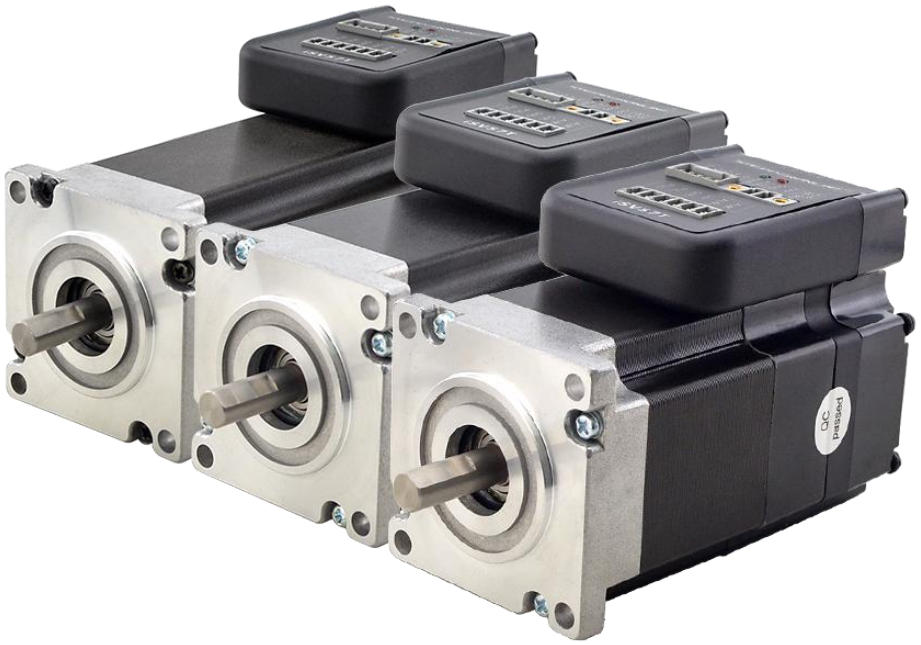
STEPPERONLINE®

User's Manual
For
Integrated Servo Motor
iSV Series



BLDC Servo Motor + Drive, 24-50VDC, Frame 57mm ,90W-180W

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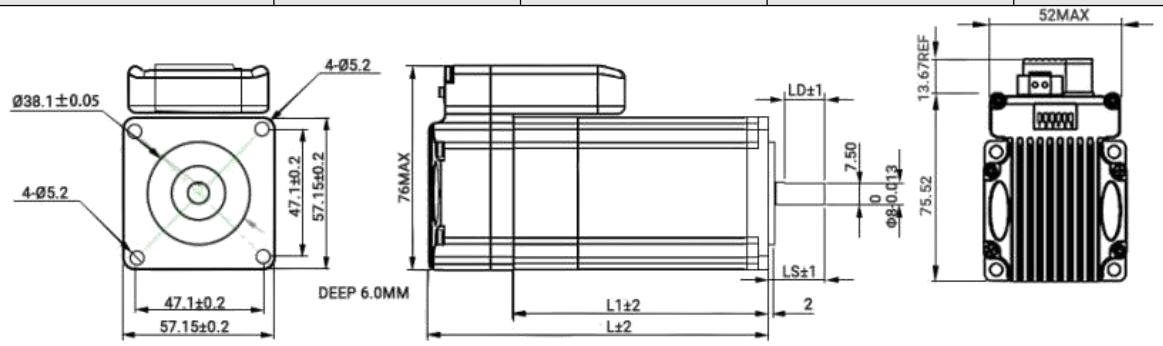
1. Introduction

An iSV57T(S) servo motor is a NEMA23 (57mm) brushless motor integrated with a 16-bit magnetic encoder and servo driver, which making performance better and tuning easier. And the compact design saves installation space, eliminates encoder and motor wiring time, reduces interference and costs.

2. Specifications

Parameter	Min	Typical	Max	Unit
Input Voltage	20	36	50	VDC
Continuous Current	0	-	6.0	A
Pulse Input Frequency	0	-	300	kHz
Pulse Voltage	0	5	5	V
Logic Signal Current	7	10	16	mA
Isolation Resistance	100	-	-	MΩ



Part Number	iSV57T-090(S)	iSV57T-130(S)	iSV57T-180(S)
Rated Power(W)	90	130	180
Rated Torque (N.m)	0.3	0.45	0.6
Peak Torque(N.m)	0.8	1.1	1.1
Rated Speed(rpm)	3000	3000	3000
Peak Speed(rpm)	4000	4000	4000
Rated Voltage(Vdc)	36	36	36
Rotor Inertia(g-cm^2)	264	394	524
Weight(kg)	0.95	1.25	1.54
L1(mm)	76	96	116
L(mm)	108	128	148
LS(mm)	33(21)	33(21)	33(21)
LD(mm)	27(15)	27(15)	27(15)

3.Connectors and Pin Assignment

Control Signal Connector			
Pin	Name	I/O	Description
1	PUL+	I	Pulse signal: Pulse active at rising edge; 4-5V when PUL-HIGH, 0-0.5V when PUL-LOW. Minimal pulse width of 2.5μs. It's recommend dutycycle 50%. Add a resistor for current-limiting at +12V or +24V input logic voltage (1K for +12V, 2k for +24V).
2	PUL-	I	
3	DIR+	I	DIR signal: Pulse active at rising edge; 4-5V when PUL-HIGH, 0-0.5V when PUL-LOW. The low/high voltage levels to represent two directions of motor rotation. Add a resistor for current-limiting at +12V or +24V input logic voltage (1K for +12V, 2k for +24V). The DIR signal at least 5μs in advance of PUL signal
4	DIR-	I	
5	ALM+	O	Alarm Signal: OC output signal, activated when one of the following protection is activated: over-voltage and over current error. They can sink or source MAX 50mA current at 24V. By default, the impedance between ALM+ and ALM- is low for normal operation and becomes high when any protection is activated.
6	ALM-	O	

Note : The enable signal is not configurable,it is enabled on power-up by default, and cannot be modified by software.

Power Connector			
Pin	Name	I/O	Description
1	+Vdc	I	Power Supply Input (Positive) 24-36VDC recommended. Please leave reasonable reservation for voltage fluctuation and back-EMF during deceleration.
2	GND	GND	Power Ground (Negative)

RS232 Communication Connector			
Pin	Name	I/O	Description
1	+5V	O	+5V power output (Note: Do not connect it to PC's serial port)
2	TxD	O	RS232 transmit.
3	GND	GND	Ground.
4	RxD	I	RS232 receive.
5	NC	-	Not connected.

4. DIP Switch

4.1 Microstep (S1-S3)

Pulse/rev	S1	S2	S3
Pr0.08	off	off	off
1600	on	off	off
2000	off	on	off
3200	on	on	off
4000	off	off	on
5000	on	off	on
6400	off	on	on
8000	on	on	on

The microstep parameter is determined by DIP switches S1 to S3. When DIP switches S1 to S3 are all OFF, the microstep parameter is Pr0.08. changed the value of parameter Pr0.08 to the desired microstep value, click "download parameter" ,"Save", power off and restart iSV57T, it can take effect. Note: microstep parameter G setting principle, when servo motor movement at the highest speed N (rpm), the input pulse frequency F≤300KHz. That is, G*N/60≤300K.

4.2 Stiffness Setting(S4-S5)

Stiffness	S4	S5
Pr0.03	off	off
9	on	off
10	off	on
11	on	on

4.3 Motor Direction (S6)

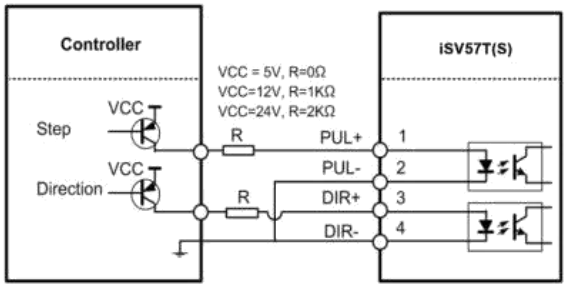
The DIP switch S6 is used to change the initial direction of the motor (offline), not as a real-time operation to modify the direction.Online modification of the motor direction is via the DIR signal

S6	Direction
off	CCW
on	CW

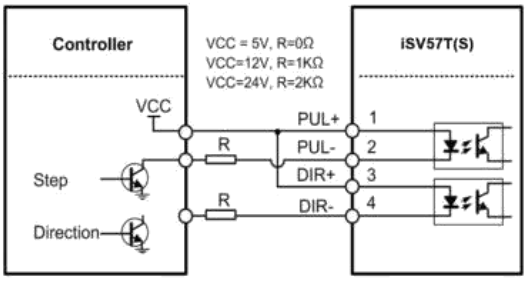
Note: Change the DIP switch status when the power is off.

5. Typical Connections

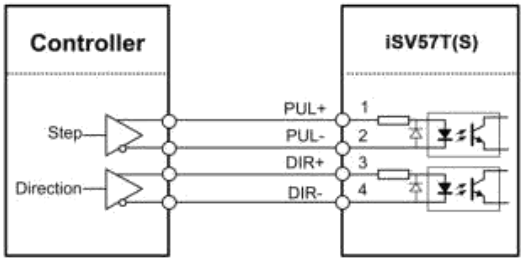
5.1 Control Signal Connection



Connections to PNP signals
(common-cathode)

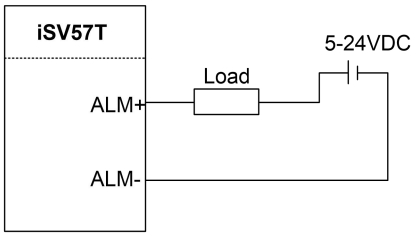


Connections to NPN Signals
(common-anode)

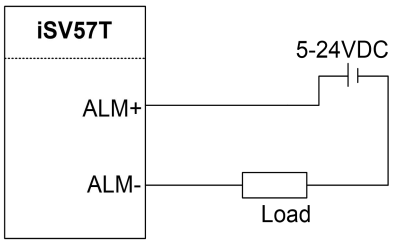


Connections to Differential signals

5.2 Alarm Output Connection



Sinking output



Sourcing output

6. Quick Setting of Parameters

6.1 Connect to Tuning Software

When you open the "communication"window,just select the correct COM port and keep the default for other else, like this baud-rate,keep the default 38400, no need to change it to 19200. Please note that the motor should be powered on when connecting to the software.

6.2 Key Parameters

Usually the setting for Pr0.01-0.04 and Pr2.22 can be :

Pr0.01 = 0; Pr0.02 = 1; Pr0.03 = 10 – 15; Pr0.04 = 100 – 1000; Pr2.22 is for smooth movement

Pr0.01	Control Mode Setup	Range	unit	default
		0-10	-	0

0: Position Control Mode;
1-10: Unsupported Control Modes;

Pr0.02	Real-time Auto-gain Tuning	Range	unit	default
		0 -2	-	1

You can set up the action mode of the real-time auto-gain tuning.

Setup value	Mode	Varying degree of load inertia in motion
0	Invalid	Real-time auto-gain tuning function is disabled.
1	Interpolation motion	Used for interpolation motion, such as CNC, engraving machine, etc.
2	Point-to-point motion	Mainly used for point-to-point movement

Note: If Pr0.02=1 or 2 , the values of Pr1.01 – Pr1.13 are all read only, they are automatically generated .

Pr0.03	Stiffness	Range	unit	default
		0 -31	-	11

It can be set by S4 and S5. If they are “off & off”. Screw-coupling load recommended stiffness range 10~14; pulley load recommended stiffness range 9~13. It is recommended to set a suitable value of Pr0.04 first, and then adjust the stiffness value.

Low ⟶ Machine stiffness ⟶ High

Low ⟶ Servo gain ⟶ High

0.1·····11.12.13·····30.31

Low ⟶ Response ⟶ High

Set rigid parameters

Servo motor rigidity refers to the ability of the motor shaft to resist external torque interference. In the servo system position mode, the rigidity parameter is a parameter that is a combination of the PID parameter and the filter parameter. Its size determines how quickly the servo responds. Generally, the higher the rigidity, the faster the response speed; however, if the rigidity is set too high, mechanical resonance is likely to occur, so an appropriate rigidity value needs to be set according to the actual mechanical load.

For the ISV57T series intelligent integrated low-voltage servo motor, if the screw-coupling direct connection structure is used, the recommended stiffness range is 10~14; the recommended stiffness range for the pulley structure is 9~13. The rigidity parameters are determined by dialing S4~S5 first. When S4~S5 are all in "OFF" state, the rigidity parameters are determined by the value of parameter "Pr0.03". The specific setting method is as follows:

A. Quickly set the rigidity parameters through dialing. After the power is turned off, refer to the S4~S5 dialing definition of the ISV57T series intelligent integrated low-voltage servo to quickly set the rigidity parameters and take effect after powering on.

B. Set rigid parameters through ACHSeries debugging software:

If the rigid parameters corresponding to the dialing code do not include the rigid parameters required by the customer, you need to modify the driver parameter "Pr0.03" through the ACHSeries debugging software to set the required rigid parameters. The setup steps are as follows:

After powering off, set all dial codes S4~S5 to "OFF" state, power on, connect to the driver through the PC software ACHSeries debugging software, modify the value of parameter Pr0.03 to the required subdivision value, and execute "Delivery Parameters" ——"Save", power off and restart to take effect.

Note: Higher the setup value, higher the velocity response and servo stiffness will be obtained. However, when increasing the value, need to avoid oscillation or vibration.

Pr0.04	Load inertia ratio	Range	unit	default
		0 -10000	%	300

It means that the ratio of load inertia against the motor rotor inertia. Recommended below 1000;

Pr0.04=(load inertia/rotate inertia)×100%

If the value of inertia ratio is set correctly, the unit of Pr1.01 and Pr1.06 will change to “Hz”. If this value is too small, the motor will stop unstably, if the value is larger than the actual, the motor will shake when running,. How to get the correct value can be referred to Appendix A

Pr0.08	Microstep	Range	unit	default
		0-32767	pulse	4000

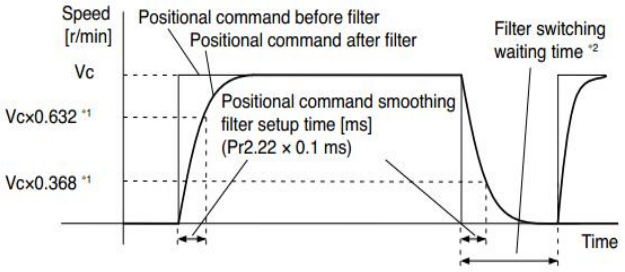
The number of pulses required for one revolution of the motor.

For some special users, it can use Pr0.09 (1st numerator of electronic gear) and Pr0.10 (Denominator of electronic Gear) to set required pulses number , they are availale when Pr0.08 is set to value 0.

Pr2.22	Positional Command Smoothing Filter	Range	unit	default
		0 -32767	0.1ms	0

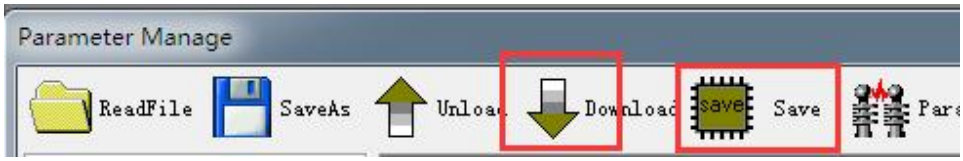
- Set up the time constant of the1st delay filter in response to the positional command.
- When a square wave command for the target speed Vc is applied ,set up the time constant of the 1st delay filter as shown in the figure below.

Note: Restart the power to make new value available .



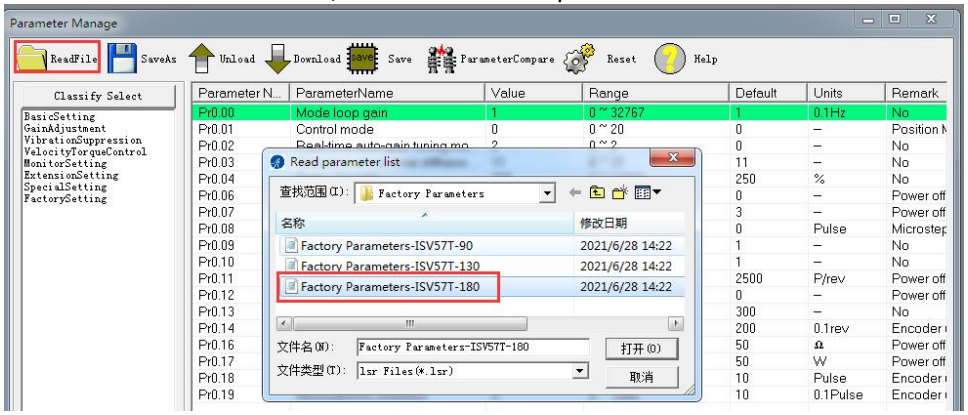
6.3 Save Parameters

If you want the modified parameters continue to be valid after power off, please click both “Download” and “Save”.



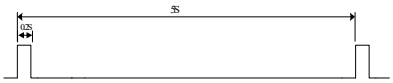
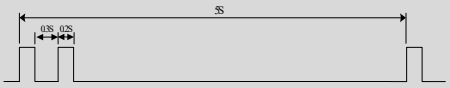
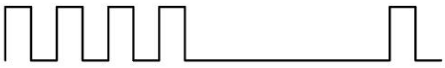
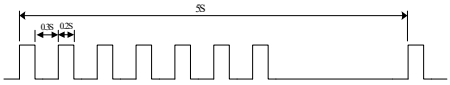
6.4 Restore to Factory

If you need to restore the factory settings, it can import the file with our factory parameter values, and then click both “Download” and “Save”, then valid after re-power.



7. Fault Protections & Troubleshooting

To improve reliability, the drive incorporates some built-in protection features.

Blink time(s)	Sequence wave of red LED	Description	Trouble shooting
1		Over-current	Turn off the power immediately. a) Check if the machinery is stuck; b) Re-import factory parameters.
2		Over-voltage	Turn off the power immediately. a) Check if the power supply is below 50V, default over-voltage point is 72VDC
4		Over-load	Turn off the power immediately. c) Check if the machinery is stuck; a) Re-import factory parameters.
5		Encoder error	Restart the power supply, if the drive is still alarm, please contact after-sale
7		Position following error	a) Motor torque is not enough; b) Check if the machinery is stuck; c) Re-import factory parameters.

When above protections are active, the motor shaft will be free and the red LED blinks. Reset the drive by repowering it to make it function properly after removing above problems.

Appendix A. How to get the correct Load inertia ratio

Load inertia ratio is a very important parameter for iSV57T(S) servo, and users need to set the correct load inertia ratio parameter before adjusting the correct rigidity parameter. Then the setup steps are as follows:

Note: Do make the axis can be moved in safe distance, any interference should be avoided to ensure safety and accuracy of testing .

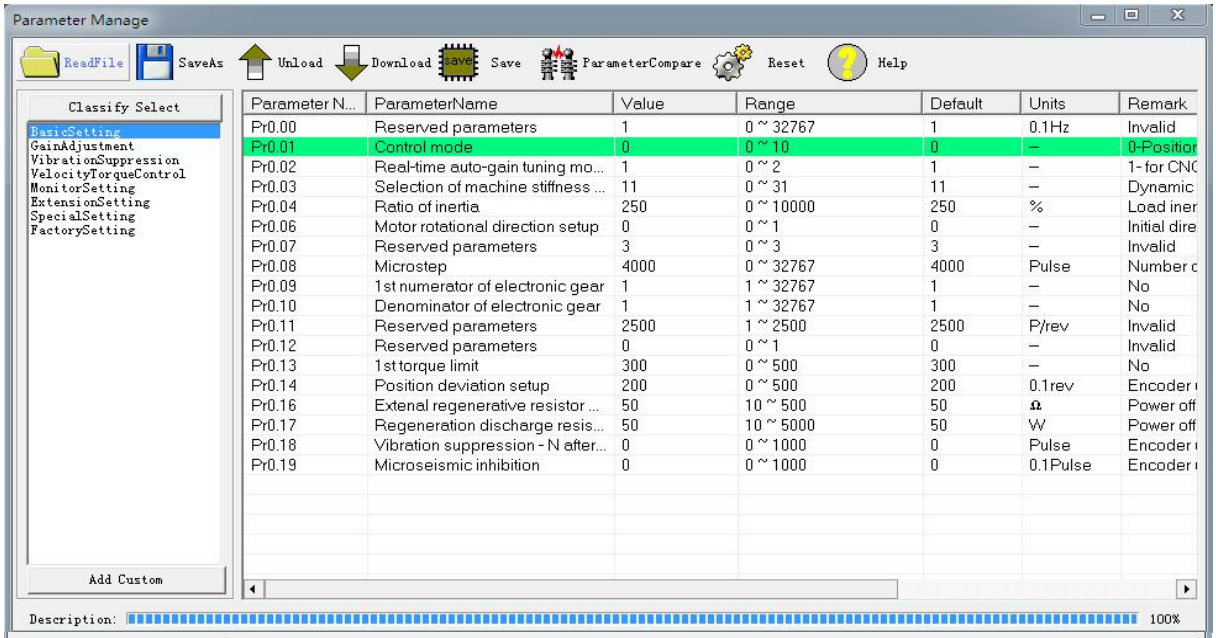
(1) Connect motor with load, if there is no load, the value of load inertia ratio will be set to “0”.

(2) Click “run test”  , motor motion parameters and operating procedures are as follows:

The value of the load inertia ratio obtained from the above steps can satisfy most applications, but for some cases where the load inertia is very high, the value of Pr0.04 can be increased to more than 1000.

Appendix B. Parameters List

The screenshot of the parameter list is provided for reference only. The figure is the factory parameter value of 180W integrated servo motor, because there are three motor models in this series, so the default parameters may not be the same.



Parameter N...	ParameterName	Value	Range	Default	Units	Remark
Pr0.00	Reserved parameters	1	0 ~ 32767	1	0.1Hz	Invalid
Pr0.01	Control mode	0	0 ~ 10	0	–	0-Positior
Pr0.02	Real-time auto-gain tuning mo...	1	0 ~ 2	1	–	1- for CNC
Pr0.03	Selection of machine stiffness ...	11	0 ~ 31	11	–	Dynamic
Pr0.04	Ratio of inertia	250	0 ~ 10000	250	%	Load iner
Pr0.06	Motor rotational direction setup	0	0 ~ 1	0	–	Initial dire
Pr0.07	Reserved parameters	3	0 ~ 3	3	–	Invalid
Pr0.08	Microstep	4000	0 ~ 32767	4000	Pulse	Number c
Pr0.09	1st numerator of electronic gear	1	1 ~ 32767	1	–	No
Pr0.10	Denominator of electronic gear	1	1 ~ 32767	1	–	No
Pr0.11	Reserved parameters	2500	1 ~ 2500	2500	P/rev	Invalid
Pr0.12	Reserved parameters	0	0 ~ 1	0	–	Invalid
Pr0.13	1st torque limit	300	0 ~ 500	300	–	No
Pr0.14	Position deviation setup	200	0 ~ 500	200	0.1rev	Encoder
Pr0.16	Extenal regenerative resistor ...	50	10 ~ 500	50	Ω	Power off
Pr0.17	Regeneration discharge resis...	50	10 ~ 5000	50	W	Power off
Pr0.18	Vibration suppression - N after...	0	0 ~ 1000	0	Pulse	Encoder
Pr0.19	Microseismic inhibition	0	0 ~ 1000	0	0.1Pulse	Encoder

Parameter N...	ParameterName	Value	Range	Default	Units	Remark
Pr1.00	1st position loop gain	320	0 ~ 30000	320	0.1/s	No
Pr1.01	1st velocity loop gain	180	1 ~ 32767	180	0.1Hz	No
Pr1.02	1st time constant of velocity lo...	310	1 ~ 10000	310	0.1ms	No
Pr1.03	1st filter of velocity detection	8	0 ~ 10000	15	–	No
Pr1.04	1st torque filter	126	0 ~ 2500	126	0.01ms	No
Pr1.05	2nd position loop gain	380	0 ~ 30000	380	0.1/s	No
Pr1.06	2nd velocity loop gain	180	1 ~ 32767	180	0.1Hz	No
Pr1.07	2nd time constant of velocity l...	10000	1 ~ 10000	10000	0.1ms	No
Pr1.08	2nd filter of velocity detection	8	0 ~ 31	15	–	No
Pr1.09	2nd torque filter	126	0 ~ 2500	126	0.01ms	No
Pr1.10	Velocity feed forward gain	300	0 ~ 1000	300	0.10%	No
Pr1.11	Velocity feed forward filter	50	0 ~ 6400	50	0.01ms	No
Pr1.12	Torque feed forward gain	0	0 ~ 1000	0	0.10%	No
Pr1.13	Torque feed forward filter	0	0 ~ 6400	0	0.01ms	No
Pr1.14	2nd gain setup	1	0 ~ 1	1	–	No
Pr1.15	Control switching mode	0	0 ~ 10	0	–	No
Pr1.17	Control switching level	50	0 ~ 20000	50	mode	No
Pr1.18	Control switch hysteresis	33	0 ~ 20000	33	mode	No
Pr1.19	Gain switching time	33	0 ~ 10000	33	0.1ms	No
Pr1.33	Speed given filter	0	0 ~ 10000	0	0.01ms	No
Pr1.35	Position command digital filter...	0	0 ~ 200	0	50ns	Power off
Pr1.36	Encoder feedback pulse digit...	0	0 ~ 200	0	50ns	Power off
Pr1.37	Special function register	0	0 ~ 32767	0	–	No

Parameter N...	ParameterName	Value	Range	Default	Units	Remark
Pr2.01	1st notch frequency	2000	50 ~ 2000	2000	Hz	No
Pr2.02	1st notch width	2	0 ~ 20	2	–	No
Pr2.03	1st notch depth	0	0 ~ 99	0	–	No
Pr2.04	2nd notch frequency	2000	50 ~ 2000	2000	Hz	No
Pr2.05	2nd notch width	2	0 ~ 20	2	–	No
Pr2.06	2nd notch depth	0	0 ~ 99	0	–	No
Pr2.22	Positonal command smoothin...	0	0 ~ 32767	0	0.1ms	Internal a
Pr2.23	Positional command FIR filter	0	0 ~ 5000	0	0.1ms	No

【Class 0】Basic setting

Pr0.01	Parameter name	Control mode			relevant mode	P	S	
	range	0～1	unit	--	Standard factory setting	0		
Setting: Control mode switching								
Set value	Description							
0	Position control mode							
1	Speed control mode							
Note: Valid for re-power-on!!								

Pr0.02	Parameter name	Set real-time automatic adjustment			relevant mode	P	S	T
	range	0~2	unit	_	Standard factory setting	2		

Set the action mode for real-time automatic gain adjustment：

Set value	model	The degree of change in load inertia during action.
0	invalid	The real-time automatic adjustment function is invalid.
1	Standard	The basic mode. Focus on stability mode, no gain switching.
2	Positioning	Focus on positioning mode. Horizontal axis such as no variable load, friction is also recommended to use small ball screw drive and other machines.

Pr0.03	Parameter name	Automatic adjustment of machine rigidity Settings in real time			relevant mode	P	S	T
	range	0 ~ 31	unit	_	Standard factory setting	11		

Mechanical rigidity setting when real-time automatic gain adjustment is in effect.

low ⟵ Mechanical ⟶ High
low ⟵ rigidity servo ⟶ high
gain

0·1·····11·12·13·····30·31

low ⟵ responsiveness ⟶ high

NOTE→ The higher the setting value, the higher the speed response, the higher the servo rigidity, but it becomes prone to vibration. Change the low value to the high value while confirming the action.

Pr0.04	Parameter name	inertia ratio			Linked Mode	P	S	T
	Setting range	0~10000	unit (of measure)	%	Standard factory setting	300		
Attention→	Set the load inertia ratio for the corresponding motor rotational inertia. Pr0.04 = (Load inertia / Rotational inertia) × 100%. When the inertia ratio is set correctly, the setting unit of Pr1.01 and Pr1.06 is (Hz); if the inertia ratio of Pr0.04 is larger than the actual one, the gain unit of the speed ring will be larger; if the inertia ratio of Pr0.04 is smaller than the actual one, the gain unit of the speed ring will be smaller.							

Pr0.06	Parameter name	Command pulse polarity setting			Linked Mode	P		
	Setting range	0~1	unit (of measure)	-	Standard factory setting	0		
Sets the direction of rotation for command pulse input, and the command pulse input form.								

Pr0.08	Parameter name	Command pulses per revolution			Linked Mode	P		
	Setting range	~ 0 32767	unit (of measure)	Pluse	Standard factory setting	4000		
Setting the number of command pulses per revolution of the motor								
Pr0.13	Parameter name	No. 1 Torque limitation			Linked Mode	P	S	
	realm	0 to 500	unit (of measure)	%	Standard factory setting	250		
Setting: 1st torque limit.								
Selection of torque limiting mode via pr5.21								

Pr0.20	Parameter name	Command pulse edge selection			Linked Mode	P		
	realm	0 to 1	unit (of measure)	--	Standard factory setting	0		
Setting: Select command pulse edge								
setpoint	descriptive							
0	Select command pulse count on rising edge							
1	Counting on the falling edge of the select command pulse							
Remarks: Re-energized to take effect!								

5.2.2 [Classification 1] Gain Adjustment

Pr1.00	Parameter name	1st position ring gain			Linked Mode	P		
	Setting range	0~30000	unit (of measure)	0.1/s	Standard factory setting	320		
	Determines the responsiveness of the position control system. Setting a large value of position loop gain reduces positioning time. However, if the setting is too large, it may cause vibration, so be careful.							

Pr1.01	Parameter name	1st Speed Loop Gain			Linked Mode	P	S	T
	Setting range	0~32767	unit (of measure)	0.1Hz	Standard factory setting	180		
Attention →	Determines the speed loop responsiveness. To increase the position loop gain and improve the overall responsiveness of the servo system, increase the setting of the speed loop gain value. However, if the setting is too large, it may cause vibration. If Pr0.04 inertia ratio is set correctly, then Pr1.01 is set in (Hz).							

Pr1.02	Parameter name	1st velocity loop integration time constant			Linked Mode	P	S	T
	Setting range	0~10000	unit (of measure)	0.1ms	Standard factory setting	310		
Attention→	Set the speed loop integration time constant. The smaller the setting value, the more pronounced the integration effect, the greater the immunity to interference, and the faster the deviation value approaches zero at the time of stopping, but it is prone to vibration. Set to "10000" for no point effect.							

Pr1.03	Parameter name	1st Speed Detection Filter			Linked Mode	P	S	T
	Setting range	0~31	unit (of measure)	-	Standard factory setting	15		

After speed detection, the time constant of the low pass filter (LPF) can be set to 32 stages (0 ~ 31).

A large setting will result in a large time constant, which reduces motor noise but also decreases responsiveness. The filter parameters can be set according to the speed loop gain as shown in the table below:

setp oint	Speed Detection Filter Cutoff Frequency (Hz)	setp oint	Speed Detection Filter Cutoff Frequency (Hz)
0	2500	16	750
1	2250	17	700
2	2100	18	650
3	2000	19	600
4	1800	20	550
5	1600	21	500
6	1500	22	450
7	1400	23	400
8	1300	24	350
9	1200	25	300
10	1100	26	250
11	1000	27	200
12	950	28	175
13	900	29	150
14	850	30	125
15	800	31	100

Pr1.04	Parameter name	No. 1 Torque Filter			Linked Mode	P	S	T
	Setting range	0~2500	unit (of measure)	0.01 ms	Standard factory setting	126		

Sets the first-order hysteresis filter time constant inserted into the torque command section.

Vibration due to torsional resonance can be controlled.

Pr1.10	Parameter name	Velocity Feedforward Constant Gain			Linked Mode	P			
	Setting range	0~1000	unit (of measure)	0.10%	Standard factory setting	300			

In the speed control instruction calculated from the internal position instruction, the value multiplied by the ratio of this parameter is added to the speed instruction from the position control processing.

Pr1.11	Parameter name	Feedforward filter time constant			Linked Mode	P			
	Setting range	0~6400	unit (of measure)	0.01ms	Standard factory setting	50			

Sets the time constant of the primary delay filter required for the speed feedforward input.

Example of using speed feedforward

When the velocity feedforward filter is set to 50 (0.5ms), the feedforward effect is gradually enhanced by gradually increasing the velocity feedforward gain. The position deviation in fixed-speed operation can be reduced by the following formula depending on the value of the velocity feedforward gain.

Position deviation [commanded units] = commanded speed [commanded units/s] / position loop gain [1/s] × (100 - speed feedforward gain [%]) / 100

PA1.15	Parameter name	Position Control Parameter Switching Mode			effective model	P		
	setting range	1~10	unit (of measure)	--	Standard factory setting	10		
	data length	16bit	causality	R/W	485 address	0x011F		
	Mode of entry into force	right now						

Set the trigger condition for gain switching during position control:

setpoint	switching condition	Gain switching conditions
0	1st gain fixed	Fixed use of gain 1 (PA1.00~PA1.04)
1	2nd gain fixed	Fixed use of gain 2 (PA1.05 to PA1.09) -
2	With gain switching input	Gain 1 when the gain switching input (GAIN) is turned off. Gain 2 when the gain switching input (GAIN) is active. The gainless switching input (GAIN) is fixed to the 1st gain when assigned to the input signal.
3	Large torque command	Currently in gain 1, if the absolute value of the torque command exceeds (level ten hysteresis) [%], transfer to gain 2. Currently in gain 2, if the absolute value of the torque command is less than (rank one hysteresis) [%] of the state duration reaches the delay time, return to the Returning to Gain 1.
4-9	reservation	reservation
10	With positional commands + Actual speed	Valid for position control. In the last time for the 1st gain, the position command is transferred to the 2nd gain if it is not 0. When the duration of the state in which the position command was 0 in the last gain 2 reaches the delay time, and the absolute value of the actual speed is less than (level - hysteresis) [r/min], return to gain 1.

It must be known--

The above "level" and "hysteresis" correspond to PA1.17 Control switching level and PA1.18 Control switching hysteresis, respectively.

For details on switching between gain 1 and gain 2, refer to "Gain Switching Function" in the Functions section.

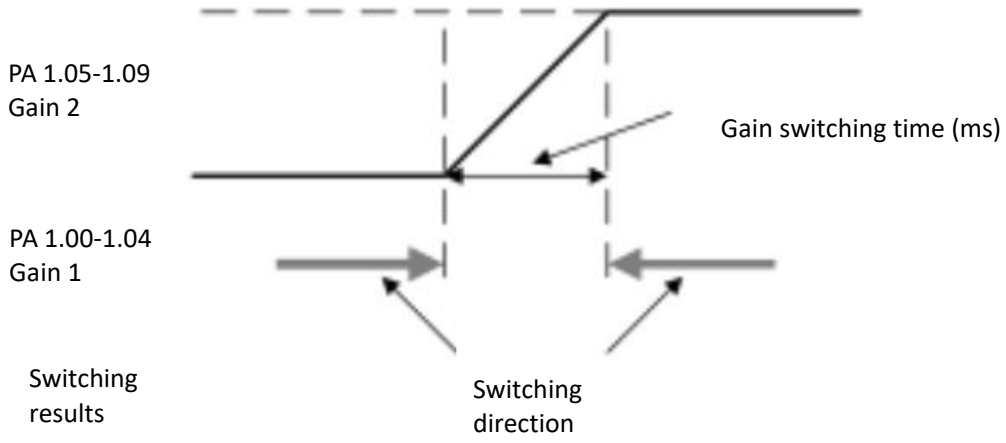
PA1.17	Parameter name	Position control parameter switching level			effective model	P		
	setting range	0~20000	unit (of measure)	based on a tactile model	Standard factory setting	50		
	data length	16bit	causality	R/W	485 address	0x0123		
	Mode of entry into force	right now						
Note	This parameter allows you to set the judgement broad value for gain switching during position control. The unit varies according to the setting of P1.15 "Position Control Parameter Switching Mode", and the switching condition is position. The unit is the number of encoder pulses: rmin for speed; % for torque. Please set to level ≥ hysteresis.							

PA1.18	Parameter name	Position control parameter switching hysteresis			effective model	P		
	setting range	0~20000	unit (of measure)	based on a feeling	Standard factory setting	33		
	data length	16bit	causality	R/W	485 address	0x0125		
	Mode of entry into force	right now						
Note	Sets the hysteresis range band for performing gain switching during position control. Generally used to eliminate gain switching conditions that constantly change between satisfied and unsatisfied, resulting in constant gain switching of unstable conditions. Combined with PA1.17 (control switching level) setting.							

PA1.19	Parameter name	Position control parameter switching time			effective model	P		
	setting range	0~10000	unit (of measure)	0.1ms	Standard factory setting	33		
	data length	16bit	causality	R/W	485 address	0x0127		
	Mode of entry into force	right now						

Note ....

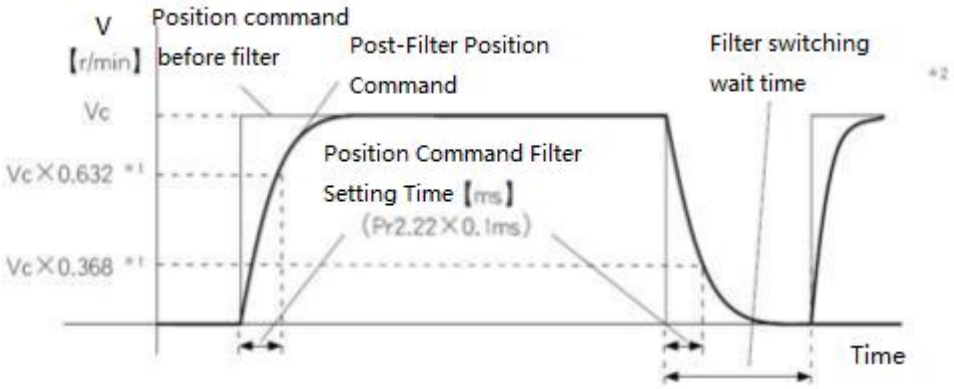
Setting the gain switching transition time suppresses vibration caused by parameter changes.
<Regarding bit gain switching time>
When the parameter is switched during position control, if the 1st gain (PA1.00~1.04) and the 2nd gain (PA1.05~1.09)
In order to moderate the torque variation due to the sharp change in the position loop gain at gain switching and the
The vibration caused by position gain switching can be mitigated by setting P1.19 "Position loop gain switching time".
gain variations and reduce vibration.
[Example] Switching between 1st gain and 2nd gain



Pr1.34	Parameter name	Velocity Feedback Sampling Window Parameters			Linked Mode	P	S	
	realm	0 to 31	unit (of measure)	--	Standard factory setting	0		
setpoint	descriptive							
0	Velocity feedback sampling window is 8, velocity feedback sampling frequency = 12000/8 = 1500Hz							
1	Speed feedback sampling window is 1, speed feedback sampling frequency = 12000/1 = 1200Hz							
2	Velocity feedback sampling window is 2, velocity feedback sampling frequency = 12000/2 = 6000Hz							
3	Speed feedback sampling window is 3, speed feedback sampling frequency = 12000/3 = 4000Hz							
4	Speed feedback sampling window is 4, speed feedback sampling frequency = 12000/4 = 3000Hz							
.....								
31	Speed feedback sampling window is 31, speed feedback sampling frequency = 12000/31 = 387Hz							
Note: 12000HZ is the PWM switching frequency.								

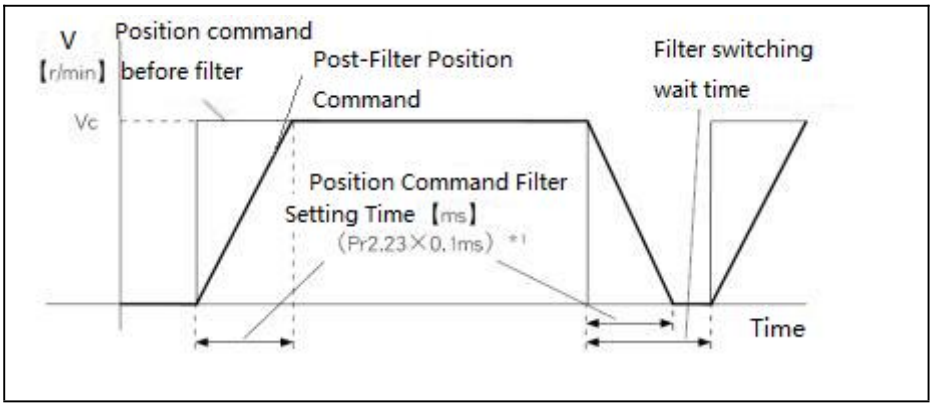
Pr1.37	Parameter name	Special Function Registers			Linked Mode			
	realm	0 to 1	unit (of measure)		Standard factory setting	0		
Settings: Partial alarm blocking and special function selection.								
setpoint	descriptive							
Pr1.37 & 0x01	= 0: Enable speed feed-forward filtering; = 1: Disable speed feed-forward filtering							
Pr1.37 & 0x02	= 0: enable torque feed-forward filtering; = 2: disable torque feed-forward filtering							
Pr1.37 & 0x04	= 0: Enable motor stall Er1A1 alarm; = 4: Block motor stall Er1A1 alarm							
Pr1.37 & 0x08	= 0: Enable overshoot Er180 alarm; = 8: Mask overshoot Er180 alarm							
Pr1.37 & 0x10	=0: Enable overload Er100 alarm; =0x10: Mask overload Er100 alarm							
Pr1.37 & 0x20	= 0: dial input function not assignable; = 0x20: dial input function assignable							
Pr1.37 & 0x40	=0: Mask drive disable Er260 alarm; =0x40: Enable drive disable Er260 alarm							
Pr1.37 & 0x400	=0: Mask undervoltage Er0D0 alarm; =0x400: Enable undervoltage Er0D0 alarm							

5.2.3 [Classification 2] Vibration Suppression

Pr2.22	Parameter name	Position command smoothing filter			Linked Mode	P		
	realm	0 to 32767	unit (of measure)	0.1ms	Standard factory setting	0		
Setting: Time constant of the 1st delay filter for position commands.								
The square wave command for the target speed Vc, as shown in the figure below, sets the time constant of the one-time delay filter. 								
Remarks: Re-powering is effective!								

Pr2.23	Parameter name	Position Command FIR Filter			Linked Mode	P		
	Setting range	~ 0 1706	unit (of measure)	0.1ms	Standard factory setting	0		

- Sets the time constant of the FIR filter for position commands.



- The square wave command for the target speed Vc sets the time to reach Vc as shown in the figure below.

5.2.4 [Category 4] Monitor Settings

Pr4.08	Parameter name	Servo forced enable control			Linked Mode	P		
	realm	0 to 0xFFFFFF	unit (of measure)	--	Standard factory setting	0x8383		

Setting: Whether or not the servo is forced to be enabled when there is no external enable signal input.				
setpoint	descriptive			
0x8383	Position mode and velocity mode, servo power-up forced enable			
0x0383	Position mode, servo power-on forced enable; Velocity mode, servo power-on disable			
0x8303	Position mode, servo power-on is not enabled; Velocity mode, servo power-on is forced to be enabled.			
0x303	Position mode and speed mode, servo power-up not enabled			
Remarks: Effective immediately!				

5.2.5 [Category 5] Extended Settings

Pr5.12	Parameter name	Overload Rating Setting			Linked Mode	P		
	realm	0 to 250	unit (of measure)	%	Standard factory setting	0		
Setting: Motor overload rating The overload is calculated when the actual current is greater than the rated current* setting value. The smaller the setting value, the more likely it is that an overload alarm will be generated.								
setpoint	descriptive							
0	Default setting, indicating 115% overload rating							
Remarks: (1) Please modify according to the manufacturer's instructions! (2) Re-powering works!								

Pr5.13	Parameter name	Overspeed level setting			Linked Mode	P		
	realm	0 to 20000	unit (of measure)	rpm	Standard factory setting	0		
Setting: Overspeed threshold.								
If the motor speed exceeds the Pr5.13 setting, the Er1A0 alarm occurs and the red LED flashes periodically 1 short and 1 long. If the setting value is 0, the overspeed level is set to the maximum motor speed × 1.2.								

Pr5.21	Parameter name	Torque Limit Mode			Linked Mode	P		
	realm	0 to 4	unit (of measure)	--	Standard factory setting	0		
Setting: Torque limiting mode selection								
setpoint	descriptive							
0	Maximum torque limit command from Pr0.13							
1	Limit Maximum Torque command from Pr5.22							
other values	Maximum torque limit command from Pr0.13							
Remarks: Re-powering is effective!								

Pr5.22	Parameter name	2nd Torque Limit			Linked Mode	P		
	realm	0 to 500	unit (of measure)	%	Standard factory setting	250		
Setting: 2nd torque limit.								
Selection of torque limiting mode via pr5.21								
Remarks:								

5.2.6 [Category 6] Special settings

Pr6.01	Parameter name	Encoder zero position compensation			Linked Mode	P		
	realm	0 to 360	unit (of measure)	degree (angles, temperature etc)	Standard factory setting	0		
Setting: Encoder zero compensation								
setpoint	descriptive							
Remarks: Cannot be modified!								

Pr6.12	Parameter name	Encoder zero correction torque limit setting			Linked Mode	P		
	realm	0~100	unit (of measure)	%	Standard factory setting	25		
Setting: Encoder Zero Correction Torque Limit								
setpoint	descriptive							
0~100	Setting the maximum motor current percentage during encoder zero correction							
Remarks: (1) Non-modifiable								

5.2.7 [Category 7] Factory settings

Pr7.15	Parameter name	Motor Model Setting			Linked Mode	P	S	
	realm	0 to 3	unit (of measure)	--	Standard factory setting	1		
Setting: Motor model, must correspond to the motor model one by one!								
setpoint	descriptive							
0	Manual modification of motor parameters: Pr7.00 to Pr7.18							
1	iSV5709V36T-01- 1000							
2	iSV5713V36T-01- 1000							
3	iSV5718V36T-01- 1000							
Remarks: (1) Re-powering works!								

Pr7.16	Parameter name	Encoder line number setting		Linked Mode	P	S	
	realm	0 to 2	unit (of measure)	--		Standard factory setting	0
Setting: Number of encoder lines							
setpoint	descriptive						
0	default setting						
Remarks: (1) Re-powering works!							

Pr7.17	Parameter name	Maximum motor current			Linked Mode	P	S	
	realm	0 to 500	unit (of measure)	%	Standard factory setting	250		
Setting: Maximum motor current								
setpoint	descriptive							
250	default setting							
Remarks: (1) Non-modifiable								

Pr7.23	Parameter name	Motor Zero Detection Control			Linked Mode	P	S	
	realm	0/15	unit (of measure)	--	Standard factory setting	15		

Setting: Whether or not the power-up drive is looking for an electromechanical angle zero position.				
setpoint	descriptive			
0	The drive is powered up and rotates through one revolution to find the electromechanical angular zero position. When this is done, the shaft is locked and Pr7.23 is set to 15.			
15	Direct shaft lock on drive power-up			
Remarks: (1) No other values may be set! (2) Re-powering works!				

Pr7.28	Parameter name	Percentage of braking			Linked Mode	P	S	
	realm	-200~200	unit (of measure)	--	Standard factory setting	0		
Setting: Percentage of drive pumping inhibition.								
Remarks: (1) Setting value to meet the requirements can be; set too large, easy to cause the drive alarm. (2) Re-powering works!								

Pr7.30	Parameter name	DC bus undervoltage point setting			Linked Mode	P	S	
	realm	15 to 60	unit (of measure)	V	Standard factory setting	16		
Setting: Whether to alarm when the DC bus voltage is lower than the set voltage								
Remarks: Re-powering is effective!								

Pr7.31	Parameter name	Reactive pump up inhibit function setting			Linked Mode	P	S	T
	realm	0 to 1	unit (of measure)	--	Standard factory setting	0		
Setting: Whether or not to enable reactive pumping inhibition								
setpoint	descriptive							
0	Turn off the brake function							
1	Enables reactive pumping up suppression. Related parameters Pr7.28, Pr7.32, Pr7.33							
2	External brake function							
Remarks:								

Pr7.32	Parameter name	braking voltage			Linked Mode	P	S	
	realm	0~72	unit (of measure)	V	Standard factory setting	50		
Setting: Enable pumping inhibit function when DC bus voltage is greater than this value, inhibit percentage = Pr7.28								
Remarks: Re-powering is effective!								

Pr7.33	Parameter name	braking hysteresis			Linked Mode	P	S	
	realm	0~36	unit (of measure)	V	Standard factory setting	1		
Setting: Disable pumping inhibit when DC bus voltage is lower than Pr7.32-Pr7.33.								
Remarks: (1) The Pr7.32-Pr7.33 value must not be lower than the operating voltage value. (2) Re-powering works!								

Pr7.34	Parameter name	DC bus overvoltage point setting			Linked Mode	P	S	
	realm	36 to 75	unit (of measure)	V	Standard factory setting	75		
Setting: Whether to alarm when the DC bus voltage is higher than the set voltage								
Remarks: Re-powering is effective!								