

ARTIFICIAL LIFT SOLUTIONS V / oil.irz.ru

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Company Overview





IZHEVSKIY RADIOZAVOD (IRZ) RUSSIAN GROUP OF COMPANIES PRODUCING ELECTRONICS



Product Lines





production

mounting

Oilfield and Power Equipment





Product line is represented by IRZ TEK, subsidiary of IRZ

Quality Management





- IQNet -

Madens Herr

tarkus Bieher tanaging Director Accredited Body: DQS GmbH, August-Scharz-Straße 21, 60433 Frankfurt am Main, Germany Administrative Office: OOO SSU DEKUES, Rospublikanskaya str. 3, 150033 Yaroslavi, Russian Federation The validity of this cortificate depends on the validity of the main certificate.

CERTIFICATE

This is to certify that the site

ISO 14001:2015

ISO 9001:2015

ISO 45001:2018





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000 "IRZ TEK"

This is to certify that the site

is part of the certified Management System of the organization AO "IRZ" with the main certificate registration no. 31101077 OHS18

CERTIFICATE

ISO 45001 : 2018



Certificate registration no 31101082 OHS18

2021-03-30

2024-03-29

2021-03-30





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- IQNet -

000 "IR7 TEK" 19 Bazisnaya str. 426034 Izhevsk Russian Federation

This is to certify that the site

is part of the certified Management System of the organization IRZ OOO with the main certificate registration no. 31101078 QM15 according to

CERTIFICATE

ISO 9001 : 2015

Scone Scope. Development, production, commissioning and servicing of telemetry equipment, fuel and energy equipment control systems, bench equipment

Certificate registration no. 31101082 QM15 Valid from 2021-09-29 Malid until 2024 00 28 2021-09-29 Issuing date

DOS GmbH

/ Markus Bieher Managing Director Accredited Body: DQS GmbH, August-Schanz-Straïe 21, 60433 Frankfurt am Main, Germany Administrative Office: OOS OSU DEKUES, Respublikanskaya str. 3A, korp. 5, office 204, 10003 Yarodak, Russian Federation The validity of this certificate depends on the validity of the main certificate.

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DQS GmbH

Accredited Body: DQS GmbH, August-Schanz-Straße 21, 60433 Frankfurt am Main, Germany Administrative Office: OOO SSU DEKUES, Respublikanskaya atr. 3, 150033 Yaroslavi, Russian Federation The validity of this certificate depends on the validity of the main certificate.

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IAF

Artificial Lift Solutions



IRZ TEK designs and manufactures electronic equipment for oil & gas industry since 1998



Production facilities - downhole sensors



Assembly, integration & tuning





MANUFACTURING CAPACITY up to 1,000 downhole sensors/month



Production facilities – motor drives



Production of inverters, assembly, integration, tuning & tests



DH sensor tests





Acceptance tests

100% dh sensors pass:

- Vibration tests
- Pressure (leak) test
- Running at 150°C at normal pressure for 24 h
- Pressure and temp sensors calibration
- Functional tests

Periodic tests (sampling):

- Functional tests with 6 km cable line
- 20 g tests

Motor drives tests

Acceptance tests

100% motor drives pass:

- Acceptance tests, including functional and electric insulation testing
- Electrical burn-in test for 32 h, including 7-hour test at +50 °C

Periodic tests (on sampling basis):

- Functional tests
- Safety check
- Exposure tests
 - high, low voltage
 - electromagnetic interference
 - high, low temperature
 - high humidity and other





ESP Downhole Sensor – Main features





sensors put in operation







Double redundant design allows increasing sensor's lifetime

High reliability of the system is ensured by two standalone electronic modules inside the sensor: the main one being operating, whereas the standby one is off.

Should the main module fail, the system switches to the standby module, either by the operator's command or automatically, assuring trouble-free operation of the system.

In addition, the second module can be used to verify readings of the main module.

ESP Downhole Sensor - Specification



MONITORED PARAMETERS		IRZ TMS	
Intake pressure	Range**	0-5800 psi	
	Resolution	0.1 psi	
	Accuracy*	± 0.5 % FS	
	Range	0-150 °C / 0-175 °C	
Intake temperature	Resolution	0.01 °C	
	Accuracy*	± 1 % FS	
Motor oil or winding temperature	Range	0-250 °C	
	Resolution	0.01 °C	
	Accuracy*	± 1 % FS - at request	
	Range	0-5 g	
Motor vibrations (X, Y, Z)	Resolution	0.01 g	
	Accuracy*	± 5 % FS	
	Range	0-10 MOhm (0-20 mA)	
Insulation resistance (current leakage)	Resolution	1 kOhm (0.001 mA)	
	Accuracy*	± 2-5 % FS (± 0.05 % FS)	
Discharge pressure	Range**	0-5800 psi	
	Resolution	0.1 psi	
	Accuracy*	± 0.5 % FS	
Discharge temperature***	Range	0-250 °C	
	Resolution	0.01 °C	
	Accuracy*	± 1 % FS	
Parameters undate time	TMS-7***	≤30 sec	
Parameters update time	TMS-8***	≤1 min	

* Higher accuracy is available upon request.

** Optionally 0-60 MPa (8700 psi)

*** TMS-7 is version with d-sub pressure measurement; TMS-8 is version with d-sub pressure/temperature measurement

Permanent Downhole Gauge





Surface Equipment



CONTROLLER

- 6" graphic screen
- Keyboard
- USB-port

HOUSING

• IP47/IP65

• -40...+70 °C

 Active size 10 Mb/3 months

INTERFACES

- SCADA support (GPRS modem), RS232/RS485 Modbus RTU
- Ethernet

AUTO START

Analog inputs/outputs

2

PROTECTION

Overvoltage protection

• Tripping relay (high temp/vibration,

low intake pressure, ground fault)







• TMS-E5M SURFACE BOARD

- 2-line display
- Keyboard
- USB-port
- Active size 1 Mb/1 week
- RS232/RS485
- Overvoltage protection
- For integration inside VFD00

• CHOKE

- 5 kV phase-to-phase
- 1 kV insul. resistance

SURFACE BOARD

- Overvoltage protection
- RS232/RS485
- Integration with any VFD

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Downhole Sensor References



ANNUAL SALES TOTAL QUANTITY, ea ~8000 sensors/year 2018 year >60 000 ea TOTAL SALES Dual redundant 4th GENERATION LAUNCH 60 000 with d-sub (>100 ea) >60000 sensors 55 000 Dual redundant 50 000 without d-sub (>300 ea) 45 000 40 000 4TH 35 000 2012 year **GENERATION** >28 000 ea 30 000 3rd GENERATION LAUNCH DHM SYSTEM 25 000 >5400 ea 20 000 2010 year 15 000 >11 000 ea 2nd GENERATION LAUNCH 10 000 2007 year >430 ea 5 000 Non-redundant 1st GENERATION LAUNCH without d-sub (>5000 ea) YEARS 1998 2000 2005 2010 2015 2020 GAZPROM TATNEFT (Russneft IIK тнк∙вр Schlumberger BASHNEFT 🗤 🔅 LUKOIL ROSNEFT НОВЫЕ २७२७२७ Технологии OKTYABRSK CANADIAN EMIRATES WESTERN **NOVOMET** BORETS ENGINEERING Co Ltd

Number of DHM systems supplied

ESP/PCP Variable Frequency Drives



CONTROLLER

- 6" graphic screen
- Pump protection functions and automatic restart
- · Service modes for variety of production scenarios
- Smart control algorithms for well production optimization
- USB-port

CABINET

· Resistant to severe environment IP43, IP54 **OR HIGHER**



Features







Suitable for ESP and PCP

Range: (@480 VAC): to 1400 kVA for 6 p. to 750 kVA for 12&18 p. to 620 kVA for AFE



Operating temperature - 60... +60 °C (wider range upon request)

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ESP Switchboards & Soft Starters





Features





Operating temperature – 60... +50 °C (wider range upon request)

Rod Pump / PCP Variable Frequency Drives & Switchboards





Features





Operating temperature - 60... +50 °C (wider range upon request)



VFD Data Analytic Tool



Adjustable graphical representation of any parameter on drive's display or a PC







Load curve drawing without a dynamograph:





VFDs References

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Water Injection System with Flowmeter





Functions:

- Obtain real-time data on bottomhole pressure, flow rate, temperature
- Distribute injection volume in real-time mode
- Protect the production string from injection pressure

Specification

Parameter	Value	
Measured environment	water, bottom water	
Operation mode	Continuous	
Operating temperature	+100 °C	
Temperature absolute error	±0.5%	
Temperature resolution	0.1 °C	
Operating pressure	050 MPa	
Pressure relative reduced error	±0.16%	
Pressure resolution	0.01 MPa	
Valve cap diameters, mm	2, 3, 4, 5, 6, 7, 8, 9, 10,12,13,15, 20	
Flow rate range	20-180 m ³ /day	
Relative flow rate error	1.5%	
Production string diameter	146 mm and more	



- Flowmeter is certified as a measurement tool
- No rotating parts
- Wide measurement range
- Wide range of valve cap diameters

Dual Completion Systems





Benefits

- · Separated control for each reservoir
- Parameters measured for each segregated zone
- One ESP for two reservoirs
- Valve is controlled by VFD
- · Pressure of separated reservoir is measured by valve
- · One motor with two ESPs configuration available

Specification

Parameter	Value	
Intake pressure range	0-60 MPa / 0-8702 psi	
Intake temperature range	0-150 °C / 32-302 °F	
Motor oil temperature	15-200 °C / 59-392 °F	
Radial vibration	0-5g	
Valve position	0-100%	
Pressure of separated reservoirs	0-60 MPa / 0-8702 psi	

In collaboration with



Pilot-1 Anti-Scaling System





Electromagnetic field changes structure of salt crystals in fluid:



The emitter generates alternating electro-magnetic field which affects structure of salt crystals in fluid. As a result, salt is not deposited on metal surfaces of downhole equipment. The effect is observed along the whole length of the well.

The system prevents deposits of salts:

Calcium carbonate

CaCO₃ CaSO₄ **Calcium sulphate**

The effect is proved by laboratory and field tests

Pilot-1 Anti-Scaling System











Benefits

- No chemicals required
- bifold MTBF increase
- +20% production rate
- ESP runtime protection

Tested and approved by



Submersible reciprocating pump unit **IRZ** with linear permanent magnet motor (SPLM)



Submersible reciprocating pump unit **IRZ** with linear permanent magnet motor (SPLM)

SPLM system is an economically viable, power efficient, and environment friendly version of a **sucker-rod pumping system**. Moreover, SPLM systems can effectively substitute **ESP systems** in marginal wells without replacement of the infrastructure.

Comparison of SPLM, ESP, PCP and SRP systems

Parameter	РСР	Rod Pumps	ESP	SPLM
Construction	Rod (Abrasion)	Rod (Abrasion)	Motor Rotary	Rodless (no Abrasion)
Suitable for deviated or horizontal wells	no	no	yes	yes
Wellhead infrastructure installations	required	required	Not required	Not required
Production	<400 bpd (<60 m³/day)	<1200 bpd (<200 m³/day)	>190 bpd (>30 m³/day)	<470 bpd (<75 m³/day)
Operating mode	continuous	continuous	periodic	continuous
Running depth	<4900 ft (<1500 m)	<6400 ft (<2000 m)	<10000 ft (<3000 m)	<20000 ft (<6000 m)
Specific energy consumption (kW/ton)	2.56 kWh/barrel (16 kWh/ton)	3.2 kWh/barrel (20 kWh/ton)	1.6 kWh/barrel (10 kWh/ton)	1.28 kWh/barrel (8 kWh/ton)





- Measuring and recording temperature distribution along
- Monitoring ESP temperature
- Locating wellbore leakage
- Defining dynamic fluid level

Specification

Parameter	Value	
Temperature measurement range	-55 +300 °C	
Temperature measurement accuracy*	±2.0 / ±0.5 °C	
Temperature resolution	0.01 °C	
Temperature increment*	1.63 / 0.25 m	
Fiber optic type	Single mode	
Measuring optic channel length	Up to 6 km	
Number of optic channels*	1; 4	
Single measurement time	1; 3; 5; 10; 15 minutes	
Switchboard supply voltage	220 ± 40 V (50 ± 1 Hz)	
Switchboard auxiliary circuits voltage	24 V	
Switchboard independent operation at ambient temperature -30 +50°C	4 hours minimum	
Enclosure class	IP54	
Switchboard operating temperatures*	-60… +50 ℃ +5… +50 ℃	
Data communication interfaces	USB-port; Ethernet-port (RJ-45); RS-485; GPRS-modem	
Dimensions	674 x 365 x 1850 mm	
Number of fibers in cable sensor*	1 to 4	
Cable sensor operating temperatures	-55 +300 °C	
Cable sensor OD	7.4 mm	
Tensile strength	30 kN	

* Optional. Depending on version



Upcoming products – Downhole Induction Heaters





Functions:

 designed for fluid heating to decrease oil viscosity and prevent from paraffins deposits



TERMIT-3M Bottomhole zone induction heater



TERMIT-5 Downhole flow induction heater

Specification

Parameter	Termit-3M	Termit-5
Overall Tool Length	3.8 m	10 m
Heating Part Length	3.0 m	9.0 m
Maximum OD	117 mm	102 mm
Supply Voltage	220, 380 V	380 V
Heating Power	4-14 kW	13 kW
Temperature Gradient at Q = 15 m ³ /day	+ 12 °C	25°C
Power Cable	3-phase	KPpPBP 3x10
Cable Connector	B46-3B	S-LOCK





Contact Information





We are looking for partners to establish long-term cooperation for ALS services

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Note: performance and physical configuration of the presented products may be changed without notice. This is not a public offer of the company.