Technical Information

Joysticks

PVRES and PVREL
## Revision history

<table>
<thead>
<tr>
<th>Date</th>
<th>Changed</th>
<th>Rev</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 2015</td>
<td>Converted to Danfoss layout</td>
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PVRES product image

General

PVRES can be used individually or with PVRES accessories built together to form a complete operating panel. PVRES is particularly suited to panel mounting and characterized by:

- finger-tip control
- small dimensions
- low weight
- built-in flow regulation
- accessories such as emergency stop and lamps (see PVRES accessories on page 11)

Two proportional functions

PVRES is supplied with one or two potentiometers. It is thus possible to regulate one function, or two functions at the same time.

Flow adjustment

Two further adjustments per function are built into PVRES. Independently of each other, these limit the signal voltage (US) and thereby the flow from proportional valve ports A and B without the movement of the remote control lever being limited. The oil flow can be infinitely reduced down to 25% of maximum flow.

On-off function

Instead of the proportional functions, PVRES can be supplied with built-in switches. The contact functions can be either normally “ON” or normally “OFF” in neutral position.
PVRES joystick

Characteristic

![Graph showing characteristic of PVRES joystick]

<table>
<thead>
<tr>
<th>Type</th>
<th>Force</th>
<th>Force (lbf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 way</td>
<td>5.7 N</td>
<td>1.29 lbf</td>
</tr>
<tr>
<td>4 way</td>
<td>6.9 N</td>
<td>1.55 lbf</td>
</tr>
</tbody>
</table>

155S170.11
PVRES joystick

Electrical system

Two proportional functions

1. Two proportional functions **without** using neutral position switch

2. Two proportional functions **with** the use of neutral position switch

**Fine line**
- Signal leads

**Thick line**
- Supply leads

**E**
- Emergency stop: An emergency stop should be built into all electrical systems

**F**
- Lead from fault monitoring
PVRES joystick

On-off-on function

3. On-off-on function

**Fine line**
- Signal leads

**Thick line**
- Supply leads

**E**
- Emergency stop: An emergency stop should be built into all electrical systems
PVRES and PVREL Joysticks

PVRES Joystick

Technical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>$U_{DC}$ 11–30 $U_{DC}$</td>
</tr>
<tr>
<td>Max. ripple</td>
<td>5%</td>
</tr>
<tr>
<td>Current consumption</td>
<td>&lt; 80 mA</td>
</tr>
<tr>
<td>Max. force</td>
<td>50 N [11.24 lbf]</td>
</tr>
<tr>
<td>Output voltage (US)</td>
<td>$U_S$ 0.25 → 0.75 $U_{DC}$</td>
</tr>
<tr>
<td>Neutral voltage (US)</td>
<td>$U_S$ 0.5 $U_{DC}$</td>
</tr>
<tr>
<td>Output signal</td>
<td>Max. load Two parallel connected PVEs</td>
</tr>
<tr>
<td>Min. load impedance to 0.5 $U_{DC}$</td>
<td>6 kΩ</td>
</tr>
<tr>
<td>Signal current max.</td>
<td>$U_{DC} = 12$ V ±0.6 mA (resistive)</td>
</tr>
<tr>
<td></td>
<td>$U_{DC} = 24$ V ±1.2 mA</td>
</tr>
<tr>
<td>Neutral position switch max. current</td>
<td>$U_{DC} = 12$ V 2 A</td>
</tr>
<tr>
<td></td>
<td>$U_{DC} = 24$ V 1 A</td>
</tr>
<tr>
<td>On - off - on switch max. current</td>
<td>$U_{DC} = 12$ V 0.7 A</td>
</tr>
<tr>
<td></td>
<td>$U_{DC} = 24$ V 0.35 A</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-30 to +60°C [-22 to 140°F]</td>
</tr>
<tr>
<td>Enclosure to IEC 529</td>
<td>Over mounting flange IP 44</td>
</tr>
<tr>
<td></td>
<td>Under mounting flange IP 23</td>
</tr>
</tbody>
</table>

PVRE and PVRET must be connected to supply voltage at the same point as PVE.

Code numbers, dimensions, and weight

<table>
<thead>
<tr>
<th>Function</th>
<th>Symbol</th>
<th>Version</th>
<th>Code number</th>
<th>Dimension [mm]</th>
<th>Weight [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><img src="155B167.10" alt="Proportional" /></td>
<td>Standard</td>
<td>155B4210</td>
<td>40 x 80 x 192 [1.57 x 3.15 x 7.56]</td>
<td>0.27 [0.60]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>155B4218</td>
<td>40 x 80 x 135 [1.57 x 3.15 x 5.31]</td>
<td>0.24 [0.53]</td>
</tr>
<tr>
<td>1</td>
<td><img src="155B169.10" alt="Proportional" /></td>
<td>Standard</td>
<td>155B4211</td>
<td>40 x 80 x 235 [1.57 x 3.15 x 9.25]</td>
<td>0.40 [0.88]</td>
</tr>
<tr>
<td>2</td>
<td><img src="155B169.10" alt="Proportional" /></td>
<td>Standard</td>
<td>155B4212</td>
<td>80 x 80 x 192 [3.15 x 3.15 x 7.56]</td>
<td>0.38 [0.84]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>155B4219</td>
<td>80 x 80 x 135 [3.15 x 3.15 x 5.31]</td>
<td>0.32 [0.70]</td>
</tr>
<tr>
<td>1</td>
<td><img src="155B367.10" alt="On-off-on" /></td>
<td>Standard</td>
<td>155B4206</td>
<td>40 x 80 x 192 [1.57 x 3.15 x 7.56]</td>
<td>0.25 [0.55]</td>
</tr>
</tbody>
</table>
PVRES joystick

Dimensions

A, B  Oil flow adjustment
C  Deflection block
D  Flat pin A 6.3 - 0.8
E  Maximum travel for on-off-on version
F  ∅17 hole for PG 11 screwed cable entry
PVRES joystick

Dimensions

A, B  Oil flow adjustment
C  Deflection block
D  Flat pin A 6.3 - 0.8
E  Maximum travel for on-off-on version
F  Ø17 hole for PG 11 screwed cable entry
PVRES accessories

PVRES accessories image

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**General**

PVRES accessories meet the demand for simple installation, monitoring and safety. They also offer the possibility of mounting other components in connection with PVRES where uniform design is desirable.

**Emergency stop module**

The module contains an emergency stop switch of the impact key type $I_{\text{NOM}} = 10$ A.

**Lamp module**

The module contains a green lamp. 12 V and 24 V bulbs are included.

**Spacing and mounting modules**

The modules are used between PVRES remote control units either as empty spacer modules or as mounting modules for switches, lamp indicators, starting keys, etc. The modules are available in widths 40 mm and 80 mm.

**Panel mounting rings**

Panel mounting rings 40 mm and 80 mm are available for PVRES modules.
PVRES accessories

PG 11 Screwed Cable Entry

PG screwed cable entry and locknut, suitable for all PVRES modules.

Code numbers, dimensions, and weight

<table>
<thead>
<tr>
<th>Type</th>
<th>Symbol</th>
<th>Code number</th>
<th>Dimension [mm [in]]</th>
<th>Weight [kg [lb]]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamp module</td>
<td>![lamp module symbol]</td>
<td>155B4213</td>
<td>40 x 80 [1.57 x 3.15]</td>
<td>0.22 [0.48]</td>
</tr>
<tr>
<td>Emergency stop</td>
<td>![emergency stop symbol]</td>
<td>155B4216</td>
<td>80 x 80 [3.15 x 3.15]</td>
<td>0.33 [0.73]</td>
</tr>
<tr>
<td>Spacer and mounting module</td>
<td>![spacer and mounting module symbol]</td>
<td>155B4214</td>
<td>40 x 80 [1.57 x 3.15]</td>
<td>0.15 [0.33]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>155B4215</td>
<td>80 x 80 [3.15 x 3.15]</td>
<td>0.18 [0.40]</td>
</tr>
<tr>
<td>Panel mounting plate</td>
<td>![panel mounting plate symbol]</td>
<td>155B4876</td>
<td>60 x 100 [2.36 x 3.94]</td>
<td>0.04 [0.09]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>155B4877</td>
<td>100 x 100 [3.94 x 3.94]</td>
<td>0.05 [0.11]</td>
</tr>
<tr>
<td>PG 11 screwed cable entry</td>
<td>![PG 11 symbol]</td>
<td>155B4875</td>
<td></td>
<td>0.01 [0.02]</td>
</tr>
</tbody>
</table>

Dimensions
PVRES accessories

PVRES panel mounting plate
PVREL product image

General

PVREL is an electric remote control lever made in weather-resistant plastic.
PVREL is for easy mounting in operating panels.
PVREL is characterised by:
• IP 67 enclosure
• low operating forces
• robust construction
• small dimensions

Proportional function

The PVREL remote control levers contains a potentiometer for the control of one proportional function.

Variants

The PVREL series contains four variants. These can be ordered with or without neutral position switch.

Standard

Spring-centred remote control lever.
PVREL series basic model.

Hold function

Spring-centred with hold function. The remote control lever functions as the basic model, but by rotating the top of the handle the centre position can be displaced and a constant control signal is given. The remote control lever can still be activated from its set centre position as normal, but when released will return to its set centre point.
PVREL joystick

Neutral lock

Spring-centred with neutral position lock. The neutral position lock can be released by lifting the release ring under the handle. When the lever is returned to neutral position after manoeuvring, the neutral position lock will again engage.

Float position

Spring-centred with float position control. The remote control lever normally has proportional regulation in both directions, but with mechanical limitation in one direction to 3/4 of the normal activation range. The final 1/4 is used for float position control. Access to the float position control is gained by lifting the release ring under the handle and moving the lever out to its float position. Here, on releasing the ring, the remote control lever becomes locked in float position. Return from float position is gained by again lifting the release ring and bringing the lever back to the proportional range.

Installation

Correctly placed, the PVREL can comply with the grade of enclosure IP 67 above the mounting flange.
PVREL joystick

Characteristic

Signal (Us) as a function of the lever angle

\[ \frac{U_s}{U_{DC}} \]

\( \alpha \)

\( 20^\circ \)

\( 20^\circ \)

4.0 N[0.899 lbf]
7.7 N[1.731 lbf]*

2.4 N[0.540 lbf]
3.4 N[0.764 lbf]*

4.0 N[0.899 lbf]
7.7 N[1.731 lbf]*

1558346.10
PVREL joystick

Float position

\[
\frac{U_s}{U_{DC}}
\]

\[\begin{align*}
20^\circ & \quad 0.50 \\
15^\circ & \quad 0.66 \\
18^\circ & \quad 0.75 \\
20^\circ & \quad 0.50
\end{align*}\]

- 4.5 N [1.016 lbf]
- 2.4 N [0.540 lbf]
- 4.0 N [0.88 lbf]
- 4.5 N [1.016 lbf]
PVREL joystick

Electrical system

One proportional function

1. One proportional function without using neutral position switch
2. One proportional function with the use of neutral position switch

Fine line: Signal leads
Thick line: Supply leads
E: Emergency stop: An emergency stop should be built into all electrical systems
F: Lead from fault monitoring
### Technical Data

#### PVREL Joystick

<table>
<thead>
<tr>
<th><strong>Supply Voltage</strong></th>
<th></th>
<th>11–30 U&lt;sub&gt;DC&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Max. Ripple</strong></td>
<td></td>
<td>5%</td>
</tr>
<tr>
<td><strong>Current Consumption</strong></td>
<td></td>
<td>&lt;80 mA</td>
</tr>
<tr>
<td><strong>Max. Force</strong></td>
<td></td>
<td>100 N [22.5 lbf]</td>
</tr>
<tr>
<td><strong>Output Voltage (US)</strong></td>
<td>U&lt;sub&gt;S&lt;/sub&gt;</td>
<td>0.25 → 0.75 U&lt;sub&gt;DC&lt;/sub&gt;</td>
</tr>
<tr>
<td><strong>Neutral Voltage (US)</strong></td>
<td>U&lt;sub&gt;S&lt;/sub&gt;</td>
<td>0.5 U&lt;sub&gt;DC&lt;/sub&gt;</td>
</tr>
<tr>
<td><strong>Output Signal</strong></td>
<td>Max. Load</td>
<td>Two parallel connected PVEs</td>
</tr>
<tr>
<td><strong>Min. Load Impedance to 0.5 • U&lt;sub&gt;DC&lt;/sub&gt;</strong></td>
<td></td>
<td>6 kΩ</td>
</tr>
<tr>
<td><strong>Signal Current Max.</strong></td>
<td>U&lt;sub&gt;DC&lt;/sub&gt; = 12 V</td>
<td>±0.6 mA</td>
</tr>
<tr>
<td></td>
<td>U&lt;sub&gt;DC&lt;/sub&gt; = 24 V</td>
<td>±1.2 mA</td>
</tr>
<tr>
<td><strong>Neutral Position Switch Max. Current</strong></td>
<td>U&lt;sub&gt;DC&lt;/sub&gt; = 12 V</td>
<td>2 A</td>
</tr>
<tr>
<td></td>
<td>U&lt;sub&gt;DC&lt;/sub&gt; = 24 V</td>
<td>1 A</td>
</tr>
<tr>
<td><strong>Ambient Temperature</strong></td>
<td></td>
<td>-30 to +60 °C [-22 to 140 °F]</td>
</tr>
<tr>
<td><strong>Enclosure to IEC 529</strong></td>
<td>Over mounting flange</td>
<td>IP 67</td>
</tr>
<tr>
<td></td>
<td>Under mounting flange with bottom cover 155U2600</td>
<td>IP 65</td>
</tr>
</tbody>
</table>

---

**PVREL must be connected to supply voltage at the same point as PVE.**

### Code Numbers and Weight

<table>
<thead>
<tr>
<th>Function</th>
<th>Symbol</th>
<th>Code Number without Neutral Position Switch</th>
<th>Code Number with Neutral Position Switch</th>
<th>Weight [kg / lb]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring centered</td>
<td><img src="155U342.10" alt="Spring centered symbol" /></td>
<td>155U2601</td>
<td>155U2605</td>
<td>[0.32 / 0.70]</td>
</tr>
<tr>
<td>With detent</td>
<td><img src="155U343.10" alt="With detent symbol" /></td>
<td>155U2602</td>
<td>155U2606</td>
<td>[0.32 / 0.70]</td>
</tr>
<tr>
<td>With neutral position lock</td>
<td><img src="155U344.10" alt="With neutral position lock symbol" /></td>
<td>155U2603</td>
<td>155U2607</td>
<td>[0.36 / 0.79]</td>
</tr>
<tr>
<td>For float position</td>
<td><img src="155U345.10" alt="For float position symbol" /></td>
<td>155U2604</td>
<td>155U2608</td>
<td>[0.36 / 0.79]</td>
</tr>
</tbody>
</table>

---

For installation, all PVREL remote control levers are supplied with O-rings and bolt sets. The bottom cover is not included in the above mentioned code number.
PVREL joystick

Accessories code number and weight

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Code number</th>
<th>Weight kg [lb]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottom cover, including PG-screwed connections for IP 65 under the assembly flange</td>
<td>155U2600</td>
<td>0.025 [0.055]</td>
</tr>
</tbody>
</table>

Dimensions

F  Float position
A  Socket A 6.3-0.8
M  Assembly aperture
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