# INSTRUCTION MANUAL

## **EC2C Control Boxes** (Flameproof and Increased Safety Construction)

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

### **Safety Precautions**

In this instruction manual, safety precautions are categorized by Warning and Caution:

Warning indicates that improper operation may cause severe personal injury or death.

### **↑** CAUTION

Caution indicates that inattention might cause personal injury or damage to equipment.

## 

#### (General requirements)

- Use FC2C control poxes that are applicable for use in hazardous areas, otherwise explosion or fire hazard may result. (Hazardous area: potentially explosive atmosphere where explosive gas or vapor may exist) EC2C control boxes are ATEX certified products. EC2C cannot be
- EC2C control boxes can be installed only in zones 1 and 2. Do not use in zone 0.
- Turn power off to the EC2C control box before installation, removal, wiring, maintenance, or inspection otherwise explosion fire hazard or electric shock may result
- Special expertise is required to transport install, wire, operate, maintain, and inspect the EC2C control box. People without such expertise must not use the EC2C control box, otherwise damage or accident may result.
- Do not disassemble, repair, or modify, otherwise damage or accident may result.
- Do not use a damaged the EC2C control box, otherwise damage or accident may result.
- When connecting with 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.
- The grounding terminal must be installed, otherwise electric shock, fire hazard, or explosion
- Do not sit on or hang from the EC2C control box, otherwise damage, personal injury, or accident may result (Operation)

- Do not open the cover of the EC2C control box during operation, otherwise electric shock, fire hazard, or explosion may result.
- Operate the EC2C control box under the rated current and voltage specified in this instruction manual, otherwise short-circuiting, fire hazard, or explosion may result

## (Maintenance and inspection)

• When maintenance and inspection of the EC2C control box, make sure that potentially explosive atmosphere of explosive gas or vapor does not exist in the vicinity, otherwise explosion may result. Do not touch the terminal carelessly. Otherwise, electric shock may

## **CAUTION**

### (General requirements)

- Do not place any obstacles in front of the nameplate
- Do not remove the nameplate.
- When opening the cover for wiring, maintenance or inspection, make sure that substances such as dust, concrete powder, or metal powder do not enter inside the box, otherwise contact failure or insulation failure may result.

## (Transportation)

Be careful not to drop or topple the EC2C control box during transportation.

## (Unpacking)

(Operation)

• Be sure to open the carton the right way up, otherwise damage or personal injury may result. • Check that the product is what you have ordered. Using an incorrect model might result in malfunction or accident

### may occur.

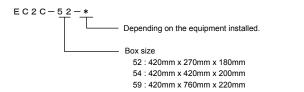
• Stop operation immediately if abnormal operation occurs. Otherwise, a secondary accident

## (Maintenance and inspection)

● The surface temperature of the EC2C control box may become extremely high during operation. Before maintenance or inspection of the EC2C control box, be sure to wear gloves to prevent burn on your hand

## 1 Product Structure

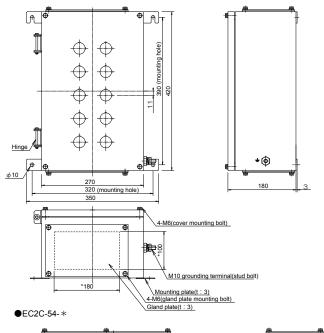
(1) Type number

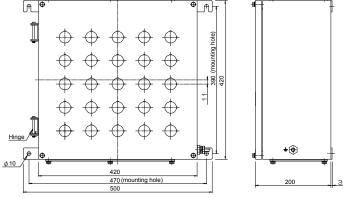


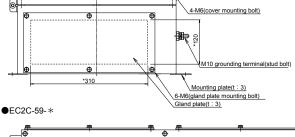
#### (2) Description of parts and dimensions

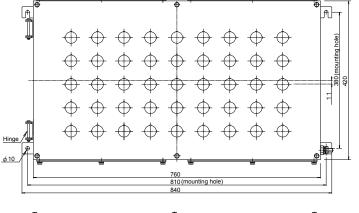
#### 1) Dimensions

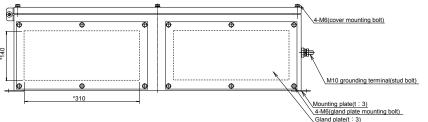
- ·Below are examples of hole processing on a control box surface and mounting of the gland plate.
- \* Dimensions marked with \* show the surface area range of the fitting or the locknut that can be mounted
- ●EC2C-52-\*











#### (3) Attachments

Operating humidity

**+**⊕

1) Attachments for all models

Hexagon wrench Hex 2...

Instruction manual (Japanese / English). .1 each 2) Attachments for HPN type cable lead-in fitting

2 Product Specifications IEC/EN60079-0, IEC/EN60079-1, IEC/EN60079-7 Applicable standards IEC/EN60079-31 Group and category Œx II2GD Ex d e IIC T6 Gb, Ex tb IIIC T80°C Db IP65 Explosion protection TÜV 12 ATEX 7189X Certificate number IP65 (IEC/EN 60529) Degree of protection Stainless steel 316L(body, cover) Box material Rated insulation voltage 600V (depends on the installed devices (Pilot light: 500V) (Terminal block WDU2.5: 550V) (AC ammeter: 300V) (DC ammeter or voltmeter: 150V) Dielectric strenath 2500V AC, 1min (depends on the installed devices) (Pilot light: 2000V AC, 1min) (AC ammeter: 1600V AC, 1min) (DC ammeter or voltmeter: 1500V AC, 1 min) Insulation resistance  $100M\Omega$  minimum (500V DC megger) Operating temperature -20 to +50°C (no freezing)

(Note) When using the EC2C control box, the allowable temperature rise of the cable and conduit wiring lead in the box must be taken into consideration. Use a cable or insulated wire with a heat-resistant temparature of 70°C or higher.

45 to 85% RH (no condensa

(2) Pushbutton switch (EU2B-YB) / Selector switch (EU2B-YS)

Key Selector switch (EU2B-YSK) / Emergency stop switch (EU2B-YBV)

2000m maximum

Contact ratings						
Rated insulation voltage (Ui)	600V	600V				
Thermal current (Ith)	10A(*)	10A(*)				
Rated operating voltage (Ue)	24V 120				240V	500
Rated operating current (le)	AC	Resistive load (AC12)	10A(*)	10A(*)	6A	2.8/
	50/60Hz	Inductive load (AC15)	10A(*)	6A	3A	1.4/
	DC	Resistive load (AC12)	8A	2.2A	1.1A	-
	D0	Inductive load (AC13)	4A	1.1A	0.55A	-

(Note) (\*)10A ( < 2 contact blocks per control unit)

9A ( = 3 contact blocks per control unit)
Minimum switching capacity (reference): 5mA at 3V AC/DC

(applicable range may vary with operating conditions and load types)

1 pc

Specifications				
Contact resistance	50m Ω maximum (initial value)			
Impulse withstand voltage (Uimp)	6kV			
Insulation resistance	100 MΩ minimum (500V I	DC megger)		
Short-circuit protective device	250V/10A fuse (Type aM I	EC60269-1/ IEC60269-2)		
Conditional short-circuit current	1,000A			
Mechanical durability	Pushbutton switch	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 durability	Pushbutton switch	250,000 operations minimum		
		(at 1,800 operations/hour)		
	Selector switch	250,000 operations minimum		
		(at 900 operations/hour)		
	Key Selector switch	250,000 operations minimum		
		(at 900 operations/hour)		
	Emergency stop switch	50,000 operations minimum		
		(at 900 operations/hour)		
Minimum Direct Opening Force	Emergency stop switch: 60 N			
Minimum Direct Opening Travel	Emergency stop switch: 7.0 mm			
Maximum Travel	Emergency stop switch: 9.0 mm			

-Notes for Operation-

 Contact bouncing
 When the control unit is operating, the contacts will bounce. When designing a control circuit, take the contact bounce time into consideration (reference value: 20 ms)

(3) Pilot light ( FU2B-YI )

7) T HOT HIGHT ( LOLD TL)	
Rated insulation voltage (Ui)	500V
Rated operating voltage (Ue)	6, 12, 24V AC/DC (Full voltage type)
	100/110, 115, 120, 200/220, 230, 240, 380,
	400/440, 480V AC (Transformer type)
Impulse withstand voltage (Uimp)	4kV
Insulation resistance	100MΩ minimum (500V DC megger)
Frequency	50/60Hz
Rated power consumption (approx.)	0.3W (Full voltage type)
	1.5VA (Transformer type)
Life (reference value)	Approx. 40,000 hours
- Notes for Operation —	

 The LED built-in lamp is super bright type. Note that the LED lamp may turn on even when the power is turned off because of induction

· IDEC does not guarantee replacement of control units, nameplate, LED lamp, or padlocking cover by the customer because it may affect explosion protection characteristics. Call IDEC when you need to replace control units, LED lamps, nameplate, or padlocking cover. (4)Meter (EU2B-YM)

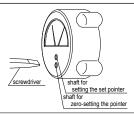
Accuracy Clas	SS	2.5	
Insulation Res	sistance	100MΩ minimum(500V DC megger)	
	Rated Insulation Voltage(Ui)	300V	
	Principle of action	Moving-iron instrument	
	Impulse Withstand Voltage(Uimp)	4kV	
AC ammeter	Power Consumption	1VA	
	Specification of Measuring Range	5A, 10A, 30A, 50A etc.	
	Specification of Input Current	1A, 5A	
	Specification of Overload Scale	3 times etc.	
	Rated Insulation Voltage(Ui)	150V	
	Principle of action	Permanent-magnet moving -coil instrument	
DC ammeter		2.5kV	
DC voltmeter	Specification of Input Current or Voltage	0 to 10V DC, 4 to 20mA DC etc.	
	Power Consumption (for DC ammeter)	0.01W	
	Consumption Current (for DC voltmeter)	1mA	

 For AC ammeter of measuring range of 10A or avobe. use a current transformer commercially available. Install the current transformer in the non-hazardous area.

Note:Zero-setting the pointer and setting the set pointer.

· Using a flat screwdriver with the tip of 0.8t×5w or smaller, adjust the pointer and the set pointer by turning the shafts as shown at the right. Do not apply excessive force on the shaft, otherwise the shaft will be damaged

· DC voltmeter and DC ammeter do not require zero



## 3 Unpacking

Check that the product is what you ordered, and that there are no damages on parts. Contact your sales representative if any parts are missing or damaged.

## 4 Notes on Operation

(1) Installation location

Do not install the EC2C control box in an environment higher than IP65 protection degree.

2) Ambient temperature: -20 to +50°C

If the control box is exposed to direct sunlight and the surface temperature may rise above 50°C, provide a shroud to keep the surface temperature below 50°C.

1) Use four M8 bolts, or other methods with equivalent strength to install the control box.

The thickness of mounting plate is 3 mm. (See dimensions) 2) If bolts become loose due to vibration, use spring washers.

3) If bolt corrosion occur, use anti-corrosion bolts or other countermeasures.

(3) Note for emergency stop switch

When using the emergency stop switch for safety-related equipment in a control system, to make sure of correct operation, refer to the safety standards and regulations in each country and region depending on the application purpose of the actual machines and installations. Before using the emergency stop switch, perform risk assessment to make sure of safety.

(4) Opening/ Closing the Cover

1) Loosen cover mounting bolts, while holding the unhinged side, open the cover slowly without exerting excessive force on the hinge.

2) Before closing the cover, make sure of the following: No foreign substances on the packing or joint surfaces

No displacement of the waterproof packing

Wires are not caught between the joint surfaces

· Cover mounting bolt is either not caught between the lid and the body.

Then, close the cover slowly,temporary fixing and tighten the cover mounting screws to a proper torque of 2.4 to 3.0 N·m.

(5) Removing/Installing the gland plate, hole processing

- 1)Loosen the mounting bolts to remove the gland plate
- 2)When opening a hole in the gland plate, refer to the specification of the fitting
- 3)Be sure that the fitting is ATEX certified (Explosion protection: II2GD Ex e II) and performance of at least IP65 and install properly.
- 4)Before installing the gland plate, make sure of the following:
- No foreign substances on the packing or joint surfaces

No displacement of the waterproof packing

Then, install the gland plate, temporary fixing and tighten evenly the gland plate mounting bolts to a proper torque of 2.4 to 3.0 N·m.

(Note)Check that the gland plate mounting bolts are tightened correctly, after tightening the

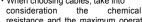
#### (6) Leading conductors into the control box

- 1) (1) Lead-in cables
- When leading cables, use ATEX certified packing type cable lead-in fitting.
- Follow the procedure as described in " 8 Leading in Cables with HPN Flameproof Packing

Type Cable Lead-in Fitting . (See diagram below)						
Flameproof packing type	Applicable cable diameter (mm)	Dimensions (mm)				
cable lead-in fitting Type no.	ead-in fitting Type no. D		В	L		
HPN21 R8E	φ6≤D≤φ8		04/0	67 to 70.5		
HPN21 R10E	φ8 < D ≤ φ 10	36	G1/2 (16)			
HPN21 R12E	φ 10 < D ≤ φ 12					
HPN22 R14E	φ 12 < D ≤ φ 14	40	G3/4	07 4- 70 5		
HPN22 R16E	φ 14 < D ≤ φ 16	40	(22)	67 to 70.5		
HPN33 R18E	φ 16 < D ≤ φ 18		G1 (28)	77.5. 04		
HPN33 R20E	φ 18 < D ≤ φ 20	50		77.5 to 81		

(Note) The dimension of B in ( ) is the nominal designation of the applicable metal conduit. (JIS C 8305)

When choosing cables, take into



resistance and the maximum operating temperature of the EC2C control box. The cable should have as little loose space as possible to prevent ingress of explosive gas through the cable. Choose cables with flat, smooth surface and round in cross-section.

Size and insulation material of the cable must be selected in consideration of the temperature rise of the cable.

Protect the cables from external damage by covering the cables with conduits or by providing a concrete duct to install the cable.

②Attaching fitting to G thread, M thread, and an NPT thread, and lead-in metal conduits

When constructing conduit lines, observe laws and regulations set by each country.

Make sure that the protection degree IP65 is achieved.

- · Choose conduit wiring size and insulation material in consideration of the temperature rise
- Thread the metal conduit appropriately and connect firmly with the box and fittings.
- · On the conduit line, install a sealing fitting on either sides of the boundary between hazardous areas, between hazardous and non-hazardous, and in the vicinity of the control box.

### (7) Limitation of the operating current

- 1) The major heat source comes from the wiring which is connected to the control box. Therefore, not only the operating current but wiring conditions (size, no. of wires, no. of wire bundles) may cause temperature rise.
- When wiring, observe the following conditions
- Stranded wire: 1.25 to 2.5 mm<sup>2</sup>, solid wire:  $\phi$  1.2 to  $\phi$  1.6 mm (16 to 14 AWG)
- Maximum no. of wires per bundle: 16 Maximum operating current (Ith): 10A(switch),5A(meter)
- (Note) However, determine the operating current so that the total heat value of 1 control box is

Also, when calculating the heat value, take the current fluctuation (10%) into consideration.

Idea of total calorific value (450 [A2•wires]) about EC2C control box

Rating of control unit(Contact block) is stated as 10A/9A(2 contact/3 contact block by taking Maximum surface temperature:80°C (T6) into consideration.

As for the restriction method of the current, current restriction formula: [A2 • wires] is applied by taking the current and wiring condition into consideration.

We hereby make comparison between the case of turning on electricity with rated current to switch and the case of turning on electricity uniformly to all the circuit. It is obvious that the condition becomes severe at the case of turning on electricity with rated

current as temperature increase.

Therefore [A2•wires] at the time of turning on electricity with rated current is stated as follows.

## ①Apply 10A to 1 circuit, 1A to the remaining 19 circuits.

- $\{(10A \times 1.1)^2 \times 2 \text{ wires}\} + \{(2A \times 1.1)^2 \times 38 \text{ wires}\} = 426 \text{ (can be used.} < 450)$
- ②Apply 10A to 1 circuit, 2A to the remaining 19 circuits.  $\{(10A \times 1.1)^2 \times 2 \text{ wires}\} + \{(3A \times 1.1)^2 \times 38 \text{ wires}\} = 656 \text{ (cannot be used.} > 450)$
- calculation example: EC2C-54\*\* (40 circuit type) ]
- ①Apply 10A to 1 circuit, 1.4A to the remaining 39 circuits
- $\{(10A \times 1.1)^2 \times 2 \text{ wires}\} + \{(1.4A \times 1.1)^2 \times 78 \text{ wires}\} = 427 \text{ (can be used within 450)}$
- 2) Apply 10A to 1 circuit, 2A to the remaining 39 circuits.
- $\{(10A \times 1.1)^2 \times 2 \text{ wires}\} + \{(2A \times 1.1)^2 \times 78 \text{ wires}\} = 620 \text{ (cannot be used below 450)}$ calculation example: EC2C-59\*\* (90 circuit type) ]
- (1) Apply 10A to 1 circuit, 0.9A to the remaining 89 circuits.
- $\{(10A \times 1.1)^2 \times 2 \text{ wires}\} + \{(0.9A \times 1.1)^2 \times 178 \text{ wires}\} = 416 \text{ (can be used within 450)}$
- ②Apply 10A to 1 circuit, 1.5A to the remaining 89 circuits.
- $\{(10A \times 1.1)^2 \times 2 \text{ wires}\} + \{(1.5A \times 1.1)^2 \times 178 \text{ wires}\} = 727 \text{ (cannot be used below 450)}$
- 2) See the table below for the allowable operating current when applying current evenly to each

control box.				
Control box	Max. no.	Max no. of	Allowable operating	
type no.	of	[wires] ([wire	[wires] ([wires] × [bundle])	
,,	circuits	Without terminal blocks	With terminal blocks	(reference) (*2)
EC2C-52⊠	30	16×n	16×n	3A
EC2C-54⊠	60	16×n	16×n	2A
EC2C-59⊠	120	16×n	16×n	2A

(\*1) Make sure that the number of wires per bundle is below 16 by reducing the wiring or by jumper wiring. (n = Number of lead-in fitting)

The maximum number of wires per bundle may need to be further reduced depending on the wire size, lead-in fitting, or conduit size. (\*2) The allowable current value (reference) when applying current evenly to all circuits of the

maximum number of circuits. If it contains meter as follows

- 2A:1 meter circuit(5A) can be replaced 12 wires per bundle.
- 3A:1 meter circuit(5A) can be replaced 6 wires per bundle.

-Control unit rating-

10A (<2 contact blocks per control unit)

→Current restriction formura = [(10 x 110%)<sup>2</sup> x 4] = 484 [A<sup>2</sup>·wires] ·····①

9A (=3 contact blocks per control unit) →Current restriction formura = [(9 x 110%)<sup>2</sup> x 6] =589 [A<sup>2</sup>·wires]

Also the rating of the Pilot light satisfies 80°C (T6), and temperature increase is less than Control unit.

The specification of EC2C Contorol box is 450 [A<sup>2</sup>·wires] as the value of the current restriction formula by taking the margin into the consideration to the value of ① formula staed above,and the specification is applied to the control box of all sizes.

as for the conformation of the varidity for total calorific value apply the test with several conditions stated below, and it is confirmed that it would be no problem for temperature increase even though Ith turning on electricity and the impact for increasing the number of wires are taken into consideration.

Regarding the box for confirmation, EC2C-52, which is considered to be most disadvantageous as capacity,is selected for confirmation.

condition 1) including motive power(power x 1, switch x 3(3 contact for each)

 $(10 \times 1.1)^2 \times 2 + (3 \times 1.1)^2 \times 18 = 438$ 

condition 2) including meter max(meter x 7, switch x 3(3 contact for each)  $(5 \times 1.1)^2 \times 14 + (1 \times 1.1)^2 \times 18 = 445$ 

condition 3) including motive power and meter(power x 1, meter x 3)  $(10 \times 1.1)^2 \times 2 + (5 \times 1.1)^2 \times 6 = 424$ 

## 5 Wiring

(1) Applicable wires

Stranded wire: 1.25 to 2.5 mm<sup>2</sup>, solid wire:  $\phi$  1.2 to  $\phi$  1.6 mm (AWG16 to 14)

(Note) Do not connect more than 2 wires to the same terminal (2) Applicable terminal block:WDU2.5(N),SAK2.5\*,ZDU2.5(Weidmuller)/

UT2.5,UK2.5N,ST2.5(Phoenix) Protective conductor:WPE2.5(N),EK2.5N,ZPE2.5(Weidmuller)/

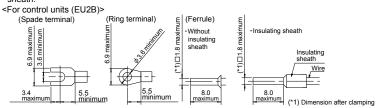
(3) Applicable crimping terminal

(Note) Do not use ring terminals for EU2B control units with IP20 protection.

(Note) Ring and spade terminals cannot be used for IP20 clamping type terminal blocks.

UT2.5-PE.ST2.5-PE.USLKG2.5N(Phoenix)

(Note) When connecting 2 ferrules to the EU2B control unit, use ferrules without insulating sheath



- <For terminal block (WDU2.5: Weidmuller)>
- Stripping length: 10mm
- (3) Recommended tightening torque
- EU2B control units (M3.5):1.0~1.3N·m
- WDU2.5 terminal block (M2.5): 0.4 to 0.8N·m

## **№** WARNING

ncorrect wiring may cause fire hazard. Observe the following conditions

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

## 6 Removing/ Installing the contact unit and lamp unit

<Removing the contact unit and lamp unit> To remove the contact unit or the lamp unit from the operator, pull the protruding part of the locking lever outwards as shown in the diagram (using a screwdriver etc.) and turn it to the left. The contact unit or lamp unit can be pulled out.

(Note) When the contact unit is removed from the emergency stop switch operator. the NO contact closes and the NC contact

Do not turn the locking lever when the contact unit is removed from the operator (the red indicator is protruding out. See the figure on the right). Otherwise, the switch may be damaged

<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 (Note) When installing the lamp unit,

check that the inner lens is not loose. (Note) Contact block adapters for emergency stop

switches cannot be used for pushbutton and selector switches.

Removing the contact block>

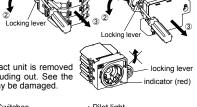
To remove the contact block, insert a flat screwdriver under the latch of the contact block adapter and disengage the latch. (See the figure below)

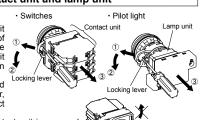
(Note) When reinstalling the contact block after maintenance or wiring make sure that the contact configuration is correct. Installing the contact block in the incorrect position or incomplete

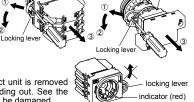
installation may cause malfunction of the switch. (Note) Make sure to remove the contact block from the operator before alling the contact block to the contact block adapter

Make sure that the contact block is correctly installed to the contact block adapter, and then attach the operator.

Do not install the contact block with the control block adapter attached to the operator. Otherwise, malfunction may result.



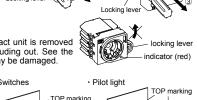


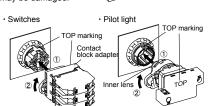


Insulating tube (covered)

Wire

5.5 to 6.0







5.5 to 7.0mm Recommended Hasp Manufacturer Type PSL-1.PSL-1A. PANDUIT Master Lock

Because a variety of shapes and sizes are available on the market for padlocks and control units during use.

The total weight of the padlock and hasp can be a maximum of 1500g. When the total weight exceeds this limit, the switch may malfunction or fail installed.

## 7 Protective Grounding

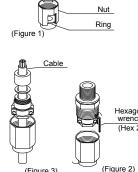
Protective grounding must be performed according to the installation environment and rating Observe laws and regulations set by each country.

- · Connect the M10 stud bolt of the EC2C control box to a proper ground (grounding resistance  $10\Omega$  maximum). When operating the EC2C control box by connecting to circuits below 300V, the grounding resistance must be 100 Ω maximum
- When using cables, connect one of the cable cores to the ground.
- Recommended tighting torque M10: 21.6 to 25.5 N·m.
- For grounding, use appropriate wires (size, material, insulation) that can tolerate the expected maximum grounding current. If outside of the stud bolt(M10) is installed, , be sure to protect the grounding wire with protection such as metal conduits from external damage

## 8 Leading in Cables with HPN Flameproof Packing Type Cable Lead-in Fitting

- (1) Description of parts (See figure 1)
- (2) Leading in cables
- (Note) Nipples are usually installed on the control box, and do not need to be removed when leading
- Do not remove the nipple as it will degrade explosion protection performance.
- Should the nipple be removed, make sure that the packing is attached and reinstall the nipple correctly. 1) Check if the cable diameter fits with the HPN
- flameproof packing lead-in fitting. If not, change the cable to fit to the size of the cable entry, or replace with a control box installed with a conduit that fits the diameter of the selected
- 2) Remove parts from the nipple in the order of nut. ring, gland, slip ring, and packing. The gland can be removed by loosening the gland set screw using a hexagon wrench (Hex 2). (Figure 2)
- 3) Attach the parts to the cable in order of nut, ring, gland, slip ring, and packing. (Figure 3)
- 4) Insert the packing and the slip ring onto the nipple Then, screw in the gland to compress the packing. Tighten the packing according to the diameter of the cable. When the cable fits the inner hole of the packing (pull the cable and make sure that the cable is not loose). Screw the gland in once If it is difficult to install the clamp, adjust the gland within the range of 1/3 of a turn.
- Then, tighten the gland set screw. (Figure 4)

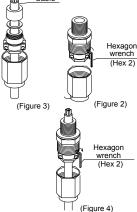
5) Screw the nut and ring onto the nipple.



Packing

Slip ring

Gland



## 9 Accessories

- (1) Color buttons for pushbutton switch:
- Flush/ HW1A-B1□, Extended/ HW1A-B2□, Mushroom/ HW1A-B4□ (Note) Specify a color code in place of  $\square$ .
- (R: red. G: green, B: black, Y: vellow, W: white, S: blue)
- (2) Color lens for pilot light: EU9Z-L□ (Note) Specify a color code in place of □.
- (R: red, G: green, A: amber, Y: yellow, W: white, S: blue)
- (Note) Use a white (W) color lens for pure white illumination. (3) Marking plate for nameplate: EU9Z-NP□

king plate lo	i namepiate. E09Z-NF□		
Code(□)	Legend	]	
0	Blank	Markir	ng plate
1	ON	②、 / for nai	meplate //// Flat screwdrive
2	OFF		Fial screwdive
3	START	l Min L	/ Marking pla
4	STOP	<b>\</b> \ \ \ \	for namepla
31	OFF-ON	1 1 1	
35	HAND-AUTO	ا الله [	Nameplate
53	HAND-OFF-AUTO	]	14 14 .
Illing the mar	king plate to a nameplate		(Figure 6)
£:	3.	1 1	$\smile$

- Instal (See figure 5)
- Removing the marking plate from a nameplate (See figure 6)
- To remove the marking plate, insert a flat screwdriver between the marking plate and nameplate
- (4) Notes for padlocking cover Applicable padlock and hasp are shown below Padlock size

PSL-1.5,PSL-1.5A,PSL-HD1

15 mm minimum 70 mm maximum

hasps, choose the appropriate type by making sure that they do not come in contact with

3.5 to 7.0mm

Do not impose excessive shocks to the Padlocking cover with the Padlock and the Hasp

Stop use immediately if the padlock cover is deformed, otherwise failure or damaged may

· Make sure that impact sparks are not generated.

- · When using plate lock type padlock covers on extended pushbutton switches, the switch contact may turn ON/OFF when installing the padlock cover on the pushbutton switches. Be sure to take preventive measures to avoid unexpected operations.
- · When using the padlock cover for safety related equipment in a control system, refer to the safety standards and regulations in each country and region depending on the use of the actual equipment and make sure of correct operation. Before using the padlock cover. perform risk assessment to make sure of safety.

#### (5) Earth bar

Whem using an earth bar installing and wiring in consideration of conditions of use. Wire keep board, be sure to use one of our specification. Recommended tighting torque M5: 1.8 to 2.2 N·m.

(Note) Only use accessories and spare parts specified by IDEC. Use of any other accessories and spare parts will void the warranty

## 10 Maintenance and Inspection

- (1) Notes for inspecting the EC2C control box
- 1) Observe the laws and regulations set by each country.
- 2) Do not open the cover while operating the EC2C control box 3) Never disassemble the control box.
- 4) Do not use tools that cause impact sparks during maintenance and inspection.
- 5) When using measuring devices, use explosion-protected types 6) When the EC2C control box needs to be disassembled or assembled for maintenance or repair, contact IDEC.
- (2) Maintenance and inspection
- 1) Perform daily or periodical maintenance and inspection for items such as damages and temperature rise of the control box listed in table 1.
- 2) To maintain explosion-proof performance, perform daily or periodical inspection listed in table 2. Perform visual inspection of the electrical wiring of the EC2C control box daily and periodically as the wiring is particularly subjected to external damage

#### Table 1 Maintenance and inspection examples

Inspection items	Inspection method	Inspections	Actions
		No rusting	<ul> <li>Cleaning</li> </ul>
Box base	Visual	No damages	<ul> <li>Rust-resistant</li> </ul>
			treatment
Tightening bolts,	Visual, tactile	No loosening	<ul> <li>Tightening</li> </ul>
screw	visual, lactile	No rusting	<ul> <li>Cleaning</li> </ul>
Packings	Visual	No cracks	
Fackings	ViSuai	<ul> <li>No apparent deformation</li> </ul>	Replacement
Lead-in fittings	Visual, tactile	No damage or deterioration	<ul> <li>Replacement</li> </ul>
Leau-III IIIIII198	visual, lactile	No loosening	<ul> <li>Tightening</li> </ul>
Connecting parts	Visual, tactile	No loosening of screws	<ul> <li>Tightening</li> </ul>
Connecting parts	visual, lactile	<ul> <li>No dirt on insulation materials</li> </ul>	<ul> <li>Cleaning</li> </ul>
Temperature rise	Thermometer,	Surface temperature	<ul> <li>Investigate</li> </ul>
remperature rise	tactile	80°C maximum	the cause
	·		

Table 2 I	nspection and maintenance of w	viring	
	Inspection Items	Inspection measure	Details
	Appearance of cable	Visual, tactile	No damage
			No swelling or hardening
Cable	Insulation resistance of cable	Measuring	- 5MΩ minimum
wiring	Appearance of	Visual, tactile	
-	cable protection parts		No damage or corrosion
	Appearance of ducts,	Visual, tactile	No damage or corrosion
	cable/wiring trench, etc.		No displacement of the cover
	Insulation resistance of wires	Measuring	- 5MΩ minimum
Metal	Appearance of	Visual, tactile	No damage or corrosion
conduit	conduits and fittings		No loosening
wiring	Screw connection	Visual, tactile	No damage or corrosion
			No loosening

## 11 Disposal

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

Specifications and other descriptions in this manual are subject to change without notice.

IDEC CORPORATION 2-6-64 Nishimiyahara, Yodoqawa-Ku, Osaka 532-0004 Japan

http://www.idec.com

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