



Merlin Systems Corp. Ltd

Servo Air Muscle

Installation and Operation

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Electric + Pneumatic Supplies

The muscle electrical power must be from a properly voltage-stabilised supply of $5.0 \pm 0.25V$ (over temperature) delivering a minimum of 2.0A current.

The air supply should be 3-5 bar (normally 4 bar) at up to 20l/min.

The muscle must never be operated without an air supply

Several muscles on a single supply may require extra electrical or pneumatic capacity, according to usage (i.e. how many may be moving at once).

Forces and Movement

Muscles should not be exposed to pull forces over about 20Kgf (200N):

The muscle can produce forces greater than this, and so must not be prevented from contracting.

The muscle must always remain in tension (never compressed end-to-end).

Neither end-block should twist more than 5° out of the line of pull during movement.

Maximum muscle length in extension is about 15% greater than nominal length, and minimum length under contraction about 15% less.

About 2-3Kg of tension is needed to achieve full extension.

The available contraction depends on the pressure of the air supply and on external loading –see specifications.

These factors do not affect the control position calibration, but may limit the range of positions which can actually be reached.

Physical Fitting

The ‘fixed’ end (with airline and electrical connectors) is secured using the four M3 mounting holes provided.

The central assembly bolts holding the end-blocks together must never be undone!

The ‘free end’ block can also be rigidly mounted, as long as the block remains in-line throughout its movement.

Alternatively a flexible connection, centred on the muscle axis, can be made by using the drilled holes in end of the block (either side of the exhaust valve) :

To fit, push the cord into the end hole, push through the fixing hole to the top surface with a thin rod and tie off with a stopper knot. A 2mm braided nylon cord with sealed ends works well.

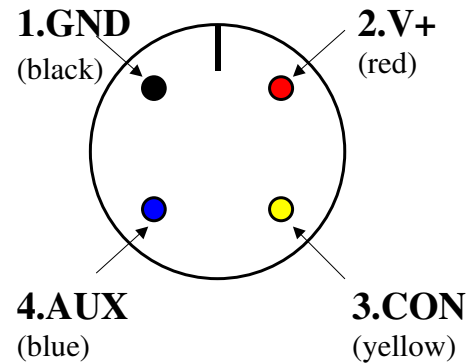
Wiring Connections

Muscles have a 3- or 4-wire connection (depending on interface type) via a 2-part circular connector, as shown:

Pins are shown here looking at the side of the muscle end-block :-

1. GND ground connection
2. V+ power supply voltage
3. CON control signal
4. AUX extra signal

(If your muscle has a pre-wired connector, wire colours will be as indicated)



The 'CON' signal carries the main control function: This is an RS232 serial signal (RS232 TX) for the ASCII interface, a digital pulse for PULSE interface, or an analog voltage for the VOLTAGE interface.

The 'AUX' signal is only used in the ASCII interface version, when it carries command responses (on the RS232 RX line).

For the ASCII-interface muscle, the connections to a standard PC 9-pin D-type port are :-

Wire		RS232	pin No.
GND (black)	==	GND	5
CON (yellow)	←	TX	3
AUX (blue)	→	RX	2

Grouping Muscles on a Bus

In principle, multiple muscles (up to 50) can be connected in parallel to the same bus wires.

The best arrangement for many muscles is to lay a single main bus cable, and connect each individual unit via a short stub connected at a T-junction –

