

Overview

The SETPOINT Monitoring System is a rack-based continuous machinery monitoring platform designed to fully comply with American Petroleum Institute Standard 670 for machinery protection systems. Up to 56 vibration/position/speed channels or 84 temperature channels can be monitored and displayed in a single 19" rack.

The system measures and alarms on shaft radial vibration, axial thrust position, casing seismic vibration (both velocity and acceleration), temperature, and shaft rotative speed. All necessary monitoring functionality is provided using only four basic module types, simplifying spare parts requirements.

A SETPOINT monitoring system consists of the following components:

- **Rack Chassis**

The rack chassis is available in both full- and half-size configurations.

The full-size rack has 16 slots and the half-size rack has 8 slots. Slots 1 and 2 are reserved for the Rack Connection Module (RCM) and System Access Module (SAM) respectively, leaving 14 available slots for monitoring modules in a full-size rack, and 6 available slots in a half-size rack. Racks may be mounted in a panel cutout, on 19" EIA



rails, or with the back flush against a wall or surface (i.e., bulkhead mounting). A lockable faceplate with or without touchscreen display is available for all rack sizes and mounting options.

- **Rack Connection Module (RCM)**

This module accepts simplex or redundant +24Vdc power and distributes to all other installed modules via the rack backplane. It also accepts discrete inputs from external contact closures to invoke rack-wide functions including Alarm Reset (i.e., Acknowledge), Inhibit (i.e., Bypass), Trip Multiply, and Special Alarm Inhibit. The system's Fault (i.e. NOT OK) relay is contained in the RCM. One RCM must be installed in each rack (slot 1).



- **System Access Module (SAM)**

This module provides three separate communications ports:

1. **DCS Communications**

This 10/100 BASE-T Ethernet port uses MODBUS[®] TCP/IP protocol for connecting a SETPOINT system to plant and machinery control systems. It supports static data only.



2. **CM Communications**

This 10/100/1000 BASE-T Ethernet port uses an industry-first fully open protocol for connection to condition monitoring (CM) software. It supports both static and dynamic (waveform) data.

3. **Display Communications**

This LVDS port is used when interfacing to the optional 8.4" color touchscreen display.

All racks require at least one SAM (slot 2); an optional second SAM may be added in slot 3 when redundant communications via MODBUS are desired.*

* NOTE: Redundant SAM capabilities are planned for 1Q2012. Systems requiring a 2nd SAM should reserve slot 3 and populate all UMMs and/or TMMs in slots 4-16.

- **Universal Monitoring Module (UMM)**

This module provides four channels of configurable vibration, position, or speed / phase trigger measurements along with 4 SPDT relays and individual 4-20 mA analog outputs for each channel. The module accepts most commercially available proximity probes, accelerometers, and velocity transducers (both moving-coil and piezo-velocity). Up to 14 UMMs may be installed in a single rack (slots 3-16); they may be mixed in any combination with TMMs. Up to six* (6) phase triggers may be installed in a single SETPOINT rack and must always be configured on channel 4 of a UMM.



* NOTE: A half-size rack (8 slots) is limited to 5 phase triggers.

- **Temperature Monitoring Module (TMM)**

This module provides six channels of configurable temperature measurements along with 4 SPDT relays and individual 4-20 mA analog outputs for each channel. It accepts 2-, 3-, and 4-wire RTDs and grounded / ungrounded thermocouples in any combination. Up to 14 TMMs may be installed in a single rack (slots 3-16); they may be mixed in any combination with UMMs.



- **Rack Configuration Software**

This software allows configuration of all modules in a rack by connecting to the USB port on any UMM or TMM. Future connectivity is planned to allow remote configuration of the rack over a secure control network via the 10/100 BASE-T communications port on the SAM. A copy of this software is provided with each system free-of-charge. It can also be downloaded from our website.



- **Integral Backlit Touchscreen Display**

Both half- and full-size racks can be ordered with an optional 8.4" color touchscreen display. The display mounts on the rack's lockable faceplate and provides all rack statuses and channel values on a single screen. It also allows the user to access detailed channel data, the system events list, and the system alarm list. The display fully complies with API 670 requirements.



- **External Power Supply (EPS)**

The SETPOINT system is energized using standard +24 Vdc instrument power, readily available in many plants. In such installations, no external power supply is required. Simply connect one or two (when optional redundancy is required) 24 Vdc power source(s) to the Rack Connection Module (RCM). For installations with 110/220 Vac, 90-350 Vdc, 400 Vac 3-PH, or 500 Vac 3-PH power sources, an external power supply (EPS) is used. Each EPS is mounted via 35mm DIN rail external to the rack enclosure.



- **Weatherproof Housing**

NEMA 4X / IP65 stainless steel housings with lockable see-through doors are available for both half- and full-size SETPOINT systems. These housings provide protection from dust, moisture, and corrosion when racks are mounted at the machine deck or in other industrial environments not suited for unprotected instrumentation. When only a door is required, it can be ordered without the complete housing. The housings and doors are designed to fit over the top of the SETPOINT system's lockable faceplate and touchscreen display. Weatherproof housings and/or doors are ordered separately. Refer to datasheet 1078951.

- **I.S. Barriers**

The SETPOINT system is approved* for use in hazardous areas up to Div 2 / Zone 2.

When transducers will be installed in Div 1 / Zone 1 areas, the SETPOINT system must be located in a safe area, or a Div 2 / Zone 2 area. Intrinsic Safety (I.S.) barriers are then used to limit the

available energy on the transducer signal and power connections. The SETPOINT system supports the use of both passive (zener) and active (isolated) barriers.



* Pending. Expected 4Q2011.

- **Condition Monitoring Software**

The SETPOINT system is the first to offer a fully open



protocol for access to both static and dynamic (waveform) data. This open connectivity allows the SETPOINT system to enjoy native integration with OSIsoft's PI® System software. Through our partnership with OSIsoft, users will be able to connect their SETPOINT system directly to PI software for comprehensive trending and diagnostic displays of all data, including plot types such as orbit, spectrum, timebase, and more.*

* Availability planned for 1Q2012.

Features and Benefits

- **Deep experience**

The Metrix team designing the SETPOINT system possesses deep experience gained through developing and sustaining more than four generations of successive API 670-compliant machinery protection systems. We pay attention to every detail, ensuring the system works the way you need it to work in the real world – where details matter.
- **Robust, rugged construction**

The SETPOINT rack chassis is constructed entirely of industrial-grade anodized aluminum and stainless steel – every card guide, every faceplate, every rack panel. In addition to excellent RFI/EMI rejection, these materials are built to last while maintaining their good looks. The SETPOINT system looks professional because it is professional.
- **Easily adaptable mounting**

The SETPOINT system's design allows the same rack to be used in panel cutout, 19" EIA, or bulkhead mounting configurations by simply employing different rack brackets. The chassis, backplane, and all modules remain the same. This also means that you don't sacrifice valuable space when bulkhead mounting – unlike systems that require twice as much space for bulkhead mounting compared to rack or panel mounting.
- **Front-loading, front-wired modules**

Every module in the SETPOINT system inserts from the front and all field wiring lands on removable connectors at the front of the rack, no matter which mounting option you choose. No more back-and-forth trips around the panel to access each side of the rack during installation and maintenance. And, everything is neatly recessed behind the SETPOINT system's attractive, lockable faceplate, protecting your critical wiring.
- **High quality, high-speed backplane**

The SETPOINT system uses state-of-the-art backplane connectors and high-speed design techniques to facilitate ultra-fast data throughput and outstanding reliability.
- **Full color, backlit touchscreen**

With the SETPOINT system's optional touchscreen, users have at-a-glance, real time visibility of every channel and status in the rack on a single screen – no scrolling, no multiplexing. We worked closely with users to ensure the system's display was intuitive, efficient, and attractive, with a rapid update time so there's no annoying wait for the screen to refresh with current values. It's also easy to see under all lighting conditions – including outdoors. And, because it uses resistive (not capacitive) technology, it works with fingers, gloves, and stylus.

- **Lockable front faceplate**

Whether with or without the optional touchscreen display, every SETPOINT rack can be ordered with a lockable faceplate. It protects all installed wiring from tampering and provides physical security, preventing unauthorized personnel from accessing configuration and data ports. Its sleek, black anodized finish is designed to complement any installation, whether in the control room or on the machine deck.

- **High density design**

Systems using separate modules for display drivers, relays, phase triggers, power supplies, and Modbus communications can mean that only 40% of the rack's slots are actually available for vibration or temperature monitoring. In contrast, the SETPOINT system requires only two slots for system power and communications (including display) – all other slots are available for monitoring. Up to 56 vibration channels in a full-size 19" rack and up to 24 vibration channels in a half-size rack. No other system offers such efficient use of space.

- **Flexible buffered output options**

The SETPOINT system delivers buffered transducer outputs at 3 different locations in the rack: at an RJ45 receptacle on each UMM where all 4 channels are available concurrently; at a 30-pin connector set on the RCM where all 56 UMM channels are available concurrently; and, at an innovative new set of three programmable BNC connectors on the front panel.* By simply using the touchscreen, you can select 2

vibration channels and their associated phase trigger, easily switching channels without ever needing to move cables from one set of connectors to the next. Imagine gathering 56 channels of dynamic data with your data collector without constantly disconnecting and reconnecting. And, we've taken the ambiguity out of these connections. When you select a channel via the touchscreen, it displays all details – channel tag and description, mV output in engineering units, and everything else necessary to ensure that your data collector inputs match the monitor system outputs.

*NOTE: Programmable BNC connectors planned for 1Q2012.

- **Outstanding EMI/RFI performance**

Solid metal construction, EMI gaskets, state-of-the-art filtering, and international EMI/RFI approvals mean that the SETPOINT system operates trouble-free in even the noisiest electromagnetic environments.

- **Standard +24 Vdc instrument power**

Because standard +24 Vdc instrument power is readily available in many plants, we built the SETPOINT system to run natively with this voltage. Simply connect 24 volt power to the RCM on each rack. No special power supplies are needed. Don't have a 24 volt power source? No problem. We offer a wide variety of external supplies compatible with 110/220 Vac, 90-350 Vdc, and even 400/500 V 3-phase power. And because all power sources are located outside the rack, heat dissipation is kept outside the rack as well, resulting in a system that runs cooler and can use smaller enclosures.

- **Truly redundant supplies**
The SETPOINT rack accepts two independent 24 volt supply inputs. Via the backplane, these supplies are delivered to each and every module in the rack. The module in each slot individually determines the best available supply. As soon as one supply is removed (or drops below the other), all modules seamlessly switch to the alternate supply assuring uninterrupted system operation.
- **Distributed power regulation**
Unlike systems that centrally regulate or condition incoming power and then distribute every voltage needed, each monitor in the SETPOINT system runs on 24 Vdc and creates its own regulated voltages. This design philosophy reduces the potential for rack single-point failures compared to systems that generate all regulated voltages centrally. In the SETPOINT system, regulator problems affect only a single module, not the entire rack.
- **Wide open access to all data**¹
The SETPOINT system provides an industry-first fully open protocol for access to *all* system data. Connect to what you want, how you want, without being locked into proprietary, single-purpose software.
- **Out-of-the-box integration with OSIsoft's PI® System software**¹
Our partnership with OSIsoft provides native connectivity between the SETPOINT system and the PI System for trending, archiving, and analysis. No intervening software or middleware is required for access to all data, both static *and* dynamic.
- **Optional DCS redundancy**²
Up to two SAM cards can reside in a single SETPOINT rack for fully redundant DCS communications links with plant and machinery control systems.
- **On-board data storage**¹
A removable SDHC card in the SAM allows up to 32 GB of static and dynamic data to be retained in the rack. This ensures that important data such as during startup, alarm, or machine trip events aren't lost, even if communications between the rack and condition monitoring software are interrupted or absent.
- **Non-proprietary storage media**¹
Uses any standard SDHC memory card up to 32 GB – the same cards used in many cameras, MP3 players, and other portable devices.
- **Data analysis even without condition monitoring software**¹
The SAM's onboard SDHC card allows you to send the card (or its contents) to us via conventional delivery methods or online file transfer when you need assistance analyzing machinery data. Separate condition monitoring software is not required simply to capture the data surrounding an event.
- **No separate I/O modules required**
Module functions and I/O are contained on the same card.
- **Clear, intuitive labeling**
Easily identify status LEDs and connections; wiring labels are provided on each module's faceplate and its removable connectors.
- **No jumpers or DIP switches**
Every option in the SETPOINT system is

configured via software. Cards do not have to be removed from the rack.

- **Hot swappable**

Modules can be inserted and removed without powering down the rack.

- **Simple, reliable, self-contained design**

Reduces likelihood of failures from inter-module dependencies.

- **Digital MODBUS® communications**

Can be used in lieu of (or simultaneously with) analog 4-20 mA outputs on monitor modules for flexibility when integrating with other instrumentation.

- **Spreadsheet-like configuration environment**

SETPOINT software provides unparalleled ease of configuration – easily cut and paste data to/from Microsoft® Excel® and most other programs. No manual reentry of data from project datasheets and documents is required, reducing the likelihood of transcription errors and eliminating tedious typing to duplicate information that already exists electronically elsewhere.

- **Highly reliable architecture**

Monitor modules in the SETPOINT system use just three transitional connectors from signal input to relay output – significantly reducing possible failure points in the critical machinery protection path.

- **Individual 4-20 mA outputs**

Every channel has its own 4-20 mA output for easy connection to PLCs, SCADA systems, chart recorders, and other instrumentation not supporting digital interfaces.

- **Four SPDT electro-mechanical relays**

Every monitor module provides 4 relays that

can be voted with other channels whether in the same or different rack modules. No separate relay modules are required, allowing you to use rack slots far more efficiently.

- **Powerful onboard processors**

Every monitoring module delivers 24-bit A-to-D resolution for highly accurate measurements – no potentiometers, no drift, no calibration required.

- **Simplified spare parts**

Only four basic module types are used, regardless of transducer input types, output types, or system options.

- **Reduced channel pair restrictions³**

Transducers can be mixed with minimal restrictions on their respective monitoring modules. Place axial position probes on separate modules, XY probe pairs on separate modules, mix RTDs and thermocouples (both grounded and ungrounded tips), and put phase triggers on the same module as other vibration/position measurements. The SETPOINT system's flexibility means you can use rack space more efficiently.

NOTES:

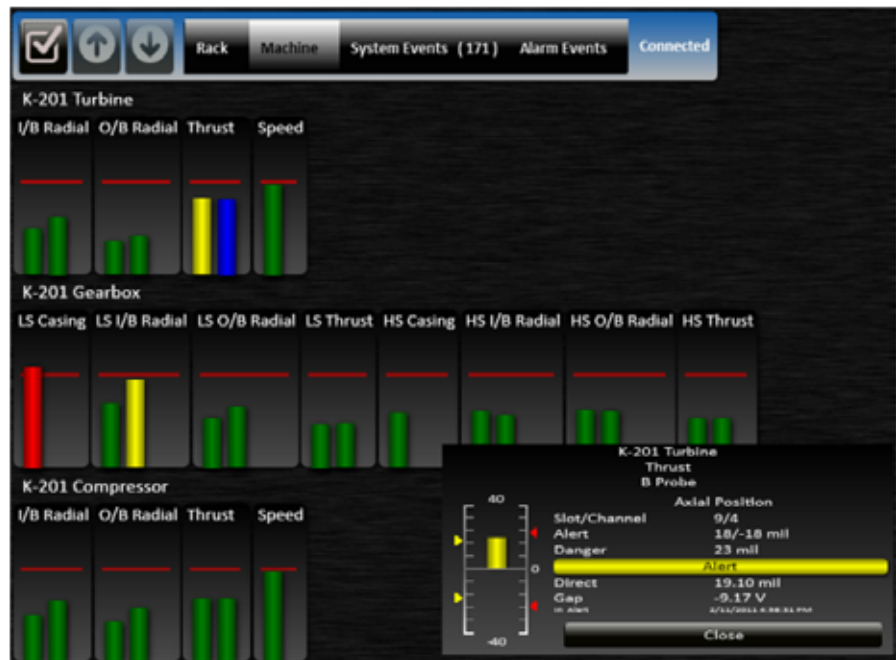
1) Dynamic data capture and communication planned for 1Q2012. Systems purchased prior to that time may be upgraded in the field via a firmware download.

2) Redundant SAM support planned for 1Q2012. Applications using redundant SAMs should reserve rack slot 3 for addition of second SAM.

3) Depending on alarm voting logic, assignment of an XY probe pair to the same UMM can increase the rack's voting logic capacity. RTDs, grounded tip thermocouples, and ungrounded tip thermocouples can be mixed in the same TMM; however, all channels share the same ground. Separate TMMs can have separate ground potentials.

Typical Screens

Machine-at-a-Glance Screen shows all channels in the rack (up to 84), arranged into user-configurable groups – typically trains, cases, and bearings. Bargraphs are color-coded to show alarm condition and normalized to % of danger setpoint for ease of comparison. Tap on any bargraph to obtain channel details. Selected bargraph turns blue for easy identification. Details window can be moved and pinned anywhere on screen.



Rack-at-a-Glance Screen is similar to machine-at-a-glance, but arranged by slot/channel to correspond with physical configuration of the rack's slot and channel assignments. This view is especially useful for I&C personnel that need to work with the rack based on physical slot and channel assignments. This screen also shows the status of each relay in addition to the status of each channel. Tapping on a relay or bargraph opens a detail window.



System Events Screen

arranges all system events in an intuitive spreadsheet-like fashion. Severity is clearly indicated by color-coded icons and unacknowledged events are highlighted in bold. Users can sort the list by simply tapping on the column header. To scroll, use the up/down arrow icons on the top menu bar. To acknowledge events and alarms, tap the checkbox icon at the top of the screen.

Severity	Direction	Date Time	Event Type	Source	Channel Type
	In	2/11/2011 5:11:17 PM	Inhibit Relay	...Y Probe	Radial Vibration
	In	2/11/2011 5:11:17 PM	Special Alarm Inhibit	Metrix.Core.Domain.Module	
		2/11/2011 5:11:16 PM	Module Removed From System	...Y Probe	Radial Vibration
	In	2/11/2011 5:11:16 PM	Inhibit Relay	Metrix.Core.Domain.Module	
	In	2/11/2011 5:11:15 PM	Special Alarm Inhibit	Metrix.Core.Domain.Module	
	In	2/11/2011 5:11:15 PM	Relay Failure	Metrix.Core.Domain.Module	
		2/11/2011 5:11:14 PM	Module Rebooted	Metrix.Core.Domain.Module	
		2/11/2011 5:11:14 PM	Module Inserted Into System	Metrix.Core.Domain.Module	
		2/11/2011 5:11:13 PM	Module Removed From System	...Phase Trigger	Phase Trigger
	In	2/11/2011 5:11:13 PM	Module Not Communicating	Metrix.Core.Domain.Module	
	In	2/11/2011 5:11:12 PM	Inhibit Relay	...Y Probe	Radial Vibration
	In	2/11/2011 5:11:12 PM	Inhibit Alert	Metrix.Core.Domain.Module	
	In	2/11/2011 5:11:10 PM	Relay Failure	...Accel	Acceleration
	In	2/11/2011 5:11:10 PM	Special Alarm Inhibit	...Accel	Acceleration
	In	2/11/2011 5:11:09 PM	Bypass Channel	...X Probe	Radial Vibration
		2/11/2011 5:11:09 PM	Slot ID failure	Metrix.Core.Domain.Module	
		2/11/2011 5:11:08 PM	CM Processor Rebooted	Metrix.Core.Domain.Module	
	In	2/11/2011 5:11:08 PM	Module Not Communicating	Metrix.Core.Domain.Module	

Alarm Events Screen

is similar to System Events Screen, but arranges all alarm events instead. Severity is clearly indicated by color-coded icons and unacknowledged alarms are highlighted in bold. Users can sort the list by simply tapping on the column header. To scroll, use the up/down arrow icons on the top menu bar. To acknowledge events and alarms, tap the checkbox icon at the top of the screen.

Severity	Direction	Date Time	Event Type	Source	Channel Type
	In	2/11/2011 5:13:05 PM	Alert	...Direct	Acceleration
	Out	2/11/2011 5:13:05 PM	Danger	...Direct	Acceleration
	In	2/11/2011 4:59:58 PM	Alert	...Direct	Radial Vibration
	In	2/11/2011 4:59:20 PM	Danger	...Direct	Acceleration
	In	2/11/2011 4:59:20 PM	Danger	...Direct	Acceleration
	In	2/11/2011 4:59:14 PM	Alert	...Direct	Acceleration
	In	2/11/2011 4:58:31 PM	Alert	...Direct	Axial Position
	In	2/11/2011 4:58:25 PM	Alert	...Direct	Axial Position

Specifications

Specifications provided are for rack chassis, system power, and touchscreen display only. For detailed specifications on each module type and selected accessories, refer to the following companion datasheets:

Components	Datasheet
SAM	1077786
UMM	1077787
TMM	1077788
RCM and External Power Supplies	1078950
Weatherproof Housings	1078951
SETPOINT Software	1078952

All specifications are at +25C (+77° F) unless otherwise noted.

Inputs			
Number of Slots	<ul style="list-style-type: none"> Full Rack: 16 Half Rack: 8 		
Supported Module Types	Module	Location	Max Qty
	RCM	Slot 1	1
	SAM	Slot 2*	1*
	UMM	Slots 3-16	14
	TMM	Slots 3-16	14
* A second SAM may be installed in slot 3 if desired for redundant DCS communications. Availability of this feature is planned for 1Q2012.			
Transducer Types	UMM cards accept most commercially available proximity probe, accelerometer, and velocity transducers. TMM cards accept 2-, 3-, and 4-wire RTDs and Type J, K, T, and E thermocouples (both grounded		

	and ungrounded tip). Refer to the UMM and TMM datasheets 1077787 and 1077788 for a comprehensive list of compatible transducers.
Channels	<ul style="list-style-type: none"> Vibration: up to 56 (14 UMM cards) Temperature: up to 84 (14 TMM cards) Phase/Speed: up to 6* <p>* Speed / phase channels are restricted to channel 4 of a UMM. A full-size SETPOINT rack may have up to 6 (six) speed/phase channels and they must reside in slots 4-9. A half-size SETPOINT rack may have up to 5 (five) speed/phase channels and they must reside in slots 4-8.</p>
Discrete Rack Control	<p>Four “dry contact” type connections are available via the RCM:</p> <ul style="list-style-type: none"> Alarm Reset (Acknowledge)* Inhibit (Bypass) Trip Multiply Special Alarm Inhibit <p>These can be invoked remotely by wiring suitable analog control signals. Refer to RCM datasheet 1078950 for details.</p> <p>* NOTE: The Alarm Reset (Acknowledge) function is also available as a local pushbutton on the RCM faceplate.</p>
Digital Rack Control	<p>Selected control (such as Trip Multiply, Alarm Adjust, Reset, Set date/time, etc.) of the rack, modules, and individual channels is available via the digital MODBUS interface on the System Access Module.</p> <p>Refer to the SAM datasheet 1077786 for details.</p>

Rack, Channel, and Module Configuration	<p>Connection of SETPOINT software to the USB port on any UMM or TMM allows configuration of all modules in the rack. Future connectivity is planned to allow remote configuration of the rack over a secure control network via the 10/100 BASE-T communications port on the SAM.*</p> <p>* Remote configuration capabilities planned for 1Q2012.</p>
Number of Supplies	Accepts up to two +24 Vdc independent power sources
Allowable Wiring Sizes for Power	12 AWG to 16 AWG via removable plugs
Power Connector Style	Removable, with positive retention
Reverse Polarity Protection	Power inputs protected from continuous input polarity reversal.
Input Voltage	<ul style="list-style-type: none"> • Nominal: +24 Vdc • Continuous: + 22 to +30 Vdc • Transient (< 1 sec) : +18 to + 36 Vdc • Ripple < 100mV pk to pk
Power Consumption	<p>≤ 160W, <8A when input power voltage is 22 to 26 Vdc.</p> <p>NOTE: Assumes fully loaded 16-position rack with display, redundant SAMs, all relays energized, all 4-20 mA outputs at full scale, and maximum transducer power requirements.</p>

Power Input Fuse Rating	10 A
Ground Select	<ul style="list-style-type: none"> • System common tied to chassis ground (external jumper* installed) • System common isolated from chassis ground** (external jumper* removed) <p>*Jumper is accessible from the front of the rack and may be installed on either the P1 or P2 removable wiring connectors on the RCM.</p> <p>** This configuration is commonly used for systems with IS barriers where a separate IS ground must be established.</p>
Alarm Reset	<p>Alarm conditions can be reset (i.e., acknowledged) in any of four ways:</p> <ol style="list-style-type: none"> 1. Via the local RESET pushbutton on the faceplate of the RCM* 2. Via remote contact closure by shorting the RST and COM terminals together on the RCM* 3. Via the optional touchscreen display* 4. Via the MODBUS digital interface** <p>* Provides global (rack-wide) reset / acknowledgement of all alarms.</p> <p>** Provides per-channel reset / acknowledgement of alarms.</p>

Buffered Transducer Outputs	
Front Panel	Channels*
	Three, programmable** via touchscreen:
	<ul style="list-style-type: none"> • Connector A can select from any speed / phase channel in the rack. • Connector B can select from any UMM channel in the rack. • Connector C can select from any UMM channel in the rack. By default, it will select the corresponding pair (if applicable and if assigned in configuration) for the channel on connector B.
	* Only Universal Monitoring Module (UMM) channels are available at buffered outputs. TMM (temperature) channels are not available.
	** Functionality planned for 1Q2012 via no-charge firmware update.
	Connector Type
	<ul style="list-style-type: none"> • BNC female
	Impedance
	<ul style="list-style-type: none"> • 550 Ω
	Short-Circuit Protected
<ul style="list-style-type: none"> • Yes 	
Signal Type	
<ul style="list-style-type: none"> • Raw (unfiltered, no integration) transducer signal in mV/engineering units* <p>* The Metrix 2-wire digital proximity transducer system provides a dynamic 4-20 mA signal that is converted to a standard mV/mil signal inside the UMM.</p>	
UMM	Channels
	<ul style="list-style-type: none"> • All 4 UMM channels are available concurrently at the RJ45 connector on the

	UMM's faceplate. A special RJ45-to-4-BNC cable is available as an optional accessory (p/n 100431).
	Connector Type
	<ul style="list-style-type: none"> • RJ45 receptacle
	Impedance
	<ul style="list-style-type: none"> • 550 Ω
	Short-Circuit Protected
	<ul style="list-style-type: none"> • Yes
	Signal Type
	<ul style="list-style-type: none"> • Raw (unfiltered, no integration) transducer signal in mV/engineering units* <p>* The Metrix 2-wire digital proximity transducer system provides a dynamic 4-20 mA signal that is converted to a standard mV/mil signal inside the UMM.</p>
RCM	Channels
	56*
	* Only Universal Monitoring Module (UMM) channels. TMM (temperature) channels are not provided.
	Connector Qty / Type
	Two Molex® Pico-Clasp® 30-pin receptacles, each with 28 buffered output channels.*
	* Buffered outputs are also available on each UMM via an RJ45 connector with all 4 channels, and on the optional rack faceplate via 3 programmable BNC-type connectors.
	Impedance
	<ul style="list-style-type: none"> • 550 Ω
	Short-Circuit Protected
	<ul style="list-style-type: none"> • Yes
	Signal Type
	<ul style="list-style-type: none"> • Raw (unfiltered, no integration) transducer signal in mV/engineering units* <p>* The Metrix 2-wire digital proximity transducer system provides a dynamic 4-20 mA signal that is converted to a standard mV/mil signal inside the UMM.</p>

System Overview

Analog Outputs	
Alarm Relays	<p>Four per monitor module. Each UMM and TMM provides four SPDT relays that can be programmed for individual channels or for logical voting among two or more channels.</p> <p>Refer to UMM and TMM datasheets for details.</p>
Fault (NOT OK) Relay	<p>One per rack, located on the RCM.</p> <p>Refer to RCM datasheet for additional details.</p>
4-20 mA	<p>One per channel for all UMM and TMM cards.</p> <p>Refer to UMM and TMM datasheets for additional details.</p>
Digital Outputs	
Modbus TCP/IP	<p>10/100 BASE-T connector on SAM provides channel values, channel status conditions, and a variety of other data.</p> <p>Refer to SAM datasheet for additional details.</p>
Condition Monitoring	<p>10/100/1000 BASE-T connector on SAM provides full static and dynamic (waveform) data using an open, published protocol.</p> <p>Refer to SAM datasheet for additional details.</p>
LEDs	
OK	<ul style="list-style-type: none"> Each TMM and UMM provides an OK LED indicating that no faults or NOT OK conditions are present within the module or any channel therein.

	<ul style="list-style-type: none"> Each SAM provides an OK LED indicating that no faults are present within the module. Each RCM provides an OK LED indicating rack-wide status; when lit, no faults or NOT OK conditions exist in any module or channel.
Relays	<ul style="list-style-type: none"> Each UMM and TMM provides 4 LEDs (one for each relay) indicating that the relay is being driven true (corresponding to the configured alarm logic for each relay)
Bypass	<ul style="list-style-type: none"> Each UMM and TMM provides an LED indicating that one or more channels are in a BYPASS condition.
Comms	<ul style="list-style-type: none"> Each SAM provides two LEDs for each of its Ethernet ports, indicating whether a connection is present and whether send/receive activity is occurring. Each SAM provides a Trip Multiply LED, indicating whether Trip Multiply has been invoked for the entire rack or any channel in the rack. Each SAM provides a DSP (display) LED, indicating whether a touchscreen display is detected.
Power	<ul style="list-style-type: none"> The RCM provides individual status LEDs for both Power 1 and Power 2 connections. When lit, power is detected and is within specifications.

System Overview

Display	
Size	8.4 inches (213 mm), measured diagonally
Resolution	1024 x 768 (XGA)
Aspect Ratio	4:3
Backlight	Rated for 100,000 hours to ½ brightness.
Technology	Active TFT
Touchscreen Type	Resistive
Color	32-bit (True Color)
Environment and Area Classification Rating	Same as rack and all modules. Inclusion of touchscreen display does not de-rate rack environmental or area classification specifications.
API 670 Compatible	Yes. All status conditions and channels are indicated continuously on a single screen, without scrolling or multiplexing.
Display Refresh	Channel values and statuses are updated on the display once per second.
Max. Racks per display	A maximum of one SETPOINT rack may be connected to each touchscreen display.
Available screen types	Machine-at-a-glance (MAG)
	All channel values and statuses displayed concurrently, arranged by user-configured groups (typically train/machine/bearing)
	Rack-at-a-glance (RAG)
	Similar to MAG screen, but organized by physical rack slot/channel assignments (useful for I&C maintenance personnel that prefer to view data in terms of slots/channels)

	<p>Alarm Events</p> <p>Displays the 1000 most recent alarm events with date/time stamp, type (alert, danger, fault, etc.), whether entering or leaving condition, channel name, and other details. Data is presented in spreadsheet-like tabular format that can be sorted by touching any column header.</p>
	<p>System Events</p> <p>Displays the 1000 most recent system events with date/time stamp, type (module removed, bypass invoked, etc.), whether entering or leaving condition, channel name, and other details. Data is presented in spreadsheet-like tabular format that can be sorted by touching any column header.</p>
	<p>Channel / Relay Detail</p> <p>Tapping on any bargraph or relay indicator while in the MAG or RAG brings up an inset screen with additional details for the selected point.</p>
Event List	<ul style="list-style-type: none"> • Size: 1000 events • Time/Date Stamp Resolution: 40 ms
Alarm List	<ul style="list-style-type: none"> • Size: 1000 alarms • Time/Date Stamp Resolution: 40 ms

Environmental	
Operating Temperature	-20C to +65C
Storage Temperature	-40C to +85C
Operating Temp. Ramp	Do not exceed 0.5C/minute
Storage Temp. Ramp	Do not exceed 10C/minute
Humidity	5% to 95%, non-condensing
CE Mark Directive (pending)	
ESD	<ul style="list-style-type: none"> Contact: 6 kV* Air: 8 kV * Criteria B
Radiated EMI Susceptibility	<ul style="list-style-type: none"> 80 – 1000 MHz: 20 V/m* 1.4 – 2 GHz: 6 V/m* 2 – 2.7 GHz: 3 V/m* * Criteria A
Magnetic Field	30 A/m, Criteria A
EFT Burst	2 kV, Criteria B
EFT Surge (Signal Lines, Power Line)	2 kV line to ground, Criteria B
Conducted RFI (Signal Lines, Power Lines)	150 kHz to 80 MHz, Criteria A
Conducted RF Common Mode Immunity (Signal Lines, Power Lines)	<ul style="list-style-type: none"> 15 Hz – 150 Hz: 10 V* 150 Hz – 1.5 kHz: 1V* 1.5 kHz – 150 kHz: 10 V* * Criteria A
Radiated EMI Emissions	30 dB μ V/m @ 30 m, 30 MHz – 1000 MHz, Class A
Conducted Emission	60 dB μ V/m @ 30 m, 0.5 MHz – 30 MHz, Class A
AC Power Voltage Dip Immunity	One-half period, 30% reduction, Criteria B

AC Power Voltage Dip Interruption	250 periods, 95% reduction, Criteria B
DC Power Voltage Dip Immunity	10 ms, 60% reduction, Criteria B
DC Power Voltage Dip Interruption	30 ms, 100% reduction, Criteria B
Low Voltage Directive	Council Directive 2006/95/EC Low voltage using Metrix-supplied power supply (rack ordering option –CC) or other Low Voltage Directive approved supply.
Hazardous Area Approvals (pending)	
ATEX/IEC Ex – Zone 2	Ex nA [ic] IIC T4 @ -20C < Ta < +65C
USA/Canada Class I, Div 2 / Zone 2	<ul style="list-style-type: none"> Class I, Div 1, Groups A-D T4 @ -20C < Ta < +65C Class I, Zone 2 AEx nA IIC T4 @ -20C < Ta < +65C
Physical	
Dimensions	See page 23
Weight	Empty Rack Chassis*
	Full-size: 7.2 kg (15.9 lbs) Half-size: 4.8 kg (10.6 lbs) * Includes 3" brackets, no faceplate, no display, no modules, no blank covers for unused module slots.
	Lockable Faceplate w/o display
	Full-size: 1.5 kg (3.3 lbs) Half-Size: 895 g (2 lbs)
	Lockable Faceplate w/ display
	Full-size: 2.12 kg (4.7 lbs) Half-size: 1.5 kg (3.3 lbs)
	3" mounting bracket
	190 g (6.5 oz)
	Flush mounting bracket*
	80 g (3 oz) * Used for bulkhead and flush mounting.
Blank Slot Cover Plate	
48 g (1.7 oz)	

Ordering Information

SETPOINT Monitoring System

Use the part number at right when ordering a complete SETPOINT system with all modules pre-installed in the correct rack slots. The part number and all dash numbers (AA-VV) will uniquely specify all system details including rack size, mounting type, module type for each slot, simplex or dual-redundant external power supplies, optional lockable faceplate, and optional touchscreen display.

Weatherproof housings are available separately. Refer to datasheet 1078951.

When spare modules are required, refer to page 22, or the module-specific datasheet, for ordering information.

Caution

Monitor system modules are shipped with default factory configuration settings which are not necessarily suitable for any particular application. Before use, each module and channel must be configured properly for its application via SETPOINT configuration software. This software is included with each system or module ordered and is also available for download at our website.

MX2020/RCK-AA-BB-CC-DD-EE-FF-GG-HH-JJ-KK-LL-MM-NN-PP-RR-SS-TT-UU-VV¹ SETPOINT Monitoring System

AA Mounting Style

0 1	Panel Cutout
0 2	Bulkhead
0 3	19" EIA

BB Slots / Faceplate / Display

0 0	8-slot, no faceplate, no display
0 1	16-slot, no faceplate, no display
0 2	8-slot, with faceplate, no display
0 3	16-slot, with faceplate, no display
0 4	8-slot, with faceplate and display ²
0 5	16-slot, with faceplate and display ²

CC Power³

0 0	+24 Vdc (no external supplies)
0 1	Single 110/220 Vac 50/60 Hz supply
0 2	Dual 110/220 Vac 50/60 Hz supplies
0 3	Single 360-440 Vac (3Ø) supply
0 4	Dual 360-440 Vac (3Ø) supplies
0 5	Single 410-550 Vac (3Ø) supply
0 6	Dual 410-550 Vac (3Ø) supplies
0 7	Single 90-350 Vdc supply
0 8	Dual 90-350 Vdc supplies

DD Approvals

0 0	None
0 1	Multi (ATEX, IEC, CSA)
X X	Country-specific ⁴

EE Slots 1 and 2

0 0	RCM slot 1, no module slot 2
0 1	RCM slot 1, Basic SAM slot 2
0 2	RCM slot 1, Enhanced SAM slot 2
0 3	RCM slot 1, UMM slot 2
0 4	RCM slot 1, TMM slot 2

FF **Slot 3**

0 0	No Module Installed
0 1	Basic SAM (bSAM)
0 2	Enhanced SAM (eSAM)
0 3	UMM
0 4	TMM

GG **Slot 4**

0 0	No Module Installed
0 3	UMM
0 4	TMM

HH **Slot 5**

0 0	No Module Installed
0 3	UMM
0 4	TMM

JJ **Slot 6**

0 0	No Module Installed
0 3	UMM
0 4	TMM

KK **Slot 7**

0 0	No Module Installed
0 3	UMM
0 4	TMM

LL **Slot 8**

0 0	No Module Installed
0 3	UMM
0 4	TMM

MM **Slot 9**

0 0	No Module Installed
0 3	UMM
0 4	TMM

NN **Slot 10**

0 0	No Module Installed
0 3	UMM
0 4	TMM

PP **Slot 11**

0 0	No Module Installed
0 3	UMM
0 4	TMM

RR **Slot 12**

0 0	No Module Installed
0 3	UMM
0 4	TMM

SS **Slot 13**

0 0	No Module Installed
0 3	UMM
0 4	TMM

TT **Slot 14**

0 0	No Module Installed
0 3	UMM
0 4	TMM

UU **Slot 15**

0 0	No Module Installed
0 3	UMM
0 4	TMM

VV **Slot 16**

0 0	No Module Installed
0 3	UMM
0 4	TMM

NOTES:

1. To prevent ambiguity, the letters I, O, and Q are not used in Metrix part numbers.
2. When a touchscreen display is installed, an Enhanced SAM must be selected for slot 2 (EE=02).
3. When dual external power supplies are required and each will use a different voltage, order a system with a simplex power supply for one of the required voltages. Order the other external supply via part number MX2020/EPS-AA-BB (refer to datasheet 1078950).
4. Country-specific approvals can be quoted upon request. Please consult the factory.

Accessories

SAM-to-Display Cable

This cable is used when connecting a rack's touchscreen display to its associated Enhanced SAM. Each touchscreen ships by default with a 7.5" cable, allowing the lockable faceplate and display to mount immediately in front of the rack. If the rack will be located separately from the display, longer versions are available, allowing up to 10 feet of cable between the display and the SAM. Identical male connectors are preinstalled at each end, compatible with the female connectors at the SAM and the touchscreen. The connectors snap securely into place using integral locking mechanisms.



100410-AAAAA

SAM-to-Touchscreen Cable

AAAAA

--	--	--	--	--

Cable Length

0	0	7	5	0	7.5 inch (191 mm) length
1	2	0	0	0	10' (3 m) length

External Power Supplies

Use the CC option when ordering a single power supply with each system, or when ordering redundant power supplies that will use the same voltage. Use the part numbers below when ordering a spare power supply, or when ordering the second power supply for redundant configurations utilizing two different input voltages.



100411*

110/220 VAC External Power Supply (spare)

100414*

360-440 3Ø VAC External Power Supply (spare)

100416*

450-550 3Ø VAC External Power Supply (spare)

100417**

90-350 VDC External Power Supply (spare)

* Provided with following multiple approvals as standard:
CSA Class I, Division 2, Groups A-D; Class I, Zone 2, Ex nC IIC T4
ATEX II 3G Eex nAC IIC T4
IEC/EN Class I, Zone 2, Eex nC II C T4 U
CE

** Provided with following multiple approvals as standard:
UL/c-UL Recognized UL 1604 Class I, Division 2, Groups A-D
ATEX II 3G Eex nAC IIC T4
CE

Breakout Cable*

This cable is used when connecting the channels in a single UMM to an external device such as a portable data collector with female BNC jacks. When it is necessary to simultaneously connect channels from multiple UMMs to external instruments, use two or more breakout cables. For ease-of-identification, each BNC connector is numbered under a clear heat-shrink label, corresponding to each UMM channel number. When longer cable runs are required, simply purchase standard CAT5E cable in the desired length and use an RJ45-to-RJ45 inline connector. Both are readily available from a variety of electronics suppliers.



100431-AA BNC breakout cable assembly – RJ45 (male) to four BNC (male)

AA Cable Length

1 0 10 foot (3 m) cable length

* NOTE: For systems with programmable BNC jacks on the SETPOINT faceplate, this cable is not required unless simultaneous connection of more than three (3) channels at a time to an external instrument is necessary.

24 Vdc Power Cable

This 3-conductor cable is used to connect a bench or desktop 24 Vdc power supply to a SAM, UMM, or TMM, allowing stand-alone testing and/or configuration of the module without the need to insert it into a SETPOINT rack. One end of the cable has a receptacle that mates to the module's backplane power connector. The other end of the cable has 3 conductors (PWR, COM, GND) for connection to a suitable 24 Vdc power source.



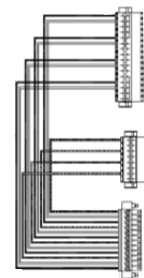
100436-AA 24Vdc SETPOINT Module Power Cable

AA Cable Length

0 6 6 foot (1.8 m) cable length

UMM Loop Test Harness

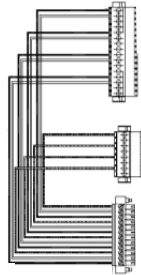
This cable assembly allows complete loop testing of the UMM when exercising the built-in self-test features on each card. It is the same harness used during final test in the factory manufacturing process and allows the user to verify signal inputs, 4-20 mA outputs, relay outputs, and transducer power outputs. The UMM manual provides detailed guidance for maintenance personnel on the use of this harness and the accompanying UMM self-test procedure.



100434 UMM Loop Test Harness

TMM Loop Test Harness

This cable assembly allows complete loop testing of the TMM when exercising the built-in self-test features on each card. It is the same harness used during final test in the factory manufacturing process and allows the user to verify signal inputs, 4-20 mA outputs, relay outputs, and transducer power outputs. The TMM manual provides detailed guidance for maintenance personnel on the use of this harness and the accompanying TMM self-test procedure.



100460

TMM Loop Test Harness

3" Rack Mounting Bracket

These brackets are sized to recess the front of the rack 3" behind the face of the bracket. All systems ordered with a faceplate (MX2020/RCK option AA = 02, 03, 04, or 05) include two of these brackets, allowing sufficient space behind the rack's faceplate to recess all module wiring. Normally, the brackets do not need to be ordered separately as they are included with each system based on the mounting option chosen.



Use the part number below only when replacing lost or damaged brackets, or when retro-fitting a faceplate to a rack that is flush mounted. The

bracket is ambidextrous, and may be used on the left or right side of the rack.

100375

SETPOINT 3" Rack Mounting Bracket

Flush Rack Mounting Bracket

These brackets are sized to align the front of the rack with the face of the bracket and are intended only when mounting the rack without a faceplate,* or when bulkhead mounting. Normally, the brackets do not need to be ordered separately as they are included with each system based on the mounting option chosen. Two of these brackets are supplied with each system using bulkhead mounting. Two are also supplied with all systems ordered without a faceplate, regardless of mounting option. The brackets mount on the rear of the rack when bulkhead mounting and on the front of the rack when flush mounting in a panel cutout or on 19" EIA rails.



Use the part number below only when replacing lost or damaged brackets, or when changing to bulkhead mounting. The bracket is ambidextrous, and may be used on the left, right, front, or rear of the rack.

100384

SETPOINT Flush Rack Mounting Bracket

* When observing minimum bend radius for cables, wiring will typically protrude 2 inches (50 mm) beyond the face of the rack. When the wiring should not protrude beyond the bracket face, use 3" brackets instead (p/n 100375).

Manuals and Software

A complete set of SETPOINT manuals and configuration software is supplied on USB memory stick at no extra charge



with each system. As languages in addition to English become available, they will also be included on the memory stick.

The most recent version of manuals and software can also be downloaded directly from our website.

Manuals are published electronically in Adobe® PDF* format and may be printed and freely distributed.

* NOTE: Adobe Reader is required and can be downloaded free-of-charge from www.adobe.com.

MX2020/CSW-AA SETPOINT Manual and Configuration Software

AA **Format**

0 1 USB Memory Stick

Spares

Rack Connection Module (RCM)

MX2020/RCM-AA Rack Connection Module (spare)

AA **Agency Approvals**

0 5 Multiple Approvals (CSA, IEC, ATEX)

System Access Module (SAM)

MX2020/SAM-AA-BB-CC System Access Module (spare)

AA **Communications Protocol**

0 1 Modbus® TCP/IP

BB **Type**

0 0 bSAM (basic SAM)

0 1 eSAM (enhanced SAM with additional processor board to support dynamic data capture and optional touchscreen display)

CC **Agency Approvals**

0 5 Multiple Approvals (CSA, IEC, ATEX)

Universal Monitoring Module (UMM)

MX2020/UMM-AA Universal Monitoring Module (spare)

AA **Agency Approvals**

0 5 Multiple Approvals (CSA, IEC, ATEX)

Temperature Monitoring Module (TMM)

MX2020/TMM-AA Temperature Monitoring Module (spare)

AA **Agency Approvals**

0 5 Multiple Approvals (CSA, IEC, ATEX)

Blank Slot Faceplates

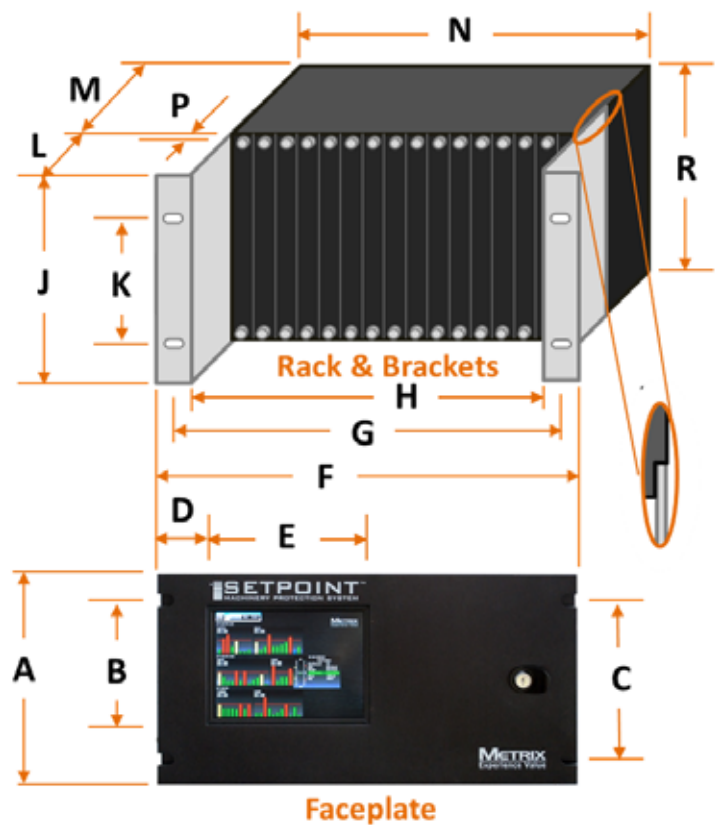
All unused slots in system racks ship with blank faceplates installed. To replace a lost or damaged faceplate, order 1 faceplate and 5 EMI clips.



100367 (blank faceplate) 100462 (EMI clips)
SETPOINT blank faceplate for unused slots

Wiring and Outline Diagrams

Dim.	Full Rack (16P)	Half Rack (8P)
A	6U / 10.47" (266 mm)	Same as 16P
B	5.16" (131 mm)	Same as 16P
C	7.50" (190 mm)	Same as 16P
D	2.82" (72 mm)	Same as 16P
E	6.80" (173 mm)	Same as 16P
F	19.00" (483 mm)	11.00" (279 mm)
G	18.31" (465 mm)	10.31" (262 mm)
H	16.32" (415 mm)	8.32" (211 mm)
J	9.06" (230 mm)	Same as 16P
K	7.50" (190 mm)	Same as 16P
L ^{1,2,3}	2.95" (75 mm)	Same as 16P
M	8.56" (217 mm)	Same as 16P
N	16.50" (419 mm)	8.50" (210 mm)
P	0.32" (8 mm)	Same as 16P
R	9.06" (230 mm)	Same as 16P

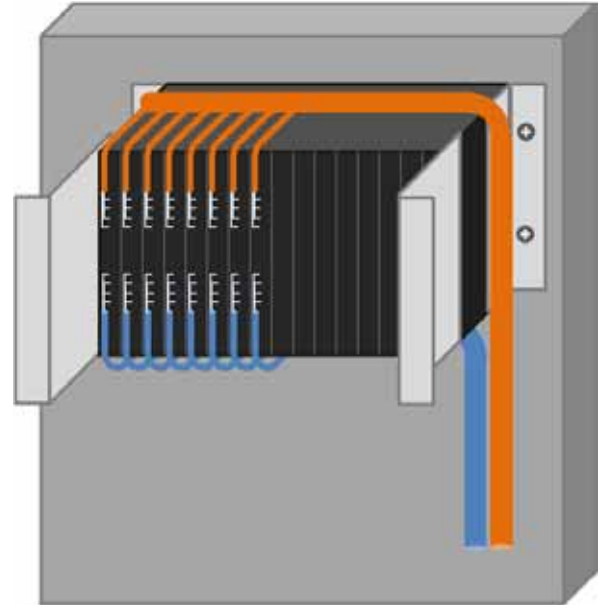


NOTES:

1. For flush-mount brackets, L=0. Captive screws will protrude by amount shown and total system depth becomes M+P.
2. Faceplate adds 0.39" (10 mm) to total system depth.
3. BNC connectors protrude 0.62" (16 mm) and keylock protrudes 0.71" (18 mm) beyond front of faceplate.

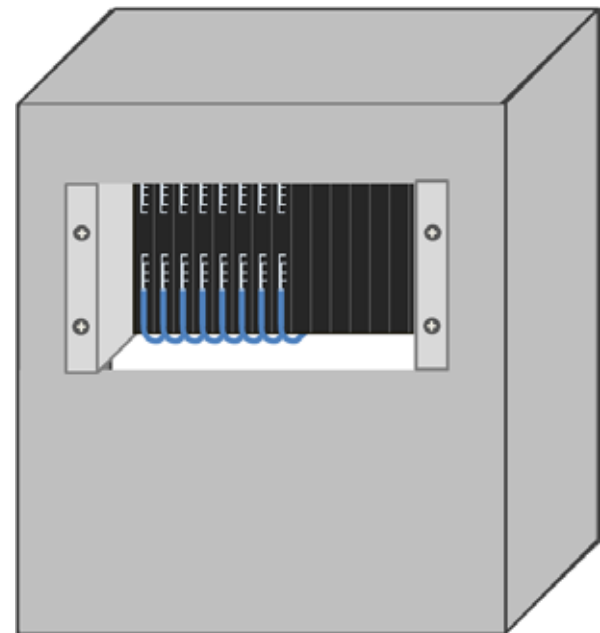
Bulkhead Mounting Style

Rear of rack mounts flush to wall or panel using flush-mount brackets. Front of rack may use optional faceplate with or without touchscreen display (for clarity, faceplate and display not shown here). When faceplate is installed it is supported on front of rack using two 3" rack brackets (shown). Faceplate is hinged to allow easy maintenance access.



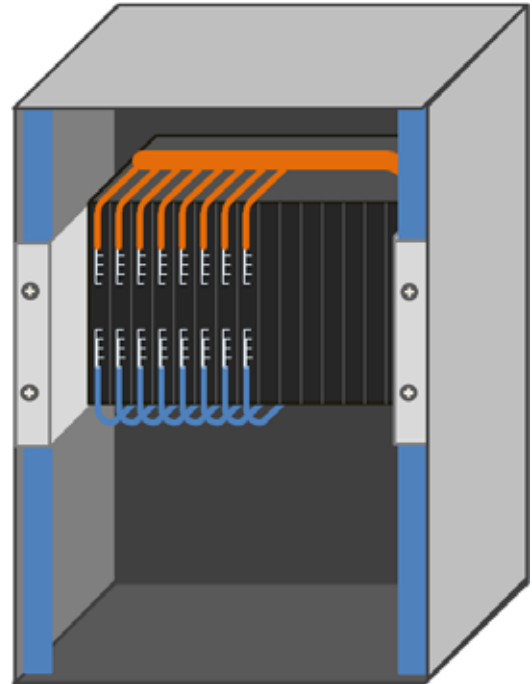
Panel Cutout Mounting Style

Rack mounts into rectangular cutout and is supported by brackets. Two 3" brackets are shown here, allowing all wiring to be recessed behind the cutout. Optional lockable faceplate and touchscreen display (not shown) may be installed over front to conceal opening. Faceplate is hinged to allow easy maintenance access.

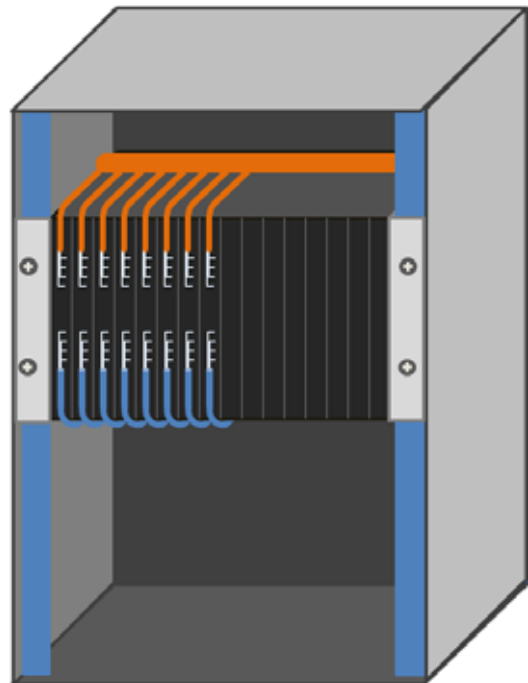


19" EIA Mounting Style (Recessed)

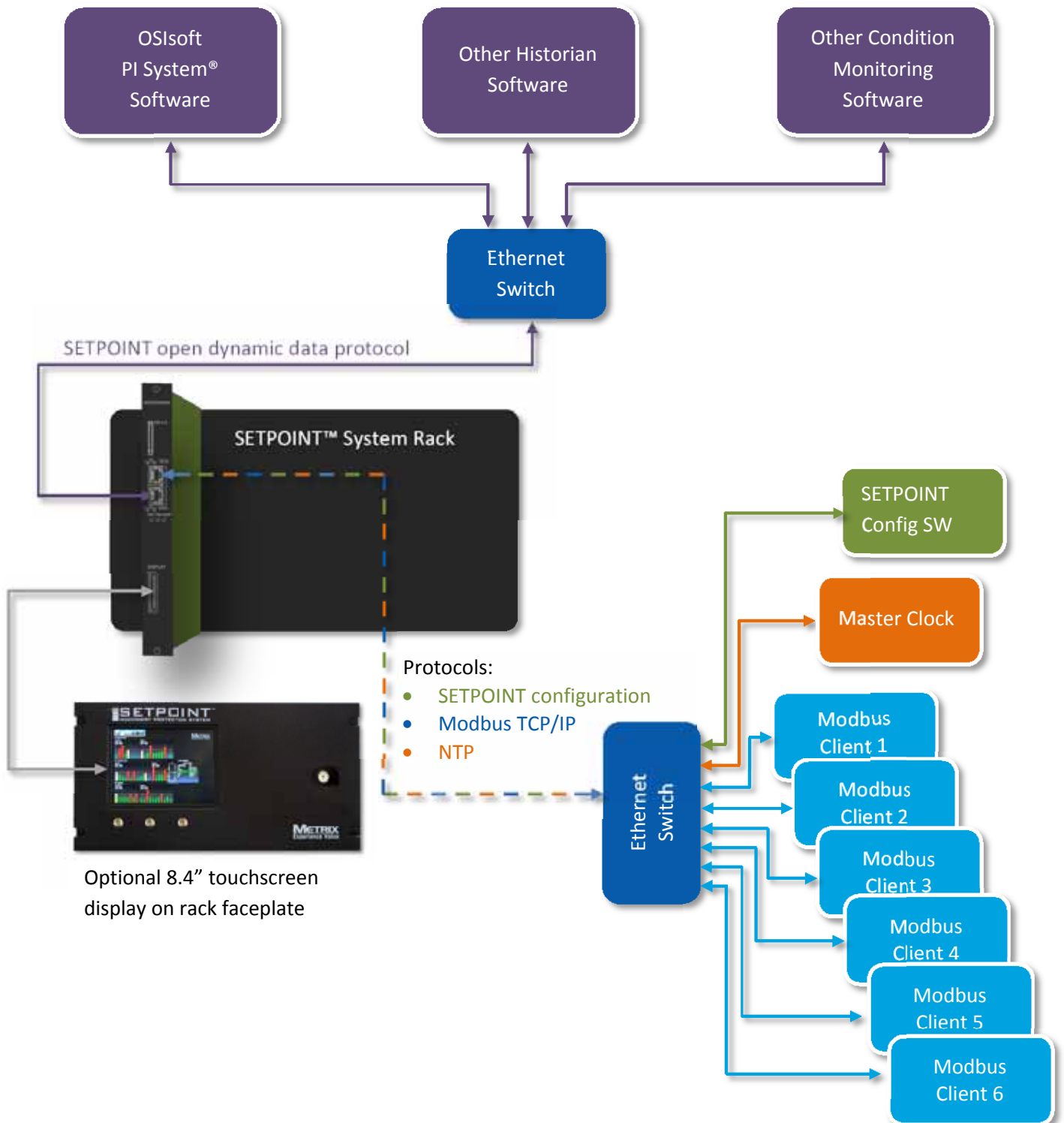
Rack mounts onto standard EIA 19" rails and is supported by two 3" brackets, allowing all wiring to be recessed. Optional lockable faceplate and touchscreen display (not shown) may be installed over front to conceal opening. Faceplate is hinged to allow easy maintenance access.

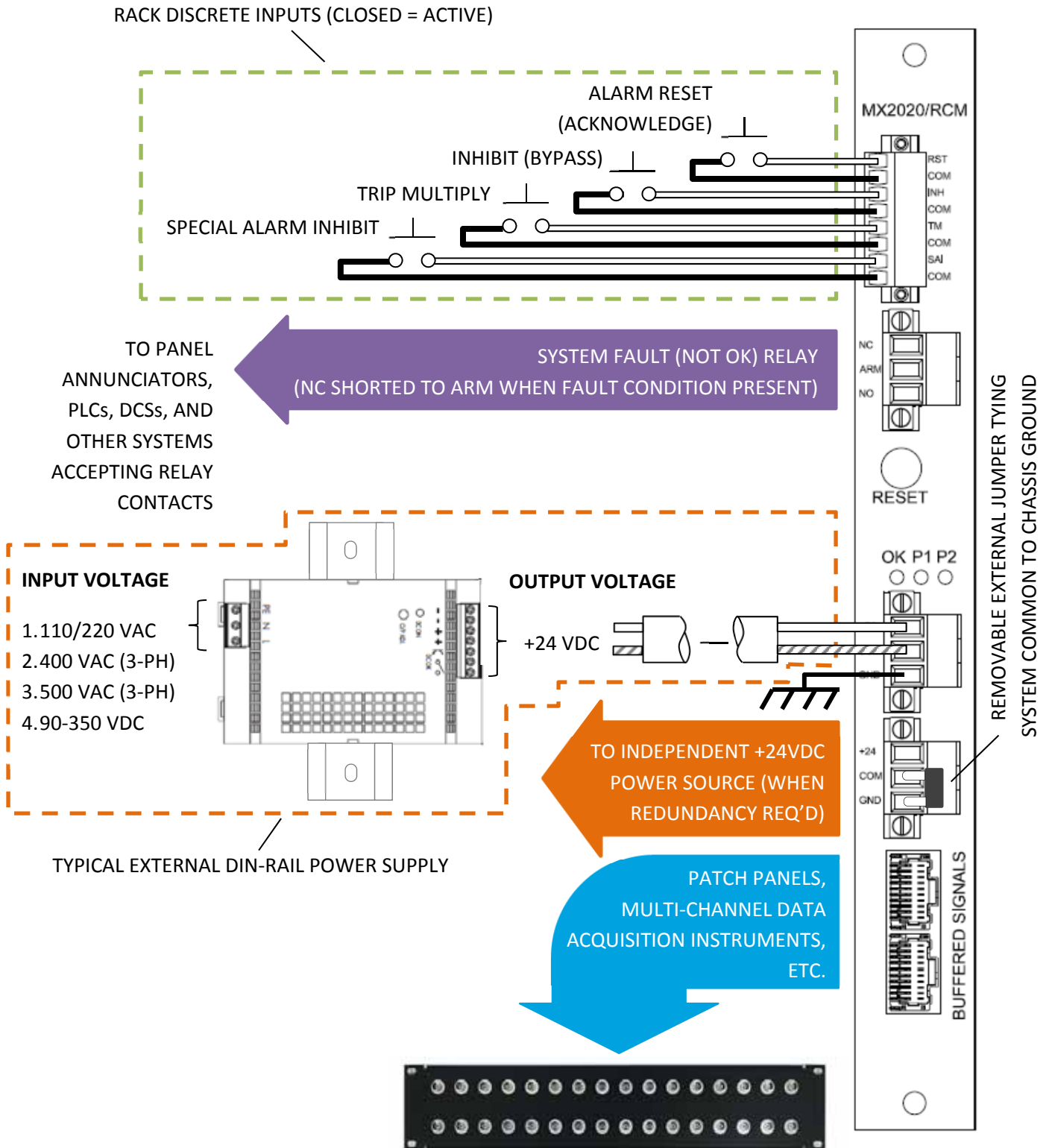
**19" EIA Mounting Style (Flush)**

Rack mounts onto standard EIA 19" rails and is supported by two flush brackets. Wiring is not recessed and assumes that the optional faceplate and display will not be installed.

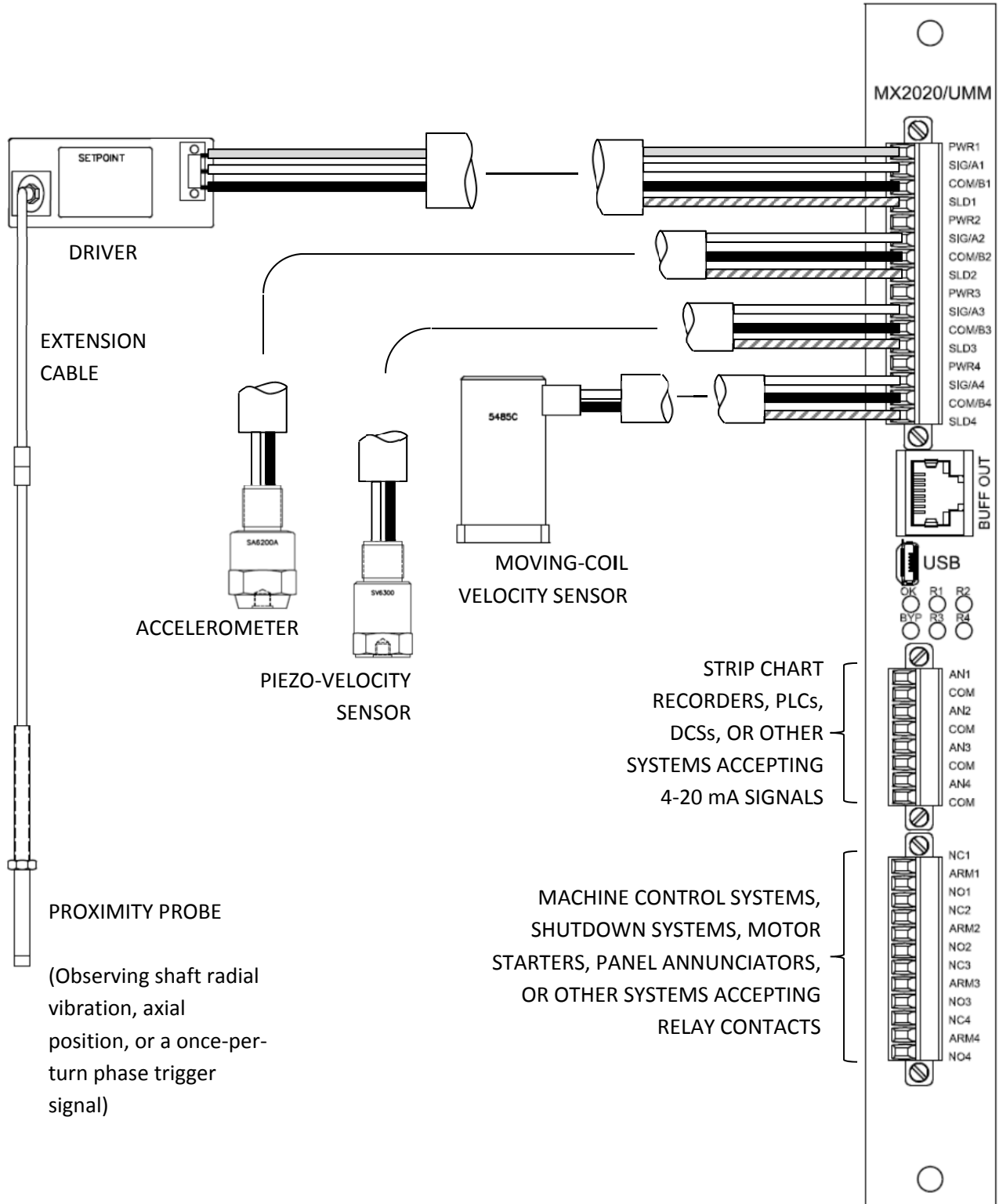


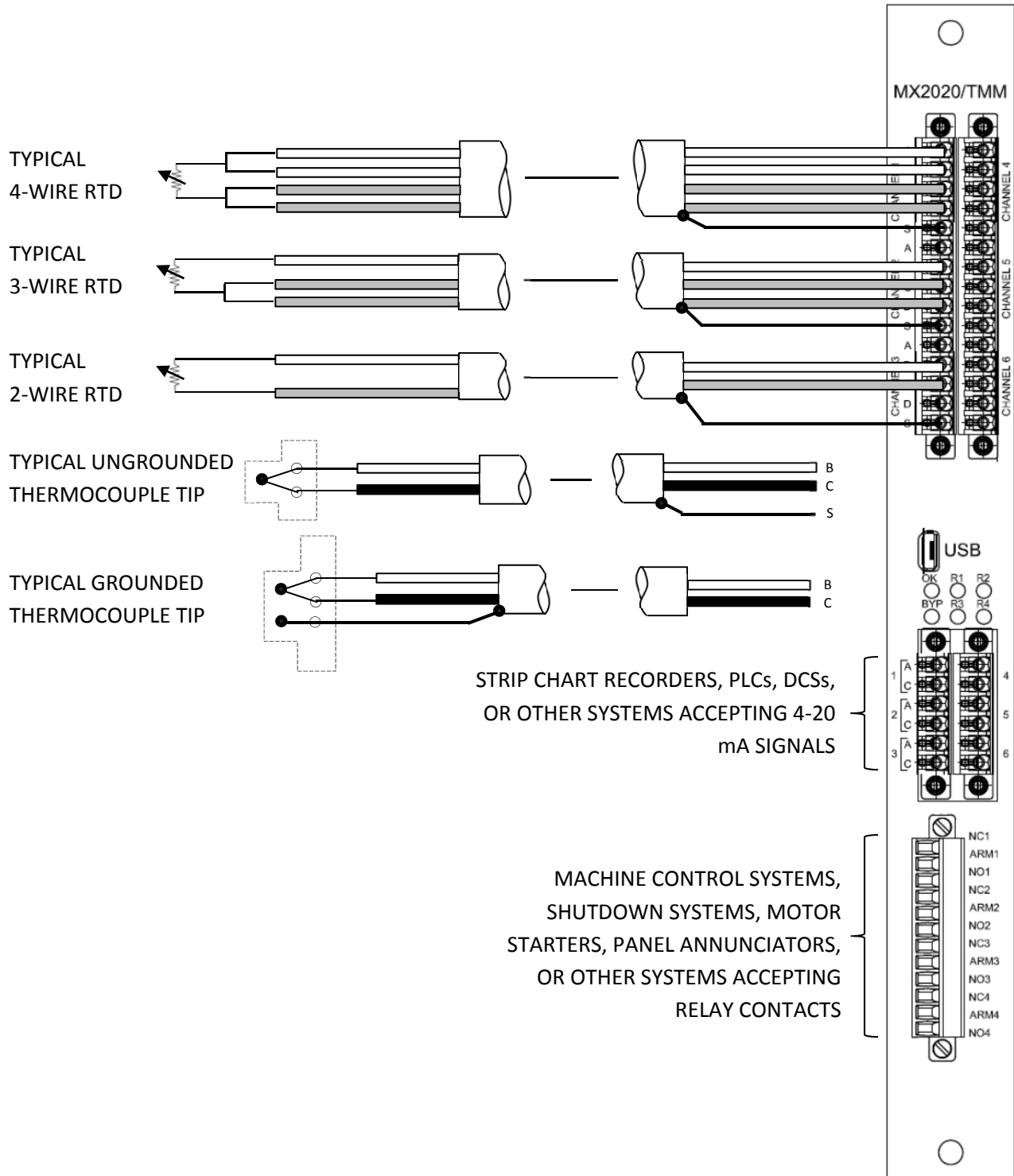
System Overview





System Overview



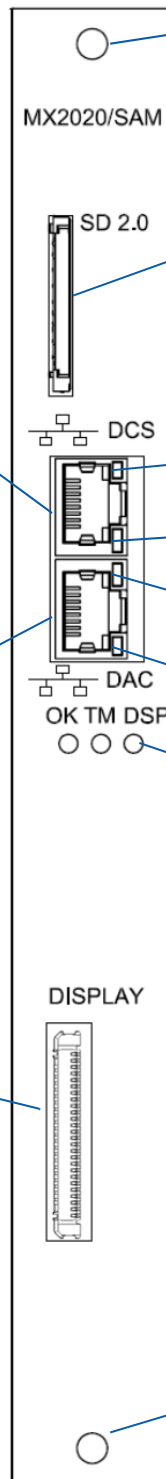


System Overview

Industry-standard MODBUS® TCP/IP communications via 10/100 BASE-T for integration with plant and machinery control systems, SCADA systems, and other control and automation platforms. Supports NTP for clock synchronization. Also allows remote access to rack by SETPOINT configuration software. (Future)

10/100/1000 BASE-T Gigabit communications using an industry-first open protocol for easy access by process historian and condition monitoring software. Native connectivity to OSIsoft's PI® System.

Optional 8.4" color touchscreen display interface. Allows display to be located anywhere within 3 m (10 feet) of SETPOINT rack.



Captive thumbscrew for securing SAM in SETPOINT rack slot.

Up to 32 GB of onboard "flight recorder" data capture and storage on removable SD card. Ensures data is available even in the event Gigabit communications with the SAM are lost or interrupted.

DCS Link Present LED

DCS Link Activity LED

DAC Link Present LED

DAC Link Activity LED

MODULE OK, TRIP MULTIPLY, and DISPLAY COMMUNICATIONS OK status LEDs.

Captive thumbscrew for securing SAM in SETPOINT rack slot.

Discrete inputs for invoking rack-wide functions:

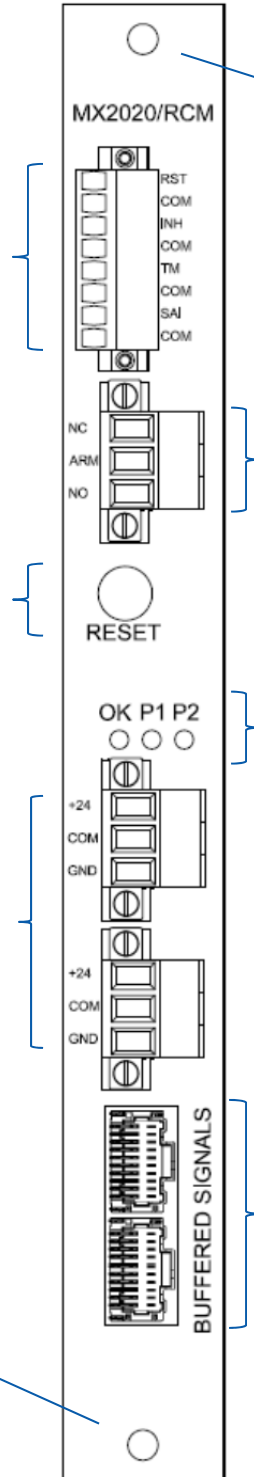
- Alarm Reset (Acknowledge)
- Rack Inhibit (Bypass)
- Trip Multiply
- Special Alarm Inhibit

Dry contact or TTL-compatible active when pulled to common or TTL zero.

Local Alarm Reset (Acknowledge) Pushbutton. Performs same function as when RST and COM discrete input terminals are shorted.

Primary/Secondary +24 Vdc (nominal) power source connections. Power 2 is on top, Power 1 is on bottom (labels are visible behind connectors).

Captive thumbscrew for securing RCM in SETPOINT rack slot.



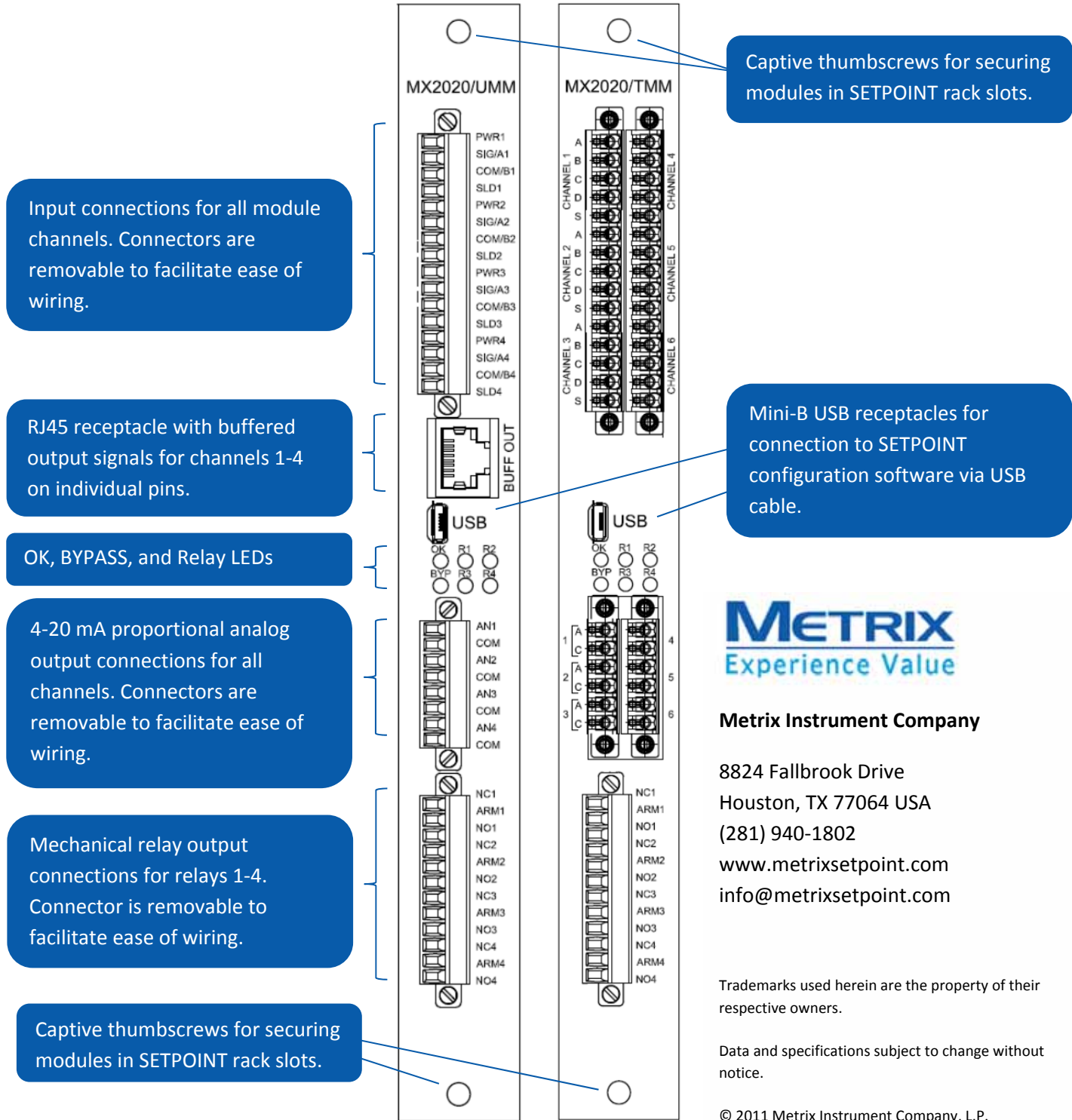
Captive thumbscrew for securing RCM in SETPOINT rack slot.

System Fault (i.e. NOT OK) Relay.

SYSTEM OK, Power 1, and Power 2 LEDs. SYSTEM OK LED is green when no faults are present. P1 is green when supply 1 detected and within specs. P2 is green when supply 2 detected and within specs.

Buffered transducer outputs for all rack UMM channels (up to 56). Intended primarily for wiring to permanent patch panels or multi-channel data acquisition instruments.

System Overview



Input connections for all module channels. Connectors are removable to facilitate ease of wiring.

RJ45 receptacle with buffered output signals for channels 1-4 on individual pins.

OK, BYPASS, and Relay LEDs

4-20 mA proportional analog output connections for all channels. Connectors are removable to facilitate ease of wiring.

Mechanical relay output connections for relays 1-4. Connector is removable to facilitate ease of wiring.

Captive thumbscrews for securing modules in SETPOINT rack slots.

Captive thumbscrews for securing modules in SETPOINT rack slots.

Mini-B USB receptacles for connection to SETPOINT configuration software via USB cable.



Metrix Instrument Company

8824 Fallbrook Drive
Houston, TX 77064 USA
(281) 940-1802
www.metrixsetpoint.com
info@metrixsetpoint.com

Trademarks used herein are the property of their respective owners.

Data and specifications subject to change without notice.

© 2011 Metrix Instrument Company, L.P.