### Revision history

**Table of revisions**

<table>
<thead>
<tr>
<th>Date</th>
<th>Changed</th>
<th>Rev</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 2019</td>
<td>Rebranded to Danfoss Power Solutions</td>
<td>0101</td>
</tr>
</tbody>
</table>
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Safety instructions

R70 PLUS general safety

The following safety instructions must be read carefully in order to install and use the product properly and to keep it in perfect working condition and to reduce the risk of misuse.

Potential damage to operator and product.
Do not use this product on machines in potentially explosive atmospheres unless the model is ATEX/RATEX certified to do so.

• Strictly adhere to the installation instructions contained in this document.
• Make sure that professional and competent personnel carry out the installation.
• Ensure that all site and prevailing safety regulations are fully respected.
• Make sure that this document is permanently available to the operator and maintenance personnel.
• Keep the transmission key when the set is not in use.
• On starting each working day, check to make sure that the STOP button and other safety measures are working.
• When in doubt, press the STOP button.
• Whenever several sets have been installed, make sure the transmitter is the right one. Identify the machine controlled on the label for this purpose on the transmitter or by using the display (in case it has one).
• Service the equipment periodically.
• When carrying out repairs, only use spare parts from Danfoss.

R70 PLUS safety warnings

Potential damage to operator and product.
Follow the guidelines below to reduce risk of injury to the operator and the product.

• Use the device with the manufacturer’s battery and battery charger (if applicable).
• Only allow qualified personnel to operate the equipment.
• Always set the STOP button in the off position when not in use.
• Always press STOP before plugging in tether cable (if applicable).
• Do not operate product when visibility is limited.
• Make sure product is compatible with the machine.
• Avoid knocking or dropping the product.
• Do not use the product if a failure is detected.

Changes or modifications not approved by Danfoss can void the user’s authority to operate this product.
Safety instructions

Quick reference precautions

Remove the transmission key only when the set is not in use or to deny the access

When in doubt, press the STOP button

Make sure the transmitter works with the machine to be handled

After use set the contact key and the STOP button

Do not use the set when visibility is limited

Avoid knocking or dropping the set
Technical description

R70 PLUS dimensions

*Dimensions in mm*

1. External antenna A60 (433) or A70 (870)

See next page for receiver board description.
Technical description

R70 PLUS hardware description

2. RS232/RS485 socket
3. Power supply
4. INXXX card socket
5. Internal removable EEPROM
6. TR800-CE MCX radio
7. CAN connection
8. BUS termination CAN
9. Signaling intern LEDs
10. Wiring connection
Installation

R70 PLUS receiver installation

The below information describes hazards to be aware of during installation and steps to locate the receiver.

Risk of shock
Completely shut down the machine when installing the receiver.
Check the power supply and shut off the main switch to disconnect the interface cable between the receiver and the machine's electrical box.

1. Find an easily accessible and clear location with a direct vision between the receiver's antenna and the transmitter's working area.

![Diagram of receiver installation](image)

2. Optional: If it is difficult to achieve direct vision between the receiver's antenna and the transmitter's working area, it is recommended to use an extended antenna in a clear location (only for models that allow an antenna).

In areas of high vibration, the use of dampers is advised.

![Diagram of extended antenna](image)

3. Proceed to connect the power supply. Use the connection block diagram provided with the system, where the correspondence between the transmitter maneuvers and the receiver's outputs are detailed.

![Connection block diagram](image)

4. Check if the electrical installation and verify if there's an option to connect the neutral or the ground cable. In that case, don't forget to connect the ground cable.

The use of fireproof or flame retardant cables are recommended for the connection.
Installation

R70 PLUS expansion cards

The R70 PLUS receiver box can be used when there is not enough space for the expansion cards configuration.

The R70 PLUS is set up with the LR72 electronic card and a power supply, if necessary to connect more than two expansion cards.

The software allows to include in the same box up to 53 relays or up to 10 analogue outputs.

The maximum number of expansion cards permitted is detailed in the table below:

<table>
<thead>
<tr>
<th>Expansion card</th>
<th>Slot size</th>
<th>Max. number of expansions</th>
</tr>
</thead>
<tbody>
<tr>
<td>R8CAN</td>
<td>1/2</td>
<td>5</td>
</tr>
<tr>
<td>A1P4RCAN</td>
<td>1/2</td>
<td>5</td>
</tr>
<tr>
<td>INCAN</td>
<td>1/2</td>
<td>5</td>
</tr>
<tr>
<td>IN 0-10V</td>
<td>Direct assembly in LR72 or INCAN cards</td>
<td>-</td>
</tr>
<tr>
<td>IN 0-45P</td>
<td>Direct assembly in LR72 or INCAN cards</td>
<td>-</td>
</tr>
<tr>
<td>IN4D</td>
<td>Direct assembly in LR72 or INCAN cards</td>
<td>-</td>
</tr>
<tr>
<td>A2ICAN</td>
<td>1/4</td>
<td>5</td>
</tr>
<tr>
<td>A2VCAN</td>
<td>1/4</td>
<td>5</td>
</tr>
</tbody>
</table>
Installation

**R70 PLUS internal wiring**

The power cables must be wired and guided form the center of the slot. The rest of the CAN bus wiring can be placed without any restriction.

**Upper slot**

**Bottom slot**

<table>
<thead>
<tr>
<th>Green wire</th>
<th>CAN bus wiring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red wire</td>
<td>Power wiring</td>
</tr>
</tbody>
</table>
## R70 PLUS troubleshooting

<table>
<thead>
<tr>
<th>LED</th>
<th>Characteristic</th>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWER</td>
<td>Green; pulsing</td>
<td>Receiver is starting up</td>
<td>Wait until start-up process is finished</td>
</tr>
<tr>
<td>HARDOCK</td>
<td>Green; continuous</td>
<td>Receiver hardware OK</td>
<td>Operate</td>
</tr>
<tr>
<td></td>
<td>Red; pulsing</td>
<td>EEPROM error; data corruption; CAN bus error (if CANERR activates)</td>
<td>Reprogram EEPROM</td>
</tr>
<tr>
<td></td>
<td>Red; other</td>
<td>Electronic board hardware breakdown</td>
<td>Replace electronic board</td>
</tr>
<tr>
<td>SIGNAL</td>
<td>LED off</td>
<td>No radio signal detected</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LED on + transmitter switched off</td>
<td>Radio channel occupied</td>
<td>Change transmitter’s frequency channel</td>
</tr>
<tr>
<td></td>
<td>LED on + DATA switched off</td>
<td>Radio channel occupied by non Danfoss system</td>
<td>Change transmitter’s frequency channel</td>
</tr>
<tr>
<td>DATA</td>
<td>LED off + SIGNAL LED on</td>
<td>Radio error</td>
<td>Replace radio</td>
</tr>
<tr>
<td></td>
<td>Green; pulsing</td>
<td>Receiving good frames</td>
<td>OK</td>
</tr>
<tr>
<td>ID</td>
<td>LED off + DATA LED on</td>
<td>No valid ID; Danfoss system nearby</td>
<td>If channel not occupied, check chosen ID in the transmitter or reset the receiver</td>
</tr>
<tr>
<td></td>
<td>LED on + SIGNAL LED on + DATA LED on</td>
<td>Valid frames received from the transmitter; correct link</td>
<td>OK</td>
</tr>
<tr>
<td>RELAY</td>
<td>Green</td>
<td>STOP relay activated</td>
<td></td>
</tr>
<tr>
<td>ORDER</td>
<td>Green</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>CAN_RUN</td>
<td>Green; switched on</td>
<td>Operational state</td>
<td>OK</td>
</tr>
<tr>
<td></td>
<td>Green; pulsing</td>
<td>Activating operational state</td>
<td></td>
</tr>
<tr>
<td>CAN_ERR</td>
<td>Red; switched on</td>
<td>CAN bus error</td>
<td>Check CAN connection</td>
</tr>
<tr>
<td></td>
<td>Red; pulsing</td>
<td>No bus connection</td>
<td>Check bus termination resistance</td>
</tr>
<tr>
<td></td>
<td>LED off</td>
<td>Correct communication</td>
<td>OK</td>
</tr>
</tbody>
</table>
Danfoss Power Solutions is a global manufacturer and supplier of high-quality hydraulic and electric components. We specialize in providing state-of-the-art technology and solutions that excel in the harsh operating conditions of the mobile off-highway market as well as the marine sector. Building on our extensive applications expertise, we work closely with you to ensure exceptional performance for a broad range of applications. We help you and other customers around the world speed up system development, reduce costs and bring vehicles and vessels to market faster.

Danfoss Power Solutions – your strongest partner in mobile hydraulics and mobile electrification.

Go to www.danfoss.com for further product information.

We offer you expert worldwide support for ensuring the best possible solutions for outstanding performance. And with an extensive network of Global Service Partners, we also provide you with comprehensive global service for all of our components.