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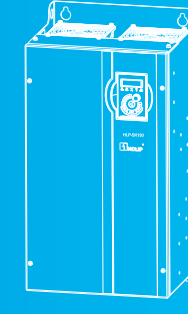
133R0260

HLP-SK190Series
Operating Manual



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ZHEJIANG HOLIP ELECTRONIC TECHNOLOGY CO.,LTD.

HLP-SK190 Series Operating Manual

Introduction

Thank you for purchasing and using the air compressor vectordrive of HLP-SK190 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.

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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 C01.09 (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 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 will expose you to a risk of electrical shock.

Chapter 2 Standards and Specifications

2.1 Label Description

Significance of the type code:

T/C:HLP-SK190003043P20XBX1CX0XXXVXXX

1-9 10-13 14-15 16-18 19 20 21 22 23 24 25 26 27-28 29-32

1-9	HLP-SK190	Indicate Product Series
10-13	0030	Indicate 30KW
14-15	43	Indicate 3-Phase AC 380V
16-18	P20	IP rating is 20
19	X	Without AC choke
	A	With AC choke
20	X	Without Brake unit
	B	With Brake unit
21	X	Without DC choke
	B	With DC choke
22	1	Control panel with LED display and potentiometer
23	C	With coating on PCB
24	X	Reserved
25	0	Domestic sale
	1	Overseas sale
26	A	Basic IO board
	B	Advanced IO board
27-28	XX	Reserved
29-32	VXXX	Indicate software version number, such as V235 means the version number is 2.35.

Note: For SK190 power less than 7.5kW (including) model, advanced IO board is standard configuration, basic IO board is optional, please specify when ordering if need basic IO board; For llkW and above power model, only advanced IO board is supported.

2.2 Particular Specifications

Model	Input voltage	Input current/ A	Output current /A	Rated power /kW	Suitable motor / kW	Net weight /KG
HLP-SK19004D043	3×380-440V50/60Hz	15.8	9.9	4.0	4.0	2
	3×440-480V50/60Hz	13.6	9			
HLP-SK19005D543	3×380-440V50/60Hz	21.3	13.3	5.5	5.5	2
	3×440-480V50/60Hz	18.4	12.1			
HLP-SK19007D543	3×380-440V50/60Hz	28.3	17.7	7.5	7.5	2.5
	3×440-480V50/60Hz	24.4	16.1			
HLP-SK190001143	3×380-440V50/60Hz	35.9	25	11	11	5.8
	3×440-480V50/60Hz	31.4	22.7			
HLP-SK190001543	3×380-440V50/60Hz	43.4	32	15	15	5.8
	3×440-480V50/60Hz	38.8	29.1			
HLP-SK19018D543	3×380-440V50/60Hz	51.5	38	18.5	18.5	8
	3×440-480V50/60Hz	46.1	34.5			
HLP-SK190002243	3×380-440V50/60Hz	61.0	45	22	22	8
	3×440-480V50/60Hz	54.5	40.9			
HLP-SK190003043	3×380-440V50/60Hz	73	61	30	30	19
	3×440-480V50/60Hz	64	52			
HLP-SK190003743	3×380-440V50/60Hz	72	75	37	37	22
	3×440-480V50/60Hz	65	68			
HLP-SK190004543	3×380-440V50/60Hz	86	91	45	45	26
	3×440-480V50/60Hz	80	82			
HLP-SK190005543	3×380-440V50/60Hz	110	112	55	55	26
	3×440-480V50/60Hz	108	110			
HLP-SK190007543	3×380-440V50/60Hz	148	150	75	75	37
	3×440-480V50/60Hz	135	140			
HLP-SK190009043	3×380-440V50/60Hz	175	180	90	90	60
	3×440-480V50/60Hz	154	160			
HLP-SK190011043	3×380-440V50/60Hz	206	215	110	110	60
	3×440-480V50/60Hz	183	190			
HLP-SK190013243	3×380-440V50/60Hz	251	260	132	132	60
	3×440-480V50/60Hz	231	240			
HLP-SK190016043	3×380-440V50/60Hz	304	315	160	160	99
	3×440-480V50/60Hz	291	302			
HLP-SK190018543	3×380-440V50/60Hz	350	365	185	185	99
	3×440-480V50/60Hz	320	335			
HLP-SK190020043	3×380-440V50/60Hz	381	395	200	200	99
	3×440-480V50/60Hz	348	361			

HLP-SK190022043	3×380-440V50/60Hz	420	435	220	220	99
	3×440-480V50/60Hz	383	398			
HLP-SK190025043	3×380-440V50/60Hz	472	480	250	250	250
	3×440-480V50/60Hz	436	443			
HLP-SK190028043	3×380-440V50/60Hz	525	540	280	280	250
	3×440-480V50/60Hz	475	490			
HLP-SK190031543	3×380-440V50/60Hz	590	605	315	315	250
	3×440-480V50/60Hz	531	540			
HLP-SK190035543	3×380-440V50/60Hz	647	660	355	355	250
	3×440-480V50/60Hz	580	590			
HLP-SK190041543	3×380-440V50/60Hz	718	745	415	415	250
	3×440-480V50/60Hz	653	678			

Notice: above 250Kw need make specially

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	V/F : 0-400Hz , VVC+: 0-200Hz;
Main control functions	Control mode	V/F, VVC+;
	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 ;
	Speedopen-loop control accuracy	30~4000 rpm: tolerance±8 rpm;
	Control command source	LCP, digital terminal, local bus;
	Frequency setting source	LCP, analog, 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; AMA Function;Motor Magnetisation; Slip Compensation;Automatic Voltage Regulation; V/F Control, DC Brake; AC brake; Speed Limit; Current Limit; Flying-Start; Reset Function; Counter; Timer;	
Application Functions	Air Compressor Application	
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; Buttonfreeze; Duplicate Fails; LCP Invalid; LCP Incompatible; Parameter Read-only; Reference Out of Range; Invalid While Running etc.	
IO board control terminals	Input	6 digital inputs ; 2 analoginput, both can receive voltage or current signals.
	Output	2 digital output ; 2 relay output; 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;
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, 10 fault records and accumulated working time etc;

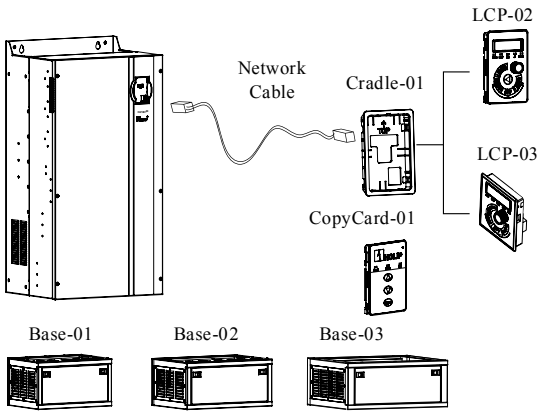
Environment	Enclosure	IP20;
	Ambient temperature	-10℃~50℃, derating use when over 40℃;
	Humidity	5%-85% (95% without condensation);
	Vibration test	≤75kW: 1.14g; ≥90kW: 0.7g;
	Max. altitude above sea level	1000m, derating use when more than 1000 meters;
	Motor cable length	Shield cable: 50 meters, unshield cable: 100 meters;
others	DC choke	≥37kW Built-in
	Braking unit	≤22kW 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 temperationwith one motor size smaller than normal. Continuous operation at full load at 50℃ ambient temperation will reduce the lifetime of the drive.

Deratingfor 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	Specification	Remark
LCP-02	LCP-02 has the same external and installation dimensions and installation method with LCP-01. The standard length of extension cable is 15 meters when mounting LCP on control cabinet.	standard configuration
LCP-03	LCP-03 has the same installation dimensions with HLP-A control panel (OP-AB01).	Optional, please specify when ordering
Cradle-01	For LCP-01 and LCP-02 installation.	Optional, please specify when ordering
CopyCard-01	For LCP-01 and LCP-02 installation.	Optional, please specify when ordering
Network Cable	Connect LCP to the drive when mounting LCP on control cabinet.	Do not offer, self procurement
Base-01	For 90~132kW	Optional, please specify when ordering
Base-02	For 160~220kW	Optional, please specify when ordering
Base-03	For 250~415kW	Optional, please specify when ordering

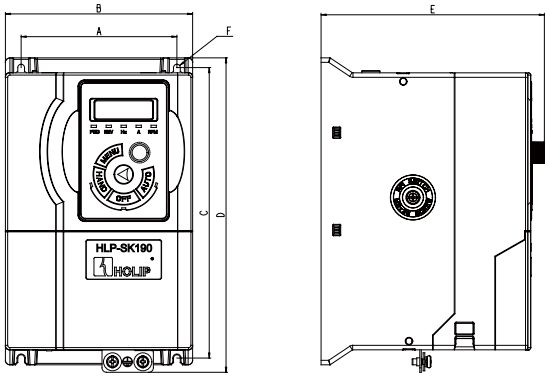
Chapter 3 Mechanical and Electrical Installation

3.1 Mechanical Installation

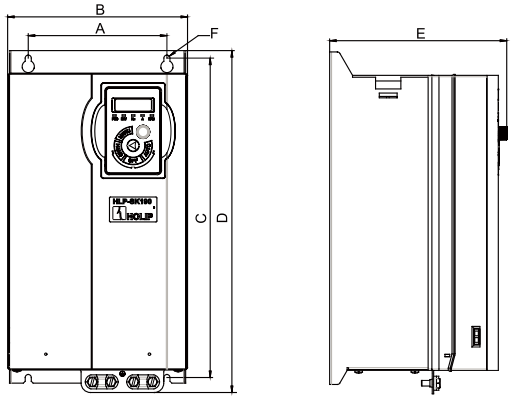
3.1.1 Installation Environment Requirements

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 less than 1.14g (<= 75kW) or 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;

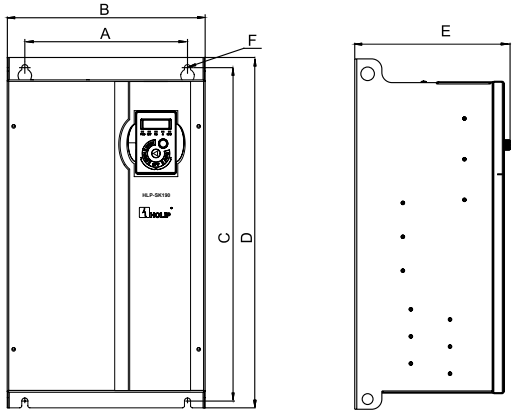
3.1.2 External and Installation Dimensions



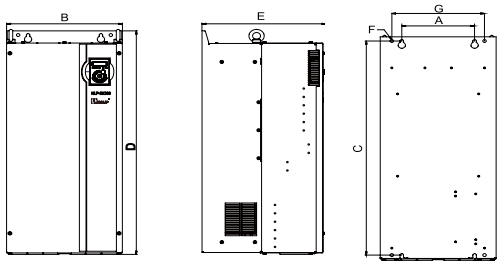
three phase 380V7.5kW



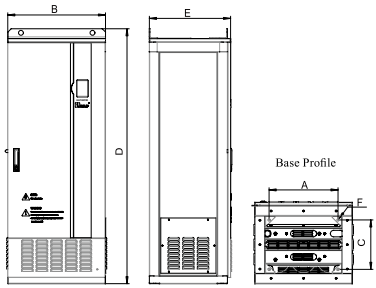
three phase 380V 11~22kW



three phase 380V 30~75kW



three phase 380V 90~220kW



three phase 380V 250~415kW

External and installation dimensions(unit: mm)

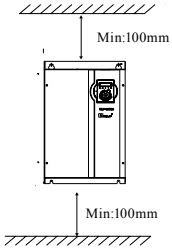
Model	A	B	C	D	E	F	G
HLP-SK190004D043	124	145	230	250	165	4.5	-
HLP-SK190005D543							
HLP-SK19007D543	133	155	243	263	175	4.5	-
HLP-SK190001143	148	192	340	365	189	6.5	-
HLP-SK190001543							
HLP-SK19018D543	150	214	395	420	194	6.5	-
HLP-SK190002243							
HLP-SK190003043	240	292	492	517	229	9	-
HLP-SK190003743							
HLP-SK190004543	240	292	537	562	249	9	-
HLP-SK190005543							
HLP-SK190007543	240	292	640	665	277	9	-

HLP-SK190009043	220	350	765	799	375	10.5	280
HLP-SK190011043							
HLP-SK190013243							
HLP-SK190016043	345	486	863	900	390	10.5	410
HLP-SK190018543							
HLP-SK190020043							
HLP-SK190022043							
HLP-SK190025043	424	600	304	1560	500	15	-
HLP-SK190028043							
HLP-SK190031543							
HLP-SK190035543							
HLP-SK190041543							

3.1.3 Installation and Direction

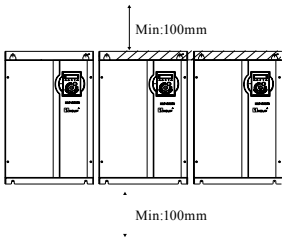
1.Single Installation

The drive must be installed vertically with smooth ventilation. Enough space must be left around the drive to ensure good cooling, as shown below:



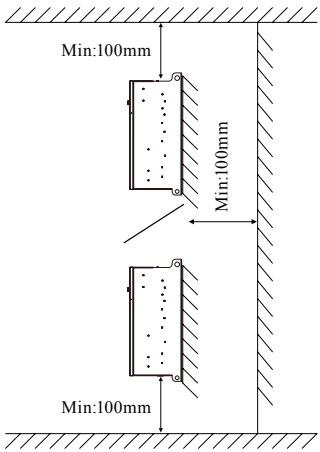
2.Side by Side Installation

The drive can be mounted side by side, a minimum space must be reserved above and below the enclosure, as shown below:



3.Upper and Lower Installation

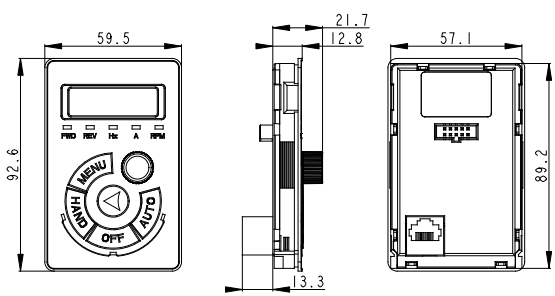
If several drives need to be installed together in one cabinet, upper and lower installation can be adopted. Enough space must be reserved to ensure effective cooling, as shown below:



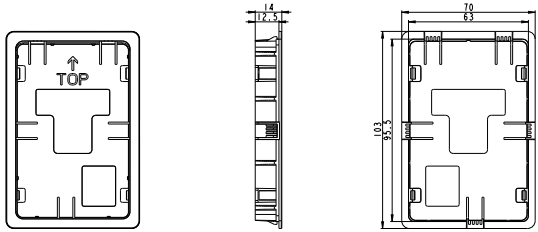
3.1.4 Accessories Installation

1. LCP-02 Installation

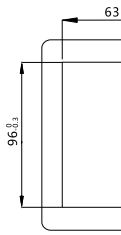
The external dimensionsof LCP-02 are shown below (unit: mm):



When installing LCP-02 outside, a cradle is needed.The external dimensions of the cradle are shown below (unit: mm):



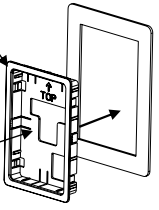
The installation steps of LCP-02 are shown below:



Stepl:Open a hole in line with the size of the control panel in the position need to instal the LCP,hole size,as shown:

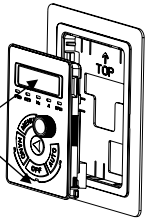
This cradle is suitable for 1.0-2.0mm thickness sheet metal parts.

Press and hold the snap roots when install-ation,using buckle defor-mation install sheet metal.

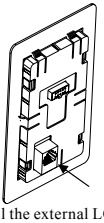


Step2:Install the LCP according to the direction of the arrow.

Recommended to install vertical mounting position arrow,press with uniform force.



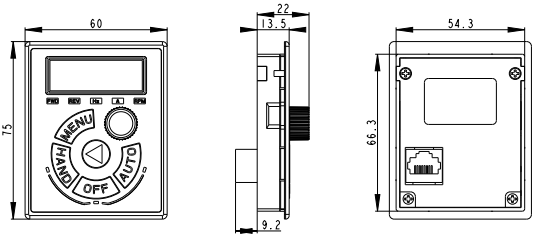
Step 3:The LCP is installed in the cradle, according to the direction of the arrow.



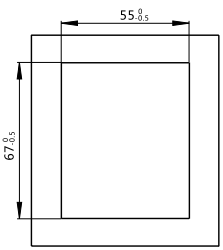
Step 4: Install the external LCP communication cable, insert into RJ45 terminal from the bottom of hole.

2. LCP-03 Installation

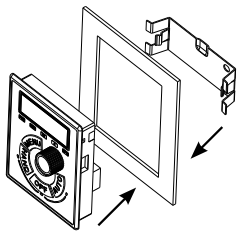
The external dimensions of LCP-03 are shown below (unit: mm):



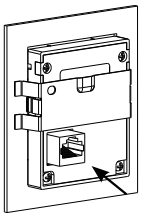
The installation steps of LCP-03 are shown below:



Step 1:Open a hole in the control panel where it is needed to install LCP-01 or LCP-02, the hole size is as shown.



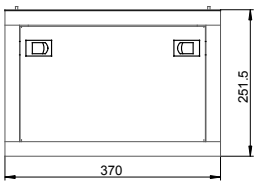
Step 2: Install the LCP according to the direction of the arrow.

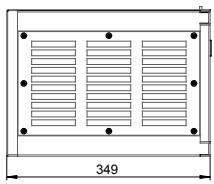


Step 3: Install the LCP communication cable, insert into RJ45 terminal from the bottom hole.

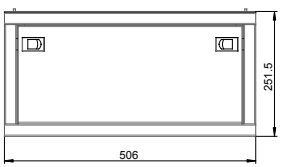
3. Base Installation

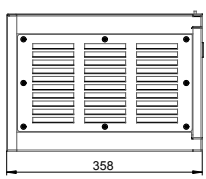
Base-01 is for 90~132kW, its external dimensions are shown below (unit: mm):



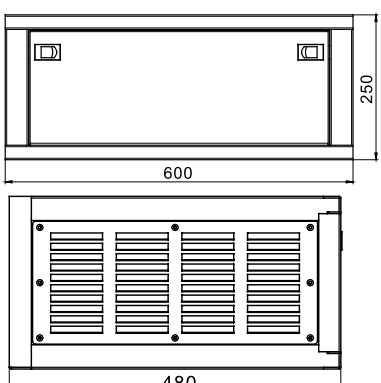


Base-02 is for 160~220kW, its external dimensions are shown below (unit: mm):



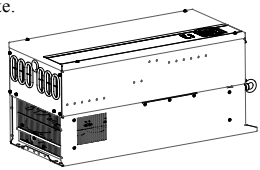


Base-03 is for 250~415kW, its external dimensions are shown below (unit: mm):

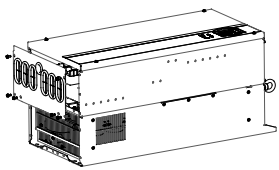


The installation steps of Base-01 and Base-02 are the same, shown below:

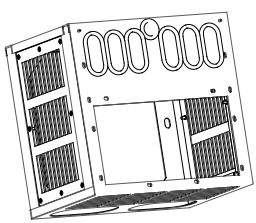
Step1: Original state.



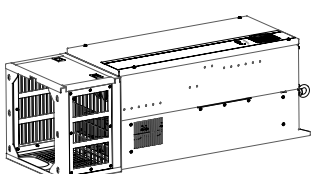
Step2: Remove the bottom cable entry sheet metal and fixing screws.



Step3: Move the rubber pieces from the bottom of the sheet metal to the Base.

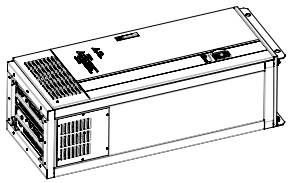


Step4: Use M5 * 12 screws to fix the Base and drive.

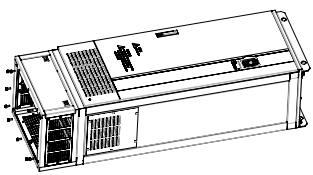


The installation steps of Base-03 are shown below:

Step1: Original state



Step2: Use 12 M8 * 20 screws to fix the Base and drive.

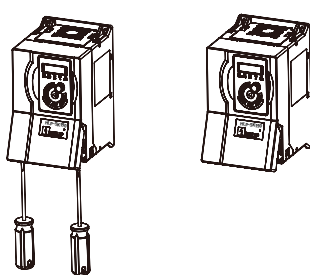


3.1.5 Removal of the Front Cover

It is needed to remove the front cover before wiring the main circuit and control circuit.

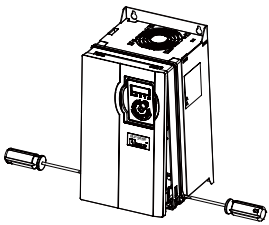
≤7.5kW

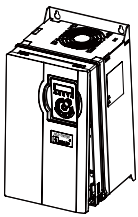
Use a screwdriver to push out the hook of the front cover inward.



11~22kW

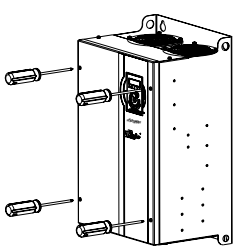
Use a screwdriver to push out the hook of the front cover inward.

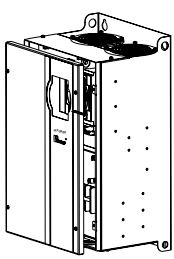




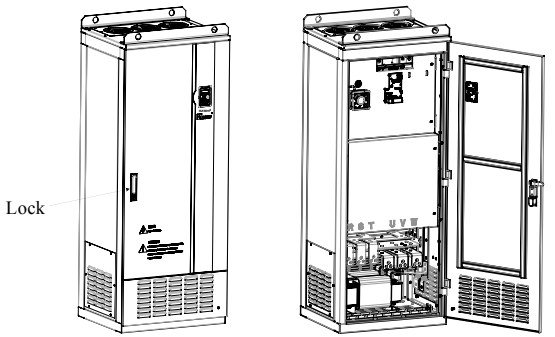
30~220kW

Use a screwdriver to loosen the screws on the front cover.





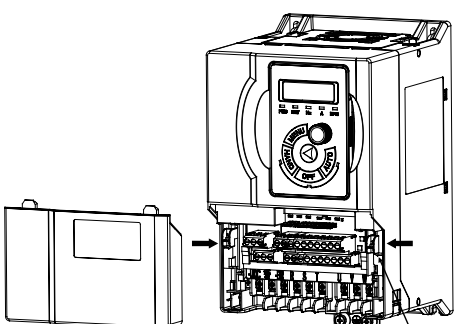
250~415kW
Screw the lock on the door.



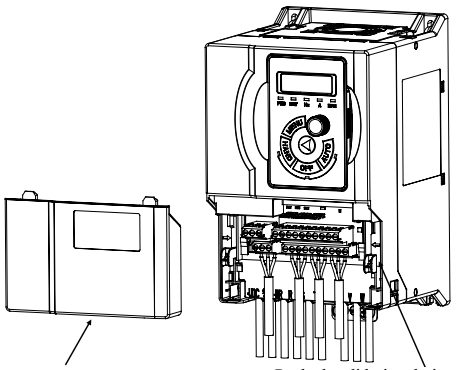
3.1.6 Slide Insulating Cover Operation

The drive which power is ⩽ 7.5kW has built-in slide insulating cover between main circuit and control circuit. Its operation is shown below:

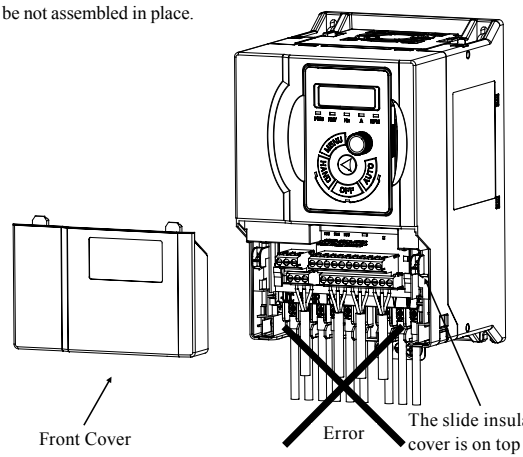
Step 1: Open the front cover, push the slide insulating cover handles inwards and pull them to the top.



Step 2: Wiring IO and main circuit, push the slide insulating cover handles inwards and pull them to the bottom, cover the front cover.

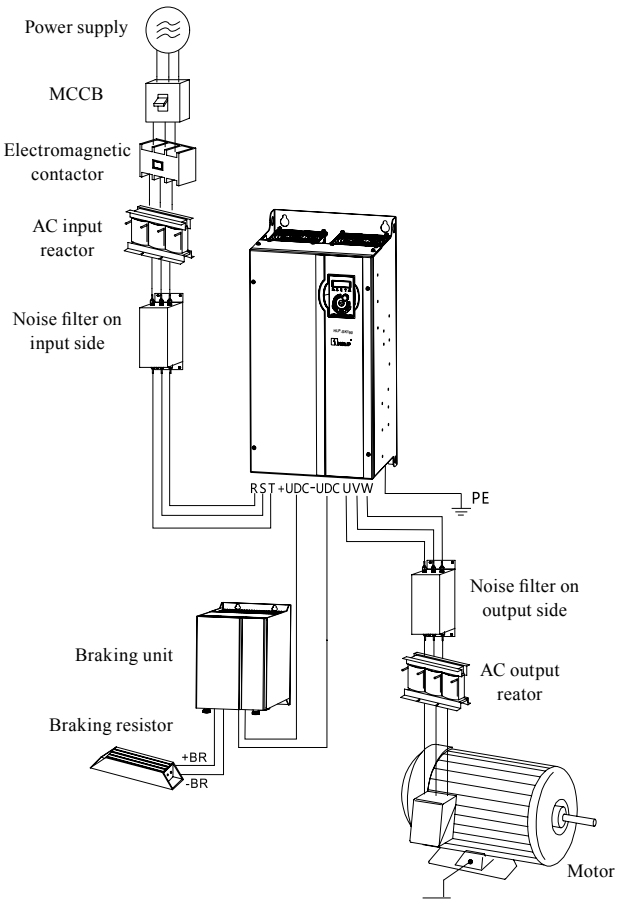


Note: If the slide insulating cover is not be pulled down, the front cover will be not assembled in place.



3.2 Peripheral Electrical Devices

The peripheral electrical devices of the drive are shown below:



Part	Mounting Location	Function Description
MCCB	Power receiving side	Interrupt the power supply when overcurrent occurs ondownstream devices.
Contactor	Between MCCB and drive input side	Do not start and stop the drive frequently by switchingthe contactor on and off (less than twice per minute) noruse 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 unbalancebetween the power phases; Eliminate the higher harmonics of the input sideeffectively; prevent other devices from beingdamaged 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 unit Braking resistor	≤22kW Braking unit is standard configuration	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.
AC output reactor	Between the drive output side and themotor, close to the drive	Degrade the motor insulation performance and damage the motor in the long run; Generate large leakage current and cause frequent ACdrive protection trips; If the distance between the drive and the motor isgreater than 100 m, install an AC output reactor;

3.2.1 Selection of MCCB/Fuse/Contactor

Model	MCCB (A)	Fuse (A)	Contactor (A)
HLP-SK19004D043	25	25	25
HLP-SK19005D543	32	32	25
HLP-SK19007D543	40	40	32
HLP-SK190001143	63	63	40
HLP-SK190001543	63	63	63
HLP-SK19018D543	100	100	63
HLP-SK190002243	100	100	100
HLP-SK190003043	150	150	100
HLP-SK190003743	150	150	100
HLP-SK190004543	175	175	135
HLP-SK190005543	200	200	150
HLP-SK190007543	250	250	200
HLP-SK190009043	300	300	240
HLP-SK190011043	350	350	260
HLP-SK190013243	400	400	350
HLP-SK190016043	500	500	450
HLP-SK19018543	630	630	450
HLP-SK190020043	630	630	550
HLP-SK190022043	800	800	550
HLP-SK190025043	800	800	630
HLP-SK190028043	800	800	630
HLP-SK190031543	1000	1000	630
HLP-SK190035543	1000	1000	800
HLP-SK190041543	1200	1200	800

3.2.2 Selection of Braking Unit and Braking Resistor

1. The guide of AC input reactor selection

Model	Ratedcurrent (A)	Maximum continuous current(A)	Inductance (mH) & 3% Impedance
HLP-SK19004D043	14.5	22	2.9
HLP-SK19005D543	20	30	2.2
HLP-SK19007D543	25	37.5	1.6
HLP-SK190001143	33	49.5	1.08
HLP-SK190001543	42	63	0.8
HLP-SK19018D543	50	75	0.65
HLP-SK190002243	60	90	0.54

HLP-SK190003043	80	120	0.45
HLP-SK190003743	80	120	0.36
HLP-SK190004543	100	150	0.3
HLP-SK190005543	120	180	0.25
HLP-SK190007543	160	240	0.18
HLP-SK190009043	200	300	0.15
HLP-SK190011043	250	375	0.12
HLP-SK190013243	300	450	0.1
HLP-SK190016043	350	525	0.085
HLP-SK190018543	400	600	0.07
HLP-SK190020043	450	675	0.065
HLP-SK190022043	500	750	0.06
HLP-SK190025043	560	710	0.05
HLP-SK190028043	630	780	0.03
HLP-SK190031543	700	880	0.0215
HLP-SK190035543	770	970	0.017
HLP-SK190041543	860	1070	0.012

2. the guide of AC output reactor selection

Model	Rated current (A)	Saturation current (A)	Inductance (mH) & 3% Impedance
HLP-SK19004D043	9.9	21	2.69
HLP-SK19005D543	13.3	28.2	1.96
HLP-SK19007D543	17.7	37.5	1.43
HLP-SK190001143	25	53	0.98
HLP-SK190001543	32	67.8	0.72
HLP-SK19018D543	38	80.6	0.58
HLP-SK190002243	45	95.4	0.49
HLP-SK190003043	61	129	0.362
HLP-SK190003743	75	159	0.294
HLP-SK190004543	91	193	0.242
HLP-SK190005543	112	238	0.197
HLP-SK190007543	150	318	0.147
HLP-SK190009043	180	382	0.123
HLP-SK190011043	215	456	0.103
HLP-SK190013243	260	551	0.085
HLP-SK190016043	315	668	0.070
HLP-SK190018543	365	774	0.060
HLP-SK190020043	395	838	0.056

Model	Rated current (A)	Saturation current (A)	Inductance (mH) & 3% Impedance
HLP-SK190022043	435	923	0.051
HLP-SK190025043	480	1020	0.009
HLP-SK190028043	540	1145	0.008
HLP-SK190031543	605	1280	0.0055
HLP-SK190035543	660	1400	0.004
HLP-SK190041543	745	1580	0.0035

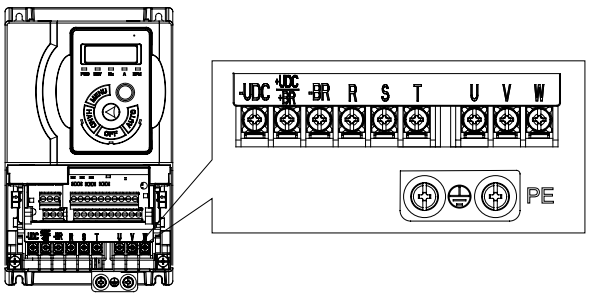
3.2.3 Selection of EMC Filter

Model	EMC Input Filter		EMC Output Filter	
	Rated Current (A)	Recommended Model*	Rated Current (A)	Recommended Model*
HLP-SK19004D043	10	NFI-010	10	NFO-010
HLP-SK19005D543	20	NFI-010	20	NFO-020
HLP-SK19007D543	20	NFI-020	20	NFO-020
HLP-SK190001143	36	NFI-036	36	NFO-036
HLP-SK190001543	36	NFI-036	36	NFO-036
HLP-SK19018D543	50	NFI-050	50	NFO-050
HLP-SK190002243	50	NFI-050	50	NFO-050
HLP-SK190003043	65	NFI-065	65	NFO-065
HLP-SK190003743	80	NFI-080	80	NFO-080
HLP-SK190004543	100	NFI-100	100	NFO-100
HLP-SK190005543	150	NFI-150	150	NFO-150
HLP-SK190007543	150	NFI-150	150	NFO-150
HLP-SK190009043	200	NFI-200	200	NFO-200
HLP-SK190011043	250	NFI-250	250	NFO-250
HLP-SK190013243	250	NFI-250	250	NFO-250
HLP-SK190016043	300	NFI-300	300	NFO-300
HLP-SK190018543	400	NFI-400	400	NFO-400
HLP-SK190020043	400	NFI-400	400	NFO-400
HLP-SK190022043	600	NFI-600	600	NFO-600
HLP-SK190025043	900	NFI-900	900	NFO-900
HLP-SK190028043	900	NFI-900	900	NFO-900
HLP-SK190031543	900	NFI-900	900	NFO-900
HLP-SK190035543	1200	NFI-1200	1200	NFO-1200
HLP-SK190041543	1200	NFI-1200	1200	NFO-1200

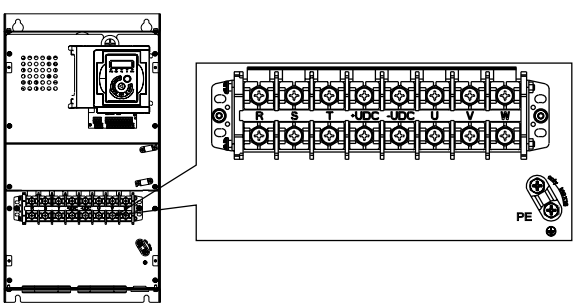
* Recommended models is the Shanghai Eagtop Electronic Technology Co., Ltd. products, website: http://www.eagtop.com/

3.3 Description of Main Circuit

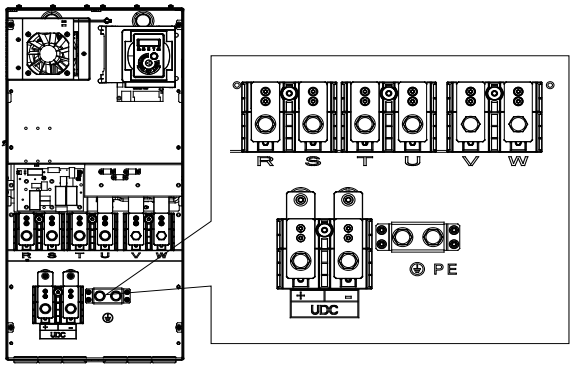
3.3.1 Schematic of Main Circuit Terminals



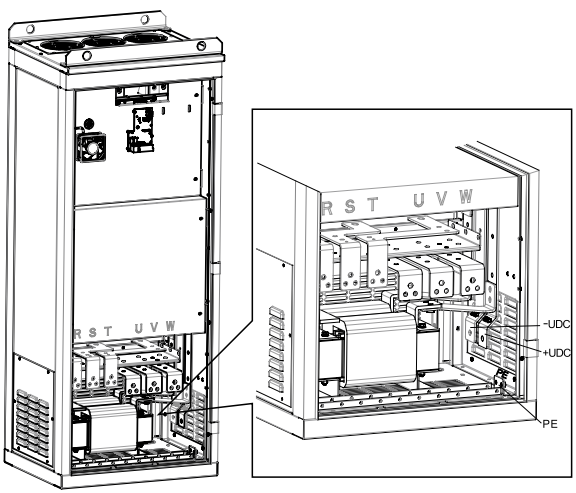
three phase380V 4.0 ~ 22kW



Three phase 380V 30~75kW



Three phase 380V 90~220kW



Three phase 380V 250~415kW

Description of main circuit terminals:

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

Note: For the power less than 22kW (including) models, +UDC and +BR is the same terminal, for the power greater than 30kW (including) models, there are no +BR,-BR Terminal.

3.3.2 Main Circuit Terminal Screws and Wiring Recommended Specifications

Model	Input Cable (mm2)	Output Cable (mm2)	Input and Output Terminals' Screws	Input and Output Terminals' Torque	Ground Terminal Screw	Ground Terminal Torque
HLP-SK190004D043	1.5	1.5	M4	1.0-1.2	M4	1.0-1.2
HLP-SK190005D543	1.5	1.5	M4	1.0-1.2	M4	1.0-1.2
HLP-SK190007D543	2.5	1.5	M4	1.0-1.2	M4	1.0-1.2
HLP-SK190001143	4	2.5	M4	1.0-1.2	M6	2.0-2.5
HLP-SK190001543	6	4	M4	1.0-1.2	M6	2.0-2.5
HLP-SK190018D543	10	4	M5	1.6-2.0	M6	2.0-2.5
HLP-SK190002243	10	6	M5	1.6-2.0	M6	2.0-2.5
HLP-SK190003043	10	10	M8	8-10	M6	2.0-2.5
HLP-SK190003743	16	16	M8	8-10	M6	2.0-2.5
HLP-SK190004543	16	16	M8	8-10	M6	2.0-2.5
HLP-SK190005543	25	25	M8	8-10	M6	2.0-2.5
HLP-SK190007543	35	35	M8	8-10	M6	2.0-2.5
HLP-SK190009043	70	70	M10	12-16	M10	12-16
HLP-SK190011043	70	70	M10	12-16	M10	12-16
HLP-SK190013243	95	95	M10	12-16	M10	12-16
HLP-SK190016043	120	150	M12*1 (M10*2)	12-16	M10*2	12-16

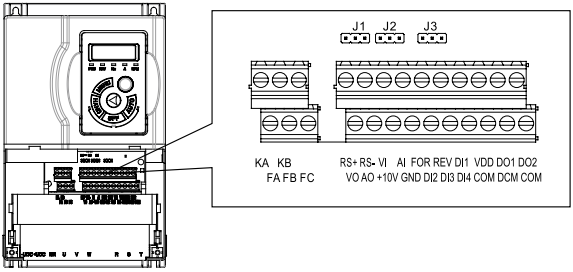
HLP-SK190018543	150	185	M12*1 (M10*2)	12-16	M10*2	12-16
HLP-SK190020043	185	185	M12*1 (M10*2)	12-16	M10*2	12-16
HLP-SK190022043	240	240	M12*1 (M10*2)	12-16	M10*2	12-16
HLP-SK190025043	70*2	70*2	M10*1	26-33	M8*1	13-16
HLP-SK190028043	95*2	95*2	M10*1	26-33	M8*1	13-16
HLP-SK190031543	95*2	95*2	M10*1	26-33	M8*1	13-16
HLP-SK190035543	120*2	120*2	M10*1	26-33	M8*1	13-16
HLP-SK190040043	120*2	120*2	M10*1	26-33	M8*1	13-16
HLP-SK190041543	120*2	120*2	M10*1	26-33	M8*1	13-16

Note: This specification is under using single-core line VV and 25℃, 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

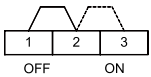
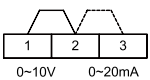
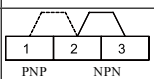
1. Schematic of Advanced IO board



Terminals' specification:

Symbol	Description	Specification
VDD	24V power supply	Max load 200 mA, with over load and short circuit protection functions.
+10V	10V power supply	Max load 10 mA, with over load and short circuit protection functions.

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;
DO1, DO2	Digital output	1. Open collector output; 2. Output current range: DO1: 0-30mA; DO1: 0-50mA; 3. Max voltage 30V;
COM	Digital ground	Isolated from internal GND.
DCM	Digital output common terminal	Connect COM as Digital output reference ground.
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;
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;
GND	Analog and communication ground	Isolated from internal COM.
Relay (FA-FB-FC, KA-KB)	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;

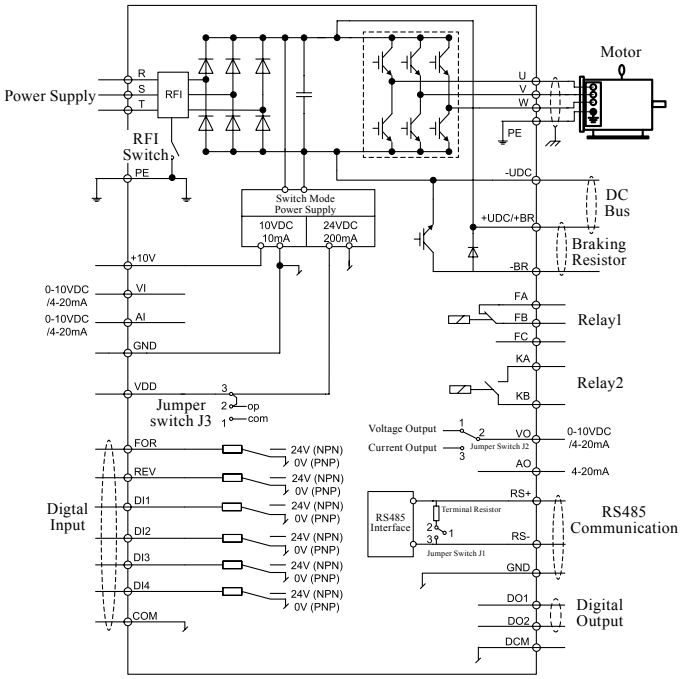
J1	RS485 termination resistor jumper switch	 Jumper switch 1-2 connected: OFF, termination resistor not connected, default state; Jumper switch 2-3 connected: ON, termination resistor connected;
J2	VO jumper switch	 Jumper switch 1-2 connected: 0~10V , default state; Jumper switch 2-3 connected: 0~20mA;
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 Terminals' Screws and Wiring Recommended Specifications

Cable types	Cable specifications (mm2)	Torque (n·m)
Shielded cables	0.4	0.4

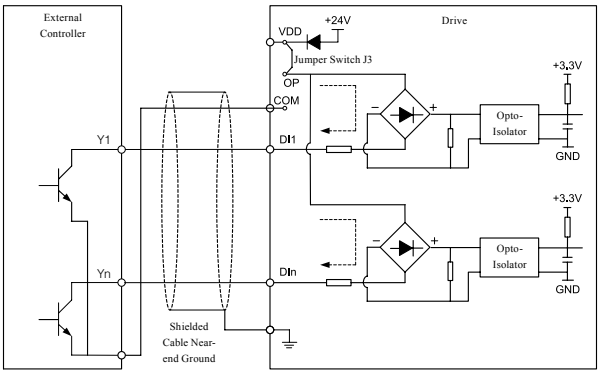
3.4.3 Control Curcuit Wiring

1. Advanced IO board wiring:



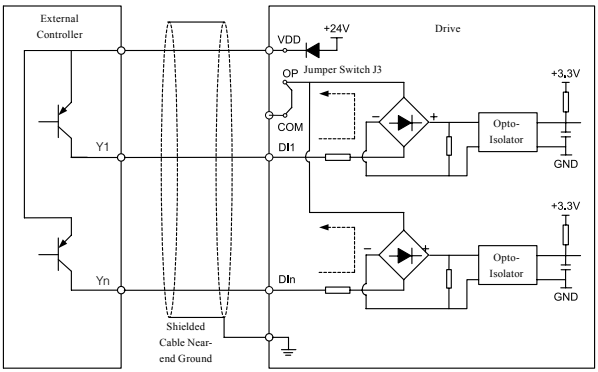
3.4.4 Digital Input Terminals Usage Specification

1. Open collector NPN mode wiring



While using this mode, J3 1-2 must be connected (default state: VDD connects to OP). Basic IO board only supports this mode.

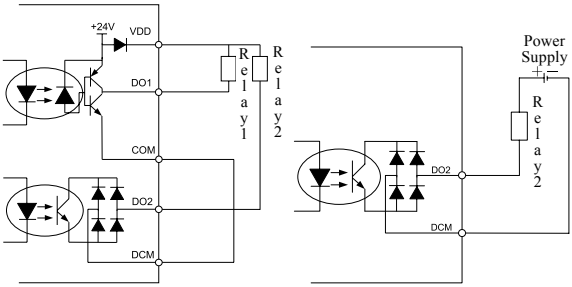
2. Open collector PNP mode wiring



While using this mode, J3 2-3 must be connected (COM connects to OP). Basic IO board does not support this mode.

3.4.5 Digital Input Terminals Usage Specification

1. Open collector NPN mode wiring



a. Use internal power supply
b. DO2 uses external power supply isolation
Note: DO1 does not support using external power supply isolation.

3.5 EMC instructions

3.5.1 Introduction to EMC Standard

The HLP-SK190 series satisfies the requirements of standardIEC/EN61800-3: 2004 (Adjustable speed electricalpower drive systems part 3:EMC requirements and specific test methods).

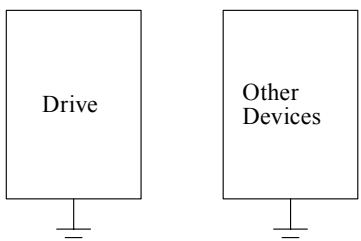
3.5.2 Noise Abatement

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. For the SK190 serials, the models which power is less than 22kW (including) can be removed RFI screws; the models which power is greater than 30kW (including) can be set C14.50 = 0 to cut RFI filter to reduce the leakage current;

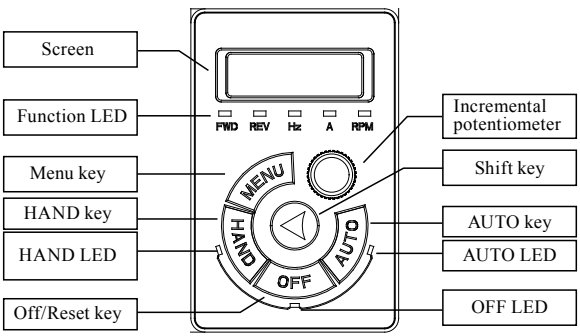
3.5.5 Induction Voltage Suppression

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 screws (models which power <= 22kW) or setting C14.50 = 1 (models which power >= 30kW).

Chapter 4 Operation and Display Interface

4.1 LCP Digital Operator

Local Control Panel (LCP) can do the operation of parameters modifications, status monitoring and drive control (start, stop), its appearance is shown blow:



1. State LED

The drive has three operating states: HAND control state, AUTO control state and OFF state. The operating states are indicated by HAND, AUTO and OFF Led.

HAND LED: The drive is in the HAND control state when it is on. The frequency can be changed by turning the incremental potentiometer. Push “HAND” key to set the drive in the HAND state.

OFF Led: The drive is in the OFF state when it is on. Push “OFF” key to set the drive in the HAND state.

AUTOLED: The drive is in the AUTO state when it is on. In the AUTO state, the drive is controlled by control terminals or communication. Push “AUTO” key to set the drive in the AUTO state.

2. FunctionLed

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

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

Local remote running lights running lights, OFF LEDs, three LED lights indicate.

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

4. 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.

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

4.2 Parameter Setting

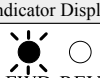
Example: Set C03.10 [0] to 20.5:

Key-press	LCP Display	Action Description
	C00.03	Press  key to display the first basic C00.03
	C03.00	Turn  clockwise to select parameter group C03

Key-press	LCP Display	Action Description
	C03.00	Press  key to shift to fractional part
	C03.10	Turn  clockwise to select parameter C03.10
	[0]	Press key  show the first option of C03.10
	0000	Press  key to show the value of the first option of parameter C03.10
	000.5	Turn  clockwise to change the fractional part to 5
	000.5	Press key  to shift to integral part
	020.5	Press  key to change the integral part to 20
	END	Press  key to accept the change and save it as 20.5

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

Reference:	Running status	Indicator Display
≥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.

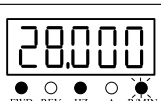
Example 1: The first line of the table indicates the drive is stop and the reference is greater than or equal to 0, means the dirve at some time in the future will run forward.

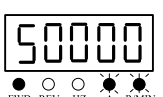
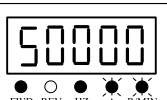
Example 2: The fourth line of the table represents the current drive is reverse running, and the reference setting is greater than or equal to 0, it means the drive at some time in the future will run forward.

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		Show the output frequency Cl6.13is50.0Hz, display accuracy: 0.1
Reference (%)			Show the reference Cl6.0l is 50.000, display accuracy: 0.00l

Display Items	Key-press	LCP Display	Action Description
Motor Current			Show the motor current Cl6.l4 is 9.00A, display accuracy: 0.0l
Motor Voltage			Show the motor voltage Cl6.l2 is 380V, display accuracy: 1
Motor Speed			Show the motor speed Cl6.05 is l440rpm, display accuracy:l
DC Voltage			Show the DC Voltage Cl6.30is 540V,display accuracy: 1
Drive temperature			Show the Drive temperature Cl6.34 is 45℃, display accuracy:l
Feedback Value			Show the feedback valueCl6.52 is 28.000, display accuracy: 0.00l
Counter A			Show counter A Cl6.72 is 65535, display accuracy:l
Counter B			Show counter B Cl6.72 is 65535, diaplay accuracy : 1

Display Items	Key-press	LCP Display	Action Description
Analog in VI			Show analog in VI C16.62 is 10.00V, display accuracy: 0.01
Analog in AI			Show Analog in AI C16.63 is 20.00mA, display accuracy: 0.01
Pulse Input			Show pulse inputC16.68is 50.000kHz, display accuracy: 0.001
Pulse Output			Show pulse output (C16.69) is50000Hz, display accuracy: 1

Note: The drive only monitor 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.

Key-press	LCP Display	Action Description
	C00.03	Press  key to display the first basic C00.03.
	C15.00	Turn  clockwise to select par. group No. C15.

Key-press	LCP Display	Action Description
	C15.00	Press  to select parameter number.
	C15.30	Turn  clockwise to select C15.30
	[0]	Press  to show the first option of C15.30
	**	Press  to show the first fault record.
	[1]	Press  to show the second fault record, it can display up to ten recent fault records in turn.

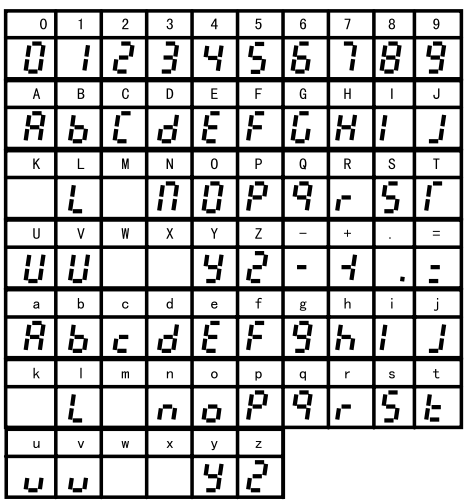
4.6 View State Parameter

By viewing the group 16th parameters can learn the current status of the drive. For example: C16.60 indicators the current state of digital input terminals.

Key-press	LCP Display	Action Description
	C00.03	Press  to display the first basic parameter C00.03.
	C16.00	Turn  clockwise to select Par. group No. C16

Key-press	LCP Display	Action Description
	C16.00	Press  to select parameter No.
	C16.60	Turn  clockwise to select C16.60
	2	Press  to view the value in C16.60, 2 indicates status of FOR, DI1, DI2, DI3, DI4 is 0, and status of REV is 1.

4.7 LED Display



Chapter 5 Parameter Overview

Par. Group	Par. No.	NameName	Range	Unit	Default
Parameter 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 3: Sturation IPMSM 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	0~4095		100
	C00.40	HAND Key Option	0: Disabled 1: Enabled		0
	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		0
	C00.47	LCP Potentiometer Step	0: 0.1 1: 1 2: 10		0

Par. Group	Par. No.	NameName	Range	Unit	Default
	*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
Par. Group0L Load/Motor	C01.00	Configuration Mode	0: Speed open loop 3: Process closed loop		0
	*C01.01	Motor Control Principle	0: V/F 1: VVC+		1
	*C01.03	Torque Characteristics	0: Constant torque 1: Variable torque 3: Auto Energy Optimization (AEO)		0
	*C01.07	Application Configuration Mode	0: No function 5:Air Compressor Application		0
	*C01.10	Motor Contruction	0: ASM; 1: SPMSM; 3:sturation IPMSM		0
	*C01.14	Damping gain	0 ~ 250	%	120
	*C01.15	Low Speed filter time const	0.01 ~ 20.00	s	0.8
	*C01.16	High Speed filter time const	0.01 ~ 20.00	s	0.8
	*C01.17	Voltage filter time const	0.01 ~ 1.00	s	0.5
	*C01.20	Motor Power	Motor dependant	kW	*
	*C01.22	Motor Voltage	50~1000	V	*
	*C01.23	Motor Frequency	20~400	Hz	*
	*C01.24	Motor Current	Motor dependant	A	*
	*C01.25	Motor Speed	100~9999	rpm	*
	*C01.26	Motor Torque	0. 1~10000.0	nm	*

Par. Group	Par. No.	NameName	Range	Unit	Default
Par. Group0I Load/Motor	*C01.29	Automatic Motor Adaption (AMA)	0: Disabled 1: Enable complete AMA 2: Enable reduced AMA		0
	*C01.30	Stator Resistance (Rs)	Motor dependant	Ω	*
	*C01.37	d-axis inductance	Motor dependant	mH	*
	*C01.39	Motor Poles	2~100	P	4
	*C01.40	Back emf at 1000 rpm	0 ~ 9000		*
	*C01.42	Motor Cable Length	0~150	m	*
	*C01.44	D axis saturated inductance	C1.37(Min)~C1.37*0.95	Ω	
	*C01.45	Q axis saturated inductance	C1.44~C1.38*0.95	Ω	
	*C01.48	current value of D-axis inductor saturation	20 ~200	%	100
	*C01.49	current value of Q-axis inductor saturation	20 ~ 200	%	100
	C01.55	V/F Characteristic-V	0.0~999.9	V	*
	C01.56	V/F Characteristic-F	0.0~400.0	Hz	*
	C01.66	The minimum motor current at low speeds	0 ~ 120	%	80
	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	0.00~10.00	Hz	0.00
	C01.76	Jump Frequency	0.0~20.0	Hz	0.0
	C01.80	Function at Stop	0: Coast 1: DC Hold		0

Par. Group	Par. No.	NameName	Range	Unit	Default
	C01.82	Min Speed for Function at Stop	0.0~400.0	Hz	0.0
	C01.90	Motor Thermal Protection	0: No protection 1: Thermistor warning 2: Thermistor trip 3: ETR warning 4: ETR trip 5: ETR self-cooling mode warning 6: ETR self-cooling mode trip		0
	*C01.93	Thermistor Resource	0: None 1: Terminal VI		0

Par. Group	Par. No.	NameName	Range	Unit	Default
Par. Group 02: Brake Function	C02.00	DC Hold Current	0~150	%	
	C02.01	DC Brake Current	0~150	%	
	C02.02	DC Braking Time	0.0~60.0	s	
	C02.04	DC Brake Cut in Speed	0.0~400.0	%	
	C02.06	PM Parking current	0 ~ 150	%	100
	C02.07	PMParking 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	Resistor Brake Threshold Voltage	Grid type dependant	V	390/ 700/ 770
	C02.15	Over-voltage Control Threshold Voltage	Grid type dependant	V	395/ 710/ 780
	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
	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	Par. No.	NameName	Range	Unit	Default
Par. Group 03: Reference/Ramps	C03.00	Reference Range	0: 0~Max 1: -Max~+Max		0
	C03.03	Maximum Reference	0.0 -6553.5		50.0
	C03.07	Main Reference Calculation	0: Presetreference + Reference source1, 2, 3 1: Presetreference priority		5.0
	C03.10	PresetReference	-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	Speed Up/Down Value	0.01~50.00	Hz	0.10
	C03.14	Preset RelativeReference	-100.00~100.00	%	0.00
	C03.15	Reference Source1	0: No function 1: Terminal VI 2: Terminal AI 11: Local bus 21: LCP potentiometer		0
	C03.16	Reference Source2			2
	C03.17	Reference Source3			0
	C03.18	Relative Reference Source			0
	C03.19	Speed Up/Down Value Store	0: No function 1: Stop save 2: Power down save		0
	C03.39	Acceleration and deceleration time accuracy	0:0.1; 1:0.01;		1
	C03.40	Ramp 1 Type	0: Linear 2: S ramp		0
	C03.41	Ramp 1 Ramp Up Time	0.05~655.35	s	*

Par. Group	Par. No.	NameName	Range	Unit	Default
Par. Group 03 Reference/Ramps	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	*

Par. Group	Par. No.	NameName	Range	Unit	Default
Par. Group 04 Limits/Warnings	*C04.10	Motor Speed Direction	0: Clockwise 1: Counter clockwise 2: Both directions		2
	*C04.12	Motor Speed Low Limit	0.0~C04.14	Hz	0.0
	*C04.14	Motor Speed High Limit	C04.12~C04.19	Hz	65.0
	C04.18	Current Limit	0~300	%	150
	*C04.19	Max Output Frequency	0.0~400.0	Hz	65.0
	*C04.21	Frequency Upper Limit Source	0: No function 1: Terminal VI 2: Terminal AI 11: Local bus 21: LCP potentiometer		1

Par. Group	Par. No.	NameName	Range	Unit	Default
Par. Group 04 Limits/Warnings	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	0.0-Imax(C16.37)	A	0.0
	C04.51	Warning Current High	0.0-Imax(C16.37)	A	*
	C04.52	Warning Frequency Low	0.0~400.0	Hz	0.0
	C04.53	Warning Frequen-cyHigh	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
	C04.61	Bypass Speed From	0.0~400.0	Hz	0.0
	C04.63	Bypass Speed to	0.0~400.0	Hz	0.0

Par. Group	Par. No.	NameName	Range	Unit	Default
Par. Group 05: Digital In/Out	C05.04	DI Filter Time	2~16	ms	4
	C5.05	DI logic	0 ~ 255		0
	C5.06	DO/RL terminal logic function	0 ~255		0
	C5.09	External alarm function	0: Null; 1: Freeze output frequency 2: Stop; 3: Jog frequency run; 4: Max frequency run; 5: Stop and alarm;		
	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 23: Set-up select 28: Catch up 29: Slow down 34: Ramp bit0		8
	C05.11	Terminal REV			0
	C05.12	Terminal DI1			0
	C05.13	Terminal DI2			0

Par. Group	Par. No.	Name	Range	Unit	Default
Par. Group 06: AnalogIn/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	4
	C06.13	Terminal VI High Current	C06.12~20.00	mA	20.00
	C06.14	Terminal VI Low Ref./Feedb. Value	-200.00 - 200.00	%	0.00
	C06.15	Terminal VI High Ref./Feedb. Value	-200.00 - 200.00	%	100.00
	C06.16	Terminal VI Filter Time	0.01~10.00	s	0.01
	C06.18	Terminal VI Zero Dead Band	0.0~20.00	V/ mA	0.00
	C06.19	Terminal VI Mode	0: Voltage mode 1: Current mode		0
	C06.20	Terminal AI Low Voltage	0.00~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	4
	C06.23	Terminal AI High Current	C06.22~20.00	mA	20.00
	C06.24	Terminal AI Low Ref./Feedb. Value	-200.00 - 200.00	%	0.00
	C06.25	Terminal AI High Ref./Feedb. Value	-200.00 - 200.00	%	100.00

Par. Group	Par. No.	Name	Range	Unit	Default
Par. Group 06: AnalogIn/Out	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
	C06.70	Terminal VO Mode	0: 0-20mA 1: 4-20mA 3: 0-10V		3
	C06.71	Terminal VO Analog Output	0~23		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
	C06.81	LCP Pot.Min. Ref.	-200.00 - 200.00	%	0.00
	C06.82	LCP Pot.Max. Ref.	-200.00 - 200.00	%	100.00
	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
	C07.20	Process PID Feedback Source	0: No function 1: Terminal VI 2: Terminal AI 11: Local bus		0
	C07.30	Process PID Normal/ Inverse	0: Normal 1: Inverse		0

Par. Group	Par. No.	Name	Range	Unit	Default
Par. Group 07: AnalogIn/Out	C07.31	Process PID Anti Windup	0: Disable 1: Enable		0
	C07.32	Process PID Start	0.0~200.0	Hz	0.0
	C07.33	Process PID Proportional Gain	0.00~10.00		10.00
	C07.34	Process PID Integral Time	0.10 - 655.35	s	12.00
	C07.35	Process PID Differentiation Time	0.00~10.00	s	0.00
	C07.38	Process PID Feed Forward Factor	0~400	%	0
	C07.39	On Reference Bandwidth	0~200	%	0
	C07.41	Process PID Output Low	-100~100	%	0
	C07.42	Process PID Output High	-100~100	%	100
Par. Group 08: AnalogIn/Out	C08.01	Control Site	0: Digital and control word 1: Digital only 2: Control word only		0
	C08.02	Control Word Selection	0: Disable 1: Enable		1
	C08.03	Control Word Timeout Time	0.01 - 650.00	s	1.0
	C08.04	Control Word Timeout Function	0: Off 1: Freeze output 2: Stop 3: Jogging 4: Max. speed 5: Stop and trip		0
	C08.06	Reset Control Word Timeout	0: Do not reset 1: Do reset		0
	C08.20	Diagnostic function	0: off; 1: start		1

Par. Group	Par. No.	Name	Range	Unit	Default
Par. Group 08: AnalogIn/Out	C08.30	Protocol	0: FC 2: Modbus RTU 6: Modbus ASCII		2
	C08.31	Address	0~247		1
	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)		0
	C08.35	Min. Response Delay	0.001~0.500	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	Modbus 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		3
	C08.53	Start Select			3
	C08.54	Reversing Select			3
	C08.55	Set-up Select			3
	C08.56	Preset Reference Select			3

Par. Group	Par. No.	Name	Range	Unit	Default
Par. Group 14: SpecialFunctions	C14.01	Switching Frequency	2~6: 2~6kHz 7: 8kHz 8: 10kHz 9: 12kHz 10: 16kHz	kHz	*
	*C14.03	Overmodulation	0: Off 1: On		1
	C14.08	Damping Gain Factor	0~200	%	96
	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 RestartWhen 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		10
	C14.21	Automatic Restart Time	0~600	s	10

Par. Group	Par. No.	Name	Range	Unit	Default
Par. Group 14: SpecialFunctions	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
	C14.27	Action at Drive Fault	0: Trip 1: Warning		1
	C14.30	Current Controller 1 Proportional Gain	0~300	%	100
	C14.31	Current Controller 1Integration Time	0.005~2.000	s	0.020
	C14.32	Current Controller Filter Time	2.0~100.0	ms	10.0
	C14.33	Current Controller 2 Proportional Gain	0~300	%	0
	C14.34	Current Controller 2Integration Time	0.001~2.000	s	0.020
	*C14.40	VT Level	40~90	%	90
	*C14.41	AEO Min. Magnetisation	40~75	%	66
	*C14.50	RFI Filter Selection	0: Off 1: On 2: Reserved		1
	*C14.51	DC Link Compensation	0: Off 1: On		0
Par. Group 15: SpecialFunctions	C15.00	Operating Days	0~9999	d	
	C15.01	Running Hours	0~60000	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

Par. Group	Par. No.	Name	Range	Unit	Default
	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		
	C15.38	Warning Code	0~255		
	C15.43	Software Version			
Par. Group 16: DataReadouts	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		
	C16.04	Active Set-up	0: Set-up 1 1: Set-up 2 2: Multi Set-up		
	C16.05	Motor Speed	0~9999	rpm	
	C16.09	Custom Readout	0.00~9999.00		
	C16.10	Output Power	0.00-655.35	kW	
	C16.11	Output Power	0.00-655.35	hp	
	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	-200.00-200.00	%	
	C16.18	Motor Thermal	0~100	%	
	C16.30	DC Link Voltage	0~65535	V	
	C16.34	IGBT Temperature	0~65535	℃	
	C16.35	Drive Thermal	0~255	%	
	C16.36	Drive NominalCurrent	0.0-6553.5	A	
	C16.37	Drive Max. Current	0.0-6553.5	A	
	C16.48	Power Board Temperature	-128~127	℃	

Par. Group	Par. No.	Name	Range	Unit	Default
Par. Group 16: DataReadouts	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	-200.00~200.00	%	
	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		
	C16.71	Relay Output	0~65535		
	C16.72	Counter A	0~65535		
	C16.73	Counter B	0~65535		
	C16.78	Analog Output AO	0.00~20.00	mA	
	C16.86	Communication Reference	-32768~32767		
	C16.90	Alarm Word 1	0~0xFFFFFFFF-FUL		
	C16.91	Alarm Word 2	0~0xFFFFFFFF-FUL		
	C16.92	Warning Word 1	0~0xFFFFFFFF-FUL		
	C16.93	Warning Word 2	0~0xFFFFFFFF-FUL		
	C28.00	Run/Stop control mode for Air Com-mressor	0 ~ 1		0

Par. Group	Par. No.	Name	Range	Unit	Default
Par. Group28 Air Commpressor Application	C28.01	Start Delay Overload Time	2 ~ 300	S	20
	C28.02	Stop Delay Time	2 ~ 300	S	10
	C28.03	Restart Delay Time For Stop	2 ~ 300	s	80
	C28.04	Temperature Sensor Lower Value	-50 ~ C28.28	℃	-20
	C28.05	Temperature Sensor Upper Vaue	C28.26 ~ 250	℃	150
	C28.06	Pressure Sensor Lower Value	0.0 ~ C28.13	Mpa	0.00
	C28.07	Pressure Sensor Upper Value	C28.26 ~ 2.00	Mpa	1.60
	C28.08	Prerun Frequency	0 ~ C4.14	Hz	30.0
	C28.09	Auto Control For Air	0 ~ 1		0
	C28.10	Over/down Load Control Mode	0 ~ 1		0
	C28.11	Stop Time For Noload	0 ~ 7200	s	1
	C28.12	Noload Frequency	0.0 ~ C28.08	Hz	25.0
	C28.13	Overload Pressure	0.00 ~ C28.15	Mpa	0.5
	C28.14	DownLoad Pressure	C28.15 ~ C28.26	Mpa	0.82
	C28.15	Set Pressure	C28.13 ~ C28.14	Mpa	0.80
	C28.16	Start Pressure	C28.06 ~ C28.15	Mpa	0.50
	C28.17	Start Frequency	C28.19 ~ 400.0	Hz	50.0
	C28.18	End Pressure	C28.15 ~ C28.07	Mpa	0.80
	C28.19	End Frequency	C28.12 ~ C28.17	Hz	40.0
	C28.20	Oil filter run limit time	0 ~ 6000	h	500
	C28.21	Oil run limit time	0 ~ 6000	h	4000
	C28.22	Null filter run limit time	0 ~ 6000	h	4000
	C28.23	Air pressure warning	C28.14 ~ C28.24	Mpa	0.84
	C28.24	Air pressure limit	C28.23 ~ 1.60	Mpa	0.86

Par. Group	Par. No.	Name	Range	Unit	Default
Par. Group28 Air Commpressor Application	C28.25	Temperature warning	C28.27 ~ C28.26	℃	105
	C28.26	Temperature limit	C28.25 ~ 150	℃	110
	C28.27	Fan start temperature	C28.28 ~ C28.25	℃	80
	C28.28	Fan stop temperature	0 ~ C28.27	℃	70
	C28.29	Temperature sensor error time	1 ~ 200	s	40
	C28.30	Pressure sensor error time	1 ~ 200	s	40
	C28.31	User password	0 ~ 9999		0
	C28.32	Use parameter password	0 ~ 9999		0
	C28.33	Null filter time clear	0 ~ 1		0
	C28.34	Oil filter time clear	0 ~ 1		0
	C28.35	Oil time clear	0 ~ 1		0
	C28.36	Change run time	0 ~ 1		0
	C28.37	Grease clear	0 ~ 1		0
	C28.38	Lube clear	0 ~ 1		0
	C28.39	Pressure uprate indicate	0 ~ 10.000	Mpa	0
	C28.40	Run total time	0 ~ 60000	h	0
	C28.41	Load run total time	0 ~ 60000	h	0
	C28.42	Stop count time (Downloas)	0 ~ 300	s	10
	C28.43	Start delay load time	0 ~ 300	s	20
	C28.44	Stop delay load time	0 ~ 300	S	80
	C28.45	Null oil run time count	0 ~ 6000	h	0
	C28.46	Oil filter run time count	0 ~ 6000	h	0
	C28.47	Oil run time count	0 ~ 6000	h	0
	C28.48	Current Feedback pressure	0.00 ~ 1.60	Mpa	0
	C28.49	Current temprature	-50 ~ 250	℃	0

Par. Group	Par. No.	Name	Range	Unit	Default
Par. Group28 Air Commpressor Application	C28.50	Systerm status message	0 ~ ffffffffh		0
	C28.51	Hand/auto	0: hand; 1:auto		1
	C28.52	Load/Download	0:Download;1:Load		0
	C28.53	Stop/Start	0: fan stop; 1:fan run		0
	C28.54	Null load stop time count	0 ~ 3600	s	0
	C28.55	Max run time	0 ~ 10000	h	0
	C28.56	Rott change	0 ~ 1000	Rpm	0
	C28.57	System Current message	0 ~ 6553.5	A	0
	C28.58	Main indicator Para	[0] Output current; [1] Dc-voltage [2]Max Temperature [3] Output frequency below max current [4] Software version		C28.58[0]:0;C28.58[1]:545;C28.58[2]:0;C28.58[3]:0;C28.58[4]:*
	C28.59	Assist indicator Para	[0] Dc-voltage; [1] Output current; [2] Internal fault;[3]Output frequency; [4]AI input current		C28.59[0]:545;C28.59[1]:0;C28.59[2]:0;C28.59[3]:0;C28.59[4]:0
	C28.60	Current standard	0 ~ 200	%	0
	C28.61	Delay time	0.0 ~ 20.0	s	10

Par. Group	Par. No.	Name	Range	Unit	Default
Par. Group28 Air Commpressor Application	C28.62	Frequency set value	0.0 ~ C04.14	Hz	50
	C28.63	Comm/Hand load control	0 ~1		0
	C28.64	Grease run time count	0 ~ 6000	h	0
	C28.65	Lube run time count	0 ~ 6000	h	0
	C28.66	PM enable frequency rate	1.0 ~ 10.0		7.0
	C28.67	Indicator Para initial-ize	0 ~ 65535		0
	C28.68	Warning function Select	0 ~ 1		0
	C28.69	PM current angle	1 ~ 200	%	100
	C28.70	Power adjust coef-ficient	0 ~ 200	%	100
	C28.71	Current adjust coef-ficient	0 ~ 200	%	100
	C28.72	Intelligent pressure constant function	[0]:0.01 ~ 0.50Mpa/s; [1]: 0.01 ~ 0.50Mpa/s [2]: 0.01% ~ 100.00% [3]:0.01% ~ 100.00% [4]:0.20 ~ 10.00s [5]: 0.00 ~ 1.00Mpa		[0]: 0.00 Mpa/s; [1]: 0.01 Mpa/s; [2]: 10.00 % [3]: 25.00 %; [4]: 0.24s; [5]: 0.40 Mpa
	C28.73	Sleep keep time count	1 ~ 3600	s	5
	C28.74	Sleep keep time limit	1 ~ 3600	s	5
	C28.75	Grease run time	0 ~ 6000	h	2000
	C28.76	Lube run time	0 ~ 6000	h	2000

Par. Group	Par. No.	Name	Range	Unit	Default
Par. Group28 Air Commpressor Application	C28.77	Fantarger temperature	0 ~ 150	℃	75
	C28.78	PM Parking current gain	1.0 ~ 20.0		5.0
	C28.79	Air compressor factory serial number	C28.79[0]:0; C28.79[1]:0; C28.79[2]:0; C28.79[3]:0; C28.79[4]:0; C28.79[5]:0; C28.79[6]:0;		0 ~ 2147483647
	C28.80	Once energy Kwh	0.0 ~ 99999999.9	kwh	0.0
	C28.81	Total energy Kwh	0.0 ~ 999.9	kwh	0.0
	C28.82	Total enerfyMwh	0.0 ~ 999999999	Mwh	0
	C28.83	Current electric RMB/kwh	0.00 ~ 100.00	/Kwh	0.0
	C28.84	Current energy total Price	0.0 ~ 999.9	RMB	0.0
	C28.85	Current energy total price	0.0 ~ 65536	KRMB	0.0
	C28.86	Motor service oefficient	0.10 ~ 100.00		1
	C28.87	Motor power	0.00 ~ 600.00	kw	*
	C28.88	Electric power reset	0 ~ 1		0
	C28.89	Sleep test frequency range	0.0 ~ 50.0	Hz	2.0
	C28.93	Running Total Counter	0~3600		
	C28.94	Sleep load/download mode	0 ~ 2		2
	C28.95	Stop download frequency	C28.12 ~ 400.0	Hz	400.0
	C28.96	Once run time(unit：h)	0 ~ 65535	h	0
	C28.97	Once run time(unit: Min)	0 ~ 59	Min	0
	C28.98	Total run time(unit: Min)	0 ~59	Min	0

Par. Group	Par. No.	Name	Range	Unit	Default
	C28.99	Total laod time(unit: Min)	0 ~ 59	Min	0
Par. 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

Par. Group	Par. No.	Name	Range	Unit	Default
	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

Par. Group	Par. No.	Name	Range	Unit	Default
	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

Par. Group	Par. No.	Name	Range	Unit	Default
	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

Note: Reference signed with "*"inPar. No. column means this parameter can't be modified when the motor is running. In factory setting column, "*" means the default setting for this parameter is determined by the drive type.

Chapter 6 Parameter Description

6.1 Group 00: Operation/Display

C00.0* Basic Settings

Par. No.	Name	Range	Unit	Default
*C00.03	Regional Settings	0: 50Hz 1: 60Hz		100.00

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, C01.33, C01.35.

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

C00.1* Set-up Operations

Define and control the individual parameter setups.
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.

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

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 notbe 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 viadigital 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).

C00.3* LCP Custom Readout

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		0.00

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	0~4095		0

The LCP is fixed to display the output frequency、reference and motor current (switch by ◄ key). This parameter is used to show another 11 basic operating states of the drive, each states corresponds to a binary code : “1” means display the item, “0” means does not display the item. For example, if you want to display the states of the temperature and the terminal VI on LCP. Transform the binary code to decimal digit, C00.33=1×23+1×27=136.

Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Custom Readout	Pulse Output	Pulse Input	AI	VI	Counter B	Counter A	Feedback Value	Temperature	DC-Voltage	Motor Speed	Motor Voltage
0	0	0	0	1	0	0	0	1	0	0	0

C00.4* LCP Keypad

Enable, disable individual keys on the LCP.

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

0: Disabled, No effect when HAND key is pressed. Select [0] Disabled to avoid accidental start of the drive in Hand operation mode;

1: Enabled, HAND key is functional;

Par. No.	Name	Range	Unit	Default
C00.41	OFF Key Option	0: Disabled 1: Enabled 2: Enabled reset only		0

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, avoids accidental start of the drive in AUTO operation mode;

1: Enabled, AUTO key is functional;

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

"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 Potentiometer Step	0: 0.1 1: 1 2: 10		0

This parameter determines the reference value increase or decrease when the LCP potentiometer rotates.

C00.5* Copy/Save

Par. No.	Name	Range	Unit	Default
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

0: No copy;

1: Copy from set-up 1, Copies all parameters in the Set-up 1 to the edit set-up (defined in C00.11);

2: Copy from set-up 2, Copies all parameters in the Set-up 2 to the edit set-up (defined in C00.11);

9: Copy from factory setting, Copies factory setting to the edit set-up (defined in C00.11);

Attention: Whenselected set-up is thesame to the editset-up,copy function doesn't work; bothLCP and parameter database are locked while copying.

C00.6* Protection

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.

6.2 Group 01: Load and Motor

C01.0* General Settings

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 control in the drive. The process control parameters are set in par. groups 7-2* and 7-3*.

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+		1

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 higher requirements on control performance applications. The main benefit of VVC+ operation is that it uses a robust motor model;

Attention: When V/F control principle is selected, slip compensation and load compensation are invalid; When VVC+ control principle is selected, it includes slip compensation and load compensation itself.

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 undervariable 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 viaC14.41 AEO Minimum Magnetisation;

Par. No.	Name	Range	Unit	Default
*C01.07	Application Configuration Mode	0: No function 1: Wobble		0

This parameter enables a choice of a configuration setting that fits different applications. Wobble function is only valid under speed open loop. If wobble function is selected, parameter C03.00 will be set to “0”.

0: No function;

1: Wobble function, see parameter group C30.*;

Par. No.	Name	Range	Unit	Default
*C01.10	Motor Contruction	0: ASM; 1: SPMSM; 3: Sturation IPMSM		0

This parameter enables a choice of a configuration setting that fits different motor.

0: Asynchronousmotor(ASM);

1: Surface mount type synchronous motor(SPMSM);

3: Sturation embedded type synchronous motor(IPMSM);

Notice: the parameter can’t change in ruuning.

Whentvalue is set 1 or 3, user change C1.24 according t motor model.

C1.29 set 1, system can get some parameters for motor automatically, the value can change motor performance.

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

Function: Set motor damping gain

Par. No.	Name	Range	Unit	Default
*C01.15	Low Speed filter time const	0.01 ~ 20.00	s	0.8

Par. No.	Name	Range	Unit	Default
*C01.16	High Speed filter time const	0.01 ~ 20.00	s	0.8

Par. No.	Name	Range	Unit	Default
*C01.17	Voltage filter time const	0.01 ~ 1.00	s	0.5

C01.2* Motor Date

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

Set the parameters according to the motor nameplate no matter whether V/F control or VVC+ control is adopted.
Changing the value of C01.24,C01.25,C01.26,C01.39, C01.30-C01.37 will be automatically modified to factory settings.

Par. No.	Name	Range	Unit	Default
*C01.29	Automatic Motor Adaption (AMA)	0: Disabled 1: Enable complete AMA 2: Enable reduced AMA 3:BackEMF AMA		0

The AMA function optimises dynamic motor performance by automatically optimising the advanced motor parameters (C01.30 Stator Resistance (Rs) to C01.37d-axis inductance at motor standstill.

Activate the AMA function by pressing HAND key after selecting [1] or [2]. See also the chapter 7.

0: Disabled;

1: Enable complete AMA, Performs AMA of the stator resistance RS,d-axis inductance. Do not select this option if an LC filter is used between the drive and the motor;

2: Enable reduced AMA, Performs a reduced AMA of the stator resistanceRs in the system only.

3: BackEMF AMA, Performs a BackEMF AMA of the Back emf at 1000rpm.

C01.3* Adv.Motor Data

Par. No.	Name	Range	Unit	Default
*C01.30	Stator Resistance (Rs)	Motor dependant	Ω	*

Parameters for advanced motor data. The motor data in C01.30 Stator Resistance (Rs) to C01.37d-axis inductance 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 motorparameters 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
*C01.37	d-axis inductance	Motor dependant	Ω	*

Parameters for advanced motor data. The motor data in C01.30 Stator Resistance (Rs) to C01.37Stator Resistance 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 motorparameters 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.

C01.4* Motor Cable Length

Par. No.	Name	Range	Unit	Default
*C01.40	Back emf at 1000rpm	0~ 9000		*

System can count C01.40auotomatically according to C01.24,C01.25,C01.26. if motor factory can supply true value, please input true value.

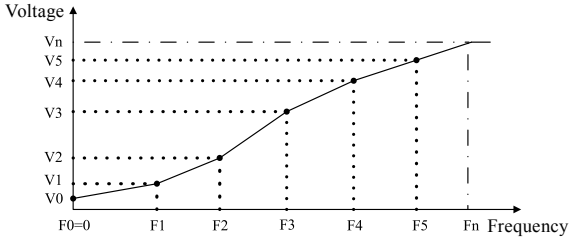
Par. No.	Name	Range	Unit	Default
*C01.42	Motor Cable Length	0~150	m	*

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

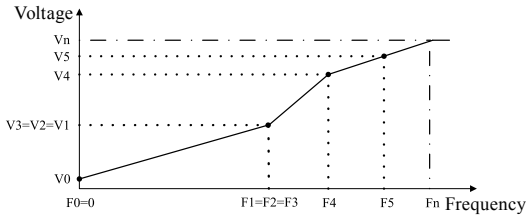
C01.5* Load Indep.Setting

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

Par. No.	Name	Range	Unit	Default
C01.66	The minimum motor current at low speeds	0 ~ 120	%	80

Express minimum input current at low speed

C01.7* Start Adjustments

Par. No.	Name	Range	Unit	Default
C01.71	Start Delay	0.0~10.0	s	0.0

This parameter 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.

Par. No.	Name	Range	Unit	Default
C01.72	Start Function	0: DC Hold 2: Coast		2

Select the start function during start delay. 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] Clockwiseis 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	0.00~10.00	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 C01.76Jump 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, thenaccelerates 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.

C01.8* Stop Adjustments

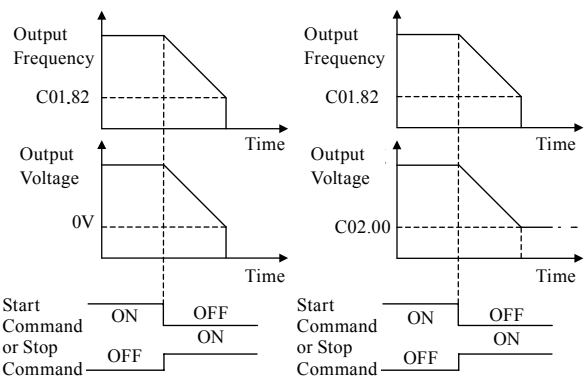
Par. No.	Name	Range	Unit	Default
C01.80	Function at Stop	0: Coast 1: DC Hold		0

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:



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.

C01.9* Motor Temperature

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 self-cooling mode warning 6: ETR self-cooling mode trip		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 IM,N and the rated motor frequency fM,N. 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 self-cooling mode warning(A10)

6: ETR self-cooling mode trip (E.10)

It recommended to enable ETR mode when not installed thermistor

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

C02.0* DC-Brake

Par. No.	Name	Range	Unit	Default
C02.06	PM Parking current	0~150	%	100
C2.07	PM Parking time	0.1 ~ 60.0	s	3

Note: When C01.10 set 1 or 2 , these parameters is valid.

C02.1*Brake Energy Funct.

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 unit.
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 unit.
The following table is theResistor Brake Threshold Voltage's range and default value which depends on C00.06Grid 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

Par. No.	Name	Range	Unit	Default
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

6.4 Group 03: Reference/Ramps

C03.0* Reference Limits

Reference is the drive control target. Reference value is a dimensionless number, reference unit depends on configuration mode (C01.00). When select [0] speed open loop in configuration mode, motor frequency is the drive control target, the reference unit is Hz; When select [4] torque open loop in configuration mode, motor torque is the drive control target, the reference unit is Nm; When select [3] process closed loop in configuration mode, process variable (such as temperature, pressure) is the drive control target, the reference unit may be °C or kg, etc.

Par. No.	Name	Range	Unit	Default
C03.00	Reference Range	0: 0~Max 1: -Max~+Max		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		50.000

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		0

Select main reference calculation method.

0: Preset reference + reference source1, 2, 3

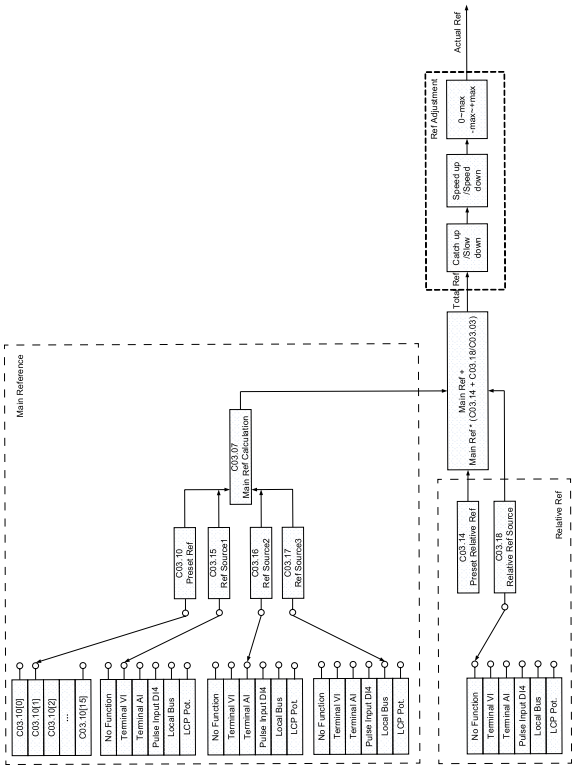
1: Preset reference priority

For option [1],

Main reference = { Preset reference[1-N] when use preset reference 1-N; Preset reference [0] + Reference source 1, 2, 3 when use preset reference 0

C03.1* References

Diagram of Reference Calculation is shown below:



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 local bus. 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	Speed Up/Down Value	0.01~50.00	Hz	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: No function 1: Terminal VI 2: Terminal AI 11: Local bus 21: LCP potentiometer		0
C03.16	Reference Source 2			2
C03.17	Reference Source 3			0

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

0: No function;

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

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

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

21: LCP potentiometer, use LCP potentiometer as reference source, see C06.8*;

Par. No.	Name	Range	Unit	Default
C03.18	Relative Reference Source	0: No function 1: Terminal VI 2: Terminal AI 11: Local bus 21: LCP potentiometer		0

Relative Reference is similar to Preset Relative Reference (see C03.14). It adds a variable value to total reference. Its calculation refers to Reference Calculation Diagram.

0: No function;

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

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

11: Local bus, use local bus reference as relative reference source, see C08.**;

21: LCP potentiometer, use LCP potentiometer as relative reference source, see C06.8*;

Par. No.	Name	Range	Unit	Default
C03.19	Speed 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.

C03.4* Ramp1

There are 4 ramps built in the drive. For each of four ramps (C03.4*, C03.5*, C03.6* and C03.7*), configure the ramp parameters: ramp type, ramp up time and ramp down time.

Par. No.	Name	Range	Unit	Default
C03.39	Acceleration and deceleration time accuracy	0: 0.1; 1: 0.01		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	*
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	*

Ramp Type:

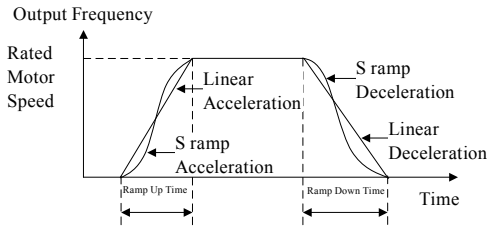
0: Linear, motor ramps up/down with constant acceleration/deceleration;

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:



C03.8* Other Ramps

Par. No.	Name	Range	Unit	Default
C03.80	Jog Ramp Time	0.05-655.35	s	*

Enter the jog ramp time, i.e. the acceleration/deceleration time between 0Hz and the rated motor frequency (C01.25).
Jog ramp time starts upon activation of a jog signal via a selected digital input or serial communication port.

6.5 Group 04: Limits/Warnings

C04.1* Motor Limits

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

elect 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 Low 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 High Limit	C04.12~C04.19	Hz	65.0

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
C04.18	Current Limit	0~300	%	150

This parameter is used to set drive output current limit, 100% equals motor current set in C01.24. 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 11: Local bus 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*;

11: Local bus, use local bus reference as frequency upper limit, see C08.**;

21: LCP potentiometer, use LCP potentiometer as frequency upper limit, see C06.8*;

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

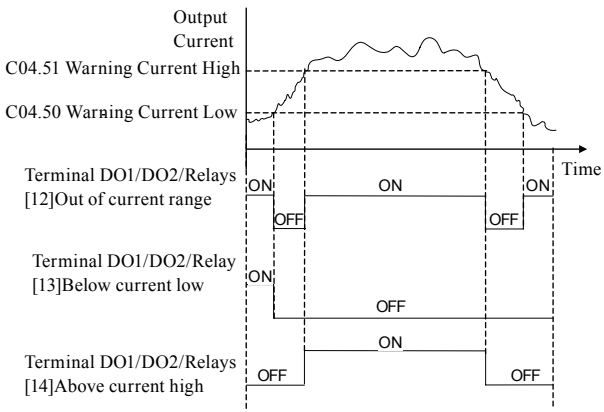
This parameter is used to control whether counter A/B's value is saved at power down.

C04.5* Adjustable Warnings

This parameter group is used to adjust warning limits for current, speed, reference and feedback. Warnings can be programmed as an output or sent via serial bus.

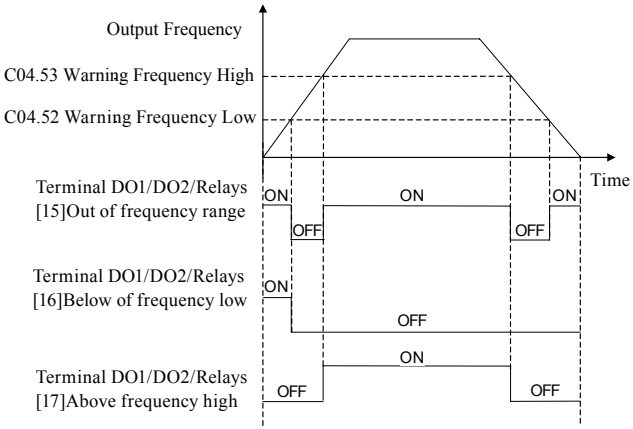
Par. No.	Name	Range	Unit	Default
C04.50	Warning Current Low	0.0-Imax(C16.37)	A	0.0
C04.51	Warning Current High	0.0-Imax(C16.37)	A	*

Enter the I_{low} / I_{high} value. When the motor current falls below I_{low} or exceeds I_{high}, 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

Enter the f_{low} / f_{high} value. When the motor frequency falls below f_{low} or exceeds f_{high}, 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

Enter the low/high reference warning value. When the actual reference falls below C04.54 or exceeds C04.55, a signal can be produced on relays or terminal DO1/DO2. 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

Enter the low/high feedback warning value. When the feedback falls below C04.56 or exceeds C04.57, a signal can be produced on relays or terminal DO1/DO2. 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 (alarm 30, 31 or 32). Select disabled for no missing motor phase alarm. It is strongly recommended to make an active setting to avoid motor damage.

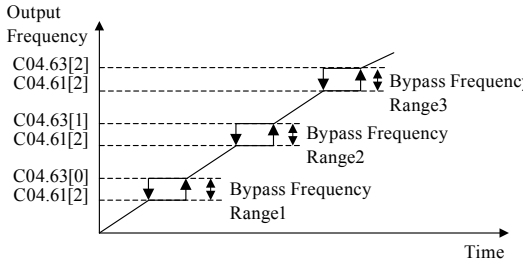
C04.6* Speed Bypass

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:



6.6 Group 05: Digital In/Out

C05.1* Digital Input

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
C05.10	Terminal FOR	0~111		8
C05.11	Terminal REV			0
C05.12	Terminal DI1			0
C05.13	Terminal DI2			0
C05.14	Terminal DI3			0
C05.15	Terminal DI4			0

The digital inputs are used for selecting various functions inthe drive. All digital inputs can be set to thefollowing 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 choicebetween one of the sixteenpreset 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: Speed up, when Speed up is activated for less than 400 ms. the resulting reference will be increased by C03.13 Speed Up/Down Value. If Speed up is activated for more than 400 ms, the resulting reference will ramp according to ramp 4;

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

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

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

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

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

35: Ramp bit1, same as [34];

Terminal of Preset ref. bit1	Preset ref. bit0	Parameter
OFF	OFF	Ramp1 (C03.41, C03.42)
OFF	ON	Ramp2 (C03.51, C03.52)
ON	OFF	Ramp3 (C03.61, C03.62)
ON	ON	Ramp4 (C03.71, C03.72)

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

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

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

60: Counter A, to count the pulse number inputted into the terminal;

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";

100: Air compressor run

101: Oil filter stock

102: Oil stock

103: Null filter stock

104: Load/download control

105: Fan overload fault

106: PTC over temperature fault

107: Emergency

108: user defined warning 1

109: user defined warning 2

110: Close loop invalid

111: External sleep control

C05.3* Digital Output

Par. No.	Name	Range	Unit	Default
C05.30	Terminal DO1	0~120		0
C05.31	Terminal DO2			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;
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.

C05.4* Relay

Par. No.	Name	Range	Unit	Default
C05.40	Relay Function	0~120		5, 9

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

0: No operation;

1: Drive ready, the drive control card have 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 Limitand 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 bit11, bit11 in control word is active;

37: Control word bit12, bit12 in control word is active;

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;

51: Drive in HANDstate;

52: Drive in AUTOstate;

53: No alarm;

56: Drive in HANDstate;

57: Drive in AUTOstate;

115: Load/Download control

116: Fan control

117: Fan overload fault

118: Pressure sensor fault

119: Temperature senseor fault

6.7 Group 06: Analog In/Out

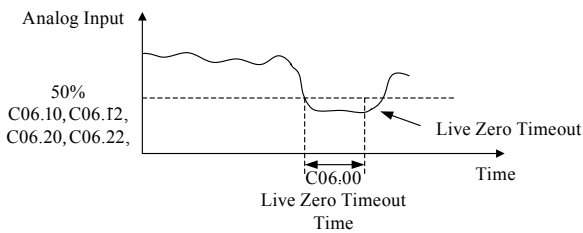
C06.0* Analog I/O Mode

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 C06.00Live Zero Timeout Time, this feature takes effect.

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

Diagram of Live Zero Timeout Function is shown below:



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;

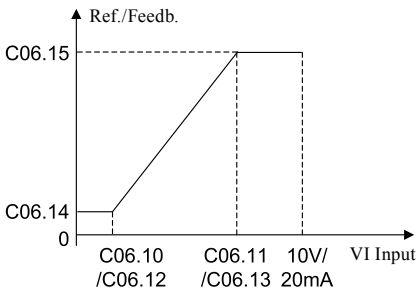
5: Stop and trip, overruled to stop with subsequent trip.

C06.1*Analoge Input VI

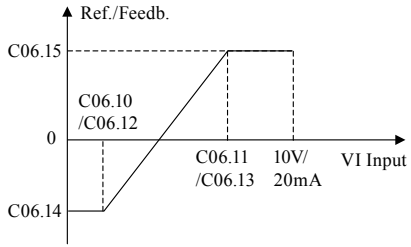
Parameters for configuring the scaling and limits for analog input VI.

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	4
C06.13	Terminal VI High Current	C06.12~20.00	mA	20.00
C06.14	Terminal VI Low Ref./ Feedb. Value	-200.00 - 200.00	%	0.00
C06.15	Terminal VI High Ref./ Feedb. Value	-200.00 - 200.00	%	100.00

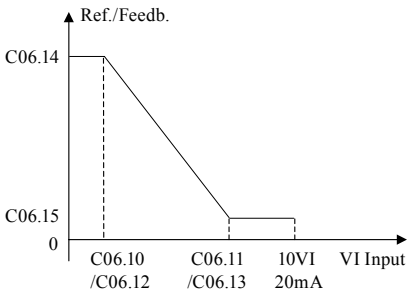
C06.10is used to set low voltage input;C06.12is used to set low current input; The low voltage and current analog input scaling value corresponds to the lowref./feedb. value, set in C06.14.
C06.11is used to set high voltage input;C06.12is used to set high current input; The high voltage and current analog input scaling value corresponds to the high ref./feedb. value, set in C06.15.
There are 4 kind of curves between terminal VI input voltage/current and its scale value:



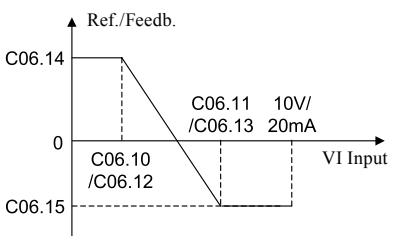
C06.14 < C06.15and C06.14 >= 0



C06.14 < C06.15 and C06.14 < 0



C06.14 > C06.15 and C06.15 >= 0



C06.14 > C06.15 and C06.15 < 0

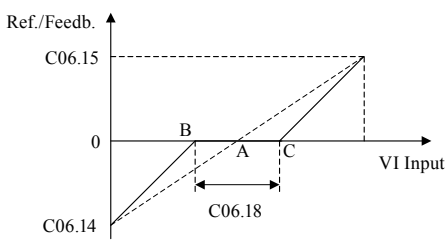
Terminal VI reference/feedback value calculated as follows:
If C06.10 <= VI Input<= C06.11,
VI Ref./Feedb.Value = (C06.15 - C06.14) ÷ (C06.11 - C06.10) × (VI input - C06.10) + C06.14;
If VI Input< C06.10,
VI Ref./Feedb.Value= C06.14;
If VIInput> C06.11,
VI Ref./Feedb.Value= C06.15;
Note: Above formulasare 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/feedback values. After setterminal VI zero dead band, UAB=UAC=C06.18/2. If the VI input is between B and C, the VI reference/feedback 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.

C06.2* Analog Input AI

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	4
C06.23	Terminal AI High Current	C06.22~20.00	mA	20.00
C06.24	Terminal AI Low Ref./Feedb. Value	-200.00~ 200.00	%	0.00
C06.25	Terminal AI High Ref./Feedb. 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.

C06.7* Analog Output VO

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.
Attention: This parameter is in relation with the jumper switch, if voltage output is selected, junmper swith J2 leg1, 2 should be asserted on; if current output is selected, junmper swith J2 leg2, 3 should be asserted on.

Par. No.	Name	Range	Unit	Default
C06.71	Terminal VO Analog Output	0~23		0

Select choices of the analog output VO.

Option	Function	Scale
0	No Function	
10	Output Frequency	0% = 0Hz, 100% = 200Hz

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

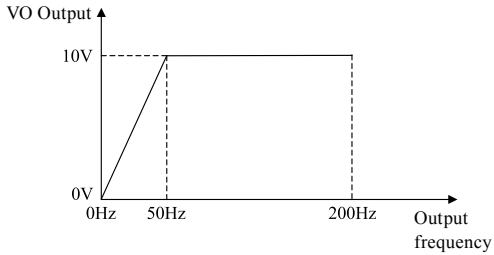
12	Feedback	
13	Output current	0% = 0, 100% = C16.37
16	Power	0% = 0, 100% = C01.20
17	Speed	0% = 0, 100% = C01.25
18	Motor Voltage	0% = 0, 100% = C01.22
20	Bus Control	
21	Pulse Input	0% = C05.55, 100% = C05.56
22	Terminal VI Input	0% = C06.10/C06.12, 100% = C06.11/C06.13
23	Terminal AI Input	0% = C06.20/C06.22, 100% = C06.21/C06.23
26	DC Link Voltage	0% = 0V, 100% = 1000V

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

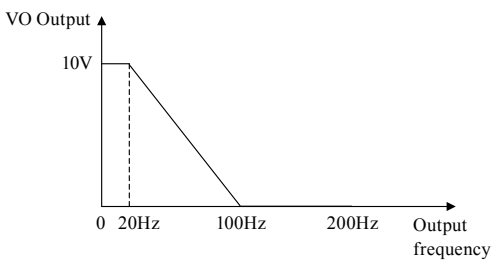
Scale minmum/maximum output of selected ananlog signal at terminal VO as percentage of minmum/maximum signal value.
VO Output Min./Max. is related with VO mode:

VO Mode	VO Output Min.	VO Output Max.
0~20mA	0mA	20mA
4~20mA	4mA	20mA
0~10V	0V	10V

For example:
Set C06.70 = 3 (0~10V), C06.71 = 10 (output frequency, Scale: 0% = 0Hz, 100% = 200Hz), if C06.73 = 0.00% (0Hz), C06.74 = 25.00% (50Hz), relationship between the output frequency and VO output is shown below:



If C06.73 = 50.00% (100Hz), C06.74 = 10.00% (20Hz), relationship between the output frequency and VO output is shown below:



C06.8* LCP Potentiometer

The LCP Potentiometer can be select either as reference resource or relative reference source.

Par. No.	Name	Range	Unit	Default
C06.81	LCP Pot. Min. Ref.	-200.00 ~200.00	%	0.00
C06.82	LCP Pot. Max. Ref.	-200.00 ~200.00	%	100.00

These parameters are used to set the minimum/maximum reference of LCP Potentiometer. The reference of LCP potentiometer's per division depends on the set of the C00.47 LCP potentiometer step.

C06.9* Analog Output AO

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

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

6.8 Group 07: Controllers

C07.1* Torque PI Control

Parameters for configuring the torque PI control in torque open loop (C01.00 Configuration Mode).

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.

C07.2* Process PID Feedback

Par. No.	Name	Range	Unit	Default
C07.20	Process PID Feedback Source	0: No function 1: Terminal VI 2: Terminal AI 11: Local bus		2

Select source of feedback signal.

C07.3* Process PID Control

This parameter is active in closed loop process control mode (See C01.00 Configuration Mode).

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

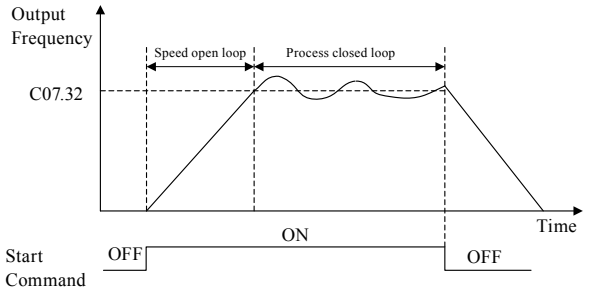
This function ensures the output frequency reaches to frequency limit. PID-controller will be initialized to the current frequency when the output frequency can not be changed. This can prevent the integrator continue to integrate on an error when the PID-controller can't adjust output frequency.

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		10.00

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	0.10 ~655.35	s	12.00

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 Differentiation Time	0.00~10.00	s	0.00

Enter the PID differentiation 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
C07.38	Process PID Feed Forward Factor	0~400	%	0

Enter the PID feed forward (FF) factor. The FF factor sends a constant fraction of the reference signal to bypass the PID control, so the PID control only affects the remaining fraction of the control signal. Any change to this parameter will thus affect the motor speed. When the FF factor is activated it provides less overshoot, and high dynamics when changing the set point.

Par. No.	Name	Range	Unit	Default
C07.39	On Reference Bandwidth	0~200	%	0

Enter the On Reference Bandwidth. When the PID Control Error (the difference between the reference and the feedback) is less than the set value of this parameter, the PID control stops.

Par. No.	Name	Range	Unit	Default
C07.41	Process PID Output Low	-100~100	%	0
C07.42	Process PID Output High	-100~100	%	100

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

6.9 Group 08: Communication

C08.0* Comm. General Settings

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

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

Communication control word is the control command sent by drive, it is 16-bit fixed-length (a word). It can be set by written register (address 2809) or coils (address 0~15) via ModBus or FC protocol. For the meaning of control word each bit, please refer to register 2810 and coils 0~15 description in appendix A Modbus Communication Specification.

0: Digital and control word, control by using both digital input andcontrol word;

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

2: Control word only, control by using control word only;

Par. No.	Name	Range	Unit	Default
C08.02	Control Word Selection	0: Disable 1: Enable		1

This parameter is used to select whether the control word is active or not.

Par. No.	Name	Range	Unit	Default
C08.03	Control Word Timeout Time	0.01~650.00	s	1.0

Enter the maximum time expected to pass between the reception of two consecutivetelegrams. If this time is exceeded, it indicates that the serial communicationhas stopped. The function selected in C08.04 Control Word Timeout Function willthen be carried out. The time-out counter is triggered by a valid control word.

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

Select the time-out function. The time-out function activates when the control word fails to be updated within the time period specified in C08.03 Control Word 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 Control Word Timeout	0: Do not reset 1: Do reset		0

Resetting control word timeout will remove any timeout function. After control word timeout occurs, a control word 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 control word timeout.

0: Do not reset, control word timeout is not reset;

1: Do reset, control word timeout is reset;

Par. No.	Name	Range	Unit	Default
C08.20	Diagnostic function	0: Off 1: On		0

The parameters will enable internal diagnostic function.

C08.3* Port Setting

Par. No.	Name	Range	Unit	Default
C08.30	Protocol	0: FC 2: Modbus RTU 6: Modbus ASCII		2

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	bit/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)	bit/s	0

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

Par. No.	Name	Range	Unit	Default
C08.35	Min. Response Delay	0.001~0.500	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	Modbus 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 Modbus WRITE instruction are saved or not at power down.

C08.5* Digital/Bus

This parameter only active only when C08.01 Control site is set to [0] digital and control word.

Par. No.	Name	Range	Unit	Default
C08.50	Coasting Select	0: Digital input 1: Bus 2: Logic AND 3: Logic OR		3
C08.53	Start Select			3
C08.54	Reversing Select			3
C08.55	Set-up Select			3
C08.56	Preset Reference Select			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 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 asignificant 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 making the DC loop signal more smooth.

C14.1* Mains On/Off

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
C14.16	Low Voltage Mode	0: Disable 1: Enable		0

If the power input voltage is low, enable low voltage mode can improve load capacity. If the voltage is 15% lower, enable low voltage mode can make the drive afford long-term full load; If the voltage is 20% lower, the drive needs to down load; If the voltage is normal, do not enable the low voltage mode, otherwise it will reduce the drive useful life.

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 shorten its life.
Automatic voltage regulation can automatically control the output voltage at the motor's rated voltage when the grid voltage exceed 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).

C14.2* Trip Reset

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		10

Select reset function after tripping.

0: Manual reset, perform reset via “OFF”button or digital inputs;

1~10: Auto reset 1-10times, 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 remaina tripstate. It needs power off and on to reset the trip after shootingfault.
Be attention to select option [13], it may cause infinite auto reset.

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 do not need power off;

1: Enable, trip lock fault reset need power off;

Par. No.	Name	Range	Unit	Default
C14.27	Action at Drive Fault	0: Trip 1: Warning		1

Select how the drive should react at inerter fault (output short circuit,over-current, earth fault or over-voltage).

0: Trip, driveissues an alarmand tripsimmediately if it detects a

fault;

1: Warning, when a fault occurs, drive issues a warning and stops the PWM outputs, and repeatlly try to open the normal PWM, if the fault still can't be removed, the drive issues an alarm and trips.

C14.3* Current Limit Control

The drive contains two current limit controllers. The two controllers will be enabled when the current is over C04.18 current limit.Current controller1 controls current by reducing the output frequency, and current controller2 controls current by reducing the output voltage. Typically only recommended to use current controller1, if it is still unable to control the current in some occasions (such as fast acceleration and deceleration), you can use the current controller2.

Par. No.	Name	Range	Unit	Default
C14.30	Current Controller 1 Proportional Gain	0~300	%	100
C14.31	Current Controller 1 Integration Time	0.005~2.000	s	0.020
C14.32	Current Controller Filter Time	2.0~100.0	ms	10.0
C14.33	Current Controller 2 Proportional Gain	0~300	%	100
C14.34	Current Controller 2 Integration Time	0.001~2.000	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.

C14.4* Energy Optimising

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
*C14.50	RFI Filter Selection	0: Off 1: On 2: Reserved		1

0: Off, only the power supply is IT mains system can select [0] Off. In this mode, the linkage can be reduced;

1: On, to ensure the drive meets EMC standards, select [1] On;

2: Reserved;

Attention: The RFI Filter selection in the model (<=22kW) is not controlled by this parameter, but selected by screwing off/on the RFI switch.

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.

6.11 Group 15: Drive Information

C15.0* Operating Data

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 C15.01Running Hours);

Attention: This parameter can't be set via local bus.

C15.3* Fault Log

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] parameters. It contains aalarm 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
C15.38	Warning Code	0~255		

View the warning code and look up its meaning in chapter 8. This parameter is an array [10] parameters. 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.

C15.4* Drive Identification

Par. No.	Name	Range	Unit	Default
C15.43	Software Version			

View the software version of the drive.

6.12 Group 16: Data Readouts

This parameter group is read-only.

C16.0* General Status

Par. No.	Name	Range	Unit	Default
C16.00	Control Word	0~65535		

View latest valid control word that sent to the drive via local bus.Turn it into 16-bit binary code. For the meaning of eachbits, please refer to register 2809 and coils 0~15 description in appendix A Modbus Communication Specification.

Par. No.	Name	Range	Unit	Default
C16.01	Reference	-4999.0~ 4999.0		

View the actual reference.

Par. No.	Name	Range	Unit	Default
C16.02	Reference	-200.0~200.0	%	

View the actual reference in percentage.

Par. No.	Name	Range	Unit	Default
C16.03	Status Word	0~65535		

View active status word, the following shows the definition for each bit.

Communication Status Word		
Bit	0	1
Bit00	Control Not Ready	Control Ready
Bit0l	Drive Not Ready	Drive Ready
Bit02	Coasting	Enabled
Bit03	No Error	Trip
Bit04	Error	Error Without Trip
Bit05	Undefined	Undefined
Bit06	No Error	Trip
Bit07	No Warning	Warning
Bit08	Not On Reference	On Reference
Bit09	Local Control	Remote Control

Bitl0	Frequency Not In Range	Frequency In Range
Bitll	Stop	Running
Bitl2	Brake Resistor Is Normal	Brake Resistor Fault
Bitl3	Voltage Limit	Out Of Voltage Limit
Bitl4	Undefined	Undefined
Bitl5	No Terminal Warning	Terminal Warning

Par. No.	Name	Range	Unit	Default
C16.04	Active Set-up	0: Set-up 1 1: Set-up 2 2: Multi Set-up		

View the drive active set-up.

Par. No.	Name	Range	Unit	Default
C16.05	Motor Speed	0~9999	rpm	

View motor speed.

Par. No.	Name	Range	Unit	Default
C16.09	Custom Readout	0.00~9999.00		

View the value of user-defined readout corrected from C00.31, C00.32 and C04.14.

C16.1* Motor Status

Par. No.	Name	Range	Unit	Default
C16.10	Output Power	0.00~655.35	kW	

View output power in kW.

Par. No.	Name	Range	Unit	Default
C16.11	Output Power	0.00~655.35	hp	

View output power in hp.

Par. No.	Name	Range	Unit	Default
C16.12	Motor Voltage	0~65535	V	

View motor phase voltage.

Par. No.	Name	Range	Unit	Default
C16.13	Output Frequency	0.0~400.0	Hz	

View output frequency.

Par. No.	Name	Range	Unit	Default
C16.14	Output Current	0.00~655.35	A	

View motor phase current.

Par. No.	Name	Range	Unit	Default
C16.15	Output Frequency	0.0~200.0	%	

View actual output frequency in percentage.

Par. No.	Name	Range	Unit	Default
C16.16	Output Torque	-200.00~200.00	%	

View actual output Torque.

Par. No.	Name	Range	Unit	Default
C16.18	Motor Thermal	0~100	%	

View calculated thermal motor load which is set as percentage of estimated thermal motor load.

C16.3* Drive Status

Par. No.	Name	Range	Unit	Default
C16.30	DC Link Voltage	0~65535	V	

View DC-link voltage.

Par. No.	Name	Range	Unit	Default
C16.34	IGBT Temperature	0~65535	℃	

View the temperature of drive's IGBT Temperature.

Par. No.	Name	Range	Unit	Default
C16.35	Drive Thermal	0~255	%	

View calculated drive thermal load, which is set as a percentage of estimated drive thermal load.

Par. No.	Name	Range	Unit	Default
C16.36	Drive Nominal Current	0.0 ~6553.5	A	

View the drive nominal current.

Par. No.	Name	Range	Unit	Default
C16.37	Drive Max. Current	0.0 ~6553.5	A	

View the drive maximum current.

Par. No.	Name	Range	Unit	Default
C16.38	Simple PLC State	0~255		

View the state of the event under execution by the simple SLC.

C16.4* Application Message

Par. No.	Name	Range	Unit	Default
C16.48	Power Board Temperature	-128~127	℃	

View the rectifier temperature, only active in >=90kW model.

Par. No.	Name	Range	Unit	Default
C16.49	Rectifier Temperature	-128~127	℃	

View the rectifier temperature, only active in >=90kW model.

C16.5* Ref./Feedb.

Par. No.	Name	Range	Unit	Default
C16.50	Main Reference	-200.0~200.0	%	

View sum of all external references in percentage.

Par. No.	Name	Range	Unit	Default
C16.51	Pulse Reference	-200.0~200.0	%	

View pulse input converted to a reference in percentage.

Par. No.	Name	Range	Unit	Default
C16.52	Feedback	-200.00~200.00	%	

View the feedback value.

C16.6*, C16.7* Inputs and Outputs

Par. No.	Name	Range	Unit	Default
C16.60	Digital Input	0~65535		

View signal states from active digital inputs, which indicates in a 16-bit binary code. If the drive detects digital input terminals connected, the corresponding position is set to "1", otherwise "0". Digital input terminal and the corresponding relationship between the binary code are as below:

Bin ary	Term. No.	Binary	Term. No.	Bin ary	Term. No.	Bin ary	Term. No.
bit0	FOR	bit4	DI3	bit8	Reserved	bit12	Reserved
bit1	REV	bit5	DI4	bit9	Reserved	bit13	Reserved
bit2	DI1	bit6	Reserved	bit10	Reserved	bit14	Reserved
bit3	DI2	bit7	Reserved	bit11	Reserved	bit15	Reserved

Par. No.	Name	Range	Unit	Default
C16.61	Terminal VI Setting	0: 0~20mA 1: 0~10V		

View actual state of analog input VI

Par. No.	Name	Range	Unit	Default
C16.62	Analog Input VI	0.00~20.00	V/mA	

View actual input voltage or current value on analog input VI.

Par. No.	Name	Range	Unit	Default
C16.63	Terminal AI Setting	0: 0~20mA 1: 0~10V		

View actual state of analog input AI.

Par. No.	Name	Range	Unit	Default
C16.64	Analog Input AI	0.00~20.00	V/mA	

View actual input voltage or current value on analog input AI.

Par. No.	Name	Range	Unit	Default
C16.65	Analog Output VO	0.00~20.00	V/mA	

View input frequency on pulse input terminal DI4.

Par. No.	Name	Range	Unit	Default
C16.66	Digital Output	0~255		

View actual state of digital output, which indicates in a 4-bit binary code; If the digital output terminal is active, the corresponding position is set to “1”, otherwise “0”. Corresponding relationship betweenstate of the digital output terminals and the binary code are as below:

Binary	bit3	bit2	bit1	bit0
Term. No.	Reserved	Reserved	DO2	DO1

Par. No.	Name	Range	Unit	Default
C16.71	Relay Output	0~65535		

View the output status of the relay, the corresponding bit is set to “1”whenthe relay output is active, otherwise it will be set to “0”.

Binary	bit1	bit0
Item. No.	Relay 2	Relay 1

Par. No.	Name	Range	Unit	Default
C16.72	Counter A	0~65535		

View present value of counter A.

Par. No.	Name	Range	Unit	Default
C16.73	Counter B	0 ~65535		

View present value of counter B.

Par. No.	Name	Range	Unit	Default
C16.78	Analog Output AO	0.00~20.00	mA	

View actual output current on analog output AO.

C16.8* Field bus/FC Port

Par. No.	Name	Range	Unit	Default
C16.86	Communication Reference	-32768~32767		

View the last received reference from communication.

C16.9* Diagnosis Readouts

Par. No.	Name	Range	Unit	Default
C16.90	Alarm Word 1	0~0xFFFFFFFFUL		
C16.91	Alarm Word 2	0~0xFFFFFFFFUL		
C16.92	Warning Word 1	0~0xFFFFFFFFUL		
C16.93	Warning Word 2	0~0xFFFFFFFFUL		

View the alarm/warning word sent via the serial communication port in hex code. Convert this parameter to a 32-bit binary code, definition of the bits in word showed in the table below, among which that reserved by manufacturers are undefined bits:

Bit	Alarm Word1 /C16.90	Alarm Word 2 /C16.91	Warning Word 1 /C16.92	Warning Word 2 /C16.93
0	Brake Detect	Undefined	Undefined	Undefined
1	Power Card Over Temp.	Undefined	Power Card Over Temp.	Undefined
2	Earth Fault	Trip	Earth Fault	Undefined
3	Reserved	Option Part	Undefined	Undefined
4	Control Card Temp	Undefined	Control Card Temp	Undefined
5	Over Current	Undefined	Over Current	Undefined
6	Torque Limit	Undefined	Undefined	Undefined
7	Motor Over Thermal	Undefined	Motor Over Thermal	Undefined
8	Motor Over Thermal ETR	Damaged Part	Motor Over Thermal ETR	Damaged Part
9	DriveOverload	Undefined	Drive Overload	Undefined

10	Under Volt	Undefined	Under Volt.	Undefined
11	Over Volt	Undefined	Over Volt.	Undefined
12	Short Circuit	External Interlock	Undefined	Undefined
13	Undefined	Undefined	Undefined	Undefined
14	Mains Ph. Loss	Undefined	Mains Ph. Loss	Undefined
15	AMA Error	Undefined	No Motor	Undefined
16	Live Zero Error	Undefined	Live Zero Error	Undefined
17	Internal Fault	Undefined	Undefined	Undefined
18	Brake Overload	Fan Fault	Brake Overload	Fan Fault
19	U Phase Loss	Undefined	Undefined	Undefined
20	V Phase Loss	Undefined	Undefined	Undefined
21	W Phase Loss	Undefined	Undefined	Undefined
22	Undefined	Undefined	Undefined	Undefined
23	Control Voltage Fault	Undefined	Undefined	Undefined
24	Undefined	Undefined	Vdd Supply Low	Undefined
25	VDD Supply Low	Undefined	Current Limit	Undefined
26	Brake Resistor Error	Undefined	Undefined	Undefined
27	Brake Transistor Fault	Undefined	Undefined	Undefined
28	Bake Transistor Open Circuit	Undefined	Undefined	Undefined
29	Drive Initialize	Feedback Error	Undefined	Feedback Error
30	Undefined	Undefined	Overload DO1	Undefined
31	Mech. Brake Low	Undefined	Overload DO2	Undefined

6.13 Group 28: Air compressor application function

Par. No.	Name	Range	Unit	Default
C28.00	Run/Stop control mode for Air Compressor	0 ~ 1		0

The parameter only can be changed by communication.

[0] Stop;

[1] Run

When system has fault or has stop command, the parameter can be changed '0' automatically

Par. No.	Name	Range	Unit	Default
C28.01	Start delay load time	2~300	s	20

The parameter impress delay time before load, the time is valid when system pressure is smaller than load pressure. The parameter will can't be changed in running.

Par. No.	Name	Range	Unit	Default
C28.02	Stop delay time	2~300	s	10

Before stop, system will delay some time.The parameter will can't be changed in running.

Par. No.	Name	Range	Unit	Default
C28.03	Restart Delay Time For Stop	2~300	s	80

After stop, when start command is valid, system will delay some time,then system will

enter intostart status. The parameter will can't be changed in running.

Par. No.	Name	Range	Unit	Default
C28.04	Temperature Sensor Lower Value	-50 ~ C28.28	℃	-20

The parameter express temperature sensor low range value for external temperature sensor lower signal.

Par. No.	Name	Range	Unit	Default
C28.05	Temperature Sensor Upper Value	C28.26 ~ 250	℃	150

The parameter express temperature sensor upper range value for external temperature sensor upper signal.

Par. No.	Name	Range	Unit	Default
C28.06	Pressure Sensor Lower Value	0.0 ~ C28.13	Mpa	0.00

The parameter express pressure sensor lower value for external pressure sensor lower signal.

Par. No.	Name	Range	Unit	Default
C28.07	Pressure Sensor Upper Value	C28.26 ~ 2.00	Mpa	1.60

The parameter express pressure sensorupperr value for external pressure sensor upper signal.

Par. No.	Name	Range	Unit	Default
C28.08	Prerun Frequency	0 ~ C4.14	Hz	30.0

Before loading signal is valid, system frequency will smaller than C28.08.

Par. No.	Name	Range	Unit	Default
C28.09	Auto Control For output air pressure value	0 ~ 1		0

[0] the function is invalid.

[1] the function is valid.

Notice: current pressure value is conflicted with C28.15, C28.16 and C28.18 will be adjusted automatically.

Par. No.	Name	Range	Unit	Default
C28.10	Load/unload Control Mode	0 ~ 1		0

[0] local– auto control

[1] remote– DI control

Par. No.	Name	Range	Unit	Default
C28.11	Stop Time For Noload	0 ~ 7200	s	0

When system frequency is equal with null frequency, current pressure is higher than load pressure, the condition is valid always in C28.11, The system will stop. Or current pressure is smaller than load pressure, the system will start. If C28.11 is zero, the function will be invalid.

Par. No.	Name	Range	Unit	Default
C28.12	Noload Frequency	0.0 ~ C28.08	Hz	25.0

View the last received reference from communication.

Par. No.	Name	Range	Unit	Default
C28.13	Load Pressure	0.00 ~ C28.15	Mpa	0.5

Feedback pressure is smaller than C28.13, Load control is valid after the system is start.

Par. No.	Name	Range	Unit	Default
C28.14	Unload Pressure	C28.15 ~ C28.26	Mpa	0.82

Feedback pressure is higher than C28.14, Unload control is valid.

Par. No.	Name	Range	Unit	Default
C28.15	Target Pressure	C28.13 ~ C28.14	Mpa	0.80

The parameter express system target pressure, If C28.09 is '1', C28.15 range will be changed.

Max(C28.13,C28.16)≤C28.15≤Min(C28.14,C28.18)

Par. No.	Name	Range	Unit	Default
C28.16	Start Pressure	C28.06 ~ C28.15	Mpa	0.50

When auto control function is valid for air pressure, the parameter is valid.

Par. No.	Name	Range	Unit	Default
C28.17	Start Frequency	C28.19 ~ 400.0	Hz	50.0

When auto control function is valid for air pressure, the parameter is valid.

C28.16 and C28.17 is matched.

Par. No.	Name	Range	Unit	Default
C28.18	End Pressure	C28.15 ~ C28.07	Mpa	0.80

When auto control function is valid for air pressure, the parameter is valid.

Par. No.	Name	Range	Unit	Default
C28.19	End Frequency	C28.12 ~ C28.17	Hz	40.0

When auto control function is valid for air pressure, the parameter is valid.

C28.18 and C28.17 is matched.

Par. No.	Name	Range	Unit	Default
C28.20	Oil filter run limit time	0 ~ 6000	h	500

The parameter express oil filter running time, when system running time is exceeded the value, thesystem display 'A.20'.

Par. No.	Name	Range	Unit	Default
C28.21	Oil run limit time	0 ~ 6000	h	4000

The parameter express oil running time, when system running time is exceeded the value, thesystem display 'A.19'.

Par. No.	Name	Range	Unit	Default
C28.22	Null filter run limit time	0 ~ 6000	h	4000

The parameter express null filter running time, when system running time is exceeded the value, thesystem display 'A.21'.

Par. No.	Name	Range	Unit	Default
C28.23	Air pressure warning	C28.14 ~ C28.24	Mpa	0.84

When system current pressure is larger than C28.23, the system display“A.37”.

Par. No.	Name	Range	Unit	Default
C28.24	Air pressure limit	C28.23 ~ 1.60	Mpa	0.86

When system current pressure is larger than C28.24, the system display“E.37”.

Par. No.	Name	Range	Unit	Default
C28.25	Temperature warning	C28.27 ~ C28.26	℃	105

When system current temperature is larger than C28.25, the system display “A.39”.

Par. No.	Name	Range	Unit	Default
C28.26	Temperature limit	C28.25 ~ 150	℃	110

When system current temperature is larger than C28.26, the system display “E.39”.

Par. No.	Name	Range	Unit	Default
C28.27	Fan start temperature	C28.28 ~ C28.25	℃	80

When system oil temperature is larger than C28.27, fan is start .C5.40[1] is set 116 ,the function is valid.

Par. No.	Name	Range	Unit	Default
C28.28	Fan stop temperature	0 ~ C28.27	℃	70

When system oil temperature is smaller than C28.28, fan is start .C5.40[1] is set 116 ,the function is valid.

Par. No.	Name	Range	Unit	Default
C28.29	Temperature sensor error time	1 ~ 200	s	40

When the value ‘VI’ is smaller than 3MA, after C28.29, system display ‘E.42’

Par. No.	Name	Range	Unit	Default
C28.30	Pressure sensor error time	1 ~ 200	s	40

When the value ‘VI’ is smaller than 3MA, after C28.29, system display ‘E.43’

Par. No.	Name	Range	Unit	Default
C28.31	User password	0 ~ 9999		255

The parameter must be larger than 0, the parameter can protect user parameter password, when C28.31 = C28.32, C28.32 can changed, at the same time other user parameters can be changed.

Par. No.	Name	Range	Unit	Default
C28.32	User parameter password	0 ~ 9999		255

User can set C28.32 , the password can protect user correlative parameters.

Par. No.	Name	Range	Unit	Default
C28.33	Null filter time clear	0 ~ 1		0

The parameter allow changed when C28.31 = C28.32. at the same time the parameter can't be changed in running.

[0] Invalid;

[1] Null filter time clear

Par. No.	Name	Range	Unit	Default
C28.34	Oil filter time clear	0 ~ 1		0

The parameter allow changed when C28.31 = C28.32. at the same time the parameter can't be changed in running.

[0] Invalid;

[1] Oil filter time clear

Par. No.	Name	Range	Unit	Default
C28.35	Oil time clear	0 ~ 1		0

The parameter allow changed when C28.31 = C28.32. at the same time the parameter can't be changed in running.

[0] Invalid;

[1] Oil time clear

Par. No.	Name	Range	Unit	Default
C28.36	Change run time	0 ~ 1		0

The parameter allow changed when C28.31 = C28.32. at the same time the parameter can't be changed in running.

[0] can't change run time

[1] can change run time

Par. No.	Name	Range	Unit	Default
C28.37	Grease clear	0 ~ 1		0

The parameter allow changed when C28.31 = C28.32. at the same time the parameter can't be changed in running.

[0] invalid

[1] Grease run time clear

Par. No.	Name	Range	Unit	Default
C28.38	Lube clear	0 ~ 1		0

The parameter allow changed when C28.31 = C28.32. at the same time the parameter can't be changed in running.

[0] invalid

[1] Lube run time clear

Par. No.	Name	Range	Unit	Default
C28.39	Pressure uprate indicate	0 ~ 10.000	Mpa	0

When C28.72 is larger than 0, system can monitor pressure uprate per-second,

Par. No.	Name	Range	Unit	Default
C28.40	Run total time	0 ~ 60000	h	0

When C28.36 is 1 , the parameter can be changed. The parameter can monitor system total run time

Par. No.	Name	Range	Unit	Default
C28.41	Load run total time	0 ~ 60000	h	0

When C28.36 is 1 , the parameter can be changed. The parameter can monitor system load total run time

Par. No.	Name	Range	Unit	Default
C28.43	Start delay load time	0 ~ 300	s	20

Only read, monitor parameter

Par. No.	Name	Range	Unit	Default
C28.44	Stop delay load time	0 ~ 300	S	80

Only read, monitor parameter

Par. No.	Name	Range	Unit	Default
C28.45	Null oil run time count	0 ~ 6000	h	0

Only read, monitor parameter

Par. No.	Name	Range	Unit	Default
C28.46	Oil filter run time count	0 ~ 6000	h	0

Only read, monitor parameter

Par. No.	Name	Range	Unit	Default
C28.47	Oil run time count	0 ~ 6000	h	0

Only read, monitor parameter

Par. No.	Name	Range	Unit	Default
C28.48	Current Feedback pressure	0.00 ~ 1.60	Mpa	0

Only read, monitor parameter

Par. No.	Name	Range	Unit	Default
C28.49	Current temprature	-50 ~ 250	℃	0

Only read, monitor parameter

Par. No.	Name	Range	Unit	Default
C28.50	Systerm status message	0 ~ ffffffffh		0

Only read, monitor parameter, the parameter express some status message.

Bit0: '0' stop, '1' run;
Bit1: load delay start;
Bit2: stop unload start;
Bit3: stop restart delay start
Bit4: sleep
Bit5: run(reverse signal)
Bit6: sleep count time start
Bit7: Emergency
Bit8: warning
Bit9: Alarm
Bit10: max running prewarning
Bit11: sleep keep count time start
Bit12: hand load/unload enable status
Bit13: DI external sleep enable

Par. No.	Name	Range	Unit	Default
C28.51	Hand/auto	0: hand; 1:auto		1

Only read, monitor parameter,
[0] hand control;
[1] auto control;

Par. No.	Name	Range	Unit	Default
C28.52	Load/Download	0: Unload;1:Load		0

Only read, monitor parameter,
[0] unload;
[1] load

Par. No.	Name	Range	Unit	Default
C28.53	Stop/Start	0: fan stop; 1:fan run		0

Only read, monitor parameter,
[0] fan stop;
[1] fan run;

Par. No.	Name	Range	Unit	Default
C28.54	Null load stop time count	0 ~ 3600	s	0

Only read, monitor parameter,

Par. No.	Name	Range	Unit	Default
C28.55	Max run time	0 ~ 10000	h	0

The parameter will limit system run time.Whensystem run total time is larger than max run time, after power down, system will can't restart. If the parameter set '0', the function will be invalid.

Par. No.	Name	Range	Unit	Default
C28.56	Rottadjust	0 ~ 1000	Rpm	0

Adjust rott value, C16.05 = rott value + C28.56,

Par. No.	Name	Range	Unit	Default
C28.57	System Current message	0 ~ 6553.5	A	0

Only read, monitor parameter,

Par. No.	Name	Range	Unit	Default
C28.58	Main indicator Para	[0] Output current; [1] Dc-voltage [2]Max Temperature [3] Output frequency below max current [4] Software version		C28.58[0]:0; zC28.58[2]:0; C28.58[3]:0; C28.58[4]:*

Only read, monitor parameter,
System will monitor some status including historical max current and min current;

Par. No.	Name	Range	Unit	Default
C28.59	Assist indicator Para	[0] Dc-voltage; [1] Output current; [2] Internal fault;[3]Output frequency; [4]AI input current		C28.59[0]:545; C28.59[1]:0; C28.59[2]:0; C28.59[3]:0; C28.59[4]:0

Only read, monitor parameter,
The parameter is corresponding with C28.59.
C28.58[0] and C28.59[0] are matched; C28.58[1] and C28.59[1] are matched;
When C28.67 is '4321', C28.58 and C28.59 are clear;

Par. No.	Name	Range	Unit	Default
C28.60	Current standard	0 ~ 200	%	0

Set C28.60 = 0, the function will be invalid, the percent will be adjusted according to motor rated current.

Par. No.	Name	Range	Unit	Default
C28.61	Delay time	0.0 ~ 20.0	s	10

Par. No.	Name	Range	Unit	Default
C28.62	Frequency set value	0.0 ~ C04.14	Hz	50

When motor current is smaller than the value of C28.60 and hold the status during the time of C28.61, Frequency will run according to C28.62.

Par. No.	Name	Range	Unit	Default
C28.63	Comm hand load control	0 ~1		0

The parameter can't be changed by LCP, only can be changed by comm.

[0] unload;

[1] load;

The parameter will be valid when C28.10 = 0, thefuction is valid, DI load function is valide at the same time.

The parameter can be set 0 automatically when power off or current system pressure is larger than unload pressure.

Par. No.	Name	Range	Unit	Default
C28.64	Grease run time count	0 ~ 6000	h	0

Only read, monitor parameter,

When system run time is larger than grease run time, system will display A.71.

Par. No.	Name	Range	Unit	Default
C28.65	Lube run time count	0 ~ 6000	h	0

Only read, monitor parameter,

When system run time is larger than lube run time count, system will display A.72.

Par. No.	Name	Range	Unit	Default
C28.66	PM optimization enable frequency ratio	1.0 ~ 10.0		7.0

The parameter can affect output voltage

Par. No.	Name	Range	Unit	Default
C28.67	Indicator Para initialize	0 ~ 65535		0

When the parameter is set '4321', C28.58 and C28.59 will be set default value.

Par. No.	Name	Range	Unit	Default
C28.68	Warning function Select	0 ~ 1		0

The parameter express warning action mode;

[0] waring display and system keep running.

[1] alarm display ands system stop.

Par. No.	Name	Range	Unit	Default
C28.69	PM current angle	1 ~ 200	%	100

Adjust the parameter value, system can optimize output current.

Par. No.	Name	Range	Unit	Default
C28.70	Power adjust coef-ficient	0 ~ 200	%	100

Adjust to displaying ratio for power.

Par. No.	Name	Range	Unit	Default
C28.71	Current adjust coef-ficient	0 ~ 200	%	100

Adjust to displaying ratio for current.

Par. No.	Name	Range	Unit	Default
C28.72	Intelligent pressure constant function	[0]:0.01 ~ 0.50Mpa/s; [1]: 0.01 ~ 0.50Mpa/s [2]: 0.01% ~ 100.00% [3]:0.01% ~ 100.00% [4]:0.20 ~ 10.00s [5]: 0.00 ~ 1.00Mpa		[0]: 0.00Mpa/s; [1]: 0.01Mpa/s; [2]: 10.00% [3]: 25.00%; [4]: 0.24s; [5]: 0.40Mpa

C28.72[0]: under pressure response sensitivity

When C28.72[0] = 0, Intelligent PI control is invalid.

When current pressure is smaller than target pressure and pressure up/down ratio is higher than C28.72[0], Fout = Fcurrent *(1-C28.72[2]). Fout>=C28.12.

C28.72[1]: under pressure gain suppression

When current pressure is larger than target pressure and pressure up/down ratio is higher than C28.72[1], Fout = Fcurrent *(1-C28.72[3]). Fout>=C28.12.

C28.72[2]: over pressure response sensitivity

C28.72[3]: over pressure gain suppression

C28.72[4]: system response time

C28.72[5]: intelligent constant pressure cracking pressure

When current pressure is larger than C28.72[5], Intelligent PI control is

valid;

Par. No.	Name	Range	Unit	Default
C28.73	Sleep keep time count	1 ~ 3600	s	5

Only read, monitor parameter,
When system enter into sleep status,the parameter start count.

Par. No.	Name	Range	Unit	Default
C28.74	Sleep keep time limit	1 ~ 3600	s	5

The parameter express min time for sleep keep status.

Par. No.	Name	Range	Unit	Default
C28.75	Grease run time	0 ~ 6000	h	2000

When system run time is larger than C28.75, the system will display 'A.71'

Par. No.	Name	Range	Unit	Default
C28.76	Lube run time	0 ~ 6000	h	2000

When system run time is larger than C28.76, the system will display 'A.72'

Par. No.	Name	Range	Unit	Default
C28.77	Fan target temperature	0 ~ 150	℃	75

Par. No.	Name	Range	Unit	Default
C28.78	PM Parking current gain	1.0 ~ 20.0		3.0

Adjust motor current for PM Parking.

Par. No.	Name	Range	Unit	Default
C28.80	Once energy Kwh	0.0 ~ 99999999.9	kwh	0.0

View each saving energy in Kwh

Par. No.	Name	Range	Unit	Default
C28.81	Total energy Kwh	0.0 ~ 999.9	kwh	0.0

View total saving energy in Kwh.

Par. No.	Name	Range	Unit	Default
C28.82	Total enerfyMwh	0.0 ~ 999999999	Mwh	0

View total saving energy in Mwh

Par. No.	Name	Range	Unit	Default
C28.83	Current electric RMB/kwh	0.00 ~ 100.00	/Kwh	0.0

Set current price in RMB

Par. No.	Name	Range	Unit	Default
C28.84	Current energy total Price	0.0 ~ 999.9	RMB	0.0

View saving money in RMB

Par. No.	Name	Range	Unit	Default
C28.85	Current energy total price	0.0 ~ 65536	KRMB	0.0

View saving money in KRMB

Par. No.	Name	Range	Unit	Default
C28.86	Motor service oef-ficient	0.10 ~ 100.00		1

Set motor service ratio according to Motor type.

Par. No.	Name	Range	Unit	Default
C28.87	Motor power	0.00 ~ 600.00	kw	*

Set motor power according to compressor motor type.

Par. No.	Name	Range	Unit	Default
C28.88	Electric power reset	0 ~ 1		028.89

Reset value of saving energy. Eg: C28.80,C28.81,C28.82,C28.84,C28.85.

Par. No.	Name	Range	Unit	Default
C28.89	Sleep test frequency range	0.0 ~ 50.0	Hz	2.0

When sysyte is running and Fout≤ C28.89+C28.12, system will enter into sleep.

Par. No.	Name	Range	Unit	Default
C28.93	Running Total Counter	0 ~ 3600	s	*

The parameter express total running counter time;

Par. No.	Name	Range	Unit	Default
C28.94	Sleep load/unload mode	0 ~ 2		2

The parameter express sleep load/unload mode:

[0] sleep unload;

After system enter into sleep , unload action is valid, After system is woken, system is start from load delay mode.

[1] sleep load;

After system enter into sleep , load action is valid, After system is woken, when current pressure is larger than 0.3Mpa, system is start form normal mode.

[2] unload sleep mode

When system is unload status, and Fout< (C28.12+C28.89), system will enter into sleep timer.

Par. No.	Name	Range	Unit	Default
C28.95	Stop download frequency	C28.12 ~ 400.0	Hz	400.0

After system enter into stop delay mode and Fout<C28.95, system enter into unload.

Par. No.	Name	Range	Unit	Default
C28.96	Once run time(unit：h)	0 ~ 65535	h	0

Only read, monitor parameter,

Par. No.	Name	Range	Unit	Default
C28.97	Once run time(unit: Min)	0 ~ 59	Min	0

Only read, monitor parameter,

Par. No.	Name	Range	Unit	Default
C28.98	Total run time(unit: Min)	0 ~59	Min	0

Only read, monitor parameter,

Par. No.	Name	Range	Unit	Default
C28.99	Total laod time(unit: Min)	0 ~ 59	Min	0

Only read, monitor parameter,

Table(corellativeprameters)

pressure	C28.06 ≤ C28.13 < C28.15 < C28.14 < C28.23 < C28.24 ≤ C28.07
temperature	C28.04 ≤ C28.28 < C28.27 < C28.25 < C28.26 ≤ C28.05
frequency	C4.12≤C28.12≤C28.08≤C04.14
auto control air pressure	C28.06≤C28.16≤C28.15; C28.15≤C28.18≤C28.07; C28.12≤C28.19≤C28.17≤C04.14; MAX（C28.13，C28.16）≤C28.15≤MIN（C28.14，C28.18）

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

Chapter 7 Quick Application Guide

7.1 Using LCP to Start/Stopthe 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 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;

7.3 Automatic Motor Adaption (AMA)

1. Reboot the drive;
2. Enter motor nameplate data to C01.20 to C01.25;
3. Choose option [2] in C01.29 to enable AMA;
4. LCP displays “PUSH”,“HAND”, press “HAND”key on LCP, “-AT-” will be displayed;
5. Wait for the LCP displays “PUSH”, “ENT”, press “  ”key, AMA complet.

Note: AMA doesn’t fit for rotate motor. Measurements are stored in C01.30, C01.37

7.4 Copy and recover user parameter

7.4.1 Copy user parameter

Set real prameters value according to real need.
Set C14.22 = 3;

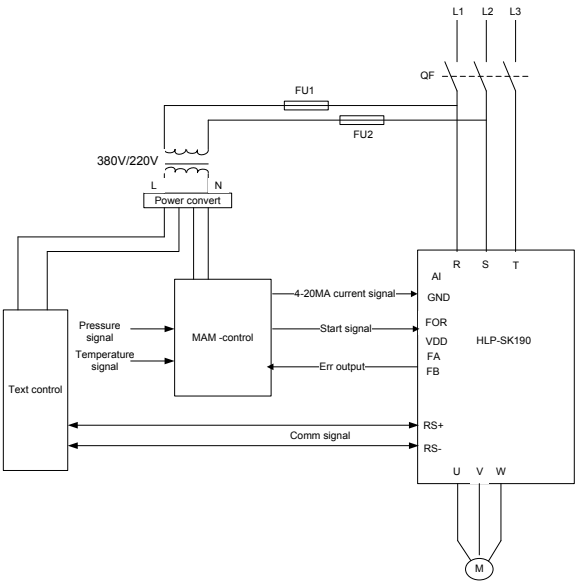
7.4.2 Recover user parameter

C14.22= 4 or press ‘OFF’key above 5s, the time can adjust by C00.46

Display ‘rEs’ about 2s, set finishly

7.5 Compressor Control System

7.5.1 Electrical Diagram



7.5.2 Correlative parameter

1. Set motor correlative parameter

No.	Parameter No.	Function	Default value	Explanation
1	C01.24	Motor current	*	According to motro name-plate
2	C01.25	Motor nominal speed	*	
3	C01.26	Motor cont. rated torque	*	

2. Set other application correlative parameter

No.	Parameter No.	Function	Default value	Explanation
1	C03.03	Max reference	50	Adjust value according to user need
3	C03.41	Acc time 1	*	
5	C03.42	Dec time 1	*	
5	C04.19	Motor frequency upper	65	
6	C04.14	Max output frequency	65	
7	C05.10	DI(FOR) teminal	8	
8	C05.40[0]	Relay(FA-FB-FC) function select	9	
9	C06.23	AI high current	20	
10	C06.25	Terminal AI High Ref./Feedb. Value	50	

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 disappear, 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 analarm 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 Cl4.23 = 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 anerror happens, LCP display “Er.XX” (XX is error code).

Warning	Alarm	Error	Fault Description	Reason analysis
A.01			Oil stock	Check oil device
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.05			Oil filter stock	Check oil filter device

Warning	Alarm	Error	Fault Description	Reason analysis
A.06			Null filter stock	Check null filter device
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		MotorOverload	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.

Warning	Alarm	Error	Fault Description	Reason analysis
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.19			Oil filtero-vertime	Change oil filter device
A.20			Oil over-time	Change oil device
A.21			Air filter overtime	Change air filter device
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.

Warning	Alarm	Error	Fault Description	Reason analysis
	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.37	E.37		Over pressure	Check external device and correlative prameter
	E.38*		Internal Fault	Contact the local distributor or Holip Company.
A.39	E.39		Over air temperature	Check external device and correlative prameter
	E.42		Temperature sensor fault	Check external device and correlative prameter
	E.43		Pressure sensor fault	Check external device and correlative prameter
	E.44*		Earth Fault	Discharge from output phases to ground (22KW or more).
	E.47*		24V Power Card Fault	24V voltage power card failure
A.49	E.49		PTC fault	Check motor and external device current

Warning	Alarm	Error	Fault Description	Reason analysis
	E.50		Fan over-load	Check fan device
	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			Current Limit	Current exceeds value set in C04.18.
	E.63		Mechenical Brake Current Low	Actual motor current can not exceeds release brake current set in C02.20 within start delay time.

Warning	Alarm	Error	Fault Description	Reason analysis
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.71			Lube overtime	Change lube
A.72			Grease overtime	Change grease
A.74	E.74		Rectifier TemperatureSensor Error	Rectifier Temperature Sensor Error
A.75	E.75		Rectifier TemperatureHigh	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.

Warning	Alarm	Error	Fault Description	Reason analysis
	E.83		Power Board Over Temperature	1. The ambient temperature is too high; 2. The air filter is blocked; 3. The fan is damaged.
	E.88*		24V Power Card Fault	24V PowerCard Fault
		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.
		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 circuitpower supply has been turned off, and the display has disappeared before carry 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 are 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 driveshould 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 than95% (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 provide 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.

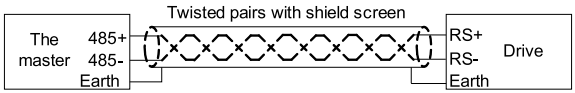
1. Application Mode

1.1 Interface Mode

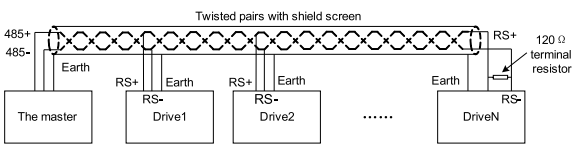
The communication interface is RS485. RS485 works on semiduplex and its data signal applies differential transmission which is called balance transmission too.

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;

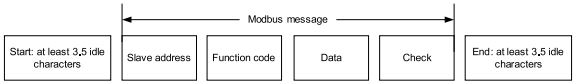
2. It is recommended to use shield cables in multiple connection. The basic parameter of the devices, such as baud rate and digital check bit in RS485 should be the same as slave device's and there should be no repeated addresses in slave devices.

2. Protocol Format

Modbus protocol supports both RTU and ASCII mode.

2.1 RTU Mode

RTU data frame format is shown as the figure below:

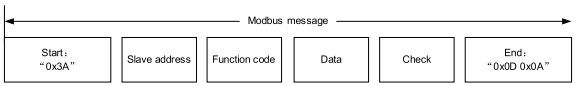


Specification:

Start	at least 3.5 idle characters
Slave address	Address: 0-247 (0 is broadcast address)
Function code	Modbus function code
Data (N-1)	2 * N data
Data (N-2)	
…	
Data 0	
CRC CHK high-8-bit	CRC check
CRC CHK low-8-bit	
End	at least 3.5 idle characters

2.2 ASCII Mode

ASCII data frame format is shown as the figure below:



Specification:

1. Frame header is "0x3A" while the default frame end is "0x0D" "0x0A";
2. In ASCII mode, all data bytes other than frame header and end are sent in the form of ASCII code; high-4-bit byte and low-4-bit byte are sent successively;
3. In ASCII mode, the data is 7-bit long. For 'A'~'F', their uppercase ASCII codes are used;
4. Data is subjected to LRC check which covers the information portion from slave address to data;

3. Function Code

Function code supported by the drive Modbus protocol are as shown in the table below:

Function code	Description	Meaning
0x01	Read Coil Status	Read drive running status parameters
0x03	Read Holding Registers	Read drive functional parameters and running status parameters
0x05	Force Single Coil	Control whether the functional parameters are saved or not at power loss.
0x06	Preset Single Register	Over-write individual drive functional parameters
0x0F	Force Multiple Coils	Control the drive running status and set output frequency
0x10	Preset Multiple Regs	Over-write multiple drive functional parameters

4. Register Address Definition

All the following register addresses are started from 0.

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 × 10 - 1 = 3029 (0x0BD5)

The register address of C16.13 is 1613 × 10 - 1 = 16129 (0x3F01)

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
2809*	Control word	R,W
2810*	Reference	R,W
2909	C16.03 Status word	R
2910*	Output frequency	R
2911	C16.14 Output current	R
2912	C16.30 DC link voltage	R
2913	C16.12 Motor voltage	R
2914	C16.13 Output frequency	R
2915	C16.52 Feedback	R
60800*	Parameter which Par. No. is set in C39.00	R,W
60801*	Parameter which Par. No. is set in C39.01	R,W
…		
60835*	Parameter which Par. No. is 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 2809 Control word specification

Bit	0	1
Bit0	Preset reference bit0 set to 0	Preset reference bit0 set to 1
Bit1	Preset reference bit1 set to 0	Preset reference bit1 set to 1
Bit2	DC brake	No DC brake
Bit3	Coast stop	No coast stop
Bit4	Quick stop	No quick stop
Bit5	Freeze freq	No freeze freq
Bit6	Ramp stop	Run
Bit7	No reset	Reset
Bit8	No jog	Jog

Bit9	Ramp 1	Ramp 2
Bit10	Data invalid	Data valid
Bit11	Relay 2 off	Relay 1 on
Bit12	Relay 2 off	Relay 2 on
Bit13	Setup 1	Setup 2
Bit14	Reserved	
Bit15	No reversing	Reversing

* Reg 2810 reference specification
The relationship between Reg 2810 reference and output frequency is shown below:

Reg 2810 = output frequency ÷C03.03 ×16384

Multiplying 16384 is for high precision of calculation.
For example:
If you want to set output frequency to 20Hz, it should write 20÷50 × 16384 = 6553.6 ≈ 6554 (0x199A) into Reg 2810.
If you want to set output frequency to -20Hz (running reverse 20Hz), it should write -20÷50 × 16384 = -6553.6 ≈ -6554 (0xE666) into Reg 2810.

*Reg 2910output frequency specification
The data format of Reg 2910output frequency is differenct from C16.13.
Output frequency = Reg 2910 × C03.03 ÷ 16384
For example:
If reg 2910 = 0x2000 (8192), then the output frequency is 8192 ×50÷ 16384 = 25Hz.
If reg 2910 = 0xE666 (-6554), then the output frequency is -6554 ×50÷ 16384 =
-20Hz.

*Reg 60800~60835specification
C39.00~C39.35 is user-defined parameters.Users can set other parameter number into C39.00~C39.35, then users can read and write these parameters quicky by communication.
Registers in Modbus is 16 bits. For using one message (eg. Write Multiple Registers) to modify parameters which data type is UINT32/INT32 or array, it need set index in C39.50~C39.85 which correspond to parameter number in C39.00~C39.35.
For example:

Par.No.	Value	Par.No.	Value	Reg.	Spec.
C39.00	303	C39.50	0	60800	C03.03 low 16 bits
C39.01	303	C39.51	1	60801	C03.03 high 16 bits
C39.02	310	C39.52	0	60802	C03.10[0]

C39.03	310	C39.53	1	60803	C03.10[1]
C39.04	310	C39.54	2	60804	C03.10[2]
C39.05	1312	C39.55	0	60805	C13.12[0] low 16 bits
C39.06	1312	C39.56	100	60806	C13.12[0] high 16 bits
C39.07	1312	C39.57	1	60807	C13.12[1] low 16 bits
C39.08	1312	C39.58	101	60808	C13.12[1] high 16 bits
C39.09	1312	C39.59	2	60809	C13.12[2] low 16 bits
C39.10	1312	C39.60	102	60810	C13.12[2] high 16 bits

The data type of C03.03 is UINT32. Set C39.50 to 0 (index) to make Reg. 60800 corresponds to C03.03 low 16 bits, set C39.51 to 1 (index) to make Reg. 60801 corresponds to C03.03 high 16 bits.
The data type of C03.10 is INT16, it is an array. Set C39.52~C39.54 to 0, 1, 2 respectively to make Reg. 60802~60804 correspond to C03.10[0]~[2].
The data type of C13.12 is INT32, it is an array. For this data type, hundreds digit represents high or low 16 bits, tens digit and ones digit represent array index. So set C39.10=1312, C39.60=102 makes Reg. 60810 corresponds to C13.12[2] high 16 bits

4.3 Parameter's Data Type

Parameters have different data type decause of they have different range and value. Parameter's data type is shown in the following table.

Par. No.	Data Type	Par. No.	Data Type
C00.03~C00.12	UINT8	C08.01~C08.02	UINT8
C00.31~C00.32	INT32	C08.03	UINT16
C00.33	UINT16	C08.04~C08.33	UINT8
C00.40~C00.60	UINT8	C08.35~C08.36	UINT16
C00.62~C00.64	INT32	C08.38~C08.56	UINT8
C01.00~C01.20	UINT8	C13.00~C13.11	UINT8
C01.22~C01.23	UINT16	C13.12	INT32
C01.24	UINT32	C13.20	UINT32
C01.25	UINT16	C13.40~C13.52	UINT8
C01.29	UINT8	C14.01~C14.10	UINT8
C01.30~C01.35	UINT32	C14.11	UINT16
C01.39~C01.42	UINT8	C14.12~C14.17	UINT8
C01.50~C01.65	UINT16	C14.18	UINT16
C01.71~ C01.73	UINT8	C14.20	UINT8
C01.75~ C01.76	UINT16	C14.21	UINT16
C01.80	UINT8	C14.22~C14.27	UINT8
C01.82	UINT16	C14.30~C14.34	UINT16

C01.90~ C01.93	UINT8	C14.40~C14.63	UINT8
C02.00~ C02.04	UINT16	C15.00~C15.03	UINT32
C02.08~ C02.10	UINT8	C15.04~C15.05	UINT16
C02.11~ C02.16	UINT16	C15.06~C15.30	UINT8
C02.17	UINT8	C15.31	INT16
C02.18~ C02.19	UINT16	C15.38	UINT8
C02.20	UINT32	C15.43	STRING
C02.22	UINT16	C16.00	UINT16
C03.00	UINT8	C16.01	INT32
C03.03	INT32	C16.02	INT16
C03.07	UINT8	C16.03	UINT16
C03.10	INT16	C16.04	UINT8
C03.11	UINT16	C16.05	UINT16
C03.12	INT16	C16.09	INT32
C03.13	UINT16	C16.10~C16.13	UINT32
C03.14	INT16	C16.14~C16.15	UINT16
C03.15~C03.40	UINT8	C16.16	INT32
C03.41~C03.42	UINT32	C16.18	UINT8
C03.50	UINT8	C16.30	UINT32
C03.51~C03.52	UINT32	C16.34	INT8
C03.60	UINT8	C16.35	UINT8
C03.61~C03.62	UINT32	C16.36~C16.37	UINT32
C03.70	UINT8	C16.38	UINT8
C03.71~C03.72	UINT32	C16.40	UINT16
C03.80	UINT32	C16.48~C16.49	INT8
C04.10	UINT8	C16.50~C16.51	INT16
C04.12~C04.19	UINT16	C16.52	INT32
C04.21~C04.42	UINT8	C16.60	UINT16
C04.50~C04.51	UINT32	C16.61	UINT8
C04.52~C04.53	UINT16	C16.62	UINT16
C04.54~C04.57	INT32	C16.63	UINT8
C04.58	UINT8	C16.64~C16.65	UINT16
C04.61~C04.63	UINT16	C16.66	UINT8
C05.04~C05.40	UINT8	C16.68~C16.69	UINT32
C05.55~C05.56	UINT32	C16.71	UINT16
C05.57~C05.58	INT32	C16.72~C16.73	INT32
C05.59	UINT16	C16.78	UINT16
C05.60	UINT8	C16.86	INT16

C05.61~C05.62	UINT32	C16.90~C16.93	UINT32
C05.63~C05.64	UINT16	C30.00	UINT8
C06.00~C06.01	UINT8	C30.01	UINT32
C06.10~C06.13	UINT16	C30.02~C30.10	UINT16
C06.14~C06.15	INT32	C30.11	UINT32
C06.16~C06.18	UINT16	C30.12~C30.15	UINT8
C06.19	UINT8	C30.16	UINT16
C06.20~C06.23	UINT16	C30.17	UINT8
C06.24~C06.25	INT32	C30.18	UINT16
C06.26~C06.28	UINT16	C30.20	UINT8
C06.29	UINT8	C30.21	INT8
C06.70~C06.71	UINT8	C30.22	INT8
C06.73~C06.74	UINT16	C30.30	UINT8
C06.81~C06.82	INT32	C30.31	UINT16
C06.90~C06.91	UINT8	C30.32	UINT16
C06.93~C06.94	UINT16	C30.33~C30.39	UINT8
C07.12~C07.13	UINT16		
C07.20~C07.31	UINT8		
C07.32~C07.33	UINT16		
C07.34	UINT32		
C07.35~C07.39	UINT16		
C07.41~C07.42	INT16		
C07.45~C07.46	UINT8		
C07.50~C07.51	INT16		
C07.55	UINT8		

UINT8 represents Unsigned Integer 8 bits;
UINT16 represents Unsigned Integer 16 bits;
UINT32 represents Unsigned Integer 32 bits;
INT8 represents Integer 8 bits;
INT16 represents Integer 16 bits;
INT32 represents Integer 32 bits;
STRING represents text string;

5. Coils address definition

All the following coils addresses are started from 0.

Coils address	0	1	R/W
0	Preset reference bit0 set to 0	Preset reference bit0 set to 1	R,W
1	Preset reference bit1 set to 0	Preset reference bit1 set to 1	R,W
2	DC brake	NoDC brake	R,W
3	Coast stop	No coast stop	R,W
4	Reserved		R,W
5	Freeze freq	Freeze freq	R,W
6	Ramp stop	Ramp stop	R,W
7	No reset	Reset	R,W
8	No jog	Jog	R,W
9	Ramp 1	Ramp 2	R,W
10	Data invalid	Data valid	R,W
11	Relay 1 off	Relay1on	R,W
12	Relay2 off	Relay2 on	R,W
13	Setup1	Setup 2	R,W
14	Reserved		
15	No reversing	Reversing	R,W
16~31	Reference		R,W
32	Control not ready	Control ready	R
33	Drive not ready	Drive ready	R
34	Coasting stop	Satety closed	R
35	No alarm	Alarm	R
36	No warning	Warning	R
37	Reserved		R
38	No trip-lock	Trip-lock	R
39	No warning	Warning	R
40	Not at reference	At reference	R
41	Hand mode	Auto mode	R
42	Out of freq range	In freq range	R
43	Stopped	Running	R
44	No resistor braking waring	Resistor braking waring	R
45	No voltage warning	Voltage warning	R

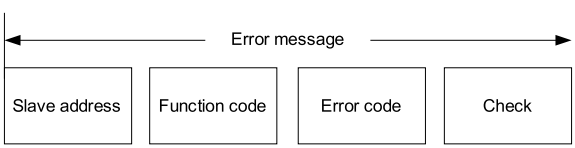
46	Not in current limit	Current limit	R
47	No thermal warning	Thermal warning	R
48~63	Output frequency		R
64	Whether the functional parameters are saved or not at power loss.		W

6. Communication ratio values

The Communication data is expressed by hexadecimal in actual application and there is no radix point in hexadecimal. For example, Ifyou 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.

7. 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 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.

8. Examples

8.1 Read Holding Registers (0x03)

8.1.1 Read Output Frequency

Read the value of C16.13 to get the output frequency.

Transmit: 01 03 3F 01 00 02 99 DF (Hexadecimal)

Receive: 01 03 04 00 00 01 F4 FA 24 (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 02	The number of read registers is 2
99 DF	CRC check

Receive data specification:

Field	Description
01	Address
03	Function
04	The byte number of received data
00 00 01 F4	0x000001F4 converts to decimal number is 500. So the value of C16.13 is 500*0.01 = 50.0
FA 24	CRC check

Note: The data type of C16.13 is UINT32, so it needs read 2 registers.

8.1.2 Read Drive Status

Read the value of C16.03 or register 2909 to get the drive status.

Transmit: 01 03 3E 9D 00 01 18 0C (Hexadecimal)

Receive: 01 03 02 02 58 B8 DE (Hexadecimal)

Transmit data specification:

Field	Description
01	Address
03	Function
3E 9D	Register address (ADDRH ADDRL). The register address of C16.03 is 1603*10-1=16029 (0x3E9D)
00 01	The number of read registers is 1
18 0C	CRC check

Receive data specification:

Field	Description
01	Address
03	Function
02	The byte number of received data
02 58	Status word: 0x0258 0x0258 converts to binary number is 0000 0010 0101 1000. They correspond to parameter C16.03 bit 0~15.
B8 DE	CRC check

8.2 Write Single Register (0x06)

8.2.1 Set Drive Output Frequency

Write C03.10[0] to set the drive output frequency.
For example: If you want to set the drive output frequency to 20.0Hz, to set C03.10[0] to 40.00% (default: C03.03=50.000, 20.0 = 50.000 × 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	Register address (ADDRH ADDRL). 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 (ADDRH ADDRL). The register address of C03.10 is 310 *10-1=3099 (0x0C1B)
0F A0	The value which has be written into C03.10[0] is 40.00% (Decimal: 4000, Hexadecimal: 0x0FA0).
FF 15	CRC check

8.2.2 Start/Stop Drive

Write register 2809 to control the drive running.
For example: Start drive
Transmit: 01 06 0A F9 04 7C 59 02 (Hexadecimal)
Receive: 01 06 0A F9 04 7C 59 02 (Hexadecimal)
Transmit data specification:

Field	Description
01	Address
06	Function
0A F9	Register address 2809 (0x0AF9)
04 7C	The value which will be written into Reg. 2809 is 0x047C (Control word) 0x047C converts to binary number is: 0000 0100 0111 1100, They correspond to Reg. 2809 bit 0~15.
59 02	CRC check

Receive data specification:

Field	Description
01	Address
06	Function
0A F9	Register address 2809 (0x0AF9)
04 7C	The value which has be written into Reg. 2809 is 0x047C (Control word)
59 02	CRC check

8.3 Write Multiple Registers (0x10)

8.3.1 Start/Stop Drive and Set Drive Output Frequency

Write register 2809 to control the drive running and write register 2810 to set the drive output frequency.
Transmit: 01 10 0A F9 00 02 04 04 7C 19 9A 09 32 (Hexadecimal)
Receive: 01 10 0A F9 00 02 92 21 (Hexadecimal)
Transmit data specification:

Field	Description
01	Address
10	Function
0A F9	Register address 2809 (0x0AF9)
00 02	The number of write registers is 2
04	The byte number of write data is 4

04 7C 19 9A	Reg. 2809 = 0x047C (Control word) Reg. 2810 = 0x199A (If you want to set output frequency to 20Hz, it should write 20 ÷ 50 × 16384 = 6553.6 ≈ 6554 (0x199A) into Reg. 2810) .
09 32	CRC check

Receive data specification:

Field	Description
01	Address
10	Function
0A F9	Register address 2809 (0x0AF9)
00 02	The number of write registers is 2
92 21	CRC check

Attention: The maximum register number can be written in one message is 10.

8.4 Read Coils (0x01)

8.4.1 Read Output Frequency

The coil's address 48~63 represents drive output frequency.

Transmit: 01 01 00 30 00 10 3D C9 (Hexadecimal)

Receive: 01 01 02 00 20 B8 24 (Hexadecimal)

Transmit data specification:

Field	Description
01	Address
01	Function
00 30	Coil address (ADDRH ADDRL), 0x0030 converts to decimal number is 48.
00 10	Data bits number is 16 (48~63), 0x0010 converts to decimal number is 16.
3C 0C	CRC check

Receive data specification:

Field	Description
01	Address
01	Function
02	The number of read byte is 2

00 20	Ouput frequency. Swap high and low, the data is 0x2000, so the output frequency is 50% of C03.03. Why does 0x2000 correspond to 50%, please refer to Reg. 2910 output frequency specification.
B8 24	CRC check

8.4.2 Read Drive Status

The coil's address 32~47 represents drive status.

Transmit: 01 01 00 20 00 10 3C 0C (Hexadecimal)

Receive: 01 01 02 02 58 B9 66 (Hexadecimal)

Transmit data specification:

Field	Description
01	Address
01	Function
00 20	Coil address (ADDRH ADDRL), 0x0030 converts to decimal number is 32.
00 10	Data bits number is 16 (32~47), 0x0010 converts to decimal number is 16.
3C 0C	CRC check

Receive data specification:

Field	Description
01	Address
01	Function
02	The number of read byte is 2
02 58	Status word: 0x0258. 0x0258 converts to binary number is 0000 0010 0101 1000, they correspond to coils 32~47.
B9 66	CRC check

8.5 Write Single Coil (0x05)

Write coil 64 to control parameter saved to RAM or EEPROM at power down.

Transmit: 01 05 00 40 FF 00 8D EE (Hexadecimal)

Receive: 01 05 00 40 FF 00 8D EE (Hexadecimal)

Transmit data specification:

Field	Description
01	Address

05	Function
00 40	Coil address (ADDRH ADDRL), 0x0040 converts to decimal number is 64, it means parameter save control at power down.
FF 00	FF 00 means saved to EEPROM at power down 00 00 means saved to RAM at power down
8D EE	CRC check

Receive data specification:

Field	Description
01	Address
05	Function
00 40	Coil address (ADDRH ADDRL), 0x0040 converts to decimal number is 64, it means parameter save control at power down.
FF 00	FF 00 means saved to EEPROM at power down 00 00 means saved to RAM at power down
8D EE	CRC check

8.6 Write Multiple Coils (0x0F)

Start/stop drive and set drive output frequency.

Transmit: 01 0F 00 00 00 20 04 7C 04 9A 19 37 B3 (Hexadecimal)

Receive: 01 0F 00 00 00 20 54 13 (Hexadecimal)

Transmit data specification:

Field	Description
01	Address
0F	Function
00 00	Coil address (ADDRH ADDRL), 0x0000 converts to decimal number is 0.
00 20	Data bits number is 32 (0~31), 0~15 represents control word, 16~31 represents reference.
04	The number of write byte is 4.
7C 04	Control word , swap high and low, the data is 0x047C.
9A 19	Reference, If you want to set output frequency to 20Hz, it should write 20 ÷ 50 × 16384 = 6553.6 ≈ 6554 (0x199A).
37 B3	CRC check

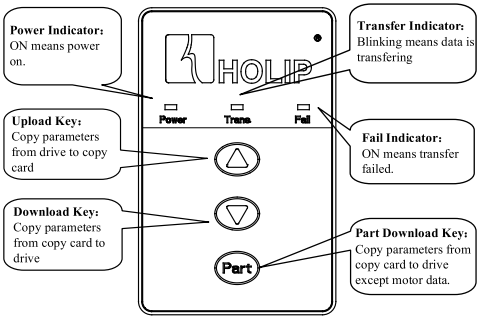
Receive data specification:

Field	Description
01	Address
0F	Function
00 00	Coil address (ADDRH ADDRL), 0x0000 converts to decimal number is 0.
00 20	The number of write bits is 0x0020 (32 bits), that's 4 bytes.
54 13	CRC check

Appendix B Copy Card Specification

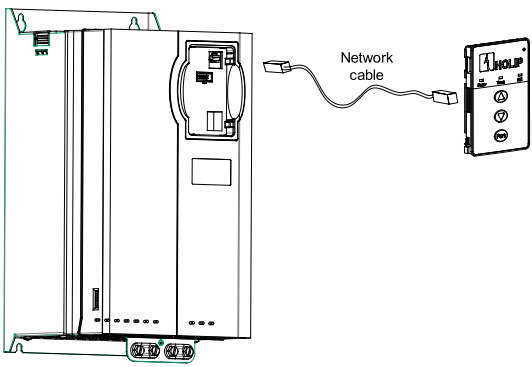
Copy Card can copy parameters from one drive to another.

1. Copy Card Interface



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:



3. Operation

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;

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;

3.3 Part Download

Part download is similar to download, use Part key instead of Download key. It copies parameters from copy card to drive except motor data.