






# I/P & P/I Converters

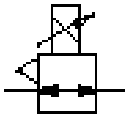
Series	Body material
 <p><b>Watson Smith VP10 Series</b> Proportional pressure control valves G<math>\frac{1}{4}</math>      <b>204</b></p>	<p>Aluminium Zinc</p> <p>●</p>
 <p><b>Watson Smith 140 Failsafe series</b> Current to pressure (I/P) electronic converter <math>\frac{1}{2}</math> NPT or M20      <b>206</b></p>	<p>● ●</p>
 <p><b>Watson Smith 421 Failsafe Series</b> Compact current to pressure (I/P) electronic converter <math>\frac{1}{4}</math> NPT      <b>208</b></p>	<p>●</p>
 <p><b>Watson Smith 422 Failfreeze Series</b> Current to pressure (I/P) electronic converter <math>\frac{1}{2}</math> NPT      <b>210</b></p>	<p>●</p>
 <p><b>Watson Smith 68 Series</b> P/I Transmitters and converters <math>\frac{1}{8}</math> NPT      <b>212</b></p>	<p>●</p>



## Watson Smith VP10 Series

Proportional pressure control valves

G $\frac{1}{4}$



**Robust proportional I/P and E/P converters**

**Suitable for a wide range of applications**

**High accuracy**

**High flow versions available**

**IP 65 protection in normal operation**

### Technical data

**Medium:**

Compressed air filtered to 5  $\mu$ m, oil-free, dry

**Output signal:**

0,2 to 1,0 bar, 0,2 to 2,0 bar, 0,2 to 4,0 bar (2 wire version), 0,2 to 6 bar, 0,2 to 8 bar (3 wire version)

**Flow:**

Up to 300 l/min

**Air consumption:**

<4 bar: 0,85 l/min typical at 50% signal

>4 bar: 1,75 l/min typical at 50% signal

**Operating pressure:**

At least 0,7 bar above maximum required output pressure range

**Mounting:**

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

**Ambient temperature:**

-40°C to +85°C

Consult our Technical Service for use below +2°C

**Response time:**

<2 bar: less than 0,5 seconds

>2 bar: 2 seconds for 10 to 90% step change (dependent on input for 10 to 90% step change and outlet pressures)

**Total error:**

$\pm 0,5\%$  of span (typical, independent error includes the combined effect of non-linearity, hysteresis, deadzone and repeatability)

**Temperature effect:**

Average 0,1% of span/°C for span and zero over operating range

**Supply sensitivity:**

< 0,075% span output change per % supply pressure change

**Failure mode:**

Signal falls to bleed pressure when electrical supply fails

**Weight:** 0,825 kg

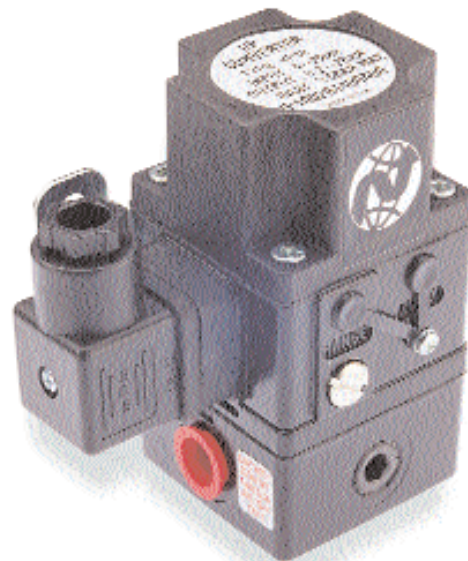
### Materials

Body: passivated zinc die-casting, epoxy painted

Diaphragms: nitrile

Internal: beryllium copper/brass

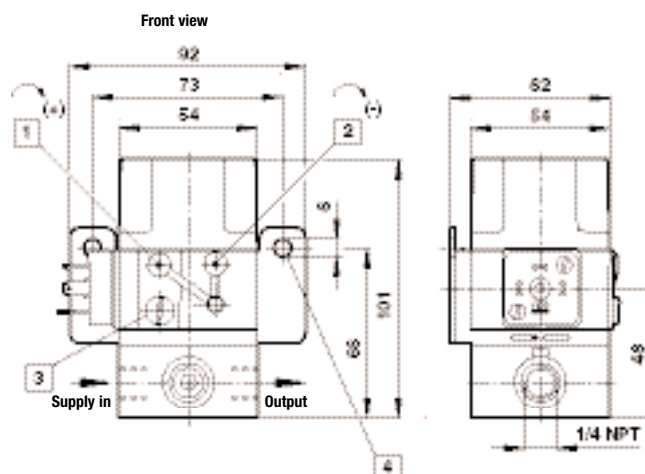
Flapper nozzle and supply valve: stainless steel/nylon



Control signal	Output pressure (bar)	Model
0 ... 10 V	0,2 ... 1	VP1001BJ100A00
4 ... 20 mA	0,2 ... 1	VP1001BJ400A00
0 ... 10 V	0,2 ... 2	VP1002BJ100A00
4 ... 20 mA	0,2 ... 2	VP1002BJ400A00
0 ... 10 V	0,2 ... 4	VP1004BJ100A00
4 ... 20 mA	0,2 ... 4	VP1004BJ400A00
0 ... 10 V	0,2 ... 6	VP1006BJ101A00
4 ... 20 mA	0,2 ... 6	VP1006BJ401A00
0 ... 10 V	0,2 ... 8	VP1008BJ101A00
4 ... 20 mA	0,2 ... 8	VP1008BJ401A00

### Electrical information

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



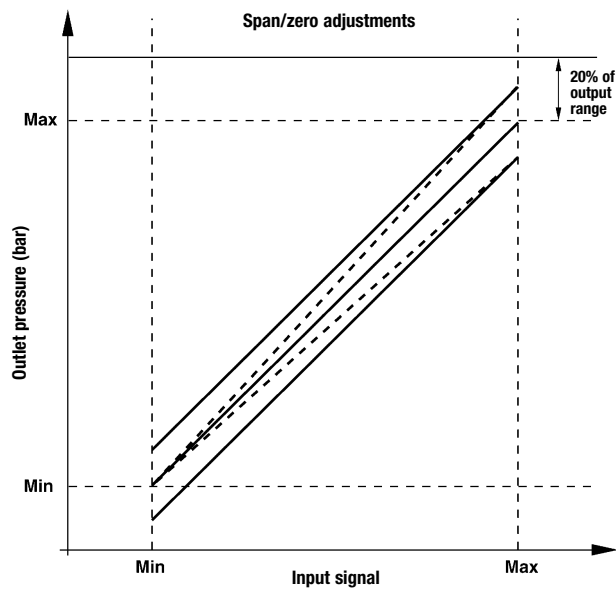
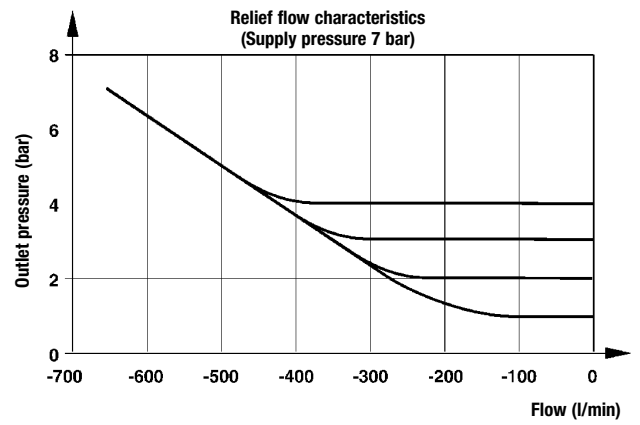
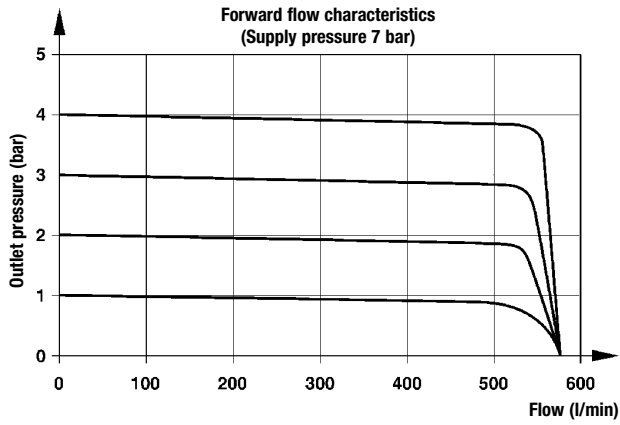
- 1 Range or span adjust (typical)
- 2 Zero adjust
- 3 Removable orifice
- 4 2 holes  $\varnothing$  6,5 mm

# Watson Smith VP10 Series

Proportional pressure control valves

G $\frac{1}{4}$

## Characteristic curves



## Watson Smith 140 Failsafe series

Current to pressure (I/P) electronic converter

½ NPT or M20x1,5



**Advanced electronic control**

**ATEX certified**

**Explosion proof and intrinsically safe**

**Complete electronics modularity for ease of maintenance**

**Jack socket for on-site monitoring**

**Fail-safe (unit pressure falls to zero on signal failure)**

**Field replaceable filter**

### Technical data

**Medium:**

Compressed air, min. filtered to 50 µm, oil-free, dry

Internal in-built air filter

**Output signal:**

0,2 to 1 bar

**Flow:**

>300 NI/min

**Air consumption:**

< 2,5 NI/min at 50% signal

**Instrument accuracy:**

Mean <0,1%

**Mounting:**

Integral bracket allows for surface or 50 mm pipe mounting in any orientation

**Ambient temperature:**

-40°C to +85°C

Consult our Technical Service for use below +2°C

**Linearity:**

Mean <0,05% of span

**Hysteresis:**

Mean <0,05% of span

**Temperature effect:**

Typically less than 0,035% span/°C between -40°C to +85°C

**Supply sensitivity:**

Less than 0.1% of span over full supply pressure range

**Calibration:**

Independent control of 0% and 100% set points. Adjustable by potentiometers up to 20% of output range. Unit is factory calibrated to within 1% of span.

**Fail-safe:**

Signal falls to below 15mbar in < 2sec, when input signal fails.

**Tight shut-off control:**

Potentiometer sets input signal failure at 3,5 mA

**Degree of protection:**

IP66, Type 4X

**Vibration immunity:**

<3% for vibration amplitude 4 mm 5 to 15 Hz, 2g 15 to 150 Hz



Description	Output pressure (bar)	Model
CENELEC (M20 via adapter)	0,2 ... 1	EX140 01BJ4LE2
Triple certification/Triple agency	0,2 ... 1	EX140 01BJ4EE1

### Electrical information

Electrical signal	4 to 20 mA (two wire) Terminal voltage <6,5 V
Min. operating current	>3,5 mA
Overload protection	100 mA max overload current
Insulation resistance	>100 MOhm at 850 V d.c., electrical terminals to case
Connections	1/2 NPT or M20 via adapter; internal terminal block with capacity up to 2,5mm <sup>2</sup> cable

**Electromagnetic compatibility:**  
Compliant with EC requirements EN 50081-2:1994 (Emissions) and EN50082-2:1995 (Immunity)

**Weight:** 2,07 kg

### Materials

Body: aluminium and zinc diecasting

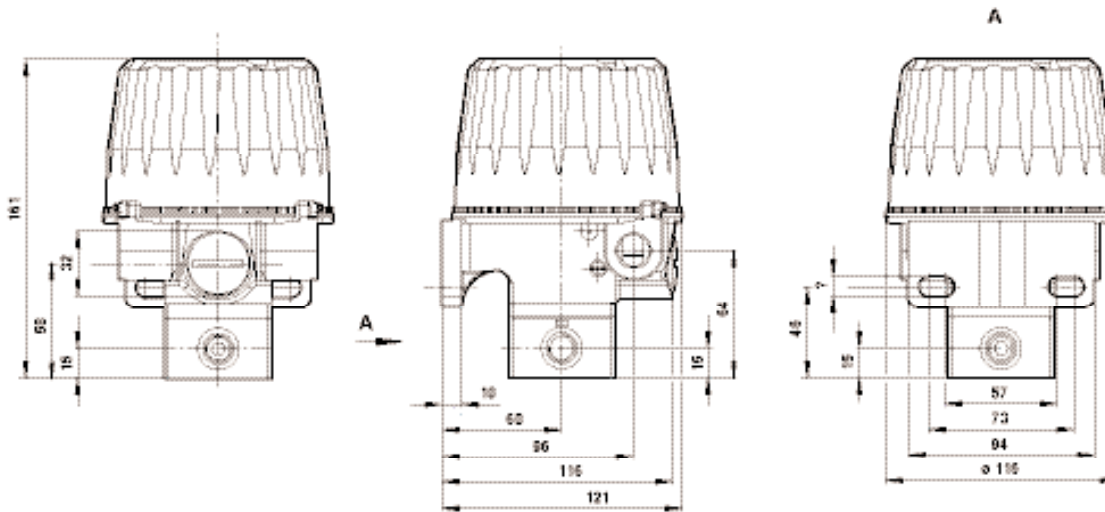
Diaphragms: nitrile

Black epoxy powder coating standard

## Watson Smith 140 Failsafe series

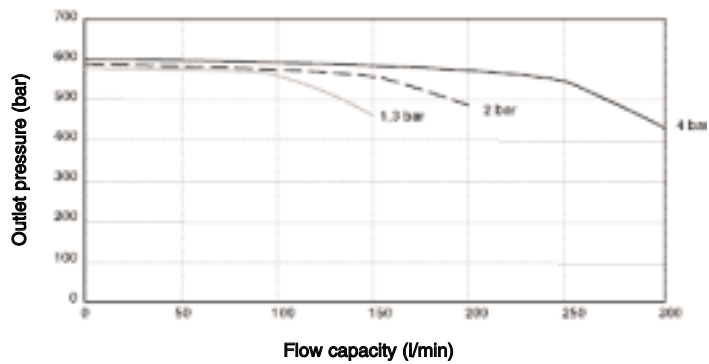
Current to pressure (I/P) electronic converter

½ NPT or M20x1,5



### Characteristic curves

Flow capacity at 12 mA  
1,3, 2 and 4 bar supply pressure



## Watson Smith 421 Failsafe Series

Compact current to pressure (I/P) electronic converter

¼ NPT



**Advanced electronic control**

**High density rail mounting**

**Failsafe operation (output pressure falls to minimum on power failure)**

**Vibration immune**

### Technical data

Medium:

Compressed air, filtered to 5 µm, oil-free, dry

Output signal:

0, 2 to 1 bar; minimum outlet pressure less than 15 mbar

Flow:

Up to 150 NI/min

Air consumption:

0,2 l/min typical low pressure

Operating pressure:

1, 5 to 3,5 bar or at least 0,7 bar above maximum output pressure

Mounting:

Optional. A rail clip is provided with each instrument for TS32 EN50035/TS35 (EN50022) rail.

Ambient temperature:

-10°C to +60°C

Consult our Technical Service for use below +2°C

Response time:

5 seconds (10 to 90% or 90 to 10% of output pressure into a 5 litre load)

Total error:

±0,5% of span (typical, independent error includes the combined effect of non-linearity, hysteresis, deadzone and repeatability)

Temperature effect:

Typically less than 1% span for span and zero between 0°C and 50°C

Supply sensitivity:

Maximum of ±2% of outlet pressure at extremes of supply range

Degree of protection:

IP40

Vibration immunity:

The unit possesses a high degree of immunity

Electromagnetic compatibility:

Compliant and CE marked in accordance with the EC E.M.C. directive. Tested to standards: BS EN50082-2: 1995, BS EN50081-2: 1994

Weight: 0,6 kg

### Materials

Pressure converter:

Anodised natural aluminium



Output pressure (bar)	Model
0,2 ... 1	53AB2100

### Electrical information

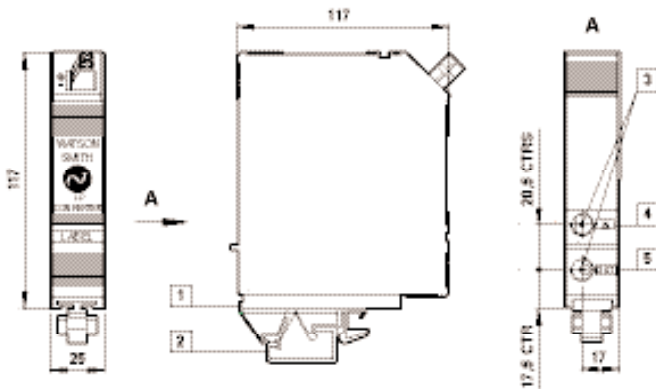
Electrical signal	4 to 20 mA (two wire); load presents 10 volts (±0,5 V) constant voltage drop to the current source
Failure mode	Signal falls to below 15 mbar when input signal fails
Connections	Two part quick release terminal block with capacity up to 2,5 mm <sup>2</sup> cable

# Watson Smith 421 Failsafe Series

Compact current to pressure (I/P) electronic converter

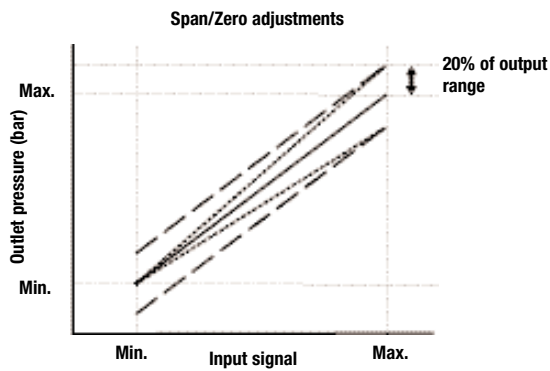
¼ NPT

Bracket mounted



- 1 Mounting bracket
- 2 Mounting rail
- 3 1/8" NPT pneumatic fittings
- 4 Pressure inlet port
- 5 Pressure outlet port

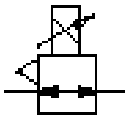
## Characteristic curves



## Watson Smith 422 Failfreeze Series

Current to pressure (I/P) electronic converter

½ NPT



**Advanced electronic control**

**Failfreeze operation (output pressure retained on power failure)**

**Vibration immune**

**IP65 environment protection**

**ATEX approved**

### Technical data

**Medium:**

Compressed air, filtered to 5 µm, oil-free, dry

**Output signal:**

0,2 to 1 bar low pressure unit; 0,2 to 8 bar high pressure unit; minimum outlet pressure less than 140 mbar

**Flow:**

Up to 300 NI/min

**Air consumption:**

0,2 l/min typical low pressure; 0,4 l/min typical high pressure

**Operating pressure:**

At least 0,7 bar above maximum output pressure

**Mounting:**

Operation in any attitude is possible without recalibration; integral surface mounting bracket provided for vertical mounting

**Ambient temperature:**

-20°C to +70°C

Consult our Technical Service for use below +2°C

**Response time:**

6 seconds (low pressure unit)

12 seconds (high pressure unit) (from 10 to 90% of output pressure into a 5 litre load)

**Total error:**

Max. error ±0,5% of span (low pressure), 0,5% (high pressure) (typical, independent error includes combined effect of non-linearity, hysteresis, deadzone and repeatability)

**Temperature effect:**

Typically better than 1% span between -10°C and 60°C

**Supply sensitivity:**

Negligible effect

**Degree of protection:**

IP65

**Vibration immunity:**

The unit possesses a high degree of immunity

**Electromagnetic compatibility:**

Compliant and CE marked in accordance with the EC E.M.C. directive. Tested to standards:

BS EN50082-2: 1995 & BS EN50081-2: 1994

**Weight:** 0,8 kg

### Materials

Body: zinc diecasting passivated and epoxy painted

Cover: Verton glass/nylon

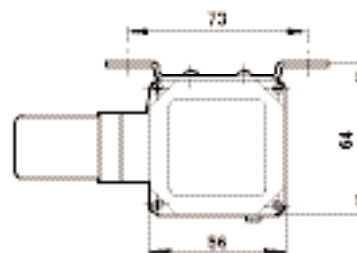
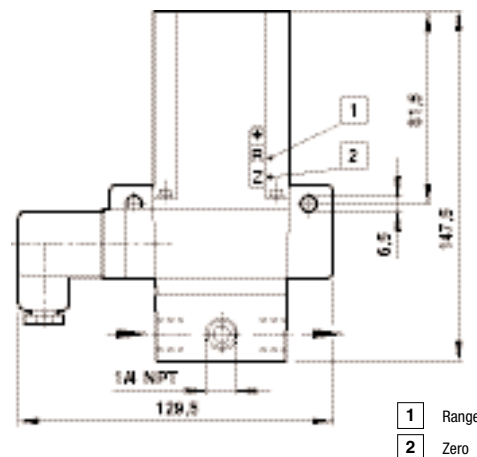
Diaphragms: nitrile



Output pressure (bar)	Model
0,2 ... 1	53AC2100
0,2 ... 8	53AC2400

### Electrical information

Electrical signal	4 to 20 mA (two wire); load presents 6 V (±0,5 V) constant voltage drop to the current source
Failure mode	Signal held at previous value when input signal falls below 2 mA ±0,5 mA; drift rate 0,02% in 30 seconds (mid-range)
Connections	30 mm square connector DIN 43650 provided, mountable in four directions



Pneumatic connections: ¼ NPT female  
Electrical connections: 30 mm square connector DIN 43650 (provided)

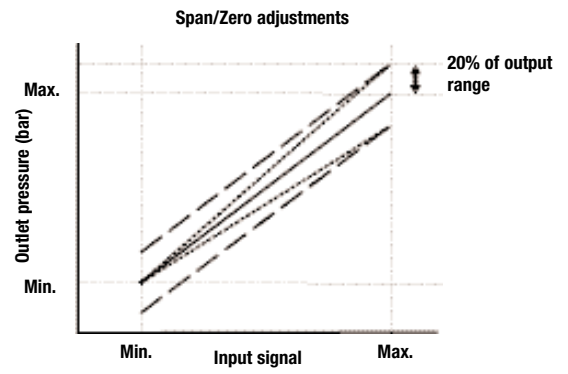
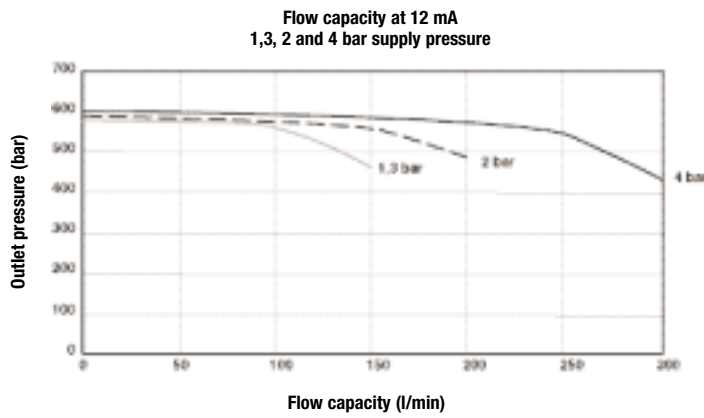


# Watson Smith 422 Failfreeze Series

Current to pressure (I/P) electronic converter

½ NPT

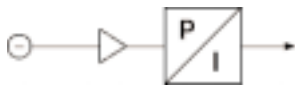
## Characteristic curves



## Watson Smith 68 Series

P/I Transmitters and converters

1/8 NPT



DIN rail or surface mounting

Weatherproof and uses non-critical power supplies

A wide range of pressure inputs available

### Technical data

Medium:

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

Over pressure:

At least 100% with negligible calibration error, except for 10 bar models which are 13,5 bar maximum

Operating pressure:

0 to 10 bar

Mounting:

DIN rail clips fit TS32 and TS35 rail or direct pipe mounting

Ambient temperature:

-10°C to +60°C

Consult our Technical Service for use below +2°C

Response time:

<10 ms for 95% step output

Range and zero controls:

±10% FS (minimum adjustment)

Total error:

±0,2% FS max.

Linearity:

Typically ±0,15%, ±0,3% max.

Hysteresis:

Typically ±0,15%, ±0,3% max.

Temperature effect:

Zero <±0,025% FS/°C

Span <±0,025% FS/°C

Stability <±0,025 over 6 months

Supply sensitivity:

±0,05% FS/V max.

Degree of protection:

IP54 (IP65 option available)

Electromagnetic compatibility:

Compliant and CE marked in accordance with the EC E.M.C. directive. Tested to standards:

BS EN50082-2: 1995, BS EN50081-2: 1994

Weight: 0,2 kg

### Materials

Casing: extruded aluminum

End plates: zinc diecast

Diaphragms: nitrile

Transducer: composite construction, mainly nickel, aluminum

Kovar, silicon rubber/gel

PCB: epoxy glass fibre



Output pressure (bar)	Model Standard	Weatherproof
0,2 ... 1	53682100	53682110
0 ... 4	53683300	53683310
0 ... 6	53683700	53683710
0 ... 7	53683600	53683610
0 ... 10	53683500	53683510

### Electrical information

Supply voltage	9 to 30 V continuous
Output	4 to 20mA
Voltage drop	9 V min. (across unit)
Load resistance	750 ohms max. (24 V supply)
Connections	Standard - Klippon terminal block to accept cables upto 2,5 mm <sup>2</sup> Weatherproof - 16 mm square connector to DIN43650 to accept cable up to 6 mm diameter with conductors of 0,75 mm <sup>2</sup>

### Alternative models

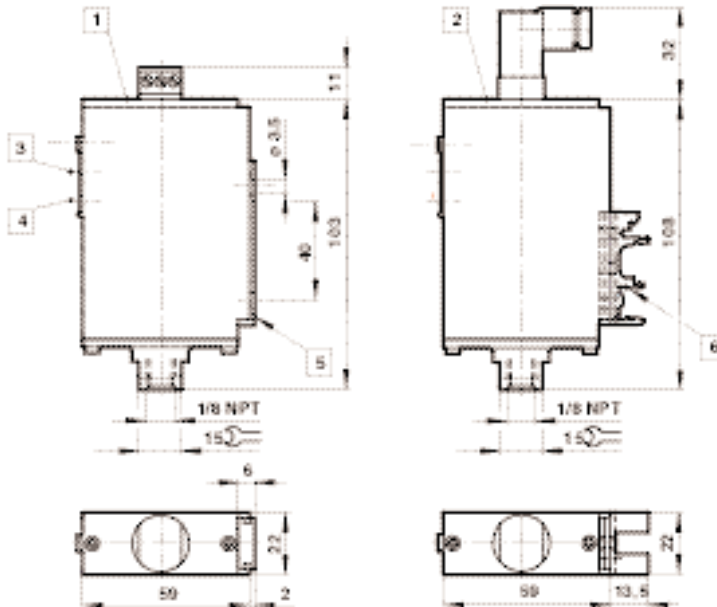
Pressure ranges between 0 to 5 bar and 10 bar

Voltage ranges other than 0 to 10 V

## Watson Smith 68 Series

P/I Transmitters and converters

1/8 NPT



- 1** Kippon terminal (standard models)
- 2** Weatherproof DIN connector
- 3** Range set
- 4** Zero set
- 5** 2x  $\varnothing 3,2$  Fixing holes at 40 CTRS on surface mounting plate (optional)
- 6** DIN rail mounting clip



