

S05, S10, S20 Series Spring Return Direct Coupled Actuators

CS4105, CS4110, CS4120, CS7505, CS7510, CS7520, CS8105,
CS8110, CS8120

PRODUCT DATA



APPLICATION

CS41XX, CS75XX, CS81XX 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 with three torque ratings: 44 lb-in. (5 N•m), 88 lb-in. (10 N•m), and 175 lb-in. (20 N•m).
- Models available for use with two-position, single pole single throw (spst), line-voltage or low-voltage controls.
- Models available for use with floating or switched single-pole, double-throw (spdt) controls.
- Models available for use with proportional current or voltage controls.
- Models available with combined floating/modulating control in a single device.
- Models available with adjustable zero and span.
- Models available with line-voltage internal and switches.
- Access cover to facilitate connectivity.
- Metal housing with built-in mechanical end limits.
- Spring return direction field-selectable.
- Shaft position indicator and scale.
- Manual winding capability with locking function.
- UL (cUL) listed and CE compliant.
- All Models are plenum-rated per UL873.



SPECIFICATIONS

Models: See Tables 2, 3 and 4.

Dimensions: See Fig. 1.

Device Weight: 7 lb (3.2 kg).

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.

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

Electrical Ratings: See Table 1.

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.

Mounting: Self-centering shaft adapter (shaft coupling).
Round Damper Shafts: 0.375 to 1.06 in. (10 to 27 mm).
Square Damper Shafts: 1/2 to 3/4 in. (13 to 19 mm).
Actuator can be mounted with shaft in any position.

NOTE: For 175 lb-in. (20 N•m) models: 3/4 in. or greater shaft diameter recommended.

Minimum Damper Shaft Length: 1 in. (25 mm); 3 in. (76 mm) recommended.

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.

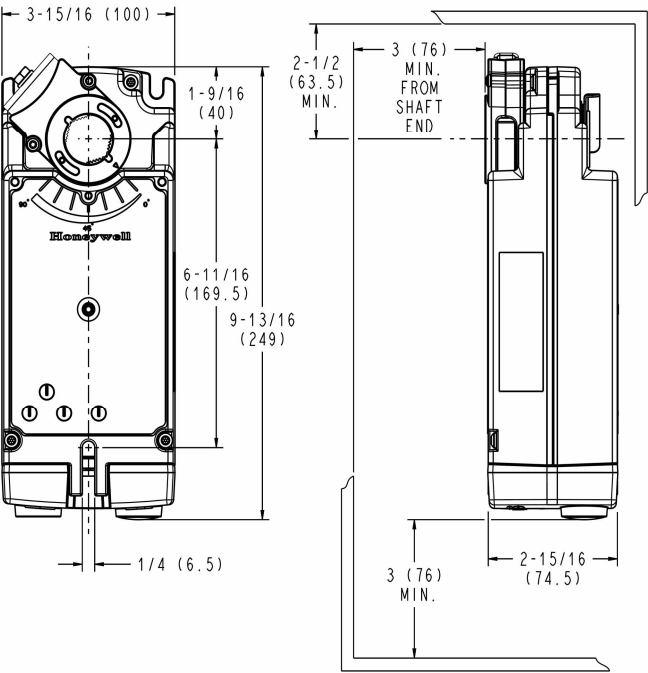


Fig. 1. Dimensional drawing of actuator in in. (mm).

Table 1. Electrical Ratings.

Model(s)	Power Input		Power Consumption (VA)					
	Voltage	Frequency	44 lb-in. (5 N•m)		88 lb-in. (10 N•m)		175 lb-in. (20 N•m)	
			Driving	Holding	Driving	Holding	Driving	Holding
Floating, Modulating	24 VAC±20% (Class 2), 24 VDC	50/60 Hz.	13	5	14	5	16	5
Two-Position, Low-voltage	24 VAC±20% (Class 2), 24 VDC	50/60 Hz.	25	8	30	8	40	8
Two-Position, Line-voltage	100-250 VAC	50/60 Hz.	45	13	45	13	60	13

ORDERING INFORMATION

If you have additional questions, need further information, or would like to comment on our products or services, please write or phone:

1. Your local Honeywell Automation and Control Products Sales Office (check white pages of your phone directory).
2. Honeywell ECC Customer Care
35F., Tower A, City Center 100 Zun Yi Road
Shanghai 200051 China Tel: (86-21) 5257 4568

International Sales and Service Offices in all principal cities of the world. Manufacturing in Australia, Finland, France, Germany, Japan, Mexico, Netherlands, Spain, Taiwan, United Kingdom, P.R.C.

Table 2. O.S. Number Selection (see Table 3 also).

C	Motorized Actuator									
S	Fail Safe Function (Spring Return)									
41	100-250 VAC Two-Position Control; Reversible Mount									
75	24 VAC/VDC Modulating and Floating Control; Reversible Mount									
81	24 VAC/VDC Two-Position Control; Reversible Mount									
05	44 lb-in. (5 N•m)									
10	88 lb-in. (10 N•m)									
20	175 lb-in. (20 N•m)									
A ^a	Standard U.S. Model									
B ^b	Standard European Model									
E ^b	Selectable control signal; Adjustable zero and span; Includes service and auto-adapt modes									
H ^a										
1	No Feedback									
2	Voltage Feedback Signal									
0	No End Switches									
2	Two End Switches									
X X	System Controlled Numbers									
C	S	75	20	A	2	0	X	X		

^a Model manufactured for sale in the United States.^b Model manufactured for sale in Europe.**Table 3. Actuator Catalog Numbering (see Table 2 also).**

S	Spring Return Fail Safe Mode									
N	Non-Spring Return Fail Safe Mode									
05	44 lb-in. (5 N•m); Spring Return Only									
10	88 lb-in. (10 N•m); Spring Return Only									
20	175 lb-in. (20 N•m)									
34	300 lb-in. (34 N•m); Non-Spring Return Only									
24	24 VAC/VDC Floating Control									
24-2POS	24 VAC/VDC Two-Position Control									
120-2POS	120 VAC Two-Position Control									
230-2POS	230 VAC Two-Position Control									
010	24 VAC/VDC Modulating and Floating Control									
	Fixed Zero/Span, No End Switches									
-SW2	Internal End Switches									
-SER ^a	Enhanced Modulating; Adjustable Zero/Span									
S	10	24-2POS	-SW2							

^a Enhanced models include two internal end switches.**Table 4. Available Model**

Model	Description
CS4105A1002	100-250 VAC Two-Position Control; Reversible Mount; 5N•m; Standard U.S Model; No Feedback; No End Switches;
CS4110A1002	100-250 VAC Two-Position Control; Reversible Mount; 10N•m; Standard U.S Model; No Feedback; No End Switches;
CS4110A1200	100-250 VAC Two-Position Control; Reversible Mount; 10N•m; Standard U.S Model; No Feedback; Two End Switches;
CS4120A1001	100-250 VAC Two-Position Control; Reversible Mount; 20N•m; Standard U.S Model; No Feedback; No End Switches;
CS4120A1209	100-250 VAC Two-Position Control; Reversible Mount; 20N•m; Standard U.S Model; No Feedback; Two End Switches;
CS7505A2008	24 VAC/VDC Modulating and Floating Control; Reversible Mount; 5N•m; Standard U.S Model; Voltage Feedback Signal; No End Switches;
CS7510A2008	24 VAC/VDC Modulating and Floating Control; Reversible Mount; 10N•m; Standard U.S Model; Voltage Feedback Signal; No End Switches;
CS7510A2206	24 VAC/VDC Modulating and Floating Control; Reversible Mount; 10N•m; Standard U.S Model; Voltage Feedback Signal; Two End Switches;
CS7510H2209	24 VAC/VDC Modulating and Floating Control; Reversible Mount; 10N•m; Selectable control signal; Adjustable zero and span; Includes service and auto-adapt modes; Voltage Feedback Signal; Two End Switches;
CS7520A2007	24 VAC/VDC Modulating and Floating Control; Reversible Mount; 20N•m; Standard U.S Model; Voltage Feedback Signal; No End Switches;
CS7520A2205	24 VAC/VDC Modulating and Floating Control; Reversible Mount; 20N•m; Standard U.S Model; Voltage Feedback Signal; Two End Switches;
CS7520H2208	24 VAC/VDC Modulating and Floating Control; Reversible Mount; 20N•m; Selectable control signal; Adjustable zero and span; Includes service and auto-adapt modes; Voltage Feedback Signal; Two End Switches;
CS8105A1008	24 VAC/VDC Two-Position Control; Reversible Mount; 5N•m; Standard U.S Model; No Feedback; No End Switches;
CS8110A1008	24 VAC/VDC Two-Position Control; Reversible Mount; 10N•m; Standard U.S Model; No Feedback; No End Switches;
CS8110A1206	24 VAC/VDC Two-Position Control; Reversible Mount; 10N•m; Standard U.S Model; No Feedback; Two End Switches;
CS8120A1007	24 VAC/VDC Two-Position Control; Reversible Mount; 20N•m; Standard U.S Model; No Feedback; No End Switches;
CS8120A1205	24 VAC/VDC Two-Position Control; Reversible Mount; 20N•m; Standard U.S Model; No Feedback; Two End Switches;

Stroke: 95° ±3°, mechanically limited.

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.

Controller Type:

S05, S10, S20: See Table 3.

S05, S10, S20: Modulating or Floating; controlled by selector switch.

Input Impedance: 95K ohms minimum.

Feedback Signal: 0-10 VDC or 2-10 VDC;

Driving current is 3 mA minimum.

Torque Ratings:

Typical Holding, Driving, Spring Return:

S05: 44 lb-in. (5 N•m).

S10: 88 lb-in. (10 N•m).

S20: 175 lb-in. (20 N•m).

Stall Maximum (fully open at 24°C):

S05: 100 lb-in. (11.3 N•m).

S10: 200 lb-in. (22.6 N•m).

S20: 350 lb-in. (39.6 N•m).

Noise Rating at 1m (Maximum):

Holding: 20 dBA (no audible noise).

Two-position models:

Driving: 50 dBA.

Spring Return: 65 dBA.

Floating and Modulating models:

Driving: 40 dBA.

Spring Return: 50 dBA.

Environmental Protection Ratings:

NEMA2 (US Models) or IP54 (European Models) when mounted on a horizontal shaft with access cover below the shaft.

Approvals: See Table 5.

Table 5. Approvals.

UL/cUL	✓
UL873 Plenum Rating, File No. E4436; Guide No. XAPX.	✓
CE	✓
C-TICK	✓

Accessories:

32004254-002 Self-Centering Shaft Adapter (supplied with actuator).

50030966-001 Anti-Rotation Bracket (supplied with actuator).

6174215 Extension Screw (supplied with actuator).

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).

5450074 Water-tight Cable Gland/Strain-relief Fitting (supplied with actuator).

32003036-001 Weather Enclosure.

50001194-001 Foot Mount Kit.

50005859-001 NEMA4/4X Enclosure.

SW2-US Auxiliary Switch Package.

See also Form 63-2620.

Sizing

Required Torque

In lieu of data from a Specification Engineer or Manufacturer, required torque for a given damper load can be determined using the following method:

$$T_R = T_D \times A_D$$

Where:

— T_R = Required torque for the damper load.

— T_D = Damper torque rating from the manufacturer, expressed in either (lb-in.)/(sq ft) or (N•m)/(sq m). the damper load.

— A_D = Damper area expressed in either sq ft or sq m.

Actuators Required

In lieu of data from a Specification Engineer or Manufacturer, the number of required actuators for a given damper load can be determined using the following method:

$$N = \frac{T_R}{T_A \times SF}$$

Where:

— N = Number of actuators.

— T_R = Required torque for the damper load. (See above.)

— T_A = Actuator torque rating.

— SF = Safety factor.

NOTE: The safety factor accounts for variables such as mis-alignments, aging of the damper, etc. 0.8 is a typical safety factor.

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