DM Series Eurocard Stepper Drives - Microstep Drive Family

Mclennan's DM series Eurocard stepper drives are form-fit replacements for the former SmartDrive models, utilising the equivalent components, manufacturing techniques and quality control procedures as their previously available counterparts.

- Advanced microstep performance
- Resolutions from 200 to 51200 PPR
- Flexible current setting
- Change current during operation
- Comprehensive Dynamic Protection
- Rugged MOSFET power stages
- High efficiency compact design
- Natural convection cooling
- Euromodule 3Ux160mm format
- 5 current ranges available
- Range from 0.5 to 16.5A

Advanced Microstep Performance

For demanding applications requiring smooth precision motion, the DM range of microstepping drives are the solution. Designed around surface mount ASIC technology, DM drives increase the number of 'steps' a motor makes per revolution from 200 to 51200. With both binary and decimal resolutions available there's a setting to suit all applications.

Flexible Current Setting

Winding current can be easily set to match the motor characteristics to the load whilst the motor is running- either by a rotary 'hex switch' on the front panel or a resistor connected to the drive backplane. In addition the drive has a boost input which increases current output by 30%, useful for rapid acceleration but can be used continuously.

Comprehensive Dynamic Protection

CDP monitors the drives dynamic environment, and reacts within 5µS to protect itself against all motor winding faults, including a short to winding, short to ground and low inductance winding. In addition there is protection against irregular motor supply voltage, low logic supply and over temperature conditions.

Compact Design

Advanced design using MOSFET technology and a compact high efficiency heatsink enables continuous operation from the Euromodule 3Ux160mm format drive, with natural free air convection cooling normally being sufficient. A standard module width of 9HP (1.8") enables as many as 8 drives plus power supply to be housed in one 19" wide rack, 14 with 6HP DM28/DM55.

Reliability

Conservatively rated components are combined with thorough production testing of all units under simulated fault conditions, and for correct thermal performance. This ensures that each DM drive provides a long life of trouble free operation, even during adverse operating conditions.

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DM Series Eurocard Stepper Drives - Specifications

	Motor Winding Output*		Electrical Supply		Mechanical	
	Maximum Peak/RMS (A)	Minimum Peak/RMS (A)	Motor (Standby) Min/Max(V) @ (mA)	Logic Min/Max(V) @ (mA)	Module Width (inch/HP)	Cooling Requirement
DM28/9	2.8 / 2.0	0.88 / 0.62	27/94 @ 150	18/30 @ 80	1.8 / 9	Convect
DM55/9	5.5 / 3.9	1.8 / 1.2	27/94 @ 180	18/30 @ 80	1.8 / 9	Convect
DM75/9	8.0 / 5.7	0.5 / 0.35	27/94 @ 180	18/30 @ 80	1.8 / 9	Convect
DM110/9	11.0 / 7.8	3.5 / 2.5	27/94 @ 250	18/30 @ 80	1.8 / 9	Convect
DM165/9	16.5 / 11.7	5.3 / 3.7	27/94 @ 330	18/30 @ 80	1.8 / 9	Fan

* reduces to 50% one second after motion stops

Drive Control Signals

Inputs (Open Collector NPN 24V 10mA)

Reset	Clears CDP shutdown and Phase 0
Boost	Increase motor current 30%
Direction	Motor shaft direction CW/CCW
Sync	Synchronise chopper frequency
Clock	Step motor (500kHz max)
Energise	Motor current ON/OFF
Set Current	External current control resistor

Outputs (Open Collector NPN 24V 10mA)

Fault	Indicates CDP shutdown condition
Phase 0	Indicates Phase 0 condition

Microstepping Ratios

Microsteps per step (motor)	Microsteps per revolution (1.8°)
Binary	Decimal
2 / 400 4 / 800 8 / 1600 16 / 3200 32 / 6400 64 / 12800 128 / 25600 256 / 51200	5 / 1000 10 / 2000 25 / 5000 50 / 10000 125 / 25000 250 / 50000

Electrical Specification

Supply Voltages	Min	Typ	Max
Winding Supply	27V	85V	94V
Logic Supply	15V	24V	33V
Logic Supply Current	80mA		

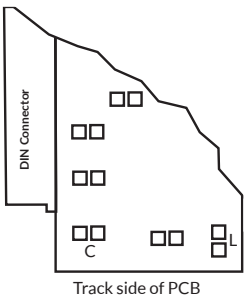
Winding Supply Fuses	D28/6, D28/9 D55/6, D55/9 D110 D165	3.15A Fast Blow 5A Fast Blow 8A Fast Blow 10A Fast Blow

Motor Inductance	Min 0.5 mH
Step Rate	0 - 500 KHz

Mechanical - Dimensions & Mounting

PCB	160 x 112mm
6HP Drive	172 x 25 x 112mm (D28 & D55 option only)
9HP Drive	72 x 42 x 112mm
Mounting	In 3U high Eurorack or pcb posts DIN41612 type D 32 way connector

Links



Track side of PCB

Label	Function
R	Link for external Reset
E	Link to permanently energise drive
S	Link for external Sync in
C	Link for external current control
L	Auto Current reduction. ON when linked.
B	Link for Boost always ON

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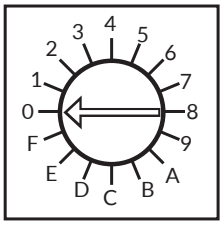
DM Series Eurocard Stepper Drives - Specifications

Current Switch Settings

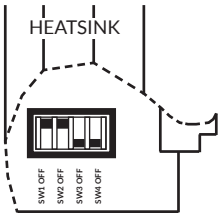


Rotary Switch

Switch Setting	Peak Current With Boost ON (Amps)				
	DM28	DM55	DM75	DM110	DM165
0	0.875	1.75	0.5	3.5	5.25
1	1	2	1	4	6
2	1.125	2.25	1.5	4.5	6.75
3	1.25	2.5	2	5	7.5
4	1.375	2.75	2,5	5.5	8.25
5	1.5	3	3	6	9
6	1.625	3.25	3.5	6.5	9.75
7	1.75	3.5	4	7	10.5

Switch Setting	Peak Current With Boost ON (Amps)				
	DM28	DM55	DM75	DM110	DM165
8	1.875	3.75	4.5	7.5	11.25
9	2	4	5	8	12
A	2.125	4.25	5.5	8.5	12.75
B	2.25	4.5	6	9	13.5
C	2.375	4.75	6.5	9.5	14.15
D	2.5	5	7	10	15
E	2.625	5.25	7.5	10.5	15.75
F	2.75	5.5	8	11	16.5

Microstep Switch Settings



Microstep selector switches set to 3200 steps/rev

Resolution (Microsteps per step)	Steps/Rev (1.8 deg/step Motors)	SW1	SW2	SW3	SW4
2	400	OFF	OFF	OFF	OFF
4	800	ON	OFF	OFF	OFF
5	1000	OFF	OFF	OFF	ON
8	1600	OFF	ON	OFF	OFF
10	2000	ON	OFF	OFF	ON
16	3200	ON	ON	OFF	OFF
35	5000	OFF	ON	OFF	ON
32	6400	OFF	OFF	ON	OFF

Resolution (Microsteps per step)	Steps/Rev (1.8 deg/ step Motors)	SW1	SW2	SW3	SW4
50	10000	ON	ON	OFF	ON
64	12800	ON	OFF	ON	OFF
125	25000	OFF	OFF	ON	ON
128	25600	OFF	ON	ON	OFF
250	50000	ON	OFF	ON	ON
256	51200	ON	ON	ON	OFF
N/A	N/A	OFF	ON	ON	ON
N/A	N/A	ON	ON	ON	ON

Drive Connections

Pin	Function	Pin	Function
2c	Motor Winding 2A	2a	Motor Winding 2A
4c	Motor Winding 2B	4a	Motor Winding 2B
6c	Motor Winding 1A	6a	Motor Winding 1A
8c	Motor Winding 1B	8a	Motor Winding 1B
10c	N/C	10a	+V Logic Supply 18-30V
12c	+V Winding Supply 27-94V	12a	+V Winding Supply 27-94V
14c	+V Winding Supply 27-94V	14a	+V Winding Supply 27-94V
16c	0V Winding Supply	16a	0V Winding Supply
18c	Reset Input	18a	0V Winding Supply
20c	Fault Condition Output	20a	Fault Condition Output
22c	Phase (0) Output	22a	Phase (0) Output
24c	Sync. Output	24a	Boost Input
26c	N/C	26a	Direction Input
28c	Sync. Output	28a	Clock Input
30c	External Current Setting A	30a	Energise Motor
32c	External Current Setting B	32a	0V (Logic Supply)

DM Series Eurocard Stepper Drives - Specifications

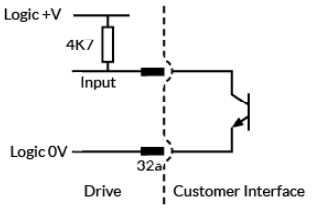
Front Panel Status LEDs

Colour	Name	Function
Red	Supply Fault	Indicates either a low logic supply, or the winding supply is too high (greater than 100V)
Red	Over Temp	Indicates the heatsink temperature is greater than 100°C
Red	W1 Fault	Indicates that either a short circuit has oc- curred on winding 1 or if the winding supply is below 27V
Red	W2 Fault	Indicates that a short circuit has occurred on winding 2
Green	Energise	Indicates that the motor is energised
Yellow	Phase 0	Indicates the phase 0 condition. Note that it is normal for this LED to flash or be dimly lit when the drive receives clock pulses

Inputs / Outputs

Clock:	Falling edge advances the motor by one step/half step
Boost:	Active low signal. Boost must be held low to obtain the rated current set by the DIL switch. With boost held high the current is 75% of the current setting.
Reset:	Active low signal. Falling edge resets drive and clears the trip circuits. The drive is held in a reset state as as Reset is low, hence the motor with be de-energised. For this feature link R must be made.
Direction:	Sets the direction of motor rotation. Direction will depend on the wiring of the motor.
Energise:	Active low signal. Switches output to motor on.
Fault:	Open collector output. Output is pulled low whilst the drive is ok. The output is high during fault conditions and power up.
Phase 0:	Open collector output 5mA. On the D Series drive this output goes low when equal current is flowing out of 1A and 2B, irrespective of energise.
External Current Setting:	The external current setting allows drive current to be set via external resistor. Contact SmartDrive for details.
Sync In & Sync Out:	These two connections are used for synchronising the chopping frequency of two or more drives. Contact SmartDrive for details.

Clock, Boost, Reset & Direction



Energise