A Long Experience in Energy Equipment and one Goal: The Customer’s satisfaction.

GAS PRESSURE REGULATORS BP (Low Pressure)
ALPHARD P/BP
Pressure Regulator

Applications
It is designed for use in transmission and distribution networks, as well as commercial and industrial supplies.

Description
The ALPHARD P/BP is a pilot-operated regulator, available with or without an integrated safety shut-off device. The pilot and feeder system supplies constant outlet pressure when the inlet pressure and/or the flow rate varies.

Technical Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inlet pressure range</strong></td>
<td>Pu: up to 20 bar</td>
</tr>
<tr>
<td><strong>Outlet pressure range</strong></td>
<td>Pd: 1 mbar – 20 bar</td>
</tr>
<tr>
<td><strong>Minimal differential pressure</strong></td>
<td>Up: 0,1 bar</td>
</tr>
<tr>
<td><strong>Accuracy class AC</strong></td>
<td>Up to 1</td>
</tr>
<tr>
<td><strong>Closing Pressure class SG</strong></td>
<td>Up to 5</td>
</tr>
<tr>
<td><strong>Accuracy class SSD</strong></td>
<td>AG 1 to AG 10</td>
</tr>
<tr>
<td><strong>Operating temperature</strong></td>
<td>-20°C to +60°C</td>
</tr>
<tr>
<td><strong>Acceptable gases</strong></td>
<td>Natural gas, propane, butane, air, nitrogen and all non-corrosive gases</td>
</tr>
<tr>
<td><strong>Safety devices</strong></td>
<td>Optional built-in SSD, OPSO/UPSO: Over-pressure and under-pressure shut-off device</td>
</tr>
</tbody>
</table>

Sizes & Connections

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sizes</strong></td>
<td>DN 25, 40, 50, 65, 80, 100, 150, 200</td>
</tr>
<tr>
<td><strong>Face To Face dimensions</strong></td>
<td>According to EN334</td>
</tr>
<tr>
<td><strong>Flanges</strong></td>
<td>PN 16, ANSI 150</td>
</tr>
</tbody>
</table>

Materials

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Body</strong></td>
<td>ASTM A352 LCB</td>
</tr>
<tr>
<td><strong>Actuator regulator</strong></td>
<td>Carbon Steel (cataforesis protected), ASTM A350 LF2</td>
</tr>
<tr>
<td><strong>Actuator SSV</strong></td>
<td>Carbon Steel, cataforesis protected</td>
</tr>
<tr>
<td><strong>Sealing parts</strong></td>
<td>NBR rubber/NBR rubber, reinforced fabric</td>
</tr>
<tr>
<td><strong>Trim</strong></td>
<td>Stainless steel</td>
</tr>
</tbody>
</table>
REGULATOR SIZING

To choose the pressure regulator, it is possible to use the following equations, on the basis of flow coefficient Cg:

a) \( \frac{P_u - P_d}{P_u + P_b} \leq 0.5 : \) sub-critical conditions

\[
Q = \frac{13.57}{\sqrt{d \cdot (t_u + 273)}} \cdot C_g \cdot \frac{P_u + P_b}{2} \cdot \sin \left( K_1 \cdot \sqrt[3]{\frac{P_u - P_d}{P_u + P_b}} \right)_{\text{deg}}
\]

b) \( \frac{P_u - P_d}{P_u + P_b} > 0.5 : \) critical conditions

\[
Q = \frac{13.57}{\sqrt{d \cdot (t_u + 273)}} \cdot C_g \cdot \frac{P_u + P_b}{2}
\]

Where:

Q = flow rate in Nmc/h

d = relative density

t_u = gas temperature at the inlet of the regulator in °C

P_u = inlet pressure in barg

P_d = outlet pressure in barg

P_b = ambient atmospheric pressure in barg

K_1 = body shape factor

| FLOW COEFFICIENT AND BODY SHAPE FACTOR OF REGULATOR |
|-----------------------------------------------|---|---|---|---|---|---|---|---|
| **Nominal Diameter (mm)** | 25 | 40 | 50 | 65 | 80 | 100 | 150 | 200 |
| **Nominal Diameter (inches)** | 1” | 1” 1/2 | 2” | 2” 1/2 | 3” | 4” | 6” | 8” (^)
| C_g | 480 | 1250 | 1800 | 2800 | 4200 | 7120 | 14800 | 26000 |
| K_1 | 122 | 122 | 122 | 122 | 122 | 122 | 122 | 122 |

(^) Maximum regulator diameter is 8”x10”.
Operating Principle

- The balance position of the diaphragm, and consequently the opening travel of the valve is determined by the closing spring of the valve and the differential pressure between the outlet pressure and the motorization pressure.
- This pressure is supplied by the pilot unit, connected by a special feeding device to the inlet pressure.
- In this way, the pressure in the upper chamber is compensated and consequently the downstream pressure is controlled.

Configurations

**Figure 1** - Operating diagram of ALP P/BP regulator with SSD built-in.

**Figure 2** - Operating diagram of ALP P/BP passive monitor and SSD built-in.
# Table 1 - Closing group AG of SSD

## AG TABLE FOR SSD

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Spring n°</th>
<th>MIN PRESSURE SET</th>
<th>MAX PRESSURE SET</th>
<th>AG Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Min set</td>
<td>Max set</td>
<td>Δpw</td>
</tr>
<tr>
<td>CA 15</td>
<td>261</td>
<td>1,90</td>
<td>6,50</td>
<td>1,50</td>
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<tr>
<td></td>
<td>262</td>
<td>4,00</td>
<td>12,60</td>
<td>2,00</td>
</tr>
<tr>
<td></td>
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<tr>
<td>CA 30</td>
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<td>1,70</td>
<td>0,40</td>
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<td>1,40</td>
<td>3,00</td>
<td>0,80</td>
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<td>0,32</td>
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<table>
<thead>
<tr>
<th>DN 25</th>
<th>DN 80</th>
<th>DN 40</th>
<th>DN 100</th>
<th>DN 50</th>
<th>DN 150</th>
<th>DN 200</th>
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VALVITALIA reserves the right to change design, specification and materials without notice.
### Table 2 - Spring Range of Regulator ALP P/BP, for Low Outlet Pressure

<table>
<thead>
<tr>
<th>n°</th>
<th>Code</th>
<th>Wire [mm]</th>
<th>Pitch [mm]</th>
<th>Color</th>
<th>RAL</th>
<th>CU120 BP</th>
<th>PIOTING SYSTEM</th>
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<tbody>
<tr>
<td>140</td>
<td>5ML14015</td>
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<td>5</td>
<td>Orange</td>
<td>2613</td>
<td>0,01</td>
<td>0,03</td>
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<tr>
<td>78</td>
<td>5ML07815</td>
<td>1,7</td>
<td>8,5</td>
<td>Mint Green</td>
<td>6029</td>
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<tr>
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<td>5ML01015</td>
<td>2</td>
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<td>Signal Yellow</td>
<td>1023</td>
<td>0,05</td>
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<tr>
<td>77</td>
<td>5ML07715</td>
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<td>7,5</td>
<td>Light Blue</td>
<td>5012</td>
<td>0,1</td>
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<tr>
<td>18</td>
<td>5ML01815</td>
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<td>7,5</td>
<td>Signal Blue</td>
<td>5017</td>
<td>0,3</td>
<td>1</td>
</tr>
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</table>

### Table 3 - Spring Range of Regulator ALP P/BP, for High Outlet Pressure

<table>
<thead>
<tr>
<th>n°</th>
<th>Code</th>
<th>Wire [mm]</th>
<th>Pitch [mm]</th>
<th>Color</th>
<th>RAL</th>
<th>min [bar]</th>
<th>max [bar]</th>
<th>PIOTING SYSTEM</th>
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</thead>
<tbody>
<tr>
<td>297</td>
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<td>10</td>
<td>Orange</td>
<td>2613</td>
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<td>297</td>
<td>5ML29715</td>
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<td>Orange</td>
<td>2613</td>
<td>0,4</td>
<td>1,2</td>
<td>RG 5</td>
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<td>65</td>
<td>5ML06515</td>
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<td>11,5</td>
<td>Mint Green</td>
<td>6029</td>
<td>0,5</td>
<td>1,5</td>
<td>RG 5</td>
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<td>5ML06515</td>
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<td>11,5</td>
<td>Mint Green</td>
<td>6029</td>
<td>1,5</td>
<td>4</td>
<td>RG 2,5</td>
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<td>58</td>
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<td>4,5</td>
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<td>59</td>
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<td>11</td>
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<td>6</td>
<td>15</td>
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<td>20</td>
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<td>20</td>
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<td>Alluminium</td>
<td>9006</td>
<td>11</td>
<td>20</td>
<td>RG 1</td>
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<tr>
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<td>15</td>
<td>Pink</td>
<td>3015</td>
<td>11</td>
<td>20</td>
<td>RG 1</td>
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<td>15,5</td>
<td>Blue-Black</td>
<td>3015</td>
<td>11</td>
<td>20</td>
<td>RG 1</td>
</tr>
</tbody>
</table>
### Table 4 - Regulator dimensions

<table>
<thead>
<tr>
<th>POS.</th>
<th>TYPE</th>
<th>CLASS ANSI</th>
<th>A mm</th>
<th>B mm</th>
<th>C mm</th>
<th>D mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DN 25 - S 380</td>
<td>#150</td>
<td>184</td>
<td>95</td>
<td>330</td>
<td>380</td>
</tr>
<tr>
<td>2</td>
<td>DN 40 - S 380</td>
<td>#150</td>
<td>222</td>
<td>105</td>
<td>340</td>
<td>380</td>
</tr>
<tr>
<td>3</td>
<td>DN 50 - S 380</td>
<td>#150</td>
<td>254</td>
<td>120</td>
<td>355</td>
<td>380</td>
</tr>
<tr>
<td>4</td>
<td>DN 50 - S 470</td>
<td>#150</td>
<td>254</td>
<td>120</td>
<td>370</td>
<td>470</td>
</tr>
<tr>
<td>5</td>
<td>DN 65 - S 380</td>
<td>#150</td>
<td>276</td>
<td>130</td>
<td>365</td>
<td>380</td>
</tr>
<tr>
<td>6</td>
<td>DN 65 - S 640</td>
<td>#150</td>
<td>276</td>
<td>130</td>
<td>400</td>
<td>650</td>
</tr>
<tr>
<td>7</td>
<td>DN 80 - S 380</td>
<td>#150</td>
<td>298</td>
<td>140</td>
<td>375</td>
<td>380</td>
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<td>8</td>
<td>DN 80 - S 640</td>
<td>#150</td>
<td>298</td>
<td>140</td>
<td>410</td>
<td>640</td>
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<td>9</td>
<td>DN 100 - S 380</td>
<td>#150</td>
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<td>160</td>
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<td>DN 150 - S 510</td>
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<td>230</td>
<td>500</td>
<td>510</td>
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<td>12</td>
<td>DN 150 - S 800</td>
<td>#150</td>
<td>451</td>
<td>230</td>
<td>540</td>
<td>800</td>
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<tr>
<td>13</td>
<td>DN 200/250 - S 510</td>
<td>#150</td>
<td>707</td>
<td>310</td>
<td>590</td>
<td>510</td>
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<td>14</td>
<td>DN 200/250 - S 800</td>
<td>#150</td>
<td>707</td>
<td>310</td>
<td>620</td>
<td>800</td>
</tr>
</tbody>
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ALPHARD M
Pressure Regulator

Applications
It is designed for use in transmission and distribution networks, as well as commercial and industrial supplies.

Description
The ALPHARD M is a pressure regulator spring type, suitable for where an immediate response is required. Furthermore it is possible to complete the regulator with the followings accessories:
- built in Safety Shut-Off Device (see safety shut-off device CA for more informations)
- internal and downstream noise control devices.
Moreover with the Top Entry design it is possible to service the regulator without dismantling the body from the line.

Technical Features

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<tr>
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<td>Pu: up to 20 bar</td>
</tr>
<tr>
<td>Outlet pressure range</td>
<td>Pd: 8 mbar – 5 bar for DN 1” - 2”</td>
</tr>
<tr>
<td></td>
<td>8 mbar – 2 bar for DN 2”1/2 - 8”x10”</td>
</tr>
<tr>
<td>Accuracy class AC</td>
<td>Up to 5</td>
</tr>
<tr>
<td>Closing Pressure class SG</td>
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</tr>
<tr>
<td>Actuator SSV</td>
<td>Carbon Steel, cataforesis protected</td>
</tr>
<tr>
<td>Sealing parts</td>
<td>NBR rubber/NBR rubber, reinforced fabric</td>
</tr>
<tr>
<td>Trim</td>
<td>Stainless steel</td>
</tr>
</tbody>
</table>
REGULATOR SIZING

To choose the pressure regulator, it is possible to use the following equations, on the basis of flow coefficient $C_g$:

\[ Q = \frac{13.57}{\sqrt{d \cdot (t_u + 273)}} \cdot C_g \cdot \frac{P_u + P_b}{2} \cdot \sin \left( K_1 \cdot \frac{P_u - P_d}{P_u + P_b} \right)_{\text{deg}} \]

\( a) \quad \frac{P_u - P_d}{P_u + P_b} \leq 0.5 \) : sub-critical conditions

\( b) \quad \frac{P_u - P_d}{P_u + P_b} > 0.5 \) : critical conditions

Where:

$Q$ = flow rate in Nmc/h
$\rho$ = relative density
$t_u$ = gas temperature at the inlet of the regulator in °C
$P_u$ = inlet pressure in barg
$P_d$ = outlet pressure in barg
$P_b$ = ambient atmospheric pressure in barg
$K_1$ = body shape factor

FLOW COEFFICIENT AND BODY SHAPE FACTOR OF REGULATOR

<table>
<thead>
<tr>
<th>Nominal Diameter (mm)</th>
<th>25</th>
<th>40</th>
<th>50</th>
<th>65</th>
<th>80</th>
<th>100</th>
<th>150</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Diameter (inches)</td>
<td>1”</td>
<td>1” 1/2</td>
<td>2”</td>
<td>2” 1/2</td>
<td>3”</td>
<td>4”</td>
<td>6”</td>
<td>8”(*)</td>
</tr>
<tr>
<td>$C_g$</td>
<td>480</td>
<td>1250</td>
<td>1800</td>
<td>2800</td>
<td>4200</td>
<td>7120</td>
<td>14800</td>
<td>26000</td>
</tr>
<tr>
<td>$K_1$</td>
<td>122</td>
<td>122</td>
<td>122</td>
<td>122</td>
<td>122</td>
<td>122</td>
<td>122</td>
<td>122</td>
</tr>
</tbody>
</table>

(*) Maximum regulator diameter is 8”x10”.

Operating Principle

The balance position of the diaphragm and consequently the opening travel of the regulator is acted by the thrust between the outlet pressure in the lower side and the set point spring in the upper side.
The control is also accurate even if happens variation of inlet pressure or/and flow rate.
Configurations

**Figure 3** - Operating diagram of Alphard M regulator with SSD built-in.

**Figure 4** - Operating diagram of Alphard M regulator with Alphard M monitor and SSD built-in.
Refer to table 1 (page 5) to fix the accuracy class AG value and the pressure range of SSD

### Table 5 - Spring Range of Regulator ALP M

<table>
<thead>
<tr>
<th>CODE</th>
<th>N°</th>
<th>DN: 25, 40, 50</th>
<th>280 / 16</th>
<th>370 / 16</th>
<th>450 / 1</th>
<th>370 / 16</th>
<th>640 / 2,5</th>
<th>510 / 5</th>
<th>800 / 2,2</th>
<th>510 / 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SML134IS</td>
<td>134</td>
<td></td>
<td>0.009 - 0.15</td>
<td></td>
<td></td>
<td>0.009 - 0.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SML210IS</td>
<td>210</td>
<td></td>
<td>0.013 - 0.21</td>
<td></td>
<td></td>
<td>0.013 - 0.21</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SML220IS</td>
<td>220</td>
<td></td>
<td>0.021 - 0.30</td>
<td></td>
<td></td>
<td>0.021 - 0.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SML127IS</td>
<td>127</td>
<td></td>
<td>0.030 - 0.36</td>
<td></td>
<td></td>
<td>0.030 - 0.36</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SML207IS</td>
<td>207</td>
<td></td>
<td>0.036 - 0.50</td>
<td></td>
<td></td>
<td>0.036 - 0.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SML094IS</td>
<td>94</td>
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<td>0.050 - 0.68</td>
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<td></td>
<td>0.050 - 0.68</td>
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<td></td>
</tr>
<tr>
<td>SML244HB</td>
<td>244</td>
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<td>0.068 - 0.10</td>
<td></td>
<td></td>
<td>0.068 - 0.10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SML245HB</td>
<td>245</td>
<td></td>
<td>0.104 - 0.14</td>
<td></td>
<td></td>
<td>0.104 - 0.14</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SML206IS</td>
<td>206</td>
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<td>0.149 - 0.25</td>
<td></td>
<td></td>
<td>0.149 - 0.25</td>
<td></td>
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</tr>
<tr>
<td>SML246HB</td>
<td>246</td>
<td></td>
<td>0.215 - 0.28</td>
<td></td>
<td></td>
<td>0.215 - 0.28</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SML247HB</td>
<td>247</td>
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<td>0.259 - 0.31</td>
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<td>0.259 - 0.31</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CODE</th>
<th>N°</th>
<th>DN: 65, 80, 100</th>
<th>0.150 - 0.30</th>
<th>0.150 - 0.30</th>
<th>0.300 - 0.36</th>
<th>0.300 - 0.36</th>
<th>0.518 - 0.746</th>
<th>0.518 - 0.746</th>
<th>0.746 - 0.896</th>
<th>0.746 - 0.896</th>
</tr>
</thead>
<tbody>
<tr>
<td>SML137IS</td>
<td>137</td>
<td></td>
<td>0.150 - 0.30</td>
<td>0.150 - 0.30</td>
<td>0.300 - 0.36</td>
<td>0.300 - 0.36</td>
<td>0.518 - 0.746</td>
<td>0.518 - 0.746</td>
<td>0.746 - 0.896</td>
<td>0.746 - 0.896</td>
</tr>
<tr>
<td>SML158IS</td>
<td>158</td>
<td></td>
<td>0.300 - 0.36</td>
<td>0.300 - 0.36</td>
<td>0.518 - 0.746</td>
<td>0.518 - 0.746</td>
<td>0.746 - 0.896</td>
<td>0.746 - 0.896</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 6 - Regulator dimensions**

![Diagram of regulator dimensions](image-url)
A Long Experience in Energy Equipment and one Goal: The Customer's satisfaction.

Padova Plant.

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