SCHORCH 啸驰电气 SCHORCH ELECTRIC

User Manual of
Low Voltage Frequency Converter
SCMOD Series

Forward

Thank you for using the SCMOD series of high-performance vector-controlled frequency converters from Schorch Electric!

This manual provides a clear and concise guide to the SCMOD series vector-controlled frequency converter and provides the necessary information to help users master the use of the converter. Users who use this product for the first time must read this manual carefully before using it.

If you are confused about some of the functions and how to use them, please consult our technical support staff for assistance with the Tel: 400-8880997.

Our company reserves the right to modify the manual without prior notice.

Cautions

Always switch off the power when installing or repairing wiring;

After the power is cut off, there is still high voltage left inside the converter, do not touch the terminals and the internal circuitry of the converter at this time; wait patiently for the LED hand control panel and the power indicator to go out completely before proceeding to the next operation;

Never connect the input power supply to the output terminals U, V and W of the frequency converter;

Be sure to ground the converter grounding terminal PE correctly;

Do not put foreign objects into the frequency converter, which will affect its normal operation;

The electronic components inside the frequency converter are particularly sensitive to static electricity, so it is not allowed to touch its internal circuit at will.

Commissioning of constant pressure water supply

Commissioning steps

Parameter initialization: Set PP-01=1, if the machine is new, this step is skipped;

Set the application parameter macro: PP-05=1, the converter parameters automatically change to constant pressure water supply application;

Set the maximum range of the remote pressure gauge (0-10V): e.g. 1.6MPa. Since the range of the converter is expressed by integer, we will expand 1.6MPa by a factor of 1000 to 1600 and store it in the PA-04, i.e. 1600 represents 1.6MPa.

Set the given pressure: for example, set the water supply pressure to 1.0MPa (range 1.6MPa).

The first method: directly press the "∧" and "∨" keys on the operation panel to set the water supply pressure. After setting the range PA-04=1600 as above, the water supply pressure data should be 1000. Press the "∧" and "∨" keys on the operation panel, and set the displayed data to 1000 to complete the pressure setting.

The second method: to set the water supply pressure through parameter PA-01, which refers to the % of water supply pressure to Max. range, i.e. the water supply pressure (1.0MPa) / the max. range (1.6MPa) *100.0%=62.5%, so to set PA.01=62.5.

Feedback pressure configuration: The feedback can be either a 0-10V pressure sensor or a 4-20mA pressure sensor (default 0-10V). The 0-10V pressure sensor is connected to the VI and GND terminals and the PA-02 function is set to 0. The 4-20mA pressure sensor is connected to the CI and GND terminals and the PA-02 function is set to 1. The CI terminal defaults to a 0-20mA signal or, in the case of a 4-20mA signal, P4-18 needs to be set to 2.00V.

Set the dormancy/wake-up parameters: By default, the dormancy/wake-up function is not used for the constant pressure water supply, if you want to use it, please set the following 4 parameters:

P8-49 Wake-up pressure

P8-50 Wake-up delay time

P8-51 Dormancy frequency

P8-52 Dormancy delay time

If the dormancy frequency (P8-51) is 0, the dormancy/wake-up function is invalid, so when use the hibernation wake-up function, theP8-51 cannot be 0.

During the operation of the converter, when the feedback pressure >= the set pressure and the operating frequency is lower than the dormancy frequency (P8-51) and the duration >= the dormancy delay time (P8-52), the converter will enter the "Dormancy" state and stop automatically.

Under the "Dormancy" state, If the feedback pressure is lower than the wake-up pressure threshold (P8-49) and the duration >= the wake-up delay time (P8-50), the converter exits the "Dormancy" state and starts normal operation.

For better use of the dormancy/wake-up function, it's suggested to set theP8-49 - P8-52 as following:

P8-49=80;　P8-50=1.0;　P8-51= 35.00;　P8-52=20.0

Operation of converter with constant pressure water supply: Press the start button to start the frequency converter running at constant pressure, and press the stop button to stop the frequency converter.

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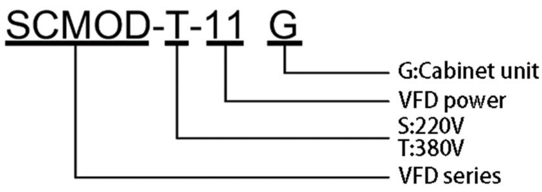
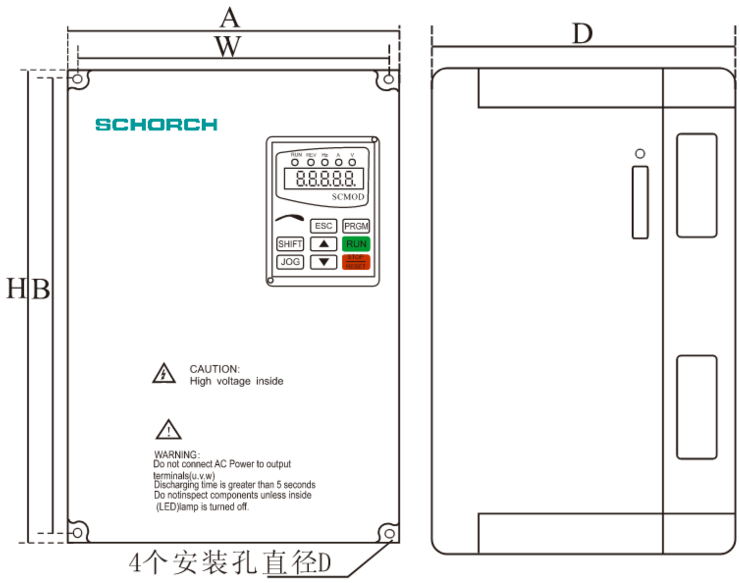
Chapter I Product Overview

1.1 Naming rules of frequency converter

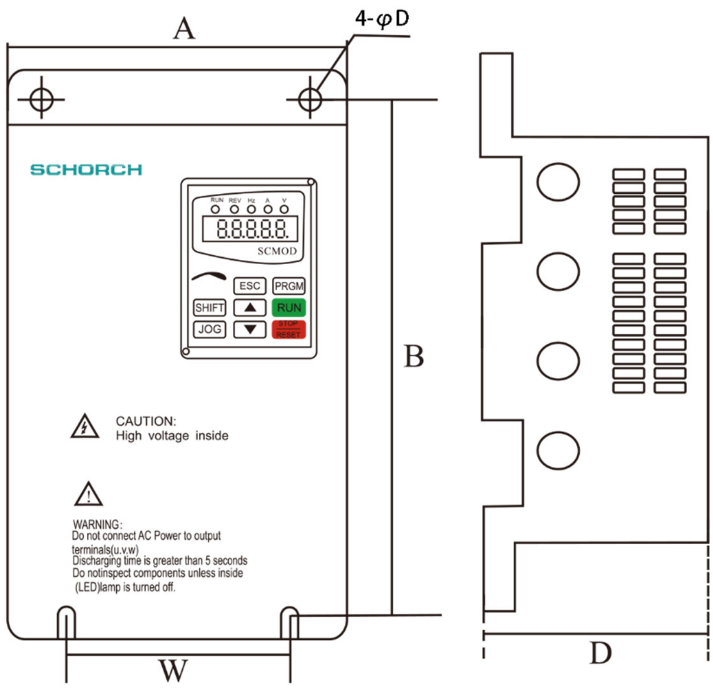


1.2 Overall dimensions and structure

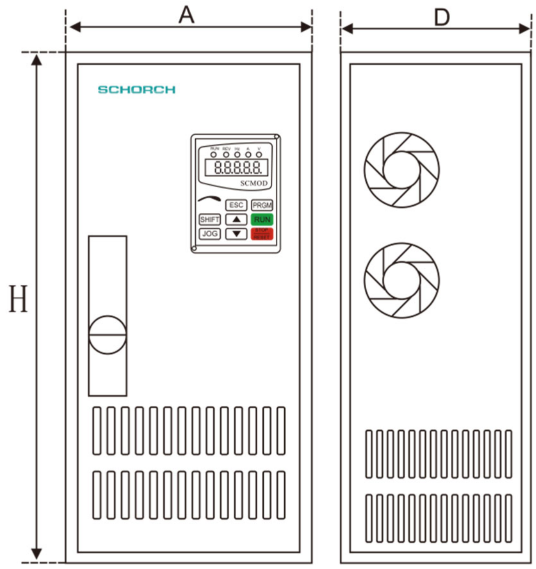
1.2.1. Fig 1-2: Overall Dimension of Plastic Enclosures (wall-mounted)



1.2.2. Fig 1-3: Overall Dimension of Metal Enclosures (wall-mounted)



1.2.3. Fig 1-4: Overall Dimension of Metal Enclosures (stand type)



Note: Dimensions are subject to change without prior notice.

Overall Dimension of SCMOD series Converter									
Enclosures	Converter type	Rated power (KW)	Dimension （mm）						Case
			A	B	H	W	D	d	
T1	SCMOD-T-0.7	0.75	118	175	185	106	154	5	Wall-mounted plastic enclosures
	SCMOD-T-1.5	1.5							
	SCMOD-T-2.2	2.2							
T1-1	SCMOD-T-4	4.0	118	175	185	106	178	5	
T2	SCMOD-T-5.5	5.5	160	235	248	148	175	6	
	SCMOD-T-7.5	7.5							
T3	SCMOD-T-11	11	220	305	510	205	198	6	
	SCMOD-T-15	15							
	SCMOD-T-18.5	18.5							
XT4	SCMOD-T-22	22	225	355	368	195	200	7	Wall-mounted metal enclosure
	SCMOD-T-30	30							
XT5	SCMOD-T-37	37	280	455	468	230	225	8	
	SCMOD-T-45	45							
XT6	SCMOD-T-55	55	300	585	620	245	285	9	
	SCMOD-T-75	75							
	SCMOD-T-90	90							
T7	SCMOD-T-110	110	430	870	900	300	510	12	
	SCMOD-T-132	132							
XT7	SCMOD-T-110	110	375	670	700	240	300	9	Wall-mounted unit
	SCMOD-T-132	132							
G7	SCMOD-T-110G	110	430	220	975	390	510	12	Cabinet unit
	SCMOD-T-132G	132							

Enclosures	Converter type	Rated power (KW)	Dimension （mm）						Case
			A	B	H	W	D	d	
T8	SCMOD-T-160	160	485	955	985	300	340	12	Wall-mounted unit
	SCMOD-T-185	185							
	SCMOD-T-200	200							
G8	SCMOD-T-160G	160	485	260	1250	435	340	Φ12*32	Cabinet unit
	SCMOD-T-185G	185							
	SCMOD-T-200G	200							
T9	SCMOD-T-220	220	550	1100	1140	360	400	12	Wall-mounted unit
	SCMOD-T-250	250							
	SCMOD-T-280	280							
G9	SCMOD-T-220G	220	550	335	1480	230	400	12	Cabinet unit
	SCMOD-T-250G	250							
	SCMOD-T-280G	280							
XT10	SCMOD-T-315G	315	672	1100	1140	400	435	12	Cabinet unit
	SCMOD-T-350G	350							
	SCMOD-T-400G	400							
	SCMOD-T-450G	450							
XG10	SCMOD-T-315	315	710	400	1500	395	510	12	Wall-mounted unit
	SCMOD-T-350	350							
	SCMOD-T-400	400							
	SCMOD-T-450	450							
G11	SCMOD-T-500G	500	To be determined						Cabinet unit
	SCMOD-T-560G	560							
	SCMOD-T-630G	630							

1.3 Standard electrical specification of frequency

AC220V Series：

Type	Rated output				Rated input				
AC 220V series	Rated power of the applicable motor (KW)	Rated output capacity (KVA)	Rated output current (A)	Maximum output voltage(V)	Input current(A)		Rated input voltage/frequency	Allowable voltage variation range	Allowable frequency variation range
					Three-phase 220V input	Single-phase 220V input			
0005	0.5	1.2	3.2	Three-phase 220V corresponding input voltage	3.8	4.0	220V 50/60Hz	±15%	47~63Hz
0007	0.75	1.6	4.1		5	5.2			
0015	1.5	2.7	7.0		8.4	10			
0022	2.2	3.7	10.0		11.5	15			

AC 220V series	Rated power of the applicable motor (KW)	Rated output capacity (KVA)	Rated output current (A)	Maximum output voltage(V)	Input current(A)		Rated input voltage/frequency	Allowable voltage variation range	Allowable frequency variation range
					Three-phase 220V input	Single-phase 220V input			
0040	4.0	6.0	15	Three-phase 220V corresponding input voltage	18	25	220V 50/60Hz	±15%	47~63Hz
0055	5.5	8.8	23		26	……			
0075	7.5	12	31		36				
0110	11	17	45		46.5				
0150	15	22	58		62				
0185	18.5	27	71		76				
0220	22	32	85		92				
0300	30	44	115		120				
0370	37	55	145		160				
0450	45	69	180		190				
0550	55	82	215		237				
0750	75	110	283		317				
0900	90	130	346		381				

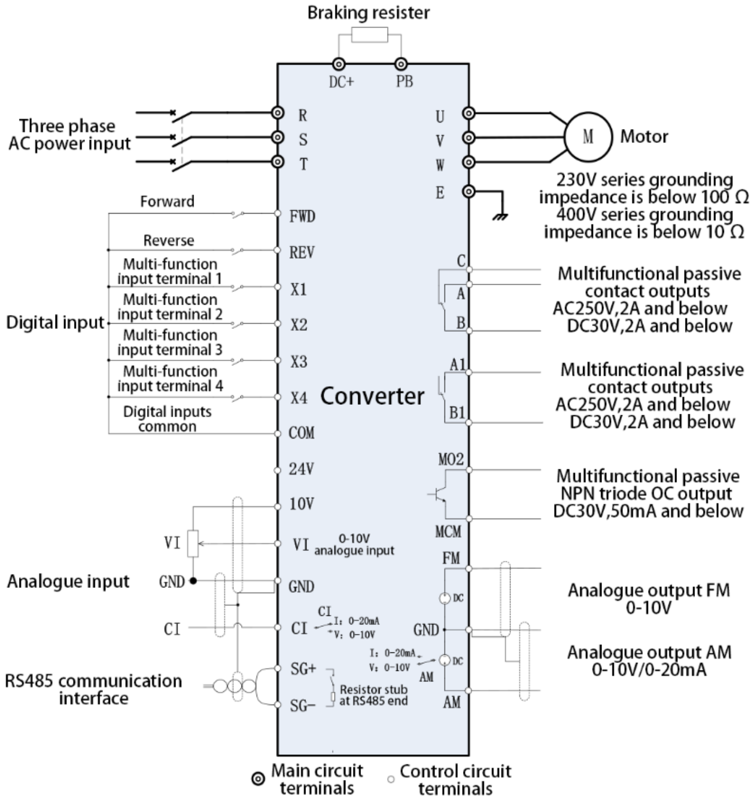
AC380V Series：

Type	Rated output				Rated input			
AC 380V series	Rated power of the applicable motor (KW)	Rated output capacity (KVA)	Rated output current (A)	Maximum output voltage(V)	Input current (A)	Rated input voltage/frequency	Allowable voltage variation range	Allowable frequency variation range
0007	0.75	1.2	2.5	Three-phase 380V corresponding input voltage	3.2	Three-phase 380V 50/60Hz	±15%	47~63Hz
0015	1.5	2.1	3.7		4.8			
0022	2.2	3.0	5.9		6.5			
0040	4.0	5.2	9.0		11.0			
0055	5.5	7.5	13.0		16			
0075	7.5	10.4	17.0		23			
0110	11	15.0	24.0		31			
0150	15	19.6	30.0		39			
0185	18.5	25	37		50			
0220	22	30	45		58			
0300	30	40	60		75			
0370	37	50	75		97			
0450	45	60	90		110			

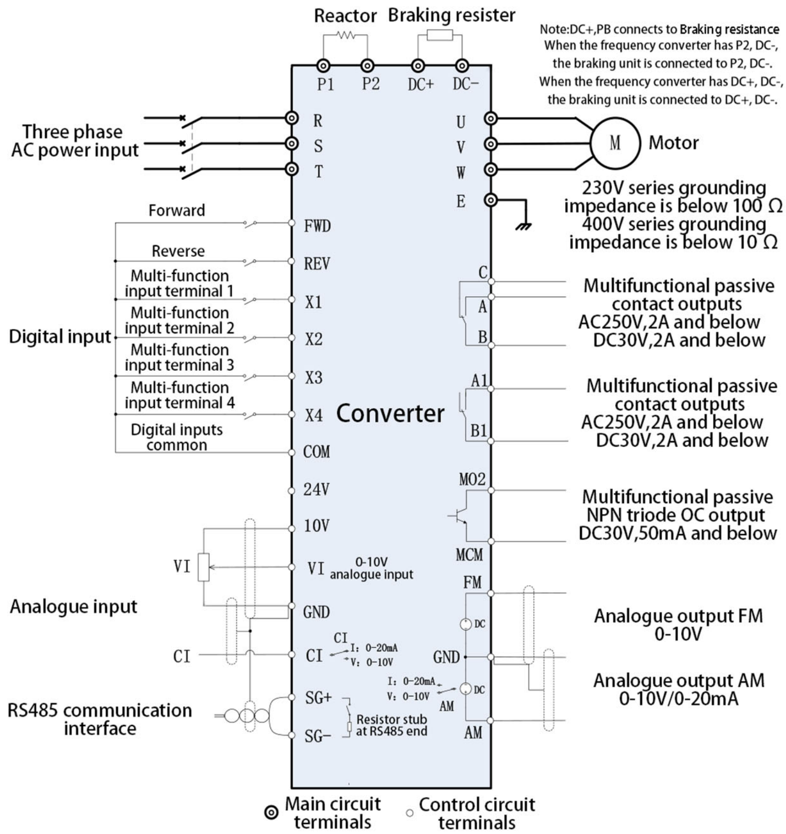
AC 380V series	Rated power of the applicable motor (KW)	Rated output capacity (KVA)	Rated output current (A)	Maximum output voltage(V)	Input current (A)	Rated input voltage/frequency	Allowable voltage variation range	Allowable frequency variation range
0550	55	73	110	Three-phase 380V corresponding input voltage	140	Three-phase 380V 50/60Hz	±15%	47~63Hz
0750	75	100	150		190			
0900	90	116	176		220			
1100	110	138	210		260			
1320	132	167	253		320			
1600	160	198	300		350			
1850	185	224	340		390			
2000	200	250	380		450			
2200	220	277	430		480			
2500	250	310	470		520			
2800	280	343	520		590			
3150	315	395	585		700			
3500	350	422	650		780			
4000	400	455	725		830			
4500	450	540	820		930			
5000	500	566	913		1023			
5600	560	626	1030		1150			
6300	630	777	1180		1300			
7100	710	856	1368		1465			

Chapter II Basic Wiring Methods

2.1 Wiring diagram of SCMOD low-power converter (18.5kW and below)



2.2 Wiring diagram of SCMOD high-power converter (18.5kW and above)



Notes:

1) The multi-function input terminal X3 is fixed as a high-speed input and can be connected to high-speed pulses;

2) The analogue input VI accepts only analogue signals of 0-10V. When a potentiometer is connected, the converter itself provides a DC10V power supply and the potentiometer resistance range is recommended to be 3-5 k ohm.

3) The analogue input CI accepts analogue signals of both 0-10V and 0-20mA, selected via the CI switch; 4-20mA is a special case of 0-20mA signals, and the parameter P4-18 is set to 2.00. CI is connected to the 0-20mA signal by default.

4) AM supports analogue outputs of 0-10V and 0-20mA, selected via the CI switch; 4-20mA is a special case of 0-20mA signals, the parameter P5-10 is set to 20.0, and the parameter P5-11 is set to 0.80. FM only supports 0-10V analogue outputs. AM is connected to the 0-20mA signal by default.

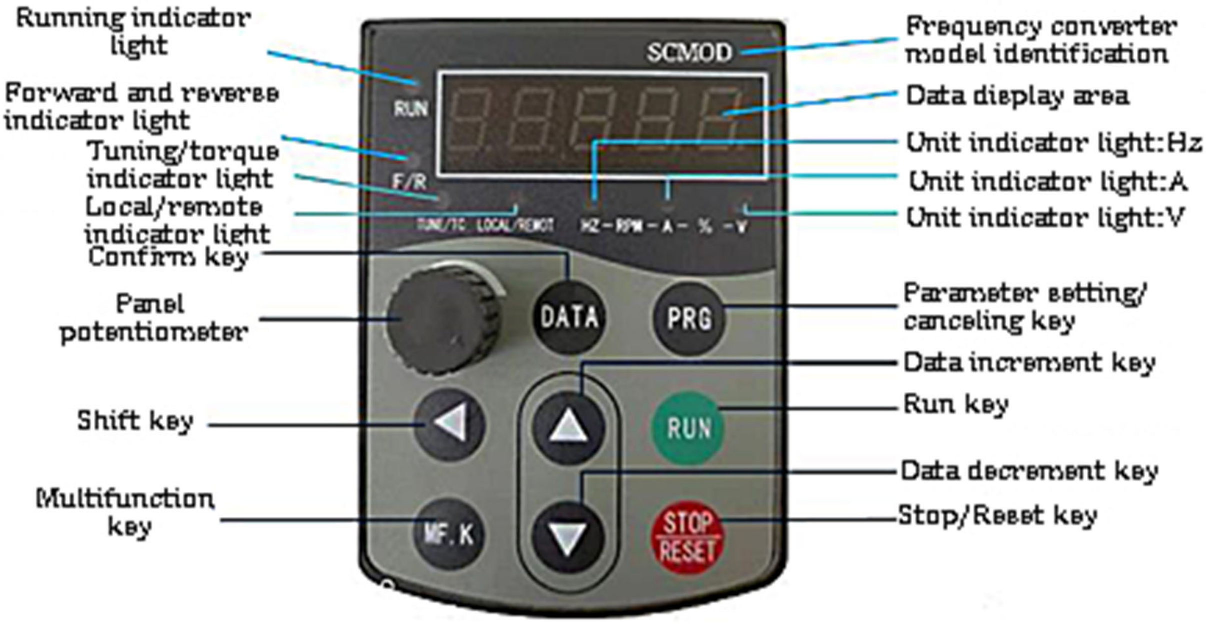
5) RS485 communication cable is recommended to use twisted shielded wire, with diameter of 0.5mm2 or above, both ends of the shielded wire connected to GND, not to be connected to a strong electrical grounding point.

6) The braking resistor is optional and is not installed inside the converter at the factory. The converter of this series ≤ 30KW has a built-in braking unit, which is connected to the P(DC+) and PB terminals respectively.

Chapter III Operation and Display

3.1 Description of operation and display interface

The keypad can be used to modify the function parameters, monitor the operating status of the converter, and control the operation of the converter (such as start and stop). The appearance and functional areas are shown in the figure below:



1)Description of function indicator lights:

RUN: When the light is off, the converter is stopped; when the light is on, the converter is in operation state.

LOCAL/REMOT: The light is off to indicate keypad operation command control; the light is on to indicate terminal operation command control; the light is flashing to indicate remote operation command control.

F/R: Light on indicates reverse rotation; light off indicates forward rotation.

TUNE/TC: Light on indicates torque control mode; slow flashing light indicates tuning; fast blinking light indicates a fault condition.

2)Unit indicator light:

Hz: frequency A: current V: voltage

RMP (Hz + A): rotational speed %(A+V): percentage

3)Digital display area: 5-digit LED display for displaying of setting frequency, output frequency, various monitoring data and alarm codes, etc.

4)keypad potentiometer

Changing the frequency setting value or the torque setting value by turning the potentiometer.

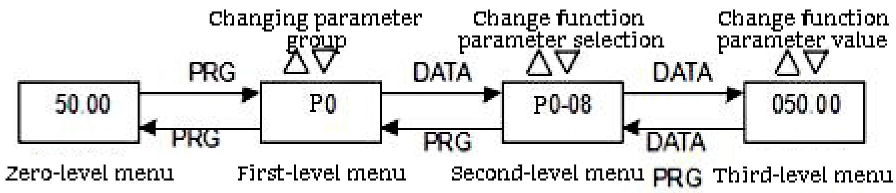
5)Description of key functions

The functions of the keypad keys on this converter are shown in the table below

Keys	Name	Function Description
PRG	Programming key	Menu entry or 1st, 2nd or 3rd level menu exit
DATA	Data key	Two, three levels of menu entry or confirmation of parameter setting
∧	Incremental key	Increment of data or function codes. In the PID control setting mode, the PID value is increased
∨	Decrement key	Decrement of data or function codes. In the PID control setting mode, the PID value is decreased
＜	Shift key	In the stop display interface and the run display interface, the display parameters can be selected cyclically; when modifying a parameter, you can select the modification bit of the parameter.
RUN	Run key	For running operations in keypad operation mode
STOP/RESET	Stop/ reset key	During running, pressing this key to stop the running operation; If in fault alarm state, pressing this key to reset the operation. The characteristics of this key are controlled by the function code P7.02
MF. K	Multifunctional key	Switching function selection according to P7.01

3.2 Function viewing and modification instructions

The operation keypad of SCMOD frequency converter adopts a three-level menu structure for parameters setting and other operations. The three levels of menu are: function parameter group (level 1 menu) → function code (level 2 menu) → function code set value (level 3 menu). The operation flow is shown in Figure.



3.3 View of status parameters

The shift key "＜" allows the display of various status parameters separately. To select whether or not display the parameter by function codes P7-03 (operating parameter 1), P7-04 (operating parameter 2) and P7-05 (stop parameter) in binary bits. To distinguish the status parameters, the values are preceded by an "Identification Code".

Table of Status Parameter Identification Codes

Parameter Identification Codes	Monitoring parameters	Parameter Identification Codes	Monitoring parameters
P	Operation frequency	b	PID feedback value
H	Setting frequency	z	PLC Phase
U	Busbar voltage	h	Input pulse frequency kHz
d	Output voltage	N	Feedback frequency
C	Output current	[	Remaining runtime
E	Output power	J	VI Pre-calibration voltage
T	Output torque	⌋	CI Pre-calibration voltage
I	Input terminal status	⊦	Pre-calibration voltage of panel potentiometer
o	Output terminal status	L	Line speed
u	VI Voltage value	e	Current power-up time
c	CI Voltage value	t	Current running time
r	Panel potentiometer voltage	a	Input pulse frequency Hz
q	Counting value	G	Communication setpoint
l	Length value	F	Actual feedback speed
n	Load speed display	X	Master fequency X display
A	PID Given value	y	Master fequency Y display

3.4 Password setting

The converter provides user password protection function, when PP-00 is set to non-zero, it is the user password, and the password protection will take effect when exiting the function code editing status, press the PRG key again, "-----" will be displayed, you must enter the user password correctly to enter the ordinary menu, otherwise you will not be able to enter it.

If you want to cancel the password protection function, you can only enter by password and set PP-00 to 0.

3.5 Self-learning of motor parameters

To select the vector control operation mode, the nameplate parameters of the motor must be accurately entered before the frequency converter runs,and the SCMOD converter matches the standard motor parameters according to these nameplate parameters; The vector control mode is highly dependent on motor parameters, and accurate parameters of the controlled motor must be obtained in order to obtain good control performance.

The self-learning steps of motor parameters are as follows:

First select the command source (P0-02) as the operating keypad command channel. And then please enter the following parameters according to the actual motor parameters (selected according to the current motor).

Motor selection	Parameters
Motor 1	P1-00: Motor type selection; P1-01: Motor rated power P1-02: Motor rated voltage; P1-03: Motor rated current P1-04: Motor rated frequency; P1-05: Motor rated speed
Motor 2	A2-00: Motor type selection; A2-01: Motor rated power A2-02: Motor rated voltage; A2-03: Motor rated current A2-04: Motor rated frequency; A2-05: Motor rated speed

Asynchronous motors must not be completely disconnected from the load: Then P1-37=1 (A2-37=1 for motor 2), (asynchronous motor static self-learning), then press the RUN key on the keypad to complete the asynchronous motor static self-learning, and only finish the learning of the parameters P1-06~P1-08 (A2-06~A2-08).

Asynchronous motor and load are completely disconnected: Then P1-37=2 (A2-37=2 for motor 2), (complete self-learning for asynchronous motor), then press RUN on the keypad, the converter will automatically calculate the learning of parameters P1-06~P1-10 (A2-06~A2-10) of the motor.

3.6 Application parameter macro

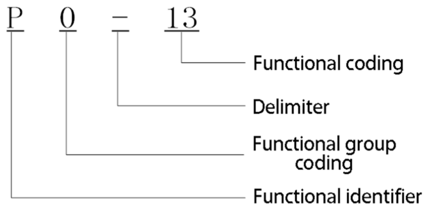
The SCMOD converter offers a quick parameter setting method for certain applications, namely the application parameter macro, where the user only needs to set one parameter PP-05, and the converter will automatically set up the application environment, which is very convenient for the user.

The following application parameter macros have been completed at present:

➢ Single converter constant pressure water supply(PP-05 =1);

Chapter IV Description of Functional Parameters

Description of functional parameters:



Notes: in following table ◎ Cannot be changed during operation; ○ Can be changed during operation

● *Read-only property*

Functional code	Name	Function Description	Default Value	Change
P0 Group Basic functional group				
P0-00	GP type display	1~2 1: G type (Constant torque load type) 2: P type (Fans, pumps and other load types)	2	◎
P0-01	No. 1 Motor control method	0~2 0: Vector control without speed sensor (SVC) 1: Vector control with speed sensor (FVC) 2: V/F control	2	
P0-02	Command source selection	0~3 0: keypad operated command channel (LOCAL/REMOT OFF) 1: Terminal command channel (LOCAL/REMOT ON) 2: Communication command channel (LOCAL/REMOT Flash)	0	○

Functional code	Name	Function Description	Default Value	Change
P0-03	Selection of main frequency source x	0~9 0: Digital setting (preset frequency P0-08, UP/DOWN modifiable, no memory on power off) 1: Digital setting (preset frequency P0-08, UP/DOWN modifiable, power-down memory) 2:VI setting 3:CI setting 4: Keypad potentiometer setting 5: High-speed pulse setting (X3) 6: multi-segment command setting 7: PLC program setting 8: Process PID setting 9: Communication settings	0	◎
P0-04	Selection auxiliary frequency source Y	Same function as P0-03	0	◎
P0-05	Selection of auxiliary frequency source Y range during superposition	0: Relative to maximum frequency 1: Relative to frequency source X	0	○
P0-06	Auxiliary frequency source Y range when superimposed	0%~150%	100%	○
P0-07	Selection of frequency source superimposition	Digit: Frequency source selection 0: Main frequency source X 1: Results of primary and secondary operations (The operational relationship is determined by ten digits) 2: Switching of main frequency source X and auxiliary frequency source Y 3: Switching of the primary frequency source X and the results of the primary and secondary operations 4: Switching of auxiliary frequency source Y and the operation results of the main and auxiliary Tens: Frequency source primary and secondary arithmetic relationship 0:P+S 1:P-S 2: Max. Value of both 3: Min. Value of both	00	○
P0-08	Preset frequency	0.00Hz~Max. frequency(P0-10)	50.00	○

Functional code	Name	Function Description	Default Value	Change
P0-09	Running direction	0: Consistent direction 1: Opposite direction	0	○
P0-10	Max. frequency	50.00Hz~500.00Hz	50.00	◎
P0-11	Upper limit frequency source	0: P0-12 setting 1: VI 2: CI 3: keypad potentiometers 4: High-speed pulse setting(X3) 5: Communication given	0	◎
P0-12	Upper limit frequency	Lower frequency limit P0-14 to maximum frequency P0-10	50.00	◎
P0-13	Upper frequency offset	0.00Hz~Max.frequency P0-10	0.00	○
P0-14	Lower frequency offset	0.00Hz~Max.frequency P0-12	0.00	○
P0-15	Carrier frequency	0.5kHz~16.0kHz	Model setting	○
P0-16	Carrier frequency adjustment with temperature	0~1 0: No	1: Yes	1
P0-17	Acceleration time 1	0.00s~65000s	Model setting	○
P0-18	Deceleration time 1	0.00s~65000s	Model setting	○
P0-19	Acceleration/deceleration time units	0~2 0: 1s 1: 0.1s 2: 0.01s	1	◎
P0-21	Offset frequency of auxiliary frequency source during superposition	0.00Hz~Max.frequency P0-10	0.00	○
P0-22	Frequency command resolution	0~2 0: 1Hz 1: 0.1Hz 2: 0.01Hz	2	◎
P0-23	Selection of digital set frequency stop memory	0: No memory; 1: Memory	1	○
P0-24	Upper limit frequency source	0: P0-12 setting 1: VI 2: CI 3: keypad potentiometers 4: High-speed pulse setting(X3) 5: Communication given	0	◎
P0-25	Upper limit frequency	Lower frequency limit P0-14 to maximum frequency P0-10	50.00	◎

Functional code	Name	Function Description	Default Value	Change
P0-26	Run-time frequency instruction UP/DOWN reference	0: Running frequency 1: Setting frequency	1	◎
P0-27	Command sources bundled with frequency sources	Digit: Selection of operation keypad command bundled with frequency sources 0: unbound 1: Digital frequency binding 2:VI binding 3:CI binding 4: Keypad potentiometer binding 5: High-speed pulse (X3) binding 6: multi-speed binding 7: PLC program binding 8: Process PID binding 9: Communication binding Tens: Selection of terminal command binding frequency source Hundredths: Selection of communication command binding frequency source Thousands: Selection of automatic operation binding frequency source	0000	○
P0-26	Run-time frequency instruction UP/DOWN reference	0: Running frequency 1: Setting frequency	1	◎
P1 Group Parameters of Motor 1				
P1-00	Motor type selection	0~1 0: Common asynchronous motors 1: Frequency conversion asynchronous motor	0	◎
P1-01	Motor rated power	0.1~1000.0kW	Model setting	◎
P1-02	Motor rated voltage	1~2000V	Model setting	◎
P1-03	Motor rated current	0.01A~655.35A (Converter frequency<=55kW) 0.1A~6553.5A (Converter frequency>55kW)	Model setting	◎
P1-04	Motor rated frequency	0.01Hz~P0-10 (Max. frequency)	Model setting	◎
P1-05	Motor rated speed	1~65535rpm	Model setting	◎
P1-06	Stator resistance of asynchronous motor	0.001~65.535 Ω (<=55kW) 0.0001~6.5535 Ω (>55kW)	Tuning parameters	◎
P1-07	Rotor resistance of asynchronous motor	0.001~65.535 Ω (<=55kW) 0.0001~6.5535 Ω (>55kW)	Model setting	◎

Functional code	Name	Function Description	Default Value	Change
P1-08	Leakage inductance of asynchronous motor	0.01~655.35mH(<=55kW) 0.001~65.535mH(>55kW)	Tuning parameters	◎
P1-09	Mutual inductance of asynchronous motor	0.1~6553.5mH(<=55kW) 0.01~655.35mH(>55kW)	Tuning parameters	◎
P1-10	No-load current of asynchronous motor	0.01~P1-03(<=55kW) 0.1~P1-03(>55kW)	Tuning parameters	◎
P1-27	Number of encoder lines	1~65535	2500	◎
P1-28	Encoder type	0: ABZ incremental encoder 1: UVW incremental encoder 2: Rotary transformer 3: Sine and cosine encoder 4: Wire-saving UVW encoder	0	◎
P1-30	ABZ incremental encoder AB phase sequence	0: Forward 1: Reverse	0	◎
P1-31	Encoder mounting angle	0.0~359.9°	0.0°	◎
P1-32	UVW encoder UVW phase sequence	0: Forward 1: Reverse	0	◎
P1-33	UVW encoder offset angle	0.0~359.9°	0.0°	◎
P1-34	Number of pole pairs in resolver	1~65535	1	◎
P1-36	Speed feedback PG break detection time	0.0: No action 0.1s~10.0s	0.0	◎
P1-37	Self-learning of motor parameters selection	0: No action 1: Static self-learning of asynchronous motor parameters 1 2: Complete self-learning of asynchronous motor parameters 3: Static self-learning of asynchronous motor parameters 2	0	◎
Group P2 Vector Control Parameters of the First Motor				
P2-00	Velocity loop proportional gain 1	1~100	50	○
P2-01	Velocity loop integration time 1	0.01s~10.00s	1.0s	○
P2-02	Switching frequency 1	0.00~P2-05	5.00Hz	○
P2-03	Velocity loop integration time 2	1~100	30	○
P2-04	Velocity loop integration time 2	0.01s~10.00s	1.00s	○

Functional code	Name	Function Description	Default Value	Change
P2-05	Switching frequency 2	P2-02~Max. frequency	10.00Hz	○
P2-06	Vector controlled differential gain	50%~200%	100%	○
P2-07	Velocity loop filter time constant	0.0~0.100s	0.0	○
P2-08	Vector controlled overexcitation gain	0~200	64	○
P2-09	Selection of upper torque limit source in speed control mode	0: Setting of function code P2-10 1: VI setting 2: CI setting 3: keypad potentiometer setting 4: High-speed pulse setting (X3) 5: Communication setting 6: MIN (VI, CI) setting 7: MAX (VI, CI) setting The full range of options 1-7 corresponds to P2-10	0	○
P2-10	Digital setting of upper torque limit in speed control mode	0.0%~200.0%	150.0%	○
P2-13	Excitation regulation proportional gain	0~60000	2000	○
P2-14	Excitation regulation integral gain	0~60000	1300	○
P2-15	Torque regulation proportional gain	0~60000	2000	○
P2-16	Torque regulation integral gain	0~60000	1300	○
P2-17	Velocity loop integral property	Digit: points separation 0: Invalid 1: Valid	0	○
P3 Group V/F Control Parameters				
P3-00	VF curve setting	0: Straight line V/F 1: Multiple points V/F 2: Square V/F 3: 1.2 times V/F 4: 1.4 times V/F 6: 1.6 times V/F 8: 1.8 times V/F 9: Reserve 10: VF full separation mode 11: VF semi-separate mode	0	◎

Functional code	Name	Function Description	Default Value	Change
P3-01	Torque boost	0.0%: (automatic torque boost) 0.1%~30.0%	Model setting	○
P3-03	Multi-point VF frequency point 1	0.00Hz~P3-05	0.00Hz	◎
P3-04	Multi-point VF voltage point 1	0.0%~100.0%	0.0%	◎
P3-05	Multi-point VF frequency point 2	P3-03~P3-07	0.00Hz	◎
P3-06	Multi-point VF voltage point 2	0.0%~100.0%	0.0%	◎
P3-07	Multi-point VF frequency point 3	P3-05~Motor rated frequency (P1-04)	0.00Hz	◎
P3-08	Multi-point VF voltage point3	0.0%~100.0%	0.0%	◎
P3-09	VF differential compensation gain	0.0%~200.0%	0.0%	○
P3-10	VF overexcitation gain	0~200	64	○
P3-11	VF oscillation suppression gain	0~100	Model setting	○
P3-13	VF separated voltage sources	0: Digit setting(P3-14) 1: VI Setting 2: CI Setting 3: keypad potentiometer setting 4: High-speed pulse setting (X3) 5: multi-speed setting 6: PLC program setting 7: Process PID setting 8: Communication setting Note: 100.0% corresponds to the motor rated voltage	0	○
P3-14	VF separated voltage Digit setting	0V~motor rated voltage	0V	○
P3-15	VF separated voltage rise time	0.0s~1000.0s Note: indicates the time changing from 0V to motor rated voltage	0.0s	○
P3-16	VF separated voltage drop time	0.0s~1000.0s Note: indicates the time the motor rated voltage changes to 0V	0.0s	○
P3-17	VF Separation shutdown mode	0: Frequency/voltage independently reduced to 0 1: The frequency is reduced again after the voltage is reduced to 0	0	○

<table>
<tr><th>Functional code</th><th>Name</th><th>Function Description</th><th>Default Value</th><th>Change</th></tr>
<tr><td colspan="5">P4 Group Input Terminals</td></tr>
<tr><td>P4-00</td><td>FWD terminal function selection</td><td rowspan="9">0~59
0: No function 1: Forward running 2: Reverse running
3: Three-wire operation enable 4: Forward rotation pointing (FJOG) 5: Reverse rotation pointing (RJOG) 6: Terminal UP
7: Terminal DOWN 8: Stop freely 9: Fault reset (RESET)
10: Running suspension
11: External fault normally open input
12: multi-segment command terminal 1
13: multi-segment command terminal 2
14: multi-segment command terminal 3
15: multi-segment command terminal 4
16: Acceleration and deceleration time selection terminal 1
17: Acceleration and deceleration time selection terminal 2
18: Frequency source switching 19: UP/DOWN Setting zero (terminal, keypad) 20: Switching between keypad commands and terminal commands; Switching between keypad commands and communication commands
21: Acceleration and deceleration prohibited
22: Process PID pause 23: PLC program status reset
24: Pendulum frequency pause 25: Counter input
26: Counter reset 27: Length counter input
28: Length counter reset 29: Torque control prohibition
30: Pulse frequency input (valid for X3 only)
31: Reserved 32: Immediate DC brake 33: External fault normally closed input 34: Frequency modification enable
35: The process PID action direction is reversed
36: Stop on keyboard request 37: Switching between terminal commands and communication commands
38: Process PID integral pause 39: Switching between frequency source X and preset frequency 40: Switching between frequency source Y and preset frequency
41: Motor selection terminal 1
42: Motor selection terminal 2
43: Switching of process PID parameter
44: User-defined fault 1 45: User-defined fault 2
46: Switching of speed control and torque control
47: Emergency stop 48: Stop at any command
49: DC brake for speed reduction
50: This running time is cleared 51-59: Reserved</td><td>1</td><td>◎</td></tr>
<tr><td>P4-01</td><td>REV terminal function selection</td><td>2</td><td>◎</td></tr>
<tr><td>P4-02</td><td>X1 terminal function selection</td><td>9</td><td>◎</td></tr>
<tr><td>P4-03</td><td>X2 terminal function selection</td><td>12</td><td>◎</td></tr>
<tr><td>P4-04</td><td>X3 terminal function selection</td><td>13</td><td>◎</td></tr>
<tr><td>P4-05</td><td>X4 terminal function selection</td><td>0</td><td>◎</td></tr>
<tr><td>P4-06</td><td>X5 terminal function selection</td><td>0</td><td>◎</td></tr>
<tr><td>P4-07</td><td>X6 terminal function selection</td><td>0</td><td>◎</td></tr>
<tr><td>P4-08</td><td>Reserved</td><td>0</td><td>◎</td></tr>
</table>

Functional code	Name	Function Description	Default Value	Change
P4-09	X1 Shutdown delay action time	0.0s~3600.0s	0.0s	○
P4-10	Filter time of input terminals X1~X6	0.000s~1.000s	0.010s	○
P4-11	Selection of terminal command start method	0: Two-wire start/stop method 1 1: Two-wire start/stop method 2 2: Three-wire start/stop method 1 3: Three-wire start/stop method 2	0	◎
P4-12	Terminal UP/DOWN change rate	0.001Hz/s~65.535Hz/s	1.00Hz/s	○
P4-13	VI Min. input	0.00V~P4-15	0.00V	○
P4-14	VI Min. input correspondence setting	-100.0%~+100.0%	0.0%	○
P4-15	VI Max. input	P4-13~+10.00V	10.00V	○
P4-16	VI Max. input correspondence setting	-100.0%~+100.0%	100.0%	○
P4-17	VI Filter time	0.00s~10.00s	0.040s	○
P4-18	CI Min. input	0.00V~P4-20	0.00V	○
P4-19	CI Min. input correspondence setting	-100.0%~+100.0%	0.0%	○
P4-20	CI Max. input	P4-18~+10.00V	10.00V	○
P4-21	CI Max. input correspondence setting	-100.0%~+100.0%	100.0%	○
P4-22	CI Filter time	0.00s~10.00s	0.040s	○
P4-23	Keypad potentiometer min. input	0.00V~P4-25	0.00V	○
P4-24	Keypad potentiometer min. Input setting	-100.0%~+100.0%	-100.0%	○
P4-25	Keypad potentiometer max. input	P4-23~+10.00V	10.00V	○
P4-26	Keypad potentiometer max. Input setting	-100.0%~+100.0%	100.0%	○

Functional code	Name	Function Description	Default Value	Change
P4-27	Keypad potentiometer filter time	0.00s~10.00s	0.10s	○
P4-28	High-speed pulse (X3) min. input	0.00kHz~P4-30	0.00kHz	○
P4-29	High-speed pulse (X3) min. input Corresponding setting	-100.0%~100.0%	0.0%	○
P4-30	High-speed pulse (X3) max. input	P4-28~100.00kHz	50.00kHz	○
P4-31	High-speed pulse (X3) max. input Corresponding setting	-100.0%~100.0%	100.0%	○
P4-32	High-speed pulse (X3) filter time	0.00s~10.00s	0.10s	○
P4-33	FWD shutdown delay action time	0.0s~3600.0s	0.0s	
P4-34	REV shutdown delay action time	0.0s~3600.0s	0.0s	
P4-35	FWD turn on delay action time	0.0s~3600.0s	0.0s	
P4-36	REV turn on delay action time	0.0s~3600.0s	0.0s	
P4-37	X1 turn on delay action time	0.0s~3600.0s	0.0s	
P4-38	Digit input terminal signal polarity reversal mode selection 1	0: F logic 1: R logic Digit: FWD Tens: REV Hundreds: X1 Thousands: X2 Ten Thousands: X3	00000	◎
P4-39	Digit input terminal signal polarity reversal mode selection 2	0: F logic 1: R logic Digit: X4 Tens: X5 Hundreds: X6 Thousands: reserved Ten Thousands: reserved	00000	○

<table>
<tr><th>Functional code</th><th>Name</th><th>Function Description</th><th>Default Value</th><th>Change</th></tr>
<tr><td colspan="5">P5 Group Output Terminals</td></tr>
<tr><td>P5-00</td><td>MO2 Terminal output mode selection</td><td>0: Pulse output
1: Switching output</td><td>1</td><td>○</td></tr>
<tr><td>P5-01</td><td>MO2 (Switching) output function selection</td><td rowspan="4">0: No output 1: Frequency converter in operation 2: Fault output (fault stop)
3: Frequency level detection FDT1 output
4: Frequency reaches 5: In zero-speed operation (no output at stop)
6: Pre-alarm for motor overload
7: Pre-alarm for converter overload
8: Preset value reaches 9: Specified value reaches 10: Length reaches
11: PLC program loop completed
12: Cumulative running time reaches
13: Frequency under limitation
14: Torque under limitation 15: Ready to run
16:VI>CI 17: Upper limit frequency reaches
18: Lower limit frequency reaches (operation related) 19: Undervoltage output
20: Communication setting
21: Positioning completed (reserved)
22: Positioning proximity (reserved)
23: In zero-speed operation 2 (also output at stop) 24: Cumulative power-up time reaches
25: Frequency level detection FDT2 output
26: Frequency 1 reaches output
27: Frequency 2 reaches output
28: Current 1 reaches output
29: Current2 reaches output (also output at stop) 30: timed arrival output
31:VI Input overrun 32: Load dropping
33: Reverse running in progress
34: Zero current state
35: Module temperature reaches
35: Module temperature reaches
36: Output current overrun
37: Lower frequency limit to
38: Alarm output (keep running)
39: Motor over-temperature pre-alarm
40: This running time arrives</td><td>0</td><td>○</td></tr>
<tr><td>P5-02</td><td>Relays (A-B-C) output function selection
B-C is normally closed
A-B is normally open</td><td>1</td><td>○</td></tr>
<tr><td>P5-04</td><td>Relays (A1-B1-1C) output function selection
B1-C1 is normally closed
A1-B1 is normally open</td><td>2</td><td>○</td></tr>
<tr><td>P5-05</td><td>Standby</td><td>4</td><td>○</td></tr>
</table>

Functional code	Name	Function Description	Default Value	Change
P5-06	MO2(pulse) output function selection	0: Operation frequency 1: Set frequency 2: Output current 3: Output torque 4: Output power 5: Output voltage 6: High-speed pulse input (100% corresponds to 100.0kHz) 7:VI 8:CI 9: Keypad potentiometer 10: Length 11: Marking value 12: Communication setting 13: Motor speed 14: Output current (100.0% corresponds to1000.0A) 15: Output voltage (100.0% corresponds to 1000.0V) 16: Reserved	0	○
P5-07	AM output function selection		0	○
P5-08	FM output function selection		1	○
P5-09	MO2 (pulse) output maximum frequency	0.01kHz~100.00kHz	50.00kHz	○
P5-10	AM zero bias coefficient	-100.0%~+100.0%	0.0%	○
P5-11	AM gain	-10.00~+10.00	1.00	○
P5-12	FM zero bias coefficient	-100.0%~+100.0%	0.0%	○
P5-13	FM gain	-10.00~+10.00	1.00	○
P5-17	MO2 (switching) output turn-on delay time	0.0s~3600.0s	0.0s	○
P5-18	Relays A-B-C output turn-on delay time	0.0s~3600.0s	0.0s	○
P5-19	Reserved	0.0s~3600.0s	0.0s	○
P5-20	Relays A1-B1-C1 output turn-on delay time	0.0s~3600.0s	0.0s	○
P5-21	Reserved	0.0s~3600.0s	0.0s	○
P5-22	MO2(switching) output break delay time	0.0s~3600.0s	0.0s	○
P5-23	Relays A-B-C output break delay time	0.0s~3600.0s	0.0s	○

Functional code	Name	Function Description	Default Value	Change
P5-24	Reserved	0.0s~3600.0s	0.0s	○
P5-25	Relays A1-B2-C3 output break delay time	0.0s~3600.0s	0.0s	○
P5-26	Reserved	0.0s~3600.0s	0.0s	○
P5-27	Digit output terminal signal polarity reversal mode selection	0: F logic 1: R logic Digit: MO2 (switching) Tens: relays A-B-C Hundreds: reserved Thousands: relays A1-B1-C1 Ten Thousands: reserved	00000	○
P6 Group Start/stop Control				
P6-00	Starting method	0: Direct start 1: Speed tracking restart 2: pre-excited start (AC asynchronous motor)	0	○
P6-01	RPM tracking method	0: Starting with the shutdown frequency 1: Starting from zero speed 2: From max. frequency	0	○
P6-02	Fast and slow RPM tracking	1~100	20	○
P6-03	Starting frequency	0.00Hz~10.00Hz	0.00Hz	○
P6-04	Starting frequency holding time	0.0s~100.0s	0.0s	○
P6-05	Starting DC braking current/ Pre-excitation current	0%~100%	0%	○
P6-06	Start DC braking time/ Pre-excitation time	0.0s~100.0s	0.0s	○
P6-07	Acceleration and deceleration methods	0: Linear acceleration and deceleration 1:S curve acceleration/deceleration A	0	○
P6-08	S-curve start time ratio	0.0%~(100.0%-P6-09)	30.0%	○
P6-09	S-curve ending time ratio	0.0%~(100.0%-P6-08)	30.0%	○
P6-10	Stopping method	0: Slow down and stop 1: Stop freely	0	○
P6-11	Stopping DC braking start frequency	0.00Hz~Max. frequency	0.00Hz	○
P6-12	Stopping DC brake waiting time	0.0s~100.0s	0.0s	○

Functional code	Name	Function Description	Default Value	Change
P6-13	Stopping DC braking current	0%~100%	0%	○
P6-14	Stopping DC braking time	0.0s~100.0s	0.0s	○
P6-15	Zero speed output prohibition	0~1 0 With output 1 Without output	0	○
P7 GROUP Keypad and Display				
P7-01	MF. K key function selection	0: MF. K invalid 1: Switching of operation keypad command channel and remote command channel (terminal command channel or communication command channel) 2: Switching of forward and reverse 3: Forward rotation pointing 4: Reverse rotation pointing	0	○
P7-02	STOP/RESET key function	0: The stop function of STOP/RES key is only available in keyboard operation 1: The stop function of STOP/RES key is available in all modes of operation	0	○
P7-03	LED running display parameters 1	0000~FFFF Bit00: Running frequency 1 (Hz) Bit01: Set frequency (Hz) Bit02: Busbar voltage(V) Bit03: Output voltage(V) Bit04: Output current(A) Bit05: Output power(kW) Bit06: Output torque (%) Bit07:X terminal input status Bit08: Terminal output status Bit09:VI voltage (V) Bit10:CI voltage (V) Bit11: Keypad potentiometer voltage Bit12: Counting value Bit13: Length value Bit14: Load speed display Bit15: PID setting	0x1F	○

Functional code	Name	Function Description	Default Value	Change
P7-04	LED running display parameters 2	0000~FFFF Bit00: PID feedback Bit01: PLC stage Bit02: High-speed input pulse frequency (kHz) Bit03: Operating frequency 2 (Hz) Bit04: Remaining running time Bit05:VI Voltage before calibration(V) Bit06:CI Voltage before calibration(V) Bit07: Keypad potentiometer calibration voltage Bit08: Line speed Bit09: Current power on time (Hour) Bit10: Current running time (Min) Bit11: High-speed input pulse frequency (kHz) Bit12: Communication setpoint Bit13: Encoder feedback speed (Hz) Bit14: Mains frequency X display (Hz) Bit15: Auxiliary frequency Y display (Hz))	0	○
P7-05	LED Stop display parameters	0000~FFFF Bit00: Set frequency (Hz) Bit01: Busbar voltage(V) Bit02:X terminal input status Bit03: Terminal output status Bit04:VI voltage(V) Bit05:CI voltage (V) Bit06: Keyboard potentiometer voltage Bit07: Counting value Bit08: Length value Bit09: PLC stage Bit10: Load speed Bit11: PID setting Bit12: PID feedback Bit13: High-speed input pulse frequency(kHz)	33	○
P7-06	Load speed display factor	0.0001~6.5000	1.0000	○
P7-07	Radiator temperature of inverter module	0.0℃~100.0℃	-	●
P7-08	Product No.		500.00	●
P7-09	Cumulative running time	0h~65535h	-	●
P7-10	Performance version No.	-	1.00	●
P7-11	Software version No.	-	1.00	●
P7-12	Spare	-	-	○
P7-13	Cumulative power on time	0h~65535h	-	●
P7-14	Cumulative power consumption	0kW~65535 KW	-	●

Functional code	Name	Function Description	Default Value	Change
P8 Group Auxiliary Functions				
P8-00	Running frequency of inching	0.00Hz~Max. frequency	2.00Hz	○
P8-01	Inching acceleration time	0.0s~6500.0s	20.0s	○
P8-02	Inching deceleration time	0.0s~6500.0s	20.0s	○
P8-03	Acceleration time 2	0.0s~6500.0s	Model setting	○
P8-04	Deceleration time 2	0.0s~6500.0s	Model setting	○
P8-05	Acceleration time 3	0.0s~6500.0s	Model setting	○
P8-06	Deceleration time 3	0.0s~6500.0s	Model setting	○
P8-07	Acceleration time 4	0.0s~6500.0s	Model setting	○
P8-08	Deceleration time 4	0.0s~6500.0s	Model setting	○
P8-09	Jumping frequency 1	0.00Hz~Max. frequency	0.00Hz	○
P8-10	Jumping frequency 2	0.00Hz~Max. frequency	0.00Hz	○
P8-11	Jump frequency amplitude	0.00Hz~Max. frequency	0.01Hz	○
P8-12	Dead time for forward and reverse rotation	0.0s~3000.0s	0.0s	○
P8-13	Reverse control enables	0:Allowed； 1: Prohibited	0	○
P8-14	Running mode with set frequency below the lower frequency	0: Running at the lower frequency limit 1: Stop 2: Zero speed running	0	○
P8-15	Sagging control	0.00Hz~10.00Hz	0.00Hz	○
P8-16	Resistive energy braking threshold voltage	120~150%	130	○
P8-17	Resistance energy braking utilization rate	0~100%	50%	○
P8-18	Starting protection options	0:No protection； 1: Protection	0	○
P8-19	Frequency detection value (FDT1)	0.00Hz~Max. frequency	1.50Hz	○
P8-20	Frequency detection lag value (FDT1)	0.0%~100.0% (PDT1 level)	5.0%	○
P8-21	Frequency reaches detection width	0.0%~100.0% (max. frequency)	0.0%	○
P8-22	Is the jump frequency valid during acceleration and deceleration	0:Invalid； 1: Valid	0	○
P8-25	Switching frequency point between acceleration time 1 and acceleration time 2	0.00Hz~Max. frequency	0.00Hz	○
P8-26	Switching frequency point between deceleration time 1 and deceleration time 2	0.00Hz~Max. frequency	0.00Hz	○

Functional code	Name	Function Description	Default Value	Change
P8-27	Terminal inching priority	0:Invalid； 1: Valid	0	○
P8-28	Frequency detection value (FDT2)	0.00Hz~Max. frequency	50.00Hz	○
P8-29	Frequency detection lag value (FDT2)	0.0%~100.0% (FDT2 level)	5.0%	○
P8-30	Arbitrary arrival frequency detection value 1	0.00Hz~Max. frequency	50.00Hz	○
P8-31	Arbitrary arrival frequency detection width 1	0.0%~100.0% (Max. frequency)	0.0%	○
P8-32	Arbitrary arrival frequency detection value 2	0.00Hz~Max. frequency	50.00Hz	○
P8-33	Arbitrary arrival frequency detection width 2	0.0%~100.0% (Max. frequency)	0.0%	○
P8-34	Zero current detection level	0.0%~300Arbitrary arrival frequency detection width% 100.0% corresponding to the rated motor current	5.0%	○
P8-35	Zero current detection delay time	0.01s~600.00s	0.10s	○
P8-36	Output current exceeds the limit	0.0% (No test) 0.1%~300.0% (motor rated current)	200.0%	○
P8-37	Output current overrun detection delay time	0.00s~600.00s	0.00s	○
P8-38	Arbitrary arrival current 1	0.0%~300.0% (motor rated current)	100.0%	○
P8-39	Arbitrary arrival current 1 width	0.0%~300.0% (motor rated current)	0.0%	○
P8-40	Arbitrary arrival current 2	0.0%~300.0% (motor rated current)	100.0%	○
P8-41	Arbitrary arrival current 2 width	0.0%~300.0% (motor rated current)	0.0%	○
P8-42	Timing function selection	0:Invalid； 1: Valid	0	○
P8-43	Timed runtime selection	0: P8-44 setting 1:VI setting 2:CI setting 3: Keypad potentiometer setting Analogue input ranges correspond to P8-44	0	○
P8-44	Timed runtime	0.0Min~6500.0Min	0.0Min	○
P8-45	VI lower limit of input voltage protection value	0.00V~P8-46	3.10V	○
P8-46	VI upper limit of input voltage protection value	P8-45~10.00V	6.80V	○
P8-47	Module temperature reaches	0℃~100℃	75℃	○
P8-48	Cooling fan control	0: Fan running during operation 1: Fans running all the time	0	○

Functional code	Name	Function Description	Default Value	Change
P8-49	Wake-up stress	0~100%	0	○
P8-50	Wake-up delay time	0.0s~6500.0s	0.0s	○
P8-51	Dormancy frequency	0.00Hz~Max. frequency(P0-10)	0.00Hz	○
P8-52	Dormancy delay time	0.0s~6500.0s	0.0s	○
P8-53	Arrival time setting for this run	0.0Min~6500.0Min	0.0Min	○
P9 Group Fault and Protection				
P9-00	Motor overload protection option	0:Allowed； 1: Prohibited	1	○
P9-01	Motor overload protection gain	0.20~10.00	1.00	○
P9-02	Motor overload warning factor	50~100%	80%	○
P9-03	Overvoltage stall gain	0~100	10	○
P9-04	Overvoltage stall protection voltage	120%~150%	130%	○
P9-05	Overcurrent stall gain	0~100	20	○
P9-06	Overcurrent stall protection current	100%~200%	120%	○
P9-07	Selection of power-on short-circuit protection to ground	0:Invalid； 1: Valid	1	○
P9-09	Number of automatic faults reset	0~20	0	○
P9-10	Fault DO action selection during automatic fault reset	0: No action 1: Action	0	○
P9-11	Fault automatic reset interval	0.1s~100.0s	1.0s	○
P9-12	Input open phase protection selection	0:Allowed； 1: Prohibited	1	○
P9-13	Output open phase protection selection	0:Allowed； 1: Prohibited	1	○
P9-14	Motor overload protection selection	0:Allowed； 1: Prohibited	1	○

Functional code	Name	Function Description	Default Value	Change
P9-14	Type of the first fault	Err0: Fault-free Err1: Reserve Err2: Accelerated overcurrent Err3: Deceleration overcurrent Err4: Constant speed overcurrent Err5: Accelerated overvoltage Err6: Deceleration overvoltage Err7: Constant speed overvoltage Err8: Buffer resistor overload Err9: Undervoltage Err10: Frequency converter overload Err11: Motor overload Err12: Input open phase Err 13: Output open phase Err14: Module overheat Err 15: External fault Err 16: Communication abnormality Err 17: Contactor abnormality Err 18: Current detection abnormality Err 19: Motor tuning abnormality Err 20: Encoder/PG card abnormality Err 21: Parameter read/write exception Err 22: Converter hardware abnormality Err 23: Motor shorted to ground Err 24: Dormancy Err 25: Reserve Err 26: Running time arrival Err 27: User defined fault 1 Err 28: User defined fault 2 Err 29: Power on time arrival Err 30: Drop of load Err 31: Loss of PID feedback during runtime Err 40: Fast current limit timeout Err 41: Switching of motors during operation Err 42: Excessive speed deviation Err 43: Motor overspeed Err 45: Motor overtemperature Err51: Initial location error	—	●
P9-15	Type of the second fault		—	●
P9-16	Type of the third (latest) fault		—	●

Functional code	Name	Function Description	Default Value	Change
P9-17	Frequency at the third (latest) fault	—	—	●
P9-18	Currently the third (latest) fault	—	—	●
P9-19	Busbar voltage of the third (latest) fault	—	—	●
P9-20	Status of input terminals of the third (latest) fault	—	—	●
P9-21	Status of output terminals of the third (latest) fault	—	—	●
P9-22	Converter status of the third (latest) fault	—	—	●
P9-23	Power-on time of the third (latest) fault	—	—	●
P9-24	Running time of the third (latest) fault	—	—	●
P9-27	Frequency of the second fault	—	—	●
P9-28	Current of the second fault	—	—	●
P9-29	Busbar voltage of the second fault	—	—	●
P9-30	Status of input terminals of the second fault	—	—	●
P9-31	Status of output terminals of the second fault	—	—	●
P9-32	Converter status of the second fault	—	—	●
P9-33	Power-on time of the second fault	—	—	●

Functional code	Name	Function Description	Default Value	Change
P9-34	Running time of the second fault	—	—	●
P9-37	Frequency of the first fault	—	—	●
P9-38	Current of the firs fault	—	—	●
P9-39	Busbar voltage of the firs fault	—	—	●
P9-40	Status of input terminals of the firs fault	—	—	●
P9-41	Status of output terminals of the firs fault	—	—	●
P9-42	Converter status of the firs fault	—	—	●
P9-43	Power-on time of the firs fault	—	—	●
P9-44	Running time of the firs fault	—	—	●
P9-47	Selection of fault protection action mode 1	0: Stop freely 1: Stop by stop method 2: Keep running Digit: Motor overload (Err11) Tens: Input open phase (Err12) Hundreds: Output open phase (Err13) Thousands: External fault (Err15) Ten Thousands: Communication abnormality (Err16)	00000	○
P9-48	Selection of fault protection action mode 2	Digit: Encoder/PG card abnormality (Err20) 0: Stop freely 1: Switch to V/F control, and stop as stop method; 2: Switch to V/F control, and keep running Tens: Converter hardware abnormality (Err 21) 0: Stop freely 1: Stop as stop method Hundreds: Dormancy alarm (Err24), the same asP9-47 Thousands: Motor overtemperature (Err25), the same a P9-47 Ten Thousands: Running time arrival (Err26) the same as P9-47	10200	○

Functional code	Name	Function Description	Default Value	Change
P9-49	Selection of fault protection action mode 3	Digit: User defined fault 1(Err27) 0: Stop freely 1: Stop as stop method 2: Keep running Tens: User defined fault 2 (Err 28) same as digit Hundreds: Power on time arrival (Err 29) same as digit Thousands: Drop of load (Err 30) 0: Stop freely 1: Slow down and stop 2: Reduces to 7% of the rated motor frequency and continues to run, automatically returning to the set frequency when the load is not dropped Ten Thousands: Running PID Feedback lost (Err 31) Same as digit	00000	○
P9-50	Selection of fault protection action mode 4	Digit: Excessive speed deviation (Err 42) 0: Stop freely 1: Stop as stop method 2: Keep running Tens: Motor overspeed (Err 43) same as digit Hundreds: Initial location error (Err 51) same as digit Thousands: Speed feedback error (Err 52) same as digit Ten Thousands: Reserve	00000	○
P9-54	Frequency methods selection for keep running in the event of a fault	0: Running at current operating frequency 1: Operation at set frequency 2: Running at the upper frequency limit 3: Running at the lower frequency limit 4: Running at abnormal standby frequency	0	○

Functional code	Name	Function Description	Default Value	Change
P9-55	Abnormal standby frequency	60.0%~100.0% (100.0% corresponding maximum frequency P0-10)	100.0%	○
P9-59	Selection of instantaneous power failure mold	0: Invalid 1: Slow down 2: Slow down and stop	0	○
P9-61	Judgement time of instantaneous outage voltage recovery	0.00s~100.00s	0.50s	○
P9-62	Determine voltage of instantaneous power failure action	60.0%~100.0% (standard busbar voltage)	80.0%	○
P9-63	Load drop protection option	0: Invalid 1: Valid	0	○
P9-64	Load drop detection level	0.0~100.0％	10.0%	○
P9-65	Load drop detection time	0.0~60.0s	1.0s	○
P9-67	Overspeed detection value	0.0％~50.0％(Max. frequency)	20.0%	○
P9-68	Overspeed detection time	0.0s~60.0s	5.0s	○
P9-69	Excessive speed deviation detection value	0.0％~50.0％(Max. frequency)	20.0%	○
P9-70	Excessive speed deviation detection time	0.0s~60.0s	0.0s	○
PA Group PID Functions				
PA-00	Process PID setting sauce	0:PA-01 setting 1:VI setting 2:CI setting 3: Keypad potentiometer setting 4: High-speed pulse setting(X3) 5: Communication setting 6: multi-segment command setting	0	○
PA-01	Process PID value setting	0.0%~100.0%	50.0%	○
PA-02	Process PID feedback source	0:VI feedback 1:CI feedback 2: Keypad potentiometer feedback 3:VI-CI feedback 4: High-speed pulse feedback (X3) 5: Communication feedback 6:VI+CI feedback 7: MAX (|VI|, |CI|) feedback 8: MIN (|VI|, |CI|) feedback	0	○

Functional code	Name	Function Description	Default Value	Change
PA-03	Process PID action direction	0: Positive effect　　1: Counteraction	0	○
PA-04	Process PID setting- feedback range	0~65535	1000	○
PA-05	Process PID proportional gain Kp1	0.0~100.0	10.0	○
PA-06	Process PID integration time Ti1	0.01s~10.00s	0.80s	○
PA-07	Process PID differential time Td1	0.000s~10.000s	0.35s	○
PA-08	Process PID reverse cut-off frequency	0.00~Max. frequency	0.00Hz	○
PA-09	Process PID deviation limit	0.0%~100.0%	0.0%	○
PA-10	Process PID differential limit	0.00%~100.00%	0.50%	○
PA-11	Process PID given time of change	0.00~650.00s	5.00s	○
PA-12	Process PID feedback filter time	0.00~60.00s	0.00s	○
PA-13	Process PID output filter time coefficient	0~100	100	○
PA-14	Reserve	-	-	○
PA-15	Process PID proportional gain Kp2	0.0~100.0	5.0	○
PA-16	Process PID integration time Ti2	0.01s~10.00s	2.00s	○
PA-17	Process PID differential time Td2	0.000s~10.000s	0.000s	○
PA-18	Process PID parameter switching condition	0: No switching 1: Switching via X terminal 2: Automatic switching according to deviation 3: Automatic switching according to running frequency	0	○
PA-19	Process PID parameter switching deviation 1	0.0%~PA-20	20.0%	○
PA-20	Process PID parameter switching deviation 2	PA-19~100.0%	80.0%	○
PA-21	Process PID initial value	0.0%~100.0%	0.0%	○
PA-22	Process PID initial value holding time	0.00~650.00s	0.00s	○
PA-23	Positive max. Value of two output deviations	0.00%~100.00%	1.00%	○
PA-24	Reverse max. Value of two output deviations	0.00%~100.00%	1.00%	○
PA-25	Process PID integral attribute	Digit: Integral separation 0: Invalid　　1: Valid Tens: Does the integration stop when the output reaches the limit value? 0: Continue　　1: Stop	00	○

Functional code	Name	Function Description	Default Value	Change
PA-26	Detection value of process PID feedback missing	0.0%: No judgement of feedback loss 0.1%~100.0％	0.0%	○
PA-27	Detection time of process PID feedback missing	0.0s~20.0s	0.0s	○
PA-28	Process PID shutdown computing	0: Shutdown without computing 1: Computing during shutdown	0	○
Pb Group Pendulum Frequency, Fixed Length and Counting				
Pb-00	Pendulum frequency setting method	0: Related to the central frequency 1: Related to Max. frequency	0	○
Pb-01	Pendulum frequency amplitude	0.0%~100.0%	0.0%	○
Pb-02	Surge frequency amplitude	0.0%~50.0%	0.0%	○
Pb-03	Pendulum frequency period	0.1s~3000.0s	10.0s	○
Pb-04	Triangular wave rises time of the pendulum frequency	0.1%~100.0%	50.0%	○
Pb-05	Set length	0m~65535m	1000m	○
Pb-06	Actual length	0m~65535m	0m	○
Pb-07	Pulses per meter	0.1~6553.5	100.0	○
Pb-08	Set count value	1~65535	1000	○
Pb-09	Specify count value	1~65535	1000	○
PC Group Multi-segment Command and PLC Program				
PC-00	Multi-segment command 0	-100.0%~100.0%	0.0%	○
PC-01	Multi-segment command 1	-100.0%~100.0%	0.0%	○
PC-02	Multi-segment command 2	-100.0%~100.0%	0.0%	○
PC-03	Multi-segment command 3	-100.0%~100.0%	0.0%	○
PC-04	Multi-segment command 4	-100.0%~100.0%	0.0%	○
PC-05	Multi-segment command 5	-100.0%~100.0%	0.0%	○
PC-06	Multi-segment command 6	-100.0%~100.0%	0.0%	
PC-07	Multi-segment command 7	-100.0%~100.0%	0.0%	○
PC-08	Multi-segment command 8	-100.0%~100.0%	0.0%	○
PC-09	Multi-segment command 9	-100.0%~100.0%	0.0%	○
PC-10	Multi-segment command 10	-100.0%~100.0%	0.0%	○
PC-11	Multi-segment command 11	-100.0%~100.0%	0.0%	○
PC-12	Multi-segment command 12	-100.0%~100.0%	0.0%	○
PC-13	Multi-segment command 13	-100.0%~100.0%	0.0%	○
PC-14	Multi-segment command 14	-100.0%~100.0%	0.0%	○
PC-15	Multi-segment command 15	-100.0%~100.0%	0.0%	○

Functional code	Name	Function Description	Default Value	Change
PC-16	PLC program run mode selection	0: Stop at the end of a single run 1: Keep the final value at the end of a single run 2: Keep cycling	0	○
PC-17	Memory selection of PLC program operation power off	Digit: Memory selection at power off 0: No memory at power off 1: Memory at power off Tens: Stop memory selection 0: No memory at stop 1: Memory at stop	00	○
PC-18	PLC program runtime for paragraph 0	0.0s (h)~6553.5s (h)	0.0s (h)	○
PC-19	Selection of acceleration and deceleration times in paragraph 0 of the PLC program	0~3	0	○
PC-20	PLC program runtime for paragraph 1	0.0s (h)~6553.5s (h)	0.0s (h)	○
PC-21	Selection of acceleration and deceleration times in paragraph 1 of the PLC program	0~3	0	○
PC-22	PLC program runtime for paragraph 2	0.0s (h)~6553.5s (h)	0.0s (h)	○
PC-23	Selection of acceleration and deceleration times in paragraph 2 of the PLC program	0~3	0	○
PC-24	PLC program runtime for paragraph 3	0.0s (h)~6553.5s (h)	0.0s (h)	○
PC-25	Selection of acceleration and deceleration times in paragraph 3 of the PLC program	0~3	0	○
PC-26	PLC program runtime for paragraph 4	0.0s (h)~6553.5s (h)	0.0s (h)	○
PC-27	Selection of acceleration and deceleration times in paragraph 4 of the PLC program	0~3	0	○
PC-28	PLC program runtime for paragraph 5	0.0s (h)~6553.5s (h)	0.0s (h)	○
PC-29	Selection of acceleration and deceleration times in paragraph 5 of the PLC program	0~3	0	○

Functional code	Name	Function Description	Default Value	Change
PC-30	PLC program runtime for paragraph 6	0.0s (h)~6553.5s (h)	0.0s (h)	○
PC-31	Selection of acceleration and deceleration times in paragraph 6 of the PLC program	0~3	0	○
PC-32	PLC program runtime for paragraph 7	0.0s (h)~6553.5s (h)	0.0s (h)	○
PC-33	Selection of acceleration and deceleration times in paragraph 7 of the PLC program	0~3	0	○
PC-34	PLC program runtime for paragraph 8	0.0s (h)~6553.5s (h)	0.0s (h)	○
PC-35	Selection of acceleration and deceleration times in paragraph 8 of the PLC program	0~3	0	○
PC-36	PLC program runtime for paragraph 9	0.0s (h)~6553.5s (h)	0.0s (h)	○
PC-37	Selection of acceleration and deceleration times in paragraph9 of the PLC program	0~3	0	○
PC-38	PLC program runtime for paragraph 10	0.0s (h)~6553.5s (h)	0.0s (h)	○
PC-39	Selection of acceleration and deceleration times in paragraph 10 of the PLC program	0~3	0	○

Functional code	Name	Function Description	Default Value	Change
PC-40	PLC program runtime for paragraph 11	0.0s (h)~6553.5s (h)	0.0s (h)	○
PC-41	Selection of acceleration and deceleration times in paragraph 11 of the PLC program	0~3	0	○
PC-42	PLC program runtime for paragraph 12	0.0s (h)~6553.5s (h)	0.0s (h)	○
PC-43	Selection of acceleration and deceleration times in paragraph 12 of the PLC program	0~3	0	○
PC-44	PLC program runtime for paragraph 13	0.0s (h)~6553.5s (h)	0.0s (h)	○
PC-45	Selection of acceleration and deceleration times in paragraph 13 of the PLC program	0~3	0	○
PC-46	PLC program runtime for paragraph 14	0.0s (h)~6553.5s (h)	0.0s (h)	○
PC-47	Selection of acceleration and deceleration times in paragraph 14 of the PLC program	0~3	0	○
PC-48	PLC program runtime for paragraph 15	0.0s (h)~6553.5s (h)	0.0s (h)	○
PC-49	Selection of acceleration and deceleration times in paragraph 15 of the PLC program	0~3	0	○
PC-50	PLC program running time unit selection	0: s (second) 1:h (hour)	0	○
PC-51	Given method of multi-segment command 0	0: Function code PC-00 given 1:VI given 2:CI given 3: Reserve 4: High-speed pulse (X3) given 5: Process PID given 6: Set frequency (P0-08) given, UP/DOWN modifiable	0	○

Functional code	Name	Function Description	Default Value	Change
PD Group Communication Parameter Groups				
Pd-00	Baud rate	Digit: MODBUS 0:300BPS 1:600BPS 2:1200BPS 3:2400BPS 4:4800BPS 5:9600BPS 6:19200BPS 7:38400BPS 8:57600BPS 9:115200BPS Tens: ProPibus-DP 0:115200BPs 1:208300BPs 2:256000BPs 3:512000Bps Hundreds: Reserve Thousands: CAN link Baud rate 0:20 1:50 2:100 3:125 4:250 5:500 6:1M	5005	○
Pd-01	Data format	0: No calibration(8-N-2) 1: Even checking(8-E-1) 2: Odd checking (8-O-1) 3:8-N-1	0	○
Pd-02	Home address	1~247, 0 is the broadcast address	1	○
Pd-03	Response delay	0ms~20ms	2	○
Pd-04	Communication timeout	0.0 (invalid)， 0.1s~60.0s	0.0	○
Pd-05	Data transfer format selection	Digit: MODBUS 0: Non-standard MODBUS protocol 1: Standard MODBUS protocol Tens: Profibus-DP 0: PPO1 format 1: PPO2 format 2: PPO3 format 3: PPO5 format	31	○
Pd-06	Communication reading current resolution	0:0.01A 1:0.1A	0	○

Functional code	Name	Function Description	Default Value	Change
PE Group User Customized Function Codes				
PE-00	User function code 0			○
PE-01	User function code 1			○
PE-02	User function code 2			○
PE-03	User function code 3			○
PE-04	User function code 4			○
PE-05	User function code 5			○
PE-06	User function code 6			○
PE-07	User function code 7			○
PE-08	User function code 8			○
PE-09	User function code 9			○
PE-10	User function code 10			○
PE-11	User function code 11			○
PE-12	User function code 12			○
PE-13	User function code 13			○
PE-14	User function code 14			○
PE-15	User function code 15			○
PE-16	User function code 16			○
PE-17	User function code 17			○
PE-18	User function code 18			○
PE-19	User function code 19			○
PE-20	User function code 20			○
PE-21	User function code 21			○
PE-22	User function code 22			○
PE-23	User function code 23			○
PE-24	User function code 24			○
PE-25	User function code 25			○
PE-26	User function code 26			○
PE-27	User function code 27			○
PE-28	User function code 28			○
PE-29	User function code 29			○

Functional code	Name	Function Description	Default Value	Change
PP Group Functional Code Management				
PP-00	User Password	0~65535	0	◎
PP-01	Parameter initialization	0: No action 01: Restore the factory parameters, but not the motor parameters 02: Clear the fault record information 04: Reserve 501: Reserve	0	○
PP-02	Function parameter group display selection	Digit: U group display selection 0: No display 1: Display Tens: A group display selection 0: No display 1: Display	11	○
PP-03	Personalized parameter group display selection	Digit: User customized parameter group display selection 0: No display 1: Display Tens: User change parameter group display selection 0: No display 1: Display	00	○
PP-04	Modify property of function code	0: Modifiable; 1: non-modifiable	0	○
PP-05	Application parameter macro	0: Invalid 1: Water supply at constant pressure	0	○
A0 Group Torque Control Parameters				
A0-00	Speed/Torque control method selection	0: Speed control 1: Torque control	0	◎
A0-01	Torque setting source selection under torque control method	0: Digital setting source (A0-03) 1:VI setting source 2:CI setting source 3: Keypad potentiometer setting source 4: High-speed pulse (X3) setting source 5: Communication setting source 6: MIN (VI, CI) setting source 7: MAX (VI, CI) setting source (Full scope of items1-7 is corresponding to A0-03 digital setting value)	0	○

Functional code	Name	Function Description	Default Value	Change
A0-03	Digital setting torque under torque control method	-200.0%~200.0%	150.0%	○
A0-05	Forward max. Frequency of torque control	0.00Hz~Max. frequency	50.00Hz	○
A0-06	Reverse max. Frequency of torque control	0.00Hz~Max. frequency	50.00Hz	○
A0-07	Torque controlled acceleration time	0.00s~65000s	0.00s	○
A0-08	Torque controlled deceleration time	0.00s~65000s	0.00s	○
A2 Group Parameters of Second Motor				
A2-00	Motor type selection	0: Common asynchronous motor 1: Frequency conversion asynchronous motor	0	◎
A2-01	Motor rated power	0.1kW~1000.0kW	Model setting	◎
A2-02	Motor rated voltage	1V~2000V	Model setting	◎
A2-03	Motor rated current	0.01A~655.35A (Converter power<=55kW) 0.1A~6553.5A (Converter power>55kW)	Model setting	◎
A2-04	Motor rated frequency	0.01Hz~Max. frequency	Model setting	◎
A2-05	Motor rated speed	1rpm~65535rpm	Model setting	◎
A2-06	Asynchronous motor stator resistance	0.001Ω~65.535Ω (Converter power<=55kW) 0.0001Ω~6.5535Ω (Converter power>55kW)	Model setting	◎
A2-07	Asynchronous motor rotor resistance	0.001Ω~65.535Ω (Converter power<=55kW) 0.0001Ω~6.5535Ω (Converter power>55kW)	Model setting	◎
A2-08	Asynchronous motor leakage inductance	0.01mH~655.35mH (Converter power<=55kW) 0.001mH~65.535mH (Converter power>55kW)	Model setting	◎

Functional code	Name	Function Description	Default Value	Change
A2-09	Asynchronous motor mutual inductance resistance	0.1mH~6553.5mH (Converter power<=55kW) 0.01mH~655.35mH (Converter power>55kW)	Model setting	◎
A2-10	Asynchronous motor unload current	0.01A~A2-03 (Converter power <=55kW) 0.1A~A2-03 (Converter power>55kW)	Model setting	◎
A2-27	Number of encoder wires	1~65535	2500	◎
A2-28	Encoder type	0: ABZ incremental encoder 1: UVW incremental encoder 2: Rotary transformer 3: Sine and cosine encoders 4: Wire-saving UVW encoder	0	◎
A2-29	Speed feedback PG selection	0: Local PG 1: Reserve 2: High-speed pulse (X3)	0	◎
A2-30	AB phase sequence of ABZ incremental encoder	0: Forward 1: Reverse	0	◎
A2-31	Encoder mounting angle	0.0~359.9°	0.0°	◎
A2-32	UVW phase sequence of UVW encoder	0: Forward 1: Reverse	0	◎
A2-33	UVW Encoder offset angle	0.0~359.9°	0.0°	◎
A2-34	Number of pole pairs of resolvers	1~65535	1	◎
A2-36	Speed feedback PG disconnection detection time	0.0: No action 0.1s~10.0s	0.0	◎
A2-37	Self-learning options of the second motor	0: No action 1: Static self-learning of asynchronous motor 1 2: Complete self-learning of asynchronous motor 3: Static self-learning of asynchronous motor 2	0	◎
A2-38	Speed loop proportional gain 1	1~100	30	○
A2-39	Speed loop integration time 1	0.01s~10.00s	0.50s	○
A2-40	Switching frequency1	0.00~A2-43	5.00Hz	○
A2-41	Speed loop proportional gain 2	1~100	20	○

Functional code	Name	Function Description	Default Value	Change
A2-42	Speed loop integration time 2	0.01s~10.00s	1.00s	○
A2-43	Switching frequency 2	A2-40~Max. frequency	10.00Hz	○
A2-44	Vector controlled differential gain	50%~200%	100%	○
A2-45	SVC torque filtering constant	1-31	28	○
A2-46	Vector controlled overexcitation gain	0~200	64	○
A2-47	Torque upper limit source under vector control method	0: A2-48 setting 1:VI 2:CI 3: Keypad potentiometer 4: High-speed pulse 5: Communication given 6: MIN (VI, CI) 7:MAX (VI, CI) Note: The full range of options 1-7 is correspond to A2-48 settings	0	○
A2-48	Torque upper limit digital setting under vector control method	0.0%~200.0%	150.0%	○
A2-51	Excitation regulation proportional gain	0~20000	2000	○
A2-52	Excitation regulation integral gain	0~20000	1300	○
A2-53	Torque regulation proportional gain	0~20000	2000	○
A2-54	Torque regulation integral gain	0~20000	1300	○
A2-55	Speed loop integral property	Digit: Integral separation 0: Invalid 1: Valid	0	○
A2-61	Control method of the second motor	0: without vector control (SVC) 1: with vector control (FVC) 2: V/F control	0	○
A2-62	Acceleration and deceleration times of the second motor	0: Same as the first motor 1: Acceleration and deceleration 1 2: Acceleration and deceleration 2	0	○
A2-63	Torque boost of the second motor	0.0%: Auto-torque 0.1%~30.0%	Model setting	○

Functional code	Name	Function Description	Default Value	Change
A5 Group Control Optimization Parameters				
A5-00	DPWM switching upper frequency	0.00Hz~P0.10	12.00Hz	○
A5-01	PWM Modulation method	0: Asynchronous modulation 1: Synchronous modulation	0	○
A5-02	dead band compensation mode selection	0: No compensation 1: Compensation mode	1	○
A5-03	Random PWM depth	0: Invalid of random PWM 1~10: Random depth of PWM carrier frequency	0	○
A5-04	Fast current limit enables	0: non-enabling 1: Enabling	1	○
A5-05	Current detection compensation	0~100	5	○
A5-06	Undervoltage point setting	60.0%~140.0%	100.0%	○
A5-07	SVC optimization mode selection	1~2 1: Optimization mode 1 2: Optimization mode 2	1	○
A5-08	Dead time adjustment	100%~200%	150%	○

Summary Table of Monitoring Parameters

Function code	Name	Min. unit
U0 Group Basic Monitoring Parameters		
U0-00	Running frequency (Hz)	0.01Hz
U0-01	Setting frequency (Hz)	0.01Hz
U0-02	Busbar voltage(V)	0.1V
U0-03	Output voltage(V)	1V
U0-04	Output current(A)	0.01A
U0-05	Output power(kW)	0.1kW
U0-06	Output torque (%)	0.1%
U0-07	X terminal input status	1
U0-08	Terminal output status	1
U0-09	VI voltage(V)	0.01V
U0-10	CI voltage(V)	0.01V
U0-11	Keypad potentiometer voltage (V)	0.01V
U0-12	Counting Value	1
U0-13	Length value	1
U0-14	Load speed display	0.001krpm
U0-15	Process PID setting	1
U0-16	Process PID feedback	1
U0-17	PLC stage	1

Function code	Name	Min. unit
U0-18	Input pulse frequency (Hz)	0.01kHz
U0-19	Feedback speed (unit 0.1Hz)	0.1Hz
U0-20	Remaining running time	0.1Min
U0-21	VI pre-calibration voltage	0.001V
U0-22	CI pre-calibration voltage	0.001V
U0-23	Keypad potentiometer pre-calibration voltage	0.001V
U0-24	Line speed	1m/Min
U0-25	Current power on time	1Min
U0-26	Current running time	0.1Min
U0-27	Input pulse frequency	1Hz
U0-28	Communication setting value	0.01%
U0-29	Encoder feedback speed	0.01Hz
U0-30	Mains frequency X Display	0.01Hz
U0-31	Mains frequency Y Display	0.01Hz
U0-32	View any memory address value	1
U0-33	Reserve	
U0-34	Motor temperature value	1℃
U0-35	Target torque (%)	0.1%
U0-36	Rotation position	1
U0-37	Power factor angle	0.1°
U0-38	ABZ position	1
U0-39	VF separate target voltage	1V
U0-40	VF separate output voltage	1V
U0-41	Visual display of input X terminal status	1
U0-42	Visual display of output terminal status	1
U0-43	Visual display of the X function status 1 (function 01-function 40)	1
U0-44	Visual display of the X function status 2 (function 41-function 80)	1
U0-59	Setting frequency (%)	0.01%
U0-60	Running frequency (%)	0.01%
U0-61	Converter status	1

Chapter V Fault Diagnosis and Countermeasures

The SCMOD converter has 35 warning messages and protection functions. In case of a fault, the protection functions will be act, the converter will stop output, the fault relay will be act and the fault code will be displayed on the converter. Before seeking service, the user should follow the instructions in this section to carry out a self-check, analyses the cause of the fault and find a solution. If the following causes cannot be solved, please seek technical support from your converter dealer or our after-service department.

Fault Name	Inverter Unit Protection
Display of Operation Keypad	Err01
Troubleshooting	1.Short circuit in the output circuit of the frequency converter 2.Excessively long wiring of motor and converter 3. Module overheats 4.Loose wiring inside the converter 5. Main control board abnormality 6.Driver board abnormality 7. Converter module abnormality
Troubleshooting response	1.Troubleshooting of external faults 2. Addition of reactor or output filter 3.Check whether the air duct is blocked; Whether the fan works normally and eliminate the existing problems. 4.Plug in all the connection cables 5.Seeking technical support
Fault Name	Accelerated Overcurrent
Display of Operation Keypad	Err02
Troubleshooting	1.Ground or short circuit in the output circuit of the frequency converter 2.The control method is vector control and no parameter identification is performed 3.Too short of acceleration time 4. Manual torque boost or inappropriate V/F curve 5.Low voltage 6. Start the rotating motor 7.Sudden load during acceleration 8. The selected converter is too small
Troubleshooting response	1.Troubleshooting of external faults 2. Identify the motor parameter 3.Increase acceleration time 4. Adjustment of the manual boost torque or V/F curve 5.Adjust the voltage to the normal range 6. Cancellation of sudden load 7.Select speed tracking start or wait for the motor to stop before starting 8.Choose a frequency converter with a higher power rating
Fault Name	Deceleration Overcurrent
Display of Operation Keypad	Err03
Troubleshooting	1.Ground or short circuit in the output circuit of the frequency converter 2.The control method is vector control and no parameter identification is performed 3.Too short of deceleration 4. Low voltage 5.Sudden load during deceleration 6. No additional brake unit and brake resistor
Troubleshooting response	1.Troubleshooting of external faults 2. Identify the motor parameter 3.Increase deceleration time 4. Adjust the voltage to the normal range 5.Cancellation of sudden load 6. Addition of brake unit and resistor

Fault Name	Constant Speed Overcurrent
Display of Operation Keypad	Err04
Troubleshooting	1.Ground or short circuit in the output circuit of the frequency converter 2.The control method is vector control and no parameter identification is performed 3.Low voltage 4. Is there any sudden loading during operation 5.The selected converter is too small
Troubleshooting response	1.Troubleshooting of external faults 2. Identify the motor parameter 3.Adjust the voltage to the normal range 4. Cancellation of sudden load 5.Choose a frequency converter with a higher power rating
Fault Name	Acceleration Overvoltage
Display of Operation Keypad	Err05
Troubleshooting	1.High input voltage 2.There is an external force to drag the motor to run during acceleration 3.Too short of acceleration time 4.No additional brake unit and brake resistor
Troubleshooting response	1.Adjust the voltage to the normal range 2.Cancel the additional power or install a braking resistor 3.Increase the acceleration time 4.Add brake unit and resistor
Fault Name	Deceleration Overvoltage
Display of Operation Keypad	Err06
Troubleshooting	1.High input voltage 2.There is an external force to drag the motor to run during deceleration 3.Too short of deceleration time 4.No additional brake unit and brake resistor
Troubleshooting response	1.Adjust the voltage to the normal range 2.Cancel the additional power or install a braking resistor 3.Increase the deceleration time 4.Add brake unit and resistor
Fault Name	Constant Speed Overvoltage
Display of Operation Keypad	Err07
Troubleshooting	1.High input voltage 2.There is an external force to drag the motor to run during operation
Troubleshooting response	1.Adjust the voltage to the normal range 2.Cancel the additional power or install a braking resistor
Fault Name	Buffer resistor overload
Display of Operation Keypad	Err08
Troubleshooting	The input voltage is not within the range specified in the specification
Troubleshooting response	Adjusting the voltage to the range required by the specification
Fault Name	Undervoltage Fault
Display of Operation Keypad	Err09
Troubleshooting	1.Instantaneous power failure 2.The voltage at the input of the frequency converter is not within the range required by the specification
Troubleshooting response	1.Reset fault 2.Adjust voltage to normal range 3.Seeking technical support

Fault Name	Frequency Converter Overload
Display of Operation Keypad	Err10
Troubleshooting	1.Whether the load is too large or the motor is blocked 2.The selected converter is small
Troubleshooting response	1.Reduce the load and check the condition of the motor and machinery 2.Choose a frequency converter with a higher power rating
Fault Name	Motor Overload
Display of Operation Keypad	Err11
Troubleshooting	1.Is the motor protection parameter P9-01 setting appropriate? 2.Whether the load is too large or the motor is blocked 3.The selected converter is small
Troubleshooting response	1.Set the parameter correctly 2.Reduce the load and check the condition of the motor and machinery 3.Choose a frequency converter with a higher power rating
Fault Name	Input Open phase
Display of Operation Keypad	Err12
Troubleshooting	1.Three-phase input power source is abnormal 2. Abnormal driver board 3.Abnormal lightning protection panel 4.Abnormal main control board
Troubleshooting response	1.Check and eliminate the problems in the external circuit. Abnormal driver board 2.Seeking technical support
Fault Name	Output Open phase
Display of Operation Keypad	Err13
Troubleshooting	1.The lead from the converter to the motor is not working properly 2.Unbalanced three-phase output of the converter when the motor is running 3.Abnormal driver board 4.Module exception
Troubleshooting response	1.Troubleshooting the external faults 2.Check whether the three-phase winding of the motor is normal and troubleshoot it.

Fault Name	Module overheating
Display of Operation Keypad	Err14
Troubleshooting	1.High ambient temperature 2.Blocked air duct 3.Damaged fan 4.Damaged module thermistor 5.Damaged inverter module
Troubleshooting response	1.Reduced the ambient temperature 2.Cleaning the air ducts 3.Replace the fan 4.Replace the thermistor 5.Replace the inverter module
Fault Name	External Equipment Faults
Display of Operation Keypad	Err15
Troubleshooting	Input the external fault signal via digital input terminal X
Troubleshooting response	Reset running
Fault Name	Communication Faults
Display of Operation Keypad	Err16
Troubleshooting	1.The upper unit is not working properly 2.Communication lines are not working properly 3.Incorrect setting of communication card P0-28 4.Incorrect setting of communication parameter PD group
Troubleshooting response	1.Check the upper unit wiring 2.Check the communication wiring 3.Set the communication expansion card type correctly 4.Set the communication parameters correctly
Fault Name	Contactor fault
Display of Operation Keypad	Err17
Troubleshooting	1. Low voltage of power grid. 2. Contactors damaged. 3. Power-on buffer resistor damaged. 4. Control circuit damaged.
Troubleshooting response	1. Check the power grid. 2. Replace the contactor. 3. Replace the buffer resistor. 4. Seek technical support.
Fault Name	Current Detection Faults
Display of Operation Keypad	Err18
Troubleshooting	1.Check Hall device abnormality 2.Drive board abnormality
Troubleshooting response	1.Replace the Hall device 2.Replace the drive board
Fault Name	Motor Tuning Faults
Display of Operation Keypad	Err19
Troubleshooting	1.Motor parameters not set according to nameplate 2.Parameter identification process timeout
Troubleshooting response	1.Correct setting of the motor parameters according to the nameplate 2.Check the lead from converter to motor
Fault Name	Code Plate Fault
Display of Operation Keypad	Err20
Troubleshooting	1.Mismatch of encoder model 2.Wrong encoder connection 3.Damaged encoder 4.PG card exception
Troubleshooting response	1.Set the encoder type correctly according to the actual 2.Troubleshoot the wiring 3.Replace the encoder 4.Replace the PG card

Fault Name	EEPROM Read/Write Fault
Display of Operation Keypad	Err21
Troubleshooting	EEPROM chip damaged
Troubleshooting response	Replace the main control board
Fault Name	Converter Hardware Faults
Display of Operation Keypad	Err22
Troubleshooting	1.Presence of overvoltage 2.Presence of overcurrent
Troubleshooting response	1.Treat as an overvoltage fault 2.Treat as an overcurrent fault; in most cases it is a hardware overvoltage fault that causes the Err22 alarm
Fault Name	Short circuit to ground fault
Display of Operation Keypad	Err23
Troubleshooting	Motor short-circuited to ground
Troubleshooting response	Replace the cable or motor
Fault Name	Dormant alarm
Display of Operation Keypad	A24
Troubleshooting	The frequency converter is in a dormant state
Troubleshooting response	The pump pressure is below the wake-up pressure and the converter automatically exits the dormant state and enters normal operation
Fault Name	Cumulative Running Time Reaches Fault
Display of Operation Keypad	A26
Troubleshooting	Cumulative running time reaches the setting value
Troubleshooting response	Clear the recorded information by using the parameter initialization function
Fault Name	User Defined Fault 1
Display of Operation Keypad	Err27
Troubleshooting	Input the signal user defined fault 1 via digital input terminal X
Troubleshooting response	Reset running
Fault Name	User Defined Fault 2
Display of Operation Keypad	Err28
Troubleshooting	Input the signal user defined fault 2 via digital input terminal X
Troubleshooting response	Reset running
Fault Name	Cumulative Power-on Time Reaches Fault
Display of Operation Keypad	Err29
Troubleshooting	Cumulative power-on time reaches setting value
Troubleshooting response	Clear the recorded information by using the parameter initialization function
Fault Name	Dropped Load Fault
Display of Operation Keypad	Err30
Troubleshooting	The converter operating current less than P9-64
Troubleshooting response	Check that the load is disengaged and that the P9-64 and P9-65 parameters are set in accordance with the actual operating conditions
Fault Name	PID Feedback Loss Fault at Runtime
Display of Operation Keypad	Err31
Troubleshooting	PID feedback less than PA-26 setting value
Troubleshooting response	Check for an open or damage of PID feedback signal or set PA-26 to a suitable value

Fault Name	Wave-by-wave Current Limiting Fault
Display of Operation	Err40
Troubleshooting	1.Whether the load is too large or the motor is blocked 2.The converter selected is small
Troubleshooting response	1.Reduce the load and check the condition of the motor and machinery 2.Choose a frequency converter with a higher power rating
Fault Name	Fault in Switching Motor During Operation
Display of Operation	Err41
Troubleshooting	Change of current motor selection via terminals during converter operation
Troubleshooting response	Switch the motor after the shutdown of frequency converter
Fault Name	Excessive Speed Deviation Fault
Display of Operation	Err42
Troubleshooting	1.Incorrect encoder parameter setting 2.No parameter identification 3. Detection parameter P9-69. P9-60 of excessive speed deviation not set correctly
Troubleshooting response	1.Set the encoder parameters correctly 2.Perform motor parameter identification 3.Rational setting of the test parameters according to the actual situation
Fault Name	Motor Overspeed Fault
Display of Operation	Err43
Troubleshooting	1.Incorrect encoder parameter setting 2.No parameter identification 3.Motor overspeed detection parameter P9-69. P9-60 not set correctly
Troubleshooting response	1.Set the encoder parameters correctly 2.Perform motor parameter identification 3.Rational setting of the test parameters according to the actual situation
Fault Name	Motor Over-temperature Fault
Display of Operation	Err45
Troubleshooting	1.Loosen of temperature sensor wiring 2.Excessive motor temperature
Troubleshooting response	1.Testing and troubleshooting temperature sensor wiring 2.Reduce the load frequency or take other cooling measures to cool the motor
Fault Name	Incorrect Initial Position
Display of Operation	Err51
Troubleshooting	Motor parameters deviate too much from actual
Troubleshooting response	Re-check that the motor parameters are correct, focusing on whether the rated current setting is low

Chapter VI Maintenance and Care

6.1 Daily maintenance

In order to prevent the failures of frequency converter, ensure the normal operation of the equipment and extend the service life of the converter, it is necessary to carry out daily maintenance on the frequency converter. The contents of daily maintenance are as follows:

Check items	Contents
Temperature / Humidity	Confirm that the ambient temperature is between 0°C and 40°C and the humidity is between 20 and 90% without condensation
Oil mist & dust	Confirm that the converter is free of oil mist and dust, without condensation
Converter	Check the frequency converter for abnormal heating and vibration
Fan	Make sure the fan is running properly, without any debris jamming etc.
Input power supply	Confirm that the voltage and frequency of the input power supply are within the permitted range
Motor	Check the motor for abnormal vibration, heat, noise and open phase

6.2 Regular maintenance

In order to prevent converter failures and to ensure its high performance and stable operation over a long period of time, the user must check the converter regularly (within six months) ; especially for the frequency converter at sites with high oscillations, high dust, high temperatures, etc must be inspected half a month.

The checking contents are as follow:

Check items	Contents	Troubleshooting methods
Screws of external terminals	Whether the screws are loose	Tighten them
PCB	Dust and dirt on PCB board	Complete removal of debris with dry compressed air
Fan	whether the accumulated time for abnormal noise and vibration exceeds 20,000 hours.	1.Remove debris 2. Replace the fan
Electrolytic Capacitor	Is it discolored and does it have an unpleasant smell?	Replace the electrolytic capacitor
Radiator	Dust and dirt	Complete removal of debris with dry compressed air
Power Component	Dust and dirt	Complete removal of debris with dry compressed air

6.3 Replacement of wearing parts of frequency converter

The fan and electrolytic capacitor in the converter are easily damaged parts, to ensure the long-term, safe, and trouble-free operation of converter, the wearing parts should be replaced regularly. The replacement time of wearing parts is as follows:

◆Fan must be replaced after more than 20,000 hours of use

◆Electrolytic capacitors: must be replaced after 30,000 to 40,000 hours of use

6.4 Warranty of frequency converter

Our company provides the SCMOD series converter with a 12-month warranty service from the date of delivery (subject to the barcode on the body).

Chapter VII Optional Accessories

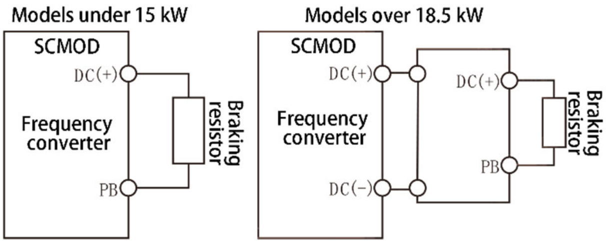
7.1 Brake Assembly

When the equipment driven by the converter needs to be braked quickly or has a large amount of energy to be fed back, a braking unit is required to release the energy fed back to the DC bus. Generally speaking, the model up to 15kW (including 15kW) has a built-in braking unit and is connected directly to a braking resistor; the model above 18.5kW (including 18.5KKW) requires an external braking unit and resistor.

The selection of braking resistors for different power classes of inverters is shown as below:

Converter power		Braking unit		Each braking unit needs to be equipped with a dynamic resistor			Braking torque (%)
Voltage	Max. capacity KW(HP)	Type 70BR	Quantity (unit)	Recommended resistance value	Single resistor specification	Quantity	
Single-phase 220V Series	0.5(0.7)	Built-in		80W 200Ω	80W 200Ω	1	100%
	0.75(1.0)	Built-in		80W 200Ω	80W 200Ω	1	
	1.5(2.0)	Built-in		150W 100Ω	150W 100Ω	1	
	2.2(3.0)	Built-in		200W 100Ω	200W 100Ω	1	
	4.0(5.0)	Built-in		300W 75Ω	300W 75Ω	1	
Three-phase 380V Series	0.75(1.0)	Built-in		80W 400Ω	80W 400Ω	1	100%
	1.5(2.0)	Built-in		120W 300Ω	180W 300Ω	1	
	2.2(3.0)	Built-in		160W 250Ω	250W 250Ω	1	
	4.0(5.0)	Built-in		300W 150Ω	400W 150Ω	1	
	5.5(7.5)	Built-in		400W 100Ω	600W 100Ω	1	
	7.5(10)	Built-in		550W 75Ω	800W 75Ω	1	
	11(15)	Built-in		1000W 68Ω	1000W 68Ω	1	
	15(20)	Built-in		1500W 50Ω	1500W 50Ω	1	
	18.5(25)	4030	1	2500W 35Ω	2500W 35Ω	1	
	22(30)	4030	1	3000W 27.2Ω	1200W 6.8Ω	4	
	30(40)	4045	1	5000W 17.5Ω	2500W 35Ω	2	
	37(50)	4045	1	9600W 16Ω	1200W 8Ω	8	
	45(60)	4045	1	9600W 13.6Ω	1200W 6.8Ω	8	
	55(75)	4030	2	6000W 20Ω	1500W 5Ω	4	
	75(100)	4045	2	9600W 15Ω	1200W 7.5Ω	8	
	93(150)	4045	2	9600W 13.6Ω	1200W 6.8Ω	8	
	110(150)	4045	3	9600W 16Ω	1200W 8Ω	8	
	132(175)	4045	3	9600W 13.6Ω	1200W 6.8Ω	8	
	160(220)	4045	4	9600W 13.6Ω	1200W 6.8Ω	8	
	220(300)	4045	5	9600W 13.6Ω	1200W 6.8Ω	8	
	250(330)	4045	6	9600W 13.6Ω	1200W 6.8Ω	8	

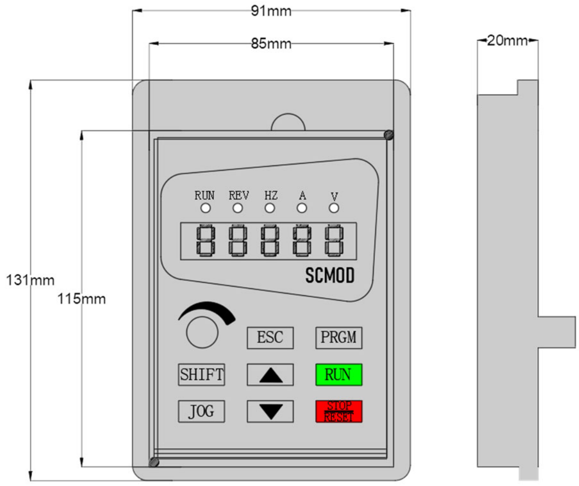
Wiring diagram for brake components:



7.2 Remote monitoring operation box

It’s installed individually on the door panel or operator's console to observe the running parameters of the converter and to keep a track of the converter operation.

The installation dimensions are as follows:



Chapter VIII Communication Protocol

The SCMOD series converters provide an RS232/RS485 communication interface and support the Modbus RTU Communication protocol. **The communication parameters, such as slave number and data format, are set via the Pd group parameters.**

8.1 RTU frame format:

Frame header START	3.5-character time
Slave address ADR	Communication address: 1~247
Command code CMD	03: Read the slave parameters; 06: write the slave parameters
Data content DATA (N-1)	Contents: address of the function code parameter, number of function code parameters, value of the function code parameter, etc.
Data content DATA (N-2)	
……	
Data content DATA0	
CRCCHK High	Detected value: CRC value.
CRCCHK Low	
END	3.5-character time

8.2 Addresses of common communication parameters

8.2.1 Monitoring parameters

Parameter Address	Parameter Description
1000 (H)	* Communication setting value (-10000~10000) (Decimal)
1001	Running frequency
1002	Busbar voltage
1003	Output voltage
1004	Output current
1004	Output current
1005	Output power
1006	Output torque
1007	Running speed
1008	X Terminal input symbol
1009	Digital terminal output symbol
100A	VI voltage
100B	CI voltage
100C	Keypad potentiometer voltage
100D	Counting value input
100E	Length value input
100F	Load speed
1010	PID setting
1011	PID feedback
1012	PLC Step
1013	Input pulse frequency, in unit of 0.01kHz
1014	Feedback speed， in unit of 0.1Hz
1015	Remaining running time
1016	VI pre-calibration voltage
1017	CI pre-calibration voltage
1018	Keypad potentiometer pre-calibration voltage
1019	Line speed
101A	Current power-on time
101B	Current running time
101C	Input pulse frequency, in unit of 1Hz
101D	Communication setting value
101E	Actual feedback speed
101F	Main frequency X display
1020	Auxiliary frequency Y display

Note:

The communication setting value is percentages of relative values, 10000 for 100.00% and -10000 for -100.00%. For frequency setting, the percentage is a percentage relative to Max. frequency (P0-10); for torque setting, the percentage is P2-10. A2-48 (the upper torque figure setting, corresponding to the first and second motors respectively).

8.2.2 Control commands of frequency converter (write only)

Command Word Address	Command Functions
2000 (H)	0001: Forward running
	0002: Reversed running
	0003: Forward inching
	0004: Reversed inching
	0005: Stop freely
	0006: Slow down and stop
	0007: Fault reset
2001	BIT0:A1-B1-C1 output control BIT1: Reserve BIT2: A-B-C output control BIT3: Reserve BIT4:MO2 Switching output control BIT5-BIT15: Reserve
2002	0~7FFF means 0％~100％: AM output
2003	0~7FFF means 0％~100％: FM output
2004	0~7FFF means 0％~100％: MO2 pulse output

8.2.3 Frequency converter status (read only)

Status Word Address	Status Word Meaning
3000 (H)	0001: Forward running
	0002: Reversed running
	0003: Stop

8.2.4 Frequency converter fault (read-only)

Fault Address	Fault information
8000（H） （Converter Faults）	0000: Faultless 0001: Reserve 0002: Accelerated overcurrent 0003: Deceleration overcurrent 0004: Constant speed overcurrent 0005: Accelerated overvoltage 0006: Deceleration overvoltage 0007: Constant velocity overvoltage 0008: Buffer resistor overload fault 0009: Undervoltage fault 000A: Converter overload 000B: Motor overload 000C: Input open phase 000D: Output open phase 000E: Module overheat 000F: External fault 0010: Communication abnormality 0011: Contactor abnormality 0012: Current detection fault 0013: Motor tuning fault 0014: Encoder/PG card fault 0015: Parameter read/write exceptions 0016: Converter hardware fault 0017: Motor short circuit to ground fault 0018: Reserve 0019: Reserve 001A: Runtime reaches 001B: User defined fault 1 001C: User defined fault 2 001D: Power-up time reaches 001E: Load dropping 001F:Loss of PID feedback at runtime 0028: Speed limit timeout fault 0029: Fault in switching motor during operation 002A: Excessive speed deviation 002B: Motor overspeed 002D: Motor overtemperature
8001 (Communication faults)	0000: Faultless 0001: Wrong password 0002: Wrong command code 0003: CRC checksum error 0004: Invalid address 0005: Invalid parameter 0006: Invalid parameter change 0007: System is locked

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