

POWER SUPPLY

6 PULSE VFD

 SERIES PASSIVE HARMONIC FILTER

 STEP-UP TRANSFORMER

 SINE-WAVE FILTER

ESP



## ELHAND Components for Oil&Gas Industry



ELHAND Transformatory is the leading manufacturer of inductive components for Oil & Gas, Maritime, AC Drives, Railway, Mining and Power Electronics Industries. Our offer includes low and medium voltage transformers, reactors and filters dedicated to the most demanding applications.

Quality Supported by Certificates





 **ELHAND Components on Oil&Gas Market**



Elhand presence on the oil extraction market started in 2011. Quality has always been our main goal. This has been proven by the reliable performance of thousands of products operating in America, the Middle East, Asia and Africa.

Quality Supported by Certificates





### VSD Input Harmonic Filters

**ElhandHF™ Harmonic Filter** allows to utilize system power capacity to maximum degree, protects equipment from malfunction and extends system run life. Compensation of harmonics by filter application helps to comply with IEEE 519, EN-61000-3 or other energy quality standards. Harmonic Filter saves electricity, lowers system cost, and increases investment return.

- Power range: 2,2 - 2600 kW
- Voltage range: 380 - 690 V
- Frequency: 50 or 60 Hz
- Protection degree: IP00 - IP66
- Cooling: air natural - no fans to maximize the filter's lifetime

EF3H



### Step-Up High Frequency Transformers



The High Frequency Step-Up Transformer is dedicated for modern **High Speed Permanent Magnet Motor ESP Pumping Solutions**. Modern PMM VSD systems are producing output of 150-350-600 Hz or higher and wave form is not always sinusoidal. VSD IGBT control system is very sensitive and requires dedicated designs for Step-Up transformers. Special transformer core materials must be used to ensure efficiency and proper operation of the systems.

- Power range: up to 3 MVA
- Voltage range: up to 21 kV (depending on power)
- Protection degree: IP00 - IP66
- Cooling: Air Natural, Air Forced, Water

ET30F



### Sine-Wave Filters

**EF3LC SWF Filter** converts rectangular PWM voltage into sinusoidal thus eliminates harmful side effects of inverter transistors switching. Application of LC filter on inverter output will protect motor against high voltage peaks, bearing currents, overheating and cable ringing, which cause premature insulation and armature damage. Filter increases system run time, lowers system cost, and increases investment return.

- Power range: 2,2 - 2600 kW
- Voltage range: 380 - 690 V
- Frequency: 0 - 200 Hz
- Protection degree: IP00 - IP66
- Cooling: air natural - no fans to maximize the filter's lifetime

EF3LC



### Elhand Power Quality Harmonic Simulation Software



**ELHAND PQ - Elhand Power Quality Harmonic Simulation Software** - is a unique simulation program, designed to calculate the level of voltage and current distortions in the network with any structure of power supply and loads. The application allows to solve problems with distortions and harmonics, and to quickly and accurately analyse the parameters of the entire power system. It takes into account the negative impact of non-linear loads on the power grid and its parameters at the point of common coupling. EPQ also helps in the selection and optimization of magnetic elements (transformers, reactors, filters).

EPQ



## ELHAND Components for Oil&Gas Industry

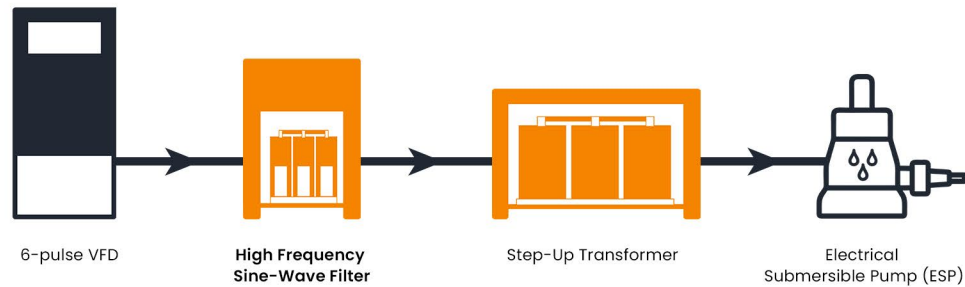
Lower Your Operational Expense by Using Newest Magnetic Technologies and Modern Designs.

- Cost optimization.
- Highly customized, non-standard solutions.
- Less carbon footprint.
- Hight quality at a reasonable price.
- Full service: design, manufacture, transport.
- Made in Europe.

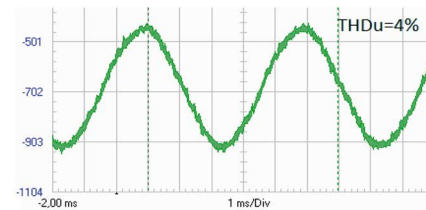
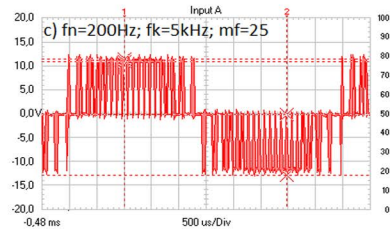
**40+**  
Years of Experience



## High Frequency Sine-Wave Filter Application



## High Frequency Sine-Wave Filter Performance



## ELHAND Sine-Wave Filters as an effective protection of high-speed motor in high frequency drives

Drive systems with increased frequency are a group of devices that has made a significant presence in the **Oil & Gas Industry** in recent years. Increased frequency of the converter output voltage allows speed changes in a wider range. This increases the efficiency and versatility of the entire drive, but at the same time causes additional stresses for the insulation of the power cables, the step-up transformer and the motor itself. Therefore, an indispensable element of such a system is a sinusoidal filter, which ensures protection and reliability of the entire drive.

### Full ESP Protection

### Prolonged Motor Lifetime

### Lower Motor Noise

|                            |  |
|----------------------------|--|
| - Rated power:             | 2,2 kW - (3 HP) - 630 kW (850 HP)  |
| - Rated current:           | 5,5 - 1100 A   |
| - Rated voltage:           | 380-690 V  |
| - Rated frequency:         | 50-400 Hz  |
| - Switching frequency:     | min. 5kHz @ 400 Hz<br>min. 1,5 kHz @ 50 Hz   |
| - THDu:                    | ≤5% default (depends on switching frequency)   |
| - Overload capability:     | 110% In (continuous)<br>160% In 1 min/h (momentary)                                      |
| - Cooling:                 | air natural  |
| - Ambient temperature:     | 40°C - land design<br>45°C - maritime design<br>≥50°C - heavy duty design<br>or derating |
| - Insulation class:        | F (2,2-15 kW, 155°C)<br>H (18,5-630 kW, 180°C)   |
| - Winding material:        | aluminium, copper  |
| - Standard equipment:      | NC temperature switch from 15 kW   |
| - Mounting:                | floor mounted  |
| - Degree of protection:    | IP00, IP23, IP54, IP66<br>open type, NEMA 3/3R, NEMA 4/4X                                |
| - Standards compatibility: | IEC 60076-6  |

Scan Me

Full article of Sine-Wave Filters as an effective protection of high-speed motor in HF drives.



## Make Your ESP Even More Efficient!

**elhand**  
TRANSFORMATORY

ELHAND Sine-Wave Filter is an improvement in operating conditions and increases the reliability not only of the motor itself, but also of the other components of the drive system, i.e. the step-up transformer or power cable.

**40+**  
Years of Experience