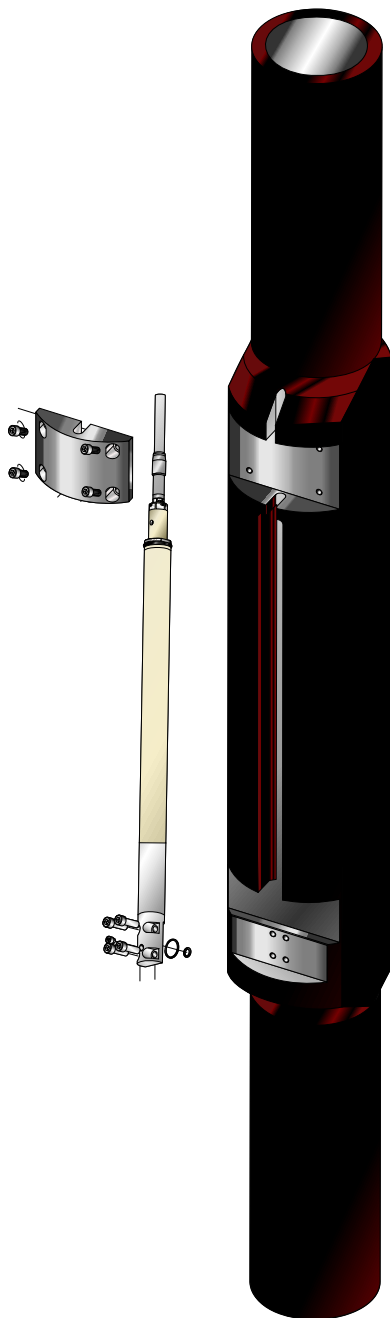


## Optical Pass-Thru Pressure/Temperature

Optical sensors fulfill the promise of permanent reservoir monitoring to enable better production and reservoir management decision-making. The Weatherford optical pass-thru pressure/temperature gauge has been designed for life-of-field reliability, unmatched stability, and ease of use in multiple applications. The pass-thru pressure/temperature gauge allows multiple gauges to share a common optical fiber, increasing the number of measurement points along the well bore. The expanded number of pass-thru temperature gauges enables multi-zone intelligent well production and reservoir monitoring applications.



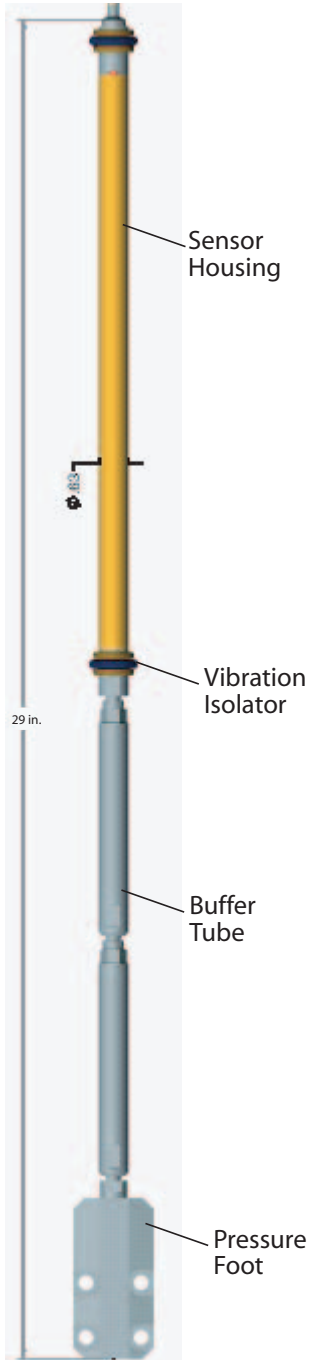
### FEATURES

- High reliability - minimum component count, no moving parts.
- Electronically passive - no electronics downhole.
- High immunity to pressure surges.
- Extremely high measurement stability - no measurable drift.
- Chemically inert - minimum corrosion compatibility problems.
- Robust - industry's highest mechanical shock and vibration survivability.
- Standard footprint - same handling and installation as electronic gauges.
- Immune to electromagnetic interference.
- Multiple pressure/temperature measurement points per fiber.

### BENEFITS

- High reliability results in unsurpassed performance over lifetime of well.
- Shock resistance means no problems with perforating or hydraulic fracturing operations.
- Immeasurable drift means no concerns about absolute pressure and temperature measurement over life-of-field.
- Minimum impact on completion design and installation.
- No electromagnetic interference issues with ESP or other electrical completion components.
- Real-time reservoir pressure results in:
  - Reduced well interventions
  - Reduced shut-ins
- Optical in-well system means all complex components are conveniently located at surface.

Simply Intelligent™



## APPLICATIONS

- All current and well-known electrical gauge applications:
  - In-well flowing pressure measurement
  - Reservoir pressure determination during shut-ins
  - Data for pressure transient analyses - skin, permeability and reservoir boundary determination
  - Management and control of well ramp-up
  - Interference test and reservoir connectivity determination
- Seamless integration with other Weatherford optical sensors, e.g., DTS, flow and phase fraction meters, and seismic systems.
- Each of the downhole optical cable's single mode optic fibers can support up to three pass-thru pressure/temperature gauges
  - Up to six pressure/temperature measurement points with DTS
  - Up to nine pressure/temperature measurement points without DTS
- Subsea wells where reliability and longevity are crucial.

## SPECIFICATIONS

Operational Performance	
Calibrated Pressure Range	Atmosphere to 20,000 psi
Over Pressure	25,000 psi @ 175°C
Collapse Pressure	>25,000 psi
Burst Pressure	>35,000 psi@ RT
Calibrated Temperature Range	25 to 175°C
Max. Temperature	200°C
Mn. Storage Temperature	-50°C
Pressure Metrology	
Pressure Accuracy	0.01% FS (+/- 2 psi)
Long Term Stability	< 0.1 psi/yr
Pressure Resolution	≤ 0.03* psi
Update Rate	1 sec - no limit
Temperature Metrology	
Temperature Accuracy	+/- 0.1°C
Long Term Temperature Stability	< 0.5°C/ year @ 175°C
Temperature Resolution	≤ 0.02 deg C RMS
Shock/Vibration	
Vibration	15 Grms, random 10 - 2000 Hz (Nav Mat)
Shock	250 g, 10ms half sine
Drop	500 g 1ms half sine
Thermal Shock	12°C/min

\*Depends upon update rate