CHAPTER 8: PARAMETERS

TABLE OF CONTENTS

INTRODUCTION

This chapter introduces the parameter settings of the servo drive, as well as the descriptions for digital input (DI) and digital output (DO). You can control the drive functions with these parameters through communications and/or DI/O.

All parameters consume two 16-bit registers. Some parameters only need the low word since the value range does not require the high word. Parameters that require both the low word and high word will populate all 32 bits.

8.1 - Parameter definitions

The servo drive parameters are divided into eight groups. The first character after the start code P is the group character and the following three characters are the parameter indicator. The communication address is the combination of the group number and the three-digit number, expressed in hexadecimal. The parameter groups are:

- *Group 0: Monitoring parameters* *(Example: P0.xxx)*
- *Group 1: Basic parameters* *(Example: P1.xxx)*
- *Group 2: Extension parameters* *(Example: P2.xxx)*
- *Group 3: Communication parameters* *(Example: P3.xxx)*
- *Group 4: Diagnosis parameters* *(Example: P4.xxx)*
- *Group 5: Motion control parameters* *(Example: P5.xxx)*
- *Group 6: PR parameters* *(Example: P6.xxx)*
- *Group 7: PR parameters* *(Example: P7.xxx)*

Control mode description:

PT: Position control (command input through terminal block)

PR: Position control (command sent from internal register)

S: Speed control

T: Torque control

Special symbol description:

Icon of Parameter Property	*Description*
★	Read-only parameter. Can only read the value of the parameter. For example, P0.000, P0.010, P4.000, etc.
▲	Parameter cannot be changed when servo is in Servo On status. For example, P1.000 and P1.046.
•	Parameter changes become valid after cycling the power. For example, P1.000 and P3.000.
■	Parameter resets to its default value after cycling the power. For example, P2.031.

8.2 - Parameter Summaries

8.2.1 - P0.xxx Monitoring Parameters

P0.xxx Parameters						
Param. No.	**Function**	**Range**	**Run Read/ Write**	**Address**	**Default**	**User**
P0.000	Firmware version	n/a	Read	0000H 0001H	Factory setting	
P0.001	Current drive alarm code	0X0000: alarm clear (same as DI.ARST). 0x0001–0xFFFF: displays the alarm code (not writable)	Read/Write■	0002H 0003H	–	
P0.002	LED Display Definition	-300 to +127	Read/Write	0004H 0005H	0	
P0.003	Analog output monitoring	0–77	Read/Write	0006H 0007H	0x0000	
P0.004	Reserved	–	–	–	–	
P0.005	Reserved	–	–	–	–	
P0.006	Reserved	–	–	–	–	
P0.007	Reserved	–	–	–	–	
P0.008	Total servo drive operation time	0–FFFFFFFF hours	Read	0010H 0011H	0	
P0.009	Status monitoring register 1	–	Read■	0012H 0013H	0	
P0.010	Status monitoring register 2	–	Read■	0014H 0015H	0	
P0.011	Status monitoring register 3	–	Read■	0016H 0017H	0	
P0.012	Status monitoring register 4	–	Read■	0018H 0019H	0	
P0.013	Status monitoring register 5	–	Read■	001AH 001BH	0	
P0.014	Reserved	–	–	–	–	
P0.015	Reserved	–	–	–	–	
P0.016	Reserved	–	–	–	–	
P0.017	Select content displayed by status monitoring register 1	0–127	Read/Write	0022H 0023H	0	
P0.018	Select content displayed by status monitoring register 2	0–127	Read/Write	0024H 0025H	0	
P0.019	Select content displayed by status monitoring register 3	0–127	Read/Write	0026H 0027H	0	
P0.020	Select content displayed by status monitoring register 4	0–127	Read/Write	0028H 0029H	0	
P0.021	Select content displayed by status monitoring register 5	0–127	Read/Write	002AH 002BH	0	
P0.022	Reserved	–	–	–	–	
P0.023	Reserved	–	–	–	–	
P0.024	Reserved	–	–	–	–	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

P0.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P0.025	Mapping parameter #1	Determined by the corresponding parameter P0.035	Read/Write■	0032H 0033H	–	
P0.026	Mapping parameter #2	Determined by the corresponding parameter P0.036	Read/Write■	0034H 0035H	–	
P0.027	Mapping parameter #3	Determined by the corresponding parameter P0.037	Read/Write■	0036H 0037H	–	
P0.028	Mapping parameter #4	Determined by the corresponding parameter P0.038	Read/Write■	0038H 0039H	–	
P0.029	Mapping parameter #5	Determined by the corresponding parameter P0.039	Read/Write■	003AH 003BH	–	
P0.030	Mapping parameter #6	Determined by the corresponding parameter P0.040	Read/Write■	003CH 003DH	–	
P0.031	Mapping parameter #7	Determined by the corresponding parameter P0.041	Read/Write■	003EH 003FH	–	
P0.032	Mapping parameter #8	Determined by the corresponding parameter P0.042	Read/Write■	0040H 0041H	–	
P0.033	Reserved	–	–	–	–	
P0.034	Reserved	–	–	–	–	
P0.035	Target setting for mapping parameter P0.025	Determined by the communication address of the parameter group	Read/Write	0046H 0047H	–	
P0.036	Target setting for mapping parameter P0.026	Determined by the communication address of the parameter group	Read/Write	0048H 0049H	–	
P0.037	Target setting for mapping parameter P0.027	Determined by the communication address of the parameter group	Read/Write	004AH 004BH	–	
P0.038	Target setting for mapping parameter P0.028	Determined by the communication address of the parameter group	Read/Write	004CH 004DH	–	
P0.039	Target setting for mapping parameter P0.029	Determined by the communication address of the parameter group	Read/Write	004EH 004FH	–	
P0.040	Target setting for mapping parameter P0.030	Determined by the communication address of the parameter group	Read/Write	0050H 0051H	–	
P0.041	Target setting for mapping parameter P0.031	Determined by the communication address of the parameter group	Read/Write	0052H 0053H	–	

▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle

P0.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P0.042	Target setting for mapping parameter P0.032	Determined by the communication address of the parameter group	Read/Write	0054H 0055H	–	
P0.043	Reserved	–	–	–	–	
P0.044	Reserved	–	–	–	–	
P0.045	Reserved	–	–	–	–	
P0.046	Commonly used DO function status	0x00–0xFF	Read■	005CH 005DH	0x0000	
P0.049	Update encoder absolute position registers	0x00–0x02	Read/Write	0062H 0063H	0x0000	
P0.050	Absolute coordinate system status	0x00–0x1F	Read■	0064H 0065H	0x0000	
P0.051	Encoder absolute position - Number of turns	-32786 to +32767 rev	Read■	0066H 0067H	0	
P0.052	Encoder absolute position - Pulse number or PUU within single turn	0–16777216-1 (pulse) -2147483648 to +2147483647 (PUU)	Read■	0068H 0069H	0	
P0.053	General range compare DO output - Filter time	0x0000–0x000F ms	Read/Write	006AH 006BH	0x0000	
P0.054	General range compare DO - first lower limit	-2147483648 to +2147483647	Read/Write	006CH 006DH	0	
P0.055	General range compare DO - first upper limit	-2147483648 to +2147483647	Read/Write	006EH 006FH	0	
P0.056	General range compare DO - second lower limit	-2147483648 to +2147483647	Read/Write	0071H 0072H	0	
P0.057	General range compare DO - second upper limit	-2147483648 to +2147483647	Read/Write	0073H 0074H	0	
P0.058	General range compare DO - third lower limit	-2147483648 to +2147483647	Read/Write	0075H 0076H	0	
P0.059	General range compare DO - third upper limit	-2147483648 to +2147483647	Read/Write	0077H 0078H	0	
P0.060	General range compare DO - fourth lower limit	-2147483648 to +2147483647	Read/Write	0079H 007AH	0	
P0.061	General range compare DO - fourth upper limit	-2147483648 to +2147483647	Read/Write	007BH 007CH	0	
P0.062	Reserved	–	–	–	–	
P0.063	Duration of DC Bus voltage exceeding 400V	0x00000000 to 0x7FFFFFFF ms	Read■	007EH 007FH	0	
P0.064	Reserved	–	–	–	–	
P0.065	Reserved	–	–	–	–	
P0.066	Reserved	–	–	–	–	
P0.067	Reserved	–	–	–	–	
P0.068	Reserved	–	–	–	–	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

8.2.2 - P1.xxx Basic Parameters

P1.xxx Parameters						
Param. No.	**Function**	**Range**	**Run Read/ Write**	**Address**	**Default**	**User**
P1.000	External pulse input type	0x0000–0x11F2	Read/Write	0100H 0101H	0x1042	
P1.001	Input for control mode and control command	0x0000–0x111F P (pulse) or S (rpm) or T (N·m)	Read/Write ●	0102H 0103H	0x0000	
P1.002	Speed and torque limits	00–11	Read/Write▲	0104H 0105H	0x0000	
P1.003	Analog and Encoder pulse output polarity	0–13	Read/Write	0106H 0107H	0x0000	
P1.004	MON1 analog monitor output proportion	0–100 % (full scale)	Read/Write	0108H 0109H	100	
P1.005	MON2 analog monitor output proportion	0–100 % (full scale)	Read/Write	010AH 010BH	100	
P1.006	Speed command smoothing constant (low-pass filter)	0–1000 ms	Read/Write	010CH 010DH	0	
P1.007	Torque command smoothing constant (low-pass filter)	0–1000 ms	Read/Write	010EH 010FH	0	
P1.008	Position command smoothing constant (low-pass filter)	0–1000 m	Read/Write	0110H 0111H	0	
P1.009	Internal Speed command 1 / internal speed limit 1	-60000 to +60000 (0.1 rpm)	Read/Write	0112H 0113H	1000	
P1.010	Internal Speed command 2 / internal speed limit 2	-60000 to +60000 (0.1 rpm)	Read/Write	0114H 0115H	1000	
P1.011	Internal Speed command 3 / internal speed limit 3	-60000 to +60000 (0.1 rpm)	Read/Write	0116H 0117H	1000	
P1.012	Internal Torque command 1 / internal torque limit 1	-400 to +400 %	Read/Write	0118H 0119H	100	
P1.013	Internal Torque command 2 / internal torque limit 2	-400 to +400 %	Read/Write	011AH 011BH	100	
P1.014	Internal Torque command 3 / internal torque limit 3	-400 to +400 %	Read/Write	011CH 011DH	100	
P1.015	Reserved	–	–	–	–	
P1.016	Reserved	–	–	–	–	
P1.017	Additional compensation time for the following error	-25.000 to +25.000	Read/Write	0122H 0123H	0	
P1.018	E-Cam: compensation time for the pulse of E-Cam master axis	-25.000 to +25.000	Read/Write	0124H 0125H	0	
P1.019	Capture / Compare additional function settings	0x0000–0x0101	Read/Write	0126H 0127H	0x0000	
P1.020	Capture - Masking range	0–100000000 pulse unit of capture source	Read/write	0128H 0129H	0	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

P1.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P1.021	E-Cam: minimum frequency of pulse compensation for the E-Cam master axis	0 to +30000	Read/Write	012AH 012BH	0	
P1.022	PR command special filter	0x0000 to 0x107F	Read/Write	012CH 012DH	0x0000	
P1.023	Compare - Data translation (non-volatile)	-10000000 to +100000000 pulse unit of compare source	Read/Write	012EH 012FH	0	
P1.024	Compare - Data translation (reset automatically)	-32768 to +32767 pulse unit of compare source	Read/Write■	0130H 0131H	0	
P1.025	Low-frequency vibration suppression frequency (1)	10–1000 0.1 Hz	Read/Write	0132H 0133H	1000	
P1.026	Low-frequency vibration suppression gain (1)	0–9	Read/Write	0134H 0135H	0	
P1.027	Low-frequency vibration suppression frequency (2)	10–1000 0.1 Hz	Read/Write	0136H 0137H	1000	
P1.028	Low-frequency vibration suppression gain (2)	0–9	Read/Write	0138H 0139H	0	
P1.029	Auto low-frequency vibration suppression mode	0–1	Read/Write	013AH 013BH	0	
P1.030	Low-frequency vibration detection level	1–8000 pulse	Read/Write	013CH 013DH	800	
P1.031	Reserved	–	–	–	–	
P1.032	Motor stop mode	0–20	Read/Write	0140H 0141H	0x0000	
P1.033	Reserved	–	–	–	–	
P1.034	Acceleration time constant (TACC)	1–65500 ms	Read/Write	0144H 0145H	200	
P1.035	Deceleration time constant (TDEC)	1–65500 ms	Read/Write	0146H 0147H	200	
P1.036	S-curve acceleration / deceleration time constant (TSL)	0–65500 ms	Read/Write	0148H 0149H	0	
P1.037	Load inertia ratio to servo motor	Panel/Software: 0.0–200.0 (1 times)	Read/Write	014AH 014BH	6.0	
		Communication: 0–2000 (0.1 times)			60	
P1.038	Zero speed range	Panel/Software: 0.0–200.0 (1 rpm)	Read/Write	014CH 014DH	10.0	
		Communication: 0–2000 (0.1 rpm)			100	
P1.039	Target speed detection level	0–30000 rpm	Read/Write	014EH 014FH	3000	
P1.040	Maximum rotation speed for analog Speed command	0–50000 rpm	Read/Write	0150H 0151H	3000	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

P1.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P1.041	Maximum output for analog Torque command	-1000 to +1000 %	Read/Write	0152H 0153H	100	
P1.042	Delay time for releasing the magnetic brake	0–1000 ms	Read/Write	0154H 0155H	0	
P1.043	Delay time for engaging the magnetic brake	-1000 to +1000 ms	Read/Write	0156H 0157H	0	
P1.044	E-Gear ratio (Numerator) (N1)	1 to (2^{29}-1) pulse	Read/Write	0158H 0159H	16777216	
P1.045	E-Gear ratio (Denominator) (M)	1 to (2^{31}-1) pulse	Read/Write	015AH 015BH	100000	
P1.046	Encoder pulse number output	20–536870912 pulse	Read/Write▲	015CH 015DH	2500	
P1.047	Speed reached (DO. SP_OK) range	0–300 rpm	Read/Write	015EH 015FH	10	
P1.048	Motion reached (DO.MC_ OK) operation selection	0x0000 - 0x0011	Read/Write	0160H 0161H	0x0000	
P1.049	Accumulated time to reach desired speed	0 - 65535 ms	Read/Write	0162H 0163H	0	
P1.050	Reserved	–	–	–	–	
P1.051	Reserved	–	–	–	–	
P1.052	Regenerative resistor value	See parameter details	Read/Write	0168H 0169H	Determined by the model.	
P1.053	Regenerative resistor watts	0 - 15000 Watt	Read/Write	016AH 016BH	Determined by the model.	
P1.054	Pulse range for position reached	0 - 16777216 pulse	Read/Write	016CH 016DH	167772	
P1.055	Maximum speed limit	0 to maximum speed rpm	Read/Write	016EH 016FH	Rated speed	
P1.056	Motor output overload warning level	0 - 120 %	Read/Write	0170H 0171H	120	
P1.057	Motor hard stop (torque percentage)	0 - 300 %	Read/Write	0172H 0173H	0	
P1.058	Motor hard stop (protection time)	1 - 1000 ms	Read/Write	0174H 0175H	1	
P1.059	Speed command - moving filter	Panel/software: 0.0–4.0 (1 ms) Communication: 0–40 (0.1 ms)	Read/Write	0176H 0177H	0.0 0	
P1.060	Reserved	–	–	–	–	
P1.061	Reserved	–	–	–	–	
P1.062	Percentage of friction compensation	0 - 100 %	Read/Write	017CH 017DH	0	
P1.063	Constant of friction compensation	1 - 1000 ms	Read/Write	017EH 017FH	1	
P1.064	Analog position command: activation control	0x0000 - 0x0011	Read/Write	0180H 0181H	0x0000	

▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle

P1.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P1.065	Smooth constant of analog Position command	1–1000 (10 ms)	Read/Write	0182H 0183H	1	
P1.066	Maximum rotation number of analog Position command	Panel/software: 0.0–200.0 (1 rev)	Read/Write	0184H 0185H	1.0	
		Communication: 0–2000 (0.1 rev)			10	
P1.067	Reserved	–	–	–	–	
P1.068	Position command - moving filter	0–100 ms	Read/Write	0188H 0189H	4	
P1.069	Reserved	–	–	–	–	
P1.070	Reserved	–	–	–	–	
P1.071	Reserved	–	–	–	–	
P1.072	Resolution of auxiliary encoder for full-closed loop and Gantry control	200–1280000 pulse/ rev	Read/Write	0190H 0191H	5000	
P1.073	Error protection range for full-closed loop control	1 to (2^{31}-1) pulse	Read/Write	0192H 0193H	30000	
P1.074	Full-closed loop control for auxiliary encoder	0000h - F132h	Read/Write	0194H 0195H	0x0000	
P1.075	Low-pass filter time constant for full- / half-closed loop control	0–1000 ms	Read/Write	0196H 0197H	100	
P1.076	Maximum speed for encoder output (OA, OB)	0–6000 rpm	Read/Write▲	0198H 0199H	5500	
P1.077	Reserved	–	–	–	–	
P1.078	Reserved	–	–	–	–	
P1.079	Reserved	–	–	–	–	
P1.080	Reserved	–	–	–	–	
P1.081	Second set of maximum rotation speed for analog Speed command	0–50000 rpm/10V	Read/Write	01A2H 01A3H	Motor rated speed	
P1.082	Filter switching time between P1.040 and P1.081	0–1000 ms (0: disable this function)	Read/Write	01A4H 01A5H	0	
P1.083	Abnormal analog input voltage level	0–12000 mV (0: disable this function)	Read/Write	01A6H 01A7H	0	
P1.084	Error clearing function when switching between full- and half-closed loops	0x0000–0x0001	Read/Write▲	01A8H 01A9H	0	
P1.085	Auto clearing position deviation between motor and auxiliary encoder	0–32767	Read/Write	01AAH 01ABH	0	
P1.086	Reserved	–	–	–	–	
P1.087	Torque homing - torque level detection	1–300 %	Read/Write	01AEH 01AFH	1	
P1.088	Torque homing - level reached timer	2–2000 ms	Read/Write	01B0H 01B1H	2000	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

P1.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P1.089	First set of vibration elimination - anti-resonance frequency	10–4000 (0.1 Hz)	Read/Write	01B2H 01B3H	4000	
P1.090	First set of vibration elimination - resonance frequency	10–4000 (0.1 Hz)	Read/Write	01B4H 01B5H	4000	
P1.091	First set of vibration elimination - resonance difference	10–4000 (0.1 dB)	Read/Write	01B6H 01B7H	10	
P1.092	Second set of vibration elimination - anti-resonance frequency	10–4000 (0.1 Hz)	Read/Write	01B8H 01B9H	4000	
P1.093	Second set of vibration elimination - resonance frequency	10–4000 (0.1 Hz)	Read/Write	01BAH 01BBH	4000	
P1.094	Second set of vibration elimination - resonance difference	10–4000 (0.1 dB)	Read/Write	01BCH 01BDH	10	
P1.095	Reserved	–	–	–	–	
P1.096	Reserved	–	–	–	–	
P1.097	Encoder output denominator (OA, OB)	0–160000	Read/Write▲	01C2H 01C3H	0	
P1.098	Disconnection detection protection (UVW) response time	0, 100–800 ms	Read/Write	01C4H 01C5H	0	
P1.099	Reserved	–	–	–	–	
P1.100	Reserved	–	–	–	–	
P1.101	Analog monitor output voltage 1	-10000 to 10000 mV	Read/Write■	01CAH 01CBH	0	
P1.102	Analog monitor output voltage 2	-10000 to 10000 mV	Read/Write■	01CCH 01CDH	0	
P1.103	Reserved	–	–	–	–	
P1.104	Reserved	–	–	–	–	
P1.105	Reserved	–	–	–	–	
P1.106	Reserved	–	–	–	–	
P1.107	Reserved	–	–	–	–	
P1.108	Reserved	–	–	–	–	
P1.109	Reserved	–	–	–	–	
P1.110	Reserved	–	–	–	–	
P1.111	Overspeed protection level	0–66000 (rotary, rpm)	Read/Write	01DEH 01DFH	Max. motor speed x 1.1	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

8.2.3 - P2.xxx Extension Parameters

P2.xxx Parameters						
Param. No.	**Function**	**Range**	**Run Read/ Write**	**Address**	**Default**	**User**
P2.000	Position control gain	0–2047 rad/s	Read/Write	0200H 0201H	35	
P2.001	Position control gain rate of change	10–500 %	Read/Write	0202H 0203H	100	
P2.002	Position feed forward gain	0–100 %	Read/Write	0204H 0205H	50	
P2.003	Position feed forward gain smoothing constant	2–100 ms	Read/Write	0206H 0207H	5	
P2.004	Speed control gain	0–8191 rad/s	Read/Write	0208H 0209H	500	
P2.005	Speed control gain rate of change	10–500 %	Read/Write	020AH 020BH	100	
P2.006	Speed integral compensation	0–1023 rad/s	Read/Write	020CH 020DH	100	
P2.007	Speed feed forward gain	0–100 %	Read/Write	020EH 020FH	0	
P2.008	Special parameter write-in function	0–65535	Read/Write	0210H 0211H	0	
P2.009	DI response filter time	0–20 ms	Read/Write	0212H 0213H	2	
P2.010	DI1 functional planning	0–0x015F (last two codes are DI codes)	Read/Write	0214H 0215H	0x0101	
P2.011	DI2 functional planning	0–0x015F (last two codes are DI codes)	Read/Write	0216H 0217H	0x0104	
P2.012	DI3 functional planning	0–0x015F (last two codes are DI codes)	Read/Write	0218H 0219H	0x0116	
P2.013	DI4 functional planning	0–0x015F (last two codes are DI codes)	Read/Write	021AH 021BH	0x0117	
P2.014	DI5 functional planning	0–0x015F (last two codes are DI codes)	Read/Write	021CH 021DH	0x0102	
P2.015	DI6 functional planning	0–0x015F (last two codes are DI codes)	Read/Write	021EH 021FH	0x0022	
P2.016	DI7 functional planning	0–0x015F (last two codes are DI codes)	Read/Write	0220H 0221H	0x0023	
P2.017	DI8 functional planning	0–0x015F (last two codes are DI codes)	Read/Write	0222H 0223H	0x0021	
P2.018	DO1 functional planning	0–0x013F (last two codes are DO codes)	Read/Write	0224H 0225H	0x0101	
P2.019	DO2 functional planning	0–0x013F (last two codes are DO codes)	Read/Write	0226H 0227H	0x0103	
P2.020	DO3 functional planning	0–0x013F (last two codes are DO codes)	Read/Write	0228H 0229H	0x0109	
P2.021	DO4 functional planning	0–0x013F (last two codes are DO codes)	Read/Write	022AH 022BH	0x0105	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

P2.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P2.022	DO5 functional planning	0–0x013F (last two codes are DO codes)	Read/Write	022CH 022DH	0x0007	
P2.023	Notch filter frequency (1)	50–5000 Hz	Read/Write	022EH 022FH	1000	
P2.024	Notch filter attenuation level (1)	0–40 -dB	Read/Write	0230H 0231H	0	
P2.025	Resonance suppression low-pass filter	Panel/software: 0.0–100.0 (1 ms)	Read/Write	0232H 0233H	1.0	
		Communication: 0–1000 (0.1 ms)			10	
P2.026	Anti-interference gain	0–1023 rad/s	Read/Write	0234H 0235H	0	
P2.027	Gain switching condition and method selection	0x0000 - 0x0018	Read/Write	0236H 0237H	0x0000	
P2.028	Gain switching time constant	0–1000 ms	Read/Write	0238H 0239H	10	
P2.029	Gain switching condition	0–50331648 pulse; Kpps; rpm	Read/Write	023AH 023BH	16777216	
P2.030	Auxiliary function	-8 to +8	Read/Write■	023CH 023DH	0	
P2.031	Frequency response bandwidth level	1–50	Read/Write	023EH 023FH	19	
P2.032	Gain adjustment mode	0–4	Read/Write	0240H 0241H	0x0001	
P2.033	Reserved	–	–	–	–	
P2.034	Speed command error warning	1–30000 rpm	Read/Write	0244H 0245H	5000	
P2.035	Excessive deviation of Position command warning	1–1677721600 pulse	Read/Write	0246H 0247H	50331648	
P2.036	DI9 functional planning	0–0x015F (last two codes are DI codes)	Read/Write	0248H 0249H	0x0000	
P2.037	DI10 functional planning	0–0x015F (last two codes are DI codes)	Read/Write	024AH 024BH	0x0000	
P2.038	VDI11 functional planning	0–0x015F (last two codes are DI codes)	Read/Write	024CH 024DH	0x0000	
P2.039	VDI12 functional planning	0–0x015F (last two codes are DI codes)	Read/Write	024EH 024FH	0x0000	
P2.040	VDI13 functional planning	0–0x015F (last two codes are DI codes)	Read/Write	0250H 0251H	0x0000	
P2.041	DO6 functional planning	0–0x013F (last two codes are DO codes)	Read/Write	0252H 0253H	0x0000	
P2.042	Reserved	–	–	–	–	
P2.043	Notch filter frequency (2)	50–5000 Hz	Read/Write	0256H 0257H	1000	
P2.044	Notch filter attenuation level (2)	0–40 -dB	Read/Write	0258H 0259H	0	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

P2.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P2.045	Notch filter frequency (3)	50–5000 Hz	Read/Write	025AH 025BH	1000	
P2.046	Notch filter attenuation level (3)	0–40 -dB	Read/Write	025CH 025DH	0	
P2.047	Auto resonance suppression mode	0x0000–0x01F2	Read/Write	025EH 025FH	0x0001	
P2.048	Auto resonance detection level	0–1000	Read/Write	0260H 0261H	100	
P2.049	Speed detection filter and jitter suppression	Panel/software: 0.0–100.0 (1 ms)	Read/Write	0262H 0263H	1.0	
		Communication: 0–1000 (0.1 ms)			10	
P2.050	Pulse Clear mode	0–1	Read/Write	0264H 0265H	0x0000	
P2.051	Reserved	–	–	–	–	
P2.052	Indexing coordinates scale	0–1000000000 PUU	Read/Write▲	0268H 0269H	1000000000	
P2.053	Position integral compensation	0–1023 rad/s	Read/Write	026AH 026BH	0	
P2.054	Synchronous speed control gain	0–8191 rad/s	Read/Write▲	026CH 026DH	0	
P2.055	Synchronous speed integral compensation	0–1023 rad/s	Read/Write▲	026EH 026FH	0	
P2.056	Synchronous position integral compensation	0–1023 rad/s	Read/Write▲	0270H 0271H	0	
P2.057	Synchronous control bandwidth	0–1023 Hz	Read/Write▲	0272H 0273H	0	
P2.058	Synchronous speed error low-pass filter	0–1000 0.1 ms	Read/Write	0274H 0275H	0	
P2.059	Max deviation between axes of gantry	-32768–32767	Read/Write	0276H 0277H	0	
P2.060	E-Gear ratio (numerator) (N2)	1 to (2^{29}-1) pulse	Read/Write	0278H 0279H	16777216	
P2.061	E-Gear ratio (numerator) (N3)	1 to (2^{29}-1) pulse	Read/Write	027AH 027BH	16777216	
P2.062	E-Gear ratio (numerator) (N4)	1 to (2^{29}-1) pulse	Read/Write	027CH 027DH	16777216	
P2.063	Reserved	–	–	–	–	
P2.064	Reserved	–	–	–	–	
P2.065	Special bit register	0–0xFFFF	Read/Write	0282H 0283H	0x0100	
P2.066	Special bit register 2	0x0000–0x182F	Read/Write	0284H 0285H	0x0020	
P2.067	Reserved	–	–	–	–	
P2.068	Following error compensation switch	0x00000000–0x00002101	Read/Write	0288H 0289H	0x00000000	
P2.069	Absolute encoder	0–1	Read/Write●	028AH 028BH	0x0000	
P2.070	Read data selection	0x00–0x07	Read/Write	028CH 028DH	0x0000	

▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle

P2.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P2.071	Absolute position homing	0–1	Read/Write■	028EH 028FH	0x0	
P2.072	Reserved	–	–	–	–	
P2.073	Reserved	–	–	–	–	
P2.074	Reserved	–	–	–	–	
P2.075	Reserved	–	–	–	–	
P2.076	Reserved	–	–	–	–	
P2.077	Reserved	–	–	–	–	
P2.078	E-Cam: DO.CAM_ AREA#2 rising-edge phase	0–360 degree	Read/Write	029CH 029DH	270	
P2.079	E-Cam: DO.CAM_ AREA#2 falling-edge phase	0–360 degree	Read/Write	029EH 029FH	360	
P2.080	Z pulse souce of homing	0x0000–0x0011	Read/Write	02A0H 02A1H	0x0000	
P2.081	Reserved	–	–	–	–	
P2.082	Reserved	–	–	–	–	
P2.083	Reserved	–	–	–	–	
P2.084	Reserved	–	–	–	–	
P2.085	Reserved	–	–	–	–	
P2.086	Reserved	–	–	–	–	
P2.087	Reserved	–	–	–	–	
P2.088	Reserved	–	–	–	–	
P2.089	Command response gain	1–2000 rad/s	Read/Write	02B2H 02B3H	25	
P2.090	Reserved	–	–	–	–	
P2.091	Reserved	–	–	–	–	
P2.092	Reserved	–	–	–	–	
P2.093	Reserved	–	–	–	–	
P2.094	Special bit register 3	0x0000–0xF3A6	Read/Write▲	02BCH 02BDH	0x1000	
P2.095	Notch filter bandwidth (1)	1–10	Read/Write	02BEH 02BFH	5	
P2.096	Notch filter bandwidth (2)	1–10	Read/Write	02C0H 02C1H	5	
P2.097	Notch filter bandwidth (3)	1–10	Read/Write	02C2H 02C3H	5	
P2.098	Notch filter frequency (4)	50–5000 Hz	Read/Write	02C4H 02C5H	1000	
P2.099	Notch filter attenuation level (4)	0–40 -dB	Read/Write	02C6H 02C7H	0	
P2.100	Notch filter bandwidth (4)	1–10	Read/Write	02C8H 02C9H	5	
P2.101	Notch filter frequency (5)	50–5000 Hz	Read/Write	02CAH 02CBH	1000	
P2.102	Notch filter attenuation level (5)	0–40 -dB	Read/Write	02CCH 02CDH	0	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

P2.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P2.103	Notch filter bandwidth (5)	1–10	Read/Write	02CEH 02CFH	5	
P2.104	P/PI torque switching command condition	1–800 %	Read/Write	02D0H 02D1H	200	
P2.105	Auto-tuning Adjustment Bandwidth Level	1–21	Read/Write	02D2H 02D3H	11	
P2.106	Auto-tuning Adjustment Overshoot Level	1–50331648 pulse number	Read/Write	02D4H 02D5H	2000	
P2.107	Reserved	–	–	–	–	
P2.108	Reserved	–	–	–	–	
P2.109	Reserved	–	–	–	–	
P2.110	Reserved	–	–	–	–	
P2.111	Reserved	–	–	–	–	
P2.112	Special bit register 4	0x0000–0x001F	Read/Write▲	02E0H 02E1H	0x0008	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

8.2.4 - P3.xxx Communication Parameters

P3.xxx Parameters						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P3.000	Address	0x0001–0x007F	Read/Write●	0300H 0301H	0x007F	
P3.001	Transmission speed	0x000–0x3405	Read/Write●	0302H 0303H	0x0203	
P3.002	Communication protocol	0x0000–0x0008	Read/Write	0304H 0305H	0x0006	
P3.003	Communication error handling	0x0000–0x0001	Read/Write	0306H 0307H	0x0000	
P3.004	Communication timeout	0–20 seconds	Read/Write	0308H 0309H	0	
P3.005	Reserved	–	–	–	–	
P3.006	Digital input (DI) control switch	0x0000–0x1FFF	Read/Write	030CH 030DH	0x0000	
P3.007	Communication response delay time	0–1000 (0.5 ms)	Read/Write	030EH 030FH	0	
P3.008	Reserved	–	–	–	–	
P3.009	Reserved	–	–	–	–	
P3.010	Reserved	–	–	–	–	
P3.011	Reserved	–	–	–	–	
P3.012	Reserved	–	–	–	–	
P3.013	Full-closed loop feedback source for the controller	0x0000–0x0022	Read/Write	031AH 031BH	0x0000	
P3.014	Reserved	–	–	–	–	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

P3.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P3.015	Reserved	–	–	–	–	
P3.016	Reserved	–	–	–	–	
P3.017	Reserved	–	–	–	–	
P3.018	Reserved	–	–	–	–	
P3.019	Reserved	–	–	–	–	
P3.020	Reserved	–	–	–	–	
P3.021	Reserved	–	–	–	–	
P3.022	Reserved	–	–	–	–	
P3.023	Reserved	–	–	–	–	
P3.024	Reserved	–	–	–	–	
P3.025	Reserved	–	–	–	–	
P3.026	Reserved	–	–	–	–	
P3.027	Reserved	–	–	–	–	
P3.028	Reserved	–	–	–	–	
P3.029	Reserved	–	–	–	–	
P3.030	Reserved	–	–	–	–	
P3.031	Reserved	–	–	–	–	
P3.032	Reserved	–	–	–	–	
P3.033	Reserved	–	–	–	–	
P3.034	Reserved	–	–	–	–	
P3.035	Reserved	–	–	–	–	
P3.036	Reserved	–	–	–	–	
P3.037	Reserved	–	–	–	–	
P3.038	Reserved	–	–	–	–	
P3.039	Reserved	–	–	–	–	
P3.040	Reserved	–	–	–	–	
P3.041	Reserved	–	–	–	–	
P3.042	Reserved	–	–	–	–	
P3.043	Reserved	–	–	–	–	
P3.044	Reserved	–	–	–	–	
P3.045*	Communication card type	-32768–32767	Read	035AH 035BH	0	
P3.046*	Communication card firmware version	0x0000–0xFFFF	Read	035CH 035DH	0x0000	
P3.047*	Communication product code	-32768–32767	Read	035EH 035FH	0	
P3.048*	Communication card error status	-32768–32767	Read	0360H 0361H	0	
P3.049*	IP configuration	-32768–32767	Read/Write■	0362H 0363H	0	
P3.050*	IP address 1	-32768–32767	Read/Write■	0364H 0365H	192	
P3.051*	IP address 2	-32768–32767	Read/Write■	0366H 0367H	168	
P3.052*	IP address 3	-32768–32767	Read/Write■	0368H 0369H	1	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

P3.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P3.053*	IP address 4	-32768–32767	Read/Write■	036AH 036BH	10	
P3.054*	Net mask 1	-32768–32767	Read/Write■	036CH 036DH	255	
P3.055*	Net mask 2	-32768–32767	Read/Write■	036EH 036FH	255	
P3.056*	Net mask 3	-32768–32767	Read/Write■	0370H 0371H	255	
P3.057*	Net mask 4	-32768–32767	Read/Write■	0372H 0373H	0	
P3.058*	Gateway 1	-32768–32767	Read/Write■	0374H 0375H	0	
P3.059*	Gateway 2	-32768–32767	Read/Write■	0376H 0377H	0	
P3.060*	Gateway 3	-32768–32767	Read/Write■	0378H 0379H	0	
P3.061*	Gateway 4	-32768–32767	Read/Write■	037AH 037BH	0	
P3.062	Reserved	–	–	–	–	
P3.063	Reserved	–	–	–	–	
P3.064	Return to factory setting	-32768–32767	Read/Write■	0380H 0381H	0	
P3.065	Setting of communication card	-32768–32767	Read/Write■	0382H 0383H	0	
P3.066	Reserved	–	–	–	–	
P3.067	PLC connection timeout	1–600	Read/Write	0386H 0387H	30	
P3.068	Ethernet timeout detection of servo drive	0–1	Read/Write	0388H 0389H	1	
P3.069	Ethernet timeout handle of servo drive	0–4	Read/Write	038AH 038BH	1	

** If the servo drive sets the Ethernet card parameters to zero at drive power-up, ensure the following:*
- *The Ethernet card is properly seated onto the drive*
- *The Ethernet card ground wire is properly attached to the card and to ground*
- *The Ethernet card Firmware Update switch is set to the "Normal" position*

▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle

8.2.5 - P4.xxx Diagnosis Parameters

P4.xxx Parameters						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P4.000	Fault record (N)	–	Read	0400H 0401H	0x00000000	
P4.001	Fault record (N-1)	–	Read	0402H 0403H	0x00000000	
P4.002	Fault record (N-2)	–	Read	0404H 0405H	0x00000000	
P4.003	Fault record (N-3)	–	Read	0406H 0407H	0x00000000	

▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle

P4.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P4.004	Fault record (N-4)	–	Read	0408H 0409H	0x00000000	
P4.005	Servo motor JOG control	0–5000 rpm	Read/Write	040AH 040BH	20	
P4.006	Digital output register (readable and writable)	0–0xFFFF	Read/Write■	040CH 040DH	0x0000	
P4.007	Multi-function for digital input	0–3FFF	Read/Write■	040EH 040FH	0x0	
P4.008	Input status of servo drive panel (read-only)	–	Read	0410H 0411H	–	
P4.009	Digital output status (read-only)	0–0x1F	Read	0412H 0413H	–	
P4.010	Reserved	–	–	–	–	
P4.011	Reserved	–	–	–	–	
P4.012	Reserved	–	–	–	–	
P4.013	Reserved	–	–	–	–	
P4.014	Reserved	–	–	–	–	
P4.015	Reserved	–	–	–	–	
P4.016	Reserved	–	–	–	–	
P4.017	Reserved	–	–	–	–	
P4.018	Reserved	–	–	–	–	
P4.019	Reserved	–	–	–	–	
P4.020	Reserved	–	–	–	–	
P4.021	Reserved	–	–	–	–	
P4.022	Analog speed input offset	-5000 to +5000 mV	Read/Write	042CH 042DH	0	
P4.023	Analog torque input offset	-5000 to +5000 mV	Read/Write	042EH 042FH	0	
P4.024	Level of undervoltage error	40–380 V (rms)	Read	0430H 0431H	160	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

8.2.6 - P5.xxx Motion Control Parameters

P5.xxx Parameters						
Param. No.	**Function**	**Range**	**Run Read/ Write**	**Address**	**Default**	**User**
P5.000	Firmware subversion	–	Read ■	0500H 0501H	Factory setting	
P5.001	Reserved	–	–	–	–	
P5.002	Reserved	–	–	–	–	
P5.003	Deceleration time for auto-protection	0x00000000– 0xFFFFFFFF	Read/Write	0506H 0507H	0xEEEFEEFF	
P5.004	Homing methods	0–0x12A	Read/Write	0508H 0509H	0x0000	
P5.005	High speed homing (first speed setting)	Panel/software: 0.1–2000.0 (1rpm)	Read/Write	050AH 050BH	100.0	
		Communication: 1–20000 (0.1rpm)			1000	
P5.006	Low speed homing (second speed setting)	Panel/software: 0.1–500.0 (1rpm)	Read/Write	050CH 050DH	20.0	
		Communication: 1–5000 (0.1rpm)			200	
P5.007	Trigger Position command (PR mode only)	0–1000	Read/Write	050EH 050FH	0	
		Readback: 0–20099				
P5.008	Forward software limit	-2147483648 to +2147483647 PUU	Read/Write	0510H 0511H	2147483647	
P5.009	Reverse software limit	-2147483648 to +2147483647 PUU	Read/Write	0512H 0513H	-2147483648	
P5.010	Data array - data size	–	Read ■	0514H 0515H	–	
P5.011	Data array - address for reading and writing	0 to (value set by P5.010 minus 1)	Read/Write ■	0516H 0517H	0	
P5.012	Data array - Element Value #1 for reading and writing	-2147483648 to +2147483647	Read/Write ■	0518H 0519H	0	
P5.013	Data array - Element Value #2 for reading and writing	-2147483648 to +2147483647	Read/Write ■	051AH 051BH	0	
P5.014	Reserved	–	–	–	–	
P5.015	PATH#1 - PATH#2 volatile setting	0x0000–0x0011	Read/Write	051EH 051FH	0x0000	
P5.016	Axis position - CN2	-2147483648 to +2147483647 PUU	Read/Write ■	0520H 0521H	0	
P5.017	Axis position - CN5	-2147483648 to +2147483647 pulse number	Read/Write	0522H 0523H	0	
P5.018	Axis position - pulse command	-2147483648 to +2147483647 pulse number	Read/Write	0524H 0525H	0	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

P5.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P5.019	E-Cam curve scaling	-2147.000000 to +2147.000000 (0.000001 times, or $1/10^6$)	Read/Write	0526H 0527H	1.000000	
P5.020	Acceleration / deceleration time (Number #0)	1–65500 ms	Read/Write	0528H 0529H	200	
P5.021	Acceleration / deceleration time (Number #1)	1–65500 ms	Read/Write	052AH 052BH	300	
P5.022	Acceleration / deceleration time (Number #2)	1–65500 ms	Read/Write	052CH 052DH	500	
P5.023	Acceleration / deceleration time (Number #3)	1–65500 ms	Read/Write	052EH 052FH	600	
P5.024	Acceleration / deceleration time (Number #4)	1–65500 ms	Read/Write	0530H 0531H	800	
P5.025	Acceleration / deceleration time (Number #5)	1–65500 ms	Read/Write	0532H 0533H	900	
P5.026	Acceleration / deceleration time (Number #6)	1–65500 ms	Read/Write	0534H 0535H	1000	
P5.027	Acceleration / deceleration time (Number #7)	1–65500 ms	Read/Write	0536H 0537H	1200	
P5.028	Acceleration / deceleration time (Number #8)	1–65500 ms	Read/Write	0538H 0539H	1500	
P5.029	Acceleration / deceleration time (Number #9)	1–65500 ms	Read/Write	053AH 053BH	2000	
P5.030	Acceleration / deceleration time (Number #10)	1–65500 ms	Read/Write	053CH 053DH	2500	
P5.031	Acceleration / deceleration time (Number #11)	1–65500 ms	Read/Write	053EH 053FH	3000	
P5.032	Acceleration / deceleration time (Number #12)	1–65500 ms	Read/Write	0540H 0541H	5000	
P5.033	Acceleration / deceleration time (Number #13)	1–65500 ms	Read/Write	0542H 0543H	8000	
P5.034	Acceleration / deceleration time (Number #14)	1–1500 ms	Read/Write	0544H 0545H	50	
P5.035	Acceleration / deceleration time (Number #15)	1–1200 ms	Read/Write	0546H 0547H	30	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

P5.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P5.036	Capture - start address of data array	0 to (value set by P5.010 minus 1)	Read/Write	0548H 0549H	0	
P5.037	Capture - axis position	-2147483648 to +2147483647 pulse unit of capture source	Read/Write ■	054AH 054BH	0	
P5.038	Number of times to Capture	1 to (value set by P5.010 minus value set by P5.036)	Read/Write ■	054CH 054DH	1	
P5.039	Capture - activate CAP control	0x0000–0xF13F	Read/Write ■	054EH 054FH	0x2010	
P5.040	Delay time after position reached (Number #0)	0–32767 ms	Read/Write	0550H 0551H	0	
P5.041	Delay time after position reached (Number #1)	0–32767 ms	Read/Write	0552H 0553H	100	
P5.042	Delay time after position reached (Number #2)	0–32767 ms	Read/Write	0554H 0555H	200	
P5.043	Delay time after position reached (Number #3)	0–32767 ms	Read/Write	0556H 0557H	400	
P5.044	Delay time after position reached (Number #4)	0–32767 ms	Read/Write	0558H 0559H	500	
P5.045	Delay time after position reached (Number #5)	0–32767 ms	Read/Write	055AH 055BH	800	
P5.046	Delay time after position reached (Number #6)	0–32767 ms	Read/Write	055CH 055DH	1000	
P5.047	Delay time after position reached (Number #7)	0–32767 ms	Read/Write	055EH 055FH	1500	
P5.048	Delay time after position reached (Number #8)	0–32767 ms	Read/Write	0560H 0561H	2000	
P5.049	Delay time after position reached (Number #9)	0–32767 ms	Read/Write	0562H 0563H	2500	
P5.050	Delay time after position reached (Number #10)	0–32767 ms	Read/Write	0564H 0565H	3000	
P5.051	Delay time after position reached (Number #11)	0–32767 ms	Read/Write	0566H 0567H	3500	
P5.052	Delay time after position reached (Number #12)	0–32767 ms	Read/Write	0568H 0569H	4000	
P5.053	Delay time after position reached (Number #13)	0–32767 ms	Read/Write	056AH 056BH	4500	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

P5.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P5.054	Delay time after position reached (Number #14)	0–32767 ms	Read/Write	056CH 056DH	5000	
P5.055	Delay time after position reached (Number #15)	0–32767 ms	Read/Write	056EH 056FH	5500	
P5.056	Compare - start address of data array	0 to (value set by P5.010 minus 1)	Read/Write	0570H 0571H	50	
P5.057	Compare - axis position	-2147483648 to +2147483647 pulse unit of compare source	Read/Write ■	0572H 0573H	0	
P5.058	Remaining Counts	1 to (value set by P5.010 minus value set by P5.056)	Read/Write ■	0574H 0575H	1	
P5.059	Compare - activate CMP control	0x00010000–0x0FFF313F	Read/Write ■	0576H 0577H	0x00640010	
P5.060	Target speed setting #0	Panel/software: 0.0–6000.0 (1 rpm)	Read/Write	0578H 0579H	20.0	
		Communication: 0–60000 (0.1 rpm)			200	
P5.061	Target speed setting #1	Panel/software: 0.0–6000.0 (1 rpm)	Read/Write	057AH 057BH	50.0	
		Communication: 0–60000 (0.1 rpm)			500	
P5.062	Target speed setting #2	Panel/software: 0.0–6000.0 (1 rpm)	Read/Write	057CH 057DH	100.0	
		Communication: 0–60000 (0.1 rpm)			1000	
P5.063	Target speed setting #3	Panel/software: 0.0–6000.0 (1 rpm)	Read/Write	057EH 057FH	200.0	
		Communication: 0–60000 (0.1 rpm)			2000	
P5.064	Target speed setting #4	Panel/software: 0.0–6000.0 (1 rpm)	Read/Write	0580H 0581H	300.0	
		Communication: 0–60000 (0.1 rpm)			3000	
P5.065	Target speed setting #5	Panel/software: 0.0–6000.0 (1 rpm)	Read/Write	0582H 0583H	500.0	
		Communication: 0–60000 (0.1 rpm)			5000	
P5.066	Target speed setting #6	Panel/software: 0.0–6000.0 (1 rpm)	Read/Write	0584H 0585H	600.0	
		Communication: 0–60000 (0.1 rpm)			6000	
P5.067	Target speed setting #7	Panel/software: 0.0–6000.0 (1 rpm)	Read/Write	0586H 0587H	800.0	
		Communication: 0–60000 (0.1 rpm)			8000	

▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle

P5.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P5.068	Target speed setting #8	Panel/software: 0.0–6000.0 (1 rpm)	Read/Write	0588H 0589H	1000.0	
		Communication: 0–60000 (0.1 rpm)			10000	
P5.069	Target speed setting #9	Panel/software: 0.0–6000.0 (1 rpm)	Read/Write	058AH 058BH	1300.0	
		Communication: 0–60000 (0.1 rpm)			13000	
P5.070	Target speed setting #10	Panel/software: 0.0–6000.0 (1 rpm)	Read/Write	058CH 058DH	1500.0	
		Communication: 0–60000 (0.1 rpm)			15000	
P5.071	Target speed setting #11	Panel/software: 0.0–6000.0 (1 rpm)	Read/Write	058EH 058FH	1800.0	
		Communication: 0–60000 (0.1 rpm)			18000	
P5.072	Target speed setting #12	Panel/software: 0.0–6000.0 (1 rpm)	Read/Write	0590H 0591H	2000.0	
		Communication: 0–60000 (0.1 rpm)			20000	
P5.073	Target speed setting #13	Panel/software: 0.0–6000.0 (1 rpm)	Read/Write	0592H 0593H	2300.0	
		Communication: 0–60000 (0.1 rpm)			23000	
P5.074	Target speed setting #14	Panel/software: 0.0–6000.0 (1 rpm)	Read/Write	0594H 0595H	2500.0	
		Communication: 0–60000 (0.1 rpm)			25000	
P5.075	Target speed setting #15	Panel/software: 0.0–6000.0 (1 rpm)	Read/Write	0596H 0597H	3000.0	
		Communication: 0–60000 (0.1 rpm)			30000	
P5.076	Capture - reset position after first data	-1073741824 to +1073741823 pulse unit of capture source	Read/Write	0598H 0599H	0	
P5.077	Reserved	–	–	–	–	
P5.078	Reserved	–	–	–	–	
P5.079	Reserved	–	–	–	–	
P5.080	Reserved	–	–	–	–	
P5.081	E-Cam: start address for data array	0 to (800 minus value set by P5.082)	Read/Write	05A2H 05A3H	100	
P5.082	E-Cam: total segment number N	5–720	Read/Write	05A4H 05A5H	5	
P5.083	E-Cam: master gear ratio setting - cycle number (M)	1–32767	Read/Write	05A6H 05A7H	1	
P5.084	E-Cam: master gear ratio setting - pulse number (P)	10–1073741823	Read/Write	05A8H 05A9H	3600	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

P5.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P5.085	E-Cam: engaged segment number	0 to (value set by P5.082 minus 1)	Read/Write	05AAH 05ABH	0	
P5.086	E-Cam: master axis position	-2147483648 to +2147483647 pulse unit of master axis	Read/Write ■	05ACH 05ADH	0	
P5.087	E-Cam: initial lead pulse before engaged	-1073741824 to +1073741823 pulse unit of master axis	Read/Write	05AEH 05AFH	0	
P5.088	E-Cam: activate E-Cam control	0x0–0x203FF257	Read/Write ■	05B0H 05B1H	0x00000000	
P5.089	E-Cam: pulse number of disengaging time	-1073741824 to +1073741823 pulse unit of master axis	Read/Write	05B2H 05B3H	0	
P5.090	E-Cam: DO.CAM_ AREA#1 rising-edge phase	0–360 degree	Read/Write	05B4H 05B5H	270	
P5.091	E-Cam: DO.CAM_ AREA#1 falling-edge phase	0–360 degree	Read/Write	05B6H 05B7H	360	
P5.092	E-Cam: pre-engaged pulse number for each cycle	-2147483648 to +2147483647 pulse unit of master axis	Read/Write	05B8H 05B9H	0	
P5.093	Motion control macro command: command parameter #4	0x00000000–0xFFFFFFFF	Read/Write	05BAH 05BBH	0	
P5.094	Motion control macro command: command parameter #3	-2147483648 to +2147483647	Read/Write	05BCH 05BDH	0	
P5.095	Motion control macro command: command parameter #2	-2147483648 to +2147483647	Read/Write	05BEH 05BFH	0	
P5.096	Motion control macro command: command parameter #1	-2147483648 to +2147483647	Read/Write	05C0H 05C1H	0	
P5.097	Motion control macro command: issue command / execution result	0–0x099F	Read/Write ■	05C2H 05C3H	0	
P5.098	PR# triggered by event rising-edge	0x0000–0xDDDD	Read/Write	05C4H 05C5H	0x0000	
P5.099	PR# triggered by event falling-edge	0x0000–0xDDDD	Read/Write	05C6H 05C7H	0x0000	
P5.100	Data array - Element Value #3 for reading and writing	-2147483648 to +2147483647	Read/Write ■	05C8H 05C9H	0	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

P5.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P5.101	Data array - Element Value #4 for reading and writing	-2147483648 to +2147483647	Read/Write ■	05CAH 05CBH	0	
P5.102	Data array - Element Value #5 for reading and writing	-2147483648 to +2147483647	Read/Write ■	05CCH 05CDH	0	
P5.103	Data array - Element Value #6 for reading and writing	-2147483648 to +2147483647	Read/Write ■	05CEH 05CFH	0	
P5.112	PATH_Target	0–99	Read/Write	05E0H 05E1H	0	
P5.113	PATH_Type	0–7	Read/Write	05E2H 05E3H	0	
P5.114	PATH_Options1	0–0x12A	Read/Write	05E4H 05E5H	0	
P5.115	PATH_Options2	0–99	Read/Write	05E6H 05E7H	0	
P5.116	PATH_Acc	0–15	Read/Write	05E8H 05E9H	0	
P5.117	PATH_Dec	0–15	Read/Write	05EAH 05EBH	0	
P5.118	PATH_Data1	-2147483648 – 2147482647	Read/Write	05ECH 05EDH	0	
P5.119	PATH_Data2	-2147483648 – 2147483647	Read/Write	05EEH 05EFH	0	
P5.120	PATH_Delay	0–15	Read/Write	05F0H 05F1H	0	
P5.121	PATH_Save	0–2	Read/Write	05F2H 05F3H	0	
P5.122	PATH_Trigger	0–2	Read/Write	05F4H 05F5H	0	
P5.123	PATH_Status	0–2147483647	Read	05F6H 05F7H	0	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

8.2.7 - P6.xxx PR Parameters

P6.xxx Parameters						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P6.000	Homing definition	0x00000000– 0xFFFFFF6F	Read/Write	0600H 0601H	0x00000000	
P6.001	Origin definition	-2147483648 to +2147483647	Read/Write	0602H 0603H	0	
P6.002	PATH#1 definition	0x00000000– 0xFFFFFFFF	Read/Write	0604H 0605H	0x00000000	
P6.003	PATH#1 data	-2147483648 to +2147483647	Read/Write	0606H 0607H	0	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

P6.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P6.004	PATH#2 definition	0x00000000–0xFFFFFFFF	Read/Write	0608H 0609H	0x00000000	
P6.005	PATH#2 data	-2147483648 to +2147483647	Read/Write	060AH 060BH	0	
P6.006	PATH#3 definition	0x00000000–0xFFFFFFFF	Read/Write	060CH 060DH	0x00000000	
P6.007	PATH#3 data	-2147483648 to +2147483647	Read/Write	060EH 060FH	0	
P6.008	PATH#4 definition	0x00000000–0xFFFFFFFF	Read/Write	0610H 0611H	0x00000000	
P6.009	PATH#4 data	-2147483648 to +2147483647	Read/Write	0612H 0613H	0	
P6.010	PATH#5 definition	0x00000000–0xFFFFFFFF	Read/Write	0614H 0615H	0x00000000	
P6.011	PATH#5 data	-2147483648 to +2147483647	Read/Write	0616H 0617H	0	
P6.012	PATH#6 definition	0x00000000–0xFFFFFFFF	Read/Write	0618H 0619H	0x00000000	
P6.013	PATH#6 data	-2147483648 to +2147483647	Read/Write	061AH 061BH	0	
P6.014	PATH#7 definition	0x00000000–0xFFFFFFFF	Read/Write	061CH 061DH	0x00000000	
P6.015	PATH#7 data	-2147483648 to +2147483647	Read/Write	061DH 061FH	0	
P6.016	PATH#8 definition	0x00000000–0xFFFFFFFF	Read/Write	0620H 0621H	0x00000000	
P6.017	PATH#8 data	-2147483648 to +2147483647	Read/Write	0622H 0623H	0	
P6.018	PATH#9 definition	0x00000000–0xFFFFFFFF	Read/Write	0624H 0625H	0x00000000	
P6.019	PATH#9 data	-2147483648 to +2147483647	Read/Write	0626H 0627H	0	
P6.020	PATH#10 definition	0x00000000–0xFFFFFFFF	Read/Write	0628H 0629H	0x00000000	
P6.021	PATH#10 data	-2147483648 to +2147483647	Read/Write	062AH 062BH	0	
P6.022	PATH#11 definition	0x00000000–0xFFFFFFFF	Read/Write	062CH 062DH	0x00000000	
P6.023	PATH#11 data	-2147483648 to +2147483647	Read/Write	062EH 062FH	0	
P6.024	PATH#12 definition	0x00000000–0xFFFFFFFF	Read/Write	0630H 0631H	0x00000000	
P6.025	PATH#12 data	-2147483648 to +2147483647	Read/Write	0632H 0633H	0	
P6.026	PATH#13 definition	0x00000000–0xFFFFFFFF	Read/Write	0634H 0635H	0x00000000	
P6.027	PATH#13 data	-2147483648 to +2147483647	Read/Write	0636H 0637H	0	
P6.028	PATH#14 definition	0x00000000–0xFFFFFFFF	Read/Write	0634H 0635H	0x00000000	

▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle

P6.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P6.029	PATH#14 data	-2147483648 to +2147483647	Read/Write	063AH 063BH	0	
P6.030	PATH#15 definition	0x00000000– 0xFFFFFFFF	Read/Write	063CH 063DH	0x00000000	
P6.031	PATH#15 data	-2147483648 to +2147483647	Read/Write	063EH 063FH	0	
P6.032	PATH#16 definition	0x00000000– 0xFFFFFFFF	Read/Write	0640H 0641H	0x00000000	
P6.033	PATH#16 data	-2147483648 to +2147483647	Read/Write	0642H 0643H	0	
P6.034	PATH#17 definition	0x00000000– 0xFFFFFFFF	Read/Write	0644H 0645H	0x00000000	
P6.035	PATH#17 data	-2147483648 to +2147483647	Read/Write	0646H 0647H	0	
P6.036	PATH#18 definition	0x00000000– 0xFFFFFFFF	Read/Write	0648H 0649H	0x00000000	
P6.037	PATH#18 data	-2147483648 to +2147483647	Read/Write	064AH 064BH	0	
P6.038	PATH#19 definition	0x00000000– 0xFFFFFFFF	Read/Write	064CH 064DH	0x00000000	
P6.039	PATH#19 data	-2147483648 to +2147483647	Read/Write	064EH 064FH	0	
P6.040	PATH#20 definition	0x00000000– 0xFFFFFFFF	Read/Write	0650H 0651H	0x00000000	
P6.041	PATH#20 data	-2147483648 to +2147483647	Read/Write	0652H 0653H	0	
P6.042	PATH#21 definition	0x00000000– 0xFFFFFFFF	Read/Write	0654H 0655H	0x00000000	
P6.043	PATH#21 data	-2147483648 to +2147483647	Read/Write	0656H 0657H	0	
P6.044	PATH#22 definition	0x00000000– 0xFFFFFFFF	Read/Write	0658H 0659H	0x00000000	
P6.045	PATH#22 data	-2147483648 to +2147483647	Read/Write	065AH 065BH	0	
P6.046	PATH#23 definition	0x00000000– 0xFFFFFFFF	Read/Write	065CH 065DH	0x00000000	
P6.047	PATH#23 data	-2147483648 to +2147483647	Read/Write	065EH 065FH	0	
P6.048	PATH#24 definition	0x00000000– 0xFFFFFFFF	Read/Write	0660H 0661H	0x00000000	
P6.049	PATH#24 data	-2147483648 to +2147483647	Read/Write	0662H 0663H	0	
P6.050	PATH#25 definition	0x00000000– 0xFFFFFFFF	Read/Write	0664H 0665H	0x00000000	
P6.051	PATH#25 data	-2147483648 to +2147483647	Read/Write	0666H 0667H	0	
P6.052	PATH#26 definition	0x00000000– 0xFFFFFFFF	Read/Write	0668H 0669H	0x00000000	
P6.053	PATH#26 data	-2147483648 to +2147483647	Read/Write	066AH 066BH	0	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

P6.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P6.054	PATH#27 definition	0x00000000–0xFFFFFFFF	Read/Write	066CH 066DH	0x00000000	
P6.055	PATH#27 data	-2147483648 to +2147483647	Read/Write	066EH 066FH	0	
P6.056	PATH#28 definition	0x00000000–0xFFFFFFFF	Read/Write	0670H 0671H	0x00000000	
P6.057	PATH#28 data	-2147483648 to +2147483647	Read/Write	0672H 0673H	0	
P6.058	PATH#29 definition	0x00000000–0xFFFFFFFF	Read/Write	0674H 0675H	0x00000000	
P6.059	PATH#29 data	-2147483648 to +2147483647	Read/Write	0676H 0677H	0	
P6.060	PATH#30 definition	0x00000000–0xFFFFFFFF	Read/Write	0678H 0679H	0x00000000	
P6.061	PATH#30 data	-2147483648 to +2147483647	Read/Write	067AH 067BH	0	
P6.062	PATH#31 definition	0x00000000–0xFFFFFFFF	Read/Write	067CH 067DH	0x00000000	
P6.063	PATH#31 data	-2147483648 to +2147483647	Read/Write	067EH 067FH	0	
P6.064	PATH#32 definition	0x00000000–0xFFFFFFFF	Read/Write	0680H 0681H	0x00000000	
P6.065	PATH#32 data	-2147483648 to +2147483647	Read/Write	0682H 0683H	0	
P6.066	PATH#33 definition	0x00000000–0xFFFFFFFF	Read/Write	0684H 0685H	0x00000000	
P6.067	PATH#33 data	-2147483648 to +2147483647	Read/Write	0686H 0687H	0	
P6.068	PATH#34 definition	0x00000000–0xFFFFFFFF	Read/Write	0688H 0689H	0x00000000	
P6.069	PATH#34 data	-2147483648 to +2147483647	Read/Write	068AH 068BH	0	
P6.070	PATH#35 definition	0x00000000–0xFFFFFFFF	Read/Write	068CH 068CH	0x00000000	
P6.071	PATH#35 data	-2147483648 to +2147483647	Read/Write	068EH 068FH	0	
P6.072	PATH#36 definition	0x00000000–0xFFFFFFFF	Read/Write	0690H 0691H	0x00000000	
P6.073	PATH#36 data	-2147483648 to +2147483647	Read/Write	0692H 0693H	0	
P6.074	PATH#37 definition	0x00000000–0xFFFFFFFF	Read/Write	0694H 0695H	0x00000000	
P6.075	PATH#37 data	-2147483648 to +2147483647	Read/Write	0696H 0697H	0	
P6.076	PATH#38 definition	0x00000000–0xFFFFFFFF	Read/Write	0698H 0699H	0x00000000	
P6.077	PATH#38 data	-2147483648 to +2147483647	Read/Write	069AH 069BH	0	
P6.078	PATH#39 definition	0x00000000–0xFFFFFFFF	Read/Write	069CH 069DH	0x00000000	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

P6.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P6.079	PATH#39 data	-2147483648 to +2147483647	Read/Write	069EH 069FH	0	
P6.080	PATH#40 definition	0x00000000– 0xFFFFFFFF	Read/Write	06A0H 06A1H	0x00000000	
P6.081	PATH#40 data	-2147483648 to +2147483647	Read/Write	06A2H 06A3H	0	
P6.082	PATH#41 definition	0x00000000– 0xFFFFFFFF	Read/Write	06A4H 06A5H	0x00000000	
P6.083	PATH#41 data	-2147483648 to +2147483647	Read/Write	06A6H 06A7H	0	
P6.084	PATH#42 definition	0x00000000– 0xFFFFFFFF	Read/Write	06A8H 06A9H	0x00000000	
P6.085	PATH#42 data	-2147483648 to +2147483647	Read/Write	06AAH 06ABH	0	
P6.086	PATH#43 definition	0x00000000– 0xFFFFFFFF	Read/Write	06ACH 06ADH	0x00000000	
P6.087	PATH#43 data	-2147483648 to +2147483647	Read/Write	06AEH 06AFH	0	
P6.088	PATH#44 definition	0x00000000– 0xFFFFFFFF	Read/Write	06B0H 06B1H	0x00000000	
P6.089	PATH#44 data	-2147483648 to +2147483647	Read/Write	06B2H 06B3H	0	
P6.090	PATH#45 definition	0x00000000– 0xFFFFFFFF	Read/Write	06B4H 06B5H	0x00000000	
P6.091	PATH#45 data	-2147483648 to +2147483647	Read/Write	06B6H 06B7H	0	
P6.092	PATH#46 definition	0x00000000– 0xFFFFFFFF	Read/Write	06B8H 06B9H	0x00000000	
P6.093	PATH#46 data	-2147483648 to +2147483647	Read/Write	06BAH 06BBH	0	
P6.094	PATH#47 definition	0x00000000– 0xFFFFFFFF	Read/Write	06BCH 06BDH	0x00000000	
P6.095	PATH#47 data	-2147483648 to +2147483647	Read/Write	06BEH 06BFH	0	
P6.096	PATH#48 definition	0x00000000– 0xFFFFFFFF	Read/Write	06C0H 06C1H	0x00000000	
P6.097	PATH#48 data	-2147483648 to +2147483647	Read/Write	06C2H 06C3H	0	
P6.098	PATH#49 definition	0x00000000– 0xFFFFFFFF	Read/Write	06C4H 06C5H	0x00000000	
P6.099	PATH#49 data	-2147483648 to +2147483647	Read/Write	0602H 0603H	0	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

8.2.8 - P7.xxx Additional PR Parameters

P7.xxx Parameters						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

P7.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P7.000	PATH#50 definition	0x00000000–0xFFFFFFFF	Read/Write	0700H 0701H	0x00000000	
P7.001	PATH#50 data	-2147483648 to +2147483647	Read/Write	0702H 0703H	0	
P7.002	PATH#51 definition	0x00000000–0xFFFFFFFF	Read/Write	0704H 0705H	0x00000000	
P7.003	PATH#51 data	-2147483648 to +2147483647	Read/Write	0706H 0707H	0	
P7.004	PATH#52 definition	0x00000000–0xFFFFFFFF	Read/Write	0708H 0709H	0x00000000	
P7.005	PATH#52 data	-2147483648 to +2147483647	Read/Write	070AH 070BH	0	
P7.006	PATH#53 definition	0x00000000–0xFFFFFFFF	Read/Write	070CH 070DH	0x00000000	
P7.007	PATH#53 data	-2147483648 to +2147483647	Read/Write	070EH 070FH	0	
P7.008	PATH#54 definition	0x00000000–0xFFFFFFFF	Read/Write	0710H 0711H	0x00000000	
P7.009	PATH#54 data	-2147483648 to +2147483647	Read/Write	0712H 0713H	0	
P7.010	PATH#55 definition	0x00000000–0xFFFFFFFF	Read/Write	0714H 0715H	0x00000000	
P7.011	PATH#55 data	-2147483648 to +2147483647	Read/Write	0716H 0717H	0	
P7.012	PATH#56 definition	0x00000000–0xFFFFFFFF	Read/Write	0718H 0719H	0x00000000	
P7.013	PATH#56 data	-2147483648 to +2147483647	Read/Write	071AH 071BH	0	
P7.014	PATH#57 definition	0x00000000–0xFFFFFFFF	Read/Write	071CH 071DH	0x00000000	
P7.015	PATH#57 data	-2147483648 to +2147483647	Read/Write	071EH 071FH	0	
P7.016	PATH#58 definition	0x00000000–0xFFFFFFFF	Read/Write	0720H 0721H	0x00000000	
P7.017	PATH#58 data	-2147483648 to +2147483647	Read/Write	0722H 0723H	0	
P7.018	PATH#59 definition	0x00000000–0xFFFFFFFF	Read/Write	0724H 0725H	0x00000000	
P7.019	PATH#59 data	-2147483648 to +2147483647	Read/Write	0726H 0727H	0	
P7.020	PATH#60 definition	0x00000000–0xFFFFFFFF	Read/Write	0728H 0729H	0x00000000	
P7.021	PATH#60 data	-2147483648 to +2147483647	Read/Write	072AH 072BH	0	
P7.022	PATH#61 definition	0x00000000–0xFFFFFFFF	Read/Write	072CH 072DH	0x00000000	
P7.023	PATH#61 data	-2147483648 to +2147483647	Read/Write	072EH 072FH	0	
P7.024	PATH#62 definition	0x00000000–0xFFFFFFFF	Read/Write	0730H 0731H	0x00000000	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

P7.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P7.025	PATH#62 data	-2147483648 to +2147483647	Read/Write	0732H 0733H	0	
P7.026	PATH#63 definition	0x00000000– 0xFFFFFFFF	Read/Write	0734H 0735H	0x00000000	
P7.027	PATH#63 data	-2147483648 to +2147483647	Read/Write	0736H 0737H	0	
P7.028	PATH#64 definition	0x00000000– 0xFFFFFFFF	Read/Write	0738H 0739H	0x00000000	
P7.029	PATH#64 data	-2147483648 to +2147483647	Read/Write	073AH 073BH	0	
P7.030	PATH#65 definition	0x00000000– 0xFFFFFFFF	Read/Write	073CH 073DH	0x00000000	
P7.031	PATH#65 data	-2147483648 to +2147483647	Read/Write	073EH 073FH	0	
P7.032	PATH#66 definition	0x00000000– 0xFFFFFFFF	Read/Write	0740H 0741H	0x00000000	
P7.033	PATH#66 data	-2147483648 to +2147483647	Read/Write	0742H 0743H	0	
P7.034	PATH#67 definition	0x00000000– 0xFFFFFFFF	Read/Write	0744H 0745H	0x00000000	
P7.035	PATH#67 data	-2147483648 to +2147483647	Read/Write	0746H 0747H	0	
P7.036	PATH#68 definition	0x00000000– 0xFFFFFFFF	Read/Write	0748H 0749H	0x00000000	
P7.037	PATH#68 data	-2147483648 to +2147483647	Read/Write	074AH 074BH	0	
P7.038	PATH#69 definition	0x00000000– 0xFFFFFFFF	Read/Write	074CH 074DH	0x00000000	
P7.039	PATH#69 data	-2147483648 to +2147483647	Read/Write	074EH 074FH	0	
P7.040	PATH#70 definition	0x00000000– 0xFFFFFFFF	Read/Write	0750H 0751H	0x00000000	
P7.041	PATH#70 data	-2147483648 to +2147483647	Read/Write	0752H 0753H	0	
P7.042	PATH#71 definition	0x00000000– 0xFFFFFFFF	Read/Write	0754H 0755H	0x00000000	
P7.043	PATH#71 data	-2147483648 to +2147483647	Read/Write	0756H 0757H	0	
P7.044	PATH#72 definition	0x00000000– 0xFFFFFFFF	Read/Write	0758H 0759H	0x00000000	
P7.045	PATH#72 data	-2147483648 to +2147483647	Read/Write	075AH 075BH	0	
P7.046	PATH#73 definition	0x00000000– 0xFFFFFFFF	Read/Write	075CH 075DH	0x00000000	
P7.047	PATH#73 data	-2147483648 to +2147483647	Read/Write	075EH 075FH	0	
P7.048	PATH#74 definition	0x00000000– 0xFFFFFFFF	Read/Write	0760H 0761H	0x00000000	
P7.049	PATH#74 data	-2147483648 to +2147483647	Read/Write	0762H 0763H	0	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

P7.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P7.050	PATH#75 definition	0x00000000–0xFFFFFFFF	Read/Write	0764H 0765H	0x00000000	
P7.051	PATH#75 data	-2147483648 to +2147483647	Read/Write	0766H 0767H	0	
P7.052	PATH#76 definition	0x00000000–0xFFFFFFFF	Read/Write	0768H 0769H	0x00000000	
P7.053	PATH#76 data	-2147483648 to +2147483647	Read/Write	076AH 076BH	0	
P7.054	PATH#77 definition	0x00000000–0xFFFFFFFF	Read/Write	076CH 076DH	0x00000000	
P7.055	PATH#77 data	-2147483648 to +2147483647	Read/Write	076EH 076FH	0	
P7.056	PATH#78 definition	0x00000000–0xFFFFFFFF	Read/Write	0770H 0771H	0x00000000	
P7.057	PATH#78 data	-2147483648 to +2147483647	Read/Write	0772H 0773H	0	
P7.058	PATH#79 definition	0x00000000–0xFFFFFFFF	Read/Write	0774H 0775H	0x00000000	
P7.059	PATH#79 data	-2147483648 to +2147483647	Read/Write	0776H 0777H	0	
P7.060	PATH#80 definition	0x00000000–0xFFFFFFFF	Read/Write	0778H 0779H	0x00000000	
P7.061	PATH#80 data	-2147483648 to +2147483647	Read/Write	077AH 077BH	0	
P7.062	PATH#81 definition	0x00000000–0xFFFFFFFF	Read/Write	077CH 077DH	0x00000000	
P7.063	PATH#81 data	-2147483648 to +2147483647	Read/Write	077EH 077FH	0	
P7.064	PATH#82 definition	0x00000000–0xFFFFFFFF	Read/Write	0780H 0781H	0x00000000	
P7.065	PATH#82 data	-2147483648 to +2147483647	Read/Write	0782H 0783H	0	
P7.066	PATH#83 definition	0x00000000–0xFFFFFFFF	Read/Write	0784H 0785H	0x00000000	
P7.067	PATH#83 data	-2147483648 to +2147483647	Read/Write	0786H 0787H	0	
P7.068	PATH#84 definition	0x00000000–0xFFFFFFFF	Read/Write	0788H 0789H	0x00000000	
P7.069	PATH#84 data	-2147483648 to +2147483647	Read/Write	078AH 078BH	0	
P7.070	PATH#85 definition	0x00000000–0xFFFFFFFF	Read/Write	078CH 078DH	0x00000000	
P7.071	PATH#85 data	-2147483648 to +2147483647	Read/Write	078EH 078FH	0	
P7.072	PATH#86 definition	0x00000000–0xFFFFFFFF	Read/Write	0790H 0791H	0x00000000	
P7.073	PATH#86 data	-2147483648 to +2147483647	Read/Write	0792H 0793H	0	
P7.074	PATH#87 definition	0x00000000–0xFFFFFFFF	Read/Write	0794H 0795H	0x00000000	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

P7.xxx Parameters (continued)						
Param. No.	***Function***	***Range***	***Run Read/ Write***	***Address***	***Default***	***User***
P7.075	PATH#87 data	-2147483648 to +2147483647	Read/Write	0796H 0797H	0	
P7.076	PATH#88 definition	0x00000000– 0xFFFFFFFF	Read/Write	0798H 0799H	0x00000000	
P7.077	PATH#88 data	-2147483648 to +2147483647	Read/Write	079AH 079BH	0	
P7.078	PATH#89 definition	0x00000000– 0xFFFFFFFF	Read/Write	079CH 079DH	0x00000000	
P7.079	PATH#89 data	-2147483648 to +2147483647	Read/Write	079EH 079FH	0	
P7.080	PATH#90 definition	0x00000000– 0xFFFFFFFF	Read/Write	07A0H 07A1H	0x00000000	
P7.081	PATH#90 data	-2147483648 to +2147483647	Read/Write	07A2H 07A3H	0	
P7.082	PATH#91 definition	0x00000000– 0xFFFFFFFF	Read/Write	07A4H 07A5H	0x00000000	
P7.083	PATH#91 data	-2147483648 to +2147483647	Read/Write	07A6H 07A7H	0	
P7.084	PATH#92 definition	0x00000000– 0xFFFFFFFF	Read/Write	07A8H 07A9H	0x00000000	
P7.085	PATH#92 data	-2147483648 to +2147483647	Read/Write	07AAH 07ABH	0	
P7.086	PATH#93 definition	0x00000000– 0xFFFFFFFF	Read/Write	07ACH 07ADH	0x00000000	
P7.087	PATH#93 data	-2147483648 to +2147483647	Read/Write	07AEH 07AFH	0	
P7.088	PATH#94 definition	0x00000000– 0xFFFFFFFF	Read/Write	07B0H 07B1H	0x00000000	
P7.089	PATH#94 data	-2147483648 to +2147483647	Read/Write	07B2H 07B3H	0	
P7.090	PATH#95 definition	0x00000000– 0xFFFFFFFF	Read/Write	07B4H 07B5H	0x00000000	
P7.091	PATH#95 data	-2147483648 to +2147483647	Read/Write	07B6H 07B7H	0	
P7.092	PATH#96 definition	0x00000000– 0xFFFFFFFF	Read/Write	07B8H 07B9H	0x00000000	
P7.093	PATH#96 data	-2147483648 to +2147483647	Read/Write	07BAH 07BBH	0	
P7.094	PATH#97 definition	0x00000000– 0xFFFFFFFF	Read/Write	07BCH 07BDH	0x00000000	
P7.095	PATH#97 data	-2147483648 to +2147483647	Read/Write	07BEH 07BFH	0	
P7.096	PATH#98 definition	0x00000000– 0xFFFFFFFF	Read/Write	07C0H 07C1H	0x00000000	
P7.097	PATH#98 data	-2147483648 to +2147483647	Read/Write	07C3H 07C4H	0	
P7.098	PATH#99 definition	0x00000000– 0xFFFFFFFF	Read/Write	07C4H 07C5H	0x00000000	
P7.099	PATH#99 data	-2147483648 to +2147483647	Read/Write	07C6H 07C7H	0	
▲=Cannot change while Servo On, ●=Cycle power to enable value, ■=Resets to default on power cycle						

8.3 - Common Parameter Groups

8.3.1 - Monitor and general output parameters

Parameter No.	Function	Default Value	Unit	Control Mode			
				PT	PR	S	T
P0.000★	Firmware version	Factory setting	-	O	O	O	O
P0.001■	Current drive alarm code (Seven-segment display)	-	-	O	O	O	O
P0.002	LED Display Definition	00	-	O	O	O	O
P0.003	Analog output monitoring	00	-	O	O	O	O
P0.008★	Total servo drive operation time	0	hour	-	-	-	-
P0.009★	Status monitoring register 1	-	-	O	O	O	O
P0.010★	Status monitoring register 2	-	-	O	O	O	O
P0.011★	Status monitoring register 3	-	-	O	O	O	O
P0.012★	Status monitoring register 4	-	-	O	O	O	O
P0.013★	Status monitoring register 5	-	-	O	O	O	O
P0.017	Select content displayed by status monitoring register 1	0	-	-	-	-	-
P0.018	Select content displayed by status monitoring register 2	0	-	-	-	-	-
P0.019	Select content displayed by status monitoring register 3	0	-	-	-	-	-
P0.020	Select content displayed by status monitoring register 4	0	-	-	-	-	-
P0.021	Select content displayed by status monitoring register 5	0	-	-	-	-	-
P0.025	Mapping parameter #1	-	-	O	O	O	O
P0.026	Mapping parameter #2	-	-	O	O	O	O
P0.027	Mapping parameter #3	-	-	O	O	O	O
P0.028	Mapping parameter #4	-	-	O	O	O	O
P0.029	Mapping parameter #5	-	-	O	O	O	O
P0.030	Mapping parameter #6	-	-	O	O	O	O
P0.031	Mapping parameter #7	-	-	O	O	O	O
P0.032	Mapping parameter #8	-	-	O	O	O	O
P0.035	Target setting for mapping parameter P0.025	-	-	O	O	O	O
P0.036	Target setting for mapping parameter P0.026	-	-	O	O	O	O
P0.037	Target setting for mapping parameter P0.027	-	-	O	O	O	O
P0.038	Target setting for mapping parameter P0.028	-	-	O	O	O	O
P0.039	Target setting for mapping parameter P0.029	-	-	O	O	O	O
P0.040	Target setting for mapping parameter P0.030	-	-	O	O	O	O
P0.041	Target setting for mapping parameter P0.031	-	-	O	O	O	O
P0.042	Target setting for mapping parameter P0.032	-	-	O	O	O	O

Parameter No.	Function	Default Value	Unit	Control Mode			
				PT	PR	S	T
P0.046★	Commonly Used DO Function Status	0	-	O	O	O	O
P1.101	Analog monitor output voltage 1	0	mV	O	O	O	O
P1.102	Analog monitor output voltage 2	0	mV	O	O	O	O

- ★ *Read-only parameter. Can only read the value of the parameter. For example, P0.000, P0.010, P4.000, etc.*
- ▲ *Parameter cannot be changed when servo is in Servo On status. For example, P1.000 and P1.046.*
- ● *Parameter changes become valid after cycling the power. For example, P1.001 and P3.000.*
- ■ *Parameter resets to its default value after cycling the power. For example, P2.031.*

8.3.2 - Filter and resonance suppression parameters

Parameter No.	Function	Default Value	Unit	Control Mode			
				PT	PR	S	T
P1.006	Speed command smoothing constant (Low-pass filter)	0	ms	-	-	O	-
P1.007	Torque command smoothing constant (Low-pass filter)	0	ms	-	-	-	O
P1.008	Position command smoothing constant (Low-pass filter)	0	10ms	O	O	-	-
P1.025	Low-frequency vibration suppression frequency (1)	1000	0.1 Hz	O	O	-	-
P1.026	Low-frequency vibration suppression gain (1)	0	-	O	O	-	-
P1.027	Low-frequency vibration suppression frequency (2)	1000	0.1 Hz	O	O	-	-
P1.028	Low-frequency vibration suppression gain (2)	0	-	O	O	-	-
P1.029	Auto low-frequency vibration suppression mode	0	-	O	O	-	-
P1.030	Low-frequency vibration detection level	500	pulse	O	O	-	-
P1.034	S-curve acceleration constant	200	ms	-	-	O	-
P1.035	S-curve deceleration constant	200	ms	-	-	O	-
P1.036	S-curve acceleration / deceleration constant	0	ms	-	O	O	-
P1.062	Percentage of friction compensation	0	%	O	O	O	O
P1.063	Constant of friction compensation	1	ms	O	O	O	O
P1.068	Position command - Moving filter	4	ms	O	O	-	-
P1.075	Low-pass filter time constant for full- and half-closed loop control	100	ms	O	O	-	-
P1.089	Set 1: Vibration elimination - Anti-resonance frequency	4000	0.1 Hz	O	O	-	-

Parameter No.	Function	Default Value	Unit	Control Mode			
				PT	PR	S	T
P1.090	Set 1: Vibration elimination - Resonance frequency	4000	0.1 Hz	O	O	-	-
P1.091	Set 1: Vibration elimination - Resonance difference	10	0.1 dB	O	O	-	-
P1.092	Set 2: Vibration elimination - Anti-resonance frequency	4000	0.1 Hz	O	O	-	-
P1.093	Set 2: Vibration elimination - Resonance frequency	4000	0.1 Hz	O	O	-	-
P1.094	Set 2: Vibration elimination - Resonance difference	10	0.1 dB	O	O	-	-
P2.023	Notch filter frequency (1)	1000	Hz	O	O	O	O
P2.024	Notch filter attenuation level (1)	0	-dB	O	O	O	O
P2.043	Notch filter frequency (2)	1000	Hz	O	O	O	O
P2.044	Notch filter attenuation level (2)	0	-dB	O	O	O	O
P2.045	Notch filter frequency (3)	1000	Hz	O	O	O	O
P2.046	Notch filter attenuation level (3)	0	-dB	O	O	O	O
P2.047	Auto resonance suppression mode	1	-	O	O	O	O
P2.048	Auto resonance detection level	100	-	O	O	O	O
P2.025	Resonance suppression low-pass filter	1.0 (panel/software)	1 ms (panel/software)	O	O	O	O
		10 (communication)	0.1 ms (communication)				
P2.049	Speed detection filter and jitter suppression	0	-	O	O	O	O
P2.095	Notch filter bandwidth (1)	5	-	O	O	O	O
P2.096	Notch filter bandwidth (2)	5	-	O	O	O	O
P2.097	Notch filter bandwidth (3)	5	-	O	O	O	O
P2.098	Notch filter frequency (4)	1000	Hz	O	O	O	O
P2.099	Notch filter attenuation level (4)	0	-dB	O	O	O	O
P2.100	Notch filter bandwidth (4)	5	-	O	O	O	O
P2.101	Notch filter frequency (5)	1000	Hz	O	O	O	O
P2.102	Notch filter attenuation level (5)	0	-dB	O	O	O	O
P2.103	Notch filter bandwidth (5)	5	-	O	O	O	O

8.3.3 - Gain and switching parameters

Parameter No.	Function	Default Value	Unit	Control Mode			
				PT	PR	S	T
P1.037	Load inertia ratio and load weight ratio to servo motor	6.0 (panel / software)	1 times (panel / software)	O	O	O	O
		60 (communication)	0.1 times (communication)				
P2.000	Position control gain	35	rad/s	O	O	-	-
P2.001	Position control gain rate of change	100	%	O	O	-	-
P2.002	Position feed forward gain	50	%	O	O	-	-
P2.003	Position feed forward gain smoothing constant	5	ms	O	O	-	-
P2.004	Speed control gain	500	rad/s	O	O	O	O
P2.005	Speed control gain rate of change	100	%	O	O	O	O
P2.006	Speed integral compensation	100	rad/s	O	O	O	O
P2.007	Speed feed forward gain	0	%	O	O	O	O
P2.026	Anti-interference gain	0	rad/s	O	O	O	O
P2.027	Gain switching condition and method selection	0	-	O	O	O	O
P2.028	Gain switching time constant	10	10 ms	O	O	O	O
P2.029	Gain switching condition	16777216	pulse kpps rpm	O	O	O	O
P2.031	Frequency response bandwidth level	19	Hz	O	O	O	O
P2.032	Gain adjustment mode	1	-	O	O	O	O
P2.053	Position integral compensation	0	rad/s	O	O	O	O
P2.089	Command responsiveness gain	25	rad/s	O	O	-	-
P2.094▲	Special bit register 3	0x1000	-	O	O	O	-
P2.104	P/PI torque switching command condition	200	%	O	O	O	-
P2.105	Auto-tuning Adjustment Bandwidth Level	11	-	O	O	-	-
P2.106	Auto-tuning Adjustment Overshoot Level	2000	-	O	O	-	-
P2.112▲	Special bit register 4	0x0008	-	O	O	O	-

- ★ *Read-only parameter. Can only read the value of the parameter. For example, P0.000, P0.010, P4.000, etc.*
- ▲ *Parameter cannot be changed when servo is in Servo On status. For example, P1.000 and P1.046.*
- ● *Parameter changes become valid after cycling the power. For example, P1.001 and P3.000.*
- ■ *Parameter resets to its default value after cycling the power. For example, P2.031.*

8.3.4 - Position control parameters

Parameter No.	Function	Default Value	Unit	Control Mode			
				PT	PR	S	T
P1.001●	Input for control mode and control command	0	pulse rpm N-M	O	O	O	O
P1.002▲	Speed and torque limits	0	-	O	O	O	O
P1.003	Analog and Encoder pulse output polarity	0	-	O	O	O	O
P1.012–P1.014	Internal torque limits 1–3	100	%	O	O	O	-
P1.044▲	E-Gear ratio (Numerator) (N1)	16777216	pulse	O	O	-	-
P1.045▲	E-Gear ratio (Denominator) (M)	100000	pulse	O	O	-	-
P1.046▲	Encoder pulse number output	2500	pulse	O	O	O	O
P1.055	Maximum speed limit	Rated speed of the model	rpm	O	O	O	O
P1.097▲	Encoder output denominator	0	-	O	O	O	O
P5.003	Deceleration time for auto-protection	EEEFEEFF	-	O	O	O	O
P5.020–P5.035	Acceleration / deceleration times	200–30	ms	O	-	-	-
P5.016	Axis position - Motor encoder	0	PUU	O	O	O	O
P5.017	Axis position - Auxiliary encoder	0	pulse	O	O	O	O
P5.018	Axis position - Pulse command	0	pulse	O	O	O	O

8.3.5 - Position control parameters - External pulse control command (PT mode)

Parameter No.	Function	Default Value	Unit	Control Mode			
				PT	PR	S	T
P1.000▲	External pulse input type	0x1042	-	O	-	-	-
P2.060	E-Gear ratio (Numerator) (N2)	16777216	pulse	O	O	-	-
P2.061	E-Gear ratio (Numerator) (N3)	16777216	pulse	O	O	-	-
P2.062	E-Gear ratio (Numerator) (N4)	16777216	pulse	O	O	-	-

8.3.6 - Position control parameters - Internal register control command (PR mode)

Parameter No.	Function	Default Value	Unit	Control Mode			
				PT	PR	S	T
P5.008	Forward software limit	+2^31	PUU	-	O	-	-
P5.009	Reverse software limit	-2^31	PUU	-	O	-	-
P6.002–P7.099	Internal Position commands 1–99	0	-	-	O	-	-
P5.060–P5.075	Internal Position commands control the movement speeds from 0–15	20–3000 (panel / software)	1 rpm (panel / software)	-	O	-	-
		200–30000 (communication)	0.1 rpm (communication)				
P5.004	Homing methods	0	-	-	O	-	-
P5.005	High speed homing (first speed setting)	1000 (communication)	0.1 rpm (communication)	-	O	-	-
				-	O	-	-
P5.006	Low speed homing (second speed setting)	200 (communication)	0.1 rpm (communication)	-	O	-	-
				-	O	-	-
P5.007	Trigger Position command (PR mode only)	0	-	-	O	-	-
P5.040–P5.055	Delay times after position reached	0–5500	ms	-	O	-	-
P5.098	PR# triggered by event rising-edge	0	-	-	O	-	-
P5.099	PR# triggered by event falling-edge	0	-	-	O	-	-
P5.015	PATH#1–PATH#2 Volatile setting	0x0	-	-	O	-	-
P5.112–P5.123	PR registers for EtherNet/IP Implicit comms	-	-	-	O	-	-

- ★ *Read-only parameter. Can only read the value of the parameter. For example, P0.000, P0.010, P4.000, etc.*
- ▲ *Parameter cannot be changed when servo is in Servo On status. For example, P1.000 and P1.046.*
- ● *Parameter changes become valid after cycling the power. For example, P1.001 and P3.000.*
- ■ *Parameter resets to its default value after cycling the power. For example, P2.031.*

8.3.7 - Speed control parameters

Parameter No.	Function	Default Value	Unit	Control Mode			
				PT	PR	S	T
P1.001●	Input for control mode and control command	0	pulse rpm N-M	O	O	O	O
P1.002▲	Speed and torque limits	0	-	O	O	O	O
P1.003	Analog and Encoder pulse output polarity	0	-	O	O	O	O
P1.046▲	Encoder pulse number output	2500	pulse	O	O	O	O
P1.055	Maximum speed limit	motor's rated speed	rpm	O	O	O	O
P1.009–P1.011	Internal Speed commands 1–3	1000–3000	0.1 rpm	-	-	O	O
P1.012–P1.014	Internal torque limits 1–3	100	%	O	O	O	O
P1.040	Maximum rotation speed for analog Speed command	3000	rpm	-	-	O	O
P1.041	Maximum output for analog Torque command	100	%	O	O	O	O
P1.076	Maximum speed for encoder output (OA, OB)	5500	rpm	O	O	O	O
P1.081	Second set of maximum rotation speed for analog Speed command	motor's rated speed	rpm			O	O

8.3.8 - Torque control parameters

Parameter No.	Function	Default Value	Unit	Control Mode			
				PT	PR	S	T
P1.001●	Input for control mode and control command	0	pulse rpm N-M	O	O	O	O
P1.002▲	Speed and torque limits	0	-	O	O	O	O
P1.003	Analog and Encoder pulse output polarity	0	-	O	O	O	O
P1.046▲	Encoder pulse number output	2500	pulse	O	O	O	O
P1.055	Maximum speed limit	motor's rated speed	rpm	O	O	O	O
P1.009–P1.011	Internal speed limits 1–3	1000–3000	0.1 rpm	-	-	O	O
P1.012–P1.014	Internal Torque commands 1–3	100	%	O	O	O	O
P1.040	Maximum rotation speed for analog Speed command	3000	rpm	-	-	O	O

Parameter No.	Function	Default Value	Unit	Control Mode			
				PT	PR	S	T
P1.041▲	Maximum output for analog Torque command	100	%	O	O	O	O

8.3.9 - Planning of digital input / output pin and output parameters

NOTE: For more detailed descriptions of DI and DO settings, please refer to section 8.4.9.

Parameter No.	Function	Default Value	Unit	Control Mode			
				PT	PR	S	T
P0.053	Extensive range compare DO output - Filter time	0	ms	O	O	O	O
P0.054	General range compare DO output - First lower limit	0	-	O	O	O	O
P0.055	General range compare DO output - First upper limit	0	-	O	O	O	O
P2.009	Response filter time of DI	2	ms	O	O	O	O
P2.010	DI1 functional planning	101	-	O	O	O	O
P2.011	DI2 functional planning	104	-	O	O	O	O
P2.012	DI3 functional planning	116	-	O	O	O	O
P2.013	DI4 functional planning	117	-	O	O	O	O
P2.014	DI5 functional planning	102	-	O	O	O	O
P2.015	DI6 functional planning	022	-	O	O	O	O
P2.016	DI7 functional planning	023	-	O	O	O	O
P2.017	DI8 functional planning	021	-	O	O	O	O
P2.018	DO1 functional planning	101	-	O	O	O	O
P2.019	DO2 functional planning	103	-	O	O	O	O
P2.020	DO3 functional planning	109	-	O	O	O	O
P2.021	DO4 functional planning	105	-	O	O	O	O
P2.022	DO5 functional planning	7	-	O	O	O	O
P2.036	DI9 functional planning	0	-	O	O	O	O
P2.037	DI10 functional planning	0	-	O	O	O	O
P2.038	VDI11 functional planning	0	-	O	O	O	O
P2.039	VDI12 functional planning	0	-	O	O	O	O
P2.040	VDI13 functional planning	0	-	O	O	O	O
P2.041	DO6 functional planning	0	-	O	O	O	O

Parameter No.	Function	Default Value	Unit	Control Mode			
				PT	PR	S	T
P1.038	Zero speed range	10.0 (panel / software)	1 rpm (panel / software)	O	O	O	O
		100 (communication)	0.1 rpm (communication)				
P1.039	Target speed detection level	3000	rpm	O	O	O	O
P1.042	Enable delay time for magnetic brake	0	ms	O	O	O	O
P1.043	Disable delay time for magnetic brake	0	ms	O	O	O	O
P1.047	Speed reached (DO. SP_OK) range	10	rpm	-	O	-	O
P1.054	Pulse range for position reached	167772	pulse	O	-	-	O
P1.056	Motor output overload warning level	120	%	O	O	O	O

- ★ *Read-only parameter. Can only read the value of the parameter. For example, P0.000, P0.010, P4.000, etc.*
- ▲ *Parameter cannot be changed when servo is in Servo On status. For example, P1.000 and P1.046.*
- ● *Parameter changes become valid after cycling the power. For example, P1.001 and P3.000.*
- ■ *Parameter resets to its default value after cycling the power. For example, P2.031.*

8.3.10 - Communication parameters

Parameter No.	Function	Default Value	Unit	Control Mode			
				PT	PR	S	T
P3.000●	RS-485 Address	0x7F	-	O	O	O	O
P3.001●	Transmission speed	0x0203	Bps	O	O	O	O
P3.002	Communication protocol	6	-	O	O	O	O
P3.003	Communication error handling	0	-	O	O	O	O
P3.004	Communication timeout	0	sec	O	O	O	O
P3.005	Communication mechanism	0	-	O	O	O	O
P3.006	Digital input (DI) control switch	0	-	O	O	O	O
P3.007	Communication response delay time	0	1ms	O	O	O	O

8.3.11 - Diagnosis parameters

Parameter No.	Function	Default Value	Unit	Control Mode			
				PT	PR	S	T
P4.000★	Fault record (N)	0	-	O	O	O	O
P4.001★	Fault record (N-1)	0	-	O	O	O	O
P4.002★	Fault record (N-2)	0	-	O	O	O	O
P4.003★	Fault record (N-3)	0	-	O	O	O	O
P4.004★	Fault record (N-4)	0	-	O	O	O	O
P4.005	Servo motor JOG control	20	rpm	O	O	O	O
P4.006▲■	Digital output register (readable and writable)	0	-	O	O	O	O
P4.007	Multi-function for digital input	0	-	O	O	O	O
P4.008★	Input status of servo drive panel (read-only)	-	-	O	O	O	O
P4.009★	Digital output status (read-only)	-	-	O	O	O	O
P4.022	Analog speed input offset	0	mV	O	O	O	O
P4.023	Analog torque input offset	0	mV	O	O	O	O

- ★ *Read-only parameter. Can only read the value of the parameter. For example, P0.000, P0.010, P4.000, etc.*
- ▲ *Parameter cannot be changed when servo is in Servo On status. For example, P1.000 and P1.046.*
- ● *Parameter changes become valid after cycling the power. For example, P1.001 and P3.000.*
- ■ *Parameter resets to its default value after cycling the power. For example, P2.031.*

8.4 - Detailed Parameter descriptions

8.4.1 - P0.xxx Monitoring parameters

P0.000★	Firmware Version		Hex Address	Dec Address
			0000H 0001H	40001 40002
Default:	Factory setting	Control mode:	All	
Unit:	-	Setting range:	-	
Format:	DEC	Data size:	16-bit	

Settings:

Displays the firmware version of the servo drive. The servo drive firmware can be upgraded with a SV2-PGM-USB15 (or -USB30) cable and SureServo2 Pro software. See the SureServo2 Pro software help file for firmware upgrade instructions. The Firmware Subversion is located in P5.000.

P0.001■	Current Drive Alarm Code (Seven-segment display)		Hex Address	Dec Address
			0002H 0003H	40003 40004
Default:	-	Control mode:	All	
Unit:	-	Setting range:	0X0000: alarm clear (same as DI.ARST). 0x0001 - 0xFFFF: displays the alarm code (not writable).	
Format:	HEX	Data size:	16-bit	

Settings:

For the list of alarms, please refer to Section 11.1 Alarm list. Most alarms can be reset by either cycling power to the drive or using a digital input set to Alarm Reset (DI.ARST) to reset the alarm after the issue causing the alarm has been corrected. Refer to section 11.2 on page 11–11 for causes and corrective actions for each alarm code. See P4.000–P4.004 for the last 5 alarm codes stored in the drive.

P0.002	LED Display Definition		Hex Address	Dec Address
			0004H 0005H	40005 40006
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-300 to +127	
Format:	DEC	Data size:	16-bit	

Settings:

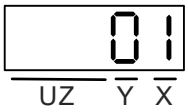
The front panel LED can display some types of drive information. See the chart in section 8.4.11 for a list of all the parameters that the LED can be set to display. Enter one of these codes into P0.002 and the LED will display that information if the keypad is not being used to enter values in Parameter Mode and if there are no active errors.

There is a common subset of monitoring variables that you can scroll through using the keypad up/down arrows when the display is in monitoring mode (variables 0-25). When changing the visible display variable through the keypad, the value is not updated in P0.002. This means the displayed variable will not be the same after a power cycle. The code entered into P0.002 determines what will be displayed on a power cycle. For the list of monitoring variables, please refer to section 8.4.11 on page 8–259 for monitoring variables descriptions. See also section 4.3.5 for keypad operation and use.

More monitoring variables can be actively monitored through communications using P0.009 - P0.013.

P0.003	Analog Output Monitoring		Hex Address	Dec Address
			0006H 0007H	40007 40008
Default:	0x0000	Control mode:	All	
Unit:	-	Setting range:	0–77	
Format:	HEX	Data size:	16-bit	

Settings:



- *X: MON**2***
- *Y: MON**1***
- *UZ: reserved*

MON1 and MON2 value	Description	MON1 and MON2 value	Description
0	Motor speed (±8 volts / Maximum speed)	4	Torque command (±8 volts / Maximum Torque command)
1	Motor torque (±8 volts / Maximum torque)	5	VBUS voltage (±8 volts / 450V)
2	Pulse command frequency (+8 volts / 4.5 Mpps)	6	Analog output voltage is the user defined value of P1.101
3	Speed command (±8 volts / Maximum Speed command)	7	Analog output voltage is the user defined value of P1.102

NOTE: *Please refer to parameters P1.004 and P1.005 for the proportional setting for the analog voltage output.*

For example: when you set P0.003 to 01 (MON1 is the analog output of motor speed; MON2 is the analog output of motor torque):

- *MON1 output voltage =* $8 \times \frac{\text{Motor Speed}}{(\text{Maximum speed} \times \frac{P1.004}{100})}$ (Unit: volts)
- *MON2 output voltage =* $8 \times \frac{\text{Motor Torque}}{(\text{Maximum torque} \times \frac{P1.005}{100})}$ (Unit: NM)

P0.004–P0.007	Reserved

P0.008★	Total Servo Drive Operation Time		Hex Address	Dec Address
			0010H 0011H	40017 40018
Default:	0	Control mode:	All	
Unit:	Hour	Setting range:	0–FFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Displays the total servo drive operation time. The unit is in hours and durations of less than 1 hour are not recorded. The recorded hours are saved when the servo powers off.

D C B A

U Z Y X

DCBA	Servo on time	UZYX	Servo power applied time
h	High word	L	Low word

P0.009 ★■	***Status Monitoring Register 1***		***Hex Address***	***Dec Address***
			0012H 0013H	40019 40020
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-	
Format:	DEC*	Data size:	32-bit	
*If the source register data is not DEC then it will be converted to decimal.				

Settings:

Set the value to be monitored in P0.017 through SureServo2 Pro, the drive panel, or communication. Please refer to P0.002 for codes that define the available monitoring values. See section 8.4.11 on page 8–259 for more information. To get the status, the communication port must read the communication address.

Where to Define the Value/Code (from table in section 8.4.11)	***Where to Read the Monitored Data***
P0.017	P0.009
P0.018	P0.010
P0.019	P0.011
P0.020	P0.012
P0.021	P0.013

For example, if you set P0.017 to 3, when accessing P0.009, the register will take a snapshot and displays the total number of feedback pulses of the motor encoder. If accessing the data through MODBUS communication, it reads two 16-bit values (0012H and 0013H) as a single 32-bit value. (0013H : 0012H) = (Hi-word : Low-word). Set P0.002 to 23 and the panel displays VAR-1 as the value of P0.009.

When accessing parameter P0.009 - P0.013, the value displayed is the value read at the moment the register was accessed. It is not a real time display or value.

P0.010 ★■	***Status Monitoring Register 2***		***Hex Address***	***Dec Address***
			0014H 0015H	40021 40022
Default:	-	Control mode:	All	
Unit:	-	Setting range:	-	
Format:	DEC*	Data size:	32-bit	
*If the source register data is not DEC then it will be converted to decimal.				

Settings:

Set the value to be monitored in P0.018. Behavior is the same as P0.009.

P0.011 ★■	Status Monitoring Register 3		Hex Address	Dec Address
			0016H 0017H	40023 40024
Default:	-	Control mode:	All	
Unit:	-	Setting range:	-	
Format:	DEC*	Data size:	32-bit	
*If the source register data is not DEC then it will be converted to decimal.				

Settings:

Set the value to be monitored in P0.019. Behavior is the same as P0.009.

P0.012 ★■	Status Monitoring Register 4		Hex Address	Dec Address
			0018H 0019H	40025 40026
Default:	-	Control mode:	All	
Unit:	-	Setting range:	-	
Format:	DEC*	Data size:	32-bit	
*If the source register data is not DEC then it will be converted to decimal.				

Settings:

Set the value to be monitored in P0.020. Behavior is the same as P0.009.

P0.013 ★■	Status Monitoring Register 5		Hex Address	Dec Address
			001AH 001BH	40027 40028
Default:	-	Control mode:	All	
Unit:	-	Setting range:	-	
Format:	DEC*	Data size:	32-bit	
*If the source register data is not DEC then it will be converted to decimal.				

Settings:

Set the value to be monitored in P0.021. Behavior is the same as P0.009.

P0.014–P0.016	Reserved

P0.017	Select Content Displayed by Status Monitoring Register 1		Hex Address	Dec Address
			0022H 0023H	40035 40036
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0–127	
Format:	DEC	Data size:	16-bit	

Settings:

Please refer to section 8.4.11 for the available values.

For example, if you set P0.017 to 07, then reading P0.009 displays the motor speed (rpm).

P0.018	Select Content Displayed by Status Monitoring Register 2		Hex Address	Dec Address
			0024H 0025H	40037 40038
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0–127	
Format:	DEC	Data size:	16-bit	

Settings:

Please refer to section 8.4.11 for the available values.

P0.019	Select Content Displayed by Status Monitoring Register 3		Hex Address	Dec Address
			0026H 0027H	40039 40040
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0–127	
Format:	DEC	Data size:	16-bit	

Settings:

Please refer to section 8.4.11 for the available values.

P0.020	Select Content Displayed by Status Monitoring Register 4		Hex Address	Dec Address
			0028H 0029H	40041 40042
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0–127	
Format:	DEC	Data size:	16-bit	

Settings:

Please refer to section 8.4.11 for the available values.

P0.021	Select Content Displayed by Status Monitoring Register 5		Hex Address	Dec Address
			002AH 002BH	40043 40044
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0–127	
Format:	DEC	Data size:	16-bit	

Settings:

Please refer to section 8.4.11 for the available values.

P0.022–P0.024	Reserved

P0.025■	Mapping Parameter (data for read/write) #1		Hex Address	Dec Address
			0032H 0033H	40051 40052
Default:	-	Control mode:	All	
Unit:	-	Setting range:	Determined by the corresponding parameter P0.035	
Format:	HEX	Data size:	32-bit	

Settings:

You can easily read and write many parameters that are scattered around by assigning them to the mapping parameters, placing them in one contiguous group for reading and writing. This is also known as Block Transfer. You can use P0.035 to specify the mapping parameter number through SureServo2 Pro, the keypad, or communication. The value of the parameter that is specified by P0.035 is shown in P0.025. Please refer to P0.035 for its settings. The Status Monitoring window in SureServo2 Pro is the easiest way to configure Mapping parameters (Block Transfer).

Block Transfer Parameters (32bit Registers)	
Where to Specify the Data Parameter Numbers to Map from/to	Where to Load/ Retrieve
P0.035	P0.025
P0.036	P0.026
P0.037	P0.027
P0.038	P0.028
P0.039	P0.029
P0.040	P0.030
P0.041	P0.031
P0.042	P0.032

P0.026■	Mapping Parameter #2		Hex Address	Dec Address
			0034H 0035H	40053 40054
Default:	-	Control mode:	All	
Unit:	-	Setting range:	Determined by the corresponding parameter P0.036	
Format:	HEX	Data size:	32-bit	

Settings:

This setting is the same as P0.025, except its mapping target is set in P0.036.

P0.027■	Mapping Parameter #3		Hex Address	Dec Address
			0036H 0037H	40055 40056
Default:	-	Control mode:	All	
Unit:	-	Setting range:	Determined by the corresponding parameter P0.037	
Format:	HEX	Data size:	32-bit	

Settings:

This setting is the same as P0.025, except its mapping target is set in P0.037.

P0.028■	Mapping Parameter #4		Hex Address	Dec Address
			0038H 0039H	40057 40058
Default:	-	Control mode:	All	
Unit:	-	Setting range:	Determined by the corresponding parameter P0.038	
Format:	HEX	Data size:	32-bit	

Settings:

This setting is the same as P0.025, except its mapping target is set in P0.038.

P0.029■	Mapping Parameter #5		Hex Address	Dec Address
			003AH 003BH	40059 40060
Default:	-	Control mode:	All	
Unit:	-	Setting range:	Determined by the corresponding parameter P0.039	
Format:	HEX	Data size:	32-bit	

Settings:

This setting is the same as P0.025, except its mapping target is set in P0.039.

P0.030■	Mapping Parameter #6		Hex Address	Dec Address
			003CH 003DH	40061 40062
Default:	-	Control mode:	All	
Unit:	-	Setting range:	Determined by the corresponding parameter P0.040	
Format:	HEX	Data size:	32-bit	

Settings:

This setting is the same as P0.025, except its mapping target is set in P0.040.

P0.031■	Mapping Parameter #7		Hex Address	Dec Address
			003EH 003FH	40063 40064
Default:	-	Control mode:	All	
Unit:	-	Setting range:	Determined by the corresponding parameter P0.041	
Format:	HEX	Data size:	32-bit	

Settings:

This setting is the same as P0.025, except its mapping target is set in P0.041.

P0.032■	Mapping Parameter #8		Hex Address	Dec Address
			0040H 0041H	40065 40066
Default:	-	Control mode:	All	
Unit:	-	Setting range:	Determined by the corresponding parameter P0.042	
Format:	HEX	Data size:	32-bit	

Settings:

This setting is the same as P0.025, except its mapping target is set in P0.042.

P0.033–P0.034	Reserved

P0.035	Target Setting (pointer) for Mapping Parameter P0.025		Hex Address	Dec Address
			0046H 0047H	40071 40072
Default:	-	Control mode:	All	
Unit:	-	Setting range:	Determined by the communication address of the parameter group	
Format:	HEX	Data size:	32-bit	

Settings:

The formats of the high-word parameter (PH) and the low-word parameter (PL) are:

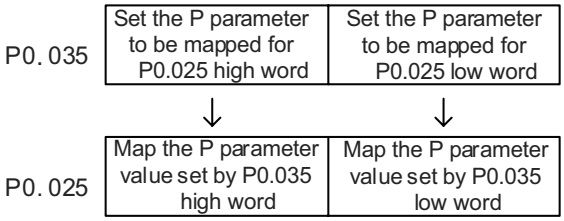
D C BA

U Z YX

BA	Hexadecimal code for the parameter index	YX	Hexadecimal code for the parameter index
C	Hexadecimal code for the parameter group	Z	Hexadecimal code for the parameter group
D	N/A	U	N/A
h	High-word	L	Low-word

Select the data block to access the parameter corresponding to register 1. The mapping value is 32 bits and can map to two 16-bit parameters or one 32-bit parameter. When writing to two different 16-bit parameters in one mapped parameter, you can't just write to one of the parameters (words). Both parameters (words) will always be written to. You cannot have a 16-bit read only and a 16-bit read/write parameter in the mapping pointers unless you only read the values. Writing to the mapping parameter will cause an error.

P0.035: (Mapping parameter: P0.035; Mapping content: P0.025)



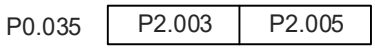
When PH does not equal PL, it indicates that the content of P0.025 includes two 16-bit parameters. When PH = PL = P, it indicates that P0.025 has one 32-bit parameter.

Example:

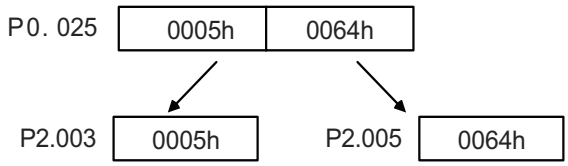
Target: Set P2.003 to 5 in the mapping parameter and set P2.005 to 100.

Setting: Set the P0.035 high word to 0203 (P2.003) and low word to 0205 (P2.005).

Thus, P0.035 = 0x02030205.

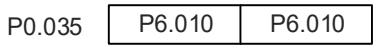


Write: In the mapping content, set P0.025 to 0x00050064, and the values of P2.003 and P2.005 are:



Example:

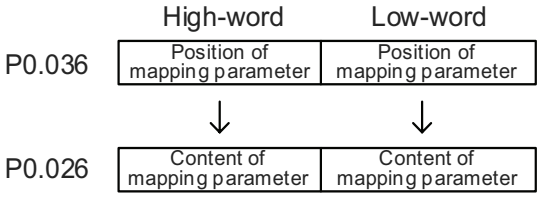
Target: Set P6.010 to 0x00050064 in the mapping parameter.
Setting: Set both the high bit and low bit of P0.035 to 060A (P6.010).
Thus, P6.010 = 0x060A060A.



Write: In the mapping content, set P0.025 to 0x00050064 and P6.010 changes immediately.

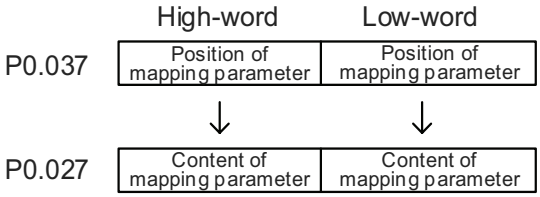
P0.036	***Target Setting (pointer) for Mapping Parameter P0.026***		***Hex Address***	***Dec Address***
			0048H 0049H	40073 40074
Default:	-	Control mode:	All	
Unit:	-	Setting range:	Determined by the communication address of the parameter group	
Format:	HEX	Data size:	32-bit	

Settings:



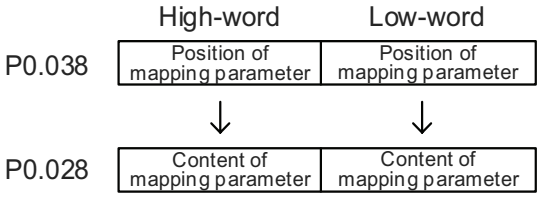
P0.037	***Target Setting (pointer) for Mapping Parameter P0.027***		***Hex Address***	***Dec Address***
			004AH 004BH	40075 40076
Default:	-	Control mode:	All	
Unit:	-	Setting range:	Determined by the communication address of the parameter group	
Format:	HEX	Data size:	32-bit	

Settings:



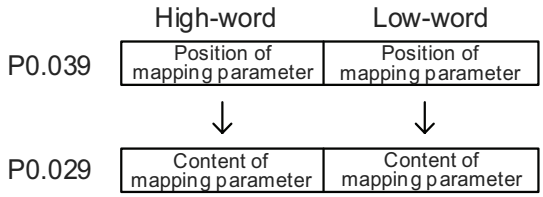
P0.038	Target Setting (pointer) for Mapping Parameter P0.028		Hex Address	Dec Address
			004CH 004DH	40077 40078
Default:	-	Control mode:	All	
Unit:	-	Setting range:	Determined by the communication address of the parameter group	
Format:	HEX	Data size:	32-bit	

Settings:



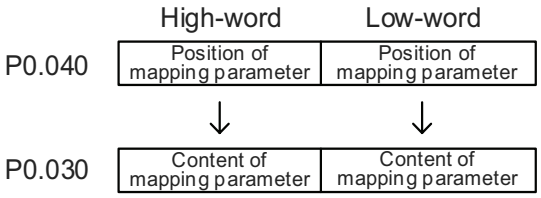
P0.039	Target Setting (pointer) for Mapping Parameter P0.029		Hex Address	Dec Address
			004EH 004FH	40079 40080
Default:	-	Control mode:	All	
Unit:	-	Setting range:	Determined by the communication address of the parameter group	
Format:	HEX	Data size:	32-bit	

Settings:



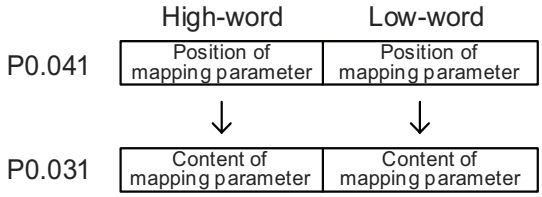
P0.040	Target Setting (pointer) for Mapping Parameter P0.030		Hex Address	Dec Address
			0050H 0051H	40081 40082
Default:	-	Control mode:	All	
Unit:	-	Setting range:	Determined by the communication address of the parameter group	
Format:	HEX	Data size:	32-bit	

Settings:



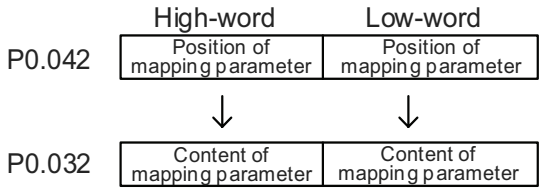
P0.041	Target Setting (pointer) for Mapping Parameter P0.031		Hex Address	Dec Address
			0052H 0053H	40083 40084
Default:	-	Control mode:	All	
Unit:	-	Setting range:	Determined by the communication address of the parameter group	
Format:	HEX	Data size:	32-bit	

Settings:



P0.042	Target Setting (pointer) for Mapping Parameter P0.032		Hex Address	Dec Address
			0054H 0055H	40085 40085
Default:	-	Control mode:	All	
Unit:	-	Setting range:	Determined by the communication address of the parameter group	
Format:	HEX	Data size:	32-bit	

Settings:



P0.043–P0.045	Reserved

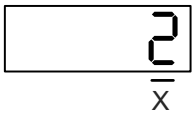
P0.046 ★■	Commonly Used DO Function Status		Hex Address	Dec Address
			005CH 005DH	40093 40094
Default:	0x0000	Control mode:	All	
Unit:	-	Setting range:	0x00–0xFF	
Format:	HEX	Data size:	16-bit	

Settings:

Bit	Function	Bit	Function
0	SRDY (servo ready)	8	HOME (homing completed)
1	SON (servo activated)	9	OLW (early warning for motor overload)
2	ZSPD (zero speed)	10	WARN (This is on when servo warning, CW, CCW, OVRD, undervoltage, communication error, etc. occurs.)
3	TSPD (target speed reached)	11	Reserved
4	TPOS (target position reached)	12	Reserved
5	TQL (torque limit activated)	13	Reserved
6	ALRM (servo alarm)	14	Reserved
7	BRKR (magnetic brake control output)	15	Reserved

P0.049■	Update Encoder Absolute Position Registers		Hex Address	Dec Address
			0062H 0063H	40099 40100
Default:	0x0000	Control mode:	All	
Unit:	-	Setting range:	0x00–0x02	
Format:	HEX	Data size:	16-bit	

Settings:



- *X: command processing*
  - *0: N/A*
  - *1: update the encoder data of P0.050–P0.052*
  - *2: update P0.050–P0.052 and clear the position error. When the command takes effect, the motor's current position is set to the terminal point of the Position command.*

P0.050 ★■	Absolute Coordinate System Status		Hex Address	Dec Address
			0064H 0065H	40101 40102
Default:	0x0000	Control mode:	All	
Unit:	-	Setting range:	0x00–0x1F	
Format:	HEX	Data size:	16-bit	

Settings:

- *Bit 0: 1 means the absolute position is lost; 0 means normal.*
- *Bit 1: 1 means the battery voltage is under 3.1 V; 0 means normal.*
- *Bit 2: 1 means the absolute multiple turns is overflowing; 0 means normal.*
- *Bit 3: 1 means the PUU is overflowing; 0 means normal.*
- *Bit 4: 1 means the absolute coordinate has not been set; 0 means normal.*
- *Bit 5–Bit 15: reserved (0).*

P0.051 ★■	Encoder Absolute Position - Number of Turns		Hex Address	Dec Address
			0066H 0067H	40103 40104
Default:	0	Control mode:	All	
Unit:	Rev	Setting range:	-32768 to +32767	
Format:	DEC	Data size:	32-bit	

Settings:

- *When you set P2.070 [Bit 1=1] to read the pulse number, this parameter displays the number of turns of the encoder (absolute position).*
- *When you set P2.070 [Bit 1=0] to read the PUU number, this parameter becomes invalid and displays 0.*

P0.052 ★■	Encoder Absolute Position - Pulse Number Or PUU Within Single Turn		Hex Address	Dec Address
			0068H 0069H	40105 40106
Default:	0	Control mode:	All	
Unit:	Pulse or PUU	Setting range:	0–16777216-1 (pulse) -2147483648 to +2147483647 (PUU)	
Format:	DEC	Data size:	32-bit	

Settings:

- *When you set bit 1 of P2.070 to 1 to read the pulse number, this parameter displays the encoder pulse number of the absolute position within a single turn.*
- *When you set bit 1 of P2.070 to 0 to read the PUU number, this parameter displays the motor's absolute position in PUU.*

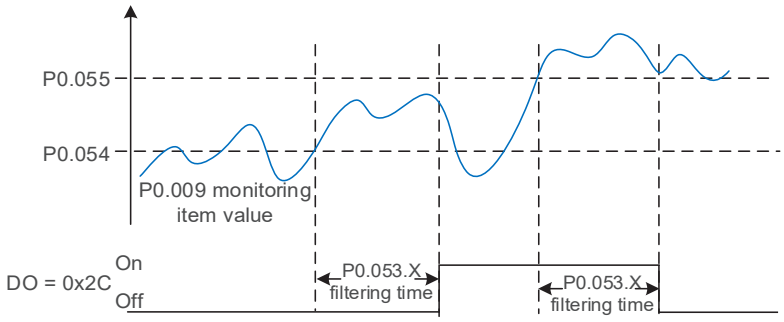
P0.053	General Range Compare DO Output - Filter Time		Hex Address	Dec Address
			006AH 006BH	40107 40108
Default:	0x0000	Control mode:	All	
Unit:	ms	Setting range:	0x0000–0x000F	
Format:	HEX	Data size:	16-bit	

Settings:

- *X: filter time*
- *Y–U: reserved*

Note: The minimum filter time is 1ms (set value 0 = 1ms; 1 = 2ms; 2 = 3ms; …; F = 16ms).

Example of filter:



P0.054	General Range Compare Digital Output - First Lower Limit		Hex Address	Dec Address
			006CH 006DH	40109 40110
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Before using this function, set a digital output function (DOx) to [0x2C]. Set the lower and upper range for the range compare window. Set the variable to be monitored by the window using P0.017. When the value of the monitored variable of P0.009 is between the lower and upper range set by P0.054 and P0.055, and remains in this window for the period of time set by P0.053.X, this digital output status is on. Once the value falls outside this window for the same period of time the digital output will turn off.

P0.055	General Range Compare Digital Output - First Upper Limit		Hex Address	Dec Address
			006EH 006FH	40111 40112
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

This parameter sets the upper limit while P0.054 sets the lower limit. See the P0.054 settings for details.

P0.056	General Range Compare Digital Output - Second Lower Limit		Hex Address	Dec Address
			0071H 0072H	40113 40114
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Before using this function, set the digital output function to [0x2D] (second set of general range comparison) and the monitoring items of P0.018. When the monitoring item value of P0.010 is within the range set by P0.056 and P0.057, and after the filtering time set by P0.053.Y, this digital output status is on.

P0.057	General Range Compare Digital Output - Second Upper Limit		Hex Address	Dec Address
			0073H 0074H	40115 40116
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

This parameter sets the upper limit while P0.056 sets the lower limit. See the P0.056 settings for details.

P0.058	General Range Compare Digital Output - Third Lower Limit		Hex Address	Dec Address
			0075H 0076H	40117 40118
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Before using this function, set the digital output function to [0x2E] (third set of general range comparison) and the monitoring items of P0.019. When the monitoring item value of P0.011 is within the range set by P0.058 and P0.059, and after the filtering time set by P0.053.Z, this digital output status is on.

P0.059	General Range Compare Digital Output - Third Upper Limit		Hex Address	Dec Address
			0077H 0078H	40119 40120
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

This parameter sets the upper limit while P0.058 sets the lower limit. See the P0.058 settings for details.

P0.060	General Range Compare Digital Output - Fourth Lower Limit		Hex Address	Dec Address
			0079H 007AH	40121 40122
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Before using this function, set the digital output function to [0x2F] (fourth set of general range comparison) and the monitoring items of P0.020. When the monitoring item value of P0.012 is within the range set by P0.060 and P0.061, and after the filtering time set by P0.053.U, this digital output status is on.

P0.061	General Range Compare Digital Output - Fourth Upper Limit		Hex Address	Dec Address
			007BH 007CH	40123 40124
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

This parameter sets the upper limit while P0.060 sets the lower limit. See the P0.060 settings for details.

P0.062	Reserved

P0.063	Duration of DC Bus Voltage Exceeding 400V		Hex Address	Dec Address
			007EH 007FH	40127 40128
Default:	0	Control mode:	All	
Unit:	ms	Setting range:	0x00000000–0x7FFFFFFF	
Format:	DEC	Data size:	32-bit	

Settings:

Records the total time during which the DC bus voltage of the servo drive exceeded 400V for SV2A-2xxx drives (230V) and 800V for SV2A-4xxx drives (460V).

P0.064–P0.068	Reserved

8.4.2 - P1.xxx Basic parameters

P1.000▲	External Pulse Input Type		Hex Address	Dec Address
			0100H 0101H	40257 40258
Default:	0x1042	Control mode:	PT	
Unit:	-	Setting range:	0x0000–0x11F2	
Format:	HEX	Data size:	16-bit	

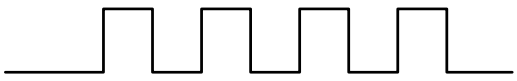
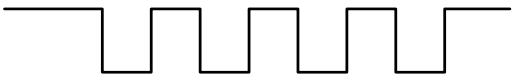
Settings:

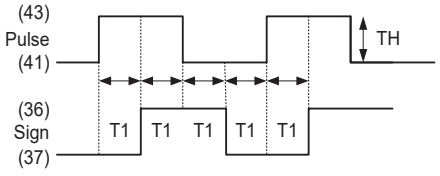
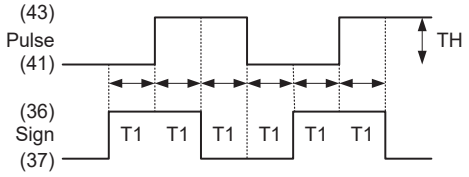
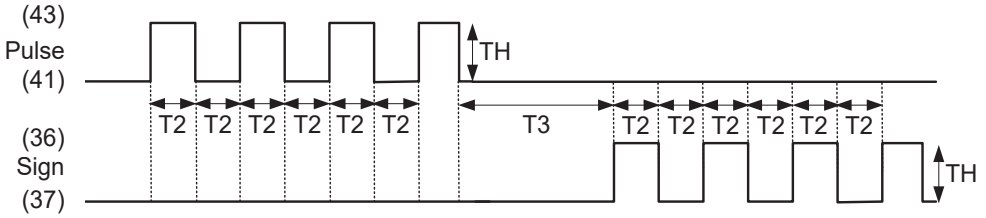
X	Command source	Z	Logic type	UY	Filter width

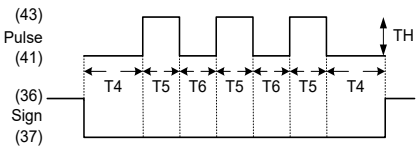
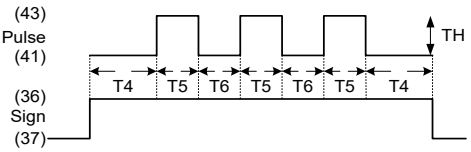
- *X: command source*
  - *0: AB phase pulse (4x)*
  - *1: clockwise and counterclockwise pulse*
  - *2: pulse + direction*
  - *Others: reserved*
- *Z: logic type*
  - *0: positive logic*
  - *1: negative logic*

Digital circuits use 0 and 1 to represent the low and high voltage levels. In positive logic, 1 represents high voltage and 0 represents low voltage; in negative logic, 1 represents low voltage and 0 represents high voltage.

For example:

Positive LLogic	Negative Logic
	

Logic Type	Pulse Type	Pulse Input	
		Forward	Reverse
Z = 0	X = 0	Pulse phase lead	Pulse phase lag
			
	X = 1		

Logic Type	Pulse Type	Pulse Input	
		Forward	Reverse
Z = 0	X = 2	Sign = low	Sign = high
			

Pulse Specification	Maximum Input Frequency	Minimum Allowed Time Width					
		T1	T2	T3	T4	T5	T6
Differential signal	4 Mpps (MHz)	62.5 ns	125ns	250ns	200ns	125ns	125ns
Open-collector	200 Kpps (kHz)	1.25 µs	2.5 µs	5µs	5µs	2.5 µs	2.5 µs

Pulse Specification	Maximum Input Frequency	Voltage	Forward Current
Differential signal	4 Mpps (MHz)	5V	< 25mA
Open-collector	200 Kpps (kHz)	24V (maximum)*	< 25mA
** If using 24V signals, do not apply 24V to SIGN and PULSE directly. Use Pull-Hi_S and Pull-Hi_P terminals to avoid damage to the drive's PT mode control circuit.*			

UY: filter width setting

If the input pulse frequency is too high, causing a pulse width smaller than the filter width, then this pulse gets filtered out as noise. Therefore, set the filter width smaller than the actual pulse width. You should set the filter width to 4 times smaller than the actual pulse width.

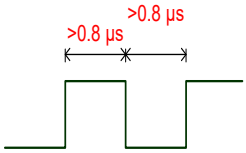
Y value	U = 0 Unit: µs (kHz)	U = 1 Unit: µs (kHz)
0	No filter function	No filter function
1	2 (250)	0.2 (2500)
2	3 (166)	0.3 (1666)
3	4 (125)	0.4 (1250)
4	5 (100)	0.5 (1000)
5	6 (83)	0.6 (833)
6	7 (71)	0.7 (714)
7	8 (62)	0.8 (625)
8	9 (55)	0.9 (555)
9	10 (50)	1 (500)
A	11 (45)	1.1 (454)
B	12 (41)	1.2 (416)
C	13 (38)	1.3 (384)
D	14 (35)	1.4 (357)
E	15 (33)	1.5 (333)

Example 1:

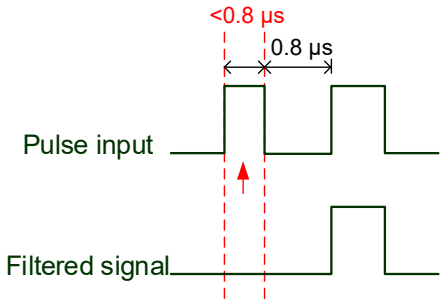
When U is set to 0 and Y is set to 4 this means there is a filter width setting of 5 µs. 5 µs is 1/2 the width of the full period. 1/100kH = 10 µs. This should be used on input pulse frequencies 4 times slower (4 times longer pulse width). Which means the input pulse width should be at least 20µs wide.

Example 2:

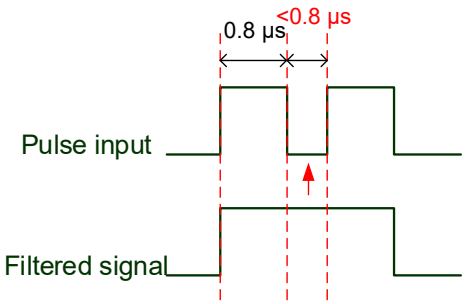
When U is set to 1 and Y is set to 1 (and filter width is therefore 0.2 µs), and when the high and low duty width of the command pulse are both larger than 0.8 µs (which means the width is 4 times 0.2 µs), then the pulse command is not filtered out.



When the high or low duty width of the pulse is smaller than the filter width, then it is filtered out.



If this first pulse width is shorter than 0.8 µs, it may be filtered, and thus two input pulses will be regarded as one pulse. If this pulse width is shorter than 0.2 µs, it will be filtered.



If this low level pulse width is shorter than 0.8 µs, it may be filtered, and thus two input pulses will be regarded as one pulse. If this low level pulse width is shorter than 0.2 µs, it will be filtered.

If you use a 125ns (4 Mpps) input pulse, set the filter value Y to 0 to disable the filter function.

NOTE: *When the high-speed pulse specification of the signal is 4 Mpps and the value of the filter is 0, then the pulse is not filtered. This pulse frequency can only be used with Differential Line Driver which is naturally less susceptible to external EMI noise interference.*

P1.001●	***Input for Control Mode and control command***		***Hex Address***	***Dec Address***
			0102H 0103H	40259 40260
Default:	0x0000	Control mode:	All	
Unit:	P (pulse); S (rpm); T (N-M)	Setting range:	0x0000–0x111F	
Format:	HEX	Data size:	16-bit	

Settings:

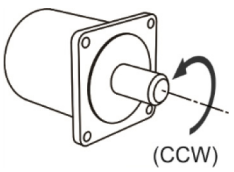
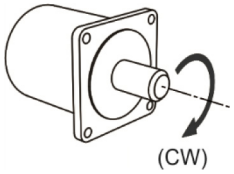
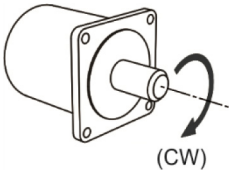
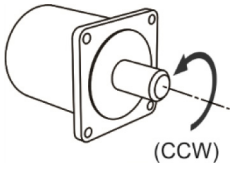
YX	Control mode setting	Z	Direction control	U	DIO value control

- *YX: control mode setting*

Mode	PT	PR	S	T	Sz	Tz
00	▲					
01		▲				
02			▲			
03				▲		
04					▲	
05						▲
Dual Mode						
06	▲		▲			
07	▲			▲		
08		▲	▲			
09		▲		▲		
0A			▲	▲		
Multi-mode						
0E	▲	▲	▲			
0F	▲	▲		▲		

  - *PT: Position (terminals) control mode; the command source is from the external pulse and the external analog voltage.*
  - *PR: Position (registers) control mode; the command source is from the 100 sets of internal registers which you can select with DI.POS0–DI.POS6. Multiple homing methods are also available.*
  - *S: Speed control mode; the command source is from the external analog voltage and the internal register which you can select with DI.SPD0 and DI.SPD1.*
  - *T: Torque control mode; the command source is from the external analog voltage and the internal register which you can select with DI.TCM0 and DI.TCM1.*
  - *Sz: Speed control mode; the command source is from the zero speed and the internal speed register which you can select with DI.SPD0 and DI.SPD1.*
  - *Tz: Torque control mode; the command source is from the zero torque and the internal torque register which you can select with DI.TCM0 and DI.TCM1.*
- *Dual mode: you can switch the mode with external DI. For example, you can use DI.S-P to switch the dual mode of PT/S (control mode setting: 06). Please refer to section 8.4.9 for further information.*
- *Multi-mode: you can switch the mode with external DI. For example, you can use DI.S-P and PT-PR to switch the multi-mode for PT/PR/S (control mode setting: 12). Please refer to section 8.4.9 for further information.*

- *Z: Definition of forward and reverse direction control*

	Z = 0	***Z = 1***
Forward direction		
Reverse direction		

- *U: DIO value control (volatile)*
  - *0: when switching modes, DIO settings (P2.010–P2.022) remain the same.*
  - *1: when switching modes, DIO settings (P2.010–P2.022) are reset to the default for each mode. This parameter nibble (U) is volatile and reset to 0 after power cycle. Refer to section 3.4.2 for DI/DO default setting for each mode.*

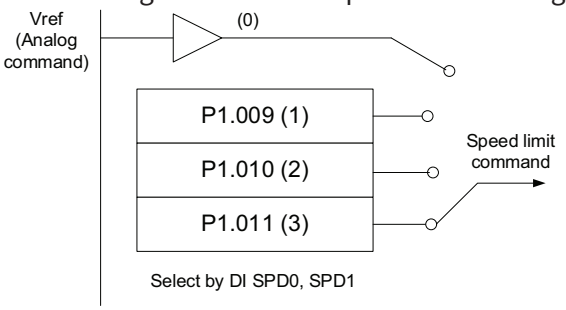
P1.002▲	***Speed and Torque Limits***		***Hex Address***	***Dec Address***
			0104H 0105H	40261 40262
Default:	0x0000	Control mode:	All	
Unit:	-	Setting range:	00–11	
Format:	HEX	Data size:	16-bit	

Settings:

X	Disable / enable Speed Limit function	Y	Disable / enable Torque Limit function	UZ	Reserved

- *X: disable / enable Speed Limit function*
  - *0: disable Speed Limit function*
  - *1: enable Speed Limit function (only available in torque modes)*

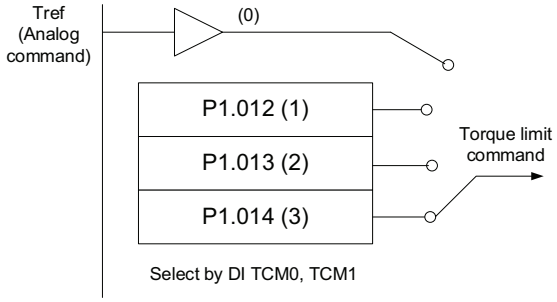
See the diagram below for Speed Limit setting:



P1.040 and P1.081 allow you to scale the analog input and DI (0x0F) allows you to switch between the two scaling values. Refer to section 6.6.1 and 6.6.2 for details on applying the speed and torque limits.

- *Y: disable / enable Torque Limit function*
  - *0: disable Torque Limit function*
  - *1: enable Torque Limit function (only available in Speed and Position modes)*

See the diagram below for Torque Limit setting:



When using the Torque Limit function, you can set this parameter to 10 to limit the torque permanently without occupying a DI setting. Alternatively, you can enable or disable the limit function through DI.TRQLM, which is more flexible, but the setting then occupies a DI setting. P1.041 determines the torque limit for the analog input and P1.012, P1.013, and P1.014 determine the limit when using TCM0-TCM1 DI selections. You can enable the Torque Limit function by either P1.002 or DI (0x09).

UZ: reserved

P1.003	***Analog and Encoder Pulse Output Polarity***		***Hex Address***	***Dec Address***
			0106H 0107H	40263 40264
Default:	0x0000	Control mode:	All	
Unit:	-	Setting range:	0–13	
Format:	HEX	Data size:	16-bit	
Related Parameters	P0.003, P1.004, P1.005			

Settings:

X	Polarity of monitor analog output	Y	Polarity of encoder pulse output	UZ	Reserved

- *X: polarity of monitor analog output*
  The MON1 and MON2 analog output terminals have a max output of ±8V. This equals an 8 volt swing about the center of the GND reference. The X nibble does not slide the center point of the analog output but can invert the MON1 or MON2 output signal. A (+) means normal polarity and (-) means inverted polarity. P1.004 and P1.005 can adjust the proportional output.
  - *0: MON1(+), MON2(+)*
  - *1: MON1(+), MON2(-)*
  - *2: MON1(-), MON2(+)*
  - *3: MON1(-), MON2(-)*
- *Y: polarity of encoder pulse output*
  - *0: pulse output in forward direction*
  - *1: pulse output in reverse direction*
- *UZ: reserved*

P1.004	MON1 Analog Monitor Output Proportion		Hex Address	Dec Address
			0108H 0109H	40265 40266
Default:	100	Control mode:	All	
Unit:	% (full scale)	Setting range:	0–100	
Format:	DEC	Data size:	16-bit	
Related Parameters	P0.003, P1.003, P1.005			

Settings:

Please refer to P0.003 for the definition of the analog output function setting.

Example 1:

If the requirement is for the motor to run at 1000 rpm, which corresponds to 8V, and its maximum speed is 5000 rpm, the setting is:

$$P1.004 = \frac{\text{Required speed}}{\text{Maximum speed}} \times 100\% = \frac{1000\ \text{rpm}}{5000\ \text{rpm}} \times 100\% = 20\%$$

Refer to the following example for the motor's current speed and relative voltage output:

Motor Speed	MON1 Analog Monitor Output
300 rpm	$MON1 = 8V \times \frac{\text{Current speed}}{(\text{Maximum speed} \times \frac{P1.004}{100})} \times 100\% = 8V \times \frac{300\ \text{rpm}}{5000\ \text{rpm} \times \frac{20}{100}} \times 100\% = 2.4V$
900 rpm	$MON1 = 8V \times \frac{\text{Current speed}}{(\text{Maximum speed} \times \frac{P1.004}{100})} \times 100\% = 8V \times \frac{900\ \text{rpm}}{5000\ \text{rpm} \times \frac{20}{100}} \times 100\% = 7.2V$

P1.005	MON2 Analog Monitor Output Proportion		Hex Address	Dec Address
			010AH 010BH	40267 40268
Default:	100	Control mode:	All	
Unit:	% (full scale)	Setting range:	0–100	
Format:	DEC	Data size:	16-bit	

Settings:

Please refer to P0.004 for the analog output setting.

P1.006	Speed Command Smoothing Constant (Low-pass filter)		Hex Address	Dec Address
			010CH 010DH	40269 40270
Default:	0	Control mode:	S / Sz	
Unit:	ms	Setting range:	0–1000	
Format:	DEC	Data size:	16-bit	
Related Parameters	P1.036, P1.059			

Settings:

- *0: disable this function.*
- *The acceleration to the target speed is immediately started but the acceleration to the target speed is given an S-curve towards the end of the acceleration over the time frame entered in P1.006 (0-1000 milliseconds).*

P1.007	Torque Command Smoothing Constant (Low-pass filter)		Hex Address	Dec Address
			010EH 010FH	40271 40272
Default:	0	Control mode:	T / Tz	
Unit:	ms	Setting range:	0–1000	
Format:	DEC	Data size:	16-bit	

Settings:

- *0: disable this function.*
- *The acceleration to the target torque is immediately started but the acceleration to the target torque is given an S-curve towards the end of the acceleration over the time frame entered in P1.007 (0-1000 milliseconds).*

P1.008	Position Command Smoothing Constant (Low-pass filter)		Hex Address	Dec Address
			0110H 0111H	40273 40274
Default:	0	Control mode:	PT / PR	
Unit:	10ms	Setting range:	0–1000	
Format:	DEC	Data size:	16-bit	
Example:	11 = 110 ms			

Settings:

- *0: disable this function.*
- *The acceleration to the target position is immediately started but the acceleration to the target position is given an S-curve towards the end of the acceleration over the time frame entered in P1.008 (0-1000 milliseconds).*
- *Should be set to 0 if using E-Cam function.*

P1.009	Internal Speed Command 1 / Internal Speed Limit 1		Hex Address	Dec Address
			0112H 0113H	40275 40276
Default:	1000	Control mode:	S / Sz: internal Speed command 1 (S1) T / Tz: internal speed limit 1	
Unit:	0.1 rpm	Setting range:	-60000 to +60000	
Format:	DEC	Data size:	32-bit	
Example:	Internal Speed command: 120 = 12 rpm Internal speed limit: positive and negative values are identical. Please refer to the following descriptions.			

Settings:

- *Internal Speed command 1: first internal Speed command.*
- *Internal speed limit 1: first internal speed limit.*
- *Using DI.SPD0 and DI.SPD1 will allow selecting S1, S2, or S3.*

In Torque Mode, the Speed limits are only valid if DI.SPDLM or P1.002:X = 1. See section "6.6 - Others" on page 6–31 for more details.

Example of internal speed limit:

Speed Limit Value Of P1.009	Valid Speed Range	Speed Limit In Forward Direction	Speed Limit In Reverse Direction
1000	-100 to +100 rpm	100 rpm	-100 rpm
-1000			

P1.010	Internal Speed Command 2 / Internal Speed Limit 2		Hex Address	Dec Address
			0114H 0115H	40277 40278
Default:	2000	Control mode:	S / Sz: internal Speed command 2 (S2) T / Tz: internal speed limit 2	
Unit:	0.1 rpm	Setting range:	-60000 to +60000	
Format:	DEC	Data size:	32-bit	
Example:	Internal Speed command: 120 = 12 rpm Internal speed limit: positive and negative values are identical. Please refer to the following descriptions.			

Settings:

- *Internal Speed command 2: second internal Speed command.*
- *Internal speed limit 2: second internal speed limit.*
- *Using DI.SPD0 and DI.SPD1 will allow selecting S1, S2, or S3.*

Example of internal speed limit:

Speed Limit Value Of P1.010	Valid Speed Range	Speed Limit In Forward Direction	Speed Limit In Reverse Direction
1000	-100 to +100 rpm	100 rpm	-100 rpm
-1000			

P1.011	Internal Speed command 3 / internal speed limit 3		Hex Address	Dec Address
			0116H 0117H	40279 40280
Default:	3000	Control mode:	S / Sz: internal Speed command 3 (S3) T / Tz: internal speed limit 3	
Unit:	0.1 rpm	Setting range:	-60000 to +60000	
Format:	DEC	Data size:	32-bit	
Example:	Internal Speed command: 120 = 12 rpm Internal speed limit: positive and negative values are identical. Please refer to the following descriptions.			

Settings:

- *Internal Speed command 3: third internal Speed command.*
- *Internal speed limit 3: third internal speed limit.*
- *Using DI.SPD0 and DI.SPD1 will allow selecting S1, S2, or S3.*

Example of internal speed limit:

Speed Limit Value Of P1.011	Valid Speed Range	Speed Limit In Forward Direction	Speed Limit In Reverse Direction
1000	-100 to +100 rpm	100 rpm	-100 rpm
-1000			

P1.012	Internal Torque Command 1 / Internal Torque Limit 1		Hex Address	Dec Address
			0118H 0119H	40281 40282
Default:	100	Control mode:	T / Tz: internal Torque command 1 (T1) PT / PR / S / Sz: internal torque limit 1	
Unit:	%	Setting range:	-400 to +400	
Format:	DEC	Data size:	16-bit	
Example:	Internal Torque command: 30 = 30% Internal torque limit: positive and negative values are identical. Please refer to the following descriptions.			

Settings:

The torque percentage relates directly to the motor's nameplate continuous torque rating. Example: For an SVL-204N, the nameplate torque is 1.27 Nm. Setting the torque limit to 50% will result in a max torque output of 0.635 Nm for this motor.

- *Internal Torque command 1: first internal Torque command.*
- *Internal torque limit 1: first internal torque limit.*
- *Using DI.TCM0 and DI.TCM1 will allow selecting of T1, T2, or T3.*

In Speed Mode, the Torque limits are only valid if DI.TRQLM or P1.002:Y=1. See section "6.6 - Others" on page 6–31 for more details.

Example of internal torque limit:

Torque Limit Value Of P1.012	Valid Torque Range	Torque Limit In Forward Direction	Torque Limit In Reverse Direction
30	-30 to +30%	30%	-30%
-30			

P1.013	Internal Torque Command 2 / Internal Torque Limit 2		Hex Address	Dec Address
			011AH 011BH	40283 40284
Default:	100	Control mode:	T / Tz: internal Torque command 2 (T2) PT / PR / S / Sz: internal torque limit 2	
Unit:	%	Setting range:	-400 to +400	
Format:	DEC	Data size:	16-bit	
Example:	Internal Torque command: 30 = 30% Internal torque limit: positive and negative values are identical. Please refer to the following descriptions.			

Settings:

- *Internal Torque command 2: second internal Torque command.*
- *Internal torque limit 2: second internal torque limit.*
- *Using DI.TCM0 and DI.TCM1 will allow selecting of T1, T2, or T3.*

Example of internal torque limit:

Torque Limit Value Of P1.013	Valid Torque Range	Torque Limit In Forward Direction	Torque Limit In Reverse Direction
30	-30 to +30%	30%	-30%
-30			

P1.014	Internal Torque Command 3 / Internal Torque Limit 3		Hex Address	Dec Address
			011CH 011DH	40285 40286
Default:	100	Control mode:	T / Tz: internal Torque command 3 (T3) PT / PR / S / Sz: internal torque limit 3	
Unit:	%	Setting range:	-400 to +400	
Format:	DEC	Data size:	16-bit	
Example:	Internal Torque command: 30 = 30% Internal torque limit: positive and negative values are identical. Please refer to the following descriptions.			

Settings:

- *Internal Torque command 3: third internal Torque command.*
- *Internal torque limit 3: third internal torque limit.*
- *Using DI.TCM0 and DI.TCM1 will allow selecting of T1, T2, or T3.*

Example of internal torque limit:

Torque Limit Value Of P1.014	Valid Torque Range	Torque Limit In Forward Direction	Torque Limit In Reverse Direction
30	-30 to +30%	30%	-30%
-30			

P1.015 – P1.016	Reserved

NOTE: *The setting value of this parameter is accumulative, which is not affected by the current error amount.*

P1.017	Additional Compensation Time for the Following Error		Hex Address	Dec Address
			0122H 0123H	40291 40292
Default:	0	Control mode:	PR	
Unit:	ms (minimum scale is μs)	Setting range:	-25.000 to +25.000	
Format:	DEC	Data size:	16-bit	

Settings:

When the following error compensation function is enabled (P1.036=1), the servo calculates the compensation amount according to the command and adjusts the position error (PUU) close to 0. If this is unable to accomplish by setting the position feed forward gain (P2.002) and position integral compensation (P2.053), set the additional compensation time to compensate the error amount.

Additional compensation distance = P1.017 x motor speed

NOTE: *Enable the following error compensation function (P1.036=1) to use the additional compensation function.*

P1.018	E-Cam: Compensation Time for the Pulse of E-Cam Master Axis		Hex Address	Dec Address
			0124H 0125H	40293 40294
Default:	0	Control mode:	PR	
Unit:	ms (minimum scale is μs)	Setting range:	-25.000 to +25.000	
Format:	DEC	Data size:	16-bit	

Settings:

During the operation of the E-Cam, if the mechanical factor is excluded but the following error still exists which may be error caused by the electrical delay, set the compensation pulse number of the master axis to correct the E-Cam phase. If the compensation time is set to 0, it is not compensated.

- *Compensation pulse = P1.018 x (pulse frequency of the E-cam master axis (Kpps) - P1.021 (minimum frequency of pulse compensation for the E-cam master axis))*

NOTE: *Monitor the pulse frequency of the E-cam master axis (Kpps) with the monitoring variable 060 (3Ch).*

P1.019	Capture / Compare Additional Function Settings		Hex Address	Dec Address
			0126H 0127H	40295 40296
Default:	0x0000	Control mode:	ALL	
Unit:	-	Setting range:	0x0000–0x0101	
Format:	HEX	Data size:	16-bit	

Settings:

X	Additional function for Capture	Z	Additional Function for Compare
Y	Reserved	U	Reserved

- *X: additional function for Capture*

Bit	3	2	1	0

Bit	Function	Description
0	Cycle mode	Set this bit to 0 to disable this function. Set this bit to 1 to enable this function. If enabled, the E-Cam alignment correction is conducted when DI.ALGN is on.
1–3	Reserved	-

- *Z: additional function for Compare*

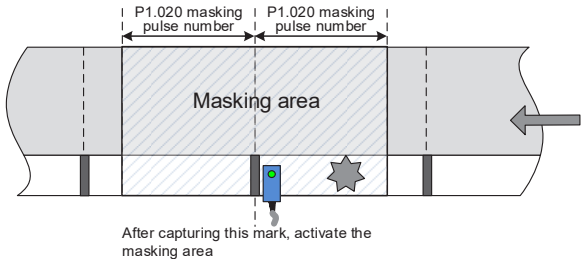
Bit	3	2	1	0

Bit	Function	Description
0	P1.024 is reset to 0 automatically	Set this bit to 0 to disable this function. Set this bit to 1, and P1.024 is reset to 0 automatically, but it only takes effect once.
1–3	Reserved	-

P1.020	Capture - Masking Range		Hex Address	Dec Address
			0128H 0129H	40297 40298
Default:	0	Control mode:	ALL	
Unit:	PUU of capture source	Setting range:	0–100000000	
Format:	DEC	Data size:	32-bit	

Settings:

When the Capture function is enabled and set to capture multiple points (P5.038 > 1), the system stops receiving the DI captured signal within this range once the data is captured. The DI captured signal received within this range is not recognized as valid. Use this function to keep the drive from seeing noise as a valid trigger within the masking range. The masking range is defined as the position of the captured data plus and minus the PUU value entered in P1.020 (CAP_DATA-P1.020, CAP_DATA+P1.020). This can also be used as a debounce filter for the Capture trigger DI7.



P1.021	E-Cam: Minimum Frequency of Pulse Compensation for the E-Cam Master Axis		Hex Address	Dec Address
			012AH 012BH	40299 40300
Default:	0	Control mode:	PR	
Unit:	Kpps	Setting range:	0 to +30000	
Format:	DEC	Data size:	16-bit	

Settings:

During the operation of the E-Cam, if the mechanical factor is excluded but the following error still exists which may be error caused by the electrical delay, set the compensation pulse number of the master axis to correct the E-Cam phase.

- *Compensation pulse = P1.018 (compensation time for the pulse of the E-Cam master axis) x (pulse frequency of the E-Cam master axis (Kpps) - P1.021)*

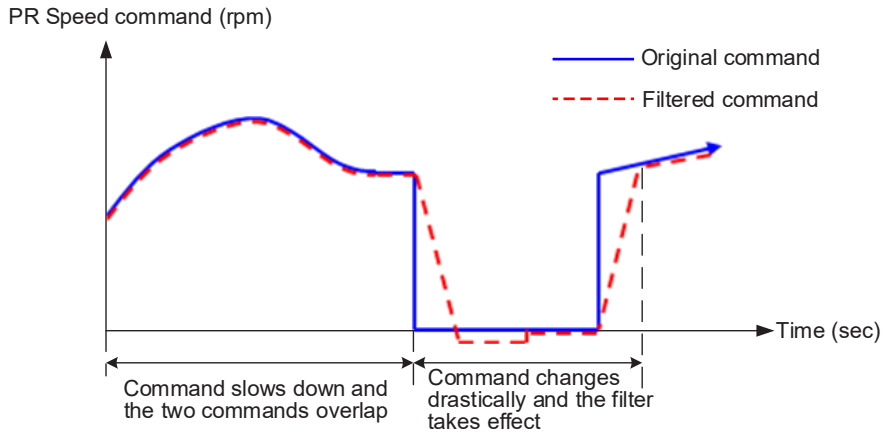
NOTE: *Monitor the pulse frequency of the E-cam master axis (Kpps) with the monitoring variable 060 (3Ch). The pulse frequency of the E-Cam master axis (Kpps) must be greater than P1.021 to be compensated.*

P1.022	PR Command Special Filter		Hex Address	Dec Address
			012CH 012DH	40301 40302
Default:	0x0000	Control mode:	PR	
Unit:	-	Setting range:	0x0000–0x107F	
Format:	HEX	Data size:	16-bit	

Settings:

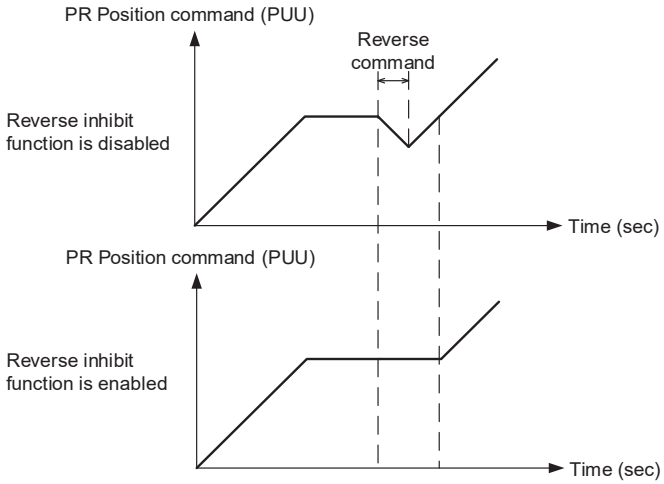
XY	Acceleration / deceleration time limit (0–1270 ms)	Z	Reserved
U	Reverse inhibit	-	-

- *YX: acceleration / deceleration time limit (0–1270 ms)*
  If the PR command changes too drastically it causes mechanical vibration. Set the acceleration / deceleration time limit (the time required for the motor to accelerate from 0 to 3,000 rpm) with this function. If the acceleration / deceleration time of the command is shorter than this limit, the filter takes effect to smooth the acceleration / deceleration which prevents the command from changing too drastically and causing mechanical vibration. When the filter is functioning, the lag caused by the smooth command is automatically compensated after the command is smoothed, so the final position is not deviated.
  Example:
  Set YX to 12 and the acceleration / deceleration time limit as 180ms (data format is HEX and unit is 10ms). If the acceleration / deceleration time of the PR command is longer than 180ms, the filter does not take effect.



NOTE: *If the command does not slow down, the internal position lag accumulates and triggers AL404.*

- *Z: reserved*
- *U: reverse inhibit*
  When the reverse inhibit function is enabled, the reverse command is inhibited. The reverse command is reserved in the servo drive and the forward command outputs after the received forward command value exceeds the reserved reverse command value.



P1.023	Compare - Data Translation (non-volatile)		Hex Address	Dec Address
			012EH 012FH	40303 40304
Default:	0	Control mode:	ALL	
Unit:	Pulse unit of compare source	Setting range:	-10000000 to +100000000	
Format:	DEC	Data size:	32-bit	

Settings:

When using the Compare function, you can add the translation value to the data array to be used as the actual comparison data:

CMP_DATA = DATA_ARRAY[*] + P1.023 + P1.024

For example:

If the data array for comparison is DATA_ARRAY[100] = 2000 and P1.023 = 40,

Then the actual comparison value = 2000 + 40 = 2040.

Notes:

1) This parameter is non-volatile.
2) P1.024: after the value takes effect, if P1.019.Z [Bit 0 = 1], then it automatically resets.
3) You can display CMP_DATA with the monitoring variable V25h (037).

P1.024■	Compare - Data Translation (reset automatically)		Hex Address	Dec Address
			0130H 0131H	40305 40306
Default:	0	Control mode:	ALL	
Unit:	Pulse unit of compare source	Setting range:	-32768 to +32767	
Format:	DEC	Data size:	16-bit	

Settings:

When using the Compare function, you can add the translation value to the data array to be used as the actual comparison data:

CMP_DATA = DATA_ARRAY[*] + P1.023 + P1.024

Notes:

1) This parameter is volatile.
2) After the parameter takes effect, if P1.019.Z [Bit 0 = 1], then it automatically resets.
3) You can display CMP_DATA with the monitoring variable V25h (037).

P1.025	Low-frequency Vibration Suppression Frequency (1)		Hex Address	Dec Address
			0132H 0133H	40307 40308
Default:	1000	Control mode:	PT / PR	
Unit:	0.1 Hz	Setting range:	10–1000	
Format:	DEC	Data size:	16-bit	
Example:	150 = 15Hz			
Related Parameters	P1.068, section 6.2.9			

Settings:

Sets the first low-frequency vibration suppression frequency. When you set P1.026 to 0, the first low-frequency vibration suppression filter is disabled.

P1.026	Low-Frequency Vibration Suppression Gain (1)		Hex Address	Dec Address
			0134H 0135H	40309 40310
Default:	0	Control mode:	PT / PR	
Unit:	-	Setting range:	0–9	
Format:	DEC	Data size:	16-bit	

Settings:

To set the gain of the first low-frequency vibration suppression, increase the value to improve the position response. If you set the value too high, the motor may not operate smoothly. The suggested value is 1. Set P1.026 to 0 to disable the first low-frequency vibration suppression filter.

P1.027	Low-frequency Vibration Suppression Frequency (2)		Hex Address	Dec Address
			0136H 0137H	40311 40312
Default:	1000	Control mode:	PT / PR	
Unit:	0.1 Hz	Setting range:	10–1000	
Format:	DEC	Data size:	16-bit	
Example:	150 = 15 Hz			

Settings:

Sets the second low-frequency vibration suppression frequency. Set P1.028 to 0 to disable the second low-frequency vibration suppression filter.

P1.028	Low-Frequency Vibration Suppression Gain (2)		Hex Address	Dec Address
			0138H 0139H	40313 40314
Default:	0	Control mode:	PT / PR	
Unit:	-	Setting range:	0–9	
Format:	DEC	Data size:	16-bit	

Settings:

To set the gain of the second low-frequency vibration suppression, increase the value to improve the position response. If you set the value too high, the motor may not operate smoothly. The suggested value is 1. Set P1.028 to 0 to disable the second low-frequency vibration suppression filter.

P1.029	Auto Low-Frequency Vibration Suppression Mode		Hex Address	Dec Address
			013AH 013BH	40315 40316
Default:	0	Control mode:	PT / PR	
Unit:		Setting range:	0–1	
Format:	DEC	Data size:	16-bit	

Settings:

- *0: Disable the automatic low-frequency vibration detection function.*
- *1: Enables the automatic low-frequency vibration suppression mode. After vibration suppression has been completed. The value resets to 0 automatically.*

Auto mode setting description:

When the value is 1, vibration suppression is in automatic mode. When the vibration cannot be detected or the vibration frequency is stable, the system resets the parameter to 0 and automatically saves the vibration suppression frequency to P1.025. This mode is not used during the Auto Tuning process.

P1.030	***Low-Frequency Vibration Detection Level***		***Hex Address***	***Dec Address***
			013CH 013DH	40317 40318
Default:	800	Control mode:	PT / PR	
Unit:	Pulse	Setting range:	1–8000	
Format:	DEC	Data size:	16-bit	

Settings:

When enabling automatic vibration suppression (P1.029 = 1), the system automatically finds the detection level. The lower the value, the more sensitive the detection, but the system may also misjudge noise or treat other low-frequency vibrations as frequencies to be suppressed. If the value is high, the system is less likely to misjudge, but if the vibration of the machine is small, the system may not properly detect low-frequency vibrations.

P1.031	***Reserved***

P1.032	***Motor Stop Mode***		***Hex Address***	***Dec Address***
			0140H 0141H	40321 40322
Default:	0x0000	Control mode:	All	
Unit:	-	Setting range:	0–20	
Format:	HEX	Data size:	16-bit	
Related Parameters	P1.038, P1.042, P1.043, DO.BRKR			

Settings:

X	Reserved	Y	Dynamic brake operation options	UZ	Reserved

- *Y: options for using the dynamic brake when the servo is in Servo Off state or an alarm (including OVRD) occurs*
  - *0: use dynamic brake*
  - *1: motor runs freely*
  - *2: use dynamic brake first. Then let the motor run freely once the speed is slower than the value of P1.038*

When the motor reaches PL (CCWL) or NL (CWL), please refer to P5.003 for setting the deceleration time. If you set the deceleraton time to 1 ms, the motor stops instantly.

P1.033	***Reserved***

P1.034	Acceleration Time Constant (TACC)		Hex Address	Dec Address
			0144H 0145H	40325 40326
Default:	200	Control mode:	S / Sz	
Unit:	ms	Setting range:	1–65500	
Format:	DEC	Data size:	16-bit	

Settings:

Acceleration constant:

P1.034 represents the acceleration time for the Speed command from zero to the motor's rated speed (not 0 to commanded speed). You can set each ramp individually. When using an internal command, if you set P1.036 to 0, acceleration / deceleration follows a trapezoid-curve; when using an analog command, P1.036 must be larger than 0 so that the acceleration / deceleration doesn't create too much jerk.

P1.034 is used for Speed Mode and for PT (high speed pulse input) Mode. See P5.020–P5.035 for 16 Acceleration/Deceleration ramp values that can be used in PR Mode.

P1.035	Deceleration Time Constant (TDEC)		Hex Address	Dec Address
			0146H 0147H	40327 40328
Default:	200	Control mode:	S / Sz	
Unit:	ms	Setting range:	1–65500	
Format:	DEC	Data size:	16-bit	

Settings:

Deceleration constant:

P1.035 represents the deceleration time for the Speed command from the rated speed to zero (not commanded speed to 0). You can set each ramp individually. When using an internal command, if you set P1.036 to 0, acceleration / deceleration follows a trapezoid-curve; when using an analog command, P1.036 must be larger than 0 so that the acceleration / deceleration doesn't create too much jerk.

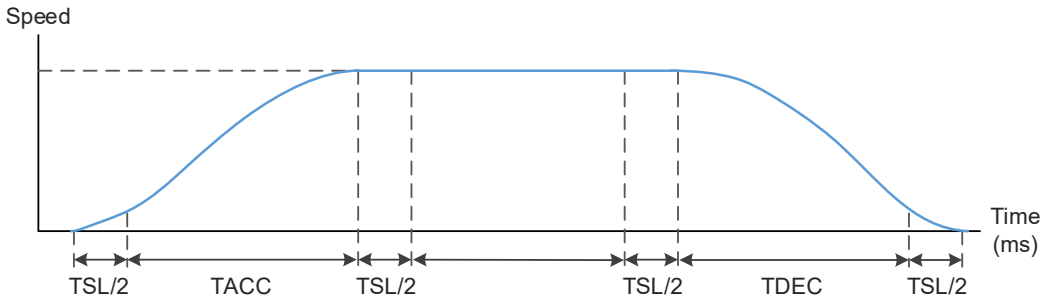
P1.034 is used for Speed Mode and for PT (high speed pulse input) Mode. See P5.020–P5.035 for 16 Acceleration/Deceleration ramp values that can be used in PR Mode.

P1.036	S-curve Acceleration / Deceleration Time Constant (TSL)		Hex Address	Dec Address
			0148H 0149H	40329 40330
Default:	0	Control mode:	PR / S / Sz	
Unit:	ms	Setting range:	0–65500	
Format:	DEC	Data size:	16-bit	

Settings:

- *0: disable this function.*

Acceleration / deceleration timing diagram of the S-curve constant.



- *P1.034: set the acceleration time for the trapezoid-curve.*
- *P1.035: set the deceleration time for the trapezoid-curve.*
- *P1.036: set the smoothing time for the S-curve acceleration / deceleration.*

You can set P1.034, P1.035, and P1.036 individually. If you set P1.036 to 0, the acceleration / deceleration follows a trapezoid-curve. See section 6.3.3 for more information on the S-curve filter.

NOTE: *The graph is from 0 to Rated Speed (not 0 to commanded speed). The Calculated acceleration or deceleration time from 0-rated speed will not be the same as the time from 0-any commanded value less than Rated speed.*

Please note the following error compensation:

	P1.036 = 0	P1.036 = 1	P1.036 > 1
Smoothing function for S-curve	Disable	Disable	Enable
Following error compensation function	Disable	Enable	Determine by P2.068.X

P1.037	Load Inertia Ratio To Servo Motor			Hex Address	Dec Address
				014AH 014BH	40331 40332
Operation interface:	Panel / software	Communication	Control mode:	All	
Default:	6.0	60	Data size:	16-bit	
Unit:	1 times	0.1 times	-	-	
Setting range:	0.0–200.0	0–2000			
Format:	One decimal	DEC	-	-	
Example:	1.5 = 1.5 times	15 = 1.5 times	-	-	

Settings:

- *Inertia ratio to servo motor: (J_load / J_motor)*

- *J_motor: rotor inertia of the servo motor*
- *J_load: total equivalent inertia of external mechanical load*

P1.038	***Zero Speed Range***			***Hex Address***	***Dec Address***
				014CH 014DH	40333 40334
Operation interface:	Panel / software	Communication	Control mode:	All	
Default:	10.0	100	Data size:	16-bit	
Unit:	1 rpm	0.1 rpm	-	-	
Setting range:	0.0–200.0	0–2000	-	-	
Format:	One decimal	DEC	-	-	
Example:	1.5 = 1.5 rpm	15 = 1.5 rpm	-	-	

Settings:

Sets the range for the zero-speed signal (ZSPD). When the forward / reverse speed of the motor is slower than this value, the zero-speed signal is triggered and the digital output is enabled if the DOx is set to DO.ZSPD.

P1.039	***Target Speed Detection Level***		***Hex Address***	***Dec Address***
			014EH 014FH	40335 40336
Default:	3000	Control mode:	ALL	
Unit:	rpm	Setting range:	0–30000	
Format:	DEC	Data size:	16-bit	

Settings:

When the target speed is reached, DO (TSPD) is enabled. When the forward / reverse speed of the motor is faster than this value, the target speed signal is triggered and the digital output is enabled.

P1.040	***Maximum Rotation Speed for Analog Speed Command***		***Hex Address***	***Dec Address***
			0150H 0151H	40337 40338
Default:	3000	Control mode:	S/T	
Unit:	rpm	Setting range:	0–50000	
Format:	DEC	Data size:	32-bit	

Settings:

P1.081 is a duplicate of this parameter and you can switch between these two parameters using DI(0x0F).

Maximum rotation speed for analog Speed command:

Speed mode:

$$\text{Speed control command} = \frac{\text{Input voltage} \times \text{Setting}}{10}$$

Set the rotation speed corresponding to 10V (maximum voltage) for the analog Speed command. If the value is 2000 and the external voltage input is 5V, then the speed control command is 1000 rpm.

$$\text{Speed control command} = \frac{5\text{V} \times 2000\ \text{rpm}}{10} = 1000\ \text{rpm}$$

Torque mode:

$$\text{Speed limit command} = \frac{\text{Input voltage} \times \text{Setting}}{10}$$

Set the rotation speed limit corresponding to 10V (maximum voltage) for the analog speed limit. If the value is 2000 and the external voltage input is 5V, then the

speed limit command = $\frac{5V \times 2000 \text{ rpm}}{10}$ = 1000 rpm

P1.041▲	***Maximum Output for Analog Torque Command***		***Hex Address***	***Dec Address***
			0152H 0153H	40339 40340
Default:	100	Control mode:	All	
Unit:	%	Setting range:	-1000 to +1000	
Format:	DEC	Data size:	16-bit	

Settings:

Maximum output for analog Torque command:

Torque mode:

Torque control command = (Unit: %)

Set the torque corresponding to 10V (maximum voltage) for the analog Torque command. If the external voltage input is 10V, then the torque control command is 100% of the rated torque. If the external voltage input is 5V, then the torque control command is 50% of the rated torque.

- *When the external analog input is 10V, the torque control command = $\frac{10V \times 100}{10}$ = 100%*
- *When the external analog input is 5V, the torque control command = $\frac{5V \times 100}{10}$ = 50%*

Example:

If P1.041 = 10

- *When the external analog input is 10V, the torque control command = $\frac{10V \times 10}{10}$ = 10%*
- *When the external analog input is 5V, the torque control command = $\frac{5V \times 10}{10}$ = 5%*

Speed, PT, and PR modes:

$$\text{Torque limit command} = \frac{\text{Input voltage} \times \text{Setting}}{10} \text{ (Unit: \%)}$$

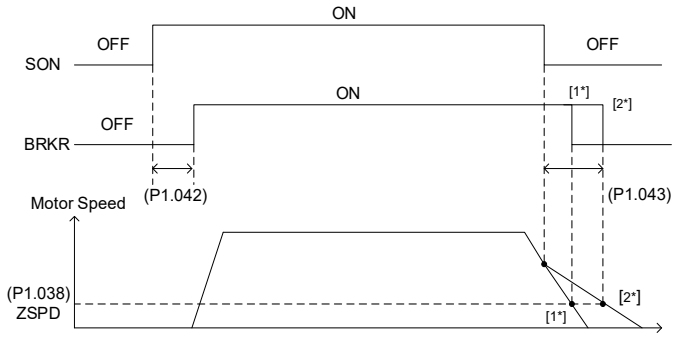
Set the torque limit corresponding to 10V (maximum voltage) for the analog torque limit.

Torque limit command = $\frac{10V \times 100}{10}$ = 100%

P1.042	Delay Time for Releasing the Magnetic Brake		Hex Address	Dec Address
			0154H 0155H	40341 40342
Default:	0	Control mode:	All	
Unit:	ms	Setting range:	0–1000	
Format:	DEC	Data size:	16-bit	
Related Parameters	P1.032, P1.038, P1.043, DO.BRKR			

Settings:

Set the delay time from Servo On status to the activation of the magnetic brake signal (DO:0x08, BRKR). Refer to "2.9 - The Use of Braking" on page 2–19 for more details.



P1.043	Delay Time For Engaging The Magnetic Brake		Hex Address	Dec Address
			0156H 0157H	40343 40344
Default:	0	Control mode:	All	
Unit:	ms	Setting range:	-1000 to +1000	
Format:	DEC	Data size:	16-bit	
Related Parameters	P1.032, P1.038, P1.042, DO. BRKR			

Settings:

Set the delay time from Servo Off status to the deactivation of the magnetic brake signal (DO:0x08, BRKR). For the detailed diagram, please refer to P1.042.

Notes:

1) If the delay time specified in P1.038 has not passed yet and the motor speed is slower than the value of P1.038, the magnetic brake signal (BRKR) is deactivated.
2) If the delay time specified in P1.038 has passed and the motor speed is faster than the value of P1.038, the magnetic brake signal (BRKR) is deactivated.
3) If P1.043 is a negative value and the servo is off due to an alarm (except for AL022) or motor override, this setting does not function. This is equivalent to setting the delay time to 0.

P1.044▲	E-Gear Ratio (Numerator) (N1)		Hex Address	Dec Address
			0158H 0159H	40345 40346
Default:	16777216	Control mode:	PT / PR	
Unit:	Pulse	Setting range:	1 to (2^{29}-1)	
Format:	DEC	Data size:	32-bit	

Settings:

For the E-Gear ratio setting, please refer to Section 6.2.5. Please refer to P2.060–P2.062 for multiple E-Gear ratio (numerator) settings. P2.060-P2.062 are only valid in PT mode.

For most applications the numerator does not need to be changed since adjusting the denominator will usually work. One example of needing to change the numerator is if the Pulse command needs to be 20,000 pulses/rev and uses a 3:1 gear box on the motor. This means the motor needs to turn 3 rotations for the mechanism to move 1 cycle. P1.045 would need to be 20000/3, but this will not work since P1.045 needs to be an integer. Instead, you set P1.044 = 3*16777216 and P1.045 = 20000 to solve this.

NOTE: *Do not change the E-Gear ratio in the Servo On state as the ratio will take effect immediately.*

In communication mode, if you cycle the power to the drive, the E-Gear ratio is set to the default value of the communication protocol. Resetting to the default value results in the reconstruction of the absolute coordinate system, so you must re-do the homing procedure.

P1.045▲	***E-Gear Ratio (Denominator) (M)***		***Hex Address***	***Dec Address***
			015AH 015BH	40347 40348
Default:	100000	Control mode:	PT / PR	
Unit:	Pulse	Setting range:	1 to (2^{31}-1)	
Format:	DEC	Data size:	32-bit	

Settings:

If the setting is incorrect, the servo motor is prone to sudden unintended acceleration. Please follow the instructions below.

Setting of pulse input:

Command pulse input range: 1 / 4<Nx / M < 262144.

Nx = (P1.044, P2.060, P2.061, or P2.062). M=P1.045. For the E-Gear ratio setting, please refer to Section 6.2.5.

NOTE: *Do not change the E-Gear ratio in the Servo On state as the ratio will take effect immediately.*

In direct communication mode, if you cycle the power to the drive, the E-Gear ratio is set to the default value of the communication protocol. Resetting to the default value results in the reconstruction of the absolute coordinate system, so you must re-do the homing procedure.

P1.046▲	***Encoder Pulse Number Output Numerator***		***Hex Address***	***Dec Address***
			015CH 015DH	40349 40350
Default:	2500	Control mode:	All	
Unit:	Pulse	Setting range:	20–536870912	
Format:	DEC	Data size:	32-bit	
Related Parameters	P1.074, P1.076, P1.097			

Settings:

The number of single-phase pulse outputs per revolution for **OA and OB terminals**; the maximum output frequency of the hardware is 19.8 MHz.

Notes:

The following circumstances may result in exceeding the maximum allowable output pulse frequency of the drive, causing AL018:

1) Encoder error
2) The motor speed is faster than P1.076

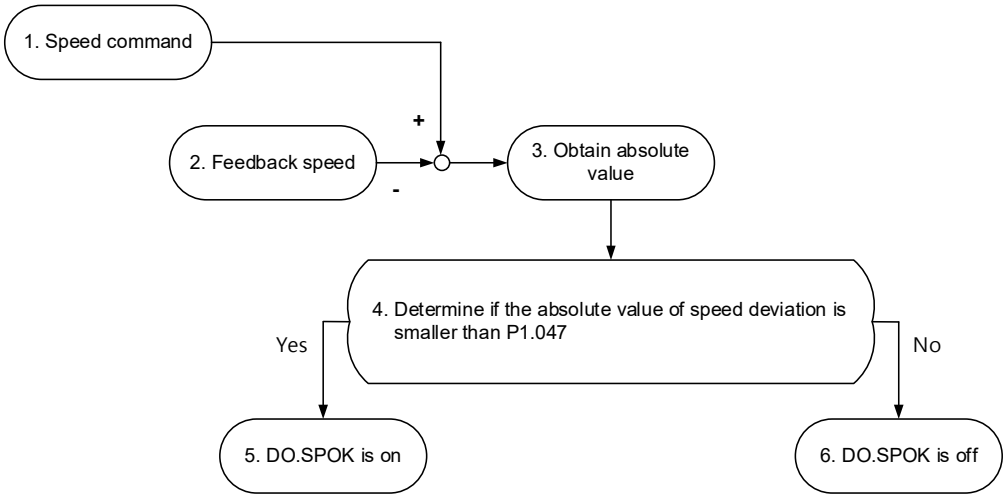
3) Source= Motor Encoder: If P1.074.Y = 0 and P1.097 = 0, motor speed (rpm)/60 x P1.046 x 4 > 19.8 x 10^6
Source= Auxiliary Encoder: if P1.074.Y = 1 and P1.097 = 1, motor speed (um/s)*1000/ 16777216 x P1.046 > 19.8 x 10^6

P1.047	***Speed Reached (DO.SP_OK) Range***		***Hex Address***	***Dec Address***
			015EH 015FH	40351 40352
Default:	10	Control mode:	S / Sz	
Unit:	rpm	Setting range:	0–300	
Format:	DEC	Data size:	16-bit	

Settings:

When the deviation between the Speed command and the motor feedback speed is less than this parameter, the digital output DO.SP_OK (DO code 0x19) is on.

Diagram:



- *Speed command: command that you input without acceleration / deceleration, not the command from the front end speed circuit. The source is the user entered target speed setting.*
- *Feedback speed: the actual speed of the motor which has been filtered for low jitter and a more stable reading.*
- *Obtain the absolute value.*
- *Determine whether the absolute value of the speed deviation is smaller than the parameter value: If you set the parameter to 0, the output is always off. If the absolute value is smaller than the parameter, the DO output is on, otherwise it is off.*

P1.048	***Motion Reached (DO.MC_OK) Operation Selection***		***Hex Address***	***Dec Address***
			0160H 0161H	40353 40354
Default:	0x0000	Control mode:	PR	
Unit:	-	Setting range:	0x0000–0x0011	
Format:	HEX	Data size:	16-bit	

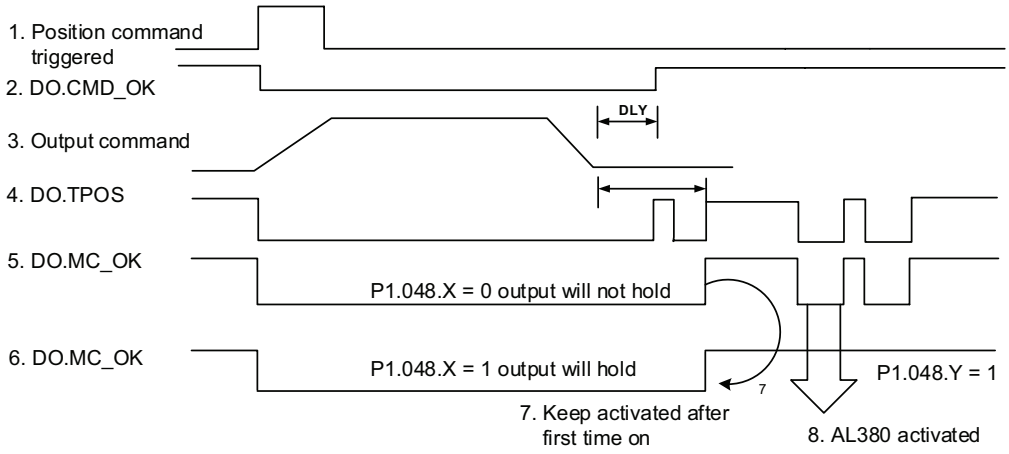
Settings:

Control selection of digital output DO.MC_OK (DO code: 0x17).

X	DO output hold option	Y	Position deviation alarm AL380 option	UZ	Reserved

- *X: DO output hold option*
  - *0: output status is not retained*
  - *1: output status is retained*
- *Y: position deviation alarm AL380 option*
  - *0: AL380 not functioning*
  - *1: AL380 functioning*

Diagram:



Description:

- *Command triggered: new PR command is effective. Output command (3) starts and clears signals 2, 4, 5, and 6 simultaneously. Command triggering source: DI.CTRG, DI.EV1/EV2, P5.007 (triggered through software), etc.*
- *DO.CMD_OK: command 3 is completed and it can set the delay time (DLY).*
- *Command output: output the profile of the Position command based on the acceleration / deceleration setting.*
- *DO.TPOS: position error of the servo drive is within the range set in P1.054.*
- *DO.MC_OK: Position command output and servo positioning completed, which indicate that DO.CMD_OK and DO.TPOS are both on.*
- *DO.MC_OK (retains digital output status): same as 5, except that once this DO is on, its status is kept regardless of the signal 4 status.*
- *Can only select one of signal 5 or signal 6 to output, and the choice is specified in P1.048.X.*
- *Position deviation: when number 7 occurs, if signal 4 (or 5) is off, it means the position has deviated and AL380 can be triggered. This alarm may be set with P1.048.Y.*

P1.049	***Accumulated Time to Reach Desired Speed***		***Hex Address***	***Dec Address***
			0162H 0163H	40355 40356
Default:	0	Control mode:	S / Sz	
Unit:	ms	Setting range:	0–65535	
Format:	DEC	Data size:	16-bit	

Settings:

In Speed mode, when the deviation between the Speed command and the motor feedback speed is less than the range in P1.047 and the difference reaches the time in P1.049, the digital output DO.SP_OK (DO code 0x19) is on. If the difference exceeds the range set in P1.047 at any time, the system recalculates the duration.

P1.050–P1.051	***Reserved***

P1.052	***Regenerative Resistor Value***		***Hex Address***	***Dec Address***
			0168H 0169H	40361 40362
Default:	Determined by the model. Please refer to the following table.	Control mode:	All	
Unit:	Ohm	Setting range:	Please refer to the note below.	
Format:	DEC	Data size:	16-bit	

Settings:

Model	***Default (Ω)***	***Setting Range***
1.5 kW or below	100	20–750
2kW	30	10–750
3kW–15kW	20	10–750

For drives up to and including 3kW, the drives include a built in resistor. For heat dissipation reasons the Wattage of the actual resistor is decreased in P1.053 vs. what is actually printed on the resistor. If the resistor was externally mounted with good airflow then the full Watt value of the resistor can be entered in P1.053. For further drive and resistor protection the drive's firmware uses half that value (P1.053/2) for energy regeneration calculations. Once the DC bus goes higher than 370VDC then the regen resistor is in use for regen purposes. See section 2.8 for more detail.

Please refer to the instructions for P1.053 for the setting to use when connecting the regenerative resistor through a different method.

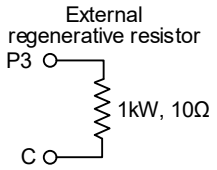
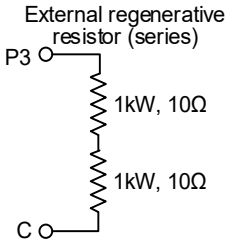
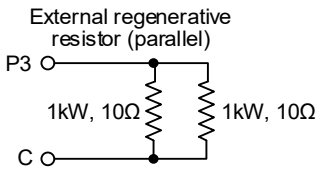
NOTE: *Setting range for 220V.*

P1.053	***Regenerative Resistor Watts***		***Hex Address***	***Dec Address***
			016AH 016BH	40363 40364
Default:	Determined by the model. Please refer to the following table.	Control mode:	All	
Unit:	Watt	Setting range:	0–15000	
Format:	DEC	Data size:	16-bit	

Settings:

Model	***Default (Watt)***
1.5 kW or below	100
2kW	30
3kW	20
5.5 kW to 15kW	0

Setting the parameter value when connecting the regenerative resistor with different methods:

External Regenerative Resistor	Setting
	Setting: P1.052 = 10 (Ω) P1.053 = 1000 (W)
	Setting: P1.052 = 20 (Ω) P1.053 = 2000 (W)
	Setting: P1.052 = 5 (Ω) P1.053 = 2000 (W)

P1.054	Pulse Range for Position Reached		Hex Address	Dec Address
			016CH 016DH	40365 40366
Default:	167772	Control mode:	PT / PR	
Unit:	Pulse	Setting range:	0–16777216	
Format:	DEC	Data size:	32-bit	

Settings:

- *In Position (PT) mode, when the deviation pulse number is smaller than the range of P1.054, DO.TPOS is on.*
- *In Position Register (PR) mode, when the deviation between the target position and the actual motor position is smaller than the range of P1.054, DO.TPOS is on. For example, if P1.054 = 167772 and the deviation is less than 167772 pulses, which equals 0.01 turns (167772/16777216 = 0.01), then DO.TPOS is on.*

P1.055	Maximum Speed Limit		Hex Address	Dec Address
			016EH 016FH	40367 40368
Default:	Same as the rated speed of each model	Control mode:	All	
Unit:	rpm	Setting range:	0 to maximum speed	
Format:	DEC	Data size:	16-bit	

Settings:

Sets the absolute maximum global speed of the servo motor. The default is the rated speed. Refer to Appendix A for the maximum speed of each motor.

P1.056	Motor Output Overload Warning Level		Hex Address	Dec Address
			0170H 0171H	40369 40370
Default:	120	Control mode:	All	
Unit:	%	Setting range:	0–120	
Format:	DEC	Data size:	16-bit	

Settings:

When the value is 0–100 and the servo motor continuously outputs load that is higher than the setting (P1.056), the pre-warning for overload (DO is set to 0x10, OLW) occurs. If the value is over 100, this function is disabled.

P1.057	Motor Hard Stop (torque percentage)		Hex Address	Dec Address
			0172H 0173H	40371 40372
Default:	0	Control mode:	All	
Unit:	%	Setting range:	0–300	
Format:	DEC	Data size:	16-bit	

Settings:

Set the protection level as a percentage of rated torque. Works with P1.058. Set the value to 0 to disable the function. Set the value to 1 or above to enable the function.

P1.058	Motor Hard Stop (protection time)		Hex Address	Dec Address
			0174H 0175H	40373 40374
Default:	1	Control mode:	All	
Unit:	ms	Setting range:	1–1000	
Format:	DEC	Data size:	16-bit	

Settings:

Set the protection time: when the motor reaches the protection level and exceeds the protection time, AL030 occurs.

NOTE: *This function is only suitable for non-contactable uses, such as applications where the actuator is not designed to impact or press down on the product (please set P1.037 correctly).*

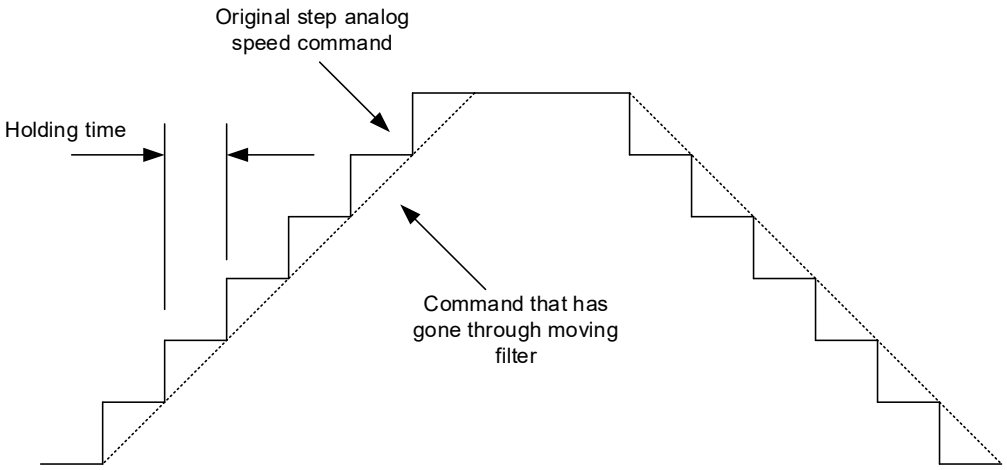
P1.059	Speed Command - Moving Filter			Hex Address	Dec Address
				0176H 0177H	40375 40376
Operation interface:	Panel / software	Communication	Control mode:	S	
Default:	0.0	0	Data size:	16-bit	
Unit:	1 ms	0.1 ms	-	-	
Format:	One decimal	DEC	-	-	
Setting range:	0.0–4.0	0–40	-	-	
Example:	1.5 = 1.5 ms	15 = 1.5 ms	-	-	

Settings:

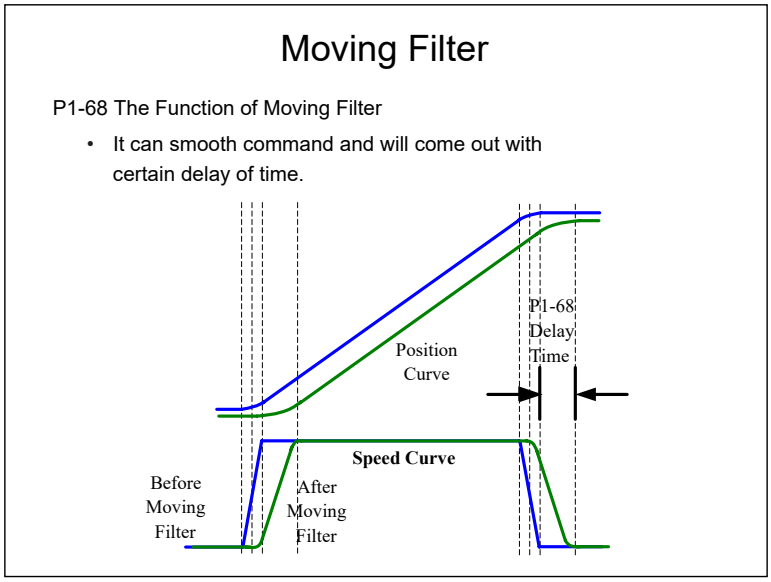
- *0: disable moving filter*

P1.006 is the low-pass filter and P1.059 is the moving filter. The difference between them is that the moving filter can smooth the command at the beginning and end of the acceleration and at the beginning and end of the deceleration ramp, while the low-pass filter can only smooth the command at the end of the acceleration and deceleration ramp. .

Therefore, if the speed loop receives the command from the controller for the position control loop, then the low-pass filter is recommended but it also slightly delays the command. If the setting is only for the speed control, then use the moving filter for better smoothing.



The delay time for a moving filter is the same as the value set in the parameter. If P1.068 is assigned to 100ms, the response will delay 100ms.



If there are commands for step function: 1→3→5→7→5→3→1, the step command difference for each step is 2.

The Moving Filter function averages the commands in a fixed range. For example, if averaging three commands each time:

- ***(1→3→5)***→7→5→3→1 = *average of 3*
- 1→***(3→5→7)***→5→3→1 = *average of 5*
- 1→3→***(5→7→5)***→3→1 = *average of 5.7*
- 1→3→5→***(7→5→3)***→1 = *average of 5*
- 1→3→5→7→***(5→3→1)*** = *average of 5*

Commands after Moving Filter: 3→5→5.7→5→3. One step command difference becomes 0.7 instead of 2, and smoothing the commands is accomplished.

P1.060–P1.061	Reserved

P1.062	Percentage of Friction Compensation		Hex Address	Dec Address
			017CH 017DH	40381 40382
Default:	0	Control mode:	PT / PR / S / Sz	
Unit:	%	Setting range:	0–100	
Format:	DEC	Data size:	16-bit	

Settings:

The level of friction compensation. For the percentage of rated torque, set the value to 0 to disable the function; set the value to 1 or above to enable the function. This function can be applied when the position error is too much while the motor begins to rotate as it overcomes the maximum static friction.

P1.063	Constant of Friction Compensation		Hex Address	Dec Address
			017EH 017FH	40383 40384
Default:	***1***	Control mode:	PT / PR / S / Sz	
Unit:	***ms***	Setting range:	1–1000	
Format:	***DEC***	Data size:	16-bit	

Settings:

Set the smoothing constant of friction compensation.

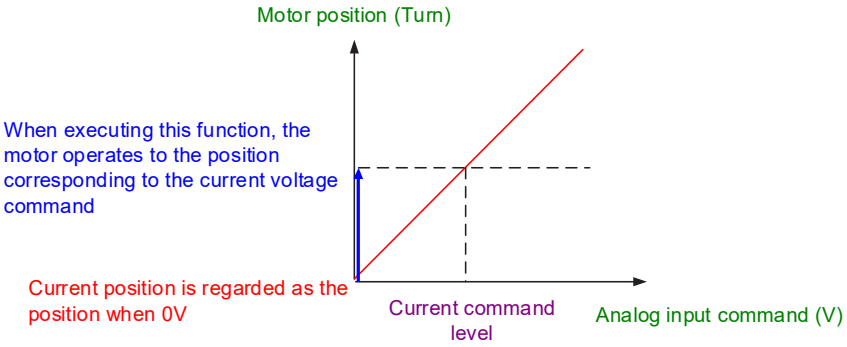
P1.064	Analog Position Command: Activation Control		Hex Address	Dec Address
			0180H 0181H	40385 40386
Default:	0x0000	Control mode:	PT	
Unit:	–	Setting range:	0x0000–0x0011	
Format:	HEX	Data size:	16-bit	

Settings:

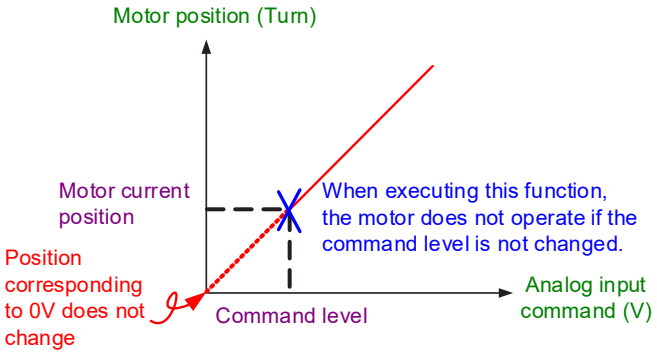
X	Setting for position command issued by the analog signal	Y	Initial position setting	UZ	Reserved

- *X: Setting for position command issued by the analog signal*
  - *0: disable*
  - *1: enable*
- *Y: Initial position setting*

- *0: After the servo is on, the motor regards the current position as the position when the voltage is 0V. Then the motor operates to the corresponding position according to the analog input command.*



- *1: After the servo is on, if the command level is not changed, the motor does not operate. The position the motor stops at is the position corresponding to the current command level.*



P1.065	***Smooth Constant of Analog Position Command***		***Hex Address***	***Dec Address***
			0182H 0183H	40387 40388
Default:	1	Control mode:	PT	
Unit:	10ms	Setting range:	1–1000	
Format:	DEC	Data size:	16-bit	

Settings:

The smooth constant of analog Position command is only effective for analog Position command.

P1.066	Maximum Rotation Number of Analog Position Command		Hex Address	Dec Address
			0184H 0185H	40389 40390

Operation Interface:	Panel / software	Communication	Control mode:	PT
Default:	1.0	10	Data size:	16-bit
Unit:	1 rev	0.1 rev	–	
Format:	One decimal	DEC		
Setting Range:	0.0–200.0	0–2000		
Example:	1.5 = 1.5 rev	15 = 1.5 rev		

Settings:

Rotation number setting when inputting the maximum voltage (10V) to the analog Position command. If the setting on the panel is 3.0 and the external voltage input is 10V, then the Position command is +3 revolutions. If the input is +5V, then the Position command is +1.5 revolutions. If the input is -10V, then the Position command is -3 cycles. Position control command = Input voltage x Set value / 10. It is highly recommended to keep the analog input at 0V when changing P1.066 or enabling the drive if P1.064.Y=0. If you want to change the direction of rotation of the motor without respect to the established analog input then use P1.001.Z to change the definition of forward being CW or CCW.

P1.067	Reserved

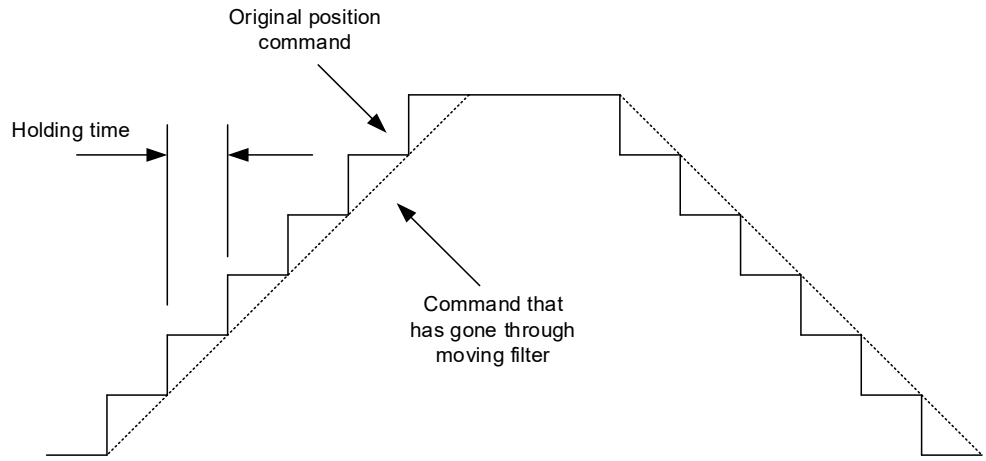
P1.068	Position Command - Moving Filter		Hex Address	Dec Address
			0188H 0189H	40393 40394

Default:	4	Control mode:	PT / PR
Unit:	ms	Setting range:	0–100
Format:	DEC	Data size:	16-bit

Settings:

- *0: disable this function*

The moving filter activates the smoothing function at the beginning and end of the step, but it also delays the command.



P1.069–P1.071	Reserved

P1.072	Resolution of auxiliary encoder for full-closed loop and gantry control		Hex Address	Dec Address
			0190H 0191H	40401 40402
Default:	5000	Control mode:	PT / PR (full-closed loop)	
Unit:	pulse / rev	Setting range:	200–1280000	
Format:	DEC	Data size:	32-bit	

Settings:

A/B pulse count from the auxiliary encoder that equates to one revolution of the motor shaft. The 4x value needs to be entered here.

There are two methods for calculating the corresponding pulse number of the auxiliary encoder per motor revolution. One method calculates the theoretical value from hand calculations. The other calculates the actual value with the software scope of SureServo2 Pro. If the resolution of auxiliary encoder for full-closed loop control (P1.072) is incorrectly set, the position error between the auxiliary encoder feedback and the motor encoder accumulates during long-term operation, triggering AL040.

The encoder must be a line driver output AB Quadrature encoder with a Z pulse. If using the full-closed loop function and if there is no Z pulse and one is not needed, then the Z and Z/ signals need to be tied to +5V and 0V respectively to avoid an alarm. A Z pulse is not required to be connected for the gantry control function.

P1.073	Error protection range for full-closed loop control		Hex Address	Dec Address
			0192H 0193H	40403 40404
Default:	30000	Control mode:	PT / PR (full-closed loop)	
Unit:	Pulse or PUU (based on the feedback of full-closed loop)	Setting range:	1 to (2^{31}-1)	
Format:	DEC	Data size:	32-bit	

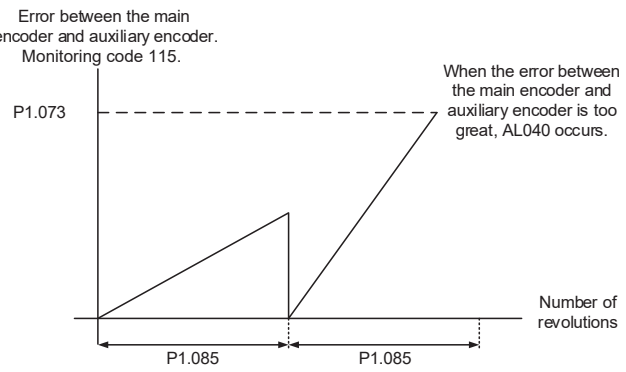
Settings:

Stopping the motor may be necessary when the deviation between the auxiliary encoder and the motor encoder feedback position is excessive due to a loose connector, an encoder failure, or other mechanical problems. This deviation can be monitored using monitoring variable code 115 in P0.001 or in the SureServo2 Pro Scope.

This parameter works in conjunction with P1.085. After the number of motor revolutions has occurred as defined in P1.085 the accumulated error measured in monitoring code [115] gets reset to 0.

When the deviation is greater than the value of P1.073, AL040 (excessive deviation of full closed-loop position control) occurs. To completely avoid this alarm, set P1.073 high and P1.085=1.

$$\text{P1.073} < (\text{Main encoder feedback} \times \frac{P1.072}{16777216}) - \text{Auxiliary encoder feedback}$$



P1.074	Full-closed loop control for secondary or auxiliary encoder		Hex Address	Dec Address
			0194H 0195H	40405 40406
Default:	0x0000	Control mode:	PT / PR (full-closed loop)	
Unit:	-	Setting range:	0000h–F132h	
Format:	HEX	Data size:	16-bit	

Settings:

X	Full-closed loop control switch	Z	Positive / negative direction selection of auxiliary encoder feedback
Y	Source for OA / OB / OZ output	U	Auxiliary encoder filter function

- *X: full-closed loop/Gantry function switch*
  - *0: disable full-closed loop/Gantry function switch*
  - *1: enable full-closed loop function*
  - *2: enable synchronous gantry control function*
- *Y: input source for CN1 outputs OA/OB/OZ*
  - *0: motor encoder is the source*
  - *1: CN5 auxiliary encoder is the source*
  - *2: CN1 pulse command is the source*
  - *3: reserved*
- *Z: positive / negative direction selection of auxiliary encoder feedback*
  - *0: positive direction when A phase leads B phase of auxiliary encoder*
  - *1: positive direction when B phase leads A phase of auxiliary encoder*
- *U: auxiliary encoder filter function*
  - *0: bypass (relays pulse signal coming into the drive back out on CN1 OA, /OA, OB, /OB)*
  - *1: 6.66 MHz*
  - *2: 1.66 MHz*
  - *3: 833 kHz*
  - *4: 416 kHz*
  - *5–F: reserved*

P1.075	Low-pass filter time constant for full- and half-closed loop control		Hex Address	Dec Address
			0196H 0197H	40407 40408
Default:	100	Control mode:	PT / PR (full-closed loop)	
Unit:	ms	Setting range:	0–1000	
Format:	DEC	Data size:	16-bit	

Settings:

When the stiffness of the mechanical system between full-closed and half-closed loops is insufficient, set the proper time constant to enhance the stability of the system. In other words, this filter temporarily blends full-closed loop and half-closed loop feedback to establish a stable start and stop position, and after stabilizing, the full-closed loop effect is in 100% control. When the stiffness is sufficient, set to disable.

A half-closed loop is referring to the encoder on the back of the servo motor being the feedback device for the drive to close the velocity and position loop. For a fully-closed loop system, this is referring to the motor's encoder being used to close the velocity loop and an external encoder connected to CN5 to close the position loop.

Set the value to 0 to disable the low-pass filter (bypass) function.

If the stiffness of the mechanical system is high, decrease the value of P1.075, or set the value to 0 to disable. If the stiffness of the mechanical system is low, increase the value of P1.075.

When an extremely flexible mechanism is using full-closed loop control and when the motor starts turning, the external encoder might get some unstable feedback due to the flexible structure. So increasing the low pass filter (P1.075) can decrease the unstable level of the feedback.

This parameter will mitigate any fluctuations seen in the external encoder when in full-closed loop control when starting and stopping . The servo will partially act as a half-closed loop system and use the servo motor's encoder to reduce instability of the load, and after the motion of the load is stabilized, the full-closed loop function is turned back on. This filter blends the two encoder feedback signals during feedback instability

P1.076▲	***Maximum speed for encoder output (OA, OB)***		***Hex Address***	***Dec Address***
			0198H 0199H	40409 40410
Default:	5500	Control mode:	All	
Unit:	rpm	Setting range:	0–6000	
Format:	DEC	Data size:	16-bit	

Settings:

Input the actual maximum speed of the motor or the maximum speed of the application.

When you set the value to 0, the smoothing function is disabled.

The setting of P1.076 and P1.046 should follow the two requirements below:

- *P1.076 > motor speed*
- $\frac{\text{Motor speed}}{60} \times P1.046 \times 4 < 19.8 \times 10^6$

P1.077–P1.080	***Reserved***

P1.081	***Second set of maximum rotation speed for analog Speed command***		***Hex Address***	***Dec Address***
			01A2H 01A3H	40419 40420
Default:	Motor rated speed	Control mode:	S / T	
Unit:	rpm / 10V	Setting range:	0–50000	
Format:	DEC	Data size:	32-bit	

Settings:

This is the same parameter is P1.040. Please refer to the description of P1.040, Maximum rotation speed for analog speed command. Switch between P1.040 and P1.081 using DI(0x0F).

P1.082	Filter switching time between P1.040 and P1.081		Hex Address	Dec Address
			01A4H 01A5H	40421 40422
Default:	0	Control mode:	S / T	
Unit:	ms	Setting range:	0–1000 (0: disable this function)	
Format:	DEC	Data size:	16-bit	

Settings:

- *0: disable filter switching time*

P1.083	Abnormal analog input voltage level		Hex Address	Dec Address
			01A6H 01A7H	40423 40424
Default:	0	Control mode:	S	
Unit:	mV	Setting range:	0–12000 (0: disable this function)	
Format:	DEC	Data size:	16-bit	

Settings:

When the analog input voltage is higher than P1.083 for more than 50ms, AL042 (analog input voltage is too high) occurs. The comparison value for this parameter is the original analog input voltage (in millivolts) which has not been changed by an offset value through P4.022 (analog speed input offset).

P1.084	Error clearing function when switching between full- and half-closed loops		Hex Address	Dec Address
			01A8H 01A9H	40425 40426
Default:	0x0000	Control mode:	PT (full-closed loop)	
Unit:	-	Setting range:	0x0000 – 0x0001	
Format:	HEX	Data size:	16-bit	

Settings:

This parameter is not available in PR mode. In PR mode, the error is automatically cleared when the systems switches between full- and half-closed loops.

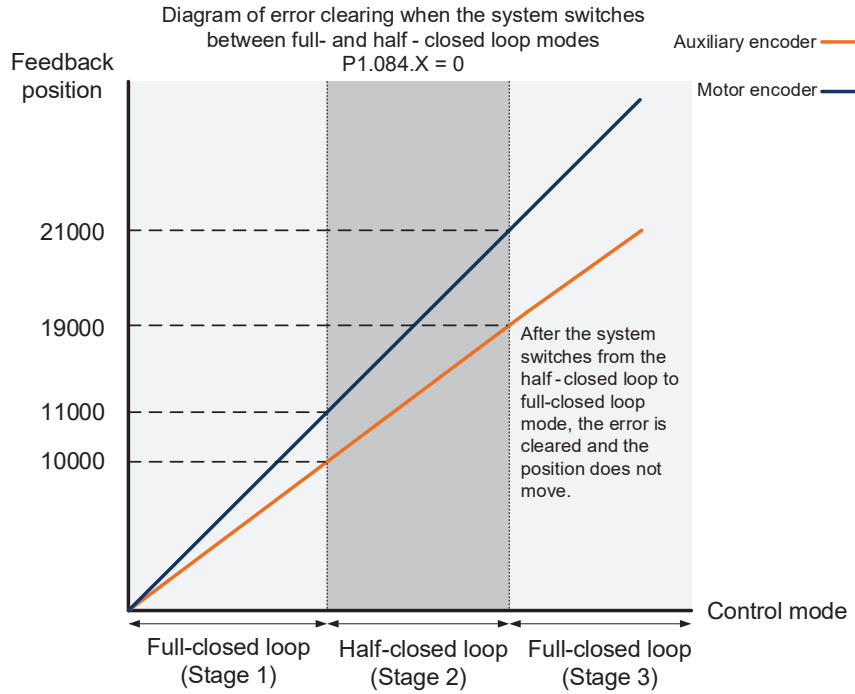
X	Error clearing function when the system switches from half-closed loop to full-closed loop	Z	Reserved
Y	Reserved	U	Reserved

- *X: Error clearing function when the system switches from half-closed loop to full-closed loop*
  - *0: clear the error when switching.*
    When the system is in half-closed loop, the command refers to the motor encoder and the position does not move after the system switches to full-closed loop.
  - *1: no clearing of the error when switching.*
    When the system is in half-closed loop control, the command refers to the motor encoder. After the system switches to full-closed loop, the command issued in half-closed loop becomes the full-closed loop command, and thus the position moves.

Note: Use DI [0x0B] to switch between full- and half-closed loop modes (P1.074.X must equal 1).

Examples:

Error Cleaning Enabled (P1.084.X=0)



Stage 1: full-closed loop control (feedback position of the auxiliary encoder)

If the servo drive issued a position command of 10,000 PUU and the feedback position of the auxiliary encoder is 10,000 PUU, the final feedback position of the motor encoder is 11,000 PUU due to the backlash and sliding of the mechanical parts.

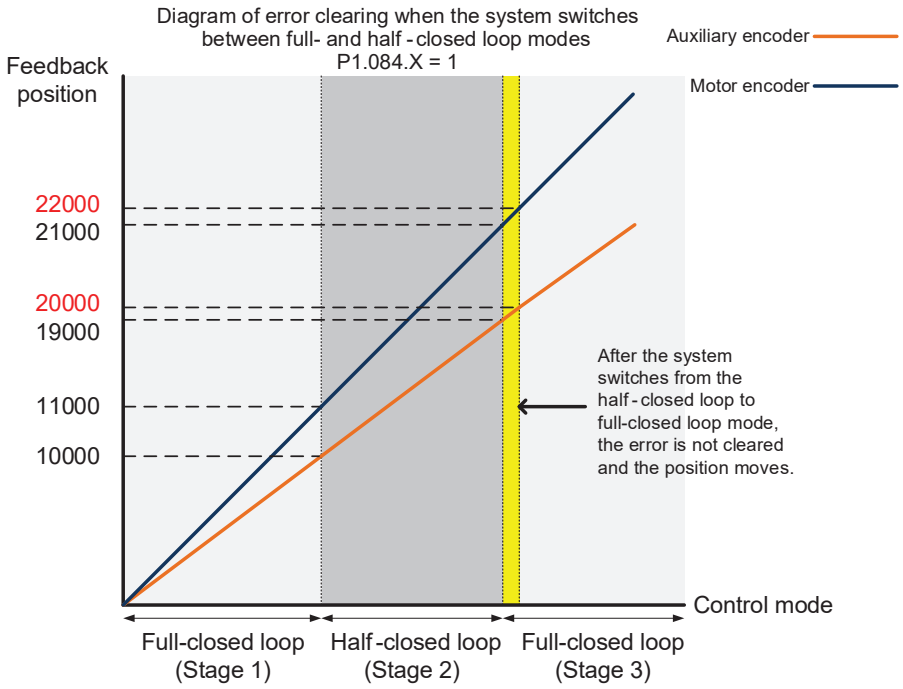
Stage 2: half-closed loop control (feedback position of the motor encoder)

Use DI [0x0B] to switch the control mode from full-closed loop to half-closed loop, and then issue the position command of 10,000 PUU again. In half-closed loop control, since the command refers to the position of the motor encoder, the feedback position of the motor encoder is 21,000 PUU, but the feedback position of the auxiliary encoder is 19,000 PUU. In this mode, there is an error of 1,000 PUU between the auxiliary encoder (19,000 PUU) and the position command (20,000 PUU).

Stage 3: full-closed loop control (feedback position of the auxiliary encoder)

When you set P1.084 to 0, the error will be cleared. Thus, after using DI [0x0B] to switch the control mode from half-closed loop to full-closed loop, the feedback position of the auxiliary encoder is not corrected.

Error Clearing Disabled (P1.084.X=1)



Stage 1: full-closed loop control

If the servo drive issued a position command of 10,000 PUU and the feedback position of the auxiliary encoder is 10,000 PUU, the final feedback position of the motor encoder is 11,000 PUU due to the backlash and sliding of the mechanical parts.

Stage 2: half-closed loop control

Use DI [0x0B] to switch the control mode from full-closed loop to half-closed loop, and then issue the position command of 10,000 PUU again. In half-closed loop control, since the command refers to the position of the motor encoder, the feedback position of the motor encoder is 21,000 PUU, but the feedback position of the auxiliary encoder is 19,000 PUU. In this mode, there is an error of 1,000 PUU between the auxiliary encoder (19,000 PUU) and the position command (20,000 PUU).

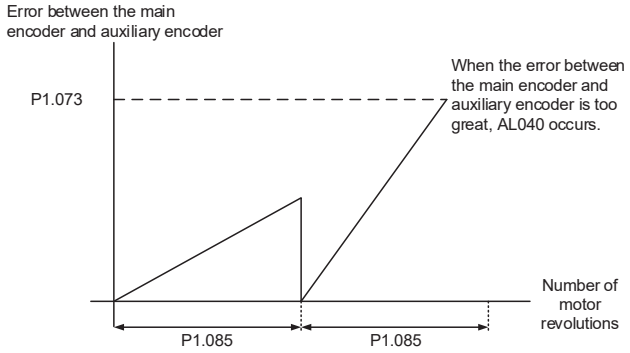
Stage 3: full-closed loop control

When you set P1.084 to 1, the error will not be cleared. Thus, after using DI [0x0B] to switch the control mode from half-closed loop to full-closed loop, the feedback position of the auxiliary encoder is corrected and the motor moves to the corresponding position (yellow area as shown in the above figure). The previous half-closed loop command becomes the full-closed loop command and refers to the auxiliary encoder to move the mechanical part to the position corresponding to the actual command. The final feedback position of the auxiliary encoder is 20,000 PUU.

P1.085	Auto clearing position deviation between motor and auxiliary encoder		Hex Address	Dec Address
			01AAH 01ABH	40427 40428
Default:	0	Control mode:	PT/PR (full-closed loop)	
Unit:	rev	Setting range:	0–32767	
Format:	DEC	Data size:	16-bit	

Settings:

This parameter sets the upper limit of the feedback position error between the main encoder and auxiliary encoder. When the number of motor revolutions is greater than or equal to this parameter value, the system automatically clears the error. When set to 0 the parameter is disabled. The deviation value will not reset regardless of the number of motor revolutions. Once the deviation reaches P1.073 then an AL040 will occur.

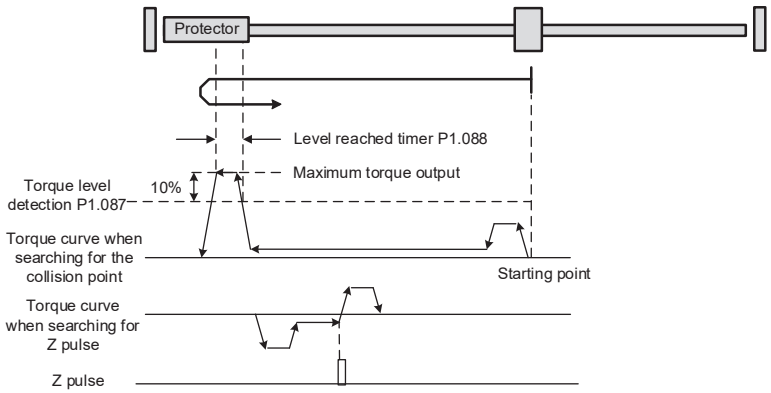


P1.086	Reserved

P1.087	Torque homing - torque level detection		Hex Address	Dec Address
			01AEH 01AFH	40431 40432
Default:	1	Control mode:	PR	
Unit:	%	Setting range:	1–300	
Format:	DEC	Data size:	16-bit	

Settings:

This setting is only for the torque homing mode. As shown in the following figure, after homing is triggered, the motor runs in one direction and reaches the protector. The servo drive then outputs a larger motor current in order to counter the external force. The servo drive uses P1.087 and P1.088 as the conditions for homing. Since the hard stops are not always the same, it is recommended to return to find the Z pulse as the origin.



P1.088	Torque homing - level reached timer		Hex Address	Dec Address
			01B0H 01B1H	40433 40434
Default:	2000	Control mode:	PR	
Unit:	ms	Setting range:	2–2000	
Format:	DEC	Data size:	16-bit	

Settings:

The setting of the torque level reached timer for the torque homing mode. If the motor torque output continues to exceed the level set by P1.087 and the duration exceeds this setting, the homing is complete. Refer to P1.087 for the timing diagram of torque homing mode.

P1.089	First set of vibration elimination - Anti-resonance frequency		Hex Address	Dec Address
			01B2H 01B3H	40435 40436
Default:	4000	Control mode:	PT / PR	
Unit:	0.1 Hz	Setting range:	10–4000	
Format:	DEC	Data size:	16-bit	

Settings:

Anti-resonance frequency for the first set of low frequency vibration elimination.

Use this function in flexible machines with low rigidity. The definition of a flexible machine is one for which when the target position is reached, due to lack of rigidity the machine vibrates and needs more time to become stable. SureServo2 provides two sets of vibration elimination. The first set is P1.089–P1.091, and the second set is P1.092–P1.094. The vibration elimination setting must be obtained through the system analysis window, and is needed to enable the low-frequency analysis options. For details, please refer to the SureServo2 Pro software instructions.

Vibration elimination takes effect only when you enable the two dimensional control function P2.094 [Bit 12]. After enabling the vibration elimination function, turn on the first set of vibration elimination with P2.094 [Bit 8] and the second set with P2.094 [Bit 9].

Example:

- *Set P2.094=0x1100 to enable the first set (bit 12=1, and bit 8=1. Binary=0001 0001 0000 0000)*
- *Set P2.094=0x1200 to enable the second set (bit 12=1, and bit 9=1. Binary=0001 0010 0000 0000).*
- *Set P2.094=0x1300 to enable the first and second set (bit 12, bit 9, and bit 8=1. Binary=0001 0011 0000 0000).*

NOTE: *See P2.094 for the definition of other special bits in P2.094.*

P1.090	First set of vibration elimination - Resonance frequency		Hex Address	Dec Address
			01B4H 01B5H	40437 40438
Default:	4000	Control mode:	PT / PR	
Unit:	0.1 Hz	Setting range:	10–4000	
Format:	DEC	Data size:	16-bit	

Settings:

Anti-resonance frequency for the first set of low frequency vibration elimination.

P1.091	First set of vibration elimination - Resonance difference		Hex Address	Dec Address
			01B6H 01B7H	40439 40440
Default:	10	Control mode:	PT / PR	
Unit:	0.1 dB	Setting range:	10–4000	
Format:	DEC	Data size:	16-bit	

Settings:

Attenuation rate for the first set of low frequency vibration elimination.

P1.092	Second set of vibration elimination - Anti-resonance frequency		Hex Address	Dec Address
			01B8H 01B9H	40441 40442
Default:	4000	Control mode:	PT / PR	
Unit:	0.1 Hz	Setting range:	10–4000	
Format:	DEC	Data size:	16-bit	

Settings:

Setting method is the same as for the first set of vibration elimination P1.089.

P1.093	Second set of vibration elimination - Resonance frequency		Hex Address	Dec Address
			01BAH 01BBH	40443 40444
Default:	4000	Control mode:	PT / PR	
Unit:	0.1 Hz	Setting range:	10–4000	
Format:	DEC	Data size:	16-bit	

Settings:

Anti-resonance frequency for the second set of low frequency vibration elimination.

P1.094	Second set of vibration elimination - Resonance difference		Hex Address	Dec Address
			01BCH 01BDH	40445 40446
Default:	10	Control mode:	PT / PR	
Unit:	0.1 dB	Setting range:	10–4000	
Format:	DEC	Data size:	16-bit	

Settings:

Attenuation rate for the second set of low frequency vibration elimination.

P1.095–P1.096	Reserved

P1.097▲	Encoder pulse number output denominator		Hex Address	Dec Address
			01C2H 01C3H	40451 40452
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0–160000	
Format:	DEC	Data size:	32-bit	
Related Parameters	P1.074.Y = which input (CN2, CN5, etc.) is the source for the encoder output P1.046 = the encoder output pulses/rev (Numerator)			

Settings:

1) When P1.074.Y = 0 (CN2 motor encoder is the source):

a) When P1.097 = 0, OA / OB pulse output refers to the value of P1.046. (Refer to Example 1.)
b) When P1.097 ≠ 0, OA / OB pulse output refers to the values of P1.046 and P1.097. (Refer to Example 2.)

2) When P1.074.Y = 1 (CN5 encoder is the source) or 2 (CN1 pulse command is the source):
a) When P1.097 = 0, OA / OB pulse output does not refer to the value of P1.046, but outputs according to the ratio of 1:1 instead.
b) When P1.097 ≠ 0, OA / OB pulse output refers to the values of P1.046 and P1.097. (Refer to Example 2.)

Example 1 (the value must be multiplied by 4 times the frequency):
When P1.097 = 0 and P1.046 = 2500,
OA / OB output is P1.046 multiplied by 4 times the frequency, which is 10,000 pulses.

Example 2 (the calculated value does not need to be multiplied by 4 times the frequency):
When P1.097 = 7 and P1.046 = 2500,
OA / OB output = 2500 / 7

NOTE: The motor outputs 2,500 pulses per seven revolutions.

P1.098	***Disconnection detection protection (UVW) response time***		***Hex Address***	***Dec Address***
			01C4H 01C5H	40453 40454
Default:	0	Control mode:	All	
Unit:	ms	Setting range:	0, 100–800	
Format:	DEC	Data size:	16-bit	

Settings:

When the motor disconnection detection protection (UVW) function is enabled (P2.065 [bit 9] = 1), this parameter indicates the response time of the detection mode. Set P1.098 to 0 to use the servo's default response time.

When P1.098 is not set to 0, the range should be between 100–800 for the detection response time.

Notes:

1) If it is necessary to shorten the response time, it is recommended that you use this parameter.
2) When the servo is on and has not started running, it is recommended that you set this parameter if you need to detect disconnection.

P1.099–P1.100	***Reserved***

P1.101■	Analog monitor output voltage 1		Hex Address	Dec Address
			01CAH 01CBH	40459 40460
Default:	0	Control mode:	ALL	
Unit:	mV	Setting range:	-10000 to +10000	
Format:	DEC	Data size:	16-bit	

Settings:

When you select 6 for the monitor source for P0.003 [YX], then the analog monitor output voltage refers to the voltage value of P1.101. You can write a fixed analog value in this register for precise control of external equipment such as a VFD or continuously write to this register to dynamically change the analog output.

P1.102■	Analog monitor output voltage 2		Hex Address	Dec Address
			01CCH 01CDH	40461 40462
Default:	0	Control mode:	ALL	
Unit:	mV	Setting range:	-10000 to +10000	
Format:	DEC	Data size:	16-bit	

Settings:

When you select 7 for the monitor source of P0.003 [YX], then the analog monitor output voltage refers to the voltage value of P1.102.

P1.103–P1.110	Reserved

P1.111■	Overspeed protection level		Hex Address	Dec Address
			01DEH 01DFH	40479 40480
Default:	Maximum motor speed x 1.1	Control mode:	ALL	
Unit:	rpm	Setting range:	0–66000	
Format:	DEC	Data size:	32-bit	

Settings:

This function is to protect the motor from overspeeding, which can be applied to all control modes. When the filtered motor speed exceeds this set speed, AL056 is triggered.

8.4.3 - P2.xxx Extension parameters

NOTE: Most applications can be tuned with the servo's Auto Tuning feature. The 3.1MHz bandwidth will help solve many problem applications. For further Auto Tuning help or for instructions on how to Manually Tune the drive, please see Chapter 5: Tuning.

P2.000	Position control gain		Hex Address	Dec Address
			0200H 0201H	40513 40514
Default:	35	Control mode:	PT / PR	
Unit:	rad/s	Setting range:	0–2047	
Format:	DEC	Data size:	16-bit	

Settings:

Increasing the value of the position control gain can enhance the position response and reduce the position errors. If you set the value too high, it may cause vibration and noise.

P2.001	Position control gain rate of change		Hex Address	Dec Address
			0202H 0203H	40515 40516
Default:	100	Control mode:	PT / PR	
Unit:	%	Setting range:	10–500	
Format:	DEC	Data size:	16-bit	

Settings:

Adjust the rate of change of position control gain according to the gain switching condition.

P2.002	Position feed forward gain		Hex Address	Dec Address
			0204H 0205H	40517 40518
Default:	50	Control mode:	PT / PR	
Unit:	%	Setting range:	0–100	
Format:	DEC	Data size:	16-bit	

Settings:

If the position control command changes position smoothly, increasing the gain value can reduce position following errors. If it does not change smoothly, decreasing the gain value can reduce mechanical vibration. This gain parameter is disabled when the two dimensional control function is on (P2.094 [Bit 12] = 1).

P2.003	Position feed forward gain smoothing constant		Hex Address	Dec Address
			0206H 0207H	40519 40520
Default:	5	Control mode:	PT / PR	
Unit:	ms	Setting range:	2–100	
Format:	DEC	Data size:	16-bit	

Settings:

If the position control command changes position smoothly, decreasing the smoothing constant value can reduce the position following errors. If it does not change smoothly, increasing the smoothing constant value can reduce mechanical vibration.

P2.004	Speed control gain		Hex Address	Dec Address
			0208H 0209H	40521 40522
Default:	500	Control mode:	All	
Unit:	rad/s	Setting range:	0–8191	
Format:	DEC	Data size:	16-bit	

Settings:

Increasing the speed control gain can enhance the speed response. If you set the value too high, it may cause vibration and noise.

P2.005	Speed control gain rate of change		Hex Address	Dec Address
			020AH 020BH	40523 40524
Default:	100	Control mode:	All	
Unit:	%	Setting range:	10–500	
Format:	DEC	Data size:	16-bit	

Settings:

Adjust the rate of change for the speed control gain according to the gain switching condition.

P2.006	Speed integral compensation		Hex Address	Dec Address
			020CH 020DH	40525 40526
Default:	100	Control mode:	All	
Unit:	rad/s	Setting range:	0–1023	
Format:	DEC	Data size:	16-bit	

Settings:

Increasing the value of the integral speed control can enhance speed response and reduce the deviation in speed control. If you set the value too high, it may cause vibration and noise.

P2.007	Speed feed forward gain		Hex Address	Dec Address
			020EH 020FH	40527 40528
Default:	0	Control mode:	All	
Unit:	%	Setting range:	0–100	
Format:	DEC	Data size:	16-bit	

Settings:

If the speed control command changes speed smoothly, increasing the gain value can reduce the speed following error. If it does not change smoothly, decreasing the gain value can reduce mechanical vibration.

P2.008■	Special parameter write-in function		Hex Address	Dec Address
			0210H 0211H	40529 40530
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0–65535	
Format:	DEC	Data size:	16-bit	

Settings:

Special parameter write-in function:

Code	Function
10	Reset to Factory Defaults (power cycle the drive after reset to defaults is finished). Be sure that both the L1/L2 control power is removed and the USB power. A power cycle will not be valid if one or the other is still supplying power.
30, 35	Write 30 then 35 to Save Compare, Capture, and E-Cam data table to EEPROM.
400	Return Digital Outputs to normal DO mode. Set P2.008=400 to exit Force mode.
406	Put Digital Outputs in Force mode (see Section 4.4.2 and P4.006).

NOTE: *Other parameters that contain special functions and/or bit adjustments:*
-P2.030 Auxiliary function (force Servo ON, enable disable EEPROM writes, save to EEPROM),
-P2.065 Special bit register (pulse/encoder/UVW error detection, ZCLAMP, pulse inhibit, friction compensation)
-P2.066 Special bit register 2 (low voltage latch and warning, overload warning detection, linear encoder disconnect error)
-P2.094 Special bit register 3 (2D control, vibration elimination, alarm enables: brake R temp, AL007, AL016).

P2.009	DI response filter time		Hex Address	Dec Address
			0212H 0213H	40531 40532
Default:	2	Control mode:	All	
Unit:	ms	Setting range:	0–20	
Format:	DEC	Data size:	16-bit	

Settings:

When environmental interference (or EMI) is high, increasing this value can enhance the control stability. If you set the value too high, it impacts the response time.

P2.010	DI1 functional planning		Hex Address	Dec Address
			0214H 0215H	40533 40534
Default:	0x0101	Control mode:	All	
Unit:	-	Setting range:	0–0x015F (last two digits are DI codes)	
Format:	HEX	Data size:	16-bit	

Settings:

- *YX: input function selection*
  Please refer to section 8.4.9
- *Z: input contact: A or B contact*
  - *0: set this input contact to be normally closed (B contact)*
  - *1: set this input contact to be normally open (A contact)*
- *U: not in use*

When these parameters are modified, please re-start the servo drive to ensure it functions normally. Use P3.006 to change the source for the digital signal, either through an external terminal block or communication parameter P4.007. See section 8.4.9 for information on Digital Input functions. All digital inputs have a max input frequency of 1kHz. This does not include Pulse or Sign inputs.

NOTE: *Some DIs and DOs can have their actions changed by certain advanced features. Be careful when using the COMPARE functions. They will supersede the actions/definitions of DI7 and DO4. It is highly recommended to set the affected DI and DO definitions to 0 (disabled) if using the above features.*

P2.011	***DI2 functional planning***		***Hex Address***	***Dec Address***
			0216H 0217H	40535 40535
Default:	0x0104	Control mode:	All	
Unit:	-	Setting range:	0–0x015F (last two codes are DI codes)	
Format:	HEX	Data size:	16-bit	

Settings:

Please refer to the description of P2.010.

P2.012	***DI3 functional planning***		***Hex Address***	***Dec Address***
			0218H 0219H	40537 40538
Default:	0x0116	Control mode:	All	
Unit:	-	Setting range:	0–0x015F (last two codes are DI codes)	
Format:	HEX	Data size:	16-bit	

Settings:

Please refer to the description of P2.010.

P2.013	***DI4 functional planning***		***Hex Address***	***Dec Address***
			021AH 021BH	40539 40540
Default:	0x0117	Control mode:	All	
Unit:	-	Setting range:	0–0x015F (last two codes are DI codes)	
Format:	HEX	Data size:	16-bit	

Settings:

Please refer to the description of P2.010.

NOTE: *DI4 functional planning will be overwritten to DI.ABSQ automatically, if using the Absolute Encoder function (DI.ABSE is on). See ABSE (0x1D) and ABSQ in section 8.4.9.*

P2.014	DI5 functional planning		Hex Address	Dec Address
			021CH 021DH	40541 40542
Default:	0x0102	Control mode:	All	
Unit:	-	Setting range:	0–0x015F (last two codes are DI codes)	
Format:	HEX	Data size:	16-bit	

Settings:

Please refer to the description of P2.010.

P2.015	DI6 functional planning		Hex Address	Dec Address
			021EH 021FH	40543 40544
Default:	0x0022	Control mode:	All	
Unit:	-	Setting range:	0–0x015F (last two codes are DI codes)	
Format:	HEX	Data size:	16-bit	

Settings:

Please refer to the description of P2.010.

P2.016	DI7 functional planning		Hex Address	Dec Address
			0220H 0221H	40545 40546
Default:	0x0023	Control mode:	All	
Unit:	-	Setting range:	0–0x015F (last two codes are DI codes)	
Format:	HEX	Data size:	16-bit	

Settings:

Please refer to the description of P2.010.

NOTE: *When P5.039.X (bit 0) = 1, the Capture feature is enabled and DI7 is automatically assigned as the High Speed Capture input. When Capture is disabled P2.016 is assigned 0x0100. This reassignment is not stored in the EEPROM therefore a power cycle will revert P2.016 back to the original assignment.*

P2.017	DI8 functional planning		Hex Address	Dec Address
			0222H 0223H	40547 40548
Default:	0x0021	Control mode:	All	
Unit:	-	Setting range:	0–0x015F (last two digits are DI codes)	
Format:	HEX	Data size:	16-bit	

Settings:

Please refer to the description of P2.010. DI8 is the only input allowed for DI.INHP (inhibit pulse) assignment due to the high speed input feature of this input.

P2.018	DO1 functional planning		Hex Address	Dec Address
			0224H 0225H	40549 40550
Default:	0x0101	Control mode:	All	
Unit:	-	Setting range:	0–0x013F (last two digits are DO codes)	
Format:	HEX	Data size:	16-bit	

Settings:

- *YX: output function selection*
  Please refer to section "8.4.10 - Digital output (DO) Function Assignments" on page 8–252.
- *Z: output contact: A or B contact*
  - *0: set this output contact to be normally closed (B contact)*
  - *1: set this output contact to be normally open (A contact)*
- *U: not in use*

When these parameters are modified, please re-start the servo drive to ensure it functions normally.

NOTE: *Several DO functions have their status available in P0.046. Use that register for status feedback (with communications) without consuming physical DO terminals.*

NOTE: *Some DIs and DOs can have their actions changed by certain advanced features. Be careful when using the COMPARE functions. They will supersede the actions/definitions of DI7 and DO4. It is highly recommended to set the affected DI and DO definitions to 0 (disabled) if using the above features.*

P2.019	DO2 functional planning		Hex Address	Dec Address
			0226H 0227H	40551 40552
Default:	0x0103	Control mode:	All	
Unit:	-	Setting range:	0–0x013F (last two codes are DO code)	
Format:	HEX	Data size:	16-bit	

Settings:

Please refer to the description of P2.018. See section 8.4.9 and 8.4.10 for more information.

NOTE: *DO2 functional planning will be automatically overwritten to DO.ABSR, if using the Absolute Encoder function (DI.ABSE is on). See ABSE (0x1D) and ABSR in section 8.4.9 and 8.4.10.*

P2.020	DO3 functional planning		Hex Address	Dec Address
			0228H 0229H	40553 40554
Default:	0x0109	Control mode:	All	
Unit:	-	Setting range:	0–0x013F (last two codes are DO code)	
Format:	HEX	Data size:	16-bit	

Settings:

Please refer to the description of P2.018. See section 8.4.9 and 8.4.10 for more information.

NOTE: *DDO3 functional planning will be automatically overwritten to DO.ABSD, if using the Absolute Encoder function (DI.ABSE is on). See ABSE (0x1D) and ABSD in section 8.4.9 and 8.4.10.*

P2.021	DO4 functional planning		Hex Address	Dec Address
			022AH 022BH	40555 40556
Default:	0x0105	Control mode:	All	
Unit:	-	Setting range:	0–0x013F (last two codes are DO code)	
Format:	HEX	Data size:	16-bit	

Settings:

Please refer to the description of P2.018.

NOTE: *When P5.039.X (bit 0) =1, the Capture feature is enabled and DO4 is automatically assigned as the High Speed Compare Output. When Compare is disabled P2.021 is assigned 0x0100 automatically. This reassignment is not stored in the EEPROM therefore a power cycle will revert P2.021 back to the original assignment.*

P2.022	DO5 functional planning		Hex Address	Dec Address
			022CH 022DH	40557 40558
Default:	0x0007	Control mode:	All	
Unit:	-	Setting range:	0–0x013F (last two codes are DO code)	
Format:	HEX	Data size:	16-bit	

Settings:

Please refer to the description of P2.018 (P2.041 is DO6).

P2.023	Notch filter frequency (1)		Hex Address	Dec Address
			022EH 022FH	40559 40560
Default:	1000	Control mode:	All	
Unit:	Hz	Setting range:	50–5000	
Format:	DEC	Data size:	16-bit	

Settings:

The first resonance frequency setting. Set P2.024 to 0 to disable this function. P2.043 and P2.044 are the second Notch filter parameters.

P2.024	Notch filter attenuation level (1)		Hex Address	Dec Address
			0230H 0231H	40561 40562
Default:	0	Control mode:	All	
Unit:	-dB	Setting range:	0–40	
Format:	DEC	Data size:	16-bit	

Settings:

This is the first Notch filter attenuation level. For example, an attenuation level of 5 indicates -5 dB. Set this parameter to 0 to disable the Notch filter function.

P2.025	Resonance suppression low-pass filter			Hex Address	Dec Address
				0232H 0233H	40563 40564
Operation interface:	Panel / software	Communication	Control mode:	All	
Default:	1.0	10	Data size:	16-bit	
Unit:	1 ms	0.1 ms	-	-	
Setting range:	0.0–100.0	0–1000	-	-	
Format:	One decimal	DEC	-	-	
Example:	1.5 = 1.5 ms	15 = 1.5 ms	-	-	

Settings:

Set the time constant for the low-pass filter for resonance suppression. Set this parameter to 0 to disable the low-pass filter.

P2.026	Anti-interference gain		Hex Address	Dec Address
			0234H 0235H	40565 40566
Default:	0	Control mode:	All	
Unit:	rad/s	Setting range:	0–1023	
Format:	DEC	Data size:	16-bit	

Settings:

Increasing this parameter can increase the damping of the speed loop and reduce the speed loop response. Setting the value of P2.026 to equal P2.006 is recommended. Please see the following for setting P2.026:

- *In Speed mode, increase the value of this parameter to reduce speed overshoot.*
- *In Position mode, decrease the value of this parameter to reduce position overshoot.*

***NOTE:** This gain parameter is disabled when the two dimensional control function is on (P2.094 [Bit 12] = 1).*

P2.027	Gain switching condition and method selection		Hex Address	Dec Address
			0236H 0237H	40567 40568
Default:	0x0000	Control mode:	All	
Unit:	-	Setting range:	0000h–0x0018	
Format:	HEX	Data size:	16-bit	

Settings:

UZ	Reserved	Y	Gain switching method	X	Gain switching condition

- *X: gain switching condition (determines the conditions when the gain switching will occur)*

X	Function	Control Mode
0	Disable gain switching function	-
1	Signal of gain switching (GAINUP) is on	All
2	In position control mode, position error is larger than P2.029	P
3	Frequency of Position command is larger than P2.029	P
4	Rotation speed of servo motor is faster than P2.029	All
5	Signal of gain switching (GAINUP) is off	All
6	In position control mode, position error is smaller than P2.029	P
7	Frequency of Position command is smaller than P2.029	P
8	Rotation speed of servo motor is slower than P2.029	All

- Y: gain switching method (after the condition in X is met, this setting determines what changes occur for gain switching)
  - *0: gain rate switching*
  - *1: integrator switching (P controller switches to PI controller)*

Value	Control Mode P	Control Mode S	Gain switching
0	P2.000 x 100% P2.004 x 100%	P2.004 x 100%	Before switching
	P2.000 x P2.001 P2.004 x P2.005	P2.004 x P2.005	After switching
1	P2.006 x 0%; P2.026 x 0%		Before switching
	P2.006 x 100%; P2.026 x 100%		After switching

- *UZ: not in use*

P2.028	Gain switching time constant		Hex Address	Dec Address
			0238H 0239H	40569 40570
Default:	10	Control mode:	All	
Unit:	ms	Setting range:	0–1000	
Format:	DEC	Data size:	16-bit	
Example:	15 = 150 ms			

Settings:

Controls the smoothing gain. Set this parameter to 0 to disable this function.

P2.029	Gain switching condition		Hex Address	Dec Address
			023AH 023BH	40571 40572
Default:	16777216	Control mode:	All	
Unit:	pulse; kpps; rpm	Setting range:	0–50331648	
Format:	DEC	Data size:	32-bit	

Settings:

You determine the gain switching (pulse error, kpps, rpm) by the selection of gain switching condition (P2.027).

P2.030■	Auxiliary function		Hex Address	Dec Address
			023CH 023DH	40573 40574
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-8 to +8	
Format:	DEC	Data size:	16-bit	

Settings:

Value	Function
0	Disable all functions described below
1	Switch servo to Servo On state
2–4	(Reserved)
5	Disable writing to the non-volatile EEPROM (parameter changes are saved in RAM only). This setting does not retain its value after powering off. When there is no need to save the data, this setting can avoid continually writing the parameters into EEPROM and shortening the lifetime of the EEPROM. Y**ou must set this parameter when using communication control.** When using communication control, always have the PLC set P2.030=5 after drive configuration is complete. Even though the EEPROM can handle millions of writes, constantly writing a new velocity (if the drive is in Speed mode) or a new position (if using PR mode) could eventually cause EEPROM failure after several years.
8	Back up all current parameter values to EEPROM, so that the values are retained after cycling the power. The panel displays 'to.rom' during execution. This feature can also be executed when servo is in the Servo On state.
-1, -5	Disable the functions of 1 and 5.
7, -2 to -4, -7, -8	(Reserved)

NOTE: *Please set the value to 0 during normal operation. The value returns to 0 automatically after cycling the power.*

NOTE: *Other parameters that contain special functions and/or bit adjustments: P2.008 Special parameter write-in function (factory reset, write to capture/compare/CAM table to EEPROM, force DOs), P2.065 Special bit register (Pulse/encoder/UVW error detection, ZCLAMP, pulse inhibit, friction compensation), P2.066 Special bit register 2 (low voltage latch and warning, overload warning detection, linear encoder disconnect error), P2.094 Special bit register 3 (2D control, vibration elimination, alarm enables: brake R temp, AL007, AL016).*

P2.031	Frequency response bandwidth level		Hex Address	Dec Address
			023EH 023FH	40575 40576
Default:	19	Control mode:	All	
Unit:	-	Setting range:	1–50	
Format:	DEC	Data size:	16-bit	

Settings:

In gain adjustment mode (P2.032), adjust the servo bandwidth with the bandwidth response level parameter (P2.031). When you increase the bandwidth response level (P2.031), the servo bandwidth increases as well. Refer to Chapter 5 for adjustment details.

P2.032	Gain adjustment mode		Hex Address	Dec Address
			0240H 0241H	40577 40578
Default:	0x0001	Control mode:	All	
Unit:	-	Setting range:	0–4	
Format:	HEX	Data size:	16-bit	

Settings:

The servo drive provides three gain adjustment modes for fine tuning. You only need to increase or decrease the frequency response level (P2.031) to tune the system. Recommendations for tuning the system are in Section 5.1.

Value	Adjustment Mode	Inertia Estimation	Parameter	
			Manual	Auto
0	Manual	Fixed set value of P1.037	P1.037, P2.000, P2.004, P2.006, P2.023, P2.024, P2.025, P2.043, P2.044, P2.045, P2.046, P2.049, P2.089, P2.098, P2.099, P2.101, P2.102	N/A
1	Gain adjustment mode 1	Real-time estimation	P2.031	P1.037, P2.000, P2.004, P2.006, P2.023, P2.024, P2.025, P2.043, P2.044, P2.045, P2.046, P2.049, P2.089, P2.098, P2.099, P2.101, P2.102
2	Gain adjustment mode 2	Fixed set value of P1.037	P1.037 P2.031	P2.000, P2.004, P2.006, P2.023, P2.024, P2.025, P2.043, P2.044, P2.045, P2.046, P2.049, P2.089, P2.098, P2.099, P2.101, P2.102
3	Gain adjustment mode 3 (only two dimensional control function is enabled)	Fixed set value of P1.037	P1.037 P2.031 P2.089	P2.000, P2.004, P2.006, P2.023, P2.024, P2.025, P2.043, P2.044, P2.045, P2.046, P2.049, P2.098, P2.099, P2.101, P2.102
4	Gain adjustment mode 4	Reset to gain default value		

NOTE: *When the two dimensional control function is turned off (P2.094 [Bit 12] = 0), the effect of gain adjustment mode 3 is equivalent to gain adjustment mode 2, so setting P2.089 (Command Response Gain) is invalid in that scenario.*

P2.033	Reserved

P2.034	Speed command error warning		Hex Address	Dec Address
			0244H 0245H	40581 40582
Default:	5000	Control mode:	S / Sz	
Unit:	rpm	Setting range:	1–30000	
Format:	DEC	Data size:	16-bit	

Settings:

In Speed mode, this parameter sets the acceptable difference between the command speed and the feedback speed. If the difference is greater than this value, AL007 occurs.

P2.035	Excessive deviation of Position command warning		Hex Address	Dec Address
			0246H 0247H	40583 40584
Default:	50331648	Control mode:	PT / PR	
Unit:	pulse	Setting range:	1–1677721600	
Format:	DEC	Data size:	32-bit	

Settings:

In Position mode, this parameter sets the acceptable difference between the command position and the feedback position. If the difference is greater than this value, AL009 occurs.

P2.036	DI9 functional planning		Hex Address	Dec Address
			0248H 0249H	40585 40586
Default:	0x0100	Control mode:	All	
Unit:	-	Setting range:	0–0x015F (last two codes are DI codes)	
Format:	HEX	Data size:	16-bit	

Settings:

Please refer to the description of P2.010.

P2.037	DI10 functional planning		Hex Address	Dec Address
			024AH 024BH	40587 40588
Default:	0x0100	Control mode:	All	
Unit:	-	Setting range:	0–0x015F (last two codes are DI codes)	
Format:	HEX	Data size:	16-bit	

Settings:

Please refer to the description of P2.010.

P2.038	VDI11 functional planning		Hex Address	Dec Address
			024CH 024DH	40589 40590
Default:	0x0000	Control mode:	All	
Unit:	-	Setting range:	0–0x015F (last two codes are DI codes)	
Format:	HEX	Data size:	16-bit	

Settings:

Please refer to the description of P2.010. Virtual digital inputs are useful when triggering communication or when physical DI points are insufficient. You can set the DI to be used as soon as power is on when the contact would be normally closed for virtual digital input, such as Servo On. P3.006 and P4.007 settings are valid for virtual DIs (VDIs) as well as physical DIs.

P2.039	VDI12 functional planning		Hex Address	Dec Address
			024EH 024FH	40591 40592
Default:	0x0000	Control mode:	All	
Unit:	-	Setting range:	0–0x015F (last two codes are DI codes)	
Format:	HEX	Data size:	16-bit	

Settings:

Please refer to the description of P2.038.

P2.040	VDI13 functional planning		Hex Address	Dec Address
			0250H 0251H	40593 40594
Default:	0x0000	Control mode:	All	
Unit:	-	Setting range:	0–0x015F (last two codes are DI codes)	
Format:	HEX	Data size:	16-bit	

Settings:

Please refer to the description of P2.038.

P2.041	DO6 functional planning		Hex Address	Dec Address
			0252H 0253H	40595 40596
Default:	0x0000	Control mode:	All	
Unit:	-	Setting range:	0–0x013F (last two codes are DO code)	
Format:	HEX	Data size:	16-bit	

Settings:

Please refer to the description of P2.018.

P2.042	Reserved

P2.043	Notch filter frequency (2)		Hex Address	Dec Address
			0256H 0257H	40599 40600
Default:	1000	Control mode:	All	
Unit:	Hz	Setting range:	50–5000	
Format:	DEC	Data size:	16-bit	

Settings:

The second setting for resonance frequency. This function is disabled if P2.044 is 0.

P2.044	Notch filter attenuation level (2)		Hex Address	Dec Address
			0258H 0259H	40601 40602
Default:	0	Control mode:	All	
Unit:	-dB	Setting range:	0–40	
Format:	DEC	Data size:	16-bit	

Settings:

The second Notch filter attenuation level. A value of 5 indicates -5 dB. Set this parameter to 0 to disable the Notch filter.

P2.045	Notch filter frequency (3)		Hex Address	Dec Address
			025AH 025BH	40603 40604
Default:	1000	Control mode:	All	
Unit:	Hz	Setting range:	50–5000	
Format:	DEC	Data size:	16-bit	

Settings:

The third setting for resonance frequency. This function is disabled if P2.046 is 0.

P2.046	Notch filter attenuation level (3)		Hex Address	Dec Address
			025CH 025DH	40605 40606
Default:	0	Control mode:	All	
Unit:	-dB	Setting range:	0–40	
Format:	DEC	Data size:	16-bit	

Settings:

The third Notch filter attenuation level. A value of 5 indicates -5dB. Set this parameter to 0 to disable the Notch filter.

P2.047	Auto resonance suppression mode		Hex Address	Dec Address
			025EH 025FH	40607 40608
Default:	0x0001	Control mode:	All	
Unit:	-	Setting range:	0x0000–0x01F2	
Format:	DEC	Data size:	16-bit	

Settings:

X	Auto resonance suppression function	Z	Fixed resonance suppression parameter
Y	Fixed resonance suppression parameter	U	Reserved

- *X: auto resonance suppression function*
  - *0: disable auto resonance suppression. After the function is disabled, the existing resonance suppression parameter values do not change.*
  - *1: auto resonance suppression mode 1; when the servo determines it is stable(see Note 2 below), the servo stores the resonance suppression points in EEPROM (non-volatile memory for parameters), and disables the auto resonance suppression function (X = 0). Before the servo is stable, if you cycle power on the servo drive, the found resonance suppression points are lost and will not be saved.* ***The servo searches for the resonance suppression points again****.*
    If you switch the setting of X from 1 to 0, the known resonance suppression points will be stored in EEPROM.
    If you keep the setting of X as 1, the known resonance suppression points will not be cleared, but they are not written to EEPROM yet. They are written to EEPROM when the servo determines it is stable.
  - *2: auto resonance suppression mode 2; when the servo determines it is stable(see Note 2 below), the servo stores the resonance suppression points in EEPROM (non-volatile memory for parameters).* ***In this mode, the searching cycle continues until the 5 sets of resonance suppression parameters are set****, then the auto resonance suppression function is disabled (X = 0). Before the servo is stable, if you cycle power on the servo drive, the resonance suppression points that are not yet stored in EEPROM are lost and will not be saved. The resonance suppression points that are stored in EEPROM will not be affected.*
    If you switch the setting of X from 2 to 0, the known resonance suppression points will be stored in EEPROM.
    If you keep the setting of X as 2, the known resonance suppression points will not be cleared, but they are not written to EEPROM yet. They are written to EEPROM when the servo determines it is stable.

NOTE:

1: If you switch the setting of X from 0 to 1 or 2, the unfixed Notch filter is automatically cleared, the frequency is set to 1,000 Hz, and the suppression level is set to 0 dB.

2: The servo determines it is stable according to the following conditions: resonances have been suppressed, no other interference that affects the operation is found, and the motor speed is maintained at above 10 rpm for 3 minutes.

- *Y: fixed resonance suppression parameter (Notch Filters 1–4)*
  In auto resonance suppression, set the Notch filters to use manual resonance suppression.

Bit	3	2	1	0

Bit	*Function*	*Description*
0	Notch 1 auto / manual setting	0: auto resonance suppression 1: manually set the first set of resonance suppression parameters
1	Notch 2 auto / manual setting	0: auto resonance suppression 1: manually set the second set of resonance suppression parameters
2	Notch 3 auto / manual setting	0: auto resonance suppression 1: manually set the third set of resonance suppression parameters
3	Notch 4 auto / manual setting	0: auto resonance suppression 1: manually set the fourth set of resonance suppression parameters

- *Z: fixed resonance suppression parameter (Notch Filter 5)*
  In auto resonance suppression, set the Notch filters to use manual resonance suppression.

Bit	3	2	1	0

Bit	*Function*	*Description*
0	Notch 5 auto / manual setting	0: auto resonance suppression 1: manually set the fifth set of resonance suppression parameters

Example: if P2.047 = 0x0021 (Z=0000, Y=0010, X=0001), and the auto resonance suppression function is enabled, the servo searches for the point of resonance and suppresses it. When you set Y to 2, you manually set the second set of resonance suppression parameters. Then, if the servo finds 2 resonance points, it writes data for the 1st point to the 1st set of resonance suppression parameters and the data for the 2nd point to the 3rd set of resonance suppression parameters. That is, it skips the 2nd set of parameters (the ones set to “manual”).

P2.048	***Auto resonance detection level***		***Hex Address***	***Dec Address***
			0260H 0261H	40609 40610
Default:	100	Control mode:	All	
Unit:	-	Setting range:	1–1000	
Format:	DEC	Data size:	16-bit	

Settings:

The smaller this parameter value, the more sensitive the drive is to detecting resonance. If P2.048 is larger, the resonance sensitivity is lower. If P2.048 is smaller, the resonance sensitivity is higher.

P2.049	Speed detection filter and jitter suppression			Hex Address	Dec Address
				0262H 0263H	40611 40612
Operation interface:	Panel / software	Communication	Control mode:	All	
Default:	1.0	10	Data size:	16-bit	
Unit:	1 ms	0.1 ms	-	-	
Setting range:	0.0–100.0	0–1000	-	-	
Format:	One decimal	DEC	-	-	
Example:	1.5 = 1.5 ms	15 = 1.5 ms	-	-	

Settings:

Set the filter for speed estimation. Adjusting this parameter can improve the extent of the speed jitter, but when the value is too high, the phase margin affecting the speed loop decreases which makes the system unstable.

P2.050	Pulse Clear mode			Hex Address	Dec Address
				0264H 0265H	40613 40614
Default:	0x0000		Control mode:	PT	
Unit:	-		Setting range:	0–1	
Format:	HEX		Data size:	16-bit	

Settings:

Please refer to section 8.4.9 for digital input. Set digital input (DI) as CCLR to enable the Pulse Clear function. If this DI is on, the accumulated position error is reset to 0. P2.050 only determines if DI.CCLR is edge triggered or level triggered.

- *0: DI.CCLR is rising-edge triggered.*
- *1: DI.CCLR is action-level triggered.*

P2.051	Reserved

NOTE: *In SureServo1 (prior servo family) P2-51 allowed the drive to be enabled on power up. To do this with SureServo2, you must assign function "Servo ON" to a DI or VDI input and configure it to be a "B" contact (normally closed).*

P2.052▲	Indexing coordinates scale			Hex Address	Dec Address
				0268H 0269H	40617 40618
Default:	1000000000		Control mode:	All	
Unit:	PUU		Setting range:	0–1000000000	
Format:	DEC		Data size:	32-bit	

Settings:

This value is the total PUU moved to cause one full 360 degree rotation of the index table when using the index coordinate wizard. Set the scale of the indexing coordinates, indexing command position, and indexing feedback position. If the value is too small, it may cause errors in the indexing coordinates. The ranges of values for P2.052 are:

- $P2.052 > 1.05 \times \text{Maximum motor speed (rpm)} \times \frac{16777216}{60000} \times \frac{P1.045}{P1.044}$

P2.053	Position integral compensation		Hex Address	Dec Address
			026AH 026BH	40619 40620
Default:	0	Control mode:	All	
Unit:	rad/s	Setting range:	0–1023	
Format:	DEC	Data size:	16-bit	

Settings:

Increase the position control integral to reduce position steady-state errors. If the value is too high, it may cause position overshoot and noise.

P2.054▲	Synchronous speed control gain		Hex Address	Dec Address
			026CH 026DH	40621 40622
Default:	0	Control mode:	PT	
Unit:	rad/s	Setting range:	0–8191	
Format:	DEC	Data size:	16-bit	

Settings:

Increase the synchronous speed control to enhance the speed following between two motors. If the value is too high, it may cause vibration and noise. This parameter is only for use in Gantry mode (P2.074.X=2). See section “6.8 - Gantry Mode” for more information on the Gantry function.

P2.055▲	Synchronous speed integral compensation		Hex Address	Dec Address
			026EH 026FH	40623 40624
Default:	0	Control mode:	PT	
Unit:	rad/s	Setting range:	0–1023	
Format:	DEC	Data size:	16-bit	

Settings:

Increase the synchronous speed integral compensation to enhance the speed following and reduce the speed errors between two motors. If the value is too high, it may cause vibration and noise. This parameter is only for use in Gantry mode (P2.074.X=2). See section “6.8 - Gantry Mode” for more information on the Gantry function.

P2.056▲	Synchronous position integral compensation		Hex Address	Dec Address
			0270H 0271H	40625 40626
Default:	0	Control mode:	PT	
Unit:	rad/s	Setting range:	0–1023	
Format:	DEC	Data size:	16-bit	

Settings:

Increase synchronous speed integral compensation to enhance the speed following and reduce the speed error between two motors. If the value is too high, it may cause vibration and noise. It is recommended that you set this value to the same value as P2.006 (Speed Integral Compensation). This parameter is only for use in Gantry mode (P2.074.X=2). See section “6.8 - Gantry Mode” for more information on the Gantry function.

P2.057▲	Synchronous control bandwidth		Hex Address	Dec Address
			0272H 0273H	40627 40628
Default:	0	Control mode:	PT	
Unit:	Hz	Setting range:	0–1023	
Format:	DEC	Data size:	16-bit	

Settings:

If you are unsure about setting P2.054–P2.056, set the value of synchronous control bandwidth instead so that the value corresponds to P2.054–P2.056. Refer to Chapter 5 for more detailed Tuning information. This parameter is only for use in Gantry mode (P2.074.X=2). See section "6.8 - Gantry Mode" for more information on the Gantry function.

1) When the synchronous control bandwidth is greater than the servo bandwidth, the synchronous following is better.
2) When the servo bandwidth is greater than the synchronous control bandwidth, the single-axis motion following is better.

When the servo bandwidth plus the synchronous control bandwidth (P2.057) is greater than the system's allowable bandwidth, however, it causes system resonance.

NOTE: *When increasing the bandwidth of both speed loop and synchronous control, the response of P2.025 (Resonance suppression low-pass filter) must be faster than the setting of both bandwidths. Therefore, decrease P2.025 as needed.*

P2.058	Synchronous speed error low-pass filter		Hex Address	Dec Address
			0274H 0275H	40629 40630
Default:	0	Control mode:	PT	
Unit:	0.1 ms	Setting range:	0–1000	
Format:	DEC	Data size:	16-bit	
Example:	15 = 1.5 ms			

Settings:

When the synchronous control is affected by low resonance, meaning that audible noise (less sharp and rough sound) is generated, use low-pass filter suppression. This filter must be faster than the synchronous control bandwidth. This parameter is only for use in Gantry mode (P2.074.X=2). See section "6.8 - Gantry Mode" for more information on the Gantry function.

P2.059	Maximum deviation between axes of gantry		Hex Address	Dec Address
			0276H 0277H	40631 40632
Default:	0	Control mode:	PT	
Unit:	PUU	Setting range:	-32768–32767	
Format:	DEC	Data size:	16-bit	

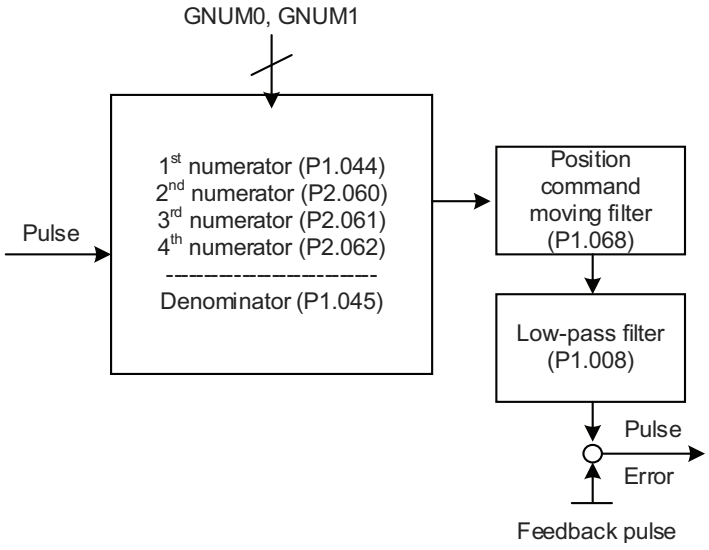
Settings:

Set P2.059 for the max permitted deviation between the two servos. This is the maximum PUU count that the two servos can be off from each other. When the deviation exceeds the range, AL081 will occur. This parameter is only for use in Gantry mode (P2.074.X=2). See section "6.8 - Gantry Mode" for more information on the Gantry function.

P2.060	E-Gear ratio (Numerator) (N2)		Hex Address	Dec Address
			0278H 0279H	40633 40634
Default:	16777216	Control mode:	PT	
Unit:	pulse	Setting range:	1 to (2^{29}-1)	
Format:	DEC	Data size:	32-bit	

Settings:

The numerator of the E-Gear ratio can be selected with DI.GNUM0 and DI.GNUM1 (please refer to section 8.4.9). If DI.GNUM0 and DI.GNUM1 are not both defined, P1.044 (E-Gear ratio numerator N1) is the default numerator of the E-Gear ratio. Please be aware that switching DI.GNUM0 and DI.GNUM1 when the servo is moving can cause mechanical damage if the gear ratio changes too drastically. Changing the E-Gear ratio in the Servo On state using DI.GNUM0 and DI.GNUM1 will cause the electronic gearing to take affect immediately.



P2.061	E-Gear ratio (Numerator) (N3)		Hex Address	Dec Address
			027AH 027BH	40635 40636
Default:	16777216	Control mode:	PT	
Unit:	pulse	Setting range:	1 to (2^{29}-1)	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P2.060.

P2.062	E-Gear ratio (Numerator) (N4)		Hex Address	Dec Address
			027CH 027DH	40637 40638
Default:	16777216	Control mode:	PT	
Unit:	pulse	Setting range:	1 to (2^{29}-1)	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P2.060.

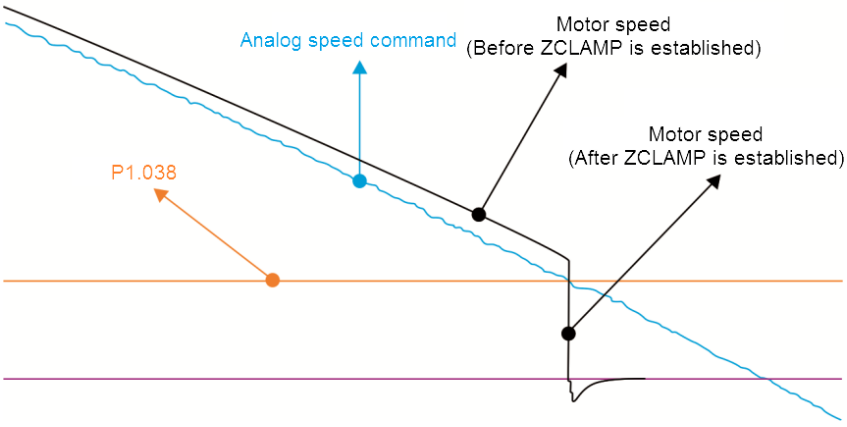
P2.063–P2.064	Reserved

P2.065	Special bit register		Hex Address	Dec Address
			0282H 0283H	40643 40644
Default:	0100	Control mode:	PT / PR / S / Sz	
Unit:	-	Setting range:	0–0xFFFF	
Format:	-	Data size:	-	

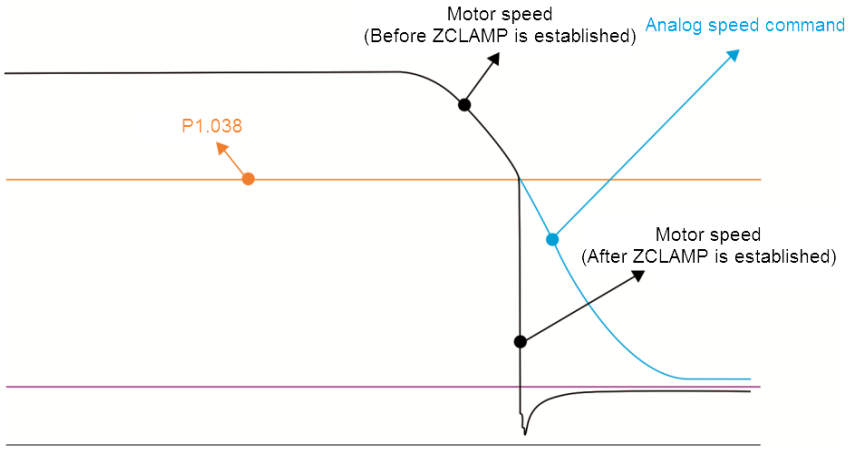
Settings:

Bit	7	6	5	4	3	2	1	0
Bit	15	14	13	12	11	10	9	8

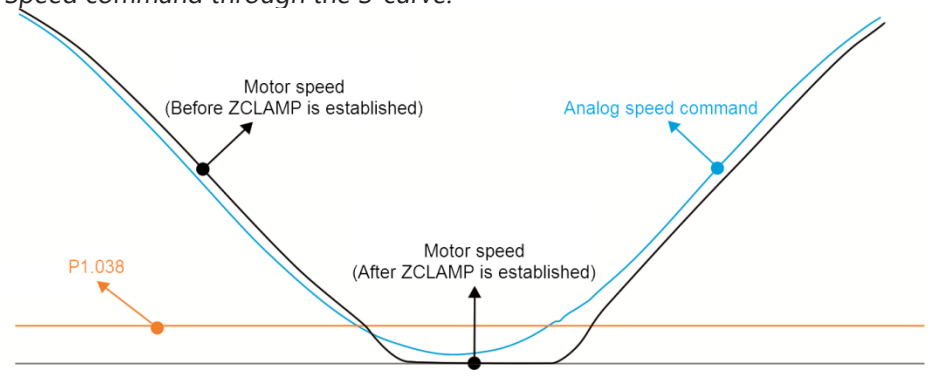
- *Bit 0–Bit 4, Bit 7, Bit 12, and Bit 14: reserved, please set to 0.*
- *Bit 5: switch for AL003 (Undervoltage) and AL022 (RST power error) in Servo Off status.*
  - *0: when the servo is off, disable the detection for AL003 (Undervoltage) and AL022 (RST power error).*
  - *1: when the servo is off, enable the detection for AL003 (Undervoltage) and AL022 (RST power error).*
- *Bit 6: in PT mode, set the pulse error (pulse frequency is too high) protection function.*
  - *0: enable the pulse error protection function.*
  - *1: disable the pulse error protection function.*
- *Bit 8: U, V, W wiring error detection function.*
  - *1: enable the U, V, W wiring error detection function.*
- *Bit 9: U, V, W wiring cut-off detection function.*
  - *1: enable the U, V, W wiring cut-off detection function. See P1.098 for response time settings.*
- *Bit 10: ZCLAMP function selection. The ZCLAMP function is enabled when the following conditions are met. Condition 1: Speed mode; Condition 2: DI.ZCLAMP is on; Condition 3: motor speed is slower than the value of P1.038 (Zero Speed Range).*
  - *Bit10=0 and the command source is analog voltage: The ZCLAMP function uses the analog Speed command without acceleration / deceleration to determine if this function should be enabled. The motor is clamped at the position where ZCLAMP conditions are met.*

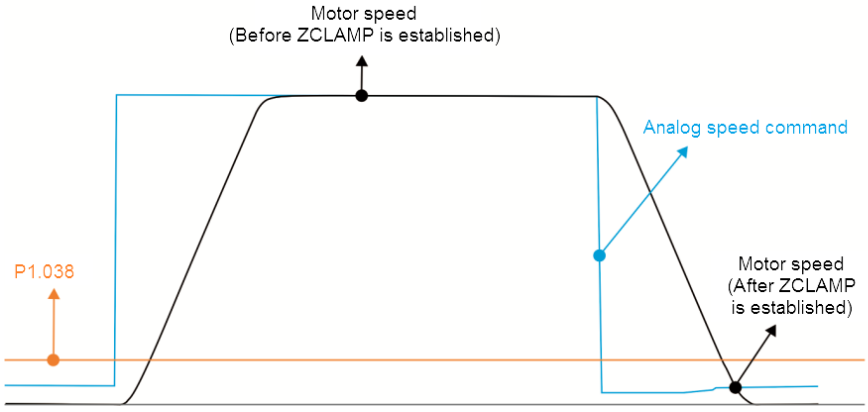


- *<u>Bit10=0 and the command source is internal registers:</u> ZCLAMP function uses the register speed command with acceleration / deceleration to determine if this function should be enabled. The motor is clamped at the position where ZCLAMP conditions are met.*

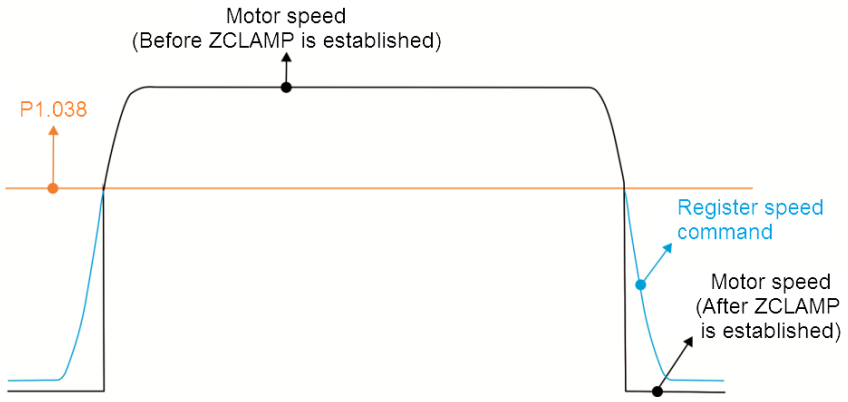


- *<u>Bit10=1 and the command source is analog voltage:</u> ZCLAMP function uses the analog Speed command without acceleration / deceleration to determine if this function is enabled. When ZCLAMP conditions are met, the motor speed decelerates to 0 rpm by S-curve deceleration. If ZCLAMP conditions are not met, the motor follows the analog Speed command through the S-curve.*





- *Bit10=1 and the command source is internal registers: ZCLAMP function uses the register Speed command with acceleration / deceleration to determine if this function should be enabled. When ZCLAMP conditions are met, the motor speed is set to 0 rpm.*



- *Bit 11: enable pulse inhibit function.*
  - *0: disable NL / PL pulse inhibit function. In PT mode, the external Position pulse command is input to the servo drive under any condition.*
  - *1: enable NL / PL pulse inhibit function. In PT mode, if NL (Reverse Inhibit Limit Digital Input) exists, the external NL pulse is not input to the servo drive and the PL Pulse command is accepted. In PT mode, if PL (Forward Inhibit Limit Digital Input) exists, the external PL pulse is not input to the servo drive and the NL pulse command is accepted. Bit11=1 allows the motor to reverse off of an overtravel sensor (but not go further in the direction of the overtravel).*
- *Bit 13: Encoder output error detection function*
  - *0: enable encoder output error (AL018, Abnormal encoder error signal alarm) detection function.*
  - *1: disable encoder output error (AL018, Abnormal encoder error signal alarm) detection function.*
- *Bit 15: Friction compensation mode selection*
  - *0: if the speed is slower than the value of P1.038 (Zero Speed Range), the friction compensation P1.062 remains unchanged.*
  - *1: if the speed is slower than the value of P1.038(Zero Speed Range), the friction compensation P1.062 becomes 0.*

***NOTE:** Other parameters that contain special functions and/or bit adjustments:*
-P2.008 Special parameter write-in function (factory reset, write to capture/compare/CAM table to EEPROM, force DOs)
-P2.030 Auxiliary function (force Servo ON, enable/disable EEPROM writes, save to EEPROM)
-P2.066 Special bit register 2 (low voltage latch and warning, overload warning detection, linear encoder disconnect error)
-P2.094 Special bit register 3 (2D control, vibration elimination, alarm enables: brake R temp, AL007, AL016).

P2.066	Special bit register 2		Hex Address	Dec Address
			0284H 0285H	40645 40646
Default:	0x0000	Control mode:	PT / PR / S / Sz	
Unit:	-	Setting range:	0x0000–0x182F	
Format:	HEX	Data size:	16-bit	

Settings:

Bit	7	6	5	4	3	2	1	0
Bit	15	14	13	12	11	10	9	8

- *Bit 0–1, Bit 3, Bit 7–8, Bit 10–11, Bit 13–15: reserved*
- *Bit 2: cancel low-voltage error latch function.*
  - *0: enable the low-voltage error AL003 latch function; the error is not cleared automatically.*
  - *1: disable the low-voltage error AL003 latch function; the error is cleared automatically.*
- *Bit 4: disable AL044 detection (servo function overload warning).*
  - *0: enable AL044 detection.*
  - *1: disable AL044 detection.*
- *Bit 5: enable AL041 disconnection detection of linear encoder (only when the full-closed loop control function is activated).*
  - *0: enable AL041 detection.*
  - *1: disable AL041 detection.*
- *Bit 6: RST power error (AL022) latch*
  - *0: disable the latch; RST power error (AL022) is cleared automatically.*
  - *1: enable the latch; RST power error (AL022) is not cleared automatically.*
- *Bit 9: set AL003 Low-voltage as a warning or an alarm.*
  - *0: set AL003 as WARN.*
  - *1: set AL003 as ALM.*
- *Bit 12: set AL022 (RST power error) as ALM or WARN*
  - *0: WARN.*
  - *1: ALM.*

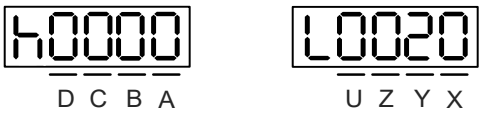
***NOTE:** When the full-closed loop function is enabled the detection for AL041 (CN5 is disconnected) is disabled by default (P2.066 [Bit 5] = 0). It is strongly recommended that you enable this function when the servo is in the full-closed loop mode.*

***NOTE:** Other parameters that contain special functions and/or bit adjustments:*
-P2.008 Special parameter write-in function (factory reset, write to capture/compare/CAM table to EEPROM, force DOs)
-P2.030 Auxiliary function (force Servo ON, enable/disable EEPROM writes, save to EEPROM)
-P2.065 Special bit register (pulse/encoder/UVW error detection, ZCLAMP, pulse inhibit, friction compensation)
-P2.094 Special bit register 3 (2D control, vibration elimination, alarm enables: brake R temp, AL007, AL016).

P2.067	Reserved

P2.068	Following error compensation switch		Hex Address	Dec Address
			0288H 0289H	40649 40650
Default:	0x00000000	Control mode:	All	
Unit:	-	Setting range:	0x00000000–0x00002101	
Format:	HEX	Data size:	32-bit	

Settings:



#	High Word	#	Low Word
A	Reserved	X	Following error compensation switch
B	Reserved	Y	Reserved
C	Reserved	Z	DI.STP triggering method
D	Reserved	U	Speed unit in Speed mode

- *X: following error compensation switch for S-Curve accel and decel (functions under the condition of P1.036 > 1)*
  - *0: disable following error compensation.*
  - *1: enable following error compensation.*
- *Y: reserved*
- *Z: DI.STP triggering method*
  - *0: DI.STP is rising-edge triggered.*
  - *1: DI.STP is level triggered.*
- *U: reserved*

P2.069•	Absolute encoder		Hex Address	Dec Address
			028AH 028BH	40651 40652
Default:	0x0000	Control mode:	All	
Unit:	-	Setting range:	0–1	
Format:	HEX	Data size:	16-bit	

Settings:

X	Set up operation mode	Z	Index coordinates function setting when overflow occurs
Y	Y: Pulse command setting when absolute position is lost	U	Reserved

- *X: set up operation mode*
  - *0: Incremental coordinate system. Absolute moves can still be performed in PR mode but the absolute position will not be tracked when the motor moves during a power off state even if a battery is installed.*
  - *1: Absolute coordinate system is to be used (encoder battery required).*
- *Y: Pulse command setting when absolute position is lost*
  - *0: when AL060 or AL06A occurs, the system cannot accept a pulse command.*
  - *1: when AL060 or AL06A occurs, the system can accept a pulse command.*

- *Z: rotary position function when an overflow occurs*
  - *0: rotary axis position is lost when an overflow occurs.*
  - *1: rotary axis position is not affected by overflow, but the absolute position is not retained (AL289 and AL062 do not function).*
- *U: reserved*

NOTE: *Changes to this setting are effective only after power is cycled to the servo drive.*

P2.070	***Read data selection***		***Hex Address***	***Dec Address***
			028CH 028DH	40653 40654
Default:	0x0000	Control mode:	All	
Unit:	-	Setting range:	0x00–0x07	
Format:	HEX	Data size:	16-bit	

Settings:

Bit	7	6	5	4	3	2	1	0
Bit	15	14	13	12	11	10	9	8

- *Bit 0: Reserved*
- *Bit 1: communication data unit setting*
  - *0: PUU (P0.051 is invalid when Bit1=0)*
  - *1: Pulse*
- *Bit 2: overflow warning setting*
  - *0: overflow warning, including AL289 (PUU) and AL062 (pulse)*
  - *1: no overflow warning*
- *Bit 3–Bit15: reserved; set to 0*

P2.071■	***Absolute position homing***		***Hex Address***	***Dec Address***
			028EH 028FH	40655 40656
Default:	0x0	Control mode:	All	
Unit:	-	Setting range:	0–1	
Format:	HEX	Data size:	16-bit	

Settings:

When P2.071 is 1, the current absolute position of the encoder is the home position. Clearing this function is enabled by setting P2.008 to 271 or by setting P2.069.x = 1 (set the encoder system to absolute).

P2.072	***Reserved***

P2.073■	E-Cam phase alignment - operation		Hex Address	Dec Address
			0292H 0293H	40659 40660
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0x5F3F6F5F	
Format:	HEX	Data size:	32-bit	

Settings:

D C B A

UZ YX

BA	PR number	YX	Range of filter (0–95%)
DC	Masking range (0–95%)	UZ	Maximum allowable collection rate (0–100%)
h	High bit	L	Low bit

- *YX: range of filter (0–95%)*
  When DI.ALGN is triggered, the E-Cam phase alignment function is enabled. The system detects the current E-Cam position. When the difference between the current E-Cam position and its previous alignment position is less than the parameter's range as a percentage, the filter function is enabled. Otherwise, the system uses the new position to do the alignment.

YX	Description
00	Filter disabled
01–5F	If |Error| ≤ (1–YX)%, then the filter is enabled

NOTE: *Using the filter allows the alignment to be more stable and reduces any position errors caused by DI noise, so the operation can be smoother.*

- *UZ: maximum allowable correction rate (0–100%)*
  When phase alignment isenabled, the limitation of the maximum allowable correction rate (C) is defined as |C| ≤ (P5.084/P5.083) x P2.073.UZ%

NOTE: *When the alignment error is too large, correcting this error once may cause motor vibration or overloading. Using this parameter can divide the phase alignment into several stages to smooth the process, but it may need more time to complete the phase alignment.*

- *BA: PR number (PR#0–PR#99)*
  After each alignment, any shortage of pulse numbers from the slave axis is stored in a specified PR. This PR can compensate for the slave position at the appropriate timing point. If BA is set to 0, any shortage of pulse numbers is not stored in PR.

NOTE: *The format of this parameter is HEX. Thus, to set PR#11, write 0B to BA.*

- *DC: masking range (0–95%)*
  When DI.ALGN is triggered, the next alignment action is allowed only after the increasing pulses of the master axis are greater than the masking distance (M).
  M ≤ (P5.084/P5.083) x P2.073.DC%

NOTE: *This masking function only allows forward pulse input and does not work for reverse pulse input.*

P2.074■	E-Cam phase alignment - DI delay time		Hex Address	Dec Address
			0294H 0295H	40661 40662
Default:	0.000	Control mode:	PR	
Unit:	ms (minimum scale is μs)	Setting range:	-25.000 to +25.000	
Format:	DEC	Data size:	16-bit	

Settings:

This parameter offsets the alignment target to resolve DI and sensor delays. The setting works as follows:

P2.074 = P2.009 (DI response filter time) + sensor's delay time

P2.075■	E-Cam phase alignment - target position		Hex Address	Dec Address
			0296H 0297H	40663 40664
Default:	0	Control mode:	PR	
Unit:	Pulse unit of master axis	Setting range:	0 to (P5.084/P5.083)-1	
Format:	DEC	Data size:	32-bit	

Settings:

Set the alignment target position for E-Cam; unit: pulse unit of master axis.

NOTE: *When the input value is within the setting range, but changes in the value of P5.084 or P5.083 cause the value to exceed the range, this parameter is automatically reset to 0.*

P2.076■	E-Cam phase alignment - control switch		Hex Address	Dec Address
			0298H 0299H	40665 40666
Default:	0x0000	Control mode:	PR	
Unit:	-	Setting range:	0x0000–0x6FF7	
Format:	HEX	Data size:	16-bit	

Settings:

X	E-Cam alignment control	UZ	Pulse data when master axis performs continous forward/reverse running or JOG function
Y	Filter intensity (0–F)	-	-

- *X: E-Cam alignment control*

Bit	3	2	1	0

Bit	Function	Description
0	Enable alignment	Set this bit to 0 to disable this function. Set this bit to 1 to enable this function. If enabled, the E-Cam phase alignment is executed when DI.ALGN is on.
1	Trigger PR immediately	The E-Cam displacement value is stored in the PR data location specified by P2.073.BA. Set this bit to 1 to trigger this PR command immediately. Set this bit to 0 and it does not tirgger this PR command imemediately. Use the PR command (P5.088.BA) when E-Cam disengages to execute phase alignment.
2	Position of the mark	Set this bit to 0 if the mark is on a non-compensated motion axis, as the position of the mark is not affected when aligning. Set this bit to 1 if the mark is on a compensated motion axis, as the position of the mark is affected when aligning.
3	Reserved	-

- *Y: filter intensity (0–F)*
  Indicates average of $2^{(value)}$. Set to 0 to disable the filter. When the value of Y increases, the correction is slower which can avoid large amounts of correction during E-Cam adjustment. This can also avoid disturbances caused by sensor noise for a smoother operation. Setting P2.076.Y too high causes the alignment to not work properly. The recommended value is 3.
  Example:
  When the filter intensity is set to 3, the actual filter intensity is 2^3=8, which means that after capturing 8 times of error values, the 8 values are averaged for the correction value of the alignment.
- *UZ: alignment forward direction allowable rate (0–100%)*

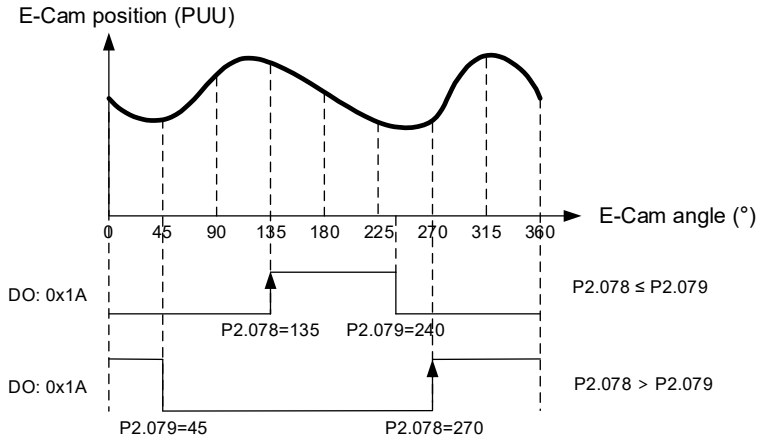
Setting Value	Alignment Direction
0	Backward alignment only
30	Forward 30%, backward 70%
50	Alignment with the shortest distance
80	Forward 80%, backward 20%
≥100	Forward alignment only

P2.077	Reserved

P2.078	E-Cam: DO.CAM_Area#2 rising-edge phase		Hex Address	Dec Address
			029CH 029DH	40669 40670
Default:	270	Control mode:	PR	
Unit:	degree	Setting range:	0–360	
Format:	DEC	Data size:	16-bit	

Settings:

The relationship between DO.CAM_Area2 and the parameter values is shown below. When E-Cam is not engaged, this signal is always off. P5.090 and P5.091 represent a second window that can be used for a different DO (0x18).



P2.079	E-Cam: DO.CAM_Area#2 falling-edge phase		Hex Address	Dec Address
			029EH 029FH	40671 40672
Default:	360	Control mode:	PR	
Unit:	degree	Setting range:	0–360	
Format:	DEC	Data size:	16-bit	

Settings:

Please refer to P2.078 for the relationship between DO.CAM_Area2 and its parameters.

P2.080	Z pulse source of homing		Hex Address	Dec Address
			02A0H 02A1H	40671 40672
Default:	0x0000	Control mode:	PR (full-closed loop)	
Unit:	–	Setting range:	0x0000 – 0x0011	
Format:	HEX	Data size:	16-bit	

Settings:

When you execute homing and have the servo look for the Z pulse, use this parameter to set either the Z pulse of the motor or the Z pulse of the auxiliary encoder as the homing origin. Select the auxiliary encoder to achieve higher positioning precision. Note this is only available in PR mode.

X	Z pulse source of full-closed loop homing	Z	Reserved
Y	Z pulse source of half-closed loop homing	U	Reserved

- *X: Z pulse source of full-closed loop homing*
  - *0: auxiliary encoder*
  - *1: motor*
- *Y: Z pulse source of half-closed loop homing*
  - *0: motor*
  - *1: auxiliary encoder*

P2.081 - P2.088	Reserved

P2.089	Command responsiveness gain		Hex Address	Dec Address
			02B2H 02B3H	40691 40692
Default:	25	Control mode:	PT / PR	
Unit:	rad/s	Setting range:	1 - 2000	
Format:	DEC	Data size:	16-bit	

Settings:

Increasing this gain speeds up the responsiveness of the Position command and shortens the tuning time, but when the gain is too large, it causes position overshoot which leads to machine jitter.

NOTE: *Enable the two dimensional control function (P2.094 [Bit 12] = 1) before adjusting this parameter.*

P2.090 - P2.093	Reserved

P2.094	Special bit register 3		Hex Address	Dec Address
			02BCH 02BDH	40701 40702
Default:	0x1010	Control mode:	PT / PR / S / Sz	
Unit:	-	Setting range:	0x0000 - 0xF3A6	
Format:	HEX	Data size:	16-bit	

Settings:

Bit	7	6	5	4	3	2	1	0
Bit	15	14	13	12	11	10	9	8

Bit	Function	Description
Bit 15–13	Reserved	-
Bit 12	Two dimensional control function	0: disable two dimensional control function 1: enable two dimensional control function If P2.094 Bit12 is off then Gain Adjustment Mode 3 is equal to Gain Adjustment Mode 2 (P2.032). Two dimensional control just allows you to adjust P2.094 and P2.031 separately.
Bit 11–10	Reserved	-
Bit 9	Second set of vibration elimination	0: disable second set of vibration elimination 1: enable second set of vibration elimination (P1.092–P1.094) Vibration elimination takes effect only when the two dimensional control function P2.094 [Bit 12] is enabled.
Bit 8	First set of vibration elimination	0: disable first set of vibration elimination 1: enable first set of vibration elimination (P1.089–P1.091) Vibration elimination takes effect only when the two dimensional control function P2.094 [Bit 12] is enabled.
Bit 7	Switch for brake resistor temperature protection after AL086 is triggered	Switch for the brake resistor temperature protection when the input voltage is too high. 0: disable 1: enable
Bit 6	Switch for AL007 (Excessive devation of speed command) detection in Position mode	Switch for AL007 detection in Position mode (PT and PR). 0: disable AL007 detection (default) 1: enabled AL007 detection
Bit 5	Cancel AL016 IGBT overheat alarm	0: enable AL016 IGBT overheat alarm 1: disable AL016 IGBT overheat alarm
Bit 4	Reserved	Bit 4 should not be adjusted by the customer and should remain at the default value of 1.
Bit 3–0	Reserved	-

***NOTE**: Other parameters that contain special functions and/or bit adjustments:*
-P2.008 Special parameter write-in function (factory reset, write to capture/compare/CAM table to EEPROM, force DOs)
-P2.030 Auxiliary function (force Servo ON, enable/disable EEPROM writes, save to EEPROM)
-P2.065 Special bit register (pulse/encoder/UVW error detection, ZCLAMP, pulse inhibit, friction compensation)
-P2.066 Special bit register 2 (low voltage latch and warning, overload warning detection, auxiliary encoder disconnect error).

P2.095	Notch filter bandwidth (1)		Hex Address	Dec Address
			02BEH 02BFH	40703 40704
Default:	5	Control mode:	All	
Unit:	-	Setting range:	1 - 10	
Format:	DEC	Data size:	16-bit	

Settings:

The first value of resonance width. This function is disabled if P2.024 (Notch filter frequency (1)) is 0. P2.023, P2.024, and P2.095 are the first set of Notch filter parameters. Refer to Chapter 5: Tuning for more detailed information on using Notch filters.

P2.096	Notch filter bandwidth (2)		Hex Address	Dec Address
			02COH 02C1H	40705 40706
Default:	5	Control mode:	All	
Unit:	-	Setting range:	1 - 10	
Format:	DEC	Data size:	16-bit	

Settings:

The second value of resonance width. This function is disabled if P2.044 (Notch filter attenuation level (2)) is 0. P2.043, P2.044,
and P2.096 are the second set of Notch filter parameters.

P2.097	Notch filter bandwidth (3)		Hex Address	Dec Address
			02C2H 02C3H	40707 40708
Default:	5	Control mode:	All	
Unit:	-	Setting range:	1 - 10	
Format:	DEC	Data size:	16-bit	

Settings:

The third value of resonance width. This function is disabled if P2.046 (Notch filter attenuation level (3)) is 0. P2.045, P2.046, and P2.097 are the third set of Notch filter parameters.

P2.098	Notch filter frequency (4)		Hex Address	Dec Address
			02C4H 02C5H	40709 40710
Default:	1000	Control mode:	All	
Unit:	Hz	Setting range:	50 - 5000	
Format:	DEC	Data size:	16-bit	

Settings:

The fourth value of resonance frequency. This function is disabled if you set P2.099 to 0. P2.098, P2.099, and P2.100 are the fourth set of Notch filter parameters.

P2.099	Notch filter attenuation level (4)		Hex Address	Dec Address
			02C6H 02C7H	40711 40712
Default:	0	Control mode:	All	
Unit:	-dB	Setting range:	0 - 40	
Format:	DEC	Data size:	16-bit	

Settings:

The fourth Notch filter attenuation level. The Notch filter is disabled if you set this parameter to 0. For example, if you set the attenuation level to 5, then the value is -5 dB

P2.100	Notch filter bandwidth (4)		Hex Address	Dec Address
			02C8H 02C9H	40713 40714
Default:	5	Control mode:	All	
Unit:	-	Setting range:	1 - 10	
Format:	DEC	Data size:	16-bit	

Settings:

The fourth value of resonance width. This function is disabled if you set P2.099 to 0. P2.098, P2.099, and P2.100 are the fourth set of Notch filter parameters.

P2.101	Notch filter frequency (5)		Hex Address	Dec Address
			02CAH 02CBH	40715 40716
Default:	1000	Control mode:	All	
Unit:	Hz	Setting range:	50 - 5000	
Format:	DEC	Data size:	16-bit	

Settings:

The fifth value of resonance frequency. This function is disabled if you set P2.102 to 0. P2.101, P2.102, and P2.103 are the fifth set of Notch filter parameters.

P2.102	Notch filter attenuation level (5)		Hex Address	Dec Address
			02CCH 02CDH	40717 40718
Default:	0	Control mode:	All	
Unit:	-db	Setting range:	0 - 40	
Format:	DEC	Data size:	16-bit	

Settings:

The fifth Notch filter attenuation level. The Notch filter function is disabled if you set this parameter to 0. For example, if you set the attenuation level to 5, then the value is -5dB.

P2.103	Notch filter bandwidth (5)		Hex Address	Dec Address
			02CEH 02CFH	40719 40720
Default:	5	Control mode:	All	
Unit:	-	Setting range:	1 - 10	
Format:	DEC	Data size:	16-bit	

Settings:

The fifth value of resonance width. This function is disabled if you set P2.102 to 0. P2.101, P2.102, and P2.103 are the fifth set of Notch filter parameters.

P2.104	P/PI torque switching command condition		Hex Address	Dec Address
			02D0H 02D1H	40721 40722
Default:	200	Control mode:	PT / PR / S / Sz	
Unit:	[%]	Setting range:	1 - 800	
Format:	DEC	Data size:	16-bit	

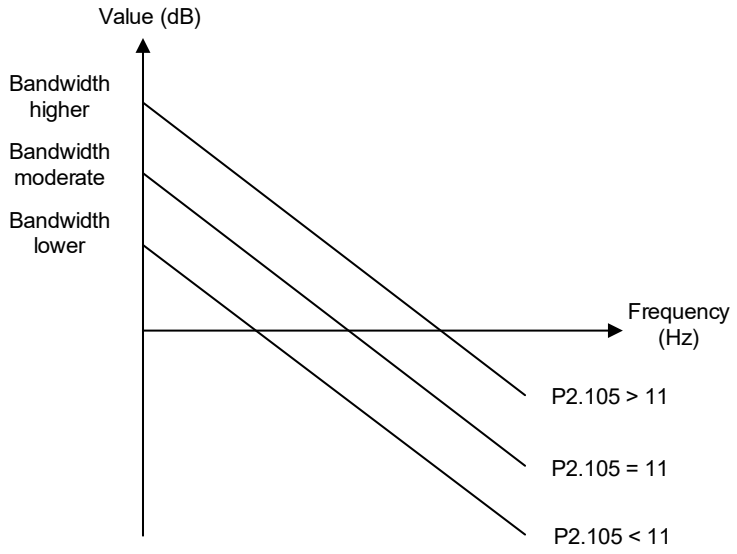
Settings:

When the Torque command exceeds P2.104, the speed controller gain is switched from PI to P in order to reduce response overshoot.

P2.105	Auto-tuning Adjustment Bandwidth Level		Hex Address	Dec Address
			02D2H 02D3H	40723 40724
Default:	11	Control mode:	PT / PR	
Unit:	-	Setting range:	1 - 21	
Format:	DEC	Data size:	16-bit	

Settings:

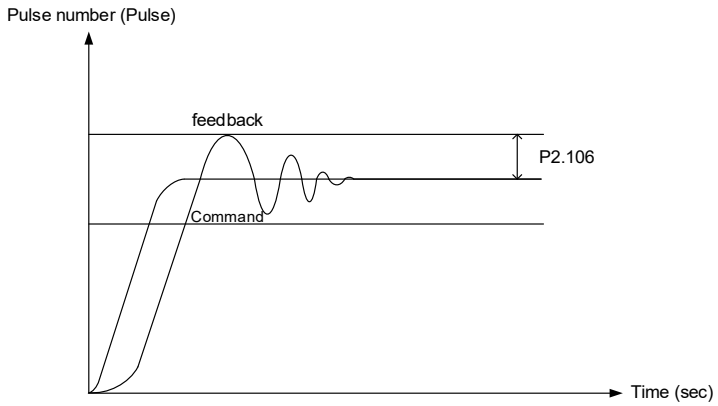
Use this parameter to adjust the bandwidth when auto-tuning. If the value is larger, the bandwidth after auto-tuning is higher, but if the bandwidth margin is insufficient, it may cause machine jitter. If the value is too low, the bandwidth after auto-tuning is lower, but the response is slower. Refer to section "5.2 - Auto tuning" on page 5–4 for more detailed information on using P2.105 and P2.106.



P2.106	Auto-tuning Adjustment Overshoot Level		Hex Address	Dec Address
			02D4H 02D5H	40725 40726
Default:	2000	Control mode:	PT / PR	
Unit:	Pulse number	Setting range:	1 - 50331648	
Format:	DEC	Data size:	32-bit	

Settings:

Use this parameter to adjust the maximum allowable overshoot when auto-tuning. The overshoot range is set for either the user or the machine. If the value is larger, the maximum overshoot allowed by auto-tuning is greater, but the response is faster. If the value is smaller, the maximum overshoot allowed by auto-tuning is smaller, but the response is slower.



P2.107 - P2.111	Reserved

P2.112	Special bit register		Hex Address	Dec Address
			02E0H 02E1H	40737 40738
Default:	0x000C	Control mode:	PT / PR / S / Sz	
Unit:	-	Setting range:	0x0000 - 0x001F	
Format:	HEX	Data size:	16-bit	

Settings:

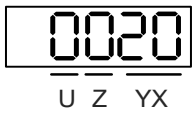
Bit	7	6	5	4	3	2	1	0
Bit	15	14	13	12	11	10	9	8

Bit	Function	Description
Bit 15–4	Reserved	-
Bit 3	Auto gain adjustment mode	0: reserved 1: cycle adjustment
Bit 2	Reserved	-
Bit 1	Enable AL089	0: disable AL089 1: enable AL089
Bit 0	Reserved	-

8.4.4 - P3.xxx Communication parameters

P3.000	Address		Hex Address	Dec Address
			0300H 0301H	40769 40770
Default:	0x7F	Control mode:	All	
Unit:	-	Setting range:	0x01–0x7F	
Format:	HEX	Data size:	16-bit	

Settings:



YX	Communication address setting	UZ	Reserved

When using RS-485 to communicate, every address must be unique. Setting more than one drive to the same address (or leaving more than drive as default) will cause abnormal communication. P3.000 represents the absolute address of the servo drive in the communication network. It is applicable to RS-485 and when connected to SureServo2 Pro. In SV2-PRO this is the Station Number (SN). This address is also used in ModTCP communication. The ModTCP PLC message must be configured with the same Station/Unit Number as P3.000.

P3.001	Transmission speed		Hex Address	Dec Address
			0302H 0303H	40771 40772
Default:	0x0203	Control mode:	All	
Unit:	-	Setting range:	0x000–0x3405	
Format:	HEX	Data size:	16-bit	

Settings:

Transmission speed is divided into U, Z, Y, and X (hexadecimal):

	U	Z	Y	X
Communication port	-	-	-	RS-485
Range	0	0–2	0	0–5

- *Definition of X value*

0: 4800	1: 9600	2: 19200
3: 38400	4: 57600	5: 115200

Notes:

1) U, Y, and Z are for future comms use.
2) The communication speed of USB is set at 1.0 Mbit/s and it cannot be changed.

P3.002	Communication protocol		Hex Address	Dec Address
			0304H 0305H	40773 40774
Default:	0x6	Control mode:	All	
Unit:	-	Setting range:	0–8	
Format:	HEX	Data size:	16-bit	

Settings:

0: 7, N, 2 (MODBUS, ASCII)	1: 7, E, 1 (MODBUS, ASCII)	2: 7, O, 1 (MODBUS, ASCII)
3: 8, N, 2 (MODBUS, ASCII)	4: 8, E, 1 (MODBUS, ASCII)	5: 8, O, 1 (MODBUS, ASCII)
6: 8, N, 2 (MODBUS, RTU)	7: 8, E, 1 (MODBUS, RTU)	8: 8, O, 1 (MODBUS, RTU)

ASCII (American Standard Code for Information Interchange). Uses 10-bit protocol string for 7 data bits, plus start, stop, and parity bits. Parity bits are Even, Odd, or None.

Example: 7N2 = (1 start + 7 data + 0 parity + 2 stop) bits

RTU (Remote Terminal Unit). Uses 11-bit protocol string for 8 data bits, plus start, stop, and parity bits.

Example: 8E1 = (1 start + 8 data + 1 parity + 1 stop) bits

P3.003	Communication error handling		Hex Address	Dec Address
			0306H 0307H	40775 40776
Default:	0x0	Control mode:	All	
Unit:	-	Setting range:	0–1	
Format:	HEX	Data size:	16-bit	

Settings:

- *0: display warning and let motor continue operating.*
- *1: display warning and let motor decelerate to a stop. Deceleration time is set in P5.003.B.*

P3.004	Communication timeout		Hex Address	Dec Address
			0308H 0309H	40777 40778
Default:	0x0	Control mode:	All	
Unit:	sec	Setting range:	0–20	
Format:	DEC	Data size:	16-bit	

Settings:

If the value is not 0, enable communication timeout immediately. To disable this function, set the value to 0.

P3.005	Reserved

P3.006	Digital input (DI) control switch		Hex Address	Dec Address
			030CH 030DH	40781 40782
Default:	0x0	Control mode:	All	
Unit:	-	Setting range:	0x0000–0x1FFF	
Format:	HEX	Data size:	16-bit	

Settings:

Source of the DI that controls the switch. Each bit of this parameter determines one input source of DI signal:

- *Bit0–Bit9 correspond to DI1–DI10.*

Bit10–Bit12 correspond to VDI11–VDI13.

The setting of bit is as follows:

- *0: DI status is controlled by the external hardware.*
- *1: DI status is controlled by P4.007.*

For more information on DI, please see:

- *DI1–DI8: P2.010–P2.017*
- *DI9–DI10: P2.036–P2.037*
- *VDI11–VDI13: P2.038–P2.040*

***NOTE:** When using the "Digital IO/Jog Control" window in SureServo2 Pro, the Enable check boxes directly control the bits of P3.006. Toggling the "On/Off" button to the right of the check box will directly control the bits of P4.007.*

P3.007	Communication response delay time		Hex Address	Dec Address
			030EH 030FH	40783 40784
Default:	0	Control mode:	All	
Unit:	0.5 ms	Setting range:	0–1000	
Format:	DEC	Data size:	16-bit	

Settings:

Delay the time of communication response from servo drive to controller.

P3.008–P3.012	Reserved

P3.013	Full-closed Loop Feedback Source for the Controller		Hex Address	Dec Address
			031AH 031BH	40794 40795
Default:	0x0000	Control mode:	PR (full-closed loop)	
Unit:	-	Setting range:	0x0000 – 0x0022	
Format:	HEX	Data size:	16-bit	

Settings:

X	Encoder feedback source in full-closed loop control	Y	Z pulse offset source in full-closed loop mode (motor/auxiliary encoder)

- *X: encoder feedback source in full-closed loop control.*

- *0: feedback pulse number from the motor*
- *1: feedback pulse number from the auxiliary encoder*
- *2: in half-closed loop control, the feedback pulse is from the motor; in full-closed loop control, the feedback pulse is from the auxiliary encoder*

- *Y: Z pulse offset source in full-closed loop mode (motor/auxiliary encoder)*
  - *0: motor*
  - *1: auxiliary encoder*
  - *2: in half-closed loop control, the motor's Z pulse offset is used; in full-closed loop control, the auxiliary encoder's Z pulse offset is used.*

Note: This parameter setting is different from P1.074.Y (switch between motor encoder and auxiliary encoder). This parameter only modifies the feedback signal source uploaded to the controller. Set P3.013 to 0x0022 to avoid misoperation when the motor is in the Servo On state.

P3.014–P3.044	Reserved

NOTE: *If the servo drive sets the Ethernet card parameters to zero at drive power-up, ensure the following:*
1) The Ethernet card is properly seated onto the drive.
2) The Ethernet card ground wire is properly attached to the card and to ground.
3) The Ethernet card Firmware Update switch is set to the "Normal" position.

P3.045 ★	Communication card type		Hex Address	Dec Address
			035AH 035BH	40859 40860
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-32768 to +32767	
Format:	DEC	Data size:	16-bit	

Settings:

The hardware version of the communication card. This Read Only value will be set by the communication card at power-up.

Setting	Description
4	Modbus TCP
5	EtherNet/IP

P3.046	Communication card firmware version		Hex Address	Dec Address
			035CH 035DH	40861 40862
Default:	0x0000	Control mode:	All	
Unit:	-	Setting range:	0x0000–0xFFFF	
Format:	HEX	Data size:	16-bit	

Settings:

Current firmware version of the ethernet card.

The Ethernet card firmware is updated through a standard Ethernet cable. The Ethernet card has a built-in webserver that facilitates the update process.

See Chapter 9 for more details.

P3.047★	Communication product code		Hex Address	Dec Address
			035EH 035FH	40863 40864
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-32768 to +32767	
Format:	DEC	Data size:	16-bit	

Settings:

The protocol version of the communication card. This read only value will be set by the communication card at power-up.

Setting	Description
1	Modbus TCP
2	EtherNet/IP

P3.048	Communication card error status		Hex Address	Dec Address
			0360H 0361H	40865 40866
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-32768 to +32767	
Format:	DEC	Data size:	16-bit	

Settings:

Error Code	Description
0	No error
75	Incorrect factory parameters default setting.
80	Ethernet connection error.
81	Communication timeout between Communication card and Servo.
83	Reset Communication card to default setting.
86	IP address setting error (IP is not assigned or IP is dupicated)
89	Communication card cannot communicate with SV2.

P3.049	IP Configuration		Hex Address	Dec Address
			0362H 0363H	40867 40868
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-32768 to +32767	
Format:	DEC	Data size:	16-bit	

Settings:

Determines whether the system uses a manually configured IP address or DHCP.

Setting	Description
0	Use a Static IP address (user defined in P3.049–P3.061)
1	Use DHCP for IP addresses

NOTE: *When Ethernet card parameters are changed, the new values must be "saved" from the drive parameters to the card. See P3.065.*

NOTE: *If the servo drive sets the Ethernet card parameters to zero at drive power-up, ensure the following:*
1) The Ethernet card is properly seated onto the drive.
2) The Ethernet card ground wire is properly attached to the card and to ground.
3) The Ethernet card Firmware Update switch is set to the "Normal" position.

NOTE: *SureServo2 / PLC ModTCP communication requires that the Station ID (typically a serial communication setting) be configured correctly in both the PLC ModTCP message and SureServo2 P3.000.*

P3.050	***IP address 1***		***Hex Address***	***Dec Address***
			0364H 0365H	40869 40870
Default:	192	Control mode:	All	
Unit:	-	Setting range:	1 to 255	
Format:	DEC	Data size:	8-bit	

Settings:
Configures the first set of digits of the IP address when manual IP addressing is used.

P3.051	***IP address 2***		***Hex Address***	***Dec Address***
			0366H 0367H	40871 40872
Default:	168	Control mode:	All	
Unit:	-	Setting range:	1 to 255	
Format:	DEC	Data size:	8-bit	

Settings:
Configures the second set of digits of the IP address when manual IP addressing is used.

P3.052	***IP address 3***		***Hex Address***	***Dec Address***
			0368H 0369H	40873 40874
Default:	1	Control mode:	All	
Unit:	-	Setting range:	1 to 255	
Format:	DEC	Data size:	8-bit	

Settings:
Configures the third set of digits of the IP address when manual IP addressing is used.

P3.053	***IP address 4***		***Hex Address***	***Dec Address***
			036AH 036BH	40875 40876
Default:	10	Control mode:	All	
Unit:	-	Setting range:	1 to 255	
Format:	DEC	Data size:	8-bit	

Settings:
Configures the fourth set of digits of the IP address when manual IP addressing is used.

P3.054	Net mask 1		Hex Address	Dec Address
			036CH 036DH	40877 40878
Default:	255	Control mode:	All	
Unit:	-	Setting range:	0 to 255	
Format:	DEC	Data size:	8-bit	

Settings:

Configures the first set of digits of the subnet mask when manual IP addressing is used.

P3.055	Net mask 2		Hex Address	Dec Address
			036EH 036FH	40879 40880
Default:	255	Control mode:	All	
Unit:	-	Setting range:	0 to 255	
Format:	DEC	Data size:	8-bit	

Settings:

Configures the second set of digits of the subnet mask when manual IP addressing is used.

P3.056	Net mask 3		Hex Address	Dec Address
			0370H 0371H	40881 40882
Default:	255	Control mode:	All	
Unit:	-	Setting range:	0 to 255	
Format:	DEC	Data size:	8-bit	

Settings:

Configures the third set of digits of the subnet mask when manual IP addressing is used.

P3.057	Net mask 4		Hex Address	Dec Address
			0372H 0373H	40883 40884
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0 to 255	
Format:	DEC	Data size:	8-bit	

Settings:

Configures the fourth set of digits of the subnet mask when manual IP addressing is used.

P3.058	Gateway 1		Hex Address	Dec Address
			0374H 0375H	40885 40886
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0 to 255	
Format:	DEC	Data size:	8-bit	

Settings:

Configures the first set of digits of the gateway when manual IP addressing is used.

P3.059	Gateway 2		Hex Address	Dec Address
			0376H 0377H	40887 40888
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0 to 255	
Format:	DEC	Data size:	8-bit	

Settings:

Configures the second set of digits of the gateway when manual IP addressing is used.

P3.060	Gateway 3		Hex Address	Dec Address
			0378H 0379H	40889 40890
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0 to 255	
Format:	DEC	Data size:	8-bit	

Settings:

Configures the third set of digits of the gateway when manual IP addressing is used.

P3.061	Gateway 4		Hex Address	Dec Address
			037AH 037BH	40891 40892
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0 to 255	
Format:	DEC	Data size:	8-bit	

Settings:

Configures the fourth set of digits of the gateway when manual IP addressing is used.

P3.062– P3.063	Reserved

P3.064	Communication Card Factory Setting (Reset)		Hex Address	Dec Address
			0380H 0381H	40897 40898
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-32768 to +32767	
Format:	DEC	Data size:	16-bit	

Settings:

Resets the system to factory defaults.

Setting	Description
1	Reset to factory defaults

P3.065	Setting of Communication Card (save parameters to card)		Hex Address	Dec Address
			0382H 0383H	40899 40900
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-32768 to +32767	
Format:	DEC	Data size:	16-bit	

Settings:

Saves the configured parameters to the communication card.

Setting	Description
1	Write/save drive parameters to the ethernet card

P3.066	Reserved

P3.067	Communication Card TCP Connection Timeout		Hex Address	Dec Address
			0386H 0387H	40903 40904
Default:	30	Control mode:	All	
Unit:	ms	Setting range:	1–600	
Format:	DEC	Data size:	16-bit	

Settings:

Ethernet timeout detection in msec. This is for both SV2-CM-ENETIP Ethernet/IP & SV2-CM-MODTCP ModTCP cards.

P3.068	Ethernet Timeout Detection of Servo Drive		Hex Address	Dec Address
			0388H 0389H	40905 40906
Default:	1	Control mode:	All	
Unit:	-	Setting range:	0–1	
Format:	DEC	Data size:	16-bit	

Settings:

Timeout detected between external controller (PLC, etc.) and ethernet card.

Setting	Description
0	Enable. Use alarm function definition from P3.069
1	Disable

P3.069	Ethernet Timeout Handle of Servo Drive		Hex Address	Dec Address
			038AH 038BH	40907 40908
Default:	1	Control mode:	All	
Unit:	-	Setting range:	0–4	
Format:	DEC	Data size:	16-bit	

Settings:

P3.069 - Ethernet timeout function.

Setting	Description
0	Warn (AL180) and continue operation
1	Fault and ramp to stop (P5.003.C as deceleration stop). (Keep Servo State ON)
2	Fault and coast to stop (Servo State OFF)
3	No warning and continue operation
4	Fault and ramp to stop (P5.003.C as deceleration stop). (Servo State OFF). Reset by DI.ARST.

NOTE: *Settings #1 and #2 will resume operation immediately when communication is restored. This may be hard to troubleshoot if comms are intermittent. (Motor stops briefly, restarts, and Warning disappears). Setting #4 will stop the drive and require a reset once the timeout occurs.*

8.4.5 - P4.xxx Diagnosis parameters

P4.000 ★	Fault record (N)		Hex Address	Dec Address
			0400H 0401H	41025 41026
Default:	0x0	Control mode:	All	
Unit:	-	Setting range:	-	
Format:	HEX	Data size:	32-bit	

Settings:

- *The last abnormal status record.*
- *Low word (LXXXX): the alarm number.*
- *High word (HYYYY): future use.*

P4.000-P4.004 will save the last 5 alarm codes. P4.000 is not necessarily the current alarm, but is the most recent alarm in the alarm history. See P0.001 for the drive's active alarm code.

P4.001 ★	Fault record (N-1)		Hex Address	Dec Address
			0402H 0403H	41027 41028
Default:	0x0	Control mode:	All	
Unit:	-	Setting range:	-	
Format:	HEX	Data size:	32-bit	

Settings:

- *The second to last abnormal status record.*
- *Low word (LXXXX): the alarm number.*
- *High word (hYYYY): future use.*

P4.002 ★	Fault record (N-2)		Hex Address	Dec Address
			0404H 0405H	41029 41030
Default:	0x0	Control mode:	All	
Unit:	-	Setting range:	-	
Format:	HEX	Data size:	32-bit	

Settings:

- *The third to last abnormal status record.*
- *Low word (LXXXX): the alarm number.*
- *High word (hYYYY): future use.*

P4.003 ★	Fault record (N-3)		Hex Address	Dec Address
			0406H 0407H	41031 41032
Default:	0x0	Control mode:	All	
Unit:	-	Setting range:	-	
Format:	HEX	Data size:	32-bit	

Settings:

- *The fourth to last abnormal status record.*
- *Low word (LXXXX): the alarm number.*
- *High word (hYYYY): future use.*

P4.004 ★	Fault record (N-4)		Hex Address	Dec Address
			0408H 0409H	41033 41034
Default:	0x0	Control mode:	All	
Unit:	-	Setting range:	-	
Format:	HEX	Data size:	32-bit	

Settings:

- *The fifth to last abnormal status record.*
- *Low word (LXXXX): the alarm number.*
- *High word (hYYYY): future use.*

P4.005	Servo motor JOG control		Hex Address	Dec Address
			040AH 040BH	41035 41036
Default:	20	Control mode:	All	
Unit:	rpm	Setting range:	0–5000	
Format:	DEC	Data size:	16-bit	

Settings:

The control methods are as follows:

- *Operation test:*
  First turn SV_ON. After the JOG speed is set by P4.005, the panel displays the JOG symbol. Pressing the UP key controls JOG operation in the positive direction; pressing the DOWN key controls JOG operation in the negative direction. Stop pressing to stop the JOG operation. If there is any error in this setting, then the motor cannot operate. The maximum JOG speed is the maximum speed of the servo motor.
- *DI control:*
  If you set the DI to JOGU and JOGD (refer to section 8.4.9), then the JOG operation in the positive or negative direction is controlled with this DI. P1.034 and P1.035 can be used to control the acceleration and deceleration when using DI jog function JOGU and JOGD.

Communication control:

Write the following values to the parameter via serial communications:

- *First enter 1–5000 to set the velocity in rpm.*
- *Then write:*
  4998: JOG operation in positive direction
  4999: JOG operation in negative direction
  0: Stop Command

NOTE: *When using communication to write values, and the write frequency is high, please set P2.030 to 5.*

P4.006▲■	Digital output register (readable and writable)		Hex Address	Dec Address
			040CH 040DH	41037 41038
Default:	0x0	Control mode:	All	
Unit:	-	Setting range:	0–0xFFFF	
Format:	HEX	Data size:	16-bit	

Settings:

bit 00: corresponds to DO code = 0x30	bit 08: corresponds to DO code = 0x38
bit 01: corresponds to DO code = 0x31	bit 09: corresponds to DO code = 0x39
bit 02: corresponds to DO code = 0x32	bit 10: corresponds to DO code = 0x3A
bit 03: corresponds to DO code = 0x33	bit 11: corresponds to DO code = 0x3B
bit 04: corresponds to DO code = 0x34	bit 12: corresponds to DO code = 0x3C
bit 05: corresponds to DO code = 0x35	bit 13: corresponds to DO code = 0x3D
bit 06: corresponds to DO code = 0x36	bit 14: corresponds to DO code = 0x3E
bit 07: corresponds to DO code = 0x37	bit 15: corresponds to DO code = 0x3F

P4.006 can be used to force DO on in two different ways. A diagnostic or non-diagnostic method.

Diagnostic Method:

Setting P2.008=406 first will cause all DO assignments to become null and switch to off so you can individually trigger each output to verify functionality of the output. See section “4.4.2 - Force DO on” on page 4–10 for info on forcing DOs for diagnostic purposes.

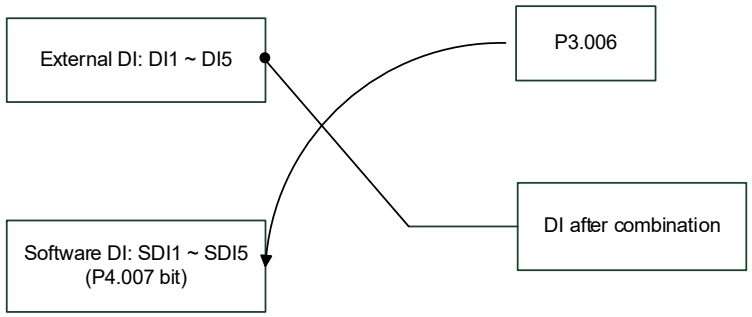
Non-Diagnostic Method:

Do not set P2.008=406. Assigning 0x30 - 0x3F functions to any DO# will allow you to write directly into P4.006 via communications or SureServo2 Pro. If you set P2.018 to 0x0030, then the output of DO#1 is now controlled by the value of bit 0 in P4.006.

P4.007■	Multi-function for digital input		Hex Address	Dec Address
			040EH 040FH	41039 41040
Default:	0x0	Control mode:	All	
Unit:	-	Setting range:	0–3FFF	
Format:	HEX	Data size:	16-bit	

Settings:

The source of the DI input signal can be the external terminal (DI1–DI10) or the software (SDI1–SDI10 corresponding to Bit 0–8 of P4.007), which is determined by P3.006. If the corresponding bit of P3.006 is 1, which means the source is the software SDI (P4.007); if the corresponding bit is 0, then the source is the hardware DI. See the figure below:



Read parameters: shows the DI status after combining external DI and software DI.

Write parameters: writes the software SDI status. This function is the same whether using the panel or communication to set the parameter.

For example: if the value of P4.007 is 0x0011 then DI1 and DI5 are ON only if P3.006 is also setting these bits to 1. Please refer to P2.010–P2.014 for more information on digital input pins (DI1–DI8).

NOTE: *When using the "Digital IO/Jog Control" window in SureServo2 Pro, the Enable check boxes directly control the bits of P3.006. Toggling the "On/Off" button to the right of the check box will directly control the bits of P4.007.*

P4.008★	Input status of servo drive panel (read-only)		Hex Address	Dec Address
			0410H 0411H	41041 41042
Default:	-	Control mode:	All	
Unit:	-	Setting range:	Read-only	
Format:	HEX	Data size:	16-bit	

Settings:

Use this communication parameter to read and check that the five keys (MODE, UP, DOWN, SHIFT, and SET) can function normally.

P4.009★	Digital output status (read-only)		Hex Address	Dec Address
			0412H 0413H	41043 41044
Default:	-	Control mode:	All	
Unit:	-	Setting range:	0–0x1F	
Format:	HEX	Data size:	16-bit	

Settings:

There is no difference whether reading by panel or through communication.

P4.010 - P4.021	Reserved

P4.022	Analog speed input offset		Hex Address	Dec Address
			042CH 042DH	41069 41070
Default:	0	Control mode:	S	
Unit:	mV	Setting range:	-5000 to +5000	
Format:	DEC	Data size:	16-bit	

Settings:

Manually adjust the offset.

P4.023	Analog torque input offset		Hex Address	Dec Address
			042EH 042FH	41071 41072
Default:	0	Control mode:	T	
Unit:	mV	Setting range:	-5000 to +5000	
Format:	DEC	Data size:	16-bit	

Settings:

Manually adjust the offset.

P4.024★	Level of undervoltage error		Hex Address	Dec Address
			0430H 0431H	41073 41074
Default:	160	Control mode:	All	
Unit:	V (rms)	Setting range:	40–380	
Format:	DEC	Data size:	16-bit	

Settings:

When the voltage of the DC BUS is lower than P4.024* $\sqrt{2}$, the undervoltage alarm occurs. The drive will auto detect the input voltage type, 110V, 230V, or 480V (model dependent), and assign the correct voltage to this parameter.

8.4.6 - P5.xxx Motion control parameters

P5.000★■	Firmware subversion		Hex Address	Dec Address
			0500H 0501H	41281 41282
Default:	Factory setting	Control mode:	All	
Unit:	-	Setting range:	-	
Format:	DEC	Data size:	32-bit	

Settings:

The low byte is the subversion of the firmware. The Firmware main version is located in P0.000

P5.001–P5.002	Reserved

P5.003	Deceleration time for auto-protection		Hex Address	Dec Address
			0506H 0507H	41287 41288
Default:	0xEEEFEEFF	Control mode:	All	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

The parameter setting is divided into D, C, B, A, U, Z, Y, X (hexadecimal), including:

Deceleration time when activating the auto-protection function: OVF (DO.0x11, Position command / feedback overflows), CTO (communication timeout AL020), SPL, SNL, PL, NL

Deceleration time for stop command: STP

Digit	D	C	B	A	U	Z	Y	X
Function	STP	PFQS	CTO	OVF	SNL	SPL	NL	PL
Range	0–F	0–F	0–F	0–F	0–F	0–F	0–F	0–F

Use 0–F to index the deceleration time of P5.020–P5.035. For example: if you set X to A, then the deceleration time of PL is determined by P5.030.

P5.004	Homing methods		Hex Address	Dec Address
			0508H 0509H	41289 41290
Default:	0x0	Control mode:	PR	
Unit:	-	Setting range:	0–0x128	
Format:	HEX	Data size:	16-bit	

Settings:

X	Homing method	Z	Limit setting
Y	Z pulse setting	U	Reserved

NOTE: *More Homing information can be found in section 7.1.3. It is highly recommended to use the Homing Setting screen of the PR Mode Window in SureServo2 Pro to configure Homing settings.*

Definition of each setting value:

<table>
<tr><th>U</th><th>Z</th><th>Y</th><th>X</th></tr>
<tr><td>Reserved</td><td>Limit setting</td><td>Z pulse setting</td><td>Homing method</td></tr>
<tr><td rowspan="12">-</td><td>0–1</td><td>0–2</td><td>0–A</td></tr>
<tr><td>Not available</td><td rowspan="4">Y = 0: return to Z pulse
Y = 1: go forward to Z pulse
Y = 2: do not look for Z pulse</td><td>X = 0: homing in forward direction and define PL as homing origin</td></tr>
<tr><td>Not available</td><td>X = 1: homing in reverse direction and define NL as homing origin</td></tr>
<tr><td rowspan="6">When the end of travel limit sensor is triggered during homing:
Z=0: show error and stop homing routine
Z=1: reverse direction and continue homing routine</td><td>X = 2: homing in forward direction, ORG: OFF→ON as homing origin</td></tr>
<tr><td>X = 3: homing in reverse direction, ORG: OFF→ON as homing origin</td></tr>
<tr><td rowspan="2">Not available</td><td>X = 4: look for Z pulse in forward direction and define it as homing origin</td></tr>
<tr><td>X = 5: look for Z pulse in reverse direction and define it as homing origin</td></tr>
<tr><td rowspan="2">Y = 0: return to Z pulse
Y = 1: go forward to Z pulse
Y = 2: do not look for Z pulse</td><td>X = 6: homing in forward direction, ORG: ON→OFF as homing origin</td></tr>
<tr><td>X = 7: homing in reverse direction, ORG: ON→OFF as homing origin</td></tr>
<tr><td>Not available</td><td>Not available</td><td>X = 8: define current position as the origin</td></tr>
<tr><td rowspan="2">When the end of travel limit sensor is triggered during homing:
Z=0: show error and stop homing routine
Z=1: reverse direction and continue homing routine</td><td rowspan="2">Y = 0: return to Z pulse
Y = 1: not available
Y = 2: do not look for Z pulse</td><td>X = 9: look for the collision point in forward direction and define it as the origin</td></tr>
<tr><td>X = A: look for the collision point in reverse direction and define it as the origin</td></tr>
</table>

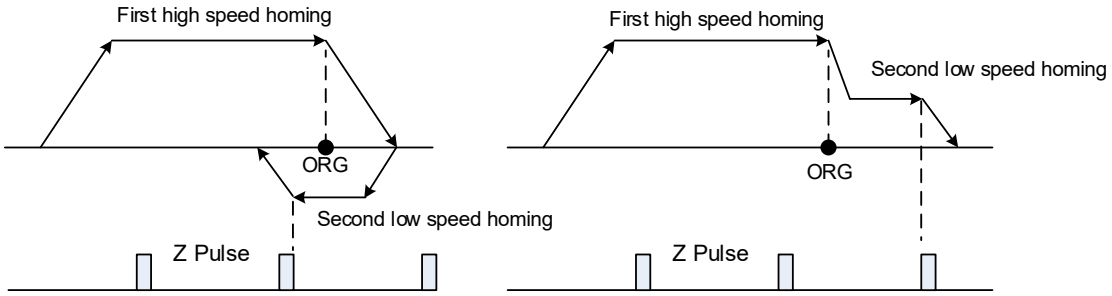
NOTE: *If homing to a hard stop (X = 9 or A), see P1.087 Torque homing - Torque level detection and P1.088 Torque Homing - level reached timer.*

NOTE: *If Homing in FWD direction to the PL (Positive Limit), don't choose "go forward to Z Pulse" after finding the home sensor (the motor can't keep going forward when it is on the PL overtravel sensor).*
If Homing in REV direction to the NL (Negative Limit), don't choose "go forward to Z Pulse" after finding the home sensor (the motor can't keep going forward when it is on the NL overtravel sensor).

P5.005	High speed homing (first speed setting)		Hex Address	Dec Address
			050AH 050BH	41291 41292
Default:	1000	Control mode:	PR (set with P5.004)	
Unit:	0.1 rpm	Setting range:	1–20000	
Format:	DEC	Data size:	32-bit	
Example:	15 = 1.5 rpm			

Settings:

The first speed setting for high speed homing. The left image is for P5.004.Y=0 (Find ORG and Return to find Z). The right image is P5.004.Y=1 (Find ORG and Keep going to find Z).



P5.006	Low speed homing (second speed setting)		Hex Address	Dec Address
			050CH 050DH	41293 41294
Default:	200	Control mode:	PR (set with P5.004)	
Unit:	0.1 rpm	Setting range:	1–5000	
Format:	DEC	Data size:	32-bit	
Example:	150 = 1.5 rpm			

Settings:

The second speed setting for low speed homing.

P5.007■	Trigger Position command (PR mode only)		Hex Address	Dec Address
			050EH 050FH	41295 41296
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	0–1000*	
Format:	DEC	Data size:	16-bit	
** Register "Read back" range = 0–20099*				

Settings:

- *Set P5.007 to 0 to start homing*
- *Set P5.007 to 1–99 to execute the specified PR procedure, which is the same as using DI.CTRG+POSn. You cannot set P5.007 to 100–999 as the value exceeds the valid range*
  Example:
  To trigger PR#2

Method 1	Trigger by DI: Register Position command selection 1–64 Bit1 (DI:0x12) + Trigger command (DI:0x08)
Method 2	By P5.007: Set P5.007 to 2 to start executing PR#2

- *Write 1000 to execute stop command which is the same as DI.STOP.*
  When reading P5.007, if the command is incomplete, the drive reads the current command (1–99). If the command is completed, the drive reads the current command +10000. If the command is completed, DO.TPOS is on, and motor position is reached, the drive reads the current command +20000. Commands triggered by DI are also applicable.
  Example:
  If the value read is 3, it means PR#3 is incomplete. If the value read is 10003, it means PR#3 completed, but the motor has not reached the target position yet. If the value read is 20003, it means PR#3 completed and the motor reached the target position.

NOTE: *Do not use P5.007 with Ethernet/IP Implicit Messaging. This parameter requires bidirectional writing (to send the command and read back status in the same register). Use P5.112 and P5.122 to trigger PR moves with Ethernet/IP Implicit Messaging.*

P5.008	***Forward software limit***		***Hex Address***	***Dec Address***
			0510H 0511H	41297 41298
Default:	2147483647	Control mode:	PR	
Unit:	PUU	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

In PR mode, if the motor rotates in the forward direction and its feedback position exceeds the value of P5.008, AL283 occurs. Manual jog operation will allow the motor to move past the software limits.

P5.009	***Reverse software limit***		***Hex Address***	***Dec Address***
			0512H 0513H	41299 41300
Default:	2147483647	Control mode:	PR	
Unit:	PUU	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

In PR mode, if the motor rotates in the reverse direction and its feedback position exceeds the value of P5.009, AL285 occurs. Manual jog operation will allow the motor to move past the software limits.

P5.010★■	***Data array - Data size***		***Hex Address***	***Dec Address***
			0514H 0515H	41301 41302
Default:	-	Control mode:	All	
Unit:	-	Setting range:	Read-only	
Format:	DEC	Data size:	16-bit	

Settings:

Data size (N x 32 bits) means size N of data array.

P5.011■	Data array - Address for reading and writing		Hex Address	Dec Address
			0516H 0517H	41303 41304
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0 to (value set by P5.010 minus 1)	
Format:	DEC	Data size:	16-bit	

Settings:

Specify the address in the data array when reading and writing data. Please refer to Chapter 7 for detailed instructions.

P5.012■	Data array–Element Value #1 for reading and writing		Hex Address	Dec Address
			0518H 0519H	41305 41306
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Data value #1: when reading the parameter using the panel, the value set by P5.011 does not add 1, but reading or writing by other methods adds 1. Please refer to Chapter 7 Data array for detailed instructions.

P5.013■	Data array–Element Value #2 for reading and writing		Hex Address	Dec Address
			051AH 051BH	41307 41308
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Data value #2: when reading and writing the parameter with the panel or through communication, the value set by P5.011 adds 1, but the panel is write-protected. Please refer to Chapter 7 Data array for detailed instructions.

P5.014	Reserved

P5.015■	PATH#1–PATH#2 Volatile setting		Hex Address	Dec Address
			051EH 051FH	41311 41312
Default:	0x0	Control mode:	PR	
Unit:	-	Setting range:	0x0–0x0011	
Format:	HEX	Data size:	16-bit	

Settings:

This parameter allows you to write data to the target continuously through communication. (PATH#1=P6.002/P6.003, PATH#2=P6.004/P6.005)

X	PATH#1 Volatile setting	UZ	Reserved
Y	PATH#2 Volatile setting		Reserved

- *X: PATH#1 Volatile setting*
  - *0: non-volatile*
  - *1: volatile*
- *Y: PATH#2 Volatile setting*
  - *0: non-volatile*
  - *1: volatile*

P5.016■	***Axis position–Motor encoder***		***Hex Address***	***Dec Address***
			0520H 0521H	41313 41314
Default:	0	Control mode:	All	
Unit:	PUU	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

- *Read: feedback position of the motor encoder, which is the monitoring variable 000 (00h) + offset value.*
- *Write: you can write any value to the parameter, and it will neither change monitoring variable 000 (00h) nor affect the positioning coordinate system. It is only for observation when adjusting the offset value.*

P5.017	***Axis position–Auxiliary encoder (CN5)***		***Hex Address***	***Dec Address***
			0522H 0523H	41315 41316
Default:	0	Control mode:	All	
Unit:	Pulse number	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Pulse count from the auxiliary encoder (linear scale).

P5.018	***Axis position–Pulse command***		***Hex Address***	***Dec Address***
			0524H 0525H	41317 41318
Default:	0	Control mode:	All	
Unit:	Pulse number	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Pulse count from the pulse command.

P5.019	E-Cam curve scaling		Hex Address	Dec Address
			0526H 0527H	41319 41320
Default:	1.000000	Control mode:	PR	
Unit:	0.000001 times, which is 1 / (10^6)	Setting range:	-2147.000000 to +2147.000000	
Format:	DEC	Data size:	32-bit	
Example:	1.100000 = 1.1 times			

Settings:

Use this parameter to magnify or reduce the magnitude of the E-Cam table without changing its value.

Example: if the data in the table is 0, 10, 20, 30, 40, 20, then setting P5.019=2.000000 will cause the E-Cam table to run values 0, 20, 40, 60, 80.

This enables the operation of E-Cam change amplitutde with the same pulse frequency of the master axis.

Magnification enlarges the path within the same time envelope and therfore proportionally increases the speed.

Notes:

This parameter can be set at any time, but the time when it becomes effective is determined by P5.088.X[Bit2].

P5.020	Acceleration / deceleration time (Number #0)		Hex Address	Dec Address
			0528H 0529H	41321 41322
Default:	200	Control mode:	PR	
Unit:	ms	Setting range:	1–65500	
Format:	DEC	Data size:	16-bit	

Settings:

The duration of acceleration and deceleration in PR mode, which is the length of time to accelerate from 0 to 3000 rpm. These accel/decel times are used in the PR mode paths in parameters 6.01 through 7.99.

P5.021	Acceleration / deceleration time (Number #1)		Hex Address	Dec Address
			052AH 052BH	41323 41324
Default:	300	Control mode:	PR	
Unit:	ms	Setting range:	1–65500	
Format:	DEC	Data size:	16-bit	

Settings:

Please refer to P5.020 for the acceleration / deceleration time in PR mode.

P5.022	Acceleration / deceleration time (Number #2)		Hex Address	Dec Address
			052CH 052DH	41325 41326
Default:	500	Control mode:	PR	
Unit:	ms	Setting range:	1–65500	
Format:	DEC	Data size:	16-bit	

Settings:

Please refer to P5.020 for the acceleration / deceleration time in PR mode.

P5.023	Acceleration / deceleration time (Number #3)		Hex Address	Dec Address
			052EH 052FH	41327 41328
Default:	600	Control mode:	PR	
Unit:	ms	Setting range:	1–65500	
Format:	DEC	Data size:	16-bit	

Settings:

Please refer to P5.020 for the acceleration / deceleration time in PR mode.

P5.024	Acceleration / deceleration time (Number #4)		Hex Address	Dec Address
			0530H 0531H	41329 41330
Default:	800	Control mode:	PR	
Unit:	ms	Setting range:	1–65500	
Format:	DEC	Data size:	16-bit	

Settings:

Please refer to P5.020 for the acceleration / deceleration time in PR mode.

P5.025	Acceleration / deceleration time (Number #5)		Hex Address	Dec Address
			0532H 0533H	41331 41332
Default:	900	Control mode:	PR	
Unit:	ms	Setting range:	1–65500	
Format:	DEC	Data size:	16-bit	

Settings:

Please refer to P5.020 for the acceleration / deceleration time in PR mode.

P5.026	Acceleration / deceleration time (Number #6)		Hex Address	Dec Address
			0534H 0535H	41333 41334
Default:	1000	Control mode:	PR	
Unit:	ms	Setting range:	1–65500	
Format:	DEC	Data size:	16-bit	

Settings:

Please refer to P5.020 for the acceleration / deceleration time in PR mode.

P5.027	Acceleration / deceleration time (Number #7)		Hex Address	Dec Address
			0536H 0537H	41335 41336
Default:	1200	Control mode:	PR	
Unit:	ms	Setting range:	1–65500	
Format:	DEC	Data size:	16-bit	

Settings:

Please refer to P5.020 for the acceleration / deceleration time in PR mode.

P5.028	Acceleration / deceleration time (Number #8)		Hex Address	Dec Address
			0538H 0539H	41337 41338
Default:	1500	Control mode:	PR	
Unit:	ms	Setting range:	1–65500	
Format:	DEC	Data size:	16-bit	

Settings:

Please refer to P5.020 for the acceleration / deceleration time in PR mode.

P5.029	Acceleration / deceleration time (Number #9)		Hex Address	Dec Address
			053AH 053BH	41339 41340
Default:	2000	Control mode:	PR	
Unit:	ms	Setting range:	1–65500	
Format:	DEC	Data size:	16-bit	

Settings:

Please refer to P5.020 for the acceleration / deceleration time in PR mode.

P5.030	Acceleration / deceleration time (Number #10)		Hex Address	Dec Address
			053CH 053DH	41341 41342
Default:	2500	Control mode:	PR	
Unit:	ms	Setting range:	1–65500	
Format:	DEC	Data size:	16-bit	

Settings:

Please refer to P5.020 for the acceleration / deceleration time in PR mode.

P5.031	Acceleration / deceleration time (Number #11)		Hex Address	Dec Address
			053EH 053FH	41343 41344
Default:	3000	Control mode:	PR	
Unit:	ms	Setting range:	1–65500	
Format:	DEC	Data size:	16-bit	

Settings:

Please refer to P5.020 for the acceleration / deceleration time in PR mode.

P5.032	Acceleration / deceleration time (Number #12)		Hex Address	Dec Address
			0540H 0541H	41345 41346
Default:	5000	Control mode:	PR	
Unit:	ms	Setting range:	1–65500	
Format:	DEC	Data size:	16-bit	

Settings:

Please refer to P5.020 for the acceleration / deceleration time in PR mode.

P5.033	Acceleration / deceleration time (Number #13)		Hex Address	Dec Address
			0542H 0543H	41347 41348
Default:	8000	Control mode:	PR	
Unit:	ms	Setting range:	1–65500	
Format:	DEC	Data size:	16-bit	

Settings:

Please refer to P5.020 for the acceleration / deceleration time in PR mode.

P5.034	Acceleration / deceleration time (Number #14)		Hex Address	Dec Address
			0544H 0545H	41349 41350
Default:	50	Control mode:	PR	
Unit:	ms	Setting range:	1–1500	
Format:	DEC	Data size:	16-bit	

Settings:

This parameter is for the deceleration time for auto protection, and the default value of this is small (shorter deceleration time).

P5.035	Acceleration / deceleration time (Number #15)		Hex Address	Dec Address
			0546H 0547H	41351 41352
Default:	30	Control mode:	PR	
Unit:	ms	Setting range:	1–1200	
Format:	DEC	Data size:	16-bit	

Settings:

This parameter is for the deceleration time for auto protection, and the default value of this is small (shorter deceleration time).

P5.036	Capture - Start address of data array		Hex Address	Dec Address
			0548H 0549H	41353 41354
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0 to (value set by P5.010 minus 1)	
Format:	DEC	Data size:	16-bit	

Settings:

The first data point is Captured, it is saved at this address for the data array. Please note that this parameter is only writable when Capture is disabled (P5.039, X bit 0 = 0).

P5.037■	Capture - Axis position		Hex Address	Dec Address
			054AH 054BH	41355 41356
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Displays the axis position of Capture pulse source. Please note that this parameter is only writable when Capture stops (please refer to P5.039). If the source is the main encoder, this parameter is write-protected and the Capture axis position is the feedback position of the motor (monitoring variable 00h).

P5.038■	Number of Times to Capture		Hex Address	Dec Address
			054CH 054DH	41357 41358
Default:	1	Control mode:	All	
Unit:	-	Setting range:	1 to (value set by P5.010 minus value set by P5.036)	
Format:	DEC	Data size:	16-bit	

Settings:

When Capture stops, this parameter indicates the number of data elements in the array expected to be captured (readable and writable). When Capture activates, this parameter indicates the remaining number of data elements to be captured (read-only); each time an element is captured, the value of P5.038 decrements by one until the value is 0. Once P5.038 reaches 0 it indicates that the Capture Cycle is complete.

NOTE: *The total number of data elements from Compare, Capture, and E-Cam cannot exceed 800.*

P5.039■	Capture - Activate CAP control		Hex Address	Dec Address
			054EH 054FH	41359 41360
Default:	0x2010	Control mode:	All	
Unit:	-	Setting range:	0x0000–0xF13F	
Format:	HEX	Data size:	16-bit	

Settings:

X	Capture setting	Z	Triggering logic
Y	Axis source of Capture	U	Trigger minimum interval

- *X: Capture setting*

bit	3	2	1	0
X function	Execute PR when finishing capturing	After capturing the first data, activate Compare	Reset position after first data	Activate Capture
Description	Execute PR#50 when finishing Capture. This will not execute when in cycle mode (P1.019.X=1)	Invalid when Compare is activated	After capturing the first data, reset the position coordinate	Start capturing when set to 1; after finishing capturing, this bit is cleared automatically. Before enabling this bit when using a sequential path group, be sure to add a 1ms delay prior to the path that sets this bit.

- *Y: axis source of Capture*
  - *0: Capture is disabled*
  - *1: AUX ENC (CN5)*
  - *2: Pulse command (CN1)*
  - *3: Main encoder (CN2)*

NOTE: *When the source of Compare is the Capture axis, the source Y of Capture cannot be changed.*

- *Z: triggering logic*
  - *0: NO (normally open). Use this option when needing to detect a black mark on a white background.*
  - *1: NC (normally closed). Use this option when needing to detect a white mark on a black background.*
- *U: trigger minimum interval (unit: ms)*

NOTE: *When P5.039.X (bit 0) = 1, the Capture feature is enabled and DI7 is automatically assigned as the High Speed Capture input. Please refer to Chapter 7 for detailed instructions.*

P5.040	Delay time after position reached (Number #0)		Hex Address	Dec Address
			0550H 0551H	41361 41362
Default:	0	Control mode:	PR	
Unit:	ms	Setting range:	0–32767	
Format:	DEC	Data size:	16-bit	

Settings:

The first delay time of PR mode.

P5.041	Delay time after position reached (Number #1)		Hex Address	Dec Address
			0552H 0553H	41363 41364
Default:	100	Control mode:	PR	
Unit:	ms	Setting range:	0–32767	
Format:	DEC	Data size:	16-bit	

Settings:

The second delay time of PR mode.

P5.042	Delay time after position reached (Number #2)		Hex Address	Dec Address
			0554H 0555H	41365 41366
Default:	200	Control mode:	PR	
Unit:	ms	Setting range:	0–32767	
Format:	DEC	Data size:	16-bit	

Settings:

The third delay time of PR mode.

P5.043	Delay time after position reached (Number #3)		Hex Address	Dec Address
			0556H 0557H	41367 41368
Default:	400	Control mode:	PR	
Unit:	ms	Setting range:	0–32767	
Format:	DEC	Data size:	16-bit	

Settings:

The fourth delay time of PR mode.

P5.044	Delay time after position reached (Number #4)		Hex Address	Dec Address
			0558H 0559H	41369 41370
Default:	500	Control mode:	PR	
Unit:	ms	Setting range:	0–32767	
Format:	DEC	Data size:	16-bit	

Settings:

The fifth delay time of PR mode.

P5.045	Delay time after position reached (Number #5)		Hex Address	Dec Address
			055AH 055BH	41371 41372
Default:	800	Control mode:	PR	
Unit:	ms	Setting range:	0–32767	
Format:	DEC	Data size:	16-bit	

Settings:

The sixth delay time of PR mode.

P5.046	Delay time after position reached (Number #6)		Hex Address	Dec Address
			055CH 055DH	41373 41374
Default:	1000	Control mode:	PR	
Unit:	ms	Setting range:	0–32767	
Format:	DEC	Data size:	16-bit	

Settings:

The seventh delay time of PR mode.

P5.047	Delay time after position reached (Number #7)		Hex Address	Dec Address
			055EH 055FH	41375 41376
Default:	1500	Control mode:	PR	
Unit:	ms	Setting range:	0–32767	
Format:	DEC	Data size:	16-bit	

Settings:

The eighth delay time of PR mode.

P5.048	Delay time after position reached (Number #8)		Hex Address	Dec Address
			0560H 0561H	41377 41378
Default:	2000	Control mode:	PR	
Unit:	ms	Setting range:	0–32767	
Format:	DEC	Data size:	16-bit	

Settings:

The ninth delay time of PR mode.

P5.049	Delay time after position reached (Number #9)		Hex Address	Dec Address
			0562H 0563H	41379 41380
Default:	2500	Control mode:	PR	
Unit:	ms	Setting range:	0–32767	
Format:	DEC	Data size:	16-bit	

Settings:

The tenth delay time of PR mode.

P5.050	Delay time after position reached (Number #10)		Hex Address	Dec Address
			0564H 0565H	41381 41382
Default:	3000	Control mode:	PR	
Unit:	ms	Setting range:	0–32767	
Format:	DEC	Data size:	16-bit	

Settings:

The eleventh delay time of PR mode.

P5.051	Delay time after position reached (Number #11)		Hex Address	Dec Address
			0566H 0567H	41383 41384
Default:	3500	Control mode:	PR	
Unit:	ms	Setting range:	0–32767	
Format:	DEC	Data size:	16-bit	

Settings:

The twelfth delay time of PR mode.

P5.052	Delay time after position reached (Number #12)		Hex Address	Dec Address
			0568H 0569H	41385 41386
Default:	4000	Control mode:	PR	
Unit:	ms	Setting range:	0–32767	
Format:	DEC	Data size:	16-bit	

Settings:

The thirteenth delay time of PR mode.

P5.053	Delay time after position reached (Number #13)		Hex Address	Dec Address
			056AH 056BH	41387 41388
Default:	4500	Control mode:	PR	
Unit:	ms	Setting range:	0–32767	
Format:	DEC	Data size:	16-bit	

Settings:

The fourteenth delay time of PR mode.

P5.054	Delay time after position reached (Number #14)		Hex Address	Dec Address
			056CH 056DH	41389 41390
Default:	5000	Control mode:	PR	
Unit:	ms	Setting range:	0–32767	
Format:	DEC	Data size:	16-bit	

Settings:

The fifteenth delay time of PR mode.

P5.055	Delay time after position reached (Number #15)		Hex Address	Dec Address
			056EH 056FH	41391 41392
Default:	5500	Control mode:	PR	
Unit:	ms	Setting range:	0–32767	
Format:	DEC	Data size:	16-bit	

Settings:

The sixteenth delay time of PR mode.

P5.056	Compare - Start address of data array		Hex Address	Dec Address
			0570H 0571H	41393 41394
Default:	50	Control mode:	All	
Unit:	-	Setting range:	0 to (value of P5.010 minus 1)	
Format:	DEC	Data size:	16-bit	

Settings:

The address of data array where the first Compare data is saved. Please note that this parameter is only writable when Compare stops (please refer to P5.059).

P5.057■	Compare - Axis position		Hex Address	Dec Address
			0572H 0573H	41395 41396
Default:	0	Control mode:	All	
Unit:	Pulse from Compare axis	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Displays the axis position of the Compare pulse source. Please note that this parameter is only writable when Compare stops (please refer to P5.059).

Notes:

1) This parameter is write-protected when the source of Compare axis is the Capture axis (P5.059.Y = 0).
2) When the Compare axis source is the Main Encoder, P5.057 is also write-protected. The pulse resolution is determined by P1.046. When you set P5.059.Y to the Main Encoder, this parameter is set to the feedback position of the motor (monitoring variable 00h). When the motor feedback position is redefined due to homing or Capture, the value will be different from the parameter value. In this case, set P5.059.Y to 0, then set P5.059.Y to 3, to reset the parameter to the motor feedback position.

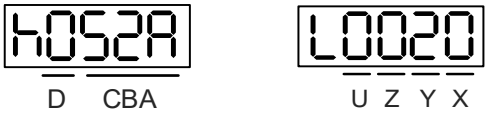
P5.058■	Compare - Remaining Counts		Hex Address	Dec Address
			0574H 0575H	41397 41398
Default:	1	Control mode:	All	
Unit:	-	Setting range:	1 to (value set by P5.010 minus value set by P5.056)	
Format:	DEC	Data size:	16-bit	

Settings:

When Compare is not in operation, the parameter indicates the number of data elements in the array expected to be compared (readable and writable). When Compare is in operation, this parameter indicates the remaining number of data elements to be compared. Each time it compares one data element, the value of P5.058 decrements by one until the value is 0 indicating that comparing is completed (read-only).

P5.059■	Compare - Activate CMP control		Hex Address	Dec Address
			0576H 0577H	41399 41400
Default:	0x00640010	Control mode:	All	
Unit:	-	Setting range:	0x00010000–0x0FFF313F	
Format:	HEX	Data size:	32-bit	

Settings:



h	High Word	L	Low Word
CBA	Duration of pulse output (unit: 1 ms)	X	Compare setting
D	N/A	Y	Compare axis source
-	-	Z	Triggering logic
-	-	U	Trigger PR

- *X: Compare setting*

bit	3	2	1	0
X function	Compare axis position returns to 0	After finishing comparing, activate Capture	Cycle mode	Activate Compare
Description	As soon as the last data is compared, Compare axis position (P5.057) returns to 0	Invalid when Capture is activated	Does not stop	Start comparing when set to 1; after finishing comparing, this bit is cleared automatically

- *Y: Compare axis source*
  - *0: when selecting Capture axes, the source of CAP cannot be changed*
  - *1: AUX ENC (CN5)*
  - *2: Pulse command (CN1)*
  - *3: Main encoder (CN2)*

NOTE: *When the source of Compare is Capture axis, the source Y of Capture cannot be changed.*

- *Z: triggering logic*
  - *0: NO (normally open)*
  - *1: NC (normally closed)*
- *U: trigger PR*

bit	3	2	1	0
U function	-	-	-	Trigger PR
Description	-	-	-	When you set this bit to 1, PR#45 is triggered after the last compare is completed

- *CBA: duration of pulse output (unit: 1 ms). Ensure the next position value to be captured is outside the pulse width value here. If DO4 is still active high when the next position in the array is met then the drive will not acknowledge that position for comparison.*

NOTE: *Please refer to Chapter 7 for detailed instructions.*

P5.060	Target speed setting #0			Hex Address	Dec Address
				0578H 0579H	41401 41402
Operation interface:	Panel / software	Communication	Control mode:	PR	
Default:	20.0	200	Data size:	16-bit	
Unit:	1 rpm	0.1 rpm			
Setting range:	0.0–6000.0	0–60000			
Format:	DEC		-	-	
Example:	15 = 15 rpm	150 = 15 rpm	-	-	

Settings:

First target speed of PR mode. Used in Point to point moves and Index position moves.

P5.061	Target speed setting #1			Hex Address	Dec Address
				057AH 057BH	41403 41404
Operation interface:	Panel / software	Communication	Control mode:	PR	
Default:	50.0	500	Data size:	16-bit	
Unit:	1 rpm	0.1 rpm			
Setting range:	0.0–6000.0	0–60000			
Format:	DEC		-	-	
Example:	1 = 1 rpm	10 = 1 rpm	-	-	

Settings:

Second target speed of PR mode.

P5.062	Target speed setting #2			Hex Address	Dec Address
				057CH 057DH	41405 41406
Operation interface:	Panel / software	Communication	Control mode:	PR	
Default:	100.0	1000	Data size:	16-bit	
Unit:	1 rpm	0.1 rpm			
Setting range:	0.0–6000.0	0–60000			
Format:	DEC		-	-	
Example:	1 = 1 rpm	10 = 1 rpm	-	-	

Settings:

Third target speed of PR mode.

P5.063	Target speed setting #3			Hex Address	Dec Address
				057EH 057FH	41407 41408
Operation interface:	Panel / software	Communication	Control mode:	PR	
Default:	200.0	2000	Data size:	16-bit	
Unit:	1 rpm	0.1 rpm			
Setting range:	0.0–6000.0	0–60000			
Format:	DEC		-	-	
Example:	1 = 1 rpm	10 = 1 rpm	-	-	

Settings:

Fourth target speed of PR mode.

P5.064	Target speed setting #4			Hex Address	Dec Address
				0580H 0581H	41409 41410
Operation interface:	Panel / software	Communication	Control mode:	PR	
Default:	300.0	3000	Data size:	16-bit	
Unit:	1 rpm	0.1 rpm			
Setting range:	0.0–6000.0	0–60000			
Format:	DEC		-	-	
Example:	1 = 1 rpm	10 = 1 rpm	-	-	

Settings:

Fifth target speed of PR mode.

P5.065	Target speed setting #5			Hex Address	Dec Address
				0582H 0583H	41411 41412
Operation interface:	Panel / software	Communication	Control mode:	PR	
Default:	500.0	5000	Data size:	16-bit	
Unit:	1 rpm	0.1 rpm			
Setting range:	0.0–6000.0	0–60000			
Format:	DEC		-	-	
Example:	1 = 1 rpm	10 = 1 rpm	-	-	

Settings:

Sixth target speed of PR mode.

P5.066	Target speed setting #6			Hex Address	Dec Address
				0584H 0585H	41413 41414
Operation interface:	Panel / software	Communication	Control mode:	PR	
Default:	600.0	6000	Data size:	16-bit	
Unit:	1 rpm	0.1 rpm			
Setting range:	0.0–6000.0	0–60000			
Format:	DEC		-	-	
Example:	1 = 1 rpm	10 = 1 rpm	-	-	

Settings:

Seventh target speed of PR mode.

P5.067	Target speed setting #7			Hex Address	Dec Address
				0586H 0587H	41415 41416
Operation interface:	Panel / software	Communication	Control mode:	PR	
Default:	800.0	8000	Data size:	16-bit	
Unit:	1 rpm	0.1 rpm			
Setting range:	0.0–6000.0	0–60000			
Format:	DEC		-	-	
Example:	1 = 1 rpm	10 = 1 rpm	-	-	

Settings:

Eighth target speed of PR mode.

P5.068	Target speed setting #8			Hex Address	Dec Address
				0588H 0589H	41417 41418
Operation interface:	Panel / software	Communication	Control mode:	PR	
Default:	1000.0	10000	Data size:	16-bit	
Unit:	1 rpm	0.1 rpm			
Setting range:	0.0–6000.0	0–60000			
Format:	DEC		-	-	
Example:	1 = 1 rpm	10 = 1 rpm	-	-	

Settings:

Ninth target speed of PR mode.

P5.069	Target speed setting #9			Hex Address	Dec Address
				058AH 058BH	41419 41420
Operation interface:	Panel / software	Communication	Control mode:	PR	
Default:	1300.0	13000	Data size:	16-bit	
Unit:	1 rpm	0.1 rpm			
Setting range:	0.0–6000.0	0–60000			
Format:	DEC		-	-	
Example:	1 = 1 rpm	10 = 1 rpm	-	-	

Settings:

Tenth target speed of PR mode.

P5.070	Target speed setting #10			Hex Address	Dec Address
				058CH 058DH	41421 41422
Operation interface:	Panel / software	Communication	Control mode:	PR	
Default:	1500.0	15000	Data size:	16-bit	
Unit:	1 rpm	0.1 rpm			
Setting range:	0.0–6000.0	0–60000			
Format:	DEC		-	-	
Example:	1 = 1 rpm	10 = 1 rpm	-	-	

Settings:

Eleventh target speed of PR mode.

P5.071	Target speed setting #11			Hex Address	Dec Address
				058EH 058FH	41423 41424
Operation interface:	Panel / software	Communication	Control mode:	PR	
Default:	1800.0	18000	Data size:	16-bit	
Unit:	1 rpm	0.1 rpm			
Setting range:	0.0–6000.0	0–60000			
Format:	DEC		-	-	
Example:	1 = 1 rpm	10 = 1 rpm	-	-	

Settings:

Twelfth target speed of PR mode.

P5.072	Target speed setting #12			Hex Address	Dec Address
				0590H 0591H	41425 41426
Operation interface:	Panel / software	Communication	Control mode:	PR	
Default:	2000.0	20000	Data size:	16-bit	
Unit:	1 rpm	0.1 rpm			
Setting range:	0.0–6000.0	0–60000			
Format:	DEC		-	-	
Example:	1 = 1 rpm	10 = 1 rpm	-	-	

Settings:

Thirteenth target speed of PR mode.

P5.073	Target speed setting #13			Hex Address	Dec Address
				0592H 0593H	41427 41428
Operation interface:	Panel / software	Communication	Control mode:	PR	
Default:	2300.0	23000	Data size:	16-bit	
Unit:	1 rpm	0.1 rpm			
Setting range:	0.0–6000.0	0–60000			
Format:	DEC		-	-	
Example:	1 = 1 rpm	10 = 1 rpm	-	-	

Settings:

Fourteenth target speed of PR mode.

P5.074	Target speed setting #14			Hex Address	Dec Address
				0594H 0595H	41429 41430
Operation interface:	Panel / software	Communication	Control mode:	PR	
Default:	2500.0	25000	Data size:	16-bit	
Unit:	1 rpm	0.1 rpm			
Setting range:	0.0–6000.0	0–60000			
Format:	DEC		-	-	
Example:	1 = 1 rpm	10 = 1 rpm	-	-	

Settings:

Fifteenth target speed of PR mode.

P5.075	Target speed setting #15			Hex Address	Dec Address
				0596H 0597H	41431 41432
Operation interface:	Panel / software	Communication	Control mode:	PR	
Default:	3000.0	30000	Data size:	16-bit	
Unit:	1 rpm	0.1 rpm			
Setting range:	0.0–6000.0	0–60000			
Format:	DEC		-	-	
Example:	1 = 1 rpm	10 = 1 rpm	-	-	

Settings:

Sixteenth target speed of PR mode.

P5.076	Capture - Reset position after first data		Hex Address	Dec Address
			0598H 0599H	41433 41434
Default:	0	Control mode:	All	
Unit:	Unit from Capture source	Setting range:	-1073741824 to +1073741823	
Format:	DEC	Data size:	32-bit	

Settings:

If the position reset function is enabled (P5.039.X [Bit1] = 1), after the first position data is captured, the servo resets the coordinates of the first point, which is defined by this parameter.

P5.077 – P5.080	Reserved

P5.081	E-Cam: start address for data array		Hex Address	Dec Address
			05A2H 05A3H	41443 41444
Default:	100	Control mode:	PR	
Unit:	-	Setting range:	0 to (800 minus value set by P5.082)	
Format:	DEC	Data size:	16-bit	

Settings:

The first piece of data in the E-Cam table is saved at the address of the data array. This parameter can be set at any time, but will be effective only when status changes from pre-engaged to engaged.

P5.082	E-Cam: total segment number N		Hex Address	Dec Address
			05A4H 05A5H	41445 41446
Default:	5	Control mode:	PR	
Unit:	-	Setting range:	5–720	
Format:	DEC	Data size:	16-bit	

Settings:

Indicates that the E-Cam curve is divided into N segments, and the table includes N+1 data. This parameter is only writable when E-Cam stops (please refer to P5.088.X [Bit0] = 0). Its range must be smaller than or equal to P5.010 minus P5.081, and P5.082 x P5.084 must be smaller than or equal to 2147483647. The number of segments in P5.082 will equal 360 degrees if P5.083=1.

P5.083	E-Cam: Master gear ratio setting - Cycle number (M)		Hex Address	Dec Address
			05A6H 05A7H	41447 41448
Default:	1	Control mode:	PR	
Unit:	-	Setting range:	1–32767	
Format:	DEC	Data size:	16-bit	

Settings:

When receiving the pulse number defined by P5.084 from the master axis, E-Cam rotates the number of cycles defined by P5.083. If P5.083 = 1 (one cycle of the E-Cam table is completed in one 360° cam cycle). If P5.083 = 2 (two cycles of the E-Cam table are completed in one 360° cam cycle. This parameter is only writable when E-Cam stops (P5.088.X [Bit0] = 0).

P5.084	E-Cam: Master gear ratio setting - Pulse number (P)		Hex Address	Dec Address
			05A8H 05A9H	41449 41450
Default:	3600	Control mode:	PR	
Unit:	-	Setting range:	10–1073741823	
Format:	DEC	Data size:	32-bit	

Settings:

When receiving the pulse number defined by P5.084 from the master axis, E-Cam rotates the number of cycles defined by P5.083. If P5.083 = 1 (one cycle of the E-Cam table is completed in one 360° Cam cycle). This parameter can be modified at any time. Its range must be the value of P5.082 x P5.083 smaller than or equal to P5.084, and P5.082 x P5.084 must be smaller than or equal to 2147483647.

P5.085	E-Cam: engaged segment number		Hex Address	Dec Address
			05AAH 05ABH	41451 41452
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	0 to (setting value of P5.082 minus 1)	
Format:	DEC	Data size:	16-bit	

Settings:

The segment number of the E-Cam table when the E-Cam is engaged.

P5.086■	E-Cam: Master axis position		Hex Address	Dec Address
			05ACH 05ADH	41453 41454
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Position counter of the E-Cam Master. This parameter is only writable when E-Cam stops (please refer to P5.088.X [Bit0] =0). P5.086 allows the master axis position to be set and monitored from here and can be written in before E-Cam has engaged. Since the moving distance of master axis remains unchanged, changing the value of P5.086 will not change the position of slave axis.

P5.087	E-Cam: Lead pulse before engaged		Hex Address	Dec Address
			05AEH 05AFH	41455 41456
Default:	0	Control mode:	PR	
Unit:	Unit from master axis	Setting range:	-1073741824 to +1073741823	
Format:	DEC	Data size:	32-bit	

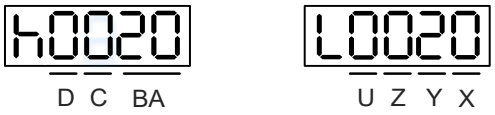
Settings:

When the condition to engage E-Cam (P5.088.Z) is met, the pulse number from the master axis has to exceed the value of this parameter for the E-Cam to fully engage. During this lead pulse period the drive is in a pre-engage state P5.088.D=2.

P5.088■	E-Cam: activate E-Cam control		Hex Address	Dec Address
			05B0H 05B1H	41457 41458
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x0–0x203FF257	
Format:	HEX	Data size:	32-bit	

Settings:

See section 7.3.1 for more information. Format of this parameter: (High word h) DCBA : (Low word L) UZYX.



BA	PR path to execute	X	Activation setting of E-Cam function
C	Reserved	Y	Command source for the master axis
D	E-Cam status display	Z	Engaging condition
-	-	U	Disengaging condition

Definition as follows:

- *X: E-Cam command*
  Description of each bit:

Bit	Function	Description
0	E-Cam activation	0: E-Cam is disabled 1: E-Cam is enabled (relevant parameters cannot be modified once E-Cam is enabled), therefore set this bit after all other E-CAM settings have been configured.
1	E-Cam does not disengage when servo is off	0: when the servo is stopped by alarm or servo is off, the clutch disengages 1: when the servo stops because of alarm or servo is off, the clutch can remain engaged. When the servo switches to on again, E-Cam can operate directly. It can return to the correct E-Cam position by macro #D.
2	P5.019 is effective immediately	0: P5.019 is effective after next engagement 1: P5.019 is effective immediately
3	Reserved	-

- *Y: command source signal of master axis*
  - *0: capture axis*
  - *1: auxiliary encoder (CN5)*
  - *2: pulse command (CN1)*
  - *3: PR command*
  - *4: time axis (1 ms)*
  - *5: reserved*
  - *6: analog channel 1 (Virtual axis, Unit: 1M pulse/s per 10V)*
- *Z: engaging time*
  - *0: immediately*
  - *1: trigger DI.CAM*
  - *2: Capture Trigger (DI7)*
- *U: disengaging condition (2, 4, and 6 cannot be selected at the same time)*

P5.088.U value	Clutch disengagement condition	System status after disengagement
0	Condition 0: remains engaged unless E-cam function is disabled	-
1	Condition 1: DI.CAM Off. Disengages when DI (DI: 0x36) is off	0: stop
2	Condition 2: disengages when the master axis pulse number reaches the setting value of P5.089, and the slave axis stops immediately (sign indicates the direction). If P5.088.Z bit 0=1 then the E-Cam will re-engage immediately.	0: stop
4	Condition 4: disengages when the master axis pulse number reaches the setting value of P5.089 and the master and slave axes enters the cyclic mode. When the pre-engaged pulse number for each cycle (P5.092) is reached, the clutch re-engages	2: pre-engage
6	Condition 6: disengages when the master axis pulse number reaches the setting value of P5.089, and the slave axis decelerates to stop	0: stop
8	Condition 8: set other disengagement conditions first, and the E-Cam function is disabled after the clutch disengages	-

- *BA: auto execute the specified PR path*
  When disengaging condition (P5.088.U = 2, 4, 6) is met, a PR 00–3F (hexadecimal; 00 means no action) is executed automatically. If the PR path is still running and the E-Cam is disabled then the PR path set is still executed.

- *C: reserved*
- *D: display engage status (Read-only)*
  - *0: stop status*
  - *1: engage status*
  - *2: pre-engage status*

P5.089	***E-Cam: data of disengaging time***		***Hex Address***	***Dec Address***
			05B2H 05B3H	41459 41460
Default:	0	Control mode:	PR	
Unit:	Unit for by master axis	Setting range:	-1073741824 to +1073741823	
Format:	DEC	Data size:	32-bit	

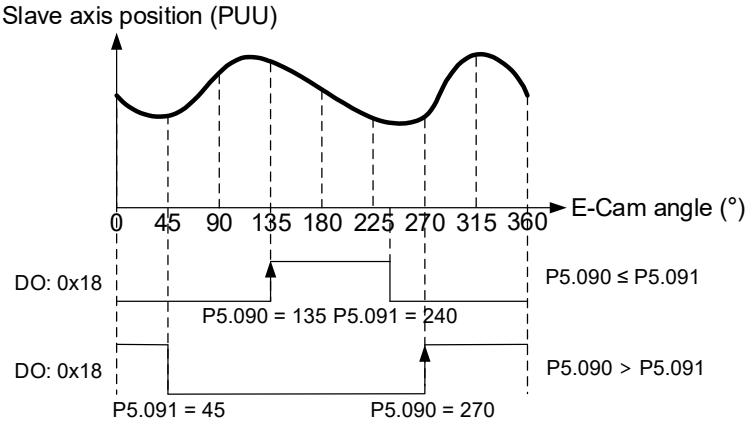
Settings:

When the pulse number of the master axis reaches the value set by P5.089, the clutch disengages based on the disengage timing setting (P5.088.U).

P5.090	***E-Cam: DO.CAM_Area rising-edge phase***		***Hex Address***	***Dec Address***
			05B4H 05B5H	41461 41462
Default:	270	Control mode:	PR	
Unit:	Degree	Setting range:	0–360	
Format:	DEC	Data size:	16-bit	

Settings:

See the correlation between DO.CAM_Area and parameters in the figure below.
When E-Cam is disengaged, DO.CAM_Area is always off. P2.078 and P2.079 represent a second window that can be used for a different DO (0x1A).



P5.091	***E-Cam: DO.CAM_Area falling-edge phase***		***Hex Address***	***Dec Address***
			05B6H 05B7H	41463 41464
Default:	360	Control mode:	PR	
Unit:	Degree	Setting range:	0–360	
Format:	DEC	Data size:	16-bit	

Settings:

Please refer to P5.090 for the correlation between DO.CAM_Area and parameters.

P5.092	E-Cam: pre-engaged length for each cycle		Hex Address	Dec Address
			05B8H 05B9H	41465 41466
Default:	0	Control mode:	PR	
Unit:	Unit from master axis	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

This parameter goes with the selection of P5.088.U = 4 (E-Cam disengages if it exceeds the moving distance): after disengaging, it does not enter stop status, but instead enters pre-engaged status. The lead pulse is determined by this parameter. The pulse number from the master axis has to exceed the value of this parameter for the E-Cam to engage again.

P5.093	Motion control macro command: command parameter #4		Hex Address	Dec Address
			05BAH 05BBH	41467 41468
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Before executing the macro command, you must set the relevant parameter #4 in advance. The function of the parameter is determined by the macro command. Not every macro command requires this parameter.

P5.094	Motion control macro command: command parameter #3		Hex Address	Dec Address
			05BCH 05BDH	41469 41470
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Before executing the macro command, you must set the relevant parameter #3 in advance. The function of the parameter is determined by the macro command. Not every macro command requires this parameter.

P5.095	Motion control macro command: command parameter #2		Hex Address	Dec Address
			05BEH 05BFH	41471 41472
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Before executing the macro command, you must set the relevant parameter #2 in advance. The function of the parameter is determined by the macro command. Not every macro command requires this parameter.

P5.096	Motion control macro command: command parameter #1		Hex Address	Dec Address
			05C0H 05C1H	41473 41474
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Before executing the macro command, you must set the relevant parameter #1 in advance. The function of the parameter is determined by the macro command. Not every macro command requires this parameter.

P5.097■	Motion control macro command: issue command / execution result		Hex Address	Dec Address
			05C2H 05C3H	41475 41476
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0–0x099F	
Format:	HEX	Data size:	16-bit	

Settings:

- *Write: used to issue macro command (0CBAh).*
- *Read: used to examine the execution result of macro command. If successful, the result is returned to 1CBAh.*

If the command issues 0001, 1001h is returned if successful; and Fxxxh if unsuccessful (depending on the command description). If you execute a command that is not supported, the failure code F001h is returned.

The command codes are listed in the following table:

Macro 3 Command code 0003h	Motion parameter protection: password setting, protection activation.
Macro parameters	P5.093 = parameter write-protected level (0–1) (0: no protection, 1: enable protection) P5.094 = protection level of data array (-1 to 7) -1: parameter groups 5, 6, 7, and data array are readable 0: password protection of all data array 1: password protection of data array #100–#799 2: password protection of data array #200–#799 3: password protection of data array #300–#799 4: password protection of data array #400–#799 5: password protection of data array #500–#799 6: password protection of data array #600–#799 7: no password protection of data array P5.095 = set new password (1–16777215) P5.096 = confirm new password (1–16777215) **Note:** P5.095 must equal to P5.096 to be successfully set and the password must be set within the allowable range.
This function can only be executed prior to activating the parameter protection function. When the protection function has been activated, the failure code is returned if this function is executed repeatedly.	
Failure code F031h	Protection function has been activated and cannot be set repeatedly
Failure code F032h	Wrong password: P5.095 does not equal to P5.096
Failure code F033h	Password value exceeds the allowable range (1–16777215)
Failure code F034h	Protection level P5.094 exceeds the allowable range (-1 to 7)
Failure code F035h	Protection level P5.093 exceeds the allowable range (0–1)
Success code 1003h	-

Macro 4 Command code 0004h	Parameter and data array protection: unlock protection
Macro parameters	P5.096 = enter password (1–16777215)

This function can only be executed when the parameter protection function has been activated.
When the protection function has been unlocked, the failure code is returned if this function is executed repeatedly. If the wrong password is entered, failure code Ennn is returned where nnn indicates the remaining attempts to enter the password. The number decrements by one after each failed attempt. When the number displays 0, it indicates the maximum number of failed password attempts has been reached and it is locked. You can only reset all parameters (P2.008=10) to unlock.

Failure code F041h	Protection function is unlocked and cannot be unlocked repeatedly
Failure code F043h	Password value exceeds the allowable range (1–16777215)
Failure code F044h	Exceeded maximum failed password attempts: locked. Can only be unlocked by resetting the parameter (P2.008 = 10), but this also resets all parameters to the default values.
Failure code Ennnh	Incorrect password setting: failed to unlock nnn: remaining attempts to enter the password. The number decrements by one after each failed attempt. When the number displays 0, it is locked and does not allow further attempts.
Success code 1004h	-

Macro 6 Command code 0006h	Build up the E-Cam table: rotary shear, including synchronous area (7 areas)
General parameters	P5.081 = Address of table (data array) P5.082 = 7 (This macro is fixed to 7 areas, 8 points) P1.044 and P1.045 = E-Gear ratio (must be set up in advance)
Macro parameters	P5.094 = A (deceleration ratio: numerator) x C (cutting count) P5.095 = B (deceleration ratio: denominator) P5.096 = 1000000 x R x V **Notes:** 1) R (cutting ratio) = L (target cutting length) / ℓ (perimeter of cutter). Allowable cutting ratio: (0.3–2.5) times 2) V (speed factor) = target cutting speed / speed of delivered product 3) V = 1.0: when cutting, the speed of cutter is same as the delivered product 4) V = 1.1: when cutting, the speed of cutter is 10% faster than the delivered product 5) V = 0.9: when cutting, the speed of cutter is 10% slower than the delivered product

This macro calculates the data for the E-Cam table according to the above parameters, and stores them in the data array specified by P5.081. Parameters listed above are relevant to the E-Cam table calculation. Please correctly set up the parameters prior to execution.
After this macro is executed, if the above parameters have been modified, the E-Cam table must be recreated and you must execute this macro again. Data in E-Cam table is changed after executing this macro; thus, do not execute the macro when E-Cam is in engaged status.
In E-Cam applications, parameters (such as P5.083 and P5.084) that are irrelevant to this macro are not listed here. Set up the parameters according to the actual application. Please refer to sections about E-Cam in Chapter 7. After executing this macro, the E-Cam table is not saved to EEPROM automatically.

Failure code F061h	When creating the table, E-Cam is in engaged status. To issue this command, E-Cam needs to disengage first.
Failure code F062h	Value of P5.094 exceeds the range: (1–65535)
Failure code F063h	Value of P5.095 exceeds the range: (1–65535)
Failure code F064h	Value of P5.096 exceeds the range: (300000–2500000)
Failure code F065h	Address specified by P5.081 is too long and the space of data array is insufficient.
Failure code F066h	Value of P5.082 must be set to 7. Otherwise the command cannot be executed.
Failure code F067h	Data calculation error. Please decrease the value of P1.044 and P1.045, but maintain the same proportions.

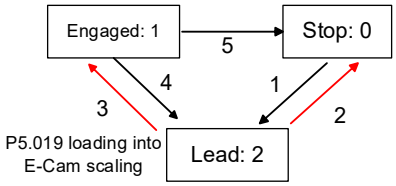
Macro 7 Command code 0007h	Build up the E-Cam table: rotary shear (multi-dimensional control)
General parameters	P5.081 = address of table (data array) P5.082 = N (30–72) (area number of E-Cam) P1.044 and P1.045 = E-Gear ratio (must be set up in advance).
Macro parameters	P5.093.H16 (high 16-bit) = S P5.093.L16 (low 16-bit) = W Note: S (curve level) = 1–4 levels; W (degree of waiting area) = -1 to +170 degrees (W = -1 is available in firmware version V1.038 (sub29) or later versions) P5.094 = Y (degree of synchronous area) = 0–330 degrees P5.095.H16 (high 16-bit) = A x C P5.095.L16 (low 16-bit) = B **Notes:** 1) A (deceleration ratio: numerator), C (cutting count) 2) B (deceleration ratio: denominator) 3) P5.096 = 1000000 x R x V
	Notes: R (cutting ratio) = L (target cutting length) / ℓ (length of cutter) 1) Allowable cutting ratio: (0.05–5.0) times 2) V (speed factor) = target cutting speed / speed of delivered product 3) V = 1.0: when cutting, the speed of cutter is same as the delivered product 4) V = 1.1: when cutting, the speed of cutter is 10% faster than the delivered product 5) V = 0.9: when cutting, the speed of cutter is 10% slower than the delivered product **Notes:** 1) W′ = 180 + 360/N–360/R + Y/2 2) P5.093.L16 < W′, E-Cam table is in error (failure code F07Ah) 3) P5.093.L16 = W′, initial speed is 0 in E-Cam table P5.093.L16 > W′, initial speed > 0 in E-Cam table

This macro calculates the data for the E-Cam table according to the above parameters, and stores them in the data array specified by P5.081. Parameters listed above are relevant to the E-Cam table calculation. Please correctly set up the parameters prior to execution. After this macro is executed, if the above parameters have been modified, the E-Cam table must be recreated and you must execute this macro again. Data in E-Cam table is changed after executing this macro; thus, do not execute when E-Cam is in engaged status. In E-Cam applications, parameters (such as P5.083 and P5.084) that are irrelevant to this macro are not listed here. Set up the parameters according to the actual application. Please refer to sections about E-Cam. After executing this macro, the E-Cam table is not saved to EEPROM automatically.

Failure code F071h	When creating the table, E-Cam is in engaged status. To issue this command, E-Cam must disengage first.
Failure code F072h	Degree of synchronous area of P5.094 exceeds the range: (0–330)
Failure code F073h	Curve level of P5.093.H16 exceeds the range: (1–4)
Failure code F074h	Degree of waiting area of P5.093.L16 exceeds the range: (0–170)
Failure code F075h	Value of P5.096 exceeds the range: (50000–5000000)
Failure code F076h	Area number of E-Cam of P5.082 exceeds the range: (30–72)
Failure code F077h	Address specified by P5.081 is too long and the space of data array is insufficient.
Failure code F078h	Data calculation error. Please decrease the setting value of P1.044 and P1.045, but maintain the same proportions.
Failure code F079h	Acceleration degree is too small; please decrease the value for waiting area (W), synchronous area (Y), or curve level (S).
Failure code F07Ah	Waiting area is too small; please increase the value for waiting area (W) or decrease the value for synchronous area (Y).

Macro 8 Command code 0008h	E-Cam curve scaling (P5.019) is effective immediately.
Macro parameters	N/A

This macro can be triggered when E-Cam is engaged, and P5.019 becomes effective immediately. Normally, E-Cam scaling is only loaded into the system by P5.019 at the point when E-Cam engages (see below: transition 3). It cannot be changed in the engaged condition. E-Cam scaling can only be changed after one E-Cam cycle to ensure that the E-Cam can return to the original position without accumulative error.



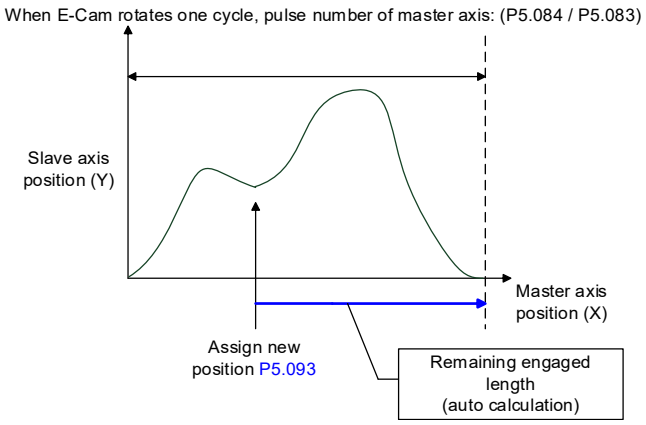
If necessary in the application, there are two ways to change the setting of E-Cam curve scaling immediately:

1) P5.088.X2 = 1: when E-Cam is engaged, set up this bit at the same time, this causes each change in P5.019 to be enabled immediately.
2) Use macro #8: each time that this macro command is triggered, the function of P5.019 is enabled immediately. However, if the value of P5.019 is changed and this macro is not triggered, then the function of P5.019 is not enabled immediately. This macro command has to be triggered again to enable the function of P5.019.

Failure code	N/A

Macro 12 Command code 000Ch	Change position X where E-Cam is engaged: E-Cam disengages after rotating one cycle in the forward direction.
General parameters	N/A
Macro parameters	P5.093 = new engaged position X, Unit: pulse number of master axis. Monitoring variable 062(3Eh): displays the current engaged position (X) of master axis.

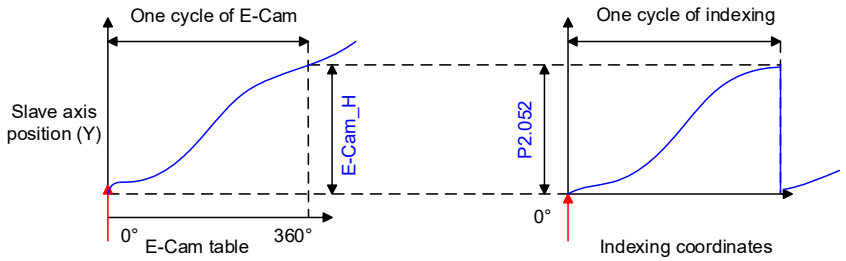
This macro command can change the engaged position immediately even when E-Cam is engaged. It automatically calculates the remaining engaged length so that E-Cam disengages after rotating one cycle (360°) in the forward direction. However, you must set P5.088.U to 2, 4, or 6; otherwise, E-Cam does not disengage.
E-Cam disengages when an alarm occurs or power supply is cut off. If you want E-Cam to re-engage at the last disengaged position and continue its remaining cycle, it is recommended that you record the last disengaged position (X) and then resume the operation of this macro command. Please note that when E-Cam is disengaged, the servo position might shift slightly, causing position error when E-Cam re-engages. The engaged direction is in the forward direction (master axis operates in forward direction):



Note: when using this macro command, it is recommended that you execute the macro command before operating the master axis.

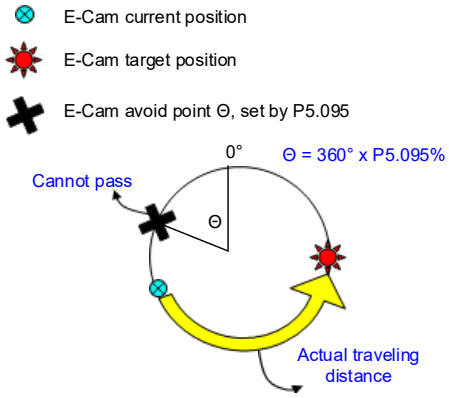
Failure code F0C1h	When executing this macro command, E-Cam is not in engaged status. Engaged position can only be modified when E-Cam is engaged.
Failure code F0C2h	Value of P5.093 is in error. The value cannot be less than 0.
Failure code F0C3h	Value of P5.093 is in error. The value has to be less than the value of (P5.084 / P5.083).
Macro 13 Command code 000Dh	Calculate the error between E-Cam and indexing coordinates for PR positioning.
General parameters	N/A
Macro parameters	P5.093.Low_Word = DCBA : UZYX (8 digits, HEX) YX (PR number) = 0–0X3F (invalid when value is 0) Value of UZ has to be set to 0 BA (function of P5.095): 0 (use avoid point); 1 (use allowable forward rate) DC (inhibit reverse rotation): 0 (invalid), 1 (inhibit reverse rotation) P5.095: avoid point (cannot pass this point) = 0–100 (%) of E-Cam cycle or allowable forward rate 0–100 (%)
Monitoring variable 091(5Bh): displays the current indexing coordinate position (PUU).	
When E-Cam is engaged and the motor is stopped due to Servo Off or an alarm, it causes position error between the actual position and the E-Cam position. After changing back to Servo On, you can use this macro command to calculate the correction value and write the value into the specified PR for incremental positioning, so that the motor can return to the correct E-Cam position.	

When using this macro command:
1) Set P5.088.X1 to 1 to keep E-Cam engaged when Servo Off and continue to calculate E-Cam position.
2) Height of indexing coordinate and E-Cam coordinate should be the same: P2.052 = ECAM_H (moving distance when E-Cam operates one cycle).
3) E-Cam table scaling P5.019 must be 1.0 time.
4) When E-Cam is engaged for the first time, 0 degrees in the E-Cam table should point to 0 degrees in the indexing coordinate. You can achieve this alignment by executing homing.
5) You can only use this macro command for a periodic cycle and when each cycle starts from the same position.



Notes:
1) ECAM_H (height of E-Cam table) = E-Cam table (last point minus first point)
2) Indexing coordinate = remainder of (absolute coordinate / P2.052)
3) Use PR command via incremental positioning control

Due to the cyclic operation of E-Cam, the motor travels to the specified position either in the forward or reverse direction. However, the moving distance is usually different between them. Thus, you can use the position of the avoid point to determine whether to operate in the forward or reverse direction.
*__Avoid point:__ the point that cannot be passed when executing macro PR positioning. Please see below for details.



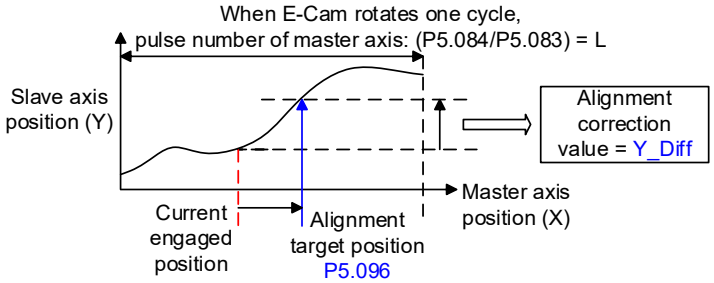
(Continued)

Failure code F0D1h	When executing this macro command, E-Cam is not in engaged status. E-Cam should be engaged.
Failure code F0D2h	P5.093.YX (PR number) exceeds the range: 1–0x3F
Failure code F0D3h	P5.095 (allowable forward rate) exceeds the range: 0–100 (%)
Failure code F0D5h	Position correction value does not exist. This macro command might be triggered twice.
Failure code F0D6h	When servo switches to on state again, E-Cam is not engaged.
Failure code F0D7h	Height (Y axis) of E-Cam table does not equal to the value of P2.052.
Failure code F0D8h	E-Cam table scaling does not equal to 1.
Failure code F0D9h	Values of P5.093.BA and P5.095 exceed the range: 0–1.
Failure code F0DAh	P5.093.DC (reverse inhibit) exceeds the range: 0–1.
Failure code F0DBh	The reverse inhibit function has failed. Do not use macro command #D and #10h consecutively.

Macro 14 Command code 000Eh	Perform E-Cam alignment immediately and write the correction value into the specified PR.
Macro parameters	P5.093 = DCBA : UZYX (8 digits, HEX) YX (PR number) = 0–0x3F (invalid when value is 0). UZ (maximum allowable correction rate) = 0–0x64 (%) A (trigger specified PR directly) = 1: on, 0: off DCB = must be set to 0. P5.094 (DI delay time compensation) = -25000 to +25000 (unit: usec). P5.095 (allowable forward rate) = 0–100 (%) P5.096 (target position of alignment X) (unit: pulse number of master axis) = 0 to (P5.084/P5.083) - 1.

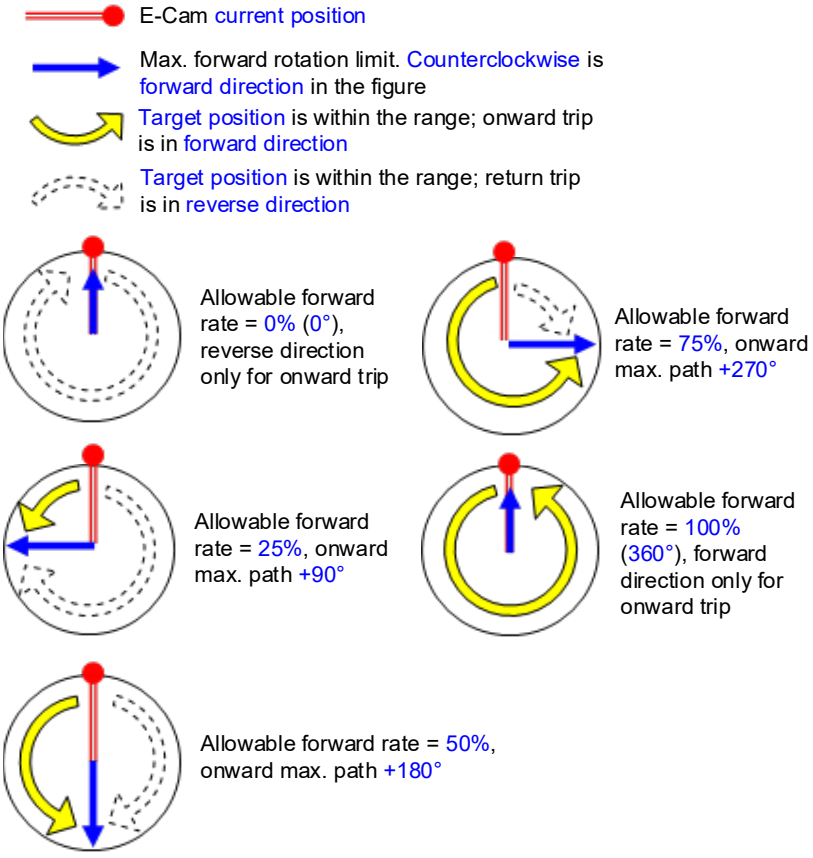
Monitoring variable 062(3Eh): displays the current engaged position (X) of master axis.

This macro command can move the engaged position to the **alignment target position X** when E-Cam is engaged, and then write the **alignment correction value** into the specified PR.
You can use this macro command: during E-Cam operation (E-Cam is engaged), if you want to quickly align the E-Cam position with the mechanical referral point, you can use the sensor to trigger DI.EVx to execute this macro command.
After E-Cam alignment completes, the engaged position moves to the new position. The excessive or insufficient moving distance after E-Cam operates one cycle is called the **alignment correction value** which is written into the PR specified by P5.093.YX. You can use the PR incremental command to execute this alignment correction so that the E-Cam slave axis position remains and offset the phase of E-Cam to align with the referral position of the machine. For some applications when PR is not needed, set P5.093.YX to 0. Please note that PR can only be executed when triggered by the host controller. This macro command is only for setting the value.



*P5.093.UZ is able to limit the maximum correction rate. The alignment target position ★ will be different from P5.096.
□□|Alignment target position ★ - Current engaged position | / L <= P5.093.UZ %
*DI time delay compensation can be set by P5.094 to correct the error caused by different speed of motion. Due to cyclic operation, when E-Cam moves from current position to the target position, it can either rotate in the forward or reverse direction. However, the moving distance is usually different between them. Thus, you can use the allowable forward rate to determine whether to operate in the forward or reverse rotation.
(Continued)

*__Allowable forward rate:__ the allowable maximum proportion of the __forward path__. Please see below for details.

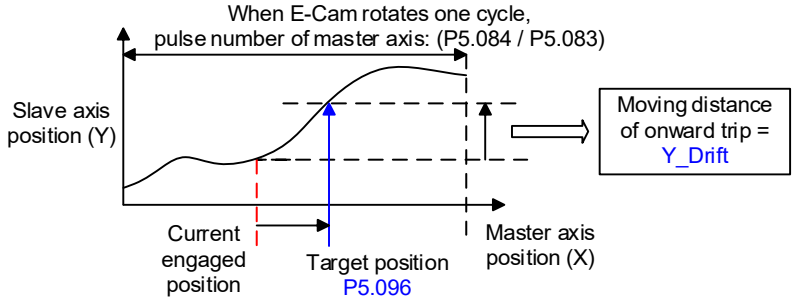


Failure code F0E1h	When executing this macro command, E-Cam is not in engaged status. E-Cam has to be engaged to execute the alignment correction.
Failure code F0E2h	P5.093.YX (PR number) exceeds the range: 0–0x3F
Failure code F0E3h	P5.093.UZ (maximum alignment correction rate) exceeds the range: 0–0x64 (%)
Failure code F0E4h	P5.094 (DI delay time compensation) exceeds the range: -10000 to +10000
Failure code F0E5h	P5.095 (allowable forward rate) exceeds the range: 0–100 (%)
Failure code F0E6h	P5.096 (alignment target position) exceeds the range: 0 to (P5.084/P5.083) - 1

Macro 15 Command code 000Fh	Calculate the moving distance between current and target position of E-Cam for PR positioning.
General parameters	N/A
Macro parameters	P5.093.Low_Word = UZYX (4 digits, HEX) YX (PR number of onward trip) = 0–0X3F (invalid when value is 0). UX (PR number of return trip) = 0–0X3F (invalid when value is 0). P5.093.Hi_Word = must be set to 0. P5.095 (allowable forward rate) = 0–100 (%) P5.096 (target position X) (unit: pulse number of master axis) = 0 to (P5.084 / P5.083) - 1.
Monitoring variable 062(3Eh): displays the current engaged position (X) of master axis.	
When E-Cam is engaged, this macro command calculates the moving distance between the **current** and **target engaged position (X)** and writes the value into the specified PR. You can use this macro command: during E-Cam operation, if you want to move the slave axis to the specified position when the master axis stops but is still in engaged status. This macro command can calculate the correct **moving distance** (Y_Drift) **of the onward trip** for the PR incremental command.	

(Continued)

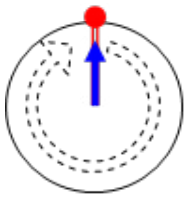
When the master axis resumes operation, use another PR for the **moving distance of the return trip** (-Y_ Drift) to return to the original position **(moving distance of onward trip + moving distance of return trip = 0)**. E-Cam position remains the same.



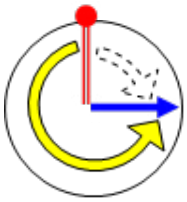
Note: regardless of onward trip or return trip, use the PR command through incremental positioning control.

Due to cyclic operation, when E-Cam moves from current position to the target position, it can either rotate in the forward or reverse direction. However, the moving distance is usually different between them. Thus, you can use the allowable forward rate to determine whether to operate in forward or reverse rotation.

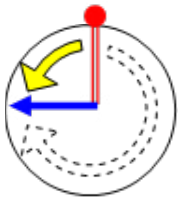
*__Allowable forward rate:__ the allowable maximum proportion of **forward path**. Please see below for details.



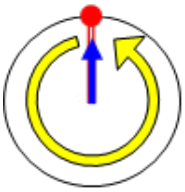
Allowable forward rate = 0% (0°), reverse direction only for onward trip



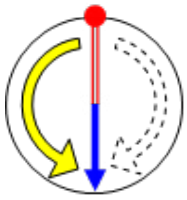
Allowable forward rate = 75%, onward max. path +270°



Allowable forward rate = 25%, onward max. path +90°



Allowable forward rate = 100% (360°), forward direction only for onward trip

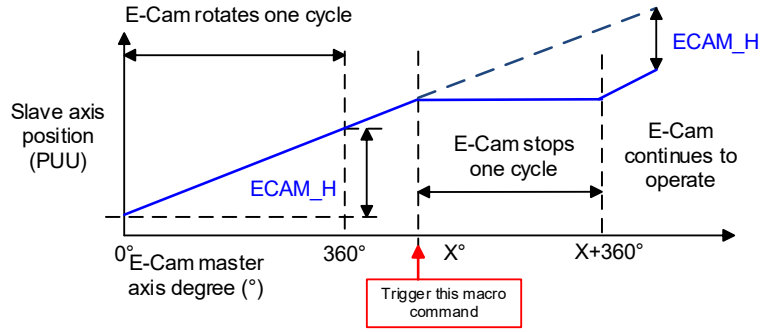


Allowable forward rate = 50%, onward max. path +180°

Failure code F0F1h	When executing this macro command, E-Cam is not in engaged status. Engaged position can only be modified when E-Cam is engaged.
Failure code F0F2h	P5.093.YX (PR number of onward trip) exceeds the range: 0–0x3F
Failure code F0F3h	P5.093.UZ (PR number of return trip) exceeds the range: 0–0x3F
Failure code F0F5h	P5.095 (allowable forward rate) exceeds the range: 0–100 (%)
Failure code F0F6h	P5.096 (target position) exceeds the range: 0 to (P5.084/P5.083) - 1

Macro 16 Command code 0010h	E-Cam pauses for one cycle and resumes operation at next cycle.
General parameters	N/A
Macro parameters	P5.093 must be set to 0.

After E-Cam is engaged, this macro command can pause the slave axis for one distance cycle regardless of the current E-Cam degree. The following conditions have to be met when using this macro command:
1) E-Cam must be in the engaged status.
2) E-Cam must be the forward operation curve (including straight line) so it can pause.
As shown in the figure below, by triggering this macro command, E-Cam pauses for one cycle regardless of the degree (X) of E-Cam's current location.



Notes:
1) ECAM_H (E-Cam pause distance) = E-Cam table (Last point minus first point) x P5.019 (effective scaling).
2) This function is accumulative. If the command is triggered for N times consecutively, it pauses the E-Cam for N cycles. Please note that the **accumulated pause distance** cannot exceed (2^31), otherwise the macro command is disabled.
3) When E-Cam resumes operation, the **accumulated pause distance** is cleared to 0.

Failure code F101h	When executing this macro command, E-Cam is not in the engaged status. E-Cam should be engaged.
Failure code F102h	Value of P5.093 is incorrect: must be set to 0.
Failure code F103h	E-Cam must operate in the forward direction. Please check the E-Cam table and make sure P5.019 > 0.
Failure code F104h	Accumulated pause distance exceeds 2^31. Do not execute this macro command consecutively.

P5.098	***PR# triggered by event rising-edge***		***Hex Address***	***Dec Address***
			05C4H 05C5H	41477 41478
Default:	0x0	Control mode:	PR	
Unit:	-	Setting range:	0x0000–0xDDDD	
Format:	HEX	Data size:	16-bit	

Settings:

Use this parameter to configure Digital Inputs (EV events) to trigger PR commands. Each EV nibble can be set to 0 - D (hex) that will point to PR#51 - PR#63. (1 = PR#51, 2 = PR#52, etc.)

- *Step 1: Define a Digital Input as an Event Trigger. Example: set P2.012 to 0x013A (DI3 = Event Trigger 2, normally open)*
- *Step 2: Configure which PR to initiate when the EV is triggered. Example: set P5.098 = 0x0090 (Y = 9 = PR#59 is triggered by EV2)*
- *Step 3: Configure PR#59 with the desired action.*

Every rising edge of DI3 will now trigger PR#59.

X	PR triggered by EV1 rising-edge	Z	PR triggered by EV3 rising-edge
Y	PR triggered by EV2 rising-edge	U	PR triggered by EV4 rising-edge

- *X: PR triggered when EV1 is on*
  - *0: no action*
  - *1–D: execute PR# 51–63*
- *Y: PR triggered when EV2 is on*
  - *0: no action*
  - *1–D: execute PR# 51–63*
- *Z: PR triggered when EV3 is on*
  - *0: no action*
  - *1–D: execute PR# 51–63*
- *U: PR triggered when EV4 is on*
  - *0: no action*
  - *1–D: execute PR# 51–63*

P5.099	**PR# triggered by event falling-edge**		***Hex Address***	***Dec Address***
			05C6H 05C7H	41479 41480
Default:	0x0	Control mode:	PR	
Unit:	-	Setting range:	0x0000–0xDDDD	
Format:	HEX	Data size:	16-bit	

Settings:

See P5.098 for details.

X	PR triggered by EV1 falling-edge	Z	PR triggered by EV3 falling-edge
Y	PR triggered by EV2 falling-edge	U	PR triggered by EV4 falling-edge

- *X: PR triggered when EV1 is off*
  - *0: no action*
  - *1–D: execute PR# 51–63*
- *Y: PR triggered when EV2 is off*
  - *0: no action*
  - *1–D: execute PR# 51–63*
- *Z: PR triggered when EV3 is off*
- *0: no action*
  - *1–D: execute PR# 51–63*
- *U: PR triggered when EV4 is off*
  - *0: no action*
  - *1–D: execute PR# 51–63*

P5.100■	Data array - Element Value #3 for reading / writing		Hex Address	Dec Address
			05C8H 05C9H	41481 41482
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Data value #3: when reading or writing the parameter by any method, the value set by P5.011 does not increase by 1. Please refer to Chapter 7 Data array for detailed instructions.

P5.101■	Data array - Element Value #4 for reading / writing		Hex Address	Dec Address
			05CAH 05CBH	41483 41484
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Data value #4: when reading or writing the parameter by any method, the value set by P5.011 does not increase by 1. Please refer to Chapter 7 Data array for detailed instructions.

P5.102■	Data array - Element Value #5 for reading / writing		Hex Address	Dec Address
			05CCH 05CDH	41485 41486
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Data value #5: when reading or writing the parameter by any method, the value set by P5.011 does not increase by 1. Please refer to Chapter 7 Data array for detailed instructions.

P5.103■	Data array - Element Value #6 for reading / writing		Hex Address	Dec Address
			05CEH 05CFH	41487 41488
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Data value #6: when reading or writing the parameter by any method, the value set by P5.011 does not increase by 1. Please refer to Chapter 7 Data array for detailed instructions.

Parameters P5.112–P5.123 were created to be able to command PR statements with Implicit Ethernet/IP communications. P5.007 can be used by Modbus (and ModTCP) to initiate PR moves, but P5.007 is bidirectional (the command is sent by a controller and the status is read back in the same register). Since Implicit communication is unidirectional, P5.112 is the PR# to be executed. P5.113–P5.119 will build all the path options just like you would in the PR Mode Setting Window in SureServo2 Pro. P5.123 is the status register of the move for Implicit messaging.

Hint- go to the PR Mode Setting window and build the path in a temporary location to view all the desired settings since the available options change depending on the Path type chosen. Please reference P6.002 for more details on path configuration details.

P5.112	***PATH_Target***		***Hex Address***	***Dec Address***
			05DEH 05DFH	41505 41506
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0–99	
Format:	DEC	Data size:	16-bit	

Settings:

This is the target Path that will be saved or executed when P5.121 (Path Save) or P5.122 (Path Trigger) are set to 1. A change in this value does not automatically trigger/save the PATH.

P5.113	***PATH_Type***		***Hex Address***	***Dec Address***
			05E2H 05E3H	41507 41508
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0–7	
Format:	DEC	Data size:	16-bit	

Settings:

Configures the PATH type.

Path Type	***Value***
Homing	0
Speed	1
Position	2 (P5.115.Z will alter this mimic path type 3)
Jump	7

P5.114	PATH Options1 configuration		Hex Address	Dec Address
			05E4H 05E5H	41509 41510
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0–0x12A	
Format:	DEC	Data size:	16-bit	

Settings:

Configure Options1 for PATH.

Value Set in P5.113	Setting Options
0 (Homing)	ZYX: hexdecimal digits to configure homing method (see P5.004 for ZYX values). This maps to P5.004 and overwrites P5.004. • X: Homing Method • Y: Signal Setting • Z: Behavior after reaching the limit
1 (Speed)	• 0: 0.1 rpm • 1: PPS (PUU per second)
2 (Position)	• 0: ABS Absolute position • 1: REL Relative position • 2: INC Incremental position • 3: CAP High speed position capturing
7 (Jump)	n/a

P5.115	PATH Options2 configuration		Hex Address	Dec Address
			05E6H 05E7H	41511 41512
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0–99	
Format:	DEC	Data size:	16-bit	

Settings:

Configure Options2 for PATH.

Value Set in P5.113	Setting Options
0 (Homing)	• 0: Stop • 1–99: Target PATH index triggered after Homing
1 (Speed)	ZYX: hexdecimal digits to configure INS/AUTO • X = 1: INS • Z = 1: AUTO
2 (Position)	ZYX: hexdecimal digits to configure INS/OVLP/AUTO • X = 1: INS • Y = 1: OVLP • Z = 1: AUTO (this will make path proceed to the next path, simulates path type 3)
7 (Jump)	ZYX: hexdecimal digits to configure INS • X = 1: INS

P5.116	PATH_Acc		Hex Address	Dec Address
			05E8H 05E9H	41513 41514
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0–15	
Format:	DEC	Data size:	16-bit	

Settings:

Set the acceleration for PATH.

Value Set in P5.113	Setting Options
0 (Homing)	0–15 (uses parameters P5.020–P5.035)
1 (Speed)	
2 (Position)	
7 (Jump)	n/a

P5.117	PATH_Dec		Hex Address	Dec Address
			05EAH 05EBH	41515 41516
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0–15	
Format:	DEC	Data size:	16-bit	

Settings:

Set the deceleration for PATH.

Value Set in P5.113	Setting Options
0 (Homing)	0–15 (uses parameters P5.020–P5.035)
1 (Speed)	
2 (Position)	
7 (Jump)	n/a

P5.118	PATH_Data1		Hex Address	Dec Address
			05ECH 05EDH	41517 41518
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-2147483648–2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Configure Data1 for PATH.

Value Set in P5.113	Setting Options
0 (Homing)	1–20000 (1st homing speed in rpm). Maps to P5.005 and overwrites P5.005.
1 (Speed)	-60000–60000/-2^{31}–2^{31-1}. Target speed in 0.1 rpm/PPS.
2 (Position)	0–15 Profile speed (0.1 rpm). Uses parameters P5.060 ~ P5.075.
7 (Jump)	0–99. Target PATH index to jump to.

P5.119	PATH_Data2		Hex Address	Dec Address
			05EEH 05EFH	41519 41520
Default:	0	Control mode:	All	
Unit:	-	Setting range:	-2147483648–2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Configure Data2 for PATH.

Value Set in P5.113	Setting Options
0 (Homing)	1–5000 (2nd homing speed in rpm). Maps to P5.006 and overwrites P5.006.
1 (Speed)	n/a
2 (Position)	-2147483648 to 2147483647 (Target position in PUU)
7 (Jump)	n/a

P5.120	Delay for PATH		Hex Address	Dec Address
			05F0H 05F1H	41521 41522
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0–15	
Format:	DEC	Data size:	16-bit	

Settings:

Set the delay for PATH.

Value Set in P5.113	Setting Options
0 (Homing)	0–15 (uses parameters P5.040–P5.055)
1 (Speed)	
2 (Position)	
7 (Jump)	

P5.121	PATH_Save		Hex Address	Dec Address
			05F2H 05F3H	41523 41524
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0–2	
Format:	DEC	Data size:	16-bit	

Settings:

Save the PATH related parameters (P5.112–P5.119) into Path index assigned in P5.xx1 with rising edge trigger.

- *0->1 rising edge to save to RAM*
- *0->2 rising edge to save to EEPROM*

P5.122	PATH_Trigger		Hex Address	Dec Address
			05F4H 05F5H	41525 41526
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0–2	
Format:	DEC	Data size:	16-bit	

Settings:

Trigger PR motion of PATH index assigned in P5.112 with rising edge trigger 0 -> 1. Changing this parameter from 0 -> 2 will stop the current PATH motion.

NOTE: *The value of P5.122 must be set to 0 after each command. Changing P5.122 from a value of 1 to a value of 2 will NOT stop the current motion.*

P5.123★	PATH_Status		Hex Address	Dec Address
			05F6H 05F7H	41527 41528
Default:	0	Control mode:	All	
Unit:	-	Setting range:	0–2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Read-only status of PATH moves. Mirrors the read function of P5.007.

Example:

If PLC triggers PATH zz:

- *P5.123 = zz when Trigger is activated*
- *P5.123= X0000 + zz when save is complete*
- *P5.123= 10000 + zz when cmd is complete*
- *P5.123= 20000 + zz when motor reaches position.*

8.4.7 - P6.xxx PR PARAMETERS

P6.000	Homing definition		Hex Address	Dec Address
			0600H 0601H	41537 41538
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFF3F	
Format:	HEX	Data size:	32-bit	

NOTE: *Additional Homing information can be found in section 7.1.3.*
We highly recommended using the Homing Setting screen of the PR Mode Window in SureServo2 Pro to configure Homing settings.

Settings:

Homing definition:

A	DEC2: deceleration time selection of second homing	YX	PATH: path type
B	DLY: select 0–F for delay time	Z	ACC: select 0–F for acceleration time
C	N/A	U	DEC1: deceleration time selection of first homing
D	BOOT	-	-

- *YX: PATH: path type*
  - *0x0: stop: homing complete and stop.*
  - *0x1–0x63h: after homing is complete, execute the specified path (Path#1–Path#99).*
- *Z: ACC: select 0–F for acceleration time*
  - *0–F: corresponds to P5.020–P5.035*
- *U: DEC1: deceleration time selection of first homing velocity*
  - *0–F: corresponds to P5.020–P5.035*
- *A: DEC2: deceleration time selection of second homing velocity*
  - *0–F: corresponds to P5.020–P5.035*
- *B: DLY: select 0–F for delay time*
  - *0–F: corresponds to P5.040–P5.055*
- *D: BOOT: when the drive is powered on decide whether to initiate the homing routine or not.*
  - *0: do not execute homing*
  - *1: execute homing automatically (servo switches to Servo On status after applying power)*

Apart from the above definitions, the related settings for homing also include:

- *P5.004 homing methods.*
- *P5.005–P5.006 speed setting of searching for the origin.*
- *P6.001: ORG_DEF is the coordinate of the origin and may not be 0.*

Notes:

1) After the origin is found (sensor or Z), it has to decelerate to a stop. The stop position exceeds the origin by a short distance:
2) If returning to the origin is not needed, set PATH to 0;
3) If returning to the origin is needed, set PATH to a non-zero value and set have that PATH execute an absolute move to ORG_DEF.

Example:

1) Upon completion of P6.000 = 0x1, automatically execute Path#1.

2) Set from absolute position (ABS) to 0 as the route of Path#1 (set P6.002 & P6.003).
3) If the origin is found (sensor or Z), and you want it to move an offset S and define the coordinate as P after moving, then PATH = non-zero and set ORG_DEF = P - S, and this absolute Position command = P.

P6.001	***Origin definition***		***Hex Address***	***Dec Address***
			0602H 0603H	41539 41540
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Origin definition. After Homing is complete, the actual position of the motor encoder will be set to P6.001. No motion occurs - the motor position is simply redefined.

ALL P6 and P7 parameters use the same settings as P6.002 and P6.003 as shown below. Please refer to P6.002 and P6.003 for detailed information about all other P6 and P7 parameters.

P6.002	***PATH#1 definition***		***Hex Address***	***Dec Address***
			0604H 0605H	41541 41542
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Format of this parameter: (High word h) DCBA : (Low word L) UZYX

High word

D C B A

Low word

U Z Y X

A	SPD, Target speed index*1	X	TYPE, Path type
B	DLY, Delay time index	Y	OPT, Option
C	AUTO*1	Z	ACC, Acceleration time index*1
D	Reserved	U	DEC, Deceleration time index*1

Definitions are as follows:

- *YX*

Y: OPT, Option				***X: TYPE, Path type***
BIT 3	***BIT 2***	***BIT 1***	***BIT 0***	
-	UNIT	AUTO	INS	1: SPEED, constant speed control.
CMD		OVLP	INS	2: SINGLE, positioning control. It stops when finished.
				3: AUTO, positioning control. It loads the next path automatically when finished.
-	-	-	INS	7: JUMP, jump to the specified path.
-	ROM	AUTO	INS	8: write specified parameter to specified path.
DIR		OVLP	INS	A: indexing position control.
-	-	-	-	Statement / arithmetic operation

- *TYPE path type: when executing 1–3, it can be interrupted and stopped by DO.STP (stop) and software limits.*
- *INS: executing this path interrupts the previous path.*
- *OVLP: allows overlapping of the next path. Overlapping is not allowed in Speed mode. When overlapping in Position mode, DLY has no function.*
- *AUTO: once current PR path is finished, load the next path automatically.*
- *UNIT: speed unit selection; 0 signifies 0.1 rpm and 1 signifies PPS (PUU per sec).*
- *CMD: please refer to Chapter 7 PR command description.*
- *ROM: write data to RAM and EEPROM at the same time. This function is only available when the writing Target is a Parameter, it is not available when the writing Target is a Data Array.*
- *DIR: sets the rotation direction with options of forward (always runs forward), backward (always runs backward), and shortest distance.*
- *UZ*

U: DEC, Deceleration time	***Z: ACC, Acceleration time***	***Corresponding parameters***	***Default Value (ms)***
0	0	P5.020	200
1	1	P5.021	300
2	2	P5.022	500
3	3	P5.023	600
4	4	P5.024	800
5	5	P5.025	900
6	6	P5.026	1000
7	7	P5.027	1200
8	8	P5.028	1500
9	9	P5.029	2000
10	10	P5.030	2500
11	11	P5.031	3000
12	12	P5.032	5000
13	13	P5.033	8000
14	14	P5.034	50
15	15	P5.035	30

- *A: SPD, target speed index*

A	*Corresponding parameters*	*Default Value (ms)*
0	P5.060	20
1	P5.061	50
2	P5.062	100
3	P5.063	200
4	P5.064	300
5	P5.065	500
6	P5.066	600
7	P5.067	800
8	P5.068	1000
9	P5.069	1300
10	P5.070	1500
11	P5.071	1800
12	P5.072	2000
13	P5.073	2300
14	P5.074	2500
15	P5.075	3000

- *B: DLY, Delay time index*

B	*Corresponding parameters*	*Default Value (ms)*
0	P5.040	0
1	P5.041	100
2	P5.042	200
3	P5.043	400
4	P5.044	500
5	P5.045	800
6	P5.046	1000
7	P5.047	1500
8	P5.048	2000
9	P5.049	2500
10	P5.050	3000
11	P5.051	3500
12	P5.052	4000
13	P5.053	4500
14	P5.054	5000
15	P5.055	5500

- *C: AUTO: once current PR path is finished, load the next path automatically.*
  This function is only enabled when X = A indexing position control.
- *Description of each bit:*

Bit 2	AUTO	0: disable auto function 1: once current PR path is finished, load next path automatically
Bit 0–1	Reserved	-

NOTE: *The parameter format definition [C, A, U, Z] is different from the above table when the path type is [7]: write the specified parameter to the specified path, and [8]: statement / arithmetic operation. Please refer to Chapter 7 for detailed instructions.*

P6.003	PATH#1 data		Hex Address	Dec Address
			0606H 0607H	41543 41544
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

P6.002 defines the property of the target point; P6.003 defines the target position of P6.002 or the target path for the Jump command.

P6.004	PATH#2 definition		Hex Address	Dec Address
			0608H 0609H	41545 41546
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.005	PATH#2 data		Hex Address	Dec Address
			060AH 060BH	41547 41548
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.006	PATH#3 definition		Hex Address	Dec Address
			060CH 060DH	41549 41550
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.007	PATH#3 data		Hex Address	Dec Address
			060EH 060FH	41551 41552
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.008	PATH#4 definition		Hex Address	Dec Address
			0610H 0611H	41553 41554
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.009	PATH#4 data		Hex Address	Dec Address
			0612H 0613H	41555 41556
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.010	PATH#5 definition		Hex Address	Dec Address
			0614H 0615H	41557 41558
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.011	PATH#5 data		Hex Address	Dec Address
			0616H 0617H	41559 41560
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.012	PATH#6 definition		Hex Address	Dec Address
			0618H 0619H	41561 41562
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.013	PATH#6 data		Hex Address	Dec Address
			061AH 061BH	41563 41564
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.014	PATH#7 definition		Hex Address	Dec Address
			061CH 061DH	41565 41566
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.015	PATH#7 data		Hex Address	Dec Address
			061EH 061FH	41567 41568
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.016	PATH#8 definition		Hex Address	Dec Address
			0620H 0621H	41569 41570
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.017	PATH#8 data		Hex Address	Dec Address
			0622H 0623H	41571 41572
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.018	PATH#9 definition		Hex Address	Dec Address
			0624H 0625H	41573 41574
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.019	PATH#9 data		Hex Address	Dec Address
			0626H 0627H	41575 41576
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.020	PATH#10 definition		Hex Address	Dec Address
			0628H 0629H	41577 41578
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.021	PATH#10 data		Hex Address	Dec Address
			062AH 062BH	41579 41580
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.022	PATH#11 definition		Hex Address	Dec Address
			062CH 062DH	41581 41582
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.023	PATH#11 data		Hex Address	Dec Address
			062EH 062FH	41583 41584
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.024	PATH#12 definition		Hex Address	Dec Address
			0630H 0631H	41585 41586
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.025	PATH#12 data		Hex Address	Dec Address
			0632H 0633H	41587 41588
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.026	PATH#13 definition		Hex Address	Dec Address
			0634H 0635H	41589 41590
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.027	PATH#13 data		Hex Address	Dec Address
			0636H 0637H	41591 41592
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.028	PATH#14 definition		Hex Address	Dec Address
			0638H 0639H	41593 41594
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.029	PATH# 14 data		Hex Address	Dec Address
			063AH 063BH	41595 41596
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.030	PATH#15 definition		Hex Address	Dec Address
			063CH 063DH	41597 41598
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.031	PATH#15 data		Hex Address	Dec Address
			063EH 063FH	41599 41600
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.032	PATH#16 definition		Hex Address	Dec Address
			0640H 0641H	41601 41602
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.033	PATH#16 data		Hex Address	Dec Address
			0642H 0643H	41603 41604
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.034	PATH#17 definition		Hex Address	Dec Address
			0644H 0645H	41605 41606
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.035	PATH#17 data		Hex Address	Dec Address
			0646H 0647H	41607 41608
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.036	PATH#18 definition		Hex Address	Dec Address
			0648H 0649H	41609 41610
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.037	PATH#18 data		Hex Address	Dec Address
			064AH 064BH	41611 41612
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.038	PATH#19 definition		Hex Address	Dec Address
			064CH 064DH	41613 41614
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.039	PATH#19 data		Hex Address	Dec Address
			064EH 064FH	41615 41616
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.040	PATH#20 definition		Hex Address	Dec Address
			0650H 0651H	41617 41618
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.041	PATH#20 data		Hex Address	Dec Address
			0652H 0653H	41619 41620
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.042	PATH#21 definition		Hex Address	Dec Address
			0654H 0655H	41621 41622
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.043	PATH#21 data		Hex Address	Dec Address
			0656H 0657H	41623 41624
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.044	PATH#22 definition		Hex Address	Dec Address
			0658H 0659H	41625 41626
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.045	PATH#22 data		Hex Address	Dec Address
			065AH 065BH	41627 41628
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.046	PATH#23 definition		Hex Address	Dec Address
			065CH 065DH	41629 41630
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.047	PATH#23 data		Hex Address	Dec Address
			065EH 065FH	41631 41632
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.048	PATH#24 definition		Hex Address	Dec Address
			0660H 0661H	41633 41634
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.049	PATH#24 data		Hex Address	Dec Address
			0662H 0663H	41635 41636
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.050	PATH#25 definition		Hex Address	Dec Address
			0664H 0665H	41637 41638
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.051	PATH#25 data		Hex Address	Dec Address
			0666H 0667H	41639 41640
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.052	PATH#26 definition		Hex Address	Dec Address
			0668H 0669H	41641 41642
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.053	PATH#26 data		Hex Address	Dec Address
			066AH 066BH	41643 41644
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.054	PATH#27 definition		Hex Address	Dec Address
			066CH 066DH	41645 41646
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.055	PATH#27 data		Hex Address	Dec Address
			066EH 066FH	41647 41648
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.056	PATH#28 definition		Hex Address	Dec Address
			0670H 0671H	41649 41650
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.057	PATH#28 data		Hex Address	Dec Address
			0672H 0673H	41651 41652
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.058	PATH#29 definition		Hex Address	Dec Address
			0674H 0675H	41653 41654
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.059	PATH#29 data		Hex Address	Dec Address
			0676H 0677H	41655 41656
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.060	PATH#30 definition		Hex Address	Dec Address
			0678H 0679H	41657 41658
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.061	PATH#30 data		Hex Address	Dec Address
			067AH 067BH	41659 41660
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.062	PATH#31 definition		Hex Address	Dec Address
			067CH 067DH	41661 41662
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.063	PATH#31 data		Hex Address	Dec Address
			067EH 067FH	41663 41664
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.064	PATH#32 definition		Hex Address	Dec Address
			0680H 0681H	41665 41666
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.065	PATH#32 data		Hex Address	Dec Address
			0682H 0683H	41667 41668
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.066	PATH#33 definition		Hex Address	Dec Address
			0684H 0685H	41669 41670
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.067	PATH#33 data		Hex Address	Dec Address
			0686H 0687H	41671 41672
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.068	PATH#34 definition		Hex Address	Dec Address
			0688H 0689H	41673 41674
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.069	PATH#34 data		Hex Address	Dec Address
			068AH 068BH	41675 41676
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.070	PATH#35 definition		Hex Address	Dec Address
			068CH 068DH	41677 41678
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.071	PATH#35 data		Hex Address	Dec Address
			068EH 068FH	41679 41680
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.072	PATH#36 definition		Hex Address	Dec Address
			0690H 0691H	41681 41682
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.073	PATH#36 data		Hex Address	Dec Address
			0692H 0693H	41683 41684
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.074	PATH#37 definition		Hex Address	Dec Address
			0694H 0695H	41685 41686
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.075	PATH#37 data		Hex Address	Dec Address
			0696H 0697H	41687 41688
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.076	PATH#38 definition		Hex Address	Dec Address
			0698H 0699H	41689 41690
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.077	PATH#38 data		Hex Address	Dec Address
			069AH 069BH	41691 41692
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.078	PATH#39 definition		Hex Address	Dec Address
			069CH 069DH	41693 41694
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.079	PATH#39 data		Hex Address	Dec Address
			069EH 069FH	41695 41696
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.080	PATH#40 definition		Hex Address	Dec Address
			06A0H 06A1H	41697 41698
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.081	PATH#40 data		Hex Address	Dec Address
			06A2H 06A3H	41699 41700
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.082	PATH#41 definition		Hex Address	Dec Address
			06A4H 06A5H	41701 41702
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.083	PATH#41 data		Hex Address	Dec Address
			06A6H 06A7H	41703 41704
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.084	PATH#42 definition		Hex Address	Dec Address
			06A8H 06A9H	41705 41706
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.085	PATH#42 data		Hex Address	Dec Address
			06AAH 06ABH	41707 41708
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.086	PATH#43 definition		Hex Address	Dec Address
			06ACH 06ADH	41709 41710
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.087	PATH#43 data		Hex Address	Dec Address
			06AEH 06AFH	41711 41712
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.088	PATH# 44 definition		Hex Address	Dec Address
			06B0H 06B1H	41713 41714
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.089	PATH#44 data		Hex Address	Dec Address
			06B2H 06B3H	41715 41716
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.090	PATH# 45 definition		Hex Address	Dec Address
			06B4H 06B5H	41717 41718
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.091	PATH#45 data		Hex Address	Dec Address
			06B6H 06B7H	41719 41720
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.092	PATH#46 definition		Hex Address	Dec Address
			06B8H 06B9H	41721 41722
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.093	PATH#46 data		Hex Address	Dec Address
			06BAH 06BBH	41723 41724
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.094	PATH#47 definition		Hex Address	Dec Address
			06BCH 06BDH	41725 41726
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.095	PATH#47 data		Hex Address	Dec Address
			06BEH 06BFH	41727 41728
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.096	PATH#48 definition		Hex Address	Dec Address
			06C0H 06C1H	41729 41730
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.097	PATH#48 data		Hex Address	Dec Address
			06C2H 06C3H	41731 41732
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P6.098	PATH#49 definition		Hex Address	Dec Address
			06C4H 06C5H	41733 41734
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P6.099	PATH#49 data		Hex Address	Dec Address
			06C6H 06C7H	41735 41736
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

8.4.8 - P7.xxx PR PARAMETERS

P7.000	PATH#50 definition		Hex Address	Dec Address
			0700H 0701H	41793 41794
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.001	PATH#50 data		Hex Address	Dec Address
			0702H 0703H	41795 41796
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.002	PATH#51 definition		Hex Address	Dec Address
			0704H 0705H	41797 41798
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002. Note that P7.002 - P7.027 can be linked to Events. See P5.098 and P5.099

P7.003	PATH#51 data		Hex Address	Dec Address
			0706H 0707H	41799 41800
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.004	PATH#52 definition		Hex Address	Dec Address
			0708H 0709H	41801 41802
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.005	PATH#52 data		Hex Address	Dec Address
			070AH 070BH	41803 41804
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.006	PATH#53 definition		Hex Address	Dec Address
			070CH 070DH	41805 41806
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.007	PATH#53 data		Hex Address	Dec Address
			070EH 070FH	41807 41808
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.008	PATH#54 definition		Hex Address	Dec Address
			0710H 0711H	41809 41810
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.009	PATH#54 data		Hex Address	Dec Address
			0712H 0713H	41811 41812
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.010	PATH#55 definition		Hex Address	Dec Address
			0714H 0715H	41813 41814
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.011	PATH#55 data		Hex Address	Dec Address
			0716H 0717H	41815 41816
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.012	PATH#56 definition		Hex Address	Dec Address
			0718H 0719H	41817 41818
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.013	PATH#56 data		Hex Address	Dec Address
			071AH 071BH	41819 41820
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.014	PATH#57 definition		Hex Address	Dec Address
			071CH 071DH	41821 41822
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.015	PATH#57 data		Hex Address	Dec Address
			071EH 071FH	41823 41824
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.016	PATH#58 definition		Hex Address	Dec Address
			0720H 0721H	41825 41826
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.017	PATH#58 data		Hex Address	Dec Address
			0722H 0723H	41827 41828
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.018	PATH#59 definition		Hex Address	Dec Address
			0724H 0725H	41829 41830
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.019	PATH#59 data		Hex Address	Dec Address
			0726H 0727H	41831 41832
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.020	PATH#60 definition		Hex Address	Dec Address
			0728H 0729H	41833 41834
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000to–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.021	PATH#60 data		Hex Address	Dec Address
			072AH 072BH	41835 41836
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.022	PATH#61 definition		Hex Address	Dec Address
			072CH 072DH	41837 41838
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.023	PATH#61 data		Hex Address	Dec Address
			072EH 072FH	41839 41840
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.024	PATH#62 definition		Hex Address	Dec Address
			0730H 0731H	41841 41842
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.025	PATH#62 data		Hex Address	Dec Address
			0732H 0733H	41843 41844
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.026	PATH#63 definition		Hex Address	Dec Address
			0734H 0735H	41845 41846
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.027	PATH#63 data		Hex Address	Dec Address
			0736H 0737H	41847 41848
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.028	PATH#64 definition		Hex Address	Dec Address
			0738H 0739H	41849 41850
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.029	PATH#64 data		Hex Address	Dec Address
			073AH 073BH	41851 41852
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.030	PATH#65 definition		Hex Address	Dec Address
			073CH 073DH	41853 41854
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.031	PATH#65 data		Hex Address	Dec Address
			073EH 073FH	41855 41856
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.032	PATH#66 definition		Hex Address	Dec Address
			0740H 0741H	41857 41858
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.033	PATH#66 data		Hex Address	Dec Address
			0742H 0743H	41859 41860
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.034	PATH#67 definition		Hex Address	Dec Address
			0744H 0745H	41861 41862
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.035	PATH#67 data		Hex Address	Dec Address
			0746H 0747H	41863 41864
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.036	PATH#68 definition		Hex Address	Dec Address
			0748H 0749H	41865 41866
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.037	PATH#68 data		Hex Address	Dec Address
			074AH 074BH	41867 41868
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.038	PATH#69 definition		Hex Address	Dec Address
			074CH 074DH	41869 41870
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.039	PATH#69 data		Hex Address	Dec Address
			074EH 074FH	41871 41872
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.040	PATH#70 definition		Hex Address	Dec Address
			0750H 0751H	41873 41874
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.041	PATH#70 data		Hex Address	Dec Address
			0752H 0753H	41875 41876
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.042	PATH#71 definition		Hex Address	Dec Address
			0754H 0755H	41877 41878
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.043	PATH#71 data		Hex Address	Dec Address
			0756H 0757H	41879 41880
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.044	PATH#72 definition		Hex Address	Dec Address
			0758H 0759H	41881 41882
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.045	PATH#72 data		Hex Address	Dec Address
			075AH 075BH	41883 41884
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.046	PATH#73 definition		Hex Address	Dec Address
			075CH 075DH	41885 41886
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.047	PATH#73 data		Hex Address	Dec Address
			075EH 075FH	41887 41888
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.048	PATH#74 definition		Hex Address	Dec Address
			0760H 0761H	41889 41890
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.049	PATH#74 data		Hex Address	Dec Address
			0762H 0763H	41891 41892
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.050	PATH#75 definition		Hex Address	Dec Address
			0764H 0765H	41893 41894
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.051	PATH#75 data		Hex Address	Dec Address
			0766H 0767H	41895 41896
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.052	PATH#76 definition		Hex Address	Dec Address
			0768H 0769H	41897 41898
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.053	PATH#76 data		Hex Address	Dec Address
			076AH 076BH	41899 41900
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.054	PATH#77 definition		Hex Address	Dec Address
			076CH 076DH	41901 41902
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.055	PATH#77 data		Hex Address	Dec Address
			076EH 076FH	41903 41904
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.056	PATH#78 definition		Hex Address	Dec Address
			0770H 0771H	41905 41906
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.057	PATH#78 data		Hex Address	Dec Address
			0772H 0773H	41907 41908
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.058	PATH#79 definition		Hex Address	Dec Address
			0774H 0775H	41909 41910
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.059	PATH#79 data		Hex Address	Dec Address
			0776H 0777H	41911 41912
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.060	PATH#80 definition		Hex Address	Dec Address
			0778H 0779H	41913 41914
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.061	PATH#80 data		Hex Address	Dec Address
			077AH 077BH	41915 41916
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.062	PATH#81 definition		Hex Address	Dec Address
			077CH 077DH	41917 41918
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.063	PATH#81 data		Hex Address	Dec Address
			077EH 077FH	41919 41920
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.064	PATH#82 definition		Hex Address	Dec Address
			0780H 0781H	41921 41922
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.065	PATH#82 data		Hex Address	Dec Address
			0782H 0783H	41923 41924
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.066	PATH#83 definition		Hex Address	Dec Address
			0784H 0785H	41925 41926
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.067	PATH#83 data		Hex Address	Dec Address
			0786H 0787H	41927 41928
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.068	PATH#84 definition		Hex Address	Dec Address
			0788H 0789H	41929 41930
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.069	PATH#84 data		Hex Address	Dec Address
			078AH 078BH	41931 41932
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.070	PATH#85 definition		Hex Address	Dec Address
			078CH 078DH	41933 41934
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.071	PATH#85 data		Hex Address	Dec Address
			078EH 078FH	41935 41936
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.072	PATH#86 definition		Hex Address	Dec Address
			0790H 0791H	41937 41938
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.073	PATH#86 data		Hex Address	Dec Address
			0792H 0793H	41939 41940
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.074	PATH#87 definition		Hex Address	Dec Address
			0794H 0795H	41941 41942
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.075	PATH#87 data		Hex Address	Dec Address
			0796H 0797H	41943 41944
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.076	PATH#88 definition		Hex Address	Dec Address
			0798H 0799H	41945 41946
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.077	PATH#88 data		Hex Address	Dec Address
			079AH 079BH	41947 41948
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.078	PATH#89 definition		Hex Address	Dec Address
			079CH 079DH	41949 41950
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.079	PATH#89 data		Hex Address	Dec Address
			079EH 079FH	41951 41952
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.080	PATH#90 definition		Hex Address	Dec Address
			07A0H 07A1H	41953 41954
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.081	PATH#90 data		Hex Address	Dec Address
			07A2H 07A3H	41955 41956
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.082	PATH#91 definition		Hex Address	Dec Address
			07A4H 07A5H	41957 41958
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.083	PATH#91 data		Hex Address	Dec Address
			07A6H 07A7H	41959 41960
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.084	PATH#92 definition		Hex Address	Dec Address
			07A8H 07A9H	41961 41962
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.085	PATH#92 data		Hex Address	Dec Address
			07AAH 07ABH	41963 41964
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.086	PATH#93 definition		Hex Address	Dec Address
			07ACH 07ADH	41965 41966
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.087	PATH#93 data		Hex Address	Dec Address
			07AEH 07AFH	41967 41968
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.088	PATH#94 definition		Hex Address	Dec Address
			07B0H 07B1H	41969 41970
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.089	PATH#94 data		Hex Address	Dec Address
			07B2H 07B3H	41971 41972
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.090	PATH#95 definition		Hex Address	Dec Address
			07B4H 07B5H	41973 41974
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.091	PATH#95 data		Hex Address	Dec Address
			07B4H 07B5H	41975 41976
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.092	PATH#96 definition		Hex Address	Dec Address
			07B8H 07B9H	41977 41978
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.093	PATH#96 data		Hex Address	Dec Address
			07BAH 07BBH	41979 41980
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.094	PATH#97 definition		Hex Address	Dec Address
			07BCH 07BDH	41981 41982
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.095	PATH#97 data		Hex Address	Dec Address
			07BEH 07BFH	41983 41984
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.096	PATH#98 definition		Hex Address	Dec Address
			07C0H 07C1H	41985 41986
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.097	PATH#98 data		Hex Address	Dec Address
			07C2H 07C3H	41987 41988
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

P7.098	PATH#99 definition		Hex Address	Dec Address
			07C4H 07C5H	41989 41990
Default:	0x00000000	Control mode:	PR	
Unit:	-	Setting range:	0x00000000–0xFFFFFFFF	
Format:	HEX	Data size:	32-bit	

Settings:

Please refer to the description of P6.002.

P7.099	PATH#99 data		Hex Address	Dec Address
			07C6H 07C7H	41991 41992
Default:	0	Control mode:	PR	
Unit:	-	Setting range:	-2147483648 to +2147483647	
Format:	DEC	Data size:	32-bit	

Settings:

Please refer to the description of P6.003.

8.4.9 - Digital Input (DI) Function Assignments

Table 8-1: Digital Input (DI) Descriptions (see P2.010–P2.017, P2.030–P2.040)

Value	Name	Description
0x01	SON	Servo on
0x02	ARST	Alarm reset
0x03	GAINUP	Gain switching
0x04	CCLR	Pulse clear
0x05	ZCLAMP	Enables a low-speed deadband for the motor speed. See P1.038. Also see P2.065 for more information.
0x06	CMDINV	Reverse direction of input command
0x08	CTRG	Command triggered
0x09	TRQLM	Torque limit (duplicates behavior of P1.002.Y)
0x0B	FHS	Switch between full- and half-closed loop modes while P1.074. X=1
0x0C	VPL	Latch function of analog Position command
0x0D	VPRS	Clear function of analog Position command
0x0E	FEC	Clear errors of the full closed-loop auxiliary encoder and motor encoder
0x0F	SPDKVC	Maximum analog Speed command switch (P1.040 and P1.081)
0x10	SPDLM	Speed limit (duplicates behavior of P1.002.X)
0x11	POS0	Register Position command selection 1 - 99 Bit0
0x12	POS1	Register Position command selection 1 - 99 Bit1
0x13	POS2	Register Position command selection 1 - 99 Bit2
0x1A	POS3	Register Position command selection 1 - 99 Bit3
0x1B	POS4	Register Position command selection 1 - 99 Bit4
0x1C	POS5	Register Position command selection 1 - 99 Bit5
0x1E	POS6	Register Position command selection 1 - 99 Bit6
0x1D	ABSE	Enable the setting and reading of absolute coordinate system
0x1F	ABSC	Set or clear the absolute coordinate system
0x14	SPD0	Register Speed command selection (1 - 4) Bit0
0x15	SPD1	Register Speed command selection (1 - 4) Bit1
0x16	TCM0	Register Torque command selection (1 - 4) Bit0
0x17	TCM1	Register Torque command selection (1 - 4) Bit1
0x18	S-P	Position / Speed modes selection
0x19	S-T	Torque / Speed modes selection
0x20	T-P	Torque / Position modes selection
0x21	OVRD	Motor override (level-based DI motor stop)
0x22	NL (CWL)	Reverse inhibit limit
0x23	PL (CCWL)	Forward inhibit limit
0x24	ORG	Homing origin
0x27	SHOM	Enable homing
0x2B	PT-PR	PT / PR modes selection
0x35	ALGN	Electronic cam phase alignment
0x36	CAM	E-Cam engaging control
0x37	JOGU	Motor JOGs in the forward direction
0x38	JOGD	Motor JOGs in the reverse direction
0x39	EV1	Event trigger command 1
0x3A	EV2	Event trigger command 2

Value	Name	Description
0x3B	EV3	Event trigger command 3
0x3C	EV4	Event trigger command 4
0x43	GNUM0	E-Gear ratio (Numerator) selection 0
0x44	GNUM1	E-Gear ratio (Numerator) selection 1
0x45	INHP	External pulse inhibit (This can only be assigned to DI8. See P2.017.)
0x46	STP	Motor stops
0x47	PFQS	Use this DI to set the emergency stop for deceleration time

Value: 0x01

DI Name	Description	Triggering Method	Control Mode
SON	When this DI is on, servo is activated (Servo On).	Level triggered	ALL

Value: 0x02

DI Name	Description	Triggering Method	Control Mode
ARST	Alarm reset. After the alarm is cleared, the drive shows that the alarm is cleared when this DI is on.	Rising-edge triggered	ALL

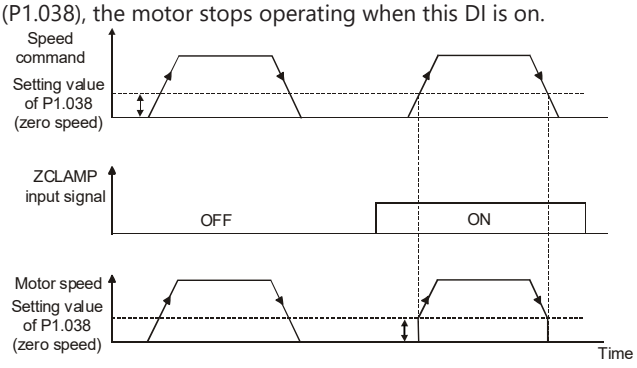
Value: 0x03

DI Name	Description	Triggering Method	Control Mode
GAINUP	In Speed and Position modes, when this DI is on (P2.027, Gain switching condition and method selection, set to 1), the gain switches to the original gain multiplied by the switching rate.	Level triggered	PT, PR, S

Value: 0x04

DI Name	Description	Triggering Method	Control Mode
CCLR	Clear pulse counter and P2.050, Pulse Clear Mode (defines CCLR as rising-edge or level triggered). Set DI.CCLR to clear position pulse deviation (applicable to PT mode). When this DI is on, the accumulative pulse deviation of the drive is cleared to 0.	Rising-edge triggered, level triggered	PT, PR

Value: 0x05

DI Name	Description	Triggering Method	Control Mode
ZCLAMP	When the speed is slower than the setting of zero speed (P1.038), the motor stops operating when this DI is on. 	Level triggered	S

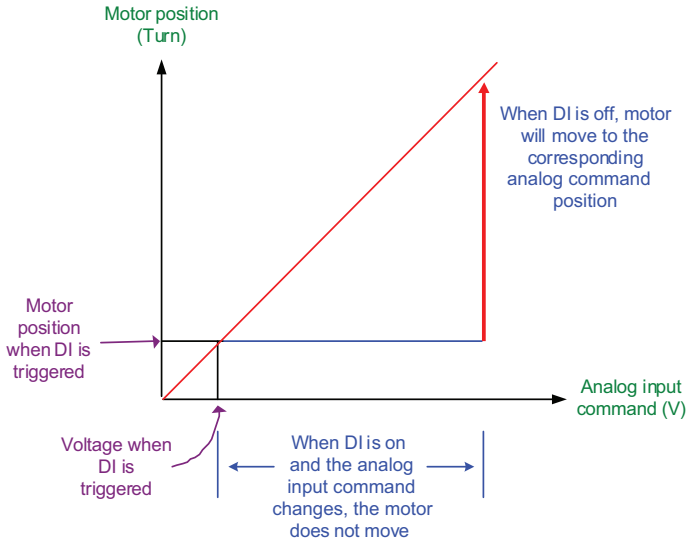
Value: 0x06			
DI Name	***Description***	***Triggering Method***	***Control Mode***
CMDINV	Command inversion. In Speed and Torque modes, input command is set to the reverse direction when this DI is on.	Level triggered	S, Sz, T

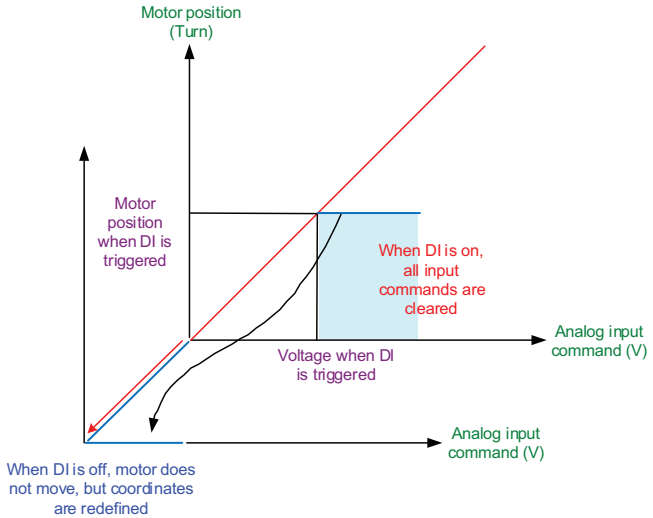
Value: 0x08			
DI Name	***Description***	***Triggering Method***	***Control Mode***
CTRG	Command trigger. In PR mode, after selecting the PR command (POS0–6), the motor operates according to the command issued by the register when this DI is on.	Rising-edge triggered	PR

Value: 0x09			
DI Name	***Description***	***Triggering Method***	***Control Mode***
TRQLM	Torque limit. In Speed and Position modes, motor torque is limited when this DI is on, and source of the torque limit command is the internal register or analog voltage. DI.TRQLM or P1.002:Y can be used to enable a torque limit. See definitions of DI.TCM0 and DI.TCM1 below. Also refer to "6.6 - Others" on page 6–31 for more details.	Level triggered	PT, PR, S

Value: 0x0A			
DI Name	***Description***	***Triggering Method***	***Control Mode***
GTRY	When the gantry synchronization function is enabled (P1.074=2), switch this DI ON to temporarily disable the monitoring function of the grantry synchronization. After receiving this DI, the servo stops calculating and monitoring the error between the two axes.	Rising-edge triggered	PT

Value: 0x0B			
DI Name	***Description***	***Triggering Method***	***Control Mode***
FHS	Switch between full- and semi-closed loop modes while P1.074.X=1..	Level triggered	PT, PR (Full-closed loop)

Value: 0x0C			
DI Name	***Description***	***Triggering Method***	***Control Mode***
VPL	Voltage/position latch for the Analog Position command. If this DI is on, position of the motor is held at the current position when the DI is triggered. While this DI is on, the motor does not move even when there is a change in the analog position command. When this DI is off, the motor completes the command that was changed during the time DI was on. See P1.064 for more details of Analog Positioning. 	Level triggered	PT

Value: 0x0D			
DI Name	***Description***	***Triggering Method***	***Control Mode***
VPRS	Clear function of analog Position command. If this DI is on, the position of the motor is held at the current position when DI is triggered. Despite the change in the analog command when DI is on, the motor remains at the current position even when the DI turns off. However, the position that the motor remains at corresponds to the new analog command. Thus, the analog input command redefines the coordinate system of the motor. 	Level triggered	PT

Value: 0x0E			
DI Name	**Description**	**Triggering Method**	**Control Mode**
FEC	Clear error of full-closed loop auxiliary encoder and motor encoder.	Rising-edge triggered	PT/PR full-closed loop

Value: 0x0F			
DI Name	**Description**	**Triggering Method**	**Control Mode**
SPDKVC	Maximum analog Speed command switch (P1.040 and P1.081)	Level triggered	S

Value: 0x10			
DI Name	**Description**	**Triggering Method**	**Control Mode**
SPDLM	Speed limit. In Torque mode, motor speed is limited when this DI is on, and the limited Speed command is the internal register or analog voltage command. DI.SPDLM or P1.002:X can be used to enable the speed limit. See definitions of SPD0 and SPD1 below. Also refer to "6.6 - Others" on page 6–31 for more details.	Level triggered	T

Value: 0x11, 0x12, 0x13, 0x1A, 0x1B, 0x1C, 0x1E

DI Name	Description	Triggering Method	Control Mode
POS0 POS1 POS2 POS3 POS4 POS5 POS6	PR command selection (1–99). The decimal value of POS6 - POS0 corresponds to the triggered PR value. Example (on the last row): binary 1100011 = decimal 99 = PR99.	Level triggered	PR

Position command	POS 6	POS 5	POS 4	POS 3	POS 2	POS 1	POS 0	CTRG	Corresponding parameter
Homing	0	0	0	0	0	0	0	↑	P6.000
									P6.001
PR 1	0	0	0	0	0	0	1	↑	P6.002
									P6.003
-									
PR 50	0	1	1	0	0	1	0	↑	P6.098
									P6.099
PR 51	0	1	1	0	0	1	1	↑	P7.000
									P7.001
-									
PR 99	1	1	0	0	0	1	1	↑	P7.098
									P7.099

Value: 0x1D			
DI Name	**Description**	**Triggering Method**	**Control Mode**
ABSE	When DI.ABSE is on, it is in absolute mode and can enable the functions of DI.ABSQ, DI.ABSC, DO.ABSR, and DO.ABSD at the same time. When DI.ABSE is on, the functions of DI4, DO2, and DO3 are no longer the ones assigned by the parameter. The DI4 function will be DI.ABSQ, DO2 will be DO.ABSR, and DO3 will be DO.ABSD. In addition, the DI point of DI.ABSC can be assigned by parameters.	Level triggered	All

Value: 0x1F			
DI Name	***Description***	***Triggering Method***	***Control Mode***
ABSC	Absolute encoder clear. When DI.ABSC is on, the number of turns stored in the absolute encoder are cleared. But this DI is only valid when DI.ABSE is on.	Rising-edge triggered	All

Value: when DI.ABSE is on, the DI.ABSQ from DI4 replaces the DI4 fnction from P2.013			
DI Name	***Description***	***Triggering Method***	***Control Mode***
ABSQ always input by DI4	During I/O transmission, the controller sends the handshaking signal. When DI.ABSQ is off, the controller issues the request; when DI.ABSQ is on, the controller has processed the ABSD signal. This DI is only valid when DI.ABSE is on.	Rising- and falling-edge triggered	All

Value: 0x14, 0x15			
DI Name	***Description***	***Triggering Method***	***Control Mode***
SPD0 SPD1	Register Speed command selection (0–3) In Torque Mode, SPD0 and SPD1 are only used as limits if DI.SPDLM=1 or P1.002.X=1. See "6.6 - Others" on page 6–31 for more details.	Level triggered	S

Speed Command Number	***DI signal of CN1***		***Command source***		***Content***	***Range***
	SPD1	***SPD0***				
S0	0	0	Mode S	External analog signal	Voltage difference between V-REF and GND	-10V to +10V
			Mode Sz	0Hz	Speed command is 0	0
S1	0	1	Register parameter		P1.009	+/- 6000 rpm (rotary)
S2	1	0			P1.010	
S3	1	1			P1.011	

Value: 0x16, 0x17			
DI Name	***Description***	***Triggering Method***	***Control Mode***
TCM0 TCM1	Register Torque command selection (0–3) In Speed Mode, TCM0 and TCM1 are only used as limits if DI.TRQLM=1 or if P1.002:Y =1. See "6.6 - Others" on page 6–31 for more details.	Level triggered	T

Torque Command Number	***DI Signal of CN1***		***Command source***			***Content***	***Range***
	TCM1	***TCM0***					
T0	0	0	Mode	T	External analog command	Voltage difference between T-REF and GND	-10V to +10V
				Tz	N/A	Torque command is 0	0
T1	0	1	Register parameter			P1.012	+/- 400%
T2	1	0				P1.013	
T3	1	1				P1.014	

Value: 0x18			
DI Name	**Description**	**Triggering Method**	**Control Mode**
S-P	In Position and Speed dual modes, if this DI is off, the drive is in Speed mode; if this DI is on, the drive is in Position mode. In PT / PR / S mode, PT and PR are selected with DI.PT-PR (0x2B).	Level triggered	Dual mode

Value: 0x19			
DI Name	**Description**	**Triggering Method**	**Control Mode**
S-T	In Speed and Torque dual modes, if this DI is off, the drive is in Speed mode; if this DI is on, the drive is in Torque mode.	Level triggered	Dual mode

Value: 0x20			
DI Name	**Description**	**Triggering Method**	**Control Mode**
T-P	In Position and Torque dual modes, if this DI is off, the drive is in Torque mode; if this DI is on, the drive is in Position mode. In PT / PR / T modes, PT and PR are selected with DI.PT-PR (0x2B).	Level triggered	Dual mode

Value: 0x21			
DI Name	**Description**	**Triggering Method**	**Control Mode**
OVRD	When this DI is active, the motor stops per P1.032, and triggers AL013. The motor will restart when the DI is inactive.	Level triggered	All

Value: 0x22			
DI Name	**Description**	**Triggering Method**	**Control Mode**
NL (CWL)	This DI is the Reverse inhibit limit (Reverse Overtravel). This DI triggers AL014 Reverse Limit Error.	Level triggered	All

Value: 0x23			
DI Name	**Description**	**Triggering Method**	**Control Mode**
PL (CCWL)	This DI is the Forward inhibit limit (Forward Overtravel). This DI triggers AL015 Forward Limit Error.	Level triggered	All

Value: 0x24			
DI Name	**Description**	**Triggering Method**	**Control Mode**
ORG	During homing, when this DI is triggered, the servo uses the position as the homing origin. Please refer to the setting of P5.004.	Rising- and falling-edge triggered	PR

Value: 0x27			
DI Name	**Description**	**Triggering Method**	**Control Mode**
SHOM	During homing, when this DI is on, it activates the function to search for the origin. Please refer to the setting of P5.004.	Rising-edge triggered	PR

Value: 0x2B			
DI Name	**Description**	**Triggering Method**	**Control Mode**
PT-PR	Use this DI to select the command source in PT-PR dual mode or PT-PR-S multiple mode. If this DI is off, the drive is in PT mode; if this DI is on, the drive is in PR mode.	Level triggered	Dual mode

Value: 0x35			
DI Name	***Description***	***Triggering Method***	***Control Mode***
ALGN	When E-Cam alignment function is enabled (P2.076.bit0 = 1 & P2.076.bit1 = 1), it executes alignment correction when this DI is on.	Rising-edge triggered	PR

Value: 0x36			
DI Name	***Description***	***Triggering Method***	***Control Mode***
CAM	E-Cam engaging control. Please refer to the setting of P5.088 U, Z value.	Rising- and falling-edge triggered	PR

Value: 0x37			
DI Name	***Description***	***Triggering Method***	***Control Mode***
JOGU	When this DI is on, the motor JOGs in the forward direction. P1.034 and P1.035 can be used to control acceleration and deceleration when using the DI jog function.	Level triggered	All

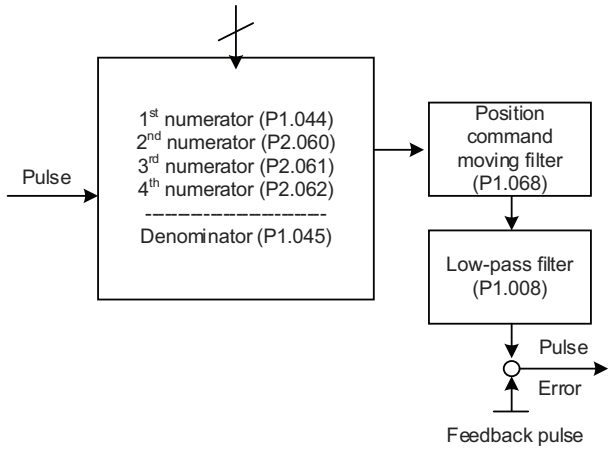
Value: 0x38			
DI Name	***Description***	***Triggering Method***	***Control Mode***
JOGD	When this DI is on, the motor JOGs in the reverse direction. P1.034 and P1.035 can be used to control acceleration and deceleration when using the DI jog function.	Level triggered	All

Value: 0x39			
DI Name	***Description***	***Triggering Method***	***Control Mode***
EV1	Event trigger command #1. Please refer to the setting of P5.098 and P5.099.	Rising- and falling-edge triggered	PR

Value: 0x3A			
DI Name	***Description***	***Triggering Method***	***Control Mode***
EV2	Event trigger command #2. Please refer to the setting of P5.098 and P5.099.	Rising- and falling-edge triggered	PR

Value: 0x3B			
DI Name	***Description***	***Triggering Method***	***Control Mode***
EV3	Event trigger command #3. Please refer to the setting of P5.098 and P5.099.	Rising- and falling-edge triggered	PR

Value: 0x3C			
DI Name	***Description***	***Triggering Method***	***Control Mode***
EV4	Event trigger command #4. Please refer to the setting of P5.098 and P5.099.	Rising- and falling-edge triggered	PR

Value: 0x43, 0x44			
DI Name	**Description**	**Triggering Method**	**Control Mode**
GNUM0 GNUM1	E-Gear ratio (Numerator) selection 0 E-Gear ratio (Numerator) selection 1 GNUM0, GNUM1  	Level triggered	PT

GNUM1	GNUM0	Numerator to Use
0	0	P1.044
0	1	P2.060
1	0	P2.061
1	1	P2.062

Value: 0x45			
DI Name	**Description**	**Triggering Method**	**Control Mode**
INHP	In Position mode, the external pulse input command will no longer command position moves when this DI is on. INHP only works when connected to the actual DI8 terminal. If DI8 is controlled via communication control or SV2-Pro2 the pulse inhibit will not work. **Note:** this function has to be set to DI8 to ensure immediate pulse inhibition.	Level triggered	PT

Value: 0x46			
DI Name	**Description**	**Triggering Method**	**Control Mode**
STP	Motor stops. This DI commands the motor to stop in PR mode. P2.068.Z defines DI.STP as rising edge triggered (default) or level triggered.	Rising-edge triggered	PR

Value: 0x47			
DI Name	**Description**	**Triggering Method**	**Control Mode**
PFQS	Use this DI to set an emergency stop. The motor decelerates to a controlled stop. The value for deceleration time is same as P5.003. If this DI is triggered, AL3CF occurs and the motor starts decelerating. When the speed reaches 0, AL3CF occurs and servo is switched to Servo Off. Please reset the alarm to switch the drive to the Servo On state.	Rising-edge triggered	PT, PR, T, S

NOTE: *When P2.010-P2.017, P2.036-P2.040 are set to 0, the input function is disabled.*

8.4.10 - Digital output (DO) Function Assignments

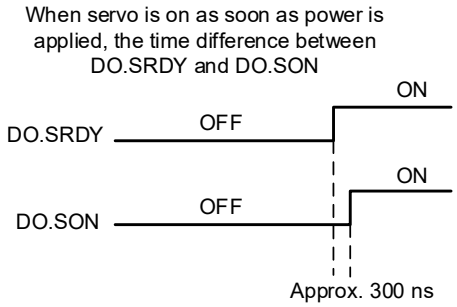
NOTE: *Several DO functions have their status available in P0.046. Since there are a limited number of physical outputs to tie the DO functions to, you can use that register for status feedback (with communications) without consuming physical DO terminals.*

Table 8-2: Digital Output (DO) Descriptions (see P2.018–P2.022, and P2.041)

Value	Name	Description
0x01	SRDY	Servo ready
0x02	SON	Servo On
0x03	ZSPD	Motor is at zero speed
0x04	TSPD	Motor reaches the target speed
0x05	TPOS	Motor reaches the target position
0x06	TQL	Torque limit activated
0x07	ALRM	Servo alarm
0x08	BRKR	Magnetic brake control
0x09	HOME	Homing is complete
0x0D	ABSW	Absolute type system error
0x0E	IDXD	Indexing coordinate is defined
0x10	OLW	Early warning for overload
0x11	WARN	Warning outputs
0x12	OVF	Position command overflows
0x13	SNL (SCWL)	Reverse software limit
0x14	SPL (SCCWL)	Forward software limit
0x15	Cmd_OK	PR command completed
0x16	CAP_OK	CAP procedure completed
0x17	MC_OK	Servo procedure completed
0x18	CAM_AREA1	Master position of the E-Cam is in the setting area
0x19	SP_OK	Speed reaches the target speed
0x1A	CAM_AREA2	Master position of the E-Cam is in the setting area 2
0x2C	Zon1	General range comparison 1
0x2D	Zon2	General range comparison 2
0x2E	Zon3	General range comparison 3
0x2F	Zon4	General range comparison 4
0x30	SPO_0	Output bit 00 of P4.006
0x31	SPO_1	Output bit 01 of P4.006
0x32	SPO_2	Output bit 02 of P4.006
0x33	SPO_3	Output bit 03 of P4.006
0x34	SPO_4	Output bit 04 of P4.006
0x35	SPO_5	Output bit 05 of P4.006
0x36	SPO_6	Output bit 06 of P4.006
0x37	SPO_7	Output bit 07 of P4.006
0x38	SPO_8	Output bit 08 of P4.006
0x39	SPO_9	Output bit 09 of P4.006
0x3A	SPO_A	Output bit 10 of P4.006
0x3B	SPO_B	Output bit 11 of P4.006
0x3C	SPO_C	Output bit 12 of P4.006
0x3D	SPO_D	Output bit 13 of P4.006
0x3E	SPO_E	Output bit 14 of P4.006

Value	Name	Description
0x3F	SPO_F	Output bit 15 of P4.006

Value: 0x01			
DO Name	**Description**	**Triggering Method**	**Control Mode**
SRDY	When the control and main circuit power is applied to the drive, this DO is on if no alarm occurs.	Level triggered	All

Value: 0x02			
DO Name	**Description**	**Triggering Method**	**Control Mode**
SON	When the servo is activated (Servo On), this DO is on if no alarm occurs. 	Level triggered	All

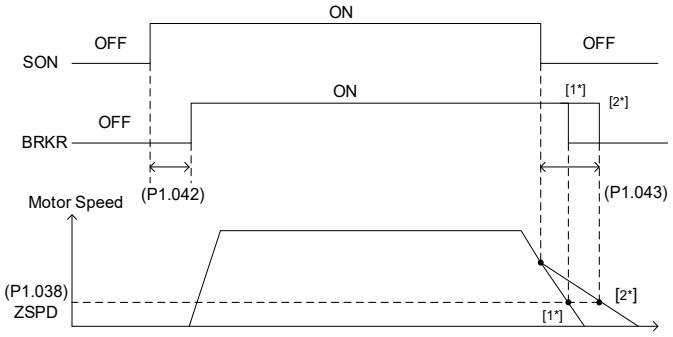
Value: 0x03			
DO Name	**Description**	**Triggering Method**	**Control Mode**
ZSPD	When the motor speed is slower than the value of the zero speed (P1.038), this DO is on.	Level triggered	All

Value: 0x04			
DO Name	**Description**	**Triggering Method**	**Control Mode**
TSPD	When the motor speed is faster than the target speed setting (P1.039), this DO is on.	Level triggered	All

Value: 0x05			
DO Name	**Description**	**Triggering Method**	**Control Mode**
TPOS	When the deviation pulse number is smaller than the position range setting (setting value of P1.054), this DO is on.	Level triggered	PT, PR

Value: 0x06			
DO Name	**Description**	**Triggering Method**	**Control Mode**
TQL	When the drive is in torque limit, this DO is on.	Level triggered	All (Except for T and Tz)

Value: 0x07			
DO Name	**Description**	**Triggering Method**	**Control Mode**
ALRM	When an alarm occurs, this DO is on (except for forward / reverse limit, communication error, and undervoltage). Read the current alarm in P0.001	Level triggered	All

Value: 0x08			
DO Name	***Description***	***Triggering Method***	***Control Mode***
BRKR	When the magnetic brake control signal is detected, please adjust the settings of parameters P1.042 and P1.043. This DO will normally turn off (engage the brake) when the motor speed drops below ZSPD. If SON is off and the speed has not dropped below ZSPD by the time set in P1.043, the brake will engage regardless of current speed.  1) If the delay time specified in P1.038 has not passed yet and the motor speed is slower than the value of P1.038, the magnetic brake signal (BRKR) is deactivated. 2) If the delay time specified in P1.038 has passed and the motor speed is faster than the value of P1.038, the magnetic brake signal (BRKR) is deactivated. 3) If P1.043 is a negative value and the servo is off due to an alarm (except for AL022) or emergency stop, this setting does not function. This is equivalent to setting the delay time to 0.	Level triggered	All

Value: 0x09			
DO Name	***Description***	***Triggering Method***	***Control Mode***
HOME	When homing is completed, the position coordinate system and position counter are defined and this DO turns on. When first applying power, this DO is off; when homing is completed, this DO is on. During operation, this DO is on until the position counter overflows (including commands or feedback). Then, this DO turns off. When the homing command is triggered, this DO turns off. After homing is completed, this DO turns on.	Level triggered	PR

Value: 0x0D			
DO Name	***Description***	***Triggering Method***	***Control Mode***
ABSW	When there are absolute encoder alarms, this DO is on.	-	All

Value: 0x0E			
DO Name	***Description***	***Triggering Method***	***Control Mode***
IDXD	Indexing coordinate is defined. When homing is completed, indexing coordinate is defined as well.	-	PR

Value: 0x10			
DO Name	**Description**	**Triggering Method**	**Control Mode**
OLW	Overload warning. This DO is on when the overload level setting is reached. **t_{OL}** = Overload allowable time of the servo x value for the overload warning level (P1.056). When the overload accumulative time exceeds **t_{OL}**, it sends the overload pre-warning DO (OLW). However, if the overload accumulative time exceeds the overload allowable time of the servo, it sets the overload error (DO.ALRM). For example: the value of the overload pre-warning is 60%. (P1.056 = 60) When the output average load of the servo drive is 200% and the output time exceeds 8 seconds, the overload alarm (AL006) occurs. **t_{OL}** = Duration of the output average load of the servo is 200% x overload warning level parameter = 8 sec x 60% = 4.8 sec Result: when the output average load of the servo drive is 200% for over **t_{OL}** = 4.8 seconds, this overload warning DO is on (DO code is set to 10). If the duration exceeds 8 seconds, then the overload alarm (AL006) occurs and sends the overload error (DO. ALRM).	Level triggered	All

Value: 0x11			
DO Name	**Description**	**Triggering Method**	**Control Mode**
WARN	Warning outputs (forward / reverse limit, communication error, and undervoltage). Read the current warning in P0.001.	Level triggered	All

Value: 0x12			
DO Name	**Description**	**Triggering Method**	**Control Mode**
OVF	Position command / feedback overflows.	Level triggered	PT, PR

Value: 0x13			
DO Name	**Description**	**Triggering Method**	**Control Mode**
SNL (SCWL)	Software limit (reverse limit).	Level triggered	PR

Value: 0x14			
DO Name	**Description**	**Triggering Method**	**Control Mode**
SPL (SCCWL)	Software limit (forward limit).	Level triggered	PR

Value: 0x15			
DO Name	**Description**	**Triggering Method**	**Control Mode**
Cmd_OK	When the Position command is completed this DO is on. When the Position command is executing, this DO is off; after the command completes, this DO is on. This DO only indicates that the processing of the command is completed, but the motor positioning may not be completed yet. Please refer to DO.TPOS.	Level triggered	PR

Value: 0x16			
DO Name	**Description**	**Triggering Method**	**Control Mode**
CAP_OK	Capture procedure is completed.	Level triggered	All

Value: 0x17			
DO Name	***Description***	***Triggering Method***	***Control Mode***
MC_OK	When DO.Cmd_OK and DO.TPOS are both on, then this DO is on. Please refer to P1.048.	Level triggered	PR

Value: 0x18			
DO Name	***Description***	***Triggering Method***	***Control Mode***
CAM_ AREA1	E-Cam area 1: the master axis phase is between the values of P5.090 and P5.091.	Level triggered	PR

Value: 0x19			
DO Name	***Description***	***Triggering Method***	***Control Mode***
SP_OK	Motor speed reaches the target speed: in Speed mode, when the deviation between the speed feedback and the command is smaller than the value of P1.047, this DO is on.	Level triggered	S, Sz

Value: 0x1A			
DO Name	***Description***	***Triggering Method***	***Control Mode***
CAM_ AREA2	E-Cam area 2: the master axis phase is between the values of P2.078 and P2.079.	Level triggered	PR

Value: 0x2C			
DO Name	***Description***	***Triggering Method***	***Control Mode***
Zon1	When the value of the item monitored by P0.009 ranges between the value of P0.054 and P0.055, then this DO is on.	-	All

Value: 0x2D			
DO Name	***Description***	***Triggering Method***	***Control Mode***
Zon2	Second set of general range comparison: when the value of the item monitored by P0.010 ranges between the values of P0.056 and P0.057, then this DO is on.	-	All

Value: 0x2E			
DO Name	***Description***	***Triggering Method***	***Control Mode***
Zon3	Third set of general range comparison: when the value of the item monitored by P0.011 ranges between the values of P0.058 and P0.059, then this DO is on.	-	All

Value: 0x2F			
DO Name	***Description***	***Triggering Method***	***Control Mode***
Zon4	Fourth set of general range comparison: when the value of the item monitored by P0.012 ranges between the values of P0.060 and P0.061, then this DO is on.	-	All

Value: 0x30			
DO Name	***Description***	***Triggering Method***	***Control Mode***
SPO_0	Output bit 00 of P4.006.	Level triggered	All

Value: 0x31			
DO Name	**Description**	**Triggering Method**	**Control Mode**
SPO_1	Output bit 01 of P4.006.	Level triggered	All

Value: 0x32			
DO Name	**Description**	**Triggering Method**	**Control Mode**
SPO_2	Output bit 02 of P4.006.	Level triggered	All

Value: 0x33			
DO Name	**Description**	**Triggering Method**	**Control Mode**
SPO_3	Output bit 03 of P4.006.	Level triggered	All

Value: 0x34			
DO Name	**Description**	**Triggering Method**	**Control Mode**
SPO_4	Output bit 04 of P4.006.	Level triggered	All

Value: 0x35			
DO Name	**Description**	**Triggering Method**	**Control Mode**
SPO_5	Output bit 05 of P4.006.	Level triggered	All

Value: 0x36			
DO Name	**Description**	**Triggering Method**	**Control Mode**
SPO_6	Output bit 06 of P4.006.	Level triggered	All

Value: 0x37			
DO Name	**Description**	**Triggering Method**	**Control Mode**
SPO_7	Output bit 07 of P4.006.	Level triggered	All

Value: 0x38			
DO Name	**Description**	**Triggering Method**	**Control Mode**
SPO_8	Output bit 08 of P4.006.	Level triggered	All

Value: 0x39			
DO Name	**Description**	**Triggering Method**	**Control Mode**
SPO_9	Output bit 09 of P4.006.	Level triggered	All

Value: 0x3A			
DO Name	***Description***	***Triggering Method***	***Control Mode***
SPO_A	Output bit 10 of P4.006.	Level triggered	All

Value: 0x3B			
DO Name	***Description***	***Triggering Method***	***Control Mode***
SPO_B	Output bit 11 of P4.006.	Level triggered	All

Value: 0x3C			
DO Name	***Description***	***Triggering Method***	***Control Mode***
SPO_C	Output bit 12 of P4.006.	Level triggered	All

Value: 0x3D			
DO Name	***Description***	***Triggering Method***	***Control Mode***
SPO_D	Output bit 13 of P4.006.	Level triggered	All

Value: 0x3E			
DO Name	***Description***	***Triggering Method***	***Control Mode***
SPO_E	Output bit 14 of P4.006.	Level triggered	All

Value: 0x3F			
DO Name	***Description***	***Triggering Method***	***Control Mode***
SPO_F	Output bit 15 of P4.006.	Level triggered	All

NOTE: *The output function is disabled when P2.018-P2.022 are set to 0.*

Value: when DI.ABSE is on, DO.ABSR triggered by DO2 will replace the DO2 assigned by P2.019			
DO Name	***Description***	***Triggering Method***	***Control Mode***
ABSR always output by DO2	When DO.ABSR is off, it indicates servo drive can receive request issued by DI.ABSQ; when DO.ABSR is on, it indicates after receiving the request, the data has been prepared and the ABSD data is valid so that the controller can access the ABSD data. This output is only valid when DI.ABSE is on.	Level triggered	All

Value: when DI.ABSE is on, DO.ABSD triggered by DO3 will replace the DO3 assigned by P2.020			
DO Name	***Description***	***Triggering Method***	***Control Mode***
ABSD always output by DO3	The DO for ABS data. The data is valid when DO.ABSR is on. This output is only valid when DI.ABSE is on.	Level triggered	All

8.4.11 - Monitoring variables descriptions

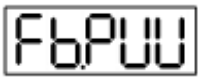
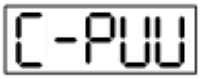
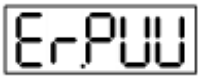
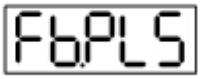
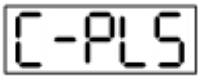
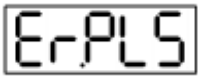
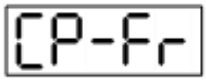
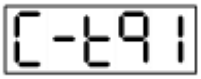
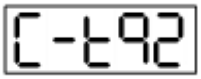
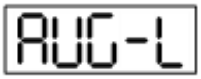
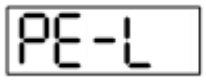
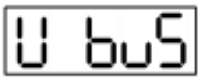
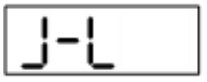
Table 8-3

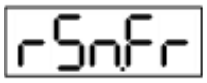
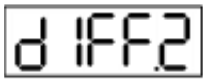
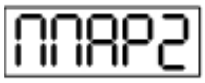
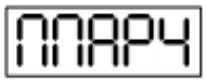
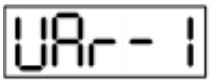
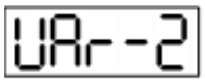
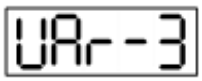
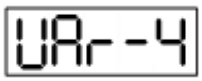
Item	Description
Monitoring code	Each monitoring variable has a code, and you can use P0.002 to set the code and monitor the variable.
Format	Each monitoring variable is stored in the 32-bit format (long integer) of the servo drive.
Category	Basic variables / expansion variables: 1) Basic variables: variables (P0.002 = 0–26) within the cycle; in monitoring mode, you can display the variables by using the UP / DOWN keys on the panel. 2) Expansion variables: variables other than basic variables. (P0.002 = 27–127)
Monitoring method	Panel display / mapping: 1) Panel display: monitor with the panel 2) Mapping: monitor variables or parameters by mapping parameters (P0.009–P0.013, P0.017–P0.021)
Panel display	1) Use the MODE key to switch to the monitor mode and press the UP / DOWN keys to select the variable to monitor. 2) Input the variable code to monitor into P0.002 and start monitoring. Press the SHIFT key on the panel to switch between high and low digit display; Press the SET key on the panel to switch between decimal and hexadecimal display.
Mapping	1) Parameters that support monitoring variable mapping: for P0.009–P0.013, please refer to Section 8.3 Parameter descriptions. 2) You can read monitoring variables through communication using mapping parameters. 3) The value of the mapping parameter (P0.009–P0.013) is the content of the basic variables (17h, 18h, 19h, 1Ah). To monitor P0.009, set P0.017 to the value to read (please refer to P0.002). You can read the data specified by P0.017 through communication or the monitor panel (set P0.002 to 23). When the panel displays "VAR-1", it indicates the content value of P0.009.

The property code of each monitoring variable is described in the following table:

Property	Description
B	BASE: basic variables, you can select with the UP / DOWN keys on the panel.
D1 D2	Decimal place displayed on panel: D1 indicates 1 decimal place, D2 indicates 2 decimal places.
Dec	Only decimal display is available on the panel, and you cannot switch to hexadecimal display by pressing the SET key.
Hex	Only hexadecimal display is available on the panel, and you cannot switch to decimal display by pressing the SET key.

Monitoring variables are described in the following table by the code sequence:

Code	Keypad Display	Variable Name / Property	Description
000 (00h)		Feedback position (PUU) B	Current feedback position of the motor encoder. Unit: Pulse of User Unit (PUU).
001 (01h)		Position command (PUU) B	Current coordinate of the Position command. Unit: Pulse of User Unit (PUU). PT mode: number of pulse commands received by the drive. PR mode: absolute coordinates of the Position command.
002 (02h)		Position deviation (PUU) B	Deviation between the Position command and the feedback position. Unit: Pulse of User Unit (PUU).
003 (03h)		Feedback position (pulse) B	Current feedback position of the motor encoder. Unit: Encoder unit (pulse).
004 (04h)		Position command (pulse) B	Current coordinate of the Position command. Unit: Encoder unit (pulse). This is the command after passing E-Gear.
005 (05h)		Position deviation (pulse) B	Deviation between the Position command and the feedback position. Unit: Encoder unit (pulse).
006 (06h)		Pulse command frequency B	Frequency of the pulse command received by the drive. Unit: Kpps. Applicable to PT / PR mode.
007 (07h)		Speed feedback B,D1,Dec	Current motor speed. Unit: 0.1 rpm. A low-pass filter has been applied to this value to make it more stable for viewing.
008 (08h)		Speed command (analog) B,D2,Dec	Speed command from the analog channel. Unit: 0.01 Volt.
009 (09h)		Speed command (integrated) B	Integrated Speed command. Unit: 1 rpm. Source includes analog, register, or position loop.
010 (0Ah)		Torque command (analog) B,D2,Dec	Torque command from the analog channel. Unit: 0.01 Volt.
011 (0Bh)		Torque command (integrated) B	Integrated Torque command. Unit: percentage (%). Source includes analog, register, or speed loop.
012 (0Ch)		Average load rate B	Average load rate from the drive. Unit: percentage (%).
013 (0Dh)		Peak load rate B	Maximum load rate from the drive. Unit: percentage (%).
014 (0Eh)		DC Bus voltage B	Rectified capacitor voltage. Unit: Volt.
015 (0Fh)		Load inertia ratio B,D1,Dec	Ratio of the load inertia to the motor inertia. Unit: 0.1 times. This variable will show the static value of P1.037. When P2.032 is set to 1 this variable will show the real time estimated inertia ratio seen by the drive.
016 (10h)		IGBT temperature B	Temperature of IGBT. Unit: °C.

Code	Keypad Display	Variable Name / Property	Description
017 (11h)		Resonance frequency B,Dec	Resonance frequency of the system consists of two groups of frequencies: F1 and F2 When monitoring from the panel, press the SHF key to switch between F1 and F2: F2 displays zero decimal places, F1 displays 1 decimal place. When reading by communication (mapping parameter): Low word displays frequency F2. High word displays frequency F1.
018 (12h)		Z phase offset B,Dec	Offset value between motor position and Z phase, range: -5000 to +5000. Where it overlaps with Z phase, the value is 0; the greater the value, the greater the offset.
019 (13h)*		Mapping parameter content #1 B	Returns the value of P0.025 which is mapped by P0.035.
020 (14h)*		Mapping parameter content #2 B	Returns the value of P0.026 which is mapped by P0.036.
021 (15h)*		Mapping parameter content #3 B	Returns the value of P0.027 which is mapped by P0.037.
022 (16h)*		Mapping parameter content #4 B	Returns the value of P0.028 which is mapped by P0.038.
023 (17h)*		Mapping monitoring variable #1 B	Returns the value of P0.009 which is mapped by P0.017.
024 (18h)*		Mapping monitoring variable #2 B	Returns the value of P0.020 which is mapped by P0.018.
025 (19h)*		Mapping monitoring variable #3 B	Returns the value of P0.011 which is mapped by P0.019.
026 (1Ah)*		Mapping monitoring variable #4 B	Returns the value of P0.012 which is mapped by P0.020.
** For MAP/Monitoring Parameters (seetings 19-26) see the details at the end of this section.*			
028 (1Ch)		Alarm code Dec B	The alarm code (in decimal). The value being converted to the hexadecimal notation is identical to the alarm code displayed in P0.001 and the error code of communication models.
029 (1Dh)		Auxiliary encoder feedback (PUU) B	Position feedback from the auxiliary encoder.
030 (1Eh)		Auxiliary encoder position error (PUU) B	Postion difference between the position feedback and the command from the auxiliary encoder.
031 (1Fh)		Position error between main and auxiliary encoders (PUU) B	Feedback position difference between the main encoder and auxiliary encoder.
032 (20h)		Position error (PUU)	Difference between the filtered position command and the feedback position. Unit: Pulse of User User (PUU).

Code	Keypad Display	Variable Name / Property	Description
033 (21h)		Position error (pulse)	Difference between the filtered position command and the feedback position. Unit: Pulse of User Unit (PUU)
035 (23h)	Set via P0.002	Indexing coordinate command	Current command for the indexing coordinates. Unit: Pulse of User Unit (PUU).
037 (25h)		Compare data of Compare	The actual Compare data is the Compare data plus a specified value: CMP_DATA = DATA_ARRAY[*] + P1.023 + P1.024.
039 (27h)		DI status (Integrated) Hex	Integrated DI status of the drive. Each bit corresponds to one DI channel. Source includes Hardware channel / P4.007, which is determined by P3.006.
040 (28h)		DO status (Hardware) Hex	Actual status from the DO hardware. Each bit corresponds to one DI channel.
041 (29h)		Status of select DO functions	Returns P0.046. Please refer to the description of this parameter.
042 (2Ah)		Index of the PR command in execution	Displays the index of the PR command being executed.
043 (2Bh)		CAP data capturing	The latest data captured by CAP hardware. Note: CAP can continuously capture multiple points.
048 (30h)		Auxiliary encoder CNT	Pulse counts from the auxiliary encoder (CN5).
049 (31h)		Pulse command CNT	Pulse counts from the pulse command (CN1).
050 (32h)		Speed command (integrated) D1,Dec	Integrated Speed command. Unit: 0.1 rpm. Source includes analog, register, or position loop.
051 (33h)		Speed feedback (immediate) D1,Dec	Current actual motor speed. Unit: 0.1 rpm.
053 (35h)		Torque command (integrated) D1,Dec	Integrated Torque command. Unit: 0.1%. Source includes analog, register, or speed loop.
054 (36h)		Torque feedback D1,Dec	Present actual motor torque of motor's nameplate continuous torque rating. Unit: 0.1%.
055 (37h)		Current feedback D2,Dec	Present actual motor amps. Unit: 0.01 ampere (Amp).
056 (38h)		DC Bus voltage D1,Dec	Rectified capacitor voltage. Unit: 0.1 Volt.
059 (3Bh)		Pulse of E-Cam master axis (accumulative)	Accumulative pulse number of the E-Cam master axis. Same as P5.086.
060 (3Ch)		Pulse of E-Cam master axis (incremental)	Incremental pulse number of the E-Cam master axis. The increment per ms.
061 (3Dh)		Pulse of E-Cam master axis (lead pulse)	The lead pulse of the E-Cam master axis which determines the engaging condition. When disengaged: lead pulse = P5.087 or P5.092; when the value is 0, E-Cam engages. When engaged: lead pulse = P5.089; when the value is 0, it disengages.
062 (3Eh)		Position of E-Cam master axis	Position of the E-Cam which corresponds to the master axis pulse, and can be used to find the phase of the E-Cam. Unit: same as the master axis pulse; when the incremental pulse number of the master axis is P, E-Cam rotates M cycles (P5.083=M, P5.084=P).

Code	Keypad Display	Variable Name / Property	Description
063 (3Fh)	Set via P0.002	Position of E-Cam slave axis	Position of the E-Cam slave axis and can be found from the E-Cam table. Unit: PUU
064 (40h)	Set via P0.002	Endpoint register of PR command	In PR mode, the endpoint of the Position command (Cmd_E).
065 (41h)		Output register of PR command	In PR mode, the accumulative output of the Position command.
067 (43h)		PR target speed	Target speed specified in the PR path. Unit: PPS (Pulse Per Second).
072 (48h)		Speed command (analog) B,D1,Dec	Speed command from the analog channel. Unit: 0.1 rpm.
081 (51h)		Capture synchronous axis Incremental pulse input	When Capture synchronous axis is enabled, the actual Mark distance can be measured by the received pulse number between two Captures.
084 (54h)		Capture synchronous axis Pulse number of synchronous deviation	When Capture synchronous axis is enabled, the accumulative deviation between the actual output pulse and the target pulse. This value is close to 0 if synchronization is reached.
085 (55h)		E-Cam alignment deviation percentage	The alignment error rate after filtering. Unit: 0.1% 10 indicates 1% and the angle conversion is 360º x 1% = 3.6º.
091 (5Bh)		Indexing coordinate feedback	Immediate feedback position of the indexing coordinates. Unit: Pulse of User Unit (PUU).
096 (60h)		Drive firmware version Dec	Includes 2 versions: DSP and CPLD When monitoring from the panel, press the SHF key to switch between DSP and CPLD: DSP displays zero decimal places, CPLD displays 1 decimal place. When reading by communication (mapping parameter): Low word returns the DSP version number. High word returns the CPLD version number.
111 (6Fh)		Error code of the servo drive	Error code from the servo drive: control loop of the servo only, not including the motion controller.
115 (73h)		Main / auxiliary encoder position deviation (pulse)	When using full closed loop, this variable will display the deviation between main encoder and auxiliary encoder.
116 (74h)		Deviation between position and Z phase of auxiliary encoder (pulse)	Deviation between the current position of the auxiliary encoder and the Z phase position of the auxiliary encoder.
120 (78h)		Communication error rate	When this value continues to increase, it indicates that there is communication interference. In an interference-free environment, this value should not increase.
123 (7Bh)		Value returned when monitoring by panel	Monitoring value displayed when returned to the monitoring panel.
-80		Encoder communication error rate	If this value is increasing, communication interference is present. This value should not increase in an interference-free environment.
-91		Overload (AL006) protection counter	Displays the motor load during operation. When the value of the overload counter reaches 100%, AL006 occurs.
-111		Regeneration error (AL005) protection counter	When the regeneration counter reaches 100%, AL005 occurs.
-124		Encoder temperature	Monitor the encoder temperature.

Code	Keypad Display	Variable Name / Property	Description
-178	Set via P0.002	Auxiliary encoder Z pulse data	Use the bit to check the Z pulse of the auxiliary encoder. • Bit0=Z pulase Note: Use the SV2-Pro scope function to monitor at the sampling rate of 16k/20k. This monitoring variable is only available on third-party incremental encoders.
-207	Set via P0.002	Regenerative Resistor power consumption	The power consumption (unit:%) of the regenerative resistor at the time when the energy of the servo drive capacitor is released to the regenerative resistor.

Map and Monitoring Parameters

When displaying MAP and Monitoring Parameters (settings 19 - 26) on the keypad display, there is a mathematical nuance to be aware of.

Each MAP/Monitoring Parameter has two Parameters' worth of data in it. Double-click on P0.035 in SureServo2 Pro to easily see how the two target parameters are defined for MAP#1.

- *If the High Word's Parameter value = 0 and the Low Word's Parameter value= 1, the keypad display will show 00001 in decimal (0x00000001 in hex). This is as expected.*
- *If the High Word's Parameter value = 1 and the Low Word's Parameter value = 0, the keypad display will show 65536 in decimal. This may not be expected, but it is the decimal conversion of hex 0x00010000. Pressing the "S" key on the keypad to display the value in Hex will show the Low word is 0000. Pressing the left arrow button to display the High word will show that it is 0001.*

To get the MAP/Monitoring parameters to display decimal values correctly on the keypad display, point the Low Word to the desired Parameter, then point the High Word Parameter to a value that will always be 0. A typical solution is to set an unused Delay Time (P5.040 - P5.055) or Target Speed Setting (P5.060 - P5.075) to zero and use that Parameter as the High Word. Make sure that the "unused" parameter is not actually used in the PR settings.