SV-X6

Hardware Instruction

Installation and Wiring for SV-X6E Series Servo Drive

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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 series servo drive.

For more details, please refer to <SV-X6E Series Servo Drive User Manual> Confirm the following items when unpacking:

Number		Name	Quantity
1	Servo drive		1
2	Accessories	Connecting terminal	3
		Cold-pressed terminal	8
		Crowbar	1
		Straight screwdriver	1
3	This manual		1
4	Certificate of Quality		1

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

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"

	Indicates that incorrect handling may result in death or severe injury.
	Indicates that incorrect handling may result in medium or slight personal injury or physical damage.
\bigcirc	Indicates "Prohibitions"(Indicates what must not be done.)
0	Indicates "Forced".(Indicates what must be done.)

	∆ DANGER	
Installi	ng and wiring	
0	Do not connect the motor to the commercial power.	To prevent fire or malfunction.
Q	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
0	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.
\smile	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.	To prevent fire.

s	afety instructions	
	Confirm the equipment's safety after the earthquake happens.	To prevent electric shock, injury 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.
	Provide an external emergency stop circuit to ensure that operation can be stopped and power switched off immediately.	To prevent injury, electric shock, fire, malfunction or damage.
	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.	To prevent electric shock.

Other safety

0

Moreover, do not disassemble the drive

Installi		
	ng and wiring	
	Please follow the specified combination of the motor	To prevent fire or
	and drive.	malfunction.
	Do not touch the terminals of comparison discut	To prevent electric
	Do not touch the terminals of connector directly.	shock or malfunction.
	Do not block intake and prevent the foreign matters	To prevent electric
	from entering into the motor and drive.	shock or fire.
0	Fix the motor and have the test run away from the	STICER OF THE.
U	mechanical system. After confirming the operation,	
	the motor can be securely mounted to mechanical	To prevent injury.
	system.	
	The servo motor must be installed in the specified	To prevent injury or
	direction.	malfunction.
	Install the equipment correctly in accordance with its	To prevent injury or
	weight and rated output.	malfunction.
Operat	tion and running	
	Do not climb or stand on servo equipment. Do not put	To prevent electric
	heavy objects on equipment.	shock, injury, fault
		or damage.
	The parameter settings must not be changed	To prevent injury.
_	excessively. Operation will be instable.	
\bigcirc	Keep it away from the direct sunlight.	To prevent
0		malfunction.
	Do not put strong impact on the motor, drive and	To prevent
	motor shaft.	malfunction.
	The electromagnetic brake on the servo motor is	To prevent injury or
	designed to hold the servo motor shaft and should not	malfunction.
	be used for ordinary braking. When power is restored after an instantaneous power	
	failure, keep away from the machine because the	
	machine may be restarted suddenly (design the	To prevent injury.
	machine so that it is secured against hazard if	To prevent injury.
	restarted).	
		To prevent injury,
_	Do not install or operate a faulty servo motor or drive.	electric shock or fire
0	Check the power specification.	To prevent fault
	The electromagnetic brake may not hold the servo	
	motor shaft. To ensure safety, install a stopper on the	To prevent injury.
	machine side.	
	A sudden restart is made if an alarm is reset with the	To any second second
	run signal on.	To prevent injury.
	Connect the relay for emergency stop and for brake in	To prevent injury or
	series.	malfunction.
Transp	portation and storage	
	Do not subject the equipment to the place with rain,	To prevent
\sim	waterdrop, poisonous gases or liquids.	malfunction.
1.		
\bigcirc	Do not carry the servo motor by the cables, shaft or	To prevent injury or
\bigcirc	encoder during transportation.	To prevent injury or malfunction.
\bigcirc	encoder during transportation. Do not drop or dump the motor during transportation	To prevent injury or malfunction. To prevent injury or
0	encoder during transportation. Do not drop or dump the motor during transportation and installation.	To prevent injury or malfunction.
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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

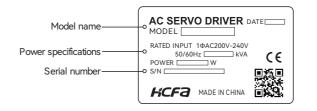
transportation 3) A failure caused when the products have been used beyond the product

4) A failure caused by external factors such as inevitable accidents, including but not

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 failure of the product

1. Product introduction and model selection

Introduction for drive nameplate



Model name identification

Sj

L

2

AC220V

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	SV-X6	E /	7	<u>X</u>	<u>xx</u>	4	4- <i>4</i>	4 (<u>0-0</u>	0	00	00
S	erial name	1	[Product	power	1				Software	custon	nized mark
		:		Symbol	Types	1					P21.5	5
	unction type		Ī	005	50W	1				Symbol	Т	ypes
ymbol	Types			010	100W	1				000	1	N/A
E	Standard type			020	200W	1				001		
F	Full-function type			040	400W	1						
L	Linear-type			075	750W					005		
Fi	unction type	1		100	1000W	1						
vmbol	Types			150	1500W	1						mized mark
A	Pulse type			200	2000W	1				Symbol		ypes
B	EtherCAT type	1	ł	250	2500W					00		N/A
N	CANOpen type	1	ł	300	3000W					Produc	rte una	dates no.
R	PROFINET type	1	t	500	5000W					Symbol	<u> </u>	ypes
ĸ	FROFINETtype	J	ł	750	7500W					0		N/A
			L	750	130011	1						N/A
	oltage spec.	1								1		
Symbol	Types									C/	ontrol p	owor
Α	AC220V										· ·	
Т	AC380V									Symbol		Types
	*	-								A	AC	power

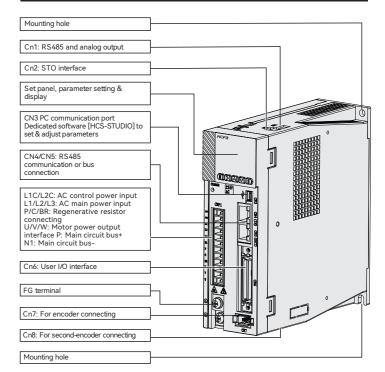
	Examples						
SV-X6EA200A-A	X6 series, 220V, 2kw, standard pulse type						
SV-X6EB200A-A	X6 series, 220V, 2kw, standard EtherCAT type						
SV-X6EN200A-A	X6 series, 220V, 2kw, standard CANOpen type						
SV-X6ER200A-A	X6 series, 220V, 2kw, standard PROFINET type						
SV-X6FA200A-A	X6 series, 220V, 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

Model name Function	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
Analog input	N/A	2-ch	N/A	2-ch	N/A	2-ch	N/A	2-ch
Analog output	N/A	2-ch	N/A	2-ch	N/A	2-ch	N/A	2-ch
Pulse input	Supported	Supported	N/A	N/A	N/A	N/A	N/A	N/A
	Supported		N/A	Supported	N/A	Supported	N/A	Supported
Z-phase collector 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	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	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
CN8:Second encoder	N/A	Supported	N/A	Supported	N/A	Supported	N/A	Supported

Drive parts name



2. Product specification

Items Specification 005 010 020 040 075 100 150 200 250 200 300 500 750 Model NameSV-X6 - A 50W 100W 200W 400W 750W 1KW 13K 2KW 2KW 3KW 5KW 7.0K W

4. Wiring explanation for servo motor and drive

220V AC input

Connector description

			Applicable motor	50W	100W	200W	400W	750W	1KW	W	2KW	W	2KW	3KW	5KW	W	
			W(mm)	40			2		0					2			
		Dimension	H(mm)	160						160 160 160 160 160 100 100 100 100 100							60
			D(mm) Weight(Kg)	154			154 154 188 188 188 188 0.8 1 1.5 1.7 1.5 1.7							20	09		
			Main circuit power	Sinale/tl	Single/three-phase 200 ~ 240V 50/60Hz Three-phase 323 ~ 440												
		Input power	Control circuit power	J		240V 50/6								ase 323 ~ 4			
		_	Ambient temperature for use	0~55°C		2.01 00/0	0112						o nigio pi			01.12	
	_ s	Temperature	Ambient temperature for storage	-20~65°	С												
	ion bion		AmbienHt humidity for use	20~85%	RH or less	s (Without o	ondensati	on)									
ы	jcat	umidity	Ambient humidity for storage			s (Without o		-									
cati	nvironmental specifications		Atmosphere for use & storage			ct to direct :		ree from co	rrosive ga	s, flammal	ole gas, oil	l mist, or d	ust				
citi	s g	-	Altitude Vibration			ve sea leve ess, 10~60		-		anned at fre			•)				
spe			Dielectric strength			AC across				owed at ite	equency of	resonanc	e)				
era.			Control type			inverting s		y unu i o									
General specification			Encoder feedback			e 23-bit ,		ported (m	ulti-turn ab	solute with	battery)						
0		Digital signal	Input			hoto-coupl											
			Output			photo-coup		ion, open	-collector (output) Swi	tch by con	trol mode					
		Analog signal	Input			itch by con											
			Output Input			witch by co upler insulat			ial open a	olloctor)							
	1	Pulse signal	Output			nase RS-42					ut)						
	0	Communication	USB			C (with "Ser			- open c0i	στων σαφ							
	L	function	RS-485	Remote	communic	ation(1: n)											
			Regeneration function			istor, and e			oraking res	istor is pos	sible						
			Dynamic brake			o dynamic											
			Control mode	control,	fully closed	l-loop contr	ol (optiona	l part neec	ed)			<i>i</i>	ion/torque c	<i>i</i> 1			
			Digital input signals										al command				
			Digital output signals	etc.	late, servo	reauy, prak	e on, nom	ng comple	ie, position	reached,	servo state	e, torque III	miting, spee	a infinung ze	no-speed	Juipi	
	Position control		Max input pulse requency	High-sp Open-co	eed pulse i ollector inp	t: Up to 500 nput: Up to ut: Up to 20	4MHz, pu 0KHz, puls	lse width la	rger than '	1.25ns;							
	con	Pulse input	Input pulse type			pen-collect											
	ion		Input pulse form	Pulse+ direction, A-Phase + B-Phase, CW+CCW A/B A: 1~1073741824 B: 1~1073741824,													
	osit		Electronic gear	A/B A: 1~10/3/41824 B: 1~10/3/41824, Encoder resolution/10000000 < A/B <encoder 2.5<="" resolution="" td=""></encoder>													
	٩		Smoothing	Smoothing filter, FIR filter													
			Output pulse form			Differentia											
		Pulse output	Division ratio			al output or	open colle	ector outpu	t								
			Output pulse	Arbitrary frequency division Encoder pulse or position Pulse instruction(can be set)													
			Digital input signals							clamp, inte	rnal speed	d control, e	xternal forw	ard/reverse	torque lin	nit etc.	
			Digital output signals										d output, etc		1		
su	2		Speed input			to +10V (M		beed at ±10	DV)								
Functions	Speed contro	Analog input	Torque limit source	External 2-TLMT	l torque lim P i.e. Al1 o	t by P03.09 it by P03.1 r AI2 as ext rd limit; TLN	l, P03.12 e ærnal forw	ard/revers	P_CL/N_C e torque lin	CL signals nit							
	S		Torque feedforward	TFFD, A	torque fee 11 or Al2												
			Internal speed command			selection b											
	e c		Digital input signals			eset, torque					C.						
	Torque	Analog input	Digital output signals Torque input			ready, brak d torque(ad				iting etc.							
	ч Ч	Analog input	Speed limit			e speed lin				input							
			Speed monitoring	Provide	1	e opeca illi		. 30.20 2)	5. E I.C. A	put							
			Vibration control	Provide													
	_		Adaptive notch filter	Provide	d												
	Common		Auto-tuning	Provide													
	imo	Encoder outp	out division and multiplication	Provide													
	Ŭ		Internal position control	Provide		10 0 0 t		اما									
			PC setting Protective functions	Overvol	tage, powe	up software r supply err			neat, overle	oad, encod	er error, o	over speed	, position de	viation too	arge,		
	1	1		paramet	ter error												

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.

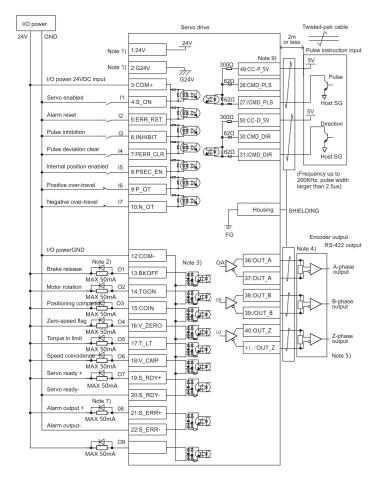
Corporation in advance. 1 Keep it away from the direct sunlight. 2 Drive must be installed in the cabinet. 3 Keep it away from the water, oil (cutting oil, oil mist) and moisture. 4 Do not install the equipment under the conditions with water, corrosive and flammable gas. 5 Free from the dust, iron powder, cutting powder and so on.

6 Keep it away from the area with high temperature, excessive vibration and shock

External dimension for servo drive

	Model SV-X6FA	0	S	Weight (kg)	
		W(mm)	H(mm)	D(mm)	(kğ)
	005、010、02、040	42	160	154	0.8
_ [075、100	52	160	154	1.0
	150、200	70	160	188	1.5
	250、300	80	160	188	1.7
	500、750	92	210	209	3.1

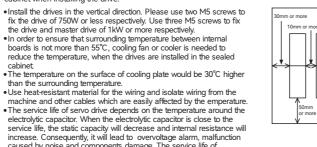
Pulse instruction 5V open collector input



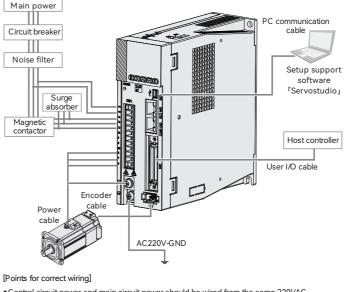
Installation direction and space

external independent power.

Leave sufficient space around the drive t ${\rm o}$ ensure the heat dissipation and convection in the cabinet when installing the drive.



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 faverage annual temperature 30°C, load rate 80% and operation of less than 20 hours a day on average.

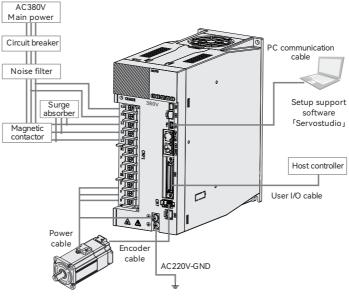


Control circuit power and main circuit power should be wired from the same 220VAC.
 The main power can select single-phase or three-phase 220VAC input. When selecting single-phase, select two inputs from L1,L2 and L3.
 A twisted-pair shielded cable should be used when I/O cable length is over 50cm.
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

•Same voltage class must be used and powered on simultaneously when connected to a

common DČ bus

380V AC input



[Points for correct wiring]

• 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

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 26
 28
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 CMD_PLS
 CC-P
 CMD_DIR
 A_SPEED
 A_TRQ
 OUT_A
 OUT_B
 OUT_Z
 GND
 HSIGN+
 OCZ
 09
 CC-D_5V

 27
 29
 31
 33
 35
 37
 39
 41
 43
 45
 47
 49

 /CMD_PLS
 CC-D
 /CMD_DIR
 A_GND
 A_GND
 OUT_/A
 OUT_/B
 OUT_/Z
 HSIGN GND
 19
 CC-P_5V

 1
 3
 5
 7
 9
 1
 13
 15
 17
 19
 1
 13
 25

 CC
 COM1
 12
 14
 16
 18
 O1
 03
 05
 07+
 08+
 5V
 HPULS

 2
 4
 11
 13
 15
 17
 19
 21
 23
 25

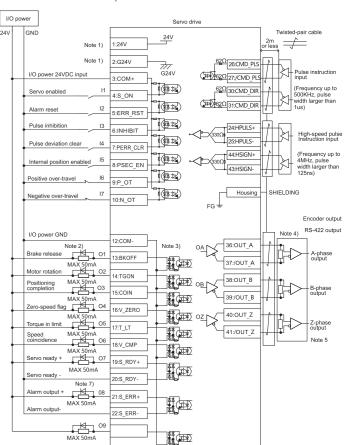
 4
 16
 18
 O1
 03
 05
 07+
 08+
 5V
 HPULS

 624
 11
 13
 15
 17
 COM2
 02
 04
 06
 07 08 HPULS+
 VCC COM1 I2

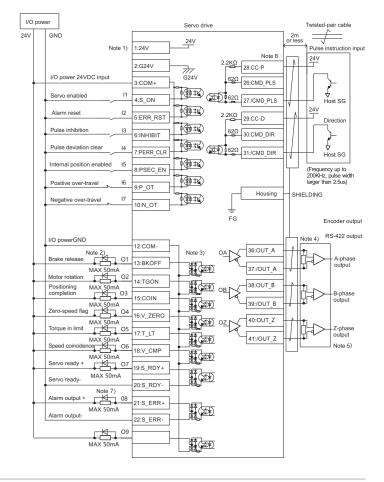
Position control mode -Internal multi-stage position command

Parameter No.	Parameter name	Description			
P00. 01	Control mode selection	Set it to 0 – Position control mode			
P00.05	Position instruction source	Set it to 2-Internal position command			
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 vali when setting P00.08 to 0)			
P00.12	Electronic gear denominator	1 ~ 1073741824(Electronic gear is vali when setting P00.08 to 0)			
P08.01	Starting stage number	Set the Start stage No. of internal position command (1-P08.02)			
P08.02	Ending stage number	Set the End stage No. of internal position command (P08.01-16)			
P08.06	Internal position control 1st stage length	-1073741824 ~ 1073741824			
P08.08	Internal position control 1st stage max speed	1 ~ 9000rpm			
P08.09	Internal position control 1st stage acceleration/deceleration time	0 ~ 65535ms			
P08.10	Waiting time after internal position control 1st stage completed	0 ~ 65535ms			
P08.11-P08.85		Arrange by the order of parameter from the 1st stage position command, then from the 2nd stage to 16th stage in tur			
Notes When using internal position command, set the DI function 25(internal position command enabling)					

Pulse instruction differential input



Pulse instruction 24V open collector input



Fault and warning code description

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.

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

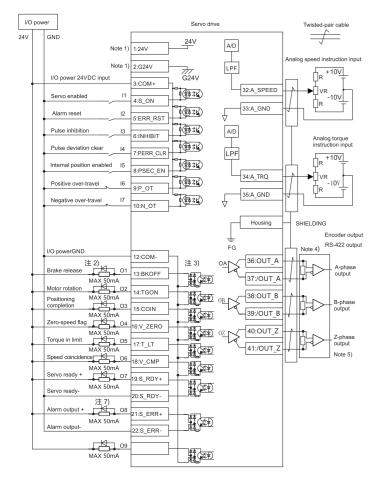
Note 5: Connect the signal ground on the host control device of output signal of the encoder.

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: OB is alarm output by default. The logic state of alarm output by default is normally-closed. 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.

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

3

Analog instruction input



6. Parameter List for SV-X6E Series Servo Drive

Common Parameters

Parameter No.	Parameter name	Description
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	S at the nerometers related to the
P09. 02	Modbus data format	Set the parameters related to the communication
P09. 03	Communication response delay	communication.

Position control mode - External pulse input

Parameter No.	Parameter name	Description
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)

Related parameters for analog speed 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	All 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
P05.03	Corresponding value of Al1 maximum input	-100.0% ~ 100.0% (max. speed at 100% speed)
P05.04	Al1 zero offset	-500mV ~ 500mV
P05.05	All dead-zone setting	0.0~20.0%
P05.06	AI1 input filtering time	0.0ms ~ 6553.5ms
P05.14	Al setting 100% speed	Set to 0 ~ max. speed of the motor

Related parameters for internal multi-speed control

Parameter No.	Parameter name	Description
P00. 01	Control mode selection	Set to 1 – Speed control mode
P03.00	Speed command source	Set to 3- internal multi-stage speed 1-16 switchover
P03.14	Acceleration time 1	Set the acceleration/deceleration time, range
P03.15	Deceleration time1	is between 0 and 65535ms
P03.36- P03.51	Speed from segment 1 to 16 Speed from segment 1 to 2000 so on P03.51 the 16th stage speed and so on P03.51 the 16th stage speed. Initial value is 0 and make the setting by the actual usage	
Notes	When using internal multi-stage speed, set the DI function 6-9 and select the speed by the switch combination	

Related parameters for analog torque control

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	AI2 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 may arread of the meter
P03.28	Internal negative speed limit	Set to 0 ~ max. speed of the motor
Analog input se	etup	
P05.07	Al2 minimum input	-10.00V ~ 10.00V
P05.08	Corresponding value of Al2 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 Al2 maximum input	-100.0% ~ 100.0% (max. torque at 100% torque)
P05.11	Al2 zero offset	-500mV ~ 500mV
P05.12	AI2 dead-zone setting	0.0~20.0%
P05.13	Al2 input filtering time	0.0ms ~ 6553.5ms
P05.14	AI setting 100% speed	Set the motor speed at 100% by Al
P05.15	Al setting 100% torque	Set the motor speed at 100% by Al

	unstable; 4. Drive fault.	power voltage is within specified range.
Err.004 FPGA fault	Software version fault.	Check if software version is correct.
Err.005 Product matching fault	Encoder cable connection broken or loose; Suse 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	Check and fasten encoder cable; A Replace products that don't match; S. 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	1. UVW wiring fault; 2. Motor breakdown; 3. 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	 Instruction input is too fast; Regenerative resistor too small or short circuited; Motor cable bad contact; Motor cable grounding; Motor UVW short circuited; Motor burnt; Software detected power transistor overcurrent 	 Check instruction input time sequence and input after S- RDY; Replace regenerative resistor; Check and fasten encoder cable; Replace motor if UVW insulation resistor is broken; Check if UVW is short circuited; Replace motor if UVW don't have equal resistance; Reduce load, use bigger drive and motor, increase acceleration/deceleration time.
Err.010 Overcurrent fault 2	 Instruction input is too fast; Regenerative resistor too small or short circuited; Motor cable bad contact; Motor cable grounding; Motor UVW short circuited; Motor burnt; Software detected power transistor overcurrent 	 Check instruction input time sequence and input after S- RDY; Replace regenerative resistor; Check and fasten encoder cable; Replace motor if UVW insulation resistor is broken; Check if UVW is short circuited; Replace motor if UVW don't have equal resistance; Reduce load, use bigger drive and motor, increase 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 cable 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.
Err.016 Speed deviation too large	Speed instruction and speed feedback deviation exceeds settings of P06.45.	 Increase P06.45 value; Increase acceleration/deceleration time or increase system responsiveness; Set P06.45=0 to disable speed deviation too large function.
Err.017 Torque saturation overtime	Torque maintains saturated for time longer than settings of P06.46.	 Increase P06.46 value; Check if UVW is broken.

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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; Aregenerative resistor breakage or not matching; Load inertia exceeds allowable range; A. Drive broken.	Check input power voltage; Check or replace regenerative resistor; J. Increase acceleration/deceleration time or replace more suitable drive/motor.
Err.021 Undervoltage	 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	1. Al wrong wiring; 2. 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; Drive 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 	1. Reduce load or increase current loop gains 2. Replace encoder cable.
Err.026 Load identification failure	 Load or inertia too large. Motor cannot run at specified curves; Verification process aborted by other faults. 	 Reduce load or increase current loop gains 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	Servo motor UVW wiring is wrong; Servo drive gain settings are too low; Servo drive gain settings are frequency is too high; 4 Position instruction acceleration is too large; S. P00.19 setting is too low; S. Servo drive/motor faulty; Rake release abnormal. Motor is locked by external forces, gravity etc.	 Reconnect the cables Increase servo gains Reduce instruction frequency, acceleration or adjust gear ratio Set up smoothing parameters; Adjust the value of P00.19 Replace the drive 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	1. Motor UVW bad contact; 2. Motor broken	1. Check UVW wiring 2. Replace motor 1. Check UVW/encoder cable
Err.046 Drive overload	 Motor UVW or encoder cable bad contact or loose Motor blocked or brake not released Wrong UVW/encoder cable wiring for multiple drives/motors Motor/drive too small for load Phase loss or wrong phase sequence Motor or drive broken 	wiring 2. Check motor is not blocked and brake is released 3. Check there is no wrong UVW/encoder cable wiring for multiple drives/motors 4. Increase acceleration/deceleration time or choose bigger drive/motor 5. Check UVW wiring 6. Replace drive/motor
Err.047 Motor overload Err.048 Electronic	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 Electronic gear ratio exceeds	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 Check UVW wiring Check UVW wiring Check UVW wiring Set correct electronic agent
gear setting fault	setting range	Set correct electronic gear

Err.049 Heat sink too hot	 Fan broken Ambient temperature is too high Too many times of restarting power after overload Inappropriate installation directions and spacing Servo drive faulty Motor or drive broken 	 Check fan. Replace fan or drive Measure ambient temperature and improved cooling conditions for servo drive Check error records and see if there has been overload error. Restart after 30s. Increase acceleration/deceleration time. Install the servo drive according to specifications in this manual. 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	1. External encoder abnormal. 2. 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	Receive or send failure Receive NMT stop or reset	NMT node reset. Do not stop or
NMT command Err.067 CAN bus	command at servo-ON CAN bus disconnection or	reset CAN node at servo-ON.
failure	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 d. Drive failure	 Reduce speed Check UVW phase sequence 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 reset 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 reset 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 sends fault reset command
Err.077 EtherCAT communication breakage	The maximum number of consecutive communication losses exceeding the setting value	Check the network cable or use 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 sends 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 sends 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	Same as Err.046	Same as Err.046
overload warning AL.082 Motor	Same as Err.046	Same as Err.046
overload warning AL.083 Parameter modification needs	Modify parameters which needs restarting.	Restart power
power restart AL.084	S-ON when servo is not ready.	S-ON after detecting S-RDY

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	1. POT & NOT valid simultaneously 2. 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	1. Electronic gear ratio too large 2. Pulse frequency too high	1. Reduce electronic gear ratio 2. Reduce pulse frequency
AL.090 Absolute encoder angle initialization warning	Angle is over 7.2 degree.	Replace motor
AL 093 Regenerative overload	 Regenerative resistor wrong wiring or bad contact; Internal resistor wiring breakage; Resistor capacity insufficient; Resistor resistance too large and causing long time braking; Input voltage exceeds specifications Resistor resistance, capacity or heating time constant parameters settings are wrong; Drive faulty 	 Check resistor wiring Check internal resistor wiring; Increase resistor capacity Reduce resistor resistance; Reduce input voltage Set correct parameters Replace drive
AL.094 Regenerative resistor too small	 External regenerative resistor is less than minimum value Wrong parameter settings 	1. Replace resistor 2. 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. 	 Increase the value of P08.95; 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 code

DI function description			
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

17	N_CL	External reverse torque limit	Valid-External torque limit enabled Invalid-External torque limit disabled
			Valid-Input instructions
18	P_JOG	Positive JOG	Invalid-Stop inputting instructions
19	N_JOG	Negative JOG	Valid-Reverse input instructions
	-	Negative 500	Invalid-Stop inputting instructions
20	GEAR_SEL1		GEAR_SEL1 invalid, GEAR_SEL2
			invalid: first electronic gear
		Electronic gear	GEAR_SEL1 valid, GEAR_SEL2 invalid: second electronic gear
21	GEAR_SEL2	selection	GEAR SEL1 invalid, GEAR SEL2
	02/11/202222		valid: third electronic gear
			GEAR_SEL1 valid, GEAR_SEL2 valid:
			fourth electronic gear
22	POS DIR	Position instruction	Invalid-Not reverse;
		negation	Valid-Reverse
23	SPD DIR	Speed instruction	Invalid-Not reverse;
		negation	Valid-Reverse
24	TOQ_DIR	Torque instruction	Invalid-Not reverse;
		negation	Valid-Reverse
		Internal multi-	Invalid-Disable internal multi-stage instruction:
25	PSEC_EN	stage enable	Valid-Enable internal multi-stage
		suge enable	instruction
		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
		1 9	value
28	HOME_IN	Homing origin	Can be used as home position signal or deceleration-point position signal
29	STHOME	point Homing start	Start homing.
			Invalid-No action
30	ESTOP	Emergency stop	Valid-Emergency stop
01	OTED	Charles and bla	Valid-Step enable;
31	STEP	Step enable	Invalid-Instruction is 0
32	FORCE ERR	Forced error	Invalid-No action
52	TORCE_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-
		positioning trigger	zero value, can only use DI8 or DI9.
		Internal position	Invalid-No action;
35	INPOSHALT	commands	Valid-Decelerate or pause internal
		generation pause	multi-stage position and interruption
		Analog input	positioning Invalid-No action;
36	ANALOG_OFF	prohibition	Invalid-No action; Valid-Prohibit analog input
			Invalid-No action:
27		SEN enabled	Valid-OAOBOZ send absolute position
37	ENC-SEN	absolute position data send	data, cannot enable servo at the same
		uata send	time
39	Touch 1	Probe 1	Invalid: No action
			Valid: Probe 1 function
40	Touch 2	Probe 2	Invalid: No action
			Valid: Probe 2 function

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

7

8

Parameter list

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

				ontro	J		
	meter	Description		mode			Pa
num	nber	Description	Р	S	Т		r
	00	Position instruction smoothing filter	•	-	•		
	01	Position instruction FIR filter	•	- 1	-		1
	02	Adaptive filtering mode	•	•	•		1
	03	Adaptive filtering load mode	٠	٠	٠		1
	04	First notch filter frequency	٠	•	٠		
	05	First notch filter width	٠	٠	٠		P05 Group Analog Input/output Parameters
ters	06	First notch filter depth	•	•	٠		a m
net	07	Second notch filter frequency	٠	•	٠		arai
araı	08	Second notch filter width	٠	٠	٠		Ĕ
Å	09	Second notch filter depth	٠	•	٠		b.
io	10	Third notch filter frequency	٠	•	٠		ort
Group Vibration Suppression Parameters	11	Third notch filter width	•	•	•		E
d	12	Third notch filter depth	•	•	•		<u> </u>
, TC	13	Fourth notch filter frequency	•	•	•		8
ĥ	14	Fourth notch filter width	•	•	٠		na
atic	15	Fourth notch filter depth	•	•	٠		∢
/ibr	19	Position instruction FIR filter 2	•	-	-		0
þ	20	First vibration attenuation frequency	•	•	-		5
no	21	First vibration attenuation filter setting	•	•	-		05
Ū	22	Second vibration attenuation frequency	•	•	-		<u> </u>
P02	23	Second vibration attenuation filter setting	•	•	•		1
	31	Resonance point 1 frequency	•	•	•		1
	32	Resonance point 1 bandwidth	•	•	٠		1
	33	Resonance point 1 amplitude	•	•	٠		1
	34	Resonance point 2 frequency	•	•	•		
	35	Resonance point 2 bandwidth	•	•	•		
	36	Resonance point 2 amplitude	•	•	•		

Para	meter	Description		Contro mode	-
nun	nber	Description	Р	S	Т
	00	Al1 minimum input	•	•	•
	01	Corresponding value of Al1 minimum input	•	•	٠
P05 Group Analog Input/output Parameters	02	Al1 maximum input	•	•	٠
	03	Corresponding value of Al1 maximum input	•	•	٠
	04	Al1 zero offset	•	•	٠
	05	Al1 dead-zone setting	•	•	٠
a u	06	Al1 input filtering time	•	•	٠
arai	07	Al2 minimum input	•	٠	٠
numl	08	Corresponding value of AI2 minimum input	•	٠	٠
	09	Al2 maximum input	•	٠	٠
	10	Corresponding value of Al2 maximum input	•	•	٠
	11	Al2 zero offset	•	•	٠
	12	AI2 dead-zone setting	•	•	٠
	13	AI2 input filtering time	•	٠	٠
	14	Al setting 100% speed	•	٠	٠
	15	Al setting 100% torque	•	٠	٠
	16	Al1 function selection	•	٠	٠
ē	17	Al2 function selection	•	٠	٠
05	28	AO1 signal selection (need optional card)	•	٠	٠
а.	29	AO1 voltage offset	•	٠	٠
	30	AO1 multiplier	•	•	•
	31	AO2 signal selection (need optional card)	•	•	٠
P05 Group Analog Input/output Parameters	32	AO2 voltage offset	•	•	٠
	33	AO2 multiplier	•	•	٠
	34	AO monitoring value type setting	•	٠	٠

	meter	Description		ontrol node	
nun	nber	Description	P	S	Т
	00	Multi-stage preset position execution pattern selection	٠	-	-
	01	Starting stage number Ending stage number	•	-	-
	02	Restarting pattern of residual stages after pausing	•	-	-
	04	Position instruction type selection	•	-	-
	05	Unit for waiting time	٠	-	-
	06	1st stage length (32-bit)	•	-	-
	08	1st stage max speed 1st stage acceleration/deceleration time	•	-	-
	10	Waiting time after 1st stage completed	•	-	-
	11	2nd stage length (32-bit)	•	-	-
	13	2nd stage max speed	•	-	-
	14	2nd stage acceleration/deceleration time	•	-	-
	15 16	Waiting time after 2nd stage completed 3rd stage length (32-bit)	•	-	-
	18	3rd stage max speed	•	-	-
	19	3rd stage acceleration/deceleration time	٠	-	-
	20	Waiting time after 3rd stage completed	•	-	-
	21	4th stage length (32-bit)	•	-	-
	23 24	4th stage max speed 4th stage acceleration/deceleration time	•	-	-
	24	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 33	6th stage length (32-bit) 6th stage max speed	•	-	-
	34	6th stage acceleration/deceleration time	•	-	-
	35	Waiting time after 6th stage completed	٠	-	-
	36	7th stage length (32-bit)	•	-	-
	38	7th stage max speed	•	-	-
ŝ	39 40	7th stage acceleration/deceleration time Waiting time after 7th stage completed	•	-	-
eter	40	8th stage length (32-bit)	•	-	-
P08 Group Gain Adjustment Parameters	43	8th stage max speed	•	-	-
Par	44	8th stage acceleration/deceleration time	•	-	-
ent	45	Waiting time after 8th stage completed	•	-	-
ţ	46	9th stage length (32-bit)	•	-	-
djus	48 49	9th stage max speed 9th stage acceleration/deceleration time	•	-	-
٩u	50	Waiting time after 9th stage completed	•	-	-
Gai	51	10th stage length (32-bit)	•	-	-
dno	53	10th stage max speed	•	-	-
Gro	54	10th stage acceleration/deceleration time	•	-	-
08	55 56	Waiting time after 10th stage completed 11th stage length (32-bit)	•	-	-
ш.	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 64	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 73	14th stage length (32-bit) 14th stage max speed	•	-	-
	74	14th stage acceleration/deceleration time	•	-	-
	75	Waiting time after 14th stage completed	•	-	-
	76	15th stage length (32-bit)	•	-	-
	78	15th stage max speed	•	-	-
	79 80	15th stage acceleration/deceleration time Waiting time after 15th stage completed	•	-	-
	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 89	Homing start modes Homing modes	•	-	-
	90	Limit switch and Z-phase signal setting at homing	•	-	-
	92	Origin search high speed	•	-	-
	93	Origin search low speed	•	-	-
	94	Acceleration/deceleration time at origin search	•	-	-
	95 96	Homing time limit Origin point coordinate offset (32-bit)	•	-	-
	98	Mechanical origin point offset (32-bit)	•	-	-
				ı	I

number P S T 00 Motor positive direction definition • • • 01 Control mode selection • • • • 03 Stiffness grade setting •	Para	meter	Description		Contro	
00 Motor positive direction definition • • • 01 Control mode selection • • • 02 Real time auto-tuning • • • 03 Stiffness grade setting • • • 04 Load inertia ratio • • • 14 Pulse output consts per motor one revolution (32-bit) • • 17 Pulse output function selection • • • 18 Pulse output function selection • • • 19 Position deviation too large threshold • • • 21 Regenerative resistor capacity • • • • 23 External regenerative resistor restance value • • • • 24 External regenerative resistor setting • • • • • 25 Step value setting • • • • • • • • • • • • • • • • •	num	nber	Description			
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17 Pulse output UUT_Z polarity • - - 18 Pulse output function selection • - - 19 Position deviation too large threshold • • • • 21 Regenerative resistor setting • • • • • 22 External regenerative resistor capacity • • • • • 23 External regenerative resistor heating time constant • • • • • 24 External regenerative resistor heating time constant •		16		•	•	٠
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25 Regenerative voltage threshold •		-		•	•	٠
26 Step value setting • - - 27 High-speed pulse train form • - - 28 Second encoder interface • - - 28 DDL motor type selection • • • • 31 DDL rotor polar pitch (N-N) • • • • 32 DDL motor rated current • • • • • 33 DDL scale resolution • <td></td> <td></td> <td></td> <td>•</td> <td>•</td> <td>٠</td>				•	•	٠
27 High-speed pulse train form • - - 28 Second encoder interface • - - 31 Motor type selection • • • 32 DDL motor poler pitch (N-N) • • • 33 DDL scale resolution • • • • 34 DDL motor poler pitch (N-N) • • • • 35 DDL rated thrust • • • • • 36 DDL maximum thrust theoretical value •<				•	-	-
28 Second encoder interface • - 31 Motor type selection • • 32 DDL motor polar pitch (N-N) • • 33 DDL scale resolution • • 34 DDL motor rated current • • 35 DDL rated thrust • • 36 DDL max. speed • • 37 DDL max. speed • • 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 • • 44 DDR encoder resolution (32-bit) • • 45 DDR motor rated current • • 46 DDR rated torque • • 47 DDR motor max. speed • • 50 DR motor rated current • • 48 DDR rated torque • • • 51 Reserved </td <td></td> <td></td> <td></td> <td>•</td> <td>-</td> <td>-</td>				•	-	-
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43 DDL Back EMF Coefficient •<				•	•	•
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50 DDR motor max. speed • • 51 Reserved - - 52 DDR motor rotor inertia • • 53 DDR stator resistance Rs • • 54 DDR motor Lq • • 55 DDR motor Ld • • 56 DDR Back EMF Coefficient • • 57 Reserved • • 58 Reserved • • 59 Current response fine-tuning coefficient • • 60 Magnetic pole seeking method • • 61 Magnetic pole seeking action threshold value • • 63 Magnetic pole seeking action threshold value • • 64 DL/DDR Feedback source - - -				-	-	-
51 Reserved - - - 52 DDR motor rotor inertia • • • 53 DDR stator resistance Rs • • • 54 DDR motor Lq • • • 55 DDR motor Ld • • • 56 DDR Back EMF Coefficient • • • 57 Reserved • • • 58 Reserved • • • 59 Current response fine-tuning coefficient • • • 60 Magnetic pole seeking method • • • 61 Magnetic pole seeking action threshold value • • 63 Magnetic pole seeking action threshold value • • 64 DL/DDR Feedback source - - -						
52 DDR motor rotor inertia • • • 53 DDR stator resistance Rs • • • 54 DDR motor Lq • • • 55 DDR motor Ld • • • 56 DDR Back EMF Coefficient • • • 57 Reserved • • • 58 Reserved • • • 59 Current response fine-tuning coefficient • • • 60 Magnetic pole seeking method • • • • 61 Magnetic pole seeking action threshold value • • • 62 Magnetic pole seeking action threshold value • • • 63 Magnetic pole seeking action threshold value • • • 64 DDL/DDR Feedback source - - - -				•	-	•
53 DDR stator resistance Rs • • 54 DDR motor Lq • • 55 DDR motor Ld • • 56 DDR Back EMF Coefficient • • 57 Reserved • • 58 Reserved • • 59 Current response fine-tuning coefficient • • 60 Magnetic pole seeking method • • 61 Magnetic pole seeking current • • 62 Magnetic pole seeking action threshold value • • 63 Magnetic pole seeking static threshold value • • 64 DL/DDR Feedback source - - -				-		-
54 DDR motor Lq • • 55 DDR motor Ld • • • 56 DDR Back EMF Coefficient • • • 57 Reserved • • • 58 Reserved • • • 59 Current response fine-tuning coefficient • • • 60 Magnetic pole seeking method • • • 61 Magnetic pole seeking current • • • 62 Magnetic pole seeking action threshold value • • 63 Magnetic pole seeking static threshold value • • 64 DL/DDR Feedback source - - -				-	-	-
55 DDR motor Ld • <				_	-	-
56 DDR Back EMF Coefficient •<				_		
57 Reserved •				-	-	-
58 Reserved •				_		
59 Current response fine-tuning coefficient • • • 60 Magnetic pole seeking method • • • • 61 Magnetic pole seeking current • • • • • 62 Magnetic pole seeking action threshold value • • • • • 63 Magnetic pole seeking static threshold value • • • • 64 DL/DDR Feedback source - - - -		-		•	•	٠
60 Magnetic pole seeking method • <t< td=""><td></td><td></td><td></td><td>•</td><td>•</td><td>٠</td></t<>				•	•	٠
61 Magnetic pole seeking current • <		-		•		٠
62 Magnetic pole seeking action threshold value • • • 63 Magnetic pole seeking static threshold value • • • • 64 DDL/DDR Feedback source - - - -				•	•	٠
63 Magnetic pole seeking static threshold value • • • 64 DDL/DDR Feedback source - - -		-		•	•	٠
64 DDL/DDR Feedback source		-		•	•	٠
		63	Magnetic pole seeking static threshold value	•	•	٠
66 DDL/DDR Motor Z-electrical angle • • •		64		-	-	-
		66	DDL/DDR Motor Z-electrical angle	٠	•	٠

Param		Description		ontro mode	
numl	ber	Description	Р	S	Т
	00	Position loop gain 1	•	-	-
F	01	Speed loop gain 1	•	٠	-
F	02	Speed loop integral time 1	•	٠	-
	03	Speed detection filter 1	•	٠	٠
	04	Torque instruction filter 1	•	٠	٠
Г	05	Position loop gain 2	•	-	-
	06	Speed loop gain 2	•	٠	-
Г	07	Speed loop integral time 2	•	٠	-
	08	Speed detection filter 2	•	٠	٠
Г	09	Torque instruction filter 2	•	٠	٠
Г	10	Speed regulator PDFF coefficient	•	٠	-
S	11	Speed feedforward control selection	•	-	-
etel	12	Speed feedforward gain	•	-	-
ů.	13	Speed feedforward filtering time	•	-	-
P01 Group Gain Tuning Parameters	14	Torque feedforward control selection	•	٠	-
g P	15	Torque feedforward gain	•	٠	-
ic	16	Torque feedforward filtering time	•	٠	-
n L	17	Digital input GAIN_SWITCH function selection	•	٠	-
.u	18	Position control gain switchover mode	•	-	-
Ö	19	Position control gain switchover delay	•	-	-
dn	20	Position control gain switchover class	•	-	-
5	21	Position control gain switchover hysteresis	•	-	-
5	22	Position control gain switchover time	•	-	-
P	23	Speed control gain switchover mode	-	٠	-
	24	Speed control gain switchover delay	-	٠	-
	25	Speed control gain switchover class	-	٠	-
	26	Speed control gain switchover hysteresis	-	٠	-
	27	Torque control gain switchover mode	-	-	٠
ſ	28	Torque control gain switchover delay	-	-	٠
Г	29	Torque control gain switchover class	-	-	٠
Г	30	Torque control gain switchover hysteresis	-	-	٠
Г	31	Observer enabled	•	٠	٠
	32	Observer cut-off frequency	•	٠	٠
Г	33	Observer phase compensation time	•	•	٠
	34	Observer inertia coefficient	•	٠	٠

Parameter number				ontro	
		Description		mode	
			Р	S	Т
P03 Group Speed & Torque Control Parameters	00	Speed instruction source selection	-	•	-
	03	Speed instruction digital setting	-	•	-
	04	JOG speed setting	-	•	-
	08	Torque limit source	•	•	-
	09	Internal forward torque limit	•	•	-
<u>s</u>	10	Internal reverse torque limit	•	•	-
ete	11	External forward torque limit	•	•	-
E	12	External reverse torque limit	•	•	-
ar	14	Acceleration time 1	-	•	•
<u>–</u>	15	Deceleration time 1	-	٠	•
Ĕ	16	Acceleration time 2	-	•	-
ů	17	Deceleration time 2	-	٠	-
e	19	Zero-speed clamp function	-	•	•
J. J.	20	Zero-speed clamp threshold value	-	•	•
Ĕ	22	Torque instruction source	-	-	•
8	25	Torque instruction digital setting value	-	-	•
e e	26	Speed limit source in torque control	-	-	•
sp Sp	27	Internal positive speed limit	-	-	•
d d	28	Internal negative speed limit	-	-	•
2	29	Hard limit torque limit	•	•	٠
ő	30	Hard limit torgue limit detection time	•	•	٠
PO	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	-	•	-

		Description	-	ontro mode	-
nun	nber	Description		S	Т
	00	Normal DI filter selection	•	•	٠
SI 2	01~09	DI1 ~9 terminal function selection	•	•	٠
	11~19	DI1 ~9 terminal logic selection	•	•	٠
S	21~29	DO1~9 terminal function selection	•	•	٠
ete	31~39	DO1 ~9 terminal logic selection	•	•	٠
am	41	FUNINL signal unassigned state (Hex)	•	•	٠
-ar	42	FUNINH signal unassigned state (Hex)	•	•	٠
B	43	Motor rotational signal threshold	•	•	٠
ę.	44	Speed conformity signal width	-	•	-
numl	45	Speed reached	•	•	•
	47	Positioning completion range	•	-	-
	48	Positioning completion output setting	•	-	-
dit	49	Positioning completion holding time	•	-	-
Ē	50	Positioning near threshold	•	-	-
num	51	Servo OFF delay time after holding brake taking action when speed is 0	•	•	٠
4	52	Speed setting for holding brake to take action in motion	•	•	٠
2	53	Waiting time for holding brake to take action in motion	•	•	٠
	54	Special output function setting	•	•	٠
	55	Torque reached (T_ARR) threshold	•	•	٠
	56	Torque reached signal width	•	•	٠
	57	Z-pulse width adjustment	•	•	٠
	58	Zero-speed signal output threshold	•	٠	٠

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10

Parameter number		Description		Contro mode	
nun	iber		Р	S	Т
	00	Electronic gear numerator 2(32-bit)	•	-	-
number 00 Electronic gear num 02 Electronic gear num 04 Electronic gear num 04 Electronic gear num 06 Position deviation c 09 Electronic gear rati 10 Potential energy los 11 P06.10 memory sel 19 Parameter identific: 20 Parameter identific: 21 Parameter identific: 22 Parameter identific: 23 Initial angle identific 24 Instantaneous pown 25 Instantaneous pown 26 Servo OFF stop mc 27 Second category fa 28 Over-travel stop mc 30 Input power phase 31 Output power phase 32 Emergency stop tor 33 Tripping protection 34 Overload warning v 35 Motor overload proi 36 Undervoltage prote 37 Over-speed error p 38	Electronic gear numerator 3(32-bit)	•	-	-	
	04	Electronic gear numerator 4(32-bit)	•	-	-
	06	Position deviation clearance function	•	-	-
	09	Electronic gear ratio switchover delay	•	-	-
	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	•	•	•
Parameters	24	Instantaneous power failure protection	•	•	•
	25	Instantaneous power failure deceleration time	•	•	•
	26	Servo OFF stop mode selection	•	•	•
	27	Second category fault stop mode selection	•	•	•
	28	Over-travel input setting	•	•	•
ioi	29	Over-travel stop mode selection	•	•	•
sue	30	Input power phase loss protection	•	٠	•
žď	31	Output power phase loss protection	•	٠	•
ш	32	Emergency stop torque	•	٠	•
no	33	Tripping protection function	•	•	•
ē	34	Overload warning value	•	٠	٠
90	35	Motor overload protection coefficient	•	•	•
Δ.	36	Undervoltage protection point	•	٠	•
	37	Over-speed error point	•	٠	•
	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	•	•	•
	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	•	•	•

		Description		ontro mode	
num	iber		Р	S	Т
	00	User password	•	٠	•
P07 Group Auxiliary function	01~05	Panel monitoring parameter setting 1~5	•	٠	•
	08~09	Function selection 1~2	•	٠	•
	09	Panel monitoring parameter setting 9	•	٠	•
	10	User password	•	٠	-
	11	Instant power failure immediate memory function	•	-	-
	12	User password screen-lock time	•	-	-
	14	Fast deceleration time	-	-	-
	16	Function selection 3	•	٠	•
	17	Maximum division number pre motor one revolution	•	٠	•
	19~22	Function selection 5~8	•	٠	•
	23	Fault reset time	•	٠	•
	24	Positive soft limit(32-bit)	•	٠	•
	26	Negative soft limit(32-bit)	•	٠	٠
	28	Homing return signal holding time	•	-	-
-	29	Modulus mode lower 32-bit	•	-	-
	31	Modulus mode higher 32-bit	•	-	-

03 Group number 00 01 02 02 03 04 04 04 04 04 05 06		Description	-	Contro mode	
num	Dei		Р	S	Т
etting	00	Modbus axis address	•	•	•
	01	Modbus baud rate	•	•	•
	02	Modbus data format	•	•	•
	03	Communication overtime	•	•	•
	04	Communication response delay	•	•	•
	05~08	Communication DI enabling setting 1~4	•	•	•
	09~10	Communication DO enabling setting 1~2	•	•	•
	11	Communication instruction holding time	•	•	•
	12	AO function or CAN communication enabled	•	•	•
	13~15	Bus communication setting 1~3	•	•	•
	16	Bus disconnection detection	•	٠	٠
	17	Bus communication setting 4	•	٠	٠
	18	Setting of slave no.	•	•	٠

Parameter number Description mode 00 Servo status • • 01 Motor speed feedback (32-bit) • • 03 Speed instruction • • • 04 Internal torque instruction (relative to rated torque) • • 05 Phase current effective value • • • 06 DC bus voltage • • • 07 Absolute position counter (32-bit) • • • 09 Electrical angle • • • • 11 Load inertia identification value • • • • 12 Speed value relative to input instruction • • • • 13 Position deviation counter (32-bit) • • • • 13 Position instruction deviation counter unit (32-bit) • • • • 14 Digital input signal monitoring • • • • •<	T • • •
number P S 00 Servo status • • 01 Motor speed feedback (32-bit) • • 03 Speed instruction • • • 04 Internal torque instruction (relative to rated torque) • • 05 Phase current effective value • • • 06 DC bus voltage • • • 07 Absolute position counter (32-bit) • • • 09 Electrical angle • • • • 11 Load inertia identification value • • • • • 12 Speed value relative to input instruction • • • • 12 Speed value relative to input instruction • • • • 13 Position instruction deviation counter (32-bit) • • • • 14 Input pulse counter (32-bit) • • • •	• • •
01 Motor speed feedback (32-bit) • • 03 Speed instruction • • 04 Internal torque instruction (relative to rated torque) • • 05 Phase current effective value • • 06 DC bus voltage • • 07 Absolute position counter (32-bit) • • 09 Electrical angle • • 10 Mechanical angle (relative to encoder zero point) • • 11 Load inertia identification value • • 12 Speed value relative to input instruction • • 13 Position deviation counter (32-bit) • • 15 Input pulse counter (32-bit) • • 17 Feedback pulse counter (32-bit) • • 21 Digital output signal monitoring • • 23 Digital output signal monitoring • • 24 Encoder status • • • 25 Total power-on time • • •	• • •
03 Speed instruction • • 04 Internal torque instruction (relative to rated torque) • • 05 Phase current effective value • • 06 DC bus voltage • • 07 Absolute position counter (32-bit) • • 09 Electrical angle • • 10 Mechanical angle (relative to encoder zero point) • • 11 Load inertia identification value • • 12 Speed value relative to input instruction • • 13 Position deviation counter (32-bit) • • 14 Input pulse counter (32-bit) • • 15 Input pulse counter (32-bit) • • 16 Digital input signal monitoring • • 23 Digital output signal monitoring • • 24 Encoder status • • 25 Total power-on time • • 29 Al 1 voltage after adjustment • • 29 Al 2 voltage be	•
04 Internal torque instruction (relative to rated torque) • 05 Phase current effective value • 06 DC bus voltage • 07 Absolute position counter (32-bit) • 09 Electrical angle • 10 Mechanical angle (relative to encoder zero point) • 11 Load inertia identification value • 12 Speed value relative to input instruction • 13 Position deviation counter (32-bit) • 15 Input pulse counter (32-bit) • 17 Feedback pulse counter (32-bit) • 19 Position instruction deviation counter unit (32-bit) • 19 Position instruction deviation counter unit (32-bit) • 19 Position instruction deviation counter unit (32-bit) • 21 Digital input signal monitoring • 22 Total power-on time • 23 Digital output signal monitoring • 24 Encoder status • 25 Total power-on time • 26 OA I 2 voltage after adjustment<	•
05 Phase current effective value • • 06 DC bus voltage • • 07 Absolute position counter (32-bit) • • 09 Electrical angle • • 10 Mechanical angle (relative to encoder zero point) • • 11 Load inertia identification value • • 12 Speed value relative to input instruction • • 13 Position deviation counter (32-bit) • • 15 Input pulse counter (32-bit) • • 17 Feedback pulse counter (32-bit) • • 18 Position instruction deviation counter unit (32-bit) • • 21 Digital input signal monitoring • • 23 Digital output signal monitoring • • 24 Encoder status • • 25 Total power-on time • • 24 Encoder status • • 25 Total power-on time • • 26 Al 1 voltage after adjustme	•
06 DC bus voltage • • 07 Absolute position counter (32-bit) • • 09 Electrical angle • • 10 Mechanical angle (relative to encoder zero point) • • 11 Load inertia identification value • • 12 Speed value relative to input instruction • • 13 Position deviation counter (32-bit) • • 15 Input pulse counter (32-bit) • • 17 Feedback pulse counter (32-bit) • • 19 Position instruction deviation counter unit (32-bit) • • 21 Digital input signal monitoring • • 23 Digital output signal monitoring • • 24 Encoder status • • 25 Total power-on time • • 24 Al 2 voltage after adjustment • • 29 Al 1 voltage after adjustment • • 20 Al 2 voltage before adjustment • • 31 M	-
07 Absolute position counter (32-bit) • 09 Electrical angle • 10 Mechanical angle (relative to encoder zero point) • 11 Load inertia identification value • 12 Speed value relative to input instruction • 13 Position deviation counter (32-bit) • 15 Input pulse counter (32-bit) • 19 Position instruction deviation counter unit (32-bit) • 19 Position instruction deviation counter unit (32-bit) • 21 Digital input signal monitoring • 23 Digital output signal monitoring • 24 Encoder status • 25 Total power-on time • 27 Al 1 voltage after adjustment • 28 Al 2 voltage before adjustment • 31 Module temperature • 32 Number of turns of absolute encoder (32-bit) • 34 Single turn position of absolute encoder (32-bit) • 36 Version code 1 • • 37 Version code 2	
09 Electrical angle • • 10 Mechanical angle (relative to encoder zero point) • • 11 Load inertia identification value • • 12 Speed value relative to input instruction • • 13 Position deviation counter (32-bit) • • 15 Input pulse counter (32-bit) • • 17 Feedback pulse counter (32-bit) • • 19 Position instruction deviation counter unit (32-bit) • • 19 Position instruction deviation counter unit (32-bit) • • 21 Digital input signal monitoring • • 23 Digital output signal monitoring • • 24 Encoder status • • 25 Total power-on time • • 26 Q Al 1 voltage after adjustment • • 29 Al 1 voltage before adjustment • • • 30 Al 2 voltage before adjustment • • • 31 Module temperature <t< td=""><td>•</td></t<>	•
10 Mechanical angle (relative to encoder zero point) • 11 Load inertia identification value • 12 Speed value relative to input instruction • 12 Speed value relative to input instruction • 13 Position deviation counter (32-bit) • 15 Input pulse counter (32-bit) • 17 Feedback pulse counter (32-bit) • 19 Position instruction deviation counter unit (32-bit) • 21 Digital input signal monitoring • 23 Digital output signal monitoring • 24 Encoder status • 25 Total power-on time • 26 Al 1 voltage after adjustment • 29 Al 1 voltage after adjustment • 20 Al 2 voltage before adjustment • 30 Al 2 voltage before adjustment • 31 Module temperature • 32 Number of turns of absolute encoder (32-bit) • 33 Version code 1 • 34 Single turn position of absolute encoder (32-bit) •<	•
11 Load inertia identification value • • 12 Speed value relative to input instruction • • 13 Position deviation counter (32-bit) • • 15 Input pulse counter (32-bit) • • 17 Feedback pulse counter (32-bit) • • 19 Position instruction deviation counter unit (32-bit) • • 21 Digital input signal monitoring • • 23 Digital output signal monitoring • • 24 Encoder status • • 25 Total power-on time • • 24 Al 1 voltage after adjustment • • 28 Al 2 voltage after adjustment • • 29 Al 1 voltage before adjustment • • 31 Module temperature • • 32 Number of turns of absolute encoder (32-bit) • • 33 Version code 1 • • • 34 Single turn position of absolute encoder (32-bit) • • •	•
12 Speed value relative to input instruction • • 13 Position deviation counter (32-bit) • • 15 Input pulse counter (32-bit) • • 17 Feedback pulse counter (32-bit) • • 19 Position instruction deviation counter unit (32-bit) • • 21 Digital input signal monitoring • • 23 Digital output signal monitoring • • 24 Encoder status • • 25 Total power-on time • • 28 Al 2 voltage after adjustment • • 29 Al 1 voltage before adjustment • • 29 Al 1 voltage before adjustment • • 31 Module temperature • • 32 Number of turns of absolute encoder (32-bit) • • 34 Single turn position of absolute encoder (32-bit) • • 36 Version code 1 • • • 37 Version code 2 • • •	•
13 Position deviation counter (32-bit) • 15 Input pulse counter (32-bit) • 17 Feedback pulse counter (32-bit) • 19 Position instruction deviation counter unit (32-bit) • 11 Digital input signal monitoring • 11 Digital input signal monitoring • 12 Digital output signal monitoring • 12 Digital output signal monitoring • 12 Digital output signal monitoring • 13 Position instruction deviation counter unit (32-bit) • 14 Encoder status • 15 Total power-on time • 16 27 Al 1 voltage after adjustment • 17 Voltage before adjustment • • 18 Al 2 voltage before adjustment • • 19 Oall 2 voltage before adjustment • • 10 Al 2 voltage before adjustment • • 10 Al 2 voltage before adjustment • • 10 Al 2 voltage before adjustment • •	•
15 Input pulse counter (32-bit) • • 17 Feedback pulse counter (32-bit) • • 19 Position instruction deviation counter unit (32-bit) • • 21 Digital input signal monitoring • • 23 Digital output signal monitoring • • 24 Encoder status • • 25 Total power-on time • • 27 Al 1 voltage after adjustment • • 28 Al 2 voltage after adjustment • • 29 Al 1 voltage before adjustment • • 30 Al 2 voltage before adjustment • • 31 Module temperature • • 32 Number of turns of absolute encoder (32-bit) • • 34 Single turn position of absolute encoder (32-bit) • • 36 Version code 1 • • • 37 Version code 2 • • • 39 Product series code • • • 40	•
17 Feedback pulse counter (32-bit) • • 19 Position instruction deviation counter unit (32-bit) • • 21 Digital input signal monitoring • • 23 Digital output signal monitoring • • 24 Encoder status • • 25 Total power-on time • • 27 Al 1 voltage after adjustment • • 28 Al 2 voltage after adjustment • • 29 Al 1 voltage before adjustment • • 30 Al 2 voltage before adjustment • • 31 Module temperature • • 32 Number of turns of absolute encoder (32-bit) • • 34 Single turn position of absolute encoder (32-bit) • • 36 Version code 1 • • • 37 Version code 2 • • • 38 Version code 3 • • • 39 Product series code • • • <td< td=""><td>•</td></td<>	•
19 Position instruction deviation counter unit (32-bit) • 21 Digital input signal monitoring • 23 Digital output signal monitoring • 24 Encoder status • 25 Total power-on time • 27 Al 1 voltage after adjustment • 28 Al 2 voltage after adjustment • 29 Al 1 voltage before adjustment • 29 Al 1 voltage before adjustment • 31 Module temperature • 32 Number of turns of absolute encoder (32-bit) • 34 Single turn position of absolute encoder (32-bit) • 36 Version code 1 • 37 Version code 2 • 38 Version code 3 • 39 Product series code • 40 Fault record display • • 41 Fault code • •	•
21 Digital input signal monitoring • • 23 Digital output signal monitoring • • 24 Encoder status • • 25 Total power-on time • • 27 Al 1 voltage after adjustment • • 29 Al 1 voltage after adjustment • • 29 Al 1 voltage before adjustment • • 30 Al 2 voltage before adjustment • • 31 Module temperature • • 32 Number of turns of absolute encoder (32-bit) • • 34 Single turn position of absolute encoder (32-bit) • • 36 Version code 1 • • • 37 Version code 2 • • • 38 Version code 3 • • • 39 Product series code • • • 40 Fault record display • • •	•
23 Digital output signal monitoring • • 24 Encoder status • • 25 Total power-on time • • 27 Al 1 voltage after adjustment • • 28 Al 2 voltage after adjustment • • 29 Al 1 voltage before adjustment • • 30 Al 2 voltage before adjustment • • 31 Module temperature • • 32 Number of turns of absolute encoder (32-bit) • • 34 Single turn position of absolute encoder (32-bit) • • 36 Version code 1 • • 37 Version code 2 • • 38 Version code 3 • • 39 Product series code • • 41 Fault record display • • 41 Fault code • •	•
24 Encoder status • • 25 Total power-on time • • 27 Al 1 voltage after adjustment • • 28 Al 2 voltage after adjustment • • 29 Al 1 voltage before adjustment • • 30 Al 2 voltage before adjustment • • 31 Module temperature • • 32 Number of turns of absolute encoder (32-bit) • • 34 Single turn position of absolute encoder (32-bit) • • 36 Version code 1 • • • 37 Version code 2 • • 38 Version code 3 • • 39 Product series code • • 40 Fault record display • • • 41 Fault code • • •	•
25 Total power-on time • • 27 Al 1 voltage after adjustment • • 28 Al 2 voltage after adjustment • • 29 Al 1 voltage before adjustment • • 29 Al 1 voltage before adjustment • • 30 Al 2 voltage before adjustment • • 31 Module temperature • • 32 Number of turns of absolute encoder (32-bit) • • 34 Single turn position of absolute encoder (32-bit) • • 36 Version code 1 • • • 37 Version code 2 • • 38 Version code 3 • • 39 Product series code • • 40 Fault record display • • • 41 Fault code • • •	•
39 Product series code • • 40 Fault record display • • 41 Fault code • •	•
39 Product series code • • 40 Fault record display • • 41 Fault code • •	•
39 Product series code • • 40 Fault record display • • 41 Fault code • •	•
39 Product series code • • 40 Fault record display • • 41 Fault code • •	•
39 Product series code • • 40 Fault record display • • 41 Fault code • •	:
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39 Product series code • • 40 Fault record display • • 41 Fault code • •	-
39 Product series code • • 40 Fault record display • • 41 Fault code • •	
39 Product series code • • 40 Fault record display • • 41 Fault code • •	•
39 Product series code • • 40 Fault record display • • 41 Fault code • •	-
40 Fault record display • • 41 Fault code • •	-
41 Fault code • •	•
	•
	•
44 Motor speed upon selected fault	•
45 U-phase current upon selected fault • •	•
46 V-phase current upon selected fault • •	•
47 DC bus voltage upon selected fault	•
48 Input terminal status upon selected fault	•
49 Output terminal status upon selected fault	•
50 Customized software version number • •	•
51 Accumulative load ratio	•
52 Regenerative load ratio	•
53 Internal warning code	•
54 Internal instruction present stage code • •	•
55 Customized serial code • •	•
56 High 32 place of absolute position counter (32-bit) • •	•
58 High 32 place of feedback pulse counter (32-bit) • •	•

Paran		Description	Control mode		
num	iber		Р	S	Т
	00	External encoder using method	٠	-	-
	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	•	-	-
ion	07	Hybrid vibration suppression time constant	•	-	-
Extension Control eters	09	Unit for full-closed hybrid deviation (32-bit)	•	-	-
roup Extens ition Control arameters	11	Unit for internal encoder counting (32-bit)	٠	-	-
	13	External encoder counting value (32-bit)	•	-	-
G roup ssition Param	16	Position comparison output mode	٠	-	-
5 S G	17	1st position	•	-	-
Р17 р	19	2nd position	٠	-	-
а.	21	3rd position	٠	-	-
	23	4th position	٠	-	-
	25	Signal effective time 1	٠	-	-
	26	Signal effective time 2	•	-	-
	27	Signal effective time 3	•	-	-
	28	Signal effective time 4	•	-	-
	29	Display delay	•	-	-

	Parameter number		Description		Control mode		
				Р	S	Т	
	P18 Group Motor Parameters	00	Motor model code	•	•	•	

	Parameter number		Description	Control mode			
P20 Group Panel and				Р	S	Т	
	_ e	00	Panel JOG	•	•	•	
	anc	01	Fault reset	•	٠	٠	
	iel a nte	03	Parameter identification function	•	٠	٠	
		05	Analog input automatic offset adjustment	•	٠	٠	
	atic me	06	System initialization function	•	٠	٠	
	nic	08	Communication operation instruction input	•	٠	٠	
	D L L	09	Communication operation status output	•	٠	٠	
	020	11	Multi-stage operation selection by communication	•	٠	-	
	ĽÖ	12	Homing start by communication	٠	-	-	

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