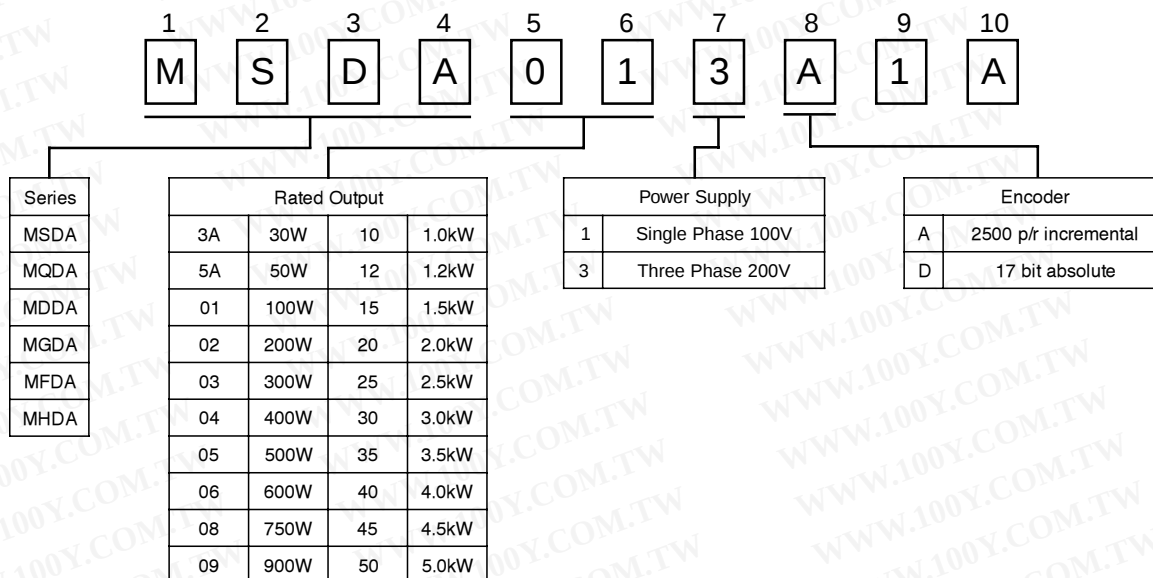


Explanation of Part Numbers



Driver Series Output

Series	30W	50W	100W	200W	300W	400W	500W	600W	750W	900W
MSDA	❖	❖	❖	❖		❖			❖	
MQDA			❖	❖		❖				
MDDA									❖	
MGDA					❖			❖		❖
MFDA						❖			❖	
MHDA							❖			

Series	1.0kW	1.2kW	1.5kW	2.0kW	2.5kW	3.0kW	3.5kW	4.0kW	4.5kW	5.0kW
MSDA	❖		❖	❖	❖	❖	❖	❖	❖	❖
MQDA										
MDDA	❖		❖	❖	❖	❖	❖	❖	❖	❖
MGDA		❖		❖		❖			❖	
MFDA			❖		❖		❖		❖	
MHDA	❖		❖	❖		❖		❖		❖

Design and specifications are subject to change without notice. Ask Panasonic for technical specifications before purchase and/or use.
 Whenever a doubt about safety arises from this product, please contact Panasonic immediately for technical consultation.

Basic Specifications

Input Power Source	Single Phase 100V		Main circuit Control circuit	AC100-115V ^{+10%} / _{-.15%} 50/60Hz
	Three phase 200V		Main circuit Control circuit	AC200-230V ^{+10%} / _{-.15%} 50/60Hz
	Allowable frequency fluctuation			Max. ±5%
Control System				IGBT PWM Control (Sine wave control)
Feedback Encoder	Incremental		2500 pulse per revolution - 11 wires	
	Absolute		17 bit - 7 wires	
Standard Functions	Regenerative Discharge		Built-in - Use an external resistor if the built-in resistor is not large enough	
	Dynamic brake		Activated at following conditions: 1) Main power OFF 2) Servo-OFF 3) Servo-alarmed 4) INH signal-ON	
	Electronic gear (Scalar of pulse command)		Formula as shown: $\frac{1 \text{ to } 10000 \times 2^{0 \text{ to } 17}}{1 \text{ to } 10000}$	
	Scale of feedback pulse	Incremental	1-2500 pulse per revolution	
		Absolute	1-16384 pulse per revolution	
Protective Functions				1) Undervoltage 2) Overvoltage 3) Overcurrent 4) Overheat 5) Overload 6) Overspeed 7) Regenerative discharge 8) Encoder error 9) Position error 10) Command pulse scaler error 11) Error counter overflow 12) EEPROM data error 13) Overtravel inhibit input error 14) Absolute system down error
Monitor	Digital display		6 digits - 7 segment LED	
	Analog output		Speed monitor: 6V / 3000rpm Torque monitor: 3V / 100% Position error pulse number	
Setting	Communication		RS232C and RS485 (Max. link up to 16 drives)	
	Touch panel keys		MODE , SET , UP , DOWN , LEFT	
Position Control	Max. input pulse frequency		500kpps / Line driver 200kpps / Open collector	
	Type of command		Quadrature pulse command CW/CCW command Step/direction command	
Speed control	Speed control range		1:5000	
	Acceleration/deceleration settling time		0-10 sec. / 1000rpm Individual acceleration/deceleration "S" curve acceleration/deceleration	
	Analog velocity command input		0±10V	
	Internal velocity command		Four speeds can be set	
Torque Control	Analog torque command input		0±10V	
	Torque limit command		Individually set to CW and CCW direction.	
	Torque command signal		SPR/TRQR with Position/Torque control mode or Torque control mode CCWTL/TRQR with Speed/Torque control mode 3V/rated torque as default	
Encoder Signal Output	A/B phase		Line driver output	
	Z phase		Line driver and Open collector output	
Physical Mounting				Front or back panel mounting
Environment	Ambient temperature		0-55jC	
	Ambient humidity		90% or less (No condensing)	
	Vibration		5.9m/s 2 (0.6G or less) at 10-50Hz	
Frequency Response				500Hz (at JL=JM)

Panasonic

Minas A Series Digital AC Servo Motors & Drivers

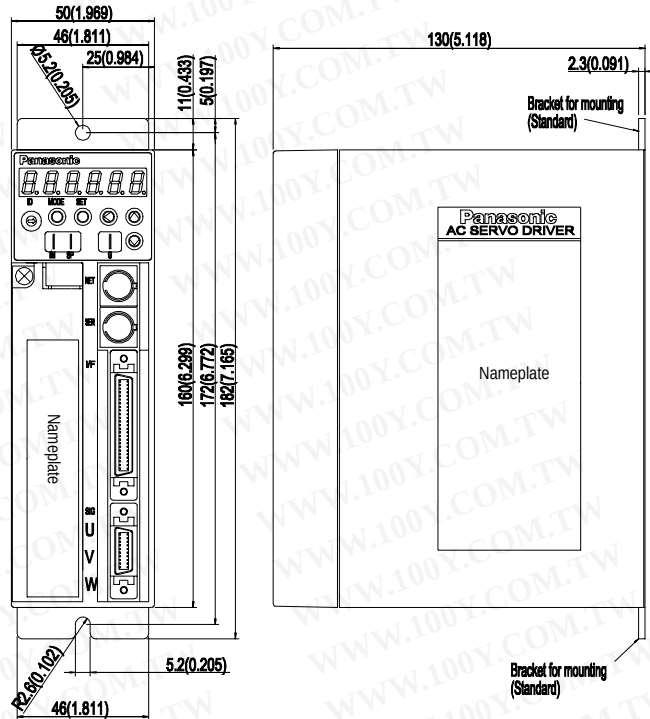
A Series Drivers

Dimensions

Units: mm(in)

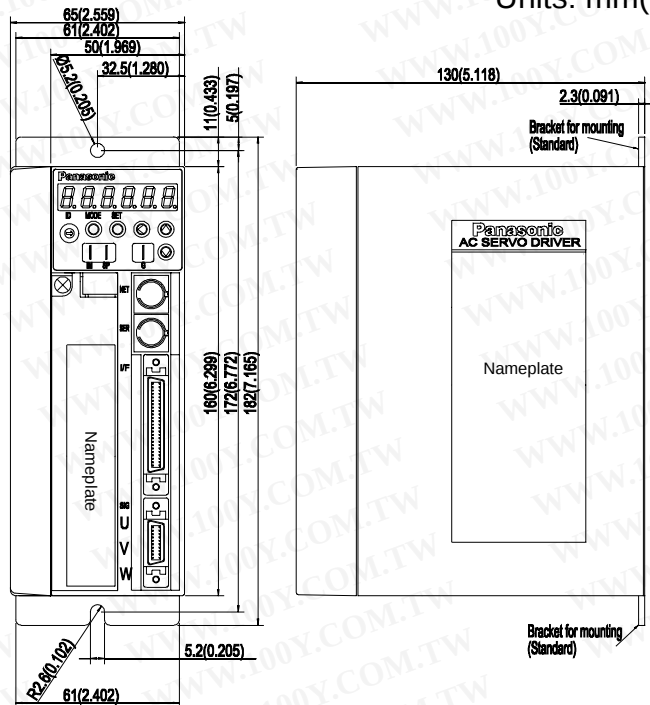
Model Number		Output / Power
MSDA	3A1	30W / 100V
	3A3	30W / 200V
	5A1	50W / 100V
	5A3	50W / 200V
	011	100W / 200V
	013	100W / 200V
MQDA	023	200W / 200V
	011	100W / 100V
	013	100W / 200V
	023	200W / 200V

Weight: 1.0 kg / 2.21 lb.



Model Number		Output / Power
MSDA	021	200W / 100V
	043	400W / 200V
MQDA	021	200W / 100V
	043	400W / 200V

Weight: 1.1 kg / 2.43 lb.

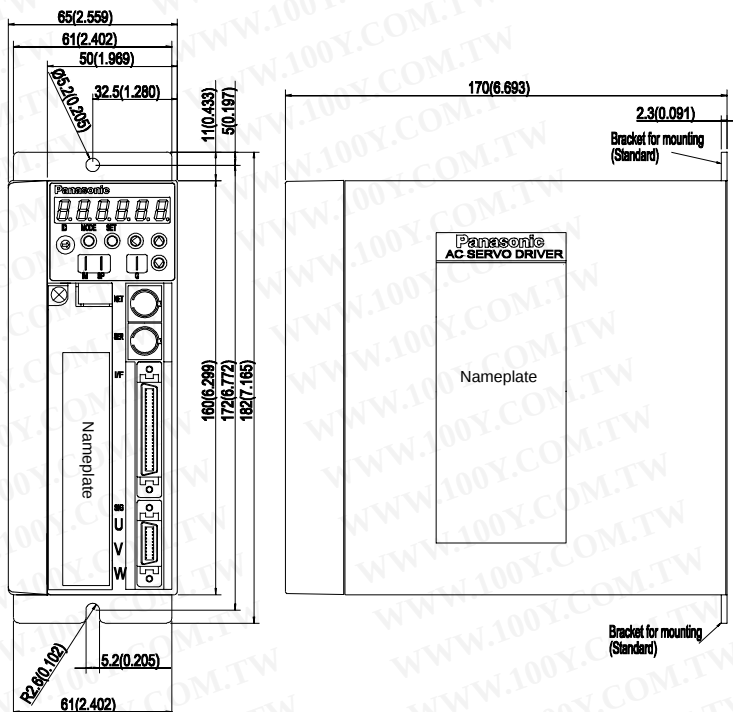


Panasonic

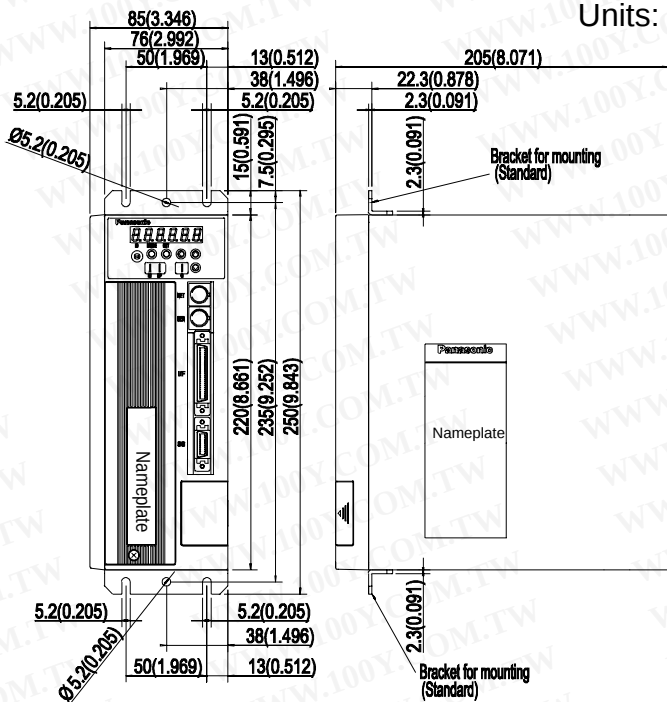
A Series Drivers

Units: mm(in)

Weight: 1.4 kg / 3.09 lb.



Weight: 3.8 kg / 8.38 lb.

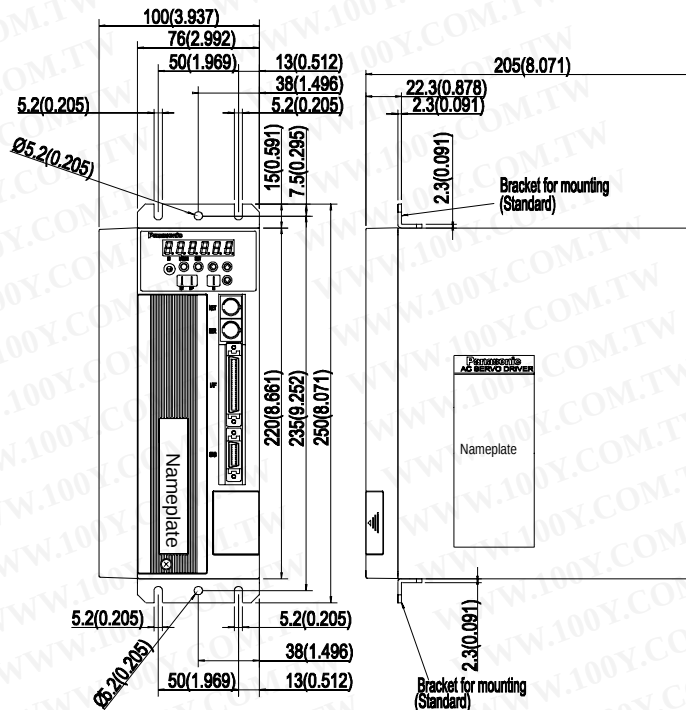


Dimensions

Units: mm(in)

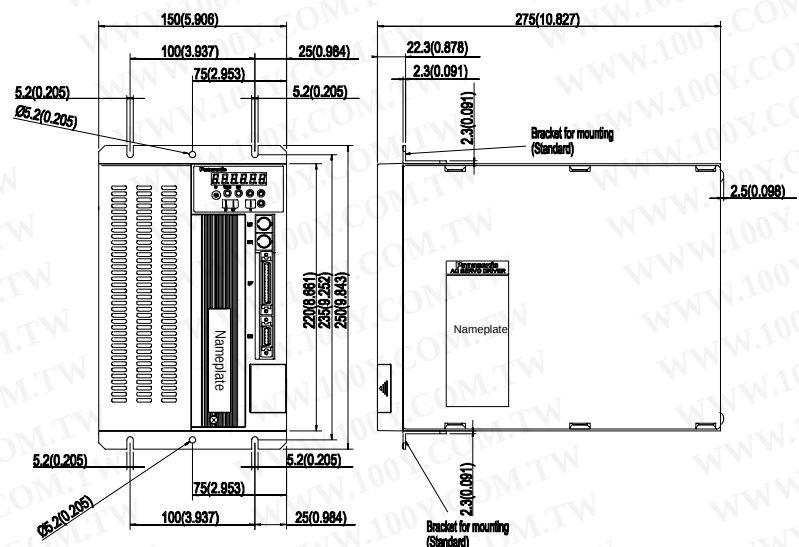
Model Number		Output / Power
MSDA	203	2.0kW / 200V
	253	2.5kW / 200V
MDDA	203	2.0kW / 200V
	253	2.5kW / 200V
MFDA	253	2.5kW / 200V
MGDA	123	1.2kW / 200V
MHDA	203	2.0kW / 200V

Weight: 4.2 kg / 9.26 lb.



Model Number		Output / Power
MSDA	303	3.0kW / 200V
	353	3.5kW / 200V
	403	4.0kW / 200V
	453	4.5kW / 200V
	503	5.0kW / 200V
MDDA	303	3.0kW / 200V
	353	3.5kW / 200V
	403	4.0kW / 200V
	453	4.5kW / 200V
	503	5.0kW / 200V
MFDA	353	3.5kW / 200V
	453	4.5kW / 200V
MGDA	303	3.0kW / 200V
	453	4.5kW / 200V
MHDA	303	3.0kW / 200V
	403	4.0kW / 200V
	503	5.0kW / 200V

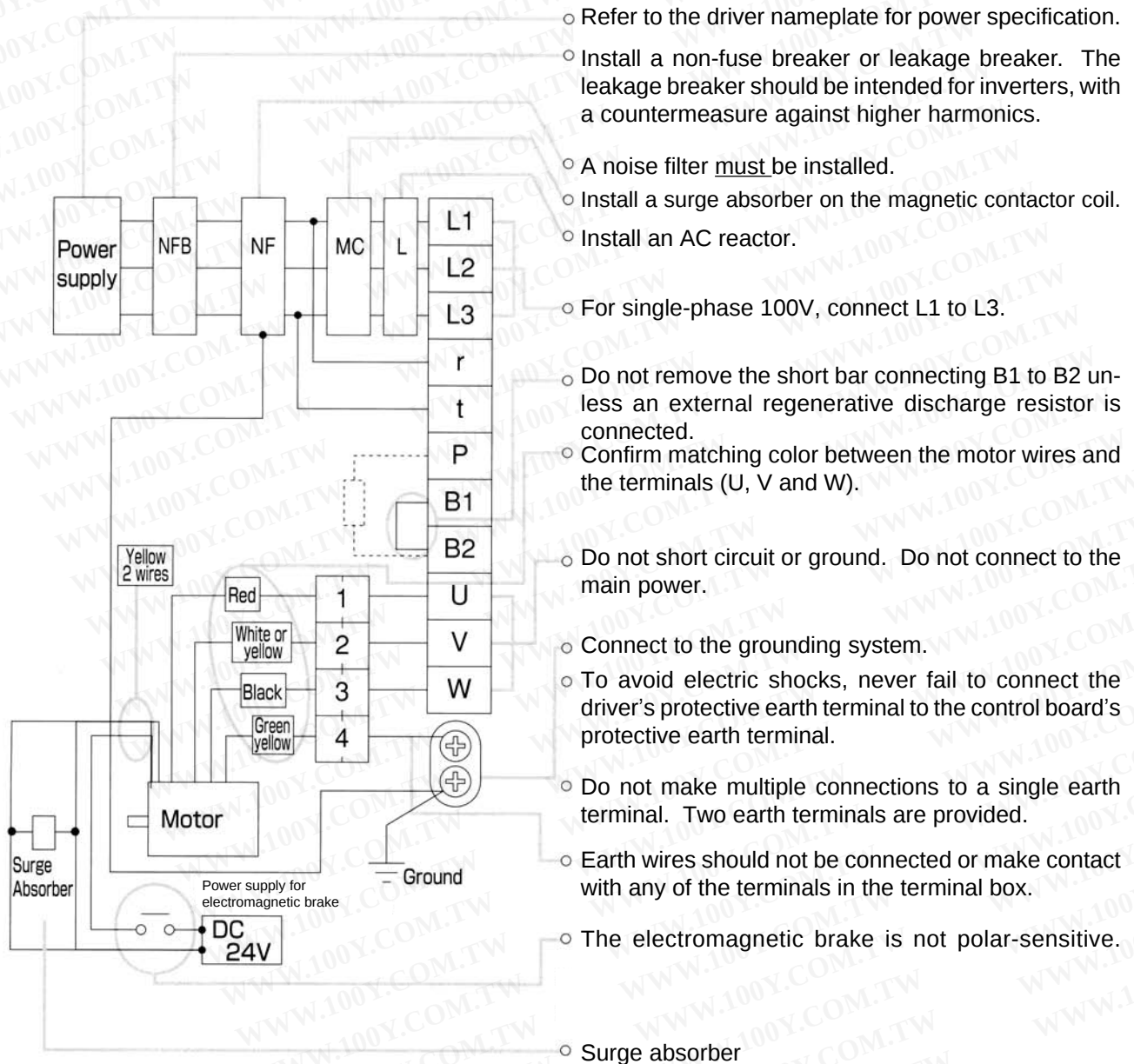
Weight: 8.0 kg / 17.64 lb.



Wiring Diagram - Main Circuit

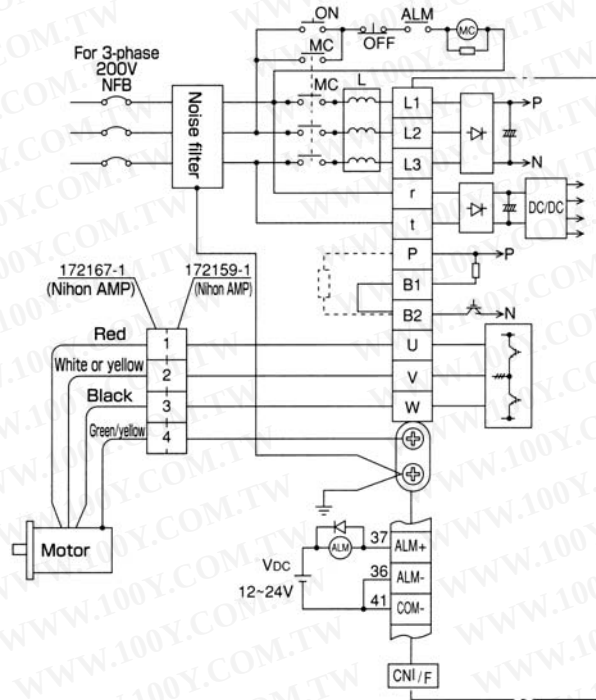
WARNING! To avoid electric shock do not turn on the main power until wiring is completed.

- 1) Detach the terminal block by removing the cover screw.
- 2) Make necessary connections using clamp terminal connectors with an insulation cover.
- 3) Attach the terminal block cover and tighten the cover screw.

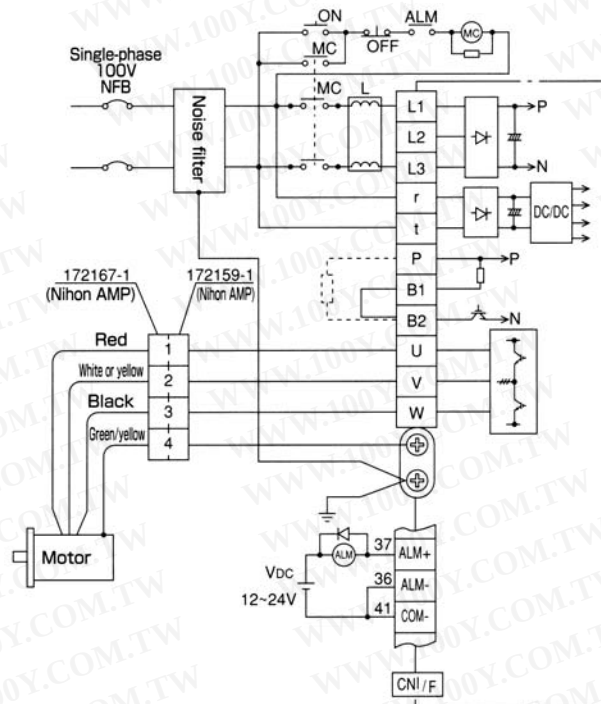


Wiring Diagram - Main Circuit

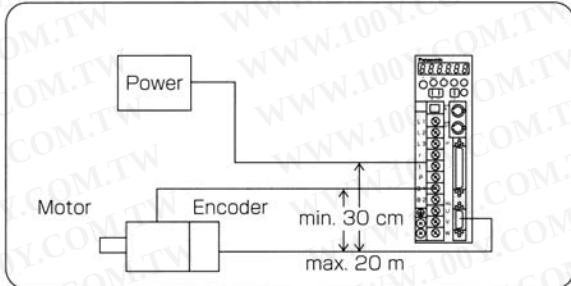
Three Phase 200V



Single Phase 100V

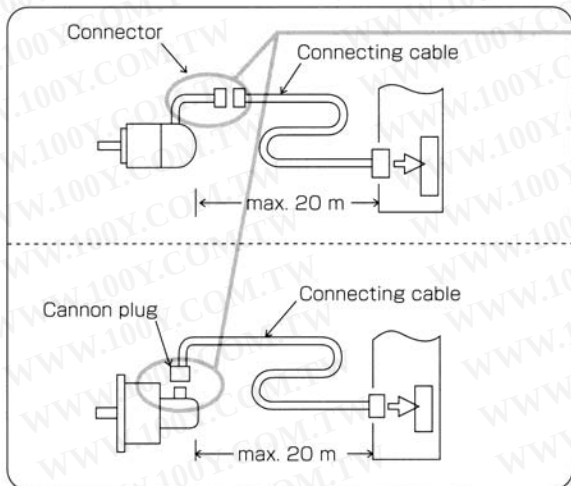


Wiring Instructions for CN SIG Connector



The cable length between the driver and the motor should be a maximum of 20m (65.62ft). If a longer cable is needed, contact your dealer or sales agent.

The wiring should be separated from the main circuit wires by at least 30cm (11.81in). Do not install these wires in the same duct as the mains or bundle them together with the mains.

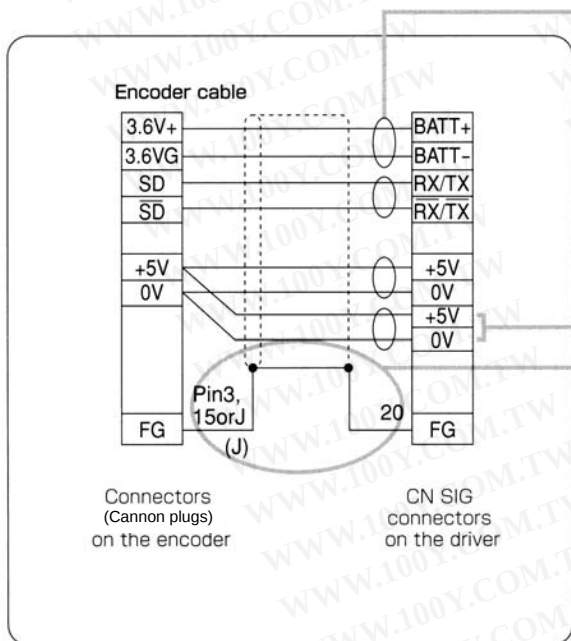


Depending on the motor model, there are two types of encoder wire terminations:

- Lead wire + connector and,
- Cannon plug.

When preparing your own connecting cables, contact Panasonic concerning optional parts for connectors and:

- 1) Follow the wiring diagram provided and,
- 2) Use wires of 0.18mm² (AWG24) or higher, shielded twisted-paired wire with enough bending durability.



- 3) Signal/power paired wires should be a twisted-paired type.

- 4) Shield:

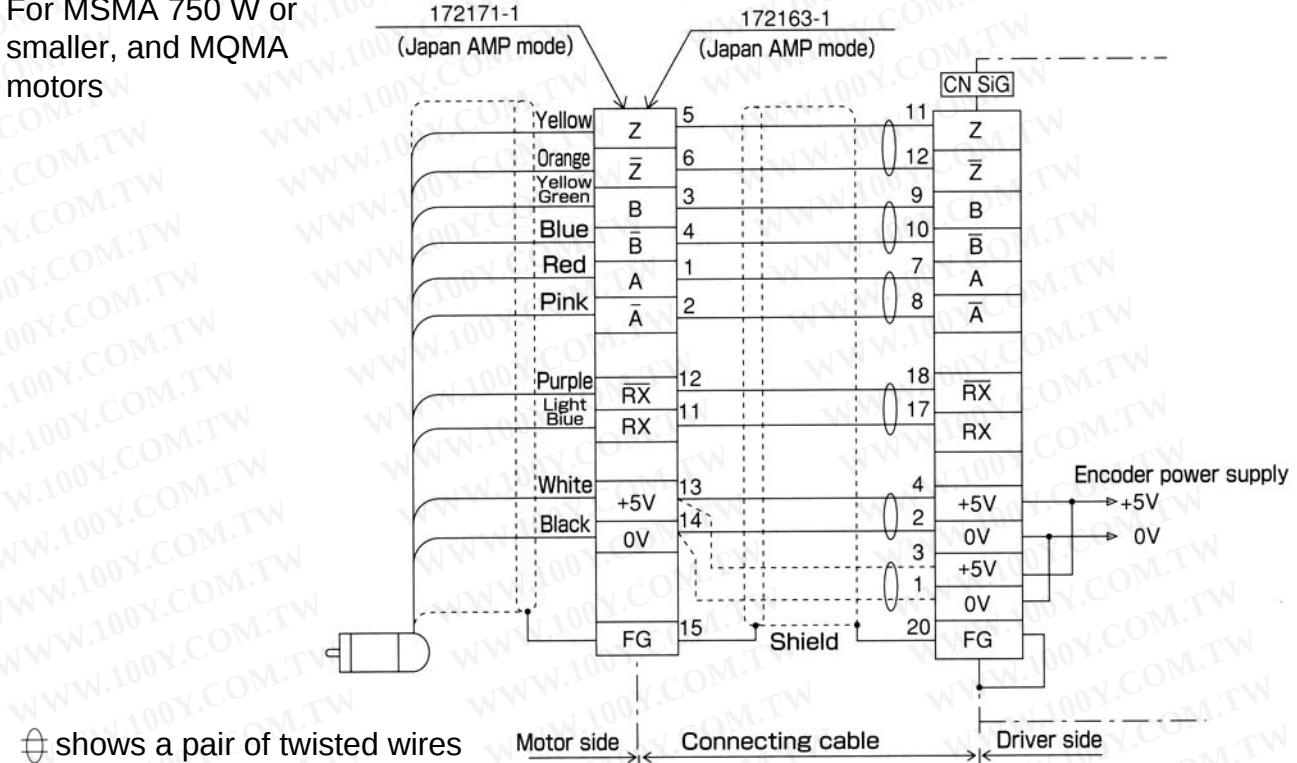
- The shield at the driver side should be connected to Pin 20 (FG) of CN SIG connector.
- The shield at the motor side should be connected to:
 - Pin 3 (for AMP 9 pin connectors)
 - Pin 15 (for AMP 15 pin connectors)
 - J-pin (for Cannon plug connectors)

- 5) If the cable is longer than 10m (32.81ft), the encoder power line (+5V and 0V) should be dual, per the figure shown to the left.

- 6) Other terminals should be left unconnected.

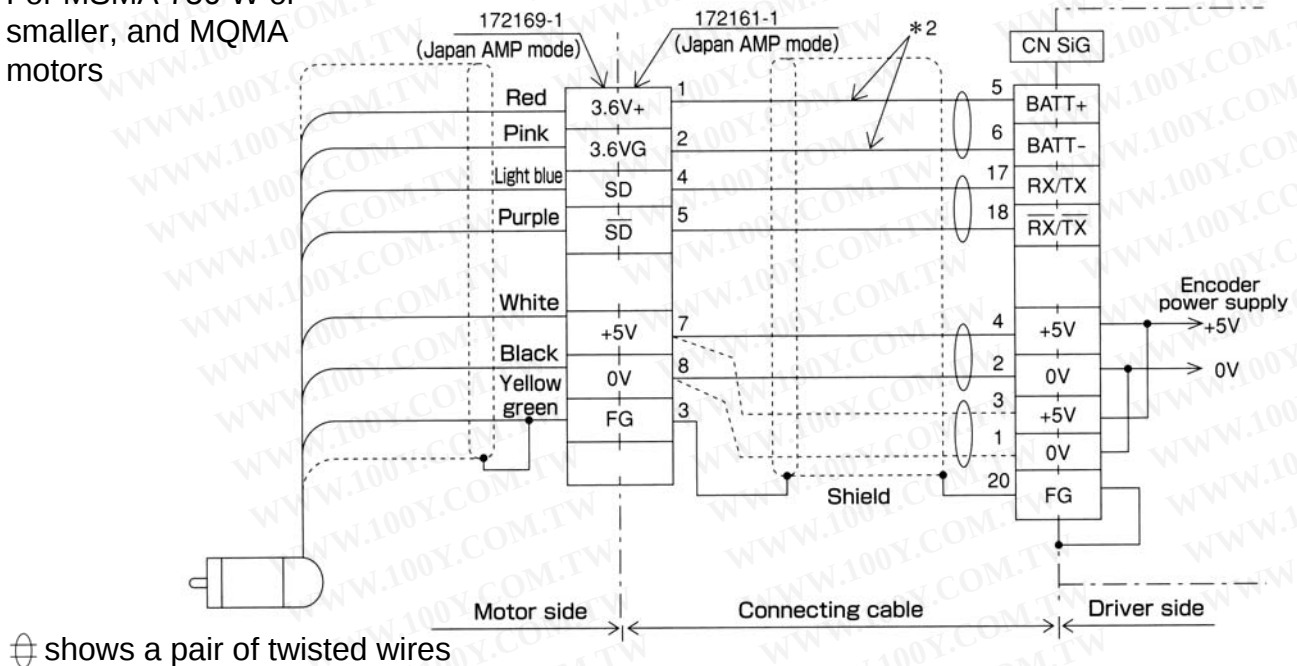
Wiring Diagram for CN SIG Connector - 2500 p/r Incremental

For MSMA 750 W or smaller, and MQMA motors

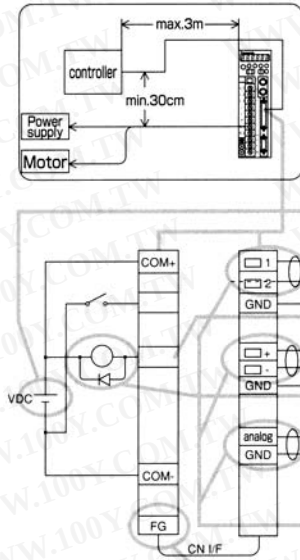


Wiring Diagram for CN SIG Connector - 17 bit Absolute

For MSMA 750 W or smaller, and MQMA motors



CN I/F Connector Wiring Instructions



Place peripheral devices, such as the controller, a maximum of 3m (9.84ft) from the driver.

Keep the wiring a minimum of 30cm (11.81in) from the main circuit wires. Do not install these wires in the same duct as the mains or bundle them together with the mains.

Control power (VDC) between COM+ and COM- should be supplied by the customer (recommended voltage: +12VDC to +24 VDC).

Control signal output terminals can accept a maximum of 24V or 50mA. Do not apply voltage or current exceeding these limits.

If a relay is activated using the control signal, install a diode in parallel to the relay as shown. Without a diode installed in the proper direction, the driver will be damaged.

Use a shielded twist-paired type of wire for pulse input, encoder signal output, or analogue command input.

The Frame Ground (FG) is connected to an earth terminal in the driver.

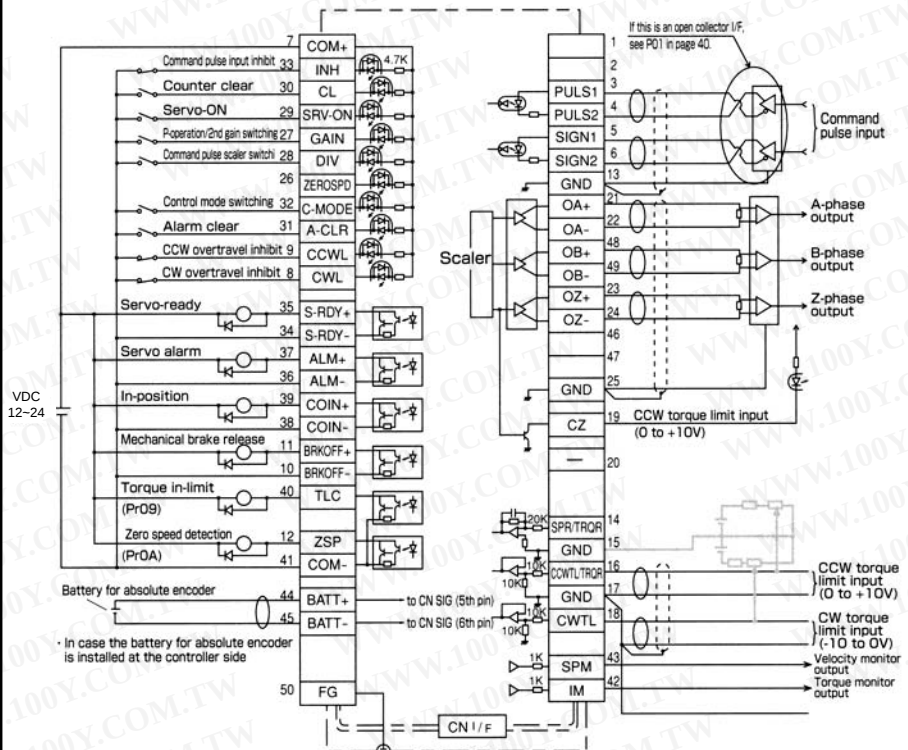
Connector Specifications

Driver Receptacle:
10250-52A2JL

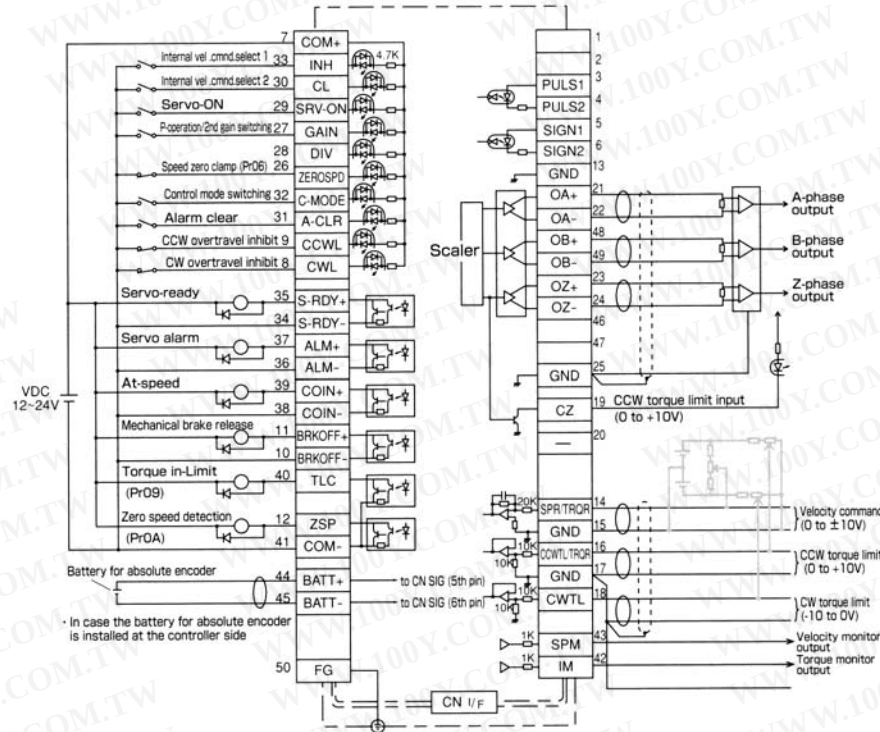
Connector to Controller:
 - Solder type plug
 Part # 10150-300VE
 - Shell
 Part # 10350-52A0-008

Manufacturer:
Sumitomo 3M

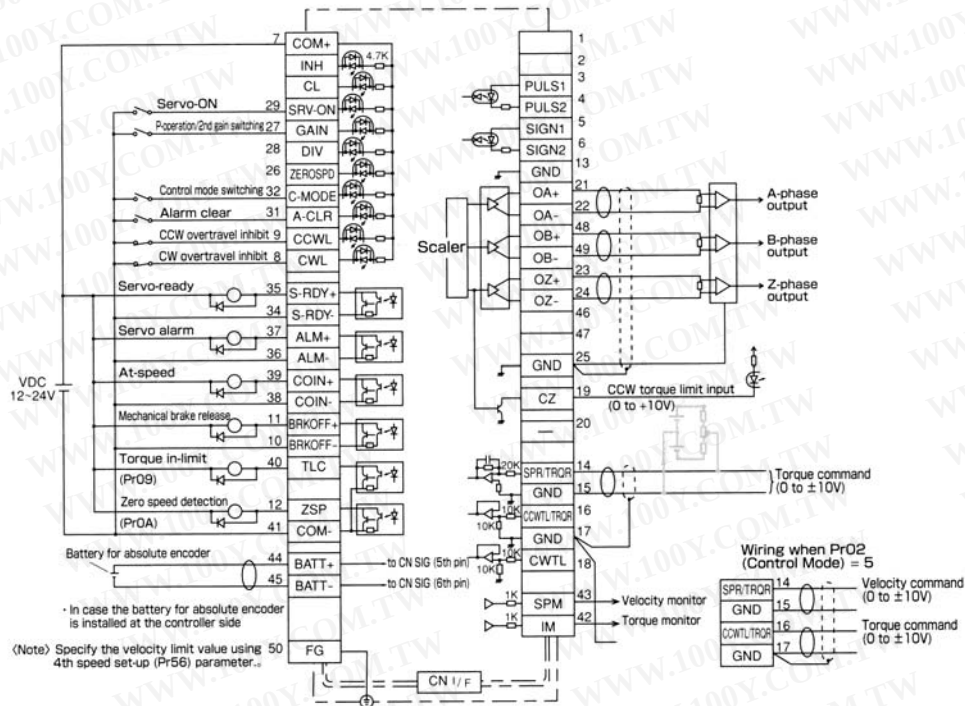
CN I/F Connector - Wiring for Position Control



CN I/F Connector - Wiring for Speed Control Mode



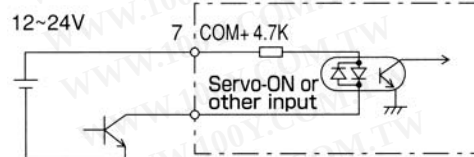
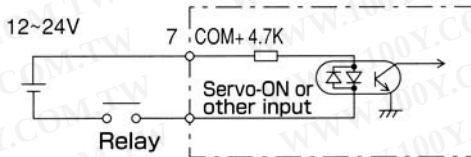
CN I/F Connector - Wiring for Torque Control Mode



Input Interface Circuit

SI - Connecting to Sequence Input Signals

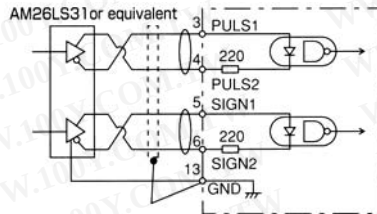
- Connect to the contacts of the switch and relay, or to a transistor of an open collector output.
- Use a switch or relay for micro current to avoid insufficient contact.
- The lower limit of the power supply (12 - 24V) should not be less than 11.4V in order to secure the appropriate level of primary current in the photo coupler.



PI - Command Pulse Input Circuit

Line Driver I/F

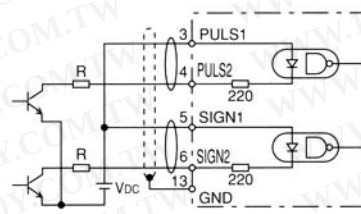
- This is a good signal transmission method that is less sensitive to noise. We recommend you use this method to maintain the reliability of signals.



⊕ shows a pair of twisted wires

Open Collector I/F

- Uses an external control power supply (VDC).
- Requires a current-limiting resistor corresponding to the capacity of the VDC value.

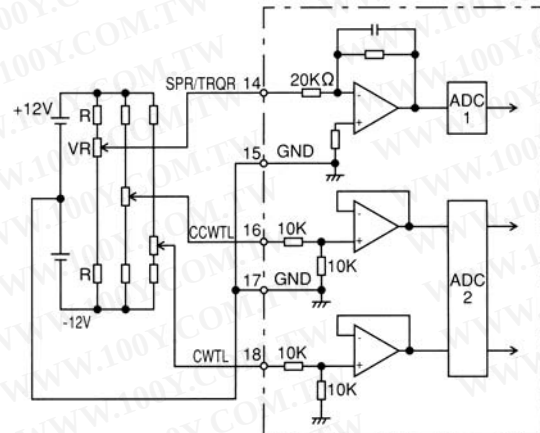


VDC	R Value
12V	1kΩ 1/4W
24V	2kΩ 1/4W

$$\frac{VDC - 1.5}{R + 220} \approx 10mA$$

AI - Analog Command Input

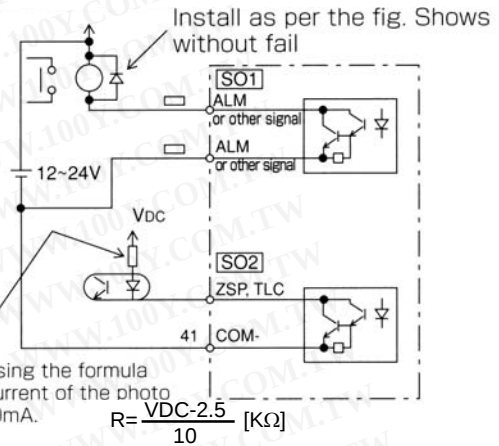
- There are three analog command inputs of SPR/TRQR (14 pins), CCWTL (16 pins) and CWTL (18 pins).
- The maximum permissible input voltage is $\pm 10V$. See the figure for input impedance.
- If you make a simplified circuit comprising a variable resistor (VR) and resistor (R), refer to the figure. When the variable range of each input is $-10V$ to $+10V$, the VR should be a B-type resistor of $2k\Omega$ (min. $1/2 W$). The R should be 200Ω (min. $1/2W$).
- The A/D converters for these inputs should have the following resolution (including 1 bit for the sign):
 - ADC1 (SPR and TRQR) - 16 bits
 - ADC2 (CCWTL and CWTL) - 10 bits



Output Interface Circuit

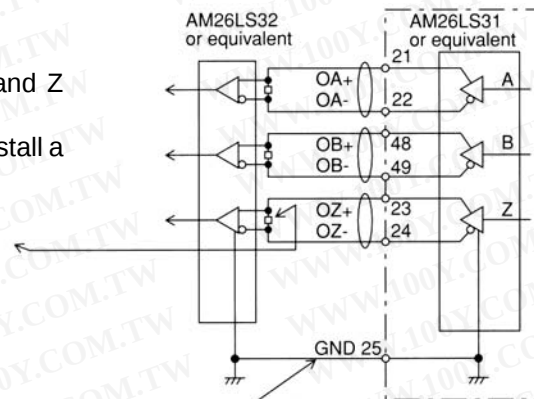
S01 S02 - Sequence Output Circuit

- Comprises a Darlington amplifier with an open collector connected to a relay or photo coupler.
- There is a collector-to-emitter voltage VCE(SAT) of approximately 1V at transistor ON, due to the Darlington connection of the output transistor. Note that normal TTLIC can not be directly connected since it does not meet the VIL requirement.
- This circuit has an independent emitter connection, or an emitter connection that is commonly used at the minus (-) terminal (COM-) of the control power.
- The maximum rating is 30V, 50mA.



P01 Line Driver (Differential) Output

- Provides differential output of encoder signals (A, B and Z phases) that come from the scalar.
- Receive these signals with line receivers. In this case, install a resistor of approximately 330Ω between the inputs.

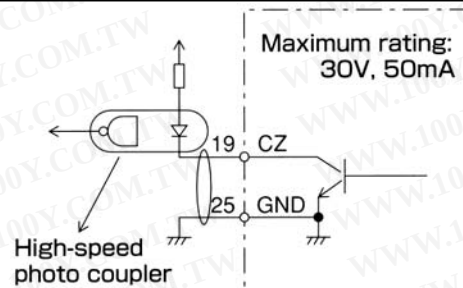


Connect the signal grounds between the controller and driver.

P02 Open Collector Output

- Outputs Z-phase signals among those from the encoder.
- Receive these signals with a high-speed photo coupler at controller side, since Z-phase signal width is normally narrow.

⊕ shows a pair of twisted wires

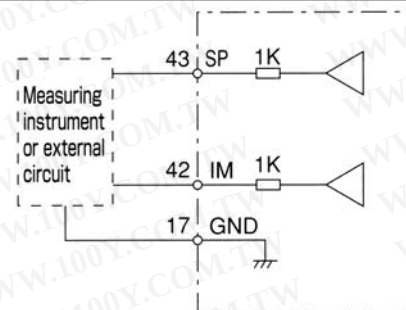


A0 Analog Monitor Output

- This output is the velocity signal (SP) or torque monitor signal (IM).
- The signal range is approximately 0 to ±9V.
- The output impedance is 1kΩ. Pay attention to the input impedance of your measuring instruments and external circuits connected.

Resolution

- Velocity monitor signal (SP): 8 r/min./LSB calculated from 6V/3000 r/min (pr07=3)
- Torque monitor signal (IM): 0.4%/LSB calculated from 3V/rated value (100%)



Driver Connector Configurations

Pin Assignment for CN I/F on Driver

26 ZERO SPD	28 DIV	30 CL	32 C- MODE	34 S- RDY-	36 ALM-	38 COIN-	40 TLC	42 IM	44 BATT+	46 NC	48 OB+	50 FG
27 GAIN	29 SRV- ON	31 A- CLR	33 INH	35 S- RDY+	37 ALM+	39 COIN+	41 COM-	43 SP	45 BATT-	47 NC	49 OB-	
1 NC	3 PULS1	5 SIGN1	7 COM+	9 CCWL	11 BRK- OFF+	13 GND	15 GND	17 GND	19 CZ	21 OA+	23 OZ+	25 GND
2 NC	4 PULS2	6 SIGN2	8 CWL	10 BRK- OFF-	12 ZSP	14 SPR/ TRQR	16 CCWTL/ TRQR	18 CWTL	20 NC	22 OA-	24 OZ-	

Pin Assignment for CN SIG on Driver - For 2500p/r Incremental Encoder

11 Z	13 NC	15 NC	17 RX	19 NC
12 Z	14 NC	16 NC	18 RX	20 FG (Shield)
1 0V	3 +5V	5 NC	7 A	9 B
2 0V	4 +5V	6 NC	8 A	10 B

Pin Assignment for CN SIG on Driver - For 17bit Absolute Encoder

11 NC	13 NC	15 NC	17 RX / TX	19 NC
12 NC	14 NC	16 NC	18 RX / TX	20 FG (Shield)
1 0V	3 +5V	5 BATT+	7 NC	9 NC
2 0V	4 +5V	6 BATT-	8 NC	10 NC