**Technical Information**

# PLUS+1 Mobile Machine Displays
## DP6XXLX Series

**Revision history**

*Table of revisions*

| Date | Changed | Rev |
|---|---|---|
| November 2017 | Minor update | 0903 |
| November 2016 | Updated to Engineering Tomorrow design | 0902 |
| June 2015 | Various minor updates; and corrected product accessory name to: Panel mounting spring clip | IA |
| August 2014 | Converted to Danfoss layout; and various updates | HA |
| March 2013 | Added a note regarding the service tool scan | GA |
| January 2013 | Added monochrome | FA |
| November 2012 | DP610LX input/output options; pin assignments | EA |
| October 2012 | Typo on dimension drawings | DB |
| July 2012 | GPL-License statement, C2 Pin table | DA |
| May 2012 | Model features | CA |
| May 2012 | Typo | BB |
| April 2012 | C4 Pin Function | BA |
| March 2012 | Literature ID number corrected | AB |
| March 2012 | First edition | AA |

## Contents

## Literature references

**DP6XXLX reference literature**

*References*

| Literature title | Literature type | Literature number |
|---|---|---|
| *DP6XXLX Series PLUS+1® Mobile Machine Displays* | Technical Information | L1209297 |
| *DP600LX Series PLUS+1® Mobile Machine Displays* | Data Sheet | L1230993 |
| *DP610LX Series PLUS+1® Mobile Machine Displays* | Data Sheet | L1222550 |
| *DP620LX Series PLUS+1® Mobile Machine Displays* | Data Sheet | L1222211 |
| *PLUS+1® GUIDE Software User Manual* | Operation Manual | 10100824 |

### Technical Information (TI)

A TI is comprehensive information for engineering and service personnel to reference.

### Data Sheet (DS)

A DS is summarized information and parameters that are unique to a specific model.

### PLUS+1® GUIDE User Manual

This user operation manual (OM) details information regarding the PLUS+1® GUIDE tool set that is used to build PLUS+1® applications. This OM covers the following broad topics:

- How to use the PLUS+1® GUIDE graphical application development tool to create machine applications
- How to configure module input and output parameters
- How to download PLUS+1® GUIDE applications to target PLUS+1® hardware modules
- How to upload and download tuning parameters
- How to use the PLUS+1® Service Tool

### Latest version of technical literature

Danfoss product literature is online at: *http://powersolutions.danfoss.com/literature/*

## User liability and safety statements

**OEM responsibility**

The OEM of a machine or vehicle in which Danfoss products are installed has the full responsibility for all consequences that might occur. Danfoss has no responsibility for any consequences, direct or indirect, caused by failures or malfunctions.

- Danfoss has no responsibility for any accidents caused by incorrectly mounted or maintained equipment.
- Danfoss does not assume any responsibility for Danfoss products being incorrectly applied or the system being programmed in a manner that jeopardizes safety.
- All safety critical systems shall include an emergency stop to switch off the main supply voltage for the outputs of the electronic control system. All safety critical components shall be installed in such a way that the main supply voltage can be switched off at any time. The emergency stop must be easily accessible to the operator.

## Overview

PLUS+1® Mobile Machine Displays are designed to provide flexible, expandable, powerful and cost effective total machine management system displays for a wide variety of vehicle applications.

## DP6XXLX Series Displays

DP6XXLX Series Displays are designed to provide mobile machine OEMs with a rugged, high performing color and monochrome display for both in-cab and open usage.

The transmissive, thin film transistor (TFT), high resolution color display with eight soft-keys and six buttons for navigation is user-programmable with PLUS+1® GUIDE (Graphical User Integrated Development Environment).

Use separate mechanical switches to implement critical safety features such as emergency stops.

Communication is done over a Controller Area Network (CAN) system.

### PLUS+1® GUIDE

PLUS+1® GUIDE (Graphical User Integrated Development Environment) is a complete toolbox that generates downloadable applications for all programmable PLUS+1® Compliant products.

A screen editor allows easy development of applications by programmers without formal software development training. The expertise from a software engineer is not needed to find your way around in PLUS+1® GUIDE

### Linux® operating system

DP6XXLX Series Displays contain embedded Linux® operating system software that is copyrighted software licensed under the GPL Version 2.0 or LGPL Version 2.1.

Linux® operating system software is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; Licenses full notice available:

GPL Version 2.0 *http://www.gnu.org/licenses/old-licenses/gpl-2.0.html*

LGPL Version 2.1 *http://www.gnu.org/licenses/old-licenses/lgpl-2.1.html*

As an installer of Linux® operating system you will have your own obligations under the licensing agreements, which may include among other things the obligation to include a copy of these licenses or to include an offer of a physical copy of the source code for such software with your distributions of the equipment. You should carefully review the licenses to determine what your obligations and options may be for your intended use.

Anyone in receipt of this program may obtain the complete corresponding source code from Danfoss for a period of three years after the last shipment of this product and/or spare parts by going on line at *http://www.danfoss.com* or include "source code for DP6XXLX" in your written request to:

PLUS+1® Helpdesk Danfoss (US) Company, 3500 Annapolis Lane North Plymouth, MN 55447 USA

#### Features for the Linux® interface

DP6XXLX Series Displays hardware contain the following features for the Linux® interface:
- The 1st stage of U-Boot boot loader is installed on the system.
- There is a recovery system for reprogramming the DP6XXLX operating system utilizing the PLUS+1® Service Tool.
- Linux® kernel v2.6 with drivers for all standard peripherals.
- To give the developer the possibility to connect to Linux® shell it is enabled by default.

## Ordering information

**Product naming convention**

*DP6XXLX model code*



P200160
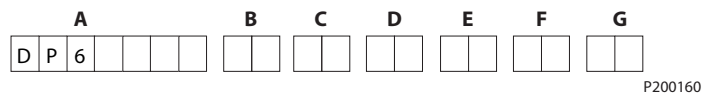
This is not a variant configurator.

*Product configuration model code*

| A | B | C | D | E | F | G | Part number |
|---|---|---|---|---|---|---|-------------|
| DP600LX | 09 | 02 | 06 | 02 | 04 | 00 | 11103049 |
| DP600LX | 09 | 02 | 06 | 02 | 04 | 04 | 11100058 |
| DP610LX | 10 | 02 | 06 | 02 | 04 | 00 | 11103051 |
| DP610LX | 10 | 02 | 06 | 02 | 04 | 04 | 11100060 |
| DP620LX | 10 | 02 | 06 | 02 | 04 | 01 | 11100065 |

*A—Model name*

| Code | Description |
|------|-------------|
| DP600LX | *PLUS+1®* Mobile Machine Displays |
| DP610LX | |
| DP620LX | |

*B—Input/output options*

| Code | Description |
|------|-------------|
| 09 | 2 CAN, 2 DIN/AIN/FreqIn/Rheo/4-20 mA IN, 2 VideoIn |
| 10 | 2 CAN, 2 DIN/AIN/FreqIn/Rheo/4-20 mA IN, 2 AIN/CAN Shield |

*C—Real time clock/low temperature functionality*

| Code | Description |
|------|-------------|
| 02 | RTC |

*D—Flash memory/application key*

| Code | Description |
|------|-------------|
| 06 | 512 MB/without application key |

*E—Application log (vault memory)*

| Code | Description |
|------|-------------|
| 02 | 16 MB |

*F—USB port type*

| Code | Description |
|------|-------------|
| 04 | USB device, host/RS232 in rear |

## Ordering information

*G—Screen size/feature*

| Code | Description |
|------|-------------|
| 00 | 400 x 240 color transflective |
| 01 | 320 x 240 monochrome transmissive |
| 04 | 400 x 240 color transflective with anti-fog treatment |

## Related products

### Assembled mating connector kits

*Danfoss mating connector kit and contents*

| Description | | Part numbers |
|-------------|---|--------------|
| **Mating connector kit** | | 11109743 |
| **Connectors** | Binder 5-pin male (USB cable included) | 10100728 |
| | Binder 8-pin male (USB cable included) | 11109742 |
| | DEUTSCH DTM06-6S 6-pin | 10103494 |
| | DEUTSCH DTM06-12SA 12-pin (16 to 22 AWG) | 10102025 |
| | DEUTSCH DTM06-12SA 12-pin (20 AWG) | 10100944 |
| **Terminal** | Binder and DEUTSCH | 10100743 |
| **Crimp tool** | 16 to 22 AWG | 10100744 |
| | 20 AWG | 10100745 |
| **Locking plug** | 6-pin DEUTSCH WM 6S | 10100742 |
| | 12-pin DEUTSCH WM 12S | 10100741 |
| **IP 67 Seal Kit** | DEUTSCH | 10103495 |
| | Binder | 10103496 |

*DEUTSCH mating connector kits and contents*

| Description | | Part numbers |
|-------------|---|--------------|
| **6-pin connector kit** | | 10103494 |
| DTM06-6S 6-pin connector | | 10100739 |
| **12-pin connector kit (16 to 20 AWG)** | | 10102025 |
| DTM06-12SA 12-pin connector | | 10100738 |
| **12-pin connector kit (20 to 24 AWG)** | | 10100944 |
| DTM06-12SA 12-pin connector | | 10100738 |
| **Terminal Deutsch/Binder** | | 10100743 |
| **Crimp tool** | 16 to 22 AWG | 10100744 |
| | 20 AWG | 10100745 |
| **Locking plug** | 6-pin DEUTSCH WM 6S | 10100742 |
| | 12-pin DEUTSCH WM 12S | 10100741 |
| **IP 67 seal kit** | DEUTSCH | 10103495 |

## Ordering information

**Accessories**

| Description | Part number |
|---|---|
| Panel mounting spring clip | 10101363 |
| USB cable (device only) | 10103497 |
| USB cable (device and host) | 11109121 |
| PLUS+1® GUIDE Professional Software (Includes 1 year of software updates, a single user license, Service and Diagnostic Tool and Screen Editor) | 11179523 (annual renewal with 11179524 to keep the software updates) |

## Inputs/outputs

### Inputs

This series of displays support the following pin types:

- Digital or Analog (DIN/AIN)
- Multifunction (DIN/AIN/FreqIN, Rheo, 4–20 mA)
- Analog or Temperature or Rheostat (AIN/Temp/Rheo)
- Fixed Range Analog or CAN shield (AIN/CAN shield)

This series of displays have input pins that support multiple functions. Pins that support multiple input types are user-configurable using PLUS+1° GUIDE software.

#### Digital/analog

*Low range multifunction input*

| Description | Unit | Minimum | Maximum | Comment |
|---|---|---|---|---|
| Range | mV | 0 | >350 | — |
| Resolution | mV | 0.15 | | 1 mV in software |
| Worst case error | mV | ±(0.15 + U*5/2%) | | — |
| Input impedance | kΩ | 230 ± 5 | | To 0 V |
| Input impedance with pull-down | kΩ | 15 ± 2 | | To 0 V |
| Input impedance with pull-up | kΩ | 15 ± 2 | | To 5 V |
| Input impedance with pull-up/down | kΩ | 7.5 ± 1 | | To 2.5 V |

*Normal range multifunction input*

| Description | Unit | Minimum | Maximum | Comment |
|---|---|---|---|---|
| Range | mV | 0 | >5.5 | — |
| Resolution | mV | 2 | | — |
| Worst case error | mV | ±(20 + U*2%) | | — |
| Input impedance | kΩ | 230 ± 5 | | To 0 V |
| Input impedance with pull-down | kΩ | 15 ± 2 | | To 0 V |
| Input impedance with pull-up | kΩ | 15 ± 2 | | To 5 V |
| Input impedance with pull-up/down | kΩ | 7.5 ± 1 | | To 2.5 V |

*High range multifunction input*

| Description | Unit | Minimum | Maximum | Comment |
|---|---|---|---|---|
| Range | mV | 0 | >60 | — |
| Resolution | mV | 30 | | — |
| Worst case error | mV | ±(300 + U*3.8%) | | — |
| Input impedance | kΩ | 105 ± 5 | | To 0 V |
| Input impedance with pull-down | kΩ | 15 ± 2 | | To 0 V |
| Input impedance with pull-up | kΩ | 15 ± 2 | | To 5 V |
| Input impedance with pull-up/down | kΩ | 7.5 ± 1 | | To 2.5 V |

## Inputs/outputs

### Multifunction

*Frequency input low range (ppu)*

| Description | Unit | Minimum | Maximum | Comment |
|---|---|---|---|---|
| Range | Hz | 0 | 10000 | In steps of 1 Hz |
| Sensitivity | mVpp | 1000 | — | Sinus peak-to-peak |
| Low threshold voltage | mV | 75 | 200 | — |
| High threshold voltage | mV | 150 | 350 | — |
| Input impedance | kΩ | 230 ± 5 | | To 0 V |
| Input impedance with pull-down | kΩ | 15 ± 2 | | To 0 V |
| Input impedance with pull-up | kΩ | 15 ± 2 | | To 5 V |
| Input impedance with pull-up/down | kΩ | 7.5 ± 1 | | To 2.5 V |

*Frequency input normal range (ppu)*

| Description | Unit | Minimum | Maximum | Comment |
|---|---|---|---|---|
| Range | Hz | 0 | 10000 | In steps of 1 Hz |
| Range (phase and quad) | Hz | 0 | 5000 | When measuring phase or quadrature counts |
| Low threshold voltage | V | 1.1 | 2.6 | — |
| High threshold voltage | V | 2.2 | 4.4 | — |
| Input impedance | kΩ | 230 ± 5 | | To 0 V |
| Input impedance with pull-down | kΩ | 15 ± 2 | | To 0 V |
| Input impedance with pull-up | kΩ | 15 ± 2 | | To 5 V |
| Input impedance with pull-up/down | kΩ | 7.5 ± 1 | | To 2.5 V |

*Resistance input*

| Description | Unit | Minimum | Maximum | Comment |
|---|---|---|---|---|
| Range | Ω | 0 | 10000 | In steps of 1 Ω |
| Resolution | | 1 | | @ 0 Ω |
| | | 2 | | @ 1 kΩ |
| | | 42 | | @ 10 kΩ |
| Source current | mA | 0 | 4 | — |

*4–20 mA input*

| Description | Unit | Minimum | Maximum | Comment |
|---|---|---|---|---|
| Range | mA | 0 | 50 | — |
| Resolution | µA | 22 | | — |
| Worst case error | mA | ±(0.2 + I*3%) | | — |
| Input impedance | Ω | 100 ± 3 | | To 0 V |
| Shut-off current | mA | 54 | | — |

## Inputs/outputs

⚠️ **Warning**

This product does not have a Real Time Operating System (RTOS). Frequency inputs are managed by the operating system. Because of this you should avoid using these inputs for any type of Safety Critical closed loop control as the accuracy maybe affected by processor load. They should only be used for non-safety critical related functions.

*High level digital input*

| Description | Unit | Minimum | Maximum | Typical | Comment |
|---|---|---|---|---|---|
| Voltage range | V | 0 | 63 | — | — |
| Input resistance | kΩ | — | — | 105 | No pull-up/down |
| | | | | 13 | With pull-up to 5 V |
| | | | | 13 | Pull-down to ground |
| | | | | 7 | With pull-up and down to 5 V |
| Programmable low threshold voltage | V | 0 | 63 | — | — |
| Programmable high threshold voltage | V | 0 | 63 | — | — |
| Rise time | µs | — | — | 20 | — |
| Fall time | µs | — | — | 20 | — |

*High level analog input*

| Description | Unit | Minimum | Maximum | Typical | Comment |
|---|---|---|---|---|---|
| Voltage range | V | 0 | 63 | — | — |
| Input resistance | kΩ | — | — | 105 | No pull-up/down |
| | | | | 13 | With pull-up to 5 V |
| | | | | 13 | Pull-down to ground |
| | | | | 7 | With pull-up/down to 5 V |
| Analog voltage error (± 300 mV + Uin x 3.4%) | mV | — | — | ± 100 | Uin = 0 V |
| | | | | ± 2760 | Uin = 70 V |
| Bandwidth | kHz | — | — | 7.1 | — |

**Encoder**

The encoder input is only suitable for user interface functions, such as, navigating in menus and adjusting values because there is no guarantee that all pulses are detected and the detected direction can be false. The rate of pulses should be kept at a few tens per second to minimize the loss of detected position changes.

The encoder function samples the A and B signals from the encoder and increments or decrements the counter according to the phase sequence. The counter is incremented/decremented on every low to high and high to low edge of the A signal. Some encoders with detents give a complete pulse between detents and the counter will be incremented/decremented by two for every detent. The counter is incremented when the A signal is the leading phase and decremented in the opposite case.

## Inputs/outputs

### Outputs

*Digital output*

| Description | Unit | Minimum value | Maximum value | Comment |
|---|---|---|---|---|
| Output current range | A | 0 | 1 | |
| Short circuit current | A | — | 2 | |
| Short circuit current peak | A | — | 8 | |
| Saturation voltage | V | — | 1 | At 1 A |
| Current measurement | A | 0 | 2 | |
| Current measurement error | mA | — | ± | At 1 A |

### Video

*Video output*

| Description | Unit | Minimum | Maximum | Typical | Comment |
|---|---|---|---|---|---|
| Short circuit protection | V | 0 | 70 | — | — |
| 12 V output voltage (9 V < Ubat < 70 V) | V | 11.5 | 12.7 | 12 | — |
| 12 V output current | A | — | — | 0.5 | Vbus < 5.25 V |
| 24 V output voltage (9 V < Ubat < 70 V) | V | 23 | 26 | 24 | — |
| 24 V output current | A | — | 0.5 | — | — |
| External video inputs | — | — | — | — | Both NTSC and PAL support |

To power the camera up, it is recommended to use the display as power supply. If using a different power supply, it should meet the specification of the camera in regards of the voltage type and range, the current and voltage amount it can supply to its load, stability of the output voltage and current under varying line and load conditions, operating/storage temperature ranges.

The use of a different power supply for the camera can create "noise" on the signal line which will affect its functionality.

### USB

*USB input/output*

| Description | Unit | Minimum | Maximum | Typical | Comment |
|---|---|---|---|---|---|
| 2.0 full speed | Mbit/s | — | — | 12 | — |
| Vbus input voltage | V | — | — | > 4.4 | — |
| Vbus input resistance | kΩ | — | — | 70 | Vbus < 5.25 V |
| Short circuit protection (No damage) | V | 0 | 70 | — | — |
| Vbus output voltage | V | 4.75 | 5.25 | — | — |
| Vbus output current | A | — | — | 0.5 | — |
| Vbus short current | A | — | 1.1 | — | — |

This series of displays all have USB ports that support memory sticks and computer connection. The display functions as a device when connected to a computer for diagnosis purposes or software

**Inputs/outputs**

download. The display functions as a host when a standard USB memory stick is connected so log-data can be transferred.

Other than supporting memory sticks and computer connection, this display series USB port does not support any other standard computer peripherals.

## Controller Area Network (CAN) specifications

### CAN shield/analog inputs

The CAN shield pin on the unit can be used as a non-configurable analog input.

The values in the following table assumes that software compensates for errors in the analog to digital (A/D) converter.

*CAN shield*

| Description | Unit | Minimum | Maximum | Typical | Comment |
|---|---|---|---|---|---|
| Input impedance | — | — | — | 1 µF + 1 Ω | — |

*Analog input (5 V only)*

| Description | Unit | Minimum | Maximum | Comment |
|---|---|---|---|---|
| Allowed voltage at pin | V | 0 | 70 | — |
| Measuring range | V | 0 | > 5.5 | — |
| Resolution | mV | 2 | | — |
| Worst case error | mV | ±(20 + U*2%) | | — |
| Input impedance | kΩ | 230 ± 5 | | — |

### CAN communication

*CAN communication*

| Description | Unit | Minimum | Maximum | Typical | Comment |
|---|---|---|---|---|---|
| Available baud rates | kBd | 50 | 1000 | 50 | With 120 Ω termination |
| | | | | 100 | |
| | | | | 125 | |
| | | | | 250 | |
| | | | | 500 | |
| | | | | 1000 | |
| Maximum input voltage range | V | 0 | 70 | — | — |

### Gateway channels

PLUS+1® Service Tool can be connected to the CAN bus by using the following gateway channels.

*Gateway channels*

| Channel | Description |
|---|---|
| 0 | DP600 only |
| 1 | DP600 + CAN0 |
| 2 | DP600 + CAN1 |
| 3 | DP600 + CAN0+1 |
| 4 | CAN0 |
| 5 | CAN1 |
| 6 | CAN0+1 |

Selecting channel zero will not increase CAN traffic because of the PLUS+1® Service Tool communication.

## Controller Area Network (CAN) specifications

Another PLUS+1® Service Tool can be connected to the CAN bus by using the following gateway channels.

*Simultaneous usage Gateway channels*

| Channel | Description |
|---------|-------------|
| 0 | CAN[0] and CAN[1] |
| 1 or 4 | CAN[1] |
| 2 or 5 | CAN[0] |
| 3 or 6 | No CAN port |

**Memory**

**NV memory**

> ⊗ **Caution**
>
> Non-volatile (NV) memory data loss is possible when the NV write cycle is not fully completed. When downloading a new application ensure data is not being written to NV memory.

**FRAM Memory**

DP6XXLX Series Displays use Ferroelectric Random Access Memory (FRAM). FRAM has a write endurance of over 100 trillion cycles, which is ideal for datalogging. 2kB is available for application.

**Vault Memory**

DP6XXLX Series Displays have 16 MB of flash vault memory (application logging memory). Application developers use this memory to log machine event data then use the PLUS+1® Service Tool to extract the logged data.

Accessing non-volatile or application log memory can delay the service tool scan.

## Product ratings

### Electrical

*Supply voltage*

| Description | Unit | Minimum | Maximum | Comment |
|---|---|---|---|---|
| DC supply voltage | V | 9 | 63 | With reverse polarity protection |
| DC supply current (circuit board only) | A | 0 | 1 | UBat = 14 V |
| | | 0 | 0.5 | UBat = 28 V |
| Power supply interruption (without rebooting) | ms | — | — | 200 ms |

*5 V reference output*

| Description | Unit | Minimum | Maximum |
|---|---|---|---|
| Output voltage | V | 4.8 | 5.2 |
| Output current | A | 0 | 0.5 |
| Output short circuit | A | — | 1 |
| Short circuit protection | V | 0 | 70 |

⚠ **Warning**

Output pins produce high voltage. High voltage can cause fire and/or electrical shock, if flammable gasses or chemicals are present, can cause an explosion. To protect against product damage and possible injury, do not exceed power supply voltage ratings and do not store this product where flammable gasses or chemicals are present.

### Environmental

*General*

| Description | | Units | Minimum | Maximum | Comment |
|---|---|---|---|---|---|
| Operating temperature | DP600LX and DP610LX | ˚C [˚F] | -30 [-22] | 70 [158] | — |
| | DP620LX | ˚C [˚F] | -20 [-4] | 70 [158] | — |
| Storage temperature | | ˚C [˚F] | -40 [-40] | 85 [185] | — |

⚠ **Warning**

Excessive high/low operating/storage temperatures can damage electronics. Damaged electronics can result in performance failure. To protect against product damage and possible injury, do not operate/store product in a environment that exceeds specified temperature ratings.

### Testing criteria

*Climatic*

| Condition | Rating |
|---|---|
| Cold/heat storage and operation | IEC 60068-2-1, IEC 60068-2-2 |
| Fogging | IEC 60068 |

**Product ratings**

*Climatic  (continued)*

| Condition | Rating |
|---|---|
| Temperature change | IEC 60068-2-14 |
| Moisture ingress | IEC 60529 |

*Chemical*

| Condition | Rating |
|---|---|
| Chemical resistance | ISO 16750-5 |

*Mechanical*

| Condition | Rating |
|---|---|
| Vibration, resonance | IEC 60068-2-6 |
| Vibration, operation | IEC 60068-2-64 |
| Bump | IEC 60068-2-29 |
| Shock | IEC 60068-2-27 |
| Free fall | IEC 60068-2-32 |

## Maintenance guidelines

> ⓘ **Caution**
>
> Warranty will be voided if device is opened.
> Device is not field serviceable. Do not open the device.

**LCD module**

> ⓘ **Caution**
>
> Prolonged exposure to direct intense sunlight can cause premature failure of the LCD module. This risk can be reduced by providing shading or mounting the display at an incline rather than the horizontal.

> ⓘ **Caution**
>
> The protective glass will break if hit with a hard or heavy object. If the protective glass is broken, remove the display from your machine then return the display to Danfoss to be serviced.

Clean the display's housing and protective glass with a clean, soft, damp cloth, or mild dishwashing detergent because abrasive pads or solvents, including alcohol, benzene, and paint thinner can cause scratching and discoloration.

## Installation

### Dimensions

*DP600LX and DP610LX in millimeters [inches]*
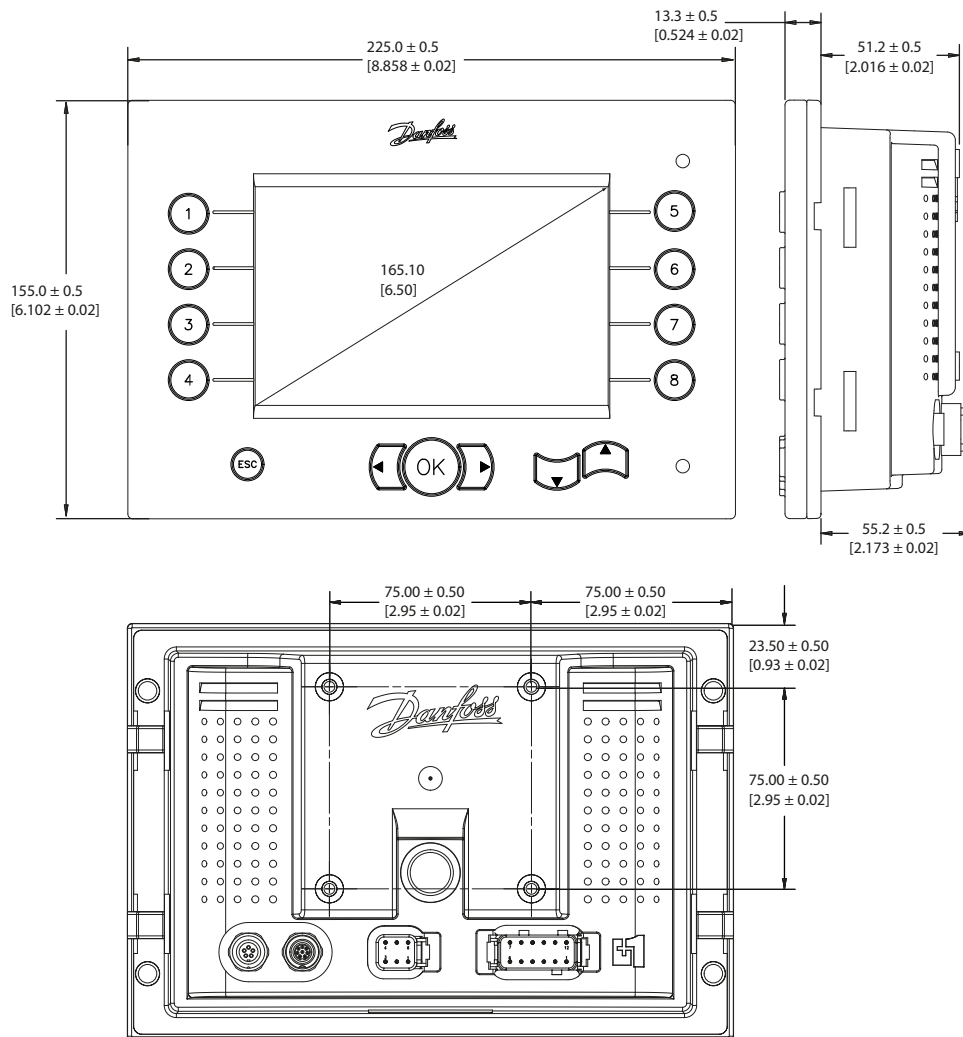


P200095

## Installation

*DP620LX in millimeters [inches]*

13.3 ± 0.5
[0.524 ± 0.02]

225.0 ± 0.5
[8.858 ± 0.02]

51.2 ± 0.5
[2.016 ± 0.02]

155.0 ± 0.5
[6.102 ± 0.02]

144.78
[5.70]

55.2 ± 0.5
[2.173 ± 0.02]

75.00 ± 0.50
[2.95 ± 0.02]

75.00 ± 0.50
[2.95 ± 0.02]

23.50 ± 0.50
[0.93 ± 0.02]

75.00 ± 0.50
[2.95 ± 0.02]
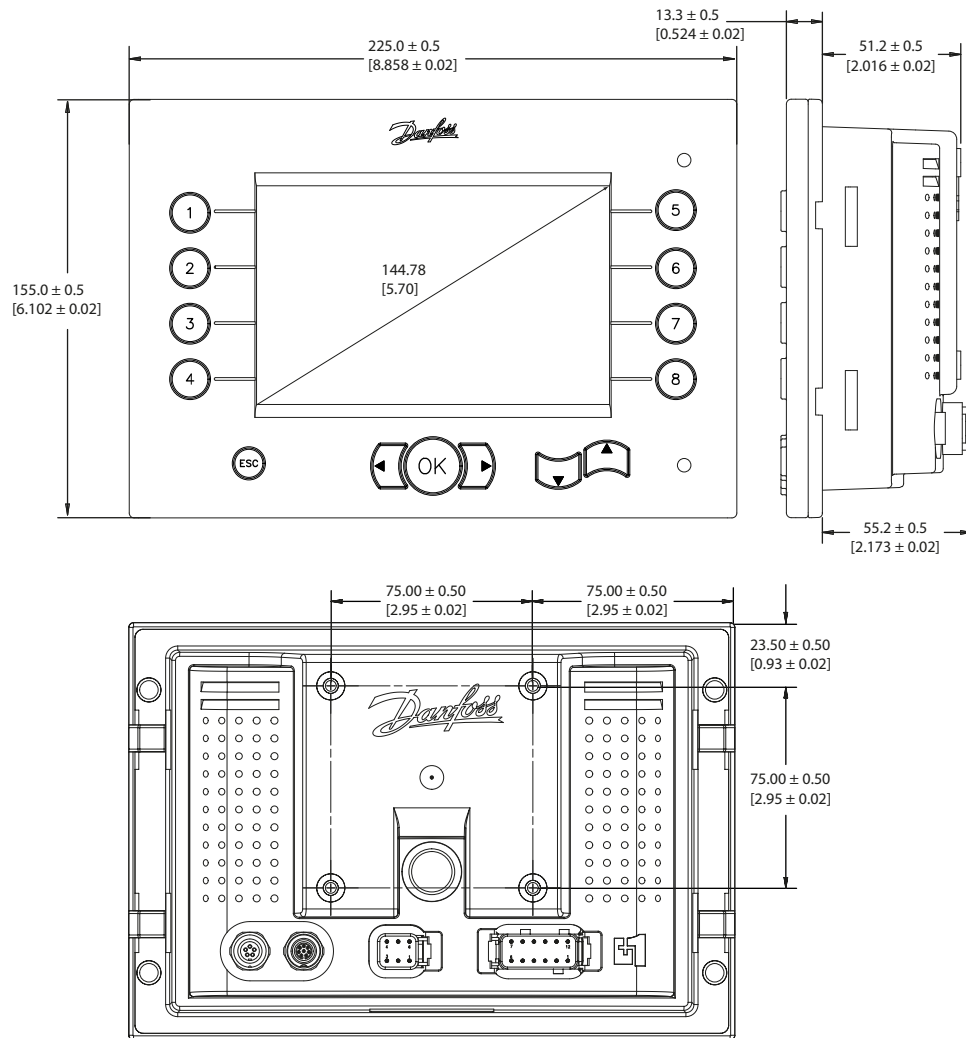
P200096

## Installation

**Two mounting options**

**Flush mounted**

Use the DP6XXLX panel mounting spring clip to flush-mount display into a dashboard.

*Panel cutout in millimeters [inches] and panel mounting spring clip*
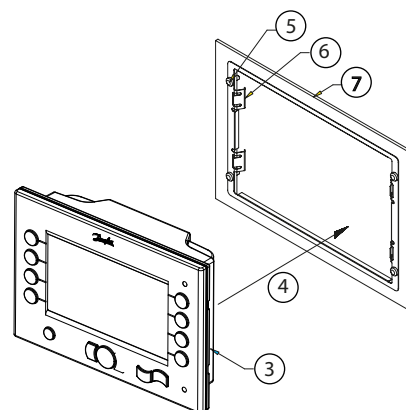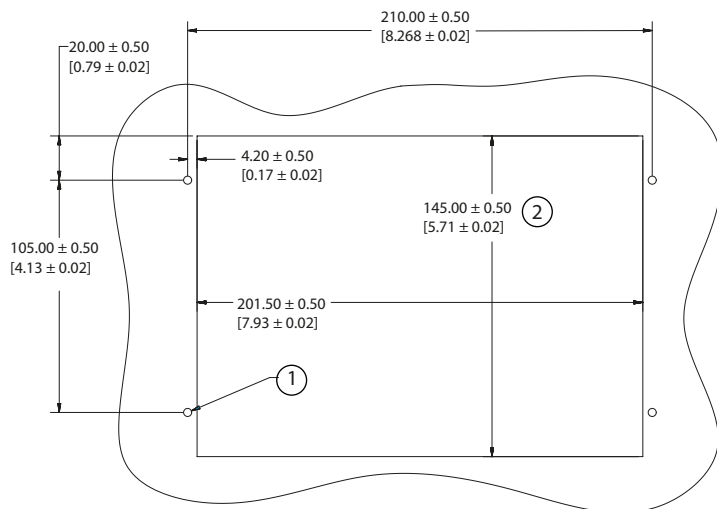


P200164

**1.** 4 holes for M4 x 4 screws

**2.** Panel cutout

**3.** Display assembly

**4.** Snap in

**5.** M4 x 4 screw

**6.** Spring clip

**7.** Panel

**Installation**

### Stand-alone on post

**1.** Mount according to VESA (Video Electronics Standards Association) Mount Standards The VESA hole pattern for this display is: 75.00 mm x 75.00 mm (02.95 in x 02.95 in).

*Post mounting option (mm [in])*
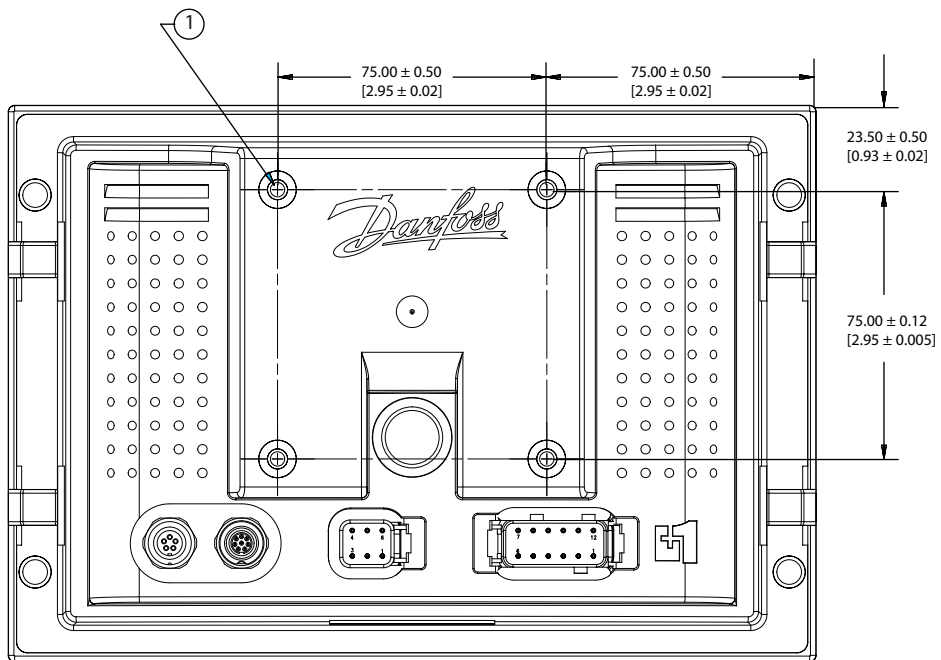
## Installation

4 x hole for M4 screw x 0.7 mm (0.03 in) x 11 mm (0.43 in) maximum depth

**2.** Disconnect your machine's battery power before connecting power and signal cables to the display.

### Pin assignments

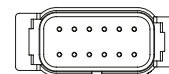*DP6XXLX series, pin assignments*
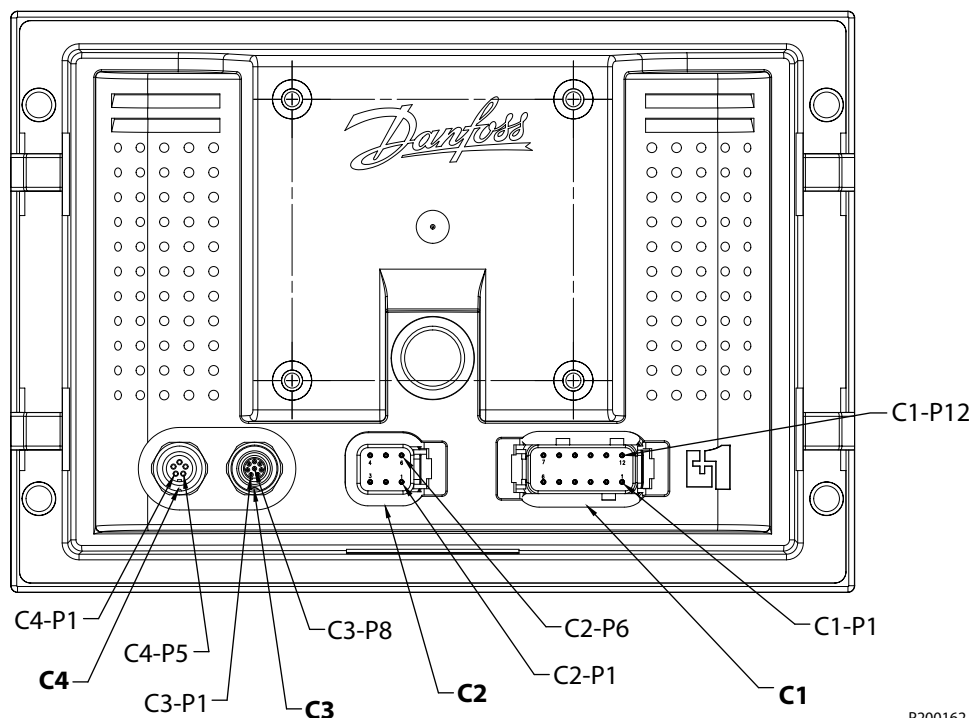


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*Pin connectors*
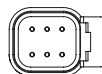


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*Pin assignments*

| Binder 702 series 5-pin | | Binder 702 series 8-pin | | Deutsch DTMO6 6-pin | | Deutsch DTMO6 12-pin | |
|---|---|---|---|---|---|---|---|
| **C4 pin** | **Function** | **C3 pin** | **Function** | **C2 pin** | **Function** | **C1 pin** | **Function** |
| 1 | Power Ground | 1 | USB Device Vbus | 1 | Battery Ground | 1 | Power ground - |
| 2 | Power Supply | 2 | USB Device Data - | 2 | Redundant Power Supply | 2 | Power ground + |
| 3 | Video 1 In | 3 | USB Device Data + | 3 | NC | 3 | CAN1 High + |
| 4 | Signal Ground | 4 | USB Device Ground | 4 | NC | 4 | CAN1 Low - |
| 5 | Video 2 In | 5 | USB Host Ground/RS232 | 5 | CAN Shield/AIN | 5 | AIN/CAN Shield |
| | | 6 | USB Host Data +/RS232 RxD | 6 | Digital/AIN | 6 | CAN0 High + |
| | | 7 | USB Host Data -/RS232 TxD | | | 7 | CAN0 Low - |
| | | 8 | USB Host Vbus | | | 8 | Sensor Supply |
| | | | | | | 9 | Multifunction-Input |
| | | | | | | 10 | Multifunction-Input |

## Installation

*Pin assignments (continued)*

| Binder 702 series 5-pin | | Binder 702 series 8-pin | | Deutsch DTMO6 6-pin | | Deutsch DTMO6 12-pin | |
|---|---|---|---|---|---|---|---|
| C4 pin | Function | C3 pin | Function | C2 pin | Function | C1 pin | Function |
| | | | | | | 11 | Analog/Digital Input |
| | | | | | | 12 | Digital Output |

**Machine wiring guidelines**

⚠️ **Warning**

Unintended movement of the machine or mechanism may cause injury to the technician or bystanders. Improperly protected power input lines against over current conditions may cause damage to the hardware. Properly protect all power input lines against over-current conditions. To protect against unintended movement, secure the machine.

🚫 **Caution**

Unused pins on mating connectors may cause intermittent product performance or premature failure. Plug all pins on mating connectors.

- Protect wires from mechanical abuse, run wires in flexible metal or plastic conduits.
- Use 85˚ C (185˚ F) wire with abrasion resistant insulation and 105˚ C (221˚ F) wire should be considered near hot surfaces.
- Use a wire size that is appropriate for the module connector.
- Separate high current wires such as solenoids, lights, alternators or fuel pumps from sensor and other noise-sensitive input wires.
- Run wires along the inside of, or close to, metal machine surfaces where possible, this simulates a shield which will minimize the effects of EMI/RFI radiation.
- Do not run wires near sharp metal corners, consider running wires through a grommet when rounding a corner.
- Do not run wires near hot machine members.
- Provide strain relief for all wires.
- Avoid running wires near moving or vibrating components.
- Avoid long, unsupported wire spans.
- Ground electronic modules to a dedicated conductor of sufficient size that is connected to the battery (-).
- Power the sensors and valve drive circuits by their dedicated wired power sources and ground returns.
- Twist sensor lines about one turn every 10 cm (4 in).
- Use wire harness anchors that will allow wires to float with respect to the machine rather than rigid anchors.

**Machine welding guidelines**

⚠️ **Warning**

High voltage from power and signal cables may cause fire or electrical shock, and cause an explosion if flammable gasses or chemicals are present.
Disconnect all power and signal cables connected to the electronic component before performing any electrical welding on a machine.

**Installation**

The following is recommended when welding on a machine equipped with electronic components:

- Turn the engine off.
- Remove electronic components from the machine before any arc welding.
- Disconnect the negative battery cable from the battery.
- Do not use electrical components to ground the welder.
- Clamp the ground cable for the welder to the component that will be welded as close as possible to the weld.

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