



Cert. No. LRQ 0963008

ISO 9001

# spirax sarco

**TI-P107-01**  
 CH Issue 10

## DP163, DP163G and DP163Y Pilot Operated

## Pressure Reducing Valves with Stainless Steel Bodies

### Description

The DP163, DP163G and DP163Y pilot operated pressure reducing valves have been manufactured using stainless steel.

### Available types

**DP163** Suitable for steam applications

**DP163G** Is a soft seal version available for compressed air and inert industrial gases. **Note: It is not recommended for oxygen service.**

**DP163Y** Having a lower rate pressure control spring is suitable for steriliser/autoclave applications

### Standards

This product fully complies with the requirements of the European Pressure Equipment Directive 97 / 23 / EC and carries the **CE** mark when so required.

### Certification

This product is available with certification to EN 10204 3.1. **Note:** All certification / inspection requirements must be stated at the time of order placement.

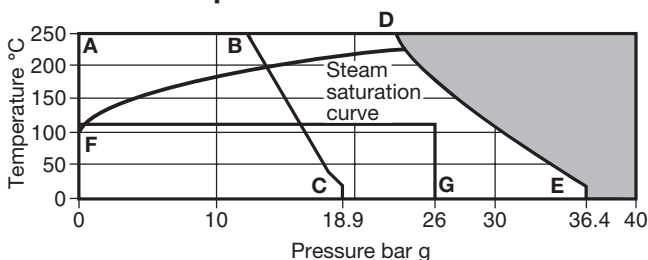
### Sizes and pipe connections

DN15LC - Low Capacity version, DN15, DN20, DN25, DN32, DN40, DN50 and DN80.

Standard flanges: EN 1092 PN25 and PN40, BS 10 Table 'J' and ASME (ANSI) 300.

Available on request: ASME (ANSI) 150 and JIS 20.

### Pressure / temperature limits



 The product **must not** be used in this region.

**A-D-E** Flanged EN 1092 PN40, BS 10 Table J and ASME (ANSI) 300.

**A-B-C** Flanged ASME (ANSI) 150.

**F-G** DP163G limited to 120°C @ 26 bar g.

**Note:** Two colour coded pressure adjustment springs are available for the following downstream pressure ranges:

**Red** 0.2 bar g to 17 bar g

**Grey** 16.0 bar g to 21 bar g

**Yellow** 0.2 bar g to 3.0 bar g (DP163Y only)

|  |                  |                    |
|--|------------------|--------------------|
| Body design conditions   | PN40             |                    |
| Maximum design pressure  | <b>A-D-E</b>     | 36.4 bar g @ 20°C  |
|  | <b>A-B-C</b>     | 18.9 bar g @ 20°C  |
| Maximum design temperature   | 250°C @ 24 bar g |                    |
| Minimum design temperature   | -10°C            |                    |
| Maximum upstream pressure for saturated steam service              | <b>A-D-E</b>     | 25 bar g           |
|  | <b>A-B-C</b>     | 14 bar g           |
| Maximum operating temperature                                      | <b>A-D-E</b>     | 250°C @ 24 bar g   |
|  | <b>A-B-C</b>     | 250°C @ 12.1 bar g |
| Minimum operating temperature                                      | 0°C              |                    |
| <b>Note:</b> For lower operating temperatures consult Spirax Sarco |                  |                    |
| Maximum differential pressure                                      | <b>A-D-E</b>     | 25 bar g           |
|  | <b>A-B-C</b>     | 14 bar g           |

Designed for a maximum cold hydraulic test pressure of 60 bar g

**Note:** With internals fitted, test pressure must not exceed 40 bar g

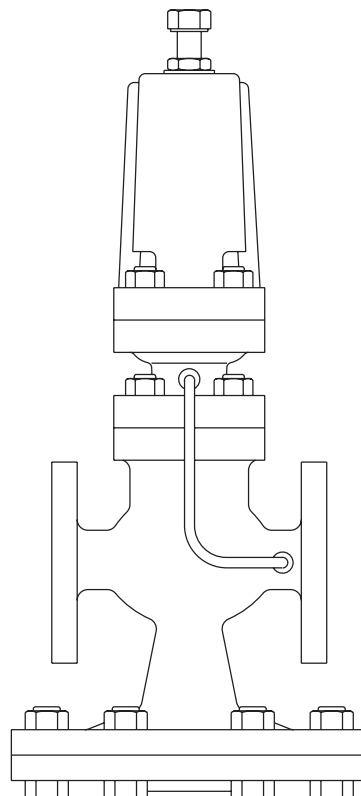
### K<sub>V</sub> values

The K<sub>V</sub> maximum values shown below are **full** capacities and should be used for safety valve sizing purposes only.

| DN15LC | DN15 | DN20 | DN25 | DN32 | DN40 | DN50 | DN80 |
|--------|------|------|------|------|------|------|------|
| 1.0    | 2.8  | 5.5  | 8.1  | 12.0 | 17.0 | 28.0 | 64.0 |

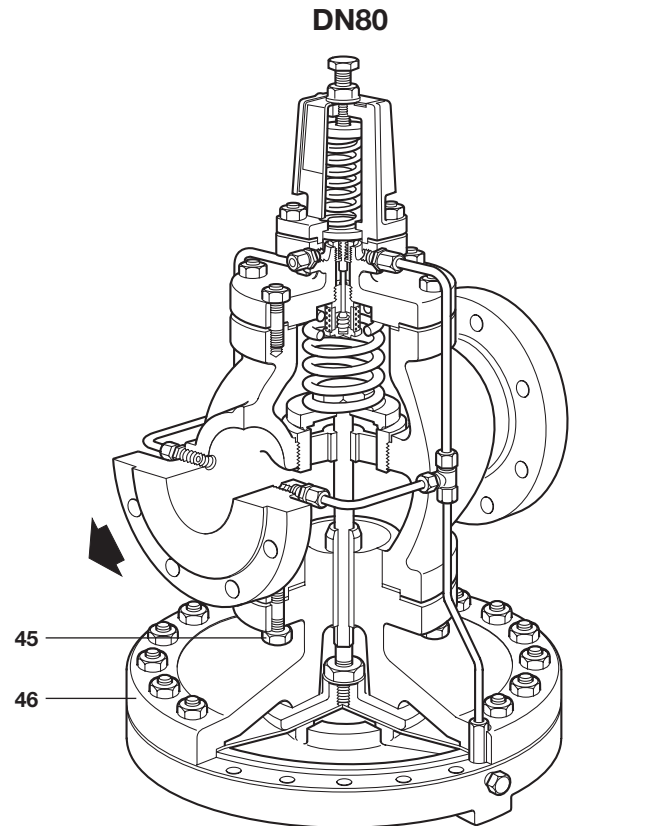
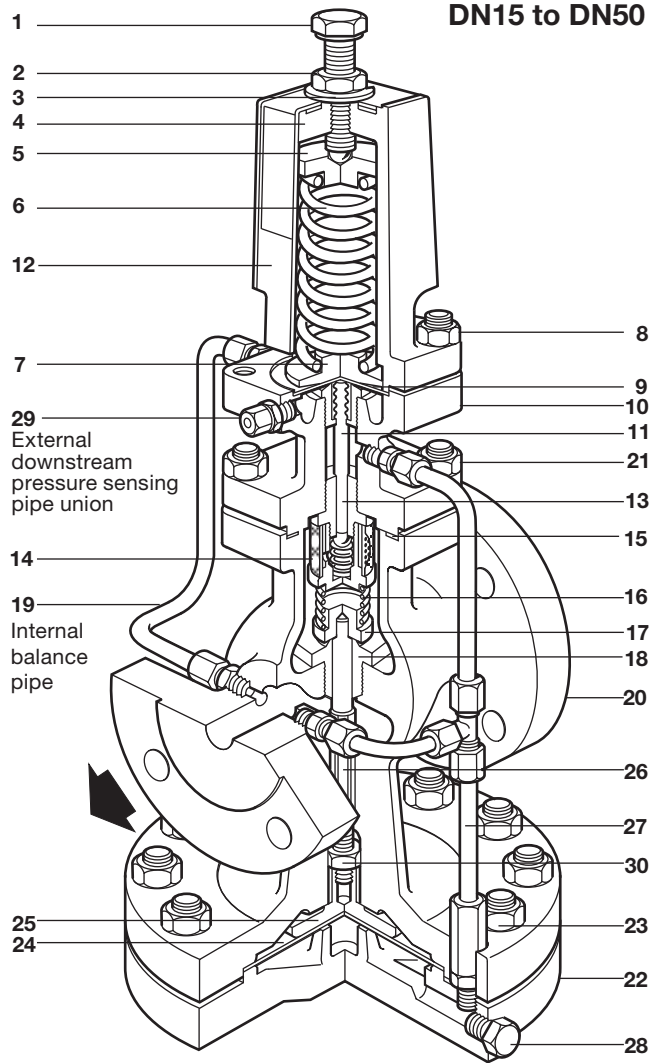
For conversion:  $C_V(\text{UK}) = K_V \times 0.963$        $C_V(\text{US}) = K_V \times 1.156$

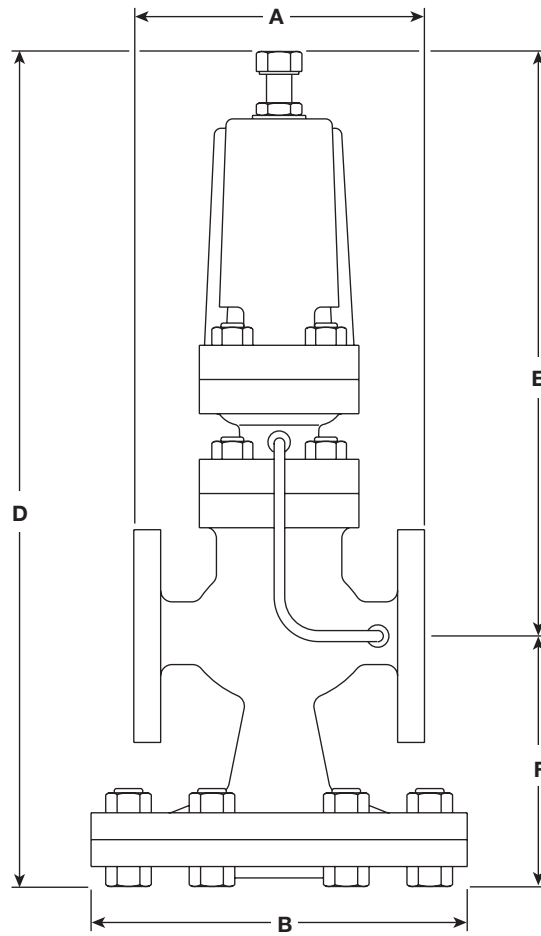
**Note:** Where the internal balance pipe is used the valve capacity will be reduced.



**Materials**

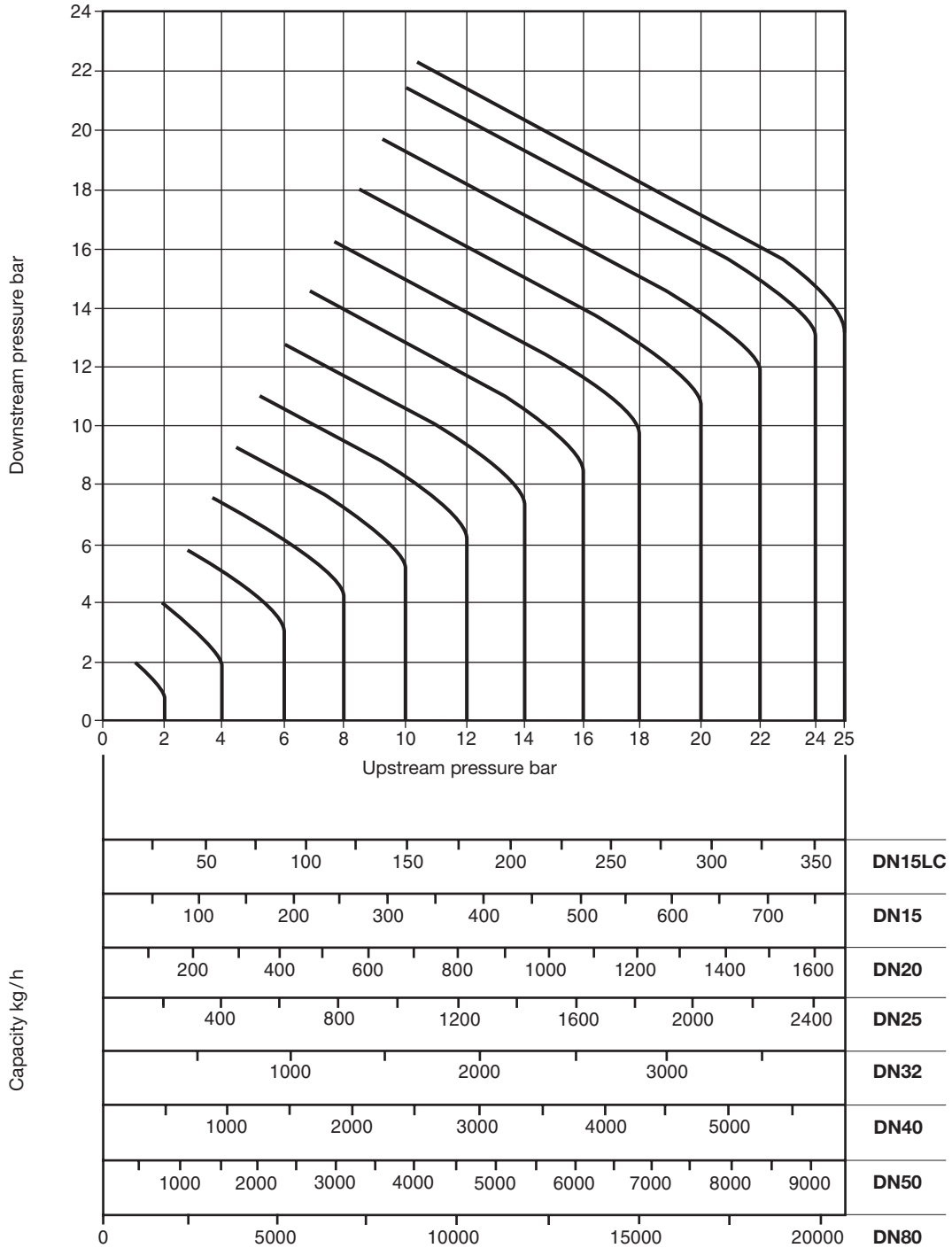
| No. | Part                         | Material   |                              |
|-----|------------------------------|--|------------------------------|
| 1   | Adjustment screw             | Stainless steel                                    | BS 6105 A4/80                |
| 2   | Adjustment lock-nut          | Stainless steel                                    | BS 6105 A4/80                |
| 3   | Washer                       | Stainless steel                                    | BS 1449 304 S16              |
| 4   | Spring housing               | Stainless steel                                    | DIN 3100 316 C12             |
| 5   | Top spring plate             | Stainless steel                                    | BS 970 431 S29               |
| 6   | Pressure adjustment spring   | Stainless steel                                    | BS 2056 302 S25              |
| 7   | Bottom spring plate          | Stainless steel                                    | BS 970 431 S29               |
| 8   | Spring housing               | Securing nuts<br>Stainless steel<br>BS 6105 A4/80  |                              |
|     |                              | Securing studs<br>Stainless steel<br>BS 6105 A4/80 | DN15 to DN50<br>M10 x 30 mm  |
| 9   | Pilot diaphragm              | Stainless steel                                    | BS 1449 316 S31              |
| 10  | Pilot valve housing          | Stainless steel                                    | BS 3100 316 C12              |
| 11  | Pilot valve plunger          | Stainless steel                                    | BS 970 431 S29               |
| 12  | Spring housing cover         | Stainless steel                                    | BS 1449 304 S12              |
| 13  | Pilot valve and seat unit    | Stainless steel                                    | BS 970 431 S29               |
| 14  | Internal strainer            | Stainless steel                                    | BS 1449 304 S16              |
| 15  | Body gasket                  | Stainless steel reinforced exfoliated graphite     |                              |
| 16  | Main valve return spring     | Stainless steel                                    | BS 2056 302 S25              |
| 17  | Main valve                   | Stainless steel                                    | BS 970 431 S29               |
| 18  | Main valve seat              | Stainless steel                                    | BS 970 431 S29               |
| 19  | Balance pipe assembly        | Stainless steel                                    | BS 3605 304 S14              |
| 20  | Main valve body              | Stainless steel                                    | BS 3100 316 C12              |
| 21  | Pilot valve housing          | Securing nuts<br>Stainless steel<br>BS 6105 A4/80  |                              |
|     |                              | Securing studs<br>Stainless steel<br>BS 6105 A4/80 | DN15 and DN20<br>M10 x 25 mm |
|     |                              |  | DN25 to DN50<br>M12 x 30 mm  |
|     |                              |  | DN80<br>M12 x 40 mm          |
| 22  | Main diaphragm chamber       | Cast<br>Stainless steel                            | BS 3100 316 C12              |
| 23  | Main diaphragm               | Securing nuts<br>Stainless steel<br>BS 3692 Gr. 8  |                              |
|     |                              | Securing bolts<br>Stainless steel<br>BS 6105 A4/80 | DN15 and DN20<br>M12 x 50 mm |
|     |                              |  | DN25 and DN32<br>M12 x 60 mm |
|     |                              |  | DN40 and DN50<br>M12 x 65 mm |
|     |                              |  | DN80<br>M12 x 80 mm          |
| 24  | Main diaphragms              | Stainless steel                                    | BS 1449 316 S31              |
| 25  | Main diaphragm plate         | Stainless steel                                    | BS 970 431 S29               |
| 26  | Pushrod                      | Stainless steel                                    | BS 970 431 S29               |
| 27  | Control pipe assembly        | Stainless steel                                    | BS 3605 304 S14              |
| 28  | Plug 1/8" BSP                | Stainless steel                                    | BS 970 431 S29               |
| 29  | Pressure pipe union          | Stainless steel                                    | BS 970 316 S31               |
| 30  | Lock-nut                     | Stainless steel                                    | BS 6105 A4/80                |
| 45  | Body nuts                    | Stainless steel                                    | BS 3692 Gr. 8                |
|     | Body studs                   | Stainless steel                                    | BS 6105 A4/80                |
|     |                              |  | DN80 only<br>M12 x 40 mm     |
| 46  | Upper main diaphragm chamber | Stainless steel                                    | BS 3100 316 C12              |



**Dimensions / weights (approximate) in mm and kg**


| Sizes   | EN 1092 PN40 | ASME 300 | ASME 150 | BS 10 Table J | B   | D   | E   | F   | Weight |
|---------|--------------|----------|----------|---------------|-----|-----|-----|-----|--------|
|         | A            | A        | A        | A             |     |     |     |     |        |
| DN15 LC | 130          | 130      | 122      | 130           | 175 | 405 | 277 | 128 | 15     |
| DN15    | 130          | 130      | 122      | 130           | 175 | 405 | 277 | 128 | 15     |
| DN20    | 150          | 150      | 142      | 150           | 175 | 405 | 277 | 128 | 16     |
| DN25    | 160          | 160      | 156      | 164           | 216 | 440 | 288 | 152 | 23     |
| DN32    | 180          | 183      | 176      | 184           | 216 | 440 | 288 | 152 | 25     |
| DN40    | 200          | 209      | 200      | 209           | 280 | 490 | 305 | 185 | 40     |
| DN50    | 230          | 236      | 230      | 243           | 280 | 490 | 305 | 185 | 42     |
| DN80    | 310          | 319      | 310      | 325           | 350 | 580 | 322 | 258 | 103    |

### Steam capacities chart



**Note**

The capacities quoted above are based on valves fitted with an external pressure sensing pipe. Reliance on the internal balance pipe will mean that capacities may be reduced. In the case of low downstream pressure this reduction could be up to 30% of the valve capacity.

**How to use the chart**

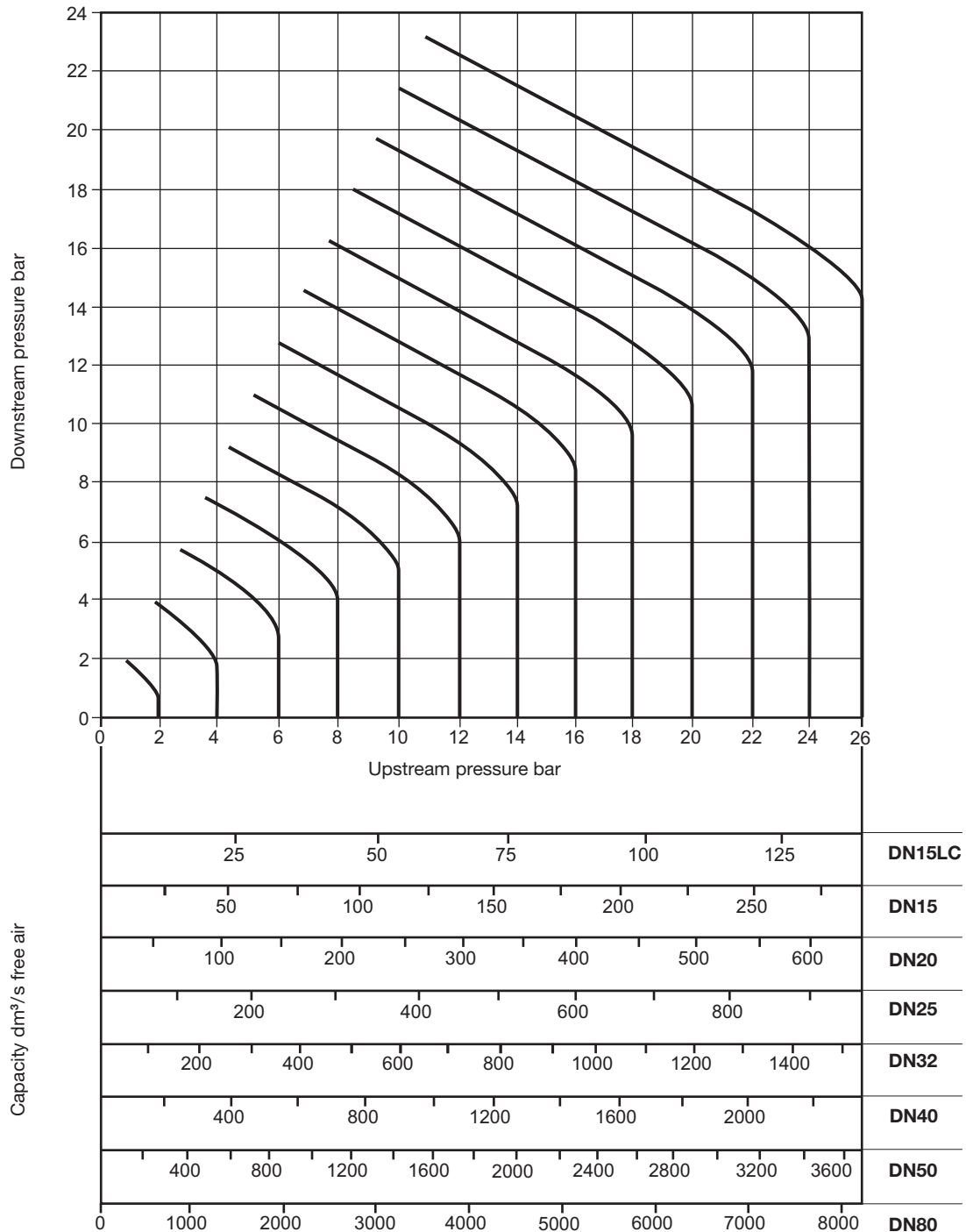
**Saturated steam**

A valve is required to pass 600 kg/h reducing from 6 bar to 4 bar. Find the point at which the curved 6 bar upstream pressure line crosses the horizontal 4 bar downstream pressure line. A perpendicular dropped from this point gives the capacities of all DP sizes under these conditions. A DN32 valve, is the smallest size which will carry the required load.

**Superheated steam**

Because of the higher specific volume of superheated steam a correction factor must be applied to the figure obtained from the chart above. For 55°C of superheat the factor is 0.95 and for 100°C of superheat the factor is 0.9. Using the example given for saturated steam, the DN32 valve would pass  $740 \times 0.95 = 703$  kg/h if the steam had 55°C of superheat. It is still big enough to pass the required load of 600 kg/h.

## Compressed air capacities chart



### How to use the chart

Capacities are given in cubic decimetres of free air per second ( $\text{dm}^3/\text{s}$ ). The use of the capacity chart can be best explained by an example. Required, a valve to pass  $100 \text{ dm}^3/\text{s}$  of free air reducing from 12 bar to 8 bar.

Find the point at which the curved 12 bar upstream pressure line crosses the horizontal 8 bar downstream pressure line. A perpendicular dropped from this point shows that whereas a DN15LC valve will only pass  $57 \text{ dm}^3/\text{s}$  and is therefore not large enough, a DN15 valve will pass approximately  $120 \text{ dm}^3/\text{s}$  under these conditions and is the correct valve size to choose.

### Safety information, installation and maintenance

For full details see the Installation and Maintenance Instructions (IM-P006-07) supplied with the product.

#### Installation note:

The valve should be installed in a horizontal pipeline with the direction of flow as indicated by the arrow on the valve body.

### How to order

**Example:** 1 off Spirax Sarco DN32 DP163 pilot operated pressure reducing valve fitted with a red pressure adjustment spring and having flanged EN 1092 PN25 connections.

## Spare parts

### Available spares

|   |               |                   |               |
|---|---------------|-------------------|---------------|
| Maintenance kit   |               |                   |               |
| A stand-by set of spares for general maintenance purposes and covers all spares marked* |               |                   |               |
| * Main diaphragm  | (2 off)       |                   | <b>A</b>      |
| * Pilot diaphragm   | (2 off)       |                   | <b>B</b>      |
| Pilot valve seal assembly   |               |                   | <b>C</b>      |
| * Pilot valve and plunger assembly  |               |                   | <b>D, E</b>   |
| Main valve assembly   |               |                   | <b>F, H</b>   |
| * Main valve return spring  |               |                   | <b>G</b>      |
|   | <b>Red</b>    | DP163 and DP163G  | 0.2 to 17 bar |
| Pressure adjustment spring  | <b>Grey</b>   | DP163 and DP163G  | 16 to 21 bar  |
|   | <b>Yellow</b> | DP163Y and DP163G | 0.2 to 3 bar  |
| * Control pipe assembly   |               |                   | <b>K</b>      |
| * Balance pipe assembly   |               |                   | <b>M, N</b>   |
| * Body gasket   | (packet of 3) |                   | <b>O</b>      |
| Set of spring housing securing studs and nuts   | (set of 4)    |                   | <b>P</b>      |
| Set of pilot valve housing securing studs and nuts                                      | (set of 4)    |                   | <b>Q</b>      |
|   | (set of 10)   | DN15 and DN20     |               |
| Set of diaphragm chamber securing bolts and nuts  | (set of 12)   | DN25 and DN32     | <b>R</b>      |
|   | (set of 16)   | DN40 and DN50     |               |
|   | (set of 20)   | DN80              |               |
| Set of main body studs and nuts (DN80)  | (set of 6)    |                   | <b>T</b>      |
| Pushrod and main diaphragm plate assembly   |               |                   | <b>V</b>      |

### How to order spares

Always order spares by using the description given in the column headed 'Available spares' and state the size and type of pressure reducing valve.

**Example:** 1 - Main valve assembly for a Spirax Sarco DN15 DP163 pressure reducing valve.

**How to fit** - See the Installation and Maintenance Instructions supplied with the pressure reducing valve. Further copies are available on request.

### Interchangeability of spares

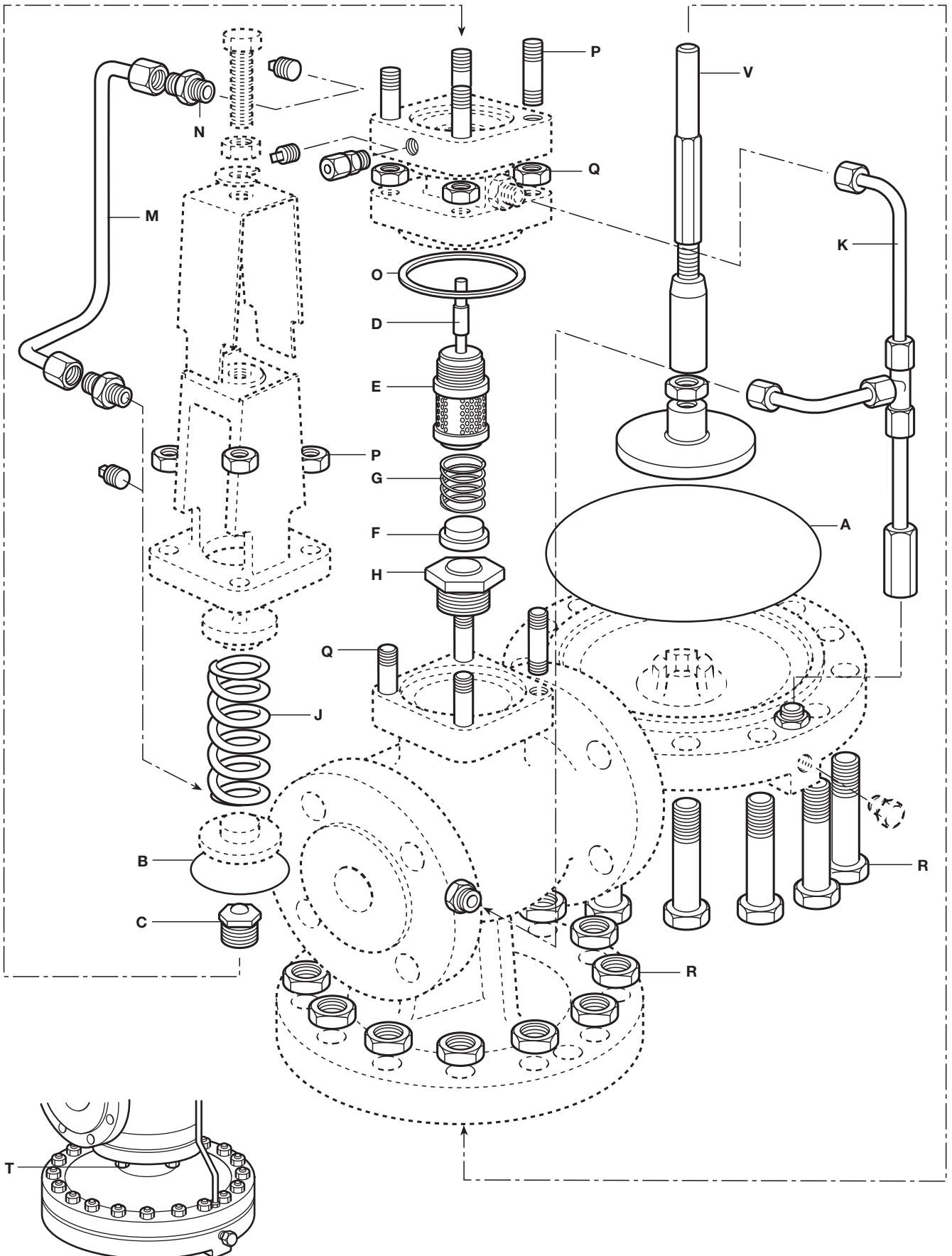
The following table shows how in certain sizes some parts are interchangeable. For example in the line headed 'Main diaphragm' the diaphragm used in the following sizes: DN15LC, DN15 and DN20 is common to these sizes by the letter 'a'. The letter 'b' indicates that sizes DN25 and DN32 use one common diaphragm.

Some parts, particularly pilot and main valve assemblies are specific to particular models e.g 'DP163G'. Interchangeability is therefore restricted to model type for some parts.

† **Please note for storage purposes:** The spare parts marked † are not of the same material as those for the DP143, consequently they are not compatible for interchangeability.

| Size   | **     | DN15 | DN20 | DN25 | DN32 | DN40 | DN50 | DN80 |
|--|--------|------|------|------|------|------|------|------|
|  | DN15LC |      |      |      |      |      |      |      |
| Main diaphragm                                       | a      | a    | a    | b    | b    | c    | c    | d    |
| Pilot diaphragm                                      | a      | a    | a    | a    | a    | a    | a    | a    |
| Pilot valve seal assembly                            | a      | a    | a    | a    | a    | a    | a    | a    |
| Pilot valve and plunger assembly                     | a      | a    | a    | a    | a    | a    | a    | a    |
| Main valve assembly                                  | a      | b    | c    | d    | e    | f    | g    | h    |
| Main valve return spring                             | a      | a    | a    | b    | b    | c    | c    | d    |
| Pressure adjustment spring                           | a      | a    | a    | a    | a    | a    | a    | a    |
| † Control pipe assembly                              | a      | a    | b    | c    | d    | e    | f    | g    |
| † Balance pipe assembly                              | a      | a    | b    | c    | d    | e    | f    | g    |
| † Body gasket  | a      | a    | a    | b    | b    | c    | c    | d    |
| † Set of spring housing securing studs and nuts      | a      | a    | a    | a    | a    | a    | a    | a    |
| † Set of pilot valve housing securing studs and nuts | a      | a    | a    | b    | b    | c    | c    | d    |
| † Set of diaphragm chamber securing bolts and nuts   | a      | a    | a    | b    | b    | c    | c    | d    |
| † Set of main body studs and nuts                    | -      | -    | -    | -    | -    | -    | -    | a    |

\*\* Not available for the DP163G



Arrangement of main diaphragm chamber DN80 size only.