

Field-mounted Two-wire Signal Conditioners 6-UNIT

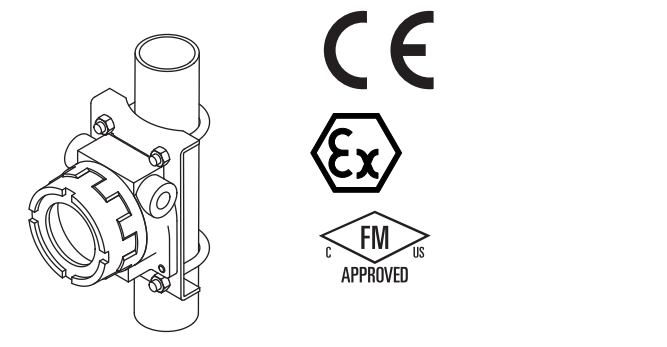
4-DIGIT LOOP POWERED INDICATOR

(outdoor enclosure, intrinsically safe/explosion-proof)

Functions & Features

- 4-digit LED display
- No external power source needed
- Scaling, linearization and other configurations selectable via three front control buttons
- Stainless steel enclosure optional

Note: Differences between the 6DV-B and the 6DVI-B exist only in safety parameters. Refer to the relevant section for more information.



MODEL:6DV-B-[1][2][3][4][5]

ORDERING INFORMATION

- Code number: 6DV-B-[1][2][3][4][5]
- Specify a code from below for each of [1] through [5].
(e.g. 6DV-B-0T01/S)
- Use Ordering Information Sheet (No. ESU-4220). Factory standard setting will be used if not otherwise specified.
 - Specify the country in which the product is to be used with the Safety Approval code 2 or 4.

[1] SAFETY APPROVAL

- 0: None
 - 1: FM intrinsically safe
 - 2: ATEX intrinsic safety
 - 3: FM explosion-proof
 - 4: ATEX flameproof
 - 7: TIIS intrinsic safety (CE not available)
 - 8: TIIS flameproof (CE not available)
- Confirm selectable combinations of approval and wiring conduit types in the table.

[2] TERMINAL BLOCK

- 0: None (Euro type terminal block at the rear of indicator module) (TIIS flameproof or TIIS intrinsically safe approvals not selectable)
- T: Incorporated

[3] WIRING CONDUIT

- 0: G 1/2
 - 1: 1/2 NPT
 - 2: M20 × 1.5
 - 3: PG 13.5
- Confirm selectable combinations of approval and wiring conduit types in the table.

[4] MOUNTING BRACKET

- 0: Without
- 1: With

[5] OPTIONS

- Enclosure Materials
- Blank:** Diecast aluminium enclosure
 - /S:** Stainless steel enclosure (TIIS flameproof approval not selectable)

■ SELECTABLE WIRING CONDUITS SPECIFIC TO EACH APPROVAL

'N' marked combinations are not selectable.

WIRING CONDUIT \ APPROVAL	APPROVAL							
	0	1	2	3	4	7	8	
0	Y	Y	Y	N	N	Y	Y	
1	Y	Y	Y	Y	Y	Y	N	
2	Y	Y	Y	N	Y	Y	N	
3	Y	Y	Y	N	N	Y	N	

RELATED PRODUCTS

- Cable gland (model: BX-E-SXY)
- Stopping plug (model: BX-E-SBP)

PACKAGE INCLUDES...

- **Cable gland:** Two provided for TIIS flameproof type
Model No.: BX-E-SXY
Cable entries: Elastomeric sealing rings
Wiring conduit size: G 1/2
Material: Chrome-plated brass (entry)
CR (sealing ring)
Applicable wire size: 8 - 12 dia.
- **Stopping plug:** One provided for TIIS flameproof type
Model No.: BX-E-SBP
Wiring conduit size: G 1/2
Material: Diecast aluminium (plug)
NBR (O-ring)

- **Mounting screws**
Bolt (M8 x 15): 4 pcs.
Spring washer for M8: 4 pcs.
- **Mounting bracket assembly (option)**
Mounting bracket: 1
M10 U-bolt: 2
Nut for M10: 4
Spring washer for M10: 4
- Material:** Stainless steel 304 (for aluminum enclosure)
Stainless steel 316 (for stainless steel enclosure)
- Applicable pipe:** 1 1/2" min.; 2" max.
- **Engineering unit label (1)**

GENERAL SPECIFICATIONS

- Degree of protection:** NEMA 4X, IP66/IP67
Wiring conduit: See 'Ordering information.'
Electrical connection:
- **Without terminal block:** Euro terminal block (Applicable wire size: 0.14 - 1.5 mm² (AWG26 - 16), stripped length 6 mm)
 - **With terminal block:**
M3 screw terminal (torque 0.5 N·m)
- Screw terminal:**
- **With terminal block:** Nickel-plated steel
- Materials**
- Meter housing:** Flame-resistant resin (black)
Enclosure: Diecast aluminium standard; stainless steel casting optional (equivalent to type 316); silver color, epoxy resin coated
- Isolation:** Input to outdoor enclosure
Linearization: Proportional, SQRT (X^{1/2}), RT32 (X^{3/2}), RT52 (X^{5/2}), user's linearization table (max. 21 calibration points) (Default setting: Proportional)
A/D conversion: Dual-slope integration
Security: Protecting settings
Scaling: Programming via the front buttons

DISPLAY

- LED:** 8 mm (.3") 7-segment, red
Number of display digits: 4
Scaling range: -1999 to 9999 counts
Offset range: -1999 to 9999 counts
Decimal point position: 10⁻¹, 10⁻², 10⁻³ or none
Polarity sign: Minus (-) sign added automatically according to the computation result
Over-range warning: All segments dark except the top ones that blink with the input exceeding the display/measurable range; or the bottom ones that blink with the input below the range.
Read rate: 2.5/s
Engineering unit indication: Sticker label attached

DC, AC, W, °C, °F, V, mV, A, mA, %, kW, mW, kV, kA, psi, K, bar, barg, Nl/min, kvar, Mvar, var, m, mm, kg, kg/h, kPa, MPa, N·m, Nm³/h, m³/h, m³/sec, m/sec, kgf/cm², l/min, %RH, l, l/h, t/h, rpm, ppm, pH, Pa

INPUT SPECIFICATIONS

- **DC Current:** 4 - 20 mA DC
 - Measurable range:** 3.75 - 23 mA DC
 - Maximum input current**
 - Non-approved:** 100 mA
 - Explosion-proof:** 23 mA
 - Intrinsically safe:** Refer to 'Safety Parameters.'
 - Voltage drop:** Approx. 3.7 V with 4 mA
Approx. 4.0 V with 20 mA (Equivalent input impedance: Approx. 200 Ω)
- The minimum required supply voltage to the 2-wire transmitter added with the indicator's voltage drop at the maximum input current must be within the output voltage range of the 2-wire transmitter's excitation supply.

INSTALLATION

- Operating temperature:** -40 to +85°C (-40 to +185°F)
(See Safety Parameters for use in a hazardous location.)
- Weight:**
 - Unit
Approx. 1.3 kg (2.9 lb), aluminium
Approx. 4.0 kg (8.8 lb), stainless steel
Approx. 2.0 kg (4.4 lb), TIIS flameproof
 - Mounting bracket set (option)
Approx. 0.78 kg (1.72 lb)

PERFORMANCE

- Accuracy:** ±0.01 mA
- Temp. coefficient:** ±0.015 %/°C (±0.008 %/°F) at 4 - 20 mA input
- Dielectric strength:** 1500 V AC @ 1 minute
(input to outdoor enclosure)

HOW TO CALCULATE ACCURACY AGAINST SCALE

- Example 1: 4 - 20 mA input, Scale 0 - 100
Accuracy = 0.01 mA ÷ (20 - 4) mA × 100 = 0.063 %
Display Error = (100 - 0) × 0.063 % = ±0.063 digits
- Example 2: 10 - 20 mA input, Scale 100 - 1000
Accuracy = 0.01 mA ÷ (20 - 10) mA × 100 = 0.1 %
Display Error = (1000 - 100) × 0.1 % = ±0.9 digits

STANDARDS & APPROVALS

- Refer to the manuals to comply with the standards.
- EU conformity:**
ATEX Directive

Ex ia EN 60079-11 (for ATEX intrinsic safety)

Ex d EN 60079-1 (for ATEX flameproof)

EMC Directive

EMI EN 61000-6-4

EMS EN 61000-6-2

RoHS Directive

Safety approval:

FM: Intrinsically safe (US, Canada)

Class I, Div. 1, Groups A, B, C and D

Class II, Div. 1, Groups E, F and G

Class III, Div. 1

Class I, Zone 0, AEx ia IIC (US)

Class I, Zone 0, Ex ia IIC (Canada)

T4 and T5

(Class 3600)

(Class 3610)

(ANSI/ISA 60079-0)

(ANSI/ISA 60079-11)

(CAN/CSA-C22.2 E60079-0)

(CAN/CSA-C22.2 E60079-11)

FM: Explosion-proof and Dust-ignition proof (US)

Class I, Div. 1, Groups B, C and D

Class II, Div. 1, Groups E, F and G

Class III, Div. 1

T6

(Class 3600)

(Class 3615)

TIIS: Intrinsic safety

Ex ia IIC T5

TIIS: Flameproof

Ex d IIC T6

ATEX: Intrinsic safety

⊕ II 1G, Ex ia IIC; T4, T5, Ga

(EN 60079-0)

(EN 60079-11)

ATEX: Flameproof

⊕ II 2G, Ex db IIC; T5, T6 Gb

(EN 60079-0)

(EN 60079-1)

T5 -20 to +60°C

For TIIS Flameproof

T6 -20 to +60°C

Ex-data:

Ui (Vmax): 30 V DC

Ii (Imax): 100 mA DC

Pi (Pmax): 0.75 W

Ci: 1.0 nF

Li: 0 mH (TIIS Intrinsically Safe: 'Negligible value')

DISPLAY DESCRIPTIONS

■ DISPLAY DIGITS

The decimal point position may shift according to the required number of digits for the integer section, even when more than one decimal places have been specified.

However, when the number of decimal places is set to 3, the '0' in the integer section is not shown in order to secure the number of effective digits, as explained in the table below.

The '0' is displayed when the number of decimal places is set to 2, though the number of effective digits in this case is reduced by 1 digit compared from the 3 decimal places.

Select appropriately for the application. Refer to 'Programming Procedure' for how to choose decimal point positions.

DECIMAL	VALUE	DATA DISPLAY
3	-1.000 thr . -1.999	-1000 ... -1999
	-0.001 thr . -0.999	-001 ... -999
2	-1.00 thr . -1.99	- 100 ... - 199
	-0.01 thr . -0.99	-001 ... -099

■ ERROR INDICATION

The data display blinks when an abnormality is detected.

The unit display backlight also blinks.

When the setting error or the security code error occurs, press ENTR / ESC button once to cancel the error status and proceed to set again.

ERROR TYPE	DATA DISPLAY
Over-scale	----
Under-scale	----
Setting error	Err
Security code error	Err

SAFETY PARAMETERS

Operating temperature

For FM/ATEX Intrinsically safe

(Temp Class: Operating temperature)

T4: -40 to +80°C

T5: -40 to +60°C

FM Explosion-proof

T6: -40 to +80°C

ATEX Flameproof

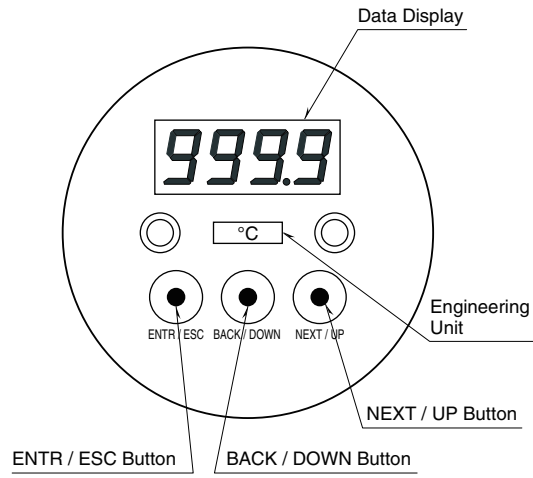
T5: -40 to +80°C

T6: -40 to +70°C

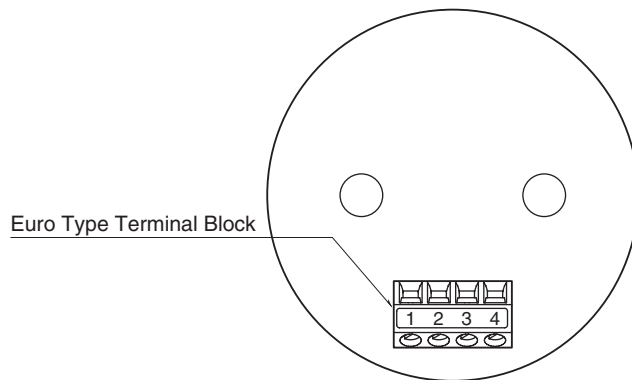
For TIIS Intrinsically safe

EXTERNAL VIEW (indicator module)

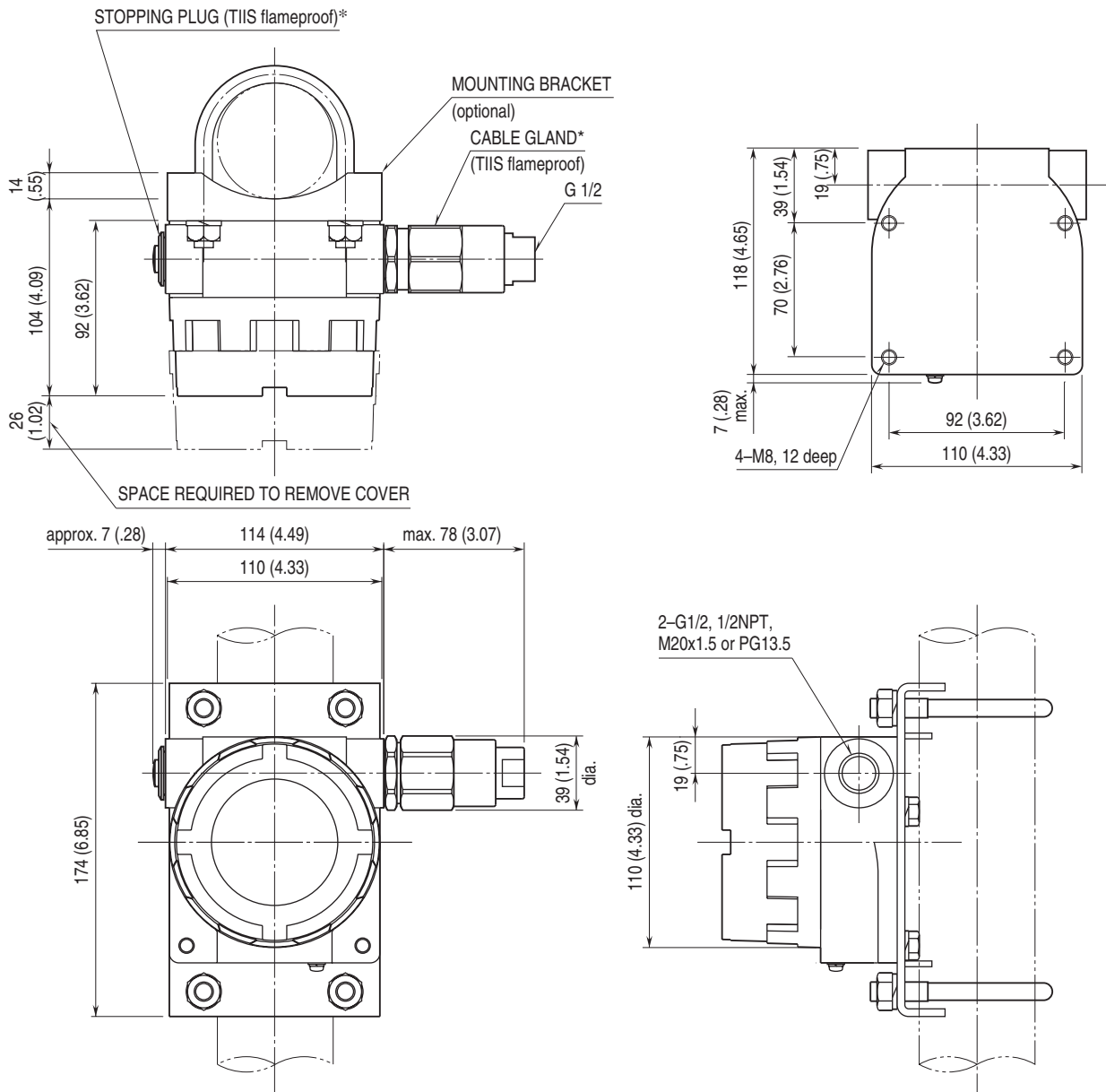
■ FRONT VIEW



■ REAR VIEW



EXTERNAL DIMENSIONS unit: mm [inch]

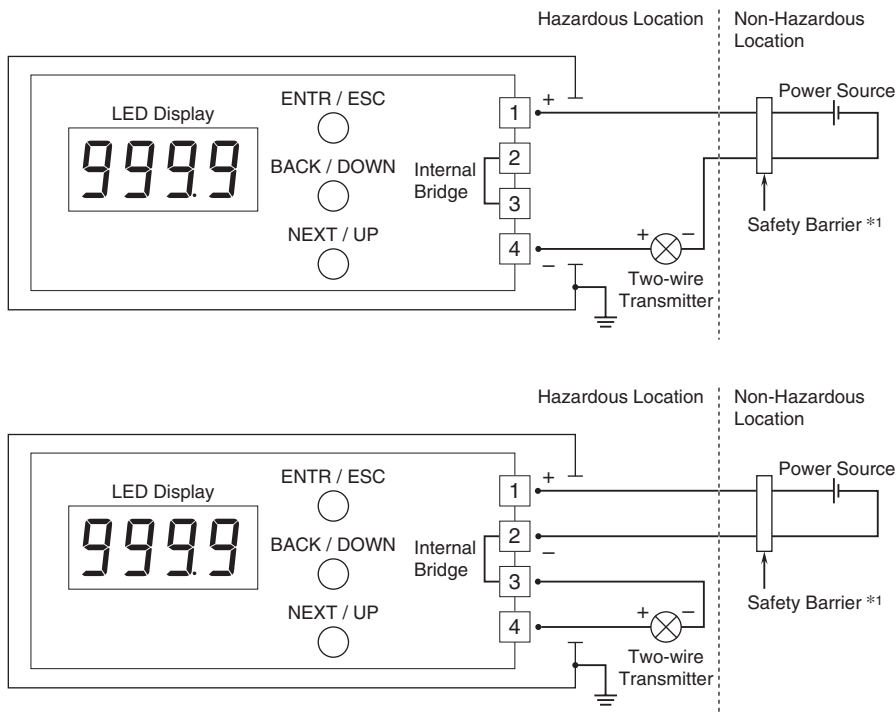


*Two cable glands and one plug are provided with TIIS flameproof type. Use them according to the field wiring requirements.

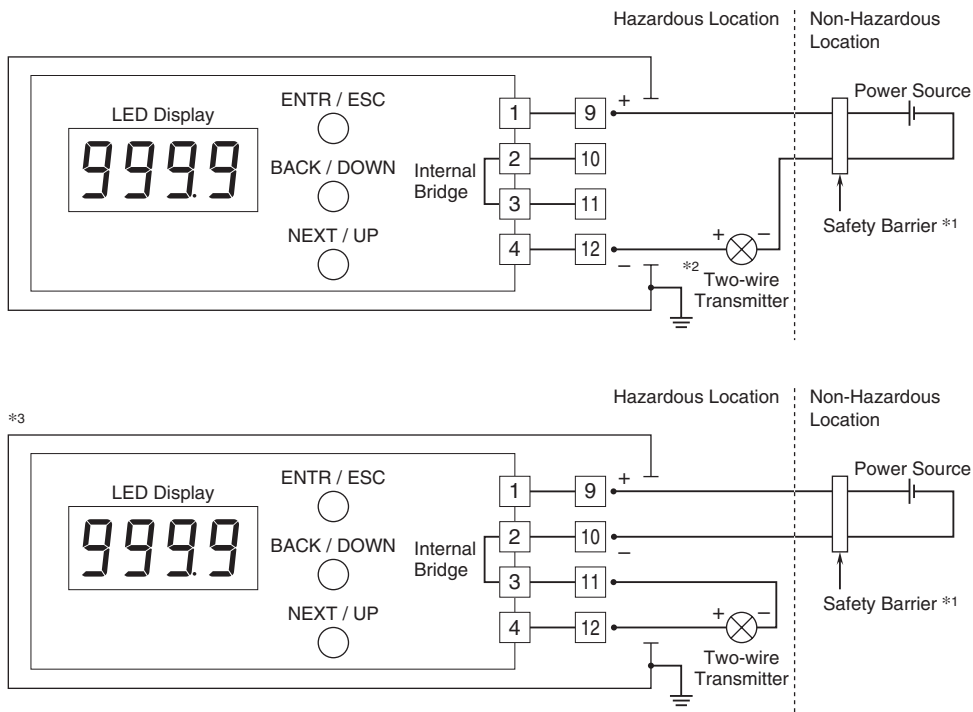
CONNECTION DIAGRAM

■ 2-WIRE CONNECTION EXAMPLE

• WITHOUT TERMINAL BLOCK (Euro terminal block at the rear of indicator module)



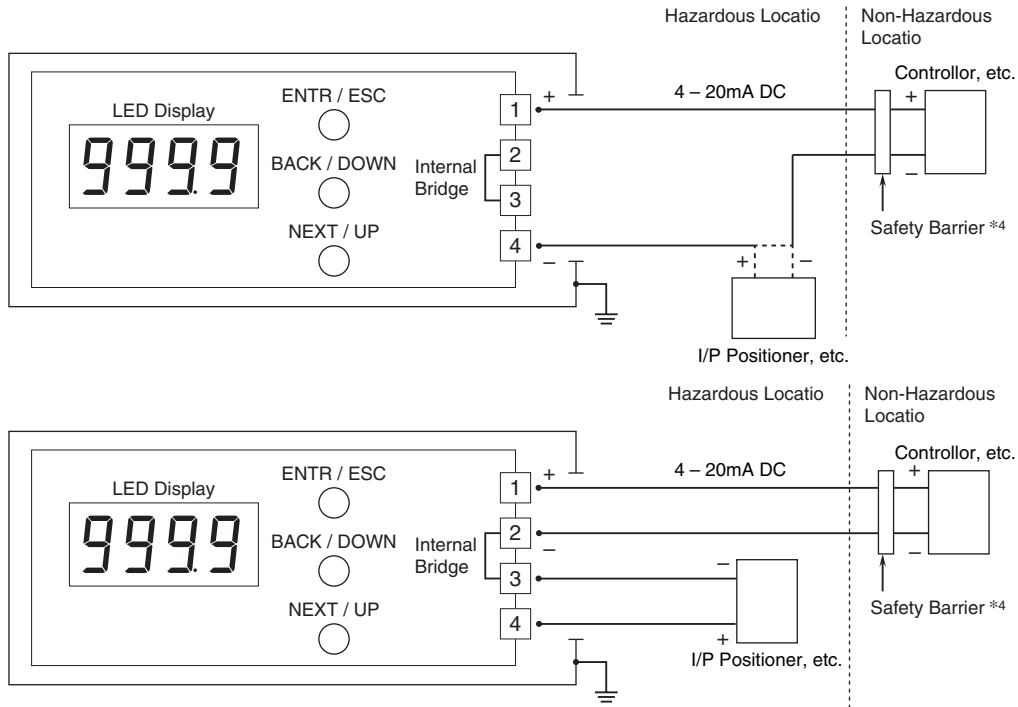
• WITH TERMINAL BLOCK



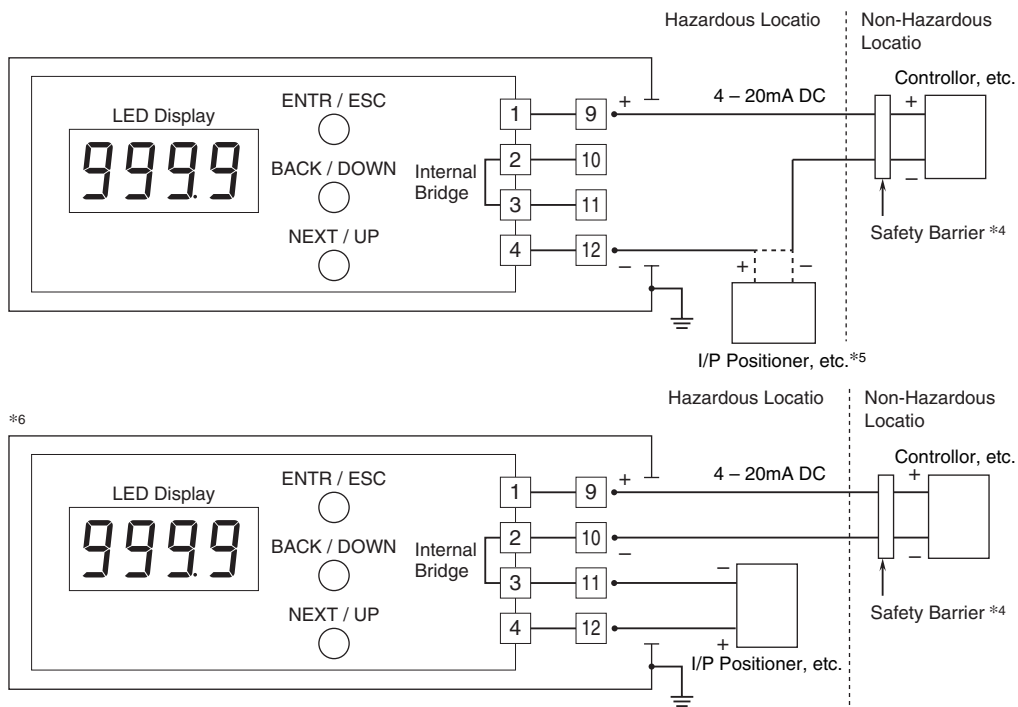
- *1. A safety barrier must be installed for the intrinsic safety.
The safety barrier must meet the Ex-data of this unit and must be approved for the hazardous location.
- *2. In order to use a two-wire transmitter in the TIIS intrinsically safe circuit, the combination of the 6DV-B with the transmitter must be re-evaluated and approved by the TIIS.
- *3. This connection diagram is not applicable for the TIIS intrinsic safety.

■ 4-WIRE CONNECTION EXAMPLE

• WITHOUT TERMINAL BLOCK (Euro terminal block at the rear of indicator module)



• WITH TERMINAL BLOCK



*4. A safety barrier must be installed for the intrinsic safety.

The safety barrier must meet the Ex-data of this unit and must be approved for the hazardous location.

*5. In order to use a two-wire transmitter, etc. in the TIIS intrinsically safe circuit, the combination of the 6DV-B with the transmitter must be re-evaluated and approved by the TIIS.

*6. This connection diagram is not applicable for the TIIS intrinsic safety.



Specifications are subject to change without notice.