Parameters

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

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

CANopen, DMCNET, EtherCAT, and PROFINET: Communication 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, and P4.001.
▲	Parameter cannot be changed when servo is in Servo On status. For example, P1.000 and P1.046.
●	Parameter changes become valid after power cycling. For example, P1.001 and P3.000.
■	Parameter resets to its default value after power cycling. For example, P3.006.

8.2 List of parameters

Monitoring and general output parameters

Parameter No.	Function	Default value	Unit	Control mode			
				PT	PR	S	T
P0.000★	Firmware version	Factory setting	-	✓	✓	✓	✓
P0.001■	Current drive alarm code (seven-segment display)	-	-	✓	✓	✓	✓
P0.002	Drive status	1	-	✓	✓	✓	✓
P0.003	Analog output monitoring	0x0000	-	✓	✓	✓	✓
P0.008★	Total servo drive operation time	0x00000000	hour	✓	✓	✓	✓
P0.009★■	Status monitoring register 1	-	-	✓	✓	✓	✓
P0.010★■	Status monitoring register 2	-	-	✓	✓	✓	✓
P0.011★■	Status monitoring register 3	-	-	✓	✓	✓	✓
P0.012★■	Status monitoring register 4	-	-	✓	✓	✓	✓
P0.013★■	Status monitoring register 5	-	-	✓	✓	✓	✓
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	-	-	✓	✓	✓	✓
P0.026■	Mapping parameter 2	-	-	✓	✓	✓	✓
P0.027■	Mapping parameter 3	-	-	✓	✓	✓	✓
P0.028■	Mapping parameter 4	-	-	✓	✓	✓	✓
P0.029■	Mapping parameter 5	-	-	✓	✓	✓	✓
P0.030■	Mapping parameter 6	-	-	✓	✓	✓	✓
P0.031■	Mapping parameter 7	-	-	✓	✓	✓	✓
P0.032■	Mapping parameter 8	-	-	✓	✓	✓	✓
P0.035	Target setting for mapping parameter P0.025	-	-	✓	✓	✓	✓
P0.036	Target setting for mapping parameter P0.026	-	-	✓	✓	✓	✓
P0.037	Target setting for mapping parameter P0.027	-	-	✓	✓	✓	✓
P0.038	Target setting for mapping parameter P0.028	-	-	✓	✓	✓	✓
P0.039	Target setting for mapping parameter P0.029	-	-	✓	✓	✓	✓
P0.040	Target setting for mapping parameter P0.030	-	-	✓	✓	✓	✓
P0.041	Target setting for mapping parameter P0.031	-	-	✓	✓	✓	✓
P0.042	Target setting for mapping parameter P0.032	-	-	✓	✓	✓	✓

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Parameter No.	Function	Default value	Unit	Control mode			
				PT	PR	S	T
P0.044★■	Status monitoring register (for PC software)	0	-	✓	✓	✓	✓
P0.045■	Status monitoring register content selection (for PC software)	0	-	✓	✓	✓	✓
P0.046★■	Servo drive digital output (DO) status	0x0000	-	✓	✓	✓	✓
P0.050★■	Absolute position system status	0x0000	-	✓	✓	✓	✓
P0.063★	Total duration of DC Bus voltage exceeding 400V	0	ms	✓	✓	✓	✓
P0.079★	IGBT highest temperature	0	°C	✓	✓	✓	✓
P1.004	MON1 analog monitor output proportion	100	% (full scale)	✓	✓	✓	✓
P1.005	MON2 analog monitor output proportion	100	% (full scale)	✓	✓	✓	✓
P1.101■	Analog monitor output voltage 1	0	mV	✓	✓	✓	✓
P1.102■	Analog monitor output voltage 2	0	mV	✓	✓	✓	✓

(★) Read-only parameter. Can only read the value of the parameter. For example, P0.000, P0.010, and P4.001.

(▲) Parameter cannot be changed when servo is in Servo On status. For example, P1.000 and P1.046.

(●) Parameter changes become valid after power cycling. For example, P1.001 and P3.000.

(■) Parameter resets to its default value after power cycling. For example, P3.006.

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	-	-	✓	-
P1.007	Torque command - smoothing constant (low-pass filter)	0	ms	-	-	-	✓
P1.008	Position command - smoothing constant (low-pass filter)	0	10 ms	✓	✓	-	-
P1.025	Low-frequency vibration suppression frequency 1	1000	0.1 Hz	✓	✓	-	-
P1.026	Low-frequency vibration suppression gain 1	0	-	✓	✓	-	-
P1.027	Low-frequency vibration suppression frequency 2	1000	0.1 Hz	✓	✓	-	-
P1.028	Low-frequency vibration suppression gain 2	0	-	✓	✓	-	-
P1.029	Auto low-frequency vibration suppression mode	0	-	✓	✓	-	-
P1.030	Low-frequency vibration detection	8000	pulse	✓	✓	-	-
P1.034	S-curve acceleration constant	200	ms	-	-	✓	-
P1.035	S-curve deceleration constant	200	ms	-	-	✓	-
P1.036	S-curve acceleration / deceleration smoothing constant	0	ms	-	✓	✓	-
P1.061	Viscous friction compensation	0	0.1%/1000 rpm	✓	✓	✓	-
P1.062	Percentage of friction compensation	0	%	✓	✓	✓	-
P1.063	Constant of friction compensation	100	%	✓	✓	✓	-
P1.068	Position command - moving filter	4	ms	✓	✓	-	-
P1.089	Vibration elimination 1 - anti-resonance frequency	4000	0.1 Hz	✓	✓	-	-
P1.090	Vibration elimination 1 - resonance frequency	4000	0.1 Hz	✓	✓	-	-
P1.091	Vibration elimination 1 - resonance difference	10	0.1 dB	✓	✓	-	-
P1.092	Vibration elimination 2 - anti-resonance frequency	4000	0.1 Hz	✓	✓	-	-
P1.093	Vibration elimination 2 - resonance frequency	4000	0.1 Hz	✓	✓	-	-
P1.094	Vibration elimination 2 - resonance difference	10	0.1 dB	✓	✓	-	-
P2.023	Notch filter 1 - frequency	1000	Hz	✓	✓	✓	✓
P2.024	Notch filter 1 - attenuation level	0	-dB	✓	✓	✓	✓
P2.025	Resonance suppression low-pass filter	1.0 (panel / software) 10 (communication)	1 ms (panel / software) 0.1 ms (communication)	✓	✓	✓	✓
P2.043	Notch filter 2 - frequency	1000	Hz	✓	✓	✓	✓
P2.044	Notch filter 2 - attenuation level	0	-dB	✓	✓	✓	✓
P2.045	Notch filter 3 - frequency	1000	Hz	✓	✓	✓	✓
P2.046	Notch filter 3 - attenuation level	0	-dB	✓	✓	✓	✓
P2.047	Auto resonance suppression mode	0x0001	-	✓	✓	✓	✓
P2.048	Auto resonance detection level	100	-	✓	✓	✓	✓

Parameter No.	Function	Default value	Unit	Control mode			
				PT	PR	S	T
P2.049	Speed detection filter and jitter suppression	1.0 (panel / software) 10 (communication)	1 ms (panel / software) 0.1 ms (communication)	✓	✓	✓	✓
P2.095	Notch filter 1 - Q factor	5	-	✓	✓	✓	✓
P2.096	Notch filter 2 - Q factor	5	-	✓	✓	✓	✓
P2.097	Notch filter 3 - Q factor	5	-	✓	✓	✓	✓
P2.098	Notch filter 4 - frequency	1000	Hz	✓	✓	✓	✓
P2.099	Notch filter 4 - attenuation level	0	-dB	✓	✓	✓	✓
P2.100	Notch filter 4 - Q factor	5	-	✓	✓	✓	✓
P2.101	Notch filter 5 - frequency	1000	Hz	✓	✓	✓	✓
P2.102	Notch filter 5 - attenuation level	0	-dB	✓	✓	✓	✓
P2.103	Notch filter 5 - Q factor	5	-	✓	✓	✓	✓

(★) Read-only parameter. Can only read the value of the parameter. For example, P0.000, P0.010, and P4.001.

(▲) Parameter cannot be changed when servo is in Servo On status. For example, P1.000 and P1.046.

(●) Parameter changes become valid after power cycling. For example, P1.001 and P3.000.

(■) Parameter resets to its default value after power cycling. For example, P3.006.

Gain and switching parameters

Parameter No.	Function	Default value	Unit	Control mode			
				PT	PR	S	T
P1.037	Load inertia ratio or total weight	2.0 0.0 (-F) (panel / software)	1 times (panel / software)	✓	✓	✓	✓
		20 0 (-F) (communication)	0.1 times (communication)				
P1.078	Gain switching delay time	0	ms	✓	✓	✓	-
P1.079	Rate of change for gain values during gain switching delay	100	%	✓	✓	✓	-
P1.080	Rate of change for speed detection filter and jitter suppression	100	%	✓	✓	✓	-
P2.000	Position control gain	35	rad/s	✓	✓	-	-
P2.001	Rate of change for position control gain	100	%	✓	✓	-	-
P2.002	Position feed forward gain	50	%	✓	✓	-	-
P2.003	Position feed forward gain smoothing constant	5	ms	✓	✓	-	-
P2.004	Speed control gain	500	rad/s	✓	✓	✓	✓
P2.005	Rate of change for speed control gain	100	%	✓	✓	✓	✓
P2.006	Speed integral compensation	100	rad/s	✓	✓	✓	✓
P2.007	Speed feed forward gain	0	%	✓	✓	✓	✓
P2.026	Anti-interference gain	0	rad/s	✓	✓	✓	✓
P2.027	Gain switching condition and method selection	0x0000	-	✓	✓	✓	✓
P2.028	Gain switching time constant	10	ms	✓	✓	✓	✓
P2.029	Gain switching condition	16777216	pulse Kpps rpm	✓	✓	✓	✓
P2.031	Bandwidth response level	19	-	✓	✓	✓	✓
P2.032	Gain adjustment mode	0x0000	-	✓	✓	✓	✓
P2.053	Position integral compensation	0	rad/s	✓	✓	✓	✓
P2.089	Command response gain	25	rad/s	✓	✓	-	-
P2.090	Two degree of freedom mode - anti-interference gain	850	0.001	✓	✓	-	-
P2.091	Two degree of freedom mode - position feed forward gain	1000	0.1%	✓	✓	-	-
P2.092	Two degree of freedom mode - speed feed forward gain	1000	0.1%	✓	✓	-	-
P2.094▲	Special bit register 3	0x0090	-	✓	✓	✓	-
P2.104	Torque command condition for P/PI switching	800	%	✓	✓	-	-
P2.105	Automatic gain adjustment level 1	11	-	✓	✓	-	-
P2.106	Automatic gain adjustment level 2	2000	pulse	✓	✓	-	-
P2.107	Rate of change for resonance suppression low-pass filter	100	%	✓	✓	✓	-
P2.112▲	Special bit register 4	0x2018	-	✓	✓	✓	-
P2.107	Rate of change for resonance suppression low-pass filter	100	%	✓	✓	✓	-
P2.112▲	Special bit register 4	0x2018	-	✓	✓	✓	-

Parameter No.	Function	Default value	Unit	Control mode			
				PT	PR	S	T
P2.126	Bandwidth for speed loop response	40	Hz	✓	✓	✓	-

(★) Read-only parameter. Can only read the value of the parameter. For example, P0.000, P0.010, and P4.001.

(▲) Parameter cannot be changed when servo is in Servo On status. For example, P1.000 and P1.046.

(●) Parameter changes become valid after power cycling. For example, P1.001 and P3.000.

(■) Parameter resets to its default value after power cycling. For example, P3.006.

Position control parameters

Parameter No.	Function	Default value	Unit	Control mode			
				PT	PR	S	T
P1.001●	Input for control mode and control command	0x0000 (-M, -L) 0x000B (-F) 0x000C (-E, -P)	-	✓	✓	✓	✓
P1.002▲	Speed and torque limits	0x0000	-	✓	✓	✓	✓
P1.003	Encoder pulse output polarity	0x0000	-	✓	✓	✓	✓
P1.012 - P1.014	Internal Torque command / internal torque limit 1 - 3	100	%	✓	✓	✓	✓
P1.044▲	E-Gear ratio - numerator N1	16777216	pulse	✓	✓	✓	✓
P1.045▲	E-Gear ratio - denominator M	100000	pulse	✓	✓	✓	✓
P1.046▲	Encoder pulse number output (OA, OB)	2500	pulse	✓	✓	✓	✓
P1.055	Maximum speed limit	Rated speed	rpm	✓	✓	✓	✓
P1.076▲	Maximum speed for encoder output (OA, OB)	5500	rpm	✓	✓	✓	✓
P1.097▲	Encoder output denominator (OA, OB)	0	-	✓	✓	✓	✓
P1.111	Overspeed protection level	Maximum motor speed x 1.1	1 rpm	✓	✓	✓	✓
P1.112	Single-direction torque limit	500	%	✓	✓	✓	✓
P2.035	Excessive deviation warning condition of Position command	50331648	pulse	✓	✓	-	-
P2.068	Following error compensation switch	0x00000000	-	✓	✓	✓	✓
P5.003	Deceleration time for auto-protection	0xEEEFEEFF	-	-	✓	✓	✓
P5.016■	Axis position - main encoder	0	PUU	✓	✓	✓	✓
P5.018	Axis position - pulse command	0	pulse	✓	✓	✓	✓
P5.020 - P5.035	Acceleration / deceleration times (#0 - #15)	Refer to description of each parameter	ms	-	✓	-	-

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	-	✓	-	-	-
P2.060	E-Gear ratio - numerator N2	16777216	pulse	✓	✓	✓	✓
P2.061	E-Gear ratio - numerator N3	16777216	pulse	✓	✓	✓	✓
P2.062	E-Gear ratio - numerator N4	16777216	pulse	✓	✓	✓	✓

(★) Read-only parameter. Can only read the value of the parameter. For example, P0.000, P0.010, and P4.001.

(▲) Parameter cannot be changed when servo is in Servo On status. For example, P1.000 and P1.046.

(●) Parameter changes become valid after power cycling. For example, P1.001 and P3.000.

(■) Parameter resets to its default value after power cycling. For example, P3.006.

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Position control parameters - internal register control command (PR mode)

Parameter No.	Function	Default value	Unit	Control mode			
				PT	PR	S	T
P5.004	Homing methods	0x0000	-	-	✓	-	-
P5.005	High speed homing (first speed setting)	100.0 (panel / software)	1 rpm (panel / software)	-	✓	-	-
		1000 (communication)	0.1 rpm (communication)	-	✓	-	-
P5.006	Low speed homing (second speed setting)	20.0 (panel / software)	1 rpm (panel / software)	-	✓	-	-
		200 (communication)	0.1 rpm (communication)	-	✓	-	-
P5.007■	Trigger Position command (PR mode only)	0	-	-	✓	-	-
P5.008	Positive software limit	2147483647	PUU	-	✓	-	-
P5.009	Negative software limit	-2147483648	PUU	-	✓	-	-
P5.015■	PATH 1 - PATH 2 volatile setting	0x0000	-	-	✓	-	-
P5.040 - P5.055	Delay time #0 - 15 after position reached	0 - 5500	ms	-	✓	-	-
P5.060 - P5.075	Target speed setting #0 - #15	20.0 - 3000.0 (panel / software)	1 rpm (panel / software)	-	✓	-	-
		200 - 30000 (communication)	0.1 rpm (communication)				
P5.098	PR number triggered by event rising-edge	0x0000	-	-	✓	-	-
P5.099	PR number triggered by event falling-edge	0x0000	-	-	✓	-	-
P6.002 - P7.099	Internal Position commands #1 - #99	0x00000000	-	-	✓	-	-

(★) Read-only parameter. Can only read the value of the parameter. For example, P0.000, P0.010, and P4.001.

(▲) Parameter cannot be changed when servo is in Servo On status. For example, P1.000 and P1.046.

(●) Parameter changes become valid after power cycling. For example, P1.001 and P3.000.

(■) Parameter resets to its default value after power cycling. For example, P3.006.

Speed control parameters

Parameter No.	Function	Default value	Unit	Control mode			
				PT	PR	S	T
P1.001●	Input for control mode and control command	0x0000 (-M, -L) 0x000B (-F) 0x000C (-E, -P)	-	✓	✓	✓	✓
P1.002▲	Speed and torque limits	0x0000	-	✓	✓	✓	✓
P1.003	Encoder pulse output polarity	0x0000	-	✓	✓	✓	✓
P1.009 - P1.011	Internal Speed command / internal speed limit 1 - 3	1000 - 3000	0.1 rpm	-	-	✓	✓
P1.012 - P1.014	Internal Torque command / internal torque limit 1 - 3	100	%	✓	✓	✓	✓
P1.040	Maximum motor speed for analog Speed command 1	Rated speed	rpm	-	-	✓	✓
P1.041▲	Maximum output for analog Torque command	100	%	✓	✓	✓	✓
P1.046▲	Encoder pulse number output (OA, OB)	2500	pulse	✓	✓	✓	✓
P1.055	Maximum speed limit	Rated speed	rpm	✓	✓	✓	✓
P1.076▲	Maximum speed for encoder output (OA, OB)	5500	rpm	✓	✓	✓	✓
P1.081	Maximum motor speed for analog Speed command 2	Rated speed	rpm	-	-	✓	✓
P1.097▲	Encoder output denominator (OA, OB)	0	-	✓	✓	✓	✓
P1.111	Overspeed protection level	Maximum motor speed x 1.1	1 rpm	✓	✓	✓	✓
P2.034	Excessive deviation warning condition of Speed command	5000	rpm	-	-	✓	-
P2.112▲	Special bit register 4	0x2018	-	✓	✓	✓	-

(★) Read-only parameter. Can only read the value of the parameter. For example, P0.000, P0.010, and P4.001.

(▲) Parameter cannot be changed when servo is in Servo On status. For example, P1.000 and P1.046.

(●) Parameter changes become valid after power cycling. For example, P1.001 and P3.000.

(■) Parameter resets to its default value after power cycling. For example, P3.006.

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Torque control parameters

Parameter No.	Function	Default value	Unit	Control mode			
				PT	PR	S	T
P1.001●	Input for control mode and control command	0x0000 (-M, -L) 0x000B (-F) 0x000C (-E, -P)	-	✓	✓	✓	✓
P1.002▲	Speed and torque limits	0x0000	-	✓	✓	✓	✓
P1.003	Encoder pulse output polarity	0x0000	-	✓	✓	✓	✓
P1.009 - P1.011	Internal Speed command / internal speed limit 1 - 3	1000 - 3000	0.1 rpm	-	-	✓	✓
P1.012 - P1.014	Internal Torque command / internal torque limit 1 - 3	100	%	✓	✓	✓	✓
P1.040	Maximum motor speed for analog Speed command 1	Rated speed	rpm	-	-	✓	✓
P1.041▲	Maximum output for analog Torque command	100	%	✓	✓	✓	✓
P1.046▲	Encoder pulse number output (OA, OB)	2500	pulse	✓	✓	✓	✓
P1.055	Maximum speed limit	Rated speed	rpm	✓	✓	✓	✓
P1.081	Maximum motor speed for analog Speed command 2	Rated speed	rpm	-	-	✓	✓
P1.111	Overspeed protection level	Maximum motor speed x 1.1	rpm	✓	✓	✓	✓
P1.112	Single-direction torque limit	500	%	✓	✓	✓	✓

(★) Read-only parameter. Can only read the value of the parameter. For example, P0.000, P0.010, and P4.001.

(▲) Parameter cannot be changed when servo is in Servo On status. For example, P1.000 and P1.046.

(●) Parameter changes become valid after power cycling. For example, P1.001 and P3.000.

(■) Parameter resets to its default value after power cycling. For example, P3.006.

Digital input / Digital output functional planning parameters

Parameter No.	Function	Default value	Unit	Control mode			
				PT	PR	S	T
P0.053	General range compare digital output - filter time	0x0000	-	✓	✓	✓	✓
P0.054	General range compare digital output 1 - lower limit	0	-	✓	✓	✓	✓
P0.055	General range compare digital output 1 - upper limit	0	-	✓	✓	✓	✓
P0.056	General range compare digital output 2 - lower limit	0	-	✓	✓	✓	✓
P0.057	General range compare digital output 2 - upper limit	0	-	✓	✓	✓	✓
P0.058	General range compare digital output 3 - lower limit	0	-	✓	✓	✓	✓
P0.059	General range compare digital output 3 - upper limit	0	-	✓	✓	✓	✓
P0.060	General range compare digital output 4 - lower limit	0	-	✓	✓	✓	✓
P0.061	General range compare digital output 4 - upper limit	0	-	✓	✓	✓	✓
P1.038	Zero speed range	10.0 (panel / software) 100 (communication)	1 rpm (panel / software) 0.1 rpm (communication)	✓	✓	✓	✓
P1.039	Target speed detection level	3000	rpm	✓	✓	✓	✓
P1.042	Delay time for enabling the magnetic brake	0	ms	✓	✓	✓	✓
P1.043	Delay time for disabling the magnetic brake	0	ms	✓	✓	✓	✓
P1.047	Speed reached (DO.SP_OK) range	10	rpm	-	-	✓	-
P1.054	Pulse range for position reached	167772	pulse	✓	✓	-	-
P1.056	Motor output overload warning level	120	%	✓	✓	✓	✓
P2.009	DI response filter time	2	ms	✓	✓	✓	✓
P2.010	DI1 functional planning	0x0101 (-L) 0x0100 (-F, -E, -M, -P)	-	✓	✓	✓	✓
P2.011	DI2 functional planning	0x0104 (-L) 0x0022 (-F, -E, -M, -P)	-	✓	✓	✓	✓
P2.012	DI3 functional planning	0x0116 (-L) 0x0023 (-F, -E, -M, -P)	-	✓	✓	✓	✓
P2.013	DI4 functional planning	0x0117 (-L) 0x0021 (-F, -E, -M, -P)	-	✓	✓	✓	✓
P2.014	DI5 functional planning	0x0102 (-L) 0x0100 (-F, -E, -M, -P)	-	✓	✓	✓	✓

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Parameter No.	Function	Default value	Unit	Control mode			
				PT	PR	S	T
P2.015	DI6 functional planning	0x0022 (-L) 0x0100 (-F, -E, -M, -P)	-	✓	✓	✓	✓
P2.016	DI7 functional planning	0x0023 (-L) 0x0100 (-F, -E, -M, -P)	-	✓	✓	✓	✓
P2.017	DI8 functional planning	0x0021 (-L) 0x0100 (-F, -E, -M, -P)	-	✓	✓	✓	✓
P2.018	DO1 functional planning	0x0101	-	✓	✓	✓	✓
P2.019	DO2 functional planning	0x0103 (-L) 0x0100 (-F, -E, -M, -P)	-	✓	✓	✓	✓
P2.020	DO3 functional planning	0x0109 (-L) 0x0100 (-F, -E, -M, -P)	-	✓	✓	✓	✓
P2.021	DO4 functional planning	0x0105 (-L) 0x0100 (-F, -E, -M, -P)	-	✓	✓	✓	✓
P2.022	DO5 functional planning	0x0007 (-L) 0x0100 (-F, -E, -M, -P)	-	✓	✓	✓	✓
P2.036	DI9 functional planning	0x0100	-	✓	✓	✓	✓
P2.037	DI10 functional planning	0x0100	-	✓	✓	✓	✓
P2.038	DI11 functional planning	0x0100	-	✓	✓	✓	✓
P2.039	DI12 functional planning	0x0100	-	✓	✓	✓	✓
P2.040	DI13 functional planning	0x0100	-	✓	✓	✓	✓
P2.041	DO6 functional planning	0x0100	-	✓	✓	✓	✓

(★) Read-only parameter. Can only read the value of the parameter. For example, P0.000, P0.010, and P4.001.

(▲) Parameter cannot be changed when servo is in Servo On status. For example, P1.000 and P1.046.

(●) Parameter changes become valid after power cycling. For example, P1.001 and P3.000.

(■) Parameter resets to its default value after power cycling. For example, P3.006.

Communication parameters

Parameter No.	Function	Default value	Unit	Control mode			
				PT	PR	S	T
P3.000●	Address	0x007F	-	✓	✓	✓	✓
P3.001●	Transmission speed	0x0203 (-L, -M, -E) 0x3203 (-F, -P)	-	✓	✓	✓	✓
P3.002	Modbus communication protocol	0x0006	-	✓	✓	✓	✓
P3.003	Modbus communication error handling	0x0000	-	✓	✓	✓	✓
P3.004	Modbus communication timeout	0	sec	✓	✓	✓	✓
P3.006■	Digital input (DI) control switch	0x0000	-	✓	✓	✓	✓
P3.007	Modbus communication response delay time	1	0.5 ms	✓	✓	✓	✓
P3.009	Communication synchronization	0x5055	-	-	-	-	-
P3.010	CANopen / DMCNET protocol	0x1011	-	-	-	-	-
P3.011	CANopen / DMCNET / PROFINET options	0x0000	-	-	-	-	-
P3.012	Communication support setting	0x0000	-	-	-	-	-
P3.017	CANopen B mode disconnection delay time	1000	ms	-	-	-	-
P3.018	EtherCAT special function switch	0x00002000	-	-	-	-	-
P3.022	EtherCAT PDO timeout setting	0xFF04	-	-	-	-	-

(★) Read-only parameter. Can only read the value of the parameter. For example, P0.000, P0.010, and P4.001.

(▲) Parameter cannot be changed when servo is in Servo On status. For example, P1.000 and P1.046.

(●) Parameter changes become valid after power cycling. For example, P1.001 and P3.000.

(■) Parameter resets to its default value after power cycling. For example, P3.006.

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Diagnosis parameters

Parameter No.	Function	Default value	Unit	Control mode			
				PT	PR	S	T
P4.000	Fault record (last)	0x00000000	-	✓	✓	✓	✓
P4.001★	Fault record (second to the last)	0x00000000	-	✓	✓	✓	✓
P4.002★	Fault record (third to the last)	0x00000000	-	✓	✓	✓	✓
P4.003★	Fault record (fourth to the last)	0x00000000	-	✓	✓	✓	✓
P4.004★	Fault record (fifth to the last)	0x00000000	-	✓	✓	✓	✓
P4.005	Servo motor JOG control	20	rpm	✓	✓	✓	✓
P4.006■	Software digital output register (readable and writable)	0x0000	-	✓	✓	✓	✓
P4.007■	Multi-function for digital input	0x0000	-	✓	✓	✓	✓
P4.008★	Input status of servo drive panel (read-only)	-	-	✓	✓	✓	✓
P4.009★	Digital output status (read-only)	-	-	✓	✓	✓	✓
P4.010▲■	Hardware calibration options	0	-	✓	✓	✓	✓
P4.011	Analog speed input 1 - hardware offset calibration	Factory setting	-	✓	✓	✓	✓
P4.012	Analog speed input 2 - hardware offset calibration	Factory setting	-	✓	✓	✓	✓
P4.013	Analog torque input 1 - hardware offset calibration	Factory setting	-	✓	✓	✓	✓
P4.014	Analog torque input 2 - hardware offset calibration	Factory setting	-	✓	✓	✓	✓
P4.015	Current detector (V1 phase) - hardware offset calibration	Factory setting	-	✓	✓	✓	✓
P4.016	Current detector (V2 phase) - hardware offset calibration	Factory setting	-	✓	✓	✓	✓
P4.017	Current detector (W1 phase) - hardware offset calibration	Factory setting	-	✓	✓	✓	✓
P4.018	Current detector (W2 phase) - hardware offset calibration	Factory setting	-	✓	✓	✓	✓
P4.019	IGBT NTC calibration level (cannot reset)	Factory setting	-	✓	✓	✓	✓
P4.020	Analog monitor output (Ch1) - offset compensation value	0	mV	✓	✓	✓	✓
P4.021	Analog monitor output (Ch2) - offset compensation value	0	mV	✓	✓	✓	✓
P4.022	Analog speed input - offset compensation value	0	mV	-	-	✓	-
P4.023	Analog torque input - offset compensation value	0	mV	-	-	-	✓

(★) Read-only parameter. Can only read the value of the parameter. For example, P0.000, P0.010, and P4.001.

(▲) Parameter cannot be changed when servo is in Servo On status. For example, P1.000 and P1.046.

(●) Parameter changes become valid after power cycling. For example, P1.001 and P3.000.

(■) Parameter resets to its default value after power cycling. For example, P3.006.

Encoder parameters

Parameter No.	Function	Default value	Unit	Control mode			
				PT	PR	S	T
P0.049■	Update encoder absolute position	0x0000	-	✓	✓	✓	✓
P0.051★■	Encoder absolute position - number of revolutions	0	rev	✓	✓	✓	✓
P0.052★■	Encoder absolute position - pulse number or PUU within single turn	0	pulse or PUU	✓	✓	✓	✓
P2.069●	Absolute encoder	0x0000	-	✓	✓	✓	✓

Special function parameters

Parameter No.	Function	Default value	Unit	Control mode			
				PT	PR	S	T
P1.057	Motor hard stop 1 - torque percentage	0	%	✓	✓	✓	✓
P1.058	Motor hard stop - protection time	1	ms	✓	✓	✓	✓
P1.060	Motor hard stop 1 - level offset	0	%	✓	✓	✓	✓
P1.105	Motor hard stop 2 - torque upper limit	0	%	✓	✓	✓	✓
P1.106	Motor hard stop 2 - torque lower limit	0	%	✓	✓	✓	✓
P2.112▲	Special bit register 4	0x2018	-	✓	✓	✓	-
P2.113	Bandwidth of disturbance attenuation	50	Hz	-	-	-	✓
P2.114	Level of disturbance attenuation	0	-	-	-	-	✓
P2.121	Special bit register 6	0x00000000	-	✓	✓	✓	✓
P2.125	Special bit register 7	0x0000	-	✓	✓	✓	✓
P4.044	Special bit register 5	0x0000	-	✓	✓	✓	✓

(★) Read-only parameter. Can only read the value of the parameter. For example, P0.000, P0.010, and P4.001.

(▲) Parameter cannot be changed when servo is in Servo On status. For example, P1.000 and P1.046.

(●) Parameter changes become valid after power cycling. For example, P1.001 and P3.000.

(■) Parameter resets to its default value after power cycling. For example, P3.006.

8.3 Parameter descriptions

P0.xxx Monitoring parameters

8

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

Settings:

Displays the firmware version of the servo drive.

P0.001■	Current drive alarm code (seven-segment display)		Address: 0002H 0003H
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, refer to Section 14.1 Alarm list.

P0.002	Drive status		Address: 0004H 0005H
Default:	1	Control mode:	All
Unit:	-	Setting range:	-300 to +127
Format:	DEC	Data size:	16-bit

Settings:

Input the monitoring code to P0.002 to view changes to the variable on the panel. For the list of monitoring variables, refer to Table 8.3 Monitoring variables descriptions.

P0.003	Analog output monitoring		Address: 0006H 0007H
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x0077
Format:	HEX	Data size:	16-bit

Settings:

U Z Y X

X	MON2 value	Z	Reserved
Y	MON1 value	U	Reserved

MON1 and MON2 set value	Description	MON1 and MON2 set 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 set value of P1.101
3	Speed command (+/- 8 volts / Maximum Speed command)	7	Analog output voltage is the set value of P1.102

Note: refer to P1.004 and P1.005 for the proportional setting for the analog output voltage.

For example: when you set P0.003 to 0x0001 (MON1 is the analog output of motor speed; MON2 is the analog output of motor torque):

$$\text{MON1 output voltage} = 8 \times \frac{\text{Motor speed}}{(\text{Maximum speed} \times \frac{P1.004}{100})} \text{ (Unit: volts)}$$

$$\text{MON2 output voltage} = 8 \times \frac{\text{Motor speed}}{(\text{Maximum speed} \times \frac{P1.005}{100})} \text{ (Unit: volts)}$$

P0.004 - P0.007	Reserved

P0.008★	Total servo drive operation time		Address: 0010H 0011H
Default:	0x00000000	Control mode:	All
Unit:	hour	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Displays the total servo drive Power On and Servo On time. The time is recorded in hours and durations of less than 1 hour are not recorded. The recorded hours are saved when the power is off.

High word

D C B A

Low word

U Z Y X

DCBA	Total time of Servo On	UZYX	Total servo power applied time

P0.009★■	Status monitoring register 1		Address: 0012H 0013H
Default:	-	Control mode:	All
Unit:	-	Setting range:	-
Format:	DEC	Data size:	32-bit

Settings:

Set the value to be monitored in P0.017 through the drive panel or communication (refer to P0.002). To get the status, read the communication address through the communication port or monitor the value from the panel (set P0.002 to 23, and the panel displays “VAR-1” and then the value of P0.009).

For example, when you set P0.017 to 7, reading P0.009 can access the motor speed (rpm). To access the data through Modbus communication, have the servo drive read two 16-bit values (0012H and 0013H) as a single 32-bit value. (0013H : 0012H) = (High word : Low word). To monitor the data through the drive panel, set P0.002 to 23 and the panel displays “VAR-1” and then the value of P0.009.

P0.010★■	Status monitoring register 2		Address: 0014H 0015H
Default:	-	Control mode:	All
Unit:	-	Setting range:	-
Format:	DEC	Data size:	32-bit

Settings:

Set the value to be monitored in P0.018 through the drive panel or communication (refer to P0.002). To get the status, read the communication address through the communication port or monitor the value from the panel (set P0.002 to 24, and the panel displays “VAR-2” and then the value of P0.010).

P0.011★■	Status monitoring register 3		Address: 0016H 0017H
Default:	-	Control mode:	All
Unit:	-	Setting range:	-
Format:	DEC	Data size:	32-bit

Settings:

Set the value to be monitored in P0.019 through the drive panel or communication (refer to P0.002). To get the status, read the communication address through the communication port or monitor the value from the panel (set P0.002 to 25, and the panel displays “VAR-3” and then the value of P0.011).

P0.012★■	Status monitoring register 4		Address: 0018H 0019H
Default:	-	Control mode:	All
Unit:	-	Setting range:	-
Format:	DEC	Data size:	32-bit

Settings:

Set the value to be monitored in P0.020 through the drive panel or communication (refer to P0.002). To get the status, read the communication address through the communication port or monitor the value from the panel (set P0.002 to 26, and the panel displays “VAR-4” and then the value of P0.012).

P0.013★■	Status monitoring register 5		Address: 001AH 001BH
Default:	-	Control mode:	All
Unit:	-	Setting range:	-
Format:	DEC	Data size:	32-bit

Settings:

Set the value to be monitored in P0.021 through the drive panel or communication (refer to P0.002). To get the status, read the communication address through the communication port.

P0.014 - P0.016	Reserved

P0.017	Select content displayed by status monitoring register 1		Address: 0022H 0023H
Default:	0	Control mode:	All
Unit:	-	Setting range:	-300 to +127
Format:	DEC	Data size:	16-bit

Settings:

Refer to Table 8.3 for the available values.

For example, if you set P0.017 to 7, then reading P0.009 displays the motor speed (rpm).

P0.018	Select content displayed by status monitoring register 2		Address: 0024H 0025H
Default:	0	Control mode:	All
Unit:	-	Setting range:	-300 to +127
Format:	DEC	Data size:	16-bit

Settings:

Refer to Table 8.3 for the available values.

P0.019	Select content displayed by status monitoring register 3		Address: 0026H 0027H
Default:	0	Control mode:	All
Unit:	-	Setting range:	-300 to +127
Format:	DEC	Data size:	16-bit

Settings:

Refer to Table 8.3 for the available values.

P0.020	Select content displayed by status monitoring register 4		Address: 0028H 0029H
Default:	0	Control mode:	All
Unit:	-	Setting range:	-300 to +127
Format:	DEC	Data size:	16-bit

Settings:

Refer to Table 8.3 for the available values.

P0.021	Select content displayed by status monitoring register 5		Address: 002AH 002BH
Default:	0	Control mode:	All
Unit:	-	Setting range:	-300 to +127
Format:	DEC	Data size:	16-bit

Settings:

Refer to Table 8.3 for the available values.

P0.022 - P0.024	Reserved

P0.025■	Mapping parameter 1		Address: 0032H 0033H
Default:	-	Control mode:	All
Unit:	-	Setting range:	Determined by the corresponding parameter P0.035
Format:	HEX	Data size:	32-bit

Settings:

You can continuously read and write two different parameters faster with mapping paramemters. Use P0.035 to specify the parameter numbers to be read or written with the mapping parameter through the panel or communication. The value of the parameter that is specified by P0.035 is shown in P0.025. Refer to P0.035 for its settings.

P0.026■	Mapping parameter 2		Address: 0034H 0035H
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		Address: 0036H 0037H
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		Address: 0038H 0039H
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		Address: 003AH 003BH
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		Address: 003CH 003DH
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		Address: 003EH 003FH
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		Address: 0040H 0041H
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 for mapping parameter P0.025		Address: 0046H 0047H
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 parameter high word (PH) and parameter low word (PL) are:

High word

D C BA

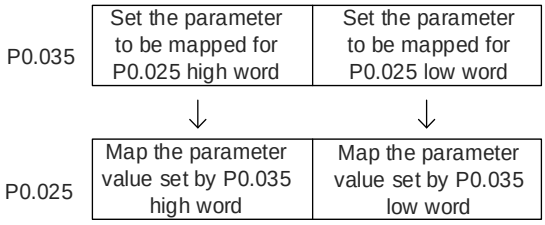
Low word

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	Reserved	U	Reserved

Select the corresponding parameter(s) for the data block access register 1 (P0.035). The mapping value is 32 bits and can map to two 16-bit parameters or one 32-bit parameter.

P0.035: (Parameter to be mapped: P0.035; Content of mapping parameter: P0.025)

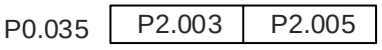


1. When PH ≠ PL, it indicates that the content of P0.025 includes two 16-bit parameters.

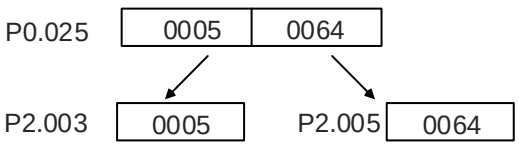
   Example: Target: set P2.003 to 0 and P2.005 to 100 through the mapping parameter.

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

   Thus, P0.035 = 0x02030205.



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

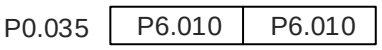


2. When PH = PL = P, it indicates that the content of P0.025 includes one 32-bit parameter.

   Example: Target: set P6.010 to 0x00050064 through the mapping parameter.

   Setting: set both the high word and low word of P0.035 to 060A (P6.010).

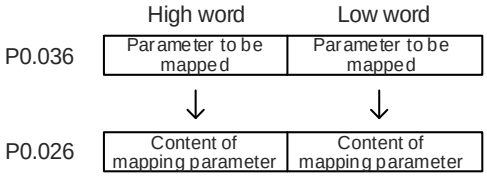
   Thus, P0.035 = 0x060A060A.



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

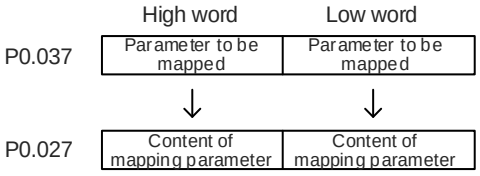
P0.036	Target setting for mapping parameter P0.026		Address: 0048H 0049H
Default:	-	Control mode:	All
Unit:	-	Setting range:	Determined by the communication address of the parameter group
Format:	HEX	Data size:	32-bit

Settings:



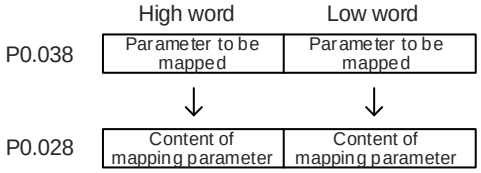
P0.037	Target setting for mapping parameter P0.027		Address: 004AH 004BH
Default:	-	Control mode:	All
Unit:	-	Setting range:	Determined by the communication address of the parameter group
Format:	HEX	Data size:	32-bit

Settings:



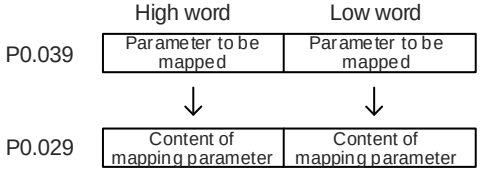
P0.038	Target setting for mapping parameter P0.028		Address: 004CH 004DH
Default:	-	Control mode:	All
Unit:	-	Setting range:	Determined by the communication address of the parameter group
Format:	HEX	Data size:	32-bit

Settings:



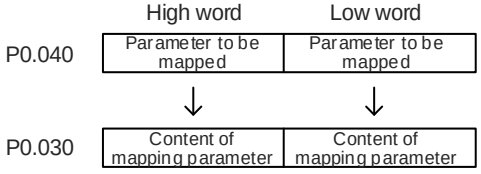
P0.039	Target setting for mapping parameter P0.029		Address: 004EH 004FH
Default:	-	Control mode:	All
Unit:	-	Setting range:	Determined by the communication address of the parameter group
Format:	HEX	Data size:	32-bit

Settings:



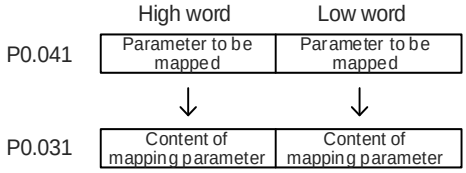
P0.040	Target setting for mapping parameter P0.030		Address: 0050H 0051H
Default:	-	Control mode:	All
Unit:	-	Setting range:	Determined by the communication address of the parameter group
Format:	HEX	Data size:	32-bit

Settings:



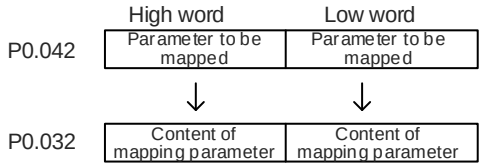
P0.041	Target setting for mapping parameter P0.031		Address: 0052H 0053H
Default:	-	Control mode:	All
Unit:	-	Setting range:	Determined by the communication address of the parameter group
Format:	HEX	Data size:	32-bit

Settings:



P0.042	Target setting for mapping parameter P0.032		Address: 0054H 0055H
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	Reserved

P0.044★■	Status monitoring register (for PC software)		Address: 0058H 0059H
Default:	0	Control mode:	All
Unit:	-	Setting range:	Determined by the communication address of the parameter group
Format:	DEC	Data size:	32-bit

Settings:

This setting is the same as P0.009.

P0.045■	Status monitoring register content selection (for PC software)		Address: 005AH 005BH
Default:	0	Control mode:	All
Unit:	-	Setting range:	-300 to +127
Format:	DEC	Data size:	16-bit

Settings:

This setting is the same as P0.017.

P0.046★■	Servo drive digital output (DO) status		Address: 005CH 005DH
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x00FF
Format:	HEX	Data size:	16-bit

8

Settings:

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

Bit	Function	Bit	Function
0	SRDY (servo ready)	8	HOME (homing complete)
1	SON (Servo On)	9	OLW (early warning for motor overload)
2	ZSPD (zero speed detection)	10	WARN (Servo warning, CW, CCW, EMGS, undervoltage, or communication error)
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

P0.047 - P0.048	Reserved

P0.049■	Update encoder absolute position		Address: 0062H 0063H
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x0002
Format:	HEX	Data size:	16-bit

Settings:

X	Command processing	Z	Reserved
Y	Reserved	U	Reserved

■ X: command processing

0: N/A

1: update the encoder data to P0.050 - P0.052.

2: update P0.050 - P0.052 and clear the position error. When this command takes effect, the motor's current position is set to the terminal point of the Position command.

P0.050★■	Absolute position system status		Address: 0064H 0065H
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 to 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 0	Absolute position status	0: normal. 1: lost.
Bit 1	Battery voltage status	0: normal. 1: undervoltage.
Bit 2	Status of absolute number of revolutions	0: normal. 1: overflows.
Bit 3	PUU status	0: normal. 1: overflows.
Bit 4	Absolute position status	0: established. 1: not yet established.
Bit 5 - Bit 15	Reserved	-

P0.051★■	Encoder absolute position - number of revolutions		Address: 0066H 0067H
Default:	0	Control mode:	All
Unit:	rev	Setting range:	-32768 to +32767
Format:	DEC	Data size:	16-bit

Settings:

When you set P2.070 [Bit 1] to 1 for reading the pulse number, this parameter displays the encoder's absolute position in the form of number of revolutions. When you set P2.070 [Bit 1] to 0 for reading the PUU number, this parameter becomes invalid and the panel displays 0.

P0.052★■	Encoder absolute position - pulse number within single turn or PUU		Address: 0068H 0069H
Default:	0	Control mode:	All
Unit:	pulse or PUU	Setting range:	0 to 16777216-1 (pulse) -2147483648 to +2147483647 (PUU)
Format:	DEC	Data size:	32-bit

Settings:

When you set P2.070 [Bit 1] to 1 for reading the pulse number, this parameter displays the encoder's absolute position in the form of pulse number within a single turn. When you set P2.070 [Bit 1] to 0 for reading the PUU number, this parameter displays the motor's absolute position in PUU.

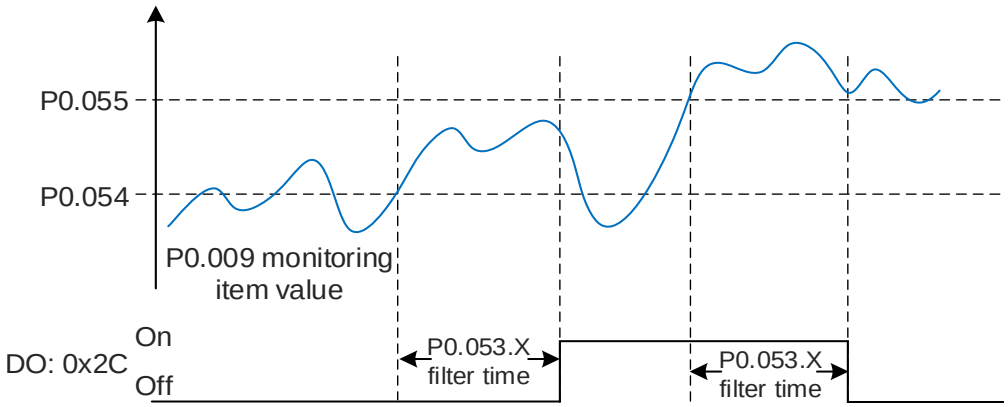
P0.053	General range compare digital output - filter time		Address: 006AH 006BH
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0xFFFF
Format:	HEX	Data size:	16-bit

Settings:

X	First filter time	Z	Third filter time
Y	Second filter time	U	Fourth filter time

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

Example of the first filter:



P0.054	General range compare digital output 1 - lower limit		Address: 006CH 006DH
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 0x2C (first set of general range comparison) and the monitoring item of P0.017. When the monitoring item value of P0.009 is within the range set in P0.054 and P0.055, and after the filter time set in P0.053.X has elapsed, this digital output is on.

P0.055	General range compare digital output 1 - upper limit		Address: 006EH 006FH
Default:	0	Control mode:	All
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P0.054.

P0.056	General range compare digital output 2 - lower limit		Address: 0070H 0071H
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 item of P0.018. When the monitoring item value of P0.010 is within the range set in P0.056 and P0.057, and after the filter time set in P0.053.Y has elapsed, this digital output is on.

P0.057	General range compare digital output 2 - upper limit		Address: 0072H 0073H
Default:	0	Control mode:	All
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P0.056.

P0.058	General range compare digital output 3 - lower limit		Address: 0074H 0075H
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 item of P0.019. When the monitoring item value of P0.011 is within the range set in P0.058 and P0.059, and after the filter time set in P0.053.Z has elapsed, this digital output is on.

P0.059	General range compare digital output 3 - upper limit		Address: 0076H 0077H
Default:	0	Control mode:	All
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P0.058.

P0.060	General range compare digital output 4 - lower limit		Address: 0078H 0079H
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 item of P0.020. When the monitoring item value of P0.012 is within the range set in P0.060 and P0.061, and after the filter time set in P0.053.U has elapsed, this digital output is on.

P0.061	General range compare digital output 4 - upper limit		Address: 007AH 007BH
Default:	0	Control mode:	All
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P0.060.

P0.062	Reserved

P0.063★	Total duration of DC Bus voltage exceeding 400V		Address: 007EH 007FH
Default:	0	Control mode:	All
Unit:	ms	Setting range:	0 to 2147483647
Format:	DEC	Data size:	32-bit

Settings:

Records the total time during which the voltage of the DC Bus exceeded 400V.

P0.064 - P0.078	Reserved

P0.079★	IGBT highest temperature		Address: 009EH 009FH
Default:	0	Control mode:	All
Unit:	°C	Setting range:	0 to 2147483647
Format:	DEC	Data size:	32-bit

Settings:

Records the highest IGBT temperature.

P0.080 - P0.100	Reserved

P1.xxx Basic parameters

P1.000▲	External pulse input type		Address: 0100H 0101H
Default:	0x1042	Control mode:	PT
Unit:	-	Setting range:	0x0000 to 0x31F2
Format:	HEX	Data size:	16-bit

Settings:

X	Pulse type	Z	Logic type
Y	Filter width	U	Filter width

■ X: pulse type

0: AB phase pulse (4x)

1: clockwise and counterclockwise pulses

2: pulse train + sign

■ Z: logic type

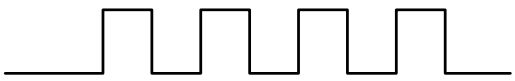
0: positive logic

1: negative logic

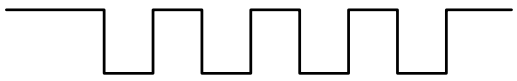
Digital circuits use 0 and 1 to represent the high and low voltage levels. In positive logic, 1 represents high voltage and 0 represents low voltage; in negative logic, 1 represents low voltage and 0 represents high voltage.

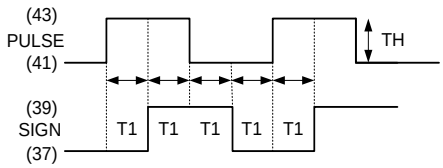
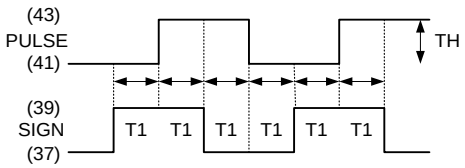
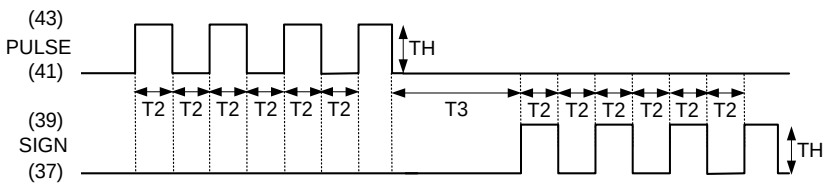
Example:

Positive logic

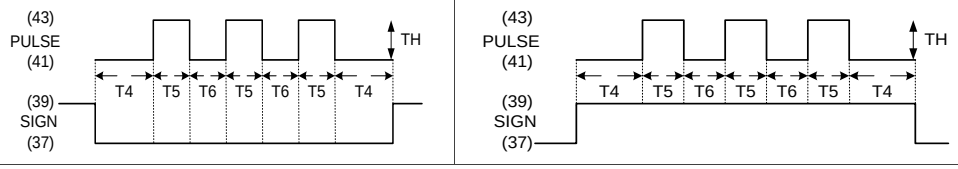


Negative logic



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



Note: the preceding diagrams are based on the -L model.
Communication type model pins: SIGN+ (23), SIGN- (24), PULSE+ (25), and PULSE- (26).

Pulse type		Maximum input frequency	Minimum allowed time width					
			T1	T2	T3	T4	T5	T6
Differential signal	Pulse train + sign	4 Mpps	62.5 ns	125 ns	250 ns	200 ns	125 ns	125 ns
	CW and CCW pulses							
	A phase + B phase (single-phase)	2 Mpps	125 ns	250 ns	250 ns	200 ns	250 ns	250 ns
Open-collector		200 Kpps	1.25 µs	2.5 µs	5 µs	5 µs	2.5 µs	2.5 µs

Pulse	Parameter settings	Type		Maximum input frequency	Voltage	Forward current
High speed pulse	Refer to the U & Y settings in the following table	Differential signal	Pulse train + sign	4 Mpps	5V	< 25 mA
			CW and CCW pulses			
			A phase + B phase (single-phase)	2 Mpps		
		Open-collector		200 Kpps	24V (max.)	< 25 mA
Low speed pulse[Note]	U = 2 and Y = 0	Differential signal		200 Kpps	5V	< 25 mA
		Open-collector		200 Kpps	24V (max.)	< 25 mA

Note:
1. When the low speed pulse is used (U = 2), parameter Y has to be 0 (no filter function).
2. It is suggested that you use the low speed pulse function when there is high frequency interference.
3. Contact Delta for the week for introducing the low speed pulse function to the servo drive.

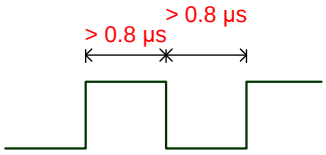
■ U, Y: filter width

If the pulse frequency is suddenly too high, causing a pulse width smaller than the set 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 as 4 times smaller than the actual pulse width.

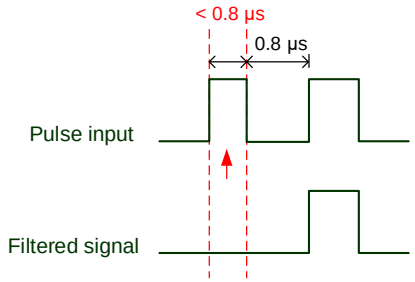
U and Y values	Filter width Unit: μs (kHz)	U and Y values	Filter width Unit: μs (kHz)
0, 0	No filter function	1, 0	No filter function
0, 1	2 (250)	1, 1	0.2 (2500)
0, 2	3 (166)	1, 2	0.3 (1666)
0, 3	4 (125)	1, 3	0.4 (1250)
0, 4	5 (100)	1, 4	0.5 (1000)
0, 5	6 (83)	1, 5	0.6 (833)
0, 6	7 (71)	1, 6	0.7 (714)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

Example:

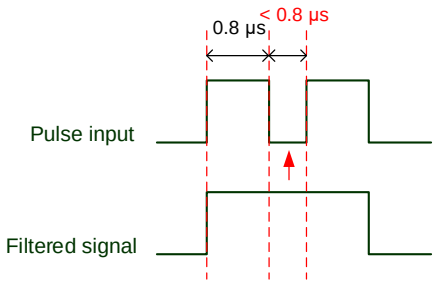
When you set U and Y both to 1 (filter width = 0.2 μs), and when the widths of the command pulse at high and low levels are both larger than 0.8 μs (four times the filter width 0.2 μs), then the pulse command is not filtered out.



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



If the first pulse width is smaller than 0.8 μs, the pulse may be filtered out, and thus two input pulses will be regarded as one pulse. If the pulse width is smaller than 0.2 μs, the pulse will be filtered out.



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

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

Note: when the signal is a high-speed pulse (4 Mpps) and the value of the filter width is 0, then the pulse is not filtered out.

P1.001●	Input for control mode and control command		Address: 0102H 0103H
Default:	0x0000 (-M, -L) 0x000B (-F) 0x000C (-E, -P)	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x112F
Format:	HEX	Data size:	16-bit

8

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			▲	▲		
0B	CANopen mode (for Delta's DVP-15MC PLC controller) DMCNET mode					
0C	CANopen mode EtherCAT mode PROFINET mode					
0D	▲	▲				
Multi-mode						
0E	▲	▲	▲			
0F	▲	▲		▲		

PT: Position control mode; the command source is from the external pulse and the external analog voltage.

PR: Position 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 registers 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 registers which you can select with DI.TCM0 and DI.TCM1.

Sz: Speed control mode; the speed command is zero or the command source is from the internal speed registers which you can select with DI.SPD0 and DI.SPD1.

Tz: Torque control mode; the torque command is zero or the command source is from the internal torque registers which you can select with DI.TCM0 and DI.TCM1.

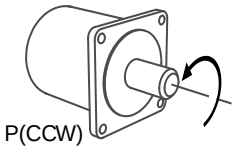
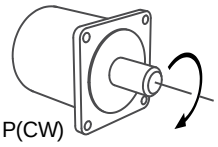
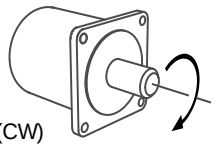
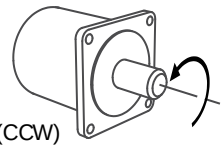
Dual mode: you can switch between two modes with the external DI. For example, you can use DI.S-P to switch the dual mode of PT-S (control mode setting: 06). Refer to Table 8.1 for further information.

Multi-mode: you can switch between three modes with the external DI. For example, you can use DI.S-P and DI.PT-PR to switch the multi-mode of PT-PR-S (control mode setting: 0E). Refer to Table 8.1 for further information.

Communication mode: the command source is from the external fieldbus controller, which sends the command to the servo drive through direct communication.

Note: if the command source is the external analog voltage, make sure to connect the voltage source properly to avoid floating connection causing misoperation.

■ Z: direction control

	Z = 0	Z = 1
Positive direction	 P(CCW)	 P(CW)
Negative direction	 N(CW)	 N(CCW)

■ U: DIO value control (volatile)

0: when modes are switched, DIO settings remain the same.

1: when modes are switched, DIO settings are reset to the default for each mode.

Note: for the default settings of -M, -F, and -E models, refer to Section 3.3.1. For the default settings of -P models, refer to Section 3.3.2. For the default settings of -L models, refer to Section 3.3.3.

P1.002▲	Speed and torque limits		Address: 0104H 0105H
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x0011
Format:	HEX	Data size:	16-bit

8

Settings:

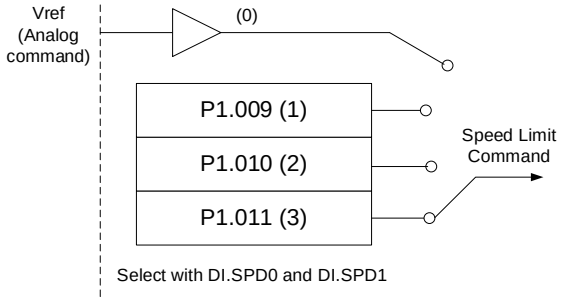
X	Disable / enable Speed Limit function	Z	Reserved
Y	Disable / enable Torque Limit function	U	Reserved

■ X: disable / enable Speed Limit function

0: disable Speed Limit function

1: enable Speed Limit function (only available in T and Tz modes)

See the following diagram for Speed Limit setting:

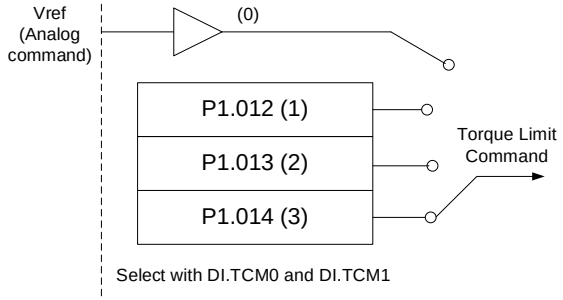


■ Y: disable / enable Torque Limit function

0: disable Torque Limit function

1: enable Torque Limit function

See the following diagram for Torque Limit setting:



When using the Torque Limit function, set P1.002.Y to 1 to enable the Torque Limit function permanently without occupying a DI setting. Alternatively, you can enable or disable the Torque Limit function with DI.TRQLM, which is more flexible, but the setting then occupies a DI setting. You can enable the Torque Limit function by either P1.002 or DI.

P1.003	Encoder pulse output polarity		Address: 0106H 0107H
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x0013
Format:	HEX	Data size:	16-bit

Settings:

X	Polarity of monitor analog output	Z	Reserved
Y	Direction of encoder pulse output	U	Reserved

■ X: polarity of monitor analog output

0: MON1(+), MON2(+)

1: MON1(+), MON2(-)

2: MON1(-), MON2(+)

3: MON1(-), MON2(-)

■ Y: direction of encoder pulse output

0: forward

1: reverse

P1.004	MON1 analog monitor output proportion		Address: 0108H 0109H
Default:	100	Control mode:	All
Unit:	% (full scale)	Setting range:	0 to 100
Format:	DEC	Data size:	16-bit

Settings:

Refer to P0.003 for the analog output setting.

Example:

If the analog voltage output is 8V when the motor speed is 1,000 rpm and the maximum speed of the motor is 5,000 rpm, the setting is as follows.

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

You can calculate the voltage output corresponding to the current motor speed with the following formula.

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		Address: 010AH 010BH
Default:	100	Control mode:	All
Unit:	% (full scale)	Setting range:	0 to 100
Format:	DEC	Data size:	16-bit

Settings:

Refer to P0.003 for the analog output setting.

P1.006	Speed command - smoothing constant (low-pass filter)		Address: 010CH 010DH
Default:	0	Control mode:	S / Sz
Unit:	ms	Setting range:	0 to 1000
Format:	DEC	Data size:	16-bit

Settings:

0: disable this function.

P1.007	Torque command - smoothing constant (low-pass filter)		Address: 010EH 010FH
Default:	0	Control mode:	T / Tz
Unit:	ms	Setting range:	0 to 1000
Format:	DEC	Data size:	16-bit

Settings:

0: disable this function.

P1.008	Position command - smoothing constant (low-pass filter)		Address: 0110H 0111H
Default:	0	Control mode:	PT / PR
Unit:	10 ms	Setting range:	0 to 1000
Format:	DEC	Data size:	16-bit
Example:	11 = 110 ms		

Settings:

0: disable this function.

P1.009	Internal Speed command 1 / internal speed limit 1		Address: 0112H 0113H
Default:	1000	Control mode:	S / Sz: internal Speed command 1 T / Tz: internal speed limit 1
Unit:	0.1 rpm	Setting range:	-75000 to +75000
Format:	DEC	Data size:	32-bit
Example:	Internal Speed command: 120 = 12 rpm Internal speed limit: positive and negative values are identical. Refer to the following descriptions.		

Settings:

Internal Speed command 1: first internal Speed command.

Internal speed limit 1: first internal speed limit.

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		Address: 0114H 0115H
Default:	2000	Control mode:	S / Sz: internal Speed command 2 T / Tz: internal speed limit 2
Unit:	0.1 rpm	Setting range:	-75000 to +75000
Format:	DEC	Data size:	32-bit
Example:	Internal Speed command: 120 = 12 rpm Internal speed limit: positive and negative values are identical. Refer to the following descriptions.		

Settings:

Internal Speed command 2: second internal Speed command.

Internal speed limit 2: second internal speed limit.

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		Address: 0116H 0117H
Default:	3000	Control mode:	S / Sz: internal Speed command 3 T / Tz: internal speed limit 3
Unit:	0.1 rpm	Setting range:	-75000 to +75000
Format:	DEC	Data size:	32-bit
Example:	Internal Speed command: 120 = 12 rpm Internal speed limit: positive and negative values are identical. Refer to the following descriptions.		

Settings:

Internal Speed command 3: third internal Speed command.

Internal speed limit 3: third internal speed limit.

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		Address: 0118H 0119H
Default:	100	Control mode:	T / Tz: internal Torque command 1 PT / PR / S / Sz: internal torque limit 1
Unit:	%	Setting range:	-5000 to +5000
Format:	DEC	Data size:	16-bit

Settings:

Internal Torque command 1: first internal Torque command.

Internal torque limit 1: first internal torque limit.

1. When P2.112 [Bit 14] = 0

Internal Torque command: 35 = 35%

Internal torque limit: positive and negative values are identical. Refer to the following descriptions.

Example of internal torque limit:

Torque limit value of P1.012	Valid torque range	Torque limit in forward direction	Torque limit in reverse direction
35	-35% to +35%	35%	-35%
-35			

2. When P2.112 [Bit 14] = 1

Internal Torque command: 35 = 3.5%

Internal torque limit: positive and negative values are identical. Refer to the following descriptions.

Example of internal torque limit:

Torque limit value of P1.012	Valid torque range	Torque limit in forward direction	Torque limit in reverse direction
35	-3.5% to +3.5%	3.5%	-3.5%
-35			

P1.013	Internal Torque command 2 / internal torque limit 2		Address: 011AH 011BH
Default:	100	Control mode:	T / Tz: internal Torque command 2 PT / PR / S / Sz: internal torque limit 2
Unit:	%	Setting range:	-5000 to +5000
Format:	DEC	Data size:	16-bit

Settings:

Internal Torque command 2: second internal Torque command.

Internal torque limit 2: second internal torque limit.

1. When P2.112 [Bit 14] = 0

Internal Torque command: 35 = 35%

Internal torque limit: positive and negative values are identical. Refer to the following descriptions.

Example of internal torque limit:

Torque limit value of P1.013	Valid torque range	Torque limit in forward direction	Torque limit in reverse direction
35	-35% to +35%	35%	-35%
-35			

2. When P2.112 [Bit 14] = 1

Internal Torque command: 35 = 3.5%

Internal torque limit: positive and negative values are identical. Refer to the following descriptions.

Example of internal torque limit:

Torque limit value of P1.013	Valid torque range	Torque limit in forward direction	Torque limit in reverse direction
35	-3.5% to +3.5%	3.5%	-3.5%
-35			

P1.014	Internal Torque command 3 / internal torque limit 3		Address: 011CH 011DH
Default:	100	Control mode:	T / Tz: internal Torque command 3 PT / PR / S / Sz: internal torque limit 3
Unit:	%	Setting range:	-5000 to +5000
Format:	DEC	Data size:	16-bit

Settings:

Internal Torque command 3: third internal Torque command.

Internal torque limit 3: third internal torque limit.

1. When P2.112 [Bit 14] = 0

Internal Torque command: 35 = 35%

Internal torque limit: positive and negative values are identical. Refer to the following descriptions.

Example of internal torque limit:

Torque limit value of P1.014	Valid torque range	Torque limit in forward direction	Torque limit in reverse direction
35	-35% to +35%	35%	-35%
-35			

2. When P2.112 [Bit 14] = 1

Internal Torque command: 35 = 3.5%

Internal torque limit: positive and negative values are identical. Refer to the following descriptions.

Example of internal torque limit:

Torque limit value of P1.014	Valid torque range	Torque limit in forward direction	Torque limit in reverse direction
35	-3.5% to +3.5%	3.5%	-3.5%
-35			

P1.015 - P1.018	Reserved

P1.019	Capture: additional function settings		Address: 0126H 0127H
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x0101
Format:	HEX	Data size:	16-bit

Settings:

X	Additional function for Capture	Z	Reserved
Y	Reserved	U	Reserved

■ X: additional function for Capture

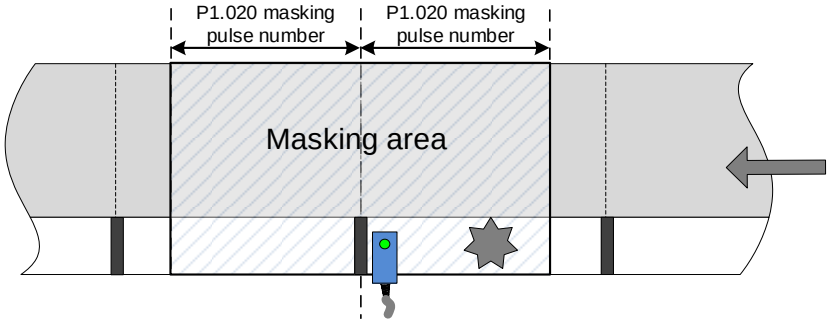
Bit	3	2	1	0

Bit	Function	Description
Bit 0	Cycle mode	0: disable this function. When the number of capturing times (P5.038) is 0, capturing is complete. 1: enable this function. When the number of capturing times (P5.038) is 0, the servo drive automatically resets the number of capturing times to the default setting.
Bit 1 - Bit 3	Reserved	-

P1.020	Capture: masking range		Address: 0128H 0129H
Default:	0	Control mode:	All
Unit:	Pulse unit of capture source	Setting range:	0 to 100000000
Format:	DEC	Data size:	32-bit

Settings:

When the Capture function is enabled and set to capture multiple points (P5.038 > 1), use this parameter to set the range within which the system stops receiving the DI captured signal once the data is captured. The DI captured signal received within this range is not recognized as valid. Use this function to prevent the system from seeing noise as effective signals within the non-capture range.



The system activates the masking area after capturing this mark.

P1.021	Reserved

P1.022	PR command special filter		Address: 012CH 012DH
Default:	0x0000	Control mode:	PR
Unit:	-	Setting range:	0x0000 to 0x107F
Format:	HEX	Data size:	16-bit

Settings:

YX	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 or to decelerate from 3,000 rpm to 0) 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.

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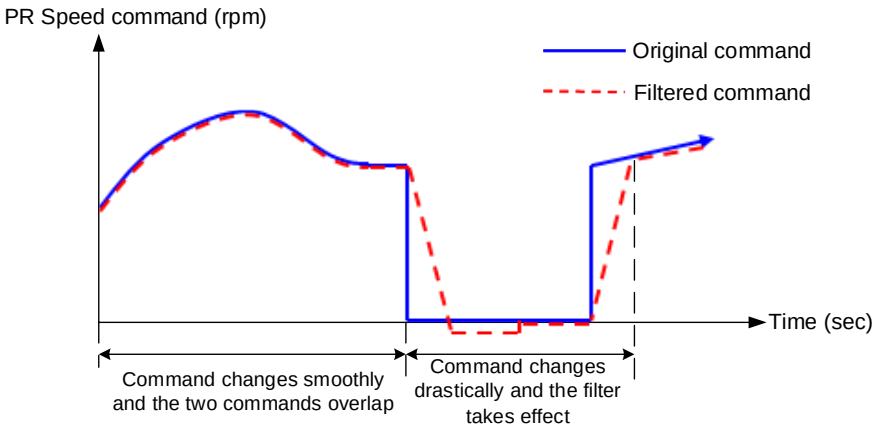
Example:

Set YX to 12 (data format is HEX and unit is 10 ms) and thus the acceleration / deceleration time limit is 180 ms. If the acceleration / deceleration time of the PR command is shorter than 180 ms, the filter takes effect. If the acceleration / deceleration time of the PR command is longer than 180 ms, the filter does not take effect.

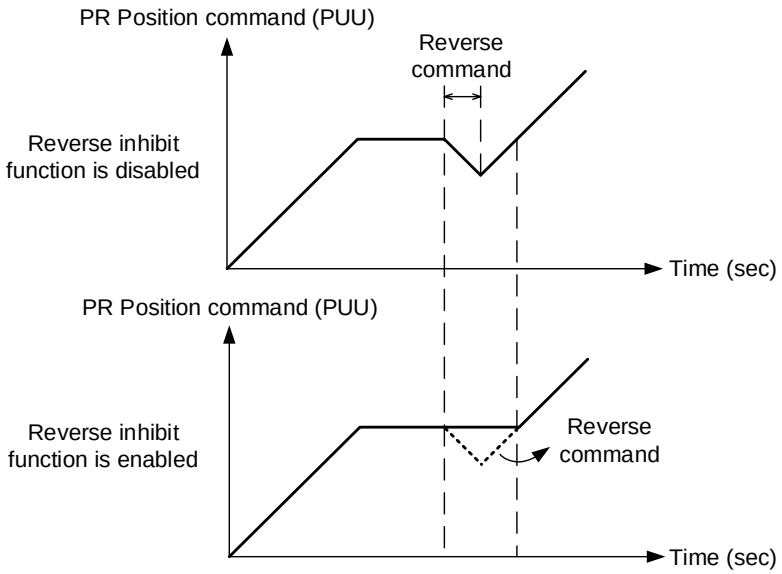


Note: if the command keeps changing drastically, the following error of the internal position exceeds the allowable range and then triggers AL404.

■ U: reverse inhibit

0: disable this function

1: enable this function. When the value of the current position command is lower than that of the previous position command, the motor does not move.



P1.023 - P1.024	Reserved

P1.025	Low-frequency vibration suppression frequency 1		Address: 0132H 0133H
Default:	1000	Control mode:	PT / PR
Unit:	0.1 Hz	Setting range:	10 to 1000
Format:	DEC	Data size:	16-bit
Example:	150 = 15 Hz	-	-

Settings:

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

P1.026	Low-frequency vibration suppression gain 1		Address: 0134H 0135H
Default:	0	Control mode:	PT / PR
Unit:	-	Setting range:	0 to 9
Format:	DEC	Data size:	16-bit

Settings:

The gain of the first low-frequency vibration suppression filter. 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		Address: 0136H 0137H
Default:	1000	Control mode:	PT / PR
Unit:	0.1 Hz	Setting range:	10 to 1000
Format:	DEC	Data size:	16-bit
Example:	150 = 15 Hz	-	-

Settings:

The frequency of the second low-frequency vibration suppression filter. When you set P1.028 to 0, the second low-frequency vibration suppression filter is disabled.

P1.028	Low-frequency vibration suppression gain 2		Address: 0138H 0139H
Default:	0	Control mode:	PT / PR
Unit:	-	Setting range:	0 to 9
Format:	DEC	Data size:	16-bit

Settings:

The gain of the second low-frequency vibration suppression filter. 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		Address: 013AH 013BH
Default:	0	Control mode:	PT / PR
Unit:	-	Setting range:	0 to 1
Format:	DEC	Data size:	16-bit

Settings:

Setting value	Description
0	Disable the automatic low-frequency vibration detection function.
1	Vibration suppression is in automatic mode. When the vibration frequency 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.

P1.030	Low-frequency vibration detection		Address: 013CH 013DH
Default:	8000	Control mode:	PT / PR
Unit:	pulse	Setting range:	1 to 128000
Format:	DEC	Data size:	32-bit

Settings:

Sets the detection level when automatic vibration suppression is enabled (P1.029 = 1). The lower the value, the more sensitive the detection, but the system may treat noise or minor 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		Address: 0140H 0141H
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x0020
Format:	HEX	Data size:	16-bit

Settings:

X	Reserved	Z	Reserved
Y	Motor stop mode	U	Reserved

■ Y: motor stop mode

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

Bit	Function	Description
Bit 5, Bit 4	Dynamic brake operation options	Options for stopping the motor when the servo is in the Servo Off state or an alarm (including EMGS) occurs Bit 5 = 0 and Bit 4 = 0: use dynamic brake Bit 5 = 0 and Bit 4 = 1: motor runs freely Bit 5 = 1 and Bit 4 = 0: use dynamic brake first, and then let the motor run freely once the speed is slower than the value of P1.038
Bit 6	Trigger stop command when RST power error (AL022) occurs[Note]	0: disable this function 1: when P1.043 is a negative value and RST power error (AL022) occurs, the servo drive commands the motor to decelerate to 0 in the Servo On state
Bit 7	Reserved	-

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

Note: this function is only available in Position and Speed (PT, PR, S, and Sz) modes and is effective only when P1.043 (Delay time for disabling the magnetic brake) is a negative value.

P1.033	Reserved

P1.034	S-curve acceleration constant		Address: 0144H 0145H
Default:	200	Control mode:	S / Sz
Unit:	ms	Setting range:	1 to 65500
Format:	DEC	Data size:	16-bit

Settings:

Sets the time for the Speed command to accelerate the motor from 0 to 3000 rpm. You can set P1.034, P1.035, and P1.036 individually. When an internal command is used, even if you set P1.036 to 0, the acceleration and deceleration follow a trapezoidal curve; when an analog command is used, you must set P1.036 larger than 0 so that the acceleration and deceleration follow a trapezoidal curve.

Note: when an analog Speed command is used, the setting range is limited to 1 - 20000.

P1.035	S-curve deceleration constant		Address: 0146H 0147H
Default:	200	Control mode:	S / Sz
Unit:	ms	Setting range:	1 - 65500
Format:	DEC	Data size:	16-bit

Settings:

Sets the time for the Speed command to decelerate the motor from 3000 rpm to 0. You can set P1.034, P1.035, and P1.036 individually. When an internal command is used, even if you set P1.036 to 0, the acceleration and deceleration follow a trapezoidal curve; when an analog command is used, you must set P1.036 larger than 0 so that the acceleration and deceleration follow a trapezoidal curve.

Note: when an analog Speed command is used, the setting range is limited to 1 - 20000.

P1.036	S-curve acceleration / deceleration smoothing constant		Address: 0148H 0149H
Default:	0	Control mode:	PR / S / Sz
Unit:	ms	Setting range:	0 to 65500
Format:	DEC	Data size:	16-bit

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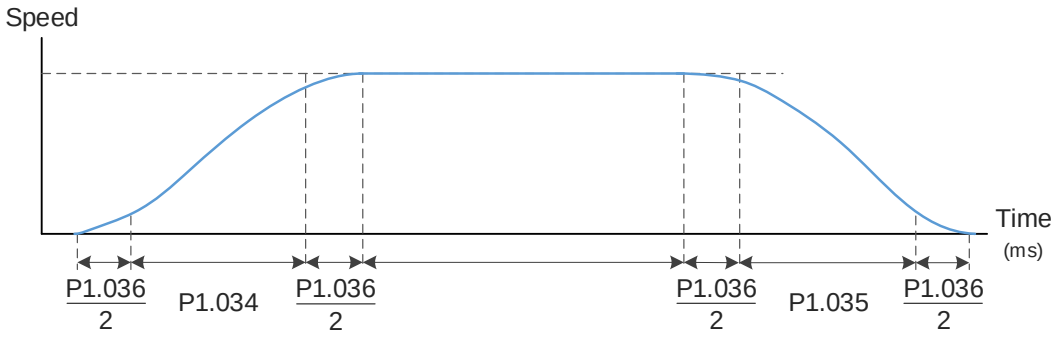
Settings:

0: disable this function



P1.034: sets the acceleration time for the trapezoidal curve.

P1.035: sets the deceleration time for the trapezoidal curve.

P1.036: sets the smoothing time for the S-curve acceleration and deceleration.

You can set P1.034, P1.035, and P1.036 individually. Even if you set P1.036 to 0, the acceleration and deceleration still follow a trapezoidal curve.

	P1.036 = 0	P1.036 = 1	P1.036 > 1
Smoothing function for S-curve	Disabled	Disabled	Enabled
Following error compensation function	Disabled	Enabled	Determined by P2.068.X

Note: when an analog Speed command is used, the setting range is limited to 1 - 10000.

P1.037	Load inertia ratio or total weight			Address: 014AH 014BH
Operation interface:	Panel / software	Communication	Control mode:	All
Default:	2.0 0.0 (-F)	20 0 (-F)	Data size:	16-bit
Unit:	1 times	0.1 times	-	-
Setting range:	0.0 to 200.0	0 to 2000	-	-
Format:	One decimal	DEC	-	-
Example:	1.5 = 1.5 times	15 = 1.5 times	-	-

Settings:

Load inertia ratio of servo motor (rotary 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			Address: 014CH 014DH
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 to 200.0	0 to 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 absolute value of the motor speed is lower than this value, the condition for triggering the zero-speed signal is met and DO.ZSPD is on.

P1.039	Target speed detection level		Address: 014EH 014FH
Default:	3000	Control mode:	All
Unit:	rpm	Setting range:	0 to 30000
Format:	DEC	Data size:	16-bit

Settings:

Sets the motor target speed. When the absolute value of the motor speed is higher than this value, the condition for triggering the target speed reached signal is met and DO.TSPD is on.

P1.040	Maximum motor speed for analog Speed command 1		Address: 0150H 0151H
Default:	Rated speed	Control mode:	S / T
Unit:	rpm	Setting range:	0 to 50000
Format:	DEC	Data size:	32-bit

Settings:

In Speed mode:

Sets the motor speed corresponding to 10V (maximum voltage) for the analog Speed command.

$$\text{Speed control command} = \frac{\text{Input voltage} \times \text{P1.040}}{10}$$

If the value is 2000 and the external voltage input is 5V, then the speed control command = $\frac{5\text{V} \times 2000 \text{ rpm}}{10}$ = 1000 rpm

In Torque mode:

Sets the motor speed limit corresponding to 10V (maximum voltage) for the analog speed limit.

$$\text{Speed limit command} = \frac{\text{Input voltage} \times \text{P1.040}}{10}$$

If the value is 2000 and the external voltage input is 5V, then the speed limit command = $\frac{5\text{V} \times 2000 \text{ rpm}}{10}$ = 1000 rpm.

P1.041▲	Maximum output for analog Torque command		Address: 0152H 0153H
Default:	100	Control mode:	All
Unit:	%	Setting range:	-1000 to +1000
Format:	DEC	Data size:	16-bit

8

Settings:

In Torque mode:

Sets the torque corresponding to 10V (maximum voltage) for the analog Torque command.

$$\text{Torque control command} = \frac{\text{Input voltage} \times \text{P1.041}}{10} \text{ (Unit: \%)}$$

In Speed, PT, and PR modes:

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

$$\text{Torque limit command} = \frac{\text{Input voltage} \times \text{P1.041}}{10} \text{ (Unit: \%)}$$

Example:

If P1.041 = 10,

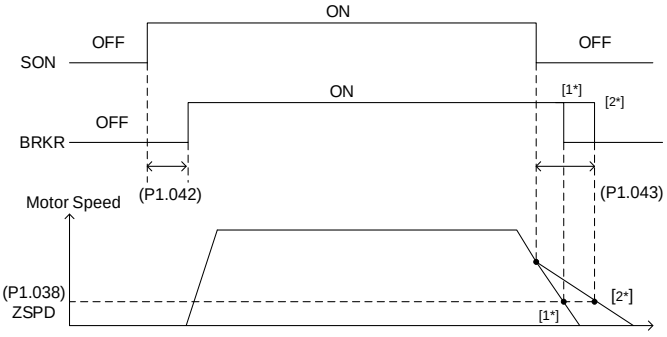
(a) when the external analog voltage input is 10V, the torque control (limit) command = $\frac{10V \times 10}{10}$ = 10%

(b) when the external analog voltage input is 5V, the torque control (limit) command = $\frac{5V \times 10}{10}$ = 5%

P1.042	Delay time for enabling the magnetic brake		Address: 0154H 0155H
Default:	0	Control mode:	All
Unit:	ms	Setting range:	0 to 1000
Format:	DEC	Data size:	16-bit

Settings:

Sets the delay time from Servo On status to the activation of the magnetic brake signal (DO: 0x08, BRKR).



Note:

1. If the delay time specified in P1.042 has not passed yet and the motor speed is slower than the value of P1.038, the magnetic brake signal (BRKR) is disabled.
2. If the delay time specified in P1.042 has passed and the motor speed is faster than the value of P1.038, the magnetic brake signal (BRKR) is disabled.

P1.043	Delay time for disabling the magnetic brake		Address: 0156H 0157H
Default:	0	Control mode:	All
Unit:	ms	Setting range:	-1000 to +1000
Format:	DEC	Data size:	16-bit

Settings:

Sets the delay time from Servo Off status to the deactivation of the magnetic brake signal (DO: 0x08, BRKR). Refer to P1.042 for the detailed diagram.

Note: if P1.043 is a negative value and the servo is off due to an alarm (except for AL022) or emergency stop, the setting of P1.043 is invalid. This is equivalent to setting the delay time to 0.

P1.044▲	E-Gear ratio - numerator N1		Address: 0158H 0159H
Default:	16777216	Control mode:	All
Unit:	pulse	Setting range:	1 to (2^{29}-1)
Format:	DEC	Data size:	32-bit

Settings:

For the E-Gear ratio setting, refer to Section 6.2.5. For multiple E-Gear ratio (numerator) settings, refer to P2.060 - P2.062.

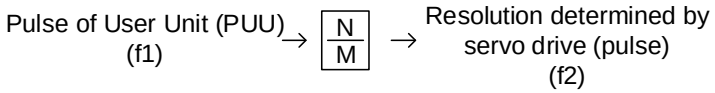
Note:
1. Do not change the setting in the Servo On state.
2. In DMCNET / CANopen / EtherCAT communication mode, if you cycle the power to the drive, the E-Gear ratio is set to the default value of the communication protocol. Resetting to the default value results in the re-establishment of the absolute position system, so you must re-do the homing procedure. If you do not want P1.044 to be reset to the default value, set P3.012.Z to 1. For details, refer to P3.012.
3. In PROFINET communication mode, you can only set P3.012.Z to 1.

P1.045▲	E-Gear ratio - denominator M		Address: 015AH 015BH
Default:	100000	Control mode:	All
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. Follow these instructions.

E-Gear ratio setting: $f2=f1\times\frac{N}{M}$



Range of E-gear ratio: 1 ≤ Nx / M ≤ 262144.

For the E-Gear ratio setting, refer to Section 6.2.5.

Note:
1. Do not change the setting in the Servo On state.
2. In DMCNET / CANopen / EtherCAT 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 re-establishment of the absolute position system, so you must re-do the homing procedure. If you do not want P1.045 to be reset to the default value, set P3.012.Z to 1. For details, refer to P3.012.
3. In PROFINET communication mode, you can only set P3.012.Z to 1.

P1.046▲	Encoder pulse number output (OA, OB)		Address: 015CH 015DH
Default:	2500	Control mode:	All
Unit:	pulse	Setting range:	1 to 536870912
Format:	DEC	Data size:	32-bit

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Settings:

The number of single-phase pulse outputs per revolution. The maximum output frequency of the hardware is 19.8 MHz.

Note:
In the following circumstances, pulse output of the encoder may exceed the maximum allowable output pulse frequency of the drive, causing AL018 or AL048:
1. Encoder error.
2. The motor speed is faster than the setting of P1.076.
3. If P1.074.Y = 0 and P1.097 = 0, motor speed (rpm)/60 x P1.046 x 4 > 19.8 x 10^6

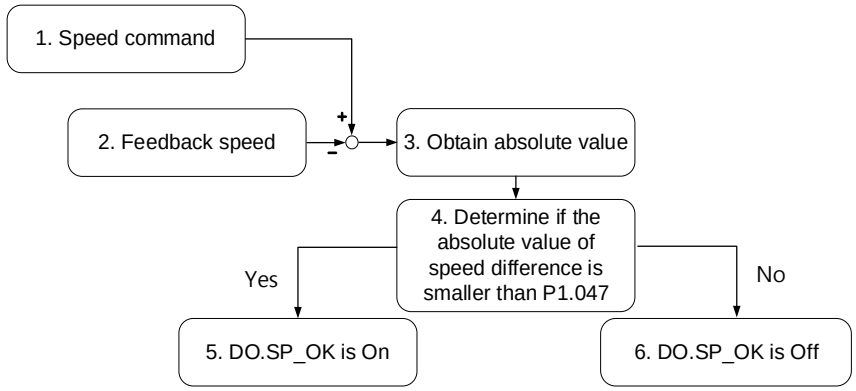
P1.047	Speed reached (DO.SP_OK) range		Address: 015EH 015FH
Default:	10	Control mode:	S / Sz
Unit:	rpm	Setting range:	0 to 300
Format:	DEC	Data size:	16-bit

Settings:

In Speed mode, when the absolute value of the difference between the Speed command and the motor feedback speed is less than this parameter and this status is kept for the time duration set in P1.049, the digital output DO.SP_OK (0x19) is on.

Note: when the difference between the Speed command and the motor feedback speed exceeds the range set in P1.047, the system recalculates the duration.

Diagram:



1. Speed command: the command that you input without acceleration or deceleration, rather than the command from the front end speed circuit. Its source is from the register.
2. Feedback speed: the actual speed of the motor which has been filtered.
3. Obtain the absolute value.
4. Determine whether the absolute value of the speed difference is smaller than the parameter value. If you set the parameter to 0, DO.SP_OK is always off. If the absolute value is smaller than the parameter, the digital output is on, otherwise it is off.

P1.048	Motion reached (DO.MC_OK) operation selection		Address: 0160H 0161H
Default:	0x0000	Control mode:	PR
Unit:	-	Setting range:	0x0000 to 0x0011
Format:	HEX	Data size:	16-bit

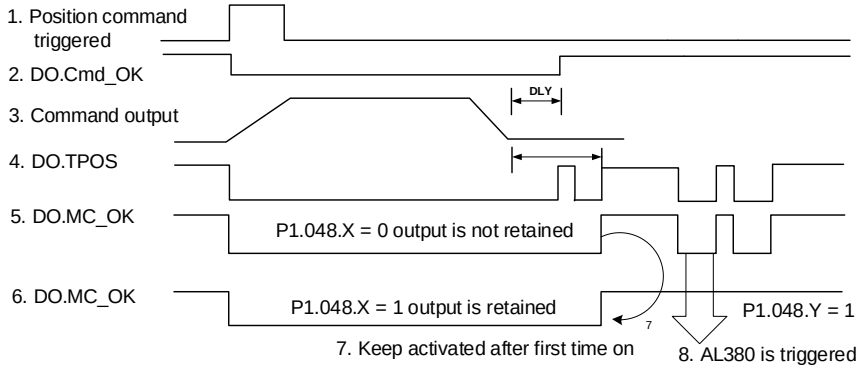
Settings:

Options for controlling the behavior of the digital output DO.MC_OK (0x17).

X	DO output retaining option	Z	Reserved
Y	Position deviation alarm (AL380) option	U	Reserved

- X: DO output retaining 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:

1. Command triggered: new PR command is effective. Command 3 starts and signals 2, 4, 5, and 6 are cleared simultaneously. Command triggering source: DI.CTRG, DI.EV1/EV2, and P5.007 (triggered through software).
2. DO.Cmd_OK: indicates whether command 3 is complete, and can be set with a delay time (DLY) with parameters.
3. Command output: output the profile of the Position command based on the setting for acceleration or deceleration.
4. DO.TPOS: position error of the servo drive is within the range set in P1.054.
5. DO.MC_OK: Position command output and servo positioning completed, which indicates that DO.Cmd_OK and DO.TPOS are both on.
6. DO.MC_OK (retains digital output status): same as 5, except that once this DO is on, its status is retained regardless of the signal 4 status.

7. Either signal 5 or signal 6 can be output, and this is determined by P1.048.X.
8. Position deviation: when event 7 occurs, if signal 4 or 5 is off, it means the position has deviated and AL380 can be triggered.
9. Set whether to enable AL380 with P1.048.Y.

P1.049	Accumulated time to reach desired speed		Address: 0162H 0163H
Default:	0	Control mode:	S / Sz
Unit:	ms	Setting range:	0 to 65535
Format:	DEC	Data size:	16-bit

Settings:

In Speed mode, when the absolute value of the difference between the Speed command and the motor feedback speed is less than the range set in P1.047 and this status is kept for the time duration set in P1.049, the digital output DO.SP_OK (0x19) is on. If the difference exceeds the range set in P1.047, no matter how long it lasts, the system recalculates the duration.

P1.050 - P1.051	Reserved

P1.052	Regenerative resistor value		Address: 0168H 0169H
Default:	Determined by the model. Refer to the following table.	Control mode:	All
Unit:	Ohm	Setting range:	Refer to the following table.
Format:	DEC	Data size:	16-bit

Settings:

Model		Default (Ω)	Setting range (Ω)
220V	750 W or below	100	60 to 750
	1 to 1.5 kW	100	30 to 750
	2 to 3 kW	20	15 to 750
400V	1 kW	100	80 to 750
	1.5 kW	100	60 to 750
	2 kW	50	45 to 750
	3 kW	50	40 to 750
	4.5 kW	35	35 to 750
	5.5 kW to 7.5 kW	35	25 to 750

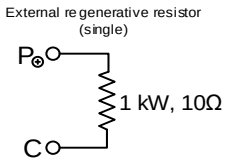
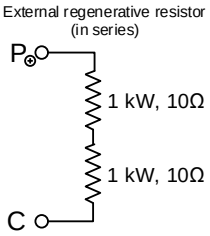
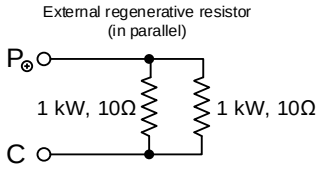
Refer to the description of P1.053 for the parameter values when connecting the regenerative resistor through different methods.

P1.053	Regenerative resistor capacity		Address: 016AH 016BH
Default:	Determined by the model. Refer to the following table.	Control mode:	All
Unit:	Watt	Setting range:	0 to 15000
Format:	DEC	Data size:	16-bit

Settings:

Model		Default (Watt)
220V	200 W or below	0
	400 W to 1.5 kW	40
	2 kW to 3 kW	80
400V	3 kW or below	80
	4.5 kW to 7.5 kW	100

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		Address: 016CH 016DH
Default:	167772	Control mode:	PT / PR
Unit:	pulse	Setting range:	0 to 16777216
Format:	DEC	Data size:	32-bit

Settings:

In Position (PT) mode, when the pulse number error is smaller than the range set by P1.054, DO.TPOS is on.

In Position Register (PR) mode, when the difference between the target position and the actual motor position is smaller than the range set by P1.054, DO.TPOS is on.

Example:

If P1.054 = 167772 and the error is less than 167772 pulses, which equals 0.01 turns (167772 / 16777216 = 0.01), then DO.TPOS is on.

P1.055	Maximum speed limit		Address: 016EH 016FH
Default:	Rated speed	Control mode:	All
Unit:	rpm	Setting range:	0 to maximum speed
Format:	DEC	Data size:	16-bit

Settings:

Sets the maximum speed of the servo motor.

P1.056	Motor output overload warning level		Address: 0170H 0171H
Default:	120	Control mode:	All
Unit:	%	Setting range:	0 to 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 of P1.056, the pre-warning signal for overload (DO: 0x10, OLW) is on. If the value is over 100, the pre-warning function is disabled.

P1.057	Motor hard stop 1 - torque percentage		Address: 0172H 0173H
Default:	0	Control mode:	All
Unit:	%	Setting range:	0 to 300
Format:	DEC	Data size:	16-bit

Settings:

Sets the protection level which is the percentage of rated torque. Set the value to 0 to disable the function and set the value to 1 or above to enable the function.

When there is no external force, the setting value = (motor current in percentage when the motor runs at constant speed in the forward direction + motor current in percentage when the motor runs at constant speed in the reverse direction) / 2 + protection torque value. When there is external force, set P1.060 additionally.

P1.058	Motor hard stop - protection time		Address: 0174H 0175H
Default:	1	Control mode:	All
Unit:	ms	Setting range:	1 to 1000
Format:	DEC	Data size:	16-bit

Settings:

Sets the protection time: when the motor torque reaches the protection level and the protection time is exceeded, AL030 occurs.

Note: this function is only suitable for non-contactable uses, such as electrical discharge machines (make sure P1.037 is correctly set).

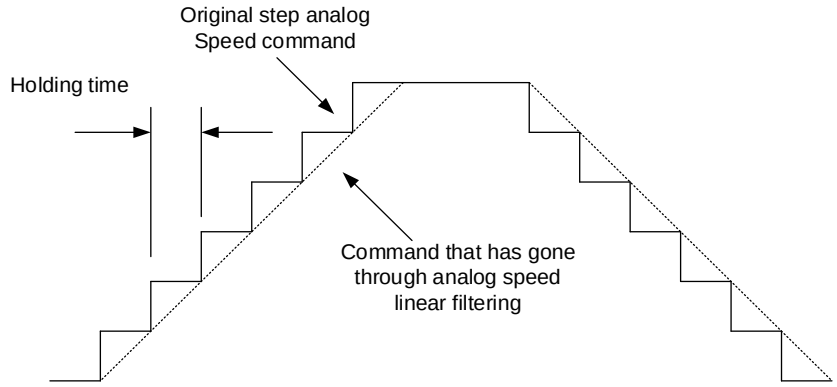
P1.059	Speed command - moving filter			Address: 0176H 0177H
Operation interface:	Panel / software	Communication	Control mode:	S
Default:	0.0	0	Data size:	16-bit
Unit:	1 ms	0.1 ms	-	-
Format:	One decimal	DEC	-	-
Setting range:	0.0 to 4.0	0 to 40	-	-
Example:	1.5 = 1.5 ms	15 = 1.5 ms	-	-

Settings:

0: disable this function.

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 beginning and end of the step command, while the low-pass filter can only smooth the command at the end.

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



P1.060	Motor hard stop 1 - level offset		Address: 0178H 0179H
Default:	0	Control mode:	All
Unit:	%	Setting range:	-300 to +300
Format:	DEC	Data size:	16-bit

Settings:

When using P1.057 (Motor hard stop 1 - torque percentage) and the average torque level deviates because of an external force, such as Z-axis gravity, you can use this parameter to set the corresponding compensation.

Suggested setting value = (Average torque at constant speed in positive direction + Average torque at constant speed in negative direction) / 2

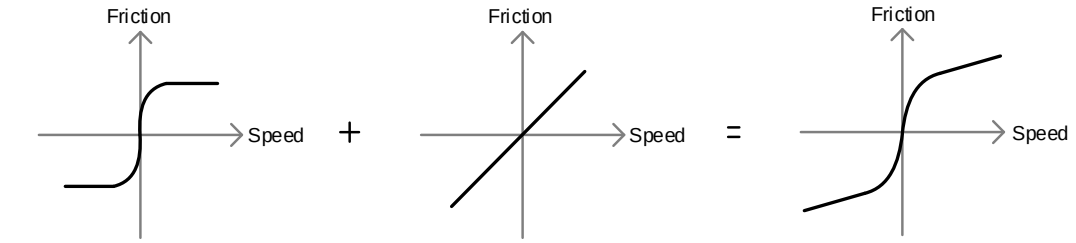
Note: refer to P0.002 = 54 (Torque feedback) for the average torque at constant speed.

P1.061	Viscous friction compensation		Address: 017AH 017BH
Default:	0	Control mode:	PT / PR / S / Sz
Unit:	0.1%/1000 rpm	Setting range:	0 to 1000
Format:	DEC	Data size:	16-bit

8

Settings:

Because kinetic friction corresponds with the speed, you can use this parameter to compensate the motor torque according to the speed to improve the position error during acceleration and deceleration. When P1.062 = 0, this parameter is invalid.



P1.062 Percentage of friction compensation
P1.063 Constant of friction compensation

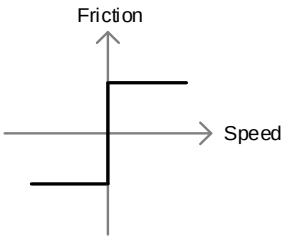
P1.061 Viscous friction compensation

P1.062 Percentage of friction compensation
P1.063 Constant of friction compensation
P1.061 Viscous friction compensation

P1.062	Percentage of friction compensation		Address: 017CH 017DH
Default:	0	Control mode:	PT / PR / S / Sz
Unit:	%	Setting range:	0 to 100
Format:	DEC	Data size:	16-bit

Settings:

Sets the level of friction compensation, which is the percentage of the rated torque. Set the value to 0 to disable the friction compensation function. Set the value to 1 or above to enable the function to reduce the position error at the moment the motion starts.



P1.062 Percentage of friction compensation

P1.063	Constant of friction compensation		Address: 017EH 017FH
Default:	100	Control mode:	PT / PR / S / Sz
Unit:	%	Setting range:	1 to 1000
Format:	DEC	Data size:	16-bit

Settings:

Sets the speed for the friction compensation value to reach the setting value of P1.062. Based on the default setting of 100%, the smaller the setting value of P1.063, the faster the setting value of P1.062 is reached; the bigger the setting value of P1.063, the slower the setting value of P1.062 is reached.

P1.064	Analog position command - activation control		Address: 0180H 0181H
Default:	0x0000	Control mode:	PT
Unit:	-	Setting range:	0x0000 to 0x0011
Format:	HEX	Data size:	16-bit

Settings:

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

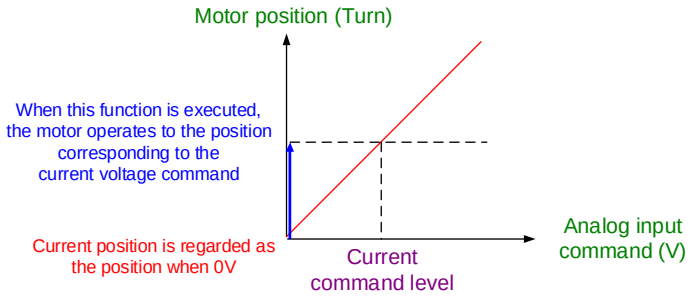
■ X: setting for position command issued by the analog signal

0: disable

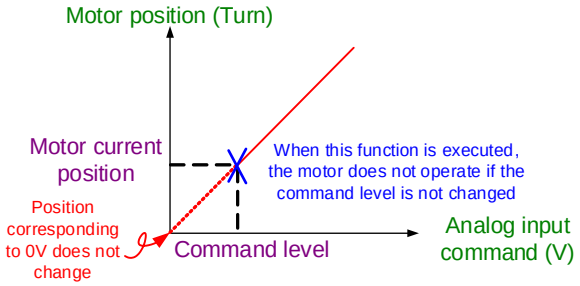
1: enable

■ 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	Analog Position command - smoothing constant		Address: 0182H 0183H
Default:	1	Control mode:	PT
Unit:	10 ms	Setting range:	1 to 1000
Format:	DEC	Data size:	16-bit

Settings:

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

P1.066	Analog Position command - maximum cycle number			Address: 0184H 0185H
Operation interface:	Panel / software	Communication	Control mode:	PT
Default:	0.0	0	Data size:	16-bit
Unit:	1 cycle	0.1 cycle	-	-
Format:	One decimal	DEC	-	-
Setting range:	0.0 to 200.0	0 to 2000	-	-
Example:	1.5 = 1.5 cycles	15 = 1.5 cycles	-	-

Settings:

Rotation number setting when the maximum voltage (10V) is input 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 cycles. If the input is +5V, then the Position command is +1.5 cycles. If the input is -10V, then the Position command is -3 cycles.

Position control command = Input voltage x P1.066 setting value / 10

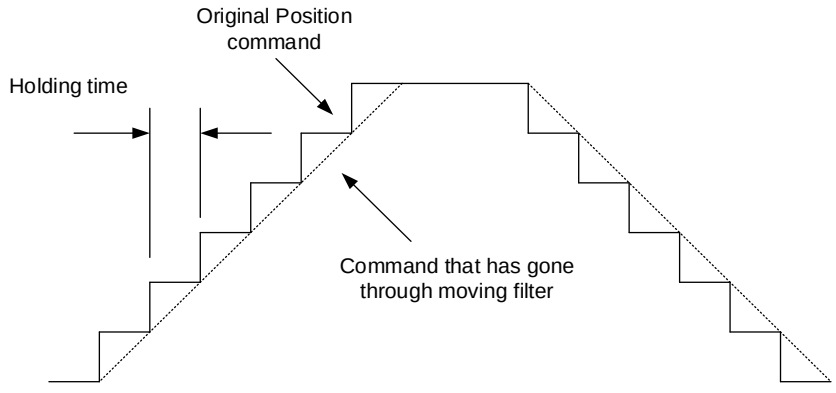
P1.067	Reserved

P1.068	Position command - moving filter		Address: 0188H 0189H
Default:	4	Control mode:	PT / PR
Unit:	ms	Setting range:	0 to 100
Format:	DEC	Data size:	16-bit

Settings:

0: disable this function.

The moving filter smooths the beginning and end of the step command, but it also delays the command.



P1.069 - P1.073	Reserved

P1.074	Output source of OA / OB / OZ		Address: 0194H 0195H
Default:	0x0000	Control mode:	PT
Unit:	-	Setting range:	0x0000 to 0x0030
Format:	HEX	Data size:	16-bit

Settings:

X	Reserved	Z	Reserved
Y	Selection of OA / OB / OZ output source	U	Reserved

■ Y: selection of OA / OB / OZ output source

0: CN2 encoder is the output source

1: reserved

2: CN1 pulse command is the output source

(If P1.097 = 0, the OA / OB output must be 1:1. If you need to change the output ratio, refer to the settings of P1.046 and P1.097.)

P1.075	Reserved

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

Settings:

Set a value which is slightly higher than the required maximum speed of motor.

P1.077	Reserved

P1.078	Gain switching delay time		Address: 019CH 019DH
Default:	0	Control mode:	P / S
Unit:	ms	Setting range:	0 to 32767
Format:	DEC	Data size:	16-bit

Settings:

When using the gain switching function (P2.027.X = 3 or 7), you can use this parameter to set the delay time after the switching condition is met. Refer to the description of P2.027 for more details.

P1.079	Rate of change for gain values during gain switching delay		Address: 019EH 019FH
Default:	100	Control mode:	P / S
Unit:	%	Setting range:	0 to 500
Format:	DEC	Data size:	16-bit

Settings:

Sets the rate of change for the gain values during gain switching delay. If P1.078 is 0, this function is disabled.

Within the delay time set by P1.078, the settings of P2.000 (Position control gain) and P2.004 (Speed control gain) will be affected by the setting of P1.079. Refer to the description of P2.027 for more details.

P1.080	Rate of change for speed detection filter and jitter suppression		Address: 01A0H 01A1H
Default:	100	Control mode:	P / S
Unit:	%	Setting range:	0 to 100
Format:	DEC	Data size:	16-bit

Settings:

Adjusts the rate of change for speed detection filter and jitter suppression (P2.049) according to the gain switching condition. (This parameter is inversely proportional to the value of P2.049. The smaller the setting value, the stronger the filtering effect.)

P1.081	Maximum motor speed for analog Speed command 2		Address: 01A2H 01A3H
Default:	Rated speed	Control mode:	S / T
Unit:	rpm	Setting range:	0 to 50000
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P1.040.

P1.082	Time constant for switching between P1.040 and P1.081		Address: 01A4H 01A5H
Default:	0	Control mode:	S / T
Unit:	ms	Setting range:	0 to 1000 (0: disable this function)
Format:	DEC	Data size:	16-bit

Settings:

0: disable this function.

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

Settings:

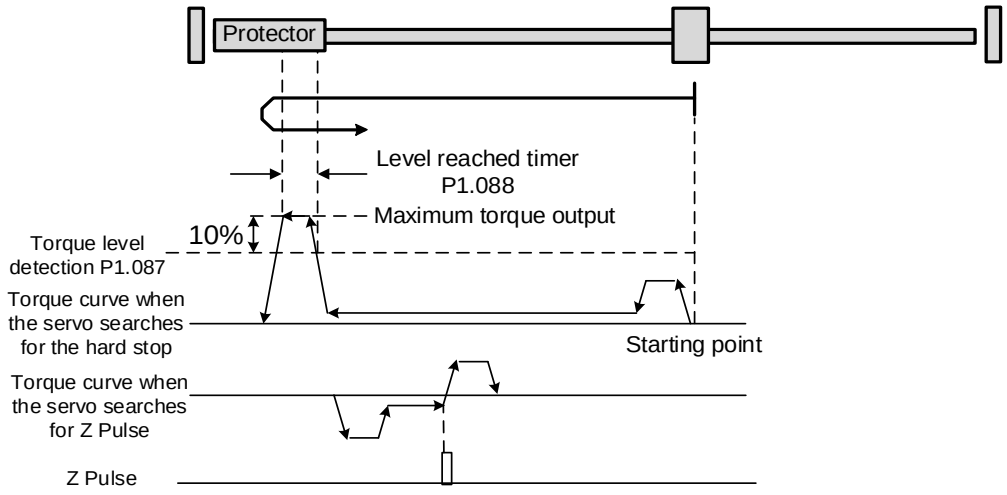
When the absolute value of the analog input voltage is higher than the set value of this parameter for more than 50 ms, AL042 occurs. The comparison value for this parameter is the original analog input voltage which has not been changed by an offset value through P4.022 (Analog speed input - offset compensation value).

P1.084 - P1.086	Reserved

P1.087	Torque homing - torque level detection		Address: 01AEH 01AFH
Default:	1	Control mode:	PR
Unit:	%	Setting range:	1 to 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 the mechanical part 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 that you have the servo reverse to find the Z pulse as the origin.



Note: the actual maximum torque output of the motor is 10% greater than the detected torque level (P1.087). For example, when you set P1.087 to 50%, the maximum torque output of the motor is 60%.

P1.088	Torque homing - level reached timer		Address: 01B0H 01B1H
Default:	2000	Control mode:	PR
Unit:	ms	Setting range:	2 to 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	Vibration elimination 1 - anti-resonance frequency		Address: 01B2H 01B3H
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.

The servo drive 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 Module** function in **System Analysis** of ASDA-Soft with the check box for **Low Frequency Analysis** selected.

Vibration elimination takes effect only when the two degree of freedom control function is enabled (P2.094 [Bit 12] = 1). After enabling the two degree of freedom control function, enable the first set of vibration elimination with P2.094 [Bit 8] and the second set with P2.094 [Bit 9].

Example:

1. Set P2.094 = 0x11□□ to enable the first set.
2. Set P2.094 = 0x12□□ to enable the second set.
3. Set P2.094 = 0x13□□ to enable the first and second sets simultaneously.

P1.090	Vibration elimination 1 - resonance frequency		Address: 01B4H 01B5H
Default:	4000	Control mode:	PT / PR
Unit:	0.1 Hz	Setting range:	10 to 4000
Format:	DEC	Data size:	16-bit

Settings:

Resonance frequency for the first set of low frequency vibration elimination.

P1.091	Vibration elimination 1 - resonance difference		Address: 01B6H 01B7H
Default:	10	Control mode:	PT / PR
Unit:	0.1 dB	Setting range:	10 to 4000
Format:	DEC	Data size:	16-bit

Settings:

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

P1.092	Vibration elimination 2 - anti-resonance frequency		Address: 01B8H 01B9H
Default:	4000	Control mode:	PT / PR
Unit:	0.1 Hz	Setting range:	10 to 4000
Format:	DEC	Data size:	16-bit

Settings:

Anti-resonance frequency for the second set of low frequency vibration elimination. The setting method is the same as the first set of vibration elimination (P1.089).

P1.093	Vibration elimination 2 - resonance frequency		Address: 01BAH 01BBH
Default:	4000	Control mode:	PT / PR
Unit:	0.1 Hz	Setting range:	10 to 4000
Format:	DEC	Data size:	16-bit

Settings:

Resonance frequency for the second set of low frequency vibration elimination.

P1.094	Vibration elimination 2 - resonance difference		Address: 01BCH 01BDH
Default:	10	Control mode:	PT / PR
Unit:	0.1 dB	Setting range:	10 to 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 output denominator (OA, OB)		Address: 01C2H 01C3H
Default:	0	Control mode:	All
Unit:	-	Setting range:	0 to 160000
Format:	DEC	Data size:	32-bit

8

Settings:

1. When P1.074.Y = 0 (output source is from the encoder connected to CN2):
   - When P1.097 = 0, OA / OB pulse output refers to the setting of P1.046. (Refer to Example 1.)
   - When P1.097 ≠ 0, OA / OB pulse output refers to the settings of P1.046 and P1.097. (Refer to Example 2.)
2. When P1.074.Y = 2 (output source is the pulse command from CN1):
   - When P1.097 = 0, OA / OB pulse output does not refer to the setting of P1.046, but outputs according to the ratio of 1:1 instead.
   - When P1.097 ≠ 0, OA / OB pulse output refers to the settings 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, indicating OA / OB outputs P1.046 * 4 = 10,000 pulses when the motor rotates 1 cycle.

Example 2 (the calculated value does not need to be multiplied by 4 times the frequency):

When P1.097 = 7 and P1.046 = 2500, indicating OA / OB outputs 2,500 pulses when the motor rotates 7 cycles.

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

Settings:

When the switch for motor power cable disconnection detection (ALC31) is enabled (P2.065 [Bit 9] = 1), set the detection response time with this parameter.

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 and 800 for the detection response time.

Note:
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		Address: 01CAH 01CBH
Default:	0	Control mode:	All
Unit:	mV	Setting range:	-10000 to +10000
Format:	DEC	Data size:	16-bit

Settings:

When you set P0.003 (Analog output monitoring) to 0x0006, then the analog monitor output voltage refers to the voltage value of P1.101.

Note: the valid setting range of P1.101 is -8V to +8V.

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

Settings:

When you set P0.003 (Analog output monitoring) to 0x0007, then the analog monitor output voltage refers to the voltage value of P1.102.

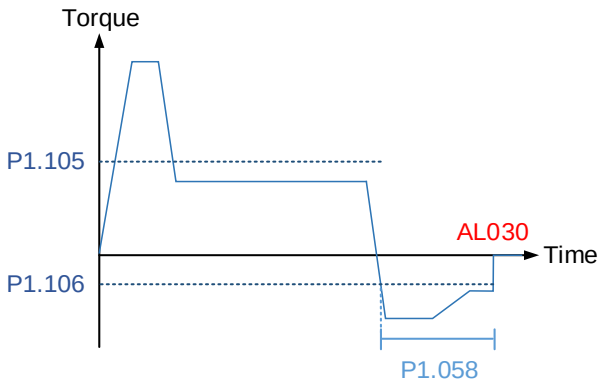
Note: the valid setting range of P1.102 is -8V to +8V.

P1.103 - P1.104	Reserved

P1.105	Motor hard stop 2 - torque upper limit		Address: 01D2H 01D3H
Default:	0	Control mode:	All
Unit:	%	Setting range:	-300 to +300
Format:	DEC	Data size:	16-bit

Settings:

When Motor hard stop 2 is enabled (P2.112 [Bit [8]]= 1), the settings of torque percentage (P1.057) and level offset (P1.060) for Motor hard stop 1 are invalid. During motor operation, if the motor torque is higher than this protection setting value and the duration of this condition exceeds the protection time (P1.058), AL030 will be triggered.



P1.106	Motor hard stop 2 - torque lower limit		Address: 01D4H 01D5H
Default:	0	Control mode:	All
Unit:	%	Setting range:	-300 to +300
Format:	DEC	Data size:	16-bit

Settings:

When Motor hard stop 2 is enabled (P2.112 [Bit [8]]= 1), the settings of torque percentage (P1.057) and level offset (P1.060) for Motor hard stop 1 are invalid. During motor operation, if the motor torque is lower than this protection setting value and the duration of this condition exceeds the protection time (P1.058), AL030 will be triggered.

P1.107 - P1.110	Reserved

P1.111	Overspeed protection level		Address: 01DEH 01DFH
Default:	Maximum motor speed x 1.1	Control mode:	All
Unit:	1 rpm	Setting range:	0 to 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 occurs.

P1.112	Single-direction torque limit		Address: 01E0H 01E1H
Default:	500	Control mode:	All
Unit:	%	Setting range:	-500 to +500
Format:	DEC	Data size:	16-bit

Settings:

Refer to the description of P4.044 for more details.

P2.xxx Extension parameters

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

Settings:

Increasing 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	Rate of change for position control gain		Address: 0202H 0203H
Default:	100	Control mode:	PT / PR
Unit:	%	Setting range:	10 to 500
Format:	DEC	Data size:	16-bit

Settings:

Adjust the rate of change for the position control gain (P2.000) according to the gain switching condition.

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

Settings:

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

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

Settings:

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

P2.004	Speed control gain		Address: 0208H 0209H
Default:	500	Control mode:	All
Unit:	rad/s	Setting range:	0 to 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	Rate of change for speed control gain		Address: 020AH 020BH
Default:	100	Control mode:	All
Unit:	%	Setting range:	10 to 500
Format:	DEC	Data size:	16-bit

Settings:

Adjust the rate of change for the speed control gain (P2.004) according to the gain switching condition.

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

Settings:

Increasing the value of the integral speed control can enhance the 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		Address: 020EH 020FH
Default:	0	Control mode:	All
Unit:	%	Setting range:	0 to 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 errors. If the speed control command does not change smoothly, decreasing the gain value can reduce the mechanical vibration.

P2.008■	Special parameter write-in function		Address: 0210H 0211H
Default:	0	Control mode:	All
Unit:	-	Setting range:	0 to 501
Format:	DEC	Data size:	16-bit

Settings:

Code	Function
10	Reset parameter groups P0 - P7 (cycle the power after reset).
20	P4.010 is writable.
22	P4.011 - P4.021 are writable.
30, 35	Save Capture data.
406	Enable forced DO mode.
400	When forced DO mode is enabled, switch back to the normal DO mode.

P2.009	DI response filter time		Address: 0212H 0213H
Default:	2	Control mode:	All
Unit:	ms	Setting range:	0 to 100
Format:	DEC	Data size:	16-bit

Settings:

When environmental interference is high, increasing this value can enhance the control stability. If you set the value too high, it affects the response time.

P2.010	DI1 functional planning		Address: 0214H 0215H
Default:	0x0101 (-L) 0x0100 (-F, -E, -M, -P)	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x015F (last two codes are DI codes)
Format:	HEX	Data size:	16-bit

Settings:

YX	Input function selection	Z	Input contact: A or B contact
-	-	U	Reserved

■ YX: input function selection

Refer to Table 8.1.

■ 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)

When these parameters are modified, re-start the servo drive to ensure it functions normally. Use P3.006 to change the source for the digital input signal, which can be either an external terminal block or the communication parameter P4.007.

P2.011	DI2 functional planning		Address: 0216H 0217H
Default:	0x0104 (-L) 0x0022 (-F, -E, -M, -P)	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x015F (last two codes are DI codes)
Format:	HEX	Data size:	16-bit

Settings:

Refer to the description of P2.010.

P2.012	DI3 functional planning		Address: 0218H 0219H
Default:	0x0116 (-L) 0x0023 (-F, -E, -M, -P)	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x015F (last two codes are DI codes)
Format:	HEX	Data size:	16-bit

Settings:

Refer to the description of P2.010.

P2.013	DI4 functional planning		Address: 021AH 021BH
Default:	0x0117 (-L) 0x0021 (-F, -E, -M, -P)	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x015F (last two codes are DI codes)
Format:	HEX	Data size:	16-bit

Settings:

Refer to the description of P2.010.

P2.014	DI5 functional planning		Address: 021CH 021DH
Default:	0x0102 (-L) 0x0100 (-F, -E, -M, -P)	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x015F (last two codes are DI codes)
Format:	HEX	Data size:	16-bit

Settings:

Refer to the description of P2.010. There is no physical pin for DI5 on -F, -E, and -M models. DI5 is a virtual digital input which you can use when the number of physical DI points is insufficient and trigger through communication. You can set the DI to be used as soon as the servo power is on (e.g. DI.SON) to be a virtual DI and normally closed.

P2.015	DI6 functional planning		Address: 021EH 021FH
Default:	0x0022 (-L) 0x0100 (-F, -E, -M, -P)	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x015F (last two codes are DI codes)
Format:	HEX	Data size:	16-bit

Settings:

Refer to the description of P2.010. There is no physical pin for DI6 on -F, -E, and -M models. DI6 is a virtual digital input which you can use when the number of physical DI points is insufficient and trigger through communication. You can set the DI to be used as soon as the servo power is on (e.g. DI.SON) to be a virtual DI and normally closed.

P2.016	DI7 functional planning		Address: 0220H 0221H
Default:	0x0023 (-L) 0x0100 (-F, -E, -M, -P)	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x015F (last two codes are DI codes)
Format:	HEX	Data size:	16-bit

Settings:

Refer to the description of P2.010. There is no physical pin for DI7 on -F, -E, -M, and -P models. DI7 is a virtual digital input which you can use when the number of physical DI points is insufficient and trigger through communication. You can set the DI to be used as soon as the servo power is on (e.g. DI.SON) to be a virtual DI and normally closed.

P2.017	DI8 functional planning		Address: 0222H 0223H
Default:	0x0021 (-L) 0x0100 (-F, -E, -M, -P)	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x015F (last two codes are DI codes)
Format:	HEX	Data size:	16-bit

Settings:

Refer to the description of P2.010. There is no physical pin for DI8 on -F, -E, -M, and -P models. DI8 is a virtual digital input which you can use when the number of physical DI points is insufficient and trigger through communication. You can set the DI to be used as soon as the servo power is on (e.g. DI.SON) to be a virtual DI and normally closed.

8

P2.018	DO1 functional planning		Address: 0224H 0225H
Default:	0x0101	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x014F (last two codes are DO codes)
Format:	HEX	Data size:	16-bit

Settings:

U Z YX

YX	Output function selection	Z	Output contact: A or B contact
-	-	U	Reserved

■ YX: output function selection

Refer to Table 8.2.

■ 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).

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

P2.019	DO2 functional planning		Address: 0226H 0227H
Default:	0x0103 (-L) 0x0100 (-F, -E, -M, -P)	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x014F (last two codes are DO codes)
Format:	HEX	Data size:	16-bit

Settings:

Refer to the description of P2.018.

P2.020	DO3 functional planning		Address: 0228H 0229H
Default:	0x0109 (-L) 0x0100 (-F, -E, -M, -P)	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x014F (last two codes are DO codes)
Format:	HEX	Data size:	16-bit

Settings:

Refer to the description of P2.018.

P2.021	DO4 functional planning		Address: 022AH 022BH
Default:	0x0105 (-L) 0x0100 (-F, -E, -M, -P)	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x014F (last two codes are DO codes)
Format:	HEX	Data size:	16-bit

Settings:

Refer to the description of P2.018.

P2.022	DO5 functional planning		Address: 022CH 022DH
Default:	0x0007 (-L) 0x0100 (-F, -E, -M, -P)	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x014F (last two codes are DO codes)
Format:	HEX	Data size:	16-bit

Settings:

Refer to the description of P2.018.

P2.023	Notch filter 1 - frequency		Address: 022EH 022FH
Default:	1000	Control mode:	All
Unit:	Hz	Setting range:	50 to 5000
Format:	DEC	Data size:	16-bit

Settings:

The resonance frequency of the first Notch filter. This function is disabled if P2.024 is 0. P2.023, P2.024, and P2.095 are the first set of Notch filter parameters.

P2.024	Notch filter 1 - attenuation level		Address: 0230H 0231H
Default:	0	Control mode:	All
Unit:	-dB	Setting range:	0 to 40
Format:	DEC	Data size:	16-bit

Settings:

The attenuation level of the first Notch filter. For example, a value of 5 indicates -5 dB. Set this parameter to 0 to disable the first Notch filter.

P2.025	Resonance suppression low-pass filter			Address: 0232H 0233H
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 to 100.0	0 to 1000	-	-
Format:	One decimal	DEC	-	-
Example:	1.5 = 1.5 ms	15 = 1.5 ms	-	-

Settings:

Sets 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		Address: 0234H 0235H
Default:	0	Control mode:	All
Unit:	rad/s	Setting range:	0 to 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 the same value of P2.006 is recommended. See the following for setting P2.026:

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

Note: the setting of this gain parameter is invalid when the two degree of freedom control function is on (P2.094 [Bit 12] = 1).

P2.027	Gain switching condition and method selection		Address: 0236H 0237H
Default:	0x0000	Control mode:	Shown as follows
Unit:	-	Setting range:	0x0000 to 0x0018
Format:	HEX	Data size:	16-bit

Settings:

X	Gain switching condition	Z	Reserved
Y	Gain switching method	U	Reserved

■ X: gain switching condition

X	Condition	Control mode	P1.078 (Gain switching delay time)
0	Disable gain switching function.	-	-
1	Signal of gain switching (DI.GAINUP: 0x03) 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	Supported
4	Speed of servo motor is faster than P2.029.	All	-
5	Signal of gain switching (DI.GAINUP: 0x03) 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	Supported
8	Speed of servo motor is slower than P2.029.	All	-

■ Y: gain switching method

0: gain rate switching

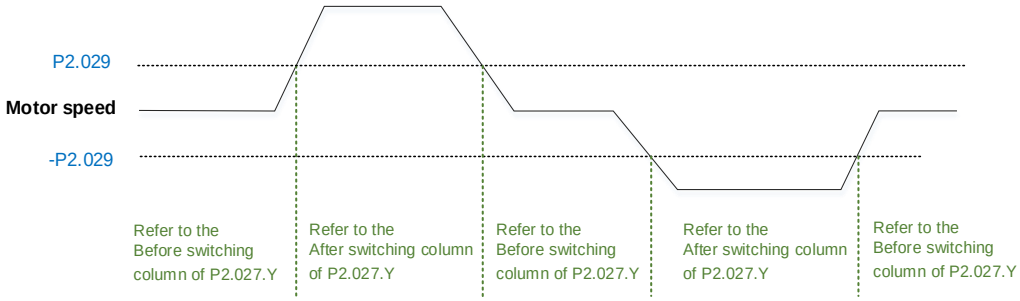
1: integrator switching (switch from P controller to PI controller)

Setting value	Control mode P	Control mode S	Gain switching
0	P2.000 x 100%	-	Before switching
	P2.004 x 100%	P2.004 x 100%	
	P2.006 x 100%	P2.006 x 100%	
	P2.025 x 100%	P2.025 x 100%	
	P2.026 x 100%	P2.026 x 100%	
	P2.049 x 100%	P2.049 x 100%	
	P2.000 x P2.001	-	After switching
	P2.004 x P2.005	P2.004 x P2.005	
	P2.006 x 100%	P2.006 x 100%	
	P2.025 x P2.107	P2.025 x P2.107	
	P2.026 x 100%	P2.026 x 100%	
	P2.049 x P1.080	P2.049 x P1.080	
1	P2.000 x 100%	-	Before switching
	P2.004 x 100%	P2.004 x 100%	
	P2.006 x 0%	P2.006 x 0%	
	P2.025 x 100%	P2.025 x 100%	
	P2.026 x 0%	P2.026 x 0%	
	P2.049 x100%	P2.049 x100%	
	P2.000 x P2.001	-	After switching
	P2.004 x 100%	P2.004 x 100%	
	P2.006 x 100%	P2.006 x 100%	
	P2.025 x P2.107	P2.025 x P2.107	
	P2.026 x 100%	P2.026 x 100%	
	P2.049 x P1.080	P2.049 x P1.080	

Note: the parameters marked with different colors in the preceding table are the differences between Y = 0 and Y = 1.

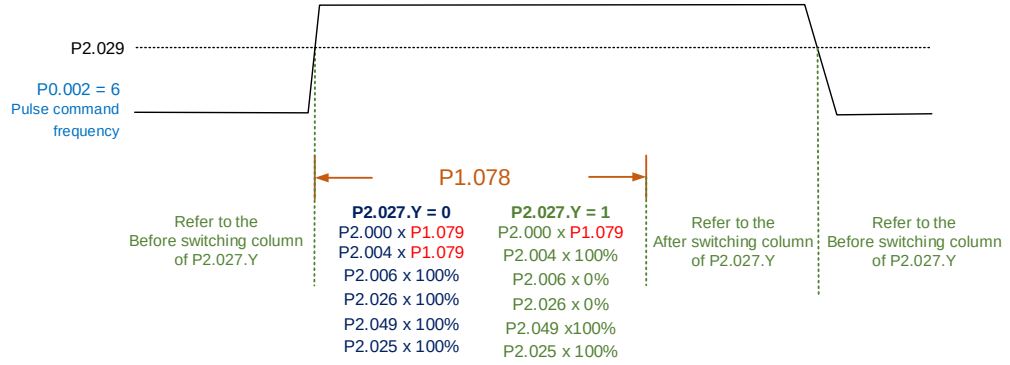
When P2.027.X is set to 0, 1, 2, 4, 5, 6, or 8, P1.078 (Gain switching delay time) is not supported. P2.027.X = 4 is taken as the example in the following figure.

P2.027.X = 4

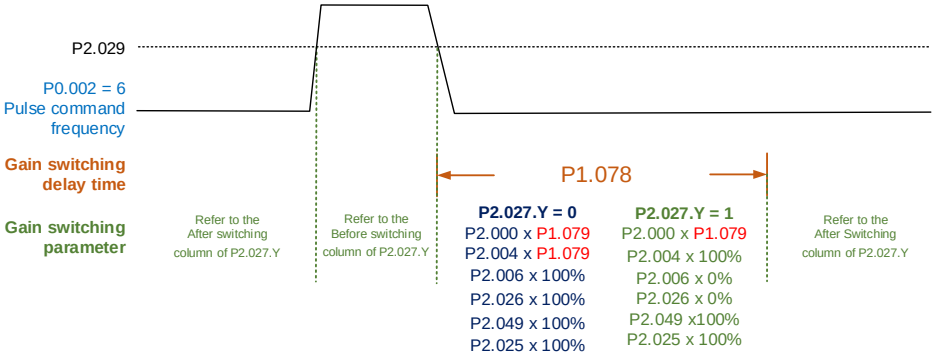


When P2.027.X is set to 3 or 7 and P1.078 (Gain switching delay time) is set, the gain parameter during the delay time is adjusted as follows.

P2.027.X = 3



P2.027.X = 7



P2.028	Gain switching time constant		Address: 0238H 0239H
Default:	10	Control mode:	Refer to P2.027.X: gain switching condition
Unit:	ms	Setting range:	0 to 1000
Format:	DEC	Data size:	16-bit

Settings:

Smoothes the speed of gain switching (P2.027). Set this parameter to 0 to disable this function.

P2.029	Gain switching condition		Address: 023AH 023BH
Default:	16777216	Control mode:	Refer to P2.027.X: gain switching condition
Unit:	pulse; Kpps; rpm	Setting range:	0 to 50331648
Format:	DEC	Data size:	32-bit

Settings:

The unit of this setting value is determined by the selection of gain switching condition (P2.027.X).

P2.030■	Auxiliary function		Address: 023CH 023DH
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 as follows.
1	Switch servo to Servo On state.
2 to 4	Reserved.
5	This setting makes all parameter settings volatile. When there is no need to permanently save the data continually written through the panel or communication, this setting can avoid shortening the lifetime of the EEPROM from continuous writing. You must use this function when using communication control.
6	This setting enables command simulation mode. In this mode, use the **Digital IO** function in ASDA-Soft to switch the servo to the Servo On state as both the external Servo On signal and the force Servo On of the PR mode in ASDA-Soft cannot work, the DSP Error (variable 0x6F) is read as 0, and P0.001 only shows the external error code (positive / negative limit, emergency stop). When DO.SRDY is on, commands are accepted in each mode. You can use the **Scope** function in ASDA-Soft to observe these commands to examine their accuracy, but the motor does not operate.
7	Reserved.
8	Back up all current parameter values to EEPROM, so that the values are retained after power cycling. The panel displays ‘to.rom’ during execution. This feature can also be executed when servo is in the Servo On state.
-1, -5, -6	Disable the functions of 1, 5, and 6.
-2 to -4, -7, -8	Reserved.

Note: set this parameter to 0 during normal operation. The value returns to 0 automatically after power cycling of the servo drive.

P2.031	Bandwidth response level		Address: 023EH 023FH
Default:	19	Control mode:	All
Unit:	-	Setting range:	1 to 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		Address: 0240H 0241H
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x0006
Format:	HEX	Data size:	16-bit

8

Settings:

The servo drive provides the following gain adjustment modes for fine tuning. You can then easily complete tuning by increasing or decreasing the bandwidth response level (P2.031).

Recommendations for tuning the machine 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 when the two degree of freedom 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		
5	Gain adjustment mode 5 (same as setting P2-32 to 1 for B2 series)	Real-time estimation, the value is updated to P1.037 every 30 minutes	P2.126	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, P2.094, P2.098, P2.099, P2.101, P2.102
6	Gain adjustment mode 6 (same as setting P2-32 to 2 for B2 series)	Fixed set value of P1.037	P1.037 P2.126	P2.000, P2.004, P2.006, P2.023, P2.024, P2.025, P2.043, P2.044, P2.045, P2.046, P2.049, P2.089, P2.094, P2.098, P2.099, P2.101, P2.102

Note: when the two degree of freedom control function is disabled (P2.094 [Bit 12] = 0), the effect of gain adjustment mode 3 is equivalent to that of gain adjustment mode 2, so setting P2.089 is invalid in that scenario.

P2.033	Reserved

P2.034	Excessive deviation warning condition of Speed command		Address: 0244H 0245H
Default:	5000	Control mode:	S / Sz
Unit:	rpm	Setting range:	1 to 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.

Note: when P2.094 [Bit 6] = 1, this parameter is available in both Position mode (PT, PR) and Speed mode (S, Sz).

P2.035	Excessive deviation warning condition of Position command		Address: 0246H 0247H
Default:	50331648	Control mode:	PT / PR
Unit:	pulse	Setting range:	1 to 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		Address: 0248H 0249H
Default:	0x0100	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x015F (last two codes are DI codes)
Format:	HEX	Data size:	16-bit

Settings:

Refer to the description of P2.010. If there is no physical pin for DI9 on the model, use DI9 as a virtual digital input when the number of physical DI points is insufficient or a trigger through communication. You can set the DI to be used as soon as the servo power is on (e.g. Servo On) to be a virtual DI and normally closed.

P2.037	DI10 functional planning		Address: 024AH 024BH
Default:	0x0100	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x015F (last two codes are DI codes)
Format:	HEX	Data size:	16-bit

Settings:

Refer to the description of P2.010. If there is no physical pin for DI10 on the model, use DI10 as a virtual digital input when the number of physical DI points is insufficient or a trigger through communication. You can set the DI to be used as soon as the servo power is on (e.g. Servo On) to be a virtual DI and normally closed.

P2.038	DI11 functional planning		Address: 024CH 024DH
Default:	0x0100	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x015F (last two codes are DI codes)
Format:	HEX	Data size:	16-bit

Settings:

Refer to the description of P2.010. If there is no physical pin for DI11 on the model, use DI11 as a virtual digital input when the number of physical DI points is insufficient or a trigger through communication. You can set the DI to be used as soon as the servo power is on (e.g. Servo On) to be a virtual DI and normally closed.

P2.039	DI12 functional planning		Address: 024EH 024FH
Default:	0x0100	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x015F (last two codes are DI codes)
Format:	HEX	Data size:	16-bit

Settings:

Refer to the description of P2.010. If there is no physical pin for DI12 on the model, use DI12 as a virtual digital input when the number of physical DI points is insufficient or a trigger through communication. You can set the DI to be used as soon as the servo power is on (e.g. Servo On) to be a virtual DI and normally closed.

P2.040	DI13 functional planning		Address: 0250H 0251H
Default:	0x0100	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x015F (last two codes are DI codes)
Format:	HEX	Data size:	16-bit

Settings:

Refer to the description of P2.010. If there is no physical pin for DI13 on the model, use DI13 as a virtual digital input when the number of physical DI points is insufficient or a trigger through communication. You can set the DI to be used as soon as the servo power is on (e.g. Servo On) to be a virtual DI and normally closed.

P2.041	DO6 functional planning		Address: 0252H 0253H
Default:	0x0100	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x014F (last two codes are DO codes)
Format:	HEX	Data size:	16-bit

Settings:

Refer to the description of P2.018.

P2.042	Reserved

P2.043	Notch filter 2 - frequency		Address: 0256H 0257H
Default:	1000	Control mode:	All
Unit:	Hz	Setting range:	50 to 5000
Format:	DEC	Data size:	16-bit

Settings:

The resonance frequency of the second Notch filter. This function is disabled if P2.044 is 0.

P2.043, P2.044, and P2.096 are the second set of Notch filter parameters.

P2.044	Notch filter 2 - attenuation level		Address: 0258H 0259H
Default:	0	Control mode:	All
Unit:	-dB	Setting range:	0 to 40
Format:	DEC	Data size:	16-bit

Settings:

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

P2.045	Notch filter 3 - frequency		Address: 025AH 025BH
Default:	1000	Control mode:	All
Unit:	Hz	Setting range:	50 to 5000
Format:	DEC	Data size:	16-bit

Settings:

The resonance frequency of the third Notch filter. This function is disabled if P2.046 is 0.

P2.045, P2.046, and P2.097 are the third set of Notch filter parameters.

P2.046	Notch filter 3 - attenuation level		Address: 025CH 025DH
Default:	0	Control mode:	All
Unit:	-dB	Setting range:	0 to 40
Format:	DEC	Data size:	16-bit

Settings:

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

P2.047	Auto resonance suppression mode		Address: 025EH 025FH
Default:	0x0001	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x01F2
Format:	HEX	Data size:	16-bit

8

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*2, the servo stores the resonance suppression points to EEPROM (non-volatile memory for parameters) and disables the auto resonance suppression function (X = 0). Before the servo is stable,

(1) 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.

(2) If you switch the setting of X from 1 to 0, the known resonance suppression points will be stored to EEPROM.

(3) 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*2, the servo stores the known resonance suppression points to EEPROM (non-volatile memory for parameters). In this mode, the searching cycle continues until the 5 sets of resonance suppression parameters are set, and then the auto resonance suppression function is disabled (X = 0). Before the servo is stable,

(1) 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 have been stored to EEPROM will not be affected.

(2) If you switch the setting of X from 2 to 0, the known resonance suppression points will be stored to EEPROM.

(3) 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 when the following conditions are met: 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

In auto resonance suppression mode, you can set the resonance suppression parameters manually by setting P2.047.Y.

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

In auto resonance suppression mode, you can set the resonance suppression parameters manually by setting P2.047.Z.

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
1 to 3	Reserved	-

Example: if P2.047 = 0x0021, the auto resonance suppression function is enabled, and the servo searches for the point of resonance and suppresses it. When you set P2.047.Y [Bit 1] to 1, you manually set the second set of resonance suppression parameters. Then, if the servo finds 2 resonance points, it writes the data of the 1st point to the 1st set of resonance suppression parameters and the data of the 2nd point to the 3rd set of resonance suppression parameters. That is, it skips the 2nd set of parameters.

P2.048	**Auto resonance detection level**		**Address: 0260H 0261H**
Default:	100	Control mode:	All
Unit:	-	Setting range:	0 to 1000
Format:	DEC	Data size:	16-bit

Settings:

If P2.048 is larger, the resonance sensitivity is lower; on the other hand, if P2.048 is smaller, the resonance sensitivity is higher.

P2.049	Speed detection filter and jitter suppression			Address: 0262H 0263H
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 to 100.0	0 to 1000	-	-
Format:	One decimal	DEC	-	-
Example:	1.5 = 1.5 ms	15 = 1.5 ms	-	-

Settings:

Sets the filter for speed detection. 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, and thus makes the system unstable.

P2.050	Position error clear setting		Address: 0264H 0265H
Default:	0x0000	Control mode:	PT, PR
Unit:	-	Setting range:	0x0000 to 0x0001
Format:	HEX	Data size:	16-bit

Settings:

Refer to Table 8.1 for digital input descriptions. Set the digital input as CCLR (DI: 0x04) to enable this function. When DI.CCLR is on, the position error in the servo drive is reset to 0.

When P2.050 = 0, DI.CCLR is rising-edge triggered.

When P2.050 = 1, DI.CCLR is level triggered.

P2.051	Reserved

P2.052▲	Rotary axis position scale		Address: 0268H 0269H
Default:	1073741824	Control mode:	All
Unit:	PUU	Setting range:	32 to 1073741824
Format:	DEC	Data size:	32-bit

Settings:

Sets the scale of the rotary axis position, rotary axis command position, and rotary axis feedback position. If the value is too small, it may cause errors in the rotary axis position system.

The input range of P2.052 is:

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

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

Settings:

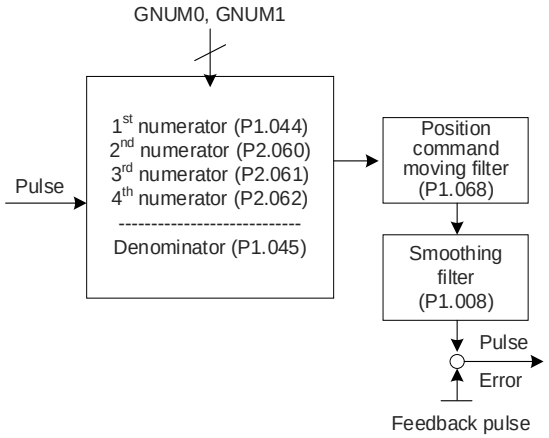
Increase the position control integral compensation to reduce the position steady-state errors. If the value is too high, it may cause position overshoot and noise.

P2.054 - P2.059	Reserved

P2.060	E-Gear ratio - numerator N2		Address: 0278H 0279H
Default:	16777216	Control mode:	All
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 (refer to Table 8.1). If both DI.GNUM0 and DI.GNUM1 are not defined, P1.044 is the default numerator of the E-Gear ratio. Switch the numerator only when the servo is stopped in order to avoid mechanical vibration.



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

Settings:

Refer to the description of P2.060.

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

8

Settings:

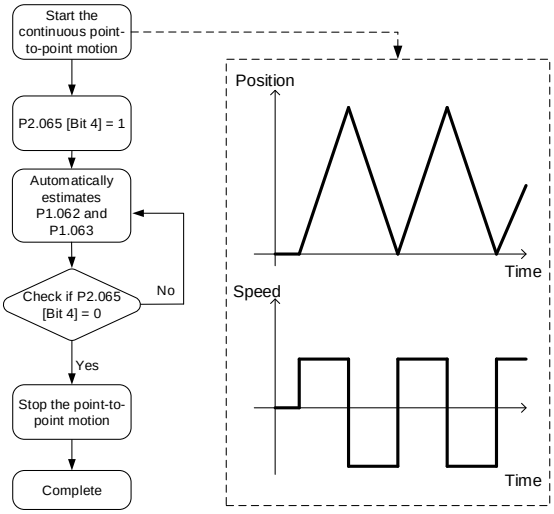
Refer to the description of P2.060.

P2.063 - P2.064	Reserved

P2.065	Special bit register 1		Address: 0282H 0283H
Default:	0x0300	Control mode:	PT / PR / S / Sz
Unit:	-	Setting range:	0x0000 to 0xFFFF
Format:	HEX	Data size:	-

Settings:

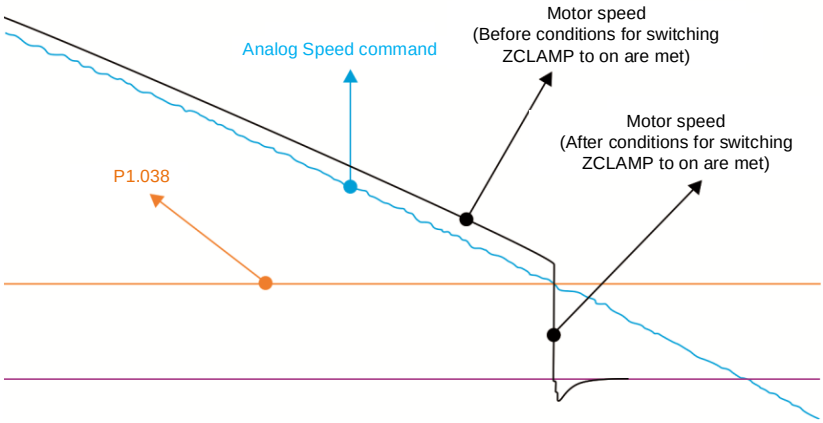
Bit	7	6	5	4	3	2	1	0
Bit	15	14	13	12	11	10	9	8

Bit	Function	Description
Bit 0 - Bit 3	Reserved	-
Bit 4	Automatic friction estimation	After enabling this function, you must conduct the continuous point-to-point motion to automatically write the estimated values to P1.062 and P1.063. 0: disable the function. 1: enable the function. 
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	Pulse error (pulse frequency is too high) protection function in PT mode	0: enable the function. 1: disable the function.
Bit 7	Reserved	-
Bit 8	Switch for motor power cable wiring error detection (AL031)	0: disable the detection. 1: enable the detection.

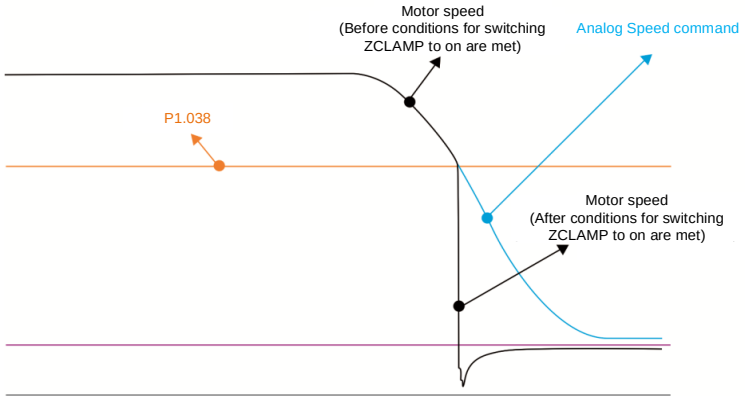
Bit	Function	Description
Bit 9	Switch for motor power cable disconnection detection (ALC31)	0: disable the detection. 1: enable the detection.
Bit 10	ZCLAMP function selection	The ZCLAMP function is enabled when all the following conditions are met. Condition 1: Speed mode Condition 2: DI.ZCLAMP is on Condition 3: motor speed is slower than the value of P1.038

Bit 10 description

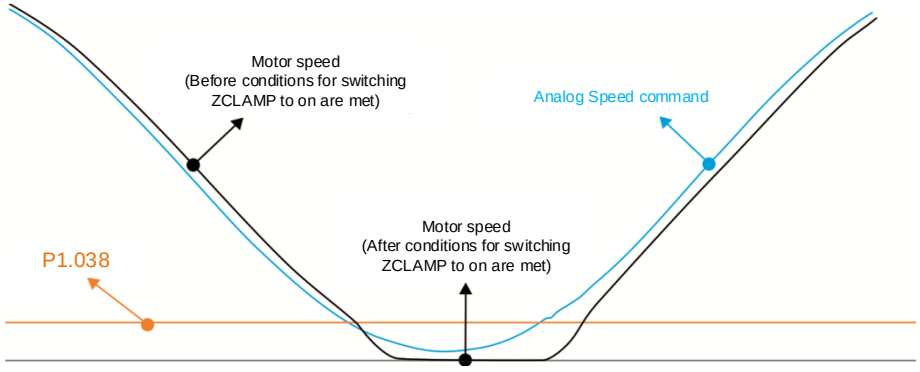
Bit 10 = 0 and command source is the analog voltage. The ZCLAMP function uses the analog Speed command without acceleration or deceleration to determine if this function should be enabled. The motor is clamped at the position where ZCLAMP conditions are met.



Bit 10 = 0 and command source is the internal register. The ZCLAMP function uses the register Speed command with acceleration or deceleration to determine if this function should be enabled. The motor is clamped at the position where ZCLAMP conditions are met.

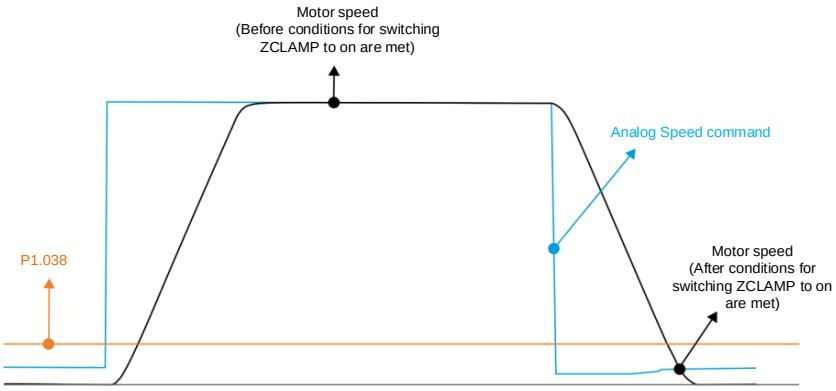


Bit 10 = 1 and command source is the analog voltage. The ZCLAMP function uses the analog Speed command without acceleration or deceleration to determine if this function should be enabled. When ZCLAMP conditions are met, the motor speed decelerates to 0 rpm by S-curve deceleration. If ZCLAMP conditions are not met, the motor follows the analog Speed command through the S-curve.

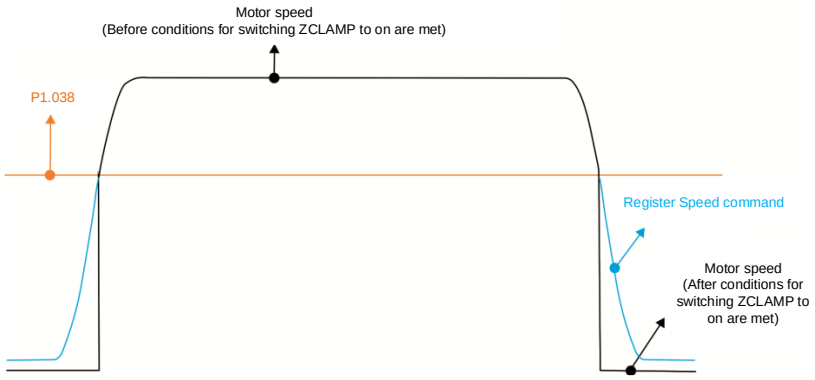


8

Bit 10 description



Bit 10 = 1 and command source is the internal register. The ZCLAMP function uses the register Speed command with acceleration or deceleration to determine if this function should be enabled. When ZCLAMP conditions are met, the motor speed is set to 0 rpm.



Bit	Function	Description
Bit 11	Pulse inhibit function in PT mode	0: disable PL / NL pulse inhibit function. In PT mode, the servo drive receives pulse position commands for both positive- and negative-direction operations whether the motor reaches the PL or NL. 1: enable PL / NL pulse inhibit function. In PT mode, if the motor reaches the PL, the servo drive receives pulse position commands for negative-direction operation and stops receiving pulse position commands for positive-direction operation. In PT mode, if the motor reaches the NL, the servo drive receives pulse position commands for positive-direction operation and stops receiving pulse position commands for negative-direction operation.
Bit 12	RST power error (AL022) detection function	0: enable the RST power error (AL022) detection function. 1: disable the RST power error (AL022) detection function.
Bit 13	OA and OB output error (AL018 / AL048) detection	0: enable OA and OB output error (AL018 / AL048) detection. 1: disable OA and OB output error (AL018 / AL048) detection.
Bit 14 ~ Bit 15	Reserved	-

P2.066	Special bit register 2		Address: 0284H 0285H
Default:	0x0020	Control mode:	PT / PR / S / Sz
Unit:	-	Setting range:	0x0000 to 0x187F
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 0 - Bit 1	Reserved	-
Bit 2	Disable the AL003 (Undervoltage error) latch	0: latch enabled; the undervoltage error is not cleared automatically. 1: latch disabled; the undervoltage error is cleared automatically.
Bit 3	Reserved	-
Bit 4	Disable the detection for AL044 (Servo function overload warning)	0: enable the detection. 1: disable the detection.
Bit 5	Reserved	-
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 7 - Bit 8	Reserved	-
Bit 9	Set AL003 (Undervoltage) as ALM or WARN	0: WARN 1: ALM
Bit 10 - Bit 11	Reserved	-
Bit 12	Set AL022 (RST power error) as ALM or WARN	0: WARN 1: ALM
Bit 13 - Bit 15	Reserved	-

P2.067	Reserved

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

Settings:

High word

D C B A

Low word

U Z Y X

A	Reserved	X	Following error compensation switch
B	Reserved	Y	Reserved
C	Reserved	Z	DI.STP triggering method
D	Reserved	U	Unit selection for CANopen PV mode / PROFINET RT mode

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- X: following error compensation switch (functions under the condition of P1.036 > 1)

  0: disable following error compensation

  1: enable following error compensation

- Z: DI.STP triggering method

  0: rising-edge triggered

  1: level triggered

- U: unit selection for CANopen PV mode / PROFINET RT mode

  0: 0.1 rpm

  1: 0.01 rpm

  Note: when you change the setting of P2.068.U in CANopen mode, the units of OD 606Bh, OD 606Ch, OD 60FFh, and P5.003 (Deceleration time for auto-protection) change as well; when in PROFINET mode, the unit of P5.003 changes. Make sure the setting values are correct.

P2.069●	Absolute encoder		Address: 028AH 028BH
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x1211
Format:	HEX	Data size:	16-bit

Settings:

X	Operation mode setting	Z	Function of preventing rotary axis position offset when overflow occurs
Y	Pulse command setting when absolute position is lost	U	Single-turn absolute function

- X: operation mode setting

  0: incremental mode. An absolute type motor can be operated as an incremental type motor.

  1: absolute mode. This setting is only applicable to an absolute type motor. If it is used for an incremental type motor, AL069 occurs.

- Y: pulse command setting when absolute position is lost

  0: when AL060 or AL06A occurs, the system cannot receive a pulse command.

  1: when AL060 or AL06A occurs, the system can receive a pulse command.

- Z: function of preventing rotary axis position offset when overflow occurs

  0: when the number of revolutions of the encoder overflows, the absolute position and rotary axis position are offset after power is off.

  1: rotary axis position is not affected by overflow, but the absolute position is offset. It is recommended that you read the rotary axis position feedback (monitoring variable 091) (AL062, AL066, and AL289 do not function).

  2: when the DVP-50MC series or AX series controller is used, rotary axis position is not affected by overflow, but the absolute position is offset. It is recommended that you read the rotary axis position feedback (monitoring variable 091) (AL062, AL066, and AL289 do not function).

■ U: single-turn absolute function

0: disable the single-turn absolute function.

1: enable the single-turn absolute function and automatically set both P2.069.X and P2.069.Z to 1.

Note: changes to this setting are effective only after power is cycled to the servo drive.

P2.070	Read data selection		Address: 028CH 028DH
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x0007
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 0	DI/DO data unit setting	0: PUU 1: pulse
Bit 1	Communication data unit setting	0: PUU 1: pulse
Bit 2	Overflow warning setting	0: the servo drive issues the overflow warnings AL289 (PUU) and AL062 (pulse). 1: no overflow warning.
Bit 3 - Bit 15	Reserved	-

P2.071■	Absolute position homing		Address: 028EH 028FH
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x0001
Format:	HEX	Data size:	16-bit

Settings:

Set P2.071 to 0x0001 to reset the current absolute position of the encoder. The clearing function is enabled by setting P2.008 to 271 and P2.069.X to 1.

P2.072 - P2.088	Reserved

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

Settings:

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

Note: enable the two degree of freedom control function (P2.094 [Bit 12] = 1) before adjusting this parameter.

P2.090	Two degree of freedom mode - anti-interference gain		Address: 02B4H 02B5H
Default:	850	Control mode:	PT / PR
Unit:	0.001	Setting range:	500 to 1999
Format:	DEC	Data size:	16-bit

Settings:

This parameter improves the command response and fine tunes the overshoot when the command is settling. Set this parameter to a smaller value to reduce the occurrence of command overshoot. This parameter is only valid when the two degree of freedom control function is enabled (P2.094 [Bit 12] = 1) and its function is similar to that of P2.026.

P2.091	Two degree of freedom mode - position feed forward gain		Address: 02B6H 02B7H
Default:	1000	Control mode:	PT / PR
Unit:	0.1%	Setting range:	0 to 3000
Format:	DEC	Data size:	16-bit

Settings:

This parameter reduces the following error of the motor. If the value is set too high, it may cause overshoot during positioning. It is suggested that you set this parameter to the default value or only make small adjustments. This parameter is only valid when the two degree of freedom control function is enabled (P2.094 [Bit 12] = 1) and its function is similar to that of P2.002.

P2.092	Two degree of freedom mode - speed feed forward gain		Address: 02B8H 02B9H
Default:	1000	Control mode:	PT / PR
Unit:	0.1%	Setting range:	0 to 3000
Format:	DEC	Data size:	16-bit

Settings:

This parameter reduces the following error when the motor starts and stops. Use this parameter to roughly adjust the overshoot during positioning. Set this parameter to a larger value to reduce overshoot. This parameter is only valid when the two degree of freedom control function is enabled (P2.094 [Bit 12] = 1) and its function is similar to that of P2.007.

P2.093	Reserved

P2.094▲	Special bit register 3		Address: 02BCH 02BDH
Default:	0x0090	Control mode:	PT / PR / S / Sz
Unit:	-	Setting range:	0x0000 to 0xF3F6
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 0 - Bit 3	Reserved	-
Bit 4	Dynamic brake options	0: disable new dynamic brake. 1: enable new dynamic brake.
Bit 5	Switch for AL016 (Abnormal IGBT temperature)	0: enable AL016 (Abnormal IGBT temperature). 1: disable AL016 (Abnormal IGBT temperature).
Bit 6	Switch for AL007 detection in Position mode	Switch for AL007 detection in Position mode (PT and PR) 0: disable AL007 detection (default). 1: enable AL007 detection.
Bit 7	Switch for AL086	Switch for the regenerative resistor temperature protection when the input voltage is too high 0: disable 1: enable
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 degree of freedom control function is enabled (P2.094 [Bit 12] = 1).
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 degree of freedom control function is enabled (P2.094 [Bit 12] = 1).
Bit 10 - Bit 11	Reserved	-
Bit 12	Two degree of freedom control function	0: disable two degree of freedom control function (A2 and B2 models do not have this function.) 1: enable two degree of freedom control function
Bit 13 - Bit 15	Reserved	-

P2.095	Notch filter 1 - Q factor		Address: 02BEH 02BFH
Default:	5	Control mode:	All
Unit:	-	Setting range:	1 to 10
Format:	DEC	Data size:	16-bit

Settings:

The resonance Q factor of the first Notch filter. This function is disabled if P2.024 is 0. P2.023, P2.024, and P2.095 are the first set of Notch filter parameters.

P2.096	Notch filter 2 - Q factor		Address: 02C0H 02C1H
Default:	5	Control mode:	All
Unit:	-	Setting range:	1 to 10
Format:	DEC	Data size:	16-bit

Settings:

The resonance Q factor of the second Notch filter. This function is disabled if P2.044 is 0. P2.043, P2.044, and P2.096 are the second set of Notch filter parameters.

P2.097	Notch filter 3 - Q factor		Address: 02C2H 02C3H
Default:	5	Control mode:	All
Unit:	-	Setting range:	1 to 10
Format:	DEC	Data size:	16-bit

Settings:

The resonance Q factor of the third Notch filter. This function is disabled if P2.046 is 0. P2.045, P2.046, and P2.097 are the third set of Notch filter parameters.

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

Settings:

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

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

Settings:

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

P2.100	Notch filter 4 - Q factor		Address: 02C8H 02C9H
Default:	5	Control mode:	All
Unit:	-	Setting range:	1 to 10
Format:	DEC	Data size:	16-bit

Settings:

The resonance Q factor of the fourth Notch filter. This function is disabled if P2.099 is 0. P2.098, P2.099, and P2.100 are the fourth set of Notch filter parameters.

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

Settings:

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

P2.102	Notch filter 5 - attenuation level		Address: 02CCH 02CDH
Default:	0	Control mode:	All
Unit:	-dB	Setting range:	0 to 40
Format:	DEC	Data size:	16-bit

Settings:

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

P2.103	Notch filter 5 - Q factor		Address: 02CEH 02CFH
Default:	5	Control mode:	All
Unit:	-	Setting range:	1 to 10
Format:	DEC	Data size:	16-bit

Settings:

The resonance Q factor of the fifth Notch filter. This function is disabled if P2.102 is 0. P2.101, P2.102, and P2.103 are the fifth set of Notch filter parameters.

P2.104	Torque command condition for P/PI switching		Address: 02D0H 02D1H
Default:	800	Control mode:	PT / PR
Unit:	%	Setting range:	1 to 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.

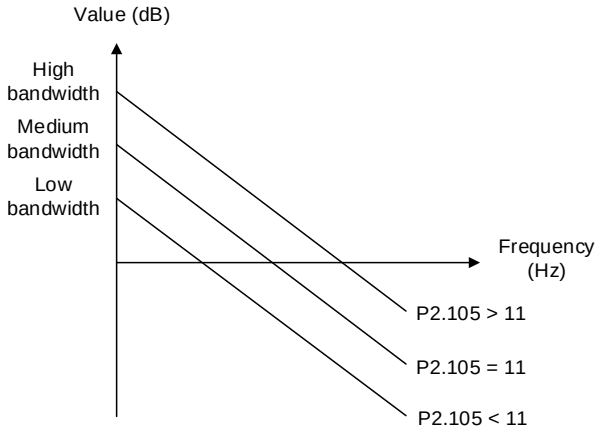
P2.105	Automatic gain adjustment level 1		Address: 02D2H 02D3H
Default:	11	Control mode:	PT / PR
Unit:	-	Setting range:	1 to 21
Format:	DEC	Data size:	16-bit

8

Settings:

Use this parameter to adjust the bandwidth when auto tuning. The higher the value, the higher the bandwidth after auto tuning. However, the bandwidth margin may be insufficient, causing machine jitter. The smaller the value, the lower the bandwidth after auto tuning. However, the response is slower.

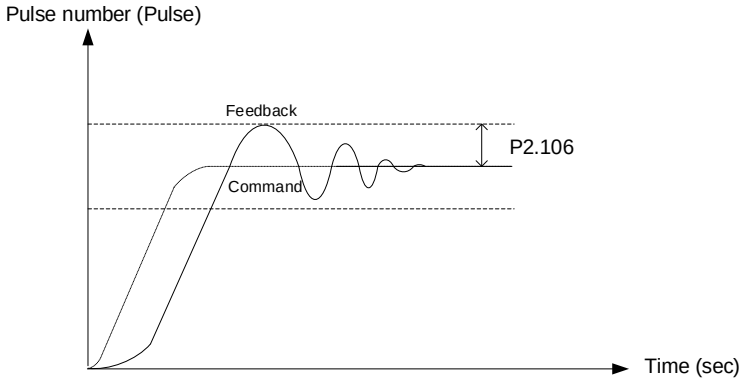
P2.105 setting value	Stiffness and response	Applicable mechanical parts
1 - 7	Low stiffness and low response	Belt, gear rack, reducer, cam
8 - 14	Medium stiffness and medium response	Screw
15 - 21	High stiffness and high response	Direct-coupled mechanical parts



P2.106	Automatic gain adjustment level 2		Address: 02D4H 02D5H
Default:	2000	Control mode:	PT / PR
Unit:	pulse	Setting range:	1 to 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 according to either the user's requirement or the machine characteristics. The higher the value, the greater the maximum overshoot allowed by auto tuning. However, the response is faster. The smaller the value, the smaller the maximum overshoot allowed by auto tuning. However, the response is slower.



P2.107	Rate of change for resonance suppression low-pass filter		Address: 02D6H 02D7H
Default:	100	Control mode:	P / S
Unit:	%	Setting range:	0 to 100
Format:	DEC	Data size:	16-bit

Settings:

Adjusts the rate of change for **the resonance suppression low-pass filter** (P2.025) according to the gain switching condition.

(This parameter is inversely proportional to the value of P2.025. The smaller the setting value of P2.107, the stronger the filtering effect.)

P2.108 - P2.111	Reserved

P2.112▲	Special bit register 4		Address: 02E0H 02E1H
Default:	0x2018	Control mode:	PT / PR / S / Sz
Unit:	-	Setting range:	0x0000 to 0x753F
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 0	Reserved	-
Bit 1	Enable or disable AL089	0: disable AL089 1: enable AL089
Bit 2	Reserved	-
Bit 3	Auto gain adjustment mode	0: reserved 1: cycle adjustment
Bit 4 - Bit 7	Reserved	-
Bit 8	Motor hard stop function selection	Motor hard stop 2 currently supports absolute motors. 0: Motor hard stop 1 (refer to the settings of P1.057, P1.058, and P1.060.) 1: Motor hard stop 2 (refer to the settings of P1.105, P1.106, and P1.058.)
Bit 9 - Bit 12	Reserved	-
Bit 13	Regenerative braking method	0: method 1 1: method 2, which releases the capacitor voltage faster and reduces the load voltage of the capacitor.
Bit 14	Unit selection for internal Torque command / internal torque limit (P1.012 - P1.014).	0: 1% 1: 0.1%
Bit 15	Reserved	-

P2.113	Bandwidth of disturbance attenuation		Address: 02E2H 02E3H
Default:	50	Control mode:	T
Unit:	Hz	Setting range:	0 to 3000
Format:	DEC	Data size:	16-bit

8

Settings:

The disturbance attenuation function is disabled when P2.114 is 0. It is recommended that you set P2.113 to the default of 50. The higher you set P2.113, the more likely the high-frequency resonance is to occur; the lower you set P2.113, the less the low-frequency vibration is suppressed.

P2.114	Level of disturbance attenuation		Address: 02E4H 02E5H
Default:	0	Control mode:	T
Unit:	-	Setting range:	0 to 500
Format:	DEC	Data size:	16-bit

Settings:

The disturbance attenuation function is disabled when P2.114 is 0. Increasing this parameter can better attenuate the disturbance. However, if you set the value too high, it may cause slower response and system divergence.

P2.115 - P2.120	Reserved

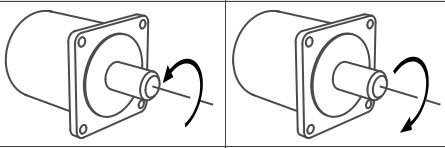
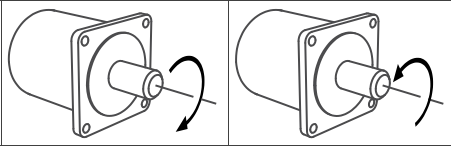
P2.121	Special bit register 6		Address: 02F2H 02F3H
Default:	0x00000000	Control mode:	All
Unit:	-	Setting range:	0x00000000 - 0x000001FF
Format:	HEX	Data size:	32-bit

Settings:

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

Bit	Function	Description
Bit 0	Reserved	-
Bit 1	[CANopen] / [EtherCAT] / [DMCNET] Behavior after homing in communication mode	0: after homing, execute absolute positioning to the position with the offset distance set in OD 607Ch. 1: decelerate to a stop after homing.
	[PROFINET] Behavior after homing in communication mode	0: after homing, execute absolute positioning to the position with the offset distance set in PNU11. 1: decelerate to a stop after homing.
Bit 2	[CANopen] / [EtherCAT] / [DMCNET] Definition of the settings for Origin definition (P6.001) and Home offset (OD 607Ch) in communication mode	0: origin definition (P6.001) = - (setting of OD 607Ch) 1: origin definition (P6.001) = OD 607Ch
	[PROFINET] Definition of the settings for Origin definition (P6.001) and Home offset (PNU11) in communication mode	0: origin definition (P6.001) = - (setting of PNU11) 1: origin definition (P6.001) = PNU11
Bit 3	[CANopen] / [EtherCAT] / [DMCNET] Unit of Homing speeds (OD 6099h) in communication mode	0: 0.1 rpm 1: 1 rpm
	[PROFINET] Unit of Homing speeds (PNU12, PNU13) in communication mode	
Bit 4	Reserved	-
Bit 5	[CANopen] / [EtherCAT] / [DMCNET] Unit selection for Homing speeds (OD 6099h), Homing acceleration (OD 609Ah), Profile acceleration (OD 6083h), and Profile deceleration (OD 6084h) in communication mode	0: the unit of OD 6099h is determined by the setting of P2.121 [Bit 3]. The unit of OD 609Ah, OD 6083h, and OD 6084h is ms (0 - 3000 rpm). When P2.121 [Bit 3] = 0, the unit of OD 6099h is 0.1 rpm. When P2.121 [Bit 3] = 1, the unit of OD 6099h is 1 rpm. 1: the unit of OD 6099h is PUU/sec. The unit of OD 609Ah, OD 6083h, and OD 6084h is PUU/sec^2.
	[PROFINET] Unit selection for Homing speeds (PNU12, PNU13), Homing acceleration (PNU14), Profile acceleration (PNU15), and Profile deceleration (PNU16) in communication mode	0: the unit of PNU12 and PNU13 is determined by the setting of P2.121 [Bit 3]; the unit of PNU14, PNU15, and PNU16 is ms (0 - 3000 rpm) When P2.121 [Bit 3] = 0, the unit of PNU12 and PNU13 is 0.1 rpm. When P2.121 [Bit 3] = 1, the unit of PNU12 and PNU13 is 1 rpm. 1: the unit of PNU12 and PNU13 is PUU/sec; the unit of PNU14, PNU15, and PNU16 is PUU/sec^2.
Bit 6	Reserved	-

8

Bit	Function	Description
Bit 7	Definition of positive / negative direction when P4.005 (Servo motor JOG control) controls the motor through USB / RS-485 communication	0: the same as the direction originally defined. 1: in reverse to the direction originally defined. P2.121 | Bit 7 = 0 | Bit 7 = 1 P4.005 = 4999  P4.005 = 4998 
Bit 8	[EtherCAT] Auto clearing of AL180 and AL185 after the state machine re-enters the Operational state in communication mode	0: no; you need to manually clear the alarms 1: yes
Bit 9 - Bit 15	Reserved	-

P2.122 - P2.124	Reserved

P2.125	Special bit register 7		Address: 02FAH 02FBH
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0xFFFF
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 0	Filter frequency for the motor speed of the monitoring variable (P0.002 = 7)	0: 15 Hz 1: 1 Hz
Bit 1 - Bit 2	Reserved	-
Bit 3	Bandwidth response level reversion	Before using this function, set the gain adjustment mode to mode 1, mode 2, or mode 3. When the system limit is reached and the resonance cannot be suppressed, the servo automatically reverts to the response level where the resonance does not occur. 0: disable 1: enable
Bit 4 - Bit 6	Reserved	-
Bit 7	[EtherCAT] Smoothing function for Velocity offset (OD 60B1h) and Torque offset (OD 60B2h) in communication mode	0: disable 1: enable
Bit 8 - Bit 15	Reserved	-

P2.126	Bandwidth for speed loop response		Address: 02FCH 02FDH
Default:	40	Control mode:	PT / PR / S / Sz
Unit:	Hz	Setting range:	1 to 1000
Format:	DEC	Data size:	16-bit

Settings:

The setting of P2.126 is effective only when you set P2.032 to 5 or 6.

Bandwidth	Stiffness and response	Applicable mechanical parts
1 - 100 Hz	Low stiffness and low response	Belt, gear rack, reducer, cam
101 - 250 Hz	Medium stiffness and medium response	Screw
251 Hz and above	High stiffness and high response	Direct-coupled mechanical parts

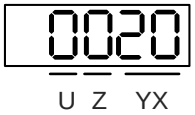
Note: the servo drive automatically sets the response of the position loop according to the setting of P2.126.
The function of P2.126 is the same as that of P2-31 for the A2 series models.

8

P3.xxx Communication parameters

P3.000●	Address		Address: 0300H 0301H
Default:	0x007F	Control mode:	All
Unit:	-	Setting range:	0x0001 - 0x007F (-L, -M, -F, -P) 0x0001 - 0xFFFF (-E)
Format:	HEX	Data size:	16-bit

Settings:



UZ	Reserved	YX	Communication address setting

The address setting required for using RS-485, CANopen, and DMCNET communication. Make sure there are no duplicate addresses in the same communication circuit, or it may cause communication failure.

■ RS-485

When the master station sets the communication address to 0xFF, the address is always 0xFF in the response message.

■ EtherCAT

When P3.018.A = 1, the address refers to the setting of P3.000; when P3.018.A = 0, the address must be set by the controller.

P3.001●	Transmission speed		Address: 0302H 0303H
Default:	0x0203 (-L, -M, -E) 0x3203 (-F, -P)	Control mode:	All
Unit:	-	Setting range:	0x0000 - 0x0405 (-L, -M, -E) 0x0000 - 0xF405 (-F, -P)
Format:	HEX	Data size:	16-bit

Settings:

X	RS-485 transmission speed	Z	CANopen / DMCNET transmission speed
Y	Reserved	U	DMCNET motion card

■ X: RS-485 transmission speed

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

■ Z: CANopen / DMCNET transmission speed

0: 125 Kbps	1: 250 Kbps	2: 500 Kbps
3: 800 Kbps	4: 1.0 Mbps	-

■ U: DMCNET motion card

0: when using Delta's controller, such as PLC or HMI
3: when using Delta's motion card

Note:
1. The transmission speed of USB is set at 1.0 Mbps and cannot be changed.
2. If this parameter is set through CANopen, only Z can be set and the others remain unchanged.
3. After the Z value is set, cycle the power to take effect.

P3.002	Modbus communication protocol		Address: 0304H 0305H
Default:	0x0006	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x0008
Format:	HEX	Data size:	16-bit

Settings:

Definition of each value:

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)

P3.003	Modbus communication error handling		Address: 0306H 0307H
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x0001
Format:	HEX	Data size:	16-bit

Settings:

0: display AL020 and let the motor continue operating.

1: display AL020 and let the motor decelerate to a stop. Deceleration time is set in P5.003.B.

P3.004	Modbus communication timeout		Address: 0308H 0309H
Default:	0	Control mode:	All
Unit:	sec	Setting range:	0 to 20
Format:	DEC	Data size:	16-bit

Settings:

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

P3.005	Modbus communication		Address: 030AH 030BH
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x0112
Format:	HEX	Data size:	16-bit

Settings:

X	Reserved	Z	During Modbus communication, when the function code is 03H or 10H (read or write multiple words), the system gives priority to read or write high word data.
Y	Sets the servo drive as the master or slave of Modbus	U	Reserved

- Y: sets the servo drive as the master or slave of Modbus.

  0: slave of Modbus

  1: master of Modbus

- Z: during Modbus communication, when the function code is 03H or 10H (read or write multiple words), the system gives priority to read or write high word data. Use this function for controllers with different priority for transmitting high word and low word of the packets.

  0: transmit low word first

  1: transmit high word first

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

Settings:

Control switch for the source of DI. Each bit of this parameter determines the input source of one DI signal: Bit 0 - Bit 12 correspond to DI1 - DI13.

The setting for each bit is as follows:

0: DI status is controlled by the external terminal block.

1: DI status is controlled by P4.007.

For more information on DI functional planning, refer to the following:

DI1 - DI8: P2.010 - P2.017

DI9 - DI13: P2.036 - P2.040

P3.007	Modbus communication response delay time		Address: 030EH 030FH
Default:	1	Control mode:	All
Unit:	0.5 ms	Setting range:	0 to 1000
Format:	DEC	Data size:	16-bit

Settings:

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

P3.008	Reserved

P3.009	Communication synchronization		Address: 0312H 0313H
Default:	0x5055	Control mode:	CANopen / EtherCAT
Unit:	-	Setting range:	0x1001 - 0x9FFF (-L, -M, -F, -P) 0x1001 - 0x9AFF (-E)
Format:	HEX	Data size:	16-bit

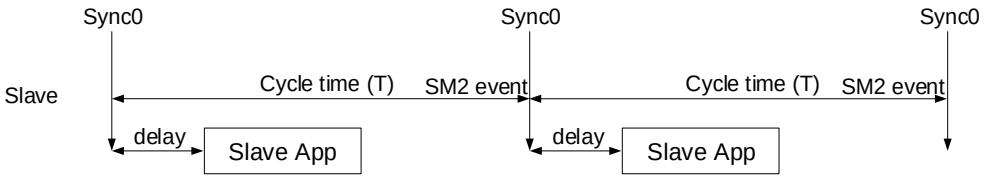
Settings:

Digit	U	Z	Y	X
Function	[CANopen] Range of synchronous error	[CANopen] / [EtherCAT] Target value	[CANopen] Deadband	Reserved
Range	1 to 9	-M, -F, -L, -P models: 0 to F -E models: 0 to A	0 to F	-

The slave synchronizes with the master via SYNC. The definition is as follows:

- Y: sets the size of deadband (unit: μsec). If the deviation between the SYNC arrival time and the target value does not exceed the deadband, a correction is not needed.
- Z: adjusts the timing of the servo accessing the packets to ensure this timing is not in conflict with the timing of the controller sending the packets.

  The delay time shown in the following figure is (T/10) x Z (μs).



- U: if the deviation between the SYNC arrival time and the target value is smaller than the range, it means the synchronization is successful (unit: 10 μs).

P3.010	CANopen / DMCNET protocol		Address: 0314H 0315H
Default:	0x1011	Control mode:	CANopen / DMCNET
Unit:	-	Setting range:	0x0000 to 0xFFFF
Format:	HEX	Data size:	16-bit

8

Settings:

X	Reserved	Z	Source of torque limit
Y	Motor status when communication error occurs	U	Auto clearing of PDO alarm

■ Y: motor status when the communication error occurs

0: when the communication error occurs (AL170), the motor continues to operate (only applicable to DMCNET mode and CANopen B mode).

1: when the communication error occurs (AL180), the motor is switched to Servo Off state (only applicable to CANopen C mode).

■ Z: source of torque limit (only applicable to DMCNET mode)

0: communication commands.

1: DI commands.

■ U: auto clearing of PDO alarm

0: when the PDO error (AL112, AL113, AL121 - AL132) occurs, the servo alarm has to be cleared by DI.ARST, NMT reset, or OD 6040h [Bit 7] Fault reset.

1: if the PDO error (AL112, AL113, AL121 - AL132) disappears, the servo alarm is automatically cleared.

P3.011	CANopen / DMCNET / PROFINET options		Address: 0316H 0317H
Default:	0x0000	Control mode:	CANopen / DMCNET / PROFINET
Unit:	-	Setting range:	Shown as follows
Format:	HEX	Data size:	16-bit

Settings:

X	Store parameters in EEPROM or not	Z	Reserved
Y	Reserved	U	Reserved

■ X: store parameters in EEPROM or not

0: not to store parameters in EEPROM.

1: when writing parameters with packets through cyclic synchronous communication, store parameters in EEPROM.

Note: if you set X to 1 and continuously write parameters with packets through cyclic synchronous communication, it shortens the lifetime of the EEPROM.

P3.012	Communication support setting		Address: 0318H 0319H
Default:	0x0000	Control mode:	CANopen / DMCNET / EtherCAT / PROFINET
Unit:	-	Setting range:	0x0000 to 0x1111
Format:	HEX	Data size:	16-bit

Settings:

U Z Y X

X	Reserved	Z	Load in the CANopen / DMCNET / EtherCAT / PROFINET parameter values
Y	Reserved	U	Error clearing when the limit alarm occurs

■ Z: load in the CANopen / DMCNET / EtherCAT / PROFINET parameter values

0: when the servo drive is power cycled or the communication is reset, parameters in the following table load the values of the CANopen / DMCNET / EtherCAT parameters. This setting is not supported in PROFINET mode.

1: when the servo drive is power cycled or the communication is reset, parameters in the following table retain the same settings and do not load the values of the CANopen / DMCNET / EtherCAT / PROFINET parameters.

Relevant parameters for Z setting:

Parameter	P3.012 = 0x0100 (Z = 1)		P3.012 = 0x0000 (Z = 0)	
	Servo parameter	Default	OD address	Default
Motor stop mode	P1.032	0x0000	605Bh	0
S-curve acceleration constant	P1.034	200	6087h	200
Zero speed range	P1.038	100 (0.1 rpm)	606Fh	100 (0.1 rpm)
E-Gear ratio - numerator N1	P1.044	16777216	6093h sub1	1
E-Gear ratio - denominator M	P1.045	100000	6093h sub2	1
Speed reached (DO.SP_OK) range	P1.047	10 (1 rpm)	606Dh	100 (0.1 rpm)
Accumulated time to reach desired speed	P1.049	0	606Eh	0
Maximum speed limit	P1.055	Depending on the motor (rpm)	607Fh	Depending on the motor (0.1 rpm)
			6080h	Depending on the motor (rpm)
Excessive deviation warning condition of Position command	P2.035	50331648	6065h	50331648
Positive software limit (PP / CSP / CSV / CST mode)	P5.008	2147483647	607Dh sub2	2147483647
Negative software limit (PP / CSP / CSV / CST mode)	P5.009	-2147483648	607Dh sub1	-2147483648
Origin definition (HM mode)*	P6.001	0	607Ch	0

Note: the setting of Origin definition is volatile in PROFINET mode. You need to redefine the origin when executing the homing procedure.

8

Methods to write parameters to EEPROM (non-volatile):

SDO: parameters are stored in EEPROM when written.

PDO: refer to the setting of P3.011.X.

P3.011.X = 1 indicates when written through PDOs, parameters are stored in EEPROM.

P3.011.X = 0 indicates when written through PDOs, parameters are not stored in EEPROM.

Note: when the function of OD 1010h (Store parameter) is enabled, the CANopen OD value is stored in non-volatile memory. When P3.012.Z = 0, the non-volatile value of CANopen OD is loaded as the initial content. Refer to the descriptions in CANopen Standard. When P3.012.Z = 1, the initial content refers to the preceding table.

■ U: error clearing when the limit alarm occurs

0: when the limit alarm (AL014 or AL015) occurs, it needs to be cleared before the servo reverses to move away from the limit.

1: when the limit alarm (AL014 or AL015) occurs, it does not need to be cleared before the servo reverses to move away from the limit.

Note: determine whether the servo has reached the limit with the bit status of OD 6041h Statusword and OD 60FDh Digital inputs.
Positive limit: OD 6041h [Bit 14] is On & OD 60FDh [Bit 1] is On
Negative limit: OD 6041h [Bit 15] is On & OD 60FDh [Bit 0] is On
The status of other bits of OD 6041h (Fault / Warning / Quick stop) remains unchanged when the servo reaches the limit.

P3.013 - P3.016	Reserved

P3.017	CANopen B mode disconnection delay time		Address: 0322H 0323H
Default:	1000	Control mode:	CANopen
Unit:	ms	Setting range:	1 to 1000
Format:	DEC	Data size:	16-bit

Settings:

If the communication disconnection time exceeds this set value when in the PV (Profile Velocity), PT (Profile Torque), or HM (Homing Mode) mode of CANopen B mode, the system issues AL303.

P3.018	EtherCAT special function switch		Address: 0324H 0325H
Default:	0x00002000	Control mode:	EtherCAT
Unit:	-	Setting range:	0x00000000 - 0x01112211
Format:	HEX	Data size:	32-bit

Settings:

High word

D C B A

Low word

U Z Y X

A	Source setting for the content loaded to the EtherCAT Station Alias Register 0x0012 after the servo drive is powered on	X	Unit selection for Target velocity (OD 60FFh) and Velocity actual value (OD 606Ch) when in the PV (Profile Velocity) mode or CSV (Cyclic Synchronous Velocity) mode

B	Reserved	Y	Reserved
C	Unit selection for the maximum speed of OD 607Fh and OD 6080h	Z	AL185 communication disconnection detection setting
D	Reserved	U	Reserved

- A: source setting for the content loaded to the EtherCAT Station Alias Register 0x0012 after the servo drive is powered on.

  0: determined by the EtherCAT EEPROM station number field (ADR 0x0004) setting, which needs to be set via the controller interface.

  1: determined by the address set with servo parameter P3.000.

- X: unit selection for Target velocity (OD 60FFh) and Velocity actual value (OD 606Ch) when in the PV (Profile Velocity) mode or CSV (Cyclic Synchronous Velocity) mode.

  0: 0.1 rpm

  1: pulse/sec

- Z: AL185 communication disconnection detection setting

  0: disconnection detection starts after EtherCAT communication enters OP state.

  1: disconnection detection starts after EtherCAT communication enters Init state.

  2: disable disconnection detection.

  Note: when using the ring topology connection, set P3.018.Z to 2 to disable the disconnection detection.

- C: unit selection for the maximum speed of OD 607Fh and OD 6080h

  0: 0.1 rpm for OD 607Fh and rpm for OD 6080h.

  1: pulse/sec for OD 607Fh and OD 6080h.

P3.019	Statusword display content		Address: 0326H 0327H
Default:	0x00000021	Control mode:	CANopen / EtherCAT
Unit:	-	Setting range:	0x00000000 - 0x0001FFFF
Format:	HEX	Data size:	32-bit

Settings:

High word

D C B A

Low word

U Z Y X

A	Reserved	X	Reserved
B	Reserved	Y	Reserved
C	Reserved	Z	Display content of OD 6041h [Bit 14]
D	Reserved	U	Reserved

- Z: display content of OD 6041h [Bit 14]

  0: display the positive limit status.

  1: display the current synchronization status between the servo drive and controller. When the status displays On, it indicates that the synchronization is complete (SYNC_OK).

P3.020 - P3.021	Reserved

P3.022	EtherCAT PDO timeout setting		Address: 032CH 032DH
Default:	0xFF04	Control mode:	EtherCAT
Unit:	-	Setting range:	0x0002 to 0xFF14
Format:	HEX	Data size:	16-bit

Settings:

When using the PDO to transmit data periodically, use this parameter to set the timeout setting. The following two sets of digits specify the trigger conditions for AL180 and AL3E3 respectively to ensure that the servo drive receives the PDO. When one of the alarm occurs, it means the allowable duration for packet loss exceeds the set range.

Digit	UZ	YX
Function	AL180 trigger condition	AL3E3 trigger condition
Range	0x00 (disabled) - 0xFF (default)	0x02 - 0x14

- YX: AL3E3 alarm condition (allowable cycle for elapsed time); applicable to CSP / CSV / CST mode.

  AL3E3 occurs when the servo drive does not receive the PDO within the set cycle.

  When the communication cycle is 4 ms and you set this parameter to 0x02 (allow two cycles), it means if the servo drive does not receive any PDO within 8 ms, AL3E3 occurs.

- UZ: AL180 trigger condition (allowable duration for elapsed time); applicable to all operation modes.

  AL180 occurs when the servo drive does not receive the PDO within the set duration (unit: ms). For example, when you set P3.022.UZ to 0x01, the duration is 1 ms; when you set P3.022.UZ to 0x02, the duration is 2 ms; and when you set P3.022.UZ to 0xFF, the duration is 255 ms.

P3.023 - P3.038	Reserved

P4.xxx Diagnosis parameters

P4.000	Fault record (last)		Address: 0400H 0401H
Default:	0x00000000	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): the error code corresponding to CANopen / DMCNET / EtherCAT.

For example, when the low word displays ALF21, the high word displays the error code of ALF21.

P4.001★	Fault record (second to the last)		Address: 0402H 0403H
Default:	0x00000000	Control mode:	All
Unit:	-	Setting range:	-
Format:	HEX	Data size:	32-bit

Settings:

The second to last abnormal status record.

Refer to the description of high / low word in P4.000.

P4.002★	Fault record (third to the last)		Address: 0404H 0405H
Default:	0x00000000	Control mode:	All
Unit:	-	Setting range:	-
Format:	HEX	Data size:	32-bit

Settings:

The third to last abnormal status record.

Refer to the description of high / low word in P4.000.

P4.003★	Fault record (fourth to the last)		Address: 0406H 0407H
Default:	0x00000000	Control mode:	All
Unit:	-	Setting range:	-
Format:	HEX	Data size:	32-bit

Settings:

The fourth to last abnormal status record.

Refer to the description of high / low word in P4.000.

P4.004★	Fault record (fifth to the last)		Address: 0408H 0409H
Default:	0x00000000	Control mode:	All
Unit:	-	Setting range:	-
Format:	HEX	Data size:	32-bit

Settings:

The fifth to last abnormal status record.

Refer to the description of high / low word in P4.000.

P4.005	Servo motor JOG control		Address: 040AH 040BH
Default:	20	Control mode:	All
Unit:	rpm	Setting range:	0 - 5000
Format:	DEC	Data size:	16-bit

Settings:

The control methods are as follows:

1. Panel control:

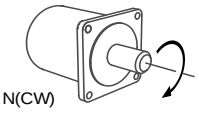
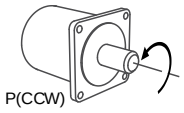
   Set the P4.005 JOG speed with the panel and it displays the JOG symbol. Pressing the UP key controls the JOG operation in the positive direction; pressing the DOWN key controls the JOG operation in the negative direction. Stop pressing to stop the JOG operation. If there is any error in this setting, then the motor cannot operate.

2. DI control:

   If you set the DI to 0x37 (JOGU) and 0x38 (JOGD) (refer to Table 8.1), then the JOG operation in the positive or negative direction is controlled with this DI.

3. USB / RS-485 communication control:

   Set the JOG speed (1 - 4997, 5000) for operation to P4.005, and then set P4.005 to 4999 or 4998 for positive or negative direction. To stop the motor operation, set P4.005 to 0.

0: stop operation	1 – 4997, 5000: JOG speed
4998*2: JOG operation in negative direction 	4999*2: JOG operation in positive direction 

Note:
1. When using communication to write values frequently, set P2.030 to 5.
2. When you control the JOG operation with the panel, the operation direction (positive / negative) varies depending on the value of P1.001.Z. When you control the JOG speed with USB communication, the operation direction (positive / negative) can be modified with P2.121 [Bit 7].
3. This function supports the S-curve acceleration / deceleration settings in P1.034 - P1.036.
4. When P1.001.X = B or C, JOG operation test is not supported.

P4.006■	Software digital output register (readable and writable)		Address: 040CH 040DH
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0xFFFF
Format:	HEX	Data size:	16-bit

Settings:

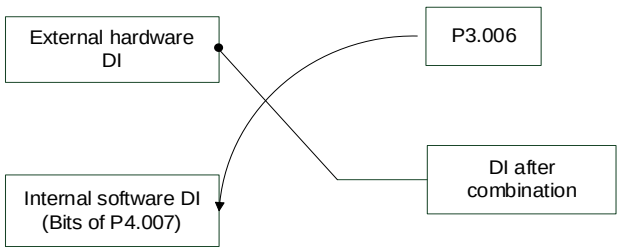
bit 00: corresponds to DO code = 0x30	bit 08: corresponds to DO code = 0x38
bit 01: corresponds to DO code = 0x31	bit 09: corresponds to DO code = 0x39
bit 02: corresponds to DO code = 0x32	bit 10: corresponds to DO code = 0x3A
bit 03: corresponds to DO code = 0x33	bit 11: corresponds to DO code = 0x3B
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

If you set P2.018 to 0x0130, then the output of DO1 is the bit 00 status of P4.006, and so forth. Set the DO codes (0x30 - 0x3F) through communication DO, and then write to P4.006.

P4.007■	Multi-function for digital input		Address: 040EH 040FH
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x3FFF
Format:	HEX	Data size:	16-bit

Settings:

The source of the DI input signal can be the external hardware terminal or the internal software DI (P4.007), which is determined by P3.006. If the corresponding bit of P3.006 is 1, it means the source is the software DI (P4.007); if the corresponding bit is 0, then the source is the hardware DI. See the following figure:



Read parameter: shows the DI status after combining external DI and software DI.

Write parameter: writes the software DI status. This function is the same whether you use the panel or communication to set the parameter.

For example: if the read value of P4.007 is 0x0011, it means DI1 and DI5 are on after combination; if the value written to P4.007 is 0x0011, it means the software DI1 and DI5 are on. Refer to P2.010 - P2.017 and P2.036 - P2.040 for more information on DI functional planning.

P4.008★	Input status of servo drive panel (read-only)		Address: 0410H 0411H
Default:	-	Control mode:	All
Unit:	-	Setting range:	Read-only
Format:	HEX	Data size:	16-bit

Settings:

Read this parameter through communication and check if the five keys (MODE, UP, DOWN, SHIFT, and SET) can function normally.

P4.009★	Digital output status (read-only)		Address: 0412H 0413H
Default:	-	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x003F
Format:	HEX	Data size:	16-bit

Settings:

There is no difference either reading by panel or through communication.

P4.010▲■	Hardware calibration options		Address: 0414H 0415H
Default:	0	Control mode:	All
Unit:	-	Setting range:	0 to 14
Format:	DEC	Data size:	16-bit

Settings:

0: reserved	4: calibrate the hardware offset of the current detector (W phase)
1: calibrate the hardware offset of the analog speed input	5: calibrate the hardware offset of options 1 - 4
2: calibrate the hardware offset of the analog torque input	6 - 14: reserved
3: calibrate the hardware offset of the current detector (V phase)	-

Note: the calibration function must be enabled by setting P2.008. When calibration, remove all external wirings for torque input and make sure the servo is in the Off state.

P4.011	Analog speed input 1 - hardware offset calibration		Address: 0416H 0417H
Default:	Factory setting	Control mode:	All
Unit:	-	Setting range:	13926 to 18842
Format:	DEC	Data size:	16-bit

Settings:

Manually calibrate the hardware offset. The function must be enabled by setting P2.008. Do not change the auxiliary calibration as this parameter cannot be reset.

P4.012	Analog speed input 2 - hardware offset calibration		Address: 0418H 0419H
Default:	Factory setting	Control mode:	All
Unit:	-	Setting range:	13926 to 18842
Format:	DEC	Data size:	16-bit

Settings:

Refer to the description of P4.011.

P4.013	Analog torque input 1 - hardware offset calibration		Address: 041AH 041BH
Default:	Factory setting	Control mode:	All
Unit:	-	Setting range:	13926 to 18842
Format:	DEC	Data size:	16-bit

Settings:

Refer to the description of P4.011.

P4.014	Analog torque input 2 - hardware offset calibration		Address: 041CH 041DH
Default:	Factory setting	Control mode:	All
Unit:	-	Setting range:	13926 to 18842
Format:	DEC	Data size:	16-bit

Settings:

Refer to the description of P4.011.

P4.015	Current detector (V1 phase) - hardware offset calibration		Address: 041EH 041FH
Default:	Factory setting	Control mode:	All
Unit:	-	Setting range:	13926 to 18842
Format:	DEC	Data size:	16-bit

Settings:

Refer to the description of P4.011.

P4.016	Current detector (V2 phase) - hardware offset calibration		Address: 0420H 0421H
Default:	Factory setting	Control mode:	All
Unit:	-	Setting range:	13926 to 18842
Format:	DEC	Data size:	16-bit

Settings:

Refer to the description of P4.011.

P4.017	Current detector (W1 phase) - hardware offset calibration		Address: 0422H 0423H
Default:	Factory setting	Control mode:	All
Unit:	-	Setting range:	13926 to 18842
Format:	DEC	Data size:	16-bit

Settings:

Refer to the description of P4.011.

P4.018	Current detector (W2 phase) - hardware offset calibration		Address: 0424H 0425H
Default:	Factory setting	Control mode:	All
Unit:	-	Setting range:	13926 to 18842
Format:	DEC	Data size:	16-bit

Settings:

Refer to the description of P4.011.

P4.019	IGBT NTC calibration level (cannot reset)		Address: 0426H 0427H
Default:	Factory setting	Control mode:	All
Unit:	-	Setting range:	1 to 4
Format:	DEC	Data size:	16-bit

Settings:

Cool down the drive to 25°C (77°F) before calibration. The function must be enabled by setting P2.008.

P4.020	Analog monitor output (Ch1) - offset compensation value		Address: 0428H 0429H
Default:	0	Control mode:	All
Unit:	mV	Setting range:	-800 to +800
Format:	DEC	Data size:	16-bit

Settings:

Manually adjust the compensation value for the offset (cannot reset). The function must be enabled by setting P2.008.

P4.021	Analog monitor output (Ch2) - offset compensation value		Address: 042AH 042BH
Default:	0	Control mode:	All
Unit:	mV	Setting range:	-800 to +800
Format:	DEC	Data size:	16-bit

Settings:

Manually adjust the compensation value for the offset (cannot reset). The function must be enabled by setting P2.008.

P4.022	Analog speed input - offset compensation value		Address: 042CH 042DH
Default:	0	Control mode:	S
Unit:	mV	Setting range:	-5000 to +5000
Format:	DEC	Data size:	16-bit

Settings:

Manually adjust the compensation value for the offset.

P4.023	Analog torque input - offset compensation value		Address: 042EH 042FH
Default:	0	Control mode:	T
Unit:	mV	Setting range:	-5000 to +5000
Format:	DEC	Data size:	16-bit

Settings:

Manually adjust the compensation value for the offset.

P4.024	Level of undervoltage error		Address: 0430H 0431H
Default:	160	Control mode:	All
Unit:	V (rms)	Setting range:	140 to 380
Format:	DEC	Data size:	16-bit

Settings:

When the voltage of the DC Bus is lower than P4.024 x $\sqrt{2}$, the undervoltage alarm (AL003) occurs.

P4.025 - P4.026	Reserved

P4.027	AL503 diagnosis time (220V models)		Address: 0436H 0437H
Default:	200	Control mode:	All
Unit:	ms	Setting range:	1 to 500
Format:	DEC	Data size:	16-bit

Settings:

This parameter is used to adjust the time duration before the STO internal circuit diagnosis is performed to avoid misdetection and triggering AL503.

P4.028 - P4.043	Reserved

P4.044	Special bit register 5		Address: 0458H 0459H
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x0063
Format:	HEX	Data size:	16-bit

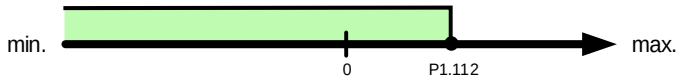
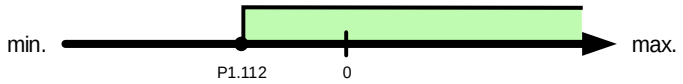
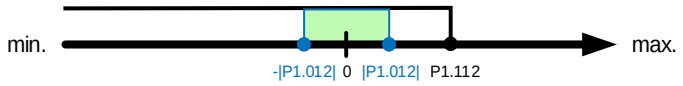
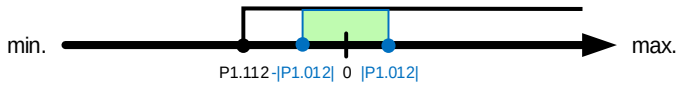
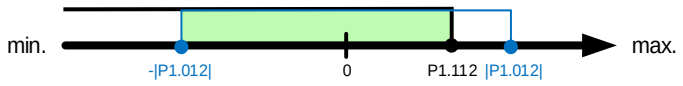
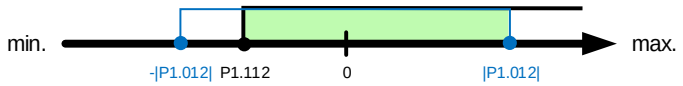
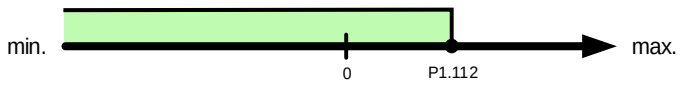
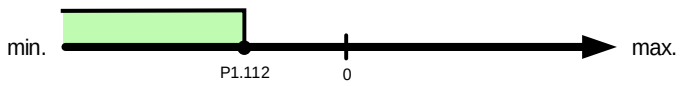
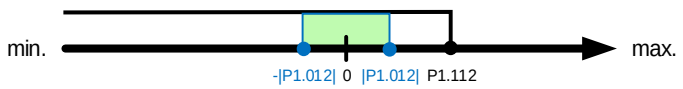
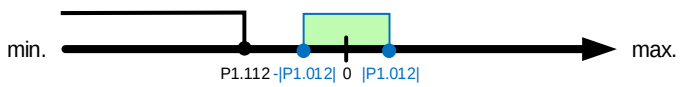
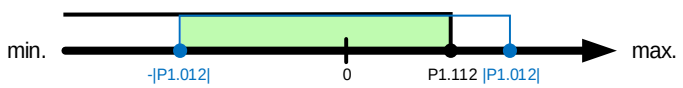
8

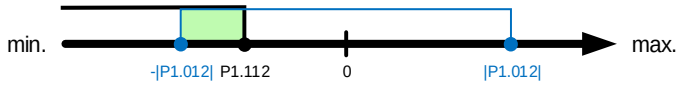
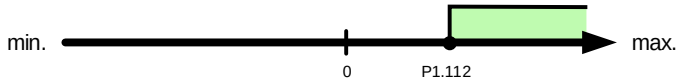
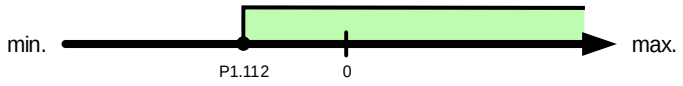
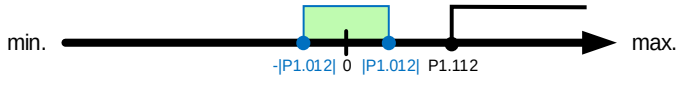
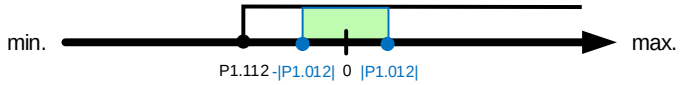
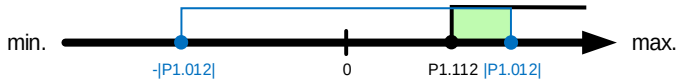
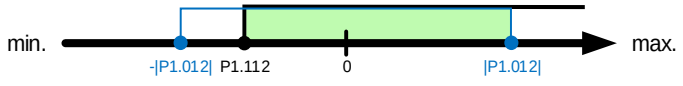
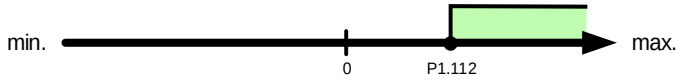
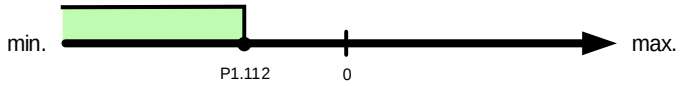
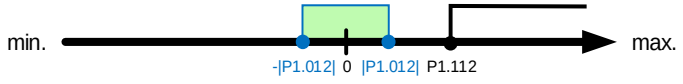
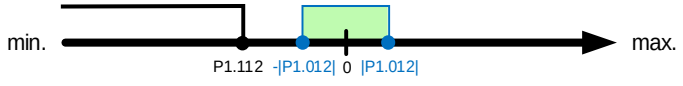
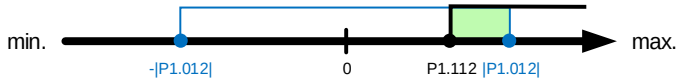
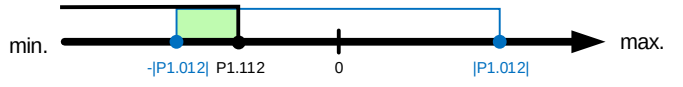
Settings:

X	Single-direction torque limit setting	Z	Reserved
Y	Special function switch	U	Reserved

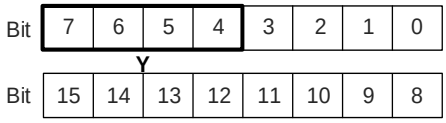
X: single-direction torque limit setting

This setting limits the torque of the motor, and is applicable to external analog commands and internal torque limits (P1.012 - P1.014). The following diagrams are illustrated based on P1.012; you can set parameters P1.012 - P1.014 according to the requirements. The light green highlighted area is the torque limit area.

P4.044.X	P1.012	P1.112	Operating range
0	Disable P1.012 (P1.002.Y = 0)	≥ 0	
		< 0	
	≤ |P1.112|	≥ 0	
		< 0	
	≥ |P1.112|	≥ 0	
		< 0	
1	Disable P1.012 (P1.002.Y = 0)	≥ 0	
		< 0	
	< |P1.112|	≥ 0	
		< 0	
	> |P1.112|	≥ 0	

P4.044.X	P1.012	P1.112	Operating range
1	> |P1.112|	< 0	
2	Disable P1.012 (P1.002.Y = 0)	≥ 0	
		< 0	
	< |P1.112|	≥ 0	
		< 0	
	> |P1.112|	≥ 0	
		< 0	
3	Disable P1.012 (P1.002.Y = 0)	≥ 0	
		< 0	
	< |P1.112|	≥ 0	
		< 0	
	> |P1.112|	≥ 0	
		< 0	

Y: special function switch



Bit	Function	Description
Bit 4	Reserved	-
Bit 5	Function of Velocity offset (OD 60B1h) in EtherCAT mode	0: enable 1: disable
Bit 6	Function of Torque offset (OD 60B2h) in EtherCAT mode	0: enable 1: disable
Bit 7	Reserved	-

P5.xxx Motion control parameters

P5.000★■	Firmware subversion		Address: 0500H 0501H
Default:	Factory setting	Control mode:	All
Unit:	-	Setting range:	-
Format:	DEC	Data size:	32-bit

Settings:

The low word is the subversion of the firmware.

P5.001 - P5.002	Reserved

P5.003	Deceleration time for auto-protection		Address: 0506H 0507H
Default:	0xEEEFEEFF	Control mode:	Except PT
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Digit	D	C	B	A	W	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

1. OVF (DO: 0x12, Position command / feedback overflows), CTO (AL020 Serial communication timeout), SPL, SNL, PL, and NL are auto-protection functions.
2. STP is the stop function.
3. Use 0 - F to index the deceleration time of P5.020 - P5.035. For example: if you set P5.003.X to A, then the deceleration time of PL is determined by P5.030.

P5.004	Homing methods		Address: 0508H 0509H
Default:	0x0000	Control mode:	PR
Unit:	-	Setting range:	0x0000 to 0x012A
Format:	HEX	Data size:	16-bit

Settings:

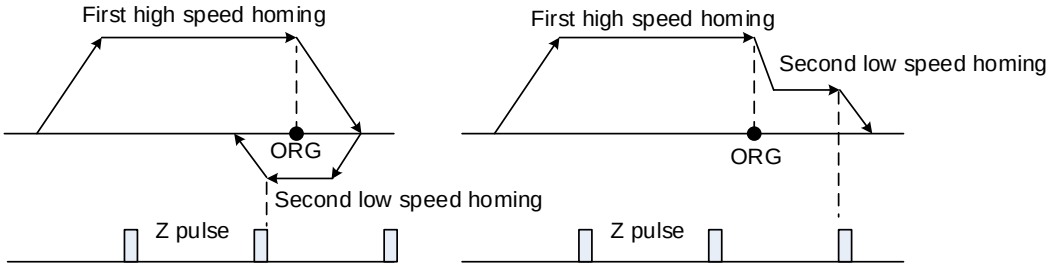
Definition of each setting value:

U	Z	Y	X
Reserved	Limit setting	Z pulse setting	Homing method
-	0 to 1	0 to 2	0 to A
	-	Y = 0: reverse to Z pulse Y = 1: go forward to Z pulse Y = 2: do not look for Z pulse	X = 0: homing in forward direction and define the positive limit as the homing origin
			X = 1: homing in reverse direction and define the negative limit as the homing origin
	When reaching the limit: Z = 0: show error Z = 1: reverse direction		X = 2: homing in forward direction, ORG: OFF→ON as the homing origin
			X = 3: homing in reverse direction with ORG (when it switches from off to on state) as the homing origin
		-	X = 4: look for Z pulse in forward direction and define it as homing origin
			X = 5: look for the Z pulse in reverse direction define it as the homing origin
		Y = 0: reverse to Z pulse Y = 1: go forward to Z pulse Y = 2: do not look for Z pulse	X = 6: homing in forward direction with the ORG (when it switches from on to off state) as the homing origin
			X = 7: homing in reverse direction with ORG (when it switches from on to off state) as the homing origin
	-	-	X = 8: define current position as the origin
	When reaching the limit: Z = 0: show error Z = 1: reverse direction	Y = 0: reverse to Z pulse Y = 2: do not look for Z pulse	X = 9: torque homing in forward direction
			X = A: torque homing in reverse direction

P5.005	High speed homing (first speed setting)			Address: 050AH 050BH
Operation interface:	Panel / software	Communication	Control mode:	PR (set with P5.004)
Default:	100.0	1000	Data size:	32-bit
Unit:	1 rpm	0.1 rpm	-	-
Setting range:	0.1 to 2000.0	1 to 20000	-	-
Format:	DEC	DEC	-	-
Example:	1.5 = 1.5 rpm	15 = 1.5 rpm	-	-

Settings:

The first speed setting for high speed homing.



P5.006	Low speed homing (second speed setting)			Address: 050CH 050DH
Operation interface:	Panel / software	Communication	Control mode:	PR (set with P5.004)
Default:	20.0	200	Data size:	32-bit
Unit:	1 rpm	0.1 rpm	-	-
Setting range:	0.1 to 500.0	1 to 5000	-	-
Format:	DEC	DEC	-	-
Example:	1.5 = 1.5 rpm	15 = 1.5 rpm	-	-

Settings:

The second speed setting for low speed homing.

P5.007■	Trigger Position command (PR mode only)		Address: 050EH 050FH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	0 to 1000
Format:	DEC	Data size:	16-bit

Settings:

1. Set P5.007 to 0 to start homing.
2. 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 - 99 Bit 1 (DI: 0x12) + Command triggered (DI: 0x08)
Method 2	Trigger by P5.007: Set P5.007 to 2 to start executing PR#2

3. Set P5.007 to 1000 to execute the stop command which is the same as DI.STP.

4. When reading P5.007, if the command is incomplete and DO.TPOS is off (the motor does not reach the target position), the drive reads the current command (1 - 99).
   If the command is complete, the drive reads the current command +10000.
   If the command is complete and DO.TPOS is on (the motor reaches the target position), 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 being executed and not yet complete.
   If the value read is 10003, it means PR#3 is complete, but the motor has not reached the target position yet.
   If the value read is 20003, it means PR#3 is complete and the motor reached the target position.

P5.008	Positive software limit		Address: 0510H 0511H
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 moves in the positive direction and its feedback position exceeds the value of P5.008, AL283 occurs.

P5.009	Negative software limit		Address: 0512H 0513H
Default:	-2147483648	Control mode:	PR
Unit:	PUU	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

In PR mode, if the motor moves in the negative direction and its feedback position exceeds the value of P5.009, AL285 occurs.

P5.010★■	Data array: data size		Address: 0514H 0515H
Default:	-	Control mode:	All
Unit:	-	Setting range:	Read-only
Format:	DEC	Data size:	16-bit

Settings:

The total data size is N x 32 bits, where N indicates the number of data sets returned to the data array.

P5.011■	Data array: address for reading and writing		Address: 0516H 0517H
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 to read or write the data array. Refer to Chapter 7 for detailed instructions.

P5.012■	Data array: window #1 for reading and writing		Address: 0518H 0519H
Default:	0	Control mode:	All
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Window #1: when read with the panel, the value set by P5.011 does not add 1, but when read or written by other methods, it adds 1. Refer to Section 7.2.1 Data array for detailed instructions.

P5.013■	Data array: window #2 for reading and writing		Address: 051AH 051BH
Default:	0	Control mode:	All
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Window #2: when read with the panel or read and written through communication, the value set by P5.011 adds 1, but this parameter is not writable with the panel. Refer to Section 7.2.1 Data array for detailed instructions.

P5.014	Reserved

P5.015■	PATH 1 - PATH 2 volatile setting		Address: 051EH 051FH
Default:	0x0000	Control mode:	PR
Unit:	-	Setting range:	0x0000 to 0x0011
Format:	HEX	Data size:	16-bit

Settings:

This parameter allows you to write data to the target continuously through communication.

X	PATH 1 volatile setting	Z	Reserved
Y	PATH 2 volatile setting	U	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 - main encoder		Address: 0520H 0521H
Default:	0	Control mode:	All
Unit:	PUU	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Read: feedback position of the main encoder, which is the monitoring variable 000 (00h) + offset value (value written in P5.016).

Write: writing any value to the parameter neither changes the monitoring variable 000 (00h) nor affects the positioning system. It adjusts the offset value only for easier observation.

P5.017	Reserved

P5.018	Axis position - pulse command		Address: 0524H 0525H
Default:	0	Control mode:	All
Unit:	pulse	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Pulse count from the pulse command.

P5.019	Reserved

P5.020	Acceleration / deceleration time #0		Address: 0528H 0529H
Default:	200	Control mode:	PR
Unit:	ms	Setting range:	1 to 65500
Format:	DEC	Data size:	16-bit

Settings:

The time setting for acceleration or deceleration in PR mode, which is the time duration required for the motor to accelerate from 0 to 3,000 rpm or decelerate from 3,000 rpm to 0.

P5.021	Acceleration / deceleration time #1		Address: 052AH 052BH
Default:	300	Control mode:	PR
Unit:	ms	Setting range:	1 to 65500
Format:	DEC	Data size:	16-bit

Settings:

The time setting for acceleration or deceleration in PR mode. Refer to P5.020 for details.

P5.022	Acceleration / deceleration time #2		Address: 052CH 052DH
Default:	500	Control mode:	PR
Unit:	ms	Setting range:	1 to 65500
Format:	DEC	Data size:	16-bit

Settings:

The time setting for acceleration or deceleration in PR mode. Refer to P5.020 for details.

P5.023	Acceleration / deceleration time #3		Address: 052EH 052FH
Default:	600	Control mode:	PR
Unit:	ms	Setting range:	1 to 65500
Format:	DEC	Data size:	16-bit

Settings:

The time setting for acceleration or deceleration in PR mode. Refer to P5.020 for details.

P5.024	Acceleration / deceleration time #4		Address: 0530H 0531H
Default:	800	Control mode:	PR
Unit:	ms	Setting range:	1 to 65500
Format:	DEC	Data size:	16-bit

Settings:

The time setting for acceleration or deceleration in PR mode. Refer to P5.020 for details.

P5.025	Acceleration / deceleration time #5		Address: 0532H 0533H
Default:	900	Control mode:	PR
Unit:	ms	Setting range:	1 to 65500
Format:	DEC	Data size:	16-bit

Settings:

The time setting for acceleration or deceleration in PR mode. Refer to P5.020 for details.

P5.026	Acceleration / deceleration time #6		Address: 0534H 0535H
Default:	1000	Control mode:	PR
Unit:	ms	Setting range:	1 to 65500
Format:	DEC	Data size:	16-bit

Settings:

The time setting for acceleration or deceleration in PR mode. Refer to P5.020 for details.

P5.027	Acceleration / deceleration time #7		Address: 0536H 0537H
Default:	1200	Control mode:	PR
Unit:	ms	Setting range:	1 to 65500
Format:	DEC	Data size:	16-bit

Settings:

The time setting for acceleration or deceleration in PR mode. Refer to P5.020 for details.

P5.028	Acceleration / deceleration time #8		Address: 0538H 0539H
Default:	1500	Control mode:	PR
Unit:	ms	Setting range:	1 to 65500
Format:	DEC	Data size:	16-bit

Settings:

The time setting for acceleration or deceleration in PR mode. Refer to P5.020 for details.

P5.029	Acceleration / deceleration time #9		Address: 053AH 053BH
Default:	2000	Control mode:	PR
Unit:	ms	Setting range:	1 to 65500
Format:	DEC	Data size:	16-bit

Settings:

The time setting for acceleration or deceleration in PR mode. Refer to P5.020 for details.

P5.030	Acceleration / deceleration time #10		Address: 053CH 053DH
Default:	2500	Control mode:	PR
Unit:	ms	Setting range:	1 to 65500
Format:	DEC	Data size:	16-bit

Settings:

The time setting for acceleration or deceleration in PR mode. Refer to P5.020 for details.

P5.031	Acceleration / deceleration time #11		Address: 053EH 053FH
Default:	3000	Control mode:	PR
Unit:	ms	Setting range:	1 to 65500
Format:	DEC	Data size:	16-bit

Settings:

The time setting for acceleration or deceleration in PR mode. Refer to P5.020 for details.

P5.032	Acceleration / deceleration time #12		Address: 0540H 0541H
Default:	5000	Control mode:	PR
Unit:	ms	Setting range:	1 to 65500
Format:	DEC	Data size:	16-bit

Settings:

The time setting for acceleration or deceleration in PR mode. Refer to P5.020 for details.

P5.033	Acceleration / deceleration time #13		Address: 0542H 0543H
Default:	8000	Control mode:	PR
Unit:	ms	Setting range:	1 to 65500
Format:	DEC	Data size:	16-bit

Settings:

The time setting for acceleration or deceleration in PR mode. Refer to P5.020 for details.

P5.034	Acceleration / deceleration time #14		Address: 0544H 0545H
Default:	50	Control mode:	PR
Unit:	ms	Setting range:	1 to 1500
Format:	DEC	Data size:	16-bit

Settings:

The deceleration time setting for auto-protection. The default value is small for faster deceleration.

P5.035	Acceleration / deceleration time #15		Address: 0546H 0547H
Default:	30	Control mode:	PR
Unit:	ms	Setting range:	1 to 1200
Format:	DEC	Data size:	16-bit

Settings:

The deceleration time setting for auto-protection. The default value is small for faster deceleration.

P5.036	Capture: start address of data array		Address: 0548H 0549H
Default:	0	Control mode:	All
Unit:	-	Setting range:	0 to (value set by P5.010 minus 1)
Format:	DEC	Data size:	16-bit

Settings:

Specifies the address of the data array to save the first data to be captured. This parameter is only writable when Capture stops (refer to P5.039).

P5.037■	Capture: axis position		Address: 054AH 054BH
Default:	0	Control mode:	All
Unit:	Pulse unit of capture source	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Displays the axis position of the Capture pulse source. Note that this parameter is only writable when Capture stops (refer to P5.039). If the pulsesource of Capture is the main encoder, this parameter is write-protected and the axis position is the feedback position of the motor (monitoring variable 00h).

P5.038■	Capture: number of capturing times		Address: 054CH 054DH
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 is not in operation, this parameter indicates the number of data sets expected to be captured (readable and writable). When Capture is in operation, this parameter indicates the remaining number of data to be captured (read-only). Each time one data is captured, the value of P5.038 decrements by 1 until the value is 0, indicating that capturing is complete.

Note: the total number of data sets from Capture cannot exceed 100.

P5.039■	Capture: activate CAP control		Address: 054EH 054FH
Default:	0x2020	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0xF23F
Format:	HEX	Data size:	16-bit

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Settings:

X	Capture setting	Z	Trigger logic
Y	Axis source of Capture	U	Minimum interval between each trigger

■ X: Capture setting

Bit	Function	Description
0	Activate Capture	Start capturing; after capturing is complete, set this bit to 0 automatically (Capture disabled).
1	Reset position	After capturing the first data, reset the position of the first data. The position of the reset point is set by P5.076.
2	Reserved	-
3	Execute PR	Execute PR#50 automatically after capturing is complete.

■ Y: axis source of Capture

0: the Capture function is disabled

1: reserved

2: CN1 (pulse command)

3: CN2 (motor encoder)

■ Z: trigger logic

0: NO (normally open)

1: NC (normally closed)

■ U: minimum interval between each trigger

0 - F: 0 - 15 ms

Note: refer to Chapter 7 for detailed instructions for Capture.

P5.040	Delay time #0 after position reached		Address: 0550H 0551H
Default:	0	Control mode:	PR
Unit:	ms	Setting range:	0 to 32767
Format:	DEC	Data size:	16-bit

Settings:

There are 16 sets of delay time (# 0 - 15) in PR mode. This parameter is the delay time #0 in PR mode.

P5.041	Delay time #1 after position reached		Address: 0552H 0553H
Default:	100	Control mode:	PR
Unit:	ms	Setting range:	0 to 32767
Format:	DEC	Data size:	16-bit

Settings:

Delay time #1 in PR mode.

P5.042	Delay time #2 after position reached		Address: 0554H 0555H
Default:	200	Control mode:	PR
Unit:	ms	Setting range:	0 to 32767
Format:	DEC	Data size:	16-bit

Settings:

Delay time #2 in PR mode.

P5.043	Delay time #3 after position reached		Address: 0556H 0557H
Default:	400	Control mode:	PR
Unit:	ms	Setting range:	0 to 32767
Format:	DEC	Data size:	16-bit

Settings:

Delay time #3 in PR mode.

P5.044	Delay time #4 after position reached		Address: 0558H 0559H
Default:	500	Control mode:	PR
Unit:	ms	Setting range:	0 to 32767
Format:	DEC	Data size:	16-bit

Settings:

Delay time #4 in PR mode.

P5.045	Delay time #5 after position reached		Address: 055AH 055BH
Default:	800	Control mode:	PR
Unit:	ms	Setting range:	0 to 32767
Format:	DEC	Data size:	16-bit

Settings:

Delay time #5 in PR mode.

P5.046	Delay time #6 after position reached		Address: 055CH 055DH
Default:	1000	Control mode:	PR
Unit:	ms	Setting range:	0 to 32767
Format:	DEC	Data size:	16-bit

Settings:

Delay time #6 in PR mode.

P5.047	Delay time #7 after position reached		Address: 055EH 055FH
Default:	1500	Control mode:	PR
Unit:	ms	Setting range:	0 to 32767
Format:	DEC	Data size:	16-bit

Settings:

Delay time #7 in PR mode.

P5.048	Delay time #8 after position reached		Address: 0560H 0561H
Default:	2000	Control mode:	PR
Unit:	ms	Setting range:	0 to 32767
Format:	DEC	Data size:	16-bit

Settings:

Delay time #8 in PR mode.

P5.049	Delay time #9 after position reached		Address: 0562H 0563H
Default:	2500	Control mode:	PR
Unit:	ms	Setting range:	0 to 32767
Format:	DEC	Data size:	16-bit

Settings:

Delay time #9 in PR mode.

P5.050	Delay time #10 after position reached		Address: 0564H 0565H
Default:	3000	Control mode:	PR
Unit:	ms	Setting range:	0 to 32767
Format:	DEC	Data size:	16-bit

Settings:

Delay time #10 in PR mode.

P5.051	Delay time #11 after position reached		Address: 0566H 0567H
Default:	3500	Control mode:	PR
Unit:	ms	Setting range:	0 to 32767
Format:	DEC	Data size:	16-bit

Settings:

Delay time #11 in PR mode.

P5.052	Delay time #12 after position reached		Address: 0568H 0569H
Default:	4000	Control mode:	PR
Unit:	ms	Setting range:	0 to 32767
Format:	DEC	Data size:	16-bit

Settings:

Delay time #12 in PR mode.

P5.053	Delay time #13 after position reached		Address: 056AH 056BH
Default:	4500	Control mode:	PR
Unit:	ms	Setting range:	0 to 32767
Format:	DEC	Data size:	16-bit

Settings:

Delay time #13 in PR mode.

P5.054	Delay time #14 after position reached		Address: 056CH 056DH
Default:	5000	Control mode:	PR
Unit:	ms	Setting range:	0 to 32767
Format:	DEC	Data size:	16-bit

Settings:

Delay time #14 in PR mode.

P5.055	Delay time #15 after position reached		Address: 056EH 056FH
Default:	5500	Control mode:	PR
Unit:	ms	Setting range:	0 to 32767
Format:	DEC	Data size:	16-bit

Settings:

Delay time #15 in PR mode.

P5.056 - P5.059	Reserved

P5.060	Target speed setting #0			Address: 0578H 0579H
Operation interface:	Panel / software	Communication	Control mode:	PR
Default:	20.0	200	Data size:	32-bit
Unit:	1 rpm	0.1 rpm	-	-
Setting range:	0.0 to 7500.0	0 to 75000	-	-
Format:	DEC	DEC	-	-
Example:	15 = 15 rpm	150 = 15 rpm	-	-

Settings:

Target speed #0 of PR mode.

P5.061	Target speed setting #1			Address: 057AH 057BH
Operation interface:	Panel / software	Communication	Control mode:	PR
Default:	50.0	500	Data size:	32-bit
Unit:	1 rpm	0.1 rpm	-	-
Setting range:	0.0 to 7500.0	0 to 75000	-	-
Format:	DEC	DEC	-	-
Example:	15 = 15 rpm	150 = 15 rpm	-	-

Settings:

Target speed #1 of PR mode.

P5.062	Target speed setting #2			Address: 057CH 057DH
Operation interface:	Panel / software	Communication	Control mode:	PR
Default:	100.0	1000	Data size:	32-bit
Unit:	1 rpm	0.1 rpm	-	-
Setting range:	0.0 to 7500.0	0 to 75000	-	-
Format:	DEC	DEC	-	-
Example:	15 = 15 rpm	150 = 15 rpm	-	-

Settings:

Target speed #2 of PR mode.

P5.063	Target speed setting #3			Address: 057EH 057FH
Operation interface:	Panel / software	Communication	Control mode:	PR
Default:	200.0	2000	Data size:	32-bit
Unit:	1 rpm	0.1 rpm	-	-
Setting range:	0.0 to 7500.0	0 to 75000	-	-
Format:	DEC	DEC	-	-
Example:	15 = 15 rpm	150 = 15 rpm	-	-

Settings:

Target speed #3 of PR mode.

P5.064	Target speed setting #4			Address: 0580H 0581H
Operation interface:	Panel / software	Communication	Control mode:	PR
Default:	300.0	3000	Data size:	32-bit
Unit:	1 rpm	0.1 rpm	-	-
Setting range:	0.0 to 7500.0	0 to 75000	-	-
Format:	DEC	DEC	-	-
Example:	15 = 15 rpm	150 = 15 rpm	-	-

Settings:

Target speed #4 of PR mode.

P5.065	Target speed setting #5			Address: 0582H 0583H
Operation interface:	Panel / software	Communication	Control mode:	PR
Default:	500.0	5000	Data size:	32-bit
Unit:	1 rpm	0.1 rpm	-	-
Setting range:	0.0 to 7500.0	0 to 75000	-	-
Format:	DEC	DEC	-	-
Example:	15 = 15 rpm	150 = 15 rpm	-	-

Settings:

Target speed #5 of PR mode.

P5.066	Target speed setting #6			Address: 0584H 0585H
Operation interface:	Panel / software	Communication	Control mode:	PR
Default:	600.0	6000	Data size:	32-bit
Unit:	1 rpm	0.1 rpm	-	-
Setting range:	0.0 to 7500.0	0 to 75000	-	-
Format:	DEC	DEC	-	-
Example:	15 = 15 rpm	150 = 15 rpm	-	-

Settings:

Target speed #6 of PR mode.

P5.067	Target speed setting #7			Address: 0586H 0587H
Operation interface:	Panel / software	Communication	Control mode:	PR
Default:	800.0	8000	Data size:	32-bit
Unit:	1 rpm	0.1 rpm	-	-
Setting range:	0.0 to 7500.0	0 to 75000	-	-
Format:	DEC	DEC	-	-
Example:	15 = 15 rpm	150 = 15 rpm	-	-

Settings:

Target speed #7 of PR mode.

P5.068	Target speed setting #8			Address: 0588H 0589H
Operation interface:	Panel / software	Communication	Control mode:	PR
Default:	1000.0	10000	Data size:	32-bit
Unit:	1 rpm	0.1 rpm	-	-
Setting range:	0.0 to 7500.0	0 to 75000	-	-
Format:	DEC	DEC	-	-
Example:	15 = 15 rpm	150 = 15 rpm	-	-

Settings:

Target speed #8 of PR mode.

P5.069	Target speed setting #9			Address: 058AH 058BH
Operation interface:	Panel / software	Communication	Control mode:	PR
Default:	1300.0	13000	Data size:	32-bit
Unit:	1 rpm	0.1 rpm	-	-
Setting range:	0.0 to 7500.0	0 to 75000	-	-
Format:	DEC	DEC	-	-
Example:	15 = 15 rpm	150 = 15 rpm	-	-

Settings:

Target speed #9 of PR mode.

P5.070	Target speed setting #10			Address: 058CH 058DH
Operation interface:	Panel / software	Communication	Control mode:	PR
Default:	1500.0	15000	Data size:	32-bit
Unit:	1 rpm	0.1 rpm	-	-
Setting range:	0.0 to 7500.0	0 to 75000	-	-
Format:	DEC	DEC	-	-
Example:	15 = 15 rpm	150 = 15 rpm	-	-

Settings:

Target speed #10 of PR mode.

P5.071	Target speed setting #11			Address: 058EH 058FH
Operation interface:	Panel / software	Communication	Control mode:	PR
Default:	1800.0	18000	Data size:	32-bit
Unit:	1 rpm	0.1 rpm	-	-
Setting range:	0.0 to 7500.0	0 to 75000	-	-
Format:	DEC	DEC	-	-
Example:	15 = 15 rpm	150 = 15 rpm	-	-

Settings:

Target speed #11 of PR mode.

P5.072	Target speed setting #12			Address: 0590H 0591H
Operation interface:	Panel / software	Communication	Control mode:	PR
Default:	2000.0	20000	Data size:	32-bit
Unit:	1 rpm	0.1 rpm	-	-
Setting range:	0.0 to 7500.0	0 to 75000	-	-
Format:	DEC	DEC	-	-
Example:	15 = 15 rpm	150 = 15 rpm	-	-

Settings:

Target speed #12 of PR mode.

P5.073	Target speed setting #13			Address: 0592H 0593H
Operation interface:	Panel / software	Communication	Control mode:	PR
Default:	2300.0	23000	Data size:	32-bit
Unit:	1 rpm	0.1 rpm	-	-
Setting range:	0.0 to 7500.0	0 to 75000	-	-
Format:	DEC	DEC	-	-
Example:	15 = 15 rpm	150 = 15 rpm	-	-

Settings:

Target speed #13 of PR mode.

P5.074	Target speed setting #14			Address: 0594H 0595H
Operation interface:	Panel / software	Communication	Control mode:	PR
Default:	2500.0	25000	Data size:	32-bit
Unit:	1 rpm	0.1 rpm	-	-
Setting range:	0.0 to 7500.0	0 to 75000	-	-
Format:	DEC	DEC	-	-
Example:	15 = 15 rpm	150 = 15 rpm	-	-

Settings:

Target speed #14 of PR mode.

P5.075	Target speed setting #15			Address: 0596H 0597H
Operation interface:	Panel / software	Communication	Control mode:	PR
Default:	3000.0	30000	Data size:	32-bit
Unit:	1 rpm	0.1 rpm	-	-
Setting range:	0.0 to 7500.0	0 to 75000	-	-
Format:	DEC	DEC	-	-
Example:	15 = 15 rpm	150 = 15 rpm	-	-

Settings:

Target speed #15 of PR mode.

P5.076	Capture: reset position after first data captured		Address: 0598H 0599H
Default:	0	Control mode:	All
Unit:	Pulse unit of capture source	Setting range:	-1073741824 to +1073741823
Format:	DEC	Data size:	32-bit

Settings:

If the position reset function is enabled (P5.039.X [Bit 1] = 1), after the first position data is captured, the servo resets the position of the first point, and the position of the reset point is defined by this parameter.

P5.077 - P5.092	Reserved

P5.093	Motion control macro command: command parameter #4		Address: 05BAH 05BBH
Default:	0x00000000	Control mode:	All
Unit:	-	Setting range:	0x00000000 to 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Before issuing the macro command, set the relevant parameters 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		Address: 05BCH 05BDH
Default:	0	Control mode:	All
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to P5.093 for details.

P5.095	Motion control macro command: command parameter #2		Address: 05BEH 05BFH
Default:	0	Control mode:	All
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to P5.093 for details.

P5.096	Motion control macro command: command parameter #1		Address: 05C0H 05C1H
Default:	0	Control mode:	All
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to P5.093 for details.

P5.097■	Motion control macro command: issue command / read execution result		Address: 05C2H 05C3H
Default:	0x0000	Control mode:	All
Unit:	-	Setting range:	0x0000 to 0x099F
Format:	HEX	Data size:	16-bit

Settings:

Write to this parameter to issue a macro command; read this parameter to examine the execution result of a macro command.

When you write the command code 0x0003 to this parameter, 0x1003 is returned if successful; and 0xF03X if unsuccessful (depending on the command description). If you issue a command that is not supported, the failure code 0xF001 is returned.

The command codes are listed in the following tables:

Command code 0x0003	Parameter and data array protection: password setting, protection activation
	This function can only be executed prior to activating the parameter protection function. When the protection function is activated, the failure code is returned if this function is executed repeatedly.
Macro parameters	P5.093 = parameter write protection 0: disabled 1: enabled P5.094 = read protection range of parameter and data array (-1 to 8) -1: parameter groups 5, 6, 7 and data array are readable 0: parameter groups 5, 6, 7 and data array are unreadable 1: parameter groups 5, 6, 7 and data array #100 - 799 are unreadable 2: parameter groups 5, 6, 7 and data array #200 - 799 are unreadable 3: parameter groups 5, 6, 7 and data array #300 - 799 are unreadable 4: parameter groups 5, 6, 7 and data array #400 - 799 are unreadable 5: parameter groups 5, 6, 7 and data array #500 - 799 are unreadable 6: parameter groups 5, 6, 7 and data array #600 - 799 are unreadable 7: parameter groups 5, 6, 7 are unreadable, but data array is readable 8: all parameter groups (P0 - P7) are unreadable P5.095 = set new password (1 - 16777215) P5.096 = confirm new password (1 - 16777215)
Read the return value of P5.097 after executing the macro	Success code
	0x1003
	Failure code
	0xF031: protection function is activated and cannot be set repeatedly
	0xF032: wrong password setting; P5.095 does not equal P5.096
	0xF033: password value exceeds the allowable range (1 - 16777215)
	0xF034: protection range P5.094 exceeds the allowable range (-1 to 8)
	0xF035: protection level P5.093 exceeds the allowable range (0 - 1)

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Command code 0x0004	**Parameter and data array protection: unlock protection**
	This function can only be executed when the protection function is activated. When the protection function is unlocked, the failure code is returned if this function is executed repeatedly. If the wrong password is entered, failure code 0xEnnn is returned. nnn indicates the remaining attempts to enter the password. The number decrements by 1 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.
Macro parameter	P5.096 = enter password (1 - 16777215)
Read the return value of P5.097 after executing the macro	Success code
	0x1004
	Failure code
	0xF041: protection function is unlocked and cannot be unlocked repeatedly
	0xF043: password value exceeds the allowable range (1 - 16777215)
	0xF044: the maximum number of failed password attempts has been reached and it is locked. You can only unlock by resetting the parameters (P2.008 = 10), but this also resets all parameters to the default values.
	0xEnnn: incorrect password setting; failed to unlock nnn: remaining attempts to enter the password. The number decrements by 1 after each failed attempt. When the number displays 0, the function is disabled and does not allow further attempts.

P5.098	**PR number triggered by event rising-edge**		**Address: 05C4H 05C5H**
Default:	0x0000	Control mode:	PR
Unit:	-	Setting range:	0x0000 to 0xDDDD
Format:	HEX	Data size:	16-bit

Settings:

X	The action when PR is EV1 rising-edge triggered	Z	The action when PR is EV3 rising-edge triggered
Y	The action when PR is EV2 rising-edge triggered	U	The action when PR is EV4 rising-edge triggered

- X: the action when EV1 is on

  0: no action

  1 - D: execute PR#51 - 63

- Y: the action when EV2 is on

  0: no action

  1 - D: execute PR#51 - 63

- Z: the action when EV3 is on

  0: no action

  1 - D: execute PR#51 - 63

- U: the action when EV4 is on

  0: no action

  1 - D: execute PR#51 - 63

P5.099	PR number triggered by event falling-edge		Address: 05C6H 05C7H
Default:	0x0000	Control mode:	PR
Unit:	-	Setting range:	0x0000 to 0xDDDD
Format:	HEX	Data size:	16-bit

Settings:

X	The action when PR is EV1 falling-edge triggered	Z	The action when PR is EV3 falling-edge triggered
Y	The action when PR is EV2 falling-edge triggered	U	The action when PR is EV4 falling-edge triggered

■ X: the action when EV1 is off

0: no action

1 - D: execute PR#51 - 63

■ Y: the action when EV2 is off

0: no action

1 - D: execute PR#51 - 63

■ Z: the action when EV3 is off

0: no action

1 - D: execute PR#51 - 63

■ U: the action when EV4 is off

0: no action

1 - D: execute PR#51 - 63

P5.100■	Data array: window #3 for reading and writing		Address: 05C8H 05C9H
Default:	0	Control mode:	All
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Window #3: when read or written by any method, the value set by P5.011 does not add 1.

Refer to Section 7.2.1 Data array for detailed instructions.

P5.101■	Data array: window #4 for reading and writing		Address: 05CAH 05CBH
Default:	0	Control mode:	All
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Window #4: when read or written by any method, the value set by P5.011 does not add 1.

Refer to Section 7.2.1 Data array for detailed instructions.

P5.102■	Data array: window #5 for reading and writing		Address: 05CCH 05CDH
Default:	0	Control mode:	All
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Window #5: when read or written by any method, the value set by P5.011 does not add 1.

Refer to Section 7.2.1 Data array for detailed instructions.

P5.103■	Data array: window #6 for reading and writing		Address: 05CEH 05CFH
Default:	0	Control mode:	All
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Window #6: when read or written by any method, the value set by P5.011 does not add 1.

Refer to Section 7.2.1 Data array for detailed instructions.

P6.xxx PR parameters

P6.000	Homing definition		Address: 0600H 0601H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFF6F
Format:	HEX	Data size:	32-bit

Settings:

High word

D C B A

Low word

U Z YX

A	DEC2: deceleration time selection for second homing	YX	PATH: path type
B	DLY: select 0 - F for delay time	Z	ACC: select 0 - F for acceleration time
C	Reserved	U	DEC1: deceleration time selection for first homing
D	BOOT: whether to execute homing automatically when the drive is powered on	-	-

- YX: PATH: path type

  0x00: Stop: the servo stops after homing is complete

  0x01 - 0x63: Auto: the servo executes the specified path (PR#1 - PR#99) after homing is complete

- Z: ACC: select 0 - F for acceleration time

  0 - F: correspond to P5.020 - P5.035

- U: DEC1: deceleration time selection for first homing

  0 - F: correspond to P5.020 - P5.035

- A: DEC2: deceleration time selection for second homing

  0 - F: correspond to P5.020 - P5.035

- B: DLY: select 0 - F for delay time

  0 - F: correspond to P5.040 - P5.055

- D: BOOT: whether to execute homing automatically when the drive is powered on

  0: do not execute homing

  1: execute homing automatically (servo switches to on for the first time after power is applied)

Apart from the preceding definitions, the related settings for homing also include:

1. P5.004: homing methods.
2. P5.005 - P5.006: speed settings for homing.
3. P6.001: the origin definition (ORG_DEF) is the position of the origin and may not be 0. This function is used as a traversal of the position system.

Note:

1. After finding the origin (sensor or Z), the servo has to decelerate to a stop. The stop position exceeds the origin by a short distance:
   If returning to the origin is not needed, set PATH to 0x00.
   If returning to the origin is needed, set PATH to 0x01 to 0x63 and set the route as PABS = 0.

Example:
When P6.000 = 0x0001, the servo automatically executes PR#1 after homing is complete.
Set the route of PR#1 (setting P6.002 & P6.003) as moving to the absolute position of 0.

2. If the origin is found (sensor or Z) and you want the servo to move an offset S and define the position after moving as P, then set PATH = non-zero and set ORG_DEF = P - S, and this absolute Position command = P.

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P6.001	Origin definition		Address: 0602H 0603H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Origin definition.

P6.002	PATH 1 definition		Address: 0604H 0605H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

High word

D C B A

Low word

U Z Y X

A	SPD, Target speed[Note]	X	TYPE, Path type
B	DLY, Delay time	Y	OPT, Option
C	AUTO[Note]	Z	ACC, Acceleration time[Note]
D	Reserved	U	DEC, Deceleration time[Note]

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 automatically loads the next path when finished.
-	-	-	INS	7: JUMP, jump to the specified path.
-	ROM	AUTO	INS	8: WRITE, write specified parameter to specified path.
DIR		OVLP	INS	A: INDEX, rotary axis position control.

TYPE (path type): when 1, 2, or 3 is executed, the motor operation can be interrupted and stopped by DI.STP and software limits.

INS: interrupts the previous path when the current path is executed.

OVLP: allow overlapping of the next path. Overlapping is not allowed in Speed mode.

AUTO: once current PR path is finished, automatically load the next path.

CMD, DIR, ROM, and UNIT: refer to Section 7.1.3 Motion Control commands.

■ UZ

U: DEC, Deceleration time	Z: ACC, Acceleration time	Corresponding parameter	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

A	Corresponding parameter	Default value (rpm)
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

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■ B: DLY, delay time

B	Corresponding parameter	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, automatically load the next path.

This function is enabled only when P6.002.X = A (rotary axis position control).

Description of each bit:

Bit	Function	Description
Bit 0 - Bit 1	Reserved	-
Bit 2	AUTO	0: disable auto function 1: once current PR path is finished, automatically load the next path

Note: the parameter format definition [C, A, U, Z] is different from the preceding table when P6.002.X = 8 (write specified parameter to specified path). Refer to Chapter 7 for detailed instructions.

P6.003	**PATH 1 data**		**Address: 0606H 0607H**
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 and P6.003 defines the target position of P6.002 or the target path for the Jump command.

P6.004	**PATH 2 definition**		**Address: 0608H 0609H**
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.005	PATH 2 data		Address: 060AH 060BH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.006	PATH 3 definition		Address: 060CH 060DH
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.007	PATH 3 data		Address: 060EH 060FH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.008	PATH 4 definition		Address: 0610H 0611H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.009	PATH 4 data		Address: 0612H 0613H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.010	PATH 5 definition		Address: 0614H 0615H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.011	PATH 5 data		Address: 0616H 0617H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.012	PATH 6 definition		Address: 0618H 0619H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.013	PATH 6 data		Address: 061AH 061BH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.014	PATH 7 definition		Address: 061CH 061DH
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.015	PATH 7 data		Address: 061EH 061FH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.016	PATH 8 definition		Address: 0620H 0621H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.017	PATH 8 data		Address: 0622H 0623H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.018	PATH 9 definition		Address: 0624H 0625H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.019	PATH 9 data		Address: 0626H 0627H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.020	PATH 10 definition		Address: 0628H 0629H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.021	PATH 10 data		Address: 062AH 062BH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.022	PATH 11 definition		Address: 062CH 062DH
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.023	PATH 11 data		Address: 062EH 062FH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.024	PATH 12 definition		Address: 0630H 0631H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.025	PATH 12 data		Address: 0632H 0633H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.026	PATH 13 definition		Address: 0634H 0635H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.027	PATH 13 data		Address: 0636H 0637H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.028	PATH 14 definition		Address: 0638H 0639H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.029	PATH 14 data		Address: 063AH 063BH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.030	PATH 15 definition		Address: 063CH 063DH
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.031	PATH 15 data		Address: 063EH 063FH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.032	PATH 16 definition		Address: 0640H 0641H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.033	PATH 16 data		Address: 0642H 0643H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.034	PATH 17 definition		Address: 0644H 0645H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.035	PATH 17 data		Address: 0646H 0647H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.036	PATH 18 definition		Address: 0648H 0649H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.037	PATH 18 data		Address: 064AH 064BH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.038	PATH 19 definition		Address: 064CH 064DH
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.039	PATH 19 data		Address: 064EH 064FH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.040	PATH 20 definition		Address: 0650H 0651H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.041	PATH 20 data		Address: 0652H 0653H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.042	PATH 21 definition		Address: 0654H 0655H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.043	PATH 21 data		Address: 0656H 0657H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.044	PATH 22 definition		Address: 0658H 0659H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.045	PATH 22 data		Address: 065AH 065BH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.046	PATH 23 definition		Address: 065CH 065DH
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.047	PATH 23 data		Address: 065EH 065FH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.048	PATH 24 definition		Address: 0660H 0661H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.049	PATH 24 data		Address: 0662H 0663H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.050	PATH 25 definition		Address: 0664H 0665H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.051	PATH 25 data		Address: 0666H 0667H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.052	PATH 26 definition		Address: 0668H 0669H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.053	PATH 26 data		Address: 066AH 066BH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.054	PATH 27 definition		Address: 066CH 066DH
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.055	PATH 27 data		Address: 066EH 066FH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.056	PATH 28 definition		Address: 0670H 0671H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.057	PATH 28 data		Address: 0672H 0673H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.058	PATH 29 definition		Address: 0674H 0675H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.059	PATH 29 data		Address: 0676H 0677H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.060	PATH 30 definition		Address: 0678H 0679H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.061	PATH 30 data		Address: 067AH 067BH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.062	PATH 31 definition		Address: 067CH 067DH
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.063	PATH 31 data		Address: 067EH 067FH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.064	PATH 32 definition		Address: 0680H 0681H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.065	PATH 32 data		Address: 0682H 0683H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.066	PATH 33 definition		Address: 0684H 0685H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.067	PATH 33 data		Address: 0686H 0687H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.068	PATH 34 definition		Address: 0688H 0689H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.069	PATH 34 data		Address: 068AH 068BH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.070	PATH 35 definition		Address: 068CH 068DH
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.071	PATH 35 data		Address: 068EH 068FH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.072	PATH 36 definition		Address: 0690H 0691H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.073	PATH 36 data		Address: 0692H 0693H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.074	PATH 37 definition		Address: 0694H 0695H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.075	PATH 37 data		Address: 0696H 0697H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.076	PATH 38 definition		Address: 0698H 0699H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.077	PATH 38 data		Address: 069AH 069BH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.078	PATH 39 definition		Address: 069CH 069DH
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.079	PATH 39 data		Address: 069EH 069FH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.080	PATH 40 definition		Address: 06A0H 06A1H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.081	PATH 40 data		Address: 06A2H 06A3H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.082	PATH 41 definition		Address: 06A4H 06A5H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.083	PATH 41 data		Address: 06A6H 06A7H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.084	PATH 42 definition		Address: 06A8H 06A9H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.085	PATH 42 data		Address: 06AAH 06ABH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.086	PATH 43 definition		Address: 06ACH 06ADH
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.087	PATH 43 data		Address: 06AEH 06AFH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.088	PATH 44 definition		Address: 06B0H 06B1H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.089	PATH 44 data		Address: 06B2H 06B3H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.090	PATH 45 definition		Address: 06B4H 06B5H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.091	PATH 45 data		Address: 06B6H 06B7H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.092	PATH 46 definition		Address: 06B8H 06B9H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.093	PATH 46 data		Address: 06BAH 06BBH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.094	PATH 47 definition		Address: 06BCH 06BDH
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.095	PATH 47 data		Address: 06BEH 06BFH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.096	PATH 48 definition		Address: 06C0H 06C1H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.097	PATH 48 data		Address: 06C2H 06C3H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P6.098	PATH 49 definition		Address: 06C4H 06C5H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P6.099	PATH 49 data		Address: 06C6H 06C7H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.xxx PR parameters

P7.000	PATH 50 definition		Address: 0700H 0701H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.001	PATH 50 data		Address: 0702H 0703H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.002	PATH 51 definition		Address: 0704H 0705H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.003	PATH 51 data		Address: 0706H 0707H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.004	PATH 52 definition		Address: 0708H 0709H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.005	PATH 52 data		Address: 070AH 070BH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.006	PATH 53 definition		Address: 070CH 070DH
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.007	PATH 53 data		Address: 070EH 070FH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.008	PATH 54 definition		Address: 0710H 0711H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.009	PATH 54 data		Address: 0712H 0713H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.010	PATH 55 definition		Address: 0714H 0715H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.011	PATH 55 data		Address: 0716H 0717H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.012	PATH 56 definition		Address: 0718H 0719H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.013	PATH 56 data		Address: 071AH 071BH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.014	PATH 57 definition		Address: 071CH 071DH
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.015	PATH 57 data		Address: 071EH 071FH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.016	PATH 58 definition		Address: 0720H 0721H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.017	PATH 58 data		Address: 0722H 0723H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.018	PATH 59 definition		Address: 0724H 0725H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.019	PATH 59 data		Address: 0726H 0727H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.020	PATH 60 definition		Address: 0728H 0729H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.021	PATH 60 data		Address: 072AH 072BH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.022	PATH 61 definition		Address: 072CH 072DH
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.023	PATH 61 data		Address: 072EH 072FH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.024	PATH 62 definition		Address: 0730H 0731H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.025	PATH 62 data		Address: 0732H 0733H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.026	PATH 63 definition		Address: 0734H 0735H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.027	PATH 63 data		Address: 0736H 0737H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.028	PATH 64 definition		Address: 0738H 0739H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.029	PATH 64 data		Address: 073AH 073BH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.030	PATH 65 definition		Address: 073CH 073DH
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.031	PATH 65 data		Address: 073EH 073FH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.032	PATH 66 definition		Address: 0740H 0741H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.033	PATH 66 data		Address: 0742H 0743H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.034	PATH 67 definition		Address: 0744H 0745H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.035	PATH 67 data		Address: 0746H 0747H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.036	PATH 68 definition		Address: 0748H 0749H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.037	PATH 68 data		Address: 074AH 074BH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.038	PATH 69 definition		Address: 074CH 074DH
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.039	PATH 69 data		Address: 074EH 074FH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.040	PATH 70 definition		Address: 0750H 0751H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.041	PATH 70 data		Address: 0752H 0753H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.042	PATH 71 definition		Address: 0754H 0755H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.043	PATH 71 data		Address: 0756H 0757H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.044	PATH 72 definition		Address: 0758H 0759H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.045	PATH 72 data		Address: 075AH 075BH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.046	PATH 73 definition		Address: 075CH 075DH
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.047	PATH 73 data		Address: 075EH 075FH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.048	PATH 74 definition		Address: 0760H 0761H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.049	PATH 74 data		Address: 0762H 0763H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.050	PATH 75 definition		Address: 0764H 0765H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.051	PATH 75 data		Address: 0766H 0767H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.052	PATH 76 definition		Address: 0768H 0769H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.053	PATH 76 data		Address: 076AH 076BH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.054	PATH 77 definition		Address: 076CH 076DH
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.055	PATH 77 data		Address: 076EH 076FH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.056	PATH 78 definition		Address: 0770H 0771H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.057	PATH 78 data		Address: 0772H 0773H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.058	PATH 79 definition		Address: 0774H 0775H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.059	PATH 79 data		Address: 0776H 0777H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.060	PATH 80 definition		Address: 0778H 0779H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.061	PATH 80 data		Address: 077AH 077BH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.062	PATH 81 definition		Address: 077CH 077DH
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.063	PATH 81 data		Address: 077EH 077FH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.064	PATH 82 definition		Address: 0780H 0781H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.065	PATH 82 data		Address: 0782H 0783H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.066	PATH 83 definition		Address: 0784H 0785H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.067	PATH 83 data		Address: 0786H 0787H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.068	PATH 84 definition		Address: 0788H 0789H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.069	PATH 84 data		Address: 078AH 078BH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.070	PATH 85 definition		Address: 078CH 078DH
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.071	PATH 85 data		Address: 078EH 078FH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.072	PATH 86 definition		Address: 0790H 0791H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.073	PATH 86 data		Address: 0792H 0793H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.074	PATH 87 definition		Address: 0794H 0795H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.075	PATH 87 data		Address: 0796H 0797H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.076	PATH 88 definition		Address: 0798H 0799H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.077	PATH 88 data		Address: 079AH 079BH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.078	PATH 89 definition		Address: 079CH 079DH
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.079	PATH 89 data		Address: 079EH 079FH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.080	PATH 90 definition		Address: 07A0H 07A1H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.081	PATH 90 data		Address: 07A2H 07A3H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.082	PATH 91 definition		Address: 07A4H 07A5H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.083	PATH 91 data		Address: 07A6H 07A7H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.084	PATH 92 definition		Address: 07A8H 07A9H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.085	PATH 92 data		Address: 07AAH 07ABH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.086	PATH 93 definition		Address: 07ACH 07ADH
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.087	PATH 93 data		Address: 07AEH 07AFH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.088	PATH 94 definition		Address: 07B0H 07B1H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.089	PATH 94 data		Address: 07B2H 07B3H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.090	PATH 95 definition		Address: 07B4H 07B5H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.091	PATH 95 data		Address: 07B6H 07B7H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.092	PATH 96 definition		Address: 07B8H 07B9H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.093	PATH 96 data		Address: 07BAH 07BBH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.094	PATH 97 definition		Address: 07BCH 07BDH
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.095	PATH 97 data		Address: 07BEH 07BFH
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.096	PATH 98 definition		Address: 07C0H 07C1H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.097	PATH 98 data		Address: 07C2H 07C3H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

P7.098	PATH 99 definition		Address: 07C4H 07C5H
Default:	0x00000000	Control mode:	PR
Unit:	-	Setting range:	0x00000000 - 0xFFFFFFFF
Format:	HEX	Data size:	32-bit

Settings:

Refer to the description of P6.002.

P7.099	PATH 99 data		Address: 07C6H 07C7H
Default:	0	Control mode:	PR
Unit:	-	Setting range:	-2147483648 to +2147483647
Format:	DEC	Data size:	32-bit

Settings:

Refer to the description of P6.003.

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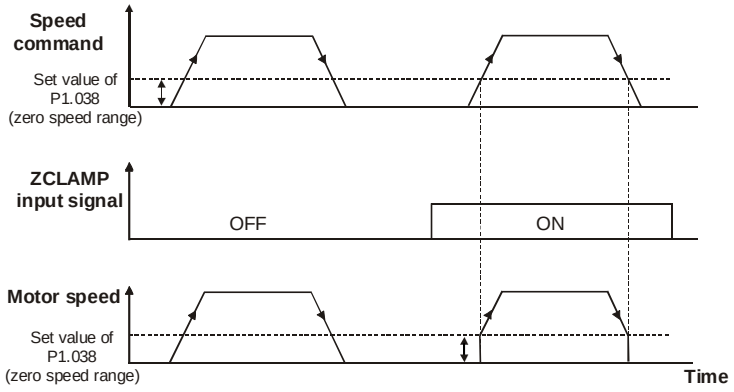
Table 8.1 Digital input (DI) descriptions

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	After you troubleshoot the alarm, this DI is on and the error signal displayed by the servo drive is cleared.	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 set to 0x0001), the gain value switches to the value which is the original gain multiplied by the rate of change.	Level triggered	PT, PR, S

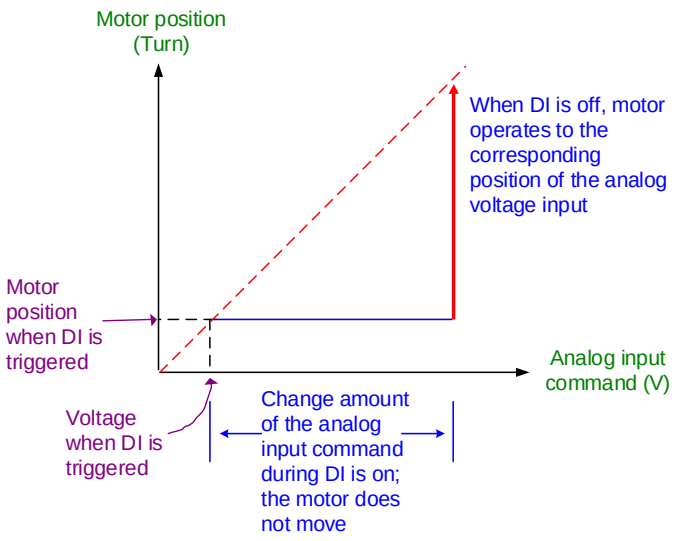
Value: 0x04			
DI name	Description	Triggering method	Control mode
CCLR	Clear the pulse counter. Refer to P2.050 for the methods to clear the pulses. When this DI is on, the accumulative position pulse deviation of the drive (P0.002 = 33) is cleared to 0.	Rising-edge triggered, level triggered	PT, PR

Value: 0x05			
DI name	Description	Triggering method	Control mode
ZCLAMP	When the speed is slower than the setting of P1.038 (zero speed range), the motor stops operating when this DI is on.  	Level triggered	S

Value: 0x06			
DI name	Description	Triggering method	Control mode
CMDINV	In Speed and Torque modes, the input command is reversed when this DI is on.	Level triggered	S, Sz, T, Tz

Value: 0x08			
DI name	Description	Triggering method	Control mode
CTRG	In PR mode, after the PR command (POS0 - 6) is selected, 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	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.	Level triggered	PT, PR, S

Value: 0x0C			
DI name	Description	Triggering method	Control mode
VPL	Latch function of analog Position command. When this DI is on, the position of the motor is held at the current position when the DI is triggered. During this DI is on, the motor does not operate even when there is a change in the analog command. When this DI is off, the motor completes the command that was changed during the time DI was on. 	Level triggered	PT

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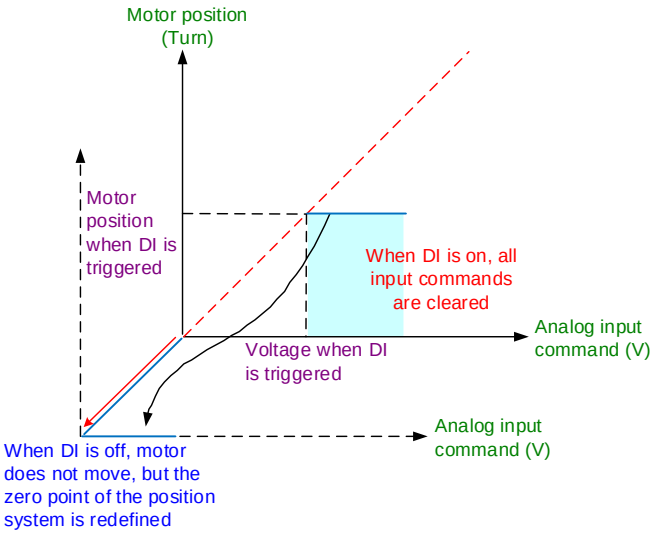
Value: 0x0D			
DI name	Description	Triggering method	Control mode
VPRS	Clear function of analog Position command. When this DI is on, the position of the motor is held at the current position when DI is triggered. Despite the change in the analog command during DI is on, the motor remains at the current position even when the DI is off. However, the position that the motor remains at corresponds to the new analog command. Thus, the analog input command redefines the position system of the motor.  	Level triggered	PT

Value: 0x0F			
DI name	Description	Triggering method	Control mode
SPDKVC	Switch between P1.040 (Maximum motor speed for analog Speed command 1) and P1.081 (Maximum motor speed for analog Speed command 2).	Level triggered	S

Value: 0x10			
DI name	Description	Triggering method	Control mode
SPDLM	In Torque mode, motor speed is limited when this DI is on, and source of the Speed limit command is the internal register or analog voltage.	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 (0 - 99)	Level triggered	PR

Position command	POS 6	POS 5	POS 4	POS 3	POS 2	POS 1	POS 0	CT RG	Corres-ponding para-meter
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, the servo 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 the parameter.	Level triggered	All

Value: 0x1F

DI name	Description	Triggering method	Control mode
ABSC	When DI.ABSC is on, the current absolute position of the encoder is set as the origin definition (P6.001), but this DI is only valid when DI.ABSE is on. Note: in CANopen / EtherCAT / DMCNET mode, the origin definition is the setting value of OD 607Ch multiplied by a negative sign; in PROFINET mode, the origin definition is the setting value of PNU11 multiplied by a negative sign.	Rising-edge triggered	All

Value: when DI.ABSE is on, the DI.ABSQ from DI4 replaces the DI4 function 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. Refer to Figure 10.3.5.1.1 for a detailed description.	Rising- and falling-edge triggered	All

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Value: 0x14, 0x15

DI name	Description	Triggering method	Control mode
SPD0 SPD1	Register Speed command selection (1 - 4)	Level triggered	S, Sz

Speed command number	DI signal of CN1		Command source		Content	Range
	SPD1	SPD0				
S1	0	0	S	External analog signal	Voltage difference between V_REF and GND	-10V to +10V
			Sz	N/A	Speed command is 0	0
S2	0	1	Internal register parameter		P1.009	+/- 7500 rpm
S3	1	0			P1.010	+/- 7500 rpm
S4	1	1			P1.011	+/- 7500 rpm

Value: 0x16, 0x17

DI name	Description	Triggering method	Control mode
TCM0 TCM1	Register Torque command selection (1 - 4)	Level triggered	T, Tz

Torque command number	DI signal of CN1		Command source		Content	Range
	TCM1	TCM0				
T1	0	0	T	External analog signal	Voltage difference between T_REF and GND	-10V to +10V
			Tz	N/A	Torque command is 0	0
T2	0	1	Internal register parameter		P1.012	+/- 500%
T3	1	0			P1.013	+/- 500%
T4	1	1			P1.014	+/- 500%

Value: 0x18

DI name	Description	Triggering method	Control mode
S-P	In S-P dual / multi-mode, when this DI is off, the drive is in Speed mode; when this DI is on, the drive is in Position mode. Select PT or PR with DI.PT-PR (0x2B).	Level triggered	Dual / multi-mode

Value: 0x19

DI name	Description	Triggering method	Control mode
S-T	In S-T dual mode, when this DI is off, the drive is in Speed mode; when 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 T-P dual / multi-mode, when this DI is off, the drive is in Torque mode; when this DI is on, the drive is in Position mode. Select PT or PR with DI.PT-PR (0x2B).	Level triggered	Dual / multi-mode

Value: 0x21			
DI name	Description	Triggering method	Control mode
EMGS	When this DI is on, the motor stops immediately.	Level triggered	All

Value: 0x22			
DI name	Description	Triggering method	Control mode
NL (CWL)	Negative inhibit limit (normally closed contact).	Level triggered	All

Value: 0x23			
DI name	Description	Triggering method	Control mode
PL (CCWL)	Positive inhibit limit (normally closed contact).	Level triggered	All

Value: 0x24			
DI name	Description	Triggering method	Control mode
ORGP	During homing, when this DI is on, the servo regards this position as the homing origin. 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, the servo starts to search for the origin. 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 multi-mode. When this DI is off, the drive is in PT mode; when this DI is on, the drive is in PR mode.	Level triggered	Dual / multi-mode

Value: 0x37			
DI name	Description	Triggering method	Control mode
JOGU	When this DI is on, the motor jogs in the positive direction.	Level triggered	All

Value: 0x38			
DI name	Description	Triggering method	Control mode
JOGD	When this DI is on, the motor jogs in the negative direction.	Level triggered	All

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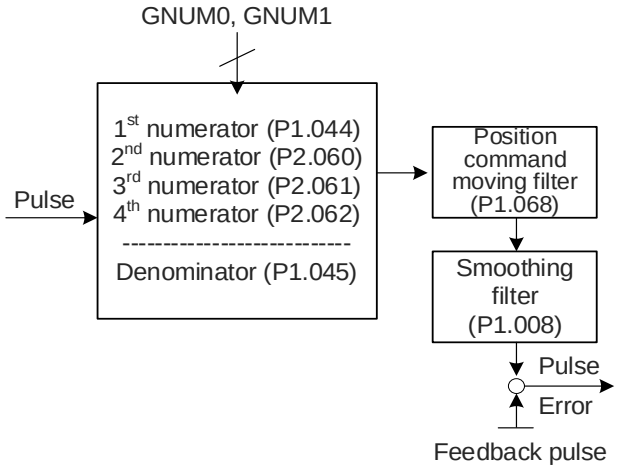
Value: 0x39			
DI name	Description	Triggering method	Control mode
EV1	Event trigger command 1. Refer to the setting of P5.098 and P5.099.	Rising- and falling-edge triggered	PR

Value: 0x3A			
DI name	Description	Triggering method	Control mode
EV2	Event trigger command 2. 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. 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. 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 	Level triggered	PT

Value: 0x45			
DI name	Description	Triggering method	Control mode
INHP	In Position mode, the external pulse input command has no function when this DI is on. Important: this function has to be set to DI4 to ensure immediate pulse inhibition.	Level triggered	PT

Value: 0x46			
DI name	Description	Triggering method	Control mode
STP	Motor stops.	Rising-edge triggered	PR

Value: 0x47			
DI name	Description	Triggering method	Control mode
PFQS	Use this DI to set the emergency stop for P5.003 (deceleration time for auto-protection). When this DI is on, AL35F occurs and the motor starts decelerating. When the speed reaches 0, AL3CF occurs and servo is switched to Servo Off.	Rising-edge triggered	PT, PR, T, S

Note: the digital input function is disabled when P2.010 - P2.017 and P2.036 - P2.040 are set to 0x0100.

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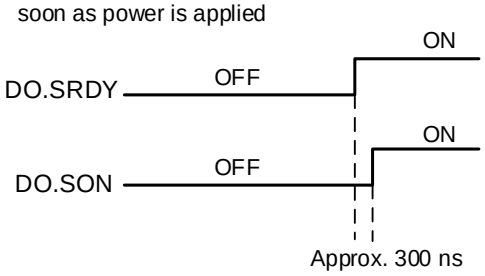
Table 8.2 Digital output (DO) descriptions

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. The time difference between DO.SRDY and DO.SON being on when the servo is on as soon as power is applied 	Level triggered	All

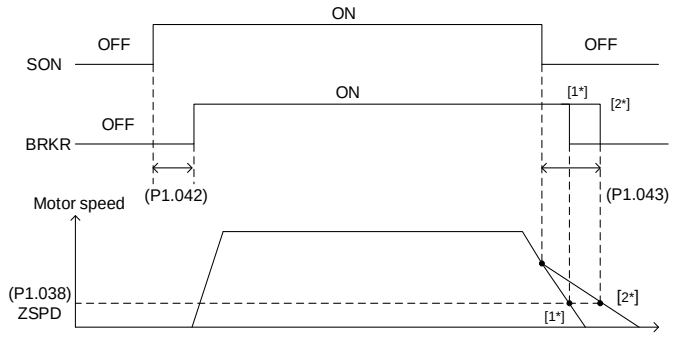
Value: 0x03			
DO name	Description	Triggering method	Control mode
ZSPD	When the motor speed is slower than the zero speed setting (P1.038), this DO is on.	Level triggered	All

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 pulse number error is smaller than the position range setting (P1.054), this DO is on.	Level triggered	PT, PR

Value: 0x06			
DO name	Description	Triggering method	Control mode
TQL	When the torque limit is activated, this DO is on.	Level triggered	All (except for T and Tz)

Value: 0x07			
DO name	Description	Triggering method	Control mode
ALRM	When a servo alarm occurs, this DO is on. (Except for positive / negative limit, communication error, and undervoltage.)	Level triggered	All

Value: 0x08			
DO name	Description	Triggering method	Control mode
BRKR	Output signal of the magnetic brake control. Set P1.042 and P1.043 to adjust the delay time before and after the magnetic brake control function is activated and deactivated.  Note: refer to the note in P1.042.	Level triggered	All

Value: 0x09			
DO name	Description	Triggering method	Control mode
HOME	When homing is complete, it means the position system and position counter are defined and this DO is on. When power is applied for the first time, this DO is off; when homing is complete, 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 is off; after homing is complete, this DO is on.	Level triggered	PR

Value: 0x0D			
DO name	Description	Triggering method	Control mode
ABSW	When an absolute encoder alarm occurs, this DO is on.	-	All

Value: 0x0E			
DO name	Description	Triggering method	Control mode
IDXD	When this DI is on, it means the rotary axis position is defined. When homing is complete, the rotary axis position is defined as well.	-	PR

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Value: 0x10			
DO name	Description	Triggering method	Control mode
OLW	This DO is on when the overload accumulative time exceeds t_{OL}. However, if the overload accumulative time exceeds the overload allowable time of the servo, the servo sends the overload alarms AL006 and AL023. t_{OL}= Overload allowable time of the servo x setting value of P1.056 (Motor output overload warning level) For example: P1.056 = 60 (unit: %). When the output average load of the servo drive is 200% and the output time exceeds 8 seconds, the overload alarms (AL006 and AL023) occur. t_{OL} = 8 sec x 60% = 4.8 sec That is, when the output average load of the servo drive is 200% for over t_{OL} = 4.8 seconds, DO.OLW (DO code: 0x10) is on. If the duration exceeds 8 seconds, the servo drive sends AL006 (overload) and AL023 (early overload warning).	Level triggered	All

Value: 0x11			
DO name	Description	Triggering method	Control mode
WARN	Warning outputs (positive / negative limit, communication error, and undervoltage).	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 (negative limit).	Level triggered	PR

Value: 0x14			
DO name	Description	Triggering method	Control mode
SPL (SCCWL)	Software limit (positive limit).	Level triggered	PR

Value: 0x15			
DO name	Description	Triggering method	Control mode
Cmd_OK	When the Position command is complete and the drive enters Position mode, this DO is on. When the Position command is executing, this DO is off; after the command is complete, this DO is on. This DO only indicates that the command is complete, but the motor positioning may not be complete yet. Refer to DO.TPOS.	Level triggered	PR

Value: 0x16			
DO name	Description	Triggering method	Control mode
CAP_OK	Capture procedure is complete.	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; otherwise, it is off. Refer to P1.048.	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 error between the speed feedback and the command is smaller than the value of P1.047, this DO is on.	Level triggered	S, Sz

Value: 0x2C			
DO name	Description	Triggering method	Control mode
Zon1	First set of general range comparison: when the value of the item monitored by P0.009 ranges between the values 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

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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

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 the servo drive can receive request issued by DI.ABSQ; when DO.ABSR is on, it indicates after the request is received, the data has been prepared and the ABSD data is valid for the controller to access. This DO is only valid when DI.ABSE is on. Refer to Figure 10.3.5.1.1 for a detailed description.	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. This DO is only valid when DI.ABSE and DO.ABSR are both on. Refer to Figure 10.3.5.1.1 for a detailed description.	Level triggered	All

Note: the digital output function is disabled when P2.018 - P2.022 and P2.041 are set to 0x0100.

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Table 8.3 Monitoring variables descriptions

Description of monitoring variables:

Item	Description
Monitoring code	Each monitoring variable has a code, and you can use P0.002 to set the code for monitoring the variable.
Format	Each monitoring variable is stored in the 32-bit format (long integer) in the servo drive.
Category	Basic variables / extension variables: 1. Basic variables: the variables (P0.002 = 0 to 28) within the loop of pressing the UP / DOWN keys; in Monitoring mode, use the UP / DOWN keys on the panel to display the variables. 2. Extension variables: the variables other than basic variables.
Monitoring method	Panel display / mapping: 1. Panel display: monitor with the panel 2. Mapping: monitor the variables or parameters by mapping parameters
Panel display	1. Use the MODE key to switch to the Monitoring mode and press the UP / DOWN keys to select the variable to monitor. 2. Input the code of the variable to be monitored into P0.002 and start monitoring. Press the SHIFT key on the panel to switch between high and low word display; press the SET key on the panel to switch between decimal and hexadecimal display.
Mapping	1. Parameters that support monitoring variable mapping: P0.009 - P0.013. Refer to Section 8.3 Parameter descriptions. 2. Read the monitoring variables through communication using mapping parameters. 3. The values of the mapping parameters (P0.009 - P0.013) are the content of the basic variables (17h, 18h, 19h, and 1Ah). To monitor P0.009, set P0.017 to the value to read (refer to P0.002). When reading the data through communication, you can directly read the data specified by P0.017; when monitoring the data with the panel (set P0.002 to 23), the panel displays “VAR-1” and then 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. Select the variables with the UP / DOWN keys on the panel.
D1 D2	Decimal place displayed on the panel. D1 indicates 1 decimal place and 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.

The monitoring variables are described in the following table by the code sequence:

Code	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 position of the Position command. Unit: Pulse of User Unit (PUU). PT mode: number of pulse commands received by the servo drive. PR mode: absolute position of the Position command.
002 (02h)	Following error (PUU) B	Difference between the Position command before filtered 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 position of the Position command. Unit: encoder unit (pulse).
005 (05h)	Following error (pulse) B	Difference between the Position command before filtered 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 and PR modes.
007 (07h)	Speed feedback B D1 Dec	Current motor speed. Unit: 0.1 rpm. This is the speed processed by the low-pass filter, which makes it more stable.
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: 0.1 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 (moving average every 20 ms) from the servo 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.
016 (10h)	IGBT temperature B	Temperature of IGBT. Unit: °C.

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Code	Variable name / property	Description
017 (11h)	Resonance frequency B Dec	Resonance frequency of the system, consisting of two sets of frequencies: F1 and F2 When monitoring from the panel, press the SHIFT 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 returns frequency F2. High word returns frequency F1.
018 (12h)	Z phase offset B Dec	Offset value between motor position and Z phase; range: -4999 to +5000. When the motor position overlaps with Z phase, the value is 0; the greater the absolute value of this variable, 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 P0.010 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.
027 (1Bh)	Z phase offset B	Offset value between motor position and Z phase. (Only available for Delta CNC controllers.)
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.
032 (20h)	Position error (PUU)	Difference between the Position command after filtered and the feedback position. Unit: Pulse of User Unit (PUU).
033 (21h)	Position error (pulse)	Difference between the Position command after filtered and the feedback position. Unit: encoder unit (pulse).
035 (23h)	Rotary axis position command	Rotary axis position command at present. Unit: Pulse of User Unit (PUU).
038 (26h)	Voltage level of the battery	Voltage level of the battery in an absolute encoder. To display the voltage level, enable the absolute encoder setting (P2.069).

Code	Variable name / property	Description
039 (27h)	DI status (integrated) Hex	Integrated DI status of the drive. Each bit corresponds to one DI channel. Source includes hardware channel or 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 DO channel.
041 (29h)	Status of the drive	Returns the value of P0.046. Refer to the description of P0.046.
042 (2Ah)	PR number in execution	Displays the number of the PR command being executed.
043 (2Bh)	Captured data of CAP	The latest data captured by CAP. Note: CAP can continuously capture multiple points.
049 (31h)	Pulse command CNT	Pulse counts from the pulse command (CN1).
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	Current actual motor torque. Unit: 0.1%.
055 (37h)	Current feedback D2 Dec	Actual motor current at present. Unit: 0.01 ampere (Amp).
056 (38h)	DC Bus voltage D1 Dec	Rectified capacitor voltage. Unit: 0.1 Volt.
064 (40h)	Register of PR command endpoint	In PR mode, the endpoint of the Position command (Cmd_E).
065 (41h)	Register of PR command output	In PR mode, the accumulative output of the Position command after filtered.
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)	Incremental pulse input of synchronous Capture axis	When the synchronous Capture axis is enabled, the actual distance between two marks can be measured by the received pulse number between two captures.
082 (52h)	PR number in execution	Provides the number of the PR command currently executed by the servo drive to the HMC. (Available for -F models)
084 (54h)	Pulse number deviation of synchronous Capture axis	The accumulative deviation between the actual output pulse and the target pulse when the synchronous Capture axis is enabled. This value is close to 0 if synchronization is reached.
091 (5Bh)	Rotary axis position feedback	Immediate feedback position of the rotary axis position. 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 SHIFT 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.

Code	Variable name / property	Description
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.
112 (70h)	CANopen SYNC TS (unfiltered)	The time (time stamp) the servo drive receives the SYNC signal. Unit: μsec.
113 (71h)	CANopen SYNC TS (filtered)	The time (time stamp) the servo drive receives the SYNC signal that has been processed the low-pass filter. Unit: μsec.
119 (77h)	EtherCAT state machine	1: Init 2: Pre-Operational (Pre-OP) 4: Safe-Operational (Safe-OP) 8: Operational (OP)
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. (Available on all models except -L)
123 (7Bh)	Value returned when monitoring by panel	Monitoring value displayed when returned to the monitoring panel.
-80	Encoder 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 change.
-91	Overload (AL006) protection counter	Displays the motor load during operation. When the value reaches 100%, AL006 occurs.
-111	Regeneration error (AL005) protection counter	When the value of the regeneration counter reaches 100%, AL005 occurs.
-124	Encoder temperature	Monitor the encoder temperature.
-169	Regenerative resistance overload (AL086) protection counter	This variable monitors the average power consumed by the regenerative resistor (unit: %) when the capacitor energy of the servo drive is released to the regenerative resistor. When the value reaches 100%, AL086 occurs.
-202	Motor electrical angle	The current electrical angle multiplied by 4.
-207	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.