



# STEAM PRESSURE REDUCING VALVE

**MODEL COSR-21** DUCTILE CAST IRON  
STAINLESS STEEL

## SELF-ACTUATED PRESSURE REDUCING VALVE WITH SHOCK-ABSORBING PISTON

### Features

**Technologically advanced, pilot operated pressure reducing valve for accurate control in process steam systems.**

1. Self-aligning shock-absorbing spherical piston and advanced pilot regulator designs maintain secondary steam pressure accuracy, even during adverse process conditions.
2. Major internal components made of stainless steel for long service life.
3. Large surface area integral screen for pilot valve extends trouble-free service.
4. Internal secondary pressure-sensing channel makes external sensing line unnecessary.
5. Sizes DN 65 and larger have a silencer for noise reduction.

### 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 to DN 80 | I        | With CE marking and Declaration of Conformity                       |
| DN 100         | II       | With CE marking and Declaration of Conformity                       |

\* Manufactured in accordance with sound engineering practice



### Specifications

| Model                                                     |     | COSR-21                                                              |                                          |                                                                                         |
|-----------------------------------------------------------|-----|----------------------------------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------------------|
| Body Material                                             |     | Ductile Cast Iron<br>(JIS FCD450)<br>(equivalent to GGG40/EN 5.3106) | Ductile Cast Iron<br>(GGG40.3/EN 5.3103) | Cast Stainless Steel<br>(A351/A351M Gr.CF8 or CF8M)<br>(equivalent to 1.4312 or 1.4410) |
| Connection                                                |     | Flanged                                                              |                                          |                                                                                         |
|                                                           |     | ASME Class 150RF, 300RF                                              | DIN 2501 PN 25/40                        |                                                                                         |
| Size                                                      |     | DN 15, 20, 25, 32, 40, 50, 65, 80, 100                               |                                          | DN 15, 20, 25, 32, 40, 50                                                               |
| Maximum Operating Pressure (barg)                         | PMO | 21                                                                   |                                          |                                                                                         |
| Maximum Operating Temperature (°C)                        | TMO | 220                                                                  |                                          |                                                                                         |
| Primary Pressure Range (barg)                             |     | 13.5 – 21                                                            |                                          |                                                                                         |
| Adjustable Pressure Range<br>(all conditions must be met) |     | From 5.5 barg to 84% of primary pressure                             |                                          |                                                                                         |
|                                                           |     | Maximum differential pressure 8.5 bar                                |                                          |                                                                                         |
| Minimum Adjustable Flow Rate                              |     | 5% of rated flow rate (For DN 65 - DN 100: 10% of rated flow rate)   |                                          |                                                                                         |

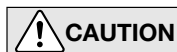
PRESSURE SHELL DESIGN CONDITIONS (**NOT** OPERATING CONDITIONS):

Maximum Allowable Pressure (barg) PMA: 21

Maximum Allowable Temperature (°C) TMA: 220

Minimum Allowable Temperature (°C): 0 (FCD450, GGG40.3/EN 5.3103), -40 (CF8/CF8M)

1 bar = 0.1 MPa



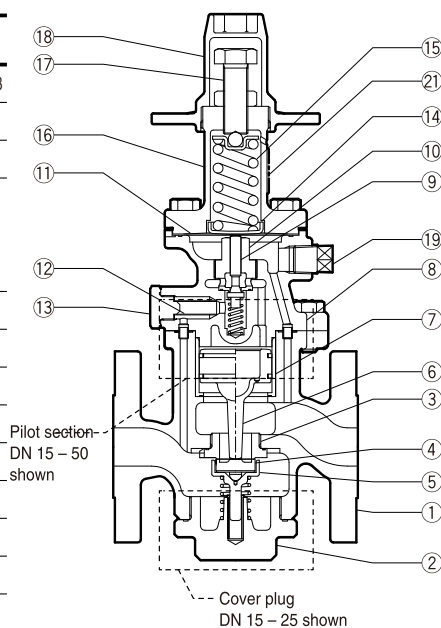
To avoid abnormal operation, accidents or serious injury, DO NOT use this product outside of the specification range. Local regulations may restrict the use of this product to below the conditions quoted.

## Configuration

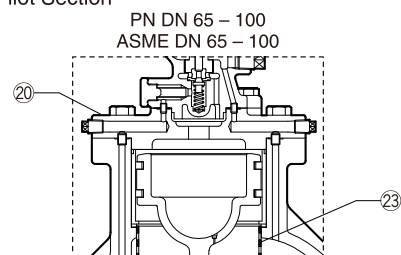
| No. | Description              | Material                   | DIN*                                                      | ASTM/AISI*                       |
|-----|--------------------------|----------------------------|-----------------------------------------------------------|----------------------------------|
| ①   | Main Body                | Flanged PN DN 15 - 100     | Ductile Cast Iron GG40.3/<br>EN 5.3103 (EN-GJS-400-18-LT) | 0.7043 A395 Gr.60-40-18          |
|     |                          | Flanged PN DN 15 - 50      | Cast Stainless Steel A351/<br>A351M Gr.CF8 or CF8M        | 1.4312 or<br>1.4410 —            |
|     |                          | Flanged ASME               | Ductile Cast Iron FCD450                                  | 0.7040 A536                      |
| ②   | Cover Plug               | Flanged PN DN 15 - 25      | Same material as main body                                |                                  |
|     | Cover                    | Flanged PN DN 32 - 100     |                                                           |                                  |
|     |                          | Flanged ASME DN 32 - 100   |                                                           |                                  |
| ③   | Main Valve Seat          | Stainless Steel            | —                                                         | —                                |
| ④   | Main Valve               | Stainless Steel            | —                                                         | —                                |
| ⑤   | Main Valve Holder        | Stainless Steel            | —                                                         | —                                |
| ⑥   | Piston                   | Stainless Steel            | —                                                         | —                                |
| ⑦   | Cylinder                 | Stainless Steel            | —                                                         | —                                |
| ⑧   | Pilot Body               | Same material as main body |                                                           |                                  |
| ⑨   | Pilot Valve              | Stainless Steel            | —                                                         | —                                |
| ⑩   | Pilot Valve Seat         | Stainless Steel            | —                                                         | —                                |
| ⑪   | Diaphragm                | Stainless Steel            | —                                                         | —                                |
| ⑫   | Pilot Screen             | Stainless Steel            | —                                                         | —                                |
| ⑬   | Pilot Screen Holder      | Ductile Cast Iron Models   | Carbon Steel S25C                                         | 1.1158 AISI1025                  |
|     |                          | Cast Stainless Steel Model | Stainless Steel SUS303 or<br>A351/A351M Gr.CF8M           | 1.4305 or<br>1.4410 AISI303 or — |
| ⑭   | Diaphragm Support        | Brass                      | —                                                         | —                                |
| ⑮   | Coil Spring              | Carbon Steel               | —                                                         | —                                |
| ⑯   | Spring Housing           | Flanged ASME               | Cast Iron FC250                                           | 0.6025 A126 Cl.B                 |
|     |                          | Flanged PN                 | Same material as main body                                |                                  |
| ⑰   | Adjustment Screw         | Cr-Mo Steel                | —                                                         | —                                |
| ⑱   | Spanner Cap              | Ductile Cast Iron Models   | Die Cast Aluminium                                        | —                                |
|     |                          | Cast Stainless Steel Model | Stainless Steel                                           | —                                |
| ⑲   | Plug – Sensing Line Port | Ductile Cast Iron Models   | Carbon Steel SS400                                        | 1.0037 A6                        |
|     |                          | Cast Stainless Steel Model | Stainless Steel SUS304 or<br>A193/A193M Gr.B8M            | 1.4301 or<br>1.4401 AISI304 or — |
| ⑳   | Pilot Cover              | Same material as main body |                                                           |                                  |
| ㉑   | Nameplate                | Stainless Steel            | —                                                         | —                                |
| ㉒   | Plug – Blow Line Port    | Carbon Steel SS400         | 1.0037                                                    | A6                               |
| ㉓   | Silencer                 | Stainless Steel            | —                                                         | —                                |

\* Equivalent materials

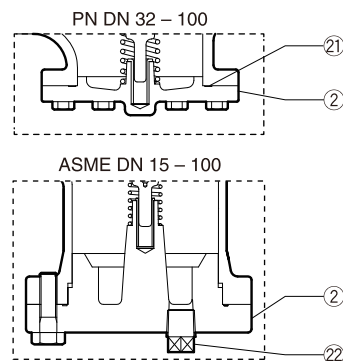
Contact TLV for available replacement parts. All gaskets are PTFE.



Pilot Section



Cover



The parts configuration of sizes DN 65 – 150 differs slightly from that of sizes DN 15 – 50.

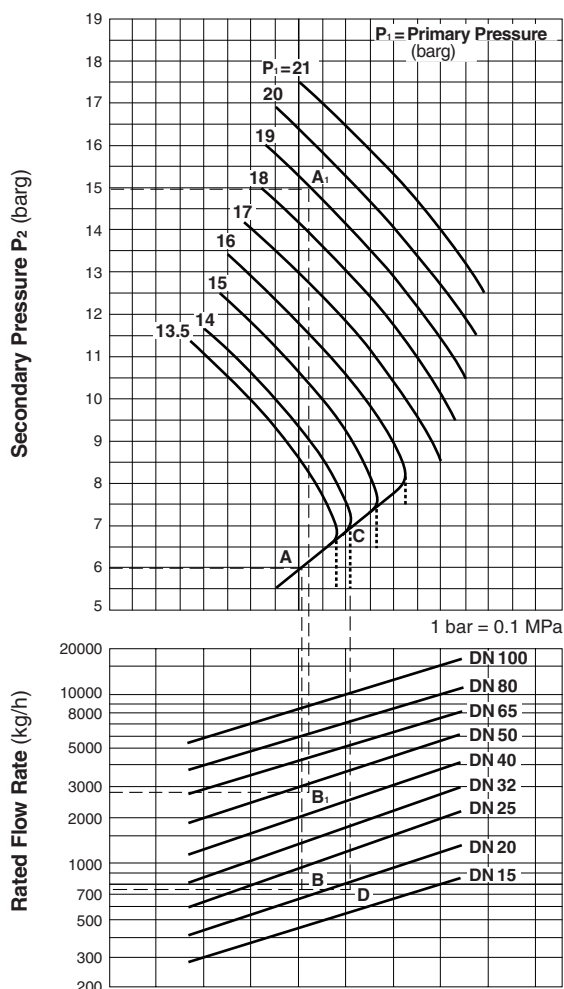
## Cv & Kvs Values

|           | Nominal Valve Size (DN) |     |      |      |      |      |      |      |     |
|-----------|-------------------------|-----|------|------|------|------|------|------|-----|
|           | 15                      | 20  | 25   | 32   | 40   | 50   | 65   | 80   | 100 |
| Kvs (DIN) | 3.3                     | 5.9 | 9.5  | 13.3 | 20.6 | 31.9 | 50.8 | 72.9 | 110 |
| Cv (UK)   | 3.2                     | 5.7 | 9.2  | 12.9 | 20.0 | 31.0 | 49.4 | 70.8 | 107 |
| Cv (US)   | 3.8                     | 6.9 | 11.1 | 15.5 | 24.0 | 37.2 | 59.3 | 85.0 | 128 |



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

## Sizing Chart



## Sizing Examples

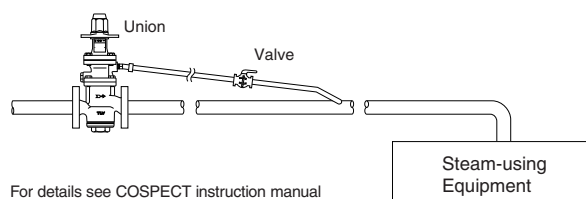
### For $P_1$ over 16 barg

For primary pressure of 19 barg, set pressure 15 barg, and saturated steam flow rate 2800 kg/h, select an appropriate size.

1. Locate intersecting point  $A_1$  of 19 barg primary pressure and 15 barg set pressure. Go to point  $A_1$  and down until 2800 kg/h, point  $B_1$  is reached.
2. Since point  $B_1$  is located between DN 40 and DN 50, the larger size, DN 50, should be chosen.

### Special Instructions for $P_1$ under 16 barg

The vertical dotted lines in the graph represent the increased capacity often achievable when the internal sensing features of COSR-21 are enhanced by the installation of a 3/8 inch external secondary pressure-sensing line (condition:  $P_2 < \frac{1}{2} P_1$ ).



For details see COSPECT instruction manual

For primary pressure of 14 barg, set pressure 6 barg, and saturated steam flow rate 750 kg/h, select an appropriate size.

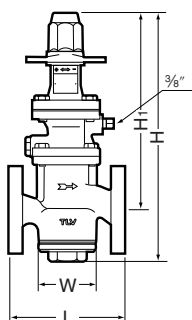
### With internal secondary pressure-sensing channel

1. Locate intersecting point A of 14 barg primary pressure and 6 barg set pressure. Go to point A and down until 750 kg/h, point B, is reached.
2. Since point B is located between DN 20 and DN 25, the larger size, DN 25, should be chosen.

### With external secondary pressure-sensing line

1. Obtain intersecting point C of 14 barg primary pressure. Go straight down from point C to 6 barg set pressure, and continue until 750 kg/h, point D, is reached.
2. Since point D is located between DN 15 and DN 20, the larger size, DN 20, should be chosen.

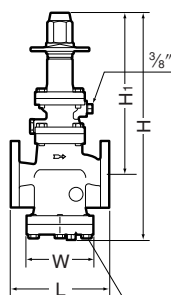
## Dimensions



DN 15 - 50 shown. Configuration of larger sizes differs slightly.

### COSR-21 Flanged DIN (mm)

| DN  | L        |          | H   | H <sub>1</sub> | W   | Weight (kg) |
|-----|----------|----------|-----|----------------|-----|-------------|
|     | DIN 2501 | PN 25/40 |     |                |     |             |
| 15  | 130      |          | 377 | 305            | 88  | 9           |
| 20  | 150      |          |     |                |     | 9.7         |
| 25  | 160      |          |     | 302            | 93  | 11          |
| 32  | 180      |          | 405 | 322            | 126 | 17          |
| 40  | 200      |          |     |                |     |             |
| 50  | 230      |          |     | 335            | 157 | 24          |
| 65  | 290      |          | 576 | 433            | 220 | 51          |
| 80  | 310      |          |     |                |     | 52          |
| 100 | 350      |          |     | 470            | 265 | 81          |



3/8" (DN 15 - 50)

1/2" (DN 65 - 100)

ASME Class 150RF/300RF, DN 15 - 50 shown. Configuration of larger sizes differs slightly.

### COSR-21 Flanged ASME (mm)

| DN   | L          |       | H     | H <sub>1</sub> | W   | Weight* (kg) |
|------|------------|-------|-------|----------------|-----|--------------|
|      | ASME Class | 150RF | 300RF |                |     |              |
| (15) | 161        | 167   | 405   | 305            | 105 | 11           |
| (20) | 172        | 178   |       |                |     | 13           |
| 25   | 181        | 187   |       | 302            | 125 | 15           |
| 32   | 212        | 219   | 457   | 322            | 150 | 19           |
| 40   | 215        | 222   |       |                |     | 21           |
| 50   | 254        | 260   |       | 335            | 195 | 36           |
| 65   | 371        | 377   | 655   | 430            | 280 | 59           |
| 80   | 374        | 384   |       |                |     | 62           |
| 100  | 434        | 450   |       | 468            | 350 | 95           |

( ) No ASME standard exists for ductile cast iron; machined to fit steel flanges

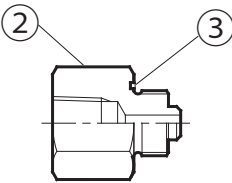
Other standards available, but length and weight may vary

\*Weight is for Class 300 RF

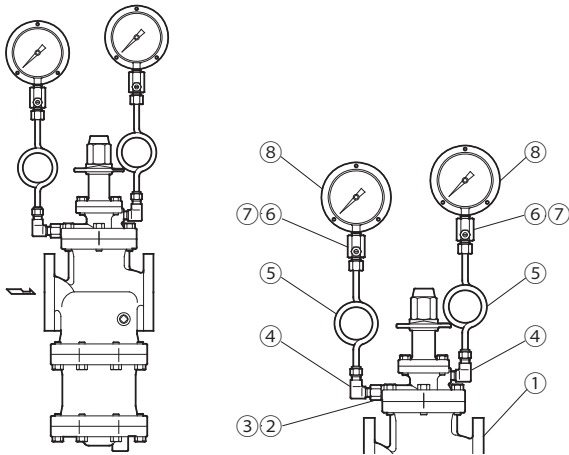
Option

|                     |                                                                                                                                                                                                                                                                                                                            |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 3/8. An elbow is required for pressure gauge installation.<br>Secondary side: Rc(PT) 3/8 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  
ISO 14001

