TWERD™
ENERGO-PLUS

www.twerd.pl

VECTOR FREQUENCY CONVERTER

MFC 1000C (AcR) for supply voltages: 3x400 V; 3x500 V; 3x690 V with possibility of returning energy to the grid

TRANSFORMERLESS FREQUENCY CONVERTERS DESIGNED FOR ADVANCED APPLICATIONS OF INDUCTION MOTOR CONTROL FOR SUPPLY VOLTAGES: **3x400V; 3x500V; 3x690V** WITH THE POSSIBILITY OF RETURNING ENERGY TO THE GRID

Basic parameters:

- Input voltage: 3 x 400 V; 3 x 500 V; 3 x 690 V; 45..60 Hz
- Output Voltage: 3 x 400 V; 3 x 500 V; 3 x 690 V; 0..400 Hz (0-200 Hz in vector mode)
- Active Front End (AFE) technology in MFC1000C AcR systems
- U/f control: linear and square; Vector: sensor-free and sensorless
- Removable signalling and control panel
- Built-in PLC
- Integrated PID controller
- Identification of engine parameters
- Built-in winder calculator controller
- Built-in pump and fan set controller
- Built-in RS232/RS485 Modbus RTU, Modbus TCP, CAN, Ethernet communication module
- Programmable constant speeds
- Motorpotentiometer function
- HTTL 24V or TTL 5V/12V encoder can be connected via optional expansion cards
- Skipping Programmable Resonant Frequency Bands
- Defining Shapes and Slope Characteristics
  speed controller (linear, "S" curve)
- Can be operated with torque control
- Programmable Structure:
  - Switchable control variants (A, B)
  - Speed controller: control panel, analogue inputs, PID controller, motopotentiometer, RS-232 / RS-485, function blocks
  - Torque Controller: Analog Inputs, Function Blocks
  - Start and direction control: control panel, digital inputs, function blocks
  - Programmable digital inputs: 10 DI 0/(15...24)V, RIN ≥ 6 kΩ separate digital inputs
  Up to 30 entries on expansion cards
  - Programmable digital outputs: 6 relay outputs: K1.. K6 – Switching Capacity: 250V/1A AC, 24V/1A DC. Fully programmable signal source.
  Up to 25 relay outputs on expansion cards
  Programmable analog outputs: 2 analog outputs (voltage-current)
  AO1, AO2: Voltage Mode 0(2).. 10 V, RL > 10 hp; Current mode0(4).. 20 mA, RL < 1 kΩ
- Configuration by parameters, accuracy 0.5%.
- Additionally, up to 10 outputs on expansion cards.
- Four motors can be stored in memory
- Interlock and diagnostic system
- Time Measurement
- Defined sets of factory parameters

TWERD ENERGO-PLUS Sp. z o.o.
ul. Aleksandrowska 28-30, 87-100 Toruń
tel./fax: +48 56 654-60-91
e-mail: twerd@twerd.pl
NIP: 956 233 78 73
REGON: 380 968 365

System Type MFC1000C 400V (AcR)	Nominal value of current		Light Mode		Heavy Duty Mode	
	Engine power [kW]	Rated Output Current [A]	Engine power [kW]	Rated Output Current [A]	Engine power [kW]	Rated Output Current [A]
MFC1000C/ 110 kW	110,0	206	110,0	196	90	169
MFC1000C/ 132 kW	132,0	246	132,0	234	110	206
MFC1000C/ 160 kW	160,0	293	160,0	278	132	2461
MFC1000C/ 200 kW	200,0	363	200,0	345	160	293
MFC1000C/ 250 kW	250,0	430	250,0	485	200	361
MFC1000C/ 315 kW	315,0	585	315,0	575	250	429
MFC1000C/ 355 kW	355,0	650	355,0	634	315	566
MFC1000C/ 400 kW	400,0	725	400,0	715	355	625
MFC1000C/ 500 kW	500,0	880	500,0	865	400	7252
MFC1000C/ 630kW	630,0	1140	630,0	1200	450	787
MFC1000C/ 710 kW	710,0	1250	710,0	1282	500	935
MFC1000C/ 800 kW	800,0	1480	800,0	1421	630	1107

[1] 130% Overload
[2] 140% overload

System Type MFC1000C 500V (AcR)	Nominal value of current		Light Mode		Heavy Duty Mode	
	Engine power [kW]	Rated Output Current [A]	Engine power [kW]	Rated Output Current [A]	Engine power [kW]	Rated Output Current [A]
MFC1000C/ 110 kW	110,0	180	110,0	171	90	156
MFC1000C/ 132 kW	132,0	240	132,0	228	110	180
MFC1000C/ 160 kW	160,0	260	160,0	247	132	2401
MFC1000C/ 200 kW	200,0	361	200,0	343	160	231
MFC1000C/ 250 kW	250,0	414	250,0	393	200	302
MFC1000C/ 315 kW	315,0	460	315,0	450	250	3612
MFC1000C/ 355 kW	355,0	503	355,0	483	315	477
MFC1000C/ 400 kW	400,0	583	400,0	573	355	513
MFC1000C/ 500 kW	500,0	715	500,0	705	400	566
MFC1000C/ 630kW	630,0	880	630,0	910	450	625
MFC1000C/ 710 kW	710,0	1070	710,0	1027	500	697
MFC1000C/ 800 kW	800,0	1156	800,0	1156	630	910

[1] 130% overload
[2] 125% overload

TWERD ENERGO-PLUS Sp. z o.o.
ul. Aleksandrowska 28-30, 87-100 Toruń
tel./fax: +48 56 654-60-91
e-mail: twerd@twerd.pl
NIP: 956 233 78 73
REGON: 380 968 365

TWERD™ ENERGO-PLUS

www.twerd.pl

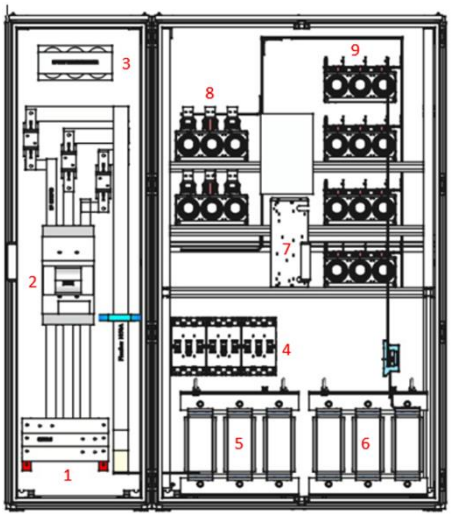
System Type MFC1000C 690V (AcR)	Nominal value of current		Light Mode		Heavy Duty Mode	
	Engine power [kW]	Rated Output Current [A]	Engine power [kW]	Rated Output Current [A]	Engine power [kW]	Rated Output Current [A]
MFC1000C/ 110 kW	110,0	119	110,0	113	90	98
MFC1000C/ 132 kW	132,0	142	132,0	234	110	119
MFC1000C/ 160 kW	160,0	174	160,0	165	132	142
MFC1000C/ 200 kW	200,0	210	200,0	200	160	174
MFC1000C/ 250 kW	250,0	271	250,0	257	200	210
MFC1000C/ 315 kW	315,0	330	315,0	320	250	255
MFC1000C/ 355 kW	355,0	370	355,0	360	315	325
MFC1000C/ 400 kW	400,0	430	400,0	420	355	3601
MFC1000C/ 500 kW	500,0	522	500,0	505	400	415
MFC1000C/ 630kW	630,0	650	630,0	630	450	455
MFC1000C/ 710 kW	710,0	721	710,0	768	500	505
MFC1000C/ 800 kW	800,0	860	800,0	864	630	673

[1] 144% overload

Power supply	Voltage U_{IN}	MFC1000 400V: 3-phase (-15% +10%), 45-60Hz MFC1000 500V: 3-phase (-15% +10%), 45-60Hz MFC1000 690V: 3-phase (-15% +10%), 45-60Hz
Exit	Voltage/Frequency	0-UIN / 0.0-400 Hz (0.0-200 Hz in vector operating mode
	Resolution	0.1 Hz / 1 rpm
Driver	Operating mode	Scalar U/f: linear or quadratic characteristic
		Vector DTC-SVM: Sensorless or Angular Position Sensor
	Keying frequency	2..15kHz (range depends on rated power)
Control inputs/outputs	Analog Inputs	5 analog inputs
	Digital inputs	Up to 40 inputs
	Analog Outputs	Up to 12 analogue outputs
	Relay outputs	Up to 11 relay outputs

Repeater data for 500V and 690V supply voltages, as well as AcR designs are available on request
For more detailed information, please contact us. The data provided is subject to change without notice. Other systems can only be equipped with a braking transistor if this is clearly indicated when placing an order. Once the repeater is produced, it is not possible to add a braking transistor.

1. Power supply by busbars
2. Main circuit breaker
3. Auxiliary power supply transformer
4. AC Contactors
5. Input choke
6. Output (motor) choke
7. Main control board
8. Thyristor-diode modules
9. Transistors with DC capacitors



TWERD ENERGO-PLUS Sp. z o.o.
ul. Aleksandrowska 28-30, 87-100 Toruń

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

NIP: 956 233 78 73
REGON: 380 968 365

For systems of 400kW and larger, the overload range is determined in consultation with the customer

ORDER CODE – HOW TO CONFIGURE THE REPEATER

(please tick the appropriate boxes and write down the symbol of the ordered device according to the formula below the table)

MFC1000C – [1] – [2] – [3] – [4] – [5] – [6]

[1]: – power [kW]

[2]: – voltage [V]

[3]: – braking
0 – without brake transistor
H – with brake transistor

[4]: - return of energy to the grid
0 – no return of energy to the grid
ACR – energy return inverter to the grid

[5]: - Input filter
0 – the order does not include an external input filter
1 – the order includes an external input filter – the specification is agreed upon when placing the order

[6]: - output filter
0 – the order does not include an external output filter
1 - the order includes an external output filter – the specification is agreed upon when placing the order

An example of how to configure a symbol to place an order:

90 kW system with 400V power supply, without brake transistor, with energy return to the grid, with input filter, without output filter:

MFC1000C 90 – 400 – 0 – ACR – 1 – 0