AC Servo Drive

PRONET User Manual

Product Line-up

Servo motor					Servo drive	
Series			Power	Model	200V	400V
Medium inertia	Small capacity	**EMJ** 3000min^{-1}	200W	EMJ-02APA	PRONET-02A□A	
			400W	EMJ-04APA	PRONET-04A□A	
			750W	EMJ-08APA	PRONET-08A□A	
			1000W	EMJ-10APA	PRONET-10A□A	
	Medium capacity	**EMG** 2000min^{-1}	1.0kW	EMG-10A□A	PRONET-10A□A	
			1.5kW	EMG-15A□A	PRONET-15A□A	
			2.0kW	EMG-20A□A	PRONET-20A□A	
			3.0kW	EMG-30A□A	PRONET-30A□A	
			5.0kW	EMG-50A□A	PRONET-50A□A	
		EML 1000min^{-1}	1.0kW	EML-10A□A	PRONET-10A□A	
			2.0kW	EML-20A□A	PRONET-20A□A	
			3.0kW	EML-30A□A	PRONET-30A□A	
			4.0kW	EML-40A□A	PRONET-50A□A	
	Large capacity	**EMB** 1500min^{-1}	7.5kW	EMB-75D□A		PRONET-75D□A
			11kW	EMB-1AD□A		PRONET-1AD□A
			15kW	EMB-1ED□A		PRONET-1ED□A

EMJ series

Fetures

- Medium inertia
- Instantaneous peak torque (300% of rated torque)
- Wide selection: 200W to 1000W, holding brake options
- Maximum speed: 4500r/min
- Mounted 2500P/R incremental encoder, Optional mounted 17-bit absolute encoder

Application Examples

- Chip mounters
- PCB drilling stations
- Robots
- Material handling machines
- Food processing equipment
- Textile machines

Model Designations

EMJ – 08 A P A 1 1

ESTUN servo motor EMJ series 【1＋2】 【3】 【4】 【5】 【6】 【7】

【1＋2】Rated output power

Code	Specifications
02	200W
04	400W
08	750W
10	1000W

【3】Power supply voltage

Code	Specifications
A	200VAC

【4】Encoder

Code	Specifications
P	Increamental wire-saving encoder : 2500P/R
S	17digit absolute : 131072P/R

【5】Design revision order

Code	Specifications
A	Design revision order

【6】Shaft end

Code	Specifications
1	Straight without key (standard)
2	Straight with key and tap

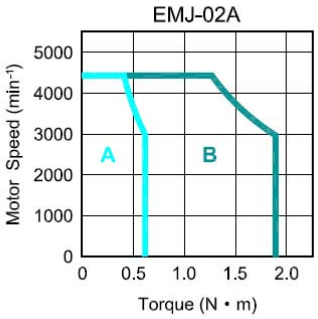
【7】Options

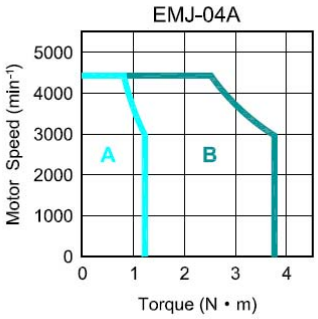
Code	Specifications
1	Without options
2	With oil seal
3	With holding brake(DC24V)
4	With oil seal and holding brake(DC24V)

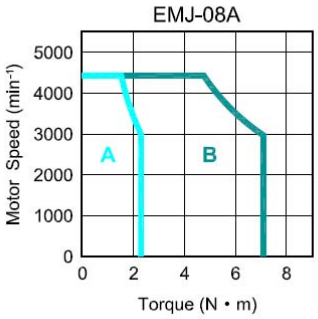
■ Ratings and specifications

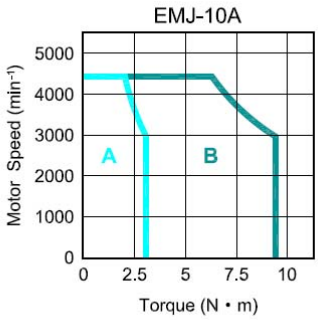
Voltage		200VAC			
Servomotor model	EMJ-	02A□A	04□PA	08A□A	10A□A
Rated output power	W	200	400	750	1000
Rated torque	N • m	0.64	1.27	2.39	3.18
Instantaneous Peak Torque	N • m	1.91	3.82	7.16	9.55
Rated Current	Arms	1.3	2.7	4.0	5.3
Instantaneous Max. Current	Arms	3.9	8.1	12.0	15.9
Rated Speed	min^{-1}	3000			
Max. Speed	min^{-1}	4500			
Rotor Moment of Inertia	$x10^{-4}kg \cdot m^2$	0.19	0.32	1.48	1.89
Encoder	Standard	Increamental wire-saving: 2500P/R			
	Option	17 digit absolute: 131072P/R			
Insulation Class		B			
Ambient Temperature		0 to +40℃ (non freezing)			
Ambient Humidity		20 to 80% RH (non condensing)			
Enclosure		Totally enclosed, self-cooled, IP55 (except for shaft opening and connectors)			
Vibration		$49m/s^2$			

● Torque-Motor Speed Characteristics (A:Continuous Duty Zone,B:Intermittent Duty Zone)

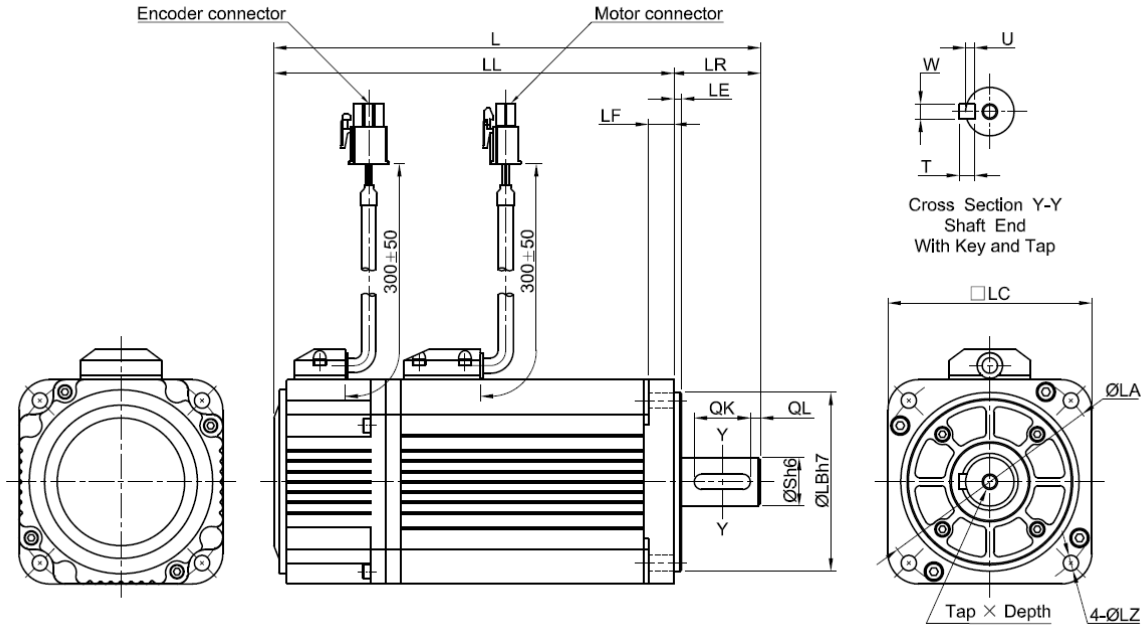






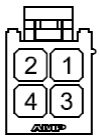


■ Dimension mm



Model EMJ-	L	LL	Flange face							S	Tap× Depth	Key				
			LR	LE	LF	LC	LA	LB	LZ			QK	QL	W	T	U
02APA	153	123	30	3	6	60	70	50	5.5	14	M5x10L	16	4	5	5	3
04APA	183	153	30	3	6	60	70	50	5.5	14	M5x10L	16	4	5	5	3
08APA	191	156	35	3	10	80	90	70	6	19	M6x15L	22	4	6	6	3.5
10APA	211	176	35	3	10	80	90	70	6	19	M6x15L	22	4	6	6	3.5

● Motor connector specification

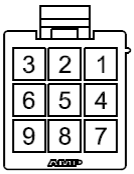


connector: 172167-1 (AMP)

pin: 170360-1 (AMP)

Pin No.	Signal	Color
1	U phase	red
2	V phase	blue
3	W phase	white
4	FG	Green/yellow

● Encoder connector specification



connector: 172169-1 (AMP)

pin: 170359-3 (AMP)

Increamental wire-saving

Pin No.	Signal	Color
1	A+	blue
2	B+	green
3	C+	yellow
4	A-	Blue/black
5	B-	Green/black
6	C-	Yellow/black
7	PG5V	red
8	PG0V	black
9	FG	shield

17 digit absolute

Pin No.	Signal	Color
1	S+	blue
2	S-	Blue/black
3	—	—
4	BAT+	brown
5	BAT-	Brown/black
6	—	—
7	PG5V	red
8	PG0V	black
9	FG	shield

EMG series

■ Features

- High-speed driving of feed shafts for various
- Wide Selection: 1.0kW to 5.0kW, holding brake options
- Mounted wire-saving encoder(2500P/R）
  Optionalmounted 17-bit serial encoder
- Protective Structure: IP65

■ Application Examples

- Machine tools
- Material handling machines
- Food processing equipment
- Textile machines

■ Model Designations

EMG - 10 A P A 1 1

ESTUN servo motor 【1＋2】 【3】 【4】 【5】 【6】 【7】
EMG series

【1＋2】rated output power

Code	Specification
10	1.0kW
15	1.5kW
20	2.0kW
30	3.0kW
50	5.0kW

【3】power supply voltage

Code	Specification
A	200VAC

【4】encoder

Code	Specification
P	Increamental wire-saving encoder : 2500P/R
S	17-bit absolute encoder: 131072P/R

【5】design revision order

Code	Specification
A	Design revision order

【6】shaft end

Code	Specification
1	Straight without key (standard)
2	Straight with key and

【7】options

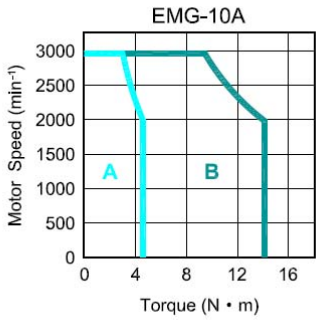
Code	Specification
1	Without option
2	With oil seal
3	With holding brake (DC24V)
4	With oil seal and holding brake(DC24V)

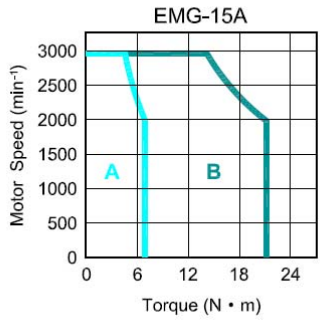
	tap

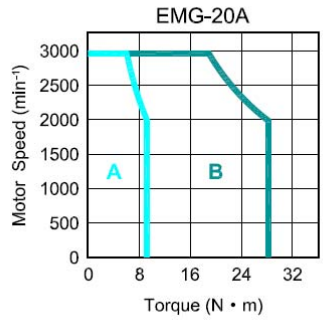
■ Ratings and Specifications

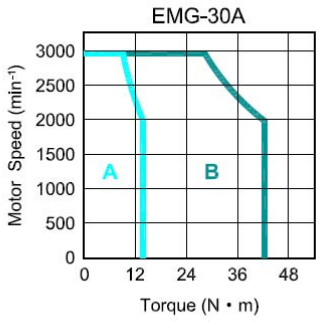
Voltage		200VAC				
Servo motor Model	EMG-	10A□A	15A□A	20A□A	30A□A	50A□A
Rated output power	kW	1.0	1.5	2.0	3.0	5.0
Rated torque	N·m	4.78	7.16	9.55	14.3	23.9
Instantaneous Peak Torque	N·m	14.3	21.5	28.7	43.0	71.6
Rated Current	Arms	6.0	9.0	12.0	18.0	28.0
Instantaneous Max. Current	Arms	18.0	27.0	36.0	54.0	84.0
Rated Speed	min^{-1}	2000				
Max. Speed	min^{-1}	3000				
Rotor Moment of Inertia	$x10^{-4}kg·m^2$	9.43	13.7	18.0		
Encoder	Standard	Increamantal wire-saving: 2500P/R				
	Option	17-bit absolute: 131072P/R				
Insulation Class						
Ambient Temperature						
Ambient Humidity						
Enclosure						
Vibration						

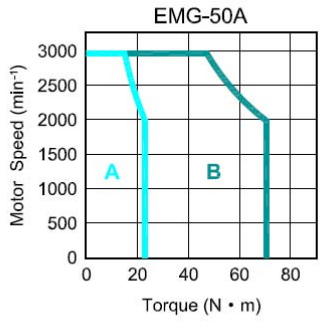
● Torque-Motor Speed Characteristics (A:Continuous Duty Zone, B:Intermittent Duty Zone)



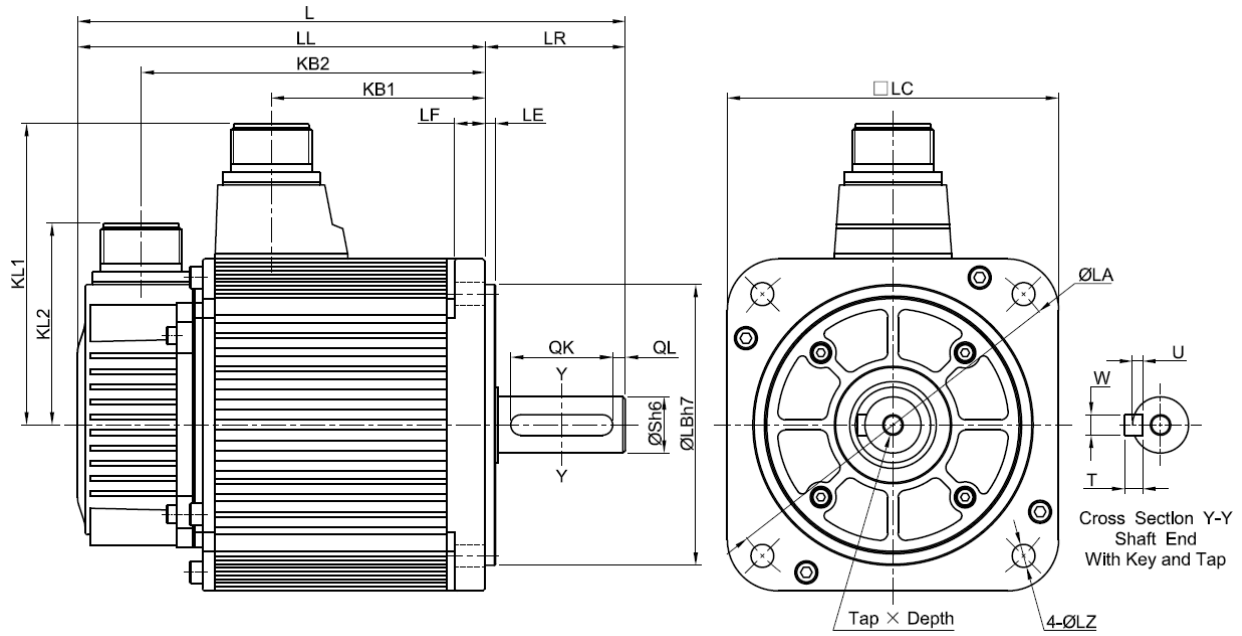






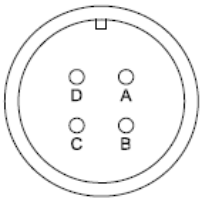


■ Dimensions mm



Model EMG-	L	LL	KB1	KB2	KL1	KL2	Flange face							S	Tap× Depth	Key				
							LR	LE	LF	LC	LA	LB	LZ			QK	QL	W	T	U
10A□A	215	160	84	135	118	79	55	4	12	130	145	110	9	22	M6x20L	40	5	8	7	4
15A□A	240	185	109	160	118	79	55	4	12	130	145	110	9	22	M6x20L	40	5	8	7	4
20A□A	265	210	134	185	118	79	55	4	12	130	145	110	9	22	M6x20L	40	5	8	7	4
30A□A	307	228	143	203	140	79	79	3.2	18	180	200	114.3	13.5	35	M8x16L	55	6	10	8	5
50A□A	347	268	183	243	140	79	79	3.2	18	180	200	114.3	13.5	35	M8x16L	55	6	10	8	5

● Motor receptacle specification



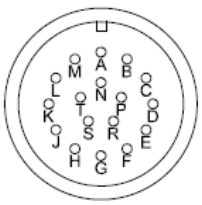
receptacle: MS3102A20-4P (EMG-10A/15A/20A); MS3102A22-22P (EMG-30A/50A)

connector: MS3108B20-4S (EMG-10A/15A/20A); MS3108B22-22S (EMG-30A/50A)

cable clamp: MS3057-12A

Pin	Signal	Color
A	U phase	red
B	V phase	blue
C	W phase	white
D	FG	Green/yellow

● Encoder receptacle specification



receptacle: MS3102A20-29P

connector: MS3108B20-29S

cable clamp: MS3057-12A

Increamental wire-saving encoder

code	signal	color	code	signal	color
A	A+	blue	K	—	—
B	A-	Blue/black	L	—	—
C	B+	green	M	—	—
D	B-	Green/black	N	—	—
E	C+	yellow	P	—	—
F	C-	Yellow/black	R	—	—
G	PG0V	black	S	—	—
H	PG5V	red	T	—	—
J	FG	shield	—	—	—

17-bit absolute

code	signal	color	code	signal	color
A	—	—	K	S+	blue
B	—	—	L	S-	Blue/black
C	—	—	M	—	—
D	—	—	N	—	—
E	—	—	P	—	—
F	—	—	R	—	—
G	PG0V	black	S	BAT-	Yellow/black
H	PG5V	red	T	BAT+	yellow
J	FG	shield	—	—	—

EML series

■ Features

- High-speed driving of feed shafts for various
- Wide Selection: 1.0kW to 5.0kW, holding brake options
- Mounted 2500P/R incremental encoder, Optional mounted 17-bit serial encoder
- Protective Structure: IP65

■ Application Examples

- Machine tools
- Material handling machines
- Food processing equipment
- Textile machines

■ Model Designation

EML - 10 A P A 1 1

ESTUN servo motor 【1＋2】 【3】 【4】 【5】 【6】 【7】
EML series

【1＋2】rated output power

code	Specification
10	1.0kW
20	2.0kW
30	3.0kW
40	4.0kW

【3】power supply voltage

code	Specification
A	200VAC

【4】encoder

code	Specification
P	Increamental wire-saving: 2500P/R
S	17-bit absolute : 131072P/R

【5】design revision order

code	Specification
A	Design revision order

【6】shaft end

code	Specification
1	Straight without key (standard)
2	Straight with key and tap

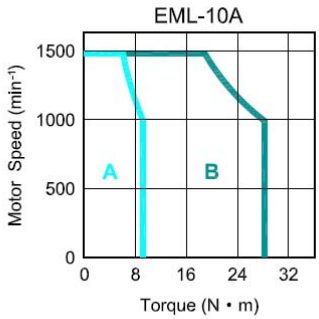
【7】option

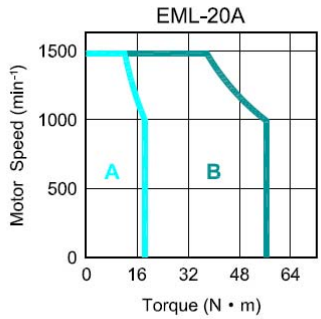
code	Specification
1	Without option
2	With oil seal
3	With holding brake (DC24V)
4	With oil seal and holding brake(DC24V)

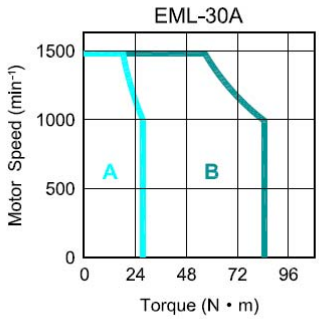
■ Ratings and specification

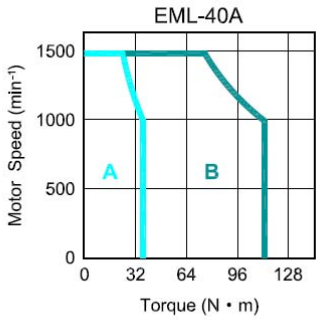
voltage		200VAC			
Servo motor Model	EML-	10A□A	20A□A	30A□A	40A□A
Rated output power	kW	1.0	2.0	3.0	4.0
Rated torque	N·m	9.55	19.1	28.7	38.2
Instantaneous Peak Torque	N·m	28.7	57.3	86.0	114.6
Rated Current	Arms	6.0	12.0	18.0	24.0
Instantaneous Max. Current	Arms	18.0	36.0	54.0	72.0
Rated Speed	min^{-1}	1000			
Max. Speed	min^{-1}	1500			
Rotor Moment of Inertia	$x10^{-4}kg·m^2$	18.0			
Encoder	Standard	Increamental wire-saving: 2500P/R			
	Option	17-bit absolute: 131072P/R			
Insulation Class		F			
Ambient Temperature		0 to +40℃ (non freezing)			
Ambient Humidity		20 to 80% RH (non condensing)			
Enclosure		Totally enclosed, self-cooled, IP55 (except for shaft opening and connectors)			
Vibration		24.5m/s^2			

Torque-Motor Speed Characteristics (A:Continuous Duty Zone, B:Intermittent Duty Zone)

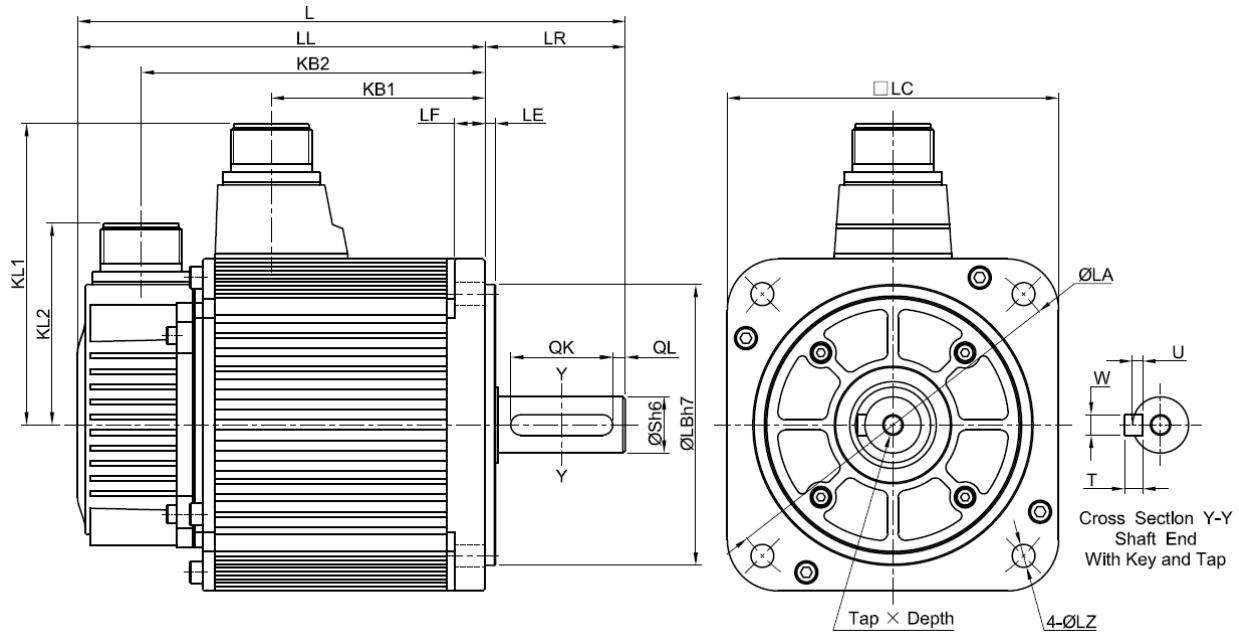








■ Dimention mm



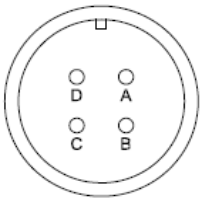
Model EML-	L	LL	KB1	KB2	KL1	KL2	Flange face							S	Tap× Depth	key				
							LR	LE	LF	LC	LA	LB	LZ			QK	QL	W	T	U
10A□A	265	210	134	185	118	79	55	4	12	130	145	110	9	22	M6x20L	40	5	8	7	4
20A□A	332	253	168	228	140	79	79	3.2	18	180	200	114.3	13.5	35	M8x16L	55	6	10	8	5
30A□A	372	293	208	268	140	79	79	3.2	18	180	200	114.3	13.5	35	M8x16L	55	6	10	8	5
40A□A	412	333	248	308	140	79	79	3.2	18	180	200	114.3	13.5	35	M8x16L	55	6	10	8	5

● Motor receptacle specification

receptacle: MS3102A20-4P (EML-10A); MS3102A22-22P (EML-20A/30A/40A)

connector: MS3108B20-4S (EML-10A); MS3108B22-22S (EML-20A/30A/40A)

cable clamp: MS3057-12A



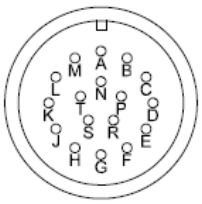
code	signal	color
A	U phase	red
B	V pahse	blue
C	W phase	white
D	FG	Green/black

● Encoder receptacle specification

receptacle: MS3102A20-29P

connector: MS3108B20-29S

cable clamp: MS3057-12A



Incremental wire-saving encoder

code	signal	color	code	signal	color
A	A+	blue	K	—	—
B	A-	Blue/black	L	—	—
C	B+	green	M	—	—
D	B-	Green/black	N	—	—
E	C+	yellow	P	—	—
F	C-	Yellow/black	R	—	—
G	PGOV	black	S	—	—
H	PG5V	red	T	—	—
J	FG	shield	—	—	—

17-bit absolute

code	signal	color	code	signal	color
A	—	—	K	S+	blue
B	—	—	L	S-	Blue/black
C	—	—	M	—	—
D	—	—	N	—	—
E	—	—	P	—	—
F	—	—	R	—	—
G	PGOV	black	S	BAT-	Yellow/black
H	PG5V	red	T	BAT+	yellow
J	FG	shield	—	—	—

EMB series

■ Features

- Power supply voltage 400V
- Driving of feed shafts for various
- Wide Selection: 1.0kW to 5.0kW, holding brake options
- Mounted 2500P/R incremental encoder, Optional mounted 17-bit serial encoder
- Protective Structure: IP65

■ Application Examples

- Machine tools
- Material handling machines
- Food processing equipment
- Textile machines

■ Model Designation

EMB - 1E D P A 1 1

ESTUN servo motor EMB series 【1＋2】 【3】 【4】 【5】 【6】 【7】

【1＋2】rated output power

code	Specification
75	7.5kW
1A	11.0kW
1E	15.0kW

【3】power supplu voltage

code	Specification
D	400VAC

【4】encoder

code	Specification
P	Increamental wire-saving encoder : 2500P/R
S	17-bit absolute encoder: 131072P/R

【5】design revision order

code	Specification
A	design revision order

【6】shaft end

code	Specification
1	Straight without key (standard)
2	Straight with key and tap

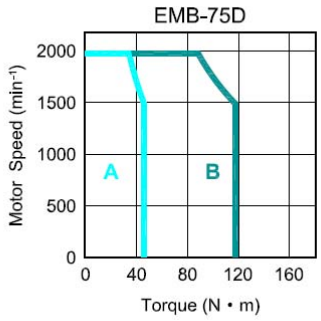
【7】option

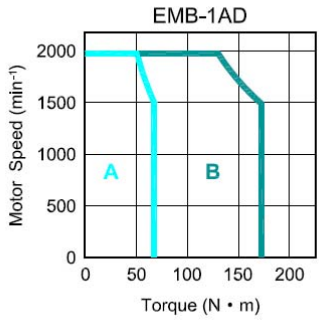
code	Specification
1	Without option
2	With oil seal
3	With holding brake (DC24V)
4	With oil seal and holding brake(DC24V)

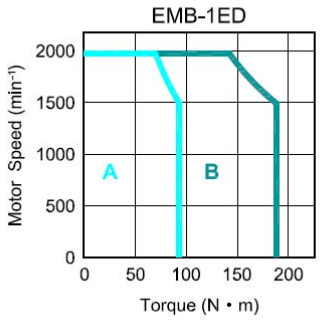
■ Ratings and specifications

voltage		200VAC		
Servo motor Model	EMB-	75D□A	1AD□A	1ED□A
Rated output power	kW	7.5	11.0	15.0
Rated torque	N·m	47.8	70.0	95.5
Instantaneous Peak Torque	N·m	119.4	175	191
Rated Current	Arms	18.0	28.0	38.0
Instantaneous Max. Current	Arms	56.0	70.0	84.0
Rated Speed	min^{-1}	1500		
Max. Speed	min^{-1}	2000		
Rotor Moment of Inertia	$x10^{-4}kg·m^2$			
Encoder	standard	Increamental wire-saving: 2500P/R		
	option	17-bit absolute: 131072P/R		
Insulation Class		F		
Ambient Temperature		0 to +40℃ (non freezing)		
Ambient Humidity		20 to 80% RH (non condensing)		
Enclosure		Totally enclosed, self-cooled, IP55 (except for shaft opening and connectors)		
Vibration		24.5m/s^2		

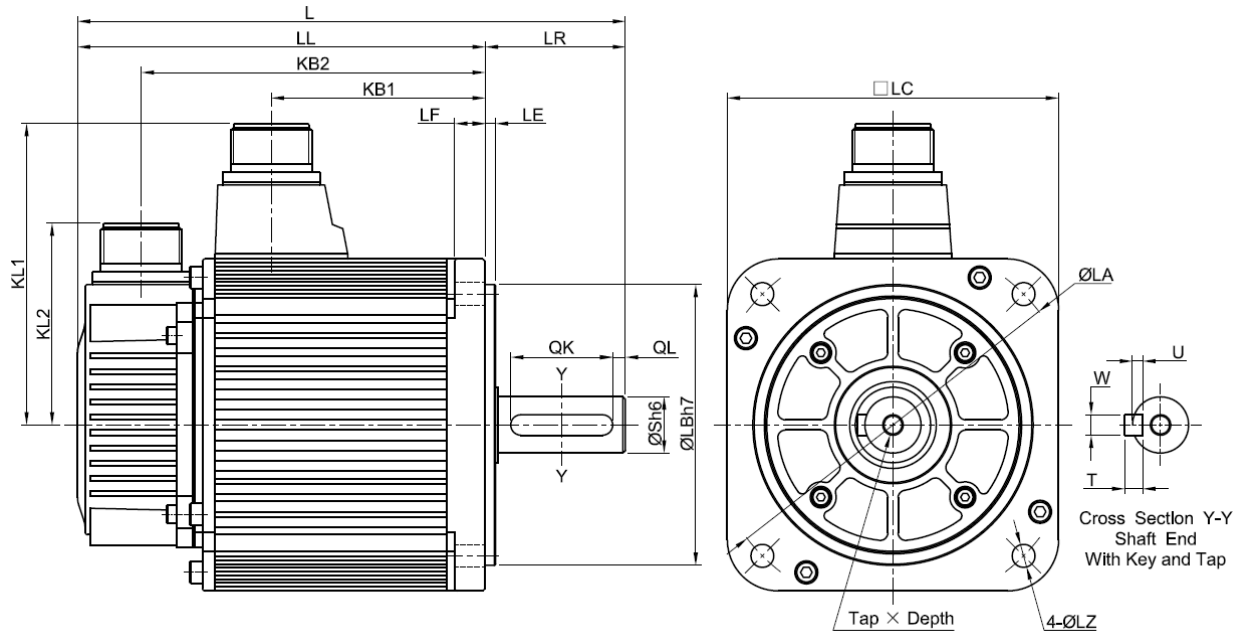
● Torque-Motor Speed Characteristics (A:Continuous Duty Zone, B:Intermittent Duty Zone)







■ Dimention mm



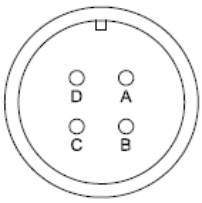
model EMB-	L	LL	KB1	KB2	KL1	KL2	Flange face							S	Tap× Depth	key				
							LR	LE	LF	LC	LA	LB	LZ			QK	QL	W	T	U
75D□A							116	4	18	220	235	200	13.5	42	M16×32	100	5	12	8	5
1AD□A							116	4	18	220	235	200	13.5	42	M16×32	100	5	12	8	5
1ED□A							116	4	18	220	235	200	13.5	42	M16×32	100	5	12	8	5

● Motor receptacle specification

receptical: MS3102A32-17P

connector: MS3108B32-17S

cable clamp: MS3057-12A



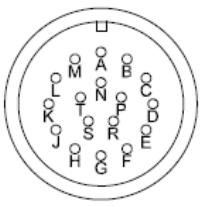
code	signal	color
A	U phase	red
B	V phase	blue
C	W phase	white
D	FG	Green/yellow

● Encoder receptacle specification

Receptacle: MS3102A20-29P

Connector: MS3108B20-29S

Cable clamp: MS3057-12A



Increamental wire-saving encoder

code	signal	color	code	signal	color
A	A+	blue	K	—	—
B	A-	Blue/black	L	—	—
C	B+	green	M	—	—
D	B-	Green/black	N	—	—
E	C+	yellow	P	—	—
F	C-	Yellow/black	R	—	—
G	PGOV	black	S	—	—
H	PG5V	red	T	—	—
J	FG	shield	—	—	—

17-bit absolute

code	signal	color	code	signal	color
A	—	—	K	S+	blue
B	—	—	L	S-	Blue/black
C	—	—	M	—	—
D	—	—	N	—	—
E	—	—	P	—	—
F	—	—	R	—	—
G	PGOV	black	S	BAT-	Yellow/black
H	PG5V	red	T	BAT+	yellow
J	FG	shield	—	—	—

PRONET series

■ Features

● PRONET series servo drive added function of current forward-feedback control, acceleration forward-feedback control, speed viewer and inertia viewer which, in turn, enable our PRONET series servo drive to improve response performance more than three times than previous products. What is more, it is available to on-line real time workload inertia check and adjustment of gain at any time to achieve the best control effect.

● Added switching control mode function,which could effectively reduce overshoot and adjustingtime by setting reasonable switch conditions.

● PRONET series servo drive is able to match 17 digit serial encode which in turn enhanced position precision and low speed stability & response performance.

● PRONET series servo drive designed expansion module interface. At represent, Profibus-DP bus communication module is available.

■ Model Designation

PRONET - 10 A M A

ESTUN Servo drive
PRONET Series

【1＋2】 【3】 【4】 【5】

【1＋2】rated output power

code	Specification
08	750W
10	1.0kW
15	1.5kW
20	2.0kW
30	3.0kW
50	5.0kW
75	7.5kW
1A	11kW
1E	15kW

【3】power supply voltage

记号	Specification
A	200VAC
D	400VAC

【4】control mode

记号	Specification
M	Used for controlling speed,torque and position
E	Used for controlling speed,torque and position（support option unit）

【5】design revision order

记号	Specification
A	Design revision order

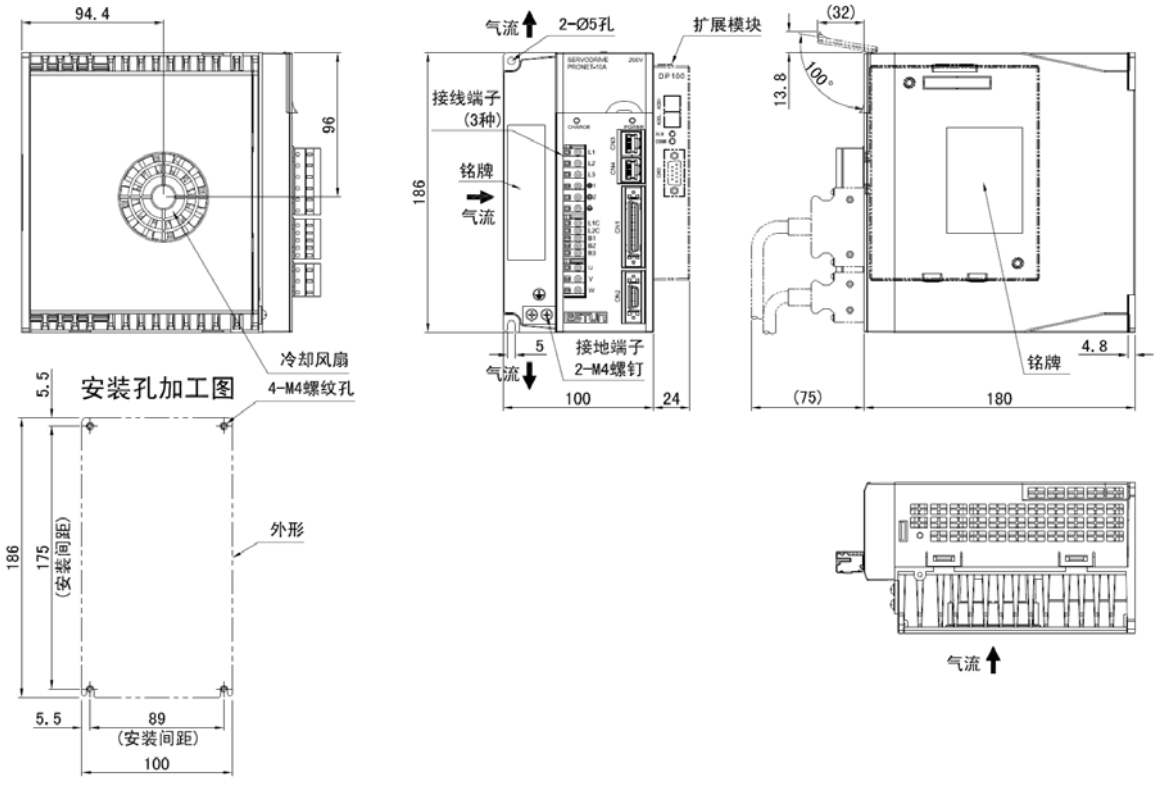
■ Ratings and specifications

Servo Drives Model: PRONET-			08A	10A	15A	20A	30A	50A	75D	1AD	1ED
Applicable Servo Motors Model: EMJ-			08A	10A							
Applicable Servo Motors Model: EMG-				10A	15A	20A	30A	50A			
Applicable Servo Motors Model: EML-				10A		20A	30A	40A			
Applicable Servo Motors Model: EMB-									75D	1AD	1ED
Continous output current [Arms]			4.0	6.0	9.0	12.0	18.0	28.0	18.0	28.0	38.0
Peak output current [Arms]			12.0	18.0	28.0	42.0	56.0	84.0	56.0	70.0	84.0
Input power supply	Main circuit		3 phase 200~230VAC +10~-15% (50/60Hz)						3 phase380~440VAC +10~-15% (50/60Hz)		
	Control circuit		Single phase 200~230VAC +10~-15% (50/60Hz)						Single phase 380~440VAC +10~-15% (50/60Hz)		
	Power	[kVA]	1.3	1.8	2.5	3.5	4.5	7.5	12.0	18.0	22.0
Control method			IGBT PWM control SVPWM control								
feedback			Increamental wire-saving encoder : 2500P/R								
			17-bit absolute encoder: 131072P/R								
Operating Conditions	Ambient/Storage Temperature		Ambient temperature: 0 to +55°C, storage temperature: -20 to +85°C								
	Ambient/Storage Humidity		90% RH or less (no condensation)								
	Elevation		1000m or less								
	Vibration/Impact Resistance		Vibration resistance: 4.9m/s^2, Impact resistance: 19.6m/s^2								
Configuration			Based-mounted								
Performance	Speed control range		1:5000								
	Speed Regulation	Load Regulation	0~100% load: ±0.01% max. (at rated speed)								
		Voltage Regulation	Rated voltage ±10%: 0% (at rated speed)								
		temperature Regulation	25±25℃: ±0.1% max. (at rated speed)								
Torque control	Analog input	Reference voltage	±10VDC at rated torque (variable setting range: ±1 to 10VDC) Max. input voltage: ±12V								
		Input impendance	About 47KΩ								
		Circuit time constant	63μs								
Speed control	Analog input	Reference voltage	DC±10V/rated speed (variable setting range: ±1 to 10VDC) Max. input voltage: ±12V								
		Input impendance	About 47KΩ								
		Circuit time constant	63μs								
	Set Speed Reference	Rotation Direction Selection	Switches the direction by /P-CON								
		Speed Selection	Speed 1 to 3 selection								
	Function	Soft Start Setting	0~10s (can be set individually for acceleration and deceleration)								
Positon control	Reference pulse	Type	Select one: sign+pulse、CCW+CW、90° phase difference 2-phase pulse (A phase+B phase)								
		Form	Line driver (about+5V), collector open								
		frenquency	Line drive: sign+pulse train、CCW+CW: 4Mpps 90° phase difference 2-phase pulse: 1Mpps Collector open: Sign+pulse、CCW+CW: 200kpps 90° phase difference 2-phase pulse: 200kpps note: Frequencies drop when the dutues have errors								
	Setting position reference	Position setting	Can set 16 position reference								
I/O signal	Encoder Output Pulses		A phase、B phase、C phase: line drive output The number of dividing pulse: Any setting ratio is available								
	Sequence Input	Number of Channels	8 Channels								
		Function	Signal allocations and positive/negative logics can be modified: Servo ON (/S-ON), P control (/P-CON), alarm reset (/ALM-RST), clear error pulse (/CLR), forward run prohibited (P-OT), reverse run prohibited (N-OT), forward torque limit (/P-CL), reverse torque limit (/N-CL)								
	Sequence output	Number of Channels	4 Channels								
		Function	Servo alarm (ALM);								

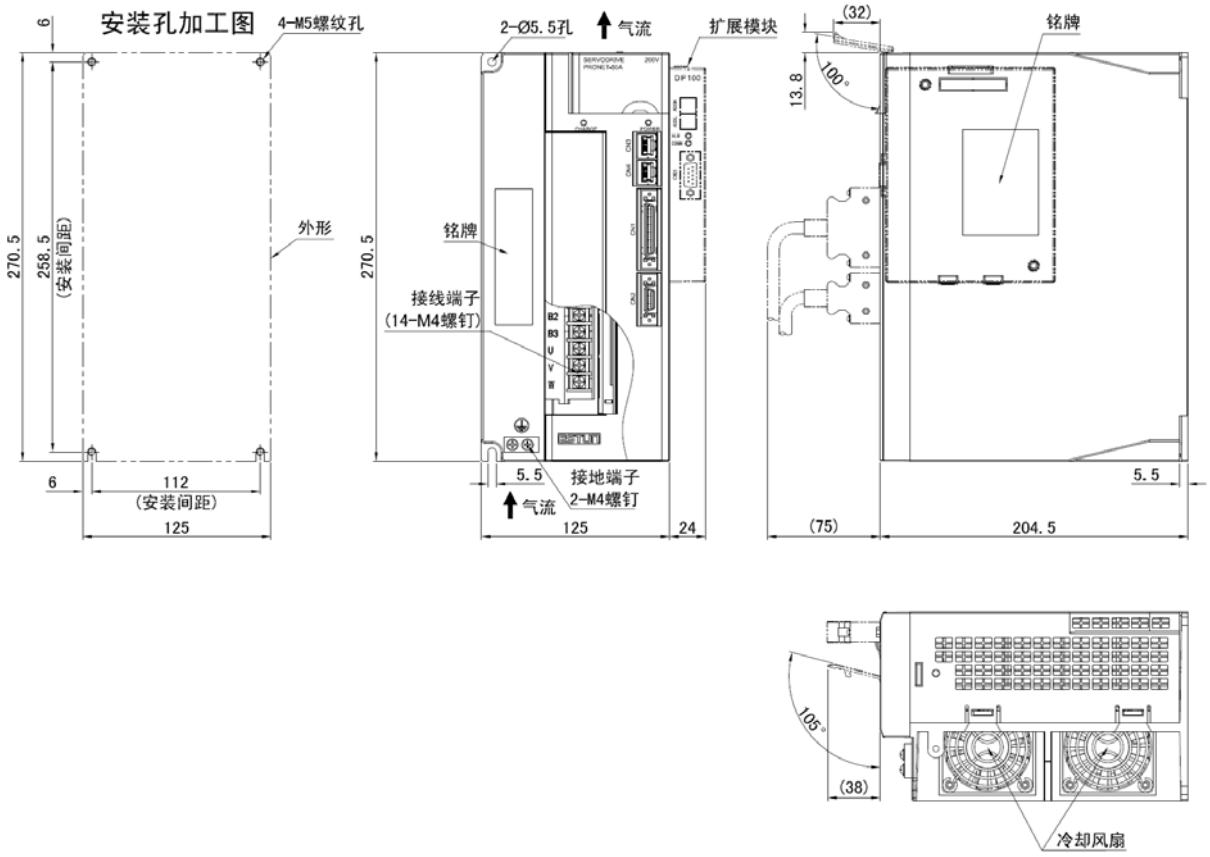
			Signal allocations and positive/negative logics can be modified: Positioning completion (/COIN), speed agree detection (/V-CMP), motor rotation detection (/TGON), servo ready (/S-RDY), torque limit detection (/CLT), brake interlock (/BK)
Built-in Functions	Dynamic Brake (DB) Functions		Operates during main power OFF, servo alarm, servo OFF or overtravel
	Regenerative Processing Functions		0.5kW to 5.0kW: built-in regenerative resistor; 7.5kW to 15kW: External regenerative resistor (optional)
	Protective Functions		Overcurrent, overvoltage, low voltage, overload, regeneration error, overspeed, etc.
	Utility Functions		Alarm trace back, JOG operation, Inertia detections, etc.
	Display Functions		CHARGE (red), POWER (green), 7-segment 5-digit LED
	Communications		RS-485 communication port, use MODBUS protocol. CAN communication port, use CANOpen protocol.

■ Dimention mm

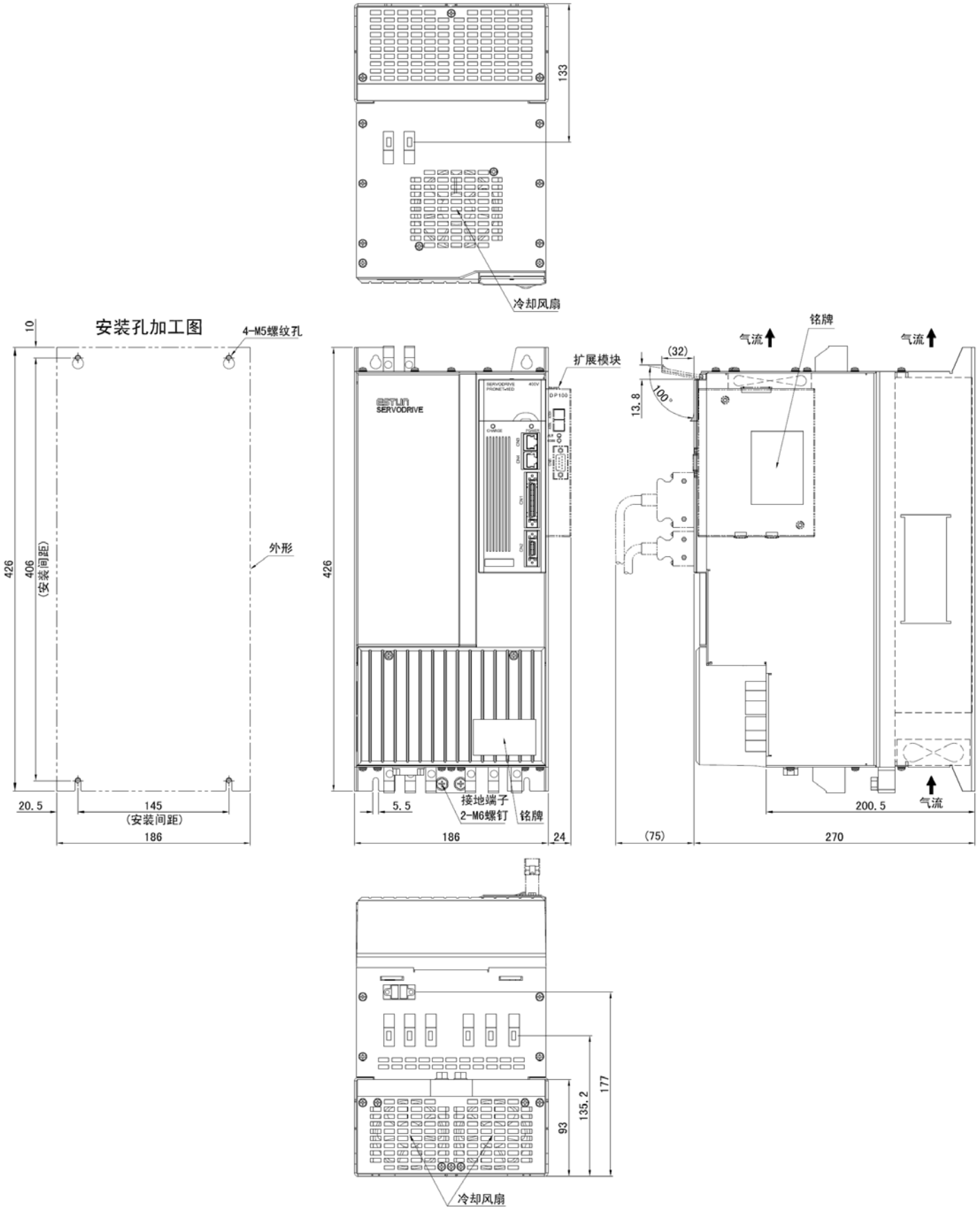
● Three-phase 200V，0.5kW/1.0kW/1.5kW：PRONET-08A/10A/15A



● Three-phase 200V，2.0kW/3.0kW/5.0kW：PRONET-20A/30A/50A


安装孔加工图
6
4-M5螺纹孔
270.5
258.5
(安装间距)
外形
6
112
(安装间距)
125
2-Ø5.5孔
气流
扩展模块
铭牌
接线端子
(14-M4螺钉)
5.5
接地端子
2-M4螺钉
气流
125
24
(32)
铭牌
13.8
100°
5.5
(75)
204.5
105°
(38)
冷却风扇

● Three-phase 400V，7.5kW/11kW/15kW：PRONET-75D/1AD/1ED



⚠ Caution

●Do not wire power lines and signal lines in the same duct or bundle them together. Wire such that signal lines are kept apart from power lines by at least 30 cm.

●Twisted pair wire and multi-core twisted pair shielding wires should be used for signal lines, encoder (PG) feedback line.

●The length for wiring is 3m maximum for the reference input line, 20 m maximum for the PG feedback line.

●Do not touch the power terminal even if power is turned off.

High voltage may still remain in Servo drive. Perform inspection only after the CHARGE LED extinct.

■ Names and functions of main circuit terminals

Terminal Symbol	Name	Main circuit power voltage[V]	Servo unit model PRONET-	Function
L1, L2, L3	Main circuit power supply input terminals	200	□□A	Three phase 200～230VAC$^{+10,-15\%}$ (50/60Hz)
		400	□□D	Three phase 380～440VAC$^{+10,-15\%}$ (50/60Hz)
U, V, W	Servo motor connection terminals	—	—	Connect with the servo motor。
L1C, L2C	Control circuit power supply input terminals	200	□□A	Single phase 200～230VAC$^{+10,-15\%}$ (50/60Hz)
		400	□□D	Single phase 380～440VAC$^{+10,-15\%}$ (50/60Hz)
⏚	Ground terminal	—	—	Connects to the power supply ground terminal and servo motor ground terminal
B1, B2, B3	Outside regenerative resistor connection terminal	200	□□A	Normal short B2-B3(for the inside regenerative resistor)。Remove the wire between B2 and B3 and connect an external regenerative resistor between B1 and B2 if the capacity of inside regenerative resistor is insufficient
B1, B2		400	□□D	Connect an external regenerative resistor between B1 and B2.
⊕1, ⊕2	DC reactor for	200	□□A	Normally, short⊕1-⊕2. If

	harmonic suppression terminal			countermeasure against power supply harmonic waves is needed, connect an DC reactor between ⊕1-⊕2
		400	□□D	—
⊖	Main circuit minus terminal	—	—	Normal not connected。

Wirings and Connections

■ Input and output signal connection

● Name and function of input signal

Control mode	Signal	Pin no.	Function	
Speed Position Torque	/S-ON	14	Servo ON: motor power on。	
	/P-CON	15	Choose this signal function through setting parameter。	
			Proportion switch	If on, switch speed circuit control mode PI control to IP control。
			Rotation direction switch	Use this signal for switching rotation direction when want to use the function “internal set speed selection”
			Control mode switch	Switch control mode
			Zero Clamp	[Speed control]if ON, command speed value is “0”
			Command pulse prohibit	[Position control]when ON, stop command pulse input。
	P-OT N-OT	16 17	Forward drive prohibit Reverse drive prohibit	Over travel prohibit: when ON, stop the servo motor’s rotation。
	/PCL /NCL	41 42	Choose this signal function through setting parameter.	
			Forward current limit Reverse current limit	Current limit function is available if on.

			Speed inside selection	Choose different setting speed inside。
	/ALM-RST	39	Alarm reset: release servo alarm status。	
	DICOM	13	I/O signal power supply source, should provide 24VDC by the client	
Speed	VREF+	1	Speed reference input: ±10V。	
	VREF-	2		
Position	PULS+	30	Pulse input form: *signal＋pulse string *CCW+CW pulse *two phase pulse（90° phase differential）	
	PULS-	31		
	SIGN+	32		
	SIGN-	33		
	PPI	34	Collector open-circuit reference power source（Separately preset 2KΩ/0.5W resistor inside of the drive）	
	/CLR	40	Position error pulse clearing: clear position error pulse during position control	
Torque	T-REF+	26	Torque reference input: ±10V。	
	T-REF-	27		

Wirings and Connections

● Name and function of output signal

Control mode	Signal	Pin no.	Function	
Speed Position Torque	ALM+	5	Servo alarm: Turn off when check abnormal status.	
	ALM-	6		
	/TGON+	7	Motor rotation detect: Turn on when motor rotation is over the setting value。	
	/TGON-	8		
	/S-RDY+	9	Servo ready: Turn on if there is no alarm when control circuit and main circuit are powered.	
	/S-RDY-	10		
	PAO+	20	A phase signal	Two-phase（A phase、B phase）PG frequency dividing output signal
	PAO-	21		
	PBO+	22	B phase signal	
	PBO-	23		

	PCO+	24	C phase signal	Zero-point pulse（C phase）signal
	PCO-	25		
	FG	Metal shell	If the shield of connector cable CN1 is connected with the metal shell, it is connected with shell ground	
Speed	/V-CMP+	11	Consistent speed: Turn on when the speed of motor is in the same condition with reference speed.	
	/V-CMP-	12		
Position	/COIN+	11	Position complete: When on after position complete(deviation pulse reach to the setting value）。	
	/COIN-	12		
Maintain	/CLT	—	Maintain functions could be allocated to /TGON、/S-RDY、/V-CMP（/COIN）signal pins by amending parameter setting。 /CLT: Torque limit output. Above setting value ON。 /BK: Breaker linkage output. Release break when on.	
	/BK			
	—	4, 18, 19, 29, 35 36, 37, 38, 43 44, 45, 47, 49	Unused pins	

Wirings and Connections

● Input and output connector(CN1)terminal array

Terminal	Name	Function	Terminal	Name	Function
1	VREF+	Speed reference input: ±10V。	26	T-REF+	Torque reference input: ±10V。
2	VREF-		27	T-REF-	
3	AGND	Analog ground	28	AGND	Analog ground
4	—	maintain	29	—	maintain
5	ALM+	Servo alarm	30	PULS+	Command pulse input
6	ALM-		31	PULS-	
7	/TGON+	Motor rotation detection	32	SIGN+	Command pulse input
8	/TGON-		33	SIGN-	
9	/S-RDY+	Servo ready	34	PPI	Collector open circuit

						reference power source
10	/S-RDY-			35	—	maintain
11	/COIN+	Position complete		36	—	maintain
12	/COIN-			37	—	maintain
13	DICOM	I/O signal 24VDC power supply		38	—	maintain
14	/S-ON	Servo ON		39	/ALM-RST	Alarm release
15	/P-CON	Position control switch		40	/CLR	Clear position bias pulse
16	P-OT	Forward drive prohibit		41	/PCL	Forward external torque limit
17	N-OT	Reverse drive prohibit		42	/NCL	Reverse external torque limit
18	—	maintain		43	—	maintain
19	—	maintain		44	—	maintain
20	PAO+	Encoder A phase signal	Two phase pulse PG frequency dividing output signal	45	—	maintain
21	PAO-			46	DGND	Digital ground
22	PBO+	Encoder B phase signal		47	—	maintain
23	PBO-			48	DGND	Digital ground
24	PCO+	Encoder C phase signal	Zero-point pulse signal	49	—	maintain
25	PCO-			50	DGND	Digital ground

(Note) 1. The following input and output can be allocated or change the function by user parameters setting.

Input: /S-ON, /P-CON, P-OT, N-OT, /ALM-RST, /CLR, /PCL, /NCL

Output: /TGON, /S-RDY, /COIN

Related details, please reference to “parameter detail explanation” Pn509,Pn510 and Pn511。

■ Encoder signal connection

● Encoder connector(CN2) terminal array

Terminal	Name	Function	Terminal	Name	Function
1	PA	PG input A phase	11	PU	PG input U phase
2	/PA	PG input/A phase	12	/PU	PG input/U phase
3	PB	PG input B phase	13	PV	PG input V phase
4	/PB	PG input/B phase	14	/PV	PG input/V phase
5	PC	PG input C phase	15	PW	PG input W phase
6	/PC	PG input/C phase	16	/PW	PG input/W phase
7	PS	PG serial signal input	17	BAT+	Battery(+)[absolute encoder]
8	/PS	PG serial signal input	18	BAT-	Battery(-)[absolute encoder]
9	PG5V	PG power source +5V	19	GND	PG power source 0V
10			20		

Wirings and Connections

■ Communication signal connection

● Communication connector(CN3) terminal array

Terminal	Name	Function
1	5V	5VDC power source
2	5V	
3	485+	RS-485 communication terminal
4	DGND	Grounding
5	DGND	

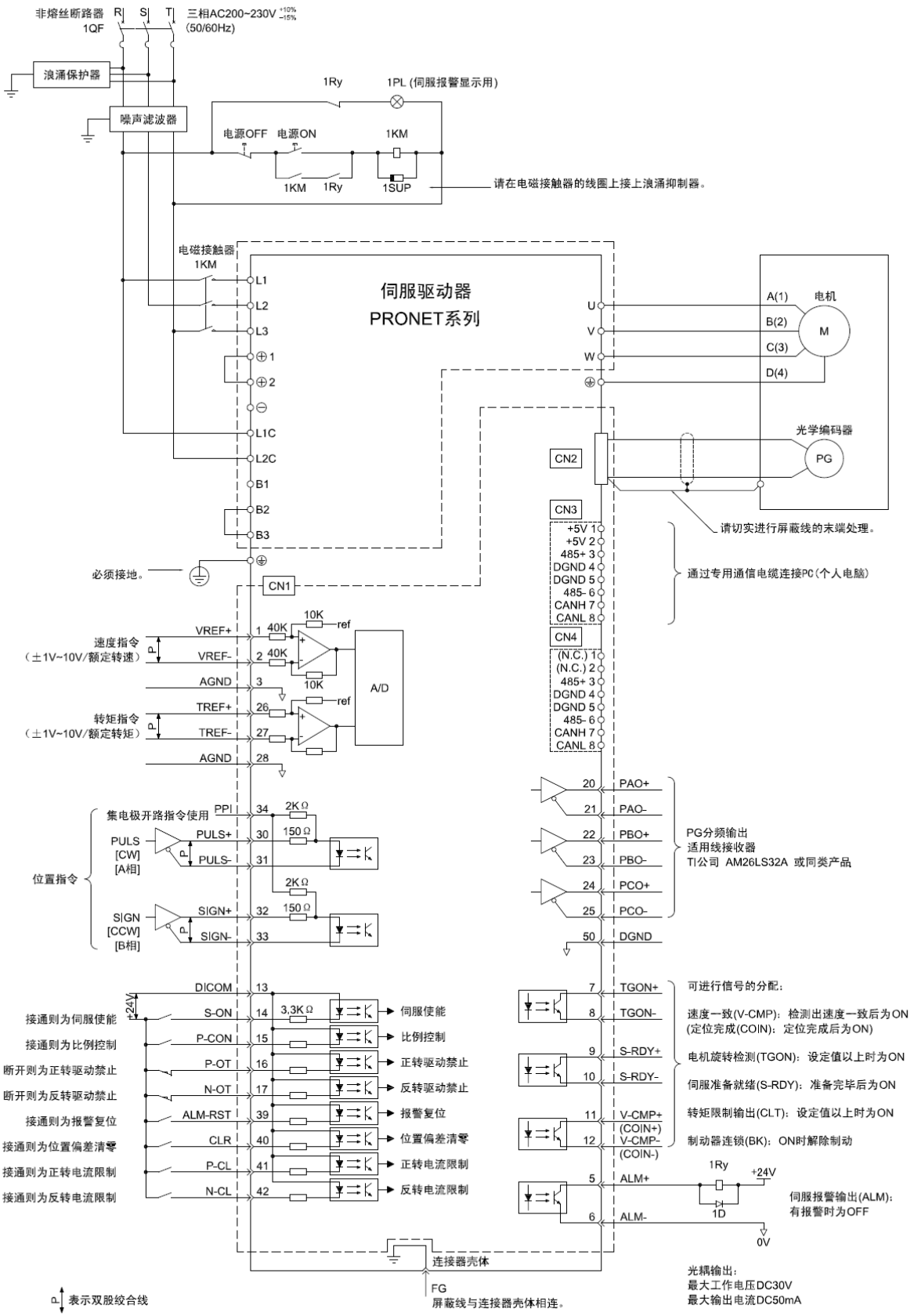
6	485-	RS-485 communication terminal
7	CANH	CAN communication terminal
8	CANL	CAN communication terminal

● Communication connector(CN4) terminal array

Terminal	Name	Function
1	—	maintain
2	—	maintain
3	485+	RS-485 communication terminal
4	DGND	grounding
5	DGND	
6	485-	RS-485 communication terminal
7	CANH	CAN communication terminal
8	CANL	CAN communication terminal

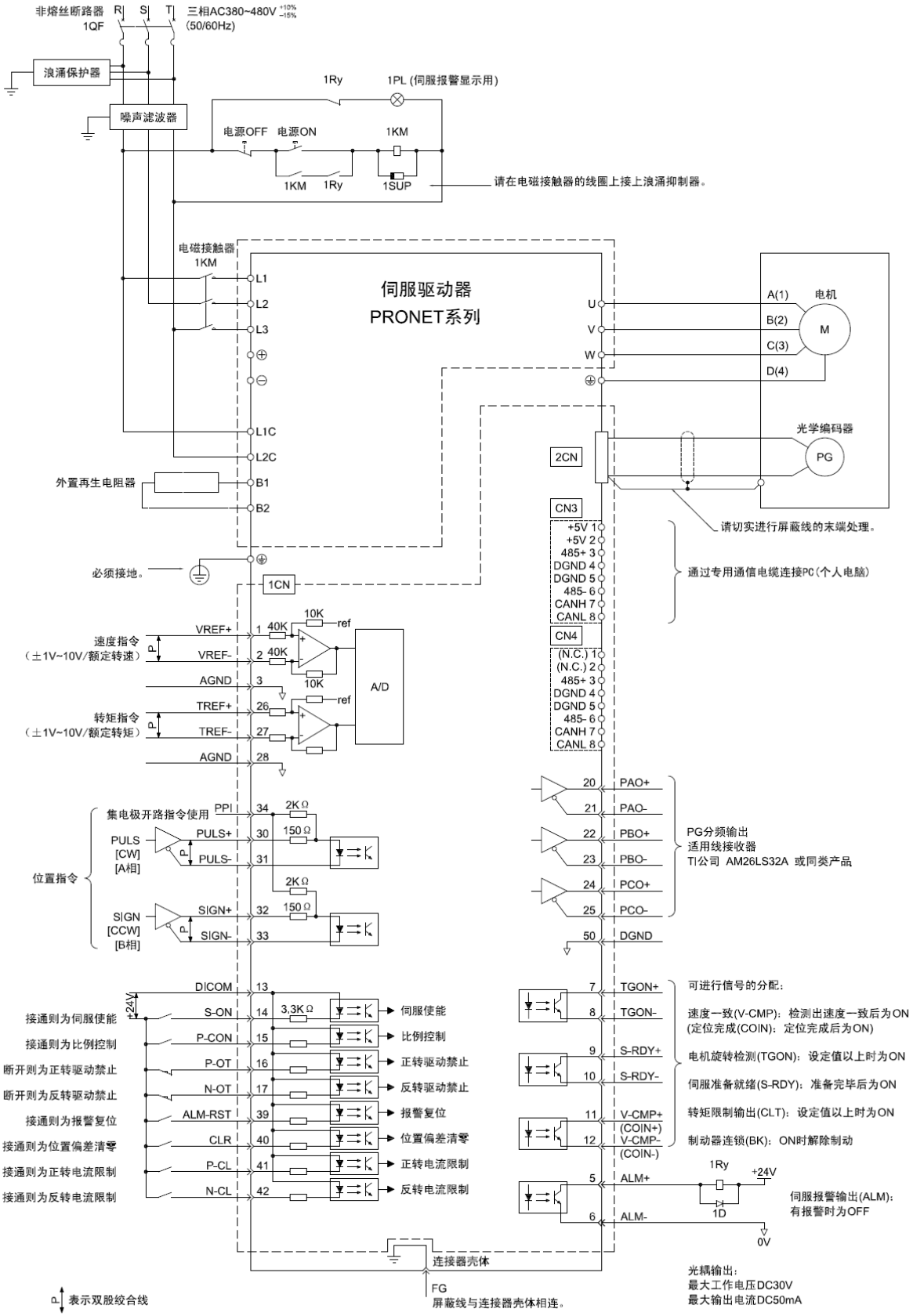
■ Connection diagrams

● Three-phase 200V power supply specification



Wirings and Connection

● Three-phase 400V power supply specification



■ Cables and connectors

Item		length	model	Main specification	picture
CN1	Connector kit (CN1)	—	EC-CN1-50	connector: 10150-3000PE (3M) connector shell: 10350-52A0-008 (3M)	
CN2 ↑ ↓ Encoder	Connector kit (CN2)	—	EC-CN2-20	connector: 10120-3000PE (3M) connector shell: 10320-52A0-008 (3M)	
	Incremental Encoder Cables (EMJ series servo motor)	3m	PMP-JB24-03		
		5m	PMP-JB24-05		
		10m	PMP-JB24-10		
		15m	PMP-JB24-15		
		20m	PMP-JB24-20		
	Incremental Encoder Cables (EMG series、EML series、EMB series Servo motor)	3m	PMP-GA24-03		
		5m	PMP-GA24-05		
		10m	PMP-GA24-10		
		15m	PMP-GA24-15		
		20m	PMP-GA24-20		
	Incremental Encoder Cables (EMJ series servo motor)	3m	PSP-JB24-03		
		5m	PSP-JB24-05		
		10m	PSP-JB24-10		
		15m	PSP-JB24-15		
		20m	PSP-JB24-20		
	Incremental Encoder Cables (EMG series、EML series、EMB series Servo motor)	3m	PSP-GA24-03		
		5m	PSP-GA24-05		
		10m	PSP-GA24-10		
		15m	PSP-GA24-15		
		20m	PSP-GA24-20		
Servo drive terminal ↑ ↓ motor	Power cable (EMJ series servo motor)	3m	PDM-JB18-03		
		5m	PDM-JB18-05		
		10m	PDM-JB18-10		
		15m	PDM-JB18-15		
		20m	PDM-JB18-20		
	Power cable (EMG-10A、EMG-15A、EML-10A servo motor)	3m	PDM-GA16-03		
		5m	PDM-GA16-05		
		10m	PDM-GA16-10		
		15m	PDM-GA16-15		
		20m	PDM-GA16-20		
	Power cable (EMG-20A servo motor)	3m	PDM-GA14-03		
		5m	PDM-GA14-05		
		10m	PDM-GA14-10		
		15m	PDM-GA14-15		
		20m	PDM-GA14-20		
	Power cable (EML-20A servo motor)	3m	PDM-GD14-03		
		5m	PDM-GD14-05		
		10m	PDM-GD14-10		
		15m	PDM-GD14-15		
		20m	PDM-GD14-20		
	Power cable (EMG-30A、EMG-50A、EML-30A、EML-40A Servo motor)	3m	PDM-GD12-03		
		5m	PDM-GD12-05		
		10m	PDM-GD12-10		
		15m	PDM-GD12-15		
		20m	PDM-GD12-20		
	Power cable (EMB-75D、EMB-1AD Servo motor)	3m	PDM-BE12-03		
		5m	PDM-BE12-05		
		10m	PDM-BE12-10		
		15m	PDM-BE12-15		
		20m	PDM-BE12-20		
	Power cable (EMB-1ED servo motor)	3m	PDM-BE10-03		
		5m	PDM-BE10-05		
		10m	PDM-BE10-10		
		15m	PDM-BE10-15		
		20m	PDM-BE10-20		
CN3	PC connection cable	2m	PSC-CC24-02		

Operation introduction

Digital Operator operation introduction

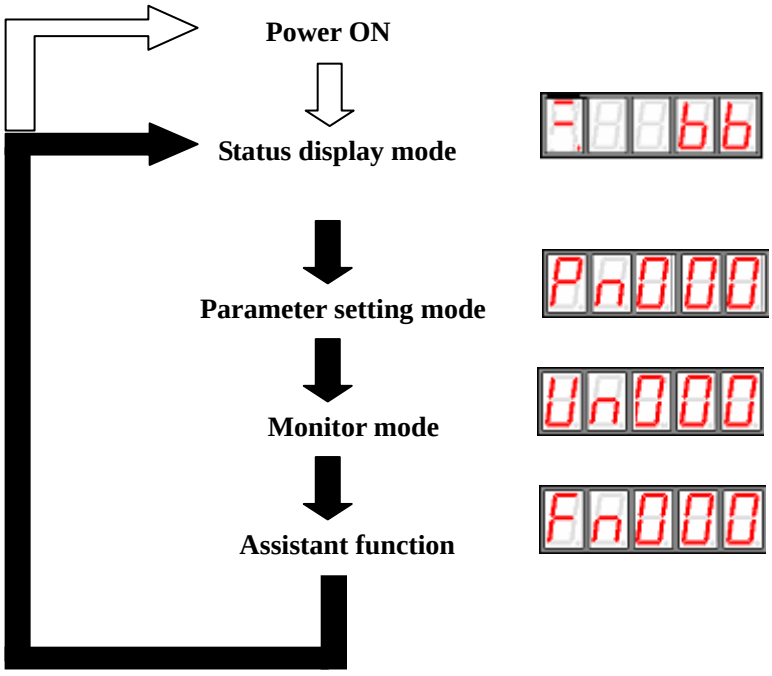
Name	Function
INC key	Press to display the parameter settings and set values. Press INC key to increment the set value Press DEC key to decrement the set value.
DEC key	
MODE key	Press to select the status display mode, setting mode, monitor mode, or error trace back mode. Press to cancel setting when set the parameters.
ENTER key	Press to display the parameter settings and set values and release alarm.

Basic Mode Selection

Through swithching among basic mode of digital operator，be able to operate status display, parameter setting, operating reference ect.

Digital Operator operation allows status display, parameter setting, operating reference, and auto-tuning operations.

Each time the mode key is pressed, the next mode in the sequence is selected.



Operation in Status Display Mode

The status display mode displays the Servodrive status as bit data and codes.

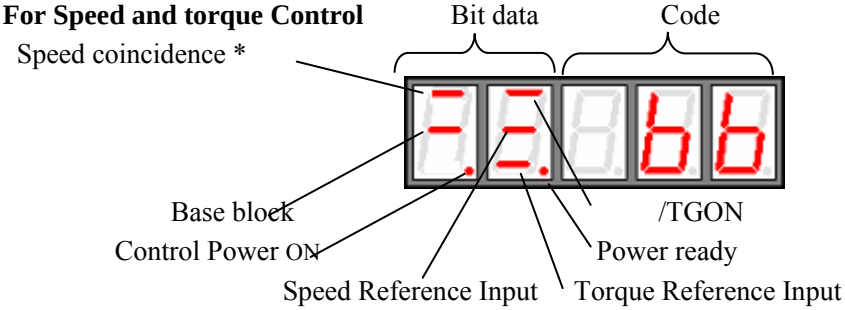
■Selecting Status Display Mode

The status display mode is displayed when the power is turned ON. If the status display mode is not displayed, select the mode by using Mode Key to switch.

■Keys to the status display are shown below.

The display varies in different modes amond speed control,torque control and position control..

For Speed and torque Control

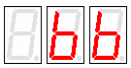
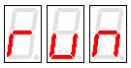
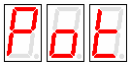
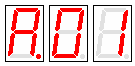


* It is highlighted when in torque control mode.

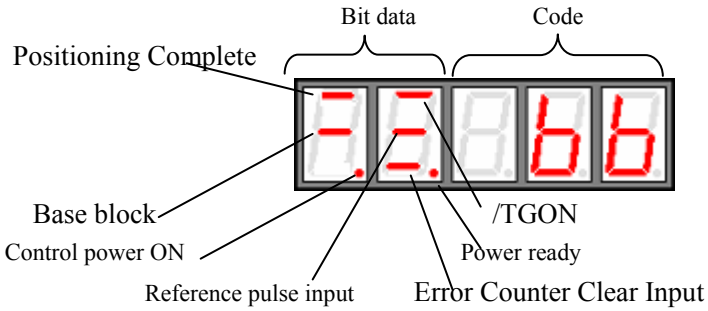
Bit displays

Bit data	Descriptions
Control Power ON	Lit when SERVODRIVE control power ON.
Base block	Lit for base block. Not lit at servo ON.
Speed Coincidence	Lit if the error between motor speed and the reference speed is below preset value Preset value：Pn501(default value10min/r)
/TGON	Lit if motor speed exceeds preset value. Not lit if motor speed is below preset value Preset value: set in Pn503（default value 20r/min）
Speed Reference Input	Lit if input speed reference exceeds preset value. Not lit if input speed reference is below preset value. Preset value: set in Pn503（default value 20r/min）
Torque Reference Input	Lit if input torque reference exceeds preset value. Not lit if input torque reference is below preset value. Preset value：10% rated torque
Power Ready	Lit when main power supply circuit is normal. Not lit when power is OFF or main power supply circuit is faulty.

Code displays

Code	Description
	Base block Servo OFF (motor power OFF)
	Run Servo ON (motor power ON)
	Forward Rotation Prohibited (P-OT) P-OT OFFstatus。
	Reverse Rotation Prohibited (N-OT) N-OT OFF status
	Alarm Status Displays the alarm number.

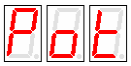
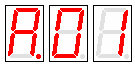
For position control



Bit data dispaly

Bit data	Description
Control power ON	Lit when Servodrive control power ON.
Base block	Lit for base block. Not lit at servo ON.
Position	Lit if error between position reference and actual motor position is below preset value. Preset value：Pn501(standard setting:10 pulse)
/TGON	Lit if motor speed exceeds preset value. Not lit if motor speed is below preset value. Preset value：set in Pn50（standard setting:20r/min）
Reference pulse input	Lit if reference pulse is input Not lit if no reference pulse is input.
Error Counter Clear Input	Lit when error counter clear signal is input. Not lit when error counter clear signal is not input.
Main circuit Power Ready	Lit when main power supply circuit is normal. Not lit when power is OFF or main power supply circuit is faulty.

Code display

Code	Description
	Base Block Servo OFF.（motor power OFF）
	Run Servo ON (motor power ON)
	Forward Rotation Prohibited 1CN-12 (P-OT) OFF.
	Reverse Rotation Prohibited 1CN-13 (N-OT) OFF
	Alarm Status Displays the alarm number.

Press ENTER to release alarm if present status is alarm

Operation in Parameter Setting Mode

Select or adjust the functions by setting parameters. The parameter list is in the appendix.

■Parameter changing procedures are described below:

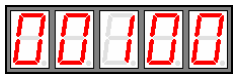
he constant settings (Cn-03 to Cn-23) allow setting of a constant. Check the permitted range of the constant in Appendix List of Parameters, before changing the data.

The example below shows how to change user setting Pn012 100 to 85.

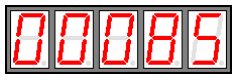
1. Press MODE to select parameter setting mode.

2. Press INC key or DEC key to select parameter number.

3. Press ENTER key to display parameter data in step 2.



4. Press INC or DEC to change the data to the desired number 00085. Hold the button to accelerate the change of value. When the data reaches the max. or Min., the value will remain unchanged, if press INC/DEC.



5. Press ENTER again to go back to parameter display.

In addtion，press MODE and ENTER at the same time to enter parameter mode,then modify parameter,after that,press both key to back off.Operate displacement of parameter in step 3 and 4:Press ENTER for a long timeto ender edit condition then press MODE to save and quit，or perss ENTER for a long timeto quit then press ENTER to back off parameter display.

Note：

If the left side of digital operator display “b”,it will display parameter in binary system。

If display "H",it will display in Hexadecimal and this parametercan only be modified in displacement editing condition,or can not be modified.

Operation in Monitor Mode

The monitor mode allows the reference values input into the SERVODRIVE, I/O signal status, and Servodrive internal status to be monitored.

The monitor mode can be set during motor operation.

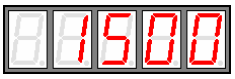
■Using the Monitor Mode

The example below shows how to display 1500, the contents of monitor number Un-001.

1. Press MODE to select monitor mode.

2. Press INC key or DEC key to select the monitor number to display.

3. Press ENTER to display the data for the monitor number selected at step 2.



4. Press ENTER once more to display the monitor number.

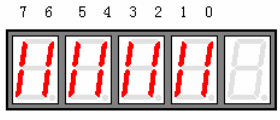
5. Above is the procedure for display 1500 in monitor number Un001

■Monitor Mode Displays

Below is the monitor mode dispalys：

Monitor No.	content
Un000	Actual motor speed Units r/min
Un001	Input speed reference Units r/min
Un002	Input torque reference Units:% (with respect to rated torque)
Un003	Internal torque reference Units:% (with respect to rated torque)
Un004	Number of pulses of Encoder angles
Un005	Input signal monitor
Un006	Encoder signal monitor
Un007	input signal monitor
Un008	Speed given by pulse (when gear ratio is 1:1)
Un009	Pulse count of motor rotated
Un010	Pulse rate of motor rotated （$\times 10^4$）
Un011	Error pulse counter lower 16 digit
Un012	Error pulse counter higher 16 digit
Un013	Received pulse counter lower digit

internal status bit display



Un014	Received pulse counter high digit ($x10^4$)	
Un015	Load inertia percentage	
Un016	Motor overload ratio	

Bit data display

Monitor No.	**Bit No.**	**Content**
Un005	0	1CN_14 input
	1	1CN_15 input
	2	1CN_16 input
	3	1CN_17 input
	4	1CN_39 input
	5	1CN_40 input
	6	1CN_41 input
	7	1CN_42 input

Monitor No.	**Bit No.**	**Content**
Un006	0	W phase
	1	V phase
	2	U phase
	3	C phase
	4	B phase
	5	A phase
	6	（not used）
	7	（not used）

Monitor No.	**Bit No.**	**Content**
Un007	0	1CN_05，1CN_06
	1	1CN_07，1CN_08
	2	1CN_09，1CN_10
	3	1CN_11，1CN_12

Operation in Assistant function mode

If it is in the assistant function mode, some operations could be select in digital operator. The detailed functions are shown as below:

Function No.	Content
Fn000	Display historical alarm data
Fn001	Turn to default value
Fn002	JOG mode
Fn003	Set speed reference offset automatically
Fn004	Set speed reference manually
Fn005	automatically adjustment of offset detected by motor current
Fn006	Manually adjustment of offset detected by motor current
Fn007	Servo software version display
Fn008	Teaching function

Alarm Trace-back Data

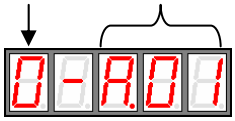
In alarm trace-back data, latest ten times alarms could be displayed.

The following shows the procedure to display the historical record.

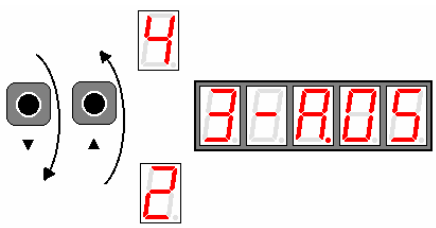
1. Press MODE to select assistant function mode
2. Press INC or DEC to select function number of alarm historical record.

1. Press ENTER to display the latest alarm code.

Alarm number Alarm code



3. Press INC or DEC to display other recent occurred alarm code.



2. Press ENTER to return to function number display.

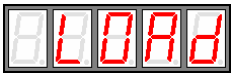
If the user wants to clear all the record, just hold ENTER for one second, then all the historical data will be deleted. 

Operation of recovering to default value

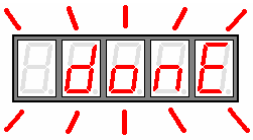
The follows are procedures to recovery of default value.

1. Press MODE to select assistant mode.
2. Press INC or DEC to select function number of recovering to default value

3. Press ENTER to enter parameter default recovery mode.



4. Hold ENTER key for one second to recover the parameter to default setting.



5. Release ENTER key to return to function number display.

Operation in JOG mode

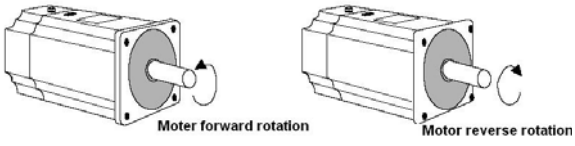
The following is steps in JOG mode

1. Press MODE to select assistant mode.
2. Press INC or DEC to select Function number of JOG mode.

3. Press ENTER to enter JOG mode.

4. Press MODE to enter Servo ON (motor ON) status.

5. Press MODE to switch between servo ON and Servo OFF. If motor running is required, servo must be ON.
6. Press INC or DEC (motor runs when press the keys.)

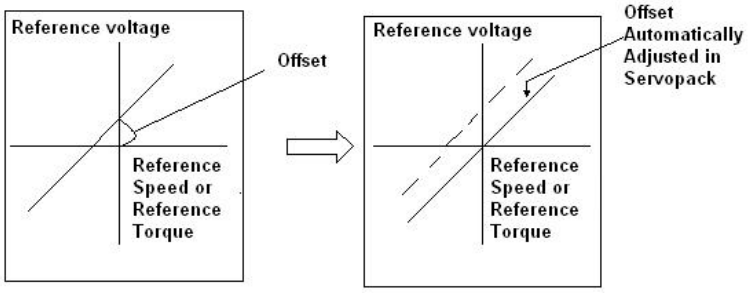


7. Press ENTER to return to function number display.(Servo is OFF)

Reference Offset Automatic Adjustment

The motor may rotate slowly when the reference voltage is intended to be 0 V. This occurs when the host controller or external circuit has a small offset (measured in mV) in the reference voltage.

The reference offset automatic adjustment mode automatically measures the offset and adjusts the reference voltage. It adjusts both speed and torque references.
The following diagram illustrates automatic adjustment of an offset in the reference voltage from the host controller or external circuit.



After completion of offset automatic adjustment, the amount of offset is stored in the Servodrive.

The amount of offset can be checked in the speed reference offset manual adjustment mode. Refer to Reference Offset Manual Adjustment Mode for details

The reference offset automatic adjustment mode cannot be used where a position loop is formed with the host controller and the error pulses are zeroed when servo lock is stopped.

In this case, use the speed reference offset manual adjustment mode. Refer to Reference Offset Manual Adjustment Mode for details.

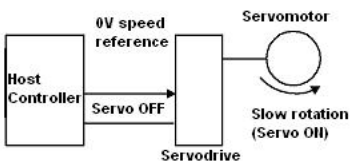
Zero-clamp speed control is available to force the motor to stop during zero speed reference. Refer to Using Zero-Clamp for details.

Note

Please automatively adjust analog reference offset on the servo OFF condition.

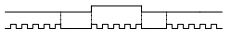
Follow the procedure below to automatically adjust the reference offset:

1. Input the (intended) 0 V reference voltage from the host controller or external circuit.

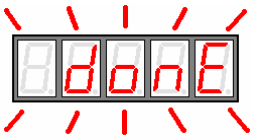


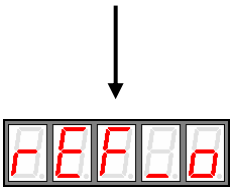
2. Press Mode to select assistant function mode.
3. Press INC or DEC key to select function number of speed reference offset.

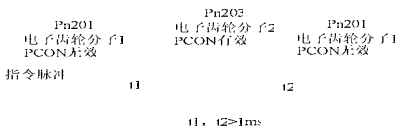
4. Press ENTER to enter mode that automatically adjust the reference offset.



5. Press MODE. When the flashing lasts for one minute, the speed offset is adjusted automatically.







6. Press ENTER to return to function number display

7. This is the end of reference offset automatic adjustment.

Reference Offset Manual Adjustment Mode

Speed reference offset manual adjustment is very convenient in the following situations:

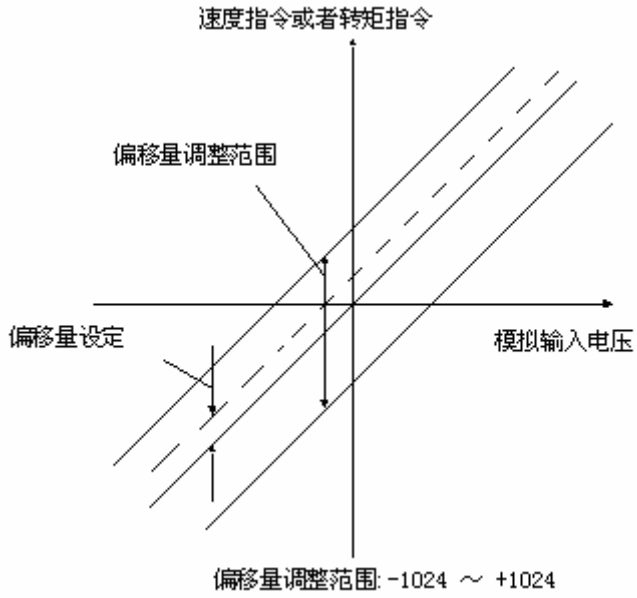
• If a loop is formed with the host controller and the error is zeroed when servo lock is stopped.

• To deliberately set the offset to some value.

It is available when checking the data of offset automatic adjustment.

The basic function is the same as analog reference offset automatic adjustment. But must directly input offset while adjusting. Offset can be set as speed reference or torque reference.

Offset Adjustment Range and Setting Units are as follows:



Note:

When offset seting by automatic adjustment is over the range of adjusting reference offset manually(-1024~+1024），manually adjustment is not available.

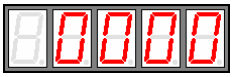
The following is procedures of adjusting reference offset manually.

1. Press MODE to select assistant function mode.
2. Press INC or DEC to select reference offset manual adjustment function number

3. Press ENTER to enter mode that manually adjust the reference offset

4. Select ON signal（/S-ON）ON, it displays as follows

5. Press ENTER key for a second to display speed reference offset



6. Press INC or DEC to adjust the offset.
7. Press ENTER for a second to display the interface on step 4.
8. Press ENTER again to go back to function display.

This ends the procedure.

Motor Current Detection Offset Adjustment

Current detection offset adjustment is performed at Estun before shipping. Basically, the customer need not perform this adjustment. Perform this adjustment only if highly accurate adjustment is required when the Digital Operator is combined with a specific motor.

This section will describe the operation of automatic offset and manual offset.

Note:

Current detection offset manual adjustment could only be performed when the Servo is OFF.

Any accidentally activation of this function especially the manual adjustment, deteriorated situations might occur.

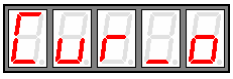
If the torque pulse is obviously too high compared with other Servodrives. Please adjust the offset automatically.

■ Motor current detection offset automatic adjustment

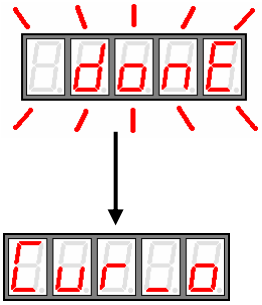
Follow the procedure below to perform current detection offset automatic adjustment

1. Press MODE key to select assistant function mode.
2. Press INC key or DEC key to select function number of motor current detection offset automatic adjustment

3. Press ENTER to enter motor current detection offset automatic adjustment.



4. Press MODE key and the adjustment will be finished after it flashes for a second.



5. Press ENTER to return function number display.

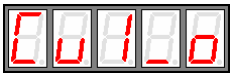
This ends the operation of adjusting the motor current detection offset automatic adjustment

■ Motor current detection offset manual adjustment

Follow the procedure below to perform current detection offset manual adjustment

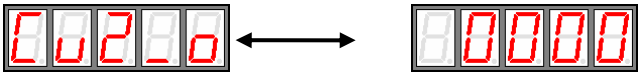
1. Press MODE key and select assistant function mode.
2. Press INC key or DEC key to select function number of motor current detection offset manual adjustment.

3. Press ENTER key to enter into motor current detection offset manual adjustment.

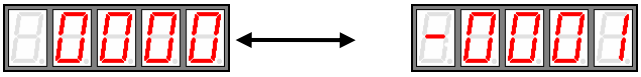


4. Press MODE key to switch U phase（Cu1_o）and V phase（Cu2_o）current detection offset adjustment mode.

5. Hold ENTER key for a second, current phase current detection data will be displayed.



6. Press INC key or DEC key to adjust the offset.



7. Hold ENTER key for a second to return the display of step 3 or step 4.
8. Press ENTER again to go back to function number display.

This ends the operation of the motor current detection offset manual adjustment

Note:

motor current detection offset manual adjustment range:-102~+102。

Checking Software Version

Use the following procedure to check the software version.

1. Press MODE key and select assistant function mode.
2. Press INC key or DEC to select the function number for servo software version.

3. Press ENTER to display software version(D,E,F is displayed at the highest position)

4. Press Mode key to display FPGA/CPLD software version(P is displayed at the highest position)

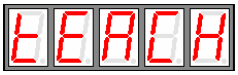
5. Repress Mode key and switch back to display the DSP software version
6. Press ENTER key to return to display the function number

Teaching position

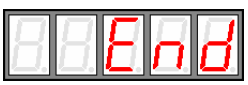
Following procedure is for teaching position.

1. Press MODE key and select assistant function mode.
2. Press INC key or DEC to select the function number for servo software version.

3. Press ENTER,to display as follows



4. Press ENTER for a second then it will display as follows



5. Teaching has been completed and release ENTER

MODBUS Communication Functions

RS-485 communication cable wiring

PRONET series have MODBUS communication function with RS-485 interface,which can modify parameters and monitor servo drive.Definitions of servo drive communication interface are as follows:

CN3 interface definition：

Interface No.	Name	Function
1	5V	Power supply:5VDC
2	5V	
3	**485+**	**RS-485 communication interface**
4	**DGND**	**ground**
5	**DGND**	
6	**485-**	**RS-485 communication interface**
7	CANH	CAN communication interface
8	CANL	CAN communication interface

CN4 interface definition：

Interface No.	Name	Function
1	—	maintain
2	—	maintain
3	**485+**	**RS-485 communication interface**
4	**DGND**	**ground**
5	**DGND**	
6	**485-**	**RS-485 communication interface**
7	CANH	CAN communication interface
8	CANL	CAN communication interface

Inductions：

（1）The cable length is less than 100 meters when in a less disturbed environment.，However, if transmission speed is above 9600Kbps, it's strongly recommended that the cable length is less than 15 meters to ensure the accuracy of transmission.

（2）It's available for up to 31 PCS servo drives to work together when RS485 is applied. 485 network end-point need to separately connect a 120Ω resistor.If need to join more appliance,a relay should be applied to expand. Need to separately connect a 120 Ω resistor.If you want to connect with more appliance,a relay must be need to expand connection units.

（3）CN3 of servo drive is always taken as input terminals，and CN4 is always take as communication cable output terminals（If still need to connect appendix station，connect cable from this terminal to the next appliance；if needn't，add balance resistor in this terminal）.If connect more than one sets pronets servo drive,it is prohibited to directly connect CN3 of servo drives.

For example，RS-485 network is composed of a pcs of PLC,A,B,C three sets of Pronets.Cable wirring is as follows:

PLC → CN3 and CN4 of A servo drive→ CN3 and CN4 of B servo drive → CN3 and

CN4 of C servo drive → 120 terminal resistor.

MODBUS communication relative parameters

Parameters No.	Name and discription	If need to electrified	Which control mode is available	Function and introduction
Pn700	16 bit datum	Yes	ALL	**Pn700.0** MODBUS communication baud rate ［0］4800bps ［1］9600bps ［2］19200bps **Pn700.1 communication protocol selection** [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） **Pn700.2** communication protocol selection ［0］no protocol SCI communicate ［1］MODBUS SCI communicate **Pn700.3** maintain
Pn701	Aix address	Yes	ALL	Aix address of MODBUS protocol communication

MODBUS communication

Only when Pn213 is set as 1 or 2 can communication be put into operation with MODBUS protocol.There are two modes for MODBUS communication. They are ASCII（American Standard Code for information interchange）mode orRTU（Remote Terminal Unit）mode.
The brief introduction as follows:

Code Meaning

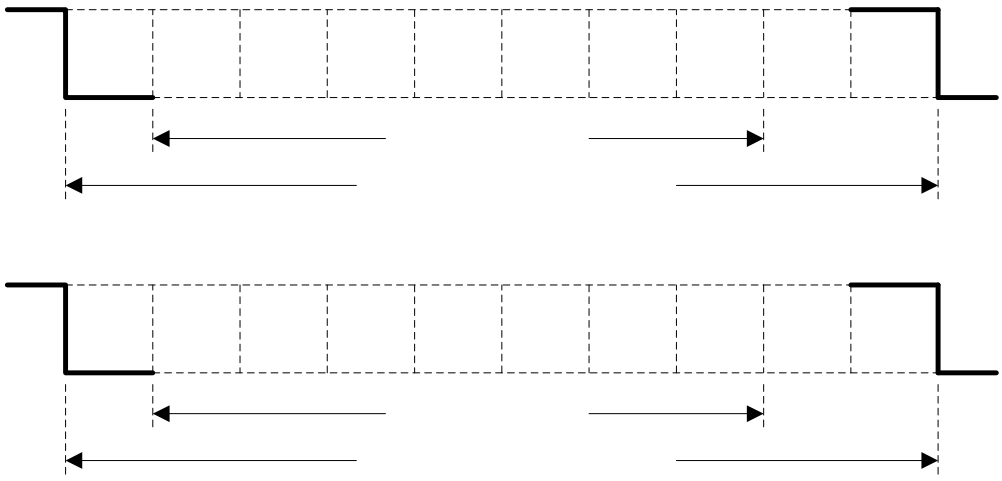
ASCII mode：
Every 8-bit datum is consisted by two ASCII characters. For instance: One 1-byte datum 64_h（Hex expression）is expressed as ASCII code '64'. It contains '6' as ASCII code（36_h） and '4' as ASCII code（34_h）.

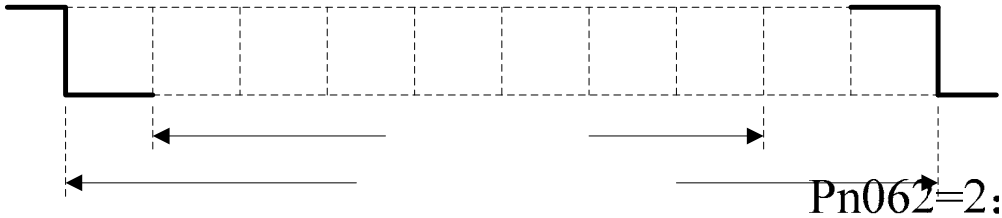
ASCII code for Number 0 to 9、character A to F are as follows:

Number	'0'	'1'	'2'	'3'	'4'	'5'	'6'	'7'
Relevant ASCII code	30H	31H	32H	33H	34H	35H	36H	37H
Character	'8'	'9'	'A'	'B'	'C'	'D'	'E'	'F'
Relevant ASCIIcode	38H	39H	41H	42H	43H	44H	45H	46H

RTU mode：
Every 8-bit datum is consisted by two 4-bit hex datum. That is to say, a normal hex number. For instance: algorism 100 can be expressed into 1-byteRTU datum as 64_h.

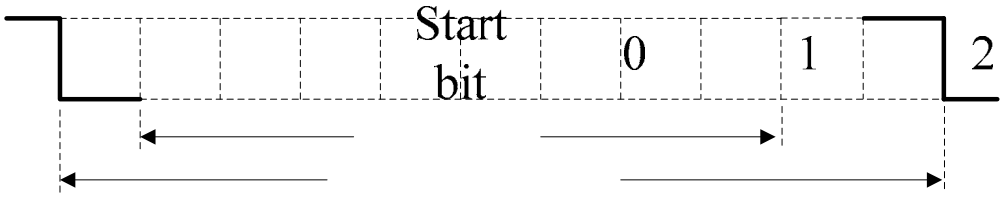
Datum structure:
10bit character form（apply in 7-bit datum）



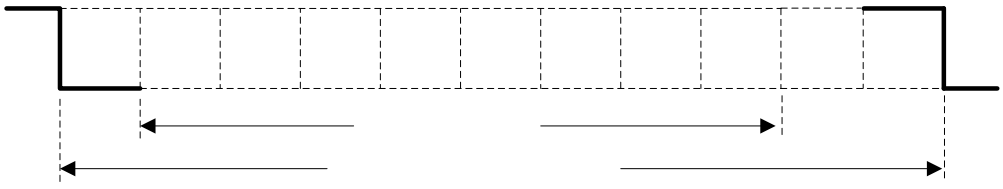


Pn062=2：7，O，1（Mo

11bit character form（apply in 8-bit datum）

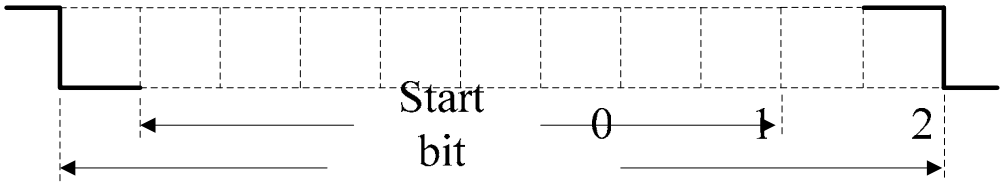


7-data bits



10- bits characte

8，N，2（Modbus，ASC



Communication protocol structure：

8-data bits

Communication protocol data format：

ASCII mode：

11- bits character fra

STX	Start charactor ‘:’ ＝＞(3AH)
ADR	Communication address＝＞1-byte contains 2 pcs of ASCII code
CMD	Reference code＝＞1-byte contains 2 pcs of ASCII code
DATA(n-1)	Data content＝＞n-word=2n-byte contains 4 pcs of ASCIIcode, n≤12
……	
DATA(0)	
LRC	Checking code＝＞1-byte contains 2 pcs of ASCII code
End 1	End code 1＝＞（0DH）(CR)
End 0	End code 0＝＞（0AH）(LF)

8，E，1（Modbus，ASC

8-data bits

11- bits character fra

8，O，1（Modbus，ASC

RTU mode：

STX	At least stop transimission for 10ms
ADR	Communication address＝＞1-byte
CMD	Reference code＝＞1-byte
DATA(n-1)	Data content＝＞n-word=2n-byte，n≤12
……	
DATA(0)	
CRC	CRC Verifying code ＝＞1-byte
End 1	At least stop transimission for 10ms

Communication protocol data format instructions below：

STX（communication start）

ASCII mode：‘：’character.

RTU mode：Sleep interval (no pulse) of transmission time which equals to four bytes at present transmission speed.（automatively changed according to different communication speed）

ADR（communication address）

Acceptable communication addresses range from 1 to 254.

For example:communicate with the servo drive which address is 32（hex as 20）：

ASCII mode：ADR=‘2’，‘0’=＞‘2’=32H，‘0’=30H

RTU mode：ADR=20H

CMD（order instruction） and DATA（datum）

Datum structure is formed by order code. Regular order code as follows:

Order code: 03_h， read N words，N is not more than 20.

For instance: read 2 words from address 0200_h from servo addressed at $01_{h.}$

ASCII mode：

Order information：

STX	‘:’
ADR	‘0’
	‘1’
CMD	‘0’
	‘3’
起始资料地址	‘0’
	‘2’
	‘0’
	‘0’
资料个数 (以word计算)	‘0’
	‘0’
	‘0’
	‘2’
LRC 校验	‘F’
	‘8’
End 1	(0DH)(CR)
End 0	(0AH)(LF)

Response information：

STX	‘:’
ADR	‘0’
	‘1’
CMD	‘0’
	‘3’
资料个数 (以 byte计算)	‘0’
	‘4’
起始资料地址 0200H的内容	‘0’
	‘0’
	‘B’
	‘1’
第二笔资料地址 0201H的内容	‘1’
	‘F’
	‘4’
	‘0’
LRC 校验	‘E’
	‘8’
End 1	(0DH)(CR)
End 0	(0AH)(LF)

RTU mode：

Order information：

ADR	01H
CMD	03H
起始资料地址	02H(地址高位)
	00H(地址低位)
资料个数 (以word计算)	00H
	02H
CRC校验低位	C5H(校验低位)
CRC校验高位	B3H(校验高位)

Response information：

ADR	01H
CMD	03H
资料个数 (以word计算)	04H
起始资料地址 0200H的内容	00H(数据高位)
	B1H(数据低位)
第二笔资料地址 0201H的内容	1FH(数据高位)
	40H(数据低位)
CRC校验低位	A3H(校验低位)
CRC校验高位	D3H(校验高位)

Order code: 06_h，write in one character（word）

For instance: write 100 （0064_h）in address 0200_h of servo addressed $01_{h.}$

ASCII mode ：

Instruction information：

Response information：

STX	‘:’
ADR	‘0’
	‘1’
CMD	‘0’
	‘6’
起始资料地址	‘0’
	‘2’
	‘0’
	‘0’
资料内容	‘0’
	‘0’
	‘6’
	‘4’
LRC 校验	‘9’
	‘3’
End 1	(0DH)(CR)
End 0	(0AH)(LF)

STX	‘:’
ADR	‘0’
	‘1’
CMD	‘0’
	‘6’
资料地址	‘0’
	‘2’
	‘0’
	‘0’
资料地址 0200H的内容	‘0’
	‘0’
	‘6’
	‘4’
LRC 校验	‘9’
	‘3’
End 1	(0DH)(CR)
End 0	(0AH)(LF)

RTU mode：

Instruction information：

ADR	01H
CMD	06H
起始资料地址	02H(地址高位)
	00H(地址低位)
资料内容	00H(数据高位)
	64H(数据高位)
CRC校验低位	89H(校验低位)
CRC校验高位	99H(校验高位)

Response information：

ADR	01H
CMD	06H
起始资料地址	02H(地址高位)
	00H(地址低位)
资料内容	00H(数据高位)
	64H(数据低位)
CRC校验低位	89H(校验低位)
CRC校验高位	99H(校验高位)

LRC（ASCI mode）and CRC（RTU mode）checksum’s calculation：

LRC calculation in ASCII mode

ASCII mode use LRC checksum. The exceeded part (E.G. the total value is 128H of hex, then take 28H only) is taken off by the unit of 256 in the total value from ADR to the last information, then calculate and compensate, the final result is LRC checksum.

STX	‘:’
ADR	‘0’
	‘1’
CMD	‘0’
	‘3’
起始资料地址	‘0’
	‘2’
	‘0’
	‘1’
资料个数 (以word计算)	‘0’
	‘0’
	‘0’
	‘1’
LRC 校验	‘F’
	‘8’
End 1	(0DH)(CR)
End 0	(0AH)(LF)

Add from ADR data to the last data.
01H+03H+02H+01H+00H01H=08H
The compensate value is F8H when 2 is selected from 08H, so LRC is “F”,”8”.

CRC calculation of RUT mode:
RTU mode use CRC(Cyclical Redundancy Check) checksum.
The process of CRC checksum calculation is as following:
The first step: Load in a 16-bit register of FFFFH, named “CRC” register.
The second step: Run XOR calculation between the first bit(bit 0) of instruction information and 16-bit CRC register’s Low bit(LSB), save back the result to CRC register.
The third step: Check the lowest bit (LSB) of CRC register, if it is 0, CRC register right move a bit; if it is 1, CRC register right move a bit, then run XOR calculation with A001H;
The fourth step: turn back to the third step, know that the third step has been operated for 8 times, then go to the fifth step.
The fifth step: repeat the second step to the fourth step to the next bit of instruction information, know all the bits haven been operated the same way, then comment of CRC register is CRC checksum.
Illustration: after calculate out the CRC checksum, in the instruction information, the CRC low bit should be filled first, and then fill the high bit of CRC, please check the following example:

Read 2 word from the 0101H address of 01H servo. The final CRC register comment calculated from ADR to the last bit of information is 3794H, then the instruction information is as following, please note that 94H is transmitted before 37H.

ADR	01H
CMD	03H
起始资料地址	01H(地址高位)
	01H(地址低位)
资料数 （以word计）	00H(高位)
	02H(低位)
CRC校验低位	94H(校验低位)
CRC校验高位	37H(校验高位)

End1、End0（Communication check is done）

ASCII mode：

(0DH)—‘\r’『carriage return』and (0AH)--‘\n’『new line』, mean the end of communication.

RTU mode：

The silent period of 4 bits’ communication time exceeding present communication speed means communication end.

Example:

The following C language create CRC value, the function need two parameters.

unsigned char * data;

unsigned char length;

The function will return unsigned integer mode’s CRC value.

```
unsigned int crc_chk(unsigned char * data,unsigned char length){
    int i,j;
    unsigned int crc_reg=oxFFFF;
    While(length- -){
        crc_ reg ^=*data++;
        for(j=0;j<8;j++){
            If(crc_reg & 0x01){
                crc_reg=( crc_reg >>1)^0xA001;
            }else{
                crc_reg＝crc_reg >>1;
            }
        }
    }
    return crc_reg;
}
```

Communication fault disposal

While communication, faults may occur. Normal faults as follows: ：

- ； While read/write parameter, datum address wrong
- ； While write parameter, the datum exceeds the maximum value of this parameter or is less than the minimum value of this parameter
- Communication is disturbed, datum transmission fault or verifying code fault

When above mentioned communication faults occur, servo drive running won't be affected. Meanwhile, servo drive will feed back a faulty frame.

The faulty frame form as follows:

Host controller datum frame:

Start	**Servo drive Address**	**Instruction**	**Datum address, data**	**Verifying**
		Instruction		

Servo drive feedback fault frame:

Start	**Servo drive address**	**Response code**	**Fault code**	**Verifying**
		＋80H		

Fault frame response code=order+80h

Fault code＝00h：communication in gear ＝01h：servo drive can not identify the required functions

＝02h：The required address does not exist in the servo drive;

＝ 03 h ： The required datum in the servo is not workable. (Beyond maximum or minimum value of the parameter)

＝04h：Servo drive starts to execute the requirement, but cannot achieve it

For instance: servo drive addressed at 03h，write in 06h into parameter Pn002, the written data are not valid because the range of Pn002 is from 0--1,the driver will feedback a fault frame, the fault code is 03H(beyond the maximal and minimal value),here following the structure.

Host controller datum frame

Start	**Servo driver address**	**Instruction**	**Datum address, data**	**Verifying**
	03H	06H	0002H 0006H	

Start	**Servo driver address**	**Response code**	**Fault code**	**Verifying**
	03H	86H	03H	

Besides, if the datum from host controller indicated servo drives address as 00 h , it

represents this datum is broadcasting datum, servo dries will not return any frames.

Servo state data communication address

Communication data address Hex	Meaning	Illustration	Operation
0000 ~ 02FD	Parameter area	Corresponding parameter to parameter list	Read-write
07F1 ~07FA	Alarm information memory area	Ten former alarms	Read only
07FB	Speed instruction zero offset		Read only
07FC	Torque instruction zero offset		Read only
07FD	Lu zero offset		Read only
07FE	Lv zero offset		Read only
0806 ~ 0814	Monitor data(corresponding with displayed data)		Read only
0806	Speed feedback	R/min	Read only
0807	Input speed value	R/min	Read only
0808	Input torque instruction percentage	Corresponding rated torque	Read only
0809	Inside torque instruction percentage	Corresponding rated torque	Read only
080A	Encoder rotation pulse number		Read only
080B	Input signal state		Read only
080C	Encoder signal state		Read only
080D	Output signal state		Read only
080E	Pulse setting		Read only
080F	Present location low bits	Unit:1 instruction pulse	Read only
0810	present location high bits	Unit:10000 instruction pulse	Read only
0811	Deviation pulse counter low 16 bits		Read only
0812	Deviation pulse counter high 16 bits		Read only
0813	setting pulse counter low bits	Unit:1 instruction pulse	Read only
0814	Setting pulse counter high bits	Unit:10000 instruction pulse	Read only
0815	Load/inertia	%	Read only
0816	Motor overload percentage	%	Read only
0817	Current alarm		Read only
0900	Modbus communication IO signal	Power off without save	Read and writable
0901	Driver state		Read only
0902	Relevant phase value		Read only
0903	Inertia inspection value		Read only

0904	Driver running time	Unit: minute	Read only
090E	software edition	Edition is displayed by digit	Read only
090F	software edition	Edition is displayed by digit	Read only
1021	Clear former alarms	01：Clear	Read and writable
1022	Clear current alarms	01：Clear	Read and writable
1023	JOG servo on	01：Enable 00：No enable	Read and writable
1024	JOG forward rotate	01： Forward rotation 00： Stop	Read and writable
1025	JOG backward rotate	01： Backward rotation 00： Stop	Read and writable
1026	JOG forward rotate at node position(start signal has been set)	01： Forward rotation 00： Stop	
1027	JOG backward rotate at node position(start signal has been set)	01： Backward rotation 00： Stop	
1028	Pause at node position	01： Pause 00： Cancel pause	

Instruction:

1、parameter area（communication address 0000 $_h$ ～ 00DE $_h$）

It is relevant to parameters in the parameter list. For instance: parameter Pn000 is relevant to communication address 0000 $_{h;}$ parameter Pn101 is relevant to communication address 0065 $_{h;}$ read-write operation to address 0000 $_h$ is the read-write operation to Pn000. If the input datum is out of the parameter range, the datum shall be abnegated and servo drive will return an operation unsuccessful signal.

2、Alarm information storage area（07F1 ～ 07FAH）

Previous alarm number	Instruction	Communication address
0	Previous alarm record 1（the last alarm）	07F1H
1 ~ 8	Previous alarms record 1--9	07F2H ~ 07F9H
9	Previous alarm record (the longest time)	07F3H

3、monitor data area（0806 $_h$ ～ 0814 $_h$）

These monitor data are relevant to servo drive display panel Un000~Un014.

For instance: read address 0807 $_h$ (speed setting) through communication as FB16 $_{h.}$ Therefore, the speed setting is-1258RPM.

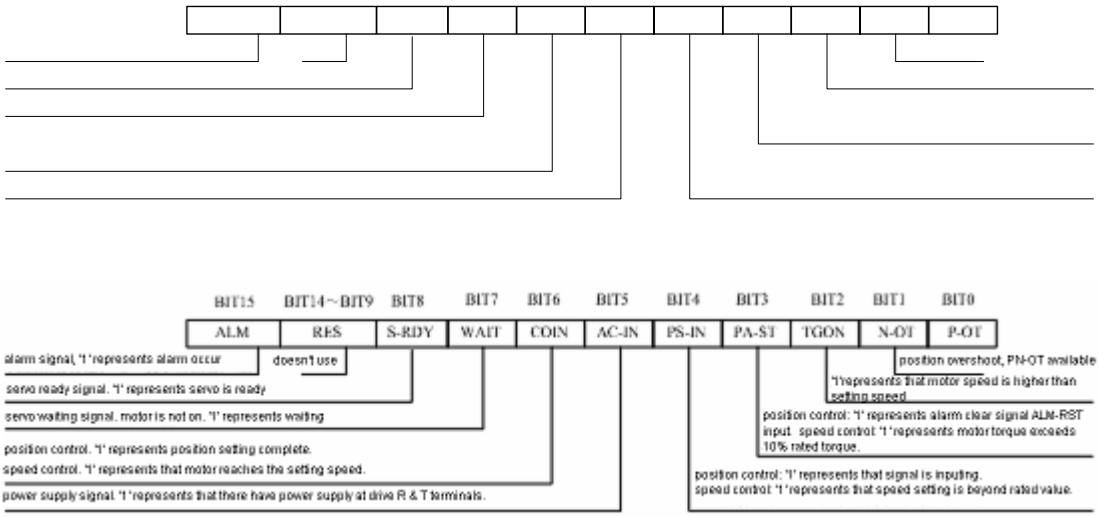
4、modbus communication IO signal

Use communication to control input number IO signal. This datum won't be reserved after power

off.

5、drive state（0901 h）

This 1-word represents the current state of the system. Meaning of each bit as follows:



BIT7 BIT6

WAIT COIN

伺服准备好状态：‘1’表示准备好

伺服等待标志（电机不使能）：‘1’表示等待

位置控制：‘1’表示定位完成

速度控制：‘1’表示电机速度到达给定速度

电源输入标志：‘1’表示驱动器的R、T端子有电源输入

6、software edition（090E h）

It represents drive's software edition by number. E.g. If the number is D201H，it means the software edition is D-201.

PARAMETER LIST

Parameter	Name and description	Unit	Range	Default	Need power on again
Pn000	**Binary** Pn000.0: parameter servo on Pn000.1: Forward rotation prohibited input (P-OT). Pn000.2: Forward rotation prohibited input (N-OT). Pn000.3: instant power off output servo alarm output（ALM）	—	0~1111	0	Need
Pn001	**Binary** Pn001.0: CCW,CW selection Pn001.1: analog speed limited enable Pn001.2: analog torque limited enable Pn001.3: the second electronic gear enable	—	0~1111	0	Need
Pn002	**Binary** Pn002.0: switch method of electronic gear Pn002.1: reserve Pn002.2: reserve Pn002.3: reserve	—	0~0011	0010	Need
Pn003	**Binary** Pn003.0: code wheel fault code alarm enale Pn003.1:C pulse protection Pn003.2: low speed compensation Pn003.3: overload increase	—	0~1111	0	Need
Pn004	**Hex** Pn004.0: Stop way Pn004.1: offset counter clear mode Pn004.2: instruction pulse form Pn004.3: reverse pulse	—	0~0x3425	0	Need
Pn005	**1Hex** Pn005.0: torque forward feedback form Pn005.1: Control method [0] Speed control(analog instruction) [1] Positioning control (pulse train instruction) [2] Torque control (analog instruction) [3] Speed control(node instruction)	—	0~0x33d3	0	Need

Parameter	Name and description	Unit	Range	Default	Need power on again
	Speed control (zero instruction) [4] Speed control(node instruction) ←→peed control (analog instruction) [5] Speed control (node instruction) ←→Positioning control(pulse train instruction) [6] Speed control(node instruction) ← → Torque control(analog instruction) [7] Positioning control(pulse train instruction)←→Speed control(analog instruction) [8] Positioning control(pulse train instruction) ← → Torque control(analog instruction) [9] Torque control(analog instruction) Speed control(analog instruction) [A] Speed control(analog instruction) ←→zero clamp control [B] positioning control(pulse train instruction) ← → Positioning control(pulse prohibited) [C] Positioning control(parameter instruction) [D]Speed control (parameter instruction) Pn005.2:Our-of-tolerance alarm enable Pn005.3: Motor type				
Pn006	**Hex** Pn006.0: Bus mode Pn006.1: Reserved Pn006.2: Reserved Pn006.3: Reserved	—	0~0x0002	0	Need
Pn100	Real time auto tune setting 0: User manual gain 1,2,3= Regular mode;4,5,6= Upright load 1,4 = No change of overload inertia;2,5 =Small change of overload inertia;3,6= Big change of overload inertia	—	0~6	1	Need
Pn101	Load rigid selection	—	0~15	5	No need

Parameter	Name and description	Unit	Range	Default	Need power on again
Pn102	Speed loop gain	Hz	1~2500	160	No need
Pn103	Speed loop integration time	0.1ms	1~4096	200	No need
Pn104	Position loop gain	1/s	0~1000	40	No need
Pn105	Torque instruction filter counstant	0.1ms	0~250	4	No need
Pn106	Load/inertia percentage	—	0~20000	0	No need
Pn107	The second speed loop gain	Hz	1~2500	40	No need
Pn108	The second speed loop integration time count	0.1ms	1~4096	200	No need
Pn109	The second position loop gain	Hz	0~1000	40	No need
Pn110	The second torque instruction filter constant	0.1ms	0~250	150	No need
Pn111	Speed offset	R/min	0~300	0	No need
Pn112	Forward feedback	%	0~100	0	No need
Pn113	Forward feedback filtering	0.1ms	0~640	0	No need
Pn114	Torque forward feedback	%	0~100	0	No need
Pn115	Torque forward feedback filtering	0.1ms	0~640	0	No need
Pn116	**P/PI switch condition** 0: Torque instruction percentage 1: Offset counter value 2: Setting acceleration value 3: Setting speed value 4: PI Fixed PI	—	0~4	0	Need
Pn117	Torque switch threshold	%	0~300	200	No need
Pn118	Offset counter switch threshold	Instruction pulse	0~10000	0	No need
Pn119	Setting acceleration switch threshold	10rpm/s	0~3000	0	No need
Pn120	Setting speed switch threshold	Rpm	0~10000	0	No need
Pn121	**Gain switch condition** 0: The first group gain is fixed 1: Outside power switch gain swap 2: Torque percentage 3: Offset counter value 4: Setting acceleration value（10r/min） 5: Setting speed value 6: Input of instruction with position	—	0~6	0	Need
Pn122	Deferred switch time	0.1ms	0~20000	0	No need
Pn123	Switch threshold level		0~20000	0	No need
Pn124	Reserved				
Pn125	Position gain switch time	0.1ms	0~20000	0	No need
Pn126	Switch hysteresis		0~20000	0	No need
Pn127	Test filtering at low speed	0.1ms	0~100	10	No need
Pn128	The increase of speed gain	—	0~3	3	No need

Parameter	Name and description	Unit	Range	Default	Need power on again
	relationship in real time adjustment period				
Pn129	Low speed verifying constant	—	0~30000	0	No need
Pn200	PG frequency division	Pulse	16~16384	16384	Need
Pn201	The first electronic gear molecule	—	1~65535	1	Need
Pn202	Electronic gear denominator	—	1~65535	1	Need
Pn203	The second electronic gear molecule	—	1~65535	1	Need
Pn204	Position instruction filtering time constant	0.1ms	0~32767	0	No need
Pn205	Position instruction filtering form selection	—	0~1	0	Need
Pn300	Input gain of speed instruction	Rpm/v	0~3000	150	No need
Pn301	Inside speed 1	Rpm	0~6000	100	No need
Pn302	Inside speed 2	Rpm	0~6000	200	No need
Pn303	Inside speed 3	Rpm	0~6000	300	No need
Pn304	Parameter speed	Rpm	0~6000	500	No need
Pn305	JOG speed	Rpm	0~6000	500	No need
Pn306	Soft accelerating time	Ms	0~10000	0	No need
Pn307	Soft reset decelerating time	Ms	0~10000	0	No need
Pn308	Speed filtering time constant	Ms	0~10000	0	No need
Pn309	S Rising time of S curve.	Ms	0~10000	0	No need
Pn310	**Speed instruction curve form** 0: Incline 1: S curve 2: Once filtering 3: Twice filtering	—	0~3	0	Need
Pn311	S form selection	—	0~3	0	No need
Pn312	DP communication inching.	Rpm	-6000~6000	500	No need
Pn400	Torque instruction gain	0.1V/100%	10~100	33	No need
Pn401	Forward direction torque inside limit	%	0~300	300	No need
Pn402	Reversed direction torque inside limit	%	0~300	300	No need
Pn403	Forward direction outside torque limit	%	0~300	100	No need
Pn404	Reversed outside torque limit	%	0~300	100	No need
Pn405	Plug braking torque limit	%	0~300	300	No need
Pn406	Speed limit in torque control period	Rpm	0~6000	1500	No need
Pn407	Wave trap 1 frequency	Hz	50~5000	5000	No need
Pn408	Wave trap 1 depth	—	0~11	1	No need
Pn408	Wave trap 2 frequency	Hz	50~5000	5000	No need
Pn410	Wave trap 2 depth	—	0~11	1	No need

Parameter	Name and description	Unit	Range	Default	Need power on again
Pn500	Discrepancy of positioning	Puls	0~5000	10	No need
Pn501	Discrepancy of speed	Rpm	0~100	10	No need
Pn502	Zero clamp speed	Rpm	0~3000	10	No need
Pn503	Rotation inspection speed TGON	Rpm	0~3000	20	No need
Pn504	Offset counter overflow alarm	256Puls	1~32767	1024	No need
Pn505	Servo on waiting time	Ms	0~2000	200	No need
Pn506	Basal waiting process	10ms	0~500	0	No need
Pn507	Braking waiting speed	Rpm	10~100	100	No need
Pn508	Braking waiting time	10ms	10~100	50	No need
Pn509	Match input end to a end of signal hex 4 bit	—	0~0xbbbb	0x3210	Need
Pn510	Match input end to a end of signal hex 4 bit	—	0~0xbbbb	0x7654	Need
Pn511	Output signal distribute	—	0~0x0444	0x0210	Need
Pn512	Bus control input node low bit enable		0~1111	0	No need
Pn513	Bus control input node high bit enable		0~1111	0	No need
Pn514	Input end filtering	0.2ms	0~1000	1	No need
Pn515	Reserved	0.2ms	0~3	1	No need
Pn516	Select the contrary of input end signal	—	0~1111	0	No need
Pn517	Select the contrary of input end signal	—	0~1111	0	No need
Pn518	Reserved	Ms	50~2000	125	No need
Pn519	Reserved	0.1ms	0~10000	3	No need
Pn520	Reserved	0.1ms	0~60000	50	No need
Pn600	Point position control position pulse	10000P	-9999~9999	0	No need
Pn601	Point position control position pulse	1P	-9999~9999	0	No need
	……				
Pn631	Point position control position pulse	1P	-9999~9999	0	No need
Pn632	Point position speed control	Rpm	0~6000	500	No need
	……				
Pn647	Point position speed control	Rpm	0~6000	500	No need
Pn648	Point position once filtering	0.1ms	0~32767	0	No need
	……				
Pn663	Point position once filtering	0.1ms	0~32767	0	No need
Pn664	Stopping time	50ms	0~300	10	No need
	……				
Pn679	Stopping time	50ms	0~300	10	No need

Parameter	Name and description	Unit	Range	Default	Need power on again
Pn680	Reserved				
Pn681	**Hex** Pn681.0: One time/recycle, reset/referring point selection Pn681.1: Change step and reset mode Pn681.2: Change step input signal mode Pn681.3: Reserved	—	0~x0333	0x0000	No need
Pn682	Program mode	—	0~1	0	No need
Pn683	Program start step	—	0~15	0	No need
Pn684	Program end step	—	0~15	1	No need
Pn685	Search travel speed	Rpm	0~3000	1500	No need
Pn686	Leave travel switch speed	Rpm	0~3000	30	No need
Pn687	Teaching position pulse	10000P	-9999~9999	0	No need
Pn688	Teaching position pulse	1P	-9999~9999	0	No need
Pn700	**Hex** Pn700.0: MODBUS communication baud rate Pn700.1: MODBUS communication protocols Pn700.2: Communication protocols selection Pn700.3: Reserved	—	0~0x0182	0x0151	Need
Pn701	MODBUS shaft address	—	1~247	1	Need

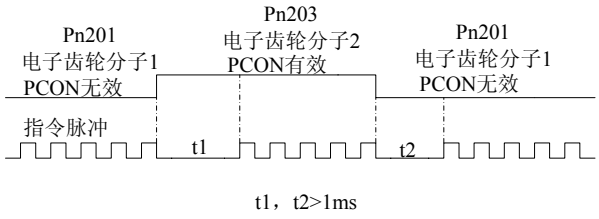
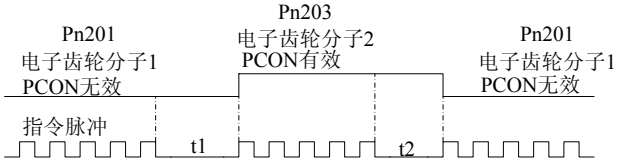
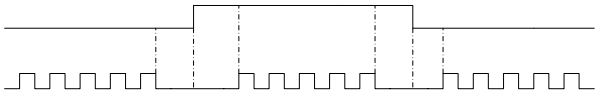
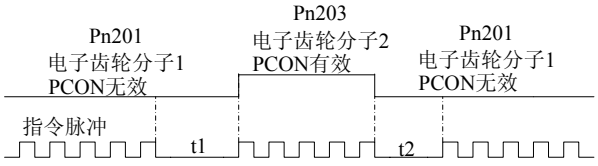
Illustration of parameter form

Form	code	description
Function selection switch	Pn000~Pn006	Control mode, stop mode and other function selection.
Servo gain parameter and so on	Pn100~Pn129	Position gain, speed gain, rigidity and so on
Position control relationship parameter	Pn200~Pn205	PG frequency division, electronic gear and so on
Speed control relationship parameter	Pn300~Pn312	Speed instruction input, soft reset and so on.
Torque control relationship parameter	Pn400~Pn406	Torque limit and so on

Parameter to control input/output ends.	Pn500~Pn520	Distribution of input/output end' functions
Relevant parameter of point position control	Pn600~Pn686	Relevant parameter of inside point position control.

Detail explanation of parameters

No.	Name and illustration	Power on again	The effective control mode	Function and meaning
Pn000	**Binary**	Need	ALL	**Pn000.0:** parameter servo on [0] outside S-ON valid [1] Outside S-ON outside S-ON invalid, after S-RDY output, motor excitation signal is turned on automatically **Pn000.1 Forward direction input prohibited** [0] Outside P-OT valid, it moves according to the time sequence movement set by Pn004.0 when it reach the travel limit. [1] Outside P-PT invalid. **Pn000.2 Reversed direction input prohibited** [0] Outside N-OT valid, it moves according to the time sequence movement set by Pn004.0 when it reach the travel limit. [1]。Outside P-PT invalid. **Pn000.3 Momentary power off alarm output** [0] No alarm in one momentary power off circle [1] Alarm in one momentary power off circle.
Pn001	**Binary**	Need	Pn001.0 ALL Pn001.1 T Pn001.2 P，S Pn001.3 P	**Pn001.0** CCW, CW selection [0] CCW: counter clockwise is the forward direction [1] CW: clockwise is the forward direction **Pn001.1 analog speed limit enable** [0]。Inter parameter Pn406 is the limited value of speed while torque control period [1] Vref input analog voltage corresponding value is the speed limit value while torque control. All control modes of the parameter are effective **Pn001.2 analog torque limit enable** [0] Pn401~Pn404 Pn401→Pn404 act as torque limit [1] Tref Tref input corresponding value act as torque limit. **Pn001.3** The second electric gear enable [0] There is no the second electric gear PCON signal acting as P/PI switch [1] The second electric gear effective PCON signal can only act as the second electric gear when Pn005.3=1
Pn002	**Binary**	Need	ALL	**Pn002.0** Switch mode of electric gear [0] Corresponding time sequence

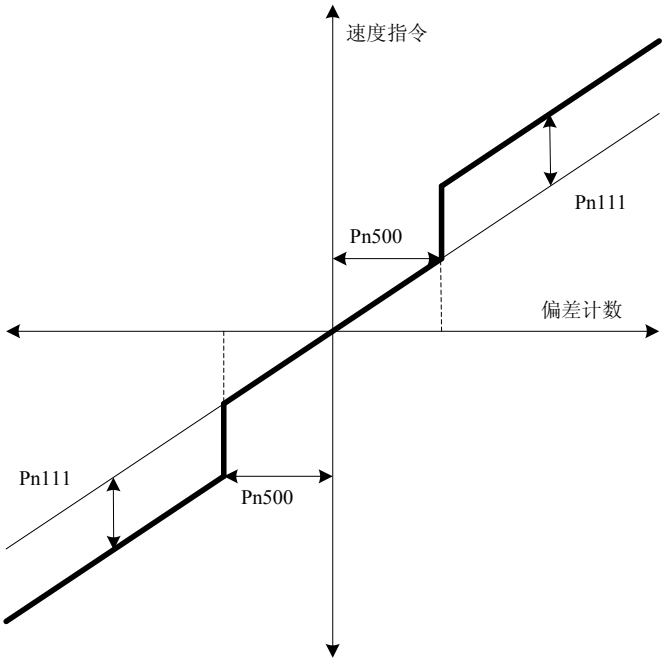
No.	Name and illustration	Power on again	The effective control mode	Function and meaning
				 t1，t2>1ms [1] Corresponding time sequence  t1，t2>1ms set to the time sequence 0 and 1 both available.  fault time sequence  t1，t2>1ms **Pn002.1** Reserved **Pn002.2** Reserved **Pn002.3**:Reserved
Pn003	**Binary**	Need	ALL	**Pn003.0** Code panel error code alarm enable [0] A.30~A.33:Alarm invalid [1] A.30~A.33:Alarm valid **Pn003.1 C** pulse protection [0] No C pulse protection [1] with C pulse protection **Pn003.2** Low speed compensation [0] No low speed verifying

No.	Name and illustration	Power on again	The effective control mode	Function and meaning
				[1] With low speed verifying to prevent motor crawling, but the intensity of motor low speed verifying has to be determined by value of Pn129 sometimes. **Pn003.3** overload enhancement [0] No overload enhancement function [1] With overload enhancement function, In some frequent start-stop applications, the function can enhance the overload which surpass 2 times' rated overload in instantaneous time.
Pn004	**Hex**	Need	Pn004.0 ALL Pn004.1 P Pn004.2 P Pn004.3 P	**Pn004.0** Stop mode ［0］Cancel braking after DB braking and running stop. ［1］ Stop freely ［2］DB when servo off, DB when servo off, plug braking stop servo off when over travel. ［3］Stop freely when servo off, plug braking stop servo off when over travel. ［4］DB when servo off, zero clamp after plug braking stop when over travel ［5］Freely stop when servo off, zero clamp after plug braking stop when over travel. **Pn004.1 Offset counter clear mode** [0] Offset counter clear when S-off, does not clear when over travel. [1] Offset counter does not clear [2] Offset counter clear when both S-off and also over travel(except zero clamp) **Pn004.2** Instruction pulse mode ［0］Symbol + pulse ［1］CW+CCW ［2］A+B（orthogonal 1 frequency doubling） ［3］A+B（rthogonal 2 frequency doubling） ［4］A+B（orthogonal 4 frequency doubling） **Pn004.3** Pulse negation ［0］PULS instruction no negation, SIGN instruction no negation ［1］PULS instruction no negation, SIGN instruction negation ［2］PULS instruction negation, SIGN instruction no negation. ［3］PULS instruction negation, SIGN instruction negation
Pn005	**Hex**	Need	Pn005.0 P，S Pn005.1 ALL Pn005.2 P	**Pn005.0** Torque feedforward mode [0] Outside analog (Tref) feed forward invalid, use regular torque feed forward. [1] Outside analog (Tref) feed forward valid, use high speed torque feed forward [2] Outside analog (Tref) feedforward invalid, use high speed torque feedforward [3] Outside analog (Tref) feedforward valid, use regular

No.	Name and illustration	Power on again	The effective control mode	Function and meaning
				torque feedforward **Pn005.1 Control mode** [0] Speed control (analog instruction) PCON: OFF, PI control; ON, P control [1] Position control(pulse train instruction) PCON: OFF, PI control; ON, P control [2]) Torque control (analog instruction) PCON invalid [3] Speed control(node instruction)←→Speed control(zero instruction) PCON: OFF, motor forward rotate; ON, motor backward rotate PCL, NCL: OFF motor stop [4] Speed control(node instruction)←→Speed control (analog instruction) PCON: OFF Motor forward rotate, ON motor backward rotate PCL, NCL: OFF switch to speed control(analog instruction) [5] Speed control (node instruction)←→Position control (pulse train instruction) PCON: OFF motor forward rotate, ON Motor backward rotate PCL, NCL: OFF switch to position control (pulse train instruction) [6] Speed control (node instruction)←→Torque control (analog instruction) PCON: OFF motor forward rotate, ON motor backward rotate PCL, NCL: OFF switch to torque control(analog instruction) [7] Position control (pulse train instruction)←→Speed control (analog instruction) PCON: OFF; position control (pulse train instruction) ON speed control (analog instruction) [8] position control (pulse train instruction)←→Torque control (analog instruction) PCON: OFF; position control (pulse train instruction) ON Torque control (analog instruction) [9] Torque control (analog instruction)←→Speed control (analog instruction) PCON: OFF; Torque control(analog instruction)

No.	Name and illustration	Power on again	The effective control mode	Function and meaning
				ON Speed control (analog instruction) [A])Speed control(analog instruction) ← → zero clamp control PCON：OFF；speed control(analog instruction) ON zero clamp control [B] position control(pulse train instruction) ← → position control (pulse prohibited) PCON：OFF position control (pulse train instruction)； ON Position control(pulse prohibited) [C] Position control(node instruction) PCON： can be as changing step PCL,NCL：can be as searching reference point or start. [D] Speed control(parameter instruction) **PCON，PCL，NCL invalid** **Pn005.2** Overproof alarm enable [0] Overproof alarm no enable [1] overproof alarm enable, alarm when offset counter value surpass the corresponding value of Pn504 [2] Reserved [3] Reserved **Pn005.3 Selection of motor type** [0] EMJ [1] EMG [2] EML [3] EMB
Pn006	**Hex**	Need		**Pn006.0 Bus mode** [0] No bus [1] PROFIBUS-DP V0/V1 [2] PROFIBUS-DP V2 **Pn006.1 Reserved** **Pn006.2 Reserved** **Pn006.3 Reserved**
Pn100	Real time auto adjustment set	Need	P，S	[0] User manual gain [1,2,3] Regular mode [4,5,6] Upright load [1,4] No change of load inertia [2,5] Small change of load inertia [3,6] Big change of load inertia Attention: The auto adjustment below the highest speed 100rpm is invalid while the movement of servo motor The adjustment is invalid while the acceleration and

No.	Name and illustration	Power on again	The effective control mode	Function and meaning
				deceleration be lower than 5000rpm/s, It should be set to user manual gain. When leak of machine is too big to be suitable for auto-adjustment during movement course, it should be set to user manual gain. When speed load are different too much to be suitable for auto-adjustment during movement course, it should be set to manual gain.
Pn101	Load rigid selection	No need	P，S	The value determines the response speed of servo system, normally the rigid should be set larger, but if it is too large, it would suffer the Mechanical impaction. It should be set smaller when vibration is big. The value is valid only when auto-adjustment time.
Pn102	Speed loop gain	No need	P，S	The value determines speed loop gain's value and load inertia percentage. The right corresponding unit is HZ when Pn 106 is set correctly.
Pn103	Speed loop integral time	No need	P，S	Decreasing the value can shorten position time, the speed response raising unit is 0.1ms
Pn104	position loop gain	No need	P	The value determines the position loop gain's value,
Pn105	Torque instruction filter constant	No need	P，S，T	Setting torque filtering can remove or decrease the mechanical vibration, but wrong setting will cause mechanical vibration sometimes.
Pn106	Load inertia percentage	No need	P，S	0 The percentage between load inertia and motor rotor inertia. The unit is %. Setting value=(load inertia/rotor inertia)x100
Pn107	The second speed loop gain	No need	P，S	These parameters' meaning is same with Pn102~Pn105. These parameters are only need to set when two level gain switch mode is open.
Pn108	The second speed loop integral time constant	No need	P，S	
Pn109	The second loop gain	No need	P	
Pn110	The second torque instruction filter constant	No need	P，S，T	
Pn111	Speed offset	No need	P	The value is to shorten the position time, But if it is set too big or not corresponded well with Pn111, vibration occurs, The relationship between the value and speed instruction, offset counter is as following.

No.	Name and illustration	Power on again	The effective control mode	Function and meaning
				
Pn112	Feed forward	no need	P	It is used to set position feed forward value, more higher position lead to faster response, less position offset. It would cause vibration and overswing when it is set too big.
Pn113	Feed forward filtering	no need	P	The mechanical impaction caused by smooth position feed forward. It would enlarge feed forward lag and cause vibration if it is set too big. Unit:0.1ms
Pn114	Torque feed forward	no need	P，S	it is used to set torque feed forward value in order to fasten the speed response. Pls set load rotation inertia percentage correctly while in the manual adjustment mode
Pn115	Torque feed forward filtering	no need	P，S	Mechanical impaction caused by smooth torque feed forward . Unit:0.1ms
Pn116	switch conditions	Need	P，S	0: torque instruction percentage 1: offset counter value 2: setting acceleration value 3: setting speed value 4: fixed PI
Pn117	Torque switch threshold	no need	P，S	The torque threshold value unit from PI control to P control:%
Pn118	Offset counter switch threshold	No need	P	The offset counter threshold value unit from PI control to P :Pulse
Pn119	Setting acceleration switch threshold	No need	P，S	The acceleration threshold value unit from PI control to P :10rpm/s
Pn120	Setting speed	No No	P，S	

No.	Name and illustration	Power on again	The effective control mode	Function and meaning
	switch threshold	need		The speed threshold value unit from PI control to P:rpm
Pn121	Gain switch condition	No need	P，S	0: Fixed to the first group gain 1: Outside power switch gain transfer(G-SEL) 2: Torque percentage 3: Offset counter value 4: Setting acceleration value(10r/min) 5: Setting speed value 6: there are position instructions input
Pn122	switch delay time	No need	P，S	How long should the gain switch be delayed when it get to the switch condition.
Pn123	Switch threshold level	No need	P，S	Gain switch's trigger level
Pn124	Reserved			
Pn125	Position gain switch time	No need	P	It can bridge smoothly by the parameter if the change between the two groups' gain is too large.
Pn126	Hysterics switch	No need	P，S	It is used to set gain switch movement delay
Pn127	speed inspection filtering at low speed	No need	P，S	It sets the filtering during speed inspection at low speed, if it is too large, the speed inspection at low speed will delay.
Pn128	Real time adjustment speed gain increase relationship	No need	P，S	It is the increase times of speed loop gain at the same rigid in the real time auto adjustment. The real time auto adjustment speed loop gain is larger as the value is set larger.
Pn129	Low speed verifying constant	No need	P，S	The anti crawl strength, anti outside friction at low speed. But it will cause vibration if it is set too large.
Pn200	PG frequency division	Need	P，S，T	Analog encoder output orthogonal differential pulse, the value means the encoder output orthogonal pulses No. When motor rotate a round.
Pn201	The first electrical gear numerator	Need	P	Using electrical gear can match the instruction pulse along with the amount of motor movement corresponding to the motor, it makes the upper device do not need to care mechanical deceleration ratio and encoder pulse No., essentially, it is a setting of frequency doubling or frequency division to instruction pulse. $\frac{\text{分倍频分子}(Pn201\text{或}Pn203)}{\text{指令脉冲分倍频分母}(Pn202)}$
Pn202	Electrical gear denominator	Need	P	
Pn203	The second electrical gear numerator	Need	P	
Pn204	Position instruction	No need	P	The smooth effect is better if the smoothness of input pulse is bigger. Delay will occur when it is too big.

<table>
<tr><th>No.</th><th>Name and illustration</th><th>Power on again</th><th>The effective control mode</th><th>Function and meaning</th></tr>
<tr><td></td><td>filtering time constant</td><td></td><td></td><td></td></tr>
<tr><td>Pn205</td><td>Selection of position instruction filtering mode</td><td>Need</td><td>P</td><td>[0]： Once filtering
[1]： Twice filtering</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Pn300</td><td>Speed instruction input gain</td><td>No need</td><td>S</td><td>The corresponding speed to Each voltage’s analog</td></tr>
<tr><td>Pn301</td><td>Inside speed 1</td><td>No need</td><td>S</td><td rowspan="3">Inside speed, the parameter is valid as the control mode is 3~6<table><tr><th>Name of ends</th><th>State of ends</th><th>Actual Inside speed value</th></tr><tr><td>PCL</td><td>OFF</td><td rowspan="2">Zero speed or switch to other control modes</td></tr><tr><td>NCL</td><td>OFF</td></tr><tr><td>PCL</td><td>OFF</td><td rowspan="2">Inside speed 1</td></tr><tr><td>NCL</td><td>ON</td></tr><tr><td>PCL</td><td>ON</td><td rowspan="2">Inside speed 3</td></tr><tr><td>NCL</td><td>OFF</td></tr><tr><td>PCL</td><td>ON</td><td rowspan="2">Inside speed 2</td></tr><tr><td>NCL</td><td>ON</td></tr></table>PCON：OFF forward rotation，ON backward rotation</td></tr>
<tr><td>Pn302</td><td>Inside speed 2</td><td>No need</td><td>S</td></tr>
<tr><td>Pn303</td><td>Inside speed 3</td><td>No need</td><td>S</td></tr>
<tr><td>Pn304</td><td>Parameter speed</td><td>No need</td><td>S</td><td>The parameter can be set to positive value and negative value. When control mode is set to D, it determines the speed of motor</td></tr>
<tr><td>Pn305</td><td>JOG speed</td><td>No need</td><td>S</td><td>The speed of JOG running, direction is decided by the keys</td></tr>
<tr><td>Pn306</td><td>Soft reset acceleration time</td><td>No need</td><td>S</td><td>The time to 1000rpm acceleration of trapezoid acceleration, Unit: ms</td></tr>
<tr><td>Pn307</td><td>Soft reset deceleration time</td><td>No need</td><td>S</td><td>The time to 1000rpm deceleration of trapezoid acceleration, Unit: ms</td></tr>
<tr><td>Pn308</td><td>Speed filtering time constant</td><td>No need</td><td>S</td><td>Once filtering time constant unit: ms</td></tr>
<tr><td>Pn309</td><td>S curve rising time</td><td>No need</td><td>S</td><td>The time from one speed spot to another by S curve transferring</td></tr>
<tr><td>Pn310</td><td>Speed instruction curve mode</td><td>Need</td><td>S</td><td>0: Incline
1: S curve
2: Once filtering
3: Twice filtering</td></tr>
<tr><td>Pn311</td><td>Selection of S shape</td><td>Need</td><td>S</td><td>It determines the transfer mode of S curve</td></tr>
</table>

No.	Name and illustration	Power on again	The effective control mode	Function and meaning	
Pn312	Communication inching speed	No need	P，S，T	Bus inching’s communication speed’s value can be set to positive and negative.	
Pn400	Torque instruction gain	No need	T	It means the needed analog input voltage’s unit is 0.1v/100% in order to get to the rated torque.	
Pn401	forward rotation torque inside limit	No need	P，S，T	Motor output torque limit value	
Pn402	Backward torque inside limit	No need	P，S，T	Motor output torque limit value	
Pn403	Forward rotation outside torque limit	No need	P，S，T	Motor output torque limit value	
Pn404	Backward outside torque limit	No need	P，S，T	Motor output torque limit value	
Pn405	Plug braking torque limit	No need	P，S，T	Motor output torque limit value	
Pn406	Torque control speed limit	No need	T	Torque control speed limit value	
Pn407	Wave trap 1 frequency	No need	P，S，T	Wave trap 1 frequency	1、Setting wave trap might enlarge the mechanical vibration and response delay under certain work condition 2、The wave trap is invalid when the frequency of wave trap is set to 5000
Pn408	Wave trap 1 depth	No need	P，S，T	Wave trap 1 depth	
Pn409	Wave trap 2 frequency	No need	P，S，T	Wave trap 2 frequency	
Pn410	Wave trap 2 depth	No need	P，S，T	Wave trap 2 depth	
Pn500	Position offset	No need	P	COIN signal is output if the offset counter value is less than it	
Pn501	Same speed offset	No need	P	The same speed signal VCMP is output if the differ between speed instruction value and speed feedback value is lees than the set value of the parameter.	
Pn502	Zero clamp speed	No need	S	The motor is locked by the temporary position loop mode when the speed corresponding to input analog is lees than the set value of the parameter.	
Pn503	Rotation inspection speed TGON	No need	P，S，T	The motor is considered to be rotated steady and TGON signal is output when the speed of motor surpass the set value of the parameter.	
Pn504	Offset counter	No	P	It is considered that offset counter alarm occur and alarm signal is	

No.	Name and illustration	Power on again	The effective control mode	Function and meaning
	overflow alarm	need		output when the value of offset counter is larger than the set value of the parameter.
Pn505	Servo-on waiting time	No need	P，S，T	These parameter are only valid when there is BK output set by end output parameter. These parameters is used to keep braking(prevent from gravity glissade or continuous outside force on motor) time sequence **Servo on waiting time** BK signal is output at first when servo-on is input, then motor stimulant signal is created after the parameter setting time is delayed. **The basic waiting course** The standard is: BK output (braking motion) servo-off at the same time. Now, the machine moves a little sometimes caused by gravity, because of the machine's constitution and characters of braking. Now the movement can be eliminated by using user constant relay servo-off motion. The parameter can only be valid when the motor is stop or at low speed. **Braking waiting speed** BK signal is output when the speed of motor after servo off is dropped below the set value of the parameter. **Braking waiting time** BK signal is output when the delay after servo off surpass the set value of the parameter. The BK signal can be output either the barking waiting speed or the braking waiting time is met.
Pn506	Basic waiting course	No need	P，S，T	
Pn507	Braking waiting speed	No need	P，S，T	
Pn508	Braking waiting time	No need	P，S，T	
Pn509	Match the ends to signals	Need	P，S，T	Pn509.0 corresponding to 1CN_14 Pn509.1 corresponding to 1CN_15 Pn509.2 corresponding to 1CN_16 Pn509.3 corresponding to 1CN_17 Pn510.0 corresponding to 1CN_39 Pn510.1 corresponding to 1CN_40 Pn510.2 corresponding to 1CN_41 Pn510.3 corresponding to 1CN_42 Every data's corresponding signal as following: 0：S-ON 1：P-CON 2：P-OT 3：N-OT 4：ALMRST 5：CLR 6：P-CL 7：N-CL 8：G-SEL
Pn510	Match the ends to signals	Need Need	P，S，T	

No.	Name and illustration	Power on again	The effective control mode	Function and meaning
				9：JDPOS-JOG+ A：JDPOS-JOG- B：JDPOS-HALT
Pn511	Match the output signals to signals	Need	P，S，T	Pn511.0 corresponding to1cn_11，1CN_12 Pn511.1 corresponding to1cn_07，1CN_08 Pn511.2 corresponding to1cn_09，1CN_10 Every data's corresponding signal as following: 0：COIN/VCMP 1：TGON 2：S-RDY 3：CLT 4：BK
Pn512	Bus control input node low bit enable	No need	P，S，T	Bus communication input ends enable [0]： no enable [1]： enable Pn512.0→1CN_14 Pn512.1→1CN_15 Pn512.2→1CN_16 Pn512.3→1CN_17 Pn513.0→1CN_39 Pn513.1→1CN_40 Pn513.2→1CN_41 Pn513.3→1CN_42
Pn513	Bus control input node high bit enable	No need	P，S，T	
Pn514	input end filtering	No need	P，S，T	Input end filtering time, too long set time will make the input end signal delay.
Pn515	Reserved		P，S，T	For user
Pn516	Input end signal negate	No need	P，S，T	[0]： No negate [1]： Negate Pn516.0→1CN_14 Negate Pn516.1→1CN_15 Negate

No.	Name and illustration	Power on again	The effective control mode	Function and meaning
Pn517	Output end signal negate	No need	P，S，T	Pn516.2→1CN_16 Negate Pn516.3→1CN_17 Negate Pn517.0→1CN_39 Negate Pn517.1→1CN_40 Negate Pn517.2→1CN_41 Negate Pn517.3→1CN_42 Negate
Pn518	Reserved	No need	P，S，T	For user
Pn519	Reserved	No need	P，S，T	For user
Pn520	Reserved	No need	P	For user
Pn600	JPOS0 point position control position pulse	No need	P	The two parameters are used combinedly, their algebraic sum is the position that JPOS0's point position need to reach(How many rounds the real motor really rotate is relevant to the programming mode when point position control) Pn602 unit：10000P Pn603 unit：1P
Pn601	JPOS0 point position control position pulse	No need	P	
	……			Other point position parameters mean same
Pn630	JPOS15 point position control mode pulse	No need	P	The two parameters are used combinedly, their algebraic sum is the position that JPOS0's point position need to reach(How many rounds the real motor really rotate is relevant to the programming mode when point position control) Pn630 unit：10000P Pn631 unit：1P
Pn631	JPOS15 point position control mode pulse	No need	P	
Pn632	JPOS0 point position speed control	No need	P	JPOS0 point position control speed unit：rpm
	……			other point position control speed
Pn647	JPOS15 point position speed control	No need	P	JPOS15 point position control speed Unit：rpm
Pn648	JPOS0 point position once filtering	No need	P	JPOS0 Point position control's once filtering time, it makes motor start-stop More tender
	……			其他点位的一次滤波 other point position's once filtering
Pn663	JPOS15 point position once	No need	P	JPOS15 Point position control's once filtering time, it makes motor start-stop

No.	Name and illustration	Power on again	The effective control mode	Function and meaning
	filtering			More tender
Pn664	JPOS0 point position stop time	No need	P	JPOS0 point position control's stop time unit ： 50ms
	……			other point position control stop time
Pn679	JPOS15 闻 point position stop time	No need	P	JPOS15 point position control stop time unit ： 50ms
Pn680	Reserved			
Pn681	**Hex**	No need	P	**Pn681.0 once/recycle, start/reference point selection** [0] recycle run, PCL start signal, NCL forward direction search reference point. [1] once run, PCL start signal, NCL forward direction search reference point. [2] recycle run, NCL start signal, PCL forward direction search reference point. [3] once run, NCL start signal, PCL forward direction search reference point. **Pn681.1 change step and start mode** [0] Change step delay, no need of start signal, start delay after S-ON. [1] PCON change step, no need of start signal, PCON start delay after S-ON, but inside pulse can not stop when PCON off. [2] Change step delay, need start signal, canceling start signal can immediately shut down inside pulse, turn back to programme start point process step when reset. [3] Change PCON step , need start signal, canceling start signal can immediately shut down inside pulse, turn back to programme start point process step when reset. **Pn681.2 Change step input signal valid mode** [0] Change step input signal electrical level mode [1] Change step input signal pulse mode **Pn681.3 Reserved**
Pn682	programming mode	No need	P	[0]： Increase programming [1]： Absolute programming
Pn683	programming start step	No need	P	Select the start point of point position control
Pn684	programming stop step	No need	P	Select the stop point of point position control

No.	Name and illustration	Power on again	The effective control mode	Function and meaning
Pn685	Search travel speed	No need	P	Search the travel switch forward direction reference point' s motor speed.
Pn686	leave travel switch speed	No need	P	Search the travel switch backward direction reference point' s motor speed.
Pn687	Teaching position pulse	No need	P	If these two parameters are used combinedly, their algebraic sum is the present position of teaching, the two parameters' algebraic sum will be given to present position at the assistant function teaching Pn600 unit：10000P Pn601 unit：1P
Pn688	Teaching position pulse	No need	P	
Pn700	**Hex**	Need	ALL	**Pn700.0** MODBUS Communication baud rate ［0］4800bps ［1］9600bps ［2］19200bps **Pn700.1 communication protocols selection** [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） **Pn700.2 communication protocols selection** ［0］No protocols SCI communication ［1］MODBUS SC communication **Pn700.3** Reserved
Pn701	MODBUS axis address	Need	ALL	The axis address when MODBUS protocols communication

If the selected driver is BUS mode, the pulse input and analog input are invalid. This moment, the motor is controlled by bus circular data. If controlling motor speed is needed, the control mode can be set to analog instruction speed control mode. It equals that the bus data is used directly to indicate speed instruction now instead of using analog to match along with speed. And now, the other functions are the same with None bus control.

List of Alarm Displays

Alarm display on digital operator	Alarm output	Alarm Name	Meaning
A．01	×	Parameter breakdown	Checksum results of parameters are abnormal.
A．02	×	A/D breakdown	AD relevant electrical circuit breakdown
A．03	×	Overspeed	Motor is out of control
A．04	×	Overloaded	Continuous running which surpass the rated torque
A．05	×	Position error counter overflow	Inside counter overflow
A．06	×	position error pulse overflow	Position error pulse has exceeded the value set in parameter Pn-036
A．07	×	The setting of electrical gear and setting of given pulse frequency are not reasonable	Electrical gear setting is not reasonable or pulse frequency is too high
A．08	×	Something wrong with the first tunnel of electric current.	Something wrong with inside chip of the first tunnel
A．09	×	Something wrong with the second tunnel of electric current.	Something wrong with inside chip of the second tunnel
A．10	×	Encoder PA， PB or PC disconnected	At least one of PA,PB or PC is disconnected
A．11	×	Encoder PU， PV or PW disconnected	At least one of PU,PV or PW is disconnected
A．12	×	Overcurrent	An overcurrent flowed through the IPM module.
A．13	×	Overvoltage	Voltage supply for the main motor circuit exceeds rating.
A．14	×	Undervoltage	Voltage supply for the main motor circuit is too low.
A．15	×	Bleeder resistor damaged	Bleeder resistor damaged
A．16	×	Regenerative error	Regenerative circuit error
A．20	×	Power lines Open phase	One phase is not connected in The main power supply

A．21	×	instantaneous power off alarm	There are more than one power cycle's power off
A．30	×	Encoder UVW illegal code	U,V, W all "1" or "0"
A．31	×	Encoder UVW wrong code	U,V,W code sequence is fault
A．32	×	Encoder C pulse is not correct	C pulse appears in wrong position
A．33	×	Encoder has no C pulse	No C pulse appear after one round of encoder.
A．50	×	Encoder communication exceed time	Encoder disconnect, encoder signal is disturbed, encoder or encoder decode electric circuit is damaged
A．52	×	Encoder absolute state is wrong	Encoder or encoder decode electric circuit is damaged
A．53	×	Encoder count error	Encoder or encoder decode electric circuit is damaged
A．54	×	。The parity bit, cut off point error.	Encoder signal is disturbed or encoder decode electric circuit is damaged
A．55	×	Encoder communication verifying error	Encoder signal is disturbed or encoder decode electric circuit is damaged
A．56	×	Encoder status field cut off point error	Encoder signal is disturbed or encoder decode electric circuit is damaged
A．60	×	Can not detect communication module	No communication module or something wrong with communication module.
A．61	×	Can not managed to connect with communication module	CPU of communication does not work well
A．62	×	drive can not receive circular data from communication module	There are something wrong with The drive data receiving tunnel or communication module sending tunnel
A．63	×	The communication module can not receive the drive's response data	Something wrong with communication module.
A．64	×	No connection between communication module and bus	Bus communication is abnormal
A．00	○	No display of error	Display normal motion state.

○： Output transistor=Open(ON)

×： Output transistor=Cut off(Alarm state)(OFF)

ASCII 模式：

指令信息：

STX	‘:’
ADR	‘0’
	‘1’
CMD	‘0’
	‘6’
起始资料地址	‘0’
	‘2’
	‘0’
	‘0’
资料内容	‘0’
	‘0’
	‘6’
	‘4’
LRC 校验	‘9’
	‘3’
End 1	(0DH)(CR)
End 0	(0AH)(LF)

回应信息：

STX	‘:’
ADR	‘0’
	‘1’
CMD	‘0’
	‘6’
资料地址	‘0’
	‘2’
	‘0’
	‘0’
资料地址 0200H的内容	‘0’
	‘0’
	‘6’
	‘4’
LRC 校验	‘9’
	‘3’
End 1	(0DH)(CR)
End 0	(0AH)(LF)

RTU 模式：

指令信息：

ADR	01H
CMD	06H
起始资料地址	02H(地址高位)
	00H(地址低位)
资料内容	00H(数据高位)
	64H(数据高位)
CRC校验低位	89H(校验低位)
CRC校验高位	99H(校验高位)

回应信息：

ADR	01H
CMD	06H
起始资料地址	02H(地址高位)
	00H(地址低位)
资料内容	00H(数据高位)
	64H(数据低位)
CRC校验低位	89H(校验低位)
CRC校验高位	99H(校验高位)

LRC（ASCII 模式）和 CRC（RTU 模式）侦误值的计算：

ASCII 模式的 LRC 计算：

ASCII 模式采用 LRC（Longitudinal Redunancy Check）侦误值。LRC 侦误值是从 ADR 至最后一笔资料内容之和，得到之结果以 256 为单位，去除超出的部分（例如加总后得到的结果为十六进制的 128H，则只取 28H），然后计算其补数，最后得到的结果即为 LRC 侦误值。例如：从局号 01H 伺服驱动器的 0201 地址读取 1 个字（word）。

STX	‘:’
ADR	‘0’
	‘1’
CMD	‘0’
	‘3’
起始资料地址	‘0’
	‘2’
	‘0’
	‘1’
资料个数 (以word计算)	‘0’
	‘0’
	‘0’
	‘1’
LRC 校验	‘F’
	‘8’
End 1	(0DH)(CR)
End 0	(0AH)(LF)

从 ADR 的数据加至最后一笔数据：
01H+03H+02H+01H+00H01H=08H
对 08H 取 2 的补数为 F8H，所以 LRC 为‘F’，‘8’。

RTU 模式的 CRC 计算：
RTU 模式采用 CRC（Cyclical Redundancy Check）侦误值。
CRC 侦误值计算步骤如下：
步骤一：载入一个内容为 FFFFH 的 16-bit 寄存器，称之为“CRC”寄存器。
步骤二：将指令讯息的第一个位（bit0）与 16-bit CRC 寄存器的低位位（LSB）进行 XOR 运算，并将结果存回 CRC 寄存器；
步骤三：检查 CRC 寄存器的最低位（LSB），若此位为 0，则 CRC 寄存器值右移一位；若此位为 1，则 CRC 寄存器值右移一位后，再与 A001H 进行 XOR 运算；
步骤四：回到步骤三，知道步骤三已被执行过 8 次，才进行到步骤五；
步骤五：对指令讯息的下一位重复步骤二到步骤四，知道所有位都被这样处理过，此时 CRC 寄存器的内容即是 CRC 侦误值。
说明：计算出 CRC 侦误值之后，在指令讯息中，须先填上 CRC 的低位，再填上 CRC 的高位，请参考以下例子。

例如：从局号为 01H 伺服的 0101H 地址读取 2 个字（word）。从 ADR 至资料数的最后一位所计算出的 CRC 寄存器的最后内容为 3794H，则其指令讯息如下所示，须注意的是 94H 在 37H 的前面传送。

ADR	01H
CMD	03H
起始资料地址	01H(地址高位)
	01H(地址低位)
资料数 （以word计）	00H(高位)
	02H(低位)
CRC校验低位	94H(校验低位)
CRC校验高位	37H(校验高位)

End1、End0（通讯侦完成）

ASCII 模式：

以（0DH）即字符‘\r’『carriage return』及（0AH）即字符为‘\n’『new line』，代表通讯结束。

RTU 模式：

超过当前通讯速率下的 4 个字节通讯时间的静止时段表示通讯结束。

范例：

下面以 C 语言产生 CRC 值。此函数需要两个参数：

unsigned char * data;

unsigned char length;

此函数将回传 unsigned integer 型态的 CRC 值。

```
unsigned int crc_chk(unsigned char * data,unsigned char length){
    int i,j;
    unsigned int crc_reg=oxFFFF;
    While(length- -){
        crc_ reg ^=*data++;
        for(j=0;j<8;j++){
            If(crc_reg & 0x01){
                crc_reg=( crc_reg >>1)^0xA001;
            }else{
                crc_reg＝crc_reg >>1;
            }
        }
    }
    return crc_reg;
}
```