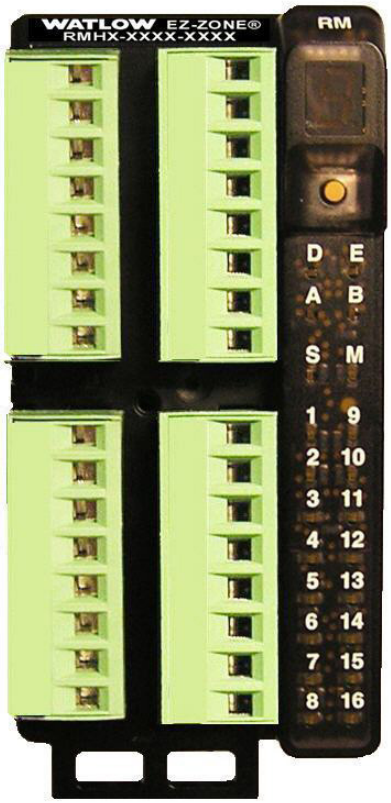
EZ-ZONE® RM High Density Module

User's Guide



RM High Density Module

WATLOW

TOTAL CUSTOMER SATISFACTION
3 Year Warranty

ISO 9001
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0600-0074-0000 Rev. E

Made in the U.S.A.

December 2013

Safety Information

We use note, caution and warning symbols throughout this book to draw your attention to important operational and safety information.

A "NOTE" marks a short message to alert you to an important detail.

A "CAUTION" safety alert appears with information that is important for protecting your equipment and performance. Be especially careful to read and follow all cautions that apply to your application.

A "WARNING" safety alert appears with information that is important for protecting you, others and equipment from damage. Pay very close attention to all warnings that apply to your application.

The safety alert symbol, ⚠ (an exclamation point in a triangle) precedes a general CAUTION or WARNING statement.

The electrical hazard symbol, ⚠ (a lightning bolt in a triangle) precedes an electric shock hazard CAUTION or WARNING safety statement. Further explanations follow:

Symbol	Explanation
	CAUTION – Warning or Hazard that needs further explanation than label on unit can provide. Consult User's Guide for further information.
	ESD Sensitive product, use proper grounding and handling techniques when installing or servicing product.
	Unit protected by double/reinforced insulation for shock hazard prevention.
	Do not throw in trash, use proper recycling techniques or consult manufacturer for proper disposal.
	Enclosure made of Polycarbonate material. Use proper recycling techniques or consult manufacturer for proper disposal.
	Unit can be powered with either alternating current (ac) voltage or direct current (dc) voltage.
	Unit is a Listed device per Underwriters Laboratories®. It has been evaluated to United States and Canadian requirements for Process Control Equipment. UL 61010 and CSA C22.2 No. 61010. File E185611 QUYX, QUYX7. See: www.ul.com
	Unit is a Listed device per Underwriters Laboratories®. It has been evaluated to United States and Canadian requirements for Hazardous Locations Class 1 Division II Groups A, B, C and D. ANSI/ISA 12.12.01-2007. File E184390 QUZW, QUZW7. See: www.ul.com
	Unit is compliant with European Union directives. See Declaration of Conformity for further details on Directives and Standards used for Compliance.
	Unit has been reviewed and approved by Factory Mutual as a Temperature Limit Device per FM Class 3545 standard. See: www.fmglobal.com
	Unit has been reviewed and approved by CSA International for use as Temperature Indicating-Regulating Equipment per CSA C22.2 No. 24. See: www.csa-international.org

Warranty

The EZ-ZONE® RM High Density module is manufactured by ISO 9001-registered processes and is backed by a three-year warranty to the first purchaser for use, providing that the units have not been misapplied. Since Watlow has no control over their use, and sometimes misuse, we cannot guarantee against failure. Watlows' obligations hereunder, at Watlows' option, are limited to replacement, repair or refund of purchase price, and parts which upon examination prove to be defective within the warranty period specified. This warranty does not apply to damage resulting from transportation, alteration, misuse or abuse. The purchaser must use Watlow parts to maintain all listed ratings.

Technical Assistance

If you encounter a problem with your Watlow controller, review your configuration information to verify that your selections are consistent with your application: inputs, outputs, alarms, limits, etc. If the problem persists, you can get technical assistance from your local Watlow representative (see back cover), by e-mailing your questions to wintechsupport@watlow.com or by dialing +1 (507) 494-5656 between 7 a.m. and 5 p.m., Central Standard Time (CST). Ask for for an Applications Engineer. Please have the following information available when calling:

- Complete model number
- All configuration information
- User's Guide
- Factory Page

Return Material Authorization (RMA)

1. Call Watlow Customer Service, (507) 454-5300, for a Return Material Authorization (RMA) number before returning any item for repair. If you do not know why the product failed, contact an Application Engineer or Product Manager. All RMA's require:
   - Ship-to address
   - Bill-to address
   - Contact name
   - Phone number
   - Method of return shipment
   - Your P.O. number
   - Detailed description of the problem
   - Any special instructions
   - Name and phone number of person returning the product.
2. Prior approval and an Return Merchandise Authorization number from the Customer Service Department is required when

returning any product for credit, repair or evaluation. Make sure the Return Merchandise Authorization number is on the outside of the carton and on all paperwork returned. Ship on a Freight Prepaid basis.

3. After we receive your return, we will examine it and try to verify the reason for returning it.
4. In cases of manufacturing defect, we will enter a repair order, replacement order or issue credit for material returned. In cases of customer misuse, we will provide repair costs and request a purchase order to proceed with the repair work.
5. To return products that are not defective, goods must be in new condition, in the original boxes and they must be returned within 120 days of receipt. A 20 percent restocking charge is applied for all returned stock controls and accessories.
6. If the unit cannot be repaired, you will receive a letter of explanation and be given the option to have the unit returned to you at your expense or to have us scrap the unit.
7. Watlow reserves the right to charge for no trouble found (NTF) returns.

EZ-ZONE RM is covered by U.S. Patent No. 6,005,577 and Patents Pending

TC Table of Contents

TC Table of Contents (cont.)

1 Chapter 1: Overview

Available EZ-ZONE RM System Literature and Resources

Document Title and Part Number	Description
EZ-ZONE Rail Mount Access (RMA) User's Guide, part number: 0600-0072-0000	Describes how to connect the RM system into an industrial network, how to use data logging, module backup and the real-time clock.
EZ-ZONE Rail Mount Controller (RMC) User's Guide, part number: 0600-0070-0000	The RMC module is an advanced integrated controller capable of PID and limit control. This document describes how to configure and program all loops of control and communications.
EZ-ZONE Rail Mount Scanner (RMS) User's Guide, part number: 0600-0071-0000	This module adds monitoring points to the RM system. This document describes common usage and the various types of I/O available.
EZ-ZONE Rail Mount Expansion (RME) User's Guide, part number: 0600-0073-0000	When additional I/O is needed the Expansion module fills the gap. This document describes common usage and the various types of I/O available.
EZ-ZONE Rail Mount Limit (RML) User's Guide, part number: 0600-0075-0000	The RML module will protect against unwanted thermal runaway and over temperature conditions. The User Guide describes configuration, programming and communications capabilities.
EZ-ZONE Remote User Interface (RUI) User's Guide, part number: 0600-0060-0000	The RUI provides a visual LED display to the RM configuration and setup menus. This document illustrates and describes connections and also describes the Home Page for each RM module as viewed from the RUI.
EZ-ZONE RM Specification Sheet, part number: WIN-EZRM-1113	Describes RM hardware options, features, benefits and technical specifications.
Watlow Support Tools DVD, part number: 0601-0001-0000	Contains all related user documents, tutorial videos, application notes, utility tools, etc...

The DVD described above ships with the product and as stated contains all of the literature above as well as much more. If the DVD is not available one can be acquired by contacting Watlow Customer Service at 1-507-454-5300.

As an alternative to the DVD, all of the user documentation described above can also be found on the Watlow website. Click on the following link to find your document of choice: http://www.watlow.com/literature/index.cfm. Once there, simply type in the desired part number (or name) into the search box and download free copies. Printed versions of all user documents can also be purchased here as well.

Your Comments are Appreciated

In an effort to continually improve our technical literature and ensure that we are providing information that is useful to you, we would very much appreciate your comments and suggestions. Please send any comments you may have to the following e-mail address: TechlitComments@watlow.com

Introduction

The EZ-ZONE® RM High Density (RMH) control module provides multi-loop (4 to 16 loops) PID control in a small footprint. The RMH takes the pain out of solving your thermal loop requirements as a stand-alone module or in applications that require distributed control.

It just got a whole lot easier to solve the thermal requirements of your system. The RMH module is provided in a space-saving, rail-mount package and is highly scalable where you only pay for what you need. For those applications that require the ability to configure/monitor the control over a network, Modbus RTU communications is an option. Other communications protocols are also available (e.g., EtherNet/IP, DeviceNet, Modbus TCP and Profibus DP) when used in conjunction with an RMA module or when using a Remote User Interface/ Gateway (RUI/GTW).

Standard Features and Benefits

PID controller

- Provides two mounting options (DIN rail, chassis mount)
- Reduces wiring time and termination complexity compared to connecting discrete products
- Reduces panel space and installation cost

Communication Capabilities

- Supports network connectivity to a PC or PLC
- Watlow Standard Bus or Modbus® RTU
- Provides plug and play capabilities with basic Remote User Interface (RUI's)
- SpecView for Watlow used over standard bus communications
- Free standard bus communications port and free PC software (EZ-ZONE Configurator)

Additional Control Integration Options

- Includes programmable timer functions
- Includes programmable counter functions
- Allows for simple math and logic programming options

Advanced PID Control Algorithm

- Offers TRU-TUNE®+ adaptive control to provide tighter control for demanding applications
- Provides auto-tune for fast, efficient startup

Integrated Thermal Loop Diagnostics

- Users can easily tell that the entire thermal system is functioning properly
- Provides complete system diagnostics that are far superior to simple discrete level diagnostics
- Allows for flexible synergistic use of hardware, such as using one loop's sensor as a backup to another loop in the event of sensor failure.
- Helps prevent load loss or allow for maintenance to be scheduled when more convenient.
- Provides notification of system problems to help reduce maintenance and service costs

Off-the-Shelf Designed System Solution

- Improves system reliability with a factory integrated solution that minimizes inter-module connections and potential problems at screw termination points.
- Reduces installation cost
- Eliminates compatibility headaches often encountered with using many different components and brands

Controller Handles High Ambient Temperatures

- Operates in an unprecedented temperature range of -18 to 65°C (0 to 149°F) for cabinets and panel enclosures with elevated temperature levels

Memory for Saving and Restoring User-Defined Parameter Default Settings

- Allows customers to save and restore their own defined defaults for machine parameter settings
- Reduces service calls and downtime due to inadvertent end user parameter adjustments

Modules Allow for Greater Design Flexibility

- Allows PID loops to be added in increments of four. Module can scale from 4 to 16 total loops
- Saves money because you do not pay for any more than you need and don't settle for any less functionality than you need

Synergistic Module Control

- Allows outputs selected for control (heat/cool), alarms or events to be located in any physical module, regardless of which module is connected to the input sensor

Split-Rail Control

- Allows modules to be mounted together or mounted remotely from one another
- Shares control operation via Synergistic Module

Control capability

- Allows individual modules to be mounted closer to the physical input and output devices to which they are wired
- Improves system reliability and lowers wiring costs

Agency Approvals: UL® listed, CE, RoHS, W.E.E.E. SEMI F47-0200, Class 1 Div. 2 Rating on Selected Models

- Assures prompt product acceptance
- Reduces panel builder's documentation and agency costs

Removable Connectors

- Assures reliable wiring and reduces service calls
- Simplifies installation

Three-Year Warranty

- Demonstrates Watlow's reliability and product support

A Conceptual View of the RMH

The flexibility of the RMH's software and hardware allows for variation in configurations. Acquiring a better understanding of its functionality and capabilities while at the same time planning out how the controller can be used will deliver maximum effectiveness in your application.

It is useful to think of the controller in three parts: inputs, procedures and outputs. Information flows from an input to a procedure to an output when the controller is properly configured. An RMH controller can carry out several procedures at the same time, e.g., PID control, monitoring for several different alarm situations, monitoring and acting upon digital inputs and driving output devices such as heaters, audible alarms, lights. Each process needs to be thought out carefully and the controller's inputs, procedures and outputs set up properly.

Inputs

The inputs provide the information that any given programmed procedure can act upon. Simply stated, this information may come from an operator pushing a button or from a sensor monitoring the temperature of a part being heated or cooled.

Each analog input typically uses a thermocouple, RTD or thermistor to read the process temperature. It can also read volts, current or resistance, allowing it to use various devices to read humidity, air pressure, operator inputs and others values. Each analog input must be configured to match the device connected to that input (see: Analog Input Menu, Setup Page).

Each digital input reads whether a device is active or inactive. An RMH equipped with digital input/output hardware includes two sets of terminals where each of which can be used as either an input or an output. Each pair of terminals must be configured to function as either an input or output with the direction parameter (see: Digital Input/Output Menu, Setup Page).

Functions

Functions use input signals to calculate a value. A function may be as simple as reading a digital input to set a state to true or false, or reading a temperature to set an alarm state to on or off. Alternatively, if a failure with the primary sensing device should occur sensor backup could be utilized to avoid an unwanted shutdown.

To set up a function, it's important to tell it what source, or instance, to use. For example, if the control is equipped with digital inputs they can be configured to reset an individual alarm or all alarms. If configured as such, the next step would be to define which of the available digital inputs would be tied to the alarm reset function. The RMH module can be equipped with up to 12 digital inputs, instance 1 - 6 and 7 - 12. Once the specific input has been selected simply assign the alarm reset function to it (Setup Page, DIO Menu). The last step would be to define the alarm instance that should be reset. If zero is entered for the alarm instance when the digital input selected above is enabled, all latched alarms without a currently existing alarm condition will be reset. If a specific alarm instance (1 - 24) is selected it will be that instance alone that will be reset.

Note:

Alarms will reset automatically when the condition that caused the alarm goes back to a non-alarm state if the alarm latching prompt is set to non-latching (Setup Page, ALM Menu).

Keep in mind that a function is a user-programmed internal process that does not execute any action outside of the controller. To have any effect outside of the controller, an output must be configured to respond to a function.

Outputs

Outputs can perform various functions or actions in response to information provided by a function, such as removal of the control voltage to a contactor; turning a light on or off; unlocking a door; or turning on an audible alarm.

Assign an output to a function in the Output Menu or Digital Input/Output Menu. Then select which instance of that function will drive the selected output. For example, in using a RMH module an output can be configured to respond to the output of the PID algorithm to drive a heater.

You can assign more than one output to respond to a single instance of a function. For example, alarm 2 could be used to trigger a light connected to output 1 and a siren connected to digital output 5.

Input Events and Output Events

Input events are internal states that are set by the digital inputs. Digital Input 1 provides the state of input event 1, and Digital Input 2 provides the state of input event 2. The setting of Digital Input function (Setup Page, Digital Input/Output Menu) does not change the relationship between the input and the event. An input will still control the input event state, even if Digital Input Function is set to None.

Actions

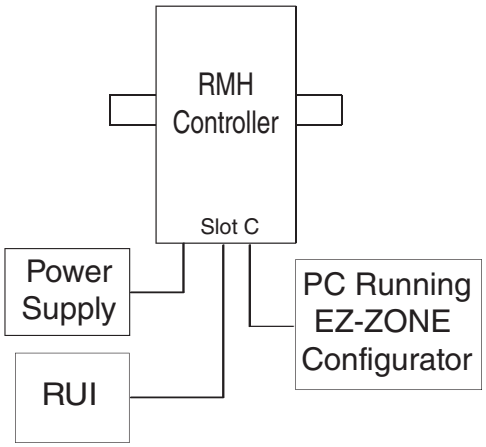
Based on a given input (Digital I/O, Event output, Logic function, etc..) the Action function can cause other functions to occur. To name a few, set alarms to off, silencing alarms and enabling remote set point.

A Conceptual View of RM Hardware Configurations

Due to the scalability and flexibility in the RM system a user has several options available in the way that the hardware can be connected. Listed below are a few examples.

RMH Connected to a Remote User Interface (RUI) and a Personal Computer (PC)

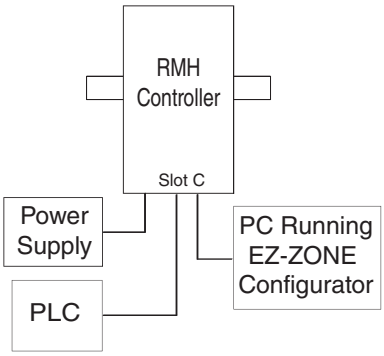
In this configuration the RUI and PC are connected to the RMH module via Watlow's Standard Bus where both will be able to talk directly to the RMH module.



In the graphic above the PC running EZ-ZONE Configurator software and or the RUI can be used to configure and then monitor the RMH and other modules connected to it.

RMH Module Connected to a Programmable Logic Controller (PLC) on a DIN Rail

In this configuration the PLC can be connected to the RMH module using the Modbus RTU protocol:



In this example, the RMH module and the PLC must be equipped with the Modbus RTU protocol.

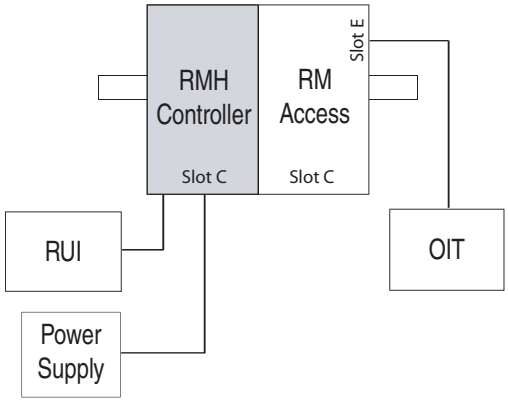
Note:

If it is intended to use an RUI or a PC using EZ-ZONE Configurator software it will be necessary to switch the protocol on the RMH to Watlow's Standard Bus to successfully communicate; disconnect all Modbus devices from the network. Once done using the RUI or EZ-ZONE Configurator software, switch the protocol back to Modbus RTU and reconnect all Modbus devices to re-establish communications over Modbus.

RMH Module Connected to an Operator Interface Terminal (OIT) through an RMA

In this configuration the RMH can be connected to the OIT through the RMA running any of a number of available protocols. The RMA and the OIT must be using the same protocol while the communications from RMA to the RMH module is accomplished over the backplane using Watlow's Standard Bus protocol. Available protocols in the RMA follow:

1. EtherNet/IP and or Modbus TCP
2. DeviceNet
3. Modbus RTU
4. Profibus DP

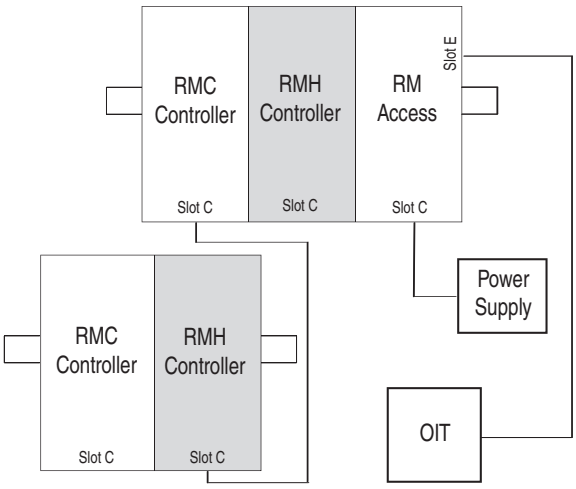


Notice that in the example above that there is an *optional* RUI connected to the RMH along with the OIT. OITs' are not generally used to configure a control but are used more for run-time information. As an alternative for configuration the RUI could be used to configure and monitor in a remote location.

One advantage in using an RMA module when communicating on a network is that protocol switching is not needed on the RMH module if using an RUI or EZ-ZONE Configurator software. The protocol of choice used with the RMA can run simultaneously with the Standard Bus protocol.

RMH Connected to a Split Rail with OIT

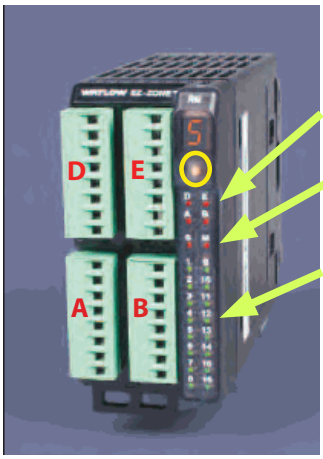
In this configuration both the inter-module bus (backplane communications) and Standard Bus are connected between rails to allow for remote capabilities. It is recommended that the split rail connection not exceed 100 feet. In this configuration the OIT can communicate with all modules (maximum 16 modules any combination with one Access module).



Module Orientation

The picture that follows represents one of several different RM modules. All of them will have four slots on the face (slot A, B, D, and E) and one on the bottom (slot C) not shown. All of these slots are not always used on all modules. On the face of the module there is a button (yellow circle) under the Zone address (5). When pushed and held it has the following functions:

1. For any module, push and hold for ~ 2 seconds to change the Zone address
2. When a module is equipped with the Modbus protocol (RMxxxxxxxxx1xx) pushing and holding this button for ~ 6 seconds the LED display will return P for protocol. Releasing the button and then pushing it again (within 6 seconds) the display will toggle between n (Modbus) and 5 (Standard Bus). Valid addresses for Modbus and Standard bus range from 1 -16 (1 - 9, A is 10, b is 11, C is 12, d is 13, E is 14, F is 15, and h is 16). The RMA (Access) module is shipped at address J or 17 and is the only module that can have its address set above 16.



Module Status (Slot A, B, D, or E)

Protocol (Standard Bus - red or Modbus - green)

Module outputs 1 through 16, all may or may not be used depending on module type

Getting Started Quickly

Consider taking the following steps to quickly commission your control:

- Wire and connect the power source to the control
- Wire and connect input and output devices to the control
- Power up the control and navigate to the Setup Page to configure inputs, outputs, alarms, etc...
- Once the control is setup, navigate to the Operations Page to modify set points.

The RMH controller has a page and menu structure that is listed below along with a brief description of its purpose. The menu structure can be easily seen and navigated using EZ-ZONE Configurator software or the Remote User Interface (RUI).

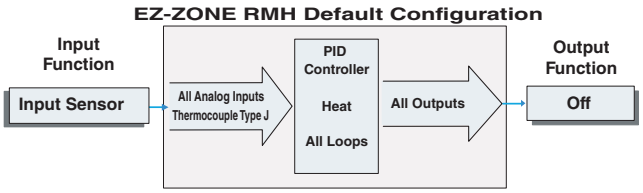
Note:
The menu navigation as described below applies when the RMH is connected to the RUI which is optional equipment.

Setup Page Using the RUI, push and hold the up and down keys (▲ ▼) for 6 seconds to enter. (See the Setup Page for further information)	A user would want to setup their control prior to operation. As an example, define the input type, alarm sides (high and or low) or set the output function.
Operations Page Using the RUI push and hold the up and down keys (▲ ▼) for 3 seconds to enter. (See the Operations Page for further information)	After setting up the control to reflect your equipment, the Operations Page would be used to monitor or change runtime settings. As an example, the user may want to see the current status (on or off) of an event status in the Action Menu.
Factory Page Using the RUI push and hold the Infinity and the green Advance keys (∞ ◉) for 6 seconds to enter. (See the Factory Page for further information)	For the most part the Factory Page has no bearing on the control when running. A user may want to enable password protection, view the control part number or perhaps create a custom Home Page.
Home Page When using the RUI, the control is at the Home Page when initially powered up where it will display the Process Value for loop 1 in the upper display and the set point for loop 1 in the lower display. **Note:** The Home Page is visible only when using the RUI.	Pushing the green Advance Key ◉ will cause the display to show the control mode for loop 1.

The default RMH loop configuration out of the box is shown below:

- All Analog Input functions are set to thermocouple, type J (to change go to the Setup Page, Analog Input Menu)
- All Process Value functions are set to off (to change go to the Setup Page, Process Value Menu)
- PID for all loops are set to heat and cool is off (to change go to the Setup Page, Loop Menu)
- All outputs are set to off (to change go to the Setup Page, Output Menu)

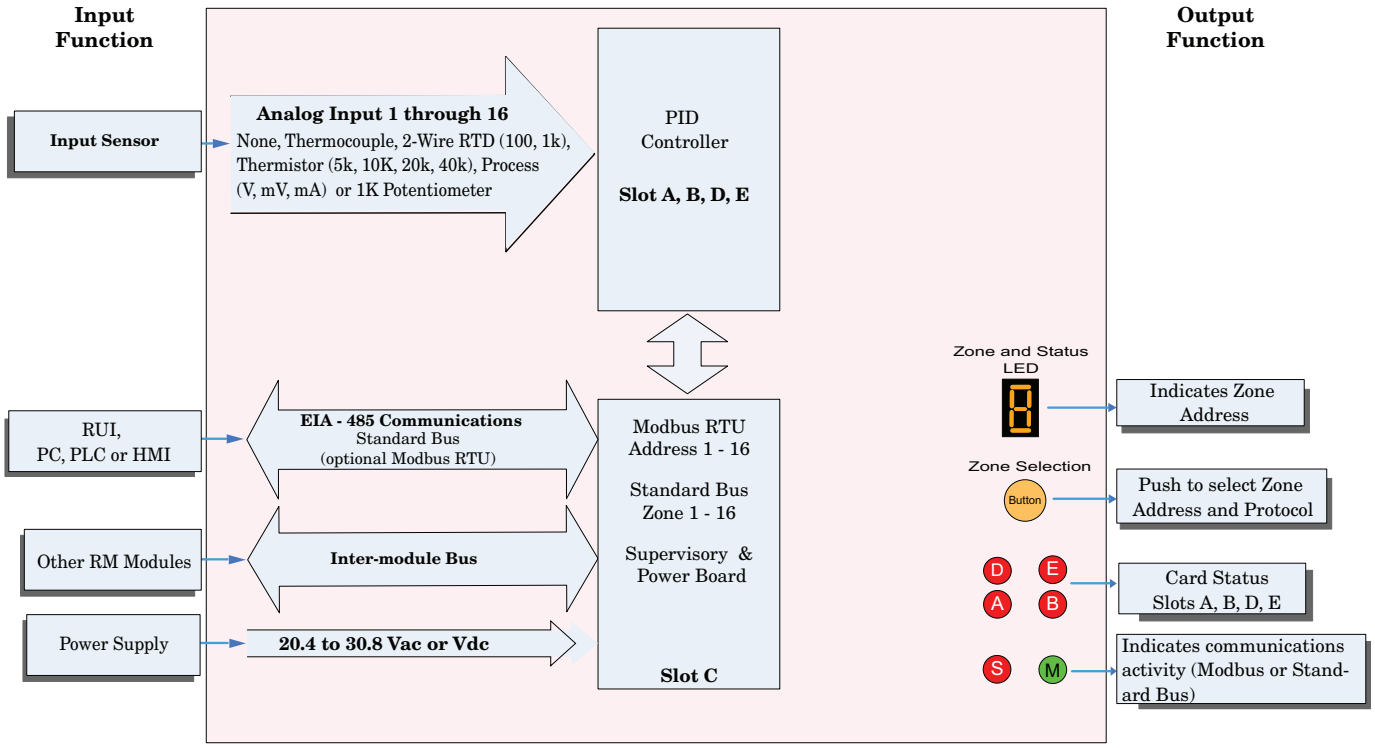
Once the control has been wired and setup, power up the control and change the appropriate set points to the desired value (on the RUI push the up ▲ and or down ▼ arrow key from the Home Page).



EZ-ZONE RMH Module - System Diagram

16 Control Loops - Slots A, B, D and E

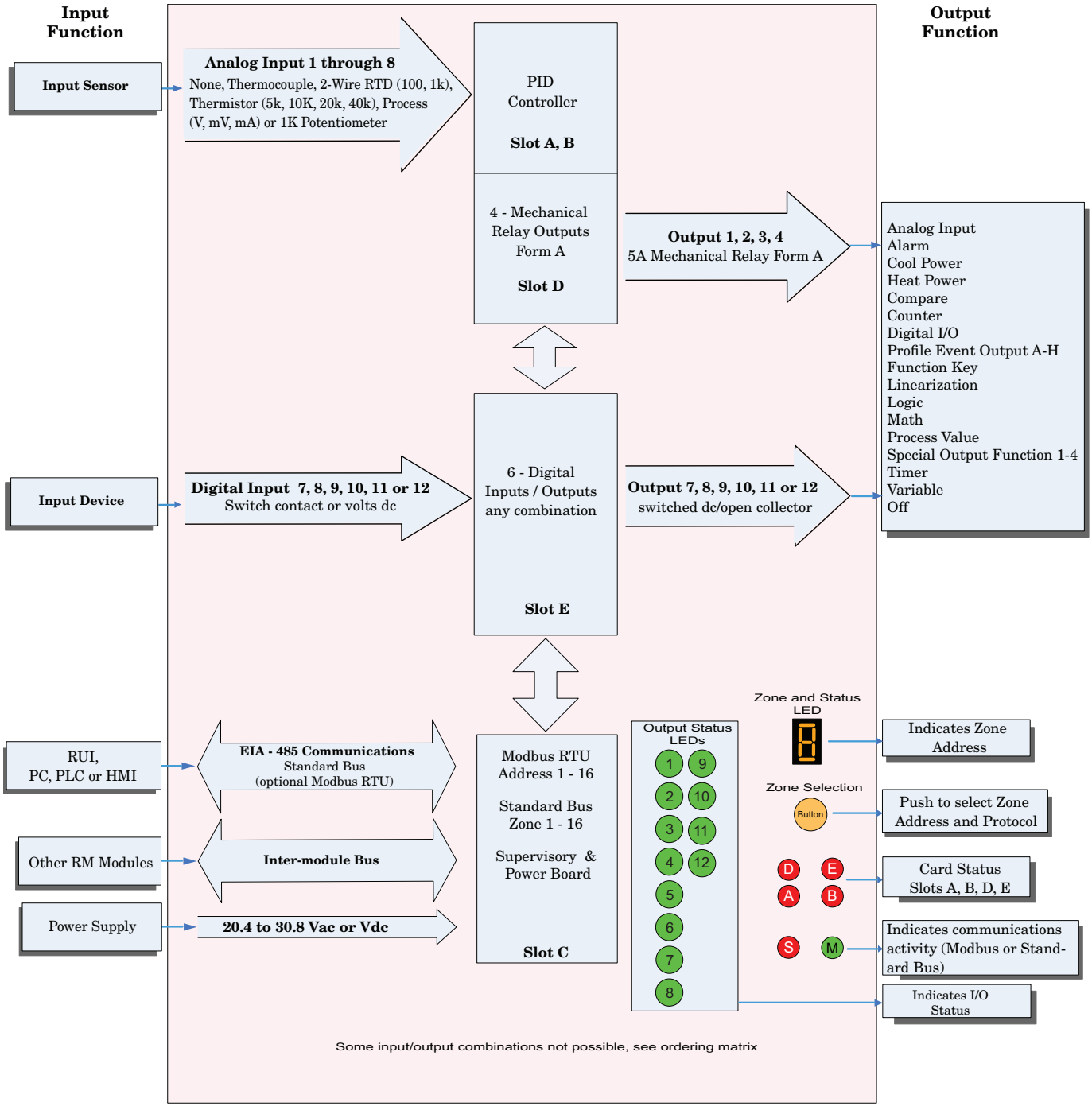
R M H x - [1,2] [1,2] [1,2] [1,2] - A A A A



EZ-ZONE RMH Module - System Diagram

8 Control Loops - Slots A, B
4 - Form A Mechanical Relays - Slot D
6 - Digital I/O - Slot E

R M H x - [1,2] [1,2] J C - A A A A



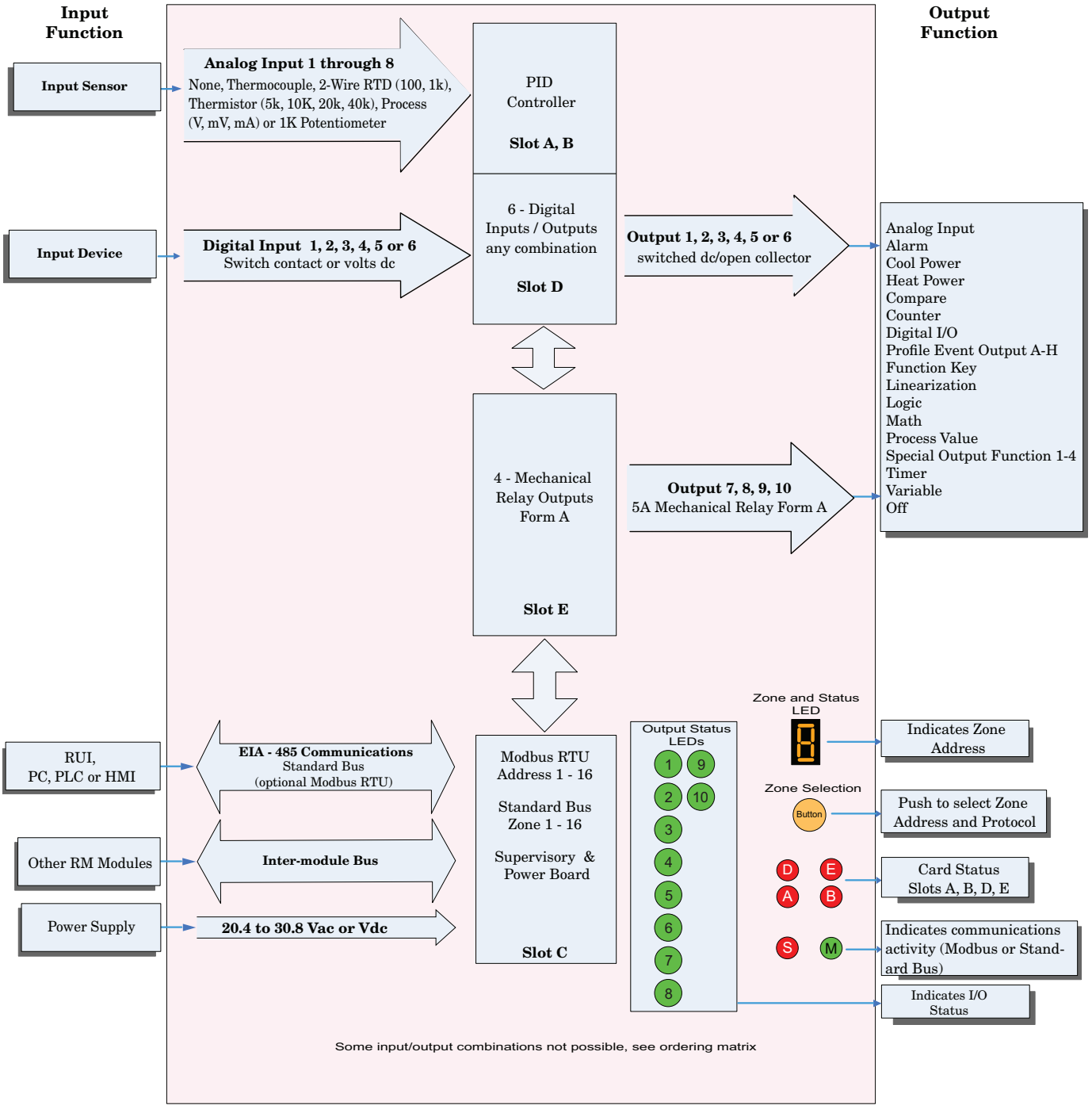
EZ-ZONE RMH Module - System Diagram

8 Control Loops - Slots A, B

6 - Digital I/O - Slot D

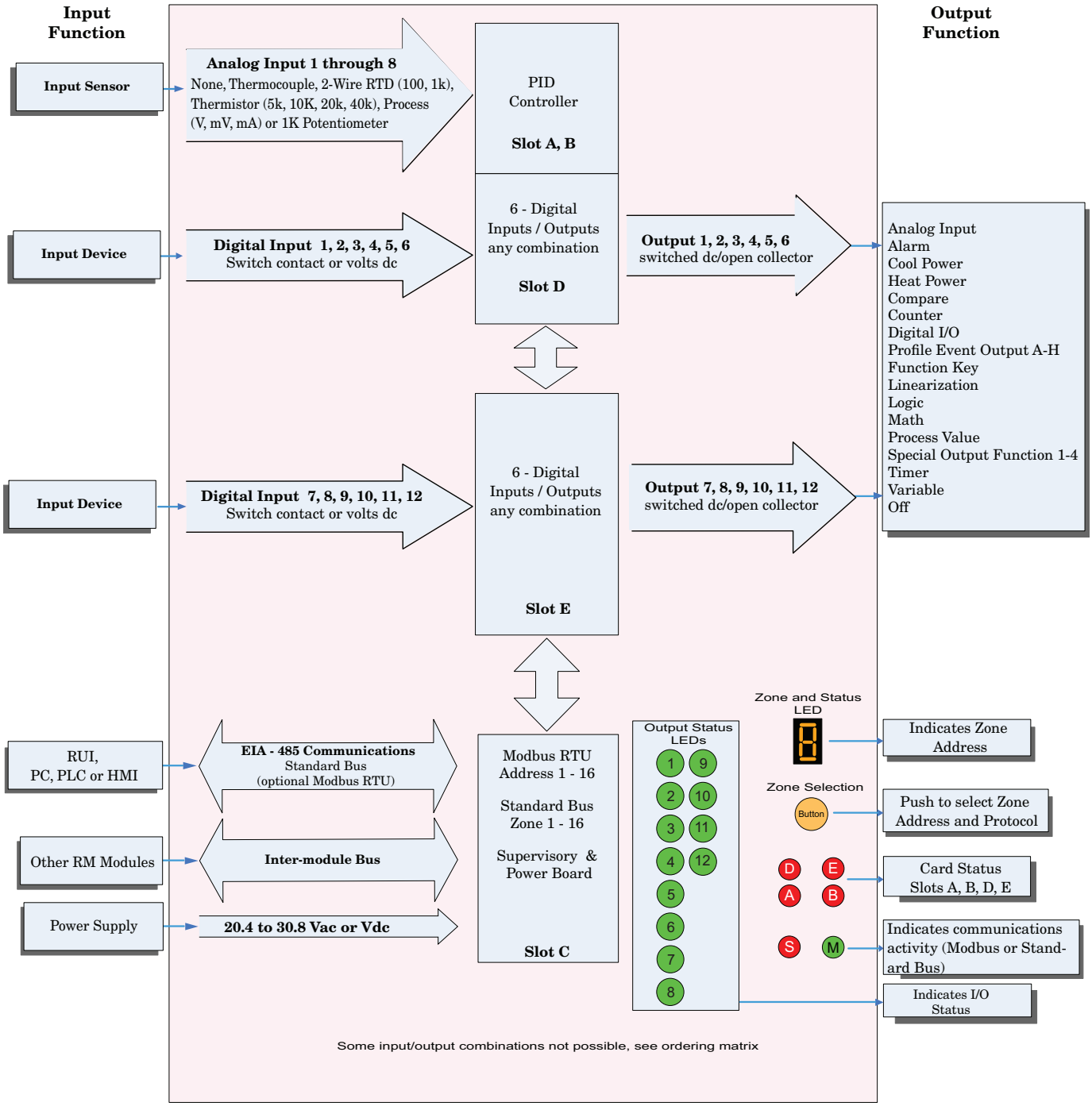
4 - Form A Mechanical Relays - Slot E

R M H x - [1,2] [1,2] C J - A A A A



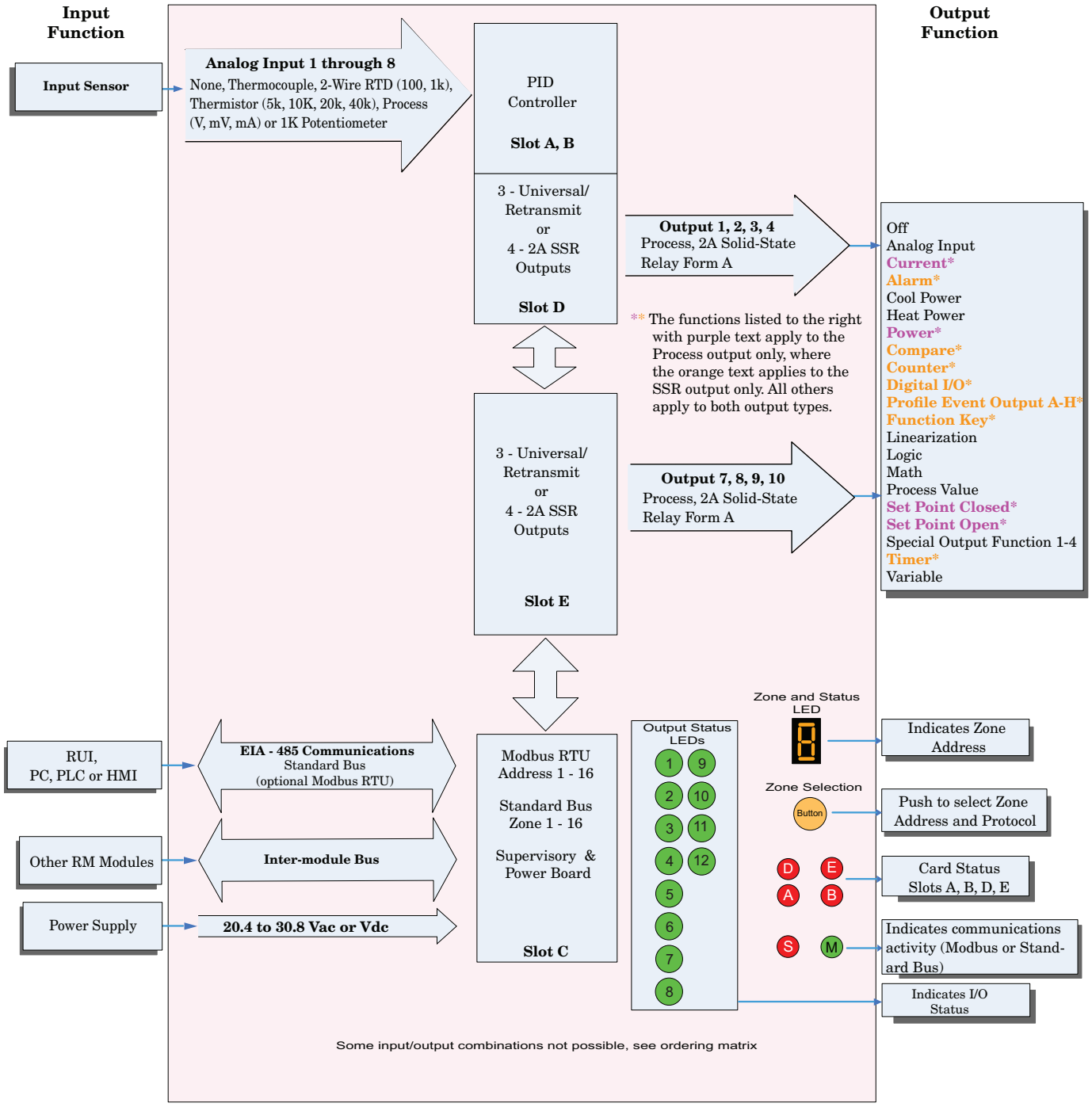
EZ-ZONE RMH Module - System Diagram

8 Control Loops - Slots A, B
6 - Digital I/O - Slot D
6 - Digital I/O - Slot E
R M H x - [1,2] [1,2] C C - A A A A



EZ-ZONE RMH Module - System Diagram

8 Control Loops - Slots A, B
3 - Process Outputs - Slot D or E
4 - SSR Outputs - Slot D or E
R M H x **-** [**1,2**] [**1,2**] [**F,L**] [**F,L**] **-** A A A A

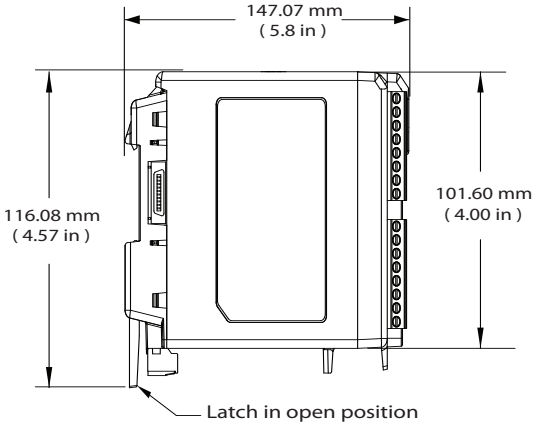


2 Chapter 2: Install and Wire

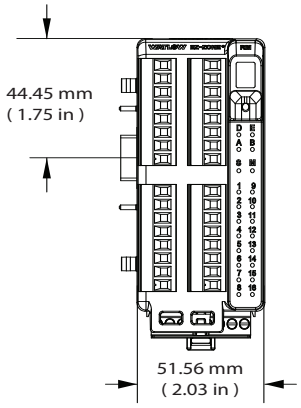
Dimensions

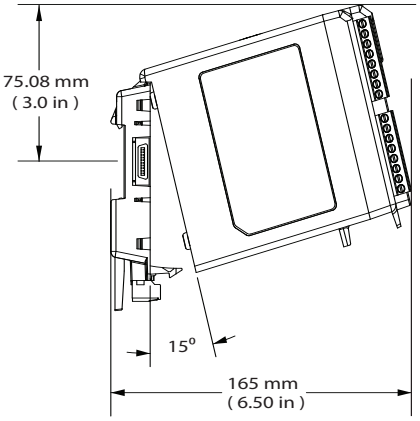
As can be seen below the dimensions of the RM system will change slightly based on the type of connector used.

Module Removal Clearance



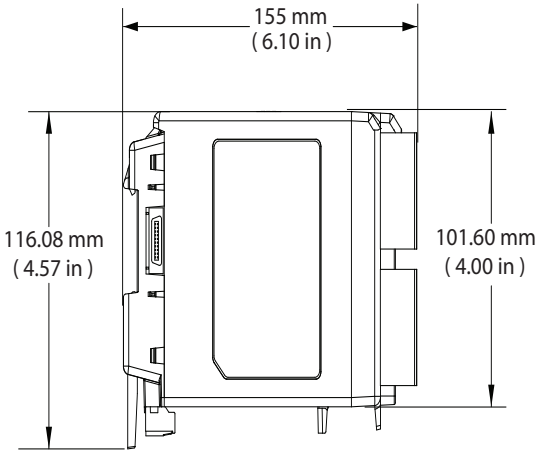
Standard Connectors



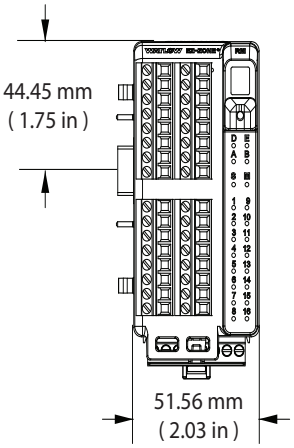


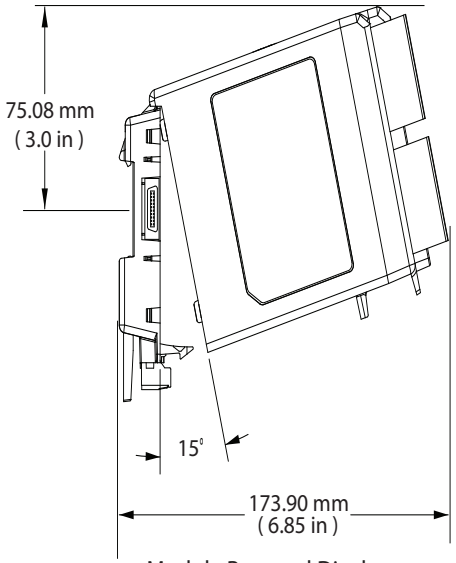
Module Removal Displacement

Module Removal Clearance



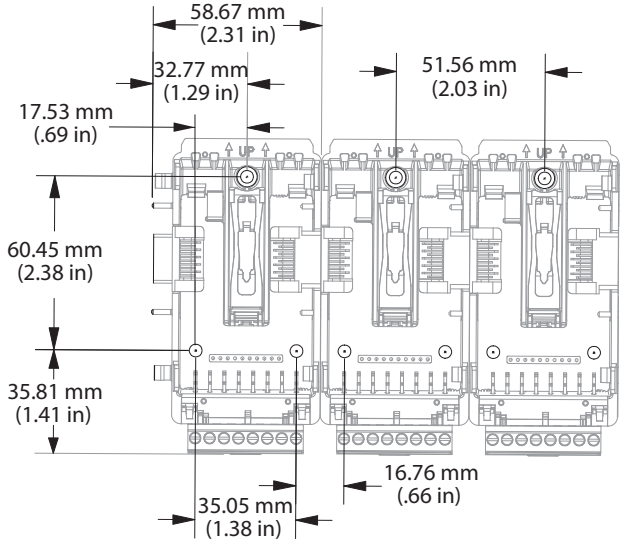
Straight Connectors





Module Removal Displacement

Chassis Mount Front View (Module Removed) - Screw Connection Pattern



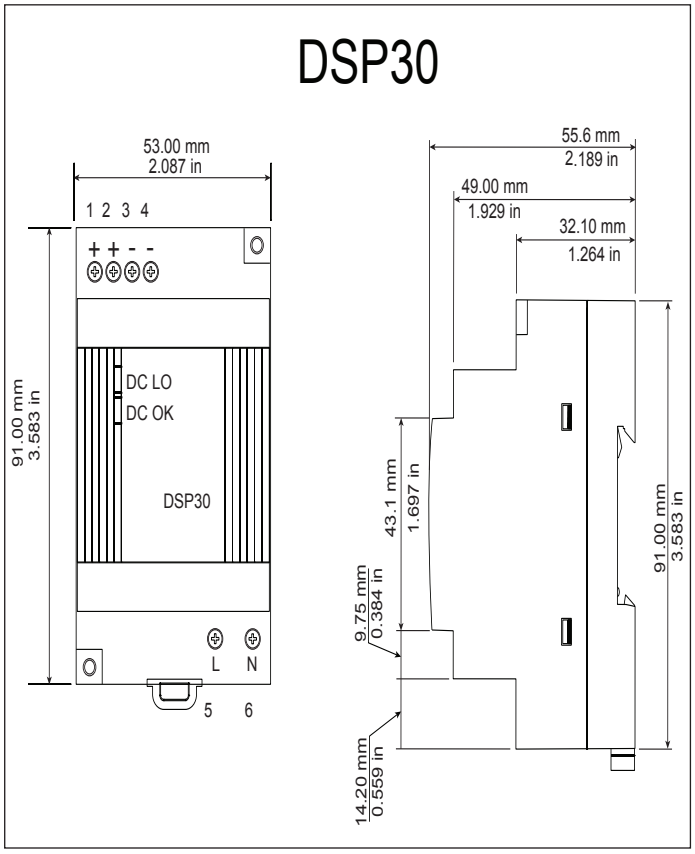
The view above is representative of the modular backplane without the module.

Recommended chassis mount hardware:

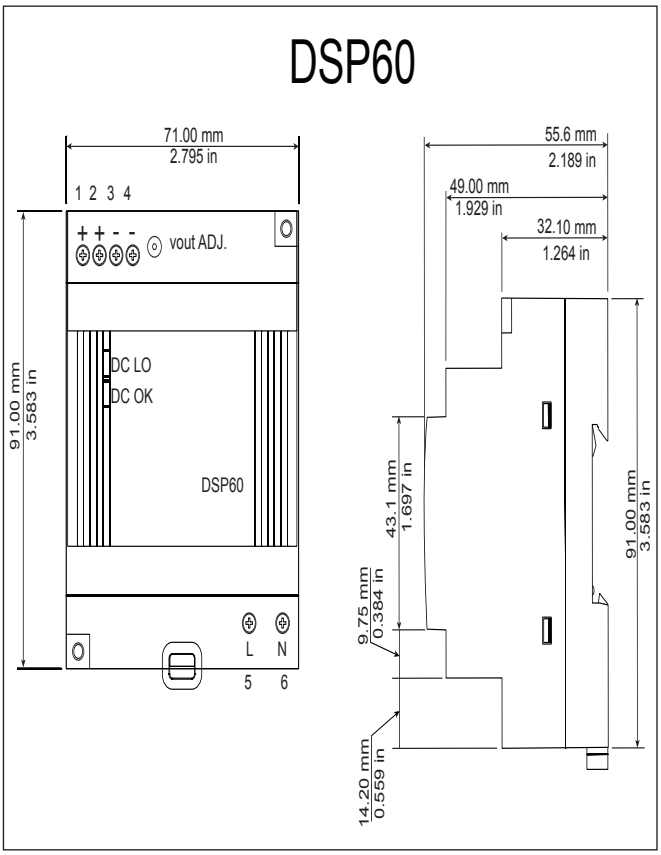
1. #8 screw, 3/4" long
2. Torque to 10 -15 in-lb
3. No washers of any kind

Power Supplies

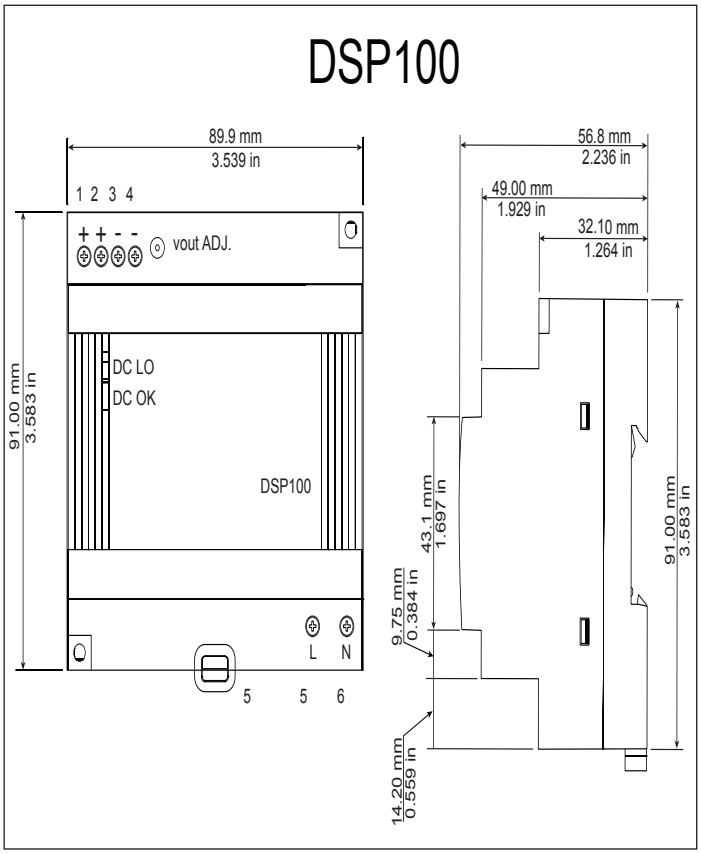
DSP30



DSP60



DSP100



Power Supply Specifications

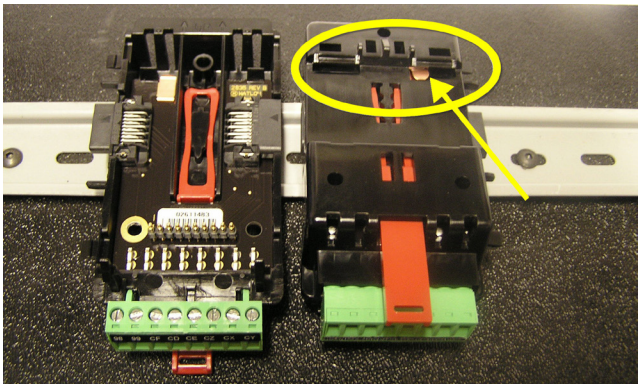
		DSP 30	DSP60	DSP100
AC Input Voltage Range	VAC	90 - 264VAC, Class II double insulated (No ground connection required)		
Input Frequency	Hz	47 - 63Hz		
DC Input Voltage range	VDC	120 - 370VDC		
Inrush Current (115 / 230VAC)	A	25 / 50A	30 / 60A	30 / 60A
Output Voltage Accuracy	%	±1% of Nominal		
Over voltage Protection	V	120 - 145%		
LED Indicators	- - - -	Green LED = On, Red LED = DC Output Low		
Operating Temperature	- - - -	-25 to +71°C (Derate linearly 2.5%/°C from 55 to 71°C)		
Storage Temperature	- - - -	-25 to +85°C		
Operating Humidity	- - - -	20 - 95% RH (non condensing)		
Vibration (Operating)	- - - -	IEC 60068-2-6 (Mounting by rail: Random wave, 10-500 Hz, 2G, ea. along X, Y, Z axes 10 min/cycle, 60 min)		
Safety Agency Approvals		UL1310 Class 2(1), UL508 Listed, UL60950-1, EN60950-1, CE		

For a comprehensive listing of these specifications point your browser to : http://us.tdk-lambda.com/lp/products/dsp-series.htm

RMH Installation and Removal on a DIN Rail

Modular Backplane Connector

The picture on the right shows the Modular Backplane Connector, both front and rear view. The rear view is bringing in to focus a metal clip. If the DIN rail is grounded the Modular Backplane Connector and the module connected to it will be also (recommended).



Installing the Modular Backplane Connector

Step 1

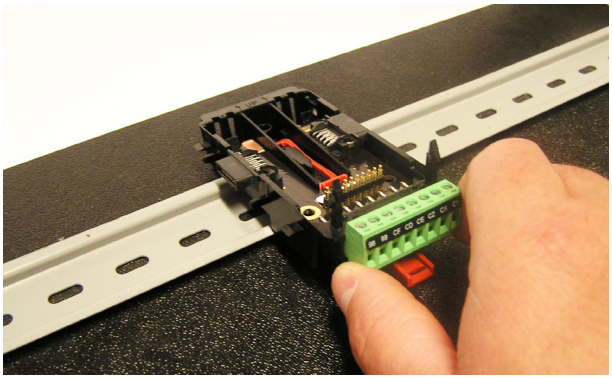
Hook backplane assembly to upper edge of DIN rail, (see rear view above, backplane hook detail that mates with upper rail edge is circled)

Step 2

Next, rotate back plane assembly downward to en gage the lower edge of the rail. (Note: Din Rail clipping distance ranges from 1.366 -1.389 inches. The back plane assembly will not latch onto the rail successfully if the rail is out of dimension).

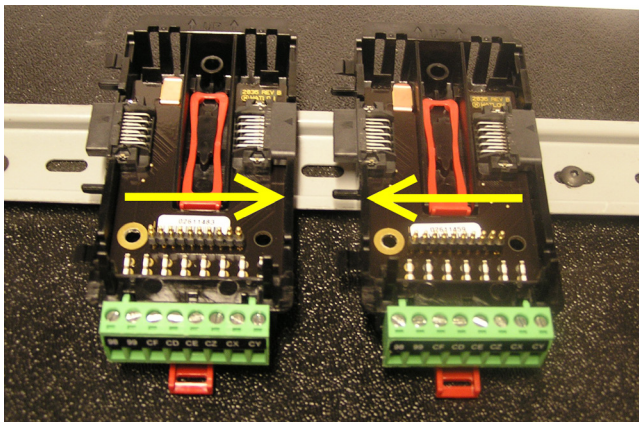
Step 3

For final positioning and locking, the red tab is to be pushed upward to further engage the bottom edge of the rail with an over center snap action latch. (The red locking tab protrudes from the bottom side of the back plane assembly).



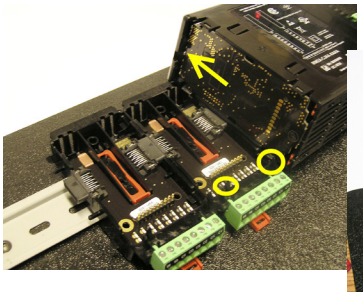
Installing Multiple Modular Backplane Connectors

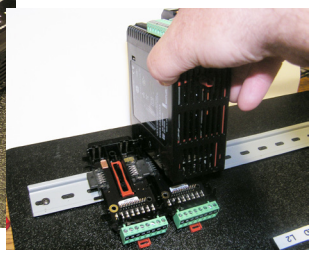
Multiple modules are easily aligned and latched together. Each module includes matched mating geometry that facilitates accurate and consistent interconnections. The recommended method of multi-module attachment is to first attach individual modules to the rail separately and second to laterally slide the modules together until they touch. (Refer to steps 1&2 above). When the multi-module system is attached and laterally positioned to the desired placement the locking tab should be engaged to secure the control system to the rail, (Refer to step 3 above).



Module Installation

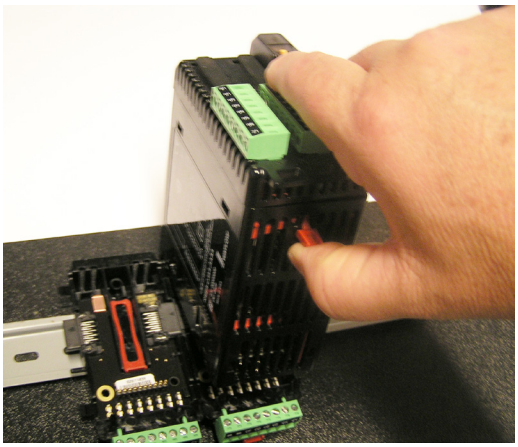
In the picture to the right notice that the arrow is pointing at the top lip of the module (on side). When installing the module simply slide this lip over the top of the Modular Backplane Connector and then push down on the rear of the module where it will seat on the two posts just above the green connector.





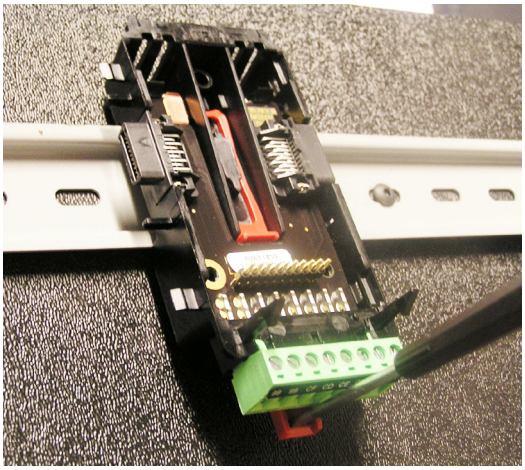
Module Removal

To remove a module from the Modular Backplane Connector find the red tab protruding from the bottom of the module and pull back on it as shown to the right. While pulling back on the red tab the two mounting posts will release the module where the module can then be lifted up and out of the Modular Backplane Connector.



Removal of the Modular Backplane Connector

A module can be removed from the Modular Backplane Connector by inserting a screw driver into the red locking tab just behind the green connector and applying downward pressure on the tab by lifting the screwdriver upwards. When released, the tab will move downward and the connector can then be lifted up off of the DIN rail.



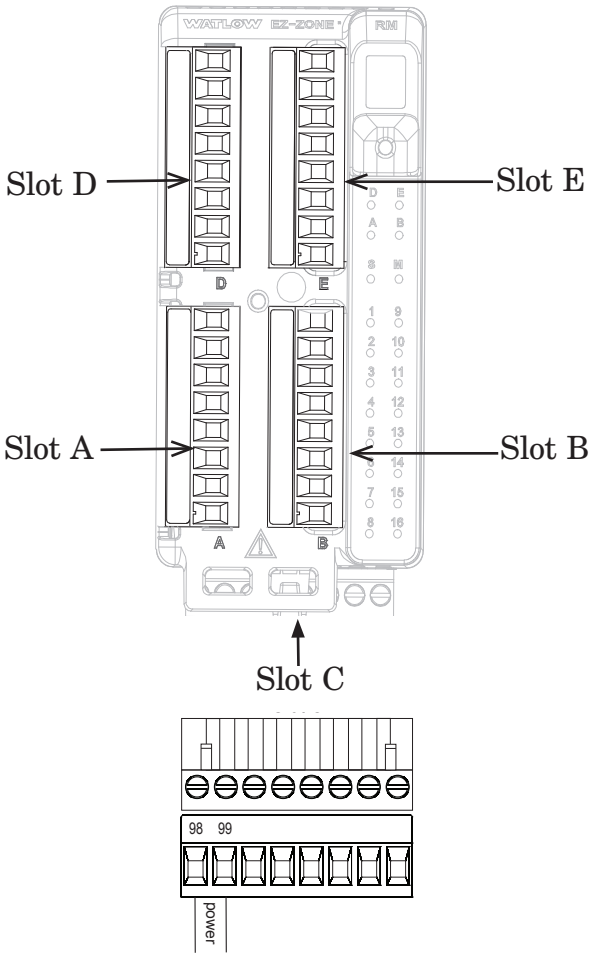
Wiring

High Density Module (R M H x - x x x x - x x x x)					
Slot A	**Slot B**	**Slot D**	**Slot E**	**Configuration**	
Inputs				**Universal, RTD and Thermistor Inputs**	
1 - 4	**5 - 8**	**9 - 12**	**13 - 16**		
S1 R1 S2 R2 S3 R3 S4 R4	S5 R5 S6 R6 S7 R7 S8 R8	S9 R9 S10 R10 S11 R11 S12 R12	S13 R13 S14 R14 S15 R15 S16 R16	S_ (RTD), thermocouple -, volts - , mA -, potentiometer wiper or thermistor R_ (RTD), thermocouple +, volts +, mA +, potentiometer or thermistor	Universal/Thermistor Input Part # Digits 5, 6, 7 Input 1-4: RMH _ - [**1,2**] _ _ _ - _ _ _ _ Input 5-8: RMH _ - _ [**1,2**] _ _ - _ _ _ _ Input 9-12: RMH _ - _ _ [**1,2**] _ - _ _ _ _ Input 13-16: RMH _ - _ _ _ [**1,2**] _ - _ _ _ _
				Digital Inputs	
- - -	**- - -**	**1 - 6**	**7-12**		
- -	- -	B1 D1 D2 D3 D4 D5 D6 Z1	B7 D7 D8 D9 D10 D11 D12 Z7	Common DC +input DC +input DC +input DC +input DC +input DC +input Internal Supply	Digital Inputs (DI) Part # Digit 7, 8 Slot A: Option not valid Slot B: Option not valid Slot D: RMH _ - _ _ [**C**] _ - _ _ _ _ Slot E: RMH _ - _ _ _ [**C**] - _ _ _ _
Outputs				**Quad 5A - Mechanical Relay Form A Outputs**	
- - -	**- - - -**	**1 - 4**	**7 - 10**		
- -	- -	L1 K1 L2 K2 L3 K3 L4 K4	L7 K7 L8 K8 L9 K9 L10 K10	normally open common normally open common normally open common normally open common	Mechanical Relay 5 A, Form A Part # Digits 7, 8 Slot D: : RMH _ - _ _ [**J**] _- _ _ _ _ Slot E: : RMH _ - _ _ _ [**J**] - _ _ _ _
				Digital Outputs	
Slot A	**Slot B**	**Slot D**	**Slot E**		**Configuration**
- - -	**- - -**	**1 - 6**	**7 - 12**		
- -	- -	B1 D1 D2 D3 D4 D5 D6 Z1	B7 D7 D8 D9 D10 D11 D12 Z7	Common open collector/ switched dc open collector/ switched dc open collector/ switched dc open collector/ switched dc open collector/ switched dc open collector/ switched dc Internal Supply	Digital Outputs (DO) Part # Digit 7, 8 Slot A: Option not valid Slot B: Option not valid Slot D: RMH _ _ - _ _ [**C**] _- _ _ _ _ Slot E: RMH _ - _ _ _ [**C**] - _ _ _ _
				Quad 2A - Solid-State Relay (SSR) Form A Outputs	
- - -	**- - -**	**1 - 4**	**7 - 10**		
- -	- -	L1 K1 L2 - - - - - - L3 K3 L4	L7 K7 L8 - - - - - - L9 K9 L10	normally open common normally open *not used* *not used* normally open common normally open	2A SSR Outputs Part # Digits 7, 8 Slot A: Option not valid Slot B: Option not valid Slot D: RMH _ - _ _ [**L**] _ - _ _ _ _ Slot E: RMH _ - _ _ _ [**L**] - _ _ _ _

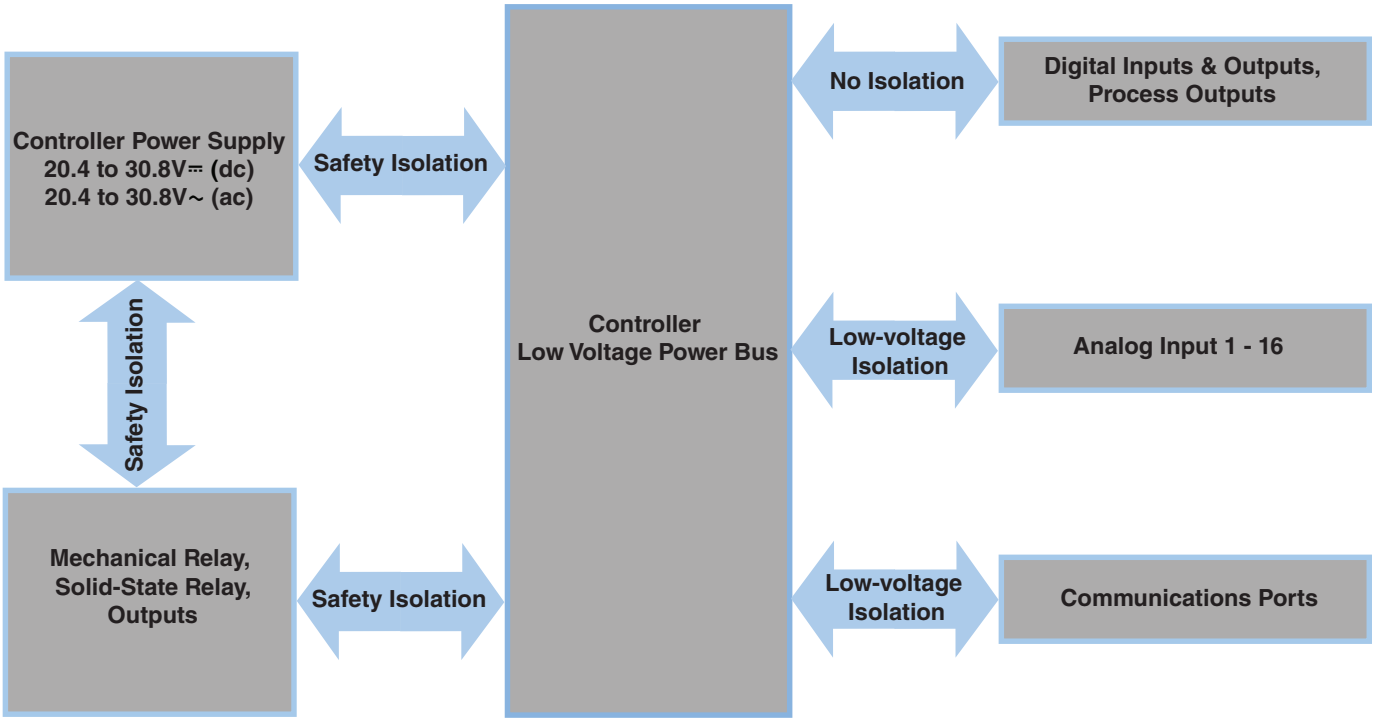
High Density Module (R M H x - x x x x - x x x x)					
Slot A	**Slot B**	**Slot D**	**Slot E**		**Configuration**
Outputs (cont.)				**Tri-State Process/Retransmit Outputs**	
- - -	**- - -**	**1 - 3**	**7 - 9**		
- - -	- - -	F1	F7	voltage or current -	Tri-Process Outputs Part # Digits 7, 8 Slot A: Option not valid Slot B: Option not valid Slot D: RMH _ - _ _ [**F**] _ - _ _ _ _ Slot E: RMH _ - _ _ _ [**F**] - _ _ _ _
- - -	- - -	H1	H7	voltage + or current +	
- - -	- - -	- - -	- - -	*not used*	
- - -	- - -	F2	F8	voltage or current -	
- - -	- - -	H2	H8	voltage + or current +	
- - -	- - -	- - -	- - -	*not used*	
- - -	- - -	F3	F9	voltage or current -	
- - -	- - -	H3	H9	voltage + or current +	

Power and Communications		
Slot C		**Configuration**
98 99	Power input: ac or dc+ Power input: ac or dc-	All
CF CD CE	Standard Bus EIA-485 common Standard Bus EIA-485 T-/R- Standard Bus EIA-485 T+/R+	Standard Bus Part # Digit 10 RMH _ - _ _ _ _ - _ [**A**] _ _
CC CA CB	Standard Bus or Modbus RTU EIA-485 common Standard Bus or Modbus RTU EIA-485 T-/R- Standard Bus or Modbus RTU EIA-485 T+/R+	Standard Bus or Modbus Part # Digit 10 RMH _ - _ _ _ _ - _ [**1**] _ _
CZ CX CY	Inter-module Bus Inter-module Bus Inter-module Bus	Inter-module Bus

RMH Module - Front View -
Standard Connector



RMH System Isolation Blocks



Low-voltage Isolation: 42V peak
Safety Isolation: 1,528V~ (ac)

Warning:

Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

Maximum wire size termination and torque rating:

- **0.0507 to 3.30 mm^2 (30 to 12 AWG) single-wire termination or two 1.31 mm^2 (16 AWG)**
- **0.8 Nm (7.0 in-lb.) torque**

Note:

Adjacent terminals may be labeled differently, depending on the model number.

Note:

To prevent damage to the controller, do not connect wires to unused terminals.

Note:

Maintain electrical isolation between digital input-outputs, switched dc/open collector outputs and process outputs to prevent ground loops.

Warning:

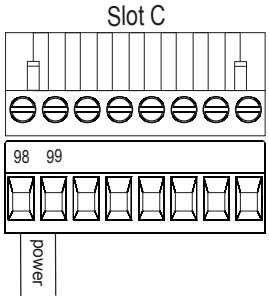
Explosion Hazard – Substitution of component may impair suitability for CLASS I, DIVISION 2.

Warning:

Explosion Hazard - Do not disconnect while the circuit is live or unless the area is known to be free of ignitable concentrations of flammable substances.

High Density Module Wiring (RMHx-xxxx-xxxx)

Low Power

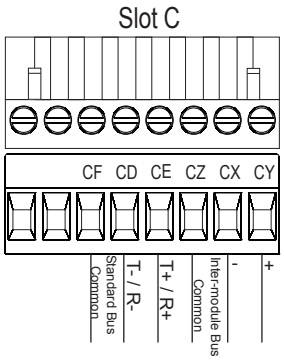


RMH- ALL Model Numbers

- 20.4 to 30.8 V ~ (ac) / ⎓ (dc)
- 47 to 63 Hz
- Controller module power consumption, 7 Watts maximum, 14VA
- 31 Watts maximum power available for P/S part #:0847-0299-0000
- 60 Watts maximum power available for P/S part #:0847-0300-0000
- 91 Watts maximum power available for P/S part #:0847-0301-0000
- Class 2 or SELV power source required to meet UL compliance standards

Communications

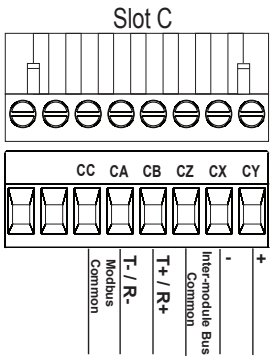
RMH Part # Digit 10 is A



- CF, CD, CE - Standard Bus EIA485 Communications
- CZ, CX, CY - Inter-module Bus EIA485 Communications
- Do not route network wires with power wires. Connect network wires in daisy-chain fashion when connecting multiple devices in a network

Communications

RMH Part # Digit 10 is 1

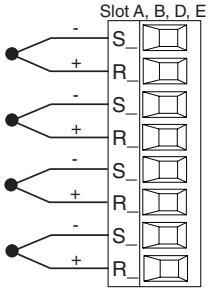


- CC, CA, CB - Modbus and Standard Bus EIA-485 Communications (selectable via push button under zone address)
- CZ, CX, CY - Inter-module Bus EIA-485 Communications
- Do not route network wires with power wires. Connect network wires in daisy-chain fashion when connecting multiple devices in a network

Modbus-IDA Terminal	EIA/TIA-485 Name	Watlow Terminal Label	Function
DO	A	CA or CD	T-/R-
D1	B	CB or CE	T+/R+
common	common	CC or CF	common

Inputs 1 through 16 Thermocouple

RMH Part # Digits 5, 6, 7, 8



- 2K Ω maximum source resistance
- >20 MΩ input impedance
- 3 microampere open-sensor detection
- Thermocouples are polarity sensitive. The negative lead (usually red) must be connected to S terminal
- To reduce errors, the extension wire for thermocouples must be of the same alloy as the thermocouple.

  Input 1 - 4 (top to bottom): RMHx-(**1**)xxx-xxxx

  Input 5 - 8 (top to bottom): RMHx-x(**1**)xx-xxxx

  Input 9 - 12 (top to bottom): RMHx-xx(**1**)x-xxxx

  Input 13 - 16 (top to bottom): RMHx-xxx(**1**)-xxxx

Warning:

Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

Maximum wire size termination and torque rating:

- **0.0507 to 3.30 mm^2 (30 to 12 AWG) single-wire termination or two 1.31 mm^2 (16 AWG)**
- **0.8 Nm (7.0 in-lb.) torque**

Note:

Adjacent terminals may be labeled differently, depending on the model number.

Note:

To prevent damage to the controller, do not connect wires to unused terminals.

Note:

Maintain electrical isolation between digital input-outputs, switched dc/open collector outputs and process outputs to prevent ground loops.

Warning:

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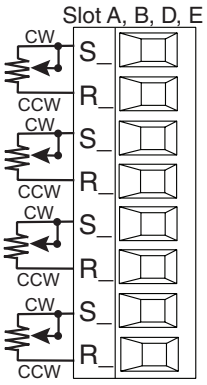
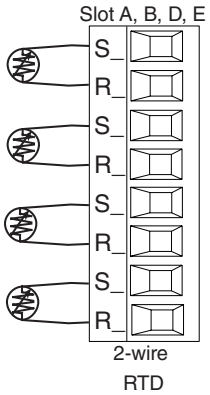
Inputs 1 through 16 Potentiometer



- Use a 1 kΩ potentiometer.
  Input 1 - 4 (top to bottom): RMHx-(**1**)xxx-xxxx
  Input 5 - 8 (top to bottom): RMHx-x(**1**)xx-xxxx
  Input 9 - 12 (top to bottom): RMHx-xx(**1**)x-xxxx
  Input 13 - 16 (top to bottom): RMHx-xxx(**1**)-xxxx

Inputs 1 through 16 RTD

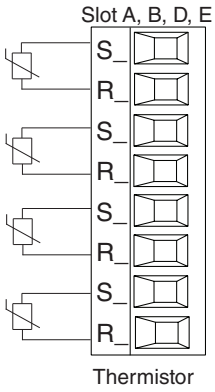


RMH Part # Digits 5, 6, 7, 8

- platinum, 100 and 1,000 Ω @ 0°C
- calibration to DIN curve (0.00385 Ω/Ω/°C)
- RTD excitation current of 0.09 mA typical. Each ohm of lead resistance may affect the reading by 2.55°C for a 100 ohm platinum sensor or 0.25°C for a 1000 ohm sensor.
  Input 1 - 4 (top to bottom): RMHx-(**1**)xxx-xxxx
  Input 5 - 8 (top to bottom): RMHx-x(**1**)xx-xxxx
  Input 9 - 12 (top to bottom): RMHx-xx(**1**)x-xxxx
  Input 13 - 14 (top to bottom): RMHx-xxx(**1**)-xxxx

AWG	Ohms/1000ft
14	2.575
16	4.094
18	6.510
20	10.35
22	16.46
24	26.17
26	41.62
28	66.17

Inputs 1 through 16 Thermistor



RMH Part # Digits 5, 6, 7, 8

- >20 MΩ input impedance
  Input 1 - 4 (top to bottom): RMHx-(**2**)xxx-xxxx
  Input 5 - 8 (top to bottom): RMHx-x(**2**)xx-xxxx
  Input 9 - 12 (top to bottom): RMHx-xx(**2**)x-xxxx
  Input 13 - 16 (top to bottom): RMHx-xxx(**2**)-xxxx

Warning:

Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

Maximum wire size termination and torque rating:

- **0.0507 to 3.30 mm^2 (30 to 12 AWG) single-wire termination or two 1.31 mm^2 (16 AWG)**
- **0.8 Nm (7.0 in-lb.) torque**

Note:

Adjacent terminals may be labeled differently, depending on the model number.

Note:

To prevent damage to the controller, do not connect wires to unused terminals.

Note:

Maintain electrical isolation between digital input-outputs, switched dc/open collector outputs and process outputs to prevent ground loops.

Warning:

Explosion Hazard – Substitution of component may impair suitability for CLASS I, DIVISION 2.

Warning:

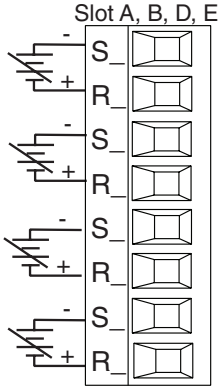
Explosion Hazard - Do not disconnect while the circuit is live or unless the area is known to be free of ignitable concentrations of flammable substances.

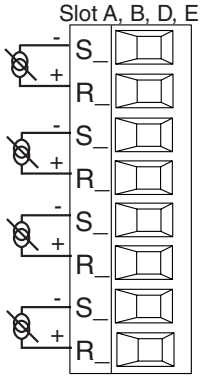
Suppressor Note:

Switching pilot duty inductive loads (relay coils, solenoids, etc.) with the mechanical relay, solid state relay or open collector output options requires use of an R.C. suppressor for AC load or a diode for a DC load.

Process Inputs 1 through 16

RMH Part # Digit 5, 6, 7, 8 is 1





- 0 to 20 mA @ 100 Ω input impedance
- 0 to 10V⎓ (dc) @ 20 kΩ input impedance
- 0 to 50 mV⎓ (dc) @ 20 MΩ input impedance
- scalable

Slot 1: RMHx-(**1**)xxx-xxxx (Inputs 1 to 4)

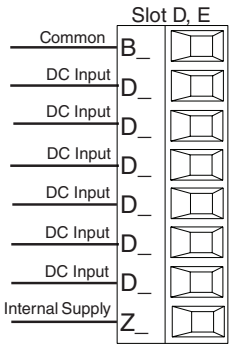
Slot 2: RMHx-x(**1**)xx-xxxx (Inputs 5 to 8)

Slot 3: RMHx-xx(**1**)x-xxxx (Inputs 9 to 12)

Slot 4: RMHx-xxx(**1**)-xxxx (Inputs 13 to 16)

Digital Inputs 1 through 12

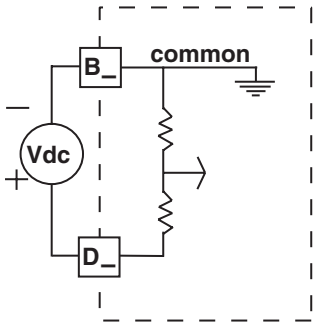
RMH Part # Digit 7, 8 is C



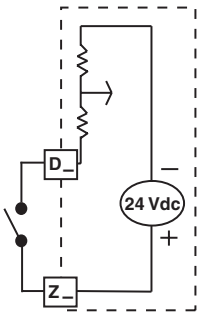
Digital Input Event Conditions

- Voltage
  - Input inactive when < 2V
  - Input active when > 3V
- Dry Contact
  - Input inactive when > 100KΩ
  - Input active when < 50Ω
- Six user configurable digital inputs/outputs per slot
  - Slot D DI 1 - 6 RMHx-xx(**C**) xx-xxxx
  - Slot E DI 7 - 12 RMHx-xxx(**C**)-xxxx

Voltage Input



Dry Contact



Warning:

Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

Maximum wire size termination and torque rating:

- **0.0507 to 3.30 mm^2 (30 to 12 AWG) single-wire termination or two 1.31 mm^2 (16 AWG)**
- **0.8 Nm (7.0 in-lb.) torque**

Note:

Adjacent terminals may be labeled differently, depending on the model number.

Note:

To prevent damage to the controller, do not connect wires to unused terminals.

Note:

Maintain electrical isolation between digital input-outputs, switched dc/open collector outputs and process outputs to prevent ground loops.

Warning:

Explosion Hazard – Substitution of component may impair suitability for CLASS I, DIVISION 2.

Warning:

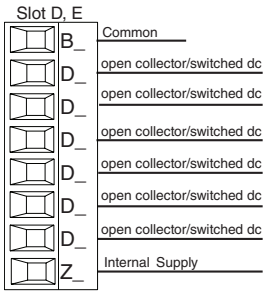
Explosion Hazard - Do not disconnect while the circuit is live or unless the area is known to be free of ignitable concentrations of flammable substances.

Suppressor Note:

Switching pilot duty inductive loads (relay coils, solenoids, etc.) with the mechanical relay, solid state relay or open collector output options requires use of an R.C. suppressor for AC load or a diode for a DC load.

Digital Outputs 1 - 12

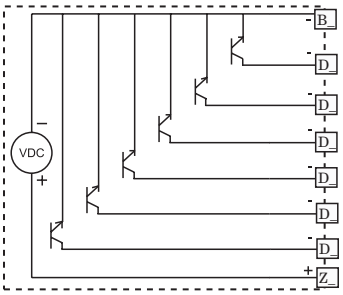
RMH Part # Digit 7, 8 is C



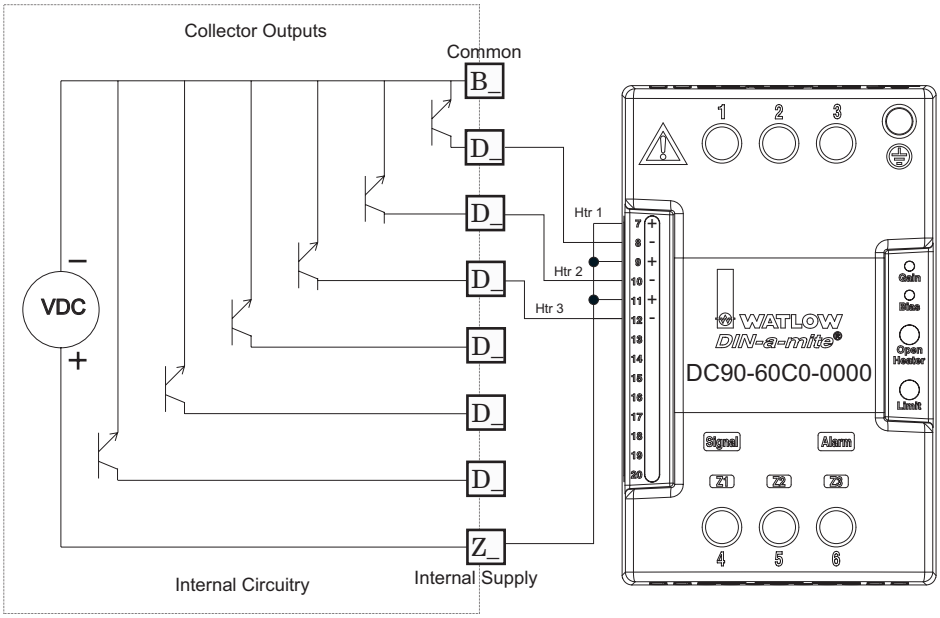
- Maximum switched voltage is 32V⎓ (dc)
- Internal supply provides a constant power output of 750mW
- Maximum output sink current per output is 1.5A (external class 2 or *SELV supply required)
- Total sink current for all outputs not to exceed 8A
- Do not connect outputs in parallel
  - Slot D DO 1 - 6 RMHx-xx(**C**)x-xxxx
  - Slot D DO 7 - 12 RMHx-xxx(**C**)-xxxx

*Safety Extra Low Voltage

Open Collector/Switched DC Outputs



Switched DC Wiring Example Using DO 1-12



Note:

As a switched DC output; this output is a constant current output delivering 750 mW, current limited to 400 mA. The internal supply does have a maximum open circuit voltage of 22 VDC and minimum open circuit voltage of 19 VDC. Pin Z_ is shared to all digital outputs. This type of output is meant to drive solid state relays, not mechanical relays.

Warning:

Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

Maximum wire size termination and torque rating:

- **0.0507 to 3.30 mm^2 (30 to 12 AWG) single-wire termination or two 1.31 mm^2 (16 AWG)**
- **0.8 Nm (7.0 in-lb.) torque**

Note:

Adjacent terminals may be labeled differently, depending on the model number.

Note:

To prevent damage to the controller, do not connect wires to unused terminals.

Note:

Maintain electrical isolation between digital input-outputs, switched dc/open collector outputs and process outputs to prevent ground loops.

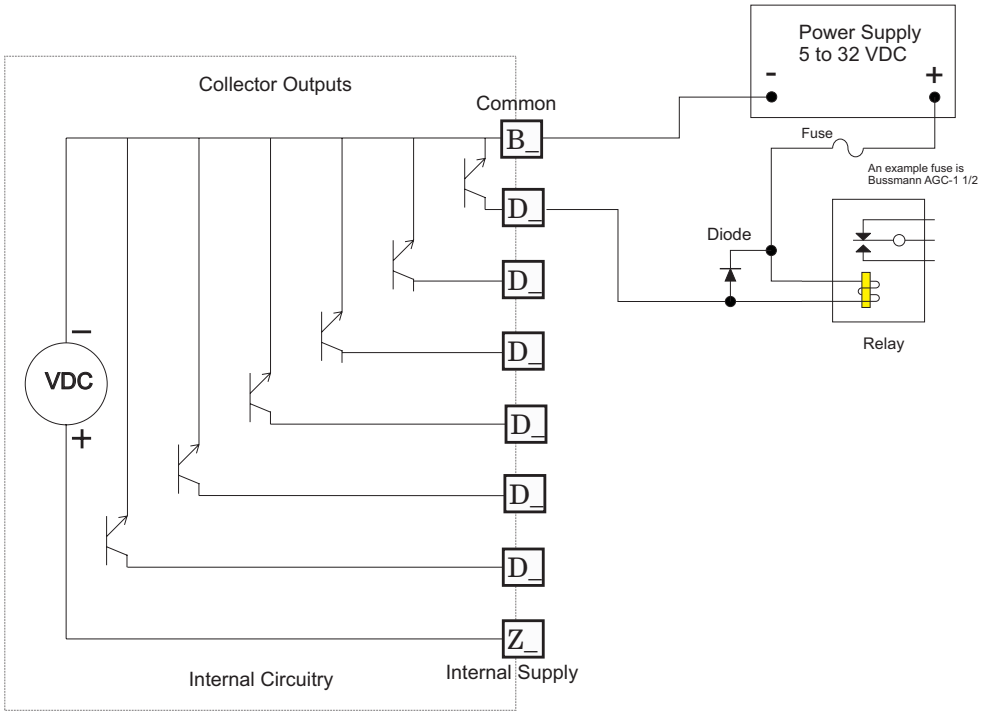
Warning:

Explosion Hazard – Substitution of component may impair suitability for CLASS I, DIVISION 2.

Warning:

Explosion Hazard - Do not disconnect while the circuit is live or unless the area is known to be free of ignitable concentrations of flammable substances.

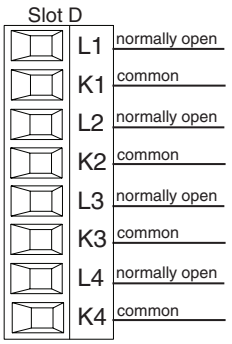
Open Collector Wiring Example Using DO 1-12

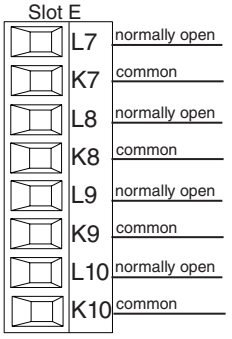


As an open collector output (see graphic below), use an external power supply with the negative wired to B_, the positive to the coil of a pilot mechanical relay and the other side of the coil wired to the output of choice (D_). Each open collector output can sink 1.5 A with the total for all open collector outputs not exceeding 8 amperes. Ensure that a kickback diode is reversed wired across the relay coil to prevent damage to the internal transistor.

Output 1 - 4 and 7 - 10 Mechanical Relay, Form A

RMH Part # Digit 7, 8 is J



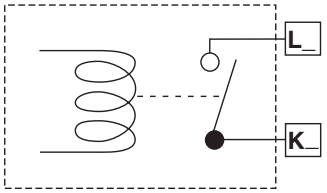


- 5 A at 240V~ (ac) or 30V⎓ (dc) maximum resistive load
- 20 mA at 24V minimum load
- 125 VA pilot duty @ 120/240V~ (ac), 25 VA at 24V~ (ac)
- 100,000 cycles at rated load
- Output does not supply power.
- for use with ac or dc

See Quencharc note.

- Slot D Outputs 1 - 6
  RMHx-xx(**J**)x-xxxx
- Slot E Outputs 7 - 10
  RMHx-xxx(**J**)-xxxx

Mechanical Relay Form A



Internal Circuitry

Warning:

Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

Maximum wire size termination and torque rating:

- **0.0507 to 3.30 mm^2 (30 to 12 AWG) single-wire termination or two 1.31 mm^2 (16 AWG)**
- **0.8 Nm (7.0 in-lb.) torque**

Note:

Adjacent terminals may be labeled differently, depending on the model number.

Note:

To prevent damage to the controller, do not connect wires to unused terminals.

Note:

Maintain electrical isolation between digital input-outputs, switched dc/open collector outputs and process outputs to prevent ground loops.

Warning:

Explosion Hazard – Substitution of component may impair suitability for CLASS I, DIVISION 2.

Warning:

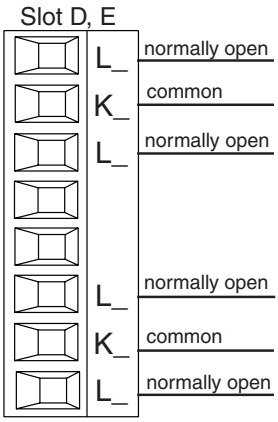
Explosion Hazard - Do not disconnect while the circuit is live or unless the area is known to be free of ignitable concentrations of flammable substances.

Suppressor Note:

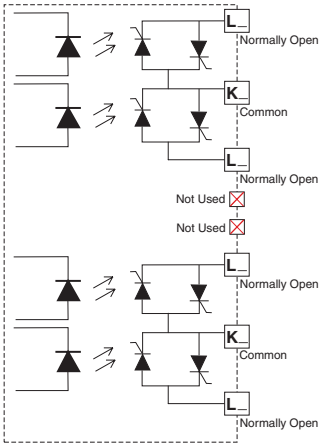
Switching pilot duty inductive loads (relay coils, solenoids, etc.) with the mechanical relay, solid state relay or open collector output options requires use of an R.C. suppressor for AC load or a diode for a DC load.

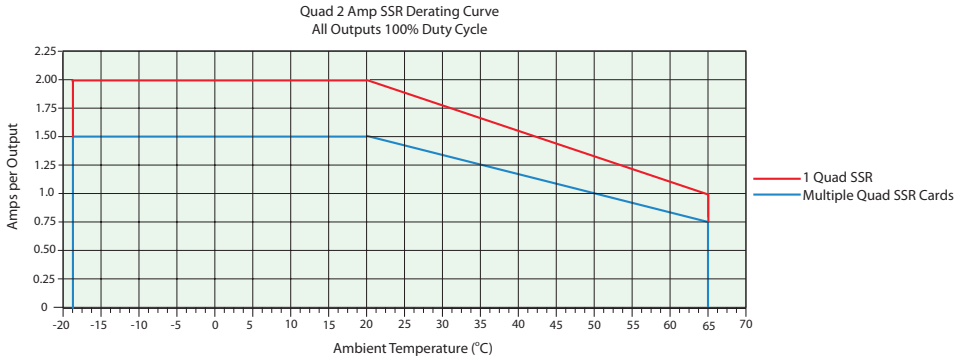
Quad 2A SSR Outputs 1-4, 7-10

RMH Part # Digit 7, 8 is L



- 2 A at 20 to 264V~ (ac) maximum resistive load
- 50 VA 120/240V~ (ac) pilot duty
- Optical isolation, without contact suppression
- maximum off state leakage of 105 microamperes
- Output does not supply power.
- Do not use on dc loads.
- N.O., COM, N.O wiring (shared common) between each set of outputs.
- See Quencharc note.



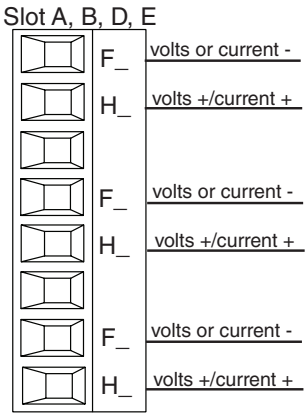


Note:

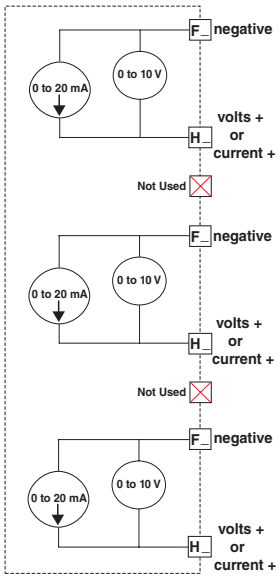
Each of the four SSR outputs has internal circuitry that will protect it from over heating. Outputs may be disabled (shut off) automatically if internal temperatures exceed those listed in the graph above. After the output temperature drops approximately 10 °C the outputs will once again be enabled for operation.

Tri-Process/Retransmit Outputs 1-3, 7-9

RMH Part # Digit 7, 8 is F



- 0 to 20 mA into 400Ω maximum load
- 0 to 10V⎓ (dc) into 4 kΩ minimum load
- Outputs are scalable
- Output supplies power
- Each output can be independently set for voltage or current.
- Output may be used as retransmit or control.



Warning:

Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

Maximum wire size termination and torque rating:

- **0.0507 to 3.30 mm^2 (30 to 12 AWG) single-wire termination or two 1.31 mm^2 (16 AWG)**
- **0.8 Nm (7.0 in-lb.) torque**

Note:

Adjacent terminals may be labeled differently, depending on the model number.

Note:

To prevent damage to the controller, do not connect wires to unused terminals.

Note:

Maintain electrical isolation between digital input-outputs, switched dc/open collector outputs and process outputs to prevent ground loops.

Warning:

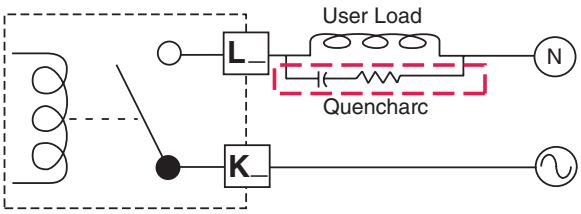
Explosion Hazard – Substitution of component may impair suitability for CLASS I, DIVISION 2.

Warning:

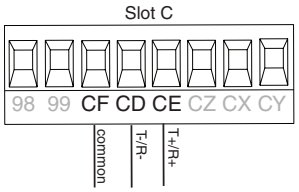
Explosion Hazard - Do not disconnect while the circuit is live or unless the area is known to be free of ignitable concentrations of flammable substances.

Quencharc Wiring Example

- In this example the Quencharc circuit (Watlow part# 0804-0147-0000) is used to protect internal circuitry from the counter electromagnetic force from the inductive user load when deenergized. It is recommended that this or an equivalent Quencharc be used when connecting inductive loads to outputs.



Standard Bus EIA-485 Communications

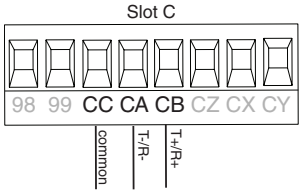


- Wire T-/R- to the A terminal of the EIA-485 port.
- Wire T+/R+ to the B terminal of the EIA-485 port.
- Wire common to the common terminal of the EIA-485 port.
- Do not route network wires with power wires. Connect network wires in daisy-chain fashion when connecting multiple devices in a network.
- A 120 Ω termination resistor may be required across T+/R+ and T-/R-, placed on the last controller on the network.
- Do not connect more than 16 EZ-ZONE RM controllers on a network.
- maximum network length: 1,200 meters (4,000 feet)
- 1/8th unit load on EIA-485 bus

RMHx-xxxx-x(**A**)xx

* All models include Standard Bus communications

Modbus RTU or Standard Bus EIA-485 Communications



- Wire T-/R- to the A terminal of the EIA-485 port.
- Wire T+/R+ to the B terminal of the EIA-485 port.
- Wire common to the common terminal of the EIA-485 port.
- Do not route network wires with power wires. Connect network wires in daisy-chain fashion when connecting multiple devices in a network.
- A termination resistor may be required. Place a 120 Ω resistor across T+/R+ and T-/R- of last controller on network.
- Only one protocol per port is available at a time: either Modbus RTU or Standard Bus.
- Do not connect more than 16 EZ-ZONE controllers on a Standard Bus network.
- Maximum number of EZ-ZONE controllers on a Modbus network is 247.
- maximum network length: 1,200 meters (4,000 feet)
- 1/8th unit load on EIA-485 bus

RMHx-xxxx-x(**1**)xx

Modbus-IDA Terminal	EIA/TIA-485 Name	Watlow Terminal Label	Function
DO	A	CA or CD	T-/R-
D1	B	CB or CE	T+/R+
common	common	CC or CF	common

Note:

Do not leave a USB to EIA-485 converter connected to Standard Bus without power (i.e., disconnecting the USB end from the computer while leaving the converter connected on Standard Bus). Disturbance on the Standard Bus may occur.

Warning:

Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

Maximum wire size termination and torque rating:

- **0.0507 to 3.30 mm^2 (30 to 12 AWG) single-wire termination or two 1.31 mm^2 (16 AWG)**
- **0.8 Nm (7.0 in-lb.) torque**

Note:

Adjacent terminals may be labeled differently, depending on the model number.

Note:

To prevent damage to the controller, do not connect wires to unused terminals.

Note:

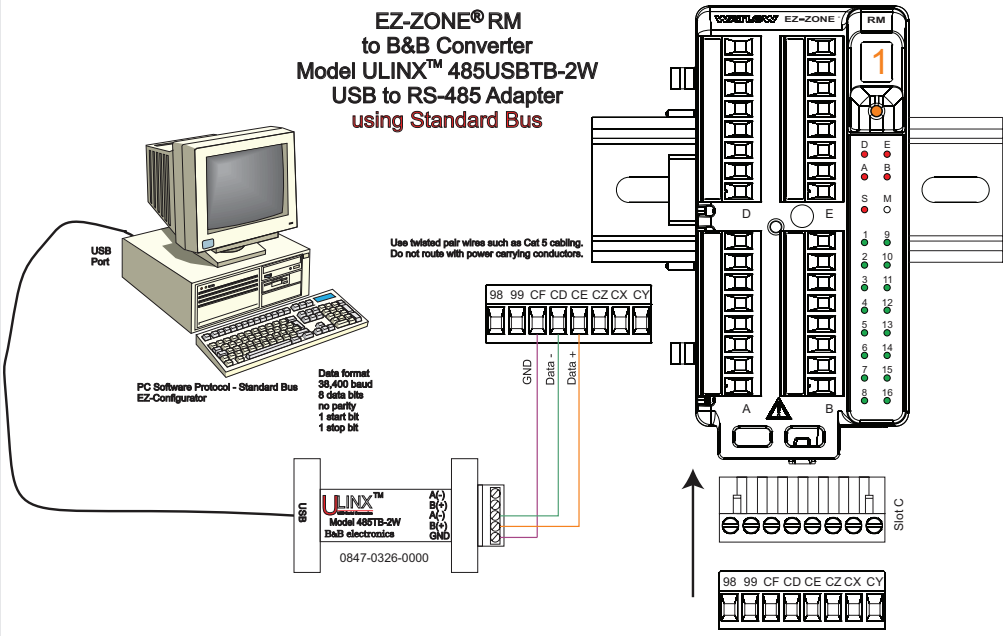
Maintain electrical isolation between digital input-outputs, switched dc/open collector outputs and process outputs to prevent ground loops.

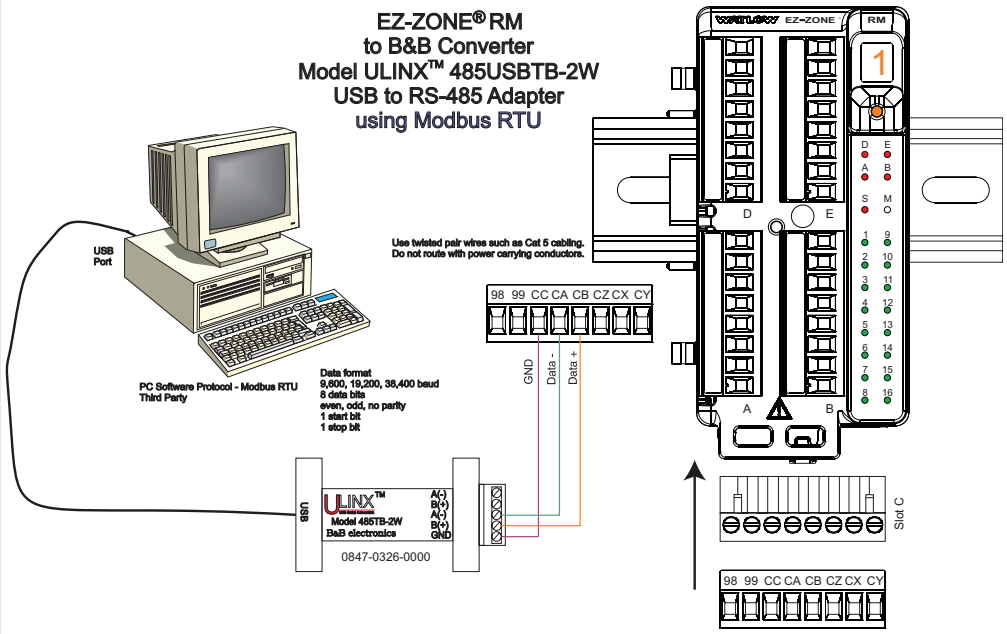
Warning:

Explosion Hazard – Substitution of component may impair suitability for CLASS I, DIVISION 2.

Warning:

Explosion Hazard - Do not disconnect while the circuit is live or unless the area is known to be free of ignitable concentrations of flammable substances.





Note:

Do not leave a USB to EIA-485 converter connected to Standard Bus without power (i.e., disconnecting the USB end from the computer while leaving the converter connected on Standard Bus). Disturbance on the Standard Bus may occur.

Warning:

Use National Electric (NEC) or other country-specific standard wiring and safety practices when wiring and connecting this controller to a power source and to electrical sensors or peripheral devices. Failure to do so may result in damage to equipment and property, and/or injury or loss of life.

Note:

Maximum wire size termination and torque rating:

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Note:

Adjacent terminals may be labeled differently, depending on the model number.

Note:

To prevent damage to the controller, do not connect wires to unused terminals.

Note:

Maintain electrical isolation between digital input-outputs, switched dc/open collector outputs and process outputs to prevent ground loops.

Warning:

Explosion Hazard – Substitution of component may impair suitability for CLASS I, DIVISION 2.

Warning:

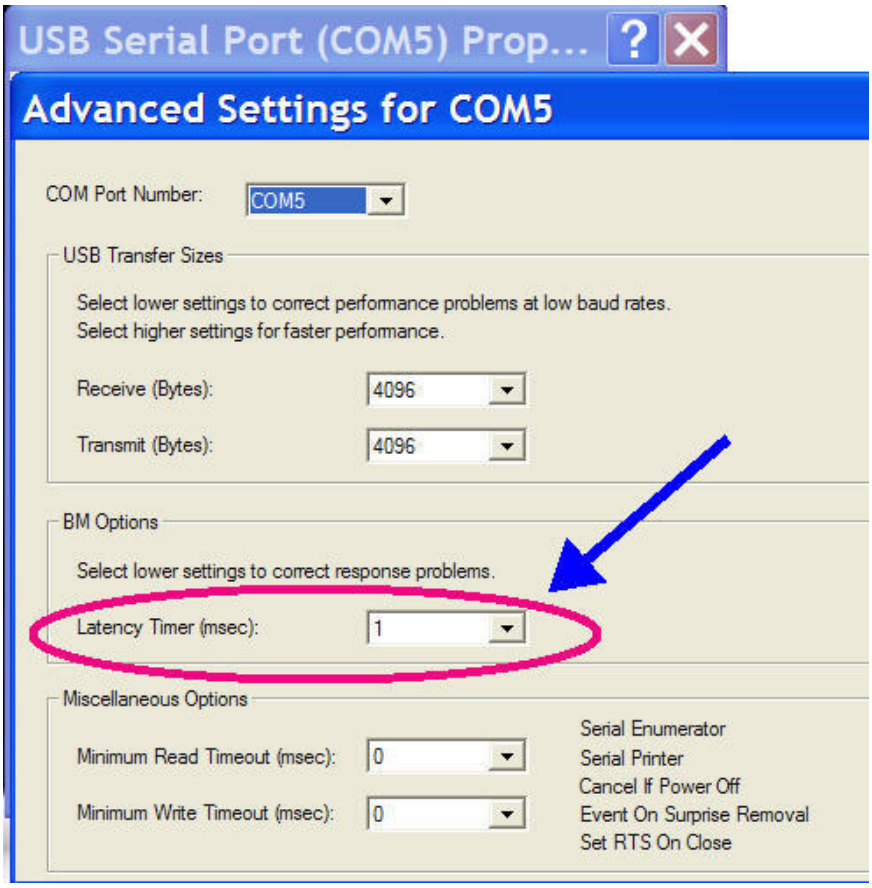
Explosion Hazard - Do not disconnect while the circuit is live or unless the area is known to be free of ignitable concentrations of flammable substances.

Note:

When connecting the USB converter to the PC it is suggested that the Latency Timer be changed from the default of 16 msec to 1 msec. Failure to make this change may cause communication loss between the PC running ZE-ZONE Configurator software and the control.

To modify Latency Timer settings follow the steps below:

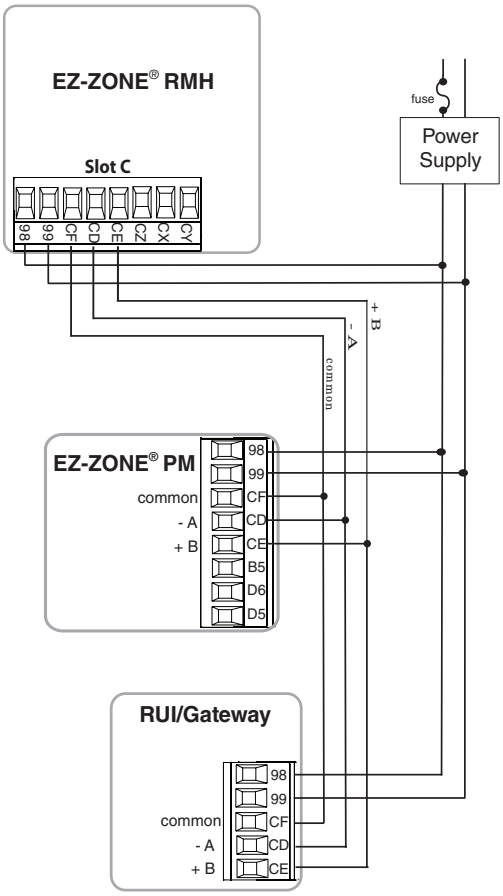
1. Navigate to Device Manager.
2. Double click on Ports.
3. Right click on the USB serial port in use and select Properties.
4. Click the tab labeled Port settings and then click the Advance button.



Wiring a Serial EIA-485 Network

Do not route network wires with power wires. Connect network wires in daisy-chain fashion when connecting multiple devices in a network.

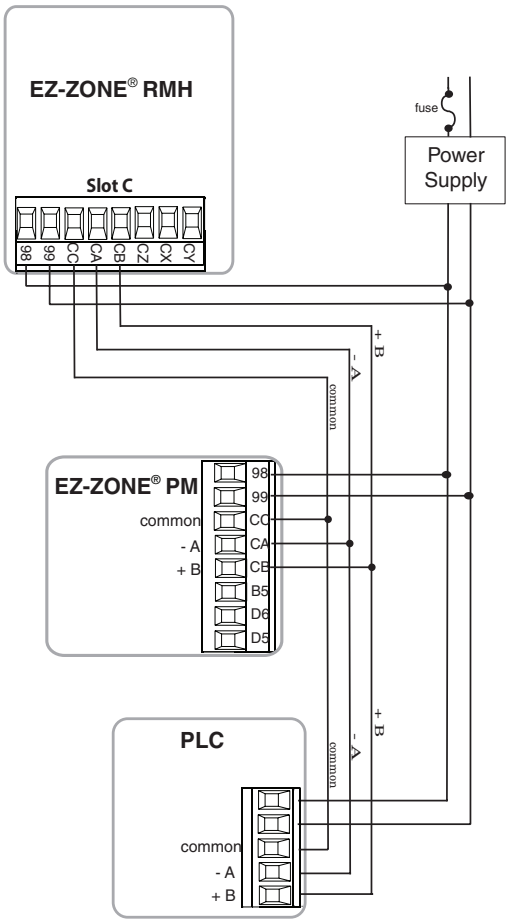
A network using Watlow's Standard Bus and an RUI/Gateway.



A termination resistor is required. Place a 120 Ω resistor across T+/R+ and T-/R- of the last controller on a network.

Only one protocol per port is available at a time: either Modbus RTU or Standard Bus.

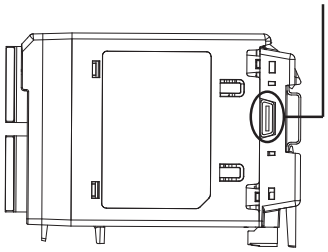
A network using Modbus RTU



RMH Module Connections

The RMH module can be installed as a stand-alone limit controller or can be interconnected on the DIN rail as shown below with other RM family modules. When modules are connected together as shown, power and communications are shared between modules over the modular backplane interconnection. Therefore, bringing the necessary power and communications wiring to any one connector in slot C is sufficient. The modular backplane interconnect comes standard with every module ordered and is generic in nature, meaning any RM modules shown below on

Modular backplane interconnect



the DIN rail can use it.

Notice in the split rail system diagram that a single power supply is being used across both DIN rails. One notable consideration when designing the hardware layout would be the available power supplied and the loading affect of all of the modules used. Watlow provides three options for power supplies listed below:

1. 90-264 Vac to 24Vdc @ 31 watts (Part #: 0847-0299-0000)
2. 90-264 Vac to 24Vdc @ 60 watts (Part #: 0847-0300-0000)
3. 90-264 Vac to 24Vdc @ 91 watts (Part #: 0847-0301-0000)

With regards to the modular loading affect, maximum power for each RM module is listed below:

1. RMCxxxxxxxxxxxx @ 7 watts / 14VA
2. RMEx-xxxx-xxxx @ 7 watts / 14VA
3. RMAx-xxxx-xxxx @ 4 watts / 9VA
4. RMLx-xxxx-xxxx @ 7 watts / 14VA
5. **RMHx-xxxx-xxxx @ 7 watts / 14VA**
6. RMSx-xxxx-xxxx @ 7 watts / 14VA

So, in the split rail system diagram, the maximum current draw on the supply would be 38 Watts.

- 2 RMC modules consumes 14W
- **1 RMH module consumes 7W**
- 1 RME modules consumes 7W
- 1 RMA module consumes 4W
- 1 Remote User Interface consumes 6W

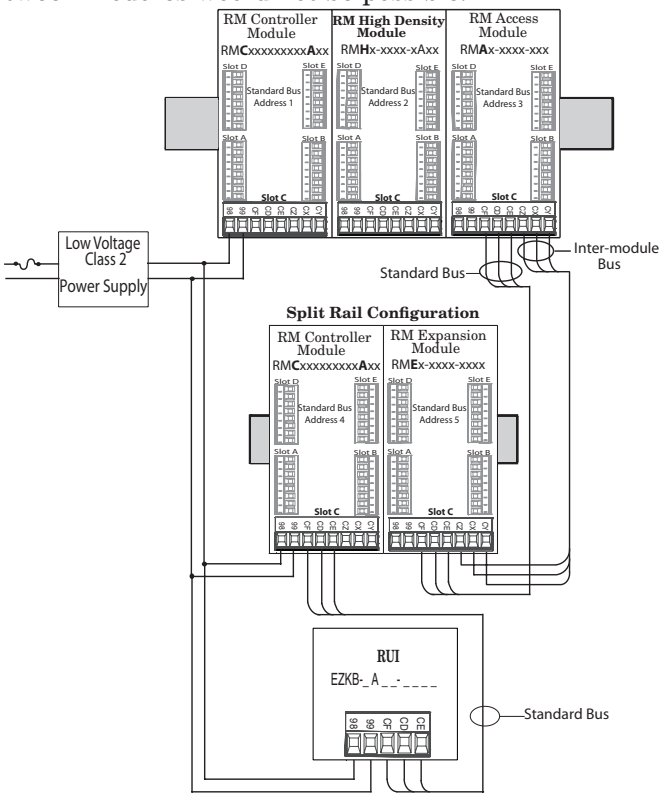
With this power requirement (38 watts) the second or third power supply could be used.

Another hardware configuration scenario that could present itself (graphic not shown) would be a configuration that requires more than one supply. Lets make some assumptions pertaining to the split rail system diagram shown below. The power supply used is the 91W supply. The top DIN rail now has the following modules:

- 2 RMC modules consumes 14W
- 1 RMA consumes 4W
- 11 RME modules consumes 77W
- **2 RMH modules consumes 14W**

As can now be seen, the total power requirement exceeds 91W. In this case, another power supply would be required. To incorporate another supply in this system simply disconnect pins 99 and 98 on the remote DIN rail and connect another appropriately sized power supply for the remote modules to those same pins.

When using a split rail configuration ensure that the interconnections for the Inter-module Bus and Standard Bus do not exceed 200 feet. Standard Bus and the Inter-module Buses are different protocols and both are required for split rail configurations. Without having both connected communications between modules would not be possible.



Note:

Unit is not provided with a disconnect, use of an external disconnect is required. It should be located in close proximity to the unit and be labeled as the disconnect for the unit.

Conventions Used in the Menu Pages

To better understand the menu pages that follow review the naming conventions used. When encountered throughout this document, the word "default" implies as shipped from the factory. Each page (Operations, Setup and Factory) and their associated menus have identical headers defined below:

Header Name	Definition
Display	Visually displayed information from the control.
Parameter Name	Describes the function of the given parameter.
Range	Defines options available for this prompt, i.e., min/max values (numerical), yes/no, etc... (further explanation below).
Default	Values as delivered from the factory.
Modbus Relative Address	Identifies unique parameters using either the Modbus RTU or Modbus TCP protocols (further explanation below).
CIP (Common Industrial Protocol)	Identifies unique parameters using either the DeviceNet or EtherNet/IP protocol (further explanation below).
Profibus Index	Identifies unique parameters using Profibus DP protocol (further explanation below).
Parameter ID	Identifies unique parameters used with other software such as, LabVIEW.
Data Type R/W	uint = Unsigned 16 bit integer dint = long, 32-bit string = ASCII (8 bits per character) float = IEEE 754 32-bit RWES = **R**eadable **W**ritable **EE**PROM (saved) User **S**et (saved)

Remote User interface (RUI) Display

Visual information from the control is displayed to the observer using a fairly standard 7 segment display. Due to the use of this technology, several characters displayed need some interpretation, see the list below:

1 = 1	0 = 0	i = i	r = r
2 = 2	A = A	J = J	S = S
3 = 3	b = b	K = K	t = t
4 = 4	c, C = c	L = L	u = u
5 = 5	d = d	M = M	v = v
6 = 6	E = E	n = n	W = W
7 = 7	F = F	o = o	y = y
8 = 8	g = g	P = P	Z = Z
9 = 9	h = h	q = q	

Note:
The RUI is optional equipment.

Range

Within this column notice that on occasion there will be numbers found within parenthesis. This number represents the enumerated value for that particular selection. Range selections can be made simply by writing the enumerated value of choice using any of the available communications protocols. As an example, turn to the Setup Page and look at the Analog Input Ai menu and then the Sensor Type SEn prompt. To turn the sensor off simply write the value of 62 (off) to Modbus register 388 and send that value to the control.

Communication Protocols and Software Tools

All RM modules come with Watlow's Standard Bus protocol. This protocol is used primarily for inter-module communications but is also used with SpecView by Watlow, LabVIEW and EZ-ZONE Configurator software (free download from Watlow's web site (http://www.watlow.com). Along with Standard Bus, the RMH module can also be ordered with Modbus RTU (only one protocol can be active at any given time). The RMA (Access) module has options for several different protocols listed below:

- Modbus RTU 232/485
- EtherNet/IP, Modbus TCP
- DeviceNet
- Profibus DP

Modbus RTU Protocol

All Modbus registers are 16-bits and as displayed in this manual are relative addresses (actual). Some legacy software packages limit available Modbus registers to 40001 to 49999 (5 digits). Many applications today require access to all available Modbus registers which range from 400001 to 465535 (6 digits). Watlow EZ-ZONE controllers support 6 digit Modbus registers. For parameters listed as float notice that only one (low order) of the two registers is listed, this is true throughout this document. By default the low order word contains the two low bytes of the 32-bit parameter. As an example, look in the Operations Page for the Process Value. Find the column identified in

the header as Modbus and notice that it lists register 380. Because this parameter is a float it is actually represented by registers 381 (low order bytes) and 381 (high order bytes). Because the Modbus specification does not dictate which register should be high or low order Watlow provides the user the ability to swap this order (Setup Page, [CoM] Menu) from the default low/high [Loh ,] to high/low [h ,Lo].

It should also be noted that some of the cells in the Modbus column contain wording pertaining to an offset. Several parameters in the control contain more than one instance; such as, alarms (24), analog inputs (16), etc... The Modbus register shown always represents instance one. Take for an example the Alarm Silencing parameter found in the Setup Page under the Alarm menu. Instance one is shown as address 2670 and +60 is identified as the offset to the next instance. If there was a desire to read or write to the same member instance 3, simply add 120 to 2670 to find its address; in this case, the instance 3 address for Alarm Silencing is 2790.

To learn more about the Modbus protocol point your browser to http://www.modbus.org.

Note:

There are two columns shown in the menus that follow for communications protocols identified as CIP (Common Industrial Protocol) and Profibus. These columns will be useful if this control is used in conjunction with the RMA module or the EZ-ZONE Remote User Interface/Gateway (RUI/GTW) where those protocols can be selected as optional hardware. For this module (RMH), as a secondary protocol beyond Standard Bus, Modbus RTU can be ordered as optional hardware.

To learn more about the RUI/GTW point your browser to the link below and search for keyword EZ-ZONE.
http://www.watlow.com/literature/pti_search.cfm

3 Chapter 3: Operations Pages

Navigating the Operations Page

To navigate to the Operations Page using the RUI, follow the steps below:

1. From the Home Page, press both the Up and Down keys for three seconds. A1 will appear in the upper display and oPEr will appear in the lower display.
2. Press the Up or Down key to view available menus.
3. Press the Advance Key to enter the menu of choice.
4. If a submenu exists (more than one instance), press the Up or Down key to select and then press the Advance Key to enter.
5. Press the Up or Down key to move through available menu prompts.
6. Press the Infinity Key to move backwards through the levels: parameter to submenu; submenu to menu; menu to Home Page.
7. Press and hold the Infinity Key for two seconds to return to the Home Page.

On the following pages, top level menus are identified with a yellow background color.

Note:
Some of these menus and parameters may not appear, depending on the controller's options. See model number information in the Appendix for more information. If there is only one instance of a menu, no submenus will appear.

Note:
Some of the listed parameters may not be visible. Parameter visibility is dependent upon controller part number.

A1
oPEr **Analog Input Menu**
1
A1 **Analog Input (1 to 16)**
A1n **Process Value**
1Er **Error Status**
1CA **Calibration Offset**

Pu
oPEr **Process Value Menu**
1
Pu **Process Value (1 to 16)**
Su.A **Source Value A**
Su.b **Source Value B**
Su.C **Source Value C**
Su.d **Source Value D**
Su.E **Source Value E**
oFSt **Offset**
o.u **Output Value**

d1o
oPEr **Digital Input/Output Menu**
1
d1o **Digital I/O (1 to 12)**
do.S **Output State**
d1.S **Input State**

ACt
oPEr **Action Menu**
1
ACt **Action (1 to 24)**
E1.S **Event Input**

mon
oPEr **Monitor Menu**
1
mon **(1 to 16)**
CMdA **Control Mode Active**
h.Pr **Heat Power**
C.Pr **Cool Power**
C.SP **Closed Loop Working Set Point**
Pu.A **Process Value Active**

LooP
oPEr **Control Loop Menu**
1
LooP **Loop (1 to 16)**
r.En **Remote Enable**
C.Md **Control Mode**
A.tSP **Autotune Set Point**
AUt **Autotune Request**
C.SP **Closed Loop Set Point**
1d.S **Idle Set Point**
h.Pb **Heat Proportional Band**
h.hy **Heat Hysteresis**
C.Pb **Cool Proportional Band**
C.hy **Cool Hysteresis**
t1 **Time Integral**
td **Time Derivative**
db **Dead Band**
o.SP **Open Loop Set Point**

ALM
oPEr **Alarm Menu**
1
ALM **Alarm (1 to 24)**
A.Lo **Low Set Point**
A.h1 **High Set Point**
A.CLr **Clear Request**
A.S1r **Silence Request**
A.St **State**

Lnr
oPEr **Linearization Menu**
1
Lnr **Linearization (1 to 24)**
Su.A **Source Value A**
oFSt **Offset**
o.u **Output Value**

CPE
oPEr **Compare Menu**
1
CPE **Compare (1 to 24)**
Su.A **Source Value A**
Su.b **Source Value B**
o.u **Output Value**

tMr
oPEr **Timer Menu**
1
tMr **Timer (1 to 24)**
Su.A **Source Value A**
Su.b **Source Value B**
E.t **Elapsed Time**
o.u **Output Value**

Ctr
oPEr **Counter Menu**
1
Ctr **Counter (1 to 24)**
Cnt **Count**
Su.A **Source Value A**
Su.b **Source Value B**
o.u **Output Value**

LGC
oPEr **Logic Menu**
1
LGC **Logic (1 to 24)**
Su.A **Source Value A**
Su.b **Source Value B**
Su.C **Source Value C**
Su.d **Source Value D**
Su.E **Source Value E**
Su.F **Source Value F**
Su.9 **Source Value G**
Su.h **Source Value H**
ou **Output Value**

rMAt
oPEr **Math Menu**
1
rMAt **Math (1 to 24)**
Su.A **Source Value A**
Su.b **Source Value B**
Su.C **Source Value C**
Su.d **Source Value D**
Su.E **Source Value E**
oFSt **Offset**
ou **Output Value**

RM High Density Module • Operations Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
A i oPEr **Analog Input Menu**								
A in [Ain]	*Analog Input (1 to 16)* **Value** View the process value. **Note:** Ensure that the Error Status (below) indicates no error (61) when reading this value using a field bus protocol. If an error exists, the last known value prior to the error occurring will be returned.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	- - - -	380 [offset 90]	0x68 (104) 1 to 16 1	0	4001	float R
Pu.F [Pu.F]	*Analog Input (1 to 16)* **Filtered Analog Input Value** View the process value when filtering is turned on.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	- - - -	422 [offset 90]	0x68 (104) 1 to 16 0x16 (22)	- - - -	4022	float R
i.Er [i.Er]	*Analog Input (1 to 16)* **Error Status** View the cause of the most recent error.	nonE None (61) OPEn Open (65) Shrt Shorted (127) E.rn Measurement Error (140) E.CAL Bad Calibration Data (139) Er.Ab Ambient Error (9) E.rtd RTD Error (141) FAIL Fail (32) nSrc Not Sourced (246)	None	382 [offset 90]	0x68 (104) 1 to 16 2	1	4002	uint R
i.CA [i.CA]	*Analog Input (1 to 16)* **Calibration Offset** Offset the input reading to compensate for lead wire resistance or other factors that cause the input reading to vary from the actual process value.	-1,999.000 to 9,999.000°F or units -1,110.000 to 5,555.000°C	0.0	402 [offset 90]	0x68 (104) 1 to 16 0xC (12)	2	4012	float RWES
No Display	*Analog Input (1 to 16)* **Clear Latched Input Error** Clear latched input when input error condition no longer exists.	Clear Latch (1221)	- - - -	436 [offset 90]	0x68 (104) 1 to 16 0x1D (29)	- - - -	4029	uint RW
Pu oPEr **Process Value Menu**								
Su.A [Sv.A]	*Process Value (1 to 16)* **Source Value A** View the value of Source A.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	- - - -	8250 [offset 70]	0x7E (126) 1 to 16 0x10 (16)	- - - -	26016	float R
Su.b [Sv.b]	*Process Value (1 to 16)* **Source Value B** View the value of Source B.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	- - - -	8252 [offset 70]	0x7E (126) 1 to 16 0x11 (17)	- - - -	26017	float R
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **If there is only one instance of a menu, no submenus will appear.**								**R: Read W: Write E: EEPROM S: User Set**

RM High Density Module • Operations Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
SuC [Sv.c]	*Process Value (1 to 16)* **Source Value C** View the value of Source C.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	- - - -	8254 [offset 70]	0x7E (126) 1 to 16 0x12 (18)	- - - -	26018	float R
SuD [Sv.d]	*Process Value (1 to 16)* **Source Value D** View the value of Source D.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	- - - -	8256 [offset 70]	0x7E (126) 1 to 16 0x13 (19)	- - - -	26019	float R
SuE [Sv.E]	*Process Value (1 to 16)* **Source Value E** View the value of Source E.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	- - - -	8258 [offset 70]	0x7E (126) 1 to 16 0x14 (20)	- - - -	26020	float R
oFSt [oFSt]	*Process Value (1 to 16)* **Offset** Set an offset to be applied to this function's output.	-1,999.000 to 9,999.000°F or units -1,110.000 to 5,555.000°C	0	8264 [offset 70]	0x7E (126) 1 to 16 0x17 (23)	- - - -	26023	float RWES
o.u [o.v]	*Process Value (1 to 16)* **Output Value** View the value of this function block's output.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	0.0	8262 [offset 70]	0x7E (126) 1 to 16 0x16 (22)	- - - -	26022	float R
d.io oPEr **Digital Input/Output Menu**								
do.S [do.S]	*Digital Output (1 to 12)* **Output State** View the state of this output.	oFF Off (62) on On (63)		1832 [offset 30]	0x6A (106) 1 to 12 7	90	6007	uint R
di.S [di.S]	*Digital Input (1 to 12)* **Input State** View this event input state.	oFF Off (62) on On (63)		1840 [offset 30]	0x6A (106) 1 to 12 0xB (11)	- - - -	6011	uint R
No Display	*Digital Output (1 to 12)* **Output State** View the state of this output.	Off (62) On (63)	- - - -	1832 [offset 30]	0x6A (106) 1 to 12 7	- - - -	6007	uint R
ACt oPEr **Action Menu**								
Ei.S [Ei.S]	*Action (1 to 24)* **Event Input Status** View this input state.	oFF Off (62) on On (63)		2188 [offset 20]	0x6E (110) 1 to 24 5	140	10005	uint R
No Display	*Function Key (1)* **Function Key State** View current state of function key 1.	Off (62) On (63)	- - - -	- - - -	- - - -	- - - -	3024	uint R
No Display	*Function Key (2)* **Function Key State** View current state of function key 2.	Off (62) On (63)	- - - -	- - - -	- - - -	- - - -	3030	uint R
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **If there is only one instance of a menu, no submenus will appear.**								**R: Read W: Write E: EEPROM S: User Set**

RM High Density Module • Operations Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
mon oPEr **Monitor Menu**								
CMA [C.MA]	*Monitor (1 to 16)* **Control Mode Active** View the control mode currently in effect.	oFF Off (62) Auto Auto (10) Man Manual (54)	Off	4100 [offset 70]	0x97 (151) 1 to 16 2	- - - -	8002	uint R
h.Pr [h.Pr]	*Monitor (1 to 16)* **Heat Power** View the heat output level currently in effect.	0.0 to 100.0%	0.0	4124 [offset 70]	0x97 (151) 1 to 16 0xD (13)	- - - -	8011	float R
C.Pr [C.Pr]	*Monitor (1 to 16)* **Cool Power** View the cool output level currently in effect.	-100.0 to 0.0%	0.0	4126 [offset 70]	0x97 (151) 1 to 0x10 (16) 0xE (14)	- - - -	8014	float R
C.SP [C.SP]	*Monitor (1 to 16)* **Closed Loop Working Set Point** View the set point currently in effect.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	75°F	5232 [offset 80]	0x6B (107) 1 to 16 7	- - - -	8029	float R
Pv.A [Pv.A]	*Monitor (1 to 16)* **Process Value Active** View the filtered process value using the control input.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	- - - -	422 [offset 90]	0x68 (104) 1 to 16 0x16 (22)	- - - -	8031	float R
LooP oPEr **Control Loop Menu**								
r.En [r.En]	*Control Loop (1 to 16)* **Remote Enable** Enable this loop to switch control to the remote set point.	no No (59) YES Yes (106)	No	5260 [offset 80]	0x6B (107) 1 to 16 0x15 (21)	38	7021	uint RWES
C.M [C.M]	*Control Loop (1 to 16)* **Control Mode** Select the method that this loop will use to control.	oFF Off (62) Auto Auto (10) Man Manual (54)	Auto	4100 [offset 70]	0x97 (151) 1 to 16 1	53	8001	uint RWES
A.tSP [A.tSP}	*Control Loop (1 to 16)* **Autotune Set Point** Set the set point that the autotune will use, as a percentage of the current set point.	50 to 200%	90	4138 [offset 70]	0x97 (151) 1 to 16 0x14 (20)	- - - -	8025	float RWES
AUt [AUt]	*Control Loop (1 to 16)* **Autotune Request** Start an autotune. While the autotune is active, the Home Page of RUI will display the tuning status. When the autotune is complete, the message will clear automatically.	no No (59) YES Yes (106)	No	4140 [offset 70]	0x97 (151) 1 to 16 0x15 (21)	54	8026	uint RW
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **If there is only one instance of a menu, no submenus will appear.**								**R: Read W: Write E: EEPROM S: User Set**

RM High Density Module • Operations Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
C.SP [C.SP]	*Control Loop (1 to 16)* **Closed Loop Set Point** Set the set point that the controller will automatically control to.	Low Set Point to High Set Point (Setup Page)	75.0°F or units 24.0°C	5220 [offset 80]	0x6B (107) 1 to 16 1	39	7001	float RWES
id.S [id.S]	*Control Loop (1 to 16)* **Idle Set Point** Set a closed loop set point that can be triggered by an event state.	Low Set Point to High Set Point (Setup Page)	75.0°F or units 24.0°C	5236 [offset 80]	0x6B (107) 1 to 16 9	40	7009	float RWES
h.Pb [h.Pb]	*Control Loop (1 to 16)* **Heat Proportional Band** Set the PID proportional band for the heat outputs.	0.001 to 9,999.000°F or units 0.001 to 5,555.000°C	25.0°F or units 14.0°C	4110 [offset 70]	0x97 (151) 1 to 16 6	55	8009	float RWES
h.hy [h.hy]	*Control Loop (1 to 16)* **Heat Hysteresis** Set the control switching hysteresis for on-off control. This determines how far into the "on" region the process value needs to move before the output turns on.	0.001 to 9,999.000°F or units 0.001 to 5,555.000°C	3.0°F or units 2.0°C	4120 [offset 70]	0x97 (151) 1 to 16 0xB (11)	56	8010	float RWES
C.Pb [C.Pb]	*Control Loop (1 to 16)* **Cool Proportional Band** Set the PID proportional band for the cool outputs.	0.001 to 9,999.000°F or units 0.001 to 5,555.000°C	25.0°F or units 14.0°C	4112 [offset 70]	0x97 (151) 1 to 16 7	57	8012	float RWES
C.hy [C.hy]	*Control Loop (1 to 16)* **Cool Hysteresis** Set the control switching hysteresis for on-off control. This determines how far into the "on" region the process value needs to move before the output turns on.	0.001 to 9,999.000°F or units 0.001 to 5,555.000°C	3.0°F or units 2.0°C	4122 [offset 70]	0x97 (151) 1 to 16 0xC (12)	58	8013	float RWES
t i [ti]	*Control Loop (1 to 16)* **Time Integral** Set the PID integral for the outputs.	0 to 9,999 seconds per repeat	180 seconds per repeat	4114 [offset 70]	0x97 (151) 1 to 16 8	59	8006	float RWES
t d [td]	*Control Loop (1 to 16)* **Time Derivative** Set the PID derivative time for the outputs.	0 to 9,999 seconds	0 seconds	4116 [offset 70]	0x97 (151) 1 to 16 9	60	8007	float RWES
db [db]	*Control Loop (1 to 16)* **Dead Band** Set the offset to the proportional band. With a negative value, both heating and cooling outputs are active when the process value is near the set point. A positive value keeps heating and cooling outputs from fighting each other.	-1,000.0 to 1,000.0°F or units -555.556 to 555.556°C	0.0	4118 [offset 70]	0x97 (151) 1 to 16 0xA (10)	61	8008	float RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **If there is only one instance of a menu, no submenus will appear.**								**R: Read W: Write E: EEPROM S: User Set**

RM High Density Module • Operations Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
o.SP [o.SP]	*Control Loop (1 to 16)* **Open Loop Set Point** Set a fixed level of output power when in manual (open-loop) mode.	-100.0 to 100.0%	0.0	5222 [offset 80]	0x6B (107) 1 to16 2	41	7002	float RWES
ALRM oPEr **Alarm Menu**								
A.Lo [A.Lo]	*Alarm (1 to 24)* **Low Set Point** If Alarm Type (Setup Page, Alarm Menu) is set to: **process** - set the process value that will trigger a low alarm. **deviation** - set the span of units from the closed loop set point that will trigger a low alarm. A negative set point represents a value below closed loop set point. A positive set point represents a value above closed loop set point.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	32.0 °F or units 0.0°C	2662 [offset 60]	0x6D (109) 1 to 24 2	18	9002	float RWES
A.hi [A.hi]	*Alarm (1 to 24)* **High Set Point** If Alarm Type (Setup Page, Alarm Menu) is set to: **process** - set the process value that will trigger a high alarm. **deviation** - set the span of units from the closed loop set point that will trigger a high alarm.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	300.0°F or units 150.0°C	2660 [offset 60]	0x6D (109) 1 to 24 1	19	9001	float RWES
A.CLr [A.hi]	*Alarm (1 to 24)* **Clear Request** User interface (RUI) access to clear an alarm	Clear Ignore	Ignore	- - - -	- - - -	- - - -	- - - -	- - - -
A.Sir [A.Sir]	*Alarm (1 to 24)* **Silence Request** User interface (RUI) access to silence an alarm	Ignore Silence	Ignore	- - - -	- - - -	- - - -	- - - -	- - - -
A.St [A.St]	*Alarm (1 to 24)* **State** View state of alarm	Startup (88) None (61) Blocked (12) Alarm low (8) Alarm high (7) Error (28)	Startup	2676 [offset 60]	0x6D (109) 1 to 24 9	- - - -	9009	uint R
No Display	*Alarm (1 to 24)* **Latched** Read this register to determine if the alarm is latched	No (59) Yes (106)	No	2678 [offset 60]	0x6D (109) 1 to 24 0x0A (10)	- - - -	9010	uint R
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **If there is only one instance of a menu, no submenus will appear.**								**R: Read W: Write E: EEPROM S: User Set**

RM High Density Module • Operations Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
No Display	*Alarm (1 to 24)* **Silenced** Read this register to determine if the alarm is silenced	No (59) Yes (106)	None	2680 [offset 60]	0x6D (109) 1 to 24 0x0B (11)	- - - -	9011	uint R
No Display	*Alarm (1 to 24)* **Clearable** Read to determine if an alarm can be cleared	No (59) Yes (106)	None	2682 [offset 60]	0x6D (109) 1 to 24 0xC (12)	- - - -	9012	uint R
No Display	*Alarm (1 to 24)* **Clear Request** Write to this register to clear an alarm	Clear (0) No Change (255)	None	2684 [offset 60]	0x6D (109) 1 to 24 0xD (13)	32	9013	uint RW
No Display	*Alarm (1 to 24)* **Silence Request** Write to this register to silence an alarm	Clear (0) No Change (255)	None	2686 [offset 60]	0x6D (109) 1 to 24 0x0E (14)	33	9014	uint RW
No Display	*Alarm (1 to 24)* **Working Process Value** Read process value used by alarms	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	None	2696 [offset 60]	0x6D (109) 1 to 24 0x13 (19)	- - - -	9019	float R
No Display	*Alarm (1 to 24)* **Output Value** Read state of alarm output	On (63) Off (62)	None	2706 [offset 60]	0x6D (109) 1 to 24 0x18 (24)	- - - -	9024	uint R
Lnr oPEr **Linearization Menu**								
Su.A [Su.A]	*Linearization (1 to 24)* **Source Value A** View the value of Source A.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C		14386 [offset 70]	0x86 (134) 1 to 24 4	- - - -	34004	float R
oFSt [oFSt]	*Linearization (1 to 24)* **Offset** Set an offset to be applied to this function's output.	-1,999.000 to 9,999.000°F or units -1,110.000 to 5,555.000°C	0	14390 [offset 70]	0x86 (134) 1 to 24 6	- - - -	34006	float RWES
o.u [o.v]	*Linearization (1 to 24)* **Output Value** View the value of this function's output.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C		14392 [offset 70]	0x86 (134) 1 to 24 7	- - - -	34007	float R
No Display	*Linearization (1 to 24)* **Error** Read reported cause for linearization error	None (61) Open (65) Shorted (127) Measurement Error (140) Bad Cal Data (139) Ambient Error (9) RTD Error (141) Fail (32) Math Error (1423) Not Sourced (246) Stale (1617)		14434 [offset 70]	0x86 (134) 1 to 24 0x1C (28)	- - - -	34028	uint R
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **If there is only one instance of a menu, no submenus will appear.**								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Operations Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
CPE oPEr **Compare Menu**								
Su.A [Su.A]	*Compare (1 to 24)* **Source Value A** View the value of Source A.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C		11272 [offset 40]	0x80 (128) 1 to 24 7	- - - -	28007	float R
Su.b [Su.b]	*Compare (1 to 24)* **Source Value B** View the value of Source B.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C		11274 [offset 40]	0x80 (128) 1 to 24 8	- - - -	28008	float R
o.u [o.v]	*Compare (1 to 24)* **Output Value** View the value of this function's output.	oFF Off (62) on On (63)		11278 [offset 40]	0x80 (128) 1 to 24 0xA (10)	- - - -	28010	uint R
No Display	*Compare (1 to 24)* **Error** Read reported cause for compare error	None (61) Open (65) Shorted (127) Measurement Error (140) Bad Cal Data (139) Ambient Error (9) RTD Error (141) Fail (32) Math Error (1423) Not Sourced (246) Stale (1617)		11284 [offset 40]	0x80 (128) 1 to 24 0x0D (13)	- - - -	28013	uint R
tMr oPEr **Timer Menu**								
Su.A [Su.A]	*Timer (1 to 24)* **Value Source A** View the value of Source A.	oFF Off (62) on On (63)	- - - -	13192 [offset 50]	0x83 (131) 1 to 24 7	- - - -	31007	uint R
Su.b [Su.b]	*Timer (1 to 24)* **Value Source B** View the value of Source B.	oFF Off (62) on On (63)	- - - -	13194 [offset 50]	0x83 (131) 1 to 24 8	- - - -	31008	uint R
E.t [E.t]	*Timer (1 to 24)* **Elapsed Time** View the value of this function's elapsed time.	0 to 30,000.0 seconds	0	13210 [offset 50]	0x83 (131) 1 to 24 0x10 (16)	- - - -	31016	float R
o.u [o.v]	*Timer (1 to 24)* **Output Value** View the value of this function's output.	oFF Off (62) on On (63)	- - - -	13198 [offset 50]	0x83 (131) 1 to 24 0x11 (17)	- - - -	31010	uint R
No Display	*Timer (1 to 24)* **Running** Read to determine if timer is running	Off (62) On (63)	- - - -	13208 [offset 50]	0x83 (131) 1 to 24 0x0F (15)	- - - -	31015	uint R
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **If there is only one instance of a menu, no submenus will appear.**								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Operations Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
No Display	*Timer (1 to 24)* **Error** Read reported cause for timer error	None (61) Open (65) Shorted (127) Measurement Error (140) Bad Cal Data (139) Ambient Error (9) RTD Error (141) Fail (32) Math Error (1423) Not Sourced (246) Stale (1617)		13214 [offset 50]	0x83 (131) 1 to 24 0x12 (18)	- - - -	31018	uint R
CtrOPEr **Counter Menu**								
Cnt [Cnt]	*Counter (1 to 24)* **Count** View the function's total count.	0 to 9,999		12248 [offset 40]	0x82 (130) 1 to 24 0xF (15)	217	30015	uint R
Su.A [Su.A]	*Counter (1 to 24)* **Source Value A** View the value of Source A.	oFF Off (62) on On (63)		12232 [offset 40]	0x82 (130) 1 to 24 7	- - - -	30007	uint R
Su.b [Su.b]	*Counter (1 to 24)* **Source Value B** View the value of Source B.	oFF Off (62) on On (63)		12234 [offset 40]	0x82 (130) 1 to 24 8	- - - -	30008	uint R
o.u [o.v]	*Counter (1 to 24)* **Output Value** View the value of this function's output.	oFF Off (62) on On (63)		12238 [offset 40]	0x82 (130) 1 to 24 0xA (10)	- - - -	30010	uint R
No Display	*Counter (1 to 24)* **Error** Read reported cause for counter error	None (61) Open (65) Shorted (127) Measurement Error (140) Bad Cal Data (139) Ambient Error (9) RTD Error (141) Fail (32) Math Error (1423) Not Sourced (246) Stale (1617)		12250 [offset 40]	0x82 (130) 1 to 24 0x10 (16)	- - - -	30016	uint R
LGCOPEr **Logic Menu**								
Su.A [Su.A]	*Logic (1 to 24)* **Source Value A** View the value of Source A.	oFF Off (62) on On (63)		9388 [offset 80]	0x7F (127) 1 to 24 0x19 (25)	- - - -	27025	uint R
Su.b [Su.b]	*Logic (1 to 24)* **Source Value B** View the value of Source B.	oFF Off (62) on On (63)		9390 [offset 80]	0x7F (127) 1 to 24 0x1A (26)	- - - -	27026	uint R
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **If there is only one instance of a menu, no submenus will appear.**								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Operations Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
Su.C [Su.C]	*Logic (1 to 24)* **Source Value C** View the value of Source C.	oFF Off (62) on On (63)		9392 [offset 80]	0x7F (127) 1 to 24 0x1B (27)	- - - -	27027	uint R
Su.d [Su.d]	*Logic (1 to 24)* **Source Value D** View the value of Source D.	oFF Off (62) on On (63)		9394 [offset 80]	0x7F (127) 1 to 24 0x1C (28)	- - - -	27028	uint R
Su.E [Su.E]	*Logic (1 to 24)* **Source Value E** View the value of Source E.	oFF Off (62) on On (63)		9396 [offset 80]	0x7F (127) 1 to 24 0x1D (29)	- - - -	27029	uint R
Su.F [Su.F]	*Logic (1 to 24)* **Source Value F** View the value of Source F.	oFF Off (62) on On (63)		9398 [offset 80]	0x7F (127) 1 to 24 0x1E (30)	- - - -	27030	uint R
Su.g [Su.g]	*Logic (1 to 24)* **Value Source G** View the value of Source G.	oFF Off (62) on On (63)		9400 [offset 80]	0x7F (127) 1 to 24 0x1F (31)	- - - -	27031	uint R
Su.h [Su.h]	*Logic (1 to 24)* **Source Value H** View the value of Source H.	oFF Off (62) on On (63)		9402 [offset 80]	0x7F (127) 1 to 24 0x20 (32)	- - - -	27032	uint R
o.u [o.v]	*Logic (1 to 24)* **Output Value** View the value of this function's output.	oFF Off (62) on On (63)		9406 [offset 80]	0x7F (127) 1 to 24 0x22 (34)	- - - -	27034	uint R
No Display	*Logic (1 to 24)* **Error** Read reported cause for logic error	None (61) Open (65) Shorted (127) Measurement Error (140) Bad Cal Data (139) Ambient Error (9) RTD Error (141) Fail (32) Math Error (1423) Not Sourced (246) Stale (1617)		9410 [offset 80]	0x7F (127) 1 to 24 0x24 (36)	- - - -	27036	uint R
MAtH oPEr **Math Menu**								
Su.A [Su.A]	*Math (1 to 24)* **Source Value A** View the value of Source A.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C		6570 [offset 70]	0x7D (125) 1 to 24 0x10 (16)	- - - -	25016	float RWES
Su.b [Su.b]	*Math (1 to 24)* **Source Value B** View the value of Source B.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C		6572 [offset 70]	0x7D (125) 1 to 24 0x11 (17)	- - - -	25017	float RWES
Su.C [Su.C]	*Math (1 to 24)* **Source Value C** View the value of Source C.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C		6574 [offset 70]	0x7D (125) 1 to 24 0x12 (18)	- - - -	25018	float RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **If there is only one instance of a menu, no submenus will appear.**								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Operations Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
Su.d [Su.d]	*Math (1 to 24)* **Source Value D** View the value of Source D.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C		6576 [offset 70]	0x7D (125) 1 to 24 0x13 (19)	- - - -	25019	float RWES
Su.E [Su.E]	*Math (1 to 24)* **Source Value E** View the value of Source E.	oFF Off (62) on On (63)		6578 [offset 70]	0x7D (125) 1 to 24 0x14 (20)	- - - -	25020	uint RWES
oFSt [oFSt]	*Math (1 to 24)* **Offset** Set an offset to be applied to this function's output.	-1,999.000 to 9,999.000°F or units -1,110.000 to 5,555.000°C	0	6584 [offset 70]	0x7D (125) 1 to 24 0x17 (23)	- - - -	25023	float RWES
o.u [o.v]	*Math (1 to 24)* **Output Value** View the value of this function's output.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C		6582 [offset 70]	0x7D (125) 1 to 24 0x16 (22)	- - - -	25022	float RWES
No Display	*Math (1 to 24)* **Error** Read reported cause for logic error	None (61) Open (65) Shorted (127) Measurement Error (140) Bad Cal Data (139) Ambient Error (9) RTD Error (141) Fail (32) Math Error (1423) Not Sourced (246) Stale (1617)		6596 [offset 70]	0x7D (125) 1 to 24 0x1D (29)	- - - -	25029	uint R
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **If there is only one instance of a menu, no submenus will appear.**								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

4 Chapter 4: Setup Pages

Navigating the Setup Page

To navigate to the Setup Page using the RUI, follow the steps below:

1. From the Home Page, press and hold both the Up and Down keys for six seconds. A1 will appear in the upper display and SEt will appear in the lower display.

Note:
If keys are released when OPEr is displayed, press the Infinity Key or reset key to exit and repeat until SEt is displayed.

2. Press the Up or Down key to view available menus.
3. Press the Advance Key to enter the menu of choice.
4. If a submenu exists (more than one instance), press the Up or Down key to select and then press the Advance Key to enter.
5. Press the Up or Down key to move through available menu prompts.
6. Press the Infinity Key to move backwards through the levels: parameter to submenu; submenu to menu; menu to Home Page.
7. Press and hold the Infinity Key for two seconds to return to the Home Page.

On the following pages, top level menus are identified with a yellow background color.

Note:
Some of these menus and parameters may not appear, depending on the controller's options. See model number information in the Appendix for more information. If there is only one instance of a menu, no submenus will appear.

Note:
Some of the listed parameters may not be visible. Parameter visibility is dependent upon controller part number.

A1
SEt **Analog Input Menu**
1
A1 **Analog Input (1 to 16)**
SEn **Sensor Type**
L in **Linearization**
Unit **Units**
SLo **Scale Low**
Sh1 **Scale High**
rLo **Range Low**
rh1 **Range High**
PEE **Process Error Enable**
PEL **Process Error Low**
tC **Thermistor Curve**
rr **Resistance Range**
FiL **Filter**
iEr **Error Latching**
dEC **Display Precision**
iCA **Calibration Offset**
A in **Process Value**
iEr **Error Status**

Pu*
SEt **Process Value Menu**
1
Pu **Process Value (1 to 16)**
Fn **Function**
SFnA **Source Function A**
S1A **Source Instance A**
SFnb **Source Function B**
S1b **Source Instance B**
S2b **Source Zone B**
SFnC **Source Function C**
S1C **Source Instance C**
S2C **Source Zone C**
SFnd **Source Function D**
S1d **Source Instance D**
S2d **Source Zone D**
SFnE **Source Function E**
S1E **Source Instance E**
S2E **Source Zone E**
CP **Cross Over Point**
Cb **Cross Over Band**
Punt **Pressure Units**
Aunt **Altitude Units**
bPr **Barometric Pressure**
FiL **Filter**

dio
SEt **Digital Input/Output Menu**
1
dio **Digital I/O (1 to 12)**
dir **Direction**
Fn **Function**
F1 **Function Instance**
S2A **Source Zone A**
oCt **Control**
otb **Time Base**
oLo **Low Power Scale**
oh1 **High Power Scale**

ACt
SEt **Action Menu**
1
ACt **Action (1 to 24)**
Fn **Function**
F1 **Function Instance**
SFnA **Source Function A**
S1A **Source Instance A**
S2A **Source Zone A**
LEu **Active Level**

LooP
SEt **Control Loop Menu**
1
LooP **Control Loop (1 to 16)**
SFnA **Loop Source**
S1A **Source Instance**
hAG **Heat Algorithm**
CAG **Cool Algorithm**
CCr **Cool Output Curve**
hPb **Heat Proportional Band**
hhy **Heat Hysteresis**
CPb **Cool Proportional Band**
Chy **Cool Hysteresis**
t1 **Time Integral**
td **Time Derivative**
db **Dead Band**
tEUn **Tru-Tune+ Enable**
tEbnd **Tru-Tune+ Band**
tEGn **Tru-Tune+ Gain**
AtSP **Autotune Set Point**
tAGr **Autotune Aggressiveness**
Pdl **Peltier Delay**
rEn **Remote Set Point Enable**
SPS **Remote Set Point Source**
SP1 **Source Instance**
S2b **Source Zone**
rty **Remote Set Point Type**
UFA **User Failure Action**
FAiL **Input Error Failure**
mAn **Manual Power**

- L.dE Open Loop Detect Enable
- L.dt Open Loop Detect Time
- L.dd Open Loop Detect Deviation
- rP Ramp Action
- r.SC Ramp Scale
- r.rt Ramp Rate
- L.SP Set Point Closed Limit Low
- h.SP Set Point Closed Limit High
- C.SP Closed Loop Set Point
- id.S Idle Set Point
- SP.Lo Set Point Open Limit Low
- SP.h i Set Point Open Limit High
- o.SP Open Loop Set Point
- C.Pn User Control Mode

oUtPut
- SEt Output Menu
  - 1
  - oUtPut Output (1 to 12)
    - Fn Function
    - F i Function Instance
    - S2.A Source Zone A
    - o.Ct Control
    - o.tb Time Base
    - o.Lo Low Power Scale
    - o.h i High Power Scale

ALrM
- SEt Alarm Menu
  - 1
  - ALrM Alarm (1 to 24)
    - AtY Type
    - SFn.A Source
    - i.S.A Source Instance
    - S2.A Source Zone
    - LooP Control Loop
    - A.hY Hysteresis
    - A.L 9 Logic
    - A.Sd Sides
    - A.Lo Low Set Point
    - A.h i High Set Point
    - A.LA Latching
    - A.bL Blocking
    - A.S i Silencing
    - A.dSP Display
    - A.dL Delay Time
    - A.CLr Clear Request
    - A.S ir Silence Request
    - A.St State

Lnr
- SEt Linearization Menu
  - 1
  - Lnr Linearization (1 to 24)
    - Fn Function
    - SFn.A Source Function A
    - S i.A Source Instance A
    - S2.A Source Zone A
    - Un it Units
    - iP.1 Input Point 1
    - oP.1 Output Point 1
    - iP.2 Input Point 2
    - oP.2 Output Point 2
    - iP.3 Input Point 3
    - oP.3 Output Point 3
    - iP.4 Input Point 4
    - oP.4 Output Point 4
    - iP.5 Input Point 5
    - oP.5 Output Point 5
    - iP.6 Input Point 6
    - oP.6 Output Point 6
    - iP.7 Input Point 7
    - oP.7 Output Point 7
    - iP.8 Input Point 8
    - oP.8 Output Point 8
    - iP.9 Input Point 9
    - oP.1 Output Point 9
    - iP.10 Input Point 10
    - oP.10 Output Point 10

CPE
- SEt Compare Menu
  - 1
  - CPE Compare (1 to 24)
    - Fn Function
    - tol Tolerance
    - SFn.A Source Function A
    - S i.A Source Instance A
    - S2.A Source Zone A
    - SFn.b Source Function B
    - S i.b Source Instance B
    - S2.b Source Zone B
    - Er.h Error Handling

tMr
- SEt Timer Menu
  - 1
  - tMr Timer (1 to 24)
    - Fn Function
    - SFn.A Source Function A
    - S i.A Source Instance A
    - S2.A Source Zone A
    - SAS.A Source Active State A
    - SFn.b Source Function B
    - S i.b Source Instance B
    - S2.b Source Zone B
    - SAS.b Source Active State B
    - t i Time
    - LEu Active Level

Ctr
- SEt Counter Menu
  - 1
  - Ctr Counter (1 to 24)
    - Fn Function
    - SFn.A Source Function A
    - S i.A Source Instance A
    - S2.A Source Zone A
    - SAS.A Source Active State A
    - SFn.b Source Function B
    - S i.b Source Instance B
    - S2.b Source Zone B
    - SAS.b Source Active State B
    - LoAd Load Value
    - tr9t Target Value
    - LAt Latching

L9C
- SEt Logic Menu
  - 1
  - L9C Logic (1 to 24)
    - Fn Function
    - SFn.A Source Function A
    - S i.A Source Instance A
    - S2.A Source Zone A
    - SFn.b Source Function B
    - S i.b Source Instance B
    - S2.b Source Zone B
    - SFn.C Source Function C
    - S i.C Source Instance C
    - S2.C Source Zone C
    - SFn.d Source Function D
    - S i.d Source Instance D
    - S2.d Source Zone D
    - SFn.E Source Function E
    - S i.E Source Instance E
    - S2.E Source Zone E
    - SFn.F Source Function F
    - S i.F Source Instance F
    - S2.F Source Zone F
    - SFn.9 Source Function G
    - S i.9 Source Instance G
    - S2.9 Source Zone G
    - SFn.H Source Function H
    - S i.H Source Instance H
    - S2.H Source Zone H
    - Er.h Error Handling

MAtH
- SEt Math Menu
  - 1
  - MAtH Math (1 to 24)
    - Fn Function
    - SFn.A Source Function A
    - S i.A Source Instance A
    - S2.A Source Zone A
    - SFn.b Source Function B
    - S i.b Source Instance B
    - S2.b Source Zone B
    - SFn.C Source Function C
    - S i.C Source Instance C
    - S2.C Source Zone C
    - SFn.d Source Function D
    - S i.d Source Instance D
    - S2.d Source Zone D
    - SFn.E Source Function E
    - S i.E Source Instance E
    - S2.E Source Zone E
    - SLo Input Scale Low
    - Sh i Input Scale High
    - Un it Units
    - r.Lo Output Range Low
    - r.h i Output Range High
    - P.unt Pressure Units
    - A.unt Altitude Units
    - F iL Filter

uAr
- SEt Variable Menu
  - 1
  - uAr Variable (1 to 24)
    - tYPE Type
    - Un it Units
    - d i9 Digital
    - AnL9 Analog

9LbL
- SEt Global Menu
  - C_F Display Units
  - ACLF AC Line Frequency
  - dPrS Display Pairs
  - USr.S User Save
  - USr.r User Restore

COMM
- SEt Communications Menu
  - bAUd Baud Rate
  - PAr Parity
  - MM.hL Modbus Word Order
  - C_F Display Units
  - nv.S Non-volatile Save

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
A1 SEt **Analog Input Menu**								
SEn [SEn]	*Analog Input (1 to 16)* **Sensor Type** Set the analog sensor type to match the device wired to this input. **Note:** There is no open-sensor detection for process inputs.	oFF Off (62) tC Thermocouple (95) mV Millivolts (56) volt Volts dc (104) mA Milliamps dc (112) rtd.1H RTD 100 Ω (113) r 1.0H RTD 1,000 Ω (114) Pot Potentiometer 1 kΩ (155) thEr Thermistor (229)		388 [offset 90]	0x68 (104) 1 to 16 5	3	4005	uint RWES
Lin [Lin]	*Analog Input (1 to 16)* **TC Linearization** Set the linearization to match the thermocouple wired to this input.	b B (11) C (15) d D (23) E (26) F (30) J J (46) H K (48) n N (58) r R (80) S S (84) t T (93)	J	390 [offset 90]	0x68 (104) 1 to 16 6	4	4006	uint RWE
Unit [Unit]	*Analog Input (1 to 16)* **Units** Set the type of units the sensor will measure.	AbtP Absolute Temperature (1540) PwJr Power (73) Pro Process (75) rh Relative Humidity (1538)	Process	462 [offset 90]	0x68 (104) 1 to 16 0x2A (42)	5	4042	uint RWE
S.Lo [S.Lo]	*Analog Input (1 to 16)* **Scale Low** Set the low scale for process inputs. This value, in millivolts, volts or milliamps, will correspond to the Range Low output of this function block.	-100.0 to 1,000.0	0.0	408 [offset 90]	0x68 (104) 1 to 16 0xF (15)	6	4015	float RWE
S.hi [S.hi]	*Analog Input (1 to 16)* **Scale High** Set the high scale for process inputs. This value, in millivolts, volts or milliamps, will correspond to the Range High output of this function block.	-100.0 to 1,000.0	20.0	410 [offset 90]	0x68 (104) 1 to 16 0x10 (16)	7	4016	float RWE
r.Lo [r.Lo]	*Analog Input (1 to 16)* **Range Low** Set the low range for this function block's output.	-1,999.000 to 9,999.000	0.0	412 [offset 90]	0x68 (104) 1 to 16 0x11 (17)	8	4017	float RWE
r.hi [r.hi]	*Analog Input (1 to 16)* **Range High** Set the high range for this function block's output.	-1,999.000 to 9,999.000	9,999.0	414 [offset 90]	0x68 (104) 1 to 16 0x12 (18)	9	4018	float RWE
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
P.EE [P.EE]	*Analog Input (1 to 16)* **Process Error Enable** Turn the Process Error Low feature on or off.	oFF Off (62) Lou Low (53)	Off	438 [offset 90]	0x68 (104) 1 to 16 0x1E (30)	10	4030	uint RWE
P.EL [P.EL]	*Analog Input (1 to 16)* **Process Error Low Value** If the process value drops below this value, it will trigger an input error.	-100.0 to 1,000.0	0.0	440 [offset 90]	0x68 (104) 1 to 16 0x1F (31)	11	4031	float RWE
t.C [t.C]	*Analog Input (1 to 16)* **Thermistor Curve** Select a curve to apply to the thermistor input.	A Curve A (1451) b Curve B (1452) C Curve C (1453) CUSt Custom (180)	Curve A	454 [offset 90]	0x68 (104) 1 to 16 0x26 (38)	- - - -	4038	uint RWE
r.r [r.r]	*Analog Input (1 to 16)* **Resistance Range** Set the maximum resistance of the thermistor input.	5 5K (1448) 10 10K (1360) 20 20K (1361) 40 40K (1449)	40K	452 [offset 90]	0x68 (104) 1 to 16 0x25 (37)	- - - -	4037	uint RWE
F iL [FiL]	*Analog Input (1 to 16)* **Filter** Filtering smooths out the process signal to both the display and the input. Increase the time to increase filtering.	0.0 to 60.0 seconds	0.5	406 [offset 90]	0x68 (104) 1 to 16 0xE (14)	12	4014	float RWE
i.Er [i.Er]	*Analog Input (1 to 16)* **Error Latching** Turn input error latching on or off. If latching is on, errors must be manually cleared.	oFF Off (62) on On (63)	Off	434 [offset 90]	0x68 (104) 1 to 16 0x1C (28)	- - - -	4028	uint RWE
dEC [dEC]	*Analog Input (1 to 16)* **Display Precision** Set the precision of the displayed value.	0 Whole (105) 0.0 Tenths (94) 0.00 Hundredths (40) 0.000 Thousandths (96)	Whole	418 [offset 90]	0x68 (104) 1 to 16 0x14 (20)	- - - -	4020	uint RWE
i.CA [i.CA]	*Analog Input (1 to 16)* **Calibration Offset** Offset the input reading to compensate for lead wire resistance or other factors that cause the input reading to vary from the actual process value.	-1,999.000 to 9,999.000°F or units -1,110.000 to 5,555.000°C	0.0	402 [offset 90]	0x68 (104) 1 to 16) 0x0C (12)	- - - -	4012	float RWE
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
A in [Ain]	*Analog Input (1 to 16)* **Value** View the process value. **Note:** Ensure that the Error Status (below) indicates no error (61) when reading this value using a field bus protocol. If an error exists, the last known value prior to the error occurring will be returned.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	- - - -	380 [offset 90]	0x68 (104) 1 to 16 1	0	4001	float R
i.Er [i.Er]	*Analog Input (1 to 16)* **Input Error** View the cause of the most recent error.	nonE None (61) OPEn Open (65) Shrt Shorted (127) E.rn Measurement Error (140) E.CAL Bad Calibration Data (139) Er.Ab Ambient Error (9) E.rtd RTD Error (141) FAIL Fail (32) nSrc Not Sourced (246)	None	382 [offset 90]	x68 (104) 1 to 16 2	1	4002	float R
Pu SEt **Process Value Menu**								
Fn [Fn]	*Process Value (1 to 16)* **Function** Set the function that will be applied to the source or sources.	oFF Off (62) SbA Sensor Backup (1201) Avg Average (1367) Co Crossover (1368) dbdb Wet Bulb / Dry Bulb (1369) So Switch Over (1370) diFF Differential (1373) rAt1 Ratio (1374) Add Add (1375) rnuL Multiply (1376) Ad1F Absolute Difference (1377) rn1n Minimum (1378) rnAH Maximum (1379) root Square Root (1380) uSLA Vaisala RH Compensation (1648) ALt Pressure to Altitude (1649)	Off	8260 [offset 70]	0x7E (126) 1 to 16 0x15 (21)	98	26021	uint RWES
SFnA [SFn.A]	*Process Value (1 to 16)* **Source Function A** Set the type of function that will be used for this source.	A1 Analog Input (142) Pu Process Value (241)	None	8220 [offset 70]	0x7E (126) 1 to 16 1	- - - -	26001	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
[Si.A]	*Process Value (1 to 16)* **Source Instance A** Set the instance of the function selected above.	1 to 250	1	8230 [offset 70]	0x7E (126) 1 to 16 6	- - - -	26006	uint RWES
[SFn.b]	*Process Value (1 to 16)* **Source Function B** Set the type of function that will be used for this source.	None (61) Analog Input (142) Linearization (238) Math (240) Process Value (241) Variable (245)	None	8222 [offset 70]	0x7E (126) 1 to 16 2	- - - -	26002	uint RWES
[Si.b]	*Process Value (1 to 16)* **Source Instance B** Set the instance of the function selected above.	1 to 250	1	8232 [offset 70]	0x7E (126) 1 to 16 7	- - - -	26007	uint RWES
[SZ.b]	*Process Value (1 to 16)* **Source Zone B** Set the zone of the function selected above.	0 to 16	0	8242 [offset 70]	0x7E (126) 1 to 16 0x0C (12))	- - - -	26012	uint RWES
[SFn.C]	*Process Value (1 to 16)* **Source Function C** Set the type of function that will be used for this source.	None (61) Analog Input (142) Linearization (238) Math (240) Process Value (241) Variable (245)	None	8224 [offset 70]	0x7E (126) 1 to 16 3	- - - -	26003	uint RWES
[Si.C]	*Process Value (1 to 16)* **Source Instance C** Set the instance of the function selected above.	1 to 250	1	8234 [offset 70]	0x7E (126) 1 to 16 8	- - - -	26008	uint RWES
[SZ.C]	*Process Value (1 to 16)* **Source Zone C** Set the zone of the function selected above.	0 to 16	0	8244 [offset 70]	0x7E (126) 1 to 16 0x0D (13)	- - - -	26013	uint RWES
[SFn.d]	*Process Value (1 to 16)* **Source Function D** Set the type of function that will be used for this source.	None (61) Analog Input (142) Linearization (238) Math (240) Process Value (241) Variable (245)	None	8226 [offset 70]	0x7E (126) 1 to 16 4	- - - -	26004	uint RWES
[Si.d]	*Process Value (1 to 16)* **Source Instance D** Set the instance of the function selected above.	1 to 250	1	8236 [offset 70]	0x7E (126) 1 to 16 9	- - - -	26009	uint RWES
[SZ.d]	*Process Value (1 to 16)* **Source Zone D** Set the zone of the function selected above.	0 to 16	0	8246 [offset 70]	0x7E (126) 1 to 16 0x0E (14)	- - - -	26014	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
SFn.E [SFn.E]	*Process Value (1 to 16)* **Source Function E** Set the type of function that will be used for this source.	none None (61) ALrM Alarm (6) CPE Compare (230) Ctr Counter (231) d io Digital I/O (1142) Ent.A Profile Event Out A (233) Ent.b Profile Event Out B (234) Ent.C Profile Event Out C (235) Ent.d Profile Event Out D (236) Ent.E Profile Event Out E (247) Ent.F Profile Event Out F (248) Ent.9 Profile Event Out G (249) Ent.h Profile Event Out H (250) FUn Function Key (1001) LgC Logic (239) tMr Timer (244) uAr Variable (245)	None	8228 [offset 70]	0x7E (126) 1 to 16 5	- - - -	26005	uint RWES
S iE [Si.E]	*Process Value (1 to 16)* **Source Instance E** Set the instance of the function selected above.	1 to 250	1	8238 [offset 70]	0x7E (126) 1 to 16 0x0A (10)	- - - -	26010	uint RWES
SZE [SZ.E]	*Process Value (1 to 16)* **Source Zone E** Set the zone of the function selected above.	0 to 16	0	8248 [offset 70]	0x7E (126) 1 to 16 0x0F (15)	- - - -	26015	uint RWES
CP [SZ.E]	*Process Value (1 to 16)* **Cross Over Point** Enter a value where the Output Value switches from Source A to Source B value. This applies only when the Process function is set to Cross Over.	-1,999.000 to 9,999.000 units or °F -1,128.333 to 5,537.223 °C	100.0	8266 [offset 70]	0x7E (126) 1 to 16 0x18 (24)	- - - -	26024	float RWES
Cb [SZ.E]	*Process Value (1 to 16)* **Cross Over Band** Enter a band centered about the Cross Over Point where Output Value switches from Source A to Source B Value. This applies only when the Process function is set to Cross Over.	-1,999.000 to 9,999.000 units or °F -1,128.333 to 5,537.223 °C	10.0	8268 [offset 70]	0x7E (126) 1 to 16 0x19 (25)	- - - -	26025	float RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
P.unt [P.unt]	*Process Value (1 to 16)* **Pressure Units** Set the units that will be applied to the source.	PSI Pounds per Square Inch (1671) mbr Millibar (1672) torr Torr (1673) PASc Pascal (1674) Atm Atmosphere (1675)	PSI	8274 [offset 70]	0x7E (126) 1 to 16 0x1C (28)	- - - -	26028	uint RWES
A.unt [A.unt]	*Process Value (1 to 16)* **Altitude Units** Set the units that will be applied to the source.	HFt Kilofeet (1677) Ft Feet (1676)	HFt	8276 [offset 70]	0x7E (126) 1 to 16 0x1D (29)	- - - -	26029	uint RWES
b.Pr [b.Pr]	*Process Value (1 to 16)* **Barometric Pressure** Set the units that will be applied to the source.	10.0 to 16.0	14.7	8278 [offset 70]	0x7E (126) 1 to 16 0x1E (30)	- - - -	26030	float RWES
FiL [FiL]	*Process Value (1 to 16)* **Filter** Filtering smooths out the output signal of this function block. Increase the time to increase filtering.	0.0 to 60.0 seconds	0.0	8270 [offset 70]	0x7E (126) 1 to 16 0x1A (26)	- - - -	26026	float RWES
dio SEt **Digital Input/Output Menu**								
dir [dir]	*Digital Input/Output (1 to 12)* **Direction** Set this function to operate as an input or output.	OtPt Output (68) in Input Voltage (193) iCon Input Dry Contact (44)	Output	1820 [offset 30]	0x6A (106) 1 to 12 1	72	6001	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
Fn [Fn]	*Digital Output (1 to 12)* **Function** Select what function will drive this output.	oFF Off (62) Ai Analog Input ALM Alarm (6) CPr Cool Power () hPr Heat Power () CPE Compare (230) Ctr Counter (231) dio Digital I/O (1142) EntA Profile Event Out A (233) EntB Profile Event Out B (234) EntC Profile Event Out C (235) EntD Profile Event Out D (236) EntE Profile Event Out E (247) EntF Profile Event Out F (248) EntG Profile Event Out G (249) EntH Profile Event Out H (250) FUn Function Key (1001) Lnr Linearization (238) LGC Logic (239) MATH Math (240) Pv Process Value (241) SoF1 Special Function Output 1 (1532) SoF2 Special Function Output 2 (1533) SoF3 Special Function Output 3 (1534) SoF4 Special Function Output 4 (1535) tMr Timer (244) uAr Variable (245)		1828 [offset 30]	0x 6A (106) 1 to 12 5	73	6005	uint RWES
Fi [Fi]	*Digital Output (1 to 12)* **Function Instance** Set the instance of the function selected above.	1 to 24	1	1830 [offset 30]	0x6A (106) 1 to 12 6	74	6006	uint RWES
SZ [SZ]	*Digital Output (1 to 12)* **Source Zone** Set the zone of the function selected above.	0 to 16	0	1842 [offset 30]	0x6A (106) 1 to 12 0xC (12)	- - - -	6012	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
oCt [o.Ct]	*Digital Output (1 to 12)* **Control** Set the output control type. This parameter is only used with PID control, but can be set anytime.	FtB Fixed Time Base (34) vtB Variable Time Base (103)	Fixed Time Base	1822 [offset 30]	0x6A (106) 1 to 12 2	75	6002	uint RWES
otb [o.tb]	*Digital Output (1 to 12)* **Time Base** Set the time base for fixed-time-base control.	0.1 to 60.0 for switched DC/ SSR, 5.0 to 60.0 for mechanical relays		1824 [offset 30]	0x6A (106) 1 to 12 3	76	6003	float RWES
olo [o.Lo]	*Digital Output (1 to 12)* **Low Power Scale** The power output will never be less than the value specified and will represent the value at which output scaling begins.	0.0 to 100.0	0.0	1836 [offset 30]	0x6A (106) 1 to 12 9	77	6009	float RWES
ohi [o.hi]	*Digital Output (1 to 12)* **High Power Scale** The power output will never be greater than the value specified and will represent the value at which output scaling stops.	0.0 to 100.0	100.0	1838 [offset 30]	0x6A (106) 1 to 12 0xA (10)	78	6010	float RWES
ACt SEt **Action Menu**								
Fn [Fn]	*Action (1 to 24)* **Function** Set the action that will be triggered by this function.	nonE None (61) USrr User Settings Restore (227) ALrM Alarm Reset (6) SiL Silence Alarms (108) AoF Control Loops Off and Alarms to Non-alarm State (220) FAL Force Alarm to Occur (218) idLE Idle Set Point Enable, level triggered (107) tUnE Tune, edge triggered (98) MnAn Manual/Auto Mode, level triggered (54) oFF Switch Control Loop Off, level triggered (90) rSEn Remote Set Point Enable (216) tdA TRU-TUNE+® Disable, level triggered (219)	None	2184 [offset 20]	0x6E (110) 1 to 24 3	113	10003	uint RWES
Fi [Fi]	*Action (1 to 24)* **Function Instance** Set the instance of the function selected above.	0 to 24	0	2186 [offset 20]	0x6E (110) 1 to 24 4	114	10004	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
SFn.A [SFn.A]	*Action (1 to 24)* **Source Function A** Set the event or function that will trigger the action.	nonE None (61) ALM Alarm (6) CPE Compare (230) Ctr Counter (231) d io Digital I/O (1142) Ent.A Profile Event Out A (233) Ent.b Profile Event Out B (234) Ent.C Profile Event Out C (235) Ent.d Profile Event Out D (236) Ent.E Profile Event Out E (247) Ent.F Profile Event Out F (248) Ent.g Profile Event Out G (249) Ent.h Profile Event Out H (250) FUn Function Key (1001) Lim Limit (126) LgC Logic (239) tMr Timer (244) uAr Variable (245)	None	2190 [offset 20]	0x6E (110) 1 to 24 6	- - - -	10006	uint RWES
Si.A [Si.A]	*Action (1 to 24)* **Source Instance A** Set the instance of the function selected above.	1 to 250	1	2182 [offset 20]	0x6E (110) 1 to 24 2	- - - -	10002	uint RWES
SZ.A [SZ.A]	*Action (1 to 24)* **Source Zone A** Set the zone of the function selected above.	0 to 16	0	2192 [offset 20]	0x6E (110) 1 to 24 7	- - - -	10007	uint RWES
LEv [LEv]	*Action (1 to 24)* **Active Level** Set the action that will be considered a true state.	LoUJ Low (53) hIgh High (37)	High	2180 [offset 20]	0x6E (110) 1 to 24 1	112	10001	uint RWES
LooP SEt **Control Loop Menu**								
SFn.A [SFn.A]	*Control Loop (1 to 16)* **Source Function A** Set the type of function that will be used for this source.	AI Analog Input (142) PU Process Value (241)	Analog Input	4156 [offset 70]	0x97 (151) 1 to 16 0x1D (29)	- - - -	8050	uint RWE
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
SiA [Si.A]	*Control Loop (1 to 16)* **Source Instance A** Set the instance of the function selected above.	1 to 16	1	- - - -	- - - -	- - - -	8021	uint R
hAg [h.Ag]	*Control Loop (1 to 16)* **Heat Algorithm** Set the heat control method.	oFF Off (62) PId PID (71) onoF On-Off (64)	PID	4104 [offset 70]	0x97 (151) 1 to 16 3	62	8003	uint RWES
CAg [C.Ag]	*Control Loop (1 to 16)* **Cool Algorithm** Set the cool control method.	oFF Off (62) PId PID (71) onoF On-Off (64)	Off	4106 [offset 70]	0x97 (151) 1 to 16 4	63	8004	uint RWES
CCr [C.Cr]	*Control Loop (1 to 16)* **Cool Output Curve** Select a cool output curve to change the responsiveness of the system.	oFF Off (62) CrA Non-linear Curve 1 (214) CrB Non-linear Curve 2 (215)	Off	4108 [offset 70]	0x97 (151) 1 to 16 5	- - - -	8038	uint RWES
hPb [h.Pb]	*Control Loop (1 to 16)* **Heat Proportional Band** Set the PID proportional band for the heat outputs.	0.001 to 9,999.000°F or units 0.001 to 5,555.000°C	25.0°F or units 14.0°C	4110 [offset 70]	0x97 (151) 1 to 16 6	55	8009	float RWES
hhy [h.hy]	*Control Loop (1 to 16)* **Heat Hysteresis** Set the control switching hysteresis for on-off control. This determines how far into the "on" region the process value needs to move before the output turns on.	0.001 to 9,999.000°F or units 0.001 to 5,555.000°C	3.0°F or units 2.0°C	4120 [offset 70]	0x97 (151) 1 to 16 0xB (11)	56	8010	float RWES
CPb [C.Pb]	*Control Loop (1 to 16)* **Cool Proportional Band** Set the PID proportional band for the cool outputs.	0.001 to 9,999.000°F or units 0.001 to 5,555.000°C	25.0°F or units 14.0°C	4112 [offset 70]	0x97 (151) 1 to 16 7	57	8012	float RWES
Chy [C.hy]	*Control Loop (1 to 16)* **Cool Hysteresis** Set the control switching hysteresis for on-off control. This determines how far into the "on" region the process value needs to move before the output turns on.	0.001 to 9,999.000°F or units 0.001 to 5,555.000°C	3.0°F or units 2.0°C	4122 [offset 70]	0x97 (151) 1 to 16 0xC (12)	58	8013	float RWES
ti [ti]	*Control Loop (1 to 16)* **Time Integral** Set the PID integral for the outputs.	0 to 9,999 seconds per repeat	180 seconds per repeat	4114 [offset 70]	0x97 (151) 1 to 16 8	59	8006	float RWES
td [td]	*Control Loop (1 to 16)* **Time Derivative** Set the PID derivative time for the outputs.	0 to 9,999 seconds	0 seconds	4116 [offset 70]	0x97 (151) 1 to 16 9	60	8007	float RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
db [db]	*Control Loop (1 to 16)* **Dead Band** Set the offset to the proportional band. With a negative value, both heating and cooling outputs are active when the process value is near the set point. A positive value keeps heating and cooling outputs from fighting each other.	-1,000.0 to 1,000.0 °F or units -555.556 to 555.556 °C	0.0	4118 [offset 70]	0x97 (151) 1 to 16 0xA (10)	61	8008	float RWES
t.tUn [t.tUn]	*Control Loop (1 to 16)* **TRU-TUNE+™ Enable** Enable or disable the TRU-TUNE+™ adaptive tuning feature.	no No (59) YES Yes (106)	No	4130 [offset 70]	0x97 (151) 1 to 16 0x10 (16)	- - - -	8022	uint RWES
t.bnd [t.bnd]	*Control Loop (1 to 16)* **TRU-TUNE+™ Band** Set the range, centered on the set point, within which TRU-TUNE+™ will be in effect. Use this function only if the controller is unable to adaptive tune automatically.	0 to 100 °F or units 0 to 55 °C	0	4132 [offset 70]	0x97 (151) 1 to 16 0x11 (17)	- - - -	8034	uint RWES
t.gn [t.gn]	*Control Loop (1 to 16)* **TRU-TUNE+™ Gain** Select the responsiveness of the TRU-TUNE+™ adaptive tuning calculations. More responsiveness may increase overshoot.	1 to 6	3	4134 [offset 70]	0x97 (151) 1 to 16 0x12 (18)	- - - -	8035	uint RWES
A.tSP [A.tSP}	*Control Loop (1 to 16)* **Autotune Set Point** Set the set point that the autotune will use, as a percentage of the current set point.	50.0 to 200.0%	90.0	4138 [offset 70]	0x97 (151) 1 to 16 0x14 (20)	- - - -	8025	float RWES
t.Agr [t.Agr]	*Control Loop (1 to 16)* **Autotune Aggressiveness** Select the aggressiveness of the autotuning calculations.	Undr Under damped (99) Crit Critical damped (21) OvEr Over damped (69)	Critical	4136 [offset 70]	0x97 (151) 1 to 16 0x13 (19)	- - - -	8024	uint RWES
P.dL [P.dL]	*Control Loop (1 to 16)* **Peltier Delay** Set a value that will cause a delay when switching from heat mode to cool mode.	0.0 to 5.0 seconds	0.0	4154 [offset 70]	0x97 (151) 1 to 16 0x1C (28)	- - - -	8051	float RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
r.En [r.En]	*Control Loop (1 to 16)* **Remote Enable** Enable this loop to switch control to the remote set point.	no No (59) YES Yes (106)	No	5260 [offset 80]	0x6B (107) 1 to 16 0x15 (21)	38	7021	uint RWES
SFn.b [SFn.b]	*Control Loop (1 to 16)* **Source Function B** Set the type of function that will be used for this source.	nonE None (61) AI Analog Input (142) Curr Current (22) CPr Cool Power (161) hPr Heat Power (160) PWJr Power (73) Lnr Linearization (238) MATH Math (240) Pu Process Value (241) SP.C Set Point Closed (242) SP.o Set Point Open (243) uAr Variable (245)	None	5264 [offset 80]	0x6B (107) 1 to 16 0x17 (23)	- - - -	7023	uint RWES
Si.b [Si.b]	*Control Loop (1 to 16)* **Source Instance B** Select the instance of the function selected above.	1 to 250	1	5266 [offset 80]	0x6B (107) 1 to 16 0x18 (24)	- - - -	7024	uint RWES
SZ.b [SZ.b]	*Control Loop (1 to 16)* **Source Zone B** Set the zone of the function selected above.	0 to 16	0	5270 [offset 80]	0x6B (107) 1 to 16 0x1A (26)	- - - -	7026	uint RWES
r.tY [r.ty]	*Control Loop (1 to 16)* **Remote Set Point Type** Enable this loop to switch control to the remote set point.	Auto Auto (10) MAn Manual (54)	Auto	5262 [offset 80]	0x6B (107) 1 to 16 0x16 (22)	- - - -	7022	uint RWES
UFA [UFA]	*Control Loop (1 to 16)* **User Failure Action** Select what the controller outputs will do when the user switches control to manual mode.	oFF Off, sets output power to 0% (62) bPLS Bumpless transfer maintains same output power, if it was less than 75% and stable, otherwise 0% (14) MAn Manual power, sets output power to Manual Power setting (33) USEr User, sets output power to last open-loop set point the user entered (100)	User	5242 [offset 80]	0x6B (107) 1 to 16 0xC (12)	- - - -	7012	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
FAiL [FAiL]	*Control Loop (1 to 16)* **Input Error Failure** Select what the controller outputs will do when an input error switches control to manual mode.	oFF Off, sets output power to 0% (62) bPLS Bumpless transfer maintains same output power, if it was less than 75% and stable, otherwise 0% (14) MAn Manual power sets output power to Manual Power setting (33) USEr User sets output power to last open-loop set point the user entered (100)	User	5244 [offset 80]	0x6B (107) 1 to 16 0xD (13)	- - - -	7013	uint RWES
MAn [MAn]	*Control Loop (1 to 16)* **Manual Power** Set the manual output power level that will take effect if an input error failure occurs while User Failure Action is set to Manual Power.	Set Point Open Loop Limit Low to Set Point Open Loop Limit High (Setup Page)	0.0	5240 [offset 80]	0x6B (107) 1 to 16 0xB (11)	- - - -	7011	float RWES
L.dE [L.dE]	*Control Loop (1 to 16)* **Open Loop Detect Enable** Turn on the open-loop detect feature to monitor a closed-loop operation for the appropriate response.	no No (59) YES Yes (106)	No	4142 [offset 70]	0x97 (151) 1 to 16 0x16 (22)	64	8039	uint RWES
L.dt [L.dt]	*Control Loop (1 to 16)* **Open Loop Detect Time** The Open Loop Detect Deviation value must occur for this time period to trigger an open-loop error.	0 to 3,600 seconds	240	4144 [offset 70]	0x97 (151) 1 to 16 0x17 (23)	65	8040	uint RWES
L.dd [L.dd]	*Control Loop (1 to 16)* **Open Loop Detect Deviation** The value entered represents the Process Value deviation that must occur to trigger an open-loop error.	-1,999.000 to 9,999.000°F or units -1,110.555 to 5,555.000°C	10.0°F or units 6.0°C	4146 [offset 70]	0x97 (151) 1 to 16 0x18 (24)	66	8041	float RWES
rP [rP]	*Control Loop (1 to 16)* **Ramp Action** Select when the controller's set point will ramp to the defined end set point.	oFF Off (62) Str Startup (88) StPt Set Point Change (1647) both Both (13)	Off	5246 [offset 80]	0x6B (107) 1 to 16 0xE (14)	- - - -	7014	uint RWES
r.SC [r.SC]	*Control Loop (1 to 16)* **Ramp Scale** Select the scale of the ramp rate.	hour Hours (39) MnUn Minutes (57)	Minutes	5248 [offset 80]	0x6B (107) 1 to 16 0xF (15)	- - - -	7015	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
r.rt [r.rt]	*Control Loop (1 to 16)* **Ramp Rate** Set the rate for the set point ramp. Set the time units for the rate with the Ramp Scale parameter.	0.0 to 9,999.000°F or units 0.0 to 5,555.000°C	1.0°F or units 1.0°C	5252 [offset 80]	0x6B (107) 1 to 16 0x11 (17)	- - - -	7017	float RWES
L.SP [L.SP]	*Control Loop (1 to 16)* **Set Point Closed Low Limit** Set the minimum value of the closed loop set point range.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	-1,999°F or units -1,128°C	5224 [offset 80]	0x6B (107) 1 to 16 3	52	7003	float RWES
h.SP [h.SP]	*Control Loop (1 to 16)* **Set Point Closed Limit High** Set the maximum value of the closed loop set point range.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	-1,999°F or units -1,128°C	5226 [offset 80]	0x6B (107) 1 to 16 4	53	7004	float RWES
C.SP [C.SP]	*Control Loop (1 to 16)* **Closed Loop Set Point** Set the set point that the controller will automatically control to.	Low Set Point to High Set Point (Setup Page)	75.0°F or units 24.0°C	5220 [offset 80]	0x6B (107) 1 to 16 1	49	7001	float RWES
id.S [id.S]	*Control Loop (1 to 16)* **Idle Set Point** Set a closed loop set point that can be triggered by an event state.	Low Set Point to High Set Point (Setup Page)	75.0°F or units 24.0°C	5236 [offset 80]	0x6B (107) 1 to 16 9	50	7009	float RWES
SP.Lo [SP.Lo]	*Control Loop (1 to 16)* **Set Point Open Limit Low** Set the minimum value of the open loop set point range.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	-1,999°F or units -1,128°C	5228 [offset 80]	0x6B (107) 1 to 16 5	52	7005	float RWES
SP.hi [SP.hi]	*Control Loop (1 to 16)* **Set Point Open Limit High** Set the maximum value of the open loop set point range.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	-1,999°F or units -1,128°C	5230 [offset 80]	0x6B (107) 1 to 16 6	53	7006	float RWES
o.SP [o.SP]	*Control Loop (1 to 16)* **Open Loop Set Point** Set a fixed level of output power when in manual (open-loop) mode.	-100.0 to 100.0%	0.0	5222 [offset 80]	0x6B (107) 1 to 16 2	51	7002	float RWES
C.M [C.M]	*Control Loop (1 to 16)* **Control Mode** Select the method that this loop will use to control.	oFF Off (62) AUto Auto (10) MAn Manual (54)	Auto	4100 [offset 70]	0x97 (151) 1 to 16 1	63	8001	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read W: Write E: EEPROM S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
oPt SEt **Output Menu**								
Fn [Fn]	*Output Digital(1 to 12)* **Function** Select what function will drive this output.	oFF Off (62) Ai Analog Input ALM Alarm (6) CPr Cool Power (161) hPr Heat Power (160) CPE Compare (230) Ctr Counter (231) dio Digital I/O (1142) Ent.A Profile Event Out A (233) Ent.b Profile Event Out B (234) Ent.C Profile Event Out C (235) Ent.d Profile Event Out D (236) Ent.E Profile Event Out E (247) Ent.F Profile Event Out F (248) Ent.g Profile Event Out G (249) Ent.h Profile Event Out H (250) FUn Function Key (1001) Lnr Linearization (238) LgC Logic (239) MAtH Math (240) Pu Process Value (241) SoF.1 Special Function Output 1 (1532) SoF.2 Special Function Output 2 (1533) SoF.3 Special Function Output 3 (1534) SoF.4 Special Function Output 4 (1535) tMr Timer (244) uAr Variable (245)	off	1828 [offset 30]	0x6A (106) 1 to 12 5	73	6005	uint RWES
Fi [Fi]	*Output Digital (1 to 12)* **Function Instance** Set the instance of the function selected above.	1 to 24	1	1830 [offset 30]	0x6A (106) 1 to 12 6	74	6006	uint RWES
SZA [SZ.A]	*Output Digital (1 to 12)* **Source Zone A** Set the instance of the function selected above.	1 to 16	0	1842 [offset 30]	0x6A (106) 1 to 12 0x0C (12)	- - - -	6012	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
o.Ct [o.Ct]	*Output Digital (1 to 12)* **Control** Set the output control type. This parameter is only used with PID control, but can be set anytime.	FtB Fixed Time Base (34) vtB Variable Time Base (103)	Fixed Time Base	1822 [offset 30]	0x6A (106) 1 to 12 2	75	6002	uint RWES
o.tb [o.tb]	*Output Digital (1 to 12)* **Time Base** Set the time base for fixed-time-base control.	0.1 to 60.0 seconds (solid-state relay or switched dc) 5.0 to 60.0 seconds (mechanical relay or no-arc power control)	0.1 sec. [SSR & sw dc] 20.0 sec. [mech, relay, no-arc]	1824 [offset 30]	0x6A (106) 1 to 12 3	76	6003	float RWES
o.Lo [o.Lo]	*Output Digital (1 to 12)* **Low Power Scale** The power output will never be less than the value specified and will represent the value at which output scaling begins.	0.0 to 100.0%	0.0%	1836 [offset 30]	0x6A (106) 1 to 12 9	77	6009	float RWES
o.hi [o.hi]	*Output Digital (1 to 12)* **High Power Scale** The power output will never be greater than the value specified and will represent the value at which output scaling stops.	0.0 to 100.0%	100.0%	1838 [offset 30]	0x6A (106) 1 to 12 0xA (10)	78	6010	float RWES
o.ty [o.ty]	*Output Process (1 to 3, 7 to 9)* **Type** ** Select whether the process output will operate in volts or milliamps.	volt Volts (104) mA Milliamps (112)	Volts	16540 [offset 60]	0x76 (118) 1-3, 7-9 1	- - - -	18001	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read W: Write E: EEPROM S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
Fn [Fn]	*Output Process (1 to 3, 7 to 9)* **Function** ** Set the type of function that will drive this output.	oFF Off (62) Ai Analog Input (142) CUrr Current (22) C.Pr Cool Power, Control Loop (161) h.Pr Heat Power, Control Loop (160) PUJr Power, Control Loop (73) Lnr Linearization (238) MTHt Math (240) Pu Process Value (241) SP.C Set Point Closed, Control Loop (242) SP.o Set Point Open, Control Loop (243) SoF.1 Special Function Output 1 (1532) SoF.2 Special Function Output 2 (1533) SoF.3 Special Function Output 3 (1534) SoF.4 Special Function Output 4 (1535) uAr Variable (245)	Off	16542 [offset 60]	0x76 (118) 1-3, 7-9 2	- - - -	18002	uint RWES
Fi [Fi]	*Output Process (1 to 3, 7 to 9)* **Function Instance** ** Set the instance of the function selected above.	1 to 24	1	16546 [offset 60]	0x76 (118) 1-3, 7-9 4	- - - -	18004	uint RWES
S2.A [ZS.A]	*Output Process (1 to 3, 7 to 9)* **Source Zone A** ** Set the zone of the function selected above.	0 to 16	0	- - - -	0x76 (118) 1-3, 7-9 0x13 (19)	- - - -	18019	uint RWES
S.Lo [S.Lo]	*Output Process (1 to 3, 7 to 9)* **Scale Low** ** Set the scale low for process output in electrical units. This value, in volts or milliamps, will correspond to 0% PID power output or range low value.	-100.0 to 100.0	0.00	16556 [offset 60]	0x76 (118) 1-3, 7-9 9	- - - -	18009	float RWES
S.hi [S.hi]	*Output Process (1 to 3, 7 to 9)* **Scale High** ** Set the scale high for process output in electrical units. This value, in volts or milliamps, will correspond to 100% PID power output or range high value.	-100.0 to 100.0	10.00	16558 [offset 60]	0x76 (118) 1-3, 7-9 0xA (10)	- - - -	18010	float RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
r.Lo [r.Lo]	*Output Process(1 to 3, 7 to 9)* **Range Low** ** Use to set the minimum value in process units. This will correspond with the Scale Low value.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	0.0°F or units -18°C	16560 [offset 60]	0x76 (118) 1-3, 7-9 0xB (11)	- - - -	18011	float RWES
r.hi [r.hi]	*Output Process (1 to 3, 7 to 9)* **Range High** ** Use to set the maximum value in process units. This will correspond with the Scale High value.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	100°F or units 38°C	16562 [offset 60]	0x76 (118) 1-3, 7-9 0xC (12)	- - - -	18012	float RWES
o.CA [o.CA]	*Output Process (1 to 3, 7 to 9)* **Calibration Offset** ** Set an offset value for a process output.	-1,999.000 to 9,999.000°F or units -1,110.000 to 5,555.000°C	0.0°F or units 0.0°C	16552 [offset 60]	0x76 (118) 1-3, 7-9 7	- - - -	18007	float RWES
ALM1 SEt **Alarm Menu**								
A.ty [A.ty]	*Alarm (1 to 24)* **Alarm Type** Select whether the alarm trigger is a fixed value or will track the set point.	oFF Off (62) dE.AL Deviation Alarm (24) Pr.AL Process Alarm (76)	Off	2688 [offset 60]	0x6D (109) 1 to 24 0xF (15)	20	9015	uint RWES
Sr.A [Sr.A]	*Alarm (1 to 24)* **Alarm Source** Select what will trigger this alarm.	nonE None (61) AI Analog Input (142) CUrr Current (22) PwJr Power, Control Loop (73) Lnr Linearization (238) MTAt Math (240) Pu Process Value (241) uAr Variable (245) Cur Current Read (179)	Analog Input	2692 [offset 60]	0x6D (109) 1 to 24 0x11 (17)	21	9017	uint RWES
iS.A [iS.A]	*Alarm (1 to 24)* **Alarm Source Instance A** Set the instance of the function selected above.	1 or 250	1	2694 [offset 60]	0x6D (109) 1 to 24 0x12 (18)	22	9018	uint RWES
SZ.A [SZ.A]	*Alarm (1 to 24)* **Alarm Source Zone A** Set the zone of the function selected above.	0 or 16	0	2708 [offset 60]	0x6D (109) 1 to 24 0x19 (25)	- - - -	9025	uint RWES
Loop [loop]	*Alarm (1 to 24)* **Control Loop** Select the loop when deviation alarm is selected above.	1 to 16	1	2704 [offset 60]	0x6D (109) 1 to 24 0x17 (23)	23	9023	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read W: Write E: EEPROM S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
A.hy [A.hy]	*Alarm (1 to 24)* **Hysteresis** Set the hysteresis for an alarm. This determines how far into the safe region the process value needs to move before the alarm can be cleared.	0.001 to 9,999.000°F or units 0.001 to 5,555.000°C	1.0°F or units 1.0°C	2664 [offset 60]	0x6D (109) 1 to24 3	24	9003	float RWES
A.Lg [A.Lg]	*Alarm (1 to 24)* **Logic** Select what the output condition will be during the alarm state.	A.LC Close On Alarm (17) A.Lo Open On Alarm (66)	Close On Alarm	2668 [offset 60]	0x6D (109) 1 to 24 5	25	9005	uint RWES
A.Sd [A.Sd]	*Alarm (1 to 24)* **Sides** Select which side or sides will trigger this alarm.	both Both (13) h.Gh High (37) Lobd Low (53)	Both	2666 [offset 60]	0x6D (109) 1 to 24 4	26	9004	uint RWES
A.Lo [A.Lo]	*Alarm (1 to 24)* **Low Set Point** If Alarm Type (Setup Page, Alarm Menu) is set to: **process** - set the process value that will trigger a low alarm. **deviation** - set the span of units from the closed loop set point that will trigger a low alarm. A negative set point represents a value below closed loop set point. A positive set point represents a value above closed loop set point.	-1,999.000 to 9,999.000°F or units -1,128.000 to 5,537.000°C	32.0°F or units 0.0°C	2662 [offset 60]	0x6D (109) 1 to 24 2	18	9002	float RWES
A.hi [A.hi]	*Alarm (1 to 24)* **High Set Point** If Alarm Type (Setup Page, Alarm Menu) is set to: **process** - set the process value that will trigger a high alarm. **deviation** - set the span of units from the closed loop set point that will trigger a high alarm.	-1,999.000 to 9,999.000 °F or units -1,128.000 to 5,537.000°C	300.0°F or units 150.0°C	2660 [offset 60]	0x6D (109) 1 to 24 1	19	9001	float RWES
A.LA [A.LA]	*Alarm (1 to 24)* **Latching** Turn alarm latching on or off. A latched alarm has to be turned off by the user.	nLAt Non-Latching (60) LAt Latching (49)	Non-Latching	2672 [offset 60]	0x6D (109) 1 to 24 7	27	9007	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
A.bL [A.bL]	*Alarm (1 to 24)* **Blocking** Select when an alarm will be blocked. After startup and/or after the set point changes, the alarm will be blocked until the process value enters the normal range.	oFF Off (62) Str Startup (88) StPt Set Point (85) both Both (13)	Off	2674 [offset 60]	0x6D (109) 1 to 24 8	28	9008	uint RWES
A.Si [A.Si]	*Alarm (1 to 24)* **Silencing** Turn alarm silencing on to allow the user to disable this alarm.	oFF Off (62) on On (63)	Off	2670 [offset 60]	0x6D (109) 1 to 24 6	29	9006	uint RWES
A.dSP [A.dSP]	*Alarm (1 to 24)* **Display** Display an alarm message when an alarm is active.	oFF Off (62) on On (63)	On	2690 [offset 60]	0x6D (109) 1 to 24 0x10 (16)	30	9016	uint RWES
A.dL [A.dL]	*Alarm (1 to 24)* **Alarm Delay Time** Set the span of time that the alarm will be delayed after the process value exceeds the alarm set point.	0 to 9,999 seconds	0	2700 [offset 60]	0x6D (109) 1 to24 0x15 (21)	31	9021	uint RWES
A.CLr [A.hi]	*Alarm (1 to 24)* **Clear Request** Select Clear to clear alarm once in safe region. **Note:** This prompt is not available unless alarm latching is set to latching.	Clear (129) Ignore (204)	Ignore	2684 [offset 60]	0x6D (109) 1 to 24 0x0D (13)	32	9026	uint RW
A.Sir [A.Sir]	*Alarm (1 to 24)* **Silence Request** Select Silence to silence alarm while in fail region. **Note:** This prompt is not available unless alarm silencing is set to on.	Ignore (204) Silence (108)	Ignore	2686 [offset 60]	0x6D (109) 1 to 24 0x0E (14)	33	9027	uint RW
A.St [A.St]	*Alarm (1 to 24)* **State** View state of alarm	Startup (88) None (61) Blocked (12) Alarm Low (8) Alarm High (7) Error (28)	Startup	2676 [offset 60]	0x6D (109) 1 to 24 9	- - - -	9009	uint R
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
Lnr SEt **Linearization Menu**								
Fn [Fn]	*Linearization (1 to 24)* **Function** Set how this function will linearize Source A.	oFF Off (62) Intr Interpolated (1482) StPd Stepped (1483)	Off	14388 [offset 70]	0x86 (134) 1 to 24 5	120	34005	uint RWES
SFn.A [SFn.A]	*Linearization (1 to 24)* **Source Function A** Set the type of function that will be used for this source.	nonE None (61) AI Analog Input (142) CUrr Current (22) C.Pr Cool Power, Control Loop (161) h.Pr Heat Power, Control Loop (160) PWJr Power, Control Loop (73) Lnr Linearization (238) MAtH Math (240) Pu Process Value (241) SP.C Set Point Closed, Control Loop (242) SP.o Set Point Open, Control Loop (243) uAr Variable (245)	None	14380 [offset 70]	0x86 (134) 1 to 24 1	- - - -	34001	uint RWES
S i.A [Si.A]	*Linearization (1 to 24)* **Source Instance A** Set the instance of the function selected above.	1 or 250	1	14382 [offset 70]	0x86 (134) 1 to 24 2	- - - -	34002	uint RWES
SZ.A [SZ.A]	*Linearization (1 to 24)* **Source Zone A** Set the zone of the function selected above.	0 or 16	0	14384 [offset 70]	0x86 (134) 1 to 24 3	- - - -	34003	uint RWES
Unit [Unit]	*Linearization (1 to 24)* **Units** Set the units of Source A.	Src Source (1539) nonE None (61) A.tP Absolute Temperature (1540) r.tP Relative Temperature (1541) PWJr Power (73) Pro Process (75) rh Relative Humidty (1538)	Source	14436 [offset 70]	0x86 (134) 1 to 24 0x1D (29)	121	34029	uint RWES
ip.1 [ip.1]	*Linearization (1 to 24)* **Input Point 1** Set the value that will be mapped to output 1.	-1,999.000 to 9,999.000 °F or units -1,128.333 to 5537.223 °C	0.0	14394 [offset 70]	0x86 (134) 1 to 24 8	122	34008	float RWES
oP.1 [op.1]	*Linearization (1 to 24)* **Output Point 1** Set the value that will be mapped to input 1.	-1,999.000 to 9,999.000 °F or units -1,128.333 to 5537.223 °C	0.0	14414 [offset 70]	0x86 (134) 1 to 24 0x12 (18)	123	34018	float RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
iP.2 [ip.2]	*Linearization (1 to 24)* **Input Point 2** Set the value that will be mapped to output 2.	-1,999.000 to 9,999.000 °F or units -1,128.333 to 5537.223 °C	1.0	14396 [offset 70]	0x86 (134) 1 to 24 9	124	34009	float RWES
oP.2 [op.2]	*Linearization (1 to 24)* **Output Point 2** Set the value that will be mapped to input 2.	-1,999.000 to 9,999.000 °F or units -1,128.333 to 5537.223 °C	1.0	14416 [offset 70]	0x86 (134) 1 to 24 0x13 (19)	125	34019	float RWES
iP.3 [ip.3]	*Linearization (1 to 24)* **Input Point 3** Set the value that will be mapped to output 3.	-1,999.000 to 9,999.000 °F or units -1,128.333 to 5537.223 °C	2.0	14398 [offset 70]	0x86 (134) 1 to 24 0xA (10)	126	34010	float RWES
oP.3 [op.3]	*Linearization (1 to 24)* **Output Point 3** Set the value that will be mapped to input 3.	-1,999.000 to 9,999.000 °F or units -1,128.333 to 5537.223 °C	2.0	14418 [offset 70]	0x86 (134) 1 to 24 0x14 (20)	127	34020	float RWES
iP.4 [ip.4]	*Linearization (1 to 24)* **Input Point 4** Set the value that will be mapped to output 4.	-1,999.000 to 9,999.000 °F or units -1,128.333 to 5537.223 °C	3.0	14400 [offset 70]	0x86 (134) 1 to 24 0xB (11)	128	34011	float RWES
oP.4 [op.4]	*Linearization (1 to 24)* **Output Point 4** Set the value that will be mapped to input 4.	-1,999.000 to 9,999.000 °F or units -1,128.333 to 5537.223 °C	3.0	14420 [offset 70]	0x86 (134) 1 to 24 0x15 (21)	129	34021	float RWES
iP.5 [ip.5]	*Linearization (1 to 24)* **Input Point 5** Set the value that will be mapped to output 5.	-1,999.000 to 9,999.000 °F or units -1,128.333 to 5537.223 °C	4.0	14402 [offset 70]	0x86 (134) 1 to 24 0xC (12)	130	34012	float RWES
oP.5 [op.5]	*Linearization (1 to 24)* **Output Point 5** Set the value that will be mapped to input 5.	-1,999.000 to 9,999.000 °F or units -1,128.333 to 5537.223 °C	4.0	14422 [offset 70]	0x86 (134) 1 to 24 0x16 (22)	131	34022	float RWES
iP.6 [ip.6]	*Linearization (1 to 24)* **Input Point 6** Set the value that will be mapped to output 6.	-1,999.000 to 9,999.000 °F or units -1,128.333 to 5537.223 °C	5.0	14404 [offset 70]	0x86 (134) 1 to 24 0xD (13)	132	34013	float RWES
oP.6 [op.6]	*Linearization (1 to 24)* **Output Point 6** Set the value that will be mapped to input 6.	-1,999.000 to 9,999.000 °F or units -1,128.333 to 5537.223 °C	5.0	14424 [offset 70]	0x86 (134) 1 to 24 0x17 (23)	133	34023	float RWES
iP.7 [ip.7]	*Linearization (1 to 24)* **Input Point 7** Set the value that will be mapped to output 7.	-1,999.000 to 9,999.000 °F or units -1,128.333 to 5537.223 °C	6.0	14406 [offset 70]	0x86 (134) 1 to 24 E (14)	134	34014	float RWES
oP.7 [op.7]	*Linearization (1 to 24)* **Output Point 7** Set the value that will be mapped to input 7.	-1,999.000 to 9,999.000 °F or units -1,128.333 to 5537.223 °C	6.0	14426 [offset 70]	0x86 (134) 1 to 24 0x18 (24)	135	34024	float RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read W: Write E: EEPROM S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
ip.8 [ip.8]	*Linearization (1 to 24)* **Input Point 8** Set the value that will be mapped to output 8.	-1,999.000 to 9,999.000 °F or units -1,128.333 to 5537.223 °C	7.0	14408 [offset 70]	0x86 (134) 1 to 24 0xF (15)	136	34015	float RWES
op.8 [op.8]	*Linearization (1 to 24)* **Output Point 8** Set the value that will be mapped to input 8.	-1,999.000 to 9,999.000 °F or units -1,128.333 to 5537.223 °C	7.0	14428 [offset 70]	0x86 (134) 1 to 24 0x19 (25)	137	34025	float RWES
ip.9 [ip.9]	*Linearization (1 to 24)* **Input Point 9** Set the value that will be mapped to output 9.	-1,999.000 to 9,999.000 °F or units -1,128.333 to 5537.223 °C	8.0	14410 [offset 70]	0x86 (134) 1 to 24 0x10 (16)	138	34016	float RWES
op.9 [op.9]	*Linearization (1 to 24)* **Output Point 9** Set the value that will be mapped to input 9.	-1,999.000 to 9,999.000 °F or units -1,128.333 to 5537.223 °C	8.0	14430 [offset 70]	0x86 (134) 1 to 24 0x1A (26)	139	34026	float RWES
ip.10 [ip.10]	*Linearization (1 to 24)* **Input Point 10** Set the value that will be mapped to output 10.	-1,999.000 to 9,999.000 °F or units -1,128.333 to 5537.223 °C	9.0	14412 [offset 70]	0x86 (134) 1 to 24 0x11 (17)	140	34017	float RWES
op.10 [op.10]	*Linearization (1 to 24)* **Output Point 10** Set the value that will be mapped to input 10.	-1,999.000 to 9,999.000 °F or units -1,128.333 to 5537.223 °C	9.0	14432 [offset 70]	0x86 (134) 1 to 24 0x1B (27)	141	34027	float RWES
CPE SEt **Compare Menu**								
Fn [Fn]	*Compare (1 to 24)* **Function** Set operator that will be used to compare Source A to Source B.	oFF Off (62) gt Greater Than (1435) Lt Less Than (1436) E Equal To (1437) nE Not Equal To (1438) goE Greater or Equal (1439) LoE Less or Equal (1440)	Off	11276 [offset 40]	0x80 (128) 1 to 24 9	171	28009	uint RWES
toL [toL]	*Compare (1 to 24)* **Tolerance** If the difference between Source A and Source B is less than this value the two will appear to be equal.	0 to 9,999.000	0.1	11280 [offset 40]	0x80 (128) 1 to 24 0xB (11)	172	28011	float RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read W: Write E: EEPROM S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
SFn.A [SFn.A]	*Compare (1 to 24)* **Source Function A** Set the type of function that will be used for this source.	none None (61) A 1 Analog Input (142) Curr Current (22) C.Pr Cool Power, Control Loop (161) h.Pr Heat Power, Control Loop (160) PWdr Power, Control Loop (73) Lnr Linearization (238) MATH Math (240) Pu Process Value (241) SP.C Set Point Closed, Control Loop (242) SP.o Set Point Open, Control Loop (243) uAr Variable (245)	None	11260 [offset 40]	0x80 (128) 1 to 24 1	- - - -	28001	uint RWES
S 1.A [Si.A]	*Compare (1 to 24)* **Source Instance A** Set the instance of the function selected above.	1 to 250	1	11264 [offset 40]	0x80 (128) 1 to 24 3	- - - -	28003	uint RWES
S2.A [SZ.A]	*Compare (1 to 24)* **Source Zone A** Set the zone of the function selected above.	0 to 16	0	11268 [offset 40]	0x80 (128) 1 to 24 5	- - - -	28005	uint RWES
SFn.b [SFn.b]	*Compare (1 to 24)* **Source Function B** Set the type of function that will be used for this source.	none None (61) A 1 Analog Input (142) Curr Current (22) C.Pr Cool Power, Control Loop (161) h.Pr Heat Power, Control Loop (160) PWdr Power, Control Loop (73) Lnr Linearization (238) MATH Math (240) Pu Process Value (241) SP.C Set Point Closed, Control Loop (242) SP.o Set Point Open, Control Loop (243) uAr Variable (245)	None	11262 [offset 40]	0x80 (128) 1 to 24 2	- - - -	28002	uint RWES
S 1.b [Si.b]	*Compare (1 to 24)* **Source Instance B** Set the instance of the function selected above.	1 to 250	1	11266 [offset 40]	0x80 (128) 1 to 24 4	- - - -	28004	uint RWES
S2.b [SZ.b]	*Compare (1 to 24)* **Source Zone B** Set thezone of the function selected above.	0 to 16	0	11270 [offset 40]	0x80 (128) 1 to 24 6	- - - -	28006	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read W: Write E: EEPROM S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
Er.h [Er.h]	*Compare (1 to 24)* **Error Handling** Select output value and error output state when compare cannot be processed	t.9 True Good (1476) t.b True Bad (1477) F.9 False Good (1478) F.b False Bad (1479)	False Bad	11282 [offset 40]	0x80 (128) 1 to 24 0xC (12)	- - - -	28012	uint RWES
tMr SEt **Timer Menu**								
Fn [Fn]	*Timer (1 to 24)* **Function** Set how the timer will function.	oFF Off (62) on.P On Pulse (1471) dEL Delay (1472) o.S One Shot (1473) rEt Retentive (1474)	Off	13196 [offset 50]	0x83 (131) 1 to 24 9	165	31009	uint RWES
SFn.A [SFn.A]	*Timer (1 to 24)* **Source Function A** Set the type of function that will be used for this source (run signal).	nonE None (61) ALM Alarm Reset (6) CPE Compare (230) Ctr Counter (231) d.io Digital I/O (1142) Ent.A Profile Event Out A (233) Ent.b Profile Event Out B (234) Ent.C Profile Event Out C (235) Ent.d Profile Event Out D (236) Ent.E Profile Event Out E (247) Ent.F Profile Event Out F (248) Ent.9 Profile Event Out G (249) Ent.h Profile Event Out H (250) FUn Function Key (1001) LgC Logic (239) SoF.1 Special Function Output 1 (1532) SoF.2 Special Function Output 2 (1533) SoF.3 Special Function Output 3 (1534) SoF.4 Special Function Output 4 (1535) tMr Timer (244) uAr Variable (245)	None	13180 [offset 50]	0x83 (131) 1 to 24 1	- - - -	31001	uint RWES
S.iA [Si.A]	*Timer (1 to 4)* **Source Instance A** Set the instance of the function selected above.	1 to 250	1	13184 [offset 50]	0x83 (131) 1 to 24 3	- - - -	31003	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
SZ.A [SZ.A]	*Timer (1 to 4)* **Source Zone A** Set the zone of the function selected above.	0 to 16	0	13188 [offset 50]	0x83 (131) 1 to 24 5	- - - -	31005	uint RWES
SASA [SAS.A]	*Timer (1 to 4)* **Source Active State A** Set what state will be read as on.	High (37) Low (53)	High	13200 [offset 50]	0x83 (131) 1 to 24 0xB (11)	- - - -	31011	uint RWES
SFn.b [SFn.b]	*Timer (1 to 24)* **Source Function B** Set the type of function that will be used to reset a retentive timer (reset signal).	nonE None (61) ALrM Alarm Reset (6) CPE Compare (230) Ctr Counter (231) d io Digital I/O (1142) Ent.A Profile Event Out A (233) Ent.b Profile Event Out B (234) Ent.C Profile Event Out C (235) Ent.d Profile Event Out D (236) Ent.E Profile Event Out E (247) Ent.F Profile Event Out F (248) Ent.9 Profile Event Out G (249) Ent.h Profile Event Out H (250) FUn Function Key (1001) L9C Logic (239) SoF.1 Special Function Output 1 (1532) SoF.2 Special Function Output 2 (1533) SoF.3 Special Function Output 3 (1534) SoF.4 Special Function Output 4 (1535) tMr Timer (244) uAr Variable (245)	None	13182 [offset 50]	0x83 (131) 1 to 24 2	- - - -	31002	uint RWES
Si.b [Si.b]	*Timer (1 to 24)* **Source Instance B** Set the instance of the function selected above.	1 to 250	1	13186 [offset 50]	0x83 (131) 1 to 24 4	- - - -	31004	uint RWES
SZ.b [SZ.b]	*Timer (1 to 24)* **Source Zone B** Set the zone of the function selected above.	0 to 16	0	13190 [offset 50]	0x83 (131) 1 to 24 6	- - - -	31006	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
SAS.b [SAS.b]	*Timer (1 to 24)* **Source Active State B** Set what state will be read as on.	High (37) Low (53)	High	13202 [offset 50]	0x83 (131) 1 to 24 0xC (12)	- - - -	31012	uint RWES
t i [ti]	*Timer (1 to 24)* **Time** Set the time span that will be measured.	0.0 to 9,999.0	1.0	13204 [offset 50]	0x83 (131) 1 to 24 0xD (13)	166	31013	float RWES
LEv [LEv]	*Timer (1 to 24)* **Active Level** Set which output state will indicate on.	High (37) Low (53)	High	13206 [offset 50]	0x83 (131) 1 to 24 0xE (14)	- - - -	31014	uint RWES
Ctr SEt **Counter Menu**								
Fn [Fn]	*Counter (1 to 24)* **Function** Set whether the counter increments or decrements the count value. Decrementing 0 returns 9,999. Incrementing 9,999 returns 0.	UP Up (1456) dn Down (1457)	Up	12236 [offset 40]	0x82 (130) 1 to 24 9	- - - -	30009	uint RWES
SFn.A [SFn.A]	*Counter (1 to 24)* **Source Function A** Set the type of function that will be used for the counter clock signal.	nonE None (61) ALM Alarm (6) CPE Compare (230) Ctr Counter (231) d io Digital I/O (1142) Ent.A Profile Event Out A (233) Ent.b Profile Event Out B (234) Ent.C Profile Event Out C (235) Ent.d Profile Event Out D (236) Ent.E Profile Event Out E (247) Ent.F Profile Event Out F (248) Ent.g Profile Event Out G (249) Ent.h Profile Event Out H (250) FUn Function Key (1001) LgC Logic (239) tMr Timer (244) uAr Variable (245)	None	12220 [offset 40]	0x82 (130) 1 to 24 1	- - - -	30001	uint RWES
S iA [Si.A]	*Counter (1 to 24)* **Source Instance A** Set the instance of the function selected above.	1 to 250	1	12224 [offset 40]	0x82 (130) 1 to 24 3	- - - -	30003	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
SZ.A [SZ.A]	*Counter (1 to 24)* **Source Zone A** Set the zone of the function selected above.	0 to 16	0	12228 [offset 40]	0x82 (130) 1 to 24 5	- - - -	30005	uint RWES
SASA [SAS.A]	*Counter (1 to 24)* **Source Active State A** Set what output state will indicate on.	High (37) Low (53) both (130)	High	12240 [offset 40]	0x82 (130) 1 to 24 0x0B (11)	- - - -	30011	uint RWES
SFn.b [SFn.b]	*Counter (1 to 24)* **Source Function B** Set the type of function that will be used for the counter load signal.	none None (61) ALM7 Alarm (6) CPE Compare (230) Ctr Counter (231) d.io Digital I/O (1142) Ent.A Profile Event Out A (233) Ent.b Profile Event Out B (234) Ent.C Profile Event Out C (235) Ent.d Profile Event Out D (236) Ent.E Profile Event Out E (247) Ent.F Profile Event Out F (248) Ent.9 Profile Event Out G (249) Ent.h Profile Event Out H (250) FUn Function Key (1001) L9C Logic (239) tM7r Timer (244) uAr Variable (245)	None	12222 [offset 40]	0x82 (130) 1 to 24 2	- - - -	30002	uint RWES
Si.b [Si.b]	*Counter (1 to 24)* **Source Instance B** Set the instance of the function selected above.	1 to 250	1	12226 [offset 40]	0x82 (130) 1 to 24 4	- - - -	30004	uint RWES
SZ.b [SZ.b]	*Counter (1 to 24)* **Source Zone B** Set the zone of the function selected above.	0 to 16	0	12230 [offset 40]	0x82 (130) 1 to 24 6	- - - -	30006	uint RWES
SASb [SAS.b]	*Counter (1 to 24)* **Source Active State B** Set what output state will indicate on.	High (37) Low (53)	High	12242 [offset 40]	0x82 (130) 1 to 24 0xC (12)	- - - -	30012	uint RWES
LoAd [LoAd]	*Counter (1 to 24)* **Load Value** Set the counter's initial value.	0 to 9,999	0	12244 [offset 40]	0x82 (130) 1 to 24 (13)	157	30013	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
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trgt [trgt]	*Counter (1 to 24)* **Target Value** Set the value that will turn the output value on.	0 to 9,999	9,999	12246 [offset 40]	0x82 (130) 1 to 24 0xE (14)	158	30014	uint RWES
LAt [LAt]	*Counter (1 to 24)* **Latching** If enabled, output will latch when count equals target value.	No (59) Yes (106)	No	12252 [offset 40]	0x82 (130) 1 to 24 0x11 (17)	160	30017	uint RWES
LGC SEt **Logic Menu**								
Fn [Fn]	*Logic (1 to 24)* **Function** Set the operator that will be used to compare the sources.	oFF Off (62) And And (1426) nAnd Nand (1427) or Or (1442) nor Nor (1443) E Equal To (1437) nE Not Equal To (1438) LAt Latch (1444) rSFF RS Flip-Flop (1693)	Off	9404 [offset 80]	0x7F (127) 1 to 24 0x21 (33)	177	27033	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
SFnA [SFn.A]	*Logic (1 to 24)* **Source Function A** Set the type of function that will be used for this source.	nonE None (61) ALM Alarm (6) CPE Compare (230) Ctr Counter (231) d io Digital I/O (1142) EntA Profile Event Out A (233) EntB Profile Event Out B (234) EntC Profile Event Out C (235) EntD Profile Event Out D (236) EntE Profile Event Out E (247) EntF Profile Event Out F (248) EntG Profile Event Out G (249) EntH Profile Event Out H (250) Fun Function Key (1001) Lim Limit (126) Log Logic (239) SoF1 Special Function Output 1 (1532) SoF2 Special Function Output 2 (1533) SoF3 Special Function Output 3 (1534) SoF4 Special Function Output 4 (1535) tMr Timer (244) uAr Variable (245))	None	9340 [offset 80]	0x7F (127) 1 to 24 1	- - - -	27001	uint RWES
SiA [Si.A]	*Logic (1 to 24)* **Source Instance A** Set the instance of the function selected above.	1 to 250	1	9356 [offset 80]	0x7F (127) 1 to 24 9	- - - -	27009	uint RWES
SZnA [SZ.A]	*Logic (1 to 24)* **Source Zone A** Set the zone of the function selected above.	0 to 16	0	9372 [offset 80]	0x7F (127) 1 to 24 0x11 (17)	- - - -	27017	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
SFn.b [SFn.b]	*Logic (1 to 24)* **Source B Function** Set the type of function that will be used for this source.	nonE None (61) ALM7 Alarm Reset (6) CPE Compare (230) Ctr Counter (231) d io Digital I/O (1142) Ent.A Profile Event Out A (233) Ent.b Profile Event Out B (234) Ent.C Profile Event Out C (235) Ent.d Profile Event Out D (236) Ent.E Profile Event Out E (247) Ent.F Profile Event Out F (248) Ent.9 Profile Event Out G (249) Ent.h Profile Event Out H (250) FUn Function Key (1001) Lim7 Limit (126) LgC Logic (239) SoF.1 Special Function Output 1 (1532) SoF.2 Special Function Output 2 (1533) SoF.3 Special Function Output 3 (1534) SoF.4 Special Function Output 4 (1535) tM7r Timer (244) uAr Variable (245))	None	9342 [offset 80]	0x7F (127) 1 to 24 2	- - - -	27002	uint RWES
S i.b [Si.b]	*Logic (1 to 24)* **Source Instance B** Set the instance of the function selected above.	1 to 250	1	9358 [offset 80]	0x7F (127) 1 to 24 0xA (10)	- - - -	27010	uint RWES
S2.b [SZ.b]	*Logic (1 to 24)* **Source Zone B** Set the zone of the function selected above	0 to 16	0	9374 [offset 80]	0x7F (127) 1 to 24 0x12 (18)	- - - -	27018	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
SFn.C [SFn.C]	*Logic (1 to 24)* **Source Function C** Set the type of function that will be used for this source.	nonE None (61) ALrM Alarm (6) CPtE Compare (230) Ctr Counter (231) d io Digital I/O (1142) Ent.A Profile Event Out A (233) Ent.b Profile Event Out B (234) Ent.C Profile Event Out C (235) Ent.d Profile Event Out D (236) Ent.E Profile Event Out E (247) Ent.F Profile Event Out F (248) Ent.g Profile Event Out G (249) Ent.h Profile Event Out H (250) Fun Function Key (1001) Lim Limit (126) LgC Logic (239) SoF.1 Special Function Output 1 (1532) SoF.2 Special Function Output 2 (1533) SoF.3 Special Function Output 3 (1534) SoF.4 Special Function Output 4 (1535) tMr Timer (244) uAr Variable (245))	None	9344 [offset 80]	0x7F (127) 1 to 24 3	- - - -	27003	uint RWES
Si.C [Si.C]	*Logic (1 to 24)* **Source Instance C** Set the instance of the function selected above.	1 to 250	1	9360 [offset 80]	0x7F (127) 1 to 24 0xB (11)	- - - -	27011	uint RWES
SZ.C [SZ.C]	*Logic (1 to 24)* **Source Zone C** Set the zone of the function selected above.	0 to 16	0	9376 [offset 80]	0x7F (127) 1 to 24 0x13 (19)	- - - -	27019	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
SFn.d [SFn.d]	*Logic (1 to 24)* **Source Function D** Set the type of function that will be used for this source.	nonE None (61) ALM Alarm (6) CPE Compare (230) Ctr Counter (231) d io Digital I/O (1142) Ent.A Profile Event Out A (233) Ent.b Profile Event Out B (234) Ent.C Profile Event Out C (235) Ent.d Profile Event Out D (236) Ent.E Profile Event Out E (247) Ent.F Profile Event Out F (248) Ent.9 Profile Event Out G (249) Ent.h Profile Event Out H (250) FUn Function Key (1001) Lim Limit (126) LgC Logic (239) SoF.1 Special Function Output 1 (1532) SoF.2 Special Function Output 2 (1533) SoF.3 Special Function Output 3 (1534) SoF.4 Special Function Output 4 (1535) tMr Timer (244) uAr Variable (245))	None	9346 [offset 80]	0x7F (127) 1 to 24 4	- - - -	27004	uint RWES
Si.d [Si.d]	*Logic (1 to 24)* **Source Instance D** Set the instance of the function selected above.	1 to 250	1	9362 [offset 80]	0x7F (127) 1 to 24 0xC (12)	- - - -	27012	uint RWES
Sz.d [SZ.d]	*Logic (1 to 24)* **Source Zone D** Set the zone of the function selected above.	0 to 16	0	9378 [offset 80]	0x7F (127) 1 to 24 0x14 (20)	- - - -	27020	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
SFnE [SFn.E]	*Logic (1 to 24)* **Source Function E** Set the type of function that will be used for this source.	noneE None (61) ALM Alarm (6) CPE Compare (230) Ctr Counter (231) d io Digital I/O (1142) EntA Profile Event Out A (233) EntB Profile Event Out B (234) EntC Profile Event Out C (235) EntD Profile Event Out D (236) EntE Profile Event Out E (247) EntF Profile Event Out F (248) EntG Profile Event Out G (249) EntH Profile Event Out H (250) Fun Function Key (1001) LIM Limit (126) LgC Logic (239) SoF1 Special Function Output 1 (1532) SoF2 Special Function Output 2 (1533) SoF3 Special Function Output 3 (1534) SoF4 Special Function Output 4 (1535) tMr Timer (244) uAr Variable (245))	None	9348 [offset 80]	0x7F (127) 1 to 24 5	- - - -	27005	uint RWES
SiE [Si.E]	*Logic (1 to 24)* **Source Instance E** Set the instance of the function selected above.	1 to 250	1	9364 [offset 80]	0x7F (127) 1 to 24 D (13)	- - - -	27013	uint RWES
SZnE [SZ.E]	*Logic (1 to 24)* **Source Zone E** Set the zone of the function selected above.	0 to 16	0	9380 [offset 80]	0x7F (127) 1 to 24 0x15 (21)	- - - -	27021	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
SFn.F [SFn.F]	*Logic (1 to 24)* **Source Function F** Set the type of function that will be used for this source.	nonE None (61) ALM Alarm (6) CPE Compare (230) Ctr Counter (231) d io Digital I/O (1142) Ent.A Profile Event Out A (233) Ent.b Profile Event Out B (234) Ent.C Profile Event Out C (235) Ent.d Profile Event Out D (236) Ent.E Profile Event Out E (247) Ent.F Profile Event Out F (248) Ent.9 Profile Event Out G (249) Ent.h Profile Event Out H (250) FUn Function Key (1001) Lim Limit (126) LgC Logic (239) SoF.1 Special Function Output 1 (1532) SoF.2 Special Function Output 2 (1533) SoF.3 Special Function Output 3 (1534) SoF.4 Special Function Output 4 (1535) tMr Timer (244) uAr Variable (245))	None	9350 [offset 80]	0x7F (127) 1 to 24 6	- - - -	27006	uint RWES
Si.F [Si.F]	*Logic (1 to 24)* **Source Instance F** Set the instance of the function selected above.	1 to 250	1	9366 [offset 80]	0x7F (127) 1 to 24 0xE (14)	- - - -	27014	uint RWES
S2.F [SF.F]	*Logic (1 to 24)* **Source Zone F** Set the zone of the function selected above.	0 to 16	0	9382 [offset 80]	0x7F (127) 1 to 24 0x16 (22)	- - - -	27022	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
SFn.g [SFn.g]	*Logic (1 to 24)* **Source Function G** Set the type of function that will be used for this source.	none None (61) ALrM Alarm (6) CPE Compare (230) Ctr Counter (231) d io Digital I/O (1142) Ent.A Profile Event Out A (233) Ent.b Profile Event Out B (234) Ent.C Profile Event Out C (235) Ent.d Profile Event Out D (236) Ent.E Profile Event Out E (247) Ent.F Profile Event Out F (248) Ent.g Profile Event Out G (249) Ent.h Profile Event Out H (250) Fun Function Key (1001) Lim Limit (126) LgC Logic (239) SoF.1 Special Function Output 1 (1532) SoF.2 Special Function Output 2 (1533) SoF.3 Special Function Output 3 (1534) SoF.4 Special Function Output 4 (1535) tMr Timer (244) uAr Variable (245))	None	9352 [offset 80]	0x7F (127) 1 to 24 7	- - - -	27007	uint RWES
Si.g [Si.g]	*Logic (1 to 24)* **Source Instance G** Set the instance of the function selected above.	1 to 250	1	9368 [offset 80]	0x7F (127) 1 to 24 0xF (15)	- - - -	27015	uint RWES
SZ.g [SZ.g]	*Logic (1 to 24)* **Source Zone G** Set the zone of the function selected above.	0 to 16	0	9384 [offset 80]	0x7F (127) 1 to 24 0x17 (23)	- - - -	27023	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
SFn.h [SFn.h]	*Logic (1 to 24)* **Source Function H** Set the type of function that will be used for this source.	nonE None (61) ALM Alarm (6) CPE Compare (230) Ctr Counter (231) d io Digital I/O (1142) Ent.A Profile Event Out A (233) Ent.b Profile Event Out B (234) Ent.C Profile Event Out C (235) Ent.d Profile Event Out D (236) Ent.E Profile Event Out E (247) Ent.F Profile Event Out F (248) Ent.9 Profile Event Out G (249) Ent.h Profile Event Out H (250) FUn Function Key (1001) Lim Limit (126) LgC Logic (239) SoF.1 Special Function Output 1 (1532) SoF.2 Special Function Output 2 (1533) SoF.3 Special Function Output 3 (1534) SoF.4 Special Function Output 4 (1535) tMr Timer (244) uAr Variable (245))	None	9354 [offset 80]	0x7F (127) 1 to 24 8	- - - -	27008	uint RWES
Si.h [Si.h]	*Logic (1 to 24)* **Source Instance H** Set the instance of the function selected above.	1 to 250	1	9370 [offset 80]	0x7F (127) 1 to 24 0x10 (16)	- - - -	27016	uint RWES
SZ.h [SZ.h]	*Logic (1 to 24)* **Source Zone H** Set the zone of the function selected above.	0 to 16	0	9386 [offset 80]	0x7F (127) 1 to 24 0x18 (24)	- - - -	27024	uint RWES
Er.h [Er.h]	*Logic (1 to 24)* **Error Handling** Select output value and error output state when logic cannot be processed	t.9 True Good (1476) t.b True Bad (1477) F.9 False Good (1478) F.b False Bad (1479)	False Bad	9408 [offset 80]	0x7F (127) 1 to 24 0x23 (35)	- - - -	27035	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
MATH SET **Math Menu**								
Fn [Fn]	*Math (1 to 24)* **Function** Set the operator that will be applied to the sources.	oFF Off (62) Avg Average (1367) P.SC Process Scale (1371) d.SC Deviation Scale (1372) So Switch Over (1370) diFF Differential (1373) rAti Ratio (1374) Add (1375) MUL Multiply (1376) Adif Absolute Difference (1377) MIn Minimum (1378) MAX Maximum (1379) root Square Root (1380) hold Sample and Hold (1381) ALt Pressure to Altitude (1349) dEwJ Dewpoint (1650)	Off	6580 [offset 70]	0x7D (125) 1 to 24 0x15 (21)	103	25021	uint RWES
SFn.A [SFn.A]	*Math (1 to 24)* **Source Function A** Set the type of function that will be used for this source.	none (61) Ai Analog Input (142) Curr Current (22) C.Pr Cool Power, Control Loop (161) h.Pr Heat Power, Control Loop (160) PwJr Power, Control Loop (73) Lnr Linearization (238) MATH Math (240) Pv Process Value (241) SP.C Set Point Closed, Control Loop (242) SP.o Set Point Open, Control Loop (243) uAr Variable (245)	None	6540 [offset 70]	0x7D (125) 1 to 24 1	- - - -	25001	uint RWES
Si.A [Si.A]	*Math (1 to 24)* **Source Instance A** Set the instance of the function selected above.	1 to 250	1	6550 [offset 70]	0x7D (125) 1 to 24 6	- - - -	25006	uint RWES
SZ.A [SZ.A]	*Math (1 to 24)* **Source Zone A** Set the zone of the function selected above.	0 to 16	0	6560 [offset 70]	0x7D (125) 1 to 24 0xB (11)	- - - -	25011	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
SFn.b [SFn.b]	*Math (1 to 24)* **Source Function B** Set the type of function that will be used for this source.	none None (61) Ai Analog Input (142) Curr Current (22) C.Pr Cool Power, Control Loop (161) h.Pr Heat Power, Control Loop (160) PwJr Power, Control Loop (73) Lnr Linearization (238) MAtt Math (240) Pu Process Value (241) SP.C Set Point Closed, Control Loop (242) SP.o Set Point Open, Control Loop (243) uAr Variable (245)	None	6542 [offset 70]	0x7D (125) 1 to 24 2	- - - -	25002	uint RWES
S i.b [Si.b]	*Math (1 to 24)* **Source Instance B** Set the instance of the function selected above.	1 to 250	1	6552 [offset 70]	0x7D (125) 1 to 24 7	- - - -	25007	uint RWES
S2.b [SZ.b]	*Math (1 to 24)* **Source Zone B** Set the zone of the function selected above.	0 to 16	0	6562 [offset 70]	0x7D (125) 1 to 24 0xC (12)	- - - -	25012	uint RWES
SFn.C [SFn.C]	*Math (1 to 24)* **Source Function C** Set the type of function that will be used for this source.	none None (61) Ai Analog Input (142) Curr Current (22) C.Pr Cool Power, Control Loop (161) h.Pr Heat Power, Control Loop (160) PwJr Power, Control Loop (73) Lnr Linearization (238) MAtt Math (240) Pu Process Value (241) SP.C Set Point Closed, Control Loop (242) SP.o Set Point Open, Control Loop (243) uAr Variable (245)	None	6544 [offset 70]	0x7D (125) 1 to 24 3	- - - -	25003	uint RWES
S i.C [Si.C]	*Math (1 to 24)* **Source Instance C** Set the instance of the function selected above.	1 to 250	1	6554 [offset 70]	0x7D (125) 1 to 24 8	- - - -	25008	uint RWES
S2.C [SZ.C]	*Math (1 to 24)* **Source Zone C** Set the zone of the function selected above.	0 to 16	0	6564 [offset 70]	0x7D (125) 1 to 24 0xD (13)	- - - -	25013	uint RWES

Note:
Some values will be rounded off to fit in the four-character display.
Full values can be read with other interfaces.

Note:
If there is only one instance of a menu, no submenus will appear.

** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.

R: Read
W: Write
E: EEPROM
S: User Set

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
SFn.d [SFn.d]	*Math (1 to 24)* **Source Function D** Set the type of function that will be used for this source.	nonE None (61) AI Analog Input (142) Curr Current (22) CPr Cool Power, Control Loop (161) hPr Heat Power, Control Loop (160) PwJr Power, Control Loop (73) Lnr Linearization (238) MAtH Math (240) Pu Process Value (241) SP.C Set Point Closed, Control Loop (242) SP.o Set Point Open, Control Loop (243) uAr Variable (245)	None	6546 [offset 70]	0x7D (125) 1 to 24 4	- - - -	25004	uint RWES
S id [Si.d]	*Math (1 to 24)* **Source Instance D** Set the instance of the function selected above.	1 to 250	1	6556 [offset 70]	0x7D (125) 1 to 24 9	- - - -	25009	uint RWES
SZ.d [SZ.d]	*Math (1 to 24)* **Source Zone D** Set the zone of the function selected above.	0 to 16	0	6566 [offset 70]	0x7D (125) 1 to 24 0xE (14)	- - - -	25014	uint RWES
SFn.E [SFn.E]	*Math (1 to 24)* **Source Function E** Set the type of function that will be used for this source.	nonE None (61) ALM Alarm (6) CPE Compare (230) Ctr Counter (231) d io Digital I/O (1142) EntA Profile Event Out A (233) Entb Profile Event Out B (234) EntC Profile Event Out C (235) Entd Profile Event Out D (236) EntE Profile Event Out E (247) EntF Profile Event Out F (248) EntG Profile Event Out G (249) Enth Profile Event Out H (250) FUn Function Key (1001) LgC Logic (239) tMr Timer (244) uAr Variable (245)	None	6548 [offset 70]	0x7D (125) 1 to24 5	- - - -	25005	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
S.iE [Si.E]	*Math (1 to 24)* **Source Instance E** Set the instance of the function selected above.	1 to 250	1	6558 [offset 70]	0x7D (125) 1 to 24 0xA (10)	- - - -	25010	uint RWES
S2.E [SZ.E]	*Math (1 to 24)* **Source Zone E** Set the zone of the function selected above.	0 to 16	0	6568 [offset 70]	0x7D (125) 1 to 24 0xF (15)	- - - -	25015	uint RWES
S.Lo [S.Lo]	*Math (1 to16)* **Input Scale Low** Active for Process or Deviation Scale of Source A only.	-1,999.000 to 9,999.000 °F or units -1,128.333 to 5537.223 °C	0.0	6586 [offset 70]	0x7D (125) 1 to 24 0x18 (24)	104	25024	float RWES
S.hi [S.hi]	*Math (1 to 24)* **Input Scale High** Active for Process or Deviation Scale of Source A only	-1,999.000 to 9,999.000 °F or units -1,128.333 to 5537.223 °C	1.0	6588 [offset 70]	0x7D (125) 1 to 24 0x19 (25)	105	25025	float RWES
Unit [Unit]	*Math (1 to 24)* **Units** Set the units of Source A.	Src Source (1539) none None (61) AbP Absolute Temperature (1540) rtP Relative Temperature (1541) PwJr Power (73) Pro Process (75) rh Relative Humidty (1538)	Source	6602 [offset 70]	0x7D (125) 1 to 24 0x20 (32)	- - - -	25032	uint RWES
r.Lo [r.Lo]	*Math (1 to 24)* **Output Range Low** Active for Process or Deviation Scale of Source A only.	-1,999.000 to 9,999.000 °F or units -1,128.333 to 5537.223 °C	0.0	6590 [offset 70]	0x7D (125) 1 to 24 0x1A (26)	106	25026	float RWES
r.hi [r.hi]	*Math (1 to 24)* **Output Range High** Active for Process or Deviation Scale of Source A only	-1,999.000 to 9,999.000 °F or units -1,128.333 to 5537.223 °C	1.0	6592 [offset 70]	0x7D (125) 1 to 24 0x1B (27)	107	25027	float RWES
P.unt [P.unt]	*Math (1 to 24)* **Pressure Units** Select units of Source A when function is Pressure to Altitude conversion only	PSi Pounds per square inch (1671) mbar mbar (1672) torr Torr (1673) PASc Pascal (1674) Atm Atmosphere (1675)	Pressure Units	6598 [offset 70]	0x7D (125) 1 to 24 0x1E (30)	- - - -	25030	uint RWES
A.unt [A.unt]	*Math (1 to 24)* **Altitude Units** Select units of output value when function is Pressure to Altitude conversion only.	Ft Feet (1674) HFt Kilofeet (1671)	Kilofeet	6600 [offset 70]	0x7D (125) 1 to 24 0x1F (31)	- - - -	25031	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
FiL [FiL]	*Math (1 to 24)* **Filter** Filtering smooths out the output signal of this function block. Increase the time to increase filtering.	0.0 to 60.0 seconds	0.0	6594 [offset 70]	0x7D (125) 1 to 24 0x1C (28)	- - - -	25028	float RWES
uAr SEt **Variable Menu**								
tYPE [tyPE]	*Variable (1 to 24)* **Data Type** Set the variable's data type.	AnLg Analog (1215) dig Digital (1220)	Analog	16060 [offset 20]	0x66 (102) 1 to 24 1	152	2001	uint RWES
Unit [Unit]	*Variable (1 to 24)* **Units** Set the variable's units.	AbSP Absolute Temperature (1540) rtSP Relative Temperature (1541) PWJr Power (73) Pro Process (75) rh Relative Humidity (1538) nonE None (61)	Absolute Temperature	16072 [offset 20]	0x66 (102) 1 to 24 7	- - - -	2007	uint RWES
dig [dig]	*Variable (1 to 24)* **Digital** Set the variable's value.	oFF Off (62) on On (63)	Off	16062 [offset 20]	0x66 (102) 1 to 24 2	153	2002	uint RWES
AnLg [AnLg]	*Variable (1 to 24)* **Analog** Set the variable's value.	-1,999.000 to 9,999.000 **Note:** Stored in °F only	0.0	16064 [offset 20]	0x66 (102) 1 to 24 3	212	2003	float RWES
No Display	*Variable (1 to 24)* **Output Value**	Off (62) On (63) -1,999.000 to 9,999.000	- - - -	16066 [offset 20]	0x66 (102) 1 to 24 4	- - - -	2004	float R
GLbL SEt **Global Menu**								
C_F [C_F]	*Global* **Display Units** Select which scale to use for temperature.	F °F (30) C °C (15)	°F	368	0x67 (103) 1 5	85	3005	uint RWES
ACLF [AC.LF]	*Global* **AC Line Frequency** Set the frequency to the applied ac line power source.	50 50 Hz (3) 60 60 Hz (4)	60 Hz	- - - -	0x65 (101) 1 0x22 (34)	- - - -	1034	uint RWES
dPrS [dPrS]	*Global* **Display Pairs** Defines the number of display pairs at the home page of an RUI	1 to 25	2	- - - -	0x67 (103) 1 0x1C (28)	- - - -	3028	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

RM High Density Module • Setup Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
USr.S [USr.S]	*Global* **User Settings Save** Save all of this controller's settings to the selected set.	nonE None (61) SEt 1 User Set 1 (101) SEt2 User Set 2 (102)	None	26	0x65 (101) 1 0x0E (14)	93	1014	uint W
USr.r [USr.r]	*Global* **User Settings Restore** Replace all of the controller's settings with another set previously saved.	nonE None (61) SEt 1 User Set 1 (101) SEt2 User Set 2 (102) FCty Factory (31)	None	24	0x65 (101) 1 0x0D (13)	92	1013	uint W
CoMM SEt **Communications Menu**								
bAUd [bAUd]	*Communications* **Baud Rate** Set the speed of this controller's communications to match the speed of the serial network.	9,600 (188) 19,200 (189) 38,400 (190)	9,600	6504	0x96 (150) 1 3	- - - -	17002	uint RWE
PAr [PAr]	*Communications* **Parity** Set the parity of this controller to match the parity of the serial network.	nonE None (61) EuEn Even (191) odd Odd (192)	None	6506	0x96 (150) 1 4	- - - -	17003	uint RWE
M.hL [M.hL]	*Communications* **Modbus Word Order** Select the word order of the two 16-bit words in the floating-point values.	h iLo Word High Low (1330) Loh i Word Low High (1331)	Low High	6508	0x96 (150) 1 5	- - - -	17043	uint RWE
C_F [C_F]	*Communications* **Display Units** Select which scale to use for temperature over comms.	°F (30) °C (15)	°F	6510	0x96 (150) 1 6	- - - -	17050	uint RWE
nV.S [nV.S]	*Communications (1)* **Non-volatile Save** If set to Yes all values written to the control will be saved in EEPROM. **Note:** Any value that is changed from the RUI or over a communications port will initiate a write to the EEPROM. Life of EEPROM is approximately one million writes.	YES Yes (106) no No (59)	Yes	6514	0x96 (150) 1 8	198	17051	uint RWE
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with other interfaces. **Note:** If there is only one instance of a menu, no submenus will appear. ** These parameters/prompts are available in these menus with firmware revisions 6.0 and above.								**R: Read** **W: Write** **E: EEPROM** **S: User Set**

5 Chapter 5: Factory Pages

Navigating the Factory Page

To navigate to the Factory Page using the RUI, follow the steps below:

1. From the Home Page, press and hold both the Advance and Infinity keys for six seconds.
2. Press the Up or Down key to view available menus.
3. Press the Advance Key to enter the menu of choice.
4. If a submenu exists (more than one instance), press the Up or Down key to select and then press the Advance Key to enter.
5. Press the Up or Down key to move through available menu prompts.
6. Press the Infinity Key to move backwards through the levels: parameter to submenu; submenu to menu; menu to Home Page.
7. Press and hold the Infinity Key for two seconds to return to the Home Page.

On the following pages, top level menus are identified with a yellow background color.

Note:
Some of these menus and parameters may not appear, depending on the controller's options. See model number information in the Appendix for more information. If there is only one instance of a menu, no submenus will appear.

Note:
Some of the listed parameters may not be visible. Parameter visibility is dependent upon controller part number.

CUSt
FCty **Custom Setup Menu**
1
CUSt **Custom Setup (1 to 50)**
PAr **Parameter**
, id **Instance ID**

LoC
FCty **Security Setting Menu**
LoC **Security Setting**
LoC.o **Operations Page**
PAS.E **Password Enable**
rLoC **Read Lock**
SLoC **Write Security**
LoC.L **Locked Access Level**
roLL **Rolling Password**
PAS.u **User Password**
PAS.A **Administrator Password**

ULoC
FCty **Security Setting Menu**
LoC **Security Setting**
CodE **Public Key**
PASS **Password**

d iAG
FCty **Diagnostics Menu**
d iAG **Diagnostics**
Pn **Part Number**
rEu **Software Revision**
S.bLd **Software Build Number**
Sn **Serial Number**
dAtE **Date of Manufacture**

CAL
FCty **Calibration Menu**
1
ACt **Calibration (1 to 16)**
mAu **Electrical Measurement**
EL io **Electrical Input Offset**
EL iS **Electrical Input Slope**

RM High Density Module • Factory Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
CUSt FCty **Custom Setup Menu**								
PAr [Par]	*Custom Menu* **Parameter 1 to 50** Select the parameters that will appear in the Home Page when using the RUI. The Parameter 1 value will appear in the upper display of the Home Page. It cannot be changed with the Up and Down Keys in the Home Page. The Parameter 2 value will appear in the lower display in the Home Page. It can be changed with the Up and Down Keys, if the parameter is a writable one. Scroll through the other Home Page parameters with the Advance Key .	nonE None (61) Pro Process (75) .CA Calibration Offset (1196) C_F Display Units (156) USr.r User Settings Restore (227) AL o Alarm Low Set Point (42) Ah i Alarm High Set Point (78) AHY Alarm Hysteresis (97) StPt Set Point () ACPu Active Process Value (25) ACSP Active Set Point (72) oP Open-Loop Set Point (110) Aut Autotune (158) CM Control Mode (159) h.Pr Heat Power (160) C.Pr Cool Power (161) t i Time Integral (162) td Time Derivative (163) db Dead Band (164) h.Pb Heat Proportional Band (166) h.hY Heat Hysteresis (167) C.Pb Cool Proportional Band (169) C.hY Cool Hysteresis (170) r.rt Ramp Rate (177) t.tun TRU-TUNE+ Enable (205) idLE Idle Set Point (107) CUSt Custom Menu (180)	Process Limit Status	- - - -	- - - -	- - - -	14005	uint RWES
iid [iid]	*Custom Setup (1 to 50)* **Instance ID** Select the parameters that will appear in the Home Page.	1 to 24	- - - -	- - - -	- - - -	- - - -	14003	uint RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with another interface. **If there is only one instance of a menu, no submenus will appear.**								**R: Read W: Write E: EEPROM S: User Set**

RM High Density Module • Factory Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
LoC FCty **Security Setting Menu**								
LoC.o [LoC.o]	*Security Setting* **Operations Page** Change the security level of the Operations Page.	1 to 3	2	----	----	----	----	----
PASE [LoC.P]	*Security Setting* **Password Enable** Turn security features on or off.	oFF Off on On	Off	----	----	----	----	----
rLoC [rLoC]	*Security Setting* **Read Lock** Set the read security clearance level. The user can access the selected level and all lower levels. If the Set Lockout Security level is higher than the Read Lockout Security, the Read Lockout Security level takes priority.	1 to 5	5	----	----	----	----	----
SLoC [SLoC]	*Security Setting* **Write Security** Set the write security clearance level. The user can access the selected level and all lower levels. If the Set Lockout Security level is higher than the Read Lockout Security, the Read Lockout Security level takes priority.	0 to 5	5	----	----	----	----	----
LoC.L [LoC.L]	*Security Setting* **Locked Access Level** Determines user level menu visibility when security is enabled. See Features section under Password Security.	1 to 5	5	----	----	----	----	----
No Display	*Security Setting* **Locked State** Current level of security	Lock (228) User (1684) Admin (1685)	----	----	----	----	3023	uint R
roLL [roLL]	*Security Setting* **Rolling Password** When power is cycled a new Public Key will be displayed.	oFF Off on On	Off	----	----	----	----	----
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with another interface. **If there is only one instance of a menu, no submenus will appear.**								**R: Read W: Write E: EEPROM S: User Set**

RM High Density Module • Factory Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
PASu [PAS.u]	*Security Setting* **User Password** Used to acquire access to menus made available through the Locked Access Level setting.	10 to 999	63	- - - -	- - - -	- - - -	- - - -	- - - -
PASA [PAS.A]	*Security Setting* **Administrator Password** Used to acquire full access to all menus.	10 to 999	156	- - - -	- - - -	- - - -	- - - -	- - - -
ULoC FCty **Security Setting Menu**								
CodE [CodE]	*Security Setting* **Public Key** If Rolling Password turned on, generates a random number when power is cycled. If Rolling Password is off fixed number will be displayed.	Customer Specific	0	- - - -	- - - -	- - - -	- - - -	- - - -
PASS [PASS]	*Security Setting* **Password** Number returned from calculation found in Features section under Password Security.	-1999 to 9999	0	- - - -	- - - -	- - - -	- - - -	- - - -
diAG FCty **Diagnostics Menu**								
Pn [Pn]	*Diagnostics Menu* **Part Number** Display this controller's part number.	24	- - - -		0x65 (101) 1 9	90	1009	string R
No Display	*Diagnostics Menu* **Device Name** Read the device name.	EZ-ZONE RM	- - - -	- - - -	0x65 (101) 1 0x0B (11)	- - - -	1011	string R
No Display	*Diagnostics Menu* **Device Status** Return hardware status Fail means return to factory.	OK (138) Fail (32)	- - - -	30	0x65 (101) 1 0x10 (16)	- - - -	1016	uint R
rEu [rEu]	*Diagnostics Menu* **Software Revision** Display this controller's firmware revision number.	5	- - - -	4	0x65 (101) 1 to 5 0x11 (17)	91	1017	string R
S.bLd [S.bLd]	*Diagnostics Menu* **Software Build Number** Display the firmware build number.	- - - -	- - - -	8	0x65 (101) 1 to 5 5	- - - -	1005	signed 32-bit R
Sn [Sn]	*Diagnostics Menu* **Serial Number** Display the serial number.	- - - -	- - - -	12	0x65 (101) 1 7	- - - -	1032	string R
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with another interface. **If there is only one instance of a menu, no submenus will appear.**								**R: Read W: Write E: EEPROM S: User Set**

RM High Density Module • Factory Page								
Display	**Parameter Name Description**	**Range**	**Default**	**Modbus Relative Address**	**CIP Class Instance Attribute hex (dec)**	**Profibus Index**	**Parameter ID**	**Data Type & Read/ Write**
dAtE [dAtE]	*Diagnostics Menu* **Date of Manufacture** Display the date code in YY-WW format	- - - -	- - - -	14	0x65 (101) 1 8	- - - -	1008	signed 32-bit R
No Display	*Diagnostics Menu* **Hardware ID** Read the hardware ID.	113	113	0	0x65 (101) 1 1	- - - -	1001	signed 32-bit R
CAL FCty **Calibration Menu**								
rMu [Mv]	*Calibration Menu (1 to 16)* **Electrical Measurement** Read the raw electrical value for this input in the units corresponding to the Sensor Type (Setup Page, Analog Input Menu) setting.	- - - -		420 [offset 90]	0x68 (104) 1 to 12 0x15 (21)	- - - -	4021	float R
EL.o [ELi.o]	*Calibration Menu (1 to 16)* **Electrical Input Offset** Change this value to calibrate the low end of the input range.	-1,999.000 to 9,999.000	0.0	398 [offset 90]	0x68 (104) 1 to 12 0xA (10)	- - - -	4010	float RWES
EL.S [ELi.S]	*Calibration Menu (1 to 16)* **Electrical Input Slope** Adjust this value to calibrate the slope of the input value.	-1,999.000 to 9,999.000	1.0	400 [offset 90]	0x68 (104) 1 to 12 0xB (11)	- - - -	4011	float RWES
Note: Some values will be rounded off to fit in the four-character display. Full values can be read with another interface. **If there is only one instance of a menu, no submenus will appear.**								**R: Read W: Write E: EEPROM S: User Set**

6 Chapter 6: Features

6 Chapter 6: Features (cont.)

Saving and Restoring User Settings

Recording setup and operations parameter settings for future reference is very important. If you unintentionally change these, you will need to program the correct settings back into the controller to return the equipment to operational condition.

After you program the controller and verify proper operation, use User Save Set USr.S (Setup Page, Global Menu) to save the settings into either of two files in a special section of memory. If the settings in the controller are altered and you want to return the controller to the saved values, use User Restore Set USr.r (Setup Page, Global Menu) to recall one of the saved settings. A digital input or the Function Key can also be configured to restore parameters.

Note:
Starting with firmware release 6, there is only one user set.

Note:
Only perform the above procedure when you are sure that all the correct settings are programmed into the controller. Saving the settings overwrites any previously saved collection of settings.
Be sure to document all the controller settings.

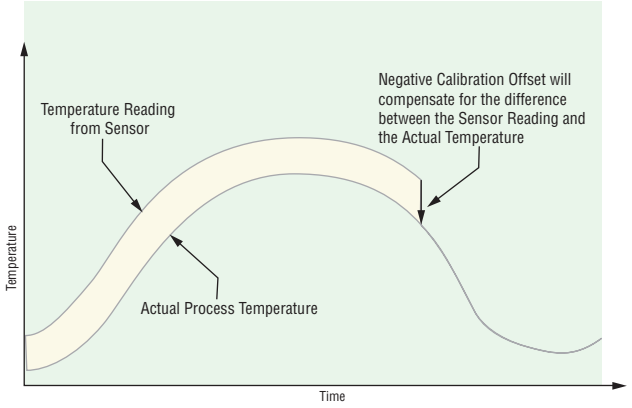
Note:
When restoring factory defaults, I/O assemblies for Modbus, DeviceNet, Profibus and Ethernet along with the zone address will be overwritten when restoring factory defaults.

Inputs

Calibration Offset

Calibration offset allows a device to compensate for an inaccurate sensor, lead resistance or other factors that affect the input value. A positive offset increases the input value, and a negative offset decreases the input value.

The input offset value can be viewed or changed with Calibration Offset InCA (Operations Page, Analog Input Menu).



Calibration

To calibrate an analog input, you will need to provide two electrical signals or resistance loads near the extremes of the range that the application is likely to utilize. See recommended values below:

Sensor Type	Low Source	High Source
thermocouple	0.000 mV	50.000 mV
millivolts	0.000 mV	50.000 mV
volts	0.000V	10.000V
milliamps	0.000 mA	20.000 mA
100 Ω RTD	50.00 Ω	350.00 Ω
1,000 Ω RTD	500.00 Ω	3,500.00 Ω
Thermistor 5K	50.00 Ω	5000.00 Ω
Thermistor 10K	50.00 Ω	10000.00 Ω
Thermistor 20K	50.00 Ω	20000.00 Ω
Thermistor 40K	50.00 Ω	40000.00 Ω

Follow these steps for a thermocouple or process input:

1. Apply the low source signal to the input you are calibrating. Measure the signal to ensure it is accurate.
2. Read the value of Electrical Measurement rMU (Factory Page, Calibration Menu) for that input.
3. Calculate the offset value by subtracting this value from the low source signal.
4. Set Electrical Input Offset EL.O (Factory Page, Calibration Menu) for this input to the offset value.
5. Check the Electrical Measurement to see whether it now matches the signal. If it doesn't match, adjust Electrical Offset again.
6. Apply the high source signal to the input. Measure the signal to ensure it is accurate.
7. Read the value of Electrical Measurement for that input.
8. Calculate the gain value by dividing the low source signal by this value.
9. Set Electrical Slope EL.S (Factory Page, Calibration Menu) for this input to the calculated gain value.
10. Check the Electrical Measurement to see whether it now matches the signal. If it doesn't match, adjust Electrical Slope again.

Set Electrical Offset to 0 and Electrical Slope to 1 to restore factory calibration.

Follow these steps for an RTD input:

1. Measure the low source resistance to ensure it is accurate. Connect the low source resistance to the input you are calibrating.
2. Read the value of Electrical Measurement rMU (Factory Page, Calibration Menu) for that input.
3. Calculate the offset value by subtracting this value from the low source resistance.
4. Set Electrical Input Offset EL.O (Factory Page,

Calibration Menu) for this input to the offset value.

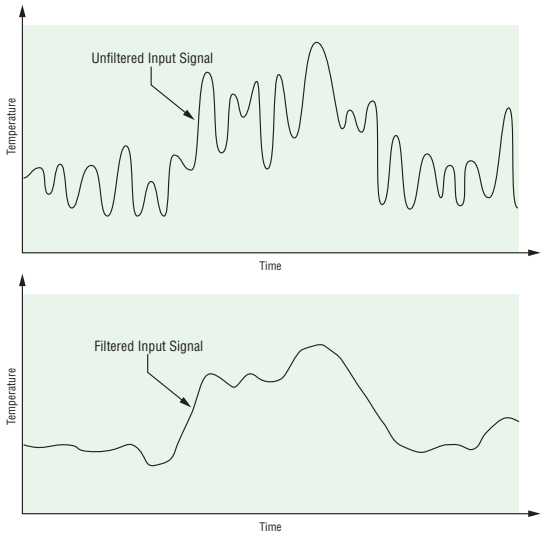
5. Check the Electrical Measurement to see whether it now matches the resistance. If it doesn't match, adjust Electrical Offset again.
6. Measure the high source resistance to ensure it is accurate. Connect the high source resistance to the input.
7. Read the value of Electrical Measurement for that input.
8. Calculate the gain value by dividing the low source signal by this value.
9. Set Electrical Slope [EL.S] (Factory Page, Calibration Menu) for this input to the calculated gain value.
10. Check the Electrical Measurement to see whether it now matches the signal. If it doesn't match, adjust Electrical Slope again.

Set Electrical Offset to 0 and Electrical Slope to 1 to restore factory calibration.

Filter Time Constant

Filtering smoothes an input signal by applying a first-order filter time constant to the signal. Filtering the displayed value makes it easier to monitor. Filtering the signal may improve the performance of PID control in a noisy or very dynamic system.

Adjust the filter time interval with Filter Time [F.iL] (Setup Page, Analog Input Menu). Example: With a filter value of 0.5 seconds, if the process input value instantly changes from 0 to 100 and remained at 100, the display will indicate 100 after five time constants of the filter value or 2.5 seconds.



Sensor Selection

You need to configure the controller to match the input device, which is normally a thermocouple, RTD or process transmitter.

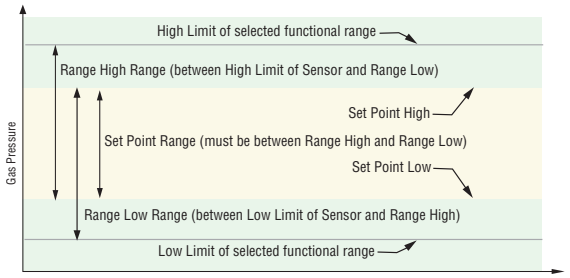
Select the sensor type with Sensor Type [SEn] (Setup Page, Analog Input Menu).

Set Point Low Limit and High Limit

The controller constrains the set point to a value between a set point low limit and a set point high limit.

Set the set point limits with Low Set Point [LSP] and High Set Point [HSP] (Setup Page, Loop Menu).

There are two sets of set point low and high limits: one for a closed-loop set point, another for an open-loop set point.



Scale High and Scale Low

When an analog input is selected as process voltage or process current input, you must choose the value of voltage or current to be the low and high ends. For example, when using a 4 to 20 mA input, the scale low value would be 4.00 mA and the scale high value would be 20.00 mA. Commonly used scale ranges are: 0 to 20 mA, 4 to 20 mA, 0 to 5V, 1 to 5V and 0 to 10V.

You can create a scale range representing other units for special applications. You can reverse scales from high values to low values for analog input signals that have a reversed action. For example, if 50 psi causes a 4 mA signal and 10 psi causes a 20 mA signal.

Scale low and high low values do not have to match the bounds of the measurement range. These along with range low and high provide for process scaling and can include values not measureable by the controller. Regardless of scaling values, the measured value will be constrained by the electrical measurements of the hardware.

Select the low and high values with Scale Low [S.Lo] and Scale High [S.hi]. Select the displayed range with Range Low [r.Lo] and Range High [r.hi] (Setup Page, Analog Input Menu).

Range High and Range Low

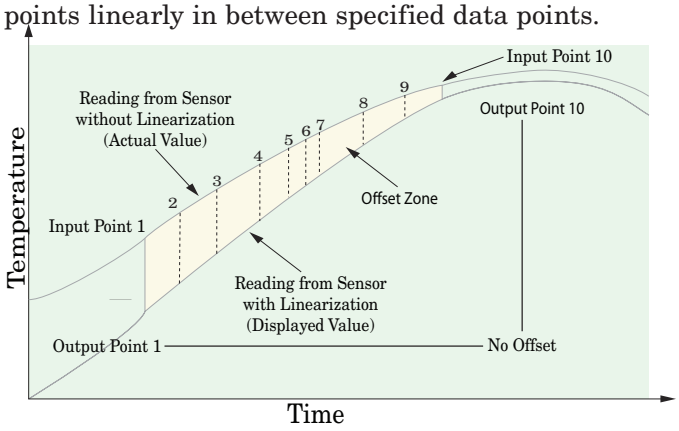
With a process input, you must choose a value to represent the low and high ends of the current or voltage range. Choosing these values allows the controller's display to be scaled into the actual working units of measurement. For example, the analog input from a humidity transmitter could represent 0 to 100 percent relative humidity as a process signal of 4 to 20 mA. Low scale would be set to 0 to represent 4 mA and high scale set to 100 to represent 20 mA. The indication on the display would then represent percent humidity and range from 0 to 100 percent with an input of 4 to 20 mA.

Select the low and high values with Range Low r.Lo and Range High r.hi (Setup Page, Analog Input Menu).

Linearization

The linearization function allows a user to re-linearize a value read from an analog input. There are 10 data points used to compensate for differences between the sensor value read (input point) and the desired value (output point). Multiple data points enable compensation for non-linear differences between the sensor readings and target process values over the thermal or process system operating range. Sensor reading differences can be caused by sensor placement, tolerances, an inaccurate sensor or lead resistance.

The user specifies the unit of measurement and then each data point by entering an input point value and a corresponding output point value. Each data point must be incrementally higher than the previous point. The linerization function will interpolate data points linearly in between specified data points.



Outputs

Duplex

Certain systems require that a single process output control both heating and cooling outputs. An EZ-ZONE® RMH controller with a process output can function as two separate outputs.

With a 4 to 20mA output the heating output will operate from 12 to 20mA (0 to +100 percent) and the cooling output will operate from 12 to 4mA (0 to -100 percent).

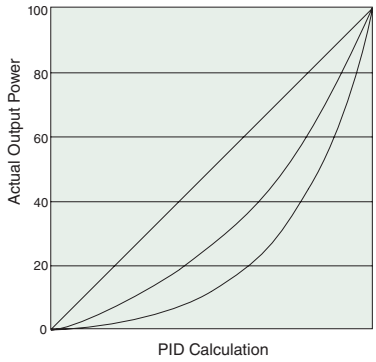
In some cases this type of output is required by the device that the EZ-ZONE RMH controls, such as a three-way valve that opens one way with a 12 to 20mA signal and opens the other way with a 4 to 12mA signal. This feature reduces the overall system cost by using a single output to act as two outputs.

Outputs 1 and 3 can be ordered as process outputs. Select duplex dUPL as the Output Function Fn (Setup Page, Output Menu). Set the output to volts volt or milliamps mAmP with Output Type oty. Set the range of the process output with Scale Low S.Lo and Scale High S.hi.

Cool Output Curve

A nonlinear output curve may improve performance when the response of the output device is nonlinear. If a cool output uses one of the nonlinear curves a PID calculation yields a lower actual output level than a linear output would provide.

These output curves are used in plastics extruder applications: curve 1 for oil-cooled extruders and curve 2 for water-cooled extruders.



Select a nonlinear cool output curve with Cool Output Curve C.Cr (Setup Menu, Loop Menu).

Retransmitting a Process Value or Set Point

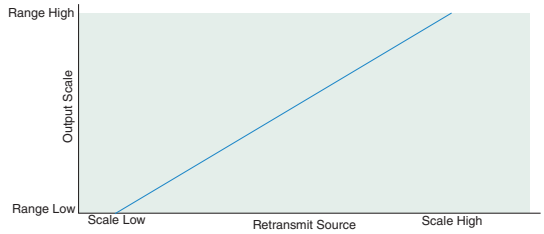
The retransmit feature allows a process output to provide an analog signal that represents the set point or process value. The signal may serve as a remote set point for another controller or as an input for a chart recorder documenting system performance over time.

In choosing the type of retransmit signal the operator must take into account the input impedance of the device to be retransmitted to and the required signal type, either voltage or milliamperes.

Typically, applications might use the retransmit option to record one of the variables with a chart recorder or to generate a set point for other controls in a multi-zone application.

Outputs 1 to 3 and 7 to 9 can be ordered as process outputs. Assign an analog source to Output Function to accomplish retransmit of a process or set point value.

Note:
The active set point is not retransmitted, only the user requested closed loop set point which may not be the closed loop set point in control. Retransmitting a profiling closed loop set point is not allowed.



Retransmit

Control Methods

Output Configuration

Each controller output can be configured as a heat output, a cool output, an alarm output or deactivated. No dependency limitations have been placed on the available combinations. The outputs can be configured in any combination. For instance, all three could be set to cool.

Heat and cool outputs use the set point and Operations parameters to determine the output value. All heat and cool outputs use the same set point value. Heat and cool each have their own set of control parameters. All heat outputs use the same set of heat control parameters and all cool outputs use the same set of cool output parameters.

Each alarm output has its own set of configuration parameters and set points, allowing independent operation.

Auto (closed loop) and Manual (open loop) Control

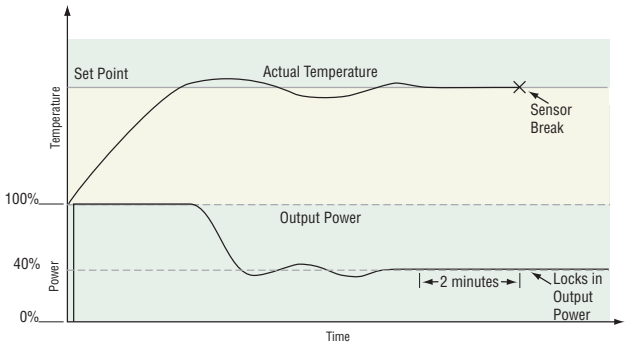
The controller has two basic modes of operation, auto mode and manual mode. Auto mode allows the controller to decide whether to perform closed-loop control or to follow the settings of Input Error Failure [FA iL] (Setup Page, Loop Menu). The manual mode only allows open-loop control. The EZ-ZONE® RMH controller is normally used in the auto mode. The manual mode is usually only used for specialty applications or for troubleshooting.

Manual mode is open-loop control that allows the user to directly set the power level to the controller's output load. No adjustments of the output power level occur based on temperature or set point in this mode.

In auto mode, the controller monitors the input to determine if closed-loop control is possible. The controller checks to make certain a functioning sensor is providing a valid input signal. If a valid input signal is present, the controller will perform closed-loop control. Closed-loop control uses a process sensor to determine the difference between the process value and the set point. Then the controller applies power to a control output load to reduce that difference.

If a valid input signal is not present, the controller will indicate an input error message in the upper display and [AtAn] in the lower display and respond to the failure according to the setting of Input Error Failure [FA iL]. You can configure the controller to perform a "bumpless" transfer [bPLS], switch power to output a preset fixed level [mAn], or turn the output power off.

Bumpless transfer will allow the controller to transfer to the manual mode using the last power value calculated in the auto mode if the process had stabilized at a ±5 percent output power level for the time interval of Time Integral (Operations Page, Loop) prior to sensor failure, and that power level is less than 75 percent.



Input Error Latching [iEr] (Setup Page, Analog Input Menu) determines the controller's response once a valid input signal returns to the controller. If latching is on, then the controller will continue to indicate an input error until the error is cleared. To clear a latched alarm, press the Advance Key then the Up Key.

If latching is off, the controller will automatically clear the input error and return to reading the temperature. If the controller was in the auto mode when the input error occurred, it will resume closed-loop control. If the controller was in manual mode when the error occurred, the controller will remain in open-loop control.

The Manual Control Indicator Light % is on when the controller is operating in manual mode.

You can easily switch between modes if the Control Mode [Cnm] parameter is selected to appear in the Home Page.

To transfer to manual mode from auto mode, press the Advance Key until [Cnm] appears in the lower display. The upper display will display [Auto] for auto mode. Use the Up or Down keys to select [mAn]. The manual set point value will be recalled from the last manual operation.

To transfer to auto mode from manual mode, press the Advance Key until [Cnm] appears in the lower display. The upper display will display [mAn] for manual mode. Use the Up or Down keys to select [Auto]. The automatic set point value will be recalled from the last automatic operation.

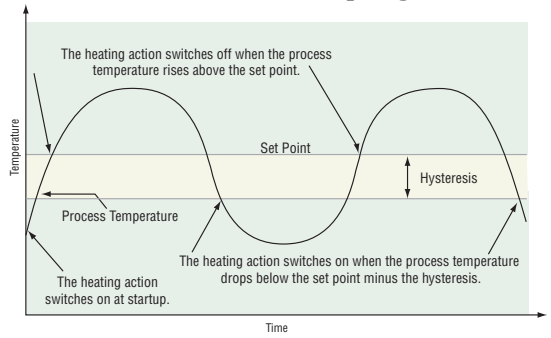
Changes take effect after three seconds or immediately upon pressing either the Advance Key or the Infinity Key.

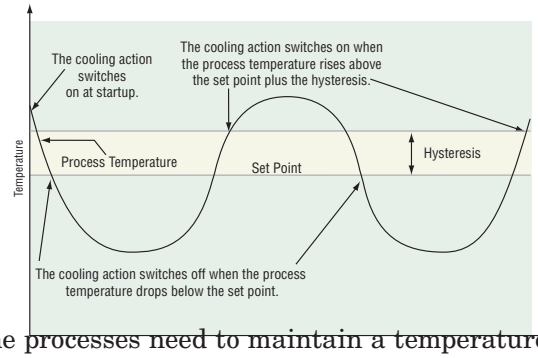
On-Off Control

On-off control switches the output either full on or full off, depending on the input, set point and hysteresis values. The hysteresis value indicates the amount the process value must deviate from the set point to turn on the output. Increasing the value decreases the number of times the output will cycle. Decreasing hysteresis improves controllability. With hysteresis set to 0, the process value would stay closer to the set point, but the output would switch on and off more frequently, and may result in the output "chattering." On-off control can be selected with Heat Algorithm [h.AG] or Cool Algorithm [C.AG] (Setup Page, Loop Menu). On-off hysteresis can be set with Heat Hysteresis [h.hY] or Cool Hysteresis [C.hY] (Operations Page, Loop Menu).

Note:

Input Error Failure Mode [FAIL] does not function in on-off control mode. The output goes off.





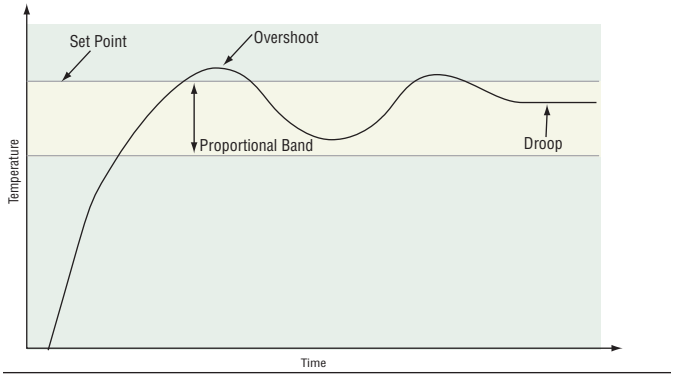
Some processes need to maintain a temperature or process value closer to the set point than on-off control can provide. Proportional control provides closer control by adjusting the output when the temperature or process value is within a proportional band. When the value is in the band, the controller adjusts the output based on how close the process value is to the set point.

The closer the process value is to the set point, the lower the output power. This is similar to backing off on the gas pedal of a car as you approach a stop sign. It keeps the temperature or process value from swinging as widely as it would with simple on-off control. However, when the system settles down, the temperature or process value tends to "droop" short of the set point.

With proportional control the output power level equals (set point minus process value) divided by the proportional band value.

In an application with one output assigned to heating and another assigned to cooling, each will have a separate proportional parameter. The heating parameter takes effect when the process temperature is lower than the set point, and the cooling parameter takes effect when the process temperature is higher than the set point.

Adjust the proportional band with Heat Proportional Band [h.Pb] or Cool Proportional Band [C.Pb] (Operations Page, Loop Menu).



Proportional plus Integral (PI) Control

The droop caused by proportional control can be corrected by adding integral (reset) control. When the system settles down, the integral value is tuned to bring the temperature or process value closer to the set point. Integral determines the speed of the correction, but this may increase the overshoot at startup or when the set point is changed. Too much integral action will make the system unstable. Integral is cleared when the process value is outside of the proportional band.

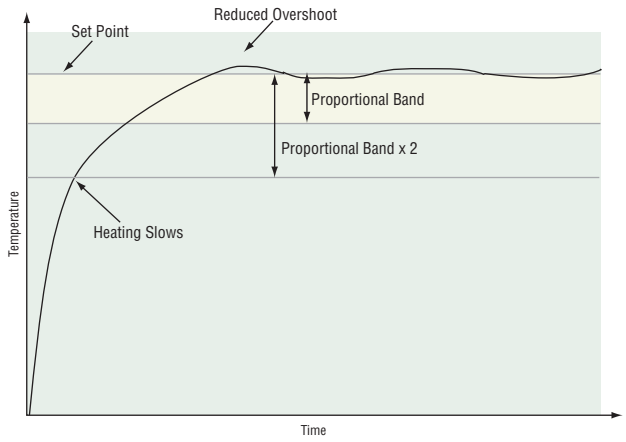
Adjust the integral with Time Integral [ti] (Operations Page, Loop Menu).

Proportional plus Integral plus Derivative (PID) Control

Use derivative (rate) control to minimize the overshoot in a PI-controlled system. Derivative (rate) adjusts the output based on the rate of change in the temperature or process value. Too much derivative (rate) will make the system sluggish.

Derivative action is active only when the process value is within twice the proportional value from the set point.

Adjust the derivative with Time Derivative [td] (Operations Page, Loop Menu).

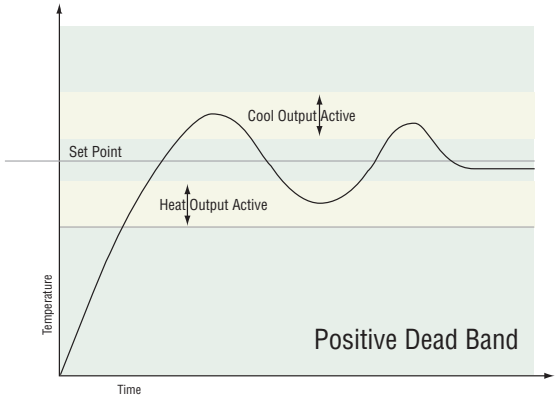


Dead Band

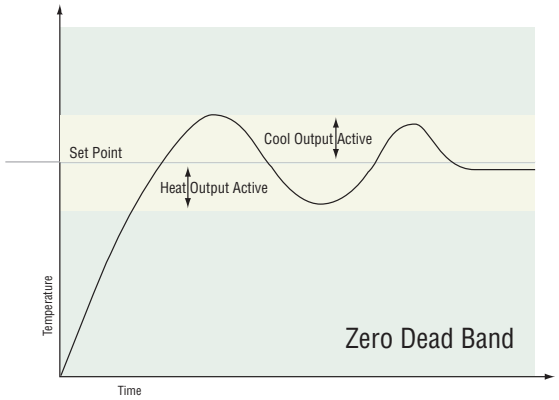
In a PID application the dead bands above and below the set point can save an application's energy and wear by maintaining process temperature within acceptable ranges.

Proportional action ceases when the process value is within the dead band. Integral action continues to bring the process temperature to the set point.

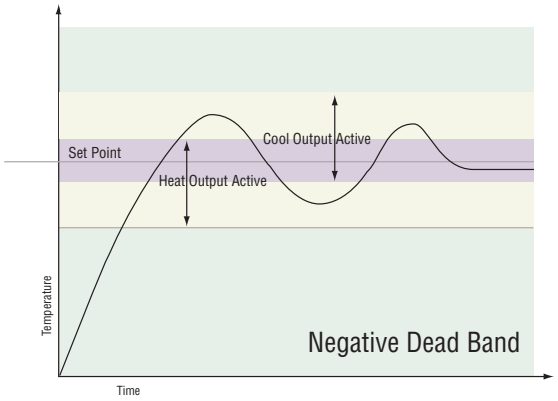
Using a **positive dead band value** keeps the two systems from fighting each other.



When the **dead band value is zero**, the heating output activates when the temperature drops below the set point, and the cooling output switches on when the temperature exceeds the set point.



When the **dead band value is a negative value,** both heating and cooling outputs are active when the temperature is near the set point.



Adjust the dead band with Dead Band db (Operations Page, Loop Menu).

Variable Time Base

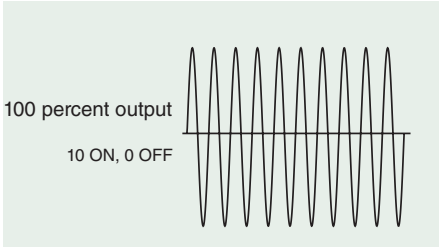
Variable time base is the preferred method for controlling a resistive load, providing a very short time base for longer heater life. Unlike phase-angle firing, variable-time-base switching does not limit the current and voltage applied to the heater.

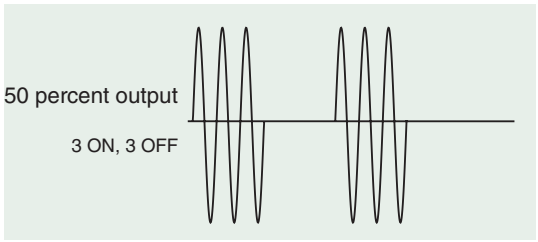
With variable time base outputs, the PID algorithm calculates an output between 0 and 100%, the output is distributed at a minimum of three ac line cycles. For each grouping of ac line cycles, the controller decides whether the power should be on or off. There is no fixed cycle time since the decision is made for each group of cycles. When used in conjunction with a zero cross (burst fire) device, such as a solid-state power controller, switching is done only at the zero cross of the ac line, which helps reduce electrical noise (RFI).

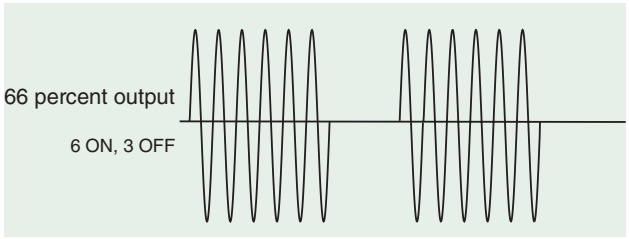
Variable time base should be used with solid-state power controllers, such as a solid-state relay (SSR) or silicon controlled rectifier (SCR) power controller. Do not use a variable time base output for controlling electromechanical relays, mercury displacement relays, inductive loads or heaters with unusual resistance characteristics.

The combination of variable time base output and a solid-state relay can inexpensively approach the effect of analog, phase-angle fired control.

Select the AC Line Frequency AC.LF (Setup Page, Global Menu), 50 or 60 Hz.







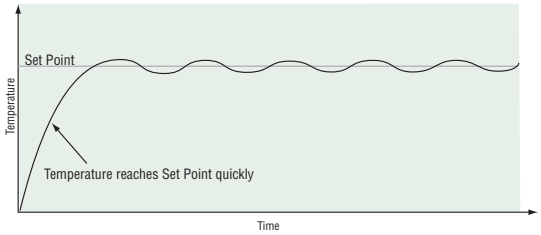
Single Set Point Ramping

Ramping protects materials and systems that cannot tolerate rapid temperature changes. The value of the ramp rate is the maximum degrees per minute or hour that the system temperature can change.

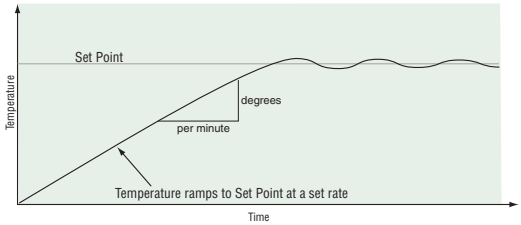
Select Ramp Action [rP] (Setup Page, Loop Menu):

- [oFF] ramping not active.
- [Str] ramp at startup.
- [StPt] ramp at a set point change.
- [both] ramp at startup or when the set point changes.

Select whether the rate is in degrees per minute or degrees per hour with Ramp Scale [r.SC]. Set the ramping rate with Ramp Rate [r.rt] (Setup Page, Loop Menu).



Heating System without Ramping



Heating System with Ramping

Alarms

Alarms are activated when the output level, process value or temperature leaves a defined range. A user can configure how and when an alarm is triggered, what action it takes and whether it turns off automatically when the alarm condition is over.

Configure alarm outputs in the Setup Page before setting alarm set points.

Alarms do not have to be assigned to an output. Alarms can be monitored and controlled through the front panel or by using software.

Process and Deviation Alarms

A process alarm uses one or two absolute set points to define an alarm condition.

A deviation alarm uses one or two set points that are defined relative to the control set point. High and low alarm set points are calculated by adding or subtracting offset values from the control set point. If the set point changes, the window defined by the alarm set points automatically moves with it.

Select the alarm type with Type [A.tY] (Setup Page, Alarm Menu).

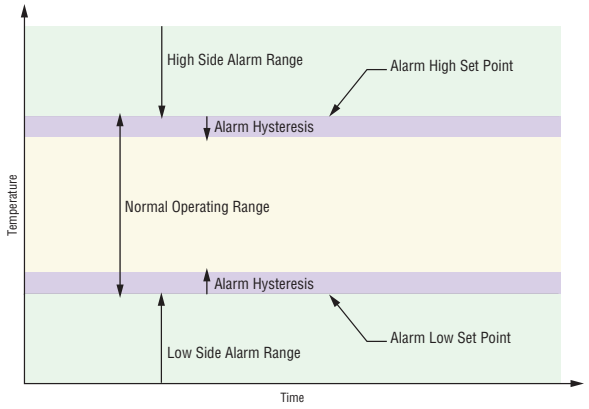
Alarm Set Points

The alarm high set point defines the process value or temperature that will trigger a high side alarm. The alarm low set point defines the temperature that will trigger a low side alarm. For deviation alarms, a negative set point represents a value below closed loop set point. A positive set point represents a value above closed loop set point. View or change alarm set points with Low Set Point [A.Lo] and High Set Point [A.hi] (Operations Page, Alarm Menu).

Alarm Hysteresis

An alarm state is triggered when the process value reaches the alarm high or alarm low set point. Alarm hysteresis defines how far the process must return into the normal operating range before the alarm can be cleared.

Alarm hysteresis is a zone inside each alarm set point. This zone is defined by adding the hysteresis value to the alarm low set point or subtracting the hysteresis value from the alarm high set point. View or change alarm hysteresis with Hysteresis [A.hY] (Setup Page, Alarm Menu).



Alarm Set Points and Hysteresis

Alarm Latching

A latched alarm will remain active after the alarm condition has passed. It can only be deactivated by the user.

An active message, such as an alarm message, will cause the RUI display to toggle between the normal settings and the active message in the upper display and [AtAn] in the lower display.

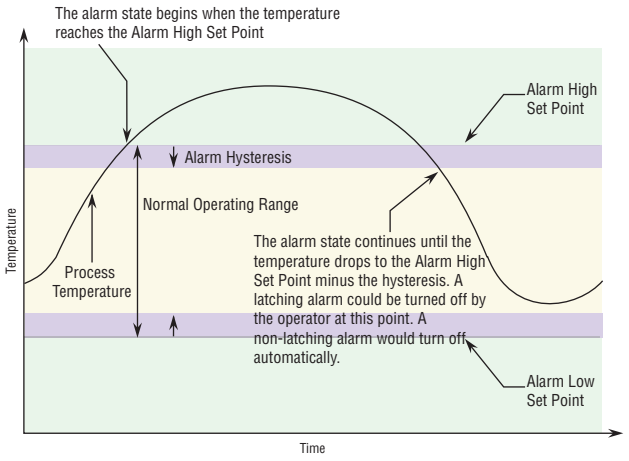
Push the Advance Key to display [iSnr] in the upper display and the message source in the lower display.

Use the Up or Down keys to scroll through possible responses, such as Clear [CLr] or Silence [SiL]. Then push the Advance or Infinity key to execute the action.

See the Keys and Displays chapter and the Home Page chapter for more details.

An alarm that is not latched (self-clearing) will deactivate automatically when the alarm condition has passed.

Turn alarm latching on or off with Latching [A.LA] (Setup Page, Alarm Menu).



Alarm Silencing

If alarm silencing is on the operator can disable the alarm output while the controller is in an alarm state. The process value or temperature has to enter the normal operating range beyond the hysteresis zone to activate the alarm output function again.

An active message, such as an alarm message, will cause the display to toggle between the normal settings and the active message in the upper display and [AtAn] in the lower display.

Push the Advance Key to display [iSnr] in the upper display and the message source in the lower display.

Use the Up and Down keys to scroll through possible responses, such as Clear [CLr] or Silence [SiL]. Then push the Advance or Infinity key to execute the action.

Turn alarm silencing on or off with Silencing [A.Si] (Setup Page, Alarm Menu).

Alarm Blocking

Alarm blocking allows a system to warm up after it has been started up. With alarm blocking on, an alarm is not triggered when the process temperature is initially lower than the alarm low set point or higher than the alarm high set point. The process temperature has to enter the normal operating range beyond the hysteresis zone to activate the alarm function.

Turn alarm blocking on or off with Blocking [A.bL] (Setup Page, Alarm Menu).

Open Loop Detection

When Open Loop Detection is enabled [L.dE], the controller will look for the power output to be at 100%. Once there, the control will then begin to monitor the Open Loop Detect Deviation [L.dd] as it relates to the value entered for the Open Loop Detect Time [L.dt]. If the specified time period expires and the deviation does not occur, an Open Loop Error will be triggered. Once the Open Loop Error condition exists the control mode will go off.

Note:
All prompts identified in this section can be found in the Loop Menu of the Setup Page.

Using Lockout to Hide Pages and Menus

If unintentional changes to parameter settings might raise safety concerns or lead to downtime, your can use the lockout feature to make them more secure.

Each of the menus in the Factory Page and each of the pages, except the Factory Page, has a security level assigned to it. You can change the read and write access to these menus and pages by using the parameters in the Lockout Menu (Factory Page).

Lockout Menu

There are five parameters in the Lockout Menu (Fac-

tory Page):

- Lock Operations Page [LoC.o] sets the security level for the Operations Page. (default: 2)

Note:
The Home and Setup Page lockout levels are fixed and cannot be changed.

- Lock Profiling Page [LoC.P] sets the security level for the Profiling Page. (default: 3)
- Password Security Enable [PAS.E] will turn on or off the Password security feature. (default: off)
- Read Lockout Security [rLoC] determines which pages can be accessed. The user can access the selected level and all lower levels. (default: 5)
- Set Lockout Security [SLoC] determines which parameters within accessible pages can be written to. The user can write to the selected level and all lower levels. (default: 5)

The table below represents the various levels of lockout for the Set Lockout Security prompt and the Read Lockout Security prompt. The Set Lockout has 6 levels (0-5) of security where the Read Lockout has 5 (1-5). Therefore, level "0" applies to Set Lockout only. "Y" equates to yes (can write/read) where "N" equates to no (cannot write/read). The colored cells simply differentiate one level from the next.

Lockout Security [SLoC] & [rLoC]						
Lockout Level	0	1	2	3	4	5
Home Page (0)	Y	Y	Y	Y	Y	Y
Operations Page (2)	N	N	Y	Y	Y	Y
Setup Page (4)	N	N	N	N	Y	Y
Factory Page						
Custom Menu (5)	N	N	N	N	N	Y
Diagnostic Menu (2)	N	Y	Y	Y	Y	Y
Calibration Menu (5)	N	N	N	N	N	Y
Lockout Menu						
[LoC.0]	N	Y	Y	Y	Y	Y
[LoC.P]	N	Y	Y	Y	Y	Y
[PAS.E]	N	Y	Y	Y	Y	Y
[rLoC]	Y	Y	Y	Y	Y	Y
[SLoC]	Y	Y	Y	Y	Y	Y

The following examples show how the Lockout Menu parameters may be used in applications:

1. You can lock out access to the Operations Page but allow an operator access to the Profile Menu, by changing the default Profile Page and Operations Page security levels. Change Lock Operations Page [LoC.o] to 3 and Lock Profiling Page [LoC.P] to 2. If Set Lockout Security [SLoC] is set to 2 or higher and the Read Lockout Security [rLoC] is set to 2, the Profiling Page and Home Pages can be accessed, and all writable parameters can be written to. Pages with security levels greater than 2 will be locked out (inaccessible).
2. If Set Lockout Security [SLoC] is set to 0 and Read Lockout Security [rLoC] is set to 5, all pages will be accessible, however, changes will not be allowed on any pages or menus, with one exception: Set Lockout Security [SLoC] can be changed to a higher level.
3. The operator wants to read all the menus and not allow any parameters to be changed.

   In the Factory Page, Lockout Menu, set Read Lockout Security [rLoC] to 5 and Set Lockout Security [SLoC] to 0.
4. The operator wants to read and write to the Home Page and Profiling Page, and lock all other pages and menus.

   In the Factory Page, Lockout Menu, set Read Lockout Security [rLoC] to 2 and Set Lockout Security [SLoC] to 2.

   In the Factory Page, Lockout Menu, set Lock Operations Page [LoC.0] to 3 and Lock Profiling Page [LoC.P] to 2.
5. The operator wants to read the Operations Page, Setup Page, Profiling Page, Diagnostics Menu, Lock Menu, Calibration Menu and Custom Menus. The operator also wants to read and write to the Home Page.

   In the Factory Page, Lockout Menu, set Read Lockout Security [rLoC] to 1 and Set Lockout Security [SLoC] to 5.

   In the Factory Page, Lockout Menu, set Lock Operations Page [LoC.0] to 2 and Lock Profiling Page [LoC.P] to 3.

Using Password Security

It is sometimes desirable to apply a higher level of security to the control where a limited number of menus are visible and not providing access to others without a security password. Without the appropriate password those menus will remain inaccessible. If Password Enabled [PAS.E] in the Factory Page under the [LoC] Menu is set to on, an overriding Password Security will be in effect. When in effect, the only Pages that a User without a password has visibility to are defined in the Locked Access Level [LoC.L] prompt. On the other hand, a User with a password would have visibility restricted by the Read Lockout Security [rLoC]. As an example, with Password Enabled and the Locked Access Level [LoC.L] set to 1 and [rLoC] is set to 3, the available Pages for a User without a password would be limited to the Home and Factory Pages (locked level 1). If the User password is entered all pages would be accessible with the exception of the Setup Page as defined by level 3 access.

How to Enable Password Security

Go to the Factory Page by holding down the Infinity key and the Advance key for approximately six seconds. Once there, push the Down key one time

to get to the [LoC] menu. Again push the Advance key until the Password Enabled [PAS.E] prompt is visible. Lastly, push either the up or down key to turn it on. Once on, 4 new prompts will appear:

1. [LoC.L], Locked Access Level (1 to 5) correspond ing to the lockout table above.
2. [roLL], Rolling Password will change the Customer Code every time power is cycled.
3. [PAS.u], User Password which is needed for a User to acquire access to the control.
4. [PAS.A], Administrator Password which is needed to acquire administrative access to the control.

The Administrator can either change the User and or the Administrator password or leave them in the default state. Once Password Security is enabled they will no longer be visible to anyone other than the Administrator. As can be seen in the formula that follows either the User or Administrator will need to know what those passwords are to acquire a higher level of access to the control. Back out of this menu by pushing the Infinity key. Once out of the menu, the Password Security will be enabled.

How to Acquire Access to the Control

To acquire access to any inaccessible Pages or Menus, go to the Factory Page and enter the [ULoC] menu. Once there follow the steps below:

Note:

If Password Security (Password Enabled [PAS.E] is On) is enabled the two prompts mentioned below in the first step will not be visible. If unknown, call the individual or company that originally setup the control.

1. Acquire either the User Password [PAS.u] or the Administrator Password [PAS.A].
2. Push the Advance key one time where the Code [CodE] prompt will be visible.

Note:

a. If the the Rolling Password is off push the Advance key one more time where the Password [PASS] prompt will be displayed. Proceed to either step 7a or 8a. Pushing the Up or Down arrow keys enter either the User or Administrator Password. Once entered, push and hold the Infinity key for two seconds to return to the Home Page.

b. If the Rolling Password [roLL] was turned on proceed on through steps 3 - 9.

3. Assuming the Code [CodE] prompt (Public Key) is still visible on the face of the control simply push the Advance key to proceed to the Password [PASS] prompt. If not find your way back to the Factory Page as described above.
4. Execute the calculation defined below (7b or 8b) for either the User or Administrator.
5. Enter the result of the calculation in the upper display play by using the Up and Down arrow keys or use EZ-ZONE Confgurator Software.
6. Exit the Factory Page by pushing and holding the Infinity key for two seconds.

Formulas used by the User and the Administrator to calculate the Password follows:

Passwords equal:

7. **User**
   a. If Rolling Password [roLL] is Off, Password [PASS] equals User Password [PAS.u].
   b. If Rolling Password [roLL] is On, Password [PASS] equals:
   ([PAS.u] x code) Mod 929 + 70

8. **Administrator**
   a. If Rolling Password [roLL] is Off, Password [PASS] equals User Password [PAS.A].
   b. If Rolling Password [roLL] is On, Password [PASS] equals:
   ([PAS.A] x code) Mod 997 + 1000

Differences Between a User Without Password, User With Password and Administrator

- User **without** a password is restricted by the Locked Access Level [LoC.L].
- A User **with** a password is restricted by the Read Lockout Security [rLoC] never having access to the Lock Menu [LoC].
- An Administrator is restricted according to the Read Lockout Security [rLoC] however, the Administrator has access to the Lock Menu where the Read Lockout can be changed.

Modbus - Using Programmable Memory Blocks

When using the Modbus protocol, the RMH features a block of addresses that can be configured by the user to provide direct access to a list of 80 user configured parameters. This allows the user easy access to this customized list by reading from or writing to a contiguous block of registers.

To acquire a better understanding of the tables found in the back of this manual (See Appendix: (Modbus Programmable Memory Blocks) please read through the text below which defines the column headers used.

Assembly Definition Addresses

- Fixed addresses used to define the parameter that will be stored in the "Working Addresses", which may also be referred to as a pointer. The value stored in these addresses will reflect (point

to) the Modbus address of a parameter within the controller.

Assembly Working Addresses

- Fixed addresses directly related to their associated "Assembly Definition Addresses" (e.g., Assembly Working Addresses 200 & 201 will assume the parameter pointed to by Assembly Definition Addresses 40 & 41).

When the Modbus address of a target parameter is stored in an "Assembly Definition Address" its corresponding working address will return that parameter's actual value. If it's a writable parameter, writing to its working register will change the parameter's actual value.

As an example, Modbus register 410 contains the Analog Input 1 Process Value (See Operations Page, Analog Input Menu). If the value 410 is loaded into Assembly Definition Address 91, the process value sensed by analog input 1 will also be stored in Modbus registers 250 and 251. Note that by default all registers are set to Hardware ID.

The table (See Appendix: Modbus Programmable Memory Blocks) identified as "Assembly Definition Addresses and Assembly Working Addresses" reflects the assemblies and their associated addresses.

Software Configuration

Using EZ-ZONE® Configurator Software

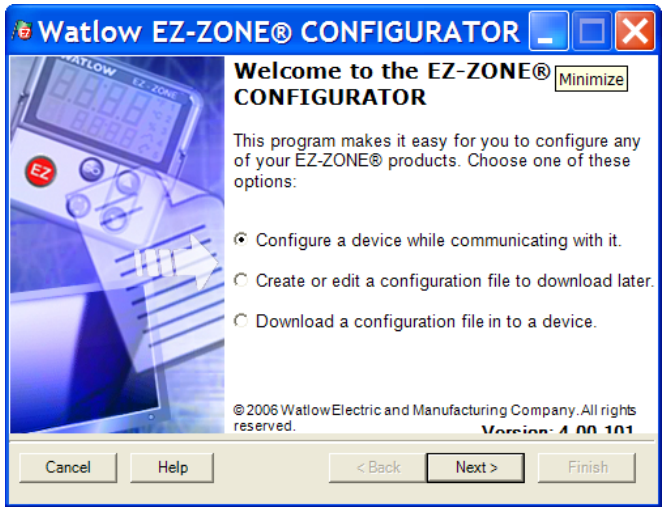
To enable a user to configure the RMH control using a personal computer (PC), Watlow has provided free software for your use. If you have not yet obtained a copy of this software insert the CD (Controller Support Tools) into your CD drive and install the software. Alternatively, if you are viewing this document electronically and have a connection to the internet simply click on the link below and download the software from the Watlow web site free of charge.

http://www.watlow.com/products/software/zone_config.cfm

Once the software is installed double click on the EZ-ZONE Configurator icon placed on your desktop during the installation process. If you cannot find the icon follow the steps below to run the software:

1. Move your mouse to the "Start" button
2. Place the mouse over "All Programs"
3. Navigate to the "Watlow" folder and then the subfolder "EZ-ZONE Configurator"
4. Click on EZ-ZONE Configurator to run.

The first screen that will appear is shown below.



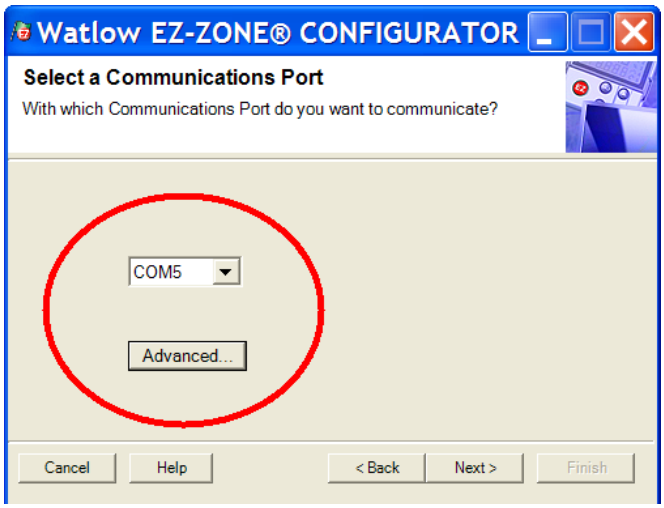
If the PC is already physically connected to the EZ-ZONE RMH control click the next button to go online.

Note:

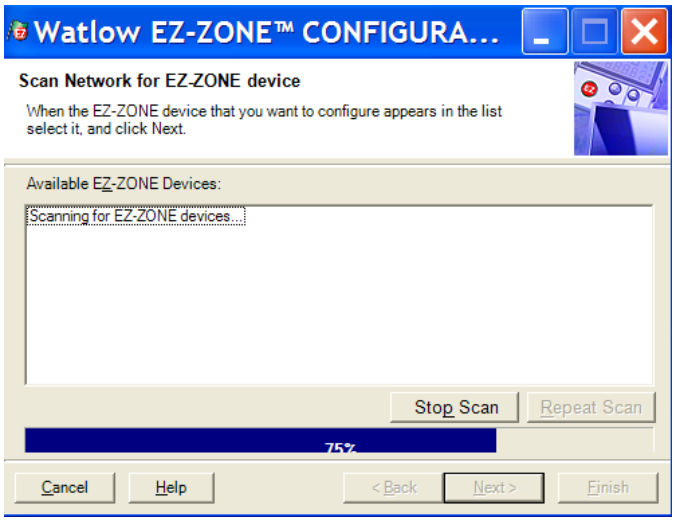
When establishing communications from PC to the RMH control an interface converter will be required. The Standard Bus network uses EIA-485 as the interface. Most PCs today would require a USB to EIA-485 converter. However, some PCs may still be equipped with EIA-232 ports, therefore an EIA-232 to EIA-485 converter would be required.

As can be seen in the above screen shot the software provides the user with the option of downloading a previously saved configuration as well as the ability to create a configuration off-line to download later. The screen shots that follow will take the user on-line.

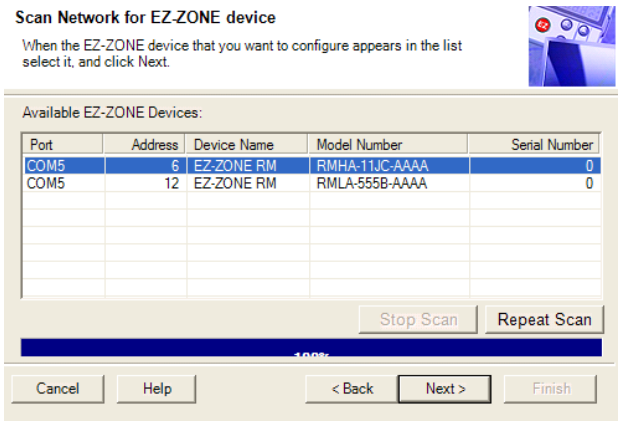
After clicking the next button above it is necessary to define the communications port on the PC to use.



The available options allow the user to select "Try them all" or to use a specific known communications port. After installation of your converter if you are not sure which communications port was allocated select "Try them all" and then click next. The screen to follow shows that the software is scanning for devices on the network and that progress is being made.



When complete, the software will display all of the available devices found on the network as shown below.

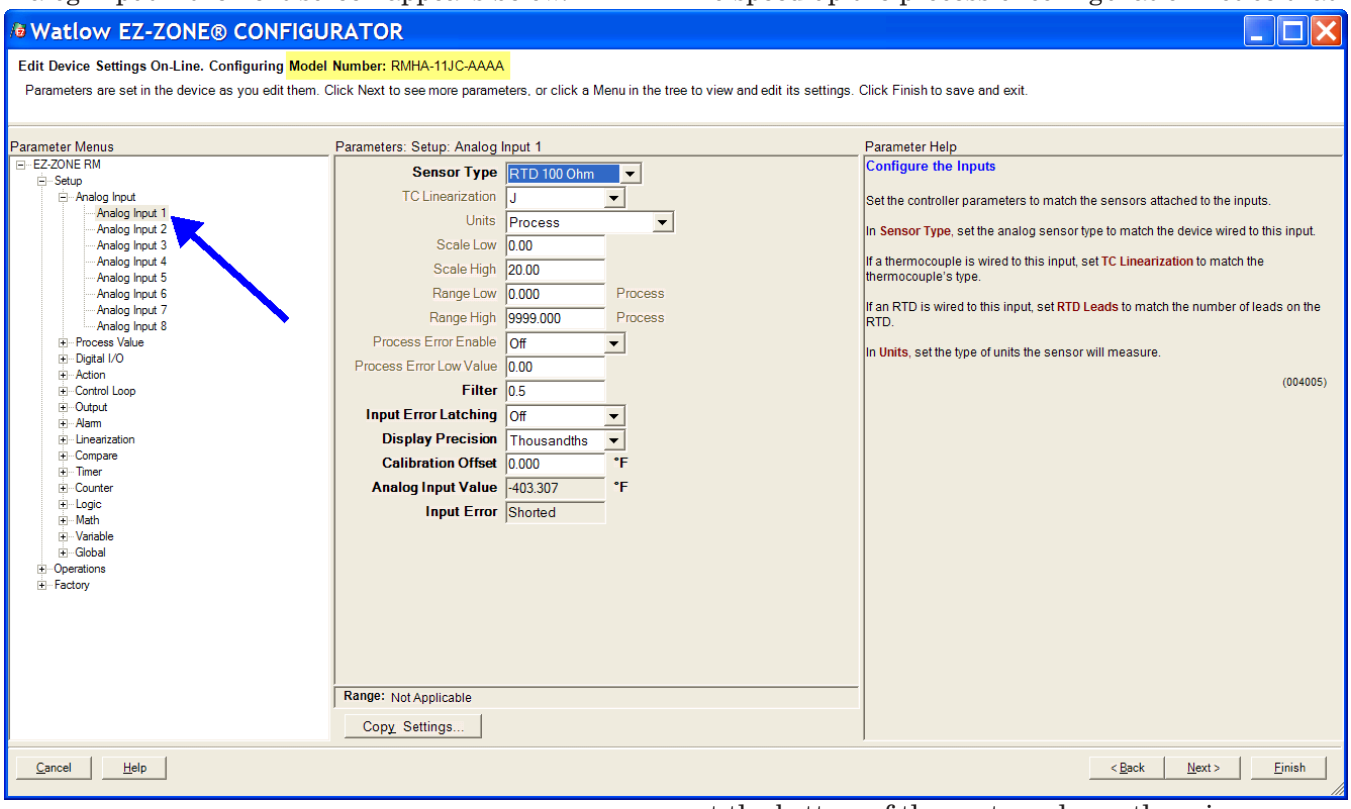


In the previous screen shot the RMH is shown high-

lighted (address 6) to bring greater clarity to the control in focus. Any EZ-ZONE device on the network will appear in this window and would be available for the purpose of configuration or monitoring. After clicking on the control of choice simply click the next button once again. After clicking on Setup and then Analog Input 1 the next screen appears below.

to that parameter will appear in the center column. The grayed out fields in the center column simply mean that this parameter does not apply for the type of sensor selected. As an example, notice that when RTD is selected,TC Linearization does not apply and is therefore grayed out.

To speed up the process of configuration notice that



In the screen shot above notice that the device part number is clearly displayed at the top of the page (yellow highlight added for emphasis). When multiple EZ-ZONE devices are on the network it is important that the part number be noted prior to configuring so as to avoid making unwanted configuration changes to another control.

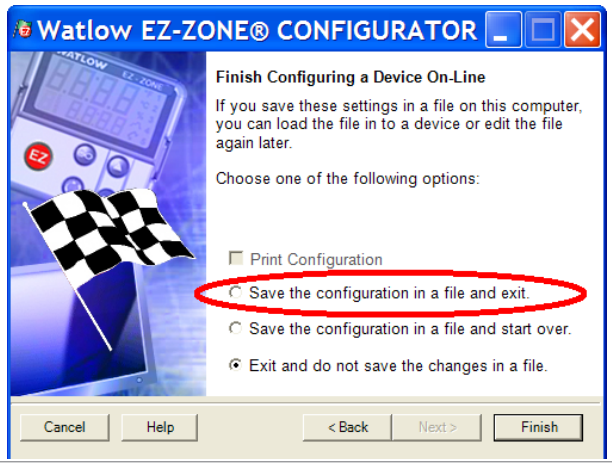
Looking closely at the left hand column (Parameter Menus) notice that when first entering this screen it displays all of the available Pages (Setup, Operations and Factory) at a high level. After clicking on any of the available pages the sub menus and associated parameters for each will appear as shown above. The Page structure as laid out within this software follows:

- Setup
- Operations
- Factory

Navigating from one Page to the next is easy and clearly visible. Simply clicking on the plus symbol next to Setup will expand the Setup Page where all of the sub-menus will appear next. If a vertical scroll bar appears click on the up or down arrow to view all of the available menus on the selected page. Once the focus is brought to an individual parameter (single click of mouse) as is the case for Analog Input 1 in the left column, all that can be setup related at the bottom of the center column there is an operation to copy settings. If Analog Input 1 and 2 are the same type of sensor click on "Copy Settings" where a copy from to copy to dialog box will appear allowing for quick duplication of all settings.

Notice too, that by clicking on any of those items in the center column that context sensitive help will appear for that particular item in the right hand column.

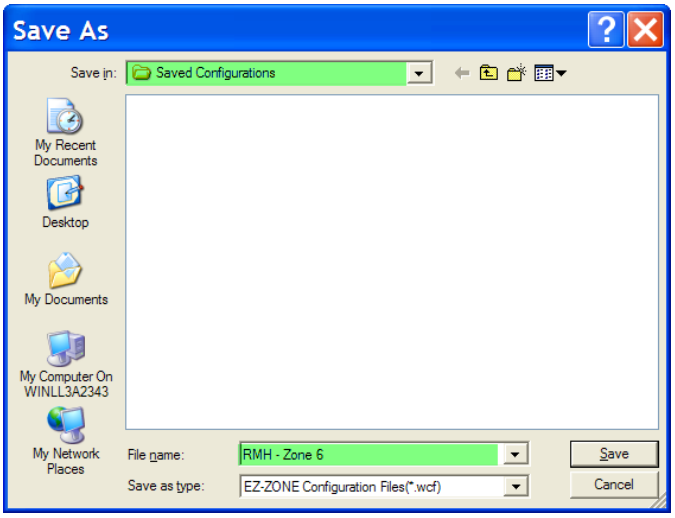
Lastly, when the configuration is complete click the "Finish" button at the bottom right of the previous screen shot. The screen that follows this action can be seen below.



Although the RMH control now contains the configuration (because the previous discussion focused on doing the configuration on-line) it is suggested that after the configuration process is completed that the user save this file on the PC for future use. If for some reason someone inadvertently changed a setting without understanding the impact it would be easy and perhaps faster to download a saved configuration back to the control versus trying to figure out what was changed.

Of course, there is an option to exit without saving a copy to the local hard drive.

After selecting Save above click the "Finish" button once again. The screen below will than appear.



When saving the configuration note the location where the file will be placed (Saved in) and enter the file name (File name) as well. The default path for saved files follows:

My Documents\Watlow\EZ-ZONE CONFIGURATOR\Saved Configurations

The user can save the file to any folder of choice.

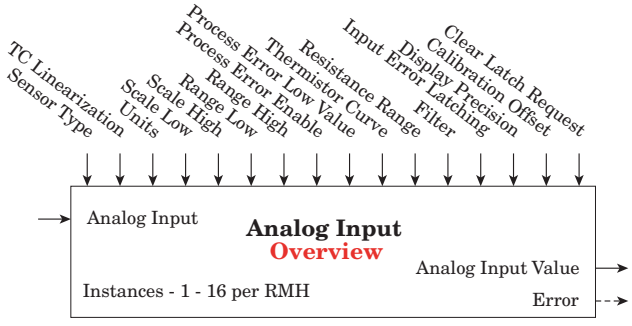
Function Block Descriptions

Each of the next several pages graphically shows each of the RMH function blocks. Note that as you view each you will find text that is black and text that appears gray. The gray text represents inputs that are not currently available based on the function's defined use (red text). For instance when the defined use of the Analog Input function is set for RTD, TC Linearization will appear gray. Ranges specified in units or degrees F, if expressed in degrees C, range is smaller

Analog Input Function

Note:

This Function configures and connects physical inputs to internal functions. Control Loop primary source instance must match Process Value or Analog Input instance.



Analog Input Menu
Setup Page

Sensor Type : Off, Thermocouple, Millivolts, Volts, Milliamps, RTD 100 Ohm, RTD 1000 Ohm, 1K Potentiometer, Thermistor (optional)

TC Linearization : B, C, D, E, F, J, K, N, R, S, T

Units : Absolute Temperature, Power, Process, Relative Humidity

Scale Low : -100.00 to 1000.00

Scale High : -100.00 to 1000.00

Range Low : -1,999.000 to 9,999.000

Range High : -1,999.000 to 9,999.000

Process Error Enable : Off, Low

Process Error Low Value : -100.00 to 1,000.00

Thermistor Curve : Curve A, Curve B, Curve C, Custom

Resistance Range : 5k, 10k, 20k, 40k

Filter : 0.0 to 60.0 seconds

Input Error Latching : Off, On

Display Precision : Whole, Tenths, Hundredths, Thousandths

Calibration Offset : -1,999.000 to 9,999.000

Analog Input Value : -1,999.000 to 9,999.000

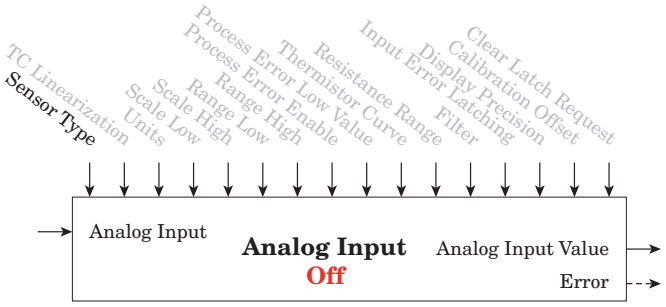
Input Error : None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Not Sourced

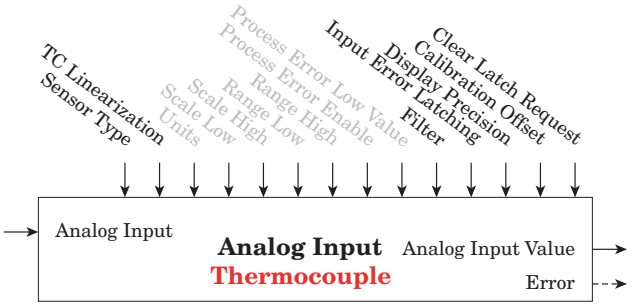
Analog Input Menu
Operation Page

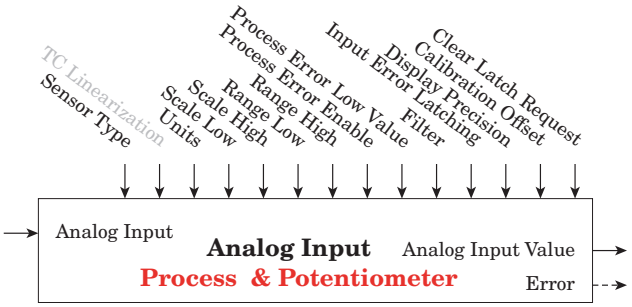
Analog Input Value : -1,999.000 to 9,999.000

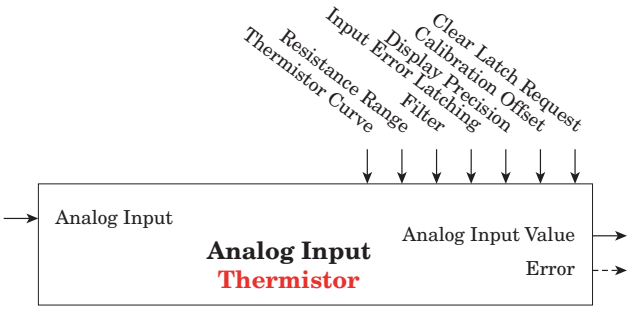
Input Error : None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Not Sourced

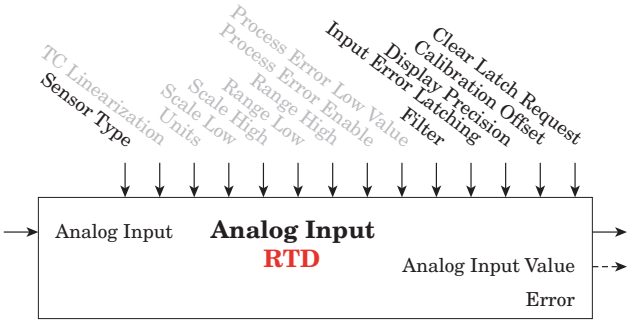
Calibration Offset : -1,999.000 to 9,999.000







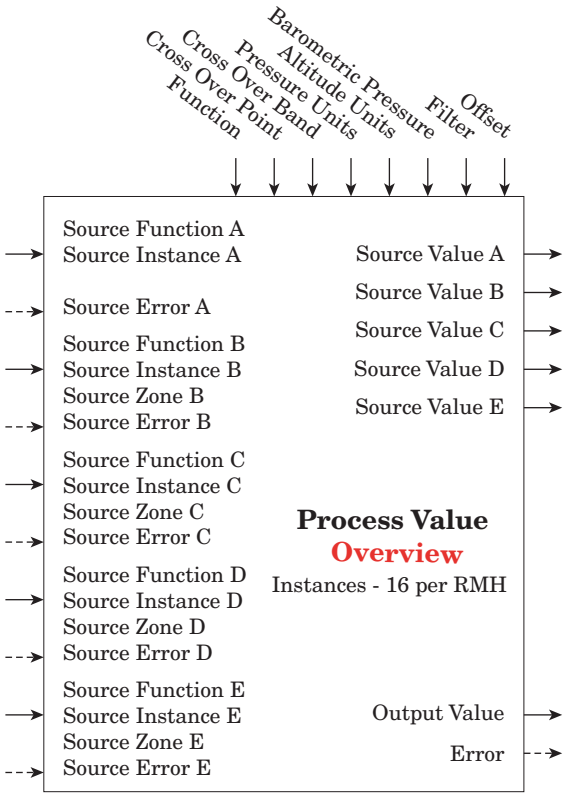




Process Value Function

The Process Value (PV) function block accepts multiple inputs and performs a programmed math function to derive an output value with Filter and Offset values applied. It is assumed that no input error conditions apply. Some PV operations must be performed in the user's units. Functions may combine multiple inputs. Those inputs may have incompatible units from a logical point of view. As a result, unless otherwise indicated, the presentation of the output value is the same as Source A. This accommodates temperatures being multiplied, divided and offset by constants and process inputs. Only inputs that have a source associated to them are used in the calculations.

An error, when read, can indicate any of the following: None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Math Error, Not Sourced, Stale



SEt Setup Page
Pu Process Value Menu

Fn Function : Off, Sensor Backup, Average, Crossover, Wet Bulb/Dry Bulb, Switch Over, Differential, Ratio, Add, Multiply, Absolute Difference, Minimum, Maximum, Square Root, Vaisala RH Compensation, Pressure to Altitude

SFnA Source Function A : Analog Input, Process Value

SiA Source Instance A : 1 to 250

S2A Source Zone A : 0 to 16

SFnb Source Function B : None, Analog Input, Linearization, Math, Process Value, Variable

Sib Source Instance B : 1 to 250

S2b Source Zone B : 0 to 16

SFnC Source Function C : None, Analog Input, Linearization, Math, Process Value, Variable

SiC Source Instance C : 1 to 250

S2C Source Zone C : 0 to 16

SFnd Source Function D : None, Analog Input, Linearization, Math, Process Value, Variable

Sid Source Instance D : 1 to 250

S2d Source Zone D : 0 to 16

SFnE Source Function E : None, Alarm, Compare, Counter, Digital I/O, Profile Event Out A to H, Function Key, Logic, Timer, Variable

SiE Source Instance E : 1 to 250

S2E Source Zone E : 0 to 16

CP Cross Over Point : -1,999.000 to 9,999.000

Cb Cross Over Band : -1,999.000 to 9,999.000

Punt Pressure Units : PSI, Torr, mBar, Atmosphere, Pascal

Aunt Altitude Units : Feet, Kilofeet

bPr Barometric Pressure : 10.0 to 16.0

FiL Filter : 0.0 to 60.0 seconds

oPEr Operation Page
Pu Process Value Menu

SuA Source Value A : -1,999.000 to 9,999.000

Sub Source Value B : -1,999.000 to 9,999.000

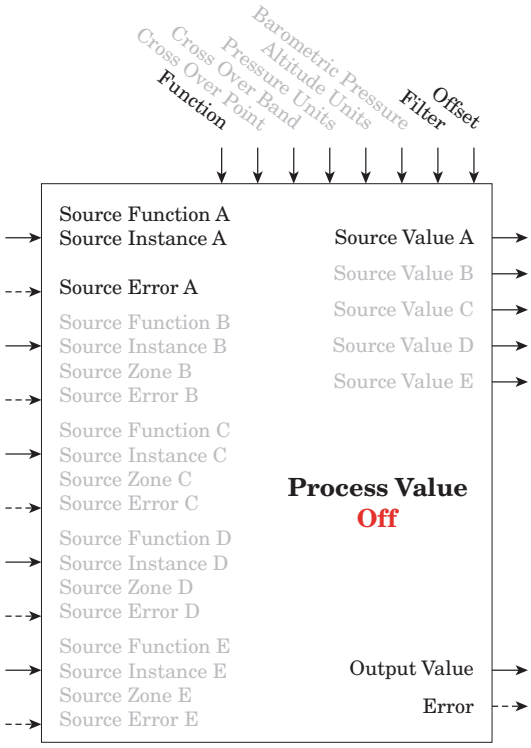
SuC Source Value C : -1,999.000 to 9,999.000

Sud Source Value D : -1,999.000 to 9,999.000

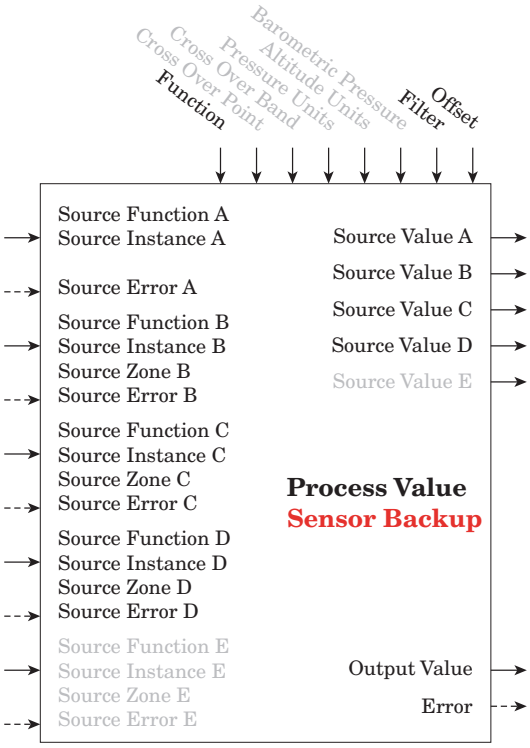
SuE Source Value E : Off, On

ou Output Value : -1,999.000 to 9,999.000

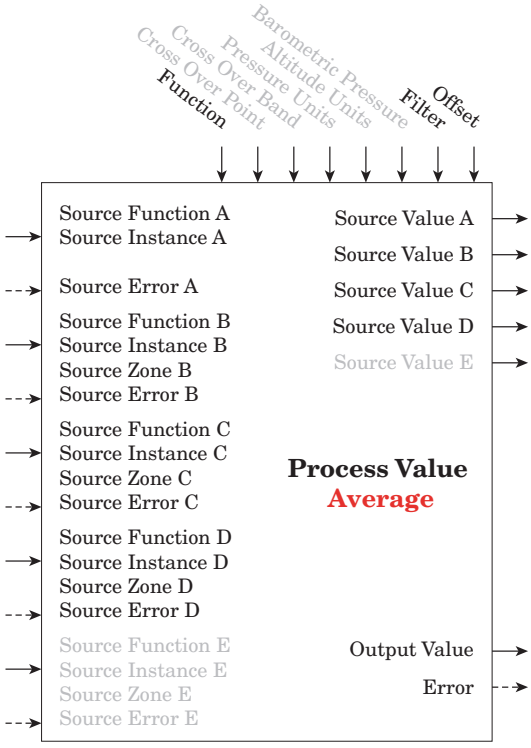
oFSt Offset : -1,999.000 to 9,999.000



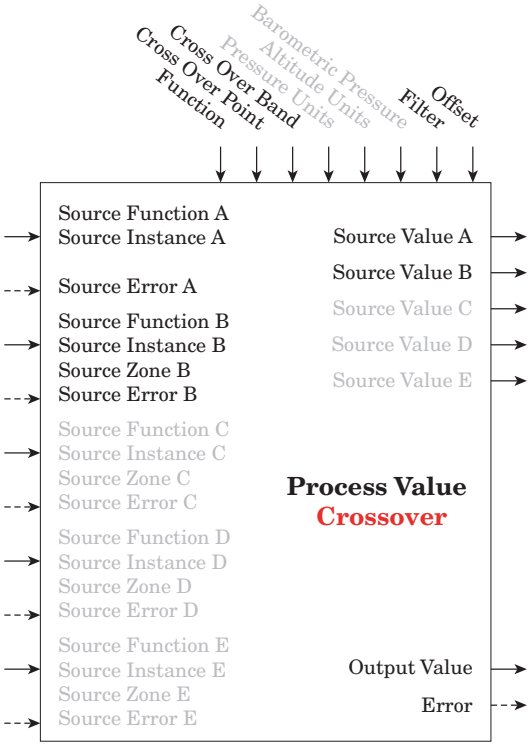
Output Value = Filter [A + Offset]
Display units follows Source A



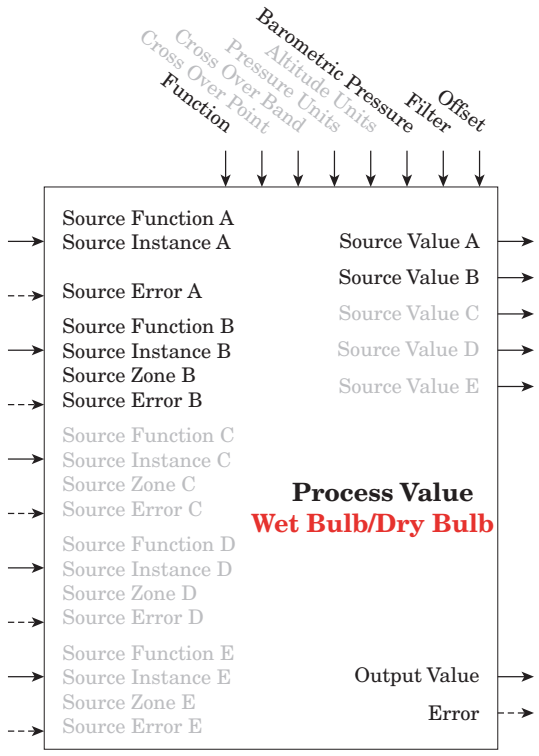
Output Value = Filter [first assigned Source without an error + Offset]



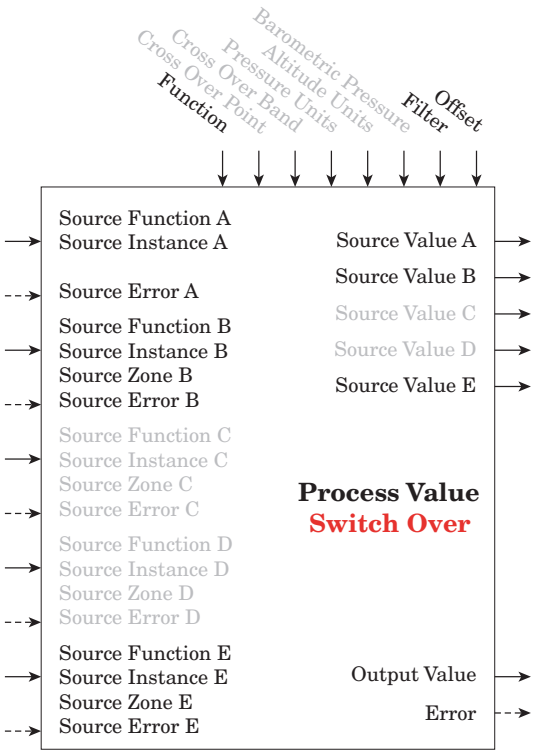
Output Value = Filter [(Average (A + B + C + D)) + Offset]
Display units follows the last source that is temperature else follow Source A



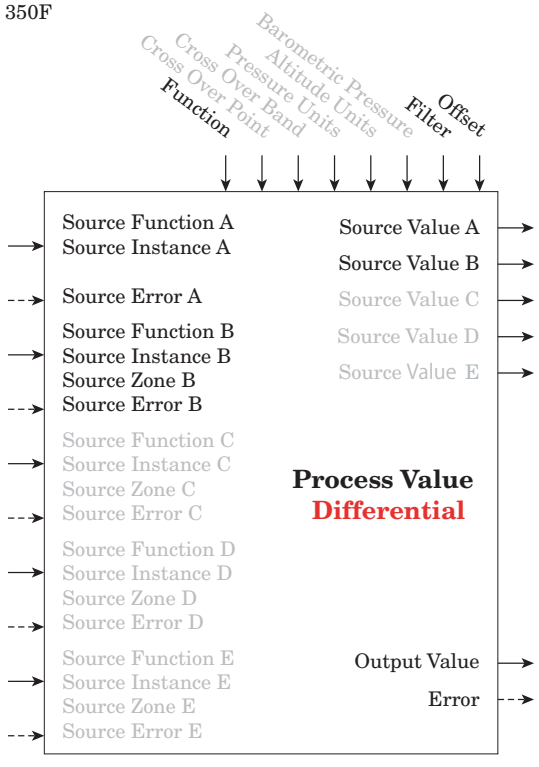
If A <= Cross Over Point - (Cross Over Band / 2) THEN
Output Value = Filter [(A + Offset)]
If A >= Cross Over Point + (Cross Over Band / 2) THEN
Output Value = Filter[(B + Offset)]
Output Value = Filter [((A * X) + (B * (1-X))) + Offset]
Where variable X = (Cross Over Point + (Cross Over Band / 2) - A) / Cross Over Band



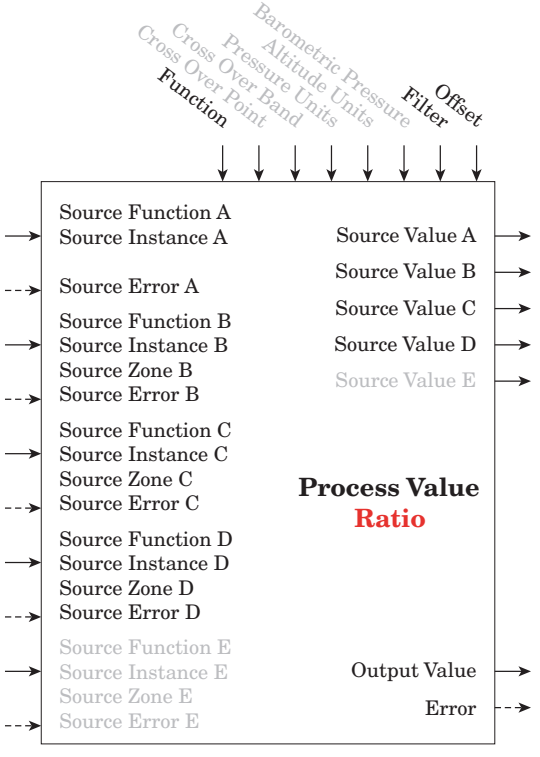
Output Value = Filter [Calculated Humidity + Offset] where Source A is the Dry Bulb and Source B is the Wet Bulb
Note: Wet/Dry bulb temperatures are in degrees F and pressures are in PSI. Output Value is % relative humidity. Useful temperature range is 10 to 350F



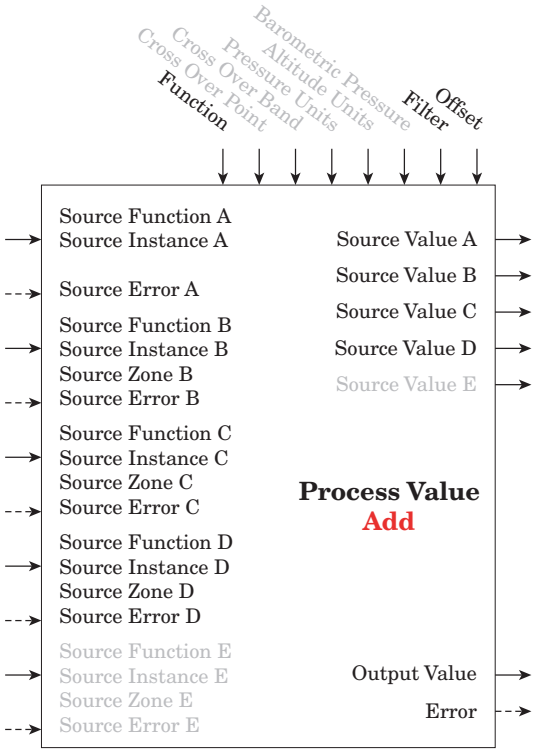
If E = OFF, Output Value = Filter [A + Offset]
If E = ON, Output Value = Filter [B + Offset]
Display units follows active source.



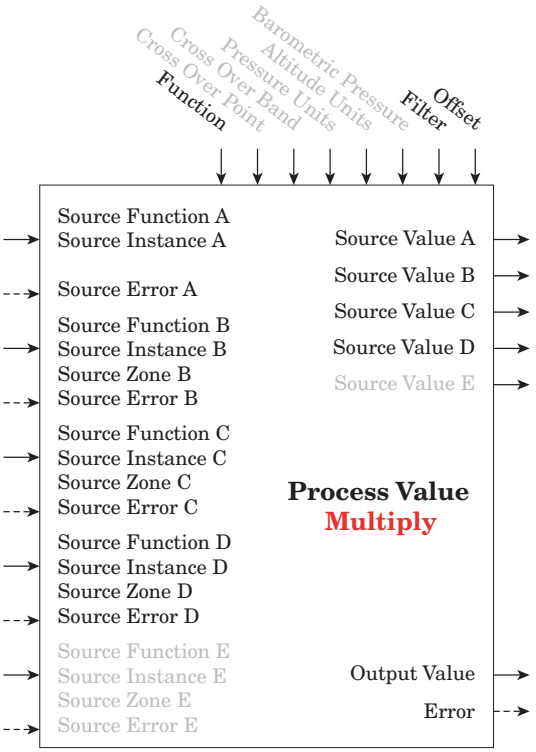
Output Value = Filter [(A - B) + Offset]
Display units follows Source A plus relative Source B



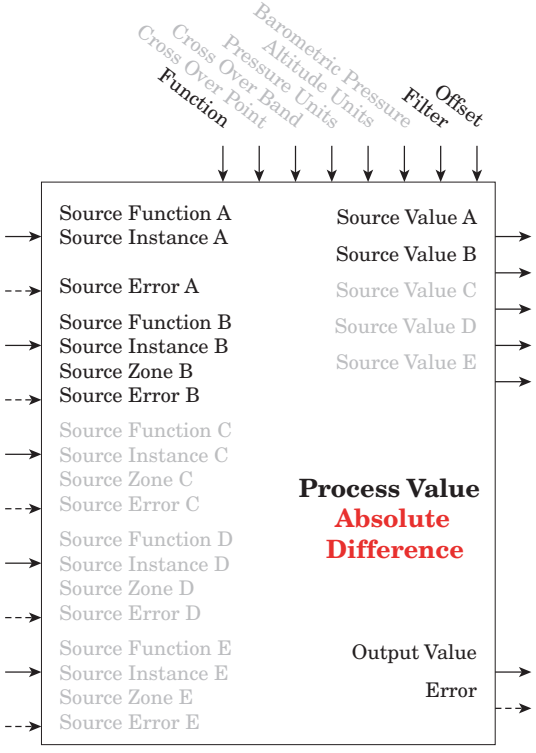
Output Value = Filter [(A / B) + Offset]
If display units of Source A = Source B, no display units on output value, else follow Source A



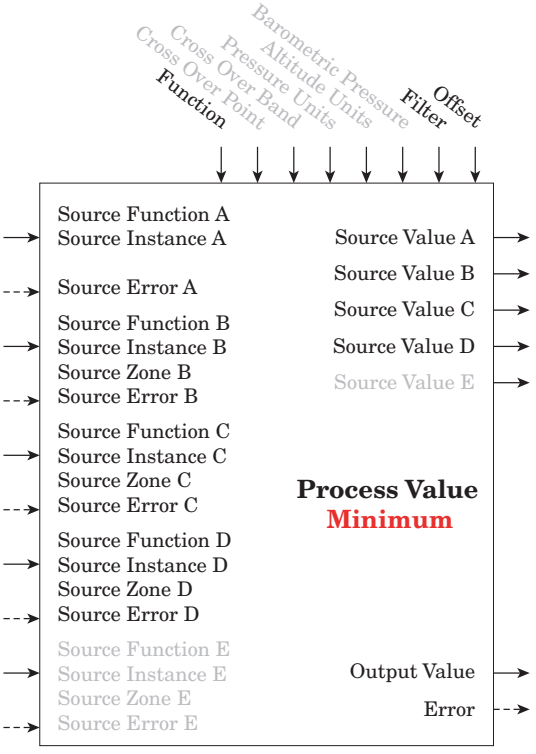
Output Value = Filter [(A + B + C + D) + Offset]
Display units follows last temperature source else follow Source A



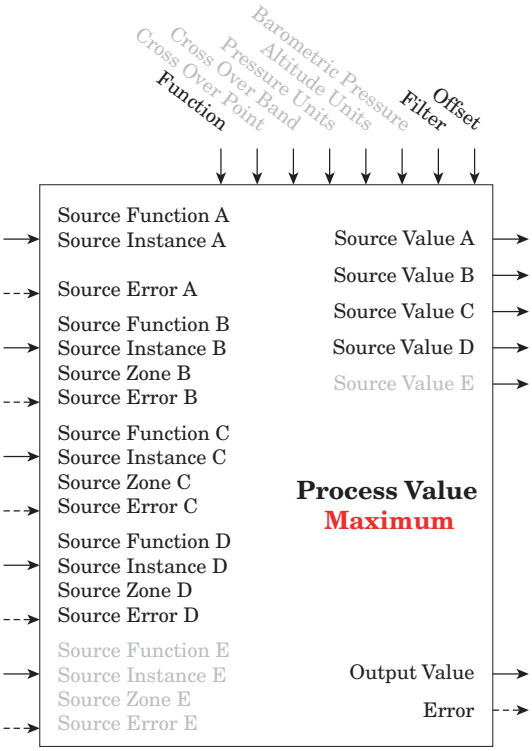
Output Value = Filter [(A * B * C * D) + Offset]
Display units follows last temperature source else follow Source A



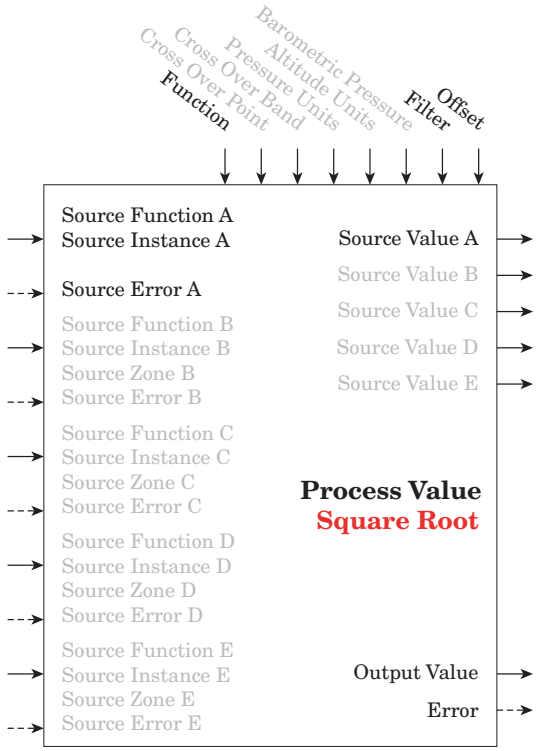
Output Value = Filter [| A - B | + Offset]
Display units follow Source A plus relative Source B



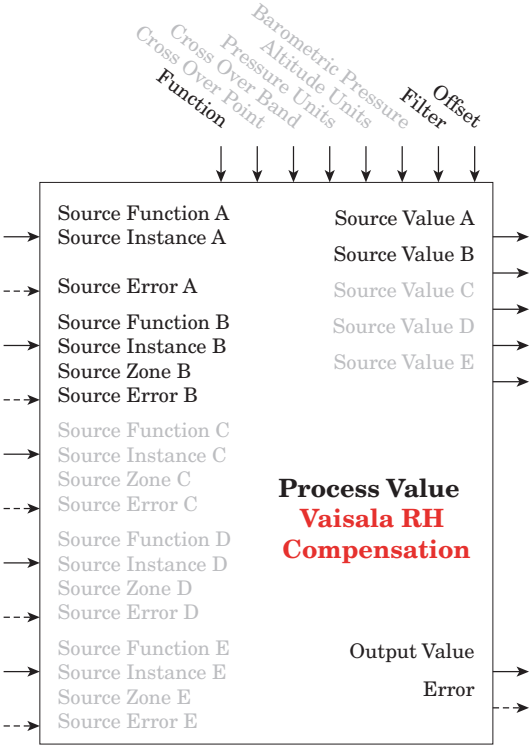
Output Value = Filter [Minimum Value (A : B : C : D) + Offset]
Display units follows Source with minimum value.



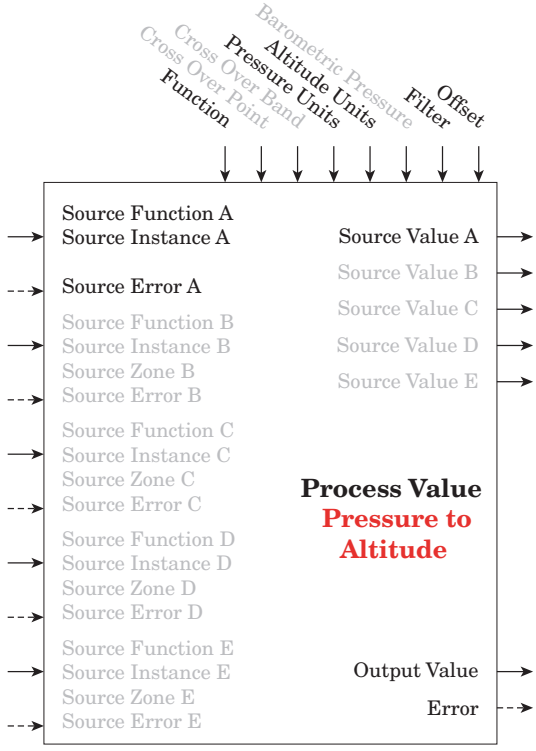
Output Value = Filter [Maximum Value (A : B : C : D) + Offset]
Display units follows Source with maximum value.



Output Value = Filter [Sqr Root A + Offset]
Display units follows Source A



Output Value = Filter [Calculated RH compensated for temperature + Offset].
Note: Source A is RH measured value from an uncompensated Vaisala RH sensor. Source B is temperature of the RH sensor in degrees F. The result is a "corrected" RH measured value. This calculation is effective over the temperature range of -75F to 350F.

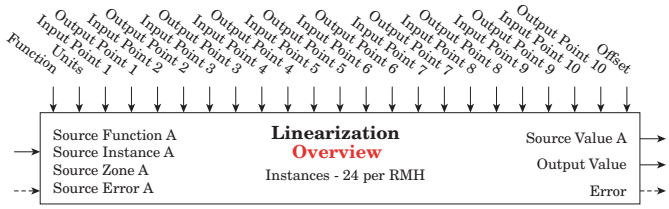


Output Value = Filter [Convert Source A in Pressure to Altitude + Offset]

Note: Pressure Altitude calculation is based on the International Standard Atmosphere 1976. Source A is a pressure signal and needs to be in PSI units for the calculation. The calculation is accurate from sea level to 90,000 feet. The standard is based on an altitude of 0 feet (sea level) pressure of 14.6967 PSI and a temperature of 59 degrees F. Result of calculation is in feet.

Linearization Function

An error, when read, can indicate any of the following: None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Math Error, Not Sourced, Stale



Loc Linearization
SEt Setup Page

Fn Function : Off, Interpolated, Stepped

SFnA Source Function A : None, Analog Input, Current, Cool Power, Heat Power, Power, Linearization, Math, Process Value, Set Point Closed, Set Point Open, Variable

S iA Source Instance A : 1 to 250

SZA Source Zone A : 0 to 16

Un it Units : Source, None, Absolute Temperature, Relative Temperature, Power, Process, Relative Humidity

iP 1 Input Point 1 : -1,999.000 to 9,999.000

oP 1 Output Point 1 : -1,999.000 to 9,999.000

iP2 Input Point 2 : -1,999.000 to 9,999.000

oP2 Output Point 2 : -1,999.000 to 9,999.000

iP3 Input Point 3 : -1,999.000 to 9,999.000

oP3 Output Point 3 : -1,999.000 to 9,999.000

iP4 Input Point 4 : -1,999.000 to 9,999.000

oP4 Output Point 4 : -1,999.000 to 9,999.000

iP5 Input Point 5 : -1,999.000 to 9,999.000

oP5 Output Point 5 : -1,999.000 to 9,999.000

iP6 Input Point 6 : -1,999.000 to 9,999.000

oP6 Output Point 6 : -1,999.000 to 9,999.000

iP7 Input Point 7 : -1,999.000 to 9,999.000

oP7 Output Point 7 : -1,999.000 to 9,999.000

iP8 Input Point 8 : -1,999.000 to 9,999.000

oP8 Output Point 8 : -1,999.000 to 9,999.000

iP9 Input Point 9 : -1,999.000 to 9,999.000

oP9 Output Point 9 : -1,999.000 to 9,999.000

iP 10 Input Point 10 : -1,999.000 to 9,999.000

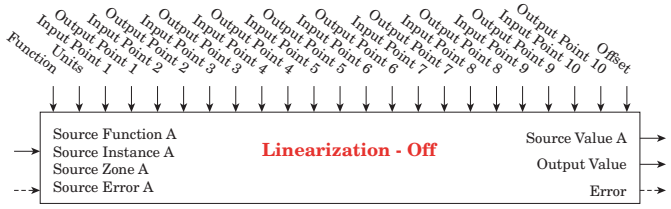
oP 10 Output Point 10 : -1,999.000 to 9,999.000

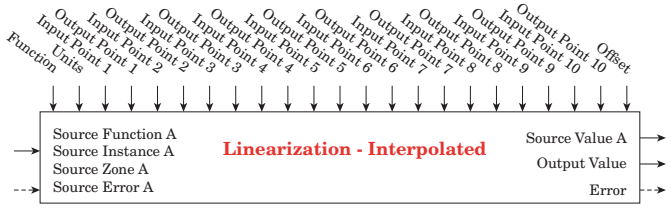
Loc Linearization Menu
oPEr Operation Page

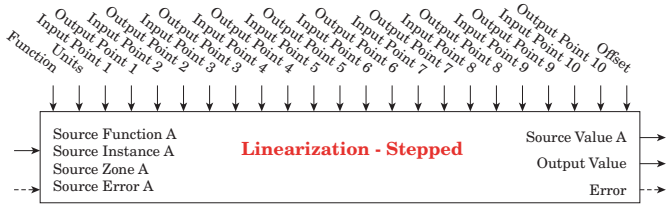
SvA Source Value A : -1,999.000 to 9,999.000

oFSt Offset : -1,999.000 to 9,999.000

ov Output Value : -1,999.000 to 9,999.000





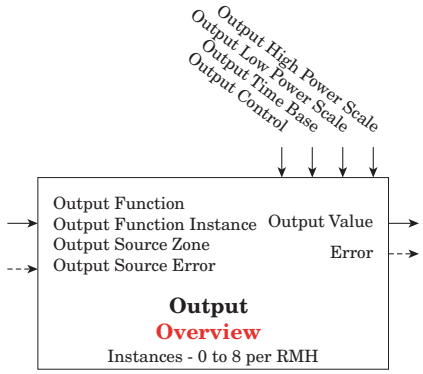


Output Function

This function configures and connects physical outputs to internal functions.

Note:
Digital Outputs not included on these sheets

An error, when read, can indicate any of the following: None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Math Error, Not Sourced, Stale



SEt Setup Page
otPt Output Menu

Fn Output Function : Off, Analog Input, Alarm, Cool Power, Heat Power, Compare, Counter, Digital I/O. Profile Event Out A to H, Function Key, Logic, Linearization, Math, Process Value, Special Function Output 1 to 4, Timer, Variable, Limit

F i Output Function Instance : 1 to 250

SZ Output Source Zone : 0 to 16

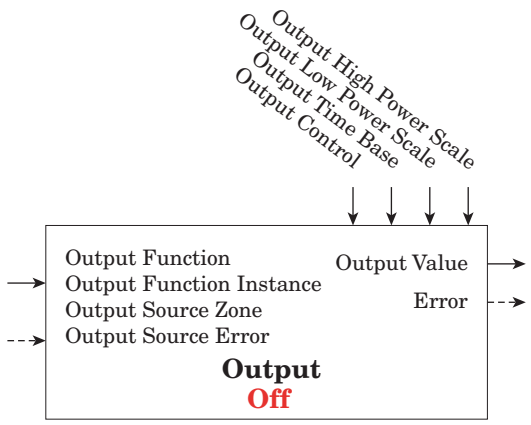
o.Ct Output Control : Fixed Time Base, Variable Time Base

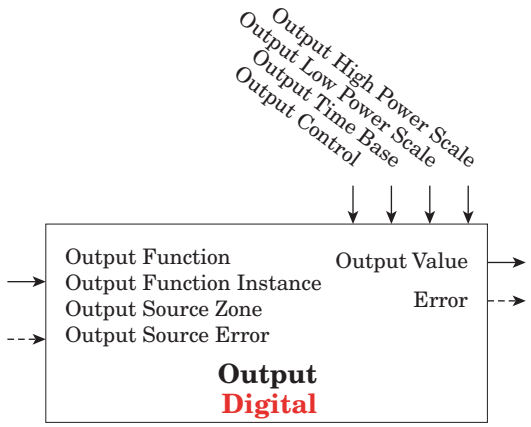
o.tb Output Time Base : 0.1 to 60.0 seconds

o.lo Output Low Power Scale : 0 to 100 %

o.h i Output High Power Scale : 0 to 100 %

ov Output Value : On, Off





Alarm Function

This function's output changes state when Alarm Source exceeds Alarm Set Point.

An error, when read, can indicate any of the following:

None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, Fail, Not Sourced

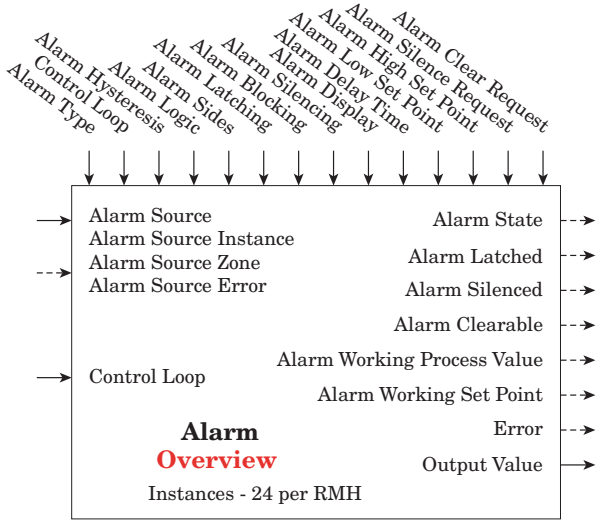
Silenced : No, Yes

Alarm Latched : No, Yes

Alarm Clearable : No, Yes

Alarm Working Process Value : -1,999.000 to 9,999.000

Alarm Working Set Point : -1,999.000 to 9,999.000



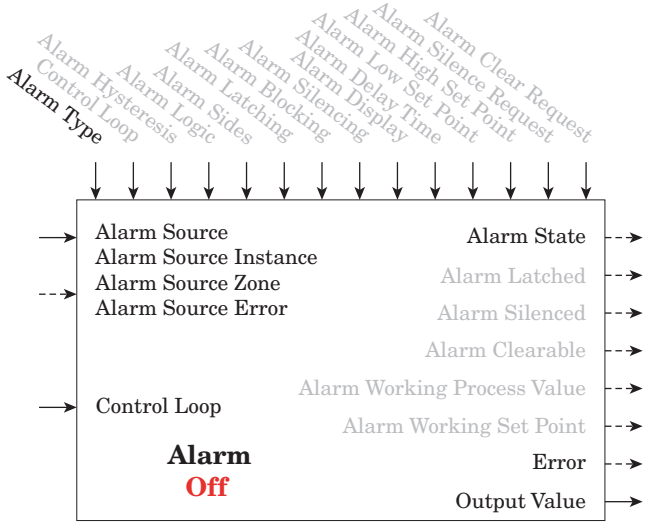
ALRM Alarm Menu
SEt Setup Page

- AtY Alarm Type : Off, Deviation, Process
- SrA Alarm Source : Analog Input, Current, Power, Linearization, Math, Process Value, Variable
- iSA Alarm Source Instance : 1 to 250
- S2A Alarm Source Zone : 0 to 16
- LooP Control Loop : 1 to 16
- AhY Alarm Hysteresis : 0.001 to 9,999.000
- AlG Alarm Logic : Close on Alarm, Open on Alarm
- ASd Alarm Sides : Both, High, Low
- ALo Alarm Low Set Point : -1,999.000 to 9,999.000
- Ahi Alarm High Set Point : -1,999.000 to 9,999.000
- ALA Alarm Latching : Non-Latching, Latching
- AbL Alarm Blocking : Off, Startup, Set Point, Both
- ASi Alarm Silencing : Off, On
- AdSP Alarm Display : Off, On
- AdL Alarm Delay Time : 0 to 9,999 seconds
- ACLr Alarm Clear Request : Ignore, Clear
- ASir Alarm Silence Request : Ignore, Silence
- ASt Alarm State : Startup, None, Blocked, Alarm Low, Alarm High, Error

ALRM Alarm Menu
oPEr Operation Page

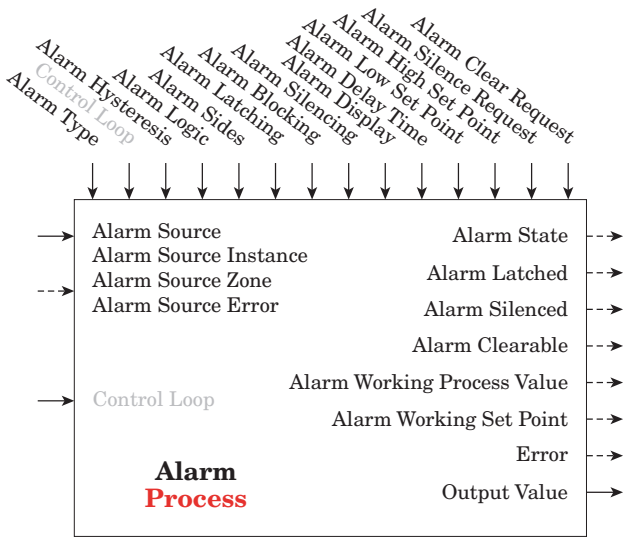
- ALo Alarm Low Set Point : -1,999.000 to 9,999.000
- Ahi Alarm High Set Point : -1,999.000 to 9,999.000
- ACLr Alarm Clear Request : Ignore, Clear
- ASir Alarm Silence Request : Ignore, Silence
- ASt Alarm State : Startup, None, Blocked, Alarm Low, Alarm High, Error

The alarm function causes outputs to change state when Alarm Source exceeds alarm set points.

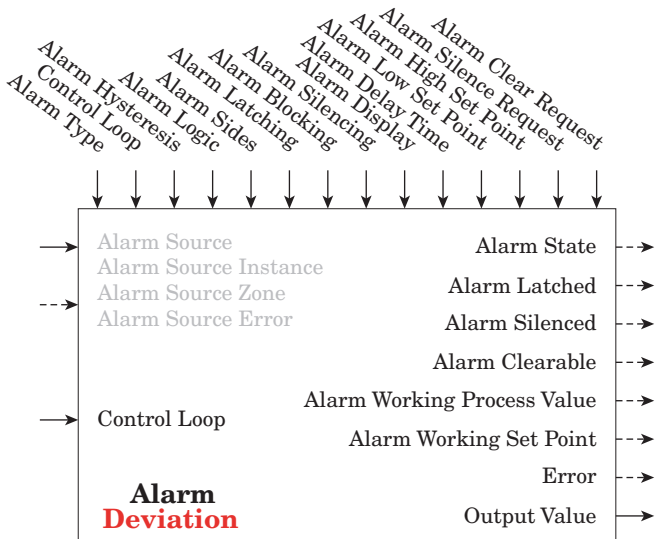


If Alarm Type = Off, Output Value = Off

If Alarm State = None, Alarm Indication = None



If Alarm Type = Process THEN Alarm Variable = Process Value

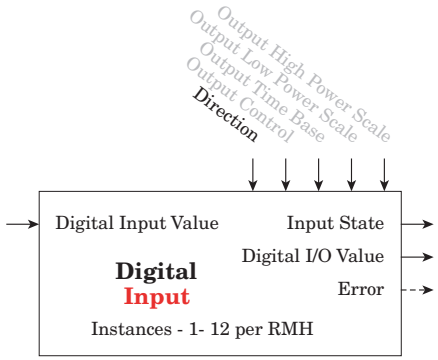


If Alarm Type = Deviation THEN Alarm Variable = Process Value - Closed Loop Set Point + Alarm Set Point

Digital Input/Output Function

Note:

Input Value is passed to either profile event inputs or action function blocks.



SEt Setup Page
d io Digital I/O Menu

- d ir Direction : Input Voltage, Input Dry Contact
- Fn Output Function : Off, Analog Input, Alarm, Cool Power, Heat Power, Compare, Counter, Digital I/O, Profile Event Out A to H, Function Key, Logic, Linearization, Math, Process Value, Special Function Output 1 to 4, Timer, Variable, Limit
- F i Output Function Instance : 1 to 250
- S2A Source Zone A : 0 to 16
- oCt Output Control : Fixed Time Base, Variable Time Base
- otb Output Time Base : 0.1 to 60.0 seconds
- oLo Output Low Power Scale : 0.0 to 100.0 %
- oh i Output High Power Scale : 0.0 to 100.0 %

oPEr Operation Page
d io Digital I/O Menu

- d iS Input State : On, Off
- doS Output State : On, Off

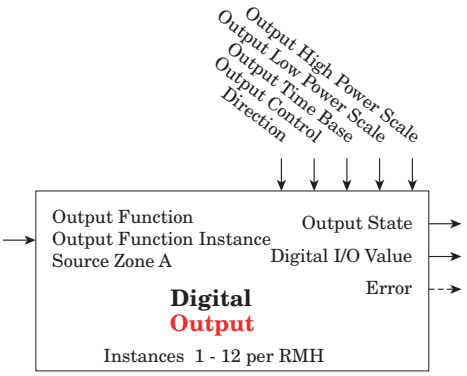
Digital Input Value : On, Off

An error, when read, can indicate any of the following:

None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Math Error, Not Sourced, Stale

Digital Input/Output Function (cont.)

Output Value is determined by Source A and Digital Output Function



SEt Setup Page
d.io Digital I/O Menu

d.dr Direction : Output

Fn Output Function : Off, Analog Input, Alarm, Cool Power, Heat Power, Compare, Counter, Digital I/O, Profile Event Out A to H, Function Key, Logic, Linearization, Math, Process Value, Special Function Output 1 to 4, Timer, Variable, Limit

F.1 Output Function Instance : 1 to 250

S2.A Source Zone A : 0 to 16

o.Ct Output Control : Fixed Time Base, Variable Time Base

o.tb Output Time Base : 0.1 to 60.0 seconds

o.Lo Output Low Power Scale : 0.0 to 100.0 %

o.h.1 Output High Power Scale : 0.0 to 100.0 %

oPEr Operation Page
d.io Digital I/O Menu

d.1S Input State : On, Off

do.S Output State : On, Off

Digital Output Value : On, Off

An error, when read, can indicate any of the following:

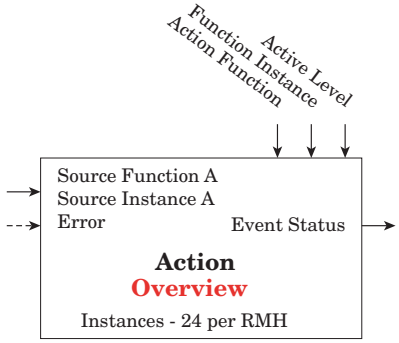
None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Math Error, Not Sourced, Stale

Action Function

The Action Function selected will execute when Source Function A = ON and Active Level = High. Based on a given input (Digital, Event output, Logic function, etc..), the Action function can cause other functions to occur. To name a few, starting and stopping a profile, silencing alarms, turn control loops off and placing alarms in non-alarm state.

Note:

Action Function selection is module type and part number dependant.



SEt Setup Page
ACt Action Menu

Fn Action Function : None, User Set Restore, Alarm, Silence Alarms, Control Loops Off and Alarms to Non-alarm State, Force Alarm to Occur, Idle Set Point, Tune, Manual, Switch Control Loop Off, Remote Set Point, TRU-TUNE+ Disable

F.1 Function Instance : 0 to 25

SFnA Source Function A : None, Alarm, Compare, Counter, Digital I/O, Profile Event Out A to H, Function Key, Limit, Logic, Timer, Variable

S.1A Source Instance A : 1 to 250

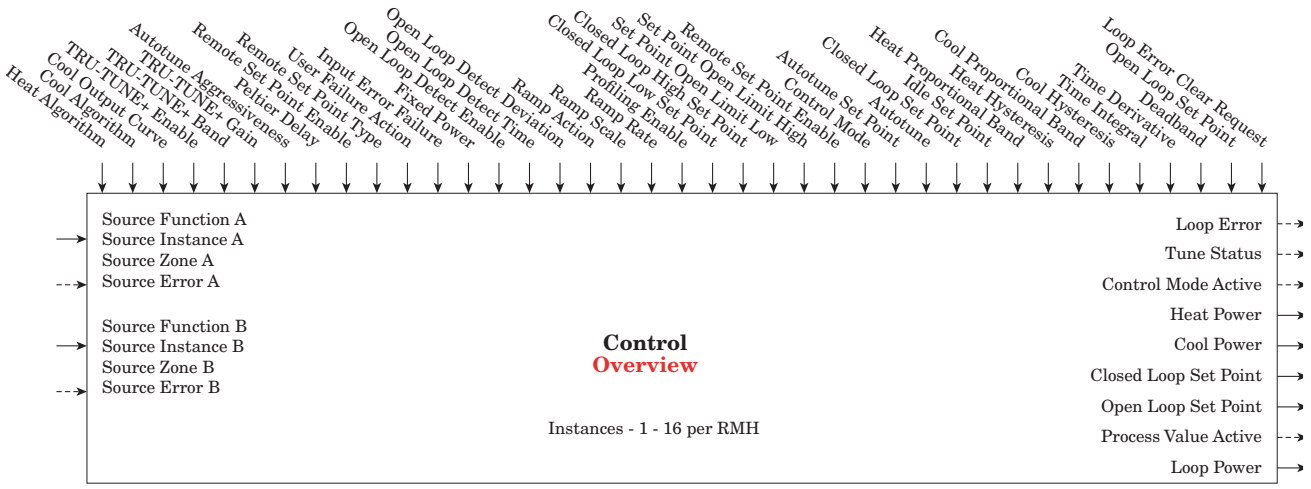
S2.A Source Zone A : 0 to 16

LEv Active Level : High, Low

oPEr Operation Page
ACt Action Menu

E.1S Event Status : On, Off

Control Function



SEt Setup Page
LooP Loop Menu

- SFnA Source Function A : Analog Input, Process Value
- ,SA Source Instance A : (not changeable)*
- hAG Heat Algorithm : Off, PID, On/Off
- CAG Cool Algorithm : Off, PID, On/Off
- CCr Cool Output Curve : Off, Non-linear curve 1, Non-linear curve 2
- hPb Heat Proportional Band : 0.001 to 9,999.000
- hHy Heat Hysteresis : 0.001 to 9,999.000
- CPb Cool Proportional Band : 0.001 to 9,999.000
- CHy Cool Hysteresis : 0.001 to 9,999.000
- t, Time Integral : 0 to 9,999 seconds
- td Time Derivative : 0 to 9,999 seconds
- db Deadband : -1,000.000 to 1,000.000
- tEUn TRU-TUNE+ Enable : No, Yes
- tbnd TRU-TUNE+ Band : 0 to 100
- tGn TRU-TUNE+ Gain : 1 to 6
- AtSP Autotune Set Point : 50 to 200 %
- tAGr Autotune Aggressiveness : Under, Critical, Over
- PdL Peltier Delay : 0.0 to 5.0
- rEn Remote Set Point Enable : No, Yes
- SFnb Source Function B (Remote Set Point Source) : None, Analog Input, Current, Cool Power, Heat Power, Power, Linearization, Math, Process Value, Set Point Closed, Set Point Open, Variable
- S ,b Source Instance B (Remote Set Point Source Instance) : 1 to 250
- S2b Source Zone B : 0 to 16
- rtY Remote Set Point Type : Auto, Manual
- UFA User Failure Action : Off, Bumpless Transfer, Manual Power, User
- FA ,L Input Error Failure : Off, Bumpless Transfer, Manual Power, User
- rnAn Fixed Power : -100.0 to 100.0 %
- LdE Open Loop Detect Enable : No, Yes
- Ldt Open Loop Detect Time : 0 to 3,600 seconds
- Ldd Open Loop Detect Deviation : -1,999.000 to 9,999.000
- rP Ramp Action : Off, Startup, Set Point, Both
- rSC Ramp Scale : Hours, Minutes
- rrt Ramp Rate : 0.000 to 9,999.000
- LSP Low Set Point : -1,999.000 to 9,999.000
- hSP High Set Point : -1,999.000 to 9,999.000
- CSP Closed Loop Set Point : -1,999.000 to 9,999.000
- ,dS Idle Set Point : -1,999.000 to 9,999.000
- SPLo Set Point Open Limit Low : -100.0 to 100.0 %
- SPh , Set Point Open Limit High : -100.0 to 100.0 %
- oSP Open Loop Set Point : -100.0 to 100.0 %
- CMd Control Mode : Off, Auto, Manual

oPEr Operation Page
MMon Monitor Menu

- CMdA Control Mode Active : Off, Auto, Manual
- hPr Heat Power : 0.0 to 100.0 %
- CPr Cool Power : 0.0 to 100.0 %
- CSP Closed Loop Set Point : -1,999.000 to 9,999.000
- PvA Process Value Active : -1,999.000 to 9,999.000

oPEr Operation Page
LooP Loop Menu

- rEn Remote Set Point Enable : No, Yes
- CMd Control Mode : Off, Auto, Manual
- AtSP Autotune Set Point : 50 to 200 %
- AUt Autotune : No, Yes
- CSP Closed Loop Set Point : -1,999.000 to 9,999.000
- ,dS Idle Set Point : -1,999.000 to 9,999.000
- hPb Heat Proportional Band : 0.001 to 9,999.000
- hHy Heat Hysteresis : 0.001 to 9,999.000
- CPb Cool Proportional Band : 0.001 to 9,999.000
- CHy Cool Hysteresis : 0.001 to 9,999.000
- t, Time Integral : 0 to 9,999 seconds
- td Time Derivative : 0 to 9,999 seconds
- db Deadband : -1,000.000 to 1,000.000
- oSP Open Loop Set Point : -100.0 to 100.0 %

Loop Power : -100.0 to 100.0 %

Loop Error: None, Open Loop, Reversed Sensor

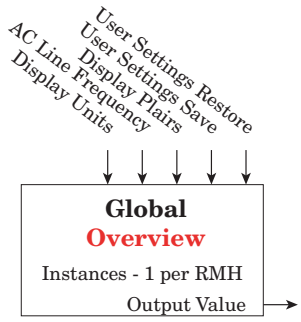
Loop Error Clear Request : Ignore, Clear

Tune Status : Off, Cross 1 Positive, Cross 1 Negative, Cross 2 Positive, Cross 2 Negative, Cross 3 Positive, Cross 3 Negative, Measuring Max, Measuring Min, Calculating, Complete, Timeout

Note:

Control Loop primary source instance must match Process Value or Analog Input instance

Global Function



SEt Setup Page
GLbL Global Menu

C_F Display Units : F, C

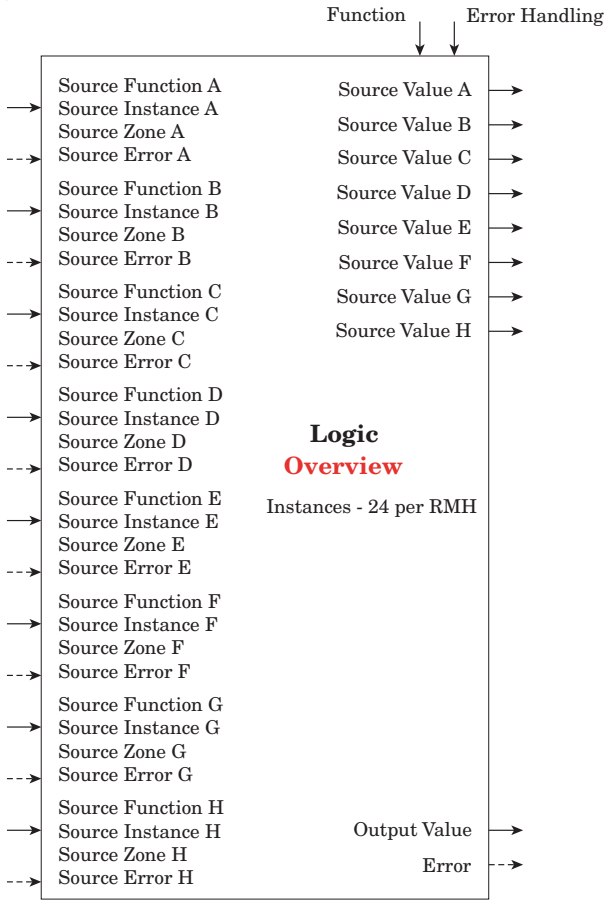
ACLF AC Line Frequency : 50 Hz, 60 Hz

dPrS Display Pairs : 1 to 10

USr.S User Settings Save : None, User Set 1, User Set 2

USr.r User Settings Restore : None, User Set 1, User Set 2, Factory

Logic Function



SEt Setup Page
LGC Logic Menu

Fn Function : Off, AND, OR, Equal To, NAND, NOR, Not Equal To, Latch, RS Flip Flop

SFnA Source Function A : None, Alarm, Compare, Counter, Digital I/O, Profile Event Out A to H, Function Key, Limit, Logic, Special Function Output 1 to 4, Timer, Variable

SiA Source Instance A : 1 to 250

SZnA Source Zone A : 0 to 16

SFnb Source Function B : None, Alarm, Compare, Counter, Digital I/O, Profile Event Out A to H, Function Key, Limit, Logic, Special Function Output 1 to 4, Timer, Variable

Sib Source Instance B : 1 to 250

SZnb Source Zone B : 0 to 16

SFnC Source Function C : None, Alarm, Compare, Counter, Digital I/O, Profile Event Out A to H, Function Key, Limit, Logic, Special Function Output 1 to 4, Timer, Variable

SiC Source Instance C : 1 to 250

SZnC Source Zone C : 0 to 16

SFnd Source Function D : None, Alarm, Compare, Counter, Digital I/O, Profile Event Out A to H, Function Key, Limit, Logic, Special Function Output 1 to 4, Timer, Variable

Sid Source Instance D : 1 to 250

SZnd Source Zone D : 0 to 16

SFnE Source Function E : None, Alarm, Compare, Counter, Digital I/O, Profile Event Out A to H, Function Key, Limit, Logic, Special Function Output 1 to 4, Timer, Variable

SiE Source Instance E : 1 to 250

SZnE Source Zone E : 0 to 16

SFnF Source Function F : None, Alarm, Compare, Counter, Digital I/O, Profile Event Out A to H, Function Key, Limit, Logic, Special Function Output 1 to 4, Timer, Variable

SiF Source Instance F : 1 to 250

SZnF Source Zone F : 0 to 16

SFn9 Source Function G : None, Alarm, Compare, Counter, Digital I/O, Profile Event Out A to H, Function Key, Limit, Logic, Special Function Output 1 to 4, Timer, Variable

Si9 Source Instance G : 1 to 250

SZn9 Source Zone G : 0 to 16

SFnh Source Function H : None, Alarm, Compare, Counter, Digital I/O, Profile Event Out A to H, Function Key, Limit, Logic, Special Function Out 1 to 4, Timer, Variable

Sih Source Instance H : 1 to 250

SZnh Source Zone H : 0 to 16

Erh Error Handling : True Good, True Bad, False Good, False Bad

oPEr Operation Page
LGC Logic Menu

SuA Source Value A : Off, On

Sub Source Value B : Off, On

SuC Source Value C : Off, On

Sud Source Value D : Off, On

SuE Source Value E : Off, On

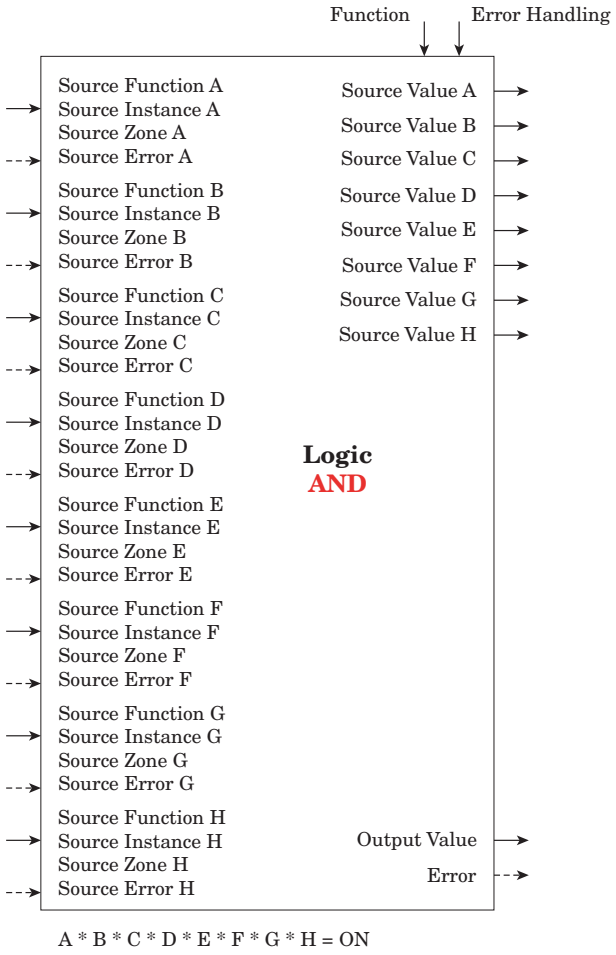
SuF Source Value F : Off, On

Su9 Source Value G : Off, On

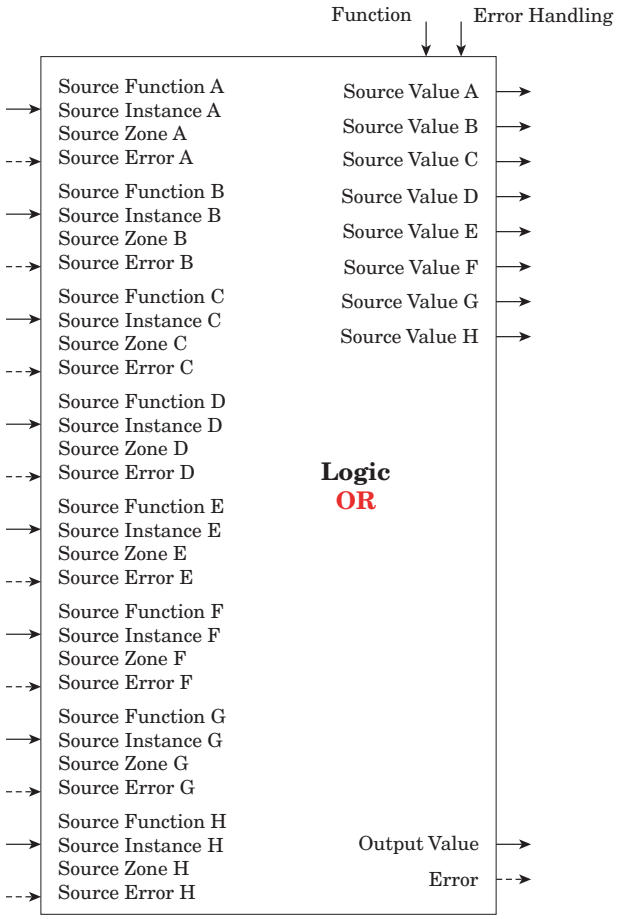
Suh Source Value H : Off, On

ou Output Value : Off, On

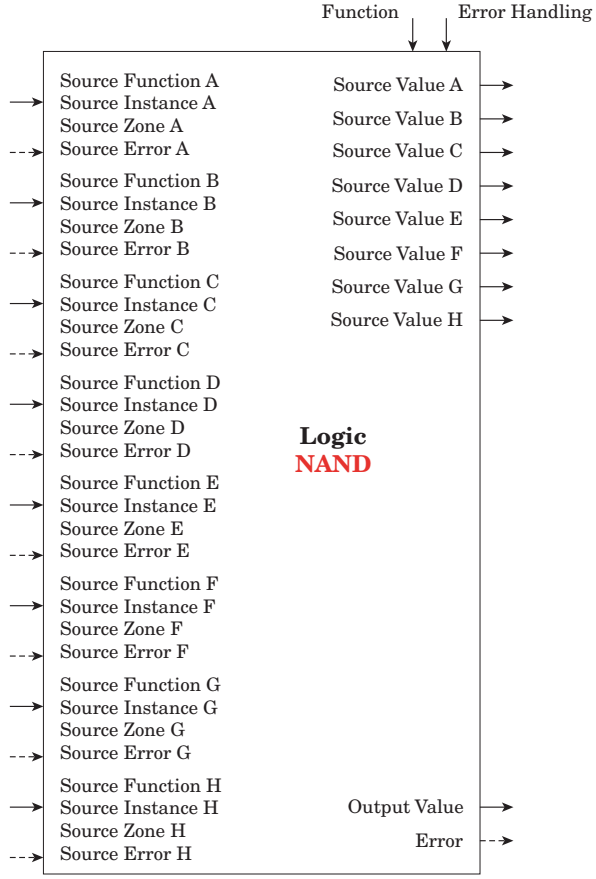
An error, when read, can indicate any of the following: None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Math Error, Not Sourced, Stale



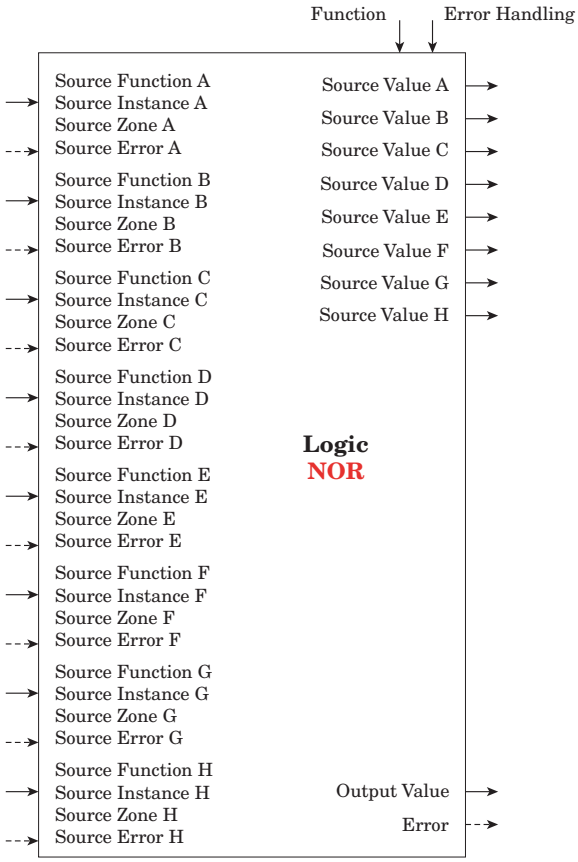
A * B * C * D * E * F * G * H = ON



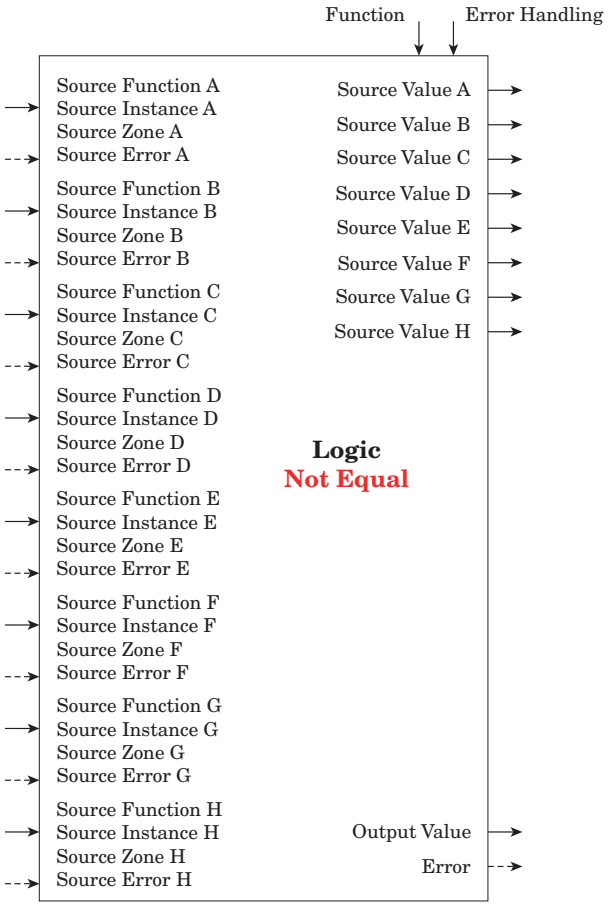
A + B + C + D + E + F + G + H = ON



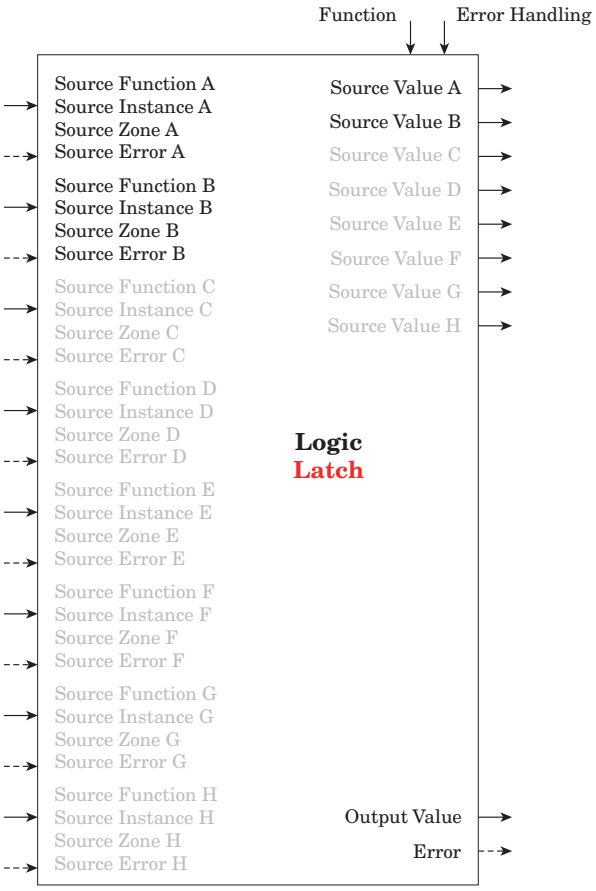
A * B * C * D * E * F * G * H = ON



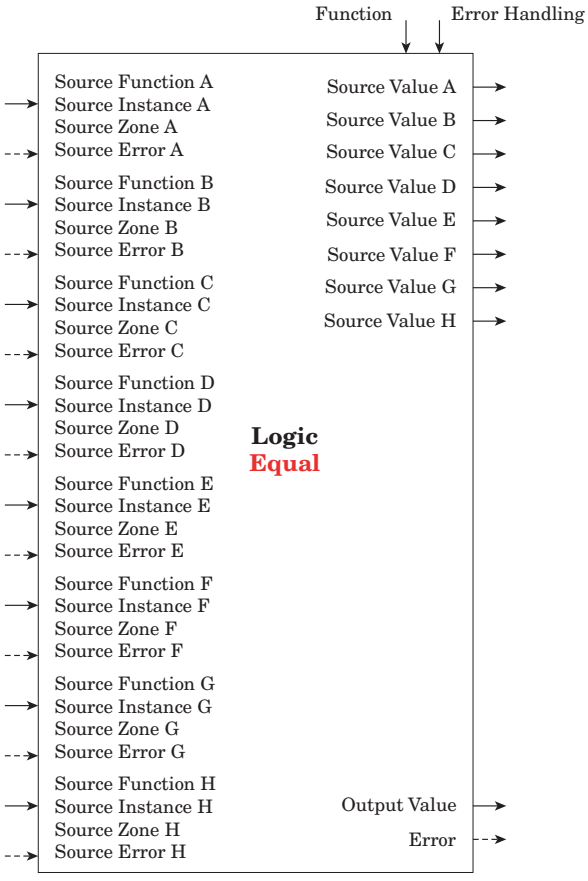
A + B + C + D + E + F + G + H = ON



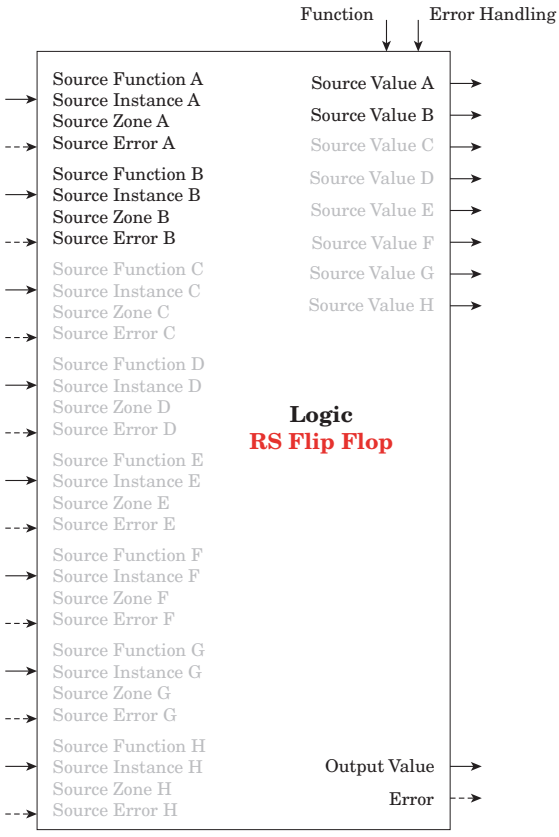
If A ≠ B ≠ C ≠ D ≠ E ≠ F ≠ G ≠ H then ON



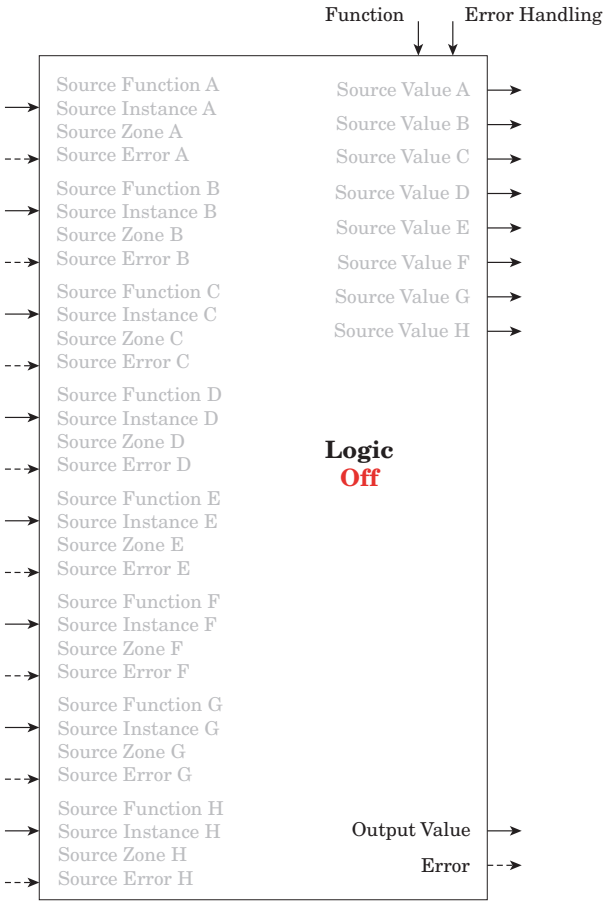
Output Value follows A, unless B = ON. When input B is on the the output will be latched on.



If A = B = C = D = E = F = G = H then ON



A negative to positive transistion on input A Sets Output Value ON and A negative to positive transistion on input B Resets Output Value OFF



Output Value = Off

SEt Setup Page
MAtH Math Menu

Fn Function : Off, Average, Process Scale, Deviation Scale, Switch Over, Differential, Ratio, Add, Multiply, Absolute Difference, Minimum, Maximum, Square Root, Sample and Hold, Pressure to Altitude, Dewpoint

SFnA Source Function A : None, Analog Input, Current, Cool Power, Heat Power, Power, Linearization, Math, Process Value, Set Point Closed, Set Point Open, Variable

S iA Source Instance A : 1 to 250

S2A Source Zone A : 0 to 16

SFnb Source Function B : None, Analog Input, Current, Cool Power, Heat Power, Power, Linearization, Math, Process Value, Closed Loop Set Point, Open Loop Set Point, Variable

S ib Source Instance B : 1 to 250

S2b Source Zone B : 0 to 16

SFnC Source Function C : None, Analog Input, Current, Cool Power, Heat Power, Power, Linearization, Math, Process Value, Set Point Closed, Set Point Open, Variable

S iC Source Instance C : 1 to 250

S2C Source Zone C : 0 to 16

SFnd Source Function D : None, Analog Input, Current, Cool Power, Heat Power, Power, Linearization, Math, Process Value, Set Point Closed, Set Point Open, Variable

S id Source Instance D : 1 to 250

S2d Source Zone D : 0 to 16

SFnE Source Function E : None, Alarm, Compare, Counter, Digital I/O, Profile Event Out A to H, Function Key, Logic, Timer, Variable

S iE Source Instance E : 1 to 250

S2E Source Zone E : 0 to 16

SLo Scale Low : -1,999.0 to 9,999.0

Sh i Scale High : -1,999.0 to 9,999.0

rLo Range Low : -1,999.0 to 9,999.0

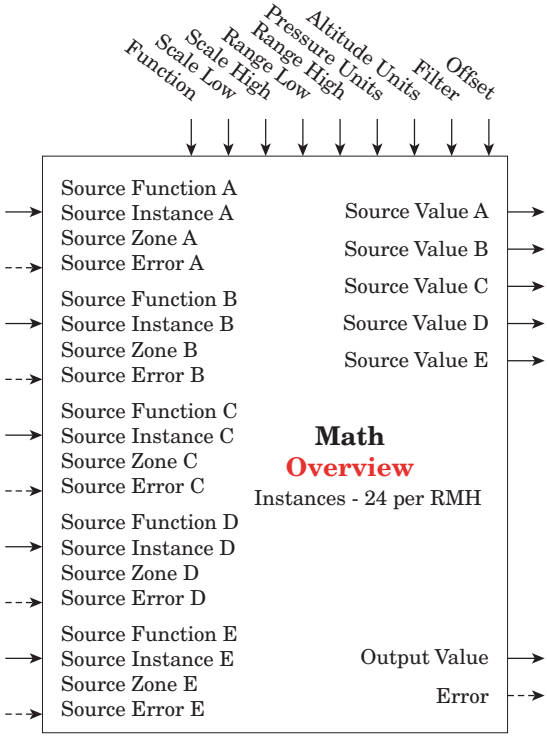
rh i Range High : -1,999.0 to 9,999.0

Punt Pressure Units : PSI, Torr, mBar, Atmosphere, Pascal

Aunt Altitude Units : Feet, Kilofeet

F iL Filter : 0.0 to 60.0 seconds

Math Function



oPEr Operation Page
MAtH Math Menu

SuA Source Value A : -1,999.000 to 9,999.000

Sub Source Value B : -1,999.000 to 9,999.000

SuC Source Value C : -1,999.000 to 9,999.000

Sud Source Value D : -1,999.000 to 9,999.000

SuE Source Value E : Off, On

ou Output Value : -1,999.000 to 9,999.000

oFSt Offset : -1,999.000 to 9,999.000

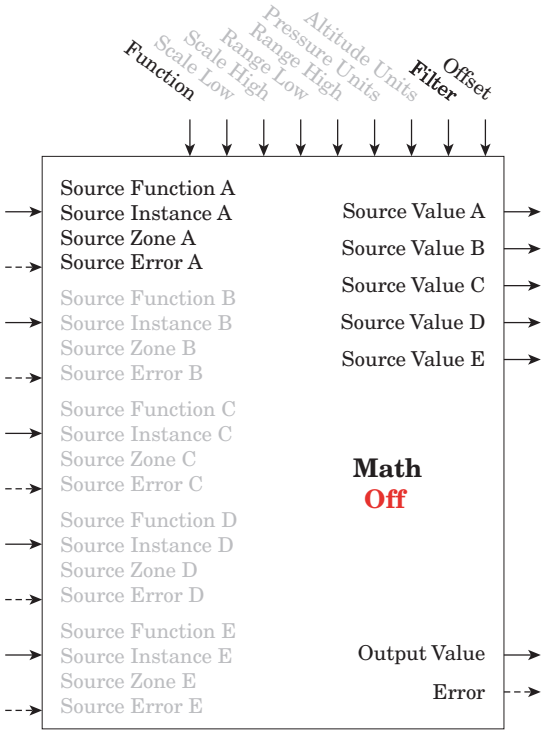
The Math function block accepts multiple inputs and performs a programmed math function to derive an output value with Filter and Offset values applied. Some math operations must be performed in the user's units.

Functions may combine multiple inputs. Those inputs may have incompatible units from a logical point of view. As a result, unless otherwise indicated, the presentation of the output value is the same as Source A. This accommodates temperatures being multiplied, divided and offset by constants and process inputs.

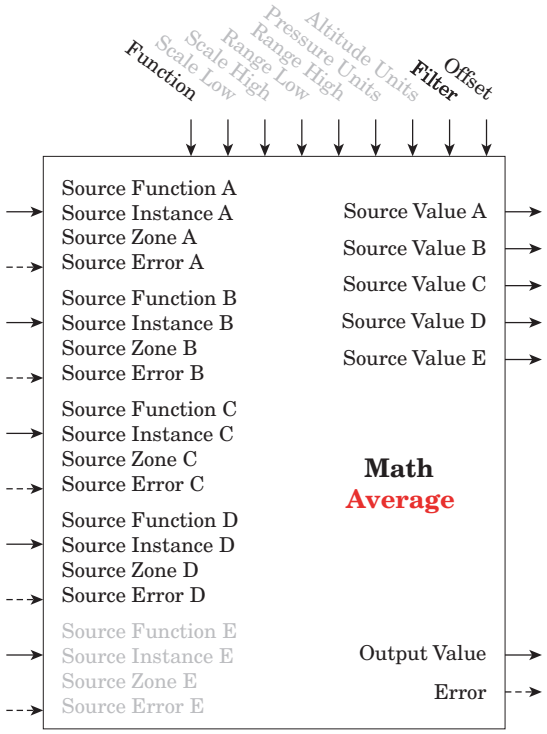
Only inputs pointed to a source are used in the calculations.

An error, when read, can indicate any of the following:

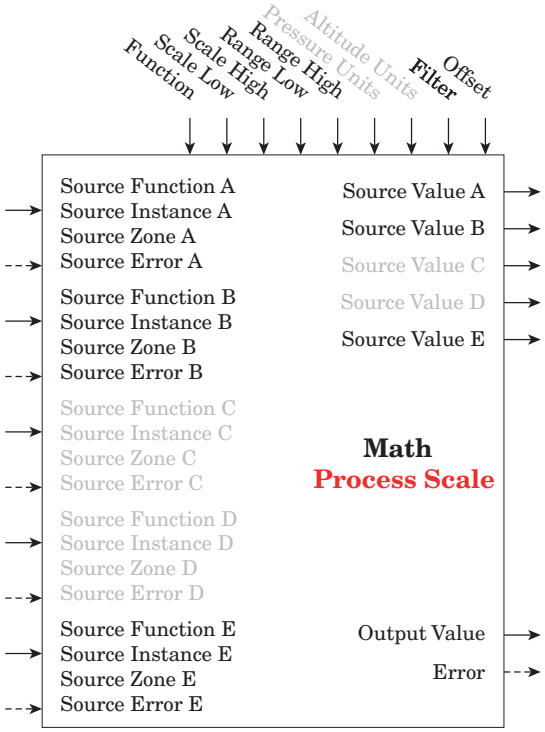
None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Math Error, Not Sourced, Stale



Output Value = Filter [A + Offset]
Display units follows Source A

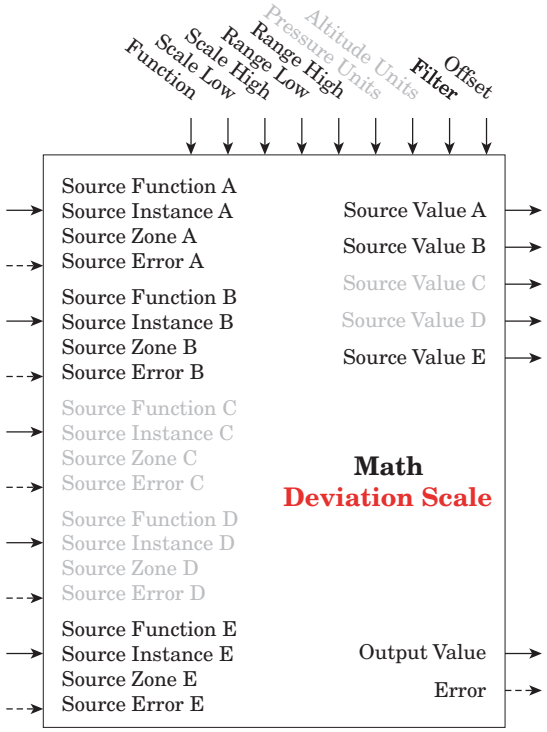


Output Value = Filter [(Average (A + B + C + D)) + Offset]
Display units follows the last source that is temperature otherwise, it will follow Source A



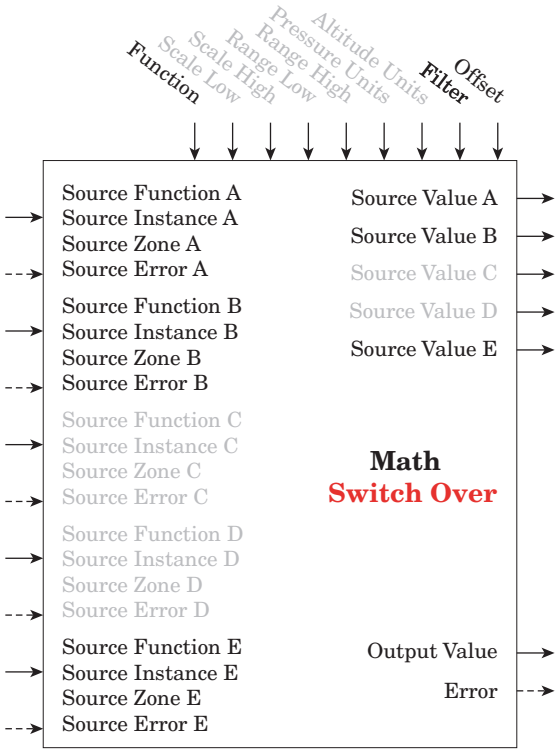
If E = OFF, Output Value = Filter [(Range High - Range Low) / (Scale High - Scale Low) * (A - Scale Low) + Range Low + Offset]
If E = ON, Output Value = Filter [B + Offset]

Scale Low/High and Range Low/High follows Source A display units.

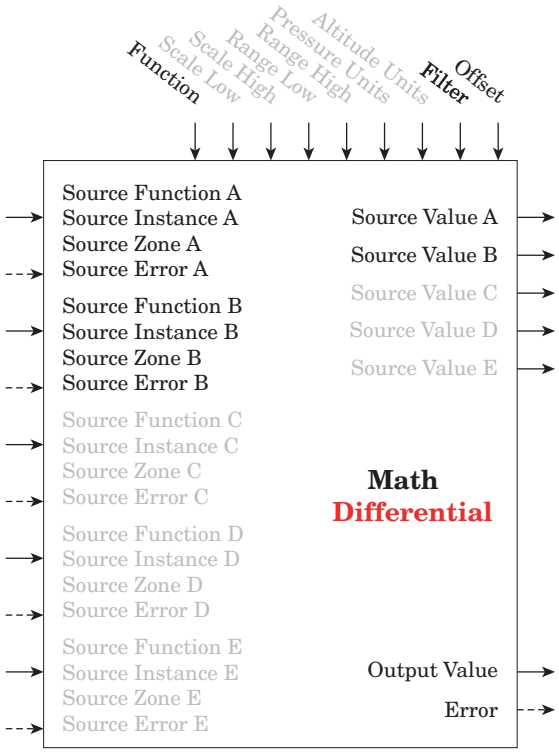


If E = OFF, Output Value = Filter [((Range High - Range Low) / (Scale High - Scale Low)) * (A - Scale Low) + Range Low + B + Offset]
If E = ON, Output Value = Filter [B + Offset]

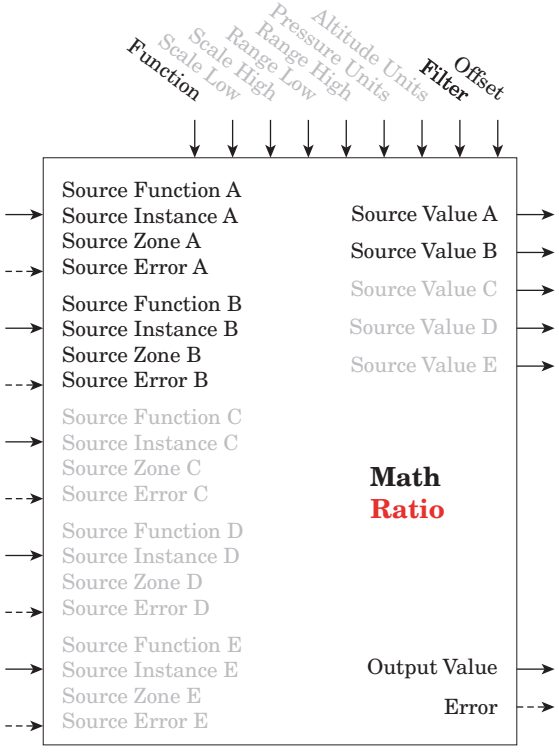
Scale Low/High and Range Low/High follows Source A display units.



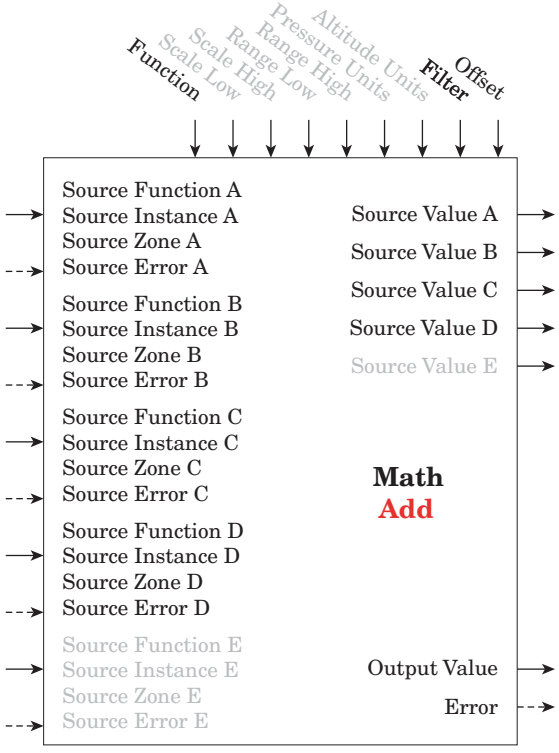
If E = OFF, Output Value = Filter [A + Offset]
If E = ON, Output Value = Filter [B + Offset]
Display units follows active source.



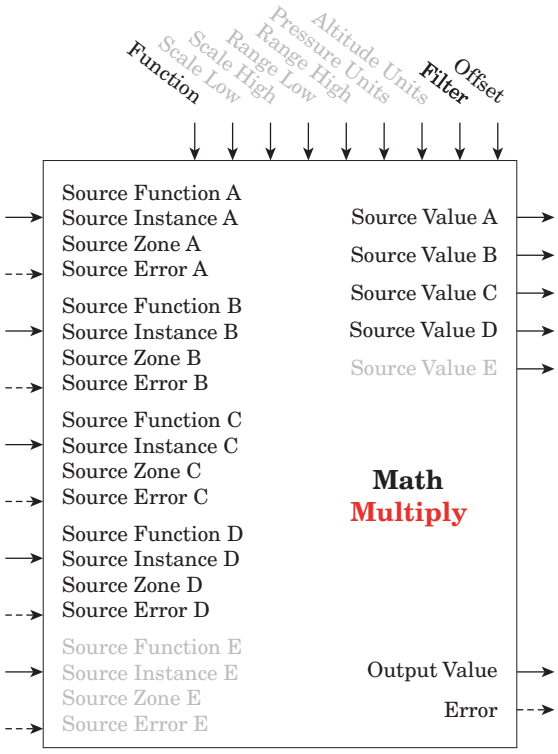
Output Value = Filter [(A - B) + Offset]
Display units follows Source A plus relative Source B



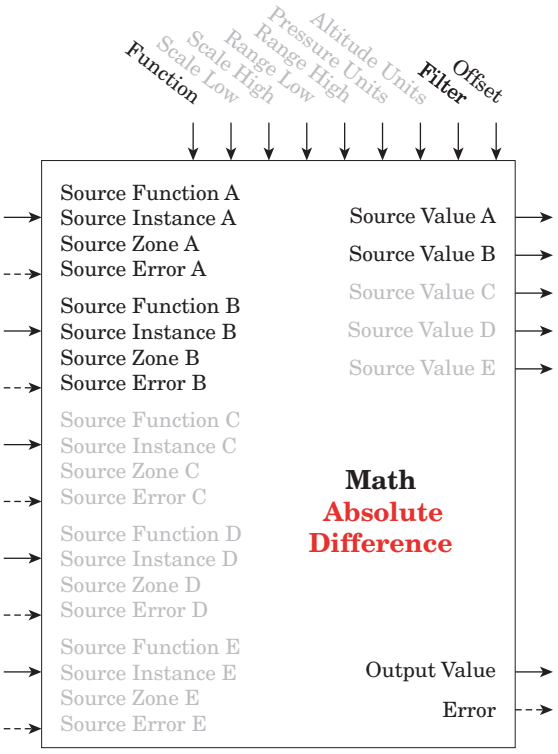
Output Value = Filter [(A / B) + Offset]
If display units of Source A = Source B, no display units on output value, else follow Source A



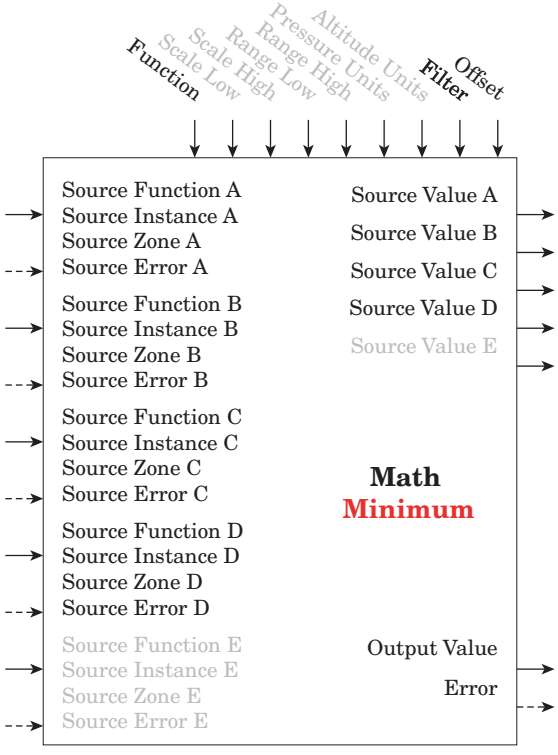
Output Value = Filter [(A + B + C + D) + Offset]
Display units follows last temperature source else follow Source A



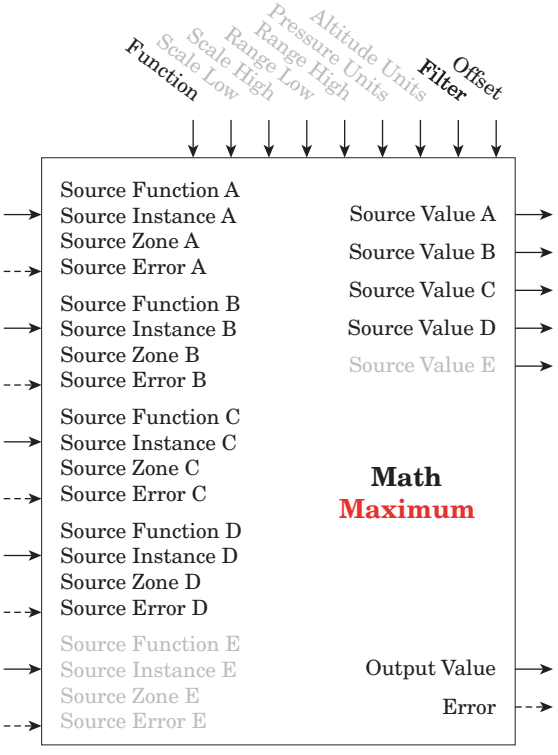
Output Value = Filter [(A * B * C * D) + Offset]
Display units follows last temperature source else follow Source A



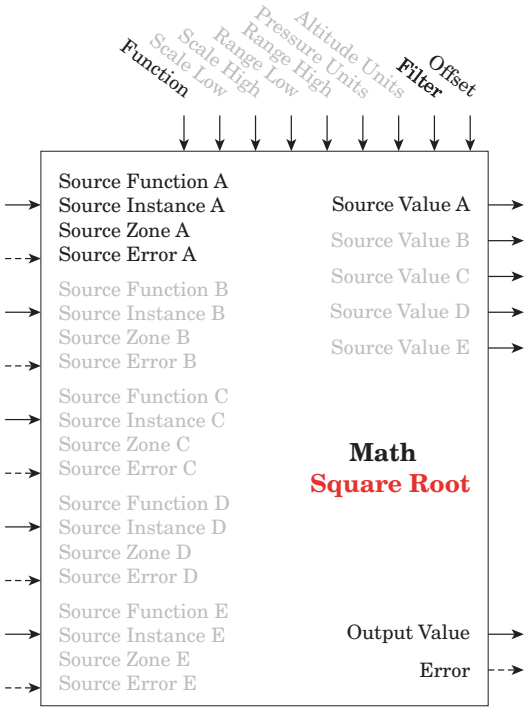
Output Value = Filter [| A - B | + Offset]
Display units follow Source A plus relative Source B



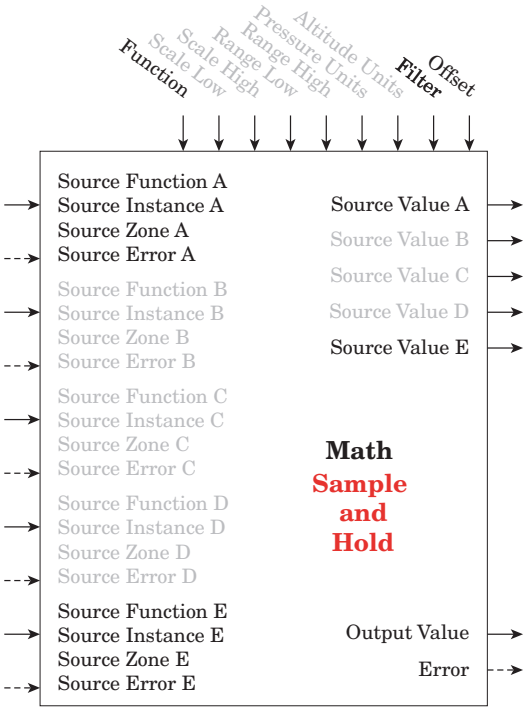
Output Value = Filter [Minimum Value (A : B : C : D) + Offset]
Display units follows Source with minimum value.



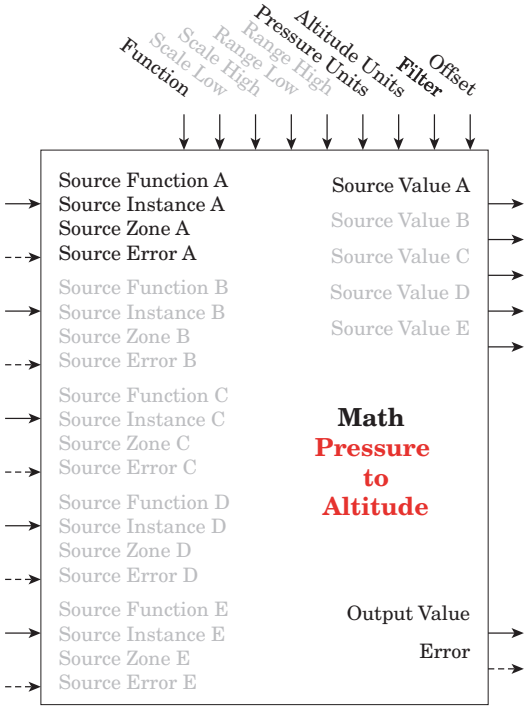
Output Value = Filter [Maximum Value (A : B : C : D) + Offset]
Display units follows Source with maximum value.



Output Value = Filter [SqrRoot A + Offset]
Display units follows Source A

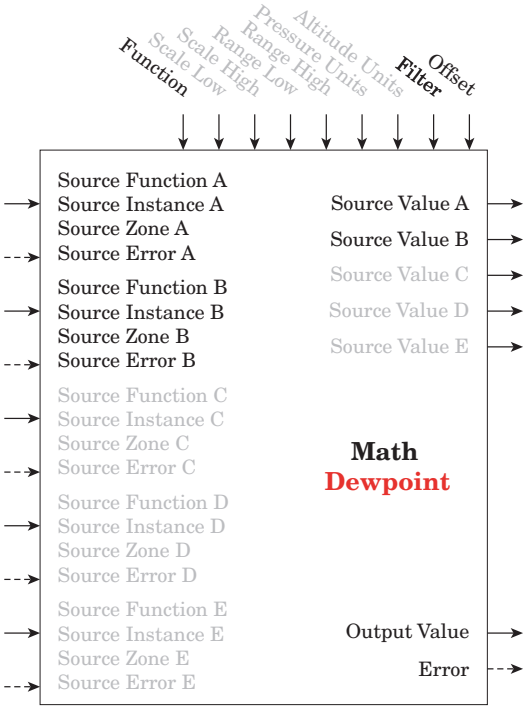


If E = OFF, Output Value = Filter [A + Offset]
If E = ON, Output Value = Filter [last value of A + Offset]
Display units follows Source A



Note:
Pressure Altitude calculation is based on the International Standard Atmosphere 1976. Source A is a pressure signal and needs to be in PSI units for the calculation. The calculation is accurate from sea level to 90,000 feet. It can be used beyond this range in both directions, but with loss of accuracy. The standard is based on an altitude of 0 feet (sea level) pressure of 14.6967 PSI and a temperature of 59 degrees F. Result of calculation is in feet.

Output Value = Filter [Convert Source A in Pressure to Altitude + Offset]

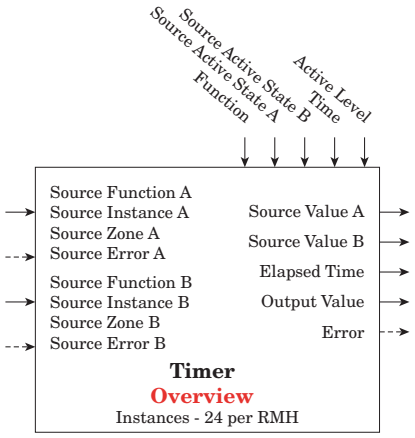


Output Value = Filter [427.26 * (CP * B / 8.8618) / (17.27- (CP * B / 8.8618)) +32 + Offset]

Source A is used for Calculated Pressure or CP ;

Note:
For dewpoint, Source A is temperature (F) and Source B is RH (%). Saturation pressure calculation is identical to that used in wet/dry bulb. Result is in degrees F.

Timer Function



SEt Setup Page
tMr Timer Menu

Fn Function : Off, On Pulse, Delay, One Shot, Retentive

SFnA Source Function A (Timer Run) : None, Alarm, Compare, Counter, Digital I/O, Profile Event Out A to H, Function Key, Logic, Special Function Output 1 to 4 , Timer, Variable

SiA Source Instance A : 1 to 250

SZA Source Zone A : 0 to 16

SASA Source Active State A (Timer Run) : High (rising), Low (falling)

SFnb Source Function B (Timer Reset) : None, Alarm, Compare, Counter, Digital I/O, Profile Event Out A to H, Function Key, Logic, Special Function Output 1 to 4, Timer, Variable

Sib Source Instance B : 1 to 250

SZb Source Zone B : 0 to 16

SASb Source Active State B (Timer Reset) : High (rising), Low (falling)

t Time : 0 to 9,999 seconds

LEu Active Level : High, Low

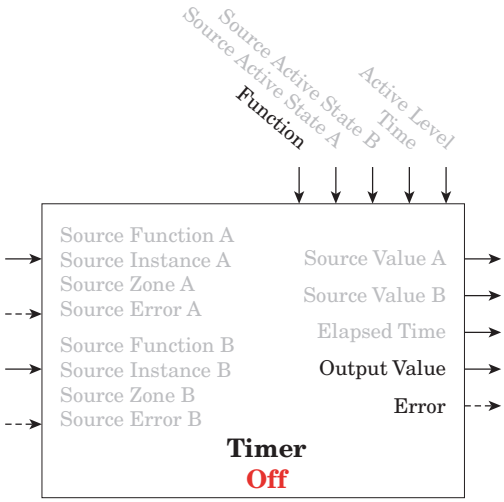
oPEr Operation Page
tMr Timer Menu

SuA Source Value A : Off, On

Sub Source Value B : Off, On

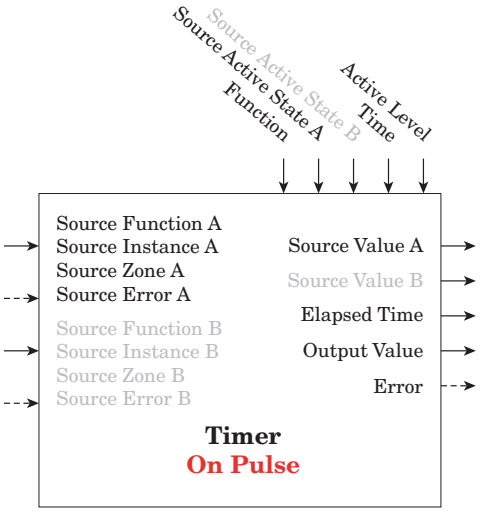
Et Elapsed Time : 0.0 to 9,999.000 seconds

ou Output Value : Off, On

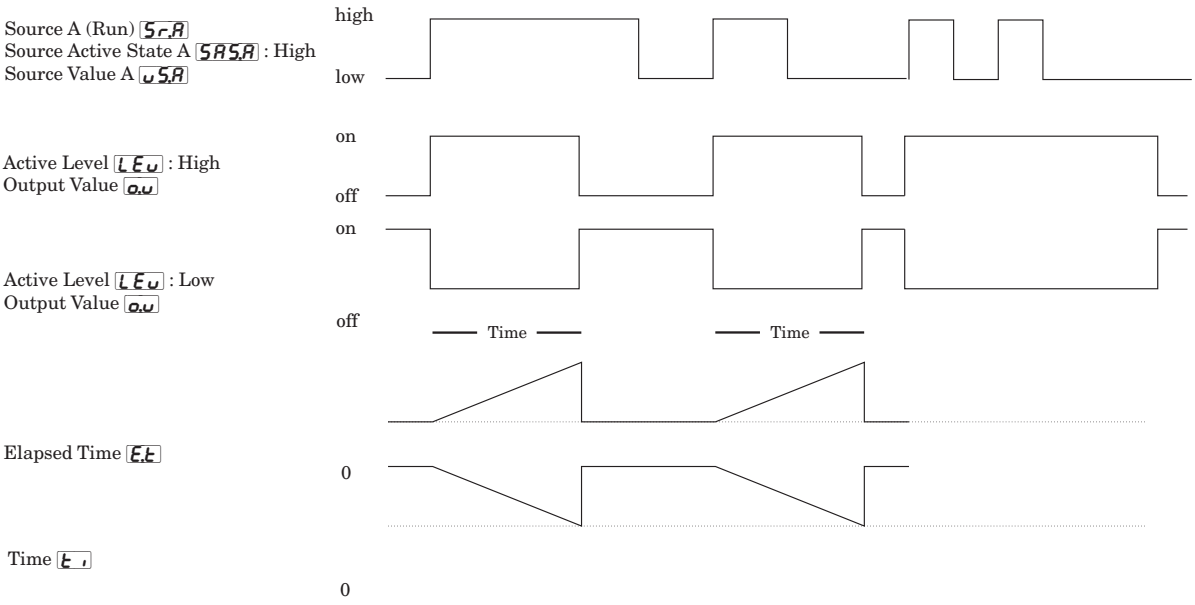


Output Value = OFF

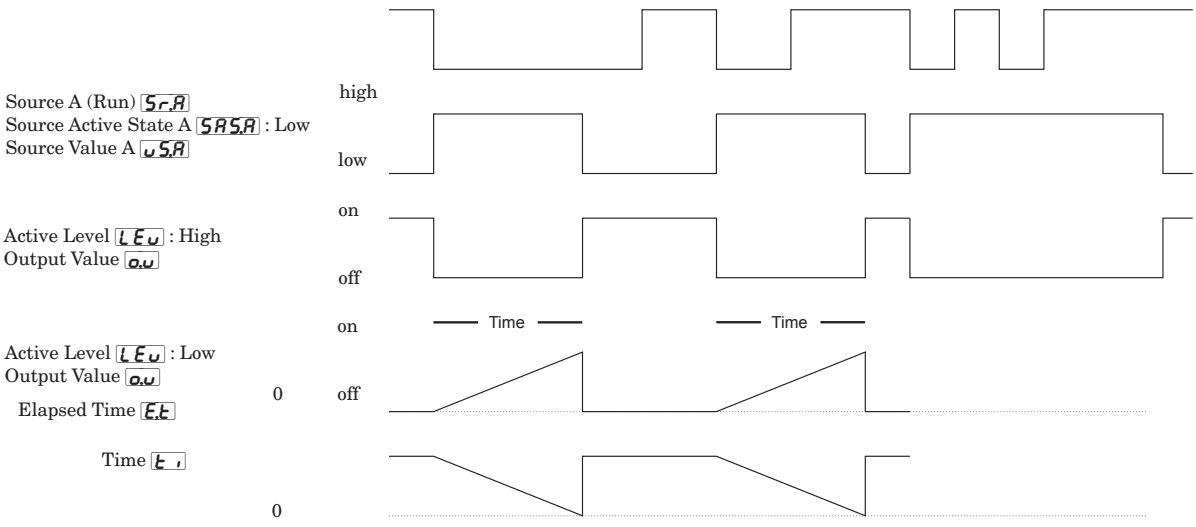
An error, when read, can indicate any of the following: None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Math Error, Not Sourced, Stale

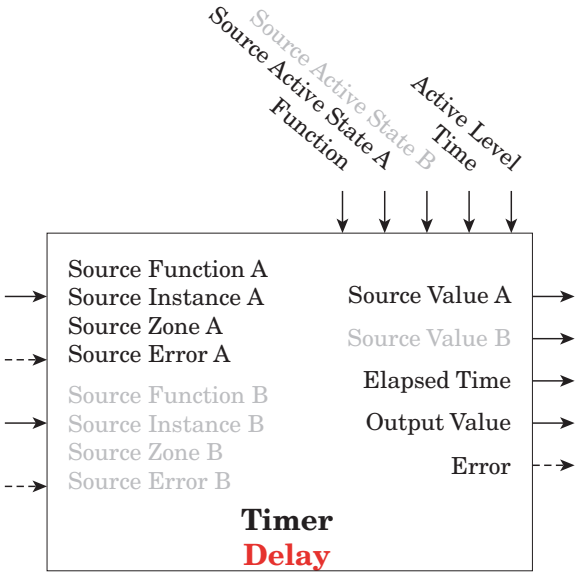


Timing Diagram of On Pulse with active state rising edge

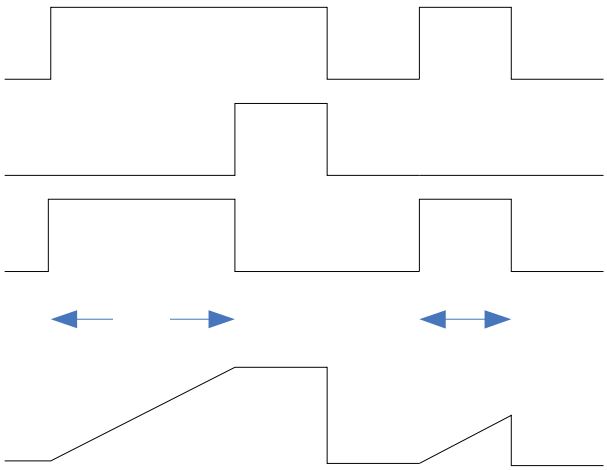


Timing Diagram of On Pulse with active state falling edge

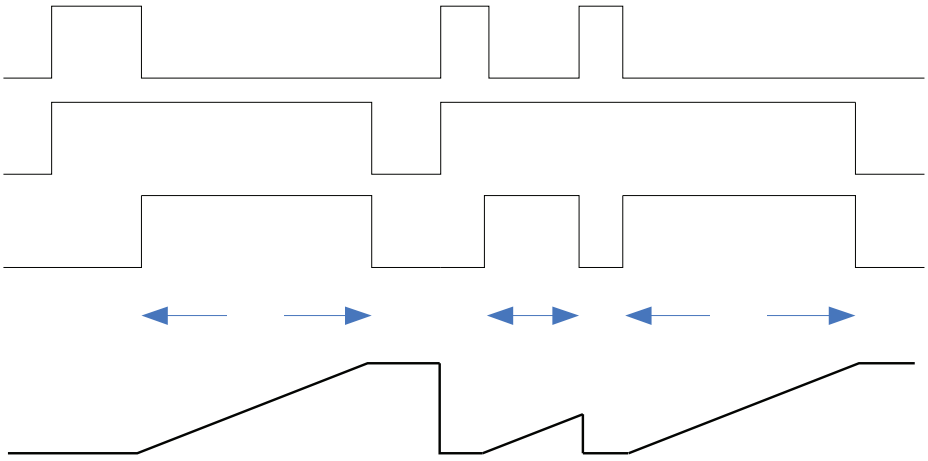


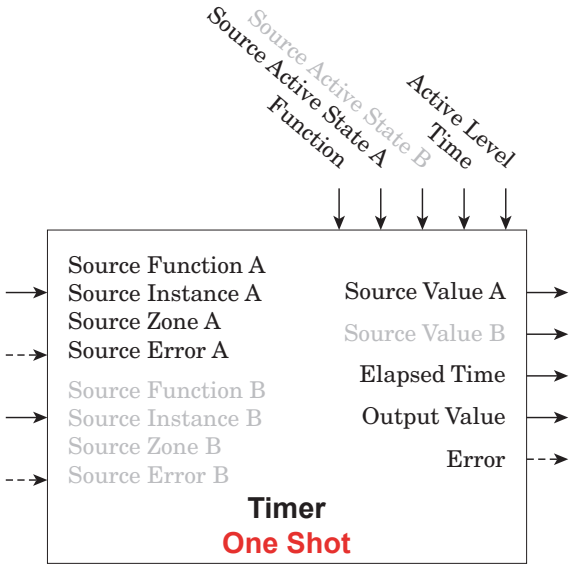


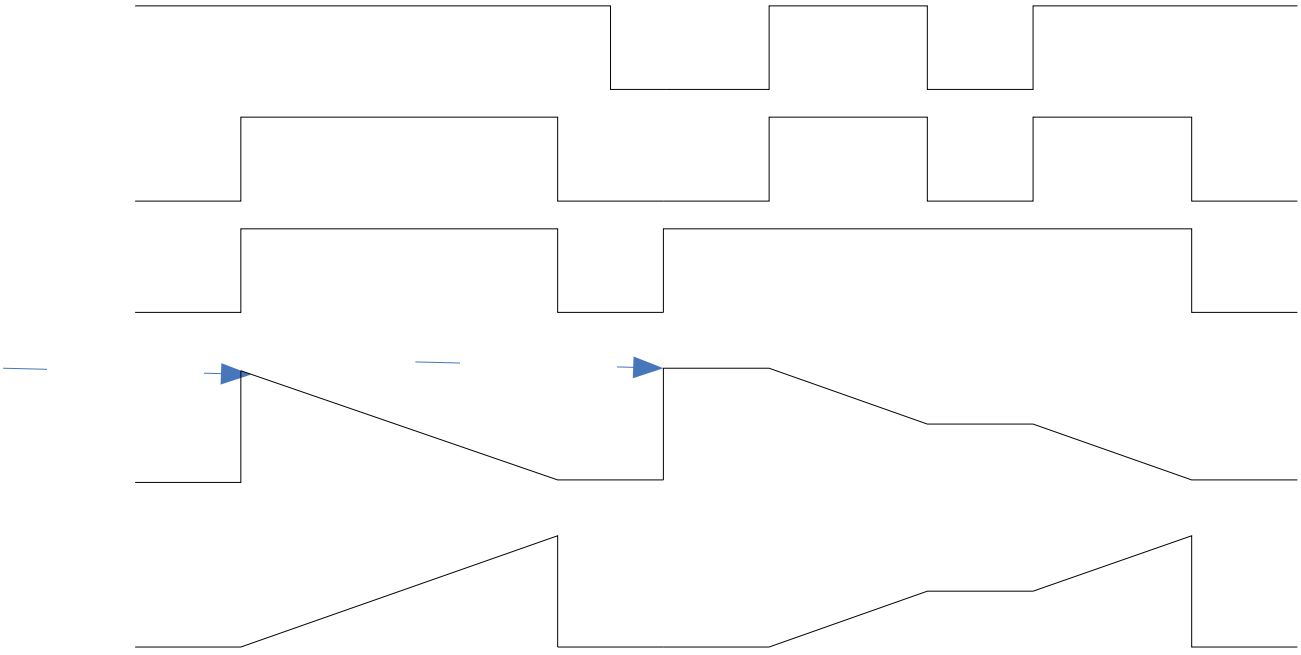
Source A

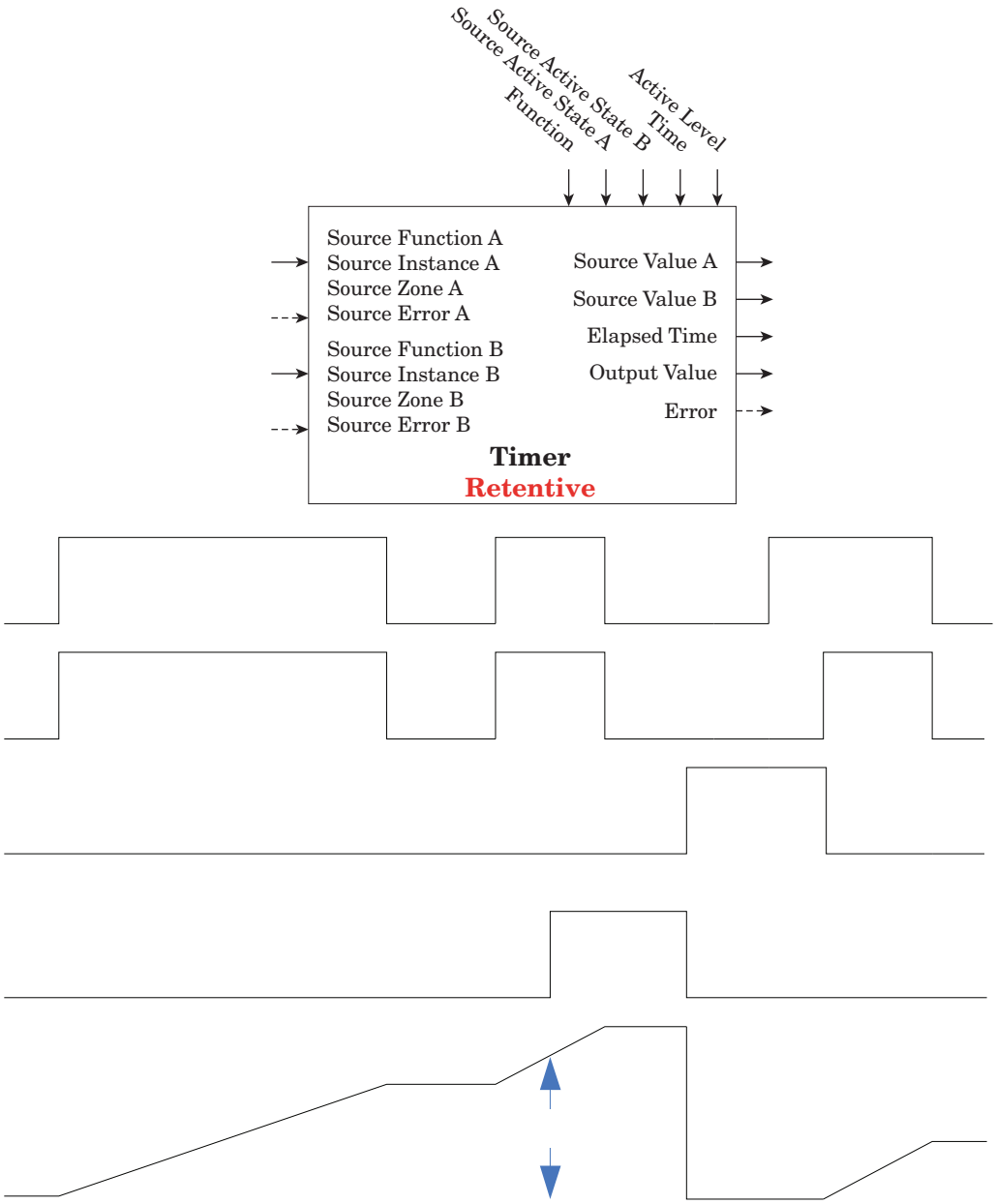


Source A




Source Active State A Function
Source Active State B
Active Level Time
Source Function A
Source Instance A
Source Zone A
Source Error A
Source Function B
Source Instance B
Source Zone B
Source Error B
Source Value A
Source Value B
Elapsed Time
Output Value
Error
Timer
One Shot



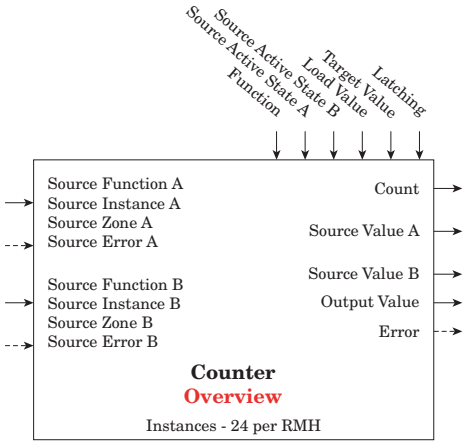

Source Active State A Function
Source Active State B Time
Active Level
Source Function A
Source Instance A
Source Zone A
Source Error A
Source Function B
Source Instance B
Source Zone B
Source Error B
Source Value A
Source Value B
Elapsed Time
Output Value
Error
Timer
Retentive

Counter Function

Function counts up or down from Load Value and produces Output Value = On when Count = Target Value.

Note:

Count value clears on power loss.
Load Value restored on power up.



SEt Setup Page
CtR Counter Menu

Fn Function : Up, Down

SFnA Source Function A (Clock) : None, Alarm, Compare, Counter, Digital I/O, Profile Event Out A to H, Function Key, Logic, Timer, Variable

S iA Source Instance A : 1 to 250

S2nA Source Zone A : 0 to 16

SASnA Source Active State A (Active State Clock) : High (rising), Low (falling), Both (rising & falling)

SFnb Source Function B (Load) : None, Alarm, Compare, Counter, Digital I/O, Profile Event Out A to H, Function Key, Logic, Timer, Variable

S ib Source Instance B : 1 to 250

S2nb Source Zone B : 0 to 16

SASnb Source Active State B (Active State Load) : High, Low

LoAd Load Value : 0 to 9,999

trGt Target Value : 0 to 9,999

LAt Latching : No, Yes

SEt Operation Page
CtR Counter Menu

Cnt Count : 0 to 9,999

SuA Source Value A : Off, On

Sub Source Value B : Off, On

oU Output Value : Off, On

Counter Operation:

Whenever a prescribed clock transition occurs without an error on source B the count will be equal to the Load Value.

Up Counter:

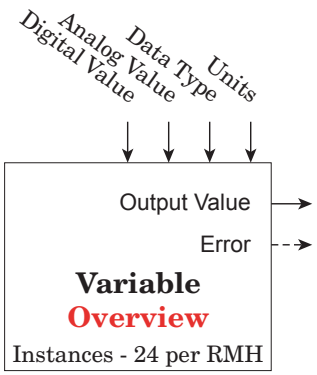
Whenever a prescribed clock transition occurs without an error on Source B the count will increment by +1. If the count is equal to 9,999 when the transition occurs count will be 1 after transition.

Down Counter:

Whenever a prescribed clock transition occurs without an error on Source B the count will decrement by -1. If the count is equal to 0 when the transition occurs the count will be 9,999 after transition.

An error, when read, can indicate any of the following: None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Math Error, Not Sourced, Stale

Variable Function



SEt Setup Page
uAr Variable Menu

tYPE Data Type : Analog, Digital

d iG Digital Value : On, Off

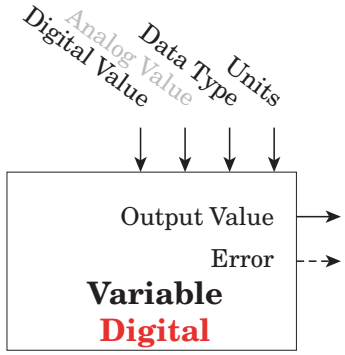
AnLG Analog Value : -1,999.000 to 9,999.000

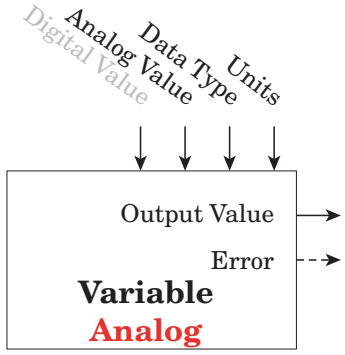
Un it Units : None, Absolute Temperature, Relative Temperature, Power, Process, Relative Humidity

oU Output Value : -1,999.000 to 9,999.000 or On or Off

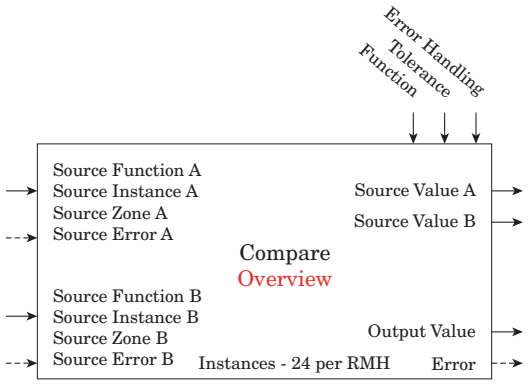
Function passes stored value to output.

An error, when read, can indicate any of the following: None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Math Error, Not Sourced, Stale





Compare Function



SEt Setup Page
CPE Compare Menu

Fn Function : Off, Greater Than, Less Than, Equal To, Not Equal To, Greater or Equal , Less or Equal

tol Tolerance : 0.0 to 9,999.000 units or F

SFnA Source Function A : None, Analog Input, Current, Cool Power, Heat Power, Power, Linearization, Math, Process Value, Set Point Closed, Set Point Open, Variable

SiA Source Instance A : 1 to 250

SZnA Source Zone A : 0 to 16

SFnb Source Function B : None, Analog Input, Current, Cool Power, Heat Power, Power, Linearization, Math, Process Value, Set Point Closed, Set Point Open, Variable

Sinb Source Instance B : 1 to 250

SZnb Source Zone B : 0 to 16

Erh Error Handling : False Bad, False Good, True Bad, True Good

oPEr Operation Page
CPE Compare Menu

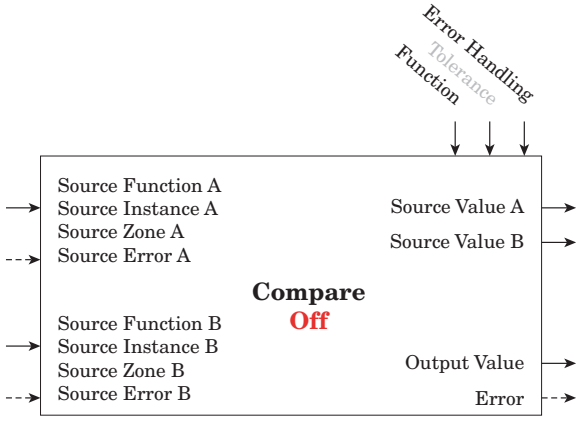
SuA Source Value A : -1,999.000 to 9,999.000 units or F

Sub Source Value B : -1,999.000 to 9,999.000 units or F

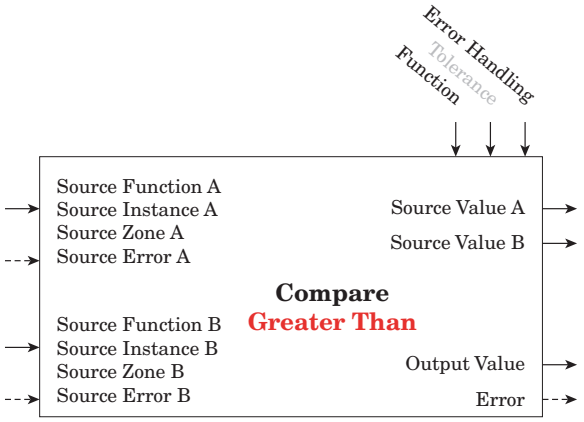
ou Output Value : Off, On

Tolerance is expressed in same units as Source A
Requires Source A and Source B to be without errors for function to work.

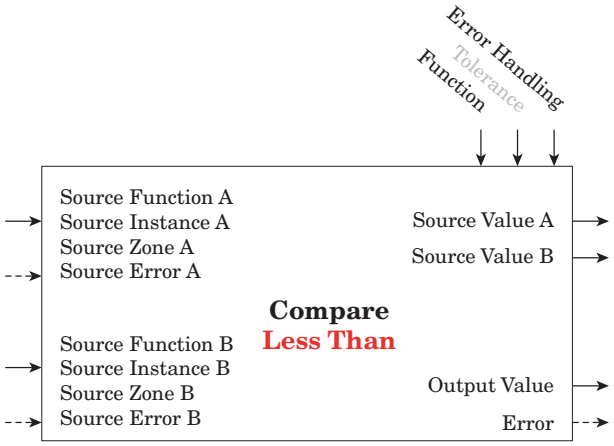
An error, when read, can indicate any of the following: None, Open, Shorted, Measurement Error, Bad Cal Data, Ambient Error, RTD Error, Fail, Math Error, Not Sourced, Stale



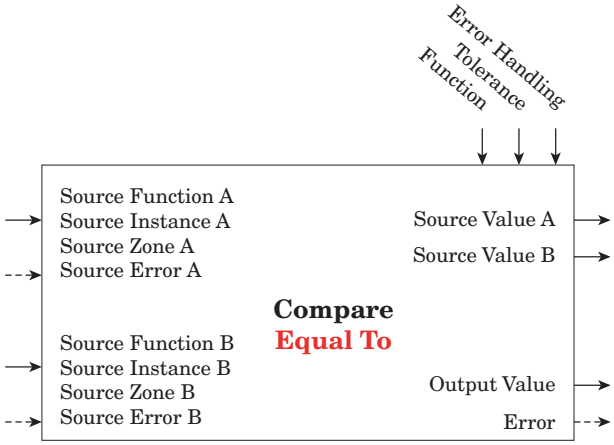
No Compare, Output Value = OFF



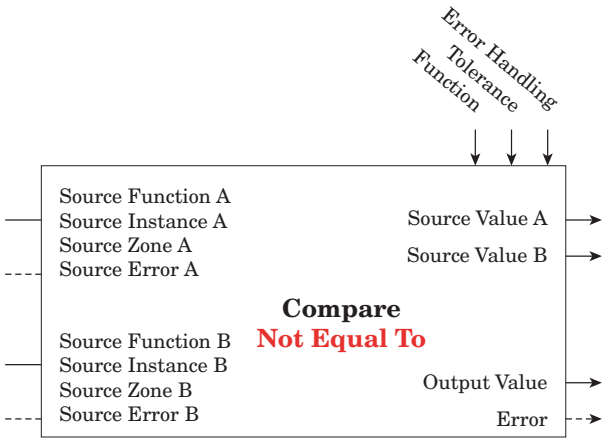
A>B, Output Value = ON



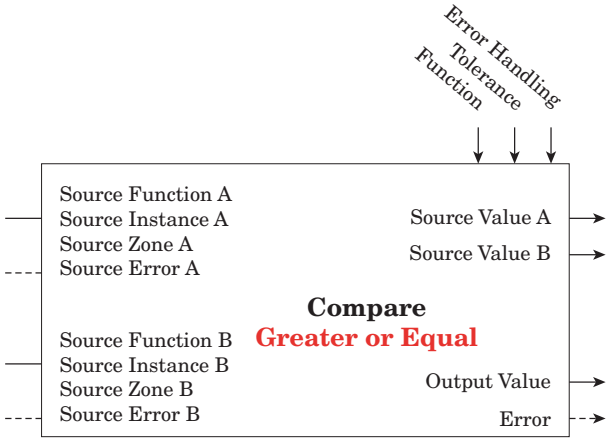
A<B, Output Value = ON



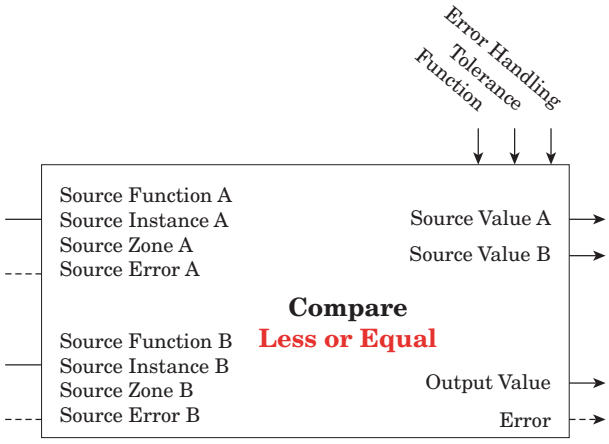
A=B, Output Value = ON



A not equal B, Output Value = ON

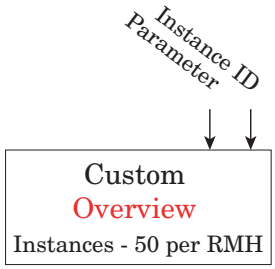


A>=B, Output Value = ON



A<=B, Output Value = ON

Custom Function



FAct Factory Page
CUSt Custom Menu

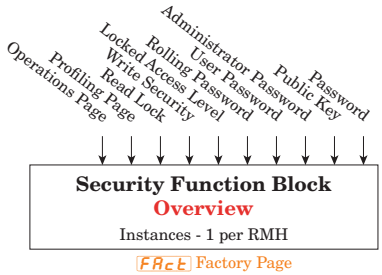
PAr Parameter : None, Process, Calibration Offset, Display Units, User Settings Restore, Alarm Low Set Point, Alarm High Set Point, Alarm Hysteresis, Set Point, Active Process Value, Active Set Point, Open-Loop Set Point, Autotune, Control Mode, Heat Power, Cool Power, Time Integral, Time Derivative, Dead band, Heat Proportional Band, Heat Hysteresis, Cool Proportional Band, Cool Hysteresis, Ramp Rate, TRU-TUNE+ Enable, Idle Set Point, Custom

id Instance ID : 1 to 24

Security Function

Note:
Set on a Zone by Zone basis. This is independent of the RUI Security Setting.

If the Password is enabled, the user must enter the Password to get to menus that have been blocked due to lock level settings. Rolling passwords require a new password each time the power has been cycled to the controller. It will be different for every controller. The administrator password is required to change the security settings even if the user enters their password to override the security settings.



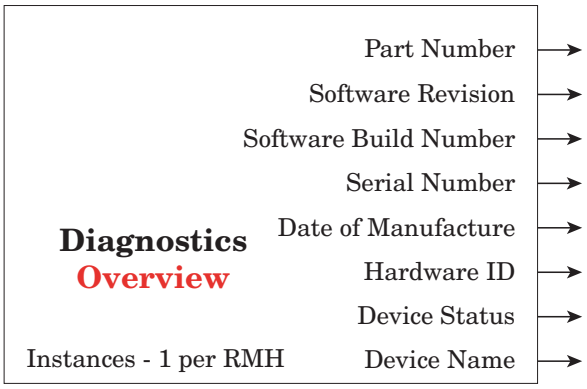
FAct Factory Page
LoC Lock Menu

LoCo Operations Page : 1 to 3
LoCP Profiling Page : 1 to 3
PASE Password Enable : Off, On
rLoC Read Lock : 1 to 5
SLoC Write Security: 1 to 5
LoCL Locked Access Level : 1 to 5
roLL Rolling Password : Off, On
PASu User Password : 10 to 999
PASA Administrator Password : 10 to 999

FAct Factory Page
ULoC Unlock Menu

CodE Public Key : xxx
PASS Password : xxx

Diagnostic Function



FACt Factory Page
d iAG Diagnostics Menu

Pn Part Number: scrolls on display

rEv Software Revision: 4.00, ...

S.bLd Software Build Number : 0, 1, 2, ...

Sn Serial Number : xxxxxx

dAtE Date of Manufacture : YWW format

Hardware ID : 113 (RMH)

Device Status : OK, Fail

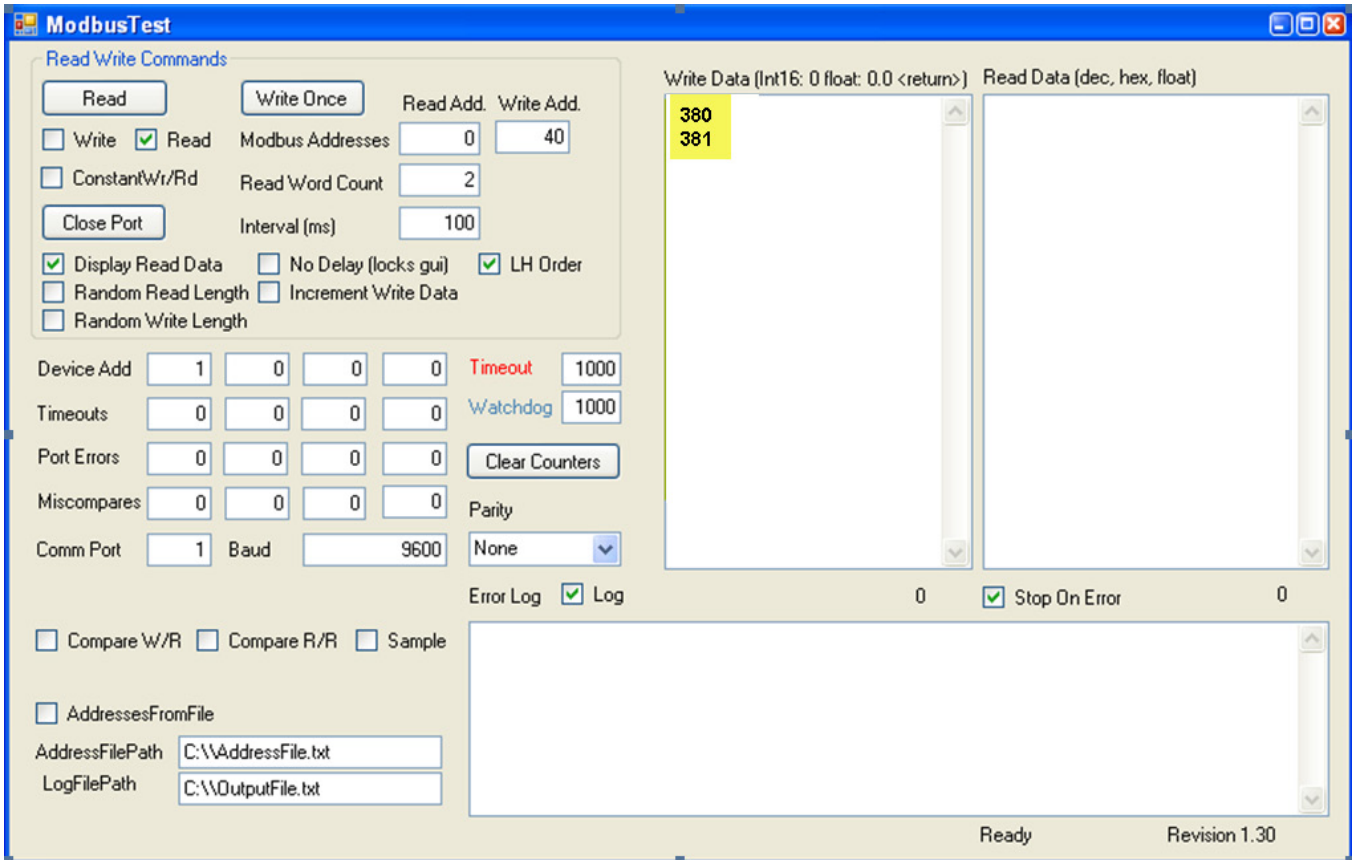
Device Name : EZ-ZONE RM

7 Chapter 10: Appendix

Modbus - Programmable Memory Blocks

The Modbus assembly contains 40 pointers to the parameters of your choosing starting at Modbus register 40 (shown on the following page). The pointers are 32-bits long so are stored in two sequential registers. As an example, if we want to move an alias to the analog input of the RMH (register 380) into register 40, we perform a multiple write command (0x10 function) of 380 into register 40 and 381 into register 41 as a single multi-write command.

Once the parameters of choice have been defined and written to the pointer registers, the working registers 200 to 279 then represent those parameters. Therefore, as in the example above, if 380 is in register 40, 381 in register 41, register 200 & 201 contains the 32-bit floating point result for analog input 1.



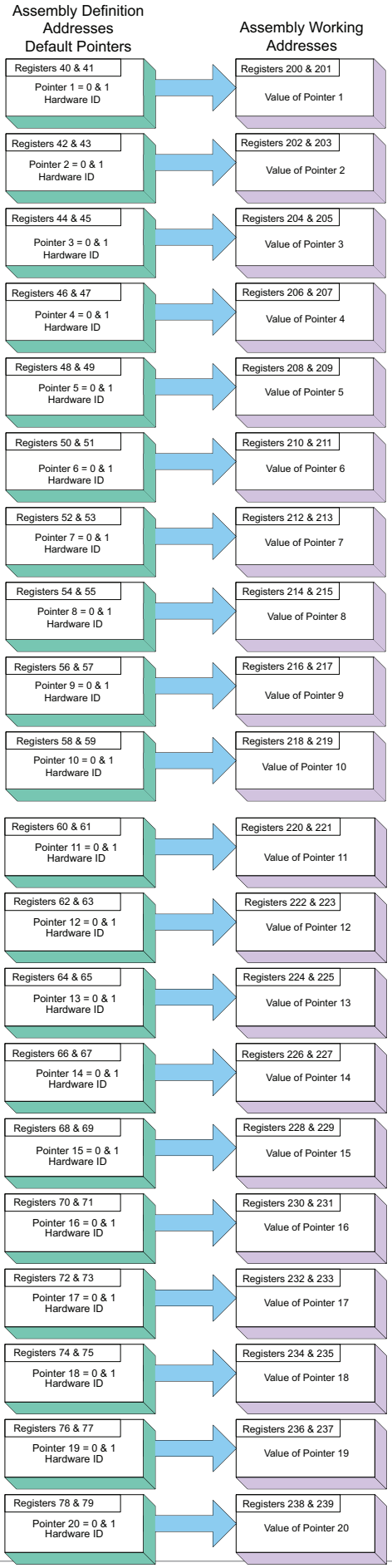
The screen shot above was taken from a program that can be found on the Watlow Support Tools DVD (shipped with the product) as well as on the Watlow website. On the DVD, it can be found under "Utility Tools" and is identified as "Modbus RTU Diagnostic Program for EZ-ZONE PM, RM and ST". A similar program can be found here as well for a connection utilizing Ethernet TCP.

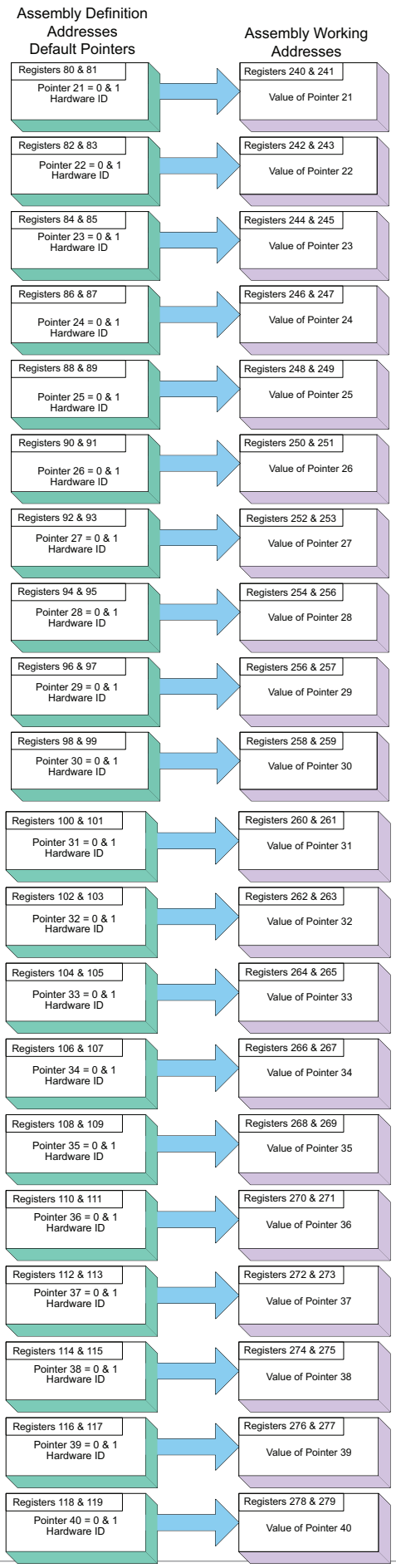
If it is easier to go to the web to acquire this software click on the link below and type "modbus" in the search field where both versions can be found with the same name. http://www.watlow.com/literature/software.cfm

Assembly Pointer Registers and Assembly Working Registers

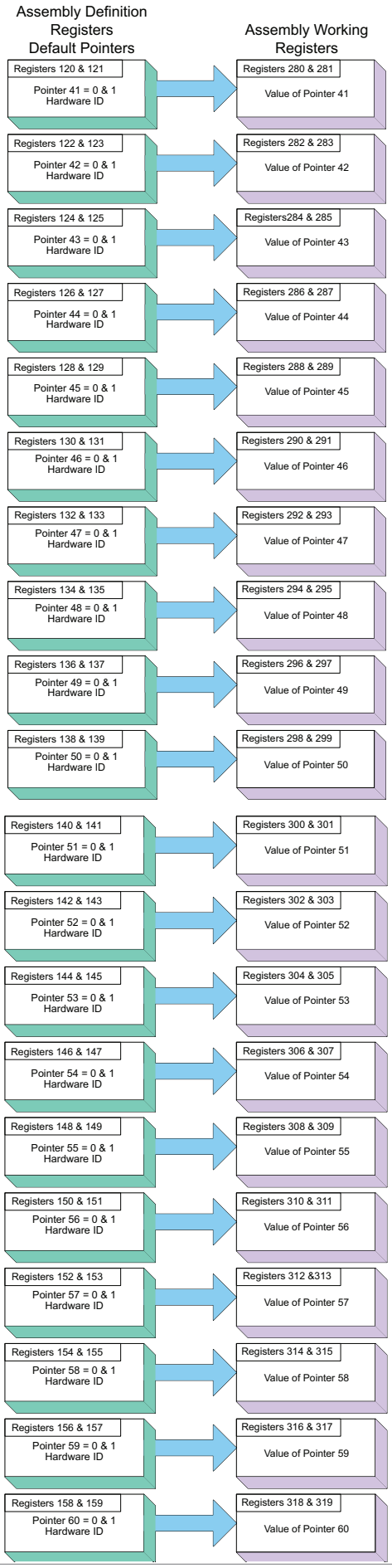
Definition Addresses	Working Addresses		Definition Addresses	Working Addresses
40 & 41	200 & 201		120 & 121	280 & 281
42 & 43	202 & 203		122 & 123	282 & 283
44 & 45	204 & 205		124 & 125	284 & 285
46 & 47	206 & 207		126 & 127	286 & 287
48 & 49	208 & 209		128 & 129	288 & 289
50 & 51	210 & 211		130 & 131	290 & 291
52 & 53	212 & 213		132 & 133	292 & 293
54 & 55	214 & 215		134 & 135	294 & 295
56 & 57	216 & 217		136 & 137	296 & 297
58 & 59	218 & 219		138 & 139	296 & 299
60 & 61	220 & 221		140 & 141	300 & 301
62 & 63	222 & 223		142 & 143	302 & 303
64 & 65	224 & 225		144 & 145	304 & 305
66 & 67	226 & 227		146 & 147	306 & 307
68 & 69	228 & 229		148 & 149	308 & 309
70 & 71	230 & 231		150 & 151	310 & 311
72 & 73	232 & 233		152 & 153	312 & 313
74 & 75	234 & 235		154 & 155	314 & 315
76 & 77	236 & 237		156 & 157	316 & 317
78 & 79	238 & 239		158 & 159	318 & 319
80 & 81	240 & 241		160 & 161	320 & 321
82 & 83	242 & 243		162 & 163	322 & 323
84 & 85	244 & 245		164 & 165	324 & 325
86 & 87	246 & 247		166 & 167	326 & 327
88 & 89	248 & 249		168 & 169	328 & 329
90 & 91	250 & 251		170 & 171	330 & 331
92 & 93	252 & 253		172 & 173	332 & 333
94 & 95	254 & 255		174 & 175	334 & 335
96 & 97	256 & 257		176 & 177	336 & 337
98 & 99	256 & 259		178 & 179	338 & 339
100 & 101	260 & 261		180 & 181	340 & 341
102 & 103	262 & 263		182 & 183	342 & 343
104 & 105	264 & 265		184 & 185	344 & 345
106 & 107	266 & 267		186 & 187	346 & 347
108 & 109	268 & 269		188 & 189	348 & 349
110 & 111	270 & 271		190 & 191	350 & 351
112 & 113	272 & 273		192 & 193	352 & 353
114 & 115	274 & 275		194 & 195	354 & 355
116 & 117	276 & 277		196 & 197	356 & 357
118 & 119	278 & 279		198 & 199	358 & 359

Modbus Default Assembly Structure 40-119





Modbus Default Assembly Structure 120-199



Troubleshooting Alarms, Errors and Module Issues

Indication	Description	Possible Cause(s)	Corrective Action
Alarm won't clear or reset	Alarm will not clear or reset with keypad or digital input	• Alarm latching is active • Alarm set to incorrect output • Alarm is set to incorrect source • Sensor input is out of alarm set point range • Alarm set point is incorrect • Alarm is set to incorrect type • Digital input function is incorrect	• Reset alarm when process is within range or disable latching • Set output to correct alarm source instance • Set alarm source to correct input instance • Correct cause of sensor input out of alarm range • Set alarm set point to correct trip point • Set alarm to correct type: process, deviation or power • Set digital input function and source instance
Alarm won't occur	Alarm will not activate output	• Alarm silencing is active • Alarm blocking is active • Alarm is set to incorrect output • Alarm is set to incorrect source • Alarm set point is incorrect • Alarm is set to incorrect type	• Disable alarm silencing, if required • Disable alarm blocking, if required • Set output to correct alarm source instance • Set alarm source to correct input instance • Set alarm set point to correct trip point • Set alarm to correct type: process, deviation or power
Alarm Error AL.E1 AL.E2 AL.E3 AL.E4 AL.E5 AL.E6 AL.E7 AL.E8 AL.E9 AL.10 AL.11 AL.12 AL.13 AL.14 AL.15 AL.16 AL.17 AL.18 AL.19 AL.20 AL.21 AL.22 AL.23 AL.24	Alarm state cannot be determined due to lack of sensor input	• Sensor improperly wired or open • Incorrect setting of sensor type • Calibration corrupt	• Correct wiring or replace sensor • Match setting to sensor used • Check calibration of controller
Alarm Low AL.L1 AL.L2 AL.L3 AL.L4 AL.L5 AL.L6 AL.L7 AL.L8 AL.L9 AL.10 AL.11 AL.12 AL.13 AL.14 AL.15 AL.16 AL.17 AL.18 AL.19 AL.20 AL.21 AL.22 AL.23 AL.24	Sensor input below low alarm set point	• Temperature is less than alarm set point • Alarm is set to latching and an alarm occurred in the past • Incorrect alarm set point • Incorrect alarm source	• Check cause of under temperature • Clear latched alarm • Establish correct alarm set point • Set alarm source to proper setting
Alarm High AL.h1 AL.h2 AL.h3 AL.h4 AL.h5 AL.h6 AL.h7 AL.h8 AL.h9 AL.10 AL.11 AL.12 AL.13 AL.14 AL.15 AL.16 AL.17 AL.18 AL.19 AL.20 AL.21 AL.22 AL.23 AL.24	Sensor input above high alarm set point	• Temperature is greater than alarm set point • Alarm is set to latching and an alarm occurred in the past • Incorrect alarm set point • Incorrect alarm source	• Check cause of over temperature • Clear latched alarm • Establish correct alarm set point • Set alarm source to proper setting

Indication	Description	Possible Cause(s)	Corrective Action
No Display	No display indication or LED illumination	• Power to controller is off • Fuse open • Breaker tripped • Safety interlock switch open • Separate system limit control activated • Wiring error • Incorrect voltage to controller	• Turn on power • Replace fuse • Reset breaker • Close interlock switch • Reset limit • Correct wiring issue • Apply correct voltage, check part number
No Serial Communication	Cannot establish serial communications with the controller	• Address parameter incorrect • Incorrect protocol selected • Baud rate incorrect • Parity incorrect • Wiring error • EIA-485 converter issue • Incorrect computer or PLC communications port • Incorrect software setup • Wires routed with power cables • Termination resistor may be required	• Set unique addresses on network • Match protocol between devices • Match baud rate between devices • Match parity between devices • Correct wiring issue • Check settings or replace converter • Set correct communication port • Correct software setup to match controller • Route communications wires away from power wires • Place 120 Ω resistor across EIA-485 on last controller
Device Error 100 rEtn	Controller displays internal malfunction message at power up.	• Controller defective • Sensor input over driven	• Replace or repair controller • Check sensors for ground loops, reverse wiring or out of range values.
Heater Error h.Er	Heater Error	• Current through load is above current trip set point	• Check that the load current is proper. Correct cause of overcurrent and/or ensure current trip set point is correct.
		• Current through load is below current trip set point	• Check that the load current is proper. Correct cause of undercurrent and/or ensure current trip set point is correct.
Current Error C.Er	Load current incorrect.	• Shorted solid-state or mechanical relay	• Replace relay
		• Open solid-state or mechanical relay	• Replace relay
		• Current transformer load wire associated to wrong output	• Route load wire through current transformer from correct output, and go to the C.S1 Source Output Instance parameter (Setup Page, Current Menu) to select the output that is driving the load.
		• Defective current transformer or controller	• Replace or repair sensor or controller
		• Noisy electrical lines	• Route wires appropriately, check for loose connections, add line filters
Remote User Interface (RUI) menus inaccessible	Unable to access SEt, OPEr, FCtY or ProF menus or particular prompts in Home Page	• Security set to incorrect level	• Check LoC settings in Factory Page • Enter appropriate password in ULoC setting in Factory Page
		• Digital input set to lockout keypad	• Change state of digital input
		• Custom parameters incorrect	• Change custom parameters in Factory Page
RUI value to low uAL.L	Value to low to be displayed in 4 digit LED display <-1999	• Incorrect setup	• Check scaling of source data

Indication	Description	Possible Cause(s)	Corrective Action
RUI value to high uRL.h	Value to high to be displayed in 4 digit LED display >9999	• Incorrect setup	• Check scaling of source data

Detection of and Rules Around Abnormal Sensor Conditions	
Inputs	**Detection of Abnormal Conditions**
Thermocouple	
Shorted	No direct detection, Open loop firmware detection.
Open	Yes, Parasitic pull-up
Reversed	Yes, firmware detection
Current Source	
Shorted	Range limiting only
Open	Range limiting only
Reversed	Range limiting only
Voltage Source	
Open	Range limiting only
Shorted	Range limiting only
Reversed	Range limiting only
RTD	
S1 open	Yes, pulled up.
S2 open	Not implemented.
S3 open	Yes, pulled up.
S1 short to S2	Yes, pulled up
S1 short to S3	Yes, pulled down to under range.
S2 shorted to S3	Not implemented, Possible, monitor S2 voltage.
S1 and S2 open	Yes, pulled down to under range.
S1 and S3 open	Yes, S1 pulled up.
S2 and S3 open	Yes pulled up.
Thermistor	
S1 open	Yes, pulled up to sensor over range.
S3 open	Yes, pulled up to sensor over range.
S1 short to S3	Yes, pulled down to sensor under range.
S1 and S3 open	Yes, S1 pulled up to sensor over range.

RMH Specifications

Line Voltage/Power

- 20.4 to 30.8V≂ (ac/dc), 50/60Hz, ±5 percent
- Power consumption: 7 W, 14VA
- Any external power supply used should comply with a class 2 or SELV rating.
- Data retention upon power failure via nonvolatile memory
- Compliant with Semi F47-0200, Figure R1-1 voltage sag requirements

Environment

- 0 to 149°F (-18 to 65°C) operating temperature
- -40 to 185°F (-40 to 85°C) storage temperature
- 0 to 90 percent RH, non-condensing
- Rail Mount modules are considered to be open type equipment needing to be installed in a fire and shock protection enclosure, such as a NEMA Type 1 enclosure; unless all circuit connections are Class 2 or SELV (Saftey Extra Low Voltage)

Accuracy

- Calibration accuracy and sensor conformity: ±0.1% of span, ±1°C @ the calibrated ambient temperature and rated line voltage
- Types R, S, B; 0.2%
- Type T below -50°C; 0.2%
- Calibration ambient temperature @ 77 ±5°F (25±3°C)
- Accuracy span :1000 °F (540°C) min.
- Temperature stability: ±0.1 °F/°F (±0.1°C/°C) rise in ambient max.

Agency Approvals

- UL®/EN 61010 listed c-UL C22.2 #61010 File E185611 QUYX, QUYX7
- ANSI/ISA 12.12.01-2007 Hazardous Locations Class 1, Div. 2-Group A, B, C, D Temperature code T4 (optional) File E184390 QUZW, QUZW7
- EN 60529 IP20; RM modules
- UL® 50, Type 4X indoor use, EN 60529 IP66; 1/16 DIN RUI, NEMA 4X
- RoHS by design, W.E.E.E.
- CE

Serial Communications

- All modules ship with isolated Standard Bus protocol for configuration and communication connection to all other EZ-ZONE products. As an optional feature Modbus RTU can also be ordered.

Optional User Interface (RUI)

- 1⁄16 DIN
- Dual 4 digit, 7-segment LED displays
- Seven-segment address LED, programmed via push-button switch
- Keys: Advance, infinity, up, down keys, plus an EZ-KEY programmable function key
- Typical display update rate 1Hz

Maximum RMH Configuration

- Up to 16 loops per module with a maximum of 16 modules

Mounting

- DIN-rail specification EN50022, 35 x 7.5 mm (1.38 x 0.30 in.)
- Can be DIN-rail mounted or chassis mounted with customer-supplied fasteners

Dimensions		Weight
155.0 mm (6.10 in)	116.08 mm (4.57 in)	Controller: 453.59 g (16 oz.)

Wiring Termination—Touch-Safe Terminals

- Right angle and front screw type terminal blocks (slots A, B, D, E)
  - Input, power and controller output terminals, touch-safe removable 12 to 30 AWG
- Wire strip length 7.6 mm (0.30 in.)
- Torque 0.8Nm (7.0 lb.-in.) right angle, 0.5Nm (4.51lb-in) front terminal block
- Use solid or stranded copper conductors only

Connector	Dimension “A” (mm/in.)
Standard	148 (5.80)
Straight	155 (6.10)

Optional Accessories

Power Supplies

- AC/DC Power supply converter 90-264V~ (ac) to 24V⎓ (dc) volts.
- P/N 0847-0299-0000: 31 W
- P/N 0847-0300-0000: 60 W
- P/N 0847-0301-0000: 91 W

EZ-ZONE RM Product Documentation

- User's Guide, printed hard copy, P/N 0600-0074-0000
- Watlow Support Tools CD, P/N 0601-0001-0000

Universal Input

- Thermocouple, grounded or ungrounded sensors
- >20MΩ input impedance
- 3µA open sensor detection
- Max. of 2KΩ source resistance
- RTD 2 wire, platinum, 100Ω and 1000Ω @ 0°C calibration to DIN curve (0.00385Ω/Ω/°C)
- Process, 0-20mA @ 100Ω ,or 0-10V ⎓(dc) @ 20kΩ input impedance; scalable, 0-50mV, 0-1000Ω

Voltage Input Ranges
- Accuracy ±10mV ±1 LSD at standard conditions
- Temperature stability ±100 PPM/°C maximum

Milliamp Input Ranges
- Accuracy ±20µA ±1 LSD at standard conditions
- Temperature stability ±100 PPM/°C maximum

Resolution Input Ranges
- 0 to 10V: 200 µV nominal
- 0 to 20 mA: 0.5 mA nominal

•Potentiometer: 0 to 1,200Ω

Input Type	Max Error @ 25 Deg C	Accuracy Range Low	Accuracy Range High	Units
J	±1.75	0	750	Deg C
K	±2.45	-200	1250	Deg C
T	±1.55	-50	350	Deg C
T	±2.10	-200	-50	Deg C
N	±2.25	0	1250	Deg C
E	±2.10	-200	900	Deg C
R	±3.90	0	1450	Deg C
S	±3.90	0	1450	Deg C
B	±2.66	870	1700	Deg C
C	±3.32	0	2315	Deg C
D	±3.32	0	2315	Deg C
F (PTII)	±2.39	0	1343	Deg C
RTD, 100 ohm	±2.00	-200	800	Deg C
RTD, 1000 ohm	±2.00	-200	800	DegC
mV	±0.05	-50	50	mV
Volts	±0.01	0	10	Volts
mA dc	±0.02	0	20	mAmps DC

Input Type	Max Error @ 25 Deg C	Accuracy Range Low	Accuracy Range High	Units
mA ac	±5	0	50	mAmps AC
Potentiometer, 1K range	±1	0	1000	Ohms

Operating Range			
Input Type	**Range Low**	**Range High**	**Units**
J	-210	1200	DegC
K	-270	1371	DegC
T	-270	400	DegC
N	-270	1300	DegC
E	-270	1000	DegC
R	-50	1767	DegC
S	-50	1767	DegC
B	-50	1816	DegC
C	0	2315	DegC
D	0	2315	DegC
F (PTII)	0	1343	DegC
RTD (100 ohm)	-200	800	DegC
RTD (1000 ohm)	-200	800	DegC
mV	0	50	mV
Volts	0	10	Volts
mAdc	0	20	mAmps DC
mAac	0	50	mAmps AC
Resistance, 5K range	0	5000	Ohms
Resistance, 10K range	0	10000	Ohms
Resistance, 20K range	0	20000	Ohms
Resistance, 40K range	0	40000	Ohms
Resistance, 40K range	0	40000	Ohms
Potentiometer, 1K range	0	1200	Ohms

Thermistor Input				
Input Type	**Max Error @ 25 Deg C**	**Accuracy Range Low**	**Accuracy Range High**	**Units**
Thermistor, 5K range	±5	0	5000	Ohms
Thermistor, 10K range	±10	0	10000	Ohms

Thermistor Input (cont.)				
Input Type	**Max Error @ 25 Deg C**	**Accuracy Range Low**	**Accuracy Range High**	**Units**
Thermistor, 20K range	±20	0	20000	Ohms
Thermistor, 40K range	±40	0	40000	Ohms

- 0 to 40KΩ, 0 to 20KΩ, 0 to 10KΩ, 0 to 5KΩ
- 2.252KΩ and 10KΩ base at 25°C
- Linearization curves built in
- Third party Thermistor compatibility requirements

Base R @ 25C	Alpha Techniques	Beta THERM	YSI	Thermistor Curve
2.252K	Curve A	2.2K3A	004	A
10K	Curve A	10K3A	016	B
10K	Curve C	10K4A	006	C

Digital Input

- Update rate 10Hz
- DC voltage
  - Max. input 36V at 3mA
  - Min. high state 3V at 0.25mA
  - Max. low state 2V

Dry Contact

- Update rate 10Hz
- Min. open resistance 10KΩ
- Max. closed resistance 50Ω

Output Hardware

- Electromechanical relay, Form A, 5A, 24 to 240V~ (ac) or 30V⎓ (dc) max., resistive load, 100,000 cycles at rated load. Requires a min. load of 20mA at 24V, 120/240 V~ (ac) 125VA, 24V~ (ac) 25VA pilot duty
- Digital outputs
  - Update rate 10Hz
  - Switched DC
    - Output voltage 20V⎓ (dc)
    - Max. supply current source 40mA at 20V⎓ (dc) and 80mA at 12V⎓ (dc)
  - Open Collector
    - Switched voltage max.: 32V⎓ (dc)
    - Max. switched current per output: 1.5A
    - Max. switched current for all 6 outputs combined: 8A

Process/Retransmit Outputs, Range Selectable

- - 0 to 10V ⎓(dc) into a min. 4KΩ load
  - 0 to 20mA into max. 400Ω load

  Resolution
  - dc ranges: 0.2mV nominal
  - mA ranges: 0.4µA nominal

  Calibration Accuracy
  - dc ranges: ±15 mV
  - mA ranges: ±30 µA

  Temperature Stability
  - 100 ppm FSR/°C

Quad Solid-State Relays

- 2A at 20 to 264V~ (ac) maximum resistive load
- 50 VA 120/240V~ (ac) pilot duty

Programmable Application Blocks

Actions (events) 24 total
Alarms 24 total

Control Loops 16 total

Compare 24 total

Off, greater than, less than, equal, not equal, greater than or equal, less than or equal

Counters 24 total

Counts up or down loads, predetermined value on load signal. Output is active when count value equals predetermined target value

Logic 24 total

Off, and, nand, or, nor, equal, not equal, Latch

Linearization 24 total

Interpolated or stepped relationship

Math 24 total

Off, average, process scale, deviation scale, differential (subtraction), ratio (divide), add, multiply, absolute difference, min., max., square root, sample and hold

Process Value 16 total

Off, sensor backup, average, crossover, wet/dry bulb, switch over, differential (subtraction), ratio (divide), add, multiply, absolute difference, min., max., square root

Timers 24 total

On Pulse produces output of fixed time on active edge of timer run signal

Delay output is a delayed start of timer run, off at same time

One Shot oven timer

Retentive measures timer run signal, output on when accumulated time exceeds target

Variable 24 total

User value for digital or analog variable

Note:

These specifications are subject to change without prior notice.

EZ-ZONE Rail-Mount High Density Module Ordering Information

High density module requires a Class 2 or SELV power supply 20.4 to 30.8 V ~(ac) /⎓(dc), communication port provided for configuration with EZ-ZONE Configurator software.

Code Number

①② EZ-ZONE Rail Mount	③ High Density Module	④ Connector Style/ Custom Product		⑤ Slot A	⑥ Slot B	⑦ Slot D	⑧ Slot E		⑨ Future Options	⑩ Enhanced Options	⑪⑫ Additional Options
RM	H		-					-	A		

Connector Style/Custom Product - Digit ④

A	=	Right angle screw connector (standard)
F	=	Front screw connector
S	=	Custom

Slot A - Digit ⑤

1	=	4 Universal inputs (t/c, 2-wire RTD, 0-10Vdc, 0-20mA, 1K pot-entiometer) with 4 control loops
2	=	4 Thermistor inputs with 4 control loops

Slot B - Digit ⑥

A	=	None
1	=	4 Universal inputs (t/c, 2-wire RTD, 0-10Vdc, 0-20mA, 1K pot-entiometer) with 4 control loops
2	=	4 Thermistor inputs with 4 control loops

Slot D - Digit ⑦

A	=	None
1	=	4 Universal inputs (t/c, 2-wire RTD, 0-10Vdc, 0-20mA, 1K pot-entiometer) with 4 control loops
2	=	4 Thermistor inputs with 4 control loops
J	=	4 Mechanical relay 5A, Form A
F	=	3 Universal Process/Retransmit outputs
L	=	4 SSR's at 2 amps each
C	=	6 Digital I/O

Slot E - Digit ⑧

A	=	None
1	=	4 Universal inputs (t/c, 2-wire RTD, 0-10Vdc, 0-20mA, 1K pot-entiometer) with 4 control loops
2	=	4 Thermistor inputs with 4 control loops
J	=	4 Mechanical relay 5A, Form A
F	=	3 Universal Process/Retransmit outputs
L	=	4 SSR's at 2 amps each
C	=	6 Digital I/O

Future Options - Digit ⑨

A	=	Standard

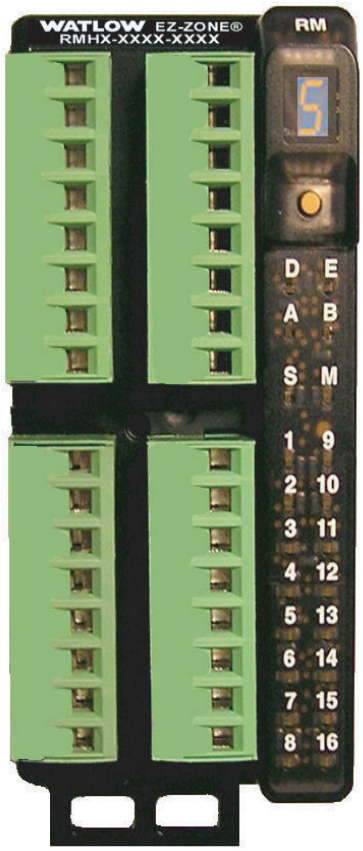
Enhanced Options - Digit ⑩

A	=	Standard Bus
1	=	Standard Bus and Modbus RTU 485 (selectable via switch)

Additional Options - Digits ⑪ ⑫

Firmware, Overlays, Parameter Settings

AA	=	Standard
AB	=	Replacement connectors hardware only, for the entered model number
12	=	Class 1 Div. 2 (not available with mechanical relay options)
XX	=	Custom (consult factory)



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Declaration of Conformity

EZ Zone Series RM

WATLOW
1241 Bundy Blvd.
Winona, MN 55987 USA

an ISO 9001 approved facility since 1996.

Declares that the following Series RM (Rail Mount) products:

Model Numbers:	**RM** followed by additional letters or numbers describing use of up to four module options of various inputs and outputs or communications.
Classification:	Temperature control, Installation Category II, Pollution degree 2
Voltage and Frequency:	SELV 24 to 28 V≂ ac 50/60 Hz or dc
Power Consumption:	RMA models 4 Watts, any other RM model 7 Watts
Environmental Rating:	IP20

Meet the essential requirements of the following European Union Directives by using the relevant standards show below to indicate compliance.

2004/108/EC Electromagnetic Compatibility Directive

EN 61326-1	**2006**	**Electrical equipment for measurement, control and laboratory use – EMC requirements, Industrial Immunity, Class A Emissions (*Not for use in a Class B environment without additional filtering).***
EN 61000-4-2	2008	Electrostatic Discharge Immunity
EN 61000-4-3	2010	Radiated Field Immunity
EN 61000-4-4	2011	Electrical Fast-Transient / Burst Immunity
EN 61000-4-5	2006	Surge Immunity
EN 61000-4-6	2008	Conducted Immunity
EN 61000-4-11	2004	Voltage Dips, Short Interruptions and Voltage Variations Immunity
EN 61000-3-2	2005	Harmonic Current Emissions
EN 61000-3-3[1]	2005	Voltage Fluctuations and Flicker
SEMI F47	2000	Specification for Semiconductor Sag Immunity Figure R1-1

[1]NOTE: To comply with flicker requirements cycle time may need to be up to 160 seconds if load current is at 15A, or the maximum source impedance needs to be < 0.13Ω. Control power input of RM models comply with 61000-3-3 requirements.

2006/95/EC Low-Voltage Directive

EN 61010-1	**2010**	**Safety Requirements of electrical equipment for measurement, control and laboratory use. Part 1: General requirements**

Compliant with 2002/95/EC RoHS Directive

Per 2002/96/EC W.E.E.E Directive *Please Recycle Properly*

Joe Millanes
Name of Authorized Representative

Winona, Minnesota, USA
Place of Issue

Director of Operations
Title of Authorized Representative

September 2013
Date of Issue

Signature of Authorized Representative

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