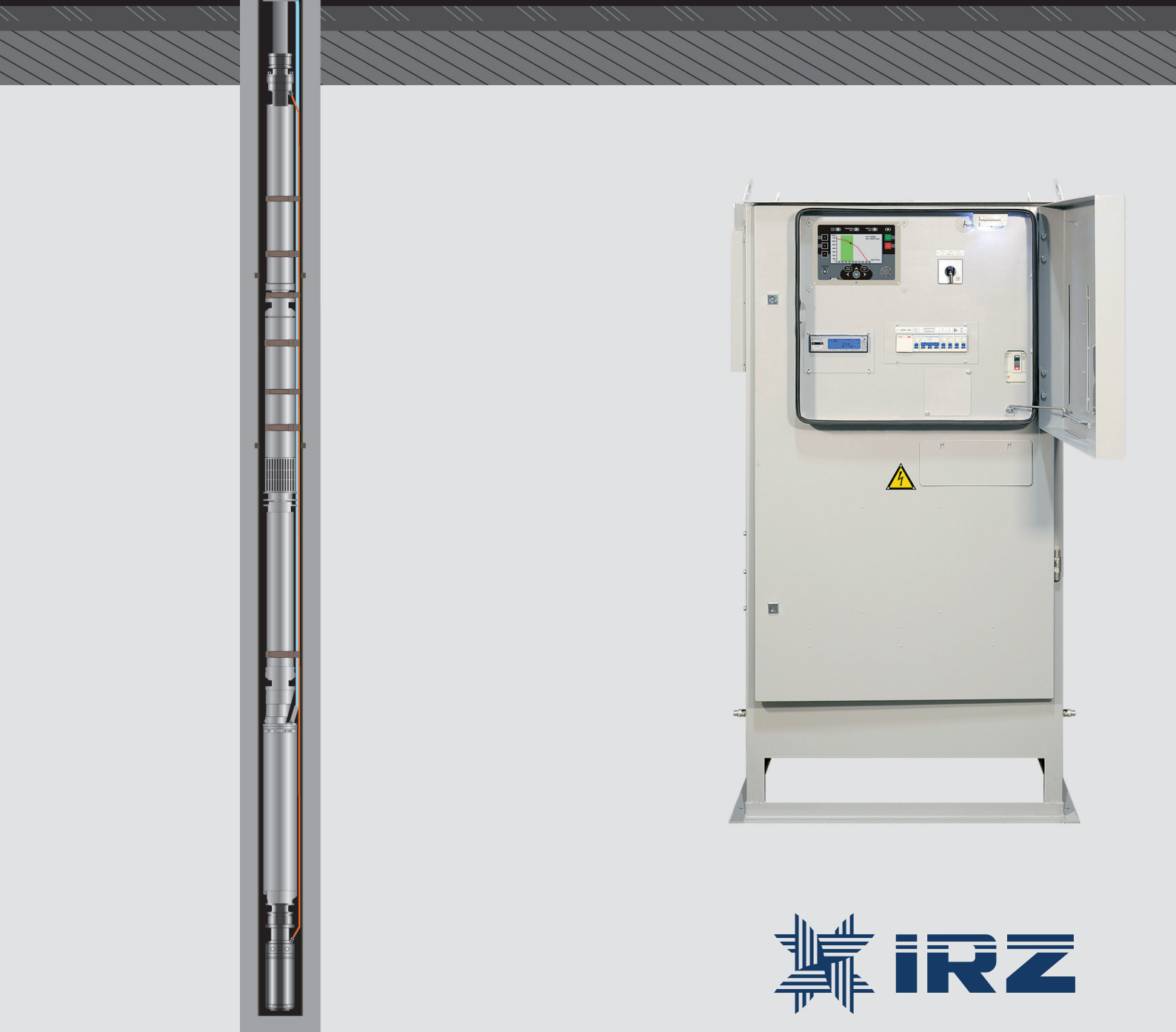
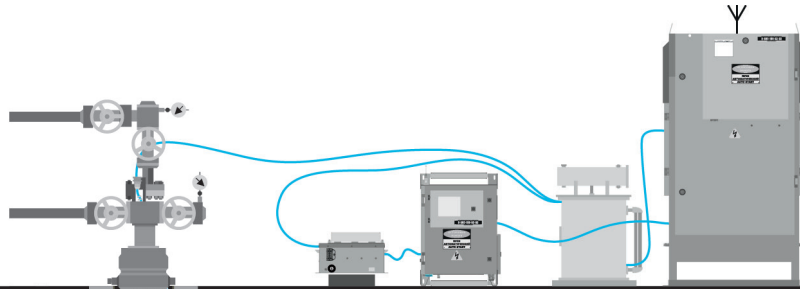


# ESP/PCP Variable Frequency Drives





**THE FAMILY OF IRZ VARIABLE FREQUENCY DRIVES** ensures control, parameters monitoring and protection of induction and permanent magnet motors of electric submersible pumps and progressive cavity pumps enabling soft start, soft stop, and rotation frequency regulation.

The IRZ drives are used by oil companies to protect downhole equipment and increase run life of pump systems.

## Technologies

- **6-Pulse drives**

a cost-effective and reliable solution; can be equipped with an input harmonics filter to ensure THDI and THDV at the VFD input  $\leq 5\%$  at nominal load and  $\leq 8-10\%$  at a lower load

- **Multi-Pulse drives**

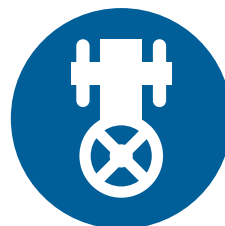
12- or 18-pulse

- **Active Front End Drive**

uses active IGBT input rectifiers featuring excellent mitigation of harmonic distortion into the power line and ensuring compliance with the IEEE 519-2014 guidelines without need in additional harmonics filtering. In addition, this drive can be used with standard step-down transformers for 6-pulse drives which is a benefit if compared to more expensive phase-shifting transformers used with multi-pulse VFDs.



**Production since  
1998**



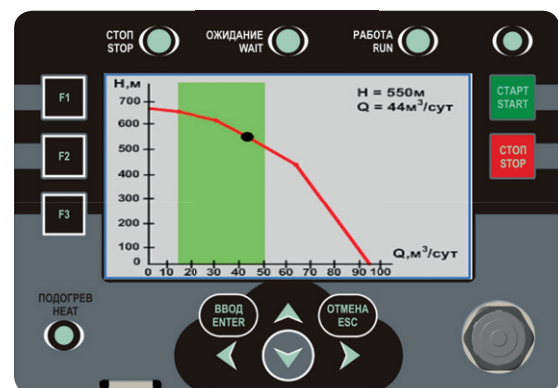
**1000 +  
VFDs annually**

## Specification

### Main operational specifications

Supply voltage	285...475 V (380 V <sup>+25%</sup> <sub>-25%</sub> ), 340...550 V (480 V <sup>+15%</sup> <sub>-30%</sub> )
Supply frequency	49...51 Hz (with input harmonics filter) 45...55 Hz (without input harmonics filter)
Ambient temperature	-60...+60 °C
Type of motor	Induction & PMM – the mode is selectable in the drive menu
Rated current	63 / 100 / 160 / 250 / 400 / 630 / 800 / 1000 / 1200 / 1400 / 1600 A
Efficiency	≥ 95 %
Enclosure standard	IP43, IP54 or higher at request
Interfaces	<ul style="list-style-type: none"> <li>– USB</li> <li>– RS232/RS485</li> <li>– Ethernet</li> <li>– Optional GPRS/Wi-Fi modem</li> <li>– NC/NO dry contacts</li> <li>– Two 0-10V / 4-20 mA DC analog inputs</li> <li>– Five discrete inputs</li> </ul>

## VFD Data Analytic Tool



- Adjustable graphic presentation of parameters on the drive's display or a PC



Features	Functions	Protections
<ul style="list-style-type: none"> <li>• Designed for outdoor installation and operation in severe climatic conditions</li> <li>• Temperature and humidity regulation</li> <li>• Suitable for induction &amp; PMM motors (selectable mode)</li> <li>• Can be used with downhole monitoring systems of IRZ and other vendors (MODBUS, RS232/RS485 interface)</li> <li>• Compatible with geophysical systems, including dual completion systems</li> <li>• Extendable interfaces</li> <li>• Built-in output sinus filter (voltage distortion &lt;5%)</li> <li>• SCADA support</li> <li>• Software update without motor shutdown using a USB drive</li> <li>• History download to a USB drive</li> <li>• Graphic screen</li> <li>• Colored light indicators</li> <li>• Inverter bypass option for ESP applications</li> </ul>	<ul style="list-style-type: none"> <li>• Control in manual and automatic mode</li> <li>• Continuous monitoring of power grid parameters in three phases</li> <li>• Calculation of voltage and current imbalances, power factor, load factor, consumed power and run time</li> <li>• Record of monitored parameters and causes of motor shutdowns in real time; the records are secured in cases of power supply interruption</li> <li>• Automatic restart</li> <li>• PID regulation: automatic maintaining pump intake pressure, motor current or a value at some analog input of the drive</li> <li>• Automatic switching from the intermittent to continuous cycle and vice versa depending on corresponding conditions</li> <li>• “Rotor catch” – backspin braking for a quick start</li> <li>• Automatic ramp-up</li> <li>• Avoiding high motor current</li> </ul> <p><b>For ESP applications:</b></p> <ul style="list-style-type: none"> <li>• Smart control algorithms:               <ul style="list-style-type: none"> <li>– Automatic well production optimization</li> <li>– Avoiding high motor temperature</li> </ul> </li> <li>• Service modes:               <ul style="list-style-type: none"> <li>– 3 modes to start ESP system when there is high torque or rotor is stuck</li> <li>– Gas lock removing mode</li> <li>– Deposits removing mode</li> </ul> </li> </ul> <p><b>For PCP applications:</b></p> <ul style="list-style-type: none"> <li>– Flow rate calculation</li> </ul> <p><b>For ESPCP application:</b></p> <ul style="list-style-type: none"> <li>– Avoiding high motor temperature</li> <li>– Flow rate calculation</li> </ul>	<ul style="list-style-type: none"> <li>• Motor overcurrent</li> <li>• Motor underload</li> <li>• High current imbalance between motor phases</li> <li>• High voltage imbalance between power line phases</li> <li>• High/low VFD supply voltage</li> <li>• Low insulation resistance in the “Transformer-Cable-Motor” link</li> <li>• Low pump intake pressure (if a downhole sensor is used)</li> <li>• High pump discharge pressure (if a downhole sensor is used)</li> <li>• High motor temperature (if a downhole sensor is used)</li> <li>• Frequency inverter overheating</li> <li>• Motor cable/ VFD output cable ground fault</li> <li>• Supply voltage surge</li> <li>• Incorrect phase sequence at VFD input</li> <li>• High/low rotation frequency</li> <li>• Backspin</li> </ul> <p><b>For ESP/ESP/PCP applications:</b></p> <ul style="list-style-type: none"> <li>• Low insulation resistance in the “Transformer-Cable-Motor” link</li> </ul>

## Contacts

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