MS4105, MS7505, MS8105 Spring Return Direct Coupled Actuators (DCA) are used within heating, ventilating, and air-conditioning (HVAC) systems. They can drive a variety of quarter-turn, final control elements requiring spring return fail-safe operation.

Applications include:
- Volume control dampers, mounted directly to the drive shaft or remotely (with the use of accessory hardware).
- Quarter-turn rotary valves, such as ball or butterfly valves mounted directly to the drive shaft.
- Linear stroke globe or cage valves mounted with linkages to provide linear actuation.

FEATURES
- Brushless DC submotor with electronic stall protection for floating/modulating models.
- Brush DC submotor with electronic stall protection for 2-position models.
- Self-centering shaft adapter (shaft coupling) for wide range of shaft sizes.
- Models available for use with two-position, single pole single throw (spst), line- (Series 40) or low- (Series 80) voltage controls.
- Models available for use with floating or switched single-pole, double-throw (spdt) (Series 60) controls.
- Models available for use with proportional current or voltage (Series 70) controls.
- Models available with combined floating/modulating control in a single device.
- Access cover to facilitate connectivity.
- Metal housing with built-in mechanical end limits.
- Spring return direction field-selectable.
- Manual winding capability with locking function.
- UL (cUL) listed and CE compliant.
- All Models are plenum-rated per UL873.

SPECIFICATIONS

Torque Ratings:
- Typical Holding, Driving, Spring Return: 44 lb-in. (5 N•m).
- Stall Maximum (fully open at 75°F): 100 lb-in. (11.3 N•m).

Electrical Ratings:
- See Table 1.

Electrical Connections:
- Field wiring 14 to 22 AWG (2.0 to 0.344 mm sq) to screw terminals, located under the removable access cover.

Stroke:
- 95° ±3°, mechanically limited.

Controller Type:
- See Models.
- Modulating (Series 70) or Floating (Series 60); controlled by selector switch.
- Input Impedance: 95K ohms minimum.
- Feedback Signal: 0 or 2-10 Vdc; Driving current is 3 mA minimum.

Timing (At Rated Torque and Voltage):
- Drive Open (typical):
  - Floating, Modulating Models: 90 seconds.
  - Two-Position Models: 45 seconds ±5 seconds.
- Spring Close: 20 seconds typical.

Temperature Ratings:
- Ambient: -40°F to 140°F (-40°C to 60°C).
- Shipping and Storage: -40°F to 158°F (-40°C to 70°C).

Humidity Ratings:
- 5% to 95% RH noncondensing.

Design Life (at Rated Voltage):
- Two-position models: 50,000 full stroke cycles; 50,000 full stroke spring returns.
- Floating and Modulating models: 60,000 full stroke cycles; 1,500,000 repositions; 60,000 full stroke spring returns.

End Switches (Two SPDT):
- Settings (fixed): 7° nominal stroke, 85° nominal stroke.
- Ratings (maximum load):
  - Low-Voltage Models: 250 Vac, 5A resistive, 3A inductive.
  - Line-Voltage Models: 250 Vac, 5A resistive.

Dimensions:
- See Fig. 1.
**Models:**

<table>
<thead>
<tr>
<th>S</th>
<th>Spring Return Fail Safe Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>05</td>
<td>44 lb-in. (5 N•m); Spring Return Only</td>
</tr>
<tr>
<td>24-2POS</td>
<td>24 Vac Two-Position Control</td>
</tr>
<tr>
<td>120-2POS</td>
<td>120 Vac Two-Position Control</td>
</tr>
<tr>
<td>230-2POS</td>
<td>230 Vac Two-Position Control</td>
</tr>
<tr>
<td>010</td>
<td>24 Vac Modulating and Floating Control</td>
</tr>
<tr>
<td></td>
<td>Fixed Zero/Span, No End Switches</td>
</tr>
<tr>
<td>S</td>
<td>05</td>
</tr>
</tbody>
</table>

**Accessories:**
- 27518 Balljoint (5/16 in.)
- 103598 Balljoint (1/4 in.)
- 205860 Electronic Minimum Position Potentiometer
- 27520A-E,G,H-L,Q Pushrod (5/16 in. diameter)
- 32000085-001 Water-tight Cable Gland/Strain-relief Fitting (10 pack)
- 32003036-001 Weather Enclosure
- 32004254-002 Self-Centering Shaft Adapter (supplied with actuator)
- 50001194-001 Foot Mount Kit
- 50005859-001 NEMA4/4X Enclosure
- 50006427-001 Anti-Rotation Bracket (supplied with actuator)
- SW2-US Auxiliary Switch Package
- See also Form 62-2620

**Fig. 1. Dimensional drawing of actuator in in. (mm).**

**Table 1. Electrical Ratings.**

<table>
<thead>
<tr>
<th>Model(s)</th>
<th>Power Input</th>
<th>Frequency</th>
<th>Power Consumption (VA)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Voltage</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Floating, Modulating</td>
<td>24 Vac ±20% (Class 2), 24 Vdc</td>
<td>50/60 Hz.</td>
</tr>
<tr>
<td></td>
<td>Two-Position, Low-voltage</td>
<td>24 Vac ±20% (Class 2), 24 Vdc</td>
<td>50/60 Hz.</td>
</tr>
<tr>
<td></td>
<td>Two-Position, Line-voltage</td>
<td>100-250 Vac</td>
<td>50/60 Hz.</td>
</tr>
</tbody>
</table>

**Table 2. O.S. Number Selection.**

<table>
<thead>
<tr>
<th>E</th>
<th>Electrical Motor</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>Fail Safe Function (Spring Return)</td>
</tr>
<tr>
<td>41</td>
<td>120 Vac Two-Position Control; Reversible Mount</td>
</tr>
<tr>
<td>75</td>
<td>24 Vac Modulating and Floating Control; Reversible Mount</td>
</tr>
<tr>
<td>81</td>
<td>24 Vac Two-Position Control; Reversible Mount</td>
</tr>
<tr>
<td>05</td>
<td>44 lb-in. (5 N•m)</td>
</tr>
<tr>
<td>A</td>
<td>Standard U.S. Model</td>
</tr>
<tr>
<td>B</td>
<td>Standard European Model</td>
</tr>
<tr>
<td>1</td>
<td>No Feedback</td>
</tr>
<tr>
<td>2</td>
<td>Voltage Feedback Signal</td>
</tr>
<tr>
<td>0</td>
<td>No End Switches</td>
</tr>
<tr>
<td>XX</td>
<td>System Controlled Numbers</td>
</tr>
</tbody>
</table>

**TYPICAL SPECIFICATION**

Spring return actuators shall be direct coupled type requiring neither crankarm nor linkage and be capable of direct mounting to a jackshaft of up to 1.05 in. diameter. The actuator shall connect to the shaft using a removable output hub with a self-centering shaft coupling. This coupling shall provide concentric mounting and include an integral adjustable range-stop mechanism.

The actuator shall provide two-position, floating, or proportional control. Proportional control refers to direct acceptance of 0-10 Vdc, 2-10 Vdc or—with addition of a 500 ohm resistor—a 4-20 mA input signal. Proportional and floating control models provide a 2-10 Vdc feedback signal. Actuators shall provide wiring terminals located within an integral access cover with conduit connections. Proportional and floating actuators shall have a rotation direction control switch accessible on the cover. Proportional and floating actuators shall use a brushless DC submotor. Two-position actuators shall use a brush DC submotor with a microprocessor control protected from overload at all angles of rotation.

All spring return actuators must be designed for either clockwise or counterclockwise fail-safe operation with a continuously engaged mechanical return spring. This spring must return the actuator to a fail-safe position within 20 seconds of power loss. All actuators shall provide a means of manually positioning the output hub in the absence of power. All actuators shall be designed for a minimum of 50,000 full-stroke cycles at actuator rated torque and temperature, 50,000 spring-return cycles and 1,500,000 repositions as documented in the product literature. Run time shall be constant and independent of: load, temperature, and supply voltage (within specifications). All actuators shall be UL873 and cUL (CSA22.2) listed, have a five year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Honeywell.

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