

Mokon Series Driver

User's Manual

V2.1

健昇科技股份有限公司

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Correction record

Version	Record
1.1	Add CN1-9 TLM+ Torque limit command
1.2	1 Adjust 5. I/O Signal Definitions and CN1 Pin Assignments
	2 Add 20. Wiring of MPC3024 wiring board to Mokon driver
	3 Modify description of CN1 Pin16 Hold
1.3	1. Chapter 5 I/O Signal Definitions and CN1 Pin Assignments
	Pin5,6,7,13,14,15,16,30,31,34 descriptions—rewrite for more detail
	Pin1,2 description—rewrite for more detail
1.4	1. Update Chapter 10,11,12 diagram
	2. Update Chapter 20 Wiring of MPC3024 wiring board to Mokon driver
	3. Update 15.1 Communication Protocol
2.0	YPV V2.0
2.1	Add Warranty

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Warranty

The Mokon series are warranted against defects in materials and workmanship for a period of one year from the date of shipment, as evidenced by receipts or serial no. on board. JS automation Corp. will, at its option, repair or replace product that proves to be defective during the warranty period. This warranty includes parts, labor and shipping costs of returning.

Except as specified herein, JS automation Corp. makes no warranties, express or implied, and specifically disclaims any warranty of merchantability or fitness for a particular purpose. Customer's right to recover damages caused by fault or negligence on the part of JS automation Corp. shall be limited to the amount theretofore paid by the customer. JS automation Corp. will not be liable for damages resulting from loss of data, profits, use of products, or incidental or consequential damages, even if advised of the possibility thereof. This limitation of the liability of JS automation Corp. will apply regardless of the form of action, whether in contract or tort, including negligence. Any action against JS automation Corp. must be brought within one year after the cause of action accrues.

JS automation Corp. shall not be liable for any delay in performance due to causes beyond its reasonable control. The warranty provided herein does not cover damages, defects, malfunctions, or service failures caused by owner's failure to follow the JS automation Corp. installation, operation, or maintenance instructions; owner's modification of the product; owner's abuse, misuse, or negligent acts; and power failure or surges, fire, flood, accident, actions of third parties, or other events outside reasonable control.

If any defect occurs, you should email to us as the following form to get the fast response:

Detailed Company Information

Company/Organization:

Contact Person:

E-mail:

Address:

Country:

Tel/Fax:

Web Site:

Product information

product model:

serial no.:

Environment to Use: such as CPU board, Operating System, target application...

description of defect: (as detail as possible)

1. Checking Mokon series products on delivery

Follow the procedure below to check Mokon Series products upon delivery

Check the following items when Mokon Series products are delivered:

1. Check the packed products for damages that may have occurred during shipping.
2. Check whether the name and number of the delivered products are the same as those on the delivery sheet.
3. Check whether the servomotor and servo drive capacity and encoder specification are the same as the ordered.
4. In the case of special order, please carefully check the delivered products and contact our company immediately if any item is incorrect.

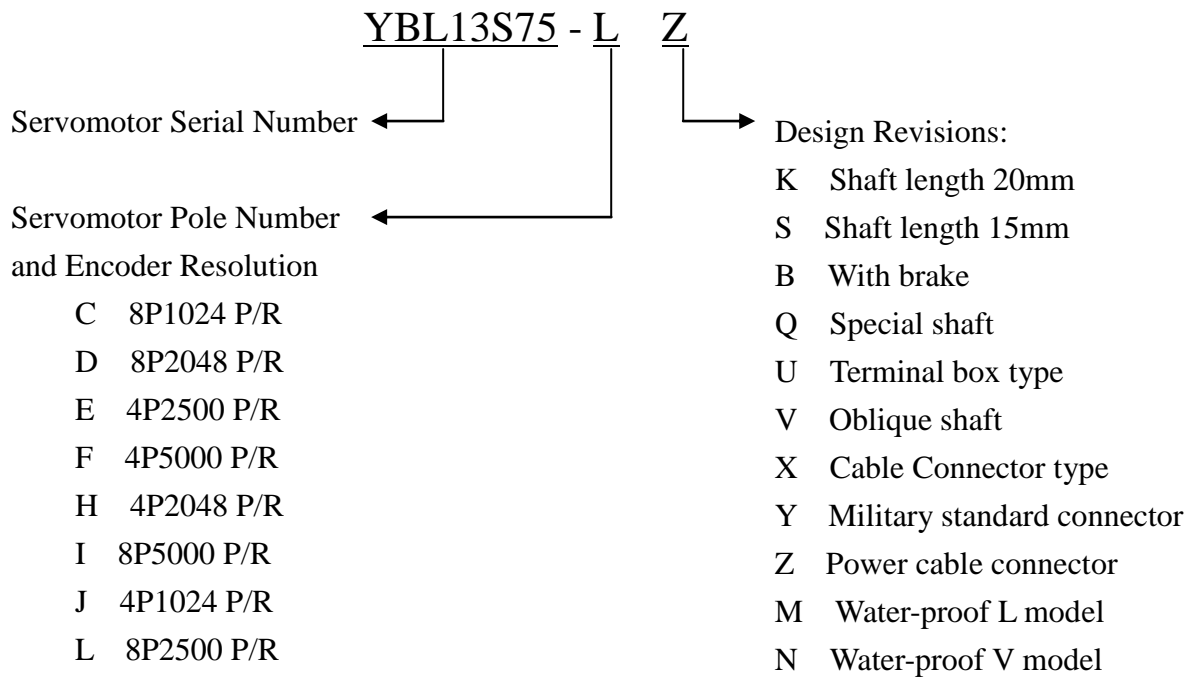
The table below shows the standard set:

- | |
|--|
| 1. One servomotor |
| 2. One servo drive |
| 3. One 37PIN D type connector for CN1* |
| 4. One 15PIN D type connector for CN2* |
| 5. One connector for servomotor power line* |
| 6. One encoder connector* |
| 7. One copy of wiring description |
| * If cable is your option, they will be soldered ready with the cable. |

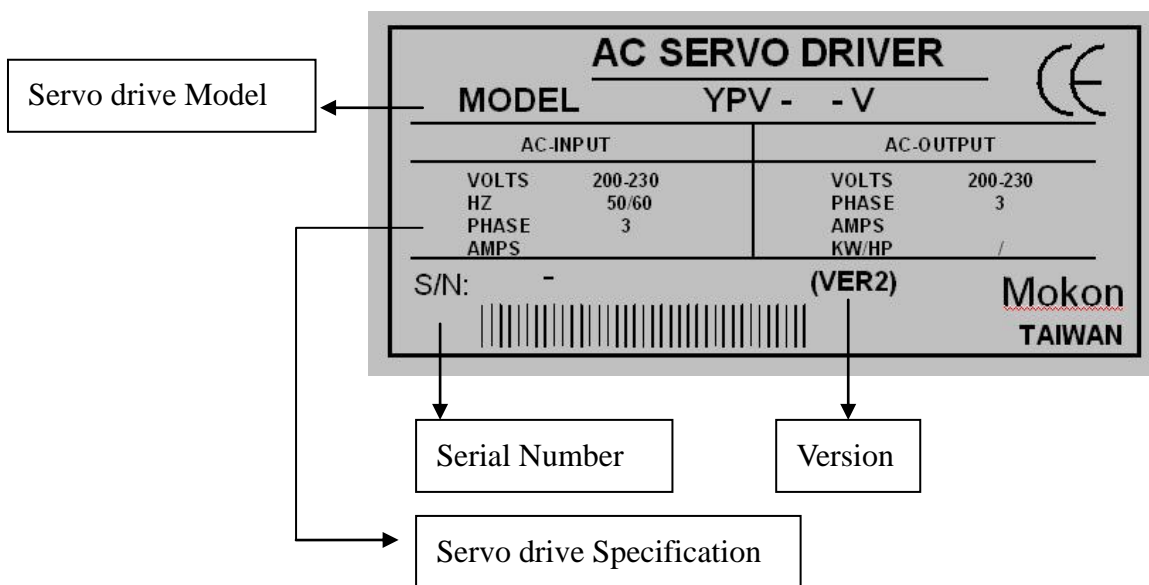
1.1 Servomotor nameplate descriptions



1.2 Servomotor model



1.3 Servo drive nameplate descriptions



1.4 Servo drive model

YPV Series Servo drive

YPV - 300-V

Servodrive Capacity ←

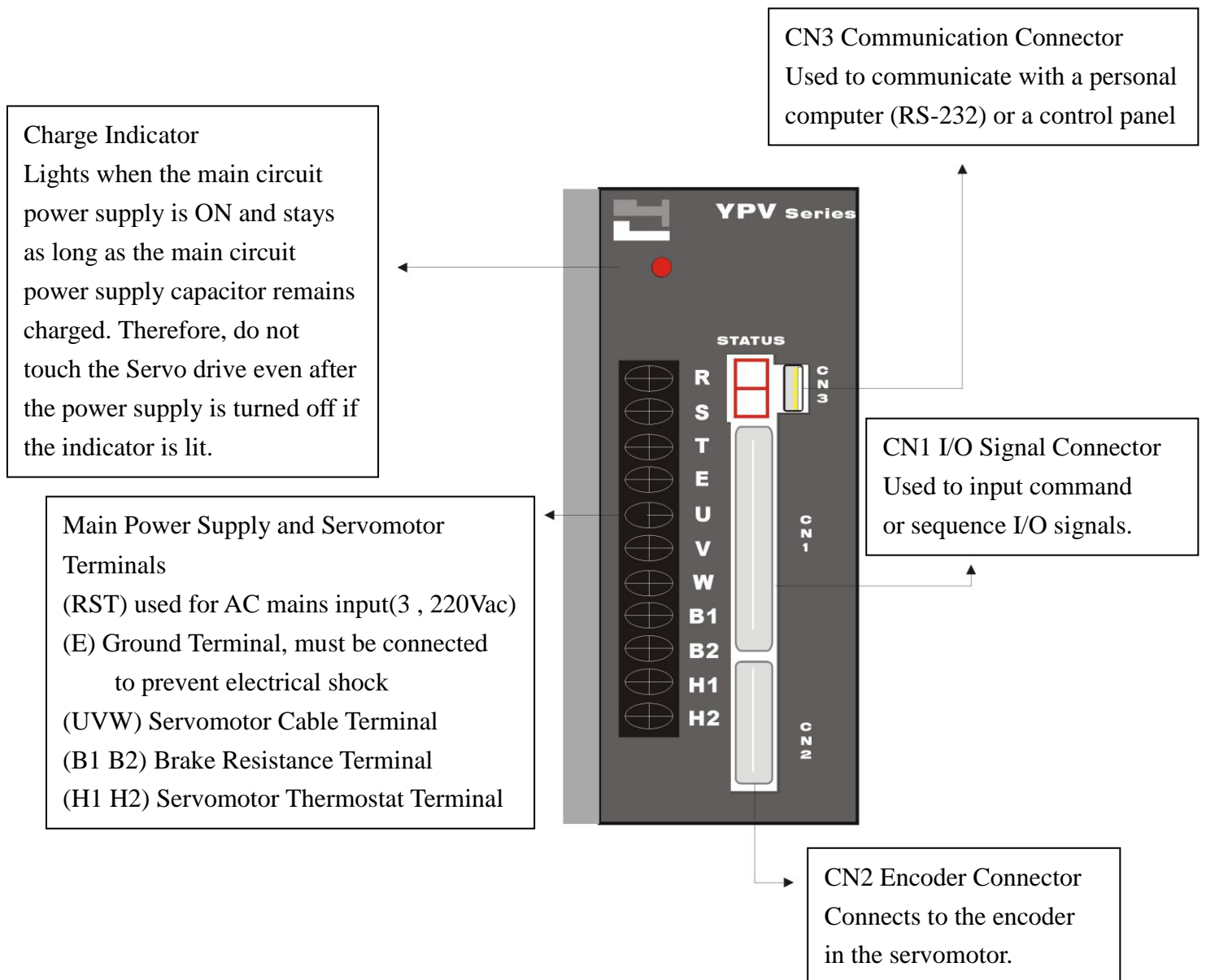
040	0.4 KW	600	6 KW
055	0.55 KW	750	7.5 KW
075	0.75 KW	860	8.6 KW
100	1 KW	1100	11 KW
150	1.5 KW	1500	15 KW
200	2 KW	2200	22 KW
300	3 KW	3000	30 KW
450	4.5 KW		

Type ←

V High resolution speed / Torque command: 12-bit resolution

1.5 Servo drive part names

The figure below shows the part names of the servo drive.



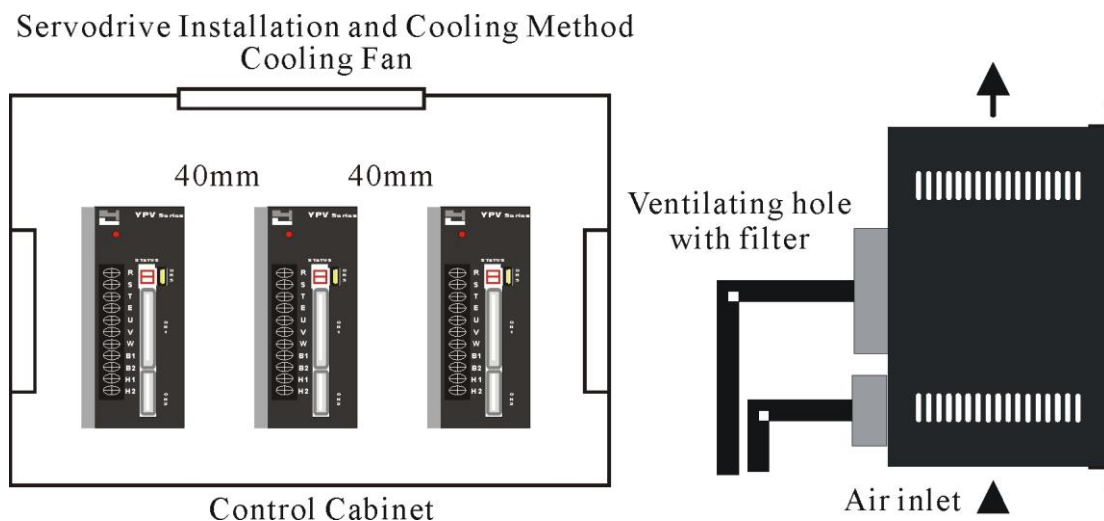
2. Servo drive installation precautions

The servo drive should be stored in the environment with ambient temperature range of 0-55 C (no freezing) and relative humidity under 90% RH (no condensation).

Installation Orientation and Spacing:

1. When installing the servo drive, make the front panel containing connectors face outward and take into consideration the easy connection/disconnection of CN1 and CN2 connectors for measurement.
2. For multiple servo drive installation in the control cabinet, allow at least 40mm between each. When installing servo drives side by side as shown in the figure below, allow at least 50mm above and below each servo drive or install cooling fans to facilitate air circulation.

Servo drive Installation and Cooling Method



2.1 Prevent foreign object intrusion

1. Prevent the drilling and cutting chips from entering the servo drive during installation.
2. Avoid the odd objects like oil water and metal powder from entering the servo drive via cooling fans.
3. If using fans for cooling, please install the filter properly at the ventilating hole, and consider the surrounding environment to choose the best direction for ventilation.
4. Please install heat exchanger or air filtering system when installing in locations subject to poisonous gas or excessive dust.

Extra Notices:

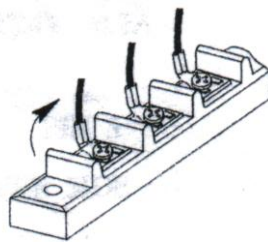
1. Do not install the servo drive in locations likely to be affected by oil and dust. If unavoidable, please install the Servo drive in the airtight control cabinet and consider using ventilation filter. Also use a protective cover over the Servomotor.
2. When installing multiple servo drives in one airtight control cabinet, allow at least 50mm between, above and below each servo drive and leave 120mm for maintenance space. In addition, to ensure the reliability and improve the product life, leave certain distance between the servo drive and the cabinet ceiling so the temperature around the servo drive does not exceed 55 C which might lead to poor ventilation.
3. A frequent use of the regenerative resistor may lead to a temperature higher than 100 C. Do not put inflammables or heating deformable objects around. The wirings must also be kept away from the resistor or severe damage will occur.
4. When installing near a source of vibration, install a vibration isolator to protect the Servo drive from vibration.

3. Servo drive wiring precautions

Wiring precautions

3.1 Main wiring

1. Apply three-phase 220V AC mains through the NFB to the magnetic contactor, then connect to the servo drive RST terminals. Consider installing a reactor and linear noise filter if the local power supply quality is poor.
2. Connect the UVW terminals of the servo drive with the red, white and black cable lines of the servomotor directly or via terminal board, on which the cable lines be secured with a terminal plier and wrapped tightly to avoid incidental short-circuit, power interruption or earth faults.
3. Make sure the cable lines are not damaged under stress. Be cautious of the cable wiring to avoid as much as possible being subject to bending or tension.
4. If the servomotor is moving with the mechanism, arrange the bending section of the cable line within the allowable curvature which is determined from the cable specification to assure normal operation life.
5. Make sure the cable lines are not touched by sharp parts of the machine or pressed by any heavy object.
6. Provide proper grounding wiring for the ground terminals of the servo drive and servomotor.
7. H1 and H2 are the thermostat terminals for the servomotor. Strictly forbid to short circuit them with the machine bed or falsely connect with U V W E terminals.
8. After fastening the main terminal board, the ends of the wiring terminals can be bended up to be kept away from the front nameplate as shown be



3.2 Wiring for the controller and the encoder

1. Each pin of CN1 and CN2 must be soldered and checked carefully for correct pin number. Check the adjacent pins after soldering to avoid being incidentally shorted circuit by the solder or unused leads.
2. Wrap the soldered leads with shrinkable tubes to keep from being touched by each other.
3. If the leads from CN2 must be extended, care must be taken in the connection section and proper shielding measures must be adopted to suppress EMI noise.
4. Do not stretch tight the leads of CN2 to avoid wiring faults of the encoder.
5. Power cables and signal lines should not be arranged in close parallel, and the leads for control signals should be twisted and shielded.

Note: Be cautious of the length of the wiring and the measures for noise shielding if Mokon series is used in position control mode. If not using the line driver type, the PULSE GND must be connected to DGND, or the lost pulse fault may occur.



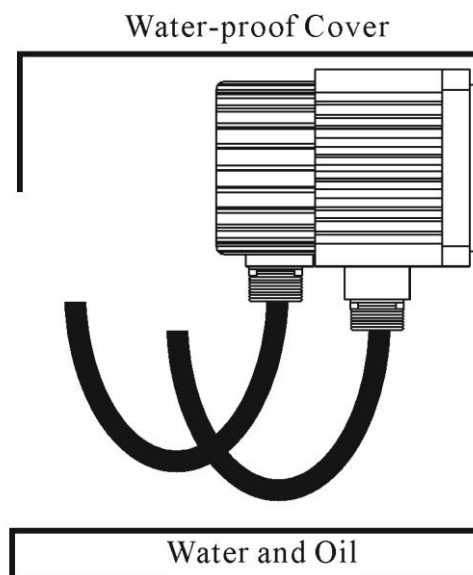
1. Do not bundle power and signal lines together in the same duct. Leave at least 30cm (11.81 in.) between power and signal lines.
2. Use twisted-pair wires or multi-core shielded-pair wires for signal and encoder (PG) feedback lines.
3. The maximum length for signal input lines is 3m (118.11 in.) and for PG feedback lines is 20m (787.40 in.).
4. Do not touch the power terminals for 5 minutes after turning power off because high voltage may still remain in the servo drive.
5. Make sure the Charge Indicator is out before starting an inspection.
6. Avoid frequently turning power on and off. Do not turn power on or off more than once per minute.
7. Since the servo drive has capacitors in the power supply, a high charging current flows for 0.2 seconds when power is turned on. Frequently turning power on and off will cause main power devices like capacitors and fuses to deteriorate, resulting in unexpected problems.

4. Servomotor installation precautions

4.1 Installation precautions

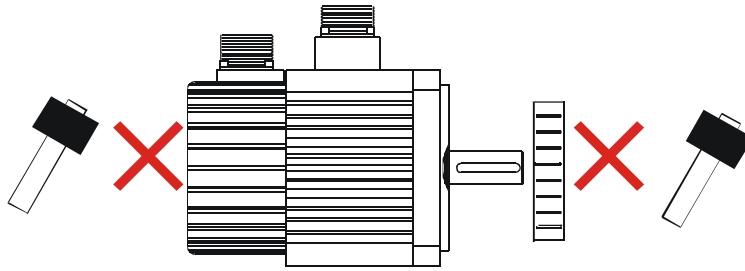
Try to avoid water and oil exposure since the servomotor contains no water-proof structure. Install a water-proof cover if it is used in a location that is subject to water or oil.

1. Servomotor cable line facing downward can prevent the oil and water from entering the servomotor via cable line.
2. If the servomotor is installed vertically or with a slope, the cable line should be bended to U-type to avoid the oil and water from entering via the cable line.
3. Carefully avoid the exposure of cable lines to oil and water that have adverse effects on servomotor and encoder, also may cause malfunctions of the servo drive.



4.2 Connect the servomotor with load precautions

1. To mount a belt wheel, use the set screw to secure it on the shaft end if the motor shaft has a keyway; Use a friction coupling if the motor shaft has no key way.
2. Use a special tool to dismantle the belt wheel, avoiding impact to the shaft.
3. Strictly forbid to exert force on the back cover of the encoder by hands or ropes when moving the servomotor.
4. Strictly forbid the use of hammer to strike the shaft (likely to damage the encoder)



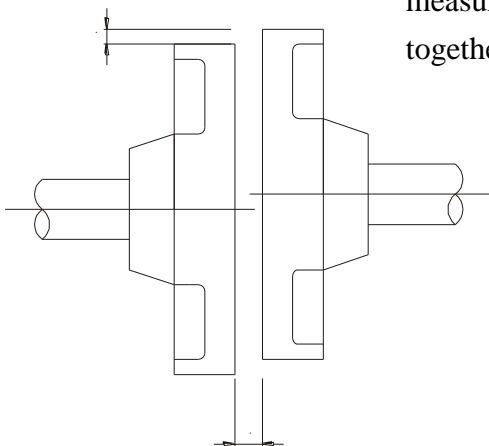
Avoid violent collision and vibration of servomotor when mounting a belt wheel or a clutch! The encoder connecting with the shaft is vulnerable under intense vibration which may adversely affect the resolution and service life of the servomotor.

5. Do not change the encoder wiring direction.
6. Use a flexible connector. The round-off must meet with the allowable radial load.
7. Choose a proper pulley, chain wheel or timing belt that can meet with the requirement of the allowable radial load.
8. If the servomotor is attached with a magnetic brake, either horizontal or vertical installation is allowed. When the shaft is upward installed, the brake may normally make some noise.

4.3 Alignment

Align the shaft of the servomotor with the shaft of the apparatus, and then couple the shafts. Install the servomotor so that alignment accuracy falls within the following range.

Measure this distance at four different positions around. The difference between the maximum and minimum measurements must be below 0.03mm (0.0012 in). (Turn together with the coupling.)

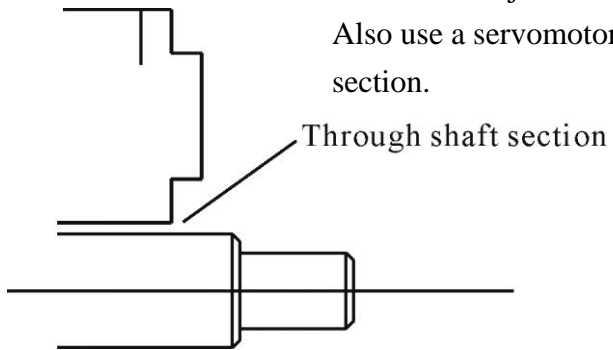


Measure this distance at four different positions around. The difference between the maximum and minimum measurements must be below 0.03mm (0.0012 in). (Turn together with the coupling.)

4.4 Handling oil and water

Install a protective cover over the servomotor if it is used in a location subject to water or oil mist.

Also use a servomotor with an oil seal to seal the through shaft section.



4.5 Cable stress

Make sure there are no bends or tension on the power lines.

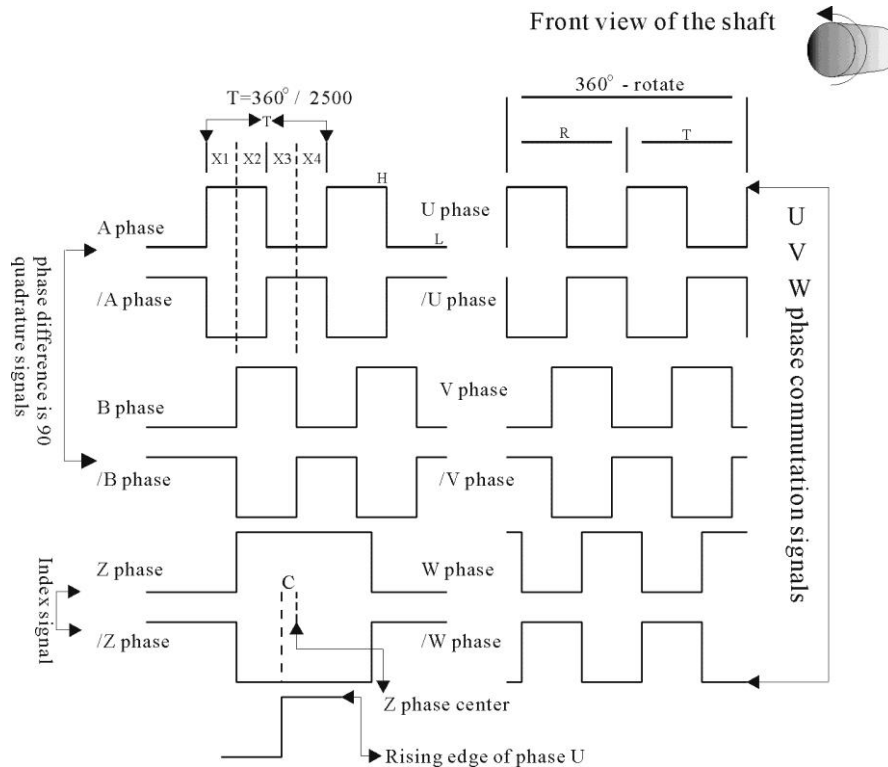
Be especially careful to signal line wiring to avoid stress because the diameter of the core wires is only 0.2 to 0.3mm (0.0079 to 0.012 in).

5. Encoder wiring and CN2 pin assignments of the servo drive

Motor RSO Connector	Motor Side Cable Color	Name of the Signal	Servo drive Side Pin No.
1	Green	A	1
2	White Grey	/A	2
3	Gray	B	3
4	White Gray	/B	4
5	Yellow	C	5
6	White Yellow	/C	6
7	Brown	U	7
8	White Brown	/U	8
9	Orange	W	9
10	White Orange	/W	10
11	Blue	V	11
12	White Blue	/V	12
13	Red	+5V	13
14	White Red	GND	14 15
15	Silver braided wire	Shielding	Case

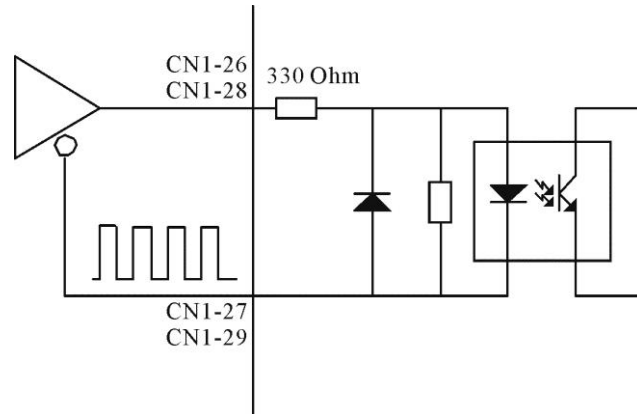
5.1 Signal waveform of feedback Encoder

The figure below shows the forward rotation (CCW) waveform of the encoder



6. Position command input circuit

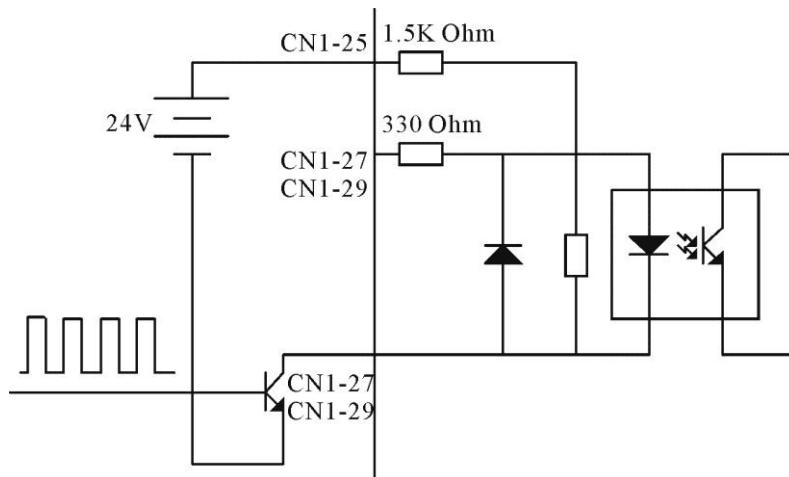
6.1 From differential type line driver



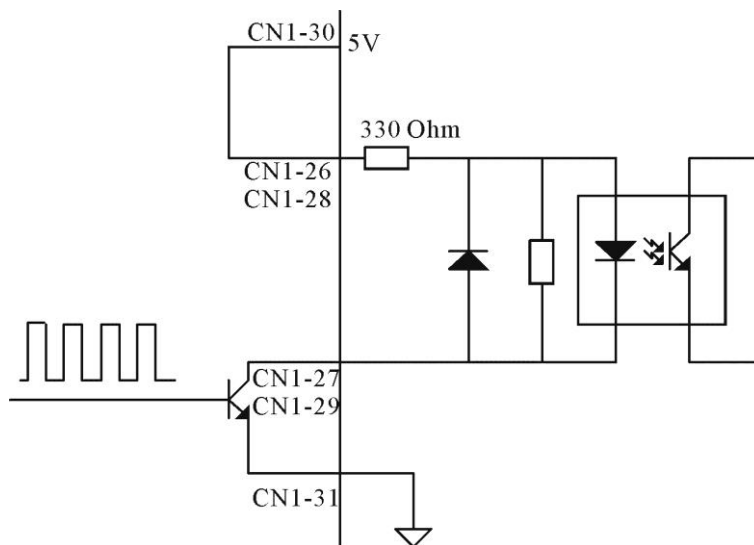
6.2 From open-collector output:

Example 1: Using an external power supply provided by the user

Note: Mokon Servo drive can be only connected with 24V external power supply.

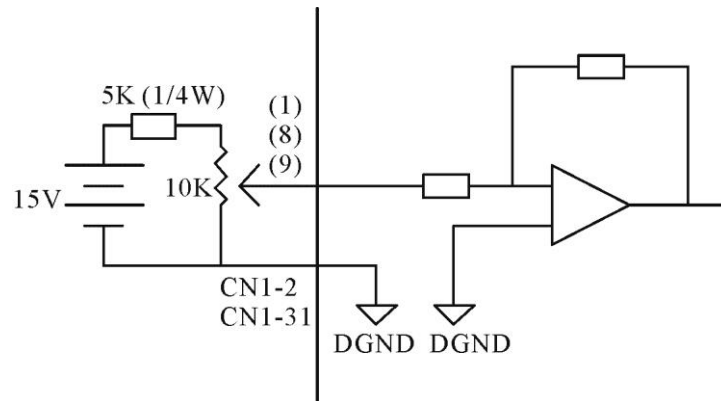


Example 2: Using power supply built in the servo drive

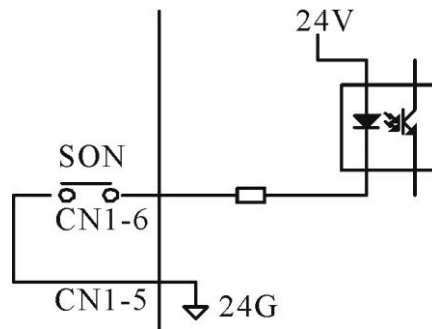


7. Analog command input circuit

7.1 Analog command input circuit



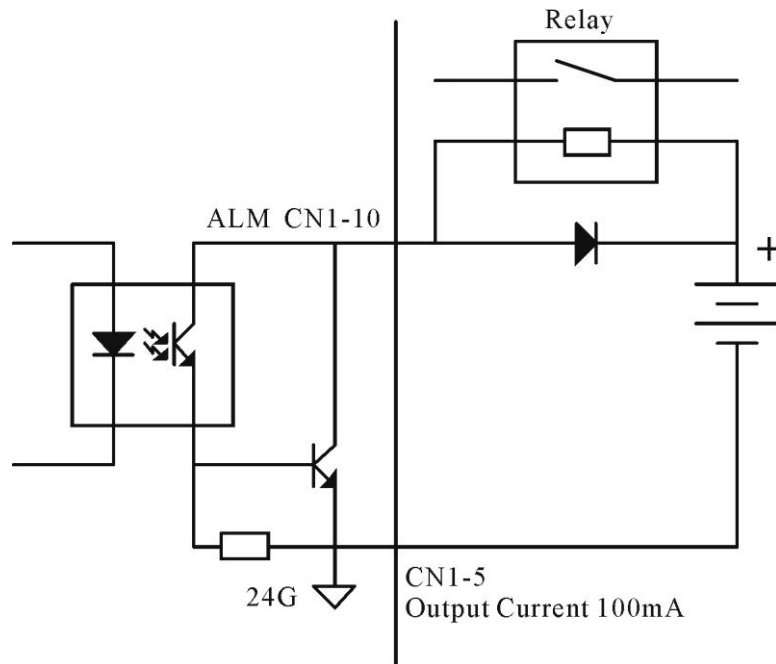
7.2 Digital input circuit interface



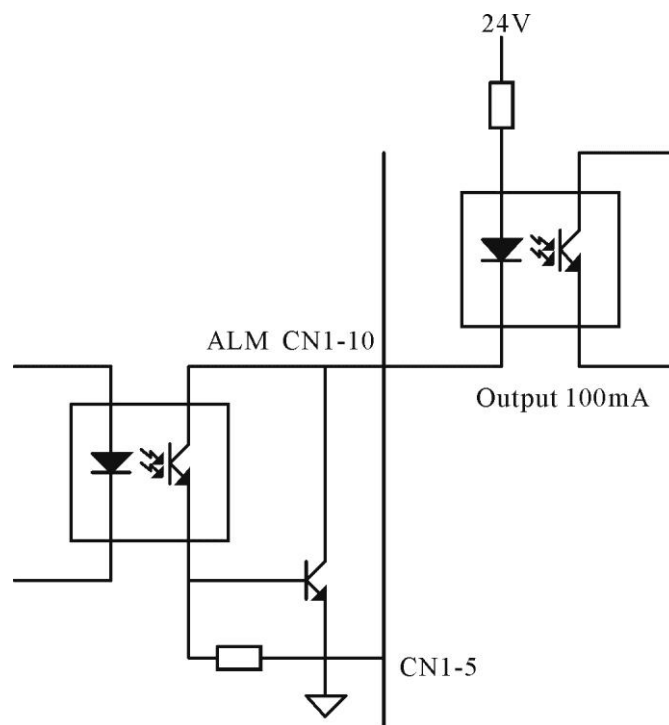
8. Output interface circuits

8.1 Digital output interface

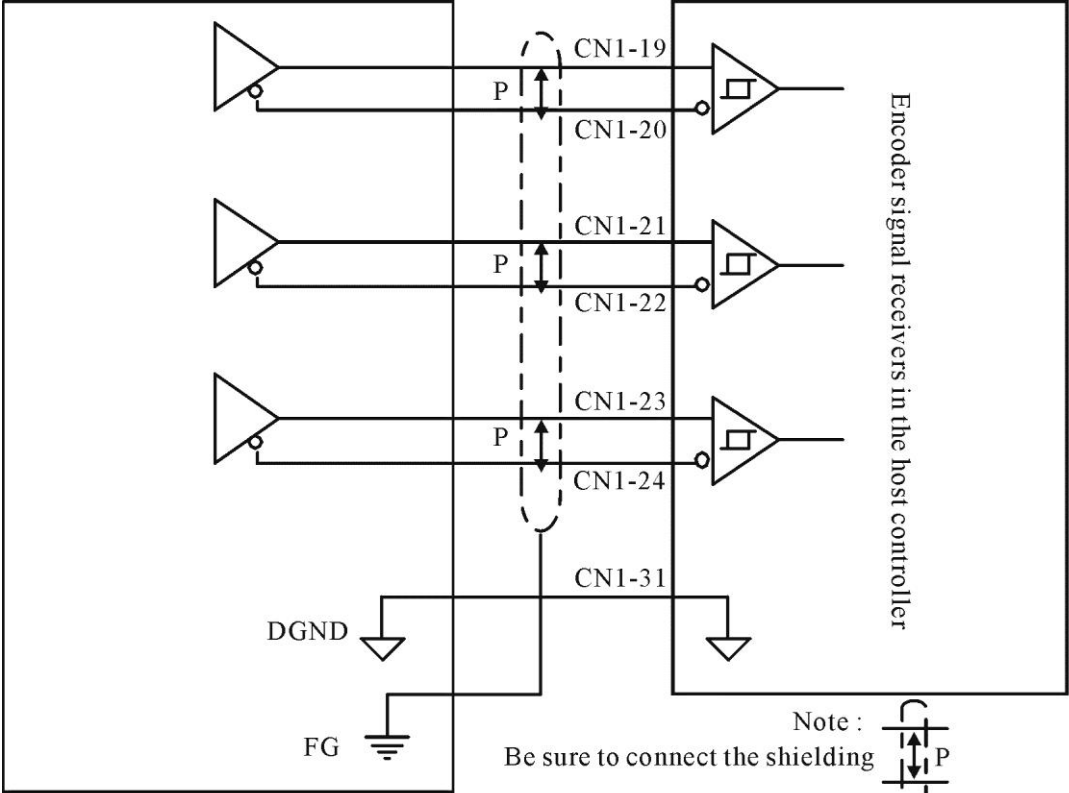
Example 1: Connecting to a relay output circuit

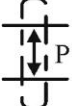


Example 2: Connecting to a photo coupler output circuit

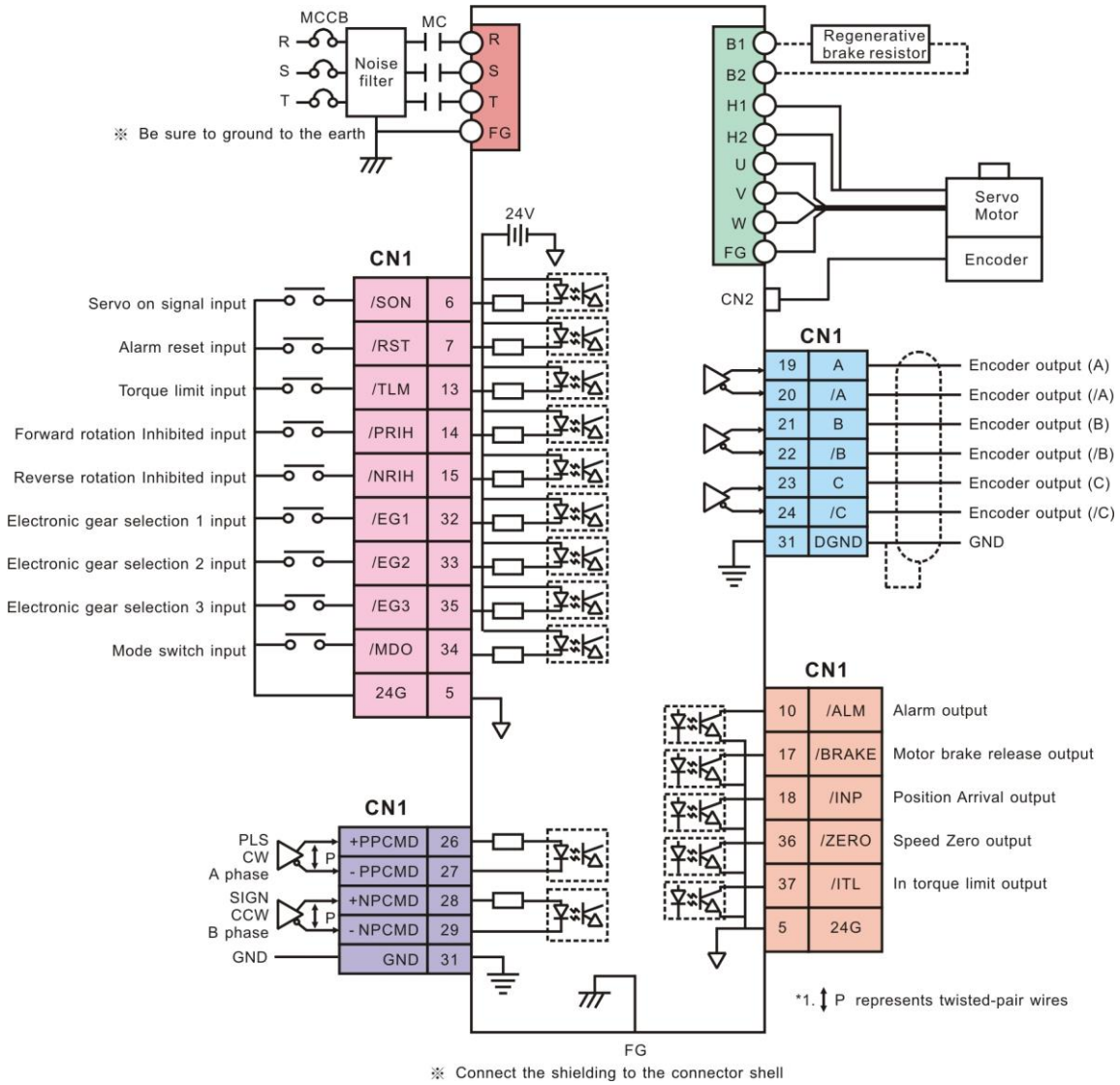


8.2 Encoder digital output interface circuit

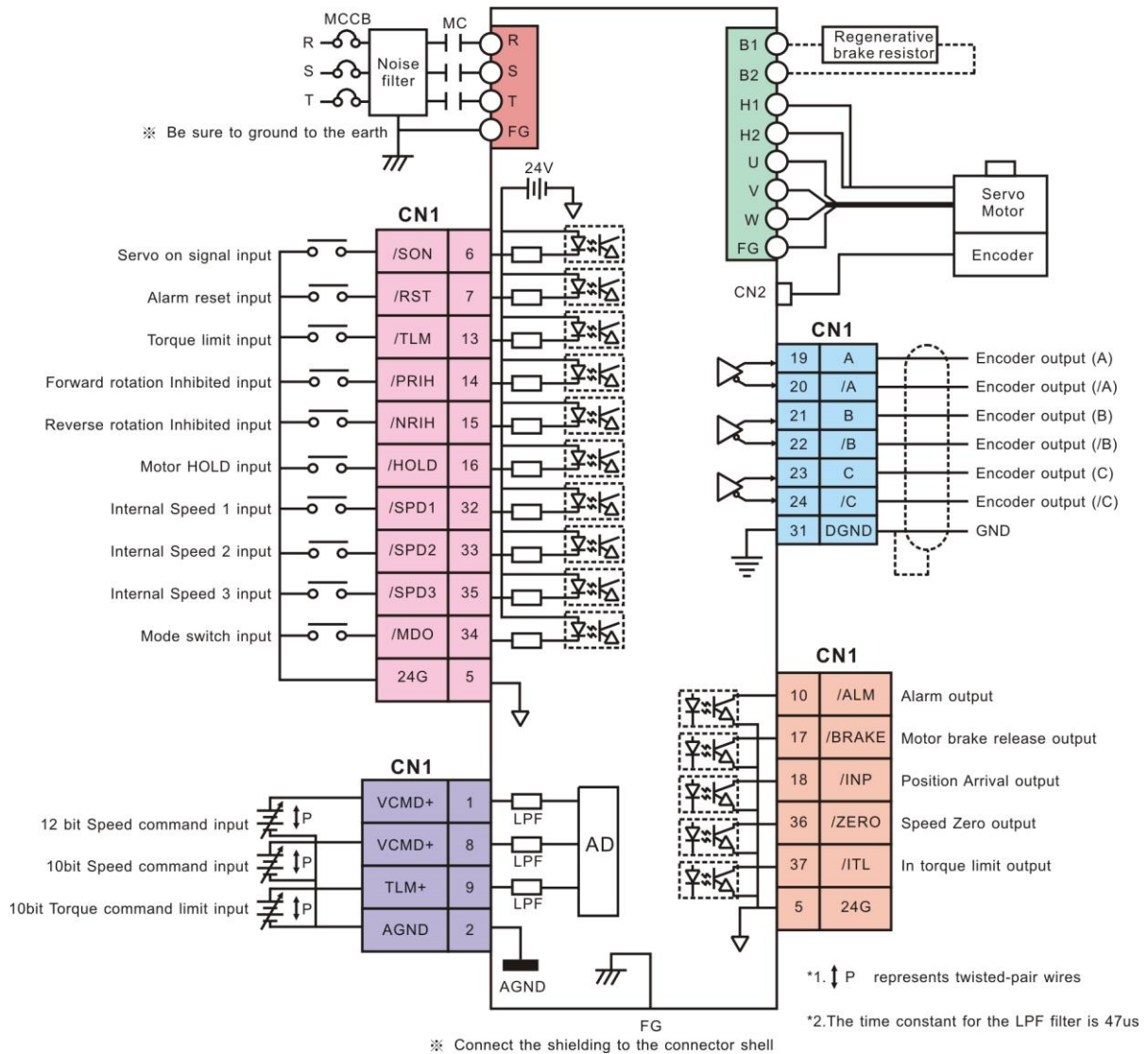


Note :  P
represents twisted-pair wires

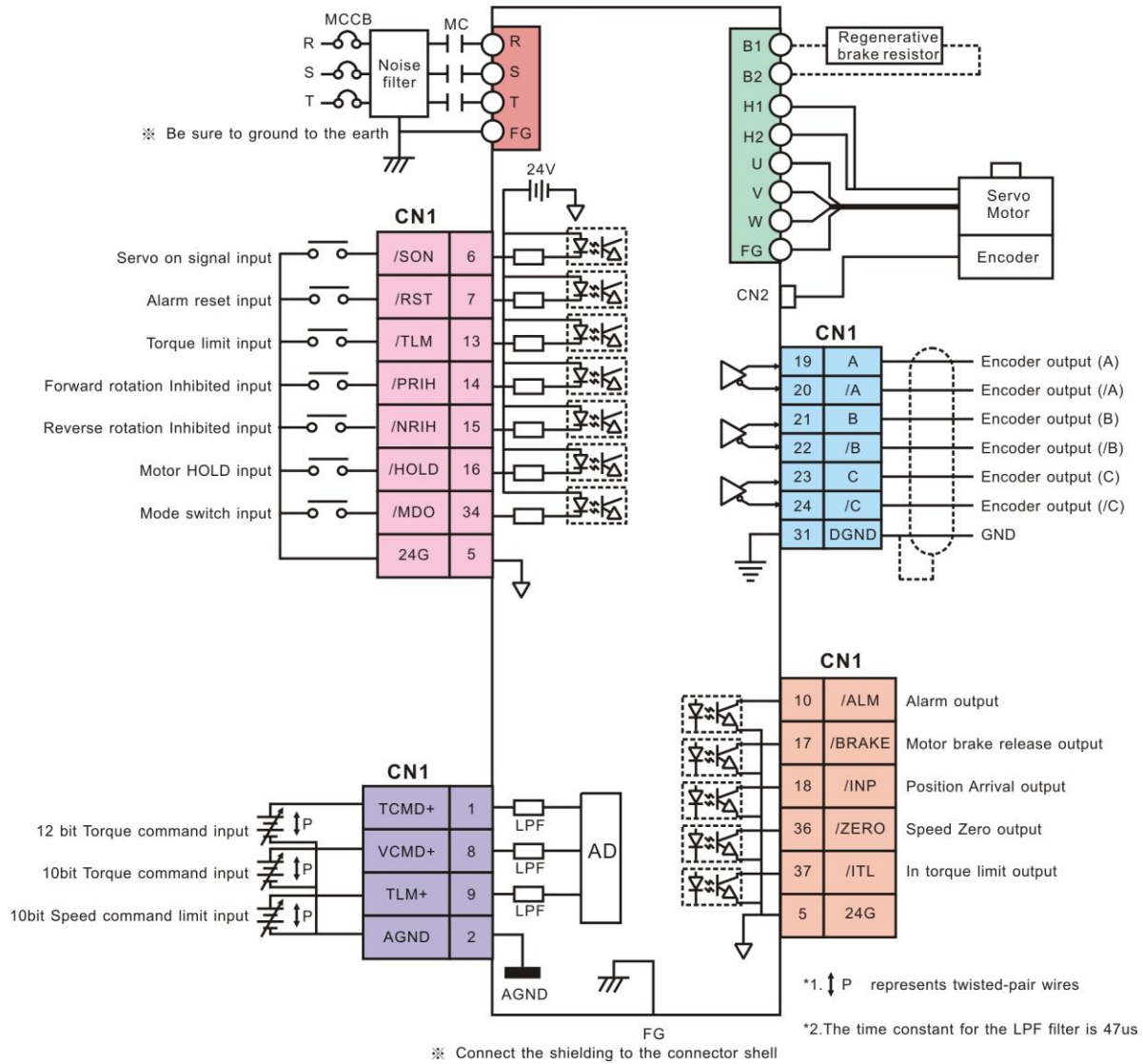
9. Position control interface



10. Speed control interface



11. Torque control interface



12. Descriptions of Mokon servo drive input signals

12.1 Input Signal definitions and CN1 pin assignments

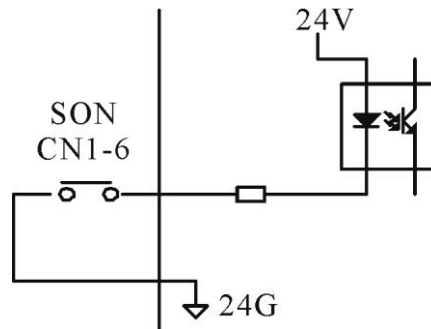
Signal Type	Pin Name	Pin No.	Function Descriptions	
Common	+15V	3	+15V voltage output	±15V volt with allowable 50mA output , spare for external analog use.
	-15V	4	-15V voltage output	
	24G	5	Common	power ground for user control interface.
	SON	6	Servo on	Digital signal for activating the servo drive when connected with 24G.(internal 24V pull high)
	RST	7	Alarm reset	Digital signal for releasing the servo drive when connected with 24G.(internal 24V pull high)
	TLM	13	Torque Limit	Digital signal for torque limit when connected 24G(internal 24V pull high)
	PRIH	14	Forward Rotation Inhibited	Digital signal for inhibiting the forward rotation when connected with 24G.(internal 24V pull high)
	NRIH	15	Reverse Rotation Inhibited	Digital signal for inhibiting the reverse rotation when connected with 24G.(internal 24V pull high)
	HOLD OR PI/P	16	Motor HOLD (forward and reverse rotation inhibited) Speed Loop Control	Digital signal for inhibiting the forward and reverse rotations when connected with 24G, in position mode, the input pulse counter will be cleared ; or switching between PI / P control modes under the speed operation mode . (The function of this pin is selected in the "common Parameter" menu .)(internal 24V pull high)
	+5V	30	5V voltage output	5 volt with allowable 50mA output, spare for external use.
	DGND	31	5V ground output	5V power ground, also ground for ±15V.
	MDO	34	Operation Mode switch	connected with 24G will switch the operation mode. (defined by Common parameter->Control mode selection) S / P Speed mode < - > Position mode P / T Position mode < - > Torque mode S / T Speed mode < - > Torque mode (internal 24V pull high)

Signal Type	Pin Name	Pin No.	Function Descriptions	
SPEED	VCMD+	1, 8	Speed command	During driver set at speed mode: Enable the motor to run at speed proportional to the speed command voltage . At $\pm 10V$ input , the motor runs $\pm 3000rpm$, or $\pm 2000rpm$. Positive voltage corresponds to forward rotation , while negative voltage corresponds to reverse rotation . (pin8 can also act as low resolution speed command input)
	AGND	2	Analog ground	Analog signal ground
TORQUE	TCMD+	1	Torque command	During driver set at torque mode: Enables the motor to output torque proportional to the torque command voltage. At $\pm 10V$, the motor output 300% rated torque .
	TLM+	9	Torque limit command	Enabled while TLM (pin13) active low, At $\pm 10V$, the motor output is limited at 300% rated torque. The function is also available in speed mode.
	AGND	2	Analog ground	Analog signal ground

Signal Type	Pin Name	Pin No.	Function Descriptions	
Position Command	EPI	25	External Power input	+24V External Power input for open collector pulse driver. (If TTL or line driver pulse source, the EPI power input is no need) Ref 7. Position Command Input Circuit
	+PPCMD	26	Forward rotation pulse Input+	Forward rotation pulse Input+ (CW+ / Pulse+ /A+)
	-PPCMD	27	Forward rotation pulse Input-	Forward rotation pulse Input- (CW- /Pulse- /A-)
	+NPCMD	28	Reverse rotation pulse Input+	Reverse rotation pulse Input+ (CCW+ / Dir+ /B+)
	-NPCMD	29	Reverse rotation pulse Input-	Reverse rotation pulse Input- (CCW- / Dir- /B-)
Common Signal for Position and Speed Command	EG1/SPD	32	Electronic gear 1 Speed selection 1	Input signal as electronic gear selection 1 in position operation mode or as speed selection 1 in speed operation mode .
	EG2/SPD2	33	Electronic gear 2 Speed selection 2	Input signal as electronic gear selection 2 in position operation mode or as speed selection 2 in speed operation mode .
	EG3/SPD3	35	Electronic gear 3 Speed selection 3	Input signal as electronic gear selection 3 in position operation mode or as speed selection 3 in speed operation mode .

12.2 Servo ON input (CN1-6)

This signal is used to turn on and off the power to the servomotor.

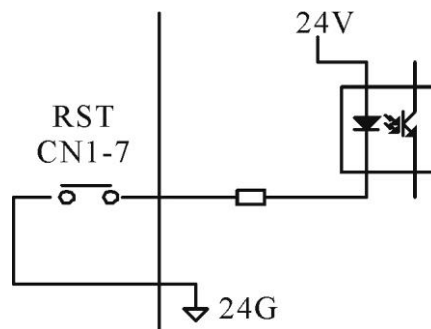


Note:

1. Contact this input to ground will make the Mokon driver ready to receive the command pulse or analog voltage input.
2. Open the contact will make the servo motor free run. Do not use this signal to work as motor stop signal.

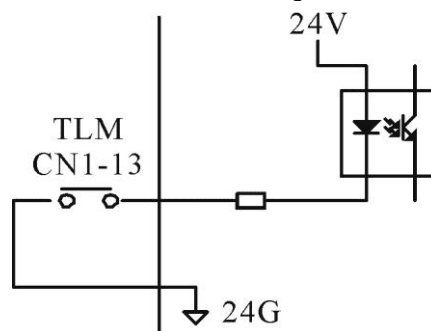
12.3 RST Servo reset input (CN1-7)

This signal is used to reset the servo drive after clearing the servo alarm.



12.4 TLM Torque limit input (CN1-13)

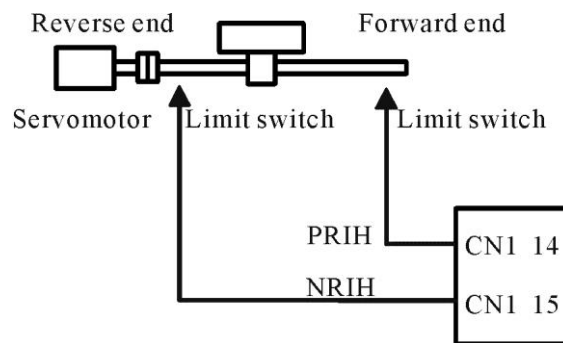
This signal, together with the TLCMD+ analog voltage input (CN1-9) torque limit signal, is to protect the apparatus or work piece. If the input torque limit exceeds the maximum motor rated torque, then the maximum motor rated torque is the maximum torque limit.



A too low torque limit might cause the problem of insufficient torque during acceleration/ deceleration.

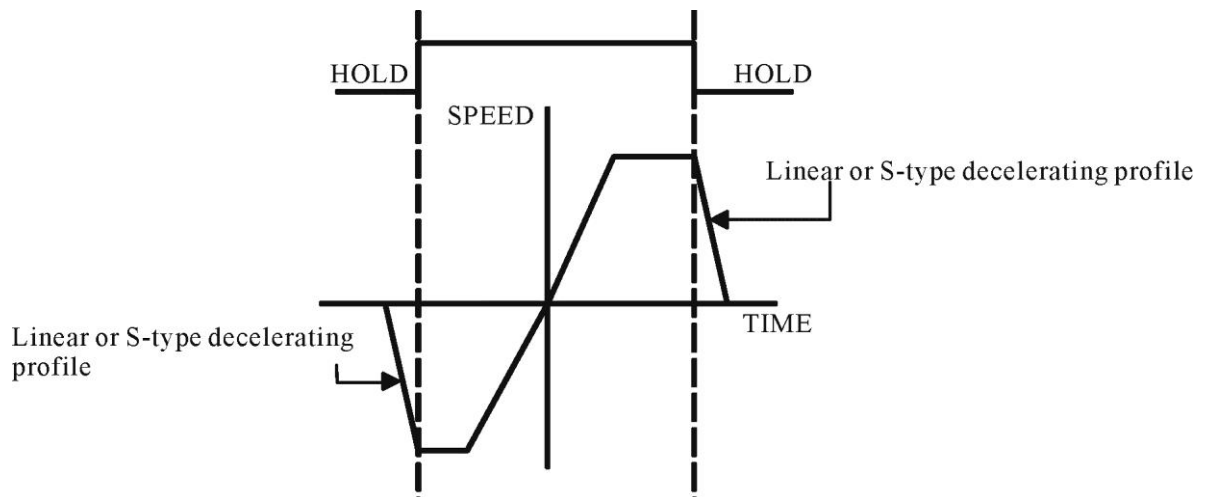
12.5 PRIH Forward rotation inhibited and NRIH reverse rotation inhibited inputs (CN1-14~15)

These two signals force the moving part of the apparatus to stop if they travel over the allowable range of motion. Connect the overtravel limit-switch signals to the correct pins (PRIH for forward overtravel, NRIH for reverse overtravel) of the servo drive CN1 connector. (as shown below)



12.6 Motor hold or PI/P control mode switch input (CN1-16)

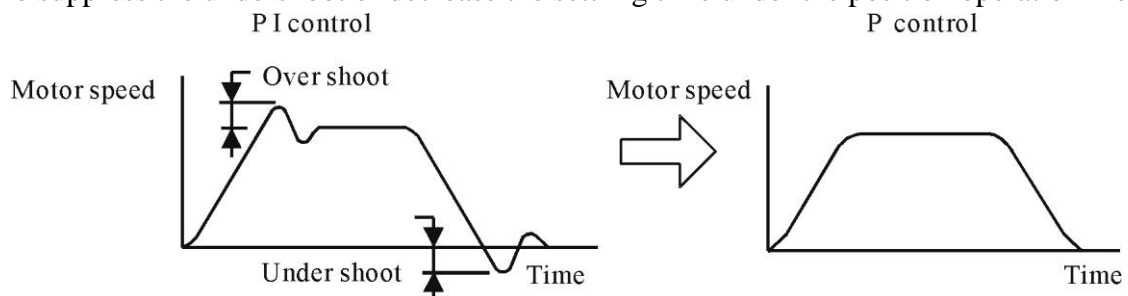
If Motor Hold function is selected, the servomotor will be stopped and held still when CN1-16 is connected with 24G. The servomotor is decelerated according to the programmed profile.



If PI/P Control Mode Switch function is selected, the speed loop will be changed from PI mode to P mode when CN1-16 is connected with 24G and. The mode switching function is described below:

Applications:

1. To suppress the overshoot during acceleration/deceleration under the speed operation mode.
2. To suppress the undershoot or decrease the settling time under the position operation mode.



12.7 MDO Operation mode

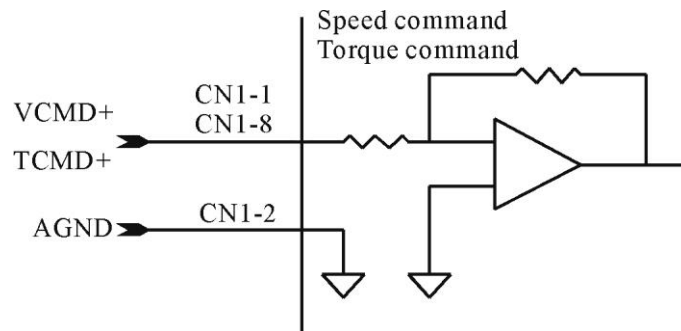
If the CNTL parameter is set in the “Common Parameter” menu as S/P (speed/Position), P/T (Position/Torque), or S/T (Speed/Torque) mode, this input signal enables the switching between operation modes.

For example: If CNTL is set as S/P mode, when CN-34 and 24G is not connected, the servo drive is in Speed operation mode, when connected; the servo drive is switched to Position operation mode.

12.8 VCMD+ and TCMD+ inputs (CN1-1 and CN1-8)

VCMD+: When the servo drive is in S Mode or is switched to S mode, this signal is used as analog speed command input. The input voltage scale can be modified at the VMDL parameter contained in the “Speed Parameter” menu. The value of the VMDL parameter defines the input voltage which corresponds to the rated speed, with positive voltage for forward rotation, and negative voltage for reverse rotation.

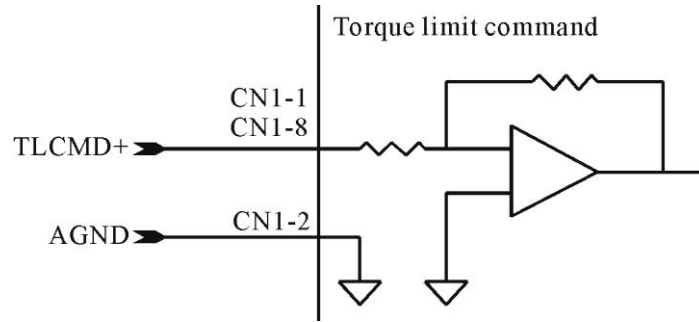
TCMD+: When the servo drive is in T Mode or is switched to Torque operation mode, this signal is used as analog torque command input. If the input voltage is 10V, the motor outputs 300% of the rated torque.



Note: CN1-1 is for high-resolution analog signal input (12 BIT). Please purchase YPV-XXX-V series servo drive if high-resolution analog input is needed. The input pin of the standard analog input (resolution 10 BIT) is CN1-8.

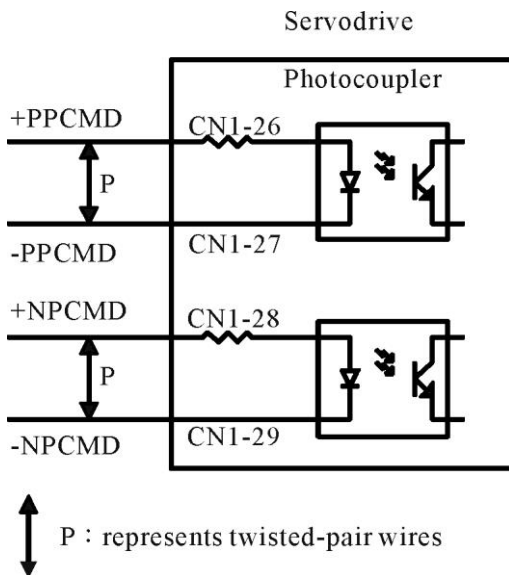
12.9 TLCMD+ Torque limit analog command input (CN1-9)

This signal is used as analog torque limit command input when CN1-13 is connected with 24G. If the input voltage is 10V, the limit range corresponds to 300% of the rated torque of the motor.



12.10 +PPCMD –PPCMD, +NPCMD -NPCMD Position command inputs (CN1-26~29)

When the servo drive is in P Mode or switched to Position operation mode, these signals are used as position command inputs. The type of the command can be changed within the parameter.



The position command signals can be any of the following forms (refer to 6. Position command input circuit):

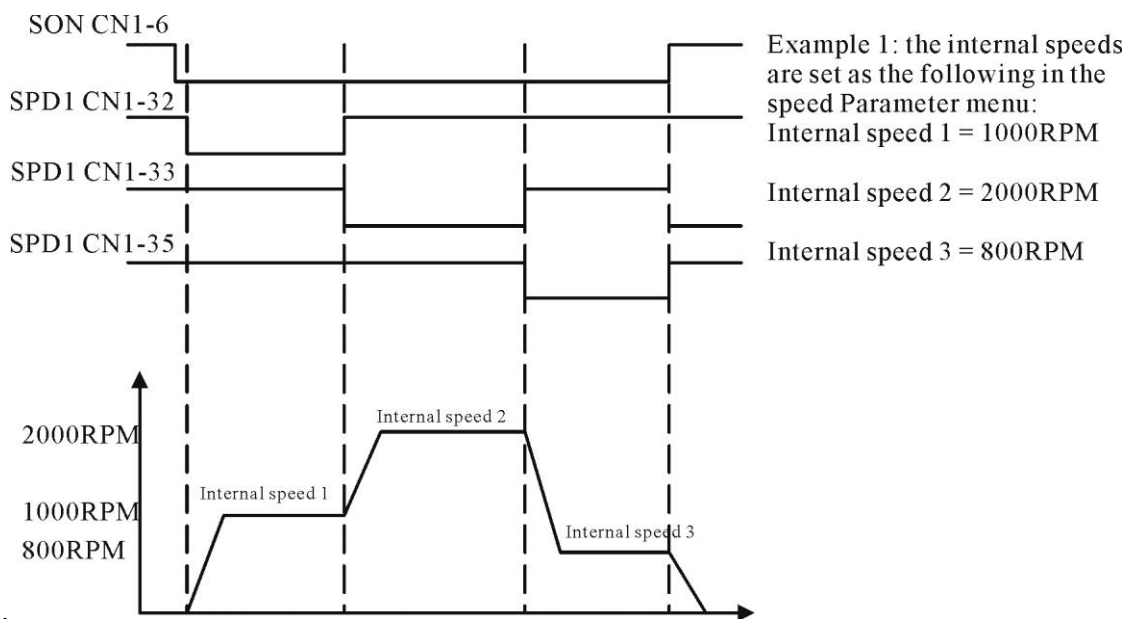
1. Differential type
2. +24V open-collector type
3. +5V open-collector type

12.11 SPD1 SPD2 SPD3 Internal speed switching inputs (CN1-32~35)

ELGN1 ELGN2 ELGN3 Electronic Gear Numerator Switching Inputs (CN1-32~35)

When the servo drive is in S Mode or switched to Speed operation mode, and if the internal speed is enabled, the internal speed command can be selected by properly connecting one among CN1-32 (SPD1), CN1-33 (SPD2) and CN1-35 (SPD3) to 24G. The three pins correspond to three different internal speed commands which are defined by the parameters Internal Speed 1, Internal Speed 2 and Internal Speed 3 (Unit: RPM) in the “Speed Parameter” menu.

When the servo drive is in P Mode or switched to Position operation mode, the numerator of the electronic gear ratio can be selected by properly connecting one among CN1-32 (ELGN1), CN1-33 (ELGN2) and CN1-35 (ELGN3) to 24G. The three pins correspond to three different numerators that are defined by the parameters Numerator 1, Numerator 2 and Numerator 3 in the “Position Parameter” menu, where a common denominator of the electronic gear ratio is also programmed



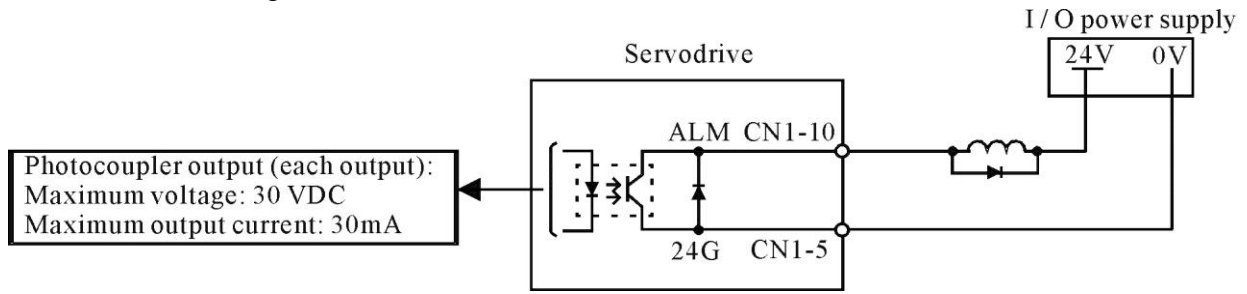
13. Descriptions of Mokon servo drive Output signals

13.1 Output Signal definitions and CN1 pin assignments

Signal Type	Pin Name	Pin No.	Function Descriptions	
Common	ALM	10	Servo Alarm	Digital signal for alarm
	BRAKE	17	Motor Brake Release Signal	Digital signal for releasing the motor brake
Speed	ZERO	36	Motor Low Speed Output	Digital signal output indicating the servomotor is running at speed lower than the user setting .
In Torque Limit	ITLM	37	Output In Torque Limit	is saturated at the torque limit value in torque is saturated at the torque limit value in torque operation mode .
Speed/Position Common Signal	INP/INS	18	Position/Speed Arrival	Digital signal output for indicating the value of position error counter is smaller than the user setting in position operation mode , or the motor speed is smaller than the user setting in speed operation mode .
Analog Output	MO1	11	Analog output 1	Analog output
	MO2	12	Analog output 2	Analog output
Encoder Signal Output	A	19	Encoder A phase	Differential, line driver digital output signal A phase.
	/A	20		
	B	21	Encoder B phase	Differential, line driver digital output signal B phase.
	/B	22		
	Z	23	Encoder Z phase	Differential, line driver digital output signal Z phase.
	/Z	24		

13.2 ALM Servo alarm output (CN1-10)

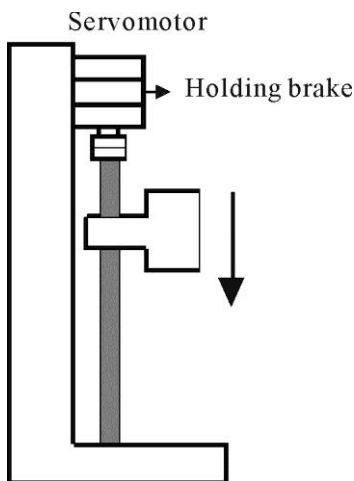
This signal indicates that an abnormal state of the servo drive occurs.



13.3 Brake motor brake release output (CN1-17)

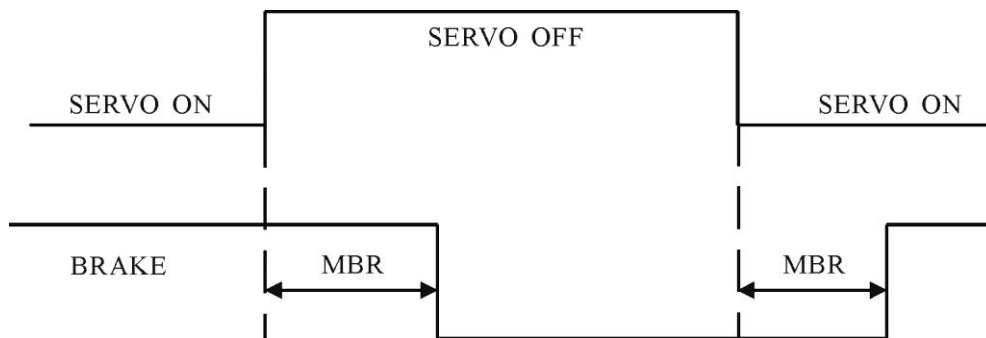
If CN-17 is programmed as the brake release signal, when the driver is enabled through the contact of SON (CN 1-6) and 24G, the brake release signal will be issued after a delay time defined by the MBR parameter in the “Common Parameter” menu.

If CN-17 is programmed as the servo ready signal (default), after the driver is enabled and no alarm has been detected, the servo ready signal will be issued immediately.



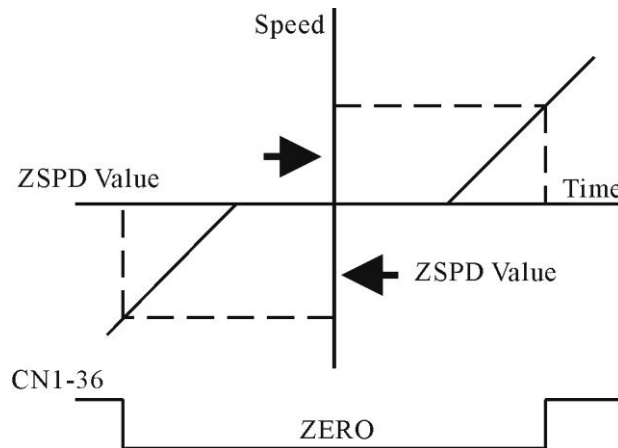
When the system power is turned off, the servomotor with brake prevents the movable parts from dropping due to gravity.

The brake built in the servomotor is of passive type and is intended only for holding the motor and cannot be used to actually stop a rotating motor. Be sure that the holding brake is applied after the motor is stopped. The braking torque is at least 120% of the rated motor torque.



13.4 Zero servo speed zero output (CN1-36)

This signal is used to indicate that the speed of the servomotor is lower than or equal to the ZSPD parameter set in the “Speed Parameter” menu and issued by connecting CN1-36 to 24G.



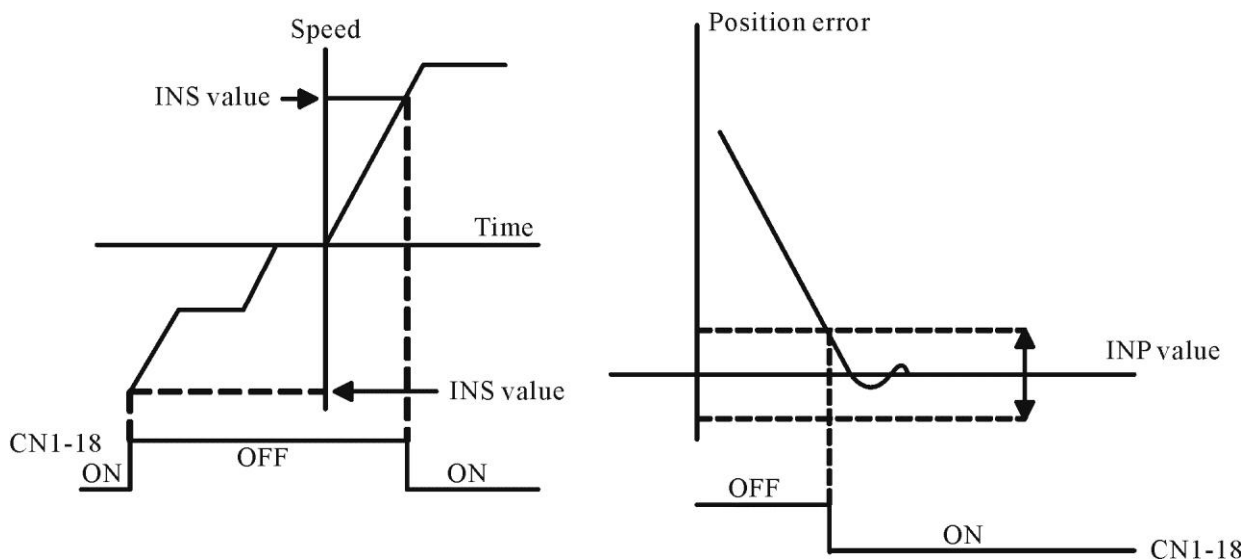
13.5 ITLM In torque limit output (CN1-37)

When the servo drive CN1-13 (TLM) is connected with 24G or if the output torque is saturated at the limit set by the driver, CN1-37 will be connected with 24G to issue the In Torque Limit signal.

13.6 INS INP Speed/Position arrival output (CN1-18)

If the servo drive is set as S Mode, when the motor speed is equal to or higher than the INS parameter set in the “Speed Parameter” menu, CN1-18 will be connected with 24G to issue the Speed Arrival signal.

If the Servo drive is set as P Mode, when the value of the position error counter is equal to or lower than the INP parameter set in the “Position Parameter” menu, CN1-18 will be connected with 24G to issue the Position Arrival signal.



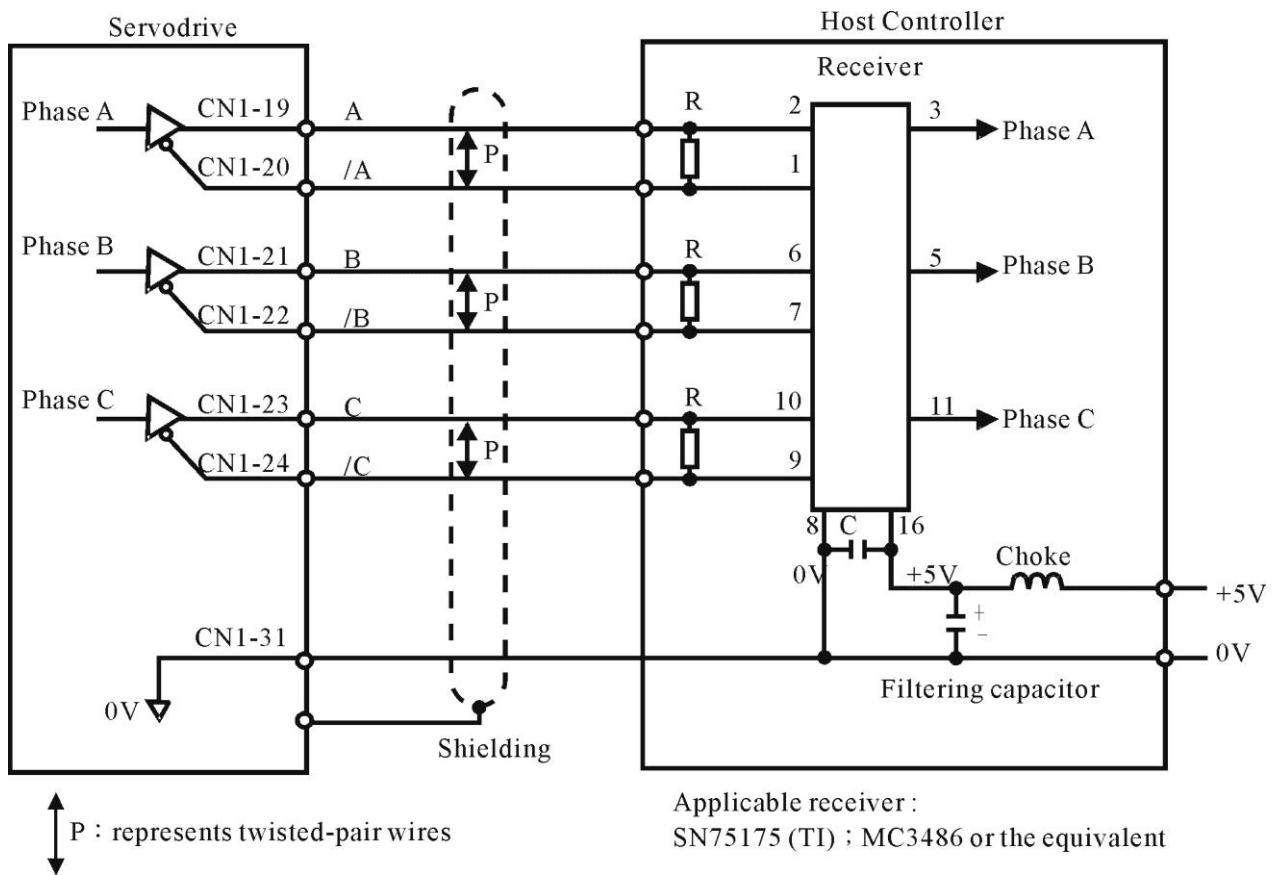
13.7 MON1 MON2 Analog monitor outputs (CN1-11~12)

These output signals are for monitoring the dynamic states of the servo drive and can be selected in the “Common Parameter” menu, in which the scale, offset and resolution of the output signals are also defined

- MON1: as Monitor Channel A defined the “Common Parameter” menu;
- MON2: as Monitor Channel B defined the “Common Parameter” menu

13.8 Encoder output signals (CN1-19~24)

Encoder output signals, derived from the servo drive, can output to an external Host Controller. The Host Controller then uses these signals in its control circuit.



14. User parameter settings and functions

14.1 Parameter settings and functions

YPV driver parameter definitions							
parameter no.	register	function/data	mode	initial	unit	range	remark
0	EEPW	0:write parameters into EEPROM	0	0			
1	CNTL	Servo control mode 0 = Torque mode 1 = Speed mode 2 = Position mode 3 = Speed/Position mode 4 = Position/Torque mode 5 = Speed/ Torque mode	S、P、T	3		0 ~ 5	
2	PMOD	PULSE CMD TYPE 0=PULSE/DIR 1=A/B 2=CW/CCW Note: no valid for YPV ver 2	P	0		0 ~ 2	
3	Ta	acceleration time for speed mode linear acceleration profile. Note: internal generated profile, if use external profile generator set this parameter to 0	S	0	ms	0 ~ 10000	
4	Td	deceleration time for speed mode linear acceleration profile. Note: internal generated profile, if use external profile generator set this parameter to 0	S	0	ms	0 ~ 10000	
5	Tsa	acceleration time for speed mode S acceleration profile. Note: internal generated	S	0	ms	0 ~ 10000	

		profile, if use external profile generator set this parameter to 0					
6	Tds	deceleration time for speed mode S acceleration profile. Note: internal generated profile, if use external profile generator set this parameter to 0	S	0	ms	0 ~ 10000	
7	PACC	Pulse mode control acceleration time. Note: internal generated profile, if use external profile generator set this parameter to 0	P	0	ms	0 ~ 10000	
8	SP0	0: internal speed generator disable 1: internal speed generator enable	S	0		0 ~ 1	
9	SPD1	speed1 of internal speed generator Note: selected by SPD1 digital input, while SP0=1	S	500	RPM	- rated RPM ~ + rated RPM	
10	SPD2	speed2 of internal speed generator Note: selected by SPD2 digital input, while SP0=1	S	1000	RPM	- rated RPM ~ + rated RPM	
11	SPD3	speed3 of internal speed generator Note: selected by SPD3 digital input, while SP0=1	S	2000	RPM	- rated RPM ~ + rated RPM	
12	VMDL	speed command voltage to motor rated speed Note: 10 means 10V for 2000 RPM rated speed motor.	S	10	V	0~10	
13	SPDO	Voltage input offset for	S、T	0		± 1024	

		speed/torque mode					
14	ZSPD	zero speed range Note: when motor speed equivalent voltage less than the setting voltage the CN1-37 (ZERO) will make.	S	50	RPM	0 ~ rated RPM	
15	INS	speed agreed range. Note: when motor speed equivalent voltage less than the setting voltage the CN1-18 (INS) will make.	S	2000	RPM	0 ~ rated RPM	
16	TQL	torque limit in speed /position mode Note: function only valid while CN1-13(TLM) short to 24G	S、P	300	%	0 ~300	
17	TLCS	torque limit source 0: internal 1: external analog command voltage (from CN1-9)	S、P	1		0 ~ 1	R/W
18	TQCA	filter time constant for torque command input Note: Larger time constant will decrease the band width of response	T	15	us	15 ~ 10000	
19	DOLO	output polarity 0: normal open 1: normal close	S、P、T	0		0 ~ 1	R/W
20	TSL	speed limit for torque mode	T	2000		0~ rated RPM	R/W
21	KVP1	proportional gain1 for speed loop	S	3000		0 ~ 30000	
22	KVP2	proportional gain2 for speed loop	S	3000		0 ~ 30000	
23	KVI1	integral gain1 for speed loop	S	130		0 ~ 30000	
24	KVI2	integral gain2 for speed loop		130		0 ~ 30000	
25	SPDB	dead band of speed command		0		0 ~	

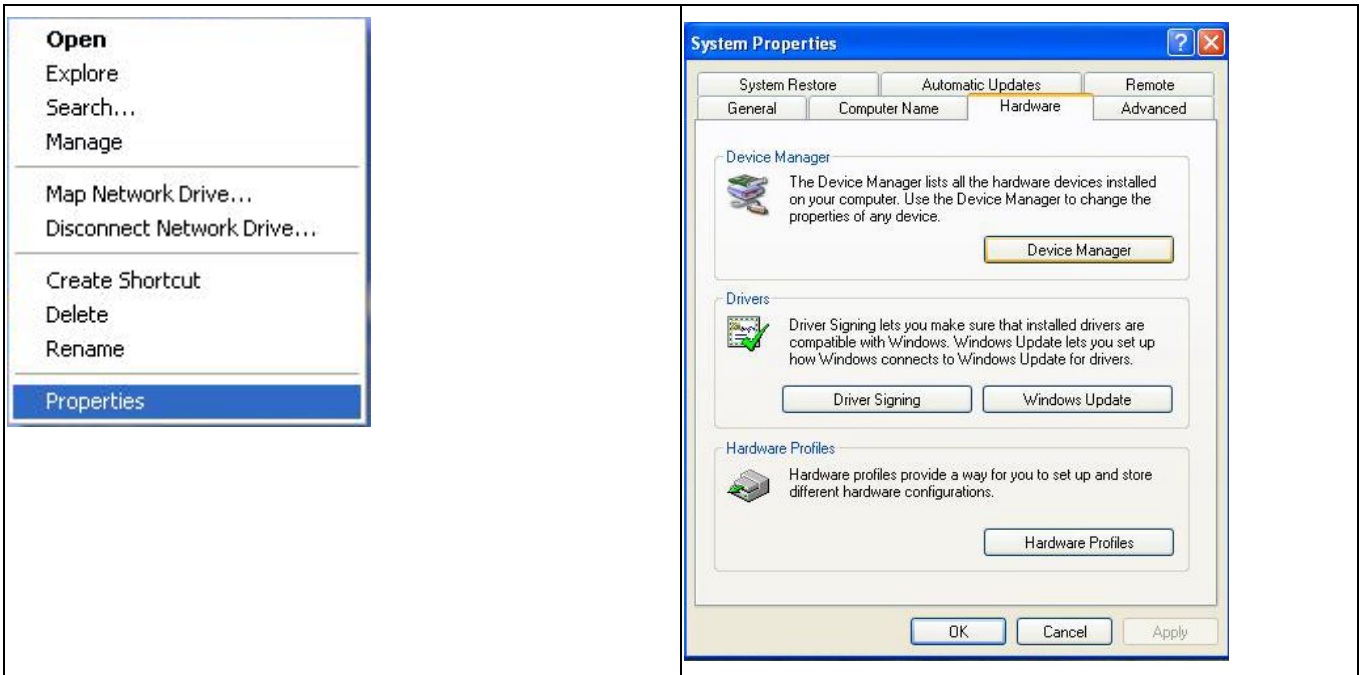
						rated RPM	
26	KPP1	proportional gain for position loop	S	300		0 ~ 30000	
27		Not available					
28	SSPD	speed loop gain switch level (speed lower than SSPD, switch from gain1 to gain2)		300	%	0 ~ 300	
29	CNTR	Refer appendix 1					
30	DO17	function configuration of CN1-17 0: active while servo ready 1: brake release while P037 (MBR) time out	S · P · T			0~1	R/W
31	INP	In-position range Note: position error falls into this range the CN1-18 (INP) will be active	P	100	Pulse		
32	ELGN	numerator of gear ratio	P	10		1 ~ 30000	
33	ELGN1	numerator 1 of gear ratio (selected by EG1 digital input)	P	10		1 ~ 30000	
34	ELGN2	numerator 2 of gear ratio (selected by EG2 digital input)	P	100		1 ~ 30000	
35	ELGN3	numerator 3 of gear ratio (selected by EG3 digital input)	P	1000		1 ~ 30000	
36	ELGD	denominator of gear ratio	P	10		1 ~ 30000	
37	MBR	brake release delay timer, after power on the CN1-17 BRAKE will active during MBR time out	S · T · P	500	ms	0~200 0	
38	MONO1	offset of monitor output1		0	mv	-127~1 27	
39	MONO2	offset of monitor output2		0	mv	-127~1 27	
40	MONT1	source of monitor output1 0 : servo motor current 1 : speed 2 : position error counter		1		0~2	

41	MONT2	source of monitor output2 0 : servo motor current 1 : speed 2 : position error counter		1		0 ~ 2	
42	MONL	speed monitor output voltage of rated speed $\pm 10V = \pm 2000$ OR ± 3000 RPM $\pm 8V = \pm 2000$ OR ± 3000 RPM		10	V	0 ~ 10	
43	MTYP	Motor pole number		8	pole	2 ~ 48	
44	RPM	Motor rated RPM		2000	RPM	0 ~ 10000	
45	ENCO	Encoder pulses per motor revolution		2500	Pulse	1 ~ 10000	
46	IPEK	Driver peak current			ma		
47	DCDY	Regenerate discharge duty cycle		50	%	0 ~ 100	
48	POEN	Numerator of encoder output ratio				1 ~ 32767	
49	POED	Denominator of encoder output ratio				1 ~ 32767	
50	IMON	Real time current value for monitoring			ma		RO
51	SMON	Real time speed value for monitoring			RPM		RO
52	OSLV	over-speed limit	S	3000	RPM	0 ~ 10000	
53	PERZ	over error counter limit Note: 0: disable PERZ function	P	3000 0	pulse	1 ~ 32766	
54		not available					
55		not available					
56	ADO	voltage command source 1 = high resolution (always choose) Note: YPV ver2 is 14 bit resolution	S	1		0~1	
57		not available					
58		not available					
59	MRO	motor rotation direction	T、S、P	1		0 ~ 1	

		0: positive command voltage in CCW direction 1: positive command voltage in CW direction					
60	DI-16	CN1-16 DI function selection 0 = CN1-16 works as HOLD function 1 = CN1-16 works as PI and P compensation switch	S · P	0		0 ~ 1	
61		not available					
62	TSLO	speed limit source of torque mode 0: internal 1: external(analog voltage in)	T	0		0~1	R/W
63		not available					
64	DILS	polarity of over-travel limit input CN1-14 and CN1-15 0: normal, ground input to PRIH , NRIH input will activate the function. 1: invert, open input to PRIH , NRIH input will activate the function.	S · P · T	0		0~1	R/W
65	SVER	Software version					RO

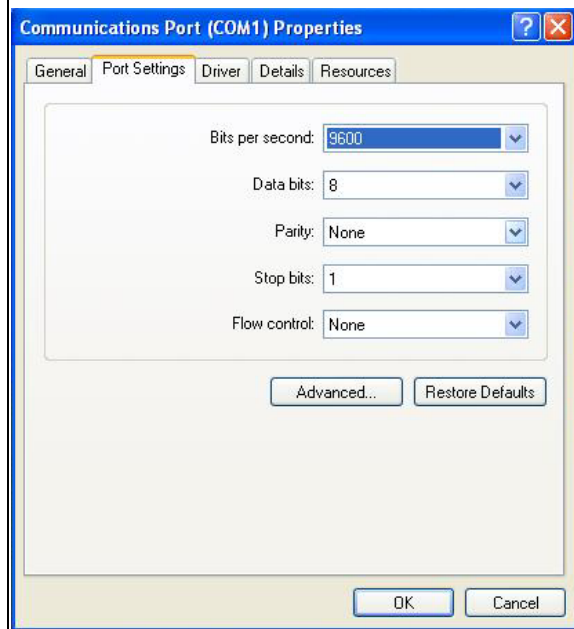
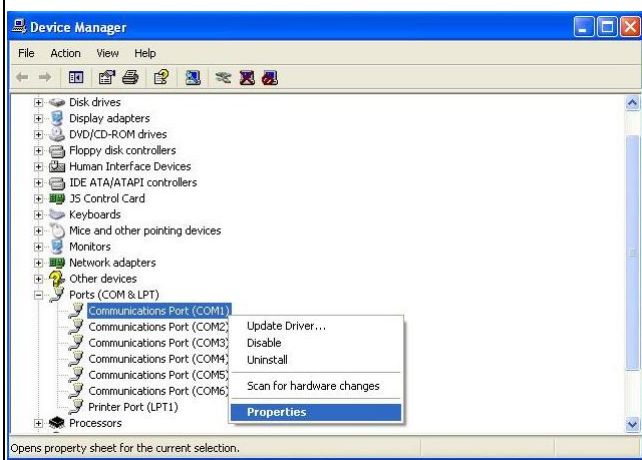
15. Driver setup via PC communication

15.1 Setup communication protocol



1. Right click the mouse on my computer icon, Choose the “Properties” item

2. Select “Hardware” -> “Device manager”



3. Select “Ports (COM & LPT) and choose the com port you are connecting to.

4. Select “Port Settings” to change parameters

Bits per second = 9600

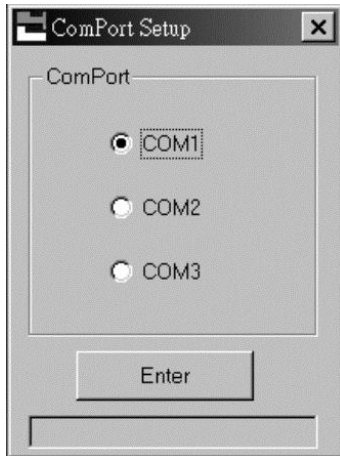
Data bits = 8

Parity = None

Stop bits = 1

Flow control = none

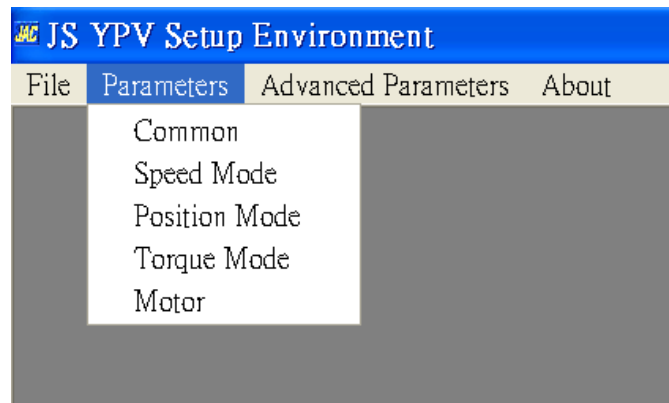
15.2 Communication port to link with the servo driver



Start -> Program Files-> JS Automation->YPV

The figure left shows the display of ComPort Setting, please choose the Communication Port used by your computer first.

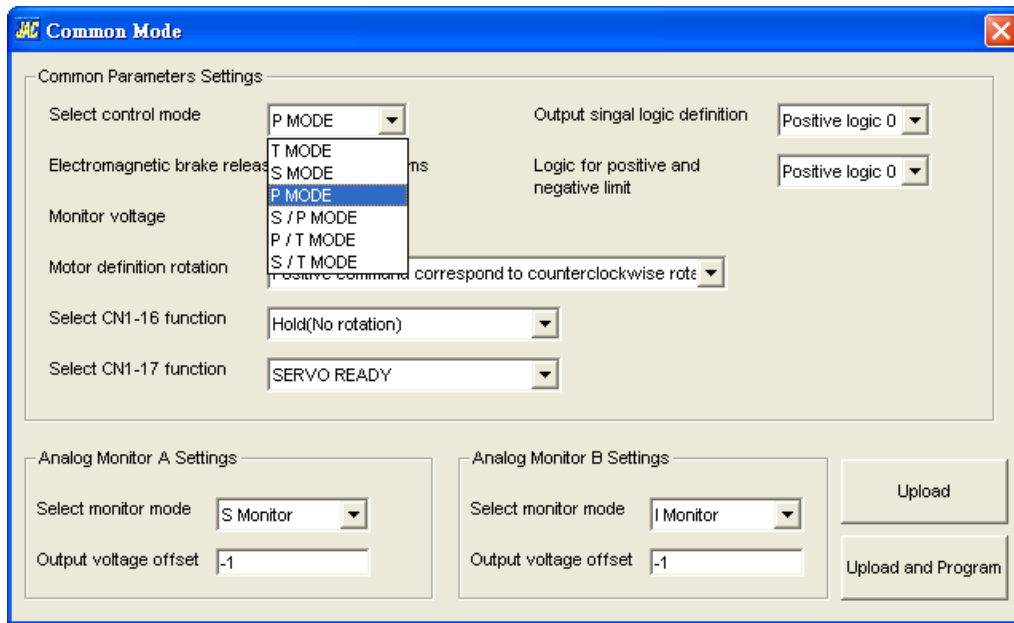
15.3 Basic functions



Mokon Servo drive has the following five menus for parameter setting:

1. Common Parameter
2. Speed Mode Parameter
3. Position Mode Parameter
4. Torque Mode Parameter
5. Motor Parameter

15.4 Common parameter



Select control mode

Mokon servo drive has six operation modes for selection

T Mode:

Torque mode, which is a single mode and cannot be switched through CN1-34 (MDO)

S Mode:

Speed mode, which is a single mode and cannot be switched through CN1-34 (MDO)

P Mode:

Position mode, which is a single mode and cannot be switched through CN1-34 (MDO)

S/P Mode:

Speed <-> Position mode, which can be switched through CN1-34 (MDO)

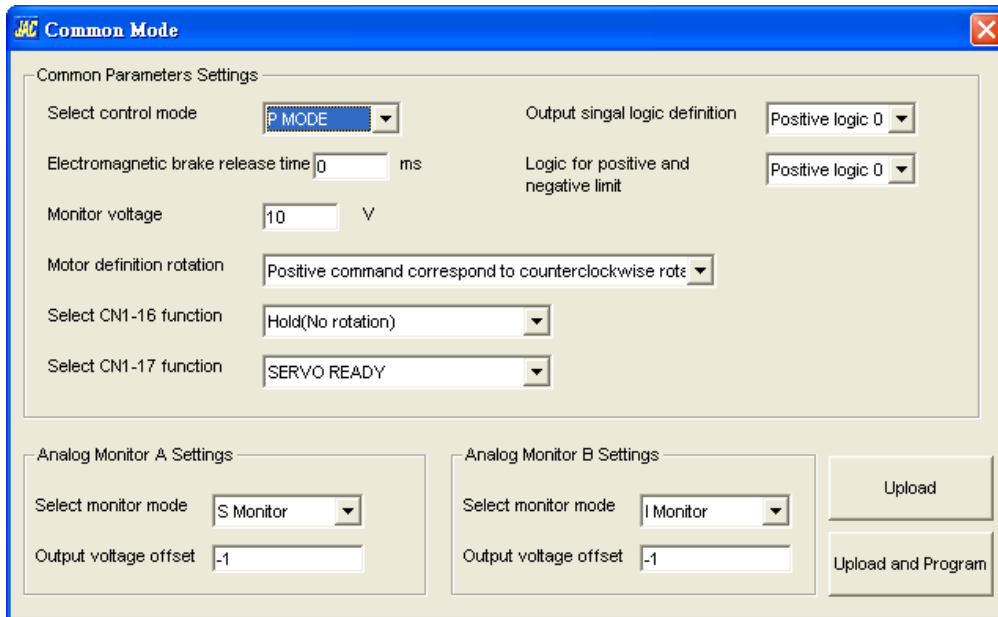
P/T Mode:

Position <-> Torque mode, which can be switched through CN1-34 (MDO)

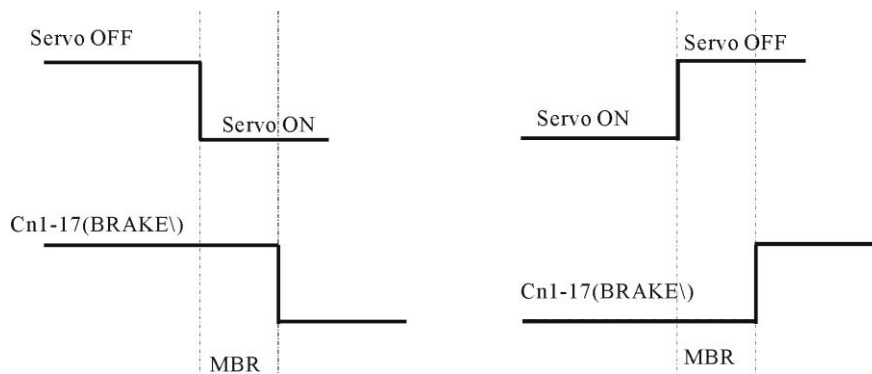
S/T Mode:

Speed <-> Torque mode, which can be switched through CN1-34 (MDO)

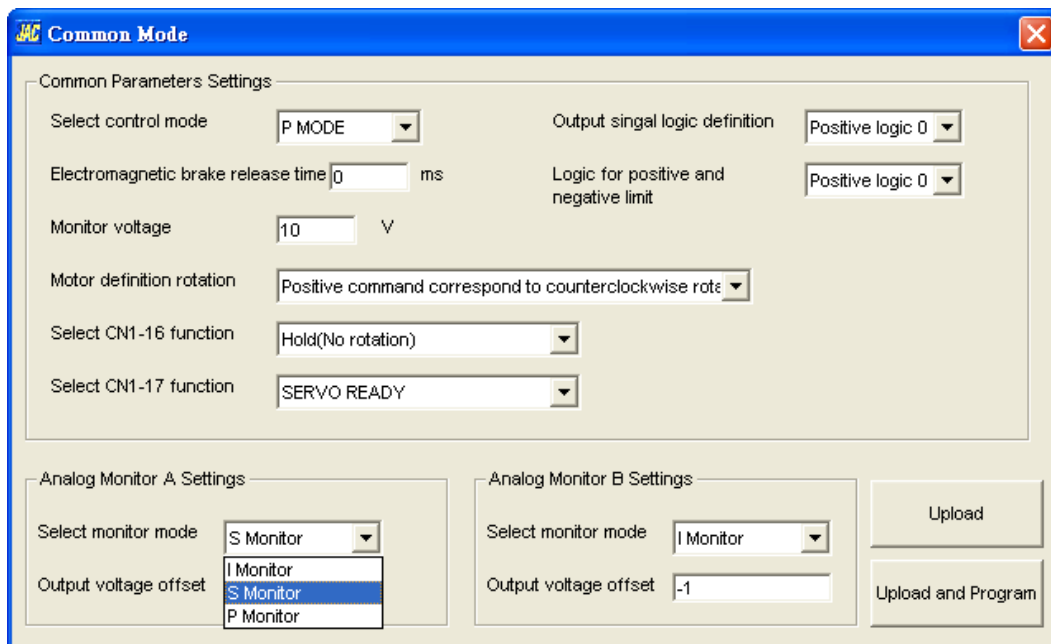
Electromagnetic brake release time (MBR)



MBR is effective only when CN1-17 is programmed as the Motor Brake Release function.
Available range: 0~ 1000 ms



Monitor voltage (MOVL)



This field is used to set the maximum output voltage of the monitoring signals for both channel A and channel B, default value is 10V.

If S Monitoring is selected, the maximum output voltage corresponds to the motor rated speed.

If I Monitoring is selected, the maximum output voltage corresponds to the motor 300% rated current.

If P Monitoring is selected, the maximum output voltage corresponds to the tracking error setting set in the “Motor Parameter” menu.

Motor definition rotation

The screenshot shows the 'Common Mode' software window. The 'Common Parameters Settings' section includes: 'Select control mode' set to 'P MODE'; 'Electromagnetic brake release time' set to '0 ms'; 'Monitor voltage' set to '10 V'; 'Motor definition rotation' set to 'Positive command correspond to counterclockwise rotation'; 'Select CN1-16 function' set to 'Positive command correspond to counterclockwise rotation'; and 'Select CN1-17 function' set to 'SERVO READY'. The 'Output signal logic definition' and 'Logic for positive and negative limit' are both set to 'Positive logic 0'. Below this, there are two sections for 'Analog Monitor A Settings' and 'Analog Monitor B Settings', both with 'Select monitor mode' set to 'S Monitor' and 'Output voltage offset' set to '-1'. 'Upload' and 'Upload and Program' buttons are visible on the right.

You can choose positive command voltage to CW rotation or CCW rotation.

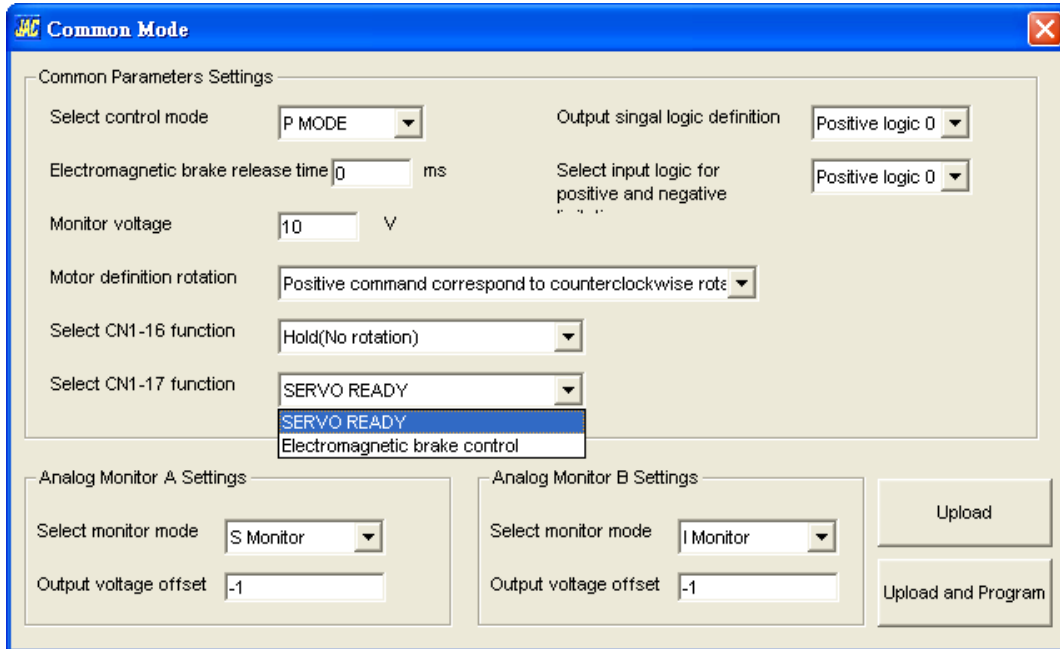
Select CN1-16 function

This screenshot is similar to the previous one, but the 'Select CN1-16 function' dropdown menu is open, showing two options: 'Hold(No rotation)' (which is highlighted) and 'PI/P Control'. The 'Select CN1-17 function' dropdown menu is also open, showing 'Hold(No rotation)' and 'PI/P Control'. All other settings in the window remain the same as in the previous screenshot.

You can choose CN1-16 as

1. Hold function input, when the input active will hold the servo immediately and clear the error counter in position mode.
2. PI/P Speed Loop Control Mode Switch input, when the input active, the driver will enter a P speed control mode.

Select CN1-17 function

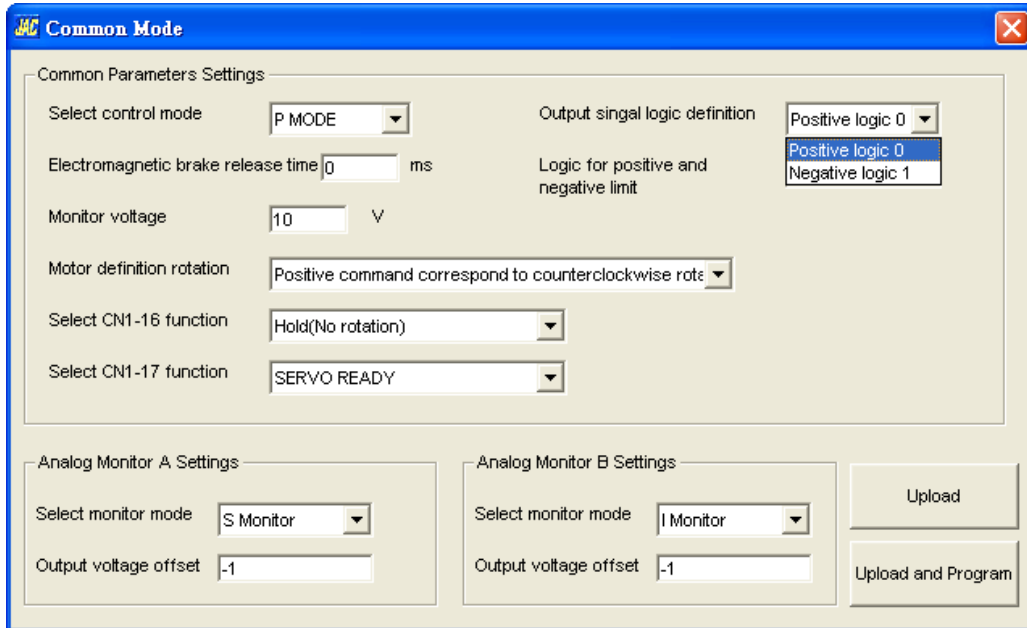


You can choose CN1-17 as

Servo Ready output: CN1-17 will be closed immediately when the servo drive is turned on and turn off when an alarm has been detected to signal the controller.

Electromagnetic brake control output: When SON (CN1-6) is engaged, CN1-17 will not be closed until after a delay time set by the Electromagnetic brake release time parameter; when SON (CN1-6) is disengaged, CN1-17 will not be open until after a delay time set by the Electromagnetic brake release time parameter.

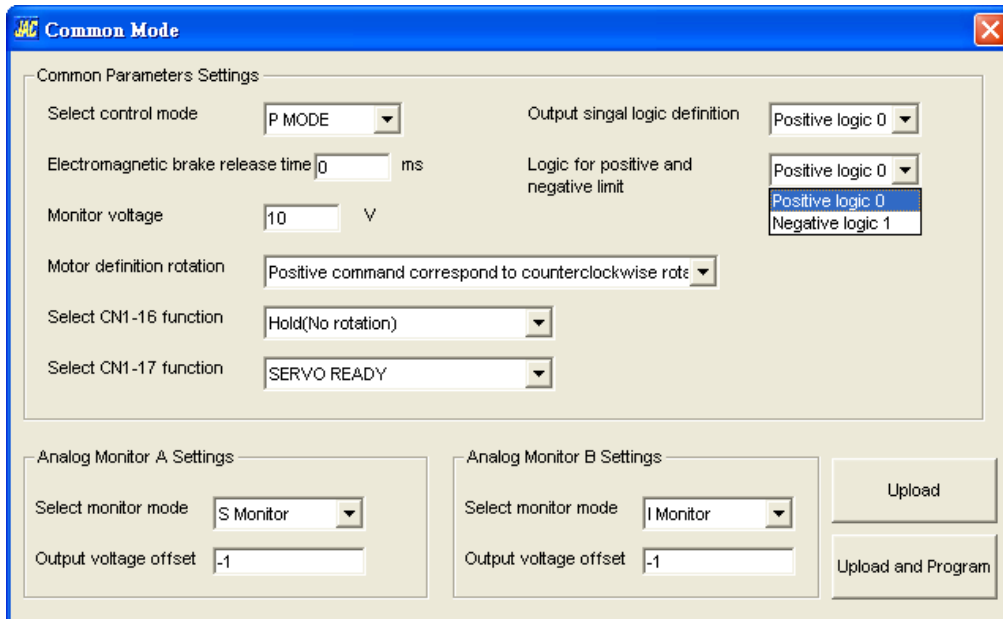
Output logic selection



Define the logic of CN1-10, CN1-17, CN1-18, CN1-36, CN1-37 output signals

1. Positive logic 0, the secondary side of the photocoupler is closed when the output signal is issued.
2. Negative logic 1, the secondary side of the photocoupler is open when the output signal is issued.

Logic for positive and negative limit



Logic for positive and negative limit:

Define the input logic of CN1-14 (Forward/Positive Rotation Inhibited PRIH) and CN1-15 (Reverse/Negative Rotation Inhibited NRIH).

1. Positive logic, motor forward and reverse rotations are inhibited when CN1-14, CN1-15 are connected with 24G (CN1-5) respectively.
2. Negative logic, motor forward and reverse rotations are inhibited when CN1-14, CN1-15 are not connected with 24G (CN1-5) respectively.

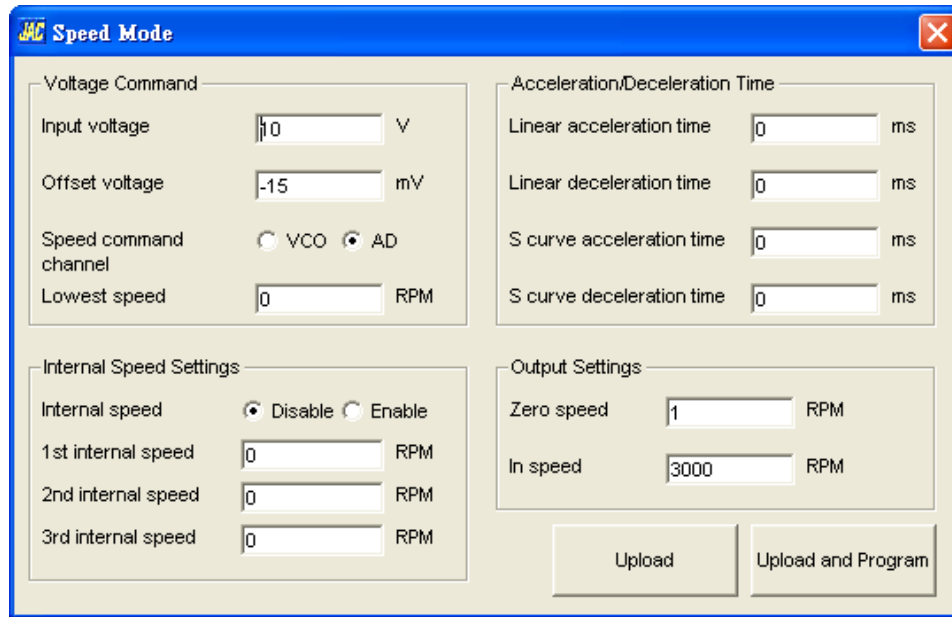
Upload

The input parameters will be transmitted and stored in the registers of the servo drive. (The input parameters will not be maintained in the servo drive after the power is turned off.)

Upload and Program

After entering the parameters, it is necessary to press this button to write these parameters stored in the registers onto the FLASH ROM in the servo drive. These parameters will thus be maintained in the servo drive and not disappear after the power is turned off.

15.5 Speed mode menu



Voltage Command

Input voltage (VMDL)

Allowable range: $\pm 2V \sim \pm 10V$

Used to scale the input voltage command (CN1-1 or CN1-8). Set the maximum input voltage of the speed command, and this maximum voltage corresponds to the rated speed of the servomotor.

Offset voltage (SPDO)

Allowable range: $-1024 \sim +1024 \text{ mV}$

Used to compensate for the offset of the voltage command. Set the offset voltage according to the actual condition, and the desired speed command is obtained internally by subtracting this setting from the input voltage (CN1-1 or CN1-8).



Speed Command Channel (ADO)

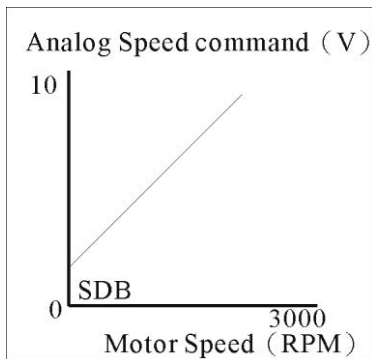
Select the speed analog command channel

AD, analog command input from CN1-8, resolution 10 Bit

VCO, analog command input from CN1-1, resolution 12 Bit (Mokon driver is suggest to use VCO)

Lowest speed (SPDB)

The servo drive will work only when the speed command is higher than the minimum motor speed setting. If controlled by the numerical controller, set this value to 0.



Minimum speed command can be set under the following situations:

- * The servomotor cannot be stopped at zero analog command.
- * The analog speed command is jammed by large noise and thus the servomotor cannot be stopped.

Internal Speed Settings

Internal Speed (SP0)

Enable or disable the function of CN1-32 (the first internal speed), CN1-33 (the second internal speed) and CN1-35 (the third internal speed) in the speed operation mode.

1st Internal Speed Settings

2nd Internal Speed Settings

3rd Internal Speed Settings

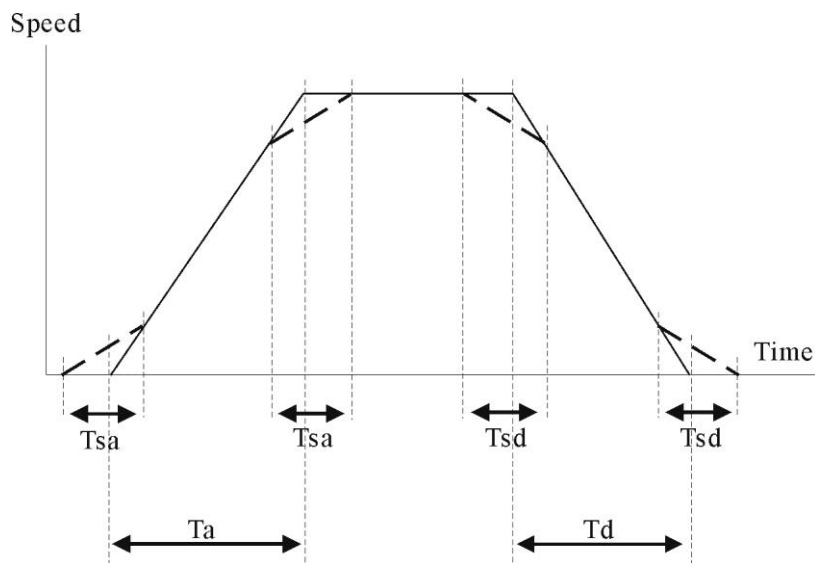
To set the pre-defined internal speed command.

If the Internal Speed Enable Setting (SP0) is set as “Enable”, the 1st internal speed (SPD1) will be executed if CN1-32 is connected with 24G.

If the Internal Speed Enable Setting (SPO) is set as “Enable”, the 2nd internal speed (SPD2) will be executed if CN1-33 is connected with 24G.

If the Internal Speed Enable Setting (SPO) is set as “Enable”, the 3rd internal speed (SPD3) will be executed if CN1-35 is connected with 24G.

Acceleration/Deceleration Time



Linear acceleration time(T_a)

Linear deceleration time(T_d)

Setting the linear deceleration/ deceleration time constant

S curve acceleration time(T_{sa})

S curve deceleration time(T_{sd})

Setting the S curve deceleration/ deceleration time constant

If controlled by a host numerical controller, set all the acceleration/deceleration time to 0.

Before setting S-type acceleration/deceleration time, linear acceleration/deceleration time must be set; otherwise the characteristics of S-type acceleration/deceleration cannot be performed.

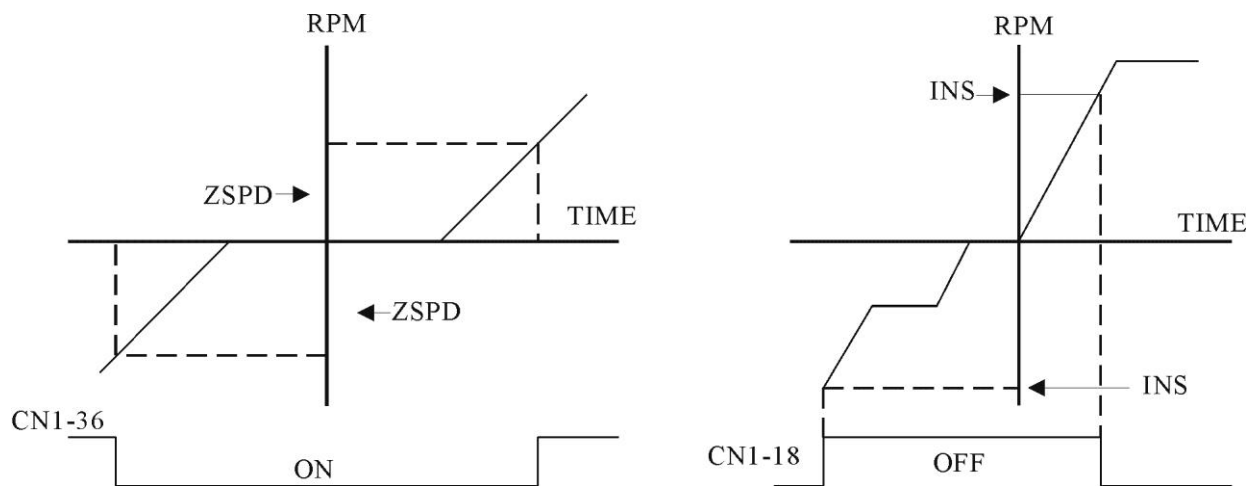
Output Settings

Zero Speed

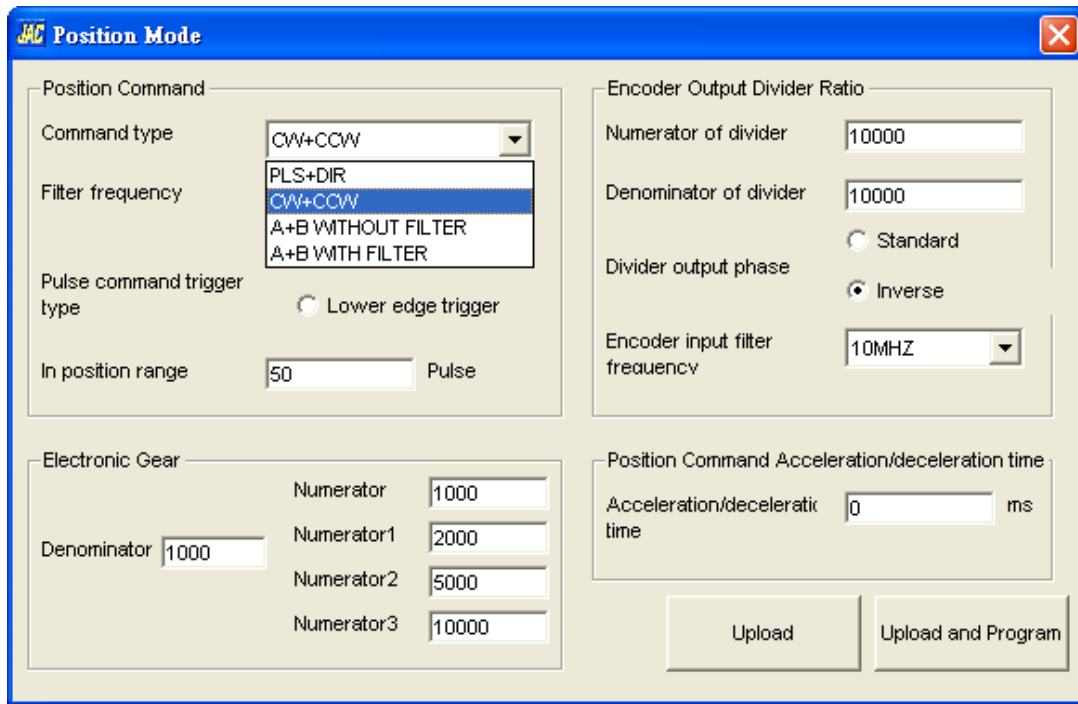
Under speed operation mode, when the motor speed is lower than or equal to the set value of ZSPD, CN1-36 will be conducted.

In Speed

Under speed operation mode, when the motor speed is higher than or equal to the set value of INS, CN1-18 will be conducted.



15.6 Position mode menu



Position Command

Command Type

Mokon servo drive can accept the following three types of command

TYPE	SIGNAL	CCW	CW
A / B	PLS		
	SIGN		
CW / CCW	PLS		
	SIGN		
PULSE / DIR	PLS		
	SIGN		

Filter frequency

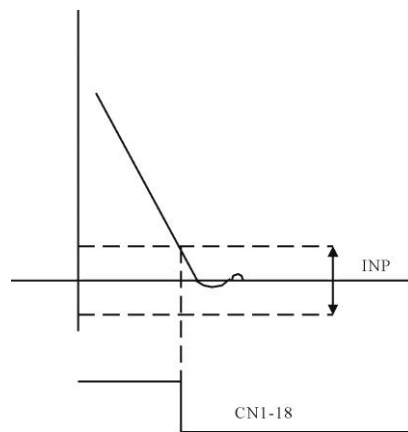
Filter frequency is only valid if the “Command type” is selected as “A+B WITH FILTER”

Pulse command trigger type

To select the polarity of the command pulse, Hi to Low trigger or Low to Hi trigger.

In position range

To set the range when the error count pulse is less than the value driver will take it as complete of positioning the CN1-18 will be engaged.



Electronic Gear

Denominator

The common denominator of the 4 numerator.

Numerator

Available range: 0 ~ 32767

If the servo motor feedback encoder is 2500ppr (2500 x 4 pulse per revolution) and the Denominator is set to 5000, the Numerator set to 10000. The controller command pulse will be 5000 pulses to run the motor one revolution.

$$\text{Command pulses to run one revolution} = \frac{2500 \text{ (Encoder pulse per revolution)} \times 4}{5000 \text{ (Denominator)}} \times 10000 \text{ (Numerator)}$$

Numerator1

Under the position operation Mode, Numerator 1 will be selected as the numerator of the electronic gear ratio when CN1-32 is connected with 24G.

Numerator2

Under the position operation Mode, Numerator 2 will be selected as the numerator of the electronic gear ratio when CN1-33 is connected with 24G.

Numerator3

Under the position operation Mode, Numerator 3 will be selected as the numerator of the electronic gear ratio when CN1-35 is connected with 24G.

Note:

- 1. When A+B pulse mode is selected as pulse command input, the pulse count of electronic gear must multiply by 4.**
- 2. When electronic gear ratio is set too large, the servo motor may caused jiggles, the adequate acceleration and deceleration is required.**

Encoder Output Divider Ratio

Numerator of divider

Denominator of divider

The encoder output is divided from the original encoder signal and the output pulse rate will be

$$\text{Output pulse} = \text{Original pulse} * (\text{Numerator} / \text{Denominator})$$

Say your servo system encoder is quadrature pulse 2500ppr, the equivalent pulse is 10,000 pulses per revolution, if you want to get the out put at 2000 ppr (equivalent pulse), you must set the Denominator to 10,000 and Numerator to 2000.

Divider output phase

The output qdudratue pulse can be the same phase with the incoming encoder signal or inverse with the incoming. Choose” Standard” means the same phase, inverse means inverse phase.

Encoder input filter frequency

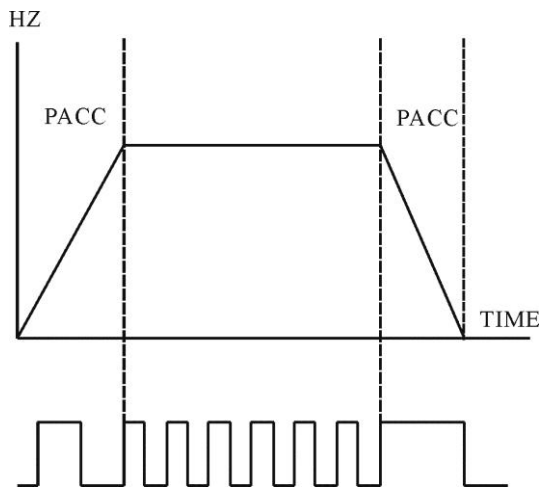
The digital filter of the input encoder signal, there are 4 choices

10MHz,5MHz,2.5MHz and 1.25MHz

Acceleration/deceleration time

The position mode internal acceleration/deceleration time.

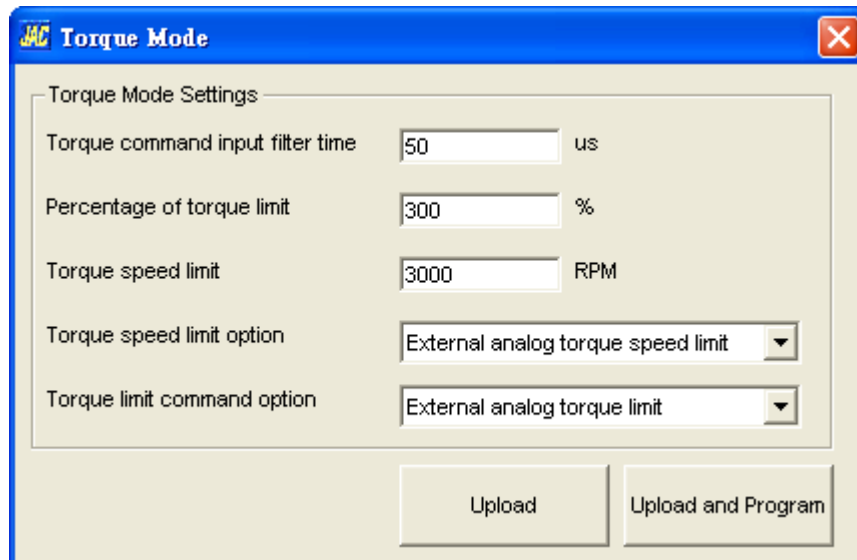
If a controller with adequate acc/dec profile control function, the time constant must set to 0.



Under position operation mode this function can provide acceleration/deceleration function for the following situations:

1. The host controller cannot perform the acceleration/deceleration function;
2. The electronic ratio is too high (> 10 times) This function does not affect the positioning precision.

15.7 Torque mode



Torque mode Settings

Torque command input filter time

Range available: 0~100us

Torque command is filtered, if the time constant is small, response will be fast but noise may come into system, large filter time constant will filter out high speed command or noise.

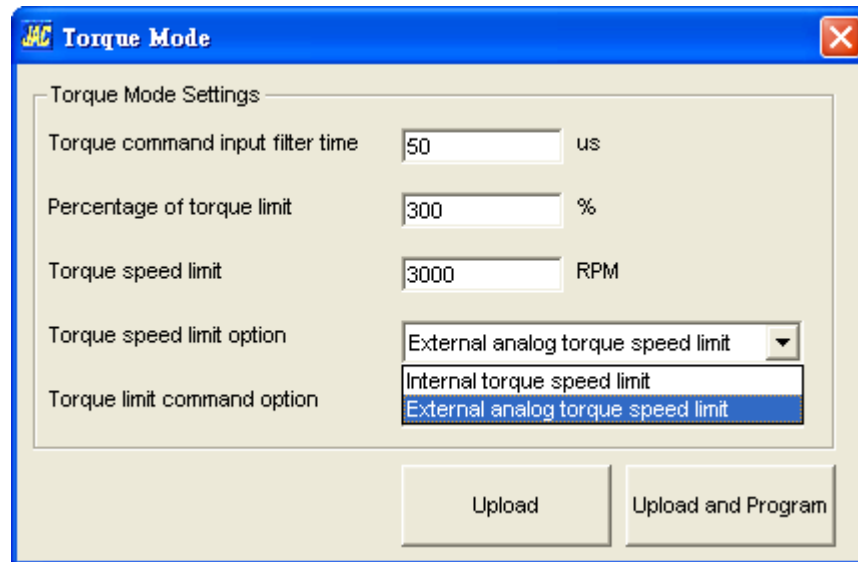
Percent of torque limitation

Range available: 0~ 300 %

Internal torque limit.

Torque speed limitation

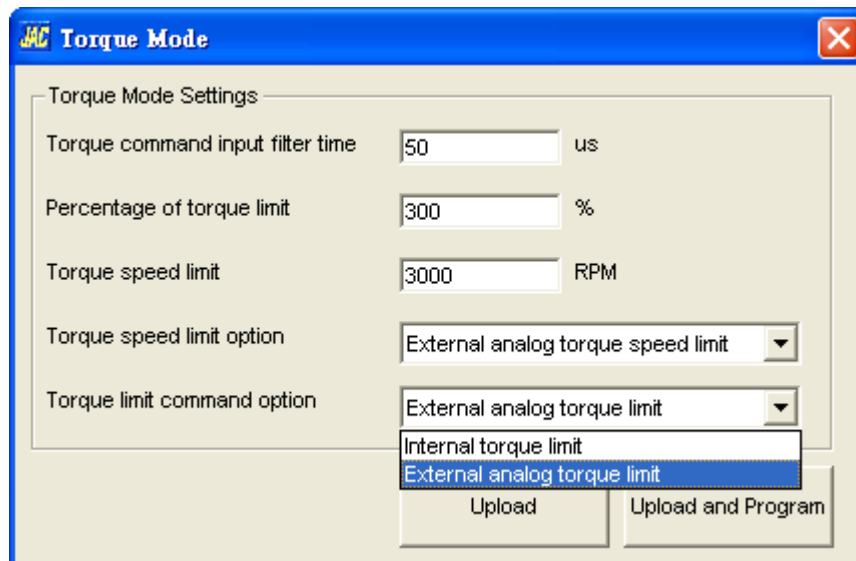
Speed limit of torque mode when internal torque limit is selected.



Torque speed limit option

There are 2 type of torque speed limit

1. Internal torque speed limit, choose this option, the Torque speed limitation will be effective.
2. External analog torque speed limit, choose this option, the CN1-8 speed input will be the speed limit of torque command (CN1-1)



Torque limit command option

There are 2 type of torque limit

3. Internal torque limit, choose this option, the Torque speed limitation will be effective.
4. External analog torque limit, choose this option, the CN1-9 torque limit input will be the limit of torque command (CN1-1)

15.8 Motor Parameter Settings

Motor Parameter Settings		Driver Parameter Settings	
Pole	4	Pole	
Rated speed	3000	RPM	
Encoder type	2500	P / R	
Max current	180	100mA	
		Discharge duty cycle	50 %
		Over speed protection	4000 RPM
		Position error range	30000 Pulse
Upload and Program			

Motor Parameter Settings

Pole : the servo motor poles according to the motor specifications

Rated speed: the servo motor rated speed according to the motor specifications

Encoder type: the feedback encoder pulse per revolution according to the motor specifications

Max current: the 3 * rated current of servo motor, less is possible but will limit the motor instantaneous torque.

Driver Protection Setting

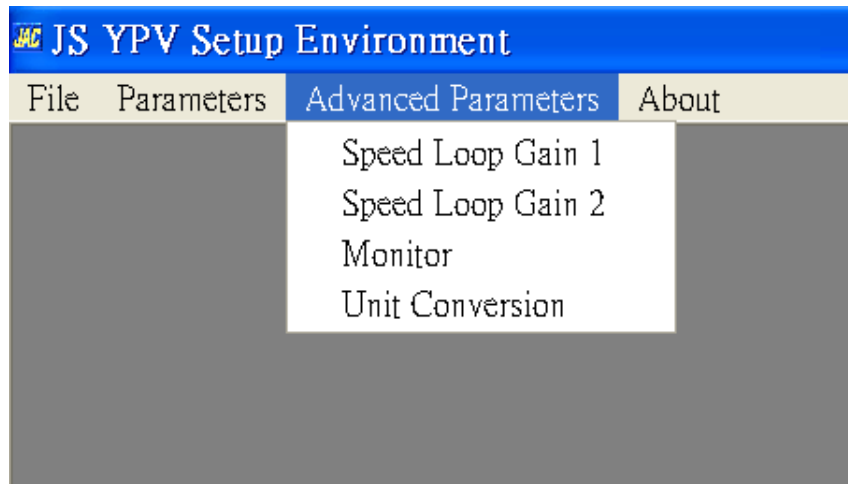
Discharge Duty Cycle: use 50% as regular condition.

Over Speed protection: To set the effective operation speed range of the servo motor.

Position error range: To setup the accumulative inaccuracy of the driver, if the value is excessive, error code 9 will occur.

Note: For high friction system, the error code 9 may occur owing to KPP value is too small.

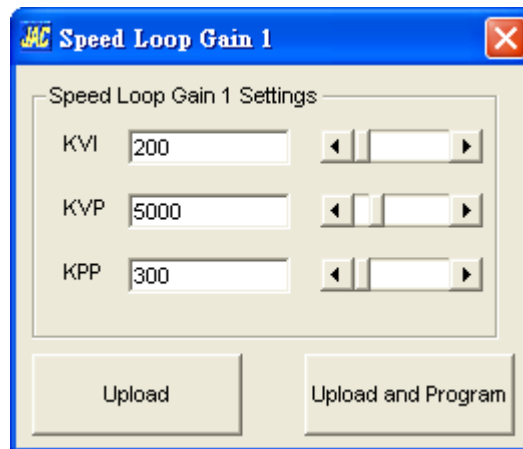
15.9 Advanced Parameters



There are 4 sub functions of Advanced Parameters

1. Speed Loop Gain 1
2. Speed Loop Gain 2
3. Monitor
4. Unit Conversion

15.10 Speed Loop Gain 1



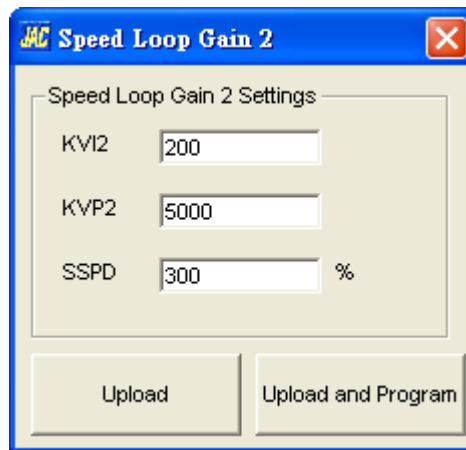
The KVI, KVP of speed loop gain 1 is used as the speed is higher than SSPD setting value.

KVI : Speed loop integral constant

KVP : Speed loop proportional gain

KPP : Position loop proportional gain

15.11 Speed Loop Gain 2



The KVI, KVP of speed loop gain2 is used as the speed is lower than SSPD setting value.

KVI : Speed loop integral constant

KVP : Speed loop proportional gain

SSPD : speed loop gain1 and speed loop gain2 switching level at speed of % rated speed

Note:

KVI: corresponds to the static stiffness of the speed loop, and is the inverse of the integral time constant of the speed compensator. A higher set value means a shorter integral time, and consequently a shorter response time is expected. This parameter is interrelated with KPP and should be tuned to induce no mechanical vibration.

Default value (130) Maximum value (32767)

KVP: corresponds to the dynamic response of the speed loop, and is the proportional gain of the speed compensator. This parameter should be tuned properly according to the load inertia, and the larger the KVI parameter is tuned, the shorter the rise time of speed response will be.

Default value (3000) Maximum value (32767)

KPP: corresponds to the dynamic response of the position loop, and is the proportional gain of the position compensator under the position operation mode. This parameter should be tuned properly dependent on the bandwidth of the internal speed loop, and the larger the KPP parameter is tuned, the shorter the rise time of position response will be.

Default value (300) Maximum value (32767)

The normal sequence for tuning servo gains is: KVP KVI KPP

The following figures show the measured waveform of Monitor voltage signal for different tuning results in the oscilloscope.

Tuning procedure for the speed loop.

1. Set all the Acceleration/Deceleration Time settings (T_a , T_d , T_{sa} , T_{sd}) to zeros in the “Speed Parameter” menu.
2. Set the Torque Filter Time Constant (TQCA) to zero in the “Torque Parameter” menu.
3. Set the initial value of KVI as zero and use the default value (3000) for KVP in the “Speed Parameter” menu.
4. Measure the I Monitor (torque monitoring signal, which can be selected in the “Common Parameter” menu) with CH1 in the oscilloscope and adjust the magnitude of the speed command. The speed command for the tuning procedure is of a step waveform and can be effectively generated by use of the Motor Hold function (CN1-16).

During the whole tuning procedure, keep watching the I Monitor signal and adjust the magnitude of the speed command accordingly so that the waveform of the I-Monitor signal is not saturated.

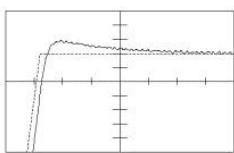
5. Measure the S Monitor (speed monitoring signal, which can be selected in the “Common Parameter” menu) with CH2 in the oscilloscope and the speed command (CN 1-1 or CN1-8) with CH3 in the oscilloscope. Slowly adjust the KVP parameter in the “Speed Parameter” menu. The adjustment should not stop until the rising slope of the S Monitor signal is close enough to the speed command and no oscillation appears along the S Monitor trace.

The steady state error normally appears because the KVI parameter is zero during this step.

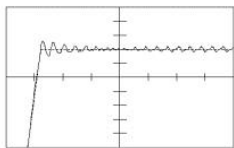
6. Slowly adjust the KVI parameter in the “Speed Parameter” menu with the default value (130) as a first trial guess. The adjustment should not stop until the settling time of the S Monitor signal is as short as possible while the overshoot of the S Monitor signal is less than 5 % (or 10%) and appears only once. No sustained oscillation is allowed after this adjustment.

Note1. If the servomotor is installed in a ball screw driven machine bed, take caution of the travel limits so that no collision may occur.

2. A well-tuned speed loop can guarantee the precision of machining and cut the job time as well. Make sure not to operate a servo drive that causes the machine bed oscillatory due to de-tuned gains.



The overshoot is large due to high KPP or KVP. Try to reduce KVP or KPP.

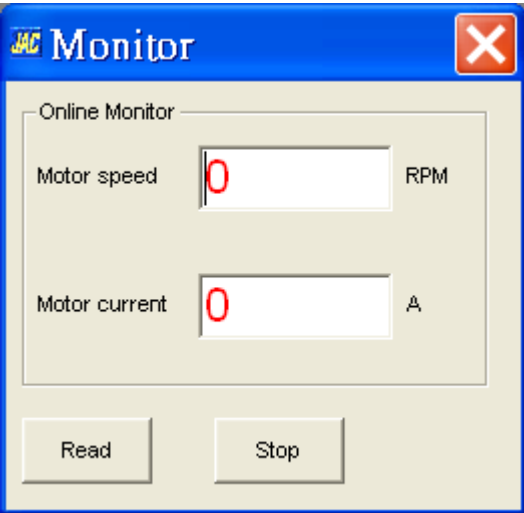


The system is oscillatory due to high KVI. Try to reduce KVI.



The system is tuned properly.

15.12 Online Monitor

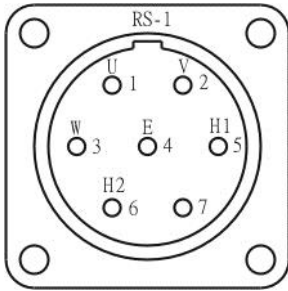


Use Read button to read the under monitoring data and stop to exit.

16. Alarm display table

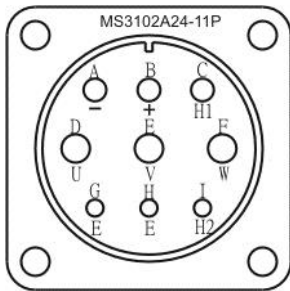
Status Display		Description	Solution
0	READY	Servo system is ready. The main power cable and the encoder cable from the servomotor are connected correctly.	The servomotor can start a normal operation
1	OC	An abnormally big instantaneous current triggers the OC alarm. The Machine will stop.	Check whether the load exceeds the rated value, any main circuit component is damaged, or output is short-circuited.
2	OV	An abnormally high DC Bus voltage due to too heavy load inertia or frequent dynamic braking triggers the OV alarm. The machine will stop.	Check whether the load inertia is over the specification and take into consideration an extra regenerative braking resistor.
3	OL	An over 150% rated load lasting for one minute triggers the OL alarm. The machine will stop.	Check the reason of overload.
4	OH	The temperature over 135° in the servomotor winding or over 85° in the heat sink of the servo drive triggers the OH alarm. The machine will stop.	Check the ambient temperature and the ventilation condition.
5	OS	An over 120% of the rated servomotor speed triggers the OS alarm The Machine will stop.	Check whether the speed command exceeds the allowable value or the load is over the specification.
6	EE	A broken encoder wiring or an incorrect wiring of the UVW feedback signals triggers the EE alarm. The machine will stop.	Refer to the wiring diagram and check the wiring again.
7	LPF	Internal power supply of logic block failure.	Send back to repair.
8	RESET	The servo drive control system is reset.	The system will start again after the alarm is cleared.
9	OVF	An overflow of the position tracking error triggers the OVF alarm. . The machine will stop.	Check whether the load is over the specification or the frequency of position pulse command is too high.

17. Connector pin assignments diagram



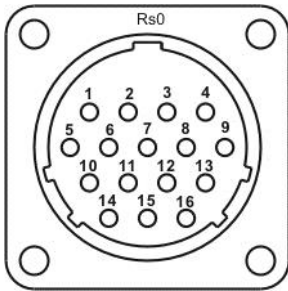
RS1

1	2	3	4	5	6
U	V	W	E	H1	H2



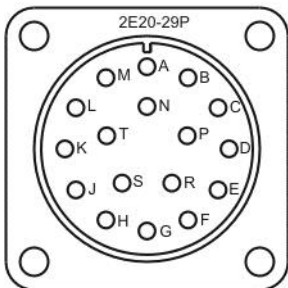
MS3102A24-11P

A	B	C	D	E	F	G	H	I
-	+	H1	U	V	W	E	E	H2



Rs0 and D-15P Pin Table

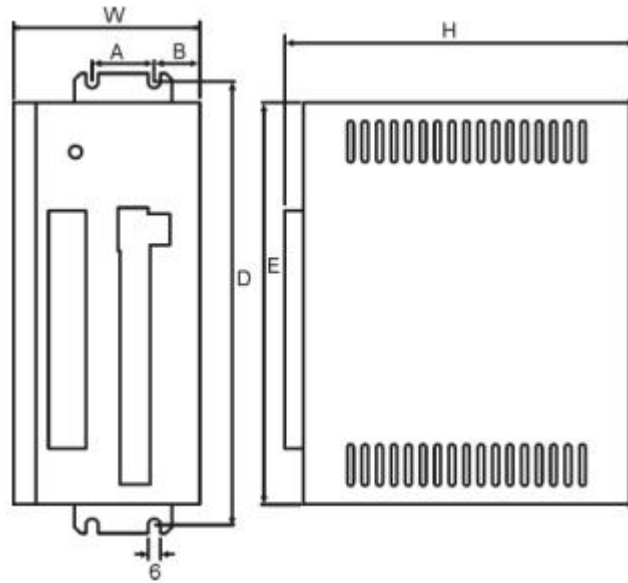
Rs0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
signal	green	White	grey	White	yellow	White	red	black	brown	White	orange	White	blue	White	shielding	NC
		green		grey		yellow				brown		orange		blue		
	A	/A	B	/B	C	/C	+5V	0V	U	/U	W	/W	V	/V		
D-15P	1	2	3	4	5	6	13	14	7	8	9	10	11	12	case	



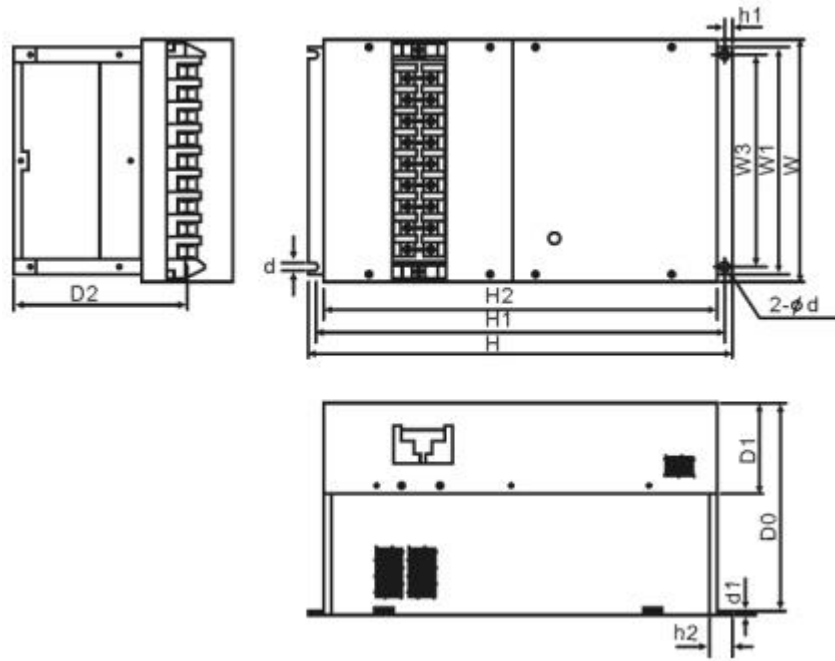
2E20-29P and D-15P Pin Table

2E20-29P	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T
signal	green	White	grey	White	yellow	White	red	black	brown	White	orange	White	blue	White	shielding	NC	NC
		green		grey		yellow				brown		orange		blue			
	A	/A	B	/B	C	/C	+5V	0V	U	/U	W	/W	V	/V			
D-15P	1	2	3	4	5	6	13	14	7	8	9	10	11	12	case		

18. Servo drive dimension



Model	Dimension (mm)						Weight (kg)
	A	B	D	E	W	H	
YPV-040	30	23	212	195	90	168	1.9
YPV-055							
YPV-075							
YPV-100	30	23	212	195	106	168	2.5
YPV-150							
YPV-200	30	23	256	239	106	168	3.4
YPV-300							
YPV-450							
YPV-600	30	38	256	238	139	173	3.9



Model	Dimension (mm)												Weight (kg)	
	W	W1	W3	H	H1	H2	h1	h2	D0	D1	D2	d		d1
YPV-750 YPV-860 YPV-1100 YPV-1500	270	253	235	460	445	429	7.5	2.5	300	100	185	10	2.3	18.6
YPV-2200 YPV-3000	440	419	275	685	660	629.5	15	30	360	170	205	12	2	

19. Regenerate brake resistor selection guide

Model (Motor Wattage)	Resistance (Ohm)	Power Rating
400W	100	80
550W-1KW	100	80
1.5KW-2KW	60	150
3KW	60	150
4.5KW	30	300
6KW	30	300
8.6KW	15	600
11KW	10	800
15KW	5	1500
22KW	5	1500
30KW	2.5	3000

The resistance can be parallel or series to get a closed value.

20. Wiring of MPC3024 wiring board to Mokon driver

Wiring of MPC3024 wiring board to Mokon driver						
Device	Name	Pin no.	wire color	pin no.	Name	Device
MPC3024 DIN wiring board (high density D-type 26 pin male)	+5Vo	1				Mokon driver CN1 (D-type 37 pin Female)
	EZ-	2		24	/Z	
	EZ+	3		23	Z	
	EXTG	4		5	24G	
	CW-	5		27	-PPCMD	
	EXTG	6				
	INP	7		18	INP	
	EXTG	8				
	EXTG	9				
	+5Vo	10				
	EB-	11		22	/B	
	EB+	12		21	B	
	EXTG	13		5	24G	
	CW+	14		26	+PPCMD	
	CCW-	15		29	-NPCMD	
	EXTG	16		5	24G	
	ALM	17		10	ALM	
	ERC	18		16	HOLD	
	+24V	19				
	EA-	20		20	/A	
	EA+	21		19	A	
	EXTG	22		31	DGND	
	CCW+	23		28	+NPCMD	
	EXTG	24		5	24G	
	SRDY	25				
	SVON	26		6	SON	

21. Appendix

YPV RS232-USB Connector

USB Connector			D-TYPE 9PIN
Name	Pin No.	Wire Color	Pin No.
VCC	1		
TX	2	White	2
RX	3	Green	3
GND	4	Black	4,5,6,7,8

Supplemental to new error codes:

A	LV	A lower than 240V DC Bus triggers the PF alarm. The machine will stop.	Check whether the AC Mains voltage is too low or the filtering capacitor in the main circuit is damaged. Use 3 ϕ AC power for the servo drive over 550W.
b	FO	Fuse open	Fuse burnt, maybe some component short or failure. Send back to repair.
c	PME	Internal power supply to power module drive circuit failure.	Send back to repair.
d	AVE	Internal power supply to analog block failure.	Send back to repair.