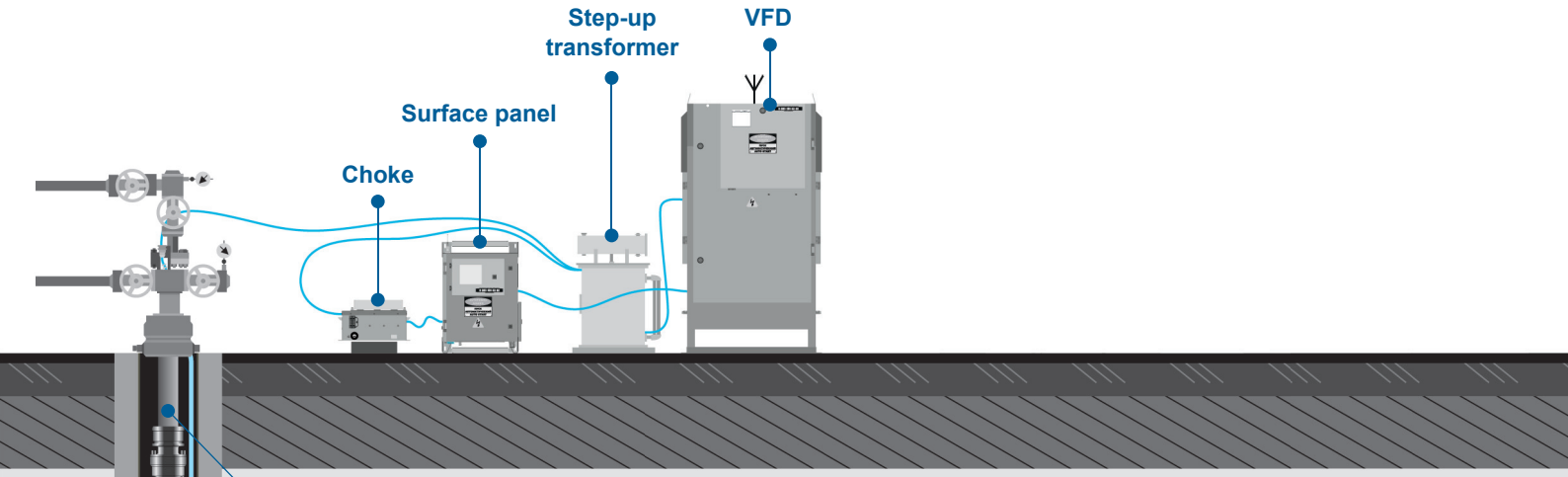
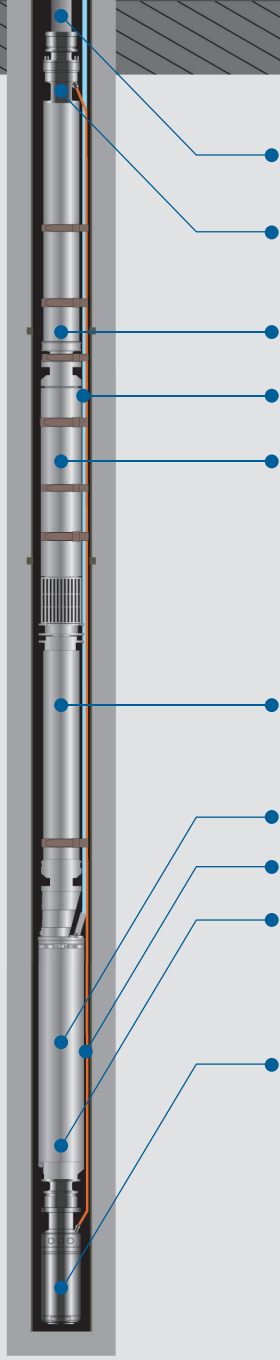
Downhole monitoring system for ESP





IRZ

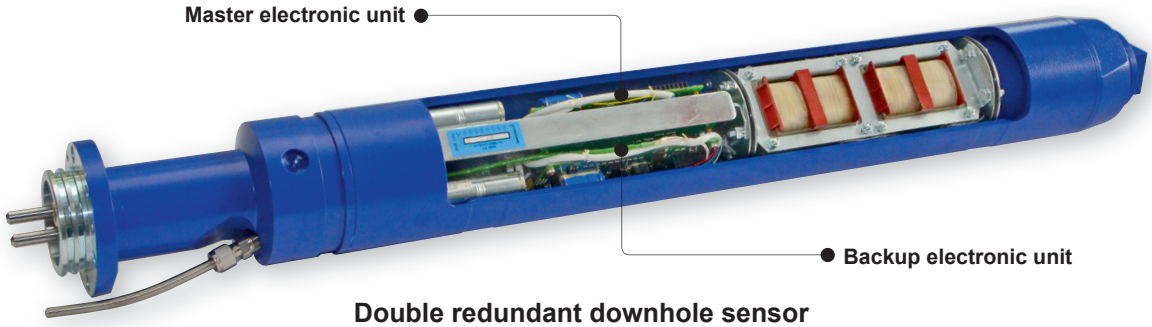
Production since
1998

60 000 +
sensors in operation

THE IRZ TMS DOWNHOLE MONITORING SYSTEMS ensure sustained real-time monitoring of all practically required downhole parameters of electrical submersible pump (ESP) system, such as pump intake pressure and temperature, motor oil/winding temperature, motor vibrations, current leakage, and pump discharge pressure, as well as up to 24 optional parameters depending on additional equipment used with the sensor (i.e. anti-scaling electromagnetic unit, motor rotation frequency measuring unit, etc.)

Data provided by IRZ TMS helps to protect ESP, increase its run life, and optimize oil production process.

High reliability of the new downhole monitoring system is ensured by two standalone electronic modules inside the downhole sensor: the main one being operating, whereas the standby one is off. Should the main module fail, the system can switch over to the standby module, either by the operator's command or automatically, assuring trouble-free operation of the system.



Double redundant downhole sensor

- **Hi-rel components**
- **Double redundant design in 150 °C version**
- **Accurate monitoring**
- **Internal protection against overvoltage up to 4000 V at ground fault in the power line or ESP cable**
- **Reliable data provision even at motor Y-point voltage increase up to 1000 V and at ESP cable insulation resistance decrease down to 10 kOhm**
- **Downhole units metal-to-metal sealing to protect against gas intake (optional)**
- **Wide DH pressure range up to 8700 psi**
- **Compatible with any drive and SCADA systems using MODBUS communication protocol**
- **Compatible with induction and permanent magnet motors**
- **Any flange / thread mechanical connections**
- **Customized motor adapters**
- **Easy installation**

ASPT surface panel

Supply voltage	85-285 V, 50 Hz / 60 Hz
Interfaces	– 1 RS485 port and 1 universal RS232/RS485 port – 1 USB-host port – 8 analog outputs 4-20 mA and/or 0-10 V – 8 analog inputs 4-20 mA and/or 0-10 V – Ethernet and wireless (GPRS) channel for SCADA network
Enclosure	IP43, IP65 or higher (at request)
Temperatures range	-40 … +70 °C
Graphic display	6"
Data log	10 MB
SW for data visualization on PC	Included in the supply package, allows data configurable visualization in the form of digits and charts
Pump protection	1 tripping relay for ESP shutdown by high Tmot, low Pi, high vibrations and ground fault
Protocols of data exchange with VFD	UNICONN, INSTRUCT, IRZ-TMS1, IRZ-TMS2, ELEKTON-TMSN1, ELEKTON-TMSN2, BORETS, and other MODBUS-based communication protocols
PC direct connection	Allows real-time data monitoring on PC
Menu language	English (other at request)

TMS-E surface board

Supply voltage	85 ... 285 V, 50 Hz
Interfaces	RS232 & RS485 ports
Enclosure	IP21
Temperatures range	-60 … +70 °C
Protocols of data exchange with VFD	UNICONN, INSTRUCT, IRZ-TMS1, IRZ-TMS2, ELEKTON-TMSN1, ELEKTON-TMSN2, BORETS, and other MODBUS-based communication protocols

Choke

Motor operating linear supply voltage	5 kV
Enclosure	IP23, IP54 or higher (at request)
Temperatures range	-55 … +85 °C

DOWNHOLE MONITORING SYSTEM FOR ESP

Technical specification

Monitored parameters		IRZ TMS	
Max. operating temperature		150 °C	175 °C
Intake pressure	Range	0-5800 psi / 0-8700 psi	
	Resolution	0.1 psi	
	Accuracy	±0.5 % FS / ±0.1 % FS	± 1 % FS
Intake temperature	Range	0-200 °C	
	Resolution	0.01 °C	
	Accuracy	± 1 % FS	
Motor oil or winding temperature	Range	0-250 °C	
	Resolution	0.01 °C	
	Accuracy	± 1 % FS	
Motor vibrations (X, Y, Z)	Range*	0-5 g	
	Resolution	0.01 g	
	Accuracy	± 5 % FS	
Insulation resistance (current leakage)	Range	0-10 MOhm (0-20 mA)	
	Resolution	1 kOhm (0.001 mA)	
	Accuracy	± 2-5 % FS (± 0.05 % FS)	
Discharge pressure	Range	0-5800 psi / 0-8700 psi	
	Resolution	0.1 psi	
	Accuracy	±0.5 % FS / ±0.1 % FS	±1 % FS

* 40 g version is available.

Downhole equipment specs

Connection and data transmission	The DH sensor is connected to the motor Y-point; powering and data transmission are through the ESP cable, pressure control line for discharge pressure measuring	
Motor adapter	Designed based on motor drawing	
Downhole equipment material	Downhole sensor & motor adapter D-sub	Carbon steel with anticorrosion coating or stainless steel
	Pressure control line	Stainless steel
Downhole sensor	OD ≤ 114 mm (4.49''), OD ≤ 95 mm (3.74''), 2-3/8'' EU 8RD box thread at the bottom (or other at request)	
D-sub	OD ≤ 133 mm (5.24") 3-1/2'' EUE box & pin threads (or other at request)	
Motor temperature measuring options	Thermal pin for motor oil temperature & connector for motor winding temperature measurement	

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