

# 2 Amp Bi-polar drive module

**MSE542**  
**PM542**

Built on the 3U high International standard extended eurocard format, the MSE 542 features a particularly slim profile for optimum space utilisation. With a width of only 34 mm ( 7E ) up to 12 units can be fitted in a single 19 in. standard Euro-rack.

## Ideal choice for small hybrid motors

With adjustable current from 0.5 to 2 amps / phase, combined with chopped constant current drive technology which enables current forcing from supply voltages up to 30Vdc, the unit provides high efficiency and optimum performance characteristics when using size 17 - 23 hybrid stepper motors.



## Advanced control features

The design of MSE542 is based on many years experience in stepper motor drive technology and incorporates the following features to provide flexible control:

- High efficiency chopped constant current power stage provides increased performance and reduced current consumption
- Selectable full or half step phase logic control
- Adjustable current settings from 0.5A to 2 Amps per phase
- Choice of automatic or externally selectable reduced current for stationary motor conditions to reduce power consumption and motor heating.
- Over-temperature monitor with selectable automatic drive shutdown.
- Opto-isolated 'drive healthy' status output
- Opto-isolated control inputs.
- Control from external clock and direction signals
- Alternative control using on-board voltage controlled oscillator featuring:
  - externally gated adjustable base and high speed settings
  - adjustable acceleration/deceleration ramping.
  - choice of oscillator gating procedures to suit alternative control philosophies.
  - automatic ramping and controlled motor reversal eliminates motor stalling when high speed direction changes are required.

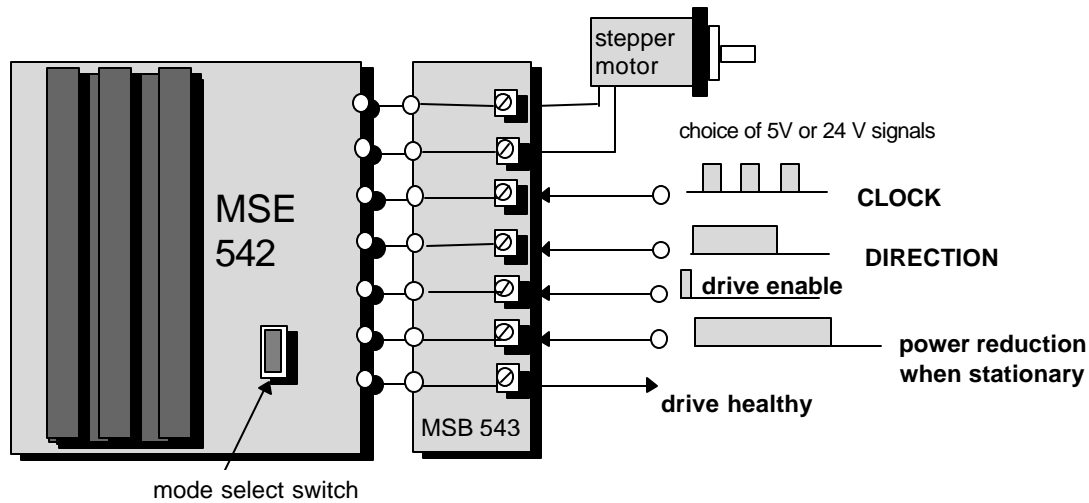
## Simplified system integration

MSE542 is designed for incorporation in standard 19 in Euro-rack units such as the PM170 series racked power supplies. A matched motherboard, MSB543 is recommended which enables all connections to be made via solder-free terminals. The MSE542 will have particular appeal to systems engineers who wish to utilise the unit in modular form since it incorporates a filtered output stage to minimise electrical emissions and significantly reduces the need for additional suppression components.

The slim profile of the PM542 ( only 7E wide ) enables up to 6 units to be fitted in a single 3U high PM173 racked power supply.

Alternatively 4 units together with a matched controller to provide a complete self contained motion system can be integrated in a single 3U high system.

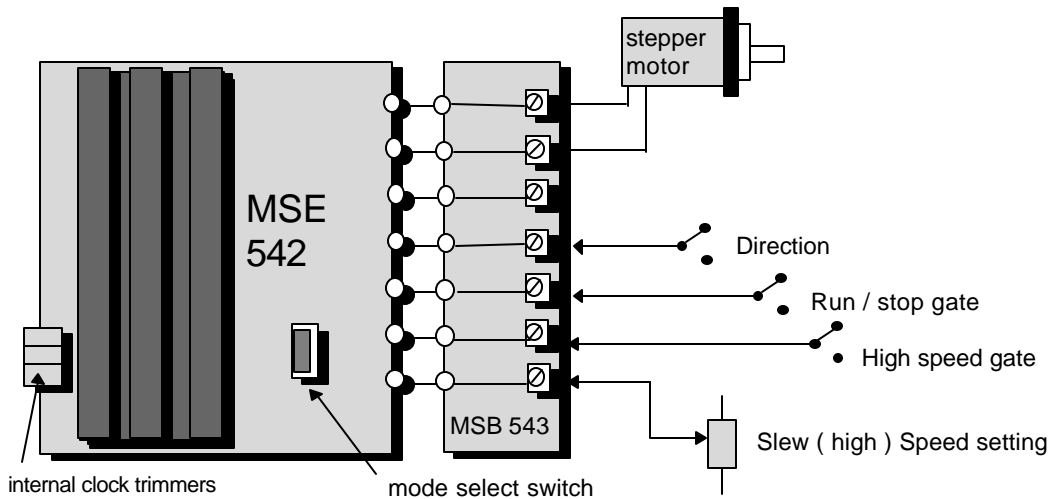
## using external clock and power reduction signals



The above drive status mode can be selected for use with either external or internal clock. Alternatively the mode switch may be used to select automatic power-down at standstill.

See data for MSE546 for mode switch control settings which are the same apart from the current settings, the values for which being as shown on the following page under the section entitled 'Power Supply Considerations'

## using internal clock ( voltage controlled oscillator )



## choice of internal clock operation

When the Run/stop gate is activated, before the High Speed gate, the motor will run at the Base ( SLOW ) speed set by the unit's on-board trimmer. Activating the High speed gate will cause the motor to accelerate to the high speed at a rate set by the on-board ramp trimmer.

Alternatively, if the High speed gate is permanently activated the unit will automatically ramp the motor to the high speed setting when the run/stop gate is activated. If a change of state on the Direction input line is detected, the on-board oscillator will automatically ramp the motor down to the base speed setting before reversing the motor and then ramp it back up to full speed.

This facility simplifies the use of the system under manual control and eliminates the possibility of motor stalling when reversal at high speed is required.

Type without front panel Type with front panel		<b>MSE 542 PM 542</b>	Notes
Supply voltage	Vdc	15-30	Max ripple: 3 V peak/peak
Current consumption	Amps	1 - 3	Depending on motor current selected
Output stage		2 phase Bi-polar	
Output current per phase	Amps	0.5 to 2.0	set by on-board DIP switch
Step logic		Full step / Half step	set by on-board DIP switch
Control Signals	Vdc	3-5 or 10-30	optically isolated
External current setting		25 - 90%	using external 10K Ohm potentiometer
Current reduction @ standstill		typically 20 - 25%	using on-board current setting
Current reduction selection		automatic or external	set by on-board DIP switch
Thermal Warning		front panel status lamp	and output signal @ 80°C
Thermal shutdown		automatic or external	set by on-board DIP switch
Enable / inhibit		External signal	sense set by on-board DIP switch
Direction		External signal	sense set by on-board DIP switch
External Clock signal		one step per pulse	Opto-isolated input
Max input frequency	KHz	20	6 µsec. minimum pulse width
Internal clock functions			Opto-isolated inputs
Low frequency range ( BASE )	KHz	0.002 to 0.7	set by front panel trimmer
Slew frequency range ( HIGH )	KHz	0.6 to 18	set by external 10 K Ohm potentiometer
Acceleration/ decel. RAMP		adjustable	set by front panel trimmer
Auto-Ramp on reverse signal		Optional	depending on gating procedure
Front panel Status Lamp		Green	Drive OK. & enabled
		Yellow	Drive not enabled
		Red	Fault: Over temperature
Status output signal	mA	10 max.	Optically isolated: ON when OK
Operating ambient temperature	°C	0-30	Use forced cooling for operation at higher temperatures
Dimensions	mm	228 long x 100 x 34	Uses 3U x 7E wide front panel
Recommended Motherboard		MSB543	

## Power Supply considerations

For single axis operation, any motor can be used with the PM171 Power Supply.

For Multi-axis applications use the following table to select the power supply required:

Standard drive current settings	0.5 A	0.8 A	1.0A	1.2 A	1.4 A	1.6 A	1.8 A	2.0A
Typical Current Consumption	1.0 A	1.3 A	1.5 A	1.7 A	2.0 A	2.2 A	2.5 A	3.0 A

The above drive current values may be selected using the on-board mode selection switch. Alternatively an external potentiometer may be used to set intermediate values.

## Typical drive / motor combinations

Motor	17HS-020E	23HS-102X	23HS-104	23HS-304	34HS-106
connection	single winding	coils in parallel	coils in parallel	coils in parallel	coils in series
Drive setting	1 Amp	1.4 Amps	2.0 Amps	2.0 Amps	2.0 Amps

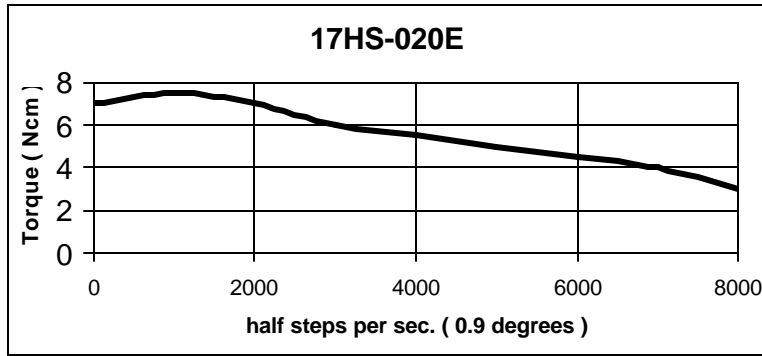
## Recommended Racked 24 Vdc Power Supplies

PM171: 3 Amp rating for single axis installations

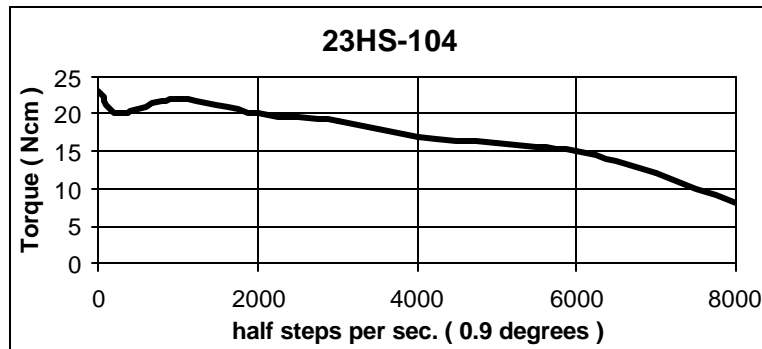
PM172 6 Amp rating for multi-axis applications

PM173 12 Amp rating for multi-axis applications

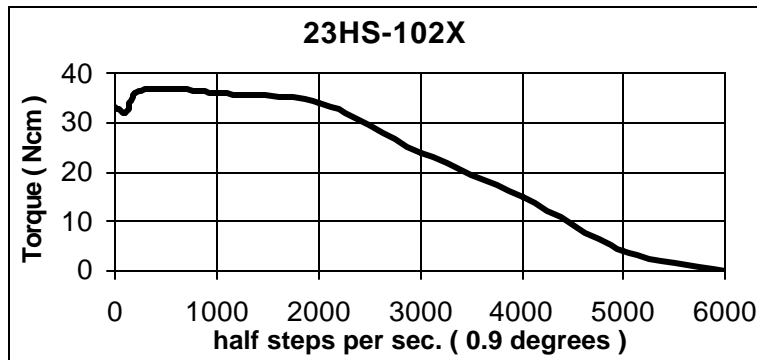
# Performance using MSE542 with 24Vdc supply



Single winding, 1.0 amps per phase



Coils in parallel, 2.0 amps per phase



Coils in parallel, 1.3 amps per phase



Coils in parallel, 2.0 amps per phase