HOLIP®

133R0225

HLP-A100
Series Operating Manual

ZHEJIANG HOLIP ELECTRONIC TECHNOLOGY CO.,LTD.

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HLP-A100 Series

Operating Manual

Introduction

Thank you for purchasing and using the general-purpose vector drive of HLP-A100 series.

Please read carefully the operation manual before putting the drive to use so as to correctly install and operate the drive, give full play to its functions and ensure the safety. Please keep the operation manual handy for future reference, maintenance, inspection and repair.

Due to the drive of a kind of power electronics product, it must be installed, tested and adjusted with specialized electrical engineering workers. The marks of ⚠ (Danger), ⚠ (Caution) and other symbols in the manual remind you of the safety and prevention cautions during the handling, installation, running and inspection. Please follow these instructions to make sure the safe use of the drive. In case of any doubt, please contact our local agent for consultation. Our professional persons are willing and ready to serve you.

The manual is subject to change without notice.

Index

Chapter 1   Safety Precautions

⚠ **Caution:** Indicates misuse may damage the drive or mechanical system.

⚡ **Danger:** Indicates misuse may result in casualty.

1.1 Before Power-up

⚠ **Caution**

• Check to be sure that the voltage of the main circuit AC power supply matches the input voltage of the drive.

• Install the drive in a safe location, avoiding high temperature, direct sunlight, humid air or water.

• The drive can only be used at the places accredited by our company. Any unauthorized working environment may have the risks of fire, gas explosion, electric shock and other incidents.

• If more than one drive installed on the same control cabinet, make additional cooling fan, so that the inside temperature is lower than 40℃ , in order to prevent overheating or fire occurs.

• It will affect the service life of the drive if a contactor is installed on the input side to control the start and stop. Generally it is required to control it through terminal commands. Special attention should be paid to its use in the case of the start and stop more frequently places.

• Do not install any switch component like circuit breaker or contactor at the output of the drive. If any of such components must be installed due process and other needs, it must be ensured that the drive has no output when the switch acts. In addition, it is forbidden to install any capacitor for improvement of power factor or any varistor against thunder at the output. Otherwise it will cause malfunctions, tripping protection and damages of components of the drive.

• Please use an independent power supply for the drive. Do avoid using the common power supply with an electrical welder and other equipment with strong disturbance. Otherwise it will cause the drive to protect or even damage the drive.

• Motor overload protection is not included in the default settings. If this function is desired, set C01.90 (motor thermal protection) to date value ETR trip or date value ETR warning.

• Do not make any high voltage test with any component inside the drive. These semi-conductor parts are subject to the damage of high voltage.

• The IC board of the drive are susceptible to the effect and damage of static electricity. Don't touch the main circuit board.

• Installation, commissioning and maintenance must be performed by qualified professional personnel.

• Don't carry the front cover of the drive directly when handling. It should be handled with the base to prevent the front cover off and avoid the dropping of the drive, which may possibly cause the injuries to people and the damages to the drive.

⚠ Danger

• Be sure to turn off the power supply before wiring.

• Mount the drive in the metal and other non-combustible materials to avoid the risk of fire.

• Don't install the drive in a space with explosive gas, otherwise, they lead to explosion.

• R, S, T terminals are power input terminals, never mixed with U.V.W terminals. Be sure that the wiring of the main circuit is correct. Otherwise it will cause damages of the drive when the power is applied to it.

• The terminal of ⏚ must be grounded separately and never connected to N-line. Otherwise it will easily cause the protection or errors of the drive.

• Do not dissemble or modify any internal connecting cord, wiring or component of the drive by yourself.

• Never remodel it or exchange control boards and components by yourself. It may expose you to an electrical shock or explosion, etc.

• Keep the drive from the reach of children or persons not concerned.

1.2 During the Power-up

⚡ **Danger**

• Do not plug the connectors of the drive during the power up to avoid any surge into the main control board due to plugging, which might cause the damage of the drive.

• Always have the protective cover in place before the power up to avoid electrical shock injury.

1.3 During the Operation

⚠ **Caution**

• Do not measure the signals on circuit boards while the drive is running to avoid danger.

• The drive has been optimized before sold. Please make proper adjustments according to the desired functions.

• Do consider the vibration, noise and the speed limit of the motor bearings and the mechanical devices.

⚡ **Danger**

• Never connect or disconnect the motor set while the drive is in running. Otherwise it will cause over-current trip and even burn up the main circuit of the drive.

• Never remove the front cover of the drive while the drive is powered up to avoid any injury of electric shock.

• Do not come close to the machine when the Reset Function is used to avoid anything unexpected. The motor may automatically recover from fault.

1.4 After the Power-off

⚠ **Caution**

• Even in the case of the main power, the other voltage inputs and the share load (linkage of DC intermediate circuit) all have been disconnected from the mains; the internal of the drive may still have residual energy. Before touching any potentially live parts of the drive, please wait at least 4 minutes for the drives of less than 22kW (including 22kW), and wait at least 15 minutes for the drives of more than 30kW (including 30kW). Otherwise, it may expose you to a risk of electrical shock.

Chapter 2   Standards and Specifications

2.1 Label Description

Product Name	**HLP-A100** **www.Holip.com**
Product Type Code	T/C: HLP-A10007D543P20XBX1CX0AXXVXXX
Product Part Number	P/N: 133F0421 S/N: 869807A521
Power	7.5kW 10HP
Input Voltage/Current	IN: 3x380-480V 50/60Hz 24.8/21.4A
Output Voltage/Current	OUT: 3x0-Vin 0-400Hz 17.7/16A
Protection Class	CHASSIS/IP20
Product Order Number	O/N: www00064209

- Website
- Product Serial Number

Safety Precautions

CAUTION:
SEE MANUAL
WARNING:
STORED CHARGE DO NOT TOUCH UNTIL 4
MIN. AFTER DISCONNECTION

RISK OF ELECTRIC SHOCK-DUAL SUPPLY
DISCONNECT MAINS AND LOADSHARING
BEFORE SERVICE

Significance of the product type code:

T/C: HLP-A10007D543P20XBX1CX0AXXVXXX

1-8   9-12   13-14 15-17 18 19 20 21 22 23 24 25 26-27   28-31

1-8	HLP-A100	Indicate Product Series
9-12	07D5	Indicate 7.5kW
13-14	21	Indicate 1-Phase AC 220V
	23	Indicate 3-Phase AC 220V
	43	Indicate 3-Phase AC 380V
15-17	P20	IP rating is 20
18	X	Without AC choke
	A	With AC choke
19	X	Without brake chopper
	B	With brake chopper
20	X	Without DC choke
	B	With DC choke
21	1	Control panel with LED display and potentiometer

22	C	With coating on PCB
23	X	Reserved
24	0	Domestic sale
	1	Overseas sale
25	B	IO board Type
26-27	XX	Reserved
28-31	VXXX	Indicate software version number, such as V235 means the version is 2.35.

2.2 Particular Specifications

Model	Input voltage	Input current (A)	Output current (A)	Rated power (kW)	Power Dissipation (W)	Air flow rate (m³/h)	Net weight (kg)
HLP-A1000D3721	1×200-240V	7.0	2.5	0.37	17.7	51	1.3
HLP-A1000D7521	1×200-240V	13.9	5.0	0.75	33.3	51	1.3
HLP-A10001D521	1×200-240V	20.6	7.5	1.5	53.8	51	1.3
HLP-A10002D221	1×200-240V	30.4	11	2.2	75.0	51	1.3
HLP-A10003D721	1×200-240V	49.7	17	3.7	115.7	51	2.0
HLP-A10005D521	1×200-240V	62.4	25	5.5	160	124	5.6
HLP-A10007D521	1×200-240V	84	32	7.5	225	230	7.8
HLP-A1000D3723	3×200-240V	4.0	2.5	0.37	16.8	51	1.3
HLP-A1000D7523	3×200-240V	8.0	5	0.75	31.5	51	1.3
HLP-A10001D523	3×200-240V	12.0	7.5	1.5	51.0	51	1.3
HLP-A10002D223	3×200-240V	17.7	11	2.2	73.7	51	1.3
HLP-A10003D723	3×200-240V	27.2	17	3.7	110.9	51	2.0
HLP-A10005D523	3×200-240V	35.1	25	5.5	155	124	5.6
HLP-A10007D523	3×200-240V	43.4	32	7.5	210	124	5.6
HLP-A100001123	3×200-240V	61	45	11	323	272	7.8
HLP-A100001523	3×200-240V	73	61	15	447	300	18.5
HLP-A10018D523	3×200-240V	88	75	18.5	795	376	19
HLP-A100002223	3×200-240V	106	91	22	975	408	26
HLP-A100003023	3×200-240V	130	112	30	1246	476	26
HLP-A100003723	3×200-240V	171	150	37	1635	595	37
HLP-A1000D7543	3×380-440V	3.7	2.3	0.75	38.5	51	1.3
	3×440-480V	3.2	2.1				

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Model	Input voltage	Input current (A)	Output current (A)	Rated power (kW)	Power Dissipation (W)	Air flow rate (m³/h)	Net weight (kg)
HLP-A10001D543	3×380-440V	6.4	4	1.5	49.0	51	1.3
	3×440-480V	5.5	3.6				
HLP-A10002D243	3×380-440V	8.9	5.6	2.2	65.2	51	1.3
	3×440-480V	7.7	5.1				
HLP-A10004D043	3×380-440V	15.8	9.9	4.0	122.9	51	2.0
	3×440-480V	13.6	9				
HLP-A10005D543	3×380-440V	21.3	13.3	5.5	139.4	51	2.0
	3×440-480V	18.4	12.1				
HLP-A10007D543	3×380-440V	28.3	17.7	7.5	211.6	68	2.5
	3×440-480V	24.4	16.1				
HLP-A100001143	3×380-440V	35.9	25	11	262.4	124	5.8
	3×440-480V	31.4	22.7				
HLP-A100001543	3×380-440V	43.4	32	15	339.3	170	5.8
	3×440-480V	38.8	29.1				
HLP-A10018D543	3×380-440V	51.5	38	18.5	418.0	230	8
	3×440-480V	46.1	34.5				
HLP-A100002243	3×380-440V	61.0	45	22	468.2	272	8
	3×440-480V	54.5	40.9				
HLP-A100003043	3×380-440V	73	61	30	676.3	303	19
	3×440-480V	64	52				
HLP-A100003743	3×380-440V	72	75	37	795.0	374	22
	3×440-480V	65	68				
HLP-A100004543	3×380-440V	86	91	45	974.8	408	26
	3×440-480V	80	82				
HLP-A100005543	3×380-440V	110	112	55	1246	476	26
	3×440-480V	108	110				
HLP-A100007543	3×380-440V	148	150	75	1635	595	37
	3×440-480V	135	140				
HLP-A100009043	3×380-440V	175	180	90	2204	646	60
	3×440-480V	154	160				
HLP-A100011043	3×380-440V	206	215	110	2600	714	60
	3×440-480V	183	190				

Model	Input voltage	Input current (A)	Output current (A)	Rated power (kW)	Power Dissipation (W)	Air flow rate (m³/h)	Net weight (kg)
HLP-A100013243	3×380-440V	251	260	132	3178	850	60
	3×440-480V	231	240				
HLP-A100016043	3×380-440V	304	315	160	3689	1029	99
	3×440-480V	291	302				
HLP-A100018543	3×380-440V	350	365	185	4268	1190	99
	3×440-480V	320	335				
HLP-A100020043	3×380-440V	381	395	200	4627	1292	99
	3×440-480V	348	361				
HLP-A100022043	3×380-440V	420	435	220	4935	1411	99
	3×440-480V	383	398				
HLP-A100025043	3×380-440V	472	480	250	5323	1564	250
	3×440-480V	436	443				
HLP-A100028043	3×380-440V	525	540	280	6543	1700	250
	3×440-480V	475	490				
HLP-A100031543	3×380-440V	590	605	315	7251	1870	250
	3×440-480V	531	540				
HLP-A100035543	3×380-440V	647	660	355	7497	2125	250
	3×440-480V	580	590				
HLP-A100041543	3×380-440V	718	745	415	8284	2380	250
	3×440-480V	653	678				

2.3 Technical Specifications

Item		Specification
Power supply	Supply voltage	Single/Three phase 200~240V -20%~+10%; Three phase 380~480V -20%~+10%;
	Frequency	48~62Hz;
	Max. imbalance	3%;
Motor output	Output voltage	Three phase 0-100% of supply voltage;
	Output frequency	0-400Hz;

Item		Specification
Main control functions	Control mode	V/F, VVC+, Vector1;
	Start torque	0.5Hz 150%;
	Overload capacity	150% 60s, 200% 1s;
	PWM switch frequency	2~16kHz;
	Speed setting resolution	Digital: 0.001Hz; Analogy: 0.5‰ of the max. operating frequency;
	Speed open-loop control accuracy	30~4000 rpm: tolerance±8 rpm;
	Control command source	LCP, digital terminal, local bus;
	Frequency setting source	LCP, analog, pulse, local bus;
	Ramp control	Selectable 4-speed steps ramp up and down times 0.05-3600.00s;
Basic Functions		Speed Open-loop Control; Process Closed-loop Control; Torque Open-loop Control; AMA Function; Motor Magnetisation; Slip Compensation; Torque compensation; Automatic Voltage Regulation; V/F Control, DC Brake; AC Brake; Speed Limit; Current Limit; Flying Start; Reset Function; Counter; Timer; Jogging; Multi-speed Control via Digital input; Mechanical Braking; UP/DOWN;
Protection Functions		Missing Motor Phase Protection; Low-voltage Protection; Over-voltage Protection; Over-current Protection; Output Phase Loss Protection; Output Short Circuit Protection; Output Grounding Fault Protection; Motor Thermal Protection; Live Zero Timeout Function; AMA Fails; CPU Fault; EEPROM Faults; Button freeze; Duplicate Fails; LCP Invalid; LCP Incompatible; Parameter Read-only; Reference Out of Range; Invalid While Running etc.
IO Terminals	Input	6 digital inputs (1 supports pulse input, pulse range: 1Hz~100kHz); 2 analog input, both can receive voltage or current signals.
	Output	2 digital outputs (1 supports pulse output, pulse range: 1Hz~100kHz); 2 relay outputs; 2 analog input (1 can be selected as current output or voltage output via jumper switch).
	Power supply	1 +10V, max current output 10mA; 1 +24V, max current output 200mA;
	Communication	RS+, RS-, max baud rate 115200bit/s;
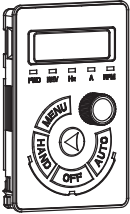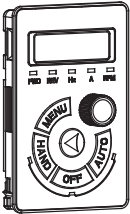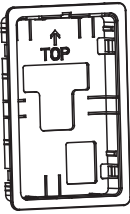
Item		Specification
Display	8 segments, 5 numeric displays	Display frequency, warnings, status and so on;
	Indicator	Light FWD, REV, HZ, A, RPM display various status of the drive;
	Data read-outs	Frequency setting, output frequency, feedback value, output current, DC link voltage, output voltage, output power, input terminals state, output terminals state, analogue input, analogue output, 1-10 fault records and accumulated working time etc.;
Environment	Enclosure	IP20;
	Ambient temperature	-10℃ ~50℃ , derating use when over 40℃ ;
	Humidity	5%-85% (95% without condensation);
	Vibration	≤75kW: 1.14g; ≥90kW: 0.7g;
	Max. altitude above sea level	1000m, derating use when more than 1000 meters;
	Motor cable length	Shield cable: 50 meters, unshield cable: 100 meters;
others	DC choke	None
	Braking chopper	Built-in
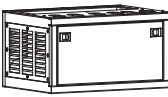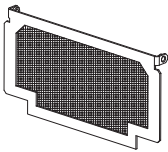
2.4 Derating Specifications

Derating for ambient temperature: If the drive is operated over 40℃ ambient temperature, the continuous output current should be decreased. The drive has been designed for operation at max 50 ℃ ambient temperation with one motor size smaller than normal. Continuous operation at full load at 50℃ ambient temperation will reduce the lifetime of the drive.

Derating for low air pressure: The cooling capability of air is decreased at low air pressure. Below 1000m altitude no de-rating is necessary but above 1000m the ambient temperature or the maximum output current should be decreased. Dcrease the output by 1% per 100m altitude above 1000m or reduce the max. ambient temperature by 1 degree per 200m.

2.5 Accessories

	Model: LCP-E10 Function: Local Control Panel (LCP) is used to modify parameters, monitor status and control the drive. The standard length of extension cable is 3 meters when mounting LCP-E10 on control cabinet. Standard configuration.
	Model: LCP-E20 Function: Local Control Panel (LCP) is used to modify parameters, monitor status and control the drive. The standard length of extension cable is 15 meters when mounting LCP-E20 on control cabinet. Product No: 133B4028
	Model: LCP-E21 Function: Local Control Panel (LCP) is used to modify parameters, monitor status and control the drive. The standard length of extension cable is 15 meters when mounting LCP-E21 on control cabinet. LCP-03 has the same installation dimensions with HLP-A series control panel (OP-AB01). Product No.: 133B5808
	Model: Cradle-01 Function: For the LCP is mounted on the control cabinet Product No.: 133B4264
	Model: CopyCard-01 Function: Copy Card can copy parameters from one drive to another. Product No.: 133B5806

	Model: A0BS07~09 Function: Used for cabinet installation Product No: 133B5809, A0BS07, for Frame A7 133B5810, A0BS08, for Frame A8 133B6320, A0BS09, for Frame A9
	Model: A0SI01~07 Function: Used for preventing dust sucked into the drive wind way. Product No: 133B9667, A0SI01, for frame F0 133B9668, A0SI02, for frame F1 133B9669, A0SI03, for frame F2 133B9658, A0SI04, for frame F3 133B9659, A0SI05, for frame F4 133B9660, A0SI06, for frame F5-1/F5-2 133B9661, A0SI07, for frame F6 133B9670, A0SI08, for frame F7 133B9671, A0SI09, for frame F8
	Model: A0IP01~05 Function: Install this option box allows the drive to achieve IP50 enclosure. Product No: 133B5835, A0IP01, for frame F0 133B5836, A0IP02, for frame F1 133B5837, A0IP03, for frame F2 133B5838, A0IP04, for frame F3 133B5839, A0IP05, for frame F4
	Model: A0FL01~08 Function: Used for flange installation Product No: 133B4604, A0FL01, for frame F0 133B4605, A0FL02, for frame F1 133B4606, A0FL03, for frame F2 133B4607, A0FL04, for frame F3 133B4608, A0FL05, for frame F4 133B4609, A0FL06, for frame F5-1 133B4610, A0FL07, for frame F5-2 133B4611, A0FL08, for frame F6

Chapter 3　Mechanical and Electrical Installation

3.1 Mechanical Installation

3.1.1 Installation Environment Requirements

1. Ambient temperature in the range of -10℃ ~ 50℃ ;

2. Drive should be installed on surface of flame retardant object, with adequate surrounding space for heat dissipation;

3. Installation should be performed where vibration is 1.14g (<=75kW)/0.7g (>=90kW);

4. Avoid from moisture and direct sunlight;

5. Do not expose to an atmosphere with flammable gases, corrosive gases, explosive gases or other harmful gases;

6. Protect the cooling fan by avoiding oil, dust and metal particles;

7. Prevent drilling residues, wire ends and screws falling into drive;

3.1.2 External and Installation Dimensions

F0~F2

F3~F6

F7~F8

底面
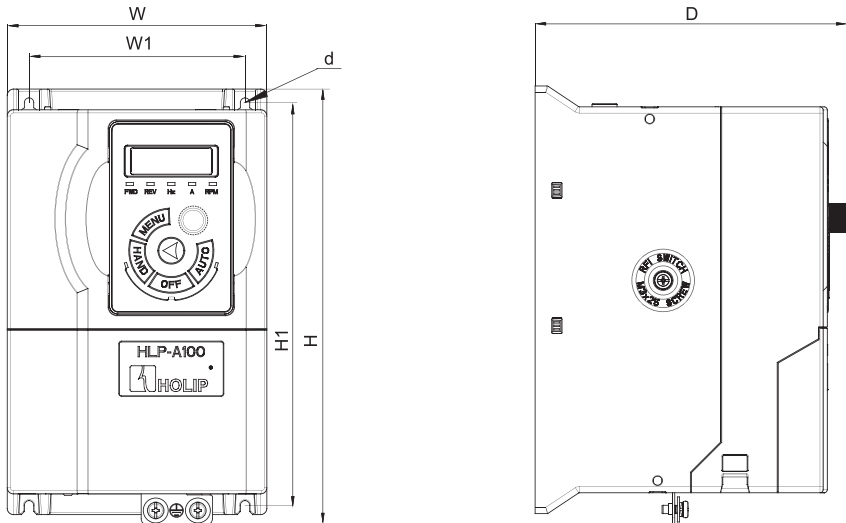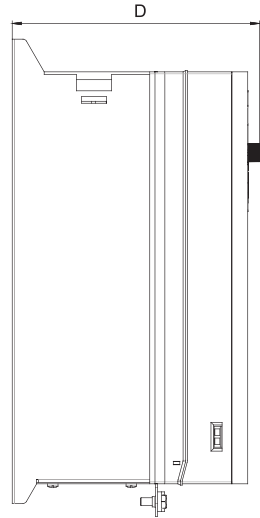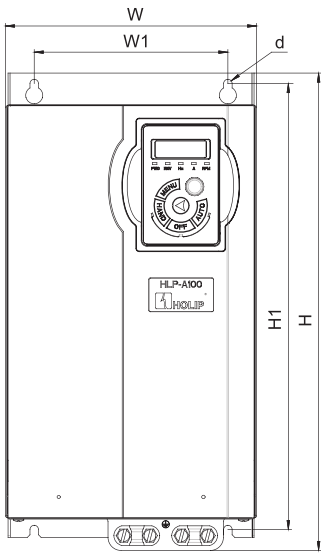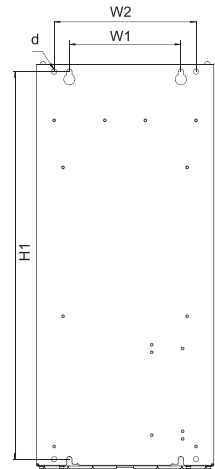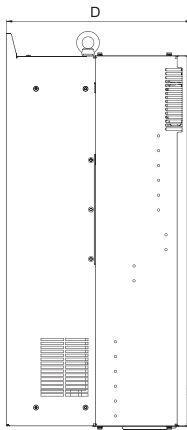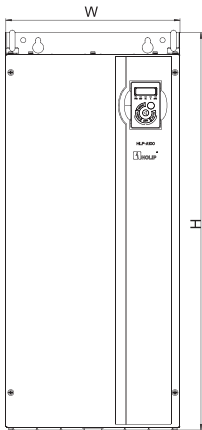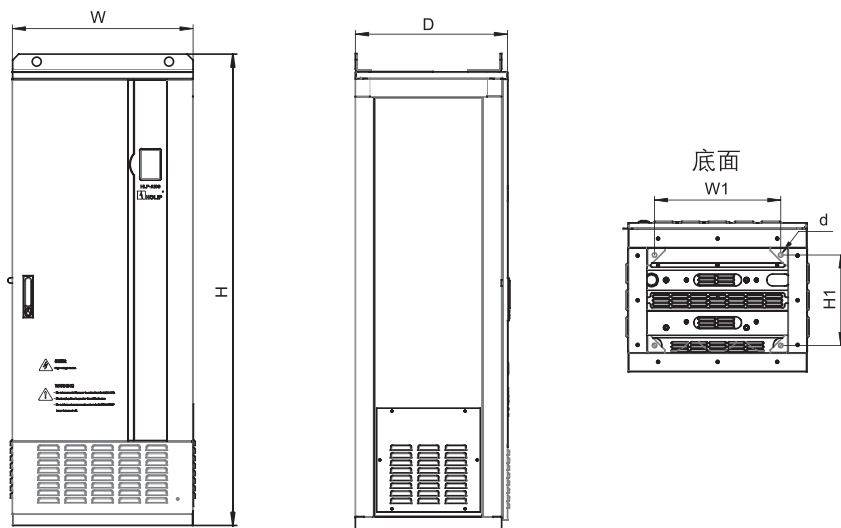
F9

Frame	Voltage & Power			Dimension(mm)						
	1×200-240V	3×200-240V	3×380-480V	W	H	D	W1	H1	W2	d
F0	0.37-1.5kW	0.37-1.5kW	0.75-2.2kW	125	210	152	104	194	-	4.5
F1	2.2-3.7kW	2.2-3.7kW	4.0-5.5kW	145	250	167	124	230	-	4.5
F2	-	-	7.5kW	155	263	177	133	243	-	4.5
F3	5.5kW	5.5-7.5kW	11-15kW	192	365	189	150	340	-	6.5
F4	7.5kW	11kW	18.5-22kW	216	420	194	150	395	-	6.5
F5-1	-	15-18.5kW	30-37kW	292	517	229	240	492	-	9
F5-2	-	22-30kW	45-55kW	292	562	249	240	537	-	9
F6	-	37kW	75kW	292	665	277	240	640	-	9
F7	-	-	90-132kW	350	799	375	220	765	280	10.5
F8	-	-	160-220kW	486	900	390	345	863	410	10.5
F9	-	-	250-415kW	600	1568	509	424	304	-	15

3.1.3 Installation and Direction

1. Single or Side by Side Installation

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The drive must be installed vertically with smooth ventilation, a minimum space must be reserved above and below the enclosure, as shown below:
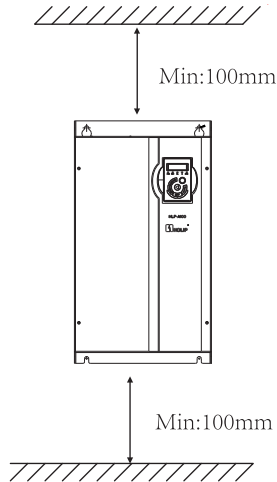
2. Upper and Lower Installation

If several drives need to be installed together in one cabinet, upper and lower installation can be adopted. Enough space must be reserved to ensure effective cooling, as shown below:
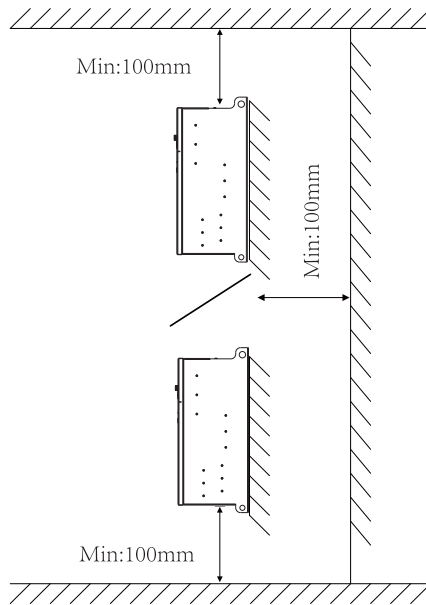
3.1.4 Local Control Panel External Installation
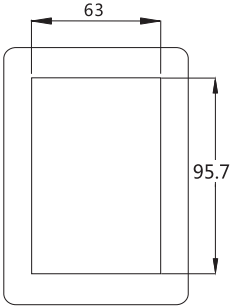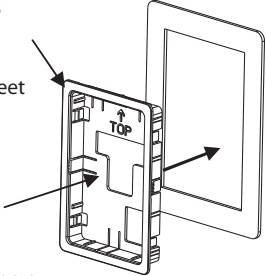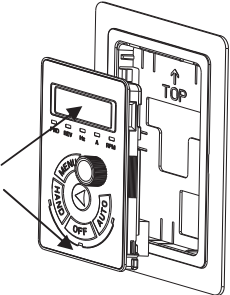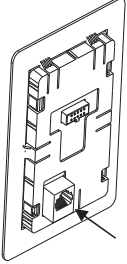
The external dimensions of LCP-E20 are shown below (unit: mm):
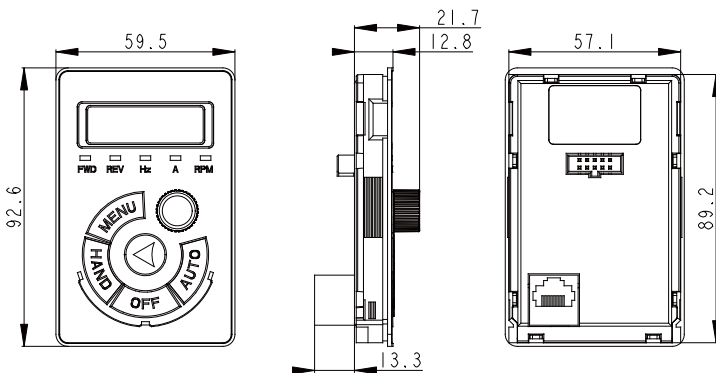
When installing LCP-E20 externally, a cradle is needed. The external dimensions of the cradle are shown below (unit: mm):
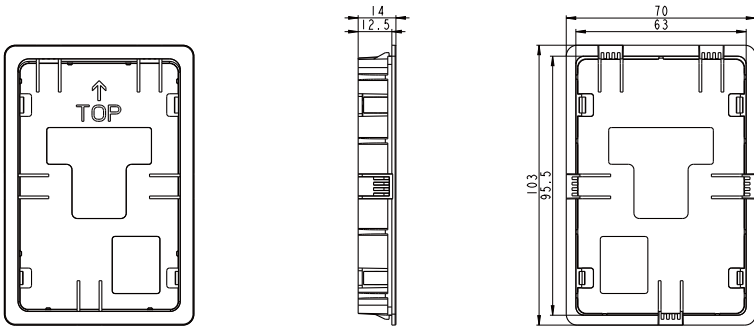
The installation steps of LCP-E20 are shown below:

 Step1: Open a hole in line with the size of the control panel in the position need to install the LCP, hole size, as shown;	This cradle is suitable for 1.0-2.0mm thickness sheet metal parts. Press and hold the snap roots when installation, using buckle deformation install sheet metal. Step2: Install the LCP according to the diection of the arrow
Recommended to install vertical mounting position arrow, press with uniform force. Step 3: The LCP is installed in the cradle, according to the direction of the arrow.	 Step 4: Install the external LCP communication cable, insert into RJ45 terminal from the bottom of hole.

3.1.5 Base Installation

A0BS07 is for frame A7, its external dimensions are shown below (unit: mm):
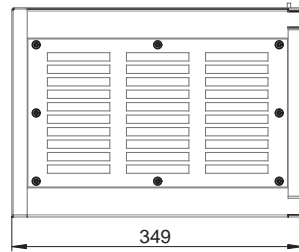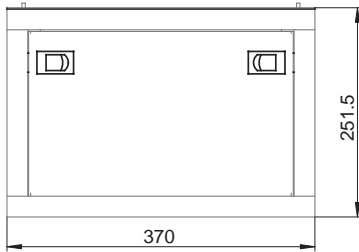
A0BS08 is for frame A8, its external dimensions are shown below (unit: mm):
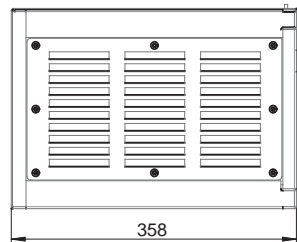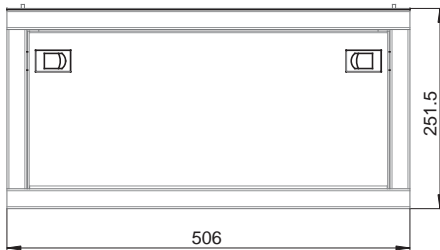
A0BS09 is for frame A9, its external dimensions are shown below (unit: mm):
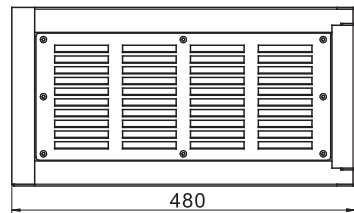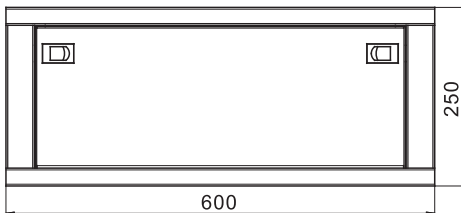
The installation steps of A0BS07 and A0BS08 are the same, shown below:

Step1: Original state.
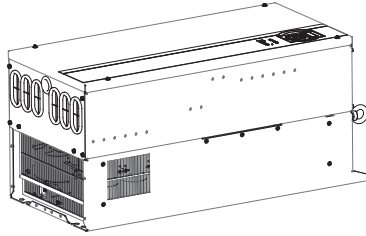
Step2: Remove the bottom cable entry sheet metal and fixing screws.
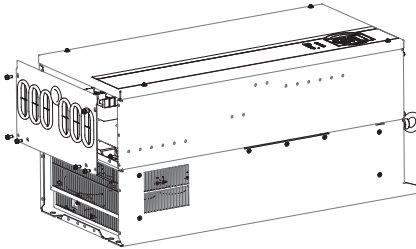
Step3: Move the rubber pieces from the bottom of the sheet metal to the Base.
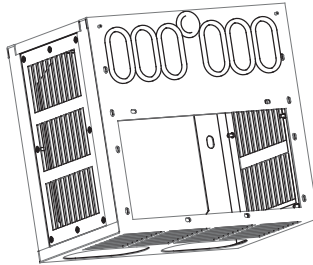
Step4: Use M5 * 12 screws to fix the Base and drive.
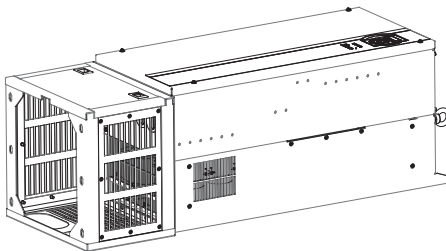
The installation steps of Base-03 are shown below:

Step1: Original state
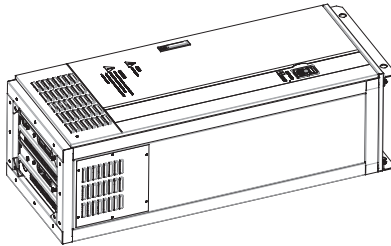
Step2: Use 12 M8 * 20 screws to fix the Base and drive.
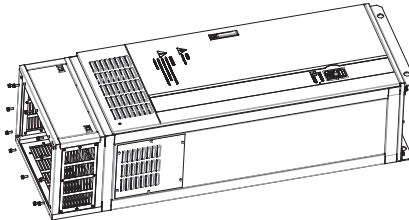
3.1.6 Sieve Installation

1. Sieve-01~03 Installation

Step1: Take two groud screws out.
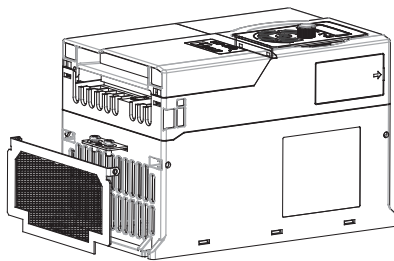
Step2: Both sides use M4 screw locking, and the screw length must not exceed 10mm.
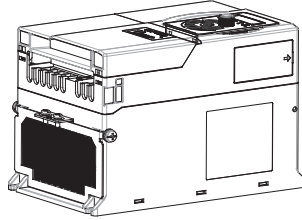
2. Sieve-04~07 Installation

Step1: Adsorbe the sieve (with four magnets) to the inlet at the bottom of the machine directly.
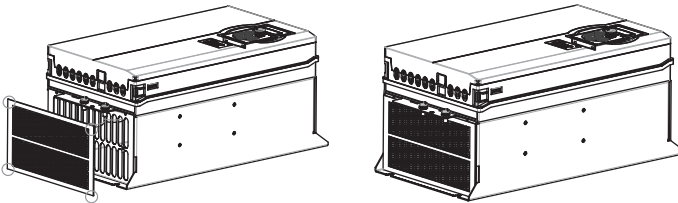
3.2 Peripheral Electrical Devices

Power supply

MCCB

Electromagnetic
contactor

AC input reactor

Noise filter on
input side

R S T +UDC -UDC U V W

PE

Noise filter on
output side

Braking unit

AC output reactor

Braking resistor

Motor

+BR

-BR
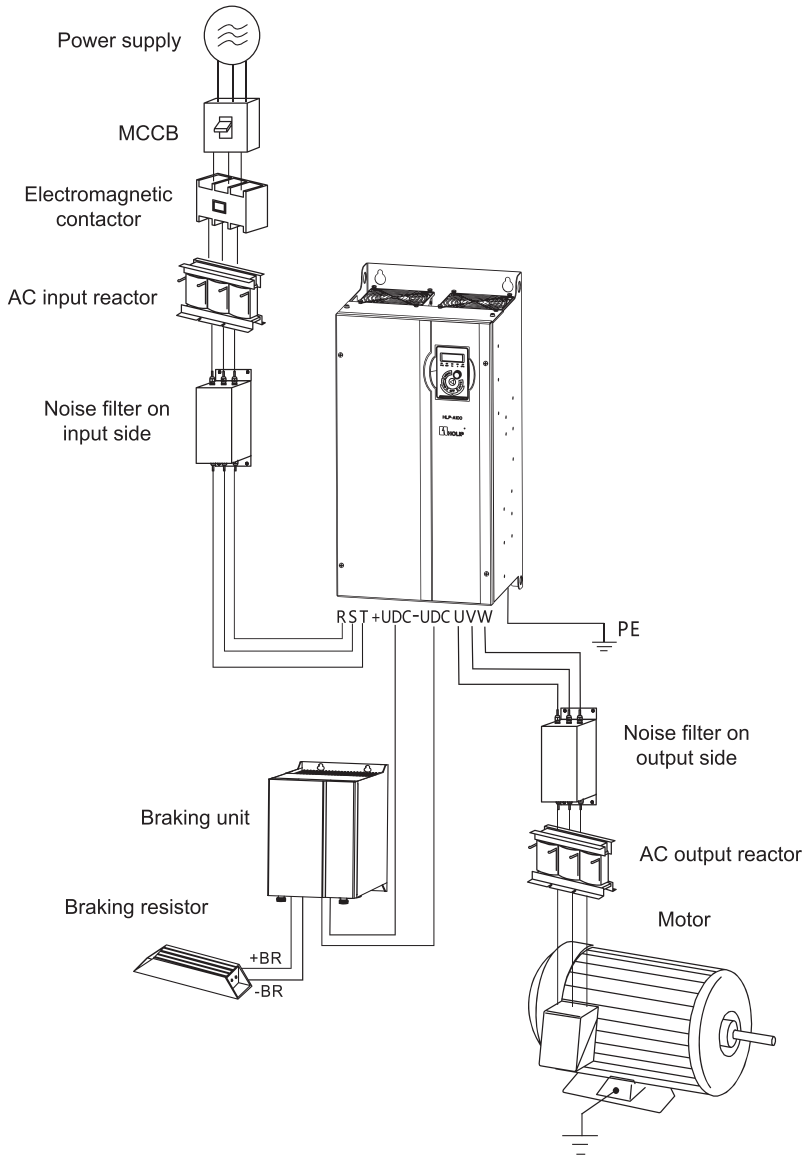
Part	Mounting Location	Function Description
MCCB	Power receiving side	Interrupt the power supply when overcurrent occurs on downstream devices.
Contactor	Between MCCB and drive input side	Do not start and stop the drive frequently by switching the contactor on and off (less than twice per minute) nor use it to directly start the drive.
AC input reactor	Drive input side	Improve the power factor of the input side; Eliminate the input current unbalance due to unbalance between the power phases; Eliminate the higher harmonics of the input side effectively; prevent other devices from being damaged due to distortion of the voltage waveform;
EMC Input filter	Drive input side	Decrease the conduction interference flowing from the power end to the drive and improve the antiinterference capacity of the drive; Reduce the external conduction and radiation interference of the drive;
Braking resistor	+BR, -BR	Consume the motor feedback energy to achieve rapid braking.
EMC Output filter	Drive output side	Reduce the external conduction and radiation interference of the drive.

3.2.1 Selection of MCCB/Fuse/Contactor

Model	MCCB (A)	Fuse (A)	Contactor (A)
HLP-A1000D3721	10	10	10
HLP-A1000D7521	25	25	16
HLP-A10001D521	32	32	25
HLP-A10002D221	40	40	32
HLP-A10003D721	63	63	63
HLP-A10005D521	100	100	100
HLP-A10007D521	150	150	100
HLP-A1000D3723	10	10	10
HLP-A1000D7523	10	10	10
HLP-A10001D523	25	25	16
HLP-A10002D223	25	25	25
HLP-A10003D723	40	40	32
HLP-A10005D523	63	63	40

HLP-A10007D523	63	63	63
HLP-A100001123	100	100	100
HLP-A100001523	100	100	100
HLP-A10018D523	150	150	100
HLP-A100002223	175	175	135
HLP-A100003023	200	200	150
HLP-A100003723	250	250	200
HLP-A1000D7543	10	10	10
HLP-A10001D543	10	10	10
HLP-A10002D243	16	16	10
HLP-A10004D043	25	25	25
HLP-A10005D543	32	32	25
HLP-A10007D543	40	40	32
HLP-A100001143	63	63	40
HLP-A100001543	63	63	63
HLP-A10018D543	100	100	63
HLP-A100002243	100	100	100
HLP-A100003043	150	150	100
HLP-A100003743	150	150	100
HLP-A100004543	175	175	135
HLP-A100005543	200	200	150
HLP-A100007543	250	250	200
HLP-A100009043	300	300	240
HLP-A100011043	350	350	260
HLP-A100013243	400	400	350
HLP-A100016043	500	500	450
HLP-A100018543	630	630	450
HLP-A100020043	630	630	550
HLP-A100022043	800	800	550
HLP-A100025043	800	800	630
HLP-A100028043	800	800	630
HLP-A100031543	1000	1000	630
HLP-A100035543	1000	1000	800
HLP-A100041543	1200	1200	800

3.2.2 Selection of Braking Unit and Braking Resistor

Users can select different braking resistor for different application, it is calculated as follows. The resistance should not be less than the minimum recommended in the table, otherwise there is a risk of damage caused by the drive, the power of braking resistor can be greater. the greater system inertia, the short deceleration time, the more frequent braking, the greater the power of the braking resistor, the smaller the braking resistor value.

1. Selection of the Braking resistor value

The braking resistor value: $R = U_{DH} \times U_{DH} \div (K_B \times P_{MN})$

U_{DH} is the limit of DC bus, generally it is 700V for 400V model , 400V for 200V model;

P_{MN} is rated motor power;

K_B is braking torque coefficient, it is between 0.8 to 2.0. For general machine, it is 1.0, for greater inertia machine, it is 1.5 to 2.

2. Selection of the Braking resistor power

Braking power: $P_b = U_{DH} \times U_{DH} \div R$

Theoretically braking resistor power and braking power can be the same, but in actual choice, it will be multiplied by a correction factor, braking resistor power: $Pr = a P_b$

Correction factor: a = 0.12~ 0.9

For not frequent acceleration and deceleration application, a can be set as 0.12, for frequent acceleration and deceleration application, it should be increased.

3. Recommended selection

Model	Braking Resistor Recommended Power	Braking Resistor Recommended value
HLP-A1000D3721	100W	$\geqq 130\Omega$
HLP-A1000D7521	150W	$\geqq 80\Omega$
HLP-A10001D521	300W	$\geqq 50\Omega$
HLP-A10002D221	300W	$\geqq 50\Omega$
HLP-A10003D721	500W	$\geqq 30\Omega$
HLP-A10005D521	900W	$\geqq 40\Omega$
HLP-A10007D521	1200W	$\geqq 30\Omega$
HLP-A1000D3723	100W	$\geqq 130\Omega$
HLP-A1000D7523	150W	$\geqq 80\Omega$

HLP-A10001D523	300W	≧ 50Ω
HLP-A10002D223	300W	≧ 50Ω
HLP-A10003D723	500W	≧ 30Ω
HLP-A10005D523	900W	≧ 40Ω
HLP-A10007D523	1200W	≧ 30Ω
HLP-A100001123	2000W	≧ 20Ω
HLP-A1000D7543	150W	≧ 300Ω
HLP-A10001D543	250W	≧ 200Ω
HLP-A10002D243	500W	≧ 100Ω
HLP-A10004D043	500W	≧ 100Ω
HLP-A10005D543	700W	≧ 80Ω
HLP-A10007D543	900W	≧ 65Ω
HLP-A100001143	1200W	≧ 40Ω
HLP-A100001543	1500W	≧ 30Ω
HLP-A10018D543	2000W	≧ 25Ω
HLP-A100002243	2500W	≧ 20Ω

3.2.3 Selection of AC Input and Output Reactor

The guide of AC input reactor selection

Model	Rated current (A)	Maximum continuous current (A)	Inductance (mH) & 3% Impedance
HLP-A1000D3721	7	10.5	2.31
HLP-A1000D7521	14	20.85	1.16
HLP-A10001D521	21	30.9	0.78
HLP-A10002D221	30	45.6	0.53
HLP-A10003D721	50	74.55	0.33
HLP-A10005D521	62	93.6	0.26
HLP-A10007D521	84	126	0.19
HLP-A1000D3723	4	6	4.04
HLP-A1000D7523	8	12	2.02
HLP-A10001D523	12	18	1.35
HLP-A10002D223	18	26.55	0.91
HLP-A10003D723	27	40.8	0.59
HLP-A10005D523	35	52.65	0.46
HLP-A10007D523	43	65.1	0.37

HLP-A100001123	61	91.5	0.27
HLP-A100001523	73	109.5	0.22
HLP-A10018D523	88	132	0.18
HLP-A100002223	106	159	0.15
HLP-A100003023	130	19	0.12
HLP-A100003723	171	256.5	0.09
HLP-A1000D7543	3.7	5.55	8.74
HLP-A10001D543	6.4	9.6	5.05
HLP-A10002D243	8.9	13.35	3.63
HLP-A10004D043	15.8	23.7	2.05
HLP-A10005D543	21.3	31.95	1.52
HLP-A10007D543	28.3	42.45	1.14
HLP-A100001143	35.9	53.85	0.90
HLP-A100001543	43.4	65.1	0.75
HLP-A10018D543	51.5	77.25	0.63
HLP-A100002243	61	91.5	0.53
HLP-A100003043	80	120	0.45
HLP-A100003743	80	120	0.36
HLP-A100004543	100	150	0.3
HLP-A100005543	120	180	0.25
HLP-A100007543	160	240	0.18
HLP-A100009043	200	300	0.15
HLP-A100011043	250	375	0.12
HLP-A100013243	300	450	0.1
HLP-A100016043	350	525	0.085
HLP-A100018543	400	600	0.07
HLP-A100020043	450	675	0.065
HLP-A100022043	500	750	0.06
HLP-A100025043	560	710	0.05
HLP-A100028043	630	780	0.03
HLP-A100031543	700	880	0.0215
HLP-A100035543	770	970	0.017
HLP-A100041543	860	1070	0.012

The guide of AC output reactor selection

Model	Rated current (A)	Saturation current (A)	Inductance (mH) & 3% Impedance
HLP-A1000D3721	2.5	3.75	6.47
HLP-A1000D7521	5	7.5	3.23
HLP-A10001D521	7.5	11.25	2.16
HLP-A10002D221	11	16.5	1.47
HLP-A10003D721	17	25.5	0.95
HLP-A10005D521	25	37.5	0.65
HLP-A10007D521	32	48	0.51
HLP-A1000D3723	2.5	3.75	6.47
HLP-A1000D7523	5	7.5	3.23
HLP-A10001D523	7.5	11.25	2.16
HLP-A10002D223	11	16.5	1.47
HLP-A10003D723	17	25.5	0.95
HLP-A10005D523	25	37.5	0.65
HLP-A10007D523	32	48	0.51
HLP-A100001123	45	67.5	0.36
HLP-A100001523	61	91.5	0.27
HLP-A10018D523	75	112.5	0.22
HLP-A100002223	91	136.5	0.18
HLP-A100003023	112	168	0.14
HLP-A100003723	150	225	0.11
HLP-A1000D7543	2.3	3.45	14.06
HLP-A10001D543	4	6	8.08
HLP-A10002D243	5.6	8.4	5.77
HLP-A10004D043	9.9	14.85	3.27
HLP-A10005D543	13.3	19.95	2.43
HLP-A10007D543	17.7	26.55	1.83
HLP-A100001143	25	37.5	1.29
HLP-A100001543	32	48	1.01
HLP-A10018D543	38	57	0.85
HLP-A100002243	45	67.5	0.72
HLP-A100003043	61	129	0.362
HLP-A100003743	75	159	0.294
HLP-A100004543	91	193	0.242
HLP-A100005543	112	238	0.197

HLP-A100007543	150	318	0.147
HLP-A100009043	180	382	0.123
HLP-A100011043	215	456	0.103
HLP-A100013243	260	551	0.085
HLP-A100016043	315	668	0.070
HLP-A100018543	365	774	0.060
HLP-A100020043	395	838	0.056
HLP-A100022043	435	923	0.051
HLP-A100025043	480	1020	0.009
HLP-A100028043	540	1145	0.008
HLP-A100031543	605	1280	0.0055
HLP-A100035543	660	1400	0.004
HLP-A100041543	745	1580	0.0035

3.2.4 Selection of EMC Filter

Model	EMC Input Filter		EMC Output Filter	
	Rated Current (A)	Recommended Model*	Rated Current (A)	Recommended Model*
HLP-A1000D3721	10	NFI-010	5	NFO-005
HLP-A1000D7521	20	NFI-020	5	NFO-005
HLP-A10001D521	20	NFI-020	10	NFO-010
HLP-A10002D221	36	NFI-036	20	NFO-020
HLP-A10003D721	50	NFI-050	20	NFO-020
HLP-A10005D521	80	NFI-080	36	NFO-036
HLP-A10007D521	100	NFI-100	36	NFO-036
HLP-A1000D3723	5	NFI-005	5	NFO-005
HLP-A1000D7523	10	NFI-010	5	NFO-005
HLP-A10001D523	10	NFI-010	10	NFO-010
HLP-A10002D223	20	NFI-020	20	NFO-020
HLP-A10003D723	36	NFI-036	20	NFO-020
HLP-A10005D523	36	NFI-036	36	NFO-036
HLP-A10007D523	50	NFI-050	36	NFO-036
HLP-A100001123	80	NFI-080	50	NFO-050
HLP-A100001523	80	NFI-080	80	NFO-080
HLP-A10018D523	100	NFI-100	100	NFO-100

HLP-A100002223	150	NFI-150	100	NFO-100
HLP-A100003023	150	NFI-150	150	NFO-150
HLP-A100003723	200	NFI-200	200	NFO-200
HLP-A1000D7543	5	NFI-005	5	NFO-005
HLP-A10001D543	5	NFI-005	5	NFO-005
HLP-A10002D243	10	NFI-010	10	NFO-010
HLP-A10004D043	10	NFI-010	10	NFO-010
HLP-A10005D543	20	NFI-020	20	NFO-020
HLP-A10007D543	20	NFI-020	20	NFO-020
HLP-A100001143	36	NFI-036	36	NFO-036
HLP-A100001543	36	NFI-036	36	NFO-036
HLP-A10018D543	50	NFI-050	50	NFO-050
HLP-A100002243	50	NFI-050	50	NFO-050
HLP-A100003043	65	NFI-065	65	NFO-065
HLP-A100003743	80	NFI-080	80	NFO-080
HLP-A100004543	100	NFI-100	100	NFO-100
HLP-A100005543	150	NFI-150	150	NFO-150
HLP-A100007543	150	NFI-150	150	NFO-150
HLP-A100009043	200	NFI-200	200	NFO-200
HLP-A100011043	250	NFI-250	250	NFO-250
HLP-A100013243	250	NFI-250	250	NFO-250
HLP-A100016043	300	NFI-300	300	NFO-300
HLP-A100018543	400	NFI-400	400	NFO-400
HLP-A100020043	400	NFI-400	400	NFO-400
HLP-A100022043	600	NFI-600	600	NFO-600
HLP-A100025043	900	NFI-900	900	NFO-900
HLP-A100028043	900	NFI-900	900	NFO-900
HLP-A100031543	900	NFI-900	900	NFO-900
HLP-A100035543	1200	NFI-1200	1200	NFO-1200
HLP-A100041543	1200	NFI-1200	1200	NFO-1200

* Recommended models are the Shanghai Eagtop Electronic Technology Co., Ltd. products, website: http://www.eagtop.com/

3.3 Description of Main Circuit

3.3.1 Schematic of Main Circuit Terminals

F0~F4

F5-1~F6

F7~F8

HLP-A100 Series Operating Manual
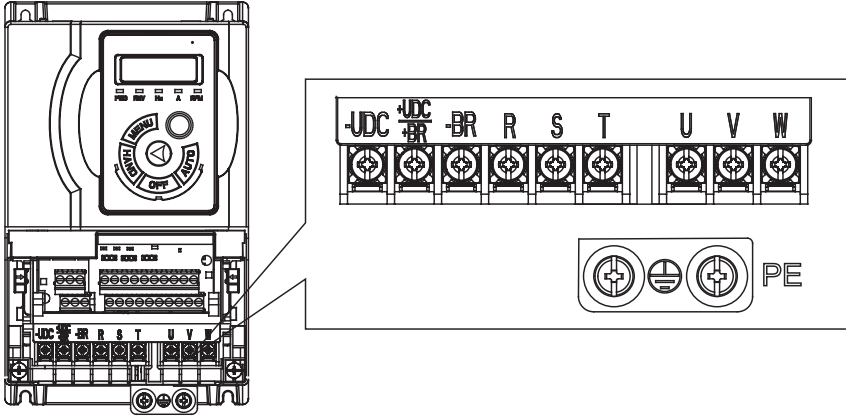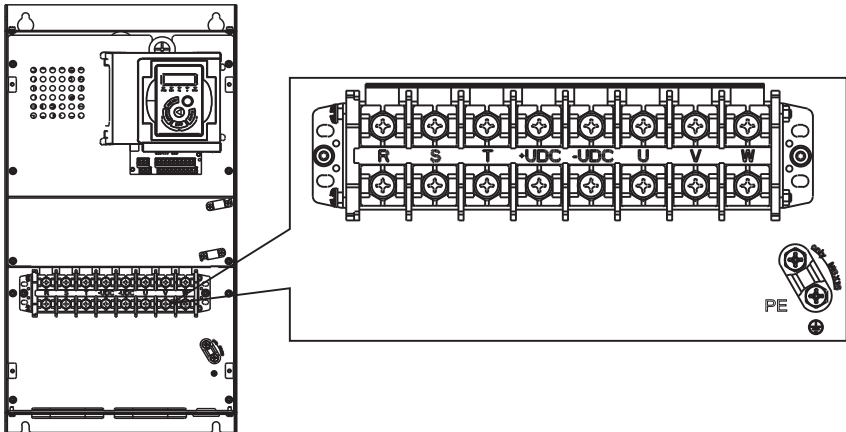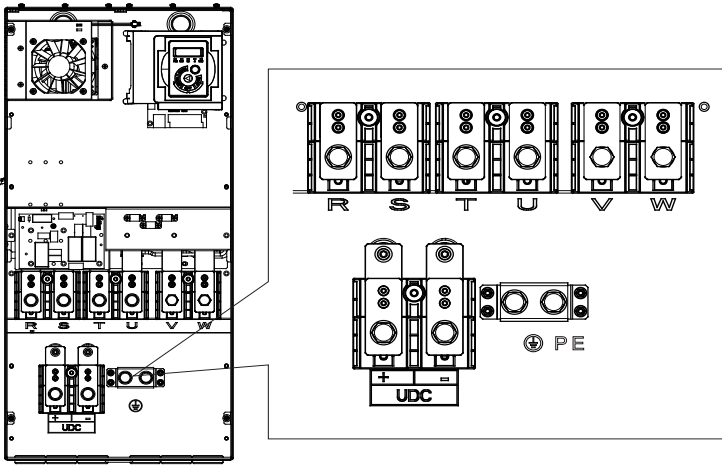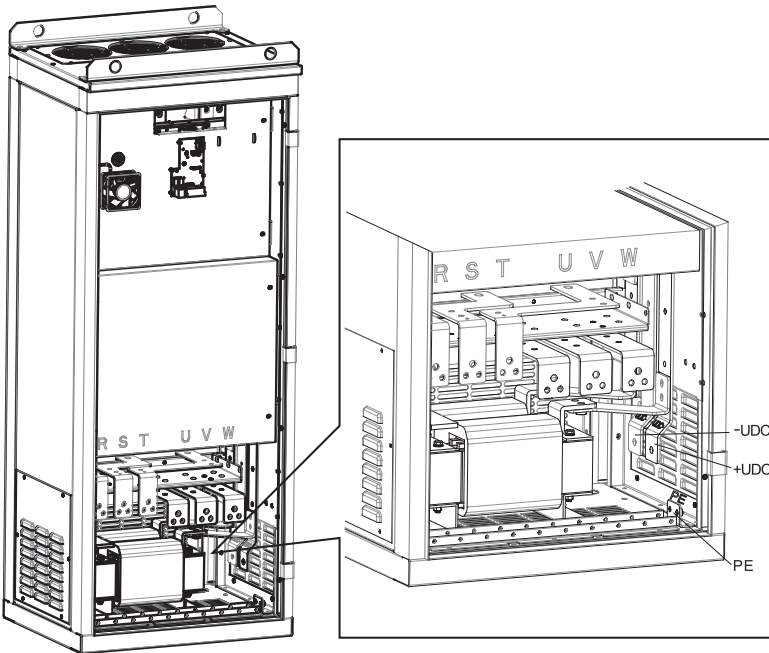
F9

Symbol	Function
R, S, T	Power input, Single phase connected to R, T
U, V, W	Power output, connect to the motor
+BR, -BR	Connect the brake resistor, make sure to set C02.10, C02.11 etc.
+UDC, -UDC	DC bus
PE	Ground terminal

3.3.2 Main Circuit Terminal Screws and Wiring Recommended Specifications

Model	Input Cable (mm^2)	Output Cable (mm^2)	Input and Output Terminals' Screws	Input and Output Terminals' Torque (N·m)	Ground Terminal Screw	Ground Terminal Torque (N·m)
HLP-A1000D3721	1	1	M3.5	0.8-1.0	M4	1.0-1.2
HLP-A1000D7521	1.5	1	M3.5	0.8-1.0	M4	1.0-1.2
HLP-A10001D521	1.5	1	M3.5	0.8-1.0	M4	1.0-1.2
HLP-A10002D221	2.5	1.5	M3.5	0.8-1.0	M4	1.0-1.2
HLP-A10003D721	6	1.5	M4	1.0-1.2	M4	1.0-1.2
HLP-A10005D521	10	2.5	M4	1.0-1.2	M6	2.0-2.5
HLP-A10007D521	16	4	M5	1.6-2.0	M6	2.0-2.5
HLP-A1000D3723	1	1	M3.5	0.8-1.0	M4	1.0-1.2
HLP-A1000D7523	1	1	M3.5	0.8-1.0	M4	1.0-1.2
HLP-A10001D523	1.5	1	M3.5	0.8-1.0	M4	1.0-1.2
HLP-A10002D223	1.5	1.5	M3.5	0.8-1.0	M4	1.0-1.2
HLP-A10003D723	2.5	1.5	M4	1.0-1.2	M4	1.0-1.2
HLP-A10005D523	4	2.5	M4	1.0-1.2	M6	2.0-2.5
HLP-A10007D523	6	4	M4	1.0-1.2	M6	2.0-2.5
HLP-A100001123	10	6	M5	1.6-2.0	M6	2.0-2.5
HLP-A100001523	10	10	M8	8-10	M6	2.0-2.5
HLP-A10018D523	16	16	M8	8-10	M6	2.0-2.5
HLP-A100002223	25	25	M8	8-10	M6	2.0-2.5
HLP-A100003023	35	35	M8	8-10	M6	2.0-2.5
HLP-A100003723	35	35	M8	8-10	M6	2.0-2.5
HLP-A1000D7543	1	1	M3.5	0.8-1.0	M4	1.0-1.2

HLP-A10001D543	1	1	M3.5	0.8-1.0	M4	1.0-1.2
HLP-A10002D243	1	1	M3.5	0.8-1.0	M4	1.0-1.2
HLP-A10004D043	1.5	1.5	M4	1.0-1.2	M4	1.0-1.2
HLP-A10005D543	1.5	1.5	M4	1.0-1.2	M4	1.0-1.2
HLP-A10007D543	2.5	1.5	M4	1.0-1.2	M4	1.0-1.2
HLP-A100001143	4	2.5	M4	1.0-1.2	M6	2.0-2.5
HLP-A100001543	6	4	M4	1.0-1.2	M6	2.0-2.5
HLP-A10018D543	10	4	M5	1.6-2.0	M6	2.0-2.5
HLP-A100002243	10	6	M5	1.6-2.0	M6	2.0-2.5
HLP-A100003043	10	10	M8	8-10	M6	2.0-2.5
HLP-A100003743	16	16	M8	8-10	M6	2.0-2.5
HLP-A100004543	16	16	M8	8-10	M6	2.0-2.5
HLP-A100005543	25	25	M8	8-10	M6	2.0-2.5
HLP-A100007543	35	35	M8	8-10	M6	2.0-2.5
HLP-A100009043	70	70	M10	12-16	M10	12-16
HLP-A100011043	70	70	M10	12-16	M10	12-16
HLP-A100013243	95	95	M10	12-16	M10	12-16
HLP-A100016043	120	150	M12*1 (M10*2)	12-16	M10*2	12-16
HLP-A100018543	150	185	M12*1 (M10*2)	12-16	M10*2	12-16
HLP-A100020043	185	185	M12*1 (M10*2)	12-16	M10*2	12-16
HLP-A100022043	240	240	M12*1 (M10*2)	12-16	M10*2	12-16
HLP-A100025043	70*2	70*2	M10*1	26-33	M8*1	13-16
HLP-A100028043	95*2	95*2	M10*1	26-33	M8*1	13-16
HLP-A100031543	95*2	95*2	M10*1	26-33	M8*1	13-16
HLP-A100035543	120*2	120*2	M10*1	26-33	M8*1	13-16
HLP-A100040043	120*2	120*2	M10*1	26-33	M8*1	13-16
HLP-A100041543	120*2	120*2	M10*1	26-33	M8*1	13-16

Note: This specification is under using single-core line VV and 25°C , if use other cables or under higher temperature environment, please refer to electrical manual.
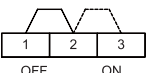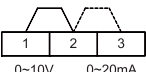
3.4 Description of Control Circuit

3.4.1 Schematic of Control Circuit Terminals
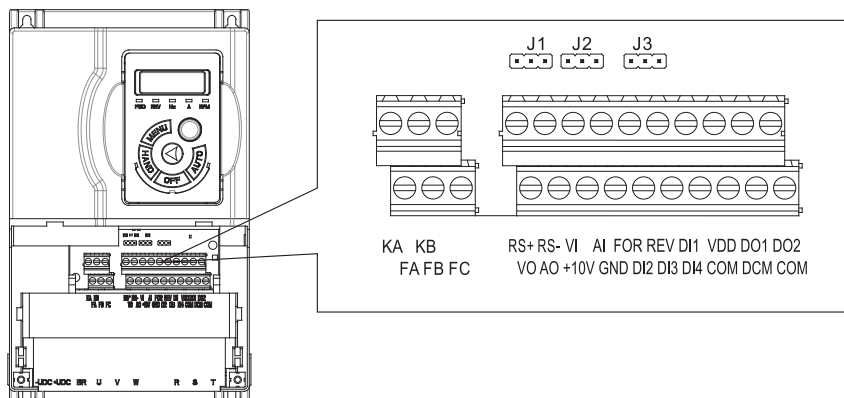
Terminals' specification:

Symbol	Description	Specification
KA-KB, FA-FB-FC	Relay output	1. Resistive Load: 250VAC 3A/30VDC 3A; 2. Inductive Load: 250VAC 0.2A/24VDC 0.1A (cosφ=0.4);
RS+, RS-	RS485 communication	Max baud rate: 115200bit/s;
VI, AI	Analog input	Both VI and AI can be configurated to 0-20mA or 0-10V by paramters: 1. Input Impedance: about 10kΩ; 2. Input Impedence: ≤200Ω;
FOR, REV, DI1, DI2, DI3, DI4	Digital input	1. Logic: >DC 19V Logic: 0; <DC 14V Logic: 1; 2. Voltage: DC 0-24V; 3. Input resistance: 5kΩ; 4. Input voltage Rang: Max ±30V; 5. Digital input can be selected to NPN or PNP mode by Jump switch J3, the default is: NPN mode;
DI4	Pulse input	1. Pulse input: 0.00-100.00kHz; 2. Voltage range: 24V ± 20%; 3. Input duty ratio: 40%-60%;

VDD	24V power supply	Max load 200 mA, with over load and short circuit protection functions.

DO1, DO2	Digital output	1. Open collector output;
		2. Output current range:
		  DO1: 0-30mA;
		  DO1: 0-50mA;
		3. Max voltage 30V;

DO1	Pulse output	DO1 can also be configured as pulse output channels: 1. Pulse output range: 0.00-100.00kHz; 2. Voltage range: 0-24V; 3. Duty ratio: 40%-60%; 4. Resistive load >1kΩ, Capacitive Load < 10nf;
VO, AO	Analog output	VO can be selected to the current output or voltage output via J2, default is: voltage output; AO only has current output mode; 1. Output Mode: 0~20mA or 0~10V; 2. Voltage Output: load larger than 500Ω; 3. Current Output: load larger than 500Ω;
+10V	10V power supply	Max load 10mA, with over load and short circuit protection functions.
GND	Analog and communication ground	Isolated from internal COM.
COM	Digital ground	Isolated from internal GND.
DCM	Digital output common terminal	Connect COM as Digital output reference ground.
J1	RS485 termination resistor jumper switch	Jumper switch 1-2 connected: OFF, termination resistor not connected, default state; Jumper switch 2-3 connected: ON, termination resistor connected;
J2	VO jumper switch	Jumper switch 1-2 connected: 0~10V , default state; Jumper switch 2-3 connected: 0~20mA;

J3	Digital input jumper switch	
		Jumper switch 1-2 connected: PNP mode;
		Jumper switch 2-3 connected: NPN mode, default state;

3.4.2 Control Circuit Terminals

Cable types	Cable specifications (mm^2)	Torque (N·m)
Shielded cables	0.4	0.4

3.4.3 Control Circuit Wiring
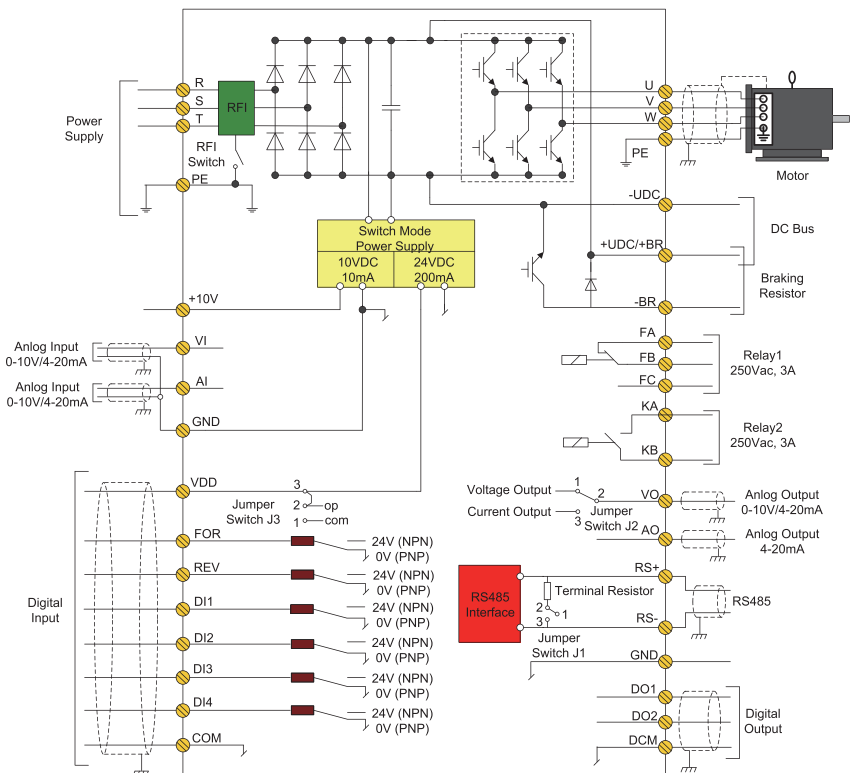
3.4.4 Digital Input Terminals Usage Specification

1. Open collector NPN mode wiring
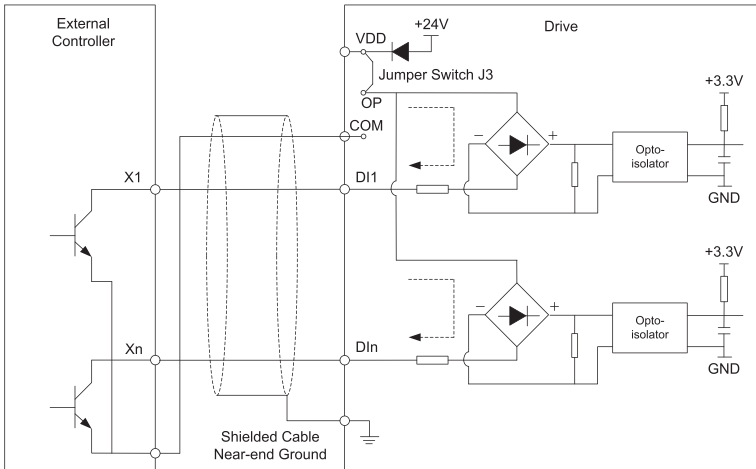
While using this mode, J3 1-2 must be connected (default state: VDD connects to OP).

2. Open collector PNP mode wiring
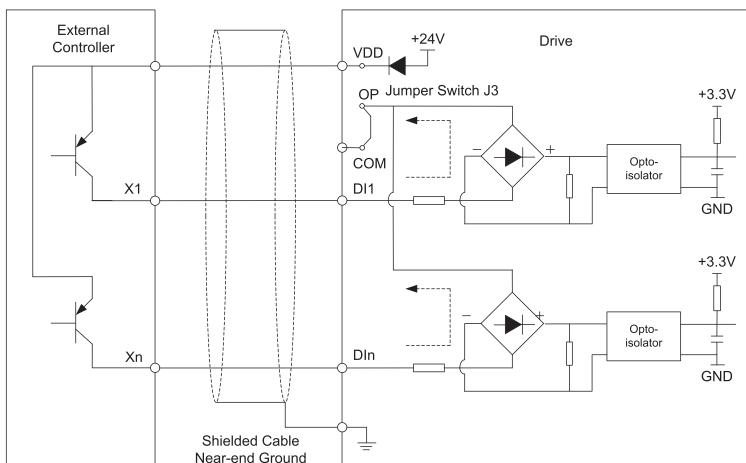
While using this mode, J3 2-3 must be connected (COM connects to OP).

3.4.5 Digital Output Terminals' Usage Specification
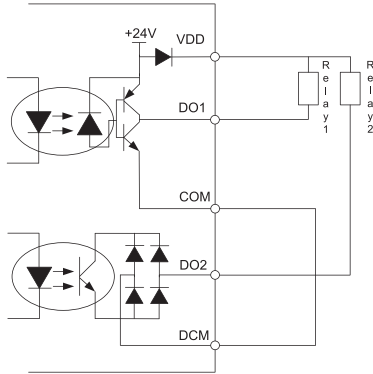
a. Use internal power supply   b. DO2 uses external power supply isolation
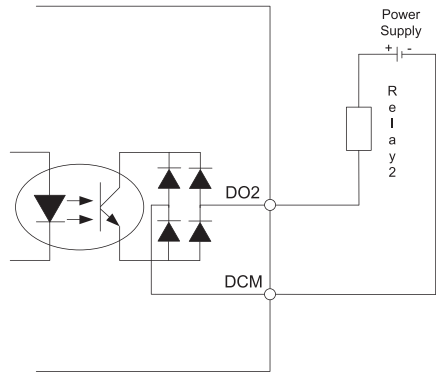
3.5 EMC Instructions

3.5.1 Introduction to EMC Standard

The drive satisfies the requirements of standard IEC/EN61800-3: 2004 (Adjustable speed electrical power drive systems part 3: EMC requirements and specific test methods).

3.5.2 Noise Abatement

1. When peripheral equipment and the drive share the power supply of one system, noise from the drive may be transmitted to other equipment in this system via power lines and result in misoperation and/or faults. In such a case, the following measures could be taken:

a. Mount input noise filter at input terminal of the drive;

b. Mount power supply filter at power input terminal of affected equipment;

c. Use isolation transformer to isolate the noise transmission path between other equipment and the drive.

2. As the wiring of peripheral equipment and the drive constitutes a circuit, the

unavoidable earthing leakage current of drive will cause equipment misoperation and/or faults. Disconnect the grounding connection of equipment may avoid this misoperation and/or faults.

3. Sensitive equipment and signal lines shall be mounted as far away from drive as possible.

4. Signal lines should be provided with shielded layer and reliably grounded. Alternatively, signal cable could be put into metallic conduits between which the distance shall be no less than 20cm, and shall be kept as far away from drive and its peripheral devices, cables as possible. Never make signal lines in parallel with power lines or bundle them up.

5. Signal lines must orthogonally cross power lines if this cross inevitable.

6. Motor cables shall be placed in thick protective screen like more than 2mm-thick pipelines or buried cement groove, also, power lines can be put into metallic conduit and grounded well with shielded cables.

7. Use 4-core motor cables of which one is grounded at close side of the drive and the other side is connected to motor enclosure.

8. Input and output terminals of drive are respectively equipped with radio noise filter and linear noise filter. For example, ferrite common mode choke can restrain radiation noise of power lines.

3.5.3 Grounding

Recommended ground electrode is shown in the figure below:
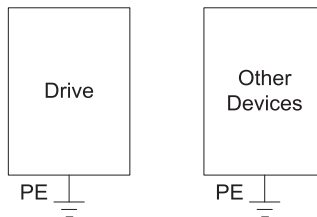
1. Use to the fullest extent the maximum standard size of grounding cables to reduce the impedance of grounding system;

2. Grounding wires should be as short as possible;

3. Grounding point shall be as close to the drive as possible;

4. One wire of 4-core motor cables shall be grounded at the drive side and connected to grounding terminal of motor at the other side. Better effect will be achieved if motor and drive are provided with dedicated ground electrodes;

5. When grounding terminals of various parts of system are linked together, leakage current turns into a noise source that may influence other equipment in the system, thus, grounding terminals of the drive and other vulnerable equipment should be separated;

6. Grounding cable shall be kept away from input & output of noise-sensitive equipment.

3.5.4 Leakage Current Suppression

Leakage current passes through the line-to-line and ground distributed capacitors at input & output sides of drive, and its size is associated with the capacitance of distributed capacitor and the carrier frequency. Leakage current is classified into ground leakage current and line-to-line leakage current.

1. Ground leakage current not only circulates inside drive system, but may also influence other equipment via ground loop. Such a leakage current may result in malfunction of RCD and other equipment. The higher the carrier frequency of drive is, the bigger the ground leakage current would be. The longer the motor cables and the bigger the parasitic capacitance are, the bigger the ground leakage current would be. Therefore, the most immediate and effective method for suppression of ground leakage current is to reduce carrier frequency and minimize the length of motor cables.

2. The higher harmonics of line-to-line leakage current that passes through between cables at output side of drive will accel the aging of cables and may bring about malfunction of other equipment. The higher the carrier frequency of drive is, the bigger the line-to-line leakage current would be. The longer the motor cables and the bigger the parasitic capacitance are, the bigger the line-to-line leakage current would be. Therefore, the most immediate and effective method for suppression of ground leakage current is to reduce carrier requency and minimize the length of motor cable. Line-to-line leakage current can also be effectively suppressed by mounting additional output reactors.

3. Remove RFI screw;

3.5.5 Induction Voltage Suppression

The drive outputs pulse voltage which will form induction voltage in the surface of the motor when the drive is not grounded. The induction voltage can be reduced by connecting the drive's PE terminal to the motor and closing RFI screw.

Chapter 4 Operation and Display Interface

4.1 Local Control Panel

Local Control Panel (LCP) can do the operation of parameters modifications, status monitoring and drive control (start, stop), its appearance is shown blow:
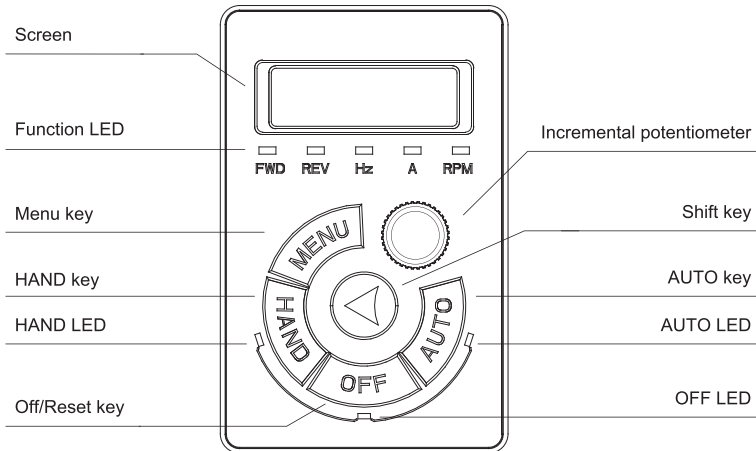
There are three operating states of the drive: HAND state, AUTO state and OFF state.

HAND state: The frequency can be changed by turning potentiometer. Press "HAND" key to set the drive in the HAND state.

AUTO state: The drive is controlled by control terminals or communication. Press "AUTO" key to set the drive in the HAND state;

OFF state: The drive stops. Press "OFF" key to set the drive in the OFF state.

1. LED Indicator

HAND LED: The HAND LED is on when the drive is in the HAND state.

OFF Led: The OFF LED is on when the drive is in the OFF state.

AUTO LED: The AUTO LED is on when the drive is in the AUTO state.

FWD, REV Led: Indicates that the drive runs forwards or reverse.

Hz, A, RPM Led: Indicates the meaning of data displayed on the screen.

2. Screen

There are 5 LED which can display reference, output frequency, monitoring data and warning/alarm code.

3. Keys

Symbol	Name	Function
MENU	Programming	Enter or exit menu.
◀	Shift	Select the displayed parameters in turn in the stop or running state; Select the digit to be modified when modifying parameters.
HAND	Hand	Push it to set the drive in the HAND control state.
OFF	Off/Reset	Stop the drive when it is in the running state and perform the reset operation when it is in the fault state.
AUTO	Auto	Push it to set the drive in the AUTO control state.
◎	Confirm	Push the incremental potentiometer. Enter the menu or confirm the parameter setting.

4. Incremental Potentiometer

Increase/decrease data or parameter, clockwise to increase, counter-clockwise to decrease.

4.2 Parameter Setting

Example: Change C03.10 [1] from 10.00 to 15.00:
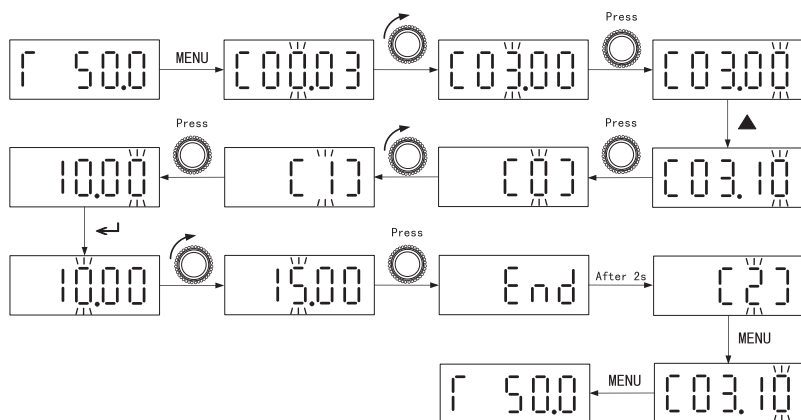
4.3 FWD/REV Status

Confirm the direction of the motor according to the set value, as shown in the following table:

Reference	Running status	Indicator Display
≥0	STOP	● ○ FWD REV
<0	STOP	○ ● FWD REV
≥0	FWD	● ○ FWD REV
≥0	REV	● ● FWD REV
<0	FWD	● ● FWD REV
<0	REV	○ ● FWD REV

Note: A flash light denotes the status coming, Light on indicates the current state, and light off means not in this state.
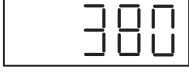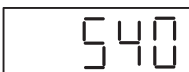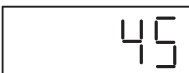
Example 1: The first line of the table indicates the drive is stop and the reference is greater than
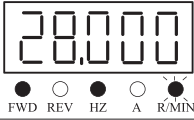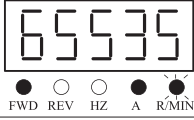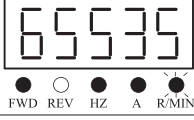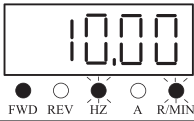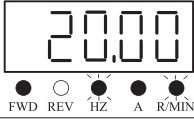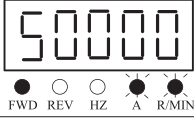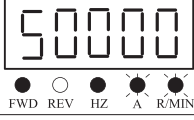
or equal to 0, means the dirve at some time in the future will run forward.

Example 2: The fourth line of the table represents the current drive is reverse running, and the reference setting is greater than or equal to 0, it means the drive at some time in the future will run forward.

4.4 Data Read-outs

Press ⓐ key to change the display items on LCP while displaying output frequency.

Display Items	Key-press	LCP Display	Action Description
Output Frequency	Initial interface	Г 50.0 ●FWD ○REV ●HZ ○A ○R/MIN	Show the output frequency C16.13 is 50.0Hz, display accuracy: 0.1
Reference	◀	50.000 ●FWD ○REV ●HZ ●A ○R/MIN	Show the reference C16.01 is 50.000, display accuracy: 0.001
Motor Current	◀	A 9.00 ●FWD ○REV ○HZ ●A ○R/MIN	Show the motor current C16.14 is 9.00A, display accuracy: 0.01
Motor Voltage	◀	380 ●FWD ○REV ●HZ ○A ●R/MIN	Show the motor voltage C16.12 is 380V, display accuracy: 1
Motor Speed	◀	1440 ●FWD ○REV ○HZ ○A ●R/MIN	Show the motor speed C16.05 is 1440rpm, display accuracy:1
DC Voltage	◀	540 ●FWD ○REV ○HZ ●A ●R/MIN	Show the DC Voltage C16.30 is 540 V, display accuracy: 1
Drive Temperature	◀	45 ●FWD ○REV ○HZ ○A ●R/MIN	Show the drive temperature C16.34 is 45°C , display accuracy:1

Feedback Value	◀	28.000 FWD REV HZ A R/MIN	Show the feedback value C16.52 is 28.000, display accuracy: 0.001
Counter A	◀	65535 FWD REV HZ A R/MIN	Show counter A C16.72 is 65535, display accuracy: 1
Counter B	◀	65535 FWD REV HZ A R/MIN	Show counter B C16.72 is 65535, diaplay accuracy: 1
Analog in VI	◀	10.00 FWD REV HZ A R/MIN	Show analog in VI C16.62 is 10.00V, display accuracy: 0.01
Analog in AI	◀	20.00 FWD REV HZ A R/MIN	Show Analog in AI C16.63 is 20.00mA, display accuracy: 0.01
Pulse Input	◀	50000 FWD REV HZ A R/MIN	Show pulse input C16.68 is 50.000kHz, display accuracy: 0.001
Pulse Output	◀	50000 FWD REV HZ A R/MIN	Show pulse output (C16.69) is 50000Hz, display accuracy: 1

Note: The drive only monitors output frequency, reference and output current reference by default. For monitoring other status (DC voltage, etc.), please set the parameter C00.33 (refer to instructions).

4.5 View Alarm Record

If the drive trips, fault code will be showed to illustrate the reason, the drive will save the last 10 trip record. See through parameter C15.30.

4.6 LED Display

0	1	2	3	4	5	6	7	8	9
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				

Chapter 5   Parameter Overview

Par. No.	Name	Range	Unit	Default
*	Par. Group 00: Operation/Display			
*C00.03	Regional Settings	0: 50Hz 1: 60Hz		0
C00.04	Operating State at Power-up	0: Resume 1: Forced stop, ref=old 2: Forced stop, ref=0		0
*C00.06	Grid Type	0~122		*
C00.10	Active Set-up	1: Set-up 1 2: Set-up 2 9: Multi set-up		1
C00.11	Edit Set-up	1: Set-up 1 2: Set-up 2		1
*C00.12	Link Set-up	0: Not linked 20: Linked		20
C00.31	Custom Readout Min. Value	0.00~99999.00		0.00
C00.32	Custom Readout Max. Value	0.00~99999.00		100.00
C00.33	LCP Display Option	0~65535		0
C00.40	HAND Key Option	0: Disabled 1: Enabled		1
C00.41	OFF Key Option	0: Disabled 1: Enabled 2: Enabled reset only		1
C00.42	AUTO Key Option	0: Disabled 1: Enabled		1
C00.46	One Key Recovery Time	0: Disabled 5: 5s 10: 10s 15: 15s 20: 20s		5
C00.47	LCP Adjustment Step	0: 0.1 1: 1 2: 10		0
*C00.51	Set-up Copy	0: No copy 1: Copy from set-up 1 2: Copy from set-up 2 9: Copy from factory setting		0
C00.60	Set-up Locked	0: Disabled 1: Enabled		0
C00.62	Password	0~65535		0
C00.63	Password Comfirm	0~65535		0
C00.64	Drive Running Time	0~65535		0

Par. No.	Name	Range	Unit	Default
		Par. Group 01: Load/Motor		
C01.00	Configuration Mode	0: Speed open loop 3: Process closed loop 4: Torque open loop		0
*C01.01	Motor Control Principle	0: V/F 1: VVC+ 2: Vector 1		1
*C01.03	Torque Characteristics	0: Constant torque 1: Variable torque 3: Auto Energy Optimization (AEO)		0
*C01.06	Rotation Direction Selection	0: Same direction 1: Reverse direction		0
*C01.10	Motor Type Selection	0: Asynchronous motor 1: SPM 2: Unsaturated IPM (Salient) 3: IPM (Salient)		0
C01.14	Damping Gain	0~250	%	120
C01.15	Low Speed Filter Time Const.	0.01~20.00	s	*
C01.16	High Speed Filter Time Const.	0.01~20.00	s	*
C01.17	Voltage Filter Time Const.	0.001~1.000	s	*
*C01.20	Rated Motor Power	Motor dependant	kW	*
*C01.22	Rated Motor Voltage	50~1000	V	*
*C01.23	Rated Motor Frequency	20~400	Hz	*
*C01.24	Rated Motor Current	Motor dependant	A	*
*C01.25	Rated Motor Speed	100~9999	rpm	*
C01.26	Rated Motor Torque	0.1~6553.5	N·m	0
*C01.29	Automatic Motor Adaption (AMA)	0: No function 1: Static complete AMA 2: Static easy AMA 3: Static complete AMA + Back-EMF 4: Static complete AMA + System inertial 5: static complete AMA + Back-EMF + System inertial		0
*C01.30	Stator Resistance (Rs)	Motor dependant	Ω	*
*C01.31	Rotor Resistance(Rr)	Motor dependant	Ω	*
*C01.33	Stator Leakage Reactance (X1)	Motor dependant	mH	*
*C01.35	Main Reactance (Xh)	Motor dependant	mH	*
C01.37	D-axis Inductance	Motor dependant		*
C01.38	Q-axis Inductance	Motor dependant		*

Par. No.	Name	Range	Unit	Default
*C01.39	Motor Poles	2~100	P	4
*C01.40	Back EMF at 1000RPM	0~9000	V	*
*C01.42	Motor Cable Length	0~150	m	*
*C01.44	D-axis Inductance Sat.	Motor dependant	Ω	*
*C01.45	Q-axis Inductance Sat.	Motor dependant	Ω	*
C01.47	PM Resistance Correction	0: Disable 1: Enable		0
*C01.48	Current at Min Inductance for D-axis	20~200	%	100
*C01.49	Current at Min Inductance for Q-axis	20~200	%	100
C01.50	Motor Magnetisation at Zero Speed	0~300	%	100
C01.52	Min Speed Normal Magnetising	0.0~10.0	Hz	0.0
C01.55	V/F Characteristic-V	0.0~999.9	V	
C01.56	V/F Characteristic-F	0.0~400.0	Hz	
C01.60	Low Speed Load Compensation	0~199	%	100
C01.61	High Speed Load Compensation	0~199	%	100
C01.62	Slip Compensation	-400~399	%	*
C01.63	Slip Compensation Time Constant	0.05~5.00	s	0.10
C01.64	Resonance Dampening	0~3000	%	*
C01.65	Resonance Dampening Time constant	0.005~0.050	s	0.005
C01.66	Min. Current at Low Speed	0~120	%	50
C01.67	PM Inertia AMA Torque Bandwidth	0~300	%	100
C01.68	PM Inertia AMA Feedforward Proportional Gain	0~100	%	100
C01.69	System Inertia	0~10000.0000	kg·m^2	*
C01.70	PM Start Mode	0: IPD 1: Parking		1
C01.71	Start Delay	0.0~10.0	s	0.0
C01.72	Start Function	0: DC hold 2: Coast		2
*C01.73	Flying Start	0: Disabled 1: Enabled		0
*C01.75	Min. Start Frequency	0.00~50.00	Hz	0.00

Par. No.	Name	Range	Unit	Default
C01.76	Jump Frequency	0.0~20.0	Hz	0.0
C01.80	Function at Stop	0: Coast 1: DC hold		0
C01.82	Min Speed for Function at Stop	0.0~400.0	Hz	0.0
C01.88	AC Brake Gain	1.0~2.0		1.4
C01.90	Motor Thermal Protection	0: No protection 1: Thermistor warning 2: Thermistor trip 3: ETR warning 4: ETR trip 5: ETR warning (Self-cooling mode) 6: ETR trip (Self-cooling mode)		0
C01.91	Motor Overload Protection Time	1~60	min	2
C01.92	Motor Overload Protection Factor	100~160	%	150
*C01.93	Thermistor Resource	0: None 1: Terminal VI		0
Par. Group 02: Brake Function				
C02.00	DC Hold Current	0~150	%	50
C02.01	DC Brake Current	0~150	%	50
C02.02	DC Braking Time	0.0~60.0	s	10.0
C02.04	DC Brake Cut in Speed	0.0~400.0	Hz	0.0
C02.06	Parking Current	0~150	%	100
C02.07	Parking Time	0.1~60.0	s	3.0
C02.08	Motor Demagnetization	0~100	%	100
C02.10	Brake Function	0: Off 1: Resistor brake 2: AC brake		0
C02.11	Brake Resistor	5~65535	Ω	*
*C02.14	Brake Resistor Threshold Voltage	Grid type dependant	V	*
C02.15	Over-voltage Control Threshold Voltage	Grid type dependant	V	*
C02.16	AC Brake Max Current	0~150	%	100
C02.17	Over-voltage Control	0: Disabled 2: Mode 1 3: Mode 2		0
C02.18	Over-voltage Control Integral Time	0.01~0.10	s	0.05
C02.19	Over-voltage Control Proportional Gain	0~200	%	100

Par. No.	Name	Range	Unit	Default
C02.20	Release Brake Current	0.00~1200.00	A	0.00
C02.22	Activate Brake Speed	0.0~400.0	Hz	0.0
Par. Group 03: Reference/Ramps				
C03.00	Reference Range	0: 0~C03.03 1: -C03.03~C03.03		0
C03.03	Maximum Reference	0.0~6553.5		50.0
C03.07	Main Reference Calculation	0: Preset reference + Reference source1, 2, 3 1: Preset reference priority 2: Reference source 2,3 operation 3: Switchover between Reference source 1 and Reference source 2 4: Switchover between Reference source 1 and Reference source 2,3 operation		0
C03.08	Reference source 2,3 operation mode	0: Reference source 2 + Reference source 3 1: Reference source 2 - Reference source 3 2: Max (Reference source 2, Reference source 3) 3: Min (Reference source 2, Reference source 3)		0
C03.10	Preset Reference	-100.00~100.00	%	0.00
C03.11	Jog speed	0.0~400.0	Hz	5.0
C03.12	Catch up/Slow down Value	0.00~100.00	%	0.00
C03.13	Up/Down Value	0.01~50.00	Hz	0.10
C03.15	Reference Source 1	0: No function 1: Terminal VI 2: Terminal AI 8: Pulse input DI4 10: Preset Reference[0] 11: Communication 21: LCP		1
C03.16	Reference Source 2	See C03.15		2
C03.17	Reference Source 3	See C03.15		11
C03.18	Relative Reference Source	See C03.15		0
C03.19	Up/Down Value Store	0: No function 1: Stop save 2: Power down save		0
C03.21	Ramp time switchover frequency	0.0~3276.0	Hz	0.0
C03.39	Ramp Time Scale	0: 0.1s 1: 0.01s		1
C03.40	Ramp 1 Type	0: Linear 2: S ramp		0
C03.41	Ramp 1 Ramp Up Time	0.05~655.35	s	*
C03.42	Ramp 1 Ramp Down Time	0.05~655.35	s	*

Par. No.	Name	Range	Unit	Default
C03.50	Ramp 2 Type	0: Linear 2: S ramp		0
C03.51	Ramp 2 Ramp Up Time	0.05~655.35	s	*
C03.52	Ramp 2 Ramp Down Time	0.05~655.35	s	*
C03.60	Ramp 3 Type	0: Linear 2: S ramp		0
C03.61	Ramp 3 Ramp Up Time	0.05~655.35	s	*
C03.62	Ramp 3 Ramp Down Time	0.05~655.35	s	*
C03.70	Ramp 4 Type	0: Linear 2: S ramp		0
C03.71	Ramp 4 Ramp Up Time	0.05~655.35	s	*
C03.72	Ramp 4 Ramp Down Time	0.05~655.35	s	*
C03.80	Jog Ramp Time	0.05~655.35	s	*
C03.85	Ramp 5 Ramp Up Time	0.05~655.35	s	*
C03.86	Ramp 5 Ramp Down Time	0.05~655.35	s	*
C03.88	Ramp 6 Ramp Up Time	0.05~655.35	s	*
C03.89	Ramp 6 Ramp Down Time	0.05~655.35	s	*
C03.91	Ramp 7 Ramp Up Time	0.05~655.35	s	*
C03.92	Ramp 7 Ramp Down Time	0.05~655.35	s	*
C03.94	Ramp 8 Ramp Up Time	0.05~655.35	s	*
C03.95	Ramp 8 Ramp Down Time	0.05~655.35	s	*
C03.96	Preset Reference and Ramp Time Related	0: Not related 1: Related		0
Par. Group 04: Limits/Warnings				
*C04.00	PM Current Control Algorithm	0: Control Algorithm 1 1: Control Algorithm 2		0
*C04.01	PM Current Controller Feed Forward Gain	0~400	%	100
*C04.10	Motor Speed Direction	0: Clockwise 1: Counter clockwise 2: Both directions		2
*C04.12	Motor Speed Lower Limit	0.0~400.0	Hz	0.0
*C04.14	Motor Speed Upper Limit	0.0~400.0	Hz	65.0
C04.16	Torque Limit Motor Mode	0~1000	%	160
C04.17	Torque Limit Generator Mode	0~1000	%	160
C04.18	Current Limit	0~300	%	*
*C04.19	Max Output Frequency	0.0~400.0	Hz	65.0

Par. No.	Name	Range	Unit	Default
C04.21	Frequency Upper Limit Source	0: No function 1: Terminal VI 2: Terminal AI 8: Pulse input DI4 10: Preset reference [0] 11: Local bus 21: LCP		0
C04.23	Power Limit Motor Mode	0~400	%	400
C04.24	Power Limit Generator Mode	0~400	%	400
C04.28	Low Voltage Overload Limit	5~100	%	100
C04.29	Low Voltage Udc Limit	50~1000	V	220/380
C04.42	Counter Store at Power down	0: Disable 1: Counter A save 2: Counter B save 3: Both counter A and B save		0
C04.50	Warning Current Low	0.00~C16.37	A	0.0
C04.51	Warning Current High	0.00~C16.37	A	*
C04.52	Warning Frequency Low	0.0~400.0	Hz	0.0
C04.53	Warning Frequency High	0.1~400.0	Hz	65.0
C04.54	Warning Reference Low	-200.00~200.00	%	0.00
C04.55	Warning Reference High	-200.00~200.00	%	100.00
C04.56	Warning Feedback Low	-200.00~200.00	%	0.00
C04.57	Warning Feedback High	-200.00~200.00	%	100.00
*C04.58	Missing Motor Phase Function	0: Disable 1: Enable		1
C04.59	Current/Torque Limit Warning Selection	0: Disable 1: Enable		1
C04.61	Bypass Speed From	0.0~400.0	Hz	0.0
C04.63	Bypass Speed to	0.0~400.0	Hz	0.0
C04.70	Minimum Torque at Zero Speed	0~100	%	5
C04.71	Minimum Torque Cut-off Frequency	0.1~50.0	Hz	3.0
C04.72	Torque open loop stop mode	0: Torque mode 1: Speed mode		0
C04.80	Unbalance Detection Frequency	5.0-400.0	Hz	15.0
C04.81	Grear Ratio	1.0~100.0		9.0
C04.82	Unbalance Detection Threshold Value	10~300	%	300

Par. No.	Name	Range	Unit	Default
C04.83	Unbalance WaitingTime	0~100	S	5
C04.84	Unbalance DetectionTime	0~100	S	10
Par. Group 05: Digital In/Out				
C05.04	DI Filter Time	2~16	ms	4
C05.05	DI Terminal Logic Selection	0~255		0
C05.06	DO/Relay Terminal Logic Selection	0~255		0
C05.09	Function at External Alarm	0: Off 2: Stop and warning 3: Jogging and warning 4: Max. speed and warning 5: Stop and trip 6: Only warning		0

Par. No.	Name	Range	Unit	Default
C05.10	Terminal FOR	0: No operation 1: Reset 2: Coast inverse 3: Coast and reset inverse 6: Stop inverse 8: Start 9: Latched start 10: Reversing 11: Start reversing 12: Enable start forward only 13: Enable start reverse only 14: Jog 15: Preset ref. bit0 16: Preset ref. bit1 17: Preset ref. bit2 18: Preset ref. bit3 19: Freeze reference 20: Freeze output 21: Speed up 22: Speed down 24: Main reference calculation switchover 32: Pulse input 34: Ramp bit0 35: Ramp bit1 35: Ramp bit2 37: Latched reversing 38: Jog reverse 42: Coast 43: External alarm input 46: Stop 50: Speed control/torque control switchover 60: Counter A 62: Reset counter A 63: Counter B 65: Reset counter B 110: Process PID pause		8
C05.11	Terminal REV	See C05.10		11
C05.12	Terminal DI1	See C05.10		15
C05.13	Terminal DI2	See C05.10		16
C05.14	Terminal DI3	See C05.10		17
C05.15	Terminal DI4	See C05.10		18

Par. No.	Name	Range	Unit	Default
C05.30	Terminal DO1	0: No operation 1: Drive ready 3: Remote control ready 4: Drive running/No warning 5: Drive running 7: Run in range/No warning 8: Run on reference/No warning 9: Alarm 10: Alarm or warning 12: Out of current range 13: Below current low 14: Above current high 15: Out of frequency range 16: Below frequency low 17: Above frequency high 18: Out of feedback range 19: Below feedback low 20: Above feedback high 21: Thermal warning 22: Ready 23: Remote ready 24: Ready, voltage OK 25: Reverse 26: Bus OK 32: Mech. brake control 36: Control word bit 11 37: Control word bit 12 38: Communication control 40: Out of reference range 41: Below reference low 42: Above reference high 43: External alarm 44: Unbalance warning 51: Drive in HAND state 52: Drive in AUTO state 53: No alarm 55: Reverse running 60: Comparator 0 61: Comparator 1 62: Comparator 2 63: Comparator 3 70: Logic rule 0 71: Logic rule 1 72: Logic rule 2 73: Logic rule 3 80: Simple PLC digital output 1 81: Simple PLC digital output 2 82: Simple PLC relay 1 83: Simple PLC relay 2		0

Par. No.	Name	Range	Unit	Default
C05.31	Terminal DO2	See C05.30		0
C05.40	Relay Function	See C05.30		9, 5
C05.41	Relay On Delay Time	0.00~600.00	s	0.00
C05.42	Relay Off Delay Time	0.00~600.00	s	0.00
C05.55	Terminal DI4 Low Frequency	0.00~C05.56	kHz	0.00
C05.56	Terminal DI4 High Frequency	C05.55~100.00	kHz	50.00
C05.57	Terminal DI4 Low Reference Value	-200.00~200.00	%	0.00
C05.58	Terminal DI4 High Reference Value	-200.00~200.00	%	100.00
C05.59	Terminal DI4 Filter Time	1~1000	ms	100
C05.60	Terminal DO1 Pulse Output	0: Digital output 10: Output frequency 11: Reference 12: Feedback 13: Output current 16: Power 17: Speed 18: Motor voltage 20: Bus control 21: Terminal DI4 pulse input 22: Terminal VI input 23: Terminal AI input 26: DC link voltage 30: Output torque 38: Communication control		0
C05.61	Pulse Output Min. Freq.	0.00~C05.62	kHz	0.00
C05.62	Pulse Output Max. Freq.	C05.61~100.00	kHz	50.00
C05.63	Pulse Output Min. Scale	0.00~200.00	%	0.00
C05.64	Pulse Output Max. Scale	0.00~200.00	%	100.00
		Group 06: Analog In/Out		
C06.00	Live Zero Timeout Time	1~99	s	10
C06.01	Live Zero Timeout Function	0: Off 1: Freeze output 2: Stop 3: Jogging 4: Max. speed 5: Stop and trip		0
C06.10	Terminal VI Low Voltage	0.00~C06.11	V	0.07
C06.11	Terminal VI High Voltage	C06.10~10.00	V	10.00
C06.12	Terminal VI Low Current	0.00~ C06.13	mA	0.14

Par. No.	Name	Range	Unit	Default
C06.13	Terminal VI High Current	C06.12~20.00	mA	20.00
C06.14	Terminal VI Low Reference Value	-200.00~200.00	%	0.00
C06.15	Terminal VI High Reference Value	-200.00~200.00	%	100.00
C06.16	Terminal VI Filter Time	0.00~10.00	s	0.01
C06.18	Terminal VI Zero Dead Band	0.00~20.00	V/mA	0.00
C06.19	Terminal VI Mode	0: Voltage mode 1: Current mode		0
C06.20	Terminal AI Low Voltage	0.00~9.99	V	0.07
C06.21	Terminal AI High Voltage	0.10~10.00	V	10.00
C06.22	Terminal AI Low Current	0.00~19.99	mA	0.14
C06.23	Terminal AI High Current	0.01~20.00	mA	20.00
C06.24	Terminal AI Low Reference Value	-200.00~200.00	%	0.00
C06.25	Terminal AI High Reference Value	-200.00~200.00	%	100.00
C06.26	Terminal AI Filter Time	0.00~10.00	s	0.01
C06.28	Terminal AI Zero Dead Band	0.00~20.00	V/mA	0.00
C06.29	Terminal AI Mode	0: Voltage mode 1: Current mode		1
C06.70	Terminal VO Mode	0: 0~20mA 1: 4~20mA 3: 0~10V		3
C06.71	Terminal VO Analog Output	0: Digital output 10: Output frequency 11: Reference 12: Feedback 13: Output current 16: Power 17: Speed 18: Motor voltage 20: Bus control 21: Terminal DI4 pulse input 22: Terminal VI input 23: Terminal AI input 26: DC link voltage 30: Output torque 38: Communication control		0
C06.73	Terminal VO Output Min. Scale	0.00~200.00	%	0.00
C06.74	Terminal VO Output Max. Scale	0.00~200.00	%	100.00

Par. No.	Name	Range	Unit	Default
C06.75	Terminal VO Min. Output	0.00~C06.76		0.00/4.00
C06.76	Terminal VO Max. Output	C06.75~10.00/20.00		10.00 /20.00
C06.81	LCP Min. Ref.	-200.00~200.00	%	0.00
C06.82	LCP Max. Ref.	-200.00~200.00	%	100.00
C06.90	Terminal VO Mode	0: 0~20mA 1: 4~20mA 3: 0~10V		3
C06.91	Terminal VO Analog Output	See C06.71		0
C06.93	Terminal VO Output Min. Scale	0.00~200.00	%	0.00
C06.94	Terminal VO Output Max. Scale	0.00~200.00	%	100.00
C06.95	Terminal VO Min. Output	0.00~C06.76		0.00/4.00
C06.96	Terminal VO Max. Output	C06.75~10.00/20.00		10.00 /20.00
Group 07: PID Controller				
C07.12	Torque PI Proportional Gain	0~500	%	100
C07.13	Torque PI Integral Time	0.002~2.000	s	0.020
C07.20	Process PID Feedback Source	0: No function 1: Terminal VI 2: Terminal AI 8: Pulse input DI4 11: Local bus		0
C07.30	Process PID Normal/Inverse	0: Normal 1: Inverse		0
C07.31	Process PID Anti Windup	0: Disable 1: Enable		1
C07.32	Process PID Start	0.0~200.0	Hz	0.0
C07.33	Process PID Proportional Gain	0.0~10.00		0.01
C07.34	Process PID Integral Time	0.01~655.35	s	655.35
C07.35	Process PID Differential Time	0.00~10.00	s	0.00
C07.36	Process PID Differential limit	1.0~50.0		5.0
C07.38	Feedforward reference coefficient	0~400	%	0
C07.39	Process PID Deviation Limit	0.0~200.0	%	0.1
C07.41	Process PID Output Lower Limit	-100.00~100.00	%	0.00
C07.42	Process PID Output Upper Limit	-100.00~100.00	%	100.00

Par. No.	Name	Range	Unit	Default
C07.45	Feedforward Source	0: No function 1: Terminal VI 2: Terminal AI 8: Pulse input DI4 11: Communication	%	200.0
C07.46	Feedforward Control Logic Selection	0: Positive logic 1: Inverse logic	%	200.0
C07.47	Process PID Reference Coefficient	0: C07.48 1: Terminal VI 2: Terminal AI 8: Pulse input DI4 11: Communication		0
C07.48	Process PID Reference Coefficient Digital Setting	0.00~100.00	%	100.00
C07.49	Process PID Parameter Switchover Deviation	0.0~200.0	%	200.0
C07.50	Process PID Integral Lower limit	-100.00~100.00	%	0.00
C07.51	Process PID Integral Upper limit	-100.00~100.00	%	100.00
C07.55	Process PID Deviation Control Method	0: Mode 0 1: Mode 1 2: Mode 2		0
Group 08: Communiction				
C08.01	Control Site	0: Digital and communication 1: Digital only 2: Communication only		0
C08.03	Communication Timeout Time	0.01~650.0	s	1.0
C08.04	Communication Timeout Function	0: Off 1: Freeze output 2: Stop 3: Jogging 4: Max. speed 5: Stop and trip		0
C08.06	Reset Communication Timeout	0: Do not reset 1: Do reset		0
C08.30	Protocol	0: FC 2: Modbus RTU		0
C08.31	Address	0~247		1

Par. No.	Name	Range	Unit	Default
C08.32	Baud Rate	0: 2400 1: 4800 2: 9600 3: 19200 4: 38400 5: 57600 6: 76800 7: 115200 8~9: Reserved	bit/s	2
C08.33	Parity/Stop Bits	0: Even parity (1 stop bit) 1: Odd parity (1 stop bit) 2: No parity (1 stop bit) 3: No parity (2 stop bit)		2
C08.35	Min. Response Delay	0.000~0.500	s	0.002
C08.36	Max. Response Delay	0.010~10.000	s	5.000
C08.38	Message Response	0: Normal 1: Only response exception message 2: Not response		0
C08.39	Parameter Write Store	0: Not saved at power down 1: Saved at power down		0
C08.50	Coasting Select	0: Digital input 1: Bus 2: Logic AND 3: Logic OR		0
C08.53	Start Select	See C08.53		0
C08.54	Reversing Select	See C08.53		3
C08.56	Preset Reference Select	See C08.53		3
Group 13: Simple PLC				
C13.00	Simple PLC Mode	0: Off 1: Order execution 2: Parallel execution		0

Par. No.	Name	Range	Unit	Default
C13.01	Start Event	0: False 1: True 2: Running 3: In current range-No warning 4: On reference-No warning 7: Out of current range 8: Below current low 9: Above current high 10: Out of frequency range 11: Below frequency low 12: Above frequency high 13: Out of feedback range 14: Below feedback low 15: Above feedback high 16: Thermal warning 17: Mains out of range 18: Reversing 19: Warning 20: Alarm (trip) 21: Alarm (trip lock) 22: Comparator 0 23: Comparator 1 24: Comparator 2 25: Comparator 3 26: Logic rule 0 27: Logic rule 1 28: Logic rule 2 29: Logic rule 3 30: Simple PLC time-out 0 31: Simple PLC time-out 1 32: Simple PLC time-out 2 33: Terminal FOR 34: Terminal REV 35: Terminal DI1 36: Terminal DI2 37: Terminal DI3 38: Terminal DI4 39: Start command 40: Drive stopped 50: Simple PLC time-out 3 51: Simple PLC time-out 4 52: Simple PLC time-out 5 53: Simple PLC time-out 6 54: Simple PLC time-out 7		39
C13.02	Stop Event	See C13.01		40
C13.03	Reset Simple PLC	0: Do not reset 1: Do reset		0

Par. No.	Name	Range	Unit	Default
C13.04	Simple PLC Store	0: No function 1: Power down save 2: Stop save 3: Both power down and stop save		0
C13.10	Comparator Operand	0: Disabled 1: Reference 2: Feedback 3: Motor speed 4: Motor current 6: Motor power 7: Motor voltage 12: Terminal VI input 13: Terminal AI input 20: Fault number 30: Counter A 31: Counter B		0
C13.11	Comparator Operator	0: Less than 1: Approx. Equal 2: Greater than		1
C13.12	Comparator Value	-9999.0~9999.0		0.0
C13.20	Simple PLC Timer	0.0~99999.0	s	0.0
C13.40	Logic Rule Boolean 1	See C13.01		0
C13.41	Logic Rule Operator 1	0: Disabled 1: AND 2: OR 3: AND NOT 4: OR NOT 5: NOT AND 6: NOT OR 7: NOT AND NOT 8: NOT OR NOT		0
C13.42	Logic Rule Boolean 2	See C13.01		0
C13.43	See C13.01	See C13.41		0
C13.44	Logic Rule Boolean 3	See C13.01		0
C13.51	Simple PLC Event	See C13.41		0

Par. No.	Name	Range	Unit	Default
C13.52	Simple PLC Action	0: Disabled 1: No action 2: Select set-up 1 3: Select set-up 2 10: Select preset ref 0 11: Select preset ref 1 12: Select preset ref 2 13: Select preset ref 3 14: Select preset ref 4 15: Select preset ref 5 16: Select preset ref 6 17: Select preset ref 7 18: Select ramp 1 19: Select ramp 2 20: Select ramp 3 21: Select ramp 4 22: Run 23: Run reverse 24: Stop 27: Coast 28: Freeze output 29: Start timer 0 30: Start timer 1 31: Start timer 2 32: Set terminal DO1 low 33: Set terminal DO2 low 34: Set relay 1 low 35: Set relay 2 low 38: Set terminal DO1 high 39: Set terminal DO2 high 40: Set relay 1 high 41: Set relay 2 high 50: Select preset ref 8 51: Select preset ref 9 52: Select preset ref 10 53: Select preset ref 11 54: Select preset ref 12 55: Select preset ref 13 56: Select preset ref 14 57: Select preset ref 15 60: Reset counter A 61: Reset counter B 65: Start timer 3 66: Start timer 4 67: Start timer 5 68: Start timer 6 69: Start timer 7 70: Reverse		0
Group 14: Special Functions				

Par. No.	Name	Range	Unit	Default
C14.01	Switching Frequency	2~6: 2~6kHz 7: 8kHz 8: 10kHz 9: 12kHz 10: 16kHz		*
*C14.03	Overmodulation	90.0~105.5	%	100.0
C14.08	Damping Gain Factor	0~200	%	96
C14.10	Action at Mains Failure	0: No function 1: Ctrl ramp-down 2: Ctrl ramp-down, trip 3: Coasting 4: Kinetic back-up 5: Kinetic back-up, trip 6: Alarm		0
C14.11	Mains Voltage at Mains Failure	100~800	V	*
C14.12	Function at Mains Imbanlance	0: Trip (Low sensitivity) 1: Warning (Low sensitivity) 2: Disabled 4: Warning (Middle sensitivity) 5: Trip (Middle sensitivity) 6: Trip (High sensitivity)		0
C14.16	Low Voltage Mode	0: Disable 1: Enable		0
C14.17	Automatic Voltage Regulation	0: Disable 1: Enable		1
C14.18	Delay Time of Auto Restart When Power up Again	0.0~3600.0	s	0.0
C14.20	Reset Mode	0: Manual reset 1~10: Auto reset 1-10 times 11: Auto reset 15 times 12: Auto reset 12 times 13: Infinite auto reset		0
C14.21	Automatic Restart Time	0~600	s	10
C14.22	Operation Mode	0: Normal operation 2: Initialization 3: Backup user settings 4: Recover user settings		0
C14.23	Trip lock	0: Disable 1: Enable		0
C14.24	Trip Delay at Current Limit	0~60	s	60
C14.25	Trip Delay at Torque Limit	0~60	s	60
C14.27	Action at Drive Fault	0: Trip 1: Warning		0
C14.30	Current Controller 1 Proportional Gain	0~500	%	100

Par. No.	Name	Range	Unit	Default
C14.31	Current Controller 1 Integral Time	0.000~2.000	s	0.020
C14.32	Current Controller Filter Time	2.0~100.0	ms	*
C14.33	Current Controller 2 Proportional Gain	0~300	%	0
C14.34	Current Controller 2 Integral Time	0.000~2.000	s	0.020
*C14.40	VT Level	40~90	%	90
*C14.41	AEO Min. Magnetisation	40~75	%	66
*C14.51	DC Link Compensation	0: Off 1: Mode1 2: Mode2		0
C14.68	Overheat Warning Relative Temperature	0~25	°C	5
C14.70	Steady State Undervoltage Threshold	200V: 171~198V 400V: 296~342V	V	176/304
C14.71	Steady State Undervoltage Threshold Protection Time	60~3600	S	3600
C14.72	Excitation Current Controller Bandwidth	10~200	Hz	30
C14.73	Excitation Current Controller Damping	1~200		100
C14.74	Excitation Current Controller Load Compensation Factor	0.1~1.0		0.5
C14.75	Torque Current Controller Bandwidth	0.01~1.00	Hz	0.03
C14.76	Torque Current Controller Damping	1~200		1
C14.77	Weak Magnetic Controller Bandwidth	0.1~10.0	Hz	2.0
C14.78	Weak Magnetic Controller Damping	0.01~1.00		0.10

Par. No.	Name	Range	Unit	Default
C14.82	User-defined Readout at Failure	0: No function 1: Reference 2: Output voltage 3: Output Torque 4: IGBT Temperature 5: Digital Input State 6: Digital Output State 7: Relay Output State 8: VI Input 9: AI Input 10: VO Output 11: AO Output 12: DI3 Pulse Input 13: DO1 Pulse Output		5, 7
		Group 15: Drive Information		
C15.00	Operating Days	0~9999	d	
C15.01	Running Hours	0~65535	h	
C15.02	kWh Counter	0~65535	kWh	
C15.03	Power Up's	0~65535		
C15.04	Over Temperatures	0~65535		
C15.05	Over Voltages	0~65535		
C15.06	Reset kWh Counter	0: Do not reset 1: Do reset		0
C15.07	Reset Running Hours Counter	0: Do not reset 1: Do reset		0
C15.30	Alarm Code	0~255		
C15.31	Internal Fault Reason	-32767~32767		
C15.32	Output Frequency at Failure	0.0~6553.5	Hz	
C15.33	Output Current at Failure	0.01~655.35	A	
C15.34	DC Link Voltage at Failure	0~65535	V	
C15.35	Running Time at Failure	0~65535	Min	
C15.36	User-defined Readout 1 at Failure			
C15.37	User-defined Readout 2 at Failure			
C15.38	Warning Code	0~255		
C15.43	Software Version			
		Group 16: Data Readouts		
C16.00	Control Word	0~65535		
C16.01	Reference	-4999.000~4999.000		

Par. No.	Name	Range	Unit	Default
C16.02	Reference Percentage	-200.0~200.0	%	
C16.03	Status Word	0~65535		
C16.05	Motor Speed	0~9999	rpm	
C16.09	Custom Readout	0.00~9999.00		
C16.10	Output Power	0.00~655.35	kW	
C16.12	Motor Voltage	0~65535	V	
C16.13	Output Frequency	0.0~400.0	Hz	
C16.14	Output Current	0.00~655.35	A	
C16.15	Output Frequency	0.0~200.0	%	
C16.16	Output Torque	-200.0~200.0	%	
C16.18	Motor Thermal	0~100	%	
C16.30	DC Link Voltage	0~65535	V	
C16.31	IO Temperature	-128~127	°C	
C16.34	IGBT Temperature	-128~127	°C	
C16.35	Drive Thermal	0~255	%	
C16.36	Drive Nominal Current	0.0~6553.5	A	
C16.37	Drive Max. Current	0.0~6553.5	A	
C16.50	Main Reference	-200.0~200.0	%	
C16.51	Pulse Reference	-200.0~200.0	%	
C16.52	Feedback	-200.0~200.0	%	
C16.57	Unbalance Value	0~300	%	
C16.60	Digital Input	0~65535		
C16.61	Terminal VI Setting	0: 0~20mA 1: 0~10V		
C16.62	Analog Input VI	0.00~20.00	V/mA	
C16.63	Terminal AI Setting	0: 0~20mA 1: 0~10V		
C16.64	Analog Input AI	0.00~20.00	V/mA	
C16.65	Analog Output VO	0.00~20.00	V/mA	
C16.66	Digital Output	0~255		
C16.66	Encoder Input	0~255		
C16.68	Pulse Input DI4	0.00~100.00	kHz	
C16.69	Pulse Output DO1	0.00~100.00	kHz	
C16.71	Relay Output	0~65535		
C16.72	Counter A	0~65535		
C16.73	Counter B	0~65535		

Par. No.	Name	Range	Unit	Default
C16.78	Analog Output AO	0.00~20.00	mA	
Group 39: Communication User-Defined Par.				
C39.00	Communication User-Defined Par. 0	0~9999		310
C39.01	Communication User-Defined Par. 1	0~9999		310
C39.02	Communication User-Defined Par. 2	0~9999		310
C39.03	Communication User-Defined Par. 3	0~9999		310
C39.04	Communication User-Defined Par. 4	0~9999		310
C39.05	Communication User-Defined Par. 5	0~9999		310
C39.06	Communication User-Defined Par. 6	0~9999		310
C39.07	Communication User-Defined Par. 7	0~9999		310
C39.08	Communication User-Defined Par. 8	0~9999		310
C39.09	Communication User-Defined Par. 9	0~9999		310
C39.10	Communication User-Defined Par. 10	0~9999		310
C39.11	Communication User-Defined Par. 11	0~9999		310
C39.12	Communication User-Defined Par. 12	0~9999		310
C39.13	Communication User-Defined Par. 13	0~9999		310
C39.14	Communication User-Defined Par. 14	0~9999		310
C39.15	Communication User-Defined Par. 15	0~9999		310
C39.16	Communication User-Defined Par. 16	0~9999		0
C39.17	Communication User-Defined Par. 17	0~9999		0
C39.18	Communication User-Defined Par. 18	0~9999		0
C39.19	Communication User-Defined Par. 19	0~9999		0
C39.20	Communication User-Defined Par. 20	0~9999		0
C39.21	Communication User-Defined Par. 21	0~9999		0

Par. No.	Name	Range	Unit	Default
C39.22	Communication User-Defined Par. 22	0~9999		0
C39.23	Communication User-Defined Par. 23	0~9999		0
C39.24	Communication User-Defined Par. 24	0~9999		0
C39.25	Communication User-Defined Par. 25	0~9999		0
C39.26	Communication User-Defined Par. 26	0~9999		0
C39.27	Communication User-Defined Par. 27	0~9999		0
C39.28	Communication User-Defined Par. 28	0~9999		0
C39.29	Communication User-Defined Par. 29	0~9999		0
C39.30	Communication User-Defined Par. 30	0~9999		0
C39.31	Communication User-Defined Par. 31	0~9999		0
C39.32	Communication User-Defined Par. 32	0~9999		0
C39.33	Communication User-Defined Par. 33	0~9999		0
C39.34	Communication User-Defined Par. 34	0~9999		0
C39.35	Communication User-Defined Par. 35	0~9999		0
C39.50	Communication User-Defined Par. 0 index	0~9999		0
C39.51	Communication User-Defined Par. 1 index	0~9999		1
C39.52	Communication User-Defined Par. 2 index	0~9999		2
C39.53	Communication User-Defined Par. 3 index	0~9999		3
C39.54	Communication User-Defined Par. 4 index	0~9999		4
C39.55	Communication User-Defined Par. 5 index	0~9999		5
C39.56	Communication User-Defined Par. 6 index	0~9999		6
C39.57	Communication User-Defined Par. 7 index	0~9999		7
C39.58	Communication User-Defined Par. 8 index	0~9999		8

Par. No.	Name	Range	Unit	Default
C39.59	Communication User-Defined Par. 9 index	0~9999		9
C39.60	Communication User-Defined Par. 10 index	0~9999		10
C39.61	Communication User-Defined Par. 11 index	0~9999		11
C39.62	Communication User-Defined Par. 12 index	0~9999		12
C39.63	Communication User-Defined Par. 13 index	0~9999		13
C39.64	Communication User-Defined Par. 14 index	0~9999		14
C39.65	Communication User-Defined Par. 15 index	0~9999		15
C39.66	Communication User-Defined Par. 16 index	0~9999		0
C39.67	Communication User-Defined Par. 17 index	0~9999		0
C39.68	Communication User-Defined Par. 18 index	0~9999		0
C39.69	Communication User-Defined Par. 19 index	0~9999		0
C39.70	Communication User-Defined Par. 20 index	0~9999		0
C39.71	Communication User-Defined Par. 21 index	0~9999		0
C39.72	Communication User-Defined Par. 22 index	0~9999		0
C39.73	Communication User-Defined Par. 23 index	0~9999		0
C39.74	Communication User-Defined Par. 24 index	0~9999		0
C39.75	Communication User-Defined Par. 25 index	0~9999		0
C39.76	Communication User-Defined Par. 26 index	0~9999		0
C39.77	Communication User-Defined Par. 27 index	0~9999		0
C39.78	Communication User-Defined Par. 28 index	0~9999		0
C39.79	Communication User-Defined Par. 29 index	0~9999		0
C39.80	Communication User-Defined Par. 30 index	0~9999		0
C39.81	Communication User-Defined Par. 31 index	0~9999		0

Par. No.	Name	Range	Unit	Default
C39.82	Communication User-Defined Par. 32 index	0~9999		0
C39.83	Communication User-Defined Par. 33 index	0~9999		0
C39.84	Communication User-Defined Par. 34 index	0~9999		0
C39.85	Communication User-Defined Par. 35 index	0~9999		0

Note: The "*" in the parameter number column means the parameter cannot be modified during the motor running.

The "*" in the default column means the value of this parameter according to the model.

Chapter 6   Parameter Description

6.1 Group 00: Operation/Display

Par. No.	Name	Range	Unit	Default
*C00.03	Regional Settings	0: 50Hz 1: 60Hz		0

This parameter is used to select motor frequency default value according to different regions.

0: 50Hz, Motor frequency default value is 50 Hz, see C01.23;

1: 60Hz, Motor frequency default value is 60 Hz, see C01.23;

Attention: This parameter can not be adjusted when motor is running. Change this parameter may result in changes in the value of the following parameters: C01.23, C01.25, C01.39, C01.56, C01.30, C01.31, C01.33, C01.35, C01.39 and C01.56.

Par. No.	Name	Range	Unit	Default
C00.04	Operating State at Power-up	0: Resume 1: Forced stop, ref=old 2: Forced stop, ref=0		0

Selects the operating mode upon reconnection of the drive to mains voltage after power down in Hand operation mode.

0: Resume, restarts the drive maintaining the same local reference and the same start/stop settings as before the drive was powered down.

1: Forced stop, ref=old, restarts the drive with a saved local reference, after mains voltage reappears and after pressing HAND key.

2: Forced stop, ref=0, resets the local reference to 0 upon restarting the drive.

Attention: This parameter is only active in Hand operation mode.

Par. No.	Name	Range	Unit	Default
*C00.06	Grid Type	0~122		*

Selects the grid type. Output frequency and voltage will be changed according to the grid type.

0: 200-240V/50Hz/IT-Grid

1: 200-240V/50Hz/IT-Delta

2: 200-240V/50Hz

10: 380-440V/50Hz/IT-Grid

11: 380-440V/50Hz/IT-Delta

12: 380-440V/50Hz

20: 440-480V/50Hz/IT-Grid

21: 440-480V/50Hz/IT-Delta

22: 440-480V/50Hz

100: 200-240V/60Hz/IT-Grid

101: 200-240V/60Hz/IT-Delta

102: 220-240V/60Hz

110: 380-440V/60HZ/IT-Grid

111: 380-440V/60Hz/IT-Delta

112: 380-440V/60Hz

120: 440-480V/60Hz/IT-Grid

121: 440-480V/60Hz/IT-Delta

122: 440-480V/60Hz

Par. No.	Name	Range	Unit	Default
C00.10	Active Set-up	1: Set-up 1 2: Set-up 2 9: Multi Set-up		1

The drive has two parameter setups that can be programmed independently of each other. This makes the drive very flexible and able to solve advanced control functionality problems, often saving the cost of external control equipment. For example, these can be used to program the drive to operate according to one control scheme in one setup (e.g. motor 1 for horizontal movement) and another control scheme in another setup (e.g. motor 2 for vertical movement). Alternatively, they can be used by an OEM machine builder to identically program all their

factory fitted drives for different machine types within a range to have the same parameters and then during production/commissioning simply select a specific setup depending on which machine the drive is installed on.

Selects the set-ups to control the drive functions.

> 1: Set-up 1, Set-up 1 to Set-up 2 are the two separate parameter set-ups within which all parameters can be programmed.

> 2: Set-up 2

> 9: Multi Set-up, two set-ups can be changed each other via digital input or communication commands.

Par. No.	Name	Range	Unit	Default
C00.11	Edit Set-up	1: Set-up 1 2: Set-up 2		1

Selects the set-up to be edited during operation, either the active set-up or one of the inactive set-ups.

Par. No.	Name	Range	Unit	Default
C00.12	Link Set-up	0: Not linked 20: Linked		20

> 0: Not linked, parameters between two set-ups can not be changed each other while the motor is running;

> 20: Linked, parameters between two set-ups can be changed each other while the motor is running via digital input or communication commands. But this facility is best for the same motor, else the link will synchronize the parameters that can not be changed while the motor is running (mainly motor parameters).

Par. No.	Name	Range	Unit	Default
C00.31	Custom Readout Min. Value	0.00~99999.00		0.00
C00.32	Custom Readout Max. Value	0.00~99999.00		100.00

It is possible to customize a readout value in the drive. Custom readout value is linear proportional to speed, it is stored in parameter C16.09.

The calculation of Custom Readout Value (C16.09) is shown below:

$$C16.09 = (C00.32 - C00.31) \times C16.13 \div C04.14 + C00.31$$

Par. No.	Name	Range	Unit	Default
C00.33	LCP Display Option	0~65535		0

The LCP is fixed to display the output frequency, reference and motor current (switch by ⊠ key). This parameter is used to show another basic operating states of the drive, each states corresponds to a weight. For example, if you want to display the states of the temperature and the terminal VI on LCP. Set

$$C00.33 = 8 + 128 = 136$$

Weight	Parameter	Discription
1	C16.12	Motor Voltage
2	C16.05	Motor Speed
4	C16.30	DC-Voltage
8	C16.34	Temperature
16	C16.52	Feedback Value
32	C16.72	Counter A
64	C16.73	Counter B
128	C16.62	VI Input
256	C16.64	AI Input
512	C16.68	Pulse Input
1024	C16.69	Pulse Output
2048	C16.09	Custom Readout
4096	C16.10	Output Power

Par. No.	Name	Range	Unit	Default
C00.40	HAND Key Option	0: Disabled 1: Enabled		0

0: Disabled, press "HAND" key can't set the drive in HAND state.

1: Enabled, press "HAND" key can set the drive in HAND state.

Par. No.	Name	Range	Unit	Default

C00.41	OFF Key Option	0: Disabled 1: Enabled 2: Enabled reset only		1

0: Disabled, avoids accidental stop of the drive;

1: Enabled, OFF key stop signal and reset of any fault;

2: Enabled reset only, reset only (fault), stop (off) function is disabled;

Par. No.	Name	Range	Unit	Default
C00.42	AUTO Key Option	0: Disabled 1: Enabled		1

0: Disabled, Press "AUTO" key can't set the drive in AUTO state.

1: Enabled, Press "AUTO" key can set the drive in AUTO state.

Par. No.	Name	Range	Unit	Default
C00.46	One Key Recovery Time	0: Disabled 5: 5s 10: 10s 15: 15s 20: 20s		1

"One Key Recovery" is that user can press OFF key to recover the backup settings if the settings have been backuped. If the settings have not been backuped, this function is disabled.

One key Recovery Time is used to determine how many seconds should OFF key pressed to recover the backup settings, it is set to 0 to disable one key recovery function.

Note: If an alarm happens, press OFF key will reset alarm first.

Par. No.	Name	Range	Unit	Default
C00.47	LCP Ajustment Value	0: 0.1 1: 1 2: 10		1

This parameter determines the reference value increase or decrease when the LCP Up/Down key is pressed or potentiometer is rotated.

Par. No.	Name	Range	Unit	Default

C00.60	Set-up Locked	0: Disabled 1: Enabled		0

0: Disabled

1: Enabled, prevent unauthorized editing of parameters.

Attention: This function is only valid to LCP, not active to local bus.

Par. No.	Name	Range	Unit	Default
C00.62	Password	0~65535		
C00.63	Password Comfirm	0~65535		
C00.64	Drive Running Time	0~65535	h	

These parameters are used to set the timer to stop the drive.

Initial state: C00.62 password is "0", C00.64 drive running time is "0", the password and drive running time are invalid;

Setting the Password: Enter C00.62, it shows "0", change the parameter value (such as 2003), Re-enter C00.62 shows "0"; Enter C00.63, it shows "0", after modifying the parameter value, and if the parameter value is the same as C00.62 (such as 2003), it displays "P.Set" 2s, password has been set; After the password has been set, re-enter the C00.62 shows "0"; If the parameter value is not the same as C00.62, it shows "Err" 2s, password setting fails; Back to the initial state.

Setting the drive running the time: After the password has been set, change the C00.64 value (such as 2000h) to set the drive running the time. After setting, the C00.64 cannot be changed. If the password has been set, but not set C00.64, reboot the drive, it will report "A.96", please set the correct password into C00.62 to clear the warning.

Clear password and the drive running time: If the password has been set, enter C00.62, it shows "0"; set the correct password into C00.62, it will display "P.Yes" 2s, then the password and the drive running time are cleared; If set the wrong password value, it will display "P.No", after 3 consecutive wrong password, the drive locked, you can not modify the parameter, it displays "A.96". It must be powered off and on again to clear "A.96" warning.

12h before the drive running time, the drive shows "A.96" to prompt the user that the running time will be over. If the running time is over, the drive can still be used; if you stop the drive, the drive will not accept any command to start, the drive displays "A.96".

Note: The drive running time refers to the drive power-up time.

6.2 Group 01: Load and Motor

Par. No.	Name	Range	Unit	Default
C01.00	Configuration Mode	0: Speed open loop 3: Process closed loop 4: Torque open loop		0

0: Speed open loop, Enables speed control (without feedback signal from motor) with automatic slip compensation for almost constant speed at varying loads. Compensations are active but can be disabled in the Load/Motor par. group C01.0*;

3: Process closed loop, Enables the use of process PID control in the drive. The process PID control parameters are set in par. groups C07.**.

4: Torque open loop, Enables the use of torque open loop in VVC+ mode (C01.01 Motor Control Principle). The torque PID parameters are set in par. group C07.1*;

Attention: If configuration mode is changed, C03.00, C03.03 will be restored to factory setting.

Par. No.	Name	Range	Unit	Default
*C01.01	Motor Control Principle	0: V/F 1: VVC+ 2: Vector1		2

Selects which motor control principle to employ.

0: V/F, for special motor or parallel connected motors in special motor applications. When V/F is selected the characteristic of the control principle can be edited in C01.55 V/F Characteristic - V and C01.56 V/F Characteristic – F;

1: VVC+, Voltage Vector Control principle suitable for common application, Only VVC+ supports PM motor;

2: Vector1, Suitable for higher requirements on control performance applications. The control performance is better than VVC+, but more sensitive to motor parameters. Before use, automatic motor adaption is required.

Par. No.	Name	Range	Unit	Default
*C01.03	Torque Characteristics	0: Constant torque 1: Variable torque 3: Auto Energy Optimization (AEO)		0

Select the torque characteristic required. VT and AEO are both energy saving operations.

0: Constant torque, Motor shaft output provides constant torque under variable speed control.

1: Variable torque, Motor shaft output provides variable torque under variable speed control, usually used for fan or pump applications. Set the variable torque level in C14.40 VT Level.

3: Auto Energy optimization (AEO), Automatically optimises energy consumption by minimising magnetisation and frequency via C14.41 AEO Minimum Magnetisation;

Par. No.	Name	Range	Unit	Default
*C01.06	Rotation Direction Selection	0: Same direction 1: Reverse direction		0

Modifying this parameter can change the rotation direction of the motor. It is equivalent to exchanging any two of the motor's U, V, W wires.

Par. No.	Name	Range	Unit	Default
*C01.10	Motor Type Selection	0: Asynchronous motor 1: SPM 2: Unsaturated IPM (Salient) 3: IPM (Salient)		0

Different parameters are active when the option is selected. See the following table.

C01.10 Motor Type Selection	[0] Asynchronous motor	[1]~[3] PM
C01.03 Torque Characteristics	√	
C01.14 Damping Gain		√
C01.15 Low Speed Filter Time Const.		√
C01.16 High Speed Filter Time Const.		√
C01.17 Voltage Filter Time Const.		√
C01.37 D-axis Inductance		√
C01.38 Q-axis Inductance		√
C01.39 Motor Poles		√
C01.40 Back EMF at 1000RPM		√
C01.44 D-axis Inductance Sat.		√
C01.45 Q-axis Inductance Sat.		√

C01.47 PM Resistance Correction		√
C01.48 Current at Min Inductance for D-axis		√
C01.49 Current at Min Inductance for Q-axis		√
C01.50 Motor Magnetisation at Zero Speed	√	
C01.52 Min Speed Normal Magnetising	√	
C01.55 V/F Characteristic-V	√	
C01.56 V/F Characteristic-F	√	
C01.60 Low Speed Load Compensation	√	
C01.61 High Speed Load Compensation	√	
C01.62 Slip Compensation	√	
C01.63 Slip Compensation Time Constant	√	
C01.64 Resonance Dampening	√	
C01.65 Resonance Dampening Time constant	√	
C01.66 Min. Current at Low Speed		√
C01.67 PM Inertia AMA Torque Bandwidth		√
C01.68 PM Inertia AMA Feedforward Proportional Gain		√
C01.69 System Inertia		√
C01.70 PM Start Mode		√
C02.06 Parking Current		√
C02.07 Parking Time		√

Par. No.	Name	Range	Unit	Default
C01.14	Damping Gain	0~250	%	120

The damping gain stabilizes the PM machine. The value of damping gain controls the dynamic performance of the PM machine. High damping gain gives high dynamic performance, and low damping gain gives low dynamic performance. The dynamic performance is related to the machine data and load type. If the damping gain is too high or low, the control becomes unstable.

Par. No.	Name	Range	Unit	Default
C01.15	Low Speed Filter Time Const.	0.01~20.00	s	*

This time constant is used below 10% rated speed. Obtain quick control through a short damping time constant. However, if this value is too short, the control becomes unstable.

Par. No.	Name	Range	Unit	Default
C01.16	High Speed Filter Time Const.	0.01~20.00	s	*

This time constant is used above 10% rated speed. Obtain quick control through a short damping time constant. However, if this value is too short, the control becomes unstable.

Par. No.	Name	Range	Unit	Default
C01.17	Voltage Filter Time Const.	0.001~1.000	s	*

Reduces the influence of high frequency ripple and system resonance in the calculation of supply voltage. Without this filter, the ripples in the currents can distort the calculated voltage and affect the stability of the system.

Par. No.	Name	Range	Unit	Default
*C01.20	Rated Motor Power	Motor dependant	kW	*
*C01.22	Rated Motor Voltage	50~1000	V	*
*C01.23	Rated Motor Frequency	20~400	Hz	*
*C01.24	Rated Motor Current	Motor dependant	A	*
*C01.25	Rated Motor Speed	100~9999	rpm	*
C01.26	Rated Motor Torque	0.1~6553.5	N•m	0

Set the parameters according to the motor nameplate no matter which control mode is adopted. Changing the value of C01.20-C01.22, C01.30-C01.35 will be automatically modified to factory settings.

Par. No.	Name	Range	Unit	Default
*C01.29	Automatic Motor Adaption (AMA)	0: No function 1: Static complete AMA 2: Static easy AMA 3: Static complete AMA + Back-EMF 4: Static complete AMA + System inertial 5: Static complete AMA + Back-EMF + System inertial		0

Use Automatic Motor Adaption (AMA) to obtain accurate motor parameters to further optimize control performance.

There are four AMA states: stator resistance AMA, inductance AMA, back EMF AMA, and system inertia AMA. Among them, stator resistance AMA and inductance AMA are static AMA, and the motor does not need to run. Back-EMF AMA and system inertia AMA are dynamic AMA. The motor needs to run (without disconnecting the load); the asynchronous motor cannot perform back-EMF AMA and system inertia AMA;

Static esay AMA is stator resistance AMA.

Static complete AMA is stator resistance AMA plus inductance AMA.

The parameters for various AMA states are as follows:

AMA State	Asynchronous motor	Permanent magnet synchronous motor	Panel display
Stator Resistance AMA	C01.30 Stator Resistance (Rs)	C01.30 Stator Resistance (Rs)	AT-1
Inductance AMA	C01.33 Stator Leakage Reactance (X1) C01.35 Main Reactance (Xh)	C01.33 Stator Leakage Reactance (X1) C01.35 Main Reactance (Xh) C01.37 D-axis Inductance C01.38 Q-axis Inductance C01.44 D-axis Inductance Sat. C01.45 Q-axis Inductance Sat. C01.48 Current at Min Inductance for D-axis C01.49 Current at Min Inductance for Q-axis	AT-2
Back EMF AMA	None	C01.40 Back EMF at 1000RPM	AT-3
System Inertia AMA	None	C01.69 System Inertia	AT-4

Before using AMA function, set the following motor parameters according to the motor nameplate: C01.20 rated motor power, C01.22 rated motor voltage, C01.23 rated motor frequency, C01.24 rated motor current, C01.25 rated motor speed, and C01.26 rated motor torque.

When the motor is in AMA, the "AT-1~4" indication will be displayed on the LCP. You can press the OFF key to stop the AMA.

In order to obtain accurate motor data, it should do AMA in the motor cooling state.

Note: Back-EMF AMA and system inertia AMA require that the motor can run in the same direction for a long time. If the equipment does not allow long-term operation in the same

direction, you cannot perform both studies to avoid danger!

While doing system inertia AMA, the drive recognizes the inertia of the system converted to the motor shaft through continuous acceleration and deceleration. The process of deceleration is affected by C02.17   Over-voltage Control. If C02.17 is equal to 0 (invalid), deceleration is performed according to the deceleration time of C03.42; if C02.17 is not equal to 0, the internal control achieves rapid deceleration to speed up the AMA process. The direct DC-bus voltage control algorithm is used to achieve rapid deceleration. During deceleration, the DC bus voltage is always controlled at 680V.

Par. No.	Name	Range	Unit	Default
*C01.30	Stator Resistance (Rs)	Motor dependant	Ω	*
*C01.31	Rotor Resistance(Rr)	Motor dependant	Ω	*
*C01.33	Stator Leakage Reactance (X1)	Motor dependant	mH	*
*C01.35	Main Reactance (Xh)	Motor dependant	mH	*
C01.37	D-axis Inductance	Motor dependant		*
C01.38	Q-axis Inductance	Motor dependant		*

Parameters for advanced motor data. The motor data in C01.30 Stator Resistance (Rs) to C01.35 Main Reactance (Xh) must match the relevant motor in order to run the motor optimally. The default settings are figures based on common motor parameter values from standard motors. If the motor parameters are not set correctly, a malfunction of the drive system may occur. If the motor data is not known, running an AMA (Automatic Motor Adaptation) is recommended.

Par. No.	Name	Range	Unit	Default
*C01.39	Motor Poles	2~100	P	4

Enter the motor poles from the nameplate data.

Par. No.	Name	Range	Unit	Default
*C01.40	Back EMF at 1000RPM	0~9000	V	*

Set the nominal back EMF for the motor when running at 1000 RPM. Back EMF is the voltage generated by a PM motor when no frequency converter is connected and the shaft is turned externally. Back EMF is normally specified for nominal motor speed or for 1000 RPM measured between 2 lines.

Par. No.	Name	Range	Unit	Default
*C01.42	Motor Cable Length	0~150	m	*

Enter the motor cable length connected between the motor and the drive. Set correct cable length can suppress noises resulted from the motor.

Par. No.	Name	Range	Unit	Default
*C01.44	D-axis Inductance Sat.	Motor dependant	Ω	*
*C01.45	Q-axis Inductance Sat.	Motor dependant	Ω	*

Usually, this parameter is not on the nameplate of the motor, and it needs to be acquired by motor AMA.

Par. No.	Name	Range	Unit	Default
C01.47	PM Resistance Correction	0: Disable 1: Enable		0

This parameter is used to set whether to perform stator resistance correction at each start.

Since the drive does not know the actual rotor position at start-up, a parking or an initial position detection (IPD) process is required. This process is determined by C01.70 PM start mode.

If C01.70 PM start mode is equal to [0] initial position detection (IPD) start, this parameter is enabled, then after the initial position detection, it needs 600ms to correct the stator resistance of the synchronous motor;

If C01.70 PM start mode is equal to [1] parking start, this parameter is enabled, then the stator resistance of synchronous motor is calibrated in the parking process, and the parking time is determined by C02.07 Parking time, if C02.07 is less than 600ms, the system will automatically extend the time for correction.

This parameter enable will increase the PM start-up time, but it can bring better control performance.

Par. No.	Name	Range	Unit	Default
*C01.48	Current at Min Inductance for D-axis	20~200	%	100
*C01.49	Current at Min Inductance for Q-axis	20~200	%	100

Usually, this parameter is not on the nameplate of the motor, and it needs to be acquired by motor AMA.

Par. No.	Name	Range	Unit	Default
C01.50	Motor Magnetisation at Zero Speed	0~300	%	100
C01.52	Min Speed Normal Magnetising	0.0~10.0	Hz	0.0

Use C01.50 Motor Magnetisation at Zero Speed along with C01.52 Min Speed Normal Magnetising to obtain a different thermal load on the motor when running at low speed (under C01.52).

The value of C01.50 is a percentage of the motor current. If the setting is too low, the torque on the motor shaft may be reduced.
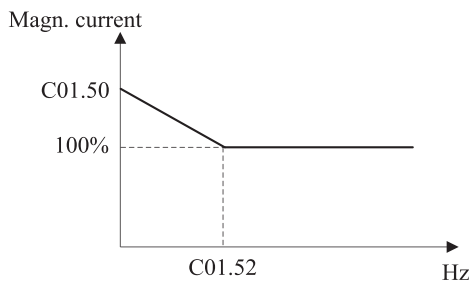
Par. No.	Name	Range	Unit	Default
C01.55	V/F Characteristic-V	0.0~999.9	V	
C01.56	V/F Characteristic-F	0.0~400.0	Hz	

These parameters are array parameters [0-5], used to manually form a V/F characteristic matching the motor. The frequency points [F0-F5] are defined in C01.56 V/F Characteristic - F. The voltage at each point [V0-V5] is defined in C01.55 V/F Characteristic - V. These parameters are only accessible when C01.01 Motor Control Principle is set to V/F.
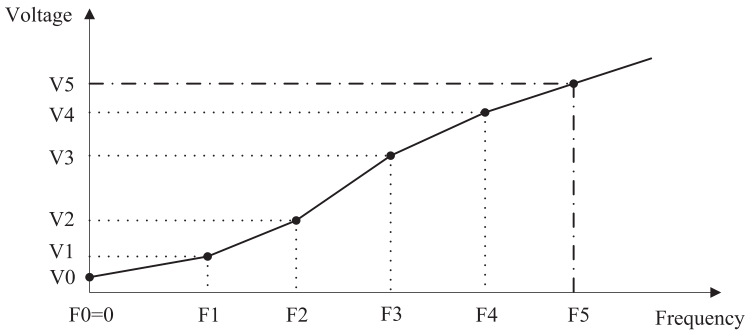
C01.55[0]~C01.55[5] is respective to V0~V5, C01.56[0]~C01.56[5] is respective to F0~F5, Vn is motor rated voltage, Fn is the motor rated frequency.

The set of C01.56 must met F0=0 and F1≤F2≤F3≤F4≤F5.

Simplify V/F characteristic by merging 2 or more points (voltages and frequencies), which respectively are set equal.

The slope (ratio of V/F) after point (F5, V5) must be equal to the slope between point (F5, V5) and the previous point.
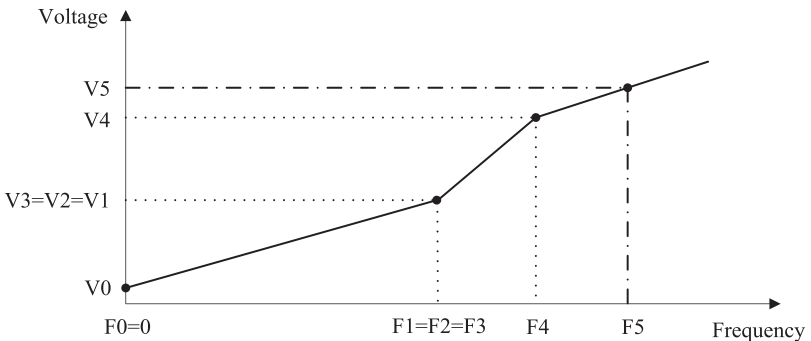
The default settings of V/F Characteristic are:

200V model:

	[0]	[1]	[2]	[3]	[4]	[5]
C01.55	0.0	7.0	230.0	230.0	230.0	230.0
C01.56	0.0	0.5	50.0	50.0	50.0	50.0

400V model:

	[0]	[1]	[2]	[3]	[4]	[5]
C01.55	0.0	12.0	400.0	400.0	400.0	400.0
C01.56	0.0	0.5	50.0	50.0	50.0	50.0

Par. No.	Name	Range	Unit	Default
C01.60	Low Speed Load Compensation	0~199	%	100
C01.61	High Speed Load Compensation	0~199	%	100

Enter the % value to compensate voltage in relation to load when the motor is running at low speed (C01.60)/high speed (C01.61) and obtain the optimum V/F characteristic.

The low and high speed change-over point is automatically calculated based on motor size. Usually it is 5Hz.
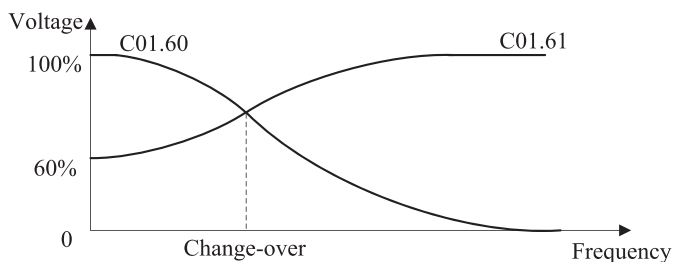
Par. No.	Name	Range	Unit	Default
C01.62	Slip Compensation	-400~399	%	*

When the motor is driving an electric-driven load, motor speed drops with the increase of load. When the motor is driving a power generating load, motor speed will increase with the increase of load. Appropriate slip compensation can maintain constant motor speed when the

motor load is changing.

If this parameter is set to 100%, it indicates that the compensation when the motor bears rated load is the rated motor slip.

Diagram of slip compensation is shown below:
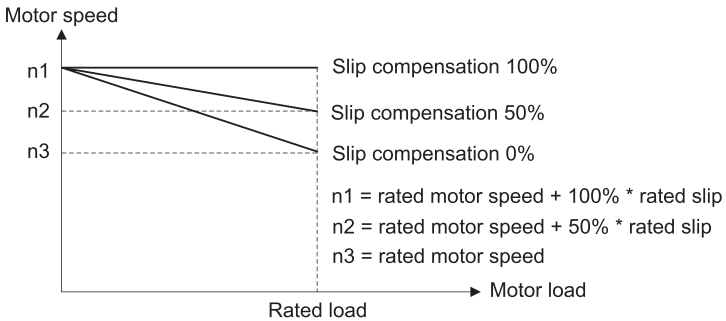
slip compensation on electric driven load
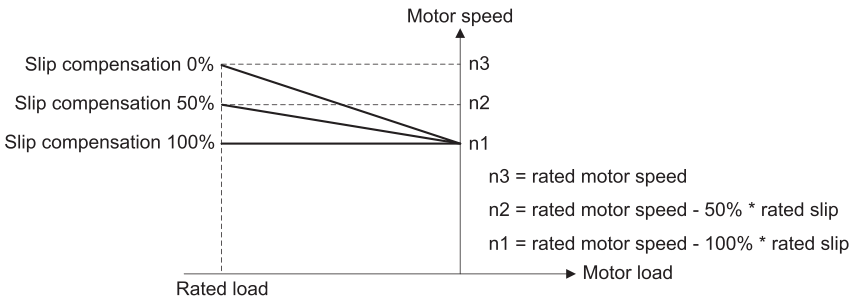
slip compensation on power generating load

When having more than one motor on the same shaft there is a need for some kinds of load share between the drives controlling the motors. This has typically been made with two drives running in speed open loop mode and one with negative slip compensation.

Par. No.	Name	Range	Unit	Default

C01.63	Slip Compensation Time Constant	0.05~5.00	s	0.10

Enter the slip compensation reaction speed. A high value results in slow reaction, and a low value results in quick reaction. If lowfrequency resonance problems occur, use a longer time setting.

Par. No.	Name	Range	Unit	Default
C01.64	Resonance Dampening	0~3000	%	*

Motor (especially >=30kW motor) speed and current resonance is likely to occur due to load vibration, and may lead to system failure even over current protection. This is particularly obvious during no-load or light-load applications.

Do not change this parameter if the motor has no resonance. Increase the value properly only when the motor has obvious resonance. The larger the value is, the better the resonance dampening result will be.

Par. No.	Name	Range	Unit	Default
C01.65	Resonance Dampening Time constant	0.005~0.050	s	0.005

Enter the resonance dampening reaction speed. A high value results in slow reaction, and a low value results in quick reaction.

Par. No.	Name	Range	Unit	Default
C01.66	Min. Current at Low Speed	0~120	%	50

Enter the minimum motor current at lowspeed. Increasing this current improvesmotor torque at low speed. Parameter C01.66 Min. Current at Low Speed is enabled only for PM motor.

Par. No.	Name	Range	Unit	Default
C01.67	PM Inertia AMA Torque Bandwidth	0~300	%	100
C01.68	PM Inertia AMA Feedforward Proportional Gain	0~100	%	100

This group of parameters are only used in the PM system inertia AMA phase. The drive recognizes the inertia of the system converted to the motor shaft through continuous

acceleration and deceleration.

This group of parameters will affect the acceleration process time, increase the parameters, reduce the acceleration process time, and vice versa.

This group of parameters generally do not need to be adjusted.

Par. No.	Name	Range	Unit	Default
C01.69	System Inertia	0~10000.0000	kg•m2	*

This parameter generally needs to be obtained through AMA.

Par. No.	Name	Range	Unit	Default
C01.70	PM Start Mode	0: IPD 1: Parking		1

Since the drive does not know the actual rotor position at start-up, a parking or an initial position detection (IPD) process is required.

The initial position detection starts quickly and its time can generally be ignored.

For parking start, the parking time is determined by C02.07.

Par. No.	Name	Range	Unit	Default
C01.71	Start Delay	0.0~10.0	s	0.0
C01.72	Start Function	0: DC hold 2: Coast		2

C01.71 enables a delay of the starting time. The drive begins with the start function selected in C01.72. Enter the time delay required before commencing acceleration. Setting start delay to 0.0 sec. disables start function when start command is given.

Select the start function during start delay by C01.72. This parameter is linked to C01.71 Start Delay.

0: DC Hold, energizes motor with a DC holding current (C02.00 DC Hold Current) during the start delay time;

2: Coast, Motor coasted during the start delay time (drive off);

Par. No.	Name	Range	Unit	Default

*C01.73	Flying Start	0: Disabled 1: Enabled		0

This function applies for the inertia load to restart due to mains drop-out; If [0] Clockwise is selected in C04.10, and no rotating motor is found, It is possible to use DC-brake command to ramp down the motor speed to 0 rpm, and then start the motor in the normal way; If [2] Both directions is selected in C04.10, and no rotating motor is found, the drive will assume the motor is stationary or in low-speed rotation, and then start the motor in the normal way. When Flying start is enabled, C01.71 Start delay and C01.72 Start function is disabled.

Warning: This function is not suitable for hoisting applications.

Par. No.	Name	Range	Unit	Default
C01.75	Min. Start Frequency	0.00~50.00	Hz	0.00

If the drive frequency reference is less than C01.75 Min. Start Frequency, the drive will not run even the start command is given (the start command will be shielded). Only the drive frequency reference is greater than or equal C01.75, then the drive starts to run. The drive still accelerates from 0 to frequency reference using ramp time.

Par. No.	Name	Range	Unit	Default
C01.76	Jump Frequency	0.0~20.0	Hz	0.0

If the drive frequency reference's absolute value (not zero, frequency reference maybe negative) is less than C01.76 Jump Frequency, the drive will run at jump frequency (maybe reversing if the reference is negative).

For example:

Set C01.76 = 3. if the frequency reference is 2, the drive will run forward at 3Hz; If the frequency reference is -2, the drive will run reversing at 3Hz; If the frequency reference is 0, the drive will stop. If the frequency reference is 20, the drive will run at 3Hz immediately, then accelerates from 3Hz to 20Hz using ramp time.

Note: it is not recommended for using C01.75 and C01.76 together.

If C01.75 and C01.76 are used together, the following talbe is its behaviour.

Freq. ref. Par. setting	3Hz	8Hz	15Hz

| C01.75 = 5.00
C01.76 = 10.0 | Freq. ref < C01.75 the start command is shielded, the drive stop. | Freq. ref > C01.75, the start command is given, Freq. ref < C01.76 the drive runs at 10.0Hz | Freq. ref > C01.75, the start command is given, Freq. ref > C01.76 the drive runs at 10Hz immediately, then accelerates from 10Hz to 15Hz using ramp time. |
| C01.75 = 10.00
C01.76 = 5.0 | Freq. ref < C01.75 the start command is shielded, the drive stop. | Freq. ref < C01.75 the start command is shielded, the drive stop. | Freq. ref > C01.75, the start command is given, Freq. ref > C01.76 the drive runs at 5Hz immediately, then accelerates from 5Hz to 15Hz using ramp time. |

Attention: When C01.76 Jump Frequency and C02.04 DC Brake Cut in Speed are not zero, DC brake will only be active when C02.04 > C01.76.

Par. No.	Name	Range	Unit	Default
C01.80	Function at Stop	0: Coast 1: DC hold		0

Select the drive function after stop command is given or start command is removed (standby), and output frequency is ramped down to C01.82 Min Speed for Function at Stop.

0: Coast, leaves motor in free mode. the drive is off;

1: DC hold, the motor is energized with a DC current. See C02.00 DC Hold Current for more information;

Diagram of Function at Stop is shown below:

Coast   DC Hold
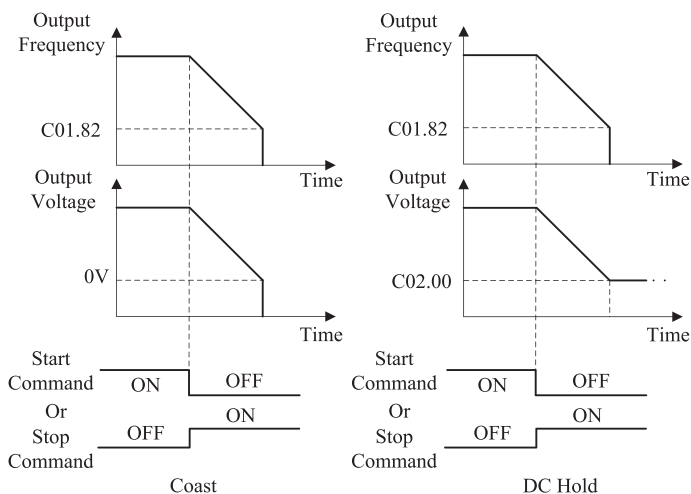
Par. No.	Name	Range	Unit	Default
C01.82	Min Speed for Function at Stop	0.0~400.0	Hz	0.0

Set the output frequency at which to activate C01.80 Function at Stop.

Par. No.	Name	Range	Unit	Default
C01.88	AC Brake Gain	1.0~2.0		1.4

Enter AC brake reaction speed. A high value results in slow reaction, and a low value results in quick reaction.

NOTE: Generally, it does not need adjustments.

Par. No.	Name	Range	Unit	Default
C01.90	Motor Thermal Protection	0: No protection 1: Thermistor warning 2: Thermistor trip 3: ETR warning 4: ETR trip 5: ETR warning (Self-cooling mode) 6: ETR trip (Self-cooling mode)		0

The drive determines the motor temperature for motor protection in two different ways:

- Via a thermistor sensor connected to the analog input terminal VI (C01.93 Thermistor Source);

- Via calculation (ETR = Electronic Terminal Relay) of the thermal load, based on the actual load and time. The calculated thermal load is compared with the rated motor current and the rated motor frequency. The calculations estimate the need for a lower load at lower speed due to less cooling from the fan incorporated in the motor.

0: No protection;

1: Thermistor warning, a thermistor connected to analog input VI gives a warning if upper limit of motor temperature range is exceeded, (see 01.93, Thermistor Resource);

2: Thermistor trip, a thermistor connected to analog input VI gives an alarm and makes the drive trip if upper limit of motor temperature range is exceeded, (see 01.93, Thermistor Resource);

3: ETR warning, if calculated upper limit of motor temperature range is exceeded, a warning occurs

4: ETR trip, if calculated upper limit of motor temperature range is exceeded, an alarm occurs and the drive trips.

5: ETR warning (Self-cooling mode)

6: ETR trip (Self-cooling mode)

Option [5]/[6] is similar with the option [3]/[4], it uses ETR function to protect the motor, if the motor exceeds the maximum temperature range, the drive will report a "A.10" warning, or "E.10" alarm, this two options are suitable for motor with no forced cooling (Self-cooling). When the drive is going into the protected status, it requires more stop time to wait motor temperature down.

Par. No.	Name	Range	Unit	Default
C01.91	Motor Overload protection time	1~60	min	2
C01.92	Motor Overload protection factor	100~160	%	150

When ETR function is used, if motor current exceeds C01.24 motor rated current * C01.92 motor

overload protection factor, and the duration exceeds C01.91 motor overload protection time, the drive will send out motor overload warning or alarm.

Motor overload protection is inverse time protection, overload current and protection time (corresponding to C01.91) are as follows:

Overload current	Protection time	Overload current	Protection time
C01.92	100%	C01.92+30%	20%
C01.92+6%	50%	C01.92+36%	18%
C01.92+12%	33%	C01.92+42%	17%
C01.92+18%	29%	C01.92+48%	16%
C01.92+24%	21%	C01.92+54%	14%

This protection relationship corresponds to the rated frequency and the protection time will be shortened if the output frequency is lower or higher than the rated frequency. The relationship between the output frequency and the overload protection correction factor is as follows:

Output frequency	Correction factor	Output frequency	Correction factor
0-12.5	2.1	100%-112.5%	1
12.5%-25%	2.1	112.5%-125%	1.05
25%-37.5%	1.67	125%-137.5%	1.12
37.5%-50%	1.45	137.5%-150%	1.2
50%-62.5%	1.31	150%-162.5%	1.31
62.5%-75%	1.2	162.5%-175%	1.45
75%-87.5%	1.12	175%-187.5%	1.67
87.5%-100%	1.05	187.5%-Max.	2.1

For example, set C01.91 = 10, C01.92 = 120%, run at rated frequency, current is 132% rated motor current, protection time is $10 \times 33\% = 3.3$ minutes. If the operating frequency is 30Hz (60% of rated frequency), the protection time is $3.3 \div 1.31 = 2.52$ minutes.

Note: It is necessary to correctly set the C01.92 motor overload protection factor according to the actual overload capacity of the motor. If this parameter is set too large, it may happen that the motor is overload and the inverter is not in alarm!

Par. No.	Name	Range	Unit	Default
*C01.93	Thermistor Resource	0: None 1: Terminal VI		0

Select the input to which the thermistor (PTC sensor) should be connected.

0: None

1: Terminal VI, Connect thermistor to analog input terminal VI;

Attention: Analog input can't be selected for other purpose when selected as thermistor resource.

Thermistor specifications:

Input Signal Type	Voltage Supply	Termistor Threshold
Analog	10V	<0.8kΩ⊠>2.9kΩ

6.3 Group 02: Brakes

Par. No.	Name	Range	Unit	Default
C02.00	DC Hold Current	0~150	%	50

Enter a value for holding current as a percentage of the rated motor current set in C01.24 Motor Current. 100% DC holding current corresponds to IM,N. This parameter either holds the motor (holding torque) or pre-heats the motor. This parameter is active if DC Hold has been selected in either C01.72 Start Function or C01.80 Function at Stop.

Attention: Avoid 100% current too long as it may overheat the motor.

Par. No.	Name	Range	Unit	Default
C02.01	DC Brake Current	0~150	%	50

Enter a value for current as a percentage of the rated motor current IM,N, see C01.24 Motor Current. 100% DC braking current corresponds to IM,N.

DC brake current is applied on a stop command, when the speed is lower than the limit set in C02.04 DC Brake Cut in Speed; or via the serial communication port. The braking current is active during the time period set in C02.02 DC Braking Time.

Par. No.	Name	Range	Unit	Default
C02.02	DC Braking Time	0.0~60.0	s	10.0

This parameter defines DC brake current (C02.01) time during which DC-brake current is

applied to the motor.

Par. No.	Name	Range	Unit	Default
C02.04	DC Brake Cut in Speed	0.0~400.0	%	0.0

Set the DC brake cut-in speed for activation of the DC braking current set in C02.01 DC Brake Current, upon a stop command.

Par. No.	Name	Range	Unit	Default
C02.08	Motor Demagnetization	0~100	%	100

when the drive output frequency less than DC brake cut in frequencies, motor demagnetization process needs to be done before starting a DC brake for preventing overcurrent at a high speed or great inertia starting DC brake. The smaller this parameter is, the faster motor demagnetization will be done, the time shorter entering the DC brake. If the Load inertia is small and DC brake cut in frequency is lower, this parameter can be reduced to 0.

Diagram of DC Brake process is shown below:

Par. No.	Name	Range	Unit	Default
C02.06	Parking Current	0~150	%	100
C02.07	Parking Time	0.1~60.0	s	3.0

This group of parameters are enabled when C01.70 PM Start Mode is equal to [1] Parking. C02.07 is used to determine the parking time. C02.06 is used to determine the current during the parking process. 100% corresponds to C01.24 rated motor current.

Par. No.	Name	Range	Unit	Default
C02.10	Brake Function	0: Off 1: Resistor brake 2: AC brake		0

0: Off;

1: Resistor brake, use the resistor brake to consume surplus energy resulting from motor braking, and prevent the drive to trip due to over-voltage in the intermediate circuit;

2: AC brake, dissipate surplus energy in the motor core, and prevent the energy back into drive causing trips. It is important to keep in mind that frequent use of this function will

cause an increase in motor temperature;

Attention: Resistor brake is only functional when the drive build-in braking unit or external braking unit must be installed.

Par. No.	Name	Range	Unit	Default
C02.11	Brake Resistor	5~65535	Ω	*

Set brake resistor value. This parameter is only active in drives with an integral brake unit.

Par. No.	Name	Range	Unit	Default
*C02.14	Resistor Brake Threshold Voltage	Grid type dependant	V	*

This parameter takes effect only to the drives with built-in brake chopper.

If C02.10 is set to 1, When the DC link voltage exceeds the value of C02.14, resistor brake will perform, the energy will be rapidly consumed through brake resistor. This value is used to regulate the brake effect of brake chopper.

The following table is the Resistor Brake Threshold Voltage's range and default value which depends on C00.06 Grid Type:

Grid Type	Range	Default
200~240V	360~395V	390V
380~440V	680~780V	700V
440~480V	750~780V	770V

Par. No.	Name	Range	Unit	Default
C02.15	Over-voltage Control Threshold Voltage	Grid type dependant	V	*

When the DC link voltage exceeds the value of C02.15, over-voltage control is active.

The following table is the Over-voltage Control Threshold Voltage's range and default value which depends on C00.06 Grid Type:

Grid Type	Range	Default
200~240V	360~395V	395V
380~440V	680~780V	710V
440~480V	750~780V	780V

Par. No.	Name	Range	Unit	Default
C02.16	AC Brake, Max Current	0~150	%	100

Enter the maximum permissible current when using AC brake to avoid overheating of motor windings. 100⬚ equals motor current set in C01.24.

Par. No.	Name	Range	Unit	Default
C02.17	Over-voltage Control	0: Disabled 2: Mode 1 3: Mode 2		0

Over-voltage control (OVC) reduces the risk of the drive tripping due to an over voltage on the DC link caused by generative power from the load.

    0: Disabled;

    2: Mode 1, used to consume surplus energy by increasing the output frequency;

    3: Mode 2, used for very short deceleration;

Attention: If C02.10 = 1 (Resistor brake), C02.17 = 2 or 3, resistor brake function starts first, if the DC link voltage still can not be controlled, OVC starts.

Par. No.	Name	Range	Unit	Default
C02.18	Over-voltage Control Integral Time	0.01~0.10	s	0.05
C02.19	Over-voltage Control Proportional Gain	0~200	%	100

Over-voltage control (OVC) reduces the risk of the drive tripping due to an over voltage on the DC link caused by generative power from the load.

Note: These parameters are only active when selecting [2] Mode 1or [3] Mode 2 in C02.17 Over-voltage Control

Par. No.	Name	Range	Unit	Default
C02.20	Release Brake Current	0.00~1200.00	A	0.00

Set the motor current for release of the mechanical brake, when a start condition is present.

Attention: When Mechanical brake control output is selected but no mechanical brake is connected, the function will not work. If start delay time has passed, and motor current is

below Release brake current, the drive trips.

Par. No.	Name	Range	Unit	Default
C02.22	Activate Brake Speed	0.0~400.0	Hz	0.0

Set the motor frequency for activation of the mechanical brake, when a stop condition is present.

Diagram of Mechanical Brake Control process is shown below:
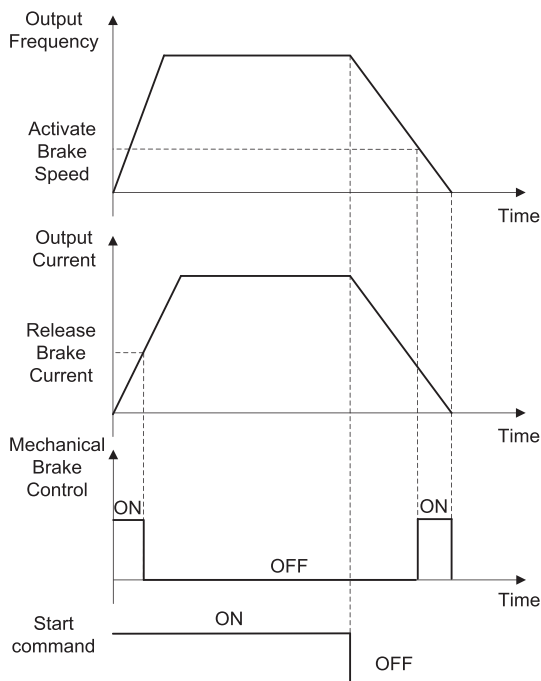
6.4 Group 03: Reference/Ramps

Par. No.	Name	Range	Unit	Default
C03.00	Reference Range	0: 0~C03.03 1: -C03.03~C03.03		0

Select the range of the reference.

0: 0~Max, Reference set point ranges can have positive values only;

1: -Max~+Max, Ranges can have both positive and negative values;

Par. No.	Name	Range	Unit	Default
C03.03	Maximum Reference	0.0~6553.5		50.0

Enter value for Maximum Reference. The Maximum Reference is the highest value obtainable by summing all references.

Par. No.	Name	Range	Unit	Default
C03.07	Main Reference Calculation	0: Preset reference + Reference source1, 2, 3 1: Preset reference priority 2: Reference source 2,3 operation 3: Switchover between Reference source 1 and Reference source 2 4: Switchover between Reference source 1 and Reference source 2,3 operation		0

Select main reference calculation method.

0: Preset reference + reference source1, 2, 3

Main reference = Preset reference + reference source1, 2, 3

1: Preset reference priority

Main reference =
Preset reference[1-N],   using preset ref.[1]-[N]

Preset reference [0] + Reference source 1, 2, 3, using preset ref.[0]

2: Reference source 2,3 operation

3: Switchover between Reference source 1 and Reference source 2

4: Switchover between Reference source 1 and Reference source 2,3 operation

Par. No.	Name	Range	Unit	Default

C03.08	Reference source 2,3 operation mode	0: Reference source 2 + Reference source 3 1: Reference source 2 - Reference source 3 2: Max (Reference source 2, Reference source 3) 3: Min (Reference source 2, Reference source 3)		0

This parameter is used to set the reference value calculation source 2,3, the results can be used for parameter C03.07 options [2] and [4].

The reference value calculation logic as shown below:

Actual Ref.

Ref. Adjustment

0~C03.03 -C03.03~C03.03

Speed up /Speed down

Catch up /Slow down

Total Ref

Main Ref + Main Ref * C03.14 + C03.18/C03.03

Main Reference

Main Reference

C03.07 Main Ref Calculation

0 1 2 3 4

C05.10~C05.15 = 24 DI1~DI4

C05.10~C05.15 = 15~18 DI1~DI4

Relative Ref.

C03.14 Preset Relative Ref

C03.18 Relative Ref Source

C03.08 Ref. source 2,3 operation mode

0 1 2 3

+ - Max Min

C03.10[0~15] Preset Ref. 0~15

C03.15 Ref Source 1

C03.16 Ref Source 2

C03.17 Ref Source 3

Par. No.	Name	Range	Unit	Default
C03.10	Preset Reference	-100.00~100.00	%	0.00

This parameter is an array-16 to be used for presetting different references. 16 preset references are selectable via digital terminals or communication. See C05.1*. 0% equals 0, 100⬚ equals value set in C03.03.

Par. No.	Name	Range	Unit	Default
C03.11	Jog Speed	0.0~400.0	Hz	0.0

The jog speed is a fixed output speed at which the drive is running when the jog function is activated.

The drive with the highest priority will operate at jog speed when a variety of run command activates. Removing the jog signal makes the drive run according to the selected configuration, this parameter is set limited by C04.14.

Par. No.	Name	Range	Unit	Default
C03.12	Catch up/Slow down Value	0.00~100.00	%	0.00

This parameter enables the entry of a percentage value (relative) which will to be either added to or deducted from the total reference.

The Catch up/Slow down function is activated by a digital input terminal (See C05.1*⬚choose [28]/[29]). If this function is active, the catch up/slow down value will be added to the total reference constituting new setting at which the drive is going to run, calculated as follows:

Reference = total reference ± total reference × (Catch up/Slowdown value)

If this function is inactive, the reference returns to its original value.

Par. No.	Name	Range	Unit	Default
C03.13	Up/Down Value	0.01~50.00		0.10

Enter the Speed Up/Down value.

Par. No.	Name	Range	Unit	Default
C03.14	Preset Relative Reference	-100.00~100.00	%	0.00

Define an adjustable Preset Relative Reference which is to be added to the total reference

as a percentage value of the actual reference. Its calculation refers to Reference Calculation Diagram.

Par. No.	Name	Range	Unit	Default
C03.15	Reference Source 1	0~21		1
C03.16	Reference Source 2	See C03.15		2
C03.17	Reference Source 3	See C03.15		11

Select the reference input to be used for the first and second reference source.

0: No function;

1: Terminal VI, use analog input VI as reference source, see C06.1*;

2: Terminal AI, use analog input AI as reference source, see C06.2*;

8: Pulse input DI4, use pulse input DI4 as reference source, see C05.5*;

10: Preset reference [0], use C03.10[0]

11: Communication, use bus reference as reference source, see C08.**;

21: LCP, use LCP Up/Down key or potentiometer as reference source, see C06.8*;

Par. No.	Name	Range	Unit	Default
C03.19	Up/Down Value Store	0: No function 1: Stop save 2: Power down save		0

This parameter is used for setting whether to save the data changed in the Speed Up/Down function if the drive stops or after it power down.

Par. No.	Name	Range	Unit	Default
C03.39	Ramp Time Scale	0: 0.1s 1: 0.01s		1

There are two kinds of ramp time scale for different applications.

After modifying the parameter, ramp time scale will be changed, the ramp time will be changed too.

Par. No.	Name	Range	Unit	Default

C03.40	Ramp 1 Type	0: Linear 2: S ramp		0
C03.41	Ramp 1 Ramp Up Time	0.05~655.35	s	*
C03.42	Ramp 1 Ramp Down Time	0.05~655.35	s	*
C03.50	Ramp 2 Type	0: Linear 2: S ramp		0
C03.51	Ramp 2 Ramp Up Time	0.05~655.35	s	*
C03.52	Ramp 2 Ramp Down Time	0.05~655.35	s	*
C03.60	Ramp 3 Type	0: Linear 2: S ramp		0
C03.61	Ramp 3 Ramp Up Time	0.05~655.35	s	*
C03.62	Ramp 3 Ramp Down Time	0.05~655.35	s	*
C03.70	Ramp 4 Type	0: Linear 2: S ramp		0
C03.71	Ramp 4 Ramp Up Time	0.05~655.35	s	*
C03.72	Ramp 4 Ramp Down Time	0.05~655.35	s	*
C03.80	Jog Ramp Time	0.05~655.35	s	*
C03.85	Ramp 5 Ramp Up Time	0.05~655.35	s	*
C03.86	Ramp 5 Ramp Down Time	0.05~655.35	s	*
C03.88	Ramp 6 Ramp Up Time	0.05~655.35	s	*
C03.89	Ramp 6 Ramp Down Time	0.05~655.35	s	*
C03.91	Ramp 7 Ramp Up Time	0.05~655.35	s	*
C03.92	Ramp 7 Ramp Down Time	0.05~655.35	s	*
C03.94	Ramp 8 Ramp Up Time	0.05~655.35	s	*
C03.95	Ramp 8 Ramp Down Time	0.05~655.35	s	*

Ramp Type:

0: Linear, motor ramps up/down with constant acceleration/deceleration;

2: S ramp, motor ramps up/down with non-linear acceleration/deceleration;

Ramp Up Time is the time motor accelerates from 0Hz to rated motor frequency (C01.25).

Ramp Down Time is the time motor decelerates from rated motor frequency (C01.25) to 0Hz.

Diagram of Ramp Type, Ramp Up Time and Ramp Down Time are shown below:

Output
Frequency

Rated
Motor Speed

Linear
Acceleration

S ramp
Deceleration

Linear
Deceleration

S ramp
Acceleration

Time

Ramp
Up Time
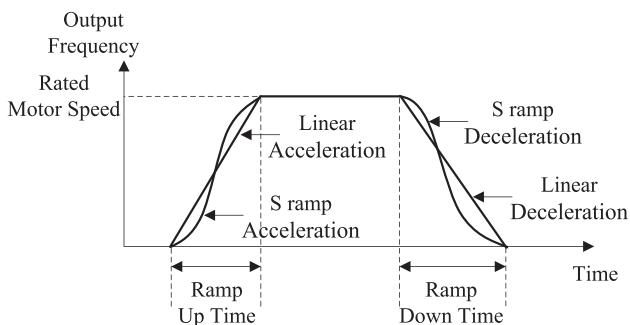
Ramp
Down Time

Par. No.	Name	Range	Unit	Default
C03.96	Link preset reference and ramp time	0: No link 1: Link		0

If choose [1] link preset reference and ramp time, preset reference 0-7 are corresponding to ramp time 1-8. For example, choose preset reference 2 by using terminals control, the ramp time is 3rd.

6.5 Group 04: Limits/Warnings

Par. No.	Name	Range	Unit	Default
*C04.00	PM Current Control Algorithm	0: Control Algorithm 1 1: Control Algorithm 2		0

The control algorithm 1 is suitable for applications where Back-EMF and system inertial AMA cannot be performed. The control algorithm is more adaptable, but the control performance is weaker than the control algorithm 2.

The control algorithm 2 is suitable for Static complete AMA, Back-EMF and system inertial AMA. This control algorithm offers better control performance.

Par. No.	Name	Range	Unit	Default
*C04.01	PM Current Controller Feed Forward Gain	0~400	%	100

This parameter and C14.30 current controller 1 proportional coefficient and C14.31 current

controller 1 integral time constitute the PM current controller, which is enabled when the output current is higher than the C04.18 current limit. By setting the feedforward gain, proportionality factor and integration time of the current controller, the dynamic response characteristics of the current controller can be adjusted.

Increasing the feed forward gain, the proportional coefficient, and reducing the integral time can speed up the dynamic response of the current controller. However, the feedforward gain, the proportional coefficient is too large, or the integral time is too small may destabilize the current control.

Par. No.	Name	Range	Unit	Default
*C04.10	Motor Speed Direction	0: Clockwise 1: Counter clockwise 2: Both directions		2

Select the motor speed direction(s) required. Use this parameter to prevent unwanted reversing.

> 0: Clockwise, the motor shaft rotates in clockwise direction, this setting prevents the motor from running in counter clockwise direction;

> 1: Counter clockwise, motor shaft rotates in counter clockwise direction, this setting prevents the motor from running in clockwise direction;

> 2: Both directions, with this setting, the motor can run in both directions;

Par. No.	Name	Range	Unit	Default
*C04.12	Motor Speed Lower Limit	0.0~C04.14	Hz	0.0

Set the minimum limit for Motor Speed, the motor speed low limit can be set to correspond to the minimum output frequency of the motor shaft. The Motor Speed Low Limit must not exceed the setting in C04.14 Motor Speed High Limit.

Par. No.	Name	Range	Unit	Default
*C04.14	Motor Speed Upper Limit	C04.12~C04.19	Hz	65.0

Set the maximum limit for Motor Speed, the motor speed high limit can be set to correspond to the maximum manufacture's rated motor speed. The motor speed high limit must exceed the Motor Speed Low Limit in C04.12.

Par. No.	Name	Range	Unit	Default
C04.16	Torque Limit Motor Mode	0~1000	%	160
C04.17	Torque Limit Generator Mode	0~1000	%	160

These parameters limit the torque on the shaft to protect the mechanical installation. 100% equals motor rated torque set in C01.26. If the motor torque is bigger than C04.16/C04.17, the drive will report "A.12".

Par. No.	Name	Range	Unit	Default
C04.18	Current Limit	0~300	%	*

This parameter is used to set drive output current limit, 100▨ equals C01.24 rated motor current. If the output current exceeds the C04.18 motor current limit, the drive will report A.59 warning and current limit controllers (see C14.3*) start.

Par. No.	Name	Range	Unit	Default
*C04.19	Max. Output Frequency	0.0~400.0	Hz	65

Provides a final limit on the output frequency for improved safety in applications where you want to avoid accidental over-speeding. This limit is final in all configurations (independent of the setting in C01.00 Configuration Mode).

Par. No.	Name	Range	Unit	Default
*C04.21	Frequency Upper Limit Source	0: No function 1: Terminal VI 2: Terminal AI 8: Pulse input DI3 10: Preset reference [0] 11: Communication 21: LCP potentiometer		1

In some occasions, it needs to set a dynamic frequency upper limit. For example, to avoid runaway in torque control mode in winding application, you can set the frequency upper limit by means of analog input. When the drive reaches the upper limit, it will continue to run at this speed.

0: No function, use C04.19 as frequency upper limit;

1: Terminal VI, use analog input VI as frequency upper limit, see C06.1*;

2: Terminal AI, use analog input AI as frequency upper limit, see C06.2*;

8: Pulse input DI3, use pulse input DI3 as frequency upper limit, see C05.5*;

11: Communication, use communication reference as frequency upper limit, see C08.**;

21: LCP, use LCP Up/Down key or potentiometer as frequency upper limit, see C06.8*;

Par. No.	Name	Range	Unit	Default
C04.23	Power Limit Motor Mode	0~400	%	400
C04.24	Power Limit Generator Mode	0~400	%	400

This group of parameters are used to set the output power limit to protect the system. 100% corresponds to C01.20 rated motor power. When the output power exceeds the value of C04.23 and C04.24, the drive will report A.104 warning. When set to the maximum value of 400, this warning detection is masked.

Par. No.	Name	Range	Unit	Default
C04.28	Low Voltage Overload Limit	5~100	%	100

When the grid voltage is low, the drive will limit output frequency for overload protection.

When C16.35 Drive Thermal factor is greater than C04.28 Low Voltage Overload Limit, the drive goes into the low voltage output frequency limit protection and reports "A.101"; When C16.35 is less than 1%, the drive quits from the protection and runs at the original frequency, the warning disappears.

When C04.28 is set to 100, the low voltage frequency limit protection is disabled; When setting to other values, it is turned on; The smaller the value is, the more likely the drive goes into the low voltage frequency limit protection.

Par. No.	Name	Range	Unit	Default
C04.29	Low Voltage Udc Limit	50~1000	V	220/380

When entering the low-voltage protection limit frequency, the inverter maximum output frequency:

$$Fmax(C16.06) = Grid\ voltage/C04.29 * C01.23$$

Par. No.	Name	Range	Unit	Default
C04.42	Counter Store at Power down	0: Disable 1: Counter A save 2: Counter B save 3: Both counter A and B save		0

This parameter is used to control whether counter A/B's value is saved at power down.

Par. No.	Name	Range	Unit	Default
C04.50	Warning Current Low	0.00~C16.37	A	0.00
C04.51	Warning Current High	0.00~ C16.37	A	*

When the motor current falls below C04.50 or exceeds C04.51, a signal can be produced on relays or terminal DO1/DO2. See [12] Out of current range, [13] Below current low and [14] Above current high in C05.30/31/40.

Diagram of Warning Current Low and Warning Current High are shown below:
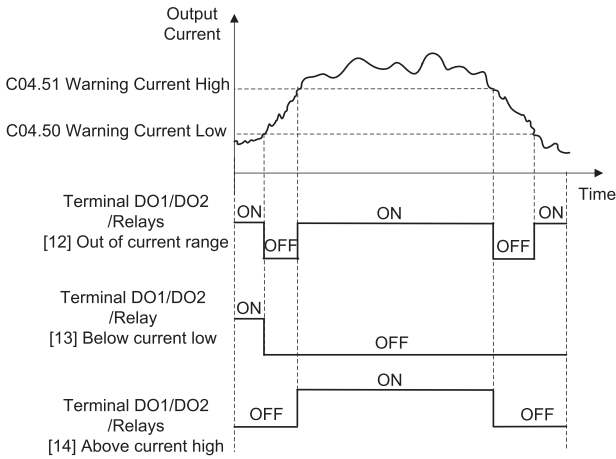
Par. No.	Name	Range	Unit	Default
C04.52	Warning Frequency Low	0.0~400.0	Hz	0.0
C04.53	Warning Frequency High	0.1~400.0	Hz	65.0

When the motor frequency falls below C04.52 or exceeds C04.53, a signal can be produced on relays or terminal DO1/DO2. See [15] Out of frequency range, [16] Below frequency low and [17] Above frequency high in C05.30/31/40.Diagram of Warning Frequency Low and Warning Frequency High are shown below:
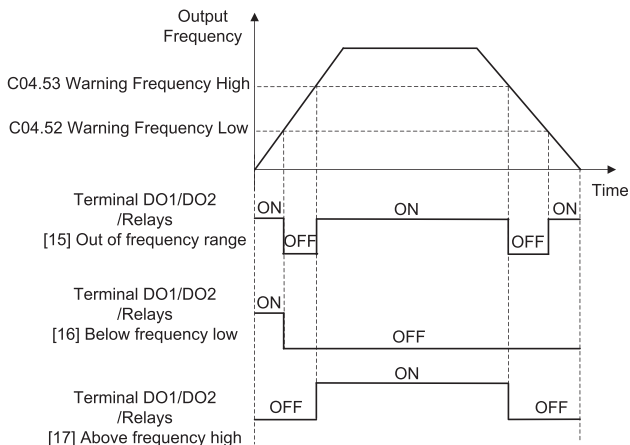
Par. No.	Name	Range	Unit	Default
C04.54	Warning Reference Low	-200.00~200.00	%	0.00
C04.55	Warning Reference High	-200.00~200.00	%	100.00

When the actual reference falls below C04.54 or exceeds C04.55, a signal can be produced on relays or terminal DO1/DO2. 100% equals value set in C03.03.

See [40] Out of reference range, [41] Below reference low and [42] Above reference high in C05.30/31/40.

Par. No.	Name	Range	Unit	Default
C04.56	Warning Feedback Low	-200.00~200.00	%	0.00
C04.57	Warning Feedback High	-200.00~200.00	%	100.00

When the feedback falls below C04.56 or exceeds C04.57, a signal can be produced on relays or terminal DO1/DO2. 100% equals value set in C03.03.

See [18] Out of feedback range, [19] Below feedback low and [20] Above feedback high in

C05.30/31/40.

Par. No.	Name	Range	Unit	Default
*C04.58	Missing Motor Phase Function	0: Disable 1: Enable		1

Displays an alarm in the event of a missing motor phase (E.30, E.31 or E.32). Select disabled for no missing motor phase alarm. It is strongly recommended to make an active setting to avoid motor damage.

Par. No.	Name	Range	Unit	Default
*C04.59	Current/Torque Limit Warning Selection	0: Disable 1: Enable		1

This parameter is used to control whether the drive reports A.12/A.59 warning or not when the motor torque exceeds C04.16/C04.17, the output current exceeds C04.18.

Note: Even if you select disable warning, C14.3* current limit controller still works.

Par. No.	Name	Range	Unit	Default
C04.61	Bypass Speed From	0.0~400.0	Hz	0.0
C04.63	Bypass Speed to	0.0~400.0	Hz	0.0

Some systems call for avoiding certain output frequencies, due to resonance problems in the system. A maximum of three frequency ranges can be avoided. The drive will pass quickly when it approaching to the Bypass Speed area.

These parameters are dyadic array, [0] is used to set the bypass speed range 1, [1] is used to set the bypass speed range 2, and [2] is used to set the bypass speed range 3.

Diagram of bypass speed ranges are shown below:
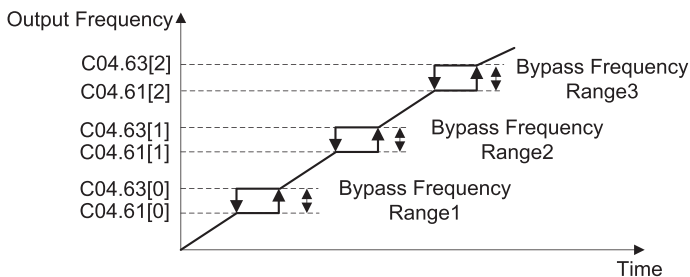
Par. No.	Name	Range	Unit	Default
C04.70	Minimum Torque at Zero Speed	0~100	%	5
C04.71	Minimum Torque Cut-off Frequency	0.1~50.0	Hz	3.0

In torque control mode, the device may not start if the torque reference is too small due to the presence of static friction. So it needs a minimum torque reference at low speed.

The following figure is a graph showing the minimum torque at zero speed and minimum torque cut-off frequency. When the output frequency is less than the minimum torque cutoff frequency, if the torque reference is greater than the corresponding value in curve, then use torque reference; If the torque reference is less than the corresponding value in curve, then use curve corresponding value;
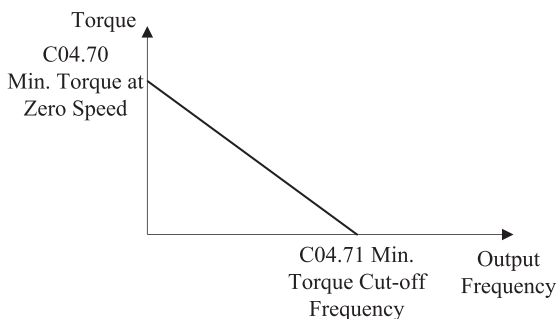
Par. No.	Name	Range	Unit	Default
C04.72	Torque open loop stop mode	0: Torque mode 1: Speed mode		0

This parameter is used to set the stop mode in torque open loop configuration mode:

    0: Torque mode. When the stop signal is activated, the drive torque is reduced to zero according to the ramp down time.

    1: Speed mode. When the stop signal is activated, the drive speed is reduced to zero according to the ramp down time.

6.6 Group 05: Digital In/Out

Par. No.	Name	Range	Unit	Default
C05.04	DI Filter Time	2~16	ms	4

It is used to set the software filter time of DI terminal status. If DI terminals are liable to interference and may cause malfunction, increase the value of this parameter to enhance the anti-interference capability. However, increase of DI filter time will reduce the response of DI terminals.

Par. No.	Name	Range	Unit	Default
C05.05	DI Terminal Logic Selection	0~255		0

This parameter is used to control the digital input terminal positive or negative logic. Each digital input terminal corresponds to a weight. For example: if you want to set FOR and DI2 terminal as negative logic, set the C05.05 to

$$1 + 8 = 9$$

Terminal	DI4	DI3	DI2	DI1	REV	FOR
Weight	32	16	8	4	2	1

Positive/Negative logic Note:

For NPN mode:

When the digital input selects positive logic, connecting the digital input terminal and COM terminal is ON state (active), disconnecting is OFF state (inactive);

When the digital input selects negative logic, connecting the digital input terminal and COM terminal is OFF state (inactive), disconnecting is ON state (active);

For PNPmode:

When the digital input selects positive logic, connecting the digital input terminal and VDD terminal is ON state (active), disconnecting is OFF state (inactive);

When the digital input selects negative logic, connecting the digital input terminal and VDD terminal is OFF state (inactive), disconnecting is ON state (active);

Note: There are some digital input function is inverse. If the terminal logic is set as negative and

the function of the terminal is inverse, then the function of the terminal is

positive. For example: When C05.10 Terminal FOR is set to [6] Stop inverse, C05.05 is set to 1 (The logic of terminal FOR is negative), then connect the terminal FOR and COM (NPN mode), function "stop" is active, disconnect the terminal FOR and COM, function "stop" is inactive.

Par. No.	Name	Range	Unit	Default
C05.06	DO/Relay terminal logic selection	0~255		0

This parameter is used to control the DO/Relay terminal positive or negative logic. Each DO/Relay terminal corresponds to weight. For example: If you want to set DO1 and Relay1 terminal as negative logic, set the C05.06 to

$$1 + 4 = 5$$

Terminal	Relay2	Relay1	DO2	DO1
Weight	8	4	2	1

Positive logic: When the selected function of DO/Relay terminals is activated, the DO/Relay terminal outputs ON signal, else outputs OFF signal.

Negative logic: When the selected function of DO/Relay terminals is activated, the DO/Relay terminal outputs OFF signal, else outputs ON signal.

Par. No.	Name	Range	Unit	Default
C05.09	Function at External Alarm	0: Off 2: Stop and warning 3: Jogging and warning 4: Max. speed and warning 5: Stop and trip		0

The function activates when the digital input terminal function [43] external alarm input is active.

0: Off, resumes control via serial bus using the most recent control word;

2: Stop and warning, drive stops and reports "A.102";

3: Jogging and warning, overruled to jog speed and reports "A.102";

4: Max. speed, overruled to max. speed and reports "A.102";

5: Stop and trip, overruled to stop with subsequent trip ("E.102").

Par. No.	Name	Range	Unit	Default
C05.10	Terminal FOR			8
C05.11	Terminal REV			11
C05.12	Terminal DI1	0~110		15
C05.13	Terminal DI2			16
C05.14	Terminal DI3			17
C05.15	Terminal DI4			18

The digital inputs are used for selecting various functions in the drive. All digital inputs can be set to the following functions:

0: No operation, no reaction to signals transmitted to the terminal;

1: Reset, reset the drive after a Trip/Alarm;

2: Coast inverse, no output, leaving the motor coasting to stop. Terminal logic '0' => coasting stop;

3: Coast and reset inverse, the drive resets leaving the motor coasting to stop. Terminal logic '0' => coasting stop;

6: Stop inverse, the drive is stopped according to selected ramp time. Terminal logic '0' => stop;

8: Start, select start for a start/stop command. Terminal logic '1' = start, logic '0' = stop;

9: Latched start, the motor starts, if a pulse is applied for min. 4ms. The motor stops when [6] Stop inverse/[46] Stop is activated;

10: Reversing, change direction of motor shaft rotation, reversing signal only changes direction of rotation, it does not activate start function, C04.10 must choose [2] Both directions;

11: Start reversing, used for start/stop and for reversing at the same time;

12: Enable start forward only, disengages the counterclockwise movement and allows for the clockwise direction;

13: Enable start reverse only, disengages the clockwise movement and allows for the counterclockwise direction;

14: Jog, used for activating jog speed, see C03.11;

15: Preset ref. bit0, Preset ref. bit0, bit1, bit2, bit3 enables a choice between one of the sixteen preset references (see C03.10) according to the table below;

16: Preset ref. bit1, same as [15];

17: Preset ref. bit2, same as [15];

18: Preset ref. bit3, same as [15];

Terminal of Preset ref. bit3	Terminal of Preset ref. bit2	Terminal of Preset ref. bit1	Preset ref. bit0	Parameter
OFF	OFF	OFF	OFF	C03.10[0]
OFF	OFF	OFF	ON	C03.10[1]
OFF	OFF	ON	OFF	C03.10[2]
OFF	OFF	ON	ON	C03.10[3]
OFF	ON	OFF	OFF	C03.10[4]
OFF	ON	OFF	ON	C03.10[5]
OFF	ON	ON	OFF	C03.10[6]
OFF	ON	ON	ON	C03.10[7]
ON	OFF	OFF	OFF	C03.10[8]
ON	OFF	OFF	ON	C03.10[9]
ON	OFF	ON	OFF	C03.10[10]
ON	OFF	ON	ON	C03.10[11]
ON	ON	OFF	OFF	C03.10[12]
ON	ON	OFF	ON	C03.10[13]
ON	ON	ON	OFF	C03.10[14]
ON	ON	ON	ON	C03.10[15]

19: Freeze reference, freezes the actual reference, if freezing reference is active, stop the drive via a terminal programmed for [2] Coast inverse, [3] Coast and reset inverse, [42] Coast and [46] Stop;

20: Freeze output, freezes the output frequency, if freezing output is active, stop the drive via a terminal programmed for [2] Coast inverse, [3] Coast and reset inverse, [42] Coast and [46] Stop;

21: Up, when speed up is activated for less than 400 ms. the resulting reference will be increased by C03.13 Up/Down Value. If Speed up is activated for more than 400 ms, the

resulting reference will ramp according to ramp 4;

22: Down, similar to [21] Speed up;

23: Set-up select, select one of the two set-ups, see C00.10;

24: Main reference calculation switchover;

This function is used C03.07 Main Reference Calculation option [3] Switchover between Reference source 1 and Reference source 2, [4] Switchover between Reference source 1 and Reference source 2,3 operation. When the terminal is in the ON state, the main reference value is Reference Source 1; when the terminal is in the OFF state, the main reference is Reference source 2 or Reference source 2,3 operation results;

28: Catch up, select catch up to increase the resulting reference value by the percentage set in C03.12 Catch up/slow Down Value;

29: Slow down, similar to [28] Catch up;

32: Pulse input, select pulse input when using a pulse sequence as either reference or feedback. Scaling is done in par. group C05.5*, the function is available for C05.15 Terminal DI4 only;

34: Ramp bit0, ramp bit0, bit1 are used for selecting one of the four ramps;

35: Ramp bit1, same as [34];

36: Ramp bit2, same as [34];

Terminal of Ramp bit2	Terminal of Ramp bit1	Terminal of Ramp bit0	Parameters
OFF	OFF	OFF	Ramp1 (C03.41, C03.42)
OFF	OFF	ON	Ramp2 (C03.51, C03.52)
OFF	ON	OFF	Ramp3 (C03.61, C03.62)
OFF	ON	ON	Ramp4 (C03.71, C03.72)
ON	OFF	OFF	Ramp5 (C03.85, C03.86)
ON	OFF	ON	Ramp6 (C03.88, C03.89)
ON	ON	OFF	Ramp7 (C03.91, C03.92)
ON	ON	ON	Ramp8 (C03.94, C03.95)

37: Latched Reversing, motor starts counter-clockwise if a pulse is applied for min. 4ms. The motor stops when [6] Stop inverse/[46] Stop is activated;

38 Jog reversing.

42: Coast, similar to [2] coast reverse, but logic contrary: Terminal logic '1' => coasting stop;

43: External alarm input, when terminal is in ON state, the drive will run as C05.09 specified.

46: Stop, similar to [6] stop reverse, but logic contrary: Terminal logic '1' => stop;

50: Speed control/torque control switchover;

When C01.00 Configuration Mode is set to [4] Torque open loop, torque open loop and speed open loop can be switched via digital input terminal. The terminal is in the OFF state, it is torque open loop; The terminal is in the ON state, it is speed open loop;

60: Counter A

62: Reset counter A, to clear counter A to "0";

63: Counter B, to count the pulse number inputted into the terminal;

65: Reset counter B, to clear counter B to "0";

110: Process PID pause, the Process PID is temporarily stopped and the drive maintains the current output frequency.

Par. No.	Name	Range	Unit	Default
C05.30	Terminal DO1	0~91		0
C05.31	Terminal DO2	0~91		0

Set the Terminal DO1/DO2 output function.

Terminal DO1 is a programmable multiplex terminal, it can be a high-speed pulse output terminal, also available as a collector's digital output terminal. if C05.60 = 0, DO1 is as a collector's digital output terminal; If C05.60 is not set to 0, DO1 is as a high-speed pulse output terminal.

Terminal DO2 can only be as a collector's digital output terminal.

If terminal DO1 and DO2 are as collector's digital output terminals, their output function options are the same as C05.40 relay output.

Par. No.	Name	Range	Unit	Default

C05.40	Relay Function	0~91		9, 5

This parameter is a 2-array parameter. C05.40[0] corresponds to the relay 1 (FA-FB-FC). C05.40[1] corresponds to the relay 2 (KA-KB).

0: No operation;

1: Drive ready, the drive control card has received supply voltage;

3: Remote control ready, the drive is ready for operation and is in AUTO mode;

4: Drive running/No warning, the drive is running and no warning is present;

5: Drive running, the drive is running;

7: Run in range/No warning, the drive is running within the programmed speed ranges set in C04.12 Motor Speed Low Limit and C04.14 Motor Speed High Limit. No warnings are present;

8: Run on reference/No warning, the drive runs at reference speed without warnings;

9: Alarm, the drive alarms;

10: Alarm or warning, an alarm or warning occurs;

12: Out of current range, output current is outside the range set in C04.50 and C04.51;

13: Below current low, output current is lower than set in C04.50;

14: Above current high, output current is higher than set in C04.51;

15: Out of frequency range, output frequency is outside the range set in C04.52 and C04.53;

16: Below frequency low, output frequency is lower than set in C04.52;

17: Above frequency high, output frequency is higher than set in C04.53;

18: Out of feedback range, feedback is outside the range set in C04.56 and C04.57;

19: Below feedback low, feedback is lower than set in C04.56;

20: Above feedback high, feedback is higher than set in C04.57;

21: Thermal warning, a thermal warning occurs;

22: Ready, no thermal warning, the drive is ready for operation and no over-temperature

warning is present;

23: Remote ready, no thermal warning, the drive is ready for operation in AUTO mode, and no over-temperature warning is present;

24: Ready, voltage OK, the drive is ready for operation, no over-voltage or under-voltage is present;

25: Reverse, the drive runs in counter clockwise;

26: Bus OK, local bus communication is normal;

32: Mech. brake control, enter mechanical brake control signal, see C02.2*;

36: Control word bit 11, bit 11 in control word is active;

37: Control word bit 12, bit 12 in control word is active;

38: Communication control, When the corresponding bit of the register 51003 is valid, an ON signal is output;

40: Out of reference range, reference is outside the range set in C04.54 and C04.55;

41: Below reference low, reference is lower than set in C04.54;

42: Above reference high, reference is higher than set in C04.55;

43: External alarm, the digital input terminal function [43] external alarm input is active;

44: Unbalance warning, unbalance occurs, see C04.8*;

51: Drive in HAND state;

52: Drive in AUTO state;

53: No alarm;

56: Drive in HAND state;

57: Drive in AUTO state;

60: Comparator 0, using a simple PLC, the results of comparator 0;

61: Comparator 1, using a simple PLC, the results of comparator 1;

62: Comparator 2, using a simple PLC, the results of comparator 2;

63: Comparator 3, using a simple PLC, the results of comparator 3;

70: Logic rule 0, using a simple PLC, the results of logic rule 0;

71: Logic rule 1, using a simple PLC, the results of logic rule 1;

72: Logic rule 2, using a simple PLC, the results of logic rule 2;

73: Logic rule 3, using a simple PLC, the results of logic rule 3;

80: Simple PLC digital rutput 1, only active for DO1;

81: Simple PLC digital output 2, only active for DO2;

82: Simple PLC relay 1, only active for relay 1;

83: Simple PLC relay 2, only active for relay 2;

Par. No.	Name	Range	Unit	Default
C05.41	Relay On Delay Time	0.00~600.00	s	0.00
C05.42	Relay Off Delay Time	0.00~600.00	s	0.00

These parameters 2-array parameters which are used to set the relay output turn-on and turn-off delay time. Array [0] is corresponding to the relay 1; array [1] is corresponding to the relay 2.

For example:

When the relay 1 function is activated, it delays C05.41[0] time, then outputs ON.

When the relay 1 function is not activated, it delays C05.42[0] time, then outputs OFF.

Par. No.	Name	Range	Unit	Default
C05.55	Terminal DI4 Low Frequency	0.00~C05.56	kHz	0.00

Enter the low frequency corresponding to the low referece value in C05.57.

Par. No.	Name	Range	Unit	Default
C05.56	Terminal DI4 High Frequency	C05.55~100.00	kHz	50.00

Enter the high frequency corresponding to the high referece value in C05.58.

Par. No.	Name	Range	Unit	Default
C05.57	Terminal DI4 Low Reference Value	-200.00~200.00	%	0.00

Enter low reference value corresponding to value in C05.55. 0% equals 0, 100⊠ equals value set in C03.03.

Par. No.	Name	Range	Unit	Default
C05.58	Terminal DI4 High Reference Value	-200.00~200.00	%	100.00

Enter high reference. value corresponding to value in C05.56. 0% equals 0, 100% equals value set in C03.03.

Par. No.	Name	Range	Unit	Default
C05.59	Terminal DI4 Filter Time	1~1000	ms	100

Enter the pulse filter time, the low pass filter reduces the influence on and dampends the oscillations on the feedback signal from the control.

Par. No.	Name	Range	Unit	Default
C05.60	Terminal DO1 Pulse Output	0~30		0

Terminal DO1 pulse output function and the corresponding scales are as follows:

Option	Function	Scale
0	Digital output	DO1 is as a collector's digital output terminal
10	Output frequency	In torque open loop: 0% = 0, 100% = C04.19 In speed open loop mode: 0% = 0, 100% = C03.03

11	Reference	If C03.00 = 0,
		then 0% = 0, 100% = C03.03;
		If C03.00 = 1,
		then 0% = -C03.03, 100% = C03.03;

12	Feedback	
13	Output current	0% = 0, 100% = C16.37
16	Power	0% = 0, 100% = C01.20
17	Speed	0% = 0, 100% = C01.25
18	Motor voltage	0% = 0, 100% = C01.22
20	Bus control	
21	Terminal DI4 pulse input	0% = C05.55, 100% = C05.56

22	Terminal VI input	0% = C06.10/C06.12, 100% = C06.11/C06.13
23	Terminal AI input	0% = C06.20/C06.22, 100% = C06.21/C06.23
26	DC link voltage	0% = 0V, 100% = 1000V
38	Communicaiton	Write register 51006 to control DO1 output. 0.00% corresponds to C05.61, 100.00% corresponds to C05.62

Par. No.	Name	Range	Unit	Default
C05.61	Pulse Output Min. Freq.	0.00~C05.62	kHz	0.00
C05.62	Pulse Output Max. Freq.	C05.61~100.00	kHz	50.00
C05.63	Pulse Output Min. Scale	0.00~200.00	%	0.00
C05.64	Pulse Output Max. Scale	0.00~200.00	%	100.00

C05.61 and C05.62 are used to set minimum and maximum frequency of the pulse output; C05.63 and C05.64 are used to set minimum and maximum scale corresponding to minimum and maximum frequency.

For example: In speed open loop mode, Set C03.03 = 50.0, C05.60 = 10 (0% = 0Hz, 100% = 50Hz), C05.61 = 2kHz, C05.62 = 10kHz, if C05.63 = 0.00% (0Hz), C05.64 = 100.00% (50Hz), then the relationship between the output frequency and terminal DO1 pulse output frequency is shown below:
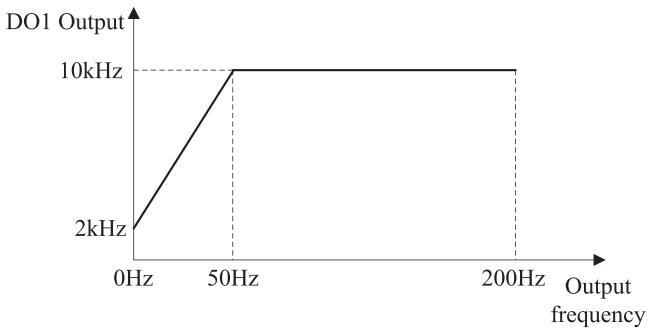
If C05.63 = 80.00% (40Hz), C05.64 = 10.00% (5Hz), then the relationship between the output frequency and DO1 pulse output frequency is shown below:

DO1 Output

10kHz

2kHz

5Hz   40Hz   200Hz   Output
                                        frequency
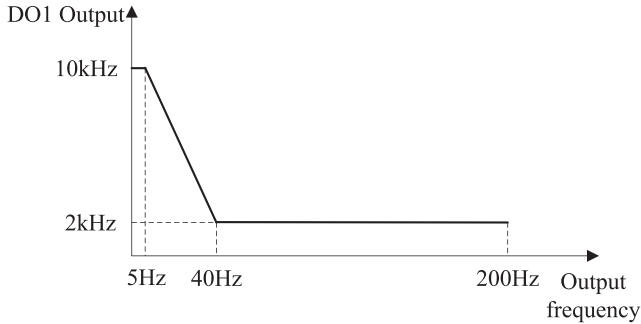
6.7 Group 06: Analog In/Out

Par. No.	Name	Range	Unit	Default
C06.00	Live Zero Timeout Time	1~99	s	10

Live Zero Time-out Function is used for analog input signal detection. To active the Live Zero Timeout Function, if voltage input is selected, then the low input voltage (C06.10, C06.20) settings must be greater than 1V; if current input is selected, the low input current (C06.12, C06.22) settings must be greater than 2mA or more. If the analog input signal is lower than 50% of the settings of parameters of C06.10, C06.12, C06.20, C06.22, and lasts longer than the settings of C06.00 Live Zero Timeout Time, this feature takes effect.

If the analog input signal is back to normal within the delay time, then reset the timer.

Diagram of Live Zero Timeout Function is shown below:

Analog Input

50%
C06.10，C06.12，
C06.20，C06.22

Live Zero Timeout

Time

C06.00
Live Zero Timeout
Time
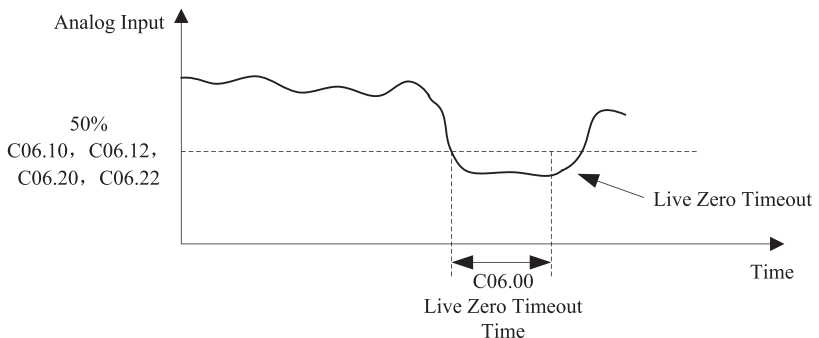
Par. No.	Name	Range	Unit	Default
C06.01	Live Zero Timeout Function	0: Off 1: Freeze output 2: Stop 3: Jogging 4: Max. speed 5: Stop and trip		0

Select the live zero time-out function.

 0: Off;

 1: Freeze output, frozen at the present value;

 2: Stop, overruled to stop;

 3: Jogging, overruled to jog speed;

 4: Max. speed, overruled to Max.speed;

 5: Stop and trip, overruled to stop with subsequent trip.

Par. No.	Name	Range	Unit	Default
C06.10	Terminal VI Low Voltage	0.00~C06.11	V	0.07
C06.11	Terminal VI High Voltage	C06.10~10.00	V	10.00
C06.12	Terminal VI Low Current	0.00~C06.13	mA	0.14
C06.13	Terminal VI High Current	C06.12~20.00	mA	20.00
C06.14	Terminal VI Low Reference Value	-200.00~200.00	%	0.00
C06.15	Terminal VI High Reference Value	-200.00~200.00	%	100.00

C06.10 is used to set low voltage input; C06.12 is used to set low current input; The low voltage and current analog input scaling value corresponds to the low reference. value, set in C06.14.

C06.11 is used to set high voltage input; C06.12 is used to set high current input; The high voltage and current analog input scaling value corresponds to the high reference value, set in C06.15.

For C06.14 and C06.15, 0% equals 0, 100⊠ equals value set in C03.03.

There are 4 kinds of curves between terminal VI input voltage/current and its scale value:
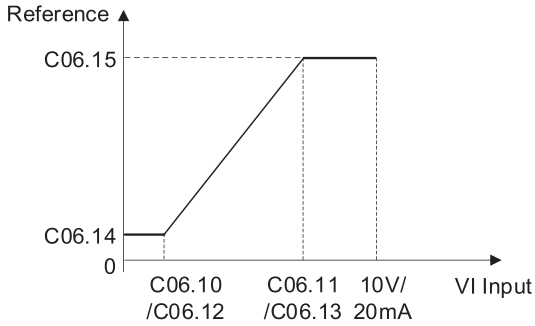
C06.14 < C06.15 and C06.14 >= 0
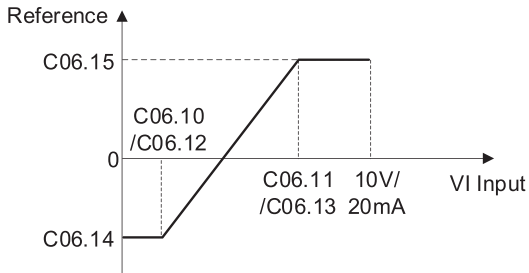
C06.14 < C06.15 and C06.14 < 0
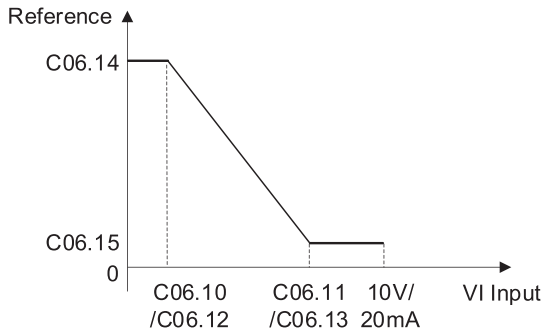
C06.14 > C06.15 and C06.15 >= 0
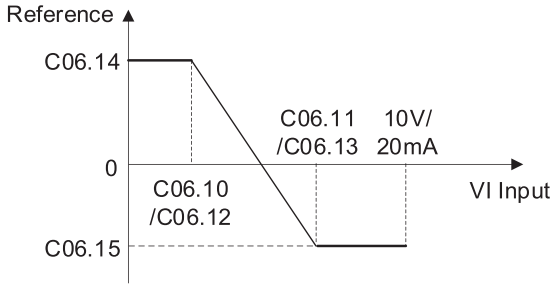
C06.14 > C06.15 and C06.15 < 0

Terminal VI reference/feedback value calculated as follows:

If C06.10 <= VI Input <= C06.11,

VI Reference Value = ((C06.15 - C06.14) ÷ (C06.11 - C06.10) × (VI input - C06.10) + C06.14) × C03.03;

If VI Input < C06.10, VI Reference Value = C06.14 × C03.03;

If VI Input > C06.11, VI Reference Value = C06.15 × C03.03;

Note: Above formulas are for voltage input. If it is a current input, C06.10 and C06.11 use C06.12 and C06.13 instead respectively.

Par. No.	Name	Range	Unit	Default
C06.16	Terminal VI Filter Time	0.01~10.00	s	0.01

Enter the terminal VI filter time. This is a first-order digital low pass filter for suppressing electrical noise in terminal VI. A high time constant value improves dampening but also increases the time delay through the filter.

Par. No.	Name	Range	Unit	Default
C06.18	Terminal VI Zero Dead Band	0.0~20.00	V/mA	0.00

Set the dead-band of VI at 0 speed. When analog input VI ref. low and ref. high have opposite signs, there must be a set point that corresponding to an analogue value equals 0. In order to

prevent the set point jitter at zero point due to analog interference, this parameter should be set properly.
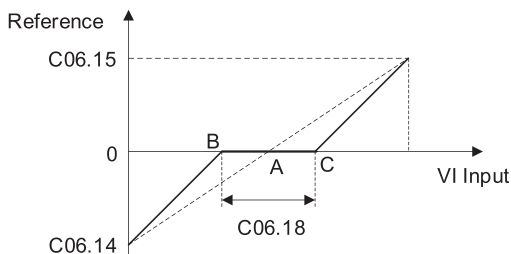
Point A as shown in the figure is the analog value that corresponds to a setpoint that equals 0. It is calculated via analog low, high values and low, high reference values. After set terminal VI zero dead band, UAB=UAC=C06.18/2. If the VI input is between B and C, the VI reference is 0.

Par. No.	Name	Range	Unit	Default
C06.19	Terminal VI Mode	0: Voltage mode 1: Current mode		0

Select the input to be present on analog input VI.

Par. No.	Name	Range	Unit	Default
C06.20	Terminal AI Low Voltage	0.00~C06.21	V	0.07
C06.21	Terminal AI High Voltage	C06.20~10.00	V	10.00
C06.22	Terminal AI Low Current	0.00~C06.23	mA	0.14
C06.23	Terminal AI High Current	C06.22~20.00	mA	20.00
C06.24	Terminal AI Low Reference Value	-200.00~200.00	%	0.00
C06.25	Terminal AI High Reference Value	-200.00~200.00	%	100.00
C06.26	Terminal AI Filter Time	0.01~10.00	s	0.01
C06.28	Terminal AI Zero Dead Band	0.0~20.00	V/mA	0.00
C06.29	Terminal AI Mode	0: Voltage mode 1: Current mode		0

The usage of terminal AI is similar to terminal VI, please refer to C06.1* Analog Input VI.

Par. No.	Name	Range	Unit	Default
C06.70	Terminal VO Mode	0: 0-20mA 1: 4-20mA 3: 0-10V		3

Select output to be present on analog output VO.

Par. No.	Name	Range	Unit	Default
C06.71	Terminal VO Analog Output	0~30		0

Select choices of the analog output VO

Option	Function	Scale
0	No function	
10	Output frequency	In torque open loop: 0% = 0Hz, 100% = C04.19 In speed open loop mode: 0% = 0Hz, 100% = C03.03

11	Reference	If C03.00 = 0,
		then 0% = 0, 100% = C03.03;
		If C03.00 = 1,
		then 0% = -C03.03, 100% = C03.03;

12	Feedback	
13	Output current	0% = 0, 100% = C16.37
16	Power	0% = 0, 100% = C01.20
17	Speed	0% = 0, 100% = C01.25
18	Motor voltage	0% = 0, 100% = C01.22
20	Bus control	
21	Pulse input	0% = C05.55, 100% = C05.56
22	Terminal VI input	0% = C06.10/C06.12, 100% = C06.11/C06.13
23	Terminal AI input	0% = C06.20/C06.22, 100% = C06.21/C06.23
26	DC link voltage	0% = 0V, 100% = 1000V
30	Output torque	0% = 0N•m, 100% = C01.26
38	Communcation Control	Write register 51004 to control VO output. 0.00% corresponds to C06.75, 100.00% corresponds to C06.76.

Par. No.	Name	Range	Unit	Default
C06.73	Terminal VO Output Min. Scale	0.00~200.00	%	0.00
C06.74	Terminal VO Output Max. Scale	0.00~200.00	%	100.00
C06.75	Terminal VO Min. Output	0.00~C06.76		0.00 /4.00
C06.76	Terminal VO Max. Output	C06.75~10.00/20.00		10.00 /20.00

Scale minmum/maximum output of selected ananlog signal at terminal VO as percentage of minmum/maximum signal value.

For example: In speed open loop mode, set C03.03 = 50.0, C06.70 = 3 (0~10V), C06.70 = 10 (Output frequency 0% = 0.0Hz, 100% = 50.0Hz), C06.73 = 0.00% (0.0Hz), C06.74 =100.00% (50.0Hz), C06.75 = 2V, C06.76 = 8V, the relationship between the output frequency and VO output is shown below:
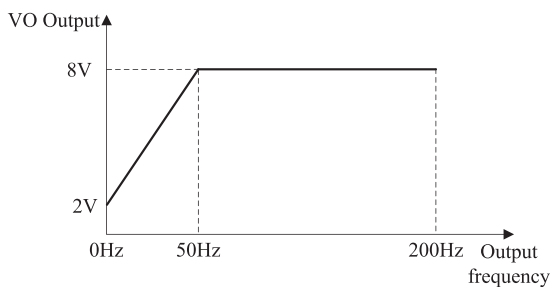
If C06.73 = 80.00% (40Hz), C06.74 = 10.00% (5Hz), then the relationship between the output frequency and VO output is shown below:

VO Output

8V

2V

5Hz 40Hz   200Hz Output
                            frequency
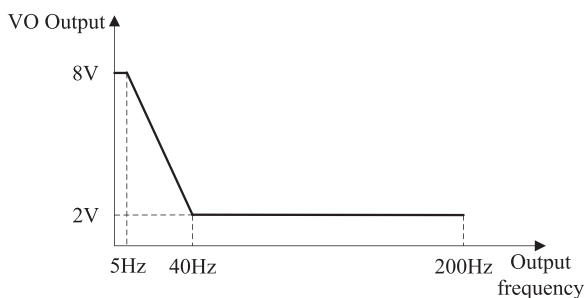
Par. No.	Name	Range	Unit	Default
C06.81	LCP Min. Ref.	-200.00~200.00	%	0.00
C06.82	LCP Max. Ref.	-200.00~200.00	%	100.00

These parameters are used to set the minimum/maximum reference of LCP Up/Down key or potentiometer.

Par. No.	Name	Range	Unit	Default
C06.90	Terminal AO Mode	0: 0-20mA 1: 4-20mA		0
C06.91	Terminal AO Analog Output	0~23		0
C06.93	Terminal AO Output Min. Scale	0.00~200.00	%	0.00
C06.94	Terminal AO Output Max. Scale	0.00~200.00	%	100.00
C06.95	Terminal AO Min. Output	0.00~C06.96		0.00
C06.96	Terminal AO Max. Output	C06.95~20.00		10.00

The usage of terminal AO is similar to terminal VO, please refer to C06.7* Analog Output VO.

6.8 Group 07: Controllers

Par. No.	Name	Range	Unit	Default
C07.12	Torque PI Proportional Gain	0~500	%	100

Enter the proportional gain value for the torque controller. Selection of a high value makes the

controller react faster. Too high a setting leads to control instability.

Par. No.	Name	Range	Unit	Default
C07.13	Torque PI Integration Time	0.002~2.000	s	0.020

Enter the integration time for the torque controller. Selection of a low value makes the controller react faster. Too low a setting leads to control instability.

Par. No.	Name	Range	Unit	Default
C07.20	Process PID Feedback Source	0: No function 1: Terminal VI 2: Terminal AI 8: Pulse input DI3 11: Communication		0

Select source of feedback signal.

Par. No.	Name	Range	Unit	Default
C07.30	Process PID Normal/ Inverse	0: Normal 1: Inverse		0

Normal and inverse control are implemented by introducing a difference between the reference signal and the feedback signal.

> 0: Normal, the drive is to reduce/increase the output frequency if the feedback signal is larger/lower than reference;

> 1: Inverse, the drive is to reduce/increase the output frequency if the feedback signal is lower/larger than reference;

Par. No.	Name	Range	Unit	Default
C07.31	Process PID Anti Windup	0: Disable 1: Enable		0

This function ensures the output frequency reaches to frequency limit. PID-controller will be initialized to the current frequency when the output frequency can not be changed. This can prevent the integrator continue to integrate on an error when the PID-controller can't adjust output frequency.

> 0: Disable, continue regulation of a given error even when the output frequency can't be increased/decreased;

1: Enable, ceases regulation of a given error when the output frequency can't be increased/decreased;

Par. No.	Name	Range	Unit	Default
C07.32	Process PID Start	0.0~200.0	Hz	0.0

Enter the motor speed to be attained as a start signal for commencement of PID control. When the power is switched on, the drive will commence ramping and then operate under speed open loop control. Thereafter, when the Process PID Start Speed is reached, the drive will change over to Process PID Control.
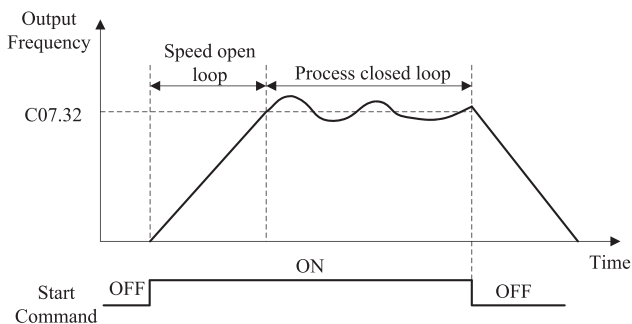
Par. No.	Name	Range	Unit	Default
C07.33	Process PID Proportional Gain	0.00~10.00		0.01

Enter the PID proportional gain. The proportional gain multiplies the error between the set point and the feedback signal.

Attention: This function is disabled when it is set to "0".

Par. No.	Name	Range	Unit	Default
C07.34	Process PID Integral Time	0.01~655.35	s	655.35

Enter the PID integral time. The integrator provides an increasing gain at a constant error between the set point and the feedback signal. The integral time is the time needed by the integrator to reach the same gain as the proportional gain.

Par. No.	Name	Range	Unit	Default
C07.35	Process PID Differential Time	0.00~10.00	s	0.00

Enter the PID differential time. The differentiator does not react to a constant error, but provides a gain only when the error changes. The shorter the PID differentiation time, the stronger the gain from the differentiator.

Par. No.	Name	Range	Unit	Default
C07.36	Process PID Differential Limit	1.0~50.0		5.0

Enter a limit for the differentiator gain. If there is no limit, the differential increases when there are fast changes.

Par. No.	Name	Range	Unit	Default
C07.38	Feedforward reference coefficient	0~400	%	0

This parameter is used to set the feedforward reference coefficient.

Par. No.	Name	Range	Unit	Default
C07.39	Process PID Deviation Limit	0.0~200.0	%	0.1

When the process PID deviation (the difference between the reference and the feedback) is less than the set value of this parameter, the process PID control stops.

Par. No.	Name	Range	Unit	Default
C07.41	Process PID Output Lower Limit	-100.00~100.00	%	0.00
C07.42	Process PID Output Upper Limit	-100.00~100.00	%	100.00

These parameters are used to set process PID controller output lower/upper limit, 100% corresponds to C04.19.

Par. No.	Name	Range	Unit	Default

Par. No.	Name	Range	Unit	Default
C07.45	Feedforward Source	0: No function 1: Terminal VI 2: Terminal AI 8: Pulse input DI4 11: Communication	%	200.0

Feedforward control is to apply the feed-forward source directly to the output of the inverter so that it can respond more quickly.

Par. No.	Name	Range	Unit	Default
C07.46	Feedforward Control Logic Selection	0: Positive logic 1: Inverse logic	%	200.0

This parameter is used to select the feedforward control logic. Positive logic treats feedforward as a positive value and inverse logic treats feedforward as a negative value.

Par. No.	Name	Range	Unit	Default
C07.47	Process PID Reference Coefficient	0: C07.48 1: Terminal VI 2: Terminal AI 8: Pulse input DI4 11: Communication		0
C07.48	Process PID Reference Coefficient Digital Setting	0.00~100.00	%	100.00

This set of parameters is used to set the reference coefficient of the process PID controller output. The value calculated by the process PID controller multiplied by the process PID reference coefficient is equal to the process PID output percentage.

Par. No.	Name	Range	Unit	Default
C07.49	Process PID Parameter Switchover Deviation	0.0~200.0	%	200.0

In some applications, one group of PID parameters cannot satisfy the requirement of the whole running process. PID parameters switchover is required.

This parameter is a 2-array parameter. Two sets of process PID parameters will be automatically switched according to the setting of this parameter. 100% corresponds to the maximum setting of C03.03.

When the absolute value of the deviation between the PID reference and feedback is less than

C07.49[0], the first set (C07.33~07.35[0]) of PID parameters is used

When the absolute value of the deviation between the PID reference and feedback is greater than C07.49[1], the second set of PID parameters (C07.33~07.35[1]) is used;

When the absolute value of the deviation between the PID reference and feedback is between C07.49[0] and C07.49[1], the linear interpolation value of the two sets of PID parameters is used;
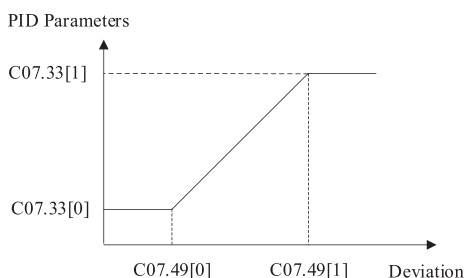
Par. No.	Name	Range	Unit	Default
C07.50	Process PID Integral Lower Limit	-100.00~100.00	%	0.00
C07.51	Process PID Integral Upper Limit	-100.00~100.00	%	100.00

This group of parameters are used to set the process PID controller integral upper and lower limits.

Par. No.	Name	Range	Unit	Default
C07.55	Process PID Deviation Control Mode	0: Mode 0 1: Mode 1 2: Mode 2		0

0: Mode 0

The absolute value of the deviation >= C07.39, PID is enabled;

The absolute value of the deviation < C07.39, PID is disabled, PID output freezes;

1: Mode 1

The absolute value of the deviation >= C07.39, PID is enabled. If deviation > 0, use deviation +

C07.39 as deviation to do PID calculation; If deviation < 0, use deviation - C07.39 as deviation to do PID calculation;

The absolute value of the deviation < C07.39, PID is enabled too;

2: Mode 2

The absolute value of the deviation >= C07.39, PD is enabled, I part does not calculate.

The absolute value of the deviation < C07.39, PID is enabled too;

The process PID control block diagram is as follows:

Object

M

Output Frequency

C04.14 Motor Speed Upper Limit

Feedforward output %

C07.38 Feedforward reference coefficient

C07.46 Feedforward Control Logic Selection

+/-

Sensor

C07.45 Feedforward source

C07.47 Reference coefficient

PID output %

C07.20 Feedback

C07.42 Output Upper Limit

C07.41 Output Lower Limit

+

C07.51 Integral Lower limit

C07.50 Integral Upper limit

C07.36 Differential Limit

C07.33 Proportional Gain

C07.34 Integral Time

C07.35 Differential Time

C07.49/C07.55 Deviation Control

C07.39 Deviation Limit

C07.30 Normal/Inverse

—

Reference

6.9 Group 08: Communication

Par. No.	Name	Range	Unit	Default
C08.01	Control Site	0: Digital and Communication 1: Digital only 2: Communication only		0

The drive start, stop, reverse, jog commands can be given both through digital input terminals and communication, this parameter is used to set the drive control command site.

0: Digital and Communication, controlled by using both digital input and Communication;

1: Digital only, controlled by using digital inputs only;

2: Communication only, controlled by using communication only;

Par. No.	Name	Range	Unit	Default
C08.03	Communication Timeout Time	0.00~650.00	s	1.00

Enter the maximum time expected to pass between the reception of two consecutive telegrams. If this time is exceeded, it indicates that the serial communication has stopped. The function selected in C08.04 Communication Timeout Function will then be carried out. The time-out counter is triggered by a valid communication.

Par. No.	Name	Range	Unit	Default
C08.04	Communication Timeout Function	0: Off 1: Freeze output 2: Stop 3: Jogging 4: Max. speed 5: Stop and trip		0

The communication time-out function activates when the communication fails to be updated within the time period specified in C08.03 Communication Timeout Time.

0: Off, resumes control via serial bus using the most recent control word;

1: Freeze output, frozen at the present value;

2: Stop, overruled to stop;

3: Jogging, overruled to jog speed;

4: Max. speed, overruled to max. speed;

5: Stop and trip, overruled to stop with subsequent trip ("E.17").

Par. No.	Name	Range	Unit	Default
C08.06	Reset Communication Timeout	0: Do not reset 1: Do reset		0

Resetting communication timeout will remove any timeout function. After communication timeout occurs, a communication interrupt flag will be within the drive. It must be use the parameter to clear the flag (Do reset), else even to restore communication or clear "E.17" alarm, the drive will continue to report communication timeout.

0: Do not reset, communication timeout is not reset;

1: Do reset, communication timeout is reset;

Par. No.	Name	Range	Unit	Default
C08.30	Protocol	0: FC 2: Modbus RTU		0

Select the protocol to be used.

Par. No.	Name	Range	Unit	Default
C08.31	Address	0~247		1

Select the address for the bus. FC-bus range is 1-126, and Modbus range is 1-247.

Par. No.	Name	Range	Unit	Default
C08.32	Baud Rate	0: 2400 1: 4800 2: 9600 3: 19200 4: 38400 5: 57600 6: 76800 7: 115200 8~9: Reserved	bits/s	2

Select baud rate for communication.

Par. No.	Name	Range	Unit	Default
C08.33	Parity/Stop Bits	0: Even parity (1 stop bit) 1: Odd parity (1 stop bit) 2: No parity (1 stop bit) 3: No parity (2 stop bit)		2

This parameter only effective for Modbus and FC bus always has even parity.

Par. No.	Name	Range	Unit	Default
C08.35	Min. Response Delay	0.000~0.500	s	0.002

Specify the minimum delay time between receiving a request and transmitting a response. This is used for overcoming modem turnaround delays.

Par. No.	Name	Range	Unit	Default
C08.36	Max. Response Delay	0.010~10.000	s	5.000

Specify the maximum permissible delay time between transmitting a request and receiving a response. If exceeds this delay time, the drive will not respond to received data.

Par. No.	Name	Range	Unit	Default
C08.38	Message Response	0: Normal 1: Only response exception message 2: Not response		0

This parameter is used to control Modbus message response.

Attention: the drive will response the READ instruction no matter what C08.38 set.

Par. No.	Name	Range	Unit	Default
C08.39	Parameter Write Store	0: Not saved at power down 1: Saved at power down		0

This parameter is used to control whether the parameters which is changed by communication WRITE instruction are saved or not at power down.

Par. No.	Name	Range	Unit	Default

C08.50	Coasting Select	0: Digital input 1: Bus 2: Logic AND 3: Logic OR		0
C08.53	Start Select	See C08.50		0
C08.54	Reversing Select	See C08.50		3
C08.56	Preset Reference Select	See C08.50		3

Select control of the coasting, start, reverse, set-up and preset reference function via the terminals (digital input) and/or via the bus.

0: Digital input, activate via a digital input;

1: Bus, activate via serial communication port;

2: Logic AND, activate via serial communication port and a digital input;

3: Logic OR, activate via serial communication port or a digital input;

6.10 Group 13: Simple PLC

Simple PLC is a user-defined sequence of operation (C13.52[x]). When the associated user-defined envents (C13.51[x]) is set to true, Sample PLC will perform these operations.

Events and related operations are paired, that is, once an event is "true", will execute its associated action. You can set up to 54 events and operations.

Start and stop simple PLC: Selects order or parallel control in C13.00 Sample PLC Mode, when start event (C13.01) is "true", start simple PLC, when stop event (C13.02) is "true", simple PLC will be stopped. In addition, you can also choose [0] off (C13.00) to stop the simple PLC.

Par. No.	Name	Range	Unit	Default
C13.00	Simple PLC Mode	0: Off 1: Order execution 2: Parallel execution		0

Set the simple PLC control mode.

0: Off;

1: Order execution, after simple PLC start event is "true", the control event executes orderly: from the control event 0 (C13.51[0]) to control events n (C13.51[N], N is the last

non-empty event) and then back to control event 0, as shown in the following figure:
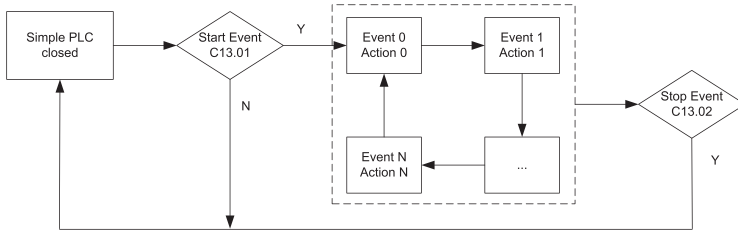
2: Parallel execution, after simple PLC start event is "true", the control event executes parallelly: control event 0~N executes at the same time (cycle) , as shown in the following figure:
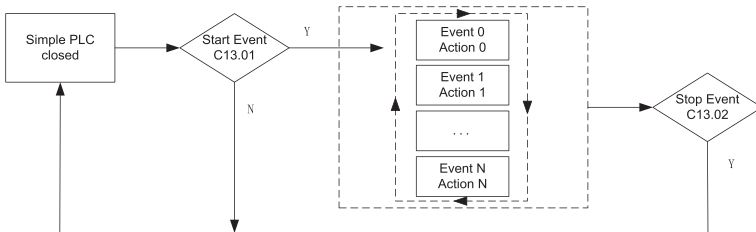
Par. No.	Name	Range	Unit	Default
C13.01	Start Event	0~54		39

Enter the simple PLC start event.

0: False, enter the fixed value - FALSE;

1: True, enter the fixed value - TRUE;

2: Running, the motor is running;

3: In current range-No warning, The motor is running within the programmed current ranges set in C04.50 Warning Current Low and C04.51 Warning Current High, and no warning is present;

4: On reference-No warning, the motor is running on reference,and no warning is present;

7: Out of current range, output current is outside the range set in C04.50 and C04.51;

8: Below current low, output current is lower than set in C04.50;

9: Above current high, output current is higher than set in C04.51;

10: Out of frequency range, output frequency is outside the range set in C04.52 and C04.53;

11: Below frequency low, output frequency is lower than set in C04.52;

12: Above frequency high, output frequency is higher than set in C04.53;

13: Out of feedback range, feedback is outside the range set in C04.56 and C04.57;

14: Below feedback low, feedback is lower than set in C04.56;

15: Above feedback high, feedback is higher than set in C04.57;

16: Thermal warning, a thermal warning occurs;

17: Mains out of range, over-voltage or under-voltage occurs;

18: Reversing, the drive runs in counter clockwise;

19: Warning, if the drive issues a warning, this event is TRUE;

20: Alarm (trip), if the drive alarms and trip is actived, this event is TRUE;

21: Alarm (trip lock), if the drive alarms and trip lock is actived, this event is TRUE;

22: Comparator 0, output of comparator 0 is used in logic rules;

23: Comparator 1, output of comparator 1 is used in logic rules;

24: Comparator 2, output of comparator 2 is used in logic rules;

25: Comparator 3, output of comparator 3 is used in logic rules;

26: Logic rule 0, result of logic rule 0 is used in logic rules;

27: Logic rule 1, result of logic rule 1 is used in logic rules;

28: Logic rule 2, result of logic rule 2 is used in logic rules;

29: Logic rule 3, result of logic rule 3 is used in logic rules;

30: Simple PLC time-out 0, result of timer 0 is used in logic rules;

31: Simple PLC time-out 1, result of timer 1 is used in logic rules;

32: Simple PLC time-out 2, result of timer 2 is used in logic rules;

33: Terminal FOR, input value entered via terminal FOR is used in logic rules;

34: Terminal REV, input value entered via terminal REV is used in logic rules;

35: Terminal DI1, input value entered via terminal DI1 is used in logic rules;

36: Terminal DI2, input value entered via terminal DI2 is used in logic rules;

37: Terminal DI3, input value entered via terminal DI3 is used in logic rules;

38: Terminal DI4, input value entered via terminal DI4 is used in logic rules;

39: Start command, if the drive starts in any way, this event is TRUE;

40: Drive stopped, if the drive stops in any way, this event is TRUE;

50: Simple PLC time-out 3, result of timer 3 is used in logic rules;

51: Simple PLC time-out 4, result of timer 4 is used in logic rules;

52: Simple PLC time-out 5, result of timer 5 is used in logic rules;

53: Simple PLC time-out 6, result of timer 6 is used in logic rules;

54: Simple PLC time-out 7, result of timer 7 is used in logic rules;

Par. No.	Name	Range	Unit	Default
C13.02	Stop Event	0~54		40

Enter the simple PLC stop event. For options, see C13.01 Start Event.

Par. No.	Name	Range	Unit	Default
C13.03	Reset Simple PLC	0: Do not reset 1: Do reset		0

0: Do not reset, retains programmed settings in all group 13 parameters;

1: Do reset, resets all group 13 parameters to default settings;

Par. No.	Name	Range	Unit	Default

		0: No function		
C13.04	Simple PLC Store	1: Power down save		0
		2: Stop save		
		3: Both power down and stop save		

This parameter is used to select whether the simple PLC state is saved or not at power down/stop.

Par. No.	Name	Range	Unit	Default
C13.10	Comparator Operand	0~31		0

Comparators are used for comparing continuous variables (e.g. output frequency, output current, analog input etc.) with fixed preset values. In addition, there are some constant value in conjunction with the preset value for comparison, please refer to options in C13.10. In each of the scanning integral the comparator will be evaluated once. And directly use the results (true or false). Parameters in this group are all array-type parameter with index 0-4. Select 0 to programme Comparator 0, select index 1 to programme Comparator 1, and so on.

For example: Motor current is 25A, C13.10 [0] =4, C13.12 [0] =23, C13.11 [0] =2, then the output of comparator 0 is TRUE.

0: Disabled;

1: Reference;

2: Feedback;

3: Motor speed [Hz];

4: Motor current [A];

6: Motor power [kW];

7: Motor Voltage [V];

12: Terminal VI input, depending on your choice is current input or voltage input;

13: Terminal AI input, depending on your choice is current input or voltage input;

20: Fault number, please refer to chapter 8;

30: Counter A;

31: Counter B;

Par. No.	Name	Range	Unit	Default
C13.11	Comparator Operator	0: Less than 1: Approx. Equal 2: Greater than		1

0: Less than, if the variable selected in C13.10 is less than the set value in C13.12, the comparator output is TRUE, else FALSE;

1: Approx. Equal, if the variable selected in C13.10 equals the set value in C13.12, the comparator output is TRUE, else FALSE;

2: Greater than, opposite with option [0];

Par. No.	Name	Range	Unit	Default
C13.12	Comparator Value	-9999.0~9999.0		0.0

Enter the "trigger level" for the variable that is monitored by this comparator.

Par. No.	Name	Range	Unit	Default
C13.20	Simple PLC Timer	0.00~3600.00	s	0.00

Use the timer output to define an event (see C13.51) or acts as Boolean inputs of the logic rules (see C13.40, C13.42 or C13.44).

This parameter is an array [8] parameters with index 0 to 7. Select index 0 to Timer 0, select index 1 to Timer 1, and so on.

Timer is started by option [29]~[31], [65]~[69] in C13.52 Simple PLC Action, and becomes TRUE if its value has exceeded the set time.

Par. No.	Name	Range	Unit	Default
C13.40	Logic Rule Boolean 1	The same as C13.01's		0

Combine up to three boolean inputs (TRUE or FALSE inputs) from timers, comparators, digital inputs, status bits and events using the logical operators AND, OR and NOT. C13.40, C13.42 and C13.44 are used to select logic rule Booleans, and C13.41, C13.43 is for selecting logic rule operators.

Caculation order: First, select three Boolean inputs from C13.40, C13.41 and C13.42 for the selected logic rule, and then the result ("TRUE or FALSE") as a logic boolean value, together with other two boolean inputs got from C13.43 and C13.44 to obtain the final result of the

calculation ("TRUE or FALSE").

All parameters in this parameter group are array [4] parameters with index 0 to 3. Select index 0 to logic rule 0, select index 1 to logic ruler 1, and so on.

Select the first boolean (TRUE or FALSE) input for the selected logic rule. Options refer to C13.01.

Par. No.	Name	Range	Unit	Default
C13.41	Logic Rule Operator 1	0~8		0

Select the first logic operator to be used on the boolean inputs from C13.40 Logic Rule Boolean 1 and C13.42 Logic Rule Boolean 2.

 0: Disabled, ignoring C13.40 and C13.42;

 1: AND, evaluates the expression [C13.40] AND [C13.42];

 2: OR, evaluates the expression [C13.40] OR [C13.42];

 3: AND NOT, evaluates the expression [C13.40] AND NOT [C13.42];

 4: OR NOT, evaluates the expression [C13.40] OR NOT [C13.42];

 5: NOT AND, evaluates the expression NOT [C13.40] AND [C13.42];

 6: NOT OR, evaluates the expression NOT [C13.40] OR [C13.42];

 7: NOT AND NOT, evaluates the expression NOT [C13.40] AND NOT [C13.42];

 8: NOT OR NOT, evaluates the expression NOT [C13.40] OR NOT [C13.42];

Par. No.	Name	Range	Unit	Default
C13.42	Logic Rule Boolean 2	The same as C13.01's		0

Select the second boolean (TRUE or FALSE) input for the selected logic rule. Options refer to C13.01.

Par. No.	Name	Range	Unit	Default
C13.43	Logic Rule Operator 2	0~8		0

Select the second logic operator to be used on the boolean input calculated in C13.40 Logic Rule Boolean 1, C13.42 Logic Rule Operator 1 and C13.43 Logic Rule Boolean 2 and the boolean

input coming from C13.44 Logic Rule Boolean 3.

0: Disabled, ignoring C13.44;

1: AND, evaluates the expression [C13.40/C13.42] AND [C13.44];

2: OR, evaluates the expression [C13.40/C13.42] OR [C13.44];

3: AND NOT, evaluates the expression [C13.40/C13.42] AND NOT [C13.44];

4: OR NOT, evaluates the expression [C13.40/C13.42] OR NOT [C13.44];

5: NOT AND, evaluates the expression NOT [C13.40/C13.42] AND [C13.44];

6: NOT OR, evaluates the expression NOT [C13.40/C13.42] OR [C13.44];

7: NOT AND NOT, evaluates the expression NOT [C13.40/C13.42] AND NOT [C13.44];

8: NOT OR NOT, evaluates the expression NOT [C13.40/C13.42] OR NOT [C13.44];

Par. No.	Name	Range	Unit	Default
C13.44	Logic Rule Boolean 3	The same as C13.01's		0

Select the third boolean (TRUE or FALSE) input for the selected logic rule. Options refer to C13.01.

Par. No.	Name	Range	Unit	Default
C13.51	Simple PLC Event	The same as C13.01's		0

This group of parameters are used for setting evens or actions for Simple PLC. All parameters in this parameter group are array [30] parameters with index 0 to 29. Select index 0 to event/ action 0, select index 1 to event/action 1, and so on.

Select the boolean input to define the Simple PLC event. Options refer to C13.01.

Par. No.	Name	Range	Unit	Default
C13.52	Simple PLC Action	0~69		0

Select the action corresponding to the C13.51 Simple PLC Events. Actions are executed when the corresponding event is evaluated as true.

0: Disabled, function is disabled;

1: No action, no action is operated;

2: Select set-up 1, select set-up 1 - changes the active set-up to "1";

3: Select set-up 2, select set-up 2 - changes the active set-up to "2";

10: Select preset ref 0;

11: Select preset ref 1;

12: Select preset ref 2;

13: Select preset ref 3;

14: Select preset ref 4;

15: Select preset ref 5;

16: Select preset ref 6;

17: Select preset ref 7;

18: Select ramp 1;

19: Select ramp 2;

20: Select ramp 3;

21: Select ramp 4;

22: Run, issues a start command to the drive;

23: Run reverse, issues a start reverse command to the drive;

24: Stop, issues a stop command to the drive;

27: Coast, the drive coasts immediately, all stop commands including the coast command stop the drive;

28: Freeze output, freezes the output frequency of the drive;

29: Start timer 0;

30: Start timer 1;

31: Start timer 2;

32: Set terminal DO1 low;

33: Set terminal DO2 low;

34: Set relay 1 low;

35: Set relay 2 low;

38: Set terminal DO1 high;

39: Set terminal DO2 high;

40: Set relay 1 high;

41: Set relay 2 high;

50: Select preset ref 8;

51: Select preset ref 9;

52: Select preset ref 10;

53: Select preset ref 11;

54: Select preset ref 12;

55: Select preset ref 13;

56: Select preset ref 14;

57: Select preset ref 15;

60: Reset counter A, reset counter A to "0";

61: Reset counter B, reset counter B to "0";

65: Start timer 3;

66: Start timer 4;

67: Start timer 5;

68: Start timer 6;

69: Start timer 7;

70: Reverse;

6.11 Group 14: Special Functions

Par. No.	Name	Range	Unit	Default

C14.01	Switching Frequency	2~6: 2~6kHz 7: 8kHz 8: 10kHz 9: 12kHz 10: 16kHz	kHz	*

Switching frequency has a significant influence to the drive and the motor. Select appropriate switch frequency can help to adjust acoustic noise from the motor, power consumption and the drive efficiency. When switching frequency increases, the consumption and the noise of the motor are reduced, but the drive's temperature will increase, and motor leakage and the interference to the external device will increase; the contrary, the opposite.

Par. No.	Name	Range	Unit	Default
*C14.03	Overmodulation	0: Off 1: On		1

The overmodulation function can obtain an output voltage greater than mains voltage.

0: Off, disable the overmodulation function to avoid torque ripple on the motor shaft. This feature may be useful for applications such as grinding machines.;

1: On, connects the overmodulation function to obtain an output voltage up to 5% greater than mains voltage. Overmodulation leads to increased torque ripple as

harmonics are increased;

Par. No.	Name	Range	Unit	Default
C14.08	Damping Gain Factor	0~200	%	96

Damping gain factor can help to improve the response speed of the DC link of the drive making the DC loop signal more smooth.

Par. No.	Name	Range	Unit	Default
C14.10	Action at Mains Failure	0: No function 1: Ctrl ramp-down 2: Ctrl ramp-down, trip 3: Coasting 4: Kinetic back-up 5: Kinetic back-up, trip 6: Alarm		0

This parameter is typically used to where very short mains interruptions (voltage dips) are present. At 100% load and a short voltage interruption, the DC voltage on the main capacitors drops quickly. For larger drive it only takes a few milliseconds before the DC level is down to about 373V DC and the IGBTs cut off and looses the control over the motor. When the mains is restored, and the IGBTs start again, the output frequency and voltage vector does not correspond to the speed/frequency of the motor, and the result is normally an overvoltage or overcurrent, mostly resulting in a trip lock. C14.10 Mains Failure can be programmed to avoid this situation.

This parameter is used to select the function to which the drive must act when the threshold in C14.11 Mains Voltage at Mains Fault has been reached.

> 0: No function. The drive will not compensate for a mains interruption. The voltage on the DC-link will drop quickly and motor control will be lost within milliseconds to seconds.

> 1: Ctrl ramp-down. This selection is particularly useful in pump applications, where the inertia is low and the friction is high. When the mains is restored, the output frequency will ramp the motor up to the reference speed (if the mains interruption is prolonged, the controlled ramp down might take the output frequency all the way down to 0rpm, and when the mains is restored, the application is ramped up from 0rpm to the previous reference speed via the normal ramp up). If the energy in the DC-link disappears before the motor is ramped to zero the motor will be coasted.

> 2: Ctrl ramp-down, trip. This selection is similar to selection [1] except that in [2] a reset is necessary for starting up after power-up.

> 3: Coasting. Centrifuges can run for an hour without power supply. In those situations, it is possible to select a coast function at mains interruption, together with a flying start which occurs when the mains is restored.

> 4: Kinetic back-up. Kinetic back-up ensures that the frequency converter keeps running as long as there is energy in the system due to the inertia from motor and load. This is done by converting the mechanical energy to the DC-link and thereby maintaining control of the drive and motor. This can extend the controlled operation, depending on the inertia in the system. For fans it is typically several seconds, for pumps up to 2 seconds and for compressors only for a fraction of a second. Many industry applications can extend controlled operation for many seconds, which is often enough time for the mains to return.

5: Kinetic back-up, trip. The difference between kinetic back-up with and without trip is that the latter will always ramp down to 0RPM and trip, regardless of whether mains return or not.

The function is made so that it will not even detect if mains return, this is the reason for the relatively high level on the DC-link during ramp down.

6: Alarm. The drive reports alarm "E.36".

Note: For option [1] to [5], the drive will report warning "A.36" while doing the selected operation.

Par. No.	Name	Range	Unit	Default
C14.11	Mains Voltage at Mains Failure	100~800	V	*

This parameter defines the threshold votlage at which the selected function in C14.10 Mains Failure should be activated.

Par. No.	Name	Range	Unit	Default
C14.12	Function at Mains Imbanlance	0: Trip (Low sensitivity) 1: Warning (Low sensitivity) 2: Disabled 4: Warning (Middle sensitivity) 5: Trip (Middle sensitivity) 6: Trip (High sensitivity)		0

Select actions when a mains imbalance is detected. The dection of mains imbalance depends on load. In order to meet different applications, different sensitivity options are set for this parameter.

0: Trip (Low sensitivity), the drive trips (reports "E.04") when a mains imbalance is detected;

1: Warning (Low sensitivity), the drive issues a warning (reports "A.04") but continues to run when a mains imbalance is detected;

The dection method for option [0] and [1] is low sensitive, even if a severe mains imbalance occurs, the drive will continue to run and do not report warning if the load is low, the drive and motor will not damage in this occasion; The drive trips (option [0]) or issues a warning (option [1]) only the load exceeds a certain range.

2: Disabled, the drive does nothing when a mains imbalance is detected. Be attention to

use this option;

4: Warning (Middle sensitivity), the drive issues a warning (reports "A.04") but continues to run when a mains imbalance is detected;

5: Trip (Middle sensitivity), the drive trips (reports "E.04") when a mains imbalance is detected;

The dection method for option [4] and [5] is middle sensitive. The drive trips (option [5]) or issues a warning (option [4]) at low frequency and heavy loaded, or high frequency and low load.

6: Trip (high sensitivity), the drive trips (reports "E.04") when a mains imbalance is detected;

The dection method for option [6] is high sensitive. Mains imbalance can be detected immediately. But there is minimum risk of false positives (generally occurs in an abnormal grid or the drive over-current protection frequently).

Par. No.	Name	Range	Unit	Default
C14.17	Automatic Voltage Regulation	0: Disable 1: Enable		1

When motor voltage 12%~20% higher than rated, motor temperature will increase, insulation capability destroyed, the torque output is unstable, long-term operation will cause the motor life shorter.

Automatic voltage regulation can automatically control the output voltage at the motor's rated voltage when the grid voltage exceeds the rated motor voltage.

Turn off automatic voltage regulation will improve the ability of rapid deceleration, but turn off this option need to be cautious, it will cause the output voltage different due to different grid voltage, there is an increased risk of heat damage to the motor.

This feature can only be turned off when in VF mode.

Par. No.	Name	Range	Unit	Default
C14.18	Delay Time of Auto Restart When Power up Again	0.0~3600.0	s	0.0

This parameter is used to define the drive action when power up again after power loss during running.

If it is set to 3600.0, the drive does not respond to the start command valid upon drive power-on (for example, start terminal is ON before power-on). The drive responds only after the start command is cancelled and becomes valid again.

If it is set to 0.0~3599.9, the drive will respond to the start command delaying the C14.18 setting time upon drive power-on (for example, start terminal is ON before power-on).

Par. No.	Name	Range	Unit	Default
C14.20	Reset Mode	0: Manual reset 1~10: Auto reset 1-10 times 11: Auto reset 15 times 12: Auto reset 12 times 13: Infinite auto reset		0

Select reset function after tripping.

   0: Manual reset, perform reset via "OFF" button or digital inputs;

   1~10: Auto reset 1-10 times, can perform 1-10 automatic resets after trips;

   11: Auto reset 15 times, can perform 15 automatic resets after trips;

   12: Auto reset 20 times, can perform 20 automatic resets after trips;

   13: Infinite auto reset, can perform an infinite number of automatic resets after trips;

Once option [1] - [13] is selected, the drive will be restarted after an alarm. If reset has been done and the running signal is active, the drive will restart automatically. For option [1] – [12], if the drive performs a set number of automatic reset, fault still cannot be removed, the drive will remain a trip state. It needs power off and on to reset the trip after shooting fault.

Be attention to select option [13], it may cause infinite auto reseted.

Par. No.	Name	Range	Unit	Default
C14.21	Automatic Restart Time	0~600	s	10

Enter time interval from trip to start of automatic reset function after an alarm. This parameter is active when C14.20 Reset Mode is set to automatic reset [1]-[13].

Par. No.	Name	Range	Unit	Default

| C14.22 | Operation Mode | 0: Normal operation
2: Initialization
3: Backup user settings
4: Recover user settings | | 0 |

0: Normal operation;

2: Initialization, initialise all the parameters except information about the drive itself and the recorded parameters.

3: Backup user settings;

4: Recover user settings;

For option [3] to [4], after modifying the drive parameters based on the functional requirements, OEM manufacturers can set C14.22 = 3 to backup settings. If the end users modify parameters and cannot be self-recovery, it can be recovered by setting C14.22 = 4 or pressing "OFF" key on LCP 5 seconds (the default time, can be modified by C00.46 One Key Recovery Time).

Par. No.	Name	Range	Unit	Default
C14.23	Trip lock	0: Disable 1: Enable		0

0: Disable, trip lock fault reset does not need power off;

1: Enable, trip lock fault reset need power off;

Par. No.	Name	Range	Unit	Default
C14.24	Trip Delay at Current Limit	0~60	s	60

Enter the current limit trip delay in seconds. When the output current reaches the current limit (parameter C04.18 Current Limit), a warning istriggered. When the current limit warning has been continuously present for the period specified in this parameter, the frequency converter trips set the parameter to 60 s=Off.

Par. No.	Name	Range	Unit	Default
C14.25	Trip Delay at Torque Limit	0~60	s	60

Enter the torque limit trip delay in seconds. When the output torque reaches the torque limits (parameter C04.16 Torque Limit Motor Mode and parameter C04.17 Torque Limit Generator Mode), a warning is triggered. When the torque limit warning has been continuously present

for the period specified in this parameter, the frequency converter trips. Disable the trip delay by setting the parameter to 60 s=Off.

Par. No.	Name	Range	Unit	Default
C14.27	Action at Drive Fault	0: Trip 1: Warning		0

Select how the drive should react at inerter fault (output short circuit, over-current, earth fault or over-voltage).

　　0: Trip, drive issues an alarm and trips immediately if it detects a fault;

　　1: Warning, when a fault occurs, drive issues a warning and stops the PWM outputs, and repeatly try to open the normal PWM, if the fault still can't be removed, the drive issues an alarm and trips.

Par. No.	Name	Range	Unit	Default
C14.30	Current Controller 1 Proportional Gain	0~500	%	100
C14.31	Current Controller 1 Integration Time	0.000~2.000	s	0.020
C14.32	Current Controller Filter Time	0.1~100.0	ms	10.0
C14.33	Current Controller 2 Proportional Gain	0~300	%	0
C14.34	Current Controller 2 Integration Time	0.000~2.000	s	0.020

It can adjust the dynamic response characteristics of the current controllers by setting the proportional gain and integration time.

Choose a higher value of proportional gain and lower integration time causes the controller response more quickly, but too high value of proportional gain and tow low value of integration time will cause the controller unstable.

Par. No.	Name	Range	Unit	Default
*C14.40	VT Level	40~90	%	90

Enter the level of motor magnetisation at low speed. Selection of a low value reduces energy loss in the motor, but also reduces load capability.

Par. No.	Name	Range	Unit	Default
*C14.41	AEO Min. Magnetisation	40~75	%	66

Enter the minimum allowable magnetisation for AEO. Selection of a low value reduces energy loss in the motor, but can also reduce resistance to sudden load changes.

Par. No.	Name	Range	Unit	Default
*C14.51	DC Link Compensation	0: Off 1: On		0

This function ensures the output voltage is independent of any voltage fluctuations in the DC link. Low torque ripple. In some cases, this dynamic compensation may cause resonance problems in DC link circuit and then this function should be disabled.

Par. No.	Name	Range	Unit	Default
C14.68	Overheat warning relative temperature	0~25	°C	5

This temperature is the overheat (E.69) relative temperature protection point, the default value is 5 °C , that is, 5 °C lower than the overheat (E.69) temperature protection point, When the drive temperature reaches the relative protection point for a few seconds, it will report A.69 warning. With this parameter, users can more easily control the overheat warning report.

Par. No.	Name	Range	Unit	Default
C14.70	Steady state undervoltage threshold	200V: 171~198V 400V: 296~342V	V	176/304
C14.71	Steady state undervoltage threshold protection time	60~3600	S	3600

When the DC link voltage is lower than the C14.70 and the duration reaches the C14.71, an E.20 fault is reported.

When C14.71 is set to 3600s, the steady state undervoltage protection is turned off.

Par. No.	Name	Range	Unit	Default
C14.72	Excitation Current Controller Bandwidth	10~200	Hz	30
C14.73	Excitation Current Controller Damping	1~200		100

C14.74	Excitation Current Controller Load Compensation Factor	0.1~1.0		0.5
C14.75	Torque Current Controller Bandwidth	0.01~1.00	Hz	0.03
C14.76	Torque Current Controller Damping	1~200		1

This group of parameters are valid only when C01.01 is equal to [2] vector 1. They are current loop adjustment parameters for vector control, and generally do not need to be adjusted.

Par. No.	Name	Range	Unit	Default
C14.77	Weak Magnetic Controller Bandwidth	0.1~10.0	Hz	2.0
C14.78	Weak Magnetic Controller Damping	0.01~1.00		0.10

This group of parameters are valid only when C01.01 is equal to [2] vector 1. They are used to set field weakening control for the synchronous motor, and generally do not need to be adjusted.

Par. No.	Name	Range	Unit	Default
C14.82	User-defined Readout at Failure	0: No function 1: Reference 2: Output voltage 3: Output Torque 4: IGBT Temperature 5: Digital Input State 6: Digital Output State 7: Relay Output State 8: VI Input 9: AI Input 10: VO Output 11: AO Output 12: DI3 Pulse Input 13: DO1 Pulse Output		5, 7

This parameter is a 2-array parameter that is used to select the status of the drive that was custom-recorded in the event of a fault.

6.12 Group 15: Drive Information

Par. No.	Name	Range	Unit	Default
C15.00	Operating Days	0~9999	d	

View how many days the drive has run. The value is saved automatically at power off and can't be reset.

Par. No.	Name	Range	Unit	Default
C15.01	Running Hours	0~60000	h	

View how many hours the motor has run. Reset the counter in C15.07 Reset Running Hours Counter.

Par. No.	Name	Range	Unit	Default
C15.02	kWh Counter	0~65535	kWh	

View the power consumption of the motor as a mean value over one hour. Reset the counter in C15.06 Reset kWh Counter.

Par. No.	Name	Range	Unit	Default
C15.03	Power Up's	0~65535		

View the number of times the drive has been powered up. This parameter can't be reset.

Par. No.	Name	Range	Unit	Default
C15.04	Over Temperatures	0~65535		

View the number of the drive temperature faults that have occurred. This parameter can't be reset.

Par. No.	Name	Range	Unit	Default
C15.05	Over Voltages	0~65535		

View the number of drive over-voltages that have occurred. This parameter can't be reset.

Par. No.	Name	Range	Unit	Default
C15.06	Reset kWh Counter	0: Do not reset 1: Do reset		0

0: Do not reset;

1: Do reset, kWh counter is reset to zero (see C15.02 kWh Counter);

Attention: This parameter can't be set via local bus.

Par. No.	Name	Range	Unit	Default
C15.07	Reset Running Hours Counter	0: Do not reset 1: Do reset		0

0: Do not reset;

1: Do reset, running hours counter is reset to zero (see C15.01 Running Hours);

Attention: This parameter can't be set via local bus.

Par. No.	Name	Range	Unit	Default
C15.30	Alarm Code	0~255		

View the alarm code and look up its meaning in chapter 8. This parameter is an array [10] parameter. It contains an alarm log showing reasons for the ten latest trips. C15.30[0] represents the latest, C15.30[9] is a recent 10th, this parameter cannot be reset.

Par. No.	Name	Range	Unit	Default
C15.31	Internal Fault Reason	-32767~32767		

This parameter contains internal fault reasons, mostly used in combination with alarm E.38.

Par. No.	Name	Range	Unit	Default
C15.32	Output Frequency at Failure	0.0~6553.5	Hz	
C15.33	Output Current at Failure	0.01~655.35	A	
C15.34	DC Link Voltage at Failure	0~65535	V	
C15.35	Running Time at Failure	0~65535	Min	
C15.36	User-defined Readout 1 at Failure			
C15.37	User-defined Readout 2 at Failure			

This group of parameters are 3-array parameters, and record the latest 3 sets of fault information. The array [0] is the most recent and the array [2] is the third most recent.

Par. No.	Name	Range	Unit	Default
C15.38	Warning Code	0~255		

View the warning code and look up its meaning in chapter 8. This parameter is an array [10] parameter. It contains a warning log showing reasons for the ten latest warnings. C15.38[0] represents the latest, C15.38[9] is a recent 10th, this parameter cannot be reset.

Par. No.	Name	Range	Unit	Default
C15.43	Software Version			

View the software version of the drive.

6.13 Group 16: Data Readouts

Par. No.	Name	Range	Unit	Default
C16.00	Control Word	0~65535		
C16.01	Reference	-4999.0~4999.0		
C16.02	Reference	-200.0~200.0	%	
C16.03	Status Word	0~65535		
C16.05	Motor Speed	0~9999	rpm	
C16.09	Custom Readout	0.00~9999.00		
C16.10	Output Power	0.000~1000.000	kW	
C16.12	Motor Voltage	0.0~6553.5	V	
C16.13	Output Frequency	0.0~400.0	Hz	
C16.14	Output Current	0.00~655.35	A	
C16.15	Output Frequency	0.0~200.0	%	
C16.16	Output Torque	-200.0~200.0	%	
C16.18	Motor Thermal	0~100	%	
C16.30	DC Link Voltage	0~65535	V	
C16.31	IO Board Temperature	-128~127	℃	
C16.34	IGBT Temperature	-128~127	℃	
C16.35	Drive Thermal	0~255	%	
C16.36	Drive Nominal Current	0.0~6553.5	A	
C16.37	Drive Max. Current	0.0~6553.5	A	
C16.48	Power Board Temperature	-128~127	℃	
C16.49	Rectifier Temperature	-128~127	℃	

C16.50	Main Reference	-200.0~200.0	%	
C16.51	Pulse Reference	-200.0~200.0	%	
C16.52	Feedback	-3000.0~3000.0		
C16.57	Unbalance Value	0~300	%	

Par. No.	Name	Range	Unit	Default
C16.60	Digital Input	0~65535		

View the status of the digital input. Each digital input terminal corresponds to a weight, as shown in the following table. If the drive detects that the digital input terminal is valid, it has a weight, otherwise it does not, and the weight value is added to the parameter value.

For example: REV and DI2 are valid, C16.60 = 2 + 8 = 10.

Terminal	DI4	DI3	DI2	DI1	REV	FOR
Weight	32	16	8	4	2	1

Par. No.	Name	Range	Unit	Default
C16.61	Terminal VI Setting	0: 0~10V 1: 0~20mA		
C16.62	Analog Input VI	0.00-20.00	V/mA	

Par. No.	Name	Range	Unit	Default
C16.66	Digital Output	0~255		

View the status of the digital output. Each digital output terminal corresponds to a weight, as shown in the following table. If a digital output terminal is valid, it has a weight, otherwise it does not, and the weight value is added to the parameter value. For example: DO1 is valid, C16.66 = 1.

Terminal	DO1
Weight	1

Par. No.	Name	Range	Unit	Default
C16.67	Encoder Input			

View the actual encoder input value, which is multiplied by the number of motor pole pairs equal to the motor frequency.

Par. No.	Name	Range	Unit	Default
C16.71	Relay Output	0~65535		

View the status of the relay output. Each relay output terminal corresponds to a weight, as shown in the following table. If a relay output terminal is valid, it has a weight, otherwise it does not, and the weight value is added to the parameter value. For example: Relay1 is valid, C16.71 = 1.

Terminal	Relay 2	Relay 1
Weight	2	1

Par. No.	Name	Range	Unit	Default
C16.72	Counter A	0~65535		
C16.73	Counter B	0~65535		
C16.86	Communication Reference	-32768~32767		

6.14 Group 39: Communication User-Defined Par.

Par. No.	Name	Range	Unit	Default
C39.00	Communication User-Defined Par. 0	0~9999		310
C39.01	Communication User-Defined Par. 1	0~9999		310
C39.02	Communication User-Defined Par. 2	0~9999		310
C39.03	Communication User-Defined Par. 3	0~9999		310
C39.04	Communication User-Defined Par. 4	0~9999		310
C39.05	Communication User-Defined Par. 5	0~9999		310
C39.06	Communication User-Defined Par. 6	0~9999		310
C39.07	Communication User-Defined Par. 7	0~9999		310
C39.08	Communication User-Defined Par. 8	0~9999		310

C39.09	Communication User-Defined Par. 9	0~9999		310
C39.10	Communication User-Defined Par. 10	0~9999		310
C39.11	Communication User-Defined Par. 11	0~9999		310
C39.12	Communication User-Defined Par. 12	0~9999		310
C39.13	Communication User-Defined Par. 13	0~9999		310
C39.14	Communication User-Defined Par. 14	0~9999		310
C39.15	Communication User-Defined Par. 15	0~9999		310
C39.16	Communication User-Defined Par. 16	0~9999		0
C39.17	Communication User-Defined Par. 17	0~9999		0
C39.18	Communication User-Defined Par. 18	0~9999		0
C39.19	Communication User-Defined Par. 19	0~9999		0
C39.20	Communication User-Defined Par. 20	0~9999		0
C39.21	Communication User-Defined Par. 21	0~9999		0
C39.22	Communication User-Defined Par. 22	0~9999		0
C39.23	Communication User-Defined Par. 23	0~9999		0
C39.24	Communication User-Defined Par. 24	0~9999		0
C39.25	Communication User-Defined Par. 25	0~9999		0
C39.26	Communication User-Defined Par. 26	0~9999		0
C39.27	Communication User-Defined Par. 27	0~9999		0
C39.28	Communication User-Defined Par. 28	0~9999		0
C39.29	Communication User-Defined Par. 29	0~9999		0

C39.30	Communication User-Defined Par. 30	0~9999		0
C39.31	Communication User-Defined Par. 31	0~9999		0
C39.32	Communication User-Defined Par. 32	0~9999		0
C39.33	Communication User-Defined Par. 33	0~9999		0
C39.34	Communication User-Defined Par. 34	0~9999		0
C39.35	Communication User-Defined Par. 35	0~9999		0
C39.50	Communication User-Defined Par. 0 index	0~9999		0
C39.51	Communication User-Defined Par. 1 index	0~9999		1
C39.52	Communication User-Defined Par. 2 index	0~9999		2
C39.53	Communication User-Defined Par. 3 index	0~9999		3
C39.54	Communication User-Defined Par. 4 index	0~9999		4
C39.55	Communication User-Defined Par. 5 index	0~9999		5
C39.56	Communication User-Defined Par. 6 index	0~9999		6
C39.57	Communication User-Defined Par. 7 index	0~9999		7
C39.58	Communication User-Defined Par. 8 index	0~9999		8
C39.59	Communication User-Defined Par. 9 index	0~9999		9
C39.60	Communication User-Defined Par. 10 index	0~9999		10
C39.61	Communication User-Defined Par. 11 index	0~9999		11
C39.62	Communication User-Defined Par. 12 index	0~9999		12
C39.63	Communication User-Defined Par. 13 index	0~9999		13
C39.64	Communication User-Defined Par. 14 index	0~9999		14

C39.65	Communication User-Defined Par. 15 index	0~9999		15
C39.66	Communication User-Defined Par. 16 index	0~9999		0
C39.67	Communication User-Defined Par. 17 index	0~9999		0
C39.68	Communication User-Defined Par. 18 index	0~9999		0
C39.69	Communication User-Defined Par. 19 index	0~9999		0
C39.70	Communication User-Defined Par. 20 index	0~9999		0
C39.71	Communication User-Defined Par. 21 index	0~9999		0
C39.72	Communication User-Defined Par. 22 index	0~9999		0
C39.73	Communication User-Defined Par. 23 index	0~9999		0
C39.74	Communication User-Defined Par. 24 index	0~9999		0
C39.75	Communication User-Defined Par. 25 index	0~9999		0
C39.76	Communication User-Defined Par. 26 index	0~9999		0
C39.77	Communication User-Defined Par. 27 index	0~9999		0
C39.78	Communication User-Defined Par. 28 index	0~9999		0
C39.79	Communication User-Defined Par. 29 index	0~9999		0
C39.80	Communication User-Defined Par. 30 index	0~9999		0
C39.81	Communication User-Defined Par. 31 index	0~9999		0
C39.82	Communication User-Defined Par. 32 index	0~9999		0
C39.83	Communication User-Defined Par. 33 index	0~9999		0
C39.84	Communication User-Defined Par. 34 index	0~9999		0
C39.85	Communication User-Defined Par. 35 index	0~9999		0

Parameters C39.00~C39.35 are user-difined parameters, and parameters C39.50~C39.85 are the index values corresponding to the parameters in C39.00~C39.35.

Because the parameter number is discontinuous, and some parameters are array parameters, it is difficult to directly read and write the parameters through one message. In order to read and write the parameters continuously, the user can set the parameter number in the C39.00~C39.35 to form a mapping relationship, and then you can read/write parameters set in group 39 by accessing the registers 60800-60835. How to use group 39, please refer to "Appendix A Modbus Communication Specification".

Chapter 7　Quick Application Guide

7.1 Using LCP to Start/Stop the Drive

1. Press "HAND" key on LCP to start the drive;

2. Turn the potentiometer to change output frequency;

3. Press "OFF" key on LCP to stop the drive;

7.2 Using Digital Input Terminals to Start/Stop the Drive

Usually there are four modes for using digital input terminals to start/stop the drive. No matter what mode, press "AUTO" key on LCP first.

7.2.1 Two-line Mode 1

It is the most commonly used two-line mode, in which the forward/reverse rotation of the motor is decided by FOR and REV. Wiring and parameters are set as below:
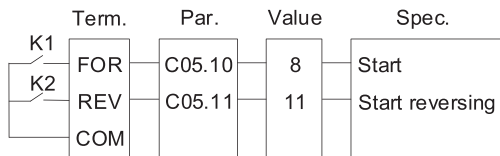
K1	K2	Command
OFF	OFF	Stop
ON	OFF	Run forward
OFF	ON	Run reverse
ON	ON	Stop

7.2.2 Two-line Mode 2
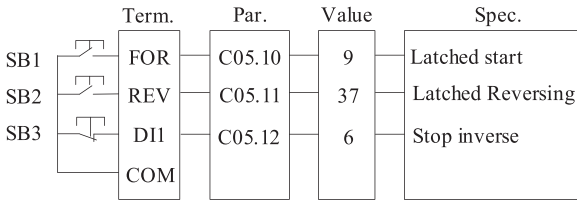
In this mode, FOR is run enabled terminal, and REV determines the running direction. Wiring and parameters are set as below:

Term.	Par.	Value	Spec.
FOR	C05.10	8	Start
REV	C05.11	10	Reversing
COM			
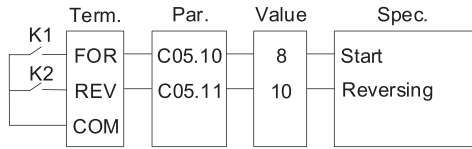
K1 K2

K1	K2	Command
OFF	OFF	Stop
ON	OFF	Run forward
OFF	ON	Stop
ON	ON	Run reverse

7.2.3 Three-line Mode 1

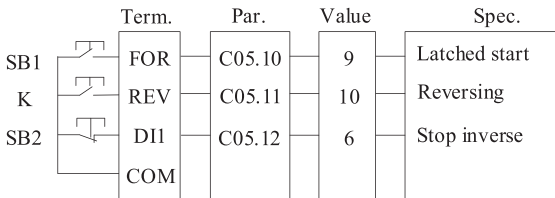In this mode, DI1 is run enabled terminal, and the direction is decided by FOR and REV. Wiring and parameters are set as below:

Term.	Par.	Value	Spec.
FOR	C05.10	9	Latched start
REV	C05.11	37	Latched Reversing
DI1	C05.12	6	Stop inverse
COM			

SB1 SB2 SB3

SB1	SB2	SB3	Command
×	×	OFF	Stop
⊓	×	ON	Run forward
×	⊓	ON	Run reverse

7.2.4 Three-line Mode 2

In this mode, DI1is run enabled terminal. The RUN command is given by FOR and the direction is decided by REV. Wiring and parameters are set as below:

Term.	Par.	Value	Spec.
FOR	C05.10	9	Latched start
REV	C05.11	10	Reversing
DI1	C05.12	6	Stop inverse
COM			

SB1 K SB2

SB1	K	SB2	Command
×	×	OFF	Stop
OFF	⊓	ON	Run forward
ON	⊓	ON	Run reverse

7.3 Multi-speed

In scenarios where the running frequency of the drive need not be adjusted continuously and only several frequencies are required, the multi-speed control can be used. The drive supports a maximum of 16 running frequencies, which are implemented by state combinations of four DI terminals. Set the parameter number corresponding to DI terminals to a value among 15 to 18 (Preset ref. bit 0~3), and then the DI terminals are specified as the multi-frequency input terminals. The following figure shows how to set the multi-speed function.
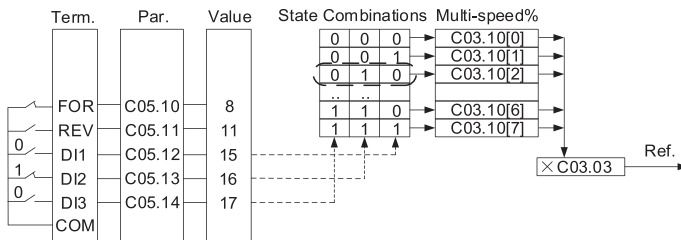
In the preceding figure, FOR, REV are set as two-line mode 1, DI1, DI2 and DI3 are used as the multi-frequency input terminals, each of which has a bit value. The state combinations of these terminals correspond to multiple frequencies, when (DI3, DI2, DI1) = (0, 1, 0), the state combination value is 2, corresponding to the value set in C03.10[2]. The target running frequency is automatically calculated by C03.10[2] x C03.03.

The drive supports a maximum of four DI terminals to be used as the multi-frequency input terminals. You can also use less than four DI terminals, and the empty bit is considered to be 0.

7.4 Analog Input as the Reference Source

The VI/AI terminals can be used as the frequency source. The following figure shows how to use the VI as the frequency source.
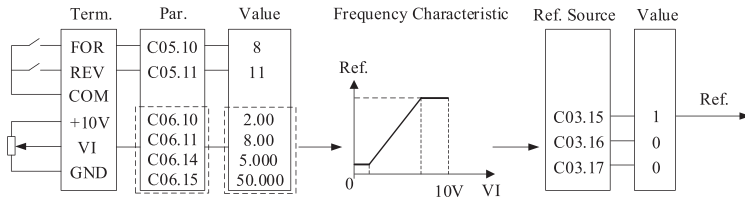
Term. | Par. | Value | Frequency Characteristic | Ref. Source | Value

Term.	Par.	Value
FOR	C05.10	8
REV	C05.11	11
COM		
+10V	C06.10	2.00
VI	C06.11	8.00
GND	C06.14	5.000
	C06.15	50.000

Ref. Source	Value
C03.15	1
C03.16	0
C03.17	0

Attention: Parameters and theirs value in dash box should be set according to the application.

7.5 Pulse Input as the Reference Source

The DI4 terminal can be used as pulse input. The following figure shows how to use the pulse input as the frequency source.

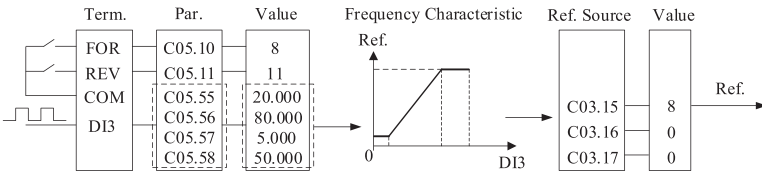| Term.	Par.	Value
FOR	C05.10	8
REV	C05.11	11
COM	C05.55	20.000
DI3	C05.56	80.000
	C05.57	5.000
	C05.58	50.000

Ref. Source	Value
C03.15	8
C03.16	0
C03.17	0

Attention: Parameters and theirs value in dash box should be set according to the application.

7.6 UP/DOWN

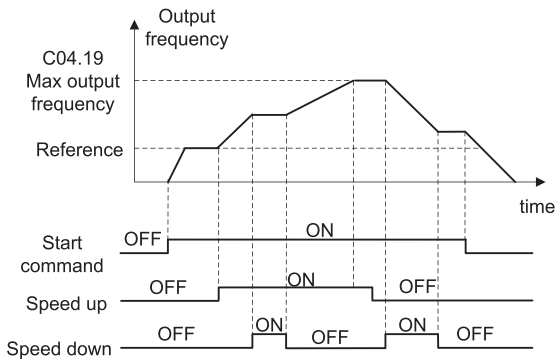When you need speed fine tuning at a fixed value, you can use the speed up/down via terminals. The following figures show how to use the function:

Term.	Par.	Value
FOR	C05.10	8
REV	C05.11	11
DI1	C05.12	21
DI2	C05.13	22
COM		
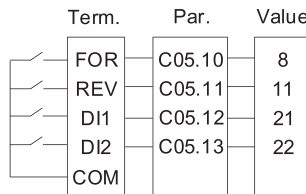
7.7 Parameter Initialization

1. Set C14.22 = 2;

2. Cut off the main power and Re-power on, LCP displays "E.80";

3. Press "OFF" key on LCP;

7.8 Fault Reset

1. Manual reset:

C14.23 = 0: Power off and re-power, press the OFF key on the LCP to reset the fault.

C14.23 = 1: Press the OFF key directly to reset the fault.

2. Power off and re-power to reset fault, set parameters as following:

Parameter	Value	Specification
C14.20	1	Automatic reset fault 1 time
C14.21	1	Automatic restart time 1 sec

Chapter 8   Faults and Solutions

8.1 Fault List

The drive has three different fault types: warning, alarm and error. When a fault happens, the drive shows a specific code to indicate it.

When a warning happens, it means that the drive is close to its design limits for some reason, but the drive still works. If the drive fault disappears, the warning will also disappear. When a warning happens, LCP displays "A.XX" (XX is warning code).

An alarm means that the drive has exceeded its design limits for some reason. When this happens, the drive will trip. The driver must be reset in order to re-run. When an alarm happens, LCP displays "E.XX" (XX is alarm code).

When some alarms happen, the drive will lock itself. These alarms are called trip-lock alarm. The Trip-lock alarm offers additional protection, the default setting is that the main power should be cut off before resetting the alarm. But by setting parameter C14.23 = 0, the trip-lock alarm can be reset without cutting the main power off. But there is a risk of accident when choosing this function. Before using this function, it is important to be familiar with the drive and the whole system in order to be safe when dealing with the drive.

Error means the drive is in a state and unable to carry out an operation. When an error happens, LCP display "Er.XX" (XX is error code).

Warning	Alarm	Error	Fault Description	Reason analysis
A.02	E.02		Live Zero Error	Please refer to C06.0 Live Zero Timeout Time.
A.03	E.03		Motor Loss	1. Motor cable connection problems; 2. The drive power is greater than the motor power;
A.04	E.04*		Mains Phase Loss	1. Missing phase on supply side; 2. Too high voltage imbalance.
A.07	E.07		Over Voltage	1. The input voltage is too high; 2. An external force drives the motor during acceleration or deceleration; 3. The deceleration time is too short; 4. The braking unit and braking resistor are not installed.

A.08	E.08		Under Voltage	1. Instantaneous power failure occurs on the input power supply; 2. The drive's input voltage is not within the allowable range; 3. The rectifier bridge and buffer resistor are faulty.
A.09	E.09		Drive Overload	1. The load is too heavy or lockedrotor occurs on the motor; 2. The drive model is of too small power class; 3. C01.** is set improperly.
A.10	E.10		Motor Overload	1. C01.24 is set improperly; 2. The load is too heavy or lockedrotor occurs on the motor; 3. The drive model is of too small power class; 4. C01.** is set improperly.
	E.11		Motor Over Temperature	Thermistor damage, uncorrectly installed or motor cooling equipment failure.
A.12	E.12*		Torque Limit	Torque exceeds the max. torque limit.
A.13	E.13*		Over Current	1. The acceleration time is too short; 2. Manual torque boost or V/F curve is not appropriate; 3. The input voltage is too low; 4. The startup operation is performed on the rotating motor; 5. A sudden load is added during acceleration/deceleration; 6. The drive model is of too small power class.
A.14	E.14*		Earth fault	Discharge from output phases to ground (22kW and below)
	E.16*		Short Circuit	Short circuit in motor or on motor terminals.
A.17	E.17		Control Word Timeout	Drive communication timeout, this alarm occurrs when C08.04 is set to 1 or 5.
A.20	E.20		Power supply voltage too low	The input voltage is lower than the threshold set by C14.70 for a long time, and it will alarm A.20 if it exceeds the preset time C14.71/2, and alarm E.20 if it exceeds the preset time C14.71.

	E.21		Under-voltage over-current	When the instantaneous bus voltage is lower than 384V (380V models) or 202V (220V models), and over-current alarm occurs within 1s
A.24	E.24		Fan Fault	Too much dust on the fan or the fan is aging.
	E.25*		Brake resistor short-circuit	Brake resistor is short circuit, leading the brake function invalid.
	E.27		Brake transisitor short-circuit	Brake transistor is short circuit leading brake function invalid.
	E.28		Brake Detect	Brake resistor is not connected or working.
	E.30*		Motor phase U missing	Check the phase and motor.
	E.31*		Motor phase V missing	Check the phase and motor.
	E.32*		Motor phase W missing	Check the phase and motor.
A.36	E.36		Main power failure	The power supply voltage of the drive is missing. Please refer to the description of C14.10 for details.
	E.38*		Internal Fault	Contact the local distributor or Holip Company.
	E.44*		Earth Fault	Discharge from output phases to ground (22KW or more).
	E.47*		24V Power Card Fault	24V voltage power card failure
	E.51		AMA check Unom and Inom	Motor voltage and motor current error setting.
	E.52		AMA Low Inom	Motor current is too low, check the settings.
	E.53		AMA Motor is too large	Motor configuration is too large to perform AMA.
	E.54		AMA Motor is too small	Motor configuration is too small, unable to perform AMA.
	E.55		AMA Paremeter Error	Motor parameter is out of the range
	E.56		AMA Interrupt	Interrupted by the user when running AMA.
	E.57		AMA Time-out	AMA takes too long to run.
A.58	E.58		AMA Internal Error	Contact Local distributor or Holip Company.
A.59	E.59		Current Limit	Current exceeds value set in C04.18.
	E.63		Mechenical Brake Current Low	Actual motor current can not exceed release brake current set in C02.20 within start delay time.

A.69	E.69*		IGBT Over Temperature	1. The ambient temperature is too high; 2. The air filter is blocked; 3. The fan is damaged; 4. The thermally sensitive resistor of the IGBT is damaged; 5. The drive IGBT is damaged.
A.74	E.74		Rectifier Temperature Sensor Error	Rectifier Temperature Sensor Error
A.75	E.75		Rectifier Temperature High	1. The ambient temperature is too high; 2. The air filter is blocked; 3. The fan is damaged.
A.76	E.76		IGBT Temperature Sensor Error U	IGBT Temperature Sensor Error U
A.77	E.77		IGBT Temperature Sensor Error V	IGBT Temperature Sensor Error V
A.78	E.78		IGBT Temperature Sensor Error W	IGBT Temperature Sensor Error W
	E.80		Parameter Initialization	Make parameter initialized.
	E.83		Power Board Over Temperature	1. The ambient temperature is too high; 2. The air filter is blocked; 3. The fan is damaged.
		Er.84	LCP Connection with the drive failed	No communication between LCP and the drive.
		Er.85	Button is disabled	Refer to parameter group C00.4*.
		Er.89	Parameter read-only	Try to write read-only parameter.
		Er.91	Parameter value is invalid in this mode	Invalid parameter value to write.
A.96			Stop time arrives	The drive has set the timer stop function
A.102	E.102		External fault	Digital input function selection option used [43] External fault input
		Err	Unchangbale	Parameter is freezed or can't be changed during running.

Note: Trip-lock alarm is with *.

Chapter 9   Maintenance

9.1 Note

Confirm the main circuit power supply has been turned off, and the display has disappeared before carrying out inspection and maintenance. Make sure the system is in dynamic state, please pay attention to the following:

- Check whether the power supply voltage matches to the rated voltage of the drive;

- Check whether the motor makes unexpected noises or abnormal vibration when running;

- Check whether there is abnormal heating;

- Check whether the drive output voltage, output current, output frequency, and monitor display is greater than the value commonly used.

- Check whether the cooling fan installed at the lower part of the drive runs normally;

- Check whether the ambient temperature is too high and whether there is dust, iron filings, corrosive fluid in the drive;

- Check whether the ambient temperature of the drive is between -10 ℃ ~40 ℃ , and whether the humidity is between 5%-85% (95% is without condensation), phenomenon of water droplets is not allowed;

- The drive should be discarded as industrial waste. It is forbidden to burn it;

9.2 Storage and Transport

The drive must be kept in its original package box before installation. Pay attention to the followings when keeping it in storage if the drive is not used for the time being:

- It must be stored in a dry place without rubbish or dust;

- The suitable temperature for storage is between -25℃ ~65℃ ;

- The relative humidity required is 5%~95% without condensation;

- There is no corrosive gas or liquid in the storage ambience;

- It is better to lay the drive on a rack and keep it in a proper package;

• The ambient temperature for transport is between -25℃ ~70℃ ;

• The relative humidity of transport ambience must be less than 95% (Ambient temperature is 40℃).

Attention: It is better not to store the drive for long time. Long time storage of the drive will lead to the deterioration of electrolytic capacity. If it needs to be stored for a long time make sure to power it up one time within a year and the power-up time should be at least above five hours. When powering up, supply voltage must be increased slowly with a voltage regulator to the rated voltage value.

Appendix A   Modbus Communication Specification

The drive provides RS485 communication interface. It adopts international standard Modbus communication protocol to perform master-slave communication. The user can realize centralized control through PC/PLC to adapt specific application requirements.

A.1 Interface Mode

A.1.1 Interface Mode

The communication interface is RS485. RS485 works on semiduplex and its data signal applies differential transmission which is called balance transmission too.

A.1.2 Networking Mode

The drive has two networking modes: single master/multiple slaves networking and single master/single slave networking.

Single master/single slave networking diagram

Single master/multiple slaves networking diagram
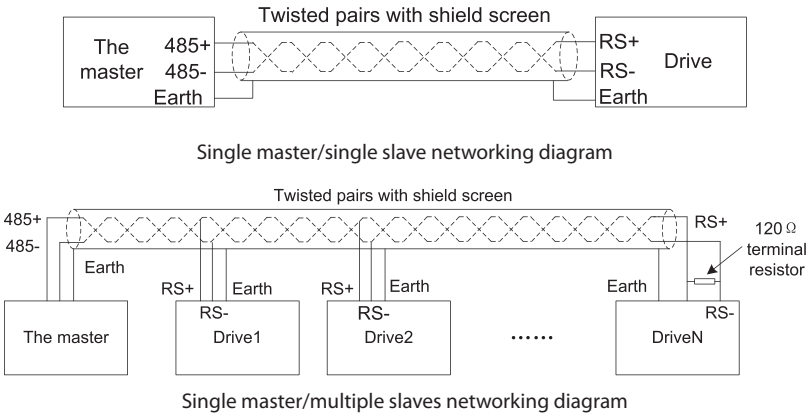
Specification:

1. No matter which mode, the drive is used as a slave in communication. When master sends commands using broadcast address, the slave does not respond;

2. It is recommended to use shield cables in multiple connection. The basic parameter of the devices, such as baud rate and digital check bit in RS485 should be the same as slave device's and there should be no repeated addresses in slave devices.

A.2 Protocol Format

Modbus protocol supports RTU mode. RTU data frame format is shown as the figure below:
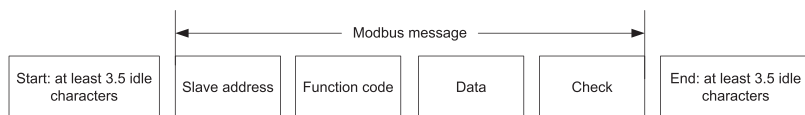
Specification:

Start	at least 3.5 idle characters
Slave address	Address: 0-247 (0 is broadcast address)
Function code	Modbus function code
Data (N-1)	
Data (N-2)	
…	2 * N data
Data 0	
CRC CHK high-8-bit	
CRC CHK low-8-bit	CRC check
End	at least 3.5 idle characters

A.3 Function Code

Function code supported by the drive Modbus protocol are as shown in the table below:

Function code	Description	Meaning
0x03	Read Holding Registers	Read drive functional parameters and running status parameters
0x06	Preset Single Register	Over-write individual drive functional parameters
0x10	Preset Multiple Regs	Over-write multiple drive functional parameters

A.4 Register Address Definition

All the following register addresses are started from 0.

A.4.1 The Rules of Register Address of the Parameter Number

The parameters can be mapping to register address. The rules of register address of the parameter number are shown below:

$$\text{Register address} = \text{PNU} \times 10 - 1$$

For example:

The register address of C03.03 is $303 \times 10 - 1 = 3029$ (0x0BD5)

The register address of C16.13 is $1613 \times 10 - 1 = 16129$ (0x3F01)

A.4.2 Other Register Addresses Specification

In addition to parameter number is mapped to Modbus registers, there are some additional registers within the drive which can be used to control the drive, monitor the drive's status.

Register address	Specification	R/W
6	The internal error code of last communication error	R
7	Register address of last occurred communication error	R
8*	Parameter index	R, W
51000*	Control command	W
51001*	Communication reference	W
51002*	Reserved	W
51003	Digital output control Bit0: DO1 output control Bit1: DO2 output control Bit2: reserved Bit3: reserved Bit4: Relay1 output control Bit5: Relay2 output control Bit6~15: reserved	W
51004	VO output control 0~10000 indicates 0.00~100.00%	W
51005	AO output control 0~10000 indicates 0.00~100.00%	W
51006	DO1 pulse output control 0~10000 indicates 0.00~100.00%	W
51100*	State	R
51101*	Warning/Alarm code	R
51102	Output frequency (0~Fmax, unit: 0.1Hz)	R
51103	Output current (unit: 0.01A)	R
51104	Output voltage (unit: 1V)	R

51105	Output power (unit: 0.01kW)	R
51106	Motor speed (unit: 1rpm)	R
51107	DC bus voltage (unit: 1V)	R
51108	Reference	R
51109	Feedback	R
60800*	The parameter set in C39.00	R, W
60801*	The parameter set in C39.01	R, W
…		R, W
60835*	The parameter set in C39.35	R, W

* Reg. 8 specification

Reg 8 is parameter index register. The drive has some array type parameters. When accessing these parameters, it should be set index first.

For example, write value into C03.10[2]. It should write 2 into Reg 8 first, then write value into 3099 (the register address of C03.10 is 310 × 10-1=3099, hexadecimal is 0x0C1B).

* Reg. 51000 specification

Bit	Specification
Bit 7~0	0x00: No function 0x01: Run forward 0x02: Reverse 0x03: Jog 0x04: Jog reverse 0x05: Stop 0x06: Coast 0x07: Reset
Bit 11~8	0000B: master speed C03.10[0] 0001B: 1st step speed C03.10[1] 0010B: 2nd step speed C03.10[2] 0011B: 3rd step speed C03.10[3] … 1111B: 7th step speed C03.10[15]
Bit 13~12	00B: Ramp 1 01B: Ramp 2 10B: Ramp 3 11B: Ramp 4
Bit 14	Reserved

Bit 15	1B: Enable Bit8~13 function
	0B: Disable Bit8~13 function

* Reg. 51001 specification

When using communication to control the drive, you can set the reference directly by writing register 51001. The register value is in the range of 0.00~ C04.19, unit 0.01.

* Reg. 51100 specification

Bit	Sepcification
Bit 0	0B: None
	1B: Warning
Bit 1	0B: None
	1B: Alarm
Bit 3~2	00B: Stop
	01B: Run forward
	10B: Reverse
	11B: Reserved
Bit 7~4	Reserved
Bit 11~8	0000B: Using master speed
	0001B: Using 1st step speed
	0010B: Using 2nd step speed
	0011B: Using 3rd step speed
	…
	1111B: Using 15th step speed
Bit 15~12	Reserved

* Reg. 51101 specification

Register 51101 is used to store the drive fault information. For example, when the drive occurs E.13 alarm, the value of register 51101 is 13.

* Reg. 60800~60835 specification

Registers 60800 to 60835 are used to read and write other parameters set by C39.00 to C39.35. Parameters C39.00~C39.35 are customized parameters for user communication. Users can input other parameter numbers of the drive into C39.00~C39.35 to quickly modify and read the values of these parameters through communication

The Modbus register is 16-bit, in order to modify 32-bit parameters and array-type parameters in the drive through a message (write multiple holding registers), it needs to be set in parameters C39.50~C39.85 and C39.00~C39. 35 corresponds to the index value.

For example, C39.00~C39.03 and C39.50~C39.53 are set as following:

Parameter	Value	Parameter	Value
C39.00	310	C39.50	0
C39.01	310	C39.51	1
C39.02	310	C39.52	2
C39.03	303	C39.53	0

Registers 60800 to 60835 are used to read and write parameters as following:

Registers	Parameter
60800	C03.10[0]
60801	C03.10[1]
60802	C03.10[2]
60803	C03.03

The parameter C03.10 is a 16-bit array parameter, and the index values 0, 1, and 2 in C39.50 to C39.52 make the register 60800 to 60802 correspond to C03.10[0]~C03.10[2].

The parameter C03.03 is a non-array parameter, so no index is needed. C39.53 sets to 0.

## A.5 Communication ratio values

The Communication data is expressed by hexadecimal in actual application and there is no radix point in hexadecimal. For example, if you want to set C03.10[0] = 60.34, 60.34 can be magnified by 100 times into 6034. So hex 0x1792 (6034) can be used to express 60.34.

A non-integer can be timed by a multiple to get an integer and the integer can be called communication ratio values.

The communication ratio values are refered to the radix point of the setting range of default value in the functional parameter list. If there are radix point n, then the communication ratio value m is 10^n.

A.6 Error message

There may be errors in the communication process, for example, some parameters are read-only, but the PC/PLC sends a written directive, the drive will return an error message. Error message data frame format is shown as the figure below:

Error message

| Slave address | Function code | Error code | Check |
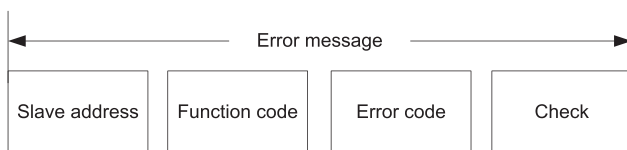
Error message function code = requirements function code + 0x80

Error code	Specification
0x01	Function code error, the drive does not support this kind of function code.
0x02	Defined parameters can not be written.
0x03	The value exceeds the upper limit of the parameter
0x04	Operation error.

A.7 Examples

A.7.1 Read Holding Registers (0x03)

Read the Reg. 51102 to get the output frequency.

Transmit: 01 03 C7 9E 00 01 D8 90 (Hexadecimal)

Receive: 01 03 02 01 F4 B8 53 (Hexadecimal)

Transmit data specification:

Field	Description
01	Address
03	Function
C7 9E	Register address: 51102 (0xC79E)
00 01	The number of read registers is 1
D8 90	CRC check

Receive data specification:

Field	Description
01	Address
03	Function
02	The byte number of received data
01 F4	0x01F4 converts to decimal number is 500. So the value of Reg. 51102 is 500 / 10= 50.0

Read the value of C16.13 to get the output frequency.

Transmit: 01 03 3F 01 00 01 D9 DE (Hexadecimal)

Receive: 01 03 02 01 F4 B8 53 (Hexadecimal)

Transmit data specification:

Field	Description
01	Address
03	Function
3F 01	Register address (ADDRH ADDRL). The register address of C16.13 is 1613*10-1=16129 (0x3F01)
00 01	The number of read registers is 1
D9 DE	CRC check

Receive data specification:

Field	Description
01	Address
03	Function
02	The byte number of received data
01 F4	0x01F4 converts to decimal number is 500. So the value of C16.13 is 500 / 10 = 50.0
B8 53	CRC check

Read Drive Status

Read the Reg. 51100 and 51101 to get the drive status.

Transmit: 01 03 C7 9C 00 02 39 51 (Hexadecimal)

Receive: 01 03 00 02 00 0D 25 CF (Hexadecimal)

Transmit data specification:

Field	Description
01	Address
03	Function
C7 9C	Register address: 51100 (0xC79C)
00 02	The number of read registers is 2
39 51	CRC check

Receive data specification:

Field	Description
01	Address
03	Function
04	The byte number of received data

00 02 00 0D	The value of Reg. 51100 is 0x0002.
	Note:
	    Bit 0 is 0B, that is No warning;
	    Bit 1 is 1B, that is Alarm;
	    Bit 3~2 is 00B, that is Stop;
	    Bit 11~8 is 0000B, that is Using master speed;
	The value of Reg. 51101 is 0x000D (13). The drive has E.13 over current alarm.

25 CF	CRC check

A.7.2 Write Single Register (0x06)

Control the drive running at 1st step speed.

Write 51000 to control the drive.

Transmit: 01 06 C7 38 81 01 94 E3 (Hexadecimal)

Receive: 01 06 C7 38 81 01 94 E3 (Hexadecimal)

Transmit data specification:

Field	Description
01	Address
06	Function
C7 38	Register address: 51000 (0xC738)

81 01	Control command is 0x8101.
	Note:
	    Bit 7~0 is 0x01, that is Run forward;
	    Bit 11~8 is 0001B, that is Using 1st step speed C03.10[1];
	    Bit 13~12 is 00B, that is Using ramp 1;
	    Bit 15 is 1B, that is Enable bit 13~8;

94 E3	CRC check

Receive data specification:

Field	Description
01	Address
06	Function

C7 38	Register address: 51000 (0xC738)
81 01	Control command
94 E3	CRC check

Set C03.10[0] to 40.00%

Transmit: 01 06 0C 1B 0F A0 FF 15 (Hexadecimal)

Receive: 01 06 0C 1B 0F A0 FF 15 (Hexadecimal)

Transmit data specification:

Field	Description
01	Address
06	Function
0C 1B	The register address of C03.10 is 310 *10-1=3099 (0x0C1B) .
0F A0	The value which will be written into C03.10[0] is 40.00% (Decimal: 4000, Hexadecimal: 0x0FA0).
FF 15	CRC check

Receive data specification:

Field	Description
01	Address
06	Function
0C 1B	Register address
0F A0	The value which has be written into C03.10[0] is 40.00% (Decimal: 4000, Hexadecimal: 0x0FA0).
FF 15	CRC check

A.7.3 Write Multiple Registers (0x10)

Start the drive and set Drive output frequency.

Write register 51000 to control the drive running and write register 51001 to set the drive output frequency.

Transmit: 01 10 C7 38 00 02 04 00 01 13 88 DB BE (Hexadecimal)

Receive: 01 10 C7 38 00 02 FD 71 (Hexadecimal)
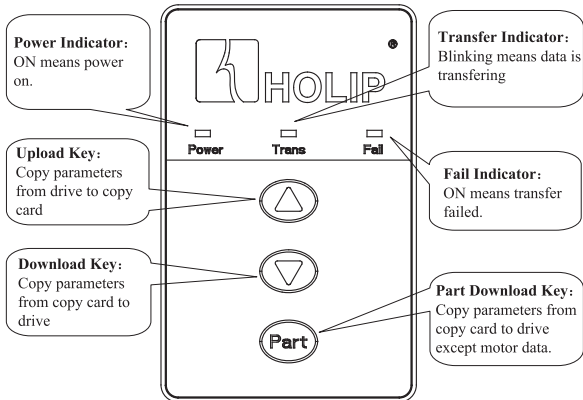
Transmit data specification:

Field	Description
01	Address
10	Function
C7 38	Register address: 51000 (0xC738)
00 02	The number of write registers is 2
04	The byte number of write data is 4

00 01 13 88	Reg. 51000 = 0x0001
	Note:
	  Bit 7~0 is 0x01, that is Run forward;
	  Bit 11~8 is 0000B, that is Using master speed C03.10[0];
	  Bit 13~12 is 00B, that is Using ramp 1;
	  Bit 15 is 0B, that is Disable bit 13~8;
	Reg. 51001 = 0x1388 (5000, So the output frequency is 5000 / 100 = 50.00Hz)

DB BE	CRC check

Receive data specification:

Field	Description
01	Address
10	Function
C7 38	Register address: 51000 (0xC738)
00 02	The number of write registers is 2
FD 71	CRC check

Appendix B   Copy Card Specification

B.1 Copy Card Interface

Power Indicator：
ON means power on.

Transfer Indicator：
Blinking means data is transfering

Upload Key：
Copy parameters from drive to copy card

Fail Indicator：
ON means transfer failed.

Download Key：
Copy parameters from copy card to drive

Part Download Key：
Copy parameters from copy card to drive except motor data.

Power   Trans   Fail

B.2 Installation

Use netcable to connect the copy card and the drive. Plug one terminal into the copy card RJ45 port which is placed on the back and plug the other terminal into drive RJ45 port. As shown in the following figure:

Network cable
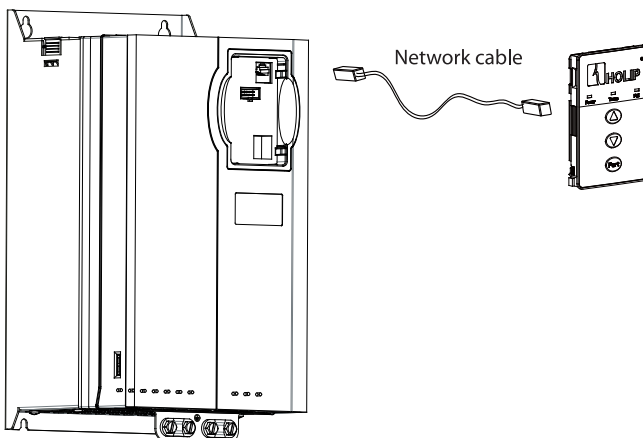
B.3 Operation

B.3.1 Upload

1) Connect copy card and drive according to 2. Installation;

2) After the drive power on, Power indicator on the copy card will be ON. If the connection between copy card and drive is not OK, fail indicator will be ON;

3) Press Upload key, parameters in drive begin copying to copy card. Trans indicator will be blinking during transfer.

4) If an error occurs during transfer, Fail indicator will be ON; If data upload success, Trans indicator will be OFF;

B.3.2 Download

1) Connect copy card and drive according to 2. Installation;

2) After the drive power on, Power indicator on the copy card will be ON. If the connection between copy card and drive is not OK, fail indicator will be ON;

3) Press Download key, parameters in copy card begin copying to drive. Trans indicator will be blinking during transfer.

4) If an error occurs during transfer, fail indicator will be ON; If data download success, Trans indicator will be OFF;

B.3.3 Part Download

Part download is similar with download, use Part key instead of Download key. It copies parameters from copy card to drive except motor data.

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