

MSE40 Data Sheet

MSE40 series 6-12 Watt DC Servo Amplifier Module

The MSE40 series DC servo amplifier is ideally suited to instrumentation applications that require accurate velocity or positional control using analogue control techniques. The unit is a circuit board module designed for incorporation in customers control cabinets. It can be used in conjunction with the DC power supply module type MSE47 which will power up to three MSE40 axes depending on the application's load requirements.

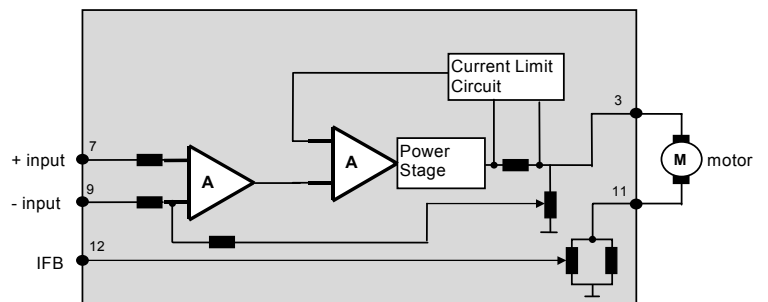
Two amplifier models are available, type MSE40 providing a maximum 0.5 Amps while MSE40-1 provides a maximum 1.0 amp output to the servo motor. The MSE40 series are 'in-service proven' amplifiers which have established a reputation for many years trouble-free service when used with the range of instrument servo motors and geared motor units.



Amplifier Block Diagram

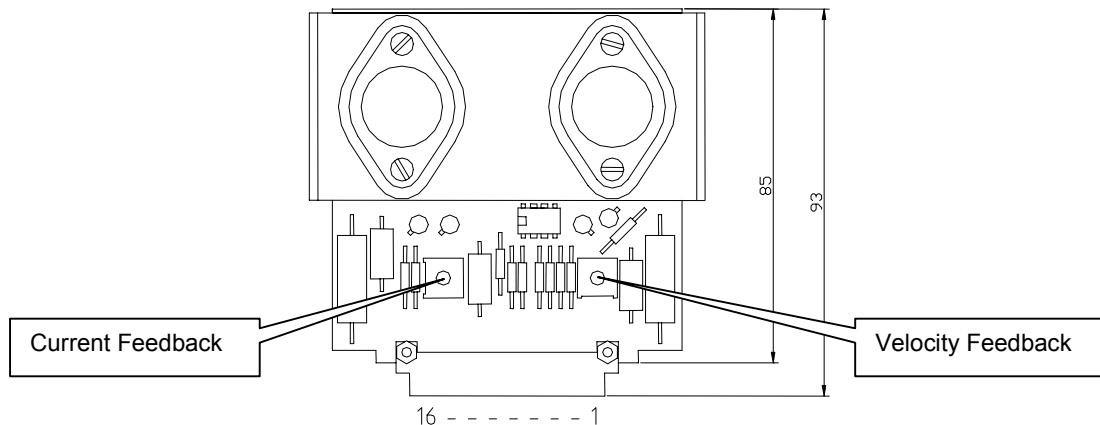
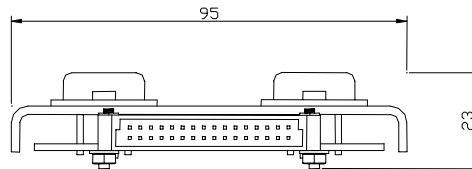
The MSE40 provides bi-directional control of the servo motor and incorporates a current limit circuit to protect the motor and amplifier against stall conditions. The unit utilises an operational amplifier to control the power stage together with both voltage and current feedback circuitry.

On-board trimmers enable the amplifier gain and current feedback (IFB) to be adjusted to ensure stable operation in both positional and velocity control applications



Dimensions

Height:	23 mm
Width:	95 mm
Length:	93 mm
Weight:	110g



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Specification

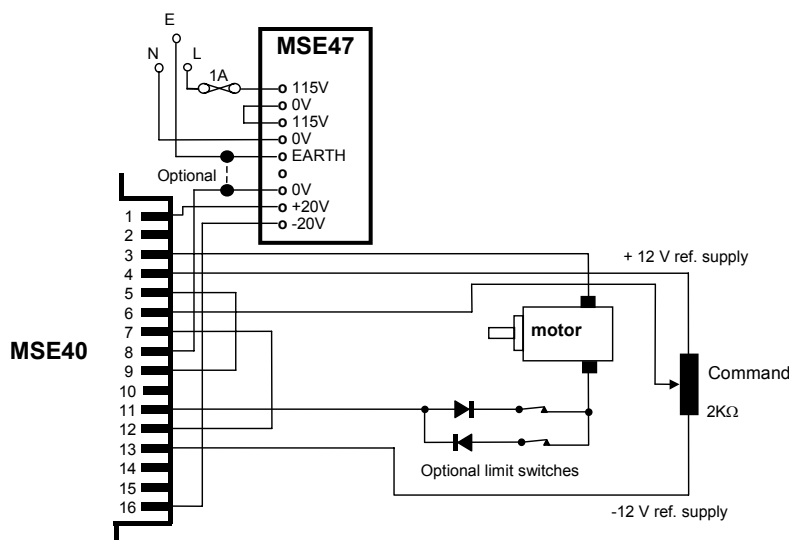
Model		MSE40	MSE40-1
Description		DC Servo amplifier	DC Servo amplifier
Supply	V	± 20 to ± 24	± 20 to ± 24
Output stage design		Low Noise Linear	Low Noise Linear
Maximum output voltage	V	-14 to +14	-14 to +14
Maximum continuous current	A	0.5	1.0
Output Reference supply	V	± 12 & ± 16	
Input Command signal range		± 12 V or 4-20 mA using external interface circuit	
Velocity control options		Bi-directional velocity control up to 100:1 speed range motor armature current or DC tachogenerator feedback	
Position control options		Positional servo control up to 500:1 resolution. Analogue positional transducer, typically 2K Ω potentiometer	

Matched Power Supply	MSE47
Suitable supplies	115 or 230 Vac, 50 or 60 Hz
Output Rating	+20V and -20V @ 1.5 Amps

Connections

Connection	Terminal	Comment
Supply Input +20/24V	1	
Output +16V	2	Zener Regulated
Motor Output	3	
+ Pot Supply (+12V)	4	+16V fed via 120R resistor
Velocity Feedback	5	
Velocity input +/- 12V	6	
Feedback Input	7	
0V	8	
Positional Input +/- 12V	9	
	10	No Connection
Motor Return	11	
Current feedback output	12	
-Pot supply output (-12V)	13	+16V fed via 120R resistor
	14	No Connection
Output -16V	15	Zener Regulated
Supply Input -20/24V	16	

Using the MSE40 amplifier as a velocity servo

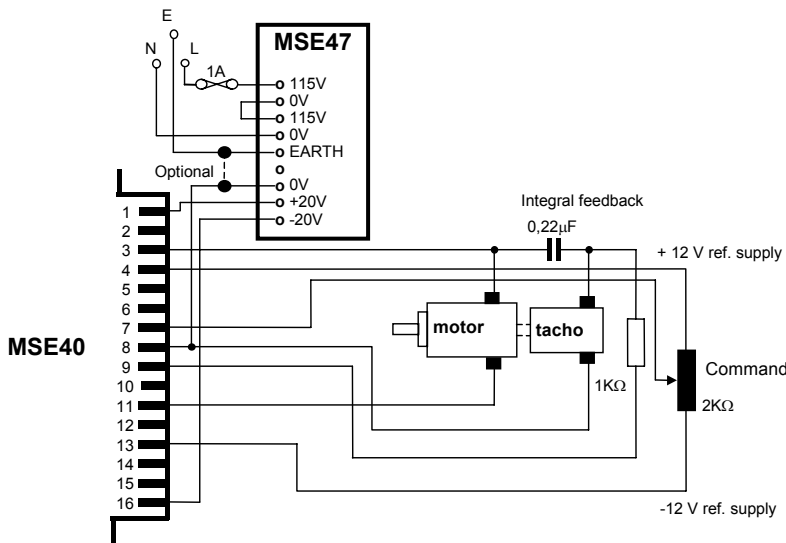


The MSE40 series may be used as a variable speed bi-directional velocity controller by connecting the unit as shown. In this mode motor speed is proportional to the command signal which may either be derived from a 2K Ohm potentiometer as shown or by means of an external signal of typically ± 10 V applied to terminal 7.

By monitoring motor armature current, speed variations which might occur as a result of changing load conditions are automatically compensated by the MSE40 unit. The system gain can be adjusted by means of the current feedback trimmer. Using this technique, a speed range in excess of 25:1 is achieved at full motor torque.

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Using the MSE40 amplifier as a velocity servo with tacho feedback



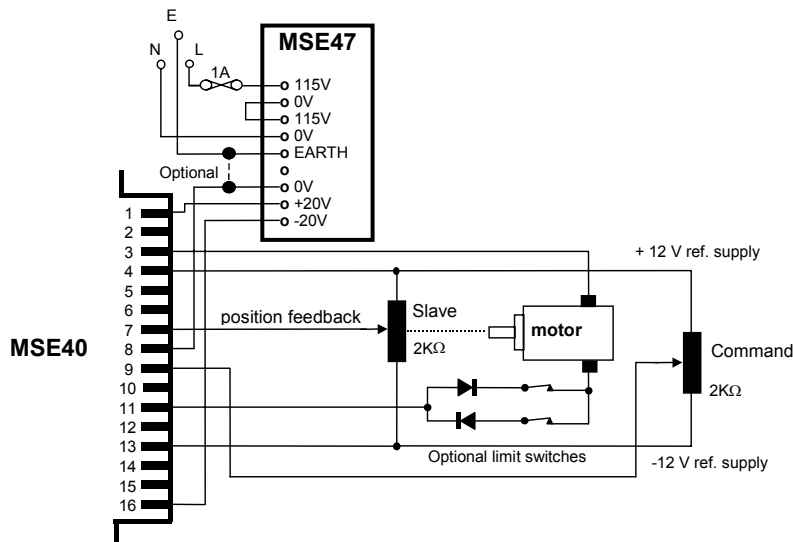
Alternatively where increased speed stability and overall speed range is required a motor equipped with a DC tachogenerator (tacho) may be employed. Using this method, a speed range of 100:1 can be achieved.

The input signal from the tacho should not exceed $\pm 12V$. If the tacho to be used has an output signal that is higher, a resistor divider network can be used to reduce the signal to an acceptable level.

When used with a tacho, the *voltage feedback* should be set as high as possible consistent with good stability. When connecting the tacho, the polarity of the feedback signal should be the same as that of the command signal.

To ensure good system stability is achieved, most motor/tacho assemblies should be used in conjunction with an integral feedback circuit consisting of a resistor/capacitor network. Typical values are shown.

Using the MSE40 amplifier as a positional servo



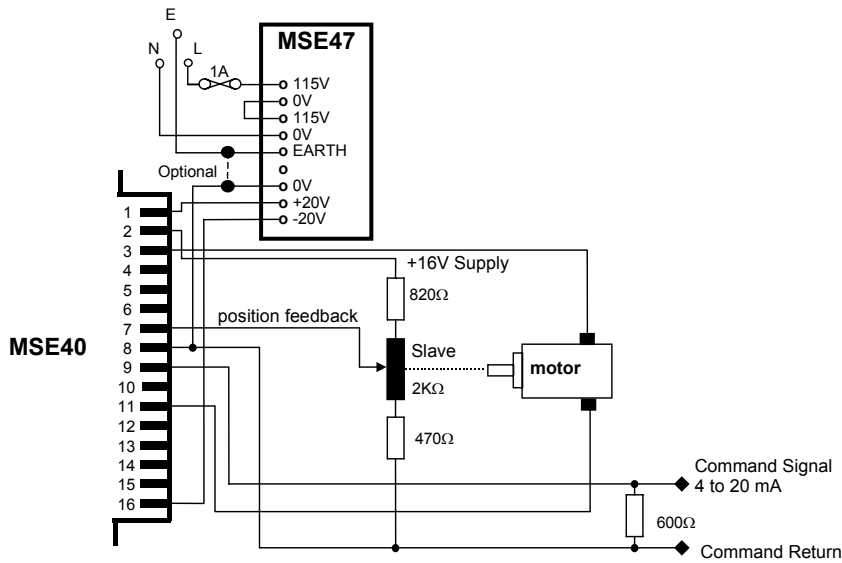
In this mode, the amplifier will control the servomotor's position. The output of a positional transducer, such as a servo potentiometer connected to the driven mechanism, is compared within the MSE40 with the command signal. The motor is then driven until the error is zeroed.

Using this approach, a positional resolution in excess of 500:1 can be obtained. This technique can also be applied to tensioning and load control mechanisms by using a load cell coupled to the driven mechanism as the slave transducer.

For positional instrumentation drives, a special version of the P5 series geared servo motor programme is available with a choice of servo potentiometers coupled to the output stage of the gearbox

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Using the MSE40 amplifier as a positional servo with current command signal



In this mode, the amplifier will control the servomotor's position according to the value of the command current. The most common current command signal is 4 to 20 mA. The connection details and the resistor values shown are for this type of signal.

Using the +16V supply voltage from the MSE40, balance resistors of 820Ω and 470Ω should be added in series with the slave signals.

NOTE:

When connecting the system, the polarity of the feedback devices (potentiometer and tachogenerator) must be such that the motor moves the system toward rather than away from equilibrium.

Voltage Feedback Trimmer

The voltage feedback trimmer should be adjusted to give the optimum performance of the servo system as shown below.

