Description
The DP27T and DP27TE are combined pressure/temperature control valves for use on steam applications. They are designed to be used in conjunction with a 2 m length of capillary which is available separately (other lengths are available on request - see 'Optional extras'). They combine a temperature and pressure pilot valve in one unit. This controls the main valve so that the temperature is maintained while the maximum steam pressure is limited.
A variable rate conical pressure adjustment spring is fitted providing a downstream pressure range of 0.2 - 17 bar g.

Notes:
1. The valve can be supplied with a blank undrilled flange if required.
2. The sensor of the control system will need to be mounted by either a union kit, pocket or wall mounting bracket - see 'Optional extras'.

Available types of valve

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DP27T</td>
<td>Pressure/temperature control</td>
</tr>
<tr>
<td>DT27TE</td>
<td>Pressure/temperature control with electrically operated solenoid valve</td>
</tr>
</tbody>
</table>

Technical data (Solenoid valve)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltages available</td>
<td>230 ±10% Vac or 115 ±10% Vac</td>
</tr>
<tr>
<td></td>
<td>(others available on request)</td>
</tr>
<tr>
<td>Frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Power consumption</td>
<td></td>
</tr>
<tr>
<td>Inrush</td>
<td>45 VA</td>
</tr>
<tr>
<td>Holding</td>
<td>23 VA</td>
</tr>
</tbody>
</table>

For 'Optional extras' - go to page 5
Temperature ranges

<table>
<thead>
<tr>
<th>Range A</th>
<th>16 °C to 49 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range B</td>
<td>38 °C to 71 °C</td>
</tr>
<tr>
<td>Range C</td>
<td>49 °C to 82 °C</td>
</tr>
<tr>
<td>Range D</td>
<td>71 °C to 104 °C</td>
</tr>
<tr>
<td>Range E</td>
<td>93 °C to 127 °C</td>
</tr>
</tbody>
</table>

Sizes and pipe connections

DN15LC - Low Capacity version, DN15, DN20, DN25, DN32, DN40 and DN50 screwed BSP (BS 21 parallel) or NPT (DN15 to DN25 only).

Standard flanges:  
DN15 - DN50 EN 1092 PN25  
DN25 - DN50 BS 10 Table H and ANSI 300  

Available on request:  
DN15 - DN50 JIS 10, JIS 16 and ANSI 150  
DN15 - DN20 BS 10 Table F  
DN15 ANSI 300

Pressure/temperature limits

The product must not be used in this region.

A-D-E Screwed and flanged EN 1092 PN25, ANSI 300, and BS 10 Table H.

A-B-C Flanged ANSI 150.

G-G The DP27TE is limited to 10 bar g @ 190 °C.

<table>
<thead>
<tr>
<th>Body design conditions</th>
<th>PN25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum design pressure</td>
<td></td>
</tr>
</tbody>
</table>
A-D-E 25 bar g @ 120 °C  
A-B-C 17.2 bar g @ 40 °C |
| Maximum design temperature | 232 °C @ 21 bar g |
| Minimum design temperature | -10 °C |
| Maximum upstream pressure for saturated steam service |  
DP27T 17 bar g  
DP27TE 10 bar g |
| Maximum operating temperature |  
DP27T 232 °C @ 17 bar g  
DP27TE 190 °C @ 10 bar g |
| Minimum operating temperature | 0 °C |
| Note: For lower operating temperatures consult Spirax Sarco |
| Maximum differential pressure |  
DP27T 17 bar  
DP27TE 10 bar |
| Designed for a maximum cold hydraulic test pressure of: | 38 bar g |
| Note: With internals fitted, test pressure must not exceed: | 25 bar g |
### Materials

<table>
<thead>
<tr>
<th>No.</th>
<th>Part</th>
<th>Material</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Adjustment screw</td>
<td>Steel</td>
<td>BS 3692 Gr. 8.8</td>
</tr>
<tr>
<td>2</td>
<td>Adjustment lock-nut</td>
<td>Steel</td>
<td>BS 3692 Gr. 8</td>
</tr>
<tr>
<td>3</td>
<td>Spring housing</td>
<td>SG iron</td>
<td>DIN1693 GGG 40.3</td>
</tr>
<tr>
<td>4</td>
<td>Top spring plate</td>
<td>Stainless steel</td>
<td>ASTM A351/A351M CF8M</td>
</tr>
<tr>
<td>5</td>
<td>Pressure adjustment spring</td>
<td>Stainless steel</td>
<td>BS 2056 302 S 25</td>
</tr>
<tr>
<td>6</td>
<td>Bottom spring plate</td>
<td>Hot brass stamping</td>
<td>BS EN 12165 CW617N</td>
</tr>
<tr>
<td></td>
<td>Securing nuts</td>
<td>Steel</td>
<td>BS 3692 Gr. 8</td>
</tr>
<tr>
<td>7</td>
<td>Spring housing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Securing studs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DN15 to DN32</td>
<td>M10 x 95 mm</td>
<td>BS 4439 Gr. 8.8</td>
</tr>
<tr>
<td></td>
<td>DN40 and DN50</td>
<td>M12 x 95 mm</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Pilot diaphragms</td>
<td>Phosphor bronze</td>
<td>BS 2870 PB102 1980</td>
</tr>
</tbody>
</table>

For items 9 to 44, go to page 4
### Materials (cont'd)

<table>
<thead>
<tr>
<th>No.</th>
<th>Part</th>
<th>Material</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Pilot valve chamber</td>
<td>SG iron</td>
<td>DIN 1693 GGG 40.3</td>
</tr>
<tr>
<td>10</td>
<td>Pilot valve plunger</td>
<td>Stainless steel</td>
<td>BS 970 431 S 29</td>
</tr>
<tr>
<td>11</td>
<td>Pilot valve seat with integral seal</td>
<td>Stainless steel + PTFE</td>
<td>BS 970 431 S 29</td>
</tr>
<tr>
<td>12</td>
<td>Pilot valve ball</td>
<td>Stainless steel</td>
<td>AISI 420</td>
</tr>
<tr>
<td>13</td>
<td>Pilot valve spring</td>
<td>Stainless steel</td>
<td>BS 2057 302 S 25</td>
</tr>
<tr>
<td>14</td>
<td>Pilot valve clip</td>
<td>Stainless steel</td>
<td>BS 1449 301 S 21</td>
</tr>
<tr>
<td>15</td>
<td>Pilot filter cap gasket</td>
<td>Stainless steel</td>
<td>BS 1449 316 S 11</td>
</tr>
<tr>
<td>16</td>
<td>Pilot filter cap</td>
<td>Stainless steel</td>
<td>BS 970 431 S 29</td>
</tr>
<tr>
<td>17</td>
<td>Pilot filter element</td>
<td>Brass</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Main valve return spring</td>
<td>Stainless steel</td>
<td>BS 2056 302 S 25</td>
</tr>
<tr>
<td>19</td>
<td>Main valve</td>
<td>Stainless steel</td>
<td>BS 970 431 S 29</td>
</tr>
<tr>
<td>20</td>
<td>Main valve seat</td>
<td>Stainless steel</td>
<td>BS 970 431 S 29</td>
</tr>
<tr>
<td>21</td>
<td>Balance pipe assembly</td>
<td>Copper</td>
<td>BS 2871 C 106 ½H</td>
</tr>
<tr>
<td>22</td>
<td>Main valve body</td>
<td>SG iron</td>
<td>DIN 1693 GGG 40.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Securing nuts</th>
<th>Steel</th>
<th>BS 3692 Gr. 8</th>
</tr>
</thead>
</table>

| 23 | Main body                        | Steel | BS 4439 Gr. 8.8 |
|    | Securing studs                  | DN15 to DN32 M10 x 25 mm |
|    |                                 | DN40 and DN50 M12 x 30 mm |

| 24 | Main diaphragm chamber          | SG iron | DIN 1693 GGG 40.3 |

<table>
<thead>
<tr>
<th>Securing nuts</th>
<th>Steel</th>
<th>BS 3692 Gr. 8</th>
</tr>
</thead>
</table>

| 25 | Main diaphragm                   | Steel | BS 3692 Gr. 8.8 |
|    | Securing studs                  | DN15 to DN32 M12 x 50 mm |
|    |                                 | DN40 and DN50 M12 x 55 mm |

| 26 | Main diaphragms                  | Phosphor bronze | BS 2870 PB 102 |

| 27 | Main diaphragm plate             | Hot brass stamping | BS EN 12165 CW617N |

| 28 | Pushrod                          | Stainless steel   | BS 970 431 S 29  |

| 29 | Control pipe assembly            | Brass and copper  |                |

| 30 | Plug 1/8" BSP                    | Steel             |                |

| 32 | Lock-nut                         | Steel             | BS 3692 Gr. 8  |

| 33 | Solenoid valve                   | Brass             | BS 2874 CZ 121 |

| 34 | Packless gland housing           | Brass             | BS 2874 CZ 122 |
| 35 | Pilot valve plunger              | Phenolic resin    | ISO (BS) PF2C3 |
| 36 | Pilot valve seat ring            | Stainless steel   | BS 970 431 S 29 |
| 37 | Pilot valve closure member       | Stainless steel   | AISI 440 B     |
| 38 | Pilot valve housing              | SG iron           | DIN 1693 GGG 40.3 |

<table>
<thead>
<tr>
<th>Securing nuts</th>
<th>Steel</th>
<th>BS 3692 Gr. 8</th>
</tr>
</thead>
</table>

| 39 | Pilot valve housing              | Steel | BS 4439 Gr. 8.8 |
|    | Securing studs                  | DN15 to DN50 M10 x 25 mm |

| 40 | Locking ring                     | Brass  | BS 2874 CZ 122 |
| 41 | Adjustment head                  | Phenolic resin | ISO (BS) PF2C3 |
| 42 | Adjustment head securing screws  | Cadmium plated | 2 BA x ¼" |
| 43 | Capillary tube                   | Copper PVC covered |                |
| 44 | Sensor                           | Brass   | EN 12451 CW707R H130/170 |
Please note that the pilot valve chamber (9) has been shown out of position to identify items 15, 16 and 17.

Exploded view of item 11

Materials - DP27T/TE
See DP27 items list on pages 3 and 4 for common components

<table>
<thead>
<tr>
<th>No.</th>
<th>Part</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>43</td>
<td>Pilot valve assembly with integral seal</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>Pipe assembly Brass and copper</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Circlip Stainless steel 1.4116</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>Retainer Stainless steel BS 970 431 S 29</td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>Variseal Composite elastomer/stainless steel Turcon T40/AQISI 302</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>Pilot seat Stainless steel + PTFE BS 970 431 S 29</td>
<td></td>
</tr>
</tbody>
</table>
Pressure sensing pipe
The DP27 controls by sensing the downstream pressure through a pressure sensing pipe taken from the union (31) or through the internal balance pipe (21) provided. Fitting is described in the Installation and Maintenance Instructions supplied with the valve.

Optional extras
- **Capillary tubes**: Available in multiples of 2 m up to a maximum of 14 m.
- **Conversion kit**: Comprising of a solenoid valve and the necessary pipe and fittings for converting an existing DP27T to DP27TE.
- **Union kit**: Comprising of union nipple (U), compression ring (V) and a gland nut (W). The union nipple is screwed ¾" BSP.
- **Pockets**: Are available in copper with brass union nipple, mild steel or stainless steel. Union nipple U forms the top of the pocket and carries compression ring V and gland nut W. The union nipple is screwed ¾" BSP. Special long pockets are available having minimum length of 0.5 m and a maximum of 1 m. They are sealed at the top by a rubber bung. Glass pockets are also available complete with bracket and sealed by a rubber bung.
- **Wall mounting bracket**: Inclusive of cover.
### Dimensions/weights (approximate) in mm and kg

| Size   | Screwed | BS 10 H | ANSI 300 | ANSI 150 | JIS 10/16 | Flanged | Weight  |
|--------|---------|---------|-----------|-----------|-----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|        | A       | A1      | A1        | A1        | A1        | B       | D       | F       | G       | Screwed | Flanged |
| DN15LC | 160     | -       | 130       | 126.6     | 117       | 120.2   | 122     | 185     | 404     | 130     | 15.7    | 16.5    |
| DN15   | 160     | -       | 130       | 126.6     | 117       | 120.2   | 122     | 185     | 404     | 130     | 15.7    | 16.5    |
| DN20   | 160     | -       | 150       | -         | 133       | 139.4   | 142     | 185     | 404     | 130     | 15.7    | 17.4    |
| DN25   | 180     | 160     | 160.0     | -         | 160.0     | 152     | 207     | 428     | 148     | 130     | 17.2    | 19.7    |
| DN32   | -       | 180     | 180       | 180.0     | -         | 176.0   | 176     | 207     | 428     | 148     | 130     | -       | 20.7    |
| DN40   | -       | 200     | 200       | 200.0     | -         | 199.0   | 196     | 255     | 473     | 178     | 139     | -       | 32.2    |
| DN50   | -       | 230     | 230       | 230.0     | -         | 228.0   | 222     | 255     | 473     | 178     | 139     | -       | 35.2    |

---

**Union kit**

<table>
<thead>
<tr>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>142</td>
<td>17.5</td>
<td>150</td>
<td>22.3</td>
</tr>
</tbody>
</table>

**Wall mounting**

<table>
<thead>
<tr>
<th>O</th>
<th>P</th>
<th>V</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>195</td>
<td>35</td>
<td>575</td>
<td>117</td>
</tr>
</tbody>
</table>

**Union kit**

**Metal pocket**

**Wall mounting**

**Glass pocket**
**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.
How to use the chart
Capacities are given in cubic decimetres of free air per second (dm$^3$/s). The use of the capacity chart can be best explained by an example. Required, a valve to pass 100 dm$^3$/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 dm$^3$/s and is therefore not large enough, a DN15 valve will pass approximately 120 dm$^3$/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-P470-09) 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 DN20 DP27T pilot operated pressure/temperature control valve having flanged EN 1092 PN25 connections and a temperature range A.
Spare parts

Available spares

Maintenance kit: A stand-by set of spares for general maintenance purposes and covers all spares marked *

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Quantity</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main diaphragm *</td>
<td>(2 off)</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Pilot diaphragms *</td>
<td>(2 off)</td>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Pilot valve assembly *</td>
<td></td>
<td></td>
<td>C, C1</td>
</tr>
<tr>
<td>Pilot valve filter and gasket</td>
<td>(packet of 3 of each)</td>
<td></td>
<td>E, F</td>
</tr>
<tr>
<td>Pilot valve assembly for temperature control unit</td>
<td></td>
<td></td>
<td>B2, C2, D2, E2</td>
</tr>
<tr>
<td>Pilot valve packless gland set *</td>
<td></td>
<td></td>
<td>H2, J2</td>
</tr>
<tr>
<td>Main valve assembly</td>
<td>DN15 to DN50</td>
<td></td>
<td>K, L</td>
</tr>
<tr>
<td>Pushrod and main diaphragm plate assembly</td>
<td></td>
<td></td>
<td>G</td>
</tr>
<tr>
<td>Internal strainer *</td>
<td></td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>Main valve return spring *</td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Pressure adjustment spring</td>
<td>0.2 - 17 bar</td>
<td></td>
<td>O</td>
</tr>
<tr>
<td>Control head (3 pieces)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range A 16 °C to 49 °C</td>
<td></td>
<td></td>
<td>Y, Z</td>
</tr>
<tr>
<td>Range B 38 °C to 71 °C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range C 49 °C to 82 °C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range D 71 °C to 104 °C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range E 93 °C to 127 °C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Union sub assembly (3 pieces)</td>
<td></td>
<td></td>
<td>U</td>
</tr>
<tr>
<td>Control pipe assembly *</td>
<td></td>
<td></td>
<td>P</td>
</tr>
<tr>
<td>Balance pipe assembly</td>
<td></td>
<td></td>
<td>Q</td>
</tr>
<tr>
<td>Body gasket set *</td>
<td>(3 off)</td>
<td></td>
<td>R</td>
</tr>
<tr>
<td>Pilot valve block gasket temperature control unit (3 pieces) *</td>
<td></td>
<td>R1</td>
<td></td>
</tr>
<tr>
<td>Set of spring housing/actuating chamber cover securing studs and nuts</td>
<td>(set of 4)</td>
<td>S</td>
<td></td>
</tr>
<tr>
<td>Set of main body studs and nuts</td>
<td>(set of 4)</td>
<td></td>
<td>T</td>
</tr>
<tr>
<td>Set of diaphragm securing bolts and nuts</td>
<td>Valve sizes: DN15 to DN32 (set of 10)</td>
<td></td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>DN40 to DN50 (set of 12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Set of temperature pilot valve housing securing studs and nuts</td>
<td>(set of 4)</td>
<td>S1</td>
<td></td>
</tr>
<tr>
<td>Set of adjustment head securing screws</td>
<td>(set of 3)</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>Type DP27TE only</td>
<td>Solenoid valve complete</td>
<td></td>
<td>W</td>
</tr>
<tr>
<td></td>
<td>Replacement coil</td>
<td></td>
<td>X1</td>
</tr>
<tr>
<td></td>
<td>Valve seat and core assembly</td>
<td></td>
<td>X2</td>
</tr>
</tbody>
</table>

When ordering state range and length of capillary tube. Normally stocked in capillary lengths of 2 m. Available in multiples of 2 m up to a maximum of 14 m (at extra cost).

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 the pilot operated pressure/temperature control valve.

Example: 1 - Main valve assembly for a Spirax Sarco DN15 Type DP27T pilot operated pressure/temperature control valve.

How to fit: See the Installation and Maintenance Instructions supplied with the product. Further copies are available on request.

For 'Interchangeability of spares' go to page 8.
## 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 screwed valves ¼" and ½" is common to these sizes by the letter 'a', the letter 'c' indicates that one diaphragm is common to the DN40 and DN50 valves. Spares which are marked † are interchangeable with the DP17 and DP27 pressure reducing valves. Spares marked 'o' are interchangeable with the 37D temperature control valve.

<table>
<thead>
<tr>
<th>Size DN</th>
<th>Screwed</th>
<th>Flanged</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>½&quot;LC</td>
<td>½&quot;</td>
</tr>
<tr>
<td>Maintenance kit</td>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>Main diaphragm</td>
<td>†</td>
<td>o</td>
</tr>
<tr>
<td>Pilot diaphragm</td>
<td>†</td>
<td>o</td>
</tr>
<tr>
<td>Pilot valve assembly for pressure control unit</td>
<td>†</td>
<td>o</td>
</tr>
<tr>
<td>Pilot valve filter and gasket</td>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>Pilot valve assembly for temperature control unit</td>
<td>o</td>
<td>a</td>
</tr>
<tr>
<td>Pilot valve packless gland set</td>
<td>o</td>
<td>a</td>
</tr>
<tr>
<td>Main valve assembly</td>
<td>†</td>
<td>o</td>
</tr>
<tr>
<td>Internal strainer</td>
<td>†</td>
<td>o</td>
</tr>
<tr>
<td>Main valve return spring</td>
<td>†</td>
<td>a</td>
</tr>
<tr>
<td>Pressure adjustment spring</td>
<td>†</td>
<td>a</td>
</tr>
<tr>
<td>Control head</td>
<td>o</td>
<td>a</td>
</tr>
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