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CONTROL TECHNIQUES™

UNIDRIVE M400

GENERAL PURPOSE
LOW VOLTAGE AC DRIVES



0.33 HP - 200 HP (0.25 kW - 132 kW)

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

Nidec
All for dreams

Unidrive M
Optimized throughput, open automation systems, maximum ease of use

Led by the results of extensive customer-driven market research, we have tailored five Unidrive M feature-sets to specific application needs identified within industrial automation.



All-round member of the Unidrive M family

Unidrive M400 is exceptional at combining the ease of use of our general purpose range with the capabilities of our high performance Unidrive M Series. The removable keypad with a real-text display makes it ideal for users who require extra diagnostic help when setting up parameters. Add in an impressive I/O count, dual Safe Torque Off (STO) and integrated PLC, all of which contribute to making Unidrive M400 an extremely capable drive.

Optional AI-485 Adaptors for RS485 communications

Optional AI-Backup Adaptor allows the drive to use an SD card for parameter cloning and acts as an input for 24 V backup. 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

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

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

User-friendly control connections

Conduit kits are available to meet UL Type 1 rating

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

Unidrive M400

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

Unidrive M400 minimizes downtime with an intuitive LCD keypad offering a real-text, multi-language display for rapid set-up and clear diagnostic help. The integrated PLC can execute a substantial range of sequencing and logic programs. Coupled with an impressive I/O count complete with two STO inputs and an SI interface for a fieldbus option or extended I/O, this feature set ensures Unidrive M400's flexible integration with any system.

Minimize downtime and system set-up time with advanced keypad options

- Informative, multi-language, 3 line display aids set up and provides diagnostic information
- 4 navigation buttons facilitate intuitive navigation and programming
- Keypad options available:
  - CI-Keypad - drive mounted LCD keypad
  - Remote IP66 Keypad – rapid panel mount (1 x 32mm Ø hole)
  - No keypad - programming and control can be achieved via AI-485, CI-485 or fieldbuses such as Ethernet

Reduce system costs by directly integrating with applications

- Unidrive M400 incorporates an onboard PLC which can execute Machine Control Studio (IEC61131-3) programs for logic and sequencing with real-time tasks - removing the need for additional PLCs
- Fit an SI module to add fieldbus communications or additional I/O



Conform to safety standards, maximize uptime and reduce costs by integrating directly with safety systems

- Unidrive M400 has integrated dual STO inputs for SIL3 / PLe conformity, eliminating the need for external components

Energy saving

With energy costs a key factor in many industries, Unidrive M400 is packed with features to enhance energy efficiency:

- Low power standby mode for applications where drives can sit idle for significant periods
- Automatic 3-speed cooling fan keeps energy usage and acoustic noise to a minimum by intelligently responding to load and environmental conditions*
- Square law V/F mode is optimized for quadratic loads such as pumps and fans to keep motor losses to a minimum
- Dynamic V to F mode keeps energy usage and motor losses to a minimum in low load conditions
- Unidrive M400 is highly efficient (above 98%)

*From 0.5 HP (0.37 kW)

Fast and easy access for commissioning, monitoring and diagnostics

Unidrive M Connect commissioning tool

The Connect PC tool is for commissioning, optimizing and monitoring drive/system performance.
Its development draws from extensive user research, using human centered design principles to give the ultimate user experience:

- Task-based drive operations are simplified with intuitive graphical tools in a familiar Windows environment
- Dynamic drive logic diagrams and enhanced searchable listings
- Drive and motor performance can be optimized with minimal specialized drive knowledge
- Tool is scalable to match application requirements
- Supports the import of Commander SK parameter files
- Drive discovery gives the ability to find drives on a network automatically without the user having to specify their addresses

Portable SD memory card

Standard SD cards can be used for quick and easy parameter and program storage using an adaptor. SD cards provide a huge memory capability allowing a system reload if required, and can be easily preprogrammed on a common PC.

Machine Control Studio software

Unidrive M400's onboard PLC is programmed using Machine Control Studio which provides a flexible and intuitive environment for programming.

IEC 61131-3 automation programming

The programming environment is fully IEC 61131-3 compliant and therefore familiar, fast and easy to use for control engineers around the world.

The following IEC 61131-3 programming languages are supported:

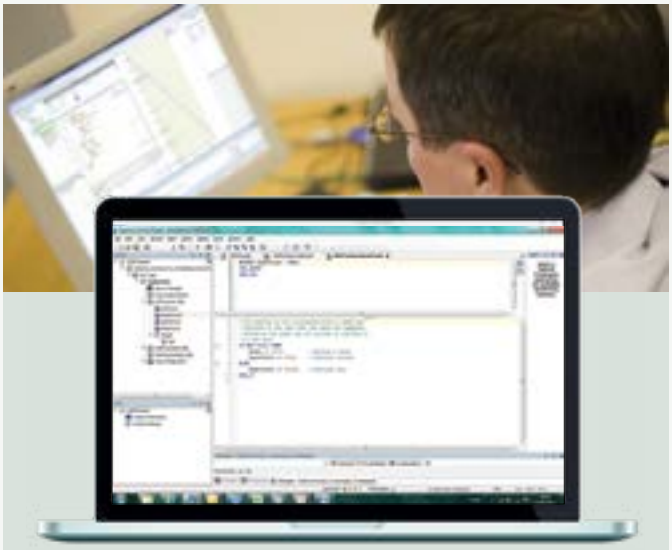
- Structured Text (ST)
- Function Block Diagram (FBD)
- Structured Function Chart (SFC)
- Ladder Diagram (LD)
- Instruction List (IL)

Also supported:

- Continuous Function Chart (CFC)

Intuitive IntelliSense functionality helps to write consistent and robust programs, speeding up software development.

Programmers have access to a vibrant open-source community for function blocks. Machine Control Studio also supports customers' own function block libraries, with on-line monitoring of program variables with user defined watch windows and help for on-line change of programs, in line with latest PLC practices.



Typical Machine Control Studio screen shot.

You can download Machine Control Studio from the software section of the Control Techniques website.



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 µs and complementary intelligent control features ensure that machine throughput and energy efficiency are maximized in all applications.

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: - 100 % torque available down to 1 Hz - Square law V/F mode - Slip compensation - 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
- Connect commissioning software tool provides a comprehensive motor database and set up wizard

Unidrive M400 options

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

The onboard I/O supports thermistor input, encoder input, frequency input and PWM or frequency output





Optional Drive Programming and Operator Interface

Connect Commissioning Software



Remote Keypad (LCD)



CI-keypad



Remote keypad RTC



AI-Backup Adaptor
(provides SD card usage for programming / cloning)



AI-Smart Adaptor
(built in memory for programming / cloning)



Communication

AI-485 24 V Adaptor



AI-485 Adaptor



SI-EtherCAT



SI-PROFIBUS



SI-Ethernet



CI-485 Adaptor



SI-DeviceNet



SI-CANopen



SI-PROFINET



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

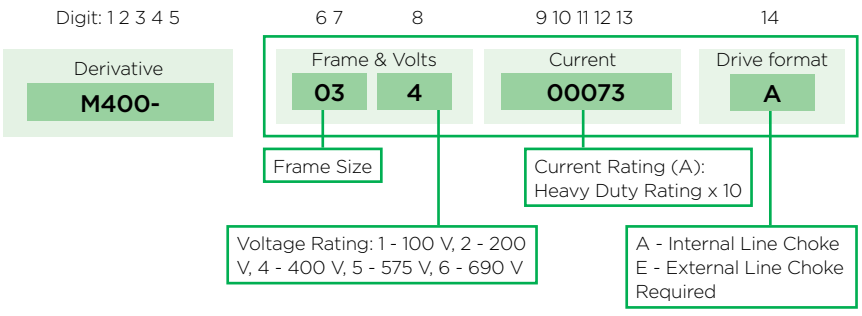
500/575 Vac 10 %

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

Key:



See overleaf for Normal Duty and Heavy Duty definitions.

UNIDRIVE M400 SPECIFICATIONS

Environment

Ambient Operating Temperature	Size 1 -4: -20°C to 60°C (-4°F to 140°F) @ 3 kHz carrier freq. Size 5 - 9: -20°C to 55°C (-4°F to 131°F) @ 3 kHz carrier freq. Size 1-4: Operation to 60°C (140°F) with de-rating Size 5-9: Operation to 55°C (131°F) with de-rating
Cooling method	Convection and forced convection, model dependent
Humidity	95% maximum non-condensing at 40°C (104°F)
Storage Temperature	Size 1 - 4: -40°C to 60°C (-40°F to 140°F) — 24 months Max. Size 5 - 9: -40°C to 55°C (-40°F to 131°F) — 24 months Max.
Altitude	Derate the continuous output current by 1% for every 100 m (328 ft) above 1000 m (3,280 ft) to a maximum of 3000 m (9,840 ft).
Vibration	Tested in accordance with IEC 60068-2-64 and IEC 60068-2-6
Mechanical Shock	Tested in accordance with IEC 60068-2-27 and IEC 60068-2-29
Enclosure	IP20, NEMA 1 conduit kits available
Electromagnetic	In compliance with IEC/EN61000-4-2/3/4/5/6/11, IEC/EN61000-6-1/2/3, IEC/EN61800-3 Immunity
RoHS	Meets the EU directive 2002-95-EC

AC Supply Requirements

Voltage	100 V models: 100 to 120 Vac ±10% (size 1, 2) 200 V models: 200 to 240 Vac ±10% (size 1-9) 400 V models: 380 to 480 Vac ±10% (size 2-9) 500 V models: 500 to 575 Vac ±10% (size 5-9) 600 V models: 500 to 690 Vac ±10% (size 7-9)
Phase	1Ø and 3Ø (Model dependent)
Maximum Supply Imbalance	2% negative phase sequence, 3% voltage imbalance between phases
Input Frequency	45 to 66 Hz
Input Displacement Power Factor	0.97

Control

Carrier Frequency	Size 1 - 4: 0.667, 1, 2, 3, 4, 6, 8 12 & 16 kHz Size 5 - 9: 2, 3, 4, 6, 8 12 & 16 kHz
Output Frequency	Up to 550 Hz
Frequency Accuracy	±0.02% of full scale
Frequency Resolution	0.01 Hz
Analog Input Resolution	Voltage mode: 11 bits (unipolar) Voltage mode: 11 bits + 1 sign bit (bipolar) (M400 only) Current mode: 11 bits
Braking	DC injection braking standard. Dynamic braking transistor included, requires external resistor

Protection

DC Bus Undervoltage Trip	100 V models: 175 Vdc (approx. 61 Vac line voltage) 200 V models: 175 Vdc (approx. 123 Vac line voltage) 400 V models: 330 Vdc (approx. 233 Vac line voltage) 500 V models: 435 Vdc (approx. 308 Vac line voltage) 600 V models: 435 Vdc (approx. 308 Vac line voltage)
DC Bus Overvoltage Trip	100 V models: 510 Vdc (approx. 180 Vac line voltage) 200 V models: 510 Vdc (approx. 361 Vac line voltage) size 1-4 415 Vdc (approx. 293 Vac line voltage) size 5-9 400 V models: 870 Vdc (approx. 615 Vac line voltage) size 1-4 830 Vdc (approx. 587 Vac line voltage) size 5-9 500 V models: 990 Vdc (approx. 700 Vac line voltage) 600 V models:1190 Vdc (approx. 841 Vac line voltage)
Drive Overload Trip	Current overload value is exceeded. Programmable to allow up to 150% of drive current for 60 seconds.
Instantaneous Overcurrent Trip	Size 1 - 4: 220% of rated motor current Size 5 - 9: 150% to 220% of full rated motor current (model dependent)
Phase Loss Trip	DC bus ripple threshold exceeded
Overtemperature Trip	Drive heatsink temperature exceeds 95°C (203°F)
Short Circuit Trip	Protects against output phase-to-phase fault
Ground Fault Trip	Protects against output phase-to-ground fault
Motor Thermal Trip	Electronically protects the motor from overheating due to loading conditions

Approval & Listings

UL, cUL	UL File #E171230
CE	CE approval
C✔	N1652
ISO	9001:2015, 14001
RoHS	RoHS Compliant
TÜV	EN ISO 13849-1 - Cat 4, PL e, EN61800-5-2/ EN62061/IEC 61508 - SIL 3 Safe Torque Off (Unidrive M300 & M400 only) UL yellow card certification reference FSPC E171230

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

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-Backup 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

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

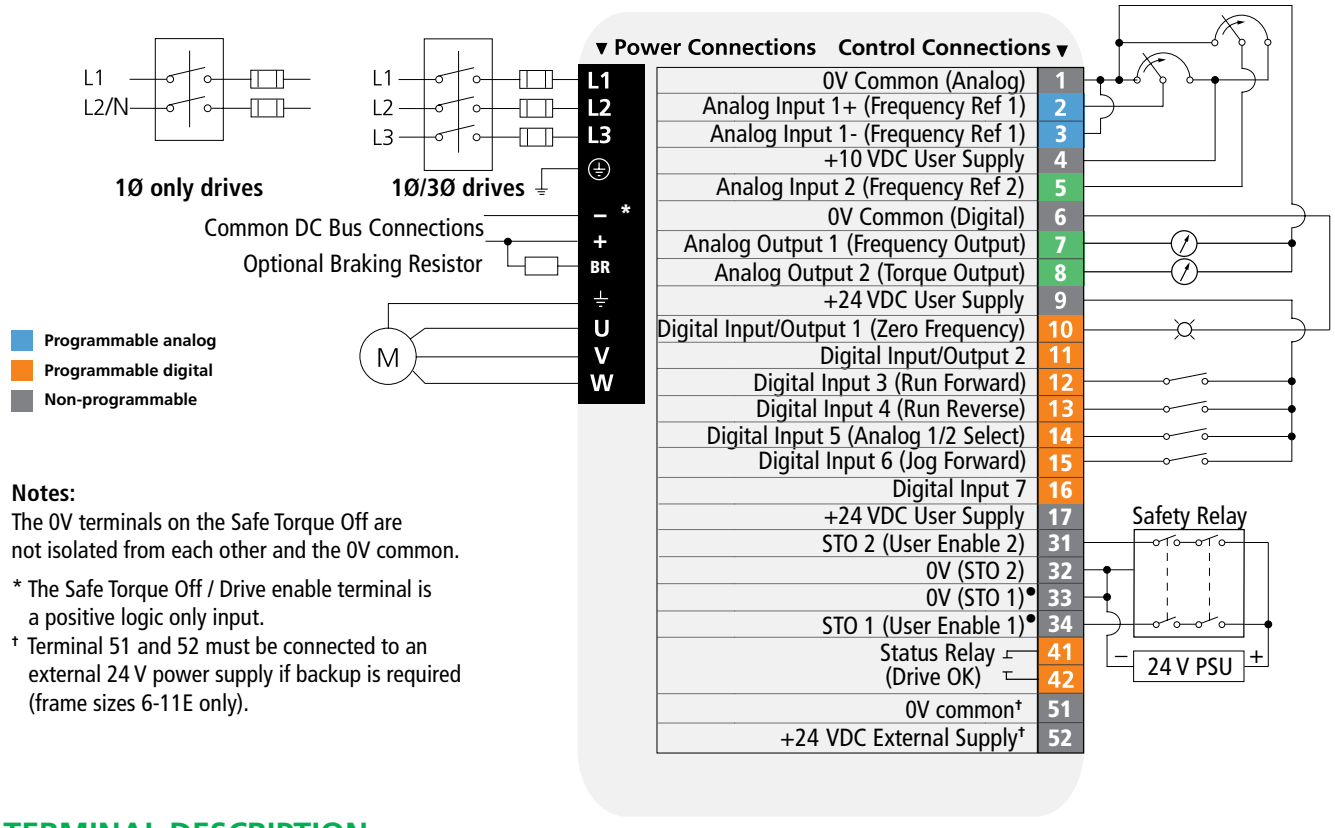
Optional external EMC filters

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
	200 V	1	Standard	4200-2001
		1	Low leakage	4200-2002
		3	Standard	4200-2003
		3	Low leakage	4200-2004
	400 V	3	Standard	4200-2005
		3	Low leakage	4200-2006
3	200 V	1	Standard	4200-3000
		1	Low leakage	4200-3001
		3	Standard	4200-3004
		3	Low leakage	4200-3005
	400 V	3	Standard	4200-3008
		3	Low leakage	4200-3009
4	200 V	1	Standard	4200-4000
		1	Low leakage	4200-4001
		3	Standard	4200-4002
		3	Low leakage	4200-4003
	400 V	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.

UNIDRIVE M400 TERMINAL DIAGRAM



Notes:
The 0V terminals on the Safe Torque Off are not isolated from each other and the 0V common.

* The Safe Torque Off / Drive enable terminal is a positive logic only input.

† Terminal 51 and 52 must be connected to an external 24 V power supply if backup is required (frame sizes 6-11E only).

TERMINAL DESCRIPTION

Pin #	Default Function	Type/Description	Notes
1	0V common	Common for external analog signals	
2	Frequency reference 1	Single/double ended analog input 11 bit	0 to +/-10 Vdc, 0-20 mA or 4-20 mA
3	Frequency reference 1	Single/double ended analog input 11 bit	0 to +10 Vdc, 0-20 mA or 4-20 mA
4	+10 Vdc user supply	Reference supply	5 mA
5	Frequency reference 2	Single ended analog input 11 bit or digital input	0 to +10 Vdc, 0-20 mA or 4-20 mA or 0 to 24 Vdc
6	Digital I/O 0V	Common for external digital signals	
7	Output frequency	Single ended analog output or digital output	0 to +10 Vdc, 0-20 mA or 4-20 mA or 0 to 24 Vdc
8	Output torque	Single ended analog output or digital output	0 to +10 Vdc, 0-20 mA or 4-20 mA or 0 to 24 Vdc
9	+24 Vdc user supply	Digital I/O supply	100 mA
10	At zero frequency	Digital I/O 1	0 to +24 Vdc
11	Unassigned	Digital I/O 2	0 to +24 Vdc
12	Run Forward	Digital input 3	0 to +24 Vdc
13	Run Reverse	Digital input 4	0 to +24 Vdc
14	Analog input 1/2 select	Digital input 5, thermistor input	0 to +24 Vdc
15	Jog forward	Digital input 6 or Frequency or AB encoder input	0 to +24 Vdc
16	Unassigned	Digital input 7 or AB encoder input	0 to +24 Vdc
17	+24 Vdc user supply		
31 (35•)	Safe Torque Off/ Drive enable	STO 2	0 to +24 Vdc
32 (36•)	0V STO 2	0V STO 2	0V common for STO 2
33 (32•)	0V STO 1	0V STO 1	0V common for STO 1
34 (31•)	Safe Torque Off/ Drive enable	STO 1	0 to +24 Vdc
41 42	Status relay (drive OK)	Normally open contact	2 A, 240 Vac, 0.5 A, 30 Vdc inductive load
51†	0V common	Common for backup supply	
52†	+24 Vdc external supply	Backup control supply	24 Vdc, 40 W

UNIDRIVE M400 DIMENSIONS

Size 1



Size 2



Size 3



Size 4



Size 5



Size 6



Size 7



Size 8



Size 9E



Size 9A



Frame size	H		W		D		Weight	
	in	mm	in	mm	in	mm	lbs	kg
1	6.3	160	3.0	75	5.1	130	1.7	.75
2	8.1	205	3.1	78	5.9	150	2.2	1.0
3	8.9	226	3.5	90	6.3	160	3.3	1.5
4	10.9	277	4.5	115	6.9	175	6.9	3.13
5	15.4	391	5.6	143	7.9	201	16.3	7.4
6	15.4	391	8.3	210	9.0	229	30.9	14
7	21.9	556	10.6	270	11.0	280	61.7	28
8	31.7	805	12.2	310	11.4	290	114.6	52
9E	39.8	1010	12.2	310	11.4	290	101.4	46
9A	43.6	1107	12.2	310	11.4	290	146.6	66.5

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