

Watson Smith Series

Electronic, Air Pressure,
Electronic Converters and
Manual/Mechanical Regulators
for compressed air systems.

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VP10



VP50



VP51



R26



Manostat



P/E & P/I



Type 421



Type 422 & 423



Type 425

- Reliable, rugged proportional I/P and E/P converters
- Suitable for a wide range of applications
- Excellent accuracy
- High flow versions
- NEMA4 environmental protection in normal operation



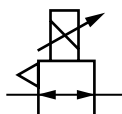
General Information

Part Number	Pressure range and input signal options	
	Control signal	Output pressure
VP1001100A00	0-10 V	3-15 psi (0.2-1 bar)
VP1001400A00	4-20 mA	3-15 psi (0.2-1 bar)
VP1002100A00	0-10 V	3-30 psi (0.2-2 bar)
VP1002400A00	4-20 mA	3-30 psi (0.2-2 bar)
VP1004100A00	0-10 V	3-60 psi (0.2-4 bar)
VP1004400A00	4-20 mA	3-60 psi (0.2-4 bar)
VP1006101A00	0-10 V	3-90 psi (0.2-6 bar)
VP1006401A00	4-20 mA	3-90 psi (0.2-6 bar)
VP1008101A00	0-10 V	3-120 psi (0.2-8 bar)
VP1008401A00	4-20 mA	3-120 psi (0.2-8 bar)

Electrical Information

Electromagnetic compatibility	This is a passive electromagnetic instrument and is unaffected by interfering high frequency signals
Electrical signal	Two wire version 4-20 mA or 0-10 V Three wire version requires 12-24 V d.c. supply
Connections	30 mm square connector DIN 43650 provided, mountable in four directions (alternative connections available)

ISO Symbols





Technical data

Medium:
 Oil free, dry air, filtered to 5 micron

Output pressure:
 3-15 psig (0.2-1.0 bar), 3-30 psig (0.2-2.0 bar),
 3-60 psig (0.2-4.0 bar), 2-120 psig (0.14-8 bar) three wire version

Flow capacity: Up to 10 scfm (300 l/min)

Air consumption
 <60 psig (<4 bar): 0.03 scfm (0.85 l/min) typical
 >60 psig (>4 bar): 0.06 scfm (1.75 l/min) typical

Operating pressure:
 At least 10 psig (0.7 bar) above maximum required output pressure

Connections: NPT 1/4"

Operating temperature: -4° to 160°F (-20°C to 70°C)

Response time
 <30 psig (<2 bar): less than 0.5 seconds for 10-90% step change
 >30 psig (>2 bar): 2 seconds for 10-90% step change

Total error:
 ±0.5% of span (typical, independent error includes the combined effect of non-linearity, hysteresis, deadzone and repeatability)

Temperature effect:
 Typically 0.1% of span/°F for span and zero over operating range

Supply sensitivity:
 >0.025% span output change per % supply pressure change

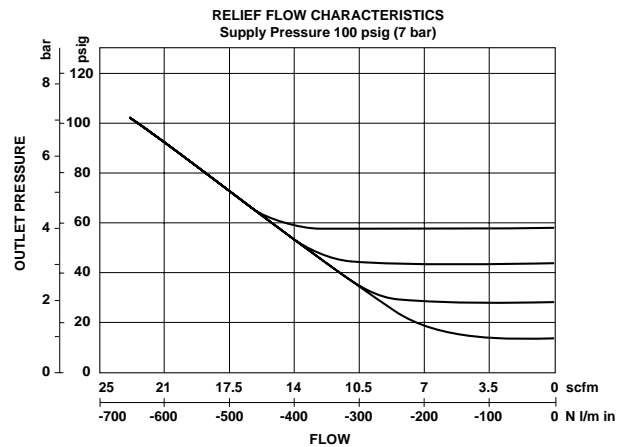
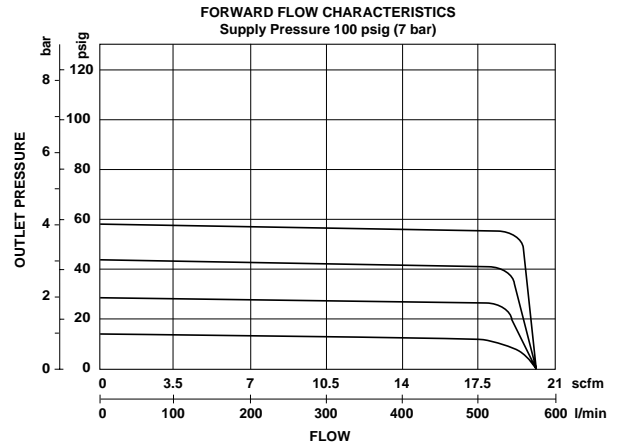
Failure mode:
 Signal falls to bleed pressure when electrical supply fails

Mounting:
 Integral surface mounting bracket provided for preferred vertical mounting.
 50 mm pipe mounting kit available

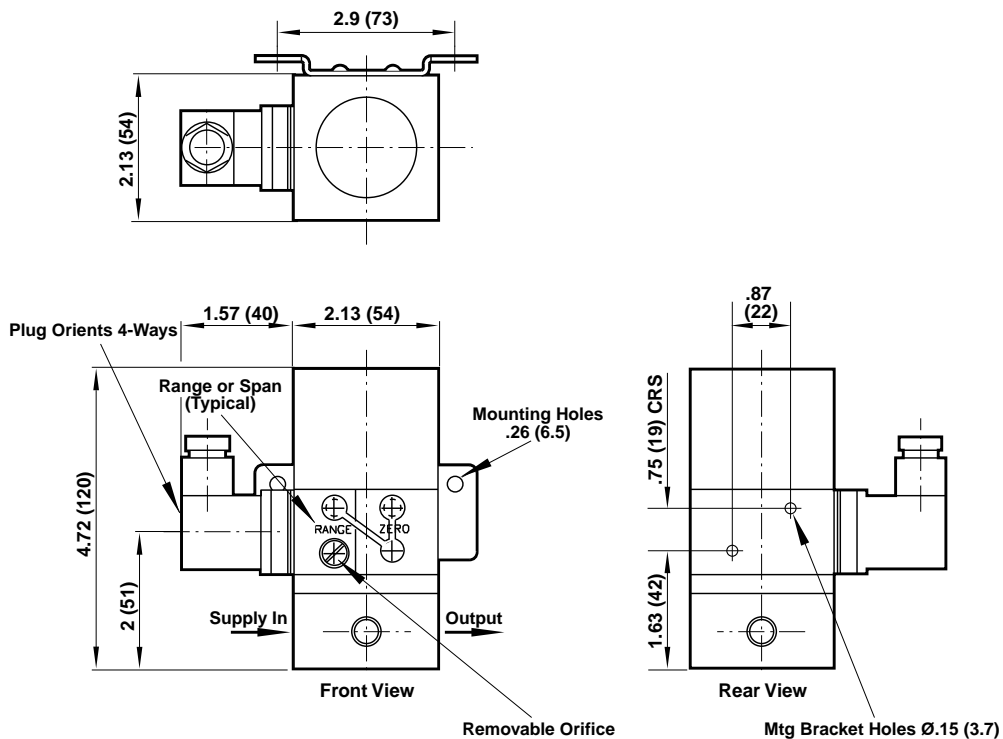
Material of construction:
 Zinc die-casting passivated and epoxy paint, nitrile diaphragms, stainless steel/nylon flapper nozzle and supply valve

Mass: 3.3 lbs (1500g) approx.

Typical Performance Characteristics



All Dimensions in Inches (mm)



- Air piloted proportional pressure control valve
- Fully user adjustable for a wide range of applications
- High speed
- Lower power consumption
- High flow capacity
- Optional manifold mount utilizes the ISO Size 1 subbase



Technical Data

Medium: Compressed air, filtered to 50micron, non-lubricated

Operation: Proportional, direct acting air piloted spool

Output Pressure: See general information p. 2

Supply Pressure: 200 psig (14 bar) max

Supply Sensivity: Better than 0.75% span output change per bar supply pressure change

Flow Capacity: Up to 50 scfm (1400 NI/min)

Response Time: < 80 mS (from 10-90% of output pressure into a 0.1 litre load)

Air Consumption: < .177 scfm (5 l/min)

Port Size: 1/4 PTF (G1/4)

Total Error: Max. error < ±1% of span (independent error includes the combined effect of non-linearity, hysteresis, deadzone and repeatability)

Operating Temperature: 23° to 120°F (-5° to 50°C)

Temperature Effect: Typically better than 0.03% of span/°C for span and zero over operating range

Degree of protection: NEMA 4 (IP65) in normal operation

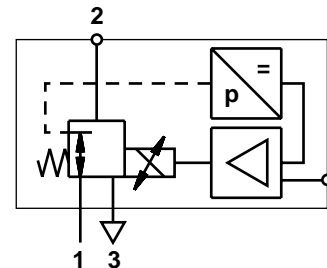
Vibration Immunity: < 3% output shift for 3g 10-2000Hz

Mounting Position: Any screw mounting

Material of Construction: Aluminium body, zinc diecast lid and end cover

Weight: 1.76 lbs. (800g) approx

Symbol





General Information

Part Number*	Pressure Range and Input Signal Options		Port Size
	Control Signal	Output Pressure in psig (bar)	
VP5010PK111H00	0-10V	0-145 (0-10)	1/4" PTF
VP5010PK411H00	4-20mA	0-145 (0-10)	1/4" PTF
VP5006PK111H00	0-10V	0-90 (0-6)	1/4" PTF
VP5006PK411H00	4-20mA	0-90 (0-6)	1/4" PTF
VP5002PK111H00	0-10V	0-30 (0-2)	1/4" PTF
VP5002PK411H00	4-20mA	0-30 (0-2)	1/4" PTF

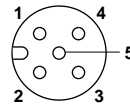
* To specify regulator calibration in BAR use "B" in the 7th position For 1/4" ISO G ports use "J" in the 8th position.

To order the **Manifold VP50** indicate an "X" in the 8th position of the part number.

Electrical information

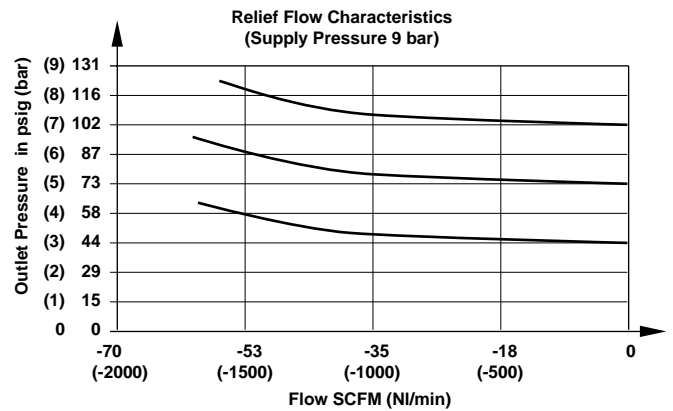
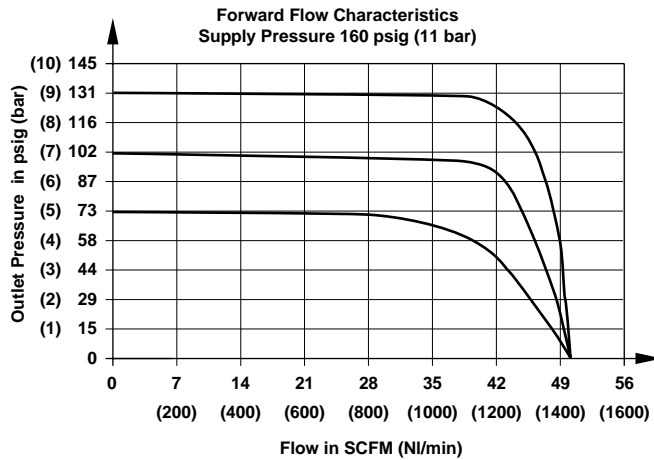
Electromagnetic Compatibility	CE marked: conforms to E.C. requirements EN 50081-2 (1994) and EN 50082-2 (1995)
Electrical Input Signal	4-20mA or 0-10V factory set
Electrical Power Input	24V dc \pm 25% (power consumption < 1W)
Output Pressure Feedback Signal	0-10V full range
Connections	DIN 43650 or Brad Harrison connection for feedback output

Instrument pin configuration



- 1 +24V d.c. supply
- 2 0-10 full range
- 3 Control signal (+ve)
- 4 Common (DC supply, signal and feedback return)
- 5 Chassis (earth)

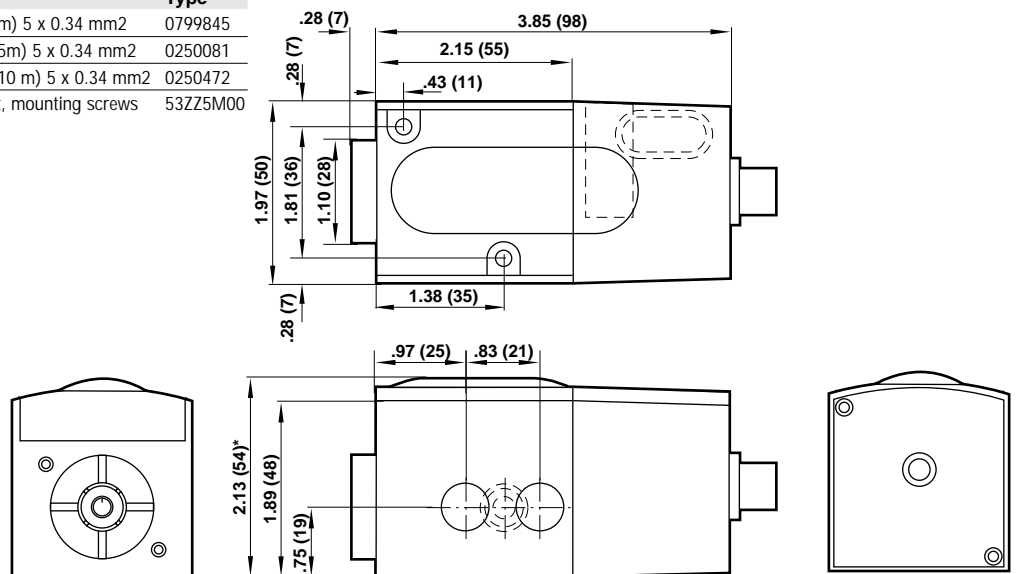
Characteristic Curves



Accessories

Designation	Specification	Type
Connectors with cable	M12 x 1.5 pin; 6 ft (2m) 5 x 0.34 mm ²	0799845
	M12 x 1.5 pin; 16 ft (5m) 5 x 0.34 mm ²	0250081
	M12 x 1.5 pin; 30 ft (10 m) 5 x 0.34 mm ²	0250472
Manifold Mounting Kit	Interface plate, gasket, mounting screws	53Z25M00

General Dimensions



*2.56 (65) for manifold mounting version

- Fully programmable with on-board diagnostics
- Multi-option language display
- Password protection option at first level functionality
- Instant LED warning functions
- Application specific set-up
- Pressure output display; no gauge necessary
- High speed response
- Optional manifold mount utilizes the ISO Size 1 subbase



Technical data

Medium:

Compressed air filtered to 50 µm,
non-lubricated

Supply pressure: 205 psig (14 bar) max.

Supply sensitivity:

<= 50 mbar between 160 and 90 psig (11 and 6 bar) supply

Flow capacity: Up to 50 scfm (1300 l/min)

Response time:

< 100 ms (from 10 to 90% of output pressure into a 0,1 litre load)

Air consumption: < .177 scfm (5 l/min)

Total error:

Maximum error ± 1.45 psig (100 mbar) of total span (independent error includes the combined effect of non-linearity, hysteresis, deadzone and repeatability)

Ambient temperature:

-4 to 122°F (-20° to 50°C)

Temperature effect:

Typically .04 psig (3 mbar)/°C for full scale and zero over operating range

Degree of protection:

NEMA 4 in normal operation

Vibration immunity:

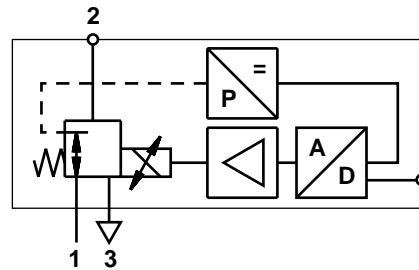
<3% output shift for 3 g ~ 10 to 150 Hz

Weight: 1.76 lbs (0.8 kg)

Materials

Body: aluminum

Lid and end cover: zinc diecast



Electromagnetic compatibility

The valve conforms to the EC requirements EN50081-2 (emission) and EN50082-2 (disturbance noise). For this specification shielded cables have to be used



General information

Control signal	Output pressure psig (bar)	Model	Connection
0-10 V	0 to 145 (10)	VP5110PK111H00	1/4 NPT (psig)
4-20 mA	0 to 145 (10)	VP5110PK411H00	1/4 NPT (psig)
0-10 V	0 to 145 (10)	VP5110BJ111H00	ISO G 1/4 (bar)
4-20 mA	0 to 145 (10)	VP5110BJ411H00	ISO G 1/4 (bar)

*To order VP51 Manifold indicate "X" in the 8th position of the part number.

User functionality options

Password protection	
Display set-up	Display language Pressure units Offline set-up Online set-up
Speed set-up	0 fastest to 7 slowest
Monitor set-up	Analogue 0 ... 10 V
Monitor output	Hi = P2 > x psi Hi = P2 OK
Local control	Manual control Max./min. ramp Max./min. stairs
Device database	Read only data: unit specific Tag number Help display
Factory defaults	Restore factory defaults

Electrical information

Electromagnetic compatibility	CE marked: conforms to EC requirements EN 50081-2 (1994) and EN 50082-2 (1995)
Electrical input signal	4 ... 20 mA or 0 ... 10 V factory set
Electrical power input	24 V d.c. ±25% (power consumption < 1 W)
Output pressure feedback signal	0 ... 10 V full range. User configurable
Connections	Plug connector, 5 pin, M12, female receptacle, Watson Smith Part No. PL500 01

Instrument pin configuration

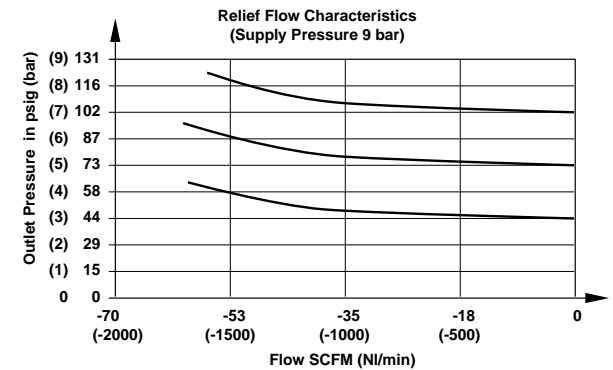
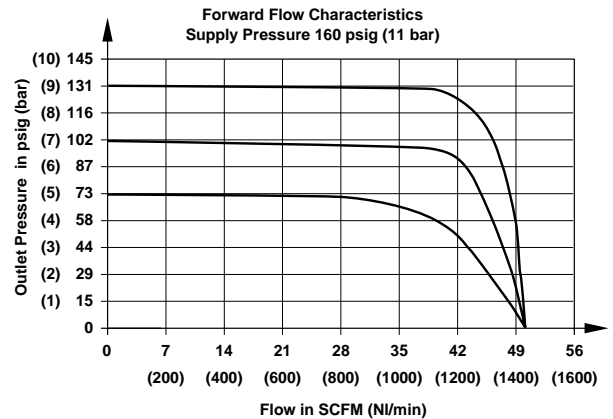
Pin	Designation	Colour*
1	+24V d.c. supply	brown/red
2	1 v/bar monitor output	white
3	Control signal (+ve)	blue
4	Common (d.c. supply, signal and feedback return)	black
5	Chassis (earth)	grey/green/yellow

Accessories

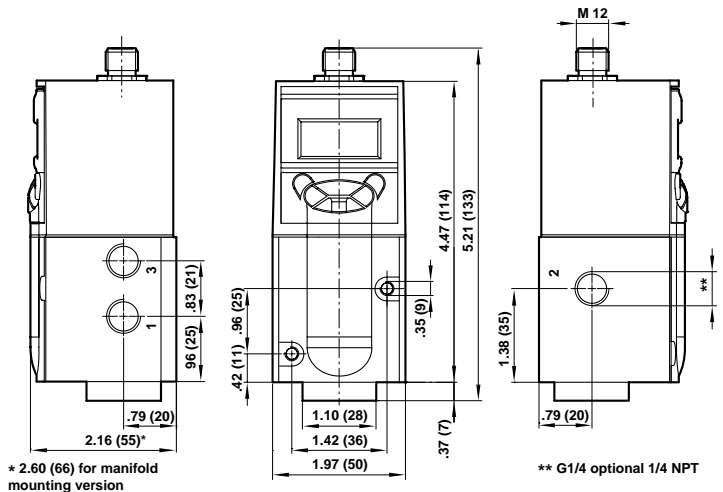
Designation	Specification	Type
Connectors with cable	M12 x 1.5 pin; 6 ft (2m) 5 x 0.34 mm2	0799845
	M12 x 1.5 pin; 16 ft (5m) 5 x 0.34 mm2	0250081
	M12 x 1.5 pin; 30 ft (10 m) 5 x 0.34 mm2	0250472

*Manifold Mounting Kit Interface plate, gasket, mounting screws 53Z5M00

Characteristic curves



General dimensions



- Fully programmable pressure regulation up to 120 psi (8 bar)
- Can be used with any standard industrial PLC
- Rapid acting - 120 psi (8 bar) step change in one second
- Tough, accurate and reliable



Ordering Information. The standard stock range is 120 psi (0-8 bar), 0-10V., 1/4" NPT. Customer calibration to other ranges and control signals is a simple adjustment. Alternative versions available ex-works are as follows:

Port Size	Model Number	Range psi (bar)	Control Signal
1/4 NPT	R26-200-RNLG	0-120 (0-8)	0-10V
1/4 NPT	R26-201-RNLG	0-120 (0-8)	0-5V
1/4 NPT	R26-202-RNLG	0-120 (0-8)	4-20mA



Technical Data

Supply:

Clean dry air (filtered to 5 μ non-condensing, oil free)
Up to 150 psi (10 bar)

Output:

0-120 psi (0-8 bar) [user adjustable down to 0-60 psi (0-4 bar)]
At zero control signal, < 0.05 bar.

Electrical supply:

Nominal 24V dc, limits 15-30V dc. Max current 100 mA

Control signal:

4-20 mA; 250 ohms 0-5V; 10 k ohms 0-10V; 10k ohms

Connections:

3 wire connection, 1.24V dc supply 2. Control Signal 3. Common

Air flow:

Consumption < .2 scfm (< 5 l/m), Capacity > 20 scfm (> 600 l/min) forward at 60 psi (4 bar), 10 scfm (300 l/min) relief at 60 psi (4 bar)

Material

Enclosure:

Case manufactured from zinc and reinforced plastic, finished with a black epoxy paint finish.

Mounting:

The Pneu-Stat can be mounted in any orientation, a mounting bracket is provided.

Pneumatic connections:

1/4 NPT. Front and rear facing Ports 1/4 NPT

Electrical connections:

30 mm square connector to DIN 43650. Orientable in four ways at 90°. Mating connector supplied.

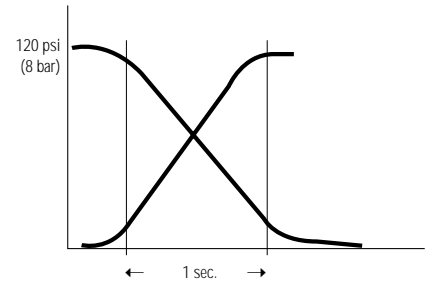
Controls:

Span and zero - external

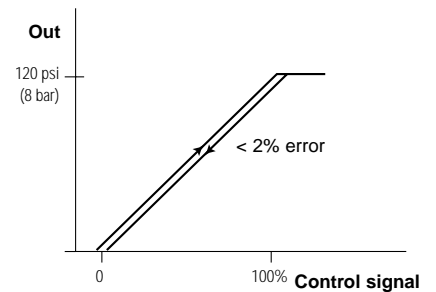
Range select switches - internal

Weight: 1.75 lbs (800g)

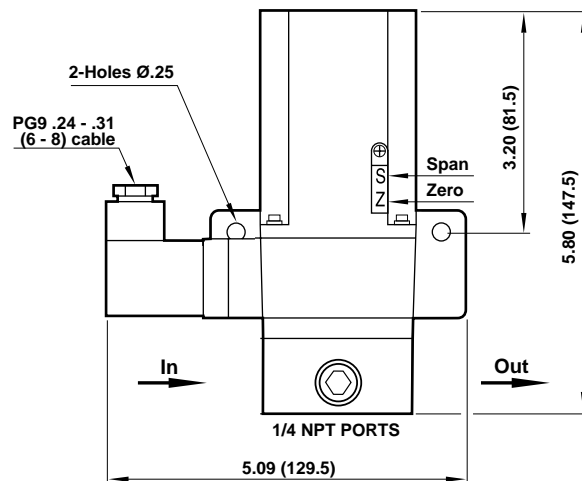
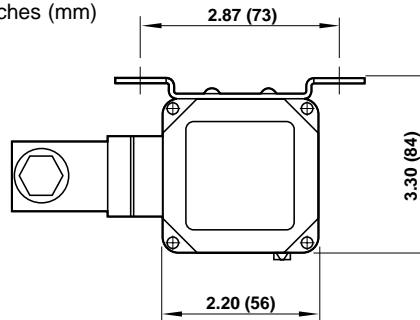
Response time into a 1 liter load



Accuracy



All Dimensions in Inches (mm)



Precision Air Pressure Regulators

- High precision pressure regulators
- Suitable for dead end or flow applications
- Excellent long term stability
- Handwheel, lever, plunger or pilot operated



Ordering Information.

Description	Model	Control Type	Output Pressure Range psig (bar)	Air Consumption scfm (l/m)	Weight lbs (kg)
Standard regulator	53-1002-00R	Handwheel 2.5-3 turns	2-25 (.14-2)	.01 (.3)	1.59 (.72)
Standard regulator	53-1003-00R	Handwheel 2.5-3 turns	2-60 (.14-4)	.02 (.6)	1.59 (.72)
Standard regulator	53-1004-00R	Handwheel 2.5-3 turns	2-120 (.14-8)	.04 (1.2)	1.59 (.72)
Lever operated regulator	53-1802-00R	Lever control 125° Rotation	2-25 (.14-2)	.01 (.3)	1.59 (.72)
Lever operated regulator	53-1803-00R	Lever control 125° Rotation	2-60 (.14-4)	.02 (.6)	1.59 (.72)
Lever operated regulator	53-1804-00R	Lever control 125° Rotation	2-120 (.14-8)	.04 (1.2)	1.59 (.72)
Plunger operated regulator	53-1404-00R	Plunger travel .065 (1.65)	2-60 (.14-4)	.02 (.6)	1.59 (.72)
Plunger operated regulator	53-1604-00R	Plunger travel .065 (1.65)	2-120 (.14-8)	.04 (1.2)	1.59 (.72)
Pilot operated relay	53-1904-00R	Pilot pressure signal	2-120 (.14-8)	.04 (1.2)	1.59 (.72)
Pilot operated relay with manual bias	53-2204-00R	Pilot pressure signal Handwheel controlled bias	2-120 (.14-8) bias of up to 30 (2)	.04 (1.2)	1.59 (.72)

Technical Data

Medium:

Dry, oil free air filter to 25 microns

Operation:

Two stage servo mechanized regulator with integral precision measuring capsule

Mounting:

Any position. Panel mounting or through mounting holes on the unit (lever, plunger and pilot versions)

Port sizes:

G 1/4

Output pressure ranges:

See individual details overleaf

Supply pressure:

Minimum at least 2.9 psig (0.2 bar) above output pressure.

Maximum 145 psig (10 bar)

Flow capacity:

Up to 10.6 scfm (300 l/m)

Hysteresis and repeatability:

Less than 0.005% setting at midrange

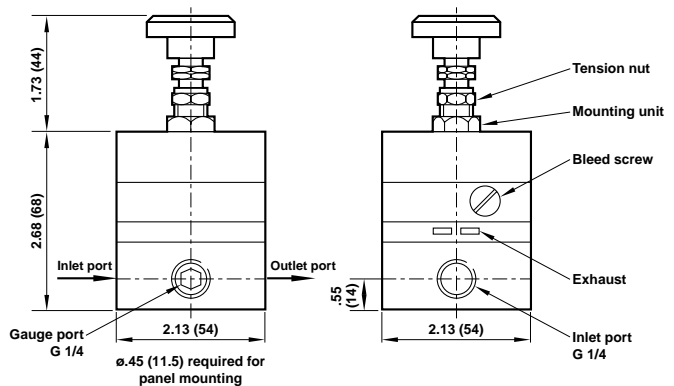
Sensitivity:

Better than 0.3 mbar

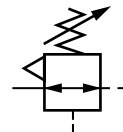
Air consumption:

See individual details

Handwheel Operated



ISO Symbols

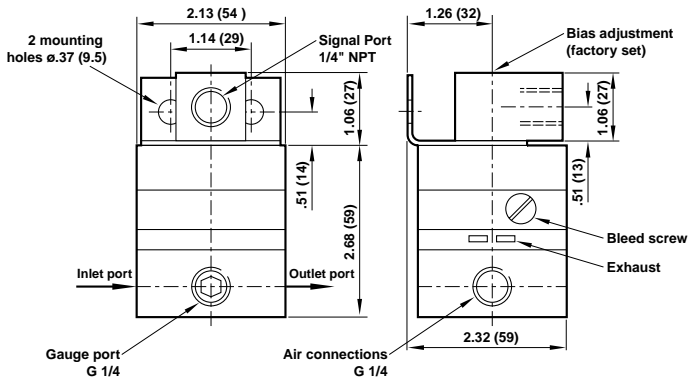


R27 Series Precision Air Pressure Regulators

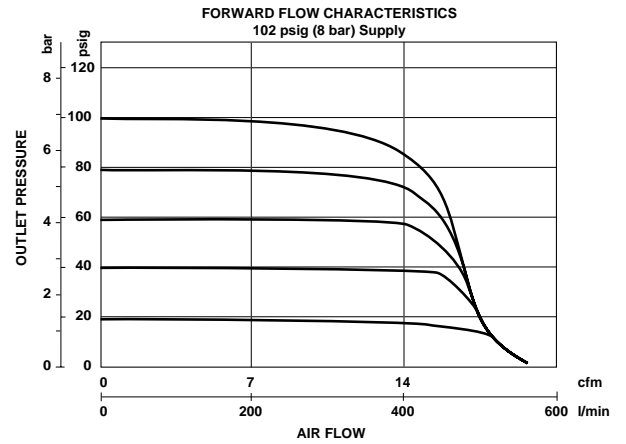


All Dimensions in Inches (mm)

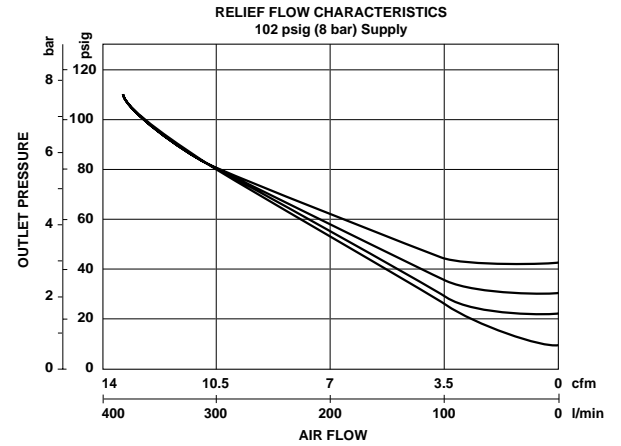
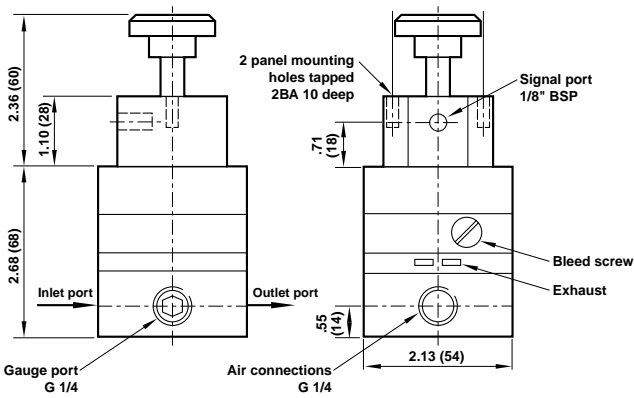
Pilot Operated



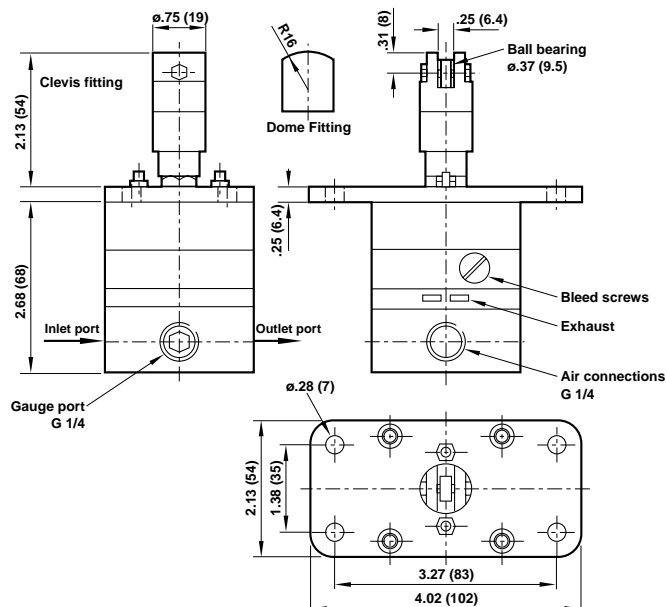
Typical Performance Characteristics



Pilot Operated with Bias



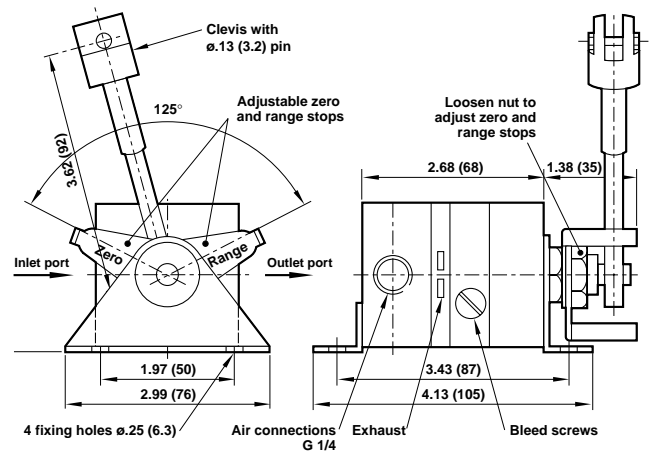
Plunger Operated



Diaphragm Repair Kits

Type	Part number
Units up to 25 psig	53 1000 95R
Units up to 60 psig	53 1000 99R
Units up to 120 psig	53 1000 98R
Tamperproof Nut	53 1000 97R
Wall Mounting Bracket	53 ABR 00700

Lever Operated



- These instruments convert pneumatic pressures into electrical signals for use with data loggers, computers and microprocessors
- Type 68 is a two-wire pressure/current device
- Type 69 a three-wire pressure/voltage type
- Both use only non-critical power supplies and can be supplied weatherproof to IP65


Ordering Information.

P/I Type 68		P/E Type 69		Range
Standard	Weatherproof	Standard	Weatherproof	
536801 00	536801 10	536901 00	536901 11	3-15 psig
536815 00	536815 10	536915 00	536915 11	0-150 psig
536816 00	536816 10	536916 00	536916 11	0-100 psig
536896 00	536896 10	536996 00	536996 11	0-200m bar
536893 00	536893 10	536993 00	536993 11	0-200m bar
536821 00	536821 10	536921 00	536921 11	0.2-1 bar
536833 00	536833 10	536933 00	536933 11	0-4 bar
536835 00	536835 10	536935 00	536935 11	0-10 bar
536836 00	536836 10	536936 00	536936 11	0-7 bar
536837 00	536837 10	536937 00	536937 11	0-6 bar
536841 00	536841 10	536941 00	536941 11	20-100 kPa
536855 00	536855 10	536955 00	536955 11	0-1000 kPa
536856 00	536856 10	536956 00	536956 11	0-700 kPa
536886 00	536886 10	536986 00	536986 11	0-100 in wg
536888 00	536888 10	536988 00	536988 11	0-200 in wg

Intrinsically Safe

P/I Type 68		P/E Type 69		Range
Standard	Weatherproof	Standard	Weatherproof	
536801 01	536801 11	536901 01	536901 11	3-15 psig
536821 01	536821 11	536921 01	536921 11	0-150 psig

NOTE:

1. Intrinsically safe models are available for all standard and weather proof instruments.
2. Other pressure ranges between 50millibar and 10 bar are available to order. Please consult factory for availability.
3. Type 69 P/E models - voltage ranges other than 0-10V are available to special order.
4. All models supplied complete with DIN rail clip and mounting plate.
5. Low pressure models within the ranges 0-25inwg to 0-50in wg. 0-1 psig to 0-2 psig and 0-70mbar to 0-150mbar are also available please ask for further details.
6. A range of models with temperature compensation -4° to 104°F (-20° to 40°C) are available for natural gas applications to special order.



Technical Data

Pneumatic:

Pressure media:

Dry, non corrosive air or gas. The units are not suitable for continuous liquid exposure

Pressure ranges:

See ordering information Units with Full Scale ranges between 1 psig (70m bar) and 150 psig (10 bar) are available to special order

Over pressure:

At least 100% with negligible calibration error, except for 150 psig models which are 200 psig maximum

Consumption: Nil Ø

Temperature range: 15° to 140°F (-10° to 60°C)

Electrical:

Maximum Supply

Voltage: 35V for 1 second

Reverse voltage: -50V continuous

Protection: 500V d.c. (components to case)

Type 68 P/I

Supply voltage: 9-30V continuous

Output: 4-20mA

Voltage drop: 9V minute (across unit)

Load resistance: 750 ohm maximum (24V supply)

Type 69 P/E

Supply voltage: 12-30 V continuous

Output: 0-10V Other voltage ranges to special order

Current: 5mA nominal

Load resistance: 2000 ohm minimum

Materials

Casing: Extruded aluminum, zinc diecast end plates

PCB: Epoxy glass fiber

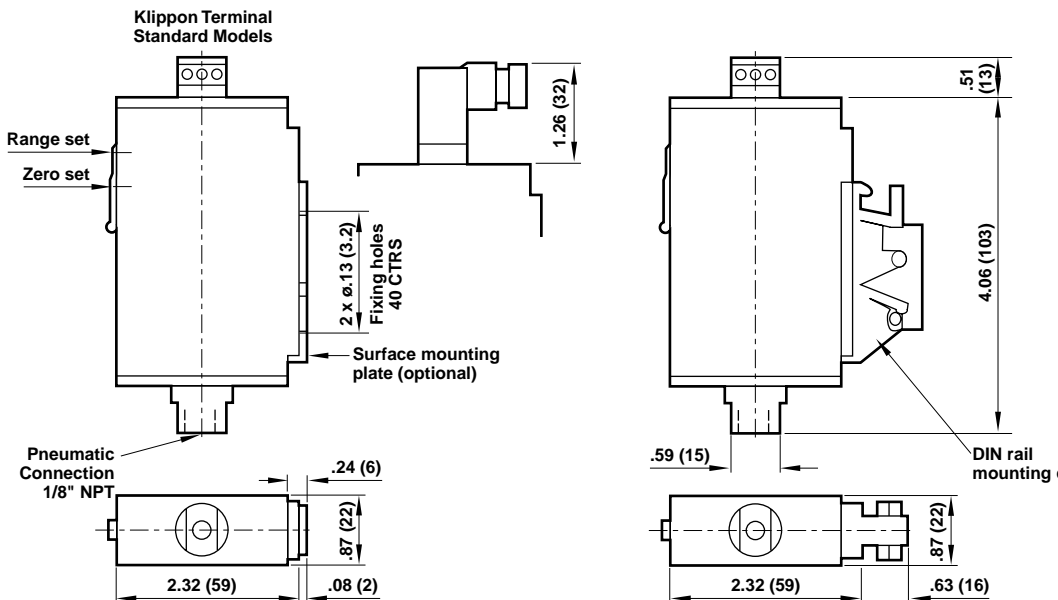
Pneumatic connection: 1/8" NPT

Transducer: Composite construction, mainly nickel, aluminum, Kovar, silicon rubber/gel

Weight: 200g

Finish: Black stove enamel

All Dimensions in Inches (mm)



- **A rugged, electronic I/P converter designed for high density rail or manifold mounting, at a spacing of only 1" (25mm)**
- **Advanced electronic control using surface mount electronics and a precision pressure transducer and offers excellent performance characteristics**
- **Unlike most I/P converters which use fragile electromechanical pressure control devices, the 421 employs a high sensitivity microminiature Reedex valve for pressure control**
- **Great reliability, long life, freedom from vibration effects, and are significantly less prone to mechanical derangement than older conventional designs**
- **Can be conveniently mounted on DIN rail, or surface mounted, or onto a high density manifold, which eliminates much plumbing**



Ordering Information

Standard models:

4-20mA input, forward action, Terminal connector

Outputs	Model Number
0.2-1 bar	53AB2100
3-15 psig	53AB0100

Options to special order:

Other pressure ranges

Manifold mounting system

Certification

All instruments are tested on the Watson Smith ATE system. An individual test certificate is provided at no extra charge.

Accuracy

Control characteristics*:

Linear, pressure proportional to signal

Maximum error*:

(Combined effect of non-linearity, hysteresis, deadzone & repeatability)

Within $\pm 0.5\%$ span of a terminally based straight line

Hysteresis + resolution*: Less than 0.1% span

Supply pressure effect*: See graph

Temperature effect: (span & zero)

Typically less than 1% FS over compensated range

Long term stability:

Typically $< 0.5\%$ span per annum

* Parameters marked with * are tested on every unit by computer controlled test equipment. Other parameters are typical.



Electrical

Input signal*: 4-20mA two wire

Load*:

Presents a constant voltage drop to the current source of $10V \pm 0.5V$

Start up time*:

Less than 6 seconds

Minimum current failure mode*:

Typically 3mA

Insulation:

Tested to 500V DC

Reverse voltage: -100V DC

Over current:

100mA continuous. 500mA for 1 second; fitted internal fuse 160mA

Rangeability:

More than $\pm 20\%$ on zero and span

Connections:

Two part quick release terminal block with capacity up to 2.5mm cable

Failure mode:

On failure of input signal the output pressure will fall below 0.2 psig (15 mbar)

Pneumatic

Output signal*: 3-15 psig (0.2-1 bar)

Response time*: See graph

Minimum outlet pressure*: Less than 0.2 psig (15 mbar)

Consumption*: Typically 0.01 scfm (200 cc/min)

Flow capacity: Up to 5 scfm (150 NI/min)

Output ripple: Less than $\pm 0.5\%$ span at 10 Hz into zero load volume

Media: Oil free, dry air filter to 5 microns

Supply pressure range: 20-50 psig (1.5-3.5 bar)

Preferred range: 25-35 psig (1.7-2.5 bar)

Connections: 1/8" NPT female

Environmental & Physical Data

Vibration:

The unit possesses a high degree of immunity

Life:

Designed MTTF greater than 8 years

Electromagnetic compatibility:

RFI protection is incorporated in the instrument

Operating temperature: 15° to 140°F (-10° to 60°C)

Compensated range: 32° to 122°F (0° to 50°C)

IP rating: IP40

Material of construction

Anodized natural aluminum

Mounting:

Any orientation. A rail clip for TS32 (EN50035)/TS35

(EN50022) rail is provided with each instrument,

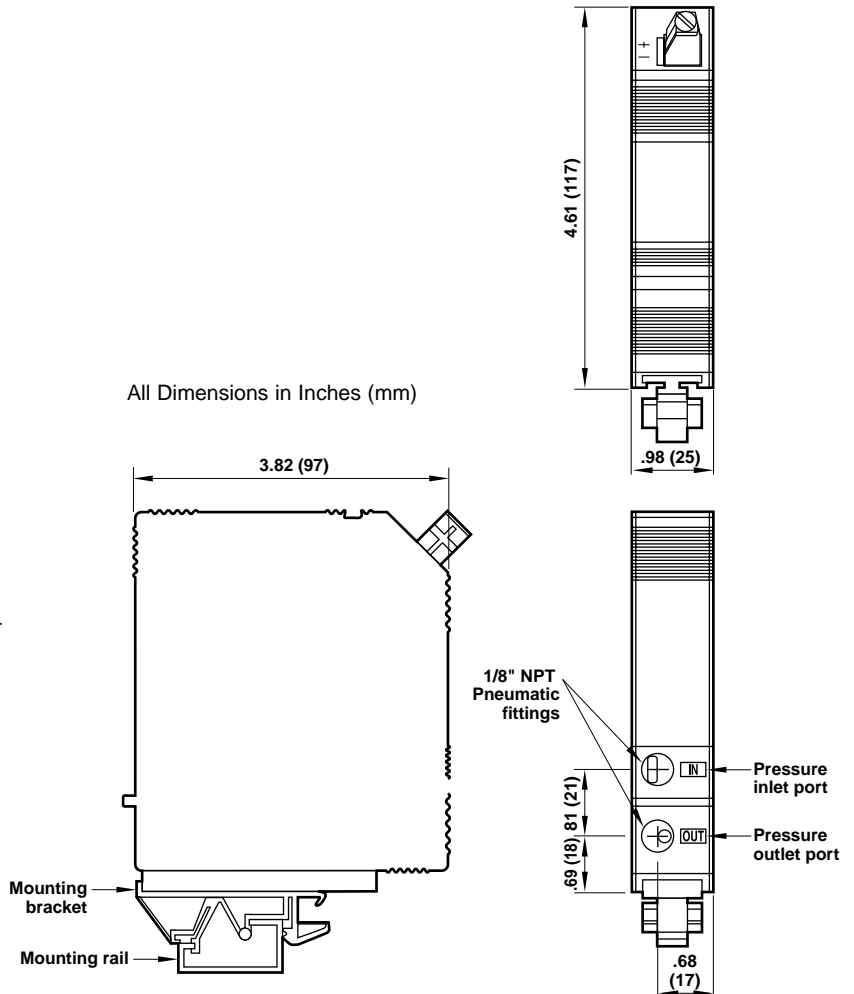
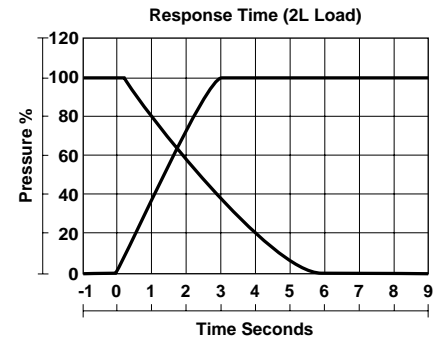
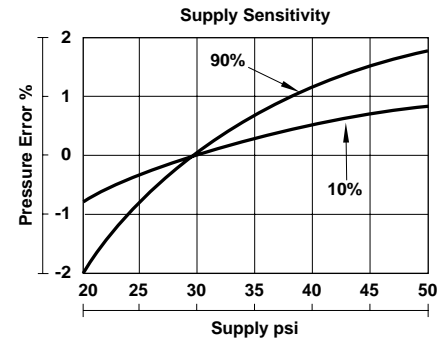
options include surface mounting bracket and a

manifold kit for up to 20 converters

Weight: 600gm

* Parameters marked with * are tested on every unit by computer controlled test equipment. Other parameters are typical.

Typical Performance Characteristics



- A major advance in I/P converter design, offering failfreeze in addition to conventional I/P features
- Advanced electronic control and a precision pressure transducer to achieve outstanding performance
- Intended for field application in which rugged construction, vibration immunity, weatherproofing and reliability are essential, together with the enhanced system safety gained from its failfreeze characteristic
- Two wire operation from a 4-210mA control signal with output pressures up to 120 psig (8 bar) as standard



Ordering Information

Standard models:

4-20mA input, forward action, DIN connector

Outputs	Model Number
0.2-1 bar	53AC2100
3-15 psig	53AC0100
0.2-8 bar	53AC2400
3-120 psig	53AC0400

Options to special order:

Other pressure ranges
 Conduit entry with flying leads
 Type N Certification
 50mm pipe mounting bracket
 1/8" NPT pneumatic connections
 I.S. Certification

Certification

All instruments are tested on the Watson Smith ATE system. An individual test certificate is provided at no extra charge.

Hazardous area approvals:

The 422 is available with Type NIIT6 approval to BS6941 1988 or Type EEx ia IIC T4 approval for intrinsically safe applications

Accuracy

Control characteristics*:

Linear, pressure proportional to signal

Maximum error*:

(Combined effect of non-linearity, hysteresis, deadzone & repeatability)

±0.5% span of a terminally based straight line (low pressure), 1% (high pressure)

Supply pressure effect*: Negligible

Temperature effect: (span & zero)

Typically less than 1% span over compensated range

Long term stability:

Typically <0.5% span per annum

* Parameters marked with * are tested on every unit by computer controlled test equipment. Other parameters are typical.



Electrical

Input signal*: 4-20mA two wire
 Load*:
 Presents a constant voltage drop to the current source of 5.5-6 Volts
 Start up time*:
 Less than 6 seconds
 Insulation:
 Tested to 500V dc
 Reverse voltage: -100Vdc
 Over current: 30mA
 Rangeability:
 More than ±20% on zero and span
 Connections:
 30mm square connector DIN 43650 provided, orientable in four directions
 Failure mode:
 When input signal falls below 2mA ±0.5mA, the output is held at its previous pressure
 Failfreeze drift rate:
 ±2% setpoint/hour at a constant temperature

Pneumatic

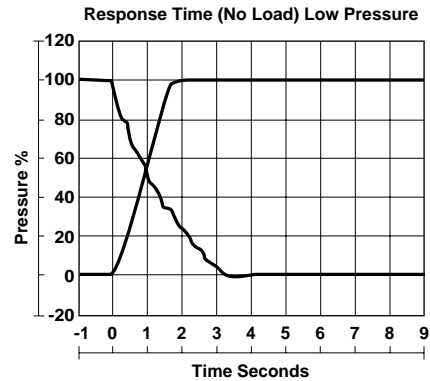
Output signal*:
 Low pressure 3-15 psig (0.2-1 bar)
 High pressure 3-120 psig (0.2-8 bar)
 Response time*: See graph
 Minimum outlet pressure*: Less than 2 psig (140 mbar)
 Air consumption*:
 Low pressure 200cc/min typical
 High pressure 400cc/min typical
 Flow capacity: Up to 10 scfm (300 NI/min)
 Media: Oil free, dry air filtered to 5 microns
 Supply pressure range:
 Low pressure 20-100 psig (1.5-7 bar)
 High pressure 125-150 psig (8.7-10 bar)
 Preferred range (low pressure): 25-35 psig (1.7-2.5 bar)
 Connections:
 1/4" NPT female (plus two integral 1/4" NPT gauge ports)

Environmental & Physical Data

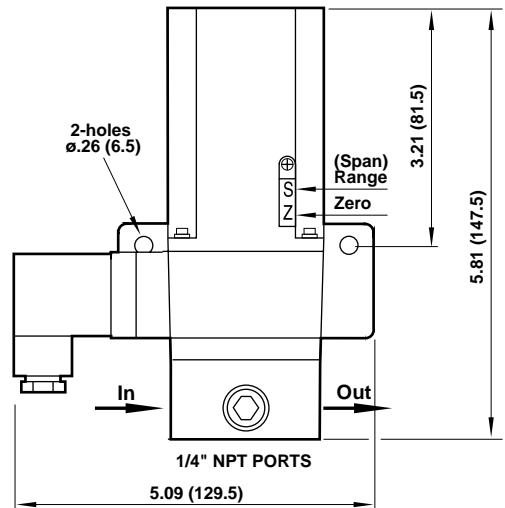
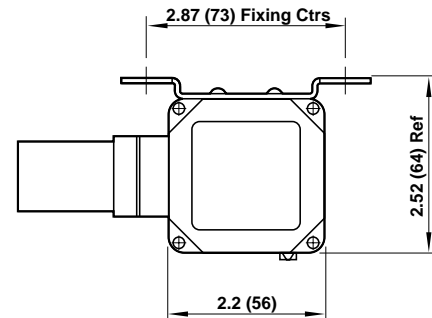
Vibration:
 The unit possesses a high degree of immunity
 Life:
 Better than 1,000,000f.s. cycles
 Electromagnetic compatibility:
 Emissions more than 20dB below accepted limits (BS800). Instrument immune to conducted transient interference up to 4kV
 Operating temperature: -4° to 158°F (-20° to 70°C)
 Compensated range: 15° to 140°F (-10° to 60°C)
 IP rating: IP65
 Material of construction
 Zinc diecasting passivated and epoxy painted, Verton glass/nylon cover, Nitrile diaphragms
 Mounting:
 Integral surface mounting bracket provided for vertical mounting. Operation in any attitude is possible without recalibration
 Weight: 800gm

* Parameters marked with * are tested on every unit by computer controlled test equipment. Other parameters are typical.

Typical Performance Characteristics



All Dimensions in Inches (mm)



- **A completely new design of electronic current/pneumatic converter for field mount process control applications**
- **State-of-art electronics, precision internal pressure measurement, digital pressure control and excellent environmental and vibration characteristics**
- **Rugged high sensitivity Reedex Valve for pressure control**
- **Extreme reliability, freedom from vibration effect and long life, together with very low air consumption and hysteresis.**
- **The pneumatic design off the 423 allows an output capacity of up to 10 scfm, so that no volume booster is necessary for high flow applications such as large valves**



Ordering Information

Standard models:

4-20mA input, forward action, DIN connector

Outputs	Model Number
0.2-1 bar	53AD2100
3-15 psig	53AD0100

Options to special order:

Other pressure ranges
 Conduit entry with flying leads
 Type N Certification
 Intrinsically Safe certification
 50mm pipe mounting bracket
 1/8" NPT pneumatic connections

Certification

All instruments are tested on the Watson Smith ATE system. An individual test certificate is provided at no extra charge.

Hazardous area approvals:

The 423 is available with Type N (Ex N II T6) approval to BS6941 1988 or Intrinsically Safe certified (Ex ia IIC T5) for hazardous area applications

Accuracy

Control characteristics*:

Linear, pressure proportional to signal

Maximum error*:

(Combined effect of non-linearity, hysteresis, deadzone & repeatability)

Within $\pm 0.5\%$ span of a terminally based straight line

Hysteresis + Resolution*:

Less than 0.1% span

Supply pressure effect*: See graph

Temperature effect: (span & zero)

Typically less than 1% FS over compensated range

Long term stability:

Typically <0.5% span per annum

* Parameters marked with * are tested on every unit by computer controlled test equipment. Other parameters are typical.



Electrical

Input signal*: 4-20mA two wire
 Load*: Presents a constant voltage drop to the current source of 10V ±0.5V
 Start up time*: Less than 6 seconds
 Minimum current failure mode*: Typically 2mA
 Insulation: Tested to 500V DC
 Reverse voltage: -100V
 Over current: 100mA Continuous, 500mA for 1 second
 Rangeability: More than ±20% on zero and span
 Connections: 30 mm square connector DIN 43650 provided, orientable in four directions
 Failure mode: On failure of input signal the output pressure will fall to below 0.2 psig (15 mbar)

Pneumatic

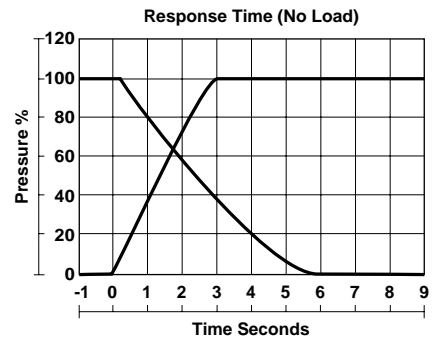
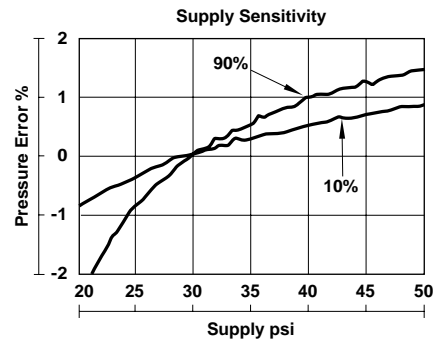
Output signal*: 3-15 psig (0.2-1 bar)
 Response time*: See graph
 Minimum outlet pressure*: Less than 0.2 psig (15 mbar)
 Consumption*: Typically 0.02 scfm (500 cc/min)
 Flow capacity: Up to 10 scfm (300 NI/min)
 Output ripple: Less than ±0.5% span at 10Hz into zero load volume
 Media: Oil free, dry air filtered to 5 microns
 Supply pressure range: 20-50 psig (1.5-3.5 bar)
 Preferred range: 25-35 psig (1.7-2.5 bar)
 Connections: 1/4" NPT female (plus two integral 1/4" NPT gauge ports)

Environmental & Physical Data

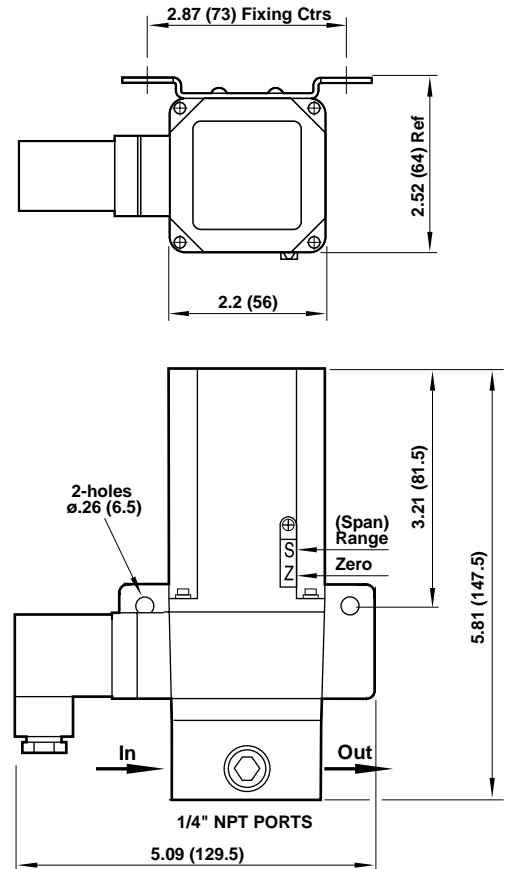
Vibration: The unit possesses a high degree of immunity
 Life: Better than 1,000,000f.s. cycles
 Electromagnetic compatibility: Emissions more than 20dB below accepted limits (BS800). Instrument immune to conducted transient interference up to 4kV
 Operating temperature: -4° to 158°F (-20° to 70°C)
 Compensated range: 15° to 140°F (-10° to 60°C)
 IP rating: IP65
 Material of construction: Zinc diecasting passivated and epoxy painted, Verton glass/nylon cover, Nitrile diaphragms
 Mounting: Integral surface mounting bracket provided for vertical mounting. Operation in any attitude is possible without recalibration
 Weight: 800gm

* Parameters marked with * are tested on every unit by computer controlled test equipment. Other parameters are typical.

Typical Performance Characteristics



All Dimensions in Inches (mm)



- **Designed for service in the most demanding industrial and process control applications, and are normally used to accurately convert a loop control current of 4-20mA to 3-15 psig (0.2-1 bar) pneumatic signal to operate a control valve actuator**
- **The pressure control principle employed uses the well proven Reedex® microminiature solenoid valve avoiding the use of sensitive flapper nozzle electromechanical components.**
- **Internal pressure sensor provides solid state closed loop control ensuring long term accuracy**
- **Advanced electronics and sophisticated control techniques with a rugged weather proof packaging to produce a field mountable I/P converter suitable for use in adverse environmental conditions giving optimum performance and low cost of ownership**


Product Safety

This product must be installed and operated in conformance with the specific safety instructions contained within the instrument handbook provided with each unit.

Ordering Information.

Conduit Entry	Certification				Range
	FM Explosion Proof	FM Intrinsically Safe	CENELEC IS	Standard	
1/2" NPT	53-AF01-11	53-AF01-21	53-AF01-31	53-AF01-01	4-20mA, 3-15 psi
	53-AF21-21	53-AF21-21	53-AF21-31	53-AF21-01	4-20mA, 0.2-1 bar
M20	X	53-AF01-22	53-AF01-32	53-AF01-02	4-20mA, 3-15 psi
	X	53-AF21-22	53-AF21-32	53-AF21-02	4-20mA, 0.2-1 bar

Certification

CENELEC (SIRA)

Intrinsically Safe E Ex ia IIC T4

Certificate number: SCS Ex 94C 2047

Factory Mutual (Pending)

Explosion Proof Class I Division I Groups BCD T6

Intrinsically Safe Class I Division I Groups BCD T4

Copies of certification documents are available on request

Testing:

All units are tested on the Watson Smith ATE System assessed by LQRA to ISO 9001

Accuracy

Control characteristics*:

Linear, pressure proportional to input signal

Maximum error*:

(Combined effect of non-linearity, hysteresis, deadzone & repeatability)

Within $\pm 0.5\%$ span of a terminally based straight line

Hysteresis + Resolution*:

Less than 0.1% span

Temperature effect: (span & zero)

Typically less than $\pm 1\%$ over compensated range

Supply pressure sensitivity* (span and zero)

Less than 1% span for 10% supply pressure change

* Parameters marked with * are tested on every unit by computer controlled test equipment. Other parameters are typical.



Electrical

Input signal*: 4-20mA two wire

Load*:

Presents a constant voltage drop to the current source of 6.0V ±0.5V
 – See note

Start up time*: Less than 6 seconds

Minimum operating current*: Less than 3.5mA

Insulation:

Tested to 500V DC

Current reversal:

No effect within normal 4-20mA range, instrument will not function

Rangeability:

More than ±20% on zero and span

Connections:

Internal terminal block with capacity up to 2.5 mm2 cable

Conduit entry: 1/2" NPT or M20 female

Alternative plug/socket: DIN 43650, 30mm, rating IP65

Failsafe operation*:

On interruption of input signal the output pressure will fall to below 0.2 psig (15mbar)

Note: Electronic I/P converters present an approximately constant voltage drop to the control loop, and therefore the loop load cannot be presented as a constant resistance. Electromechanical I/P converters normally behave as a simple resistance load, from which the loop voltage drop can be calculated. For example, a resistave I/P converter with internal resistance 300 ohms would give a loop voltage drop of 6.0V at 20 mA, the same value as the 425 converter.

Pneumatic

Output signal*: 3-15 psig (0.2-1 bar)

Response time*:

Into load volume up to 5 liters
 Upscale 10-90% span, less than 1 sec.
 Downscale 90-10% span, less than 6 sec.

Minimum outlet pressure*: Less than 0.2 psig (15 mbar)

Consumption*: Typically 0.01 scfm (350 cc/min)

Flow capacity: Up to 10 scfm (300 NI/min)

Output ripple:

Less than ±0.5% span at 10Hz into load volume 0.51

Media: Oil free, dry air filtered to 5 microns

Supply pressure range: 18-60 psig (1.3-4 bar)

Preferred range: 25-35 psig (1.7-2.5 bar)

Connections:

1/4" NPT female (plus two integral 1/4" NPT gauge ports)

Environmental & Physical Data

Vibration:

Less than 1% output pressure change for vibration amplitude 5mm 10-30Hz, 10g 30-500Hz

Electromagnetic compatibility:

RFI protection is incorporated within the instrument, giving full protection up to RF field of 10V/m over the band 30-1000MHz

Operating temperature range: -4° to 158°F (-20° to 70°C)

Compensated temperature range: 15° to 140°F (-10° to 60°C)

Materials of construction

Aluminum and zinc diecastings. Nitrile diaphragms

Paint:

Standard paint finish is black epoxy powder coating. Optional finish for severe or off-shore environments

Weatherproofing:

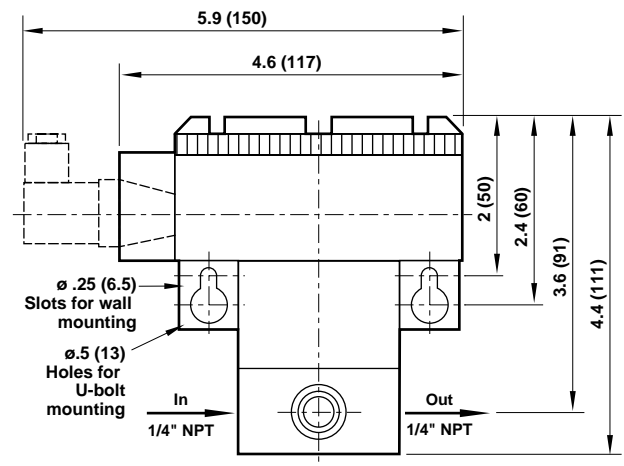
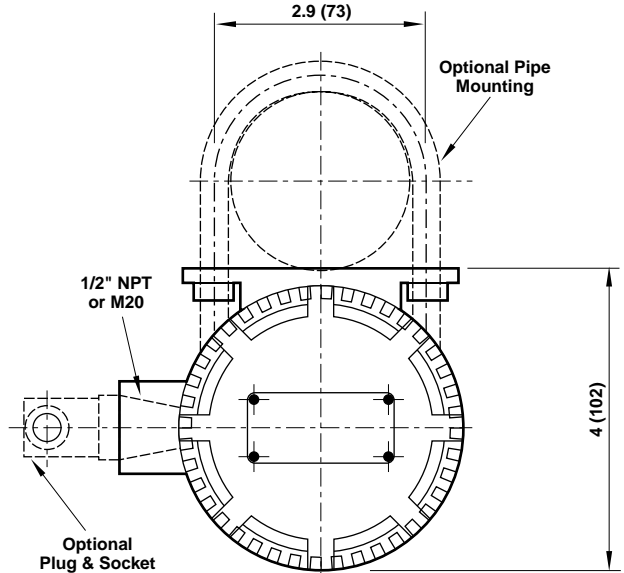
NEMA 4X, IP66. The unit will operate in any orientation, but must be mounted upright to achieve these environmental ratings

Mounting:

Integral bracket allow for surface or 50mm pipe mounting

Weight: 2.0 lb (0.93kg)

All Dimensions in Inches (mm)



* Parameters marked with * are tested on every unit by computer controlled test equipment. Other parameters are typical.