
182	RTD overheating (OH3r)	V		V
204	Safety MCU ROM (ROMF)	V	V*2	
205	Safety MCU time-out (STOT)	V	V*2	
206	Safety MCU WatchDog (STOW)	V	V*2	
207	Safety MCU 24V error (STOF)	V	V*2	
208	Safety MCU 6V error (STOB)	V	V*2	
209	Safety MCU 5V2 error (STOC)	V	V*2	
210	Safety MCU STD error (STOS)	V	V*2	
220	Parameter copy write failure (CWF)	V		V
221	FPGA Watch Dog Fault (FWDF)	V		V
222	Chopper SW OH (CSOH)	V		V
223	RD Signal Fault (RDF)	V		V
224	PLL fault (PLLF)	V		V
225	Current Offset Fault (COF)	V		V
226	Clamp SW fault (CSF)	V	V*1	
227	Current sensor abnormal (CSAF)	V		V
228	Ver of CTB & FPGA mismatch (CFNM)	V		V
229	Clamp resistor overheat (CROH)	V	V*1	
230	FPGA State Fault (FSF)	V		V
231	OVD Broken (OvdB)	V		V
234	Low Ac Voltage (Lvac)	V		V

J5-10 FireMode Log 1 Start Date

(0x130A) Default: Read only

Settings 0–31129999

J5-11 FireMode Log 1 Start Time

(0x130C) Default: Read only

Settings 0–245959

J5-12 FireMode Log 1 End Date

(0x130E) Default: Read only

	Settings 0–31129999	
J5-13	FireMode Log 1 End Time	
(0x1310)		Default: Read only
	Settings 0–245959	
J5-14	FireMode Log 1 Fault Code	
(0x1312)		Default: Read only
	Settings 0–65535	
J5-15	FireMode Log 1 Warning Code	
(0x1313)		Default: Read only
	Settings 0–65535	
J5-16	FireMode Log 1 Warranty Fault	
(0x1314)		Default: Read only
	Settings 0–65535	
J5-17	FireMode Log 2 Start Date	
(0x1315)		Default: Read only
	Settings 0–31129999	
J5-18	FireMode Log 2 Start Time	
(0x1317)		Default: Read only
	Settings 0–245959	

J5-19	FireMode Log 2 End Date	
(0x1319)		Default: Read only
	Settings 0–31129999	
J5-20	FireMode Log 2 End Time	
(0x131B)		Default: Read only
	Settings 0–245959	
J5-21	FireMode Log 2 Fault Code	
(0x131D)		Default: Read only
	Settings 0–65535	
J5-22	FireMode Log 2 Warning Code	
(0x131E)		Default: Read only
	Settings 0–65535	

J5-23	FireMode Log 2 Warranty Fault	
(0x131F)		Default: Read only
	Settings 0–65535	

J5-24	FireMode Log 3 Start Date	
(0x1320)		Default: Read only
	Settings 0–31129999	

J5-25	FireMode Log 3 Start Time	
(0x1322)		Default: Read only
	Settings 0–245959	

J5-26	FireMode Log 3 End Date	
(0x1324)		Default: Read only
	Settings 0–31129999	

J5-27	FireMode Log 3 End Time	
(0x1326)		Default: Read only
	Settings 0–245959	

J5-28	FireMode Log 3 Fault Code	
(0x1328)		Default: Read only
	Settings 0–65535	

J5-29	FireMode Log 3 Warning Code	
(0x1329)		Default: Read only
	Settings 0–65535	

J5-30	FireMode Log 3 Warranty Fault	
(0x132A)		Default: Read only
	Settings 0–65535	

- 🕮 In the fire mode, records three groups of relevant information during the fire for investigation. Each set of record information includes a total of 7 parameters including start date and time, end date and time, fault code, warning code and warranty code. There are 21 related record parameters in total (Pr.J5-10–J5-30).
- 🕮 The date in the parameter is expressed in the form of “month/ day/ AD year”, a total of 8 codes. The time expression is the 24-hour format “hour/ minute/ second” with a total of 8 codes.
- 🕮 For information about fault codes and warning codes, refer to Chapter 8 Fault Treatment. The scope of fault code records covers low priority and high priority faults (Table 2).
- 🕮 During the fire, no matter how many faults has occurred, only the first fault code, warning code and warranty code will be recorded. For example, there are three faults 13 (Lvn), 12 (Lvd) and 11 (LvA)

occurred in the fire, only the first fault code (13) will be recorded.

- For example, there are 3 faults (13 Lvn, 12 Lvd and 11 LvA) during the first fire (Table 3), and there is no warning and warranty code. The start and end date of Record 1 is 05/01/2023, the start and end time of Record 1 is 00/00/00 to 00/10/00, a total of 10 minutes, and the record fault code is 13 (Lvn).
- For example, there are 2 faults (11 Lvn and 5 occ) during the first fire (Table 3), and there is no warning code. The start and end date of Record 3 is 05/20/2023, the start and end time of Record 3 is 18/00/00 to 18/30/00, the fault code of Record 3 is 11 (LvA) and the warranty code is 5 (occ).
- From the above, since the warranty fault record is 5 (oc), the original warranty condition of the drive will be invalid, and the after-sales service will be handled outside the warranty.
- Since there are only 3 parameters in the fire mode record, the related information will be saved in Pr.J5-10–J5-16 when the first fire occurs. The information of the second fire occurrence will also exist in the same position, but the original information of the first fire will be pushed back to Pr.J5-17–J5-23. In the same way, the record information is stacked backwards, and the latest fire related information will be saved in Pr.J5-10–J5-16.

Table 3 - Parameter record method

Fire Occurrence Time / FireMode Record	1st Fire	2nd Fire	3rd Fire	4th Fire
	(J5-02 MI OFF to ON to OFF)			
J5-10 FireMode Log 1 Start Date	05012023	05102023	05202023	06012023
J5-11 FireMode Log 1 Start Time	000000	090000	180000	120000
J5-12 FireMode Log 1 End Date	05012023	05102023	05202023	06012023
J5-13 FireMode Log 1 End Time	001000	095900	183000	120500
J5-14 FireMode Log 1 Fault Code	13 (Lvn)	1 (ocA)	11 (LvA)	7 (ovA)
J5-15 FireMode Log 1 Warning Code	0	0	0	0
J5-16 FireMode Log 1 Warranty Fault	0	0	5 (occ)	0
J5-17 FireMode Log 2 Start Date	0	(J5-10) 05012023	(J5-10) 05102023	(J5-10) 05202023
J5-18 FireMode Log 2 Start Time	0	(J5-11) 000000	(J5-11) 090000	(J5-11) 180000
J5-19 FireMode Log 2 End Date	0	(J5-12) 05012023	(J5-12) 05102023	(J5-12) 05202023

Fire Occurrence Time / FireMode Record	1st Fire	2nd Fire	3rd Fire	4th Fire
	(J5-02 MI OFF to ON to OFF)			
J5-20 FireMode Log 2 End Time	0	(J5-13) 001000	(J5-13) 095900	(J5-13) 183000
J5-21 FireMode Log 2 Fault Code	0	(J5-14) 13 (Lvn)	(J5-14) 1 (ocA)	(J5-14) 0
J5-22 FireMode Log 2 Warning Code	0	(J5-15) 0	(J5-15) 0	(J5-15) 0
J5-23 FireMode Log 2 Warranty Fault	0	(J5-16) 0	(J5-16) 0	(J5-16) 5 (occ)
J5-24 FireMode Log 3 Start Date	0	0	(J5-10) 05012023	(J5-10) 05102023
J5-25 FireMode Log 3 Start Time	0	0	(J5-11) 000000	(J5-11) 090000
J5-26 FireMode Log 3 End Date	0	0	(J5-12) 05012023	(J5-12) 05102023
J5-27 FireMode Log 3 End Time	0	0	(J5-13) 001000	(J5-13) 095900
J5-28 FireMode Log 3 Fault Code	0	0	(J5-14) 13 (Lvn)	(J5-14) 1 (ocA)
J5-29 FireMode Log 3 Warning Code	0	0	(J5-15) 0	(J5-15) 0
J5-30 FireMode Log 3 Warranty Fault	0	0	(J5-16) 0	(J5-16) 0

J5-31 FireMode Indn

(0x132B) Default: 0

Settings 0: Disabled

1–2: Relay1–Relay2

When the drive is in Fire Mode, the specified MO contact activates.

J6. Time Function

J6-00 Low Battery Action

(0x1340) Default: 1

Settings 0: No Detection
1: Warning Once
2: Warning per hour
3: Warning per day

- Install a button-type battery CR2032 in the drive before using the scheduling function and set the Calendar through the digital keypad.
- When the drive detects low battery of the CR2032, it prompts according to this parameter.

J6-01 Time Function 1

(0x1341) Default: 0

J6-02 Time Function 2

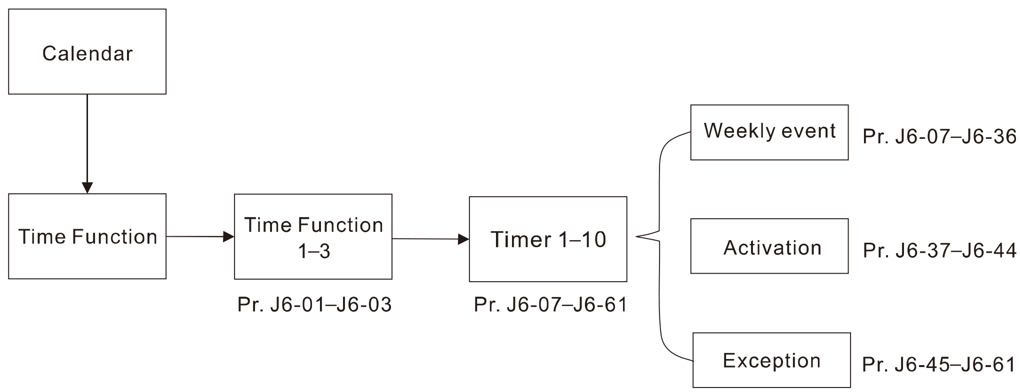
(0x1342) Default: 0

J6-03 Time Function 3

(0x1343) Default: 0

Settings 0–1023
bit0: Timer 1
bit1: Timer 2
bit2: Timer 3
bit3: Timer 4
bit4: Timer 5
bit5: Timer 6
bit6: Timer 7
bit7: Timer 8
bit8: Timer 9
bit9: Timer 10

- There are 3-time functions, each Time Function has 10 timers that can be activated separately. When activate one timer, the corresponded bit is ON, and the bit is OFF when disable the timer.
- When setting Pr.J6-01 Time Function 1 to enable Timer 1–3, the corresponded bit0–2 is ON, other bits are OFF; when setting Pr.J6-02 Time Function 2 to enable Timer 3–4, the corresponded bit2–3 is ON, other bits are OFF.



J6-04 Time Function 1 Select

(0x1344) Default: 0

J6-05 Time Function 2 MI Select

(0x1345) Default: 0

J6-06 Time Function 3 MI Select

(0x1346) Default: 0

Settings
0: Disabled
1: Enabled
2–7: MI1–MI6

The Time Function must be enabled through parameter settings or turn ON the specified MI terminal.

J6-07 Timer 1 Configuration

(0x1347) Default: 0

Settings
bit0: Monday
bit1: Tuesday
bit2: Wednesday
bit3: Thursday
bit4: Friday
bit5: Saturday
bit6: Sunday
bit7: Activation 1
bit8: Activation 2
bit9: Activation 3
bit10: Activation 4
bit11: Exception
bit12: Holiday

bit13: Workday

J6-08	Timer 1 Start Time	
(0x1348)		Default: 00:00
	Settings 00:00–23:59 (hh:mm)	
J6-09	Timer 1 Duration	
(0x1349)		Default: 00:00:00
	Settings 00:00:00–07:00:00 (dd:hh:mm)	
J6-37	Activation 1 Start Date	
(0x136F)		Default: 01:01
	Settings 01:01–31:12 (dd:mm)	
J6-38	Activation 1 End Date	
(0x1370)		Default: 01:01
	Settings 01:01–31:12 (dd:mm)	

- The time function determines the final output of the timer based on the combination and setting of the weekly events, activation, and exception schedule.
- The weekly events selections are Monday to Sunday (bit0–6), the activations are Activation 1–4 (bit7–10), and the exceptions are holiday and workday (bit12–13).
- There are ten timers in the Time Function. The weekly event of each timer can set timer configuration, start/ end date and duration (Pr.J6-07–J6-36), and the maximum duration can be set to 7 days (day:hour:minute, 07:00:00).
- As above, the activation of each timer can set the activation start date and activation end date, which provides Activation 1–4, a total of 4 groups of activation settings (Pr.J6-37–J6-44). In addition, the start date can be set larger than the end date. For example, the start date is 1/12, end date is 31/1, then the activation would be 1/12–31/12 and 1/1–31/1.
- As above, refer to the parameter description for the exception time function of each timer. When setting the exception time as workday, bit11 and bit13 must be ON.
  - Example 1:
    If the weekly event is set as 8:00 AM to 5:00 PM on Monday, Wednesday and Friday, then set the timer bit0, 2, and 4 to ON; set the start time as 8:00 (hour:minute, 08:00) and the duration time as 9 hours (hour:minute, 09:00), then the final output would be as the table below.
  - Example 2:
    If the weekly event is set as Monday, Wednesday and Friday from 8:00 AM to 5:00 PM the next day, then set the timer bit0, 2, and 4 to ON; set the start time as 8:00 (hour:minute, 08:00) and the duration time as 1 day and 9 hours (day:hour:minute, 01:09:00), then the final output would be as

the table below.

- Example 3:

  If the weekly event is set from 00:00 AM to 5:00 PM the day after tomorrow on Sunday, set the timer bit6 to ON; and set the start time as 0:00 (hour:minute, 00:00) and the duration time as 2 day and 17 hours (day:hour:minute, 02:17:00), then the final output would be as the table below.

- Example 4:

  If the weekly event is set as Monday, Wednesday and Friday from 11:00 AM to 10:00 AM the next day, set the timer bit0, 2, and 4 to ON; and set the start time as 11:00 (hour:minute, 11:00) and the duration time as 23 hours (day:hour:minute, 00:23:00), the activation start date to 3/1 (day:month, 03:01) and end date to 6/1 (day:month, 06:01), then the final output would be as the table below.

- Example 5:

  If the weekly event is set from 8:00 AM to 5:00 PM from Monday to Friday, set the timer bit0–4 to ON; and set the start time as 8:00 (hour:minute, 08:00) and the duration time as 9 hours (hour:minute, 09:00), set the exception as 1, exception type bit0 as OFF (workday), and the exception 1 start day as 7/1 (day:month: 07:01), exception 1 duration as 2 days, then the final output would be as the table below.

bit13	bit12	bit11	bit10	bit9	bit8	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	Settings
Work-day	Holiday	Excep-tion Type	Activa-tion 4	Activa-tion 3	Activa-tion 2	Activa-tion 1	Sun.	Sat.	Fri.	Thurs.	Wed.	Tues.	Mon.	Content
									ON		ON		ON	Example 1 Weekly event
									8:00–17:00		8:00–17:00		8:00–17:00	Final Output
									ON		ON		ON	Example 2 Weekly event
								0:00–17:00	8:00–23:59	0:00–17:00	8:00–23:59	0:00–17:00	8:00–23:59	Final Output
							ON							Example 3 Weekly event
							0:00–23:59					0:00–17:00	0:00–23:59	Final Output
									ON		ON		ON	Example 4
								0:00–10:00	11:00–23:59 (6/1)	0:00–10:00	11:00–23:59 (4/1)	0:00–10:00	11:00–23:59 (2/1)	Weekly event
						ON			6/1	5/1	4/1	3/1		Activation
									11:00–23:59	0:00–10:00	11:00–23:59	0:00–10:00		Final Output
									ON	ON	ON	ON	ON	Example 5
									8:00–17:00	8:00–17:00	8:00–17:00	8:00–17:00	8:00–17:00	Weekly event

bit13	bit12	bit11	bit10	bit9	bit8	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	Settings
Work-day	Holiday	Excep-tion Type	Activa-tion 4	Activa-tion 3	Activa-tion 2	Activa-tion 1	Sun.	Sat.	Fri.	Thurs.	Wed.	Tues.	Mon.	Content
									(6/1)	(5/1)	(4/1)	(3/1)	(2/1)	
ON		ON					8/1	7/1						Exception Workday
							0:00–23:59	0:00–23:59	8:00–17:00	8:00–17:00	8:00–17:00	8:00–17:00	8:00–17:00	Final Output

J6-10 Timer 2 Configuration

(0x134B) Default: 0

Settings 0–16383

J6-11 Timer 2 Start Time

(0x134C) Default: 00:00

Settings 00:00–23:59 (hh:mm)

J6-12 Timer 2 Duration

(0x134D) Default: 00:00:00

Settings 00:00:00–07:00:00 (dd:hh:mm)

J6-13 Timer 3 Configuration

(0x134F) Default: 0

Settings 0–16383

J6-14 Timer 3 Start Time

(0x1350) Default: 00:00

Settings 00:00–23:59 (hh:mm)

J6-15 Timer 3 Duration

(0x1351) Default: 00:00:00

Settings 00:00:00–07:00:00 (dd:hh:mm)

Refer to description of Pr.J6-07.

J6-16 Timer 4 Configuration

(0x1353) Default: 0

Settings 0–16383

J6-17 Timer 4 Start Time

(0x1354) Default: 00:00

Settings 00:00–23:59 (hh:mm)

J6-18 (0x1355)	Timer 4 Duration	Default: 00:00:00
	Settings 00:00:00–07:00:00 (dd:hh:mm)	
J6-19 (0x1357)	Timer 5 Configuration	Default: 0
	Settings 0–16383	
J6-20 (0x1358)	Timer 5 Start Time	Default: 00:00
	Settings 00:00–23:59 (hh:mm)	

J6-21 (0x1359)	Timer 5 Duration	Default: 00:00:00
	Settings 00:00:00–07:00:00 (dd:hh:mm)	
J6-22 (0x135B)	Timer 6 Configuration	Default: 0
	Settings 0–16383	
J6-23 (0x135C)	Timer 6 Start Time	Default: 00:00
	Settings 00:00–23:59 (hh:mm)	
J6-24 (0x135D)	Timer 6 Duration	Default: 00:00:00
	Settings 00:00:00–07:00:00 (dd:hh:mm)	
J6-25 (0x135F)	Timer 7 Configuration	Default: 0
	Settings 0–16383	
J6-26 (0x1360)	Timer 7 Start Time	Default: 00:00
	Settings 00:00–23:59 (hh:mm)	
J6-27 (0x1361)	Timer 7 Duration	Default: 00:00:00
	Settings 00:00:00–07:00:00 (dd:hh:mm)	

Refer to description of Pr.J6-07.

✓ **J6-28**	Timer 8 Configuration	
(0x1363)		Default: 0
	Settings 0–16383	
✓ **J6-29**	Timer 8 Start Time	
(0x1364)		Default: 00:00
	Settings 00:00–23:59 (hh:mm)	
✓ **J6-30**	Timer 8 Duration	
(0x1365)		Default: 00:00:00
	Settings 00:00:00–07:00:00 (dd:hh:mm)	
✓ **J6-31**	Timer 9 Configuration	
(0x1367)		Default: 0
	Settings 0–16383	

✓ **J6-32**	Timer 9 Start Time	
(0x1368)		Default: 00:00
	Settings 00:00–23:59 (hh:mm)	
✓ **J6-33**	Timer 9 Duration	
(0x1369)		Default: 00:00:00
	Settings 00:00:00–07:00:00 (dd:hh:mm)	
✓ **J6-34**	Timer 10 Configuration	
(0x136B)		Default: 0
	Settings 0–16383	
✓ **J6-35**	Timer 10 Start Time	
(0x136C)		Default: 00:00
	Settings 00:00–23:59 (hh:mm)	
✓ **J6-36**	Timer 10 Duration	
(0x136D)		Default: 00:00:00
	Settings 00:00:00–07:00:00 (dd:hh:mm)	

📖 Refer to description of Pr.J6-07.

✓ **J6-39**	Activation 2 Start Date	
(0x1371)		Default: 01:01
	Settings 01:01–31:12	

J6-40 Activation 2 End Date

(0x1372) Default: 01:01

Settings 01:01–31:12

J6-41 Activation 3 Start Date

(0x1373) Default: 01:01

Settings 01:01–31:12

J6-42 Activation 3 End Date

(0x1374) Default: 01:01

Settings 01:01–31:12

📖 Refer to description of Pr.J6-37, J6-38.

J6-43 Activation 4 Start Date

(0x1375) Default: 01:01

Settings 01:01–31:12

J6-44 Activation 4 End Date

(0x1376) Default: 01:01

Settings 01:01–31:12

J6-45 Exception Enable Number

(0x1377) Default: 3

Settings 1–12

📖 There are 12 exception schedules in total. This parameter defines the enable number of exception schedule, for example, when you set this parameter to 6, the exception schedules are enabled in order from 1 to 6.

J6-46 Exception Type

(0x1378) Default: 0

Settings
bit0: Exception 1
bit1: Exception 2
bit2: Exception 3
bit3: Exception 4
bit4: Exception 5
bit5: Exception 6
bit6: Exception 7
bit7: Exception 8

bit8: Exception 9
bit9: Exception 10
bit10: Exception 11
bit11: Exception 12

📖 This parameter defines the type of exception schedule 1–12 as workday (default) or holiday.

📖 When the exception is defined as workday, the corresponded bit is OFF; if it is defined as holiday, the corresponded bit is ON.

📖 When Pr.J6-46 defines Exception 1–3 as holiday and the rest of exceptions are workday, then the corresponded bit0–2 is ON, and the other bits are OFF.

✓ J6-47 Exception 1 Start Date

(0x1379) Default: 01:01

Settings 01:01–31:12 (dd:mm)

✓ J6-48 Exception 1 Duration Days

(0x137A) Default: 0

Settings 0–60 days

📖 Defines 12 groups (Pr.J6-45–J6-61) of exception dates.

📖 The first 3 groups set the interval, for example, the start date is 1/1 (day:month, 01:01) and the duration is 3 days, the exception time is set from 1/1 to 3/1.

📖 The last 9 groups set the start date, for example, the start date is 28/2 (day:month, 28:02), the exception time is 28/2 from 00:00 to 23:59 on the day.

✓ J6-49 Exception 2 Start Date

(0x137B) Default: 01:01

Settings 01:01–31:12 (dd:mm)

✓ J6-50 Exception 2 Duration Days

(0x137C) Default: 0

Settings 0–60 day

✓ J6-51 Exception 3 Start Date

(0x137D) Default: 01:01

Settings 01:01–31:12 (dd:mm)

✓ J6-52 Exception 3 Duration Days

(0x137E) Default: 0

Settings 0–60 day

📖 Refer to description of Pr.J6-47, J6-48.

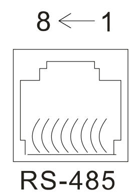
⌁ **J6-53**	**Exception 4 Start Date**	
(0x137F)		Default: 01:01
	Settings 01:01–31:12 (dd:mm)	
⌁ **J6-54**	**Exception 5 Start Date**	
(0x1380)		Default: 01:01
	Settings 01:01–31:12 (dd:mm)	
⌁ **J6-55**	**Exception 6 Start Date**	
(0x1381)		Default: 01:01
	Settings 01:01–31:12 (dd:mm)	
⌁ **J6-56**	**Exception 7 Start Date**	
(0x1382)		Default: 01:01
	Settings 01:01–31:12 (dd:mm)	
⌁ **J6-57**	**Exception 8 Start Date**	
(0x1383)		Default: 01:01
	Settings 01:01–31:12 (dd:mm)	
⌁ **J6-58**	**Exception 9 Start Date**	
(0x1384)		Default: 01:01
	Settings 01:01–31:12 (dd:mm)	

⌁ **J6-59**	**Exception 10 Start Date**	
(0x1385)		Default: 01:01
	Settings 01:01–31:12 (dd:mm)	
⌁ **J6-60**	**Exception 11 Start Date**	
(0x1386)	10-1·	Default: 01:01
	Settings 01:01–31:12 (dd:mm)	
⌁ **J6-61**	**Exception 12 Start Date**	
(0x1387)		Default: 01:01
	Settings 01:01–31:12 (dd:mm)	

n. Communication

n1. Modbus

When using the communication interface, the diagram on the right shows the communication port pin definitions. We recommend that you connect the VIDAR to your PC by using VIDAR IFD6530 or IFD6500 as a communication converter. Refer to the RJ45 terminal on Section 3-4-1 Wiring for details of the communication port on the right. Refer to Section 6-1 Modbus Communication for more details.



n1-00 Modbus Decoding Method

(0x1580) Default: 0

Settings 0: VIDAR defined 2000

1: VIDAR defined 6000

📖 Refer to Chapter 6 VIDAR Communication Network for further information.

		Decoding Method 1	Decoding Method 2
Source of Operation Control	Digital Keypad	Digital keypad controls the drive action regardless of decoding method 1 or 2.	
	External Terminal	External terminal controls the drive action regardless of decoding method 1 or 2.	
	RS-485	Refer to address: 2000h–20FFh	Refer to address: 6000h–60FFh

⌁ n1-01 Modbus Address

(0x1581) Default: 1

Settings 1–254

📖 Sets the communication address for the VIDAR if the VIDAR is controlled through RS-485 serial communication. The communication address for each VIDAR must be unique.

⌁ n1-02 Modbus COM Baud Rate

(0x1582) Default: Read only

Settings 0: 4.8 Kbps

1: 9.6 Kbps

2: 19.2 Kbps

3: 38.4 Kbps

4: 57.6 Kbps

5: 76.8 Kbps
6: 115.2 Kbps

📖 The transmission speed of Modbus.

n1-03 Modbus Package Format

(0x1583) Default: Read only

Settings
0: 7, N, 2 (ASCII)
1: 7, E, 1 (ASCII)
2: 7, O, 1 (ASCII)
3: 7, E, 2 (ASCII)
4: 7, O, 2 (ASCII)
5: 8, N, 1 (ASCII)
6: 8, N, 2 (ASCII)
7: 8, E, 1 (ASCII)
8: 8, O, 1 (ASCII)
9: 8, E, 2 (ASCII)
10: 8, O, 2 (ASCII)
11: 8, N, 1 (RTU)
12: 8, N, 2 (RTU)
13: 8, E, 1 (RTU)
14: 8, O, 1 (RTU)
15: 8, E, 2 (RTU)
16: 8, O, 2 (RTU)

n1-04 Modbus Timeout Check Time

(0x1584) Default: 0.0

Settings 0.0–100.0 sec.

📖 Sets the communication time-out value.

n1-05 Modbus Timeout Disposal

(0x1585) Default: 0

Settings
0: Continue OPER
1: Warning & continue OPER
2: Fault & ramp to stop
3: Fault & coast to stop

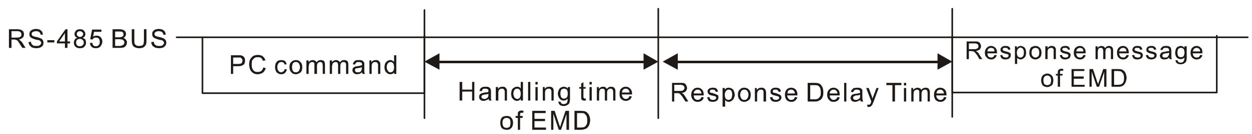
📖 Determines the treatment when an error is detected that the host controller does not continuously transmit data to the VIDAR during Modbus communication. The detection time is based on the Pr.n1-04 setting.

n1-06 Modbus Response Delay Time

(0x1586) Default: 2.0

Settings	0.0–200.0 ms

📖 If the host controller does not finish the transmitting/receiving process, you can use this parameter to set the response delay time after the VIDAR receives communication command as shown in the following picture.



n1-07 Modbus MO Mask

(0x1587) Default: 0

Settings	0: Disable
	1: Enable
	bit 0–1: Relay1–2
	bit 2–15: Reserve

📖 This function is enabled when Pr. G1-04 or G1-06 is set as 1587h (n1-07 Modbus MO Mask).

n1-08 Modbus AO Mask

(0x1588) Default: 0

Settings	0: Disable
	1: Enable
	bit 0–1: AO1–AO2
	bit 2–15: Reserve

📖 This function is enabled when Pr.G3-01 or G3-15 is set as 1588h (n1-08 Modbus AO Mask).

n5. EtherNET

n5-00 EtherNET Decoding Method

(0x15C0) Default: 0

Settings 0: VIDAR defined 2000
1: VIDAR defined 6000

📖 Refer to description of Pr.n1-00.

n5-01 EtherNET IP Configuration

(0x15C1) Default: 0

Settings 0: Static IP
1: DHCP
2: BOOTP

📖 0: Set the IP address manually.

📖 1: IP address is dynamically set by the host controller.

📖 2: IP address is assigned by BOOTP server based on the device’s MAC address.

⌁ n5-02 EtherNET IP Address 1

(0x15C2) Default: 1

Settings 0–223

⌁ n5-03 EtherNET IP Address 2

(0x15C3) Default: 0

Settings 0–255

⌁ n5-04 EtherNET IP Address 3

(0x15C4) Default: 0

Settings 0–255

⌁ n5-05 EtherNET IP Address 4

(0x15C5) Default: 0

Settings 0–255

📖 Use Pr.n5-02–n5-05 with a EtherNET communication card.

⌁ n5-06 EtherNET Mask Address 1

(0x15C6) Default: 0

Settings 0–255

n5-07 EtherNET Mask Address 2

(0x15C7) Default: 0

Settings 0–255

n5-08 EtherNET Mask Address 3

(0x15C8) Default: 0

Settings 0–255

n5-09 EtherNET Mask Address 4

(0x15C9) Default: 0

Settings 0–255

n5-10 EtherNET Gateway Address 1

(0x15CA) Default: 1

Settings 0–223

n5-11 EtherNET Gateway Address 2

(0x15CB) Default: 0

Settings 0–255

n5-12 EtherNET Gateway Address 3

(0x15CC) Default: 0

Settings 0–255

n5-13 EtherNET Gateway Address 4

(0x15CD) Default: 0

Settings 0–255

n5-14 EtherNET Password

(0x15CE) Default: 0

Settings 0–4294967295

n5-15 EtherNET Reset

(0x15D0) Default: 0

Settings 0: Disable

1: Reset

n5-16 EtherNET Control Word

(0x15D1) Default: 0

Settings bit0: Enable IP filter

bit1: Enable Internet parameters
bit2: Enable Login Password

📖 bit1: When the IP address is set, this bit is enabled. After updating the parameters for the communication card, this bit changes to disabled.

📖 bit2: When you enter the login password, this bit is enabled. After updating the parameters for the communication card, this bit changes to disabled.

✓ n5-17 EtherNET MO Mask

(0x15D2) Default: 0

Settings 0: Disabled
1: Enabled
bit 0–1: Relay1–2

📖 This function is enabled when Pr. G1-04 or G1-06 is set as 15D2h (n5-17 EtherNet Mo Mask).

✓ n5-18 EtherNET AO Mask

(0x15D3) Default: 0

Settings 0: Disabled
1: Enabled
bit 0–1: AO1–AO2

📖 This function is enabled when Pr.G3-01 or G3-15 is set as 15D3h (n5-18 EtherNet AO Mask).

n5-19 EtherNET Status

(0x15D4) Default: Read only

Settings bit0: Enable IP filter
bit1: Enable internet parameters
bit2: Enable login password

📖 bit0: When the communication card is set with a password, this bit is enabled. When the password is cleared, this bit changes to disabled.

o. Monitor & Recorder

o0. Status Monitor

o0-00 Status Display 1

(0x1640) Default: 0

o0-01 Status Display 2

(0x1641) Default: 0

o0-02 Status Display 3

(0x1642) Default: 0

Settings
0: Display motor current (unit: Amp)
1: Display counter value (Unit: CNT)
2: Display the motor’s actual output frequency (Unit: Hz)
3: Display the VIDAR Clamp bus voltage (Unit: V_{DC})
4: Display the VIDAR output voltage (Unit: V_{AC})
5: Display the VIDAR power factor (Unit: deg)
6: Display the VIDAR output power (Unit: kW)
7: Display the motor speed rpm (Unit: rpm)
8: Display the VIDAR estimated output torque, motor’s rated torque is 100% (Unit: %)
9: Display the Clamp bus Analog-to-Digital (AD) value (Unit: AD)
11: Display AI1 analog input terminal signal (Unit: %)
12: Display AI2 analog input terminal signal (Unit: %)
16: The digital input status (ON / OFF)
17: The digital output status (ON / OFF)
18: Display multi-step speed
19: The corresponding ACB digital input pin status
20: The corresponding ACB digital output pin status
21: Display the VIDAR’s MAX IGBT temperature (Unit: °C)
22: Display the VIDAR’s MAX capacitance temperature (Unit: °C)
23: Display the control MCU ambient temperature (Unit: °C)
24: Display the PCB3 ambient temperature (Unit: °C)
25: Display the control board ambient temperature (Unit: °C)
34: Operation speed of fan (Unit: %)
36: Present operating carrier frequency of the drive (Unit: Hz)

38: VIDAR Status
39: Display the VIDAR estimated output torque (Unit: Nt-m)
41: kWh (Unit: kWh)
42: PID reference (Unit: %)
43: PID feedback (Unit: %)
44: PID output frequency command (Unit: Hz)
46: Motor temperature KTY84 (Unit: °C)
48: RTD (Unit: °C)
52: Input voltage frequency (Unit: Hz)
53: ACB Relative Humidity (Unit: %)
54: ACB T Temperature (Unit: °C)
55: Display the VIDAR output power (Unit: HP)
56: Overload (Unit: %)
57: Output Load % (Unit: %)
58: Display input current (Unit: Amp)

- Pr.o0-00–o0-02 set the internal value of the drive, input and output values, status, physical quantity, etc. that the user needs to observe.
- VIDAR status:
  - bit 0 and bit 1 combine a two-bit status with value 0 to 3:
    0 = VIDAR stopped, 1 = VIDAR stopping, 2 = VIDAR standby (no PWM outputting),
    3 = VIDAR running.
  - bit 2 is JOG, when this bit is high means jogging, bit is low means no-jogging.
  - bit 3 and bit 4, the value means forward or reverse direction.
    bit 3 and 4 = 00: Direction command and VIDAR are forward
    bit 3 and 4 = 01: Direction forward VIDAR reverse
    bit 3 and 4 = 10: Command is reverse, but VIDAR is forward
    bit 3 and 4 = 11: Command and VIDAR are reverse.

✎ o0-03 Current Display Filter Time

(0x1643) Default: 0.100

Settings 0.001–65.535 sec.

- Set this parameter to reduce the fluctuation of the current display value on the keypad.

✱ ⌿ o0-04 Clamp bus Voltage Display Filter Time

(0x1644 Default: 0.050

Settings	0.001-65.535 sec.

📖 Set this parameter to reduce the fluctuation of the Clamp bus display value on the keypad.

⌿ o0-05 Status Display Filter Time

(0x1645) Default: 0.100

Settings	0.001–65.535 sec.

📖 Sets the general filter time for the output frequency, motor speed and power display on keypad.

⌿ o0-06 Drive Ready Indn

(0x1646) Default: 0

Settings	0: Disabled
	1–2: Relay1–Relay2

📖 Selects the Relay terminal for the “Drive Ready” status indication.

📖 If the VIDAR starts without any abnormal status, the terminal contact selected in Pr.o0-06 activates.

⌿ o0-07 Run Indn

(0x1647) Default: 0

Settings	0: Disabled
	1–2: Relay1–Relay2

📖 Selects the Relay terminal for the “Drive RUN” status indication.

📖 When the VIDAR is in the non-stop status, the terminal contact selected in Pr.o0-07 activates.

⌿ o0-08 Output Amp Detection Level

(0x1648) Default: 0.0

Settings	0.0–200.00%

⌿ o0-09 Output Amp Exceed Indn

(0x1649) Default: 0

Settings	0: Disabled
	1–2: Relay1–Relay2

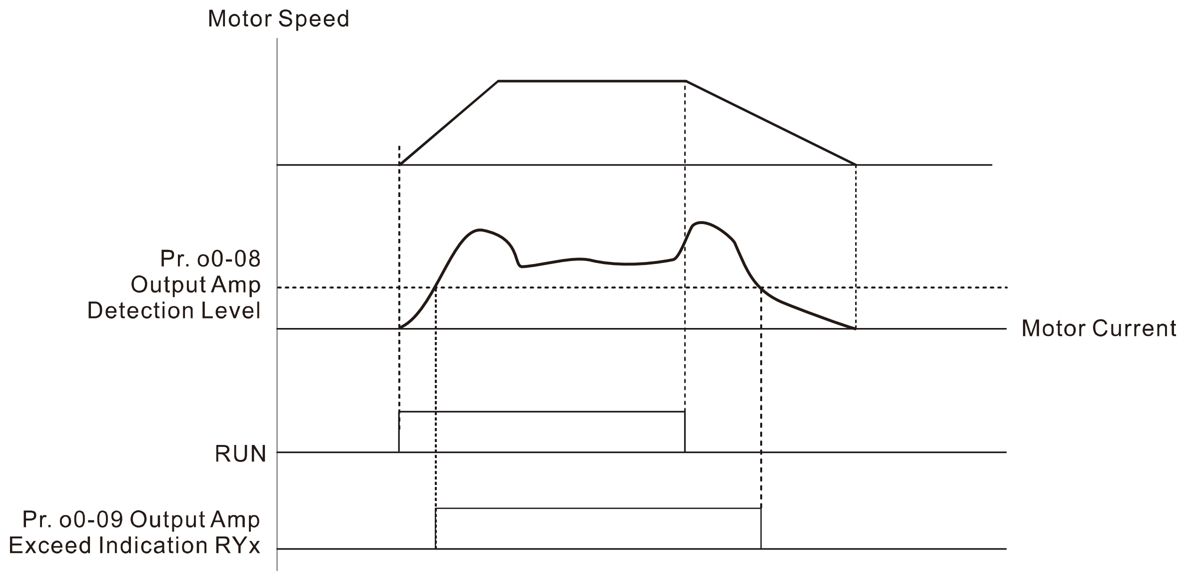
⌿ o0-10 Output Amp under Indn

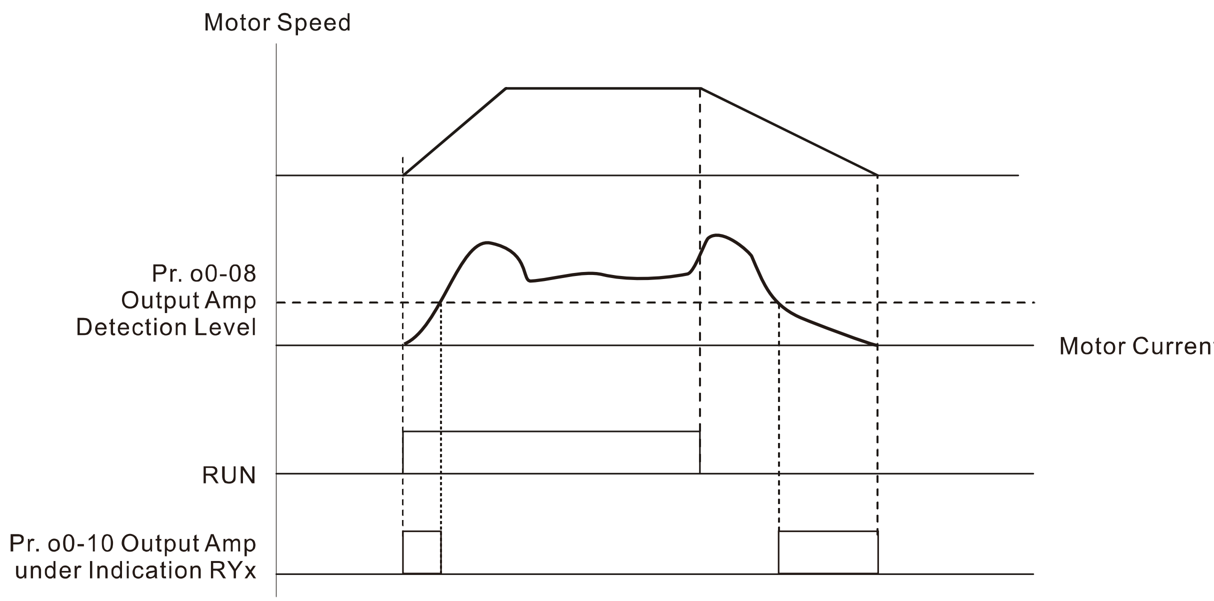
(0x164A) Default: 0

Settings	0: Disabled
	1–2: Relay1–Relay2

📖 Pr.o0-08 is the detection level of Pr. o0-09 and o0-10. 100% corresponds to Pr.A0-01 VIDAR rated current.

- 🕮 When the motor current is higher than Pr.o0-08 current level, the terminal contact selected in Pr.o0-09 activates.
- 🕮 When the motor current is lower than Pr.o0-08 current level, the terminal contact selected in Pr.o0-10 activates.





⌁ o0-11 Target Speed Width

(0x164B) Default: 0.3

Settings 0.1–5.0%

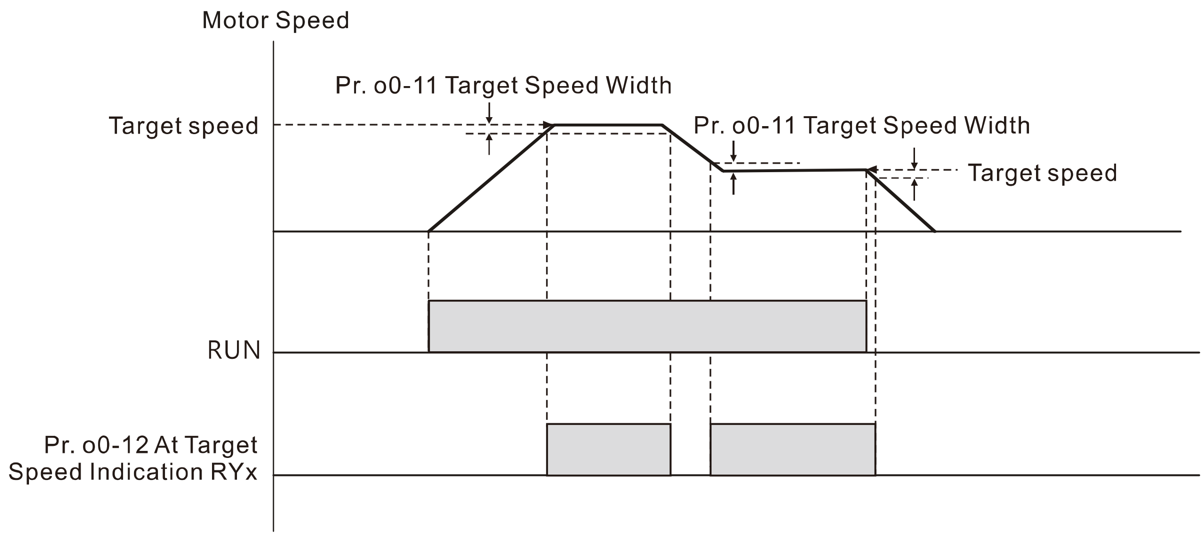
⌁ o0-12 At Target Speed Indn

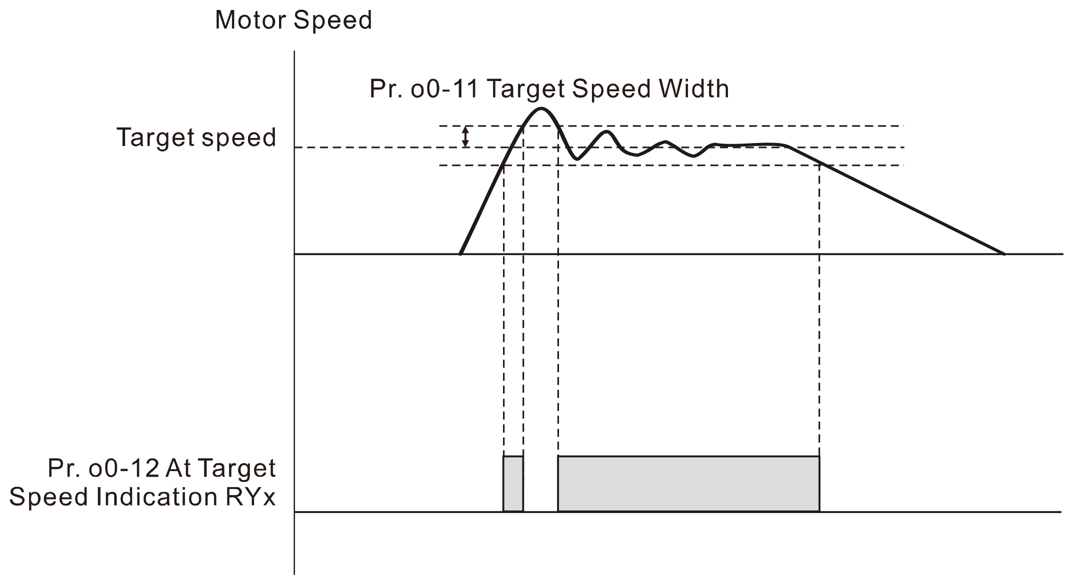
(0x164C) Default: 0

Settings 0: Disabled

1–2: Relay1–Relay2

- When the motor speed reaches the set speed width in Pr.o0-11, the terminal contact selected in Pr.o0-12 activates.
- When rated speed = 1800 rpm, target speed = 800 rpm and Pr.o0-11 = 1%, the terminal contact selected in Pr.o0-12 activates within the range of “800 +/- 18” rpm.





o0-13 Speed Detection Level

(0x164D) Default: 5

Settings 0–8985 rpm

o0-14 Speed Exceed Indn

(0x164E) Default: 1

Settings 0: Disabled

1–2: Relay1–Relay2

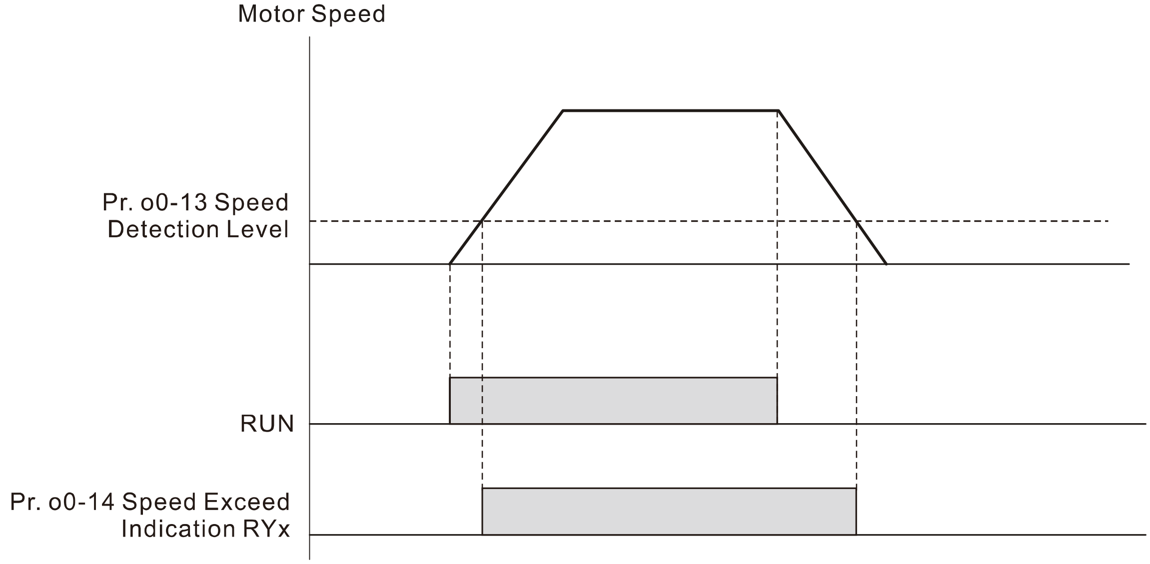
o0-15 Speed under Indn

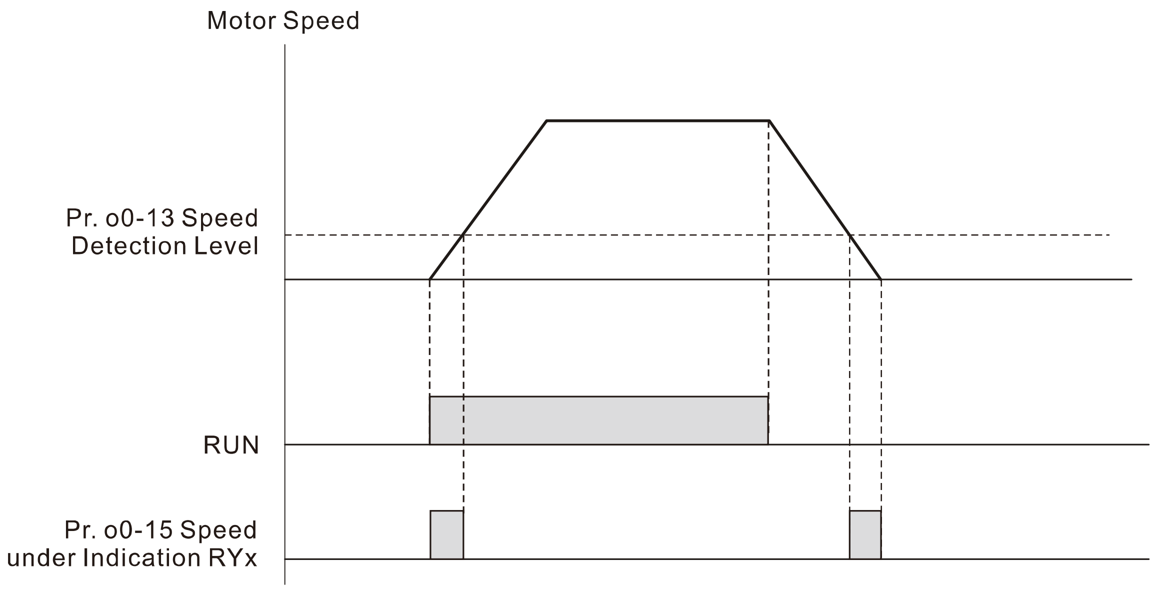
(0x164F) Default: 0

Settings 0: Disabled

1–2: Relay1–Relay2

- When the motor speed is higher than the setting for Pr.o0-13, the terminal contact selected in Pr.o0-14 activates.
- When the motor speed is lower than the setting for Pr.o0-13, the terminal contact selected in Pr.o0-15 activates.





	o0-16	Speed Reached Level 1	
	(0x1650)		Default: 885
		Settings 0–8985 rpm	

	o0-17	Speed Reached Range 1	
	(0x1651)		Default: 30
		Settings 0–8985 rpm	

o0-18 Speed Reached 1 Indn

(0x1652) Default: 0

Settings 0: Disabled

1–2: Relay1–Relay2

o0-19 Speed Reached Level 2

(0x1653) Default: 750

Settings 0–8985 rpm

o0-20 Speed Reached Range 2

(0x1654) Default: 30

Settings 0–8985 rpm

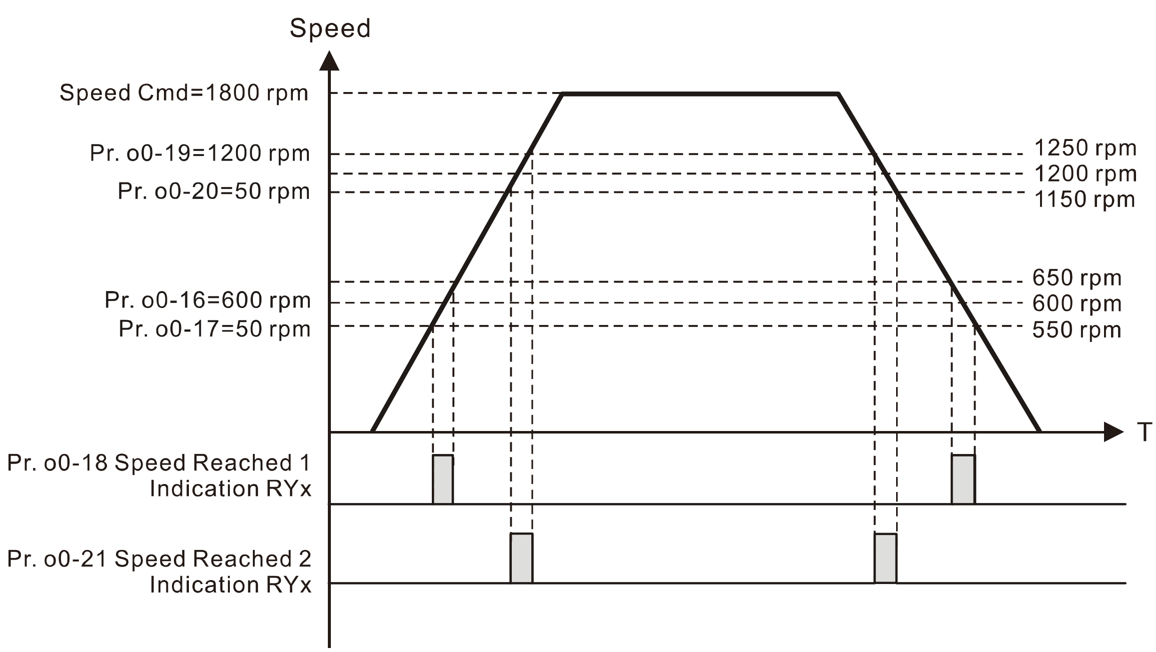
o0-21 Speed Reached 2 Indn

(0x1655) Default: 0

Settings 0: Disabled

1–2: Relay1–Relay2

- When the motor speed reaches Pr.o0-16 speed level 1, the terminal contact selected in Pr.o0-18 activates.
- When the motor speed reaches Pr.o0-19 speed level 2, the terminal contact selected in Pr.o0-21 activates.



✎ o0-22 Zero Speed Indicator at Run(Speed Cmd)

(0x1656) Default: 0

Settings 0: Disabled

1–2: Relay1–Relay2

- When the speed command is set to 0, the terminal contact selected in Pr.o0-22 activates.
- This function only activates when the VIDAR is in operation.

✎ o0-23 Zero Speed Command Indicator (Speed Cmd)

(0x1657) Default: 0

Settings 0: Disabled

1–2: Relay1–Relay2

- When the speed command is set to 0 or stop, the terminal contact selected in Pr.o0-23 activates.

✎ o0-24 Zero Speed Width

(0x1658) Default: 0.1

Settings 0.1–5.0%

✎ o0-25 Zero Speed (Motor Speed) At Run

(0x1659) Default: 0

Settings 0: Disabled

1–2: Relay1–Relay2

- When the motor speed is 0, the terminal contact selected in Pr.o0-25 activates.
- This function only activates when the VIDAR is in operation.

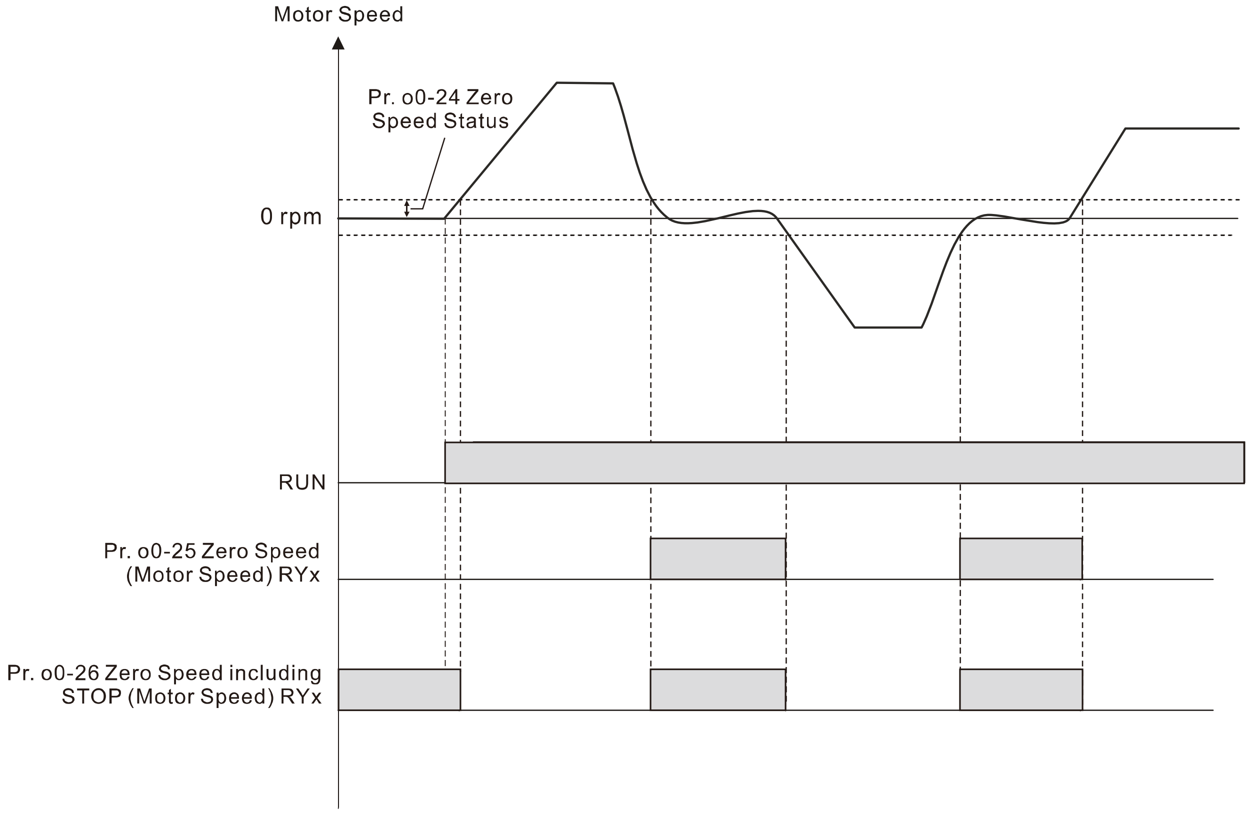
✎ o0-26 Zero Speed Output Indicator (Motor Speed)

(0x165A) Default: 0

Settings 0: Disabled

1–2: Relay1–Relay2

- When the motor speed is 0 or stopped, the terminal contact selected in Pr.o0-26 activates.



⌁ o0-27 Speed Cmd AO Sel

(0x165B) Default: 0

Settings 0: Disabled Keypad has No Function

1–2: AO1–AO2

- Use this parameter to select analog output terminals that are defined as “Speed command”.
- 100% corresponds to Pr.C2-17 maximum operation speed.

⌁ o0-28 Speed Profile AO Sel

(0x165C) Default: 0

Settings 0: Disabled

1–2: AO1–AO2

- Use this parameter to select analog output terminals that are defined as “Speed profile”.
- 100% corresponds to Pr.C2-17 maximum operation speed.

✎ o0-29 Motor RPM AO Sel

(0x165D) Default: 1

Settings 0: Disabled

1–2: AO1–AO2

- Use this parameter to select analog output terminals that are defined as “Motor speed”.
- 100% corresponds to Pr.C2-17 maximum operation speed.

o0-30 Motor Input Current (A) AO Sel

(0x165E) Default: 2

Settings 0: Disabled

1–2: AO1–AO2

- Use Pr.o0-30 to select analog output terminals that are defined as ‘Motor Input current’.
- 100% corresponds to 2.0 × Pr.A0-02 (VIDAR Rated Input Current).
- When Pr.o0-30 is set to AO1 or AO2, the corresponding AO gain (Pr.G3-05 for AO1 or Pr.G3-19 for AO2) is automatically set to 200%, ensuring that 100% corresponds to the VIDAR rated input current defined in Pr.A0-02. If Pr.o0-30 is reset to 0, the AO1 or AO2 gain reverts to its default value of 100%.

o0-31 Motor Current (A) AO Sel

(0x165F) Default: 0

Settings 0: Disabled

1–2: AO1–AO2

- Use this parameter to select analog output terminals that are defined as “Motor current”.
- 100% corresponds to 2.5 times of Pr.A0-01 VIDAR rated current.
- When Pr.o0-31 is set to AO1 or AO2, the AO1 gain or AO2 gain (Pr.G3-05 or Pr.G3-19) will be set to 250% automatically, which makes the 100% correspond to Pr.A0-01 VIDAR rated current. If Pr.o0-31 is set back to 0, the AO1 gain or AO2 gain (Pr.G3-05 or Pr.G3-19) will be set back to default value 100%.

✎ o0-32 Output Voltage (V) AO Sel

(0x1660) Default: 0

Settings 0: Disabled

1–2: AO1–AO2

- Use this parameter to select analog output terminals that are defined as “Output voltage”.
- 100% corresponds to 500V.

✔ o0-34 Output Torque AO Sel

(0x1662) Default: 0

Settings 0: Disabled
1–2: AO1–AO2

- Use this parameter to select analog output terminals that are defined as "Output torque".
- 100% corresponds to 2 times of the motor rated torque.

✔ o0-35 Output Power AO Sel

(0x1663) Default: 0

Settings 0: Disabled
1–2: AO1–AO2

- Use this parameter to select analog output terminals that are defined as "Output power".
- 100% corresponds to 2 times of the motor rated power.

✔ o0-36 Power Factor AO Sel

(0x1664) Default: 0

Settings 0: Disabled
1–2: AO1–AO2

- Use this parameter to select analog output terminals that are defined as "Power factor".
- Power factor -1.000–1.000 correspond to 0%–100%.

o0-37 Recent 1Hr OPER kW-hour

(0x1665) Default: Read only

Settings 0.0–6553.5 kW-hour

- Degree (kW-hr): Often referred to as kilowatt-hour, it is a unit of energy, which is equivalent to the energy consumed by an electrical device with a power of 1000 watts after 1 hour of use, which is equal to 3.6 million joules. "Kilowatt-hour" is usually used as a unit of billing for electricity delivered by power companies to consumers.
- Pr.o0-37 displays the power consumption of the drive in the previous hour.

o0-38 Cumulative OPER kW-hour

(0x1666) Default: Read only

Settings 0.0–999.9 kW-hour

o0-39 Cumulative OPER MW-hour

(0x1667) Default: Read only

Settings 0–999 MW-hour

o0-40 Cumulative OPER GW-hour

(0x1668) Default: Read only

Settings 0–999 GW-hour

- The accumulative operating degrees are recorded in three units of degrees (kW-hour), thousand degrees (MW-hour) and million degrees (GW-hour). When the accumulated degree reaches 1,000 degrees, carry to 1,000 degrees; when the thousand degrees accumulated to 1,000,000 degrees, carry to million degrees. If the degree is less than one hour, it will be discarded and not recorded.
- Pr.o0-38–o0-40 are the accumulative motor operating degrees (kW-hour), accumulative motor operating thousand degrees (MW-hour) and accumulative motor operating million degrees (GW-hour).
- The total accumulative motor operating degrees is (GW+MW+kW)-hour.
- The parameters related to the operating degree record can be cleared through the reset kWh function in the parameter reset function.
- The operating degree record parameter is only available for reading, it cannot be manually modified or written into any value.
- When executing parameter copy function, the record parameters cannot be copied.

o0-41 Cumulative OPER Minutes

(0x1669) Default: 0

Settings 0–60 minutes

o0-42 Cumulative OPER Hours

(0x166A) Default: 0

Settings 0–24 hours

o0-43 Cumulative OPER Days

(0x166B) Default: 0

Settings 0–65535 days

- Pr.o0-41–o0-43 are the accumulative operating minutes, operating hours and operating days of the drive.
- The total accumulative operating time of the drive: days + hours + minutes.
- Set these parameter as 0 to clear the accumulative value. An operation time shorter than 60 seconds is not recorded.

o0-44	Drive Output Efficiency	
(0x166C)		Default: Read only
	Settings	0.0–99.9%

📖 This parameter is the immediate output efficiency of the drive.

o0-45	Drive Output PF Angle	
(0x166D)		Default: Read only
	Settings	-90.0–90.0 deg

📖 This parameter is the immediate output power angle of the drive.

o0-46	Drive Output Apparent Power	
(0x166E)		Default: Read only
	Settings	0.0–6553.5 kVA The KVA units are not on the Keypad

📖 This parameter is the immediate output apparent power of the drive.

o0-47	Drive Output Active Power	
(0x166F)		Default: Read only
	Settings	0.0–6553.5 kW

📖 This parameter is the immediate output active power of the drive.

o0-48	Drive Output Reactive Power	
(0x1670)		Default: Read only
	Settings	0.0–6553.5 kVar The KVar units are not on the Keypad

📖 This parameter is the immediate output reactive power of the drive.

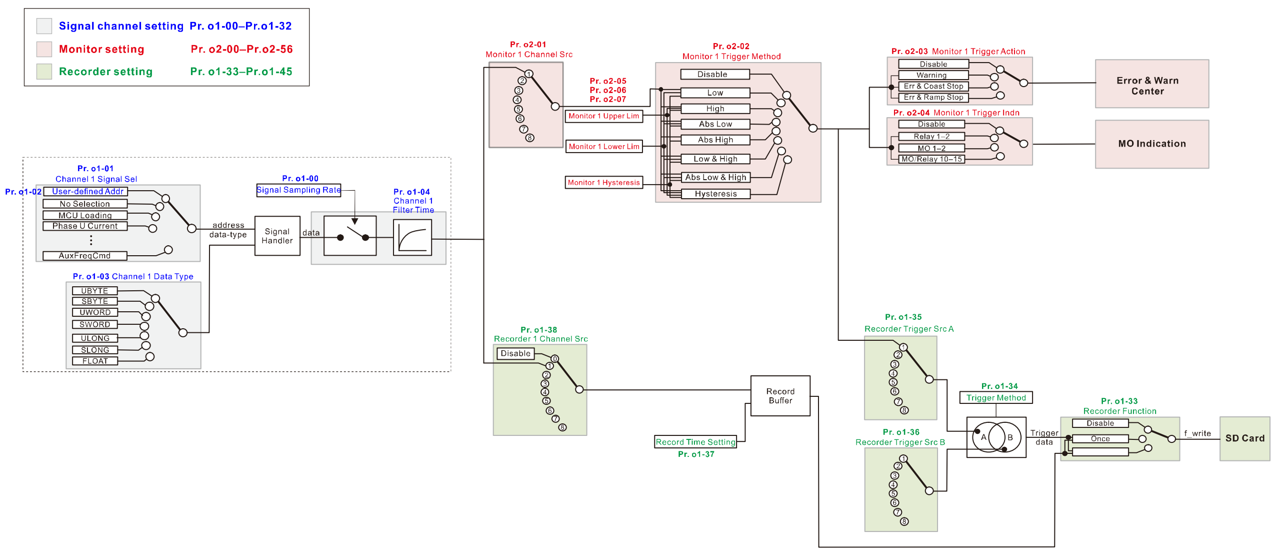
o1. Signal & Recorder Function

VIDAR allows the user to select 8 groups of real-time signal monitoring and recording function.
When the signal exceeds the range set by the user, or when a specific condition is met, a Signal Even can be triggered. When the signal event is established, it can trigger a warning or fault message of the drive, or as a trigger for the signal record module. This function records the signal waveform of the specific period before the event occurs to the SD card.
NOTE: the SD card must be formatted as exFAT first.

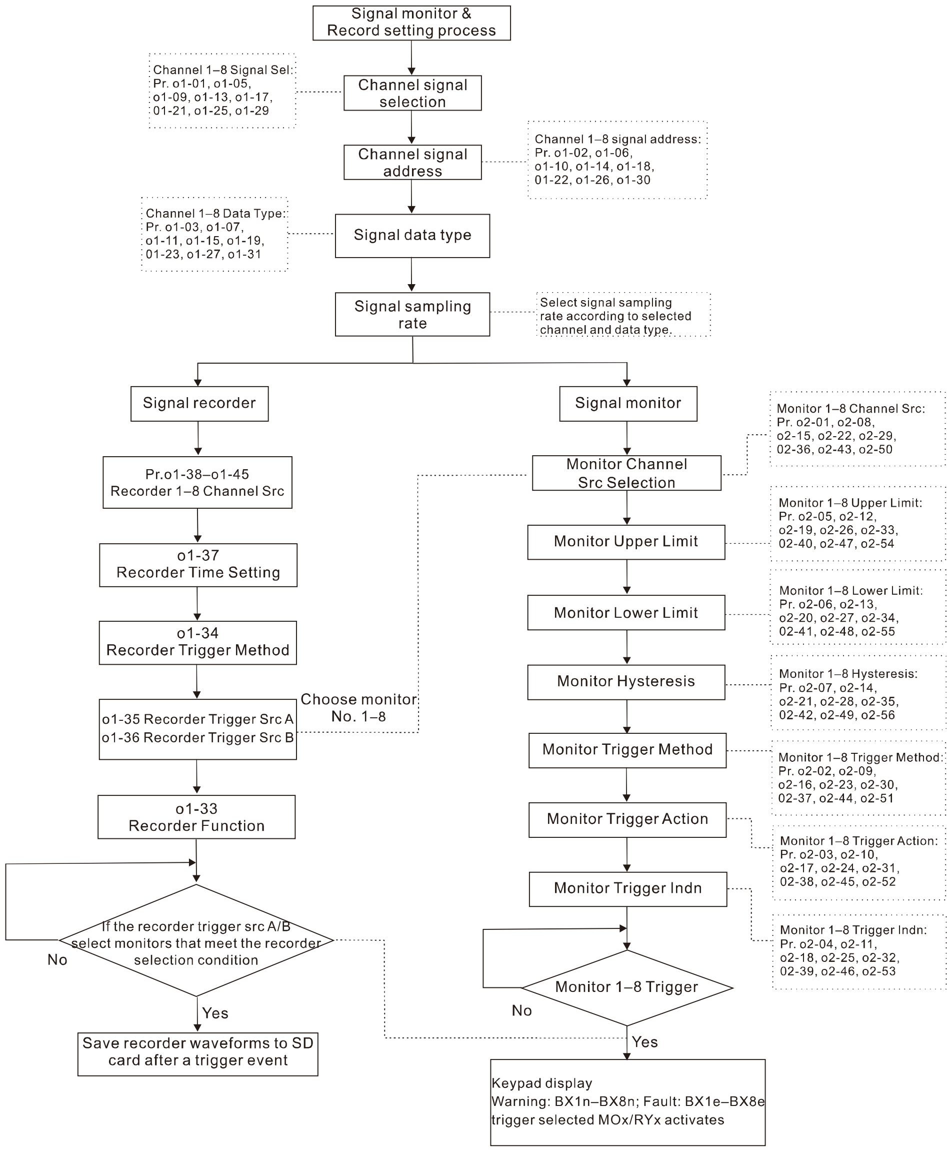
Regardless of the signal monitoring or signal recording function, the signal source can be specified through the menu, or you can specify the signal source of monitoring directly by inputting the monitoring address.

- Pr.o1-00–o1-32: Signal channel 1–8 settings (including channel signal selection, signal address, signal data type, channel filter time, etc. of each channel.)
- Pr.o1-33–o1-45: Recorder 1–8 settings (including recorder function selection, trigger method, trigger source A & B selection, recorder time setting, channel source, etc. of recorder 1–8)
- Pr.o2-00–o2-56: Monitor 1–8 settings (including channel source selection, trigger method, trigger action, trigger indication, upper and lower limits, monitor hysteresis, etc. of monitor 1–8)

📖 Diagram of channel selection, monitor and recorder function. The following diagram takes Channel 1, Monitor 1 and Recorder 1 as example. For detailed parameter settings of Channel 1–8, Motor 1–8 and Recorder 1–8, refer to the description in the following sections of parameter group o1 and o2.



Setting process of channel selection, monitor and recorder function:


Signal monitor & Record setting process
Channel 1–8 Signal Sel: Pr. o1-01, o1-05, o1-09, o1-13, o1-17, 01-21, o1-25, o1-29
Channel signal selection
Channel signal address
Channel 1–8 signal address: Pr. o1-02, o1-06, o1-10, o1-14, o1-18, 01-22, o1-26, o1-30
Channel 1–8 Data Type: Pr. o1-03, o1-07, o1-11, o1-15, o1-19, 01-23, o1-27, o1-31
Signal data type
Signal sampling rate
Select signal sampling rate according to selected channel and data type.
Signal recorder
Signal monitor
Monitor 1–8 Channel Src: Pr. o2-01, o2-08, o2-15, o2-22, o2-29, 02-36, o2-43, o2-50
Pr.o1-38–o1-45 Recorder 1–8 Channel Src
Monitor Channel Src Selection
Monitor 1–8 Upper Limit: Pr. o2-05, o2-12, o2-19, o2-26, o2-33, 02-40, o2-47, o2-54
o1-37 Recorder Time Setting
Monitor Upper Limit
Monitor 1–8 Lower Limit: Pr. o2-06, o2-13, o2-20, o2-27, o2-34, 02-41, o2-48, o2-55
o1-34 Recorder Trigger Method
Monitor Lower Limit
Monitor 1–8 Hysteresis: Pr. o2-07, o2-14, o2-21, o2-28, o2-35, 02-42, o2-49, o2-56
Monitor Hysteresis
Choose monitor No. 1–8
o1-35 Recorder Trigger Src A
o1-36 Recorder Trigger Src B
Monitor Trigger Method
Monitor 1–8 Trigger Method: Pr. o2-02, o2-09, o2-16, o2-23, o2-30, 02-37, o2-44, o2-51
o1-33 Recorder Function
Monitor Trigger Action
Monitor 1–8 Trigger Action: Pr. o2-03, o2-10, o2-17, o2-24, o2-31, 02-38, o2-45, o2-52
Monitor Trigger Indn
Monitor 1–8 Trigger Indn: Pr. o2-04, o2-11, o2-18, o2-25, o2-32, 02-39, o2-46, o2-53
If the recorder trigger src A/B select monitors that meet the recorder selection condition
No
Monitor 1–8 Trigger
No
Yes
Save recorder waveforms to SD card after a trigger event
Yes
Keypad display
Warning: BX1n–BX8n; Fault: BX1e–BX8e
trigger selected MOx/RYx activates

o1-00 Signal Sampling Rate

(0x1680) Default: 0

Settings	0: 1 kHz
	1: 2 kHz
	2: 5 kHz
	3: 10 kHz

- Use this parameter to set the signal sampling rate of the channel. The signal record module can select the appropriate sampling rate for signal sampling.
- Due to the limitation of SD card write-in rate and buffer zone, the defined data stream speed of the record is 80 KB/s.

Sampling Rate →

Total byte Number	Data Stream	1k	2k	5k	10k
	1	1	2	5	10
	4	4	8	20	40
	8	8	16	40	80
	10	10	20	50	~~100~~
	12	12	24	60	
	14	14	28	70	
	16	16	32	80	
	18	18	36	~~90~~	
	20	20	40		
	22	22	44		
	24	24	48		
	26	26	52		
	28	28	56		
	30	30	60		
	32	32	64		

The data stream in the gray zone is > 80 KB/s, the fool-proof logic prevents parameters from being set to this area.

For example: Pr.o1-00 = 3, 10 kHz
Pr.o1-03 = 4 ULONG (4-byte)
Pr.o1-05 = 2, o1-07 = 2 UWORD (2-byte)
Pr.o1-03 = 6 FLOAT (4-byte)
If setting Pr.o1-38 = 1 (Recorder 1 Source = Channel 1) uses 40 KB/s, Pr.o1-39 = 2 (Recorder 2 Source = Channel 2) uses 20 KB/s, then setting Pr.o1-40 = 3 (Recorder 3 Source = Channel 3) will exceed the limitation of 80 KB/s, Pr.o1-40 will automatically return to 0 (Disabled) via the fool-proof mechanism.

	Pr.	ID No.	Description	Data Stream
	o1-00	3	Sampling Rate = 10 kHz	-
Channel 1 Setting	o1-02	Monitor address		-
	o1-03	4	ULONG (4-byte)	-

	Pr.	ID No.	Description	Data Stream
Channel 2 Setting	o1-05	2	User Frequency Cmd	-
	o1-07	2 (automatically input)	UWORD (2-byte)	-
Channel 3 Setting	o1-10	Monitor address		-
	o1-11	6	FLOAT (4-byte)	-
Recorder Setting	o1-38	1	Recorder 1 Source = Channel 1	40 KB/s
	o1-39	2	Recorder 2 Source = Channel 2	60 KB/s
	o1-40	3	Recorder 3 Source = Channel 3	100 KB/s
Fool-proof Logic	o1-40	0 (automatically return)	Recorder 3 Source = OFF	60 KB/s

o1-01 Channel 1 Signal Sel

(0x1681) Default: 0

o1-05 Channel 2 Signal Sel

(0x1685) Default: 0

o1-09 Channel 3 Signal Sel

(0x1689) Default: 0

o1-13 Channel 4 Signal Sel

(0x168D) Default: 0

o1-17 Channel 5 Signal Sel

(0x1692) Default: 0

o1-21 Channel 6 Signal Sel

(0x1697) Default: 0

o1-25 Channel 7 Signal Sel

(0x169C) Default: 0

o1-29 Channel 8 Signal Sel

(0x16A1) Default: 0

Settings 0: Signal Address

1–52 (Number of Signal List)

- Pr.o1-01, o1-05, o1-09, o1-13, o1-17, o1-21, o1-25 and o1-29 select the signal of Channel 1–8 (refer to Signal Channel Selection Table).
- When Pr.o1-01 = 0, it means that the signal in the channel signal selection table is not used, and the specific signal address can be directly set in Pr.o1-02.
- Channel Signal Selection Table:

Channel Signal Selection List			**Channel Data Type**	
ID No.	Description	Description	Settings	Description
0	User-defined Address	The signal address corresponds to Pr.o1-02 Channel 1	User inputs	0: UBYTE 1: SYTE 2: UWORD 3: SWORD 4: ULONG 5: SLONG 6: FLOAT
1	No selection	No selection	2 (Pr. auto fill in)	UWORD
2	User Freq CMD (Hz,D2)	User Freq CMD (Hz,D2)	2 (Pr. auto fill in)	UWORD
3	Frequency Ref.(Hz,D2)	Frequency Reference (Hz,D2)	3 (Pr. auto fill in)	SWORD
4	Output Frequency (Hz,D2)	Output Frequency (Hz,D2)	3 (Pr. auto fill in)	SWORD
5	Output Freq LPF (Hz,D2)	Output Freq Low Pass Filter (Hz,D2)	3 (Pr. auto fill in)	SWORD
6	Motor Current (A,D2)	Motor Current (Amp,D2)	2 (Pr. auto fill in)	UWORD
7	Clamp Bus (V,D1)	Clamp Bus (V,D1)	2 (Pr. auto fill in)	UWORD

8	Phase U Current (%,D2)	Phase U Current (%,D2) 100% = VIDAR rated current	3 (Pr. auto fill in)	SWORD
9	Phase V Current (%,D2)	Phase V Current (%,D2) 100% = VIDAR rated current	3 (Pr. auto fill in)	SWORD
10	Phase W Current (%,D2)	Phase W Current (%,D2) 100% = VIDAR rated current	3 (Pr. auto fill in)	SWORD
11	Input AC Volt. R (V,D1)	Input AC Volt. R (V,D1)	3 (Pr. auto fill in)	SWORD
12	Input AC Volt. S (V,D1)	Input AC Volt. S (V,D1)	3 (Pr. auto fill in)	SWORD
13	Input AC Volt. T (V,D1)	Input AC Volt. T (V,D1)	3 (Pr. auto fill in)	SWORD
14	Input Voltage RMS (V,D1)	Input Voltage RMS (V,D1)	2 (Pr. auto fill in)	UWORD
15	Input Volt Freq (Hz,D1)	Input Volt Freq (Hz,D1)	2 (Pr. auto fill in)	UWORD
16	Top Fault Code	Top Fault Code	2 (Pr. auto fill in)	UWORD
17	Warning Code	Warning Code	2 (Pr. auto fill in)	UWORD
18	Mi Status	Mi Status	2 (Pr. auto fill in)	UWORD
19	Mo Status	Mo Status	2 (Pr. auto fill in)	UWORD
20	Output Voltage (Vrms,D1)	Output Voltage (Vrms,D1)	2 (Pr. auto fill in)	UWORD
21	Analog Input 1 (%,D2)	Analog Input 1	3 (Pr. auto fill	SWORD

		(%,D2)	in)	
22	Analog Input 2 (%,D2)	Analog Input 2 (%,D2)	3 (Pr. auto fill in)	SWORD
23	Analog Output 1 (%,D2)	Analog Output 1 (%,D2)	2 (Pr. auto fill in)	UWORD
24	Analog Output 2 (%,D2)	Analog Output 2 (%,D2)	2 (Pr. auto fill in)	UWORD
25	Fan Speed (%)	Fan Speed (%)	2 (Pr. auto fill in)	UWORD
26	PID Reference	PID Reference	3 (Pr. auto fill in)	SWORD
27	PID Feedback	PID Feedback	3 (Pr. auto fill in)	SWORD
28	Max IGBT Temperature(D1)	Max IGBT Temperature (D1)	3 (Pr. auto fill in)	SWORD
29	Max Cap Temperature (D1)	Max Cap Temperature (D1)	3 (Pr. auto fill in)	SWORD
30	Phase U IGBT-1 Temp(D1)	Phase U IGBT-1 Temp (D1)	3 (Pr. auto fill in)	SWORD
31	Phase U IGBT-2 Temp(D1)	Phase U IGBT-2 Temp (D1)	3 (Pr. auto fill in)	SWORD
32	Phase U IGBT-3 Temp(D1)	Phase U IGBT-3 Temp (D1)	3 (Pr. auto fill in)	SWORD
33	Phase U Cap Temp(D1)	Phase U Cap Temp (D1)	3 (Pr. auto fill in)	SWORD
34	Phase V IGBT-1 Temp(D1)	Phase V IGBT-1 Temp (D1)	3 (Pr. auto fill in)	SWORD
35	Phase V IGBT-2 Temp(D1)	Phase V IGBT-2 Temp (D1)	3 (Pr. auto fill in)	SWORD
36	Phase V IGBT-3 Temp(D1)	Phase V IGBT-3 Temp (D1)	3 (Pr. auto fill in)	SWORD
37	Phase V Cap Temp(D1)	Phase V Cap Temp (D1)	3 (Pr. auto fill in)	SWORD

38	Phase W IGBT-1 Temp(D1)	Phase W IGBT-1 Temp (D1)	3 (Pr. auto fill in)	SWORD
39	Phase W IGBT-2 Temp(D1)	Phase W IGBT-2 Temp (D1)	3 (Pr. auto fill in)	SWORD
40	Phase W IGBT-3 Temp(D1)	Phase W IGBT-3 Temp (D1)	3 (Pr. auto fill in)	SWORD
41	Phase W Cap Temp(D1)	Phase W Cap Temp (D1)	3 (Pr. auto fill in)	SWORD
42	Ctrl MCU Temperature(D2)	Ctrl MCU Temperature (D2)	3 (Pr. auto fill in)	SWORD
43	PCB3 TA Temperature(D2)	PCB3 TA Temperature (D2)	3 (Pr. auto fill in)	SWORD
44	Ctrl TA Temperature(D2)	Ctrl TA Temperature (D2)	3 (Pr. auto fill in)	SWORD
45	KTY84 Temperature (D1)	KTY84 Temperature (D1)	3 (Pr. auto fill in)	SWORD
46	RTD Temperature (D1)	RTD Temperature (D1)	3 (Pr. auto fill in)	SWORD
47	ACB NTC Temperature (D1)	ACB NTC Temperature (D1)	3 (Pr. auto fill in)	SWORD
48	NTC R11 Temperature (D1)	NTC R11 Temperature (D1)	3 (Pr. auto fill in)	SWORD
49	Year	Year	2 (Pr. auto fill in)	UWORD
50	Month & Date	Month & Date	2 (Pr. auto fill in)	UWORD
51	Hour & Minute	Hour & Minute	2 (Pr. auto fill in)	UWORD
52	Second	Second	2 (Pr. auto fill in)	UWORD
53	Carrier Frequency (Hz)	Carrier Frequency (Hz)	2 (Pr. auto fill in)	UWORD
54	ACB Relative Humidity (%,	ACB Relative	3 (Pr. auto fill	SWORD

	D1)	Humidity	in)	
55	ACB T Temperature (D1)	ACB T Temperature	3 (Pr. auto fill in)	SWORD
56	Over Load (%, D1)	Over Load (%, D1)	2 (Pr. auto fill in)	UWORD

o1-02 Channel 1 Signal Address
(0x1682) Default: 0

o1-06 Channel 2 Signal Address
(0x1686) Default: 0

o1-10 Channel 3 Signal Address
(0x168A) Default: 0

o1-14 Channel 4 Signal Address
(0x168E) Default: 0

o1-18 Channel 5 Signal Address
(0x1693) Default: 0

o1-22 Channel 6 Signal Address
(0x1698) Default: 0

o1-26 Channel 7 Signal Address
(0x169D) Default: 0

o1-30 Channel 8 Signal Address
(0x16A2) Default: 0

Settings 0–0xFFFFFFFF

- When Channel 1–8 signal selection = 0 “Signal Address”, it means that the signal is not used.
- You can set the signal address by Pr.o1-02, o1-06, o1-10, o1-14, o1-18, o1-22, o1-26 and o1-30.

o1-03 Channel 1 Data Type
(0x1683) Default: 0

o1-07 Channel 2 Data Type
(0x1687) Default: 0

o1-11 Channel 3 Data Type
(0x168B) Default: 0

o1-15 Channel 4 Data Type
(0x168F) Default: 0

o1-19	Channel 5 Data Type
(0x1694)	Default: 0

o1-23	Channel 6 Data Type
(0x1699)	Default: 0

o1-27	Channel 7 Data Type
(0x169E)	Default: 0

o1-31	Channel 8 Data Type
(0x16A3)	Default: 0

Settings 0: UBYTE
1: SBYTE
2: UWORD
3: SWORD
4: ULONG
5: SLONG
6: FLOAT

- Pr.o1-03, o1-07, o1-11, o1-15, o1-19, o1-23, o1-27 and o1-31 select the data type of Channel 1–8.
- If Pr.o1-01 is set as VFD default, then Pr.o1-03 automatically writes in the corresponded data type.
- For example: Pr.o1-01 = 6 (motor current), Pr.o1-03 automatically writes in 2 (UWORD).

o1-04	Channel 1 Filter Time
(0x1684)	Default: 0.0

o1-08	Channel 2 Filter Time
(0x1688)	Default: 0.0

o1-12	Channel 3 Filter Time
(0x168C)	Default: 0.0

o1-16	Channel 4 Filter Time
(0x1691)	Default: 0.0

o1-20	Channel 5 Filter Time
(0x1696)	Default: 0.0

o1-24	Channel 6 Filter Time
(0x169B)	Default: 0.0

o1-28 Channel 7 Filter Time

(0x16A0) Default: 0.0

o1-32 Channel 8 Filter Time

(0x16A5) Default: 0.0

Settings 0.0–6553.5 ms

- Pr.o1-04, o1-08, o1-12, o1-16, o1-20, o1-24, o1-28 and o1-32 set the low pass filter of Channel 1–8.

✎ o1-33 Recorder Function

(0x16A6) Default: 0

Settings 0: Disabled

1: One-Time Record

2: Continuously Record

- Pr.o1-33 selects the operation method of the continuously record or the one-time record.
- Continuously record: When the trigger condition is established, the signal data will be continuously written to the SD card according to the sampling frequency and record length set.
- One-time record: Only records the data within a specific time range before and after the trigger event occurs (set by Pr.o1-37) to the SD card. When the one-time record completes, the parameter automatically returns to 0.

o1-34 Recorder Trigger Method

(0x16A7) Default: 0

Settings 0: Src A

1: Src A Reverse

2: Src A and Src B

3: Src A or Src B

4: Src A xor Src B

- Use Pr.o1-34 to select the trigger method of the recorder.
- For example: Pr.o1-34 = 2 (Source A and source B), when the monitoring conditions selected in Pr.o1-35 and o1-36 are triggered, the recorder function records the waveform to the SD card according to Pr.o1-33 and o1-37 settings.

o1-35 Recorder Trigger Src A

(0x16A8) Default: 1

o1-36 Recorder Trigger Src B

(0x16AA) Default: 1

Settings 1–8 Monitor No.

📖 Pr.o1-35 and o1-36 set the monitor of source A and source B respectively.

o1-37 Recorder Time Setting

(0x16AB) Default: 20

Settings 20–600 sec.

📖 The user can specify the recording data length when triggering: the recording length before triggering is determined by Pr.o1-37, and the recording length after the triggering is always 20 seconds.

o1-38 Recorder 1 Channel Src

(0x16AC) Default: 1

o1-39 Recorder 2 Channel Src

(0x16AD) Default: 2

o1-40 Recorder 3 Channel Src

(0x16AF) Default: 3

o1-41 Recorder 4 Channel Src

(0x16B0) Default: 4

o1-42 Recorder 5 Channel Src

(0x16B1) Default: 5

o1-43 Recorder 6 Channel Src

(0x16B2) Default: 6

o1-44 Recorder 7 Channel Src

(0x16B4) Default: 7

o1-45 Recorder 8 Channel Src

(0x16B5) Default: 8

Settings 0–8 Channel No.

📖 Pr.o1-38–o1-44 select the channel source of recorder 1–8.

o2. Monitor Function

o2-00 Monitor Trigger Status

(0x16C0) Default: Read only

Settings 0–0x00FF

- This parameter displays the trigger status of Monitor 1–8. bit0–bit7 correspond to Monitor 1–8 respectively.
- For example: Pr.o2-00 = 0000 0000 0000 0001, it means that the signal of Monitor 1 reaches the Monitor 1 trigger condition set in Pr.o2-02.

o2-01 Monitor 1 Channel Src

(0x16C1) Default: 1

o2-08 Monitor 2 Channel Src

(0x16CB) Default: 2

o2-15 Monitor 3 Channel Src

(0x16D5) Default: 3

o2-22 Monitor 4 Channel Src

(0x16DF) Default: 4

o2-29 Monitor 5 Channel Src

(0x16E9) Default: 5

o2-36 Monitor 6 Channel Src

(0x16F3) Default: 6

o2-43 Monitor 7 Channel Src

(0x16FD) Default: 7

o2-50 Monitor 8 Channel Src

(0x1707) Default: 8

Settings 1–8 Channel No.

- Pr.o2-01, o2-08, o2-15, o2-22, o2-29, o2-36, o2-43 and o2-50 select the signal channel source of Monitor 1–8.

o2-02 Monitor 1 Trigger Method

(0x16C2) Default: 0

o2-09 Monitor 2 Trigger Method

(0x16CC) Default: 0

o2-16 Monitor 3 Trigger Method

(0x16D6) Default: 0

o2-23	Monitor 4 Trigger Method
(0x16E0)	Default: 0
o2-30	Monitor 5 Trigger Method
(0x16EA)	Default: 0
o2-37	Monitor 6 Trigger Method
(0x16F4)	Default: 0

o2-44	Monitor 7 Trigger Method
(0x16FE)	Default: 0
o2-51	Monitor 8 Trigger Method
(0x1708)	Default: 0

Settings 0: Disabled
1: Low
2: High
3: Abs Low
4: Abs High
5: Low & High
6: Abs Low & Abs High
7: Hysteresis

- Pr.o2-02, o2-09, o2-16, o2-23, o2-30, o2-37, o2-44 and o2-51 select the trigger method of Monitor 1–8.
- Trigger action and non-action conditions:

Trigger method = 1 Low:

Action condition: the signal selected by the monitor is lower than [the monitor lower limit – (0.5 × hysteresis)].

Non-action condition: the signal selected by the monitor is higher than [the monitor lower limit + (0.5 × hysteresis)].

Trigger method = 2 High:

Action condition: the signal selected by the monitor is higher than [the monitor upper limit + (0.5 × hysteresis)].

Non-action condition: the signal selected by the monitor is lower than [the monitor upper limit – (0.5 × hysteresis)].

Trigger method = 3 Abs Low:

Action condition: the absolute value of signal selected by the monitor is lower than the absolute value of [the monitor lower limit – (0.5 × hysteresis)].

Non-action condition: the absolute value of signal selected by the monitor is higher than the absolute value of [the monitor lower limit + (0.5 × hysteresis)].

Trigger method = 4 Abs High:

Action condition: the absolute value of signal selected by the monitor is higher than the absolute value of [the monitor upper limit + (0.5 × hysteresis)].

Non-action condition: the absolute value of signal selected by the monitor is lower than the absolute value of [the monitor upper limit – (0.5 × hysteresis)].

Trigger method = 5 Low & High:

Action condition: the signal selected by the monitor is higher than [the monitor upper limit + (0.5 × hysteresis)] or lower than [the monitor lower limit – (0.5 × hysteresis)].

Non-action condition: the signal selected by the monitor is between [the monitor upper limit – (0.5 × hysteresis)] and [the monitor lower limit + (0.5 × hysteresis)].

Trigger method = 6 Abs Low & Abs High:

Action condition: the absolute value of signal selected by the monitor is higher than the absolute value of [the monitor upper limit + (0.5 × hysteresis)] or lower than the absolute value of [the monitor lower limit – (0.5 × hysteresis)].

Non-action condition: the absolute value of signal selected by the monitor is between the absolute value of [the monitor upper limit – (0.5 × hysteresis)] and [the monitor lower limit + (0.5 × hysteresis)].

Trigger method = 7 Hysteresis:

Action condition: the signal selected by the monitor is higher than [the monitor upper limit + (0.5 × hysteresis)].

When the signal is between [the monitor upper limit + (0.5 × hysteresis)] and [the monitor lower limit – (0.5 × hysteresis)], the action status remains.

Non-action condition: the signal selected by the monitor is lower than [the monitor lower limit – (0.5 × hysteresis)].

🕮 For example: Pr.o1-01 = 29 (Max Capacitor temperature), Pr.o2-01 = 1 (Channel 1), Pr.o2-02 = 2 (high), Pr.o2-05 = +100.00 and Pr.o2-07 = 2.00.

Action condition: the signal selected by the monitor is higher than [the monitor upper limit + (0.5 × hysteresis)].

The signal is higher than 100.00 + (0.5×2.00) = 100.00 + 1.00 = 101.00

Non-action condition: the signal selected by the monitor is lower than [the monitor upper limit – (0.5 × hysteresis)].

The signal is lower than 100.00 – (0.5×2.00) = 100.00 – 1.00 = 99.00

o2-03	Monitor 1 Trigger Action
(0x16C3)	Default: 0

o2-10	Monitor 2 Trigger Action
(0x16CD)	Default: 0

o2-17	Monitor 3 Trigger Action
(0x16D7)	Default: 0

o2-24	Monitor 4 Trigger Action
(0x16E1)	Default: 0

o2-31	Monitor 5 Trigger Action
(0x16EB)	Default: 0

o2-38	Monitor 6 Trigger Action
(0x16F5)	Default: 0

o2-45	Monitor 7 Trigger Action
(0x16FF)	Default: 0

o2-52	Monitor 8 Trigger Action
(0x1709)	Default: 0

Settings 0: Disabled
1: Warning
2: Fault & ramp to stop
3: Fault & coast to stop

📖 Pr.o2-03, o2-10, o2-17, o2-24, o2-31, o2-38, o2-45 and o2-52 respectively set the trigger action of the monitor selected in o2-01, o2-08, o2-15, o2-22, o2-29, o2-36, o2-43 and o2-50.

o2-04	Monitor 1 Trigger Indn
(0x16C4)	Default: 0

o2-11	Monitor 2 Trigger Indn
(0x16CE)	Default: 0

o2-18	Monitor 3 Trigger Indn
(0x16D8)	Default: 0

o2-25	Monitor 4 Trigger Indn
(0x16E2)	Default: 0

o2-32	Monitor 5 Trigger Indn
(0x16EC)	Default: 0

o2-39	Monitor 6 Trigger Indn

(0x16F6) Default: 0

o2-46 Monitor 7 Trigger Indn

(0x1700) Default: 0

o2-53 Monitor 8 Trigger Indn

(0x170A) Default: 0

Settings 0: Disabled

1–2: Relay1–Relay2

📖 After the monitor selected in Pr.o2-01, o2-08, o2-15, o2-22, o2-29, o2-36, o2-43, and o2-50 is triggered, the contact in o2-04, o2-11, o2-18, o2-25, o2-32, o2-39, o2-46 and o2-53 activates.

o2-05 Monitor 1 Upper Limit

(0x16C5) Default: 0.00

o2-12 Monitor 2 Upper Limit

(0x16CF) Default: 0.00

o2-19 Monitor 3 Upper Limit

(0x16D9) Default: 0.00

o2-26 Monitor 4 Upper Limit

(0x16E3) Default: 0.00

o2-33 Monitor 5 Upper Limit

(0x16ED) Default: 0.00

o2-40 Monitor 6 Upper Limit

(0x16F7) Default: 0.00

o2-47 Monitor 7 Upper Limit

(0x1701) Default: 0.00

o2-54 Monitor 8 Upper Limit

(0x170B) Default: 0.00

Settings -21474836.00–21474836.00

📖 Pr.o2-05, o2-12, o2-19, o2-26, o2-33, o2-40, o2-47, and o2-54 set the upper limit of Monitor 1–8.

o2-06 Monitor 1 Lower Limit

(0x16C7) Default: 0.00

o2-13 Monitor 2 Lower Limit

(0x16D1) Default: 0.00

o2-20 Monitor 3 Lower Limit

(0x16DB) Default: 0.00

o2-27	Monitor 4 Lower Limit	
(0x16E5)		Default: 0.00
o2-34	Monitor 5 Lower Limit	
(0x16EF)		Default: 0.00
o2-41	Monitor 6 Lower Limit	
(0x16F9)		Default: 0.00
o2-48	Monitor 7 Lower Limit	
(0x1703)		Default: 0.00
o2-55	Monitor 8 Lower Limit	
(0x170D)		Default: 0.00
	Settings -21474836.00–21474836.00	

📖 Pr.o2-06, o2-13, o2-20, o2-27, o2-34, o2-40, o2-48, and o2-55 set the lower limit of Monitor 1–8.

o2-07	Monitor 1 Hysteresis	
(0x16C9)		Default: 0.00
o2-14	Monitor 2 Hysteresis	
(0x16D3)		Default: 0.00
o2-21	Monitor 3 Hysteresis	
(0x16DD)		Default: 0.00
o2-28	Monitor 4 Hysteresis	
(0x16E7)		Default: 0.00
o2-35	Monitor 5 Hysteresis	
(0x16F1)		Default: 0.00
o2-42	Monitor 6 Hysteresis	
(0x16FB)		Default: 0.00
o2-49	Monitor 7 Hysteresis	
(0x1705)		Default: 0.00
o2-56	Monitor 8 Hysteresis	
(0x170F)		Default: 0.00
	Settings 0.00–100000.00	

📖 Pr.o2-07, o2-14, o2-21, o2-28, o2-35, o2-40, o2-49, and o2-56 set the hysteresis of Monitor 1–8 respectively.

o4. Fault Record 1–2

o4-00	Fault Code REC 1

(0x1780) Default: Read only

o4-19 Fault Code REC 2

(0x1793) Default: Read only

Settings 0: No fault record

1: Over-current during acceleration (ocA)

2: Over-current during deceleration (ocd)

3: Over-current during steady operation (ocn)

4: Ground fault (GFF)

5: IGBT short circuit between upper bridge and lower bridge (occ)

6: Over-current at stop (ocS)

7: Over-voltage during acceleration (ovA)

8: Over-voltage during deceleration (ovd)

9: Over-voltage at constant speed (ovn)

10: Over-voltage at stop (ovS)

11: Low-voltage during acceleration (LvA)

12: Low-voltage during deceleration (Lvd)

13: Low-voltage at constant speed (Lvn)

16: IGBT overheating (oH1)

17: Capacitor overheating (oH2)

18: Thermal 1 open (tH1o)

19: Thermal 2 open (tH2o)

21: Over load (oL)

24: Motor overheating (oH3)

26: Over-torque 1 (ot1)

27: Over-torque 2 (ot2)

28: Under current (uC)

30: EEPROM write error (cF1)

31: EEPROM read error (cF2)

42: Over-Current Motor (OCm)

43: Over-Current Endplate (OCe)

48: AI1 loss (Ai1L)

49: External fault (EF)

50: Emergency stop (EF1)

52: Password is locked (Pcod)

66: Short-Circuit Motor (OCCm)

67: Short-Circuit Endplate (OCCe)

68: Reverse direction of the speed feedback (SdRv)

69: Over speed rotation feedback (SdOr)

70: Large deviation of speed feedback (SdDe)

72: STO Loss 1 (STL1)

76: Safe torque off (STO)

77: STO Loss 2 (STL2)

78: STO Loss 3 (STL3)

87: Overload protection at low frequency (oL3)

88: Model ID change (IDCH)

94: Initializing power board communication error when power ON (POCF)

95: Board identification error during power-on initialization (IDDE)

97: AI2 loss (Ai2L)

118: Monitor signal 1 trigger (BX1e)

119: Monitor signal 2 trigger (BX2e)

120: Monitor signal 3 trigger (BX3e)

121: Monitor signal 4 trigger (BX4e)

122: Monitor signal 5 trigger (BX5e)

123: Monitor signal 6 trigger (BX6e)

124: Monitor signal 7 trigger (BX7e)

125: Monitor signal 8 trigger (BX8e)

132: Under load protection (ULD)

133: Overload protection (OLD)

141: Large amount leakage error (LEKE)

142: High pressure error (HPS)

143: Low pressure error (LPSE)

144: Dry pump error (dynE)

145: Dry pump auto-tune error (dAUE)

161: STO Loss 4 (STL4)

162: STO Loss 5 (STL5)

163: STO Loss 6 (STL6)

164: Gate Buffer U (GBFU)

165: Gate Buffer V (GBFV)

166: Gate Buffer W (GBFW)
167: Safety MCU Comm Crc (StCE)
168: Safety MCU Comm Time-out (StTO)
170: Version of ACB and CTB mismatch (CBNM)
171: Inner burn timeout (IBTO)
182: RTD overheating (OH3r)
204: Safety MCU ROM (ROMF)
205: Safety MCU Time-Out (STOT)
206: Safety MCU WatchDog (STOW)
207: Safety MCU 24V Error (STOF)
208: Safety MCU 6V Error (STOB)
209: Safety MCU 5V2 Error (STOC)
210: Safety MCU STD Error (STOS)
220: Not Complete Copy Write (CWF)
221: FPGA Watch Dog Fault (FWDF)
222: Chopper SW OH (CSOH)
223: RD Signal Fault (RDF)
224: PLL fault (PLLF)
225: Current Offset Fault (COF)
226: Clamp SW Fault (CSF)
227: Current sensor abnormal (CSAF)
228: Ver of CTB & FPGA mismatch (CFNM)
229: Clamp Resistor Over Heat (CROH)
230: FPGA State Fault (FSF)
231: OVD Broken (OvdB)
234: Low Ac Voltage (Lvac)

📖 This parameter displays the Fault Record 1–2.

o4-01 OPER Time at Fault REC 1

(0x1781) Default: Read only

Settings 0–2359 hours/ minutes

o4-02	OPER Days at Fault REC 1	
(0x1782)		Default: Read only
	Settings 0–65535 days	

o4-20	OPER Time at Fault REC 2	
(0x1794)		Default: Read only
	Settings 0–2359 hours/ minutes	

o4-21	OPER Days at Fault REC 2	
(0x1795)		Default: Read only
	Settings 0–65535 days	

- Pr.o4-01 and o4-02 display the accumulative operation time of the drive at "Fault record 1"; Pr.o4-20 and o4-21 display the accumulative operation time of the drive at "Fault record 2".
- For example: Pr.o4-01 = 2129, o4-02 = 234, the accumulative operation time of the drive at "Fault record 1" is 234 days 21 hours and 29 minutes.

o4-03	Date of Fault REC 1	
(0x1783)		Default: Read only
	Settings 0–1231 month/day	

o4-04	Time of Fault REC 1	
(0x1784)		Default: Read only
	Settings 0–2359 hours/ minutes	

o4-22	Date of Fault REC 2	
(0x1796)		Default: Read only
	Settings 0–1231 month/day	

o4-23	Time of Fault REC 2	
(0x1797)		Default: Read only
	Settings 0–2359 hours/ minutes	

- Pr.o4-03 and o4-04 display the time of "Fault record 1"; Pr.o4-22 and o4-23 display the time of "Fault record 2".
- For example: Pr.o4-03 = 0509, o4-04 = 1834, "Fault record 1" occurs at 18:34 on May 9th.

o4-05	SPD Cmd at Fault REC 1	
(0x1785)		Default: Read only
	Settings 0–8985 rpm	

o4-24 SPD Cmd at Fault REC 2

(0x1798) Default: Read only

Settings 0–8985 rpm

📖 Displays the speed command at Fault record 1–2.

o4-06 Motor Speed at Fault REC 1

(0x1786) Default: Read only

Settings 0–8985 rpm

o4-25 Motor Speed at Fault REC 2

(0x1799) Default: Read only

Settings 0–8985 rpm

📖 Displays the output frequency at Fault record 1–2.

o4-07 Motor Current at Fault REC 1

(0x1787) Default: Read only

Settings 0.0–6553.5 A

o4-26 Motor Current at Fault REC 2

(0x179A) Default: Read only

Settings 0.0–6553.5 A

📖 Displays the motor current at Fault record 1–2.

o4-08 Output Voltage at Fault REC 1

(0x1788) Default: Read only

Settings 0.0–6553.5 V_{AC}

o4-27 Output Voltage at Fault REC 2

(0x179B) Default: Read only

Settings 0.0–6553.5 V_{AC}

📖 Displays the output voltage at Fault record 1–2.

o4-09 Clamp bus Voltage at Fault REC 1

(0x1789) Default: Read only

Settings 0.0–6553.5 V_{DC}

o4-28 Clamp bus Voltage Fault REC 2

(0x179C) Default: Read only

Settings 0.0–6553.5 V_{DC}

📖 Displays the Clamp bus voltage at Fault record 1–2.

o4-10 IGBT Temp at Fault REC 1

(0x178A) Default: Read only

Settings -3276.8–3276.7°C

o4-29 IGBT Temp at Fault REC 2

(0x179D) Default: Read only

Settings -3276.8–3276.7°C

📖 Displays the IGBT temperature at Fault record 1–2.

o4-11 Cap Temp at Fault REC 1

(0x178B) Default: Read only

Settings -3276.8–3276.7°C

o4-30 Cap Temp at Fault REC 2

(0x179E) Default: Read only

Settings -3276.8–3276.7°C

📖 Displays the capacitor temperature at Fault record 1–2.

o4-12 Fan Speed at Fault REC 1

(0x178C) Default: Read only

Settings 0–65535%

o4-31 Fan Speed at Fault REC 2

(0x179F) Default: Read only

Settings 0–65535%

📖 Displays the fan speed at Fault record 1–2.

o4-13 Input Voltage at Fault REC 1

(0x178D) Default: Read only

Settings 0.0–6553.5 V_{AC}

o4-32 Input Voltage at Fault REC 2

(0x17A0) Default: Read only

Settings 0.0–6553.5 V_{AC}

📖 Displays the input voltage at Fault record 1–2.

o4-14 PCB3 Temp at Fault REC 1

(0x178E) Default: Read only

Settings -327.68–327.67°C

o4-33 PCB3 Temp at Fault REC 2

(0x17A1) Default: Read only

Settings -327.68–327.67°C

📖 Displays the PCB3 temperature at Fault record 1–2.

o4-15 Output Torque at Fault REC 1

(0x178F) Default: Read only

Settings 0.0–6553.5%

o4-34 Output Torque at Fault REC 2

(0x17A2) Default: Read only

Settings 0.0–6553.5%

📖 Displays the output torque at Fault record 1–2.

📖 The motor rated torque is 100%.

o4-16 MI Status at Fault REC 1

(0x1790) Default: Read only

Settings 0000h–FFFFh

o4-35 MI Status at Fault REC 2

(0x17A3) Default: Read only

Settings 0000h–FFFFh

📖 Displays the MI status at Fault record 1–2.

o4-17 Rly Status at Fault REC 1

(0x1791) Default: Read only

Settings 0000h–FFFFh

o4-36 Rly Status at Fault REC 2

(0x17A4) Default: Read only

Settings	0000h–FFFFh

📖 Displays the MO status at Fault record 1–2.

o4-18 Drive Status at Fault REC 1

(0x1792) Default: Read only

Settings	0000h–FFFFh

o4-37 Drive Status at Fault REC 2

(0x17A5) Default: Read only

Settings	0000h–FFFFh

📖 Displays the drive status at Fault record 1–2.

o5. Fault Record 3–4

o5-00 Fault Code REC 3

(0x17C0) Default: Read only

Settings 0–65535

o5-01 OPER Time at Fault REC 3

(0x17C1) Default: Read only

Settings 0–2359 hours/ minutes

o5-02 OPER Days at Fault REC 3

(0x17C2) Default: Read only

Settings 0–65535 days

o5-03 Date of Fault REC 3

(0x17C3) Default: Read only

Settings 0–1231 month/day

o5-04 Time of Fault REC 3

(0x17C4) Default: Read only

Settings 0–2359 hours/ minutes

o5-05 SPD Cmd at Fault REC 3

(0x17C5) Default: Read only

Settings 0–8985 rpm

o5-06 Motor Speed at Fault REC 3

(0x17C6) Default: Read only

Settings 0–8985 rpm

o5-07 Motor Current at Fault REC 3

(0x17C7) Default: Read only

Settings 0.0–6553.5 A

o5-08 Output Voltage at Fault REC 3

(0x17C8) Default: Read only

Settings 0.0–6553.5 V_{AC}

o5-09 Clamp bus Voltage at Fault REC 3

(0x17C9) Default: Read only

Settings 0.0–6553.5 V_{DC}

o5-10	IGBT Temp at Fault REC 3
(0x17CA)	Default: Read only
	Settings -3276.8–3276.7°C

o5-11	Cap Temp at Fault REC 3
(0x17CB)	Default: Read only
	Settings -3276.8–3276.7°C

o5-12	Fan Speed at Fault REC 3
(0x17CC)	Default: Read only
	Settings 0–65535%

o5-13	Input Voltage at Fault REC 3
(0x17CD)	Default: Read only
	Settings 0.0–6553.5 V_{AC}

o5-14	PCB3 Temp at Fault REC 3
(0x17CE)	Default: Read only
	Settings -3276.8–3276.7°C

o5-15	Output Torque at Fault REC 3
(0x17CF)	Default: Read only
	Settings 0.0–6553.5%

o5-16	MI Status at Fault REC 3
(0x17D0)	Default: Read only
	Settings 0000h–FFFFh

o5-17	Rly Status at Fault REC 3
(0x17D1)	Default: Read only
	Settings 0000h–FFFFh

o5-18	Drive Status at Fault REC 3
(0x17D2)	Default: Read only
	Settings 0000h–FFFFh

o5-19	Fault Code REC 4
(0x17D3)	Default: Read only
	Settings 0–65535

o5-20	OPER Time at Fault REC 4
(0x17D4)	Default: Read only
	Settings 0–2359 hours/ minutes
o5-21	OPER Days at Fault REC 4
(0x17D5)	Default: Read only
	Settings 0–65535 days
o5-22	Date of Fault REC 4
(0x17D6)	Default: Read only
	Settings 0–1231 month/day
o5-23	Time of Fault REC 4
(0x17D7)	Default: Read only
	Settings 0–2359 hours/ minutes
o5-24	SPD Cmd at Fault REC 4
(0x17D8)	Default: Read only
	Settings 0–8985 rpm
o5-25	Motor Speed at Fault REC 4
(0x17D9)	Default: Read only
	Settings 0–8985 rpm

o5-26	Motor Current at Fault REC 4
(0x17DA)	Default: Read only
	Settings 0.0–6553.5 A
o5-27	Output Voltage at Fault REC 4
(0x17DB)	Default: Read only
	Settings 0.0–6553.5 V_{AC}
o5-28	Clamp bus Voltage at Fault REC 4
(0x17DC)	Default: Read only
	Settings 0.0–6553.5 V_{DC}
o5-29	IGBT Temp at Fault REC 4
(0x17DD)	Default: Read only
	Settings -3276.8–3276.7°C

o5-30	Cap Temp at Fault REC 4	
(0x17DE)		Default: Read only
	Settings -3276.8–3276.7°C	

o5-31	Fan Speed at Fault REC 4	
(0x17DF)		Default: Read only
	Settings 0–65535%	

o5-32	Input Voltage at Fault REC 4	
(0x17E0)		Default: Read only
	Settings 0.0–6553.5 V_{AC}	

o5-33	PCB3 Temp at Fault REC 4	
(0x17E1)		Default: Read only
	Settings -3276.8–3276.7°C	

o5-34	Output Torque at Fault REC 4	
(0x17E2)		Default: Read only
	Settings 0.0–6553.5%	

o5-35	MI Status at Fault REC 4	
(0x17E3)		Default: Read only
	Settings 0000h–FFFFh	

o5-36	Rly Status at Fault REC 4	
(0x17E4)		Default: Read only
	Settings 0000h–FFFFh	

o5-37	Drive Status at Fault REC 4	
(0x17E5)		Default: Read only
	Settings 0000h–FFFFh	

📖 Refer to description of Parameter Group o4.

o6. Fault Record 5–6

o6-00 Fault Code REC 5

(0x1800) Default: Read only

Settings 0–65535

o6-01 OPER Time at Fault REC 5

(0x1801) Default: Read only

Settings 0–2359 hours/ minutes

o6-02 OPER Days at Fault REC 5

(0x1802) Default: Read only

Settings 0–65535 days

o6-03 Date of Fault REC 5

(0x1803) Default: Read only

Settings 0–1231 month/day

o6-04 Time of Fault REC 5

(0x1804) Default: Read only

Settings 0–2359 hours/ minutes

o6-05 SPD Cmd at Fault REC 5

(0x1805) Default: Read only

Settings 0–8985 rpm

o6-06 Motor Speed at Fault REC 5

(0x1806) Default: Read only

Settings 0–8985 rpm

o6-07 Motor Current at Fault REC 5

(0x1807) Default: Read only

Settings 0.0–6553.5 A

o6-08 Output Voltage at Fault REC 5

(0x1808) Default: Read only

Settings 0.0–6553.5 V_{AC}

o6-09 Clamp bus Voltage at Fault REC 5

(0x1809) Default: Read only

Settings 0.0–6553.5 V_{DC}

o6-10 IGBT Temp at Fault REC 5

(0x180A) Default: Read only

Settings -3276.8–3276.7°C

o6-11 Cap Temp at Fault REC 5

(0x180B) Default: Read only

Settings -3276.8–3276.7°C

o6-12 Fan Speed at Fault REC 5

(0x180C) Default: Read only

Settings 0–65535%

o6-13 Input Voltage at Fault REC 5

(0x180D) Default: Read only

Settings 0.0–6553.5 V_{AC}

o6-14 PCB3 Temp at Fault REC 5

(0x180E) Default: Read only

Settings -3276.8–3276.7°C

o6-15 Output Torque at Fault REC 5

(0x180F) Default: Read only

Settings 0.0–6553.5%

o6-16 MI Status at Fault REC 5

(0x1810) Default: Read only

Settings 0000h–FFFFh

o6-17 Rly Status at Fault REC 5

(0x1811) Default: Read only

Settings 0000h–FFFFh

o6-18 Drive Status at Fault REC 5

(0x1812) Default: Read only

Settings 0000h–FFFFh

o6-19 Fault Code REC 6

(0x1813) Default: Read only

Settings 0–65535

o6-20	OPER Time at Fault REC 6	
(0x1814)		Default: Read only
	Settings 0–2359 hours/ minutes	

o6-21	OPER Days at Fault REC 6	
(0x1815)		Default: Read only
	Settings 0–65535 days	

o6-22	Date of Fault REC 6	
(0x1816)		Default: Read only
	Settings 0–1231 month/day	

o6-23	Time of Fault REC 6	
(0x1817)		Default: Read only
	Settings 0–2359 hours/ minutes	

o6-24	SPD Cmd at Fault REC 6	
(0x1818)		Default: Read only
	Settings 0–8985 rpm	

o6-25	Motor Speed at Fault REC 6	
(0x1819)		Default: Read only
	Settings 0–8985 rpm	

o6-26	Motor Current at Fault REC 6	
(0x181A)		Default: Read only
	Settings 0.0–6553.5 A	

o6-27	Output Voltage at Fault REC 6	
(0x181B)		Default: Read only
	Settings 0.0–6553.5 V_{AC}	

o6-28	Clamp bus Voltage at Fault REC 6	
(0x181C)		Default: Read only
	Settings 0.0–6553.5 V_{DC}	

o6-29	IGBT Temp at Fault REC 6	
(0x181D)		Default: Read only
	Settings -3276.8–3276.7°C	

o6-30 Cap Temp at Fault REC 6

(0x181E) Default: Read only

Settings -3276.8–3276.7°C

o6-31 Fan Speed at Fault REC 6

(0x181F) Default: Read only

Settings 0–65535%

o6-32 Input Voltage at Fault REC 6

(0x1820) Default: Read only

Settings 0.0–6553.5 V_{AC}

o6-33 PCB3 Temp at Fault REC 6

(0x1821) Default: Read only

Settings -3276.8–3276.7°C

o6-34 Output Torque at Fault REC 6

(0x1822) Default: Read only

Settings 0.0–6553.5%

o6-35 MI Status at Fault REC 6

(0x1823) Default: Read only

Settings 0000h–FFFFh

o6-36 Rly Status at Fault REC 6

(0x1824) Default: Read only

Settings 0000h–FFFFh

o6-37 Drive Status at Fault REC 6

(0x1825) Default: Read only

Settings 0000h–FFFFh

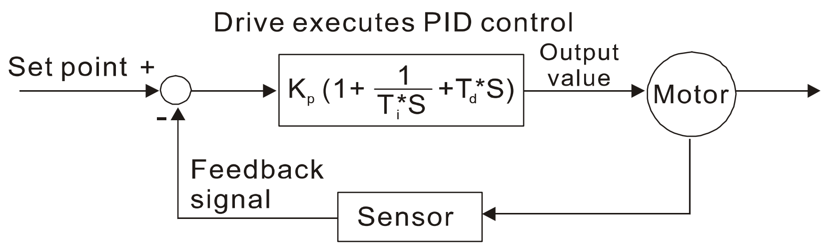
📖 Refer to description of Parameter Group o4.

P. PID Function

Common applications for PID control:

- Flow control: Use a flow sensor to feedback the flow data and perform accurate flow control.
- Pressure control: Use a pressure sensor to feedback the pressure data and perform precise pressure control.
- Air volume control: Use an air volume sensor to feedback the air volume data to achieve excellent air volume regulation.
- Temperature control: Use a thermocouple or thermistor to feedback temperature data for comfortable temperature control.
- Speed control: Use a speed sensor to feedback motor shaft speed or input another machine speed as a target value for synchronous control.

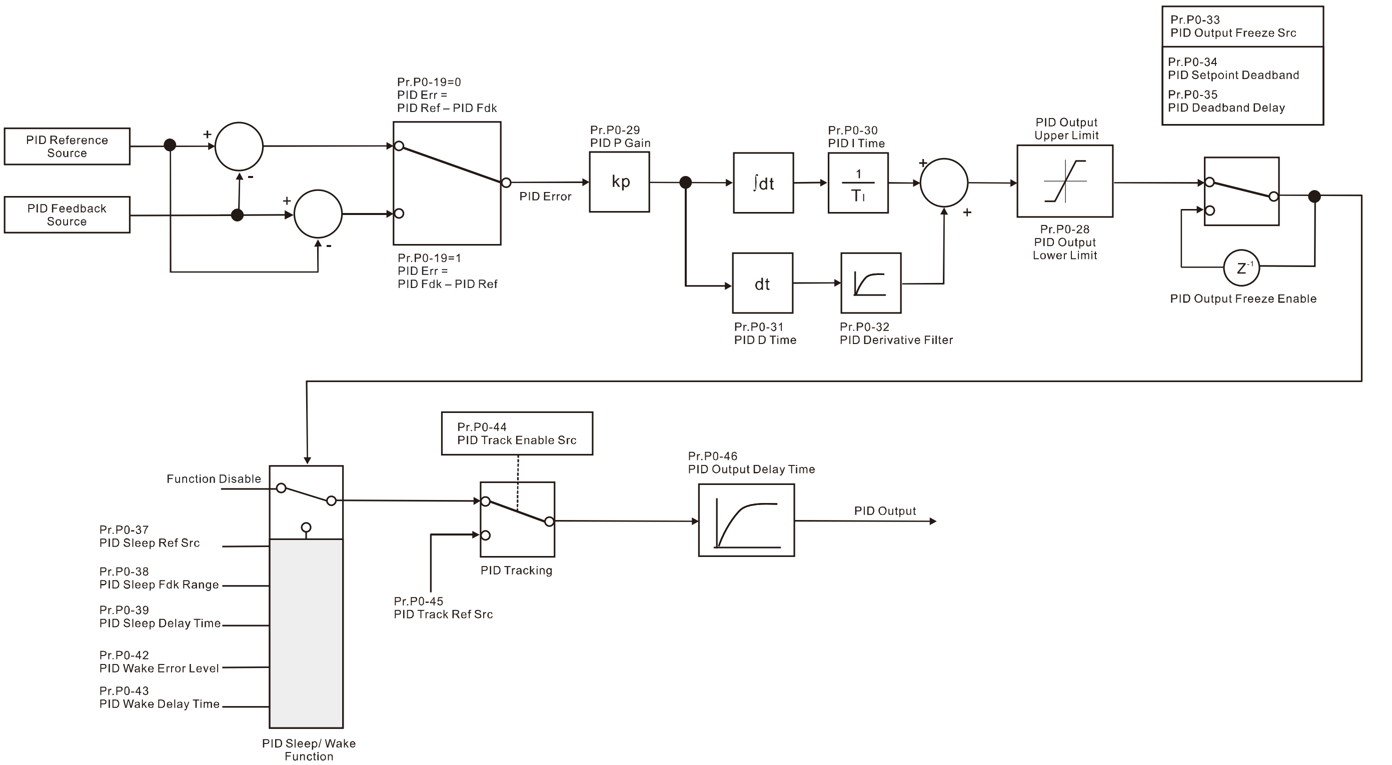
PID control loop:



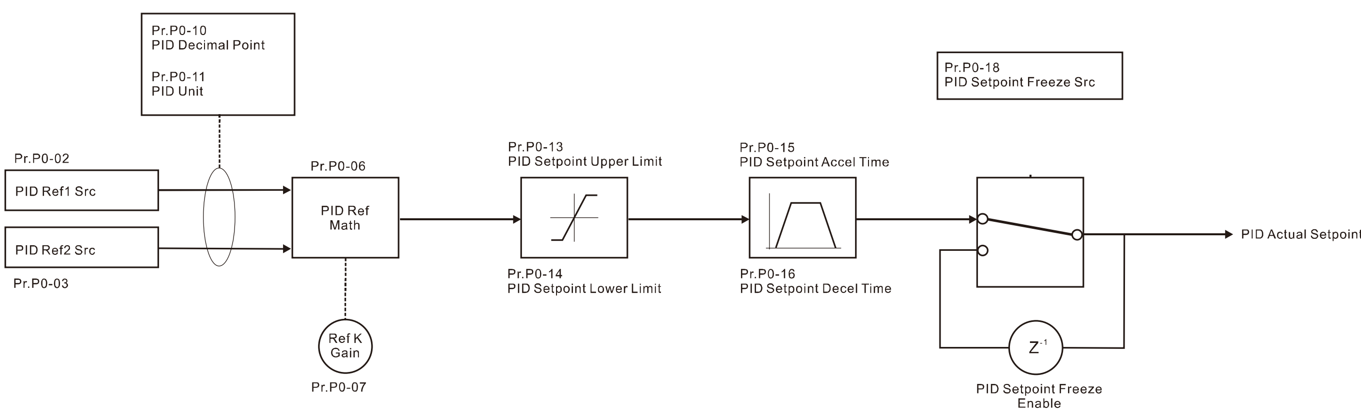
K_P Proportional Gain (P), T_i Integral Time (I), T_d Differential Time (D), S Calculation

P0. Process PID

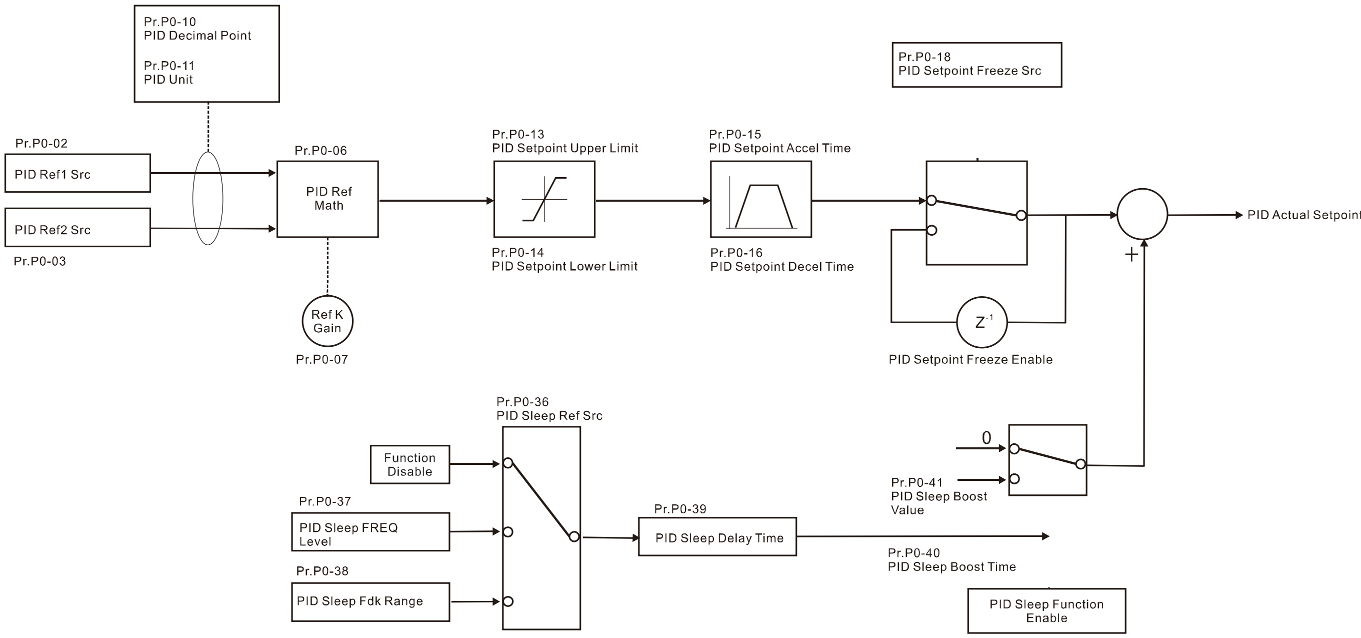
- Process PID control diagram:



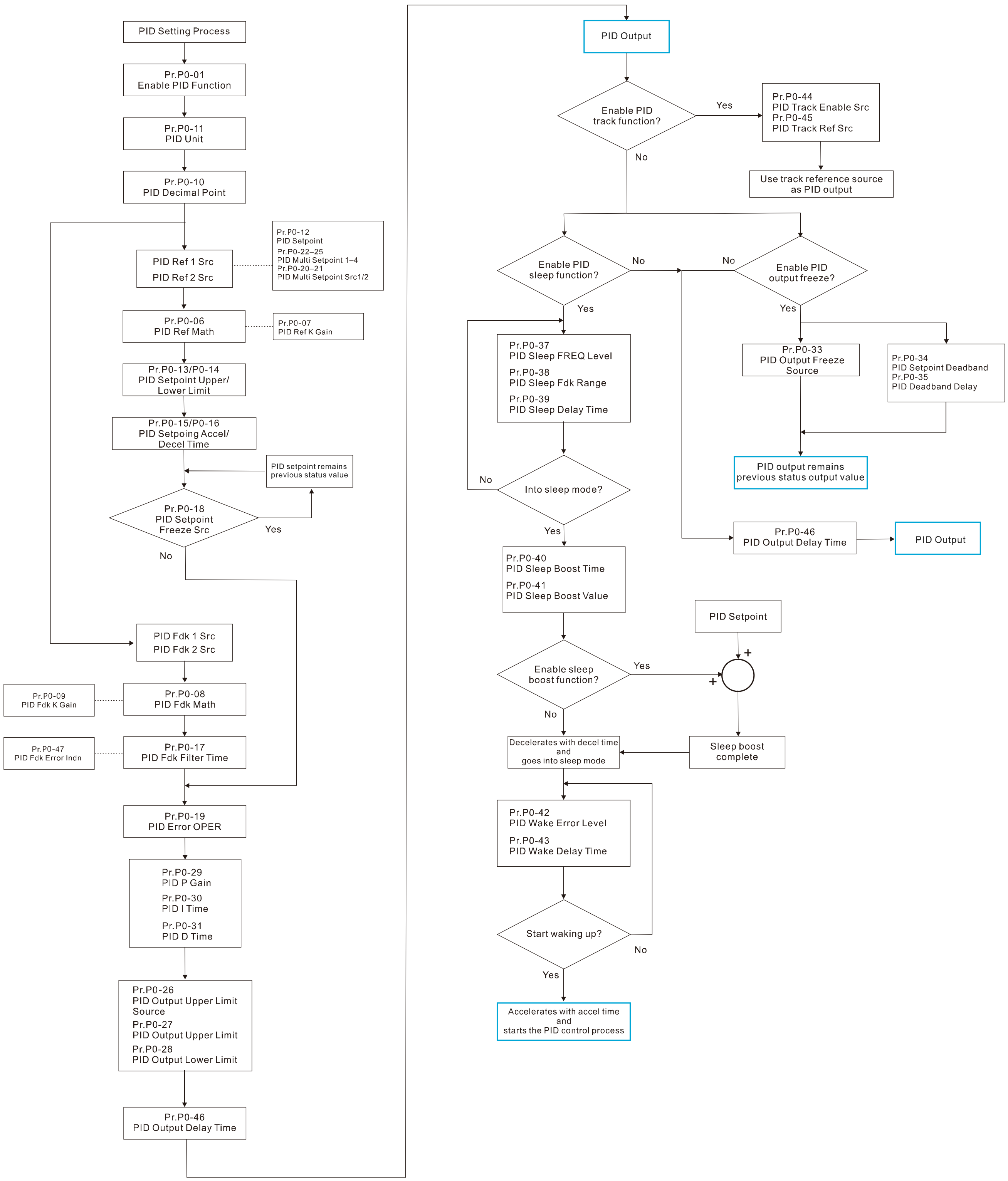
- Process PID setpoint diagram (not using sleep boost function)



- Process PID setpoint diagram (using sleep boost function)



- Process PID parameter setting process.



⌁ P0-00 Pressure Transmitter Type Sel

(0x1880) Default: 0

Settings 0: Reserved
1: Discharge Pressure
2: Suction Pressure
3: Differential Pressure
4: Flow
5: Discharge Level
6: Suction Level
7: Temperature
8: Other

- 🕮 When setting pressure transmitter (or other controller and equipment), you need to select the transmitter type based on the parameter type that the pressure transmitter is used to measure, so the system could process the signals based on the parameter type, such as pressure, differential pressure, flow, suction level or temperature.
- 🕮 Setting this parameter will automatically provide suggested values for Pr.P0-19, P0-20 and P0-21, which can be further fine-tuned based on these suggestions.
- 🕮 0: The function is not used.
- 🕮 1: Discharge pressure, for example, the pressure at the outlet of the pump or compressor.
- 🕮 2: Suction pressure, for example, the pressure at the inlet of the pump or compressor.
- 🕮 3: Differential pressure between two measuring points.
- 🕮 4: Flow, general differential pressure transmitter with flow elements.
- 🕮 5: Discharge level, measure the liquid level at the outlet (indirectly calculate the liquid level using the measured pressure).
- 🕮 6: Suction level, measure the liquid level at the inlet.
- 🕮 7: Temperature, some of the pressure transmitters or systems support the temperature signals.
- 🕮 8: Other types that are not listed in the above applications.

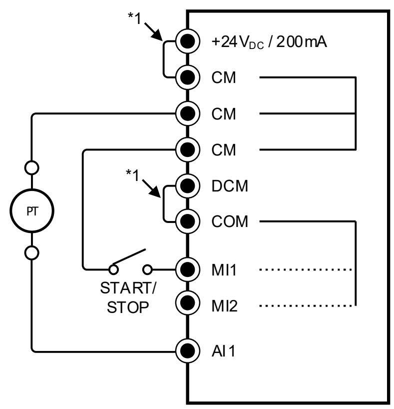
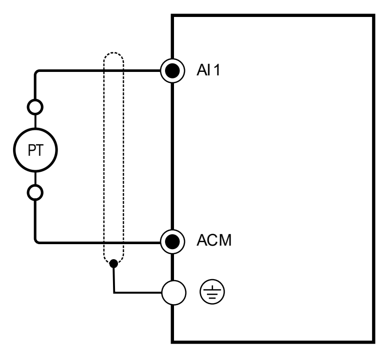
P0-01 PID Function

(0x1881) Default: 0

Settings 0: Disabled

1: Enabled After Run

Pr.P0-01 determines whether to enable Process PID.

Transmitter	External Terminal Control Circuits
Loop Power	 To complete the setup,configure the following parameters. **P0-00:** Transmitter Type **P0-00:** PID Function (1: Enabled) **P0-02:** PID Ref1 Src **P0-04:** PID Fdk 1 Src **P0-11:** PID Unit **P0-13:** PID Setpoint Upper Limit **P0-14:** PID Setpoint Lower Limit **P0-19:** PID Error OPER *1Rewire the factory default jumpers to create additional 24V_{DC} terminals.
External Power	 To complete the setup,configure the following parameters. **P0-00:** Transmitter Type **P0-00:** PID Function (1: Enabled) **P0-02:** PID Ref1 Src **P0-04:** PID Fdk 1 Src **P0-11:** PID Unit **P0-13:** PID Setpoint Upper Limit **P0-14:** PID Setpoint Lower Limit **P0-19:** PID Error OPER

P0-02 PID Ref1 Src

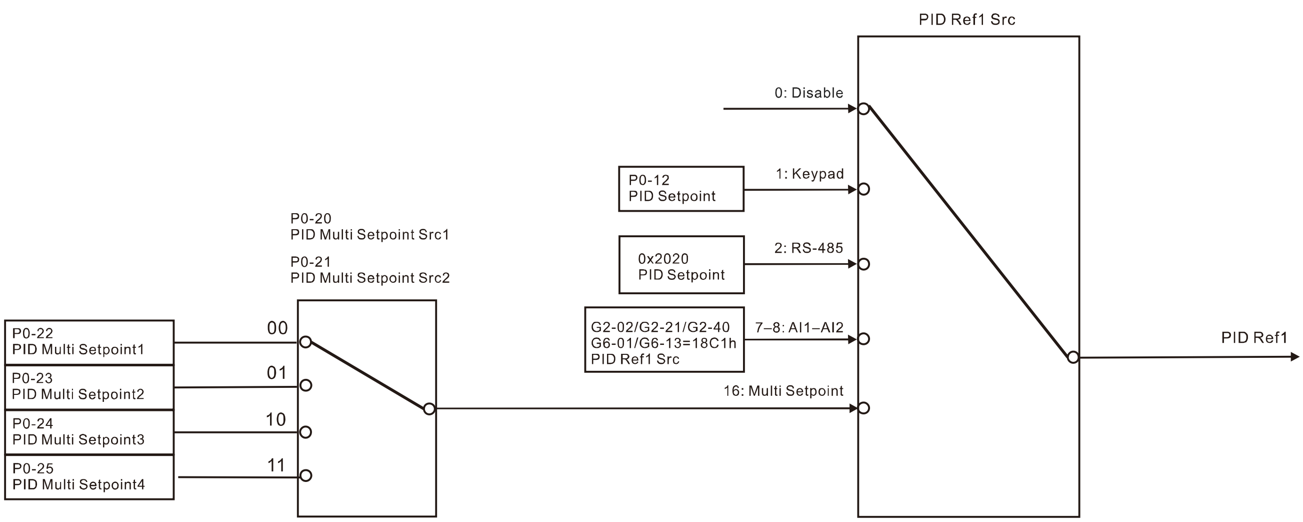
(0x1882) Default: 0

P0-03 PID Ref2 Src

(0x1883) Default: 0

Settings
0: Disabled
1: COM1 (Keypad)
2: COM1 (Modbus)
3–6: Reserved
7–8: AI1–AI2
9–15: Reserved
16: Multi Setpoint

- Use Pr.P0-02 and P0-03 to select PID reference 1 and reference 2 source.
- You can set PID reference 1 and reference 2 sources as the same one. However, the AI source is an exception, PID reference 1 and reference 2 sources cannot be set as the same AI source.



P0-04 PID Fdk1 Src

(0x1884) Default: 0

P0-05 PID Fdk2 Src

(0x1885) Default: 0

Settings	0: Disabled
	1: Reserved
	2: COM1 (Modbus)
	3–6: Reserved
	7–8: AI1–AI2

Use Pr.P0-04 and P0-05 to select PID feedback 1 and feedback 2 source.

⚡ P0-06 PID Ref Math

(0x1886) Default: 0

Settings
0: Ref1
1: Ref1 + K*Ref2
2: Ref1 – K*Ref2
3: Ref1*K*Ref2
4: Ref1/K*Ref2
5: MIN(Ref1, Ref2)
6: MAX(Ref1, Ref2)
7: AVE(Ref1, Ref2)
8: K*sqrt(Ref1)
9: K*sqrt(Ref1-Ref2)
10: K*sqrt(Ref1+Ref2)
11: sqrt(Ref1)+K*sqrt(Ref2)
12: $(Ref1 – K*Ref2)^2$
13: $(Ref1)^2 + K* (Ref2)^2$

📖 Use Pr.P0-06 to select the mathematical operation method for PID reference 1 and reference 2 source.

⚡ P0-07 PID Ref Math Gain

(0x1887) Default: 1.00

Settings -300.00– 300.00

📖 Use Pr.P0-06 to select the mathematical operation gain K for PID reference 1 and reference 2 source.

⚡ P0-08 PID Fdk Math

(0x1888) Default: 0

Settings
0: Fdk1
1: Fdk1 + K*Fdk2
2: Fdk1 – K*Fdk2
3: Fdk1*K*Fdk2
4: Fdk1/K*Fdk2
5: MIN(Fdk1, Fdk2)
6: MAX(Fdk1, Fdk2)
7: AVE(Fdk1, Fdk2)
8: K*sqrt(Fdk1)

9: K*sqrt(Fdk1-Fdk2)

10: K*sqrt(Fdk1+Fdk2)

11: sqrt(Fdk1)+K*sqrt(Fdk2)

12: $(Fdk1 – K*Fdk2)^2$

13: $(Fdk1)^2 + K* (Fdk2)^2$

📖 Use Pr.P0-08 to select the mathematical operation method for PID feedback 1 and feedback 2 source.

P0-09 PID Fdk Math Gain

(0x1889) Default: 1.00

Settings -300.00– 300.00

📖 Use Pr.P0-09 to select the mathematical operation gain K of PID feedback 1/ 2 source.

P0-10 PID Decimal Point

(0x188A) Default: 1

Settings 0: No Decimal Point

1: One Decimal Point

2: Two Decimal Point

3: Three Decimal Point

📖 Sets the decimal point of PID unit.

P0-11 PID Unit

(0x188B) Default: 0

Settings 0: Hz

1: rpm

2: %

3: m/s

4: kW

5: HP

6: ppm

7: 1/m

8: kg/s

9: kg/m

10: kg/h

11: lb/s

12: lb/m
13: lb/h
14: ft/s
15: ft/m
16: m
17: ft
18: degC
19: degF
20: mbar
21: bar
22: Pa
23: kPa
24: mWG
25: inWG
26: ftWG
27: psi
28: atm
29: L/s
30: L/m
31: L/h
32: m3/s
33: m3/h
34: GPM
35: CFM
36: kg
37: kg/cm^2

📖 Selects the using unit of PID.

⌁ P0-12 PID Setpoint

(0x188C) Default: 0

Settings	-30000–30000 PID unit

📖 When setting Pr.P0-02 and P0-03 (PID Ref1/2 Src) = 1 (Keypad), Pr.P0-12 is the specified parameter of PID source.

P0-13 PID Setpoint Upper Limit

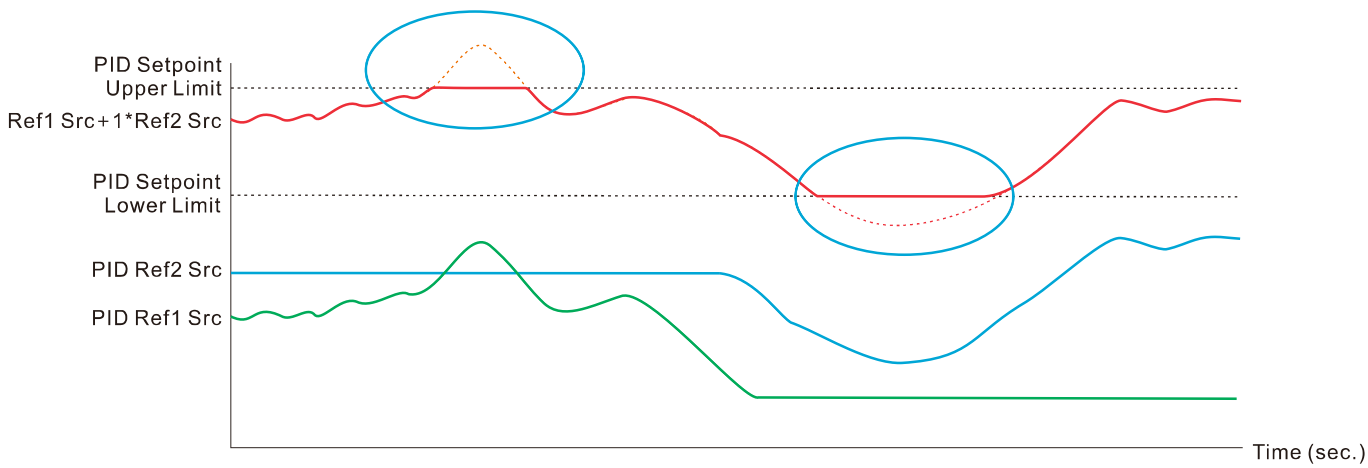
(0x188D) Default: 10000

P0-14 PID Setpoint Lower Limit

(0x188E) Default: 0

Settings	-30000–30000 PID unit

📖 Since VIDAR provides two sets of PID reference source for mathematical operation, the physical quantity setpoint on the system may exceed expectations. Use Pr.P0-13 and P0-14 to set the setpoint upper and lower limits of the PID setpoint calculation result, which can prevent the unexpected surge of the calculation source from exceeding the upper or lower limit that the system can withstand.



P0-15 PID Setpoint Accel Time

(0x188F) Default: 0.0

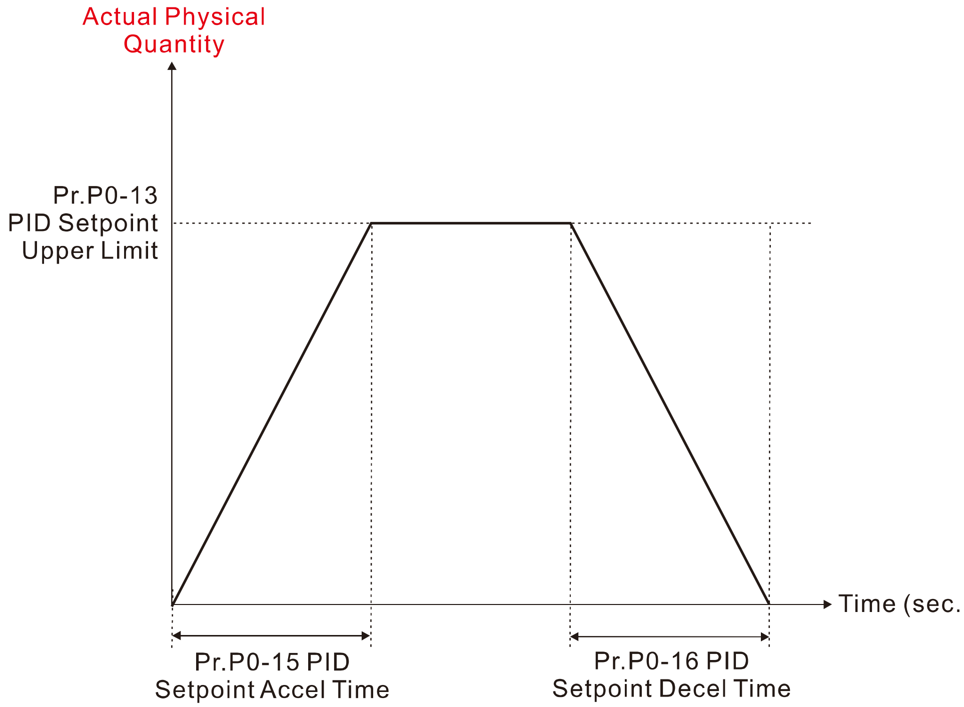
P0-16 PID Setpoint Decel Time

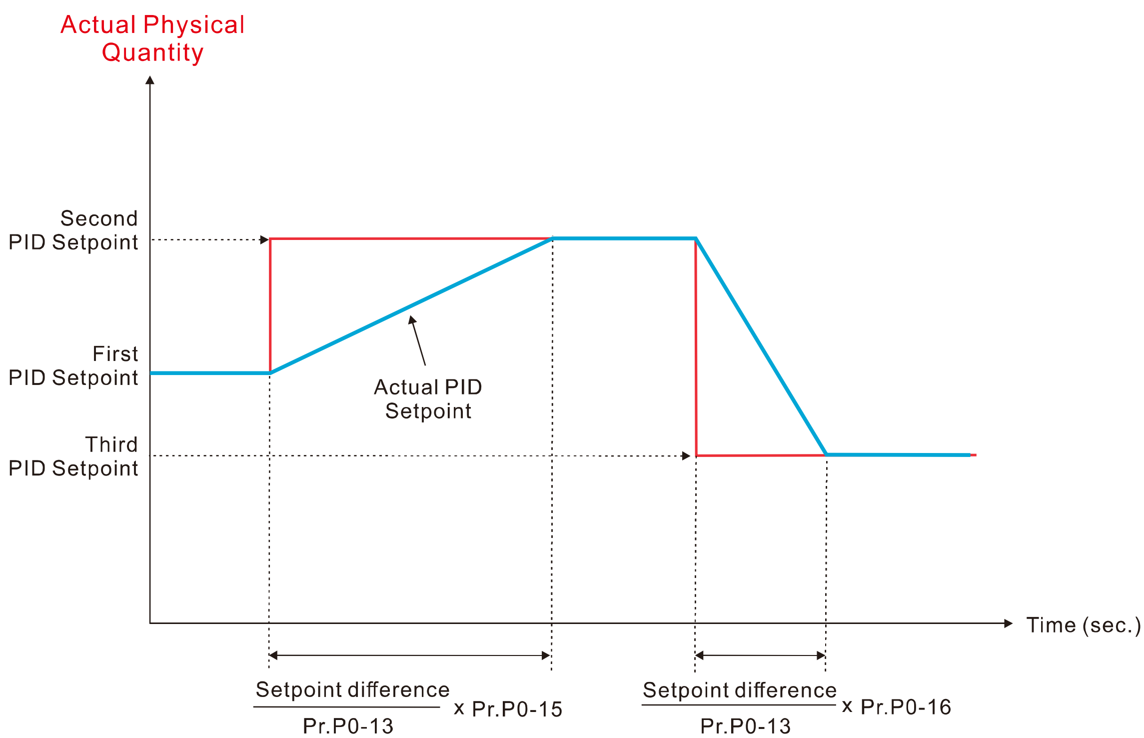
(0x1890) Default: 0.0

Settings	0.0–1800.0 sec.

📖 PID setpoint acceleration time determines the required time for the drive setpoint accelerates from 0 to Pr.P0-13 PID setpoint upper limit. PID setpoint deceleration time determines the required time for the drive setpoint decelerates from PID setpoint upper limit to 0.

📖 For applications that need to prevent the PID output drops or rises suddenly due to the PID setpoint step change, and affecting the application process or causing equipment damage, you can use Pr.P0-15 and P0-16 (PID setpoint accel/ decel time).


Actual Physical Quantity
Pr.P0-13
PID Setpoint
Upper Limit
Time (sec.)
Pr.P0-15 PID
Setpoint Accel Time
Pr.P0-16 PID
Setpoint Decel Time


Actual Physical Quantity
Second
PID Setpoint
First
PID Setpoint
Third
PID Setpoint
Actual PID
Setpoint
Time (sec.)
Setpoint difference / Pr.P0-13 x Pr.P0-15
Setpoint difference / Pr.P0-13 x Pr.P0-16

⌁ P0-17 PID Fdk Filter Time

(0x1891) Default: 0.000

Settings	0.000–30.000 sec.

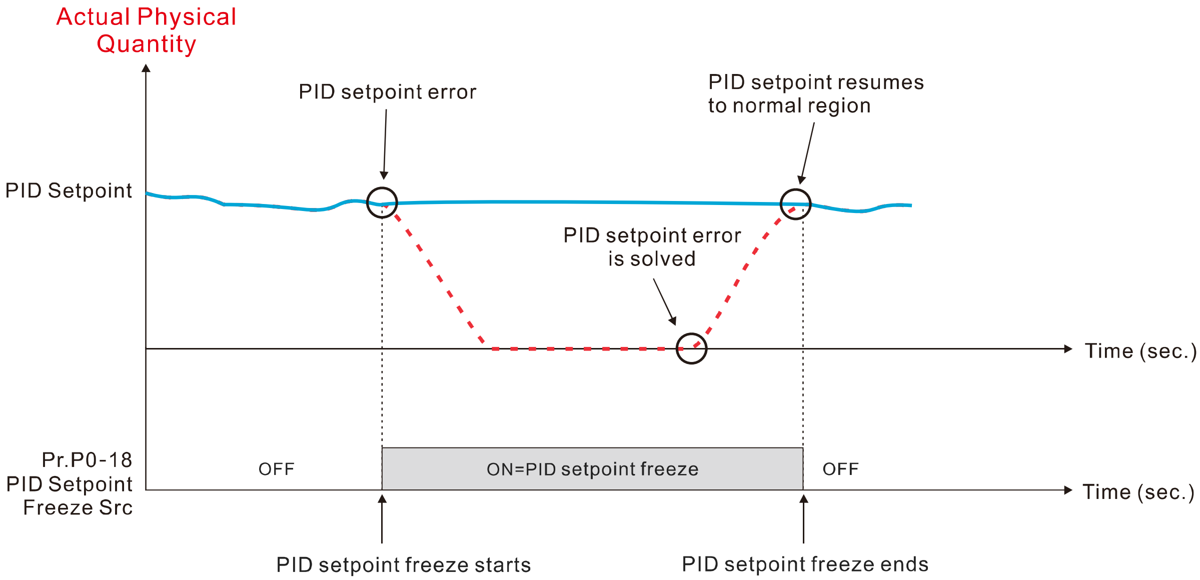
📖 Filter the PID feedback that is last used for PID control to filter out the interference noise.

⌁ P0-18 PID Setpoint Freeze Src

(0x1892) Default: 0

Settings	0: Disabled
	1: Enabled
	2–7: MI1–MI6
	8–25: Reserved
	26–28: Time Function 1–3
	29–30: Reserved
	31–38: Monitor 1–8

📖 When an error occurs to the PID reference source, this parameter freezes the PID setpoint to remain at the previous status output and repair the system in real time. After troubleshooting, you can use the previous set PID reference source as the PID control command.



⌁ P0-19 PID Error OPER

(0x1893) Default: 0

Settings	0: PID err = PID Ref – PID Fdk
	1: PID err = PID Fdk – PID Ref

📖 PID Error = Target value (set point) – Feedback Use this setting when the detection value increases if the output speed increases.

📖 PID Error = Feedback – Target value (set point) Use this setting when the detection value decreases if the output speed increases.

P0-20 PID Multi Setpoint Src1

(0x1894) Default: 0

P0-21 PID Multi Setpoint Src2

(0x1895) Default: 0

Settings 0: Switch Bit OFF

1: Switch Bit ON

2–7: MI1–MI6

8–25: Reserved

26–28: Time Function 1–3

29–30: Reserved

31–38: Monitor 1–8

P0-22 PID Multi Setpoint 1

(0x1896) Default: 0

P0-23 PID Multi Setpoint 2

(0x1897) Default: 0

P0-24 PID Multi Setpoint 3

(0x1898) Default: 0

P0-25 PID Multi Setpoint 4

(0x1899) Default: 0

Settings -30000–30000 PID unit

📖 When using Pr.P0-02 and P0-03 to select PID Ref1 Src and PID Ref2 Src as 16: Multi Setpoint, the VIDAR follows the status of Pr.P0-20 and P0-21 (PID Multi Setpoint Src 1 & 2) to combine four groups of internal setting, as shown in the table below, and uses to determine the internal setting (Pr.P0-22–P0-25) as the PID set point.

PID Multi Setpoint Src / PID Multi Setpoint	P0-21	P0-20
	PID Multi Setpoint Src2	PID Multi Setpoint Src1
PID Multi Setpoint 1 (P0-22)	OFF	OFF
PID Multi Setpoint 2 (P0-23)	OFF	ON
PID Multi Setpoint 3 (P0-24)	ON	OFF
PID Multi Setpoint 4 (P0-25)	ON	ON

- PID multi set point can also be set directly through PID multi set point source: Pr.P0-20 or P0-21 = 0 (OFF) or 1 (ON). You can also select MI1–MI6, Time function 1–3 or Monitor 1–8 to set the ON or OFF status.

P0-27 PID Output Upper Limit

(0x189B)

Default: 1770 / 3550

Depending on the models

Settings 0–9000 rpm

P0-28 PID Output Lower Limit

(0x189C)

Default: 0

Settings 0–9000 rpm

- When PID output is larger than Pr.P0-27 setting value, PID output = PID output upper limit.
- When PID output is lower than Pr.P0-28 setting value, PID output = PID output lower limit.

P0-29 PID P Gain

(0x189D)

Default: 1.00

Settings 0.01– 100.00

- The P gain is mainly used to immediately reduce the deviation in proportion when there is a deviation in the system. Increasing proportional gain usually gets faster response speed. If you set the value too high, overshoot occurs, and it may cause system oscillation and instability. If you set the gain to a lower value, the response will be late.
- The output of P control is proportional to the input error signal. If the integral (I) time = 0 and the differential (D) time = 0, then only the P gain acts, and the system output has a steady-state error.
- Adjust Proportional Gain (P):
  Turn off the Ti and Td, or remain Ti and Td in constant value, then adjust the proportional gain (P).
  Increase: Faster status feedback, but excessive adjustment increases the overshoot.
  Decrease: Smaller overshoot, but excessive adjustment slows down the transient response.

⌁ P0-30 PID I Time

(0x189E) Default: 1.0

Settings	0.0–6000.0 sec.

- Use the integral controller to eliminate the deviation during stable system operation. The integral control does not stop working until the deviation is zero.
- The integral is affected by the integral time. When the integral time is long, there is a small I controller gain, with slower response and slow external control. When the integral time is short, there is a large I controller gain, with faster response and rapid external control. When the integral time is too short, it may cause overshoot or oscillation for the output speed and system.
- Set Integral Time to 0.00 to disable the I controller.
- Adjust Integral Time (I):
  The integral time (I) accumulates from the time difference, if the vibration cycle is longer than the setting for integral time, the integration enhances. Increase the integral time (I) to reduce the vibration.
  Increase: Reduce the overshoot, excessive adjustment causes worse transient response.
  Decrease: Faster transient response, but the transient time will be longer, and takes more time to achieve the steady state. Excessive adjustment causes larger overshoot.

⌁ P0-31 PID D Time

(0x189F) Default: 0.000

Settings	0.000–10.000 sec.

- Use the differential controller to show the system deviation change, as well as to preview the change in the deviation. You can use the differential controller to eliminate the deviation in order to improve the system state. Using a suitable differential time can reduce overshoot and shorten adjustment time; however, the differential operation increases noise interference. Note that a too large differential causes more noise interference. In addition, the differential shows the change, and the differential output is 0 when there is no change. Note that you cannot use the differential control independently. You must use it with the other two controllers for the PD controller or PID controller.

- Sets the D controller gain to determine the deviation change response. Using a suitable differential time reduces the P and I controllers overshoot to decrease the oscillation for a stable system. A differential time that is too long may cause system oscillation.
- The differential controller acts on the change in the deviation and cannot reduce the interference. Do not use this function when there is significant interference.
- Adjust Differential Time (D):

When the vibration cycle is shorter and continuous, it means that the differential time setting is too large and causes excessive output. Decrease the setting of D gain to reduce the vibration. If the D gain is set to 0, adjust the PID control again.

P0-32 PID Derivative Filter

(0x18A0) Default: 0.0

Settings 0.0–10.0 sec.

Since the deviation controller acts on the change of deviation, its immunity to interference is poor. Use this parameter to filter the differential time (D) and eliminate the noise.

P0-33 PID Output Freeze Src

(0x18A1) Default: 0

Settings 0: Disabled
1: Enabled
2–7: MI1–MI6
8–25: Reserved
26–28: Time Function 1–3
29–30: Reserved
31–38: Monitor 1–8

In the application of PID control, you can remain the PID output at previous status output through this function to prevent the motor stop running from unexpected events (for example, feedback sensor failure) or routine equipment maintenance, and to ensure that the drive remains outputting during troubleshooting or maintenance without motor stopping due to the above situation.

P0-34 PID Setpoint Deadband

(0x18A2) Default: 0

Settings 0–10000

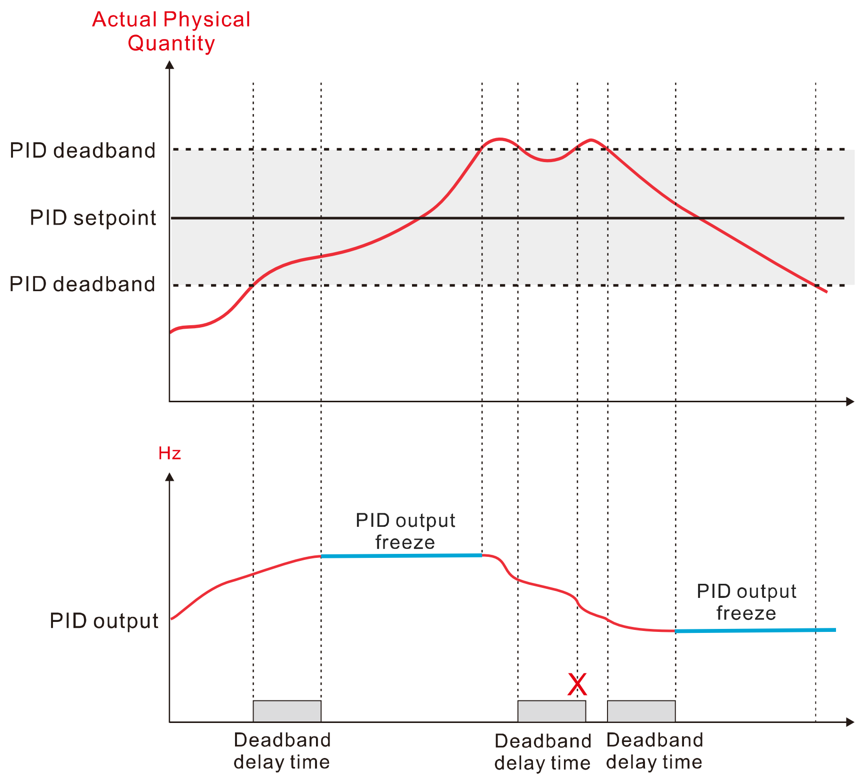
Deadband refers to a range that any change to the input does not cause any response in the output.

P0-35 PID Deadband Delay

(0x18A3) Default: 0.0

Settings 0.0–3600.0 sec.

When the PID feedback enters PID set point dead band and remains for the dead band delay time, the PID output remains at the previous status output until the PID feedback exits the PID set point dead band range.



P0-36	PID Sleep Ref Src

(0x18A4) Default: 0

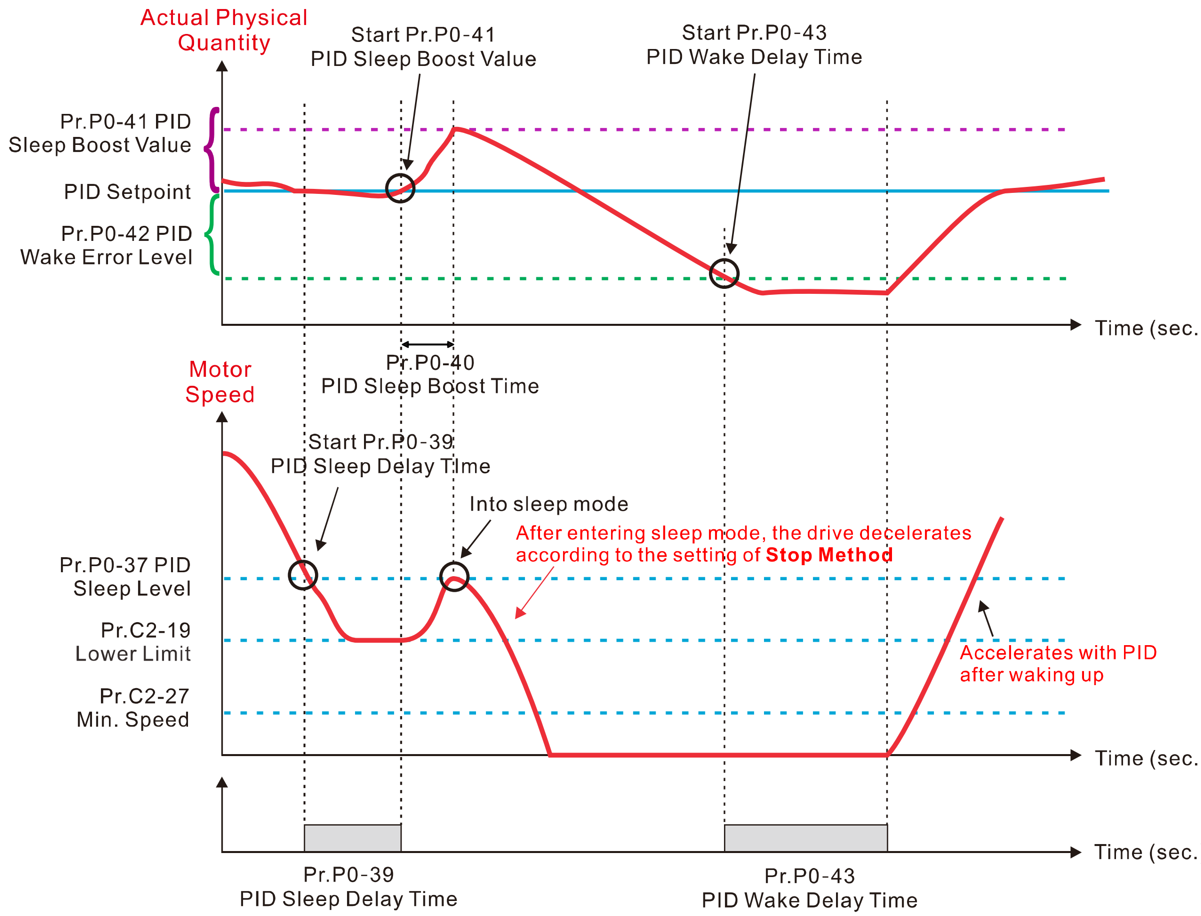
Settings 0: Disabled

1: Motor Speed

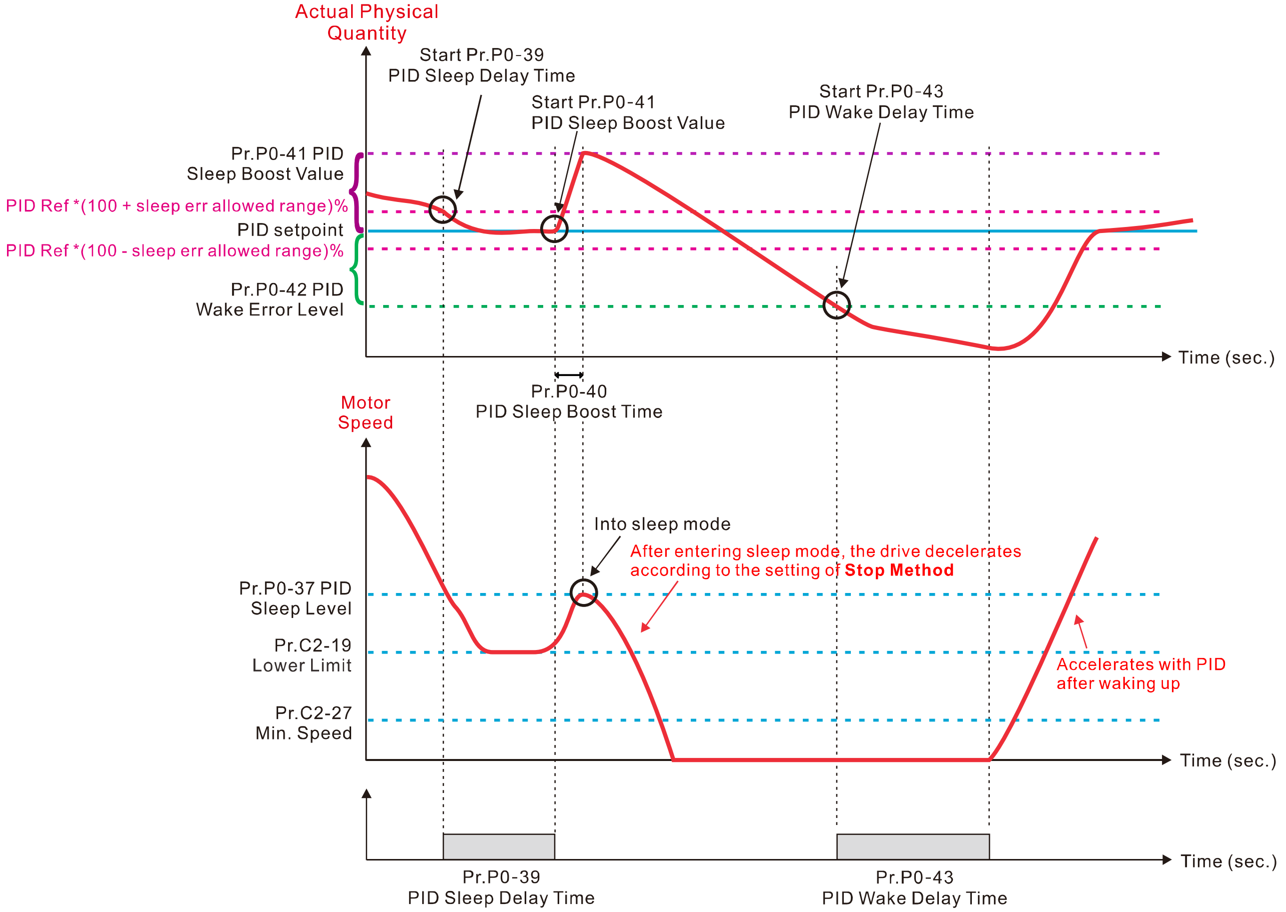
2: By PID Feedback

📖 Under PID control, when the drive operates at an extremely low speed to maintain the physical quantity at the set point, the motor can be completely stopped through the sleep function to save energy, and to avoid running at low speed in the low efficiency range for a long time. When the physical quantity error needs to be controlled by the VIDAR, you can wake the VIDAR by setting the wake function. (Since the lubrication or cooling of some equipment depends on the speed of the motor, providing this function can prevent this type of equipment from running at low speed for a long time and cause premature mechanical aging.)

📖 Pr.P0-36 PID sleep reference source = 1 (Motor Speed)



📖 Pr.P0-36 PID sleep reference source = 2 (Feedback Value)



P0-37 PID Sleep Level

(0x18A5)

Default: 185/365

Depending on the models

Settings Pr.P0-27–Pr.P0-28

P0-38 PID Sleep Fdk Range

(0x18A6)

Default: 0.00

Settings 0.00–100.00 %

P0-39 PID Sleep Delay Time

(0x18A7)

Default: 15.0

Settings 0.0–3600.0 sec.

📖 Sleep judgment: Pr.P0-36 PID sleep reference source = 1 (Motor Speed)

Under this sleep reference source, if you need to enable sleep function, set Pr.P0-37 (PID Sleep

Level) > 0 and set Pr.P0-39 (PID Sleep Delay Time). When the motor speed is lower than or equal to sleep level, the sleep delay time starts to count. During the counting:

1. If the motor speed is lower than or equal to sleep level, and the sleep delay time is reached, then the VIDAR enters sleep mode.
2. If the motor speed is higher than sleep level during the delay time counting, then the VIDAR skips out of the sleep delay count and remains at PID control.

📖 Sleep judgment: Pr.P0-36 PID sleep reference source = 2 (Feedback Value)
Under this sleep reference source, if you need to enable sleep function, set Pr.P0-38 (PID Sleep Feedback Range) > 0 and set Pr.P0-39 (PID Sleep Delay Time). If the feedback physical quantity is in the range of [PID setpoint × (100± sleep error allowed range) %], the sleep detection starts to count. During the counting:

1. If the feedback physical quantity exceeds the range of [PID setpoint × (100± sleep error allowed range) %], the VIDAR skips out of the speed count and remains at PID control.
2. If the feedback physical quantity exceeds the range of [PID setpoint × (100± sleep error allowed range) %], and the sleep detection count remains for the time× of sleep delay/ detect time, then the VIDAR enters sleep mode.

⚡ P0-40 PID Sleep Boost Time

(0x18A8) Default: 0.0

Settings 0.0–3600.0 sec.

⚡ P0-41 PID Sleep Boost Value

(0x18A9) Default: 0

Settings 0–30000 PID unit

📖 Before entering sleep mode from the PID mode, the sleep boost will be performed first:

📖 If Pr.P0-40 (PID Sleep Boost Time) and Pr.P0-41 (PID Sleep Boost Value) are set as default (default are both 0), then the VIDAR directly enters sleep mode.

📖 When Pr.P0-40 (PID Sleep Boost Time) and Pr.P0-41 (PID Sleep Boost Value) are both set > 0, the VIDAR performs boosting to the physical quantity before entering the sleep mode and controls the actual physical quantity to PID set point + PID boost value with PID control.

📖 If the PID actual boost time does not complete the sleep boost time counting, and the actual physical quantity has controlled to PID set point + PID boost value, then VIDAR directly enters the sleep mode.

📖 If the PID actual boost time reaches the set sleep boost time, but the actual physical quantity is not controlled to PID set point + PID boost value, the VIDAR still enters the sleep mode.

📖 If the actual physical quantity feedback is lower than the PID set point during the PID boosting process, the VIDAR skips from boosting mode back to PID control and re-executes the sleep judging logic.

📖 The stopping behavior in sleep mode refers to the parameter setting of stop method.

✔ P0-42 PID Wake Error Level

(0x18AA) Default: 0

Settings 0–10000 PID unit

✔ P0-43 PID Wake Delay Time

(0x18AB) Default: 0.50

Settings 0.00–60.00 sec.

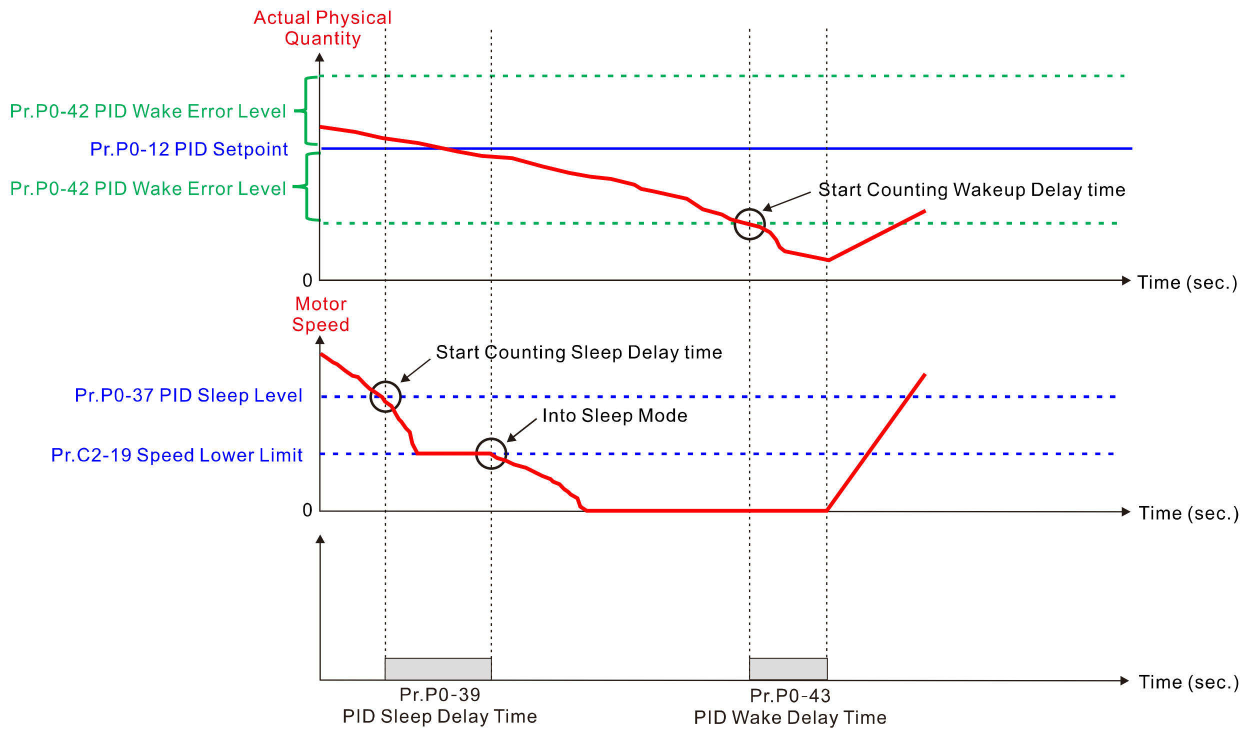
✔ P0-44 PID Wake Type

(0x18AC) Default: 1

Settings 0: Bi-directional error
1: Positive error
2: Negative error

📖 Wake judgment:
Pr.P0-36 PID sleep reference source = 1 (Motor Speed) or 2 (Feedback Value):
During sleep process, if the absolute value of [physical quantity set point – physical quantity feedback] is lower than the wake error, then different results will be obtained according to different settings of Pr.P0-19 and P0-44 (refer to the following graphics), and remains for the time set in wake delay time, the VIDAR turns from sleep mode to PID control mode.

- Scenario 1
  Pr. P0-19 = 0 (PID Ref. – PID Fbk)
  Pr. P0-44 = 1 (Positive error)
- Scenario 2
  Pr. P0-19 = 1 (PID Fbk – PID Ref.)
  Pr. P0-44 = 2 (Negative error)
- Scenario 3
  Pr. P0-19 = 1 or 2
  Pr. P0-44 = 0 (Bi-directional error)



- Scenario 1

  Pr. P0-19 = 1 (PID Fbk – PID Ref.)

  Pr. P0-44 = 1 (Positive error)

- Scenario 2

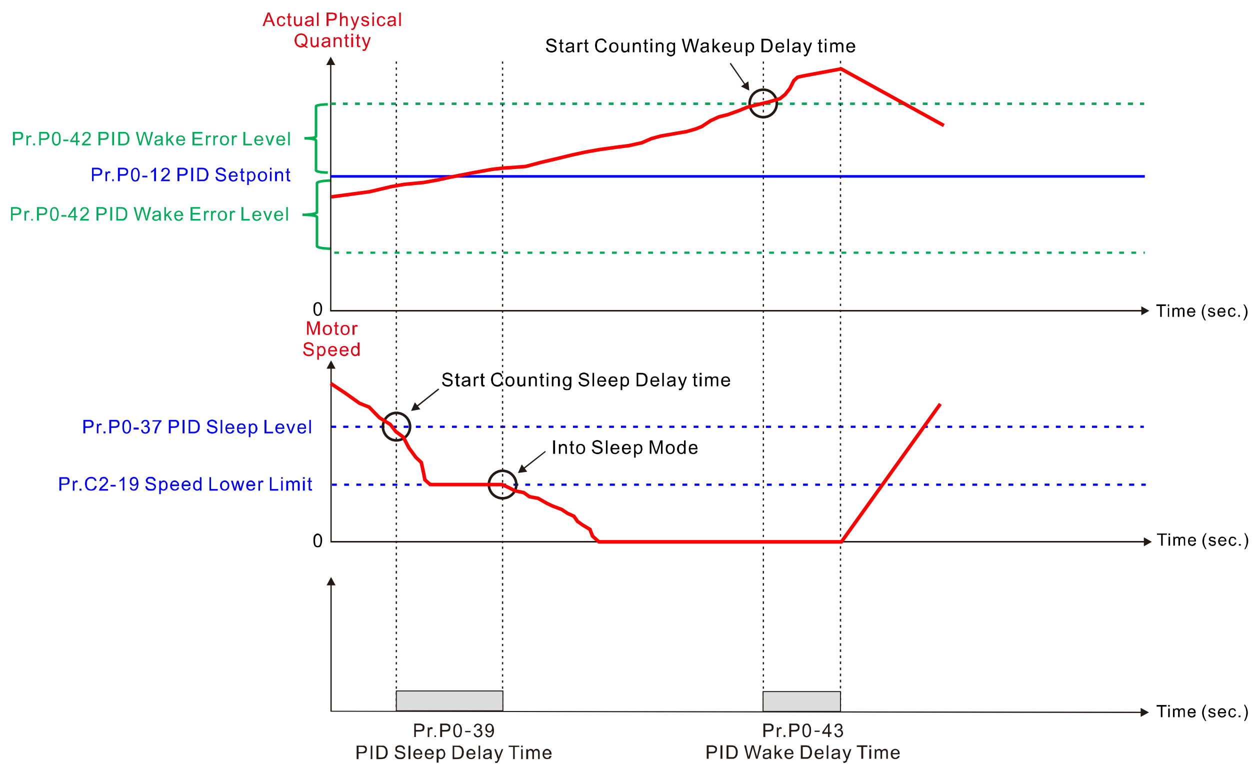
  Pr. P0-19 = 0 (PID Ref. – PID Fbk)

  Pr. P0-44 = 2 (Negative error)

- Scenario 3

  Pr. P0-19 = 1 or 2

  Pr. P0-44 = 0 (Bi-directional error)



P0-45 PID Track Enable Src

(0x18AD) Default: 0

Settings
0: Disabled
1: Enabled
2–7: MI1–MI7
8–25: Reserved
26–28: Time Function 1–3
29–30: Reserved
31–38: Monitor 1–8

P0-46 PID Track Ref Src

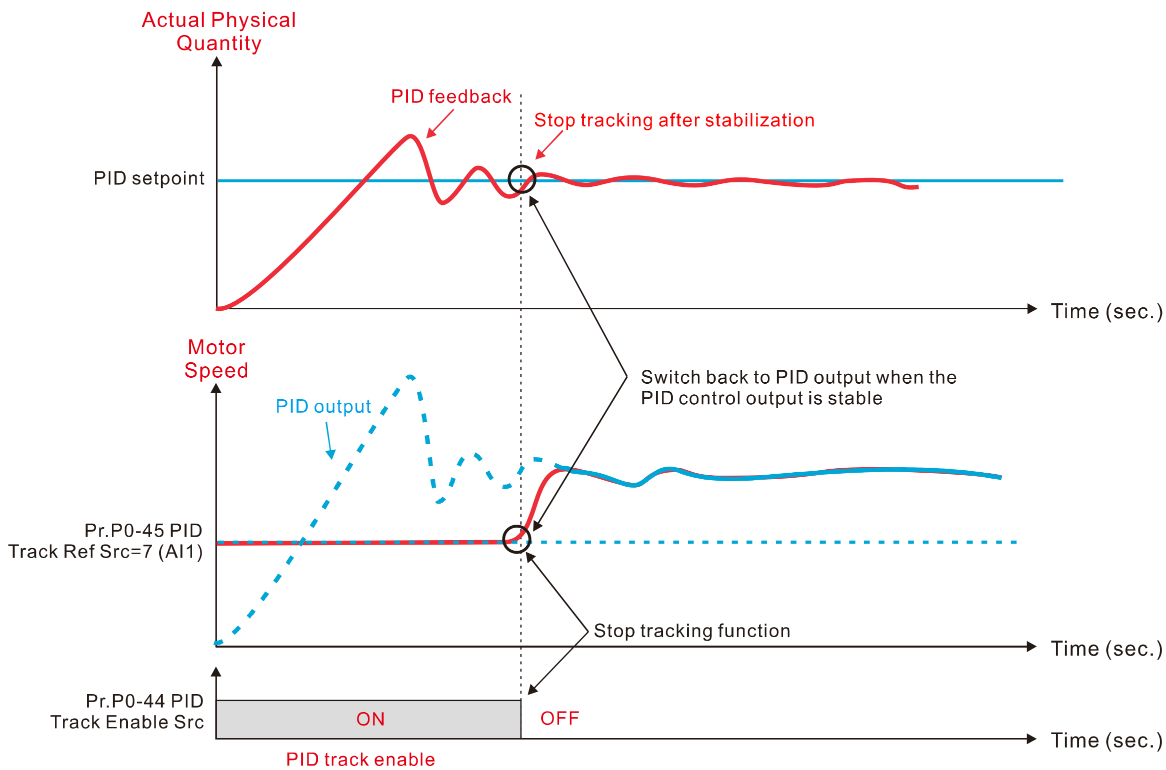
(0x18AE) Default: 0

Settings
0: Disabled
1: Reserved
2: COM1 (Modbus)
3–6: Reserved
7–8: AI1–AI2

For the application that is known the integral transient causes sudden speed jump and severe vibration, or the physical quantity cannot be converge to the set point immediately at the initial stage of PID control (for example, in tension control occasions, if using PID control at the initial stage of furling, the PID control will be up to the maximum PID upper limit output since the tension cannot be established immediately; however, when the tension is established, the furling may be broken because the PID cannot response in time), you can enable the track function and use other sources (AI1–AI2 or Fieldbus) as PID output, and then switch back to PID output when the PID control output is stable, to prevent sudden speed jump caused by the original integral transient.

📖 In certain applications that required higher accuracy and following of physical quantity, we usually decrease setting of integral time. Under this setting, when a larger physical quantity error occurs (system sudden disturbance), the convergence process usually causes severe speed vibration, and the system will stabilize after a long time. The above situation of large physical quantity error rarely occurs to the application occasion and is not expected to adjust through PID controller parameters. In this case, you can use this function as PID output first, and switch back to PID output when the PID control output is stable.

📖 Pr.P0-45 determines the track reference source when using PID track function.



✎ P0-47 PID Output Delay Time

(0x18AF) Default: 0.000

Settings	0.000–30.000 sec.	

- Sets the time constant of the low pass filter for PID control output, increase the setting may affect the response speed of the drive.
- The speed command output for the PID controller will be filtered by a delay function. This function can slow down the change of speed command, a long delay time means a large degree of filtering, and vice versa.
- An inappropriate setting of delay time may cause system vibration.

P0-48 PID Fdk Error Indn

(0x18B0) Default: 0

Settings	0: Disabled
	1–2: Relay1–Relay2

- PID feedback error indication is used when the sensor failure or there is wiring problem between the drive and the sensor.
- Selects the Relay terminal for the “PID feedback error” status indication.
- When an error occurs to PID feedback, the terminal selected by Pr.P0-48 “activates”.
- You must use PID feedback error indication when using PID control. It can prevent dangerous status such as impact caused by rapid acceleration of the motor due to abnormal feedback.

U. Industry

∗ U1. FPGA Control

∗: Level 3 Security parameter, enter password to unlock this parameter.

∗ **U1-00** Mains FREQ

(0x1B40) Default: 60

Settings 40–80 Hz

∗ **U1-01** PLL Kp

(0x1B41) Default: 1.0

Settings 0.0–1000.0

∗ **U1-02** PLL Ki

(0x1B42) Default: 100.0

Settings 0.0–1000.0

∗ **U1-03** PLL SSI

(0x1B43) Default: 100.0

Settings 0.0–5000.0

∗ **U1-04** PLL Filter

(0x1B44) Default: 10.0

Settings 1.0–200.0 Hz

∗ **U1-05** Deadtime 1

(0x1B45) Default: 2.0

Settings 0.5–5.0 us

∗ **U1-06** Deadtime 2

(0x1B46) Default: 1.0

Settings 0.5–5.0 us

∗ **U1-07** Deadtime 3

(0x1B47) Default: 1.0

Settings 0.5–5.0 us

∗ **U1-08** Deadtime 4

(0x1B48) Default: 1.0

Settings 0.5–5.0 us

∗ **U1-09** Fault EN bit

(0x1B49) Default: 41087

Settings bit0: Watchdog

bit1: Iu Low
bit2: Iu High
bit3: Iv Low
bit4: Iv High
bit5: Iw Low
bit6: Iw High
bit7: Vr Low
bit8: Vr High
bit9: Vs Low
bit10: Vs High
bit11: Vt Low
bit12: Vt High
bit13: Vclamp High
bit14: MCU Trip EN
bit15: Dset Trip EN

✱ U1-10 Current Limit Protection

(0x1B4A) Default: Depending on the models

Settings 100–300% (Rated motor current)

📖 Motor Current Trip Level, where 100% is the model rated motor current.

U1-11 Reserved

U1-12 Reserved

U1-13 Reserved

✱ U1-14 Detection Mode Selection

(0x1B4E) Default: 2

Settings 0: No detection
1: Detection mode 1
2: Detection mode 2

📖 The VIDAR is composed of a power converter and a motor, when Pr.U1-14 is activated (for example, set to a non-zero value), the VIDAR will automatically check for any hardware damage in the power converter or the motor.

📖 Setting 0: No self- check process is performed.

- Setting 1: The self-check process is carried out **before** the VIDAR starts up.
- Setting 2: The self-check process is automatically triggered **after** an error occurs to the VIDAR.
- After the self-check, the error codes are defined as the following:
  - OV: The power converter error LED lights up. The device cannot be reset, which indicates that the power converter may be damaged.
  - OCe/ OCCe: The power converter error LED lights up. The device cannot be reset, which also suggests potential power converter damage.
  - OCm/ OCCm: The motor error LED lights up. The device cannot be reset, which indicates that the motor may be damaged.

* U1-15 FPGA Mode Selection

(0x1B4F) Default: 48164

Settings 0–65535

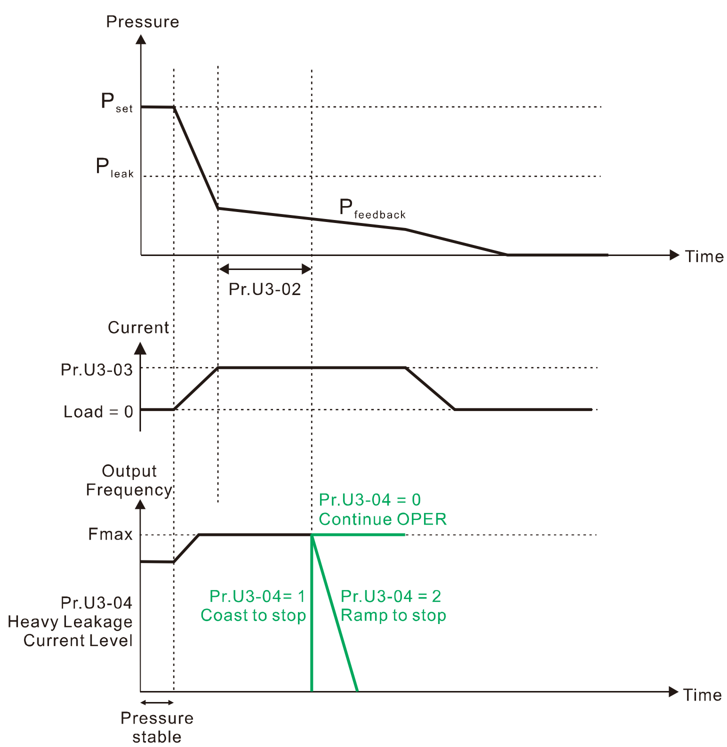
U3. Pump Protection

U3-00	Pressure Protection Function	
(0x1BC0)		Default: 0
	Settings	0: Disabled
		1: Enabled

Must enable this parameter to turn on Heavy Leakage, Hi-Pressure or Lo-Pressure faults.

U3-01	Heavy Leakage Detect Level	
(0x1BC1)		Default: 85
	Settings	0–85%

- When the VIDAR is operating in PID control and the speed operates at the maximum speed, and the VIDAR output current rated percentage is higher than Pr.U3-03 and the detected pressure feedback is less than the Pleak = Target pressure × (1 – Pr.U3-01) after the continuous time of Pr.U3-02, the heavy leakage protection is triggered. Select the action once a heavy leakage is detected according to Pr.U3-04, and VIDAR will display a warning LEKn or a fault LEKE.
- The heavy leakage pressure detection source should be set as single process / Basic PID analog feedback value.
- When either of the Pr.U3-03 and U3-01 is set as 0, the heavy leakage loading detection function is disabled.



U3-02	Heavy Leakage Detect Time	
(0x1BC2)		Default: 15.0
	Settings 0.0–300.0 sec.	

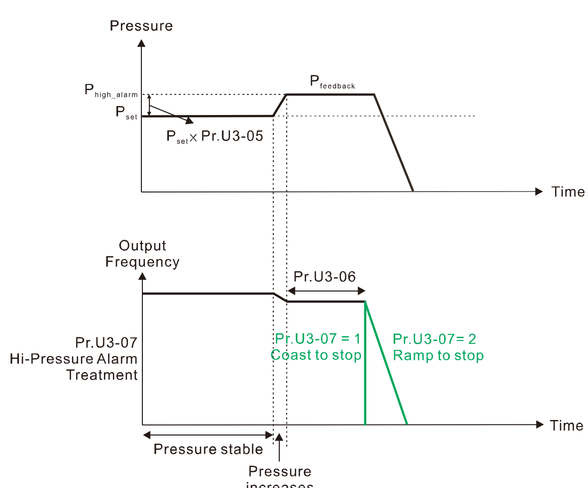
U3-03	Heavy Leakage Current Level	
(0x1BC3)		Default: 20
	Settings 0–100%	

U3-04	Heavy Leakage Treatment	
(0x1BC4)		Default: 0
	Settings 0: Warning & Continue OPER 1: Fault & Coast to Stop 2: Fault & Ramp to Stop	

- 0: Warning & Continue OPER will continue to operate and display a warning for Heavy Leakage.
- 1: Fault & Coast to Stop will remove energy to the motor and allow the VIDAR to coast to stop.
- 2: Fault & Ramp to Stop will ramp the VIDAR to a stop as defined in the deceleration rate set in parameter C2-00.

U3-05	Hi-Pressure Alarm Level	
(0x1BC5)		Default: 25
	Settings 0–50%	

- A Hi-Pressure Alarm fault will occur when the detected feedback pressure is higher than the pressure setpoint (Target pressure) as set in parameter U3-05. A fault will occur when Pressure Feedback ≥ Target pressure × (1 + Pr.U3-05) for the continuous time of Pr.U3-06 and will act according to Pr.U3-07 to coast to stop or ramp to stop.
- The pressure detection source should be set as a single process / Basic PID analog feedback value.



U3-06	Hi-Pressure Alarm Detect Time	
(0x1BC6)		Default: 5.0
	Settings 0.0–300.0 sec.	

U3-07	Hi-Pressure Alarm Treatment	
(0x1BC7)		Default: 0
	Settings 1: Fault & Coast to Stop	
	2: Fault & Ramp to Stop	

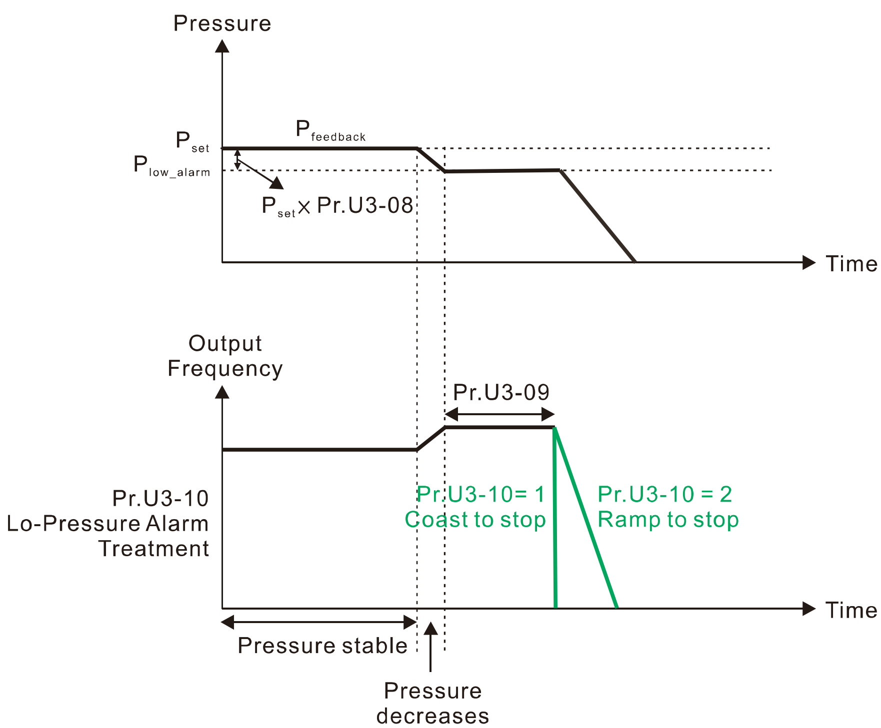
📖 1: Fault & Coast to Stop will remove energy to the motor and allow the VIDAR to coast to stop.

📖 2: Fault & Ramp to Stop will ramp the VIDAR to a stop as defined in the deceleration rate set in parameter C2-00.

U3-08	Lo-Pressure Alarm Level	
(0x1BC8)		Default: 25
	Settings 0–50%	

📖 A Lo-Pressure Alarm fault will occur when the detected feedback pressure is lower than the pressure setpoint (Target pressure) as set in parameter U3-08. A fault will occur when Pressure Feedback ≤ Target pressure × (1 - Pr.U3-08) for the continuous time of Pr.U3-07 and act according to Pr.U3-07 to coast to stop, ramp to stop or continue to operate with a warning.

📖 The pressure detection source should be set as a single process / Basic PID analog feedback value.



U3-09 Lo-Pressure Alarm Detect Time

(0x1BC9) Default: 5.0

Settings 0.0–300.0 sec.

U3-10 Lo-Pressure Alarm Treatment

(0x1BCA) Default: 0

Settings 0: Warning & Continue OPER
1: Fault & Coast to Stop
2: Fault & Ramp to Stop

📖 0: Warning & Continue OPER will continue to operate and display a warning for Heavy Leakage.

📖 1: Fault & Coast to Stop will remove energy to the motor and allow the VIDAR to coast to stop.

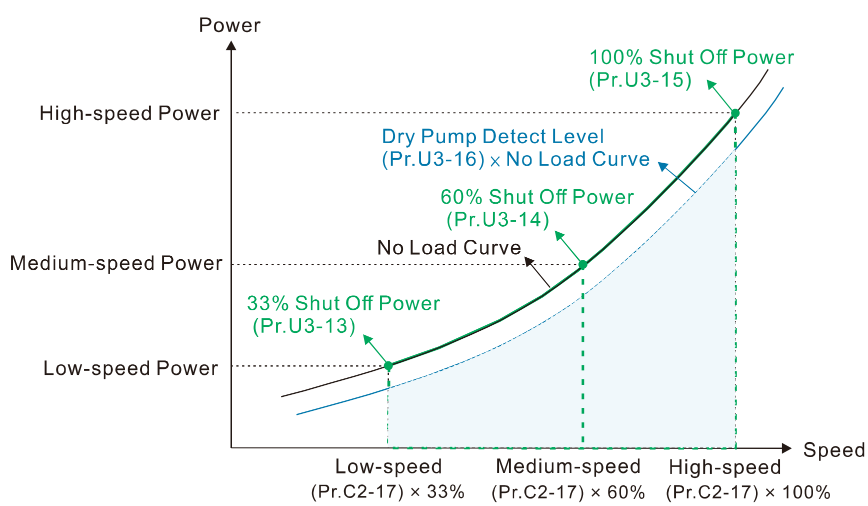
📖 2: Fault & Ramp to Stop will ramp the VIDAR to a stop as defined in the deceleration rate set in parameter C2-00.

U3-11 Dry Pump Curve Autotune

(0x1BCB) Default: 0

Settings 0: Disabled
1: Enabled

📖 The Pump Dry Run Protection detects when a pump is running-dry or is operating with no fluid in the pump. This function works by automatically collecting the power against a closed discharge valve at three speeds, 33%, 60% and 100% as shown in the figure below for a limited time not to exceed 40 seconds. Once the shut-off or zero flow load curve is established VIDAR will fault if the load falls below 95% (default set in parameter U3-16) of the shut-off power load curve for a period of 5 seconds (default in parameter U3-18).



- Establish a baseline state first by running the pump at rated flow for 5 minutes or long enough to establish the pump is fully primed with no entrained. Shut down the pump and isolate with pump discharge and any bypass line to ensure zero flow output of the pump discharge. DO NOT isolate the suction of the pump or close the suction value. To enable the Dry Pump Autotuning set parameter U3-11 = 1 and with VIDAR in LOCAL press the START key. VIDAR will display a warning DtUn and automatically run to 33%, 60% and 100% of the maximum speed, and record the output power respectively in parameters U3-13, U3-14 and U3-15.
- After the autotune function is complete VIDAR will ramp to zero speed. Open the pump discharge valve to allow flow and resume normal operation.
- If VIDAR cannot establish the zero-flow load curve within 40 seconds (default Pr. U3-12) the VIDAR displays a warning dAUE indicating the Dry Pump Curve Autotune has failed and will need to be run again.
- When the dry pump fault is triggered, VIDAR will ramp to zero speed will be in standby status and waiting for automatic restart in enabled in parameter U3-20.
- If VIDAR as exhausted the number of restarts, the VIDAR will not START until the fault is cleared.
- VIDAR can accept a STOP command when the dry pump warning is triggered and is waiting for restart. A STOP command will clear the dry pump fault.

U3-12 Dry Pump Autotune Max. Time

(0x1BCC) Default: 40.0

Settings 0.0–600.0 sec.

- Set Pr.U3-12 and Pr.C2-00 for the maximum time for dry pump curve autotune process.
- When dry pump curve autotune process exceeds Pr.U3-12 and Pr.C2-00 setting, the VIDAR displays a warning dAUE to remind the user to re-detect.

U3-13 33% Shut-off Power

(0x1BCD) Default: 0.00

Settings 0.00–Rated Power*1.2

U3-14 60% Shut-off Power

(0x1BCE) Default: 0.00

Settings 0.00–Rated Power*1.2

U3-15 100% Shut-off Power

(0x1BCF) Default: 0.00

Settings 0.00–Rated Power*1.2

U3-16	Dry Pump Detect Level	
(0x1BD0)		Default: 95
	Settings	0–200%

📖 The value of this parameter determines the level of dry pump detection. A setting below 100% will trigger a fault when the load is below the zero-flow load curve. Setting this too low can prevent the dry run detection to function properly. A setting above 100% will trigger a fault when the load is above the zero-flow load making the detection more sensitive to detect low flow conditions.

📖 When the load is lower than the dry pump load curve and remains for the time of Pr.U3-18, the VIDAR gives the dry pump warning and stops according to Pr.U3-21.

U3-17	Dry Pump Detect Function	
(0x1BD1)		Default: 0
	Settings	0: Disabled 1: Enabled

📖 Set to 1: Enabled to turn on the pump dry run protection.

U3-18	Dry Pump Detect Time	
(0x1BD2)		Default: 5.0
	Settings	0.0–300 sec.

📖 When the load is lower than the dry pump load curve and remains for the time of Pr.U3-18, the VIDAR gives the dry pump warning and stops according to Pr.U3-21.

U3-19	Dry Pump Restart Delay Time	
(0x1BD3)		Default: 1
	Settings	0–1000 min.

U3-20	Dry Pump Restart Times Limit	
(0x1BD4)		Default: 5
	Settings	0–20

📖 Re-detects whether the trigger condition of dry pump has still remained after the delay time of Pr.U3-19. If the trigger condition is cleared, the VIDAR clears the dry pump warning and resumes to the original state. If the dry pump condition still exists, the VIDAR remains dry pump warning and waits for the next detection restarts.

📖 If the restart time limit exceeds the setting value for Pr.U3-20, a dry pump fault will be reported.

📖 When the dry pump fault is triggered and reset, or when the VIDAR power is cycled, Pr.U3-20 returns to the original user setting.

U3-21 Dry Pump Alarm Treatment

(0x1BD5) Default: 0

Settings 0: Warning & Coast to Stop

1: Warning & Ramp to Stop

📖 1: Fault & Coast to Stop will remove energy to the motor and allow the VIDAR to coast to stop.

📖 2: Fault & Ramp to Stop will ramp the VIDAR to a stop as defined in the deceleration rate set in parameter C2-00.

Visit our website for the latest version of this document and more information:

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