

**MURPHY**®

by **ENOVATION** CONTROLS



**PowerCore™**  
**Model MPC-20**  
**Installation Manual**



\*Approved by CSA for non-hazardous locations (Group Safety Publication IEC 61010-1 Third Edition).

Products covered in this document comply with European Council electromagnetic compatibility directive 2004/108/EC and electrical safety directive 2006/95/EC.

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**00-02-0897**  
**2015-10-22**  
**Section 40**

In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time. The latest version of this manual can be found at [www.fwmurphy.com](http://www.fwmurphy.com).

**Warranty** - A limited warranty on materials and workmanship is given with this Murphy product. A copy of the warranty may be viewed or printed by going to <http://www.fwmurphy.com/warranty>.



**BEFORE BEGINNING INSTALLATION OF THIS MURPHY PRODUCT:**

- Read and follow all installation instructions.
- Visually inspect this product before installation for any damage during shipping.
- Disconnect all electrical power to the machine. Failure to do this before welding can result in damage to the panel and/or its components.
- It is your responsibility to have a qualified technician install the unit and make sure the installation conforms to local codes Including but not limited to double insulation and fire containment.
- Observe all Warnings and Cautions in each section of these instructions.
- The MPC-20 is designed for use in industrial environments for monitoring and control which include engine driven pumps, compressors, grinders, chippers, & rock crushers. Potential difficulties may exist when ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbances.

Contact Enovation Controls Technical Service if you have any questions or concerns at: +1 918-317-4100.

**IMPORTANT!** Improper use and operation of electronic products can be dangerous. It is required that point-of-operation guarding devices be installed and maintained. All such devices must meet OSHA and ANSI Machine safety standards. The manufacturer shall not accept any responsibility for installation, application, or safety of systems.

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-NOTES-



LENS CLEANING PROCEDURES



The lens on the MPC-20 is composed of Polycarbonate materials. Use only mild soap and water to clean the lens/display window. Evidence of improper cleaning techniques or chemicals includes cracks, smear marks, scratches, or fogged/hazy lenses.

## Operations Manual Location

After installation, please review the MPC-20 Operations Manual prior to placing the controller into service. In order to access the MPC-20 Operation Manual please visit the MPC-20 product page to download or print a copy located under the literature tab.

[www.fwmurphy.com/mpc-20](http://www.fwmurphy.com/mpc-20)

## Hardware Installation

The following instructions will guide you through installing the MPC-20 controller.

### Inspecting Package Contents

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Before attempting to install the product, it is recommended that you ensure all parts are accounted for and inspect each item for damage (which sometimes occurs during shipping). The items included in the box are:

MPC-20 Controller kit – P/N 40-70-0490 includes:

- MPC-20 Controller
- 4 (6-32) mounting screws
- 4 (#6) lock washers
- P/N 00-02-0897 MPC-20 Installation Manual

### Tools Needed

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Use a 1/4" drill bit to make the approximately sized 0.250" mounting holes.

## Installation

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### Preparing the Enclosed Panel

Determine the location of the MPC-20 on the customer-supplied flat or enclosed panel. The suitability of the enclosure is subject to investigation by the local authority having jurisdiction at the time of the installation.

Use the Installation Template measurements (included at the end of the manual) as a guideline to cut a hole to the specified dimensions. Drill holes where indicated on the template for the mounting screws. Please read IMPORTANT note below:



**IMPORTANT:** When using the paper template from the manual, please be aware that the drawing is not represented to scale. The measurements provided are accurate, and should be referred to when preparing the placement of the unit.

Once the holes are cut, check to make sure that there is adequate clearance for the edges of the MPC-20 housing to mount flush against the outside surface of your panel.

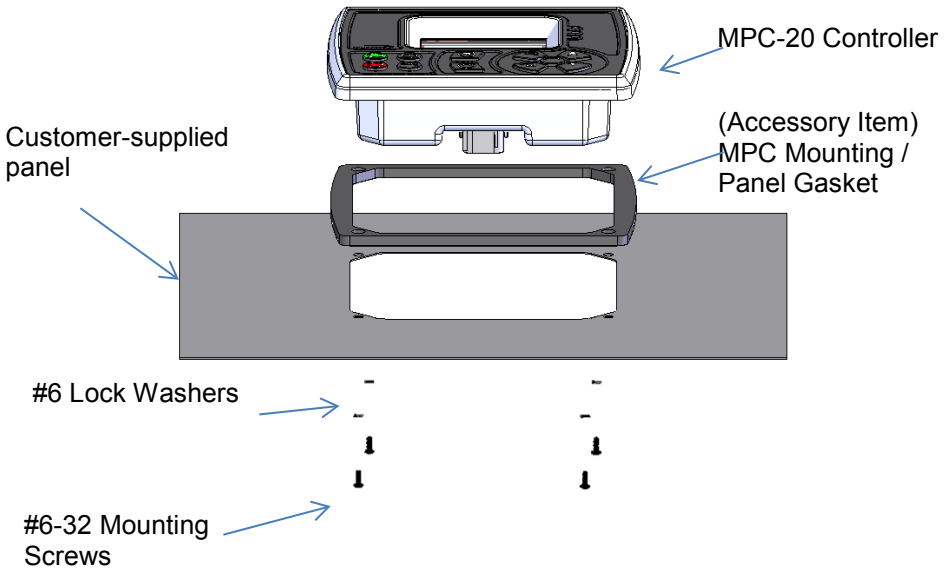
Recommended torque for tightening the mounting screws is 7.5-inch pounds. Although not required, only Blue polycarbonate compatible thread lock should be used for the MPC-20 mounting screws if thread lock is desired.

Insert the MPC-20 controller from the front side of the panel and install the four mounting screws and lock washers. Ensure that there is a good seal between the controller, the gasket (if used) and the mounting panel. Plan the MPC-20 mounting for easy wiring and access.

## Installing the Display

Place the back side of the display through the opening in the panel.

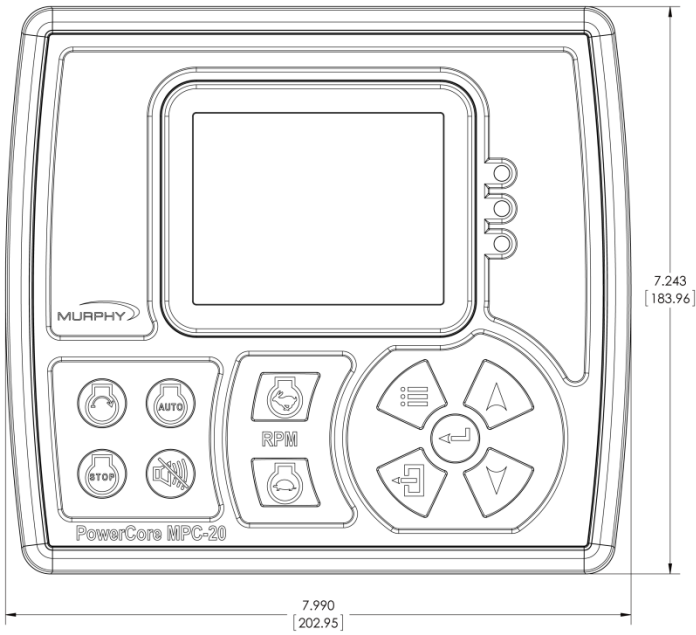
1. Use the 4 screws to line up the unit with the drilled holes.
2. Ensure that the back of the case is flush.
3. Use the screws provided to tighten unit to the panel. Use the appropriate wrench or socket to tighten. Torque screws to 7.5 inch pounds.



# Dimensions for Installation

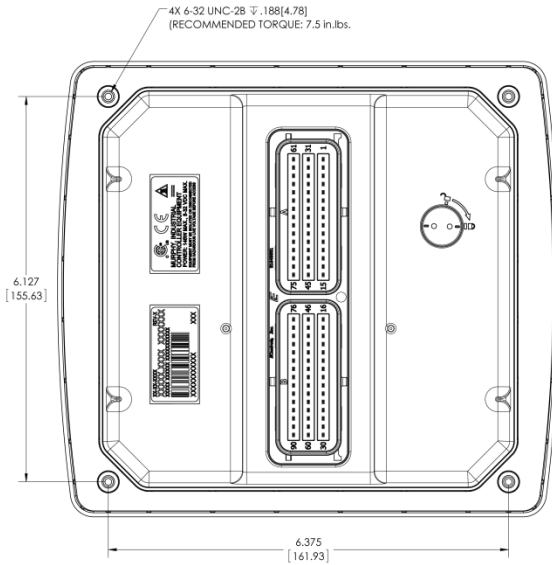
Front

Inches  
[mm]

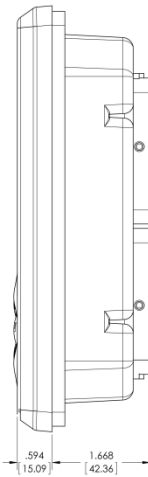




## Back



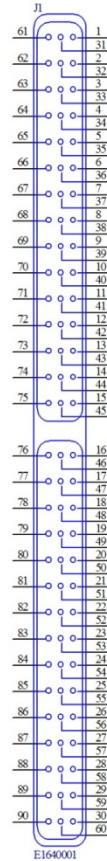
## Side View



# Wiring Instructions

## PIN Specifications for FCI Connection

Pin #	Pin Assignments	Pin #	Pin Assignments	Pin #	Pin Assignments
1	SW_BATT	31	BATT	61	BATT
2	GND	32	GND	62	GND
3	AN1_IN	33	DIG_IN1	63	DIG_IN2
4	AN2_IN	34	DIG_IN3	64	DIG_IN4
5	AN3_IN	35	DIG_IN5	65	DIG_IN6
6	AN4_IN	36	Reserved	66	HS_2A_OUT_1
7	AN5_IN	37	Reserved	67	HS_2A_OUT_2
8	AN6_IN	38	Reserved	68	Reserved
9	AN7_IN	39	Reserved	69	FREQ_IN
10	AN8_IN	40	AN_OUT	70	GND
11	Reserved	41	Reserved	71	Reserved
12	RS485_L	42	Reserved	72	CAN1L
13	RS485_H	43	Reserved	73	CAN1H
14	ETH_TD_P	44	ETH_TD_N	74	CAN2L
15	ETH_RD_P	45	ETH_RD_N	75	CAN2H
16	USB_DP_OUT	46	USB_DM_OUT	76	USB1_VBUS
17	USB_GND	47	USB_SHLD	77	USB_ID_OUT
18	RLY4_NC	48	Reserved	78	RLY1_NC
19	RLY4_COM	49	Reserved	79	RLY1_COM
20	RLY4_NO	50	Reserved	80	RLY1_NO
21	Reserved	51	Reserved	81	Reserved
22	RLY5_NC	52	Reserved	82	RLY2_NC
23	RLY5_COM	53	Reserved	83	RLY2_COM
24	RLY5_NO	54	Reserved	84	RLY2_NO
25	Reserved	55	Reserved	85	Reserved
26	RLY6_NC	56	Reserved	86	RLY3_NC
27	RLY6_COM	57	Reserved	87	RLY3_COM
28	RLY6_NO	58	Reserved	88	RLY3_NO
29	LS_1A_OUT_1	59	Reserved	89	HS_5V_OUT_1
30	LS_1A_OUT_2	60	Reserved	90	HS_5V_OUT_2

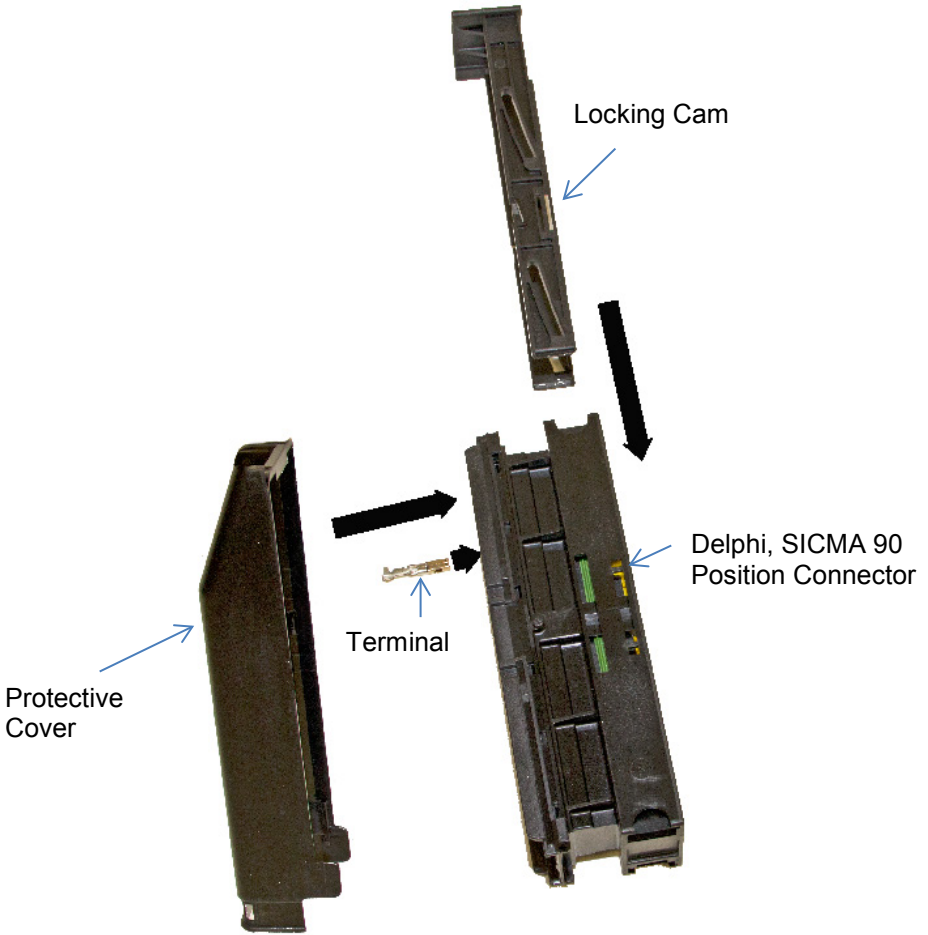


Wiring of this device must meet all applicable electrical codes.

Battery lines to the unit must all come through a single 10 Amp or less fuse or circuit breaker to retain the controller's CSA rating.

## Connector

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## Accessories

Component	Part #
PowerCore 90 Position Conn Kit	40-70-0496
PowerCore 90 Position Conn Whip Harness 3'	40-00-0554
IP66 Panel Gasket	40-05-1031

# Specifications

## Electrical

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**Display:** 3.8" Monochrome, Transflective, White Backlight LCD

**Operating Voltage:** 8-32 VDC, protected against reverse battery polarity and load-dump

**Power Consumption:** 18W max without 2 2A High-sides active, 146W max with 2 2A High-sides active

### Communications

**2-CAN:** J1939

**USB:** 2.0B (Only supported for programming)

**Ethernet:** (Not supported in initial release)

**RS485:** Modbus RTU

**Connection:** Delphi SICMA 90 way connector, 1.5mm

**Keyboard:** 11 tactile feedback buttons

### Inputs

**6-Digital Inputs:** high/low

**8-Analog Inputs:** configurable (4-20mA, 0-5V, resistive)

**1-Frequency Input:** supporting Magnetic Pickup or Engine Alternator  
(2 Hz – 10 KHz, 3.6 VAC – 120 VAC)

### Outputs

**6-Relays:** 10A, SPDT, Form C (30 VDC @ 10A or 125 VAC @ 10A max.), 40A maximum aggregate @ 85C

**2-Low-side Outputs:** 1A

**2-High-side Outputs:** 2A

**2-5V Outputs:** 200mA (to drive external relays)

**1-Analog Output:** 0-5V

**Real-time clock:** with battery backup

## **Environmental**

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**Operating Temperature:** -40°C to +85°C

**Storage Temperature:** -40°C to +85°C

**Protection:** IP67 front and back, when using accessory gasket and properly mounted the panel seal retains IP66.

**Emissions:** SAE J1113

**Immunity:** SAE J1113

**Vibration:** Random vibration, 7.86 Grms (5-2000 Hz), 3 axis

**Shock:** ± 50G in axis

## **Mechanical**

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**Case Material:** Polycarbonate/ABS

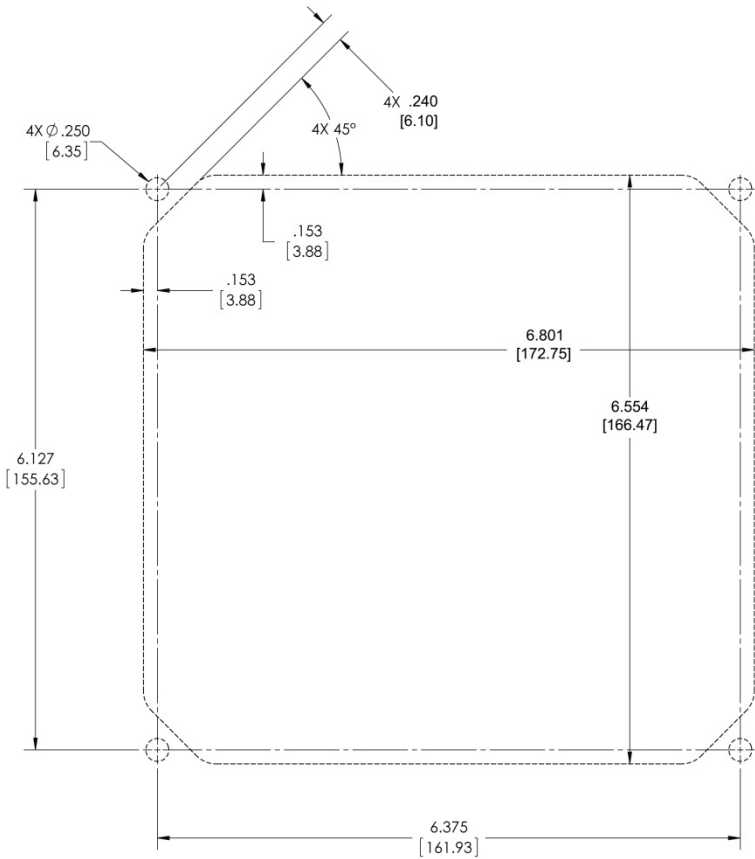
**Keypad/Gasket Material:** Silicone

# Mounting Template

## Panel Opening Cutout

Note: This template is for reference dimensions only.

Inches  
[mm]



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**ENOVATION CONTROLS CORPORATE HEADQUARTERS**  
5311 S 122ND EAST AVENUE  
TULSA, OK 74146

**ENOVATION CONTROLS – SAN ANTONIO OFFICE**  
6757 FARINON DRIVE  
SAN ANTONIO, TX 78249

**ENOVATION CONTROLS – HOUSTON OFFICE**  
105 RANDOLPH OYER RD  
ROSENBERG, TX 77471

**ENOVATION CONTROLS LTD. – UNITED KINGDOM**  
CHURCH ROAD LAVERSTOCK  
SALISBURY SP1 1UJ UK

**MURPHY ECONTROL TECHNOLOGIES (HANGZHOU) CO., LTD.**  
77 23RD STREET  
HANGZHOU ECONOMIC & TECHNOLOGICAL DEVELOPMENT AREA  
HANGZHOU, ZHEJIANG 310018 CHINA

**DOMESTIC SALES & SUPPORT**

**ECONTROL PRODUCTS**  
PHONE: 210 495 9772  
FAX: 210 495 9791  
EMAIL: [INFO@ECONTROL.COM](mailto:INFO@ECONTROL.COM)  
[WWW.ECONTROL.COM](http://WWW.ECONTROL.COM)

**MURPHY PRODUCTS**  
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FAX: 918 317 4586  
EMAIL: [SALES@FWMURPHY.COM](mailto:SALES@FWMURPHY.COM)  
[WWW.FWMURPHY.COM](http://WWW.FWMURPHY.COM)

**MURPHY CONTROL SYSTEMS & SERVICES**  
PHONE: 281 633 4500  
FAX: 281 633 4586  
EMAIL: [CSS-SOLUTIONS@FWMURPHY.COM](mailto:CSS-SOLUTIONS@FWMURPHY.COM)

**MURPHY INDUSTRIAL PANEL DIVISION**  
PHONE: 918 317 4100  
FAX: 918 317 4124  
EMAIL: [IPDSALES@FWMURPHY.COM](mailto:IPDSALES@FWMURPHY.COM)

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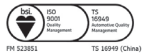
**UNITED KINGDOM**  
PHONE: +44 1722 410065  
FAX: +44 1722 410088  
EMAIL: [SALES@ENOVATIONCONTROLS.EU](mailto:SALES@ENOVATIONCONTROLS.EU)  
[WWW.FWMURPHY.EU](http://WWW.FWMURPHY.EU)

**CHINA**  
PHONE: +86 21 6237 5885  
FAX: +86 21 6237 5887  
EMAIL: [IPSALES@FWMURPHY.COM](mailto:IPSALES@FWMURPHY.COM)

**LATIN AMERICA & CARIBBEAN**  
PHONE: 918 317 2500  
EMAIL: [LASALES@FWMURPHY.COM](mailto:LASALES@FWMURPHY.COM)

**SOUTH KOREA**  
PHONE: +82 70 7951 4100  
EMAIL: [SKOREASALES@FWMURPHY.COM](mailto:SKOREASALES@FWMURPHY.COM)

**INDIA**  
PHONE: +91 91581 37633  
EMAIL: [INDIASALES@FWMURPHY.COM](mailto:INDIASALES@FWMURPHY.COM)



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