✧ Preface

Thanks for selecting the CA500 series heavy-load high-performance servo drives manufactured by Shenzhen SUNFAR Electric Technologies Co., Ltd.

The manual is the operation manual (Simple Edition) of CA500 series heavy-load high-performance servo drives, describing the installation, wiring, functional parameter, daily maintenance, fault diagnosis and elimination and other relevant detailed specifications as well as precautions about the CA500 series servo drives.

In order to make good use of the series servo drives and give full play to the products' excellent performance as well as ensuring the safety of users and equipments, please carefully read the manual prior to using the CA500 series servo drives. Incorrect use may result in abnormal operation of servo drives, malfunctions, shortening service life and even equipment damage, personal injury and other accidents!

The operation manual is an attachment delivered at random, please keep properly and safely for future troubleshooting and maintenance of servo drives.

Our company has been engaged in continuous improvement of the products, so any change of data provided shall not be advised additionally!

SUNFAR 四方电气

CA500 Series Heavy-Load High-Performance Servo Drives-Operation Manual (Simple Edition)
Operation Manual Edition: V1.0
Revised on July. 2016

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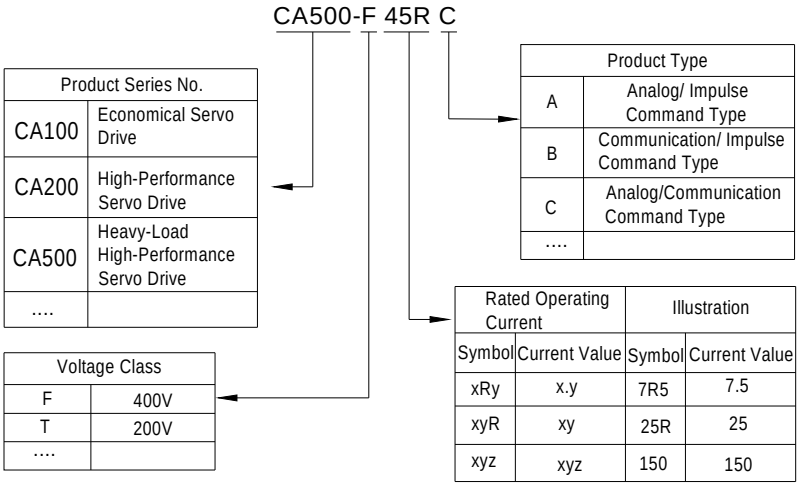
Chapter 1 Product Introduction

1.1 Model Description of Servo Drive



1.2 Model Specification Table

Voltage Class	Model	Rated Capacity (KVA)	Adapter Motor (KW)	Rated Current (A)
Three Phase 380V	CA500- F25RC	16.5	11	25
	CA500- F33RC	21.7	15	33
	CA500- F39RC	25.7	18.5	39
	CA500- F45RC	29.6	22	45
	CA500- F60RC	39.5	30	60
	CA500- F75RC	49.4	37	75
	CA500- F95RC	62.5	45	95
	CA500- F115C	75.7	55	115
	CA500- F150C	98.7	75	150

1.3 Brake Resistor Model Selection Table

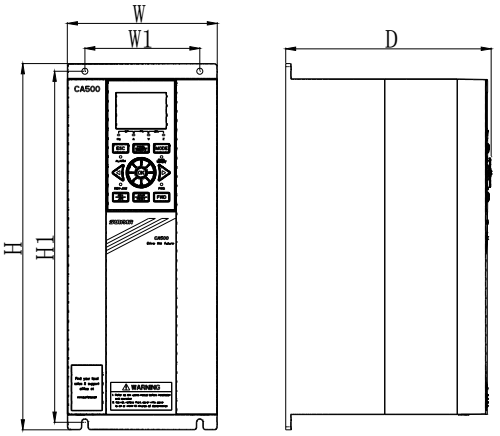
Servo Drive Model	Power of Brake Resistor (KW)	Value of Brake Resistor (Ω)	Braking Torque (%)
CA500-F25RC	2.5	50	100
CA500-F33RC	3.6	35	100
CA500-F39RC	4.5	30	100
CA500- F45RC	5.5	25	100
CA500- F60RC	6.5	20	100
CA500- F75RC	8.5	15	100
CA500- F95RC	12	12	100
CA500- F115C	15	10	100
CA500- F150C	18	8	100

1.4 Specification of Recommended Electrical Appliance

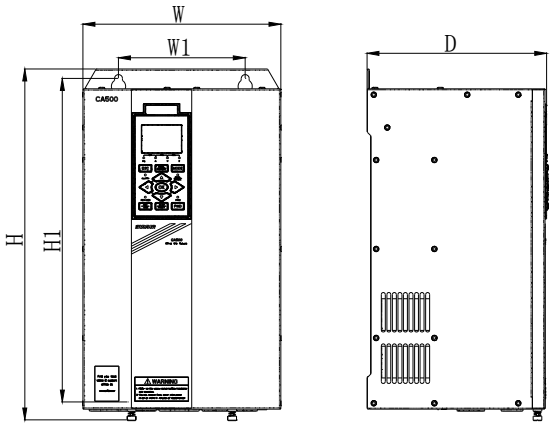
Servo Drive Model	EMC Input Filter (A)	Wire Gauge (Major Loop)(mm^2)	Air Circuit Breaker (A)	Electromagnetic Contactor (A)
CA500-F7R5C	——	——	——	——
CA500-F9R5C	——	——	——	——
CA500-F13RC	——	——	——	——
CA500-F17RC	——	——	——	——
CA500-F21RC	——	——	——	——
CA500- F25RC	50	10	63	40
CA500- F33RC	50	10	63	40
CA500- F39RC	80	16	80	63
CA500- F45RC	80	16	100	63
CA500- F60RC	100	25	125	100
CA500- F75RC	120	25	160	100
CA500- F95RC	150	35	200	125
CA500- F115C	150	50	225	125
CA500- F150C	200	70	250	160

1.5 Installation Dimension of Servo Drive

Class I, Applicable Models: CA500-F7R5C ～ CA500-F21RC



Class II, Applicable Models: CA500-F25RC～CA500-F150C



Product installation dimension and weight are as shown in the following table:

Servo Drive Model (Three phase 380V)	W1 (mm)	W (mm)	H1 (mm)	H (mm)	D (mm)	Screw Specifi	Weight (kg)
CA500-F7R5C	——	——	——	——	——	——	——
CA500- F9R5C							
CA500- F13RC							
CA500- F17RC	——	——	——	——	——	——	——
CA500- F21RC							
CA500- F25RC	136.0	207.0	328.0	344.0	220.0	M6	11.2
CA500- F33RC							
CA500- F39RC	160.0	250.0	410.0	430.0	225.0	M8	16.2
CA500- F45RC							
CA500- F60RC							
CA500- F75RC	200.0	300.0	496.0	518.0	276.5	M8	26.0
CA500- F95RC	240.0	381.0	576.0	600.0	280.0	M8	39.0
CA500- F115C							40.0
CA500- F150C	240.0	390.0	610.0	635.0	280.0	M8	53.0

Chapter 2 Wiring of Servo Drive

2.1 Connecting Optional Accessories with Servo Drive

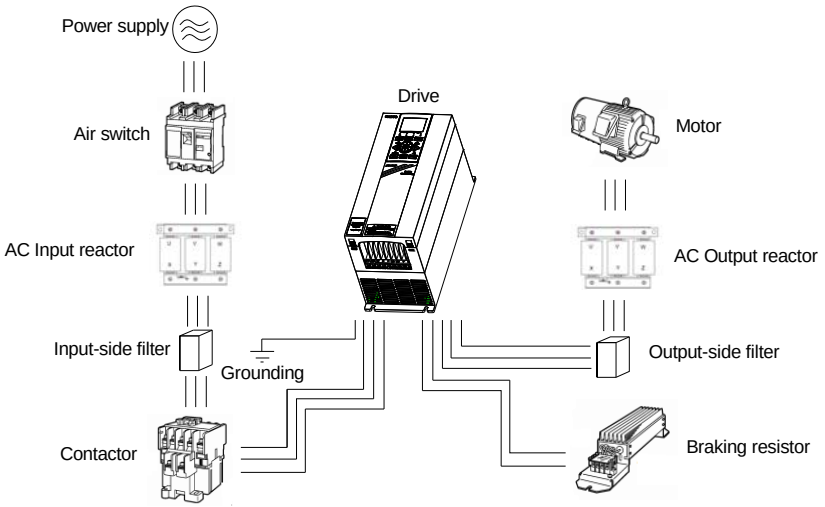


Figure 1 Wiring of Servo Drive

2.2 Wiring of Major Loop Terminals

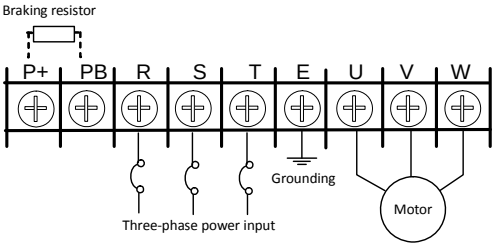
2.2.1 Description of Terminal Function

Terminal Symbol	Function Description	Terminal Symbol	Function Description
P+	Positive terminal of DC side voltage	PB	Brake resistor can be used for connecting P+ with PB
P-	Negative terminal of DC side voltage	E	Ground terminal
R、S、T	Connected to three-phase AC power supply of the power grid	U、V、W	Connected to three-phase AC motor

2.2.2 Wiring description of major loop terminal and connection terminal

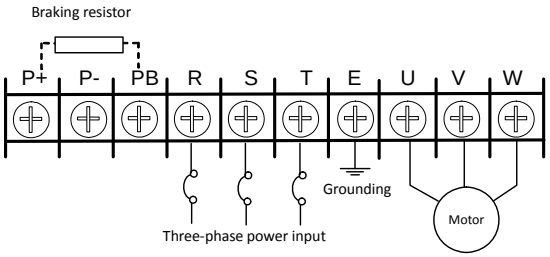
Class I Major Loop Terminal

Applicable Models: CA500-F7R5C ~ CA500-F13RC



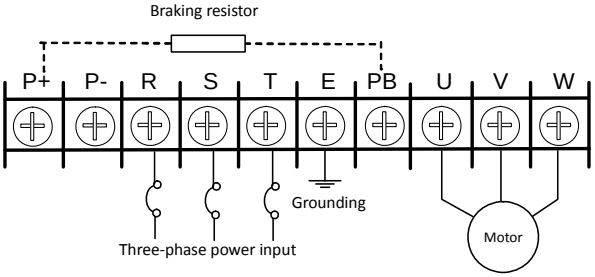
Class II Major Loop Terminal

Applicable Models: CA500-F17RC ~ CA500-F21RC



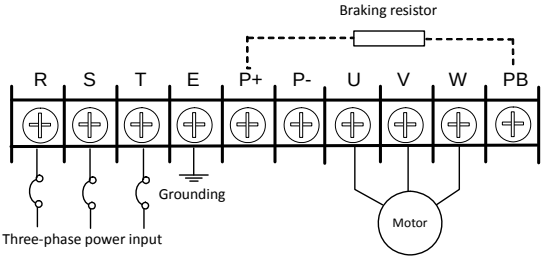
Class III Major Loop Terminal

Applicable Models: CA500-F25RC~ CA500-F33RC



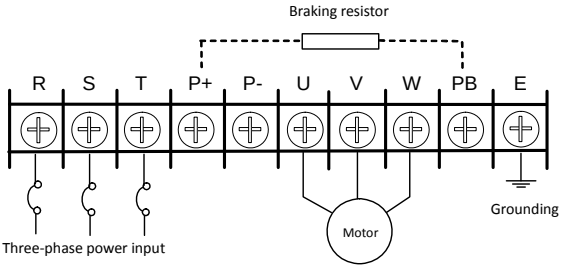
Class IV Major Loop Terminal

Applicable Models: CA500-F39RC~ CA500-F60RC



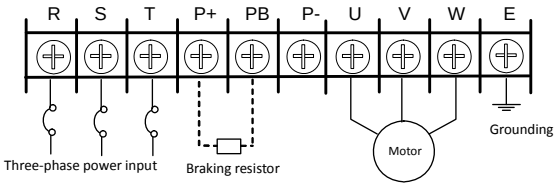
Class V Major Loop Terminal

Applicable Models: CA500-F75RC



Class VI Major Loop Terminal

Applicable Models: CA500-F95RC~ CA500-F150C



2.3 Description of Control Terminal

2.3.1 Appearance of electro-hydraulic injection molding expansion card, and control terminal

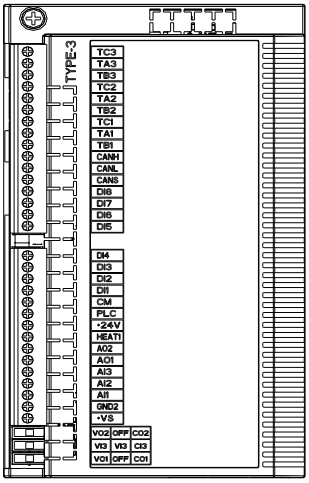


Figure 2 External View of Special Expansion Card for Electro-Hydraulic Injection-Molding Servo

2.3.2 Description of Terminal Function

Terminal type	Title	Function Description
Digital Quantity Input	DI1~DI8	Eight-channel programmable multi-function digital quantity input
	PLC	Multi-function input common terminal
Power Supply	CM	+24V DC power supply reference ground
	24V-CM	Switching value terminal +24V power supply; maximum load capacity:100mA
Analog Quantity Input	A1-GND	Input voltage: 0~10V
	AI2-GND	
	AI3-GND	Input voltage: 0~10V; Input current: 0~20mA
Analog Quantity Output	AO1-GND	Output voltage: 0~10V; Output current: 0~20mA
	AO2-GND	
Replay Output	TA1	Multi-function relay output RO1; TA1-TB1 is normally open; TA1-TC1 is normally closed; Contact capacity: AC250V/1A
	TB1	
	TC1	
	TA2	Multi-function relay output RO2; TA2-TB2 is normally open; TA2-TC2 is normally closed; Contact capacity: AC250V/1A
	TB2	
	TC2	
	TA3	Multi-function relay output RO3; TA3-TB3 is normally open; TA3-TC3 is normally closed; Contact capacity: AC250V/1A
	TB3	
	TC3	
Power supply	GND	Analog signal common terminal
	VS-GND	Reference source of external signal; +10V DC power supply; maximum load

Terminal type	Title	Function Description
		capacity: 10mA
CAN communication port	CANH	CAN communication terminal
	CANL	
	CANS	

2.3.3 Description of Dial Switch

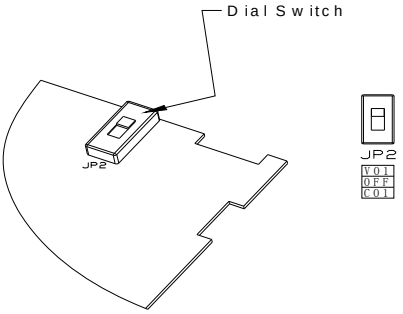


Figure 3 Schematic Diagram of Dial Switch

Terminal / Switch	Left gear	Middle gear	Right gear
JP3 AO2 Terminal	VO2 Output voltage signal	OFF Nonuse /Suspended	CO2 Input current signal
JP1 AI3 Terminal	VI3 Input voltage signal	VI3 Input voltage signal	CI3 Input current signal
JP2 AO1 Terminal	VO1 Output voltage signal	OFF Nonuse /Suspended	CO1 Output current signal

2.4 Description of Resolver Adapter Card

2.4.1 Description of connection terminal (**DB 9** Interface Female End)

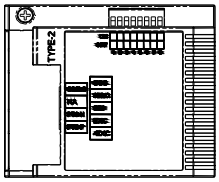


Figure 4 Schematic Diagram of Resolver Adapter Card Terminal

Pin No.	Terminal name	Function
1	/EXC	Excitation source output
2	EXC	
3	SIN	Sin signal input
4	SINLO	
5	COS	Cos signal input
9	COSLO	
6	PTC-P	Motor thermistor input
7	PTC-N	
8	--	--

Table 1 Description of Terminal Function

2.4.2 Description of Dial Switch

Figure 5 Dial Switch

Switch No.	Function	ON	OFF
0	Acceleration mode	OFF	ON
1	Resolution selection	1024C/T	256C/T

Switch No.	Function / Pole number	8 pole	6 pole	4 pole	2 pole
2	Pole number selection	ON	OFF	ON	OFF
3		ON	ON	OFF	OFF

Switch No.	Function / Frequency	20KHz	10KHz	Retention
4	Frequency of excitation source	OFF	ON	Others
5		OFF	OFF	

Switch No.	Retention
6	X *
7	X *

Note: "*"refers to any status.

2.5 Wiring Diagram of Electro-Hydraulic Injection Molding System

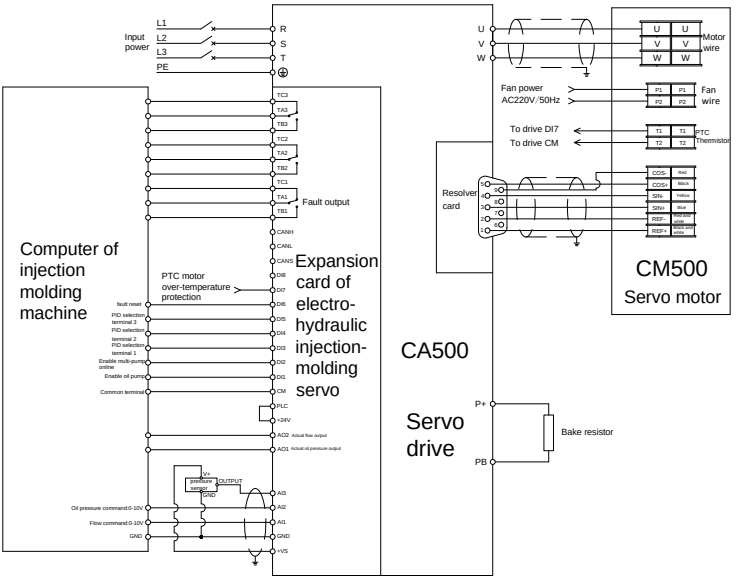
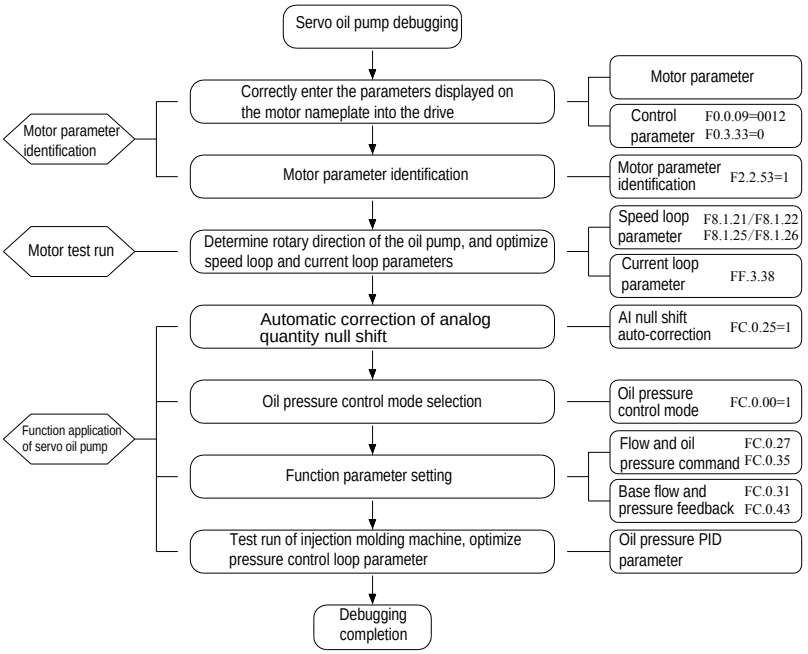


Figure 6 System Wiring Diagram

Chapter 3 Guidance for Electro-Hydraulic Injection Molding System Debugging

3.1 Flow Chart of Electro-Hydraulic Injection Molding System Debugging



3.2 Description of installation and debugging procedures

3.2.1 Motor parameter identification

1）Correctly enter the servo motor parameter (enter the parameters displayed on motor nameplate, the following parameter table takes CM500-200F08020RW AC permanent magnet servo motor for example)

Parameter Code	Set Value	Function Description	Remarks
F2.0.11	80NM	Rated torque of synchronous motor	Rated parameter of synchronous motor
F2.0.12	330V	Rated voltage of synchronous motor	Rated parameter of synchronous motor
F2.0.13	31.5A	Rated current of synchronous motor	Rated parameter of synchronous motor
F2.0.14	133.33Hz	Rated frequency of synchronous motor	Rated parameter of synchronous motor
F2.0.15	2000rpm	Rated speed of synchronous motor	Rated parameter of synchronous motor
F2.0.16	4	Number of pole-pairs of synchronous motor	Rated parameter of synchronous motor

2）Set control parameter

Parameter Code	Set Value	Function Description	Remarks
F0.0.09	0012	Motor type selection	Synchronous servo motor
FF.0.00	0001	Lock function of FF configuration parameter	Enable modifying FF set parameters
FF.1.23	0001	Configuration of protective action	Turn off warning message
FF.4.43	0000	Turn off the autorun of motor parameter identification	Not start stator resistor or inductance detection

3）Check whether the position of dial switch of resolver adapter card is correct

Dial No.	Function	ON		OFF		Corresponding dial position of the resolver compatible with CM500
0	Acceleration Mode	OFF		ON		OFF
1	Resolution selection	1024 C/T		256 C/T		ON
---	Section of number of poles	8 poles	6 poles	4 poles	2 poles	---
2		ON	OFF	ON	OFF	ON
3		ON	ON	OFF	OFF	ON
---	Frequency of excitation source	20KHz	10KHz	---		---
4		OFF	ON	---		ON
5		OFF	OFF	---		OFF

4） Start self-identification of motor parameter

Parameter Code	Set Value	Function Description	Remarks
F2.2.53	1	Turn on self-identification of motor parameter	

Note:

(1) The self-identification of motor parameter must be carried out under the control mode of "operation panel": 【F0.3.33】=0;

(2) The self-identification of motor parameter must be carried out in the no-load conditions;

(3) Press "FWD" key on the panel to start self-identification, the drive will stop automatically after the self-identification completes, and the value of 【F2.2.53】will be restored to "0" automatically. The self-identification process can be interrupted by pressing "STOP" key.

3.2.2 Motor Test Run

1）Set test-run parameters of motor

Parameter Code	Set Value	Function Description	Remarks
F0.1.16	1	Frequency setting channel selection	Select frequency setting source 2
F0.2.32	3.00	Set value of frequency setting 2 on the panel	The run frequency is set as 3Hz
0.3.33	0	Control command 1	Start and stop of operation panel

2）Confirm the motor's rotary direction

Check whether running direction of the motor is correct by pressing the "FWD" key on the panel to start motor. If no, any two of the motor U, V and W phases will be exchanged and the self-identification of motor parameter will be performed

3.3 Servo System Function Setting

3.3.1 Automatic correction of analog quantity null drift

Parameter Code	Set Value	Function Description	Remarks
F0.3.33	0	Control command 1	Start and stop of operation panel
FC.0.25	1	AI null drift auto-correction	Turn on the null drift auto-correction function

Note:

1）Press the "FWD" key on the panel to start auto-correction, the frequency converter will consider the detected values of the current three analog channels as corrected values of null drift, and stop auto-correction three seconds later by pressing "STOP" key, the parameter of

【FC.0.25】is restored to "0".

2) Please confirm whether the values of flow, pressure and feedback pressure given on the computer board of injection molding machine are 0 before auto-correction.

3.3.2 Oil Pressure Control Mode Selection

1)【FC.0.00】=0: Non-oil-pressure control mode, i.e. debugging mode;

2)【FC.0.00】=1: Oil pressure control mode. The system flow and pressure signals are given by analog quantity in such mode;

3)【FC.0.00】=2: Oil pressure control mode. The system flow and pressure signals are given by CAN communication in such mode.

3.3.3 Parameter Setting under the Oil Pressure Control Mode

If【FC.0.00】=1, the relevant system parameters are set as below:

1) Parameter setting of frequency converter

Parameter Code	Set Value	Function Description	Remarks
F0.1.16	0	Frequency setting channel selection	Select frequency setting source 1
F0.3.33	1	Control command 1	External control terminal
F1.0.03	0.3s	Acceleration time	
F1.0.04	0.3s	Deceleration time	
F3.0.00	7	DI1 function	The DI1 is set as forward control terminal
F8.1.21	0.3～0.5	Proportional Gain 1	
F8.1.22	1.5	Integral Gain1	
F8.1.25	0.3～0.5	Proportional Gain 2	
F8.1.26	5.5	Integral Gain 2	
FF.3.38	1.5	Current closed-loop proportional gain	
FF.3.39	0.8	Current closed-loop integral time constant	

2) Parameter setting of expansion card

Parameter Code	Set Value	Function Description	Remarks
FC.0.01	2000	Upper speed limit	As set by the maximum speed system requires
FC.0.03	1	DI1 function is run enable	Run enable
FC.0.04	2	DI2 function is online conflux enable	It works when there is multiple pumps
FC.0.09	7	DI7 function is motor temperature protection	
FC.0.10	40	Function parameter of terminal state	Invert DI7 terminal state
FC.0.15	0	AI3 signal selection	0~10V voltage
FC.0.16	0.0	AI1 minimum value	The maximum value and minimum value of analog channel input
FC.0.17	10.00	AI1 maximum value	
FC.0.18	0.0	AI2 minimum value	
FC.0.19	10.00	AI2 maximum value	
FC.0.20	0.0	AI3 minimum value	
FC.0.21	10.00	AI3 maximum value	
FC.0.27	0	The flow presets the corresponding channel	Corresponding to AI1
FC.0.28	0.00	The analog quantity corresponding to the 0% flow	Flow command linear relation

Parameter Code	Set Value	Function Description	Remarks
		command	
FC.0.29	10.00	The analog quantity corresponding to the 100% flow command	
FC.0.30	100.0	The flow command value corresponding to the upper speed limit	
FC.0.31	10.0	Setting of minimum flow	Base flow
FC.0.35	1	The oil pressure presets the corresponding channel	Corresponding to AI2
FC.0.36	250.0	The maximum value of system setting pressure	Oil pressure command linear relation
FC.0.37	0.0	The analog quantity corresponding to the 0 pressure	
FC.0.38	10.00	The analog quantity corresponding to the maximum pressure	
FC.0.39	5.0	The minimum oil pressure setting	
FC.0.43	2	The channel corresponding to oil pressure feedback	Corresponding to AI3
FC.0.44	300.0	The maximum value of oil pressure feedback	Oil pressure feedback linear relation
FC.0.45	0.0	The analog quantity corresponding to the 0 pressure feedback	
FC.0.46	10.00	The analog quantity corresponding to the maximum pressure feedback	
FC.0.47	0	Pressure sensor line breakage protection function prohibited	

3.4 System Test-Run of Injection Molding Machine

The drive provides eight sets of PID parameters in accordance with the portfolio selection of input terminal, shown as below:

PID 3	PID 2	PID 1	The Corresponding PID Set
OFF	OFF	OFF	1st set PID:【FD.0.00】, 【FD.0.01】, 【FD.0.02】
OFF	OFF	ON	2nd set PID:【FD.0.03】, 【FD.0.04】, 【FD.0.05】
OFF	ON	OFF	3rd set PID:【FD.0.06】, 【FD.0.07】, 【FD.0.08】
OFF	ON	ON	4th set PID:【FD.0.09】, 【FD.0.10】, 【FD.0.11】
ON	OFF	OFF	5th set PID:【FD.0.12】, 【FD.0.13】, 【FD.0.14】
ON	OFF	ON	6th set PID:【FD.0.15】, 【FD.0.16】, 【FD.0.17】
ON	ON	OFF	7th set PID:【FD.0.18】, 【FD.0.19】, 【FD.0.20】
ON	ON	ON	8th set PID:【FD.0.21】, 【FD.0.22】, 【FD.0.23】

Note: The bigger the proportional gain is, the smaller the integral time is and the bigger the derivative time is, the faster the system response is. Too fast response may result in overshoot easily and unstable system operation. The smaller the proportional gain is, the bigger the integral time is and the smaller the derivative time is, the slower the system response is. Too slow response may result in productivity impairment and unstable product performance.

Chapter 4 Diagnosis and Countermeasures of Warning and Alarm

When the servo drive sends warning signal, the display bar will show warning code; a part of warnings have no effect on normal operation of servo drive, but some warnings do, so it's necessary to endeavor to remove the fault that is possible to affect the operation of servo drive, otherwise worse fault may be arisen. When alarm fault occurs to the servo drive, the protection function will be activated, the servo drive will display fault code and stop output immediately, and the motor will be shut down by free coast-down.

4.1 Removal of Fault with Warning or Alarm Displayed

4.1.1 Alarm Display and Fault Removal

Fault Code	Fault Description	Possible Cause	Solution
Fu.001	Over-current occurs in acceleration process	1. The acceleration time is set to be too short 2. Restart the rotating motor after instantaneous stop and reenergizing 3. The capacity of servo drive is a little low 4. Encoder fault or line breakage occurs in the PG acceleration process	1. Adjust acceleration time 2. [F0.4.38] is set as 1. valid, restore operation by means of deceleration and restart after power failure 3. Select the servo drive matched in capacity level 4. Inspect encoder and its wires
Fu.002	Over-current occurs in deceleration process	1. The deceleration time is set to be too short 2. The load of potential energy or load inertia is a little bigger 3. The capacity of servo drive is a little low 4. Encoder fault or line breakage occurs in the PG deceleration process	1. Adjust deceleration time 2. Make external connection with brake resistor 3. Select the servo drive matched in capacity level 4. Inspect encoder and its wires
Fu.003	Over-current occurs in operation	1. Load sudden change occurs 2. Grid voltage is too low 3. The capacity of servo drive is a little low 4. Overload 5. Restart the rotating motor after instantaneous stop and reenergizing 6. Inter-phase short circuit or phase line-to-ground short circuit of servo drive three-phase output line 7. Encoder fault or line breakage occurs in running processes	1. Reduce load sudden change 2. Inspect power voltage 3. Select the servo drive matched in capacity level 4. Inspect load or replace with the servo drive of higher capacity 5. [F0.4.38] is set as 1 valid, restore operation by means of deceleration and restart after power failure 6. Remove short-circuit fault 7. Inspect encoder wiring
Fu.004	Over-voltage occurs in acceleration process	1. Abnormal input voltage 2. Improper setting of closed-loop parameter of rotate speed when performing vector control operation 3. Start the motor that is rotating (no speed tracking)	1. Inspect input power 2. Please refer to the description of parameter set in F8.1 to adjust closed-loop parameter of rotate speed 3. [F0.4.38] is set as 1 valid, restore operation by means of deceleration and

Fault Code	Fault Description	Possible Cause	Solution
			restart after power failure
Fu.005	Over-voltage occurs in deceleration process	1. The deceleration time is set to be too short 2. The load of potential energy or load inertia is a little bigger 3. Abnormal input voltage	1. Adjust deceleration time 2. Make external connection with brake resistor 3. Inspect input power
Fu.006	Over-voltage occurs in operation	1. Abnormal variation of input voltage occurs 2. Improper setting of regulator parameter when performing vector control operation	1. Install input reactor 2. Please refer to the description of parameter set in F8.1 to adjust speed regulator parameter
Fu.007	Over-voltage occurs in down time	Abnormal power voltage	Inspect power voltage
Fu.008	Under-voltage occurs in operation (Can be shielded)	1. Abnormal variation of power voltage 2. A heavy load in the power grid is started	1. Inspect power voltage 2. Separate power supply
Fu.009	Drive protection action	Abnormal major loop	Ask for manufacturer's support
Fu.010	Output grounding (Can be shielded)	Abnormal grounding detected at the motor or motor cable	Inspect and remove ground fault
Fu.011	Electromagnetic interference	The malfunction arisen from the surrounding electromagnetic interference	Ask for technical support
Fu.012	Overload of servo drive	1. Overload 2. The acceleration time is too short 3. The acceleration torque is set to be too big 4. The rotating motor is started directly before the stating of speed tracking 5. The encoder pulse direction is opposite to the motor rotating direction in the close-loop vector mode	1. Reduce load or replace with the servo drive of higher capacity 2. Extend acceleration time 3. Decrease the values of [F1.4.39] and [F1.4.40] 4. The units digit of start/stop mode ([F0.4.38]) is set to be the speed tracking start mode 5. Check whether the encoder is reverse
Fu.013	Motor overload protection action	1. Grid voltage is too low 2. The has been running for a long period in low speed and heavy load 3. The motor overload protection parameter is set to be too small 4. Motor stalling or overload 5. The encoder is in reverse direction when it's in the operation mode of close-loop vector control	1. Inspect input grid voltage 2. Please select the special variable frequency motor when it needs long-term slow running 3. Increase the motor overload protection parameter ([F2.0.25]) 4. Adjust load condition or select the servo drive matched in capacity level 5. Adjust encoder wiring or alter the settings of encoder direction and function

Fault Code	Fault Description	Possible Cause	Solution
Fu.014	Over-temperature of servo drive (Sensor 1)	1. The air duct is blocked 2. Too high environment temperature 3. Abnormalities in fan operation 4. Abnormalities in temperature detection circuit or power module	1. Clear air duct or improve ventilation conditions 2. Improve ventilation conditions and reduce carrier frequency 3. Replace fan 4. Ask for manufacturer's support
Fu.015	Over-temperature of servo drive (Sensor 2)	As above	As above
Fu.016	Over-temperature of servo drive (Sensor 3)	As above	As above
Fu.017	Failure of peripheral equipment or forced outage of control panel	Failure of peripheral equipment of servo drive, and the input terminal has input signals	Inspect the signal source and related equipment, and identify the root of forced outage of control panel
Fu.018	Excessive speed deviation protection (DEV)	1. Overload 2. The acceleration time is too short 3. The load is turned into lock state 4. Improper setting of detection value ([F8.2.34]) and detection time ([F8.2.35]) of excessive speed deviation (DEV)	1. Reduce load 2. Extend acceleration and deceleration time 3. Verify the load mechanical system 4. Reset the detection value ([F8.2.34]) and detection time ([F8.2.35]) of excessive speed deviation (DEV)
Fu.019	Over-speed fault (OS)	1. Over-Shoot or under-shoot occurs 2. The frequency set value is too high 3. Improper setting of detection value ([F8.2.36]) and detection time ([F8.2.37]) of over-speed (OS)	1. Adjust gain 2. Adjust frequency set value 3. Reset the detection value ([F8.2.36]) and detection time ([F8.2.37]) of over-speed (OS)
Fu.020	Reverse connection of A & B phase pulses of PG card	The access sequence of feedback pulse of encoder is inconsistent with the motor's rotary direction	1. Alter access sequence of A & B phase pulses; 2. Adjust the sequence of any two phases of U, V and W; 3. Alter the value of parameter F8.0.06
Fu.021	Poor pull-in of master contactor or blocked thyristor of major loop	1. Abnormal contact of contactor contact points of major loop 2. Sudden changes always occur due to the unstable supply voltage	1. Clear and inspect contactor of major loop 2. Inspect grid voltage 3. Turn off the protection function (FF.1.21)

Fault Code	Fault Description	Possible Cause	Solution
Fu.022	Internal data memory error	1 . There is strong noise in the surroundings in the process of writing function code data 2. The internal memory is damaged	1. Retry after resetting 2. Ask for manufacturer's support
Fu.023	Phase R input voltage loss (Can be shielded)	1. Open circuit of phase R incoming line of servo drive 2. The input phase R power-line terminal is loose 3. The fluctuation of phase R input voltage is too big	1Remove faults of peripheral equipment 2. Ask for manufacturer's support
Fu.024	Phase S input voltage loss (Can be shielded)	1. Open circuit of phase S incoming line of servo drive 2. The input phase S power-line terminal is loose 3. The fluctuation of phase S input voltage is too big	
Fu.025	Phase T input voltage loss (Can be shielded)	1. Open circuit of phase T incoming line of servo drive 2. The input phase T power-line terminal is loose 3. The fluctuation of phase T input voltage is too big	
Fu.026 Fu.027 Fu.028	Phase U output current loss/low Phase V output current loss/ low Phase W output current loss/ low	1. The lead wire connecting servo drive with motor is broken 2. Fault of driver board or control panel of servo drive 3. Fault of motor three-phase winding	1. Remove faults of peripheral equipment 2. Ask for manufacturer's support 3. Remove motor faults
Fu.032	Three-phase input voltage unbalance (Can be shielded)	The unbalance rate of three-phase voltage is a little bigger	1. Inspect connection condition of input power 2. Increase AC or DC reactor
Fu.036 Fu.037 Fu.038	AI1 input break fault AI2 input break fault AI3 input break fault	1. Breakage of analog input signal line or inexistence of analog input signal source 2. The parameter configuration related to line breakage detection is unreasonable	1. Inspect analog input signal line and analog input signal source 2. Modify configuration parameter
Fu.039	Fin input break	1. Breakage of impulse input signal line or inexistence of analog input signal source 2. The parameter configuration related to line breakage detection is unreasonable	1. Inspect impulse input signal line and analog input signal source 2. Modify configuration parameter

Fault Code	Fault Description	Possible Cause	Solution
Fu.040	Speed detection circuit break	1. The wiring of speed measuring module is incorrect 2. The wiring of speed measuring module is broken 3. Abnormal output of speed measuring module 4. Unreasonable setting of the related function code	1. Inspect the connection line of speed measuring module 2. Ask for manufacturer's support
Fu. 041	Motor fails to be accessed when identifying motor parameter	The motor fails to be accessed when identifying motor parameter	Access motor
Fu.042	Phase U output break or serious parameter unbalance	1. The wiring connecting servo drive with motor is broken 2. Fault of driver board or control panel of servo drive 3. Fault of motor three-phase winding	1. Remove faults of peripheral equipment 2. Ask for manufacturer's support 3. Remove motor faults
Fu.043	Phase V output break or serious parameter unbalance	1. The wiring connecting servo drive with motor is broken 2. Fault of driver board or control panel of servo drive 3. Fault of motor three-phase winding	1. Remove faults of peripheral equipment 2. Ask for manufacturer's support 3. Remove motor faults
Fu.044	Phase W output break or serious parameter unbalance	1. The lead wire connecting servo drive with motor is broken 2. Fault of driver board or control panel of servo drive 3. Fault of motor three-phase winding	1. Remove faults of peripheral equipment 2. Ask for manufacturer's support 3. Remove motor faults
Fu.045	Motor over-temperature	1. Abnormal motor temperature 2. The motor temperature detection function is abnormal	1. Reduce motor load 2. Improve operating environment 3. Remove motor faults
Fu.046	Motor stalling	1. Motor overload 2. Motor under-power	Install a proper motor
Fu.047	Abnormal PG feedback signals of U, V & W	The UVW signals of PG card or resolver are lost	Check whether fault exists in the signal line or PG card
Fu.048	Initial position error of rotor magnetic pole	The initial setting of rotor magnetic pole position is wrong when fitting synchronous motor	Re-identify rotor position and inspect signal connection condition
Fu.049	Abnormal identification of Z signal	The Z signal cannot be detected when performing parameter identification of synchronous motor	Inspect PG feedback card and its connection lines
Fu.051	Phase U current detection error (Sensor or circuit)	1. Current sensor or circuit damage 2. Auxiliary power supply failure 3. Poor connection between control panel and drive board	Ask for manufacturer's support

Fu.052	Phase V current detection error (Sensor or circuit)	1．Current sensor or circuit damage 2．Auxiliary power supply failure 3．Poor connection between control panel and drive board	Ask for manufacturer's support
Fu.053	Phase W current detection error (Sensor or circuit)	1．Current sensor or circuit damage 2．Auxiliary power supply failure 3．Poor connection between control panel and drive board	Ask for manufacturer's support
Fu.054	Temperature sensor 1 fault (Can be shielded for protection)	Abnormalities in temperature detection circuit	Ask for manufacturer's support
Fu.055	Temperature sensor 2 fault (Can be shielded for protection)	Abnormalities in temperature detection circuit	Ask for manufacturer's support
Fu.056	Temperature sensor 3 fault (Can be shielded for protection)	Abnormalities in temperature detection circuit	Ask for manufacturer's support
Fu.067	Function extension unit 1 fault	Abnormal interruption of communication link of function extension unit 1	Inspect connection status of the expansion card 1
Fu.068	Function extension unit 2 fault	Abnormal interruption of communication link of function extension unit 2	Inspect connection status of the expansion card 2
Fu.071	Abnormal communication of control panel		
Fu.072	Abnormal connection with accessories		
Fu.131	Slave pump 1 fault	Examine the panel of slave pump	Depend on fault phenomenon
Fu.132	Slave pump 2 fault		
Fu.133	Slave pump 3 fault		
Fu.134	Slave pump 4 fault		
Fu.135	Slave pump 5 fault		
Fu.136	Slave pump 6 fault		
Fu.137	Slave pump 7 fault		
Fu.138	Slave pump 8 fault		
Fu.139	Slave pump 9 fault		
Fu.190	CAN communication fault	CAN network is disconnected.	Connect to CAN network
Fu.191	Pressure sensor fault	Pressure sensor is damaged	Replace pressure sensor
Fu.192	Pressure sensor line breakage	Pressure sensor is disconnected with drive.	Reconnect
Fu.193	Motor temperature protection	Motor temperature is too high	Ask for manufacturer's support
Fu.201	Parameter setting conflict		Please contact with the supplier directly
Fu.301 ~ Fu.311	Control panel fault		Ask for manufacturer's support

4.1.2 Warning Display and Fault Removal

Display code	Warning Message	Shielding	Other solutions except shielding
aL.003	Over-high supply voltage		Inspect input power
aL.008	Low input voltage (under-voltage warning)		Inspect input power
aL.011	Poor electromagnetic environment		Improve work environment or ask for manufacturer's support
aL.012	Overload is possible to activate protection		Reduce load, or choose to replace with the servo drive of higher power
aL.014	INV overheating warning		Improve ventilation conditions and reduce carrier wave
aL.018	Excessive speed deviation (DEV)		1．Reduce load 2．Extend acceleration and deceleration time 3．Verify the load mechanical system 4．Verify the detection value ([F8.2.34]) and detection time ([F8.2.35]) of excessive speed deviation
aL.019	Over-speed (OS)		1．Adjust frequency setting loop 2．Inspect the set values of the detection value ([F8.2.36]) and detection time ([F8.2.37]) of over-speed (OS)
aL.023 aL.024 aL.025	Phase U input voltage loss Phase V input voltage loss Phase W input voltage loss		
aL.026 aL.027 aL.028	Phase U output current loss or low Phase V output current loss or low Phase W output current loss or low	Can be shielded	Inspect the line connecting servo drive with motor and motor winding
aL.031	Start enabling signal loss		1．Inspect the connection line of start enabling (42) in the multifunction input terminals and the terminal state (ON/OFF) 2．Check whether the start enabling signal digit in the bus command word is valid
aL.032	Three-phase input voltage unbalance warning	Can be shielded	Measure input voltage of each phase, additional install AC reactor (ACR) and reduce the interphase unbalance rate
aL.036 aL.037 aL.038	AI1 input break AI2 input break AI3 input break		1．Inspect analog input signal line 2．Check whether the signal source has signals
aL.039	Fin input break		Ask for manufacturer's support
aL.040	Speed detection circuit break	Can be shielded	1．Inspect the connection line of speed measuring module 2．Ask for manufacturer's support
aL.041	Fail to identify motor parameter at idle running		
aL.042	Abnormal motor phase U parameter		Check whether the motor winding is in fault

Display code	Warning Message	Shielding	Other solutions except shielding
aL.043 aL.044	Abnormal motor phase V parameter Abnormal motor phase W parameter		
aL.045	Motor over-temperature		For long-term operation in low speed, selecting special variable frequency motor
aL.046	Bound break of dynamic tracking of synchro rotor magnetic poles		Inspect PG feedback card and its connection lines
aL.047	Z signal loss or abnormal parameter identification		Inspect PG feedback card and its connection lines
aL.048	Excessive deviation of feedback UVW signal		Inspect PG feedback card and its connection lines
aL.049	Abnormal unbalance of drive circuit		Ask for manufacturer's support
aL.050	Possible to be connected with motor properly		
aL.054 aL.055 aL.056	Temperature sensor 1 fault Temperature sensor 2 fault Temperature sensor 3 fault	Can be shielded	1．Raise over-temperature warning action point ([F5.4.46]) 2．Change temperature sensors 1, 2 &3
aL.058	Cannot perform batch recovery of parameters in operation		Ask for manufacturer's support
aL.059	Cannot restore the values at power-on in operation		Ask for manufacturer's support
aL.061	Abnormal interrupt of link between extended communication module and main control panel		Ask for manufacturer's support
aL.062~aL.063	Hardware conflict of function extension units 1 and 2		1．The optional extension unit is improper and not matched with such type of servo drive 2．Internal fault of function extension unit
aL.064	Resource conflict of function extension unit		The extension unit cannot work with other extension units
aL.065	Fail to establish communication link with function extension unit 1		
aL.066	Fail to establish communication link with function extension unit 2		
aL.067	Abnormal interrupt in communication link of function extension unit 1		
aL.068	Abnormal interrupt in communication link of function extension unit 2		
aL.071	Parameter download failed (Note: downloading is performed from the operation panel to the control panel of servo drive, while uploading is performed from the control panel to the operation panel)		Check whether the communication interface between control panel and operation panel is normal
aL.072	Panel memory operation failure		
aL.073	The parameter cannot be downloaded, because the panel memory is prohibited to be written		
aL.074	Parameter upload failed (automatically		1．Check whether the communication interface between

Display code	Warning Message	Shielding	Other solutions except shielding
	recovered to the value before uploading)		control panel and operation panel is normal 2．Prohibit parameter upload in enable local upload in parameter copy F0.0.08
aL.075	The uploading operation cannot be done, because the panel parameter version is different from the device parameter version		Re-upload the panel parameter the same as the device parameter version
aL.076	The uploading operation cannot be performed, because there is no valid parameters on the panel		The panel parameter needn't to be uploaded if no valid revision has been made
aL.077	Upload failed, due to the panel parameter exceeds the allowed setting range of INV		Confirm the allowed parameter setting range, and upload parameter after resetting
aL.099	Abnormal connection of operation panel		Refit or change the panel after turning off the power
aL.100	Electromagnetic interference results in losing control of control program		Improve electromagnetic environment
aL.101	Setting parameter conflict		Reset parameter
aL.102	The setting parameters aren't connected with the corresponding expansion card		Change the corresponding expansion card
aL.103	Motor parameter setting conflict (rated frequency, rotate speed conflict)		Reset motor parameter
aL.104	Motor parameter setting conflict (no-load current, rated current, rated speed, rated frequency and rotor duration)		Reset motor parameter
aL.105	Overflow of inductance parameter of motor stator (human error of motor parameter setting)		Reset inductance parameter of motor stator
aL.106	Setting conflict of rated frequency, rotate speed and number of pole-pairs of synchronous motor		Inspect the motor parameter setting and make revisions
aL.201	The motor is to be shut down due to parameter setting conflict,		Please contact with the supplier directly

4.2 Abnormal Running Prompt and Solution

4.2.1 Motor fails to rotate

Possible Cause	Solution
The selection of run command channel is wrong	Switch the run command channel to the correct channel by means of PANEL/REMOTE key on the operation panel or remote terminal
The selection of run command source is wrong	Reset the selection of run command source ([F0.1.15]), control command 1 ([F0.3.33]) and control command 2 ([F0.3.34]) depending on the field requirements
The set frequency is under the start frequency	1. The set frequency is set to be above the start frequency ([F0.4.39]) 2. Check whether the frequency setting channel is normal, remove the possible setting fault of analog input frequency and shuttle reactor fault, etc. 3. Correctly connect with the external terminals related to the frequency setting
The other frequency command sources with higher priority is valid	Reset the setting priority ([F5.3.28]) of frequency (rotate speed) depending on the field requirements
The setting of upper and lower limits for frequency is improper	Inspect the frequency data of upper limit ([F0.1.21]) and lower limit([F0.1.22]), and reset
The motor torque is insufficient	1. Re-determine motor parameter ([F2.2.53]) 2. Adjust the starting time of pre-excitation ([F2.2.52]) in the vector mode

4.2.2 Motor is rotating, but fails to speed up

Possible Cause	Solution
The set value of the maximum output frequency is a littler small	Increase the value of the maximum output frequency ([F0.1.20])
The set value of upper frequency limit is a little small	1. Increase the value of the upper frequency limit ([F0.1.21]) 2. Increase the maximum value of frequency setting channel 1 ([F0.2.28]) and that of frequency setting channel 1 ([F0.2.31])
The set frequency is a little low	Check whether the setting of frequency setting channel selection ([F0.1.16]) is correct, the set frequency is a little low or the frequency setting channel is in fault
The acceleration time is too long	Set the proper acceleration time ([F1.0.03], [F1.0.05], [F1.0.07] and [F1.0.09])
The motor parameter setting is improper	1. Check whether ([F2.0.00]～[F2.0.09]) is compatible with the motor parameters 2. Let the motor make automatic measurement in the vector control mode, so as to obtain the correct internal parameter of motor
The current limit protection results in the output frequency failing to rise	1. Make reasonable allocation of acceleration/deceleration current limit level ([F1.4.39]), strong starting current limit level (F1.4.40) and strong starting current hold time ([F1.4.41]) depending on the requirements of application field 2. Check whether the output frequency rises under the condition of restarting after reducing torque and boosting voltage
The torque setting limit results in the output frequency failing to rise	Verify the correctness of set values of torque setting limit ([F8.3.47], [F8.3.48]～[F8.3.51])

4.2.3 The Rotating direction of motor is opposite to the command

Possible Cause	Solution
Running direction	Inspect the setting of running direction ([F0.1.17])
The selection of forward and reverse function codes in the multi-function input terminals is incorrect	Check whether the multi-function input terminals ([F3.0.00]～[F3.0.08]) correctly select the function codes of forward FWD running command terminal and reverse REV running command terminal and three-wire running control
The selection of external control terminal action mode is incorrect	Inspect the action mode (F0.3.35) of external control terminal
Inspect the motor wiring	Interchange any two inter-phase lines of U, V and W of servo drive or motor
Inspect the wiring of forward and reverse control terminals	Check whether the wirings of multi-function input terminals of the forward FWD running command terminal and reverse REV running command terminal and three-wire running control is correct

4.2.4 Fluctuation of rotating speed and current occurs when running at constant speed

Possible Cause	Solution
Frequency setting changes	It's appropriate to increase the analog input filter time constant ([F4.0.06]、[F4.0.07]、[F4.0.08]) when the frequency is set by means of analog input terminal
The set value of carrier frequency is a little small	Check whether vibration disappears after increasing the carrier frequency ([F1.1.13]) of servo drive and altering carrier characteristics ([F1.1.14])
The setting of load type is improper	Check whether vibration disappears after the macroparameter ([F0.0.0]) is set as steady load running
The setting of motor parameter is incorrect	1. Verify the correct setting of motor parameters ([F2.0.00~F2.0.09]) or self-adjust the internal parameters of motor again 2. Adjust the motor speed closed-loop parameters ([F8.2.25~F8.2.27])
The line connecting servo drive with motor is too long	Try to shorten output line or additionally install AC reactor
The vibration is arisen from the vibration with low rigidity at load side	Cancel automatic torque boost, automatic energy-saving running, overload protection control, current limit and torque control to check whether vibration disappears

4.2.5 Motor roars or makes unusual sound

Possible Cause	Solution
Low carrier wave	Increase the carrier frequency of servo drive ([F1.1.13])
The ambient temperature of servo drive is a little higher	1. It's necessary to improve ventilation conditions and lower the temperature if the ambient temperature exceeds 40℃ 2. Reduce load and lower the temperature of servo drive (the blower and pump shall be lowered on its upper frequency limit ([F0.1.21])) 3. Select adjustment functions related to the temperature in the carrier characteristics ([F1.1.14])
Output phase failure	1. Inspect the line connecting servo drive with motor 2. Check whether the motor three-phase winding is in fault or burnout
Improper setting of motor parameter	Adjust motor speed closed-loop PID parameter ([F8.2.25~F8.2.27])

Possible Cause	Solution
Mechanical resonance	1. Let the motor rotate alone to find the reasons of mechanical resonance and improve the characteristics at the motor side 2. Adjust hopping frequency ([F5.0.00]～[F5.0.05]) to avoid continuous running in the frequency range where mechanical resonance occurs

4.2.6 Motor fails to accelerate or decelerate in the given acceleration and deceleration time

Possible Cause	Solution
Running in the S-shaped acceleration and deceleration curves	1. The acceleration and deceleration characteristic parameter ([F1.0.00]) is set as the mode of linear acceleration and deceleration to observe the acceleration and deceleration conditions 2. Shorten acceleration and deceleration time ([F1.0.03]～[F1.0.10]) to observe the acceleration and deceleration conditions
Current limit action, the frequency rise is restrained when accelerating	1. Increase the data of acceleration current limit level ([F1.4.39]) and strong starting current limit level ([F1.4.40]) 2. Extend the acceleration time ([F1.0.03], [F1.0.05], [F1.0.07], [F1.0.09])
The motor torque is insufficient	Increase the boost voltage ([F1.2.18]) of torque to check whether the motor starts
The torque limit imposes restriction on acceleration and deceleration of the frequency	1. Reset torque setting limit ([F8.3.47]), the maximum and minimum torque limit value ([F8.3.48]～[F8.3.51]) 2. Extend the acceleration and deceleration time ([F1.0.03]～[F1.0.10])
Wrong selection of acceleration and deceleration time	Check whether the selection signals of acceleration and deceleration time of multi-function input terminals ([F3.0.00]～[F3.0.08]) are correct

4.2.7 The motor fails to restart after instantaneous power failure, even if the power supply recovers

Possible Cause	Solution
The function of restart after power failure (F0.4.48)	The function of restart after instantaneous power failure ([F0.4.48]) is set as valid
The run command is in the OFF mode when recovering power supply	Confirm the reset sequence of external circuit, if required, discuss whether the hold relay for run command is employed

4.2.8 Improper parameter setting, the original value or factory default value shall be restored

Possible Cause	Solution
The function code has been subject to unnecessary parameter setting	The unnecessarily set parameters are recovered to the default values
The function code has been subject to wrong parameter setting	Reset the necessary function code after initializing the parameter set as required and make confirmation

4.3 Reset of Warning or Alarm Fault

When warning or alarm fault occurs, the following operations can be adopted to restore normal operation:

1) Press the STOP/RESET key when displaying fault code.

2) When using the run command channel of external terminals, the fault is reset if the multi-function input terminal DIX is defined as the fault reset input terminal being valid.

3) When using the run command channel of field bus, the host computer can send fault reset command to servo drive by RS485 interface.

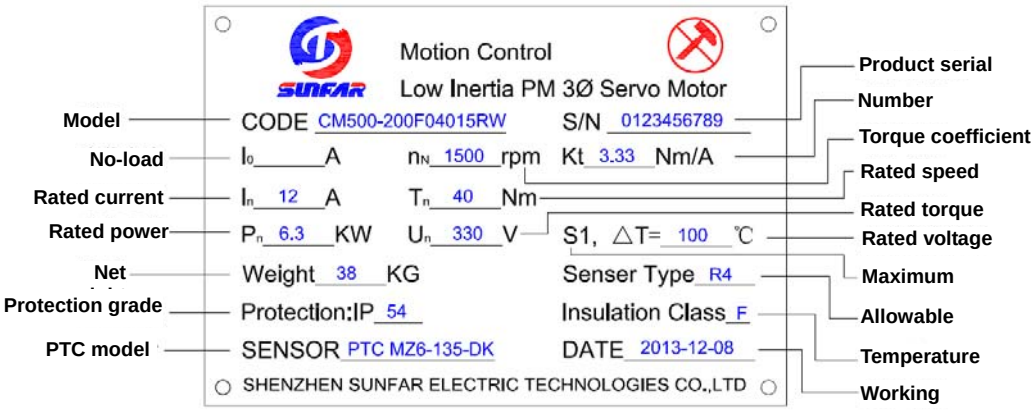
4) Turn off the power.

- Be sure to thoroughly identify all fault causes and remove the fault before reset, otherwise permanent damage to the servo drive may be arisen.
- Identify the causes if reset fails or fault occurs again, because continuous resetting may damage the servo drive.
- Reset delay for five minutes shall be performed if overload and overheating protective actions occur.
- When the external terminal controls, please perform fault resetting operation after undoing the terminal run command.

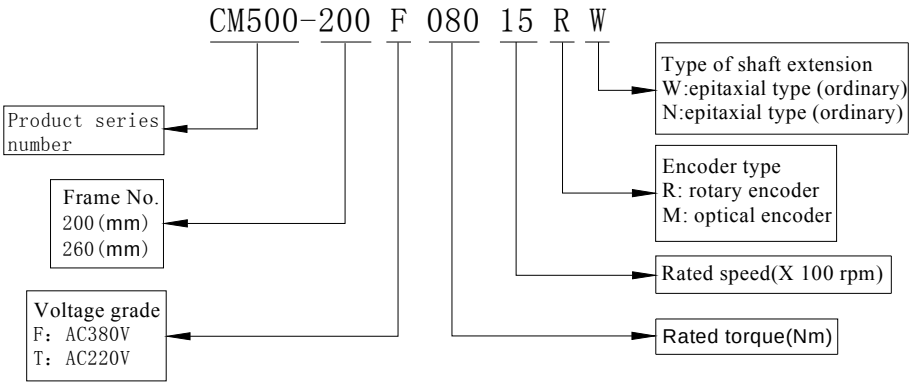
Appendix I Permanent Magnet AC Servo Motor

Product Nameplate

A nameplate is attached to the permanent magnet AC servo motor, indicating motor model, rated parameters product information and other content as shown below:



Model Description

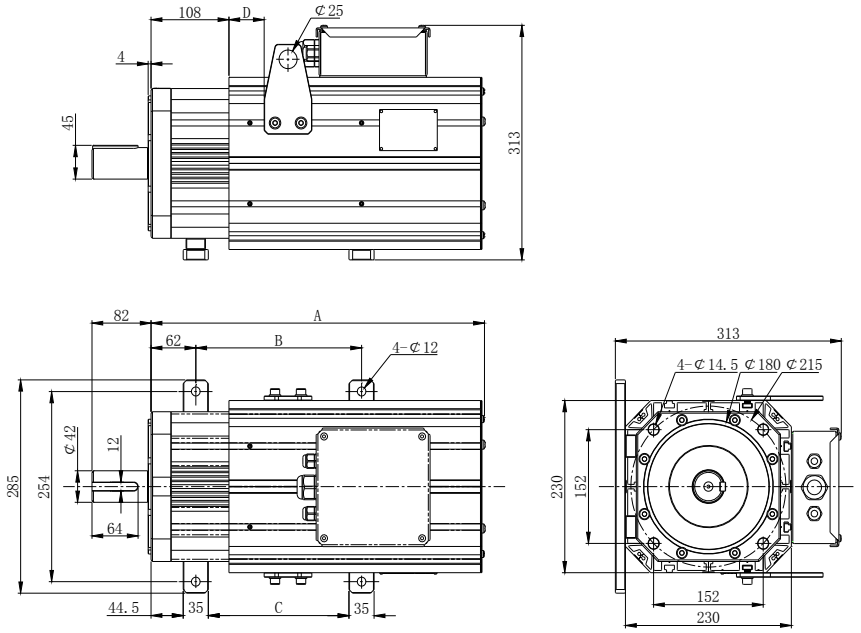


Technical Parameters of CM500 Series

Model Specifications	Rated torque N.m	Power kW	Rated speed rpm	Rated Freq. Hz	Max. Speed rpm	Rate Current A	Torque Coefficient N.m/A	Counter EMF V/1000 rpm
CM500-200F04015RW	40	6.3	1500	100	2000	12	3.33	202
CM500-200F04017RW	40	7.0	1700	113.3	2200	14	2.86	178
CM500-200F04020RW	40	8.4	2000	133.3	2500	16	2.5	154
CM500-200F06015RW	60	9.4	1500	100	2000	19	3.14	196
CM500-200F06017RW	60	10.7	1700	113.3	2200	20.7	2.9	178
CM500-200F06020RW	60	12.5	2000	133.3	2500	24	2.5	151
CM500-200F08015RW	80	12.5	1500	100	2000	24.5	3.27	202
CM500-200F08017RW	80	14.2	1700	113.3	2200	27.5	2.9	178
CM500-200F08020RW	80	16.7	2000	133.3	2500	31.5	2.54	154
CM500-200F10015RW	100	15.7	1500	100	2000	30.5	3.28	200
CM500-200F10017RW	100	17.8	1700	113.3	2200	34.5	2.9	178
CM500-200F10020RW	100	21	2000	133.3	2500	39.5	2.53	155
CM500-200F12015RW	120	18.8	1500	100	2000	36	3.33	204
CM500-200F12017RW	120	21.4	1700	113.3	2200	41.5	2.9	177
CM500-200F12020RW	120	25	2000	133.3	2500	49	2.45	151
CM500-200F14015RW	140	22	1500	100	2000	44.5	3.15	200
CM500-200F14017RW	140	25	1700	113.3	2200	50	2.8	177
CM500-200F14020RW	140	29.3	2000	133.3	2500	56	2.5	150
CM500-200F18015RW	180	28.3	1500	100	2000	56	3.2	201
CM500-200F18017RW	180	32	1700	113.3	2200	62	2.9	177
CM500-200F18020RW	180	37.7	2000	133.3	2500	72	2.5	154

Outline and Installation Dimension of CM500 Series (unit: mm)

1）Schematic Diagram of Installation Dimension



2）Table of Installation Dimensions

No.	Motor Specifications and Models	A （mm）	B （mm）	C （mm）	D（mm）
1	CM500-200F04015RW — CM500-200F04020RW	380	150	115	10
2	CM500-200F06015RW — CM500-200F06020RW	420	190	155	30
3	CM500-200F08015RW — CM500-200F08020RW	460	230	195	50
4	CM500-200F10015RW — CM500-200F10020RW	500	270	235	60
5	CM500-200F12015RW — CM500-200F12020RW	540	310	275	80
6	CM500-200F14015RW — CM500-200F14020RW	580	350	315	100
7	CM500-200F18015RW — CM500-200F18020RW	660	430	395	140

Wiring Instructions

1）Outgoing Line of Rotary Encoder:

No.	Color of Outgoing Line	Definition	Remarks
1	Blue	SIN+	
2	Yellow	SIN-	
3	Black	COS+	
4	Red	COS-	
5	Yellow-white	REF+	
6	Red-white	REF-	

2）Outgoing line of PTC thermistor: T1, T2 (Service Voltage≤2.5V)

3）Outgoing line of fan: P1, P2 (Single-phase 220V, 50Hz)

4）Outgoing line of motor: U, V, W are connected to the outgoing lines U, V, W (380V, 50Hz) of servo drive

Appendix II Function Parameters Table

Common Parameters Table

1、Servo drive parameters setting

Function Code	Title	Setting Range and Description	Resolution	Factory	Change Restriction
F0.0.01	Parameter Display and Modification (H)	**Units digit: Parameter Display Mode** 0：display all parameters 1：display valid configuration parameters 2：display the parameters different from factory defaults 3：display the parameters modified and stored after power-on of this time 4：display the parameters modified but not stored after power-on of this time **Tens digit: Parameter Modification Mode** 0：valid after modification, and permanently saved 1：valid after modification, but not saved, and lost after power off **Hundreds digit: Retained** **Thousands digit: Batch recovery and batch storage of parameters** 2：discard the modifications to all unsaved parameters (restored to the original value) 5：perform batch storage of all parameters modified but unsaved 9：resored all parameters to the initial values at power-on of this time	1	0001	
F0.0.03	LCD Language Selection	0：Chinese 1：English	1	0	-
F0.0.05	Parameter Lock (H)	**Units digit: Parameter Modification Permissions** 0：All parameters are allowed to be rewritten 1：Except the parameter, frequency digital setting, PID digital setting, rotating speed digital setting, torque digital setting and lock password (F0.0.06), the other parameters are not allowed to be rewritten. 2：Except the parameter and lock password, the other parameters are not allowed to be rewritten. **Tens digit: Password Lock** 0: Invalid 1: Valid----the parameter cannot be modified until the correct password is entered after preseting password	1	0000	
F0.0.07	Parameter Initialization	0：No action 1：Parameters in F0~F9 group are restored to factory defaults 2：Parameters in F0~FA group are restored to factory defaults 3：Parameters in F0~Fb group are restored to factory defaults 4：Parameters in F0~Fc group are restored to factory defaults 5：Parameters in F0~Fd group are restored to factory defaults 6：Parameters in F0~FE group are restored to factory defaults 7：Parameters in F0~FF group are restored to factory defaults 8：Clear fault log	1	0	×

Function Code	Title	Setting Range and Description	Resolution	Factory	Change Restriction
F0.0.08	Parameter Copy (H)	**Units digit: Upload and Download Operations** 0：No action 1：Parameter upload 2：Parameter download 3：Parameter download (Except for motor parameters/F2 group) **Tens digit: Allow Local Download** 0：Prohibit parameter download 1：Allow parameter download	1	0000	×
F0.0.09	Selection of motor type and control mode (H)	**Units digit: Motor 1 Type Selection** 0：Induction asynchtonous motor 1：AC asynchronous servo motor 2：Permanent magnet synchronous motor **Tens digit: Motor 1 Control Mode** 0：SVC mode/ open-loop vector control 1：VC mode/closed-loop vector control 2：V/F control 3：V/F separation control	1	0000	×
F0.3.33	Control command 1	0：Operation panel 1：External control terminal 2：MODBUS field bus/standard configuration of expansion card 3：Extended communication module	1	0	
F0.3.34	Control command 2		1	0	
F1.0.03	Acceleration time 1	0.01~ 600.00（Sec./Min.）	0.01	☆	
F1.0.04	Deceleration time 1	0.01~ 600.00（Sec./Min.）	0.01	☆	
F1.1.13	Carrier frequency	1.5~15.0KHz (Related to the model)	0.1	☆	
F1.1.14	Carrier characteristics	**Units digit: Load Related Adjustment** 0: Invalid 1: valid **Tens digit: Tmperature Related Adjustment** 0: Invalid 1: valid **Hundreds digit: Fundamental-Frequency Related Adjustment** 0: Invalid 1: valid **Thousands digit: Modulation Mode** 0：Asynchronous Modulation 1：Synchronous Modulation 2：Smooth Noise	1	0111	

Function Code	Title	Setting Range and Description	Resolution	Factory	Change Restriction
F2.0.11	Rated torque of synchronous motor	0.1~5000.0NM	0.1NM	☆	×
F2.0.12	Rated voltage of synchronous motor	30~480V	1V	380/220	×
F2.0.13	Rated current of synchronous motor	0.01~650.00A	0.01A	☆	×
F2.0.14	Rated frequency of synchronous motor	5.00~300.00Hz	0.01Hz	50.00	×
F2.0.15	Rated speed of synchronous motor	10~60000rpm	1	1500	×
F2.0.16	Pole-pairs of synchronous motor	1~32	1	2	×
F2.0.17	Counter EMF constant of synchronous motor	0.010~5.000V/rpm	0.001	0.215	×
F2.0.18	Torque coefficient of synchronous motor	0.10~500.00 Nm/A	0.01	3.00	×
F2.0.19	Identification current of synchronous motor	1.0~80.0%*[F2.0.13]	0.1	20.0	×
F2.0.20	Stator resistance of synchronous motor	0.01~65000mΩ		☆	×
F2.0.21	D-axis inductance of synchronous motor (Ld)	0.001~6500.0mH		☆	×
F2.0.22	Q-axis inductance of synchronous motor (Lq)	0.001~6500.0mH		☆	×
F2.0.23	Initial angle of synchronous motor	0~65535	1	0	×
F2.0.24	Initial angle of Z pulse	0.0~359.9	0.1	0.0	×
F2.0.25	Motor overload protection coefficient	50.0~131.0(%)（131--OFF）	0.1	120.0	
F2.2.53	Motor parameter determination	0：OFF 1：Motor identification	1	0	×
F3.0.00	Multi-function input terminal DI1	0~96	1	0	×
Speed Control Parameter Set					
F8.1.21	Proportional gain 1（ASR-P1）	0.05~2.00	0.01	0.9	
F8.1.22	Integral time 1（ASR-I1）	0.0，0.01~50.00 Sec.	0.01	0.50	
F8.1.23	Differential coefficient 1（ASR-D1）	0.0，0.01~10.00	0.01	0.0	
F8.1.24	Differential output filter constant 1 (ASR-DT1)	0.10~5.00 Sec.	0.01	1.00	
F8.1.25	Proportional gain 2 (ASR-P2)	0.1~2.00	0.01	0.8	
F8.1.26	Integral time 2（ASR-I2）	0.0，0.01~50.00 Sec.	0.01	5.00	
F8.1.27	Differential coefficient 2（ASR-D2）	0.0，0.01~10.00	0.01	0.0	
F8.1.28	Differential output filter constant 2 (ASR-DT2)	0.10~10.00 Sec.	0.01	1.00	

2、Function Parameter of Servo Oil Pump

Pressure and Flow Function Parameter Set					
FC.0.00	Control mode selection	0：Non-oil-pressure control mode 1：Given pressure and flow command of analog channel 2：CAN given 3：Retained	1	0	×
FC.0.01	Upper speed limit	The upper limit of system output speed: 1rpm~60000rpm	1	1500	×
FC.0.02	Maximum reverse frequency	0.0 ~ 100.0%	0.1	20.0%	×
FC.0.03	Multi-function input terminal DI1	0: Invalid 1: Run enable 2: Online conflux enable 3: PID 1 4：PID 2 5：PID 3 6：Fault reset 7：Motor temperature protection 8~10：Retained	1	1	×
FC.0.04	Multi-function input terminal DI2		1	2	×
FC.0.05	Multi-function input terminal DI3		1	3	×
FC.0.06	Multi-function input terminal DI4		1	4	×
FC.0.07	Multi-function input terminal DI5		1	5	×
FC.0.08	Multi-function input terminal DI6		1	6	×
FC.0.09	Multi-function input terminal DI7		1	7	×
FC.0.10	Multi-function input terminal DI8		1	0	×
FC.0.11	Function parameter of terminal state (H)	0000 ~FFFF	1	00	
FC.0.15	AI3 signal selection	0：0.00 ~ 10.00V 1：0.00 ~ 20.00mA	0.01	0	
FC.0.16	AI1 minimum value	0.00 ~ 10.00V	0.01	0.00	
FC.0.17	AI1 maximum value	0.00 ~ 10.00V	0.01	10.00	
FC.0.18	AI2 minimum value	0.00 ~ 10.00V	0.01	0.00	
FC.0.19	AI2 maximum value	0.00 ~ 10.00V	0.01	10.00	
FC.0.20	AI3 minimum value	0.00 ~ 10.00V /0.00 ~ 20.00mA	0.01	0.00	
FC.0.21	AI3 maximum value	0.00 ~ 10.00V /0.00 ~ 20.00mA	0.01	10.00	
FC.0.22	AI1 filter time	0 ~ 500ms	1	5	
FC.0.23	AI2 filter time	0 ~ 500ms	1	5	
FC.0.24	AI3 filter time	0 ~ 500ms	1	5	
FC.0.25	Self-correcting of AI null shift	0 ~ 1	1	0	
FC.0.27	Flow command channel selection	0：AI1 1：AI2 2：AI3 3：CAN given	1	0	
FC.0.28	Analog quantity corresponding to the 0% flow command	0.00 ~ 10.00V /0.00 ~ 20.00mA	0.01	0.00	
FC.0.29	Analog quantity corresponding to the 100% flow command	0.00 ~ 10.00V /0.00 ~ 20.00mA	0.01	10.00	
FC.0.30	Flow command value corresponding to the maximum frequency	10.0 ~ 100.0%	0.1	100.0%	
FC.0.31	Setting of minimum flow	0.0 ~ 50.0%	0.1	10.0%	
FC.0.32	Rise time of flow command	1~500ms	1	100	
FC.0.33	Fall time of flow command	1~500ms	1	100	
FC.0.35	Oil pressure command channel selection	0：AI1 1：AI2 2：AI3 3：CAN given	1	1	×
FC.0.36	System setting maximum value of oil pressure	0.0 ~ 500.0kg / cm^2	0.1	250.0	
FC.0.37	Analog quantity corresponding to the 0 oil pressure	0.00 ~ 10.00V / 0.00 ~ 20.00mA	0.01	0.00	
FC.0.38	Analog quantity corresponding to the maximum value of preset oil pressure	0.00 ~ 10.00V / 0.0 ~ 20.00mA	0.01	10.00	

FC.0.39	Setting of minimum oil pressure	0.0 ~ 50.0kg / cm^2	0.1	5.0	
FC.0.40	Rise time of oil pressure command	1 ~ 500ms	1	100	
FC.0.41	Fall time of oil pressure command	1 ~ 500ms	1	100	
FC.0.43	Oil pressure feedback channel selection	0：AI1 1：AI2 2：AI3	1	2	
FC.0.44	Measurement range of pressure sensor	0.0 ~ 500.0kg / cm^2	0.1	300.0	
FC.0.45	Analog quantity corresponding to the 0 oil pressure feedback	0.00 ~ 10.00V / 0.0 ~ 20.00mA	0.01	0.00	
FC.0.46	Analog quantity corresponding to the maximum value of measurement range of pressure sensor	0.00 ~10.00V / 0.00 ~ 20.00mA	0.01	10.00	
FC.0.47	Line breakage protection function of the pressure sensor	0: Invalid 1：Enable	1	0	
FC.0.48	Value of protective valve of the pressure sensor	0.00 ~ 10.00V	0.01	0.00	
FC.0.49	Action time of line breakage detection of the pressure sensor	0.01 ~ 1.00S	0.01	0.20	
FC.0.50	Action selection of the pressure sensor after line breakage	0：No action 1：forcibly selecting the minimum value 2：forcibly selecting the maximum value 3：forcibly selecting the default setting value (FC.0.51) 4：Fault Shutdown	1	0	
FC.0.51	The default value after line breakage	0.00 ~ 10.00V / 0.00 ~ 20.00mA	0.01	0.00	
FC.0.52	Source selection of rise-fall time of pressure and flow	0：Keyboard set 1：CAN Given	1	0	
FC.0.53	The running speed in the non-oil-pressure control mode	0rpm ~upper speed limit	1	100	
Pressure PID Control Parameter Set					
FD.0.00	Oil pressure proportional gain 1	0.0 ~ 200.0	0.1	1.5	
FD.0.01	Oil pressure integral time 1	0.001 ~ 10.000s	0.001	0.15	
FD.0.02	Oil pressure derivative time 1	0.001 ~ 1.000s	0.001	0	
FD.0.03	Oil pressure proportional gain 2	0.0 ~ 200.0	0.1	2.5	
FD.0.04	Oil pressure integral time 2	0.001 ~ 10.000s	0.001	0.1	
FD.0.05	Oil pressure derivative time 2	0.001 ~ 1.000s	0.001	0	
FD.0.06	Oil pressure proportional gain 3	0.0 ~ 200.0	0.1	1.0	
FD.0.07	Oil pressure integral time 3	0.001 ~ 10.000s	0.001	0.2	
FD.0.08	Oil pressure derivative time 3	0.001 ~ 1.000s	0.001	0	
FD.0.09	Oil pressure proportional gain 4	0.0 ~ 200.0	0.1	1.5	
FD.0.10	Oil pressure integral time 4	0.001 ~ 10.000s	0.001	0.15	
FD.0.11	Oil pressure derivative time 4	0.001 ~ 1.000s	0.001	0	
FD.0.12	Oil pressure proportional gain 5	0.0 ~ 200.0	0.1	2.5	
FD.0.13	Oil pressure integral time 5	0.001 ~ 10.000s	0.001	0.1	
FD.0.14	Oil pressure derivative time 5	0.001 ~ 1.000s	0.001	0	
FD.0.15	Oil pressure proportional gain 6	0.0 ~ 200.0	0.1	1.0	
FD.0.16	Oil pressure integral time 6	0.001 ~ 10.000s	0.001	0.2	
FD.0.17	Oil pressure derivative time 6	0.001 ~ 1.000s	0.001	0	
FD.0.18	Oil pressure proportional gain 7	0.0 ~ 200.0	0.1	1.5	
FD.0.19	Oil pressure integral time 7	0.001 ~ 10.000s	0.001	0.15	
FD.0.20	Oil pressure derivative time 7	0.001 ~ 1.000s	0.001	0	
FD.0.21	Oil pressure proportional gain 8	0.0 ~ 200.0	0.1	2.5	
FD.0.22	Oil pressure integral time 8	0.001 ~ 10.000s	0.001	0.1	
FD.0.23	Oil pressure derivative time 8	0.001 ~ 1.000s	0.001	0	
FD.0.24	AO1 output function number	0: constant value	1	0	

FD.0.25	AO2 output function number	1: frequency 3: pressure feedback	1	0	
FD.0.26	Output value of AO1 constant value	0.0 ~ 10.00V	1	0	
FD.0.27	Output value of AO2 constant value	0.0 ~ 20.00mA	1	0	
FD.0.28	AO1 signal selection	0：0.0 ~ 10.00V 1：0.0 ~ 20.00mA	1	0	
FD.0.29	AO2 signal selection	0：0.0 ~ 10.00V 1：0.0 ~ 20.00mA	1	0	
FD.0.30	AO1 output minimum value	0.0 ~ 10.00V / 0.0 ~ 20.00mA	0.01	0.00	
FD.0.31	AO1 output maximum value	0.0 ~ 10.00V / 0.0 ~ 20.00mA	0.01	10.00	
FD.0.32	AO2 output minimum value	0.0 ~ 10.00V / 0.0 ~ 20.00mA	0.01	0.00	
FD.0.33	AO2 output maximum value	0.0 ~ 10.00V / 0.0 ~ 20.00mA	0.01	10.00	
FD.0.36	RL1 output function selection	0：No action 1：Fault output 2：Pressure control state output 3：The swashplate of double-discharge plunger pump is switched to ON 4：Retained	1	0	
FD.0.37	RL2 output function selection		1	0	
FD.0.38	RL3 output function selection		1	0	
FD.0.39	Output delay time of pressure control state	0.01 ~ 5.00s	0.01	0.10	
FD.0.40	Value of changeover valve of plunger pump	0.0 ~ 100.0%	0.1	80	
CAN Function Parameter Set					
FE.0.00	CAN bus Baud rate	0：1Mbps　1：800Kbps 2：500Kbps　3：250Kbps 4：100Kbps　5：50Kbps	1	2	
FE.0.01	CAN communication address	0 ~ 255 0: Shunt/conflux host computer 1~255: Conflux slave	1	0	
FE.0.03	Shutdown pressure of slave pump	0.0 kg / cm2~ the maximum value of system setting oil pressure (FC.0.36)	0.1	250.0	
FE.0.04	Shutdown speed of slave pump	1rpm ~upper speed limit (FC.0.01)	1	900	
FE.0.05	Unlocking speed of slave pump	(FE.0.04)~upper speed limit (FC.0.01)	1	1200	
FE.0.06	CAN communication fault enable	0：fault diagnosis prohibited 1：fault diagnosis allowed	1	0	
FE.0.25	Program version	——	—	2501	R

3、Monitor State Parameter

Fault Log Parameter					
dE.0.00	The last fault log	—	—	—	R/I
dE.0.01~ dE.0.07	Past fault 1~Past fault7	—	—	—	R/I
dE.0.08	Running frequency (synchronous rotor)	-300.00~300.00Hz	0.01	0	R/I
dE.0.09	Output current	0.0~3000.0A	0.1	0	R/I
dE.0.10	Output voltage	0~1000V	1	0	R/I
dE.0.11	Motor speed detection	0~30000rpm	1	0	R/I
dE.0.12	DC side voltage	0~1000V	1	0	R/I
dE.0.13	Output torque	-300.0~300.0%	0.1	0	R/I
dE.0.14	Target frequency	0.0~300.00Hz	0.01	0	R/I
dE.0.15	Maximum temperature of the equipment	0.0~150.0	0.1	0	R/I

dE.0.16	Command state	Units digit: Command state selection 0：halt command 1：run command	1	0000	R/I
dE.0.17	Operation condition of servo drive	Units digit: Operation mode 0：VF mode 1：open-loop vector velocity 2：close-loop vector velocity 3：open-loop torque control 4：close-loop torque control 5：V-F separation control Tens digit: Operating condition 0：Halt 1：Start and accelerate 2：Stop and decelerate 3：Decelerate with reduced frequency 4：Stable operation Hundreds digit: Electric and brake mode 0：Electric operation 1：Generation operation Thousands digit: Extreme suppression 0：No action 1：overcurrent suppression action 2：overvoltage suppressor action 3：undervoltage suppression action	1	0000	R/I
dE.0.18	Accumulated startup running time at the last fault	0~65535	1H	65535	R/I
dE.019	Startup running time interval between the recent two faults	0~65535	1H	65535	R/I
dE.0.20	Sync output frequency	-300.00~300.00Hz	0.01	0	R/I
General State Parameter					
d0.0.00	Output frequency and direction	-300.0Hz ~ 300.00Hz	0.01Hz	—	R
d0.0.01	Motor speed and direction	-30000~30000rpm	1rpm	—	R
d0.0.02	Output current	0.0~ 6000.0A	0.1A	—	R
d0.0.03	Output torque	-300.0~300.0%	0.1%	—	R
d0.0.04	Output voltage	0~500V	1V		R
d0.0.05	Output power	-1000.0~1000.0KW	0.1KW	—	R
d0.0.06	Maximum temperature of motor body	0~150.0℃	0.1℃	—	R
d0.0.07	DC side voltage	0~1000V	1V	—	R
d0.1.34	Actually measured speed value	-30000~30000rpm	1rpm	—	R
Servo Oil Pump State Parameter					
d1.0.30	Flow command value	0.0~100.0%	0.01	0	R
d1.0.31	Oil pressure command value	0.0~500.0kg/cm^2	0.01	0	R
d1.0.32	Oil pressure feedback value	0.0~500.0kg/cm^2	0.01	0	R
d1.0.33	Flow output value	0.0~100.0%	0.01	0	R
d1.0.34	AI1 Pressure (Corrected)	0.0~12.00V	0.01	0	R
d1.0.35	AI2 Pressure (Corrected)	0.0~12.00V	0.01	0	R
d1.0.36	AI3 Pressure (Corrected)	0.0~12.00V 0.0~1.20A	0.01	0	R
d1.0.37	AO1 Output voltage	0.0~12.00V 0.0~1.20A	0.01	0	R
d1.0.38	AO2 Output voltage	0.0~12.00V 0.0~1.20A	0.1	0	R
d1.0.39	Motor temperature value	0.0~140.0℃	0.1	0	R