MODEL APS - OCTAL PLUG-IN ACCESSORY POWER SUPPLY

DESCRIPTION
The Model APS is an unregulated +12 VDC supply designed to load share when connected in parallel with internal power supplies of many Red Lion Controls Counters and Rate Indicators. It can also be used as a general purpose “Stand-alone” power supply to power other control circuits, sensors and accessories. The APS is furnished for 115 VAC or 230 VAC, ±10%, 50/60 Hz primary supply. Operating temperature range is -20°C to +50°C. Output current is per regulation curve.

TYPICAL CONNECTION DIAGRAM

DIMENSIONS In inches (mm)

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>APS01</td>
<td>115 VAC Accessory Power Supply</td>
<td>APS01000</td>
</tr>
<tr>
<td>APS02</td>
<td>230 VAC Accessory Power Supply</td>
<td>APS02000</td>
</tr>
<tr>
<td>SKT1</td>
<td>Base Mount 8-pin Octal Socket</td>
<td>SKT10000</td>
</tr>
<tr>
<td>--</td>
<td>DIN Rail 8-pin Socket</td>
<td>SKTDIN00</td>
</tr>
</tbody>
</table>

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
These industrial relays have a mechanical life expectancy in excess of 10 million cycles, and are both UL and CSA recognized.

**RELAY SPECIFICATIONS**

**COIL:**
- 12 VDC Coil - 120 Ω ±10%,
  - Rated +12 VDC @ 100 mA.
- 115 VAC Coil - 2250 Ω ±10%,
  - Rated 115 VAC @ 52 mA.

**CONTACTS:**
- 10 A @ 115 and 230 VAC
  - (1/6 HP @ 115 V, 1/3 HP @ 230 VAC)

**OPERATING TIMES:**
- Energize - 30 msec max.
- De-energize - 30 msec max.

Operating times do not include bounce time (approx. 3 msec).

**OPERATING TEMPERATURE RANGE:**
- -45° to +60°C

**ELECTRICAL LIFE:**
- In excess of 100,000 operations @ rated load.

**WEIGHT:**
- 3 oz (85.1 g)

Mating sockets sold separately. See Ordering Information.

### LIMITED WARRANTY

The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company’s liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company’s option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products.

The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or sub-contractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 92-573) as now in effect or as amended hereafter.

No warranties expressed or implied are created with respect to The Company’s products except those expressly contained herein. The Customer acknowledges the disclaimers and limitations contained herein and relies on no other warranties or affirmations.
MODEL APSIS - Octal Plug-in Accessory Power Supply With 20 mA Current Sources

PROVIDES...
- 24 VDC UNREGULATED “HELPER” SUPPLY FOR LOAD SHARING WITH OTHER 24 VOLT SYSTEMS WITH UNUSUAL SENSOR AND ACCESSORY LOADS OR...
- “STAND-ALONE” APPLICATIONS FOR POWERING +24 VDC SENSORS AND ACCESSORIES OR...
- TWO 20 mA CURRENT SOURCES, EACH CAPABLE OF SUPPLYING 20 mA OF CURRENT FOR SERIAL COMMUNICATION LOOPS AND POWERING UP TO 16 UNITS PER LOOP.

DESCRIPTION
The Model APSIS is a convenient plug-in unregulated +24 VDC power supply designed to “load share” when connected in parallel with other +24 VDC unregulated systems with unusual power requirements due to sensor or accessory loading (see Fig.1). It can also be used as a general purpose stand-alone supply to power +24 VDC control circuits, sensors and accessories (see Fig.2). In addition, two 20 mA Current Source outputs are available, each capable of powering up to 16 Serial Communications units (see Fig.3). The APSIS is available in 115 and 230 VAC ±10%, 50/60 Hz. primary supply (see Ordering Information). Operating temperature range is -20°C to +50°C.

SPECIFICATIONS
1. POWER SOURCE: 2 versions, 115 VAC or 230 VAC ±10%, 50/60 Hz., 11 VA max. (see Ordering Information).
2. POWER OUTPUT: +24 VDC unregulated @ 200 mA max. current*. Ripple = 1.5 V P-P max.
3. OUTPUT: Two 20 mA current sources, each capable of supplying 20 mA of current for serial communication loops and powering up to 16 units per loop.
4. OPERATING TEMPERATURE: -20°C to +50°C (-4°F to +122°F)
* Maximum available output current derates to 175 mA with 1 source active and 150 mA max. with both sources active.

TYPICAL LOAD SHARING CONNECTION DIAGRAM

DIMENSIONS In inches (mm)

TEMPERATURE MONITORING SYSTEM
A temperature monitoring process requires both remote and control room indicators and datalogging capabilities. An RTD (Resistance Temperature Detector) to 4 to 20 mA Transmitter, provides a proportional 4 to 20 mA output from the RTD input. Two Red Lion Controls “Loop Powered Process Indicators” (Model LPPI) are installed in series in the “Loop” and scaled to provide Local and Remote temperature displays. A Datalogger is also placed in the “Loop” to provide a hard-copy of process temperatures. Each device in the “Loop” has an associated “voltage drop” as follows: RTD Transmitter = 9 VDC drop; LPPI = 3 VDC x 2 units = 6 VDC drop; Datalogger = 5 VDC drop. The total voltage drops in the “Loop” = 20 VDC. Therefore, RLC’s Model APSIS, with its +24 VDC Supply, is used to power this process “Loop”.

FIGURE 1

FIGURE 2
PROCESS MONITORING
SYSTEM
8 Apollo Thermocouples (APLTC) and 8 GEMINIs, all with isolated 20 mA Current Loop Serial Communications, monitor and control processes within a plant. All units, which are located in different areas of the plant, are tied together in series in two “Loops” (one Transmit Tx, the other Receive Rx) and are connected to a Central Computer located in another area of the plant. Since there are more than 7, and no more than 16 units in the “Loop”, the APSIS +20 mA Current Source Outputs are used to power each “Loop”. (Both Apollo Thermocouple and Gemini units can power up to 7 units in a “Loop” when using their internal 20 mA sources. However, their sources may not be tied together to power more than 7 units.) Each unit is assigned a different address number and the same Baud rate (see appropriate APLTC or Gemini data sheet). An application program is written which allows the Central Computer to send and retrieve data from any APLTC or Gemini.

OUTPUT VOLTS/CURRENT

OUTPUT DC VOLTS

TOTAL OUTPUT DC CURRENT (mA) *

* Unregulated output + (2) 20 mA current sources (if used).

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBERS FOR AVAILABLE SUPPLY VOLTAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>230 VAC</td>
</tr>
<tr>
<td>APSIS</td>
<td>Accessory Power Supply- Current Source</td>
<td>APSIS010</td>
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<tr>
<td></td>
<td>Base Mount, 8-Pin Octal Socket</td>
<td>SKT10000</td>
</tr>
<tr>
<td></td>
<td>Din Rail Mount, 8-Pin Octal Socket</td>
<td>SKTDIN00</td>
</tr>
</tbody>
</table>
INSTALLATION

BMK6 - Open Base Mount

Before attaching the BMK6 to the panel or frame, it is recommended to wire and mount the unit to ensure good electrical connections. The following steps outline the most common sequence for installing a unit without an MLPS attached.

1. Install the grommet (provided in the accessory bag) in the hole in the base mount.
2. Assemble nut fastener and mounting screw onto both sides of the mounting clip. The tip of the screw should not project from the hole in mounting clip.
3. Slide the panel gasket over the rear of the unit to the back of the bezel. Then install the unit through the opening in the front of the base mount until the bezel flange makes contact.
4. Slide the mounting clip over the rear of the unit until the mounting clip is against the inside of the base mount. The mounting clip has latching features which engage into mating features on the unit’s housing.
   Note: It is necessary to hold the unit in place when sliding the mounting clip into position.
5. Alternately tighten each screw to ensure uniform gasket compression.
6. Connect the necessary wires from the grommet to the unit.
7. Mount the base mount enclosure to the panel or frame as application requires. Four bolts and nuts are provided with the Base Mount Kit.

DESCRIPTION

The BMK6 and BMK7 base mounts are designed for use with the CUB4, DT8, and DT9 units. The BMK7 is large enough to accommodate a Microline Power Supply (MLPS) attached to the unit. The BMK6 or BMK7 can also be used for the CUB5 Series without the MLPS attached.

The wires can either be brought through the panel on which the unit is mounted, or through the hole(s) in the enclosure itself. Grommets are provided to insert in the hole(s) on the base mount (where applicable) when wires are routed through it. The grommets are in the accessory bag with each base mount unit, along with four nuts and bolts for mounting.

The base mounts are constructed of steel with a textured black polyurethane finish.
**INSTALLATION**

**BMK7 - Closed Base Mount**

Before attaching the BMK7 to the panel or frame, it is recommended to wire and mount the unit to ensure good electrical connections. The following steps outline the most common sequence for installing a unit with an MLPS attached.

1. Install the grommets (provided in the accessory bag) in the holes in the base mount.
2. Slide the panel gasket over the rear of the unit to the back of the bezel.
3. Remove the common and V+ screw terminals from the rear of the unit (save for later use), and replace them with the hex drive stand-offs with round washers (supplied with the MLPS).
4. Assemble nut fastener and mounting screw onto both sides of the mounting clip. The tip of the screw should not project from the hole in mounting clip.
5. Route the wires from the grommets, through the mounting clip, into the rear of the base mount and out the front.
6. Connect the wires necessary for the application to the unit.
7. Install the unit through the opening in the front of the base mount until the bezel flange makes contact.
8. Slide the mounting clip over the rear of the unit until the mounting clip is against the inside of the base mount. The mounting clip has latching features which engage into mating features on the unit’s housing.

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>MODEL NO</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMK</td>
<td>OPEN BASE MOUNT KIT</td>
<td>BMK60000</td>
</tr>
<tr>
<td></td>
<td>CLOSED BASE MOUNT KIT</td>
<td>BMK70000</td>
</tr>
</tbody>
</table>

For More information on Pricing, Enclosures & Panel Mount Kits refer to the RLC Catalog or contact your local RLC Distributor.
**MODEL BMK6, BMK7 & BMK7A - BASE MOUNT KIT FOR CUB4, CUB5 & DT8 UNITS**

**DESCRIPTION**

The BMK6, BMK7 and BMK7A base mounts are designed for use with the CUB4, CUB5, and DT8 units. The BMK7 is large enough to accommodate a Micro-line Power Supply (MLPS) attached to a CUB4 or DT8. The BMK7A will accommodate a Micro-line Power Supply (MLPS) attached to a CUB5. The wires can either be brought through the panel on which the unit is mounted, or through the hole(s) in the enclosure itself. Grommets are provided to insert in the hole(s) on the base mount (where applicable) when wires are routed through it. The grommets are in the accessory bag with each base mount unit, along with four nuts and bolts for mounting. The base mounts are constructed of steel with a textured black finish.

**DIMENSIONS In inches (mm)**

**BMK6 - OPEN BASE MOUNT KIT**
(Without MLPS)

**BMK7/BMK7A - CLOSED BASE MOUNT KIT**
(With or Without MLPS)

**INSTALLATION**

**BMK6 - Open Base Mount**

Before attaching the BMK6 to the panel or frame, it is recommended to wire and mount the unit to ensure good electrical connections. The following steps outline the most common sequence for installing a unit without an MLPS attached.

1. Install the grommet (provided in the accessory bag) in the hole in the base mount.
2. Assemble nut fastener and mounting screw onto both sides of the mounting clip. The tip of the screw should not project from the hole in mounting clip.
3. Slide the panel gasket over the rear of the unit to the back of the bezel. Then install the unit through the opening in the front of the base mount until the bezel flange makes contact.
4. Slide the mounting clip over the rear of the unit until the mounting clip is against the inside of the base mount. The mounting clip has latching features which engage into mating features on the unit’s housing.
   **Note:** It is necessary to hold the unit in place when sliding the mounting clip into position.
5. Alternately tighten each screw to ensure uniform gasket compression.
6. Connect the necessary wires from the grommet to the unit.
7. Mount the base mount enclosure to the panel or frame as application requires. Four bolts and nuts are provided with the Base Mount Kit.
**INSTALLATION**

BMK7/BMK7A - Closed Base Mount

Before attaching the BMK7/BMK7A to the panel or frame, it is recommended to wire and mount the unit to ensure good electrical connections. The following steps outline the most common sequence for installing a unit with an MLPS attached.

1. Install the grommets (provided in the accessory bag) in the holes in the base mount.
2. Slide the panel gasket over the rear of the unit to the back of the bezel.
3. Remove the common and V+ screw terminals from the rear of the unit (save for later use), and replace them with the hex drive stand-offs with round washers (supplied with the MLPS).
4. Assemble nut fastener and mounting screw onto both sides of the mounting clip. The tip of the screw should not project from the hole in mounting clip.
5. Route the wires from the grommets, through the mounting clip, into the rear of the base mount and out the front.
6. Connect the wires necessary for the application to the unit.
7. Install the unit through the opening in the front of the base mount until the bezel flange makes contact.
8. Slide the mounting clip over the rear of the unit until the mounting clip is against the inside of the base mount. The mounting clip has latching features which engage into mating features on the unit's housing. 

   **Note:** It is necessary to hold the unit in place when sliding the mounting clip into position.

9. Alternately tighten each screw to ensure uniform gasket compression.
10. Connect AC power to the terminal block of the MLPS.

   **Note:** Make sure the AC selector switch is set to the appropriate position before applying power to the unit.

11. Mount the MLPS and optional sensor wires needed to the stand-offs using the screw terminal from the unit with the supplied square washers.
12. Mount the base mount enclosure to the panel or frame as application requires. Four bolts and nuts are provided with the Base Mount Kit.

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**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>MODEL NO</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMK</td>
<td>OPEN BASE MOUNT KIT</td>
<td>BMK60000</td>
</tr>
<tr>
<td></td>
<td>CLOSED BASE MOUNT KIT (DT8, CUB4)</td>
<td>BMK70000</td>
</tr>
<tr>
<td></td>
<td>CLOSED BASE MOUNT KIT (CUB5)</td>
<td>BMK7A000</td>
</tr>
</tbody>
</table>

For More information on Pricing, Enclosures & Panel Mount Kits refer to the RLC Catalog or contact your local RLC Distributor.
MODEL BMK9 - DIN RAIL MOUNT ADAPTER KIT FOR PAX

DESCRIPTION
The BMK9 DIN rail mount kit is designed to adapt any PAX panel mount meter to DIN rail mount requirements. Wire feed to the PAX unit may be through the top or bottom of the adapter kit.

The DIN rail adapter frame is constructed of steel with a textured black finish and includes two plastic DIN rail mounting feet for attachment to a top hat (T) profile rail according to ENS0022 - 35 x 7.5 and 35 x 15.

DIMENSIONS In inches (mm)

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMK9</td>
<td>DIN Rail PAX Base Mount Kit</td>
<td>BMK90000</td>
</tr>
</tbody>
</table>

For more information on Pricing, Enclosures & Panel Mount Kits refer to the RLC Catalog or contact your local RLC Distributor.

INSTALLATION

1. Remove the panel latch (mounting clip) from the PAX meter unit and insert the mounting screws (supplied with the PAX) on both sides of panel latch. The tip of the screw should not project from the hole in the panel latch (mounting clip).

2. The PAX meter may be wired after the unit has been mounted in the adapter frame, in which case continue with Step 3. If pre-wiring the PAX is more convenient, skip to the pre-wiring step at the end of this installation procedure before returning to Step 3.

3. Slide the PAX meter through the cut out in the BMK9 and then slide the panel latch (mounting clip) over the rear of the PAX.

4. Continue sliding the PAX meter until the bezel flange contacts the adapter frame. The PAX panel gasket is optional.

5. Slide the panel latch (mounting clip) towards the front of the unit until it latches firmly against the inside of the adapter frame. Note: It is necessary to hold the PAX meter in place when sliding the mounting clip into position.

6. Alternately tighten mounting screws through the rear access holes of the adapter frame.

7. Apply both DIN rail feet to the rear of the adapter frame. The two latching pins of the rail foot are positioned into the mating holes on the adapter frame. Slight pressure applied to the center of the rail foot will snap foot into locking position.

8. Wire PAX meter appropriately.

9. To install the complete assembly on a T style rail, angle the assembly so that the top groove of both rail feet are located over the top lip of the rail. Push the assembly towards the rail until it snaps into place.

10. To remove the assembly from the rail, place a screwdriver behind the bottom groove of the foot rail and slightly pry upwards to release first rail foot. Apply same procedure to second rail foot and remove complete assembly.

Pre-wire PAX

2a. Route wires through the panel latch (mounting clip) and then through the front cut out of the adapter frame from the inside to the outside. Wire PAX meter appropriately. Continue with installation at Step 3 above.
**DESCRIPTION**
The model BMK11 can be used to mount a CUB5 meter or a Micro Line Power Supply (MLPS) in various applications. Need a DIN rail mounted display? Simply add the DIN rail clips to the back of the BMK11, install your meter and snap it on the rail. If your application requires an inexpensive power supply, simply mount an MLPS to the BMK11 and snap it to the rail. For base mount application, just use the appropriate mounting screws to securely fasten the BMK11. Nothing could be easier.

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMK11</td>
<td>CUB5 or MLPS DIN Rail Base Mount Kit</td>
<td>BMK11000</td>
</tr>
</tbody>
</table>

**DIMENSIONS In inches (mm)**

**BMK11 WITHOUT UNIT**

- 1.73 (43.8) in
- 3.59 (91.2) in
- 2.05 (52.1) in

**BMK11 WITH CUB5**

- 1.91 (48.5) in
- .33 (8.4) in

**BMK11 WITH MLPS**

- 2.35 (59.7) in
- .33 (8.4) in
**MLPS INSTALLATION**

1. Using the two nuts supplied with the BMK11, affix standoffs from MLPS hardware pack as indicated in the diagram at left.

2. Snap the MLPS over the standoffs into the BMK11 as indicated in the diagram.

3. Attach the MLPS to the standoffs using the square washers and SEMS terminal screws included with MLPS hardware pack.

4. Assembly can be wired at this time, or after the mounting is completed.

5. For **DIN RAIL** mounting, insert the two plastic feet as shown in the diagram. Angle the assembly so that the top groove of both rail feet are located over the top lip of the rail. Rotate the assembly towards the rail until it snaps into place.

6. For **Base Mount**, use the holes indicated in the diagram at left, and screw or bolt the assembly to the desired mounting surface. User is responsible for selecting the appropriate screw or bolt to provide mounting to the desired surface. Base mount holes in the BMK11 are designed for #8 hardware.

7. To remove the MLPS from the BMK11, slide a small screwdriver between the MLPS and the latch wall. Draw the latch away from the MLPS until disengaged. Repeat the procedure on the other side. Once the latches are released, remove the indicator from the BMK11.

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**CUB5 INSTALLATION**

1. Remove the panel latch (mounting clip) from the indicator. Insert the indicator into the BMK11 per diagram at right. Verify indicator is fully seated and latches have engaged. With latches properly engaged the indicator will not pull out of the BMK11.

2. Wire the indicator.

3. For **DIN RAIL** mounting, insert the two plastic feet as shown in the diagram at right. Angle the assembly so that the top groove of both rail feet are located over the top lip of the rail. Rotate the assembly towards the rail until it snaps into place.

4. To remove the assembly from the rail, place a screwdriver behind one of the rail feet and draw the rail foot away from the rail disengaging it from the rail. Apply the same procedure to the second rail foot and remove the complete assembly from the rail.

5. For **Base Mount**, use the holes indicated in the diagram at left, and screw or bolt the assembly to the desired mounting surface. User is responsible for selecting the appropriate screw or bolt to provide mounting to the desired surface. Base mount holes in the BMK11 are designed for #8 hardware.

6. To remove the indicator from the BMK11, slide a small screwdriver into the slot provided in the latch. Draw the latch away from the indicator until disengaged. Repeat the procedure on the other side. Once the latches are released, remove the indicator from the BMK11.

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**LIMITED WARRANTY**

The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company's liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company's option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products. The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or sub-contractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.

No warranties expressed or implied are created with respect to The Company’s products except those expressly contained herein. The Customer acknowledges the disclaimers and limitations contained herein and relies on no other warranties or affirmations.
MODEL CT004 - CURRENT TRANSFORMER

DESCRIPTION
The CT004 is intended for use with temperature controllers for monitoring heater current. The CT004 is suitable for general purpose AC current monitoring applications up to 40 Amps.

SPECIFICATIONS
1. CURRENT RATIO: 40:0.1A
2. MAX HEATER CURRENT: 50 A.
3. DIELECTRIC STRENGTH: 1000 VAC (For 1 minute)
4. VIBRATION RESISTANCE: 50 Hz (Approx. 10 G)
5. TERMINALS: Solder type
6. WINDOW DIAMETER: 0.228" (5.8 mm).
7. WEIGHT: 0.406 oz (11.5 g).

Notes: Refer to the instruction manual of the temperature controller for connection information and max. heater current allowable by the temperature controller.

DIMENSIONS In inches (mm)

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>CURRENT RATIO</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT004</td>
<td>40 : 0.1 A</td>
<td>CT004001</td>
</tr>
</tbody>
</table>
**SPECIFICATIONS**

1. **Operating Frequency:** 50 to 400 Hz.
2. **Insulation Class:** 0.6 KV BIL 10 KV full wave.
3. **Terminals:** Brass studs No. 8-32 UNC with flat washer and hex nuts.
4. **Window Diameter:** 1.13” (28.7 mm).
5. **Weight:** 8.0 oz (226.0 g).

UL Recognized Component
(Instrument Transformers, Inc., PN# 2SFT500-0.1, 2SFT500, 2SFT201, File # E93779)

Note: The listed current ratio of the current transformer is based on the primary conductor passing once through the transformer opening. The ratio is reduced in multiples by looping the conductor through the opening. A transformer having a ratio 200:5 changes to a ratio of 100:5 if two loops are made through the transformer with the primary conductor. The ratio of the transformer will be 50:5 if four loops are made with the primary conductor, etc.

**ORDERING INFORMATION**

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<thead>
<tr>
<th>CURRENT RATIO</th>
<th>ACCURACY @ 60 Hz</th>
<th>VA 60 Hz</th>
<th>MAXIMUM OUTPUT WIRE DISTANCE BETWEEN CT AND METER</th>
<th>PART NUMBERS</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>18 AWG</td>
<td>16 AWG</td>
</tr>
<tr>
<td>50:0.1</td>
<td>±5.0%</td>
<td>2.5</td>
<td>Wire distance is not an issue due to the low current flow. Wires may be as long as needed.</td>
<td>CT005001</td>
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<tr>
<td>50:5</td>
<td>±3.0%</td>
<td>2.0</td>
<td>5.0 ft.</td>
<td>7.5 ft.</td>
</tr>
<tr>
<td>200:5</td>
<td>±1.0%</td>
<td>4.0</td>
<td>10 ft.</td>
<td>17.5 ft.</td>
</tr>
</tbody>
</table>

**DIMENSIONS** In inches (mm)

![Dimensions Diagram]
**DESCRIPTION**

The DMTD can be panel mounted or used as a desk-top unit. The unit’s programmable Time and Date Stamping feature can print the actual time and date following each data printout. The Line Counter Stamping feature can keep a running record of the number of lines printed. The unit can print one line at a time or can print a group of lines with a print buffer command. Character height, width, and font size can be changed along with inverting the direction of print. To allow other nonprintable communications on the same serial loop, the print head can be turned off and on serially.

Red Lion Controls offers serial converters to interface the unit’s RS232 communications to any RLC product with serial communications capability. Direct PC access is through any terminal emulator program and any PC RS232 serial communications port. Accessories available from Red Lion Controls include paper and ribbons for the Dot Matrix printer. Thermal paper is a standard size available at most office supply stores. A ten foot generic printer cable is also available.

**SPECIFICATIONS**

1. **POWER:**
   - DMTD0000: 115 VAC ±5% (1.0 A @ 9 V)
   - DMTDTP00: 115 VAC ±5% (2.0 A @ 9 V)
   - DMTD0010: 230 VAC ±5% (1.0 A @ 9 V)
   - DMTD0020: +7.5 to 13.6 VDC @ 1.0 A max.
   - DMTDTP20: +7.5 to 13.6 VDC @ 2.0 A max.
   - DMTD0030: +15 to 24 VDC @ 1.0 A max.
   - Wire color for 18” cord of above models: Red wire is +DC, Black wire is -DC

2. **SERIAL COMMUNICATIONS:**
   - Type: RS232
   - Communication Format: Baud Rate: DIP switch selectable for 150 through 9600
   - Parity: DIP switch selectable for odd, even, or no parity
   - Data Bits: 7 or 8 bits
   - Buffer: 2K
   - Connection: 25 DP female

3. **PAPER:** (One roll supplied) 2.25” Plain Paper Roll (2.5” ext. diameter)

4. **RIBBON CARTRIDGE:** (One ribbon cartridge supplied)
   - Blue ink, Self reversing, 250 K character life

5. **PRINT:**
   - Dot Matrix: 40 or 30 characters per line
   - Thermal: 24 through 64 characters per line
   - 2.5 lines per second printing
   - 5 lines per second, paper feed mode
   - Full ASCII character set

6. **INTERVAL TIMER OUTPUT:** NPN Open Collector Transistor output
   - Max. Voltage: +30 VDC
   - Max. Current: 100 mA
   - Range: 5 seconds to 24 hours
   - Pulse Length: 100 msec.

7. **TEMPERATURE RANGE:** 0 to 50° C

8. **RELATIVE HUMIDITY:** 20 to 90% non-condensing

9. **WEIGHT:** 2 lbs (0.907 kg)

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMTD*</td>
<td>Dot Matrix Printer - 115 VAC</td>
<td>DMTD0000</td>
</tr>
<tr>
<td></td>
<td>Dot Matrix Printer - 220 VAC</td>
<td>DMTD0010</td>
</tr>
<tr>
<td></td>
<td>Dot Matrix Printer - +7.5 to 13.6 VDC</td>
<td>DMTD0020</td>
</tr>
<tr>
<td></td>
<td>Dot Matrix Printer - +15 to 24 VDC</td>
<td>DMTD0030</td>
</tr>
<tr>
<td></td>
<td>Thermal Printer - 115 VAC</td>
<td>DMTDTP00</td>
</tr>
<tr>
<td></td>
<td>Thermal Printer - +7.5 to 13.6 VDC</td>
<td>DMTDTP20</td>
</tr>
<tr>
<td></td>
<td>Dot Matrix Paper: 12 rolls</td>
<td>DMTDPR12</td>
</tr>
<tr>
<td></td>
<td>Dot Matrix Ribbon: 12 cartridges</td>
<td>DMTDRB12</td>
</tr>
<tr>
<td></td>
<td>Printer Cable: 4 wire w/shield, one end 25DP male, 10 feet long</td>
<td>DMTDCB00</td>
</tr>
<tr>
<td>GCM232</td>
<td>Serial Converter 20mA RS-232</td>
<td>GCM23201</td>
</tr>
<tr>
<td>ICM4</td>
<td>RS232/RS485 Serial Converter</td>
<td>ICM40030</td>
</tr>
<tr>
<td>ICM5</td>
<td>RS232/RS485 Converter Module</td>
<td>ICM50000</td>
</tr>
</tbody>
</table>

* Printer power cables are removable and have a DC connector on the printer end.

**DIMENSIONS In inches (mm)**

Front View of Dot Matrix Printer shown. Thermal Printer does not have a ribbon.

---

**CAUTION:** Risk of Danger. Read complete instructions prior to installation and operation of the unit.

**CAUTION:** Risk of electric shock.
INSTALLATION ENVIRONMENT
The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

The bezel should be cleaned only with a soft cloth and neutral soap product. Do NOT use solvents. Continuous exposure to direct sunlight may accelerate the aging process of the bezel.

Do not use tools of any kind (screwdrivers, pens, pencils, etc.) to operate the push buttons of the unit.

INSTALLATION
If this unit will be desk top mounted, proceed to Wiring Diagrams. The unit installation is complete.

PANEL MOUNTING
The following procedure assures proper installation:
1. Cut panel opening and drill mounting holes to specified dimensions.
Remove burrs and clean around panel opening.
2. Pull unit from case until stops are reached.
3. Slide printer case into the panel.
4. Install 4 mounting screws through the brackets on the printer case all the way through the panel. Screws may be secured with lock washers.
5. Push the bezel of the printer toward the panel until it latches in the case.

WIRING DIAGRAMS

Red Lion Controls Optional Printer Cable
The printer side of the cable has a 25 pin D male connector, with the device end left bare to be terminated as needed by the application. The drawing here shows the internal connections of the cable. This cable is optional and must be purchased separately.

PC 9 Pin RS-232 To 25 Pin RS-232 Printer
To connect the printer to the RS-232 port of a computer, a null modem cable is needed. If this cable is not available, then one can be fabricated using a 9 pin to 25 pin D male connector, wired as shown in the cable diagram. Programming using the PC is described later. Baud Rate and Format is described later.

PC 25 Pin RS-232 To 25 Pin RS-232 Printer
To connect the printer to the RS-232 port of a computer, a null modem cable is needed. If this cable is not available, then one can be fabricated using a 25 pin to 25 pin D male connector, wired as shown in the cable diagram. Programming using the computer is described later. Baud Rate and Format is described later.

Red Lion Controls RS-232 To RS-232 Printer
To connect the printer with another RLC product using RS-232 communications, a cable must be fabricated using a 25 pin D male connector, wired as shown in the cable diagram. If using the Interval Timer of the printer as a print request to RLC products, then connect the wires marked *.

<table>
<thead>
<tr>
<th>COMPUTER 25 PIN RS-232</th>
<th>PRINTER 25 PIN RS-232</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIN</td>
<td>SIGNAL</td>
</tr>
<tr>
<td>3</td>
<td>RXD</td>
</tr>
<tr>
<td>2</td>
<td>TXD</td>
</tr>
<tr>
<td>7</td>
<td>COMM</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RLC PRODUCT WITH RS-232</th>
<th>PRINTER 25 PIN RS-232</th>
</tr>
</thead>
<tbody>
<tr>
<td>TERM. #</td>
<td>SIGNAL</td>
</tr>
<tr>
<td>* A(+)TXD</td>
<td>3</td>
</tr>
<tr>
<td>* B(+)RXD</td>
<td>2</td>
</tr>
<tr>
<td>* R(-) COMM</td>
<td>7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>USER INPUT COMM</th>
<th>* USER Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>* User Input</td>
<td>* User Input</td>
</tr>
</tbody>
</table>

- Terminal numbers will vary from unit to unit.
- If using Interval Timer Print Request

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
Red Lion Controls RS-485 to RS-232 Printer

To interface the printer with an RLC product using RS-485 communications, a cable must be fabricated using a 25 pin D male connector to the ICM4 (RS485 to RS232 converter) and another cable from the ICM4 to the RLC product per the shown cable diagram. The printer will print the unit’s address when it is setup on the RLC unit. If using the Interval Timer of the printer as a request print to RLC products, then connect the wires marked *. (There is no minimum baud rate for ICM4 operations, when communications from RS485 to RS232 only.)

<table>
<thead>
<tr>
<th>RLC PRODUCT WITH RS-485</th>
<th>CM4 CONVERTER</th>
<th>PRINTER 25 PIN RS-232</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TERM. #</strong></td>
<td><strong>SIGNAL</strong></td>
<td><strong>PIN</strong></td>
</tr>
<tr>
<td>★ TX/RX B(-)</td>
<td>1 TXB TXD</td>
<td>7</td>
</tr>
<tr>
<td>★ RX/TX A(+)</td>
<td>2 TXA RXA</td>
<td>5</td>
</tr>
<tr>
<td>★ COMM</td>
<td>3 COMM</td>
<td>10</td>
</tr>
</tbody>
</table>

User Input Comm
* User Input
* If using Interval Timer Print Request
★ Terminal numbers will vary from unit to unit.

Red Lion Controls 20mA Serial Loop to RS-232 Printer

With 20 mA serial communications, multiple RLC products can be on the same loop and send data to the printer. The printer will print the unit’s address when it is setup on the RLC unit. For RS232 to 20 mA use a RLC GCM converter and then use the below cable diagram. A 25DP male to 25DP male cable is needed between the printer and GCM. If using the Interval Timer of the printer as a request print to RLC products, then connect the wires marked *.

<table>
<thead>
<tr>
<th>RLC PRODUCT WITH 20 mA</th>
<th>RLC GCM 20mA to RS232</th>
<th>PRINTER 25 PIN RS-232</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TERM. #</strong></td>
<td><strong>SIGNAL</strong></td>
<td><strong>+12VDC COMM</strong></td>
</tr>
<tr>
<td>★ S+</td>
<td></td>
<td>680Ω</td>
</tr>
<tr>
<td>★ SI-</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>★ SO+</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>★ SO-</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>★ -20mA SRC</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>★ +20mA SRC</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Must have SO+ to +20mA SRC connected for RLC Gemini products.
★ Terminal numbers will vary from unit to unit.

INSTALLING PAPER
When the printer is out of paper, the yellow DTR/EOP LED will blink. Printer power must be on to install paper.
To replace the paper supply, pull the front bezel forward, insert a new roll of paper and thread as shown in the diagram. Repeatedly press <FEED> to advance the paper over the ribbon and through the front panel.

INSTALLING RIBBON (Dot Matrix Only)
To replace the ribbon, pull the installed ribbon cartridge forward to remove. Insert the new cartridge with the paper under the ribbon. Turn the knob toward the arrow to tighten the ribbon.
Note: Remove the ribbon if printer will be idle for more than two weeks.

FRONT PANEL DESCRIPTION

LEDs
PWR (green): When lit power is on.
DTR/EOP (yellow): When lit printer is On-Line.
When flashing printer is out of paper.

FUNCTION KEYS
ON-LINE:
<SLCT>: Press to change printer from on-line to off-line mode.
On-Line: The DTR/EOP LED is on.
<ADVN>: Press when printer is Off-Line to advance paper five lines.
<TEST>: Press to print program version, time, date and count value of printer.
<FEED>: Press to advance paper one line.

OFF-LINE:
<SLCT>: Press to change printer from off-line to on-line mode.
Off-Line: The DTR/EOP LED is off.
<ADVN>: Press when printer is On-Line to advance paper five lines.
<TEST>: Press when printer is Off-Line to enter Printer Set Mode menus
<TEST>: Press to print program version, time, date and count value of printer.
<FEED>: Press to advance paper one line.
**FRONT PANEL PROGRAMMING**

**Main Set Menu**

With DTR/EOP on, press <SLCT> then <ADVN> to access the menu below:

- **<SLCT>** EXIT SET MODE: Exits the Set Mode and places the printer on-line.
- **<ADVN>** BAUD RATE AND PARITY: See Baud Rate and Parity section.
- **<TEST>** CLOCK/CALENDAR/INTERVAL: See Clock/Calendar/Counter/Interval Timer Section.
- **<FEED>** PRINT FEATURES: See Print Features Section.

**PRINT AND CHARACTER FEATURES**

From the Main Set Menu, press <FEED> to access the menu below:

**Fields for Print and Character Features**

- **<SLCT>** EXIT SET MODE: Exits the Set Mode and places the printer on-line.
- **<ADVN>** BACKUP TO PREVIOUS MENU: Exits to Main Set Menu.
- **<TEST>** ADVANCE FIELD SELECTED: Advances selections in the field marked with “Æ” (This arrow indicates the changeable field).
- **<FEED>** GO TO THE NEXT FIELD: Moves “Æ” to the next field.

**Example:**

<table>
<thead>
<tr>
<th>Field</th>
<th>Selections For Print And Character Features Fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>LINE : Prints as soon as a complete line of characters is stored or when a Carriage Return Form Feed Vertical Tab or Line Feed is received. (Default)</td>
</tr>
<tr>
<td></td>
<td>BUFFER : Only prints when 2K buffer is full or with CTRL D.</td>
</tr>
<tr>
<td>B</td>
<td>NORMAL : The bottom of the characters come out of the printer first. (Default)</td>
</tr>
<tr>
<td></td>
<td>INVERTED : The top of the characters come out of the printer first. First line transmitted is printed last.</td>
</tr>
<tr>
<td>C</td>
<td>H07 : Character normal height 7 dots (Default)</td>
</tr>
<tr>
<td></td>
<td>H14 : Character expanded height 14 dots</td>
</tr>
<tr>
<td>D</td>
<td>W05 : Character width 5 dots (Default)</td>
</tr>
<tr>
<td></td>
<td>W10 : Character width 10 dots (Dot Matrix Only)</td>
</tr>
<tr>
<td>E</td>
<td>CRLF: If Carriage Return and Line Feed is received it is converted to LF OR after a full line both Carriage Return and Line Feed is ignored. (Default)</td>
</tr>
<tr>
<td></td>
<td>All: All Carriage Returns and Line Feeds are processed.</td>
</tr>
<tr>
<td>F</td>
<td>F30 : 30 character per line</td>
</tr>
<tr>
<td></td>
<td>F40 : 40 character per line (Default)</td>
</tr>
<tr>
<td></td>
<td>F24, F32 (Default), F40, F42, F48, F64: Thermal</td>
</tr>
</tbody>
</table>

Printer returns to default settings with a serial CTRL X command. The clock/calendar/counter stamp and program menus will always print in normal height and width.

**Clock/Calendar/Counter/Interval Timer Features**

From the **Main Set Menu**, press **<TEST>** to access the menu below:

- **<SLCT>** EXIT SET MODE: Exits the Set Mode and places the printer on-line.
- **<ADVN>** BACKUP TO PREVIOUS MENU: Exits to Main Set Menu.
- **<TEST>** CLOCK/CALENDAR FORMAT: Formats printout of Clock/Calendar/Counter/Interval Timer Section.
- **<FEED>** CLOCK/CALENDAR SET: Sets Clock/Calendar/Counter/Interval Timer.

**Fields for Clock/Calendar/Counter/Interval Timer Set**

From the Selection Mode Menu, press <FEED> to access the menu below:

- **<SLCT>** EXIT SET MODE: Exits the Set Mode and places the printer on-line.
- **<ADVN>** BACKUP TO PREVIOUS MENU: Exits to Main Set Menu.
- **<TEST>** ADVANCE FIELD SELECTED: Advances selections in the field marked with “Æ” (This arrow indicates the changeable field).
- **<FEED>** GO TO THE NEXT FIELD: Shows the value entered and moves “Æ” to the next field.

**Example:**

```
Æ  21  :30  04 /24 /98 0000 OFF
```

Field | Selections for Clock/Calendar/Counter/Interval Timer Set Fields
A | 00-24: Sets hours in 24 hour format. Press <TEST> for each hour to be advanced.
B | 00-59: Sets minutes. Press <TEST> for each minute to be advanced.
C | 00-12: Sets month. Press <TEST> for each month to be advanced.
D | 00-31: Sets date. Press <TEST> for each date to be advanced.
E | 00-99: Includes year. Press <TEST> for each year to be advanced.
F | 0000-9999: Sets line counter (counts number of Carriage Returns). Press <TEST> to reset to 0000.
G | OFF 05S 15S 30S 02M 02M 05M 15M 30M 01H 02H 04H 06H 08H 12H 24H

Sets the interval time between the pulsing of the Interval Timer pin 6. Press <TEST> for each time period to be advanced and displayed.

* Value will advance without display indication. Press <FEED> to review.

**Fields for Clock/Calendar/Line Counter Format**

From the Selection Mode Menu, press **<TEST>** to access the menu below:

- **<SLCT>** EXIT SET MODE: Exits the Set Mode and places the printer on-line.
- **<ADVN>** BACKUP TO PREVIOUS MENU: Exits to Main Set Menu.
- **<TEST>** ADVANCE FIELD SELECTED: Advances selections in the field marked with “Æ” (This arrow indicates the changeable field).
- **<FEED>** GO TO THE NEXT FIELD: Moves “Æ” to the next field.

**Example:**

```
Æ  ON  HH:MM :SS MM/DD /YY COUNT ON
```

Field | Selections for Clock/Calendar/Counter/Interval Timer Formats
A | Enabled | Disabled
B | ON | OFF | Clock Printout
C | HH:MM | : | Hours & Minutes Printout
D | :SS | : | Seconds Printout
E | /YY | / | Year Printout
F | COUNT ON | COUNT OFF | Line counter printout

The values and formats are saved and the clock/calendar continues to run during power down by an internal nonreplaceable battery. The time date stamp will not occur until one second after the final carriage return of a transmission. The line counter will continue to count carriage returns even if the line counter printout is off.
**Baud Rate and Parity Features**

From the Main Set Menu, press <ADVN> to access the menu below:

*Note: Before setting Baud Rate and Parity be sure to review the interfaced RLC product limitations. See DIP Switches for default settings.*

**Fields for Baud Rate and Parity Features**

- **<SLCT> EXIT SET MODE**: Exits the Set Mode and places the printer on-line.
- **<ADVN> BACKUP TO PREVIOUS MENU**: Exits to Main Set Menu
- **<TEST> ADVANCE FIELD SELECTED**: Advances selections in the field marked with “Æ” (This arrow indicates the changeable field).
- **<FEED> GO TO THE NEXT FIELD**: Moves “Æ” to the next field

**Example:**

<table>
<thead>
<tr>
<th>Field</th>
<th>Selections for Baud Rate and Parity Fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>150 300 600 1200 1800 2400 4800 9600: Baud Rate</td>
</tr>
<tr>
<td>B</td>
<td>7 8: DATA</td>
</tr>
<tr>
<td>C</td>
<td>EVEN ODD NONE: Parity Set</td>
</tr>
</tbody>
</table>

**Interval Timer Output**

This printer has an NPN Open Collector transistor 100 msec output closure between pin 6 and pin 7. To use this output, wire pin 6 to the user input or print request terminals of Red Lion Control products and pin 7 to RLC common. This user input must be in the sinking position (active low) to perform a print request from the printer. With this configuration, the printer could be programmed to have the RLC product send it’s data to the printer on a timer interval basis. The interval can be programmed by the front panel or by serial communications. The Interval Timer transmits [05] by RS232 when this output is activated. Wiring for single product Interval Timer print request was shown previously.

**DIP Switches**

The printer communication protocol can be changed by the front panel or by DIP switches located inside the printer. When power is cycled to the printer, the printer WILL ALWAYS DEFAULT to the DIP switch settings. It is preferred to set the printer communication (Baud Rate and Parity) protocol by the following DIP switch tables. After setting the DIP switches, cycle power to the printer to enable the new settings.

**Factory Setting**: 2400 baud, Data 7, Parity Enable, Parity Odd

**Baud Rate**

<table>
<thead>
<tr>
<th>Switch#</th>
<th>150</th>
<th>300</th>
<th>600</th>
<th>1200</th>
<th>1800</th>
<th>2400</th>
<th>4800</th>
<th>9600</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>2</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>3</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
</tbody>
</table>

**Format**

<table>
<thead>
<tr>
<th>Switch#</th>
<th>Data7 Bit</th>
<th>Data8 Bit</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>5</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>6</td>
<td>ON</td>
<td>OFF</td>
</tr>
</tbody>
</table>

**Two Or More Products Printing At Same Time**

At least a 100 msec time delay is needed between transmissions, when more than one RLC product is sending information to the printer at the same time. The Interval Timer output of the printer or other print request device must be parallel from the first RLC user input to a RLC timer or other time delay device or relay. The delayed output from these units would then go to the second RLC product user input. An additional time delay is needed for each additional RLC product. Wiring for this is shown below.

**Wiring for Multi-product**

**Print Request Transmission Time Delay**

The RS232, RS485, and 20 mA wiring is not shown here.
**SERIAL PROGRAMMING**

The following ASCII commands and ESCAPE functions can be used in a PC using a terminal emulator program (available from Red Lion Controls in SMD programs). The ASCII commands can be programmed into messages of Red Lion Controls ADI or MDI message display products. To print messages in the ADI/MDI the message DESTINATION must be on TRANSMIT and after each message to be printed add a Carriage Return. In the ADI/MDI CONFIGURATION file the XON/XOFF should be OFF.

### ASCII Printer Commands

<table>
<thead>
<tr>
<th>Address Decimal</th>
<th>Hex</th>
<th>Control Keys (Letters are CAPS)</th>
<th>Symbols in MDI/ADI</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>[00]</td>
<td>CTRL @</td>
<td>☛</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>[01]</td>
<td>CTRL A</td>
<td>☝</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>[02]</td>
<td>CTRL B</td>
<td>☞</td>
<td>Select character per line: Dot Matrix - 30</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Thermal - 24</td>
</tr>
<tr>
<td>3</td>
<td>[03]</td>
<td>CTRL C</td>
<td>☯</td>
<td>Select character per line: Dot Matrix - 40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Thermal - 32</td>
</tr>
<tr>
<td>4</td>
<td>[04]</td>
<td>CTRL D</td>
<td>✴</td>
<td>End of Text or print buffer</td>
</tr>
<tr>
<td>5</td>
<td>[05]</td>
<td>CTRL E</td>
<td>▲</td>
<td>Transmitted by Interval Timer</td>
</tr>
<tr>
<td>6</td>
<td>[06]</td>
<td>CTRL F</td>
<td>△</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>[07]</td>
<td>CTRL G</td>
<td>★</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>[08]</td>
<td>CTRL H</td>
<td>☆</td>
<td>Back Space: Remove previous character.</td>
</tr>
<tr>
<td>9</td>
<td>[09]</td>
<td>CTRL I</td>
<td>§</td>
<td>Horizontal Tab: Advances four spaces in line.</td>
</tr>
<tr>
<td>10</td>
<td>[0A]</td>
<td>CTRL J</td>
<td>＄</td>
<td>Line Feed: Advance to beginning of next line.</td>
</tr>
<tr>
<td>11</td>
<td>[0B]</td>
<td>CTRL K</td>
<td>!</td>
<td>Vertical Tab: Advance 5 lines.</td>
</tr>
<tr>
<td>12</td>
<td>[0C]</td>
<td>CTRL L</td>
<td>®</td>
<td>Form Feed: Advance 10 lines.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(SLK Key sends &lt;XON&gt; [12] when pressed.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>[0D]</td>
<td>CTRL M</td>
<td>☼</td>
<td>Carriage Return: Advance beginning next line.</td>
</tr>
<tr>
<td>14</td>
<td>[0E]</td>
<td>CTRL N</td>
<td>♬</td>
<td>All characters expanded height. (14 dots)</td>
</tr>
<tr>
<td>15</td>
<td>[0F]</td>
<td>CTRL O</td>
<td>☢</td>
<td>All characters normal height. (7 dots)</td>
</tr>
<tr>
<td>16</td>
<td>[10]</td>
<td>CTRL P</td>
<td>†</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>[12]</td>
<td>CTRL R</td>
<td>††</td>
<td>Print Head On: Turns print head on after an off.</td>
</tr>
<tr>
<td>19</td>
<td>[13]</td>
<td>CTRL S</td>
<td>☠</td>
<td>XOFF</td>
</tr>
<tr>
<td>20</td>
<td>[14]</td>
<td>CTRL T</td>
<td>☷</td>
<td>MDI/ADI software can not use this character.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Does not turn off DTR/EOP LED</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>[16]</td>
<td>CTRL V</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>[17]</td>
<td>CTRL W</td>
<td>▼</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>[18]</td>
<td>CTRL X</td>
<td>→</td>
<td>Resets printer to defaults.</td>
</tr>
<tr>
<td>25</td>
<td>[19]</td>
<td>CTRL Y</td>
<td>↑</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>[1A]</td>
<td>CTRL Z</td>
<td>↔</td>
<td></td>
</tr>
</tbody>
</table>

**Num. Lock numbers must be used for ALT commands.**

### Escape Key [ESC] Printer Functions

<table>
<thead>
<tr>
<th>Command (Letters must be CAPS)</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ESC]E</td>
<td>Auto print clock/calendar/counter. Enter once to Auto print after each carriage return per [ESC]F format.</td>
</tr>
<tr>
<td>[ESC]F{Format Character}</td>
<td>Format print clock/calendar/line counter per Auto print [ESC]E.</td>
</tr>
<tr>
<td>[ESC]D</td>
<td>Disable print clock/calendar/line counter. Enter once to stop Auto print [ESC]E.</td>
</tr>
<tr>
<td>[ESC]T{Format Character}</td>
<td>Single serial transmit clock/calendar/line counter per this format.</td>
</tr>
<tr>
<td>[ESC]P{Format Character}{CTRL M}</td>
<td>Single print clock/calendar/line counter per this format.</td>
</tr>
<tr>
<td>[ESC]S{time date}{CTRL M}</td>
<td>Set {time and date} 24 hour format: HH:MM:SS MM/DD/YR. Example: [ESC]S26:30:00 01/24/98{CTRL M}</td>
</tr>
<tr>
<td>[ESC]C</td>
<td>Reset line counter to 0000.</td>
</tr>
<tr>
<td>[ESC]@</td>
<td>Disable interval timer.</td>
</tr>
<tr>
<td>[ESC]?</td>
<td>Prints current interval timer settings.</td>
</tr>
<tr>
<td>[ESC]I{Interval Character}</td>
<td>Set interval timer (see Interval Timer Chart for Interval Character).</td>
</tr>
<tr>
<td>[ESC]M</td>
<td>Normal mode: Bottom of the character prints first. (Default)</td>
</tr>
<tr>
<td>[ESC]M</td>
<td>Inverted mode: Top of the character prints first. First line transmitted is printed last.</td>
</tr>
<tr>
<td>[ESC]ML{CTRL D}</td>
<td>Line mode: Prints as soon as a complete line of characters is stored or when a Carriage Return, Form Feed, Vertical Tab, or Line Feed is received. (Default)</td>
</tr>
<tr>
<td>[ESC]E</td>
<td>Enter once to stop Auto print [ESC]E.</td>
</tr>
<tr>
<td>[ESC]F{Format Character}</td>
<td>Command (Letters must be CAPS)</td>
</tr>
<tr>
<td>[ESC]M{time date}</td>
<td>See the Clock/Calendar/Line Counter Format Chart for Format Character.</td>
</tr>
<tr>
<td>[ESC]MA</td>
<td><strong>See the font size chart for format number.</strong></td>
</tr>
<tr>
<td>[ESC]F{Format Number**}</td>
<td>Format font size for thermal models.</td>
</tr>
</tbody>
</table>

*See the Clock/Calendar/Line Counter Format Chart for Format Character. **See the font size chart for format number.

**Note: CTRL X: Resets printer to Default.**

### Print Head On/Off

This printer has a Print Head On/Off function. The Print Head Off (CTRL U) serial command function allows other communications to be on the serial loop without being printed. For example, the Red Lion Controls products ADI and MDI can ask for embedded data from other products on the loop without the communications being printed. The Print Head On (CTRL R) serial command function will then turn the printer back on allowing the next information to be printed. These commands can be in separate ADI/MDI messages or in the same message.

**Single Message Example:**

Message: CTRL U Test A CTRL R Test B Carriage Return

Print Result: Test B
Clock/Calendar/Line Counter Format Chart
This chart is only used for Escape Functions F, T, and P.

<table>
<thead>
<tr>
<th>Format Character</th>
<th>Hours/Minutes</th>
<th>Seconds</th>
<th>Month/Day</th>
<th>Years</th>
<th>Line Counter</th>
</tr>
</thead>
<tbody>
<tr>
<td>@</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>A or I</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>B or R</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>C or S or K</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>D</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>E or M</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>F or V</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>G or O or W</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>H</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>J or Z</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>L</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>N or ^</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>P</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>Q</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>T</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>U</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>X</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>Y</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>[</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>]</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
<td>■</td>
</tr>
</tbody>
</table>

Interval Timer Chart
This chart is only used for Escape Function I.

<table>
<thead>
<tr>
<th>Interval Character</th>
<th>Interval Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>@</td>
<td>OFF</td>
</tr>
<tr>
<td>A</td>
<td>5 sec</td>
</tr>
<tr>
<td>B</td>
<td>15 sec</td>
</tr>
<tr>
<td>C</td>
<td>30 sec</td>
</tr>
<tr>
<td>D</td>
<td>1 min</td>
</tr>
<tr>
<td>E</td>
<td>2 min</td>
</tr>
<tr>
<td>F</td>
<td>5 min</td>
</tr>
<tr>
<td>G</td>
<td>15 min</td>
</tr>
<tr>
<td>H</td>
<td>30 min</td>
</tr>
<tr>
<td>I</td>
<td>1 hour</td>
</tr>
<tr>
<td>J</td>
<td>2 hour</td>
</tr>
<tr>
<td>K</td>
<td>4 hour</td>
</tr>
<tr>
<td>L</td>
<td>6 hour</td>
</tr>
<tr>
<td>M</td>
<td>8 hour</td>
</tr>
<tr>
<td>N</td>
<td>12 hour</td>
</tr>
<tr>
<td>O</td>
<td>24 hour</td>
</tr>
<tr>
<td>?</td>
<td>prints current setting</td>
</tr>
</tbody>
</table>

For additional explanations of these settings, see Interval Timer Output.

Font Size Chart
This chart is only used for Escape Function F.

<table>
<thead>
<tr>
<th>Font Number</th>
<th>Font Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td>1</td>
<td>32</td>
</tr>
<tr>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>3</td>
<td>42</td>
</tr>
<tr>
<td>4</td>
<td>48</td>
</tr>
<tr>
<td>5</td>
<td>64</td>
</tr>
</tbody>
</table>

Printing From a PC or Similar Terminal Device
The printer requires a Carriage Return/Line Feed combination in order to print the last line of ASCII text from a PC or similar terminal device. This is known as the “Enter” or “NewLine” key on a keyboard.

For Red Lion Controls PARADIGM Operator Interfaces, this is accomplished by programming the function “PrintNewLine()” after the text to be printed.

For G3 Operator Interfaces, this is accomplished by programming the function “/R” after the text to be printed.

Unwanted Multiple Transmissions of Same Data
In some products, multiple transmissions of the same data may occur when using the Red Lion Controls’ product front button (print request). This is normal operation for those products. When using the product’s user input and multiple transmissions of the same data occurs, the following could help:
1) Lower the User Input active pulse length to just below a single transmission time. (With this printer, the Interval Timer output is at fixed 100 msec. pulse length.)
2) Lower the baud rate of the transmission to the slowest possible.
3) Add mnemonics, serial unit address, or more than one parameter to the transmissions.
LIMITED WARRANTY

The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company’s liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company’s option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products.

The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or sub-contractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.

No warranties expressed or implied are created with respect to The Company’s products except those expressly contained herein. The Customer acknowledges the disclaimers and limitations contained herein and relies on no other warranties or affirmations.
MODEL ENC8 - NEMA 4 ENCLOSURES FOR CUB4, CUB5, & DT7 UNITS

ENC8A & ENC8B - FIBERGLASS ENCLOSURES

DESCRIPTION

These enclosures are designed for applications requiring a water resistant instrument enclosure. The enclosures are fabricated of polycarbonate and are designed to withstand NEMA 4X/IP65 wash-down applications. The enclosures must be drilled to accept conduit fittings or other types of wiring connectors. The enclosures can be used free-standing, or securely fastened to a mounting surface.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENC8A000</td>
<td>Fiberglass Enclosure for single units</td>
</tr>
<tr>
<td>ENC8B000</td>
<td>Fiberglass Enclosure for units with an MLPS attached</td>
</tr>
</tbody>
</table>

For More information on Pricing, Enclosures & Panel Mount Kits, refer to the RLC Catalog or contact your local RLC Distributor.

ENC8A INSTALLATION

1. Determine the location of the conduit fitting and drill the necessary hole. Install the fitting and bring the wiring into the enclosure.
2. Slide the panel gasket over the rear of the unit to the back of the bezel.
3. Assemble nut fastener and mounting screw onto both sides of the mounting clip. The tip of the screw should not project from the hole in mounting clip.
4. Install the unit through the opening in the front of the lid until the bezel flange contacts the panel.
5. Slide the mounting clip over the rear of the unit until the mounting clip is against the inside of the enclosure. The mounting clip has latching features which engage into mating features on the unit’s housing.
6. Alternately tighten each screw to ensure uniform gasket pressure. Visually inspect the front panel gasket. The gasket should be compressed to about 75 to 80% of its original thickness (Recommended torque is 28 to 36 in-oz.). If not, gradually turn mounting screws to further compress the gasket.
7. If the gasket is not adequately compressed, and the mounting screws can no longer be turned, loosen the mounting screws and check that the mounting clip is latched as close as possible to the inside of enclosure. Repeat the procedure for tightening the screws.
8. Connect the necessary wires to the unit for the application desired.
9. Assemble the enclosure with the screws provided. Alternately tighten each screw to ensure uniform gasket pressure.
ENC8B w/ MLPS Installation

Installing a unit with an MLPS attached requires some planning. It is recommended that the unit with the MLPS attached be temporarily installed in the enclosure to determine the best location for the conduit fitting to avoid interference with the MLPS.

1. Determine the location of the conduit fitting and drill the necessary hole.
2. Install the fitting and bring the wiring into the enclosure.
3. Remove the common and V+ screw terminals from the rear of the unit (save for later use) and replace them with the stand-offs (supplied with the MLPS).
4. Assemble nut fastener and mounting screw onto both sides of the mounting clip. The tip of the screw should not project from the hole in mounting clip.
5. Install the unit through the opening in the front of the lid until the bezel flange contacts the panel mounted gasket.
6. Slide the mounting clip over the rear of the unit until the mounting clip is against the inside of the enclosure. The mounting clip has latching features which engage into mating features on the unit’s housing.

Note: It is necessary to hold the unit in place when sliding the mounting clip into position.

7. Alternately tighten each screw to ensure uniform gasket pressure. Visually inspect the front panel gasket. The gasket should be compressed to about 75 to 80% of its original thickness (Recommended torque is 28 to 36 in-oz.). If not, gradually turn mounting screws to further compress the gasket.
8. If the gasket is not adequately compressed, and the mounting screws can no longer be turned, loosen the mounting screws and check that the mounting clip is latched as close as possible to the inside of enclosure. Repeat the procedure for tightening the screws.

9. Mount the MLPS and optional sensor wires needed, to the stand-offs using the screw terminals from the unit with the supplied square washers.
10. Connect AC power to the terminal block of the MLPS.
11. After all electrical connections have been made, assemble the enclosure with the screws provided. Alternately tighten each screw to ensure uniform gasket pressure.

ENC8 - STEEL ENCLOSURE

DESCRIPTION

This enclosure is designed for use with the CUB4, CUB5, & DT7 units. The enclosures are large enough to accommodate a Micro-line Power Supply (MLPS) attached to the unit. These rugged enclosures are fabricated of formed steel with all seams welded to withstand NEMA 4/IP65 wash-down applications. The kits are coated with a durable black polyurethane finish.

The holes for conduit fittings or other types of wiring connectors can be drilled through the removable rear access panel, or through the enclosure itself. The enclosures can be free standing or securely fastened to a mounting surface with the brackets and hardware found in the mounting kit (provided with the enclosure). The brackets also allow the enclosure to be raised and/or tilted from the mounting surface in order to achieve the most favorable operating position. Provided are four self-stick foot pads that can be applied to the bottom of the enclosure to protect the mounting surface. The foot pads are particularly useful for free standing installations.

DIMENSIONS In inches (mm)

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENC8</td>
<td>NEMA 4/IP65 ENCLOSURE</td>
<td>ENC80000</td>
</tr>
</tbody>
</table>

For More information on Pricing, Enclosures & Panel Mount Kits, refer to the RLC Catalog or contact your local RLC Distributor.
**ENC8 INSTALLATION**

It is recommended to wire the unit before mounting it in the enclosure to ensure good electrical connections. The following steps outline the most common sequence for installing a unit without an MLPS attached.

1. Determine the location of the conduit fitting and drill the necessary hole.
2. Apply adhesive side of panel gasket to rear enclosure opening.
   **DO NOT APPLY THE ADHESIVE SIDE OF THE GASKET TO THE ACCESS PANEL.**
3. Slide the panel gasket over the rear of the unit to the back of the bezel.
4. Assemble nut fastener and mounting screw onto both sides of the mounting clip. The tip of the screw should not project from the hole in mounting clip.
5. Route the wire to be connected to the unit from the conduit fitting through the mounting clip, and then through the rear of the enclosure and out the front.
6. Connect the necessary wires to the unit for the application desired.
7. Install the unit through the opening in the front of the enclosure until the bezel flange contacts the panel.
8. Slide the mounting clip over the rear of the unit until the mounting clip is against the inside of the enclosure. The mounting clip has latching features which engage into mating features on the unit’s housing.
   **Note: It is necessary to hold the unit in place when sliding the mounting clip into position.**
9. Alternately tighten each screw to ensure uniform gasket pressure. Visually inspect the front panel gasket. The gasket should be compressed to about 75 to 80% of its original thickness (Recommended torque is 28 to 36 in-oz.). If not, gradually turn mounting screws to further compress the gasket.
10. If the gasket is not adequately compressed, and the mounting screws can no longer be turned, loosen the mounting screws and check that the mounting clip is latched as close as possible to the inside of the enclosure. Repeat the procedure for tightening the screws.
11. Attach the rear access panel to the enclosure with the eight screws provided.
12. Connect AC power to the terminal block of the MLPS.
13. Mount the MLPS and optional sensor wires needed, to the stand-offs using the screw terminals from the unit with the supplied square washers.
14. After all electrical connections have been made, attach the rear access panel to the enclosure with the eight screws provided.
15. Alternately tighten each screw to ensure uniform gasket pressure. Visually inspect the sponge rubber gasket. The gasket should be compressed to about 75 to 80% of its original thickness.

---

**ENC8 w/ MLPS Installation**

Installing a unit with an MLPS attached requires some planning. It is recommended that the unit with the MLPS attached be temporarily installed in the enclosure to determine the best location for the conduit fitting to avoid interference with the MLPS.

1. Mark the location of the conduit fitting and drill the necessary hole.
2. Apply adhesive side of panel gasket to rear enclosure opening.
   **DO NOT APPLY THE ADHESIVE SIDE OF THE GASKET TO THE ACCESS PANEL.**
3. Slide the panel gasket over the rear of the unit to the back of the bezel.
4. Assemble nut fastener and mounting screw onto both sides of the mounting clip. The tip of the screw should not project from the hole in mounting clip.
5. Route the wire to be connected to the unit from the conduit fitting through the mounting clip, and then through the rear of the enclosure and out the front.
6. Connect the necessary wires to the unit for the application desired.
7. Install the unit through the opening in the front of the enclosure until the bezel flange contacts the panel.
8. Slide the mounting clip over the rear of the unit until the mounting clip is against the inside of the enclosure. The mounting clip has latching features which engage into mating features on the unit’s housing.
   **Note: It is necessary to hold the unit in place when sliding the mounting clip into position.**
9. Alternately tighten each screw to ensure uniform gasket pressure. Visually inspect the front panel gasket. The gasket should be compressed to about 75 to 80% of its original thickness (Recommended torque is 28 to 36 in-oz.). If not, gradually turn mounting screws to further compress the gasket.
10. If the gasket is not adequately compressed, and the mounting screws can no longer be turned, loosen the mounting screws and check that the mounting clip is latched as close as possible to the inside of the enclosure. Repeat the procedure for tightening the screws.
11. Attach the rear access panel to the enclosure with the eight screws provided.

---

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
MOUNTING THE ENCLOSURE

1. Self-stick foot pads may be applied to the features on the bottom of the enclosure to protect the mounting surface.

2. To securely mount the enclosure, attach the adjustable mounting brackets to the enclosure using the plastic washers and screws. Mounting brackets may be attached to the top or bottom of the enclosure.

3. Secure the adjustable mounting brackets to mounting location with the screws provided.

LIMITED WARRANTY

The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to one year from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company’s liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company’s option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products.

The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or sub-contractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.

No warranties expressed or implied are created with respect to The Company’s products except those expressly contained herein. The Customer acknowledges the disclaimers and limitations contained herein and relies on no other warranties or affirmations.
MODEL ENC11 - NEMA 4/IP65 1/16 DIN ENCLOSURES

- RUGGED STEEL CONSTRUCTION
- COMPLETELY SEALED FOR WASH-DOWN
- VERSATILE MOUNTING OPTIONS FOR MACHINE OR DESK-TOP

DESCRIPTION
This enclosure is designed for applications requiring a water resistant instrument enclosure. The enclosure is fabricated of formed steel with all seams welded to withstand NEMA 4/IP65 wash-down applications. The kit is coated with a durable flat black polyurethane finish.

Electrical connections to the enclosed instrument are easily made through a removable access panel at the rear of the enclosure. The panel must be drilled to accept conduit fittings or other types of wiring connectors.

The enclosure can be used free-standing or securely fastened to a mounting surface with brackets which are provided with each enclosure. The brackets also allow the enclosure to be raised and/or tilted from the mounting surface in order to achieve the most favorable operating position. Self-stick rubber pads are provided which can be applied to the bottom of the enclosure. These rubber pads will protect the mounting surface and are particularly useful for free-standing installations.

DIMENSIONS “In inches (mm)”

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENC11</td>
<td>NEMA 4 Enclosure for 1/16 DIN Units</td>
<td>ENC11000</td>
</tr>
</tbody>
</table>
MODEL FCOR - FERRITE SUPPRESSION CORE

DESCRIPTION

This Ferrite suppression core is packaged in a nylon case ready to clamp on a single cable or several cables connecting to electronic equipment. The purpose of the core is to attenuate conducted Electro-Magnetic Interference (EMI) in the 25 MHz to 200 MHz range. Increasing the number of cable turns through the core increases the impedance of the core. A higher impedance results in greater EMI attenuation.

Placing more than one core on a cable increases the impedance at a slower rate than adding turns to one core. The impedance for multiple cores is equal to the sum of each core’s impedance. For a given application, start with a single core using 2 turns. Add additional turns or additional cores as necessary.

Note: Increasing the number of turns beyond two will tend to degrade performance at higher frequencies (see Specifications).

Place the cores on the cables as close to the equipment as possible unless the equipment is mounted in a shielded enclosure and the source of the EMI is from outside the enclosure. In this case, place the cores on the cable just inside or outside the entry point of the enclosure.

APPLICATION

Ferrite core used for suppressing common-mode noise.

IN = Common-mode Noise Current
ZL = Load Impedance
VS = Signal Voltage
VN = Common-mode Noise Voltage

SPECIFICATIONS

1. MAX. CABLE DIAMETER: 0.390" (9.9 mm)
2. IMPEDANCE (OHMS):

<table>
<thead>
<tr>
<th># OF TURNS</th>
<th>25 MHz MIN.</th>
<th>100 MHz ±20%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>110</td>
<td>225</td>
</tr>
<tr>
<td>2</td>
<td>440</td>
<td>900</td>
</tr>
<tr>
<td>4</td>
<td>1760</td>
<td>1000</td>
</tr>
</tbody>
</table>

# OF TURNS = The number of times the cable passes through the core.
3. WEIGHT: 0.63 oz. (18 g)

DIMENSIONS “In inches (mm)”

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCOR</td>
<td>Ferrite Suppression Core</td>
<td>FCOR0000</td>
</tr>
</tbody>
</table>
**MODEL LFIL - GENERAL PURPOSE LINE FILTER**

**DESCRIPTION**
This line filter can be used in AC or DC power supply lines to attenuate conducted Electro-Magnetic Interference (EMI). EMI is the most common cause of erratic operation in electronic equipment. Line filters should be installed close to electronic equipment and mounted directly to a metal enclosure that is connected to earth ground (protective earth).

*Note: Always connect the earth lead of the filter to the power line ground (protective earth).*

The ideal location for the line filter is directly inside the metal enclosure in which the unit is mounted when the source of EMI is external to the enclosure (See Figure 1). Mount the filter where the power enters the enclosure. If the enclosure contains many different types of equipment or EMI generating devices, such as motors or contactors, then the EMI source may be inside the enclosure. In this case, mount the line filter as close to the unit as possible (See Figure 2).

If the panel and enclosure are non-conductive, then the power feed ground is the only earth ground connection. Connecting only the earth lead of the filter to the earth ground without mounting the filter directly to a metal enclosure will not be as effective.

**DIMENSIONS “In inches (mm)”**

![Figure 1](metal_enclosure_side_view.png)

![Figure 2](metal_panel_rear_view.png)

**SPECIFICATIONS**
1. **CURRENT RATING:** 1.15 A @ 25°C ; 1 A @ 40°C
2. **LEAKAGE CURRENT:** 0.21 mA/Lead @ 220 V, 50 Hz
3. **INDUCTANCE:** 3 mH
4. **INSERTION LOSS:**
   - 150 KHz: 30 dB
   - 1.0 MHz: 47 dB
   - 10 MHz: 55 dB
5. **CONNECTIONS:** Flexible wires 20 AWG
6. **HIPOT TEST VOLTAGE:** 2 KV, 50 Hz
7. **MAX OPERATING VOLTAGE:** 250 VAC, 50/60 Hz
8. **OPERATING FREQUENCY:** DC to 400 Hz
9. **TEMPERATURE RANGE:** -25°C to +85°C
10. **WEIGHT:** 2.29 oz. (65 g)

UL recognized component
(Schaffner Electronik AG, PN# FN610-1/07, File # E64388 (M))

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFIL</td>
<td>General Purpose Line Filter</td>
<td>LFIL0000</td>
</tr>
</tbody>
</table>

**BLOCK DIAGRAM**

![Block Diagram](block_diagram.png)

Bulletin No. LFIL-X
Drawing No. LP0380
Revised 1/01

Tel +1 (717) 767-6511
Fax +1 (717) 764-0839
www.redlion-controls.com

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
MODEL MLPS - MICRO-LINE POWER SUPPLY

- PROVIDES +12 VDC POWER TO BACKLIGHT VERSIONS OF THE MICRO-LINE SERIES
- 115/230 VAC SWITCH SELECTABLE
- 12 VDC OUTPUT @ 80 mA
- EASILY ATTACHED TO BACKLIGHT VERSIONS

DESCRIPTION
The Model MLPS is a +12 VDC power supply designed to attach to the rear of backlight versions of the Micro-Line Series. The MLPS can be powered from either a 115 V AC or 230 V AC source and is switch selectable.

Caution: The maximum output current of the MLPS is 80 mA. Check the specifications of the specific counter(s)/indicator(s) and sensor(s) being used to ensure that total current requirements do not exceed 80 mA.

SAFETY SUMMARY
All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

SPECIFICATIONS
1. POWER REQUIREMENTS: Switch selectable 115/230 V AC (±10%), 50/60 Hz, 3 VA. The unit is shipped from factory in the 230 V AC position.
2. POWER OUTPUT: +12 VDC (+5/-25%) @ 80 mA max.
   The MLPS is listed in the UL Recognized Component Directory Category QQFU2 as having an Output category (OC) of NEC Class 2.
3. ENVIRONMENTAL CONDITIONS:
   Operating Temperature: 0 to 60°C
   Storage Temperature: -30 to 75°C
   Operating and Storage Humidity: 85% max. (non-condensing) from 0°C to 50°C.
   Altitude: Up to 2000 meters
4. CERTIFICATIONS AND COMPLIANCES:
   SAFETY
   UL Recognized Component, File # E143054, UL1012, CSA 22.2 No. 107.1 Recognized to U.S. and Canadian requirements under the Component Recognition Program of Underwriters Laboratories Inc.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>MLPS</td>
<td>Micro Line/Sensor Power Supply</td>
<td>MLPS0000</td>
</tr>
</tbody>
</table>

DIMENSIONS in inches (mm)

- 2.65 (67.3)
- 2.60 (66)
- 1.85 (47)
- 1.30 (33)

* SEE APPROPRIATE LITERATURE FOR UNIT DIMENSIONS

UL Recognized Component, File # E143054
Drawing No. LP0231
Released 4/03

Tel +1 (717) 767-6511
Fax +1 (717) 764-0839
www.redlion-controls.com
**SPECIFICATIONS (Cont’d)**

4. **CERTIFICATIONS AND COMPLIANCES:** (Cont’d)
   - IECEE CB Scheme Test Certificate # US/5685/UL
   - CB Scheme Test Report # 01/ME22279-01302002
   - Issued by Underwriters Laboratories, Inc.
   - IEC 1010-1, EN 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1.

**ELECTROMAGNETIC COMPATIBILITY**

<table>
<thead>
<tr>
<th>Immunity to EN 50082-2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrostatic discharge</td>
<td>EN 61000-4-2</td>
</tr>
<tr>
<td>Electromagnetic RF fields</td>
<td>EN 61000-4-3</td>
</tr>
<tr>
<td>Fast transients (burst)</td>
<td>EN 61000-4-4</td>
</tr>
<tr>
<td>RF conducted interference</td>
<td>EN 61000-4-6</td>
</tr>
<tr>
<td>Power frequency magnetic fields</td>
<td>EN 61000-4-8</td>
</tr>
</tbody>
</table>

5. **CONSTRUCTION:** High impact black plastic. Two hex stand-offs and two washers included. Installation Category II, Pollution Degree 2.

6. **CONNECTION:** Two position terminal block which accepts one 14 AWG wire (torque terminal screws to 5 inch-lbs. [-6Nm]).

7. **WEIGHT:** 4 oz (113 g)

---

**INSTALLATION ENVIRONMENT**

The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

**Installation Procedure**

The MLPS is shipped with all the necessary hardware to mount to the rear of an installed backlight version Micro-Line unit. The user must remove the common and V+ screw terminals on the rear of the Micro-Line unit (Save these screw terminals for later use). Install the 1/4” hex drive stand-offs into the common and V+ terminals. The MLPS is then mounted to the stand-offs using the screw terminals from the compatible Micro-Line unit with the supplied square washers. AC power can then be connected to the terminal block of the MLPS.

**Note:** Make sure the A.C. selector switch is set to the appropriate position before applying power to the unit.

---

**TROUBLESHOOTING**

For further technical assistance, contact technical support at the appropriate company numbers listed.
**MODEL MLPS1 and MLPS2 - MICRO-LINE POWER SUPPLIES**

- PROVIDES POWER FOR THE MICRO-LINE SERIES
- MLPS1: 12 VDC OUTPUT @ 400 mA
- MLPS2: 24 VDC OUTPUT @ 200 mA
- EASILY ATTACHED TO BACK OF DT8, CUB4 AND CUB5

**DESCRIPTION**

The Model MLPS power supplies are designed to attach to the rear of the Micro-Line Series. The MLPS1 provides a 12 VDC output, while the MLPS2 provides a 24 VDC output. Both supplies can be powered from an 85-250 V AC source.

**Caution:** The maximum output current of the MLPS1 is 400 mA and the MLPS2 is 200 mA. Check the specifications of the specific counter(s)/indicator(s) and sensors(s) being used to ensure that total current requirements do not exceed the respective values of the power supplies.

**SAFETY SUMMARY**

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

**DIMENSIONS In inches (mm)**

- EXISTING PANEL: 2.65 (67.3)
- MOUNTING CLIP: 2.60 (66)
- MLPS UNIT: 95 (47)
- 1.30 (33)

**SPECIFICATIONS**

1. **POWER REQUIREMENTS:** 85-250 VAC, 50/60 Hz, 14 VA.
2. **POWER OUTPUT:**
   - MLPS1: +16 VDC max @ 4 mA; 11.5 VDC min @ 400 mA
   - MLPS2: +26 VDC max @ 0 mA; 22 VDC min @ 200 mA
3. **ENVIRONMENTAL CONDITIONS:**
   - Operating Temperature: 0 to 60°C
   - Storage Temperature: -30 to 75°C
   - Operating and Storage Humidity: 85% max. (non-condensing) from 0°C to 50°C.
   - Altitude: Up to 2000 meters
4. **CERTIFICATIONS AND COMPLIANCES:**
   - **SAFETY**
     - UL Recognized Component, File # E179259, UL 61010-1, CSA C22.2 No. 61010-1
     - Recognized to U.S. and Canadian requirements under the Component Recognition Program of Underwriters Laboratories, Inc.
     - Output meets Class 2 power requirements per UL 1310.
     - IECEE CB Scheme Test Certificate # US/8946/UL, CB Scheme Test Report # E179259-V2-S1
     - Issued by Underwriters Laboratories, Inc.
   - **ELECTROMAGNETIC COMPATIBILITY**
     - Emissions and Immunity to EN 61326: Electrical Equipment for Measurement, Control and Laboratory use.
   - **Immunity to Industrial Locations:**
     - Electrostatic discharge EN 61000-4-2 Criterion A
     - 4 kV contact discharge
     - 8 kV air discharge
     - Criterion A
     - 10 V/m Criterion A
     - Fast transients (burst) EN 61000-4-4 Criterion A
     - 2 kV power
     - 1 kV signal
     - Surge EN 61000-4-5 Criterion B
     - 1 kV L-L, 2 kV L-N-E power
     - 1 kV signal
     - RF conducted interference EN 61000-4-6 Criterion A
     - 2 kV L-N-E power
     - Voltage dip/interruptions EN 61000-4-11 Criterion A
     - 3 V/rms
     - 0.5 cycle
   - **Emissions:**
     - EN 55011 Class B

**NOTES:**

2. Criterion B: Temporary loss of performance from which the unit self-recovers.
3. **CONSTRUCTION:** High impact black plastic. Mounting hardware included. Installation Category II, Pollution Degree 2.
4. **CONNECTION:** Two position terminal block which accepts one 14 AWG wire (torque terminal screws to 5 inch-lbs. [0.56 N-m]).
5. **WEIGHT:** 2 oz (47 g)
**INSTALLATION ENVIRONMENT**

The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

**Installation Procedure**

The MLPS is shipped with all the necessary hardware to mount to the rear of an installed Micro-Line unit. Refer to the instructions that correspond to your Micro-Line unit for proper installation.

**TROUBLESHOOTING**

For further technical assistance, contact technical support at the appropriate company numbers listed.

The user must remove the common and V+ screw terminals on the rear of the Micro-Line unit. Install the 1/4" hex drive stand-offs into the common and V+ terminals. The MLPS is then mounted to the stand-offs using the screw terminals and square washers. AC power can then be connected to the terminal block of the MLPS.

The user must remove the common and V+ screw terminals on the rear of the Micro-Line unit. Install the 3/16" hex drive stand-offs into the common and V+ terminals. The MLPS is then mounted to the stand-offs using the supplied screws and square washers. AC power can then be connected to the terminal block of the MLPS.
## SPECIFICATIONS

1. **CONTACT RATING:** 4 Amps @ 125 V AC or 28 VDC; 2 Amps @ 250 V AC.
2. **ELECTRICAL LIFE:** 10,000 make-and-break cycles at full load.
3. **CONTACT RESISTANCE:** Below 10 mΩ typical.
4. **INSULATION RESISTANCE:** $10^9$ Ω min.
5. **DIELECTRIC STRENGTH:** 1,000 V RMS min. @ sea level.
6. **INDEXING:** 90° 2 position.
7. **CONSTRUCTION:** Zinc alloy with nickel plated finish.
8. **CERTIFICATIONS AND COMPLIANCES:**
   - UL Recognized Component, File #E42363
   - Recognized to U.S. and Canadian requirements under the Component Recognition Program of Underwriters Laboratories, Inc.
   - CSA Certified #LR49546

UL recognized component
(C&K, PN# Y-101-14-2B-203-NQ, File # E42363)

### ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>PKS1</td>
<td>PANEL KEY SWITCH</td>
<td>PKS10000</td>
</tr>
</tbody>
</table>

### DIMENSIONS “In inches (mm)”

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>PANEL CUT-OUT</td>
<td>.36</td>
<td>(9.1)</td>
</tr>
<tr>
<td></td>
<td>.19</td>
<td>(4.9)</td>
</tr>
<tr>
<td></td>
<td>.22</td>
<td>(5.7)</td>
</tr>
<tr>
<td></td>
<td>.93</td>
<td>(23.6)</td>
</tr>
<tr>
<td></td>
<td>.63</td>
<td>(16.0)</td>
</tr>
<tr>
<td></td>
<td>.64</td>
<td>(16.3)</td>
</tr>
</tbody>
</table>

### TYPICAL APPLICATIONS

#### LGB

![Typical Application Diagram](image)

#### CUB4L

![Typical Application Diagram](image)

#### OPERATION

- **PIN 1 & PIN 8** CLOSED
- **PIN 1 & PIN 3** OPEN
- **PIN 1 & PIN 8** OPEN
- **PIN 1 & PIN 3** CLOSED

---

**ORDERING INFORMATION**

- **MODEL NO.** PKS1
- **DESCRIPTION** PANEL KEY SWITCH
- **PART NUMBER** PKS10000
The PMK8 panel mount adapter kit is used to mount a PAX meter into an existing GEMINI panel cut-out. The kit includes two durable steel mounting plates painted black and a neoprene gasket. The Adapter Kit, when used with a meter which has NEMA 4/IP65 specifications, will meet NEMA 4/IP65 requirements when properly installed.

**PMK8 INSTALLATION**

1. Apply the panel gasket (*provided with the meter*) over the PAX meter.
2. Insert the PAX meter through the mounting plate.
3. Apply the panel gasket (*provided with the adapter kit*) over the PAX meter behind the mounting plate.
4. Insert the PAX meter with mounting plate and gaskets into the front of the existing Gemini hole cut-out. Slide the adapter plate over the rear of the PAX meter.
5. Slide the panel latch (*provided with the meter*) over the rear of the PAX meter and tighten the screws.

---

**MODEL PMK8 - PANEL MOUNT ADAPTER KIT FOR PAX TO GEMINI CUT-OUT**

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMK8</td>
<td>Panel Mount Adapter Kit (PAX to Gemini)</td>
<td>PMK80000</td>
</tr>
</tbody>
</table>
DESCRIPTION
Cub Counters and Ditak Tachometers are basically self-powered devices and do not have built-in capability for powering electronic sensors or accepting high level sensor outputs. The PSMA provides a convenient plug-in answer to those applications requiring electronic sensors or accessories for pulse input to Cub Counters or Ditak Tachometers.

The PSMA is available in 115 VAC and 230 VAC primary power input versions, and delivers regulated D.C. voltage for sensors and accessories. The signal conditioning amplifier can accept NPN or PNP Open Collector Inputs, or 2-Wire Proximity Sensor Inputs.

The signal conditioning amplifier supplies two separate outputs, one for direct drive to the H.S. Input of Cub Counters, and the other for direct drive input to the PSM Input of the Ditak. A "pulse stretcher" is used in the circuit that provides the output drive to Cub Counters (Terminal 4). This stretcher allows the PSM to accept 50 µsec input pulses, standard on some Red Lion Controls' sensors and accessories, and expand it to the 100 µsec pulse, as required by the Cub Counters. The Ditak output (Terminal 8) is not pulse stretched, allowing this output to continue functioning to the full 10 KHz limit of the Ditak.

SPECIFICATIONS
1. POWER SOURCE: 2 versions, for 115 VAC ±10% 50/60 Hz, or 230 VAC ±10% 50/60 Hz. (See Ordering Information.)
2. POWER OUTPUT TO SENSORS OR ACCESSORIES: 12 VDC regulated ±5%, 100 mA max.
3. INPUT SIGNAL: (Terminal 3) NPN Open Collector (sink), PNP Open Collector (source), or 2-wire Input. Built-in 3.3 K resistor (Terminal 5) can be jumper connected for pull-up, pull-down, or left unconnected as required. Input Schmidt trigger levels as shown on BLOCK DIAGRAM.
4. OUTPUTS: (Terminal 4) Bi-polar drive to H.S. Input of Cub Counters supplies 100 µsec negative going logic pulse (switches from +3 to 0 volts) in response to a trailing (negative going) edge of the input pulse. This output will drive up to 3 Cub Counters in parallel. (Terminal 8) NPN Loaded Collector to drive the input of Ditaks. The output voltage on this terminal is in phase with the input signal going into Terminal 3. The high level of this voltage will be clamped to 6.2V by the zener diode in the Ditak. This output can drive up to 3 Ditak units.
5. OPERATING FREQUENCY: 0 to 5 KHz with Cub Counters; 0 to 10 KHz with Ditaks.

ALLOWS CUB COUNTERS & DITAK TACHOMETERS TO OPERATE WITH:
2-WIRE PROXIMITY SENSORS,
ROTARY PULSE GENERATORS,
LOGIC MAGNETIC PICKUPS,
MEASURING WHEEL LENGTH SENSORS,
CLOCK OSCILLATOR MODULES,
-- AND MANY OTHER SENSORS, CIRCUITS AND ACCESSORIES

* PSMA intended for use with Cub 1, 2, and 7 Counters and Ditak 8 and 9 Tachometers.
**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSMA</td>
<td>Power Supply &amp; Interface Module (less socket), 115 V AC</td>
<td>PSMA1000</td>
</tr>
<tr>
<td></td>
<td>Power Supply &amp; Interface Module (less socket), 230 V AC</td>
<td>PSMA2000</td>
</tr>
<tr>
<td>-</td>
<td>Base Mount, 8-Pin Octal Socket</td>
<td>SKT10000</td>
</tr>
<tr>
<td>-</td>
<td>Din Rail Mount, 8-Pin Octal Socket</td>
<td>SKTDIN00</td>
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</tbody>
</table>

**DIMENSIONS In inches (mm)**

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.38&quot; (60.5)</td>
<td>1.75&quot; (44.5)</td>
</tr>
</tbody>
</table>
MODEL PT600 - POTENTIAL TRANSFORMER

DESCRIPTION
The PT600 Potential Transformer allows voltages up to 600 VAC to be monitored with Red Lion Controls instruments that accept AC voltage signals. The transformer reduces the voltage by a factor of 5:1, which provides a maximum output of 120 VAC.

The core and coil assembly is encased in a thermoplastic shell and filled with resin. The transformer is designed for operation line-to-line. It may also be operated line-to-ground or line-to-neutral at reduced voltage (58% of rated voltage).

It is recommended to use a 0.40 Amp fuse in the secondary circuit to protect the transformer. This transformer is ANSI C57.13 group 2 certified.

VOLTAGE TRANSFORMER FUSES
The National Electric Code requires that all voltage transformers installed indoors or in an enclosure shall be fused in the primary circuit with devices rated 15 amperes or less. This arrangement will protect the supply from faults internally in the transformer, but faults in the secondary circuit may not rupture the primary fuse. It is suggested that the user fit secondary circuit fuses to protect the transformer from such faults. The recommended fuse rating is 125% of rated full load amperes, with a maximum of 167%, again referring to the National Electric Code.

When fusing either the primary or the secondary circuits of voltage transformers that are connected line-to-ground, only one fuse should be fitted line side so that the transformer cannot remain energized from a line connection while the grounded neutral fuse is ruptured.

LINE TO LINE

REQUIRED
H1 X1
PRIMARY SECONDARY
L
L
OPTIONAL
TO UNIT

LINE TO GROUNDED NEUTRAL

REQUIRED
H1 X1
PRIMARY SECONDARY
N
H2
X2
OPTIONAL
TO UNIT

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>VOLTAGE RATING</th>
<th>TURNS RATIO</th>
<th>PART NUMBER</th>
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<tbody>
<tr>
<td>PT600</td>
<td>600 : 120</td>
<td>5 : 1</td>
<td>PT600120</td>
</tr>
</tbody>
</table>

DIMENSIONS “In inches (mm)”

| 1.50 (38.1) | 3.78 (96.0) | 2.5 (6.4) |
| 5.5 (145.4) | 3.06 (77.7) | 4.0 (101.6) |
| 1.89 (42.9) |
| 3.00 (76.2) |

UL recognized component
(Sunshine Scientific Instruments, Inc., PN# 467-600, UL File #E93779)
MODEL RLY5 - SOLID STATE POWER UNIT

- Switches up to 45 amperes @ 240 VAC
- Low level DC input control signal (3-32 VDC)
- Optically-isolated output
- Zero voltage turn-on, zero current turn-off for reduced RFI
- Internal snubbers to reduce false triggering related to high dv/dt applications
- Supplied with high efficiency heatsink for superior thermal and surge current ratings

GENERAL DESCRIPTION
The SSR Power Unit is a solid state relay which can switch load currents up to 45 Amperes @ 240 VAC. The unit interfaces directly with a SSR Drive Module (OMD00003). The input and output terminals are isolated from each other to eliminate ground loops and noise problems. The unit features a zero voltage turn-on and a zero current turn-off detector to minimize radiated RFI when switching. An internal snubber minimizes inrush currents and guards against false triggering of the output; related to high dv/dt applications. A low DC control signal of +3 to +32 VDC is all that is needed for the switching operation. The solid state switch, highlighted by the inverse-parallel SCR output, provides a greatly increased operational life over a mechanical relay by avoiding the usual relay contact problems: arcing, bouncing, mechanical failure, etc. The solid state relay is shipped mounted to the high efficiency heatsink for immediate installation.

SPECIFICATIONS

OUTPUT SPECIFICATIONS
1. Operating Voltage Range: 50-280 VAC RMS
2. Operating Frequency Range: 47-63 Hz
4. Maximum Surge Load Current: See Peak Surge Current Curve
5. Minimum Load Current: 40 mA RMS
6. Maximum Off-State Leakage Current: 10 mA RMS
7. Maximum Transient Voltage: 600 V peak
8. Maximum Output Voltage Drop: 1.6 V peak
9. Power Dissipation at Full Load: 50 Watts
10. Maximum I^2T: 1600A^2 sec
    (For Fusing Purposes, t = 8.3 msec)

INPUT SPECIFICATIONS
(Use with RLC SSR Drive Module, OMD00003)
1. Control Voltage Range: 3 to 32 VDC
2. Maximum Turn-on Voltage: 3 VDC
3. Minimum Turn-off Voltage: 1 VDC
4. Maximum Reverse Voltage: -32 VDC
5. Minimum Input Impedance: 1500 Ω
6. Maximum Turn-on/Turn-off time: 8.3 msec

GENERAL SPECIFICATIONS
1. Isolation (Input to Output to Base): 4000 V RMS
2. Insulation Resistance: 10 GΩ
3. Operating Temperature Range: -30° to +75°C
4. Storage Temperature Range: -40° to +120°C

INSTALLATION
It is recommended to mount the unit outside of an enclosure in an area where there is unrestricted air flow. The unit should always be mounted with the fins in a vertical position to maximize heat dissipation. If mounting the unit inside an enclosure, the internal temperature of the enclosure will normally be higher than the surrounding area and must be accounted for. At full rated load, the unit will dissipate 50 watts and achieve a case temperature in excess of 90°C. In all installations, it is important to allow at least two inches around the power unit for proper ventilation.
**FUSING**

The output of the SSR Power Unit should be protected by a fast blow I2t fuse (Bussman KAX-30 or equivalent). This guards against long duration surge currents, short circuits, etc., which may damage the SSR Power Unit.

**MECHANICAL INTERRUPT SWITCH**

The off-state output leakage current of the power unit is 10 mA maximum. The voltage level of the output will rise proportional to the resistance of the load due to this leakage current. Full line voltage can be measured when the output is connected to a high resistance load and the power unit is in the off-state. A mechanical interrupt switch (double pole) should be placed between both sides of the line voltage and the load. The switch should be opened when servicing any part of the output wiring. When measuring the off-state output voltage of the unit for correct operation, load the output of the SSR Power Unit with a small resistance (approximately 100 ohms).

**SNUBBING**

The power unit has internal snubbers to guard against transients generated by most loads. Loads with low power factors (i.e. motors) may require additional external snubbing network.

**SURGE CURRENT**

When the SSR Power Unit switches a load on, an in-rush (surge) current that is higher than the continuous load current will flow. The surge current can be estimated from the table below which outlines the ratio of surge to steady state current for various load devices. The surge current duration must be within the Safe Operating Area of the Peak Surge Current vs. Time Figure. Surge currents outside the safe operating area will shorten the life of or cause permanent damage to the power unit.

**CONNECTIONS**

Separate power feed lines should be run to the load side of the relay. The controller unit and the load should NEVER share the same power feed. It is recommended to install the SSR Power Unit as close to the load as possible to keep the power cable runs short. This will help reduce noise from radiating into other equipment. The input control signal cable can be run over distances in excess of 200 ft. with shielded cable from the controller to the SSR power unit. Connect the shield to the minus “-” terminal of the control signal, on the SSR Power Unit and at only one end.

**MULTIPLE UNITS**

For increased power handling, up to four SSR Power Units may be parallel connected and all controlled by a single output of an SSR Drive Module (OMD00003). The output of the SSR Power Units must NOT be parallel connected to the same load because of unequal current sharing among the devices. The outputs should be wired to individual heaters, but they may share the same supply. If five or more SSR Power Units are required, a Relay Output Module (OMD00000) may be used in conjunction with an external +12 VDC power source (RLC Model APS01000) to switch the SSR Power Units.

**OPERATION**

The following are important aspects of operation of the SSR power unit which must be considered. Adhering to these guidelines will ensure reliable and trouble free operation.

**THERMAL RATING CURVES**

The Thermal Rating Curve will determine the maximum allowable ambient operating temperature for the maximum continuous load current. The two parameters must intersect in the Safe Operating Area of the graph. Operation outside the safe operating area will shorten the life of or cause permanent damage to the SSR Power Unit. The ambient temperature of the power unit should be measured with all of the associated equipment operating to verify the Thermal Ratings.
MODEL RLY6/RLY6A - SINGLE PHASE DIN RAIL MOUNT SOLID STATE RELAY

GENERAL DESCRIPTION

The RLY60000 is a solid state relay that switches load currents up to 25 A; the RLY6A000 switches load currents up to 40 A. These units feature a zero voltage turn-on detector to minimize radiated RFI when switching. An internal snubber guards against false triggering of the output related to high dv/dt applications. A low level DC control signal of 4 to 32 VDC is all that is needed for the switching operation. These units, highlighted by the inverse-parallel SCR output, provide a greatly increased operational life over mechanical relays by avoiding the usual relay contact problems such as: arcing, bouncing, and mechanical failure.

The RLY6/RLY6A can be directly controlled by logic/SSR drive output or sourcing output of Red Lion Controls products.

SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the literature or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so, can be potentially harmful to persons or equipment in the event of a fault to the unit.

SPECIFICATIONS

OUTPUT SPECIFICATIONS

1. OPERATING VOLTAGE RANGE: 24 to 660 VAC
2. OPERATING FREQUENCY RANGE: 47 to 63 Hz
3. MAXIMUM CONTINUOUS LOAD CURRENT: (See Safe Operating Conditions)
   RLY6: 25 A<sub>RMS</sub>
   RLY6A: 40 A<sub>RMS</sub>
4. SURGE CURRENT:
   RLY6:
   - Non-Repetitive 1 Cycle: 250 A<sub>PEAK</sub>
   - Non-Repetitive 1 Second: 100 A<sub>PEAK</sub>
   RLY6A:
   - Non-Repetitive 1 Cycle: 250 A<sub>PEAK</sub>
   - Non-Repetitive 1 Second: 150 A<sub>PEAK</sub>
5. MIN. LOAD CURRENT: 100 mA
6. LEAKAGE CURRENT @ V<sub>OUT</sub> (Max.): 8 mA
7. OVER VOLTAGE RATING: 1400 PIV
8. VOLTAGE DROP @ I<sub>OUT</sub>: 1.5 VAC
9. POWER DISSIPATION AT FULL LOAD:
   RLY6: 25.0 Watts
   RLY6A: 48.0 Watts
SPECIFICATIONS (Cont’d)

10. I2T FUSING: 1035 A’s
   (For Fusing Purposes, T = 8.3 msec.)
11. Dv/Dt @ VOUT (Max.): 500 V/µsec

INPUT SPECIFICATIONS
1. CONTROL VOLTAGE RANGE: 4 to 32 VDC
2. TURN-ON VOLTAGE (MIN.): 4 VDC
3. TURN-OFF VOLTAGE (MAX.): 1 VDC
4. REVERSE VOLTAGE PROTECTION: -75 VDC
5. INPUT CURRENT (MAX.): 8 mA

GENERAL SPECIFICATIONS
1. ISOLATION (INPUT TO OUTPUT TO BASE): 4000 V rms
2. CAPACITANCE INPUT TO OUTPUT: 3 pF
3. OPERATING TEMPERATURE RANGE: -40°C to +80°C

SAFE OPERATING CONDITIONS
   The relay must always operate within the “Safe Operating Area” of the Derating Curve Figure. Operations outside the Safe Operating Area will shorten the life of, or cause permanent damage to, the relay. The ambient temperature should be measured 1” (25 mm) below the relay (when mounted to a vertical surface) and with all of the associated equipment operating.

   It is strongly recommended that a 0.18” (4.6 mm) clearance is maintained on all four sides of the relay. If the relays are mounted against each other, then the end relays must be derated by additional 10% (of the Derating Curve) and the middle relays by 20%.

   In small enclosures, adequate ventilation must be provided to assure proper safe operating temperature. Accumulation of dust and dirt on the heat sink fins will also affect heat dissipation. In extreme dust and dirt conditions, the relay must be derated by additional 20%.

   Devices such as electromechanical circuit breakers and slow blow fuses cannot react quickly enough to protect this relay in a shorted condition. Fast “semiconductor fuses” with appropriate I2T ratings are strongly recommended.

MECHANICAL INTERRUPT SWITCH
   The off-state leakage current of the power unit is 8 mA maximum. The voltage level of the output will rise proportional to the resistance of the load due to this leakage current. Full line voltage can be measured when the output is connected to a high resistance load and the power unit is in the off-state.

   A mechanical interrupt switch is recommended between both sides of the line voltage and the load. The switch should be opened when servicing any part of the output wiring. When measuring the off-state output voltage of the unit for correct operation, load the output of the RLY6/RLY6A with a small resistance (approximately 100 ohms).

WIRING GUIDELINES
   The controlling device and the relay load should NEVER share the same power feed. It is recommended that this relay be installed as close as possible to the load to keep the power cable runs short. The control voltage can run over distances in excess of 200 feet with shielded cable. If using shielded cable, connect the shield to the minus “-” terminal of the control signal at one end only.

ORDERING INFORMATION

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<th>DESCRIPTION</th>
<th>PART NUMBERS</th>
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<tr>
<td>RLY6</td>
<td>25 A Single Phase Din Rail Mount Solid State Relay</td>
<td>RLY60000</td>
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<td>RLY6A</td>
<td>40 A Single Phase Din Rail Mount Solid State Relay</td>
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LIMITED WARRANTY
The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company’s liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company’s option. The Company disclaims all liability for any affirmation, promise or representation with respect to the product.

The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, death, property damage, lost profit, and other matters which RLC, its employees, or sub-contractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as more in effect or as amended hereafter.

No warranties expressed or implied are created with respect to The Company’s products except those expressly contained herein. The Customer acknowledges the disclaimers and limitations contained herein and relies on no other warranties or affirmations.
MODEL RLY7 - THREE PHASE DIN RAIL MOUNT SOLID STATE RELAY

- INTEGRATED HEAT SINK
- OPTICALLY ISOLATED
- SOLID STATE SWITCHING
- 25 A THREE PHASE OUTPUT RATING
- 24 TO 660 VAC SWITCHING
- 4 TO 32 VDC CONTROL SIGNAL
- ZERO VOLTAGE TURN-ON
- MOUNTS ON DIN RAIL OR DIRECTLY TO PANEL
- 4000 VOLT ISOLATION
- BUILT-IN SNUBBER
- LED "ON" INDICATOR
- CAGE CLAMP TERMINATIONS

GENERAL DESCRIPTION
The RLY7 is a three phase solid state relay that switches load currents up to 25 A. The unit features a zero voltage turn-on detector to minimize radiated RFI when switching. An internal snubber guards against false triggering of the output related to high dv/dt applications. A low level DC control signal of 4 to 32 VDC is all that is needed for the switching operation. This unit, highlighted by the inverse-parallel SCR output, provides a greatly increased operational life over a mechanical relay by avoiding the usual relay contact problems such as: arcing, bouncing, and mechanical failure.

The RLY7 can be directly controlled by logic/SSR drive output or sourcing output of Red Lion Controls products.

SAFETY SUMMARY
All safety related regulations, local codes and instructions that appear in the literature or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use this unit to directly command motors, valves, or other actuators not equipped with safeguards. To do so, can be potentially harmful to persons or equipment in the event of a fault to the unit.

SPECIFICATIONS

OUTPUT SPECIFICATIONS
1. Operating Voltage Range: 24 to 660 VAC
2. Operating Frequency Range: 47 to 63 Hz
3. Maximum Continuous Load Current: 25 Amps (3 pole), 35 Amps (2 pole)
   (See Safe Operating Conditions)
5. Min. Load Current: 100 mA
6. Leakage Current @ VOUT (Max.): 10 mA
7. Peak Blocking Voltage: 1400 VAC
8. Voltage Drop @ IOUT: 3 VAC
9. I²T Fusing: 1350 A²sec
   (For Fusing Purposes, T = 8.3 msec.)
10. Dv/Dt @ VOUT (Max.): 1000 V/μsec

DIMENSIONS In inches (mm)

UL Recognized Component, File #E191578

Bulletin No. RLY7-C
Drawing No. LP0472
Released: 6/08

Tel +1 (717) 767-6511
Fax +1 (717) 764-0839
www.redlion.net

CAUTION: Risk of Danger.
Read complete instructions prior to installation and operation of the unit.

CAUTION: Risk of electric shock.

SPECIFICATIONS

OUTPUT SPECIFICATIONS
1. Operating Voltage Range: 24 to 660 VAC
2. Operating Frequency Range: 47 to 63 Hz
3. Maximum Continuous Load Current: 25 Amps (3 pole), 35 Amps (2 pole)
   (See Safe Operating Conditions)
5. Min. Load Current: 100 mA
6. Leakage Current @ VOUT (Max.): 10 mA
7. Peak Blocking Voltage: 1400 VAC
8. Voltage Drop @ IOUT: 3 VAC
9. I²T Fusing: 1350 A²sec
   (For Fusing Purposes, T = 8.3 msec.)
10. Dv/Dt @ VOUT (Max.): 1000 V/μsec
**INPUT SPECIFICATIONS**
1. Control Voltage Range: 4 to 32 VDC
2. Turn-on Voltage (Min.): 4 VDC
3. Turn-off Voltage (Max.): 1 VDC
4. Input Current (Max.): 15 mA

**GENERAL SPECIFICATIONS**
1. Isolation (Input to Output to Base): 4000 V RMS
2. Operating Temperature Range: 0°C to 40°C

**SAFE OPERATING CONDITIONS**
The relay must always operate within the “Safe Operating Area” of the Derating Curve Figure. Operations outside the Safe Operating Area will shorten the life of, or cause permanent damage to, the relay. The ambient temperature should be measured 1” (25 mm) below the relay (when mounted to a vertical surface) and with all of the associated equipment operating.

It is strongly recommended that a 1” (25 mm) clearance is maintained on all four sides of the relay. If the relays are mounted against each other, then the end relays must be derated by an additional 10% (of the Derating Curve) and the middle relays by 20%.

**FUSING**
Devices such as electromechanical circuit breakers and slow blow fuses cannot react quickly enough to protect this relay in a shorted condition. Fast “semiconductor fuses” with appropriate I²T ratings are strongly recommended.

**MECHANICAL INTERRUPT SWITCH**
The off-state leakage current of the power unit is 10 mA maximum. The voltage level of the output will rise proportional to the resistance of the load due to this leakage current. Full line voltage can be measured when the output is connected to a high resistance load and the power unit is in the off-state.

A mechanical interrupt switch is recommended between the line voltage and the load. The switch should be opened when servicing any part of the output wiring. When measuring the off-state output voltage of the unit for correct operation, load the output of the RLY7 with a small resistance (approximately 100 ohms).

**WIRING GUIDELINES**
The controlling device and the relay load should NEVER share the same power feed. It is recommended that this relay be installed as close as possible to the load to keep the power cable runs short. The control voltage can run over distances in excess of 200 feet with shielded cable. If using shielded cable, connect the shield to the minus “–” terminal of the control signal at one end only.

In small enclosures, adequate ventilation must be provided to assure proper safe operating temperature. Accumulation of dust and dirt on the heat sink fins will also affect heat dissipation. In extreme dust and dirt conditions, the relay must be derated by an additional 20%.

**SCHEMATIC**

**ORDERING INFORMATION**

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<th>DESCRIPTION</th>
<th>PART NUMBER</th>
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<td>RLY7</td>
<td>Three Phase Din Rail Mount Solid State Relay</td>
<td>RLY70000</td>
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**THREE PHASE HEATING APPLICATION**
This application shows a Model TCU Temperature Controller regulating the temperature of a drying kiln. The TCU has an SSR Drive Output Module installed. This module controls the three phase relay directly.
**MODEL RS - DIN RAIL RELAY SYSTEM**

- **TERMINAL BLOCKS WITH BUILT-IN RELAY OUTPUTS**
- **SLIM DESIGN SAVES DIN RAIL SPACE**
- **REPLACEABLE RELAY SAVES DOWNTIME**
- **JUMPERS SAVE WIRING TIME**

**DESCRIPTION**

The RS Relay System provides a compact, modular means of adding relay outputs to any transistor output device. The RSRLYB Relay Block serves as the base for a miniature, 24 volt coil relay, capable of switching up to 250 VAC at 6 Amps. Accessories, such as Jumpers, Buss Blocks, and Relay Markers are available to save installation time and money.

**RELAY BLOCK-RSRLYB**

The RS Relay System is built around the Relay Block. The Relay Block is a 6.2 mm wide terminal block that serves as the base for the miniature plug-in relay (included). The relay has a 24 VDC coil, and its SPDT output can switch loads up to 250 VAC at 6 Amps. With its plug-in design, the relay can be replaced in seconds. The Block has a built-in suppression circuit to reduce EMC interference. Other features include an input LED, and reverse polarity protection. The RSRLYB00 is shipped in packages of 5 pieces, with the relay installed.

**DIMENSIONS In Inches (mm)**

![Block Diagram](image)

**SPECIFICATIONS**

1. NOMINAL INPUT VOLTAGE: 24 VDC
2. TYPICAL INPUT CURRENT @ 24 VDC: 9 mA
3. TYPICAL OPERATE TIME: 4 msec
4. TYPICAL RELEASE TIME: 8 msec
5. CONTACT TYPE: SPDT (Form C)
6. CONTACT MATERIAL: AgSnO
7. MAX. CONTACT VOLTAGE: 250 V AC/DC
8. MIN. CONTACT VOLTAGE: 12 V AC/DC
9. LIMITING CONTINUOUS CURRENT: 6 A
10. MAX. INRUSH CURRENT: 30 A
11. MIN. SWITCHING CURRENT: 10 mA
12. MAX. POWER RATING (RESISTIVE LOAD): 140 W

**BLOK DIAGRAM**

**2-POSITION JUMPER-RSJMPR**

The RSJMPR Jumper can be used to bridge connections between adjacent Relay Blocks. This avoids the tedious task of wire-jumping signals such as commons or neutrals together. The maximum current capability of the RSJMPR is 6 A. The RSJMPR is available in three different colors, and is shipped in packages of 20 pieces.

**SPECIFICATIONS**

1. MAX. CURRENT: 6 A
2. LENGTH: 0.24" (6 mm)
3. COLOR: Available in Red, Blue, and Gray
CONTINUOUS JUMPER-RSCJMP

The RSCJMP can be used to bridge up to 80 adjacent Relay Blocks with total currents as high as 30 A. For currents above 6 A, the Buss Block must be used as the starting point. This cut-to-length jumper is available in three colors, and is shipped in packages of 2 pieces.

SPECIFICATIONS
1. MAX. CURRENT: 30 A
2. LENGTH: 19.7” (500 mm)
3. COLOR: Available in Red, Blue, and Gray

BARRIER-RSBARR

The Barrier is always required at the start and end of a Relay System to provide protective separation according to VDC 0106-101. The Barrier should also be used to isolate adjacent Relay Blocks with voltage potentials greater than 250 V. The RSBARR is equipped with prescored breakout points at the bridging positions so that individual bridges can pass through if needed. The RSBARR00 is shipped in packages of 2 pieces.

SPECIFICATIONS
1. COLOR: Black

BUSS BLOCK-RSBUSS

The 9 mm wide Buss Block is the same shape as the RSRLYB Relay Block. It can be used as a starting point for the continuous jumper in applications requiring up to 30 A. In applications that require less than 6 A, the starting point for the jumper(s) can take place at one of the Relay Blocks.

SPECIFICATIONS
1. MAX. CURRENT: 30 A
2. MAX. VOLTAGE: 250 V
3. CONSTRUCTION: Case body is gray, Polymide PA non-reinforced
4. CONNECTIONS: 10 AWG max. Torque 4-6 in-lb.
5. WEIGHT: 0.077 lb. (34.9 g)

RELAY MARKERS-RSMARK

The RSMARK00 Relay Markers can be used to label the Relay Blocks. After labeling or writing on the Marker, it is snapped onto the engagement lever of the Relay Block, providing a visual means of identification. The RSMARK00 is shipped in packages of 100 pieces.

SPECIFICATIONS
1. COLOR: White

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Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
MODEL TMP - QUICK DISCONNECT TEMPERATURE PROBES

GENERAL DESCRIPTION

Model TMP Quick Disconnect Thermocouples are available with both miniature and standard size connector termination. These rugged probes feature a variety of calibration types, sheath materials and diameters, and are available with an ungrounded junction. A high temperature probe is also available that can be mated with a standard female universal connector, as well as a 2 wire universal female connector with a signal amplifier built in. All temperature probes are rated at the tolerance standard SLE, (Special Limits Of Error), which is ±2°C degrees of error. This is half of the standard tolerance grade, providing the highest accuracy possible in the temperature sensing industry.

SPECIFICATIONS

1. SHEATH: Constructed of 304 stainless steel, Inconel 600, or XL (High Temperature Probe only)
2. SHEATH DIAMETER: 0.062" or 0.125"
3. PROBE LENGTH: 12" Ungrounded junction.
4. CONNECTOR BODY: Glass Filled Nylon, rated to 200° C.
5. LEAD LENGTH AND WIRE INSULATION: Sold separately, see accessory details

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* XL probes have a very low drift and are for use in high temperature applications up to 1335° C.
**MODEL TMWS - THERMOCOUPLE WIRE**

**GENERAL DESCRIPTION**
Thermocouple wire is for use with the Mini and Standard Quick Disconnect Temperature Probes. It is available in a variety of insulation and calibration types, and spool lengths.

**SPECIFICATIONS**
1. **WIRE LENGTH**: 25 or 100 Foot Spools
2. **INSULATION**: Duplex Insulated
3. **TYPE**: 24 AWG Solid Wire
4. **COLOR CODE**: ANSI color codes

**ORDERING INFORMATION**

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<td>J</td>
<td>260</td>
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<td>.056 X .093</td>
<td>TMWSJ100</td>
</tr>
<tr>
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<tr>
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<td></td>
<td>J</td>
<td>482</td>
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<td>TMWGJ100</td>
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<tr>
<td></td>
<td>K</td>
<td>482</td>
<td>GLASS BRAID</td>
<td>.050 X .080</td>
<td>TMWGK100</td>
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<tr>
<td></td>
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<td>200</td>
<td>GLASS BRAID</td>
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<td>E</td>
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<tr>
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<td>TEFLOW PFA</td>
<td>.056 X .092</td>
<td>TMWST025</td>
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<td>TEFLOW PFA</td>
<td>.056 X .092</td>
<td>TMWSE025</td>
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<tr>
<td></td>
<td>K</td>
<td>482</td>
<td>GLASS BRAID</td>
<td>.050 X .080</td>
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<tr>
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<td>T</td>
<td>200</td>
<td>GLASS BRAID</td>
<td>.050 X .080</td>
<td>TMWGT025</td>
</tr>
<tr>
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<td>E</td>
<td>430</td>
<td>GLASS BRAID</td>
<td>.050 X .080</td>
<td>TMWGE025</td>
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</tbody>
</table>

**MODEL TMPCB - RETRACTABLE SENSOR CABLES**

**GENERAL DESCRIPTION**
The retractable sensor cables are color coded and for use with thermocouples and RTD's. The cables have a superior jacket construction, employing the latest in jacketing material: TPE (thermoplastic elastomer), a unique family of thermoplastics which exhibits characteristics previously found only in rubber compounds. TPE is extremely tough and flexible, and has excellent abrasion resistance. This special construction technique yields an expansion rate of up to 500%. These retractable cables are for use with electronic type indicators, either panel, handheld or bench type models.

**SPECIFICATIONS**
1. **INSULATION**: TPE Thermoplastic Elastomer outer jacket
2. **INNER CONDUCTORS**: Teflon
3. **CALIBRATIONS**: J, K, T, E
4. **TEMPERATURE RATING**: -30 to 105ºC (-22 to 220º F)
5. **CONSTRUCTION**: 28 AWG stranded wire (7 strand x 36 gauge)
6. **LENGTH**: 2 feet (600 mm)
7. **COMPATIBLE WITH J, K, T AND E THERMOCOUPLE CALIBRATIONS**
8. **EXPANSION RATIO UP TO 500% - 1 Ft (300 mm) OF CABLE STRETCHES TO 5 Ft (1500 mm)**
9. **IDEAL FOR USE WITH HANDHELD AND BENCH STAND ELECTRONIC INDICATORS**
10. **BARE WIRE ENDS**

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>TYPE</th>
<th>JACKET</th>
<th>+WIRE</th>
<th>-WIRE</th>
<th>PART NUMBER</th>
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<tr>
<td>2 FT RETRACT CABLE</td>
<td>J</td>
<td>BLACK</td>
<td>WHITE</td>
<td>RED</td>
<td>TMPCBS01</td>
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<tr>
<td></td>
<td>K</td>
<td>YELLOW</td>
<td>YELLOW</td>
<td>RED</td>
<td>TMPCBS02</td>
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<tr>
<td></td>
<td>T</td>
<td>BLUE</td>
<td>BLUE</td>
<td>RED</td>
<td>TMPCBS03</td>
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<tr>
<td></td>
<td>E</td>
<td>PURPLE</td>
<td>PURPLE</td>
<td>RED</td>
<td>TMPCBS04</td>
</tr>
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</table>

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
MODEL TMP CN - QUICK DISCONNECT STANDARD CONNECTORS

GENERAL DESCRIPTION
Standard Connectors are for use with the Standard Quick Disconnect TC Probes. They are available in both male and female termination, and include a “write on label” for easy identification. The female standard connector is a universal connector, meaning it can be used to terminate male versions of both the standard and miniature connector.

SPECIFICATIONS
1. CONNECTOR BODY MATERIAL: Glass Filled Nylon, for temperature ranges of -29 to 220°C.
2. CONNECTOR BODY COLOR: ANSI color coded
3. WIRE GAGE: Accepts stranded or solid wire up to 14 AWG
4. WIRE TERMINATION: Combination Phillips/Slot Screws

ORDERING INFORMATION

MODEL TMP CN - QUICK DISCONNECT MINIATURE CONNECTORS

GENERAL DESCRIPTION
Miniature Connectors are for use with the Miniature Quick Disconnect TC Probes. They are available in both male and female termination, and include a “write on label” for easy identification.

SPECIFICATIONS
1. CONNECTOR BODY MATERIAL: Glass Filled Nylon, for temperature ranges of -29 to 220°C.
2. CONNECTOR BODY COLOR: ANSI color coded
3. WIRE GAGE: Accepts stranded or solid wire up to 20 AWG
4. WIRE TERMINATION: Combination Phillips/Slot Screws

ORDERING INFORMATION
LIMITED WARRANTY

The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company’s liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company’s option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products.

The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or sub-contractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.

No warranties expressed or implied are created with respect to The Company’s products except those expressly contained herein. The Customer acknowledges the disclaimers and limitations contained herein and relies on no other warranties or affirmations.
MODEL TMP - FIELD CUTTABLE TEMPERATURE SENSOR PROBES
AND ACCESSORIES

GENERAL DESCRIPTION
Model TMP Thermocouple and RTD Temperature Probes are field cuttable to the desired length. The probes can be trimmed to within 3.5" (88.9 mm) of the probe tip allowing for greater application flexibility. Accessory hardware is available to wire and mount the probes in the user's existing thermowell.

Optional spring loaded fittings (sold separately) slide along the probe sheath to proper immersion depth as determined by the user. These fittings allow for strong contact between the probe and the thermowell to improve response. The spring loaded fittings are adjustable and reusable.

SPECIFICATIONS
1. TYPES:
   Thermocouple: J, K, T, E
   RTD: Platinum, 100 Ω @ 0°C, alpha = 0.00385 (DIN = 43760)
2. RANGE AND ACCURACY:
   Thermocouple

<table>
<thead>
<tr>
<th>TC TYPE</th>
<th>RANGE</th>
<th>ACCURACY</th>
<th>WIRE COLOR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-200 to 0°C</td>
<td>±1.0°C or ±1.5%</td>
<td>blue (+)</td>
</tr>
<tr>
<td></td>
<td>-328 to 32°F</td>
<td>±1.8°F or ±1.5%</td>
<td>red (-)</td>
</tr>
<tr>
<td></td>
<td>0 to 350°C</td>
<td>±1.0°C or ±0.75%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>32 to 682°F</td>
<td>±1.8°F or ±0.75%</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>0 to 900°C</td>
<td>±1.7°C or ±0.5%</td>
<td>violet (+)</td>
</tr>
<tr>
<td></td>
<td>32 to 1682°F</td>
<td>±3.0°F or ±0.5%</td>
<td>red (-)</td>
</tr>
<tr>
<td>J</td>
<td>0 to 750°C</td>
<td>±2.2°C or ±0.75%</td>
<td>white (+)</td>
</tr>
<tr>
<td></td>
<td>32 to 1382°F</td>
<td>±4.0°F or ±0.75%</td>
<td>red (-)</td>
</tr>
<tr>
<td>K</td>
<td>0 to 1250°C</td>
<td>±2.2°C or ±0.75%</td>
<td>yellow (+)</td>
</tr>
<tr>
<td></td>
<td>32 to 2282°F</td>
<td>±4.0°F or ±0.75%</td>
<td>red (-)</td>
</tr>
</tbody>
</table>

   Note: Where the error is given in percent, the percentage applies to the temperature being measured, not the range. Select whichever is greater.

   RTD

<table>
<thead>
<tr>
<th>TEMP °C</th>
<th>ACCURACY ±°C</th>
<th>WIRE COLOR</th>
</tr>
</thead>
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<tr>
<td>-200</td>
<td>.42</td>
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<tr>
<td>-100</td>
<td>.25</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>.26</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>.44</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>.65</td>
<td></td>
</tr>
<tr>
<td>300</td>
<td>.86</td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>1.09</td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>1.34</td>
<td></td>
</tr>
<tr>
<td>600</td>
<td>1.60</td>
<td></td>
</tr>
<tr>
<td>650</td>
<td>1.74</td>
<td></td>
</tr>
<tr>
<td>700</td>
<td>1.80</td>
<td></td>
</tr>
</tbody>
</table>

   Note: Where there is no standard wire colors for RTD probes. When connecting the RTD wiring, two wires are the same color and one is a different color. The two wires of the same color connect to signal (+) and excitation (+). These two wires are interchangeable. The other wire connects to signal common.

3. SHEATH: Constructed of 304 stainless steel with an outside diameter of 0.25" (6.35 mm)
4. THERMOCOUPLE MEASURING JUNCTION:
   Ungrounded thermocouple junction
5. PROBE LENGTH: 2 ft. (0.6 M). Min. length after cutting is 3.5" (88.9 mm).
6. LEAD LENGTH: 6" (152.4 mm) beyond the end of the uncut tube
7. LEAD WIRE INSULATION: Available in Teflon (400°F), Fiberglass (900°F), or High Temperature Fiberglass (1300°F) (Thermocouple only)

ACCESSORIES (sold separately)
Weatherproof Heads:
   Meets NEMA 4/IP65 requirements
   Cast Aluminum
   Protects against dust, rain, splashing, and hose directed water
   Weatherproof gasket
   Stainless steel chain

Terminal Blocks
   2 Terminal Simplex for use with TC's
   3 Terminal for use with RTD's

Spring Loaded Fittings: Connects probe to thermowell and attaches to weatherhead 1/2" NPT X 1/2" NPT Stainless Steel.

Tube Sleeve
   Tube sleeve to protect probe leads from burrs after cutting probe.
**CUTTING THE TUBING**

The thermocouple and RTD probes have a crimp mark located 3" (76.2 mm) from the tip. This indicates the end of the internal seal. Damage to the probe will occur if trimmed within 3.5" (88.9 mm) of the tip.

1. Determine the desired length of the probe and mark with a pen or marker. Secure the probe within a tube vice being careful not to deform or flatten the probe.
2. “Score” the tubing with a tubing cutter. Make one or two revolutions with the cutter. Do not cut completely through the tubing to prevent burrs or a sharp lip on the inside of the tubing.
3. Use a pair of pliers to grasp the excess tubing to be removed.
4. Use a narrow range of motion to slowly work the excess tubing from side to side until it separates from the probe. Using a wide range of motion will deform the tube and prevent installation of the tube sleeve.
5. Remove the excess tubing and trim the leads to the desired length.
6. Install the tube sleeve in the open end of the tube to protect the leads from any sharp edges on the inside of the tube.

**INSTALLATION**

1. Orient the probe and the spring loaded fitting as shown below.
2. Screw the spring loaded fitting one complete turn into the thermowell (not included).
3. Push the probe into the fitting until it touches the bottom of the thermowell.
4. Hold the probe to the bottom of the thermowell and tighten the fitting. This ensures good contact between the probe and the bottom of the thermowell.
5. Completely tighten the fitting into the thermowell.

*Note: The probe must be inserted only as shown below to prevent damage to the fitting.*

If it becomes necessary to separate the probe and the fitting, first disconnect the wires and then unscrew the fitting completely from the thermowell. Pull the probe through the fitting from the end that was screwed into the thermowell. The fitting will present resistance to the probe removal if you attempt to go in the wrong direction.

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>MAX TEMP °F</th>
<th>LEAD INSULATION</th>
<th>TYPE</th>
<th>PART NUMBER</th>
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<tbody>
<tr>
<td>TC Temp Probe</td>
<td>400</td>
<td>Teflon</td>
<td>J</td>
<td>TMP2SU1</td>
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<tr>
<td></td>
<td>900</td>
<td>Fiberglass</td>
<td>J</td>
<td>TMP2SU2</td>
<td></td>
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<td></td>
<td>1300</td>
<td>High Temp Fiberglass</td>
<td>J</td>
<td>TMP2SU3</td>
<td></td>
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<td></td>
<td>400</td>
<td>Teflon</td>
<td>K</td>
<td>TMPK2SU1</td>
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<tr>
<td></td>
<td>900</td>
<td>Fiberglass</td>
<td>K</td>
<td>TMPK2SU2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1300</td>
<td>High Temp Fiberglass</td>
<td>K</td>
<td>TMPK2SU3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>400</td>
<td>Teflon</td>
<td>T</td>
<td>TMPT2SU1</td>
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</tr>
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<td></td>
<td>400</td>
<td>Teflon</td>
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<td>TMPPE2SU1</td>
<td></td>
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<tr>
<td></td>
<td>900</td>
<td>Fiberglass</td>
<td>E</td>
<td>TMPPE2SU2</td>
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<tr>
<td></td>
<td>1300</td>
<td>High Temp Fiberglass</td>
<td>E</td>
<td>TMPPE2SU3</td>
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<tr>
<td>RTD Temp Probe</td>
<td>400</td>
<td>Teflon</td>
<td>Plat</td>
<td>TMPA2S01</td>
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<tr>
<td></td>
<td>900</td>
<td>Fiberglass</td>
<td>Plat</td>
<td>TMPA2S02</td>
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</table>

*Note: One tube sleeve is included with each probe.*

**ACCESSORIES (All accessories are sold separately)**

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<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMPACC</td>
<td>Spring Loaded Fitting</td>
<td>TMPACC01</td>
</tr>
<tr>
<td></td>
<td>Cast Aluminum Weatherproof Head</td>
<td>TMPACC02</td>
</tr>
<tr>
<td></td>
<td>Spare Tube Sleeve</td>
<td>TMPACC03</td>
</tr>
<tr>
<td></td>
<td>Simplex Terminal Block (for TC's)</td>
<td>TMPACC04</td>
</tr>
<tr>
<td></td>
<td>Three Terminal Block (for RTD's)</td>
<td>TMPACC05</td>
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</table>

(One tube sleeve is included with each probe.)
MODELS TMPRT & TMPCN THERMOCOUPLES

MODEL TMPRT - ADVANCED DESIGN SURFACE MOUNT RTD SENSOR

GENERAL DESCRIPTION
Model TMPRT "stick-on" style RTD temperature sensor mounts on flat surfaces and provides Class A accuracy for critical monitoring applications. Based on a bare 2 X 2 X .08 mm thin film platinum RTD, the unit is supplied in a Teflon PFA insulated configuration and can be easily applied using its self-adhesive backing. Some of the applications of this versatile RTD sensor include monitoring chip, heat sink, and environmental temperatures in electronic devices; checking piping or ducting temperatures; monitoring motor and transformer core heat; testing insulation capabilities, as well as checking other applications in which surface and/or gradient temperatures need to be monitored and controlled.

SPECIFICATIONS
1. MINIMUM/MAXIMUM TEMPERATURE:
   -73° C (-100° F) to 260° C (500° F) continuous
   290° C (554° F) short-term (when stuck in place)
2. SENSING ELEMENT: 100 Ω at 0° C (32° F)
   Temperature coefficient of 0.00385 Ω/Ω/°C (IEC60751)
3. ACCURACY: ± 0.06% at 0° C (DIN Class A)
4. RESPONSE TIME: Less than 0.9 s (63% response time in water immersion), less than 2 s response time on a hot plate.
5. SELF HEATING EFFECT: 2.5mW/°C
6. LEAD WIRE: 10 foot 26 AWG stranded nickel plated copper, Teflon PFA-insulated and jacket cable
7. ADHESIVE PAD DIMENSIONS: 1 x ¾ " (25 X 19 mm)

DIMENSIONS In inches (mm)

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>INSULATION TYPE</th>
<th>TERMINATION (COLD SIDE)</th>
<th>LENGTH (FT)</th>
<th>PART NUMBER</th>
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<tbody>
<tr>
<td>TMPRT</td>
<td>SMT RTD</td>
<td>TEFLO PFA</td>
<td>STRIPPED WIRE BARE ENDS</td>
<td>10</td>
<td>TMPRT001</td>
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</table>

The IEC-751/BS EN60751 1996 standard tolerances for Pt 100Ω RTD elements:
Class A devices have an accuracy of ± 0.35° at 100° C

<table>
<thead>
<tr>
<th>TEMP. IN °C</th>
<th>IEC 751 CLASS A/B STANDARD TOLERANCES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CLASS A</td>
</tr>
<tr>
<td>± °C</td>
<td>± Ω</td>
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<tr>
<td>-200</td>
<td>0.55</td>
</tr>
<tr>
<td>-100</td>
<td>0.35</td>
</tr>
<tr>
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<td>0.15</td>
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<td>500</td>
<td>1.15</td>
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<tr>
<td>600</td>
<td>1.35</td>
</tr>
</tbody>
</table>
MODEL TMPRT - PIPE PLUG RTD SENSOR

GENERAL DESCRIPTION
The pipe plug RTD sensor is a unit specially designed for use in pressure vessel applications. Its 3 wire construction provides connectivity to most hand held instruments. The unit features a high accuracy 100 Ω Class A DIN platinum element and steel braided, Teflon PFA insulated wires for the necessary durability and protection demanded by harsher environments.

SPECIFICATIONS
1. WIRE GAGE: 26 AWG, standard limits of error
2. INSULATION: Teflon PFA
3. MAX TEMPERATURE: 230°C (450°F)
4. TERMINATION: Stripped bare wire ends
5. OVERBRAID: Stainless Steel
6. THREADS: ¼” NPT
7. SENSING ELEMENT END DIAMETER: .24” (6mm)

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>CABLE LENGTH</th>
<th>TERMINATION (COLD SIDE)</th>
<th>PART NUMBER</th>
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<tr>
<td>TMPRT</td>
<td>PIPE PLUG RTD SENSOR</td>
<td>6 '</td>
<td>STRIPPED BARE WIRE ENDS</td>
<td>TMPRT002</td>
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</table>

MODEL TMPCN - RTD PROBE CONNECTORS

GENERAL DESCRIPTION
RTD Mini Connectors are for use with RTD probes. They are miniature size, and are available in both male and female termination.

SPECIFICATIONS
1. CONNECTOR BODY MATERIAL: Glass Filled Nylon, for temperature ranges of -29 to 220°C.
2. CONNECTOR BODY COLOR: ANSI color coded
3. WIRE GAGE: Accepts stranded or solid wire up to 20 AWG
4. WIRE TERMINATION: Combination Phillips/Slot Screws
5. CONNECTOR ENDS: Copper

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>TYPE</th>
<th>TERMINATION</th>
<th>PART NUMBER</th>
</tr>
</thead>
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<td>RTD miniature male connector</td>
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<td>MALE</td>
<td>TMPCNM09</td>
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<td></td>
<td>RTD miniature female connector</td>
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<td>FEMALE</td>
<td>TMPCNM10</td>
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MODEL TSW - THUMBWHEEL SWITCH ASSEMBLY

DESCRIPTION

The Model TSW Thumbwheel Switch Assembly is a modular 4 or 6-digit panel mounted BCD input switch designed to provide BCD data to programmable controllers. BCD data lines are diode isolated and have separate digit commons allowing for multiplexed operation with more than one Thumbwheel Switch Assembly. All units consist of screw-clamp terminal blocks with integral PC board labels for wiring ease of all BCD and common lines. In addition, 16-pin DIP sockets provide for cascading of more than one Thumbwheel Switch Assembly with the optional DIP plug connector cable (Model ACA1). This greatly reduces installation time and eliminates miswiring. All versions are available in either “1” TRUE or “0” TRUE LOGIC (See Schematics at Right). For “1” True Logic, a voltage “HIGH” is applied to the Digit Common, and the associated BCD outputs are “HIGH”, ie 4 = 0100. For “0” True Logic, a voltage “LOW” is applied to Digit Common, and associated BCD outputs are “LOW”, ie 4 = 1011.

The front bezel of all Thumbwheel Switch Assemblies allows for easy installation into panel thicknesses of up to 1/4” with the included hardware pack.

SPECIFICATIONS

1. CODE: BCD 1-2-4-8
2. SWITCH POSITIONS: 0 to 9
3. CURRENT: 100 mA @ 28 VDC max.; 0.01 mA min.
4. MECHANICAL LIFE: Greater than 500,000 detent operations per digit with 10 mA resistive load @ 5 VDC and 25°C.
5. CHARACTER HEIGHT: 0.234”

DIMENSIONS In inches (mm)

<table>
<thead>
<tr>
<th></th>
<th>4-DIGIT</th>
<th>6-DIGIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3.825” (92.08)</td>
<td>5.000” (127)</td>
</tr>
<tr>
<td>B</td>
<td>2.875” (73.03)</td>
<td>4.375” (111.15)</td>
</tr>
<tr>
<td>C</td>
<td>3.250” (82.55)</td>
<td>4.625” (117.48)</td>
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<tr>
<th>MODEL NO.</th>
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</tr>
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<tbody>
<tr>
<td>TSW1A4</td>
<td>4-Digit Thumbwheel Switch, 1 True, Terminal Block</td>
<td>TSW1A400</td>
</tr>
<tr>
<td>TSW0A4</td>
<td>4-Digit Thumbwheel Switch, 0 True, Terminal Block</td>
<td>TSW0A400</td>
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<tr>
<td>TSW1A6</td>
<td>6-Digit Thumbwheel Switch, 1 True, Terminal Block</td>
<td>TSW1A600</td>
</tr>
<tr>
<td>TSW0A6</td>
<td>6-Digit Thumbwheel Switch, 0 True, Terminal Block</td>
<td>TSW0A600</td>
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<tr>
<td>ACA1</td>
<td>18&quot; DIP Plug Cable Assembly</td>
<td>ACA10000</td>
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**MODELS PMK5, PMK7, and PMK7A - PANEL MOUNT ADAPTER KITS**

**PMK5 - 1/4 DIN TO 1/8 DIN ADAPTER**

This panel mount adapter kit is used to mount 1/8 DIN instruments, vertically or horizontally into an existing 1/4 DIN panel cut-out. The kit includes two durable steel mounting plates painted black and a neoprene gasket. The Adapter Kit, when used with a unit which has NEMA 4/IP65 specifications, will meet NEMA 4/IP65 requirements when properly installed. Red Lion Controls 1/8 DIN products include Temperature and Process Control Units (Models TCU, TSC, PSC, and PSC), and PAX Series.

**DIMENSIONS In inches (mm)**

<table>
<thead>
<tr>
<th>MOUNTING PLATE</th>
<th>ADAPTER PLATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.77 (45)</td>
<td>0.09 (2.3)</td>
</tr>
<tr>
<td>4.50 (114.3)</td>
<td>3.62 (92)</td>
</tr>
<tr>
<td>4.00 (101.6)</td>
<td>4.50 (114.3)</td>
</tr>
</tbody>
</table>

**INSTALLATION**

**TYPICAL VERTICAL MOUNT INSTALLATION**

1. Remove the paper backing from the adhesive side of the adapter gasket (included with adapter kit) and carefully apply the gasket to the front of the existing panel cut-out.
2. Apply the panel gasket (provided with the unit) to one side of the mounting plate. Slide the mounting plate over the unit with the gasket facing the Bezel of the unit.
3. Insert the unit with mounting plate into the panel cut-out from the front. Slide the adapter plate over the rear of the unit. The protrusion on the adapter plate is designed to fit into the existing 1/4 DIN panel cut-out to properly position the unit.
4. Refer to the installation section of the manual, supplied with the instrument, to complete the installation.

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMK5</td>
<td>Panel Mount Adapter Kit (1/4 DIN TO 1/8 DIN)</td>
<td>PMK500000</td>
</tr>
<tr>
<td>PMK7</td>
<td>Panel Mount Adapter Kit (1/4 DIN TO 1/16 DIN)</td>
<td>PMK700000</td>
</tr>
<tr>
<td>PMK7A</td>
<td>Panel Mount Adapter Kit (1/4 DIN TO CUB)</td>
<td>PMK7A0000</td>
</tr>
</tbody>
</table>

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
**PMK7 - 1/4 DIN TO 1/16 DIN ADAPTER**

This panel mount adapter kit is used to mount 1/16 DIN instruments, into an existing 1/4 DIN panel cut-out. The kit includes two durable steel mounting plates painted black and a neoprene gasket. The Adapter Kit, when used with a unit which has NEMA 4/IP65 specifications, will meet NEMA 4/IP65 requirements when properly installed. Red Lion Controls 1/16 DIN products include Temperature and Process Control Units (Models T48, T16, P48, and P16), and Model C48 Counters and Timers.

**DIMENSIONS In inches (mm)**

<table>
<thead>
<tr>
<th>MOUNTING PLATE</th>
<th>ADAPTER PLATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.77 (45)</td>
<td>1.77 (45)</td>
</tr>
<tr>
<td>4.50 (114.3)</td>
<td>4.50 (114.3)</td>
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<tr>
<td>0.09 (2.3)</td>
<td>0.06 (2.3)</td>
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</tbody>
</table>

**INSTALLATION**

**TYPICAL INSTALLATION**

1. Remove the paper backing from the adhesive side of the adapter gasket (included with adapter kit) and carefully apply the gasket to the front of the existing panel cut-out.
2. Apply the panel gasket (provided with the unit) to one side of the mounting plate. Slide the mounting plate over the unit with the gasket facing the Bezel of the unit.
3. Insert the unit with mounting plate into the panel cut-out from the front. Slide the adapter plate over the rear of the unit. The protrusion on the adapter plate is designed to fit into the existing 1/4 DIN panel cut-out to properly position the unit.
4. Refer to the installation section of the manual, supplied with the instrument, to complete the installation.
PMK7A - 1/4 DIN TO CUB ADAPTER

This panel mount adapter kit is used to mount CUB4, CUB5, DT8 and DT9 instruments, into an existing 1/4 DIN panel cut-out. The kit includes two durable steel mounting plates painted black and a neoprene gasket. The Adapter Kit, when used with a unit which has NEMA 4/IP65 specifications, will meet NEMA 4/IP65 requirements when properly installed.

**DIMENSIONS In inches (mm)**

<table>
<thead>
<tr>
<th></th>
<th>MOUNTING PLATE</th>
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</thead>
<tbody>
<tr>
<td>Height</td>
<td>4.60 (116.84)</td>
<td>4.50 (114.3)</td>
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<tr>
<td>Height</td>
<td>2.69 (68.33)</td>
<td>2.69 (68.33)</td>
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<tr>
<td>Width</td>
<td>1.30 (33.0)</td>
<td>1.30 (33.0)</td>
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<tr>
<td><strong>Notes</strong></td>
<td>0.09 (2.29)</td>
<td>0.04 (1.01)</td>
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**INSTALLATION**

**TYPICAL INSTALLATION**

1. Remove the paper backing from the adhesive side of the adapter gasket (included with adapter kit) and carefully apply the gasket to the front of the existing panel cut-out.

2. Apply the panel gasket (provided with the unit) to one side of the mounting plate. Slide the mounting plate over the unit with the gasket facing the Bezel of the unit.

3. Insert the unit with mounting plate into the panel cut-out from the front. Slide the adapter plate over the rear of the unit. The protrusion on the adapter plate is designed to fit into the existing 1/4 DIN panel cut-out to properly position the unit.

4. Refer to the installation section of the manual, supplied with the instrument, to complete the installation.
LIMITED WARRANTY

The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company’s liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company’s option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products.

The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or sub-contractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.

No warranties expressed or implied are created with respect to The Company’s products except those expressly contained herein. The Customer acknowledges the disclaimers and limitations contained herein and relies on no other warranties or affirmations.
MODELS PMK5 and PMK7 - PANEL MOUNT ADAPTER KITS

The PMK5 panel mount adapter kit is used to mount 1/8 DIN instruments, vertically or horizontally into an existing 1/4 DIN panel cut-out. The kit includes two durable steel mounting plates painted black and a neoprene gasket. The Adapter Kit, when used with a unit which has NEMA 4/IP65 specifications, will meet NEMA 4/IP65 requirements when properly installed. Red Lion Controls 1/8 DIN products include Temperature and Process Control Units (Models TCU, TSC, PCU, and PSC), PAX Series, Intelligent Meter (IM) series, and the Apollo (APL) series units.

The PMK7 panel mount adapter kit is used to mount 1/16 DIN instruments, into an existing 1/4 DIN panel cut-out. The kit includes two durable steel mounting plates painted black and a neoprene gasket. The Adapter Kit, when used with a unit which has NEMA 4/IP65 specifications, will meet NEMA 4/IP65 requirements when properly installed. Red Lion Controls 1/16 DIN products include Temperature and Process Control Units (Models T48, T16, P48, and P16), and Model C48 Counters and Timers.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
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<tr>
<td>PMK5</td>
<td>Panel Mount Adapter Kit (1/4 DIN TO 1/8 DIN)</td>
<td>PMK50000</td>
</tr>
<tr>
<td>PMK7</td>
<td>Panel Mount Adapter Kit (1/4 DIN TO 1/16 DIN)</td>
<td>PMK70000</td>
</tr>
</tbody>
</table>
**PMK5 INSTALLATION**

**TYPICAL VERTICAL MOUNT INSTALLATION**

1. Remove the paper backing from the adhesive side of the adapter gasket (included with adapter kit) and carefully apply the gasket to the front of the existing panel cut-out.

2. Apply the panel gasket (provided with the unit) to one side of the mounting plate. Slide the mounting plate over the unit with the gasket facing the Bezel of the unit.

3. Insert the unit with mounting plate into the panel cut-out from the front. Slide the adapter plate over the rear of the unit. The protrusion on the adapter plate is designed to fit into the existing 1/4 DIN panel cut-out to properly position the unit.

4. Refer to the installation section of the manual, supplied with the instrument, to complete the installation.

**PMK7 INSTALLATION**

**TYPICAL INSTALLATION**

1. Remove the paper backing from the adhesive side of the adapter gasket (included with adapter kit) and carefully apply the gasket to the front of the existing panel cut-out.

2. Apply the panel gasket (provided with the unit) to one side of the mounting plate. Slide the mounting plate over the unit with the gasket facing the Bezel of the unit.

3. Insert the unit with mounting plate into the panel cut-out from the front. Slide the adapter plate over the rear of the unit. The protrusion on the adapter plate is designed to fit into the existing 1/4 DIN panel cut-out to properly position the unit.

4. Refer to the installation section of the manual, supplied with the instrument, to complete the installation.
**NEMA 4/IP65 ENCLOSURES**

- **RUGGED STEEL CONSTRUCTION**
- **COMPLETELY SEALED FOR WASH-DOWN**
- **VERSATILE MOUNTING OPTIONS FOR MACHINE OR DESK-TOP**

**DESCRIPTION**
This series of enclosures is designed for applications requiring a water resistant instrument enclosure. These rugged enclosures are fabricated of formed steel with all seams welded to withstand NEMA 4/IP65 wash-down applications. The kits are coated with a durable flat black polyurethane finish. 

Electrical connections to the enclosed instrument are easily made through a removable access panel at the rear of the enclosure. The panel can be drilled to accept conduit fittings or other types of wiring connectors.

The enclosures can be mounted free-standing or securely fastened to a mounting surface with brackets which are provided with each enclosure. The brackets also allow the enclosures to be raised and/or tilted from the mounting surface in order to achieve the most favorable operating position. Self-stick rubber pads are provided which can be applied to the bottom of the enclosure. These rubber pads will protect the mounting surface and are particularly useful for free-standing installations.

**DIMENSIONS In inches (mm)**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legend &amp; Libra Series NEMA 4 Enclosure</td>
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<td>4.75&quot; (120.6)</td>
<td>7.00&quot; (177.8)</td>
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<tr>
<td>Apollo &amp; IM Series NEMA 4 Enclosure</td>
<td>3.00&quot; (76.2)</td>
<td>4.75&quot; (120.6)</td>
<td>8.00&quot; (203.2)</td>
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<tr>
<td>Gemini Series NEMA 4 Enclosure</td>
<td>3.50&quot; (88.9)</td>
<td>6.00&quot; (152.4)</td>
<td>8.00&quot; (203.2)</td>
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**ORDERING INFORMATION**

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<td>Apollo &amp; IM Series NEMA 4/IP65 Enclosure</td>
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</tr>
<tr>
<td>Gemini Series NEMA 4/IP65 Enclosure</td>
<td>ENC60000</td>
</tr>
</tbody>
</table>
**Installation**

The RLC ASTRO LINE products (GEMINI, LIBRA, APOLLO) have side openings in the case for panel mounting latches, special latches are supplied with each enclosure to engage the latch openings and securely retain the instrument. The installation procedure is as follows:

1. Verify that the enclosure brackets are installed into the enclosure with the bracket screws backed out more than half way from the brackets but keeping the screw head flush against the enclosure rear.
2. Slide the panel gasket over the rear of the unit until it is against the back of the bezel.
3. Hold the unit on its side so that a side bracket opening is facing up and insert the unit into the enclosure front opening.
4. The bracket hook should fall into the unit bracket opening. Keeping the meter and enclosure on their side, turn the bracket screw tight.
5. Flip the meter and enclosure to the other side.
6. The other bracket hook should fall into the unit bracket opening. Keeping the meter and enclosure on their side, turn the other bracket screw tight.
7. Verify that both screws are tight enough so that the front panel gasket is compressed to at least 50% of its original thickness.
8. Install any connectors or conduit fittings to the rear access panel. Make the desired wiring connections to the enclosed unit.
9. Install the rear panel gasket with the adhesive side against the enclosure and the screw clearance holes aligned with the threaded holes in the enclosure.
10. After all electrical connections have been made, attach the rear access panel to the rear of the enclosure with the four screws and washers provided.

---

**Installation**

**Mounting Bracket Installation**

**Mounting Options**

---

Red Lion Controls
20 Willow Springs Circle
York PA 17402
Tel +1 (717) 767-6511
Fax +1 (717) 764-0839

Red Lion Controls BV
Basicweg 11b
NL - 3821 BR Amersfoort
Tel +31 (0) 33 723 225
Fax +31 (0) 33 893 793

Red Lion Controls AP
31, Kaki Bukit Road 3,#06-04/05 TechLink
Singapore 417818
Tel +65 6744-6613
Fax +65 6743-3360

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Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
NEMA 4/IP65 LARGE DISPLAY ENCLOSURE & SHROUD FOR LARGE DISPLAY

DESCRIPTION

The NEMA 4/IP65 Large Display Enclosure is designed to protect the Large Display (Model LDD and LMC) from dust and hose directed water, when properly installed. This rugged all steel unit utilizes welded seams and neoprene gaskets to meet NEMA 4/IP65 requirements. A textured, polyurethane coating protects against corrosion and is scratch resistant. Figure 1 below shows the overall dimensions of the Enclosure. The Display Enclosure with Mounting Channels weighs 13.5 pounds (6 Kg).

DIMENSIONS

Provided with the enclosure are two ¼-20 UNC x 1” hex bolts, two ¼-20 UNC “strut nuts”, and two ¼” washers. The “strut nuts” can be installed anywhere in the channel by inserting them, spring side down, into the channels, then rotating them 90 degrees clockwise until the notches engage with the lips of the channel. The bolts and washers provided allow mounting to surfaces ¼” to ½” thick (6.4 to 12.7 mm). Use longer bolts for mounting to thicker surfaces. Bolts fabricated from materials other than steel are not recommended.

MOUNTING

Removing the rear panel of the enclosure allows access to the Large Display for service. Either the rear panel or housing may be drilled to accept sealed conduit fittings, liquid-tight cable fittings or other types of wiring connectors. The enclosure may be attached to horizontal surfaces located above or below it, using the mounting channels provided.

TYPICAL INSTALLATIONS FOR NEMA 4/IP65 ENCLOSURE

- FOR LDD AND LMC MODELS
- RUGGED STEEL CONSTRUCTION
- COMPLETELY SEALED FOR WASH-DOWN
- MOUNTING CHANNELS FOR VERSATILE INSTALLATION

Figure 1

Figure 2

Figure 3
ASSEMBLY AND INSTALLATION PROCEDURE

1. Install the two mounting channels on the enclosure housing using the four #8-32 screws provided and then insert the strut nuts (provided).
2. If the wiring is to be routed through the housing, make sure that the mounting channels are oriented properly before drilling, so the Large Display will be readable. Wiring is generally brought into the right side of the housing or rear panel, closest to the terminals of the personality board. Drill the proper size hole in the housing or rear panel for the wiring connector or sealed conduit fitting and attach the fitting(s).
3. Before installing the Large Display into the housing, be sure that the mounting channels are oriented properly for the type of installation planned. Place the gasket that is supplied with the Large Display over the studs extending from the front panel of the display.
4. Place the Large Display with gasket through the holes in the housing as shown at right. Working back and forth across the stud pattern, install the #10-32 kep nuts supplied with the Large Display on the studs. Tighten firmly.
5. Mount the housing, using the strut nuts and steel ¼-20 UNC bolts and washers, as shown in figure 3.
6. Connect the wires to the Large Display per the instructions included with the personality board.
7. Remove the center section of the rear panel gasket. Apply the gasket to the rear panel of the enclosure by inserting the #8-32 screws through the panel and into the holes in the gasket. Position the panel on the housing, start all of the screws, then firmly tighten them in a pattern working back and forth across the rear panel.

DIMENSIONS FOR THE LARGE DISPLAY SHROUD
The optional Large Display Shroud enhances the readability of Large Displays that are installed in areas with high intensity overhead light sources. The Shroud can be used with the Large Display in any installation, (panel mount, NEMA 4/IP65 Enclosure, or Universal Mounting Bracket). When properly assembled, the Shroud will not affect the integrity of a NEMA 4/IP65 installation. The Shroud weighs 1.5 pounds (0.7 Kg).

SHROUD INSTALLATION PROCEDURES

Installing The Shroud On A Large Display With Optional Universal Mounting Brackets (P/N MB600000)
1. Orient the shroud as shown in figure 6, and place it over the Large Display. The studs of the display should now be protruding through the rear of the shroud.
2. Configure the Universal Mounting Brackets for the intended mounting per the bracket literature (Bulletin LD/MB6). The gaskets supplied with the Large Display and Shroud are not needed with universal mounting brackets.
3. Locate the mounting brackets on the proper sets of studs per the bracket literature, using the #10-32 kep nuts provided with the Large Display.
4. Place the remaining nuts on the remaining studs. Tighten all of the nuts firmly.

Installing The Shroud On A Large Display In A NEMA 4/IP65 Enclosure Or Panel
1. Place a gasket over the studs extending from the rear of the front panel of the Large Display.
2. Orient the shroud as shown in Figure 7, and place it over the display. The studs of the display should now be protruding through the rear of the shroud.
3. Place the other gasket over the studs.
4. Install the unit into the panel or enclosure using the #10-32 kep nuts that are supplied with the Large Display. Tighten the nuts firmly.

ORDERING INFORMATION

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<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
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<tbody>
<tr>
<td>ENC7</td>
<td>LDD &amp; LMC NEMA 4/IP65 Enclosure</td>
<td>ENC700000</td>
</tr>
<tr>
<td>SHR</td>
<td>Large Display Shroud</td>
<td>SHR100000</td>
</tr>
<tr>
<td>MB6 *</td>
<td>Mounting Brackets</td>
<td>MB600000</td>
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</tbody>
</table>

* Mounting brackets are for use with display and/or the shroud, will not function with ENC7 enclosures.
**DESCRIPTION**

This enclosure is designed for applications requiring a water resistant instrument enclosure. The enclosure is fabricated of formed steel with all seams welded to withstand NEMA 4/IP65 wash-down applications. The kit is coated with a durable flat black polyurethane finish.

Electrical connections to the enclosed instrument are easily made through a removable access panel at the rear of the enclosure. The panel must be drilled to accept conduit fittings or other types of wiring connectors.

The enclosure can be used free-standing or securely fastened to a mounting surface with brackets which are provided with each enclosure. The brackets also allow the enclosure to be raised and/or tilted from the mounting surface in order to achieve the most favorable operating position. Self-stick rubber pads are provided which can be applied to the bottom of the enclosure. These rubber pads will protect the mounting surface and are particularly useful for free-standing installations.

**DIMENSIONS In inches (mm)**

```
5.50 (139.7)  
3.25 (82.6)    
1/8" THICK FOAM RUBBER PAD
```

**ORDERING INFORMATION**

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<th>DESCRIPTION</th>
<th>PART NUMBER</th>
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</thead>
<tbody>
<tr>
<td>ENC5A</td>
<td>NEMA 4 Enclosure for PAX &amp; Short Apollo</td>
<td>ENC5A000</td>
</tr>
</tbody>
</table>

**INSTALLATION**

1. Mark the location on the rear panel for your wire connector or conduit fitting, and drill the necessary hole. Connect your wire connector or fitting to the rear panel.
2. Remove the center sections of the front and rear panel gaskets. These centers contain the optional foam rubber feet for the enclosure.
3. Apply the adhesive side of the panel gasket to the front and rear openings of the enclosure. DO NOT APPLY THE ADHESIVE SIDE OF THE GASKET TO THE FRONT OR REAR PANELS.
4. Install the unit to the front panel according to the standard panel installation instructions found in the product literature.
5. Route the wires to be connected to the unit from the conduit fitting through the rear of the enclosure and out the front.
6. Connect the necessary wires to the unit for the application desired.
7. Attach the front and rear panels to the enclosure with the screws and washers provided. Alternately tighten each screw to ensure uniform gasket compression. Visually inspect the sponge rubber gasket. The gasket should be compressed to about 75 to 80% of its original thickness.
8. For a free-standing enclosure, apply the self-stick foam rubber pads to the features on the bottom of the enclosure to protect the mounting surface.
9. To securely mount the enclosure, attach the adjustable mounting brackets to the enclosure using the washers and bolts provided. Secure the mounting brackets to the desired mounting location. The mounting screws to attach the brackets to your surface are not provided due to the variety of installation options available.
**NEMA 4 PAX SERIES ENCLOSURES**

**ENC5B & ENC5C - PLASTIC ENCLOSURES**

- RUGGED POLYCARBONATE CONSTRUCTION
- COMPLETELY SEALED FOR NEMA 4X/IP65 WASH-DOWN
- EASY MOUNTING OPTIONS

**DESCRIPTION**

These enclosures are designed for applications requiring a water resistant instrument enclosure. The ENC5B and ENC5C enclosures are fabricated of polycarbonate and are designed to withstand NEMA 4X/IP65 wash-down applications. The enclosures must be drilled to accept conduit fittings or other types of wiring connectors. The enclosures can be used free-standing, or securely fastened to a mounting surface. The enclosures are precut for either one or two meters. When properly installed, the meter and the enclosure can withstand NEMA 4X wash-down applications.

Electrical connections to the enclosed instrument are easily made by drilling the desired location on the back or side of the enclosure. Select the proper drill size to accommodate the conduit fitting or other wire connector. To maintain the enclosure NEMA 4X rating, sealed connectors must be used. Also enclosed are wall fastening lugs, which can be used to easy mount the enclosure to a wall.

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>MODEL NO</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENC5B</td>
<td>NEMA 4X/IP65 Enclosure for One PAX Meter</td>
<td>ENC5B000</td>
</tr>
<tr>
<td>ENC5C</td>
<td>NEMA 4X/IP65 Enclosure for Two PAX Meters</td>
<td>ENC5C000</td>
</tr>
</tbody>
</table>

For More information on Pricing, Enclosures & Panel Mount Kits, refer to the RLC Catalog or contact your local RLC Distributor.

---

**ENC5B AND ENC5C INSTALLATION**

It is recommended to wire the unit before mounting it in the enclosure to ensure good electrical connections. The following steps outline the most common sequence for installing a unit.

1. Determine the location of the conduit fitting and drill the necessary hole. Install the fitting and bring the wiring into the enclosure.
2. Slide the panel gasket over the rear of the unit to the back of the bezel.
3. Install the unit through the opening in the front of the lid until the bezel flange contacts the panel.
4. Slide the mounting clip over the rear of the unit until the mounting clip is against the inside of the enclosure.
   The mounting clip has latching features which engage into mating features on the unit's housing.
   Note: It is necessary to hold the unit in place when sliding the mounting clip into position.
5. While holding the unit in place, push the panel latch over the rear of the unit so that the tabs of the panel latch engage in the slots on the case. The panel latch should be engaged in the farthest forward slot possible. To achieve a proper seal, tighten the latch screws evenly until the unit is snug in the panel (Torque to approximately 7 in-lbs [79 N-cm]). Do not over-tighten the screws.
6. If the gasket is not adequately compressed, and the mounting screws can no longer be turned, loosen the mounting screws and check that the mounting clip is latched as close as possible to the inside of enclosure. Repeat the procedure for tightening the screws.
7. Connect the necessary wires to the unit for the application desired.
8. Assemble the enclosure with the screws provided. Alternately tighten each screw to ensure uniform gasket pressure.
**DESCRIPTION**

The ENC5A enclosure is fabricated of formed steel with all seams welded to withstand NEMA 4/IP65 wash-down applications. The kit is coated with a durable flat black polyurethane finish.

Electrical connections to the enclosed instrument are easily made through a removable access panel at the rear of the enclosure. The panel must be drilled to accept conduit fittings or other types of wiring connectors.

The enclosure can be used free-standing or securely fastened to a mounting surface with brackets which are provided with each enclosure. The brackets also allow the enclosure to be raised and/or tilted from the mounting surface in order to achieve the most favorable operating position. Self-stick rubber pads are provided which can be applied to the bottom of the enclosure. These rubber pads will protect the mounting surface and are particularly useful for free-standing installations.

**ENC5A INSTALLATION**

1. Mark the location on the rear panel for your wire connector or conduit fitting, and drill the necessary hole. Connect your wire connector or fitting to the rear panel.
2. Remove the center sections of the front and rear panel gaskets. These centers contain the optional foam rubber feet for the enclosure.
3. Apply the adhesive side of the panel gasket to the front and rear openings of the enclosure. DO NOT APPLY THE ADHESIVE SIDE OF THE GASKET TO THE FRONT OR REAR PANELS.
4. Install the unit to the front panel according to the standard panel installation instructions found in the product literature.
5. Route the wires to be connected to the unit from the conduit fitting through the rear of the enclosure and out the front.
6. Connect the necessary wires to the unit for the application desired.
7. Attach the front and rear panels to the enclosure with the screws and washers provided. Alternately tighten each screw to ensure uniform gasket compression. Visually inspect the sponge rubber gasket. The gasket should be compressed to about 75 to 80% of its original thickness.
8. For a free-standing enclosure, apply the self-stick foam rubber pads to the features on the bottom of the enclosure to protect the mounting surface.
9. To securely mount the enclosure, attach the adjustable mounting brackets to the enclosure using the washers and bolts provided. Secure the mounting brackets to the desired mounting location. The mounting screws to attach the brackets to your surface are not provided due to the variety of installation options available.

**DIMENSIONS**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENC5A</td>
<td>NEMA 4/IP65 Enclosure for PAX &amp; Short Apollo</td>
<td>ENC5A000</td>
</tr>
</tbody>
</table>

For More information on Pricing, Enclosures & Panel Mount Kits, refer to the RLC Catalog or contact your local RLC Distributor.
Three panel mount kits for CUB1 and two panel mount kits for CUB2 are available to replace most existing miniature counters on the market today. Most kits come complete with adapter plates, mounting hardware, and gaskets to provide a complete sealed unit after installation. PMK2A is not sealed because of the key lock feature.

**PMK1**

This panel mount kit adapts the CUB1 to an oversized 1" X 2" (25 X 50 mm) panel cut-out. The kit consists of two metal panel adapters and one neoprene gasket. The adapter plates and gasket are pinched between the front bezel of the counter and the mounting clips (provided with the CUB in the accessory bag).

**INSTALLATION**

Note: If room permits, install signal connector after counter is mounted. If there is not enough room, pull the wires through before installing as described below:

1. Pull signal connector through the following items in order:
   A. One panel adapter plate.
   B. Through existing panel opening.

2. Slide the following items on the counter.
   A. Panel gasket
   B. Adapter plate
   C. Adapter gasket

3. Install connector into CUB1. Ensure connector is in proper orientation, i.e. lockslots toward left side of case seen from rear of counter.

4. Slide counter through panel cut-out from the front, allowing the counter to center in the panel opening.

5. Install mounting clips (one on either side) with the screws provided. Tighten the screws moderately to "pinch" the gaskets and panels between the front bezel and the mounting clips. (Mounting clips and screws are provided in accessory bag.)

**MOUNTING**

The mounting procedure for the remaining panels are identical and therefore procedures are described only once. Figure 2 shows a typical exploded view of individual parts and their placement. CUB2 is shown, however, installation is identical for CUB1.

**For Mounting, proceed as follows:**

1. Slide panel gasket over back of counter. (Gasket is supplied in accessory bag with counter.)

2. Slide counter onto adapter plate.

3. Slide adapter gasket onto counter.

4. Attach counter to adapter plate with two mounting clips and screws. (Both mounting clips and screws are supplied in accessory bag with counter.)

5. Pull connector plug through existing panel opening and install in counter. (See CUB1 and 2 Bulletin.)

6. Place complete assembly over existing cut-out lining up the adapter plate mounting holes with existing holes.

7. Use either two or four mounting screws and nuts provided with Panel Adapter Kit to secure panel to existing cut-out. (Two screws and nuts are provided with PMK1A and PMK1B; four are provided with PMK2A and PMK2B.)
Panel Adapter Kit PMK2A is a panel to accommodate CUB2 and provides a key switch to enable or disable the reset function. Installation for the counter is identical (See reverse.) Two methods for wiring are provided below to enable or disable the reset.

**FIGURE 3**

**METHOD A**

This method provides a means of disabling the front panel reset by means of a key switch. When the key is in the OPERATE position the counter will operate, but the front panel reset button is inoperative. When the key is in the RESET MODE position, the counter continues to operate, but the front panel reset button can be used to reset the counter.

**HOOKUP**

1. Install counter on plate as described under Mounting. (See reverse.)
2. Push black and yellow wire-lugs (provided with panel kit) on key switch terminals.
3. Ensure black wire from CUB is in COMMON location and yellow wire from CUB is in RESET ENABLE location.
4. Twist black wire from key switch together with black wire from CUB with wire nut provided in accessory bag with CUB.
5. Twist yellow wire from key switch together with yellow wire from CUB with wire nut provided in accessory bag with CUB.
6. Mount adapter plate into existing panel cut-out.

**METHOD B**

This method can be used to directly reset the counter with the key itself. With the key in the OPERATE position, the counter will continue to accumulate counts. In the RESET MODE position, the counter will reset to zero and remain there until the key is moved to the OPERATE position.

**HOOKUP**

1. Install counter on adapter plate as described under Mounting. (See reverse.)
2. Push black and yellow wires with wire lugs (provided with panel kit) on key switch terminals.
3. Ensure black wire from CUB is in COMMON location.
4. Remove yellow wire from plug. (See CUB1 and 2 Bulletin.)
5. Insert blue wire (supplied with CUB in accessory bag) in REMOTE RESET location.
6. Twist black wire from key switch together with black wire from CUB with wire nut provided in accessory bag with the CUB.
7. Twist yellow wire from key switch together with blue wire from CUB with wire nut provided in accessory bag with the CUB.
8. Mount adapter plate into existing panel cut-out.

Note: Because of the key feature, this panel does not provide a sealed enclosure, however, the CUB itself will be sealed.

**DIMENSIONS In inches (mm)**

- **PMK 1**
- **PMK 1A**
- **PMK 1B**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>PMK 1</th>
<th>PMK 1A</th>
<th>PMK 1B</th>
</tr>
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<tbody>
<tr>
<td>Width</td>
<td>2.31</td>
<td>1.97</td>
<td>2.19</td>
</tr>
<tr>
<td>Height</td>
<td>2.31</td>
<td>1.97</td>
<td>2.19</td>
</tr>
<tr>
<td>Gasket</td>
<td>0.28</td>
<td>0.89</td>
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<tr>
<td>Plate</td>
<td>0.21</td>
<td>1.76</td>
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</tr>
<tr>
<td>Adapter</td>
<td>0.21</td>
<td>2.36</td>
<td>2.36</td>
</tr>
</tbody>
</table>

**REPLACES**

- **Veedor Root:** 7991 & 7998
- **Duran:** Series 3000 & 3100
- **Ivo:** F120, F514, F518, F524 & F544
- **Sodeco:** RG Series

- **Veedor Root:** 1205, 1981, 7443 & 7995
- **Duran:** Miniature Electric Series Y-RMF, Y-MF, YE, 3200 & 54000
- **Hecon:** G0402, G0404 & G0414
- **Ivo:** F104, F109, F504 & F574

- **Veedor Root:** 7491 & 7498
- **Duran:** Series 3000 & 3100
- **Ivo:** F120, F514, F518, F524 & F544
- **Sodeco:** RG Series

- **Veedor Root:** 1205, 1981, 7443 & 7995
- **Duran:** Miniature Electric Series Y-RMF, Y-MF, YE, 3200 & 54000
- **Hecon:** G0402, G0404 & G0414
- **Ivo:** F104, F109, F504 & F574

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
The panel mount adapter kit is used to mount 1/16 DIN instruments into existing vertical or horizontal 1/8 DIN panel cut-outs. The kit includes two black painted durable steel mounting plates and a sponge rubber gasket. The Adapter Kit, when used with a unit which has NEMA 4/IP65 specifications, will meet NEMA 4/IP65 requirements when properly installed. Red Lion Controls 1/16 DIN products include Temperature and Process Control Units (Models T48, and P48), and the C48 units.

**DIMENSIONS In inches (mm)**

**MOUNTING PLATE**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>2.50  (63.5)</td>
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<tr>
<td>Height</td>
<td>1.79  (45.5)</td>
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<tr>
<td></td>
<td>4.60  (116.84)</td>
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<tr>
<td>Thickness</td>
<td>.09   (2.29)</td>
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**ADAPTER PLATE**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
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<tbody>
<tr>
<td>Width</td>
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<td>1.79  (45.5)</td>
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<tr>
<td></td>
<td>4.50  (114.3)</td>
</tr>
<tr>
<td>Thickness</td>
<td>.04   ± .01</td>
</tr>
</tbody>
</table>

**INSTALLATION**

**TYPICAL VERTICAL MOUNT INSTALLATION**

1. Remove the paper backing from the adhesive side of the adapter gasket (included with adapter kit) and carefully apply the gasket to the front of the existing panel cut-out.

2. Carefully remove the center section of the panel gasket (provided with the unit) and discard. Slide the panel gasket over the rear of the unit to the back of the bezel.

3. Slide the mounting plate over the rear of the unit to the back of the bezel.

4. Insert the unit with mounting plate into the panel cut-out from the front. Slide the adapter plate over the rear of the unit. The protrusion on the adapter plate is designed to fit into the existing 1/8 DIN panel cut-out to properly position the unit.

5. Refer to the installation section of the manual, supplied with the unit, to complete the installation.

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMK6</td>
<td>Panel Mount Adapter Kit (1/8 DIN to 1/16 DIN)</td>
<td>PMK60000</td>
</tr>
</tbody>
</table>

---

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
The panel mount adapter kit is used to mount CUB5 units into existing 1/8 DIN panel cut-outs. The kit includes two black painted durable steel mounting plates and a sponge rubber gasket. The Adapter Kit, when used with a unit which has NEMA 4/IP65 specifications, will meet NEMA 4/IP65 requirements when properly installed. Red Lion Controls CUB5 products include Counters, Timers, Temperature, Process and Rate units.

**DIMENSIONS In inches (mm)**

**MOUNTING PLATE**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.60 (116.8)</td>
<td></td>
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<tr>
<td>2.69 (68.3)</td>
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<tr>
<td>2.50 (63.5)</td>
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</tr>
<tr>
<td>1.31 (33.3)</td>
<td></td>
</tr>
<tr>
<td>0.09 (2.3)</td>
<td></td>
</tr>
</tbody>
</table>

**ADAPTER PLATE**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.50 (114.3)</td>
<td></td>
</tr>
<tr>
<td>2.69 (68.3)</td>
<td></td>
</tr>
<tr>
<td>1.30 (33.0)</td>
<td></td>
</tr>
<tr>
<td>3.50 (88.9)</td>
<td></td>
</tr>
<tr>
<td>0.04 (1.0)</td>
<td></td>
</tr>
</tbody>
</table>

**INSTALLATION**

**TYPICAL HORIZONTAL MOUNT INSTALLATION**

1. Remove the paper backing from the adhesive side of the adapter gasket (included with adapter kit) and carefully apply the gasket to the front of the existing panel cut-out.
2. Carefully remove the center section of the panel gasket (provided with the unit) and discard. Slide the panel gasket over the rear of the unit to the back of the bezel.
3. Slide the mounting plate over the rear of the unit to the back of the bezel.
4. Insert the unit with mounting plate into the panel cut-out from the front. Slide the adapter plate over the rear of the unit. The protrusion on the adapter plate is designed to fit into the existing 1/8 DIN panel cut-out to properly position the unit.
5. Refer to the installation section of the manual, supplied with the unit, to complete the installation.

---

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMK6A</td>
<td>Panel Mount Adapter Kit (1/8 DIN to CUB5)</td>
<td>PMK6A000</td>
</tr>
</tbody>
</table>
Three panel mount kits for CUB1 and two panel mount kits for CUB2 are available to replace most existing miniature counters on the market today. Most kits come complete with adapter plates, mounting hardware, and gaskets to provide a complete sealed unit after installation. PMK2A is not sealed because of the key lock feature.

**PMK1**

This panel mount kit adapts the CUB1 to an oversized 1" X 2" (25 X 50 mm) panel cut-out. The kit consists of two metal panel adapters and one neoprene gasket. The adapter plates and gasket are pinched between the front bezel of the counter and the mounting clips (provided with the CUB in the accessory bag).

**INSTALLATION**

Note: If room permits, install signal connector after counter is mounted. If there is not enough room, pull the wires through before installing as described below:

1. Pull signal connector through the following items in order:
   - A. One panel adapter plate.
   - B. Through existing panel opening.
2. Slide the following items on the counter.
   - A. Panel gasket
   - B. Adapter plate
   - C. Adapter gasket
3. Install connector into CUB1. Ensure connector is in proper orientation, i.e. lockslots toward left side of case seen from rear of counter.
4. Slide counter through panel cut-out from the front, allowing the counter to center in the panel opening.
5. Install mounting clips (one on either side) with the screws provided. Tighten the screws moderately to “pinch” the gaskets and panels between the front bezel and the mounting clips. (Mounting clips and screws are provided in accessory bag.)

**MOUNTING**

The mounting procedure for the remaining panels are identical and therefore procedures are described only once. Figure 2 shows a typical exploded view of individual parts and their placement. CUB2 is shown, however, installation is identical for CUB1.

**For Mounting, proceed as follows:**

1. Slide panel gasket over back of counter. (Gasket is supplied in accessory bag with counter.)
2. Slide counter onto adapter plate.
3. Slide adapter gasket onto counter.
4. Attach counter to adapter plate with two mounting clips and screws. (Both mounting clips and screws are supplied in accessory bag with counter.)
5. Pull connector plug through existing panel opening and install in counter. (See CUB1 and 2 Bulletin.)
6. Place complete assembly over existing cut-out lining up the adapter plate mounting holes with existing holes.
7. Use either two or four mounting screws and nuts provided with Panel Adapter Kit to secure panel to existing cut-out. (Two screws and nuts are provided with PMK1A and PMK1B; four are provided with PMK2A and PMK2B.)
Panel Adapter Kit PMK2A is a panel to accommodate CUB2 and provides a key switch to enable or disable the reset function. Installation for the counter is identical (See reverse.) Two methods for wiring are provided below to enable or disable the reset.

**METHOD A**
This method provides a means of disabling the front panel reset by means of a key switch. When the key is in the OPERATE position the counter will operate, but the front panel reset button is inoperative. When the key is in the RESET MODE position, the counter continues to operate, but the front panel reset button can be used to reset the counter.

**HOOKUP**
1. Install counter on plate as described under Mounting. (See reverse.)
2. Push black and yellow wire-lugs (provided with panel kit) on key switch terminals.
3. Ensure black wire from CUB is in COMMON location and yellow wire from CUB is in RESET ENABLE location.
4. Twist black wire from key switch together with black wire from CUB with wire nut provided in accessory bag with CUB.
5. Twist yellow wire from key switch together with yellow wire from CUB with wire nut provided in accessory bag with CUB.
6. Mount adapter plate into existing panel cut-out.

**METHOD B**
This method can be used to directly reset the counter with the key itself. With the key in the OPERATE position, the counter will continue to accumulate counts. In the RESET MODE position, the counter will reset to zero and remain there until the key is moved to the OPERATE position.

Note: Do not leave key in RESET MODE position for long periods of time, as this will drain the batteries at a faster than specified rate.

**HOOKUP**
1. Install counter on adapter plate as described under Mounting. (See reverse.)
2. Push black and yellow wires with wire lugs (provided with panel kit) on key switch terminals.
3. Ensure black wire from CUB is in COMMON location.
4. Remove yellow wire from plug. (See CUB1 and 2 Bulletin.)
5. Insert blue wire (supplied with CUB in accessory bag) in REMOTE RESET location.
6. Twist black wire from key switch together with black wire from CUB with wire nut provided in accessory bag with the CUB.
7. Twist yellow wire from key switch together with blue wire from CUB with wire nut provided in accessory bag with the CUB.
8. Mount adapter plate into existing panel cut-out.

Note: Because of the key feature, this panel does not provide a sealed enclosure, however, the CUB itself will be sealed.
**R-C SNUBBER NOISE AND ARC SUPPRESSOR**

---

**SPECIFICATIONS**

1. **R-C Value:** 0.1 µf, 47 Ω 1/2 Watt (±30%)
2. **Max. Line Voltage:** 250 V rms or 250 VDC
3. **Frequency:** DC to 62 Hz
4. **Peak Pulse Voltage:** 1200 V max.

UL recognized component
(Okaya Electric America, Inc. PN# XEB0471, UL-1414, File # E47474)

---

**GENERAL DESCRIPTION**

The R-C Snubber is intended to suppress the "inductive kick" from motors, solenoids or relay coils. High energy noise spikes are generated whenever current is interrupted through an inductive load. These noise spikes may interfere with associated equipment causing erratic operation and may also accelerate relay contact wear. Applied across an inductive load, the R-C snubber suppresses the noise spikes and extends contact life.

---

**DIMENSIONS In inches (mm)**

**[All Dimensions are nominal]**

![Dimensions Diagram]

---

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNUB</td>
<td>R-C Snubber Inductive Load Suppressor</td>
<td>SNUB0000</td>
</tr>
</tbody>
</table>

---

**APPLICATION**

The R-C snubber inductive load suppressor should be applied as shown below. Placing the suppressor across the contact in many cases can work as well, but for maximum effect, it is best to place the suppressor directly across the load. All inductive loads in a system should be suppressed in this manner to avoid mutual interference. The suppressors are effective in both AC and DC circuits.

---

* Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
UTILITY ENCLOSURES, NEMA 1
PROVIDE EASY MACHINE, DESK-TOP, OR SHELF MOUNTING
FOR RLC PANEL MOUNTED COUNTERS & INDICATORS

DESCRIPTION
These easy-to-assemble enclosure kits feature interchangeable prepunched panels which accept most RLC Counters and Indicators without drilling, sawing, punching, or filing. Blank panels are also available for custom applications. (Panels are ordered separately.) Convenient, 3-piece assembly permits base to be mounted first. Then, the counter or indicator is mounted in the panel and wiring connections made with the unit in-place. Finally, the cover is installed without bending wires or stuffing wires back into the enclosure. Two knockouts on the rear, (one 1/2", and one dual 7/8" - 1 1/8") accept standard conduit adapters or can be fitted with grommets for flexible cable entry. In most applications, enclosures are roomy enough to allow mounting accessory circuit components such as control relays toward the rear of the case. Rubber grommet feet allow the enclosure to be free standing or base-mounted with through-bolts on a machine frame member or shelf.

Enclosures and panels are coated with a durable flat black polyurethane finish. Hardware includes assembly screws and foot grommets.

DIMENSIONS In inches (mm)

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>USED WITH</th>
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</tr>
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<tbody>
<tr>
<td>SMALL ENCLOSURE KIT (Less Front Panel)</td>
<td>—</td>
<td>ENC10000</td>
</tr>
<tr>
<td>Front Panels For Small Enc. #ENC10000</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Blank Panel (No Cut-out)</td>
<td>—</td>
<td>PNL1A000</td>
</tr>
<tr>
<td>Panel With Single Cut-out</td>
<td>Models SCP &amp; RMX</td>
<td>PNL1B000</td>
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<tr>
<td>Panel With Single Cut-out</td>
<td>Gemini Series</td>
<td>PNL1C000</td>
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<td>Panel With Single Cut-out</td>
<td>Legend &amp; Libra Series</td>
<td>PNL1D000</td>
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<tr>
<td>Panel With Single Cut-out</td>
<td>Lynx Series</td>
<td>PNL1E000</td>
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<tr>
<td>Panel With Single Cut-out</td>
<td>PAX, PAXLite, Apollo &amp; IM Series</td>
<td>PNL1F000</td>
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<td>Panel With Single Cut-out</td>
<td>C48/T48</td>
<td>PNL1G000</td>
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<td>LARGE ENCLOSURE KIT (Less Front Panel)</td>
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<tr>
<td>Blank Panel (No Cut-out)</td>
<td>—</td>
<td>PNL2A000</td>
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<tr>
<td>Panel With Single Cut-out</td>
<td>Model SCD</td>
<td>PNL2C000</td>
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<tr>
<td>Panel With Dual Cut-outs (Combination Applications)</td>
<td>(ANY TWO) Models SCP &amp; RMX</td>
<td>PNL2D000</td>
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18 GAGE, COLD ROLLED STEEL
The 1/8 DIN panel adapter kit permits the mounting of the PAX and Apollo units into an existing 1.8" (45.7 mm) x 3.88" (98.5 mm) (DT3A, DT3D, SCT, & SCP) panel cut-out. The kit consists of two metal adapter plates coated with a durable flat black polyurethane finish, and a neoprene gasket, which provides a sealed front panel that meets NEMA 4/IP65 specifications when properly installed.

**DIMENSIONS In Inches (mm)**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>O.A. DIM.</td>
<td>2.25&quot; (57.1 mm) x 4.63&quot; (117.6 mm)</td>
</tr>
</tbody>
</table>

**NOTE:** An overall panel area of 2.25" (57.1 mm) x 4.63" (117.6 mm) is required for proper mounting.

**INSTALLATION**

1. Remove the backing from the adhesive side of the adapter gasket (included with adapter kit) and carefully stick the gasket to the front of the existing panel cut-out.

2. Place the standard panel mount gasket (provided with the unit) over the unit. Then slide one of the plates over the unit. If the gasket has adhesive, apply the gasket to the plate, then slide the plate over the unit. (Gasket must be facing the bezel.)

3. Insert the unit into the panel cut-out from the front and slide the remaining adapter plate over the unit from the rear.

4. Install the mounting clip(s) as per the unit instructions. Tighten the mounting screws evenly to apply uniform compression and to provide a water-tight seal.

**CAUTION:** Only minimum pressure is required to seal the panel. Do NOT overtighten the mounting screws.

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMKA1</td>
<td>3-PIECE KIT permits mounting to existing 1.8&quot; x 3.88&quot; (45.7 x 98.4 mm) Panel cut-out, O.A. DIM. 2.25&quot; x 4.63&quot; (57.1 x 117.6 mm)</td>
<td>PMKA1000</td>
</tr>
</tbody>
</table>
**MODEL BMK3 & BMK4 - BASE MOUNT KITS**

**DESCRIPTION**

The Model BMK3 and 4 Base Mount Kits provide the necessary equipment for base mounting various units. The kits are coated with a durable flat black polyurethane finish and consist of two mounting legs which attach to the customer’s base panel, using the hardware provided.

Model PMK3 and 4 are separate front panels, available for different sized units. After mounting the units to the appropriate PMK panel, the entire assembly is then attached to the mounting legs.

**MOUNTING PROCEDURE**

1. Mark and drill holes (3/16" Dia.) in base panel for attaching the base mount legs. Use the appropriate Model PMK panel as a template for marking the mounting hole locations. NOTE: RECOMMENDED MINIMUM BASE PANEL THICKNESS IS 1/8" TO SUPPORT THE WEIGHT OF THE INDICATOR WITHOUT PANEL DISTORTION.
2. Attach the base mount legs to the base panel using the machine screws and nuts provided or user supplied hardware if panel thickness exceeds 1/4".
3. Mount the indicator to the Model PMK panel, utilizing the mounting clips provided, in accordance with the panel mounting instructions supplied with the individual unit.
4. Attach the PMK panel and unit assembly to the base mount legs by using the self-tapping screws provided.

**BASE MOUNT DIMENSIONS  In inches (mm)**

<table>
<thead>
<tr>
<th>BMK3</th>
<th>BMK4</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMK 3</td>
<td>PMK 4</td>
</tr>
<tr>
<td>3.38 (85.9)</td>
<td>3.00 (76.2)</td>
</tr>
<tr>
<td>6.43 (163.3)</td>
<td>7.30 (185.4)</td>
</tr>
<tr>
<td>[For use with Legend, Lynx, Libra, C48, T48, T16 &amp; P16 Units]</td>
<td>[For use with Gemini, Apollo, IM, PAX, TCU, PCU, TSC &amp; PSC Units]</td>
</tr>
</tbody>
</table>

**BASE MOUNT DIMENSIONS  In inches (mm)**

<table>
<thead>
<tr>
<th>BMK3</th>
<th>BMK4</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMK 3</td>
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<td>[For use with Gemini, Apollo, IM, PAX, TCU, PCU, TSC &amp; PSC Units]</td>
</tr>
</tbody>
</table>
## PANEL DIMENSIONS  
*In inches (mm)*

### PMK3A
- Cut-Out For Lynx
- Dimensions: 3.00 (76.2) x 3.50 (88.9) x 2.56 (65.0) x 3.44 (87.4)

### PMK3B
- Cut-Out For Libra/Legend
- Dimensions: 3.00 (76.2) x 3.50 (88.9) x 3.25 (82.6) x 4.09 (103.9)

### PMK3C
- Cut-Out For C48, T48, P16, & T16
- Dimensions: 3.44 (87.36) x 2.56 (65.0) x 3.50 (88.9) x 1.772 (45.0)

### PMK4A
- Cut-Out For Gemini
- Dimensions: 2.50 (63.5) x 3.12 (79.2) x 5.63 (143.0) x 6.51 (165.4)

### PMK4B
- Cut-Out For Apollo, IM, PAX, TCU, PCU, TSC, & PSC
- Dimensions: 2.50 (63.5) x 3.12 (79.2) x 4.25 (108) x 5.13 (130.0)

## ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMK 3</td>
<td>Base Mount Kit For Legend, Lynx And Libra</td>
<td>BMK30000</td>
</tr>
<tr>
<td>BMK 4</td>
<td>Base Mount Kit For Gemini, Apollo, IM, PAX, TCU, PCU, TSC And PSC</td>
<td>BMK40000</td>
</tr>
<tr>
<td>PMK 3A</td>
<td>Mounting Panel For Lynx</td>
<td>PMK3A000</td>
</tr>
<tr>
<td>PMK 3B</td>
<td>Mounting Panel For Libra And Legend</td>
<td>PMK3B000</td>
</tr>
<tr>
<td>PMK 3C</td>
<td>Mounting Panel For C48, T48, P16 And T16</td>
<td>PMK3C000</td>
</tr>
<tr>
<td>PMK 4A</td>
<td>Mounting Panel For Gemini</td>
<td>PMK4A000</td>
</tr>
<tr>
<td>PMK 4B</td>
<td>Mounting Panel For IM, Apollo, PAX, TCU, PCU, TSC And PSC</td>
<td>PMK4B000</td>
</tr>
</tbody>
</table>
**DESCRIPTION**

The CT004 is intended for use with temperature controllers for monitoring heater current. The CT004 is suitable for general purpose AC current monitoring applications up to 40 Amps.

Notes: Refer to the instruction manual of the temperature controller for connection information and max. heater current allowable by the temperature controller.

**SPECIFICATIONS**

1. CURRENT RATIO: 40:0.1A
2. MAX HEATER CURRENT: 50 A.
3. DIELECTRIC STRENGTH: 1000 VAC (For 1 minute)
4. VIBRATION RESISTANCE: 50 Hz (Approx. 10 G)
5. TERMINALS: Solder type
6. WINDOW DIAMETER: 0.228" (5.8 mm).
7. WEIGHT: 0.406 oz (11.5 g).

**MODEL CT - CURRENT TRANSFORMER**

**SPECIFICATIONS**

1. Operating Frequency: 50 to 400 Hz.
2. Insulation Class: 0.6 KV BIL 10 KV full wave.
3. Terminals: Brass studs No. 8-32 UNC with one flat washer, lockwasher, and hex nut.
4. Window Diameter: 1.13” (28.7mm).
5. Weight: 8.0 oz (226.0g).

These transformers are UL Recognized, File #E155930(M)

Note: The listed current ratio of the current transformer is based on the primary conductor passing once through the transformer opening. The ratio is reduced in multiples by looping the conductor through the opening. A transformer having a ratio 200:5 changes to a ratio of 100:5 if two loops are made through the transformer with the primary conductor. The ratio of the transformer will be 50:5 if four loops are made with the primary conductor, etc.
**BASE MOUNT KITS FOR GEMINI, LEGEND, LIBRA, LYNX, & APOLLO UNITS**

**DESCRIPTION**

The Model BMK3 and 4 Base Mount Kits provide the necessary equipment for base mounting various units. The kits are coated with a durable flat black polyurethane finish and consist of two mounting legs which attach to the customer’s base panel, using the hardware provided.

Model BMK3 and 4 are separate front panels, available for different sized units. After mounting the units to the appropriate PMK panel, the entire assembly is then attached to the mounting legs.

**MOUNTING PROCEDURE**

1. Mark and drill holes (3/16" Dia.) in base panel for attaching the base mount legs. Use the appropriate Model PMK panel as a template for marking the mounting hole locations. NOTE: RECOMMENDED MINIMUM BASE PANEL THICKNESS IS 1/8" TO SUPPORT THE WEIGHT OF THE INDICATOR WITHOUT PANEL DISTORTION.

2. Attach the base mount legs to the base panel using the machine screws and nuts provided or user supplied hardware if panel thickness exceeds 1/4".

3. Mount the indicator to the Model PMK panel, utilizing the mounting clips provided, in accordance with the panel mounting instructions supplied with the individual unit.

4. Attach the PMK panel and unit assembly to the base mount legs by using the self-tapping screws provided.

**BASE MOUNT DIMENSIONS  In inches (mm)**

<table>
<thead>
<tr>
<th></th>
<th>BMK3</th>
<th>BMK4</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMK 3</td>
<td>[For use with Legend, Lynx, Libra, C48, T48, T16 &amp; P16 Units]</td>
<td>[For use with Gemini, Apollo, IM, &amp; PAX Units]</td>
</tr>
<tr>
<td>3.38</td>
<td>85.9</td>
<td>3.00</td>
</tr>
<tr>
<td>6.43</td>
<td>(163.3)</td>
<td>7.30</td>
</tr>
<tr>
<td>0.075</td>
<td>1.9</td>
<td>0.075</td>
</tr>
<tr>
<td>0.075</td>
<td>(1.9)</td>
<td>0.075</td>
</tr>
</tbody>
</table>

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
PMK3A

Cut-Out For LYNX

3.00 (76.2)

3.50 (88.9)

2.56 (65.0)

3.44 (87.4)

PMK3B

Cut-Out For LIBRA/LEGEND

3.00 (76.2)

3.50 (88.9)

3.25 (82.6)

4.09 (103.9)

PMK3C

Cut-Out For C48, T48, P16 & T16

3.44 (87.36)

2.56 (65.0)

3.00 (76.2)

1.772 (45.0)

PMK4A

Cut-Out For GEMINI

2.50 (63.5)

3.12 (79.2)

5.63 (143.0)

6.51 (165.4)

PMK4B

Cut-Out For APOLLO/M/PAX

2.50 (63.5)

3.12 (79.2)

4.25 (108)

5.13 (130.0)

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
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</tr>
</thead>
<tbody>
<tr>
<td>BMK 3</td>
<td>Base Mount Kit For Legend, Lynx And Libra</td>
<td>BMK30000</td>
</tr>
<tr>
<td>BMK 4</td>
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<tr>
<td>PMK 3A</td>
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<td>Mounting Panel For Libra And Legend</td>
<td>PMK3B000</td>
</tr>
<tr>
<td>PMK 3C</td>
<td>Mounting Panel For C48, T48, P16 And T16</td>
<td>PMK3C000</td>
</tr>
<tr>
<td>PMK 4A</td>
<td>Mounting Panel For Gemini</td>
<td>PMK4A000</td>
</tr>
<tr>
<td>PMK 4B</td>
<td>Mounting Panel For IM, Apollo And PAX</td>
<td>PMK4B000</td>
</tr>
</tbody>
</table>
INDUCTIVE LOAD SUPPRESSOR

DESCRIPTION

These devices, when installed across an inductive load, such as a contactor, solenoid or relay, will suppress transient surges during a switching. This will enhance relay life and provide increased reliability of operation.

There are two devices available, one for use in 115 volt circuits and one for use in 230 volt circuits.

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>ILS1</td>
<td>115 VAC Inductive Load Suppressor</td>
<td>ILS11500</td>
</tr>
<tr>
<td>ILS2</td>
<td>230 VAC Inductive Load Suppressor</td>
<td>ILS23000</td>
</tr>
</tbody>
</table>

FULLY SLIDE PVC INSULATING TUBING OVER MODEL ILS LEADS, AS SHOWN.

Caution: Ensure VAC is “OFF” before installing Model ILS.

ILS SPECIFICATIONS *

<table>
<thead>
<tr>
<th>DEVICE MODEL NUMBER</th>
<th>RATED VOLTAGE</th>
<th>RATED PEAK SINGLE PULSE TRANSIENT CURRENT (AMPS)</th>
<th>SINGLE PULSE TRANSIENT ENERGY JOULES</th>
<th>POWER DISSIPATION WATTS</th>
<th>CLAMPING VOLTAGE VOLTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ILS1</td>
<td>130 AC</td>
<td>175 DC</td>
<td>6500</td>
<td>80</td>
<td>1.0</td>
</tr>
<tr>
<td>ILS2</td>
<td>275 AC</td>
<td>370 DC</td>
<td>6500</td>
<td>150</td>
<td>1.0</td>
</tr>
</tbody>
</table>

*NOTE: These devices will suppress most transient surges. However, if the device heats up or stops functioning after a short period of time a higher joules rated device may be required.
Most electronic equipment designed for use in industrial environments has a high degree of noise immunity and protection against damage. But even the best can experience difficulties in operation if certain minimal considerations are not adhered to when installing the equipment. When relay contacts are used to switch inductive loads, such as auxiliary relays or solenoids, extremely large voltage spikes can be generated when the relay contact opens, these voltage spikes can cause pitting of the relay's contacts, thereby reducing its usable life.

The internal functioning components of an electronic instrument operate on a low DC voltage, generally 5 V, and respond to signals as low as 1 V or less. In contrast, stray voltage spikes in excess of 100 V and sometimes thousands of volts can be detected in the industrial environment. These voltage spikes can be coupled from power lines that are powering equipment that contains S.C.R. circuitry, or in other ways causes rapid load changes on the AC line. These spikes can also be coupled from lines that are actuating AC or DC solenoids or actuators. In other words, any wiring in an industrial application should be considered a potential noise source.

How can these noise spikes get into the instrument? There are three major ways that noise spikes can enter the instrument.

1. Noise can enter directly, via the AC power input. It is recommended that electronic instruments be connected to a relatively clean source of power. If this cannot be accomplished, there are means of suppressing noise or isolating the instrument from the noise. These consist of everything from simple inductive load suppressors (M.O.V.'s) to constant voltage isolation transformers, depending on the severity of power line disturbance.

2. Noise can enter via the input leads. Here, there are two modes (See Fig. 1) by which the noise can enter. Normal mode, which means the noise enters on the input lead, with respect to the instrument common; and common mode, which means the noise enters on both the input and the instrument common with respect to earth ground (power line neutral). It is recommended that sensor input and control input wiring not be run in the same conduit or raceways with power lines or current carrying control lines. It is also recommended that these lines be kept away from inductive loads such as motors, solenoids, relays and contactors. For best results, it is recommended that two-conductor shielded cable be used to connect these inputs. The shield should be connected to the input common at the instrument only. In addition, the input common should only be connected to machine ground (earth) at one point, preferably a direct connection to the input common terminal.

3. The third way noise can enter the instrument is via the output lines. This is one of the most overlooked sources of trouble. When an output is driving an inductive load, such as solenoids, contactors, or relays; a large noise spike, several times the supply voltage, is generated every time the output is turned off. This noise spike, in addition to physically degrading the relay contact, can radiate off the output lines and into more sensitive areas of the instrument. The surest way to alleviate this situation is to suppress the noise spike. It is best to do it at the noise source (See Fig. 2), to prevent noise currents from flowing in the output lines. There are several ways to do this. If it is a DC device, then either a diode or a M.O.V. (Metal Oxide Varistor) can be placed across the device to suppress it. The greater the current load of the device, the higher wattage diode required. If it is an AC load, then a M.O.V. or capacitor and resistor in series can be used. It can be seen that the output lines can be noise sources and as such should be kept away from the instrument’s own input lines, as well as the input lines of other instruments. In addition to the foregoing considerations, care should be taken when connecting input and output returns to the instrument’s common. When separate input and output commons are provided, they should not be mixed. When an output device return is connected to an input common (See Fig. 4), the output current will flow in the input common line. This will cause a noise voltage to be present, which can affect the operation of the instrument.

In summary, it is much easier to eliminate problems when building up a system than after it is installed.
**PMKCC1 & PMKCC2**

These panelmount kits adapt the CUB Controller to either a 50 mm x 50 mm or a 68 mm x 68 mm panel cut-out. The kit consists of two metal panel adaptors, one neoprene gasket and 2 3-48 x 1/2” screws. The adapter plates and gasket are pinched between the front bezel of the counter and the mounting clips (*provided with the controller accessory bag*). The 1/2” long screws may be necessary for thicker panel installations.

*Note: If room permits, install signal connector after unit is mounted. If there is not enough room, pull the wires through before installing as described below:*

1. Pull signal connector through the following items in order:
   a) One panel adapter plate.
   b) Through existing panel opening.
2. Slide the following items onto the counter.
   a) Panel gasket
   b) Adapter plate
   c) Adapter gasket
3. Install connector in the Cub Controller. Ensure connector is in proper orientation i.e. lockslots visible when viewed from below the case.
4. Slide counter through panel cut-out from the front, and center in the panel opening.

5. Install mounting clips (*one on either side*) with the screws provided. Tighten the screws moderately to “pinch” the gaskets and panels between the front bezel and the mounting clips. (*Mounting clips are provided in accessory bag.*)

**DIMENSIONS “In inches (mm)”**

<table>
<thead>
<tr>
<th>PMKCC1</th>
<th>PMKCC2</th>
<th>PMKCC3</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.250” (6.3)</td>
<td>2.270” (57.6)</td>
<td>2.250” (57.6)</td>
</tr>
<tr>
<td>1.770”(45)</td>
<td>1.770”(45)</td>
<td>1.770”(45)</td>
</tr>
<tr>
<td>0.250” (6.3)</td>
<td>1.770”(45)</td>
<td>1.770”(45)</td>
</tr>
<tr>
<td>2.270” (57.6)</td>
<td>3.000”(76)</td>
<td>3.000”(76)</td>
</tr>
<tr>
<td>2.48” (62)</td>
<td>2.48” (62)</td>
<td>2.48” (62)</td>
</tr>
<tr>
<td>1.18” (30)</td>
<td>1.8” (45.7)</td>
<td>1.8” (45.7)</td>
</tr>
<tr>
<td>2.95” (75)</td>
<td>2.95” (75)</td>
<td>2.95” (75)</td>
</tr>
<tr>
<td>177”(45)</td>
<td>177”(45)</td>
<td>177”(45)</td>
</tr>
<tr>
<td>2 Plcs.</td>
<td>2 Plcs.</td>
<td>2 Plcs.</td>
</tr>
<tr>
<td>595” (15)</td>
<td>595” (15)</td>
<td>595” (15)</td>
</tr>
<tr>
<td>2.36” (57)</td>
<td>2.36” (57)</td>
<td>2.36” (57)</td>
</tr>
<tr>
<td>1” (25.4)</td>
<td>1” (25.4)</td>
<td>1” (25.4)</td>
</tr>
</tbody>
</table>
**PMKCC3**

For mounting proceed as follows:
1. Slide panel gasket over back of counter. (*Gasket is supplied in accessory bag with counter.*)
2. Slide counter onto adapter plate.
3. Slide adapter gasket onto counter.
4. Attach counter to adapter plate with two mounting clips and screws. (*Both mounting clips are supplied in accessory bag with counter.*)
5. Install connector in the Cub Controller. Ensure connector is in proper orientation i.e. lockslots visible when viewed from below the case.
6. Place complete assembly over existing cut-out, lining up the adapter plate mounting holes with existing holes.
7. Use two mounting screws and nuts provided with Panel Adapter Kit to secure panel to existing cut-out.

### ORDERING INFORMATION

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMKCC1 3-PIECE KIT permits mounting in existing 1.97&quot; X 1.97&quot; (50 mm x 50 mm) panel cut-outs O.A. 2.27&quot; x 2.27&quot; (57.6 mm x 57.6 mm)</td>
<td>PMKCC100</td>
<td></td>
</tr>
<tr>
<td>PMKCC2 3-PIECE KIT permits mounting in existing 2.68&quot; x 2.68&quot; (68 mm x 75 mm) socket box panel cut-outs, (72 mm x 72 mm DIN bezel opening) O.A. 3&quot; x 3&quot; (76 mm x 76 mm)</td>
<td>PMKCC200</td>
<td></td>
</tr>
<tr>
<td>PMKCC3 2-PIECE KIT permits mounting for existing 2.36&quot; x 2.95&quot; (60 mm x 75 mm) socket box panel cut-outs O.A. 2.36&quot; x 2.96&quot; (60 mm x 75 mm) Hole Centers 2.48&quot; (63 mm)</td>
<td>PMKCC300</td>
<td></td>
</tr>
</tbody>
</table>
DESCRIPTION

This easy-to-assemble enclosure kit features interchangeable prepunched panels which accept a variety of Red Lion Products, without drilling, sawing, punching, or filing. A blank panel is also available for custom applications. (Panels are ordered separately.) Convenient, 3-piece assembly permits base to be mounted first. Second, the counter or indicator is mounted to the panel and wiring connections are made to the unit through the base knockout(s). Third, the panel is fastened to the cover, then the cover is fastened to the base. Two knockouts on the rear (one 1/2" and one dual 7/8" - 1 1/8") accept standard conduit adapter or can be fitted with grommets for flexible cable entry. Rubber grommet feet allow the enclosure to be free-standing or base-mounted with through-bolts on a machine frame member or shelf.

Enclosure and panels are coated with a durable flat black polyurethane finish. Hardware includes assembly screws and foot grommets.

DIMENSIONS “In inches (mm)”

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enclosure Kit (Less Front Panel)</td>
<td>ENC30000</td>
</tr>
<tr>
<td>Panel For Libra/Legend</td>
<td>PNL3A000</td>
</tr>
<tr>
<td>Panel For Libra/Legend With Keylock</td>
<td>PNL3B000</td>
</tr>
<tr>
<td>Panel For Lynx</td>
<td>PNL3C000</td>
</tr>
<tr>
<td>Panel For Lynx With Keylock</td>
<td>PNL3D000</td>
</tr>
<tr>
<td>Blank Panel (No Cut-out)</td>
<td>PNL3E000</td>
</tr>
<tr>
<td>Panel For C48/P16/P48/T16/T48</td>
<td>PNL3F000</td>
</tr>
<tr>
<td>Panel For C48/P16/P48/T16/T48 With Keylock</td>
<td>PNL3G000</td>
</tr>
</tbody>
</table>
The LX label accessories allow the 5 digit LPAX display to be customized with an engineering unit. The label is affixed to the embossed area on the bezel of the LPAX. The LPAX module is then programmed to turn on its backlighting, which illuminates the label from behind.

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>LX</td>
<td>Custom Units Label for 5 Digit LPAX</td>
<td>Listed Below</td>
</tr>
</tbody>
</table>
**ENC9-NEMA 4/IP65 LPAX ENCLOSURE**

The ENC90000 NEMA 4/IP65 enclosure provides a means of mounting the LPAX display in dirty or washdown environments. The enclosure comes with all the gaskets, hardware (except the mounting screws), and brackets required to base, ceiling, or wall mount the LPAX display. The mounting screws to attach the brackets to your surface are not provided due to the variety of installation options available.

**ENCLOSURE ASSEMBLY**

1. Before drilling a hole in the enclosure for your wire connector or fitting, ensure that the location you have chosen allows enough clearance around the MPAX module.
2. Remove the center section of the gasket provided with the LPAX, and slide it over the rear of the display and onto the mounting studs.
3. Insert the LPAX into the enclosure as illustrated. Install six #10-32 keps nuts (supplied with the LPAX) and tighten evenly for uniform gasket compression. The gasket should be compressed to about 75 to 80% of its original thickness. Do not overtighten the nuts.
4. Run the wires through the hole that was drilled in the enclosure, and attach them to the LPAX. Wiring instructions are provided in the appropriate PAX bulletin shipped with the MPAX module.
5. Remove the center section of the rear cover gasket. Apply the gasket to the rear panel of the enclosure by inserting the screws through the panel and into the holes in the gasket. Position the panel on the enclosure and start all of the screws. Alternately tighten each screw to ensure uniform gasket compression. The gasket should be compressed to about 75 to 80% of its original thickness.
6. To securely mount the enclosure, attach the adjustable mounting brackets to the enclosure using the washers and screws provided.
7. Secure the mounting brackets to the desired mounting location.

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENC9</td>
<td>NEMA 4 Enclosure for LPAX</td>
<td>ENC90000</td>
</tr>
</tbody>
</table>

**SHROUD**

The optional shroud enhances the readability of the LPAX unit in areas with high intensity overhead light sources. The shroud can be used in conjunction with any installation (panel mount, enclosure, or mounting brackets). When properly installed, the shroud will not affect the integrity of a NEMA 4 installation.

**INSTALLATION**

1. Remove the center section of the gasket provided with the LPAX, and slide it over the rear of the display and onto the mounting studs.
2. Orient the shroud and gasket as shown in the assembly figure, and place it over the LPAX. The studs of the LPAX should now be protruding through the rear of the shroud.
3. Follow the remaining installation instructions for panel mounting, bracket mounting or enclosure mounting as appropriate.
**MBLPAX-MOUNTING BRACKETS**

The MBLPAX mounting brackets provide an easy way to base, wall, or ceiling mount the LPAX display. The MBLPAX kit comes with two sets of brackets, and most of the hardware to mount the LPAX at virtually any angle. The screws to attach the brackets to your surface are not provided due to the variety of installation options available.

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**DIMENSIONS In inches (mm)**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value (in)</th>
<th>Value (mm)</th>
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<tr>
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<td>120.65</td>
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<td>3.60</td>
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<td>0.50</td>
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<td>4.20</td>
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</tbody>
</table>

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**ASSEMBLY**

- **WALL MOUNT**
- **CEILING MOUNT**
- **BASE MOUNT**

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**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>DESCRIPTION</th>
<th>PART NUMBERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB</td>
<td>Mounting Bracket for LPAX</td>
<td>MBLPAX00</td>
</tr>
</tbody>
</table>

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**Notes:**

1. When installing the brackets, the fastener bracket must be installed on the studs of the LPAX as shown.
2. The mounting bracket may be installed with the flange facing in or out.
3. The rubber washers provided must be installed between the two mounting brackets during assembly.
4. The screws for fastening the brackets to a surface are not provided in the MBLPAX kit. The holes are 0.2” in diameter and will accept size #10 screws and smaller.

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 Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
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