



HIT-NOT Proximity System

FMM-C

User's Manual v1.0



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1 Overview

The Facility Marker Module - Control (FMM-C) provides complementary capabilities to a HIT-NOT® Proximity Protection System. It detects the presence of a 73 kHz magnetic field generated by a HIT-NOT® Magnetic Field Generator (MFG). When the magnetic field strength reaches a high enough level, the Facility Marker Module - Control initiates a predetermined action. The Facility Marker Module - Control threshold is adjustable by the user. A typical purpose of the Facility Marker Module - Control is to activate a flashing light to alert workers of an approaching truck. It is thus ideal for intersections and pedestrian areas with blind corners. The Facility Marker Module - Control is typically installed at a fixed location. The predetermined actions are initiated via discrete signals sent out via wires to other devices such as lights, gates, horns, etc.

1.1 Theory of Operation

The functions of the Facility Marker Module - Control are:

- To sense the 73 kHz field generated around a vehicle or piece of machinery equipped with a MFG.
- To echo a signal back to the MFG to confirm signal recognition.
- Turn on a discrete signal output when the 73 kHz signal from the MFG is confirmed and exceeds a preset threshold. (The threshold is adjustable by the user.)

When the magnetic field from a MFG system installed on a moving vehicle impinges on an Facility Marker Module - Control, the Facility Marker Module - Control will detect the 73 kHz magnetic field from the generator and analyze its field strength. The Facility Marker Module - Control sends an echo back to the MFG with a 916.48 MHz transmission to confirm the signal recognition, but it does not send an alert to the MFG. Instead, when the 73 kHz field strength received by the Facility Marker Module - Control is above a certain threshold, the Facility Marker Module - Control sends discrete signals to two independent output connections labeled as Mode "Out A and Mode Out B. This enables one or two peripheral devices to be connected to the Facility Marker Module - Control via an electrical cable. Each mode can be used alone or both modes can be used simultaneously. Examples of peripheral devices include lights, gates, horns, etc.

There are four mechanical slide-switches that allow further definition of four possible actions for each mode. Example actions that can be selected include whether the discrete signal is continuous, the signal times-out, the signal is normally ON, or the signal is normally OFF. Further details are given in the Section 2.1.2 – Operation.

1.2 Frequency of Operation

The Facility Marker Module - Control receives on a frequency of 73 kHz and transmits at 916.48 MHz.

1.3 FCC/IC Information

The FCC ID for the Facility Marker Module - Control is QUI-DDAC-FMM-C-SM and complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received including interference that may cause undesired operation.

Any intentional or unintentional changes or modifications to the configuration of the Range Adjust Tool, not expressly approved by Frederick Energy Products LLC, could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is not guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.*
- Increase the separation between the equipment and receiver.*
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- Consult the dealer or an experienced radio/TV technician for help.*

Conformité aux normes FCC Cet équipement a été testé trouvé conforme aux limites pour un dispositif numérique de classe B, conformément à la Partie 15 des règlements de la FCC. Ces limites sont conçues pour fournir une protection raisonnable contre les interférences nuisibles dans une installation résidentielle.

Cet équipement génère, utilise et peut émettre des fréquences radio et, s'il n'est pas installé et utilisé conformément aux instructions du fabricant, peut causer des interférences nuisibles aux communications radio.

Rien ne garantit cependant que l'interférences ne se produira pas dans une installation particulière. Si cet équipement provoque des interférences nuisibles à la réception radio ou de télévision, qui peut être déterminé en comparant et en l'éteignant, l'utilisateur est encouragé à essayer de corriger les interférence par une ou plusieurs des mesures suivantes:

- Réorienter ou déplacer l'antenne de réception.*
- Augmenter la distance entre l'équipement et le récepteur.*

--Branchez l'appareil dans une prise sur un circuit différent de celui auquel le récepteur est connecté.

--Consulter le vendeur ou un technicien radio / expérimenté.

Les changements ou modifications à cet appareil sans expressément approuvée par la partie responsable de conformité pourraient annuler l'autorité de l'utilisateur de faire fonctionner cet équipement.

The required notices are specified in the RSS documents (including RSS-Gen) applicable to the equipment model. **These notices are required to be shown in a conspicuous location in the user manual for the equipment, or to be displayed on the equipment model. If more than one notice is required, the equipment model(s) to which each notice pertains should be identified.** Suppliers of radio apparatus shall provide notices and user information in **both English and French.**

This device complies with Industry Canada license-exempt RSS-standards(s). Operation is subject to the following two conditions:

- (1) this device may not cause interference, and
- (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme avecx Industrie Canada exempt de licence Rss standard(s). Son fonctionnement est soumis aux deux conditions suivantes:

- (1) cet appareil ne peut causer d'interférence, et*
- (2) cet appareil doit accepter toute interférence, y compris des interférences qui peuvent provoquer un fonctionnement indésirable du périphérique.*

2 Operation

2.1 Installation Information

The Facility Marker Module - Control typically mounts at a fixed location on walls, posts, etc. Mounting can be accomplished using four magnets shipped with unit. The exact location is selected based on where the user wants the moving vehicle to cause activation of the peripheral device. For example, it may be desired to activate a flashing light at a point at some distance before the moving vehicle reaches the flashing light. In this case the Facility Marker Module - Control would be positioned far enough away to provide adequate warning of the approaching vehicle while the peripheral warning light would be mounted at the specific point where danger to pedestrians was greatest.

A mounting location should be free from strong electro-magnetic interference (EMI). Mounting close to a source of EMI may result in erratic responses, especially if very close proximity to

some electronic devices. A safe guideline is to keep the Facility Marker Module - Control at least 21 inches away from any electrical/electronic device (including hidden electrical power wires). One test to determine whether the location is acceptable is to hold a Personal Alarm Device (PAD) at the same potential location where the FMM-C is to be mounted. Then verify that the PAD functions OK when near the edge of a magnetic field from a MFG. If the PAD functions properly then the Facility Marker Module - Control will likely function properly also.

2.1.1 Wiring Connections for Peripheral Devices

An Facility Marker Module - Control includes a six-wire output cable “pigtail” stored in the Facility Marker Module - Control Mounting Base. These wires provide connections for the Mode Out A and Mode Out B options.

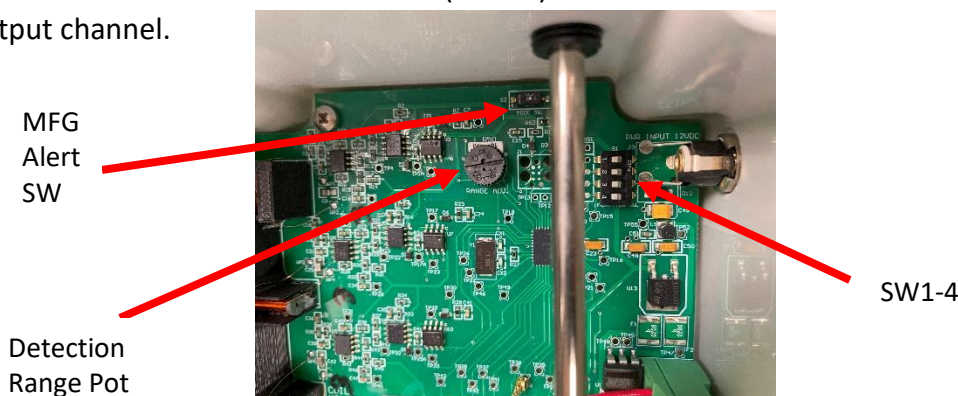
- Mode Out A - To use output Mode Out A, connect the Red wire to the peripheral device positive connection and the Black wire to the peripheral device negative connection.
- Mode Out B - To use output Mode Out B, connect the Yellow wire to the peripheral device positive connection and the Green wire to the peripheral device negative connection.



As discussed earlier, either Mode Out A or Mode Out B can be connected alone, or they can be simultaneously connected to separate peripheral devices.

2.1.2 Multiple Output Functional Options

In addition to the availability of two different output channels (Mode Out A and Mode Out B), each of these output channels have four functional options for their operation. These options are selected via a four slide switches (SW1-4). Table 1 below delineates the four options for each output channel.



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Table 1. Mode Switch Settings

Mode Out A			Mode Out B		
SW1 Setting	SW2 Setting	Mode Function	SW3 Setting	SW4 Setting	Mode Function
ON	ON	Output times-out after 5 sec when MFG is present	ON	ON	Fast Flash of lights when MFG is present.
ON	OFF	Continuous output when MFG is not present - stops when MFG is present	ON	OFF	Continuous output when MFG is not present - stops when MFG is present
OFF	ON	Output times-out after 3 sec when MFG is present	OFF	ON	Slow flash of lights when MFG is present
OFF	OFF	Output continuous - when MFG is present	OFF	OFF	Output continuous - when MFG is present

2.1.3 Inoperability Warning

The primary source of inoperability for an Facility Marker Module - Control is erratic behavior caused by EMI sources near the unit. Excessive EMI impinging on the Facility Marker Module - Control can causes the FMM-C sensing elements to inaccurately sense magnetic field strength; thus, shortening the detection distance.

2.2 Charging

The Facility Marker Module - Control receives 12 VDC power from a Wall Wart Power Converter connected to a 110 – 240 VAC power source.

2.3 Alerts

Facility Marker Module - Controls do not issue alerts other than the deliberate discrete signals sent to peripheral devices.

2.4 Maintenance

The Facility Marker Module - Control should be regularly cleaned to reduce buildup of dust and dirt. A daily check should be performed to verify that power is applied. There is a blue power-LED on the Facility Marker Module - Control, visible on the housing. There also should be a daily test to verify that the detection range of the Facility Marker Module - Control is acceptable. The detection can be tested by driving a MFG- equipped-vehicle by the Facility Marker Module - Control.

2.5 Adjustments

A potentiometer installed on printed circuit board (See figure in Section 2.1.2) provides the capability for users to adjust the range where moving vehicles with MFG are detected. Maximum range for the Facility Marker Module - Control detection is approximately 43 ft. To perform the adjustment, park the vehicle with MFG at the desired distance away from the Facility Marker Module - Control (within 43 ft. of each other). The proper field is set when the Orange LED on the printed circuit board illuminates. Turn the potentiometer knob to the right to increase the distance, and to the left to decrease.

2.6 Interferences

There are instances when the magnetic field generated from other sources such as an electrical panel, motorized machinery, large conductor cables etc. can generate EMI disturbances that are picked up by the Facility Marker Module - Control. However, these disturbances are usually local in nature and moving the Facility Marker Module - Control a few feet from that location will result in a location with an acceptable EMI environment.

2.7 Facility Marker Module - Control Specifications

Model Number: FMM-C

Size:

Weight:

Input Voltage: 12 VDC

Magnetic Field Frequency: none

Receiver Frequency: 73 kHz signal

Transmitter Frequency: 916.48 MHz

Transmitter Power: 0.001W (typical)

Facility Marker Module - Control

Battery: none

Operating Temperature Range: -40°C to + 55°C ; -40°F to 130°F

Shipping Considerations: none

3 Revision History

3.1 Version 1.0 – February 20, 2021

Original Release. No revision history.