

# MCH Series Drive 1 - 250 Hp



## DESCRIPTION

The MCH Series variable frequency drive has been specifically designed for HVAC loads such as fans, pumps and cooling towers. The application specific keypad offers easy operation. Features especially useful for fan or pump applications include:

- HOA keys to mimic traditional Hand, Off, and Auto functions
- PID set point control
- Hour and kWh meters
- 32 character plain English backlit LCD display with adjustable viewing angle

The MCH Series is available as a basic drive by itself or as part of a package with options such as Bypass, input disconnect switch, input fuses, input line reactor, etc. Please refer to the Option Box and Bypass package data sheets listed below for more information on optional configurations:

MCH Series Drive/Option Box Package #DS-MHOB  
MCH Series Drive/Bypass Package #DS-MHBP

## GENERAL MCH FEATURES

### DESIGN FEATURES

- 32 character, plain English, backlit LCD display with adjustable contrast
- Keypad with HOA functionality
- Speed reference sources:
  - 0-10 VDC (scalable)
  - 4-20 mA (scalable)
  - speed pot (scalable)
  - preset speeds (4 available)
  - keypad
- Loss of follower: fault or go to preset speed
- Analog outputs: two available
  - 0-10 VDC or 2-10 VDC (scalable)
  - proportional to speed and load
- Digital outputs:
  - one Form C relay (option for 2nd relay)
  - two open-collector outputs
- PID setpoint control
- RS-485 serial comm. (Modbus RTU)
- Password protection of parameters
- Surface mount technology
- UL, cUL, and CSA listed

### SERVICE CONDITIONS

- Enclosures: NEMA Types 1
- Storage Temperature: -20°C to 70°C
- Ambient Operating Temp: -10°C to 40°C
- Ambient Humidity: Up to 95% (non-condensing)
- Altitude: 3300 ft/1000 m above sea level (higher with derating)

### PERFORMANCE FEATURES

- Ratings:
  - 1 to 60 Hp at 240/200 Vac
  - 1 to 250 Hp at 480/400 Vac
  - 1 to 60 Hp at 590/480 Vac
- Accel time: 0.1 to 3600 seconds
- Decel time: 0.1 to 3600 seconds
- Current limit: adjustable up to 120%
- Carrier frequency: 2.5 kHz to 14 kHz
- Sleep Mode with adjustable threshold and time
- Adjustable Volts/Hz ratio
- DC injection braking: adjustable voltage and time
- Skip frequencies: two available with adjustable bandwidth (up to 10 Hz)
- Output frequency: 0-120 Hz
- Analog input filter: adjustable
- Start options:
  - Start upon application of power
  - Auto restart after fault (5 attempts)
  - Flying restart to catch a spinning motor
- 500 ms power loss ride-through

### DRIVE OPTIONS

- Door interlocked disconnect switch or circuit breaker
- Input fuses
- Input line reactor (std on some models)
- 2nd programmable Form C relay
- Popular protocols such as MetaSys, LONWorks, BACnet, and Siemens P1
- NEMA 4 and NEMA 12 enclosures

### PROTECTIVE FEATURES

- 120% overload capacity for 60 seconds
- Overvoltage & undervoltage faults
- Output short circuit fault
- Phase to ground fault
- Phase to phase fault
- Electronic thermal overload
- Current limit: adjustable up to 120%
- Overtemperature fault
- External fault input for safety interlocks

### ELECTRICAL SPECIFICATIONS

- Input voltage ratings: 240/200 Vac, 480/400 Vac, 590/480 Vac
- Input voltage tolerance: +10%, -15%
- Input frequency tolerance: 48 to 62 Hz
- Input phase sequence insensitive
- Output frequency: 0-120 Hz
- Output wave form: Sine-coded PWM
- Efficiency: > 97% over speed range
- Power factor (displacement): > 0.96

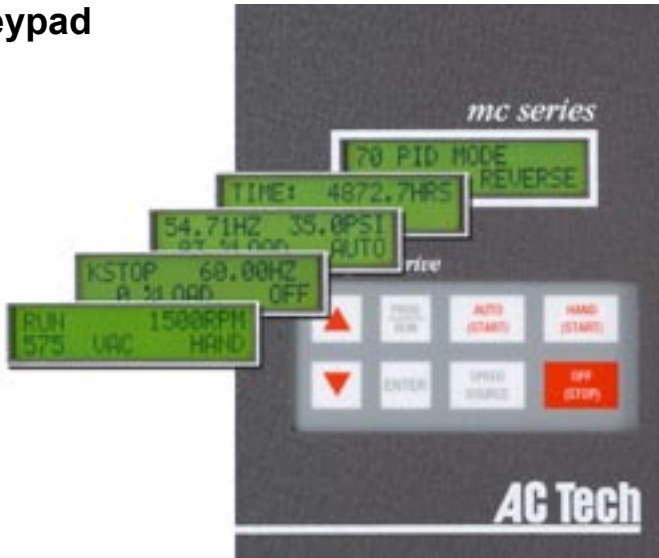
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DS-MH-OHOF

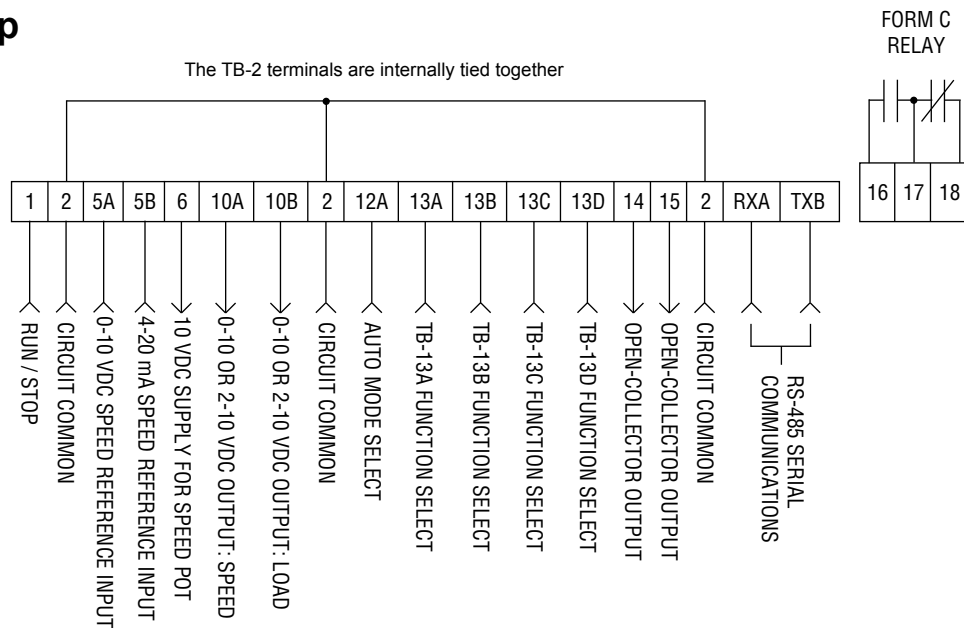
# MCH Series Drive Keypad



The MCH keypad has the following features:

- 2 line, 32 character backlit LCD display
- Plain English display makes monitoring and programming simple and intuitive
- In Run mode, simultaneous display of:
  - Drive Status (RUN, STOP, FAULT, etc)
  - Speed Command or PID Setpoint
  - Percent Load or Output Voltage
  - Hand, Off, or Auto status
- Elapsed Time Display shows total run time
- kWh meter
- 8 button keypad has the following functions:
  - Hand, Off, and Auto select buttons
  - Speed Source button to change speed reference
  - Program/Run button to toggle between Program mode and Run mode (Program mode is password protected)
  - ▲ and ▼ buttons to edit parameters and change speed
  - Enter button to confirm changes and store settings

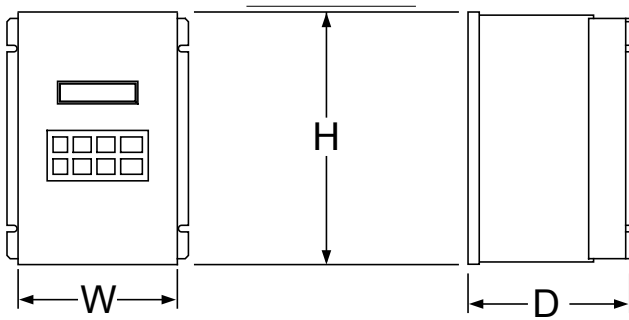
## Terminal Strip



## Parameter Summary

- Automatic line voltage calibration
- Four programmable preset speeds
- Two skip frequencies with adjustable bandwidth
- Independent accel and decel rates up to 3600 seconds
- Minimum and maximum frequency
- DC braking with adjustable voltage and time
- Dynamic braking enable/disable
- Current limit from 25-120%
- Motor overload from 25-100%
- Base frequency adjustable to match motor
- Voltage boost for increased starting torque
- Carrier frequency from 2.5-14 kHz
- Auto mode speed source
- Hand mode speed source
- Start method: normal, start on power-up, or flying restart
- Stop method: ramp or coast
- Display units for speed: Hz, RPM, %, units per second, units per minute, units per hour
- Display units for PID: %, PSI, CFM, GPM, IN, units per second, units per minute, units per hour
- Display units scaling
- LCD contrast adjustment to optimize viewing angle
- Sleep Mode threshold frequency
- Sleep Mode time
- Speed at minimum signal and speed at maximum signal to set speed range
- Analog input filter time
- Analog speed output with scaling
- Analog load output with scaling
- Four programmable inputs
- Three programmable digital outputs for drive status indication
- Loss of follower action: fault or go to preset speed
- Loss of serial link action: fault or go into Auto mode
- Serial communications enable/disable
- Serial address from 1-247
- Password adjustable from 0000-9999
- Factory reset for 50 Hz or 60 Hz defaults
- PID mode enable/disable for direct or reverse acting systems
- PID feedback source: 0-10 V or 4-20 mA
- PID minimum and maximum feedback settings to match transducer
- P, I, and D gains
- PID minimum and maximum feedback alarms
- Fault history stores last eight fault messages and drive status

# MCH Series Drive Dimensions



HP	INPUT VOLTAGE	OUTPUT CURRENT	MODEL NUMBER	NEMA 1 DIMENSIONS		
				H	W	D
1	240 / 200	4.0	MH210B	7.50	4.70	4.33
	480 / 400	2.0	MH410B	7.50	4.70	3.63
	590 / 480	1.6	MH510B	7.50	4.70	3.63
2	240 / 200	6.8	MH220B	7.50	6.12	5.12
	480 / 400	3.4	MH420B	7.50	6.12	4.22
	590 / 480	2.7	MH520B	7.50	6.12	4.22
3	240 / 200	9.6	MH230B	7.50	6.12	5.12
	480 / 400	4.8	MH430B	7.50	6.12	5.12
	590 / 480	3.9	MH530B	7.50	6.12	5.12
5	240 / 200	15.2	MH250B	7.88	7.86	5.94
	480 / 400	7.6	MH450B	7.50	6.12	5.12
	590 / 480	6.1	MH550B	7.88	7.86	5.94
7.5	240 / 200	22	MH275B	9.38	7.86	6.84
	480 / 400	11.0	MH475B	9.38	7.86	6.25
	590 / 480	9.0	MH575B	9.38	7.86	6.25
10	240 / 200	28	MH2100B	11.25	7.86	6.84
	480 / 400	14.0	MH4100B	9.38	7.86	6.84
	590 / 480	11.0	MH5100B	9.38	7.86	7.40
15	240 / 200	42	MH2150B	12.75	7.86	6.84
	480 / 400	21	MH4150B	11.25	7.86	6.84
	590 / 480	17.0	MH5150B	12.75	7.86	6.84
20	240 / 200	54	MH2200B	12.75	10.26	7.74
	480 / 400	27	MH4200B	12.75	7.86	6.84
	590 / 480	22	MH5200B	12.75	7.86	7.40
25	240 / 200	68	MH2250B	15.75	10.26	8.35
	480 / 400	34	MH4250B	12.75	10.26	7.74
	590 / 480	27	MH5250B	12.75	10.26	7.74
30	240 / 200	80	MH2300B	15.75	10.26	8.35
	480 / 400	40	MH4300B	12.75	10.26	7.74
	590 / 480	32	MH5300B	12.75	10.26	8.25
40	240 / 200	104	MH2400B*	25.00	13.00	10.50
	480 / 400	52	MH4400B	15.75	10.26	8.35
	590 / 480	41	MH5400B	15.75	10.26	8.35
50	240 / 200	130	MH2500B*	25.00	13.00	10.50
	480 / 400	65	MH4500B	19.75	10.26	8.55
	590 / 480	52	MH5500B	19.75	10.26	8.55
60	240 / 200	154	MH2600B*	47.00	16.64	11.85
	480 / 400	77	MH4600B	19.75	10.26	8.55
	590 / 480	62	MH5600B	19.75	10.26	8.55
75	480 / 400	96	MH4750B*	29.00	16.64	11.85
100	480 / 400	124	MH41000B*	29.00	16.64	11.85
125	480 / 400	156	MH41250B*	29.00	24.42	11.85
150	480 / 400	180	MH41500B*	29.00	24.42	11.85
200	480 / 400	0240	MH42000B*	29.00	36.66	11.85
250	480 / 400	300	MH42500B*	29.00	36.66	11.85

\* Input line reactor is standard.