# Canvas 7D Datasheet - Model 0

## No Built-In I/O

MAN1385_00_EN_CV7D_Mod0

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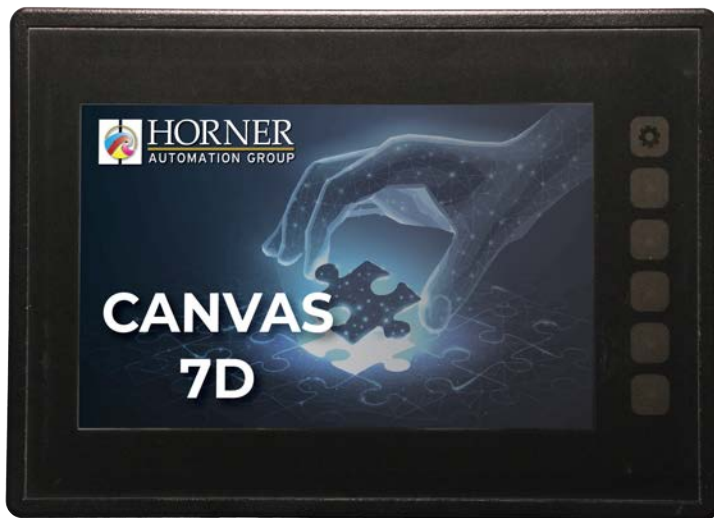
## Part Number: HE-CV-070D-00

## User Manual and Add-Ons

Find the documents via the Documentation Search.

| Part # | Description |
|---|---|
| MAN1383 | Canvas 7D User Manual |
| MAN1142 | Rechargeable Battery Manual |
| HE-BAT019 | Rechargeable 3.6V Lithium Battery |
| HE-XCK | Programming Cables |
| HE-XDAC | 2 channel Analog Output I/O option kit, selectable 0-10V, +/-10V, 4-20mA. |
| HE-XDAC107 | 4 channel Analog Output I/O option kit, selectable 0-10V, +/-10V, 4-20mA. |
| HE-XKIT | Blank I/O Board |
| HE200MJ2TRM | Adapter, RJ45 (8P8C) male to 8-position terminal strip. |
| HE-FBD001 | Ferrite core for filtering out electrical noise. |

## Battery Maintenance

The Canvas 7D uses a Renata CR2032 lithium battery to run the Real Time Clock. The battery life is 7-10 years.

For more information, see **MAN1383**.

# TECHNICAL SPECIFICATIONS

## General Specifications

| | |
|---|---|
| Required Power (Inrush) | 25A for < 1ms @ 24VDC |
| Heater Option* | Add 250mA with heater* (24VDC) |
| Primary Power Range | 10 - 30VDC; 10- 24VDC (with heater*) |
| Maximum Current | 1100mA, Class 2 |
| Relative Humidity | 5 to 95%, Non-Condensing |
| Clock Accuracy | ± 20 ppm maximum at 25°C ,(± 1 min/month) |
| Real Time Clock | Battery Backed, Lithium Coin |
| Operating Temperature | -10°C to +60°C<br>-40°C to +60°C (with heater*) |
| Storage Temperature | -20°C to +60°C |
| Weight | 1.59 lbs (721.2g) |
| Altitude | Up to 2000m |
| Pollution Degree | Degree 2 Rating |
| Certification (UL/CE) | North America or Europe |
| Enclosure Type | 1, 3R, 4, 4X, 12, 12K & 13 |

*Heater Option (Model # plus "-22")

## Backlight

| | | |
|---|---|---|
| **HE-CV-070D-00 (Model 0)** | Typical Power Backlight at 100% | 385mA@10V(3.85W);176mA@24VDC(4.224W) |
| | Power Backlight at 50% | 119mA@24VDC(2.86W) |
| | Power Backlight Off | 116mA@24VDC(2.78W) |
| **HE-CV-070D-02 (Model 2)** | Typical Power Backlight at 100% | 516mA@10VDC(5.16W); 233mA@24VDC(5.592W) |
| | Power Backlight at 50% | 176mA@24VDC(4.22W) |
| | Power Backlight Off | 173mA@24VDC(4.15W) |
| **HE-CV-070D-03 (Model 3)** | Typical Power Backlight at 100% | 413mA@10VDC(4.13W); 228mA@24VDC(5.472W) |
| | Power Backlight at 50% | 171mA@24VDC(4.10W) |
| | Power Backlight Off | 168mA@24VDC(4.03W) |
| **HE-CV-070D-04 (Model 4)** | Typical Power Backlight at 100% | 422mA@10VDC(4.22W); 244mA@24VDC(5.856W) |
| | Power Backlight at 50% | 187mA@24VDC(4.49W) |
| | Power Backlight Off | 184mA@24VDC(4.42W) |
| **HE-CV-070D-05 (Model 5)** | Typical Power Backlight at 100% | 588mA@10VDC(5.88W); 294mA@24VDC(7.056W) |
| | Power Backlight at 50% | 237mA@24VDC(5.69W) |
| | Power Backlight Off | 234mA@24VDC(5.62W) |
| **HE-CV-070D-06 (Model 6)** | Typical Power Backlight at 100% | 572mA@10VDC(5.72W); 262mA@24VDC(6.288W) |
| | Power Backlight at 50% | 205mA@24VDC(4.92W) |
| | Power Backlight Off | 202mA@24VDC(4.85W) |

# Control and Logic

| | |
|---|---|
| Control Language Support | Register-Based Advanced Ladder Logic; Variable-Based Advanced Ladder IEC 61131-3 Languages |
| Logic Program Size | 2MB, maximum |
| Scan Rate | 0.02ms/kB |
| Digital Inputs | 2048 |
| Digital Outputs | 2048 |
| Analog Inputs | 512 |
| Analog Outputs | 512 |
| General Purpose Registers | 50,000 (words) Retentive 16,384 (bits) Retentive 16,384 (bits) Non-retentive |

**USB Webcams**

USB Webcams supported should support the UVC (USB Video class) protocol for the OCS to be able to display video. Most USB based video devices support this today. Special feature such as zoom and high definition are not supported by the OCS.

# User Interface

| | |
|---|---|
| Display Type | 7" TFT Color |
| Screen Brightness | 800cd/m$^2$ (nits) |
| Resolution | QVGA (800 x 480) |
| Color | 16-bit (65,535) |
| Screen Memory | 17MB |
| User-Programmable Screens | 1023 maximum pages; 1023 objects per page |
| Backlight | LED - 50,000 hour life |
| Brightness Control | 0-100% via System Register %SR57 |
| Number of Keys | 6 |

## Connectivity

| Serial Ports | 1 RS-232 & 1 RS-485 on first Modular Jack (MJ1/2); |
| | 1 RS-232 or 1 RS-485 on second Modular Jack (MJ3) |
| USB mini-B | USB 2.0 (480Mbps) Programming & |
| | Data Access |
| USB A (500mA max) | USB 2.0 (480 Mbps) for USB flash drives (2TB) |
| CAN Port | |
| Isolated 1kV | 2 x Remote I/O, Peer-to-peer Comms, Cscape |
| CAN Protocols | CsCAN, CANopen, DeviceNet, J1939 |
| Ethernet | 2 x 10/100 Mb (Auto-MDX) |
| Ethernet Protocols | TCP/IP, Modbus TCP, FTP, SMTP, EGD, ICMP, ASCII, Cscape, Ethernet IP |
| Remote I/O | OCS-I/O |
| Removable Memory | microSD, SDHC, SDXC (in FAT32 format), support for 32GB maximum. Application Updates, Datalogging |
| Audio | Line Out |

**UV and Sunlight Protection**

Protection of this product from direct sunlight is recommended but not required. The overlay is made of Lexan HP92W which is designed to be UV resistant. Protection will further extend the life of the overlay and touchscreen

# CONTROLLER OVERVIEW

## Overview of OCS



HG-746

1. Touchscreen

2. Function Keys

3. MJ1: RS-232 / MJ2: 1/2 Duplex RS-485

4. DIP Switches

5. MJ3: RS-232/RS-485 Serial Port

6. CAN1 Port

7. Primary Power: 10-30VDC In

8. Audio In and Out Port

9. USB Type A 2.0: Flash Drive (See Precaution #12 about USB and grounding)

10. LAN 1&2 Ports

11. CAN2 Port

12. USB Type Mini B: Programming

13. microSD: Data Storage

## LAN2 Ethernet Port

HE-ETX2 is used in place of LAN2 for in order to utilize 2nd ethernet port functionality at this time due to components shortage issues. If multi-USB device functionality is needed, such as for USB flash drive or webcam utilization, a power USB hub may be used. The RTS5411 chipset was found to be functional in our testing.

## Power Wiring

**NOTE**: The Primary Power Range is 10VDC to 30VDC.

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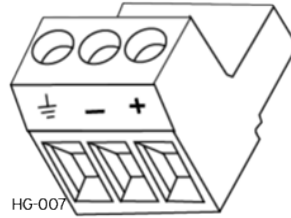
| Primary Power Port Pins | | |
|---|---|---|
| **PIN** | **Signal** | **Description** |
| **1** | Ground | Frame Ground |
| **2** | DC- | Input Power Supply Ground |
| **3** | DC+ | Input Power Supply Voltage |

## DC Input / Frame

- Solid/Stranded Wire: 12-24 AWG(2.5-0.2 mm²)

- Strip length: 0.28" (7mm)

- Torque, Terminal Hold-Down Screws: 4.5 – 7 in•lbs (0.50 – 0.78 N•m)

- DC- is internally connected to I/O V-, but is isolated from CAN V-. A Class 2 power supply must be used.

## Power Up

1. **OPTION**: Attach ferrite core with a minimum of two turns of the DC+ and DC- signals from the DC supply that is powering the controllers.
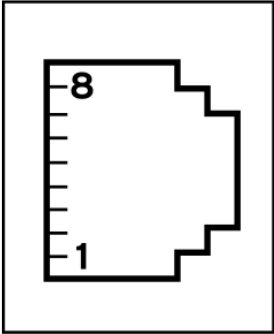


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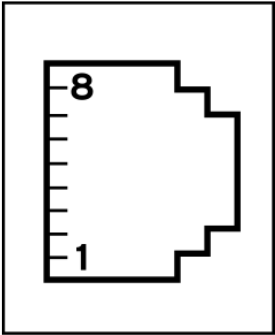
2. Connect to earth ground.
3. Apply recommended power.

# COMMUNICATIONS

## Serial Communication

### MJ1/2 Serial Ports



HG-008

**MJ1**: RS-232 w/Full Handshaking
**MJ2**: RS-485 Half-Duplex

|  | MJ1 Pins | | MJ2 Pins | |
|---|---|---|---|---|
| PIN | SIGNAL | DIRECTION | SIGNAL | DIRECTION |
| 8 | TXD | OUT | -- | -- |
| 7 | RXD | IN | -- | -- |
| 6 | 0V | COMMON | 0V | COMMON |
| 5 | +5V @ 60mA | OUT | +5V @ 60mA | OUT |
| 4 | RTS | OUT | -- | -- |
| 3 | CTS | IN | -- | -- |
| 2 | -- | -- | RX-/TX- | IN/OUT |
| 1 | -- | -- | RX+/TX+ | IN/OUT |

### MJ3 Serial Port



HG-008

2 Multiplexed Serial Ports on One Modular Jack (8 position)
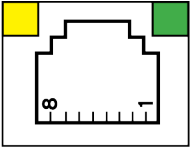
| MJ3 PINS | | |
|---|---|---|
| PIN | SIGNAL | DIRECTION |
| 8 | TXD RS-232 | OUT |
| 7 | RXD RS-232 | IN |
| 6 | 0V | COMMON |
| 5 | +5V @ 60mA | OUT |
| 4 | TX- RS-485 | OUT |
| 3 | TX+ RS-485 | OUT |
| 2 | RX- RS-485 | IN |
| 1 | RX+ RS-485 | IN |

**NOTE:** Attach optional ferrite core with a minimum of two turns of serial cable.
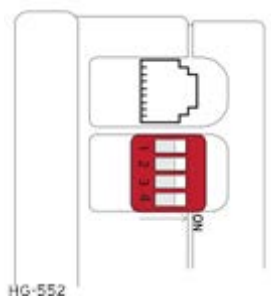
## Ethernet



HG-041

**Green LED indicates link** - when illuminated, data communication is available.
**Yellow LED indicates activity** - when flashing, data is in transmission.

## DIP Switches



HG-552

| DIP Switches | | | |
|---|---|---|---|
| SWITCH | NAME | FUNCTION | DEFAULT |
| 1 | MJ3 RS-485 Termination | ON = Terminated | OFF |

| DIP Switches | | | |
|---|---|---|---|
| 2 | MJ3 Duplex | Both ON = Half<br>Both OFF = Full | OFF |
| 3 | | | OFF |
| 4 | MJ2 RS-485 Termination | ON = Terminated | OFF |

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The DIP switches are used to provide a built-in termination to both the MJ1, MJ2 & MJ3 ports if needed. The termination for these ports should only be used if this device is located at either end of the multidrop/ daisy-chained RS-485 network.
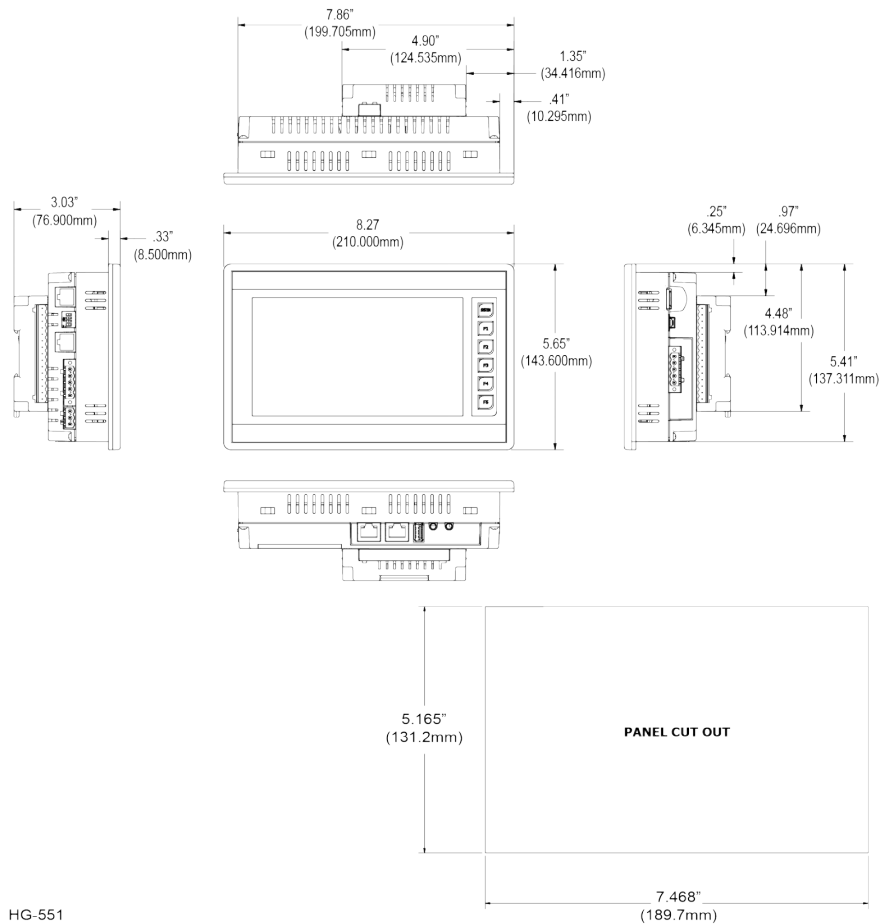
# CAN Communications



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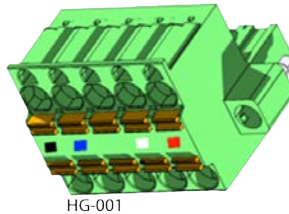
| CAN Network & Power Port Pin Assignment | | |
|---|---|---|
| Pin | Signal | Signal Description |
| 1 | V- | CAN Ground – Black |
| 2 | CN_L | CAN Data Low – Blue |
| 3 | SHLD | Shield Ground – None |
| 4 | CN_H | CAN Data High – White |
| 5 | V+ (NC) | No Connect – Red |

- **Solid/Stranded Wire**: 12-24 AWG(2.5-0.2mm²).

- **Strip Length**: 0.28" (7mm).

- Locking spring-clamp, two-terminators per conductor.

- **Torque, Terminal Hold-Down Screws**: 4.5 – 7 in•lbs (0.50 – 0.78 N•m).

- V+ pin is not internally connected, the SHLD pin is connected to Earth ground via a 1MΩ resistor and 10 nF capacitor.

# DIMENSIONS & INSTALLATION

## Canvas 7D



7.86"
(199.705mm)

4.90"
(124.535mm)

1.35"
(34.416mm)

.41"
(10.295mm)

3.03"
(76.900mm)

.33"
(8.500mm)

8.27"
(210.000mm)

5.65"
(143.600mm)

.25"
(6.345mm)

.97"
(24.696mm)

4.48"
(113.914mm)

5.41"
(137.311mm)

5.165"
(131.2mm)

PANEL CUT OUT

7.468"
(189.7mm)

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* +1.6 mm /-0 mm cutout tolerance

## Installation Information

- The Canvas 7D utilizes a clip installation method to ensure a robust and watertight seal to the enclosure. Please follow the steps below for the proper installation and operation of the unit.

- This equipment is suitable for Class I, Division 2, Groups A, B, C and D or non-hazardous locations only.

- Digital outputs shall be supplied from the same source as the operator control station.

- Jumpers on connector JP1 shall not be removed or replaced while the circuit is live unless the area is known to be free of ignitable concentrations of flammable gases or vapors.

- **WARNING**- The USB ports are for operational maintenance only. Do not leave permanently connected unless area is known to be non-hazardous.

## Installation Procedure

The Canvas 7D OCS utilizes a clip installation method to ensure a robust and watertight seal to the enclosure. Please follow the steps below for the installation and operation of the unit.

1.  Carefully locate a place to mount the Canvas OCS. Be sure to leave enough room at the top of the unit for insertion and removal of the microSD™ card.

2.  Carefully cut the host panel per the diagram, creating a 131.2mm x 189.7mm with a +1.6 mm /-0 mm panel cutout tolerance, opening into which the OCS may be installed. **Note**: If the opening is too large, water may leak into the enclosure, potentially damaging the unit. If the opening is too small, the OCS may not fit through the hole without damage.

3.  Remove any burrs and or sharp edges and ensure the panel is not warped in the cutting process.

4.  Remove all Removable Terminals from the OCS. Insert the OCS through the panel cutout (from the front). The gasket must be between the host panel and the OCS.

5.  Install and tighten the four mounting clips (provided in the box) until the gasket forms a tight seal **NOTE:** Maximum torque is 0.8 to 1.13N•m or 7 to 10 in•lbs.

6.  Reinstall the I/O Removable Terminal Blocks. Connect communications cables to the serial port, USB ports, Ethernet port, and CAN port as required.

# SAFETY & MAINTENANCE

## Warnings

1. To avoid the risk of electric shock or burns, always connect the safety (or earth) ground before making any other connections.
2. To reduce the risk of fire, electrical shock, or physical injury, it is strongly recommended to fuse the voltage measurement inputs. Be sure to locate fuses as close to the source as possible.
3. Replace fuse with the same type and rating to provide protection against risk of fire and shock hazards.
4. In the event of repeated failure, do **NOT** replace the fuse again as repeated failure indicates a defective condition that will **NOT** clear by replacing the fuse.
5. Only qualified electrical personnel familiar with the construction and operation of this equipment and the hazards involved should install, adjust, operate, or service this equipment.
6. Read and understand this manual and other applicable manuals in their entirety before proceeding. Failure to observe this precaution could result in severe bodily injury or loss of life.
7. **WARNING:** Battery may explode if mistreated. Do not recharge, disassemble, or dispose of in fire.
8. **WARNING:** EXPLOSION HAZARD- Batteries must only be changed in an area known to be non-hazardous.
9. **WARNING:** Do not disconnect while circuit is live unless area is know to be non-hazardous.

## FCC Compliance

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

## Precautions

All applicable codes and standards need to be followed in the installation of this product. Adhere to the following safety precautions whenever any type of connection is made to the module:
1. Connect the safety (earth) ground on the power connector first before making any other connections.
2. When connecting to the electric circuits or pulse-initiating equipment, open their related breakers.
3. Do NOT make connection to live power lines.
4. Make connections to the module first; then connect to the circuit to be monitored.
5. Route power wires in a safe manner in accordance with good practice and local codes.
6. Wear proper personal protective equipment including safety glasses and insulated gloves when making connections to power circuits.
7. Ensure hands, shoes, and floor are dry before making any connection to a power line.
8. Make sure the unit is turned OFF before making connections to terminals.
9. Make sure all circuits are de-energized before making connections.
10. Before each use, inspect all cables for breaks or cracks in the insulation. Replace immediately if defective.
11. Use copper conductors in field wiring only, 60/75°C.

12. Use caution when connecting controllers to PCs via serial or USB. PCs, especially laptops, may use "floating power supplies" that are ungrounded. This could cause a damaging voltage potential between the laptop and controller. Ensure the controller and laptop are grounded for maximum protection. Consider using a USB isolator due to voltage potential differences as a preventative measure.

## Technical Support

| North America | Europe |
|---|---|
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