The next generation of OEM drives

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CD CONTENTS

MaxConnect® | MaxLoader® | Firmware Update
Catalog Supplement | Demo default parameter file
M-Max Series Drive publication | User Manual

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latest content updates and revisions.

M-Max™ series of drives

The next generation of drives specifically engineered for today's machinery applications.

M-Max microprocessor-based drives have standard features that can be programmed to tailor the drive's performance to suit a wide variety of application requirements. The M-Max product line uses a 32-bit microprocessor and insulated gate bipolar transistors (IGBTs) that provide quiet motor operation, high motor efficiency and smooth low-speed performance. The size and simplicity of the M-Max make it ideal for hassle-free installation. Models rated at 575 volts, three-phase, 50/60 Hz are available in sizes ranging from 1 to 7-1/2 hp. Models rated at 480 volts, three-phase, 50/60 Hz are available in sizes ranging from 1/2 to 25 hp. Models rated at 240 volts, three-phase, 50/60 Hz are available in sizes

ranging from 1/4 to 15 hp. Models rated at 240 volts, single-phase, 50/60 Hz are available in sizes ranging from 1/4 to 3 hp. Models rated at 115 volts, single-phase, 50/60 Hz are available in the 1/4 to 1-1/2 hp size range. The standard drive includes a digital display and operating and programming keys on a visually appealing, efficient application programming interface. The display provides drive monitoring, as well as adjustment and diagnostic information. The keys are used for digital adjustment and programming of the drive, and for operator control. Separate terminal blocks for control and power wiring are provided for your connections.

Ease of use.

Preset application macros, startup wizard, PC software, diagnostic capabilities and the local/remote button are designed to simplify and save time during start up and operation of the unit.

Macros

The M-Max drive comes pre-programmed with four on-board macros: basic, pump, fan and high-load applications (Parameter P1.2). These macros set default values to parameters based on the application and typical user settings. Torque characteristics, ramp times, minimum frequency and stop characteristics are all predefined based on this selection. The values can be adjusted if needed.

Startup wizard

Common to all Eaton drives, the M-Max variable frequency drive uses a startup wizard to define the most critical user parameters and motor nameplate data during initial startup without having to browse through numerous parameter menus.

PC software

MaxConnect and MaxLoader software allows users to easily configure parameters, real-time monitor critical VFD and motor data, and compare parameter sets. The PC software is free to download. Visit www.eaton.com/m-max for the latest revision.

Diagnostics

Extremely easy keypad navigation allows you to monitor 21 common values during operation (MON menu). Both Fault and Alarm status for the previous nine faults are also stored along with time (FLT menu).

Local/remote button

Allows the user to toggle operation between the keypad, I/O terminals and fieldbus at the push of a button, rather than adding an HOA switch or reprogramming your speed reference and start sources.

Space-saving design.

Multiple mounting orientations for all your panel needs
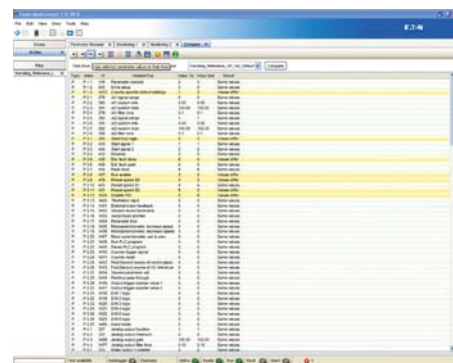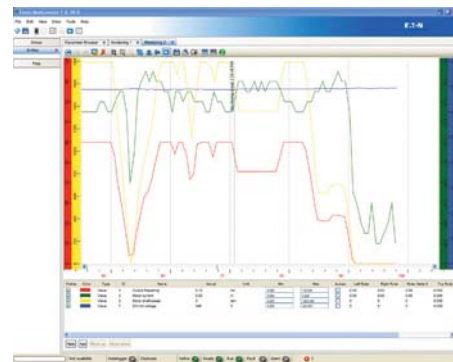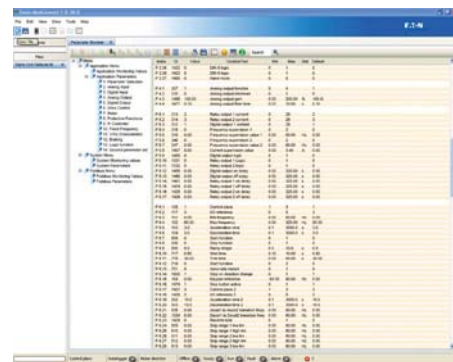
The M-Max drive's exceedingly small footprint, mounting characteristics and 50°C rating allows OEMs to save critical panel space when installing M-Max units.

Mounting characteristics (frame sizes 1 to 3 only)

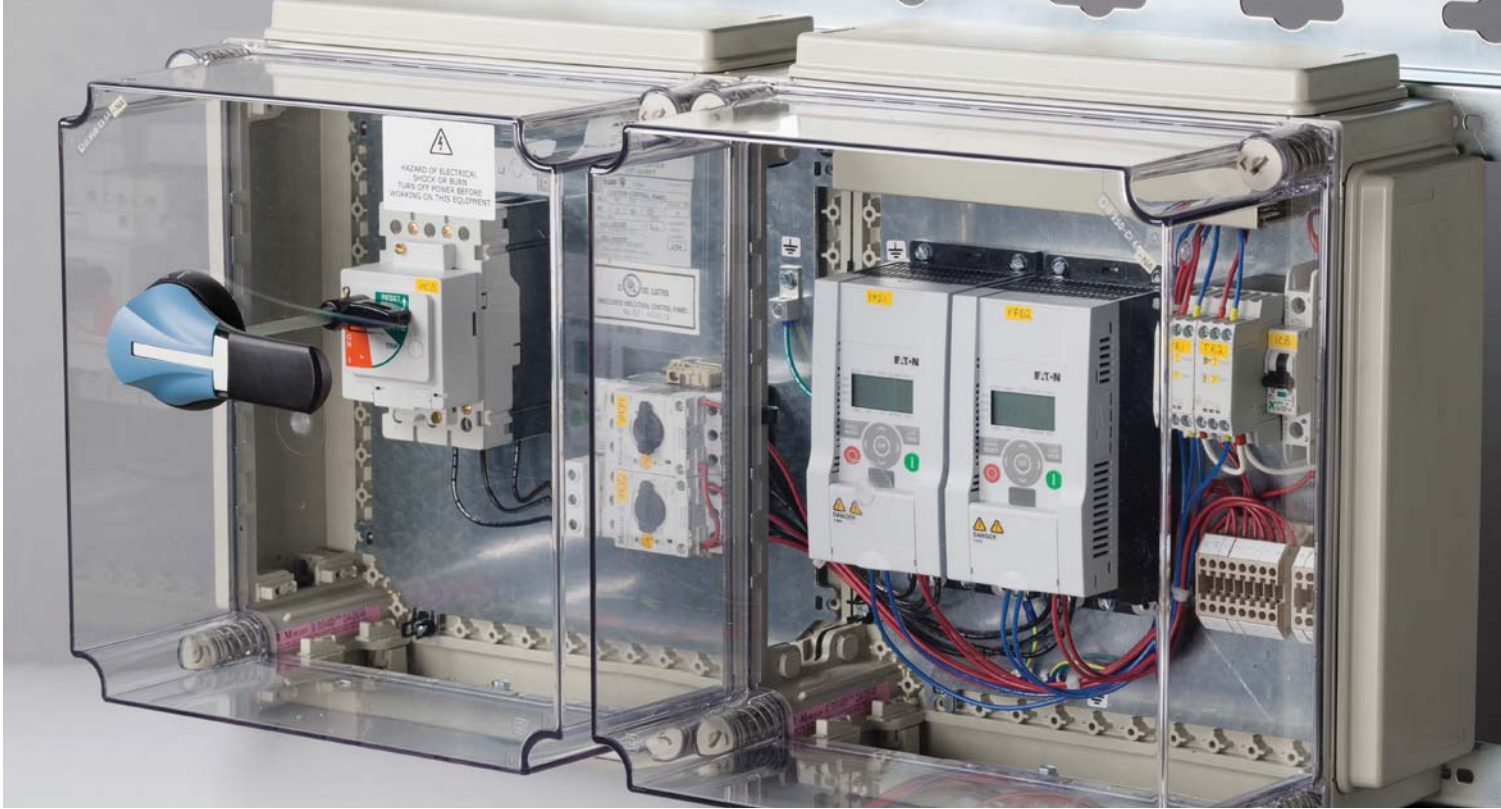Side-by-side mounting with zero clearance in your panel is permissible with the M-Max units. The M-Max drive can also be mounted in just about any orientation. Only 180 degree rotation is not allowed because of keypad operation safety concerns.

Small footprint (frame sizes 1 to 3 only)

Extremely compact size that can be DIN rail or panel mounted.

Rugged and reliable— 50°C (122°F)

Rated to handle higher ambient temperatures.

Approximate dimension in Inches (mm).
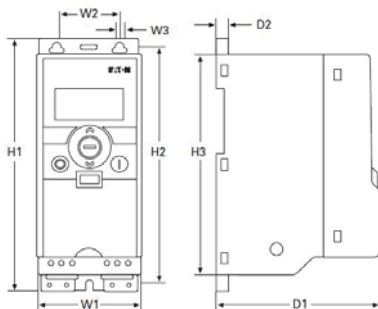
Frame Type	H1	H2	H3	W1	W2	W3	D1	D2	Weight Lbs (kg)
FS1	6.30 (160.0)	5.79 (147.0)	5.40 (137.3)	2.60 (66.0)	1.50 (38.0)	0.17 (4.5)	4.02 (102.0)	0.18 (4.5)	1.2 (0.55)
FS2	7.68 (195.0)	7.17 (182.0)	6.69 (170.0)	3.54 (90.0)	2.46 (62.5)	0.22 (5.5)	4.14 (105.0)	0.22 (5.5)	1.5 (0.70)
FS3	9.96 (253.0)	9.53 (242.0)	9.50 (241.3)	3.94 (100.0)	2.95 (75.0)	0.22 (5.5)	4.41 (112.0)	0.22 (5.5)	2.2 (0.99)
FS4	14.57 (370.0)	13.82 (351.0)	13.27 (337.0)	6.50 (165.0)	5.51 (140.0)	0.55 (14.0)	6.61 (168.0)	0.28 (7.0)	18.0 (8.00)
FS5	16.30 (414.0)	15.70 (398.0)	15.08 (383.0)	6.50 (165.0)	5.51 (140.0)	0.55 (14.0)	8.07 (205.0)	0.28 (7.0)	22.0 (10.00)
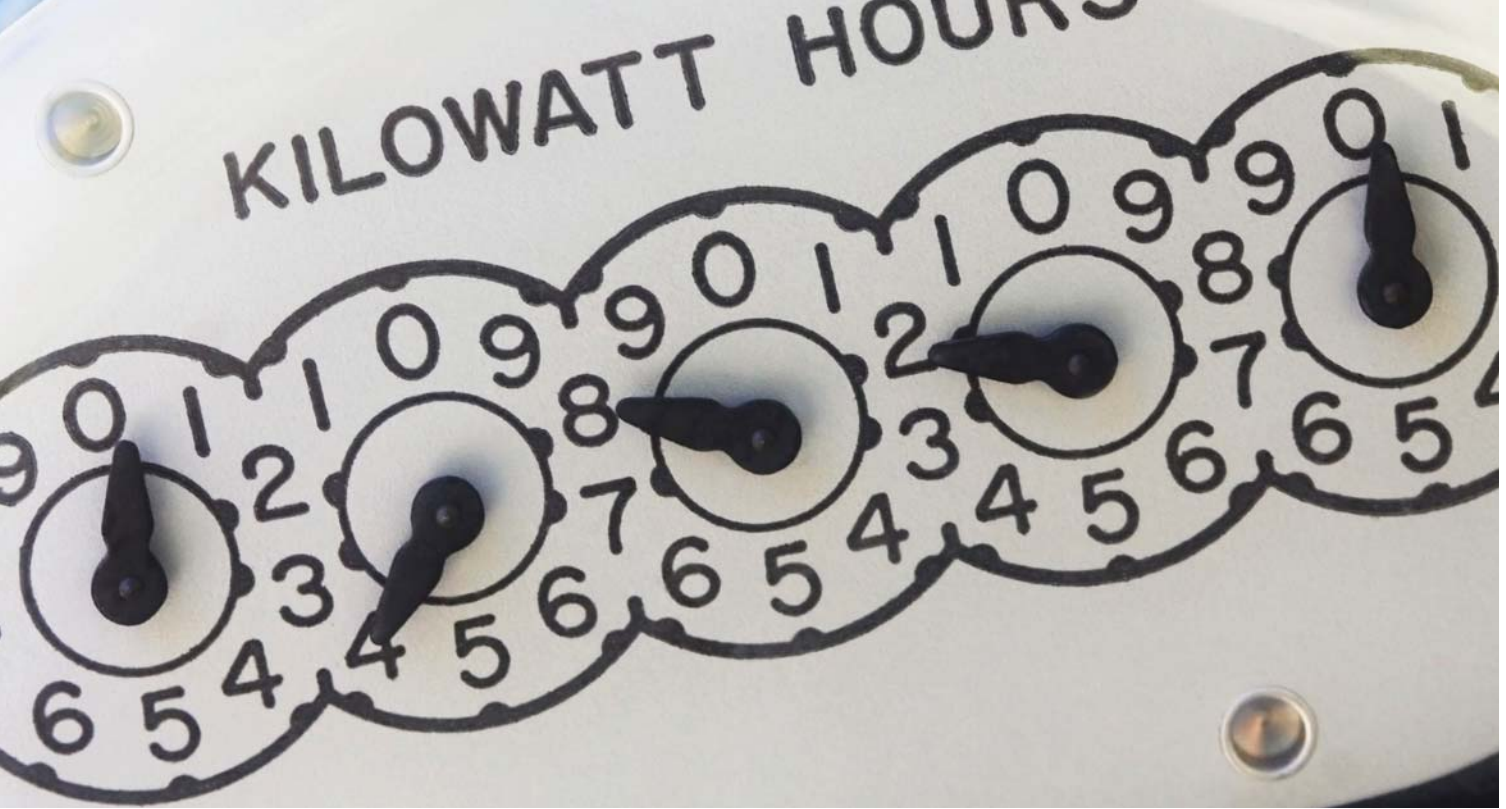
Efficiency.

On average, 30% less loss watts than our competitor's offerings.
This means lower operation costs and less impact on the environment...

30 Watt Savings X **1000 Units** = **$13,140** in energy **savings** per year

CO_2 **reduction** of 180,000 lbs.

Equivalent to removing **17** cars off the road **per year**.

* For a drive that runs 12 hours a day, 365 days a year.
  Based on $0.10/kWh and 1.37lbs/kWh

Rugged and reliable.

The M-Max drive incorporates multiple features designed to improve reliability under harsh operating conditions and extend the life of the unit.

Temp-controlled fan

Internal temperature sensors start the cooling fan when needed, instead of continuously running. Extends fan life, which extends VFD life.

50°C (122°F)

Rated to handle higher ambient termperatures.

Conformal coating

Protective coating for printed circuit boards. It protects and insulates against moisture, corrosion, dust, and thermal shock.

High overload rating

150% for 1 minute each 10 minutes or 200% for 2 seconds each 20 seconds. Meets constant torque applications.

NEMA® 1 enclosures

Available for all frame sizes to meet NEMA 1 and IP21 requirements. Includes conduit entry plate.

EMC filters

Type C2 protection integrated into the unit on single-phase 230V and three-phase 480V units.

Brake chopper circuit

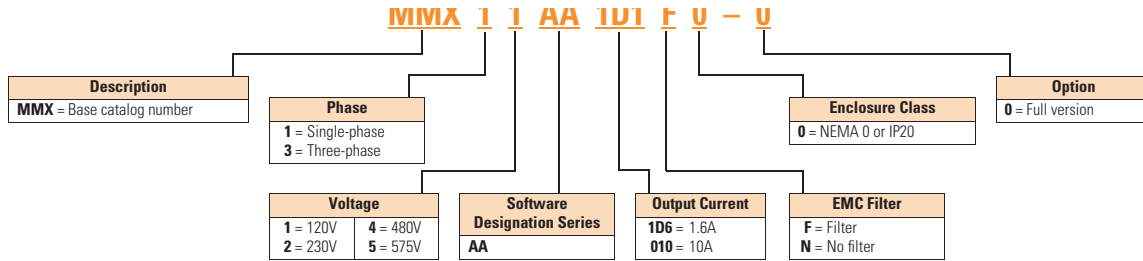Integrated into three-phase FS2, FS3, FS4 and FS5 units.

Global acceptance

Designed and tested to meet the standards of the global market.

MMX 1 1 AA 1D1 F 0 – 0

Description	Phase	Voltage	Software Designation Series	Output Current	EMC Filter	Enclosure Class	Option
MMX = Base catalog number	**1** = Single-phase **3** = Three-phase	**1** = 120V **4** = 480V **2** = 230V **5** = 575V	**AA**	**1D6** = 1.6A **010** = 10A	**F** = Filter **N** = No filter	**0** = NEMA 0 or IP20	**0** = Full version

M-Max

M-Max Basic Controller

hp [1]	Volts [2]	100% Continuous Current I_N (A)	Nominal Input Current (A)	Frame Size	Catalog Number
1/4	100–120V single-phase in 230V three-phase out	1.7	9.2	FS2	**MMX11AA1D7N0-0**
1/2		2.4	11.6		**MMX11AA2D4N0-0**
3/4		2.8	12.4		**MMX11AA2D8N0-0**
1		3.7	15		**MMX11AA3D7N0-0**
1-1/2		4.8	16.5	FS3	**MMX11AA4D8N0-0**
1/4	200–240V single-phase in 230V three-phase out	1.7	4.2	FS1	**MMX12AA1D7F0-0** [3]
1/2		2.4	5.7		**MMX12AA2D4F0-0** [3]
3/4		2.8	6.6		**MMX12AA2D8F0-0** [3]
1		3.7	8.3	FS2	**MMX12AA3D7F0-0** [3]
1-1/2		4.8	11.2		**MMX12AA4D8F0-0** [3]
2		7	14.1		**MMX12AA7D0F0-0** [3]
3		9.6	15.8	FS3	**MMX12AA9D6F0-0** [3]
1/4	200–240V three-phase in 230V three-phase out	1.7	2.7	FS1	**MMX32AA1D7N0-0**
1/2		2.4	3.5		**MMX32AA2D4N0-0**
3/4		2.8	3.8		**MMX32AA2D8N0-0**
1		3.7	4.3	FS2	**MMX32AA3D7N0-0**
1-1/2		4.8	6.8		**MMX32AA4D8N0-0**
2		7	8.4		**MMX32AA7D0N0-0**
3		11	13.4	FS3	**MMX32AA011N0-0**
5		17	17	FS4	**MMX32AA017F0-0** [4]
7-1/2		25	25		**MMX32AA025F0-0** [4]
10		31	31	FS5	**MMX32AA031F0-0** [4]
15		38	38		**MMX32AA038F0-0** [4]
1/2	380–480V three-phase in 460V three-phase out	1.3	2.2	FS1	**MMX34AA1D3F0-0** [3]
3/4		1.9	2.8		**MMX34AA1D9F0-0** [3]
1		2.4	3.2		**MMX34AA2D4F0-0** [3]
1-1/2		3.3	4	FS2	**MMX34AA3D3F0-0** [3]
2		4.3	5.6		**MMX34AA4D3F0-0** [3]
3		5.6	7.3		**MMX34AA5D6F0-0** [3]
4		7.6	9.6	FS3	**MMX34AA7D6F0-0** [3]
5		9	11.5		**MMX34AA9D0F0-0** [3]
7-1/2		12	14.9		**MMX34AA012F0-0** [3]
10		14	18.7		**MMX34AA014F0-0** [3]
10		16	16	FS4	**MMX34AA016F0-0** [4]
15		23	23		**MMX34AA023F0-0** [4]
20		31	31	FS5	**MMX34AA031F0-0** [4]
25		38	38		**MMX34AA038F0-0** [4]
1	575V three-phase in 575V three-phase out	1.7	2.0	FS3	**MMX35AA1D7N0-0**
2		2.7	3.6		**MMX35AA2D7N0-0**
3		3.9	5.0		**MMX35AA3D9N0-0**
5		6.1	7.6		**MMX35AA6D1N0-0**
7-1/2		9.0	10.4		**MMX35AA9D0N0-0**

Notes

[1] Horsepower ratings are based on the use of a 240V, 460V, and 575V NEMA B, four- or six-pole squirrel cage induction motor and are for reference only. Units are to be selected such that the motor current is less than or equal to the MMX rated continuous output current.

[2] For 208V, 380V, or 415V applications, select the unit such that the motor current is less than or equal to the MMX rated continuous output current.

[3] Units are also available without EMC filters. Substitute -N0-0 for this option.

[4] Units are also available without EMC filters and 5% DC choke. Substitute -N0-0 for this option.

Accessories

M-Max Copy/Paste Module

Description	Catalog Number
Module is plugged onto the front of the drive to provide: upload/download of all parameters, direct link to a PC via USB interface for parameter assignment via MaxConnect software, and copying of parameters for a series of devices or when exchanging devices. No PC required	MMX-COM-PC

NEMA Type 1 Kits ①

Description	Catalog Number
NEMA Type 1 and IP21 kit for frame 1	MMX-IP21-FS1
NEMA Type 1 and IP21 kit for frame 2	MMX-IP21-FS2
NEMA Type 1 and IP21 kit for frame 3	MMX-IP21-FS3
NEMA Type 1 for frame 4	MMX-CKIT-FS4
NEMA Type 1 for frame 5	MMX-CKIT-FS5

Optional Communication Modules ②

Description	Catalog Number
Communication adapter kit (FS1–FS3)	MMX-NET-XA
Communication adapter kit (FS4 and FS5)	MMX-NET-XA-45
PROFIBUS DP network card with serial connection	XMX-NET-PS-A
PROFIBUS DP network card with Sub-D connection	XMX-NET-PD-A
DeviceNet network card	XMX-NET-DN-A

Remote Keypad ③

Description	Catalog Number
Keypad, bezel and cable	OPTRMT-BP-HMX
Remote copy/paste keypad	MMX-REMKEY-TEXT
VFD adapter	MMX-ADAPTER-RJ45

Notes
① NEMA Type 1 kit provides conduit entry plate.
② Additional input and output reactors are available. Consult Eaton representative for a complete listing.
③ All three components are required for remote keypad operation.

Technical Data and Specifications

Ratings

M-Max Basic Controller IP20 Standard Ratings

Description	Specification
Protections	
Overcurrent protection	Trip limit 4.0 x I_H instantaneously
Overvoltage protection	115/230V series: 437 Vdc; 400V series: 874 Vdc; 575V series: 1048 Vdc trip level
Undervoltage protection	115/230V series: 183 Vdc; 400V series: 333 Vdc; 575V series: 460 Vdc trip level
Ground fault protection	Ground fault is tested before every start. In case of ground fault in motor or motor cable, only the frequency converter is protected
Overtemperature protection	Yes
Motor overload protection	Yes
Motor stall protection	Yes
Motor underload protection	Yes

Programmable Parameters

Description
Application macros: basic, pump, fan and high load (hoist)
Programmable start/stop and reverse signal logic (sinking or sourcing)
Reference scaling
Programmable start and stop functions
DC-brake at start and stop
Programmable V/Hz curve
Adjustable switching frequency
Autorestart function after fault
Protections and supervisions (all fully programmable; off, warning, fault)
Current signal input fault
External fault
Fieldbus communication
Eight preset speeds
Analog input range selection, signal scaling and filtering
PID controller
Skip frequencies

Specifications

M-Max Series Drives

Description	Specification
Input Ratings	
Input voltage (V_{in})	+10%/–15%
Input frequency (f_{in})	50/60 Hz (variation up to 45–66 Hz)
Connection to power	Once per minute or less (typical operation)
Output Ratings	
Output voltage	0 to V_{in} [1]
Continuous output current	Continuous rated current I_N at ambient temperature max. 122°F (50°C), overload 1.5 x I_N max. 1 min/10 min
Output frequency	0 to 320 Hz
Frequency resolution	0.01 Hz
Initial output current (I_H)	Current 2 x I_N for 2 seconds in every 20-second period Torque depends on motor
Control Characteristics	
Control method	Frequency control (V/Hz) open loop or sensorless vector control
Switching frequency	1.5 to 16 kHz; default 4 kHz
Frequency reference	Analog input: resolution 0.1% (10-bit), accuracy ± 1% V/Hz Panel reference: resolution 0.01 Hz
Field weakening point	30 to 320 Hz
Acceleration time	0 to 3000 sec
Deceleration time	0 to 3000 sec
Braking torque	DC brake: 30% x T_n (without brake option)
Brake Resistor (Minimum Values) [2]	
230V Series	FS2 35 ohms and FS3 26 ohms, FS4 14 ohms, FS5 9 ohms
400V Series	FS2 75 ohms and FS3 54 ohms, FS4 28 ohms, FS5 17 ohms
575V Series	FS3 103 ohms
Ambient Conditions	
Ambient operating temperature	14°F (–10°C), no frost to 122°F (+50°C): Rated loadability I_N
Storage temperature	–40°F (–40°C) to 158°F (70°C)
Relative humidity	0 to 95% RH, noncondensing, non-corrosive, no dripping water
Air quality	Chemical vapors: IEC 721-3-3, unit in operation, Class 3C2; Mechanical particles: IEC 721-3-3, unit in operation, Class 3S2
Altitude	100% load capacity (no derating) up to 3280 ft (1000m); 1% derating for each 328 ft (100m) above 3280 ft (1000m); max. 6560 ft (2000m)
Vibration	EN 60068-2-6; 3 to 150 Hz, displacement amplitude 1 mm (peak) at 3 to 15.8 Hz, max. acceleration amplitude 1G at 15.8 to 150 Hz
Shock	EN 50178, IEC 68-2-27 UPS Drop test (for applicable UPS weights); storage and shipping: max. 15G, 11 ms (in package)
Enclosure class	IP20 (FS1–FS3) IP21 (FS4 and FS5)

Notes

[1] Exception: 115V single-phase in, 230V three-phase out.

[2] Only three-phase FS2 and FS3 drives are equipped with brake chopper circuit.

Standards

I/O Specifications

- Digital inputs DI1–DI6 are freely programmable. The user can assign multiple functions to a single input
- Digital, relay, and analog outputs are freely programmable

Includes:

- Six digital inputs
- Two analog inputs
  - 4–20 mA
  - 0–10V
- One analog output
- One digital output
- Two relay outputs
- RS-485 interface

Reliability

- Pretested components
- Computerized testing
- Final test with full load
- Conformal-coated boards
- Eaton Electrical Services & Systems: national network of AF drive specialists

M-Max I/O Interface

Terminal		Signal	Factory Preset	Description
1	+10V	Ref. output voltage	—	Maximum load 10 mA
2	AI1	Analog signal in 1	Freq. reference [P]	0–+10V Ri = 200k ohms [min.]
3	GND	I/O signal ground	—	—
6	24V	24V output for DIs	—	±20%, max. load 50 mA
7	GND	I/O signal ground	—	—
8	DI1	Digital input 1	Start forward [P]	0–+30V Ri = 12k ohms min.
9	DI2	Digital input 2	Start reverse [P]	—
10	DI3	Digital input 3	Preset speed [P]	—
A	A	RS-485 signal A	FB communication	—
B	B	RS-485 signal B	FB communication	—
4	AI2	Analog signal in 2	PI actual value [P]	0[4]–20 mA, Ri = 200k ohms
5	GND	I/O signal ground	—	—
13	GND	I/O signal ground	—	—
14	DI4	Digital input 4	Preset speed B1 [P]	0–+30V Ri = 12k ohms min.
15	DI5	Digital input 5	Fault reset [P]	0–+30V Ri = 12k ohms min.
16	DI6	Digital input 6	Disable PI contr. [P]	0–+30V Ri = 12k ohms min.
18	AO	Analog output	Output frequency [P]	0(2)–10V, RL = 500 ohms
20	DO	Digital signal out	Active = READY [P]	Open collector, max. load 48V/50 mA
22	RO11	Relay out 1	Active = RUN [P]	Max. switching load: 250 Vac/2A or 250 Vdc/0.4A
23	RO12			
24	RO21	Relay out 2	Active = FAULT [P]	Max. switching load: 250 Vac/2A or 250 Vdc/0.4A
25	RO22			
26	RO23			

AUTOGEN Ref Current

Analog OUT

Note
P) Parameter-selectable function.

Dimensions

Approximate Dimensions in Inches (mm)

Dimensions and Frame Sizes, FS1–FS3 (FS = Frame Size)

FS1

FS2

FS3

0.28 in
(7 mm)
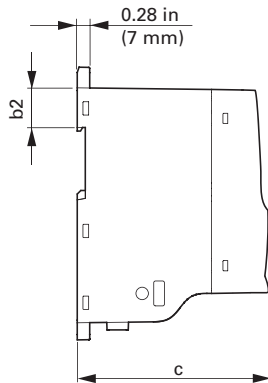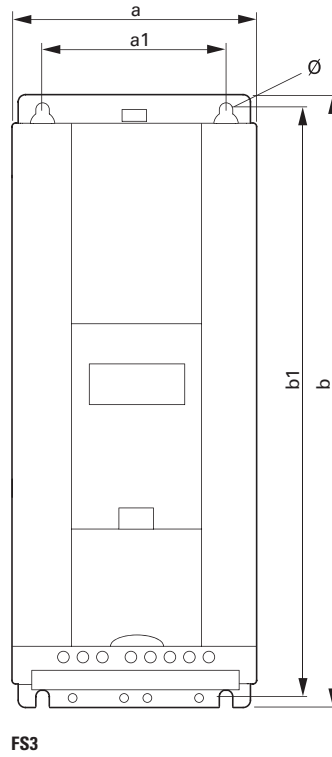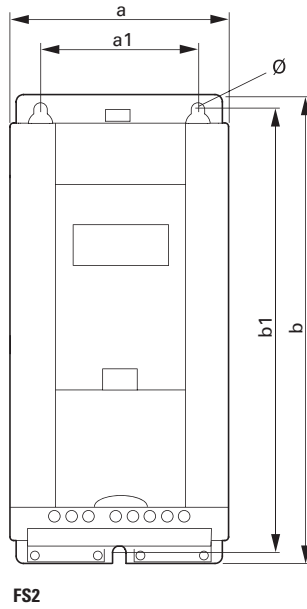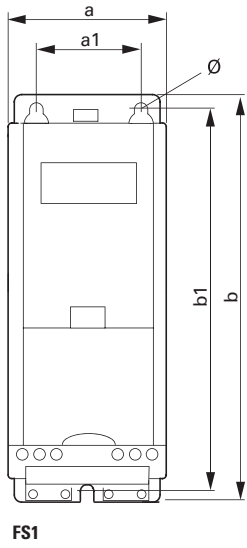
Approximate Dimensions in Inches (mm)

Dimensions and Frame Sizes, FS4 and FS5 (FS = Frame Size)

Dimensions and Frame Sizes

Approximate Dimensions in inches (mm)

Part Number	a	a1	b	b1	b2	c	Ø, Ø1	Ø2	Installation Size
MMX12AA1D7_ MMX12AA2D4_ MMX12AA2D8_	2.60 (66)	1.50 (38)	6.30 (160)	5.79 (147)	1.26 (32)	4.02 (102)	0.18 (4.5)	—	FS1
MMX32AA1D7_ MMX32AA2D4_ MMX32AA2D8_									
MMX34AA1D3_ MMX34AA1D9_ MMX34AA2D4_									
MMX11AA1D7_ MMX11AA2D4_ MMX11AA2D8_ MMX11AA3D7_	3.54 (90)	2.46 (62.5)	7.68 (195)	7.17 (182)	1.26 (32)	4.14 (105)	2.17 (5.5)	—	FS2
MMX12AA3D7_ MMX12AA4D8_ MMX12AA7D0_									
MMX32AA3D7_ MMX32AA4D8_ MMX32AA7D0_									
MMX34AA3D3_ MMX34AA4D3_ MMX34AA5D6_									
MMX11AA4D8_	3.94 (100)	2.95 (75)	9.96 (253)	9.53 (242)	1.34 (34)	4.41 (112)	2.17 (5.5)	—	FS3
MMX12AA9D6_									
MMX32AA011_									
MMX34AA7D6_ MMX34AA9D0_ MMX34AA012_ MMX34AA014_									
MMX35AA1D7_ MMX35AA2D7_ MMX35AA3D9_ MMX35AA6D1_ MMX35AA9D0_									
MMX32AA012_ MMX32AA017_ MMX32AA025_	6.50 (165.0)	5.51 (140.0)	14.57 (370.0)	13.82 (351.0)	13.27 (337.0)	6.61 (168.0)	0.28 (7.0)	0.55 (14.0)	FS4
MMX34AA016_ MMX34AA023_									
MMX32AA031_ MMX32AA038_	6.50 (165.0)	5.51 (140.0)	14.57 (414.0)	13.82 (398.0)	15.08 (383.0)	8.07 (205.0)	0.28 (7.0)	0.55 (14.0)	FS5
MMX34AA031_ MMX34AA038_									

Note

1 in = 25.4 mm, 1 mm = 0.0394 in

List of Parameters

The abbreviations used in the parameter lists have the following meaning:

PNU	Parameter number
ID	Identification number of the parameter
RUN	Access to the parameters during operation (RUN): ✓ = Modification permissible, X = Modification only possible in STOP
ro/rw	Parameter read and write permissions via a fieldbus connection (BUS): ro = read only rw = read and write
FS	Factory setting of the parameters
User setting	User setting of the parameters

Quick Configuration (Basis)

When first switching on or after activating the default settings (S4.2 = 1), you are guided step by step through the provided parameters by the quick start assistant. The defined values are confirmed with the OK button or they can be changed to suit your application and the motor data.

The quick start assistant can be switched off in the first parameter (P1.1) by entering a zero (access to all parameters).

In parameter P1.2, you can switch to the specified application setting with the quick start assistant (see table on **Page 40**).

The quick start assistant ends this first cycle by automatically switching to frequency display (M1.1 = 0.00 Hz).

By selecting the parameter level (PAR) again, besides the selected parameters for the quick configuration, the system parameters (S) are also shown in other cycles.

Quick Start Parameter Guide (Full parameter guide begins on Page 164)

PNU	ID	Access RUN	ro/rw	Designation	Value Range	Page	FS (P1.3)	User Setting
P1.1	115	✓	**rw**	Quick start parameters	**0** = All parameters (disable) **1** = Only quick configuration parameters (enable)	**67**	1	
P1.2	540	X	**rw**	Application	**0** = Basic **1** = Pump drive **2** = Fan drive **3** = High load	**67**	0	
P1.3	1472	X	**rw**	Country specific default settings	**0** = EU **1** = NA	**67**	1	
P6.1	125	✓	**rw**	Primary remote control source	**1** = Control signal terminals (I/O) **2** = Control unit (KEYPAD) **3** = Fieldbus (BUS)	**82**	0	
P6.2	117	✓	**rw**	Primary remote speed reference	**0** = Fixed frequency (FF0) **1** = Control unit (KEYPAD) **2** = Fieldbus (BUS) **3** = AI1 (analog setpoint 1) **4** = AI2 (analog setpoint 2) **5** = Motor potentiometer	**82**	3	
P6.3	101	X	**rw**	Minimum frequency	0.00–P6.4 Hz	**83**	0.00	
P6.4	102	X	**rw**	Maximum frequency	P6.3–320.00 Hz	**83**	60.00	
P6.5	103	X	**rw**	Primary acceleration time (acc1)	0.1–3000s	**83**	3.0	
P6.6	104	X	**rw**	Primary deceleration time (dec1)	0.1–3000s	**83**	3.0	
P6.7	505	X	**rw**	Start function	**0** = Acceleration time (ramp) **1** = Flying restart circuit	**84**	0	
P6.8	506	X	**rw**	Stop function	**0** = Fee coasting **1** = Deceleration time (ramp)	**84**	0	

Quick Start Parameter Guide, continued (Full parameter guide begins on Page 161)

PNU	ID	Access RUN	ro/rw	Designation	Value Range	Page	FS (P1.3)	User Setting
P7.1	113	X	**rw**	Motor, rated operational current	$0.2 \times I_e$–$2 \times I_e$ (see motor rating plate)	**89**	I_e	
P7.3	112	X	**rw**	Motor, rated speed	300–20000 RPM (see motor rating plate)	**89**	1720	
P7.4	120	X	**rw**	Motor, power factor (cos φ)	0.30–1.00 (see motor rating plate)	**89**	0.85	
P7.5	110	X	**rw**	Motor, rated operating voltage	180– 500V (see motor rating plate)	**89**	①	
P7.6	111	X	**rw**	Motor, rated frequency	30–320 Hz (see motor rating plate)	**89**	60.00	
P11.7	109	X	**rw**	Torque increase	0 = Deactivated 1 = Enabled	**109**	0	
M1.1	1	X	**ro**	Output frequency	Hz	**127**	0.00	

System Parameters in the Quick Start

PNU	ID	Access RUN	ro/rw	Designation	Value Range	Page	FS (P1.3)	User Setting
S1.1	833	X	**ro**	API SW ID	—	**125**	—	
S1.2	834	X	**ro**	API SW Version	—	**125**	—	
S1.3	835	X	**ro**	Power SW ID	—	**125**	—	
S1.4	836	X	**ro**	Power SW Version	—	**125**	—	
S1.5	837	X	**ro**	Application ID	—	**125**	—	
S1.6	838	X	**ro**	Application revision	—	**125**	—	
S1.6	838	X	**ro**	System load	—	**125**	—	
S2.1 ②	808	X	**ro**	Communication status	RS485 in xx.yyy format **xx** = Number of error messages (0–64) **yyy** = Number of correct messages (0–999)	**125**		
S2.2 ②	809	✓	**rw**	Fieldbus protocol	**0** = FB disabled **1** = Modbus	**125**	0	
S2.3 ②	810	✓	**rw**	Slave address	1–255	**125**	1	
S2.4 ②	811	✓	**rw**	Baud rate	**0** = 300 **1** = 600 **2** = 1200 **3** = 2400 **4** = 4800 **5** = 9600	**125**	5	

Notes

① Factory settings dependent on specific drive selected.
② These parameters are overwritten with the bus-specific parameters when a fieldbus connection (for example, CANopen) is used. The parameter values described in the manual of the fieldbus interface then apply.

System Parameters in the Quick Start, continued

PNU	ID	Access RUN	ro/rw	Designation	Value Range	Page	FS (P1.3)	User Setting
S2.6	813	✓	rw	Parity type	**0** = None, no, see 2 stop bits **1** = Even, see 1 stop bit **2** = Odd, see 1 stop bit	**126**	0	
S2.7	814	✓	rw	Communication timeout	**0** = Not used **1** = 1s **2** = 2s …255 = up to 255s	**126**	0	
S2.8	815	✓	rw	Reset communication status	**0** = Not used **1** = Resets parameter S2.1	**126**	0	
S3.1	827	X	ro	MWh counter	MWh	**126**	—	
S3.2	828	X	ro	Operating days (d)	0–0000 days	**126**	—	
S3.3	829	X	ro	Operating hours (h)	0–24 h	**126**	—	
S3.4	840	X	ro	RUN counter, days	0–0000 days	**126**	—	
S3.5	841	X	ro	RUN counter, hours	0–24 h	**126**	—	
S3.6	842	X	ro	Fault/alarm counter	Trip Counter: 0–0000	**126**	—	
S4.1	830	✓	rw	Display contrast	0–15	**126**	7	
S4.2	831	X	rw	Restore factory defaults	**0** = Factory setting or changed value **1** = Restores factory settings for all parameters	**126**	0	
S4.3	832	✓	rw	Password	0000–9999	**126**	0000	

Default I/O

Designation	Terminal	Function	Parameter
DI1	8	Start Fwd	P3.1, P3.2
DI2	9	Stop/Start Rev	P3.1, P3.3
DI3	10	Fixed Frequency B0 (12 Hz)	P3.9, P10.2
DI4	14	Fixed Frequency B1 (18 Hz)	P3.10. P10.3
DI5	15	Fault Reset	P3.7

Designation	Terminal	Function	Parameter
DI6	16	PID Controller Deactivate	P3.12
RO1 (NO)	22/23	Run	P5.1, P5.10
RO2 (NO/NC)	24/25/26	Fault	P5.2, P5.11
DO	13	Ready	P5.3, P5.9

All Parameters

When first switching on or after activating the default settings (S4.2 = 1) parameter P1.1 must
be set to 0 for access to all parameters.

Parameter Selection

PNU	ID	Access RUN	ro/rw	Designation	Value Range	Page	FS (P1.3)	User Setting
P1.1	115	✓	**rw**	Quick start parameters	**0** = All parameters **1** = Only quick configuration parameters	**66/67**	1	
P1.2	540	X	**rw**	Application	**0** = Basic **1** = Pump drive **2** = Fan drive **3** = High load	**67**	0	
P1.3	1472	X	**rw**	Country specific default settings	**0** = EU **1** = USA	**67**	1	

Analog Input

PNU	ID	Access RUN	ro/rw	Designation	Value Range	Page	FS (P1.3)	User Setting
P2.1	379	✓	**rw**	AI1 signal range (analog input)	(microswitch S2) **0** = 0–10V/0–20 mA **1** = 2–10V/4–20 mA	**68**	0	
P2.2	380	✓	**rw**	AI1 custom minimum	−100.00 to 100.00%	**68**	0	
P2.3	381	✓	**rw**	AI1 custom maximum	−100.00 to 100.00%	**68**	100	
P2.4	378	✓	**rw**	AI1, filter time	0.0–10.0s	**68**	0.1	
P2.5	390	✓	**rw**	AI2 signal range (analog input)	(microswitch S3) Like P2.1	**69**	1	
P2.6	391	✓	**rw**	AI2 custom minimum	−100.00 to 100.00%	**69**	0	
P2.7	392	✓	**rw**	AI2 custom maximum	−100.00 to 100.00%	**69**	100	
P2.8	389	✓	**rw**	AI2, filter time	0.0–10.0s	**69**	0.1	

Digital Input

PNU	ID	Access RUN	ro/rw	Designation	Value Range	Page	FS (P1.3)	User Setting
P3.1	300	✓	rw	Start/Stop-Logic	**0** = DI1 (FWD), DI2 (REV), REAF **1** = DI1 (FWD) + DI2 = REV **2** = DI1 (Start pulse), DI2 (stop pulse) **3** = DI1 (FWD), DI2 (REV)	**72**	3	
P3.2	403	✓	rw	Start signal/Start FWD (1)	**0** = Deactivated **1** = Activated via control signal terminal 8 (DI1) **2** = Activated via control signal terminal 9 (DI2) **3** = Activated via control signal terminal 10 (DI3) **4** = Activated via control signal terminal 14 (DI4) **5** = Activated via control signal terminal 15 (DI5) **6** = Activated via control signal terminal 16 (DI6)	**72**	1	
P3.3	404	✓	rw	STOP signal/Start REV (1)	Like P3.2	**72**	2	
P3.4	412	✓	rw	Reverse	Like P3.2	**72**	0	
P3.5	405	X	rw	Ext. fault close (N/O)	Like P3.2	**72**	0	
P3.6	406	X	rw	Ext. fault open (N/C)	Like P3.2	**73**	0	
P3.7	414	✓	rw	Fault reset	Like P3.2	**73**	5	
P3.8	407	✓	rw	Run enable	Like P3.2	**73**	0	
P3.9	419	✓	rw	Fixed frequency, binary value B0	Like P3.2	**73**	3	
P3.10	420	✓	rw	Fixed frequency, binary value B1	Like P3.2	**73**	4	
P3.11	421	✓	rw	Fixed frequency, binary value B2	Like P3.2	**73**	0	
P3.12	1020	✓	rw	PID controller deactivate	Like P3.2	**74**	6	
P3.13	1400	—	—	(Not used)	—	—	—	
P3.14	1401	✓	rw	External brake, feedback signal (N/O)	Like P3.2	**74**	0	
P3.15	1402	✓	rw	Change acceleration/ deceleration time (acc 2/dec 2)	Like P3.2	**74**	0	
P3.16	1403	✓	rw	Stop acceleration/deceleration time	Like P3.2	**74**	0	
P3.17	1404	✓	rw	Block parameter access	Like P3.2	**74**	0	
P3.18	1405	✓	rw	Motor potentiometer, increase value	Like P3.2	**74**	0	
P3.19	1406	✓	rw	Motor potentiometer, decrease value	Like P3.2	**74**	0	

Digital Input, continued

PNU	ID	Access RUN	ro/rw	Designation	Value Range	Page	FS (P1.3)	User Setting
P3.20	1407	✓	**rw**	Motor potentiometer, set value to zero	Like P3.2	**74**	0	
P3.21	1408	✓	**rw**	PLC program start	Like P3.2	**74**	0	
P3.22	1409	✓	**rw**	PLC program pause	Like P3.2	**75**	0	
P3.23	1410	✓	**rw**	Counter, input signal	Like P3.2	**75**	0	
P3.24	1411	✓	**rw**	Counter, reset	Like P3.2	**75**	0	
P3.25	1412	✓	**rw**	Activate secondary remote control source	Like P3.2	**75**	0	
P3.26	1413	✓	**rw**	Activate secondary remote speed reference	Like P3.2	**75**	0	
P3.27	1414	✓	**rw**	Activate second parameter set (2PS)	Like P3.2	**75**	0	
P3.28	1415	✓	**rw**	Fieldbus, remote input	Like P3.2	**75**	0	
P3.29	1416	✓	**rw**	Counter reference value 1	0–65535	**75**	0	
P3.30	1417	✓	**rw**	Counter reference value 2	0–65535	**75**	0	
P3.31	1418	✓	**rw**	DI1 logic (control signal terminal 8)	**0** = N/O **1** = N/C	**75**	0	
P3.32	1419	✓	**rw**	DI2 logic (control signal terminal 9)	Like P3.31	**75**	0	
P3.33	1420	✓	**rw**	DI3 logic (control signal terminal 10)	Like P3.31	**76**	0	
P3.34	1421	✓	**rw**	DI4 logic (control signal terminal 14)	Like P3.31	**76**	0	
P3.35	1422	✓	**rw**	DI5 logic (control signal terminal 15)	Like P3.31	**76**	0	
P3.36	1423	✓	**rw**	DI6 logic (control signal terminal 16)	Like P3.31	**76**	0	
P3.37	1480	✓	**rw**	Manual mode	Like P3.2	**76**	0	

Analog Output

PNU	ID	Access RUN	ro/rw	Designation	Value Range	Page	FS (P1.3)	User Setting
P4.1	307	✓	**rw**	AO signal (Analog Output)	**0** = Deactivated **1** = Output frequency (Hz) **2** = Output current (A) **3** = Torque (%) **4** = PID controller (%)	**77**	1	
P4.2	310	✓	**rw**	AO, minimum value	**0** = 0V **1** = 2V (live-zero)	**77**	1	
P4.3	1456	✓	**rw**	AO, gain	0.00–200.00%	**77**	100.00	
P4.4	1477	✓	**rw**	AO, filter time	0.00–10.00s	**77**	0.0	

Digital Output

PNU	ID	Access RUN	ro/rw	Designation	Value Range	Page	FS (P1.3)	User Setting
P5.1	313	✓	rw	RO1 Signal (Relay 1 Output)	**0** = Deactivated **1** = READY **2** = RUN **3** = FAULT **4** = Error message (inverted) **5** = ALARM **6** = REV **7** = Output frequency **8** = Motor controller active **9** = Zero frequency **10** = Frequency monitoring 1 **11** = Frequency monitoring 2 **12** = PID monitoring **13** = Overtemperature signal **14** = Overcurrent control active **15** = Overvoltage control active **16** = PLC Sequence control active **17** = PLC sequence control, single step completed **18** = PLC sequence control, program cycle completed **19** = PLC sequence control, pause **20** = Counter, value 1 reached **21** = Counter, value 2 reached **22** = RUN message active **23** = Analog min reference error **24** = LOG function fulfilled **25** = PID controller, actual value monitoring **26** = External brake actuated **27** = Current monitoring **28** = Fieldbus, remote output	78	2	
P5.2	314	✓	rw	RO2 signal (relay output 2)	Like P5.1	79	3	
P5.3	312	✓	rw	DO Signal (Digital Output)	Like P5.1	79	1	
P5.4	315	✓	rw	Frequency monitoring 1	**0** = Deactivated **1** = 0.00–P5.5 Hz **2** = P5.5–P6.4 Hz	79	0	
P5.5	316	✓	rw	Frequency monitoring 1 reference value	0.00–P6.4 Hz	80	0.00	
P5.6	346	✓	rw	Frequency monitoring 2	**0** = Deactivated **1** = 0.00–P5.7 Hz **2** = P5.7–P6.4 Hz	80	0	
P5.7	347	✓	rw	Frequency monitoring 2 reference value	0.00–P6.4 Hz	80	0.00	
P5.8	1457	✓	rw	Current monitoring	0.00–P7.2A	81	0.00	

Digital Output, continued

PNU	ID	Access RUN	ro/rw	Designation	Value Range	Page	FS (P1.3)	User Setting
P5.9	1458	✓	**rw**	DO logic (control signal terminal 13)	**0** = N/O **1** = N/C	**81**	0	
P5.10	1331	✓	**rw**	RO1 logic (control signal terminals 22, 23)	Like P5.9	**81**	0	
P5.11	1332	✓	**rw**	RO2 logic (control signal terminal 24, 25, 26)	Like P5.9	**81**	0	
P5.12	1459	✓	**rw**	DO, on delay	0.00–320.00s	**81**	0.00	
P5.13	1460	✓	**rw**	DO, off-delay	0.00–320.00s	**81**	0.00	
P5.14	1461	✓	**rw**	RO1, on delay	0.00–320.00s	**81**	0.00	
P5.15	1424	✓	**rw**	RO1, off-delay	0.00–320.00s	**81**	0.00	
P5.16	1425	✓	**rw**	RO2, on delay	0.00–320.00s	**81**	0.00	
P5.17	1426	✓	**rw**	RO2, off-delay	0.00–320.00s	**81**	0.00	

Drives Control

PNU	ID	Access RUN	ro/rw	Designation	Value Range	Page	FS (P1.3)	User Setting
P6.1	125	✓	**rw**	Primary remote control source	**1** = Control signal terminals (I/O) **2** = Operating unit (KEYPAD) **3** = Fieldbus (BUS)	**82**	1	
P6.2	117	✓	**rw**	Primary remote speed reference	**0** = Fixed frequency (FF0) **1** = Operating unit (REF) **2** = Fieldbus (BUS) **3** = AI1 **4** = AI2 **5** = Motor potentiometer	**82**	3	
P6.3	101	X	**rw**	Minimum frequency	0.00–P6.4 Hz	**83**	0.00	
P6.4	102	X	**rw**	Maximum frequency	P6.3–320.00 Hz	**83**	60.00	
P6.5	103	X	**rw**	Primary acceleration time (acc1)	0.1–3000s	**83**	3.0	
P6.6	104	X	**rw**	Primary deceleration time (dec1)	0.1–3000s	**83**	3.0	
P6.7	505	X	**rw**	Start function	**0** = Ramp, acceleration **1** = Flying restart circuit	**84**	0	
P6.8	506	X	**rw**	Stop function	**0** = Free coasting **1** = Ramp, deceleration	**84**	0	
P6.9	500	X	**rw**	S ramp	0.00 = Linear 0.1–10.0s (S-shaped)	**84**	0.0	
P6.10	717	X	**rw**	REAF, Wait time before an automatic restart	0.10–10.00s	**85**	0.50	
P6.11	718	X	**rw**	REAF, Testing period over three automatic restarts	0.00–60.00s	**85**	30.00	
P6.12	719	X	**rw**	REAF, Start function with automatic restart	**0** = Ramp, acceleration **1** = Flying restart circuit **2** = According to P6.7	**85**	0	

Drives Control, continued

PNU	ID	Access RUN	ro/rw	Designation	Value Range	Page	FS (P1.3)	User Setting
P6.13	731	X	rw	REAF, automatic restart after an error message	**0** = Deactivated **1** = Activated	**85**	0	
P6.14	1600	X	rw	Stop on direction change via the arrow buttons (</>) of the keypad (KEYPAD)	**0** = Deactivated **1** = Activated	**85**	1	
P6.15	184	X	rw	Keypad frequency reference (REF)	−P6.4 – +P6.4 Hz	**86**	0.00	
P6.16	1474	X	rw	Stop button active	**0** = Deactivated (no) **1** = Activated (yes)	**86**	1	
P6.17	1427	X	rw	Secondary remote control source	**1** = Control signal terminals (I/0) **2** = Control unit (KEYPAD) **3** = Fieldbus (BUS)	**86**	3	
P6.18	1428	X	rw	Secondary remote speed reference	**0** = Fixed frequency (FF0) **1** = Operating unit (REF) **2** = Fieldbus (BUS) **3** = AI1 **4** = AI2 **5** = Motor potentiometer	**86**	2	
P6.19	502	X	rw	Secondary acceleration time (acc2)	0.1–3000s	**86**	10.0	
P6.20	503	X	rw	Secondary deceleration time (dec2)	0.1–3000s	**86**	10.0	
P6.21	526	X	rw	Acceleration transition frequency (acc1–acc2)	0.00–P6.4 Hz	**86**	0.00	
P6.22	1334	X	rw	Deceleration transition frequency (dec1–dec2)	0.00–P6.4 Hz	**86**	0.00	
P6.23	1429	X	rw	REV blocked	**0** = Deactivated **1** = Activated	**86**	0	
P6.24	509	X	rw	Skip frequency 1, lower value	0.00–P6.25	**87**	0.00	
P6.25	510	X	rw	Skip frequency 1, upper value	P6.24–P6.4 Hz	**87**	0.00	
P6.26	511	X	rw	Skip frequency 2, lower value	0.00–P6.27	**87**	0.00	
P6.27	731	X	rw	Skip frequency 2, upper value	P6.26–P6.4 Hz	**87**	0.00	
P6.28	513	X	rw	Skip frequency 3, lower value	0.00–P6.29	**87**	0.00	
P6.29	514	X	rw	Skip frequency 3, upper value	P6.28–P6.4 Hz	**87**	0.00	
P6.30	759	X	rw	Automatic REAF attempts	1–10	**87**	3	
P6.31	1481	X	rw	Manual mode, primary control source	**1** = Control signal terminals (I/0) **2** = Control unit (KEYPAD) **3** = Fieldbus (BUS)	**87**	1	
P6.32	1482	X	rw	Manual mode, primary speed reference	**0** = Fixed frequency (FF0) **1** = Operating unit (REF) **2** = Fieldbus (BUS) **3** = AI1 **4** = AI2 **5** = Motor potentiometer	**87**	3	
P6.33	1483	X	rw	Manual mode, KEYPAD lock	**0** = Deactivated **1** = Activated	**87**	1	

Motor

PNU	ID	Access RUN	ro/rw	Designation	Value Range	Page	FS (P1.3)	User Setting
P7.1	113	X	**rw**	Motor, rated operational current	$0.2 \times I_e$–$2 \times I_e$ (see motor rating plate)	**89**	I_e	
P7.2	107	X	**rw**	Current limit	$0.2 \times I_e$–$2 \times I_e$	**89**	$1.5 \times I_e$	
P7.3	112	X	**rw**	Motor, rated speed	300–$20000 \, min^{-1}$ (see motor rating plate)	**89**	1720	
P7.4	120	X	**rw**	Motor, power factor (cos φ)	0.30–1.00 (see motor rating plate)	**89**	0.85	
P7.5	110	X	**rw**	Motor, rated operating voltage	180–500V (see motor rating plate)	**89**	①	
P7.6	111	X	**rw**	Motor, rated frequency	30–320 Hz (see motor rating plate)	**89**	60.00	

Protective Functions

PNU	ID	Access RUN	ro/rw	Designation	Value Range	Page	FS (P1.3)	User Setting
P8.1	700	X	**rw**	Analog minimum reference error (live-zero)	**0** = Deactivated **1** = Alarm **2** = Fault, stop according to P6.8	**90**	1	
P8.2	727	X	**rw**	Undervoltage error	Like P8.1	**90**	2	
P8.3	703	X	**rw**	Ground fault	Like P8.1	**90**	2	
P8.4	709	X	**rw**	Stall protection	Like P8.1	**91**	1	
P8.5	713	X	**rw**	Underload protection	Like P8.1	**91**	0	
P8.6	704	X	**rw**	Motor, temperature protection	Like P8.1	**91**	2	
P8.7	705	X	**rw**	Motor, ambient temperature	−20° to 100°C	**91**	40	
P8.8	706	X	**rw**	Motor, cooling factor at zero frequency	0.0–150%	**91**	40	
P8.9	707	X	**rw**	Motor, thermal time constant	1–200 min	**91**	45	
P8.10	1430	X	**rw**	Analog minimum reference error, reaction time	0.0–10.0s	**93**	0.5	
P8.11	1473	X	—	(Not used)	—	—	—	
P8.12	714	X	**rw**	Underload low torque limit	10.0–150%	**93**	60.0	
P8.13	715	X	**rw**	Underload, low torque limit at zero frequency	10.0–150%	**93**	10.0	
P8.14	733	X	**rw**	Fieldbus error	Like P8.1	**94**	2	
P8.15	734	X	**rw**	Fieldbus interface error	Like P8.1	**94**	2	

Note
① Factory settings dependent on specific drive selected.

PID Controller

PNU	ID	Access RUN	ro/rw	Designation	Value Range	Page	FS (P1.3)	User Setting
P9.1	163	✓	**rw**	PID controller	**0** = Deactivated **1** = Activated for drive control **2** = Activated for external application	**95**	0	
P9.2	118	✓	**rw**	PID controllers, P gain	0.0–1000.0%	**95**	100.0	
P9.3	119	✓	**rw**	PID controller, I reset time	0.00–320.00s	**95**	10.00	
P9.4	167	✓	**rw**	PID controller setpoint, keypad reference	0.0–100.0%	**95**	0.0	
P9.5	332	✓	**rw**	PID controller, setpoint source	**0** = Keypad unit (P9.4) **1** = Fieldbus **2** = AI1 **3** = AI2	**95**	0	
P9.6	334	✓	**rw**	PID controller, process variable (PV) source (Actual value or feedback)	**0** = Fieldbus **1** = AI1 **2** = AI2	**96**	2	
P9.7	336	✓	**rw**	PID controller, actual value limiting, minimum	0.0–100.0%	**96**	0.0	
P9.8	337	✓	**rw**	PID controller, actual value limiting, maximum	0.0–100.0%	**96**	100.0	
P9.9	340	✓	**rw**	PID controller, controller deviation	**0** = Not inverted **1** = Inverted	**96**	0	
P9.10	132	✓	**rw**	PID controller, D rate time	0.00–10.0s	**96**	0.00	
P9.11	1431	✓	**rw**	PID controller, output filter, delay time	0.00–10.0s	**96**	0.0	
P9.12	1016	✓	**rw**	Sleep mode, frequency	0.00–P6.4 Hz	**96**	0.00	
P9.13	1018	✓	**rw**	Sleep mode, wake up setpoint	0.0–100.0%	**96**	25.0	
P9.14	1017	✓	**rw**	Sleep mode, delay time	0–3600s	**96**	30	
P9.15	1433	✓	**rw**	Hysteresis, upper limit	0.0–100.0%	**97**	0.0	
P9.16	1434	✓	**rw**	Hysteresis, lower limit	0.0–100.0%	**97**	0.0	
P9.17	1435	✓	**rw**	PID controller, max. controller deviation	0.0–100.0%	**97**	3.0	
P9.18	1475	✓	**rw**	PID controller, reference value scaling	0.1–32.7	**97**	1.0	
P9.19	1476	✓	**rw**	PID controller, process value scaling	0.1–32.7	**97**	1.0	
P9.20	1478	✓	**rw**	PID controller, output signal limit	0.00–100.0%	**97**	100.0	

Fixed Frequencies

PNU	ID	Access RUN	ro/rw	Designation	Value Range	Page	FS (P1.3)	User Setting
P10.1	124	✓	**rw**	Fixed frequency FF0	0.00–P6.4 Hz	**101**	6.00	
P10.2	105	✓	**rw**	Fixed frequency FF1	0.00–P6.4 Hz	**101**	12.00	
P10.3	106	✓	**rw**	Fixed frequency FF2	0.00–P6.4 Hz	**101**	18.00	
P10.4	126	✓	**rw**	Fixed frequency FF3	0.00–P6.4 Hz	**101**	24.00	
P10.5	127	✓	**rw**	Fixed frequency FF4	0.00–P6.4 Hz	**101**	30.00	
P10.6	128	✓	**rw**	Fixed frequency FF5	0.00–P6.4 Hz	**101**	36.00	
P10.7	129	✓	**rw**	Fixed frequency FF6	0.00–P6.4 Hz	**101**	48.00	
P10.8	130	✓	**rw**	Fixed frequency FF7	0.00–P6.4 Hz	**101**	60.00	
P10.9	1436	✓	**rw**	PLC Sequence control, operating mode	**0** = Deactivated **1** = Program cycle, execute once **2** = Execute program cycle continuously **3** = Execute program cycle in steps **4** = Execute program cycle continuously in steps	**102**	0	
P10.10	1437	✓	**rw**	PLC Sequence control, program (FWD/REV)	0–255	**102**	0	
P10.11	1438	✓	**rw**	Set time for FF0	0–10000s	**103**	0	
P10.12	1439	✓	**rw**	Set time for FF1	0–10000s	**103**	0	
P10.13	1440	✓	**rw**	Set time for FF2	0–10000s	**103**	0	
P10.14	1441	✓	**rw**	Set time for FF3	0–10000s	**103**	0	
P10.15	1442	✓	**rw**	Set time for FF4	0–10000s	**103**	0	
P10.16	1443	✓	**rw**	Set time for FF5	0–10000s	**103**	0	
P10.17	1444	✓	**rw**	Set time for FF6	0–10000s	**103**	0	
P10.18	1445	✓	**rw**	Set time for FF7	0–10000s	**103**	0	

V/Hz-Characteristic Curve

PNU	ID	Access RUN	ro/rw	Designation	Value Range	Page	FS (P1.3)	User Setting
P11.1	108	X	**rw**	V/Hz characteristic curve	**0** = Linear **1** = Squared **2** = Configurable	**107**	0	
P11.2	602	X	**rw**	Cut-off frequency	30.00–320.00 Hz	**108**	60.00	
P11.3	603	X	**rw**	Output voltage	10.00–200.00% of the motor rated voltage (P6.5)	**108**	100.00	
P11.4	604	X	**rw**	V/Hz characteristic curve, mean frequency value	0.00–P11.2 Hz	**109**	60.00	
P11.5	605	X	**rw**	V/Hz characteristic curve, mean voltage value	0.00–P11.3%	**109**	100.00	
P11.6	606	X	**rw**	Output voltage at 0 Hz	0.00–40.00%	**109**	0.00	
P11.7	109	X	**rw**	Torque increase	**0** = Deactivated **1** = Enabled	**109**	0	
P11.8	600	X	**rw**	Control mode	**0** = Frequency control (V/Hz) **1** = Speed control with slip compensation	**109**	0	
P11.9	601	X	**rw**	Carrier frequency	1.5–16.0 kHz	**111**	6.0	
P11.10	522	X	**rw**	Sine-wave filter (constant carrier frequency)	**0** = Deactivated **1** = Enabled	**111**	0	

Braking

PNU	ID	Access RUN	ro/rw	Designation	Value Range	Page	FS (P1.3)	User Setting
P12.1	507	X	**rw**	DC braking, current	$0.2 \times I_e$–$2 \times I_e$	**112**	I_e	
P12.2	516	X	**rw**	DC braking, braking time at start	0.00–600.00s	**112**	0.00	
P12.3	515	X	**rw**	DC braking, start frequency	0.00–10.00 Hz	**113**	1.50	
P12.4	508	X	**rw**	DC braking, braking time at STOP	0.00–600.00s	**114**	0.00	
P12.5	504	X	**rw**	Brake chopper	(Only active and visible with braking transistor installed) **0** = Deactivated **1** = Automatic activation in operation (RUN) **2** = Automatic activation in operation (RUN) and upon stop (STOP)	**116**	0	
P12.6	1447	X	**rw**	Brake chopper, DC bus switching threshold	(Only active and visible with braking transistor installed) 0–870V	**116**	0	
P12.7	1448	X	**rw**	External brake, delay time opening	0.00–320.00s	**117**	0.20	
P12.8	1449	X	**rw**	External brake, frequency threshold opening	0.00–P6.4 Hz	**117**	1.50	
P12.9	1450	X	**rw**	External brake, frequency threshold closing	0.00–P6.4 Hz	**117**	1.00	
P12.10	1451	X	**rw**	External brake, frequency threshold REV closing	0.00–P6.4 Hz	**117**	1.50	
P12.11	1452	X	**rw**	External brake, current limit opening	0.00–P7.2 A	**117**	0.00	

Logic Function

PNU	ID	Access RUN	ro/rw	Designation	Value Range	Page	FS (P1.3)	User Setting
P13.1	1453	X	**rw**	LOG function, Selection input A	**0** = Deactivated **1** = READY **2** = RUN **3** = FAULT **4** = Error message (inverted) **5** = ALARM **6** = REV **7** = Output frequency = frequency setpoint **8** = Motor controller active **9** = Zero frequency **10** = Frequency monitoring 1 **11** = Frequency monitoring 2 **12** = PID monitoring **13** = Overtemperature signal **14** = Overcurrent control active **15** = Overvoltage control active **16** = PLC sequence control active **17** = PLC sequence control, single step completed **18** = PLC sequence control, program cycle completed **19** = PLC Sequence control, pause **20** = Counter, value 1 reached **21** = Counter, value 2 reached **22** = RUN message active **23** = Analog min. reference error **24** = LOG function fulfilled **25** = PID controller, actual value monitoring **26** = External brake actuated **27** = Current monitoring **28** = Fieldbus, remote output	**119**	0	
P13.2	1454	X	**rw**	LOG function, Selection input B	Like P13.1	**120**	0	
P13.3	1455	X	**rw**	LOG function, select operation	**0** = A AND B **1** = A OR B **2** = A XOR B	**120**	0	

Second Parameter Set

PNU	ID	Access RUN	ro/rw	Designation	Value Range	Page	FS (P1.3)	User Setting
P14.1	1347	X	**rw**	Motor rated current (2PS)	$0.2 \times I_e$–$2 \times I_e$ (see motor rating plate)	**121**	I_e	
P14.2	1352	X	**rw**	Current limit (2PS)	$0.2 \times I_e$–$2 \times I_e$	**121**	$1.5 \times I_e$	
P14.3	1350	X	**rw**	Motor rated speed (2PS)	$300 \ldots 20000 \ min^{-1}$ (see motor rating plate)	**121**	①	
P14.4	1351	X	**rw**	Motor power factor (cos φ) (2PS)	0.30–1.00 (see motor rating plate)	**121**	①	
P14.5	1348	X	**rw**	Motor rated operating voltage (2PS)	180–500V (see motor rating plate)	**121**	①	
P14.6	1349	X	**rw**	Motor nominal frequency (2PS)	30–320 Hz (see motor rating plate)	**121**	60.00	
P14.7	1343	X	**rw**	Minimum frequency (2PS)	0.00–P14.8 Hz	**121**	0.00	
P14.8	1344	X	**rw**	Maximum frequency (2PS)	P14.7–320.00 Hz	**121**	60.00	
P14.9	1345	X	**rw**	Acceleration time (2PS) (acc3)	0.1–3000s	**121**	3.0	
P14.10	1346	X	**rw**	Deceleration time (2PS) (dec3)	0.1–3000s	**121**	3.0	
P14.11	1355	X	**rw**	V/Hz characteristic curve (2PS)	**0** = Linear **1** = Squared **2** = Configurable	**122**	0	
P14.12	1354	X	**rw**	Torque increase (2PS)	**0** = Deactivated **1** = Activated	**122**	0	
P14.13	1353	X	**rw**	Motor temperature protection (2PS)	**0** = Deactivated **1** = Alarm **2** = Fault, stop according to P6.8	**122**	0	
P14.14	1469	X	**rw**	Motor ambient temperature (2PS)	−20° to 100°C	**122**	40	
P14.15	1470	X	**rw**	Motor cooling factor at zero frequency (2PS)	0.0–150%	**122**	40.0	
P14.16	1471	X	**rw**	Motor thermal time constant (2PS)	1–200 min	**122**	45	

Note

① Factory settings dependent on specific drive selected.

System Parameters

PNU	ID	Access RUN	ro/rw	Designation	Value Range	Page	FS (P1.3)	User Setting
Hard- and Software Information								
S1.1	833	X	**ro**	API SW ID	—	**125**	0	
S1.2	834	X	**ro**	API SW Version	—	**125**	0	
S1.3	835	X	**ro**	Power SW ID	—	**125**	0	
S1.4	836	X	**ro**	Power SW Version	—	**125**	0	
S1.5	837	X	**ro**	Application ID	—	**125**	0	
S1.6	838	X	**ro**	Application revision	—	**125**	0	
S1.7	839	X	**ro**	System load	%	**125**	0	
Communication								
S2.1 ①	808	X	**ro**	Communication status	In xx.yyy format **xx** = Number of error messages (0–64) **yyy** = number of correct messages (0–999)	**125**		
S2.2 ①	809	✓	**rw**	Fieldbus protocol	**0** = FB disabled **1** = Modbus RTU	**125**	0	
S2.3 ①	810	✓	**rw**	Slave address	1–255	**125**	1	
S2.4 ①	811	✓	**rw**	Baud rate	**0** = 300 **1** = 600 **2** = 1200 **3** = 2400 **4** = 4800 **5** = 9600 **6** = 19200 **7** = 38400 **8** = 57600	**125**	5	
S2.6	813	✓	**rw**	Parity type	**0** = None, no, see 2 stop bits **1** = Even, see 1 stop bit **2** = Odd, see 1 stop bit	**126**	0	
S2.7	814	✓	**rw**	Communication timeout	**0** = Not used **1** = 1s **2** = 2s …255 = up to 255s	**126**	0	
S2.8	815	✓	**rw**	Reset communication status	**0** = Not used **1** = Resets parameter S2.1	**126**	0	

Note

① These parameters are overwritten with the bus-specific parameters when a fieldbus connection (for example, CANopen) is used. The parameter values described in the manual of the fieldbus interface then apply.

System Parameters, continued

PNU	ID	Access RUN	ro/rw	Designation	Value Range	Page	FS (P1.3)	User Setting
Unit Counter								
S3.1	827	X	**ro**	MWh counter	MWh	**126**	—	
S3.2	828	X	**ro**	Operating days (d)	0–0000 days	**126**	—	
S3.3	829	X	**ro**	Operating hours (h)	0–24 h	**126**	—	
S3.4	840	X	**ro**	RUN counter, days	0–0000 days	**126**	—	
S3.5	841	X	**ro**	RUN counter, hours	0–24 h	**126**	—	
S3.6	842	X	**ro**	Fault/alarm counter	Trip counter: 0–0000	**126**	—	
User Set								
S4.1	830	✓	**rw**	Display contrast	0–15	**126**	7	
S4.2	831	X	**rw**	Restore factory defaults	**0** = Factory setting or changed value **1** = Restores factory settings for all parameters	**126**	0	
S4.3	832	✓	**ro**	Password	0000–9999	**126**	0000	

Parameters marked with "M" (Monitor) are values currently being measured, variables calculated from these measured values, or status values from control signals.

The M parameters cannot be edited (only display values).

Parameter Values Currently Being Measured

PNU	ID	Access RUN	ro/rw	Designation	Value Range	Page	FS (P1.3)	User Setting
Display Values								
M1.1	1	**ro**		Output frequency	Hz	**127**	0.00	
M1.2	25	**ro**		Frequency reference value	Hz	**127**	0.00	
M1.3	2	**ro**		Motor shaft speed	RPM (calculated value, RPM)	**127**	0	
M1.4	3	**ro**		Motor current	A	**127**	0.00	
M1.5	4	**ro**		Motor torque	% (calculated value)	**127**	0.0	
M1.6	5	**ro**		Motor power	% (calculated value)	**127**	0.0	
M1.7	6	**ro**		Motor voltage	V	**127**	0.0	
M1.8	7	**ro**		DC bus voltage	V	**127**	0.0	
M1.9	8	**ro**		Unit temperature	°F (°C)	**127**	0	
M1.10	9	**ro**		Motor temperature	% (calculated value)	**127**	0	
M1.11	13	**ro**		Analog input 1	%	**127**	0.0	
M1.12	14	**ro**		Analog input 2	%	**127**	0.0	
M1.13	26	**ro**		Analog output 1	%	**127**	0.0	
M1.14	15	**ro**		Digital input	DI1, DI2, DI3 status	**127**	0	
M1.15	16	**ro**		Digital input	DI4, DI5, DI6 status	**128**	0	
M1.16	17	**ro**		Digital output	RO1, RO2, DO status	**128**	1	
M1.17	20	**ro**		PID reference value	%	**128**	0.0	
M1.18	21	**ro**		PID feedback	%	**128**	0.0	
M1.19	22	**ro**		PID error value	%	**128**	0.0	
M1.20	23	**ro**		PID output	%	**128**	0.0	
M1.21	1480	**ro**		Counter, digital input	—	**128**	0	

Default Parameter Set

Index	ID	VariableText	Min	Max	Unit	Value	Default
		Menu					
		Application Menu					
		Application Monitoring Values					
M 1.1	1	Output frequency	N/A	N/A	Hz	0.00	0.00
M 1.2	25	Frequency setpoint value	N/A	N/A	Hz	60.00	0.00
M 1.3	2	Motor shaft speed	N/A	N/A	rpm	0	0
M 1.4	3	Motor current	N/A	N/A	A	0.00	0.00
M 1.5	4	Motor torque	N/A	N/A	%	0.0	0.0
M 1.6	5	Motor rating	N/A	N/A	%	0.0	0.0
M 1.7	6	Motor voltage	N/A	N/A	V	0.0	0.0
M 1.8	7	Intermediate DC voltage circuit	N/A	N/A	V	339	0
M 1.9	8	Unit temperature	N/A	N/A	C	36	0
M 1.10	9	Motor temperature	N/A	N/A	%	0	0
M 1.11	13	Analog input AI1	N/A	N/A	%	100.0	0.0
M 1.12	14	Analog input AI2	N/A	N/A	%	39.7	0.0
M 1.13	26	Analog output AO	N/A	N/A	%	0.0	0.0
M 1.14	15	Digital input DI1, DI2, DI3	N/A	N/A		0	0
M 1.15	16	Digital input DI4, DI5, DI6	N/A	N/A		1	0
M 1.16	17	Digital output RO1, RO2, DO	N/A	N/A		10	0
M 1.17	20	PID setpoint value	N/A	N/A	%	0.0	0.0
M 1.18	21	PID feedback	N/A	N/A	%	39.7	0.0
M 1.19	22	PID error value	N/A	N/A	%	-39.7	0.0
M 1.20	23	PID output	N/A	N/A	%	0.0	0.0
M 1.21	1479	Counter, digital input	N/A	N/A		0	0
		Application Parameters					
1		Parameter Selection					
P 1.1	115	Quick Start Parameters	0	1		0	1
P 1.2	540	Application	0	3		0	0
P 1.3	1472	Country Specific Default Settings (FS)	0	1		1	0
2		Analog Input					
P 2.1	379	AI1, Signal range	0	1		0	0
P 2.2	380	AI1, minimum value	-100.00	100.00	%	0.00	0.00
P 2.3	381	AI1, maximum value	-100.00	100.00	%	100.00	100.00
P 2.4	378	AI1, filter time constant	0.0	10.0	s	0.1	0.1
P 2.5	390	AI2, Signal range	0	1		1	1
P 2.6	391	AI2, minimum value	-100.00	100.00	%	0.00	0.00
P 2.7	392	AI2, maximum value	-100.00	100.00	%	100.00	100.00
P 2.8	389	AI2, filter time constant	0.0	10.0	s	0.1	0.1
3		Digital Input					
P 3.1	300	Start/stop logic	0	3		0	3
P 3.2	403	Start signal / FWD (1)	0	6		1	1
P 3.3	404	Start REV / Stop Signal (1)	0	6		2	2
P 3.4	412	Reversing (change of direction of the field of rotation)	0	6		0	0
P 3.5	405	Ext. fault close (N/O)	0	6		6	0
P 3.6	406	Ext. fault open (N/C)	0	6		0	0

Index	ID	Value	VariableText	Min	Max	Unit	Default
P 3.7	414	5	Fault reset	0	6		5
P 3.8	407	3	Run enable	0	6		0
P 3.9	419	0	Fixed frequency, binary value B0	0	6		3
P 3.10	420	4	Fixed frequency, binary value B1	0	6		4
P 3.11	421	5	Fixed frequency, binary value B2	0	6		0
P 3.12	1020	0	PID controller deactivate	0	6		6
P 3.13	1400	0	Thermistor input (currently deactivated)	0	6		0
P 3.14	1401	0	External brake, feedback signal (N/O)	0	6		0
P 3.15	1402	0	Change acceleration / deceleration time (acc 2 / dec 2)	0	6		0
P 3.16	1403	0	Stop acceleration/deceleration time	0	6		0
P 3.17	1404	0	Block parameter access	0	6		0
P 3.18	1405	0	Motor potentiometer, increase value	0	6		0
P 3.19	1406	0	Motor potentiometer, decrease value	0	6		0
P 3.20	1407	0	Motor potentiometer, set value to zero	0	6		0
P 3.21	1408	0	PLC program start	0	6		0
P 3.22	1409	0	PLC program pause	0	6		0
P 3.23	1410	0	Counter, input signal	0	6		0
P 3.24	1411	0	Counter, reset	0	6		0
P 3.25	1412	0	Activate secondary remote control source	0	6		0
P 3.26	1413	0	Activate secondary remote speed reference	0	6		0
P 3.27	1414	0	Activate second parameter set (2PS)	0	6		0
P 3.28	1415	0	Field bus, remote input	0	6		0
P 3.29	1416	0	Counter reference value 1	0	65535		0
P 3.30	1417	0	Counter reference value 2	0	65535		0
P 3.31	1418	0	DI1 Logic	0	1		0
P 3.32	1419	0	DI2 Logic	0	1		0
P 3.33	1420	0	DI3 Logic	0	1		0
P 3.34	1421	0	DI4 Logic	0	1		0
P 3.35	1422	0	DI5 Logic	0	1		0
P 3.36	1423	0	DI6 Logic	0	1		0
P 3.37	1480	0	Manual mode	0	6		0
4			Analog Output				
P 4.1	307	1	AO Signal (Analog Output)	0	4		1
P 4.2	310	0	AO, minimum value	0	1		0
P 4.3	1456	100.00	AO, gain	0.00	200.00	%	100.00
P 4.4	1477	0.10	AO, filter time	0.01	10.00	s	0.10
5			Digital Output				
P 5.1	313	2	RO1 Signal	0	28		2
P 5.2	314	3	RO2 Signal	0	28		3
P 5.3	312	1	DO1 Signal	0	28		1
P 5.4	315	0	Frequency monitoring 1	0	2		0
P 5.5	316	0.00	Frequency monitoring 1, reference value	0.00	60.00	Hz	0.00

Index	ID	VariableText	Min	Max	Unit	Default	Value
P 5.6	346	Frequency monitoring 2	0	2		0	0
P 5.7	347	Frequency monitoring 2, reference value	0.00	60.00	Hz	0.00	0.00
P 5.8	1457	Current monitoring, setpoint value	0.00	3.40	A	0.00	0.00
P 5.9	1458	DO Logic	0	1		0	0
P 5.10	1331	RO1 Logic	0	1		0	0
P 5.11	1332	RO2 Logic	0	1		0	0
P 5.12	1459	DO, on delay	0.00	320.00	s	0.00	0.00
P 5.13	1460	DO, off delay	0.00	320.00	s	0.00	0.00
P 5.14	1461	RO1, on delay	0.00	320.00	s	0.00	0.00
P 5.15	1424	RO1, off delay	0.00	320.00	s	0.00	0.00
P 5.16	1425	RO2, on delay	0.00	320.00	s	0.00	0.00
P 5.17	1426	RO2, off delay	0.00	320.00	s	0.00	0.00
6		Drive Control					
P 6.1	125	Primary remote control source	1	3		1	1
P 6.2	117	Primary remote speed reference	0	5		3	3
P 6.3	101	Minimum frequency	0.00	60.00	Hz	0.00	0.00
P 6.4	102	Maximum frequency	0.00	320.00	Hz	50.00	60.00
P 6.5	103	Primary acceleration time (acc1)	0.1	3000.0	s	3.0	3.0
P 6.6	104	Primary deceleration time (dec1)	0.1	3000.0	s	3.0	3.0
P 6.7	505	Start function	0	1		0	0
P 6.8	506	Stop function	0	1		0	0
P 6.9	500	S ramp	0.0	10.0		0.0	0.0
P 6.10	717	REAF, Wait time before an automatic restart	0.10	10.00	s	0.50	0.50
P 6.11	718	REAF, Test time before an automatic restart	0.00	60.00	s	30.00	30.00
P 6.12	719	REAF, Start function with automatic restart	0	2		0	0
P 6.13	731	REAF, automatic restart after an error message	0	1		0	0
P 6.14	1600	Stop on rotation direction change (KEYPAD)	0	1		1	1
P 6.15	184	Keypad frequency (REF)	-60.00	60.00	Hz	0.00	0.00
P 6.16	1474	STOP button active	0	1		1	1
P 6.17	1427	Secondary remote control source	1	3		3	3
P 6.18	1428	Secondary remote speed reference	0	5		2	2
P 6.19	502	Secondary acceleration time (acc2)	0.1	3000.0	s	10.0	10.0
P 6.20	503	Secondary deceleration time (dec2)	0.1	3000.0	s	10.0	10.0
P 6.21	526	Acceleration transition frequency (acc1 - acc2)	0.00	60.00	Hz	0.00	0.00
P 6.22	1334	Deceleration transition frequency (dec1 - dec2)	0.00	60.00	Hz	0.00	0.00
P 6.23	1429	REV blocked	0	1		0	0
P 6.24	509	Skip Frequency 1, lower value	0.00	60.00	Hz	0.00	0.00
P 6.25	510	Skip frequency 1, upper value	0.00	60.00	Hz	0.00	0.00
P 6.26	511	Skip Frequency 2, lower value	0.00	60.00	Hz	0.00	0.00
P 6.27	512	Skip frequency 2, upper value	0.00	60.00	Hz	0.00	0.00
P 6.28	513	Skip Frequency 3, lower value	0.00	60.00	Hz	0.00	0.00
P 6.29	514	Skip frequency 3, upper value	0.00	60.00	Hz	0.00	0.00

Index	ID	Value	VariableText	Min	Max	Unit	Default
P 6.30	759	3	Automatic REAF attempts	1	10		3
P 6.31	1481	1	Manual mode, primary control source	1	3		1
P 6.32	1482	3	Manual mode, primary speed reference	0	5		3
P 6.33	1483	1	Manual mode, KEYPAD lock	0	1		1
7			**Motor**				
P 7.1	113	1.70	Motor, rated current	0.34	3.40	A	0.00
P 7.2	107	2.55	Current limit	0.34	3.40	A	0.00
P 7.3	112	1720	Motor, rated speed	300	20000	rpm	1440
P 7.4	120	0.85	Motor, power factor (cos φ)	0.30	1.00		0.85
P 7.5	110	230	Motor, rated operating voltage	180	500	V	0
P 7.6	111	60.00	Motor, rated frequency	30.00	320.00	Hz	0.00
8			**Protective Functions**				
P 8.1	700	1	Analog minimum reference error (live zero)	0	2		1
P 8.3	703	2	Ground fault	0	2		2
P 8.4	709	1	Stall protection	0	2		1
P 8.5	713	0	Underload protection	0	2		0
P 8.6	704	2	Motor, temperature protection	0	2		2
P 8.7	705	40	Motor, ambient temperature	-20	100	C	40
P 8.8	706	40.0	Motor, cooling factor at zero frequency	0.0	150.0	%	40.0
P 8.9	707	45	Motor, thermal time constant	1	200	M	45
P 8.10	1430	0.5	Analog minimum reference error	0.0	10.0	s	0.5
P 8.11	1473	0	Not Used	0	0		0
P 8.12	714	50.0	Underload low torque limit at zero frequency	10.0	150.0	%	50.0
P 8.13	715	10.0	Underload, low torque limit	5.0	150.0	%	10.0
P 8.14	733	2	Fieldbus error	0	2		2
P 8.15	734	2	Fieldbus interface error	0	2		2
9			**PI Controller**				
P 9.1	163	0	PID Controller	0	2		0
P 9.2	118	100.0	PID controllers, P gain	0.0	1000.0	%	100.0
P 9.3	119	10.00	PID controller, I reset time	0.00	320.00	s	10.00
P 9.4	167	0.0	PID controller, keypad reference	0.0	100.0	%	0.0
P 9.5	332	0	PID controller, setpoint source	0	3		0
P 9.6	334	2	PID controller, actual value	0	2		2
P 9.7	336	0.0	PID controller, actual value limiting, minimum	0.0	100.0	%	0.0
P 9.8	337	100.0	PID controller, actual value limiting, maximum	0.0	100.0	%	100.0
P 9.9	340	0	PID controller, controller deviation	0	1		0
P 9.10	132	0.00	PID controller, D rate time	0.00	10.00	s	0.00
P 9.11	1431	0.0	PID controller, output filter, delay time	0.0	10.0	s	0.0
P 9.12	1016	0.00	Sleep mode, frequency	0.00	60.00	Hz	0.00
P 9.13	1018	25.0	Sleep mode, wake up frequency	0.0	100.0	%	25.0
P 9.14	1017	30	Sleep mode, delay time	0	3600	s	30
P 9.15	1433	0.0	Hysteresis, upper limit	0.0	100.0	%	0.0

Index	ID	VariableText	Min	Max	Unit	Value	Default
P 9.16	1434	Hysteresis, lower limit	0.0	100.0	%	0.0	0.0
P 9.17	1435	PID controller, maximum controller deviation	0.0	100.0	%	3.0	3.0
P 9.18	1475	PID controller, reference value scaling	0.1	32.7		1.0	1.0
P 9.19	1476	PID controller, process value scaling	0.1	32.7		1.0	1.0
P 9.20	1478	PID controller, output signal limit	0.0	100.0	%	100.0	100.0
10		Fixed Frequency					
P 10.1	124	Fixed frequency FF0	0.00	60.00	Hz	6.00	5.00
P 10.2	105	Fixed frequency FF1	0.00	60.00	Hz	12.00	10.00
P 10.3	106	Fixed frequency FF2	0.00	60.00	Hz	18.00	15.00
P 10.4	126	Fixed frequency FF3	0.00	60.00	Hz	24.00	20.00
P 10.5	127	Fixed frequency FF4	0.00	60.00	Hz	30.00	25.00
P 10.6	128	Fixed frequency FF5	0.00	60.00	Hz	36.00	30.00
P 10.7	129	Fixed frequency FF6	0.00	60.00	Hz	48.00	40.00
P 10.8	130	Fixed frequency FF7	0.00	60.00	Hz	60.00	50.00
P 10.9	1436	PLC sequence control	0	4		0	0
P 10.10	1437	PLC sequence control, program (FWD/REV)	0	255		0	0
P 10.11	1438	Set time for FF0	0	10000	s	0	0
P 10.12	1439	Set time for FF1	0	10000	s	0	0
P 10.13	1440	Set time for FF2	0	10000	s	0	0
P 10.14	1441	Set time for FF3	0	10000	s	0	0
P 10.15	1442	Set time for FF4	0	10000	s	0	0
P 10.16	1443	Set time for FF5	0	10000	s	0	0
P 10.17	1444	Set time for FF6	0	10000	s	0	0
P 10.18	1445	Set time for FF7	0	10000	s	0	0
11		V/Hz Characteristic					
P 11.1	108	V/Hz characteristic curve	0	2		0	0
P 11.2	602	Cut-off frequency	30.00	320.00	Hz	60.00	50.00
P 11.3	603	Output voltage	10.00	200.00	%	100.00	100.00
P 11.4	604	V/Hz characteristic curve, mean frequency value	0.00	60.00	Hz	30.00	50.00
P 11.5	605	V/Hz characteristic curve, mean voltage value	0.00	100.00	%	100.00	100.00
P 11.6	606	Output voltage at 0 Hz	0.00	40.00	%	0.00	0.00
P 11.7	109	Torque increase	0	1		0	0
P 11.8	600	Control mode	0	1		0	0
P 11.9	601	Carrier frequency	1.5	16.0	kHz	14.0	6.0
P 11.10	522	Sine wave filter	0	1		0	0
12		Braking					
P 12.1	507	DC braking, current	0.34	3.40	A	1.70	0.00
P 12.2	516	DC braking, braking time at start	0.00	600.00	s	0.00	0.00
P 12.3	515	DC braking, start frequency at	0.10	10.00	Hz	1.50	1.50
P 12.4	508	DC braking, braking time at STOP	0.00	600.00	s	0.00	0.00
P 12.7	1448	External brake, delay time opening	0.00	320.00	s	0.20	0.20
P 12.8	1449	External brake, frequency threshold opening	0.00	60.00	Hz	1.50	1.50

Index	ID	Value	VariableText	Min	Max	Unit	Default
P 12.9	1450	1.00	External brake, frequency threshold closing	0.00	60.00	Hz	1.00
P 12.10	1451	1.50	External brake, frequency threshold (REV) closing	0.00	60.00	Hz	1.50
P 12.11	1452	0.00	External brake, current limit opening	0.00	3.40	A	0.00
13			Logic function				
P 13.1	1453	0	LOG function, Selection input A	0	28		0
P 13.2	1454	0	LOG function, Selection input B	0	28		0
P 13.3	1455	0	LOG function, select operation	0	2		0
14			Second parameter set				
P 14.1	1347	1.70	Motor rated current limit (2PS)	0.34	3.40	A	3.64
P 14.2	1352	2.55	Current limit (2PS)	0.34	3.40	A	4.00
P 14.3	1350	1720	Motor rated speed (2PS)	300	20000	rpm	1440
P 14.4	1351	0.85	Motor power factor (cos φ) (2PS)	0.30	1.00		0.85
P 14.5	1348	230	Motor rated operating voltage (2PS)	180	500	V	400
P 14.6	1349	60.00	Motor rated frequency (2PS)	30.00	320.00	Hz	50.00
P 14.7	1343	0.00	Minimum frequency (2PS)	0.00	60.00	Hz	0.00
P 14.8	1344	60.00	Maximum frequency (2PS)	0.00	320.00	Hz	50.00
P 14.9	1345	3.0	Acceleration time (2PS, acc3)	0.1	3000.0	s	3.0
P 14.10	1346	3.0	Deceleration time (2PS, dec3)	0.1	3000.0	s	3.0
P 14.11	1355	0	V/Hz characteristic curve (2PS)	0	2		0
P 14.12	1354	0	Torque increase (2PS)	0	1		0
P 14.13	1353	2	Motor temperature protection (2PS)	0	2		2
P 14.14	1469	40	Motor, ambient temperature (2PS)	-20	100	C	40
P 14.15	1470	40.0	Motor, cooling factor at zero frequency (2PS)	0.0	150.0	%	40.0
P 14.16	1471	45	Motor, thermal time constant (2PS)	1	200	M	45
			System Menu				
			System Monitoring values				
S 1.1	2314	62	API SW ID	N/A	N/A		0
S 1.2	835	10	API SW Version	N/A	N/A		0
S 1.3	2315	1	Power SW ID	N/A	N/A		0
S 1.4	834	24	Power SW Version	N/A	N/A		0
S 1.5	837	9001	Application ID	N/A	N/A		0
S 1.6	838	0.44	Application, revision	N/A	N/A		0.00
S 1.7	839	74	System load	N/A	N/A	%	0
S 3.1	827	0.000	MWh counter	N/A	N/A	MWh	0.000
S 3.2	828	10	Operating days	N/A	N/A		0
S 3.3	829	7	Operating hours	N/A	N/A	h	0
S 3.4	840	0	RUN counter, days	N/A	N/A		0
S 3.5	841	0	RUN counter, hours	N/A	N/A	h	0
S 3.6	842	23	FLT counter	N/A	N/A		0
			System Parameters				
S 4.1	830	7	Display contrast	0	15		7
S 4.2	831	0	Default settings (WE)	0	1		0
S 4.3	832	0	Password	0	9999		0
			Fieldbus Menu				
			Fieldbus Monitoring Values				

Index	ID	VariableText	Min	Max	Unit	Default
S 2.1	808	Communication status	N/A	N/A		0.000
		Fieldbus Parameters				
S 2.2	809	Field bus protocol	0	1		0
S 2.3	810	Address (slave)	1	255		1
S 2.4	811	Baud rate	0	8		5
S 2.6	813	Parity type	0	2		0
S 2.7	814	Communication status, timeout	0	255	s	0
S 2.8	815	Reset communication status	0	1		0

(Value column: S 2.1 = 0.000, S 2.2 = 0, S 2.3 = 1, S 2.4 = 5, S 2.6 = 0, S 2.7 = 0, S 2.8 = 0)

Mode navigation

To change the mode (REF, MON, PAR, FLT), hit the [BACK RESET] until the screen clears and the left mode arrow begins to flash. Use the up/down arrows to switch between modes; select (OK) to enter the new mode.

Example Starting Point

REF
MON ◄ **M 1.1**
PAR
FLT   0.00

[BACK RESET]

REF ◄
MON
PAR
FLT

⌃

REF
MON ◄
PAR
FLT

⌄

REF
MON
PAR ◄
FLT

(OK)

REF
MON
PAR ◄ **P 1.1**
FLT   0
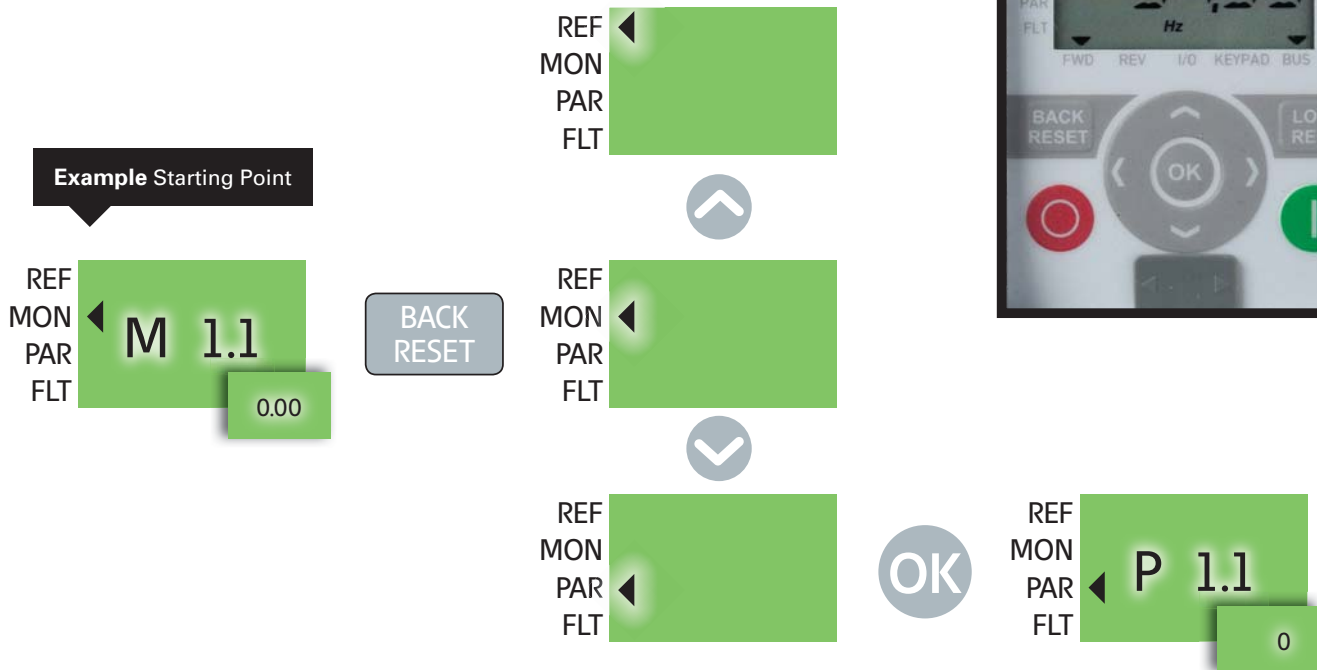
Monitor navigation

MON allows you to display 21 different values. The monitor mode also displays the units of the value. You can scroll through all of the different monitored values by pressing the up and down arrows. Press the OK button to view the selected value. In the monitor mode, values can not be altered.

M 1.2
0.00
Hz

(OK)

0.00
Hz

(OK)

⌃

Example Starting Point

REF
MON ◄ **M 1.1**
PAR
FLT   0.00
Hz

⌄

M 1.21
0.00

(OK)

0

(OK)
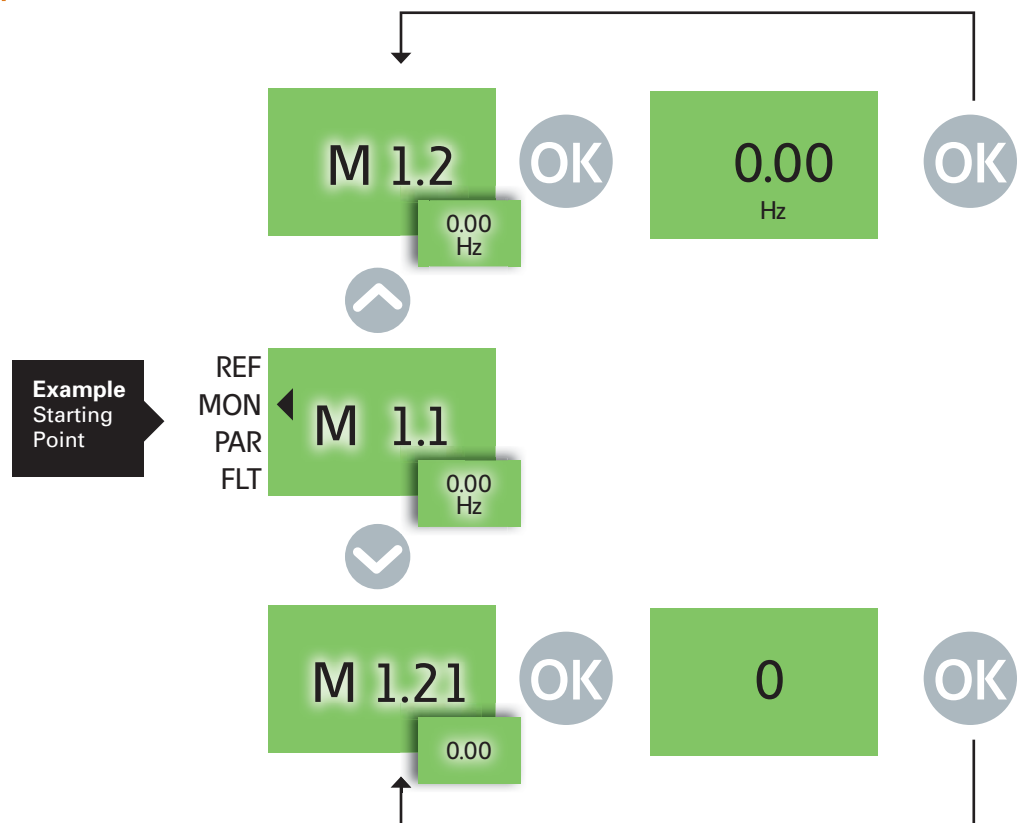
Parameter navigation

PAR mode allows you to view and alter all of the parameters within the drive. When you enter parameter mode, you will be starting at parameter P1.1. The up/down arrows allow you to scroll one parameter at a time. The right/left arrows allow you to jump from parameter group to group.

| P 1.3 | | P 2.3 | | P 3.3 |
| P 1.2 | | P 2.2 | | P 3.2 |

Example Starting Point

REF MON PAR FLT

◄ P 1.1

0.00

P 2.1

P 3.1

| S 4.3 | | P 1.3 | | P 2.8 |
| S 4.2 | | P 1.2 | | P 2.7 |
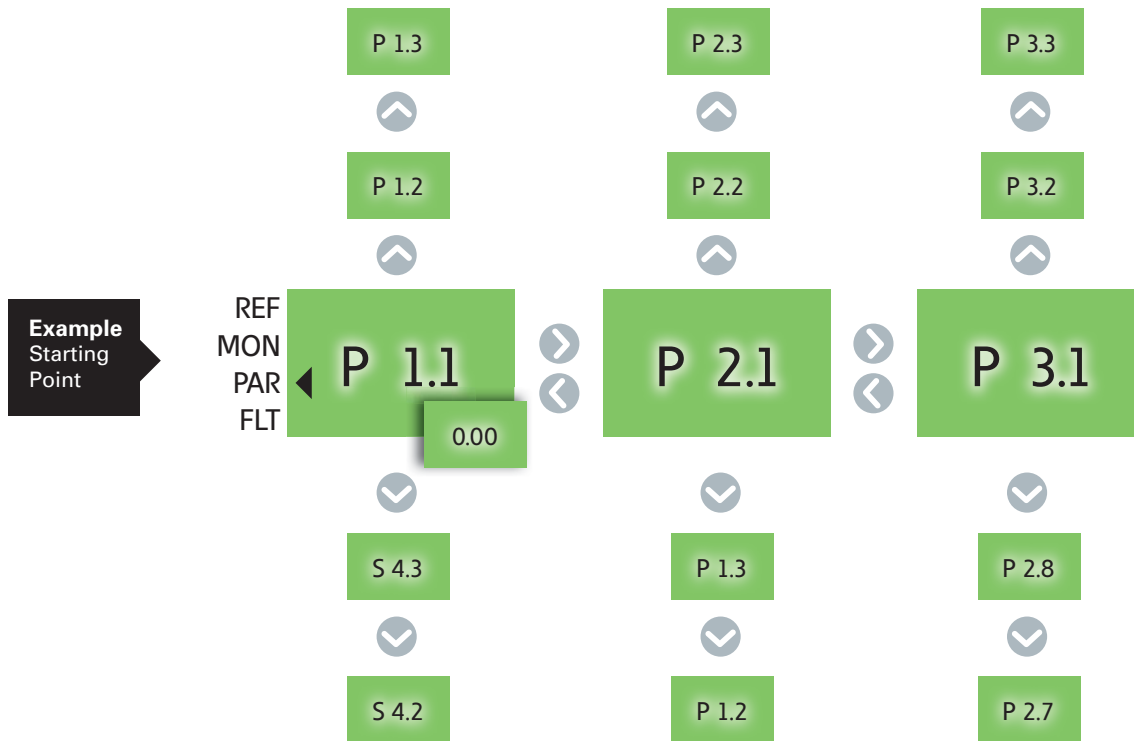
Parameter modification

Navigate to the parameter value you would like to alter, press OK. The value will flash. The up/down arrows will adjust the value. Press OK again to select the new value. The display will now flash the parameter number and the new value.

3

Example Starting Point

REF MON PAR FLT

◄ P 3.1

2

OK

2

1

OK

P 3.1

1
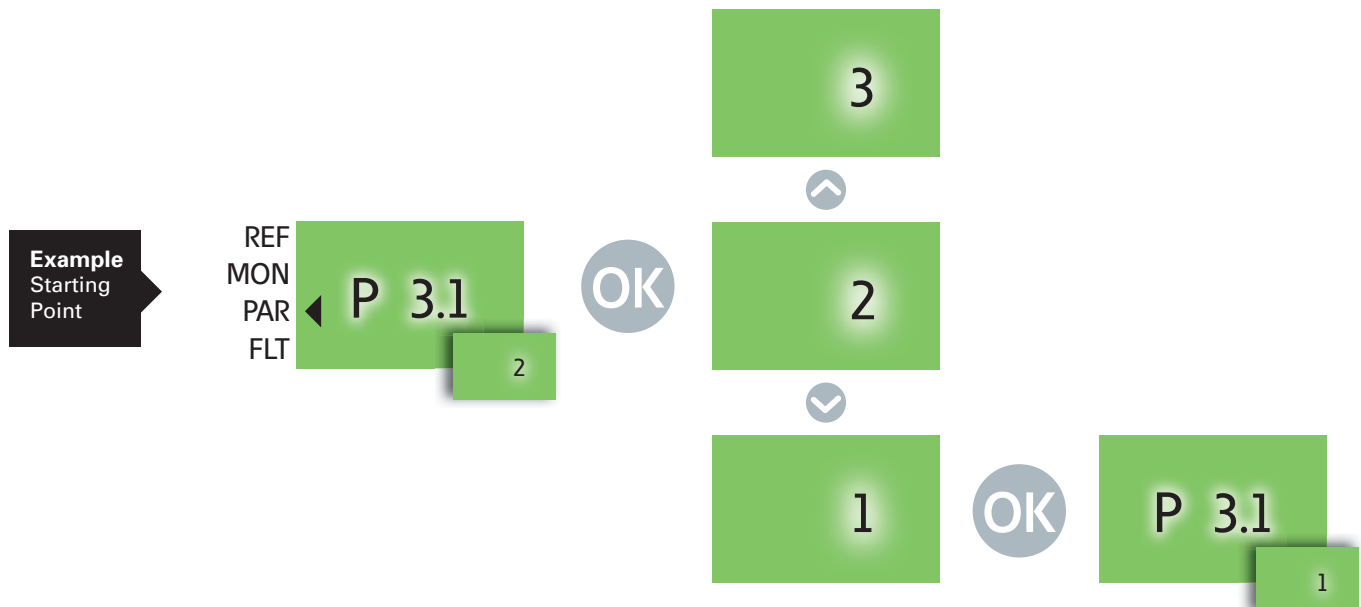
Display overview

BACK/RESET

Allows you to exit any of the four modes (REF, MON, PAR, FLT). When you press BACK/RESET, the arrow on the left hand column will flash and allow you to select a new mode (by pressing up/down arrows) to enter. To enter the new mode, press OK.

LOC/REM

Allows you to switch from LOC (local) to REM (remote) or REM to LOC at the push of a button. The primary start and reference commands for REM can be configured by parameters P6.1, P6.2 and secondary sources via P6.17 and P6.18. LOC will always reference the keypad for start/stop and speed reference. For this demo, REM is programmed to reference the I/O terminals. P6.1=1 and P6.2=3.

Start button ⏻

This will only start the drive when in LOC of keypad mode. A READY indication is also needed for the drive to start.

Stop button ⏺

This button will always stop the drive in LOC and is programmed as a default to stop the unit in REM. However, the stop button can be disabled in REM by parameter P6.16.

OK

The OK button is used to enter the various modes or select parameter values.

Directional arrows

Up and down arrows allow you to scroll through parameters 1 by 1, or increase and decrease values that are being adjusted. Right and left arrows move the cursor between the different place values. For instance, you can press the right arrow to move the cursor from the tens place to the onces place when adjusting values. The arrows also ease programming by skipping from one parameter group to the next. For example, in the parameter menu, if you are reviewing P1.1 you can press the up arrow twice to scroll to P1.2 and then P1.3, or you could press the right arrow twice to scroll to P2.1 and then P3.1.

READY (READY status)

The drive is ready to be controlled. Without a READY signal, the drive will not run.

RUN (RUN status)

An arrow pointing to RUN indicates that the drive currently has a Run or Start signal. Note that this does not necessarily indicate that the motor is spinning. The speed reference could be 0.

STOP (STOP status)

This indicates that the drive is stopped and does not have a Run or Start signal.

ALARM (ALARM status)

Indicates that the drive is in an ALARM state. Certain motor protection features can be programmed to send an ALARM notification rather than FAULT. See parameter group P8 for details.

FAULT (FAULT status)

Indicates that the drive is in a FAULT state.

REF (Reference mode)

REF is the local speed reference. This mode is only used to adjust the speed of the drive when the speed reference is set to keypad. This mode does not display the output frequency.

MON (Monitor mode)

MON allows you to display 21 different values. The monitor mode also displays the units of the value, for instance: V, A, Hz, rpms, %, etc. You can scroll through all of the different monitored values by pressing the up and down arrows. You can also select a value that you'd like to view by pressing the OK button. This will eliminate the flashing between the Monitor reference number (M1.1 for instance) and the actual monitored value. In the monitor mode, the values can not be altered. A listing of all values that can be displayed are located in the parameter guide.

PAR (Parameter mode)

PAR mode allows you to view and alter all of the parameters within the drive. When you enter parameter mode, you will be starting at parameter P1.1. The up/down arrows allow you to scroll one parameter at a time. The right/left arrows allow you to jump from parameter group to group. See the parameter guide for a map of the parameters and the groups. The display will flash between the parameter number and its value. To alter the value, press the OK button. The value will now flash. The up/down arrows will adjust the value. Press OK again to select the new value. The display will now flash the parameter number and the new value.

FLT (Fault mode)

FLT mode allows you to view the last 10 fault codes. An explanation of the fault codes is included at the end of the parameter guide. Each fault is time stamped based on run time.

FWD (Forward)

Indicates that the current motor rotation is forward. If the motor is actually running reverse (but should be running forward), power down the drive and swap any two of the motor leads to correct the motor rotation. Typically users will "bump" the motor with a brief start command to confirm proper rotation.

REV (Reverse)

Indicates that the current motor rotation is reverse. If the motor is actually running forward (but should be running reverse), power down the drive and swap any two of the motor leads to correct the motor rotation. Typically users will "bump" the motor with a brief start command to confirm proper rotation.

I/O (Controlled via I/O terminals)

Primary and secondary start source and speed reference are defined by parameters (P6.1, P6.2, P6.17, P6.18 and P3.25).

Keypad (Controlled via keypad)

Start and stop is controlled by the buttons on the keypad and the speed reference is defined by the REF mode.

BUS (Controlled via fieldbus)

Control of the drive is defined by a communication protocol. Modbus RS-485 is built into the drive. Additional communication option boards are also available: DeviceNet, CANopen, PROFIBUS.

Demo overview

Eaton has created an online learning center for the M-Max VFD.
The learning center is meant to serve two purposes:

Training guide

It allows the user to interface with a virtual M-Max VFD and a demo unit. We have written scripts for multiple modules of the learning center that help walk the user through a step-by-step explanation of how the VFD and the demo case operates. A brief explanation of those sections is below.

Teaching guide

The online learning center is a great tool for sales and customers to use during group training sessions. It helps both the class instructor and the trainees follow along as you walk them through proper operation of the VFD and the demo.

DISPLAY OVERVIEW

A closeup look at the drives keypad and the display along with explanations of all of the functions.
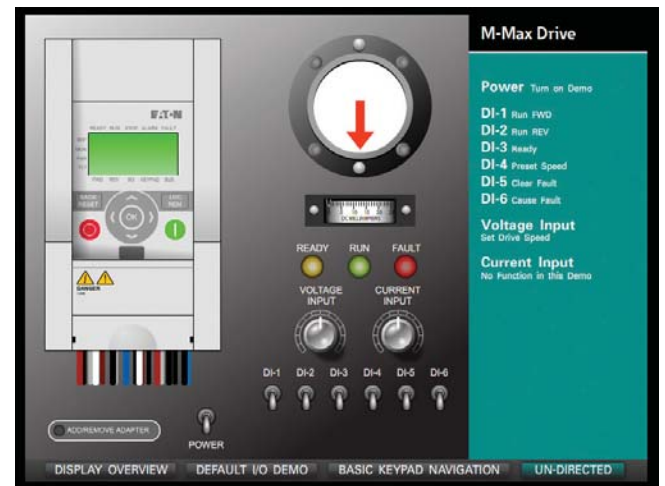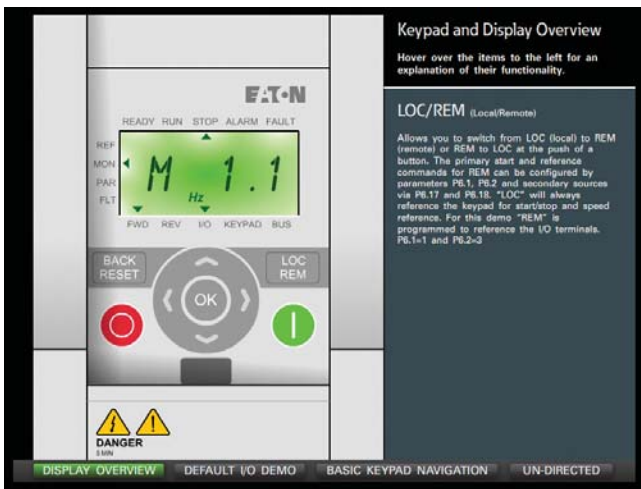
DEFAULT I/O DEMO

A step-by-step review of the demo case default program.

BASIC KEYPAD NAV

A step-by-step review of some basic keypad navigation and the parameter changes.

UN-DIRECTED

Allows the user to interface with the online demo in an unscripted, "trial by error" scenario.

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