


FB series Plastic Enclosures

IP65 lightweight plastic enclosures for installing switches/pilot lights.

- $\phi 22\text{mm}$ switches/pilot lights can be installed.
- Blank front enclosures, without mounting holes, are also available.
- Blank front enclosures can also be used as junction boxes to mount terminal blocks.
- Yellow cover version for emergency stop switches is also available.
- Front panel mounting, rear panel mounting, hook mounting, and frame mounting options are available.
- UL/c-UL listed.

Applicable Standards	Mark	Certification Organization / File No.
UL508 UL50 CSA C22.2 No. 14 CSA C22.2 No. 94		UL/c-UL listed File No. E68961 (with mounting hole)

- Contact cover box (Model: FB1BR) is not UL or c-UL listed.
- Enclosures without mounting hole is not UL or c-UL listed. (Enclosures less than 1,639 cm^3 is not approved by UL50, 2:8.)

Enclosure

Size	No. of Mounting Holes	Mounting Hole Description	Cover Color	Part No.
76mm	0	Without mounting hole	Light beige	FB1T-000Z
	1	$\phi 22\text{mm}$	Yellow	FB1W-111Y
	1	$\phi 22\text{mm}$		FB1W-111Z
140mm	0	Without mounting hole		FB2T-000Z
	2	$\phi 22\text{mm}$, mounting centers 50mm		FB2W-211Z
	3	$\phi 22\text{mm}$, mounting centers 30mm		FB2W-312Z
200mm	0	Without mounting hole	Light beige	FB3T-000Z
	3	$\phi 22\text{mm}$, mounting centers 50mm		FB3W-311Z
	4	$\phi 22\text{mm}$, mounting centers 36mm		FB3W-413Z
	5	$\phi 22\text{mm}$, mounting centers 30mm		FB3W-512Z

Specifications (Note 1)

Applicable Standards	IEC/EN60529 UL508 UL50 CSA C22.2 No. 14 CSA C22.2 No. 94
Standard Operating Conditions	Ambient temperature: -25 to $+60^\circ\text{C}$ (no freezing) Relative humidity: 45 to 85%RH (no condensation) Storage temperature: -40 to $+80^\circ\text{C}$ (no freezing) Degree of pollution: 3
Degree of Protection	IP65 (when IP65 switches/pilot lights are installed) NEMA Type 4X Indoor Use Only (when Type 4X switches/pilot lights are installed)
Electric Shock Protection	Class II (when class II switches/pilot lights are installed)
Material	Cover/base: Polycarbonate Cover mounting screws: Stainless steel
Applicable Switches/Pilot Lights	IDEC's HW/TW/XW series and accessories (Note 2) (Note 3)
Weight (approx.)	76mm: 125g (FB1W-111Z) 140mm: 184g (FB2W-211Z) 200mm: 243g (FB3W-311Z)

Note 1: The above specifications are for enclosures. For switches/pilot lights, refer to the specifications of each unit.

Note 2: Choose switches/pilot lights and accessories which match the mounting hole centers, effective depth behind the cover, and the thickness of the cover where switches/pilot lights are installed (3 mm). Note that enclosures with 30mm or 36mm mounting hole centers may limit the knob orientation of selector switches, because the contact blocks can be mounted in one direction only on these mounting centers.

Note 3: An XW series emergency stop switch of screw terminal type can be installed on an enclosure with one mounting hole or mounting holes of 50mm mounting centers, by connecting one clamping terminal to one terminal pole.



Contact Cover Box

Size	No. of Mounting Holes	Mounting Hole Description	Cover Color	Part No.
76mm	1	$\phi 22\text{mm}$ hole in the base	Light beige	FB1WR-111Z

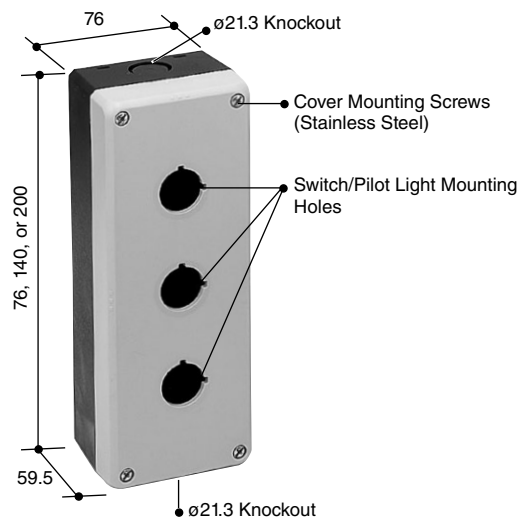
- Cover does not have a switch/pilot light mounting hole.
- For operating instructions, see page G-29.

Accessories

Description	Part No.	Ordering No.	Package Quantity
Mounting Bracket	FB9Z-PK1	FB9Z-PK1	1
DIN Rail Adapter	FB9Z-PK3	FB9Z-PK3PN02	2
Mounting Hole Plug	LW9Z-BP1	LW9Z-BP1	1

- For the dimensions and operating instructions, see pages G-32 and G-33.
- Connectors and nuts are supplied by users.

Parts Description



Switches & Pilot Lights

Flush Silhouette Switches

Emergency Stop Switches

Control Stations

Display Lights

Operator Interfaces

PLCs

Softwares

Relays

Sockets

Timers

Terminal Blocks

Circuit Protectors

Power Supplies

Sensors

Ex-proof Control Boxes

Barriers

LEDs

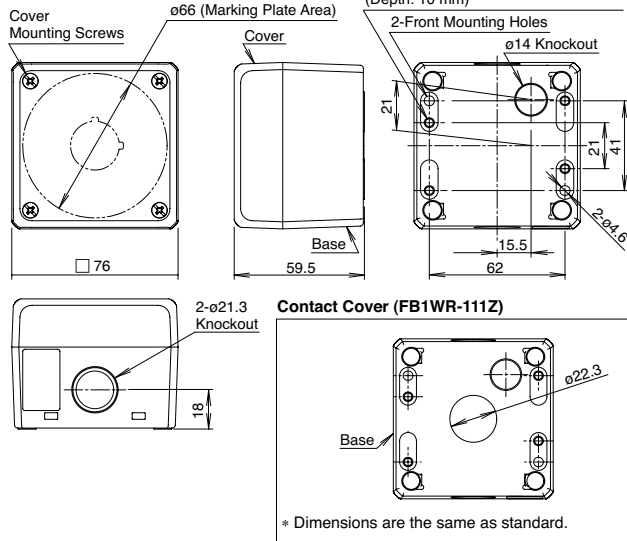
Safety Products

Information

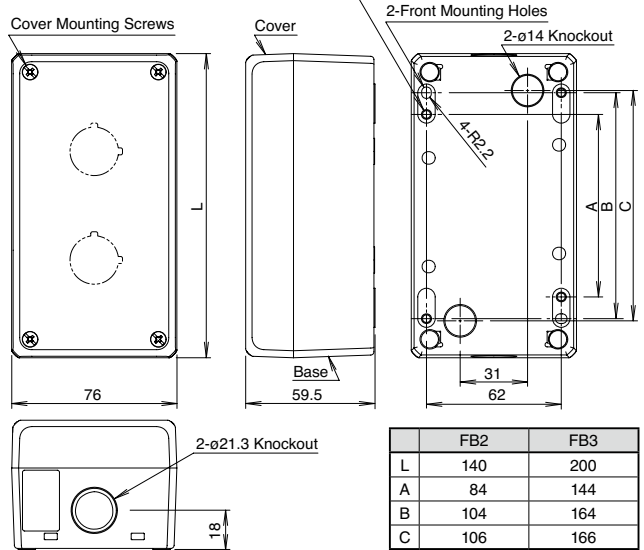
FB Series Plastic Enclosures

Dimensions

76mm (FB1)



140/200mm (FB2/FB3)



Switch/Pilot Light Mounting Hole Centers

Model	FB1	FB2		FB3		
		2 mounting holes	3 mounting holes	3 mounting holes	4 mounting holes	5 mounting holes
Shape						

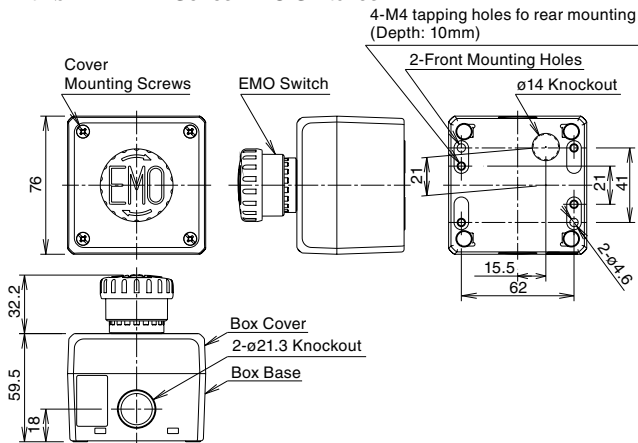
Mounting Hole Dimensions

Model	FB1	FB2	FB3	FB2/FB3
		50mm mounting centers	36/50mm mounting centers	
Shape				

Note: For contact cover boxes, see page G-27.

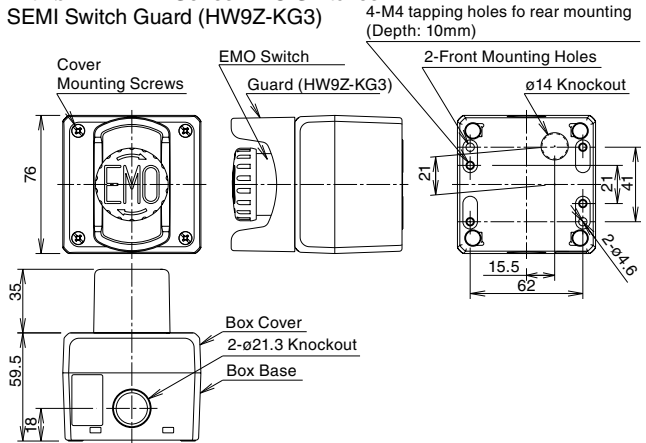
FB Series Plastic Enclosure

With ø22mm XW Series EMO Switches



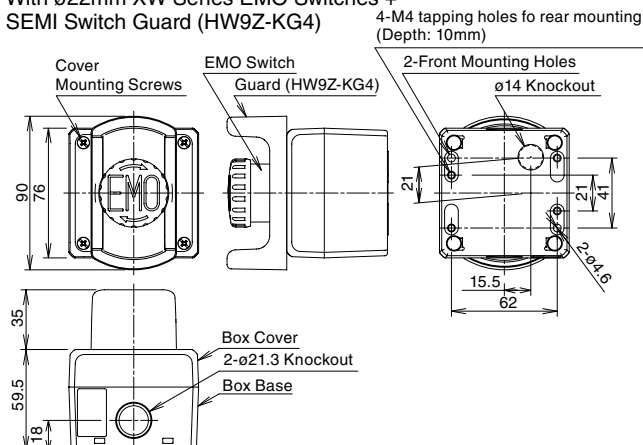
FB Series Plastic Enclosure

With ø22mm XW Series EMO Switches + SEMI Switch Guard (HW9Z-KG3)

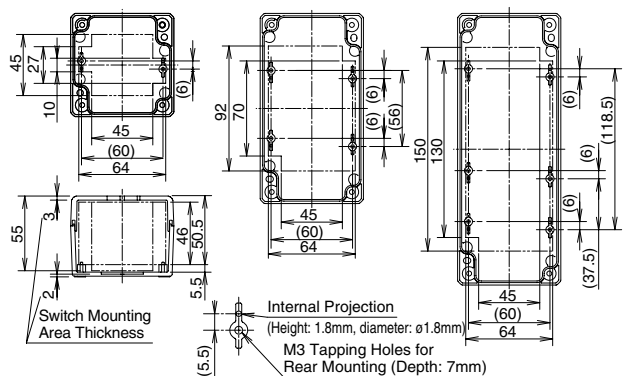


FB Series Plastic Enclosure

With ø22mm XW Series EMO Switches + SEMI Switch Guard (HW9Z-KG4)



Internal Dimensions



Choose an enclosure in consideration of switch's depth behind the panel and the mounting centers of the adjacent switches.

Applicable Accessories

Series	Description
HW Series	Nameplate: HWAM, HWAQ, HWAS, HWAV-*
	Marking plate for nameplate: HWNP-*
	Anti-rotation ring: HW9Z-RL
	EMO switch guard: HW9Z-KG3, HW9Z-KG4
	Switch guard: HW9Z-K1, HW9Z-K11
	Pushbutton clear boot: OC-31, OC-32
	Padlock cover: HW9Z-KL1
XW Series Emergency Stop Switches	Nameplate: HWAV-*
	EMO switch guard: HW9Z-KG3, HW9Z-KG4
	Anti-rotation ring: HW9Z-RL
TW Series	Nameplate: NWA-*, NWAQ-*, NWAQ-0, NWAQ-1, NWAQ-2, NWAQ-3, NWAQ-4, NWAQ-5, NWAQ-6, NWAQ-7, NWAQ-8, NWAQ-9, NWAQ-10, NWAQ-11, NWAQ-12, NWAQ-13, NWAQ-14, NWAQ-15, NWAQ-16, NWAQ-17, NWAQ-18, NWAQ-19, NWAQ-20, NWAQ-21, NWAQ-22, NWAQ-23, NWAQ-24, NWAQ-25, NWAQ-26, NWAQ-27, NWAQ-28, NWAQ-29, NWAQ-30, NWAQ-31, NWAQ-32, NWAQ-33, NWAQ-34, NWAQ-35, NWAQ-36, NWAQ-37, NWAQ-38, NWAQ-39, NWAQ-40, NWAQ-41, NWAQ-42, NWAQ-43, NWAQ-44, NWAQ-45, NWAQ-46, NWAQ-47, NWAQ-48, NWAQ-49, NWAQ-50, NWAQ-51, NWAQ-52, NWAQ-53, NWAQ-54, NWAQ-55, NWAQ-56, NWAQ-57, NWAQ-58, NWAQ-59, NWAQ-60, NWAQ-61, NWAQ-62, NWAQ-63, NWAQ-64, NWAQ-65, NWAQ-66, NWAQ-67, NWAQ-68, NWAQ-69, NWAQ-70, NWAQ-71, NWAQ-72, NWAQ-73, NWAQ-74, NWAQ-75, NWAQ-76, NWAQ-77, NWAQ-78, NWAQ-79, NWAQ-80, NWAQ-81, NWAQ-82, NWAQ-83, NWAQ-84, NWAQ-85, NWAQ-86, NWAQ-87, NWAQ-88, NWAQ-89, NWAQ-90, NWAQ-91, NWAQ-92, NWAQ-93, NWAQ-94, NWAQ-95, NWAQ-96, NWAQ-97, NWAQ-98, NWAQ-99, NWAQ-100
	Anti-rotation ring: OGL-31
	Metal protector: OLV-C
	Pushbutton clear boot: OC-31, OC-32
	Button cover: OCW-10*, OCW-11*
	Padlock cover: HW9Z-KL1, HS9Z-PC22

Note: Confirm the specifications of enclosure, switches/pilot lights, and accessories before choosing accessories, referring to separate catalogs.

Applicable DIN Rail

Description	Material	Part No.
DIN Rail	Aluminum	BAA1000
	Steel	BAP1000
End Clip	Steel	BNL6

Note: Use DIN rail adapters FB9Z-PK3 when installing a DIN rail in the enclosure. See page G-32.

Applicable Terminal Block / Transformer

Series / Part No.	
Terminal Block	BN-W Series: BN10W, BN15MW, BN15LW, BN30W
	BA Series: BA111T, BA211T, BA311T
Separate Mounting Transformer	TWR5**

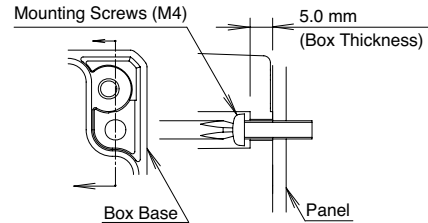
Note: Install the terminal blocks and separate mounting transformers on a DIN rail using two DIN rail adapters (FB9Z-PK3). Choose the types and quantity of terminal blocks, transformers, end clips, and enclosures carefully taking the specifications into consideration. The separate mounting transformer can be installed on a DIN rail adapter directly.

Instructions

Installation

Panel Mounting

- Installing the FB series from the front
 - Using two M4 screws, install the base onto the panel. Recommended tightening torque: 1.4 to 2.0 N-m



- * Determine the screw length in consideration of the base and panel thickness.
- * Mounting screws are not supplied with the FB series. Use M4 mounting screws.

- Installing the FB series from the rear

- * Insert four M4 tapped screws into holes for tapping screws on the back of the base (depth: 8 to 10 mm, tapping screw hole diameter: $\phi 3.7$ mm), and fasten the screws to a tightening torque of 1.3 ± 0.1 N-m (Nitto Seiko M4-P-TITE).
- * Mounting screws are not supplied with the FB series. Use M4 tapping screws (recommended screws: Nitto Seiko M4-P-TITE).
- * The value of the recommended tightening torque has been confirmed with a M4 tapping screw (Nitto Seiko M4-P-TITE). When using other screws, check that the tapping screw hole is not damaged and the screw can be securely tightened.

- Installation using mounting bracket FB9Z-PK1

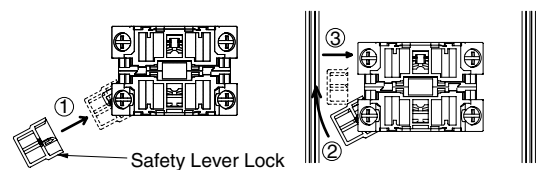
- * Refer to installation instructions on page G-31.

Installing and Removing the Switch/Pilot Light

- * Refer to installation instructions for each unit.

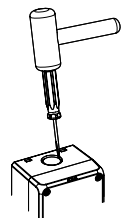
Installing the Safety Lever Lock for HW Series (HW9Z-LS, yellow)

When installing the HW series in the direction shown below, install the safety lever lock with the lever in the unlocked position, lock the lever, and push in the safety lever lock.



Installing the 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 make 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.



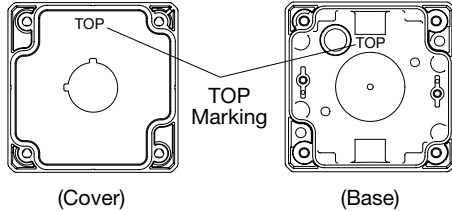
Switches & Pilot Lights
Flush Silhouette Switches
Emergency Stop Switches
Control Stations
Display Lights
Operator Interfaces
PLCs
Softwares
Relays
Sockets
Timers
Terminal Blocks
Circuit Protectors
Power Supplies
Sensors
Ex-proof Control Boxes
Barriers
LEDs
Safety Products
Information

FB Series Plastic Enclosures

Instructions

Installing the Cover and Base

- Attach the cover to the base so that the TOP mark on the cover and base are in the same direction.
- Use cover mounting screws to attach the cover to the base. (Recommended tightening torque: 1.3 ± 0.1 N·m)



- * Make sure that the cover and the base are attached in the correct direction. Otherwise, the FB series may be damaged.

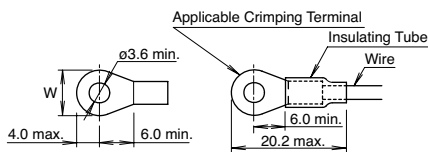
Installation using tapping screw hole inside the enclosure

- When using M3 tapping hole screws inside the enclosure, 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. Enclosures installed with devices using tapping screw holes will not be UL or c-UL listed.
- M3 tapping screw hole (depth: 6 to 7mm, tapping screw hole diameter $\phi 2.7$ mm)
- Recommended tightening torque: 0.9 ± 0.1 N·m, M3-P-TITE (Nitto Seiko)

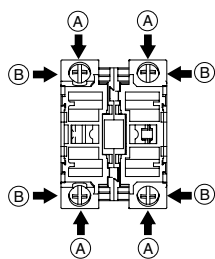
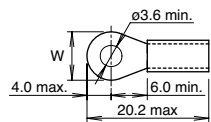
Applicable Crimping Terminal

HW/TW Series

Non-insulated Terminal



Insulated Terminal

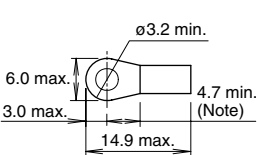


W dimensions

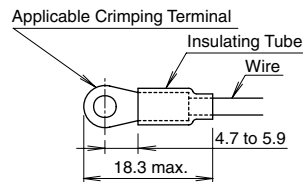
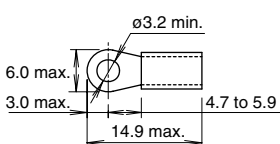
Direction of A: 8.0 maximum
Direction of B: 6.6 maximum

XW Series (Screw Terminal)

Non-insulated Terminal



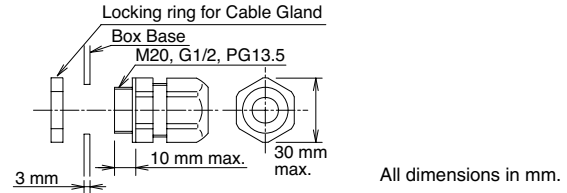
Insulated Terminal



- * When a 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 terminals for the XW series, use only one crimping terminal for each terminal.
- * Make sure that the wiring does not contact the enclosure.

Applicable Cable Gland

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



- * Cable gland and Locking nuts are not attached.

1. When using plastic cable gland, metal 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 the cable gland

Gland Port Size	Locking Nut Part No. (made of plastic)
M20	HW9Z-NM20 (IDEC)
G1/2	HW9Z-G (IDEC)
PG13.5	HW9Z-PG135 (IDEC)

- The degree of protection of the cable gland examples described above is not NEMA TYPE 4X.
- When using the FB plastic enclosures in North America, be sure to use UL approved plastic cable glands.
- Tighten cable glands to a torque of 3.0 ± 0.3 N·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, use the $\phi 14$ knockout on the back of the enclosure. A cable gland cannot be installed to the $\phi 14$ knockout.

Instructions

Notes

Applicable Wire Size

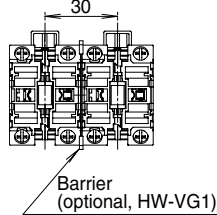
- Determine the wire size in consideration of the applicable wire for switches/pilot lights and the applicable diameter of cables.

Wiring

- Avoid foreign objects such as dust, liquid, and oil from entering the switch while connecting a conduit or wiring.
- Do not twist or pull the cable of flexible conduit with excessive force. Otherwise, the wire, FB series, and switches/pilot lights may be damaged.
- Because the FB series is not provided with a PG terminal, bonding circuits cannot be interconnected.

Installation of switches/pilot lights on 30mm centers

- When mounting HW/TW series control units on 30mm 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 enclosure may be damaged.
- Use the FB series for INDOOR applications only.

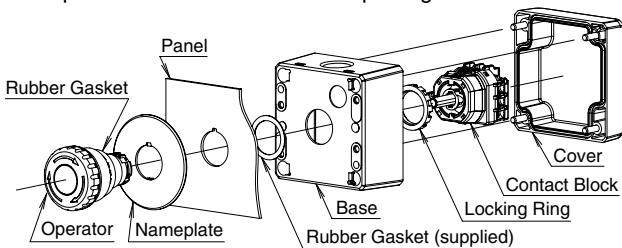
Contact Cover Box

Specifications, applicable units, and wiring

- Same as the standard enclosures.

Installing XW series to the FB1WR-111Z contact cover

- 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 base to the operator unit (place the rubber gasket between the panel and the 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 cover to the base using four 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 base (2.0 mm) and accessories (if used) from the maximum panel thickness for the switches/pilot light.

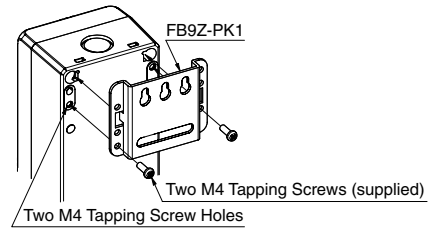


- Do not expose the cable to excessive force, otherwise failure or damage may be caused. When mounting strength is needed, insert M4 tapping screws from the front of the panel (screw tightening depth: 8 to 10mm tapping screw hole: ø3.7mm)
- Determine the mounting hole centers referring to the dimensions of the plastic enclosures on page G-28.

Mounting Bracket

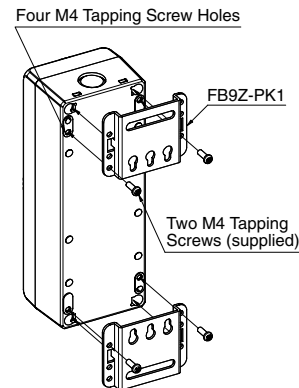
Hook Mounting

- Attach the FB9Z-PK1 mounting bracket on the FB series with the supplied screws (two M4 tapping screws). Recommended tightening torque: 1.3±0.1 N·m
- Do not tighten the FB9Z-PK1 onto the FB series with excessive force. The tapping screw hole may be damaged and may not securely hold the enclosure.
- When using the FB9Z-PK1 as hook mounting brackets, make sure that vibrations or shocks do not cause the enclosure to fall off, and that the switch/pilot light operates properly.
- Make sure that the mounting strength is secured.



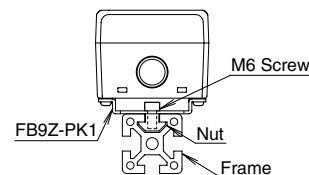
Frame Mounting

- The FB9Z-PK1 can be used as frame mounting brackets by attaching two FB9Z-PK1 as shown below.



- Attach the FB9Z-PK1 on the FB series with the supplied screws (two M4 tapping screws). Recommended tightening torque: 1.3±0.1 N·m.
- Do not tighten the FB9Z-PK1 onto the FB series with excessive force. The tapping screw hole may be damaged and may not securely hold the enclosure.
- Using two M6 screws, fasten the FB9Z-PK1 securely on the frame. Recommended tightening torque: 5.0±0.3 N·m

- * M6 mounting screws and nuts are not supplied with the FB9Z-PK1.
- * The value of the recommended tightening torque for M6 screws has been confirmed with a hexagon socket head screw. When other screws are used and tightened to a smaller torque, make sure that the screws do not become loose after mounting.



- Do not expose the FB series to excessive force, otherwise failure or damage may be caused.
- Make sure that the mounting strength is secured in consideration of the operation of switch/pilot light.

Switches & Pilot Lights

Flush Silhouette Switches

Emergency Stop Switches

Control Stations

Display Lights

Operator Interfaces

PLCs

Softwares

Relays

Sockets

Timers

Terminal Blocks

Circuit Protectors

Power Supplies

Sensors

Ex-proof Control Boxes

Barriers

LEDs

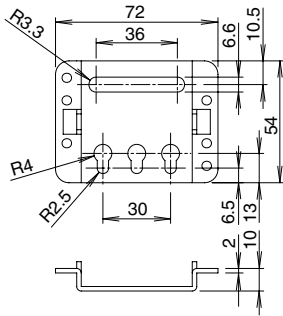
Safety Products

Information

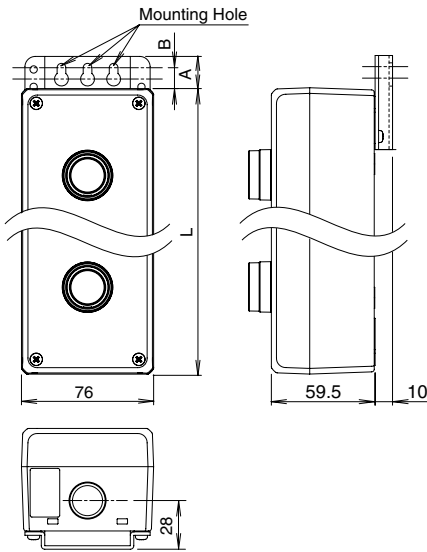
FB Series Plastic Enclosures

Dimensions

FB9Z-PK1

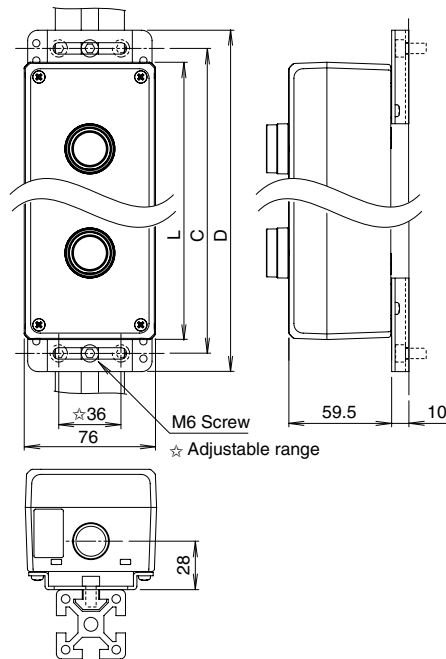


Hook Mounting



FB Series Enclosure			
	FB1	FB2	FB3
L	76	140	200
A	19	18.5	18.5
B	12.5	12	12

Frame Mounting



FB Series Enclosure			
	FB1	FB2	FB3
L	76	140	200
C	93	156	216
D	114	177	237

All dimensions in mm.

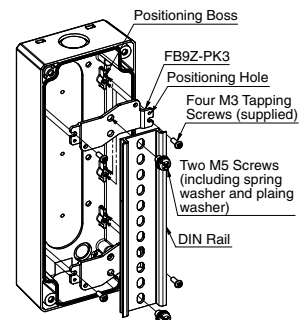
DIN Rail Adapter

Installing the FB9Z-PK3 DIN Rail Adapter

- To attach the FB9Z-PK3 on the FB series, position the positioning hole of the FB9Z-PK3 with the positioning boss in the enclosure using four M3 tapping screws (supplied) as shown in the figure below. Recommended tightening torque: 0.9 ± 0.1 N·m
- Do not tighten the FB9Z-PK3 onto the FB series with excessive force. The tapping screw hole may be damaged and may not securely hold the enclosure.

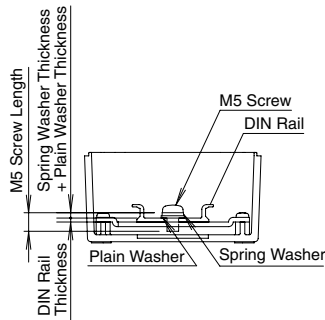
Installing the DIN Rail

- To attach a DIN rail, use plain washers and spring washers on two M5 screws and tighten firmly. Recommended tightening torque: 2.0 ± 0.1 N·m
- DIN rail mounting screw (M5)
Screw length: (spring washer thickness + plain washer thickness + DIN rail thickness) + 3 to 5 mm



FB Series Plastic Enclosures

- M5 screws, spring washers, and plain washers are not supplied.
- The length of DIN rail must be within the effective internal dimensions.
- Do not tighten the M5 screw onto the FB9Z-PK3 with excessive force. The screw hole may be damaged and may not securely hold the FB9Z-PK3.

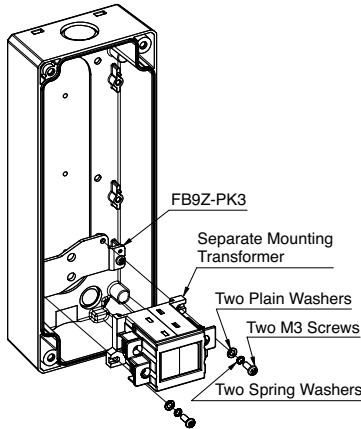


Mounting Switches/Pilot Lights on DIN Rail

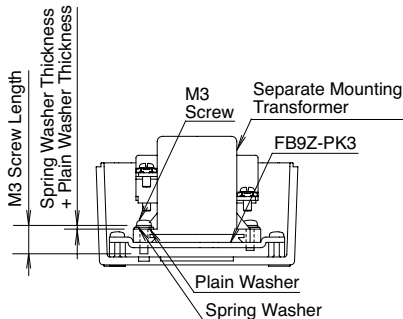
- Refer to each instruction sheet.

Installing the Separate Mounting Transformer

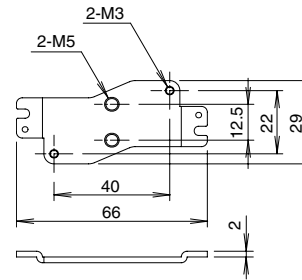
- After attaching the FB9Z-PK3 on the FB series, attach the separate mounting transformer on the FB9Z-PK3, using plain washers and spring washers on two M3 screws as shown in the figure below. Recommended tightening torque: 0.5 to 0.8 N·m



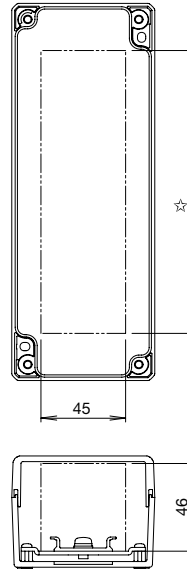
- Separate mounting transformer mounting screw (M3) Screw Length: (Spring washer thickness) + (Plain washer thickness) + 7 to 10 mm
- M3 screws, spring washers, and plain washers are not supplied.
- Do not tighten the screw with excessive force. The screw hole and the separate mounting transformer may be damaged.



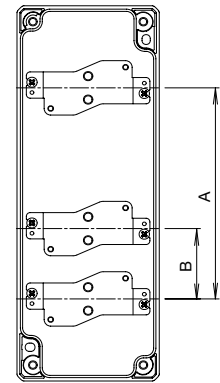
FB9Z-PK3 Dimensions



Inside Dimensions of FB Series Enclosure



FB9Z-PK3 Installation Positions



	FB Series Enclosure	
	FB2	FB3
A	50	112.5
B	—	37.5

† See internal dimensions on page G-28.

All dimensions in mm.

Other Precautions

- Rated current of terminal blocks depends on operating conditions such as wire type, number of bundle wires, and ambient temperature. Check the specifications of terminal blocks carefully, and use terminal blocks within the specification values. Otherwise electric shock or fire hazard may be caused.
- FB series is rated as Class II protection against electric shock (no reliance on installation protective measures, according to IEC 61140). When using a blank front enclosure as a junction box and grounding is necessary, provide appropriate grounding, for example installing a grounding terminal block inside the enclosure.
- For wiring, refer to the instructions of the FB series enclosures and switches/pilot lights used.

Switches & Pilot Lights
Flush Silhouette Switches
Emergency Stop Switches
Control Stations
Display Lights
Operator Interfaces
PLCs
Softwares
Relays
Sockets
Timers
Terminal Blocks
Circuit Protectors
Power Supplies
Sensors
Ex-proof Control Boxes
Barriers
LEDs
Safety Products
Information