THE MC SERIES - The secret of a great microdrive
Building a great microdrive requires listening to customers that apply them day in and day out. They need to be ready for any environment, any supply voltage and over a wide power range. And, since the machines and processes where they will be applied are so varied, they need to have the functions that lend flexibility yet still be easy to set up and operate.

General Specifications

Horsepower: ¼ to 60 HP (0.2 to 45kW)
Supply Power:

Single Phase:	120 or 240VAC
Three Phase:	208, 240, 400, 480 or 590VAC
	50 or 60 Hz (+10/-15%)

Motors: The MC Series is designed to operate standard polyphase induction motors rated for 200, 230, 400, 460 or 575VAC from 0 to 120Hz. Operation to 1000 Hz is available, call AC Tech.

Enclosures:
- NEMA 1 for clean environments
- NEMA 12 dust-tight/oil-tight for dirty areas.
- NEMA 4 water resistant for wash down areas.
- NEMA 4X in stainless steel for corrosive or caustic environments.

Standard Features

Easy setup and operation: The MC offers intuitive operator interface using plain English programming and operational information.
- 16 character backlit display
- Keypad for operation and programming
- Personal computer interface using AC Tech's free TechLink Software

Motor Thermal Overload: The MC includes UL and cUL approved motor protection device for single motor applications.

The MC drives are available in two versions:
- M1000 Series for standard applications
- M3000 Series for process control

M1000 Series

Designed for typical constant torque applications where motor speed is controlled from the drive keypad, a 0-10 VDC or 4-20 mA control signal, or from a standard potentiometer. The M1000 series provides bi-directional control of the motor over a speed range of 0 to 120Hz. High speed operation up to 1000Hz is optional.

M3000 Series

Designed for processes where set-point control is required. The PID control algorithm in the M3000 Series is applicable on both constant and variable torque loads. Applications include fans, pumps, material feed conveyors, and rock crushers to name a few.

MC Series Options

Dynamic Braking: For faster stopping or for improved speed control, dynamic braking with external resistors can easily be added.

Remote Keypad: When mounting the MC drive within another enclosure, a remote keypad and display can be brought out for operator interface.

Additional Form-C Relay: Converts one of the open-collector outputs to a Form-C Relay.

Metasys® communication protocol: The M3000 can support RS-485 serial communication for Johnson Controls Systems.

Programmable parameters common to M1000 and M3000

- Input Line Voltage calibration - automatically or manually optimizes over and under voltage trip levels
- Anti-stall, frequency foldback, current limit to 180% for 20 seconds, 150% for one minute.
- Thermal overload: Inverse I^2t Motor thermal protection
- Four preset speeds
- Two critical frequency avoidance ranges; with adjustable bandwidth
- Independent Accel and Decel
- DC injection braking timed or continuous on starting or stopping with programmable maximum load level
- Dynamic brake enable/disable (dynamic braking requires option card and resistors)
- Base frequency adjustment to calibrate V/Hz to motor requirements with constant or variable torque curves
- Low frequency voltage boost for high starting torque
- Adjustable carrier frequency for quiet and efficient motor operation (2.5 to 14 kHz)
- Automatic restarting after fault for unattended applications
- Coast or ramp stopping
- Auto and Manual mode enable/disable
- Units display calibration and decimal point adjustment
- Load meter calibration
- Adjustable contrast setting for easy viewing of display from any angle
- Two analog inputs: 0-10 V and 4-20 mA. Software adjustable filter for external noise reduction.
- Speed reference selection: Keypad or analog input
- Speed reference calibration
- Speed indicating output signal selection: 0-10 VDC or 4-20 mA
- Speed indicating output signal calibration
- Load indicating output signal selection: 0-10 VDC or 4-20 mA
- Load indicating output signal calibration
- Four programmable terminals for speed reference and control activation
- Programmable terminal for external trip activation or manual reset
- Serial communications enable/disable
- Serial communications address: 1-247
- Password protection: enable/disable and setting
- Monitor mode: enable/disable allows viewing of password protected parameter settings
- Parameter reset: Reset to factory defaults (choice of 50 Hz or 60 Hz factory settings)
- Fault history: View log of eight previous trips with drive status at time of trip
- Fault history reset
- Output Frequency to 120Hz (Optional 1000 Hz on M1000)

Programmable parameters with M1000

- Manual boost for high starting torque
- Auto-boost for high torque accelerating at any speed
- Adjustable units display: Hz, RPM, %, /SEC, /MIN, /HR, none
- Slip compensation for tight speed regulation even under fluctuating loads
- Control configuration: local, remote, both, serial communications
- Auxiliary outputs: two open collector outputs and a form C relay. Functions include Run, Fault, Inverse Fault, Fault Lockout, At Commanded Speed, Above A Preset Speed, Current Limit, Auto/Manual Mode Indication.
- Forward only, Reverse only, Both
- Modbus® Serial Communications Protocol

Programmable parameters with M3000

- Speed synchronized automatic restart after fault
- Loss of follower signal action: fault or go to preset speed
- Control configuration: local, remote, serial communications, keypad, terminal strip, PID mode
- Adjustable units display: PSI, CFM, GPM, FPM, IN, FT, Hz, RPM %, /SEC, /MIN, /HR, none
- Auxiliary outputs: two open collector outputs and a form-C relay: Functions include Run, Fault, Inverse Fault, Fault Lockout, At Commanded Speed, Above A Preset Speed, Current Limit, Auto/Manual Mode Indication, Loss of Speed Reference Signal, PID High or Low Level Alarm.
- PID - Mode: enable/disable
  - Mode: direct or reverse acting
  - Signal calibration
  - Proportional gain
  - Integral gain
  - Derivative gain
  - Acceleration
  - High and low level alarm settings
- Sleep mode with adjustable speed threshold and time
- Modbus Serial Communications Protocol (standard)
- Metasys® Serial Communications Protocol (optional)

Specifications

Output wave form	High carrier frequency, sine coded, pulse width modulated (PWM)	
Input voltage ratings	240/120, 240/200, 480/400, 590/480 Vac	
Input voltage tolerance	+10%, -15% of rating	
Input frequency tolerance	48 to 62 Hz	
Output frequency	0-120 Hz (optional to 1000 Hz on M1000)	
Carrier frequency	2.5 kHz to 14 kHz (Drive rated at 8 kHz)	
Frequency stability	+0.00006% / C	
Overload current capacity	180% for 20 seconds, 150% for one minute (at 8 kHz)	
Service factor	1.0	
Power factor	Near unity	
Efficiency	Up to 98.5%	
Speed reference follower	0 – 10 VDC or 4 – 20 mA	
Control voltage	15 VDC	
Analog outputs	0 – 10 VDC, or 2 – 10 VDC (4 - 20 mA with 500ohm impedance). Proportional to speed or load	
Digital outputs	Form C relay: 2 A at 28 VDC or 120 Vac. Two open collector outputs: 40 mA at 30 VDC	
Serial communications	RS485 networkable, Modbus (Metasys optional on M3000)	
Storage temperature	-20° to 70° C	
Ambient operating temperature (at 100 % current and maximum carrier of 8 kHz. Derated for higher carrier.)	Chassis	-10° - 55 °C
	Type 1 (IP31)	-10° - 50° C
	Type 4 (IP65)	-10° - 40° C
	Type 12 (IP54)	-10° - 40° C
Ambient humidity	Less than 95% (non-condensing)	
Maximum altitude	3300 Feet (1000 meters)	

Dimensions

HP	Voltage	Input Phase	3 Phase Output Amps	NEMA 1 Model (See Note 1)	H x W x D (inches)	H x W x D (mm)	NEMA 4 & 12 Model (See Notes)	NEMA 4X Model	H x W x D (inches)	H x W x D (mm)
0.25 (0.18KW)	240/120	1Ø	1.4	M1103SB	7.50 x 4.70 x 3.33	190 x 119 x 85	M1103SC	M1103SE	7.88 x 6.12 x 3.63	200 x 155 x 92
0.5 (0.37KW)	240/120	1Ø	2.2	M1105SB	7.50 x 6.12 x 3.63	190 x 155 x 92	M1105SC	M1105SE	7.88 x 7.86 x 3.75	200 x 200 x 95
	240	1Ø	2.2	M1205SB	7.50 x 4.70 x 3.63	190 x 119 x 92	M1205SC	M1205SE	7.88 x 6.12 x 4.35	200 x 155 x 110
	240/200	3Ø	2.2/2.5	M1205B	7.50 x 4.70 x 3.63	190 x 119 x 92	M1205C	M1205E	7.88 x 6.12 x 4.35	200 x 155 x 110
1 (0.75KW)	240/120	1Ø	4.0	M1110SB	7.50 x 6.12 x 4.22	190 x 155 x 107	M1110SC	M1110SE	7.88 x 7.86 x 4.90	200 x 200 x 124
	240	1Ø	4.0	M1210SB	7.50 x 4.70 x 4.33	190 x 119 x 110	M1210SC	M1210SE	7.88 x 6.12 x 4.35	200 x 155 x 110
	240/200	3Ø	4.0/4.6	M1210B	7.50 x 4.70 x 4.33	190 x 119 x 110	M1210C	M1210E	7.88 x 6.12 x 4.35	200 x 155 x 110
	480/400	3Ø	2.0/2.3	M1410B	7.50 x 4.70 x 3.63	190 x 119 x 92	M1410C	M1410E	7.88 x 6.12 x 4.35	200 x 155 x 110
	590	3Ø	1.6	M1510B	7.50 x 4.70 x 3.63	190 x 119 x 92	M1510C	M1510E	7.88 x 6.12 x 4.35	200 x 155 x 110
1.5 (1.1KW)	240/120	1Ø	5.2	M1115SB	7.50 x 6.12 x 4.22	190 x 155 x 107	M1115SC	M1115SE	7.88 x 7.86 x 4.90	200 x 200 x 124
	240	1Ø	5.2	M1215SB	7.50 x 6.12 x 4.22	190 x 155 x 107	M1215SC	M1215SE	7.88 x 7.86 x 4.90	200 x 200 x 124
	240/200	3Ø	5.2/6.0	M1215B	7.50 x 4.70 x 4.33	190 x 119 x 110	M1215C	M1215E	7.88 x 6.12 x 5.25	200 x 155 x 133
2 (1.5KW)	240	1Ø	6.8	M1220SB	7.50 x 6.12 x 5.12	190 x 155 x 130	M1220SC	M1220SE	7.88 x 7.86 x 4.90	200 x 200 x 124
	240/200	3Ø	6.8/7.8	M1220B	7.50 x 6.12 x 5.12	190 x 155 x 130	M1220C	M1220E	7.88 x 7.86 x 4.90	200 x 200 x 124
	480/400	3Ø	3.4/3.9	M1420B	7.50 x 6.12 x 4.22	190 x 155 x 107	M1420C	M1420E	7.88 x 7.86 x 4.90	200 x 200 x 124
	590	3Ø	2.7	M1520B	7.50 x 6.12 x 4.22	190 x 155 x 107	M1520C	M1520E	7.88 x 7.86 x 4.90	200 x 200 x 124
3 (2.2KW)	240	1Ø	9.6	M1230SB	7.50 x 6.12 x 5.12	190 x 155 x 130	M1230SC	M1230SE	7.88 x 7.86 x 5.90	200 x 200 x 150
	240/200	3Ø	9.6/11.0	M1230B	7.50 x 6.12 x 5.12	190 x 155 x 130	M1230C	M1230E	7.88 x 7.86 x 5.90	200 x 200 x 150
	480/400	3Ø	4.8/5.5	M1430B	7.50 x 6.12 x 5.12	190 x 155 x 130	M1430C	M1430E	7.88 x 7.86 x 4.90	200 x 200 x 124
	590	3Ø	3.9	M1530B	7.50 x 6.12 x 5.12	190 x 155 x 130	M1530C	M1530E	7.88 x 7.86 x 4.90	200 x 200 x 124
5 (3.7KW)	240/200	3Ø	15.2/17.5	M1250B	7.88 x 7.86 x 5.94	200 x 200 x 151	M1250C	M1250E	9.75 x 10.26 x 7.20	248 x 261 x 183
	480/400	3Ø	7.6/8.7	M1450B	7.50 x 6.12 x 5.12	190 x 155 x 130	M1450C	M1450E	7.88 x 7.86 x 5.90	200 x 200 x 150
	590	3Ø	6.1	M1551B	7.88 x 7.86 x 5.94	200 x 200 x 151	M1550C	M1550E	7.88 x 7.86 x 5.90	200 x 200 x 150
7.5 (5.5KW)	240/200	3Ø	22/25	M1275B	9.38 x 7.86 x 6.84	238 x 200 x 174	M1275C	M1275E	11.75 x 10.26 x 8.35	298 x 261 x 212
	480/400	3Ø	11.0/12.6	M1475B	9.38 x 7.86 x 6.25	238 x 200 x 159	M1475C	M1475E	9.75 x 10.26 x 7.20	248 x 261 x 183
	590	3Ø	9.0	M1575B	9.38 x 7.86 x 6.25	238 x 200 x 159	M1575C	M1575E	9.75 x 10.26 x 7.20	248 x 261 x 183
10 (7.5KW)	240/200	3Ø	28/32	M12100B	11.25 x 7.86 x 6.84	286 x 200 x 174	M12100C	M12100E	13.75 x 10.26 x 8.35	349 x 261 x 212
	480/400	3Ø	14.0/16.0	M14100B	9.38 x 7.86 x 6.84	238 x 200 x 174	M14100C	M14100E	11.75 x 10.26 x 8.35	298 x 261 x 212
	590	3Ø	11.0	M15100B	9.38 x 7.86 x 7.40	238 x 200 x 188	M15100C	M15100E	11.75 x 10.26 x 8.35	298 x 261 x 212
15 (11KW)	240/200	3Ø	42/48	M12150B	12.75 x 7.86 x 6.84	324 x 200 x 174	M12150C	M12150E	15.75 x 10.26 x 8.35	400 x 261 x 212
	480/400	3Ø	21/24	M14150B	11.25 x 7.86 x 6.84	286 x 200 x 174	M14150C	M14150E	13.75 x 10.26 x 8.35	349 x 261 x 212
	590	3Ø	17.0	M15150B	12.75 x 7.86 x 6.84	324 x 200 x 174	M15150C	M15150E	13.75 x 10.26 x 8.35	349 x 261 x 212
20 (15KW)	240/200	3Ø	54/62	M12200B	12.75 x 10.26 x 7.74	324 x 261 x 197	M12200D	----------	15.75 x 10.26 x 8.35	400 x 261 x 212
	480/400	3Ø	27/31	M14200B	12.75 x 7.86 x 6.84	324 x 200 x 174	M14200C	M14200E	15.75 x 10.26 x 8.35	400 x 261 x 212
	590	3Ø	22	M15200B	12.75 x 7.86 x 7.40	324 x 200 x 188	M15200C	M15200E	15.75 x 10.26 x 8.35	400 x 261 x 212
25 (18.5KW)	240/200	3Ø	68/78	M12250B	15.75 x 10.26 x 8.35	400 x 261 x 212	----------	----------		
	480/400	3Ø	34/39	M14250B	12.75 x 10.26 x 7.74	324 x 261 x 197	M14250D	----------	15.75 x 10.26 x 8.35	400 x 261 x 212
	590	3Ø	27	M15250B	12.75 x 10.26 x 7.74	324 x 261 x 197	M15250D	----------	15.75 x 10.26 x 8.35	400 x 261 x 212
30 (22KW)	240/200	3Ø	80/92	M12300B	15.75 x 10.26 x 8.35	400 x 261 x 212				
	480/400	3Ø	40/46	M14300B	12.75 x 10.26 x 7.74	324 x 261 x 197	M14300D	----------	15.75 x 10.26 x 8.35	400 x 261 x 212
	590	3Ø	32	M15300B	12.75 x 10.26 x 8.25	324 x 261 x 210	M15300D	----------	15.75 x 10.26 x 8.35	400 x 261 x 212
40 (30KW)	480/400	3Ø	52/60	M14400B	15.75 x 10.26 x 8.35	400 x 261 x 212	M14400D	----------	20.25 x 10.26 x 8.35	514 x 261 x 212
	590	3Ø	41	M15400B	15.75 x 10.26 x 8.35	400 x 261 x 212	M15400D	----------	20.25 x 10.26 x 8.35	514 x 261 x 212
50 (37.5KW)	480/400	3Ø	65/75	M14500B	19.75 x 10.26 x 8.55	502 x 261 x 217	M14500D	----------	21.00 x 13.72 x 8.35	533 x 348 x 212
	590	3Ø	52	M15500B	19.75 x 10.26 x 8.55	502 x 261 x 217	M15500D	----------	21.00 x 13.72 x 8.35	533 x 348 x 212
60 (45KW)	480/400	3Ø	77/88	M14600B	19.75 x 10.26 x 8.55	502 x 261 x 217	M14600D	----------	21.00 x 13.72 x 8.35	533 x 348 x 212
	590	3Ø	62	M15600B	19.75 x 10.26 x 8.55	502 x 261 x 217	M15600D	----------	21.00 x 13.72 x 8.35	533 x 348 x 212

Note 1: Model numbers shown are for the M1000 series, please replace the "M1" at the beginning of the model number with a "M3" to specify a M3000 series drive.
Note 2: Model numbers ending with "C" are suitable for NEMA 4 and NEMA 12 applications.
Note 3: Model numbers ending with "D" are suitable for NEMA 12 applications.