XM Electronic Overspeed Detection System

Catalog Numbers XM-442, XM-220, 1606-XLP
Important User Information

Solid-state equipment has operational characteristics differing from those of electromechanical equipment. Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls (publication SGI-1.1 available from your local Rockwell Automation sales office or online at http://www.rockwellautomation.com/literature/) describes some important differences between solid-state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid-state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.

- **WARNING:** Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

- **ATTENTION:** Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.

- **SHOCK HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.

- **BURN HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.

- **IMPORTANT** Identifies information that is critical for successful application and understanding of the product.

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DeviceNet is a trademark of the Open DeviceNet Vendor Association (ODVA).

Microsoft and Windows are registered trademarks of the Microsoft Corporation.

Trademarks not belonging to Rockwell Automation are property of their respective companies.
European Communities (EC) Directive Compliance

If this product has the CE mark it is approved for installation within the European Union and EEA regions. It has been designed and tested to meet the following directives.

**EMC Directive**

This product is tested to meet the Council Directive 89/336/EC Electromagnetic Compatibility (EMC) by applying the following standards, in whole or in part, documented in a technical construction file:

- EN 61000-6-4 EMC — Generic Standards, Part 6-4 — Emission Standard for Industrial Environments (Class A)
- EN 61000-6-2 EMC — Generic Standards, Part 6-2 — Immunity Standard for Industrial Environment
- EN 61326-6-2 Electromagnetic Equipment for Measurement, Control, and Laboratory Use — Industrial EMC Requirements

This product is intended for use in an industrial environment.

**Low Voltage Directive**


**ATEX Directive**

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Chapter 1

Introduction

This chapter provides an overview of the XM Electronic Overspeed Detection System. It also discusses the components of the Electronic Overspeed Detection System.

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Introducing the Electronic Overspeed Detection System

The XM® Electronic Overspeed Detection System (EODS) is a highly reliable, redundant system that fully meets the performance, measurement, and relay requirements of the American Petroleum Institute Standards 670 and 612 as pertaining to overspeed protection. It is intended for use on gas and steam turbine driven machinery where protection is required to prevent potentially catastrophic failures of the machine from overspeed events.

Figure 1.1 XM EODS

![Diagram of XM EODS system](image-url)
The XM EODS is comprised of the following components:

- **Two Allen-Bradley™ 1606-XLP30E Power Supplies** - The two power supply modules (85 - 264 VAC input, +24V DC output) provide redundant power to the EODS. Each power supply is independently capable of supplying power for the entire system. If one of the power supply modules fails, the system will continue to operate properly.

- **Three XM-220 Dual Speed modules** - The three XM-220 modules individually accept input signals from a proximity probe transducer or magnetic pickup. Each module measures the speed of the transducer and compares it against a user-defined danger threshold value. The modules also record the highest measured speed.

The XM-220 modules include an overspeed/circuit fault output signal, which is wired to the XM-442 module, as shown in Figure 1.1. If the XM-220 senses an overspeed condition or detects a failed speed sensor or logic device, it will activate its overspeed/circuit fault output signal.

Channel 1 of each of the XM-220 modules serves as the overspeed channel of the electronic overspeed detection system. The on-board relay in each of the XM-220 modules serves as the circuit fault relay for that overspeed channel. The XM-220 modules also include two 4-20mA outputs and a buffered output for each input channel.

For more information about the XM-220, refer to the XM-220 Dual Speed Module User Guide.

- **XM-442 EODS Relay module** - The XM-442 module provides the two-out-of-three or one-out-of-three voting logic. The module includes four high power relays that serve as the EODS alarm and shutdown relays.

The XM-442 module accepts the overspeed/circuit fault outputs from the three XM-220 modules. If at least two of the three overspeed/circuit fault outputs are active, the XM-442 module activates the three shutdown relays. If at least one of the three overspeed/circuit fault outputs is active, or there is failure of a logic device in the XM-442 or a failure of a power supply, the XM-442 activates the alarm relay. Note that the shutdown relays are not affected by a single power supply failure or a circuit fault within the XM-442 module. The XM-442 contains redundant logic which allows it to operate correctly even in the presence of a single internal circuit fault.

The EODS modules include LED indicators for indicating power failures, alarm and shutdown status, and circuit faults. The XM-442 module has no configurable parameters. The XM-220 module can be configured remotely via the DeviceNet network, or locally using a serial connection to a PC or laptop.
The XM EODS can operate stand-alone, or it can be deployed on a standard or dedicated DeviceNet network where it can provide real-time data and system information to other XM modules, Programmable Logic Controllers (PLCs), distributed control systems (DCS), and Condition Monitoring Systems.

**XM Module Components**

The XM modules in the XM EODS consist of a terminal base and an instrument module. The instrument module and terminal base for the XM-220 and XM-442 is shown below.

For more information about the Allen-Bradley 1606-XLP30E Power Supply modules, refer to the 1606-XLP Power Supply Installation and Operation manual.

**XM-220 Module Components**

**Figure 1.2 XM-220 Module Components**

- XM-941 Position/Speed Module Terminal Base Unit
  - Cat. No. 1440-TB-B

- XM-220 Dual Speed Module
  - Cat. No. 1440-SPD02-01RB

- XM-941 Position/Speed Module Terminal Base - A DIN rail mounted base unit that provides terminations for all field wiring required by Position and Speed modules, including the XM-220.

- XM-220 Dual Speed Module - Mounts on the XM-941 terminal base unit via a keyswitch and a 96-pin connector. The XM-220 contains the measurement electronics, processor, relay, and serial interface port for local configuration.
XM-442 Module Components

Figure 1.3 XM-442 Module Components

- XM-946 EODS Relay Terminal Base Unit - A DIN rail mounted base unit that provides terminations for all field wiring required by the XM-442.

- XM-442 Voted EODS Relay Module - Mounts on the XM-946 terminal base unit via a keyswitch and a 96-pin connector. The XM-442 contains four on-board relays. The XM-442 has no configurable parameters.

Using this Manual

This manual explains the installation and provides the configuration procedures for the XM Electronic Overspeed Detection System. It is intended for anyone who installs or uses the XM EODS.

This manual does not contain instructions for installing the Allen-Bradley 1606-XLP30E Power Supply modules. Refer to 1606-XLP Power Supply Installation and Operation manual.

In addition, it only provides installation instructions for the XM-220 as it pertains to the EODS. Refer to the XM-220 Dual Speed Module User Guide for more information about the XM-220 module.

Organization

To help you navigate through this manual, it is organized in chapters based on these tasks and topics.

Chapter 1 "Introduction" contains an overview of the XM Electronic Overspeed Detection System and information about this manual.
Chapter 2 "Installing the XM Electronic Overspeed Detection System" describes how to install, wire, and operate the XM EODS.

Chapter 3 "Configuring the XM EODS" provides information to help you configure your XM Electronic Overspeed Detection System using the XM Serial Configuration Utility software.

Appendix A "Specification" lists the technical specifications for the XM-442 Voted EODS Relay module.

For definitions of terms used in this Guide, see the Glossary at the end of the Guide.

**Document Conventions**

There are several document conventions used in this manual, including the following:

The XM Electronic Overspeed Detection System is also referred to as XM EODS and electronic overspeed detection system throughout this manual.

**TIP**

A tip indicates additional information which may be helpful.

**EXAMPLE**

This convention presents an example.
Installing the XM Electronic Overspeed Detection System

This chapter discusses how to install and wire the XM Electronic Overspeed Detection System. It also describes the LED indicators and the basic operation of the XM EODS.

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**Environment and Enclosure**

This equipment is intended for use in a Pollution Degree 2 Industrial environment, in overvoltage Category II applications (as defined in IED publication 60664–1), at altitudes up to 2000 meters without derating.

This equipment is supplied as “open type” equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present, and appropriately designed to prevent personal injury resulting from accessibility to live parts. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.

See NEMA Standards publication 250 and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosures.
XM Installation Requirements

This section describes wire, power, and grounding requirements for an XM system.

Wiring Requirements

Use solid or stranded wire. All wiring should meet the following specifications:

- 12 to 28 AWG copper conductors without pretreatment; 8 AWG required for grounding the DIN rail for electromagnetic interference (emi) purposes
- Recommended strip length 8 millimeters (0.31 inches)
- Minimum insulation rating of 300V
- Soldering the conductor is forbidden
- Wire ferrules can be used with stranded conductors; copper ferrules recommended

ATTENTION
See the XM Documentation and Configuration Utility CD for Hazardous Locations installation drawings. The XM Documentation and Configuration Utility CD is packaged with the XM modules.

Power Requirements

Before installing your module, calculate the power requirements of all modules in each chassis. The total current draw through the side connector cannot exceed 3A. Refer to the specifications for the specific modules for power requirements.

ATTENTION
A separate power connection is necessary if the total current draw of the interconnecting modules is greater than 3A.
Figure 2.1 is an illustration of wiring modules using separate power connections.

**Figure 2.1 XM Modules with Separate Power Connections**

---

**Grounding Requirements**

Use these grounding requirements to ensure safe electrical operating circumstances, and to help avoid potential emi and ground noise that can cause unfavorable operating conditions for your XM system.

**DIN Rail Grounding**

The XM modules make a chassis ground connection through the DIN rail. The DIN rail must be connected to a ground bus or grounding electrode conductor using 8 AWG or 1 inch copper braid. See Figure 2.2 on page 16.

Use zinc-plated, yellow-chromated steel DIN rail (Allen-Bradley part no. 199-DR1 or 199-DR4) or equivalent to assure proper grounding. Using other DIN rail materials (e.g. aluminum, plastic, etc.), which can corrode, oxidize, or are poor conductors can result in improper or intermittent platform grounding.
1 Use 14 AWG wire. If it is desired to isolate the power supply because of possible ground loops, do not connect 24V Common to earth as illustrated in Figure 2.2. When the 24V supply is isolated from earth, it is recommended to use an isolator on the RS-232 lines. Refer to the XM-220 Dual Speed Module User Guide.

The grounding wire can be connected to the DIN rail using a DIN Rail Grounding Block (Figure 2.3).
Panel/Wall Mount Grounding

The XM modules can also be mounted to a conductive mounting plate that is grounded. See Figure 2.5. Use the grounding screw hole provided on the terminal base to connect the mounting plate the Chassis terminals.

Figure 2.4 Grounding Screw on XM Terminal Base
Use 14 AWG wire. If it is desired to isolate the power supply because of possible ground loops, do not connect 24V Common to earth as illustrated in Figure 2.2. When the 24V supply is isolated from earth, it is recommended to use an isolator on the RS-232 lines. Refer to the XM-220 Dual Speed Module User Guide.
Installing the XM Electronic Overspeed Detection System

24V Common Grounding

It is recommended that all 24V power to the XM modules is grounded. When two or more power supplies power the XM system, ground the 24V Commons at a single point, such as the ground bus bar.

For applications where redundant power supplies are used, only one power supply needs to be grounded. The XM module ties the two 24V Common lines together.

**IMPORTANT**

The 24V Common and Signal Common terminals are internally connected. They are isolated from the Chassis terminals unless they are connected to ground as described in this section. See Terminal Block Assignments on page 24 for more information.

Transducer Grounding

Make certain the transducers are electrically isolated from earth ground. Cable shields must be grounded at one end of the cable, and the other end left floating or not connected. It is recommended that where possible, the cable shield be grounded at the XM terminal base by connecting to a Chassis terminal and not at the transducer.

Switch Input Grounding

The Switch Input circuits are electrically isolated from other circuits. It is recommended that the Switch RTN signal be grounded at a single point.

Mounting the Power Supply Modules

Connect the Switch RTN signal to the XM terminal base (Chassis terminal) or directly to the DIN rail, or ground the signal at the switch or other equipment that is wired to the switch.

Mounting the Power Supply Modules

The XM EODS requires two Allen Bradley power supply modules (Cat. No. 1606-XLP30E). The power supply modules are DIN rail mountable and provide redundant power to the XM EODS. These modules provide all the system power and each can be powered by +24V dc and/or 85 to 264V ac.

The outputs of the two power supply modules are connected to the terminal base units of the XM modules. See Figure 2.7 on page 29. A failure in one of the power supplies will not affect the operation of the EODS.

Refer to the documentation that was shipped with the 1606-XLP power supply for instructions on how to install the power supply modules.
Mounting the Terminal Base Units

The XM family includes several different terminal base units to serve all of the measurement modules.

- The XM-941 terminal base, Cat. No. 1440-TB-B, is the only terminal base unit used with the XM-220 module.
- The XM-946 terminal base, Cat. No. 1440-TB-G, is the only terminal base unit used with the XM-442 module.

The terminal base can be DIN rail or wall/panel mounted. Refer to the specific method of mounting below.

DIN Rail Mounting

Use the steps below to mount the XM-941 and XM-946 terminal base units on a DIN rail. We recommend you mount the XM-946 terminal base first, next to the power supply modules (see Figure 2.7 on page 29).
1. Position the XM-946 terminal base on the 35 x 7.5mm DIN rail (A) (A-B pt no. 199-DR1 or 199-DR4).

2. Slide the terminal base unit over leaving room for the side connector (B).

3. Rotate the terminal base onto the DIN rail with the top of the rail hooked under the lip on the rear of the terminal base.

4. Press down on the terminal base unit to lock the terminal base on the DIN rail. If the terminal base does not lock into place, use a screwdriver or similar device to open the locking tab, press down on the terminal base until flush with the DIN rail and release the locking tab to lock the base in place.
Interconnecting Terminal Base Units

Follow the steps below to install the XM-941 terminal base units.

1. Position the XM-941 terminal base on the 35 x 7.5mm DIN rail (A).

2. Make certain the side connector (B) is **fully retracted** into the base unit.

3. Slide the terminal base unit over tight against the neighboring terminal base. Make sure the hook on the terminal base slides under the edge of the terminal base unit.

4. Press down on the terminal base unit to lock the terminal base on the DIN rail. If the terminal base does not lock into place, use a screwdriver or similar device to open the locking tab, press down on the terminal base until flush with the DIN rail and release the locking tab to lock the base in place.

5. Gently push the side connector into the side of the neighboring terminal base unit to complete the backplane connection.

6. Repeat the steps to install the other two XM-941 terminal base units.

Panel/Wall Mounting

Installation on a wall or panel consists of:

- laying out the drilling points on the wall or panel
- drilling the pilot holes for the mounting screws
- installing the terminal base units and securing them to the wall or panel
Use the following steps to install the terminal base on a wall or panel. We recommend you mount the XM-946 terminal base first, next to the power supply modules (see Figure 2.7 on page 29).

1. Lay out the required points on the wall/panel as shown in the drilling dimension drawing below.

2. Drill the necessary holes for the #6 self-tapping mounting screws.


4. To install the XM-941 terminal base unit, retract the side connector into the base unit. Make sure it is fully retracted.

5. Position the terminal base unit up tight against the neighboring terminal base. Make sure the hook on the terminal base slides under the edge of the terminal base unit.

6. Gently push the side connector into the side of the neighboring terminal base to complete the backplane connection.

7. Secure the terminal base to the wall with two #6 self-tapping screws.

8. Repeat steps 4-7 to install the other two XM-941 terminal base units.
Connecting Wiring for Your XM EODS

Wiring to the module is made through the terminal base unit on which the module mounts. The XM-220 is compatible only with the XM-941 terminal base unit, Cat. No. 1440-TB-B. The XM-442 is compatible only with the XM-946 terminal base unit, Cat. No. 1440-TB-G.

Figure 2.6 XM Terminal Base Unit

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
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<th>12</th>
<th>13</th>
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<td>39</td>
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<td>42</td>
<td>43</td>
<td>44</td>
<td>45</td>
<td>46</td>
<td>47</td>
<td>48</td>
<td>49</td>
</tr>
</tbody>
</table>

XM-941 (Cat. No. 1440-TB-B) and XM-946 (Cat. No. 1440-TB-G)

Terminal Block Assignments

The terminal block assignments and descriptions for the XM-220 and XM-442 modules are shown below:

ATTENTION

The terminal block assignments are different for different XM modules. The following tables apply only to the XM-442 and XM-220 modules. Refer to the installation instructions for the specific XM module for its terminal assignments.

WARNING

EXPLOSION HAZARD

Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.

Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.
### XM-442 Terminal Block Assignments

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>24V In 1</td>
<td>Connection to primary external +24V power supply, positive side</td>
</tr>
<tr>
<td>1</td>
<td>24V Common</td>
<td>Connection to external +24V power supply, negative side (internally DC-coupled to circuit ground)</td>
</tr>
<tr>
<td>2</td>
<td>Reset Relay</td>
<td>Switch input to reset internal relay (active low)</td>
</tr>
<tr>
<td>3</td>
<td>24V In 2</td>
<td>Connection to secondary external +24V power supply, positive side; used when redundant power supplies are required</td>
</tr>
<tr>
<td>4</td>
<td>Shutdown Relay 1 N.O. 2</td>
<td>Shutdown Relay #1 Normally Open contact 2</td>
</tr>
<tr>
<td>5</td>
<td>Shutdown Relay 1 N.O. 1</td>
<td>Shutdown Relay #1 Normally Open contact 1</td>
</tr>
<tr>
<td>6</td>
<td>Shutdown Relay 2 N.O. 2</td>
<td>Shutdown Relay #2 Normally Open contact 2</td>
</tr>
<tr>
<td>7</td>
<td>No Connection</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Shutdown Relay 2 N.O. 1</td>
<td>Shutdown Relay #2 Normally Open contact 1</td>
</tr>
<tr>
<td>9</td>
<td>Shutdown Relay 3 N.O. 2</td>
<td>Shutdown Relay #3 Normally Open contact 2</td>
</tr>
<tr>
<td>10</td>
<td>No Connection</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Shutdown Relay 3 N.O. 1</td>
<td>Shutdown Relay #3 Normally Open contact 1</td>
</tr>
<tr>
<td>12</td>
<td>Alarm Relay N.O. 2</td>
<td>Alarm Relay Normally Open contact 2</td>
</tr>
<tr>
<td>13</td>
<td>Alarm Relay N.O. 1</td>
<td>Alarm Relay Normally Open contact 1</td>
</tr>
<tr>
<td>14</td>
<td>No Connection</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Chassis</td>
<td>Connection to DIN rail ground spring or panel mounting hole</td>
</tr>
<tr>
<td>16</td>
<td>Primary Power Monitor</td>
<td>Connection to primary external +24V power supply, positive side; used to monitor the primary electronic overspeed detection system power supply</td>
</tr>
<tr>
<td>17</td>
<td>24V Common</td>
<td>Connection to external +24V power supply, negative side (internally DC-coupled to circuit ground)</td>
</tr>
<tr>
<td>18</td>
<td>Reset Relay RTN</td>
<td>Reset relay switch return</td>
</tr>
</tbody>
</table>
| 19  | 24V Out | Diode-ORed output for 24V In 1 and 24V In 2  
**DO NOT CONNECT** |
| 20  | Shutdown Relay 1 Common 2 | Shutdown Relay #1 Common contact 2 |
| 21  | Shutdown Relay 1 Common 1 | Shutdown Relay #1 Common contact 1 |
| 22  | Shutdown Relay 2 Common 2 | Shutdown Relay #2 Common contact 2 |
| 23  | No Connection | |
| 24  | Shutdown Relay 2 Common 1 | Shutdown Relay #2 Common contact 1 |
| 25  | Shutdown Relay 3 Common 2 | Shutdown Relay #3 Common contact 2 |
| 26  | No Connection | |
### XM-442 Terminal Block Assignments

<table>
<thead>
<tr>
<th>No.</th>
<th>Name Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>Shutdown Relay 3 Common 1</td>
</tr>
<tr>
<td>28</td>
<td>Alarm Relay Common 2</td>
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<td>29</td>
<td>Alarm Relay Common 1</td>
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<tr>
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<tr>
<td>31</td>
<td>Chassis</td>
</tr>
<tr>
<td>32</td>
<td>No Connection</td>
</tr>
<tr>
<td>33</td>
<td>No Connection</td>
</tr>
<tr>
<td>34</td>
<td>Secondary Power Monitor</td>
</tr>
<tr>
<td>35</td>
<td>Overspeed/Circuit Fault 1</td>
</tr>
<tr>
<td>36</td>
<td>Overspeed/Circuit Fault 2</td>
</tr>
<tr>
<td>37</td>
<td>Overspeed/Circuit Fault 3</td>
</tr>
<tr>
<td>38</td>
<td>Shutdown Relay 1 N.C. 2</td>
</tr>
<tr>
<td>39</td>
<td>Shutdown Relay 1 N.C. 1</td>
</tr>
<tr>
<td>40</td>
<td>Shutdown Relay 2 N.C. 2</td>
</tr>
<tr>
<td>41</td>
<td>No Connection</td>
</tr>
<tr>
<td>42</td>
<td>Shutdown Relay 2 N.C. 1</td>
</tr>
<tr>
<td>43</td>
<td>Shutdown Relay 3 N.C. 2</td>
</tr>
<tr>
<td>44</td>
<td>No Connection</td>
</tr>
<tr>
<td>45</td>
<td>Shutdown Relay 3 N.C. 1</td>
</tr>
<tr>
<td>46</td>
<td>Alarm Relay N.C. 2</td>
</tr>
<tr>
<td>47</td>
<td>Alarm Relay N.C. 1</td>
</tr>
<tr>
<td>48</td>
<td>No Connection</td>
</tr>
<tr>
<td>49</td>
<td>Chassis</td>
</tr>
<tr>
<td>50</td>
<td>No Connection</td>
</tr>
<tr>
<td>51</td>
<td>No Connection</td>
</tr>
</tbody>
</table>

- **Description:**
  - Shutdown Relay #3 Common contact 1
  - Alarm Relay Common contact 2
  - Alarm Relay Common contact 1
  - Connection to DIN rail ground spring or panel mounting hole
  - Connection to secondary external +24V power supply, positive side; used to monitor the secondary electronic overspeed detection system power supply
  - Connect to terminal 19 on the first XM-220 module to indicate circuit fault or alarm (overspeed) condition on channel 1
  - Connect to terminal 19 on the second XM-220 module to indicate circuit fault or alarm (overspeed) condition on channel 2
  - Connect to terminal 19 on the third XM-220 module to indicate circuit fault or alarm (overspeed) condition on channel 3
  - Shutdown Relay #1 Normally Closed contact 2
  - Shutdown Relay #1 Normally Closed contact 1
  - Shutdown Relay #2 Normally Closed contact 2
  - Shutdown Relay #2 Normally Closed contact 1
  - Shutdown Relay #3 Normally Closed contact 2
  - Shutdown Relay #3 Normally Closed contact 1
  - Alarm Relay Normally Closed contact 2
  - Alarm Relay Normally Closed contact 1
  - Connection to DIN rail ground spring or panel mounting hole
### XM-220 Terminal Block Assignments

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Xducer 1 (+)</td>
<td>Transducer 1 connection</td>
</tr>
<tr>
<td>1</td>
<td>Xducer 2 (+)</td>
<td>Transducer 2 connection</td>
</tr>
<tr>
<td>2</td>
<td>Buffer 1 (+)</td>
<td>Signal 1 buffered output</td>
</tr>
<tr>
<td>3</td>
<td>Buffer 2 (+)</td>
<td>Signal 2 buffered output</td>
</tr>
<tr>
<td>4</td>
<td>Switched Buffer (+)</td>
<td>Switched buffered output for use with redundant mode</td>
</tr>
<tr>
<td>5</td>
<td>Buffer Power 1 IN</td>
<td>Channel 1 buffer power input; Connect to terminal 6 for positive biased</td>
</tr>
<tr>
<td></td>
<td></td>
<td>transducer or terminal 21 for negative biased transducer</td>
</tr>
<tr>
<td>6</td>
<td>Positive Buffer Bias</td>
<td>Provides positive (-5V to +24V) voltage compliance to buffered outputs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Connect to terminals 5 (CH 1) and 22 (CH 2) for positive bias transducers</td>
</tr>
<tr>
<td>7</td>
<td>TxD</td>
<td>PC serial port, transmit data</td>
</tr>
<tr>
<td>8</td>
<td>RxD</td>
<td>PC serial port, receive data</td>
</tr>
<tr>
<td>9</td>
<td>XRTN¹</td>
<td>Circuit return for TxD and RxD</td>
</tr>
<tr>
<td>10</td>
<td>Chassis</td>
<td>Connection to DIN rail ground spring or panel mounting hole</td>
</tr>
<tr>
<td>11</td>
<td>4-20mA 1 (+)</td>
<td>4-20mA output</td>
</tr>
<tr>
<td>12</td>
<td>4-20mA 1 (-)</td>
<td>300 ohm maximum load</td>
</tr>
<tr>
<td>13</td>
<td>Chassis</td>
<td>Connection to DIN rail ground spring or panel mounting hole</td>
</tr>
<tr>
<td>14</td>
<td>Chassis</td>
<td>Connection to DIN rail ground spring or panel mounting hole</td>
</tr>
<tr>
<td>15</td>
<td>Chassis</td>
<td>Connection to DIN rail ground spring or panel mounting hole</td>
</tr>
<tr>
<td>16</td>
<td>Xducer 1 (-)¹</td>
<td>Transducer 1 connection</td>
</tr>
<tr>
<td>17</td>
<td>Xducer 2 (-)¹</td>
<td>Transducer 2 connection</td>
</tr>
<tr>
<td>18</td>
<td>Buffer Common¹</td>
<td>Buffered output return</td>
</tr>
<tr>
<td>19</td>
<td>Overspeed/Circuit Fault</td>
<td>Overspeed and circuit fault output signal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Used as input by the XM-442 EODS Relay module</td>
</tr>
<tr>
<td>20</td>
<td>Switched Buffer (-)</td>
<td>Switched buffered output for use with redundant mode (inverted signal)</td>
</tr>
<tr>
<td>21</td>
<td>Buffer/Xducer Pwr (-)</td>
<td>Provides negative (-24V to +9V) voltage compliance to buffered outputs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Connect to terminals 5 (CH 1) and 22 (CH 2) for negative bias transducers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transducer power supply output, negative side; used to power external</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sensors (40mA maximum load)</td>
</tr>
<tr>
<td>22</td>
<td>Buffer Power 2 IN</td>
<td>Channel 2 buffer power input</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Connect to terminal 6 for positive biased transducer or terminal 21 for</td>
</tr>
<tr>
<td></td>
<td></td>
<td>negative biased transducer</td>
</tr>
<tr>
<td>23</td>
<td>CAN_High</td>
<td>DeviceNet bus connection, high differential (white wire)</td>
</tr>
<tr>
<td>24</td>
<td>CAN_Low</td>
<td>DeviceNet bus connection, low differential (blue wire)</td>
</tr>
<tr>
<td>25</td>
<td>+24V Out</td>
<td>Internally connected to 24V In 1 (terminal 44)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Used to daisy chain power if XM modules are not plugged into each other</td>
</tr>
<tr>
<td>26</td>
<td>DNet V (+)</td>
<td>DeviceNet bus power input, positive side (red wire)</td>
</tr>
</tbody>
</table>
## XM-220 Terminal Block Assignments

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>DNet V (-)</td>
<td>DeviceNet bus power input, negative side (black wire)</td>
</tr>
<tr>
<td>28</td>
<td>24V Common&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Internally connected to 24V Common (terminals 43 and 45) Used to daisy chain power if XM modules are not plugged into each other If power is not present on terminal 44, there is no power on this terminal</td>
</tr>
<tr>
<td>29</td>
<td>4-20mA 2 (+)</td>
<td>4-20mA output</td>
</tr>
<tr>
<td>30</td>
<td>4-20mA 2 (-)</td>
<td>300 ohm maximum load</td>
</tr>
<tr>
<td>31</td>
<td>Chassis</td>
<td>Connection to DIN rail ground spring or panel mounting hole</td>
</tr>
<tr>
<td>32</td>
<td>Chassis</td>
<td>Connection to DIN rail ground spring or panel mounting hole</td>
</tr>
<tr>
<td>33</td>
<td>Chassis</td>
<td>Connection to DIN rail ground spring or panel mounting hole</td>
</tr>
<tr>
<td>34</td>
<td>Chassis</td>
<td>Connection to DIN rail ground spring or panel mounting hole</td>
</tr>
<tr>
<td>35</td>
<td>Chassis</td>
<td>Connection to DIN rail ground spring or panel mounting hole</td>
</tr>
<tr>
<td>36</td>
<td>Chassis</td>
<td>Connection to DIN rail ground spring or panel mounting hole</td>
</tr>
<tr>
<td>37</td>
<td>Chassis</td>
<td>Connection to DIN rail ground spring or panel mounting hole</td>
</tr>
<tr>
<td>38</td>
<td>Chassis</td>
<td>Connection to DIN rail ground spring or panel mounting hole</td>
</tr>
<tr>
<td>39</td>
<td>Start</td>
<td>Switch input to activate startup switch (active closed)</td>
</tr>
<tr>
<td>40</td>
<td>Switch RTN</td>
<td>Switch return for Start and Reset Relay</td>
</tr>
<tr>
<td>41</td>
<td>Reset Relay</td>
<td>Switch input to reset internal relay (active closed)</td>
</tr>
<tr>
<td>42</td>
<td>+24V In 2</td>
<td>Connection to secondary external +24V power supply, positive side Used when redundant power supplies are required</td>
</tr>
<tr>
<td>43</td>
<td>24V Common&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Connection to external +24V power supply, negative side (internally DC-coupled to circuit ground)</td>
</tr>
<tr>
<td>44</td>
<td>+24V In 1</td>
<td>Connection to primary external +24V power supply, positive side</td>
</tr>
<tr>
<td>45</td>
<td>24V Common&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Connection to external +24V power supply, negative side (internally DC-coupled to circuit ground)</td>
</tr>
<tr>
<td>46</td>
<td>Relay N.C. 1</td>
<td>Relay Normally Closed contact 1</td>
</tr>
<tr>
<td>47</td>
<td>Relay Common 1</td>
<td>Relay Common contact 1</td>
</tr>
<tr>
<td>48</td>
<td>Relay N.O. 1</td>
<td>Relay Normally Open contact 1</td>
</tr>
<tr>
<td>49</td>
<td>Relay N.O. 2</td>
<td>Relay Normally Open contact 2</td>
</tr>
<tr>
<td>50</td>
<td>Relay Common 2</td>
<td>Relay Common contact 2</td>
</tr>
<tr>
<td>51</td>
<td>Relay N.C. 2</td>
<td>Relay Normally Closed contact 2</td>
</tr>
</tbody>
</table>

<sup>1</sup> Terminals are internally connected and isolated from the Chassis terminals.
Typical XM EODS Wiring Diagram

Figure 2.7 shows the typical XM Electronic Overspeed Device System wiring configuration. See the following topics for specific wiring information.

Connecting the Power Supply Modules

The power supply to the XM-442 module is 24V dc. The XM-442 provides two 24V dc power supply connections. The connections are electrically isolated from each other so a power interruption to one connection does not affect the other connection. This allows you to have a redundant power supply for the XM EODS. The XM-442 also provides terminals (16 and 34) for monitoring the primary and secondary EODS power supply modules.
Connecting the Primary Power Supply

The primary 24V dc needs to be wired to terminal 0 (24V In 1) on the XM-442 terminal base to provide power to the XM-442 and the other XM-220 modules.

Wire the primary power supply to the XM-442 terminal base unit as shown in Figure 2.8. Then place a jumper between terminals 0 and 16 so that the XM-442 can monitor the EODS primary power supply module.

Figure 2.8 Primary Power Supply Connection
Connecting the Secondary Power Supply

The secondary (redundant) power supply needs to be wired to all of the XM modules in the XM EODS. Wire the secondary power supply to the XM modules as shown in Figure 2.9. Then place a jumper between terminals 3 and 34 on the XM-442 terminal base to enable the XM-442 to monitor the EODS secondary power supply.

ATTENTION

The power connections are different for the XM-220 and XM-442 modules.

Figure 2.9 Secondary Power Supply Connection

![Diagram of secondary power supply connection]

Jumper connected to terminals 3 and 34 on XM-442
Connecting the Overspeed/Circuit Fault Signals

The XM-442 module accepts one discrete digital input signal from each of the three XM-220 modules. If the XM-220 detects an overspeed condition or a circuit fault condition (failure of a sensor connected to, or logic device in, the XM-220), it will activate this signal. The 1-out-of-3 or 2-out-of-3 voting logic is determined by the number of active overspeed/circuit fault signals.

Wire the XM-220 overspeed/circuit fault connections to the XM-442 terminal base as shown in Figure 2.10.

Figure 2.10 Overspeed/Circuit Fault Signal Connections

Connecting the Relays

The XM modules have both Normally Open (NO) and Normally Closed (NC) relay contacts. Normally Open relay contacts close when the control output is energized. Normally Closed relay contacts open when the control output is energized.

All XM relays are double-pole, double-throw type relays. This means that each relay has two contacts in which each contact operates independently but identically. The following information and illustrations show wiring solutions for both contacts; although, in many applications it may be necessary to wire only one contact.

IMPORTANT The NC/NO terminal descriptions correspond to a de-energized (unpowered relay). When the relay is configured for failsafe operation, the relay is normally energized, and the behavior of the NC and NO terminals is inverted.
Wiring the XM-442 Relays

There are four normally energized (failsafe) relays in the XM-442 module. Three relays serve as the shutdown relays. The fourth relay is the alarm relay.

The shutdown relays will be activated by any of the following conditions:

- Overspeed condition on any two (or all three) of the three XM-220 channels.
- Failure of a sensor, power supply, or logic device in any two (or all three) of the three XM-220 channels (circuit fault).

The alarm relay will be activated by any of the following conditions:

- Overspeed condition on any one of the three XM-220 channels.
- Failure of a sensor, power supply, or logic device in any one of the three XM-220 channels, or within the XM-442 module itself.
- Failure of the XM EODS primary or secondary power supply.

The appropriate relay(s) will activate within 40 milliseconds of the onset of any of the above conditions.

Table 2.1 shows the on-board relay connections for the XM-442.

![Table 2.1 Relay Connections for XM-442](image)

Figures 2.11 and 2.12 illustrate the behavior of the NC and NO terminals when the relay is wired for either failsafe, nonalarm condition or failsafe, alarm condition.
Installing the XM Electronic Overspeed Detection System

Figure 2.11 Relay Connection - Failsafe, Nonalarm Condition

Figure 2.12 Relay Connection - Failsafe, Alarm Condition

Alternate Relay Wiring

Figures 2.13 and 2.14 show how to wire both ends of a single external indicator to the XM terminal base for either failsafe, nonalarm condition or failsafe, alarm condition.

Figure 2.13 Relay Connection - Failsafe, Nonalarm Condition
Wiring the XM-220 Relays

The on-board relay in each of the XM-220 modules will serve as the circuit fault relay for the overspeed channel (channel 1 of XM-220). The alarms associated with the XM-220 relay and whether the XM-220 relay is normally de-energized (non-failsafe) or normally energized (failsafe) depends on the configuration of the XM-220 module.

To ensure proper operation of the XM EODS, the on-board relay in each of the XM-220 modules must be configured for failsafe operation (normally energized). Refer to Relay Parameters on page 53 for details.

<table>
<thead>
<tr>
<th>Table 2.2 Relay Connections for XM-220</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Configured for Failsafe Operation</strong></td>
</tr>
<tr>
<td>Nonalarm</td>
</tr>
<tr>
<td>Closed</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Opened</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Refer to the XM-220 Dual Speed Module User Guide for relay wiring illustrations and for a description of the XM-220 configuration parameters.
Connecting the Remote Relay Reset Signal

The XM-442 relays are latching relays. This means the relays stay activated even when the condition that caused the alarm has ended. The remote relay reset signal enables you to reset the XM EODS relays remotely after you have corrected the alarm condition.

Wire the Remote Relay Reset Signal to the XM-442 terminal base unit as shown in Figure 2.15.

**Figure 2.15 Remote Relay Reset Signal Connection**

![Remote Relay Reset Signal Connection Diagram]

ATTENTION

The Switch Input circuits are electrically isolated from other circuits. It is recommended that the Switch RTN signal be grounded at a signal point. Connect the Switch RTN signal to the XM terminal base (Chassis terminal) or directly to the DIN rail, or ground the signal at the switch or other equipment that is wired to the switch.

IMPORTANT

The on-board relay in each of the XM-220 modules must be set to latching as well. To set the XM-220 relay to latching, select the **Latching** parameter using either the XM Serial Configuration Utility or a network configuration tool such as RSNetWorx. Refer to Relay Parameters on page 53.
Connecting the Transducers

The XM-220 modules can accept input signals from either a proximity probe transducer or magnetic pickup. The three individual transducers are connected to Channel 1 (terminals 0 and 16) of each of the XM-220 modules. For wiring connections pertaining to Channel 2, refer to the XM-220 Dual Speed Module User Guide.

Connecting a Proximity Probe Transducer

The figure below shows the wiring of a proximity probe transducer to Channel 1 of the XM-220 module.

- ATTENTION: You may ground the cable shield at either end of the cable. Do not ground the shield at both ends. Recommended practice is to ground the cable shield at the terminal base and not at the transducer. Any convenient Chassis terminal may be used (see Terminal Block Assignments on page 27).

- IMPORTANT: The internal transducer power supply is providing power to the non-contact sensor.

**Figure 2.16 Proximity Probe Sensor to Channel 1 Wiring**

TYPICAL WIRING FOR NON-CONTACT SENSOR TO XM-220 DUAL SPEED MODULE CHANNEL 1

- Shield Floating
- Isolated Sensor Driver
- Signal Common
- Channel 1 Input Signal
- -24V DC
- Jumpering terminal 5 to terminal 21 configures CH 1 buffer for -24V to 9V
Connecting a Magnetic Pickup Sensor

The figure below shows the wiring of a passive magnetic pickup sensor to Channel 1 of the XM-220 module.

**ATTENTION**

You may ground the cable shield at either end of the cable. Do not ground the shield at both ends. Recommended practice is to ground the cable shield at the terminal base and not at the transducer. Any convenient Chassis terminal may be used (see Terminal Block Assignments on page 27).

**IMPORTANT**

The module does not power the sensor. It measures only the input voltage.

**IMPORTANT**

An internal isolated constant current (0.5mA) supply is provided to detect a cable or transducer fault (short). This current is enabled with the **Enable Bias Current** parameter. Refer to Tachometer Parameters on page 50.

**Figure 2.17 Magnetic Pickup to Channel 1 Wiring**
Other XM-220 Connections

The XM-220 module includes two 4-20mA outputs, a buffered output for each input channel, and a DeviceNet™ connection that allows it to communicate with a Programmable Logic Controller (PLC), Distributed Control System (DCS) or another XM module. It can be connected to a Startup switch as well. For more information about XM-220 module, refer to the XM-220 Dual Speed Module User Guide.

Mounting the XM Modules

The XM-442 mounts on the XM-946 terminal base unit, Cat. No. 1440-TB-G, and the XM-220 mounts on the XM-941 terminal base unit, Cat. No. 1440-TB-B. We recommend that you mount the modules after you have connected the wiring on the terminal base units.

ATTENTION

The XM-442 module is compatible only with the XM-946 terminal base unit. The keyswitch on the terminal base unit should be at position 6 for the XM-442 module.

Do not attempt to install the XM-441 module on other terminal base units.

Do not change the position of the keyswitch after wiring the terminal base.

ATTENTION

The XM-220 module is compatible only with the XM-941 terminal base unit. The keyswitch on the terminal base unit should be at position 4 for the XM-220 module.

Do not attempt to install XM-220 modules on other terminal base units.

Do not change the position of the keyswitch after wiring the terminal base.

ATTENTION

All XM modules are designed so you can remove and insert them under power. However, when you remove or insert the XM module with power applied, I/O attached to the module can change states due to its input/output signal changing conditions. Take special care when using this feature.
1. Make certain the keyswitch (A) on the terminal base unit (C) is at the correct position as required for the module.

<table>
<thead>
<tr>
<th>XM Module</th>
<th>Keyswitch Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>XM-442</td>
<td>6</td>
</tr>
<tr>
<td>XM-220</td>
<td>4</td>
</tr>
</tbody>
</table>

2. Make certain the side connector (B) is pushed all the way to the left. **You cannot install the module unless the connector is fully extended.**

3. Make sure that the pins on the bottom of the module are straight so they will align properly with the connector in the terminal base unit.

4. Position the module (D) with its alignment bar (E) aligned with the groove (F) on the terminal base.

5. Press firmly and evenly to seat the module in the terminal base unit. The module is seated when the latching mechanism (G) is locked into the module.

6. Repeat the above steps to install the next module in its terminal base.

**WARNING** When you insert or remove the XM module while power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

**IMPORTANT** Install the XM-220 overlay slide label to protect serial connector and electronics when the serial port is not in use.
LED Indicators

Each XM module has indicators to help you troubleshoot any problems with your XM EODS. The LED indicators are located on top of the module as illustrated in Figure 2.18.

Figure 2.18 LED Indicators

LED Indicators for the XM-442 Module

The XM-442 module has three LED indicators, which include a module status (MS) indicator and a status indicator for the Alarm and Shutdown relays.

The following tables describe the status indicators for XM-442 module.

Module Status (MS) Indicator

<table>
<thead>
<tr>
<th>Color</th>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No color</td>
<td>Off</td>
<td>No power applied to the module.</td>
</tr>
<tr>
<td>Green</td>
<td>Solid</td>
<td>Module operating normally.</td>
</tr>
<tr>
<td>Red</td>
<td>Solid</td>
<td>An unrecoverable fault has occurred. The module may need to be repaired or replaced.</td>
</tr>
</tbody>
</table>

Shutdown and Alarm Indicator

<table>
<thead>
<tr>
<th>Color</th>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>Off</td>
<td>On-board relay is not activated.</td>
</tr>
<tr>
<td></td>
<td>Solid</td>
<td>On-board relay is activated.</td>
</tr>
</tbody>
</table>
LED Indicators for the XM-220 Module

Each XM-220 module has seven LED indicators – a module status (MS) indicator, a network status (NS) indicator, a status indicator for each channel (CH1 and CH2), an activation indicator for startup, a status indicator for the Relay, and an indicator (AUX) reserved for future use.

The following tables describe the status indicators for the XM-220 modules.

**Module Status (MS) Indicator**

<table>
<thead>
<tr>
<th>Color</th>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No color</td>
<td>Off</td>
<td>No power applied to the module.</td>
</tr>
<tr>
<td>Green</td>
<td>Flashing Red</td>
<td>Module performing power-up self test.</td>
</tr>
<tr>
<td></td>
<td>Flashing</td>
<td>XM-220 module operating in Program Mode.</td>
</tr>
<tr>
<td></td>
<td>Solid</td>
<td>Module operating in Run Mode and operating normally.</td>
</tr>
<tr>
<td>Red</td>
<td>Flashing</td>
<td>• Application firmware is invalid or not loaded.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Download firmware to the XM-220 module.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Firmware download is currently in progress.</td>
</tr>
<tr>
<td></td>
<td>Solid</td>
<td>An unrecoverable fault has occurred. The module may need to be repaired or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>replaced.</td>
</tr>
</tbody>
</table>

1 Program Mode - Typically this occurs when the XM-220 module configuration settings are being updated with the XM Serial Configuration Utility. In Program Mode, the XM-220 does not perform its normal functions. The signal processing/measurement process is stopped, and the status of the alarms is set to the disarm state to prevent a false alert or danger status. Note that this mode is not applicable to the XM-442 module.

2 Run Mode - In Run Mode, the XM-220 module collects measurement data and monitors each vibration measurement device.

**Network Status (NS) Indicator**

<table>
<thead>
<tr>
<th>Color</th>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No color</td>
<td>Off</td>
<td>XM-220 module is not online.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Module is autobauding.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• No power applied to the module, look at Module Status LED.</td>
</tr>
<tr>
<td>Green</td>
<td>Flashing</td>
<td>XM-220 is online (DeviceNet) but no connections are currently established.1</td>
</tr>
<tr>
<td></td>
<td>Solid</td>
<td>XM-220 is online with connections currently established.</td>
</tr>
<tr>
<td>Red</td>
<td>Flashing</td>
<td>One or more I/O connections are in the timed-out state.</td>
</tr>
<tr>
<td></td>
<td>Solid</td>
<td>Failed communications (duplicate MAC ID or Bus-off).</td>
</tr>
</tbody>
</table>

1 Normal condition when the XM-220 module is not a slave to an XM-440, PLC, or other master device.
Channel 1 and Channel 2 Indicator

<table>
<thead>
<tr>
<th>Color</th>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No color</td>
<td>Off</td>
<td>- Normal operation within alarm limits on the XM-220 channel.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- No power applied to the module, look at XM-220 Module Status LED.</td>
</tr>
<tr>
<td>Yellow</td>
<td>Solid</td>
<td>An alert level alarm condition exists on the channel (and no transducer fault, tachometer fault, or danger level alarm condition exists).</td>
</tr>
<tr>
<td></td>
<td>Flashing</td>
<td>Tachometer fault (no transducer fault) condition exists on the XM-220 channel.</td>
</tr>
<tr>
<td>Red</td>
<td>Solid</td>
<td>A danger level alarm condition exists on the XM-220 channel (and no transducer fault or tachometer fault condition exists).</td>
</tr>
<tr>
<td></td>
<td>Flashing</td>
<td>A transducer fault condition exists on the XM-220 channel.</td>
</tr>
</tbody>
</table>

Startup (Start) Indicator

<table>
<thead>
<tr>
<th>Color</th>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow</td>
<td>Off</td>
<td>Startup period is not in effect.</td>
</tr>
<tr>
<td></td>
<td>Solid</td>
<td>Startup period is in effect.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- XM-220 module may be inhibiting the Tach Fault alarm status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- XM-220 module may be monitoring for locked rotor conditions.</td>
</tr>
</tbody>
</table>

Relay Indicators

<table>
<thead>
<tr>
<th>Color</th>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>Off</td>
<td>On-board relay is not activated.</td>
</tr>
<tr>
<td></td>
<td>Solid</td>
<td>On-board relay is activated.</td>
</tr>
</tbody>
</table>
Basic Operations

Powering Up the Modules

Both the XM-220 and the XM-442 perform a self-test at power-up.

XM-442 Self-Test

The XM-442 self-test includes an LED test. When power is applied to the module, the following occurs.

- Module Status (MS) indicator lights red for 1 to 2 seconds and then turns green if it has passed the self-test.
- Shutdown and Alarm Status indicators light red for 1 to 2 seconds and then turn off if no shutdown or alarm conditions are present; otherwise, they will stay lit.

XM-220 Self-Test

The XM-220 self-test includes an LED test and a device test. During the LED test, the indicators will be turned on independently and in sequence for approximately 0.25 seconds.

The device test occurs after the LED test. The Module Status (MS) indicator is used to indicate the status of the device self-test.

<table>
<thead>
<tr>
<th>MS Indicator State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flashing Red and Green</td>
<td>Device self-test is in progress.</td>
</tr>
<tr>
<td>Solid Green or Flashing Green</td>
<td>Device self-test completed successfully, and the firmware is valid and running.</td>
</tr>
<tr>
<td>Flashing Red</td>
<td>Device self-test completed, the hardware is OK, but the firmware is invalid. Or, the firmware download is in progress.</td>
</tr>
<tr>
<td>Solid Red</td>
<td>Unrecoverable fault, hardware failure, or Boot Loader program may be corrupted.</td>
</tr>
</tbody>
</table>

Refer to LED Indicators on page 41 for more information about the LED indicators.
Manually Resetting the XM EODS Relays

The XM-442 has an external reset switch located on top of the module, as shown in Figure 2.19.

Figure 2.19 XM-442 Relay Switch

The switch can be used to reset all the latched relays in the XM-442 module. Note that the XM-220 module has an external reset switch as well. Refer to the XM-220 Dual Speed Module User Guide for more details.

**IMPORTANT**
Press the Reset Switch to reset the relays

The Reset switch resets the relays only if the input is no longer in alarm or the condition that caused the alarm is no longer present.

**IMPORTANT**
Reset the relays after the XM-220 modules are configured and are not in alarm.
Chapter 3

Configuring the XM EODS

This chapter provides information to help you configure your XM Electronic Overspeed Detection System using the XM Serial Configuration Utility software.

Please refer to XM-220 Dual Speed Module User Guide for a complete list and description of the configuration parameters. Descriptions on how to navigate through the software as well as the software screens are contained in the XM Serial Configuration Utility online help. Refer to the XM Serial Configuration Utility Getting Results Guide for additional assistance.

The XM User Guides and the Getting Results Guide can be found on the XM Documentation and Configuration Utility CD, which is packaged with your XM modules.

<table>
<thead>
<tr>
<th>For information about</th>
<th>See page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration Overview</td>
<td>47</td>
</tr>
<tr>
<td>Using the XM Serial Configuration Utility</td>
<td>49</td>
</tr>
</tbody>
</table>

Configuration Overview

Configuring the XM EODS consists of setting the parameters for the three XM-220 modules. The XM-442 module has no configurable parameters.

The XM-220 modules can be configured using the XM Serial Configuration Utility software and a personal computer. If the module is installed on a DeviceNet network, configuring can also be performed using a network configuration tool such as RSNetWorx (Version 3.0 or later). Refer to the XM-220 Dual Speed Module User Guide for information about the DeviceNet connection.

The XM Serial Configuration Utility is a Windows® application program that allows you to configure and view live data from any XM module. It is packaged with your XM EODS and runs as a stand-alone program on a computer connected directly to the XM-220 module. To configure your XM-220 modules using the XM Serial Configuration Utility software, you must:

- Install the XM Serial Configuration Utility software onto the computer that will be connected directly to the XM-220 module. Refer to the XM-442 Voted EODS Relay Module Installation Instructions (publication GMSI10-UM016) for assistance.
• Connect the computer to the XM-220 module. Connection to the XM-220 module is through the module’s serial interface using either the three-wire connections on the XM-220 terminal base or the mini-connector on top of the module (see Figure 3.1).

Figure 3.1 XM Cable Connection

A special cable (Cat. No. 1440-SCDB9FXM2) is required for the mini-connector connection. The connector that inserts into the PC is a DB-9 female connector, and the connector that inserts into the module is a USB Mini-B male connector.

![Cable connects to the mini-connector on top of the XM-220 module.]

**WARNING**

If you connect or disconnect the serial cable with power applied to the module or the serial device on the other end of the cable, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

**TIP**

Refer to Chapter 2 in the XM-220 Dual Speed Module User Guide for more information on the terminal base connection.

• Start the XM Serial Configuration Utility program. The Serial Configuration Utility uploads the current configuration from the XM-220 module, and displays the parameters in the Configuration Tool for the connected XM-220 module. Review and modify any configuration parameters as needed. Refer to Using the XM Serial Configuration Utility on page 49.

Repeat this process for all three XM-220 modules. All three XM-220 modules must be configured in order for the XM EODS to function properly.
To configure an XM-220 module using the XM Serial Configuration Utility, follow these steps.

1. Power up the XM-220 module if you haven’t already done so, and start the XM Serial Configuration Utility program. Click the Start program, and then choose Programs > Entek > XM > Serial Config Utility.

The Serial Configuration Utility defaults to the COM 1 serial port. If you are not using COM 1, select the correct COM port on the XM Serial Configuration Utility screen.

When you are connected to an XM-220 module, the XM-220 module type appears on the XM icon, and the connection icon changes to show the connection. Refer to Configuration Overview on page 47 for details on connecting the computer to the XM-220 module.

2. Click the Configure button on the XM Serial Configuration Utility screen. The XM-220 Speed Module Configuration Tool appears.

3. Review and modify any parameters as needed. See the topics below for more details.

If you need help, press F1 to display the online help topic for the current tab or dialog, or refer to Chapter 3 in the XM-220 Dual Speed Module User Guide for a description of the configuration parameters.

4. When you are finished modifying the configuration parameters, choose Device > Download to Device to download the configuration to the connected XM-220 module.

Any configuration parameter changes that you make in the Configuration Tool do not affect the XM-220 module until you download them to the module. The module begins using the new parameters immediately after the download.

You can save the XM-220 configuration to a configuration file and later download it to another XM-220 module by choosing File > Save As. You can also print the configuration by choosing File > Print.
5. From the **File** menu, choose **Close** to close the Configuration Tool window.

### Tachometer Parameters

The Channel tab in the XM-220 Speed Module Configuration Tool allows you to define the characteristics of the tachometers you will be using with your XM-220 module and to determine the signal processing performed on tachometer signal. There are two Channel tabs, one for each channel. Channel 1 of each XM-220 module serves as an overspeed channel of the XM EODS.

The Channel tab also allows you to configure the operating mode of the XM-220. The XM-220 can operate in three different modes: dual channel, single redundant channel, or reverse rotation. This controls how the two tachometers are used to calculate the speed, acceleration, and peak measurements.

**IMPORTANT**

To ensure proper functioning of the XM EODS, the **Mode parameter** in each of the XM-220 modules must be set to "Dual channel."

To configure the tachometer parameters, follow these steps.
1. In the XM-220 Speed Module Configuration Tool, click the **Channel** tab. (The Channel tab is the default tab). You will see a screen similar to this.

![XM-220 Speed Module Configuration Tool](image)

Select **Dual channel** parameter to ensure proper operation of the XM-220 in the XM EODS.

Check this checkbox to cause the XM-220 to provide a small amount of current to help detect transducer faults for passive magnetic sensors.

A voltage reading outside this range constitutes a transducer fault.

Check this checkbox to enable Auto Trigger mode. Uncheck this checkbox to enable Manual Trigger mode and enter **Trigger threshold** and **Trigger slope**.

Enter zero if you are not using the tachometer channel to disable the tachometer measurement.

2. Enter or select the desired parameters to configure the operating mode, and characteristics of the tachometer. This includes:
   - Dual channel mode (two channels on the XM-220 measure two independent speeds, usually on two separate components)
   - the minimum and maximum expected DC voltage
   - the DC bias time constant
   - the number of tachometer signal pulses per revolution of the shaft
   - the amount of hysteresis around the trigger threshold
   - the multiplier value used by the internal tachometer signal to obtain the measured speed

**TIP** Refer to Chapter 3 in the XM-220 Dual Speed Module User Guide for a detailed description of the configuration parameters.

**TIP** Press F1 to display the online help topic for the current tab or dialog.

3. When you are finished, choose **Device > Download to Device** to download your changes to the XM-220 module.
Alarm Parameters

Use the Alarm, Relay and 4-20 mA Output tab in the XM-220 Speed Module Configuration Tool to select the type of measurement that is associated with an alarm and to set the alert and danger threshold values.

The XM-220 provides a total of eight alarms, four per channel. Each alarm is permanently associated with a particular measurement.

To configure the alarm parameters, follow these steps:

1. In the XM-220 Speed Module Configuration Tool, click the **Alarm, Relay, and 4-20 mA** tab. You will see a screen similar to this.

2. Select the **Alarm** that you want to configure.

3. Enter or select the desired parameters to set up the behavior of the alarm. This includes:
   - the measurement and channel associated with the alarm
   - the measurement values at which the alarm changes state
   - the amount that the measurement must fall before the alarm condition is cleared (hysteresis)
   - whether to prohibit the tachometer fault during the startup period
   - the length of time that the tachometer fault is inhibited after the startup signal is received

TIP Refer to Chapter 3 in the XM-220 Dual Speed Module User Guide for a detailed description of the configuration parameters.

![XM-220 Speed Module Configuration Tool](image-url)
4. When you are finished, choose **Device > Download to Device** to download your changes to the XM-220 module.

**Relay Parameters**

Use the Alarm, Relay and 4-20 mA Output tab in the XM-220 Speed Module Configuration Tool to configure which alarms the relay is associated with, as well as the behavior of the relay.

The on-board relay (Relay 1) serves as the circuit fault relay for the overspeed channel (channel 1). It must be configured for failsafe operation (normally energized) and latching.

**IMPORTANT** To ensure proper functioning of the XM EODS, Relay 1 in each of the XM-220 modules must have the **Failsafe relay**, **Latching**, and **Module fault** parameters enabled (selected).

To configure the relay parameters, follow these steps.

1. In the XM-220 Speed Module Configuration Tool, click the **Alarm, Relay and 4-20 mA** tab. You will see a screen similar to this.

   ![Relay Parameters Configuration Tool](image)

   - **This checkbox must checked in order to use the relay.**
   - **The activation logic must persist for this length of time before the relay is activated.**
   - **The relay activation logic and what alarm the relay is to monitor.**
   - **The alarm conditions that cause the relay to activate. More than one can be checked.**
   - **Check the checkbox if the relay is normally energized. Uncheck the checkbox if the relay is normally de-energized. This checkbox must be checked for circuit fault relay.**
   - **Check the checkbox if the relay is to be explicitly reset (as required in the XM EODS). Uncheck the checkbox if the relay is to reset itself. This checkbox must be checked for circuit fault relay.**
2. Select the relay **Number** that you want to configure. Relay number 1 is the on-board relay (circuit fault relay for XM EODS). Numbers 2 through 5 are either relays on the XM-441 Expansion Relay module when it’s connected to the XM-220 or virtual relays.

3. Enter or select the desired parameters to configure the behavior of the relay. This includes:
   - the number of seconds after an alarm condition has been exceeded before the relay activates (activation delay)
   - the alarm that the relay is monitoring
   - the conditions that cause the relay to activate (for example, module fault, measurement exceeds danger level thresholds)
   - whether the relay is latched or failsafe

   **IMPORTANT** When configuring Relay 1, make certain to select the **Module fault** parameter, the **Failsafe relay** parameter, and the **Latching** parameter to ensure proper functioning of the XM EODS.

   **TIP** Refer to Chapter 3 in the XM-220 Dual Speed Module User Guide for a detailed description of the configuration parameters.

   **TIP** Press F1 to display the online help topic for the current tab or dialog.

4. When you are finished, choose **Device > Download to Device** to download your changes to the XM-220 module.

### 4-20mA Output Parameters

Use the Alarm, Relay and 4-20 mA Output tab in the XM-220 Speed Module Configuration Tool to set up the two 4-20mA output signals (A and B). The parameters are the same for each output.

To configure the 4-20mA parameters, follow these steps.
1. In the XM-220 Speed Module Configuration Tool, click the **Alarm, Relay and 4-20 mA** tab. You will see a screen similar to this.

2. Select the 4-20 mA output (A or B) that you want to configure.

3. Enter or select the desired parameters to define the characteristics of the 4-20mA output signal. This includes:
   - the measurement that the 4-20mA output is tracking
   - the min and max range of the 4-20mA output signal

   **TIP** Refer to Chapter 3 in the XM-220 Dual Speed Module User Guide for a detailed description of the configuration parameters.

   **TIP** Press F1 to display the online help topic for the current tab or dialog.

4. When you are finished, choose **Device > Download to Device** to download your changes to the XM-220 module.
**View Data from the XM-220**

Use the View Data tab to view and analyze live data from the XM-220 module. You can monitor the data, alarms and relays. To view the data from the XM-220, click on the **View Data** tab in the XM-220 Speed Module Configuration Tool. You will see a screen similar to this.

![XM-220 Speed Module Configuration Tool](image)

**Saving the Configuration to a File**

When you are finished configuring the first XM-220 module, you can save the configuration to a configuration file. This file can be used to quickly configure the other two XM-220 modules in the EODS.

**To save the configuration to a file**

1. From the **File** menu, choose **Save As**. The Save As dialog appears.

2. Select the directory where you want to save the new file.

3. Enter a name for the configuration file or accept the default name (XMConfig) and click **Save**. The file is saved with a .220 file extension.

**To open a previously saved configuration**

1. Connect the computer to one of the other XM-220 modules in the EODS. Refer to Configuration Overview on page 47 for details.
2. Click the **Configure** button on the XM Serial Configuration Utility screen. The XM-220 Speed Module Configuration Tool appears.

3. From the **File** menu, choose **Open**. The Open dialog appears.

4. Select the saved XM-220 configuration file (.220 file) and click **Open**.

5. From the **Device** menu, choose **Download to Device**. Click the **Yes** button to download the configuration to the module.
Specifications

The Appendix lists the technical specifications for the XM-441 module. Refer to the XM-220 Dual Speed Module User Guide for the technical specifications for the XM-220 module. Refer to the 1606-XLP Power Supply Installation and Operation manual for the technical specifications for the 1606-XLP power supplies.

**XM-441 Technical Specifications**

<table>
<thead>
<tr>
<th>Product Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communications</td>
<td>Side Connector</td>
</tr>
<tr>
<td>Indicators</td>
<td>3 LEDs</td>
</tr>
</tbody>
</table>
XM-441 Technical Specifications

<table>
<thead>
<tr>
<th>Product Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relays</td>
<td></td>
</tr>
<tr>
<td>Number</td>
<td>Four relays, two sets of contacts each - DPDT (2 Form C)</td>
</tr>
<tr>
<td>Contacts</td>
<td>250V AC, 50/60 Hz, 3 A Resistive</td>
</tr>
<tr>
<td>Failsafe</td>
<td>Normally energized</td>
</tr>
<tr>
<td>Latching</td>
<td>The shutdown and alarm relays shall latch when the conditions that activate them are met.</td>
</tr>
<tr>
<td>Voting Logic</td>
<td>Two-out-of-three, One-out-of-three</td>
</tr>
<tr>
<td>Activation</td>
<td>Low logic level (&lt;0.8V) on the overspeed/circuit fault inputs</td>
</tr>
<tr>
<td>Reset</td>
<td>Local reset switch on top of module, Remote reset switch wired to terminal base</td>
</tr>
<tr>
<td>Power</td>
<td></td>
</tr>
<tr>
<td>Module</td>
<td>24V DC</td>
</tr>
<tr>
<td>Consumption</td>
<td>120mA maximum</td>
</tr>
<tr>
<td>Heat Production</td>
<td>2.9 Watts (9.9 BTU/hr) maximum</td>
</tr>
<tr>
<td></td>
<td><strong>Redundant Power:</strong> All XM Measurement and Relay modules support redundant power. Each module includes redundant power inputs on its terminal base unit.</td>
</tr>
<tr>
<td>Environmental</td>
<td></td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-20 to +65°C (-4 to +149°F)</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-30 to +85°C (-22 to +185°F)</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>95% non-condensing</td>
</tr>
<tr>
<td></td>
<td><strong>All printed circuit boards are conformally coated in accordance with IPC-A-610C.</strong></td>
</tr>
<tr>
<td>Physical</td>
<td></td>
</tr>
<tr>
<td>Dimensions</td>
<td>Height: 3.8in (97mm), Width: 3.7in (94mm), Depth: 3.7in (94mm)</td>
</tr>
<tr>
<td>Terminal Screw Torque</td>
<td>7 pound-inches (0.6Nm)</td>
</tr>
</tbody>
</table>
## XM-441 Technical Specifications

<table>
<thead>
<tr>
<th>Product Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approvals (when product or packaging is marked)</td>
<td>UL Listed for Ordinary Locations</td>
</tr>
<tr>
<td></td>
<td>UL Listed for Class I, Division 2 Group A, B, C, and D Hazardous Locations</td>
</tr>
<tr>
<td></td>
<td>CSA Certified Process Control Equipment</td>
</tr>
<tr>
<td></td>
<td>CSA Certified Process Control Equipment for Class I, Division 2 Group A, B, C, and D Hazardous Locations</td>
</tr>
<tr>
<td></td>
<td>CE* European Union 89/336/EEC EMC Directive</td>
</tr>
<tr>
<td></td>
<td>C-Tick* Australian Radiocommunications Act, compliant with:</td>
</tr>
<tr>
<td></td>
<td>AS/NZS 2064, Industrial Emissions</td>
</tr>
</tbody>
</table>

* See the Product Certification link at [www.rockwellautomation.com](http://www.rockwellautomation.com) for Declarations of Conformity, Certificates and other certification details.
alarm

An alarm alerts you to a change in a measurement. For example, an alarm can notify you when the measured vibration level for a machine exceeds a pre-defined value.

Automatic Device Replacement (ADR)

A means for replacing a malfunctioning device with a new unit, and having the device configuration data set automatically. The ADR scanner uploads and stores a device’s configuration. Upon replacing a malfunctioning device with a new unit (MAC ID 63), the ADR scanner automatically downloads the configuration data and sets the MAC ID (node address).

baud rate

The baud rate is the speed at which data is transferred on the DeviceNet network. The available data rates depend on the type of cable and total cable length used on the network:

<table>
<thead>
<tr>
<th></th>
<th>Maximum Cable Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable</td>
<td>125K</td>
</tr>
<tr>
<td>Thick Trunk Line</td>
<td>500m (1,640ft.)</td>
</tr>
<tr>
<td>Thin Trunk Line</td>
<td>100m (328ft.)</td>
</tr>
<tr>
<td>Maximum Drop Length</td>
<td>6m (20ft.)</td>
</tr>
<tr>
<td>Cumulative Drop Length</td>
<td>156m (512ft.)</td>
</tr>
</tbody>
</table>

The XM measurement modules’ baud rate is automatically set by the bus master. You must set the XM-440 Relay module baud rate. You set the XM-440 Relay Master to 125kb, 250kb, 500kb, or Autobaud if another device on the network has set the baud rate.

bus off

A bus off condition occurs when an abnormal rate of errors is detected on the Control Area Network (CAN) bus in a device. The bus-off device cannot receive or transmit messages on the network. This condition is often caused by corruption of the network data signals due to noise or baud rate mismatch.

Change of State (COS)

DeviceNet communications method in which the XM module sends data based on detection of any changed value within the input data (alarm or relay status).
**current configuration**

The current configuration is the most recently loaded set of configuration parameters in the XM module’s memory. When power is cycled, the current configuration is loaded with either the saved configuration (in EEPROM) or the factory defaults (if there is no saved configuration). In addition, the current configuration contains any configuration changes that have been downloaded to the module since power was applied.

**DeviceNet network**

A DeviceNet network uses a producer/consumer Controller Area Network (CAN) to connect devices (for example, XM modules). A DeviceNet network can support a maximum of 64 devices. Each device is assigned a unique node address (MAC ID) and transmits data on the network at the same baud rate.

A cable is used to connect devices on the network. It contains both the signal and power wires. General information about DeviceNet and the DeviceNet specification are maintained by the Open DeviceNet Vendor’s Association (ODVA). ODVA is online at http://www.odva.org.

**EEPROM**

See **NVS** (Non-Volatile Storage).

**Electronic Data Sheet (EDS) Files**

EDS files are simple text files that are used by network configuration tools such as RSNetWorx for DeviceNet to describe products so that you can easily commission them on a network. EDS files describe a product device type, revision, and configurable parameters.

**Electronic Overspeed Detection System**

Consists of speed sensors, power supplies, output relays, signal processing, and alarm/shutdown/integrity logic. Its function is to continuously measure shaft rotational speed and activate its output relays when an overspeed condition is detected.

**Help window**

A **window** that contains help topics that describe the operation of a program. These topics may include:

- An explanation of a command.
- A description of the controls in a dialog box or property page.
- Instructions for a task.
- Definition of a term.
MAC ID

See node address.

master device

A device which controls one or more slave devices. The XM-440 Master Relay module is a master device.

node address

A DeviceNet network can have as many as 64 devices connected to it. Each device on the network must have a unique node address between 0 and 63. Node address 63 is the default used by uncommissioned devices. Node address is sometimes called “MAC ID.”

Normally Closed Contacts

A set of contacts on a relay or switch that are closed when the relay is de-energized or the switch is de-activated. They are open when the relay is energized or the switch is activated.

Normally Open Contacts

A set of contacts on a relay or switch that are open when the relay is de-energized or the switch is de-activated. They are open when the relay is energized or the switch is activated.

NVS (Non-Volatile Storage)

NVS is the permanent memory of an XM module. Modules store parameters and other information in NVS so that they are not lost when the module loses power (unless Auto Save is disabled). NVS is sometimes called “EEPROM.”

online help

Online help allows you to get help for your program on the computer screen by pressing F1. The help that appears in the Help window is context sensitive, which means that the help is related to what you are currently doing in the program.

Polled

DeviceNet communications method in which the module sends data in response to a poll request from a master device.
settling time

The amount of time it takes a measurement to reach 90% of the final value given a step change in the input signal.

slave device

A device that receives and responds to messages from a Master device but does not initiate communication. Slave devices include the XM measurement modules, such as the XM-120 Dynamic Measurement module and the XM-320 Position module.

transducer

A transducer is a device for making measurements. These include accelerometers, velocity pickups, displacement probes, and temperature sensors.

virtual relay

A virtual relay is a non-physical relay. It has the same capabilities (monitor alarms, activation delay, change status) as a physical relay only without any physical or electrical output. The virtual relay provides additional relay status inputs to a controller, PLC, and XM-440 Master Relay module (firmware revision 5 and later).

XM configuration

XM configuration is a collection of user-defined parameters for XM modules.

XM Serial Configuration Utility Software

XM Serial Configuration Utility software is a tool for monitoring and configuring XM modules. It can be run on computers running Windows 2000 service pack 2, Windows NT service pack 6, or Windows XP operating systems.
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Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products. At [http://www.rockwellautomation.com/support/](http://www.rockwellautomation.com/support/), you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration, and troubleshooting, we offer TechConnect support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit [http://www.rockwellautomation.com/support/](http://www.rockwellautomation.com/support/).

Installation Assistance

If you experience a problem within the first 24 hours of installation, review the information that is contained in this manual. You can contact Customer Support for initial help in getting your product up and running.

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New Product Satisfaction Return

Rockwell Automation tests all of its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

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