BO1-FC-32-03

FC DI32/DO32 Module

Basic Installation Instructions V1.5

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

CNC controllers are precision electronic devices. For the safety of both operators and the machine, please ensure all installations, 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, please contact our branches in your region. Our professionals are glad to be at your service.

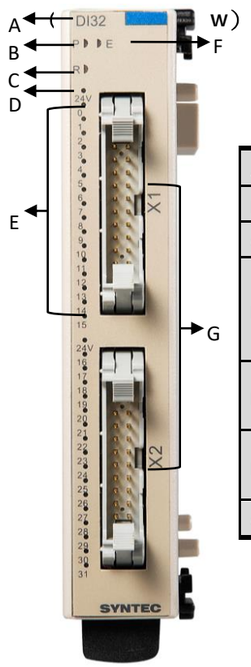
The following are the guidelines you should comply with before finishing reading the complete manual:

- 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

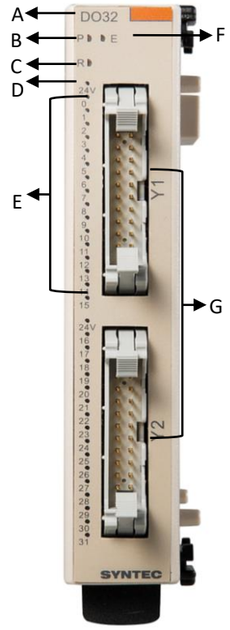
Please pay extra attention to the instructions below while operating the product.	
DANGER	■ Please install the controller according to the manual or it might cause damage to the equipment. ■ Do not operate the product in places exposed to water vapor, corrosive, or flammable gases. It might cause damage to the device, electric shocks, fire, or explosion. ■ Do not install the product at a temperature exceeding the specified range. It might cause device damage or malfunctioning. ■ The controller series is designed to control the motor of the machine tool and manage the IO control. Do not touch the internal circuits or components while the controller is powered up. It might cause electric shock or device damage. ■ The internal circuit board of the driver contains CMOS ICs, which are vulnerable to static electricity. Do not touch the circuit board with your hands before taking any precautions. ■ The product has been tested and found to comply with the limits for a KC Class A Commercial equipment) digital device. It was designed for use in commercial and industrial environments instead of households. ■ Do not apply the product to machines that might lead to casualties, device damage, or system shut down.
WARNING	■ Please cut off all the external loads when powering up the controller for the first time. The built-in testing PLC program may start the motor immediately after power-up, which might be dangerous for the staff around. ■ The controller is a precision instrument. Please prevent non-maintenance staff or non-professional electronic control personnel from disassembling the device.
	■ Please separate the communication cable of the driver from all the other motor and power cables with individual wiring ducks to prevent the controller from malfunction caused by loud noise interference. ■ Please apply the correct ground loop to prevent errors from the controller.
CAUTION	■ The CNC controller adopts a microcomputer design. Please install the controller in a safe area and keep it clean. Please keep iron shavings, wires, water, corrosive gas, and liquid from the driver to avoid malfunction. ■ Storage temperature range: -20℃~60℃ Storage relative humidity range: 0% to 90% and without condensation. ■ Operating temperature range: -10℃~55℃ Please reserve at least 50mm in width for ventilation and heat dissipation. ■ The grounding of the controller and machine tool system is necessary for leakage protection and prevention of lightning strikes. Please ensure the driver and the machine tool system are grounded properly before installing. ■ The rated voltage of the controller power system should not exceed 24V±20%. If the operating environment provides an unstable voltage source, please apply a voltage stabilizer so that the controller can function properly. ■ Please turn off the power before plugging/unplugging the cables or modifying the wirings to prevent electric shocks or damage to the driver. ■ Please ensure all the terminals are in the correct positions while wiring to prevent the driver from damage caused by wiring mistakes. ■ Do not touch the terminals within 10 minutes after cutting off the power in case the residual voltage might cause electric shocks. ■ Do not touch the panel with sharp objects or it might cause malfunction due to depression. ■ To ensure communication quality, the length of USB extension cords in use shall not exceed five meters. Besides, do not charge or supply power via the USB port; otherwise, it may cause controller malfunction.

2. Interface Specifications



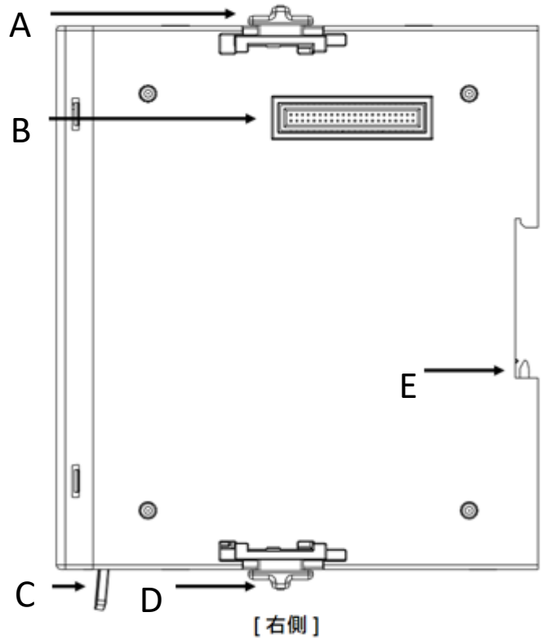
A	Module Name	Module name abbreviation (DI32)
B	Power Indicator (P)	Indicate the power condition (Yellow light)
C	Operating Indicator (R)	Indicate the operating condition (Green light)
D	External 24V Indicator	Indicate the external power supply condition of the digital output function module; 24V·1A (yellow light)
E	Signal Indicator Light	The indicator light turns green when the input point is activated.
F	Abnormal Indicator Light	Indicate the abnormal condition of the function module (red light)
G	Input Terminal (X1、X2)	Input terminal

（DO32 Front View）

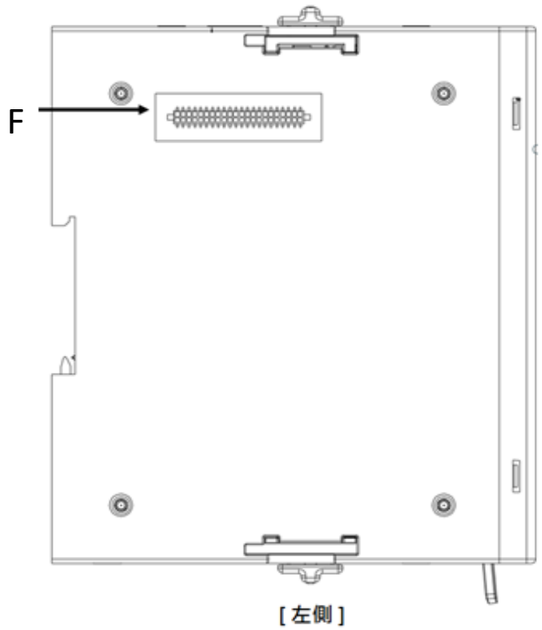


A	Module Name	Module name abbreviation (DO32)
B	Power Indicator (P)	Indicate the power condition (Yellow light)
C	Operating Indicator (R)	Indicate the operating condition (Green light)
D	External 24V Indicator	Indicate the external power supply condition of the digital output function module; 24V·1A (yellow light)
E	Signal Indicator Light	The indicator light turns green when the output point is activated
F	Abnormal Indicator Light	Indicate the abnormal condition of the function module. (Red light)
G	Output Terminal (Y1, Y2)	Output terminal

（Side View）



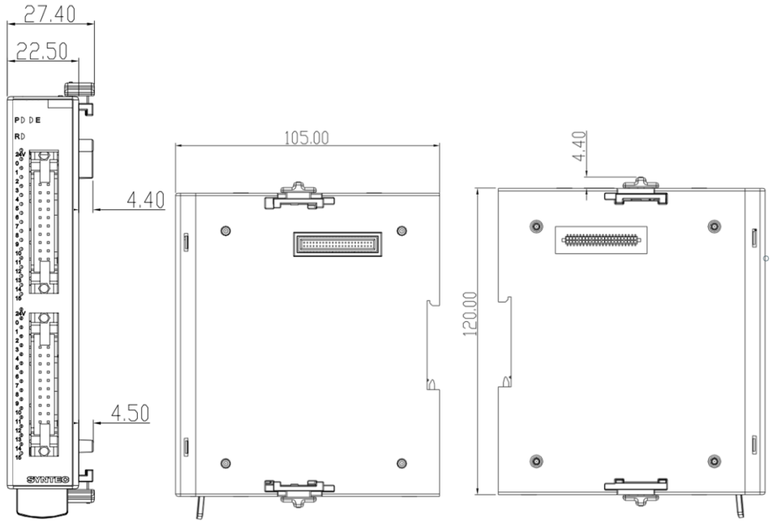
(Right)



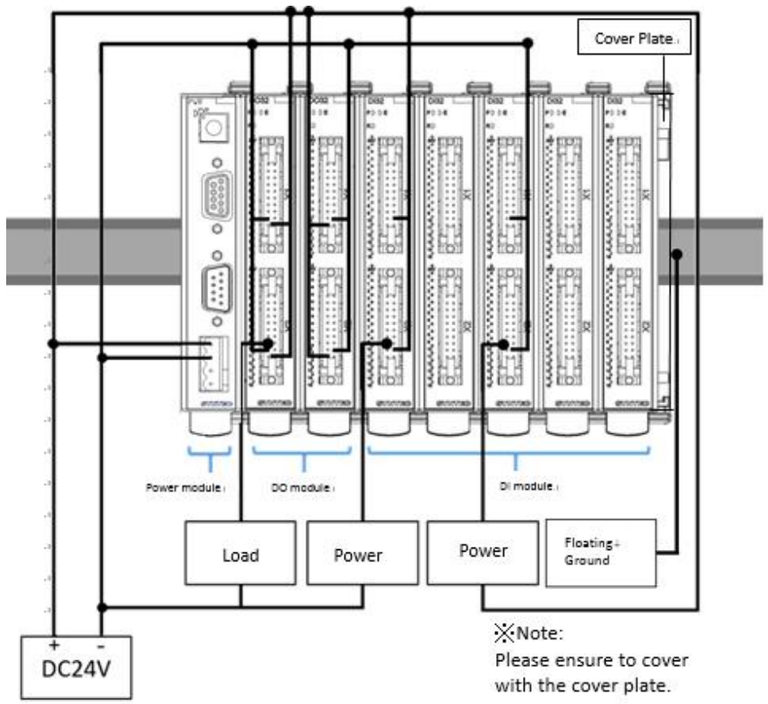
(Left)

A	Upper Fastener	Connect to the upper fasteners of other FC function modules
B	Internal Communication Port (Right)	Connect to other FC function modules for communication
C	Slide Tenon Batch	Control the slide tenon
D	Lower Fastener	Connect to the lower fastener of other FC function modules
E	Slide Tenon	Fix the tenon on the slide
F	Internal Communication Port (Left)	Communicate with other FC modules

3. FC Module External Dimension (Unit: mm)



4. Basic Wiring Diagram



5. Interface Configurations

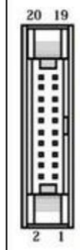
Please notice the value and polarities of voltages.

● DI Module Connector Arrangement

◎ X1 Connector Arrangement

X1	PIN	SIGNAL	PIN	SIGNAL
	20	INPUT8	19	INPUT0
	18	INPUT9	17	INPUT1
	16	INPUT10	15	INPUT2
	14	INPUT11	13	INPUT3
	12	INPUT12	11	INPUT4
	10	INPUT13	09	INPUT5
	08	INPUT14	07	INPUT6
	06	INPUT15	05	INPUT7
	04	GND	03	GND
	02	--	01	--

◎ X2 Connector Arrangement



X2	PIN	SIGNAL	PIN	SIGNAL
	20	INPUT24	19	INPUT16
	18	INPUT25	17	INPUT17
	16	INPUT26	15	INPUT18
	14	INPUT27	13	INPUT19
	12	INPUT28	11	INPUT20
	10	INPUT29	09	INPUT21
	08	INPUT30	07	INPUT22
	06	INPUT31	05	INPUT23
	04	GND	03	GND
	02	--	01	--

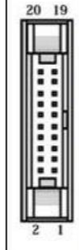
● DO Module Connector Arrangement

◎ Y1 Connector Arrangement

◎ Y2 Connector Arrangement

※Output current of each O Point (Max.): 1.9A

Y1	PIN	SIGNAL	PIN	SIGNAL
	20	OUTPUT8	19	OUTPUT0
	18	OUTPUT9	17	OUTPUT1
	16	OUTPUT10	15	OUTPUT2
	14	OUTPUT11	13	OUTPUT3
	12	OUTPUT12	11	OUTPUT4
	10	OUTPUT13	09	OUTPUT5
	08	OUTPUT14	07	OUTPUT6
	06	OUTPUT15	05	OUTPUT7
	04	GND	03	GND
	02	24V	01	24V



Y2	PIN	SIGNAL	PIN	SIGNAL
	20	OUTPUT24	19	OUTPUT16
	18	OUTPUT25	17	OUTPUT17
	16	OUTPUT26	15	OUTPUT18
	14	OUTPUT27	13	OUTPUT19
	12	OUTPUT28	11	OUTPUT20
	10	OUTPUT29	09	OUTPUT21
	08	OUTPUT30	07	OUTPUT22
	06	OUTPUT31	05	OUTPUT23
	04	GND	03	GND
	02	24V	01	24V

6. Wiring Notifications

- Please connect the ground wire to class-3 (under 100Ω). Poor grounding might cause signal errors, electric shock, or fire.
- When using a solenoid valve or other inductive loads, please apply an arc extinguisher or an RC varistor to ensure the life of the contact points. Advantages of the arc extinguisher:
  1) Extend the life of electrical contacts.
  2) Reduce the sparks from the contact points.
  3) Restrain the impulse voltage.
  4) Prevent the inductive loads from interferences caused by back EMF
- Do not connect other cables to extend the original length. It might cause signal errors or malfunction.
- If the servo line in use is not a standard Syntec cable, please verify all the terminals are connected properly before power-on. Incorrect wirings will lead to controller output command errors and malfunctioning.
- The external 24V power supply used in wiring should be certificated and protective to avoid the malfunction caused by wiring mistakes. (Recommendation standard：fulfill requirements of both EN60950 or UL1950)
- Please crimp or weld the wire connections while doing the wirings.
- In case of the use of Ethernet, to prevent internet congestion and noise, the CAT5e or CAT6 cable is recommended.
- Do not use counterfeit terminal strips. Those terminal strips cannot provide overall protection for the system. The quality is also not guaranteed and tends to cause electrical control problems of the machine tools.
- To avoid noise interference, it is recommended to use Syntec standard SRI cables to connect to Syntec controllers. As for the cables connecting to other FC modules, shielded twisted pairs are recommended.
- Grounding Directions:
  1) The guide rail of FC Controller sets must be grounded.
  2) The length of grounding wires should comply with the electrical equipment regulations; the shorter the better.
  3) Ground the grounding wire of the driver separately with high-current loads such as electric welders or high-frequency motors.
  4) Please refer to the pictures below when the controller is grounded with multiple electrical control devices. Do not make it a loop.

(a) O (b) O (c) X