RIPPLE METER

MODELS

<table>
<thead>
<tr>
<th>Number</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>290-RPL-BATT</td>
<td>290-RPL-2</td>
</tr>
<tr>
<td>290-RPL-1</td>
<td>290-RPL-3</td>
</tr>
<tr>
<td>290-RPL-2-N</td>
<td></td>
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</table>

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Check for the latest manual updates at JPTech.com
INSTALLATION

Step-by-Step Guide

1. Read Manual to familiarize yourself with the operation of the meter.

2. Mount Unit.

3. Connect the RED lead to the positive bus bar on the rectifier or tank. Connect the BLACK lead to the negative bus bar on the rectifier or tank. NOTE: You may need additional wire or terminal strip to make the connections to the bus bar or tank. If so, make sure the wire is heavy enough for the total voltage possible.

4. Apply power to the meter using a 110VAC source. There is no switch on the meter; disable the meter by unplugging.

Battery Installation

1. Unscrew the four (4) screws holding the faceplate in place.

2. From the bottom of the faceplace, pry up and rotate forward.

3. Remove old battery from holder and replace with the new one.

4. Replace lid and secure with the four screws.

NOTE: YOU COULD BE EXPOSED TO HIGH VOLTAGES AND AMPERAGES. USE EXTREME CAUTION WHEN USING THIS INSTRUMENT.
QUICK START

USING THE METER

JP Tech’s Ripple meters are designed for measuring DC voltages, AC voltages, and the amount of ripple present.

JP Tech’s Ripple meters incorporate a simple menu design featuring a two (2) button keypad. Pressing the SELECT key once cycles through different menu screens. Holding the SELECT key for about three (3) seconds will enable changes to be made on the menu screen chosen (not applicable on all screens; see the Menu Operation section for information on which values are editable).

After holding the SELECT key for three (3) seconds, a flashing cursor will appear, allowing for changes to be made. In this mode, the SELECT key moves your cursor right, and the CHANGE key advances the selected value by one. Once you have set the values you want, hold the SELECT key to return to the menu.

NOTE: The SELECT key will not change any values by itself! It only provides a way to move through menu screens or move the flashing cursor.

When the cursor is not flashing, pressing both the SELECT and CHANGE keys together will take you back to the default ‘SECONDS’ screen (as shown above). However, while editing values (cursor is flashing), pressing both the SELECT and CHANGE keys together will reset the value to zero.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>RANGE</th>
<th>RESOLUTION</th>
<th>ACCURACY</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC VOLTAGES</td>
<td>6.00 V</td>
<td>0.01 V</td>
<td>+/- (1.0% + 2dgt)</td>
</tr>
<tr>
<td></td>
<td>60.0V</td>
<td>0.1V</td>
<td>+/- (1/0% + 2dgt)</td>
</tr>
<tr>
<td></td>
<td>600V</td>
<td>1V</td>
<td>+/- (1.0% + 2dgt)</td>
</tr>
<tr>
<td>AC VOLTAGES</td>
<td>6.00V</td>
<td>0.01 V</td>
<td>+/- (1.0% + 2dgt)</td>
</tr>
<tr>
<td></td>
<td>60.0V</td>
<td>0.1V</td>
<td>+/- (1/0% + 2dgt)</td>
</tr>
<tr>
<td></td>
<td>600V</td>
<td>1V</td>
<td>+/- (1.0% + 2dgt)</td>
</tr>
</tbody>
</table>

Accuracy is given as +/- (% of reading + number of least significant digits)

At 20 degrees C to 24 degrees C for a period of six months after calibration.
MENU OPERATION

Menu Hierarchy

1. Main Display Screen *(Default Screen)*

2. Setup
   
   2.1. Relay Enable
   2.2. Low Ripple
   2.3. High Ripple
   2.4. Low DC Volts
   2.5. High DC Volts
   2.6. Alarm Min DCV
   2.7. Alarm Delay
   2.8. Averaging Filter *(290-RPL-BATT & 290-RPL-1 ONLY)*
1. MAIN DISPLAY SCREEN
To the right is the Main Display Screen. This screen shows DC voltages, AC voltages, and the amount of ripple currently present. This screen automatically ranges from 0-600V with the DC and AC readouts automatically ranging separately. The maximum percentage ripple the meter can display is 999.99%.

The lower right corner indicates the alarm status.

ALARM SYMBOLS:

- X = Alarm Relay is Disabled
- A = Alarm Relay is Engaged
- V = DC Volt Below Minimum Set Point
- U = Low DC Volt Below Set Point
- O = High DC Volt Over Set Point
- H = High Ripple Over Set Point
- L = Low Ripple Below Set Point

2. SETUP
After holding down the SELECT key for about 3 seconds, this screen allows you to enable/disable the alarm relay, program the set points for activating the alarm, set the amount of delay before the alarm activates, and enable/disable the averaging filters.
**MENU OPERATION**

**Setup Options**

2.1. RELAY ENABLE
This menu screen allows you to ENABLE or DISABLE the alarm relay.

*If the alarm relay is enabled, an “A” will appear on the main screen. If the alarm relay is disabled, an “X” will appear on the main screen.*

2.2. LOW RIPPLE
This menu screen allows you to set the lower limit of ripple before the alarm condition is engaged. Normally (and by default) this is set to 0% ripple, which disables the alarm condition. In some cases, however, when the ripple parameters are known, setting this screen to a value may be helpful to alert you to a potential problem with your rectifier.

*If the amount of ripple goes below this setpoint, an “L” will appear on the main screen.*

2.3. HIGH RIPPLE
This menu screen allows you to set the upper limit of ripple before the alarm condition is engaged. This setting should be set high enough that slight fluctuations in power can take place without setting off the alarm. Setting this screen to 999.99% disables this alarm condition.

*If the amount of ripple goes above this setpoint, a “H” will appear on the main screen.*

2.4. LOW DC VOLTS
This menu screen allows you to set the lower DC voltage limit. The alarm condition will be engaged if a voltage is encountered that is lower than this value. Setting this screen to 000.00V disables this alarm.

*If a voltage under this setpoint is encountered, a “U” will appear on the main screen.*

2.5. HIGH DC VOLTS
This menu screen allows you to set the high DC voltage limit. The alarm condition will be engaged if a voltage is encountered that is higher than this value. Setting this screen to 999.00V disables this alarm.

*If a voltage over this setpoint is encountered, an “O” will appear on the main screen.*

2.6. ALARM MIN DVC
The alarm will be DISABLED when the meter’s voltage is below the setpoint entered into this screen. For example, if this screen is set for 1 volt, any voltage below this amount will inhibit the alarm condition.

*If the meter’s voltage drops below this setpoint, the alarm will DISABLE, and a “V” will appear on the main screen. KEEP THIS VALUE TO AT LEAST 0.10V.*
MENU OPERATION

Setup Options

2.7. ALARM DELAY
This screen allows you to set the amount of time, in seconds, before an alarm condition is reported to the main display. This function is used to prevent slight variations in ripple that happen over a short period of time from engaging the alarm condition. A typical value would be 4 to 6 seconds, but may need to be longer depending on the performance of your rectifier.

The value must be set to a minimum of 1 second.

2.8. AVERAGING FILTER
This screen allows you to engage the averaging filter. The averaging filter allows the ripple to be averaged over a period of time in order to smooth out peaks and valleys that occur due to voltage fluctuations, barrels rolling, etc. The ripple percentage will become more stable on the main display when this function is enabled.
## PARTS LIST

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELASTIC SQUEEZE TUBE</td>
<td>245-4-ELSQZTUB</td>
</tr>
<tr>
<td><em>(Standard with unit. Good for weak to strong alkalis, weak to medium acids.)</em></td>
<td></td>
</tr>
<tr>
<td>THERMISTANT SQUEEZE TUBE</td>
<td>245-4-TMSQZTUB</td>
</tr>
<tr>
<td><em>(Has superior acid-resistant and alkali-resistant qualities.)</em></td>
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</tr>
<tr>
<td>FLUORO-VITON SQUEEZE TUBE</td>
<td>245-4-FVSQZTUB</td>
</tr>
<tr>
<td><em>(Good for strong solvents and acids.)</em></td>
<td></td>
</tr>
<tr>
<td>SQUEEZE TUBE LUBRICANT</td>
<td>245-4-SQZLUBE</td>
</tr>
<tr>
<td>100 RPM/24 VDC PERISTALTIC GEAR MOTOR</td>
<td>245-4-GEARMOTOR-FV</td>
</tr>
<tr>
<td>ROLLER FOR PERISTALTIC UNITS</td>
<td>245-4-ROLLER</td>
</tr>
<tr>
<td>FACEPLATE FOR PERISTALTIC UNITS</td>
<td>245-4-FACEPLATE</td>
</tr>
<tr>
<td>ROLLER / TUBE PUMP HOUSING</td>
<td>245-4-PMPBODY</td>
</tr>
<tr>
<td>RED/BLACK TWISTED PAIR SIGNAL WIRE</td>
<td>210-1-TWPR22RD</td>
</tr>
<tr>
<td>DELIVERY TUBING—20’ ROLL</td>
<td>245-4-PLYTB20</td>
</tr>
<tr>
<td><em>(Polyethylene 1/4’ OD, rigid wall tubing)</em></td>
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<tr>
<td>DELIVERY TUBING—50’ ROLL</td>
<td>245-4-PLYTB50</td>
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<tr>
<td>DELIVERY TUBING—100’ ROLL</td>
<td>245-4-PLYTB100</td>
</tr>
<tr>
<td>PERISTALTIC HINGE</td>
<td>245-4-HINGE</td>
</tr>
</tbody>
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**NOTE:** CHECK YOUR SQUEEZE TUBES PERIODICALLY FOR INTEGRITY (ABLE TO EXPAND AFTER BEING SQUEEZED BY THE ROLLERS).

### ORDER PARTS

<table>
<thead>
<tr>
<th>PHONE:</th>
<th>262-642-7671</th>
</tr>
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<tbody>
<tr>
<td>FAX:</td>
<td>262-642-7681</td>
</tr>
<tr>
<td>E-MAIL:</td>
<td><a href="mailto:sales@jptech.com">sales@jptech.com</a></td>
</tr>
<tr>
<td>MAIL:</td>
<td>JP TECH, INC.</td>
</tr>
<tr>
<td></td>
<td>P.O. Box 863</td>
</tr>
<tr>
<td></td>
<td>East Troy, WI 53120</td>
</tr>
<tr>
<td></td>
<td>USA</td>
</tr>
</tbody>
</table>
JP TECH, INC.

LIMITED PRODUCT WARRANTY

JP Tech warrants to first user of each new JP Tech product or component that it is free from defect in material and workmanship. The obligations of JP Tech under this warranty are expressly limited to the following:

- JP Tech will repair or replace, at its option, any defective components for a period of twelve (12) months from date of shipment. No charges are covered for the removal or replacement of defective components.
- This warranty applies only if the product is defective under normal use. It does not apply to breakage or defect from accident, alteration, misuse, or abuse of the product or component. In addition, this warranty is effective only if the product or component is installed in a location and manner prescribed by JP Tech’s instructions and only if it is so maintained. This warranty becomes null and void if the product or component is altered by anyone other than JP Tech, it’s authorized representatives, or by expressed written authorization for a specific situation.
- If JP Tech elects to send a service technician to a customer site to repair a defect, the cost of transportation and/or living expenses will be paid for by the customer. Should the defect turn out to be the result of the customer’s misuse, improper installation, or maintenance of the product or component, the customer will be responsible for the full cost of the service call including labor charges plus the aforementioned travel and living expenses.
- JP Tech will repair or replace any defective part within a product at the sole discretion of JP Tech. If JP Tech should choose to supply a part to the customer as a no-charge warranty replacement, the customer assumes all cost of installation associated with the replacement part. If the product needs to be returned for warranty service, a Returned Material Authorization (RMA) must be issued by JP Tech prior to such return. All returned material must be sent freight prepaid or it will not be accepted by JP Tech irrespective of warranty issues.
- There are no implied warranties of merchantability or of fitness for a particular purpose. The above warranty is made in lieu of all other guarantees or warranties, express or implied. JP Tech distributors or OEMs who purchase JP Tech products for resale are not authorized to assume any other obligation or liability for JP Tech.
- JP Tech will in no case or under any circumstances be liable for special, incidental or consequential damages, loss of profit or commission for any loss caused by any delay in production or shipment of product, or defect of any kind in any product or component covered by the sale. Without limitation, JP Tech will not be so liable with respect to furnishing of any product, or component, delay in such furnishing, use, resale, or other cause. JP Tech’s liability arising out of the supply of any product or component, its use, resale or other disposition, or out of any guarantee or warranty, express or implied, or any other cause, shall in no way exceed the cost to JP Tech of the product or component which JP Tech agrees to repair or replace. JP Tech’s liability for any product or component terminates upon expiration of the applicable repair or replacement period.

This implementation of this warranty may, under separate agreement, be subrogated to exclusive distributors or manufacturers who shall assume all or portions of the liability associated with warranty costs.

This warranty may be modified, wholly or in part, at any time by JP Tech without notice to past or future customers. The warranty revision in effect at the time of shipment shall prevail in any claims rendered.

JP TECH, INC.

TERMS AND CONDITIONS OF SALE

The purchase of any products or services supplied by JP Tech shall be governed by the terms of this agreement. Purchaser of these products and services acknowledges and agrees to these terms without modification by any competing document or any agreement not reduced to writing and authorized by an officer of JP Tech, Inc.

- Pricing is the effective price at the time of the order. If the shipment of product is postponed by buyer, the price may be changed to reflect any price changes enacted by JP Tech. Prices may be changed by JP Tech at any time for any reason without notice to purchaser except for accepted orders not affected by a purchaser initiated delay. Prices, unless otherwise stipulated, do not include shipping and handling charges.
- Certain products may require initial and progress payments before the commencement and continuation of design, engineering, component procurement, and manufacture. These products will not be shipped until all progress payments have been made. Cancellation of any orders in progress will necessitate the forfeitures of any payments received to date as well as payment of any costs accrued in excess of paid amounts.
- Orders must be accepted by JP Tech at their home office. Acceptance of any purchase order, regardless of the method, is conditioned on assent of buyer to the terms and conditions contained herein.
- Sales are FOB point of shipment. Sales terms are net 30 days from date of shipment. Present or future sales, use, or other taxes on sales, installation or use shall be paid by purchaser. Purchaser shall pay 1½% interest per month on all outstanding amounts due to JP Tech. Interest accrual shall begin on the 31st day after shipment for all outstanding amounts.
- All sales are final. Any decisions to accept return of product after shipment and receipt by purchaser shall be at the sole discretion of JP Tech and not until payment has been made and agreement by purchaser to pay all shipping, cancellation, and restocking charges that may accrue.
- Shipping dates given prior to shipment are estimated, actual delivery will be based on factory and engineering loading at the time of manufacture as well as the availability of parts required for manufacture. JP Tech shall not be liable for any costs or damages arising out of or related to any delays in shipment or delivery, including but not limited to liquidated damages, unless otherwise agreed in writing.
- JP Tech may change design or construction of any product or component in any way they see fit. Upgrades for previously purchased products may be available for certain products for a price that will be determined when appropriate.
- Except as provided herein, any controversy, claim or dispute arising out of or related to any order or sale or breach thereof, including but not limited to any breach of warranty claims, shall be litigated in state court, Walworth or Waukesha Counties, Wisconsin, and shall be governed by the laws of Wisconsin. If JP Tech is the prevailing party, JP Tech shall be entitled to collect all reasonable fees and costs, including court costs and attorney fees.