

# PosiFlex

## Valve Positioners



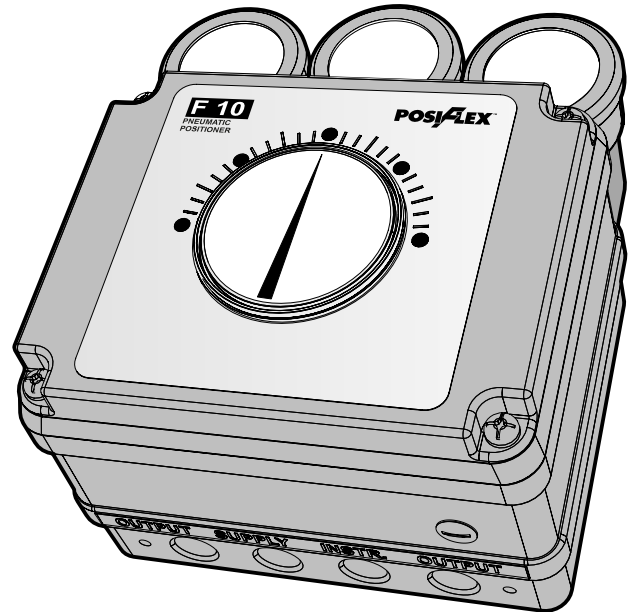
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## PosiFlex F10 Pneumatic Positioner For Spring Return and Double Acting Actuators

### Key features and benefits

- Trouble-Free, Modular Design - incorporates modular and stack-able components in a compact package to provide (highly accurate, versatile control capability).
- Independent Span and Zero Setting - allows fast and easy setup and adjustment for normal control functions .
- 3 Lobe Cam - provides linear, quick opening, and equal percentage characteristics to cover all standard ranges and stroke lengths.
- Application Flexibility - can be used with double or single acting rotary actuators.
- Durable, Corrosion Resistant Aluminum Housing- features a two part polyurethane finish and "O"ring sealed components for compliance with NEMA 4 and IP65 requirements.



### Description

The PosiFlex F10 Pneumatic Positioner is a single stage, force balance instrument that provides stepless positional control for a wide variety of rotary and linear pneumatic actuators. A single universal model can be used for double acting or single acting applications.

The unit operates using a high gain, motion balance principle. This simple operating design allows the unit to be adjusted for all normal control functions such as reverse acting, etc. without the use of additional components.

A comprehensive range of integrated control options is available including gauges, disc or dome type indicators, mechanical or proximity limit switches, position transmitter, and special rotary, range and linear stroke length cams. NAMUR, VDI/VDE 3845-2, and special mounting accessories for any actuator can also be supplied.

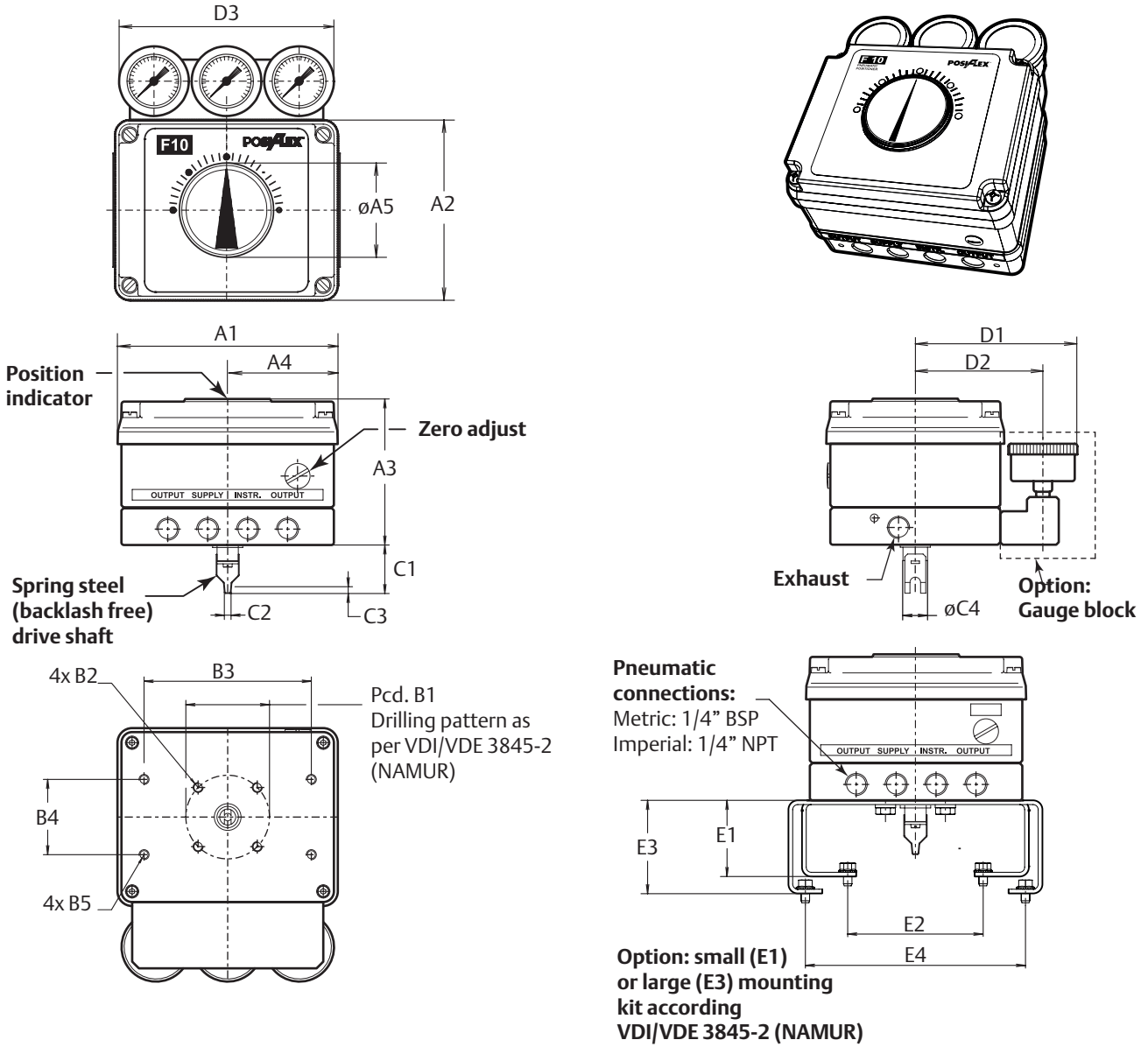
**Tabelle 1. General Specifications for F10 Positioner**

	Metric	Imperial
Hysteresis:	0.6%	
Linearity:	1.0%	
Air Flow:	210 NI/min (at 6 bar)	7.4 SCFM (at 87 psi)
Air Consumption:	15 NI/min (at 6 bar)	0.6 SCFM (at 87 psi)
Min. volume actuator:	0.1 NI	6.1 in3
Temperature:	-20° to +80°C	-4° to +176°F
Enclosure:	IP65	NEMA 4
Mounting:	VDI/VDE 3845-2	
Air Entry:	G 1/4"	1/4" NPT
Air Supply:	1.4 to 8.6 bar	21 to 125 psi
<b>Input Signal:</b>		
- Standard:	0.2 to 1.0 bar	3 to 15 psi
- Adjustable:	0.2 to 0.6 bar	3 to 9 psi
	0.6 to 1.0 bar	9 to 15 psi
Pressure Media:	Non-lubricated instrument air, filtered at 25 micron. Dew point should be 10°C (18°F) below environmental temperature. Air quality class 3-2-3 accord. to ISO 8573-1.	
<b>Materials:</b>		
Housing	Aluminium Alloy	
Enclosure	IP65 / NEMA4	
Finish	Polyester powder coated	

**Tabelle 2. Modular Control Options for F10 Positioner**

Option Identifier	Description:	See Data Sheet
G1	Gauge block, for instrument and two output pressure	PF.02.G12.EN
PT2	Position transmitter - 2 wire ( in module frame )	PF.02.PT2.EN
S2	Two Mechanical Switches	PF.02.S2.EN
IS2	Two Inductive Switches - 2 Wire	PF.02.IS2.EN
PNP	Two Inductive Switches - 3 Wire	PF.02.PNP.EN
POT	Potentiometer	PF.02.POT.EN

### Dimensions F10 PosiFlex Positioner:



Dim.	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5
mm	132	106	88	66	53	50	M6 x 9	100	45	M6 x 9
Inch	5.20	4.17	3.46	2.60	2.09	1.97	1/4"UNC x 0.35	3.94	1.77	1/4"UNC x 0.35

Dim.	C1	C2	C3	C4	D1	D2	D3	E1	E2	E3	E4
mm	29	4	4	14.7	100	75	129	45	80x30	55	130x30
inch	1.14	0.16	0.16	0.58	3.94	2.95	5.08	1.77	3.15 x 1.18	2.17	5.12 x 1.18

## PosiFlex F20 Electro-Pneumatic Positioner For Spring Return and Double Acting Actuators

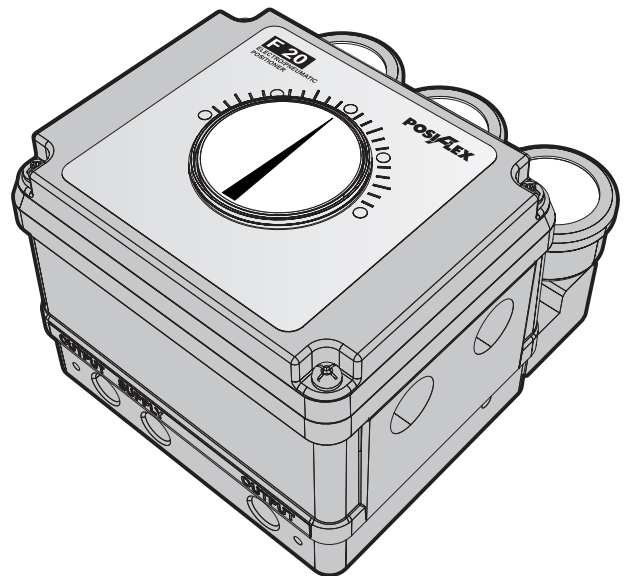
### Key features and benefits

- Trouble-Free, Modular Design - incorporates modular and stack-able components in a compact package to provide highly accurate, versatile control capability.
- 4-20mA Electronic Control - allows the most frequently used control adjustments to be easily located and reset.
- Application Flexibility - can be used with double or single acting rotary or linear actuators.
- Durable, Corrosion Resistant Aluminum Housing - features a two part polyurethane finish and "O" ring sealed components for compliance with NEMA 4 and IP65 requirements.

### Description

The PosiFlex F20 Series Electro/Pneumatic Positioner is suitable for either double or single acting rotary or linear actuators. The unit operates using the principle of analog electronic comparison and uses the analog 4-20 mA input signal to obtain an accurate position of the actuator.

The PosiFlex Electro/Pneumatic Positioner is a true 2-wire instrument which uses the 4-20 mA signal to provide both the controlling signal and electronics power supply. An electronic module allows zero, range, and sensitivity control characteristics to be reset using trim pots on the control card.



A comprehensive range of integrated control options is available including:

- Pressure gauge block
- 4-20mA position transmitter
- Mechanical SPDT limit switches
- 2-Wire (NAMUR) or 3-Wire (PNP) proximity limit switches,
- feedback potentiometers.
- VDI/VDE 3845-2 (NAMUR) mounting kits
- Low temperature version -50°C to +80°C

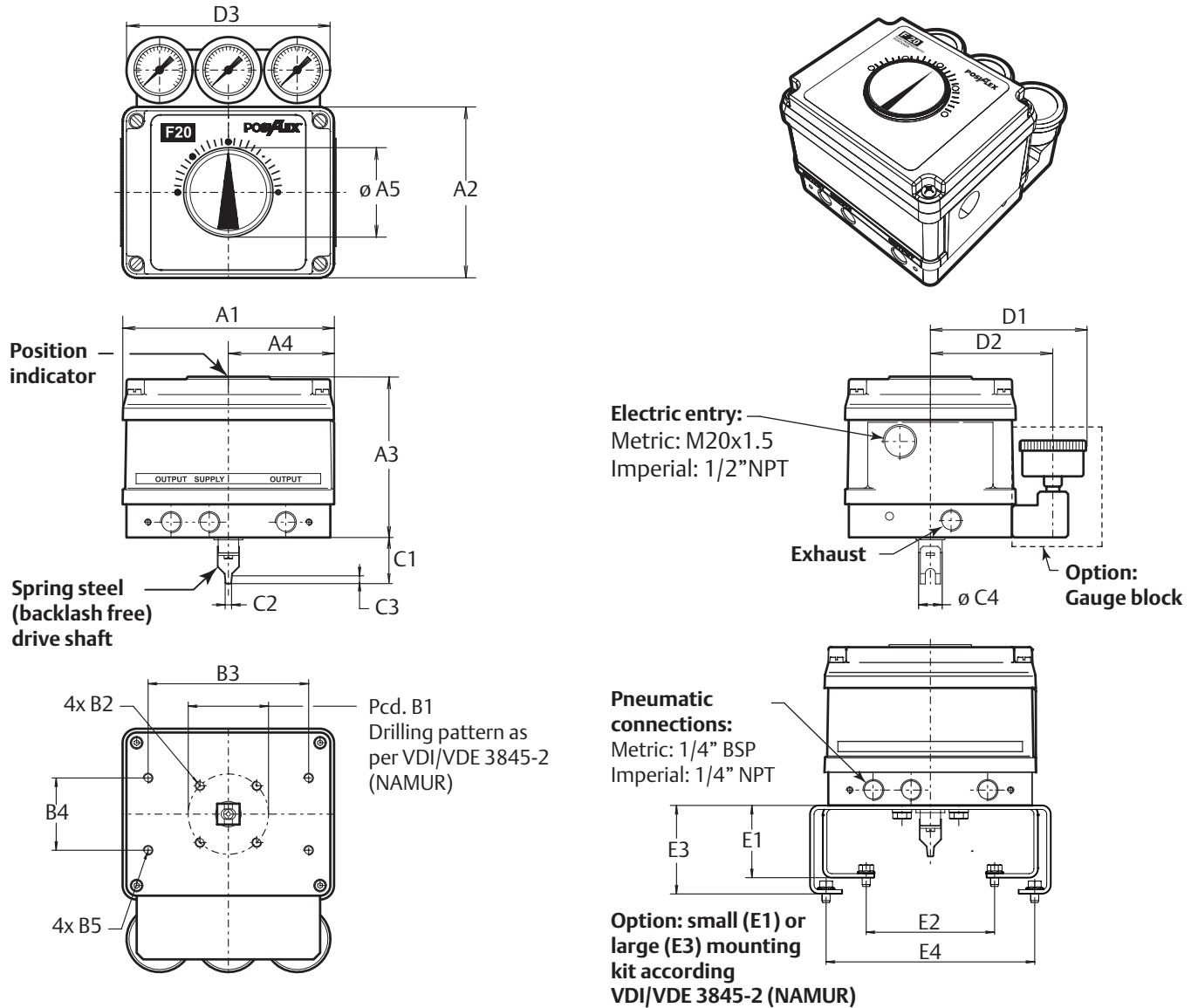
**Tabelle 3. General specifications for F20 PosiFlex Positioner**

	Metric	Imperial
Hysteresis		0.60%
Linearity		1.00%
Air Flow	210 NI/min (6 bar)	7.4 SCFM (87psi)
Air Consumption	10 NI/min (6 bar)	0.4 SCFM (87psi)
Min. volume actuator	0.1 NI	6.1 in <sup>3</sup>
Temperature	-20° / +80° C.	-4° / +176°F
Enclosure	IP 65	NEMA 4
Mounting	VDI/VDE 3845-2	
<b>Pressure Media</b>		
Air quality	Non-lubricated instrument air, filtered at 25 micron. Dew point should be 10°C (18°F) below environmental temperature. Air quality class 3-2-3 accord. to ISO 8573-1.	
Air Supply	1.4 - 8.6 bar.	21 to 125 psi
Air Entry	G 1/4".	1/4" NPT
<b>Electrical data</b>		
- Standard	2 wire: 4 - 20 mA (~ 8VDC).	
- Adjustable (for split range)	4-12mA / 12-20 mA	
Resistance (at 20 mA)	350 Ohm	
Electrical Entry	M20 x 1.5	1/2"NPT
<b>Materials:</b>		
Housing	Aluminium Alloy	
Enclosure	IP65 / NEMA4	
Finish	Polyester powder coated	

**Modular Control Options for F20 Positioner**

Option identifier	Description:	See Data Sheet
G2	Gauge block, for supply and two output pressure	PF.02.G12.EN
PT2	Position transmitter - 2 wire	PF.02.PT2.EN
PTF20	Position transmitter - 2 wire ( build-in for F20)	PF.02.PTF.EN
S2	Two Mechanical Switches	PF.02.S2.EN
IS2	Two Inductive Switches - 2 Wire (Intrinsically safe)	PF.02.IS2.EN
PNP	Two Inductive Switches - 3 Wire	PF.02.PNP.EN
POT	Potentiometer	PF.02.POT.EN

### Dimensions F20 PosiFlex Positioner:



Dim.	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5
mm	132	106	102	66	53	50	M6 x 9	100	45	M6 x 9
Inch	5.20	4.17	4.02	2.60	2.09	1.97	1/4"UNC x 0.35	3.94	1.77	1/4"UNC x 0.35

Dim.	C1	C2	C3	C4	D1	D2	D3	E1	E2	E3	E4
mm	29	4	4	14.7	100	75	129	45	80x30	55	130x30
inch	1.14	0.16	0.16	0.58	3.94	2.95	5.08	1.77	3.15 x 1.18	2.17	5.12 x 1.18



## Positioner Option G1 or G2 Gauge Block

### Key features and benefits

- Large and clear pressure gauges with metric (bar) and imperial (psi) scales.
- Easy identification of the pressure status.
- Heavy duty gauges with stainless steel housings.
- Suitable for double acting and spring return applications
- Mountable on both sides of the base positioners
- Versions for Pneumatic- or Electro-Pneumatic positioners.
- is available as factory fitted or as retrofit kit.

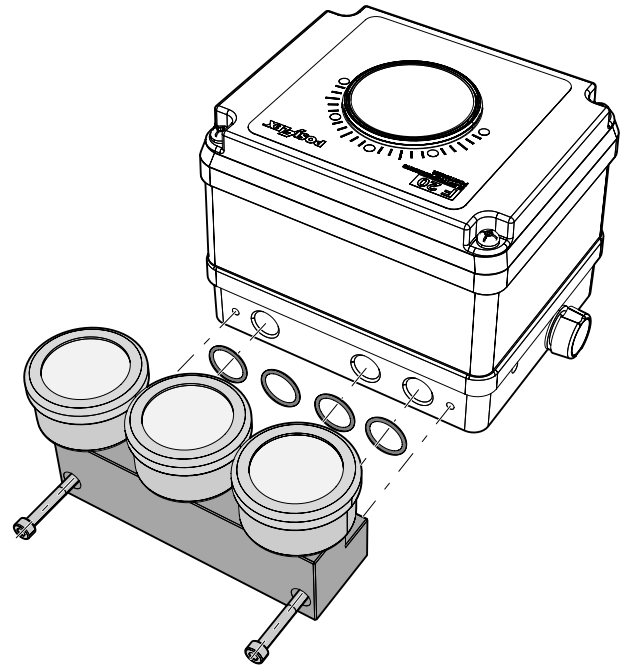
### Description

The Gauge Block kits are available as option in two forms:

- G1 kits have two output gauges for the actuator operating pressure and one gauge for the incoming instrument pressure. G1 gauge blocks are for basic F10 pneumatic positioners.
- G2 kits have two output gauges and one gauge for the incoming supply pressure. G2 gauge blocks are for electro/pneumatic positioner, type F20.

Both kits are suitable for double acting or single acting positioners. When used on a single acting actuator only one of the two output gauges will show a pressure. If required the inactive gauge may be replaced with a (G 1/8") blanking plug and the removed gauge stored to be used as a spare.

The gauges are heavy duty type with stainless steel housings and are graduated in metric (bar) and Imperial (psi) units.



### Construction

Gauge blocks are normally attached to the positioner base at the opposite side to the air supply and output ports. Alternatively they may be fitted to the air inlet face, this way is more suitable for linear actuators.

**Tabelle 4. Specifications Gaugeblock G1 / G2**

Gauges	G1 For F10	G2 for F20
- Input	0 to 1.6 bar 0 to 30 psi	0 to 10 bar 0 to 160 psi
- Output	0 to 10 bar. 0 to 160 psi.	0 to 10 bar 0 to 160 psi
- Connections	G 1/8"	
Temperature	-20° to +80°C (-4°F to +176°F)	
Gauge block	Aluminium Alloy	
Gauges	Stainless steel	
Finish	Anodized	

## PosiFlex Option PTF20

### Position transmitter

#### Key features and benefits

- Provides a 4-20 mA output signal, independent from the input signal.
- Provides a continuous output signal in proportion to the mechanical position of the positioner.
- Designed for F20 PosiFlex positioners as a "build-in" option.
- Trimmers for easy adjusting of zero and span settings.
- 2-wire connection for power supply and output signal.
- Jumpers for easy action setting.
- is available as factory fitted or as retrofit kit.

#### Description

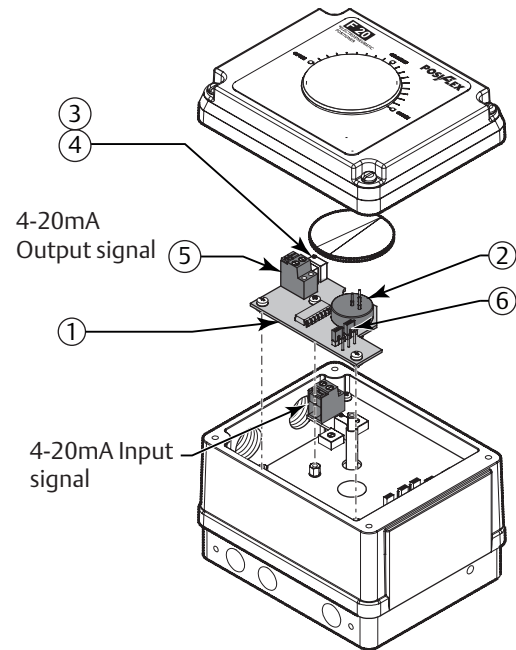
The PTF20 position transmitter provides a continuous 4-20 mA output signal in proportion to the mechanical position of the positioner. The two wire function is independent from the input signal.

PTF20 position transmitter is specially designed for F20 PosiFlex positioners as a "Built-in" option and is available as factory fitted or as retrofit kit.

#### Construction

The PTF20 position transmitter card is directly mounted on top of the main board in the enclosure of the F20 positioner. The card (1) has its own feedback potentiometer (2), trimmers for zero (3) and span (4) adjustments and terminals (5) for the 2-wire-connections, which are used for power supply for the electronics as well as the output signal.

The trimmers for zero and span can be set throughout the complete range. This way split range and reverse acting is possible. The positioners indicator spindle provides the drive for the potentiometer. Jumpers (6) are provided to select the action (direct or reverse).



**Tabelle 5. Specifications PTF20 Option**

Voltage	15 - 30 VDC. (external)
Output	4 - 20 mA With full range adjustment for zero and range
Jumper setting	Action (direct or reverse).
Temperature	-20° to +80°C (-4°F to +176°F)
Housing	Aluminium Alloy
Enclosure	IP65 / NEMA4
Finish	Polyester powder coated

## PosiFlex Option PT2 Position transmitter

### Key features and benefits

- Provides a 4-20 mA output signal, independent from the input signal.
- Provides a continuous output signal in proportion to the mechanical position of the positioner.
- Stackable position feedback module can easily be added by inserting it between the base housing and the cover.
- Trimmers for easy adjusting of zero and span settings.
- 2-wire connection for power supply and output signal.
- Jumpers for easy action setting.
- is available as factory fitted or as retrofit kit.

### Description

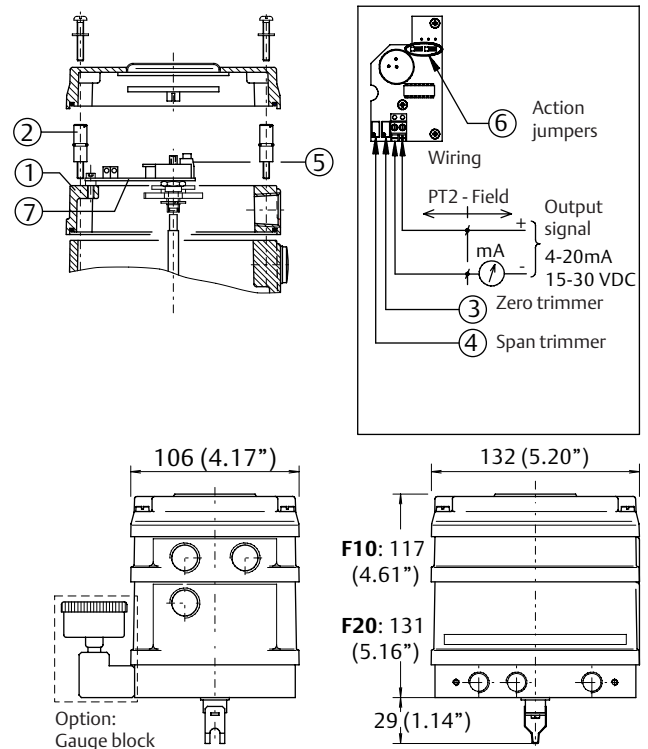
The PT2 position transmitter provides a continuous 4-20 mA output signal in proportion to the mechanical position of the positioner. The two-wire function is independent from the input signal and has a separate electrical entry.

PT2 position transmitters may be used with PosiFlex F1 (or F20) positioners and are available as factory fitted or as retrofit kit.

The position transmitter module (1) is pre-assembled with its circuit board (7) and has a potentiometer, trimmers for zero (3) and range (4) adjustments and terminals (5) for the external power supply. Jumpers (6) are provided to select the action (direct or reverse).

### Construction

The PT2 module (1) is assembled to the base positioner by inserting it between the base housing and the cover. The indicator spindle of the positioner provides the drive for the potentiometer (3). The option modules are stackable and fully modular, so that combinations of position sensors and switch modules can be realized as required.



**Tabelle 6. Specifications PT2**

Voltage	15 - 30 VDC. (external)
Output	4 - 20 mA
Adjustments	Zero Range Jumpers for action setting (direct / reverse)
Entries	Metric units: 2x M20x1.5 Imperial units: 2x 1/2" NPT
Temperature	-20° to +80°C (-4°F to +176°F)
Housing	Aluminium Alloy
Enclosure	IP65 / NEMA4
Finish	Polyester powder coated

## PosiFlex Option S2 Mechanical Switch option

### Key features and benefits

- Addition of two mechanical switches to provide an electrical indication at the end of stroke positions.
- Stack-able switch module for easy inserting between the base positioner housing and the cover.
- Easy switch point adjustment.
- Pre-wired to easily accessible terminal blocks.
- Module frame is fitted with two electrical entries.
- Is available as factory fitted or as retrofit kit.

### Description

This S2 PosiFlex positioner option offers the addition of two mechanical switches (1) to provide an electrical indication at the end of stroke positions. The mechanical switches are of the SPDT type with a NC and NO contact.

### Construction

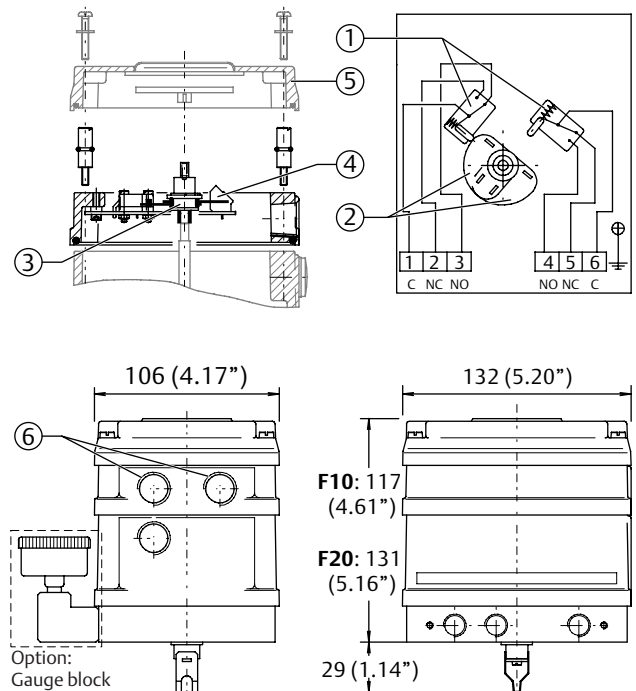
The switches are operated by two cams (2) on an extension (3) of the positioner indicator spindle.

The three leads of both switches are pre-wired to terminal blocks (4) which are easily accessible when the positioner cover (5) is removed. All mechanical parts are contained within the enclosure.

Both switches are independently adjustable throughout the operating stroke, but are normally set to indicate at about 5° before each end position.

Two electrical entries (6) are provided, one of which is fitted with a blanking plug.

The S2 switch modules may be added to standard PosiFlex F10 or F20 positioners and are available as factory fitted or as retrofit kit. The S2 switch module is assembled to the basic positioner by inserting it between the base housing and the cover.



PosiFlex Control Options are stack-able and fully modular so that combinations of position transmitters and switch modules can be assembled as required.

**Table 7. Specification S2 Option**

Switches Type	V3 Mechanical
Voltage	250 VAC / VDC
Current	11 A at 250 V AC 1 A at 12 V DC 250mA at A 250V DC
Contacts	Single pole, change over - Normally open and normally closed
Entries	Metric units: 2x M20x1.5 Imperial unit: 2x 1/2" NPT
Temperature	-20° C to +80° C (-4°F to +176°F)
Housing	Aluminium Alloy
Enclosure	IP65 / NEMA4
Finish	Polyester powder coated

## PosiFlex Option PNP

### 3 wire inductive switches

#### Key features and benefits

- Addition of two 3 wire inductive switches to provide an electrical indication at the end of stroke positions.
- Stack-able switch module can easily be added by inserting it between the base housing and the cover.
- Easy switch point adjustment.
- Pre-wired to easily accessible terminal blocks.
- Module frame is fitted with two electrical entries.
- Is available as factory fitted or as retrofit kit.

#### Description

This PNP PosiFlex positioner offers the addition of two 3 wire inductive switches (1) to provide indication at the end of stroke positions.

These electronic switches are contact free and provide an exceptionally “clean” output signal, they are inductive proximity switches and incorporate their own solid state line amplifiers and so provide a direct switching current of up to 100 mA.

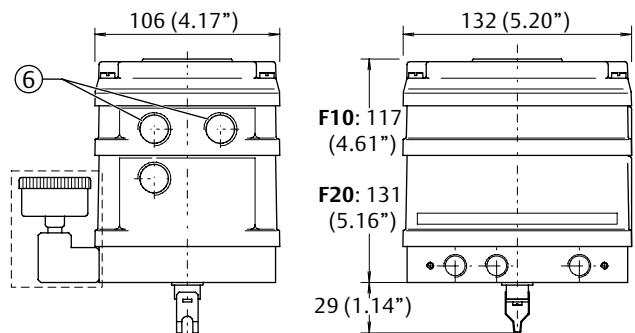
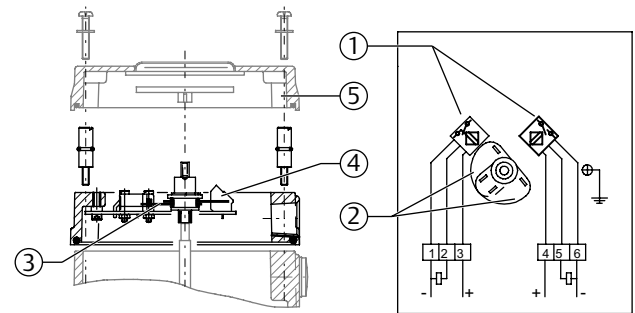
#### Construction

The switches are operated by two cams (2) on an extension (3) of the positioner indicator spindle.

The three leads of both switches are pre-wired to terminal blocks (4) which are easily accessible when the positioner cover (5) is removed. All mechanical parts are contained within the enclosure.

Both switches are independently adjustable throughout the operating stroke, but are normally set to indicate at about 5° before each end position.

Two electrical entries (6) are provided, one of which is fitted with a blanking plug.



The PNP switch modules may be added to standard PosiFlex F10 or F20 positioners and are available as factory fitted or as retrofit kit. The PNP switch module is assembled to the basic positioner by inserting it between the base housing and the cover.

PosiFlex Control Options are stack-able and fully modular so that combinations of position transmitters and switch modules can be assembled as required.

**Tabelle 8. Specification PNP switch Option**

Switch type	3-Wire inductive PNP - NBB2-V3-E2
Voltage	U <sub>b</sub> =10 to 30 V DC
Output current	Max. : 100 mA
Connections	Terminals inside the casing.
Entries	Metric units: 2x M20x1.5 Imperial units: 2x 1/2" NPT
Temperature	-20° to +80°C (-4°F to +176°F)
Housing	Aluminium Alloy
Enclosure	IP65 / NEMA4
Finish	Polyester powder coated

## PosiFlex Option IS2

### 2 wire inductive switches (NAMUR)

#### Key features and benefits

- Addition of two 2 wire inductive switches to provide an electrical indication at the end of stroke positions.
- Stack-able switch module can easily be added by inserting it between the base housing and the cover.
- Easy switch point adjustment.
- Pre-wired to easily accessible terminal blocks.
- Module frame is fitted with two electrical entries.
- Is available as factory fitted or as retrofit kit.

#### Description

This IS2 PosiFlex positioner option offers the addition of two 2 wire inductive switches to provide indication at the end of stroke positions.

These electronic switches are contact free and provide an exceptionally “clean” output signal and they are ultra low power inductive proximity switches.

#### Construction

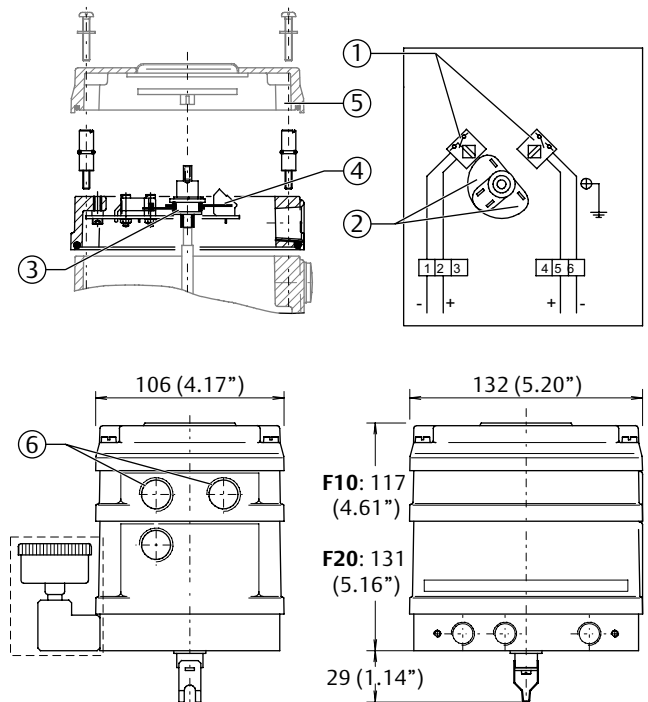
The switches are operated by two cams (2) on an extension (3) of the positioner indicator spindle.

Both leads of both switches are pre-wired to terminal blocks (4) which are easily accessible when the positioner cover (5) is removed. All mechanical parts are contained within the enclosure.

Both switches are independently adjustable throughout the operating stroke, but are normally set to indicate at about 5° before each end position.

Two electrical entries (6) are provided, one of which is fitted with a blanking plug.

The IS switch modules may be added to standard Posiflex F10 or F20 positioners and are available as factory fitted or as retrofit kit. The IS2 switch module is assembled to the basic positioner by inserting it between the base housing and the cover.



PosiFlex Control Options are stack-able and fully modular so that combinations of position transmitters and switch modules can be assembled as required.

**Table 9. Specification IS2 Switch Option**

Type	Inductive, 2 wire, S <sub>J</sub> 3.5 N
Voltage	7 to 9V DC (acc. to DIN 19234)
Output	Un-switched: > 3 mA Switched: < 1 mA
Connections	Terminals inside the casing
Entries	Metric units: 2x M20x1.5 Imperial units: 2x 1/2" NPT
Temperature	-20° to +80°C (-4°F to +176°F)
Housing	Aluminium Alloy
Enclosure	IP65 / NEMA4
Finish	Polyester powder coated

## PosiFlex Option POT Potentiometer

### Key features and benefits

- Provides a voltage output signal, by means of a 1 KOhm potentiometer.
- Provides a continuous output signal in proportion to the mechanical position of the positioner.
- Stack-able module can easily be added by inserting it between the base housing and the cover.
- Pre-wired to easily accessible terminal blocks.
- Module frame is fitted with two electrical entries.
- Is available as factory fitted or as retrofit kit.

### Description

This positioner option offers the addition of a 1 KOhm potentiometer (1) and provides a continuous output signal in proportion to the mechanical position of the positioner and independent from the input signal.

When connected as shown, a voltage signal will indicate an analog position.

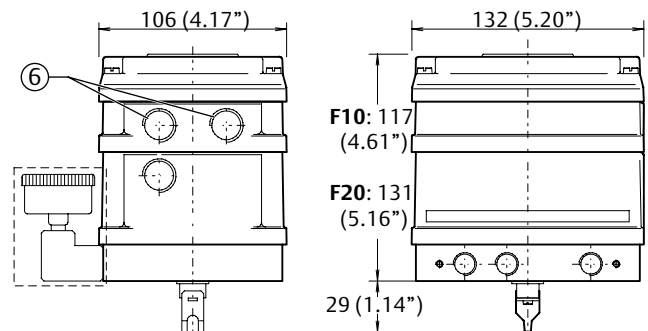
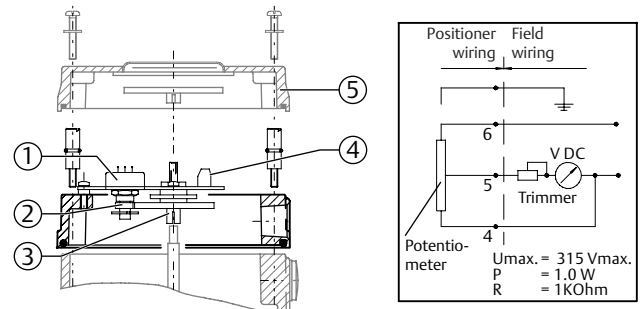
### Construction

The potentiometer (1) is operated by gears (2) on an extension (3) of the positioner indicator spindle.

The potentiometer is pre-wired to terminal blocks (4) which are easily accessible when the positioner cover (5) is removed. All mechanical parts are contained within the enclosure.

Two electrical entries (6) are provided, one of which is fitted with a blanking plug.

The POT modules may be added to standard Posiflex F10 or F20 positioners and are available as factory fitted or as retrofit kit. The POT module is assembled to the basic positioner by inserting it between the base housing and the cover.



PosiFlex Control Options are stack-able and fully modular so that combinations of position transmitters and switch modules can be assembled as required.

**Tabelle 10. Specification POT Potentiometer Option:**

Voltage	Up to 315 V
Power	Max. 1.0 Watt
Resistance	1 KOhm ( $\pm 20\%$ )
Linearity	$\leq 1\%$
Entries	Metric units: 2x M20x1.5 Imperial unitx: 2x 1/2" NPT
Temp.	-20° to +80°C (-4°F to +176°F)
Housing	Aluminium Alloy
Enclosure	IP65 / NEMA4
Finish	Polyester powder coated

## PosiFlex Option MTK Actuator Mounting kits

### Key features and benefits

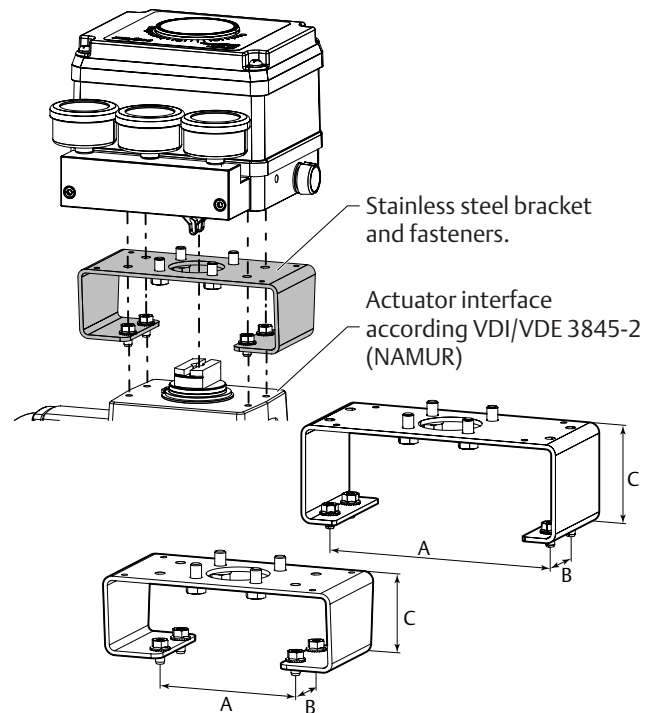
- Default mounting kits are suitable for accessory mounting interfaces according VDI/VDE 3845-2
- Stainless steel brackets and fasteners provides excellent corrosion resistance.
- Fasteners for positioner and actuator included.

### Description

This positioner option offers the addition of a mounting bracket with fasteners to mount the PosiFlex positioners on top of pneumatic actuators with an accessory mounting interface according VDI/VDE3845-2 (NAMUR).

Two variations are available for smaller and larger actuators. The brackets are made of stainless steel and are shipped with:

- Stainless steel fasteners for mounting the positioners on the bracket and
- Stainless steel fasteners for mounting the complete assembly on the actuator.



**Tabelle 11. Specifications NAMUR Mounting Kits**

Materials	
Bracket	AISI 304 Stainless steel
Fasteners	Stainless steel, grade A2
Dimensions small bracket	
A	80 mm / 3.15"
B	30 mm / 1.18"
C	45 mm / 1.77" - suitable for pinion top heights of 20 mm / 0.79"
Dimensions large bracket	
A	130 mm / 3.15"
B	30 mm / 1.18"
C	55 mm / 2.16" - suitable for pinion top heights of 30 mm / 1.18"



## Block Dimensions F10 Positioner on Actuator

### Dimensions on EL-O-Matic F-Series

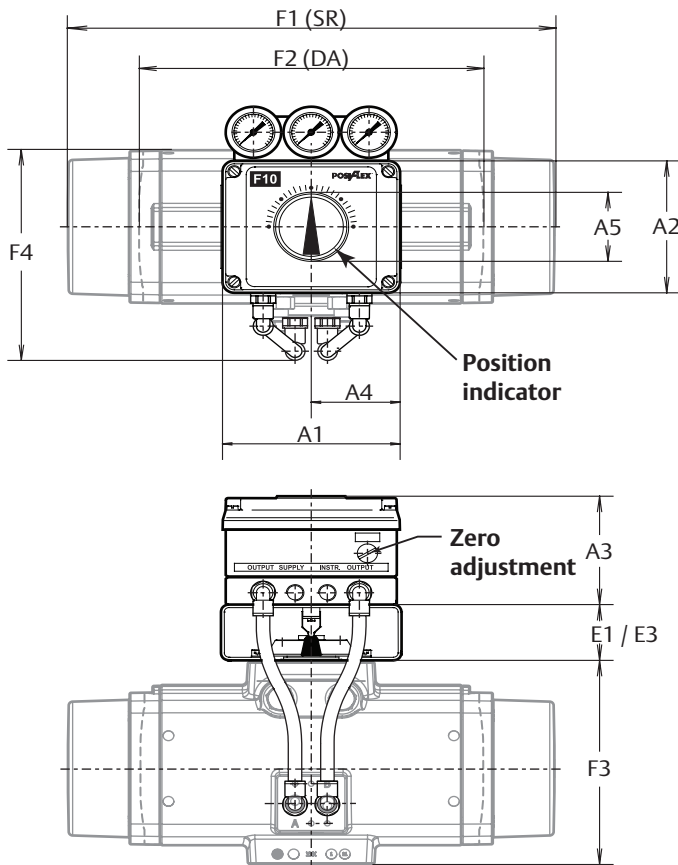


Tabelle 12. General Dimensions

Dim.	A1	A2	A3	A4	A5	E1	E3
mm	132	106	88	66	53	45	55
Inch	5.20	4.17	3.46	2.60	2.09	1.77	2.17

**Notes:**

1. For more detailed information of PosiFlex positioners and options. Please consult data sheet PF.00.00.EN
2. Dimension F4 is a guide dimension. Actual F4 dimension might differ depending on actual used pipe fitting.
3. A dedicated bracket is available for actuator size F12.

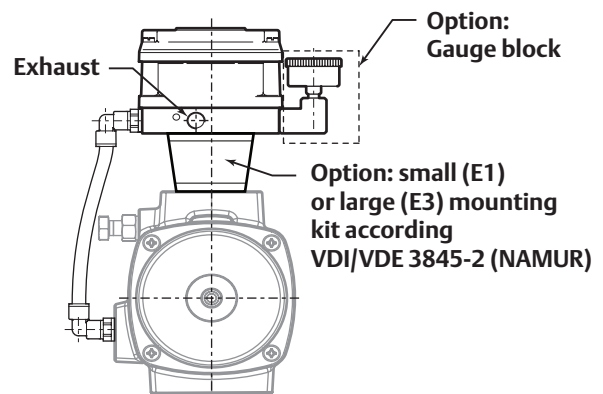


Tabelle 13. Assembly Dimensions of Actuator and Positioner

Dim. in mm	Actuator size												
	0012	0025	0040	0065	0100	0150	0200	0350	0600	0950	1600	2500	4000
F1	118	166	192	217	247	304	362	385	476	658	732	877	959
F2	103	166	192	217	247	235	265	284	356	400	462	550	649
F3	60	91	112	124	131	157	163	201	248	268	302	354	389
F4	115	124	132	143.5	155	162	193.5	227.5	278.5	330	373	424	427
Inch	0012	0025	0040	0065	0100	0150	0200	0350	0600	0950	1600	2500	4000
F1	4.65	6.54	7.56	8.54	9.72	11.97	14.25	15.16	18.74	25.91	28.82	34.53	37.76
F2	4.06	6.54	7.56	8.54	9.72	9.25	10.43	11.18	14.02	15.75	18.19	21.65	25.55
F3	2.36	3.58	4.41	4.88	5.16	6.18	6.42	7.91	9.76	10.55	11.89	13.94	15.31
F4	4.53	4.88	5.2	5.65	6.1	6.38	7.62	8.96	10.96	12.99	14.69	16.69	16.81

## Block Dimensions F20 Positioner on Actuator

### Dimensions on EL-O-Matic F-Series

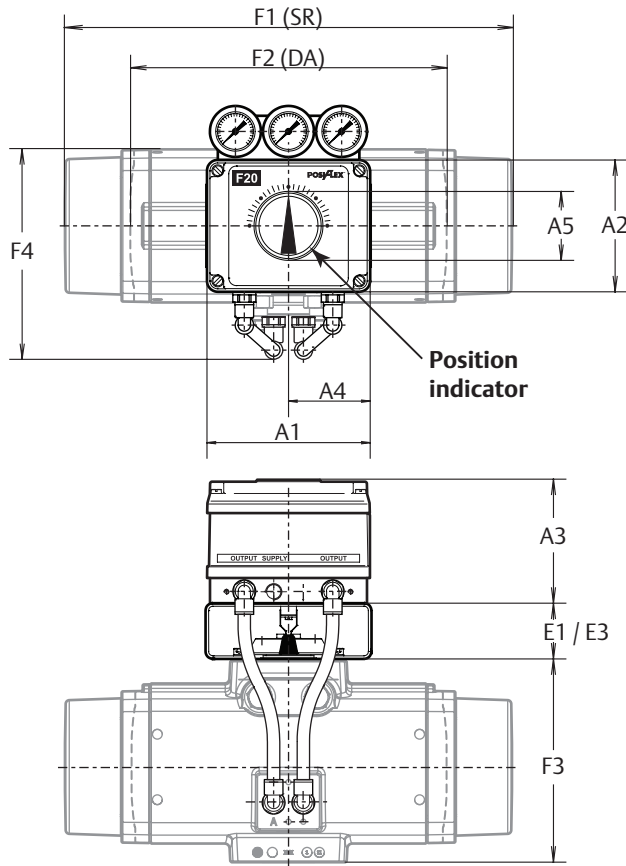


Table 14. General Dimensions

Dim.	A1	A2	A3	A4	A5	E1	E3
mm	132	106	102	66	53	45	55
Inch	5.20	4.17	4.02	2.60	2.09	1.77	2.17

**Notes:**

1. For more detailed information of Posiflex positioners and options please consult data sheet PF.00.00.EN
2. Dimension F4 is a guide dimension. Actual F4 dimension might differ depending on actual used pipe fitting.
3. A dedicated bracket is available for actuator size F12

**Electric entry:**  
Metric: M20x1.5  
Imperial: 1/2"NPT

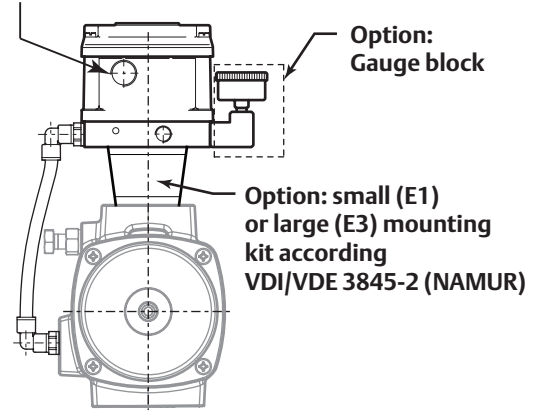
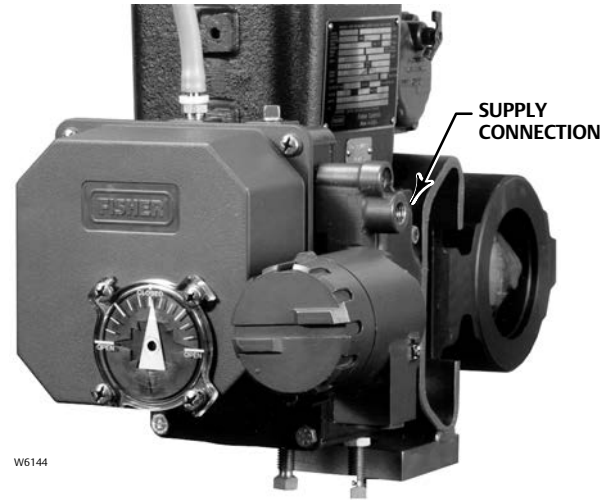


Table 15. Assembly Dimensions of Actuator and Positioner

Dim. in	Actuator size												
	0012	0025	0040	0065	0100	0150	0200	0350	0600	0950	1600	2500	4000
F1	118	166	192	217	247	304	362	385	476	658	732	877	959
F2	103	166	192	217	247	235	265	284	356	400	462	550	649
F3	60	91	112	124	131	157	163	201	248	268	302	354	389
F4	115	124	132	143.5	155	162	193.5	227.5	278.5	330	373	424	427
Inch	0012	0025	0040	0065	0100	0150	0200	0350	0600	0950	1600	2500	4000
F1	4.65	6.54	7.56	8.54	9.72	11.97	14.25	15.16	18.74	25.91	28.82	34.53	37.76
F2	4.06	6.54	7.56	8.54	9.72	9.25	10.43	11.18	14.02	15.75	18.19	21.65	25.55
F3	2.36	3.58	4.41	4.88	5.16	6.18	6.42	7.91	9.76	10.55	11.89	13.94	15.31
F4	4.53	4.88	5.2	5.65	6.1	6.38	7.62	8.96	10.96	12.99	14.69	16.69	16.81

# Fisher™ 3710 and 3720 Positioners and 3722 Electro-Pneumatic Converter

Fisher 3710 pneumatic and 3720 electro-pneumatic positioners are designed for use with either diaphragm or piston rotary actuators. These positioners provide a valve ball or disk position for a specific input signal. The 3710 provides a valve position in response to a pneumatic input signal. The 3720 is created by the addition of a Fisher 3722 electro-pneumatic converter to the 3710 positioner. The positioner provides a valve position in response to a DC current input signal. Either type can easily be configured as single- or double-acting for rotary actuators.



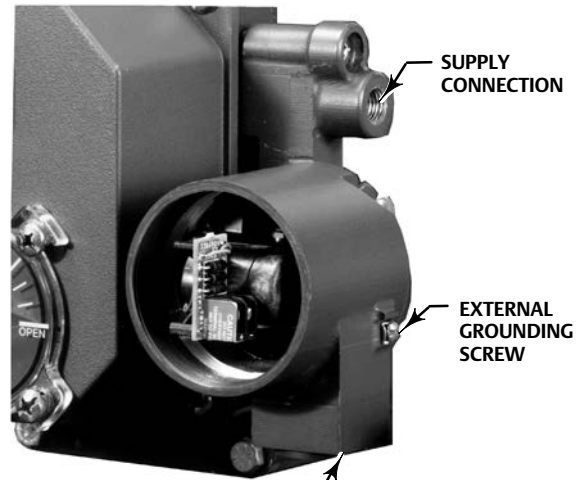
W6144

3720 POSITIONER  
MOUNTED ON A 1052 ACTUATOR



W6058-1

3710 POSITIONER  
MOUNTED ON A 1066 ACTUATOR



W6145

1/2 NPT OR M20  
CONDUIT CONNECTION

3722 ELECTRO-PNEUMATIC CONVERTER

**Specifications**

**Available Configuration**

3710: ■ Single- or ■ double-acting pneumatic rotary valve positioner  
 3720: ■ Single- or ■ double-acting electro-pneumatic rotary valve positioner consisting of a 3710 with a 3722 attached  
 3722: An electro-pneumatic converter that converts a 4-20 mA DC input signal to a 0.2 to 1.0 bar (3 to 15 psig) signal for the pneumatic positioner

**Input Signal**

3710:  
*Standard:* ■ 0.2 to 1.0 bar (3 to 15 psig) or ■ 0.4 to 2.0 bar (6 to 30 psig)  
*Split-Range:* ■ 0.2 to 0.6 bar (3 to 9 psig) and 0.6 to 1.0 bar (9 to 15 psig) or ■ 0.4 to 1.2 bar (6 to 18 psig) and 1.2 to 2.0 bar (18 to 30 psig)  
 3720:  
*Standard:* ■ 4-20 mA DC constant current with 30 VDC maximum compliance voltage  
*Split-Range:* ■ 4-12 mA DC or 12-20 mA DC

**Equivalent Circuit**

3720: 120 ohms shunted by three 5.6 V zener diodes

**Output Signal**

Pneumatic pressure as required by the actuator up to full supply pressure  
 Action<sup>(1)</sup>: Field reversible between direct and reverse

**Supply Pressure<sup>(2)</sup>**

*Minimum Recommended:* 0.3 bar (5 psig) above actuator requirement  
*Maximum:* 10.3 bar (150 psig) or maximum pressure rating of the actuator, whichever is lower

**Supply Medium**

3710: Air or Natural Gas  
 3720: Air

The 3720 positioner is not approved for use with Natural Gas as the supply medium

**Steady-State Air Consumption<sup>(3)</sup>**

3710:  
*6 mm Spool Valve:* 0.82 normal m<sup>3</sup>/hr (29 scfh) at 4.1 bar (60 psig) supply pressure

3720:  
*6mm Spool Valve:* 1.0 normal m<sup>3</sup>/hr (36 scfh) at 4.1 bar (60 psig) supply pressure

**Maximum Supply Air Demand<sup>(3)</sup> (Double-Acting)**

*6 mm Spool Valve:* 20 normal m<sup>3</sup>/hr (700 scfh) at 4.1 bar (60 psig) supply pressure

**Typical Performance<sup>(4)</sup>**

3710 Pneumatic Positioner  
*Independent Linearity:* ±0.5% of output span  
*Hysteresis:* 0.5% of output span  
*Deadband:* 0.3% of input span

3720 Electro-Pneumatic Positioner  
*Independent Linearity:* ±1.0% of output span  
*Hysteresis:* 0.6% of output span  
*Deadband:* 0.35% of input span

**Electromagnetic Compatibility for 3722 electro-pneumatic converter:**

Meets EN 61326-1:2013  
 Immunity—Industrial locations per Table 2 of the EN 61326-1 standard. Performance is shown in table 1 below.  
 Emissions—Class A  
 ISM equipment rating: Group 1, Class A

Note: Electromagnetic Compatibility specifications also apply to the 3720 positioner

**Operating Influences**

*Supply Pressure Sensitivity:* A 10% change in supply pressure changes the valve shaft position less than the following percentages of valve rotation:  
 3710: 1.0% at 4.1 bar (60 psig) supply pressure  
 3720: 1.5% at 4.1 bar (60 psig) supply pressure

**Operative Temperature Limits<sup>(2)</sup>**

- -40 to 80°C (-40 to 180°F),
- -50 to 107°C (-58 to 225°F)

**Construction Materials**

*Positioner Base:* Low copper aluminum alloy  
*Cover:* Polyester plastic  
*Feedback Shaft:* Stainless steel  
*Range Spring:* Stainless steel  
*Input Module Diaphragm, O-rings:* ■ Nitrile or ■ Ethylene-propylene (EPDM)  
*Spool Valve:* SST/C72900  
*Tubing:* Copper (standard)

-continued-

## Specifications (Continued)

### Construction Materials (continued)

Fittings: Brass (standard)  
Gauges: Chrome-plated brass connection with plastic case  
Connectors for diagnostic testing: ■ Stainless steel or ■ Brass

### Electrical Classifications for 3722 Converter

CSA—Intrinsically Safe, Explosion-proof, Type n, Dust-Ignition Proof  
FM—Intrinsically Safe, Explosion-proof, Type n, Non-incendive, Dust-Ignition Proof  
ATEX—Intrinsically Safe, Flameproof, Type n  
IECEX—Intrinsically Safe, Flameproof, Type n  
Note: These classifications also apply to the 3720 positioner

### Housing Classification for 3722 Converter

CSA— Type 3 Encl.     ATEX— IP64  
FM— NEMA 3, IP54     IECEX— IP54

Mount instrument with vent on side or bottom if weatherproofing is a concern

Note: These classifications also apply to the 3720 positioner

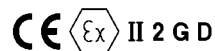
### Other Classifications/Certifications for 3722 Converter

CUTR— Customs Union Technical Regulations (Russia, Kazakhstan, Belarus, and Armenia)  
INMETRO—National Institute of Metrology, Quality and Technology (Brazil)  
KGS—Korea Gas Safety Corporation (South Korea)  
Contact your [Emerson sales office](#) or Local Business Partner for classification/certification specific information

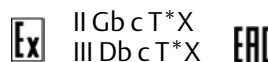
Note: This classification also applies to the 3720 positioner

### Hazardous Area Classification for 3710 Positioner

Complies with the requirements of ATEX Group II Category 2 Gas and Dust



Meets Customs Union technical regulation TP TC 012/2011 for Groups II/III Category 2 equipment



Note: These ratings do not apply to the 3720 positioner

### Pressure Connections

1/4 NPT internal

### Electrical Connection for 3720 Positioner

1/2-14 NPT conduit connection

### Rotary Valve Rotation

■ 90 degrees (standard) ■ 60 degrees (optional)

### Options

Span Adjuster Assembly: ■ 0.2 to 1.0 bar (3 to 15 psig) input range or, ■ 0.4 to 2.0 bar (6 to 30 psig) input range

Elastomers (O-rings, diaphragm): ■ standard temperature range, -40 to 80°C (-40 to 180°F), ■ extended temperature range -50 to 107°C (-58 to 225°F)

■ Special applications, ■ Beacon indicator, ■ Gauges<sup>(5)</sup>, tire valves, or connectors for diagnostic testing

### Approximate Weight

3710: 2.04 kg (4.5 pounds)  
3720: 2.72 kg (6.0 pounds)

NOTE: Specialized instrument terms are defined in ANSI/ISA Standard 51.1 - Process Instrument Terminology.

1. Direct-acting, an increasing input signal extends actuator rod. Reverse-acting, an increasing input signal retracts actuator rod.

2. The pressure and temperature limits in this document and any applicable standard or code limitation should not be exceeded.

3. Normal m<sup>3</sup>/hr--Normal cubic meters per hour (0°C and 1.01325 bar, absolute); Scfh--Standard cubic feet per hour (60°F and 14.7 psia).

4. Typical values determined by tests with a 1061 size 30 actuator at 4.1 bar (60 psig) supply pressure. Performance may vary with other actuator types and supply pressures.

5. Gauges not available for high temperature range.

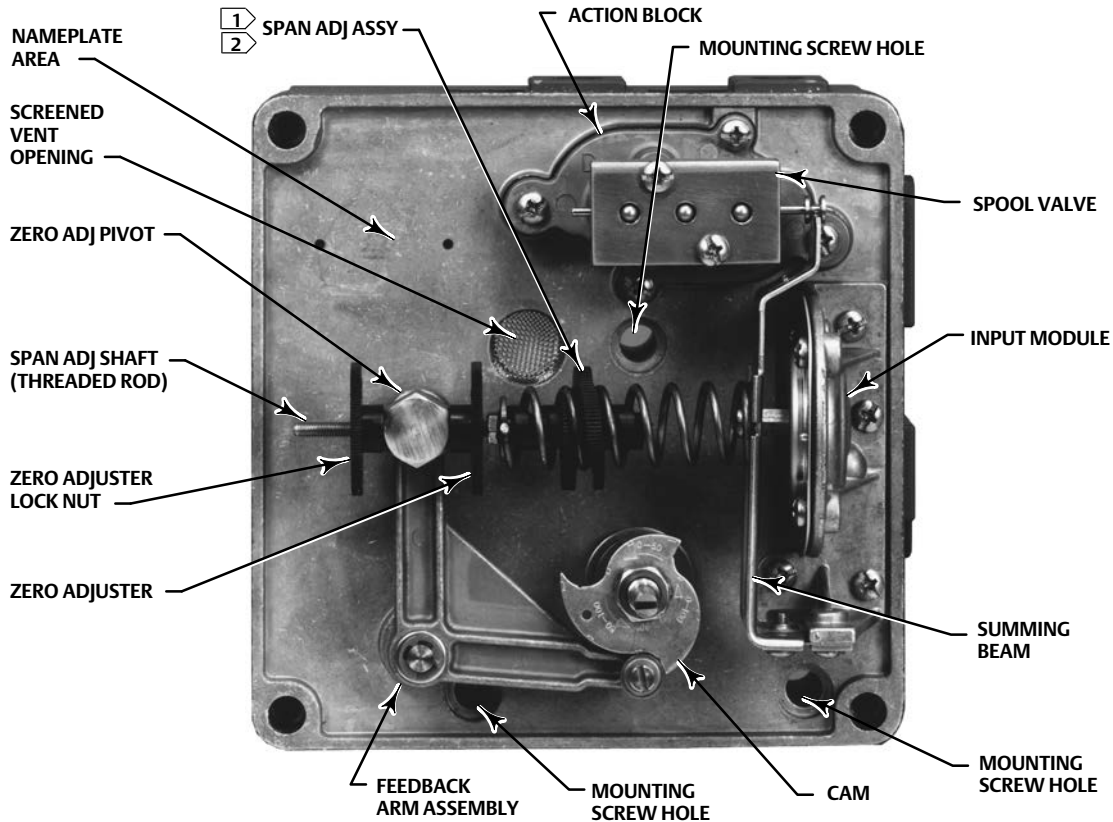
**Table 1. Fisher 3722 Electro-Pneumatic Converter<sup>(1)</sup> EMC Summary Results—Immunity**

Port	Phenomenon	Basic Standard	Test Level	Performance Criteria <sup>(2)</sup>
Enclosure	Electrostatic Discharge (ESD)	IEC 61000-4-2	4 kV contact; 8 kV air	A
	Radiated EM field	IEC 61000-4-3	80 to 1000 MHz @ 10V/m with 1 kHz AM at 80% 1400 to 2000 MHz @ 3V/m with 1 kHz AM at 80% 2000 to 2700 MHz @ 1V/m with 1 kHz AM at 80%	A
	Rated power frequency magnetic field	IEC 61000-4-8	60 A/m at 50 Hz	A
I/O signal/control	Burst (fast transients)	IEC 61000-4-4	1 kV	A
	Surge	IEC 61000-4-5	1 kV (line to ground only)	B
	Conducted RF	IEC 61000-4-6	150 kHz to 80 MHz at 3 volts	A
Specification limit = ±1% of span 1. The information contained in the table also applies to the 3720 positioner. 2. A = No degradation during testing. B = Temporary degradation during testing, but is self-recovering.				

## Features

- **Accurate, Fast Response**—3710 and 3720 positioners use field-proven spool valve technology for a simple design that gives accurate, fast-responding operation with high cycle life. These positioners are able to withstand the severe vibrations of most plant environments.
- **Modular Construction**—The 3710 positioner converts easily to a 3720 positioner by adding the 3722 electro-pneumatic converter. The converter mounts over the instrument and supply ports in the 3710 positioner base. This provides a simple, compact, and cost-effective field conversion from pneumatic to electro-pneumatic valve positioning.
- **Corrosion-Resistant Construction with Air Purge**—Case, components, and gasket materials withstand harsh environments. Proven engineered resins and 300 Series stainless steel construction is used throughout each unit. Die castings are low copper aluminum alloy to maximize corrosion resistance. Positioner bleed air purges internal positioner parts. As an option with some Fisher actuators, bleed air also purges the actuator housing for additional protection.
- **Extended Temperature Capability**—With EPDM O-rings and input module diaphragm, 3710 and 3720 positioners can be used in low-temperature and high-temperature applications.
- **Meets Special Application Requirements**—3710 and 3720 positioners with EPDM O-rings and input module diaphragm can be used in applications with special material requirements as in the food and beverage industry, pharmaceuticals, and tobacco processing.
- **Easy Positioner Adjustments**—With the cover removed (figure 1), all internal components are easily accessed. Zero and span adjustments are made by hand with no tools required.
- **Stable Operation**—Changes in supply pressure and ambient temperature have minimal effect on positioner operation.
- **Control Valve Diagnostic Testing Capability**—To support diagnostic testing of valve/actuator/positioner packages, connectors, piping, and other hardware can be installed between the 3710 positioner and the actuator. A typical connector installation is shown in figure 5.
- **Valve Position Indicator**—Standard, low-profile indicator or optional, beacon-style indicator mount easily to the positioner cover.

Figure 1. Features and Adjustments



**Notes:**

- 1 The Span Adj Assy is made up of the range spring, span adj shaft (threaded rod) and span adj knob.
- 2 The Span Adj Assy features a red color-coded range spring for a 0.4 to 2.0 bar (6 to 30 psig) input signal.

W5947

## Actuators

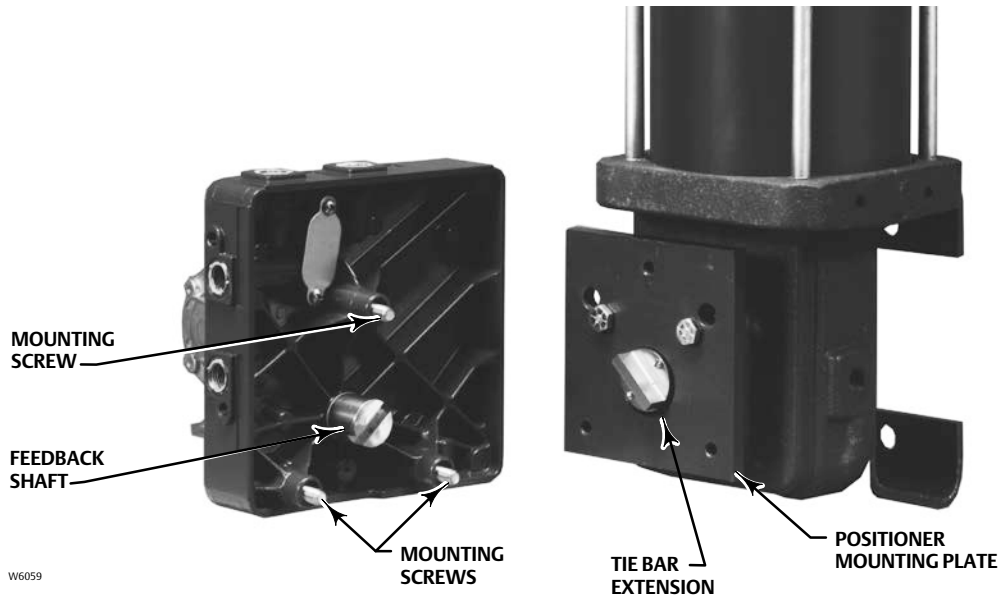
The positioner mounts integrally to the actuator cover plate (figure 2) of the following Fisher actuators:

- 1051 and 1052, size 30: The size 30 actuator is no longer manufactured by Emerson. The 3710 positioner is available for field installation on existing size 30 actuators.
- 1051, size 40 and 60
- 1052, size 40, 60, and 70
- 1061, size 30, 40, 60, and 68
- 1051, size 33
- 1052, size 20, 33
- 1061, size 80, 100
- 1066, size 20, 27, and 75
- 2052, size 1, 2, and 3
- NAMUR Mounting

A mounting plate is used to mount the 3710 positioner to the following Fisher actuators:



Figure 2. Mounting the Positioner Base Plate



## Principle of Operation

Refer to the positioner schematic (figure 3). The operational description here follows the schematic layout and orientation.

The 3710 pneumatic positioner is a force-balance instrument that provides a control valve position proportional to a pneumatic input signal. The balance of opposing forces in the positioner occurs at the summing beam.

One force applied to the summing beam is developed from the input signal pressure on the diaphragm. The other force is from the feedback spring and is proportional to the position of the feedback lever.

When the input pressure is increased to the diaphragm of the input module, the diaphragm strokes down, increasing the effective force from the input module and compressing the feedback spring. The summing beam moves the spool down in the spool body, opening output port B to supply air to the left side of the actuator. At the same time, output port A of the spool valve opens, allowing the right side of the actuator to vent to atmosphere.

The piston in the actuator moves to the right, rotating the feedback shaft and cam counterclockwise. This rotation causes the feedback lever to rotate clockwise, increasing the compression on the feedback spring. These rotations continue until the additional force from the spring balances with the input module force on the summing beam. When the forces are equal, the summing beam returns to its steady state or neutral position and the actuator is held at a new position.

In a 3720 positioner, the 3722 converter receives the milliamper (mA), direct current (DC), input signal and provides a proportional pneumatic output signal through a nozzle/flapper arrangement. Nozzle pressure from the converter module travels through the converter housing to provide the input signal pressure to the 3710 pneumatic positioner.

The feedback lever position is determined by the location or rise of the cam (figure 4) which is attached to the feedback shaft. When the two opposing forces are equal or at a steady state, the summing beam holds the spool in a neutral position. At steady state, a small flow of air passes from supply through both outputs of the spool valve to the actuator, holding the actuator at a constant position. At the same time, another small flow of air exhausts out each end of the spool valve.

Figure 3. Fisher 3710 Positioner Schematic

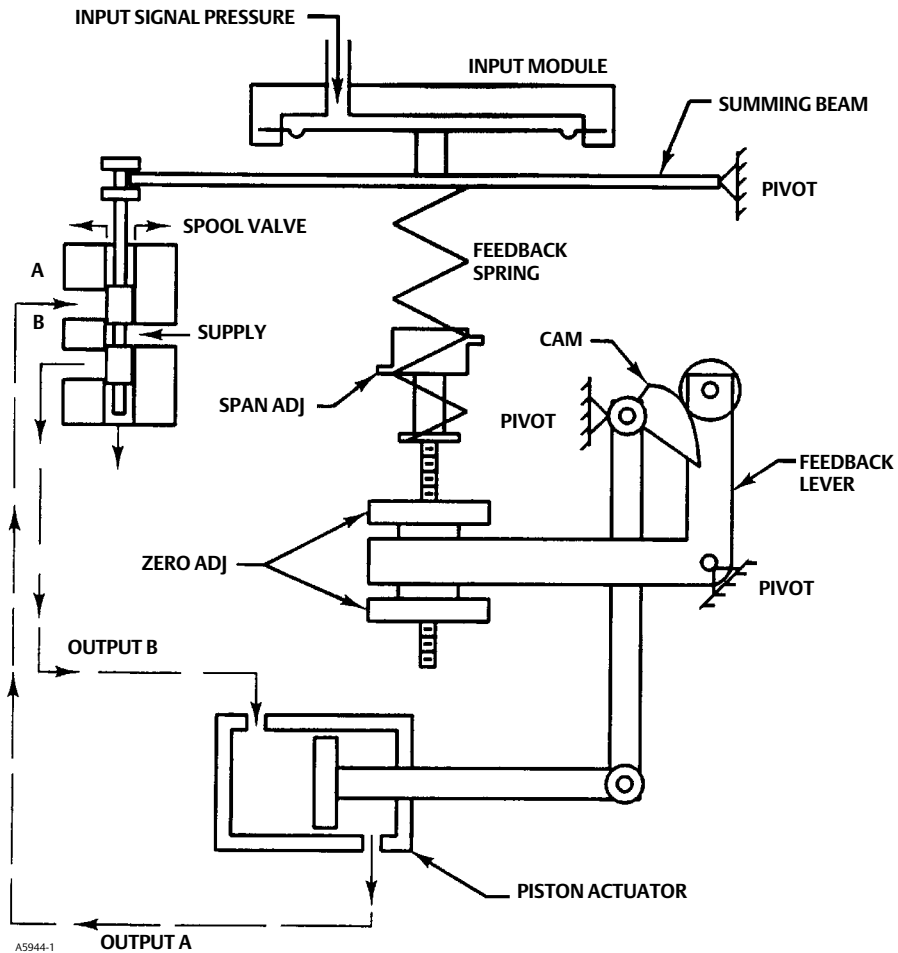
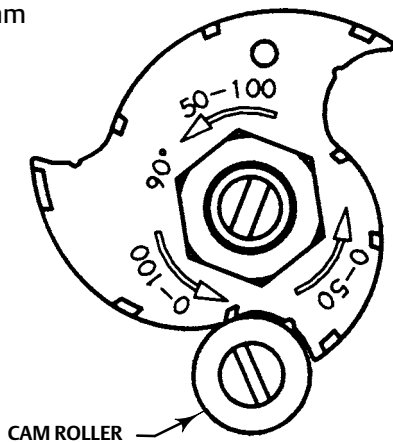


Figure 4. Cam



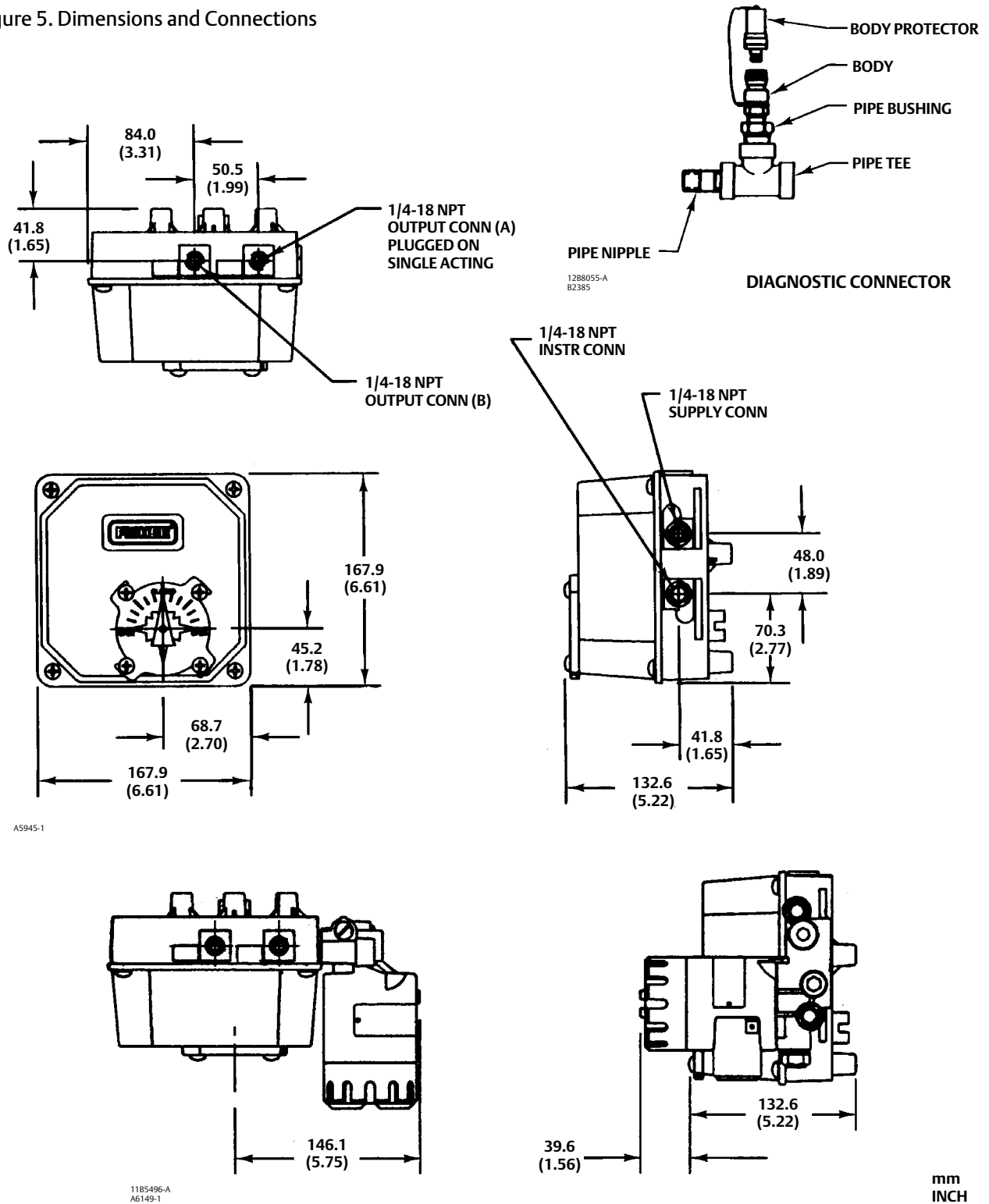
A6045

## Installation

The supply pressure medium must be a clean, dry, filtered air, or noncorrosive gas (3710 positioner only). If the supply source is capable of exceeding the maximum actuator operating pressure or positioner supply pressure, take appropriate steps during installation to protect the positioner and all connected equipment against overpressure.

Positioner connections including connections for diagnostic testing and overall dimensions are shown in figure 5.

Figure 5. Dimensions and Connections



## Ordering Information

When ordering, specify:

### Required Application Information

1. Positioner type number
2. Pneumatic or DC current input signal range
3. Direct- or reverse-acting
4. Actuator type, size, and degrees of rotation
5. Maximum supply pressure available

6. Ambient temperature range
7. Special application material requirements such as EPDM elastomers
8. Supply pressure regulator and options such as gauges or tire valves, if required
9. Connectors for diagnostic testing, if required

### Construction Specifications

Refer to the construction details given in the Specifications. If different materials of construction are required, contact your [Emerson sales office](#) or Local Business Partner.



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# Fisher™ FIELDVUE™ DVC2000 Digital Valve Controller

The FIELDVUE DVC2000 digital valve controller is simple to use, compact, and designed for easy mounting. It converts a 4-20 mA input signal into a pneumatic output signal, which feeds the control valve actuator. Instrument setup is performed with an enclosed push button and liquid crystal display (LCD) interface. The interface supports multiple languages, available in two language pack options.

The DVC2000 uses a two-stage positioner design. The pre-amplifier stage provides high static gain for responsiveness to small changes in the input signal. The power amplifier stage delivers the right volume of air to the actuator, combining superior dynamic

performance with minimal steady-state air consumption.

The high performance, linkage-less feedback system eliminates physical contact between the valve stem and the positioner. There is no wear of parts so cycle life is maximized. Additionally, the elimination of levers and linkages reduces the number of mounting parts and the mounting complexity. Positioner replacement and maintenance is simplified because the feedback parts stay connected to the actuator stem.

Designed to meet intrinsically safe and non-incendive requirements, this instrument delivers scalable functionality and high performance in a small package.



W8755-3

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## Specifications

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### Available Mountings

- Integral mounting to Fisher 657/667 or GX actuators
- Sliding-stem applications
- Quarter-turn rotary applications

DVC2000 digital valve controllers can also be mounted on other actuators that comply with IEC 60534-6-1, IEC 60534-6-2, VDI/VDE 3845 and NAMUR mounting standards.

### Input Signal

**Analog Input Signal:** 4-20 mA DC, nominal; can be configured for split range  
**Minimum Voltage:** Voltage available at instrument terminals must be 8.5 volts for analog control, 9.0 volts for HART® communication  
**Maximum Voltage:** 30 VDC  
**Minimum Control Current:** 4.0 mA (below 3.5 mA may cause microprocessor restart)  
**Overcurrent Protection:** Input circuitry limits current to prevent internal damage  
**Reverse Polarity Protection:** No damage occurs from reversal of loop current

### Output Signal

Pneumatic signal as required by the actuator, up to full supply pressure  
**Minimum Span:** 0.5 bar (7 psig)  
**Maximum Span:** 7 bar (101 psig)  
**Action:** Single Acting, direct

### Supply Pressure<sup>(1)</sup>

**Recommended:** 0.5 bar (7 psig) greater than the maximum actuator requirements  
**Maximum:** 7 bar (101 psig)  
Supply medium must be clean, dry air or noncorrosive gas that meets the requirements of ISA Standard 7.0.01 or ISO 8573-1

### Temperature Limits<sup>(1)</sup>

-40 to 80°C (-40 to 176°F). LCD may not be readable below -20°C (-4°F).

### Air Consumption<sup>(2)</sup>

**Supply pressure**  
*At 1.5 bar (22 psig)<sup>(3)</sup>: 0.06 normal m<sup>3</sup>/h (2.3 scfh)*  
*At 4 bar (58 psig)<sup>(4)</sup>: 0.12 normal m<sup>3</sup>/h (4.4 scfh)*

### Air Capacity<sup>(2)</sup>

**Supply pressure**  
*At 1.5 bar (22 psig)<sup>(3)</sup>: 4.48 normal m<sup>3</sup>/h (167 scfh)*  
*At 4 bar (58 psig)<sup>(4)</sup>: 9.06 normal m<sup>3</sup>/h (338 scfh)*

### Independent Linearity

±0.5% of output span

### Electromagnetic Compatibility

Meets EN 61326-1:2013  
Immunity—Industrial locations per Table 2 of the EN 61326-1 standard. Performance is shown in table 1 below  
Emissions—Class A  
ISM equipment rating: Group 1, Class A  
Tested to NAMUR NE21 requirements

### Vibration Testing Method

Tested per ANSI/ISA-75.13.01 Section 5.3.5. A resonant frequency search is performed on all three axes. The instrument is subjected to the ISA specified 1/2 hour endurance test at each major resonance, plus an additional two million cycles.

### Input Impedance

The input impedance of the DVC2000 active electronic circuit is not purely resistive. For comparison to resistive load specifications, an equivalent impedance of 450 ohms may be used. This value corresponds to 9 V @ 20 mA.

### Electrical Classification

#### Hazardous Area:

- CSA—Intrinsically Safe and Non-incendive
- FM—Intrinsically Safe and Non-incendive
- ATEX—Intrinsically Safe
- IECEx—Intrinsically Safe

Contact your [Emerson sales office](#) if additional information is required

#### Electrical Housing:

- CSA—IP66, Type 4X
- FM—IP66
- ATEX—IP66
- IECEx—IP66

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-continued-



## Specifications (continued)

### Other Classifications/Certifications

CUTR— Customs Union Technical Regulations (Russia, Kazakhstan, Belarus, and Armenia)

ESMA— Emirates Authority for Standardization and Metrology - ECAS-Ex (UAE)

INMETRO— National Institute of Metrology, Quality and Technology (Brazil)

KGS— Korea Gas Safety Corporation (South Korea)

NEPSI— National Supervision and Inspection Centre for Explosion Protection and Safety of Instrumentation (China)

PESO CCOE— Petroleum and Explosives Safety Organisation - Chief Controller of Explosives (India)

SABS— South African Bureau of Standards (South Africa)

Contact your [Emerson sales office](#) for classification/certification specific information

### Connections

#### Standard

Supply and Output Pressure: G1/4 internal

Electrical: M20 internal

#### Optional

Supply and Output Pressure: 1/4 NPT internal

Electrical: 1/2 NPT internal

### Materials of Construction

Housing and Cover: A03600 low copper aluminum alloy

Elastomers: nitrile, fluorosilicone

### Stem Travel<sup>(6)</sup>

Minimum: 6.35 mm (0.25 inch)

Maximum: 606 mm (23-7/8 inches)

### Shaft Rotation<sup>(6)</sup>

Minimum: 0 - 45°

Maximum: 0 - 90°

### Mounting

Designed for direct actuator mounting. For weatherproof housing capability, the vent must be positioned at the lowest point of the instrument.

### Weight

1.5 kg (3.3 lbs)

### Dimensions

Refer to figure 3

### Options

■ **Airset:** Fisher 67CFR with filter

■ **Language Packs:** ■ *Standard:* English, German, French, Italian, Spanish, Japanese, Chinese, Portuguese, Russian, Polish, and Czech

■ *Optional:* English, German, French, Italian, Spanish, Japanese, Chinese, and Arabic

■ **Pipe-away vent**

■ **Limit Switches:** Two isolated switches, configurable throughout calibrated travel range

Supply Voltage: 5-30 VDC

OFF State: 0.5 to 1.0 mA

ON State: 3.5 to 4.5 mA (above 5 volts)

Reference Accuracy: 2.5% of travel span<sup>(5)</sup>

■ **Transmitter:** 4-20 mA output, isolated

Supply Voltage: 8-30 VDC

Fault Indication: offrange high or low

Reference Accuracy: 1% of travel span<sup>(5)</sup>

1. The pressure/temperature limits in this document and any applicable standard or code limitation should not be exceeded. Note: Temperature limits vary based on hazardous area approval.

2. Normal m<sup>3</sup>/hour - Normal cubic meters per hour at 0°C and 1.01325 bar, absolute. Scfh - Standard cubic feet per hour at 60°F and 14.7 psia.

3. Low pressure relay: 0 to 3.3 bar (0 to 49 psig).

4. High pressure relay: 3.4 to 7.0 bar (50 to 102 psig).

5. Typical values when calibrated at temperature.

6. Stem Travel or Shaft Rotation can be modified with special mounting kits. Contact your Emerson sales office for maximum angle or shaft rotation.

## Features

- **Simplicity**—The DVC2000 is easy to use. If you are mounting the instrument for the first time, the linkage-less feedback system is easy to install. Once a magnet array is assembled to the valve stem, positioner replacement is simple since there are no physically connected parts.

At its very basic functionality, the DVC2000 digital valve controller has a local user interface that will allow you to configure, calibrate, and tune the instrument. If the I/O Options Package is installed, you can calibrate the 4-20 mA transmitter and configure the limit switch action. Running the Quick Setup routine calibrates and tunes the instrument specifically for that actuator.

The full text display in the local interface is easy to navigate, in part due to the selection of languages. Each unit can be configured to display English, German, French, Italian, Spanish, Japanese or Chinese. The standard language pack also includes Portuguese, Russian, Polish, and Czech. An optional language pack replaces these four languages with Arabic.

- **Reliability**—The DVC2000 is based on the field-proven FIELDVUE technology. Years of control experience has brought this product line to a high level of reliability and dependability.
- **Performance**—The two-stage positioner design provides a mechanical platform that enables responsiveness to small input changes and tighter process control. The digital tuning algorithm allows optimal response to get the valve to its desired position quickly.

- **Diagnostics**

*Local User Interface:* DVC2000 instruments come standard with a liquid crystal display. Predefined instrument and valve diagnostics are built into the firmware to alert you if there are any problems with the mounting, electronics, hardware, or valve performance.

*Handheld Field Communicator:* DVC2000 instruments are packed with user-configurable alerts and alarms. These flags provide notification of current status and potential valve and instrument problems through alerts such as travel deviation, travel limit, cycle count, and travel accumulation.

*ValveLink™ software:* Tests can be performed to identify problems with the entire control valve assembly using ValveLink software. Using valve stem travel feedback, actuator pressure sensor, and other sensors on the instrument, the health of the control valve can be evaluated while the valve is still in service and fully operational. This helps to pinpoint problems without disrupting the process - before the equipment fails.

- **I/O Options Package**— The DVC2000 is available with an I/O Options Package which includes two (2) integral limit switches and a stem position transmitter. The limit switches are configurable for open and closed valve indication at any point throughout the calibrated travel range. The position transmitter provides a 4-20 mA signal for valve position feedback verification. As an integral component to the instrument, this option module avoids the need for difficult-to-mount external switches and transmitters.

## Integration

### Traditional 4-20 mA Systems

Because the DVC2000 instrument operates with a 4-20 mA control signal, it directly replaces older analog instruments. Microprocessor based electronics provide improved control performance along with repeatable and reliable configuration and calibration.

### Modbus with ValveLink Software and HART Multiplexers

HART communication allows you to extract more value from the DVC2000 instrument beyond its inherent improved performance. When integrated into a multiplexer network and using ValveLink software,

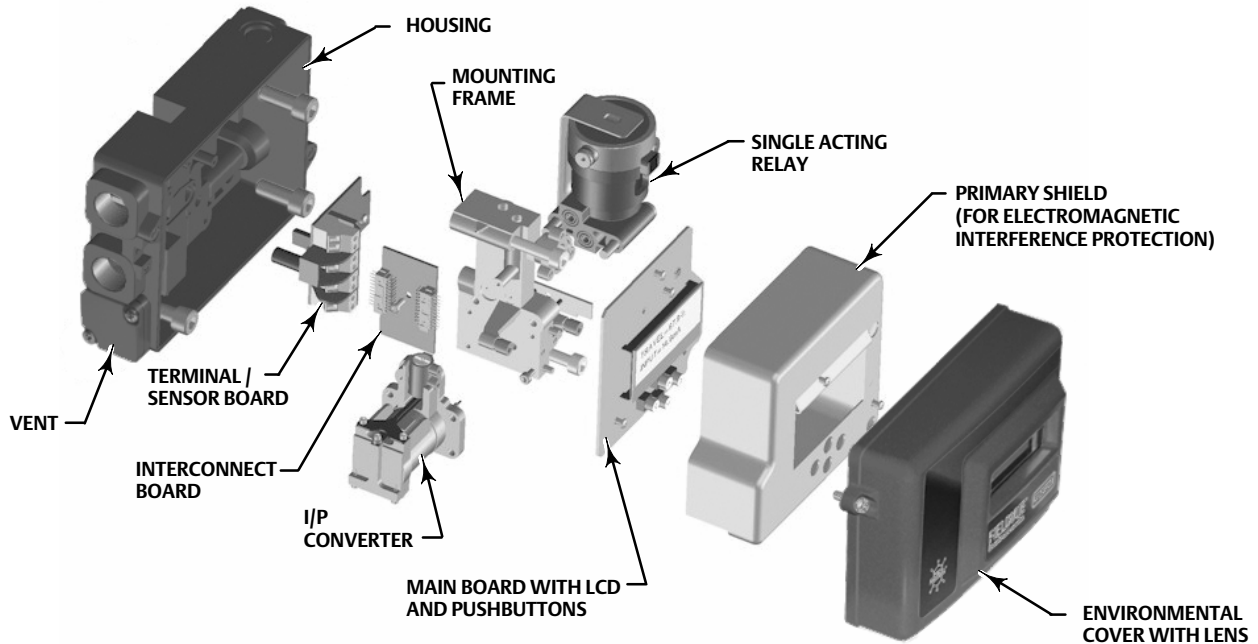
the device and valve information is real-time. From the safety of a control room, multiple instruments can be monitored for alerts and alarms.

Additionally, tasks such as configuration, calibration, and diagnostic testing do not require special trips to the field. ValveLink software can communicate via Modbus to the distributed control system (DCS) to provide critical information such as valve travel alerts and alarms.

### Integrated Control System

A control system with HART communication capabilities has the ability to directly gather information from DVC2000 digital valve controllers. Information such as valve travel, alerts and alarms can be seamlessly accessed to provide a view into the field device from the safety of the control room.

Figure 1. FIELDVUE DVC2000 Digital Valve Controller Assembly (Exploded View)



W8946-1

## Principle of Operation

The DVC2000 (figures 1 and 2) receives a 4-20 mA set point and position the valve by increasing or decreasing the air output to an actuator.

- The input signal provides electrical power and the set point simultaneously. The 4-20 mA signal is routed into the terminals through a twisted pair of wires.
- The unit's mainboard contains a microprocessor that continuously runs a digital control algorithm. This algorithm produces a "drive signal" to the I/P converter.
- The I/P converter assembly (or pre-amplifier) is connected to supply pressure and converts the electronic "drive signal" into a pneumatic "pressure signal." This pressure signal is the input to the pneumatic relay assembly.
- The relay (or power amplifier) is also connected to supply pressure and amplifies the small pressure signal from the I/P converter into a larger pressure output signal used by the actuator. The change in

relay output pressure to the actuator causes the valve to move.

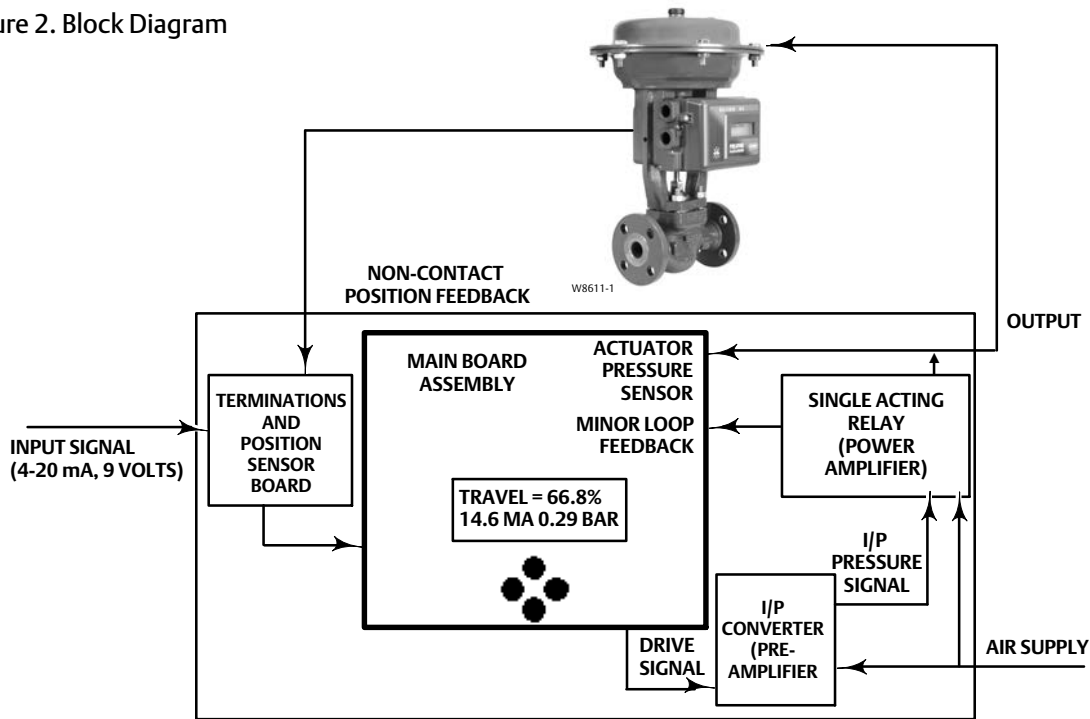
There are two relay options. The low pressure relay operates with actuators that require less than 3.5 bar (50 psi) of supply air. The high pressure relay operates with actuators that require 3.5 to 7.0 bar (50 to 100 psi) of supply air.

- Valve position is sensed through the linkage-less feedback system. The travel sensor is electrically connected to the printed wiring board to provide a travel feedback signal used in the control algorithm. The valve continues to move until the correct position is attained.

## Installation

The DVC2000 is designed for mounting on any single acting pneumatic actuator up to 606 mm (23-7/8 inches) of travel. The envelope and travel feedback system conforms to VDI/VDE 3845, IEC 60534-6-1, and IEC 60534-6-2 standards.

Figure 2. Block Diagram



Furthermore, the DVC2000 instrument can be integrally mounted to the GX actuator, avoiding the need for complicated mounting brackets. The positioner mounts directly to an interface pad on the actuator yoke leg with a secure 3-point mounting. Internal passages inside the actuator yoke legs route the pneumatic output of the digital valve controller to the actuator casing, eliminating the need for external tubing (only for the air-to-open configuration).

Electrical connections are made on the termination strip, which uses cage clamp style wiring connectors. The electrical wiring entry point is available with either M20 or 1/2 NPT internal connections. Pressure connections are available with either G1/4 or 1/4 NPT internal connections.

## Ordering Information

Refer to the Specifications section. Carefully review each specification and indicate your choice whenever a selection is to be made.

When ordering, specify:

1. Actuator type and size

2. Maximum actuator travel or rotation
3. Minimum actuator operating pressure
4. Hazardous area certification requirements
5. Options
  - a. ■ G1/4 pneumatic and M20 conduit connections or ■ 1/4 NPT pneumatic and 1/2 NPT conduit connections
  - b. Language pack: ■ Standard—English, German, French, Italian, Spanish, Japanese, Chinese, Portuguese, Russian, Polish, and Czech or ■ Optional—English, German, French, Italian, Spanish, Japanese, Chinese, and Arabic
  - c. Supply pressure regulator
  - d. Valve diagnostic level (online performance testing, offline advanced testing, basic alerts/alarms)
  - e. I/O Options Package (includes position transmitter and two (2) limit switches)
  - f. Pipe-away vent connector
  - g. HART filter

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DVC2000 Digital Valve Controller  
D103167X012

Figure 3. Dimensions for FIELDVUE DVC2000 Digital Valve Controller

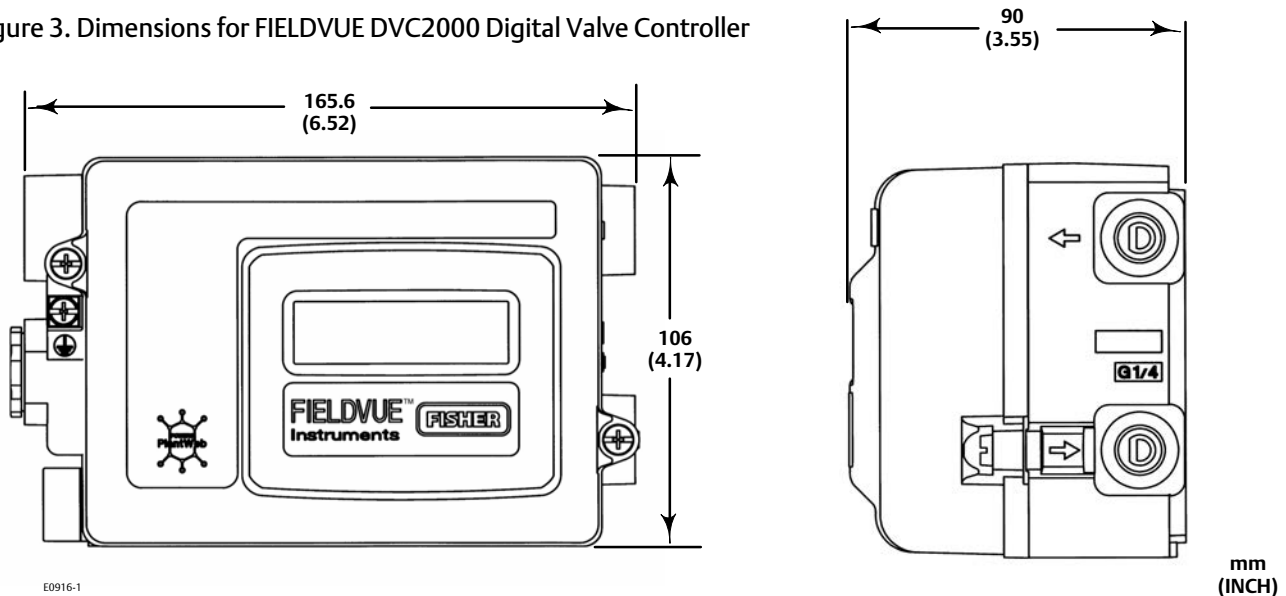


Table 1. EMC Summary Results—Immunity

Port	Phenomenon	Basic Standard	Test Level	Performance Criteria <sup>(1)</sup>
Enclosure	Electrostatic discharge (ESD)	IEC 61000-4-2	6 kV contact 8 kV air	B
	Radiated EM field	IEC 61000-4-3	80 to 1000 MHz @ 10V/m with 1 kHz AM at 80% 1400 to 2000 MHz @ 3V/m with 1 kHz AM at 80% 2000 to 2700 MHz @ 1V/m with 1 kHz AM at 80%	A
	Rated power frequency magnetic field	IEC 61000-4-8	30 A/m at 50 Hz, 60 sec	A
I/O signal/control	Burst (fast transients)	IEC 61000-4-4	± 1 kV	A
	Surge	IEC 61000-4-5	± 1 kV (line to ground only, each)	B
	Conducted RF	IEC 61000-4-6	150 kHz to 80 MHz at 10 Vrms	A

Performance criteria is + / - 1% effect.  
1. A = No degradation during testing. B = Temporary degradation during testing, but is self-recovering.

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