

M-Link® Installation Manual

Use this document as a guide to install the M-Link IoT Gateway. Installation is to be done by a qualified technician.

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Product Description

The M-Link IoT gateway is a messenger communication device with available Iridium® satellite, AT&T® and Verizon® services. It houses an internal cellular modem to ensure broadband field connectivity with a Wi-Fi hotspot. This device monitors equipment and can manage updates and changes across your assets with Bluetooth and Wi-Fi capabilities.

Available in both dual- and tri-mode. Both types automatically switch between cell carriers to capture the best available signal. The tri-mode units can also be configured to switch between cell and satellite carriers.

Features and Operations

M-Link Dual Mode – uses AT&T or Verizon cell service (cell only).

M-Link Tri Mode – uses AT&T or Verizon cell or Iridium satellite service (cell and satellite).

Mobile Application— M-Link Connect sized for a mobile screen and used for quick reference on fleets or single units from anywhere at anytime.

Web Application – M-Link Connect sized for a computer screen full view and offers extensive set-up options compared to mobile application.

RDM Application – Remote Device Management Client available only within the Web App for clients with special permissions and offers client-specific management opportunities.

Links

All M-Link application links are available at www.fwmurphy.com/mlink.

Parts Available

Part Number	Part Name	Description
53702504	M-Link Dual	M-Link Dual Mode AT&T & Verizon (cell only)
53702503	M-Link Tri	M-Link Tri Mode AT&T, Verizon & Iridium (cell & sat)
53703504	M-Link Dual + Harness Kit	M-Link Dual Mode and 12' harness
53703503	M-Link Tri + Harness Kit	M-Link Tri Mode and 12' harness
53704504	M-Link Dual + Harness + Mounting Kit	M-Link Dual Mode + 12' harness + mounting Kit
53704503	M-Link Tri + Harness + Mounting Kit	M-Link Tri Mode + 12' harness + mounting Kit
E2484897	12' Wire Harness	M-Link 18-pin connector 12' pig tail harness
E2484896001	25' Extension Harness	M-Link 18-pin connector 25' extension harness (male and female connectors)
E2484896002	50' Extension Harness	M-Link 18-pin connector 50' extension harness (male and female connectors)
E2484898	Bridge Dongle, Common Bus	M-Link Common Bus Bridge Dongle
53050069	Mounting Bracket	M-Link Mounting Bracket (top and side mount)
53050082	Mounting Kit	M-Link Mounting Bracket (hardware to mount to surface with bolts or magnets / top and side mount)

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M-Link Kit List

M-Link Dual + Harness Kit (53703504)		
Part Number	Description	QTY
53702504	M-Link Dual Mode AT&T & Verizon (cell only)	1
E2484897	M-Link 18-pin Connector 12' Pig Tail Harness	1

M-Link Tri + Harness Kit (53703503)		
Part Number	Description	QTY
53702503	M-Link Tri Mode AT&T, Verizon & Iridium (cell & sat)	1
E2484897	M-Link 18-pin Connector 12' Pig Tail Harness	1

Mounting Kit (53050082)		
Part Number	Description	QTY
53050082	Top or Side Mount for All M-Link Units	1

Kit Details

M-Link Dual + Harness Kit (53703504) + Mounting Kit (53050082)		
Part Number	Description	QTY
53702504	M-Link Dual	1
53050069	M-Link Mounting Bracket, Top/Side Mount	1
53050301	Neodymium Magnets 1.23"	4
E2314021002	Washer, Flat, SS, OD #10 x .5"	4
E2102011000	Nut, Top Lock, SS, #10-24	4
E2090051006	Screw, Flat Head Machine, SS #10-24 x 5/8"	4
E2262101	Cable Tie, Strain Relief, Edge Clip	2
E2484897	M-Link 18-pin Connector 12' Pig Tail Harness	1

M-Link Tri + Harness Kit (53703503) + Mounting Kit (53050082)		
Part Number	Description	QTY
53702503	M-Link Dual	1
53050069	M-Link Mounting Bracket, Top/Side Mount	1
53050301	Neodymium Magnets 1.23"	4
E2314021002	Washer, Flat, SS, OD #10 x .5"	4
E2102011000	Nut, Top Lock, SS, #10-24	4
E2090051006	Screw, Flat Head Machine, SS #10-24 x 5/8"	4
E2262101	Cable Tie, Strain Relief, Edge Clip	2
E2484897	M-Link 18-pin Connector 12' Pig Tail Harness	1

Mounting Kit (53050082)		
Part Number	Description	QTY
53050069	M-Link Mounting Bracket, Top/Side Mount	1
53050301	Neodymium Magnets 1.23"	4
80010804	Screw, Button Head Torx, ZN, 8-32 x 3/8"	4
E2314021002	Washer, Flat, SS, OD #10 x .5"	4
E2102011000	Nut, Top Lock, SS, #10-24	4
E2090051006	Screw, Flat Head Machine, SS #10-24 x 5/8"	4
E2262101	Cable Tie, Strain Relief, Edge Clip	2

Specifications

Hardware Specifications

Active dual 4G LTE cellular communication (AT&T & Verizon)
Iridium LEO (Low-Earth Orbit) satellite fallback
GPS for device location
Wi-Fi, Bluetooth and Ethernet for local data viewing and configuration
All internal antennas
Local Device Data Connections:
1 CAN
1 RJ45 Ethernet
2 RS485 ports (1 client, 1 server)
4 GB non-volatile storage for data logging and software updates
IP66 & IP67 ingress protection ratings
Pollution degree 2
CSA Class I, Division 2, Groups A, B, C and D, T4 Certified
Class 1, Zone 2 Groups IIC, T4
Compliance to ANSI C63.4 (2014) and 47 CFR Part 15 (USA & CAN-ADA)

Operating temperature: -40° to 176° F (-40° to 80° C)

Operating voltage: 10-30 VDC, 360 mA max, 4 W max

Software Specifications

Always connected automatic communication switching
Periodic data transmission at user-definable rates
User-configurable data maps
User-configurable alarms
Remote request for data snapshots on demand
Over-the-air updates for configuration changes and firmware
Remote firmware and configuration updates for FW Murphy-connected devices
Wi-Fi hotspot
Data aggregation for local SCADA systems available via Modbus RTU or Modbus TCP/IP
Supports Modbus RTU, Modbus TCP/IP, CAN bus (J1939 & CCP)



WARNING - EXPLOSION HAZARD. DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR AREA IS KNOWN TO BE NON-HAZARDOUS.

AVERTISSEMENT – RISQUE D'EXPLOSION. AVANT DE DECONNECTER LE'EQUIPMENT, COUPLER LE OURANT OUT SASSURER QUE L'EMPLACEMENT EST DESIGNE NON DANGEREUX.

- Please read the following information before installing the M-Link device. This installation information is intended for M-Link only. Observe all Warnings and Cautions at each section in these instructions.
- Installation is to be done only by a qualified technician of the Responsible Body. The safety of any system incorporating the equipment is the responsibility of the assembler of the system.
- Device shall be wired in accordance with NEC, CEC or other local code, as applicable.
- Do not use the equipment in a manner not specified. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Only use the mating electrical cable and connector provided by FW Murphy for the M-Link. This includes the 12-foot harness, 25-and 50-foot extension harnesses, dongle and mating connectors.
- Do not install product higher than 2000 meters above sea level. Maximum use altitude is 2000 m above sea level.
- This equipment may only be powered by a power supply unit with a limited energy electric circuit in accordance with CAN/CSA C22.2 No. 61010-1-12 and ANSI/UL 61010-1, or Class 2 as defined in the Canadian Electrical Code C22.1, Section 16-200 and/or National Electrical Code (NFPA 70), article 725.121.
- Range of environmental conditions for which the equipment is designed including the following:
 - Pollution Degree: 2.
 - Overvoltage Category: II.
- CLASS 2258 03 - PROCESS CONTROL EQUIPMENT – Intrinsically Safe and Non-incendive systems - For Hazardous Locations.
- CLASS 2258 83 - PROCESS CONTROL EQUIPMENT - Intrinsically Safe and Non-incendive systems - For Hazardous Locations – Certified to U.S. Standards.
- Mount the M-Link to a NEMA type 4X enclosure. The mounting surface flatness must maintain a tolerance ≤ 0.0156 in (0.5 mm) across the entire gasket surface to maintain the NEMA type of seal to the enclosure.

Installation

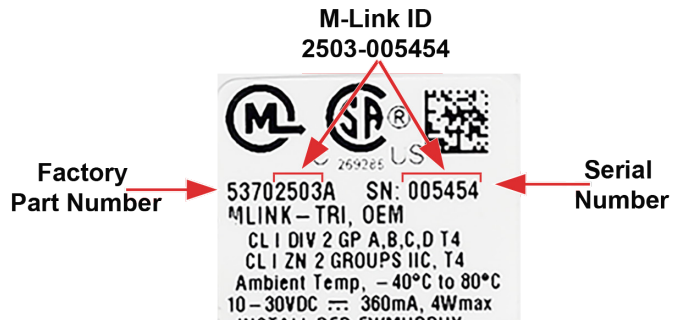
Before you install your M-Link device, you will need (1) a password from the IoT team, (2) to install the mobile application and (3) to connect the M-Link to the system.

Once the M-Link is in the system, you can load the configuration on the device via mobile app or Web app with internet connection. This can also be done locally via Bluetooth or Wi-Fi without internet connection.

Get Password for Setup

1. Locate the ID sticker on the bottom of the M-Link device (see example at right).
2. Send an email to IOThelpdesk@fwmurphy.com and include the M-Link ID number, panel number and unit information. You will receive an email with a password to set up the device.

NOTE: The M-Link ID, device ID or device part number and serial number are the same.



NOTE: Use a dash to separate the two groups of numbers. Making the M-Link ID 2503-005454, the A is not used.

Set Up Mobile App (M-Link Connect) – Connecting Device

After receiving FW Murphy's IoT portal invite with your login ID and password from notifications@noreply.fwmurphy-iot.com, you may open and set up the mobile app using the credentials.



SCAN ME

1. With your smartphone, scan this QR code and download the M-Link Connect app. Another option is to scan the QR code on the M-Link shipping box or open fwmurphy.com/mlink, scroll down and download the M-Link Mobile App.
2. Open app and select Login.
3. Accept the b2clogin.com.
4. Sign in with the email address and password you received via email.



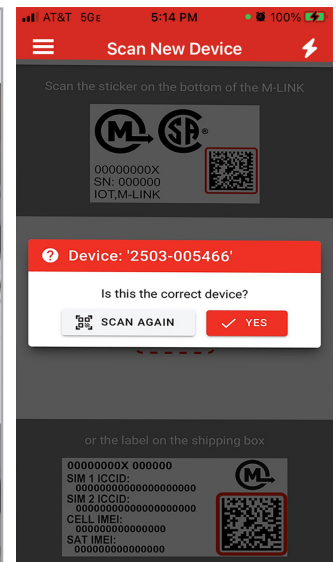
QR sticker on M-Link shipping box



M-LINK Connect
Fleet Management m...
★★★★★ 4

Icon for M-Link Mobile App

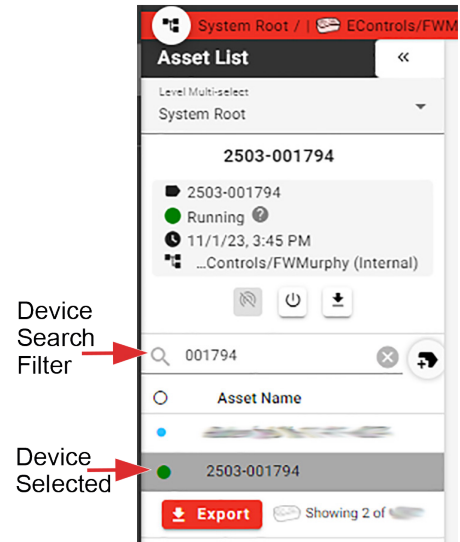
5. Select Menu.
 6. Choose Scan New Device.
 7. Position the red frame over the M-Link ID sticker on bottom of M-Link. This will enter the information into the system. Confirm device.
 8. Select Device Group and confirm.
 9. "Success" will appear.
- NOTE: Pending your permissions level you may be asked to change the default billing plan. You can choose to change/activate it now (Yes) or later (No).
10. To view device in the system select Menu, choose Home and enter the device ID in search. The device ID will appear on screen with its information.



Set Up Web App (M-Link Connect)

Once the M-Link is in the system, you may view the device from the Web app and create setup and user options.

1. Open www.fwmurphy-iot.com.
2. Sign in with the same email address and password you received via email and used for the mobile app.
3. In the Home Dashboard, enter the Device ID in the search bar located under Asset List on left side of screen.
4. Select Device ID under Asset Name. The Dashboard will display the device information in the Widgets.



Loading Configuration for First-Time Use

Once the M-Link is in the system, you may load the configuration. This can be done before or after installation.

1. Install the configuration. There are two ways to achieve this.
 - a. Option 1
 - i. If your company has a configuration to load into the system, contact your internal M-Link administrator to gain access.
 - ii. Power up the M-Link.
 - iii. Work with your internal team to send file to the M-Link.
 - b. Option 2
 - i. Email IOTHelpdesk@fwmurphy.com and include the M-Link serial number, connected device(s), communication type(s), addresses and speed(s).
 - ii. Power up the M-link.
 - iii. FW Murphy's team can load the file directly to the M-Link.

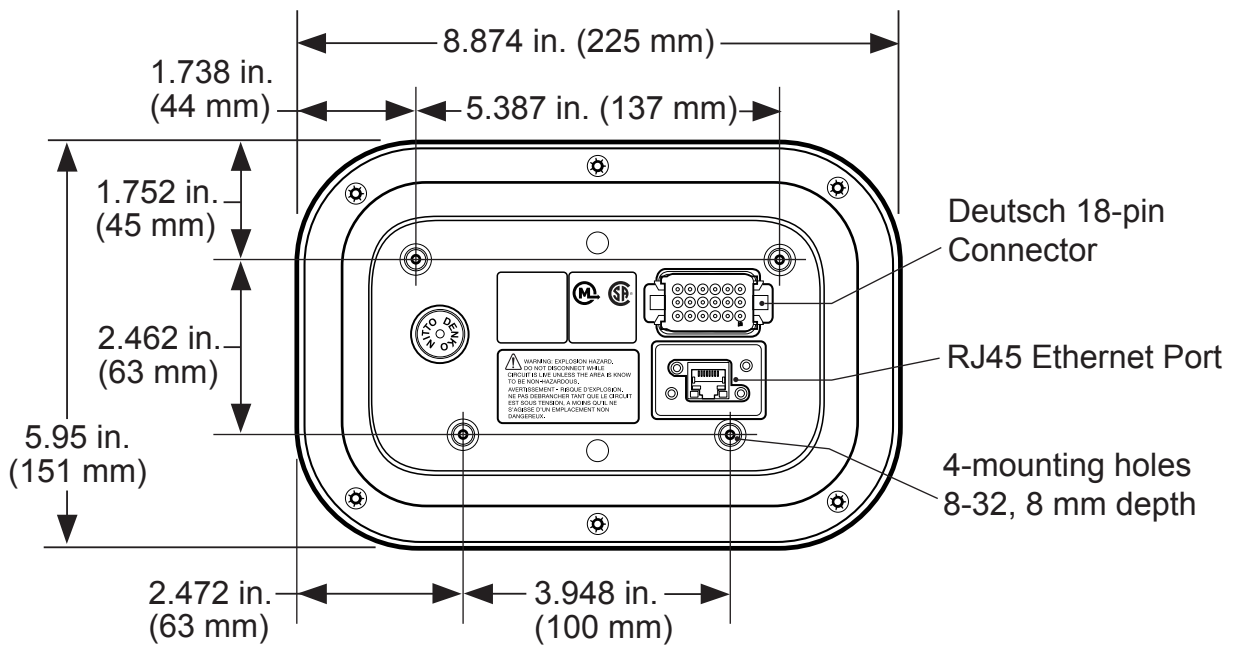
M-Link Mounting Information



CAUTION: Before beginning installation of this product, disconnect all electrical power to the equipment. Make sure the equipment cannot operate during installation. Follow all safety warnings of the equipment manufacturer. Read and follow all installation instructions.

- Mount the M-Link horizontally so the top is toward the sky. Keep metal away from all sides and top of the M-Link by 12 inches or more to achieve best performance.
- Do not place objects on top of or touching the sides of the M-Link.
- We suggest mounting to the flat surface on the top or side of the panel. Another option is using our bracket mount kit.
- Mount the M-Link with gasket down against a flat surface and secure with fasteners provided using an X-pattern. Torque to 18.14 in-lb ± 2.7 in-lb (2.05 Nm ± 0.3Nm). Do not overtighten.
- Direct mount requires surface cutout at the 18-pin connector and Ethernet port. Drill (4) mounting screw holes. See M-Link Cutout Template section.
- The bracket with magnet mount prevents cutting the mounting surface.

M-Link Mounting Dimensions



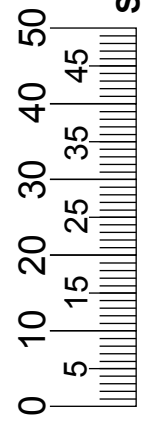
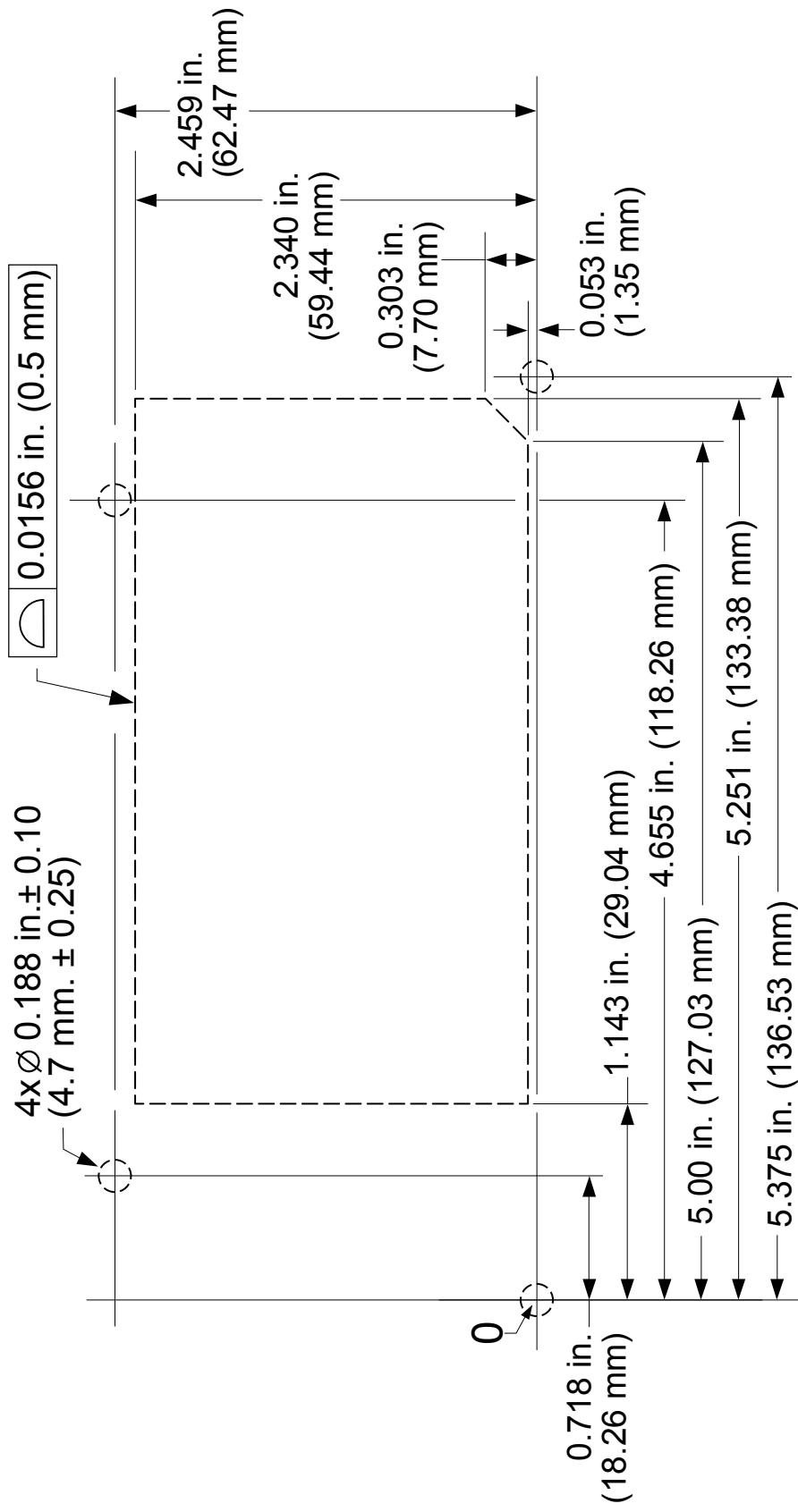
Direct Mount

1. Ensure the harness and Ethernet wires will have clearance to connect to M-Link from underneath and route to connections.
2. Use the cutout dimensions on the mounting surface from the topside. Cut the mounting surface for the 18-pin connector and Ethernet port so the device will rest flat on surface.
3. Drill holes for the (4) mounting screws.
4. Mount the M-Link with gasket down against mounting surface and secure with fasteners provided using an X-pattern. Torque to 18.14 in-lb. \pm 2.7 in-lb. (2.05 Nm \pm 0.3Nm). Do not overtighten.

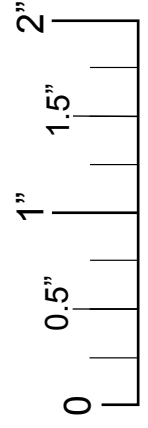


M-Link mounted on FW Murphy panel

CUT-OUT FROM TOP SIDE SCALE 1:1 IN. (MM.)



SCALE 1:1 mm.



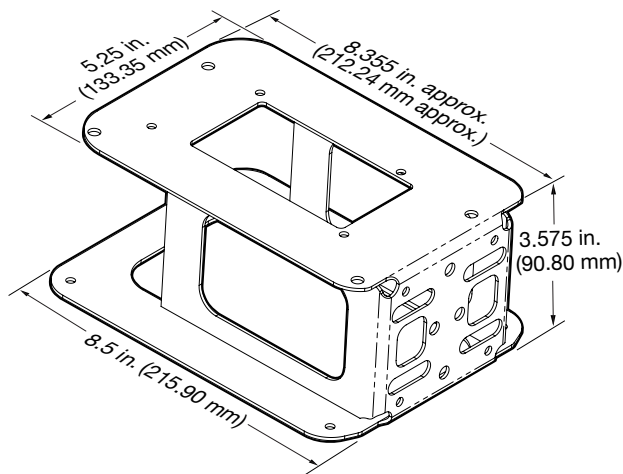
SCALE 1:1 inches

Bracket Mount Kit

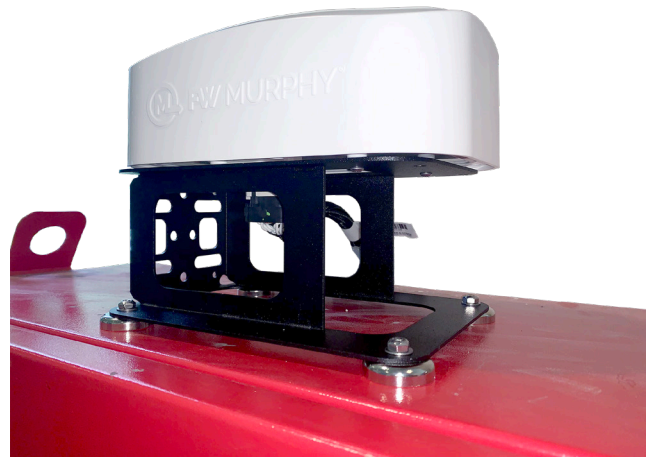
When using the M-Link Bracket Mount Kit with fasteners provided in the kit, mounting options include top or side mount. The M-Link is secured using magnets or drilling holes in the surface for mounting bolts.

Bracket Mount with Magnets

1. Attach the M-Link to the bracket. Place M-Link on bracket matching the mounting holes and secure with short screws from underneath top side of bracket to M-Link.
2. Tighten screws using an X-pattern. Torque to 18.14 in-lb. \pm 2.7 in-lb. (2.05 Nm \pm 0.3Nm). Do not overtighten.
3. Insert bolt through magnets flat side to sit flush in countersink (4). Attach to bottom of brackets mounting holes (4) and secure with flat washer and locknut (4).
4. Attach the M-Link harness 18-pin connector to the M-Link. Place the mounting assembly on the surface.
5. Support the harness using the provided stay straps to secure the harness in several places to prevent excessive vibration and to keep away from heated or moving parts. The special clips allow for attaching to metal or plastic when holes are not present.



M-Link Mounting Bracket (universal)



Bracket Mount with magnets on top of panel

Bracket Mount with Bolts

1. On the mounting surface, mark and drill holes for the (4) mounting bolts.
2. Attach the M-Link to the bracket. Place M-Link on bracket matching the mounting holes and secure with short screws from underneath top side of bracket to M-Link.
3. Tighten screws using an X-pattern. Torque to 18.14 in-lb. \pm 2.7 in-lb. (2.05 Nm \pm 0.3Nm). Do not overtighten.
4. Place the bracket on mounting surface aligned with holes. Secure with provided bolts, washers and locking nuts. Tighten fasteners using an X-pattern.
5. Attach the M-Link harness 18-pin connector to the M-Link. Place the mounting assembly on the surface.
6. Support the harness using the provided stay straps to secure the harness in several places to prevent excessive vibration and to keep away from heated or moving parts. The special clips allow for attaching to metal or plastic when holes are not present.

M-Link Harness Connections

Make the M-Link Harness connections. Extension harnesses of 25 ft. and 50 ft. are available if needed.

- Deutsch 18-pin connector to the M-Link unit
- DC+ wire to battery power (10-30 VDC, 3A)
- GND to battery ground
- Enable to battery power
- Communication wires as appropriate to EICS, TTD, Centurion, PLC, etc.
- Dual ECM application only: dongle connects 2 to 3 and 8 to 9

M-Link Harness Connections		
PIN	Name/Function	Description
1	Enable	Switched VDC+ (Sleep)
2	CAN HI	CAN Positive
3	CAN HI Dongle	Dual ECM only (2 to 3)
4	Unused	
5	RS485 Shield 1	
6	RS485 B2	RS485_2 Low
7	CAN Shield	
8	CAN LO	CAN Negative
9	CAN LO Dongle	Dual ECM only (8 to 9)
10	Unused	
11	RS485 Shield 2	
12	RS485 A2	RS485_2 High
13	DC-	Ground
14	DC+	10-30 VDC, 3A
15	Unused	
16	Unused	
17	RS485 A1	RS485_1 High
18	RS485 B1	RS485_1 Low

Communications Wiring

For detailed illustrations, please refer to the online document, Wiring Diagrams for CAN Communication in Control Panels at <https://www.fwmurphy.com/resources-support/other-support-resources>.

M-Link Communications Wiring to Controller System	
Controller System	Wire Connection
EICS	CAN HI / LO
Centurion	C4 = RS485
	C5 = RS485 or CAN or Ethernet
ASC	CAN HI / LO
PLC	RS485 or CAN or Ethernet
TTD	RS485 HI / LO
TDXM	RS485 HI / LO
EICS-Dual ECM	CAN HI / LO (Must Use Dongle)

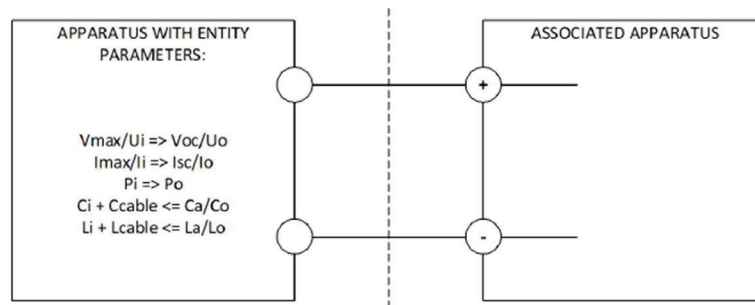
Entity Parameters

Inputs / Outputs are only for connections for devices located in CLASS 1, DIVISION 2, GROUPS A, B, C, D, OR CLASS 1, ZONE 2 GROUP, IIC HAZARDOUS location or ordinary (NONHAZARDOUS) location with non-incendive simple apparatus or approved device with entity concept parameters (V_{oc}/U_o , I_{sc}/I_o , P_o , C_a/C_o , L_a/L_o , V_{max}/U_i , I_{max}/I_i , P_i , C_i , L_i) appropriate for connection to associated apparatus with entity concept parameters as listed in the tables..

- The output current of this apparatus is limited by resistor such that the output voltage-current plot is a straight line drawn between open-circuit voltage and short-circuit current. The entity concept allows interconnection of non-incendive apparatus with associated apparatus not specifically examined in combination as a system when the approved values of V_{oc} (or U_o) and I_{sc} (or I_o) for the associated apparatus are less than or equal to V_{max} (U_i) and I_{max} (I_i) for the non-incendive apparatus. Capacitance and inductance of the field wiring from the non-incendive apparatus to the associated apparatus shall be calculated and must be included in the system calculations. Cable capacitance, C_{cable} , plus non-incendive equipment capacitance, C_i must be less than the marked capacitance, C_a (or C_o), shown on any associated apparatus used. The same applies for inductance (L_{cable} (or L_i) and L_a (or L_o), respectively). Where the cable capacitance and inductance per foot are not known, the following values shall be used $C_{cable} = 60\text{pF/ft}$, $L_{cable} = 0.2 \mu\text{H/ft}$.

Hazardous (Classified) Location
Class I, Div 2 Grps A, B, C and D
Class I, Zone 2, Group IIC
IECEx/ATEX Zone 2, Group IIC

Nonhazardous Location
or
Hazardous (Classified) Location
Class I, Div 2 Grps A, B, C and D
Class I, Zone 2, Group IIC



$$V_{max}/U_i \geq V_{oc}/U_o; I_{max}/I_i \geq I_{sc}/I_o; C_a/C_o \geq C_i + C_{cable}; L_a/L_o \geq L_i + L_{cable}$$

- This apparatus may also be connected to non-incendive or simple apparatus as defined in Article 504.2 and installed and temperature classified in accordance with Article 504.10(B) of the National Electrical Code (ANSI/NFPA 70), CEC C22.1 Annex F for non-incendive field wiring, and other local codes, as applicable for connection with entity concept parameters as listed in tables. Examples of 'simple apparatus' are general purpose contact/switch, thermocouples and RTD.
- Control equipment must not use or generate more than 250 V rms or dc with respect to earth.
- For installations in which both C_i and L_i of the non-incendive apparatus exceeds 1% of the C_a/C_o and L_a/L_o parameters of the associated apparatus (excluding the cable), then 50% of C_a/C_o and L_a/L_o parameters are applicable and shall not be exceeded.
- This equipment is suitable for use in non-hazardous locations and hazardous locations Zone 2, Group IIC T4 or Class I, Division 2, Groups A, B, C, D Temperature Code T4 Installations.

Ethernet Port

Designation	VOC/UO [V]	ISC/IO [mA]	PO [mW]	La/LO [mH]	Ca/CO [μ F]	VMAX/Ui [V]	IMAX/li [mA]	Pi [mW]	Li [mH]	Ci [μ F]
J3	3.3	\pm 64	212	19.09	999.9	3.3	\pm 64	212	0.44	0.002

Non-Incendive Field Wiring Parameters

Pin	Designation	VOC/UO [V]	ISC/IO [mA]	PO [mW]	La/LO [mH]	Ca/CO [μ F]	VMAX/Ui [V]	IMAX/li [mA]	Pi [mW]	Li [mH]	Ci [μ F]
1	Enable	0	0	0	-	999.9	0	0	0	-	0.1
2	CAN HI	5	100	123	8	999.99	5	100	124	0	0.0003
3*	CAN HI/ ML2	5	100	123	8	999.99	5	100	124	0	0.0003
4	Unused	-	-	-	-	-	-	-	-	-	-
5	RS485 Shield 1***	-	-	-	-	-	-	-	-	-	0.1
6	RS485 B2	5	60	124	22.2	999.99	5	60	124	0	0.01
7	CAN shield	-	-	-	-	-	-	-	-	-	0.01
8	CAN LO	5	100	123	8	999.99	5	100	124	0	0.0003
9*	CAN LO/ ML2	5	100	123	8	999.99	5	100	124	0	0.0003
10	Unused	-	-	-	-	-	-	-	-	-	-
11	RS485 Shield 2***	-	-	-	-	-	-	-	-	-	0.1
12	RS485 A2	5	60	124	22.2	999.99	5	60	124	0	0.01
13	DC-**	Ground Pin									
14	DC+	-	-	-	-	0.12	30	360	4000	.617	0.1
15	Unused	-	-	-	-	-	-	-	-	-	-
16	Unused	-	-	-	-	-	-	-	-	-	-
17	RS485 A1	5	60	124	22.2	99.99	5	60	124	0	0.01
18	RS485 B1	5	60	124	22.2	99.99	5	60	124	0	0.01

* Pins 3 and 9 are un-assigned in the product but are present when optional bridge harness is being used.

**DC- connects to power return.

***CAN shield, RS485 Shield 1, RS485 Shield 2 connects to ground.

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FW MURPHY PRODUCTION CONTROLS

SALES, SERVICES & ACCOUNTING
4646 S. HARVARD AVE.
TULSA, OK 74135

MANUFACTURING

2151 RANDON DYER ROAD
ROSENBERG, TX 77471

DOMESTIC SALES & SUPPORT

FW MURPHY PRODUCTS
PHONE: 918 957 1000
EMAIL: INFO@FWMURPHY.COM
WWW.FWMURPHY.COM

FW MURPHY CONTROL SYSTEMS & SERVICES
PHONE: 281 633 4500
EMAIL: CSS-SOLUTIONS@FWMURPHY.COM

INTERNATIONAL SALES & SUPPORT

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PHONE: +1 918 770 8775
EMAIL: INTERNATIONAL@FWMURPHY.COM



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