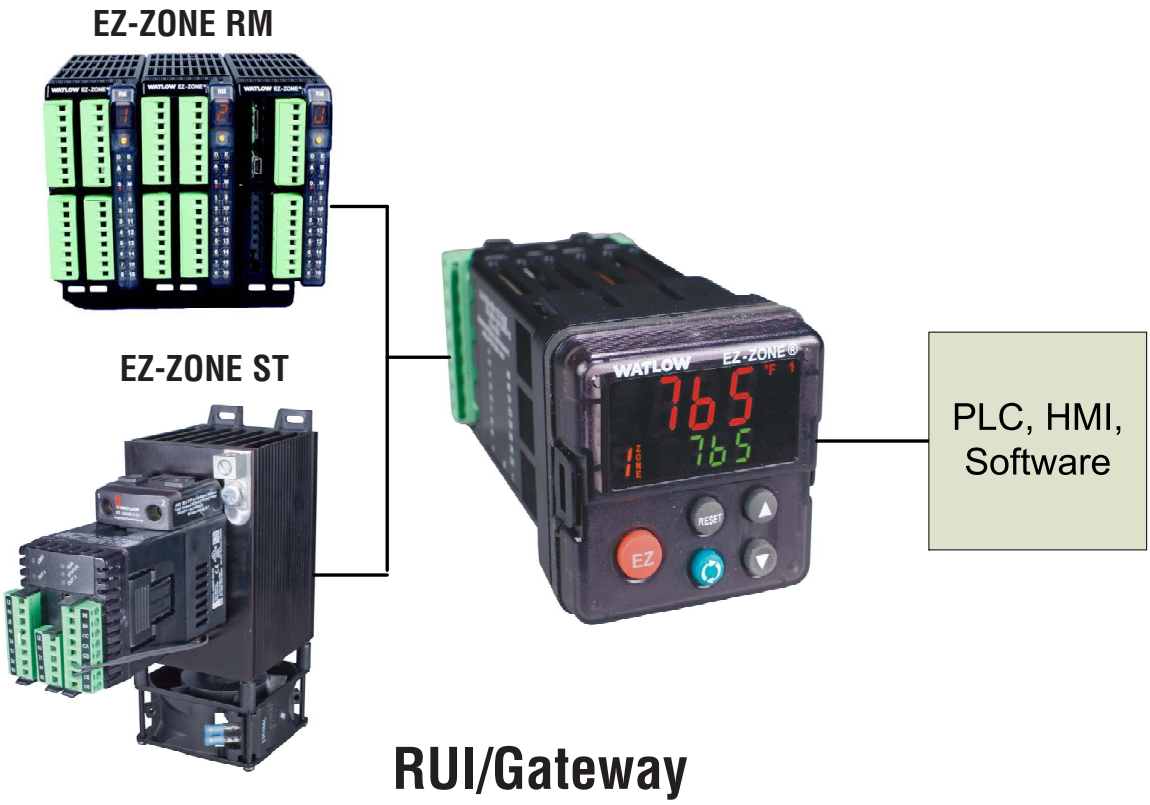
EZ-ZONE® RUI/Gateway

User's Guide



WATLOW®

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TOTAL CUSTOMER SATISFACTION 3 Year Warranty

ISO 9001 Registered Company Winona, Minnesota USA

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0600-0060-0000 Rev. E

Made in the U.S.A.

August 2016

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

CE	Unit is compliant with European Union directives. See Declaration of Conformity for further details on Directives and Standards used for Compliance.
CSA	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
DeviceNet CONFORMANCE TESTED	Unit has been reviewed and approved by ODVA for compliance with DeviceNet communications protocol. See: www.odva.org
EtherNet/IP conformance tested	Unit has been reviewed and approved by ODVA for compliance with Ethernet/IP communications protocol. See: www.odva.org

Warranty

The EZ-ZONE® RUI/Gateway 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. Watlow's obligations hereunder, at Watlow's 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

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 RMA number from the Customer Service Department is required when returning any product for credit, repair or evaluation. Make sure the RMA 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 mis-use, 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 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 is not repairable, 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.

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1 Chapter 1: Overview

Available EZ-ZONE Literature and Resources

DVD and Part Number	Description
Watlow Support Tools DVD, part number: 0601-0001-0000	Contains all related EZ-ZONE 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 EZ-ZONE user manuals can also be found on the Watlow website. Click on the following link to find your document of choice: http://www.watlow.com/en/resources-and-support/Technical-Library/User-Manuals. 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® Remote User Interface (RUI) allows a user to connect, view and change any readable and writable parameters within any EZ-ZONE controller. As the name implies, this can be accomplished while being connected at a distance of up to 200 feet away from the monitored controller.

If your application requires communications from EZ-ZONE controllers to better manage system performance or to initiate real-time changes over a network, the RUI provides a means to do so. Along with its default communications protocol (Standard Bus), the RUI can also communicate with many other popular industrial protocols. When used with other protocols, the RUI will serve as a gateway or bridge between Standard Bus and any of the industrial protocols listed below:

- EtherNet/IP
- DeviceNet
- Modbus TCP
- Modbus RTU
- Profibus DP

Standard Features and Benefits

Remote User Interface/Gateway (RUI/GTW)

- Uses one RUI for multiple zones
- The RUI without a gateway card utilizes minimal panel depth allowing it to fit in small spaces
- Eliminates the costs and complexity of having to bring all controller related wires to the front
  panel
- Enables the use of multiple RUIs to improve the system's usability and flexibility

Agency Approvals: UL Listed, cULus, CSA, CE, RoHS,

- Assures prompt product acceptance
- Reduces end product documentation costs

Short Case

- CSA C22.2 #14 Approved File 158031
- cULus UL 508 Listed approval File E102269
- UL® 50 Type 4X, NEMA 4X indoor locations, IP65 front panel seal (indoor use only)

Long Case

- UL® Listed to UL 61010-1 File E185611
- UL® Reviewed to CSA C22.2 No.61010-1-04
- UL® 50 Type 4X, NEMA 4X indoor locations, IP65 front panel seal (indoor use only)
- ODVA-EtherNet/IP™ and DeviceNet Compliance
- CSA C22.2 No. 24 File 158031 Class 4813-02
- Profibus DP

P3T Armor Sealing System

- NEMA 4X and IP65, indoor use only
- Offers water and dust resistance, can be cleaned and washed down

Three Year Warranty

- Demonstrates Watlow's reliability and product support

EZ-Key

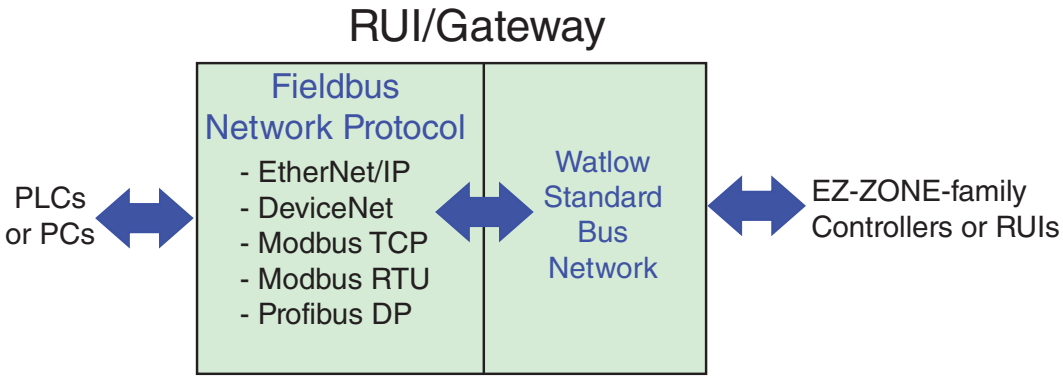
- Programmable EZ-Key enables simple one-touch operation of repetitive user activities.

Using the RUI/GTW as a Gateway

The addition of a gateway card allows information to be passed from the Standard Bus side of the gateway (EZ-ZONE®-family controllers) to one or more of the following popular field bus networks:

- EtherNet/IP™
- DeviceNet™
- Modbus TCP
- Modbus RTU
- Profibus DP

The networks see the gateway and RUI as separate devices. Both sides (1 port on each side) of the gateway will require unique addresses based on the protocol specifications.



Note:

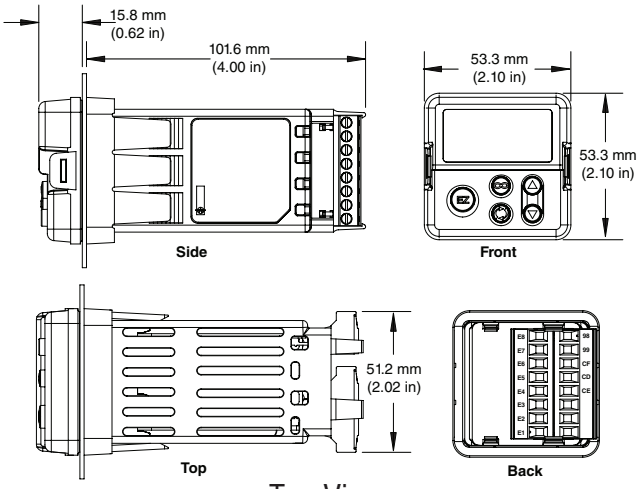
Excessive writes through the gateway to other EZ-ZONE® family controllers may cause premature EE-PROM failure. For more detail see the section entitled "Saving Settings to Non-volatile Memory."

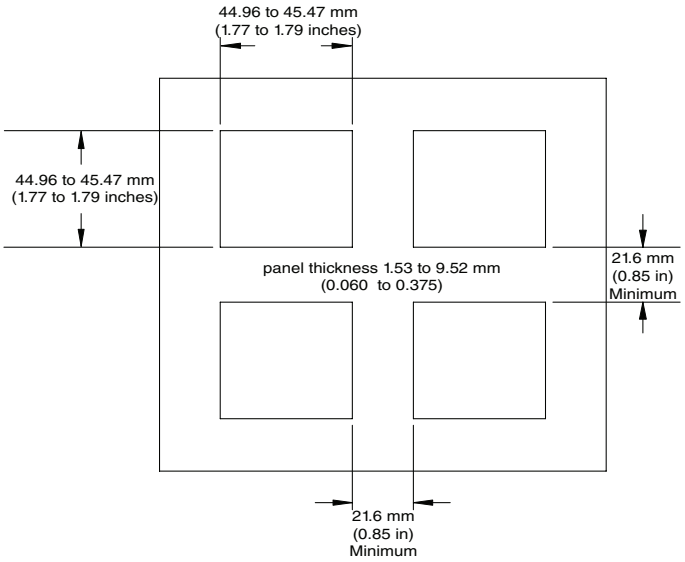
Note:

A Standard Bus network can communicate with a maximum of eight RUIs with up to four of those being gateways. Valid Standard Bus addresses for RUIs equipped with the gateway option are 1, 2, 3 or 4. As is always the case with devices on a network, each RUI must have a unique Standard Bus address.

2 Chapter 2: Install and Wire

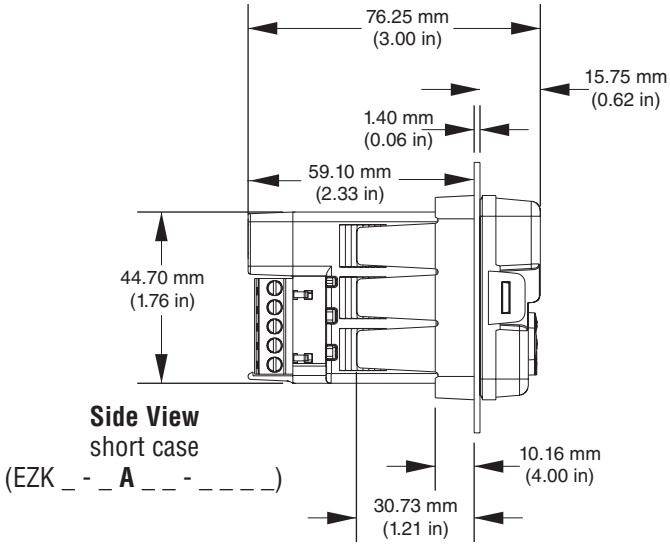
Dimensions



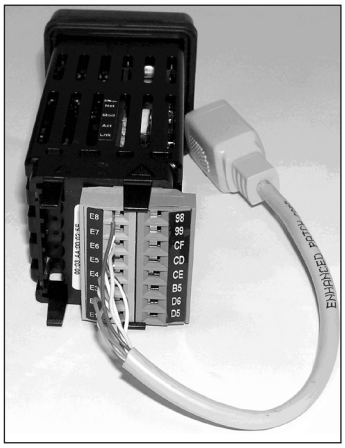


Top View
long case
(EZK_-_(2, 3, 5 or 6)_ _-_ _ _ _)

Back View
short case



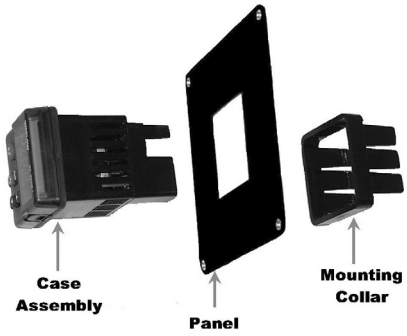
Side View
short case
(EZK _ - _ **A** _ _ - _ _ _ _)



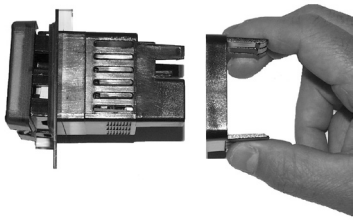
EtherNet/IP™ and Modbus TCP gateway in slot B. Shown with supplied cable.

Mounting the Remote User Interface (RUI)

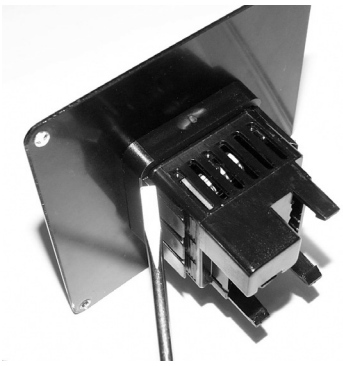
1. Make the panel cutout using the mounting template dimensions in this chapter. Insert the case assembly into the panel cutout.



2. While pressing the case assembly firmly against the panel, slide the mounting collar over the back of the RUI. If the installation does not require a NEMA 4X seal, simply slide together until the gasket is compressed.



3. For a NEMA 4X, IP65 seal, alternately place and push the blade of a screwdriver against each of the four corners of the mounting collar assembly. Apply pressure to the face of the RUI while pushing with the screwdriver. Don't be afraid to apply enough pressure to properly install the RUI. If you can move the case assembly back and forth in the cutout, you do not have a proper seal. The tabs on each side of the mounting collar have teeth that latch into the ridges on the sides of the RUI. Each tooth is staggered at a different depth from the front so that only one of the tabs, on each side, is locked onto the ridges at a time.



WARNING! ⚠

- This equipment is suitable for use in class 1, div. 2, Groups A, B, C and D or Non-Hazardous locations only. Temperature Code T4A.
- WARNING – EXPLOSION HAZARD. Substitution of component may impair suitability for class 1, div. 2.
- WARNING – EXPLOSION HAZARD. Do not disconnect equipment unless power has been switched off or the area is known to be nonhazardous.

WARNING! ⚠

All electrical power to the RUI must be disconnected before removing the RUI from the front panel or disconnecting other wiring. Failure to follow these instructions may cause an electrical shock and/or sparks that could cause an explosion in class 1, div. 2 hazardous locations.

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 mm² (30 to 12 AWG) single-wire termination or two 1.31 mm² (16 AWG)
- 0.56 Nm (5.0 in-lb.) torque

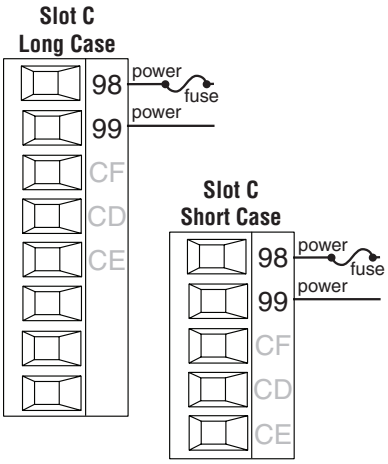
Warning: ⚠
Explosion Hazard - Dry contact closure Digital Inputs shall not be used in Class I Division 2 Hazardous Locations unless switch used is approved for this application.

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.

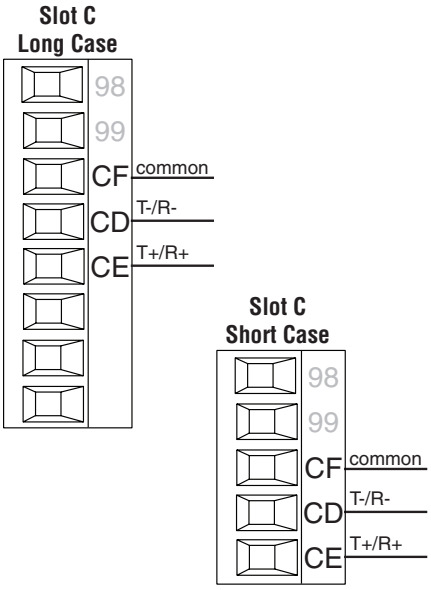
Note:
Excessive writes through the gateway to other EZ-ZONE family controllers may cause premature EEPROM failure. For more detail see the section entitled "Saving Settings to Non-volatile Memory."

Power



- Minimum/Maximum Ratings
- 85 to 264V~ (ac)
- 20.4 to 26.4 V≂ (ac/dc)
- 47 to 63Hz
- 6VA maximum

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.
- Do not connect more than 16 controllers on a network.
- Maximum network length: 1,200 meters (4,000 feet)
- 1/8th unit load on EIA-485 bus

Note:
Disconnect any USB to EIA-485 converter when not connected to a PC (without power). Failure to do so may cause communications errors.

Note:
Maximum recommended distance between the RUI and EZ-ZONE controller is 200 feet.

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 mm² (30 to 12 AWG) single-wire termination or two 1.31 mm² (16 AWG)
- 0.56 Nm (5.0 in-lb.) torque

Warning: ⚠
Explosion Hazard - Dry contact closure Digital Inputs shall not be used in Class I Division 2 Hazardous Locations unless switch used is approved for this application.

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:
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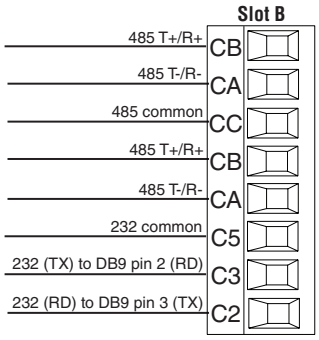
EIA-232/485 Modbus RTU Communications



- 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 120Ω resistor across T+/R+ and T-/R- of last controller on network.
- Do not wire to both the EIA-485 and the EIA-232 pins at the same time.
- Two EIA-485 terminals of T/R are provided to assist in daisy-chain wiring.
- Do not connect more than one EZ-ZONE® RUI on a EIA-232 network.
- Maximum number of EZ-ZONE RUI on a Modbus® RTU EIA-485 network: 247
- Maximum EIA-232 network length: 15 meters (50 feet)
- Maximum EIA-485 network length: 1,200 meters (4,000 feet)
- 1/8th unit load on EIA-485 bus.

EZK _-_ 2 _ _-A _ A A

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

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 mm² (30 to 12 AWG) single-wire termination or two 1.31 mm² (16 AWG)
- 0.56 Nm (5.0 in-lb.) torque

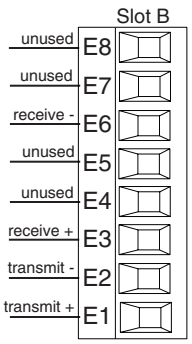
Warning: ⚠
Explosion Hazard - Dry contact closure Digital Inputs shall not be used in Class I Division 2 Hazardous Locations unless switch used is approved for this application.

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:
Excessive writes through the gateway to other EZ-ZONE family controllers may cause premature EEPROM failure. For more detail see the section entitled "Saving Settings to Non-volatile Memory."

EtherNet/IP™ and Modbus TCP Communications

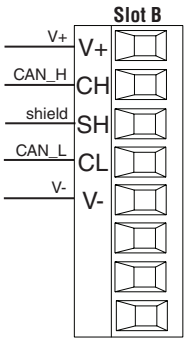


- Do not route network wires with power wires.
- Connect one Ethernet cable per device to a 10/100 mbps Ethernet switch. Both Modbus® TCP and EtherNet/IP™ are available on the network.

RJ-45 Pin	T568B Wire Color	Signal	Slot B
8	brown	unused	E8
7	brown & white	unused	E7
6	green	receive -	E6
5	white & blue	unused	E5
4	blue	unused	E4
3	white & green	receive +	E3
2	orange	transmit -	E2
1	white & orange	transmit +	E1

Note:
When changing the fixed IP address on the RUI cycle module power for new address to take effect.

DeviceNet™ Communications



Terminal	Signal	Function
V+	V+	DeviceNet™ power
CH	CAN_H	positive side of DeviceNet™ bus
SH	shield	shield interconnect
CL	CAN_L	negative side of DeviceNet™ bus
V-	V-	DeviceNet™ power return

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 mm² (30 to 12 AWG) single-wire termination or two 1.31 mm² (16 AWG)
- 0.56 Nm (5.0 in-lb.) torque

Warning: ⚠

Explosion Hazard - Dry contact closure Digital Inputs shall not be used in Class I Division 2 Hazardous Locations unless switch used is approved for this application.

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.

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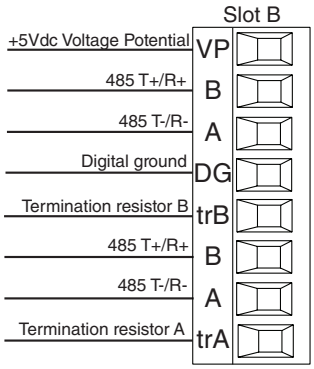
Profibus DP Communications



Note:

When termination jumpers are in place, there is a 392 ohm pull-up resistor to 5V and a 392 ohm pull-down resistor to DG. There is also a 221 ohm resistor between A and B.

- 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 Digital Ground 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 should be used if this controller is the last one on the network.
- If using a 150Ω cable Watlow provides internal termination. Place a jumper across pins trB and B and trA and A.
- If external termination is to be used with a 150Ω cable place a 390Ω resistor across pins VP and B, a 220Ω resistor across pins B and A, and lastly, place a 390Ω resistor across pins DG and A.
- Do not connect more than 32 EZ-ZONE devices on any given segment.
- Maximum EIA-485 network length: 1,200 meters (4,000 feet)
- 1/8th unit load on EIA-485 bus.

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.

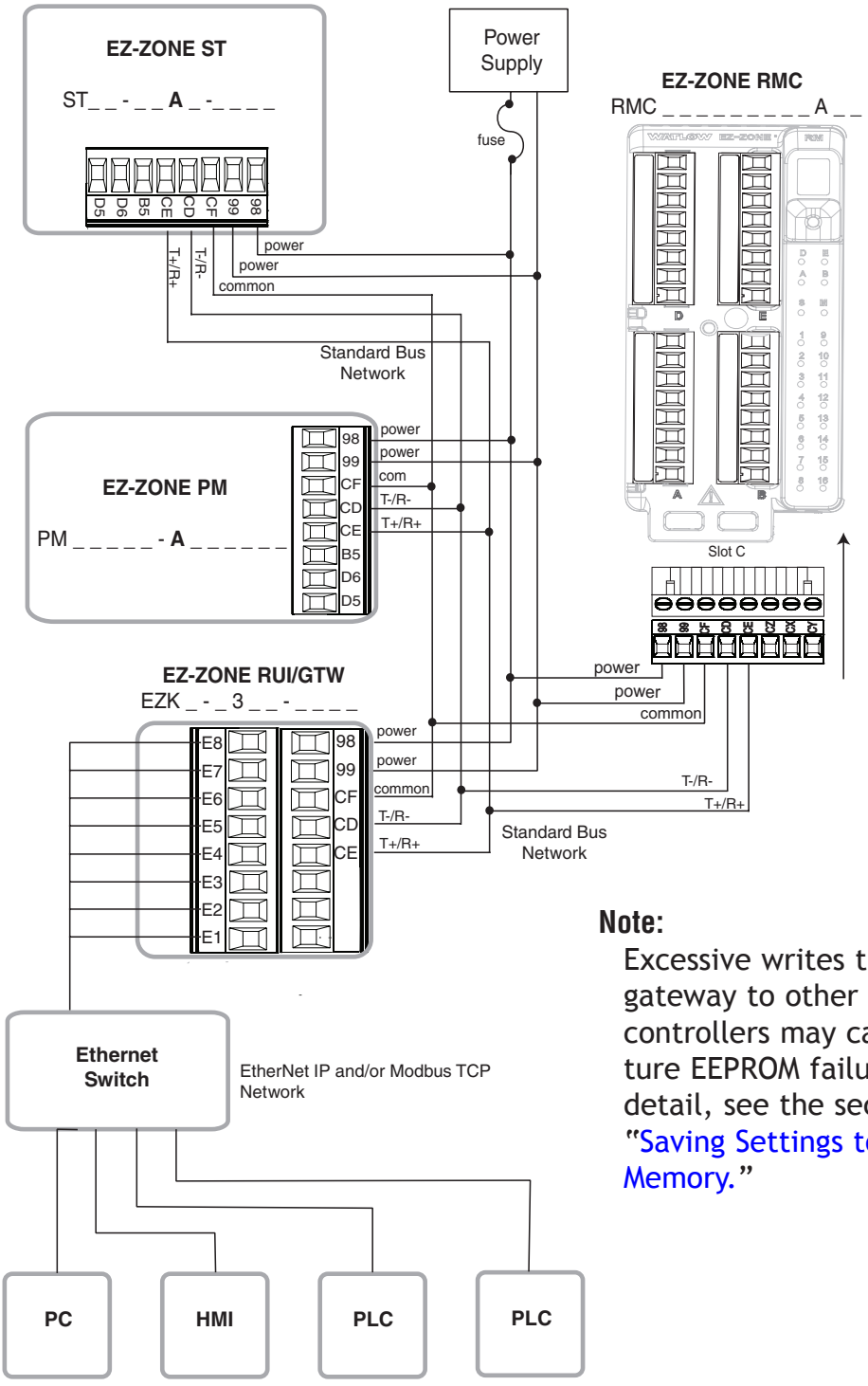
A termination resistor may be required. Place a 120Ω resistor across T+/R+ and T-/R- of the last controller on a network.

Note:

The RUI without a gateway installed, can communicate using Watlows' Standard Bus only.

Note:

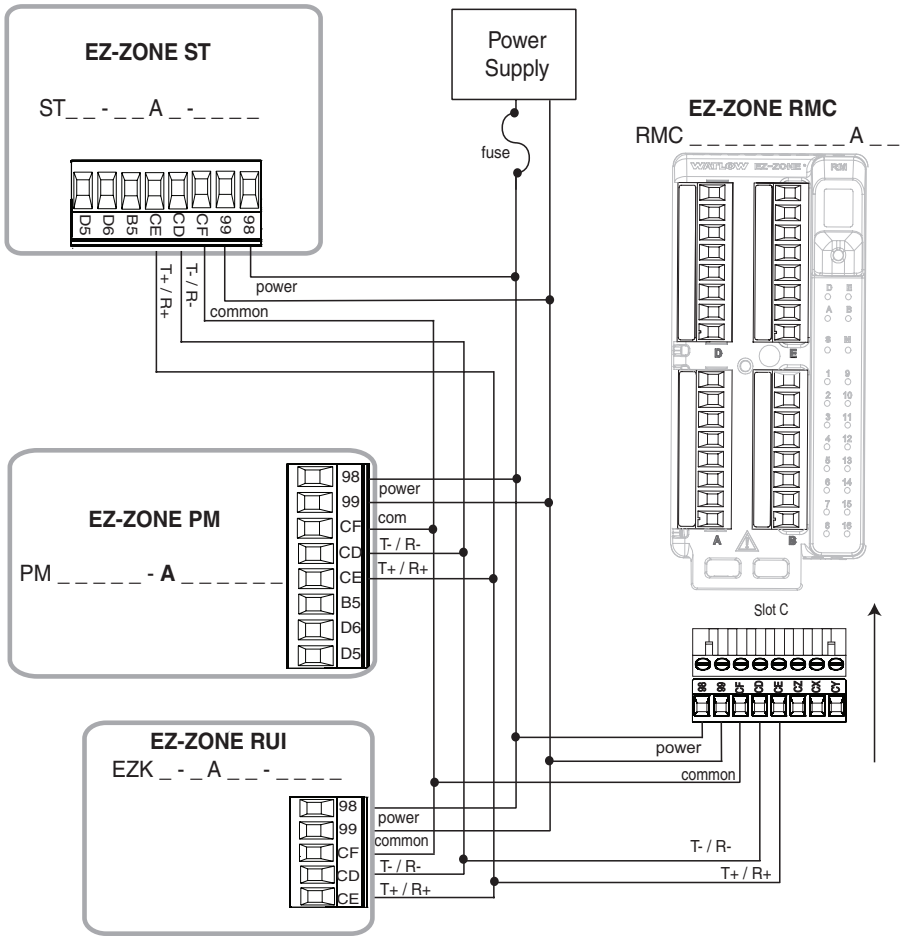
Do not route network wires with power wires.



Note:

Excessive writes through the gateway to other EZ-ZONE family controllers may cause premature EEPROM failure. For more detail, see the section entitled "Saving Settings to Non-volatile Memory."

A Network Using Watlow's Standard Bus and an RUI



3 Chapter 3: Keys and Displays

Upper Display:
In the Home Page, displays the parameter specified by Custom 1 in the factory page, otherwise displays the value of the parameter in the lower display.

Zone Display:
Indicates the controller zone that the RUI is currently communicating with.

1 to 9 = zones 1 to 9

A = zone 10 E = zone 14

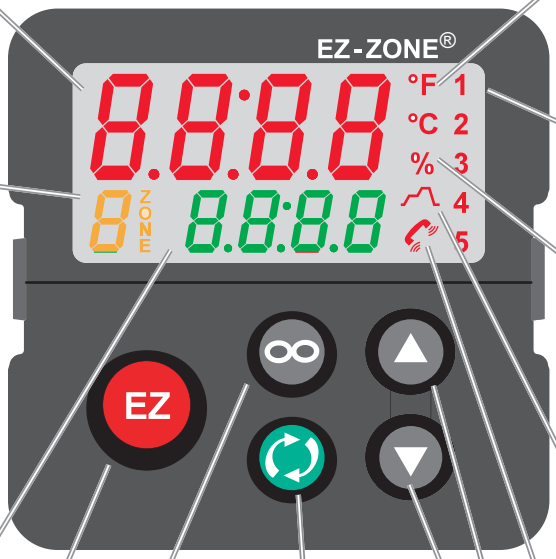
b = zone 11 F = zone 15

C = zone 12 h = zone 16

d = zone 13 J = zone 17

Lower Display:
Indicates the set point or Manual Power value during operation, or the parameter whose value appears in the upper display.

EZ Key/s:
This key can be programmed to do various tasks, such as starting a profile.



Temperature Units:
Indicates whether the temperature is displayed in Fahrenheit or Celsius.

Output Activity:
Number LEDs indicate activity of outputs. A flashing light indicates output activity.

Percent Units:
Lights when the controller is displaying values as a percentage or when the open-loop set point is displayed.

Profile Activity;
Lights when a profile is running. Flashes when a profile is paused.

Communications Activity
Flashes when another device is communicating with the RUI.

Up and Down Keys
In the Home Page, the parameter specified by Custom 1 in the factory page. In other pages, changes the upper display to a higher or lower value, or changes a parameter selection.

Infinity Key
In the Home Page, press to scroll through the network zones, clears alarms and errors if clearable. On other pages, press to back up one level, or press and hold for two seconds to return to the Home Page.

Advance Key
Advances through parameter prompts.

Note:
Upon power up, the upper or left display will briefly indicate the firmware revision and the lower or right display will show RUI.

Responding to a Displayed Message

Attention Codes

An active message (see Home Page for listing) will cause the display to toggle between the normal settings and the active message in the upper display and Attention AtEn in the lower display. Your response will depend on the message and the controller settings. Some messages, such as Ramping and Tuning, indicate that a process is underway. If the message was generated by a latched alarm or limit condition, the message can be cleared when the condition no longer exists by simply pushing the Infinity ♾ or alternatively by following the steps below. If an alarm has silencing enabled, it can also be silenced.

Push the Advance Key ◉ to display Ignore iGnr in the upper display and the message source (such as Alarm High AL.h1 in the lower display. Use the Up ▲ and Down ▼ keys to scroll through possible responses, such as Clear CLr or Silence S iL, then push the Advance ◉ or Infinity ♾ key to execute the action. See the table for further information on the Attention Codes.

Display	Parameter Name Description	Range	Default	Appears If
AtEn	*Attention* An active message will cause the display to toggle between the normal settings and the active message in the upper display and AtEn in the lower display, and the Zone will flash reflecting the Zone which generated the message. Your response will depend on the message and the controller settings. Some messages, such as Ramping and Tuning, indicate that a process is underway. If the message was generated by a latched alarm or limit condition, the message can be cleared when the condition no longer exists. If an alarm has silencing enabled, it can be silenced. 1. Push the Advance Key ◉ to display iGnr in the upper display and the message source (such as AL.h1) in the lower display. 2. Use the Up ▲ and Down ▼ keys to scroll through possible responses, such as Clear CLr or Silence S iL. 3. Press the Advance **Key** ◉ or Infinity ♾ key to execute the action. Alternatively, rather than scrolling through all messages, simply push the Infinity ♾ button to generate a clear.	**Note:** Due to the fact that the RUI/GTW can be used with all EZ-ZONE controllers, the prompts and the number of instances shown below reflect features and the maximum values that could be available across the family of controllers at the time this guide was written. The maximum values shown are subject to change in the future. To determine the features and the maximum number of instances available for your controller, please reference the associated product User's Guide. AL.L1 to AL.24 Alarm Low 1 to 24 AL.h1 to AL.24 Alarm High 1 to 24 AL.E1 to AL.24 Alarm Error 1 to 24 Er.i1 to Er.16 Error Input 1 or 16 L iL1 to L i16 Limit Low 1 to 16 L ih1 to L i16 Limit High 1 to 16 L iE1 to L i16 Limit Error 1 to 16 tUn1 to tU16 Tuning 1 to 16 rP1 to rP16 Ramping 1 to 16 LP.o1 to LP.16 Loop Open Error 1 to 16 LP.r1 to LP.16 Loop Reversed Error 1 to 16 CEr1 to CEr4 Current Error 1 to 4 hEr1 to hEr4 Heater Error 1 to 4 uAL.h Value to high to be displayed in 4 digit LED display >9999 uAL.L Value to low to be displayed in 4 digit LED display <-1999		An alarm or error message is active.

Display	Parameter Name Description	Range	Default	Appears If
P.St 1	**Profile Start** Select a profile or step number that will be affected by Profile Action.	0 to 250	0	The controller includes profiling.
P.AC 1	**Profile Action Request** Select the action to apply to the profile or step selected in Profile Start.	nonE No Action ProF Start a Profile PAUS Pause rESU Resume End End	None	The controller includes profiling.

No Device Connected

If there is no device connected to the RUI/GTW or the controller on the selected zone is disconnected, no will appear in the upper display and dEv will appear in the lower display. Press the Infinity Key to move to the next zone.

If a zone disappears, ensure that its Standard Bus address was not intentionally changed. Also, check all network wiring and ensure that communications wiring is routed seperately from power wiring, and check that the Number of Zones parameter nU.2n in the RUI Page, Communications Menu, is set to cover address of the module being accessed.

Changing the Position of a Controllers Operations Page and or Profiling Page in the Lockout Menu

To change the position of the Operations Page or Profiling Page in the Lockout Menu, you must go to the Lock Operations Page parameter LoC.o or Lock Profiling Page parameter LoC.P in the Factory Page, Lockout Menu LoC.

- To go to the Factory Page from the Home Page, press both the Advance and Infinity keys for six seconds. CUSt will appear in the Upper Display and FCty will appear in the Lower Display.
- Press the Up or Down key to move to the Lockout Menu LoC.
- Press the Advance Key to select a parameter.
- Press the Up or Down key to change the parameter value. The value you select (1, 2 or 3) will determine the position of the Operations Page or Profiling Pages in the Lockout Menu in the RUI Page.
- Press the Infinity Key to move backwards through the levels: parameter to menu; menu to Home Page.
- Press and hold the Infinity Key for two seconds to return to the Home Page.

Note:

rLoC and SLoC settings of the RUI will always take precedence over any other individual controller settings. In other words, if an RUI is on a network with multiple PM controllers where all of the PM controllers have SLoC set to 0 (not writable) and the RUI has SLoC set to 5, all writable parameters in all PM controllers can be written to via the RUI. Conversely, if all PM controllers have SLoC set to 5 and the RUI has it set to 0 all of the PM controllers will be write protected. If it is required that protection for any given controller not be overridden by the RUI, turn to the Features section of the controller User's Guide and find the section entitled "Using Password Security".

Example 1

The operator wants to read all the menus and not allow any parameters to be changed.

In the RUI Page, Lockout Menu, set Read Lock rLoC to 5 and Set Lock SLoC to 0.

Example 2

The operator wants to read and write to the Home Page and Profiling Page, and lock all other pages and menus.

In the RUI Page, Lockout Menu, set Read Lock rLoC to 2 and Set Lock SLoC to 2.

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

Example 3

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 RUI Page, Lockout Menu, set Read Lock rLoC to 1 and Set Lock SLoC to 5.

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

Programming the EZ Key Using an RUI

The following examples show how to program the EZ Key to start and stop a profile using PM, RM and ST family controllers.

Note:

This functionality is embedded in the configuration of the control, therefore, any "EZ" Function Key from any RUI pointing to the programmed control will assume the programmed function.

Using the RUI with PM Family Controllers

Note:

The steps shown below were created using PM firmware version 11.00. Slight differences may exist if your controller has a different version. The firmware version can be found by cycling power to the controller (first numerical value displayed in the upper display) or by navigating to the revision rEv prompt found in the Diagnostic Menu diAG in the Factory Page

1. Go to the Setup Page from the Home Page, press both the Up ▲ and Down ▼ keys for six seconds. Ai will appear in the upper display and SEt will appear in the lower display.

- Keys must be held continuously until SEt is displayed in green. If keys are released when OPEr is displayed, press the Infinity key ∞ to exit and repeat until SEt is displayed.

2. Press the Up ▲ or Down ▼ key until Fun ap-pears in the upper display and SEt will appear in the lower display.
3. Press the Advance Key ◉ once, hiGh will appear in the upper display and LEv (high or low) will appear in the lower display. Select whether a high state or a low state will start the profile.
4. Press the Up ▲ or Down ▼ key to scroll through the functions that can be assigned to the EZ Key. When PStS (Profile Start/Stop) appears in the up-per display and Fn appears in

the lower display, press the Infinity Key once to select that function and move to the F 1 (Function Instance equals Profile 1, 2, 3 or 4) parameter.

5. Press the Up or Down key to select the profile of choice.
6. Press the Infinity Key once to return to the submenu, twice to return to the Home Page.

Using the RUI with RM Family Controllers

Note:

The steps shown below were created using RM firmware version 6.00. Slight differences may exist if your controller has a different version. The firmware version can be found by navigating to the revision rEv prompt found in the Diagnostic Menu diAG in the Factory Page.

1. Go to the Setup Page from the Home Page, press both the Up and Down keys for six seconds. A 1 will appear in the upper display and SEt will appear in the lower display.

- Keys must be held continuously until SEt is displayed in green. If keys are released when OPEr is displayed, press the Infinity key to exit and repeat until SEt is displayed.

2. Press the Up or Down key until the Action prompt ACt appears in the upper display and SEt will appear in the lower display.
3. Press the Advance Key once and select the Action instance (1-8) using the Up or Down key. Upon entry, the upper display will show 1 and the lower display will show ACt.
4. Press the Advance Key once and then using the Up or Down key to select Profile Start/Stop PSt5 as the Function Fn.
5. Press the Advance Key once and then using the Up or Down key select the Function Instance F 1 (Function Instance equals Profile 1, 2, 3...25).
6. Press the Advance Key once to define the source of this Action by using the Up or Down key to select the Function Key Fun as the Source Function SFnA.
7. Press the Advance Key once and then using the Up or Down key select the Source Instance S 1A (Source Instance in this case equals EZ-Key 1 or 2.
8. Press the Advance Key once and then using the Up or Down key select the Source Zone S2A (Source Zone equals 0 -16).

Note:

Zone 0 represents the current module being configured while in this example, this selection represents the module in which the profile will run.

9. Press the Advance Key once and then using the Up or Down key select the Level LEv desired to trigger the Action, high hiGh or low LoLo.
10. Press the Infinity Key three times to return to the Home Page.

Using the RUI with ST Family Controllers

Note:

The steps shown below were created using PM firmware version 8.00. Slight differences may exist if your controller has a different version. The firmware version can be found by cycling power to the controller (first numerical value displayed in the upper display) or by navigating to the revision rEv prompt found in the Diagnostic Menu diAG in the Factory Page

1. Go to the Setup Page from the Home Page, press both the Up and Down keys for six seconds. A 1 will appear in the upper display and SEt will appear in the lower display.

- Keys must be held continuously until SEt is displayed. If keys are released when OPEr is displayed, press the Infinity key to exit and repeat until SEt is displayed.

2. Press the Up or Down key until FUn appears in the upper display and SEt will appear in the lower display.
3. Press the Advance Key once, 1 will appear in the upper display and FUn will appear in the lower display. At this time select instance 1.

Note:
As of this firmware revision (8.0), two instances appear to be available and selectable. However, instance 2 is provided for future firmware enhancements only.

4. Press the Advance Key once and then using the Up or Down key to select Profile Start/Stop PSt5 as the Function Fn.
5. Press the Advance Key once and then using the Up or Down key select the Function Instance F 1 (Function Instance equals Profile 1, 2, 3 or 4).
6. Press the Infinity Key twice to return to the submenu, three times to return to the Home Page.

Changing the Set Point

You can change the set point by using the Up or Down keys when a profile is not running.

Default EZ-ZONE Home Pages

Watlow's patented user-defined menu system improves operational efficiency. The user-defined Home Page provides you with a shortcut to monitor or change the parameter values that you use most often. The default Home Pages for the EZ-ZONE PM Express, ST, Panel Mount (PM) and Rail Mount (RM) controllers are shown on the following pages. When a parameter normally located in the Setup Page or Operations Page is placed in the Home Page, it is accessible through both. If you change a parameter in the Home Page, it is automatically changed in its original page. If you change a parameter in its original page it is automatically changed in the Home Page.

Use the Advance Key to step through the Home Page parameters. When not in pairs, the parameter prompt will appear in the lower display, and the parameter value will appear in the upper display. You can use the Up and Down keys to change the value of writable parameters, just as you would in any other menu. If Control Mode is set to Auto, the Process Value is in the upper display and the Closed Loop Set Point (read-write) is in the lower display.

If a profile is running, the process value is in the upper display and the Target Set Point (read only) is in the lower display. If Control Mode is set to Manual, the Process Value is in the upper display and the output power level (read-write) is in the lower display. If Control Mode is set to Off, the Process Value is in the upper display and oFF (read only) is in the lower display.

If a sensor failure has occurred, the upper display will show four dashes ---- and the output power level (read-write) is in the lower display.

Modifying the Home Page

To modify the Home Page proceed to the Factory Menu by pushing and holding the Advance key and the Infinity key for approximately six seconds. Upon entering the Factory Page the

first menu will be the Custom Menu CuSt. Once there push the Advance Key where the lower display will show CuSt and the upper display will show 1. Again, push the Advance Key where the prompt for the Process Value AC.Pu will be displayed on the top and Parameter PAr on the bottom. Using the Up or Down arrow keys will allow for a customized selection of choice. There are twenty positions available that can be customized.

Modifying the Display Pairs

The Home Page, being a customized list of as many as 20 parameters can be configured in pairs of up to 10 via the Display Pairs dPrS prompt found in the Global Menu GLbL (Setup Page).

As stated above, the user can define pairs of prompts to appear on the display every time the Advance Key is pushed. For each controller the first pair will always be as defined in the Custom Menu and as stated will default (factory settings) to the Active Process Value loop 1 AC.Pu, and the Active Set Point loop 1 AC.SP. For the Limit, it would be the Active Process Value AC.Pu,and Limit Status, either Safe SAFE or FAiL. When configuring the Custom Menu to your liking it should be noted that if 2 changeable (writable) prompts are displayed in a Pair, i.e., Control Mode on top and Idle Set Point on the bottom, only the lower display (Idle Set Point) can be changed.

Using the RUI connected to multiple EZ-ZONE controls, if you navigate to the Global Menu and then set the Display Time dti parameter to something other than 0, the RUI, once back at the Home Page will scroll through each of the EZ-ZONE zone addresses on the network. By default this would show the first two custom display prompts for each of those controls at the rate specified.

On each individual control, if you navigate to the Global Menu on the Setup Page and change the Display Pairs dPrS parameter to something other than the default, the RUI will continue to scroll through all the connected controllers as well as all pairs for each individual control prior to moving on to the next control.

PM Express Home Page

Custom Menu Number	Home Page Display (defaults)	Parameter Name	Custom Menu Display (defaults)	Parameter Page and Menu
If 4th digit of part number is equal to: PM _ [L] _ _ _ - _ _ _ _ B _ _ (Limit Controller)				
1 Upper or left display	(value only)	Active Process Value	AC.Pu	Home Page
2 Lower or right display	SAFE or FAIL	Limit State	L.St	Home Page
- - - -	(value only)	Low Limit Set Point	LLS	Operations Page
- - - -	(value only)	High Limit Set Point	LhS	Operations Page
- - - -	(value only)	Minimum Set Point	ALo	Operations Page
- - - -	(value only)	Maximum Set Point	Ahi	Operations Page
- - - -	(value only)	Calibration Offset	iCA	Operations Page
If 4th digit of PN is equal to: PM _ [C] _ _ _ - _ _ _ _ B _ _ (PID Controller)				
1 Upper or left display	(value only)	Active Process Value	AC.Pu	Home Page
2 Lower or right display	(value only)	Active Set Point	AC.SP	Home Page
- - - -	AUt1	Autotune	- - - -	Operations Menu
- - - -	CM1	User Control Mode	- - - -	Operations Menu
- - - -	hPb1	Heat Proportional Band	- - - -	Operations Menu
- - - -	CPb1	Cool Proportional Band	- - - -	Operations Menu
- - - -	ti1	Time Integral	- - - -	Operations Menu
- - - -	td1	Time Derivative	- - - -	Operations Menu
- - - -	otb1	Time Base Output 1	- - - -	Operations Menu
- - - -	otb2	Time Base Output 2	- - - -	Operations Menu
- - - -	ALo1	Minimum Set Point	- - - -	Operations Menu
- - - -	Ahi1	Maximum Set Point	- - - -	Operations Menu
- - - -	iCA1	Calibration Offset	- - - -	Operations Menu

ST Home Page

Custom Menu Number	Home Page Display (defaults)	Parameter Name	Custom Menu Display (defaults)	Parameter Page and Menu
1 Upper Display	(value only)	Active Process Value	AC.Pu	Operations Page, Analog Input Menu
2 Lower Display	(value only)	*Active Set Point	AC.SP	Operations Page, Monitor Menu
If 4th digit of PN is equal to: ST _ [L] - _ _ _ _ - _ _ _ _ (Integrated Limit included)				
3	(value only)	Process Value Analog Input 2	Pro	Operations Page, Analog Input Menu
4	L.St	Limit State	L.St	Operations Page, Limit Menu
If 4th digit of PN is equal to: ST _ [A] - _ _ _ _ - _ _ _ _				
3	None	- - - -	- - - -	- - - -
4	nonE	- - - -	- - - -	- - - -
5	C.M1	User Control Mode	C.M	Operations Page, Monitor Menu
6	h.Pr1	Heat Power	h.Pr	Operations Page, Monitor Menu
7	C.Pr1	Cool Power	C.Pr	Operations Page, Monitor Menu
8	AUt1	Autotune	AUt	Operations Page, Loop Menu
9	idS1	Idle Set Point	idLE	Operations Page, Loop Menu
If 12th digit of PN is equal to: ST _ _ - _ _ _ _ - _ [P] _ _ (Profile Ramp and Soak included)				
10	P.St1	Profile Start	P.Str	Home Page only (See ST User Manual, Profile Page Chapter.)
11	P.AC1	Profile Action Request	P.ACr	Home Page only (See ST User Manual, Profile Page Chapter.)
If 12th digit of PN is equal to: ST _ _ - _ _ _ _ - _ [A, S] _ _				
10 to 20	(skipped)	None	nonE	(Add parameters to the Home Page in the Custom Menu, Factory Page.)

- If Control Mode is set to Auto, the process value is in the upper display and the Closed Loop Set Point (read-write) is in the lower display.
- If a profile is running, the process value is in the upper display and the Target Set Point (read only) is in the lower display.
- If Control Mode is set to Manual, the process value is in the upper display and the output power level (read-write) is in the lower display.
- If Control Mode is set to Off, the process value is in the upper display and oFF (read only) is in the lower display.
- If a sensor failure has occurred, dashes - - - - will appear in the upper display and the output power level (read-write) is in the lower display.

PM Home Page

Custom Menu Number	Home Page Display	Home Page Defaults	Custom Menu Display (defaults)	Parameter Page and Menu
All Models				
1	Numerical value	Active Process Value (1)	AC.Pu	Operations Page, Monitor Menu
2	Numerical value	Active Set Point (1)*	AC.SP	Operations Page, Monitor Menu
If 10th digit of PN is equal to: PM _ _ _ _ _ - _ [L, M] _ _ _ _ _				
3	Numerical value	Process Value (2)	AC.Pu	Operations Page, Monitor Menu
4	SAFE or FAIL	Limit Status	AC.SP	Home Page
If 10th digit of PN is equal to: PM _ _ _ _ _ - _ [A, C, J, R, P, T] _ _ _ _ _				
3	Pu.A2	Active Process Value (2)	AC.Pu	Operations Page, Monitor Menu
4	C.SP2	Closed Loop Set Point (2)	AC.SP	Operations Page, Monitor Menu
5	C.M1	User Control Mode (1)	C.M	Operations Page, Monitor Menu
6	h.Pr1	Heat Power (1)	h.Pr	Operations Page, Monitor Menu
7	C.Pr1	Cool Power (1)	C.Pr	Operations Page, Monitor Menu
8	Aut1	Autotune (1)	AUt	Operations Page, Loop Menu
9	id.S1	Idle (1)	idLE	Operations Page, Loop Menu
10	C.M2	User Control Mode (2)	C.M	Operations Page, Monitor Menu
11	h.Pr2	Heat Power (2)	h.Pr	Operations Page, Monitor Menu
12	C.Pr2	Cool Power (2)	C.Pr	Operations Page, Monitor Menu
13	Aut2	Autotune (2)	AUt	Operations Page, Loop Menu
14	id.S2	Idle (2)	idLE	Operations Page, Loop Menu
If 10th digit of PN is equal to: PM _ _ _ _ _ - _ [L, M] _ _ _ _ _				
15	LLS1	Limit Set Point Low	LLS	Operations Page, Limit Menu
16	LhS1	Limit Set Point High	LhS	Operations Page, Limit Menu
If 10th digit of PN is equal to: PM _ _ _ _ _ - _ [R, B, N, E] _ _ _ _ _				
17	P.St1	Start Profile	P.Str	Home Page only (See Profile Page Chapter.)
18	P.AC1	Action Request	P.ACr	Home Page only (See Profile Page Chapter.)
19 to 20		None		

- If Control Mode is set to Auto, the process value is in the upper display and the Closed Loop Set Point (read-write) is in the lower display.
- If a profile is running, the process value is in the upper display and the Target Set Point (read only) is in the lower display.

- If Control Mode is set to Manual, the process value is in the upper display and the output power level (read-write) is in the lower display.
- If Control Mode is set to Off, the process value is in the upper display and oFF (read only) is in the lower display.
- If a sensor failure has occurred, - - - - is in the upper display and the output power level (read-write) is in the lower display.

Note:
Numbers within parenthesis indicates the instance.

RMC (Controller) Home Page

Custom Menu Number	Home Page Display	Parameter Name	Custom Menu Display	Parameter Page and Menu
1 Upper Display	Numerical value	Active Process Value	Ac.Pu	Operations Page, Analog Input Menu
2 Lower Display	Numerical value	Active Set Point	Ac.SP	Operations Page, Monitor Menu
3	Cnt 1	Control Mode	Cnt	Operations Page, Loop Menu
4	hPr 1	Heat Power	hPr	Operations Page, Monitor Menu
5	CPr 1	Cool Power*	CPr	Operations Page, Monitor Menu
6	Aut 1	Autotune	AUt	Operations Page, Loop Menu
7	idS 1	Idle Set Point	idLE	Operations Page, Loop Menu
If 4th digit of PN is equal to: RM _ [3, 4] _ _ _ _ _ _ _ _ _ (Profile Ramp and Soak included)				
8	PSt 1	Profile Start	PStr	Home Page only (See Profile Page Chapter.)
9	PAC 1	Profile Action Request	PACr	Home Page only (See Profile Page Chapter.)
10 to 20	(skipped)	None	nonE	(Add parameters to the Home Page in the Custom Menu, Factory Page.)

RME (Expansion) Home Page

Custom Menu Number	Home Page Display	Parameter Name	Custom Menu Display	Parameter Page and Menu
1 Upper Display	(skipped)	None	nonE	(Add parameters to the Home Page in the Custom Menu, Factory Page.)
2 Lower Display	F	Display Units	C_F	Setup Page, Global Menu
3	ALo 1	Alarm Set Point Low	ALo	Operations Page, Alarm Menu
4	Ah i 1	Alarm Set Point High	Ah i	Operations Page, Alarm Menu
5 to 20	(skipped)	None	nonE	(Add parameters to the Home Page in the Custom Menu, Factory Page.)

RMS (Scanner) Home Page

Custom Menu Number	Home Page Display	Parameter Name	Custom Menu Display	Parameter Page and Menu
1 Upper Display	Numerical value	Active Process Value 1	Ac.Pu	Operations Page, Analog Input Menu
2 Lower Display	Numerical value	Active Process Value 2	Ac.Pu	Operations Page, Analog Input Menu
3 - 16	Same as above instance 3 - 16			
17 - 30	(skipped)	None	nonE	(Add parameters to the Home Page in the Custom Menu, Factory Page.)

RMH (High Density) Home Page

Custom Menu Number	Home Page Display	Parameter Name	Custom Menu Display	Parameter Page and Menu
1 Upper Display	Numerical value	Active Process Value 1	Ac.Pu	Operations Page, Analog Input Menu
2 Lower Display	Numerical value	Active Set Point 1	Ac.SP	Operations Page, Monitor Menu
3	Cnt1	Control Mode	Cnt	Operations Page, Loop Menu
4 to 48	Same as above instance 4 - 16			
49 to 50	(skipped)	None	nonE	(Add parameters to the Home Page in the Custom Menu, Factory Page.)

RML (Limit) Home Page

Custom Menu Number	Home Page Display	Parameter Name	Custom Menu Display	Parameter Page and Menu
1 Upper Display	Numerical value	Active Process Value 1	Ac.Pu	Operations Page, Analog Input Menu
2 Lower Display	Safe or Fail	Limit Status	LSt	Setup Page, Global Menu
3 to 24	Same as above instance 4 - 16			
25 to 30	(skipped)	None	nonE	(Add parameters to the Home Page in the Custom Menu, Factory Page.)

RMA (Access) Home Page

Custom Menu Number	Home Page Display	Parameter Name	Custom Menu Display	Parameter Page and Menu
1 Upper Display	EZ-ZONE RMA	None	- - - -	Cannot be modified
2 Lower Display	RMA Part Number	Part Number	- - - -	Cannot be modified

4 Chapter 4: RUI Page

Navigating the RUI Page

To navigate to the RUI Page follow the steps below:

1. From the Home Page, press and hold both the Down arrow and the Advance Key for six seconds. CoMM will appear in the upper display and rUi 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.

CoMM

SEt **Communications Menu (1 to 2)**

1

CoMM Communications
- Ads Standard Bus Address
- St.Zn Start Zone Address
- nU.Zn Number of Zones

2

CoMM Communications
- Ad.MM Modbus Address
- bAUd Baud Rate
- PAr Parity
- MM.hL Modbus Word Order
- iP.MM IP Address Mode
- iP.F1 IP Fixed Address Part 1
- iP.F2 IP Fixed Address Part 2
- iP.F3 IP Fixed Address Part 3
- iP.F4 IP Fixed Address Part 4
- iPS1 IP Fixed Subnet Part 1
- iPS2 IP Fixed Subnet Part 2
- iPS3 IP Fixed Subnet Part 3
- iPS4 IP Fixed Subnet Part 4
- iPG1 IP Fixed Gateway Part 1
- iPG2 IP Fixed Gateway Part 2
- iPG3 IP Fixed Gateway Part 3
- iPG4 IP Fixed Gateway Part 4
- MMbE Modbus TCP Enable
- E iPE EtherNet/IP Enable
- Add DeviceNet™ Node Address
- BAUd Baud Rate DeviceNet™
- FCE DeviceNet™ Quick Connect Enable
- PAdd Profibus Address
- ALoC Profibus Address Lock
- C_F Display Units

GLbL

SEt **Global Menu**
- CLEd Communications LED Action
- dt i Display Time
- USr.S Save Settings As
- USr.r Restore Settings From

GtWy

SEt **Local Remote Gateway Menu (1 to 16)**

1

GtWy Local Remote Gateway
- duEn Device Enabled
- duSt Device Status

- WJho Device Selection
- M7.oF Modbus Address Offset
- oSt CIP Instance Offset
- Ao.nb CIP Implicit Assembly Output Member Quantity
- Ai.nb CIP Implicit Assembly Input Member Quantity
- S.oF Profibus Slot Offset

LoC

rUi Security Setting Menu

- 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

rUi Security Setting Menu

- CodE Public Key
- PASS Password

diAg

rUi Diagnostics Menu

- Pn Part Number
- rEu Firmware Revision
- S.bLd Software Build Number
- Sn Serial Number
- dAtE Date of Manufacture
- iP.AC Actual IP Addressing Mode
- iP.A1 IP Actual Address Part 1
- iP.A2 IP Actual Address Part 2
- iP.A3 IP Actual Address Part 3
- iP.A4 IP Actual Address Part 4

Display	Parameter name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Profibus Index	Param-eter ID	Data Type & Read/ Write
CoM SEt **Communications Menu**								
Ad.S Ad.S	*Communications 1* **RUI Address** Set the Standard Bus address of this RUI. Each RUI on the network must have a unique address.	1 to 8	1	410	0x96 (150) 1 1	- - - -	17001	uint RWE
St.2n St.2n	*Communications 1* **Start Zone** Set the lowest Standard Bus address that this RUI will communicate with. Narrowing the range of addresses will speed up some operations.	1 to 24	1	- - - -	- - - -	- - - -	- - - -	uint RWE
nU.2n nU.2n	*Communications 1* **Number of Zones** Set the number of contiguous Standard Bus addresses that this RUI will communicate with. Narrowing the range of addresses will speed up some operations.	1 to 24	8				17005	uint RWE
Modbus RTU								
Ad.M Ad.M	*Communications (2)* **Modbus Address** Set the network address of this gateway. Each device on the network must have a unique address.	1 to 247	1	432	0x96 (150) 2 2	- - - -	17007	uint RWE
bAUd bAUd	*Communications (2)* **Baud Rate** Set the speed of this RUIs communications to match the speed of the Modbus serial network.	9600 9,600 (188) 19.2 19,200 (189) 38.4 38,400 (190)	9,600	434	0x96 (150) 2 3	- - - -	17002	uint RWE

Display	Parameter name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Profibus Index	Parameter ID	Data Type & Read/ Write
PAr PAr	*Communications (2)* **Parity** Set the parity of this controller to match the parity of the Modbus serial network.	nonE None (61) EuEn Even (191) odd Odd (192)	None	436	0x96 (150) 2 4	- - - -	17003	uint RWE
M.hL M.hL	*Communications (2)* **Modbus Word Order** Select the word order of the two 16-bit words in the floating-point values.	Loh ı Low-High (1331) h ıLo High-Low (1330)	Low-High	438	0x96 (150) 2 5	- - - -	17043	uint RWE
C_F C_F	Communications (2) **Display Units** Select which scale to use for temperature passed over communications port 2.	F °F (30) C °C (15)	°F	440	0x96 (150) 2 6	25	17050	uint RWE
Modbus TCP or EtherNet/IP								
M.hL M.hL	*Communications (2)* **Modbus Word Order** Select the word order of the two 16-bit words in the floating-point values.	Loh ı Low-High (1331) h ıLo High-Low (1330)	Low-High	438	0x96 (150) 2 5	- - - -	17043	uint RWE
iP.M iP.M	*Communications (2)* **IP Address Mode** Select DHCP to let a DHCP server assign an address to the gateway.	dhCP DHCP (1281) FAdd Fixed Address (1284)	DHCP	- - - -	- - - -	- - - -	17012	uint RWE
Note: When changing IP address, the control power must be cycled for the new address to take effect.								
ip.F1 ip.F1	*Communications (2)* **IP Fixed Address Part 1** Set the IP address of this gateway. Each device on the network must have a unique address.	0 to 255	169	- - - -	- - - -	- - - -	17014	uint RWE
ip.F2 ip.F2	*Communications (2)* **IP Fixed Address Part 2** Set the IP address of this gateway. Each device on the network must have a unique address.	0 to 255	254	- - - -	- - - -	- - - -	17015	uint RWE

Display	Parameter name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Profibus Index	Parameter ID	Data Type & Read/ Write
iP.F3 ip.F3	*Communications (2)* **IP Fixed Address Part 3** Set the IP address of this gateway. Each device on the network must have a unique address.	0 to 255	1	- - - -	- - - -	- - - -	17016	uint RWE
iP.F4 ip.F4	*Communications (2)* **IP Fixed Address Part 4** Set the IP address of this gateway. Each device on the network must have a unique address.	0 to 255	1	- - - -	- - - -	- - - -	17017	uint RWE
iP.S1 ip.S1	*Communications (2)* **IP Fixed Subnet Part 1** Set the IP subnet mask for this gateway.	0 to 255	255	- - - -	- - - -	- - - -	17020	uint RWE
iP.S2 ip.S2	*Communications (2)* **IP Fixed Subnet Part 2** Set the IP subnet mask for this gateway.	0 to 255	255	- - - -	- - - -	- - - -	17021	uint RWE
iP.S3 ip.S3	*Communications (2)* **IP Fixed Subnet Part 3** Set the IP subnet mask for this gateway.	0 to 255	0	- - - -	- - - -	- - - -	17022	uint RWE
iP.S4 ip.S4	*Communications (2)* **IP Fixed Subnet Part 4** Set the IP subnet mask for this gateway.	0 to 255	0	- - - -	- - - -	- - - -	17023	uint RWE
iP.g1 ip.g1	*Communications (2)* **Fixed IP Gateway Part 1** Used for the purpose of sending and receiving messages from another network.	0 to 255	0	- - - -	- - - -	- - - -	17026	uint RWE

Display	Parameter name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Profibus Index	Param-eter ID	Data Type & Read/ Write
iP.g2 ip.g2	*Communications (2)* **Fixed IP Gateway Part 2** Used for the purpose of sending and receiving messages from another network.	0 to 255	0	- - - -	- - - -	- - - -	17027	uint RWE
iP.g3 ip.g3	*Communications (2)* **Fixed IP Gateway Part 3** Used for the purpose of sending and receiving messages from another network.	0 to 255	0	- - - -	- - - -	- - - -	17028	uint RWE
iP.g4 ip.g4	*Communications (2)* **Fixed IP Gateway Part 4** Used for the purpose of sending and receiving messages from another network.	0 to 255	0	- - - -	- - - -	- - - -	17029	uint RWE
Mb.E Mb.E	Communications (2) **Modbus TCP Enable** Activate Modbus TCP.	YES Yes (106) no No (59)	Yes	- - - -	- - - -	- - - -	17041	uint RWE
EiP.E EiP.E	Communications (2) **EtherNet/IP™ Enable** Activate Ethernet/IP™.	YES Yes (106) no No (59)	Yes	- - - -	- - - -	- - - -	17042	uint RWE
C_F C_F	Communications (2) **Display Units** Select which scale to use for temperature passed over communications port 2.	F °F (30) C °C (15)	°F	440	0x96 (150) 2 6	25	17050	uint RWE
DeviceNet								
Add Ad.d	*Communications (2)* **DeviceNet™ Node Address** Set the DeviceNet™ address for this gateway.	0 to 63	63	- - - -	- - - -	- - - -	17052	- - - -

Display	Parameter name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Profibus Index	Param-eter ID	Data Type & Read/ Write
bAUd bAUd	*Communications (2)* **DeviceNet™ Baud Rate** Set the DeviceNet speed for this gate-way's communica-tions to match the speed of the serial network.	125 125 kb (1351) 250 250 kb (1352) 500 500 kb (1353)	125	- - - -	- - - -	- - - -	17053	- - - -
FC.E FC.E	*Communications (2)* **DeviceNet™ Quick Connect Enable** Allows for immediate communication with the scanner upon power up.	no No (59) YES Yes (106)	No	- - - -	- - - -	- - - -	17054	- - - -
C_F C_F	Communications (2) **Display Units** Select which scale to use for temperature passed over commu-nications port 2.	F °F (30) C °C (15)	°F	440	0x96 (150) 2 6	25	17050	uint RWE
Profibus DP								
P.Add P.Add	*Communications (2)* **Profibus Node Ad-dress** Set the Profibus ad-dress for this con-trol.	0 to 126	126	- - - -	- - - -	- - - -	17060	uint RWE
A.Loc A.Loc	*Communications (2)* **Profibus Address Lock** When set to yes will not allow address to be changed using software. Can be changed from front panel.	no No (59) YES Yes (106)	No	- - - -	- - - -	- - - -	17061	uint RWE
StAt Stat	*Communications* **Profibus DP Status** Current Profibus status.	rEdY Ready (1662) rnG Running (149)	- - - -	- - - -	- - - -	- - - -	17062	uint R

Display	Parameter name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Profibus Index	Param-eter ID	Data Type & Read/ Write
GLbL SEt **Global Menu**								
C.LEd C.LEd	*Global* **Communications LED Action** Turns comms LED on or off for selected comms ports.	Con1 Comm port 1 (1189) Con2 Comm port 2 (1190) both Comm port 1 and 2 (13) oFF Off (62)	both	386	0x67 (103) 1 0x0E (14)	- - - -	3014	uint RWES
d.ti d.ti	*Global* **Display Time** Time delay in toggling between Display Pairs.	0 to 60	0	356	0x67 (103) 1 0x1D (29)	- - - -	3029	uint RWES
USr.S USr.S	Global **Save Settings As** Save all of this controller's settings to the selected set.	SEt 1 User Set 1 (101) SEt2 User Set 2 (102) nonE None (61)	None	26	0x65(101) 1 0xE (14)	8	1014	uint RWE
USr.r USr.r	Global **Restore Settings From** Replace all of this controller's settings with another set.	FCty Factory (31) nonE None (61) SEt 1 User Set 1 (101) SEt2 User Set 2 (102)	None	24	0x65 (101) 1 0xD (13)	7	1013	uint RWE
GtwJ SEt **Local Remote Gateway Menu**								
du.En du.En	*Local Remote Gateway (1 to 16)* **Device Enabled** When set to yes the gateway attempts to establish a connection with the specified device.	no No (59) YES Yes (106)	No	452 offset +20	0x7C (124) 1 to 16 2	18	24002	uint RWE
du.St du.St	*Local Remote Gateway (1 to 16)* **Device Status** Indicates whether or not a valid connection is made.	oFF Off (62) on On (63)	- - - -	460 offset +20	0x7C (124) 1 to 16 6	- - - -	24006	uint R

Display	Parameter name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Profibus Index	Parameter ID	Data Type & Read/ Write
uWho Who	*Local Remote Gateway (16)* **Device Selection** Changing this parameter to RUI allows the fieldbus to communicate internally to the RUI rather than a controller at Standard Bus address 16. When set to Device, the RUI passes all fieldbus communications through RUI to controller at address 16.	dEu Device (1141) rUi RUI (197)	RUI	- - - -	0x7C (124) 16 0x0C (12)	- - - -	24012	uint RWE
M.oF M.oF	*Local Remote Gateway (1 to 16)* **Modbus Address Offset** When multiple EZ-ZONE controllers are used over Modbus the value entered allows for parameter differentiation from control to the next.	0 to 65,535	0	454 offset +20	0x7C (124) 1 to 16 3	- - - -	24003	uint RWE
oSt oSt	*Local Remote Gateway (1 to 16)* **CIP Instance Offset** When executing explicit messages with multiple EZ-ZONE controllers the number entered allows for differentiation from control to control.	0 to 255	0	456 offset +20	0x7C (124) 1 to 16 4	- - - -	24004	uint RWE
Ao.nb Ao.nb	*Gateway (1 to 16)* **CIP Implicit Assembly Output Member Quantity** The number entered determines the size of the output (produced) assembly.	0 to 20	20	466 offset +20	0x7C (124) 1 to 16 9	- - - -	24009	uint RWE

Display	Parameter name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Profibus Index	Parameter ID	Data Type & Read/ Write
A.nb Ai.nb	*Gateway (1 to 16)* **CIP Implicit Assembly Input Member Quantity** The number entered determines the size of the input (consumed) assembly.	0 to 20	20	468 offset +20	0x7C (124) 1 to 16 0x0A (10)	- - - -	24010	uint RWE
S.oF S.of	*Gateway (1 to 16)* **Profibus DP Slot Offset** Set Profibus instance member offset for this Standard Bus controller.	0 to 254	Gateway instance 1 (0), 2 (20), 3 (40), all other instances (up to 17) multiple of 20	- - - -	0x7C (124) 1 to 16 0x0B (11)	19	24011	uint RWE
LoC FCty **Remote User Interface (RUI) Security Settings**								
PASE PAS.E	*RUI Security Setting* **Password Enable** If set to on, a password is required to change security clearance level or password.	on On (63) oFF Off (62)	Off	- - - -	- - - -	- - - -	3015	uint RWE
rLoC rLoC	*RUI Security Setting* **Read Lock** Set the read security clearance level. The user can access the selected level and all lower levels when using an RUI. If the Write Lockout Security level is higher than the Read Lockout Security, the Read Lockout Security level takes priority.	1 to 5	5	378	0x67 (103) 1 0x0A (10)	- - - -	3010	uint RWE

Display	Parameter name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Profibus Index	Param-eter ID	Data Type & Read/ Write
SLoC SLoC	*RUI Security Setting* **Write Security** Set the write security clearance level. The user can access the selected level and all lower levels when using an RUI. If the Write Lockout Security level is higher than the Read Lockout Security, the Read Lockout Security level takes priority.	0 to 5	5	380	0x67 (103) 1 0x0B (11)	- - - -	3011	uint RWE
LoC.L LoC.L	*RUI Security Setting* **Locked Access Level** Determines user level menu visibility when security is enabled. See Features section under Password Security.	1 to 5	5	- - - -	- - - -	- - - -	3016	uint RWE
No Display	*RUI Security Setting* **Locked State** Current level of security	Lock (228) User (1684) Admin (1685)	- - - -	- - - -	- - - -	- - - -	3023	uint R
roLL roLL	*RUI Security Setting* **Rolling Password** If set on, the password changes each time the controller's power is cycled. The Public Key is used to determine the present password changes.	on On (63) oFF Off (62)	Off	- - - -	- - - -	- - - -	3019	uint RWE
PAS.u PAS.u	*RUI Security Setting* **User Password** Set user password - Used to acquire access to menus made available through the Locked Access Level setting.	10 to 999	63	- - - -	- - - -	- - - -	3017	uint RWE

Display	Parameter name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Profibus Index	Param-eter ID	Data Type & Read/ Write
PASA PAS.A	*RUI Security Setting* **Administrator Password** Set administrator password - Used to acquire full access to change passwords.	10 to 999	156	- - - -	- - - -	- - - -	3018	uint RWE
ULoC FCty **Remote User Interface (RUI) Security Settings**								
CodE CodE	*RUI Security Setting* **Public Key** The Public Key is used to determine the present password if the password is unknown. If Rolling Password is turned on, this will generate a new random number every time the power is cycled. If Rolling Password is off, a fixed number will be displayed.	Customer Specific	- - - -	- - - -	- - - -	- - - -	3020	uint R
PASS PASS	*RUI Security Setting* **Password** If password is enabled, enter password here to access lock settings or password changes.	-1999 to 9999	4999	- - - -	- - - -	- - - -	3022	int RW
diAG rUi **Diagnostics Menu**								
Pn Pn	*Diagnostics Menu* **Part Number** Display the RUI/ GTW part number.	15 characters	- - - -	- - - -	0x65 (101) 1 9	5	1009	string R
rEu rEu	*Diagnostics Menu* **Software Revision** Display the RUI/ GTW firmware revision number.	1 to 10	- - - -	4	0x65 (101) 1 3	6	1003	dint R
S.bLd S.bLd	*Software Build* View the software build number.	0 to 2,147,483,647	- - - -	8	0x65 (101) 1 5	- - - -	1005	dint R

Display	Parameter name Description	Range	Default	Modbus Relative Address	CIP Class Instance Attribute hex (dec)	Profibus Index	Param-eter ID	Data Type & Read/ Write
Sn Sn	*Serial Number* View the controller serial number.	0 to 2, 147,483,647	- - - -	12	0x65 (101) 1 7	- - - -	1032	dint R
dAtE dAtE	*Date of Manufacture* View the controller manufacture date.	0 to 2, 147,483,647	- - - -	14	0x65 (101) 1 8	- - - -	1008	dint R
iP.AC iP.AC	*Diagnostics Menu* **IP Actual Address Mode** View the addressing mode of the gateway in slot B of this RUI.	dhCP DHCP (1281) F.Add Fixed Address (1284)	- - - -	- - - -	- - - -	- - - -	17013	uint R
iP.A1 iP.A1	*Diagnostics Menu* **IP Actual Address Part 1** View or change the first part of the IP address of the gateway in slot B of this RUI..	0 to 255	- - - -	- - - -	- - - -	- - - -	17044	uint R
iP.A2 iP.A2	*Diagnostics Menu* **IP Actual Address Part 2** View or change the second part of the IP address of the gateway in slot B of this RUI..	0 to 255	- - - -	- - - -	- - - -	- - - -	17045	uint R
iP.A3 iP.A3	*Diagnostics Menu* **IP Actual Address Part 3** View or change the third part of this controller's IP address.	0 to 255	- - - -	- - - -	- - - -	- - - -	17046	uint R
iP.A4 iP.A4	*Diagnostics Menu* **IP Actual Address Part 4** View or change the fourth part of this controller's IP address.	0 to 255	- - - -	- - - -	- - - -	- - - -	17047	uint R
StAt StAt	*Profibus DP Status* Indicates if the Profibus card is ready or currently running.	rEdY Ready (1662) rn9 Running (149)	None	- - - -	- - - -	- - - -	17063	uint R

5 Chapter 5: Using an RUI/Gateway

Conceptual View of the RUI/GTW

As shown in the following network screen shots the gateway allows for connectivity between dissimilar networks. Within the Watlow controllers there are many parameters (members), of which, some can be read and some read and or written to. As an example, the Process Value can be read only, where the Closed Loop Set Point can be read and or written to. In order for these parameters to be available on the field bus side of the gateway some basic setup is required in the RUI/GTW. Communications instance 1 will always represent the Standard Bus side of the network where communications instance 2 represents the field bus side. On each side of the RUI/GTW there are addresses (unique to each network) that need to be set up; there are also some network specific settings as well. As an example, when using DeviceNet™ as the field bus of choice, the network baud rate and node address must be specified. When using Ethernet the user can enable EtherNet/IP™ and or Modbus TCP. On the Standard Bus side, the user will determine the total number of EZ-ZONE® controllers (slaves) to scan (starting and end zones). Once the RUI/GTW is configured, all accessible parameters for each of the EZ-ZONE controllers on the Standard Bus network will be available on the field bus side of the Gateway.

Note:

Excessive writes through the gateway to other EZ-ZONE family controllers may cause premature EEPROM failure. For more detail, open the associated controller User Guide to find the Non-Volatile Save prompt nU.S. Turn to the Setup Page and then under the Com Menu and set this prompt to Yes (enable writes) or No (disable writes). To learn more turn to the section entitled "Saving Settings to Non-volatile Memory".

Using RUI Lockout and Password Security

If unintentional changes to parameter settings might raise safety concerns or lead to downtime, you can use the lockout feature to make them more secure. There are two methods of lockout that can be deployed through the RUI, both of which are accessible from the RUI Page. Method 1 is discussed below.

Method 1- Change the value of the Read Lock rLoc (1 to 5) and Set Lock SLoc (0 to 5) prompts where the higher the value or setting for each translates to a higher security clearance (greater access).

Note:

When using Method 1 Lockout all settings can be modified by anyone who knows how to find their way to the SLoc and rLoc parameters.

Note:

These lockout settings apply to the RUI only. When utilizing Method 1 described above, the RUI settings may serve as an override to the local PM settings when it too is using Method 1. As an example, if a PM control has Read Lock set to 1 and the RUI has the same prompt set to 5, the RUI will have full visibility to all PM menus when connected to it.

An example of Method 1 lockout usage could be that it is determined that an operator should have read access to all menus while allowing write access to the Home Page only.

1. Press and hold the Advance and Infinity keys for approximately 6 seconds to enter the RUI Page.
2. Navigate to the LoC Menu using the Up or Down arrow keys.
3. Using the Advance key, navigate to the Read Lockout Security rLoC and change it to 5.
4. Push the green Advance key and navigate to the and Set Lockout Security SLoC changing it to 1.

Using Lockout Method 1 (Read and Set Lock)

There are two Pages within an RUI (Home and RUI Page) that are always visible regardless of Read and Set Lock settings. However, the menus that are visible and which ones can be written to are dependent on these settings. Looking at the table below, "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. As stated previously, the Set Lockout has 6 levels (0 to 5) of security where the Read Lockout has 5 (1 to 5). Therefore, level "0" applies to Set Lockout only.

RUI Page Menus rLoC and SLoC						
Menus	Security Level					
	0	1	2	3	4	5
Communications Menu	N	N	N	N	N	Y
Global Menu	N	N	N	N	N	Y
Gateway Menu	N	N	N	N	N	Y
Lock Menu	N*	Y*	Y*	Y*	Y*	Y
Diagnostic Menu**	N	Y	Y	Y	Y	Y

* Visible, with limited write capabilities. Read and Set Lock can always be written to.

** Always visible and never writable

Note:

Using Method 1 Lockout all settings can be modified by anyone who knows how to find their way to the SLoC and rLoC parameters

Method 2- Enable Password Security PASE and then modify the Lock Level LoCL value which ranges from 1 to 5. See the section entitled Using Lockout Method 2 for more detail.

Using Lockout Method 2 (Password Enable)

It is sometimes desirable to apply a higher level of security to the RUI where a password would be required to access the menus. If Password Enabled PASE in the RUI Page under the LoC Menu is set to on, an overriding Password Security will be in effect for the RUI. Without the appropriate password (User or Administrator), specified menus within the RUI will remain inaccessible based on the Locked Access Level LoCL prompt. On the other hand, a User with a password would have visibility restricted by the Read Lockout rLoC and the Set Lockout SLoC settings. As an example, with the following settings:

- Password PASE Enabled
- Locked Access Level LoCL set to 1

- Read rLoC and Set SLoC Lock set to 5

A User (having entered a User password) would have access to all menus with the exception of the Lock menu. Therefore, Read and Set Lock cannot be changed. If an Administrator enters the appropriate password all menus would then become available again.

How to Enable Password Security

Follow the steps below:

1. Go to the RUI Page by holding down the Advance key and the Down key for approximately six seconds.
2. Push the Down or Up key to get to the LoC menu. Again push the Advance key until the Password Enabled PASE prompt is visible.
3. Push either the Down or Up key to turn it on. Once on, 4 new prompts will appear:
   a. LoCL, Locked Access Level (1 to 5) corresponding to the lockout table above.
   b. roLL, Rolling Password will change the Customer Code every time power is cycled.
   c. PASU, User Password which is needed for a User to acquire access to the control.
   d. PASA, 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. In other words the Lock Menu LoC is not available to a User. 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 Menus, go to the RUI Page and enter the ULoC menu. Once there follow the steps below:

Note:

If Password Security (Password Enabled PASE is on) is enabled the two prompts mentioned below in the first step will not be visible. If the password is unknown, call the individual or company that originally setup the control.

1. Acquire either the User Password PASU or the Administrator Password PASA.
2. Push the Advance key until the Code CodE prompt appears.

Note:

a. If the Rolling Password is off push the Advance key until the Password PASS prompt is 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 RUI 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 by using the Up ▲ and Down ▼ arrow keys or use EZ-ZONE Confgurator Software.
6. Exit the RUI 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.

An example using Method 2 lockout may be a case where once the RUI gateway is setup downtime due to inadvertent and unwanted changes to the RUI would be unacceptable. By enabling Password Security all menus (with the exception of Unlock ULoC) would be inaccessible until a valid password is entered.

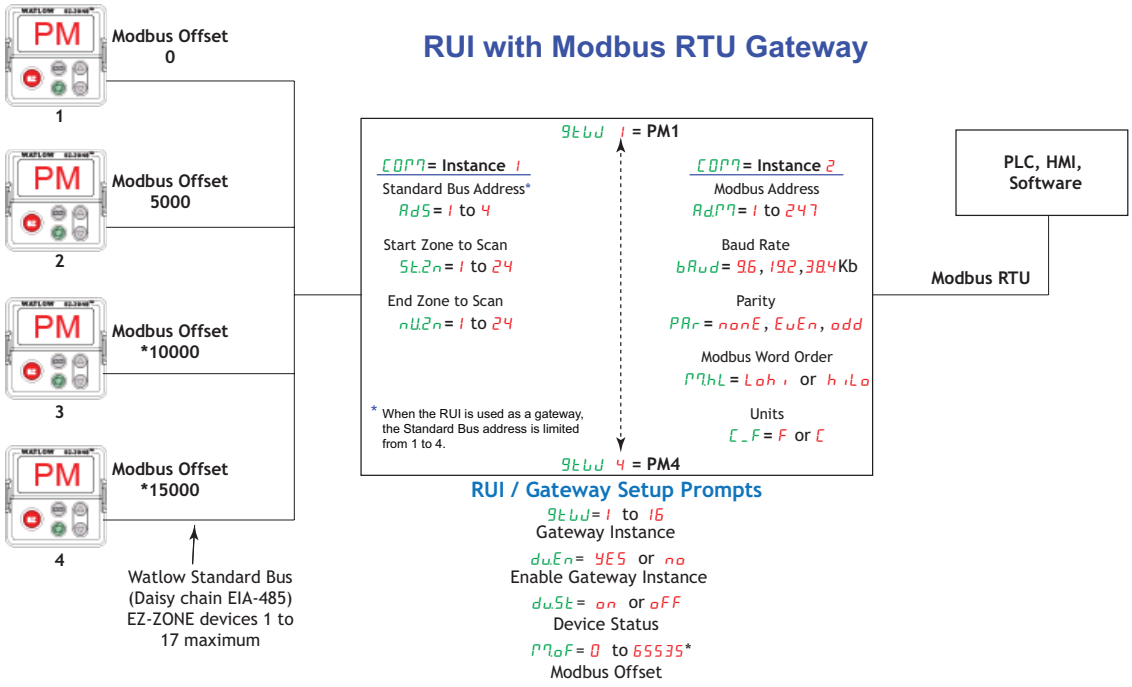
1. Press and hold the Advance ◉ and Down ▼ arrow keys for approximately 6 seconds to enter the RUI Page
2. Navigate to the LoC Menu using the Up ▲ or Down ▼ arrow keys.
3. Using the Advance ◉ key, navigate to the Password Enable PAS.E prompt and change it to on.
4. Push the Advance ◉ key and navigate to the Lock Level LoC.L prompt changing it to 1.
5. Push the Advance ◉ key and select whether or not rolling password roLL should be on or off.
6. Push the Advance ◉ key and select a User Password PAS.u by using the Up ▲ or Down ▼ arrow keys.
7. Push the Advance ◉ key and select an Administrator Password PAS.A by using the Up ▲ or Down ▼ arrow keys.
8. Push and hold the Infinity ∞ key for 3 seconds to return to the Home Page.

Using Modbus RTU

Communications To/From a Master:

Once the gateway instance is enabled for Modbus RTU there is one other prompt mAoF (Modbus Offset) that will have an impact on which parameter is read or written to as well as which controller.

As an example, lets assume the offsets are as shown in the graphic on the following page and the Master wants to read instance one Closed Loop Set Point from both Standard Bus address 1 and 4. Open up the associated PM Users Guide and determine whether or not the controller is configured to use Map 1 or Map 2 Modbus addresses. This can be found in the Setup Page under the CoM Menu. Once this is determined, turn to the Operations Page and look in the Loop Menu for Closed Loop Set Point. If using Map 1 you'll notice that the Modbus register that holds the Closed Loop Set Point value is 2160; if using Map2 then the address would be 2640. To read instance one Closed Loop Set Point from Standard Bus address 1 the appropriate absolute Modbus address would be: 2160 + 400001 + Modbus offset (0) = 402161.



* The RUI allows for a maximum entry of 9999 due to the limitations of the 7 segment display. To enter an offset > 9999 EZ-ZONE Configurator software must be used.

To read the Closed Loop Set Point from Standard Bus address 4, the absolute address would be: 2160 + 400001 + Modbus offset (15000) = 417161.

When considering what the offsets will be for each control, first determine the highest Modbus address that you will need to access from any given control while keeping in mind that the last available Modbus address is 465535. Ensure the offsets for each control do not overlap one another. As a point of reference, the table below shows the maximum number of Modbus registers in each of the EZ-ZONE controllers.

	PM Express	PM	ST	RMC	RMH	RMS	RML	RME	RMA
With Profiles	- - - -	8,500	8,000	43,400	- - - -	- - - -	- - - -	- - - -	- - - -
Without Profiles	2,200	4,000	2,200	5,300	17,000	18,000	9,500	7,000	5,500

Note:

The Modbus Offset M.oF as modified through the RUI cannot exceed 9999. Therefore, if it is desired to utilize a Modbus offset as shown in the following graphic (above 9999) it must be entered using EZ-ZONE Configurator software. This software can be downloaded free of

charge from the Watlow web site. After clicking on the link below simply type EZ-ZONE in the Keyword field and then click the search button.

http://www.watlow.com/en/resources-and-support/Technical-Library/Software-and-Demos

Modbus - Using Programmable Memory Blocks

All EZ-ZONE controllers equipped with the Modbus protocol feature a block of addresses that can be configured by the user to provide direct access to a list of 40 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" (i.e., Assembly Working Addresses 200 & 201 will assume the 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 (using the EZ-ZONE ST Users Guide), Modbus register 360 and 361 (Map 2) contains the Analog Input 1 Process Value (See Operations Page, Analog Input Menu). If the value 360 and 361 is loaded into Assembly Definition Addresses 90 and 91, the Process Value sensed by Analog Input 1 will also be stored in Modbus registers 250 and 251. Note that by default this parameter is also stored in working registers 240 and 241 as well.

Note:

When changing the assembly as in the example above a multi-write function must be used, i.e., writing 360 to register 90 and 361 to register 91. All members in the assembly are 32 bits.

The table identified as "Modbus Programmable Memory Blocks" found in the appendix of this Users Guide reflects the assemblies and their associated addresses.

To learn more about the Modbus RTU protocol point your browser address below:

http://www.modbus.org

Note:

To minimize traffic and enable better throughput on Standard Bus, set the Number of Zones prompt nU2n in the RUI to the maximum number of EZ-ZONE controllers on the network to be scanned.

Note:

The logic used when determining the Modbus offset is based on the number of Modbus addresses needed for any given controller. In the above example, each PM controller would have access to the first 5000 Modbus registers (400001 - 405001).

Note:

If using a legacy EZ-ZONE ST controller with a firmware version less the 3.0, consider using the Modbus addresses listed in the ST Users Guide in the column entitled "RUI/GTW Modbus". If the firmware in the ST is 3.0 or higher new features were added and made accessible through the Map 2 registers. If interested in using the new features today or perhaps in the future configure the ST for Map2 Modbus registers.

CIP - Communications Capabilities

Communications using CIP (EtherNet/IP and DeviceNet) can be accomplished with any EZ-ZONE controller using an RUI/GTW. Reading or writing when using CIP can be accomplished via explicit and or implicit communications. Explicit communications usually requires the use of a message instruction within the Programmable Logic Controller (PLC) but there are other ways to do this as well. Implicit communications is also commonly referred to as polled communications. When using implicit communications there is an I/O assembly that would be read or written to; the default assemblies are embedded into the firmware of the controller and are different for each. Watlow refers to these assemblies as the T to O (Target to Originator) and the O to T (Originator to Target) assemblies where the Target is always the EZ-ZONE controller and the Originator is the PLC or Master on the network. The O to T assembly is made up of 20 (32 bit) members that are user configurable where the T to O assembly consists of 21 (32 bit) members. The first member of the T to O assembly is called the Device Status, it is unique to the RUI/GTW and cannot be changed. Bits 16 - 31 of this 32 bit word represents the communications status of the EZ-ZONE controllers on the Standard Bus side of the RUI/GTW when enabled. Once a Zone is enabled, valid communications will be represented with the bit set to a "1", if set to "0", the RUI/GTW is not communicating with the zone. Bit 16 represents Zone 1 where bit 31 represents Zone 16. The 20 members that follow Device Status are user configurable. The Appendix of this user manual contains the assemblies for each of the EZ-ZONE controllers. (See Appendix: CIP Implicit Assemblies by product).

To change any given member of either assembly simply write the new class, instance and attribute to the member location of choice. As an example, if it were desired to change the 14th member of the O to T assembly of an EZ-ZONE PM Integrated controller (PM1) from the default parameter (Heat Proportional Band) to Clear Limit (see Operations Page, Limit Menu) write the value of 0x70, 0x01 and 0x01 (Class, Instance and Attribute respectively) to 0x77, 0x01 and 0x0E. Once executed, writing a value of zero to this member will reset a limit assuming the condition that caused it is no longer present.

Note:

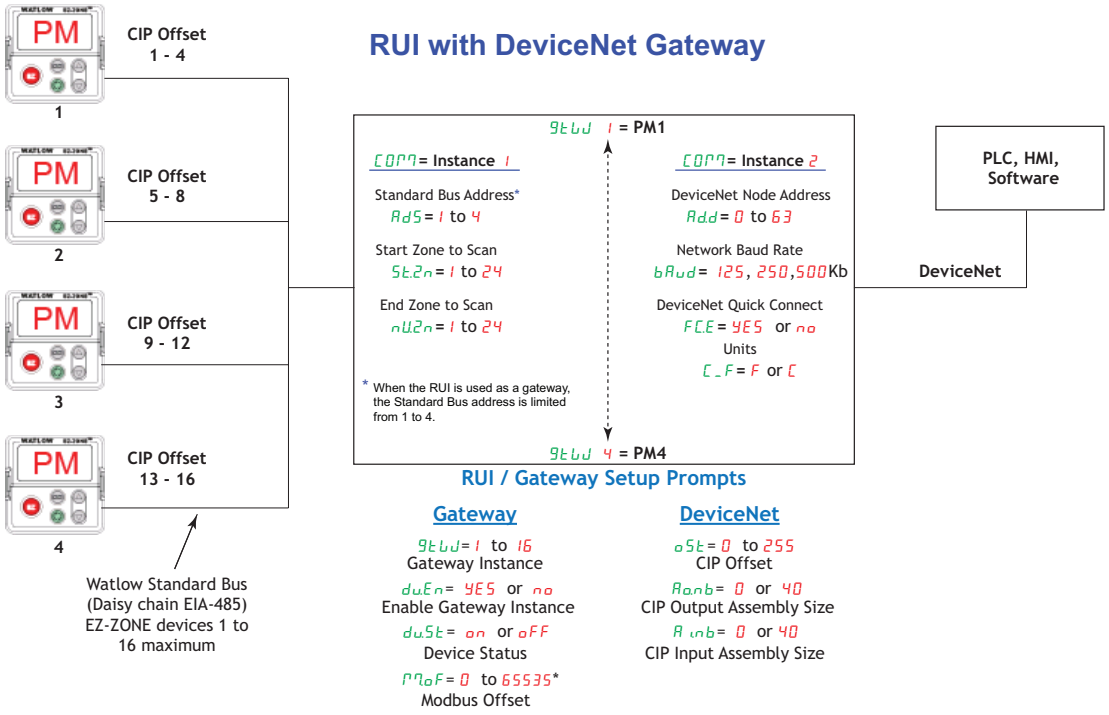
When changing the implicit assembly of any given controller through the RUI/GTW ensure that the CIP Instance Offset is added to the documented instance for any given parameter as well as the assembly instance. As an example, if it were desired to do the above operation on PM3 the value to write would now be 0x70, 0x09 and 0x01 (Class, Instance and Attribute respectively) to 0x77, 0x09 and 0x0E. Notice that the CIP Offset was added to each.

Using DeviceNet™

Communications To/From Third Party Device:

When using the DeviceNet protocol, there are two methods used in communicating, implicitly and explicitly. Once the gateway instance is enabled there are two prompts that relate directly to these forms of communication.

Use the graphic below in reference to the descriptions that follow.



oSt CIP Offset, used exclusively with explicit messaging where it defines a specific gateway instance (EZ-ZONE PM or RM controller) to receive a message originating from the network Master. The CIP offset is unique to each gateway instance and is added to the published instance of any given parameter.

As an example, when programming the explicit message ensure that the class, instance and attribute are defined. To read the first instance of the Process Variable in PM1 (see graphic above) use the following information in the message instruction:

Class = 104 or (0x68)
Instance = 1
Attribute = 1

Note that the instance is identified as instance 1 because there is no offset to add. RUI prompt entry for gateway instance 1 follows:

oSt = 0

RUI prompt entry for gateway instance 2 (PM2) follows:

oSt = 4

RUI prompt entry for gateway instance 3 follows:

oSt = 8

RUI prompt entry for gateway instance 4 follows:

oSt = 12

To read the process value instance 2 of PM4 add the offset to the instance. The following information would need to be entered in the message instruction:

Class = 104 or (0x68)

Instance = **14** or (0x0E)

Attribute = 1

Aanb From the gateway perspective, this assembly represents data that comes from Standard Bus controllers (EZ-ZONE PM or RM) and is sent out on the network. As seen from the network, this is the CIP Implicit Output Assembly representing inputs to the Master and is used exclusively when communicating implicitly. For any given RUI gateway instance (EZ-ZONE controller), the output assembly size will never be greater than 20, 32-bit members. The user entry ranges from 0 to 20.

A inb From the gateway perspective, this assembly represents data that comes from the network Master and is sent to one or more gateway instance (EZ-ZONE PM or RM) on Standard Bus. As seen from the network, this is the CIP Implicit Input Assembly representing outputs from the Master and is used exclusively when communicating implicitly. For any given RUI gateway instance (EZ-ZONE controller), the input assembly size will never be greater than 20, 32-bit members. The user entry ranges from 0 to 20.

Note:

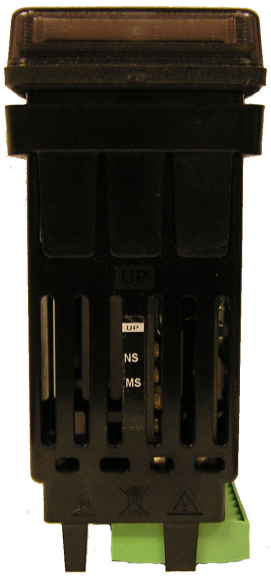
The maximum number of implicit input/output members using DeviceNet cannot exceed 200. A network could have up to 10 EZ-ZONE controllers with 20 members each maximum or the 200 members can be divided any way the user would like as long as 20 I/O members per controller are not exceeded.

Using the graphic above as an example, if gtwJ instance 1 - 4 has Aanb and A inb set to 5, each of the four EZ-ZONE family controllers will contain the first 5 members of the assembly and this information would then be passed implicitly to the Master on the DeviceNet™ network. The EDS (Electronic Data Sheet) can be found on the CD shipped with the product "Controller Support Tools".

Note:

To minimize traffic and enable better throughput on Standard Bus, set the End Zone prompt nU2n in the RUI to the maximum number of EZ-ZONE controllers on the network to be scanned.

DeviceNet RUI/GTW LED Indicators



Viewing the unit from the front and then looking on top of the RUI/GTW two LEDs can be seen aligned vertically front to back. The LED closest to the front is identified as the network (Net) LED where the one next to it would be identified as the module (Mod) LED.

Network Status (NS)

Indicator LED	Description
Off	The device is not online and has not completed the duplicate MAC ID test yet. The device may not be powered.
Green	The device is online and has connections in the established state (allcated to a Master).

Indicator LED	Description
Red	Failed communication device. The device has detected an error that has rendered it incapable of communicating on the network (duplicate MAC ID or Bus-off).
Flashing Green	The device is online, but no connection has been allocated or an explicit connection has timed out.
Flashing Red	A poll connection has timed out.

Module Status (MS)

Indicator LED	Description
Off	No power is applied to the device.
Flashing Green-Red	The device is performing a self-test.
Flashing Red	Major Recoverable Fault.
Red	Major Unrecoverable Fault.
Green	The device is operating normally.

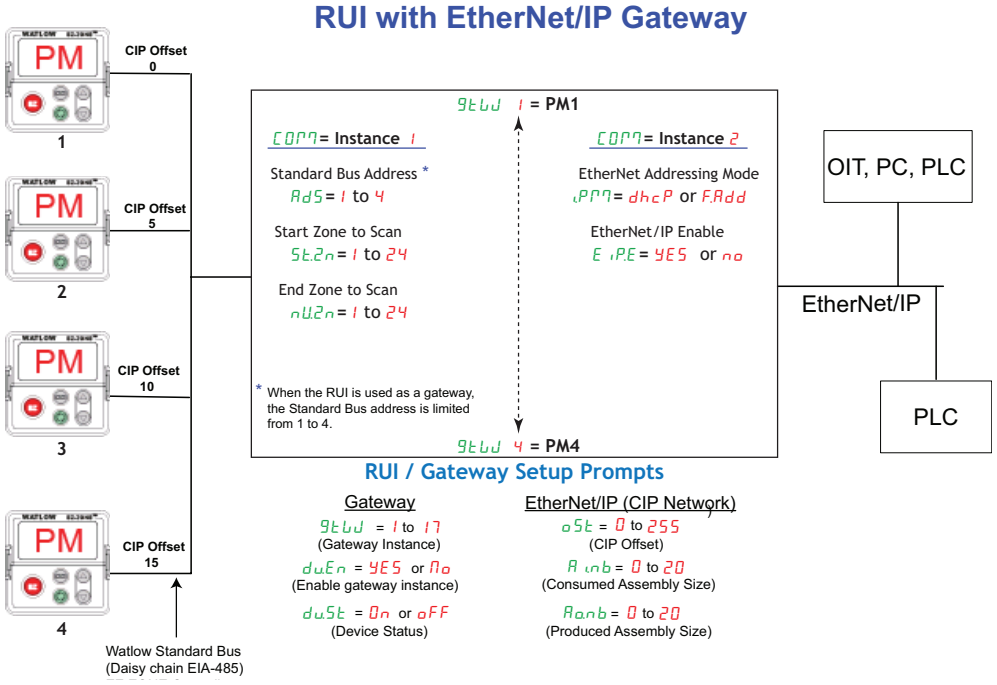
To learn more about CIP and DeviceNet point your browser to: http://www.odva.org

Ethernet Communications

Using EtherNet/IP™

When using the EtherNet/IP protocol, there are two methods used in communicating, implicitly and explicitly. Once the gateway instance is enabled there are two prompts that relate directly to these forms of communication.

Use the graphic below in reference to the descriptions that follow below.



ost - CIP Offset, is used exclusively with explicit messaging where it defines a specific gateway instance (EZ_ZONE PM or RM controller) to receive a message originating from the network Master. The CIP offset is unique to each gateway instance and is added to the published instance of any given parameter.

As an example, when programming an explicit message ensure that the class, instance and attribute is defined. To read the first instance of the Process Variable in PM1, use the following information in the message instruction:

Class = 104 (0x68)
Instance = 1
Attribute = 1

Note that the instance is identified as instance 1 because there is no offset to add. RUI prompt entry for gateway instance 1 follows:

oSt = 0

RUI prompt entry for gateway instance 2 (PM2) follows:

oSt = 4

RUI prompt entry for gateway instance 3 follows:

oSt = 8

RUI prompt entry for gateway instance 4 follows:

oSt = 12

To read the process value instance 2 of PM4 add the offset to the instance. The following information would need to be entered in the message instruction:

Class = 104 (0x68)

Instance = **14** or (0x0E)

Attribute = 1

Aonb From the gateway perspective, this assembly represents data that comes from Standard Bus controllers (EZ-ZONE PM or RM) and is sent out on the network. As seen from the network, this is the CIP Implicit Output Assembly representing inputs to the Master and is used exclusively when communicating implicitly. For any given RUI gateway instance (EZ-ZONE controller), the output assembly size will never be greater than 20, 32-bit members. The user entry ranges from 0 to 20.

A inb From the gateway perspective, this assembly represents data that comes from the network Master and is sent to one or more gateway instance (EZ-ZONE PM or RM) on Standard Bus. As seen from the network, this is the CIP Implicit Input Assembly representing outputs from the Master and is used exclusively when communicating implicitly. For any given RUI gateway instance (EZ-ZONE controller), the input assembly size will never be greater than 20, 32-bit members. The user entry ranges from 0 to 20.

Note:

The maximum number of implicit input/output members using EtherNet/IP cannot exceed 100. A network could have up to 5 EZ-ZONE controllers with 20 members each maximum or the 100 members can be divided any way the user would like as long as 20 I/O members per controller are not exceeded.

Using the graphic on the following page as an example, if:

9tUJ instance 1 has A inb and Aonb set to 5

9tUJ instance 2 has A inb and Aonb set to 5

9tUJ instance 3 has A inb and Aonb set to 5

9tUJ instance 4 has A inb and Aonb set to 5

Each of the four EZ-ZONE family controllers will contain the first 5 members of the assembly and this information would then be passed implicitly to/from the Master on the EtherNet/IP network.

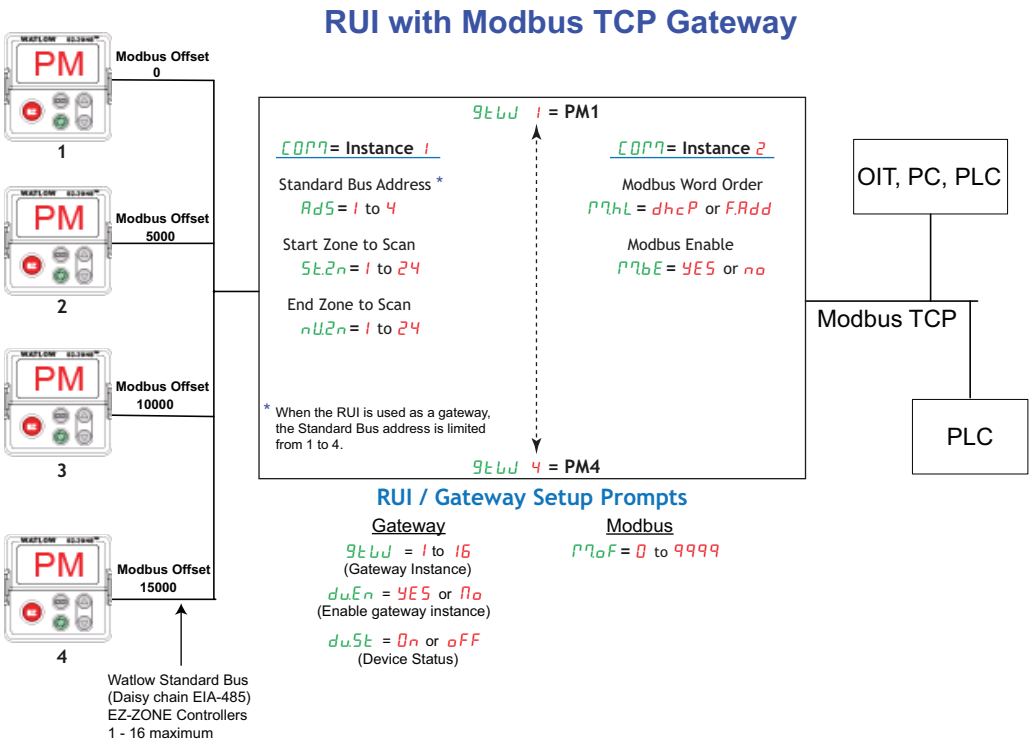
Using Modbus TCP

Communications To/From a Master:

When using Modbus TCP there are some unique prompts that need to be addressed. They are:

1. Modbus TCP Enable `MTbE`, turns Modbus on or off.
2. Modbus TCP Word Order `MThL`, which allows the user to swap the high and low order 16 bit values of a 32-bit member.
3. Modbus TCP Offset `MToF`, which defines each of the available Modbus registers for each gateway instance.

As an example, when using Modbus TCP notice that the Modbus offset now applies. For the purpose of this discussion assume the offsets are as shown in the graphic below and the Master wants to read the first instance of Closed Loop Set Point from both Standard Bus address 1 and 4. Open up the appropriate PM User's Guide and go to the Operations Page, Control Loop Menu to find the Set Point.



Note:

If using a legacy EZ-ZONE ST controller with a firmware version less the 3.0, consider using the Modbus addresses listed in the ST User's Guide in the column entitled "RUI/GTW Modbus". If the firmware in the ST is 3.0 or higher new features were added and made accessible through the Map 2 registers. If interested in using the new features today or perhaps in the future, configure the ST for Map 2 Modbus registers.

When found, notice that the relative Modbus register is 2160 (Map 1) or 2640 (Map 2). To read the Closed Loop Set Point from address 1, the appropriate Modbus address would be 2161.

To read the Closed Loop Set Point from Standard Bus address 4 the address would change to include the offset: 17161.

Note:
To minimize traffic and enable better throughput on Standard Bus, set the End Zone prompt nU2n in the RUI to the maximum number of EZ-ZONE controllers on the network to be scanned.

Note:
The RUI/GTW allows for a maximum entry of 9999 due to limitations of the 7 segment display. To enter a Modbus offset > 9999 EZ-ZONE Configurator must be used.

Note:
In the above graphic there are several prompts omitted for the sake of saving some space. When the Ethernet addressing mode is set to Fixed the user will find several more prompts that will follow the prompt shown for "Ethernet Addressing Mode" related to specifying the actual IP iPF1 - iPF4, subnet iPS1 - iPS4 and the gateway iPG1 - iPG4 (external gateway) addresses. If set to receive an IP address from a host (dhCP) computer, the prompts shown above are accurate.

Note:
When changing the RUI/GTW IP address, power must be cycled for the new address to take effect.

Ethernet RUI/GTW LED Indicators

Viewing the unit from the front and then looking on top of the RUI/GTW four LEDs can be seen aligned vertically front to back. The LEDs are identified accordingly: closest to the front reflects the Network (Net) status, Module (Mod) status is next, Activity status follows and lastly, the LED closest to the rear of the RUI/GTW reflects the Link status.

Network Status

Indicator State	Summary	Requirement
Steady Off	Not powered, no IP address	If the device does not have an IP address (or is powered off), the network status indicator shall be steady off.
Flashing Green	No connections	If the device has no established connections, but has obtained an IP address, the network status indicator shall be flashing green.
Steady Green	Connected	If the device has at least one established connection (even to the Message Router), the network status indicator shall be steady green.
Flashing Red	Connection timeout	If one or more of the connections in which this device is the target has timed out, the network status indicator shall be flashing red. This shall be left only if all timed out connections are reestablished or if the device is reset.
Steady Red	Duplicate IP	If the device has detected that its IP address is already in use, the network status indicator shall be steady red.
Flashing Green / Red	Self-test	While the device is performing its power up testing, the network status indicator shall be flashing green / red.

Module Status

Indicator State	Summary	Requirement
Steady Off	No power	If no power is supplied to the device, the module status indicator shall be steady off.
Steady Green	Device operational	If the device is operating correctly, the module status indicator shall be steady green.
Flashing Green	Standby	If the device has not been configured, the module status indicator shall be flashing green.
Flashing Red	Minor fault	If the device has detected a recoverable minor fault, the module status indicator shall be flashing red. NOTE: An incorrect or inconsistent configuration would be considered a minor fault.
Steady Red	Major fault	If the device has detected a non-recoverable major fault, the module status indicator shall be steady red.
Flashing Green / Red	Self-test	While the device is performing its power up testing, the module status indicator shall be flashing green / red.

Link Status

Indicator State	Summary	Requirement
Steady Off		If the device cannot determine link speed or power is off, the network status indicator shall be steady off.
Green		If power is applied and the cable is good, the link LED will be green.

Activity Status

Indicator State	Summary	Requirement
Flashing Green	Detects activity	If the MAC detects activity, the LED will be flashing green.
Red		If the MAC detects a collision, the LED will be red.

Using Profibus DP

Communications To/From Third Party Device:

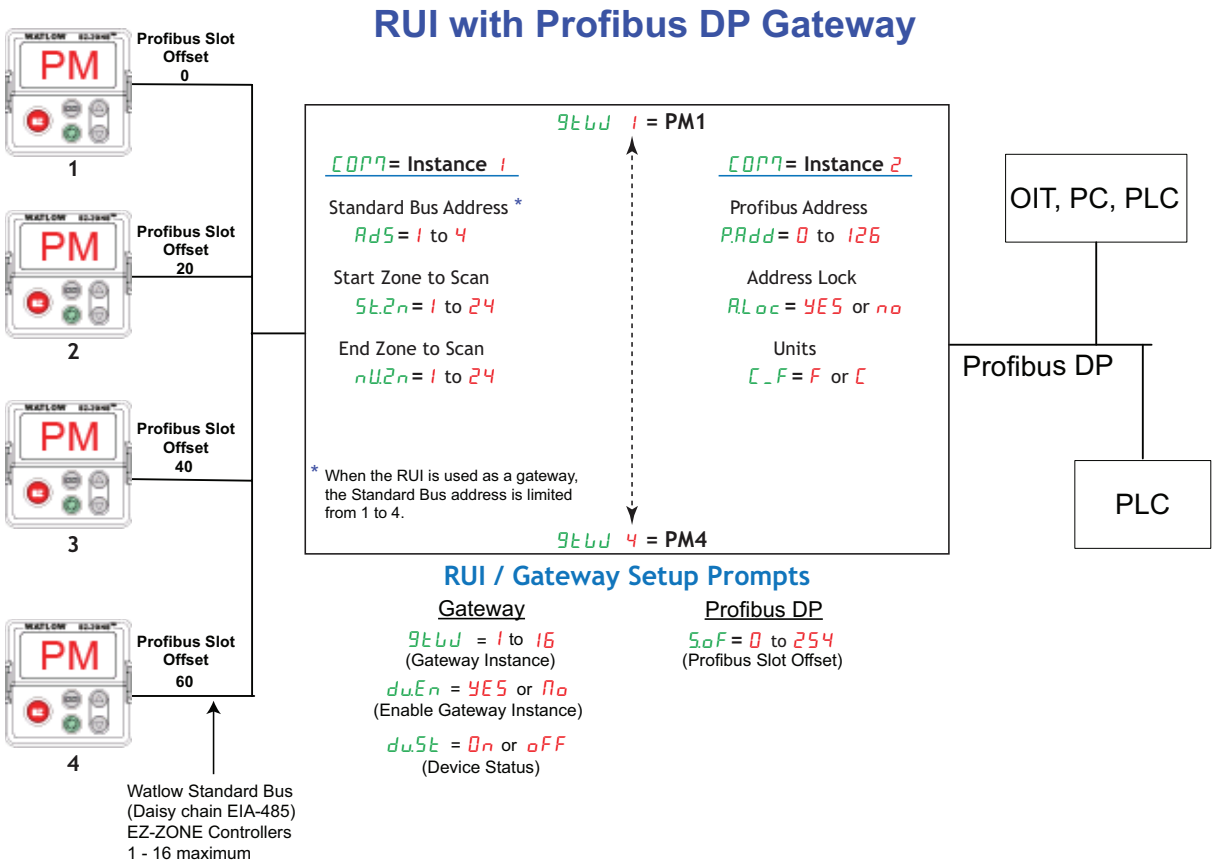
The RUI/GTW equipped with the Profibus DP protocol supports cyclic (DP-V0) and acyclic (DP-V1) communications. For your reference, cyclic communications implies that a set of defined parameters (user configured as it relates to the RUI/GTW) are periodically read and or written. The frequency or period of the read/write operations is determined (setup) via the Master on the network. You can configure the cyclic parameter set by installing the software (Profibus GSD Editor for EZ-ZONE Products) which can be found on the DVD that came with the product (Controller Support Tools) or download the software free of charge by clicking on the link below and typing GSD into the Keyword field. Once the GSD (Generic Station Description) file is created, simply upload it to the Master device.

http://www.watlow.com/en/resources-and-support/Technical-Library/Software-and-Demos

Acyclic communications will read and or write data on demand and is based on the Slot Offset and the specific index for any given parameter. Most of the discussion that follows is related to acyclic communications.

As with all of the other available protocols prior to establishing communications between Master and the slave the gateway instance must first be enabled duEn. Once enabled, the user must define the Slot Offsets for each enabled EZ-ZONE controller.

Use the graphic below (RUI being used as a Profibus DP Gateway) in reference to the descriptions that follow below.



SoF Slot Offsets are used exclusively with acyclic (DP-V1) communications and define the individual EZ-ZONE controller on the network as well as the instance of the parameter to be read or written to. The offset defaults are as shown in the graphic in increments of 20, however, they can be changed based on user needs.

As an example, when programming the Master device ensure that the Slot Offset and the Profibus Index (found in each product user manual in the various menus) are defined. To read the first instance of the Process Value in PM2 use the following information when programming the Master:

Slot Offset = 20
Index = 0 (See the EZ-ZONE PM Users Manual, Operations Page under the Analog Input Menu)

Note that PM2 and instance 1 is identified in the Slot Offset where the parameter, in this case, Process Value 1 is identified via the Profibus Index. If it were instance 2 same parameter that was needed the Slot Offset would change to 21.

Likewise, to read the Process Value instance 2 of PM4 the following information would need to be entered when programming the Master:

Slot Offset = 61
Index = 0

Profibus DP RUI/GTW LED Indicators

Viewing the unit from the front and then looking on top of the RUI/GTW two bi-color LEDs can be seen where only the front one is used. Definition follows:

Closest to the Front

Indicator LED	Description
Red	Profibus network not detected
Red Flashing	Indicates that the Profibus card is waiting for data exchange.
Green	Data exchange mode

To learn more about Profibus DP point your browser to: http://www.profibus.org

Software Configuration

Using EZ-ZONE® Configurator Software

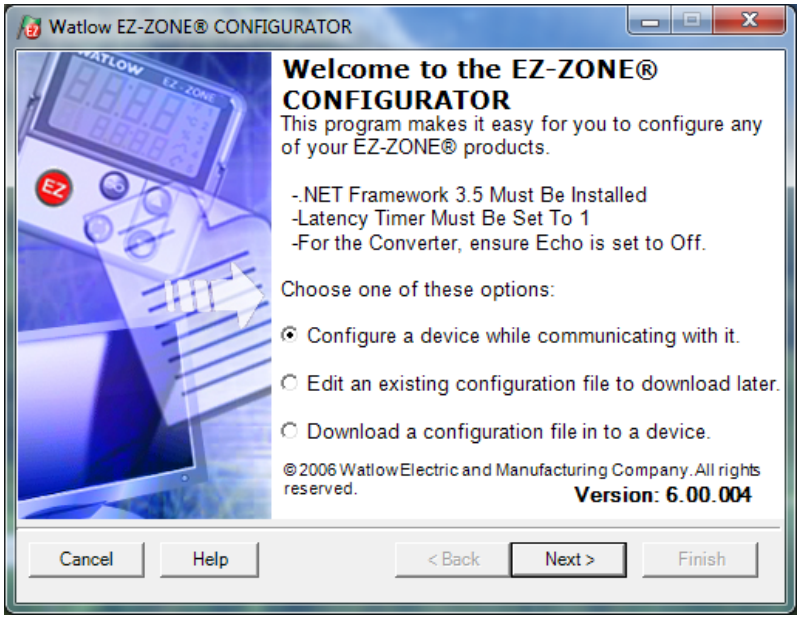
To enable a user to configure the RUI/GTW using a personal computer (PC), Watlow has provided free software for your use. If you have not yet obtained a copy of this software insert the DVD that came with the product (Controller Support Tools) into your CD/DVD drive and install the software. Alternatively, 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/en/resources-and-support/Technical-Library/Software-and-Demos

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.

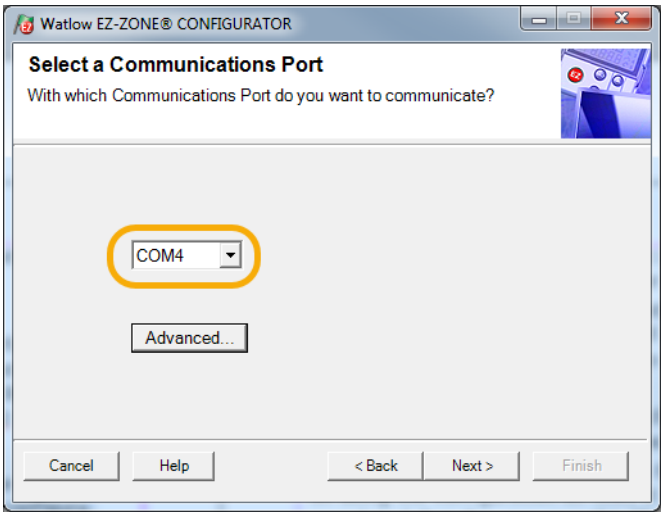


If the PC is already physically connected to the EZ-ZONE RUI/GTW click the next button to go on-line.

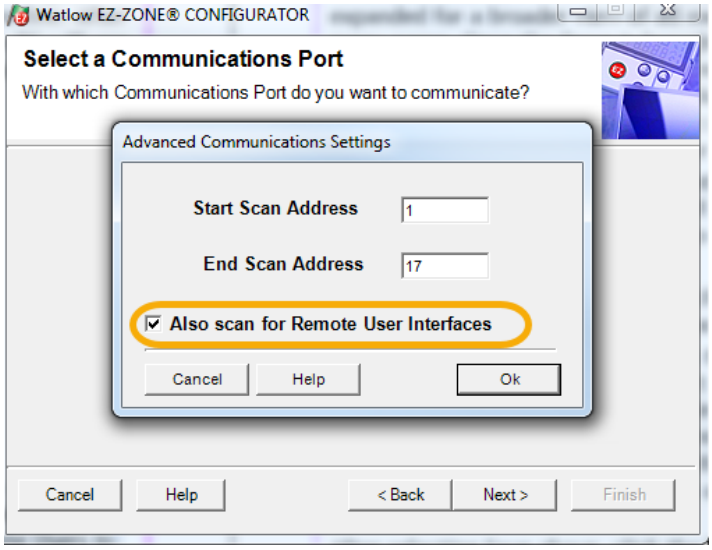
Note:

When establishing communications from PC to the EZ-ZONE RUI/GTW 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 (consider Watlow Part # 0847-0326-0000). However, some PCs may still be equipped with EIA-232 ports, therefore an EIA-232 to EIA-485 converter would be required.

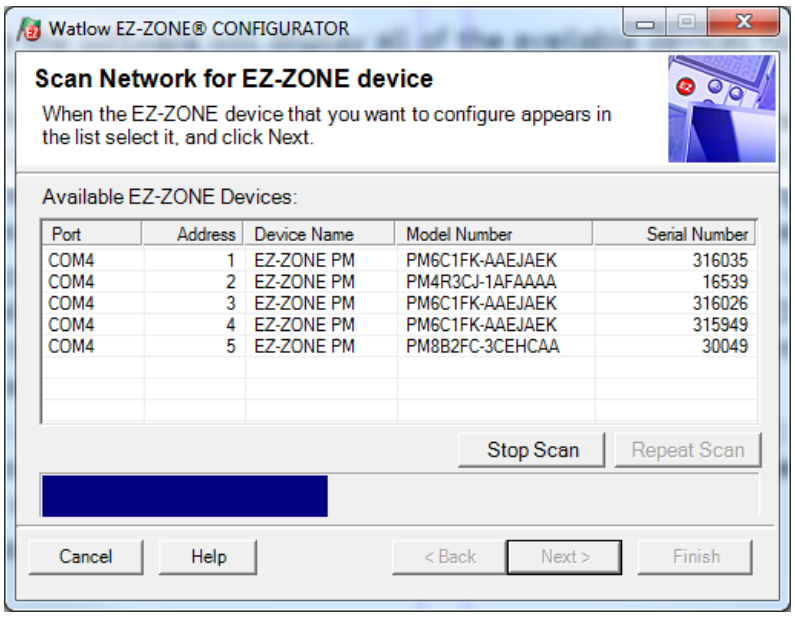
As can be seen in the above screen shot the software provides the user with the option of downloading a previously saved configuration as well as the ability to create a configuration off-line to download later. The screen shots that follow will take the user on-line. After clicking the next button it is necessary to define which communications port the PC will use. Clicking on the drop down (orange circle below) will show all available communication ports.



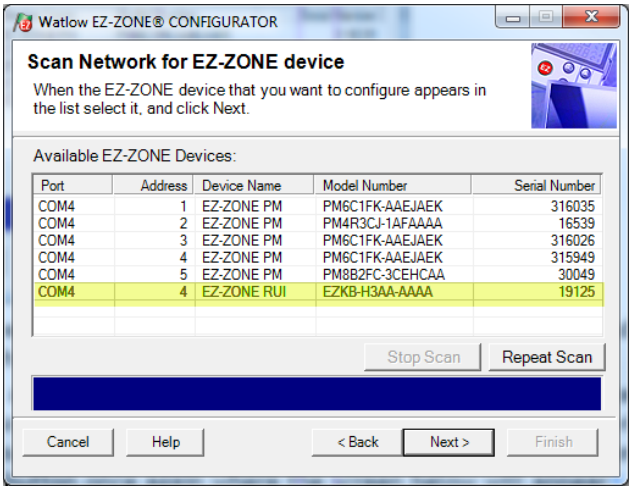
The "Advanced" button allows the user to specify how many controller zones (1 - 17) to look for when scanning as well as whether or not to scan for RUI/GTWs. If it is desired to connect and configure the RUI/GTW, be sure to check the check box "Also scan for Remote Users Interfaces" as shown in the graphic below.



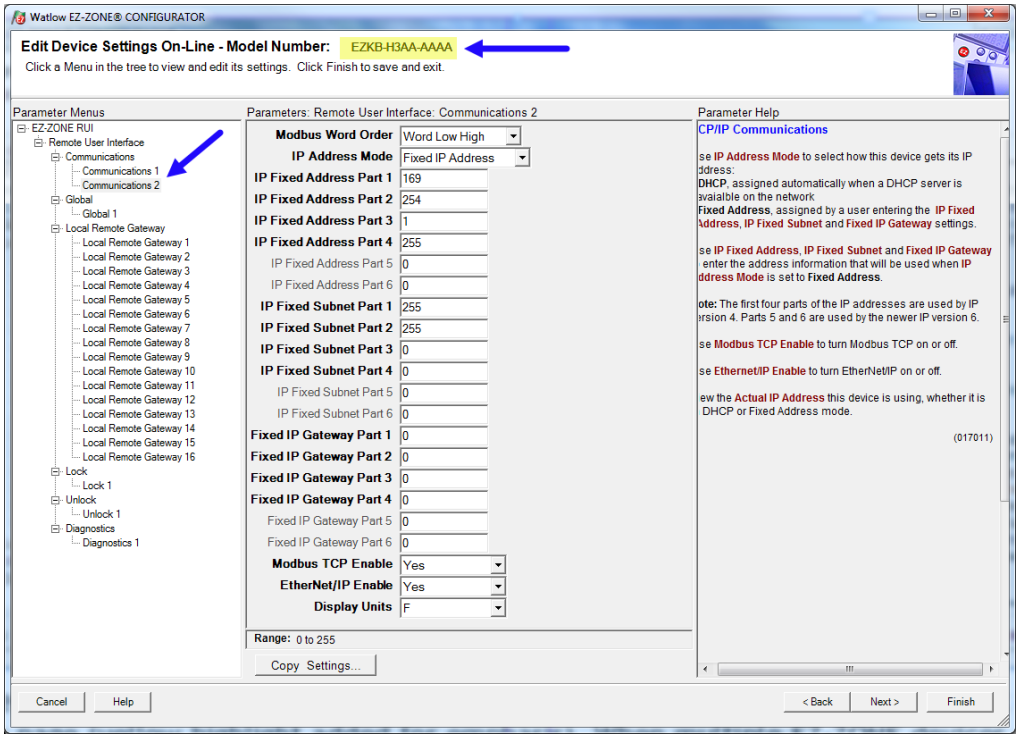
The following screen shot shows that the software is scanning for devices on the network and that progress is being made.



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



In the screen shot above the RUI/GTW is shown highlighted to bring greater clarity to the subject in focus. Any EZ-ZONE device on the network will appear in this window and would be available for the purpose of configuration and monitoring. After clicking on the RUI/GTW simply click the next button once again where the screen below will appear.



Notice in the screen shot above 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 controller.

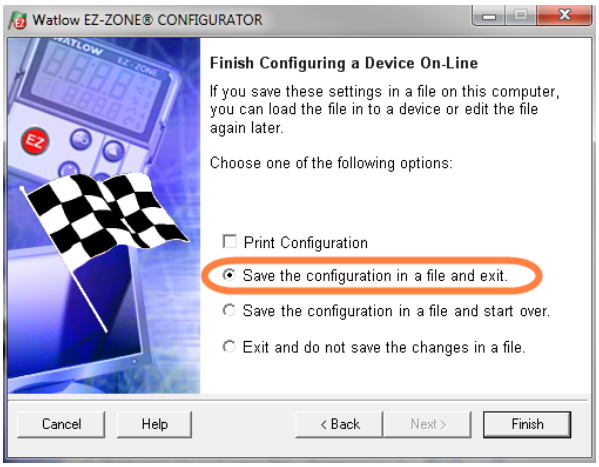
Looking closely at the left hand column (Parameter Menus) notice that it displays all of the available menus and associated parameters within the gateway. The menu structure as laid out within this software follows:

- Communications
- Global
- Local Remote Gateway
- Lock
- ULock
- Diagnostics

Navigating through this software and acquiring a better understanding of the available options is easy. Simply slide the scroll bar up or down to display the menu and parameter of choice. As an alternative, menus can be collapsed for greater focus on the menu of choice and or expanded for a broader view of all menus by clicking on the plus or negative symbol next to menu name. Once the focus is brought to an individual parameter (single click of mouse) as shown above for Communications 2, all that can be setup related to that parameter will appear in the center column along with context sensitive help in the right hand column. If a parameter is grayed out (not selectable) as shown in the center column above, that function is either not enabled or it does not apply.

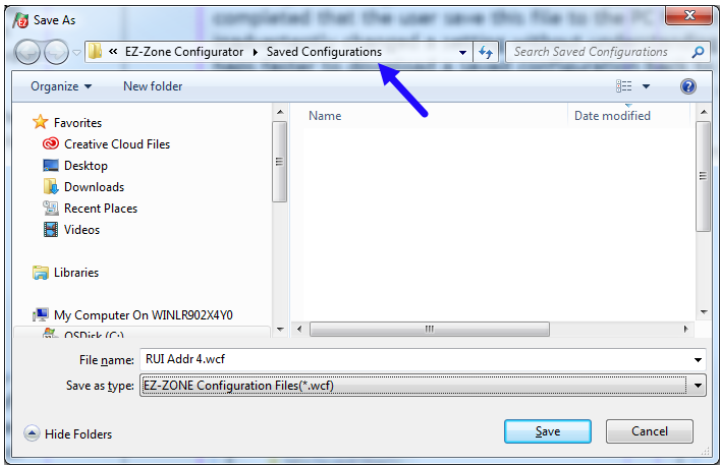
To speed up the process of configuration, notice that at the bottom of the center column there is an option to copy settings. If gateway settings are the same for all instances click on "Copy Settings" where a copy from to copy to dialog box will appear allowing for quick duplication of all settings.

Once the configuration is complete click the "Finish" button at the bottom right of the screen above. The screen that follows this action can be seen below.



Although the RUI/GTW now contains the configuration (because this entire discussion focused on doing the configuration on-line) it is suggested that after the configuration process is completed that the user save this file to 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 RUI/GTW versus trying to figure out what was changed. There is also 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 then appear.



When saving the configuration note the location where the file will be placed (arrow) and enter the file name (File name, yellow highlight) 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.

Saving Settings to Non-volatile Memory

When save to EEPROM is enabled, values are saved once every five seconds if a value written has changed. If the EEPROM is disabled, any changes from the keypad that cause a change in the controller will initiate a save of all values.

If controller settings are entered from the front panel (PM) or via an RUI, changes are always saved to non-volatile memory (EEPROM) in the controller (RM, PM or ST). If the controller loses power or is switched off, its settings will be restored when power is reapplied.

The EEPROM will wear out after about 1,000,000 writes, which should not be a problem with changes made from the panel or RUI. However, if the controller is receiving data from a Master device on a network such as a PLC via the gateway, the EEPROM could over time, wear out.

By default, settings made over Standard Bus (Com instance 1) via the gateway or front panel of the RUI are saved to EEPROM. Whenever new information is sent from these devices, e.g., new set point, new control mode, etc... a write to EEPROM will occur. No further writes to EEPROM will occur until the input data changes again. This would be true over a network (Com instance 2) as well. If the data is changing, it will be written to the EEPROM. If it is desired to inhibit writes to the EEPROM over a network, write the value of 59 to the addresses in the controllers specified below.

Note:

This is an individual operation on each EZ-ZONE controller on the Standard Bus side of the network.

CIP (DeviceNet and EtherNet/IP) by Controller Type

For the following controllers:

RMC, RMS, RML, RMH, ST and PM PID

Class = 150
Instance = 1
Attribute = 8

RMA

Class = 150
Instance = 2
Attribute = 8

PMI and PML

Class = 150	Class = 150
Instance = 1	Instance = 2
Attribute = 8	Attribute = 8

Modbus Registers by Controller Type

PM Integrated and PM Limit

Instance 1	Instance 2
Map 1 = 2494	Map 1 = 2514
Map 2 = 2974	Map 2 = 2994

PM PID

Instance 1
Map 1 = 2494
Map 2 = 2974

ST
Map 1 = 317
Map 2 = 2064

RMC	RMA	RMS	RML	RMH
2834	444	3474	3504	6514

Profibus by Controller Type

RMC, RML, RMH, PM Limit, PM Integrated and PM PID
198

RMS
112

RMA
82

Enumerated values for this member follows:

Yes = 106 (allow writes to EEPROM), No = 59 (Disable writes to EEPROM)

Note:

Some controllers have only 1 communications port where this discussion would apply if connected to an RUI/GTW or RMA module. Other controllers like the PMI and the PML can have 2 communications ports therefore you will find 2 instances. This setting relates to the controller the RUI/GTW is connected to, not the RUI/GTW itself. Everything changed in the RUI/GTW, either via EZ-ZONE Configurator software or from the front panel will be saved to the EEPROM in the RUI/GTW.

6 Chapter 6: Appendix

Troubleshooting

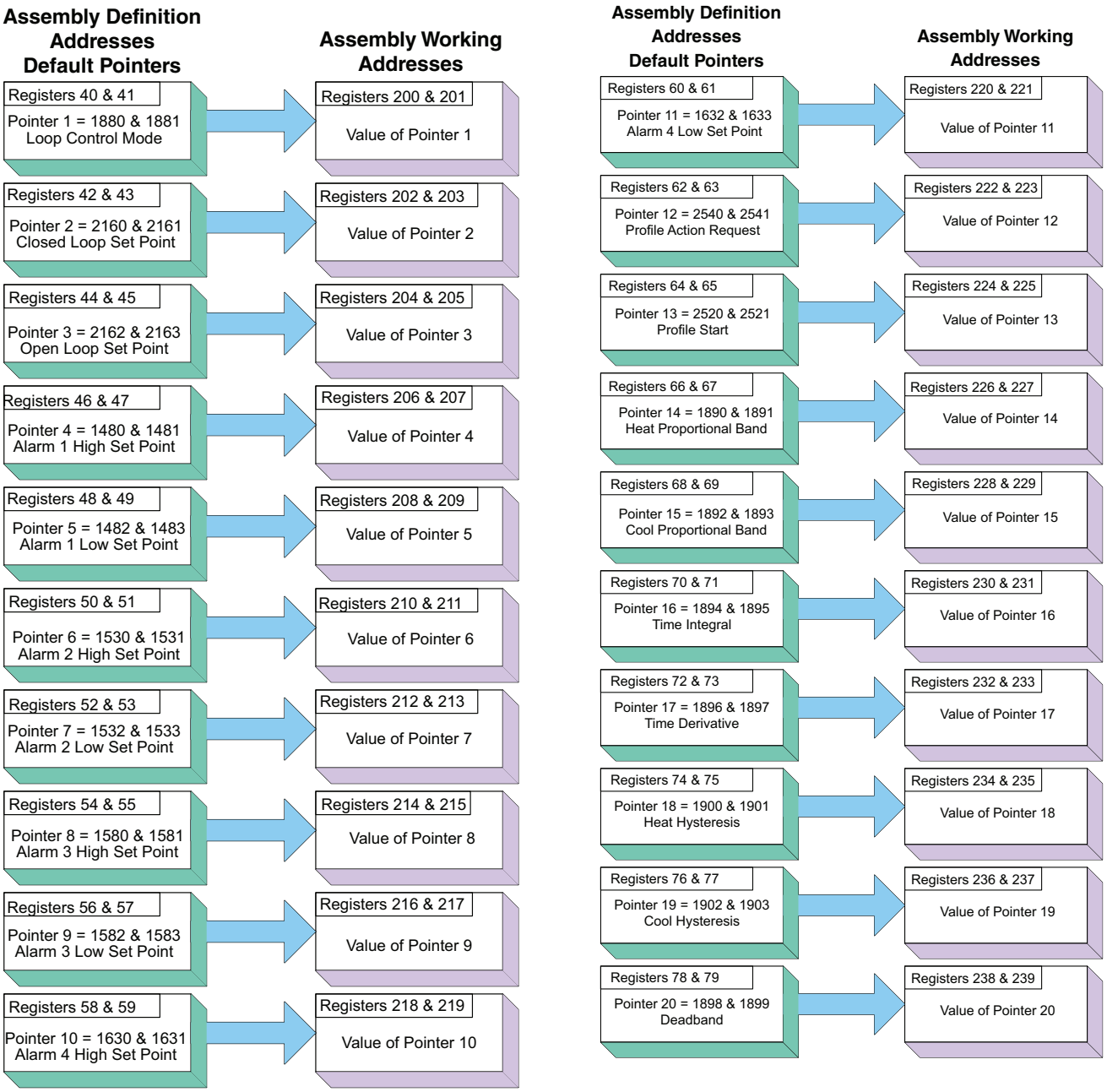
Indication	Description	Possible Cause(s)	Corrective Action
No Display	No display indication or LED illumination	• Power to RUI (Remote User Interface) is off • Fuse open • Breaker tripped • Safety interlock switch open • Separate system limit controller activated • Wiring error • Incorrect voltage to controller	• Turn on power • Replace fuse • Reset breaker. • Close interlock switch • Reset limit • Correct wiring issue • Apply correct voltage
EZ-Key doesn't work	EZ-Key does not activate required function	• The key is programmed incorrectly	• Replace or repair the RUI
no upper display dEv lower display	The RUI (Remote User Interface) will not communicate with the controller at the selected zone	• Communications wired incorrectly • Communications wires routed with power wires • Zone address set out of range • RUI or controller defective	• Check and correct wiring • Check and correct wiring • Check zone range and address • Replace or repair RUI or controller
vALh	Value is too large to be displayed (>9999)	• Scaling is out of range	• Check scaling • Call technical support
vALL	Value is too small to be displayed (<-1999)	• Scaling is out of range	• Check scaling • Call technical support

Modbus - Programmable Memory Blocks

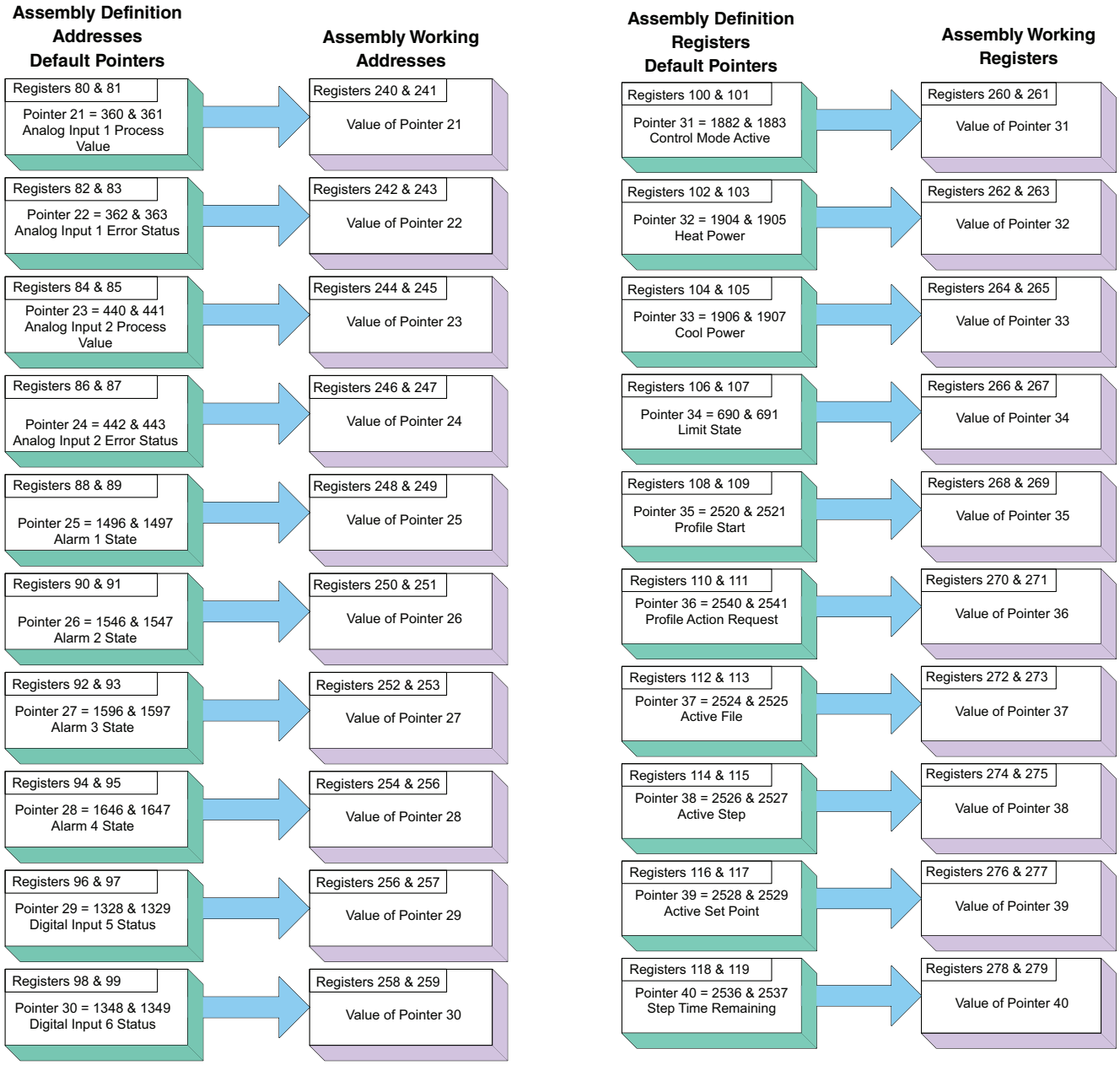
PM Modbus Assembly Definition

Assembly Definition Addresses	Assembly Working Addresses	Assembly Definition Addresses	Assembly Working Addresses
40 & 41	200 & 201	80 & 81	240 & 241
42 & 43	202 & 203	82 & 83	242 & 243
44 & 45	204 & 205	84 & 85	244 & 245
46 & 47	206 & 207	86 & 87	246 & 247
48 & 49	208 & 209	88 & 89	248 & 249
50 & 51	210 & 211	90 & 91	250 & 251
52 & 53	212 & 213	92 & 93	252 & 253
54 & 55	214 & 215	94 & 95	254 & 255
56 & 57	216 & 217	96 & 97	256 & 257
58 & 59	218 & 219	98 & 99	256 & 259
60 & 61	220 & 221	100 & 101	260 & 261
62 & 63	222 & 223	102 & 103	262 & 263
64 & 65	224 & 225	104 & 105	264 & 265
66 & 67	226 & 227	106 & 107	266 & 267
68 & 69	228 & 229	108 & 109	268 & 269
70 & 71	230 & 231	110 & 111	270 & 271
72 & 73	232 & 233	112 & 113	272 & 273
74 & 75	234 & 235	114 & 115	274 & 275
76 & 77	236 & 237	116 & 117	276 & 277
78 & 79	238 & 239	118 & 119	278 & 279

PM Modbus Default Assembly Structure 40-79



PM Modbus Default Assembly Structure 80-119



RM Modbus Assembly Definition

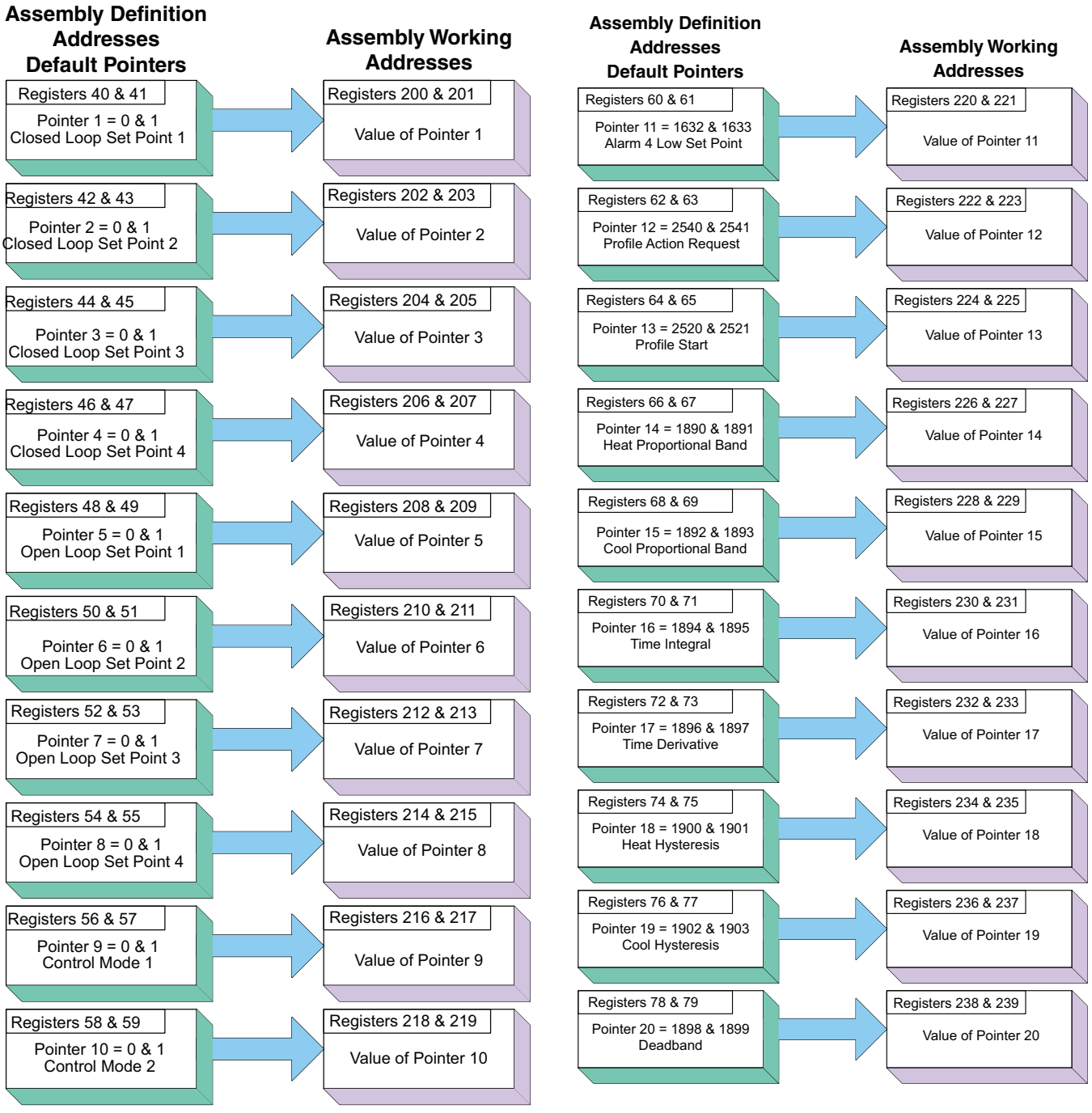
Assembly Definition Address and Assembly Working Addresses

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

RM Modbus Default Assembly Structure 40 - 79

Note:

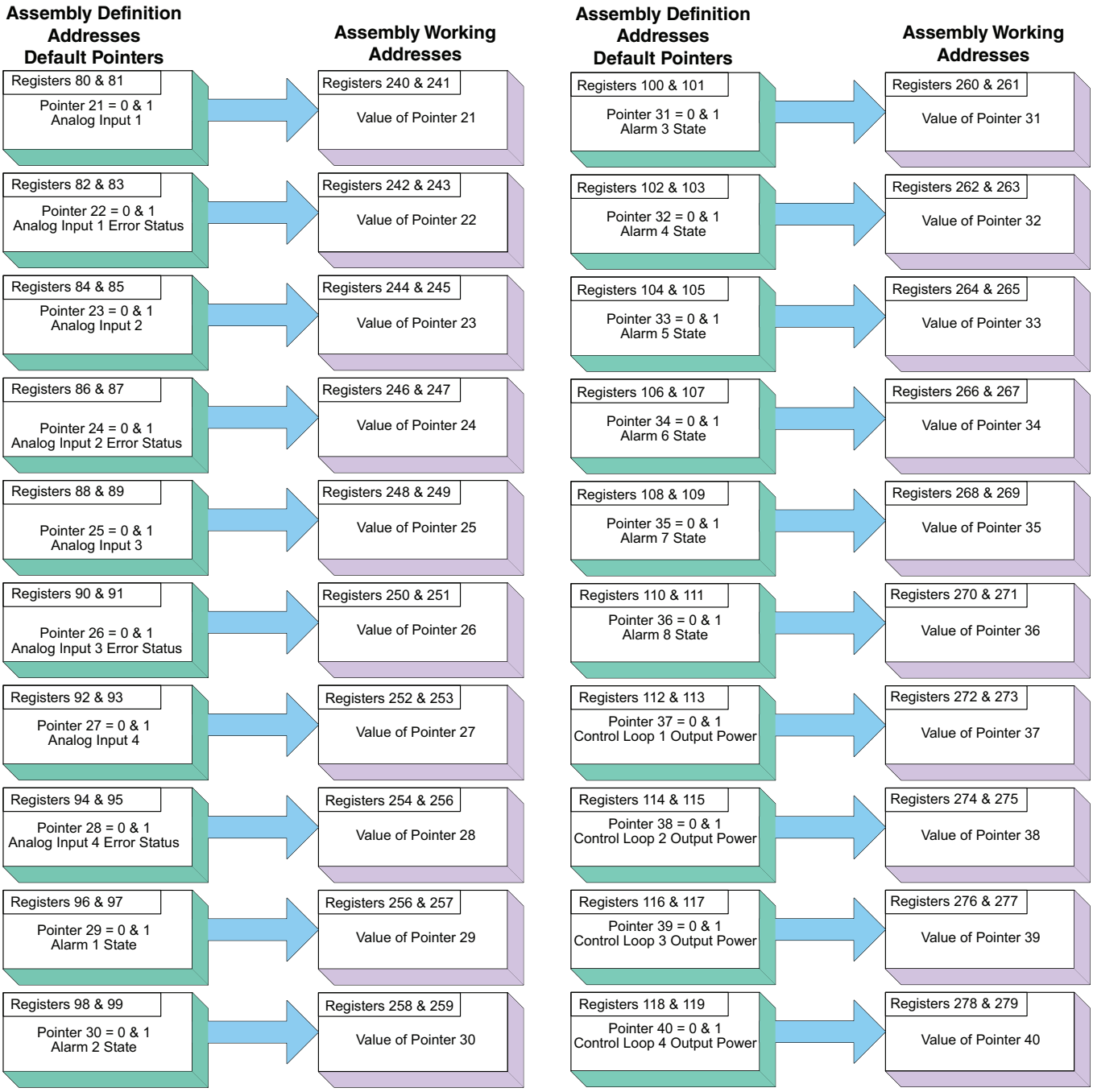
Notice that in the Modbus tables that follow the first 40 members have predefined definitions from the factory. These members reflect the assembly of the RMC module only. All other RM module assemblies are undefined as delivered from the factory; if the undefined members are to be used, they must be configured by the user



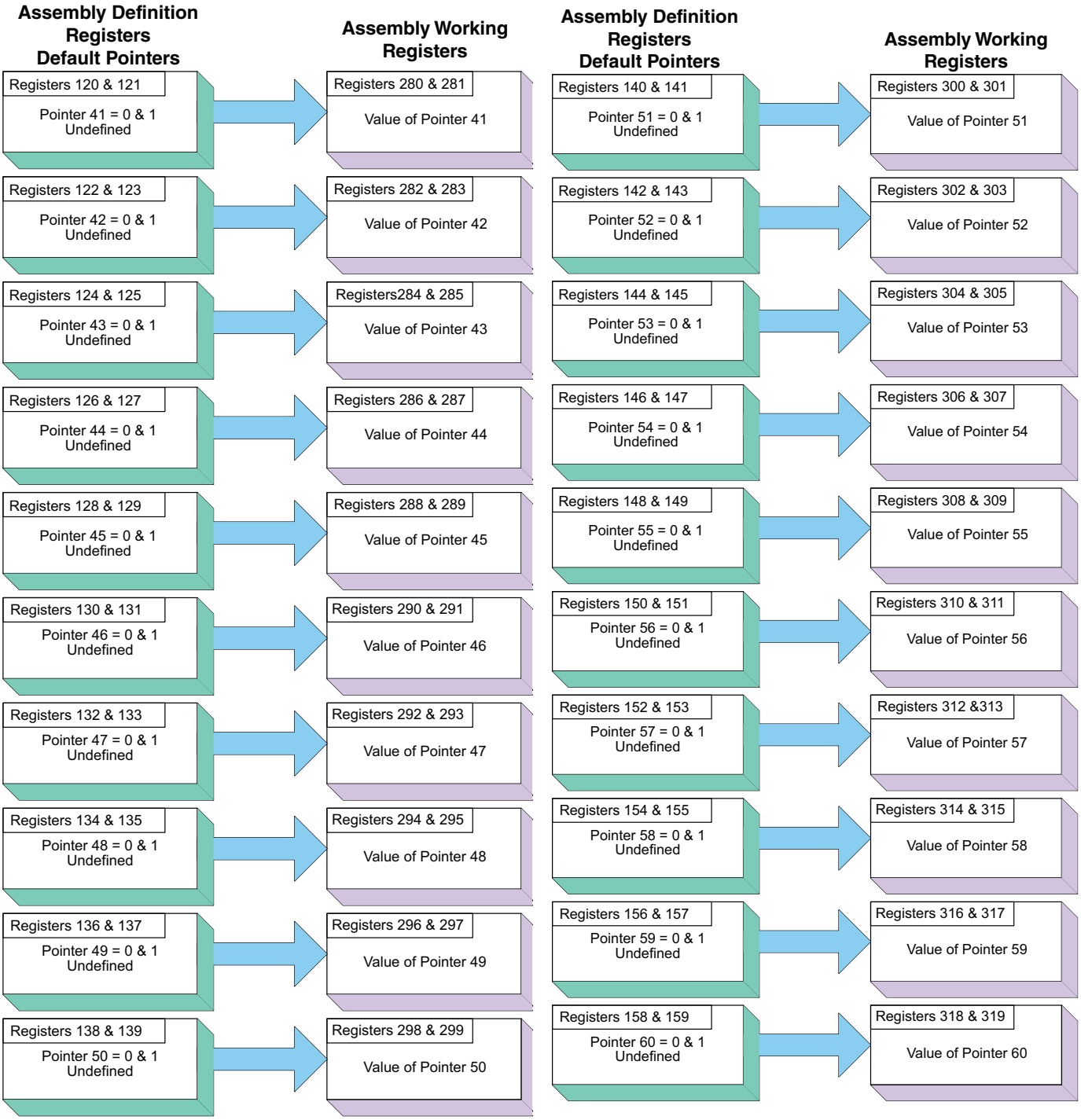
RM Modbus Default Assembly Structure 80 - 119

Note:

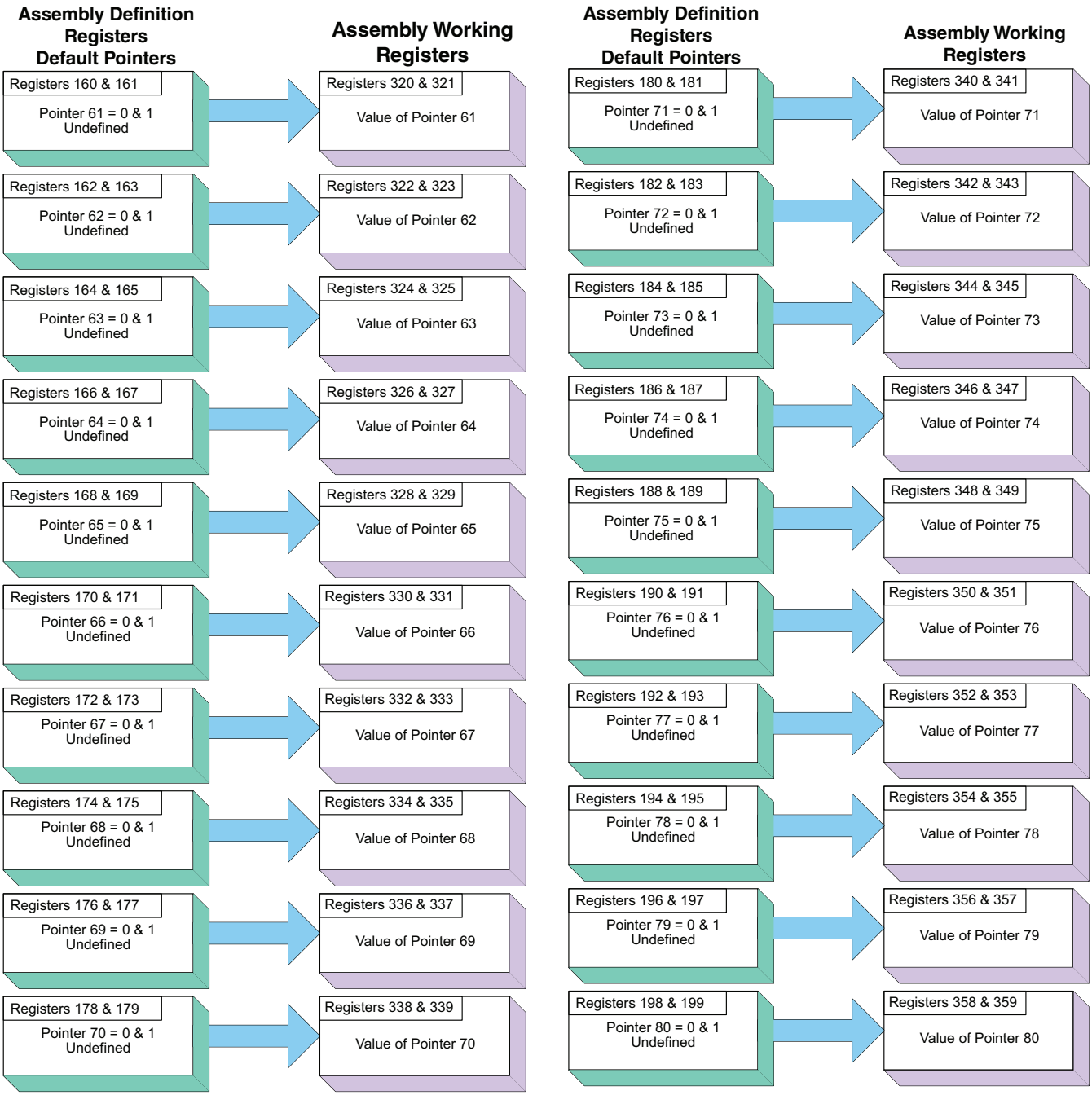
Notice that in the Modbus tables that follow the first 40 members have predefined definitions from the factory. These members reflect the assembly of the RMC module only. All other RM module assemblies are undefined as delivered from the factory; if the undefined members are to be used, they must be configured by the user



RM Modbus Default Assembly Structure 120 - 159



RM Modbus Default Assembly Structure 160 - 199



CIP Implicit Assembly Originator (Master) to Target (ST)					
Assembly Members	Assembly Class, Instance, Attribute	ST Data Type	Parameter	Parameter Class, Instance, Attribute	PLC Data Type
1	0x77, 0x01, 0x01	DINT	Control Loop 1, User Control Mode	0x97, 0x01, 0x01	DINT
2	0x77, 0x01, 0x02	DINT	Closed Loop Set Point	0x6B, 0x01, 0x01	REAL
3	0x77, 0x01, 0x03	DINT	Open Loop Set Point	0x6B, 0x01, 0x02	REAL
4	0x77, 0x01, 0x04	DINT	Alarm 1 - Alarm High Set Point	0x6D, 0x01, 0x01	REAL
5	0x77, 0x01, 0x05	DINT	Alarm 1 - Alarm Low Set Point	0x6D, 0x01, 0x02	REAL
6	0x77, 0x01, 0x06	DINT	Alarm 2 - Alarm High Set Point	0x6D, 0x02, 0x01	REAL
7	0x77, 0x01, 0x07	DINT	Alarm 2 - Alarm Low Set Point	0x6D, 0x02, 0x02	REAL
8	0x77, 0x01, 0x08	DINT	Alarm 3 - Alarm High Set Point	0x6D, 0x03, 0x01	REAL
9	0x77, 0x01, 0x09	DINT	Alarm 3 - Alarm Low Set Point	0x6D, 0x03, 0x02	REAL
10	0x77, 0x01, 0x0A	DINT	Alarm 4 - Alarm High Set Point	0x6D, 0x04, 0x01	REAL
11	0x77, 0x01, 0x0B	DINT	Alarm 4 - Alarm Low Set Point	0x6D, 0x04, 0x02	REAL
12	0x77, 0x01, 0x0C	DINT	Profile Action Request	0x7A, 0x01, 0x0B	DINT
13	0x77, 0x01, 0x0D	DINT	Profile Start	0x7A, 0x01, 0x01	DINT
14	0x77, 0x01, 0x0E	DINT	Heat Proportional Band	0x97, 0x01, 0x06	REAL
15	0x77, 0x01, 0x0F	DINT	Cool Proportional Band	0x97, 0x01, 0x07	REAL
16	0x77, 0x01, 0x10	DINT	Time Integral	0x97, 0x01, 0x08	REAL
17	0x77, 0x01, 0x11	DINT	Time Derivative	0x97, 0x01, 0x09	REAL
18	0x77, 0x01, 0x12	DINT	Heat Hysteresis	0x97, 0x01, 0x0B	REAL
19	0x77, 0x01, 0x13	DINT	Cool Hysteresis	0x97, 0x01, 0x0C	REAL
20	0x77, 0x01, 0x14	DINT	Dead Band	0x97, 0x01, 0x0A	REAL

CIP Implicit Assembly Target (ST) to Originator (Master)					
Assembly Members	Assembly Class, Instance, Attribute	ST Data Type	Parameter	Parameter Class, Instance, Attribute	PLC Data Type
- - - -	Cannot be changed	Binary	Device Status	None	BIN
1	0x77, 0x02, 0x01	DINT	Analog Input 1, Analog Input Value	0x68, 0x01, 0x01	REAL
2	0x77, 0x02, 0x02	DINT	Analog Input 1, Input Error	0x68, 0x01. 0x02	REAL
3	0x77, 0x02, 0x03	DINT	Analog Input 2, Analog Input Value	0x68, 0x02, 0x01	REAL
4	0x77, 0x02, 0x04	DINT	Analog Input 2, Input Error	0x68, 0x02, 0x02	REAL
5	0x77, 0x02, 0x05	DINT	Alarm 1, Alarm State	0x6D, 0x01, 0x09	DINT
6	0x77, 0x02, 0x06	DINT	Alarm 2, Alarm State	0x6D, 0x02, 0x09	DINT
7	0x77, 0x02, 0x07	DINT	Alarm 3, Alarm State	0x6D, 0x03, 0x09	DINT
8	0x77, 0x02, 0x08	DINT	Alarm 4, Alarm State	0x6D, 0x04, 0x09	DINT
9	0x77, 0x02, 0x09	DINT	Event Status 1	0x6E, 0x01, 0x05	DINT
10	0x77, 0x02, 0x0A	DINT	Event Status 2	0x6E, 0x02, 0x05	DINT
11	0x77, 0x02, 0x0B	DINT	Control Mode Active	0x97, 0x01, 0x02	DINT
12	0x77, 0x02, 0x0C	DINT	Heat Power	0x97, 0x01, 0x0D	REAL
13	0x77, 0x02, 0x0D	DINT	Cool Power	0x97, 0x01, 0x0E	REAL
14	0x77, 0x02, 0x0E	DINT	Limit State	0x70, 0x01, 0x06	DINT
15	0x77, 0x02, 0x0F	DINT	Profile Start	0x7A, 0x01, 0x01	DINT
16	0x77, 0x02, 0x10	DINT	Profile Action Request	0x7A, 0x01, 0x0B	DINT
17	0x77, 0x02, 0x11	DINT	Current Profile	0x7A, 0x01, 0x03	DINT
18	0x77, 0x02, 0x12	DINT	Current Step	0x7A, 0x01, 0x04	DINT
19	0x77, 0x02, 0x13	DINT	Active Set Point	0x7A, 0x01, 0x05	REAL
20	0x77, 0x02, 0x14	DINT	Step Time Remaining	0x7A, 0x01, 0x09	DINT

Note:

The first T to O member above (Device Status) is always present but not counted when configuring the gateway size using the RUI or EZ-ZONE Configurator software. However, it most always be counted when configuring the input size of the Master. As an example, if using the DINT comm format in a PLC and the entire assembly as shown above, the input size would require 21 members.

CIP Implicit Assembly Originator (Master) to Target (PM)					
Assembly Members	Assembly Class, Instance, Attribute	PM Data Type	Parameter	Parameter Class, Instance, Attribute	PLC Data Type
1	0x77, 0x01, 0x01	DINT	Control Loop 1, User Control Mode	0x97, 0x01, 0x01	DINT
2	0x77, 0x01, 0x02	DINT	Closed Loop Set Point	0x6B, 0x01, 0x01	REAL
3	0x77, 0x01, 0x03	DINT	Open Loop Set Point	0x6B, 0x01, 0x02	REAL
4	0x77, 0x01, 0x04	DINT	Alarm 1 - Alarm High Set Point	0x6D, 0x01, 0x01	REAL
5	0x77, 0x01, 0x05	DINT	Alarm 1 - Alarm Low Set Point	0x6D, 0x01, 0x02	REAL
6	0x77, 0x01, 0x06	DINT	Alarm 2 - Alarm High Set Point	0x6D, 0x02, 0x01	REAL
7	0x77, 0x01, 0x07	DINT	Alarm 2 - Alarm Low Set Point	0x6D, 0x02, 0x02	REAL
8	0x77, 0x01, 0x08	DINT	Alarm 3 - Alarm High Set Point	0x6D, 0x03, 0x01	REAL
9	0x77, 0x01, 0x09	DINT	Alarm 3 - Alarm Low Set Point	0x6D, 0x03, 0x02	REAL
10	0x77, 0x01, 0x0A	DINT	Alarm 4 - Alarm High Set Point	0x6D, 0x04, 0x01	REAL
11	0x77, 0x01, 0x0B	DINT	Alarm 4 - Alarm Low Set Point	0x6D, 0x04, 0x02	REAL
12	0x77, 0x01, 0x0C	DINT	Profile Action Request	0x7A, 0x01, 0x0B	DINT
13	0x77, 0x01, 0x0D	DINT	Profile Start	0x7A, 0x01, 0x01	DINT
14	0x77, 0x01, 0x0E	DINT	Heat Proportional Band	0x97, 0x01, 0x06	REAL
15	0x77, 0x01, 0x0F	DINT	Cool Proportional Band	0x97, 0x01, 0x07	REAL
16	0x77, 0x01, 0x10	DINT	Time Integral	0x97, 0x01, 0x08	REAL
17	0x77, 0x01, 0x11	DINT	Time Derivative	0x97, 0x01, 0x09	REAL
18	0x77, 0x01, 0x12	DINT	Heat Hysteresis	0x97, 0x01, 0x0B	REAL
19	0x77, 0x01, 0x13	DINT	Cool Hysteresis	0x97, 0x01, 0x0C	REAL
20	0x77, 0x01, 0x14	DINT	Dead Band	0x97, 0x01, 0x0A	REAL
21	0x77, 0x02, 0x15	DINT	None Specified	- - - -	- - - -
22	0x77, 0x02, 0x16	DINT	None Specified	- - - -	- - - -
23	0x77, 0x02, 0x17	DINT	None Specified	- - - -	- - - -
24	0x77, 0x02, 0x18	DINT	None Specified	- - - -	- - - -
25	0x77, 0x02, 0x19	DINT	None Specified	- - - -	- - - -
26	0x77, 0x02, 0x1A	DINT	None Specified	- - - -	- - - -
27	0x77, 0x02, 0x1B	DINT	None Specified	- - - -	- - - -
28	0x77, 0x02, 0x1C	DINT	None Specified	- - - -	- - - -
29	0x77, 0x02, 0x1D	DINT	None Specified	- - - -	- - - -
30	0x77, 0x02, 0x1E	DINT	None Specified	- - - -	- - - -
31	0x77, 0x02, 0x1F	DINT	None Specified	- - - -	- - - -
32	0x77, 0x02, 0x20	DINT	None Specified	- - - -	- - - -
33	0x77, 0x02, 0x21	DINT	None Specified	- - - -	- - - -
34	0x77, 0x02, 0x22	DINT	None Specified	- - - -	- - - -
35	0x77, 0x02, 0x23	DINT	None Specified	- - - -	- - - -
36	0x77, 0x02, 0x24	DINT	None Specified	- - - -	- - - -
37	0x77, 0x02, 0x25	DINT	None Specified	- - - -	- - - -
38	0x77, 0x02, 0x26	DINT	None Specified	- - - -	- - - -
39	0x77, 0x02, 0x27	DINT	None Specified	- - - -	- - - -
40	0x77, 0x02, 0x28	DINT	None Specified	- - - -	- - - -

Note:

PM revision 15 and above firmware allows for 40 implicit members. Revisions below 15, allow for a maximum of 20.

Note:

Although 40 members are built into PM/RM controllers, the RUI allows for a maximum of 20. If 40 members are needed, consider using the EZ-ZONE RMA module.

CIP Implicit Assembly Target (PM) to Originator (Master)					
Assembly Members	Assembly Class, Instance, Attribute	PM Data Type	Parameter	Parameter Class, Instance, Attribute	PLC Data Type
- - - -	Cannot be changed	Binary	Device Status	None	BIN
1	0x77, 0x02, 0x01	DINT	Analog Input 1, Analog Input Value	0x68, 0x01, 0x01	REAL
2	0x77, 0x02, 0x02	DINT	Analog Input 1, Input Error	0x68, 0x01. 0x02	REAL
3	0x77, 0x02, 0x03	DINT	Analog Input 2, Analog Input Value	0x68, 0x02, 0x01	REAL
4	0x77, 0x02, 0x04	DINT	Analog Input 2, Input Error	0x68, 0x02, 0x02	REAL
5	0x77, 0x02, 0x05	DINT	Alarm 1, Alarm State	0x6D, 0x01, 0x09	DINT
6	0x77, 0x02, 0x06	DINT	Alarm 2, Alarm State	0x6D, 0x02, 0x09	DINT
7	0x77, 0x02, 0x07	DINT	Alarm 3, Alarm State	0x6D, 0x03, 0x09	DINT
8	0x77, 0x02, 0x08	DINT	Alarm 4, Alarm State	0x6D, 0x04, 0x09	DINT
9	0x77, 0x02, 0x09	DINT	Event Status 1	0x6E, 0x01, 0x05	DINT
10	0x77, 0x02, 0x0A	DINT	Event Status 2	0x6E, 0x02, 0x05	DINT
11	0x77, 0x02, 0x0B	DINT	Control Mode Active	0x97, 0x01, 0x02	DINT
12	0x77, 0x02, 0x0C	DINT	Heat Power	0x97, 0x01, 0x0D	REAL
13	0x77, 0x02, 0x0D	DINT	Cool Power	0x97, 0x01, 0x0E	REAL
14	0x77, 0x02, 0x0E	DINT	Limit State	0x70, 0x01, 0x06	DINT
15	0x77, 0x02, 0x0F	DINT	Profile Start	0x7A, 0x01, 0x01	DINT
16	0x77, 0x02, 0x10	DINT	Profile Action Request	0x7A, 0x01, 0x0B	DINT
17	0x77, 0x02, 0x11	DINT	Current Profile	0x7A, 0x01, 0x03	DINT
18	0x77, 0x02, 0x12	DINT	Current Step	0x7A, 0x01, 0x04	DINT
19	0x77, 0x02, 0x13	DINT	Active Set Point	0x7A, 0x01, 0x05	REAL
20	0x77, 0x02, 0x14	DINT	Step Time Remaining	0x7A, 0x01, 0x09	DINT
21	0x77, 0x02, 0x15	DINT	None Specified	- - - -	- - - -
22	0x77, 0x02, 0x16	DINT	None Specified	- - - -	- - - -
23	0x77, 0x02, 0x17	DINT	None Specified	- - - -	- - - -
24	0x77, 0x02, 0x18	DINT	None Specified	- - - -	- - - -
25	0x77, 0x02, 0x19	DINT	None Specified	- - - -	- - - -
26	0x77, 0x02, 0x1A	DINT	None Specified	- - - -	- - - -
27	0x77, 0x02, 0x1B	DINT	None Specified	- - - -	- - - -
28	0x77, 0x02, 0x1C	DINT	None Specified	- - - -	- - - -
29	0x77, 0x02, 0x1D	DINT	None Specified	- - - -	- - - -
30	0x77, 0x02, 0x1E	DINT	None Specified	- - - -	- - - -
31	0x77, 0x02, 0x1F	DINT	None Specified	- - - -	- - - -
32	0x77, 0x02, 0x20	DINT	None Specified	- - - -	- - - -
33	0x77, 0x02, 0x21	DINT	None Specified	- - - -	- - - -
34	0x77, 0x02, 0x22	DINT	None Specified	- - - -	- - - -
35	0x77, 0x02, 0x23	DINT	None Specified	- - - -	- - - -
36	0x77, 0x02, 0x24	DINT	None Specified	- - - -	- - - -
37	0x77, 0x02, 0x25	DINT	None Specified	- - - -	- - - -
38	0x77, 0x02, 0x26	DINT	None Specified	- - - -	- - - -
39	0x77, 0x02, 0x27	DINT	None Specified	- - - -	- - - -
40	0x77, 0x02, 0x28	DINT	None Specified	- - - -	- - - -

Note:

The first T to O member above (Device Status) is always present but not counted when configuring the gateway size using the RUI or EZ-ZONE Configurator software. However, it most always be counted when configuring the input size of the Master. As an example, if using the DINT comm format in a PLC and the entire assembly as shown above, the input size would require 21 members.

Note:

Although 40 members are built into PM/RM controllers, the RUI allows for a maximum of 20. If 40 members are needed, consider using the EZ-ZONE RMA module.

CIP Implicit Assembly Originator (Master) to Target (RMC)					
Assembly Members	Assembly Class, Instance, Attribute	RM Data Type	Parameter	Parameter Class, Instance, Attribute	PLC Data Type
1	0x77, 0x01, 0x01	DINT	Control Loop 1, Closed Loop Set Point	0x6B, 0x01, 0x01	REAL
2	0x77, 0x01, 0x02	DINT	Control Loop 2, Closed Loop Set Point	0x6B, 0x02, 0x01	REAL
3	0x77, 0x01, 0x03	DINT	Control Loop 3, Closed Loop Set Point	0x6B, 0x03`, 0x01	REAL
4	0x77, 0x01, 0x04	DINT	Control Loop 4, Closed Loop Set Point	0x6B, 0x04, 0x01	REAL
5	0x77, 0x01, 0x05	DINT	Control Loop 1, Open Loop Set Point	0x6B, 0x01, 0x02	REAL
6	0x77, 0x01, 0x06	DINT	Control Loop 2, Open Loop Set Point	0x6B, 0x02, 0x02	REAL
7	0x77, 0x01, 0x07	DINT	Control Loop 3, Open Loop Set Point	0x6B, 0x03, 0x02	REAL
8	0x77, 0x01, 0x08	DINT	Control Loop 4, Open Loop Set Point	0x6B, 0x04, 0x02	REAL
9	0x77, 0x01, 0x09	DINT	Control Loop 1, User Control Mode	0x97, 0x01, 0x02	DINT
10	0x77, 0x01, 0x0A	DINT	Control Loop 2, User Control Mode	0x97, 0x02, 0x02	DINT
11	0x77, 0x01, 0x0B	DINT	Control Loop 3, User Control Mode	0x97, 0x03, 0x02	DINT
12	0x77, 0x01, 0x0C	DINT	Control Loop 4, User Control Mode	0x97, 0x04, 0x02	DINT
13	0x77, 0x01, 0x0D	DINT	Alarm 1, Alarm High Set Point	0x6D, 0x01, 0x01	REAL
14	0x77, 0x01, 0x0E	DINT	Alarm 2, Alarm High Set Point	0x6D, 0x02, 0x01	REAL
15	0x77, 0x01, 0x0F	DINT	Alarm 3, Alarm High Set Point	0x6D, 0x03, 0x01	REAL
16	0x77, 0x01, 0x10	DINT	Alarm 4, Alarm High Set Point	0x6D, 0x04, 0x01	REAL
17	0x77, 0x01, 0x11	DINT	Alarm 1, Alarm Low Set Point	0x6D, 0x05, 0x01	REAL
18	0x77, 0x01, 0x12	DINT	Alarm 2, Alarm Low Set Point	0x6D, 0x06, 0x01	REAL
19	0x77, 0x01, 0x13	DINT	Alarm 3, Alarm Low Set Point	0x6D, 0x07, 0x01	REAL
20	0x77, 0x01, 0x14	DINT	Alarm 4, Alarm Low Set Point	0x6D, 0x08, 0x01	REAL
21	0x77, 0x01, 0x15	DINT	None Specified	- - - -	- - - -
22	0x77, 0x01, 0x16	DINT	None Specified	- - - -	- - - -
23	0x77, 0x01, 0x17	DINT	None Specified	- - - -	- - - -
24	0x77, 0x01, 0x18	DINT	None Specified	- - - -	- - - -
25	0x77, 0x01, 0x19	DINT	None Specified	- - - -	- - - -
26	0x77, 0x01, 0x1A	DINT	None Specified	- - - -	- - - -
27	0x77, 0x01, 0x1B	DINT	None Specified	- - - -	- - - -
28	0x77, 0x01, 0x1C	DINT	None Specified	- - - -	- - - -
29	0x77, 0x01, 0x1D	DINT	None Specified	- - - -	- - - -
30	0x77, 0x01, 0x1E	DINT	None Specified	- - - -	- - - -
31	0x77, 0x01, 0x1F	DINT	None Specified	- - - -	- - - -
32	0x77, 0x01, 0x20	DINT	None Specified	- - - -	- - - -
33	0x77, 0x01, 0x21	DINT	None Specified	- - - -	- - - -
34	0x77, 0x01, 0x22	DINT	None Specified	- - - -	- - - -
35	0x77, 0x01, 0x23	DINT	None Specified	- - - -	- - - -
36	0x77, 0x01, 0x24	DINT	None Specified	- - - -	- - - -
37	0x77, 0x01, 0x25	DINT	None Specified	- - - -	- - - -
38	0x77, 0x01, 0x26	DINT	None Specified	- - - -	- - - -
39	0x77, 0x01, 0x27	DINT	None Specified	- - - -	- - - -
40	0x77, 0x01, 0x28	DINT	None Specified	- - - -	- - - -

Note:

Although 40 members are built into PM/RM controllers, the RUI allows for a maximum of 20. If 40 members are needed, consider using the EZ-ZONE RMA module.

CIP Implicit Assembly Target (RMC) to Originator (Master)					
Assembly Members	Assembly Class, Instance, Attribute	RM Data Type	Parameter	Parameter Class, Instance, Attribute	PLC Data Type
- - - -	Cannot be changed	Binary	Device Status	None	BIN
1	0x77, 0x02, 0x01	DINT	Analog Input 1, Analog Input Value (filtered)	0x68, 0x01, 0x01	REAL
2	0x77, 0x02, 0x02	DINT	Analog Input 1, Input Error	0x68, 0x01, 0x02	DINT
3	0x77, 0x02, 0x03	DINT	Analog Input 2, Analog Input Value (filtered)	0x68, 0x02, 0x01	REAL
4	0x77, 0x02, 0x04	DINT	Analog Input 2, Input Error	0x68, 0x02, 0x02	DINT
5	0x77, 0x02, 0x05	DINT	Analog Input 3, Analog Input Value (filtered)	0x68, 0x03, 0x01	REAL
6	0x77, 0x02, 0x06	DINT	Analog Input 3, Input Error	0x68, 0x03, 0x02	DINT
7	0x77, 0x02, 0x07	DINT	Analog Input 4, Analog Input Value (filtered)	0x68, 0x04, 0x01	REAL
8	0x77, 0x02, 0x08	DINT	Analog Input 4, Input Error	0x68, 0x04, 0x02	DINT
9	0x77, 0x02, 0x09	DINT	Alarm 1, Alarm State	0x6D, 0x01, 0x09	DINT
10	0x77, 0x02, 0x0A	DINT	Alarm 2, Alarm State	0x6D, 0x02, 0x09	DINT
11	0x77, 0x02, 0x0B	DINT	Alarm 3, Alarm State	0x6D, 0x03, 0x09	DINT
12	0x77, 0x02, 0x0C	DINT	Alarm 4, Alarm State	0x6D, 0x04, 0x09	DINT
13	0x77, 0x02, 0x0D	DINT	Alarm 5, Alarm State	0x6D, 0x05, 0x09	DINT
14	0x77, 0x02, 0x0E	DINT	Alarm 6, Alarm State	0x6D, 0x06, 0x09	DINT
15	0x77, 0x02, 0x0F	DINT	Alarm 7, Alarm State	0x6D, 0x07, 0x09	DINT
16	0x77, 0x02, 0x10	DINT	Alarm 8, Alarm State	0x6D, 0x08, 0x09	DINT
17	0x77, 0x02, 0x11	DINT	Control Loop 1, Output Power	0x97, 0x01, 0x0F	REAL
18	0x77, 0x02, 0x12	DINT	Control Loop 2, Output Power	0x97, 0x02, 0x0F	REAL
19	0x77, 0x02, 0x13	DINT	Control Loop 3, Output Power	0x97, 0x03, 0x0F	REAL
20	0x77, 0x02, 0x14	DINT	Control Loop 4, Output Power	0x97, 0x04, 0x0F	REAL
21	0x77, 0x02, 0x15	DINT	None Specified	- - - -	- - - -
22	0x77, 0x02, 0x16	DINT	None Specified	- - - -	- - - -
23	0x77, 0x02, 0x17	DINT	None Specified	- - - -	- - - -
24	0x77, 0x02, 0x18	DINT	None Specified	- - - -	- - - -
25	0x77, 0x02, 0x19	DINT	None Specified	- - - -	- - - -
26	0x77, 0x02, 0x1A	DINT	None Specified	- - - -	- - - -
27	0x77, 0x02, 0x1B	DINT	None Specified	- - - -	- - - -
28	0x77, 0x02, 0x1C	DINT	None Specified	- - - -	- - - -
29	0x77, 0x02, 0x1D	DINT	None Specified	- - - -	- - - -
30	0x77, 0x02, 0x1E	DINT	None Specified	- - - -	- - - -
31	0x77, 0x02, 0x1F	DINT	None Specified	- - - -	- - - -
32	0x77, 0x02, 0x20	DINT	None Specified	- - - -	- - - -
33	0x77, 0x02, 0x21	DINT	None Specified	- - - -	- - - -
34	0x77, 0x02, 0x22	DINT	None Specified	- - - -	- - - -
35	0x77, 0x02, 0x23	DINT	None Specified	- - - -	- - - -
36	0x77, 0x02, 0x24	DINT	None Specified	- - - -	- - - -
37	0x77, 0x02, 0x25	DINT	None Specified	- - - -	- - - -
38	0x77, 0x02, 0x26	DINT	None Specified	- - - -	- - - -
39	0x77, 0x02, 0x27	DINT	None Specified	- - - -	- - - -
40	0x77, 0x02, 0x28	DINT	None Specified	- - - -	- - - -

Note:

The first T to O member above (Device Status) is always present but not counted when configuring the gateway size using the RUI or EZ-ZONE Configurator software. However, it most always be counted when configuring the input size of the Master. As an example, if using the DINT comm format in a PLC and the entire assembly as shown above, the input size would require 21 members.

Note:

Although 40 members are built into PM/RM controllers, the RUI allows for a maximum of 20. If 40 members are needed, consider using the EZ-ZONE RMA module.

CIP Implicit Assembly Originator (Master) to Target (RME / RMH / RMS / RML)					
Assembly Members	Assembly Class, Instance, Attribute	RM Data Type	Parameter	Parameter Class, Instance, Attribute	PLC Data Type
1	0x77, 0x01, 0x01	DINT	None Specified	- - - -	- - - -
2	0x77, 0x01, 0x02	DINT	None Specified	- - - -	- - - -
3	0x77, 0x01, 0x03	DINT	None Specified	- - - -	- - - -
4	0x77, 0x01, 0x04	DINT	None Specified	- - - -	- - - -
5	0x77, 0x01, 0x05	DINT	None Specified	- - - -	- - - -
6	0x77, 0x01, 0x06	DINT	None Specified	- - - -	- - - -
7	0x77, 0x01, 0x07	DINT	None Specified	- - - -	- - - -
8	0x77, 0x01, 0x08	DINT	None Specified	- - - -	- - - -
9	0x77, 0x01, 0x09	DINT	None Specified	- - - -	- - - -
10	0x77, 0x01, 0x0A	DINT	None Specified	- - - -	- - - -
11	0x77, 0x01, 0x0B	DINT	None Specified	- - - -	- - - -
12	0x77, 0x01, 0x0C	DINT	None Specified	- - - -	- - - -
13	0x77, 0x01, 0x0D	DINT	None Specified	- - - -	- - - -
14	0x77, 0x01, 0x0E	DINT	None Specified	- - - -	- - - -
15	0x77, 0x01, 0x0F	DINT	None Specified	- - - -	- - - -
16	0x77, 0x01, 0x10	DINT	None Specified	- - - -	- - - -
17	0x77, 0x01, 0x11	DINT	None Specified	- - - -	- - - -
18	0x77, 0x01, 0x12	DINT	None Specified	- - - -	- - - -
19	0x77, 0x01, 0x13	DINT	None Specified	- - - -	- - - -
20	0x77, 0x01, 0x14	DINT	None Specified	- - - -	- - - -
21	0x77, 0x01, 0x15	DINT	None Specified	- - - -	- - - -
22	0x77, 0x01, 0x16	DINT	None Specified	- - - -	- - - -
23	0x77, 0x01, 0x17	DINT	None Specified	- - - -	- - - -
24	0x77, 0x01, 0x18	DINT	None Specified	- - - -	- - - -
25	0x77, 0x01, 0x19	DINT	None Specified	- - - -	- - - -
26	0x77, 0x01, 0x1A	DINT	None Specified	- - - -	- - - -
27	0x77, 0x01, 0x1B	DINT	None Specified	- - - -	- - - -
28	0x77, 0x01, 0x1C	DINT	None Specified	- - - -	- - - -
29	0x77, 0x01, 0x1D	DINT	None Specified	- - - -	- - - -
30	0x77, 0x01, 0x1E	DINT	None Specified	- - - -	- - - -
31	0x77, 0x01, 0x1F	DINT	None Specified	- - - -	- - - -
32	0x77, 0x01, 0x20	DINT	None Specified	- - - -	- - - -
33	0x77, 0x01, 0x21	DINT	None Specified	- - - -	- - - -
34	0x77, 0x01, 0x22	DINT	None Specified	- - - -	- - - -
35	0x77, 0x01, 0x23	DINT	None Specified	- - - -	- - - -
36	0x77, 0x01, 0x24	DINT	None Specified	- - - -	- - - -
37	0x77, 0x01, 0x25	DINT	None Specified	- - - -	- - - -
38	0x77, 0x01, 0x26	DINT	None Specified	- - - -	- - - -
39	0x77, 0x01, 0x27	DINT	None Specified	- - - -	- - - -
40	0x77, 0x01, 0x28	DINT	None Specified	- - - -	- - - -

Note:

Although 40 members are built into PM/RM controllers, the RUI allows for a maximum of 20. If 40 members are needed, consider using the EZ-ZONE RMA module.

CIP Implicit Assembly Target (RME / RMH / RMS / RML) to Originator (Master)					
Assembly Members	Assembly Class, Instance, Attribute	RM Data Type	Parameter	Parameter Class, Instance, Attribute	PLC Data Type
- - - -	Cannot be changed	Binary	Device Status	None	BIN
1	0x77, 0x02, 0x01	DINT	None Specified	- - - -	- - - -
2	0x77, 0x02, 0x02	DINT	None Specified	- - - -	- - - -
3	0x77, 0x02, 0x03	DINT	None Specified	- - - -	- - - -
4	0x77, 0x02, 0x04	DINT	None Specified	- - - -	- - - -
5	0x77, 0x02, 0x05	DINT	None Specified	- - - -	- - - -
6	0x77, 0x02, 0x06	DINT	None Specified	- - - -	- - - -
7	0x77, 0x02, 0x07	DINT	None Specified	- - - -	- - - -
8	0x77, 0x02, 0x08	DINT	None Specified	- - - -	- - - -
9	0x77, 0x02, 0x09	DINT	None Specified	- - - -	- - - -
10	0x77, 0x02, 0x0A	DINT	None Specified	- - - -	- - - -
11	0x77, 0x02, 0x0B	DINT	None Specified	- - - -	- - - -
12	0x77, 0x02, 0x0C	DINT	None Specified	- - - -	- - - -
13	0x77, 0x02, 0x0D	DINT	None Specified	- - - -	- - - -
14	0x77, 0x02, 0x0E	DINT	None Specified	- - - -	- - - -
15	0x77, 0x02, 0x0F	DINT	None Specified	- - - -	- - - -
16	0x77, 0x02, 0x10	DINT	None Specified	- - - -	- - - -
17	0x77, 0x02, 0x11	DINT	None Specified	- - - -	- - - -
18	0x77, 0x02, 0x12	DINT	None Specified	- - - -	- - - -
19	0x77, 0x02, 0x13	DINT	None Specified	- - - -	- - - -
20	0x77, 0x02, 0x14	DINT	None Specified	- - - -	- - - -
21	0x77, 0x02, 0x15	DINT	None Specified	- - - -	- - - -
22	0x77, 0x02, 0x16	DINT	None Specified	- - - -	- - - -
23	0x77, 0x02, 0x17	DINT	None Specified	- - - -	- - - -
24	0x77, 0x02, 0x18	DINT	None Specified	- - - -	- - - -
25	0x77, 0x02, 0x19	DINT	None Specified	- - - -	- - - -
26	0x77, 0x02, 0x1A	DINT	None Specified	- - - -	- - - -
27	0x77, 0x02, 0x1B	DINT	None Specified	- - - -	- - - -
28	0x77, 0x02, 0x1C	DINT	None Specified	- - - -	- - - -
29	0x77, 0x02, 0x1D	DINT	None Specified	- - - -	- - - -
30	0x77, 0x02, 0x1E	DINT	None Specified	- - - -	- - - -
31	0x77, 0x02, 0x1F	DINT	None Specified	- - - -	- - - -
32	0x77, 0x02, 0x20	DINT	None Specified	- - - -	- - - -
33	0x77, 0x02, 0x21	DINT	None Specified	- - - -	- - - -
34	0x77, 0x02, 0x22	DINT	None Specified	- - - -	- - - -
35	0x77, 0x02, 0x23	DINT	None Specified	- - - -	- - - -
36	0x77, 0x02, 0x24	DINT	None Specified	- - - -	- - - -
37	0x77, 0x02, 0x25	DINT	None Specified	- - - -	- - - -
38	0x77, 0x02, 0x26	DINT	None Specified	- - - -	- - - -
39	0x77, 0x02, 0x27	DINT	None Specified	- - - -	- - - -
40	0x77, 0x02, 0x28	DINT	None Specified	- - - -	- - - -

Note:

The first T to O member above (Device Status) is always present but not counted when configuring the gateway size using the RUI or EZ-ZONE Configurator software. However, it most always be counted when configuring the input size of the Master. As an example, if using the DINT comm format in a PLC and the entire assembly as shown above, the input size would require 21 members.

Note:

Although 40 members are built into PM/RM controllers, the RUI allows for a maximum of 20. If 40 members are needed, consider using the EZ-ZONE RMA module.

Remote User Interface (RUI) Specifications

LineVoltage/Power (Minimum/Maximum Ratings)

- 85 to 264V~ (ac), 47 to 63Hz
- 20 to 28V≂ (ac/dc), 47 to 63Hz
- 10VA maximum power consumption

Operator Interface

- Dual 4-digit, 7-segment LED displays
- Forward, backward, up and down keys plus a customer programmable function key
- Typical display update rate 1Hz
- Standard Bus protocol ships with all units
- Optional Communications Protocols:
  - EIA 232/485 Modbus RTU
  - EtherNet/IP and Modbus TCP
  - DeviceNet
  - Profibus DP

Agency Approvals

- Agency approved to IP65/NEMA 4X (indoor use only)
- UL Listed to ANSI/ISA 12.12.01-2007 File E184390
- This equipment is suitable for use in Class 1, Div.2, Groups A, B, C and D or non-hazardous locations only. Temperature Code T4A
- UL reviewed to Standard No. CSA C22.2 No.213-M1987, Canadian Hazardous locations

Environment

- -18 to 65°C ambient
- -40 to 80°C shipping and storage

Dimensions

Size	Behind Panel (max.)	Width	Height	Display Height
Long Case	101.6 mm (4.00 in)	53.3 mm (2.10 in)	53.3 mm (2.10 in)	up: 10.80 mm (0.425 in) low: 6.98 mm (0.275 in)
Short Case	59.1 mm (2.33 in)	53.3 mm (2.10 in)	53.3 mm (2.10 in)	up: 10.80 mm (0.425 in) low: 6.98 mm (0.275 in)

Weight

- Controller (short case): 99.8 g (0.22 lb)
- Controller (long case): 162.5 g (0.36 lb)

Modbus® is a trademark of AEG Schneider Automation Inc.

EtherNet/IP™ is a trademark of ControlNet International Ltd. used under license by Open DeviceNet™ Vendor Association, Inc. (ODVA).

UL® is a registered trademark of Underwriters Laboratories Inc.

DeviceNet™ is a trademark of Open DeviceNet™ Vendors Associatlon.

Note:

These specifications are subject to change without prior notice.

Ordering Information

EZ-ZONE® Remote Users Interface E Z K __ - __ __ __ __ - __ __ __ __

Remote User Interface (RUI)
B Basic 1/16 DIN

Power Supply Voltage for Remote User Interface (RUI)
L Low voltage 24 to 28V‡ (ac/dc)
H Universal high voltage 100 to 240V‡ (ac/dc)

Communications Options (Standard Bus always included)
A None (short case)
2 EIA 232/485 Modbus® RTU (long case)
3 EtherNet/IP™ Modbus TCP (long case)
5 DeviceNet™ (long case)
6 Profibus DP (long case)

Custom Remote User Interface (RUI)
AA None
XX Custom options, consult factory

Future Option
A None

Future Option
A None

Customized Options
AA None
12 Class 1, Div. 2 (only available with communications options 2, 3, 5 and 6)

Note:
Configurator PC software can be downloaded for free from the Watlow website:
http://www.watlow.com/en/resources-and-support/Technical-Library/Software-and-Demos

Declaration of Conformity

Series EZ-ZONE® RUI

CE

WATLOW Electric Manufacturing Company ISO 9001 since 1996.
1241 Bundy Blvd.
Winona, MN 55987 USA

Declares that the following product:

Designation:	**Series EZ-ZONE® RUI**
Model Numbers:	EZK (A, B, C, D or E) (A, L or H) (any three numbers or letters) A, A, (any two letters or numbers)
Classification:	Temperature control, Installation Category II, Pollution degree 2 IP65 Environmental seal on front panel.
Rated Voltage and Frequency:	Control 100 to 240 V~ (ac 50/60 Hz) **or** 24 to 28 V≂ (ac 50/60 Hz or dc)
Rated Power Consumption:	10 VA

Meets 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	**2013**	**Electrical equipment for measurement, control and laboratory use – EMC requirements (Industrial Immunity, EZK_- _A models are Class A emissions. *Not for use in a Class B environment without additional filtering),* All other models are Class B emissions.**
EN 61000-4-2	2009	Electrostatic Discharge Immunity
EN 61000-4-3	2010	Radiated Field Immunity
EN 61000-4-4	2012	Electrical Fast-Transient / Burst Immunity
EN 61000-4-5	2006	Surge Immunity (Reviewed to IEC 61000-4-5 2014)
EN 61000-4-6	2014	Conducted Immunity
EN 61000-4-8	2010	Magnetic Field Immunity
EN 61000-4-11	2004	Voltage Dips, Short Interruptions and Voltage Variations Immunity
EN 61000-3-2	2009	Harmonic Current Emissions (Reviewed to IEC 61000-3-2 2014)
EN 61000-3-3	2013	Voltage Fluctuations and Flicker
SEMI F47	2000	Specification for Semiconductor Sag Immunity Figure R1-1

2006/95/EC Low-Voltage Directive

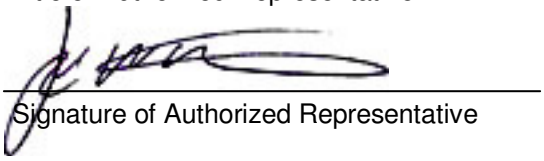
EN 61010-1	**2011**[1]	**Safety Requirements of electrical equipment for measurement, control and laboratory use. Part 1: General requirements**

[1] Compliance with 3rd Edition requirements with use of external surge suppressor installed on 230 Vac~ power line units. Recommend minimum 1000 V peak to maximum 2000 V peak, 70 joules or better part be used.

Compliant with 2011/65/EU RoHS2 Directive

Per 2012/19/EU WEEE Directive *Please Recycle Properly*

Joe Millanes	Winona, Minnesota, USA
Name of Authorized Representative	Place of Issue
Director of Operations	September 2014
Title of Authorized Representative	Date of Issue



Signature of Authorized Representative

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TOTAL CUSTOMER SATISFACTION
3 Year Warranty