Chemical Injection Throttle Valve (CTV)

Ultra Flow (CTV-UF)

FEATURES

- High performance with minimum footprint
- Horizontal and vertical installation
- Best value
## Technical Data

### Product data
- **Manufacturer**: Oceaneering Rotator AS
- **Product description**: Chemical Injection Throttle Valve, Ultra Flow (CTV-UF)

### Basic design data
- **Rated working pressure**: 15,000 psi (1035 bar)
- **Rated ambient pressure**: 5,800 psi (400 bar)
- **Max. differential pressure (DP) across CTV**: 15,000 psi (1035 bar), 2,900 psi (200 bar) recommended maximum DP during flow valve operation
- **Design life**: 30 years
- **Operational life**: Qualification tested to 1,000 cycles, one cycle: 0-100-0%

### Engineering units reported by SW (SI units)
<table>
<thead>
<tr>
<th>Flow rate</th>
<th>Pressure</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>l/min</td>
<td>Bar</td>
<td>°C</td>
</tr>
</tbody>
</table>

### Power requirements
- **Power supply**: 24 ±4 V DC
- **Idle power consumption**: 3 W max (~2W nominal)
- **Operating power consumption**: During flow valve operation: 12 W max (~9 W nominal)
- **Inrush current**: < 250mA for 100 ms

### Interfaces
- **ROV interface**: D-handle
- **Hydraulic coupling type**: Parker 3/4” DST through-bore female coupling
- **Electric connector**: Siemens Digitron or Teledyne ODI, 4 or 7 way
- **Pin-out**: Pin 1: Pwr +, Pin 2: Pwr -, Pin 3: Can H / RS B [+] Pin 4: Can L / RS A [-]
- **Communication**: CANbus CiA 443 SIIS L2 v2 / Modbus RTU

![Diagram of the Chemical Injection Throttle Valve, Ultra Flow (CTV-UF) showing components such as the Flow Valve, Ceramic Sleeve, Electronic Housing Controller, Spindle, Variable Restrictor, Electrical Connector, etc.]}
### Installation and retrieval

<table>
<thead>
<tr>
<th><strong>ROV and equipment</strong></th>
<th>Standard work-class ROV manipulator for working pressures up to 6,670 psi (460 bar); torque tool required for working pressures up to 15,000 psi (1035 bar)</th>
</tr>
</thead>
</table>
| **Installation torque** | Up to 460 bar working pressure: Recommended 150 Nm (No torque tool)  
Up to 690 bar working pressure: Recommended: 300 Nm  
Up to 1035 bar working pressure: Recommended: 400 Nm  
Not to exceed torque: 400 Nm (Damage torque > 400 Nm) |
| **Retrieval torque** | Not to exceed torque: 400 Nm (Damage torque > 400 Nm) |
| **Number of turns for installation/retrieval** | 16 ± 1 turns |

### Material data

- **Parts in full or partial contact with seawater**
  - Super Duplex (UNS S32750)
  - Alloy 725 (UNS N07725)
  - Nitronic 50 (UNS S20910)
  - Hastelloy C-276 (UNS N10276)
  - Alloy 625 (UNS N06625)
  - AISI 316 (UNS S31600)
  - Polyethylene (HDPE)
  - Tygon-F-4040-A (compensation hose)
  - Nylon 6.6 (compensation hose clip)
  - El. Conn.: Super Duplex (UNS S32550)
  - Fasteners: Alloy 725 (UNS N07725)
  - Alloy 625 (UNS N06625)
  - Hydraulic couplings: Nitronic 50 (UNS S20910) (body)
  - ToughMet® 3 AT 110 (UNS C72900) [seal retainer insert/cartridge]

- **Parts in full or partial contact with injection chemical**
  - Super Duplex (UNS S32750)
  - Alloy 725 (UNS N07725)
  - Nitronic 50 (UNS S20910)
  - Alloy X750 (UNS N07750)
  - Pressure sensor: Alloy 625 (UNS N06625)
  - Hydraulic couplings: Nitronic 50 (UNS S20910) (body)
  - ToughMet® 3 AT 110 (UNS C72900) (between primary and secondary seal)

### Seals

- Chemical Wetted: PTFE 25C, FFKM, PEEK, gold plated alloy 718 [UNS-N07718].
- Seawater wetted: NBR, silver plated Hastelloy C-276 [UNS N10276] (dual redundant seals between seawater and electronics canister).

### Dimensions and weight

| **Length** | ~1065 mm (retracted) to ~1113 mm (extended) (42-44 in) |
| **Diameter** | 6.7 in (170 mm) |
| **Weight in air** | ~198 lb (~90 kg) |
| **Weight in water** | ~168 lb (~76 kg) |

### Temperature ratings

- **Mechanical design temperature** | 14°F to 158°F (-10°C to +70°C) |
- **Electronics design temperature** | 0°F to 158°F (-18°C to +70°C) |
- **Operating temperature** | 23°F to 104°F (-5°C to +40°C) |
- **Storage temperature** | 0°F to 122°F (-18°C to +50°C) |

### Flow meter and pressure sensors

- **Primary flow measurement** | Integrated flow meter based on absolute pressure sensor measurements over a restriction. |
- **Secondary flow measurement** | Flow chart (part number specific) |
- **Pressure differential requirement** | DP over fixed restrictor > 0.1 bar for accurate flow measurement  
DP > 0.2 bar recommended |
- **Pressure sensors** | Quantity: 3 off  
Type: GE M&C  
Pressure Rating: 15K  
Calibrated range: 0-15,000 psi (0-1035 bar) [FS] Accuracy: < ± 0.025% FS (total error band) (within specified operating conditions) |
- **Flow rate measuring accuracy** | Better than < ±5% FS assuming known and constant viscosity |
Flow valve operation

<table>
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<tr>
<th>Control</th>
<th>Electrical remote operated</th>
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<tr>
<td>Drive</td>
<td>Stepper motor with strain wave gear</td>
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<tr>
<td>Travel time</td>
<td>21 minutes ±10 sec (0-100% or 100-0% open)</td>
</tr>
</tbody>
</table>

Operational safety margin
CTV will operate to 250 bar DP or higher.

Position indication
Stepper motor drive pulses

Operation verification
Secondary position indicator (proximity switch verifying movement, resolution ~0.7%)

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Flow Curves with Rotator Ultra Flow Test Fluid

For information, please contact: rotator@oceaneering.com

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