

INSTRUCTION SHEET



Control Box FB Series

Confirm that the delivered product is what you have ordered. Read this instruction sheet to make sure of correct operation. Make sure that the instruction sheet is kept by the end user.

Safety Precautions

- Turn off the power to the control unit before starting installation, removal, wiring, and maintenance. Failure to turn power off may cause electric shocks or fire hazard.
- Use wires of a proper size to meet voltage and current requirements. Tighten the terminal screws to recommended tightening torque. Improper wires and loose terminals during operation will cause overheating and fire hazard. Provide a proper protection against electric shocks. Failure to turn power off may cause electric shock or fire hazard.

1 Type

< Without control unit >

Box size (Length)
 1 : 76 mm
 2 : 140 mm
 3 : 200 mm

Box cover color
 Y : Yellow
 Z : Light beige

Control unit mounting hole centers
 T : Without hole
 W : With hole (φ22 mm)

Types (With control unit mounting hole)
 Blank : Standard type
 1 : 1
 R : Contact cover type

No. of rows
 0 : No hole
 1 : 1
 2 : 2
 3 : 3
 4 : 4
 5 : 5

No. of control unit mounting holes
 0 : No hole
 1 : 50 mm
 2 : 30 mm
 3 : 36 mm

< With control unit >

1 hole

Types of accessories
 0 : None
 1 to (undefined) : Separate designation (Refer to the catalog)

Types of control units
 A (Five digits) : Separate designation (Refer to the catalog)

Example: FB3W-311Z-A03010

2 Dimensions

< Dimensions >

140/200 mm Types

4 M4 tapping holes for rear mouting (depth: 10 mm)
 2 front mouting holes
 2-φ14 knockout

Box cover mounting screw
 Box cover
 Box base
 2-φ21.3 knockout

	140 mm Type	200 mm Type
L	140	200
A	84	144
B	104	164
C	106	166

φ66 (Nameplate installation range)
 Box cover
 Box base
 2-φ21.3 knockout
 4 M4 tapping holes for rear mouting (depth: 10 mm)
 2 front mouting holes
 φ14 knockout
 2-φ4.6
 21
 41
 15.5
 62
 59.5
 18
 φ22.3
 Box base
 < Contact cover type >
 *Dimensions are the same as the standard type.
 *There is no control unit mounting hole on the box cover.
 φ22.3
 Box base
 < Control unit mounting space >
 *The inside dimensions show the available space for mounting control units, excluding the protrusions inside the FB series control box.
 45
 27
 10
 45
 (60)
 64
 92
 70
 (6)
 (66)
 150
 130
 (6)
 (118.5)
 45
 (60)
 64
 45
 (60)
 64
 (37.5)
 (6)
 5.5
 46
 50.5
 5.5
 45
 15
 64
 (Reference: Dimension of protrusions in the control box)
 boss (height: 1.8mm, diameter: φ1.8mm)
 M3 tapping screw hole (depth: 7mm)

< Control unit mounting hole centers >

76 mm Type	140 mm Type		200 mm Type		
	2 holes	3 holes	3 holes	4 holes	5 holes

< Control unit mounting hole diameter >

76 mm Type	140 mm Type	200 mm Type	140/200 mm Type

3 Specifications

Applicable Standards	IEC/EN60529 UL50, UL508 CSA C22.2 No.94, CSA C22.2 No.14
Standard Operating Conditions	Operating Temperature -25 to +60°C (no freezing) Relative Humidity 45 to 85%RH (no condensation) Storage Temperature -40 to +80°C (no freezing) Pollution Degree 3
Degree of Protection	IP65 (When applicable Auxiliary Devices are installed) NEMA TYPE 4X (When applicable NEMA TYPE 4X Auxiliary Devices are installed) NEMA TYPE 1 (When applicable NEMA TYPE 4X Auxiliary Devices are not installed)
Electric Shock Protection	Class II (When applicable control unit is installed)
Material	Box Cover, Box Base: Polycarbonate Box cover mounting screw: Stainless steel
Applicable Control Unit	HW/TW/XW series control unit and accessories (IDEC)
Weight (approx.)	76 mm Type 125g (FB1W-111Y only) 140 mm Type 184g (FB2W-211Z only) 200 mm Type 243g (FB3W-311Z only)

- The above specifications are for the FB series control box only. For details on control units, refer to the specifications of each control unit.
- Install control units or accessories in consideration of the mounting centers, depth, and thickness (3 mm) of the FB series control box. For selector switches, the mounting angle of the operator is limited for 30 mm and 36 mm mounting hole center type control boxes.
- The XW screw terminal type control units can be installed in one-hole type or 50 mm mounting hole centers type by wiring one crimping terminal to each terminal.
- Damages caused by using control units other than those specified by IDEC are excluded from any warranty.
- The contact cover type (Type: FB1WR) is not UL and c-UL listed.
- FB series control box without hole type (Type: FB□T) is not UL and c-UL listed.

4 Mounting

< Panel Mounting >

- Installing the FB series control box from the front
 - Use two M4 screws. (Recommended tightening torque: 1.4 to 2.0 N·m)
 - Determine the screw length in consideration of the box base and panel thickness.
 - *Mounting screws are not supplied with the FB series control box. Use M4 mounting screws.
- Installing the FB series control box from the back
 - When installing from the back, insert M4 tapping screws into holes for the tapping screws on the back of the box base (depth: 8 to 10 mm, tapping screw hole diameter: φ3.7 mm) [Recommended tightening torque: 1.3±0.1N·m (M4-P-TITE (Nitto Seiko))]
 - *Mounting screws are not supplied with the FB series control box. Use M4 tapping screws. [Recommended screws: M4-P-TITE (Nitto Seiko)]
 - *The value of the recommended tightening torque has been confirmed with a M4 tapping screw [P-TITE screw (Nitto Seiko)]. When using other screws, check that the tapping screw hole is not damaged and the screw can be securely tightened.
- Installation using accessories (FB9Z-PK1)
 - When using accessories for installation, refer to each instruction sheet.

< Installing and removing the control unit >

Refer to installation instructions for each control unit.

< Installing the safety lever lock for HW series control units (HW9Z-LS, yellow) >

- When installing the HW series control units in the direction shown at right, install the unit with the safety lever in the unlocked position, lock the lever and push in the safety lever lock.
- Installing a cable gland
 - Break a desired knockout to mount a cable gland using a hammer and a screwdriver, and install the cable gland.
 - When breaking the knockout to open a cable gland hole, be careful not to damage the internal contact block.
 - *Note that cracks or burrs on the cable gland hole will degrade the waterproof characteristics.
- Installing the box cover and box base
 - Attach the box cover to the box base so that the TOP mark on the box cover and box base are in the same direction.
 - Use box cover mounting screws to attach the box cover to the box base. (Recommended tightening torque: 1.3±0.1 N·m)
 - *Make sure that the box cover and the box base are attached in the correct direction. Otherwise, the FB series control box may be damaged.
- Installation using tapping screw hole inside the control box
 - When using M3 tapping hole screws inside the control box, make sure to install the devices in consideration of the insulation distance and temperature rise. Damages caused by using devices other than those specified by IDEC are excluded from any warranty. Control boxes installed with devices using tapping screw holes will not be UL and c-UL listed.
 - M3 tapping screw hole (depth: 6 to 7 mm, tapping screw hole diameter: φ2.7 mm) [Recommended tightening torque: 0.9±0.1N·m (M3-P-TITE (Nitto Seiko))]

5 Wiring

< Applicable Wire >

- Determine the wire size in consideration of the control unit and cable thickness of the cable gland.

< Applicable crimping terminal >

- HW/TW series
 - Non-insulated terminal
 - Applicable crimping terminal
 - Insulating tube
 - Wire
 - φ3.6 minimum
 - 6.0 minimum
 - 20.2 maximum
 - 4.0 maximum
 - 6.0 minimum
 - 20.2 maximum
 - Insulated terminal
 - φ3.6 minimum
 - 4.0 maximum
 - 6.0 minimum
 - 20.2 maximum
- XW Series (Screw terminal type)
 - Non-insulated terminal
 - Applicable crimping terminal
 - Insulating tube
 - Wire
 - φ3.2 minimum
 - 6.0 maximum
 - 3.0 maximum
 - 4.7 *1) minimum
 - 18.3 maximum
 - 14.9 maximum
 - 4.7 to 5.9
 - 3.0 maximum
 - 14.9 maximum
 - 4.7 to 5.9
 - Insulated terminal
 - φ3.2 minimum
 - 6.0 maximum
 - 3.0 maximum
 - 14.9 maximum

*1) When spade terminal is used, the dimension is 4.7 to 5.9 mm.

*Be sure to install an insulating tube on the crimping terminal.

*When using crimping terminal for the XW series, use only one crimping terminal for each terminal.

*Make sure that the wiring does not contact the FB series control box.

< Applicable Cable Gland >

- Use cable glands with waterproof characteristics (IP65, NEMA TYPE 4X) which can be mounted on a panel thickness of 3 mm or more.

1. When using plastic cable gland and multi-core cable

Gland port size	Plastic cable gland
M20	5311 1220[Skintop-ST-M], Applicable gasket: GPM20 (LAPP, Germany)
G1/2	5380 6030[Skintop-ST-PF], Applicable gasket: GP 050 (LAPP, Germany)
PG13.5	5301 5030[Skintop-ST], Applicable gasket: GP13.5 (LAPP, Germany)

2. Locking nut for installing cable gland

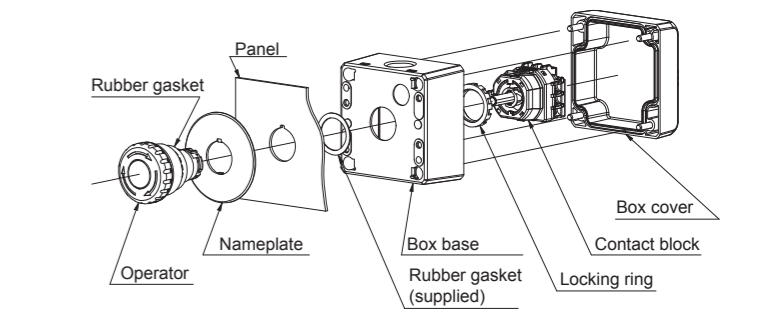
(The locking nut for installing cable gland is not supplied. Order separately.)

Gland port size	Locking Nut Type (Made of plastic)
M20	HW9Z-NM20PN05 (IDEC)
G1/2	HW9Z-GPN05 (IDEC)
PG13.5	HW9Z-PG135PN05 (IDEC)

- The degree of protection of the cable gland examples described above is not NEMA TYPE 4X.
- Only UL approved cable glands are described.
- When using the FB control box in North America, be sure to use UL approved plastic cable glands.
- Tighten cable glands to a torque of 3.0±0.3N·m.
- Insufficient tightening of the cable gland may degrade the waterproof characteristics.
- Electric shock protection Class II is maintained only when a plastic cable gland is used.
- Determine the cable gland for a multi-core cable according to the outside diameter of the cable sheath.
- When wiring from the back of FB series control box, use the φ14 knockout on the back of the control box. A cable gland cannot be installed to the φ14 knockout.

6 Contact Cover Type

- Specifications (Applicable model) and Wiring
- Same as the standard control boxes.
- Installation (When installing XW series control units to the FB1WR-111Z control box)
 - Remove the contact block and the locking ring from the operator and check that the rubber gasket is in place. Insert the operator from panel front into the panel hole. Attach the rubber gasket and the box base to the operator unit (Place the rubber gasket between the panel and the box base) and tighten the locking ring using locking ring wrench MW9Z-T1. (Recommended tightening torque: 2.0 N·m)
 - Attach the contact block to the operator. After wiring, attach the box cover to the box base using four box cover mounting screws. (Recommended tightening torque: 1.3±0.1 N·m)
 - Use a nameplate if necessary.
 - Determine the panel thickness by excluding the thickness of the box base (2.0 mm) and accessories (if used) from the maximum panel thickness for the control unit.



3. Notes for Operation

- Do not expose the cable to excessive force, otherwise failure or damage may be caused. When mounting strength is needed, insert M4 tapping screws from the front of the panel. (Screw tightening depth: 8 to 10 mm / Tapping screw hole: φ3.7 mm)
- Determine the mounting hole centers referring to the dimensions of the contact cover type.

7 Notes for Operation

- < Wiring >**
- Avoid foreign objects such as dust, liquid, and oil from entering the switch while wiring.
 - Do not twist or pull the cable or cable gland with excessive force. Otherwise, the wire, FB series control box, and control units may be damaged.
 - Because the FB series control box is not provided with a PG terminal, a bonding circuit cannot be interconnected.
 - Installation of control units on 30 mm mounting centers
 - When mounting HW/TW series control units on 30 mm mounting centers (close mounting), make sure to use a barrier (optional: HW-VG1) to secure the insulation properties of the terminal. The barriers (HW-VG1) can be easily pressed into the side of the contact block.
- < Operation >**
- Avoid any contact with oil or coolants. Otherwise, the control box may be damaged.
-

(TYPE 4X Indoor Use Only)

8 Accessories

- Mounting bracket: FB9Z-PK1
- DIN rail adapter: FB9Z-PK3
- For installation, refer to each instruction sheet.

9 Precautions for Disposal

- Dispose of the FB series control box as an industrial waste.