CORIOLIS FLOW METER

MONITORING FOR CONSISTENT FLUID RETURNS TO MAINTAIN SAFE MANAGED PRESSURE DRILLING OPERATIONS

OVERVIEW

The Coriolis Skid is a stand-alone unit designed to provide flow measurements via a Coriolis mass flow meter. The system interacts with an MPD skid by providing flow rate measurements for flow control, and any other applications where a Coriolis output reading is desired.

The primary flow path consists of a three manual ball valve system for isolation of the Coriolis meter without stopping fluid flow. The Coriolis meter is run during operation in an upright or “vertical” position, but the entire unit may be laid down in a shipping or “horizontal” orientation for ease of transport.

In some assemblies, as detailed in the following table, an integrated pilot operated pressure relief valve is installed to ensure equipment safety from unexpected over pressurization to the manifold. The relief flow path includes a modulating relief valve with a non-flowing pilot set to relieve pressure at a set pressure. The relief valve is a fully mechanical device, and therefore does not communicate with the MPD system, merely allows for relief of over pressure to protect the process equipment on skid. The relief valve setup includes a Nitrogen charge to energize the main valve piston to help prevent leaks.

The Coriolis Skid receives power via a power cable connected to the MPD system. A Profibus cable is also connected to provide communication between the skids. In some applications or as requested, an overhead light is installed to aide an operator performing maintenance on the skid during darkness, as well as backlighting provided with the Coriolis meter digital readout.

The Coriolis Skid can be provided as per customer required certifications. All units are provided with DNV 2.7-1 certified structural frame as a standard.

FEATURES

» E&H Coriolis Promass 83F mass flow meter with transmitter and digital LED display for flow measurement, error limits to ISO/DIN 11631, calibration to ISO 17025
  - 0.10% accuracy for liquid mass flow
  - 0.35% accuracy for gas mass flow
  - 0.15% accuracy for liquid volume flow
  - 1 deg F accuracy for temperature
  - 0.01 g/cm³ accuracy for liquid density
» DNV 2.7-1 certified frame, sling and shackles
» Two ball valves (4” or 6”) to isolate the flow meter for maintenance
» One 6” ball valve to open skid bypass through line when service to Coriolis meter is required
» High point bleed valve for bleeding off of air during fill-up, or pressure during servicing of meter
» Low point drain valve to aid in equipment maintenance
» Junction box to maintain electrical connections from switch, and power to meter from MPD skid
» Overhead roof protection
» Piloted relief valve for equipment protection from higher than designed pressures – some units
» Overhead light and on/off switch for skid mounted overhead light – some units

BENEFITS

» Early gas detection
» Coriolis mass flow measurement for MPD applications
» Return flow versus injected flow for kick/loss situation analysis
# Equipment Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>4” 150# 101787711</th>
<th>4” 300# w/ Pressure Relief Valve 102274720</th>
<th>6” 900# 2K 102538228</th>
<th>6” 300# 102525097</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions in (m) (l x w x h)</td>
<td>110.4 x 27.6 x 74.4 (2.8 x 0.7 x 1.89)</td>
<td>98.5 x 55.5 x 111 (2.5 x 1.41 x 2.82)</td>
<td>99.5 x 61.5 x 149 (2.53 x 1.56 x 3.78)</td>
<td>86 x 53.5 x 133 (2.18 x 1.36 x 3.38)</td>
</tr>
<tr>
<td>Weight lb (kg)</td>
<td>3210 (1460)</td>
<td>4000 (1815)</td>
<td>7850 (3561)</td>
<td>4500 (2041)</td>
</tr>
<tr>
<td>End Connections</td>
<td>6” 150# x 4” 206 (T) Inlet</td>
<td>6” 300# x 6” GR52 Inlet and Outlet</td>
<td>6” 900# RTJ x 6” 206 (T) Inlet</td>
<td>6” 300# x 6” 206 (T) Inlet</td>
</tr>
<tr>
<td></td>
<td>6” 150# x 4” 206 (W) Outlet</td>
<td></td>
<td>6” 900# RTJ x 6” 206 (W) Outlet</td>
<td>6” 300# x 6” 206 (W) Outlet</td>
</tr>
<tr>
<td>Working Pressure psi (bar)</td>
<td>250 (17)</td>
<td>510 (35)</td>
<td>2000 (137.9)</td>
<td>510 (35)</td>
</tr>
<tr>
<td>Pressure Relief Valve</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>PRV Set Point psi (bar)</td>
<td>N/A</td>
<td>510 (35)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Maximum flow, water, lb/min (kg/s)</td>
<td>12,860.3 (97.2)</td>
<td>12,860.3 (97.2)</td>
<td>29,394.9 (222.2)</td>
<td>29,394.9 (222.2)</td>
</tr>
<tr>
<td>Service Temperature °F (°C)</td>
<td>-20 to 200 (-29 to 93.3)</td>
<td>-20 to 200 (-29 to 93.3)</td>
<td>-20 to 200 (-29 to 93.3)</td>
<td>-20 to 200 (-29 to 93.3)</td>
</tr>
<tr>
<td>Additional Design Codes</td>
<td>Electrical components selected as per ATEX requirements</td>
<td>CE certified (PED/ATEX) NORSOK</td>
<td>Components selected as per CE (PED/ATEX) and IECEx requirements</td>
<td>NEC 500 (Class 1/Div 1) API RP 14F (Class 1/Div 1)</td>
</tr>
</tbody>
</table>

**Notes:**
- Standards as applicable and documented on the individual equipment specification data sheet (ESDS).
- All units built to NACE MR0175 for sour gas applications.
- All piping to ASME B31.3 c/w 1/16” corrosion allowance.
- Structural frames designed and certified to DNV 2.7-1.
- These ratings are guidelines only. Refer to the equipment data book for individual equipment specifications.

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