# PNEUMATIC CONTROL VALVE FOR STEAM

## MODEL PN-COSR-16

### DUCTILE CAST IRON, CAST IRON CAST STAINLESS STEEL

**REMOTELY CONTROLLABLE PNEUMATICALLY ACTUATED CONTROL VALVE**

## Features

**The PN-COSR-16 is a pneumatic control valve designed for remotely controlling steam pressure based on the structure of the TLV COSR pressure reducing valve which is suitable for use in steam heating processes.***

1. The rapid response pneumatic actuator precisely adjusts the valve position to ensure accurate pressure control.
2. Large surface area integral screen for pilot valve extends trouble-free service.
3. Combining with a controller and an electropneumatic transducer enables automatic PID operation.
4. When combined with an air regulator it can be used as a pressure reducing valve to set secondary pressure remotely, and 2 point pressure switching is possible as well.
5. By adjusting the internal spring load, steam can continue to be supplied at the required lowest set pressure even with motive air cut off (emergency case).

* Can be used to control process temperature if desired temperature is controllable using secondary pressure within the adjustable pressure range.

## Pressure Equipment Directive (PED)

Classification according to PED 2014/68/EU, fluid group 2

| Size | Category | CE marking |
|---|---|---|
| DN 15 to DN 40 | —* | Art. 4, Sec. 3 (sound engineering practice), CE marking not allowed |
| DN 50 | I | With CE marking and Declaration of Conformity |

* Manufactured in accordance with sound engineering practice

## Specifications

| Model | PN-COSR-16 | | |
|---|---|---|---|
| Body Material | Cast Iron (JIS FC250) (equiv. GG-25/EN-JL1040) | Ductile Cast Iron (GGG40.3/EN 5.3103) | Cast Stainless Steel (A351/A351M Gr.CF8 or CF8M) (equiv. 1.4312 or 1.4410) |
| Connection | Flanged | | |
| | ASME | DIN | |
| Size | DN 15, 20, 25, 40, 50 | | |
| Max. Operating Pressure (barg) PMO | 13 | 16 | |
| Max. Operating Temperature (°C) TMO | 200 | 220 | |
| Primary Pressure Range (barg) | 2 – 13 | 2 – 16 | |
| Adjustable Pressure Range (all conditions must be met) | Within 10 – 84% of primary pressure but with a minimum pressure of 0.3 barg | | |
| | Max. pressure : [Motive air pressure – 1] barg | | |
| | Differential Pressure between 0.7 – 8.5 bar | | |
| Minimum Adjustable Flow Rate | 5% of rated flow rate | | |
| Motive Medium | Oil-free air, filtered to 5 $\mu$m | | |
| Required Motive Air Pressure | [Desired secondary pressure + 1] barg or higher (but not exceeding 16 barg) | | |

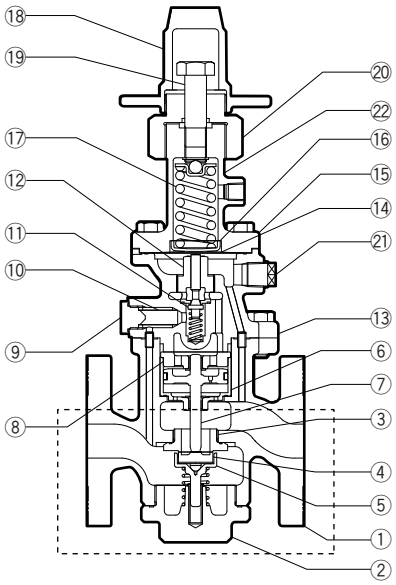
PRESSURE SHELL DESIGN CONDITIONS (**NOT** OPERATING CONDITIONS): 1 bar = 0.1 MPa
Maximum Allowable Pressure (barg) PMA: 13 (FC250), 21 (GGG40.3/EN 5.3103 or CF8/CF8M)
Maximum Allowable Temperature (°C) TMA: 200 (FC250), 220 (GGG40.3/EN 5.3103 or CF8/CF8M)
Minimum Allowable Temperature (°C): 0 (FC250, GGG40.3/EN 5.3103), -40 (CF8/CF8M)

**CAUTION** To avoid abnormal operation, accidents or serious injury, DO NOT use this product outside of the specification range.
Local regulations may restrict the use of this product to below the conditions quoted.

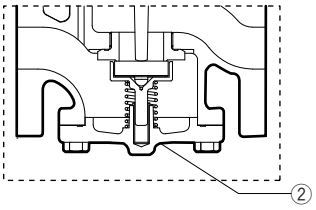
## Configuration

| No. | Description | | Material | DIN* | ASTM/AISI* |
|---|---|---|---|---|---|
| ① | Body | | Cast Iron FC250 | 0.6025 | A126 Cl.B |
| | | | Ductile Cast Iron GGG40.3/ EN 5.3103 (EN-GJS-400-18-LT) | 0.7043 | A395 Gr.60-40-18 |
| | | | Cast Stainless Steel A351/ A351M Gr.CF8 or CF8M | 1.4312 or 1.4410 | — |
| ② | Plug | DN 15-25 | Same material as Body | | |
| | Cover | DN 40, 50 | | | |
| ③ | Main Valve Seat | | Cast Stainless Steel | — | — |
| ④ | Main Valve | | Stainless Steel | — | — |
| ⑤ | Main Valve Holder | | Stainless Steel | — | — |
| ⑥ | Cylinder | | Stainless Steel | — | — |
| ⑦ | Piston | | Cast Stainless Steel | — | — |
| ⑧ | Piston Guide | DN 15-25 | Stainless Steel | — | — |
| | | DN 40, 50 | Cast Stainless Steel | — | — |
| ⑨ | Pilot Screen Holder | Cast Iron/Ductile Cast Iron Body | Carbon Steel S25C | 1.1158 | A1025 |
| | | Cast Stainless Steel Body | Stainless Steel SUS303 or A351/A351M Gr.CF8M | 1.4305 or 1.4401 | AISI303 or — |
| ⑩ | Pilot Screen | | Stainless Steel | — | — |
| ⑪ | Pilot Valve | | Stainless Steel | — | — |
| ⑫ | Pilot Valve Seat | | Stainless Steel | — | — |
| ⑬ | Pilot Body | | Same material as Body | | |
| ⑭ | Diaphragm | | Stainless Steel | — | — |
| ⑮ | Spring Housing | | Cast Stainless Steel A351/A351M Gr.CF8 | 1.4312 | — |
| ⑯ | Diaphragm Support | | Brass | — | — |
| ⑰ | Coil Spring | | Carbon Steel | — | — |
| ⑱ | Spanner Cap | Cast Iron/Ductile Cast Iron Body | Die Cast Aluminium | — | — |
| | | Cast Stainless Steel Body | Cast Stainless Steel | — | — |
| ⑲ | Adjustment Screw | | Carbon Steel | — | — |
| ⑳ | Packing Retainer | | Stainless Steel | — | — |
| ㉑ | Plug - Sensing Line Port | Cast Iron/Ductile Cast Iron Body | Carbon Steel SS400 | 1.0037 | A6 |
| | | Cast Stainless Steel Body | Stainless Steel SUS304 or A182/A182M F316 | 1.4301 or 1.4401 | AISI304 or — |
| ㉒ | Nameplate | | Stainless Steel SUS304 | — | — |

DN 15 - 25




DN 40, 50




* Equivalent material
Contact TLV for available replacement parts. All gaskets are PTFE.

## Cv & Kvs Values

| | Nominal Valve Size (DN) | | | | |
|---|---|---|---|---|---|
| | 15 | 20 | 25 | 40 | 50 |
| Kvs (DIN) | 3.3 | 5.9 | 9.5 | 20.6 | 31.9 |
| Cv (UK) | 3.2 | 5.7 | 9.2 | 20.0 | 31.0 |
| Cv (US) | 3.8 | 6.9 | 11.1 | 24.0 | 37.2 |

**CAUTION** The Cv & Kvs values shown are for the valve in the full fail open position. These values are not to be used for PN-COSR-16 sizing, and instead may be used as one of the factors in calculations for safety valve selection.

## Capacity Table

**With internal (factory standard) or external (option) secondary pressure-sensing channel or line** (kg/h)

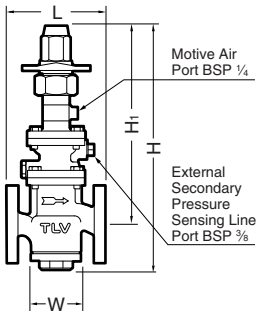
| Primary Steam Press. (barg) | Secondary (Set) Steam Pressure (barg) | | Nominal Valve Size (DN) | | | | |
|---|---|---|---|---|---|---|---|
| | Internal Channel | External Line (option) | 15 | 20 | 25 | 40 | 50 |
| 2 | *1.3 | *1.3 | 170 | 240 | 340 | 670 | 920 |
| | 1.1 | 1.1 | 180 | 260 | 370 | 720 | 990 |
| | 1 | **0.3 - 1 | 185 | 270 | 380 | 730 | 1010 |
| | 0.7 | | 60 | 160 | 360 | 700 | 1000 |
| | **0.3 | | 50 | 140 | 340 | 660 | 990 |
| 3 | *2.3 | *2.3 | 190 | 280 | 400 | 710 | 1090 |
| | 2 | 2 | 200 | 290 | 430 | 800 | 1240 |
| | 1.5 | **0.3 - 1.5 | 210 | 310 | 450 | 880 | 1370 |
| | 1 | | 80 | 190 | 400 | 840 | 1300 |
| | **0.3 | | 50 | 140 | 340 | 740 | 1150 |
| 4 | *3.3 | *3.3 | 200 | 290 | 410 | 800 | 1250 |
| | 3 | 3 | 220 | 310 | 450 | 920 | 1420 |
| | 2.5 | 2.5 | 230 | 320 | 480 | 1040 | 1610 |
| | 2 | **0.4 - 2 | 240 | 350 | 520 | 1130 | 1750 |
| | 1 | | 80 | 280 | 440 | 960 | 1490 |
| | **0.4 | | 60 | 150 | 390 | 850 | 1310 |
| 5 | *4.2 | *4.2 | 220 | 320 | 370 | 940 | 1460 |
| | 4 | 4 | 240 | 340 | 470 | 1030 | 1590 |
| | 3 | 3 | 260 | 380 | 590 | 1270 | 1980 |
| | 2.5 | **0.5 - 2.5 | 270 | 400 | 620 | 1350 | 2080 |
| | 1.5 | | 170 | 320 | 520 | 1120 | 1730 |
| | **0.5 | | 60 | 150 | 410 | 890 | 1380 |
| 6 | *5 | *5 | 250 | 350 | 520 | 1120 | 1740 |
| | 4 | 4 | 280 | 410 | 660 | 1420 | 2210 |
| | 3.5 | 3.5 | 290 | 440 | 690 | 1500 | 2330 |
| | 3 | **0.6 - 3 | 300 | 460 | 720 | 1560 | 2420 |
| | 1.5 | | 170 | 320 | 480 | 1030 | 1600 |
| | **0.6 | | 60 | 150 | 420 | 920 | 1420 |
| 7 | *5.8 | *5.8 | 250 | 370 | 600 | 1300 | 2020 |
| | 5 | 5 | 290 | 450 | 720 | 1560 | 2420 |
| | 4 | 4 | 330 | 500 | 800 | 1720 | 2670 |
| | 3.5 | **0.7 - 3.5 | 350 | 510 | 820 | 1780 | 2750 |
| | 2 | | 200 | 380 | 610 | 1310 | 2040 |
| | **0.7 | | 70 | 230 | 430 | 930 | 1450 |
| 8 | *6.7 | *6.7 | 280 | 410 | 670 | 1440 | 2230 |
| | 6 | 6 | 300 | 480 | 780 | 1680 | 2610 |
| | 5 | 5 | 340 | 540 | 870 | 1890 | 2930 |
| | 4 | **0.8 - 4 | 400 | 570 | 920 | 1990 | 3090 |
| | 2 | | 200 | 380 | 610 | 1310 | 2040 |
| | **0.8 | | 70 | 160 | 410 | 900 | 1390 |
| 10 | *8.4 | *8.4 | 310 | 500 | 810 | 1750 | 2720 |
| | 7 | 7 | 390 | 630 | 1010 | 2180 | 3380 |
| | 6 | 6 | 470 | 670 | 1080 | 2340 | 3620 |
| | 5 | **1.5 - 5 | 500 | 700 | 1120 | 2420 | 3750 |
| | 3 | | 300 | 460 | 740 | 1600 | 2480 |
| | **1.5 | | 170 | 320 | 480 | 970 | 1510 |
| 12 | *10 | *10 | 350 | 610 | 980 | 2110 | 3270 |
| | 8 | 8 | 500 | 760 | 1230 | 2650 | 4110 |
| | 7 | 7 | 570 | 800 | 1290 | 2780 | 4310 |
| | 6 | **3.5 - 6 | 600 | 820 | 1320 | 2850 | 4420 |
| | 5 | | 500 | 680 | 1090 | 2370 | 3670 |
| | **3.5 | | 360 | 550 | 890 | 1930 | 2980 |
| 13 | *10.9 | *10.9 | 360 | 650 | 1040 | 2250 | 3490 |
| | 10 | 10 | 410 | 740 | 1190 | 2560 | 3970 |
| | 8 | 8 | 470 | 850 | 1360 | 2950 | 4570 |
| | 6.5 | **4.5 - 6.5 | 480 | 880 | 1410 | 3060 | 4740 |
| | 5.5 | | 400 | 730 | 1180 | 2550 | 3950 |
| | **4.5 | | 320 | 580 | 940 | 2020 | 3140 |
| 14 | *11.7 | *11.7 | 410 | 700 | 1120 | 2430 | 3760 |
| | 10 | 10 | 540 | 840 | 1360 | 2940 | 4550 |
| | 8 | 8 | 670 | 980 | 1490 | 3220 | 4990 |
| | 7 | **5.5 - 7 | 730 | 1050 | 1520 | 3280 | 5090 |
| | 6 | | 600 | 840 | 1240 | 2690 | 4170 |
| | **5.5 | | 550 | 770 | 1130 | 2450 | 3790 |
| 16 | *13.4 | *13.4 | 470 | 790 | 1270 | 2740 | 4250 |
| | 10 | 10 | 730 | 1100 | 1650 | 3560 | 5520 |
| | 9 | 9 | 790 | 1200 | 1750 | 3650 | 5660 |
| | 8 | **7.5 - 8 | 880 | 1300 | 2000 | 3710 | 5750 |
| | **7.5 | | 820 | 1250 | 1800 | 3400 | 5260 |

* Maximum adjustable secondary pressure ** Minimum adjustable secondary pressure

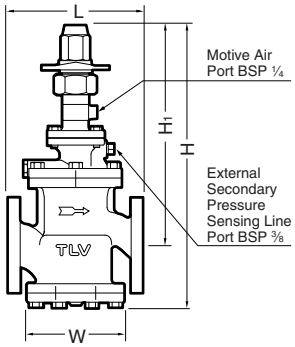
1 bar = 0.1 MPa

## Dimensions

● **PN-COSR-16** Flanged




DN 15 - 25




DN 40, 50

**PN-COSR-16** Flanged (mm)

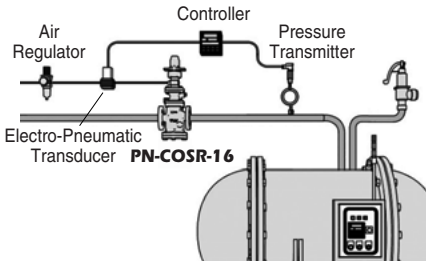
| DN | L | | | | H | $H_1$ | W | Weight* (kg) |
|---|---|---|---|---|---|---|---|---|
| | DIN 2501 | ASME Class | | | | | | |
| | PN25/40 | (150RF) | 250RF | (300RF) | | | | |
| (15) | 130 | 170 | — | 170 | 400 | 330 | 88 | 11 |
| (20) | 150 | 182 | — | 182 | | | | 12 |
| 25 | 160 | 188 | 188 | 192 | | 325 | 93 | 14 |
| 40 | 200 | 220 | 222 | 224 | 430 | 350 | 126 | 21 |
| 50 | 230 | 255 | 260 | 261 | 460 | 360 | 157 | 28 |

( ) No ASME standard exists for cast iron; machined to fit steel flanges
Class 250 RF can connect to 300 RF
Other standards available, but length and weight may vary
* Weight is for GGG 40.3 PN 25/40 model

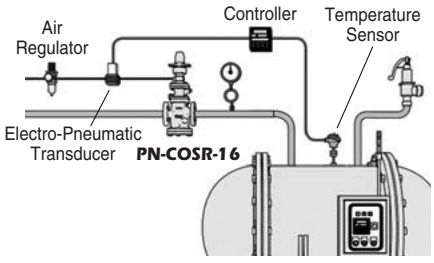
## Usage Examples

### As a Control Valve

**Automatic PID Control System (Pressure Control)**



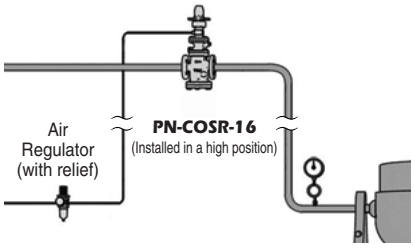

**Automatic PID Control System (Temperature Control*)**



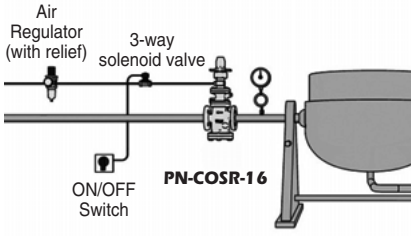

* Can be used to control process temperature if desired temperature is controllable using secondary pressure within the Adjustable Pressure Range.

### As a Pressure Reducing Valve

**Manual Remote System**




**2 Point Pressure Switching**

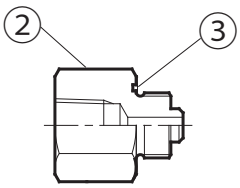



For explanation purposes only, not intended as installation designs.

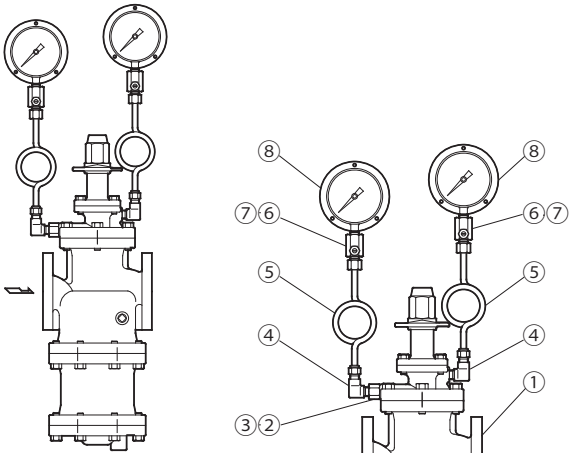
## Option

| | |
|---|---|
| Pressure Gauge Unit | Replaces the standard screen holder plug to enable installation of a pressure gauge of the user's choice.<br>Primary side: M16 holder plug (male/female), BSP/Rc(PT)/NPT ⅜. An elbow is required for pressure gauge installation.<br>Secondary side: Rc(PT) ⅜ mounting port for elbow and pressure gauge installation. |
| | Elbows, pressure gauge and connecting parts must be purchased separately. |

### • Configuration




### • Installation Example




NOTE: For explanation purposes, a siphon tube style pressure gauge will be used. However, the instructions also apply to cooling tower-style pressure gauges.

| No. | Part Name | No. | Part Name |
|---|---|---|---|
| 1 | Valve Body | 5 | Siphon Tube* |
| 2 | Holder Plug | 6 | Dampener* |
| 3 | Holder Plug Gasket | 7 | Dampener Gasket* |
| 4 | Elbow (male/female)* | 8 | Pressure Gauge* |

* Purchase separately

**Manufacturer**
TLV CO., LTD.
Kakogawa, Japan
is approved by LRQA Ltd. to ISO 9001/14001
ISO 9001
ISO14001



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Specifications subject to change without notice.