



User's Manual

MFS-RX-2G4

1. DESCRIPTION

The MFS-RX-2G4 is a 2.4GHz MFS Receiver with 16 digital outputs, 1 PWM output, 1 main contact output, 4 digital inputs, and 4 analog inputs. The 16 digital outputs are individually configurable for on/off delay, normally open or normally closed (NO/NC) output, output latching, and output assignments of DK or configurable logic functions. The PWM output is configurable for normal or inverted outputs, dithering, and up to 4 speed settings defined per DK and selectable by digital output, digital input, load limit, or logic functions.

Note: 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.

2. TECHNICAL SPECIFICATIONS

Temperature Range	-30° to +70° Celsius
Supply Voltage Range	6-36 VDC
Supply Current	<80mA @ 12V (No External Load)
Outputs	16 Digital (Max: 6A single, 135°C) 1 PWM (Max: 4A) 1 Main Contact (Max: 25A, 125°C) 1 5 VDC Supply (Max: 300mA) 9 Status LEDs RF/Cable Backup Feedback
Inputs	VSW Supply (6-36VDC) 4 Digital (0-36VDC Digital, High above 4V) 4 Digital/Analog (0-10VDC or 0-20mA) 1 Learning Switch RF/Cable Backup Data

Note: The user is cautioned that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

3. **FUNCTIONAL DESCRIPTION**

3.1. **Receiver Operation**

- The main contact (MC) is a normally open high-side dual switch connected to UB. The main contact will turn off after all transmitter buttons are released (time is based on H-Link programming).
- D3 – D14 and P1 are internally powered by the main contact.
- D1, D2, D15, and D16 are powered by VSW. Main contact may be connected to VSW for safety operation of these signals if desired.
- D1 – D16 are high-side switched outputs and are fully programmable with the H-Link (on/off delay, NO/NC, latching, DK/logic assignment, input/output interlocking).
- In DK1 Static Mode, any received DK will activate the main contact if no error is detected. In DK1 Pulsed Mode, the main contact will only activate if DK1 is received. Any other DK received in Pulsed Mode when the system is not started will trigger an error.
- DK1 may be used to clear previous system errors.
- The STOP function will clear all outputs (MC, D1-D16, P1) immediately.
- Short circuit protection is activated if voltage is detected on the main contact output while the circuit is not active. If a main contact short circuit is detected the system will enter an error state.
- DIN1-4 are digital inputs. They can be configured via H-Link for NO/NC, interlocking, and interlocking delay operation.
- AIN1-4 are analog inputs. They can be calibrated for use in arbitrary unit conversions and configured as digital inputs 5-8. In digital mode, the high/low threshold is adjustable.
- Analog input error is detected if an analog channel is 0V or greater than 5V. This can be used to select a PWM speed on open or short circuit detection.
- P1 is the PWM output. The min/max values, dither amplitude, dither frequency, speed settings, and speed selections are adjustable via H-Link.
- PWM speeds may be selected using a logic AND function with a digital output, digital input, analog error, load percentage, or logic gate result.
- A feedback telegram is transmitted immediately after a control telegram is received. In repeater mode, this will be followed by repeating the control telegram.
- The system includes a load-limiting calculation function. The coefficients for the equation, analog sensor calibration, analog sensor mapping, and load vibration feedback pulses are configurable via H-Link and may be monitored using online status mode. The system load status may be used to select PWM speeds or interlock digital outputs.
- The system provides a “boost” function to allow user overrides during overload conditions. Boost PWM speed settings, load interlocking override, maximum boost load percentage, and boost on/off/wait times are provided via H-Link.

3.2. **Learning Function**

The receiver has a learning function that allows the user to set the receiver’s address and channels to a transmitter’s without the need for an H-Link programmer. To use the learning function follow these steps:

1. Press and hold START (DK1) on the transmitter.
2. While holding START press and hold the learning button on the receiver.
3. The Green LED will begin flashing when learning is complete.

3.3 Over Current Protection

3.3.1 Main Contact

The main contact current protection is maintained by the main contact hardware switches and limits the overall current provided through D3-14 and the PWM (and Vsw if connected). These switches will detect an overload and open the circuit automatically. The cutoff criteria are as follows:

Maximum Load Current: 25A

Maximum Unit Temperature: 150°C

3.3.2 PWM Output

The PWM current sensing function of the Main Controller limits the output to 4A and may be further limited by the PWM speed settings. The PWM uses no temperature limiting.

3.3.3 Digital Outputs

The digital outputs are grouped together in hardware and each group is independently current and temperature protected. The digital output groupings are shown in Table 3, below.

Output Groupings	
Group	Outputs
1	1, 2, 15, 16
2	3, 4, 5, 14
3	6, 7, 12, 13
4	8, 9, 10, 11

Table 3 – Output Protection Groups

If the circuit protection is enabled, all four outputs attached to the faulting group will be disabled (open). In the event of a fault, the group will be enabled after the temperature lowers below the maximum temperature. The cutoff criteria for each group is as follows:

Maximum Single Channel Load Current: 6A

Maximum Group Reset Temperature: 135°C

Maximum Group Shutdown Temperature: 200°C

For applications with multiple high power loads that will be activated simultaneously, it is advisable to distribute the high power loads across different output groups. This allows such loads to operate simultaneously with a decreased chance for overheating the output circuitry.