Reducing and Reducing/Relieving Cartridge Valves

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<th>Page</th>
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<td>40</td>
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<td>41</td>
</tr>
</tbody>
</table>
Reducing and Reducing/Relieving Valves

PILOT OPERATED REDUCING

Full Adjustment 5 Turns

- Maximum operating pressure = 350 bar
- Factory pressure setting established at blocked control port (deadhead)
- Control pilot flow = PBBB, PBDB: 0.11 to 0.16 L/min., PBFB: 0.16 to 0.25 L/min., PBHB, PBJB: 0.25 to 0.33 L/min.
- Pressure at port 3 is directly additive to the valve setting at a 1:1 ratio and should not exceed 210 bar.

Performance Curves

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Typical Cartridge Code</th>
<th>Regulated Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 L/min.</td>
<td>PBBB – LAN T-163A</td>
<td>31 19.1 65 67 71</td>
</tr>
<tr>
<td>40 L/min.</td>
<td>PBDB – LAN T-11A</td>
<td>34.9 22.2 64 66 70</td>
</tr>
<tr>
<td>80 L/min.</td>
<td>PBFB – LAN T-2A</td>
<td>34.9 28.6 72 74 78</td>
</tr>
<tr>
<td>160 L/min.</td>
<td>PBHB – LAN T-17A</td>
<td>46 31.8 84 86 90</td>
</tr>
<tr>
<td>320 L/min.</td>
<td>PBJB – LAN T-19A</td>
<td>63.5 41.3 100 104 107</td>
</tr>
</tbody>
</table>

Cartridge Dimensions

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Model Code</th>
<th>Cavity</th>
<th>Installation Torque (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 L/min.</td>
<td>PBBB – LAN T-163A</td>
<td>a 19 1.6 65 67 71</td>
<td>35/40</td>
</tr>
<tr>
<td>40 L/min.</td>
<td>PBDB – LAN T-11A</td>
<td>a 22.2 64 66 70</td>
<td>40/50</td>
</tr>
<tr>
<td>80 L/min.</td>
<td>PBFB – LAN T-2A</td>
<td>a 28.6 72 74 78</td>
<td>60/70</td>
</tr>
<tr>
<td>160 L/min.</td>
<td>PBHB – LAN T-17A</td>
<td>a 31.8 84 86 90</td>
<td>200/215</td>
</tr>
<tr>
<td>320 L/min.</td>
<td>PBJB – LAN T-19A</td>
<td>a 41.3 100 104 107</td>
<td>465/500</td>
</tr>
</tbody>
</table>

OPTION ORDERING INFORMATION

Model Codes printed in Red are Preferred Versions and most readily available

PB * B – **

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Control**</th>
<th>Adjustment Range</th>
<th>Seal</th>
</tr>
</thead>
<tbody>
<tr>
<td>B 20 L/min. *</td>
<td>L Standard Screw</td>
<td>A 7 - 210 bar</td>
<td>N Buna-N</td>
</tr>
<tr>
<td>D 40 L/min.</td>
<td>C Tamper Resistant</td>
<td>B 3.5 - 105 bar</td>
<td>V Viton</td>
</tr>
<tr>
<td>F 80 L/min.</td>
<td>K Handknob</td>
<td>N 4 - 55 bar</td>
<td></td>
</tr>
<tr>
<td>H 160 L/min.</td>
<td></td>
<td>Q 4 - 25 bar</td>
<td></td>
</tr>
<tr>
<td>J 320 L/min.</td>
<td></td>
<td>W 10 - 315 bar</td>
<td></td>
</tr>
</tbody>
</table>

Adjustment Range Options:

All are standard set at 14 bar.

Maximum pressure differentials for spring ranges:

A and B are 210 bar.
N and Q are 140 bar.
W is 550 bar inlet pressure.

** See page 162 for information on Control Options

** Minimum setting 5 bar on all ranges.
Customer may specify pressure setting.

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Reducing and Reducing/Relieving Valves

PILOT OPERATED REDUCING/RELIEVING

Maximum operating pressure = 350 bar
Factory pressure setting established at blocked control port (deadhead)
Control pilot flow = PPDB: 0.11 to 0.16 L/min., PPFB: 0.16 to 0.25 L/min., PPHB, PPJB: 0.25 to 0.33 L/min.
Pressure at port 3 is directly additive to the valve setting at a 1:1 ratio and should not exceed 210 bar.

Performance Curves

- PPDB
- PPFB
- PPHB
- PPJB

Cartridge Dimensions

| Capacity | Typical Cartridge Model Code | Cavity | a | b | L | C | K | Installation
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>40 L/min.</td>
<td>PPDB – LAN</td>
<td>T - 11A</td>
<td>34.9</td>
<td>22.2</td>
<td>64</td>
<td>66</td>
<td>70</td>
<td>40/50</td>
</tr>
<tr>
<td>80 L/min.</td>
<td>PPFB – LAN</td>
<td>T - 2A</td>
<td>34.9</td>
<td>28.6</td>
<td>72</td>
<td>74</td>
<td>78</td>
<td>60/70</td>
</tr>
<tr>
<td>160 L/min.</td>
<td>PPHB – LAN</td>
<td>T - 17A</td>
<td>46</td>
<td>31.8</td>
<td>84</td>
<td>86</td>
<td>90</td>
<td>200/215</td>
</tr>
<tr>
<td>320 L/min.</td>
<td>PPJB – LAN</td>
<td>T - 19A</td>
<td>63.5</td>
<td>41.3</td>
<td>100</td>
<td>104</td>
<td>107</td>
<td>465/500</td>
</tr>
</tbody>
</table>

Option Ordering Information

- Model Codes printed in Red are Preferred Versions and most readily available
- Nominal Capacity
  - D 40 L/min.
  - F 80 L/min.
  - H 160 L/min.
  - J 320 L/min.

- Control**
  - L Standard Screw
  - C Tamper Resistant
  - K Handknob

- Adjustment Range
  - A 7 - 210 bar
  - B 3.5 - 105 bar
  - N 4 - 55 bar
  - Q 4 - 25 bar
  - W 10 - 315 bar

- Seal
  - N Buna-N
  - V Viton

Adjustment Range Options:
- All are standard set at 14 bar.
- Maximum pressure differentials for spring ranges:
  - A and B are 210 bar.
  - N and Q are 140 bar.
  - W is 350 bar inlet pressure.
- Customer may specify pressure setting.

Visit www.sunhydraulics.com for detailed and complete technical information on our full line of products.
Reducing and Reducing/Relieving Valves

DIRECT ACTING REDUCING/RELIEVING

- Maximum operating pressure = 350 bar
- Factory pressure setting established at blocked control port (deadhead)
- Maximum leakage = PRDB: 32.8 cc/min./70 bar, PRFB: 49.2 cc/min./70 bar, PRHB: 65.5 cc/min./70 bar, PRJB: 81.9 cc/min./70 bar.
- Pressure at port 3 is directly additive to the valve setting at a 1:1 ratio and should not exceed 210 bar.
- All spring ranges are capable of operating with 350 bar inlet pressure.

OPTION ORDERING INFORMATION

Model Codes printed in Red are Preferred Versions and most readily available

Visit www.sunhydraulics.com for detailed and complete technical information on our full line of products.
PILOT OPERATED REDUCING/RELIEVING, EXTERNALLY DRAINED

Performance Curves

- **Maximum operating pressure = 350 bar**
- **Factory pressure setting established at blocked control port (deadhead)**
- **Control pilot flow =** PVDA: 0.11 to 0.16 L/min., PVFA: 0.16 to 0.25 L/min., PVHA, PVJA: 0.25 to 0.33 L/min.
- **Maximum pressure at port 3 should be limited to 210 bar.**
- **Pressure on the drain (port 4) is directly additive to the valve setting at a 1:1 ratio and should not exceed 350 bar.**

OPTION ORDERING INFORMATION

Model Codes printed in Red are Preferred Versions and most readily available

<table>
<thead>
<tr>
<th>Cartridge Dimensions</th>
<th>Capacity</th>
<th>Typical Cartridge Model Code</th>
<th>Cavity</th>
<th>a</th>
<th>b</th>
<th>L</th>
<th>C</th>
<th>K</th>
<th>Installation Torque (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>40 L/min.</td>
<td>PVDA – LAN</td>
<td></td>
<td>34,9</td>
<td>22,2</td>
<td>79</td>
<td>81</td>
<td>85</td>
<td>40/50</td>
</tr>
<tr>
<td></td>
<td>80 L/min.</td>
<td>PVFA – LAN</td>
<td></td>
<td>34,9</td>
<td>28,6</td>
<td>88</td>
<td>90</td>
<td>94</td>
<td>60/70</td>
</tr>
<tr>
<td></td>
<td>160 L/min.</td>
<td>PVHA – LAN</td>
<td></td>
<td>46</td>
<td>31,8</td>
<td>100</td>
<td>102</td>
<td>107</td>
<td>200/215</td>
</tr>
<tr>
<td></td>
<td>320 L/min.</td>
<td>PVJA – LAN</td>
<td></td>
<td>63,5</td>
<td>41,3</td>
<td>122</td>
<td>126</td>
<td>129</td>
<td>465/500</td>
</tr>
</tbody>
</table>

**See page 162 for information on Control Options**

Visit www.sunhydraulics.com for detailed and complete technical information on our full line of products.
Reducing and Reducing/Relieving Valves

PILOT OPERATED REDUCING/RELIEVING, VENTABLE

- Maximum operating pressure = 350 bar
- Factory pressure setting established at blocked control port (deadhead)
- Control pilot flow = PVDB: 0.11 to 0.16 L/min., PVFB: 0.16 to 0.25 L/min., PVHB, PVJB: 0.25 to 0.33 L/min.
- Pressure at port 3 is directly additive to the valve setting at a 1:1 ratio and should not exceed 210 bar.
- By controlling the pressure at the vent (port 4), the effective setting of the valve can be controlled below the nominal valve setting.

OPTION ORDERING INFORMATION

Model Codes printed in Red are Preferred Versions and most readily available

Visit www.sunhydraulics.com for detailed and complete technical information on our full line of products.
Reducing and Reducing/Relieving Valves

AIR CONTROLLED, PILOT OPERATED REDUCING

- Pilot ratio, air to hydraulic 1:20
- Maximum operating pressure = 140 bar
- Maximum air pressure should not exceed 10 bar.
- Control pilot flow = PBFC: 0.16 to 0.25 L/min., PBHC, PBJC: 0.25 to 0.33 L/min.
- Maximum pressure differential, inlet to outlet = 210 bar.
- The pressure at port 3 determines the minimum valve setting and should not exceed 70 bar.

OPTION ORDERING INFORMATION

Model Codes printed in Red are Preferred Versions and most readily available

### Cartridge Dimensions

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Cartridge Model Code</th>
<th>Cavity</th>
<th>Cavity</th>
<th>Cavity</th>
<th>Installation Torque (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 L/min.</td>
<td>PBFC – ABN</td>
<td>34.9</td>
<td>28.6</td>
<td>51</td>
<td>60/70</td>
</tr>
<tr>
<td>160 L/min.</td>
<td>PBHC – BBN</td>
<td>46</td>
<td>31.8</td>
<td>-</td>
<td>200/215</td>
</tr>
<tr>
<td>320 L/min.</td>
<td>PBJC – BBN</td>
<td>63.5</td>
<td>41.3</td>
<td>-</td>
<td>465/500</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Control Port</th>
<th>Adjustment Range</th>
<th>Seal</th>
</tr>
</thead>
<tbody>
<tr>
<td>F 80 L/min.</td>
<td>Available in PBFC only</td>
<td>3.5 - 105 bar</td>
<td>N Buna-N</td>
</tr>
<tr>
<td>H 160 L/min.</td>
<td>1/4” NPTF</td>
<td>Pilot Port at end of Cartridge</td>
<td>V Viton</td>
</tr>
<tr>
<td>J 320 L/min.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Available for PBHC, PBJC only

- **B** SAE-4
  - Pilot Port at end of Cartridge

Visit [www.sunhydraulics.com](http://www.sunhydraulics.com) for detailed and complete technical information on our full line of products.
Reducing and Reducing/Relieving Valves

AIR CONTROLLED, PILOT OPERATED REDUCING/RELIEVING

- Pilot ratio, air to hydraulic 1:20
- Maximum operating pressure = 140 bar
- Maximum air pressure should not exceed 10 bar.
- Control pilot flow = PPFC: 0.16 to 0.25 L/min., PPHC, PPJC: 0.25 to 0.33 L/min.
- Maximum pressure differential, inlet to outlet = 210 bar.
- The pressure at port 3 determines the minimum valve setting and should not exceed 70 bar.

### Performance Curves

**PPFC**

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Typical Cartridge Model Code</th>
<th>Cavity</th>
<th>a</th>
<th>b</th>
<th>c</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 L/min</td>
<td>PPFC – ABN</td>
<td>T : 2A</td>
<td>34.9</td>
<td>28.6</td>
<td>51</td>
</tr>
<tr>
<td>160 L/min</td>
<td>PPHC – BBN</td>
<td>T : 17A</td>
<td>46</td>
<td>31.8</td>
<td>-</td>
</tr>
<tr>
<td>320 L/min</td>
<td>PPJC – BBN</td>
<td>T : 19A</td>
<td>63.5</td>
<td>41.3</td>
<td>-</td>
</tr>
</tbody>
</table>

**PPHC**

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Typical Cartridge Model Code</th>
<th>Cavity</th>
<th>a</th>
<th>b</th>
<th>c</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 L/min</td>
<td>PPFC – ABN</td>
<td>T : 2A</td>
<td>34.9</td>
<td>28.6</td>
<td>51</td>
</tr>
<tr>
<td>160 L/min</td>
<td>PPHC – BBN</td>
<td>T : 17A</td>
<td>46</td>
<td>31.8</td>
<td>-</td>
</tr>
<tr>
<td>320 L/min</td>
<td>PPJC – BBN</td>
<td>T : 19A</td>
<td>63.5</td>
<td>41.3</td>
<td>-</td>
</tr>
</tbody>
</table>

**PPJC**

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Typical Cartridge Model Code</th>
<th>Cavity</th>
<th>a</th>
<th>b</th>
<th>c</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 L/min</td>
<td>PPFC – ABN</td>
<td>T : 2A</td>
<td>34.9</td>
<td>28.6</td>
<td>51</td>
</tr>
<tr>
<td>160 L/min</td>
<td>PPHC – BBN</td>
<td>T : 17A</td>
<td>46</td>
<td>31.8</td>
<td>-</td>
</tr>
<tr>
<td>320 L/min</td>
<td>PPJC – BBN</td>
<td>T : 19A</td>
<td>63.5</td>
<td>41.3</td>
<td>-</td>
</tr>
</tbody>
</table>

### Cartridge Dimensions

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Control Port at End of Cartridge</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 L/min</td>
<td>Available in PPFC only</td>
</tr>
<tr>
<td>160 L/min</td>
<td>A 1/4&quot; NPTF</td>
</tr>
<tr>
<td>J 320 L/min</td>
<td>B SAE-4</td>
</tr>
</tbody>
</table>

### Seal

- N Bruna-N
- V Viton

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Reducing and Reducing/Relieving Valves

MODULATING ELEMENT WITH INTEGRAL PILOT CONTROL CAVITY

The -8 control option allows a pilot control valve to be incorporated directly into the end of the modulating element via the T-8A cavity. These pilot control cartridges are sold separately and include electro-proportional, solenoid, air pilot, and hydraulic pilot operation. See Pilot Control Cartridges on page 121.

- Maximum operating pressure = 350 bar
- Control pilot flow = PBDB-8: 0.11 to 0.16 L/min., PBFB-8: 0.16 to 0.25 L/min., PBHB-8, PBJB-8: 0.25 to 0.33 L/min.
- Pressure at port 3 is directly additive to the valve setting at a 1:1 ratio and should not exceed 210 bar.
- Maximum inlet pressure is determined by the bias spring. The D spring is limited to 140 bar maximum differential pressure and the W spring is limited to 350 bar maximum inlet pressure.
- With the -8 control option, the main stage valve should first be installed to the correct torque value. The T-8A pilot control valve should then be installed into the main stage valve to its required torque value.

OPTION ORDERING INFORMATION

Model Codes printed in Red are Preferred Versions and most readily available

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Reducing and Reducing/Relieving Valves

3-WAY, MODULATING ELEMENT WITH INTEGRAL PILOT CONTROL CAVITY

The -8 control option allows a pilot control valve to be incorporated directly into the end of the modulating element via the T-8A cavity. These pilot control cartridges are sold separately and include electro-proportional, solenoid, air pilot, and hydraulic pilot operation. See Pilot Control Cartridges on page 121.

The -8 control option allows a pilot control valve to be incorporated directly into the end of the modulating element via the T-8A cavity. These pilot control cartridges are sold separately and include electro-proportional, solenoid, air pilot, and hydraulic pilot operation. See Pilot Control Cartridges on page 121.

### Performance Curves

**Reduced Pressure**

- Maximum operating pressure = 350 bar
- Control pilot flow = PPDB-8: 0.11 to 0.16 L/min., PPFB-8: 0.16 to 0.25 L/min., PPHB-8: 0.25 to 0.33 L/min.
- Pressure at port 3 is directly additive to the valve setting at a 1:1 ratio and should not exceed 210 bar.
- Maximum inlet pressure is determined by the bias spring. The D spring is limited to 140 bar maximum differential pressure and the W spring is limited to 350 bar maximum inlet pressure.
- With the -8 control option, the main stage valve should first be installed to the correct torque value. The T-8A pilot control valve should then be installed into the main stage valve to its required torque value.

### Option Ordering Information

Model Codes printed in Red are Preferred Versions and most readily available.

### Nominal Capacity

- D: 40 L/min.
- F: 80 L/min.
- H: 160 L/min.
- J: 320 L/min.

### T-8A Cavity in hex body for pilot operation (Pilot valve to be ordered separately)

### Minimum Control Pressure

- D: 1.7 bar
- W: 7 bar

### Seal

- N: Buna-N
- V: Viton

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Reducing and Reducing/Relieving Valves

3-WAY, EXTERNALLY DRAINED, MODULATING ELEMENT WITH INTEGRAL PILOT CONTROL CAVITY

The -8 control option allows a pilot control valve to be incorporated directly into the end of the modulating element via the T-8A cavity. These pilot control cartridges are sold separately and include electro-proportional, solenoid, air, pilot, and hydraulic pilot operation. See Pilot Control Cartridges on page 121.

### Performance Curves

**PVDA-8**
- **Reduced Pressure**
- **Drain**
- **Tank**
- **Inlet**
- **Reduced Pressure**

**PVFA-8**
- **Reduced Pressure**
- **Drain**
- **Tank**
- **Inlet**
- **Reduced Pressure**

**PVHA-8**
- **Reduced Pressure**
- **Drain**
- **Tank**
- **Inlet**
- **Reduced Pressure**

**PVJA-8**
- **Reduced Pressure**
- **Drain**
- **Tank**
- **Inlet**
- **Reduced Pressure**

- **Specifications**
  - **Maximum operating pressure**: 350 bar
  - **Control pilot flow**: PVDA-8: 0.11 to 0.16 L/min., PVFA-8: 0.16 to 0.25 L/min., PVHA-8, PVJA-8: 0.25 to 0.33 L/min.
  - **Maximum pressure at port 3**: should be limited to 210 bar.
  - **Pressure on the drain (port 4)**: is directly additive to the valve setting at a 1:1 ratio and should not exceed 350 bar.
  - **Maximum inlet pressure**: is determined by the bias spring. The D spring is limited to 140 bar maximum differential pressure and the W spring is limited to 350 bar maximum inlet pressure.
  - **With the -8 control option**, the main stage valve should first be installed to the correct torque value.
  - The T-8A pilot control valve should then be installed into the main stage valve to its required torque value.

### OPTION ORDERING INFORMATION

Model Codes printed in Red are Preferred Versions and most readily available.

- **PV**
- **A**
- **8**
- **8**

<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Control</th>
<th>Minimum Control Pressure</th>
<th>Seal</th>
</tr>
</thead>
<tbody>
<tr>
<td>D 40 L/min.</td>
<td>T-8A Cavity in hex body for pilot operation (Pilot valve to be ordered separately)</td>
<td>D 1.7 bar</td>
<td>N Buna-N</td>
</tr>
<tr>
<td>F 80 L/min.</td>
<td></td>
<td>W 7 bar</td>
<td>V Viton</td>
</tr>
<tr>
<td>H 160 L/min.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J 320 L/min.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Reducing and Reducing/Relieving Valves

ELECTRO-PROPORTIONAL, DIRECT ACTING REDUCING/RELIEVING

Maximum operating pressure = 350 bar
Maximum valve leakage = 328 cc/min. at deadhead
Pressure at port 3 is directly additive to the valve setting at a 1:1 ratio and should not exceed 210 bar.
For optimum performance, an amplifier with current sensing and adjustable dither should be used.
Dither should be adjustable between 100 - 250 Hz.

Option Ordering Information  Model Codes printed in Red are Preferred Versions and most readily available

Capacity | Typical Cartridge Code | Cavity | a | b | c | d | e (dia.) | Torque (Nm)
--- | --- | --- | --- | --- | --- | --- | --- | ---
20 L/min. | PRDL - MDN | T-11A | 35.1 | 22.2 | 38.1 | 70.1 | 37.3 | 45/50

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NOTE: Coil must be ordered separately. Use 12V DC or 24V DC (Series 770-***) coils only. See page 167.
Reducing and Reducing/Relieving Valves

ELECTRO-PROPORTIONAL, DIRECT ACTING WITH LOW LEAKAGE

- Maximum operating pressure = 350 bar
- Maximum valve leakage = 32.8 cc/min. at deadhead
- Pressure at port 3 is directly additive to the valve setting at a 1:1 ratio and should not exceed 210 bar.
- For optimum performance, an amplifier with current sensing and adjustable dither should be used. Dither should be adjustable between 100 - 250 Hz.

Cartridge Dimensions

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Typical Cartridge Model Code</th>
<th>Cavity</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e (dia.)</th>
<th>Installation Torque (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 L/min.</td>
<td>PRDP – MDN</td>
<td>T-11A</td>
<td>35.1</td>
<td>22.2</td>
<td>38.1</td>
<td>70.1</td>
<td>37.3</td>
<td>45/50</td>
</tr>
</tbody>
</table>

OPTION ORDERING INFORMATION

Model Codes printed in Red are Preferred Versions and most readily available

PRDP – MDN

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