

# General Specifications

## YVP110 Advanced Valve Positioner



GS 21B04C01-01E

### FEATURES

Model YVP110 FOUNDATION fieldbus™ Valve Positioner accepts digital communication to control a pneumatic actuator mounted to a control valve.

The YVP110 positioner minimizes transmission lag, improves valve characteristics and response and reduces flow-pressure variation effects.

Setup can be done more easily and interactively by using YVP Management Software YVP20S "ValveNavi".



### STANDARD SPECIFICATIONS

#### Applicable Control Valve:

Linear or Rotary Motion Control Valve  
(Diaphragm Actuator and Cylinder)

#### Functions:

Function Blocks:

- AO: One Analog Output
- DI: Two Discrete Inputs
- OS: One Splitter Block
- IS: One Input Selector
- AR: One Arithmetic
- PID: One/Two PID Control Function (Optional)

Note: IS, AR and PID (2 blocks) function blocks are applicable for only software download function (/EE).

Link Master Function

Pressure Sensor (Optional/BP)

Flow Characterization Feature:

- Linear
- Equal Percentage (50 : 1)
- Equal Percentage (30 : 1)
- Quick Opening
- Camflex Percentage
- Customer Characterization (10 segments)

Auto Tuning Function

Valve Position Detecting Function

Continuous Diagnostics Function:

- Total Travel
- Number of Cycles
- Time Open/Time Close/Time Near Close

#### Housing Materials:

- Case: Aluminum die-cast
- Paint: Polyurethane resin-baked finish
- Color: Deep-sea moss-green (Munsell 0.6GY3.1/2.0 or equivalent)

#### Communication:

Digital: FOUNDATION fieldbus

#### Supply Voltage:

- 9 to 32V DC for general use and flameproof type
- 9 to 24V DC for intrinsically safe type Entity model
- 9 to 17.5V DC for intrinsically safe type FISCO model

#### Conditions of Communication Line

Supply Voltage: 9 to 32V DC

Current Draw:

- Steady state: 17 mA max.
- Software download state: 41 mA max.

#### Output Signals and Pressure Gauge Scale:

No gauge in standard. Pressure gauge can be selected as option. The supply pressure unit on the name plate for non-gauge model is Pa.

Diaphragm, Single acting Cylinder			
Calibration unit	Supply Air Pressure	Pressure Gauge Scale	
		Supply Air	Output Signal
Pa	140 to 400 kPa	400 kPa	400 kPa
kgf/cm <sup>2</sup>	1.4 to 4 kgf/cm <sup>2</sup>	4 kgf/cm <sup>2</sup>	4 kgf/cm <sup>2</sup>
bar	1.4 to 4 bar	4 bar	4 bar
psi	20 to 60 psi	60 psi	60 psi

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Double acting Cylinder			
Calibration unit	Supply Air Pressure	Pressure Gauge Scale	
		Supply Air	Output Signal
Pa	200 to 700 kPa	1 MPa	1 MPa
kgf/cm <sup>2</sup>	2 to 7 kgf/cm <sup>2</sup>	10 kgf/cm <sup>2</sup>	10 kgf/cm <sup>2</sup>
bar	2 to 7 bar	10 bar	10 bar
psi	30 to 105 psi	150 psi	150 psi

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#### Pressure Gauge Case:

Stainless steel JIS SUS 304

**Normal Operating Conditions:**

Air Supply pressure:  
 Single Acting Actuator:  
     20 to 60 psi (140 to 400 kPa)  
 Double Acting Actuator:  
     30 to 100 psi (200 to 700 kPa)  
 Vibration Limit: 4 mm at 5 to 15 Hz;  
                   2G at 15 to 2000 Hz  
 Shock limit: 10G

**Manual Operation:**

Available using Auto/Manual (A/M) transfer switch

**Zero Adjustment Range:**

-15 to 85% of span

**Span Adjustment Range:**

Within 300% of span

**Valve-stem Travel Range:**

Linear Motion:  
     10 to 100 mm (0.4 to 4.0 inch)  
     (Rotation Range: ±10 to ±25 deg)  
 Rotary Motion:  
     20 to 90 deg

**Air Consumption and Output Capacity:**

	Diaphragm, Single Acting Cylinder
Maximum Air Consumption	0.20 SCFM (0.32 Nm <sup>3</sup> /h) at 140 kPa
Maximum Output Capacity	4.1 SCFM (6.6 Nm <sup>3</sup> /h) at 140 kPa

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	Double Acting Cylinder
Maximum Air Consumption	0.62 SCFM (1.0 Nm <sup>3</sup> /h) at 400 kPa
Maximum Output Capacity	8.5 SCFM (13.7 Nm <sup>3</sup> /h) at 400 kPa

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**Ambient Temperature Limits:**

Single Acting Actuator:  
     -40 to 85°C (-40 to 185°F)  
 Double Acting Actuator:  
     -40 to 60°C (-40 to 140°F) for standard  
     -10 to 85°C (14 to 185°F) for high temperature  
     use with option code /HT

**Ambient Humidity Limits:**

5 to 95% RH at 40°C (104°F)

**EMC Conformity Standards:** **CE** , **N200**

EN61326-1 Class A, Table 2  
 (For use in industrial locations)

**Degrees of Protection:**

IP65, NEMA4X

**Connections:**

Air Connection: Rc 1/4 or 1/4 NPT female  
 Electrical Connection: G 1/2, 1/2 NPT, M20 and Pg13.5 female  
 Pressure Gauge Connection:

		Pressure gauge connection	With pressure gauge(Optional)
Connections	1,5 and 6	Rc 1/8 female	/GP, /GM, and /GB
Codes	3	1/8 NPT female	/GE

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**Mounting:**

Front of Actuator with bracket.  
 Direct Connection for rotary valve.

**Weight:**

Single Acting Actuator: 2.4 kg (5.3 lb)  
 Double Acting Actuator: 2.8 kg (6.2 lb)

**■ PERFORMANCE SPECIFICATIONS**

**Linearity:**

Single Acting Actuator:  
     ±0.5% of Span (including linkages)  
 Double Acting Actuator:  
     ±1.0% of Span (including linkages)

**Hysteresis:**

Single Acting Actuator: 0.3% of Span  
 Double Acting Actuator: 0.5% of Span

**Ambient Temperature Effect:**

±0.08% of Span/°C

**Position Effect:**

±0.3% of Span/90 deg

**Vibration Effect:**

±2% of Span at 2G (15 to 2000 Hz)

## MODEL AND SUFFIX CODES

Model	Suffix Codes	Description
<b>YVP110</b>	.....	Valve positioner
Input Signal	<b>-F</b> .....	Digital communication (FOUNDATION Fieldbus protocol)
Applicable Control Valve	<b>1</b> .....	Single Acting Actuator
	<b>2</b> .....	Double Acting Actuator
_____	<b>A</b> .....	Always A
Connections	<b>1</b> .....	Electrical Connection: G 1/2, Pneumatic Connection: Rc 1/4
	<b>3</b> .....	Electrical Connection: 1/2 NPT, Pneumatic Connection: 1/4 NPT
	<b>5</b> .....	Electrical Connection: DIN Pg 13.5, Pneumatic Connection: Rc 1/4
	<b>6</b> .....	Electrical Connection: M20, Pneumatic Connection: Rc 1/4
_____	<b>N</b> .....	Always N
Optional Codes	/□ .....	Optional Specifications

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## OPTIONAL SPECIFICATIONS

Item	Description	Code
Lightning protection	Power supply 9 to 32V DC Allowable current Max. 6000 A(1× 40 μs), repeating 1000 A(1× 40 μs), 100 times	<b>A</b>
Painting	Coating change	Epoxy resin coating
	Color change	Terminal Cover only
		Munsell notation code: N1.5 Black
	Munsell notation code: 7.5BG4/1.5, jade green	
	Metallic silver	
PID function	PID control function (one block)	<b>LC1</b>
	PID control function (two blocks) <sup>*7</sup>	<b>LC2</b>
Output monitor	Built-in output pressure sensor <sup>*3</sup> and signature function <sup>*4</sup>	<b>BP</b>
With pressure gauge	Scale and calibration unit: Pa <sup>*1</sup>	<b>GP</b>
	Scale and calibration unit: kgf/cm <sup>2</sup> <sup>*1</sup>	<b>GM</b>
	Scale and calibration unit: bar <sup>*1</sup>	<b>GB</b>
	Scale and calibration unit: psi <sup>*2</sup>	<b>GE</b>
Valve linkage	Two levers: stroke limit of 10 to 100 mm	<b>LV1</b>
	One lever: stroke limit of 5 to 20 mm When using this lever set, following performance specifications shall be applied; Linearity: Single Acting Actuator: ±1.0% of span, Double Acting Actuator: ±2.0% of span Hysteresis: Single Acting Actuator: 0.6% of span, Double Acting Actuator: 1.0% of span	<b>LV2</b>
High temperature use <sup>*5</sup>	Ambient temperature limits: -10 to 85°C(14 to 185°F)	<b>HT</b>
Software download function <sup>*6</sup>	Based on Foundation Fieldbus Specification(FF-883) Download class: Class1	<b>EE</b>

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- \*1: Applicable for Connections code 1, 5 and 6.
- \*2: Applicable for Connections code 3.
- \*3: For double acting actuator, OUT1 connection is available.
- \*4: Single acting actuator type with /BP supports 5 types of signature functions.
- \*5: Applicable for double acting actuator.
- \*6: Not applicable for Option code FS15 and KS25.
- \*7: Applicable for Option code EE.

**OPTIONAL SPECIFICATIONS (For Explosion Protected types)**

Item	Description	Code
Explosionproof type	<p>CSA Explosionproof Approval*1                      Applicable standard: C22.2 No. 0, No. 0.4, No. 0.5, No. 25, No. 30, No. 94, No. 1010.1                      Certificate: 1186507                      Explosionproof for Class I, Division 1, Class B, C &amp; D; Class II, Groups E, F &amp; G., Class III.                      Enclosure Type: NEMA4X Temp. Class: T5/T6                      Amb.Temp.: -40 to 82°C(-40 to 180°F) for T5, -40 to 75°C(-40 to 167°F) for T6.</p>	<b>CF1</b>
	<p>FM Explosionproof Approval*1                      Applicable standard: FM3600, FM3615, FM3810, ANSI/NEMA250                      Explosion proof for Class 1, Division 1, Groups A, B, C and D;                      Dust-ignitionproof for Class II/III, Division 1, Groups E, F and G                      Enclosure Type: NEMA 4X Temp. Class: T6                      Amb. Temp.: -40 to 80°C (-40 to 176°F)</p>	<b>FF1</b>
	<p>FM Intrinsically Safe, Nonincendive Approval*1                      Applicable standard: FM3600, FM3610, FM3611, FM3810, ANSI/NEMA250                      IS/ I, II, III/1/ABCDEF/T4 Ta=60°C; Type 4X                      I/O/AEx ia/IIC/T4 Ta=60°C; Type 4X, NI/II/2/ABCD/T4 Ta=60°C; Type 4X, I/2/IIC/T4 Ta=60°C; Type 4X, S/II/2/FG/T4 Ta=60°C; Type 4X, S/III/2/T4 Ta=60°C; Type 4X                      Entity Parameters:                      Groups A, B, C, D, E, F, and G and Group IIC Vmax=24 V, Imax=250 mA, Pi=1.2 W, Ci=1.76 nF, Li=0 mH                      FISCO Parameters:                      Groups A, B, C, D, E, F, and G and Group IIC Vmax=17.5 V, Imax=360 mA, Pi=2.52 W, Ci=1.76 nF, Li=0 mH                      Groups C, D, E, F, and G and Group IIB Vmax=17.5 V, Imax=380 mA, Pi=5.32 W, Ci=1.76 nF, Li=0 mH                      Nonincendive Field Wiring Parameters:                      Groups A, B, C, D, E, F, and G and Group IIC: Vmax=32 V, Ci=1.76 nF, Li=0 mH</p>	<b>FS15</b>
	<p>FM Nonincendive Approval for /EE Software download *5                      Applicable standard: FM3600, FM3611, FM3810                      Class I, Division 2, Group A, B, C, &amp; D                      Class II, Division 2, Group F &amp; G and Class III, Division 1                      Class I, Zone 2, Group IIC in Hazardous (Classified) locations                      Enclosure: "NEMA4X", Temp. Cl.: T4, Amb. Temp. -40 to 60°C (-40 to 140°F)                      Vmax.=32V, Ci=3.52 nF, Li=0μH</p>	<b>FN15</b>
	<p>ATEX Flameproof Approval*2                      Applicable standard: EN60079-0: 2009, EN60079-1: 2007                      Certificate: KEMA 10ATEX0023 X                      II 2G Ex d IIC T6 and T5 Amb. Temp.: -40 to 65°C (-40 to 149°F) for T6, -40 to 80°C (-40 to 176°F) for T5</p>	<b>KF2</b>
	<p>ATEX Intrinsically Safe Approval*2                      Applicable standard: EN60079-0: 2006, EN60079-11: 2007, EN60079-26: 2007, EN60079-27: 2006, EN61241-0: 2006, EN61241-1: 2004, EN61241-11: 2006 and EN60529                      Certificate: KEMA 08ATEX0114 X                      II 1G Ex ia IIB/IIC T4                      II 1D Ex iaD 20 IP65 T100°C                      II 1D Ex tD A20 IP65 T100°C                      Maximum Surface Temperature for dust proof: T100°C                      Ambient Temperature for Ex ia/Ex iaD: -40 to 60°C (-40 to 140°F)                      Ambient Temperature for Ex tD: -40 to 80°C (-40 to 176°F)                      Enclosure: IP65                      For Ex ia IIC or Ex iaD: Ui=24.0 V, Ii=250 mA, Pi=1.2 W, Ci=1.76 nF, Li=0 μH                      For Ex ia IIB/IIC or Ex iaD (FISCO model): Ui=17.5 V, Ii=380 mA, Pi=5.32 W, Ci=1.76 nF, Li=0 μH                      For II 1D Ex tD: Input signal: 32 Vdc, Output current: 17 mA</p>	<b>KS25</b>
	<p>ATEX Intrinsically safe (Ex ic) / Type n (Ex nA) declaration*2*5                      Ex ic: II 3G Ex ic IIC T4 Gc (Intrinsically safe) Ui=32 V, Ci=3.52 nF, Li=0 μH                      Ex nA: II 3G Ex nA IIC T4 Gc (Non-sparking) Supply voltage: 32V DC MAX                      Applicable Standards: EN60079-0: 2009/2012 (Ex ic/Ex nA), EN60079-11: 2012 (Ex ic)                      EN60079-15: 2010 (Ex nA)                      Amb. Temp.: -30 to 75°C (-22 to 167°F)                      Enclosure: IP65</p>	<b>KN25</b>
	<p>TIIS Flameproof Approval*3                      Certificate: TC15453, TC15452 for option code /BP                      Ex d IIC T6 Amb. Temp.: -20 to 60°C</p>	<b>JF3</b>
Attached flameproof packing adapter*4	Electrical connection: G1/2 female Applicable cable: O.D. 8 to 12 mm	<b>G11</b>

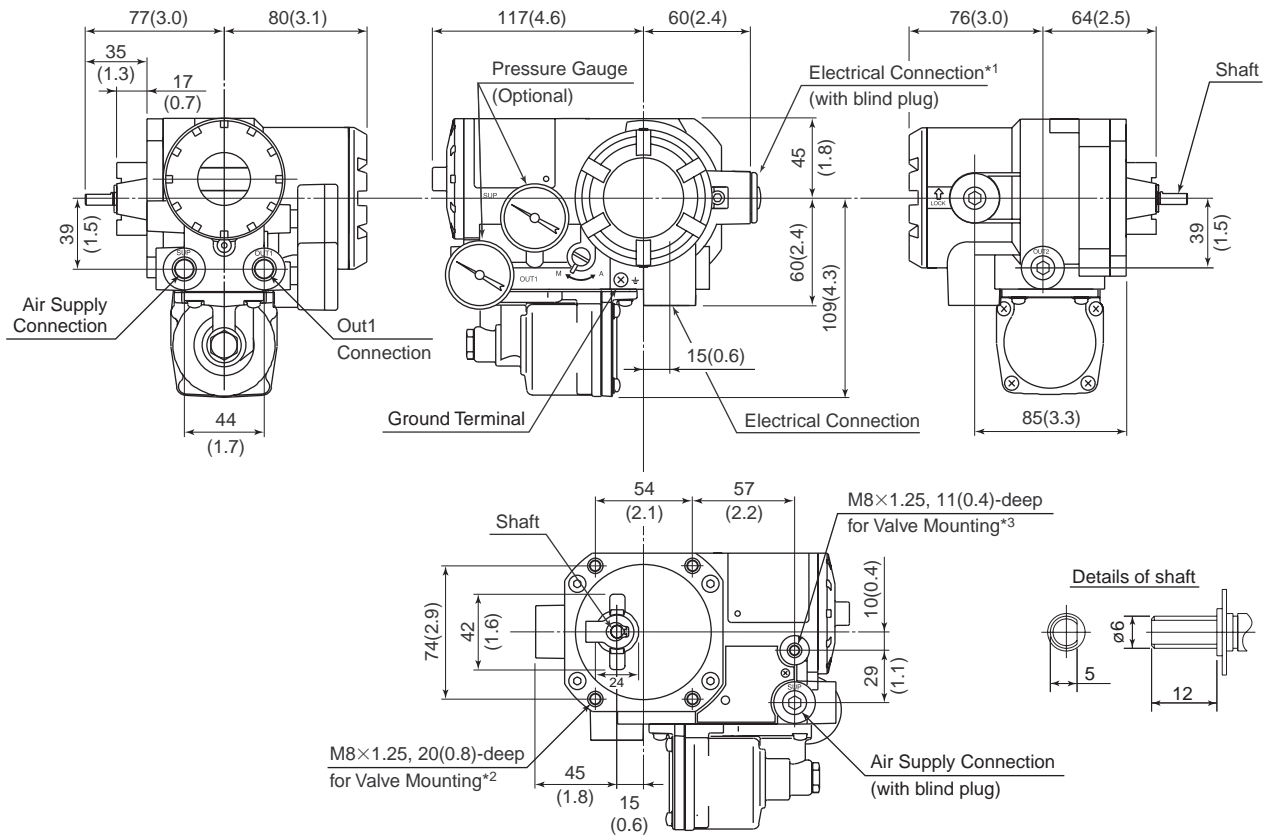
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- \*1: Applicable for Connections code 3.
- \*2: Applicable for Connections code 3 and 6.
- \*3: Applicable for Connections code 1, 3 and 6.
- \*4: If cable wiring is to be used to a TIIS flameproof type transmitter, do not fail to add the YOKOGAWA assured flameproof packing adapter.
- \*5: Applicable for Option code EE.

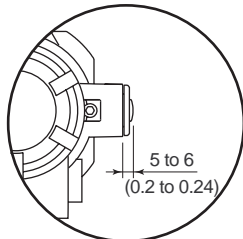
## DIMENSIONS

### ● For Single Acting Actuator

Unit: mm(approx. inch)



\*1: Blind plug for Connection code 1, 5, and 6



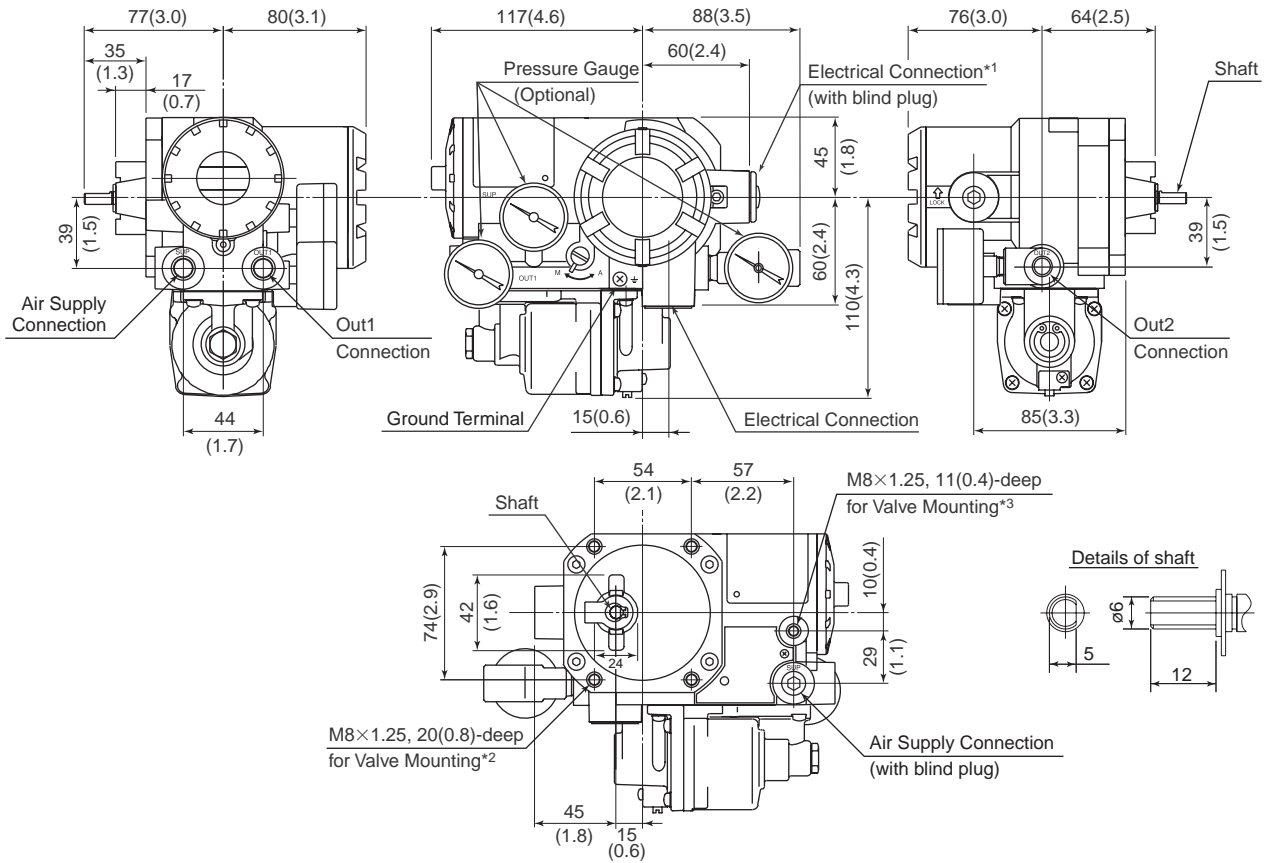
\*2: Attached with 4 mounting bolts (M8, 25 mm) and spring washers (applicable 3 to 6 mm thick brackets).

\*3: Available when unable to mount securely with the 4 bolts in \*2.

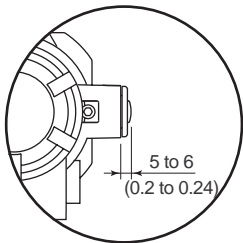
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● For Double Acting Actuator

Unit: mm(approx. inch)



\*1: Blind plug for Connection code 1, 5, and 6



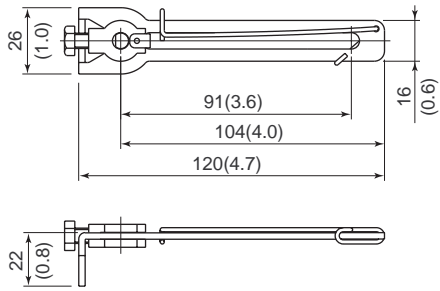
\*2: Attached with 4 mounting bolts (M8, 25 mm) and spring washers (applicable 3 to 6 mm thick brackets).

\*3: Available when unable to mount securely with the 4 bolts in \*2.

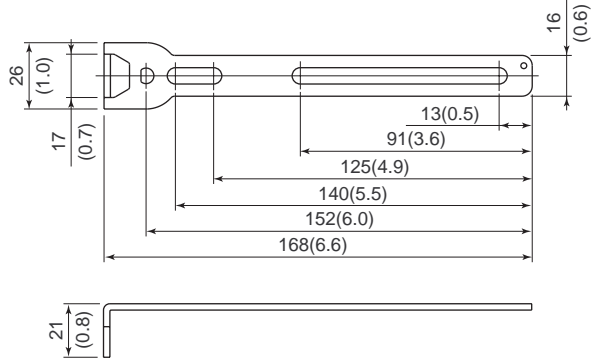
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Unit: mm(approx. inch)

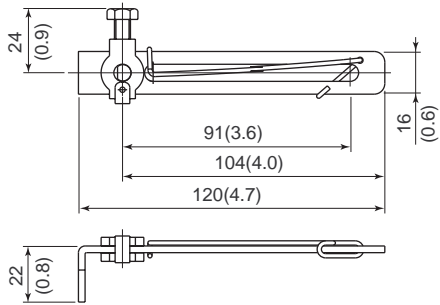
◆ Lever 1 (Option code /LV1)



◆ Lever 2 (Option code /LV1)

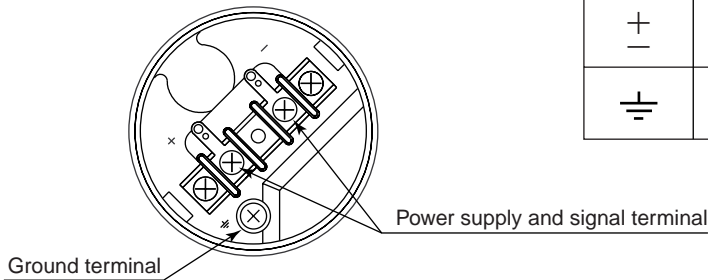


◆ Lever 3 (Option code /LV2)



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● Terminal Configuration



● Terminal Wiring

+	Power supply and signal terminal
⊖	Ground terminal

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<Ordering information>

- Specify the followings when ordering:
1. Model, Suffix, and optional codes.
  2. Tag No.; Amplifier memory and TAG Plate.  
Specified tag number will be entered in the amplifier memory and also be engraved on the stainless steel tag plate.  
Up to 16 characters using alphanumerics and the symbols of - and .17 characters or above may be specified by Tokuchu.
  3. Node Address
  4. Operation Functional Class  
Select 'BASIC' or 'LINK MASTER'.

< Related Instruments >

The customer should prepare instrument maintenance tool, terminator, fieldbus power supply etc.

< Safety Barrier for CENELEC (KEMA)/FM Intrinsically Safe Type >

Supplier	Type	Model
P+F	Isolator	KLD2-PR-Ex1. IEC1 (FISCO)

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