



Unidrive M400

Fast set-up and diagnostics with real-text display,
integrated PLC and safety inputs

0.25 kW - 110 kW Heavy Duty (0.33 hp - 150 hp)
100 V | 200 V | 400 V | 575 V | 690 V



Control Techniques™


EMERSON™
Industrial Automation

Unidrive M400 features



Optional AI-485 Adaptor for RS485 communications

Optional AI-Back-up Adaptor allows the drive to use an SD card for parameter cloning and acts as an input for 24 V back-up.
Optional AI- Smart Adaptor has built-in memory for parameter cloning and 24 V backup

Optional CI-Keypad - intuitive plain text multilingual back-lit LCD keypad for rapid set-up and superior diagnostics

Optional IP66 (NEMA 4) Remote Keypad available for flexible mounting

Power-on / drive status LED

Dual onboard Safe Torque Off (STO) terminals for easy SIL3 conformity

Drive rated to IP21 / UL open class (NEMA 1) on size 1 to 4 as standard

Conduit kits are available to meet UL Type 1 rating

Conventional surface and DIN rail mounting (DIN rail mounting available on size 1 and 2 only)***

User-friendly control connections

Easy-to-disconnect internal EMC filter*

User-friendly power connections*

Easy-to-remove terminal cover with tool-less close system (patent pending)

Robust cable management system providing grounding point for shielded control and power cables

Typical System Integration (SI) option module**

System Integration (SI) module slot for optional communications and additional I/O**

* Features and their locations vary on some drive sizes
 ** Frame 2 upwards
 *** Additional fixings recommended where heavy vibration is expected



Performance motor control

Unidrive M400 combines the latest microprocessor technology with unique motor control algorithms to give maximum stability of induction motors at all powers. Current loop update rates up to 125 μ s and complementary intelligent control features ensure that machine throughput and energy efficiency are maximized in all industrial applications.

Motor control modes include:



Control Mode	Features
Enhanced open loop Rotor Flux Control for induction motors (RFC-A)	High performance speed and torque control through an advanced vector algorithm, utilizing closed loop current control to greatly enhance performance for all induction motor sizes without the need for a feedback device
Open loop vector or V/Hz induction motor control	Reliable performance and easy configuration: <ul style="list-style-type: none"> - 100 % torque available down to 1 Hz - Slip compensation - Square law V/F mode - Dynamic V/F mode - Multi-motor control

Easy motor pairing

Several intuitive tools are available to guarantee fast and optimized pairing between Unidrive M400 and AC induction motors. These include:

- Easy-to-use keypad with parameter reference guide on front panel
- Multilingual LCD remote keypad with clear parameter and diagnostic descriptions
- Three autotune procedures (stationary, rotating and inertia) to automatically optimize motor and drive configuration
- Unidrive M Connect software tool provides a comprehensive motor database and set up wizard

Unidrive M400 option choices and terminal layout

Control Mode

1. Open loop vector or V/Hz induction motor control
2. Open loop Rotor Flux Control for induction motors (RFC-A)



Input/Output

SI-I/O



- 4 x Digital I/O
- 3 x Analog inputs (default) / digital inputs
- 1 x Digital input
- 2 x Relays

Onboard



- 4 x Analog I/O
- 7 x Digital I/O
- 2 x STO
- 1 x Relay

Communications

AI-485 Adaptor



SI-EtherCAT



SI-PROFIBUS



SI-Ethernet



CI-485 Adaptor



SI-DeviceNet



SI-CANopen



SI-PROFINET



DC back-up power supply



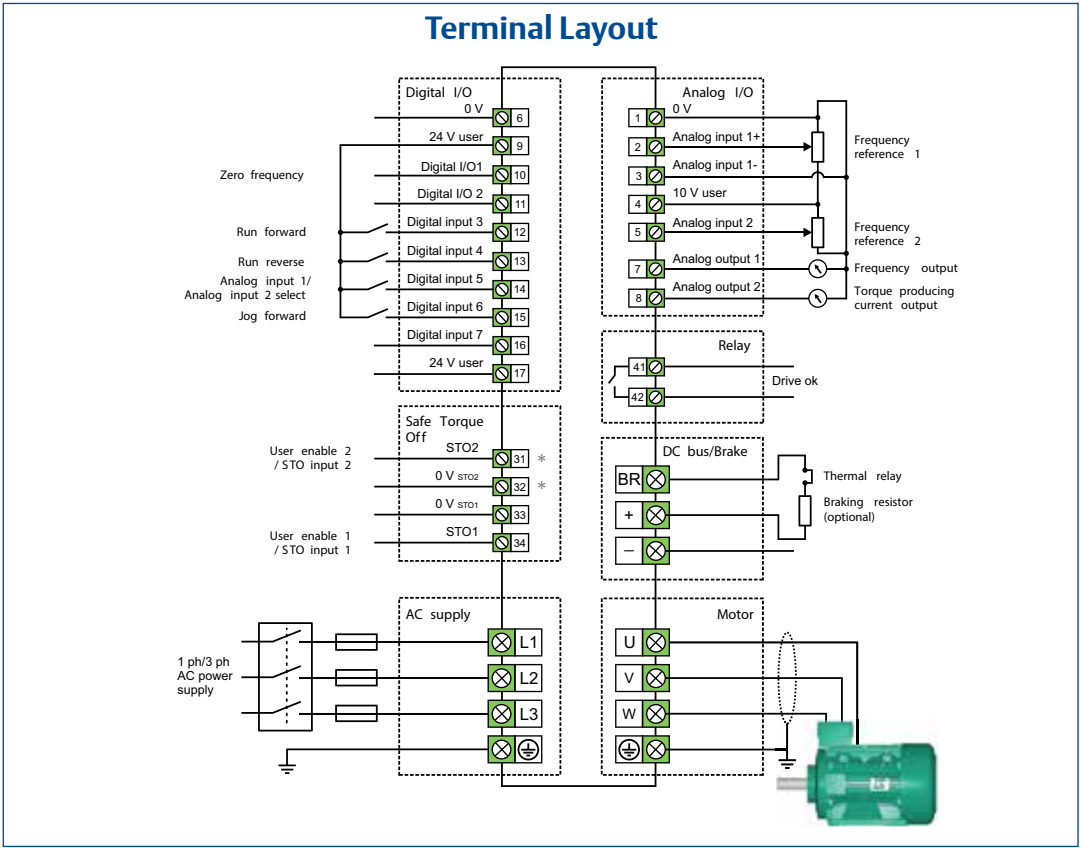
AI-Back-up Adaptor and AI-Smart Adaptor (Input for 24 V back-up)





Optional Drive Programming and Operator Interface

<p>Unidrive M Connect</p> 	<p>Remote Keypad (LCD)</p> 	<p>CI-keypad</p> 	<p>Remote keypad RTC</p> 
<p>AI-Back-up Adaptor (provides SD card usage for programming / cloning)</p> 	<p>AI-Smart Adaptor (built in memory for programming / cloning)</p> 		



* For frame sizes 5 - 9 STO input, refer to Unidrive M400 documentation

Unidrive M400 ratings and specifications

100/120 Vac ±10 %							
Order Code	Supply Phases	Heavy Duty			Normal Duty		
		Max Continuous Current (A)	Motor Shaft Power (kW)	Motor Shaft Power (hp)	Max Continuous Current (A)	Motor Shaft Power (kW)	Motor Shaft Power (hp)
M400-011 00017A	1	1.7	0.25	0.33	For Normal Duty applications, use Heavy Duty ratings.		
M400-011 00024A	1	2.4	0.37	0.5			
M400-021 00042A	1	4.2	0.75	1			
M400-021 00056A	1	5.6	1.1	1.5			

200/240 Vac ±10 %										
Order Code	Supply Phases	Heavy Duty			Normal Duty					
		Max Continuous Current (A)	Motor Shaft Power (kW)	Motor Shaft Power (hp)	Max Continuous Current (A)	Motor Shaft Power (kW)	Motor Shaft Power (hp)			
M400-012 00017A	1	1.7	0.25	0.33	For Normal Duty applications, use Heavy Duty ratings.					
M400-012 00024A	1	2.4	0.37	0.5						
M400-012 00033A	1	3.3	0.55	0.75						
M400-012 00042A	1	4.2	0.75	1						
M400-022 00024A	1/3	2.4	0.37	0.5						
M400-022 00033A	1/3	3.3	0.55	0.75						
M400-022 00042A	1/3	4.2	0.75	1						
M400-022 00056A	1/3	5.6	1.1	1.5						
M400-022 00075A	1/3	7.5	1.5	2						
M400-032 00100A	1/3	10	2.2	3						
M400-042 00133A	1/3	13.3	3	3						
M400-042 00176A	3	17.6	4	5						
M400-052 00250A	3	25	5.5	7.5				30	7.5	10
M400-062 00330A	3	33	7.5	10				50	11	15
M400-062 00440A	3	44	11	15	58	15	20			
M400-072 00610A	3	61	15	20	75	18.5	25			
M400-072 00750A	3	75	18.5	25	94	22	30			
M400-072 00830A	3	83	22	30	117	30	40			
M400-082 01160A	3	116	30	40	149	37	50			
M400-082 01320A	3	132	37	50	180	45	60			
M400-092 01760A	3	176	45	60	216	55	75			
M400-092 02190A	3	219	55	75	266	75	100			

380/480 Vac ±10 %							
Order Code	Supply Phases	Heavy Duty			Normal Duty		
		Max Continuous Current (A)	Motor Shaft Power (kW)	Motor Shaft Power (hp)	Max Continuous Current (A)	Motor Shaft Power (kW)	Motor Shaft Power (hp)
M400-024 00013A	3	1.3	0.37	0.5	For Normal Duty applications, use Heavy Duty ratings.		
M400-024 00018A	3	1.8	0.55	0.75			
M400-024 00023A	3	2.3	0.75	1			
M400-024 00032A	3	3.2	1.1	1.5			
M400-024 00041A	3	4.1	1.5	2			
M400-034 00056A	3	5.6	2.2	3			
M400-034 00073A	3	7.3	3	3			
M400-034 00094A	3	9.4	4	5			
M400-044 00135A	3	13.5	5.5	7.5			
M400-044 00170A	3	17	7.5	10			
M400-054 00270A	3	27	11	20	30	15	20
M400-054 00300A	3	30	15	20	30	15	20
M400-064 00350A	3	35	15	25	38	18.5	25
M400-064 00420A	3	42	18.5	30	48	22	30

M400-064 00470A	3	47	22	30	63	30	40
M400-074 00660A	3	66	30	50	79	37	50
M400-074 00770A	3	77	37	60	94	45	60
M400-074 01000A	3	100	45	75	112	55	75
M400-084 01340A	3	134	55	100	155	75	100
M400-084 01570A	3	157	75	125	184	90	125
M400-094 02000A	3	200	90	150	221	110	150
M400-094 02240A	3	224	110	150	266	132	200

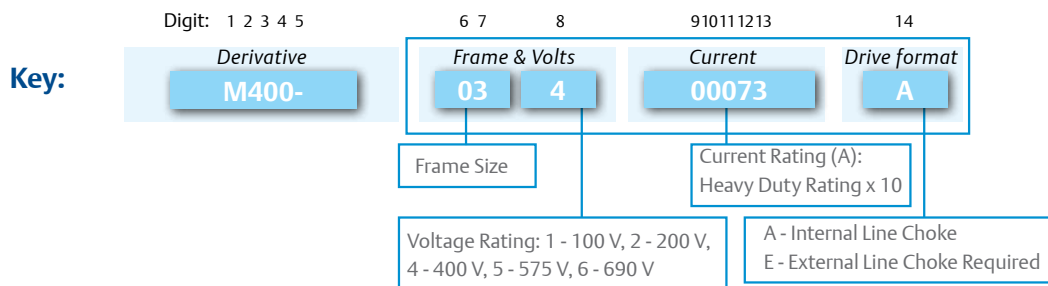
500/575 Vac ±10 %

Drive	Supply Phases	Heavy Duty			Normal Duty		
		Max Continuous Current (A)	Typical Output (kW)	Motor Power (hp)	Max Continuous Current (A)	Typical Output (kW)	Motor Power (hp)
M400-055 00030 A	3	3	1.5	2	3.9	2.2	3
M400-055 00040 A	3	4	2.2	3	6.1	4	5
M400-055 00069 A	3	6.9	4	5	10	5.5	7.5
M400-065 00100 A	3	10	5.5	7.5	12	7.5	10
M400-065 00150 A	3	15	7.5	10	17	11	15
M400-065 00190 A	3	19	11	15	22	15	20
M400-065 00230 A	3	23	15	20	27	18.5	25
M400-065 00290 A	3	29	18.5	25	34	22	30
M400-065 00350 A	3	35	22	30	43	30	40
M400-075 00440 A	3	44	30	40	53	37	50
M400-075 00550 A	3	55	37	50	73	45	60
M400-085 00630 A	3	63	45	60	86	55	75
M400-085 00860 A	3	86	55	75	108	75	100
M400-095 01040 A	3	104	75	100	125	90	125
M400-095 01310 A	3	131	90	125	150	110	150

500/690 Vac ±10 %

Drive	Supply Phases	Heavy Duty			Normal Duty		
		Max Continuous Current (A)	Typical Output (kW)	Motor Power (hp)	Max Continuous Current (A)	Typical Output (kW)	Motor Power (hp)
M400-076 00190 A	3	19	15	20	23	18.5	25
M400-076 00240 A	3	24	18.5	25	30	22	30
M400-076 00290 A	3	29	22	30	36	30	40
M400-076 00380 A	3	38	30	40	46	37	50
M400-076 00440 A	3	44	37	50	52	45	60
M400-076 00540 A	3	54	45	60	73	55	75
M400-086 00630 A	3	63	55	75	86	75	100
M400-086 00860 A	3	86	75	100	108	90	125
M400-096 01040 A	3	104	90	125	125	110	150
M400-096 01310 A	3	131	110	150	150	132	175

See overleaf for Normal Duty and Heavy Duty definitions.



Unidrive M400 ratings and specifications

Environmental safety and electrical conformance

- **Size 1 to 4:**
IP21 / UL open class (NEMA 1). IP20 when the AI-Back-up or AI-485 Adaptors are fitted.
UL TYPE 1 compliance requires the appropriate conduit kit to be fitted.
- Ambient temperature -20 °C (4 °F) to 40 °C (104 °F) as standard. 60 °C/ 140 °F with derating for frames 1-4.
- **Size 5 to 9:**
IP20 / UL open class (NEMA 1). UL TYPE 1 compliance requires the appropriate conduit kit to be fitted.
IP65 / UL TYPE 12 rating is achieved on the rear of the drive when through panel mounted.
- Ambient temperature -20 °C (4 °F) to 40 °C (104 °F) as standard. 55 °C/ 131 °F with derating for frames 5-9
- Storage temperature -40 °C to 60 °C (-40 °F to 140 °F).
- Humidity 95 % maximum (non-condensing) at 40 °C (104 °F) in accordance with EN/IEC 60068-2-78 and ANSI/EIA-364-31.
- EN/IEC 60068-2-60, Method 4 Corrosive gas.
- Altitude: 0 to 3000 m (0 to 9843 ft), derate 1 % per 100 m (328 ft) between 1000 m and 3000 m (3281 ft and 9843 ft).
- Random Vibration: Tested in accordance with EN/IEC 60068-2-64 with SI and AI option modules fitted.
- Mechanical Shock: Tested in accordance with EN/IEC 60068-2-29.
- Electromagnetic Immunity complies with EN/IEC 61800-3 and EN/IEC 61000-6-2.
- With onboard EMC filter, complies with EN/IEC 61800-3 (2nd environment).
- EN/IEC 61000-6-3 and EN/IEC 61000-6-4 with optional footprint EMC filter.
- EN/IEC 61800-5-1 Electrical Safety.
- EN/IEC 61131-2 I/O.
- Safe Torque Off, independently assessed by TÜV to EN/IEC 61800-5-2 SIL3 and EN ISO 13849-1 PLe.
- UL 508C Electrical Safety.

Unidrive M operating modes

Operating mode	RFC from cold	RFC from 100 %	Open loop from cold	Open loop from 100 %
Normal duty overload with motor rated current = drive rated current	110 % for 165 s	110 % for 9 s	110 % for 165 s	110 % for 9 s
Heavy duty overload with motor rated current = drive rated current (size 8 and below)	180 % for 3 s	180 % for 3 s	150 % for 60 s	150 % for 8 s
Heavy duty overload with motor rated current = drive rated current (size 9)	175 % for 42 s	175 % for 5 s	150 % for 60 s	150 % for 7 s

Dimensions and Weight



Frame Size		1	2	3	4	5	6	7	8	9A	9E
Dimensions (H x W x D)	mm	160x75x130	205x78x150	226x90x160	277x115x175	365x143x202	365x210x227	508x270x280	753x310x290	1049x310x290	1010x310x290
	in	6.3x3.0x5.1	8.1x3.1x5.9	8.9x3.5x6.3	10.9x4.5x6.9	14.4x5.6x8	14.4x8.3x8.9	20x10.6x11.0	29.6x12.2x11.4	41.3x12.2x11.4	39.7x12.2x11.4
Weight	kg (lb)	0.75 (1.65)	1.0 (2.2)	1.5 (3.3)	3.13 (6.9)	7.4 (16.3)	14 (30.9)	28 (61.7)	50 (110.2)	66.5 (146.6)	46 (101.4)

Notes:

From frame sizes 5 onwards dimensions do not include removable mounting brackets. Additional distance should be added to the height dimension (H) when the following options are fitted:

- AI-Back-up Adaptor: 15 mm (0.59 in)
- AI-485 Adaptor: 26 mm (1.02 in)
- AI-Smart Adaptor: 15 mm (0.59 in)

Unidrive M400 features and specification table

Performance	Current loop update: 125 µs
	Heavy Duty peak rating: 180 % (3 s), 150 % (60 s)
	Maximum output frequency: 550 Hz
	Switching frequency range: 0.67, 1, 2, 3, 4, 6, 8, 12, 16 kHz (3 kHz default)
Onboard intelligence	Programmable Logic Control (PLC) - memory: 16 kB
	1 x Real-time task (16ms), 1 x Background task
Mechanical attributes	DIN rail mountable (size 1 and 2)
	Commander SK compatible mechanical footprint either as standard or with conversion plates
Parameter back-up	Serial port cloning (using optional AI-485 Adaptor or CI-485 Adaptor)
	SD card (using optional AI-Back-up Adaptor)
Follower	Encoder Input 1
Onboard I/O	2 x Analog inputs, 2 x Analog outputs
	5 x Digital inputs, 2 x Bidirectional digital inputs or outputs
	1 x Relay output
Machine safety	2 x Safe Torque Off (STO) inputs
Back-up power	24 V control back-up (using optional AI-Back-up Adaptor) AI-Smart Adaptor (Built-in memory for parameter cloning and 24 V backup)
Other	Temperature controlled fan with standby (off)
	User replaceable fan(s)
	Conformal coating
	Standby mode (energy saving)
	User defined security levels (e.g. restricted access or read-only parameters via user defined security code)

Optional keypad

Description/Order code	Order code
Remote Keypad	82500000000001
CI-keypad	82500000000000
Remote keypad RTC	82400000019600

Optional accessories

Description/Order code	Order code
AI-Back-up Adaptor	82500000000004
AI-485 Adaptor	82500000000003
AI-Smart Adaptor	82500000018500
CI-485 Adaptor	82500000000002

Through hole kits

IP65 / UL TYPE 12 rating is achieved on the rear of the drive when through panel mounted using the following kits.

Frame size	Order code
5	3470-0067
6	3470-0055
7	3470-0079
8	3470-0083

IP55 / UL TYPE 12 rating can be achieved for frame sizes 9A and 9E using the following kits:

Frame size	Order code
9A	3470-0119
9E	3470-0105

UL Type 1 Conduit kit

Frame size	Order code
1	3470-0091
2	3470-0094
3	3470-0098
4	3470-0102
5	3470-0069
6	3470-0059
7	3470-0080
8 / 9A	3470-0088
9E	3470-0115

Retrofit mounting brackets

These mounting brackets ensure the drive can be mounted on existing Commander SK installations.

Frame size	Order code
3	3470-0097
4	3470-0101
5	3470-0066
6	3470-0074
7	3470-0078
8	3470-0087
9A / 9E	3470-0118

Line reactor

Frame size	Order code
9E (200 V/400 V)	4401-0181
9E (575 V/600 V)	4401-0183

Finger-guard grommet

Frame size	Order code
9A / 9E	3470-0107

Lifting tool

Frame size	Order code
9A	7778-0045
9E	7778-0016

Fan replacement kit

Frame size	Order code
1	3470-0092
2	3470-0095
3	3470-0099
4	3470-0103

Optional external EMC filters

Unidrive M built-in EMC filter complies with EN/IEC 61800-3.

External EMC filters are required for compliance with EN/IEC

61000-6-4 as per the table below.

Frame size	Voltage	Phases	Type	Order code
1	All	1	Standard	4200-1000
	All	1	Low leakage	4200-1001
2	100 V	1	Standard	4200-2000
		1	Standard	4200-2001
		1	Low leakage	4200-2002
		3	Standard	4200-2003
	400 V	3	Low leakage	4200-2004
		3	Standard	4200-2005
3	200 V	3	Low leakage	4200-2006
		1	Standard	4200-3000
		1	Low leakage	4200-3001
		3	Standard	4200-3004
	400 V	3	Low leakage	4200-3005
		3	Standard	4200-3008
		3	Low leakage	4200-3009
		3	Standard	4200-3008
4	200 V	1	Standard	4200-4000
		1	Low leakage	4200-4001
		3	Standard	4200-4002
	400 V	3	Low leakage	4200-4003
		3	Standard	4200-4004
		3	Low leakage	4200-4005
5	200 V	3	Standard	4200-0312
	400 V	3	Standard	4200-0402
	575 V	3	Standard	4200-0122
6	200 V	3	Standard	4200-2300
	400 V	3	Standard	4200-4800
	575 V	3	Standard	4200-3690
7	200 V & 400 V	3	Standard	4200-1132
	575 V & 690 V	3	Standard	4200-0672
8	200 V & 400 V	3	Standard	4200-1972
	575 V & 690 V	3	Standard	4200-1662
9A	200 V & 400 V	3	Standard	4200-3021
	575 V & 690 V	3	Standard	4200-1660
9E	200 V & 400 V	3	Standard	4200-4460
	575 V & 690 V	3	Standard	4200-2210

For a full list of patents and patent applications, visit www.controltechniques.com/patents.