Tubing Ovality Monitor

TOM

User Manual

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**Tubing Ovality Monitor - **TOM

Tubing Ovality Monitor is a system to measure coiled tubing string ovality.
- Diameter sizes from 1” to 2”.
- Very high scan rate (measuring frequency).
- Highly precise measurements.

**Laser measuring head**

This is the measuring sensor device. The laser measuring head has laser transmitters and receivers. For as long as the pipe remains within an area of 64 x 64 mm squared, the laser measuring head will measure the pipe ovality accurately and is programmed to make 10 readings per second. Thus even at coiled tubing speeds of 120 ft/min, the device will measure the ovality 5 times per foot.

![Image of Laser measuring head](image)

The laser measuring head requires 230 VAC to operate and transmits data to the controller HMI through a serial port (RS-232).

Furthermore, in extreme weather conditions it is necessary to keep the laser device at a reasonable operating temperature. The optimum temperature range is between 0°C to 45°C. Thus, the laser measuring head is equipped with a climate control, which will self-start once the conditions approach uncomfortable. The climate control utilises 12 vdc power and can be supplied directly from a truck battery. The current drawn by the climate control system would be around 15 amps.
**Controller**

The communication between the controller HMI and the laser measuring head is through a serial port (RS-232). On the HMI, the port used is Port B.

The controller HMI saves the *Depth*, *Ovality*, *Ballooning*, *Necking*, *Maximum Diameter*, and *Minimum Diameter* data every 1 second.

To enable the HMI read data from TOM, the **OVALITY** option must be turned on. This option is accessed through the HMI MENU;

![Image of HMI interface with menu options]

After entering the password\(^1\) the HMI Systems Settings screen will be displayed.

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\(^1\) *By default, the password is 290992*
After turning the OVALITY function ON, the Raw Data from TOP can be viewed on the RAW DATA page.
Finally, all the Ovality data will be recorded in a CSV file on the SD memory card. The stored data can be viewed from the home page of the HMI and clicking View Logs.
A cable bundle consisting of four individual cables is supplied with the unit. Each cable is used for a specific task:

1. **Serial data cable**: This cable is used for connecting between the serial port on the control HMI and the laser measuring head.
2. **AC Power**: This cable is used to supply the laser measuring head with AC power. Plugs directly to a power socket.
3. **DC Power**: This cable is used to supply DC power to the climate control system within the laser measuring head. Can be connected directly to a truck battery, hence the connections to the battery are loose.
Connections

- AC Power
- Serial port
- DC Power
Front view of chassis mount connectors
On the side of the Laser Measuring Head

AC Power – 4 way connector
A = Live
B = Neutral
C = Ground
D = Not connected

Serial RS232 – 3 way connector
<table>
<thead>
<tr>
<th>TOM Connector</th>
<th>D-Type Connector</th>
<th>RJ11 Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin A</td>
<td>Pin 2</td>
<td>Yellow</td>
</tr>
<tr>
<td>Pin B</td>
<td>Pin 3</td>
<td>Black</td>
</tr>
<tr>
<td>Pin C</td>
<td>Pin 5</td>
<td>Red</td>
</tr>
</tbody>
</table>

Important Note: If using a 3-pin connector on the REAM HMI enclosure or flightcase, then ensure that you follow the TOM connector to RJ11 convention. If the REAM HMI connector is XLR type, then use Pin 1 instead of Pin A, Pin 2 instead of Pin B, and Pin 3 instead of Pin C.

DC Power – 6 way connector
A = +12 vdc
D = Ground or 0 vdc
Short A, B, and C on both 6-way connectors, i.e. on the chassis mount male and cable mount female
Short D, E, and F on both 6-way connectors, i.e. on the chassis mount male and cable mount female.