

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
- Supply Current: 17 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 ²	1.4 to 4 kgf/cm ²	4 kgf/cm ²	4 kgf/cm ²
bar	1.4 to 4 bar	4 bar	4 bar
psi	20 to 60 psi	60 psi	60 psi

T01E.EPS

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 ²	2 to 7 kgf/cm ²	10 kgf/cm ²	10 kgf/cm ²
bar	2 to 7 bar	10 bar	10 bar
psi	30 to 105 psi	150 psi	150 psi

T01E-2.EPS

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 ³ /h) at 140 kPa
Maximum Output Capacity	4.1 SCFM (6.6 Nm ³ /h) at 140 kPa

T02E.EPS

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

T02E-2.EPS

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:  ,  N200

EN61326, AS/NZS CISPR11

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:

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

T03E.EPS

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

T05E.EPS

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	A	
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)	LC1	
	PID control function (two blocks) ^{*7}	LC2	
Output monitor	Built-in output pressure sensor ^{*3} and signature function ^{*4}	BP	
With pressure gauge	Scale and calibration unit: Pa ^{*1}	GP	
	Scale and calibration unit: kgf/cm ² ^{*1}	GM	
	Scale and calibration unit: bar ^{*1}	GB	
	Scale and calibration unit: psi ^{*2}	GE	
Valve linkage	Two levers: stroke limit of 10 to 100 mm	LV1	
	One lever: stroke limit of 5 to 10 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	LV2	
High temperature use ^{*5}	Ambient temperature limits: -10 to 85°C(14 to 185°F)	HT	
Software download function ^{*6}	Based on Foundation Fieldbus Specification(FF-883) Download class: Class1	EE	

T06-01.EPS

- *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	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 & D; Class II, Groups E, F & 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.	CF1
	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)	FF1
	FM Intrinsically Safe, Nonincendive Approval*1 Applicable standard: FM3600, FM3610, FM3611, FM3810, ANSI/NEMA250 IS/ I, II, III/1/ABCDEFG/T4 Ta=60°C; Type 4X I/0/AEx ia/IIC/T4 Ta=60°C; Type 4X, NI/I/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	FS15
	FM Nonincendive Approval for /EE Software download *5 Applicable standard: FM3600, FM3611, FM3810 Class I, Division 2, Group A, B, C, & D Class II, Division 2, Group F & 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	FN15
	CENELEC ATEX (KEMA) Flameproof Approval*2 Applicable standard: EN50014, EN50018 Certificate: KEMA 02ATEX2159 II 2G EEx d IIC T6 and T5 Amb. Temp.: -40 to 75°C (-40 to 167°F) for T6, -40 to 80°C (-40 to 176°F) for T5	KF2
	CENELEC ATEX (KEMA) Intrinsically Safe Approval*2 Applicable standard: EN50014, EN50020, EN500284, EN50281-1-1 Certificate: KEMA 02ATEX1274X 1G/1GD EEx ia IIC T4 Ui=17.5 V, li=360 mA, Pi=2.52 W, Ci=1.76 nF, Li=0 μH (FISCO model) Ui=24.0 V, li=250 mA, Pi=1.2 W, Ci=1.76 nF, Li=0 μH (Entity model) 1G/1GD EEx ia IIB T4 Ui=17.5 V, li=380 mA, Pi=5.32 W, Ci=1.76 nF, Li=0 μH (FISCO model) 1D Um=32.0 V Tamb(1G): -40 to 60°C (-40 to 140°F), Tamb(1D): -40 to 80°C (-40 to 176°F), Tamb(1GD): -40 to 60°C (-40 to 140°F), T100°C (1D, 1GD) Enclosure: IP65	KS25
	CENELEC ATEX Type n declaration*2 *5 Applicable standard: EN60079-15 Amb. Temp: -40 to 85°C (-40 to 185°F), Enclosure: IP65 Ex nA IIC T4 (Non-sparking): Supply Voltage 32V dc Max Ex nL IIC T4 (Energy Limitation): Ui=32 V, Ci=1.76 nF, Li=0 μH	KN25
	TIIS Flameproof Approval*3 Certificate: TC15453, TC15452 for option code /BP Ex d IIC T6 Amb. Temp.: -20 to 60°C	JF3
Attached flameproof packing adapter*4	Electrical connection: G1/2 female Applicable cable: O.D. 8 to 12 mm	G11

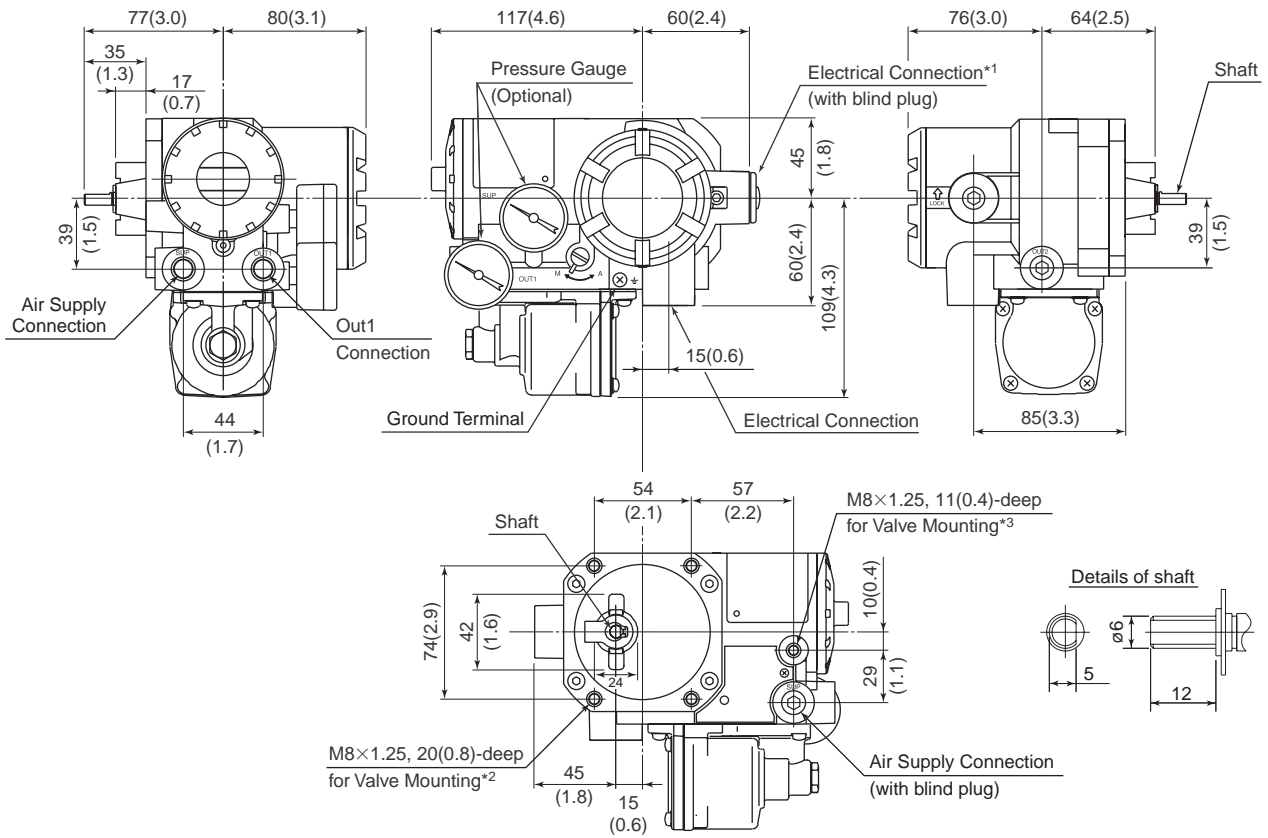
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- *1: Applicable for Connections code 3.
- *2: Applicable for Connections code 3 and 6.
- *3: Applicable for Connections code 1, 3 and 6.
- *4: If cable wiring is to be used to a TIIS flameproof type transmitter, do not fail to add the YOKOGAWA assured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

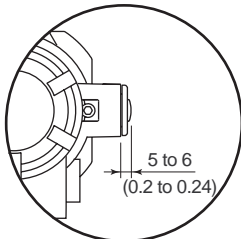
DIMENSIONS

● For Single Acting Actuator

Unit: mm(approx. inch)



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



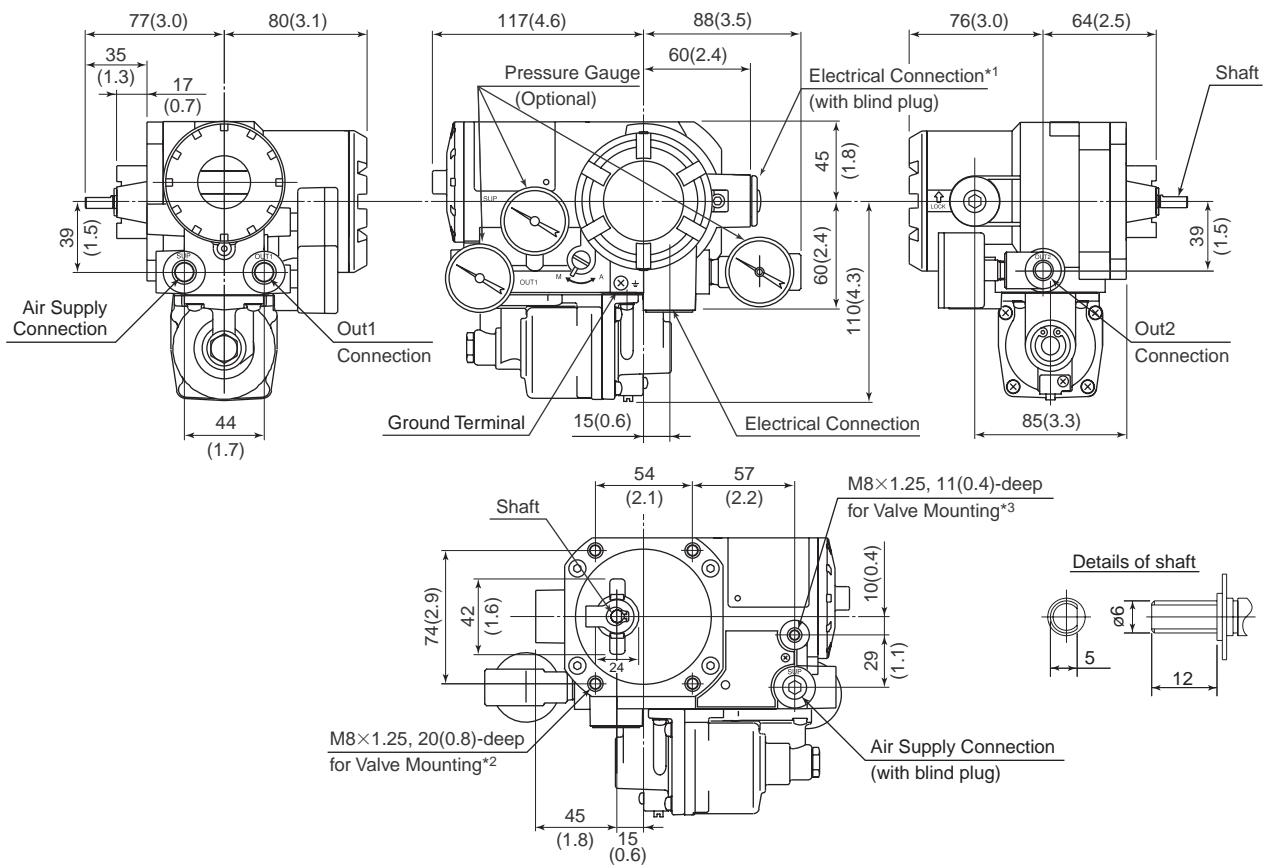
*2: Attached with 4 mounting bolts (M8, 25 mm) and spring washers (applicable 3 to 6 mm thick brackets).

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

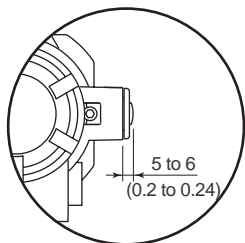
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● For Double Acting Actuator

Unit: mm(approx. inch)



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



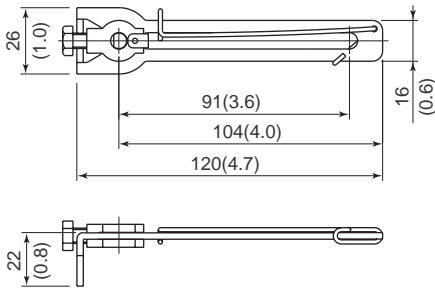
*2: Attached with 4 mounting bolts (M8, 25 mm) and spring washers (applicable 3 to 6 mm thick brackets).

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

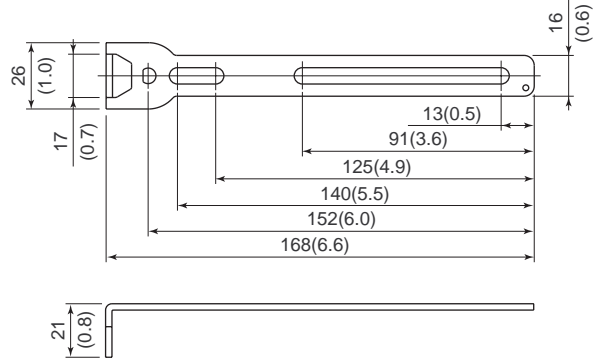
F03E.EPS

Unit: mm(approx. inch)

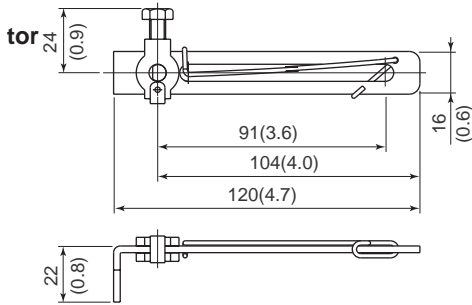
◆ Lever 1 (Option code /LV1)



◆ Lever 2 (Option code /LV1)

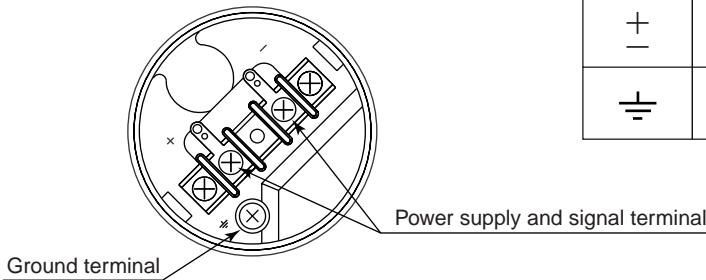


◆ Lever 3 (Option code /LV2)



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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 alphanumeric 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)

T07E.EPS