## Operator Interfaces

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
<th>Communication Protocols</th>
<th>Display Height</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Silver Series EM</strong></td>
<td>Rugged, email ready, touch screen operator interface terminal</td>
<td>Ethernet, Modbus® RTU, Modbus® TCP</td>
<td>4.3, 7 or 10 in. (109, 178 or 254 mm) diagonal</td>
<td>335</td>
</tr>
<tr>
<td><strong>EZ-ZONE® RUI and Gateway</strong></td>
<td>Remote user interface and communications device</td>
<td>Standard Bus, Modbus® RTU, EtherNet/IP™, Modbus® TCP, DeviceNet™ and PROFIBUS DP</td>
<td>Upper: 0.40 in. (10 mm) Lower: 0.24 in. (6 mm)</td>
<td>341</td>
</tr>
</tbody>
</table>

*Note:* The specifications in the table above are best available values in each category. Not all combinations of these values are available in a single model number.
Operator Interfaces

Silver Series EM

The Silver Series EM is a rugged, touch-screen operator interface terminal (OIT). Available in three sizes (4.3, 7 and 10 inch diagonal display sizes), the OIT’s feature serial and Ethernet communications with multiple controllers, email messaging, universal serial bus (USB host), data logging, flexible password security and multiple languages. The small bezel size and two-inch depth make mounting in tight spots easy.

The Silver Series EM programming software, EZwarePlus, is easy to use and features a large variety of built-in screen objects that makes it powerful. When creating screens, the user can call upon extensive graphics libraries, import custom graphics and add numeric displays, entry fields, analog meters, bar graphs and trend graphs with just a few mouse clicks. Screen objects are highly customizable, and the user can create libraries of their own objects for repeat use. The online simulator, Ethernet and USB support make testing and downloading fast. The EZwarePlus screen editor is part of the EZwarePlus software suite and is available as a FREE download on www.watlow.com.

The Silver Series EM OIT paired with Watlow® controllers is the perfect solution for your industrial process or machine control application.

Features and Benefits

Bright, color, high resolution, graphic, touch screen, thin film transistor (TFT) display
- Maximizes display space in the OIT footprint
- Allows application specific interface design
- Allows viewing from a distance and at an angle
- Highlights important process information with color and animation

User selectable portrait or landscape operation
- Fits in tight spots

Ethernet, serial and USB host ports
- Allows options for connecting to controllers
- Provides options for downloading projects
- Expands memory for additional recipe and data log storage
- Supports barcode readers, keyboard, mouse and printers
- Supports monitoring from a personal computer (PC) with free virtual network computing (VNC) client software

Support for over 100 protocols, up to three simultaneously plus multiple protocols over Ethernet
- Connects to a wide range of industrial controllers and devices
- Integrates a variety of devices to simplify complex operation tasks

Data logging, display and trending
- Helps operators monitor processes
- Reduces labor and increases accuracy by automating time-stamped data collection
- Stores captured data for future retrieval in multiple files
- Saves time by exporting data to Excel®-compatible comma separated value (.csv) files
- Improves process understanding by allowing live and historical data to be viewed on the OIT

Alarm and event email notification, monitoring and recording
- Reduces downtime by helping troubleshoot equipment and processes
- Simplifies troubleshooting by recording time and date-stamped alarm and event history
- Organizes and prioritizes alarms and events in up to 255 categories and four priority levels

Recipe management
- Reduces errors by automating process setting changes

Offline and online simulation
- Speeds up development by making it faster and easier to test projects
- Allows faster creation of fine-tuned interfaces by speeding up iterations

Time or trigger-based data exchange
- Simplifies integration by allowing the OIT to copy data from one controller or OIT to another

Internal, piezoelectric buzzer
- Provides audible alarms and key chirp
Silver Series EM

Features and Benefits (Continued)

Two-year warranty
• Provides product support and reliability

Screen object password security with programmable hierarchy and multiple users
• Prevents errors and tampering by allowing only authorized users to access restricted items on the screen
• Allows flexible hierarchies by letting the developer assign each screen object to any of 12 groups and grant each user access to any combination of groups
• Provides password protection for upload, download and access to local setup
• Supports up to 127 users

Screen object invisibility and/or interlock control
• Prevents errors by guiding operators

Powerful, easy-to-use EZwarePlus programming software
• Requires only a small investment in time to create a useful interface
• Provides the ability to learn additional features as needed
• Provides advanced interface features such as animation and pop-up windows

• Reduces development time by providing extensive graphical libraries and facilitating reuse with user-created libraries
• Simplifies development allowing import of common graphic formats: bitmaps, JPEGs and animated GIFs

User-programmable macros with math functions and support for floating point
• Extends functionality
• Automates processes

TrueType fonts with Unicode (international) characters and language switching feature
• Makes screens easy to read by allowing bold, italic, underlined, scrolling and blinking text to direct operator’s eyes
• Prevents errors by communicating with users in their native languages
• Reduces development and support by allowing inclusion of up to 24 user-selectable languages in a project

UL®, NEMA 4, CE, RoHS,
• Allows use in harsh industrial environments
• Assures prompt product acceptance

Integrate multiple devices to simplify operation of complex systems.

Include the types of displays users understand such as gauges, sliders and bar graphs to make screens intuitive.

Log and graph process data for quality records and better process control.

Create screens that guide work flow.
Operator Interfaces

Silver Series EM

Dimension and Connection Diagrams
Models TS00-0043-EM00/TS00-0043-EM0B

Front View

Rear View

Bottom View

Model TS00-0070-EM00/TS00-0070-EM0B

Front View

Rear View

Bottom View

Model TS00-0100-EM00

Front View

Rear View

Bottom View
Operator Interfaces

Silver Series EM

<table>
<thead>
<tr>
<th>Feature</th>
<th>TS00-0043-EM00/TS00-0043-EM0B</th>
<th>TS00-0070-EM00/TS00-0070-EM0B</th>
<th>TS00-0100-EM00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor Type</td>
<td>600MHz, 32-bit, RISC, fanless</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memory</td>
<td>128MB Flash, 128MB DRAM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethernet Port</td>
<td>10/100 Base-T (RJ45)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serial Ports</td>
<td>COM1: RS-232 or RS-485 (2-wire or 4-wire)</td>
<td>COM3: RS-485 (2-wire)</td>
<td></td>
</tr>
<tr>
<td>USB Host (Type A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Version 2.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real Time Clock</td>
<td>Built-in</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Audible Alarm and Key Chirp</td>
<td>Piezoelectric buzzer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Display Type</td>
<td>TFT LCD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resolution (Pixels)</td>
<td>480 x 272</td>
<td>800 x 480</td>
<td></td>
</tr>
<tr>
<td>Colors</td>
<td>16 million</td>
<td>262 thousand</td>
<td></td>
</tr>
<tr>
<td>LED Backlight Brightness</td>
<td>500 cd/m²</td>
<td>350 cd/m²</td>
<td>300 cd/m²</td>
</tr>
<tr>
<td>Contrast Ratio</td>
<td>500:1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viewing Angle</td>
<td>Top: 50°, bottom, right, left: 70°</td>
<td>Top: 60°, bottom, right, left: 70°</td>
<td>Top: 45°, bottom, right, left: 65°</td>
</tr>
<tr>
<td>Backlight Longevity</td>
<td>30,000 hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Touch-Screen Type</td>
<td>4-wire analog resistive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Touch-Screen Resolution</td>
<td>Continuous</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Touch-Screen Light Transmission</td>
<td>Greater than 80%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Touch-Screen Lifespan</td>
<td>1,000,000 activations min.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>32 to 122°F (0 to 50°C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-4 to 140°F (-20 to 60°C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 to 90% @ 40°C (non-condensing)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Shock Resistance</td>
<td>10 to 25Hz (X, Y, Z direction 2G, 30 min.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Ratings</td>
<td>NEMA 4 (IP65) indoor only</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agency</td>
<td>CE, cULus, RoHS</td>
<td>Class 1, Division 2, CE, cULus, RoHS</td>
<td>CE, cULus, RoHS</td>
</tr>
<tr>
<td>Enclosure</td>
<td>Plastic molded</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting</td>
<td>Panel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions Cutout (W x H)</td>
<td>4.69 x 3.66 in. (119 x 93 mm)</td>
<td>7.55 x 5.43 in. (192 x 138 mm)</td>
<td>10.20 x 7.91 in. (259 x 201 mm)</td>
</tr>
<tr>
<td>Dimensions Overall (W x H x D)</td>
<td>5.04 x 4.02 x 1.26 in. (128 x 102 x 32 mm)</td>
<td>7.88 x 5.76 x 1.34 in. (200 x 146 x 34 mm)</td>
<td>10.67 x 8.38 x 1.57 in. (271 x 213 x 40 mm)</td>
</tr>
<tr>
<td>Weight</td>
<td>0.55 lbs (0.25 kg)</td>
<td>1.31 lbs (0.6 kg)</td>
<td>2.9 lbs (1.3 kg)</td>
</tr>
<tr>
<td>Input Power: Voltage</td>
<td>24VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Power: Current</td>
<td>300mA max.</td>
<td>350mA max.</td>
<td>400mA max.</td>
</tr>
</tbody>
</table>

EZwarePlus Software System Requirements

Compatible Operating Systems:
- Windows® 10, 8.1 and 7
Operator Interfaces

Silver Series EM

EZwarePlus Software Suite

The EZwarePlus software suite includes EasyConverter, EZwarePlus screen editor, Utility Manager and Recipe Editor programs.

Utility Manager uploads and downloads projects to and from the Silver Series EM OIT, opens compiled projects in simulation and launches the other EZwarePlus programs.

The Recipe Editor configures memory files for use with Silver Series EM OITs and allows offline creation of recipes.

EasyConverter converts log files saved by the Silver Series EM OIT to file formats used by popular Windows® software such as Microsoft® Excel®.

EZwarePlus provides a graphical screen designing environment with point-and-click access to features and drag-and-drop ease.

EZwarePlus provides a graphical screen designing environment with point-and-click access to features and drag-and-drop ease.
Operator Interfaces

Silver Series EM

Connectivity

RS-232
...to one Watlow EZ-ZONE® product equipped with Modbus® RTU or one third-party product via a supported protocol.

RS-485
...to one or more Watlow EZ-ZONE products equipped with Modbus® RTU or one or more third-party products via a supported protocol.

Ethernet
...to Watlow EZ-ZONE products equipped with Modbus® TCP and third-party products via supported protocols.

...to VNC Client software for remote monitoring with a personal computer.

Email
...to an email server keeping technicians and operators informed.

Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TS00-0043-EM00</td>
<td>4.3 in. (480 x 272) color TFT LCD touch screen; two-tone, light gray bezel; USB host; two serial ports and Ethernet</td>
</tr>
<tr>
<td>TS00-0043-EM0B</td>
<td>4.3 in. (480 x 272) color TFT LCD touch screen; two-tone, dark gray bezel; USB host; two serial ports and Ethernet</td>
</tr>
<tr>
<td>TS00-0070-EM00</td>
<td>7 in. (800 x 480) color TFT LCD touch screen; two-tone, light gray bezel; USB host; two serial ports and Ethernet</td>
</tr>
<tr>
<td>TS00-0070-EM0B</td>
<td>7 in. (800 x 480) color TFT LCD touch screen; two-tone, dark gray bezel; USB host; two serial ports and Ethernet</td>
</tr>
<tr>
<td>TS00-0100-EM00</td>
<td>10 in. (800 x 480) color TFT LCD touch screen; two-tone, light gray bezel; USB host; two serial ports and Ethernet</td>
</tr>
</tbody>
</table>

Accessories

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0601-0001-0000</td>
<td>Controller support tools DVD-ROM with programming software and product manuals</td>
</tr>
<tr>
<td>0830-0750-0000</td>
<td>Power supply, Input: 85-264VAC, Output: 24VDC, 1.7A, 40W (not Class 2)</td>
</tr>
<tr>
<td>0847-0299-0000</td>
<td>Class 2 power supply, Input: 90-264VAC, Output: 24VDC, 1.3A, 31W</td>
</tr>
<tr>
<td>0219-0388-0000</td>
<td>TS00-0043-EM00 and TS00-0043-EM0B communication cable, 5-foot, COM1 (RS-485, 2-wire) to bare wires for Watlow EZ-ZONE® controller screw terminals</td>
</tr>
<tr>
<td>0219-0374-0000</td>
<td>TS00-0070-EM00, TS00-0070-EM0B or TS00-0100-EM00 communication cable, 5-foot, COM1 (RS-485, 2-wire) to bare wires for Watlow EZ-ZONE controller screw terminals</td>
</tr>
<tr>
<td>0830-0782-0000</td>
<td>Package of 5 ea. protective screen covers for the TS00-0043-EM00 and TS00-0043-EM0B</td>
</tr>
<tr>
<td>0830-0753-0000</td>
<td>Package of 5 ea. protective screen covers for the TS00-0070-EM00 and TS00-0070-EM0B</td>
</tr>
<tr>
<td>0830-0754-0000</td>
<td>Package of 3 ea. protective screen covers for the TS00-0100-EM00</td>
</tr>
</tbody>
</table>
Operator Interfaces

**EZ-ZONE® RUI and Gateway**

The EZ-ZONE® Remote User Interface (RUI and communications gateway) can be utilized as a communication gateway device to save cost, space and wiring when digital communications is being used with two or more EZ-ZONE controllers. The EZ-ZONE RUI can also serve as a display for showing all parameter values for up to 16 EZ-ZONE controllers, again saving cost, space and wiring expenses.

**Indicator Features and Benefits—Remote User Interface (RUI)**

**Single user interface device or location to access multiple controllers**
- Easy accessibility to all controllers and all parameters from a central location by using one RUI display
- Reduces component material costs by using a single RUI to display multiple control zones
- Eliminates cost and complexity from bringing all controller related input and output wiring to the front panel

**Flexible use of a display interface**
- Can be used when needed during normal machine production, for OEM prototype design purposes or for remote troubleshooting scenarios
- Ability to use more than one RUI indicator to display additional data including temperature and current (ammeter) to improve user system interface

**Communications Gateway Features and Benefits**

**A single RUI and gateway provides field bus access for up to 16 EZ-ZONE controllers**
- Lowers solution cost when field bus communications is required for multiple loops

**Expand communication protocols to all EZ-ZONE controllers**
- Ability to utilize multiple communication protocols for different user preferences. Flex between different communication protocols while still maintaining a reduced level of inventory

**Delivers multiple communication protocol options**
- Ability to connect EZ-ZONE controllers to communication networks utilizing
  - Modbus® RTU
  - DeviceNet™
  - Ethernet/IP™
  - Modbus® TCP
  - PROFINET

**Additional Features**

**EZ-ZONE P3T armor sealing system**
- Complies with NEMA 4X, IP65 RUI
- Offers water and dust resistance, can be cleaned and washed down

**EZ-KEY (RUI)**
- Programmable EZ-Key is a functional key programmable by the user to perform simple one-touch operation of repetitive user activities

**Compact package**
- Reduces required panel size for ⅛ DIN
- Utilizes less depth behind panel allowing for mounting in tight spaces

**Touch-safe package**
- Complies with IP2X which increases safety for user

**Agency approvals:** UL® Listed, CSA, CE, RoHS, W.E.E.E., SEMI F47-0200, Class 1, Div. 2 rating on selected models
- Meets applications requiring agency approvals

**Three-year warranty**
- Provides product support and protection
Operator Interfaces

EZ-ZONE RUI and Gateway

Specifications

Line Voltage/Power
- Universal high voltage 100 to 240VAC, +10%/-15%; (85-264VAC), 50/60Hz, ±5%
- Low voltage 20 to 28VAC or 25 to 40VDC, 50/60Hz, ±5% for RUI only in short case version
- Low voltage 20 to 28VAC or 12 to 40VDC, 50/60Hz, ±5% for RUI and Gateway in long case version
- Data retention upon failure via nonvolatile memory

Environment
- 0 to 149°F (-18 to 70°C) operating temperature
- -40 to 185°F (-40 to 85°C) storage temperature
- 0 to 90% RH, non-condensing

Wiring Termination—Touch-Safe Terminals
- Terminals touch safe, removable, 12 to 22 AWG

DIN Sizes
- 3⁄8 DIN

Display Update Rate
- 1HZ

Operator Interface
- Dual 4 digit, 7 segment LED displays
- Forward, backward, up and down keys plus a customer-programmable function key - EZ key

Communication Options
- Standard bus - ships with all EZ-ZONE products
- EIA-235/485, Modbus® RTU
- EtherNet/IP™, Modbus® TCP, 10 BASE-T/100 BASE-TX
- DeviceNet™
- PROFIBUS DP

Agency Approvals
- cULus® UL®/EN/CSA C22.2 No. 61010-1 listed, File E185611 for long case models
- cULus® UL®508/EN/CSA C22.2 No. 61010-1 listed, File E102269 for short case models
- CSA C22.2 No. 14 (short case) No. 24 (long case), File 158031
- UL® 50 4X indoor locations, NEMA 4X, IP65 front seal
- CE, RoHS by design, W.E.E.E.
- SEMI F47-0200 when powered at 24V or greater

RUI (EZKB) Utilized as a Communication Gateway Device

The RUI (EZKB) can be used as a communication gateway to connect any EZ-ZONE controller with standard bus to other system components using different communication protocols such as EIA-232/485 Modbus® RTU, EtherNet/IP™, Modbus® TCP, DeviceNet™ or PROFIBUS DP.
Operator Interfaces

EZ-ZONE RUI and Gateway

Remote User Interface (RUI) — Dimensional Drawings

Front View

Short Case Version

Long Case Version

Accessory — DIN-Rail Mounting Bracket
Part Number: 0822-0586-P002

Front View

Rear View
## Operator Interfaces

### EZ-ZONE RUI and Gateway

#### Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>EZK</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4</th>
<th>Remote User Interface (RUI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Basic 1/16 DIN</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5</th>
<th>Power Supply Voltage for RUI</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>Low voltage 24-28VAC/VDC</td>
</tr>
<tr>
<td>H</td>
<td>Universal high voltage 100-240VAC/VDC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6</th>
<th>Communication Gateway Options* (Standard Bus Always Included)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>None</td>
</tr>
<tr>
<td>2</td>
<td>EIA-232/485 Modbus® RTU</td>
</tr>
<tr>
<td>3</td>
<td>EtherNet/IP™/Modbus® TCP</td>
</tr>
<tr>
<td>5</td>
<td>DeviceNet™</td>
</tr>
<tr>
<td>6</td>
<td>PROFIBUS DP</td>
</tr>
</tbody>
</table>

* Options 2 through 6 require the long case dimensions

<table>
<thead>
<tr>
<th>7</th>
<th>Custom RUI</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>None</td>
</tr>
<tr>
<td>XX</td>
<td>Custom options, contact factory</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>11</th>
<th>Custom Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>None</td>
</tr>
<tr>
<td>12</td>
<td>Class 1, Div. 2 (only available with communication options 2, 3, 5 and 6)</td>
</tr>
</tbody>
</table>