Installation and Wiring for SV-X6E Series Servo Drive

Manual Number	Manual Version	Date
HPPD12300EN	V1.2	Aug.2021

HCFA Website: http://www.hcfa.com.cn Thank you for purchasing this product. This manual mainly describes the safety use, installation, wiring and parameter list for SV-X6E

	olease refer to <sv-x6e ing items when unpackir</sv-x6e 	Series Servo Drive User Manual>. ng:	
Number		Name	Qua
1	Servo drive		
2	Accordanias	Connecting terminal	

Cold-pressed terminal

• Check if there are some damage to the products during transportation • Any questions, please contact the HCFA Technology.

This manual

Safety Precautions

Please pay attention to the following safety precautions anywhere and any time during acceptance inspection, installation, wiring, operation and maintenance.

In this manual, the safety precautions are ranked as "DANGER" and "CAUTION"

⚠ DANGER	Indicates that incorrect handling may result in death or severe injury.
⚠ CAUTION	Indicates that incorrect handling may result in medium or slight personal injury or physical damage.
	Indicates "Prohibitions"(Indicates what must not be done.)

0	Indicates "Forced".(Indicates what must be done.)

Installi	ng and wiring	
\bigcirc	Do not connect the motor to the commercial power.	To prevent fire or malfunction.
O	Do not place the combustibles around the servo motor and drive.	To prevent fire.
	Be sure to protect the drives through the case, and leave specified clearances between the case or other equipment and the drive.	To prevent electric shock, fire or malfunction.
•	Install it at the place free from excessive dust and dirt, water and oil mist	To prevent electric shock, fire , malfunction or damage
	Install the equipment to incombustibles, such as metal.	To prevent fire.
U	Any person who is involved in wiring and inspection should be fully competent to do the work.	To prevent electric shock.
	FG terminal of motor and drive must be grounded.	To prevent electric shock.
	Perform the wiring correctly after cut off the breaker.	To prevent electric shock, injury, malfunction or damage
	Have the insulation processing when connecting cables.	To prevent electric shock fire or malfunction.
Operat	ion and running	
	During operation, never touch the internal parts of the drive.	To prevent burns or electric shock.
	The cables should not be damaged, stressed loaded, or pinched.	To prevent electric shock, malfunction or damage.
	During operation, never touch the rotating parts of the servo motor.	To prevent injury.
	Do not install the equipment under the conditions with water, corrosive and flammable gas.	To prevent fire.
\bigcirc	Do not use it at the location with great vibration and shock.	To prevent electric shock, injury or fire.
_	Do not use the servo motor with its cable soaked in oil or water.	To prevent e lectric shock, malfunction or damage
	Operate the switches and wiring with dry hand.	To prevent electric shock, injury or fire.
	Do not touch the keyway directly when using the motor with shaft-end keyway	To prevent injury.
	Do not touch the motor and drive heat sink, as they are very hot	To prevent burns or parts damaged.

Do not drive the motor by external drive.

	Confirm the equipment's safety after the earthquake happens.		orevent electric shock, ry or fire.	
	Installing and setting correctly to prevent the fire and personal injury when earthquake happens.	To prevent injury, electric shock, fire, malfunction or damage.		
0	Provide an external emergency stop circuit to ensure that operation can be stopped and power switched off immediately.	sho	orevent injury, electric ck, fire, malfunction or nage.	
	About maintenance and inspection			
	As there's dangerous and high-voltage parts inside the drive, before wiring or inspection, turn off the power and wait for 5 minutes or more. Moreover, do not disassemble the drive.	Тор	prevent electric shock.	
	⚠ CAUTION			
nstallir	ng and wiring			

	△ CAUTION	
nstalli	ng and wiring	
	Please follow the specified combination of the motor and drive.	To prevent fire or malfunction.
	Do not touch the terminals of connector directly.	To prevent electric shock or malfunction.
_	Do not block intake and prevent the foreign matters from entering into the motor and drive.	To prevent electric shock or fire.
0	Fix the motor and have the test run away from the mechanical system. After confirming the operation, the motor can be securely mounted to mechanical system.	To prevent injury .
	The servo motor must be installed in the specified direction.	To prevent injury or malfunction.
	Install the equipment correctly in accordance with its weight and rated output.	To prevent injury or malfunction.
Opera	tion and running	
	Do not climb or stand on servo equipment. Do not put heavy objects on equipment.	To prevent electric shock, injury, fault or damage.
	The parameter settings must not be changed excessively. Operation will be instable.	To prevent injury.
\bigcirc	Keep it away from the direct sunlight	To prevent malfunction.
	Do not put strong impact on the motor, drive and motor shaft.	To prevent malfunction.
	The electromagnetic brake on the servo motor is designed to hold the servo motor shaft and should not be used for ordinary braking.	To prevent injury or malfunction.
	When power is restored after an instantaneous power failure, keep away from the machine because the machine may be restarted suddenly (design the machine so that it is secured against hazard if restarted).	To prevent injury.
_	Do not install or operate a faulty servo motor or drive.	To prevent injury, electric shock or fire
0	Check the power specification.	
•	The electromagnetic brake may not hold the servo motor shaft. To ensure safety, install a stopper on the machine side.	To prevent injury.
	A sudden restart is made if an alarm is reset with the run signal on.	To prevent injury.
	Connect the relay for emergency stop and for brake in series.	To prevent injury or malfunction.
Fransp	portation and storage	
_	Do not subject the equipment to the place with rain,	
$\langle \rangle$	waterdrop, poisonous gases or liquids. Do not carry the servo motor by the cables, shaft or	
_	encoder during transportation.	
	Do not drop or dump the motor during transportation	To prevent injury or
•	and installation. If you want to store it for a long time, follow the	malfunction.
•	instruction manual.	-
	Store the unit in a place in accordance with the instruction manual.	To prevent malfunction.
Other	safety instructions	
0	Please dispose the battery according to your local laws. When disposing of the product, handle it as industrial wa	
Mainte	enance and inspection	
	Do not disassemble and/or repair the equipment on	To prevent
\bigcirc	customer side. Do not turn on or switch off the main power	malfunction.
	frequently.	malfunction.
	Do not touch the servo drive heat sink, regenerative resistor, servo motor etc. Their temperatures may be	To prevent hums or
	high while power is on or for some time after power- off.	electric shock.
•	When the drive become faulty, switch off the control circuit and main power.	To prevent fire.
	If the servo motor is to be stored for a long time,	malfunction. To prevent electric shock or malfunction. To prevent electric shock or fire. To prevent injury. To prevent injury or malfunction. To prevent injury or malfunction. To prevent injury, fault or damage. To prevent injury. To prevent injury. To prevent malfunction. To prevent injury or malfunction. To prevent injury. To prevent injury or malfunction. To prevent malfunction. To prevent malfunction. To prevent malfunction. To prevent malfunction.

About maintenance and inspection < Warranty period> The term of warranty for the product is 18 months from the date of manufacture. It's exceptional to brake motors as they are warranted when acceleration / deceleration times is not beyond the specified service life. < Warranty coverage >

This warranty applies only when the condition, method, environment, etc. of use are in compliance with the terms and conditions and instructions that are stated in the instruction manual and user manual for the Product However, even during warranty period, the repair cost will be charged on customer in the following cases.

 A failure caused by improper storing or handling, repair and modification.
 A failure caused by the parts which have dropped down or damaged during 3) A failure caused when the products have been used beyond the product

specification
4) A failure caused by external factors such as inevitable accidents, including but limited to fire, earthquake, lightning stroke, windstorm disaster, flood, salt damage, abnormal fluctuation of voltage and other natural disaster.

5) A failure caused by the intrusion of water, oil, metal and other foreign matters. The warranty coverage is only for the product itself. We assume no responsibilities for any losses of opportunity and/or profit incurred by you due to a

1. Product introduction and model selection

Introduction for drive nameplate

Model name identification

failure of the product

Model name———	AC SERVO DRIVER DATE
Power specifications Serial number—	RATED INPUT 10AC200V-240V 50/60Hz
	HCF3 MADE IN CHINA

	SV-X6	E A	<u>XX</u>	XX	4	<u>\</u> - <u>/</u>	<u> </u>	<u>)-0</u>	(<u>)</u>	000
S	erial name	1	Produc	t power						Software	customized mark
		i	Symbol	Types					l		P21.55
	ınction type		005	50W					l	Symbol	Types
Symbol	Types		010	100W					l	000	N/A
E	Standard type		020	200W					l	001	
F	Full-function type		040	400W	1				l		
L	Linear-type		075	750W					l	005	
Fu	ınction type	1	100	1000W					l		
Symbol	Types	1	150	1500W	1				l		customized mark
A	Pulse type		200	2000W	1				L	Symbol	Types
В	EtherCAT type	1	250	2500W	1					00	N/A
N	CANOpen type		300	3000W						Produc	ets updates no.
R	PROFINET type	1	500	5000W						Symbol	Types
	1	I	750	7500W						0	N/A
Voltage spec.		1			'					1	
Symbol	Types	1									
A	AC220V									Co	ntrol power
T	AC220V AC380V									Symbol	Types
1 1	AC380V	I								 	10

. /10000	·	Α	AC power
	Examples		
SV-X6EA200A-A	X6 series, 220V, 2kw, standard pulse type		
SV-X6EB200A-A	X6 series, 220V, 2kw, standard EtherCAT type		
SV-X6EN200A-A	X6 series, 220V, 2kw, standard CANOpen type		
SV-X6ER200A-A	X6 series, 220V, 2kw, standard PROFINET type		
SV-X6FA200A-A	X6 series, 220V, 2kw, full-function pulse type		
SV-X6FB200A-A	X6 series, 220V, 2kw, full-function EtherCAT type		
SV-X6FN200A-A	X6 series, 220V, 2kw, full-function CANOpen type		
SV-X6FR200A-A	X6 series, 220V, 2kw, full-function PROFINET type		

Functions and Ports for X6E Series

Analog input N/A 2-ch

Analog output N/A 2-ch

Pulse input	Supported	Supported	N/A	N/A	N/A	N/A	N/A	N/A
Pulse frequency division output	Supported		N/A	Supported	N/A	Supported	N/A	Supported
Z-phase collecto output	Supported	Supported	N/A	Supported	N/A	Supported	N/A	Supported
Serial communication	USB/485	USB/485	USB	USB/485	USB	USB/485	USB	USB
Full-closed mode	e N/A	Supported	N/A	Supported	N/A	Supported	N/A	Supported
Gantry synchronization	N/A	Supported	N/A	Supported	N/A	Supported	N/A	Supported
Directdrive	N/A	Supported	N/A	Supported	N/A	Supported	N/A	Supported
Model name Ports	Pulse Standard	Pulse Full- function	EtherCAT bus standard	Bus full-	CANopen Bus standard	CANopen Bus full- function	ProfiNet Bus standard	ProfiNet Bus full- function
CN1: Analog output	N/A	Supported	N/A	Supported	N/A	Supported	N/A	Supported
CN2: STO port	N/A	Supported	N/A	Supported	l N/A	Supported	N/A	Supported
CN3: USB port	Supported	Supported	Supported	Supported	Supported	Supported	Supported	Supported
CN4/CN5 port	Supported	Supported	Supported	Supported	Supported	Supported	Supported	Supported

2-ch

N/A

N/A

2-ch

synchronization	n N/A	Supported	N/A	Supported	N/A	Supported	N/A	Supported		
Directdrive	N/A	Supported	N/A	Supported	N/A	Supported	N/A	Supported		
Model name Ports	Pulse Standard	Pulse Full- function	EtherCAT bus standard	EtherCAT Bus full- function	CANopen Bus standard	CANopen Bus full- function	ProfiNet Bus standard	ProfiNet Bus full- function		
CN1: Analog output	N/A	Supported	N/A	Supported	N/A	Supported	N/A	Supported		
CN2: STO port	N/A	Supported	N/A	Supported	N/A	Supported	N/A	Supported		
CN3: USB port	Supported	Supported	Supported	Supported	Supported	Supported	Supported	Supported		
CN4/CN5 port	Supported	Supported	Supported	Supported	Supported	Supported	Supported	Supported		
CN6: User I/O	Supported	Supported	Supported	Supported	Supported	Supported	Supported	Supported		
CN7: Encoder	Supported	Supported	Supported	Supported	Supported	Supported	Supported	Supported		

Supported N/A Supported N/A Supported

Drive parts name

Connector description

Pulse instruction differential input

Note 1) 1:24V

Note 1) 2:G24V

3:COM+

4:S_ON

5:ERR RST

8:PSEC EN

12:COM-

15:COIN

- 22:S_ERR-

4:S_ON

5:ERR RST

10:N_OT

Servo ready+ MAX 50mA 16:V_CMP O7 19:S_RDY+ MAX 50mA

MAX 50mA ence 06 18:V_CMP

22:S_ERR-

₩3%

国

(FF)

Torque in limit MAX 50mA
Torque in limit O5
Speed MAX 50mA
coincidence MAX 50mA
17:T_LT
18:V_CMP

Servo ready + O7 19:S_RDY+

Alarm output + 08 21:S_ERR+

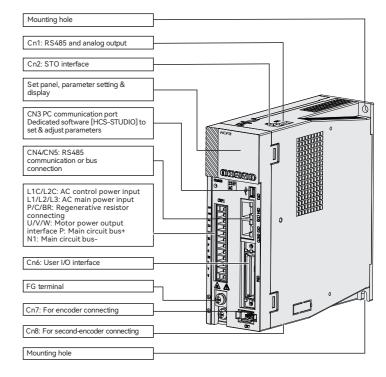
MAX 50mA

■ Pulse instruction 24V open collector input

I/O power

7:PERR_CLR

N/A



26 4 4 4 4 4 4 4 4 4 4 4 4 4 4 50

7// G24V

P33

433K

10:N_OT_

(\$100 620 27;/CMD_PLS

(3ED)62Ω 31:CMD_DIR

330Ω**0** 25:HPULS-

OA 36:OUT_A 37:/OUT_A

OB 39:/OUT_B

0Z 40:00 _ 41:/0UT_Z

2.2KΩ 28:CC-P

62Ω 30:CMD_DIR

OA 36:OUT_A 37:/OUT_A

62Ω 27:/CMD_PLS

-(52Ω 31:/CMD_DIR

0B 38:OUT_B 39:/OUT_B

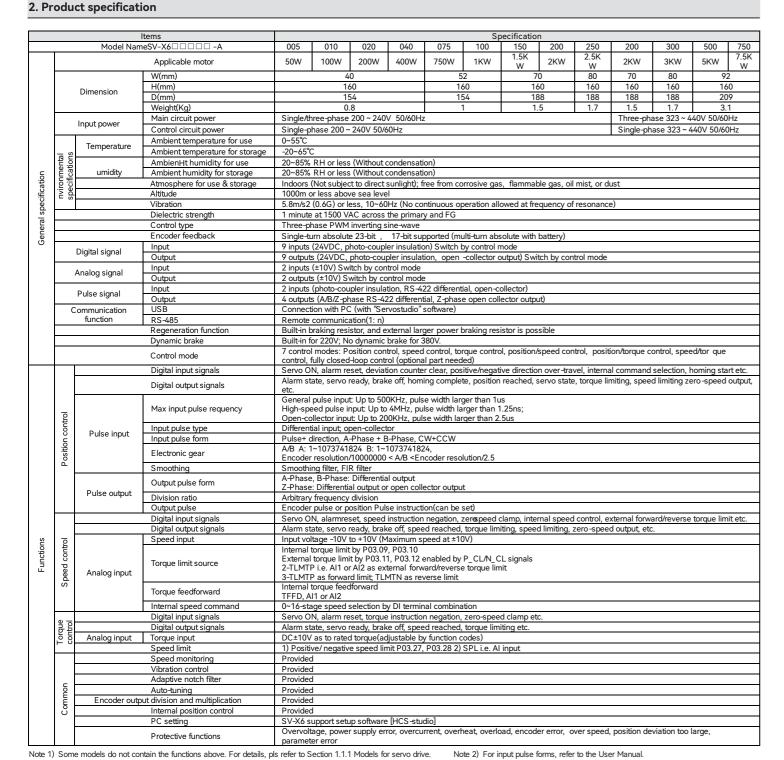
41:/OUT_Z

62Ω 30:CMD_DIR

High-speed pulse Instruction input

2

To prevent fire.



3.Installation and size of servo motor and drive

Model name identification

Installation environment conditions About the environmental conditions, make sure to follow the company's instructions. If you need to use the product outside the scope of the environmental conditions, please consult HCFA

Corporation in advance. 1 Keep it away from the direct sunlight.

2 Drive must be installed in the cabinet
3 Keep it away from the water, oil (cutting oil, oil mist) and moisture.
4 Do not install the equipment under the conditions with water, corrosive and flammable gas. 5 Free from the dust, iron powder, cutting powder and so on. 6 Keep it away from the area with high temperature, excessive vibration and shock

External dimension for servo drive

■ Pulse instruction 5V open collector input

LW-J le D					
	Model SV-X6FA□□□A	[Dimension	S	Weight (kg)
	Model SV-XoFALLLA	W(mm)	H(mm)	D(mm)	(kg)
	005、010、02、040	42	160	154	0.8
-	075、100	52	160	154	1.0
1 1 1	150、200	70	160	188	1.5
	250、300	80	160	188	1.7
11 11 1	500、750	92	210	209	3.1

3:COM+

4:S_ON 5:ERR_RST

6:INHIBIT Pulse deviation clear 4 7.PERR_CLR 1 0620 31:/CMD_DIR

Positive over-travel 16 9:P_OT

Negative over-travel 17 10:N_OT

Servo ready + 07 19:S_RDY+

Alarm output + 08 21:S_ERR+

Analog instruction input

I/O power

19:S_RDY+

MAX 50mA

20:S_RDY-

22:S_ERR-

Note 1) 2:G24V

3:COM+

4:S_ON 12 5:ERR_RST (季3L)

13 6:INHIBIT (Fig. 1)

enabled 15 8:PSEC_EN

10:N_OT

MAX 50mA

MAX 50mA

20:S_RDY-

22:S_ERR-

300Ω 49:CC-P_5V

62Ω 26:CMD_PLS

300Ω 50:CC-D_5V

62Ω 30:CMD_DIR

Encoder output

R +10V

Analog torque instruction input

Encoder output

R +10V

SHIELDING

RS-422 output

20.CMD_FLS

#3K

MAX 50mA
Somo Joseph Max 50mA
Torque in limit MAX 50mA
Speed coincidence 1 O6
MAX 50mA
Speed c

(FF)

A/D

(FF)

34:A_TRQ

35:A_GND Housing

38:OUT_B

B-phase output

40:OUT_Z

Z-phase output
Note 5)

Installation direction and space

Leave sufficient space around the drive to ensure the heat dissipation and convection in the cabinet when installing the drive. $\frac{1}{2} \int_{-\infty}^{\infty} \frac{1}{2} \left(\frac{1}{2} \int_{-\infty}^{\infty} \frac{1}{2$ Install the drives in the vertical direction. Please use two M5 screws to

fix the drive of 750W or less respectively. Use three M5 screws to fix the drive and master drive of 1kW or more respectively.

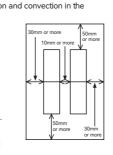
In order to ensure that surrounding temperature between internal boards is not more than 55°C, cooling fan or cooler is needed to reduce the temperature, when the drives are installed in the sealed cabinet
•The temperature on the surface of cooling plate would be 30°C higher

than the surrounding temperature.

Use heat-resistant material for the wiring and isolate wiring from the machine and other cables which are easily affected by the emperature.

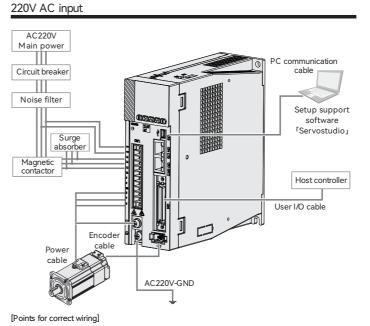
The service life of servo drive depends on the temperature around the electrolytic capacitor. When the electrolytic capacitor is close to the electrolytic capacitor. When the electrolytic capacitor is close to the service life, the static capacity will decrease and internal resistance will increase. Consequently, it will lead to overvoltage alarm, malfunction caused by noise and components damage. The service life of electrolytic capacitor is approx. 5 to 6 years under the condition average annual temperature 30°C, load rate 80% and operation of less than 20 hours a day on average J

external independent power.



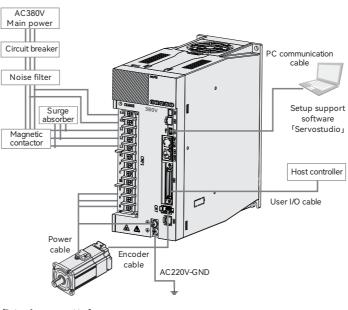
3

4. Wiring explanation for servo motor and drive



Control circuit power and main circuit power should be wired from the same 220VAC.
The main power can select single-phase or three-phase 220VAC input. When selecting single-phase, select two inputs from L1,L2 and L3.
A twisted-pair shielded cable should be used when I/O cable length is over 50cm.
The encoder cable should be less than 20m. •Same voltage class must be used and powered on simultaneously when connected to a

380V AC input



 Control circuit power and main circuit power should be wired from the same 380VAC.
 The main power must use three-phase 380VAC input. • A twisted-pair shielded cable should be used when I/O cable length is over 50cm. The encoder cable should be less than 20m.

Same voltage class must be used and powered on simultaneously when connected to a common DC bus.

5. Wiring description for user I/O connector (CN6)

Terminal arrangements for user I/O connector(CN6)

Terminal arrangements

26 CM D_		28 CC-P		30 D_DIR	A_SF		3/ A_T		0U		0U	8 T_B	OU		GN		HSI	4 3N+	00		4		CC-
1	/CMD		29 CC-D	/CME		33 A_G1		3 A_G		0U1		0U1		OUT		HSI		GN		47		CC-F	
1 VC	С	COM:	.	5 12	7	7	9	5	1		1		1		1 0		07	9 7+	2 08		2		НР
	2 G2	4	4 1	É		8 15		1	0 7	CO		1 0		1		1 0		07		22 08		HPU	

Position control mode -Internal multi-stage position command

Description

Set it to 0 - Position control mode

Set it to 2-Internal position command

0 Unit/Turn ~ 1073741824 Unit/Turn

1 ~ 1073741824(Electronic gear is valid

when setting P00.08 to 0)
1 ~ 1073741824(Electronic gear is valid

Arrange by the order of parameter from

when setting P00.08 to 0)
Set the Start stage No. of internal position command (1-P08.02)

position command (P08.01-16)

-1073741824 ~ 1073741824

1 ~ 9000rpm

0 ~ 65535ms

0 ~ 65535ms

Parameter name

Control mode selection

Position instruction source

revolution

Instruction units per motor one

Electronic gear numerator 1

Electronic gear denominator

Internal position control 1st

Internal position control 1st

Internal position control 1st

Waiting time after internal

position control 1st stage

stage acceleration/deceleration

Starting stage number

Ending stage number

stage length

4

P00.08

P00.10

P00.12

P08.06

P08.08

P08.09

P08.10

Notes

P08.11-P08.85

P05.03

P05.04

P05.14

Code and name	Cause
Err. 001: System parameter error	Control circuit power suddenly drops; After updating servo software, some previously saved parameters exceed settings range.
Err.002 Product model selection fault	Encoder cable connection broken or loose; Invalid drive or motor model.
Err.003 Fault during parameter storage	Parameter reading/writing too frequent, Parameter storage component fault, Control circuit power unstable; Drive fault.
Err.004 FPGA fault	Software version fault.
Err.005 Product matching fault	Encoder cable connection broken or loose; Use third-party encoder which is not supported; Motor capacity and drive capacity don't match. Motor capacity class is larger than or two levels off the drive; Product model code doesn't exist.
Err.006 Software abnormal	System parameter abnormal; Drive internal fault
Err.007	Encodor signal abnormal at

Related para	ameters for analog spe	ed control
Parameter No.	Parameter name	Description
P00. 01	Control mode selection	Set to 1 – Speed control mode
P03.00	Speed command	Set to 1 -External analog(Al1 input by default)
P05.16	Al1 function selection	Set to 0-Speed analog input
P03.14	Acceleration time 1	Set the acceleration/deceleration time, range
P03.15	Deceleration time1	is between 0 and 65535ms
Analog input	setup	
P05.00	Al1 minimum input	-10.00V ~ 10.00V
P05.01	Corresponding value of Al1 minimum input	-100.0% ~ 100.0% (max. speed at 100% speed)
P05.02	Al1 maximum input	-10.00V ~ 10.00V
DOE 03	Corresponding value of	-100.0% ~ 100.0% (max. speed at 100%

speed)

0.0~20.0%

-500mV ~ 500mV

0.0ms ~ 6553.5ms

Set to 0 ~ max, speed of the motor

the 1st stage position command, then from the 2nd stage to 16th stage in turn
When using internal position command, set the DI function 25(internal

Related parameters for internal multi-speed control

Al1 maximum input

Al1 dead-zone setting

Al1 input filtering time

Al setting 100% speed

Al1 zero offset

P03.00 Speed command source Se sw P03.14 Acceleration time 1 Se	tt to 1 – Speed control mode tt to 3- internal multi-stage speed 1-16 ittchover	
P03.14 Speed command source sw P03.14 Acceleration time 1 Se	itchover	
	t the acceleration/deceleration time, range	
P03.15 Deceleration time1 is	is between 0 and 65535ms	
P03.36- Speed from segment 1 so va	rameter P03.36 is the 1st stage speed and on P03.51 the 16th stage speed. Initial lue is 0 and make the setting by the actual age	
Notes When using internal multi-stage the speed by the switch combin	speed, set the DI function 6-9 and select ation	

Al setting 100% speed

Parameter No.	Parameter name	Description	
P00. 01	Control mode selection	Set to 2 - Torque control mode	
P03.22	Torque instruction source	Set to 1 - External analog input setup	
P05.17	Al2 function selection	Set to 1-Analog torque input	
P03.26	Speed limit source in torque control	Set to 0-Internal speed limit	
P03.27	Internal positive speed limit	Set to 0 ~ max. speed of the motor	
P03.28 Internal negative speed		Section illux. speed of the filotol	
Analog input s	etup		
P05.07	Al2 minimum input	-10.00V ~ 10.00V	
P05.08	Corresponding value of AI2 minimum input	-100.0% ~ 100.0% (max. torque at 100% torque)	
P05.09	Al2 maximum input	-10.00V ~ 10.00V	
P05.10	Corresponding value of AI2 maximum input	-100.0% ~ 100.0%(max. torque at 100% torque)	
P05.11	Al2 zero offset	-500mV ~ 500mV	
P05.12	Al2 dead-zone setting	0.0~20.0%	
P05.13	Al2 input filtering time	0.0ms ~ 6553.5ms	

Set the motor speed at 100% by AI

Set the motor speed at 100% by Al

6. Parameter List for SV-X6E Series Servo Drive

Description

Description

connected and the positive/ negative logic can be changed by function code.

Note 1: Control power output (24V, G24V) can be used as I/O power. But the maximum output current is 150mA, and when driving the output such as relay and brake, please use

Note 2: Please connect protective circuit (diode) when driving load with inductive component such as relay.

Note 3: According to different wiring methods, the output pin can output high level or low level.

So make wiring according to actual needs. Note 4: The differential pulse output and 485 communication circuits need to connect the $\,$

terminal resistor.

Note 5: Connect the signal ground on the host control device of output signal of the encoder.

Note 5: Connect the signal ground on the host control device of output signal of the encoder.
The connection of signal ground and power supply GND may cause malfunction.
Note 6: O8 is alarm output by default. The logic state of alarm output by default is normallyclosed. The logic state can be set by function code. For details, refer to Section 7.2
Parameter list -P04 group Digital I/O.

Note 7: Two types according to the pulse generation method: NPN &PNP.

Note 8: Two types according to the pulse generation method: NPN &PNP.

DI function can be configured by function code flexibly. DI becomes valid when connected
and the positive/ negative logic can be changed by function code.
DO function can be configured by function code flexibly. DO becomes valid when
connected and the positive/ negative logic can be changed by function code.

Common Parameters Parameter name

P00. 00	Motor positive direction definition	Check the positive direction of the motor rotation, generally by default	
P00. 02	Real time auto-tuning	Set the "Real time auto-tuning" to 1 or 2, change the rigidity, the servo gain	
P00. 03	Stiffness grade setting	parameter adjust automatically. Set it to 0, adjust the gain parameter by manual	
P00. 04	Load inertia ratio	set up the ratio of the load inertia against the rotor (of the motor) inertia	
P00. 16	Pulse output positive direction definition	Set the reversal of pulse output B-phase, generally by default	
P00. 19	Position deviation too large threshold	Set excess range of positional deviation by the command unit (default).	
P00. 21	Brake resistor setup	Select either to use built-in brake resistor or externally install the brake resistor. Default setting: 1 (external). No need to change.	
P00. 22	External regenerative resistor capacity	Set the external resistor capacity and resistance in accordance with the actual	
P00. 23	External regenerative resistor resistance value	conditions. For the resistance, please refer to Model selection of peripheral braking resistor in Instruction Manual.	
P03. 08	Torque limit source		
P03. 09	Internal forward torque limit	Set the torque limit source and setting	
P03. 10	Internal reverse torque limit	value, generally internal torque limit by	
P03. 11	External forward torque limit	default. Default value 300%.	
P03. 12	External reverse torque limit		
P09. 00	Modbus axis address		
P09. 01	Modbus baud rate	Set the parameters related to the	
P09. 02	Modbus data format	communication.	
P09. 03	Communication response delay	Communication.	

Position control mode - External pulse input

P00. 01	Control mode selection	Set it to 0 – Position control mode
P00.05	Position instruction source	Set it to 0-Pulse instruction
P00.07	Pulse train form	Select one of the following pulse format 0-Direction + pulse, positive logic 1-Direction + pulse, negative logic 2-A-phase+ B-phase orthogonal pulse, 4 multiplication, positive logic 3-A-phase+ B-phase orthogonal pulse, 4 multiplication, negative logic 4-CW +CCW, positive logic 5-CW +CCW, negative logic
P00.08	Instruction units per motor one revolution	0 Unit/Turn ~ 1073741824 Unit/Turn
P00.10	Electronic gear numerator 1	1 ~ 1073741824(Electronic gear is valid when setting P00.08 to 0)
P00.12	Electronic gear denominator	1 ~ 1073741824(Electronic gear is valid when setting P00.08 to 0)

Code and name	Cause	What to do
Err. 001: System parameter error	Control circuit power suddenly drops; After updating servo software, some previously saved parameters exceed settings range.	Make sure input power is within specified range; Set P20.06=1 to initialized system parameters.
Err.002 Product model selection fault	Encoder cable connection broken or loose; Invalid drive or motor model.	Check and fasten encoder cable; Replace with valid drive or motor model.
Err.003 Fault during parameter storage	1. Parameter reading/writing too frequent, 2. Parameter storage component fault, 3. Control circuit power unstable; 4. Drive fault.	Check if upper controller is reading/writing E2PROM too frequent; Check control circuit power cable and ensure control circuit power voltage is within specified range.
Err.004 FPGA fault	Software version fault	Check if software version is correct
Err.005 Product matching fault	1. Encoder cable connection broken or loose; 2. Use third-party encoder which is not supported; 3. Motor capacity and drive capacity don't match. Motor capacity class is larger than or two levels off the drive; 4. Product model code doesn't exist.	1. Check and fasten encoder cable; 2. Replace products that don't match; 3. Choose correct encoder type or replace the drive.
Err.006 Software abnormal	System parameter abnormal; Drive internal fault.	Set P20.06=1 to initialized system parameters and restart power.
Err.007 Encoder initialization abnormal	Encoder signal abnormal at power on.	Check or replace encoder cable.
Err.008 Short circuit to ground detection fault	UVW wiring fault, Motor breakdown; Drive fault.	Check if UVW is short circuited to ground. If so replace cable; Check if motor cable or grounding resistance is abnormal. If so replace the motor.
Err.009 Overcurrent fault 1	1. Instruction input is too fast, 2. Regenerative resistor too small or short circuited; 3. Motor cable bad contact, 4. Motor cable grounding; 5. Motor UVW short circuited; 6. Motor burnt, 7. Software detected power transistor overcurrent	1. Check instruction input time sequence and input after S-RDY; 2. Replace regenerative resistor; 3. Check and fasten encoder cable; 4. Replace motor if UVW insulation resistor is broken; 5. Check if UVW is short circuited; 6. Replace motor if UVW don't have equal resistance; 7. Reduce load, use bigger drive and motor, increase acceleration/deceleration time.
Err.010 Overcurrent fault 2	1. Instruction input is too fast; 2. Regenerative resistor too small or short circuited; 3. Motor cable bad contact; 4. Motor cable grounding; 5. Motor UVW short circuited; 6. Motor burnt; 7. Software detected power transistor overcurrent	1. Check instruction input time sequence and input after S-RDY; 2. Replace regenerative resistor; 3. Check and fasten encoder cable; 4. Replace motor if UVW insulation resistor is broken; 5. Check if UVW is short circuited; 6. Replace motor if UVW don't have equal resistance; 7. Reduce load, use bigger drive and motor, increase acceleration/deceleration time.

_	absolute encode number of turns abnormal
	Err.013 Encoder communication abnormal
	Err.014 Encoder data abnormal

Err.016

Err.017

Speed deviation too

		acceleration/deceleration time.
Err.012 Incremental encoder Z breakage or absolute encoder number of turns abnormal	Incremental encoder: Z-phase signal loss due to cable breakage or encoder fault; Absolute encoder: battery shortage, encoder cable plugging & unplugging during power off, or after P06.47=1 not initialize the encoder.	Rotate motor shaft manually, if error still occurs, replace cabl or encoder; Replace battery if undervoltage; P20.06=7 and initialize.
Err.013 Encoder communication abnormal	Communicational encoder cable breakage; Encoder not grounded; Communication verification abnormal.	Check or replace encoder cable; Check if encoder is grounded properly.
Err.014 Encoder data abnormal	Serial encoder breakage or bad contact; Serial encoder data reading/writing abnormal	Check or replace encoder cable
Err.015 Encoder battery undervoltage	Encoder battery voltage is less than P06.48 and ten's place of P06.47 is 1.	Replace encoder battery.

Speed instruction and speed

Torque maintains saturated for time longer than settings of

feedback deviation exceeds settings of P06.45.

. Increase P06.45 value;

3. Set P06.45=0 to disable

speed deviation too large

Increase P06.46 value;
 Check if UVW is broken.

acceleration/deceleration time or

2. Increase

function.

increase system

Err.018 Control power Undervoltage	Incorrect wiring or input power failure	Check input power or wiring Replace the servo drive
Err.019 Tripping	Incorrect wiring may make the control circuit diverge and result in motor stall.	Check UVW and encoder wiring. Check the motor and drive. Replace it when necessary.
Err.020 Overvoltage	Input power voltage exceeds 280VAC; Regenerative resistor breakage or not matching; Load inertia exceeds allowable range; Drive broken.	Check input power voltage; Check or replace regenerative resistor; Increase acceleration/deceleration time o replace more suitable drive/motor.
Err.021 Undervoltage	I. Input power voltage drops; Instantaneous power off; P06.36 setting is too high; Drive broken	Make sure input power is stable; Reduce P06.36 value if input power is normal. (Memory is configurable by P07.19)
Err.022 Current sampling fault	Drive internal current sampling fault	Replace servo drive.
Err.023 Al sampling voltage too large	Al wrong wiring; Al external input power voltage too high	Do correct AI wiring and set input power voltage within ±10V.
Err.024 Overspeed	Speed instruction exceeds maximum speed setting value; Wrong UVW phase sequence; Speed response over modulation; Horive faulty	Lower speed instruction Check if UVW phase sequence is correct; Adjust speed loop gains to reduce over shoot; Replace drive
Err.025 Electrical angle identification failure	Load or inertia too large; Wrong encoder cable wiring	Reduce load or increase current loop gains Replace encoder cable.
Err.026 Load identification failure	Load or inertia too large. Motor cannot run at specified curves; 2. Verification process aborted by other faults.	1. Reduce load or increase current loop gains 2. Make sure verification process correct
Err.027 DI parameter setting fault	Different DOs are assigned with same function; Physical DI and communicational DI have definition conflicts	Reassign DI functions
Err.028 DO parameter setting fault	Different DOs are assigned with same function	Reassign DO functions
Err.040 S-ON instruction invalid fault	Input S-ON signal after motor is energized by other auxiliary functions	Change incorrect operation.
Err.042 Pulse division output overspeed	Pulse division output is over upper limit.	Adjust pulse division output settings.
Err.043 Position deviation too large	1. Servo motor UVW wiring is wrong; 2. Servo drive gain settings are too low; 3. Position instruction pulse frequency is too high; 4 Position instruction acceleration is too large; 5. P00.19 setting is too low; 6. Servo drive/motor faulty; 7. Brake release abnormal. Motor is locked by external forces, gravity etc.	1. Reconnect the cables 2. Increase servo gains 3. Reduce instruction frequency, acceleration or adjust gear ratio 4. Set up smoothing parameters 5. Adjust the value of P00.19 6. Replace the drive 7. Check brake power and servo motor is not blocked.
Err.044 Main circuit input phase loss	Input power cable bad contact; Phase loss fault, i.e. during power on, one phase of R/S/T is too low for over 1s.	Check input power cables Measure R/S/T phase-to- phase voltage to ensure 3 phases are balanced and input power is up to standard.
Err.045 Drive output phase loss	Motor UVW bad contact; Motor broken	Check UVW wiring Replace motor
Err.046 Drive overload	1. Motor UVW or encoder cable bad contact or loose 2. Motor blocked or brake not released 3. Wrong UVW/encoder cable wiring for multiple drives/motors 4. Motor/drive too small for load 5. Phase loss or wrong phase sequence 6. Motor or drive broken	Check UVW/encoder cable wiring Check motor is not blocked and brake is released Check there is no wrong UVW/encoder cable wiring for multiple drives/motors Increase acceleration/deceleration time o choose bigger drive/motor Check UVW wiring Replace drive/motor
Err.047 Motor overload	1. Motor UVW or encoder cable bad contact or loose 2. Motor blocked or brake not released 3. Wrong UVW/encoder cable wiring for multiple drives/motors 4. Motor/drive too small for load 5. Phase loss or wrong phase sequence 6. Motor or drive broken	Check UVW/encoder cable wiring Check motor is not blocked and brake is released Check there is no wrong UVW/encoder cable wiring for multiple drives/motors Increase acceleration/deceleration time o choose bigger drive/motor Check UVW wiring Replace drive/motor
Err.048 Electronic gear setting fault	Electronic gear ratio exceeds setting range	Set correct electronic gear

		Check fan. Replace fan or drive
Err.049 Heat sink too hot	1. Fan broken 2. Ambient temperature is too high 3. Too many times of restarting power after overload 4. Inappropriate installation directions and spacing 5. Servo drive faulty 6. Motor or drive broken	drive 2. Measure ambient temperatu and improved cooling conditior for servo drive 3. Check error records and see if there has been overload erro Restart after 30s. Increase acceleration/deceleration time. 5. Install the servo drive according to specifications in this manual. 6. Power off and wait for 5 minutes. If this error persists, replace drive.
Err.050 Pulse input abnormal	Input pulse frequency is larger than maximum frequency setting Input pulse is interfered.	Adjust P06.38 Check wiring grounding conditions. Use twisted-pair shielded cable. Separate UVW cable from encoder cable.
Err.051 Fully-closed loop position deviation too large	External encoder abnormal. Relative settings too conservative.	Check external encoder wirings. Replace external encoder. Check parameters of fully- closed loop deviation and protective functions.
Err.054 User forced fault	User uses DI of function 32 FORCE_ERR to forcibly enter faulty state.	Disconnect DI of function 32.
Err.055 Absolute position resetting fault	Absolute encoder absolute position resetting faulty.	Contact HCFA.
Err.056 Main circuit outage	Power outage or main circuit abnormal	Check if there is instantaneous power failure. Increase power voltage capacity.
Err.060 First start after writing customized software	First start after writing customized software	Initialize the servo drive.
Err.065 CAN bus OFF	CAN bus disconnection or Receive or send failure	Check the wiring
Err.066 Abnormal NMT command	Receive NMT stop or reset command at servo-ON	NMT node reset. Do not stop or reset CAN node at servo-ON.
Err.067 CAN bus failure	CAN bus disconnection or Receive or send failure	Check the wiring
Err.068 External overspeed (reserved)	Speed exceeds the max.speed setting value UVW phase error Speed response severely overshoot Trive failure	Reduce speed Check UVW phase sequences Adjust speed loop gain Replace servo drive
Err.069 Excessive hybrid deviation	External encoder disconnection External encoder breakage Device transmission failure	Check or replace external encoder or wiring Check mechanical transmission
Err.071 Node protection or heartbeat overtime	Do not get any response when node protection and heartbeat monitoring reach the setting value	Check the nodes, NMT node reset
Err.072 Synchronization failure	Failure between the CANOpen and host controller in IP mode	NMT node reset or 6040 send failure reset command
Err.073 CANOpen Trace buffer underflow	CANOpen, Synchronous clock loss more than 2 times in IP or CSP mode	Check any interference to the communication and operation of host controller; NMT node rese or 6040 send failure reset command
Err.074 CANOpen Trace buffer overflow	CANOpen Sync. Clock too fast or the actual clock frequency do not match the setting value IP or CSP mode	Check any interference to the communication and operation of host controller; NMT node rese or 6040 send failure reset command
Err.075 Slave initialization failure	EtherCAT slave initialization failure	Reload the XML con guration le, and then power on again
Err.076 Synchronization failure	EtherCAT synchronization failure	NMT node reset, or 6040 send fault reset command
Err.077 EtherCAT communication breakage	The maximum number of consecutive communication losses exceeding the setting value	Check the network cable or us the shielded network cable or increase the setting value of P09.16
Err.078 Command abnormal	The operating speed command exceeds the maximum speed of the motor in CSP mode	NMT node reset, or 6040 send fault reset command
Err.079 No control mode after enabled	6060h is the control mode that's not suppo ed after the se o enabled	NMT node reset, or 6040 send fault reset command
Alarm code and name	Causes	What to do
AL.080 Undervoltage warning	DC bus voltage is relatively low.	1. Check main circuit 2. Adjust P06.36
AL.081 Drive overload warning	Same as Err.046	Same as Err.046
AL.082 Motor overload warning	Same as Err.046	Same as Err.046
AL.083 Parameter modification needs power restart	Modify parameters which needs restarting.	Restart power
	i .	

AL.085 EEPROM frequency writing warning	Operating EEPROM too frequent	Reduce EEPROM using frequency. Use communication2 which do not save in E2PROM.
AL.086 Positive over-travel warning	POT & NOT valid simultaneously Servo over-travel in some directions. Can be removed automatically.	Trigger positive limit switch, check operation mode, move the servo towards negative direction. After leaving positive limit switch, this alarm will be removed automatically.
AL.087 Negative over- travel warning	Same as AL.086	Trigger negative limit switch, check operation mode, move the servo towards positive direction. After leaving negative limit switch, this alarm will be removed automatically.
AL.088 Positive instruction overspeed	Electronic gear ratio too large Pulse frequency too high	Reduce electronic gear ratio Reduce pulse frequency
AL.090 Absolute encoder angle initialization warning	Angle is over 7.2 degree.	Replace motor
AL 093 Regenerative overload	1. Regenerative resistor wrong wiring or bad contact; 2. Internal resistor wiring breakage; 3. Resistor capacity insufficient; 4. Resistor resistance too large and causing long time braking; 5. Input voltage exceeds specifications 6. Resistor resistance, capacity or heating time constant parameters settings are wrong; 7. Drive faulty	1. Check resistor wiring 2. Check internal resistor wiring; 3. Increase resistor capacity 4. Reduce resistor resistance; 5. Reduce input voltage 6. Set correct parameters 7. Replace drive
AL.094 Regenerative resistor too small	External regenerative resistor is less than minimum value Wrong parameter settings	Replace resistor Check parameters P00.21~P00.24
AL.095 Emergency stop	Emergency stop is triggered.	This is a normal DI function (function 30)
AL.096 Homing error	Homing time exceeds P08.95 P08.90 is set is 3, 4, or 5 and contacted limit switches Contact limit switches twice when not using limit switches as origin points.	1. Increase the value of P08.95; 2. Reduce homing speeds P08.92, P08.93
AL.097 Encoder battery undervoltage	Encoder battery voltage is lower than what's set in P06.48.	Replace battery.
AL.099 Limit alignment	Meet limits during operation in CSP mode, resulting in misalignment of the position feedback and the command	Send a reverse command to exit the limit area, and the warning will be automatically cleared (Manual rotation of the motor is prohibited for the safety)
DI/DO function co	ode	

		DI function desc	cription
Value	Sign	Name	Remarks
1	S_ON	Servo enable	Invalid-Servo disabled Valid- Servo enabled
2	ERR_RST	Error reset	Servo can continue to work after some error reset. Valid when detecting edge changes.
3	GAIN_SEL	Gain switchover	Invalid-Speed loop is PI control. Valid-Speed loop is P control.
4	CMD_SEL	Command switchover	Invalid: present command is A Valid: present command is B
5	PERR_CLR	Pulse deviation clear	Invalid-No action Valid-Clear pulse deviation
6	MI_SEL1	Multi-stage selection 1	
7	MI_SEL2	Multi-stage selection 2	For internal position or internal speed
8	MI_SEL3	Multi-stage selection 3	control
9	MI_SEL4	Multi-stage selection 4	
10	MODE_SEL	Control mode switchover	Switchover of control modes(speed,m position, torque) when P00.01 is set to 3, 4 or 5.
12	ZERO_SPD	Zero-speed clamp	Valid-Enable zero-speed clamp Invalid-Disable zero-speed clamp
13	INHIBIT	Pulse input inhibition	Valid-Disable pulse input Invalid-Enable pulse input
14	P_OT	Positive over- travel	Use with limit switches for over-travel protections. Valid-Positive over-travel, positive drive disabled Invalid-Normal range, positive drive enabled
15	N_OT	Negative over- travel	Use with limit switches for over-travel protections. Valid-Negative over-travel, positive drive disabled Invalid-Normal range, positive drive enabled
16	P_CL	External forward torque limit	Valid-External torque limit enabled Invalid-External torque limit disabled

			Lyre, L. e
17	N_CL	External reverse torque limit	Valid-External torque limit enabled Invalid-External torque limit disabled
18	P JOG	Positive JOG	Valid-Input instructions
18	P_JOG	Positive JOG	Invalid-Stop inputting instructions
19	N JOG	Negative JOG	Valid-Reverse input instructions
20	GEAR_SEL1	ŭ	Invalid-Stop inputting instructions GEAR SEL1 invalid, GEAR SEL2
20	GEAR_SELT	-	invalid: first electronic gear
			GEAR_SEL1 valid, GEAR_SEL2
		Electronic gear	invalid: second electronic gear
21	GEAR_SEL2	selection	GEAR_SEL1 invalid, GEAR_SEL2
			valid: third electronic gear GEAR_SEL1 valid, GEAR_SEL2 valid:
			fourth electronic gear
		Position instruction	Invalid-Not reverse:
22	POS_DIR	negation	Valid-Reverse
23	SPD DIR	Speed instruction	Invalid-Not reverse;
23	3FD_DIK	negation	Valid-Reverse
24	TOQ DIR	Torque instruction	Invalid-Not reverse;
	.04_5	negation	Valid-Reverse
		Internal multi-	Invalid-Disable internal multi-stage
25	PSEC_EN	stage enable	instruction; Valid-Enable internal multi-stage
		3 tage chabic	instruction
0.4	INTR LILL	Interrupt	Invalid-No action;
26	INTP_ULK	positioning release	Valid-when P08.86 is set to 2 or 4
		Interrupt	Invalid-No action;
27	INTP_OFF	positioning inhibit	Valid-When P08.86 is set to non-zero
		Homing origin	value Can be used as home position signal
28	HOME_IN	point	or deceleration-point position signal
29	STHOME	Homing start	Start homing.
30	ESTOP	Emergency stop	Invalid-No action
	20.0.	zmorgonoj otop	Valid-Emergency stop
31	STEP	Step enable	Valid-Step enable; Invalid-Instruction is 0
		Forced error	Invalid-No action
32	FORCE_ERR	protection	Valid-Forced error protection
		Homing	Invalid-No action
33	HOME_DEC	deceleration point	Valid-Switchover to low-speed search
			homing Invalid-No action:
34	INTP TRIG	Interrupt	Valid-Valid: when P08.86 is set to non-
5 -7		positioning trigger	zero value, can only use DI8 or DI9.
		Internal position	Invalid-No action;
35	INPOSHALT	commands	Valid-Decelerate or pause internal
-	OOIIALI	generation pause	multi-stage position and interruption
		Analog input	positioning Invalid-No action:
36	ANALOG_OFF	prohibition	Valid-Prohibit analog input
		SEN enabled	Invalid-No action;
37	ENC-SEN	absolute position	Valid-OAOBOZ send absolute position
٠,		data send	data, cannot enable servo at the same
			time Invalid: No action
39	Touch 1	Probe 1	Valid: Probe 1 function
40	Touch 2	Probe 2	Invalid: No action
40	IOUCH Z	Frode 2	Valid: Probe 2 function
-1 0	TOUCH Z	1 TODE Z	Valid: Probe 2 function

		DO function desc	cription
Value	Sign	Name	Remarks
1	S_RDY	Servo ready	Valid-Servo ready Invalid-Servo not ready
2	S_ERR	Servo error	Valid when detecting error
3	S_WARN	Servo warning	Valid when warning signal output (disconnected)
4	TGON	Motor rotation	Valid-When motor speed is larger than settings of P04.43. Invalid-Invalid motor rotation signal
5	V_ZERO	Motor speed is 0	Valid-Motor speed is 0. Invalid-Motor speed is non-zero.
6	V_CMP	Speed conformity	Speed control, valid when absolute deviation of motor speed and speed instruction is less than the settings of P04.44.
7	COIN	Positioning completed	Position control, valid when pulse deviation is less than the settings of P04.47.
8	NEAR	Positioning near	Position control, valid when pulse deviation is less than the settings of P04.50.
9	T_LT	Torque in limit	Valid-Motor torque is in limit Invalid-Motor torque is not in limit
10	V_LT	Speed in limit	Valid-Motor speed is in limit Invalid-Motor speed is not in limit
11	BKOFF	Brake release	Valid-Break release Invalid-Break recover
12	T_ARR	Torque reached	Valid when torque feedback reaches the settings of P04.55; allowable fluctuations set in P04.56.
13	V_ARR	Speed reached	Valid when speed feedback reaches the settings of P04.45; allowable fluctuations ±10rpm
15	INTP_DONE	Interrupt positioning complete	Output after interrupt positioning complete
16	BD_OUT	Dynamic brake output	Externally connecting relay or contactor and current-limiting resistor
17	HOME	Homing complete	Valid-Home return completed Invalid-Home return not completed
18	INTP_WORK	Interrupt positioning working	Interrupt positioning working
19	PCOM1	Position 1 comparison trigger signal	Output trigger signal when position 1 reaches the corresponding range
20	PCOM2	Position 2 comparison trigger signal	Output trigger signal when position 2 reaches the corresponding range
21	РСОМ3	Position 3 comparison trigger signal	Output trigger signal when position 3 reaches the corresponding range
22	PCOM4	Position 4 comparison trigger signal	Output trigger signal when position 4 reaches the corresponding range

8

Parameter list	
Control modes P: position control S: speed control T: torque control • means applicable - means not applicable	
Parameter	

Parameter		Description	Control mode		
num	ber	Description	Р	S	Т
	00	Motor positive direction definition	· ·	•	
ŀ	01	Control mode selection	•	•	_
	02	Real time auto-tuning	•	•	_
ŀ	03	Stiffness grade setting		•	_
ŀ	04	Load inertia ratio		•	_
ŀ	14	Pulse output counts per motor one revolution (32-bit)	•	-	-
	16	Pulse output positive direction definition	+ -	•	_
	17	Pulse output OUT_Z polarity	1	-	_
	18	Pulse output function selection	+ -	-	_
ŀ	19	Position deviation too large threshold	+-	•	•
ŀ	21	Regenerative resistor setting	+ -	-	-
-	22	ŭ ŭ	+ -	•	•
ŀ	23	External regenerative resistor capacity	+ :	•	-
ŀ		External regenerative resistor resistance value	+:	-	-
ŀ	24	External regenerative resistor heating time constant	+:	•	•
ŀ	25	Regenerative voltage threshold			_
ļ	26	Step value setting	•	-	_
υ	27	High-speed pulse train form	•	-	_
ĘĘ	28	Second encoder interface	•	-	_
>00 Group Basic Parameters	31	Motor type selection	•	•	•
ara	32	DDL motor polar pitch (N-N)	•	•	•
مّ	33	DDL scale resolution	•	•	•
Sic	34	DDL motor rated current	•	•	•
B	35	DDL rated thrust	•	•	•
호	36	DDL maximum thrust theoretical value	•	•	•
3.0	37	DDL max. speed	•	•	•
00	39	DDL rotor mass	•	•	•
PC	40	DDL Stator phase resistance Rs	•	•	•
	41	DDL motor Lq (line inductance/2)	•	•	•
	42	DDL motor Ld (line inductance/2)	•	•	•
	43	DDL Back EMF Coefficient	•	•	•
Ī	45	DDR encoder resolution (32-bit)	•	•	•
Ī	46	DDR encoder resolution high-bit	•	•	•
	47	DDR motor rated current	•	•	•
Ì	48	DDR rated torque	•	•	•
j	49	DDR Maximum torque theoretical value	•	•	•
ļ	50	DDR motor max. speed	•	•	•
ŀ	51	Reserved	-	-	-
Ì	52	DDR motor rotor inertia	•	•	•
ŀ	53	DDR stator resistance Rs	•	•	•
ŀ	54	DDR motor Lq	•	•	•
ŀ	55	DDR motor Ld	•	•	•
ŀ	56	DDR Back EMF Coefficient	•	•	-
ŀ	57	Reserved	<u> </u>	•	•
ŀ	58	Reserved	1	•	-
ŀ	59	Current response fine-tuning coefficient	+:	•	-
ŀ	60	Magnetic pole seeking method	_	_	-
ŀ			•	•	-
ŀ	61	Magnetic pole seeking current	+ •	_	_
}	62	Magnetic pole seeking action threshold value	•	•	•
	63	Magnetic pole seeking static threshold value	•	٠	•
ŀ	64	DDL/DDR Feedback source		-	

Parameter number		Description	_	Contro mode	
				S	Т
	00	Position loop gain 1	•	-	-
	01	Speed loop gain 1	•	•	-
	02	Speed loop integral time 1	•	•	-
	03	Speed detection filter 1	•	•	•
	04	Torque instruction filter 1	•	•	•
	05	Position loop gain 2	•	-	-
	06	Speed loop gain 2	•	•	-
	07	Speed loop integral time 2	•	•	-
	08	Speed detection filter 2	•	•	•
	09	Torque instruction filter 2	•	•	•
	10	Speed regulator PDFF coefficient	•	•	-
Ś	11	Speed feedforward control selection	•	-	-
işte.	12	Speed feedforward gain	•	-	-
Ĕ	13	Speed feedforward filtering time	•	-	-
P01 Group Gain Tuning Parameters	14	Torque feedforward control selection	•	•	-
g D	15	Torque feedforward gain	•	•	-
Ξ	16	Torque feedforward filtering time	•	•	-
Ξ	17	Digital input GAIN_SWITCH function selection	•	•	-
⊆	18	Position control gain switchover mode	•	-	-
<u>"</u>	19	Position control gain switchover delay	•	-	-
ď	20	Position control gain switchover class	•	-	-
5	21	Position control gain switchover hysteresis	•	-	-
5	22	Position control gain switchover time	•	-	-
<u> </u>	23	Speed control gain switchover mode	-	•	-
	24	Speed control gain switchover delay	-	•	-
	25	Speed control gain switchover class	-	•	-
	26	Speed control gain switchover hysteresis	-	•	-
	27	Torque control gain switchover mode	-	-	•
	28	Torque control gain switchover delay	-	-	•
	29	Torque control gain switchover class	-	-	•
	30	Torque control gain switchover hysteresis	-	-	•
	31	Observer enabled	•	•	•
	32	Observer cut-off frequency	•	•	•
	33	Observer phase compensation time	•	•	•
	34	Observer inertia coefficient	•	•	•

	meter nber	Description		ontro	
		2 11 11 11 11	P	S	T
	00	Position instruction smoothing filter	•	<u> </u>	<u> </u>
	01	Position instruction FIR filter	•	<u> </u>	-
	02	Adaptive filtering mode	•	•	•
	03	Adaptive filtering load mode	•	•	•
	04	First notch filter frequency	•	•	•
S	05	First notch filter width	•	•	•
ţe	06	First notch filter depth	•	•	•
l e	07	Second notch filter frequency	•	•	•
2	08	Second notch filter width	•	•	•
- E	09	Second notch filter depth	•	•	•
.io	10	Third notch filter frequency	•	•	•
888	11	Third notch filter width	•	•	•
P02 Group Vibration Suppression Parameters	12	Third notch filter depth	•	•	•
J d	13	Fourth notch filter frequency	•	•	•
Ę	14	Fourth notch filter width	•	•	•
aţi.	15	Fourth notch filter depth	•	•	•
igi	19	Position instruction FIR filter 2	•	-	-
>	20	First vibration attenuation frequency	•	•	-
l b	21	First vibration attenuation filter setting	•	•	-
ق	22	Second vibration attenuation frequency	•	•	-
02	23	Second vibration attenuation filter setting	•	•	•
4	31	Resonance point 1 frequency	•	•	•
	32	Resonance point 1 bandwidth	•	•	•
	33	Resonance point 1 amplitude	•	•	•
	34	Resonance point 2 frequency	•	•	•
	35	Resonance point 2 bandwidth	•	•	•
	36	Resonance point 2 amplitude	•	•	•

Parameter number		Description		ontro	
		I		S	Т
	00	Speed instruction source selection	-	•	-
	03	Speed instruction digital setting	-	•	-
	04	JOG speed setting	-	•	-
	08	Torque limit source	•	•	-
	09	Internal forward torque limit	•	•	-
2	10	Internal reverse torque limit	•	•	-
eţe	11	External forward torque limit	•	•	-
P03 Group Speed & Torque Control Parameters	12	External reverse torque limit	•	•	-
ari	14	Acceleration time 1	-	•	•
<u>-</u>	15	Deceleration time 1	-	•	•
Ę	16	Acceleration time 2	-	•	-
ပိ	17	Deceleration time 2	-	•	-
e	19	Zero-speed clamp function	-	•	•
оrq	20	Zero-speed clamp threshold value	-	•	•
Ĕ	22	Torque instruction source	-	-	•
- Q	25	Torque instruction digital setting value	-	-	•
ee.	26	Speed limit source in torque control	-	-	•
Š	27	Internal positive speed limit	-	-	•
ď	28	Internal negative speed limit	-	-	•
5	29	Hard limit torque limit	•	•	•
33 (30	Hard limit torque limit detection time	•	•	•
P	31	Internal speed instruction segment number selection mode	-	•	-
	32	Acceleration time selection for internal speed segment 1-8	-	•	-
	33	Deceleration time selection for internal speed segment 1-8	-	•	-
	34	Acceleration time selection for internal speed segment 9-16	-	•	-
	35	Deceleration time selection for internal speed segment 9-16	-	•	-
	36~51	Segment 1-16 speed	-	•	-

Parameter		Description	1 7	ontro mode	
nui	mber	2		S	Т
Sie	00	Normal DI filter selection	•	•	•
	01~09	DI1 ~9 terminal function selection	•	•	•
	11~19	DI1 ~9 terminal logic selection	•	•	•
	21~29	DO1~9 terminal function selection	•	•	•
ete	31~39	DO1 ~9 terminal logic selection	•	•	•
am	41	FUNINL signal unassigned state (Hex)	•	•	•
)ar	42	FUNINH signal unassigned state (Hex)	•	•	•
품	43	Motor rotational signal threshold	•	•	•
004 Group Digital Input/output Parameters	44	Speed conformity signal width	-	•	-
	45	Speed reached	•	•	•
	47	Positioning completion range	•	-	-
=	48	Positioning completion output setting	•	-	-
gits	49	Positioning completion holding time	•	-	-
	50	Positioning near threshold	•	-	-
roup	51	Servo OFF delay time after holding brake taking action when speed is 0	•	•	•
4 0	52	Speed setting for holding brake to take action in motion	•	•	•
P0	53	Waiting time for holding brake to take action in motion	•	•	•
	54	Special output function setting	•	•	•
	55	Torque reached (T_ARR) threshold	•	•	•
	56	Torque reached signal width	•	•	•
	57	Z-pulse width adjustment	•	•	•
	58	Zero-speed signal output threshold	•	•	•

 neter nber	Description
00	Al1 minimum input
01	Corresponding value of Al1 minimum input
02	Al1 maximum input
03	Corresponding value of Al1 maximum input
04	Al1 zero offset
05	Al1 dead-zone setting
06	Al1 input filtering time
07	Al2 minimum input
08	Corresponding value of AI2 minimum input
09	Al2 maximum input
10	Corresponding value of AI2 maximum input
11	Al2 zero offset

25	05	Al1 dead-zone setting	•	•	•	
rame	06	Al1 input filtering time	•	•	•	
	07	Al2 minimum input	•	•	•	
Ъа	08	Corresponding value of AI2 minimum input	•	•	•	
Ħ	09	Al2 maximum input	•	•	•	
P06 Group Expansion Parameters			_	-		
	10	Corresponding value of AI2 maximum input	•	•	•	
	11	Al2 zero offset	•	•	•	
	12	Al2 dead-zone setting	•	•	•	
8	13	Al2 input filtering time	•	•	•	
-B	14	Al setting 100% speed	•	•	•	
∢	15	Al setting 100% torque	•	•	•	
奻	16	Al1 function selection	•	•	•	
Ę,	17	Al2 function selection	•	•	•	
5	28	AO1 signal selection (need optional card)	•	•	•	
P0	29		-	•	÷	
		AO1 voltage offset			_	
	30	AO1 multiplier	•	•	•	
	31	AO2 signal selection (need optional card)	•	•	•	
	32	AO2 voltage offset	•	•	•	
	33	AO2 multiplier	•	•	•	
	34	AO monitoring value type setting	•	•	•	
		AO monitoring value type setting Description Electronic gear numerator 2(32-bit) Electronic gear numerator 3(32-bit)		Control mode		
man			P	S	T	
	00		•			
	02	Electronic gear numerator 3(32-bit)	•	-	-	
	04	Electronic gear numerator 4(32-bit)	•	-	-	
	06	Position deviation clearance function	•	- 1	-	
	09	Electronic gear ratio switchover delay	•	<u>-</u>	-	
	10		•	•	-	
		Potential energy load torque compensation	+ :		-	
	11	P06.10 memory selections	_	•		
	19	Parameter identification rate	•	•	-	
	20	Parameter identification acceleration time	•	•	-	
	21	Parameter identification deceleration time	•	•	_	
	22	Parameter identification mode selection	•	•	-	
	23	Initial angle identification current limit	•	•	•	
	24	Instantaneous power failure protection	•	•	•	
e.	25	Instantaneous power failure deceleration time	•	•	•	
et	26	Servo OFF stop mode selection	•	•	•	
aī.	27		+ -	•	•	
ar		Second category fault stop mode selection	_	-		
sion Parameters	28	Over-travel input setting	•	•	•	
. <u>Q</u>	29	Over-travel stop mode selection	•	•	•	
aŭ	30	Input power phase loss protection	•	•	•	
ă.	31	Output power phase loss protection	•	•	•	
Э	32	Emergency stop torque	•	•	•	
ă	33	Tripping protection function	•	•	•	
Ġ	34	Overload warning value	•	•	•	
90	35	Motor overload protection coefficient	•	•	•	
ď	36	Undervoltage protection point	•	•	•	
	37		+ :		•	
		Over-speed error point	_	-	•	
	38	Maximum input pulse frequency	•	-		
	39	Short circuit to ground detection protection selection	•	•	•	
	40	Encoder interference detection delay	•	•	•	
	41	Input pulse filtering setting	•	-		
	42	Input pulse inhibition setting	•		_	
	43	Deviation clearance input setting	•	-	-	
	44	High speed DI filtering setting	•	•	•	
	45	Speed deviation too large threshold	•	•	_	
	46	Torque saturation overtime setting	•	•	•	
	46		+ :		•	
		Absolute system setting	_	-		
	48	Encoder battery undervoltage threshold	•	•	•	
	49	High-speed pulse input filter	•	•	•	
	50 51	Stop mode for emergency stop Stop mode for pause	•	•	•	

• • •

	٦,	Short circuit to ground detection protection selection	1 *	1 -					
	40	Encoder interference detection delay	•	•	•				
		41	Input pulse filtering setting	•	-	-			
		42	Input pulse inhibition setting	•	-	-			
		43	Deviation clearance input setting	•	-	-			
		44	High speed DI filtering setting	•	•	•			
		45	Speed deviation too large threshold	•	•	-			
		46	Torque saturation overtime setting	•	•	•			
		47	Absolute system setting	•	•	•			
		48	Encoder battery undervoltage threshold	•	•	•			
		49	High-speed pulse input filter	•	•	•			
		50	Stop mode for emergency stop	•	•	•			
		51	Stop mode for pause	•	•	•			
Parameter			Description		Control mode				
	Hulli	DEI		P	S	Т			
		00	User password	•	•	•			
.5	5	01~05	Panel monitoring parameter setting 1~5	•	•	•			
nctio	08~09	Function selection 1~2	•	•	•				
42	2	09	Panel monitoring parameter setting 9	•	•	•			
oup Auxiliary Parameters	10	User password	•	•	-				
	11	Instant power failure immediate memory function	•	-	_				
	12	User password screen-lock time	•	-	_				
	14	Fast deceleration time		-	_				
غ ا	5	16	Function selection 3	•	•	•			
		17	Maximum division number pre motor one revolution	•	•	•			
¤	_	19~22	Function selection 5~8	•	•	•			
		23	Fault reset time	•	•	•			
		24	Positive soft limit(32-bit)	•	•	•			
		26	Negative soft limit(32-bit)	•	•	•			
		28	Homing return signal holding time	•	-	-			
		29	Modulus mode lower 32-bit	•	-	-			
P07 Group Auxiliary function Parameters musu	31	Modulus mode higher 32-bit		-	-				

	meter	Description		ontro node
nur	mber	·	P	S
	00	Multi-stage preset position execution pattern selection	•	-
	01	Starting stage number	•	-
	02	Ending stage number	•	-
	03	Restarting pattern of residual stages after pausing Position instruction type selection	•	-
	05	Unit for waiting time	•	_
	06	1st stage length (32-bit)	•	-
	08	1st stage max speed	•	-
	09	1st stage acceleration/deceleration time	•	-
	10	Waiting time after 1st stage completed	•	ı
	11	2nd stage length (32-bit)	•	ı
	13	2nd stage max speed	•	-
	14	2nd stage acceleration/deceleration time	•	_
	15	Waiting time after 2nd stage completed	•	-
	16	3rd stage length (32-bit)	•	-
	18 19	3rd stage max speed 3rd stage acceleration/deceleration time	-	-
	20	Waiting time after 3rd stage completed	•	-
	21	4th stage length (32-bit)	-	H
	23	4th stage max speed	•	-
	24	4th stage acceleration/deceleration time	•	-
	25	Waiting time after 4th stage completed	•	-
	26	5th stage length (32-bit)	•	-
	28	5th stage max speed	•	-
	29	5th stage acceleration/deceleration time	•	-
	30	Waiting time after 5th stage completed	•	-
	31	6th stage length (32-bit)	•	_
	33	6th stage max speed	•	-
	34	6th stage acceleration/deceleration time	•	-
	35	Waiting time after 6th stage completed	•	-
	36	7th stage length (32-bit)	•	_
	38	7th stage max speed	•	_
s	39 40	7th stage acceleration/deceleration time Waiting time after 7th stage completed	•	-
Ę	41	8th stage length (32-bit)	+:	_
Ĕ	43	8th stage max speed	•	-
ara	44	8th stage acceleration/deceleration time	•	-
뉟	45	Waiting time after 8th stage completed	•	_
μĒ	46	9th stage length (32-bit)	•	-
rst	48	9th stage max speed	•	-
P 08 Group Gain Adjustment Parameters	49	9th stage acceleration/deceleration time	•	-
_⊑	50	Waiting time after 9th stage completed	•	ı
g G	51	10th stage length (32-bit)	•	ı
d	53	10th stage max speed	•	1
2	54	10th stage acceleration/deceleration time	•	-
8	55	Waiting time after 10th stage completed	•	-
ĭ	56	11 th stage length (32-bit)	•	_
	58	11 th stage max speed	•	-
	59	11th stage acceleration/deceleration time	•	-
	60	Waiting time after 11th stage completed	•	-
	61	12th stage length (32-bit)	•	_
	63	12th stage max speed 12th stage acceleration/deceleration time	•	-
	65	Waiting time after 12th stage completed	•	-
	66	13th stage length (32-bit)	•	-
	68	13th stage max speed	•	-
	69	13th stage acceleration/deceleration time	•	-
	70	Waiting time after 13th stage completed	•	
	71	14th stage length (32-bit)	•	-
	73	14th stage max speed	•	1
	74	14th stage acceleration/deceleration time	•	_
	75	Waiting time after 14th stage completed	•	-
	76	15th stage length (32-bit)	•	_
	78 79	15th stage max speed 15th stage acceleration/deceleration time	•	-
	80	Waiting time after 15th stage completed	•	<u> </u>
	81	16th stage length (32-bit)	•	-
	83	16th stage max speed	•	-
	84	16th stage acceleration/deceleration time	•	-
	85	Waiting time after 16th stage completed	•	-
	86	Interrupt positioning setting	•	-
	88	Homing start modes	•	ľ
	89	Homing modes	•	-
	90	Limit switch and Z-phase signal setting at homing	•	Ξ
	92	Origin search high speed	•	-
	93	Origin search low speed	•	
	94	Acceleration/deceleration time at origin search	•	-
		Acceleration/deceleration time at origin search Homing time limit Origin point coordinate offset (32-bit)	•	-

9

Control mode P S T • Parameter number Description OD Modbus axis address O1 Modbus baud rate O2 Modbus data format O3 Communication overtime O4 Communication D1 enabling setting 1~4 O9~10 Communication D0 enabling setting 1~2 O1 Communication or CAN communication enabled O1 To Bus communication setting 1~3 O1 Bus communication detection O1 Bus communication setting 4 O1 Bus communication setting 4 O1 Bus communication setting 4

Parameter number		Description		Control mode	
Hulli	ibei		Р	S	T
	00	External encoder using method	•	-	-
	01	External encoder pitch (32-bit)	•	-	-
	03	Full-closed excessive hybrid deviation threshold (32-bit)	•	-	-
	05	Hybrid deviation counting setting	•	-	-
	06	Hybrid vibration suppression gain	•	-	-
o	07	Hybrid vibration suppression time constant	•	-	-
Extension Control eters	09	Unit for full-closed hybrid deviation (32-bit)	•	-	-
Extensi Control	11	Unit for internal encoder counting (32-bit)	•	-	-
	13	External encoder counting value (32-bit)	•	-	-
Group osition Param	16	Position comparison output mode	•	-	-
D S G	17	1st position	•	-	-
P17 pc	19	2nd position	•	-	-
_	21	3rd position	•	-	-
	23	4th position	•	-	-
	25	Signal effective time 1	•	-	-
	26	Signal effective time 2	•	-	-
	27	Signal effective time 3	•	-	-
	28	Signal effective time 4	•	-	-
	29	Display delay	•	-	-

Parameter number P18 Group Motor Parameters 00		Description		Control mode		
		·	P	S	Т	
		Motor model code	•	•	•	
ь.				to a 1 oo		
		Description	P	trol m	loae T	
	00	Panel JOG	-			
gč ug	01	Fault reset	<u> </u>	•	•	
ela iter	03	Parameter identification function	•	•	•	
Motor	05	Analog input automatic offset adjustment	•	•	•	
ntio me	06	System initialization function	•	•	•	
ou ou ara	08	Communication operation instruction input	•	•	•	
nur Pg	09	Communication operation status output	•	•	•	
20 20	11	Multi-stage operation selection by communication	•	•	-	
	12	Homing start by communication				

Parameter number		Description		contro mode	
man			P	S	L
	00	Servo status	•	•	L
	01	Motor speed feedback (32-bit)	•	•	L
	03	Speed instruction	•	•	L
	04	Internal torque instruction (relative to rated torque)	•	•	L
	05	Phase current effective value	•	•	L
	06	DC bus voltage	•	•	L
	07	Absolute position counter (32-bit)	•	•	L
	09	Electrical angle	•	•	L
	10	Mechanical angle (relative to encoder zero point)	•	•	L
11 12		Load inertia identification value	•	•	L
		Speed value relative to input instruction	•	•	L
	13	Position deviation counter (32-bit)	•	•	L
	15	Input pulse counter (32-bit)	•	•	L
	17	Feedback pulse counter (32-bit)	•	•	L
	19	Position instruction deviation counter unit (32-bit)	•	•	L
	21	Digital input signal monitoring	•	•	L
	23	Digital output signal monitoring	•	•	L
ε	24	Encoder status	•	•	L
P21 Group Monitoring Parameters	25	Total power-on time	•	•	L
Ĕ	27	Al 1 voltage after adjustment	•	•	L
arg	28	Al 2 voltage after adjustment	•	•	L
g B	29	Al 1 voltage before adjustment	•	•	L
Ę.	30	Al 2 voltage before adjustment	•	•	L
差	31	Module temperature	•	•	L
8	32	Number of turns of absolute encoder (32-bit)	•	•	L
鱼	34	Single turn position of absolute encoder (32-bit)	•	•	L
õ	36	Version code 1	•	•	L
9	37	Version code 2	•	•	L
P 2	38	Version code 3	•	•	L
	39	Product series code	•	•	L
	40	Fault record display	•	•	L
	41	Fault code	•	•	L
	42	Time stamp upon selected fault (32-bit)	+	•	L
	44	Motor speed upon selected fault		•	H
	45	U-phase current upon selected fault	•	•	L
	46	V-phase current upon selected fault	•	•	L
	47	DC bus voltage upon selected fault	•	•	L
-	48	Input terminal status upon selected fault	•	•	L
	49	Output terminal status upon selected fault	•	•	L
	50	Customized software version number	•	•	L
	51	Accumulative load ratio	•	•	L
-	52	Regenerative load ratio	•	•	L
	53	Internal warning code	•	•	L
	54	Internal instruction present stage code	•	•	L
	55	Customized serial code	•	•	L
	56 58	High 32 place of absolute position counter (32-bit) High 32 place of feedback pulse counter (32-bit)	+	•	L

10

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