**Product Description**

The RL1 Automated Return Loss Meter has been precisely designed for the most accurate mandrel-free insertion loss and return loss measurements available in the industry. The RL1 is capable of testing even the most challenging fiber optic cable assemblies and components with smart integrated analysis settings adaptable to user requirements.

It is important for the RL1 to be flexible as applications keep changing with new industry requirements. JGR has designed the RL1 to be chassis modular, allowing for quick pairing to equipment in the XN1 family via USB connection. The RL1 can contain up to 4 built-in wavelengths (850, 1300, 1310, 1490, 1550, 1625, 1650nm) with the option of a dual front panel output.

The RL1 can be paired with up to four RD-S Wireless Remote-head Detectors. The re-designed integrating sphere can measure loss on dense 72 channel MTP/MPO and also duplex LC with one connection. The RD-S comes standard with SD Slide Detector adapters allowing for the ultimate in ease-of-use.

Unique to the RL1, the optical meter has been designed with many innovative new smart features that increase production efficiency and improve overall usage.

**KEY FEATURES**
- Most accurate RL in its class
- Self-Calibration
- Chassis modular
- Wireless integrating sphere detector
- No computer required
- Ready for Production Automation
- Barcode control available
- XN1 Ready

**APPLICATIONS**
- Testing of IL/RL of fiber optic assemblies
- Single and multi-fiber testing
- SM 1310nm, 1490nm, 1550nm, 1625nm
- MM 850nm, 1300nm
- QA and R&D testing

**COMPLIANCE**
- Multimode meets IEC 61280-4-1 Encircled Flux standard

**IN THE BOX**
- RL1 Meter
- RD-S Wireless Power Meter
- USB-A USB-B (1.5m)
- Ethernet cable (1.5m)
- Remote Head Cable (1.5m)
- SD00 Detector Cap
- SD01 FC Detector Adapter
- FC/APC-FC/APC jumper (3m)
- FC/APC-FC/UPC jumper (3m)
- SX1
- AC power cord
- Test Report

**Optimized for Speed and Accuracy**

The user can choose between “Fast” and “Standard” modes. Fast mode measures IL/RL in less than 1.5 seconds per wavelength with the same accuracy as other premium test solutions up to 75 dB. Standard mode’s accuracy surpasses all other commercially available cable assembly test solutions and can accurately measure RL up to 85 dB.

**Self Calibration**

The RL1 Automated Return Loss Meter does not need to be sent back to JGR for annual calibration. The self-calibration feature provides step-by-step instructions and generates a calibration report thereby minimizing production down-time and assuring measurement reliability.

**Wireless Remote-head Detector**

The RD-S Wireless Remote-head Detector is a standard feature of the RL1 which helps optimize expensive facility desk space. It can be wired to the rear panel of the RL1 or operated wirelessly for maximum flexibility.

**Duplex Ready**

The RL1 is available with dual outputs allowing for duplex assembly testing without the need of an additional switch. The new integrating sphere in the RD-S remote-head can measure IL on a duplex LC connector in one connection for simple automated testing. If duplex polarity is a concern, a second remote-head can be paired to identify duplex polarity.
**Touchscreen**
The large RL1 touchscreen display allows users to clearly see device under test results through color coded on screen pass/fail results. With the RL1 touchscreen, operators can load pre-defined custom test plans for automated testing, or they can manually perform specific individual measurements.

**Automated Measurements Made Easy**
The RL1 Automated Return Loss meter has been designed with the future of automated cable assembly testing in mind. Automation is much more obtainable with the new easily interchangeable SD slide detector adapters, wireless remote head and the easy to program test plans. The testing stage can now be automated using ethernet to synchronize automated mechanical movements with remote measurements.

**Scan and Test**
Barcode scanners can be connected directly into the RL1 allowing operators to save results to a central database along with any other data contained in the barcode. Barcodes can also be used to quickly load test plans or provide custom field information. Using a barcode scanner will eliminate the need for manual user input resulting in less errors and faster production.

**Chassis Modular**
The RL1 can be connected directly to an additional SX1 switch for multi-fiber testing. The RL1 takes full control of the switch, automating measurements while storing all references and results. If desired, a second SX1 switch can be connected to measure insertion loss, return loss, and verify mapping of multi-fiber connectors or complex assemblies.

**No Computer Required**
The RL1 is self-sufficient and does not require a PC for automated measurements. Manufacturing facilities are often fighting to keep up with the ever changing lifecycles of Windows Operating systems or troubleshooting incompatible Linux systems; this is no longer an issue with the RL1. Multiple units can be connected to a local area network to save results to a local database. One central server can maintain all test plan information as well as test results for multiple production lines. Test plans can be loaded into the unit using the front panel touch screen or a barcode reader.

**Chassis Modular**
The RL1 can be connected directly to an additional SX1 switch for multi-fiber testing. The RL1 takes full control of the switch, automating measurements while storing all references and results. If desired, a second SX1 switch can be connected to measure insertion loss, return loss, and verify mapping of multi-fiber connectors or complex assemblies.

**XN1 Ready**
All RL1’s in a facility can communicate directly to the XN1 server which can be installed on any computer or server connected on the same Network as the RL1. The XN1 server can manage all test equipment, test plans, test results, labels and allow communication from one piece of JGR test equipment to another. This creates an ecosystem of test equipment and information under one centralized location.

**Table**

<table>
<thead>
<tr>
<th>Fiber Loss</th>
<th>RL</th>
<th>RL1</th>
<th>RL3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1350</td>
<td>0.13</td>
<td>65.3</td>
<td>65.3</td>
</tr>
<tr>
<td>1490</td>
<td>0.14</td>
<td>65.4</td>
<td>65.4</td>
</tr>
<tr>
<td>1550</td>
<td>0.15</td>
<td>64.7</td>
<td>65.5</td>
</tr>
<tr>
<td>1625</td>
<td>0.21</td>
<td>63.2</td>
<td>62.2</td>
</tr>
</tbody>
</table>
Ordering Scheme & Instructions

1 - Configure RL1 meter

**Single-mode version**

RL1-[]-[0][0]-[0][9][F][A]-

- **OUTPUT**
  - 1: [0][1]
  - 2: [0][2]

- **Laser 1**
  - No Laser
  - 850 nm
  - 1300 nm
- **Laser 2**
  - No Laser
  - 1650 nm
  - 1670 nm
- **Laser 3**
  - No Laser
  - 1550 nm
  - 1570 nm
- **Laser 4**
  - No Laser
  - 1650 nm
  - 1670 nm
- **Measurement**
  - IL & RL - Leave Blank
  - IL only

**Multimode version**

RL1-[]-[0][0]-[0][0]-[5][0][F][P]

- **OUTPUT**
  - 1x 10 µm
  - 2x 10 µm
  - 6x 50 µm
  - 6x 52.5 µm

- **Laser 1**
  - No Laser
  - 850 nm
- **Laser 2**
  - No Laser
  - 1490 nm
  - 1550 nm
  - 1625 nm
  - 1650 nm
- **Laser 3**
  - No Laser
  - 1310 nm
  - 1550 nm
  - 1625 nm
  - 1650 nm
- **Laser 4**
  - No Laser
  - 1550 nm
  - 1625 nm
  - 1650 nm

**MEASUREMENT**
- IL & RL - Leave Blank
- IL only

2 - Configure SX1 Switch  *if no switch needed, skip ahead*

**Switch Chassis**

SX1-1A-[0][0][0]-[0][0][B]

- **OUTPUT SWITCH**
  - 1x2
  - 1x4
  - 1x12
  - 1x24
  - 1x32
  - 1x48
  - 1x72
  - 1x96

- **Connector Type**
  - C/UPC
  - FC/APC

3 - Add accessories

**Additional Remote Head**

RD-S

*each RL1 can pair with up to 4 Remote Heads at once*

**Slide Detector adapters**

More detectors available upon request. See more details on pg 72.

**Barcode scanner**

**USB-BARCODE**

**Rackmount kit**

2U-RACK-KIT
### Optical/Electrical Specification

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Single-mode</th>
<th>Multimode</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fiber Type (μm)</strong></td>
<td>9/125</td>
<td>50/125 and/or 62.5/125</td>
</tr>
<tr>
<td><strong>Encircled Flux Standard</strong></td>
<td>N/A</td>
<td>IEC 61280-1-4</td>
</tr>
<tr>
<td><strong>Operating Wavelengths (nm)</strong></td>
<td>1310 / 1490 / 1550 / 1625 / 1650</td>
<td>850 / 1300</td>
</tr>
<tr>
<td><strong>Return Loss Range (dB)</strong></td>
<td>± 1.0 (30 to 70)</td>
<td>± 1.4 (10 to 30)</td>
</tr>
<tr>
<td></td>
<td>± 1.3 (70 to 75)</td>
<td>± 1.9 (30 to 40)</td>
</tr>
<tr>
<td></td>
<td>± 2.9 (75 to 80)</td>
<td>± 2.2 (40 to 43)</td>
</tr>
<tr>
<td></td>
<td>± 3.9 (80 to 85)</td>
<td>± 4.7 (43 to 50)</td>
</tr>
<tr>
<td><strong>Detected Type</strong></td>
<td>Wide Area Integrating Sphere Wireless Remote Head</td>
<td></td>
</tr>
<tr>
<td><strong>Insertion Loss Accuracy (dB)</strong></td>
<td>± 0.05 (&lt;5 dB Loss)</td>
<td>± 0.15 (&gt;5 dB Loss)</td>
</tr>
<tr>
<td><strong>Remote Interface</strong></td>
<td>USB / Ethernet</td>
<td></td>
</tr>
<tr>
<td><strong>Testing Time (s)</strong></td>
<td>&lt;5 per wavelength</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;1.5 per wavelength</td>
<td></td>
</tr>
<tr>
<td><strong>Cable Assembly Length (m)</strong></td>
<td>0.7 to 3000</td>
<td>0 to 3000</td>
</tr>
<tr>
<td></td>
<td>1.7 to 3000</td>
<td>1.7 to 5000</td>
</tr>
<tr>
<td></td>
<td>0 to 3000</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Input Voltage</strong></td>
<td>100 - 240 V AC, 50 - 60 Hz</td>
<td></td>
</tr>
<tr>
<td><strong>Power Consumption (VA)</strong></td>
<td>60 maximum</td>
<td></td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td>USB or Ethernet</td>
<td></td>
</tr>
<tr>
<td><strong>Switch Life</strong></td>
<td>10^6 cycles</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
1. ±0.05 dB in “Fast Mode”.
2. “Standard Mode” only.
3. Receiver test jumper required for <1.7m cable assembly.

### Mechanical/Environmental Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unit Dimensions W x H x D (cm)</strong></td>
<td>RL1: 235 x 12 x 325 (2U half rack)</td>
</tr>
<tr>
<td></td>
<td>RD-S: 11 x 92 x 86</td>
</tr>
<tr>
<td></td>
<td>Shipping Box Dimensions W x H x D (cm): 36.5 x 39 x 53</td>
</tr>
<tr>
<td><strong>Unit Weight (kg)</strong></td>
<td>8</td>
</tr>
<tr>
<td><strong>Total Shipment Weight (kg)</strong></td>
<td>9</td>
</tr>
<tr>
<td><strong>Operating Temperature (°C)</strong></td>
<td>0 to 55</td>
</tr>
</tbody>
</table>

**Notes:**
- RL1: Automated Return Loss Meter
- RD-S: Wireless Remote Head

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### RL1 Automated Return Loss Meter

**Specifications:**
- **Dimensions:** 235 x 12 x 325 (2U half rack)
- **Weight:** 8 kg
- **Shipment Weight:** 9 kg
- **Temperature:** 0 to 50 °C

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### SX1 Optical Switch

**Specifications:**
- **Dimensions:** 36.5 x 39 x 53 cm
- **Weight:** 8 kg
- **Shipment Weight:** 9 kg
- **Temperature:** 0 to 55 °C