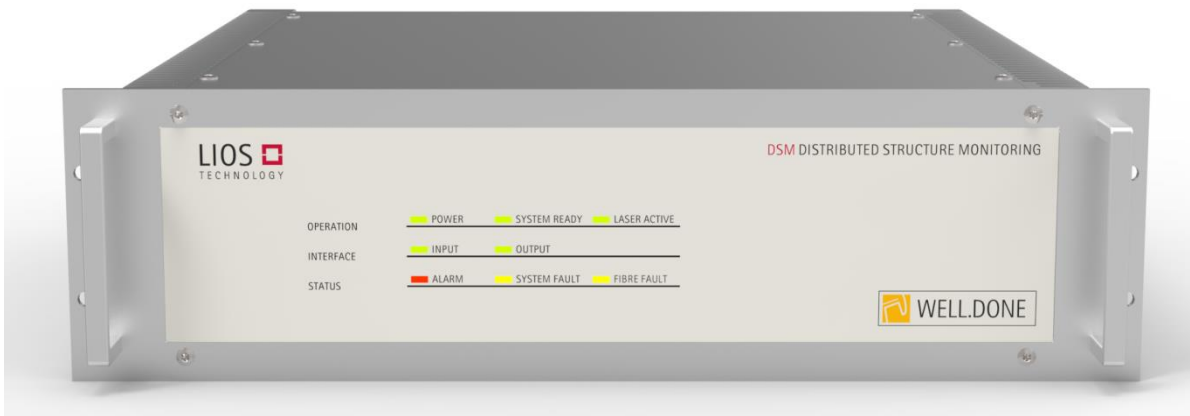


Long-Range Distributed Temperature Sensing System

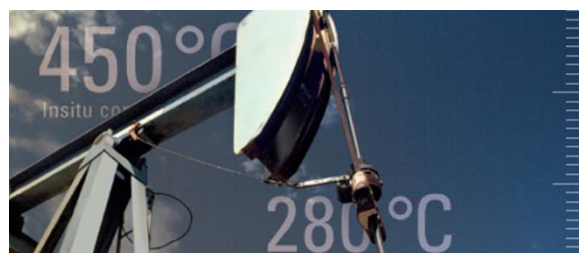


WELL.DONE® DTS for Distributed Temperature Monitoring in Oil & Gas

The long-range OTS4 series of the field-proven WELL.DONE DTS family is based on a proprietary Brillouin measurement technology. Its major advantages are the excellent distance range and measurement performance in combination with the passively cooled (fan-less) and maintenance-free industrial design of the WELL.DONE DTS family. Especially at distances above 20km, it exhibits a superior temperature resolution and accuracy in comparison to other technologies. The excellent performance is achieved in both, single- and double-ended fibre configurations. The OTS4 series is designed for autonomous operation without PC and comprises an internal SSD (solid state drive) for storage of measurement and event data.

The OTS4 series is fully integrated with the Charon4 software suite for easy configuration, long-term data storage and enhanced visualization that also serves other WELL.DONE DTS series. Data from different series of DTS and other temperature sensors are easily combined in the database to enable an efficient monitoring of complex industrial assets using multiple DTS with different distance range and also point temperature sensors.

The WELL.DONE OTS4 controller simultaneously monitors thousands of locations along the entire length of a well. Detection of well temperature profiles, reservoir monitoring, optimization of production and prevention of any unwanted operation conditions are examples of key functions of the temperature monitoring system. With its high optical budget and the frequency-based measurement, it is virtually insensitive to hydrogen darkening of optical fibres under the harsh conditions within a wellbore.



LIOS WELL.DONE

DISTRIBUTED TEMPERATURE MONITORING

Distance Ranges of DSM Models

WELL.DONE OTS4-050,-100,-200,-300,-400,-500,-600,-700	5 km, 10 km, 20 km, 30 km, 40 km, 50 km, 60 km, 70 km
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Optical Data

Optical channels (internal)	1, 2, 3, 4, 6, 8, 9, 12 or 16
Fibre configuration	No loop or termination required
Optical connector(s)	E2000 / APC
Fibre type	Single-mode 9/125
Laser classification	Class 1M (IEC60825-1), eye-safe wavelength

Measurement Performance*

Sampling Interval	0.25, 0.5 or 1 m
Spatial resolution	1, 2, 3 or 5 m
Temperature resolution, minimum	< 0.1 °C
Temperature resolution @ 10dB optical loss	< 1 °C
Temperature accuracy	2 °C**
Measurement time	1 to 20 min
* Measurement performance parameters are interdependent	** after calibration on a loose fibre without strain

Data Storage / Communication / Interfaces

Internal SSD storage	8, 16, 32 or 64 GB
Communication interfaces	2x Ethernet TCP/IP, USB, (optional: WLAN, GSM)
Communication protocols (options)	XML, MODBUS, DNP3, IEC60870, IEC61850
Programmable inputs / outputs	4 / 10
Fixed outputs	Collective fault and alarm
I/O board (optional***)	4 inputs / 12 outputs
Analogue sensors interface board (optional****)	4x Pt100, 2x 0(4)-20mA and 2x 0-10V
Analogue outputs (optional external module)	4 - 20mA
*** 2 optional internal boards can be installed in total	

Mechanical Data

Rack space	19-inch rack, 3 height units
Dimensions (H x W x D)	13.3 x 43.9 x 40.3 cm
Weight	15kg

Electrical Data

Power consumption, max. (DC / AC options)	40W / 45W
Operating voltage (DC-1 option)	12 ... 24 V DC (-15%/+10%)
Operating voltage (DC-2 option)	24 ... 48 V DC (-15%/+10%)
Mains voltage (AC option)	100 ... 240 V AC 50..60 Hz / 110... 220 V DC (-15%/+10%)

Environmental Conditions

Storage temperature	-40°C to +85°C
Operating temperature	-10°C to +60°C
Humidity (relative)	≤95 % (non-condensing)
Protection class (IEC 60529)	IP51

Conformity to Standards

Electrical safety	IEC/UL 61010-1, LV directive 2014/35/EC, CAN/CSA-C22.2
EMC***	EN61326-1, EN61000-6-2,3,-4-2,3,4,5,6,8,11,-3-2,3, FCC 47 CFR Ch.1 Part15
Hazardous substances, waste	RoHS directive 2011/65/EC, WEEE directive 2002/96/EC
Environmental testing****	IEC 60068-2-6,14,27,30
Functional safety (IEC61508)****	Hardware design compliant to Safety Integrity Level SIL2
Explosion safety (option)****	EX II (1) G [Ex op is T4 Ga] IIC / II (1) D [Ex op is Da] IIIC / I (M1) [Ex op is Ma]

**** Qualification in process



WELL.DONE®

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