

# 30mm Hazardous Location Switches: EU2B Series



## PRODUCT DESCRIPTION

Complying with UL and ATEX Directives for hazardous environments, new 30mm EU2B Hazardous Location Switches provide increased safety for your applications.

Available models include:

- Pushbuttons
- Pilot Lights
- Selector Switches
- Key Selector Switches
- Emergency Stop Switches
- Meters

## STANDARDS COMPLIANCE

	Switches	Pilot Lights	Meters
UL	Class I, Zone 1, AEx de IIC T6 Gb Class I, Div 2, Groups A, B, C and D	Class I, Zone 1, AEx de IIC T6 Gb Class I, Div 2, Groups A, B, C and D	Class I, Zone 1, AEx de IIC T6 Gb Class I, Div 2, Groups A, B, C and D
c-UL	Class I, Zone 1, Ex de IIC T6 Gb Class I, Div 2, Groups A, B, C and D	Class I, Zone 1, Ex de IIB T6 Gb Class I, Div 2, Groups C and D	Class I, Zone 1, Ex de IIC T6 Gb Class I, Div 2, Groups A, B, C and D
ATEX		Ex de IIC tD A21 IP65	Ex de IIC Gb Ex tb IIIC Db IP65

## KEY FEATURES

- Class I, Zone 1/Division 2
- Applicable in explosive gas atmospheres (AEx de IIC T6 Gb)
- UL Type 4X rated
- Up to 3 contact blocks
- Selector switches available with lever or key
- Selector switches available with overlapping contacts
- Exposed and finger-safe (IP20) screw terminals available

## CERTIFICATE NUMBERS

UL/cUL	E347230
ATEX	PTB 08 ATEX 1053 U PTB 08 ATEX 1003 U

## APPLICABLE STANDARDS

Products	Applicable Standards	Mark	Certifications
Pushbuttons Selector Switches Key Selector Switches Pilot Lights	EN60947-5-1		EU Low Voltage Directive
Emergency Stop Switches	EN60947-5-5		TÜV SÜD
			EU Low Voltage Directive



IECEX is pending approval

# SPECIFICATIONS

## General Specifications

Degree of Protection	IP65 (IEC60529), Type 4X	
Insulation Resistance	100 MΩ minimum (500V DC megger)	
Operating Temperature	-20 to +50°C (no freezing)	
Operating Humidity	45 to 85% (no condensation)	
Altitude	2,000m Maximum	
Pollution Degree	3	
Shock Resistance	Operating Extremes	100-m/s <sup>2</sup> Emergency Stop Switch: 150-m/s <sup>2</sup> (without Meter)
	Damage Limits	1000-m/s <sup>2</sup>
Vibration Resistance	Operating Extremes	5 to 55-Hz, amplitude 0.5 mm Emergency Stop Switch: 5 to 500-Hz, amplitude 0.35-mm, acceleration 50-m/s <sup>2</sup> (without Meter)
	Damage Limits	30Hz, amplitude 1.5-mm Emergency Stop Switch: 5 to 500-Hz, amplitude 0.35-mm, acceleration 50-m/s <sup>2</sup>

## Switches

Rated Insulation Voltage	600V	
Contact Resistance	50mΩ maximum (initial value)	
Impulse Withstand Voltage (Uimp)	6kV	
Insulation Resistance	100MΩ minimum (500V DC megger)	
Short-Circuit Protection	250V/10A fuse (Type aM IEC60269-1/IEC60269-2)	
Conditional Short-Circuit Current	1,000A	
Mechanical Life	Pushbutton	1,000,000 operations minimum
	Selector Switch	500,000 operations minimum
	Key Selector Switch	500,000 operations minimum
	Emergency Stop Switch	50,000 operations minimum
Electrical Life	Pushbutton	250,000 (switching frequency 1800 operations/h)
	Selector Switch	250,000 (switching frequency 900 operations/h)
	Key Selector Switch	250,000 (switching frequency 900 operations/h)
	Emergency Stop Switch	50,000 (switching frequency 900 operations/h)
Minimum Operator Stroke Required for Direct Opening Action	Emergency Stop Switch	7.0mm
Maximum Operator Stroke	Emergency Stop Switch	9.0mm

Note: Contacts will bounce during operation of pushbuttons and selector switches (reference value: 20-ms). Be sure to take contact bounce time into consideration when designing a control circuit.

## Contact Rating (Switches)

Rated Insulation Voltage (Ui)	600V					
Rated Thermal Current (Ith)	10A*					
Rated Operating Voltage (Ue)	24V	120V	240V	500V		
Rated Operating Current (Ie)	AC 50/60Hz	Resistive Load (AC12)	10A*	10A*	6A	2.8A
		Inductive Load (AC15)	10A*	6A	3A	1.4A
	DC	Resistive Load (DC12)	8A	2.2A	1.1A	—
		Inductive Load (DC13)	4A	1.1A	0.55A	—

Note: Up to 2 contacts (per control unit): 10A

3 contacts (per control unit): 9A

Minimum applicable load: 3V AC/DC, 5mA

Applicable operating locations may vary according to operating conditions and load types.

Contact Rating Code Designation	Thermal Continuous Test Current Amperes	Maximum current, Amperes								Maximum Volt-Amperes	
		120 Volt		240 Volt		480 Volt		600 Volt		600 Volt	
		Make	Break	Make	Break	Make	Break	Make	Break	Make	Break
A600	10	60	6.00	30	3.00	15	1.5	12	1.2	7200	720

## Pilot Lights

Rated Insulation Voltage (Ui)	500V	
Rated Operating Voltage (Ue)	Voltage	6V, 12V, 24V AC/DC
	Transformer	120V, 230V, 240V, 380V, 480V AC
Impulse Withstand Voltage (Uimp)	4kV	
Insulation Resistance	100 MΩ minimum (500V DC)	
Frequency	50/60Hz	
Power Consumption (approx.)	Full Voltage	0.3W
	Transformer	1.5VA
Life (reference value)	Approx. 40,000 hours	

Note: Because the built-in LED lamp is a high-brightness version, the lamp may light dimly due to induction even when power is off.

## Meters

Accuracy Class	2.5	
Insulation Resistance	100 MΩ minimum (500V DC megger)	
AC ammeter	Rated Insulation Voltage (Ui)	300V
	Operation	Moving core
	Impulse Withstand Voltage (Uimp)	4kV
	Power Consumption	1VA
	Measurement	5A, 10A, 30A, 50A, etc
	Input (CT Ratio)	1A, 5A
Extended Memory	3 times, etc	
DC ammeter	Rated Insulation Voltage (Ui)	150V
	Operation	Moving coil
	Impulse Withstand Voltage (Uimp)	2.5kV
	Input	0 to 10V DC, 4 to 20mA, etc.
	Power Consumption	0.15W
	Consumption Current	1mA

Note: Use a commercially available CT (current transformer) for all AC ammeters, and install the CT in a non-hazardous location.

## PART NUMBERS

### Pushbuttons



#### Part Number Structure

**EU2B - YB1 11 F S D**

##### Operator (style / function)

B1 : Flush pushbutton / Momentary  
B2 : Extended pushbutton / Momentary  
B3 : Mushroom pushbutton / Momentary

##### Contact arrangement

10 : 1NO      01 : 1NC  
20 : 2NO      02 : 2NC  
30 : 3NO      03 : 3NC  
11 : 1NO-1NC    12 : 1NO-2NC  
21 : 2NO-1NC

##### Button color

Blank: Red, Green, Black, and White included  
Y : Yellow S : Blue

##### Terminals

F : Finger-safe terminal (IP20)  
C : Exposed screw terminal

Note: Use only when interpreting part numbers. Do not use for developing part numbers.

Part Number	Style and Function	Contact Arrangement	Weight (Approx.)	① Button Color
EU2B-YB110④①-D	Flush Momentary	1NO	68g	① Blank - supplied with red, green, black, and white buttons  For yellow or blue buttons, specify Y (yellow) or S (blue).
EU2B-YB101④①-D		1NC		
EU2B-YB111④①-D		1NO-1NC	92g	
EU2B-YB120④①-D		2NO		
EU2B-YB102④①-D		2NC		
EU2B-YB121④①-D		2NO-1NC	116g	
EU2B-YB112④①-D		1NO-2NC		
EU2B-YB130④①-D		3NO		
EU2B-YB103④①-D		3NC		
EU2B-YB210④①-D	Extended Momentary	1NO	70g	Specify a button color code in place of ① in the part number  B : black G : green R : red S : blue W : white Y : yellow
EU2B-YB201④①-D		1NC		
EU2B-YB211④①-D		1NO-1NC	94g	
EU2B-YB220④①-D		2NO		
EU2B-YB202④①-D		2NC		
EU2B-YB221④①-D		2NO-1NC	118g	
EU2B-YB212④①-D		1NO-2NC		
EU2B-YB230④①-D		3NO		
EU2B-YB203④①-D		3NC		
EU2B-YB310④①-D	Mushroom Momentary	1NO	76g	
EU2B-YB301④①-D		1NC		
EU2B-YB311④①-D		1NO-1NC	101g	
EU2B-YB320④①-D		2NO		
EU2B-YB302④①-D		2NC		
EU2B-YB321④①-D		2NO-1NC	125g	
EU2B-YB312④①-D		1NO-2NC		
EU2B-YB330④①-D	3NO			
EU2B-YB303④①-D	3NC			

Note: ① Button Color.

Specify a contact terminal style in place of ④ in the part number: F (Finger-safe terminal), C (Exposed screw terminal)

For flush and extended models, a boot is required for Type 4X applications. Without boot, switches meet IP65.

### Emergency Stop Switches



#### Part Number Structure

**EU2B - YBV3 11 F R**

##### Operator (style / function)

BV3 : 40mm mushroom/push, pull or twist release

##### Contact arrangement

01 : 1NC  
11 : 1NO-1NC  
02 : 2NC  
03 : 3NC  
12 : 1NO-2NC

##### Button color

R : Red

##### Terminals

F : Finger-safe terminal (IP20)  
C : Exposed screw terminal

Note: Use only when interpreting part numbers. Do not use for developing part numbers.

Part Number	Operator	Contact Arrangement	Weight (Approx.)	Button Color
EU2B-YBV301④R	ø40 Mushroom	1NC	96g	R : Red
EU2B-YBV311④R		1NO-1NC	120g	
EU2B-YBV302④R		2NC		
EU2B-YBV312④R		1NO-2NC	144g	
EU2B-YBV303④R		3NC		

Specify a terminal style in place of ④ in the part number: F (Finger-safe terminal), C (Exposed screw terminal)

### Pilot Lights



#### Part Number Structure

**EU2B - YL1 22 F D R**

##### Operator (style / function)

L1 : Pilot Light / dome

##### Lens/LED Colors

R : Red G : Green A : Amber  
Y : Yellow PW : White S : Blue

##### Operating voltage

126 : AC 120V (Transformer type)    66 : AC/DC 6V (Full voltage type)  
246 : AC 240V (Transformer type)    11 : AC/DC 12V (Full voltage type)  
386 : AC 380V (Transformer type)    22 : AC/DC 24V (Full voltage type)  
486 : AC 480V (Transformer type)

##### Terminals

F : Finger-safe terminal (IP20)  
C : Exposed screw terminal

Note: Use only when interpreting part numbers. Do not use for developing part numbers.

Part Number	Type	Operating Voltage	Weight (Approx.)	① Illumination Color Code
EU2B-YL1126④D①	Transformer	120V AC	150g	R : red G : green A : amber Y : yellow PW : white S : blue
EU2B-YL1236④D①		230V AC		
EU2B-YL1246④D①		240V AC		
EU2B-YL1386④D①		380V AC		
EU2B-YL1486④D①		480V AC		
EU2B-YL166④D①	Full Voltage	6V AC/DC	108g	
EU2B-YL111④D①		12V AC/DC		
EU2B-YL122④D①		24V AC/DC		

Note: ① Illumination Color.

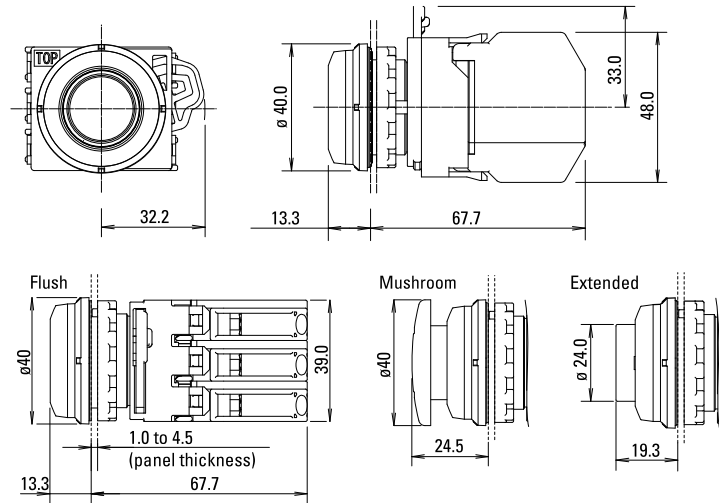
Specify a contact terminal style in place of ④ in the part number: F (Finger-safe terminal), C (Exposed screw terminal)

## DIMENSIONS

All dimensions in mm

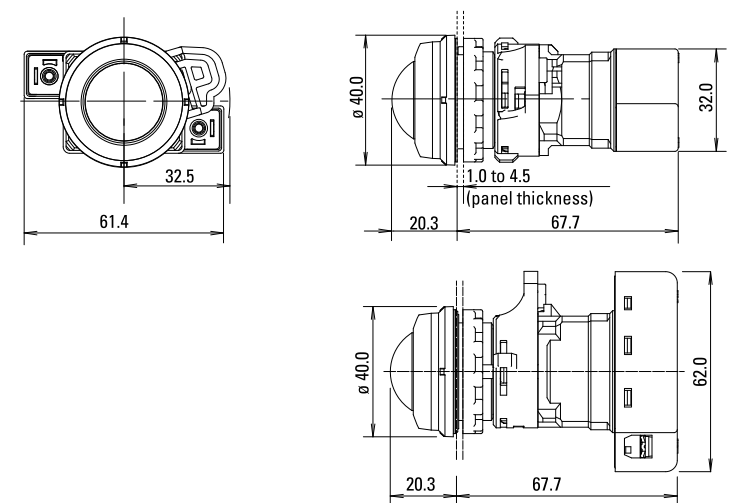
### Pushbuttons

Shown with finger-safe contacts



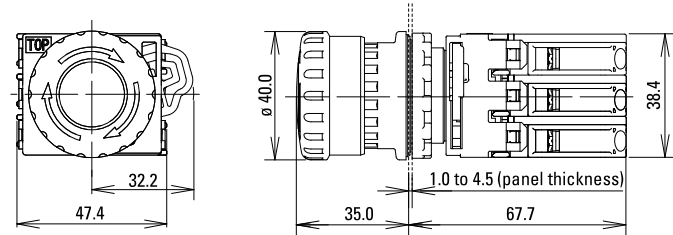
### Pilot Lights

Shown with finger-safe contacts



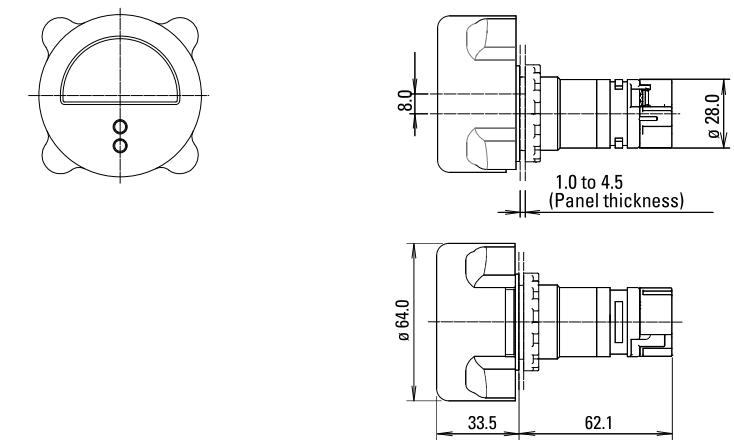
### Emergency Stop Switches

Shown with finger-safe contacts



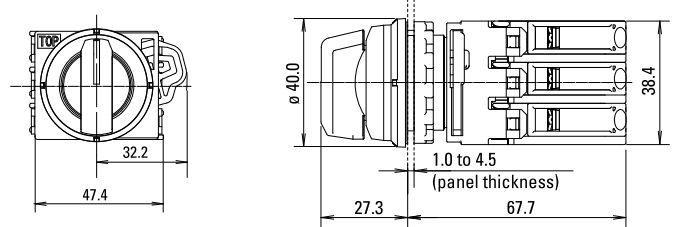
### Meters

Shown with finger-safe contacts



### Selector Switches

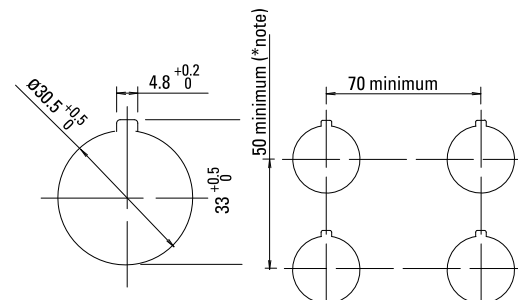
Shown with finger-safe contacts



### Mounting Hole Dimensions

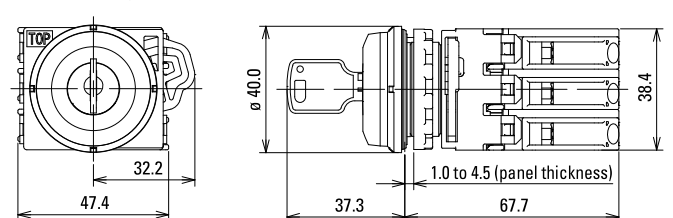
Panel thickness: 1.0 to 4.5 mm.

\*Note: The meter can be mounted on the top mounting holes of a standard 50mm mounting centers. The meter can be mounted on any mounting hole with a 70mm or larger mounting center.



### Key Selector Switch

Shown with finger-safe contacts


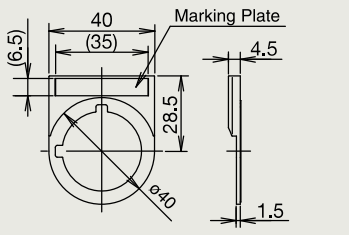


## ACCESSORIES






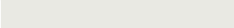

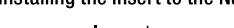
All dimensions in mm

### Nameplates

Used for pilot light, pushbutton, selector switch, and key selector switch.

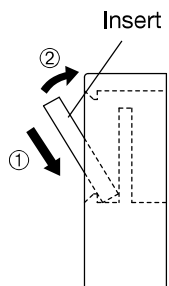
Appearance	Part Number	Dimensions
	EU9Z-NM	

### Nameplate Inserts

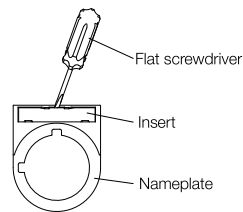
Appearance	Legend	Part Number
	Blank	EU9Z-NP0
	ON	EU9Z-NP1
	OFF	EU9Z-NP2
	START	EU9Z-NP3
	STOP	EU9Z-NP4
	OFF-ON	EU9Z-NP31
	HAND-AUTO	EU9Z-NP35
	HAND-OFF-AUTO	EU9Z-NP53

Material: Aluminum

Installing the Insert to the Nameplate



Removing the Insert from the Nameplate


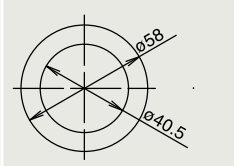

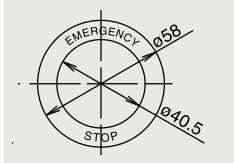


To remove the Insert, insert a flat screwdriver between the Insert and Nameplate.

### Rubber Boots

Appearance	Description/Usage	Part Number
	For Flush Pushbuttons	
	Not for use with name plate	EU9Z-DB1
	For use with name plate	EU9Z-DB1N
	For Extended Pushbuttons	
	Not for use with name plate	EU9Z-DB2
	For use with name plate	EU9Z-DB2N

### Emergency Stop Switch Nameplate Stickers

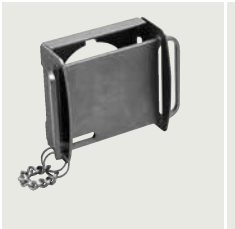
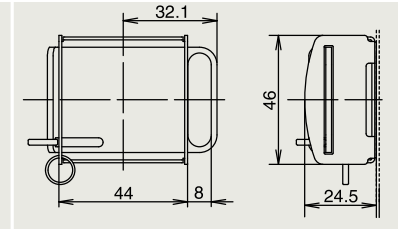
Appearance	Legend	Part Number	Dimensions
	Blank	EU9Z-NVS0	
	Emergency Stop	EU9Z-NVS27	

Material: yellow vinyl Legend: black

### Padlock Cover

EU2B-YB2 extended pushbutton: to maintain latched status


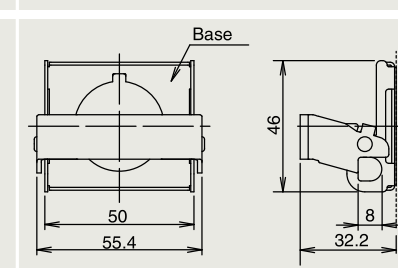
EU2B-YB1 flush pushbutton/EU2B-YSK key selector switch: to prevent operation

Appearance	Part Number	Dimensions
	EU9Z-PC	

Material: Stainless Steel

### Emergency Stop Switch Padlock Cover

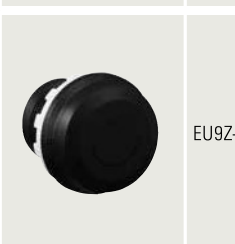
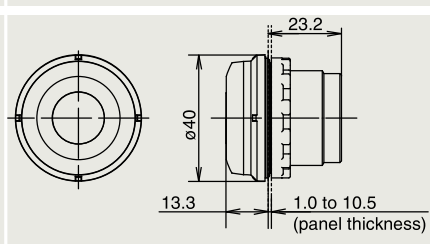
Used with EU2B-YBV emergency stop switch to maintain the switch in the latched status.

Appearance	Part Number	Dimensions
	EU9Z-PCE	




Coating: yellow Material: Stainless Steel

### Mounting Hole Plug

Used to plug unused mounting holes (ø30.5) on the mounting panel.

Appearance	Part Number	Dimensions / Usage
	EU9Z-BP	

## Buttons

Appearance	Style	Part Number	Button Color Code
	Flush	HW1A-B1①	Specify a color code in place of ① in the Ordering Number. R : red G : green B : black Y : yellow W : white S : blue
	Extended	HW1A-B2①	
	ø40 Mushroom	HW1A-B4①	

Material: Polyacetal

## Lenses

Appearance	Lens Color	Part Number
	Red	EU9Z-LR
	Green	EU9Z-LG
	Amber	EU9Z-LA
	Yellow	EU9Z-LY
	White	EU9Z-LW
	Blue	EU9Z-LS

Material: AS resin (gasket supplied)

## LED Lamps



Operating Voltage	Current Draw		Part Number	Illumination Color Code	Base
	AC	DC			
6V AC/ DC±10%	8mA	7mA (A, R, W) 5.5mA (G, PW, S)	LSTD-6①	Specify a color code in place of ① in the part number R : red G : green A : amber PW : white S : blue Use a white (PW) LED with yellow (Y) lens.	BA9S/13
12V AC/ DC±10%	11mA	10mA	LSTD-1①		
24V AC/ DC±10%	11mA	10mA	LSTD-2①		

## OPERATING INSTRUCTIONS

### Wiring

#### Applicable Wires

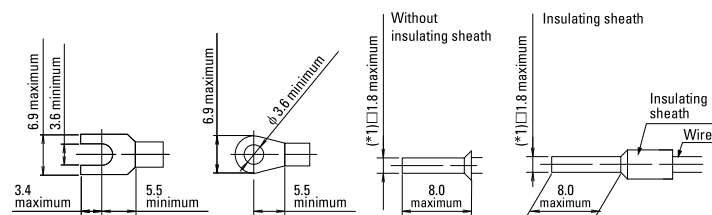
Stranded wire: 1.5 to 2.5 mm<sup>2</sup>, solid wire: ø1.2 to ø1.6 mm (AWG16 to 14)

Note: Do not connect more than 2 wires to the same terminal.

#### Applicable crimping terminal

Ring and spade terminals cannot be used with IP20 finger-safe terminal blocks.

When connecting 2 ferrules to the EU2B control unit, use ferrules without insulating sheath.



Recommended crimping terminal (WAGO)

Ferrule with insulating sheath: 216-204

Ferrule without insulating sheath: 216-104

Crimping plier: 206-204

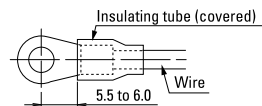
#### Recommended Tightening Torque

EU2B control units (M3.5): 1.0 to 1.3 N·m

### Warning

Incorrect wiring may cause fire hazard. Observe the following conditions.

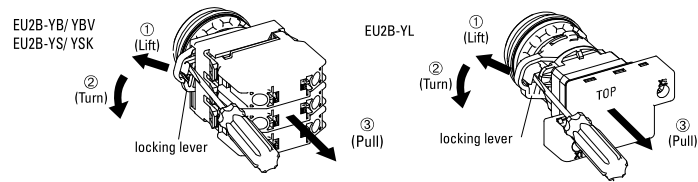
- Be sure to install an insulating sheath on the crimping terminal or the crimping terminal with insulation.
- When connecting solid wires or stranded wires directly, strip the insulation, mentioned below, and insert the wire all the way in.  
EU2B Control units: 8.6 mm maximum  
Crimping terminal: 8 to 9 mm
- When using stranded wires, make sure that there are no wire whiskers.
- Make sure that the spade crimping terminals and ferrules are inserted all the way in.





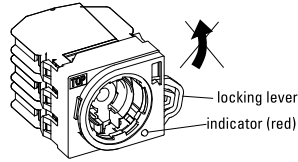
## Removing and Installing the Contact Unit / Lamp Unit

To remove the contact unit or the lamp unit from the operator, pull the protruding yellow part of the locking lever outwards as shown in the figure below using a screwdriver, and turn it to the left. The contact unit or lamp unit can be removed.



When the contact unit is removed from the emergency stop switch operator, the NO contact closes and the NC contact opens.

Do not turn the locking lever when the contact unit is removed from the operator (the red indicator is protruding out. See the figure below) or the switch can be damaged.



## Panel mounting for the operator, lens unit and meter

Remove the locking ring from the operator and check that the rubber gasket is in place. Insert the operator from the panel front into the panel hole. Place the projection on the operator with TOP marking upward and the recess on the mounting panel in the same direction. (The meter has no projection.)

Tighten the locking ring using ring wrench XN9Z-T1 to a torque of 2.5 Nm. When using a nameplate or padlocking cover, install it between the operator and panel. Make sure that the groove of the nameplate or padlocking cover and the projection on the TOP marking of the operator are in the same direction.

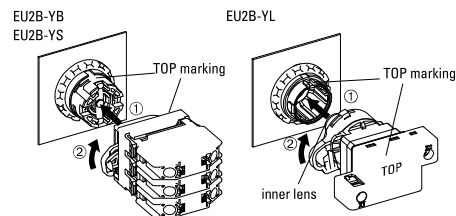
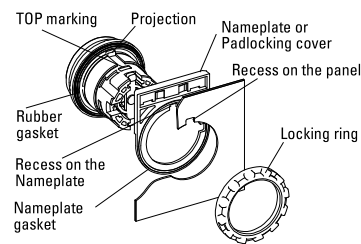
Note: The locking ring for emergency stop switches and meter is metallic. The meter can't mount the nameplate or padlocking cover.

## Installing the contact unit and lamp unit

To install the contact unit, place the TOP marking on the operator and the TOP marking on the contact block adapter in the same direction, and then attach the contact unit to the operator. Then turn the locking lever to the right. Follow the same procedure when installing the lamp unit.

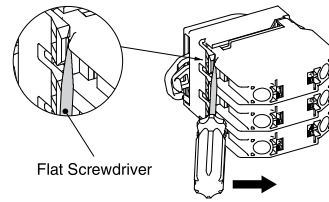
When installing the lamp unit, check that the inner lens is not loose.

The contact block adapters for emergency stop switches cannot be used for the pushbutton, selector and key selector switches.



## Removing the Contact Block

To remove the contact block, insert a flat screwdriver under the latch of the contact block adaptor and disengage the latch as shown in the figure below.



## Installing the Contact block

When installing the contact block after maintenance or wiring, make sure that the contact configuration is correct. Installing the contact block in the incorrect position or incomplete installation may cause malfunction of the switch.

Remove the contact block from the operator before installing the contact block to the contact block adaptor. Also make sure that the contact block is correctly installed to the contact block adaptor before attaching the operator. Do not install the contact block adaptor with the operator attached. Otherwise, malfunction may result.

## Accessories

### Padlock Cover

The following padlocks and hasps can be used.

(Padlock Size)	a	b	c
Flush/extended pushbutton/key selector switch	ø3.5 to 7.0 mm	15 mm min.	70 mm max.
Emergency Stop Switch	ø5.5 to 7.0 mm	—	—

### Recommended Hasp

Manufacturer	Part No.
Panduit	PSL-1, PSL-1A, PSL-1.5, PSL-1.5A, PSL-HD1
Master Lock	420, 421

Padlock and hasp are available in various shapes and sizes. Make sure that they do not interfere with the control units. Note: Not supplied by IDEC.

Keep the total weight of padlock and hasp under 1500g max, otherwise the switch may malfunction or result in failure. No vibration should be applied when padlock or hasp are installed. When padlock or hasp are disfigured, stop usage immediately.

Ensure that no shock or electric sparks are generated.

When using the plate lock padlock cover with the extended pushbutton, the switch contact may turn on/off when the cover is being installed. Ensure to provide functional safety measure to prevent unexpected startup.

When using the padlock cover on the safety-related part of the control system, observe safety standards and regulations of the relevant country or region. Also be sure to perform risk assessment before operation.

## Installing EU9Z-PC Padlock Cover

(Flush/extended pushbutton/key selector switch)

EU9Z-PC can be installed in the following two ways.

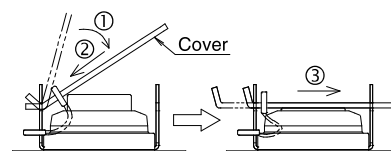
Remove the cover in the reverse step of installing the cover. Do not install or remove the cover forcefully, or it will cause failure.

[Installation A]



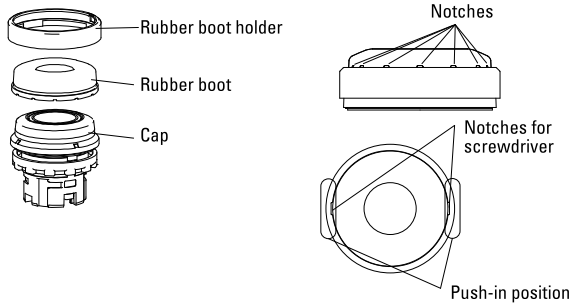
[Installation B]

This method is effective when the neighboring control unit interferes when installing in method A.



## Installing EU9Z-DB Rubber Boots

To install the rubber boot on flush and extended pushbuttons, place the rubber boot on the cap and push the rubber boot holder straight. The notches around the rubber boot must show evenly.

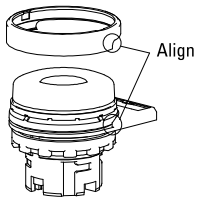


Push the rubber boot holder further around on the two notches on the holder so that the holder fits the button completely.

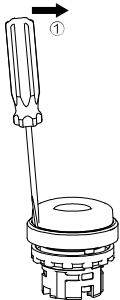
Make sure that the rubber boot and rubber boot holder are installed straight.

On Nameplate Types, the EU2B and the rubber boot holder must be aligned so that when installed, the anti-rotation projection on the EU2B comes to the center of the groove on the holder.

Make sure that the rubber boot is installed completely, otherwise water droplets might enter the rubber boot, but no water will enter the control box.



To remove the rubber boot from the flush and extended pushbuttons, gently insert the slotted screwdriver (0.5t x 4w or below) inside a notch on the rubber boot holder and tilt to the direction shown by the arrow ①. To prevent damage, do not apply excessive force to the EU2B when removing the rubber boot.



## Maintenance and Inspection

EU2B switches should be installed in an appropriate control box.

### Maintenance and Inspection Method

Perform daily or periodical maintenance and inspection for items such as damage and temperature rise of the EU2B switches listed in the Maintenance and Inspection table below.

### Maintenance and Inspection

Inspection Items	Inspection Method	Inspections	Measures
Enclosure base	Visual	No rusting No damages	Cleaning Rust-resistant treatment
Tightening bolt, screws	Visual, tactile	No loosening No rusting	Tightening Cleaning
Packings	Visual	No cracks No apparent deformation	Replacement
Connecting parts	Visual, tactile	No loosening of screws No dirt on insulation materials	Tightening Cleaning
Temperature rise	Thermometer, tactile	Surface temperature 80°C max.	Investigate the cause

## Disposal

Observe laws and regulations set by each country concerning refuse disposal.

## Safety Precautions

Use EU2B switches that are applicable for use in hazardous areas (potentially explosive atmosphere where explosive gas or vapor may exist), otherwise explosion or fire hazard may result.

- EU2B switches can be installed only in zones 1 and 2. Do not use in zone 0.
- Turn power off to the EU2B switches before installation, removal, wiring, or maintenance, otherwise explosion, fire hazard, or electric shock may result.
- Do not disassemble, repair, or modify, otherwise damage or accident may result.
- Do not use damaged EU2B switches, otherwise damage or accident may result.
- When connecting external devices, make sure that each cable is connected to the correct terminal, otherwise electric shock, fire hazard, or explosion may result.
- Use wires of a proper size to meet voltage and current requirements. Incorrect wiring may cause abnormal temperature rise and lead to fire hazard and explosion.
- Connect the grounding terminal to a proper ground, otherwise electric shock, fire hazard, or explosion may result.
- Operate the EU2B switches at the rated current and voltage specified in this catalog, otherwise short-circuiting, fire hazard, or explosion may result.
- Stop operation immediately if abnormal operation occurs. Otherwise, a secondary accident may occur.

