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Operating comfort redefined
Frequency Inverters M-Max™

Product Information
Frequency Inverter
M-Max™

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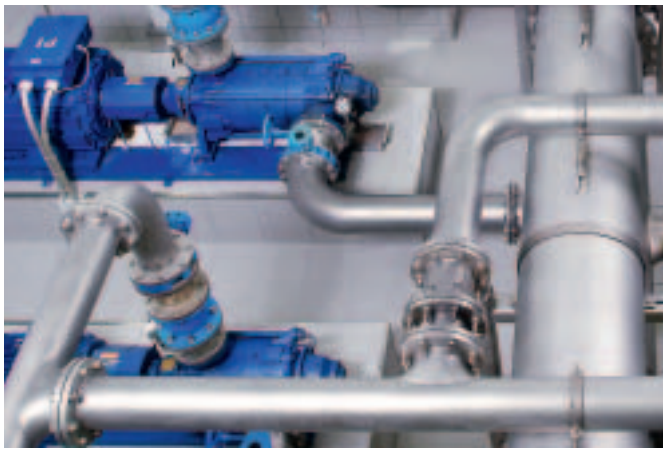
M-Max™ Frequency Inverter System Features

The M-Max series frequency inverters allow drives to be adapted easily to customer requirements. With a compact design for assigned motor ratings from 0.25 kW to 5.7 kW, M-Max can offer maximum flexibility. M-Max also demonstrates how a high level of functionality can be implemented in a simple and user-friendly design. The small and compact design also allows a space saving installation. M-Max is provided with an integrated RFI filter (EMC) and a flexible interface for solving important machine building requirements, for example, the optimization of production and manufacturing processes. It reliably ensures the required motion sequences of the drive motor and thus contributes to operational safety.



M-Max – the "energy optimizer"

M-Max frequency inverters provide an economical solution for several processes in pumping applications. The integrated PI controller and extensive motor-protective functions ensure a high level of operational reliability and allow significant energy savings in the connected process. The lacquered control boards also allow use in highly humid and aggressive environments, such as in a sewage treatment plant. The optional MMX-IP21-FS... accessory enables the degree of protection of the M-Max to be increased to IP21.

M-Max – for "dynamic precision"

The compact design of the M-Max saves valuable mounting space in machine building since the RFI filter and the brake chopper are already integrated. Shielded control and motor cable can also be connected with EMC compliance directly to the frequency inverter. The maximum permissible ambient temperature of +50 °C during operation with continuous current and with full overload withstand capability also meets machine building requirements. The performance of the sensorless vector control ensures also a high speed accuracy; even with load deviations and low motor speeds.

M-Max – the fieldbus flexibility

The frequency inverters of the M-Max series can be integrated into different fieldbus systems with the plug-in modules inserted into the side of the device.

The following fieldbus modules are available:
- CANOpen (XMX-NET-CO-A)
- Profibus DP (XMX-NET-PD-A)
- DeviceNet (XMX-NET-DN-A

The attachment of the modules to the frequency inverter is undertaken with a special mounting frame (MMX-NET-XA).

MMX-COM-PC – the "in-line communicator"

The MMX-COM-PC communication module that can be plugged onto the front provides the following without a mains voltage on the frequency inverter (internal battery):

- Upload and download of all parameters,
- Direct link to a PC via USB interface (parameter assignment),
- Copying of parameters for series machines or when exchanging devices.

This communication module considerably increases data security and reduces the time required for commissioning and maintenance.

Frequency inverters - simple and straightforward

Display unit

Backlit liquid crystal display (LCD)

Status symbols (▲):
READY = Ready to start
RUN = Operational
STOP = Stop, Stop command active
ALARM = Alarm message active
FAULT = Drive was stopped due to an error message

Menu level (◀):
REF = Reference value entry
MON = Monitor operating data
PAR = Parameters
FLT = Fault memory (Fault)

Control commands (▼):
FWD = Forward run
REV = Reverse run
I/O = Via control terminals (Input/Output)
KEYPAD = Via the keypad
BUS = Via fieldbus (interface)

Function keys

START
Motor start via keypad
(function must be activated)

STOP
- Motor stop via keypad
- Activates the Startup Wizard (press for 5 s)

OK
- Activates the selected parameter
- Confirm and save the set value
- Parameter group selection (submenu)

BACK/RESET
Back in menu. Exit edit mode and acknowledge error messages (reset).

LOC/REM
Move between different control levels (keypad – control terminals – fieldbus)

UP/DOWN
- Menu level selection in the display unit
- Change in the parameter groups and parameter lists
- Increase and reduce parameter values
- Increase and reduce reference value (electronic motor potentiometer)

LEFT/RIGHT
- Change the parameter group
- Change the position with value input

Features

- Integrated RFI filter (EMC: C2 and C3 to/EN61800-3)
- Dynamic motor control with sensorless vector control or V/f control (selectable)
- Integrated keypad and display unit
- Electronic reference value potentiometer
- Fixed frequencies
- PID controller
- Integrated brake unit (with MMX34 in sizes FS2 and FS3)
- 6 digital control inputs (24 V DC) (logic can be set)
- 1 digital output (transistor, 24 V DC, 50 mA)
- 2 analog inputs (0…10V / 0/4…20 mA can be set)
- 1 output analog (0...10V)
- 2 relays (1x NO, 1x changeover, 230 V AC, 2 A)
- Serial interface (RS485 / Modbus RTU)
- Optional fieldbus
- International standards (CE, UL, cUL, c-Tick)

Application examples

- Speed control of asynchronous three-phase motors up to 14 A for assigned motor outputs up to 7.5 kW (400 V))
- Pump and fan applications in buildings and industrial areas with quadratic and linear load characteristics.
- The high speed accuracy allows a whole range of possible applications in the textile, paper and printing industry, as well as with finishing machines in the metal industry.
- The compact design with integrated EMC filter offers maximum flexibility in machine building and saves valuable mounting space.
- The twofold startup torque and 1.5 overload torque allows the implementation of applications with demanding speed and torque requirements.

Technical data (extract)

Type designation and Assigned motor rating

Motor rating P		Motor rating P		Rated current	Type designation	Article No.	Size Motor rating		
[kW]	[A]*)	[HP]	[A]*)	I_e [A]			W [mm]	H [mm]	D [mm]
Mains supply voltage: 1 AC 230 V, 50/60 Hz (177…264 V ±0 %, 45…66 Hz ±0 %)									
0.25	1.4			1.7	**MMX12AA1D7F0-0**	**121363**	66	157	99
0.37	2	1/2	2.2	2.4	**MMX12AA2D4F0-0**	**121364**			
0.55	2.7			2.8	**MMX12AA2D8F0-0**	**121365**			
0.75	3.2	3/4	3.2	3.7	**MMX12AA3D7F0-0**	**121366**	90	195	102
1.1	4.6	1	4.2	4.8	**MMX12AA4D8F0-0**	**121367**			
1.5	6.3	2	6.8	7	**MMX12AA7D0F0-0**	**121368**			
2.2	8.7	3	9.6	9.6	**MMX12AA9D6F0-0**	**121369**	100	263	109
Mains supply voltage: 3 AC 400 V, 50/60 Hz (323…528 V ±0 %, 45…66 Hz ±0 %)									
0.37	1.1	1/2	1.1	1.3	**MMX34AA1D3F0-0**	**121397**	66	157	99
0.55	1.5	3/4	1.6	1.9	**MMX34AA1D9F0-0**	**121398**			
0.75	1.9	1	2.1	2.4	**MMX34AA2D4F0-0**	**121399**			
1.1	2.6	1-1/2	3	3.3	**MMX34AA3D3F0-0**	**121400**	90	195	102
1.5	3.6	2	3.4	4.3	**MMX34AA4D3F0-0**	**121401**			
2.2	5	3	4.8	5.6	**MMX34AA5D6F0-0**	**121402**			
3	6.6			7.6	**MMX34AA7D6F0-0**	**121403**	100	263	109
4	8.5	5	7.6	9	**MMX34AA9D0F0-0**	**121404**			
5.5	11.3	7-1/2	11	12	**MMX34AA012F0-0**	**121405**			
7.5**	15.2	10	14	14	**MMX34AA014F0-0**	**122684**			

*) Rated motor current for normal four-pole internal and surface cooled asynchronous three-phase motors (1500 rpm).
**) Allocated motor output at a maximum ambient temperature of +40 °C and a maximum pulse frequency of 4 kHz

Operating data

Mode	Sensorless vector control / V/f control (selectable)
Output current	Rated current at max. +50 °C; Overload withstand capability 150 % for 60 s every 600 s; Startup current 200 % for 2 s every 20 s
Output frequency	0...320 Hz; Preset 50 Hz; Resolution 0.01 Hz
Operating frequency	1... 16 kHz; Preset 6 kHz; Resolution 0.1 kHz
Ambient temperature in operation	-10 °C (without icing) ...+50 °C at rated current
Humidity	0...95 % relative humidity, non-condensing
Installation height	Up to 1,000 m above sea level at 100 % rated current, up to 2,000 m with approx. 1 % reduction per 100 m.
Degree of protection	IP 20, IP21 (NEMA1) MMX-IP21-FS... option
Protective functions	Overvoltage, undervoltage, ground fault detection in motor and motor cable at start, overtemperature, overcurrent, motor overload, motor underload, motor blocking.
EMC measures	Internal RFI filter (use in accordance with IEC 61800-3 in public, commercial and industrial networks).

Accessories

Designation	Type designation	Article No.
Communication module for PC link and parameter transfer	**MMX-COM-PC**	**121406**
Housing accessories (66 x 157 x 99) for degree of protection IP21/NEMA1	**MMX-IP21-FS1**	**121407**
Housing accessories (90 x 195 x 102) for degree of protection IP21/NEMA1	**MMX-IP21-FS2**	**121408**
Housing accessories (100 x 263 x 109) for degree of protection IP21/NEMA1	**MMX-IP21-FS3**	**121409**
Adater for fieldbus modules	**MMX-NET-XA**	**134510**
CANopen fieldbus module	**XMX-NET-CO-A**	**134511**
PROFIBUS DP, Fieldbus module with plug-in bus terminals	**XMC-NET-PS-A**	**136556**
PROFIBUS DP, Fieldbus module with 9-pole D-Sub connector	**XMC-NET-PD-A**	**136557**
DeviceNet, Fieldbus module	**XMC-NET-DN-A**	**136558**
Handbuch M-Max™ Hardware und Projektierung	**AWB8230-1603de**	**125632**
Manual M-Max™ Hardware and Engineering	**AWB8230-1603en**	**125633**

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