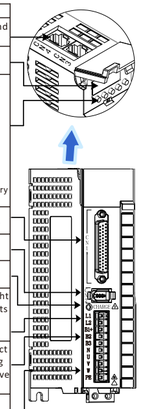
User Manual for E6 Series Servo Driver

Driver Parts Name

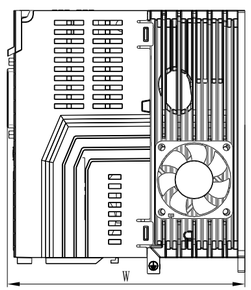
	Specification
CN3、CN4	Internal parallel, with RS-232、RS-485、Canopen Command Device connected.
Digital Tube Display	5-digit 7-segment LED digital tube is used to display the operation condition and parameter setting.
key operator	MODE ▲ ▼ ◀◀ SET Press the button to display the setting value of each parameter, namely entering the setting mode (long press the parameter to confirm) Shift the current blinking bit to the left The set value can be reduced to act as a reverse start button during JOG operation in auxiliary function mode . The set value can be increased to act as a forward rotation start button during JOG operation in auxiliary function mode . Switch basic mode: conditions display, auxiliary function, parameter setting and monitoring
CN1 I/O terminal	Ports for command input signals and other input signals.
Cn2 Motor encod terminal	Connected to the motor encoder terminals.
L1、L2 Main power terminal	Simple x AC200V-240V, -15%～10%，50/60Hz.
CHARGE Bus voltage indicator	Used to indicate bus capacitor is in a charge d state.when light on, even if the main circuit power is turned off, the servo units may still have electric charges. So do not touch the power terminals when the light is on to avoid electric shock.
B1+、B2、B3 Bra king resistor terminal	When using an external braking resistor, you should connect a resi stor between B1+B2. When using an internal braking resistor, B2 and B3 should be short- circuited.(B2 and B3 have been short-circuited before leaving factor).
U、V、W、PE Motor power terminal and ground terminal	It must be in correspondence with the UVW terminals of the motor one by one.

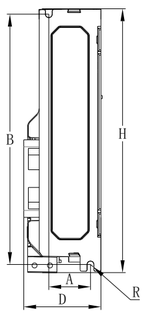


Braking resistor related specifications

Model Type		Built-in braking resistor specifications		Min. Allowed Resistance (Ω)	Max. Braking Energy Absorbed by Capacitor (J)
		Resistance (Ω)	Power(W)		
Single phase 220V	E6-200RS	-	-	50	9
	E6-400RS	-	-	45	18
	E6-750RS	50	50	40	26
	E6-1000RS	50	50	40	26

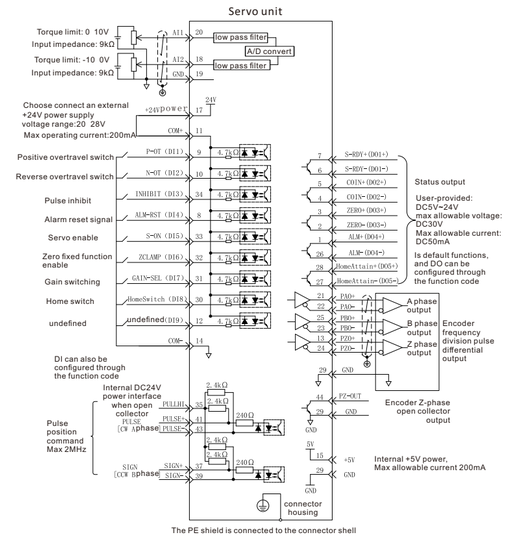
Product Specification



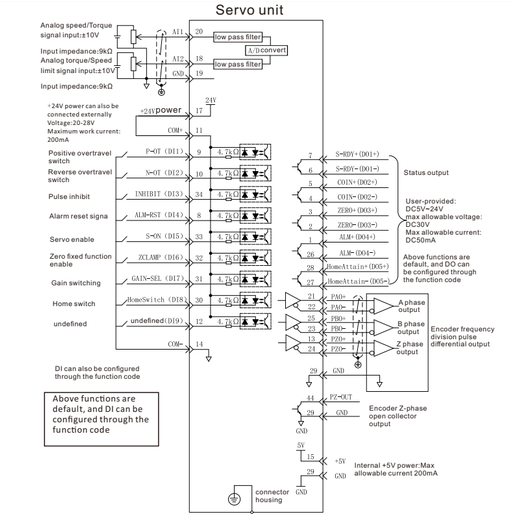


Item			Specification			
E6 Series			200RS	400RS	750RS	1000RS
Dimension	A(mm)		27			
	B(mm)		162			
	W(mm)		154			
	H(mm)		171			
	D(mm)		51			
	R(mm)		2			
	W(kg)		0.9			
Basic Specifications	Input Power		Single phase AC200V-240V，-15%~10%，50/60Hz			
	Environmental Specifications	Temperature: Ambient Temperature	0~55℃(from 45℃~to 55℃,keep average load rate within 80%) no freezing			
		Temperature: Preservation of Ambient Temperature	-20~65℃			
		Humidity: Ambient Humidity	below 20~85%RH (no condensation)			
		Humidity: Preservation of Ambient Humidity	below 20~85%RH (no condensation)			
		Use and Preservation of Ambient Air	indoor (no direct sunlight), no corrosive gas, flammable gas, oil mist, dust			
		Altitude	below 1000m			
		Vibration	below 5.8m/s² (0.6G) 10~60Hz(do not use continuously at resonance frequency)			
	Dielectric Withstand Voltage		AC1500V between primary and FG for 1 minute			
	Control Method		three-phase PWM converter sine wave drive			
	Encoder Feedback		17bit 、23bit (functions as a multi-turn absolute encoder after adding a battery)			
	Control Signal	Input	9-way input (DC24V optocoupler isolation) function switching according to the control mode			
		Output	5-way output (DC24V optocoupler isolation, open collector output) switching according to the control mode function			
	Pulse Signal	Input	2-way input (optocoupler isolation, RS-422 differential, open collector output)			
		Output	4-way output (A/B/Z phase RS-422 differential; Z phase open collector output)			
	Communi cation	RS232	for PC communication (for "Servostudio" connection)			
		RS-485	for host remote control communication (1:n)			
		CAN	CANOPEN bus communication			
	Regenerative Functions		Connect regenerative resistor internally or externally pay attention to modifying internal parameters			
	Control Modes		6 control modes:speed control,position control,torque control,torque/speed control, speed/position control,torque/position,torque/speed/position mixed control			
Functions	Control Input		Alarm reset, proportional action switching, zero fixed function enabling, forward drive prohibited, reverse drive prohibited, external torque limit for forward rotation, external torque limit for reverse rotation, forward jog, reverse jog, forward reset switch, reverse reset switch, origin switch, emergency stop, servo enabling, gain switching			
	Control Output		Servo ready, motor rotating, zero speed signal, speed arrival, position arrival, positioning approach signal, torque limit, speed limit, brake output, warning, servo failure, alarm code (3-digit output)			
	Position Control: Pulse Input	Maximum command pulse frequency	The maximum low speed is 500Kpps, and the pulse width cannot be lower than 1μs; Open collector: maximum 200Kpps, pulse width not less than 2.5μs			
		Input pulse signal form	Differential input; open collector			
		Input pulse signal mode	pulse+direction, right angle phase difference (phase A+phase B), CW+CCW pulse			
		Command pulse frequency division and multiplication(Electroni c gear ratio setting)	0.1048576 < B/A <419430.4			
		Command filter	Smooth filter, FIR filter			
	Position Control: Pulse output	Output pulse form	Phase A and B: differential output Z-phase: differential output or open collector output			
		Frequency division ratio	Arbitrary frequency division			
		Output pulse function	Encoder position pulse and position pulse command (settable)			
	Speed Control	Control Input	Servo ON, alarm reset, reverse speed command, zero speed clamping, internal command selection input 1, internal command selection input 2, internal command selection input 3, internal command selection input 4, forward external torque limit input, reverse external torque limit input, emergency stop			
		Control Output	Alarm status, servo ready, brake release, output during torque limit, output during speed limit, speed reached, speed coincidence, motor rotation output, zero speed signal output			
	Torque Control	Control Input	Servo ON, alarm reset, torque command reverse, zero speed clamp			
		Control Output	Alarm status, servo preparation, brake release, torque limit, speed limit output, emergency stop			
		Torque Command Input	(Factory default setting, range can be set by function code)			
		Speed Limit Function	Positive and negative internal speed limit P03.27, P03.28			
	Similarities	Speed Observer Function	Yes			
		Vibration Control function	Yes			
		Adaptive Notch Filter	Yes			
		Auto adjustment function	Yes			
		Encoder output frequency division and multiplication	Yes			
		Internal location planning function	Yes			
		Adjustment/Function Setting	Use the upper computer to set the software "Servostudio" to adjust			
		Protective function	Over voltage, abnormal power supply, over current, overload, abnormal encoder, overspeed, excessive position deviation, abnormal parameters, etc.			

Location Mode Wiring



Speed/Torque Control Mode Block Diagram



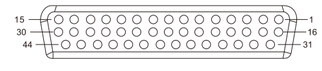
Indicates twisted pair

Note:
- Signal cables and power cables must be routed separately, with an interval of at least 30 cm.
- When the signal cable is not long enough to connect the cable, the shielding layer must be connected reliably to ensure reliable shielding and grounding.
- With a reference to GND, when you use +5V, do not exceed the maximum allowable current, otherwise the driver will not work properly.

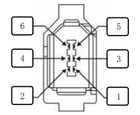
CN1 Terminal arrangement description

15 +5V	14 COM-	13 PZO+	12 DI9	11 COM+	10 DI2	9 DI1	8 DI4	7 DO1+	6 DO1-	5 DO2+	4 DO2-	3 DO3+	2 DO3-	1 DO4+	
30 DI8	29 GND	28 DO5+	27 DO5-	26 DO4-	25 PB0+	24 PZO+	23 PB0-	22 PA0-	21 PA0+	20 AI1	19 GND	18 AI2	17 +24V	16 GND	
44 PZ+OUT	43 PULSE-	-	41 PULSE+	-	39 SIGN-	-	37 SIGN+	-	35 PULLHI	34 DI3	33 DI5	32 DI6	31 DI7		

Model type show

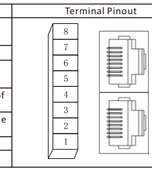


CN2 Illustration of the terminal arrangement of the absolute encoder

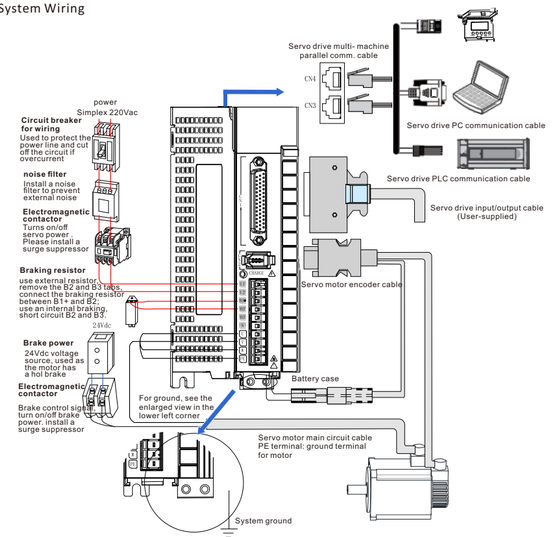


Terminal	Name	Function
1	+5V	PG power+5V
3	-	-
5	PS+	S+ phase
2	OV	Signal
4	-	-
6	PS-	S-phase

CN3、CN4 Illustration of terminal arrangement

Pin	Definition	Description	Terminal Pinout
1	CANH	CAN comm. port	
2	CANL		
3	CGND	CAN comm. port	
4	RS485+	RS485 comm. port	
5	RS485-		
6	RS232-TXD	RS232 Sending end, connected with the receiving end of the host computer	
7	RS232-RXD	RS232 The receiver is connected to the transmitter of the host computer	
8	GND	Ground	
Shell	PE	shield	

Servo System Wiring



Please pay attention to the power supply capacity when connecting external control power supply or 24Vdc power supply, especially when supplying power to several drives or multiple brakes at the same time, insufficient power supply capacity will lead to insufficient supply current and failure of the drive or the brake. The braking power supply is a 24V DC voltage source. The power should refer to the motor model and meet the braking power requirements.

System wiring precautions:

1.When connecting an external braking resistor, please remove the short-circuit wire between terminals B2 and B3 of the servo drive before connecting. Pay attention to modify the internal parameters.

2.CN3 and CN4 define exactly the same communication interface for the two pins, which can be used arbitrarily between the two.

3.In single-phase 220V wiring, the main circuit terminals are L1 and L2, and the reserved terminals should not be connected.

P02 Group Basic control parameters

Function code		Name	Unit	Factory setting	Effective way	Setting way	Related patterns
P02	00	Control Mode Selection	-	1	Effective immediately	Stop setting	-
P02	01	Absolute value system selection	-	0	Power up again	Stop setting	ALL
P02	02	rotating direction selection	-	0	Power up again	Stop setting	PST
P02	03	Output pulse phase	-	0	Power up again	Stop setting	PST
P02	05	stop model at S-ON off	-	0	Effective immediately	Stop setting	PST
P02	06	Fault No.2 Stop Mode Selection	-	0	Effective immediately	Stop setting	PST
P02	07	Choice of Overhaul Mode	-	1	Effective immediately	Stop setting	PST
P02	08	Fault No.1 Stop Mode Selection	-	0	Effective immediately	Stop setting	PST
P02	09	delay from brake output ON to command received	ms	250	Effective immediately	Run settings	PS
P02	10	delay from brake output OFF to motor de-energized in static state	ms	150	Effective immediately	Run settings	PS
P02	11	motor speed threshold at brake output OFF in rotating state	rpm	30	Effective immediately	Run settings	PS
P02	12	Rotate state, motor does not power to lock output OFF delay	ms	500	Effective immediately	Run settings	PS
P02	15	LED Warning Display Select	-	0	Effective immediately	Run settings	PST
P02	18	Servo Enable (S-ON) Filter time constant	ms	0	Effective immediately	Run settings	PST
P02	21	Brake resistance minimum allowed by driver	Ω	-	-	Display	PST
P02	22	Built-in Brake Resistance Power	W	-	-	Display	PST
P02	23	Built-in brake resistance	Ω	-	-	Display	PST

Function code		Name	Unit	Factory setting	Effective way	Setting way	Related patterns
P02	24	Resistance heat dissipation factor	%	30	Effective immediately	Stop setting	PST
P02	25	Brake resistance settings	-	0	Effective immediately	Stop setting	PST
P02	26	External brake resistance power	W	-	Effective immediately	Stop setting	PST
P02	27	External brake resistance resistance	Ω	-	Effective immediately	Stop setting	PST
P02	30	User password	-	0	Power up again	Stop setting	PST
P02	31	System parameter initialization	-	0	Effective immediately	Stop setting	PST
P02	32	Panel Default Display	-	50	Effective immediately	Run settings	-
P02	38	Fault short circuit braking time	ms	5000	Effective immediately	Run settings	PST

P05 Group Position control parameters

Function code		Name	Unit	Factory setting	Effective way	Setting method	Related patterns
P05	00	Location instruction source	-	0	Effective immediately	Stop setting	P
P05	01	Pulse instruction input terminal selection	-	0	Effective immediately	Stop setting	P
P05	02	Number of position instructions per rotation of motor	P/r	0	Power up again	Stop setting	P
P05	04	First-order low-pass filter time constant	ms	0.0	Effective immediately	Stop setting	P
P05	05	Step by step	unit	50	Effective immediately	Stop setting	P
P05	06	Average filter time constant	ms	0.0	Effective immediately	Stop setting	P
P05	07	Electronic tooth ratio 1 (Molecules)	-	131072	Effective immediately	Run settings	P
P05	09	Electronic tooth ratio 1 (denominator)	-	10000	Effective immediately	Run settings	P
P05	11	Electronic tooth ratio 2 (Molecules)	-	131072	Effective immediately	Run settings	P
P05	13	Electronic tooth ratio 2 (denominator)	-	10000	Effective immediately	Run settings	P
P05	15	Pulse instruction pattern	-	0	Power up again	Stop setting	P
P05	16	Clear action selection	-	0	Effective immediately	Stop setting	P
P05	17	Number of frequency division pulses	P/r	2500	Power up again	Stop setting	-
P05	19	Speed feedforward control selection	-	1	Effective immediately	Stop setting	P
P05	20	Location Complete Output Condition	-	0	Effective immediately	Run settings	P
P05	21	Location completion threshold	Encoder / Instruction Unit	734	Effective immediately	Run settings	P
P05	22	Positioning proximity threshold	Encoder / Instruction Unit	65535	Effective immediately	Run settings	P
P05	30	Origin Reversion Enable Control	-	0	Effective immediately	Run settings	P
P05	31	Origin Recovery Mode	-	0	Effective immediately	Stop setting	P
P05	32	Speed of high-speed search for origin switch signal	rpm	100	Effective immediately	Run settings	P
P05	33	Speed of low speed search for origin switch signal	rpm	10	Effective immediately	Run settings	P
P05	34	Time of acceleration and deceleration when searching origin	ms	1000	Effective immediately	Stop setting	P
P05	35	Limit the time to find the origin	ms	10000	Effective immediately	Stop setting	P
P05	36	Mechanical origin offset	Instruction unit	0	Effective immediately	Stop setting	P
P05	38	Servo Pulse Output Source Selection	-	0	Power up again	Stop setting	P
P05	39	Electronic gear ratio switching conditions	-	0	Effective immediately	Stop setting	P
P05	40	Mechanical Origin Offset and Limit Treatment	-	0	Effective immediately	Stop setting	P
P05	41	Z Pulse Output Polarity Selection	-	1	Power up again	Stop setting	P
P05	43	Position pulse along selection	1	0	Power up again	Run settings	PST
P05	46	Absolute position linear mode position bias (low 32 bits)	Encoder unit	0	Effective immediately	Stop setting	ALL
P05	48	Absolute position linear mode position bias (high 32 bits)	Encoder unit	0	Effective immediately	Stop setting	ALL
P05	50	Absolute position rotation mode mechanical gear ratio (molecule)	-	65535	Effective immediately	Stop setting	ALL
P05	51	Absolute position rotation mode mechanical gear ratio (denominator)	-	1	Effective immediately	Stop setting	ALL
P05	52	Absolute position rotation mode load rotation cycle number of pulses (low 32 bits)	Encoder unit	0	Effective immediately	Stop setting	ALL
P05	54	Absolute position rotation mode load rotation cycle number of pulses (32 bits high)	Encoder unit	0	Effective immediately	Stop setting	ALL
P05	56	Threshold of zero velocity judgment	rpm	2	Effective immediately	Run settings	P
P05	58	Contact Stop Zero Torque Limit	%	100.0%	Effective immediately	Run settings	P
P05	59	Location Completion Window Time	ms	1	Effective immediately	Run settings	P
P05	60	Positioning completion retention time	ms	0	Effective immediately	Run settings	P
P05	61	Number of divider pulses (32 bits)	P/r	0	Power up again	Stop setting	-
P05	63	Collector Z signal width	。	0.15	Power up again	Stop setting	P

P06 Group Speed control parameters

Function code		Name	Unit	Factory setting	Effective way	Setting way	Related patterns
P06	00	A Source of Main Speed Instruction	-	0	Effective immediately	Stop setting	S
P06	01	Auxiliary Speed Instruction B Source	-	1	Effective immediately	Stop setting	S
P06	02	Speed Instruction Selection	-	0	Effective immediately	Stop setting	S
P06	03	Speed command keyboard setting	rpm	200	Effective immediately	Run settings	S
P06	04	Set point speed	rpm	100	Effective immediately	Run settings	S
P06	05	Speed command acceleration ramp time constant	ms	0	Effective immediately	Run settings	S
P06	06	Speed command acceleration ramp time constant	ms	0	Effective immediately	Run settings	S
P06	07	Maximum Speed Threshold	rpm	6000	Effective immediately	Run settings	S
P06	08	Forward velocity threshold	rpm	6000	Effective immediately	Run settings	S
P06	09	Reverse velocity threshold	rpm	6000	Effective immediately	Run settings	S
P06	11	Torque Feedforward Control Selection	-	1	Effective immediately	Run settings	S
P06	15	Zero fixed speed threshold	rpm	10	Effective immediately	Run settings	S
P06	16	Motor rotation speed threshold	rpm	20	Effective immediately	Run settings	S
P06	17	Speed consistent signal threshold	rpm	10	Effective immediately	Run settings	S
P06	18	Speed reaches signal threshold	rpm	1000	Effective immediately	Run settings	S
P06	19	Zero speed output signal threshold	rpm	10	Effective immediately	Run settings	S

P07 Group Torque control parameters

Torque instruction 100% corresponding to motor rated torque.

Function code		Name	Unit	Factory setting	Effective way	Setting way	Related patterns
P07	00	A source of master torque instruction	-	0	Effective immediately	Stop setting	T
P07	01	Auxiliary torque instruction B source	-	1	Effective immediately	Stop setting	T
P07	02	Torque Directive Selection	-	0	Effective immediately	Stop setting	T
P07	03	Torque instruction keyboard setting	%	0	Effective immediately	Run settings	T
P07	05	Torque instruction filter time constant	ms	0.79	Effective immediately	Run settings	PST
P07	06	Second torque instruction filtering time constant	ms	0.79	Effective immediately	Run settings	PST
P07	07	Torque limitation sources	-	0	Effective immediately	Stop setting	PST
P07	08	T-LMT selection	-	2	Effective immediately	Stop setting	PST
P07	09	Positive internal torque limit	%	300.0	Effective immediately	Run settings	PST
P07	10	Negative internal torque limit	%	300.0	Effective immediately	Run settings	PST
P07	11	Positive external torque limit	%	300.0	Effective immediately	Run settings	PST
P07	12	Negative External Torque Limit	%	300.	Effective immediately	Run settings	PST
P07	17	Selection of speed limit sources	-	0	Effective immediately	Run settings	T
P07	18	V-LMT Selection	-	1	Effective immediately	Run settings	T
P07	19	Torque control forward speed limit value / torque control speed limit value 1	rpm	3000	Effective immediately	Run settings	T
P07	20	Negative Speed Limit for Torque Control /Speed Limit for Torque Control 2	rpm	3000	Effective immediately	Run settings	T
P07	21	Torque reaches reference value	%	0.0	Effective immediately	Run settings	PST
P07	22	Torque reaches effective value	%	20.0	Effective immediately	Run settings	PST
P07	23	Torque arrives invalid	%	10.0	Effective immediately	Run settings	PST
P07	40	Speed restricted window in torque mode	ms	1.0	Effective immediately	Run settings	T

P08 Group Gain class parameters

Function code		Name	Unit	Factory setting	Effective way	Setting method	Related patterns
P08	00	speed gain	Hz	25.0	Effective immediately	Run settings	PS
P08	01	Speed loop integral time constant	ms	31.83	Effective immediately	Run settings	PS
P08	02	Position loop gain	Hz	40.0	Effective immediately	Run settings	P
P08	03	Second speed loop gain	Hz	40.0	Effective immediately	Run settings	PS
P08	04	No.2 Speed loop integral time constant	ms	40.0	Effective immediately	Run settings	PS
P08	05	No.2 Position loop gain	Hz	64.0	Effective immediately	Run settings	P
P08	08	Second Gain Mode Settings	-	1	Effective immediately	Run settings	PST
P08	09	Gain switching condition selection	-	0	Effective immediately	Run settings	PST
P08	10	Gain switching delay time	ms	5.0	Effective immediately	Run settings	PST
P08	11	Gain Switching Level	According to switching conditions	50.0	Effective immediately	Run settings	PST
P08	12	Gain switching delay	According to switching conditions	30.	Effective immediately	Run settings	PST
P08	13	Position gain switching time	ms	3.0.	Effective immediately	Run settings	P
P08	15	Load moment of inertia ratio	times	1.00	Effective immediately	Run settings	PST
P08	18	Speed feed filter time constant	ms	0.50	Effective immediately	Run settings	P
P08	19	Speed feedforward gain	%	0.0	Effective immediately	Run settings	P
P08	20	Torque feed filter time constant	ms	0.50	Effective immediately	Stop setting	PS
P08	21	Torque Feedforward Gain	%	0.0	Effective immediately	Run settings	PS
P08	22	Speed Feedback Filter Option	-	0	Effective immediately	Stop setting	PS
P08	23	Speed feedback low pass filter cutoff frequency	Hz	4000	Effective immediately	Run settings	PS
P08	24	Pseudo-differential feedforward control coefficient	-	100.0	Effective immediately	Run settings	PS
P08	27	Friction gain	%	0.0	Effective immediately	Run settings	P
P08	28	Static friction	%	%	Effective immediately	Run settings	P

P09 Group Self-adjusting parameters

Function code		Name	Unit	Factory setting	Effective way	Setting method	Related patterns
P09	00	Self adjustment mode selection	-	0	Effective immediately	Run settings	PST
P09	01	Rigid grade selection	-	12	Effective immediately	Run settings	PST
P09	02	Adaptive Trap Mode Selection	-	0	Effective immediately	Run settings	PST
P09	03	On-line Inertial Identification Mode	-	0	Effective immediately	Run settings	RST
P09	04	Selection of Low Frequency Resonance Suppression Mode	-	0	Effective immediately	Run settings	P
P09	05	Offline Inertial Identification Mode Selection	-	0	Effective immediately	Stop setting	PST
P09	06	Maximum velocity for inertia identification	rpm	500	Effective immediately	Stop setting	PST
P09	07	Acceleration to maximum velocity time constant for inertia identification	ms	125	Effective immediately	Stop setting	PST
P09	08	Waiting time after completion of single inertia identification	ms	800	Effective immediately	Stop setting	PST
P09	09	Complete single inertia identification number of motor turns	r	-	-	Display	PST
P09	12	Group 1 Trap Frequency	Hz	4000	Effective immediately	Run settings	PS
P09	13	Group 1 Trap width rating	-	2	Effective immediately	Run settings	PS
P09	14	Group 1 Trap depth rating	-	0	Effective immediately	Run settings	PS
P09	15	Group 2 Trap Frequency	Hz	4000	Effective immediately	Run settings	PS
P09	16	Group 2 Trap width rating	-	2	Effective immediately	Run settings	PS
P09	17	Group 2 Trap depth rating	-	0	Effective immediately	Run settings	PS
P09	18	Group 3 Trap Frequency	Hz	4000	Effective immediately	Run settings	PS
P09	19	Group 3 Trap width rating	-	2	Effective immediately	Stop setting	PS
P09	20	Group 3 Trap depth rating	-	0	Effective immediately	Run settings	PS
P09	21	Group 4 Trap Frequency	Hz	4000	Effective immediately	Run settings	PS
P09	22	Group 4 Trap width rating	-	2	Effective immediately	Run settings	PS
P09	23	Group 4 Trap depth rating	-	0	Effective immediately	Run settings	PS
P09	24	Resonance Frequency Identification Results	Hz	0	-	Display	PS
P09	30	Torque disturbance compensation gain	%	0.0	Effective immediately	Run settings	PS
P09	31	Time constant of torque disturbance observer filter	ms	0.50	Effective immediately	Run settings	PS
P09	38	Low frequency resonance frequency	Hz	100.0	Effective immediately	Run settings	P

P0B Group Monitoring parameters

Function code		Name	Unit	Factory setting	Effective way	Setting method	Related patterns
P0B	00	Actual motor speed	rpm	-	-	Display	PST
P0B	01	Speed instruction	rpm	-	-	Display	PS
P0B	02	Internal torque instruction (relative to rated torque)	%	-	-	Display	PST
P0B	03	Input signal (DI signal) monitoring	-	-	-	Display	PST
P0B	05	Output signal (DO signal) monitoring	-	-	-	Display	PST
P0B	07	Absolute position counter (32-bit decimal display)	Instruction Unit	-	-	Display	PST
P0B	09	Mechanical angle (number of pulses starting at origin)	Encoder Unit	-	-	Display	PST
P0B	10	Electrical angle	°	-	-	Display	PST
P0B	11	Input position instruction corresponding speed information	rpm	-	-	Display	P
P0B	12	Average load rate	%	-	-	Display	PST
P0B	13	Input instruction pulse counter (32-bit decimal display)	Instruction Unit	-	-	Display	P
P0B	15	Encoder position deviation counter (32-bit decimal display)	Encoder Unit	-	-	Display	P
P0B	17	Feedback pulse counter (32-bit decimal display)	Encoder Unit	-	-	Display	PST
P0B	19	Total power-up time (32-bit decimal display)	s	-	-	Display	PST
P0B	21	Ai1 Sampling 21voltage values	V	-	-	Display	PST
P0B	22	Ai2 Sampling voltage values	V	-	-	Display	PST
P0B	24	Phase current RMS	A	-	-	Display	PST
P0B	26	Bus voltage	V	-	-	Display	PST
P0B	27	Module temperature values	℃	-	-	Display	PST
P0B	33	Failure logging	-	0	Effective	Run	PST
P0B	34	Number of failures selected	-	-	-	Display	PST
P0B	35	Selected fault timestamp	S	-	-	Display	PST
P0B	37	Motor speed at selected faults	rpm	-	-	Display	PST
P0B	38	Electrical U phase current at selected fault	A	-	-	Display	PST
P0B	39	Electrical U phase current at selected fault	A	-	-	Display	PST
P0B	40	Bus voltage at selected fault	V	-	-	Display	PST
P0B	41	Input terminal status at selected fault	-	-	-	Display	PST
P0B	42	Output terminal status at selected fault	-	-	-	Display	PST
P0B	53	Position Deviation Counter	Instruction Unit	-	-	Display	P
P0B	55	Actual motor speed(0.1rpm)	rpm	-	-	Display	PST
P0B	58	Mechanical absolute position (32 bits low)	Encoder Unit	0	-	Display	ALL
P0B	60	Mechanical absolute position (32 bits high)	Encoder Unit	0	-	Display	ALL
P0B	64	Real-time input position instruction counter	Unit of instruction	-	-	Display	PST
P0B	70	Absolute value encoder rotation circle data	r	0	-	Display	ALL
P0B	71	In-circle position of absolute encoder	Encoder Unit	0	-	Display	ALL
P0B	77	Absolute encoder absolute position (low 32 bits)	Encoder Unit	0	–	Display	ALL
P0B	79	Absolute encoder absolute position (high 32 bits)	Encoder Unit	0		Display	ALL
P0B	81	Rotating load single loop position (low 32 bits)	Encoder Unit	0	-	Display	ALL
P0B	83	Rotating load single loop position (high 32 bits)	Encoder Unit	0	-	Display	ALL

Troubleshooting

Display	Fault name
FU.101	P02 and above group parameters are abnormal
FU.102	Programmable logic configuration failure
FU.104	Programmable logic interrupt fault
FU.105	Internal program exception
FU.108	Parameter storage failure
FU.110	Frequency division pulse output setting failure
FU.111	Internal fault
FU.120	Product matching failure
FU.121	Servo ON command invalid fault
FU.122	Absolute position mode product matching failure
FU.130	DI function repeated allocation
FU.131	DO function allocation exceeds limit
FU.136	Data check error in motor ROM or parameter not saved
FU.201	Over current 2
FU.202	Software over current
FU.203	Excessive current null point
FU.207	D/Q axis current overflow fault
FU.208	FPGA system sampling operation timeout
FU.210	Output short circuit to ground
FU.220	Phase sequence error
FU.234	Speed car
FU.235	Excessive speed tracking error
FU.400	Main circuit over voltage
FU.410	Main circuit under voltage
FU.420	Main circuit lack of phase
FU.430	Control voltage under voltage
FU.431	Excessive analog voltage
FU.432	Too large null point
FU.500	Over speed
FU.510	Pulse output over speed
FU.601	Back to origin timeout failure
FU.602	Angle recognition failed
FU.610	Drive overload
FU.620	Motor over load

Display	Fault name
FU.625	Brake closed abnormally
FU.626	Brake opened abnormally
FU.630	Motor blocked
FU.650	Radiator overheated
FU.730	Encoder battery warning
FU.731	Encoder battery failure
FU.733	Encoder multi-turn counting error
FU.735	Encoder multi-turn counting over flow
FU.740	Encoder interference
FU.741	Counting error made by encoder
FU.760	Overheat alarm from encoder
FU.831	AI zero drift is too large
FU.834	AD sampling overvoltage
FU.835	High-precision AD sampling failure
FU.900	DI emergency brake
FU.909	Motor overload warning
FU.920	Braking resistor overload
FU.922	External braking resistor is too small
FU.939	Motor power line is broken
FU.941	Change parameters need to be re-powered to take effect
FU.942	Frequent parameter storage
FU.950	Forward over travel warning
FU.952	Reverse over travel warning
FU.980	Encoder internal fault
FU.990	Input phase loss warning
FU.994	CAN address conflict
FU.A33	Encoder data is abnormal
FU.A40	Internal fault
FU.B00	Position deviation is too large
FU.B01	Pulse input abnormal
FU.B02	Full closed loop position deviation is too large
FU.B03	Electronic gear ratio setting exceeds limit
FU.B04	Full closed loop function parameter setting error
FU.D03	CAN communication connection interrupted

MODBUS Communication Protocol

The function codes of servo driver can be divided into 16bits and 32bits in length. Through MODBUS RTU protocol, the data of function code can be read and written. The command code differs owing to different length of data when you write data of function code.

Operation	Command code
Read 16/32 bits function codes	0*03
Write 16 bits function codes	0*06
Write 32 bits function codes	0*10

Read Function Code: 0*03

In MODBUS RTU protocol, command code, 0*03, should be adopted when 16 bits and 32 bits function codes are read.

Request Frame Format:

START	Greater than or equal to 3.5 characters idle time, indicative of the start of a frame
ADDR	Servo axis address:1~247 Note:Here 1-247 is a decimal number, which is converted to a hexadecimal number when ADDR is filled in.
CMD	Command code:0*03
DATA[0]	Starting function code group number,such as P06-11, 06 being the group number
DATA[1]	Starting function code intra group offset, such as P06-11, 11 being the offset Note:Here 11 is a decimal number. It should be converted to a hexadecimal number such as 0*0B when DATA[1] is filled in.
DATA[2]	Read numbers of functional codes(over 8 bits)in hexadecimal form
DATA[3]	Read numbers of functional codes(below 8 bits)in hexadecimal form
CRCL	Check valid byte by CRC(below 8 bits)
CRCH	Check valid byte by CRC(over 8 bits)
END	Greater than or equal to 3.5 characters idle time, indicative of the end of a frame

Response frame format:

START	Greater than or equal to 3.5 characters idle time, indicative of the start of a frame
ADDR	Servo axis address, in hexadecimal form
CMD	Command code:0*03
DATALENGTH	The bits of function codes equal to the code which is read(N)*2
DATA[0]	Starting function code ,over 8 bits
DATA[1]	Starting function code, below 8 bits
DATA[...]	-
DATA [N*2-1]	Ending function code, below 8 bits
CRCL	Check low valid byte by CRC
CRCH	Check high valid byte by CRC
END	Greater than or equal to 3.5 characters idle time, indicative of the end of a frame

Write 16 Bits Function Code: 0*06

Stop using 0*06 to do the writing operation on 32 bits function code, or unexpected mistake will happen.

Request Frame Format:

START	Greater than or equal to 3.5 characters idle time, indicative of the start of a frame
ADDR	Servo axis address:1~247 Note:Here 1-247 is a decimal number, which is converted to a hexadecimal number when ADDR is filled in.
CMD	Command code:0*06
DATA[0]	Function code group number to be written,such as P06-11, 06 being the group number. Note: Here 06 is a hexadecimal number, so it doesn't need conversion.
DATA[1]	Function code offset to be written, such as P06-11, 11 being the offset Note:Here 11 is a decimal number. It should be converted to a hexadecimal number such as 0*0B when DATA[1] is filled in.
DATA[2]	Write data in high byte and in hexadecimal form.
DATA[3]	Write data in low byte and in hexadecimal form.
CRCL	Check low valid byte by CRC
CRCH	Check high valid byte by CRC
END	Greater than or equal to 3.5 characters idle time, indicative of the end of a frame

Response frame format:

START	Greater than or equal to 3.5 characters idle time, indicative of the start of a frame
ADDR	Servo axis address and in hexadecimal form
CMD	Command code:0*06Command code:0*06
DATA[0]	Function code group number to be written,such as P06-11, 06 being the group number.
DATA[1]	Function code offset to be written, such as P06-11, 11 being the offset.
DATA[2]	Write data in high byte and in hexadecimal form.
DATA[3]	Write data in low byte and in hexadecimal form.
CRCL	Check low valid byte by CRC
CRCH	Check high valid byte by CRC
END	Greater than or equal to 3.5 characters idle time, indicative of the end of a frame

Write 32 Bits Function Code: 0*10

Stop using 0*06 to do the writing operation on 32 bits function code, or unexpected mistake will happen.

Request Frame Format:

START	Greater than or equal to 3.5 characters idle time, indicative of the start of a frame
ADDR	Servo axis address:1~247 Note:Here 1-247 is a decimal number, which is converted to a hexadecimal number when ADDR is filled in.
CMD	Command code:0*10
DATA[0]	Function code group number to be written,such as P11-12, 11 being the group number. Note: Here 11 is a hexadecimal number, so it doesn't need conversion.
DATA[1]	Function code offset to be written, such as P11-12, 12 being the offset. Note: Here 12 is a decimal number. It should be converted to a hexadecimal number such as 0*0C when DATA[1] is filled in.
DATA[2]	The number of function code is 8 bits higher M(H), and the 32 bits of function code is as long as 2.
DATA[3]	The number of function code M(L)is 8 bits lower.
DATA[4]	The number of function code equals to double bits---the number of bits M*2. Such as P05-07, DATA[4] should be P04.
DATA[5]	The number of function code which has been written is 8 bits higher and should be in hexadecimal form.
DATA[6]	The number of function code which has been written is 8 bits higher and should be in hexadecimal form.
DATA[7]	The starting function code which has been written in groups should be 8 bits higher and in hexadecimal form if its offset is +1.
DATA[8]	The starting function code which has been written in groups should be 8 bits lower and in hexadecimal form if its offset is +1.
CRCL	Check low valid byte by CRC
CRCH	Check high valid byte by CRC
END	Greater or equal to 3.5 characters idle time, indicative of the end of a frame

Response frame format:

START	Greater than or equal to 3.5 characters idle time, indicative of the start of a frame
ADDR	Servo axis address and in a hexadecimal form
CMD	Command code:0*10
DATA[0]	Function code group number to be written,such as P11-12, 11 being the group number.
DATA[1]	Function code offset to be written, such as when P11-12 is to be written, 12 should be converted into a hexadecimal form.
DATA[2]	The number of function code to be written is 8 bits higher.
DATA[3]	The number of function code to be written is 8 bits lower.
CRCL	Check low valid byte by CRC
CRCH	Check high valid byte by CRC
END	Greater or equal to 3.5 characters idle time, indicative of the end of a frame