AC Tech
member of the Lenze Group
Drive for Global Excellence

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.

Impossible? No, it's AC Tech's MC Series!

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 brake control 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.

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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
- Speed synchronized automatic restart after fault

Programmable parameters with M3000

- 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	-20º to 70º C	
Ambient operating temperature (at 100 % current and maximum carrier of 8 kHz. Derated for higher carrier.)	Chassis	-10º - 55 ºC
	Type 1 (IP31)	-10º - 50º C
	Type 4 (IP65)	-10º - 40º C
	Type 12 (IP54)	-10º - 40º C
Ambient humidity	Less than 95% (non-condensing)	
Maximum altitude	3300 Feet (1000 meters)	

Dimensions

HP	Input Voltage	Phase	Output Amps	NEMA 1 Model	H x W x D (inches)	Nema 4 & 12 Models	NEMA 4X Model	H x W x D (inches)
0.25 (.20 kW)	240 / 120	1Ø	1.4	M(*)103SB	7.50 x 4.70 x 3.33	M(*)103SC	M(*)103SE	7.88 x 6.12 x 3.63
0.5	240 / 120	1Ø	2.2	M(*)105SB	7.50 x 6.12 x 3.63	M(*)105SC	M(*)105SE	7.88 x 7.86 x 3.75
(.38 kW)	240	1Ø	2.2	M(*)205SB	7.50 x 4.70 x 3.63	M(*)205SC	M(*)205SE	7.88 x 6.12 x 4.35
	240 / 200	3Ø	2.2/2.5	M(*)205B	7.50 x 4.70 x 3.63	M(*)205C	M(*)205E	7.88 x 6.12 x 4.35
1	240 / 120	1Ø	4.0	M(*)110SB	7.50 x 6.12 x 4.22	M(*)110SC	M(*)110SE	7.88 x 7.86 x 4.90
(.75 kW)	240	1Ø	4.0	M(*)210SB	7.50 x 4.70 x 4.33	M(*)210SC	M(*)210SE	7.88 x 6.12 x 4.35
	240 / 200	3Ø	4.0/4.6	M(*)210B	7.50 x 4.70 x 4.33	M(*)210C	M(*)210E	7.88 x 6.12 x 4.35
	480 / 400	3Ø	2.0/2.3	M(*)410B	7.50 x 4.70 x 3.63	M(*)410C	M(*)410E	7.88 x 6.12 x 4.35
	590	3Ø	1.6	M(*)510B	7.50 x 4.70 x 3.63	M(*)510C	M(*)510E	7.88 x 6.12 x 4.35
1.5	240 / 120	1Ø	5.2	M(*)115SB	7.50 x 6.12 x 4.22	M(*)115SC	M(*)115SE	7.88 x 7.86 x 4.90
(1.1 kW)	240	1Ø	5.2	M(*)215SB	7.50 x 6.12 x 4.22	M(*)215SC	M(*)215SE	7.88 x 7.86 x 4.90
	240 / 200	3Ø	5.2/6.0	M(*)215B	7.50 x 4.70 x 4.33	M(*)215C	M(*)215E	7.88 x 6.12 x 5.25
2	240	1Ø	6.8	M(*)220SB	7.50 x 6.12 x 5.12	M(*)220SC	M(*)220SE	7.88 x 7.86 x 4.90
(1.5 kW)	240 / 200	3Ø	6.8/7.8	M(*)220B	7.50 x 6.12 x 5.12	M(*)220C	M(*)220E	7.88 x 7.86 x 4.90
	480 / 400	3Ø	3.4/3.9	M(*)420B	7.50 x 6.12 x 4.22	M(*)420C	M(*)420E	7.88 x 7.86 x 4.90
	590	3Ø	2.7	M(*)520B	7.50 x 6.12 x 4.22	M(*)520C	M(*)520E	7.88 x 7.86 x 4.90
3	240	1Ø	9.6	M(*)230SB	7.5 x 6.12 x 5.12	M(*)230SC	M(*)230SE	7.88 x 7.86 x 5.90
(2.2 kW)	240 / 200	3Ø	9.6/11.0	M(*)230B	7.5 x 6.12 x 5.12	M(*)230C	M(*)230E	7.88 x 7.86 x 5.90
	480 / 400	3Ø	4.8/5.5	M(*)430B	7.5 x 6.12 x 5.12	M(*)430C	M(*)430E	7.88 x 7.86 x 4.90
	590	3Ø	3.9	M(*)530B	7.5 x 6.12 x 5.12	M(*)530C	M(*)530E	7.88 x 7.86 x 4.90
5	240 / 200	3Ø	15.2/17.5	M(*)250B	7.88 x 7.86 x 5.94	M(*)250C	M(*)250E	9.75 x 10.26 x 7.20
(3.7 kW)	480 / 400	3Ø	7.6/8.7	M(*)450B	7.5 x 6.12 x 5.12	M(*)450C	M(*)450E	7.88 x 7.86 x 5.90
	590	3Ø	6.1	M(*)551B	7.88 x 7.86 x 5.94	M(*)550C	M(*)550E	7.88 x 7.86 x 5.90
7.5	240 / 200	3Ø	22/25	M(*)275B	9.38 x 7.86 x 6.84	M(*)275C	M(*)275E	11.75 x 10.26 x 8.35
(5.5 kW)	480 / 400	3Ø	11.0/12.6	M(*)475B	9.38 x 7.86 x 6.25	M(*)475C	M(*)475E	9.75 x 10.26 x 7.20
	590	3Ø	9.0	M(*)575B	9.38 x 7.86 x 6.25	M(*)575C	M(*)575E	9.75 x 10.26 x 7.20
10	240 / 200	3Ø	28/32	M(*)2100B	11.25 x 7.86 x 6.84	M(*)2100C	M(*)2100E	13.75 x 10.26 x 8.35
(7.5 kW)	480 / 400	3Ø	14.0/16.0	M(*)4100B	9.38 x 7.86 x 6.84	M(*)4100C	M(*)4100E	11.75 x 10.26 x 8.35
	590	3Ø	11.0	M(*)5100B	9.38 x 7.86 x 7.4	M(*)5100C	M(*)5100E	11.75 x 10.26 x 8.35
15	240 / 200	3Ø	42/48	M(*)2150B	12.75 x 7.86 x 6.84	M(*)2150C	M(*)2150E	15.75 x 10.26 x 8.35
(11 kW)	480 / 400	3Ø	21/24	M(*)4150B	11.25 x 7.86 x 6.84	M(*)4150C	M(*)4150E	13.75 x 10.26 x 8.35
	590	3Ø	17	M(*)5150B	12.75 x 7.86 x 6.84	M(*)5150C	M(*)5150E	13.75 x 10.26 x 8.35
20	240 / 200	3Ø	54/62	M(*)2200B	12.75 x 10.26 x 7.74	M(*)2200D	———	15.75 x 10.26 x 8.35
(15 kW)	480 / 400	3Ø	27/31	M(*)4200B	12.75 x 7.86 x 6.84	M(*)4200C	M(*)4200E	15.75 x 10.26 x 8.35
	590	3Ø	22	M(*)5200B	12.75 x 7.86 x 7.4	M(*)5200C	M(*)5200E	15.75 x 10.26 x 8.35
25	240 / 200	3Ø	68/78	M(*)2250B	15.75 x 10.26 x 8.35	M(*)2205D	———	20.25 x 10.26 x 8.35
(18.5 kW)	480 / 400	3Ø	34/39	M(*)4250B	12.75 x 10.26 x 7.74	M(*)4250D	———	15.75 x 10.26 x 8.35
	590	3Ø	27	M(*)5250B	12.75 x 10.26 x 7.74	M(*)5250D	———	15.75 x 10.26 x 8.35
30	240 / 200	3Ø	80/92	M(*)2300B	15.75 x 10.26 x 8.35	M(*)2300D	———	20.25 x 10.26 x 8.35
(22 kW)	480 / 400	3Ø	40/46	M(*)4300B	12.75 x 10.26 x 7.74	M(*)4300D	———	15.75 x 10.26 x 8.35
	590	3Ø	32	M(*)5300B	12.75 x 10.26 x 8.25	M(*)5300D	———	15.75 x 10.26 x 8.35
40	480/400	3Ø	52/60	M(*)4400B	15.75 x 10.26 x 8.35	M(*)4400D	———	20.25 x 10.26 x 8.35
(30 kW)	590	3Ø	41	M(*)5400B	15.75 x 10.26 x 8.35	M(*)5400D	———	20.25 x 10.26 x 8.35
50	480/400	3Ø	65/75	M(*)4500B	19.75 x 10.26 x 8.55	M(*)4500D	———	21.00 x 13.72 x 8.35
(37.5 kW)	590	3Ø	52	M(*)5500B	19.75 x 10.26 x 8.55	M(*)5500D	———	21.00 x 13.72 x 8.35
60	480/400	3Ø	77/88	M(*)4600B	19.75 x 10.26 x 8.55	M(*)4600D	———	21.00 x 13.72 x 8.35
(44 kW)	590	3Ø	62	M(*)5600B	19.75 x 10.26 x 8.55	M(*)5600D	———	21.00 x 13.72 x 8.35

Note 1: (*) 1=M1000 Series 3=M3000 Series
Note 2: Model numbers ending with “C” are suitable for NEMA 4 and NEMA 12 applications, numbers ending with “D” are suitable for NEMA 12 applications