

## Generation II Driver Expansion Module-10PIN-1 Axis

### Basic Installation Instructions v1.1

Dear users, please go through the instructions in detail before installation. Also, please hand the manual to the actual operator of the machine and preserve it properly.

Drivers are precision electronic devices. For the safety of both operators and the machine, please make sure all the installation, tests and adjustments are operated by professional personnel. For the description with "DANGER", "WARNING" and "CAUTION" in the manual, please read them in detail. If there are any concerns, you may contact our branches in your region. Our professionals are glad to be at your service. Below are the guidelines you should comply with before you finish reading the whole manual:

- The installing environment should be indoor and without water vapor, corrosive or flammable gas.
- Implement the wirings according to the wiring diagram
- The grounding must be strictly implemented and follow the current National Electrical Code. (References: NFPA 70:National Electrical Code,2005 Ed.)  
Do not modify the wirings while the device is powered up.

#### 1. Safety Precautions

**Please pay extra attention to the instructions below while operating the product.**

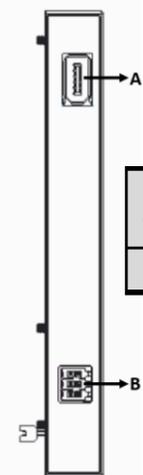
- Install the product by following the manual or it may cause damage to the equipment.
- Do not operate the product in facilities which are exposed to water vapor, corrosive or flammable gases, it might cause damage to the device, electric shocks, fire or explosion.
- Do not install the product in an environment that exceeds the temperature specifications, it might cause damage to the device or lead to malfunction.
- Do not touch the internal circuits or parts while the device is powered up, it might cause electric shocks or device damage.
- The internal circuit board of the controller contains CMOS ICs, which are vulnerable to static electricity field. Do not touch the circuit board with your hands before taking any precautions.
- The product is designed to be used in business environment.
- Do not apply the product to machines that might lead to casualties, device damage or system shut down.



	<ul style="list-style-type: none"> <li>■ Please cut off all the external device loads when powering up the driver for the first time in case the built-in testing program starts running the motor right after power input. It may be dangerous for the operators around.</li> <li>■ The driver is a precision instrument, do not disassemble the device unless you are the maintenance staff or an electrical control professional.</li> <li>■ Please apply the correct grounding loop to prevent signal errors.</li> <li>■ Please separate the signal cable of the driver from all the other motors and power cables to prevent the controller from malfunction caused by large noise interference.</li> </ul>
	<ul style="list-style-type: none"> <li>■ Please select a safe area to install the driver. The driver is designed with a microcomputer. Please keep the surroundings clean and avoid iron shavings, wires, water, corrosive gases and liquids from intruding into the driver, which might lead to malfunction.</li> <li>■ The storage temperature must be controlled between -20°C~60°C, the relative humidity must be controlled between 0% to 90% and without condensation.</li> <li>■ The operating temperature must be controlled between 0°C~55°C, please make sure there is an over 50mm width space reserved around the driver for ventilation and heat dissipation. If the ambient temperature exceeds 45 °C, please put the driver in a well-ventilated place or air-conditioning room.</li> <li>■ The grounding of the driver and machine tool system is a necessary protection to avoid leakage and the damage caused by the lightning strike. Please make sure the controller and machine tool system are grounded properly before the installation.</li> <li>■ The driver should be installed with a power system which meets the rated voltage. If the operating environment is providing an unstable voltage source, please apply a voltage stabilizer so the driver can function properly.</li> <li>■ Please turn off the power before plugging/unplugging or modifying the cables to prevent electric shocks and damage to the driver.</li> <li>■ Please make sure all the terminals are in the correct positions while wiring to prevent the driver from the damage caused by wiring mistakes.</li> <li>■ Do not touch the terminals within 10 minutes after cutting off the power, the residual voltage may cause electric shock.</li> </ul>

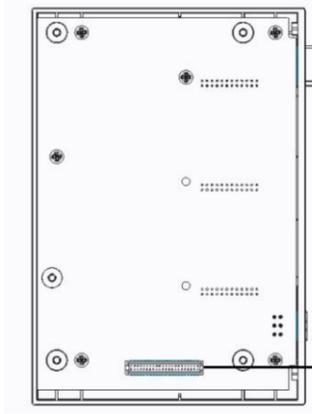
#### 2. Interface Instructions

(Front View)



A	Encoder Feedback	Able to connect with motor encoder or serial encoder feedback.
B	RTD connector	Able to connect with motor thermistor

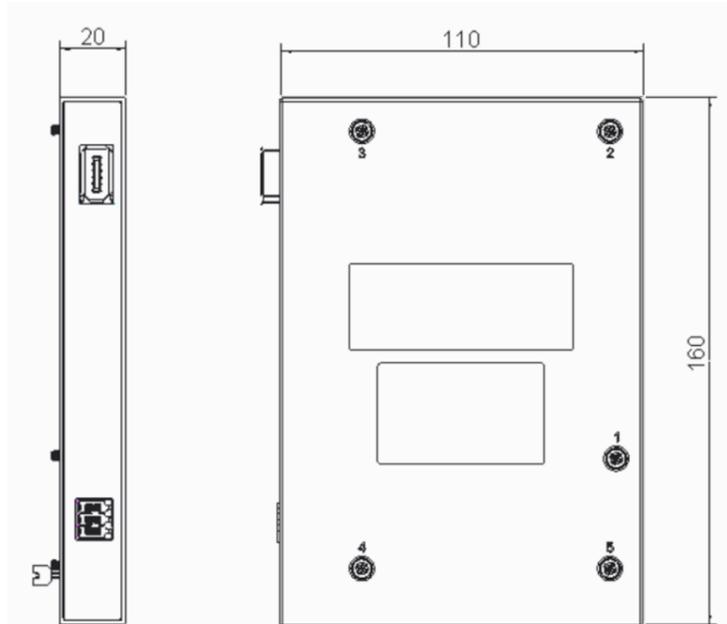
(Side View)



A	Internal Communication Port (Left Side)	Connect with other drivers for communication
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#### 3. Mechanism Specifications: (Unit : mm)

(Front View)



#### 4. Installation Procedure

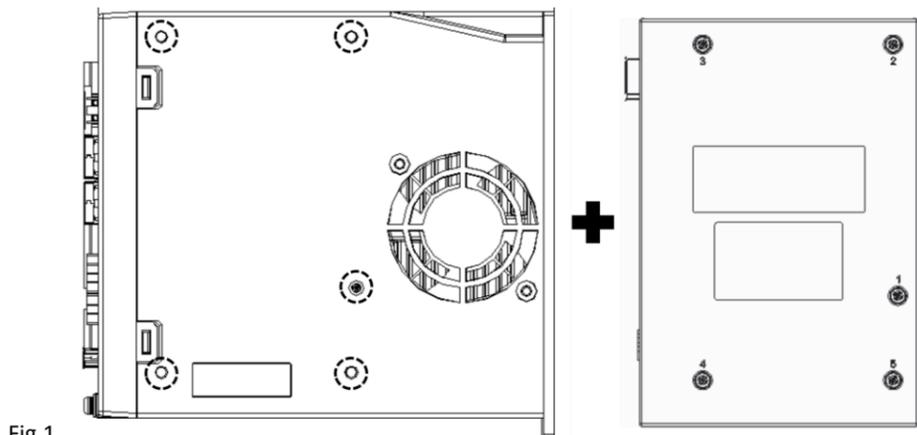


Fig.1

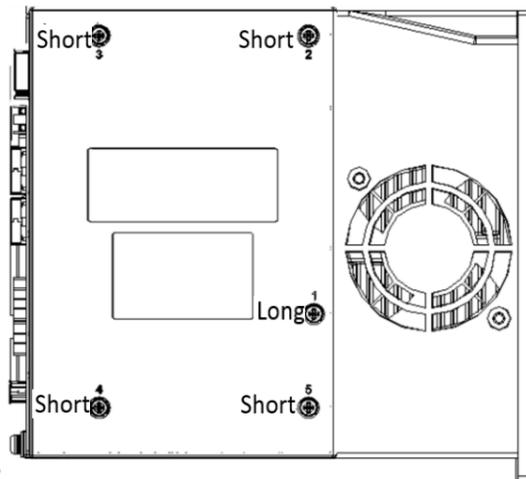


Fig.2

- Remove the dust plug on the right side of the driver. Then align and connect the pin on the left side of the expansion card with the socket on the right side of the driver. (Fig.1)
- Lock the long screw (round head nickel-plated screw 3\*10) in hole 1, then lock the 4 short screws (round head nickel-plated screw 3\*5) in hole 2~5 (Fig.2) and the assemble is finished. Torque: 5kgf·cm

## 5. Interface Definition

Please be careful with the voltage value and the polarities.

- Expanded Controller Feedback (ENC+1)

ENC+1	PIN	SIGNAL	PIN	SIGNAL
	1	VDD	2	GND
	3	A+	4	A-
	5	B+	6	B-
	7	Z+	8	Z-
	9	BAT+	10	BAT-

- Applied to the listed serial encoders: Syntec / Tamagawa / Nikon / Feetdat

ENC+1	PIN	SIGNAL	PIN	SIGNAL
	1	VDD	2	GND
	3	Data+	4	Data-
	5	-	6	-
	7	-	8	-
	9	BAT+	10	BAT-

- Applied to the listed serial encoder: Biss C / Endat

ENC+1	PIN	SIGNAL	PIN	SIGNAL
	1	VDD	2	GND
	3	Data+	4	Data-
	5	CLOCK+	6	CLOCK-
	7	-	8	-
	9	BAT+	10	BAT-

- RTD thermistor connectors:

Illustration	PIN	SIGNAL	PIN	SIGNAL
	2	RTD1-	1	RTD1+
	4	RTD2-	3	RTD2+
	6	RTD3-	5	RTD3+

## 6. Wiring Notifications

- When using the solenoid valve or other inductive loads, please apply an arc extinguisher or RC voltage dependent resistor RC to ensure the life of the contact points. Advantages of arc extinguisher

- 1) Extend the life of electrical contacts
- 2) Reduce the sparks from the contact points
- 3) Prevent the inductive loads from interferences caused by back EMF
- 4) Restrain the impulse voltage

- Do not connect a cable with other cables to extend the length. It might cause signal error or malfunction.

- Please crimp or weld the wire connections while doing the wirings.

- If the server line you are using is not a standard Syntec cable, please check all the terminals and make sure they are connected properly before running a test. Wrong wirings will lead to errors of controller command output and malfunctioning.

- The output capacity of encoder connector +5V is 500mA. It is only used by a single encoder. Do not connect other loads. Otherwise, it may cause malfunction due to insufficient driving capability.

- Do not use counterfeit terminal strips. Those terminal strips can't provide overall protection of the system. The quality is also not guaranteed and prone to cause electrical control problems of the machine tools.

- The wiring between the driver and the motor cannot be too tight.

- Do not put heavy objects on the driver.

- The six power lines, R, S, T and U, V, W, should not be near to other signal lines. It's suggested to be at least 30 cm apart from them.

- If it's needed to extend the encoder connections, please use twisted-pair signal cable equipped with isolated ground. Do not extend it over 20 meters. In the case of extension more than 20 meters, please use the signal cable with double wire diameter to reduce signal attenuation.

- The drive is fragile and shall be treated carefully.
- Do not put conductive objects such as metal chips, screws or combustible materials such as oil in the driver.
- Please connect the ground wire to class-3(under 100Ω). Poor grounding might cause signal error, electric shock or fire.
- The grounding of the motor must connect to one of the grounded terminals of the frequency converter.
- According to regulation EN 61800-5-1 (Section 4.3.5.5.2), since the normal contact current of the frequency converter is above 3.5 mA AC or 10 mA DC, it should be connected with a fixed protecting grounding:

- 1) The cross-sectional area of the protecting grounding wire should be at least 10mm<sup>2</sup> with copper or 16mm<sup>2</sup> with Aluminum.
- 2) Automatic power break when the protecting grounding conductor is cut off or
- 3) Change a spare protecting grounding conductor with the same cross-sectional area as the original one.

- Ground wire description:

- 1) The size of the ground wire is as specified in the technical reference of the electrical equipment. The ground wire is better to be as short as possible.
- 2) The ground wire of driver must not be grounded together with high current loads such as electric welders and high horsepower motors.
- 3) When the driver is grounded together with multiple electronic control devices, please refer to the following figure, and remember not to form a ground loop :

