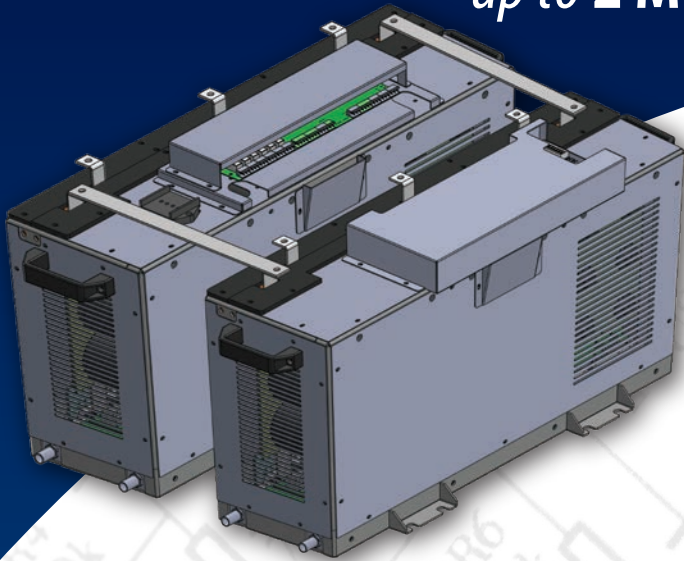




MEDIUM VOLTAGE FREQUENCY CONVERTER

- **1.1 kV MFC810** *type*
 - **3.3 kV MFC910** *type*
- up to 2 MVA*



Medium Voltage transformerless frequency converters series are designed for **high-end induction motor control applications** with **1.1 kV and 3.3 kV**.

MAIN FEATURES

- **Input:** 3 x 1.1 kV or 3 x 3.3 kV, 45..66 Hz
- **Output:** 3 x 0..1.1 kV or 3 x 0..3.3 kV, 0..400 Hz
- **NPC 3-level topology**
- **Cooling system:** Liquid
- **Active Front-End (AFE)** in AcR frequency converters series
- **Modular construction** and **scalable topology** allows a parallel connection to multiply power capability
- Internal **fiber optic connections** to avoid electromagnetic interference
- **Operation modes:** U/f (linear, exponential), Vector (sensor/sensorless)
- **Optimized to install in explosion-proof cabinets**
- Build-in **PLC controller**
- Internal and user programmable **PID controller**
- Build-in communication module **RS-485 (Modbus)** - remote control and programming of all parameters of the frequency converter
- Programmable **constant speeds**
- **Incremental speed change function** (motopotentiometer)
- Build-in **incremental encoder** interface (fiber optic)
- Resonance **frequencies elimination**
- Definable type of **speed curves** (linear, "S" curve)
- **Direct Torque Control DTC - SVM**
- **Motor parameters identification**
- **Programmable structure:**
- **Total worktime counter**
- **Access control and diagnostics system**
- User defined **security codes** for access control
- Store up to **4 sets of motor parameters**
- **Default (factory) settings** according to customer's requirements



TECHNICAL DATA:

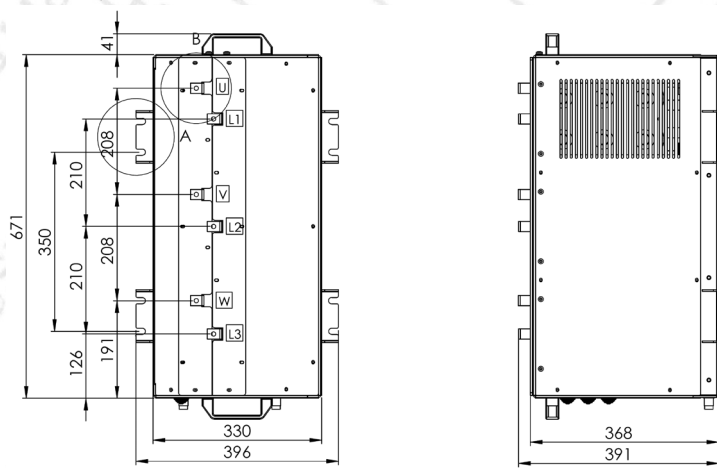
Type	Constant Torque Load		Pump & Fan Load		Over current 60 sec. every 10 min. [A]	No. of modules	
	Rated motor power [kW]	Rated output current [A]	Rated motor power [kW]	Rated output current [A]		Without AFE	With AFE
MFC810/250kW	250	180	315	220	270	1	2
MFC810/315kW	315	220	400	275	330	1	2
MFC810/400kW	400	275	500	340	410	2	4
MFC810/500kW	500	340	630	430	500	2	4
MFC810/630kW	630	430	800	530	640	2	4

MFC 910 3.3 kV technical data on request.

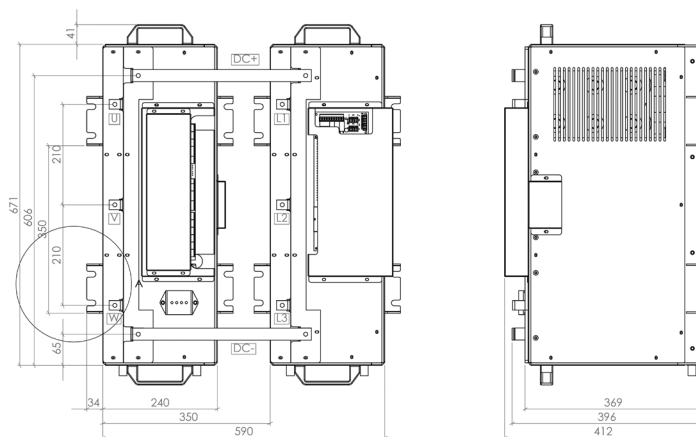
Connectors

Power supply (U_{IN})	3 x 1.1 kV or 3.3 kV, 45-66 Hz
Output	3 x 0... U_{IN} [V] / 0...400 Hz
Cooling	Liquid
Control mode	U/f (linear, exponential), Vector DTC-SVM without sensor Vector DTC-SVM with sensor of the rotor position
Switching frequency	2...5 kHz (2,5 kHz for nominal power)
Analog inputs	3 analog inputs: AI0: voltage mode 0(2)...10 V, $R_{IN} \geq 200$ k Ω ; AI1, AI2: voltage mode 0(2)...10 V, $R_{IN} \geq 100$ k Ω ; AI1, AI2: current mode 0(4)...20 mA, $R_{IN} = 250$ Ω , Operation mode and polarity are chosen by parameters. Accuracy: 0.5% of the full range.
Digital inputs	6 digital separated inputs 0/(15...24) V, $R_{IN} \geq 3$ k Ω
Analog outputs	2 outputs; AO1 and AO2: 0(2)...10 V / 0(4)...20 mA configuration by parameters, accuracy: 0.5%
Digital outputs	4 relays (K1...K4) Breaking capacity: 250 V / 1A AC, 24 V / 1A DC, Fully programmable signal source
Overcurrent protection	Instantaneous value $3.2 I_N$; effective value $2.25 I_N$
Overvoltage AC / DC protection	$1,46 U_{IN}$ AC
Under voltage protection	$0.65 U_{IN}$
Device thermal protection	Build-in heatsink heat sensor
Motor thermal protection	I^2t limit, motor heat sensor
Communication with Control panel	Established permissible time of connection absence
RS communication	Established permissible time of connection absence
Control of analog inputs	Check of absence of "living null" in modes 2...10 V and 4...20 mA
Control of a load symmetry	E.g. break in one of the motor phases
PLC controller	Possibility of taking control over converter's operation, START / STOP system, direction of rotation and frequency, possibility of controlling any external process without connection of external PLC controller. 100 universal functional blocks, 43 functions: simple logic and arithmetic blocks; block of 8-state sequencer, 2 multiplexers with 8 inputs, curve shaping unit, maximum execution time of the PLC program: 10 ms.

Example of mechanical view of the MFC810 315 kW 1.1 kV frequency converter.



Example of mechanical view of the MFC810 315 kW 1.1 kV Active Front-End (AFE) frequency converter.



Active Front-End regenerative frequency converters make possible recover the energy to the electric network during braking or changing direction of motor.

The dimensions are given as examples. Each time is required to agree with the client the housing and cooling system.

Please feel free to contact us for more information about other types.



Zakład Energoelektroniki TWERD Sp. z o.o.

ul. Aleksandrowska 28-30
87-100 Toruń, Poland

tel. +48 56 654 60 91
e-mail: twerd@twerd.pl
www.twerd.pl

