Centurion™ C5 Series Custom Controller

The C5 Custom Controllers are programmed on an engineered-to-order basis, and we can partner with you to create user customized, multi-application design for your specifications. Primarily designed for engine/electric motor-driven compressors, the C5 is custom programmed for any variety of custom control loop algorithms, custom calculations, highly specialized valve sequencing or any other control scenario for your equipment. Applications for electric motor, electronic engine and mechanical engine-driven gas compressors and pumps are an example of the types of equipment that can be used with our C5 Custom Controller.

The Centurion continuously monitors input signals and set points and commands outputs to maintain proper operation. When an out-of-limits event occurs, the controller will stop, shut down or control equipment to change conditions. The auto-start capabilities of the Centurion allow for start/stop based on parameters such as pressure set points or by digital signals.

The Centurion provides real-time data via communication ports to a connected display and/or supervisory system. This advanced system offers multiple options for remote communications and operation including HMIs, PLCs, PCs and SCADA systems. The industry-standard Modbus RTU protocol means greater support for a wide variety of communication equipment including radio and satellite communications systems.

Features

- Fully custom control and monitoring system. Applications include reciprocating/screw compressors and pump systems.
- Expandable system to meet all three- to four-stage compressor applications.
- All I/O points are custom configured.
- No programming experience required.
- Local and remote communications, Modbus RTU via RS485/232/Ethernet.
- Unlimited set point.
- Upload/download capabilities.
- Shut-down history list.
- Event history list.

- Active alarm list.
- Maintenance reminder timers.
- Run hourmeter.
- No-flow totalization using lubricator pulses and rate calculation possible.
- Short cycle start protection / starts per hour (electric motor).
- Unlimited control loops, closed loop PID / open loop linear.
- Set points stored in non-volatile EEPROM memory.
- CAN capable, to support electronic engines.
- View EICS® and Centurion systems on

one M-View® Touch screen display.
- Diagnostics that reduce troubleshooting.
- World-class certifications and harmonized international standards.
- Future-proof.
- All non-incendive inputs.
- Compressor rod load calculation, alarm and shutdown.

Basic Components

The Centurion consists of a display module, a main I/O module and up to three expansion I/O modules and choice of M-View Series display. The Centurion is designed for use within a weatherproof enclosure only.

C5, Main I/O Module:
Centurion C5 Custom Controller

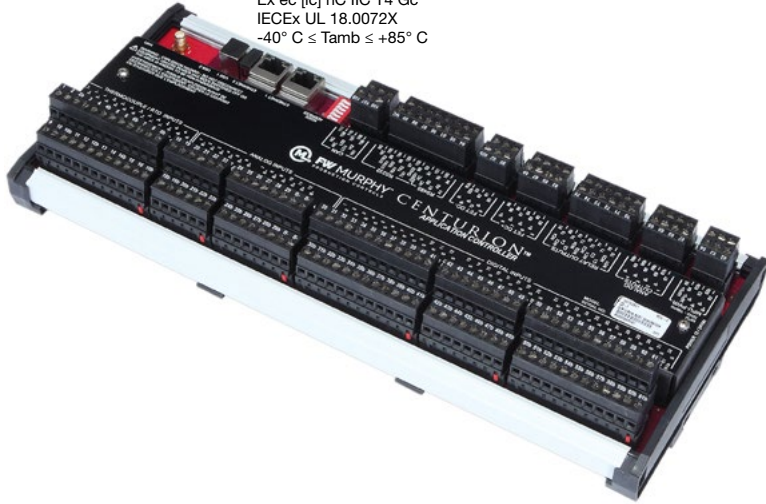**(Optional) MX4-R2 Expansion I/O Module:**

(Optional) MX5-R2 Expansion I/O Module:

Display: Choose from
MV-5-C, MV-7T or MV-12T

C5 Series Main I/O Module

- Operating temperature: -40° to 185° F (-40° to 85° C)
- Power input: 30 W max 10-30 VDC
- Application firmware:
  - Centurion Custom option offers highly customized applications
  - Centurion programmable integrates with Rockwell Automation Processors as I/O module to write IEC 61131-3 logic (Ladder Logic, Structured Text, Function Block Diagram)
- All I/O options individually software selectable: No jumpers required.
- Clock: Battery backed internal real-time clock, approximately 10 years unpowered service life
- 12 Analog inputs*:
  - 0-24 mA or 0-5 VDC, 15-bit hardware
  - 4 configurable for resistive potentiometer measurement
- 32 Digital inputs*:
  - NO or NC (active high/active low) intrinsically safe
  - Optically isolated DC digital inputs (active high/active low) with LED indicators
  - Polarity sense / wire fault detection on normally closed systems
  - Approved for use with general purpose switches in hazardous areas
- Eight temperature inputs*:
  - J or K Type Thermocouples (ungrounded)
  - 3-wire 100Ω Pt RTD temperature inputs***
  - Open, short DC-, short DC+ wire fault detection
  - Cold junction compensation
- One magnetic pickup input/AC run signal:
  - 30 to 10 kHz, 4.5 VAC rms min, 120 VAC rms max.
- 10 digital outputs:
  - LED indicators:
  - 4 relay outputs, form C, dry contacts
  - 4 FET outputs (source)
  - 2 FET outputs (sink)
- Four analog outputs:
  - 4-20 mA, 16-bit hardware
- 11 Communication ports:
  - Two SERIAL RS232:
    - > Protocol: Modbus RTU (server)
  - Two SERIAL RS485:
    - > Protocol: Modbus RTU (server)
  - One USB: Host Type A (data log access, firmware updates)
  - One USB: Server Type B (configuration/firmware updates)

- Two CAN:
  - > One proprietary for FW Murphy hardware
  - > One reserved for J1939 Engine ECU
- Two Ethernet 10/100 (DLR), Single MAC ID:
  - > Protocol: Modbus TCP/IP (server)
  - > EtherNet/IP (CIP)
- One Wi-Fi: Optional C5-1 only
- Third-party approvals:
  - North America:
  - Class 1, Div 2, Grps A, B, C, D Haz. Loc. T4
  - Class I, Zone 2, AEx ec [ic] nC IIC T4 Gc Ex ec [ic] nC IIC T4 Gc X
  - ATEX Zone 2
    - II 3G Ex ec [ic] nC IIC T4 Gc
    - DEMKO 18 ATEX 1926X
    - -40° C ≤ Tamb ≤ +85° C
  - IECEx Zone 2
    - Ex ec [ic] nC IIC T4 Gc
    - IECEx UL 18.0072X
    - -40° C ≤ Tamb ≤ +85° C

Expansion I/O Modules

MX4-R2 Expansion I/O Module

- Operating Temperature: -40° to 185° F (-40° to 85° C)
- Power input: 14.1 W max 10-30 VDC
- 18[†] thermocouple inputs*: J or K Type thermocouples (ungrounded)
- 9[†] 3-wire 100Ω Pt RTD temperature inputs*,***
  - Open, short DC-, short DC+ wire fault detection
  - Cold junction compensation
- One magnetic pickup input* / AC Run Signal: 4.5 VAC – 120 VAC, 30 Hz – 10 kHz
- Third-party approvals:
  - Class 1, Div 2, Grps A, B, C, D Haz. Loc. T4
  - Class I, Zone 2, AEx ec [ic] IIC T4 Gc Ex ec [ic] IIC T4 Gc X
  - ATEX Zone 2
    - II 3G Ex ec [ic] IIC T4 Gc
    - DEMKO 18 ATEX 1926X
    - -40° C ≤ Tamb ≤ +85° C
  - IECEx Zone 2
    - Ex ec [ic] IIC T4 Gc
    - IECEx UL 18.0072X
    - -40° C ≤ Tamb ≤ +85° C
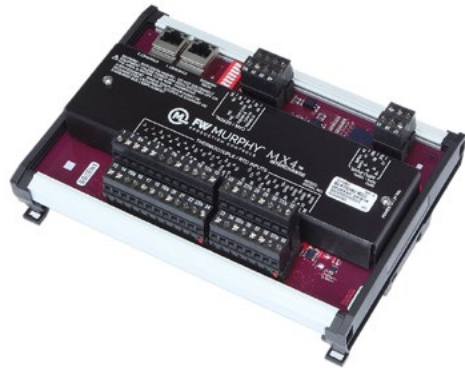
MX5-R2 Expansion I/O Module

- Operating temperature: -40° to 185° F (-40° to 85° C)
- Power input: 16.5 W max 10-30 VDC
- 24 Digital inputs*:
  - NO or NC (active high/active low) intrinsically safe
  - Optically isolated DC digital inputs (active high/active low) with LED indicators
  - Polarity sense / wire fault detection on normally closed systems
  - Approved for use with general purpose switches in hazardous areas
- 10 analog inputs*: 0-24 mA or 0-5 VDC, 15 bit hardware
- 16 digital outputs: FET (sink)
- 4 analog outputs: 4-20 mA, 16 bit hardware
- 1 magnetic pickup input* /AC Run Signal: 4.5 VAC -120 VAC, 30 Hz to 10 kHz
- Third-party approvals:
  - Class 1, Div 2, Grps A, B, C, D Haz. Loc. T4
  - Class I, Zone 2, AEx ec [ic] IIC T4 Gc Ex ec [ic] IIC T4 Gc X
  - ATEX Zone 2
    - II 3G Ex ec [ic] IIC T4 Gc
    - DEMKO 18 ATEX 1926X
    - -40° C ≤ Tamb ≤ +85° C
  - IECEx Zone 2
    - Ex ec [ic] IIC T4 Gc X
    - IECEx UL 18.0072X
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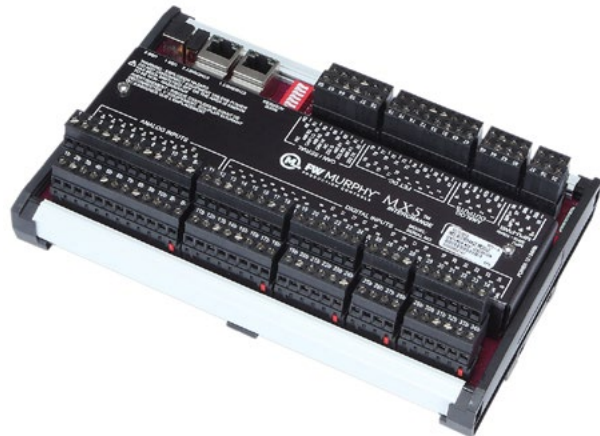
* Non-incendive. (Digital Inputs, Analog Inputs and Temperature Inputs are intrinsically safe and non-incendive.)
*** RTD=Resistive Temperature Device, American RTD Standard, TCR 0.00392, units Ohms/Ohm / deg. between 0-100 C.
[†] When configured for an RTD channel, two consecutive odd/even T/C channels are consumed.

MV-5-C, M-View® Monochrome LCD Display

- Operating temperature: -40° to 185° F (-40° to 85° C)
- Power input: 11 W max 10-30 VDC
- Screen: 320 x 240 pixels, LCD display with backlight
- User interface: 12-key keypad set point entry, alarm acknowledgment, start, stop, reset, etc.
- Communications:
  - RS232-1/RS485-1 (Modbus RTU client)
  - RS485-2 (Modbus RTU server)
  - 1 USB Server Type B (firmware updates)
  - 1 USB Host Type A (reserved)
  - CAN x 2
    - >1 proprietary for FW Murphy Hardware
    - >1 reserved for J1939 engine ECU
- Customizable process screens:
  - Line by line
  - Gauge
  - Control loop
  - Generic register

- Built-in screens (examples):
  - Digital input status and polarity
  - Digital output status
  - Temperature input status/fault
  - Fault snapshot (mirror of line by line)
  - Alarm log
  - Event log
- Third-party approvals:
  - North America:
    - Class 1, Div 2, Grps A, B, C, D Haz. Loc. T4
    - Class I, Zone 2, AEx ec ic [ic] IIC T4 Gc Ex ec ic [ic] IIC T4 Gc X
  - ATEX Zone 2
    - II 3G Ex ec ic [ic] IIC T4 Gc
    - DEMKO 18 ATEX 1926X
    - -40° C ≤ Tamb ≤ +85° C
  - IECEx Zone 2
    - Ex ec ic [ic] IIC T4 Gc
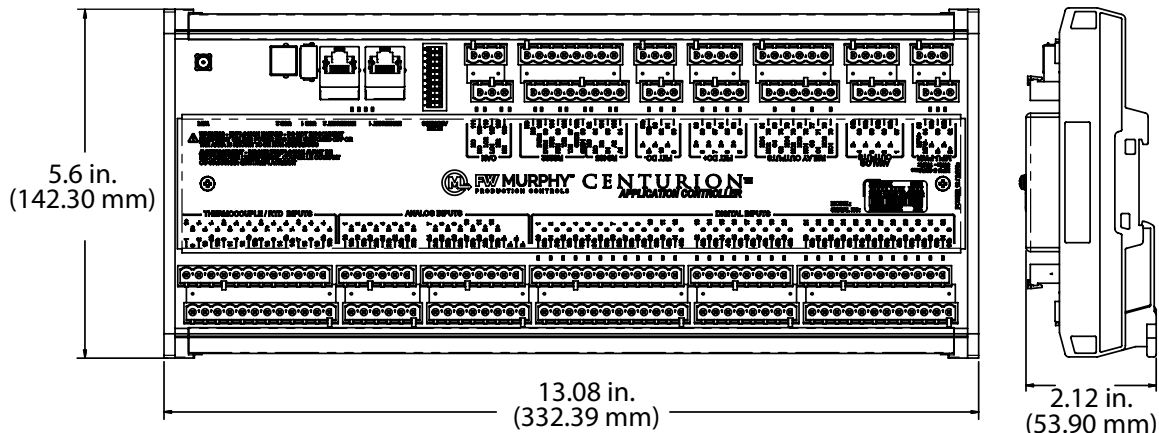   - IECEx UL 18.0072X
    - -40° C ≤ Tamb ≤ +85° C

MV-7T and MV-12T, M-View® Touch Series Displays

- Operating temperature:
  - -4° to 140° F (-20° to 60° C)
- Power input:
  - MV-7T, 15 W max 10-30 VDC
    (36 W max with modules)
  - MV-12T, 23 W max 10-30 VDC
    (57 W max with modules)
- Screen (sunlight readable):
  - MV-7T, 800x480 pixels, 7" widescreen, brightness 1000 cd/m2
  - MV-12T, 1280x800 pixels, 12" widescreen, brightness 1600 cd/m2
- User interface: resistive analog touchscreen
- Communication interface
  - 2x RS232
  - 1x RS485
  - 2x USB host type A (file transfer, datalogging, USB device)
  - 1x USB server (program/firmware updates)
  - 2 Ethernet 10/100 Base TX (RJ45)
- Communication protocols:
  - EtherNet/IP (CIP)
  - Modbus TCP/IP
  - Modbus RTU standard
  - 300 plus available, web server

- Third-party approvals:
  - CE approved
    - EN 61326-1 immunity to industrial Locations emission CISPR 11 Class A
    - IEC/EN 61010-1
    - RoHS compliant
  - ATEX approved
    - II 3 G Ex ic nA IIC T4 Gc
    - II 3 D Ex tc IIIC T135°C Dc
    - DEMKO 14 ATEX 1387X
    - EN 60079-0, -11, -15, -31
  - IECEx approved
    - Ex ic nA IIC T4 Gc
    - Ex tc IIIC T135°C Dc
    - IECEx UL 15.0035X
    - IEC 60079-0, -11, -15, -31
  - UL approved
  - cULus listed for ordinary location: File #E302106
    - UL 61010-1, -2-201
  - cULus listed for hazardous location: File #E317425
    - Class I, Division 2, Groups A, B, C and D
    - Class II, Division 2, Groups F and G
    - Class III, Division 2 ANSI/ISA 12.12.01, C22.2 No. 213-M1987, 157-92
  - IP66 Enclosure rating (Face only)
  - Type 4X outdoor enclosure rating (face only)
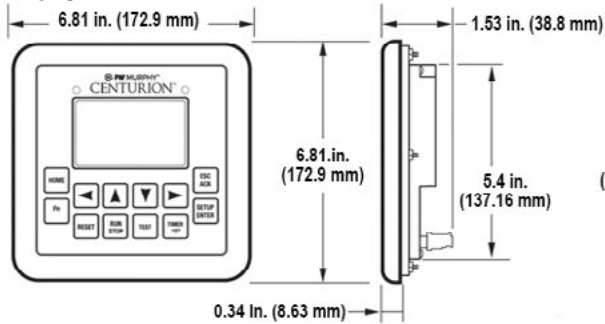 - ABS type approval for shipboard applications
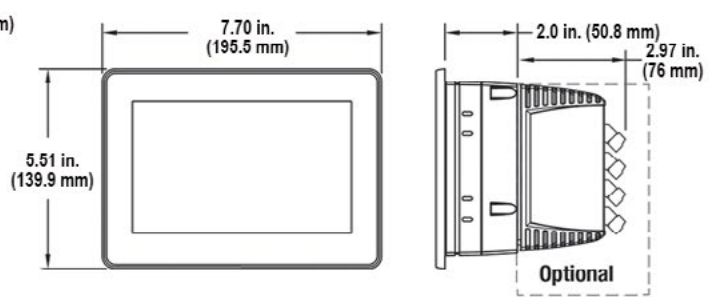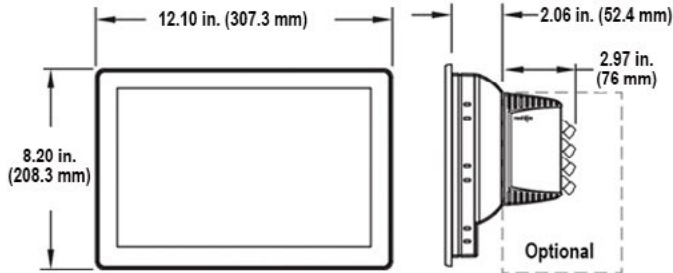
Dimensions

C5 Series Main Module

5.6 in.
(142.30 mm)

13.08 in.
(332.39 mm)

2.12 in.
(53.90 mm)

Dimensions (continued)

MV-5-C

6.81 in. (172.9 mm)

1.53 in. (38.8 mm)

6.81.in. (172.9 mm)

5.4 in. (137.16 mm)

0.34 In. (8.63 mm)

MV-7T

7.70 in. (195.5 mm)

2.0 in. (50.8 mm)

2.97 in. (76 mm)

5.51 in. (139.9 mm)

Optional

MV-12T

12.10 in. (307.3 mm)

2.06 in. (52.4 mm)

2.97 in. (76 mm)

8.20 in. (208.3 mm)
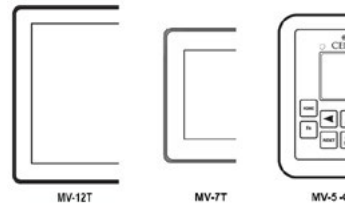
Optional

Side-by-Side Screen Approximate Sizes

MV-12T   MV-7T   MV-5-C

How to Order

Select the Centurion Custom Controller.
- C5

Specify any combination up to three expansion I/O modules (optional).

- MX4-R2, MX5-R2

Specify a display.
- MV-5-C, MV-7T or MV-12T

The minimum system requirements:
- C5 Main I/O Module
- Display capable of Modbus communications

The FW Murphy M-View Series displays are highly integrated HMIs for use with the Centurion system and are recommended for most customers.

Some systems may require additional I/O which is available on the MX4-R2 or MX5-R2 expansion I/O modules.

Part Number	Description	Notes
Specify Model	C5, Centurion Controller (Main Module)	Custom Controller
	MV-5-C, (5 in. monochrome LCD display)	Optional
	MV-7T, (7 in. touchscreen full-color display)	Standard
	MV-12T, (12 in. touchscreen full-color display)	
50703852	MX4-R2 expansion I/O module	Optional
50703853	MX5-R2 expansion I/O module	
50000774	Ignition noise (choke) filter	
00032696	C5 Plug kit	Printed replacement terminal plugs for main I/O module
00032656	MX4-R2 Plug kit	Printed replacement terminal plugs for MX4-R2 expansion I/O module
00032657	MX5-R2 Plug kit	Printed replacement terminal plugs for MX5-R2 expansion I/O module

Approximate Shipping Weight and Dimensions		
Model	Weight	Dimension
C5 Controller	2 lb. 7 oz.	16 x 11 x 5 in.
MV-5-C Display	2 lb. 4 oz.	8 x 8 x 6 in.
MV-7T Display	3 lb. 4 oz.	10 x 10 x 6 in.
MV-12T Display	5 lb. 1 oz.	10 x 12 x 12-1/4

Approximate Shipping Weight and Dimensions		
Model	Weight	Dimension
MX4-R2 expansion I/O module	1 lb. 6 oz.	12 x 7 x 5 in.
MX5-R2 expansion I/O module	1 lb. 6 oz.	12 x 7 x 5 in.
C5 Plug kit	0 lb. 5 oz.	5 x 5 x 5
MX4-R2 Plug kit	0 lb. 3 oz.	5 x 5 x 5
MX5-R2 Plug kit	0 lb. 3 oz.	5 x 5 x 5