JOHNSON CONTROLS

PCS

M-9100 Series Electric Damper Actuators

Application

The M-9100 series direct-mount damper actuators are designed to regulate control air dampers and related equipment in heating, ventilating and air conditioning systems.

The M-9100 Series delivers up to 24 Nm of torque. Models with 3-point (floating) or proportional (0 (2) to 10 V and 0 (4) to 20 mA) input are available

Compact construction allows installation in confined spaces. Universal collar design provides direct coupling to round damper shafts up to 20 mm Ø or square damper shafts up to 16 mm.

Models are available in three torque sizes. They can be supplied with two SPDT auxiliary switches or feedback potentiometer.

Mechanical output torque is sufficient to position damper capacity up to approx. 6 m².

Operation

The M-9100 series actuator is, by means of a special collar, directly mounted on to the damper shaft. The universal mounting bracket supplied with the actuator will prevent movement of the actuator.
The angle of rotation is mechanically adjustable from 0 to 90 ° in 5-degree increments. When reaching the damper or actuator end position, the motor stops automatically eliminating the need for end switches. At the same time the current flow to the motor will be reduced by the integral electronic current limiting circuit.
The gear can be manually disengaged by simply moving down the spring loaded slider on the side of the actuator cover. Whilst the slider is moved down, the damper shaft can be manually rotated.

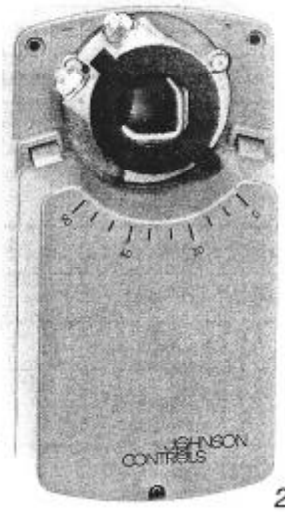

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Fig.1 M-9100 Electronic Damper Actuator

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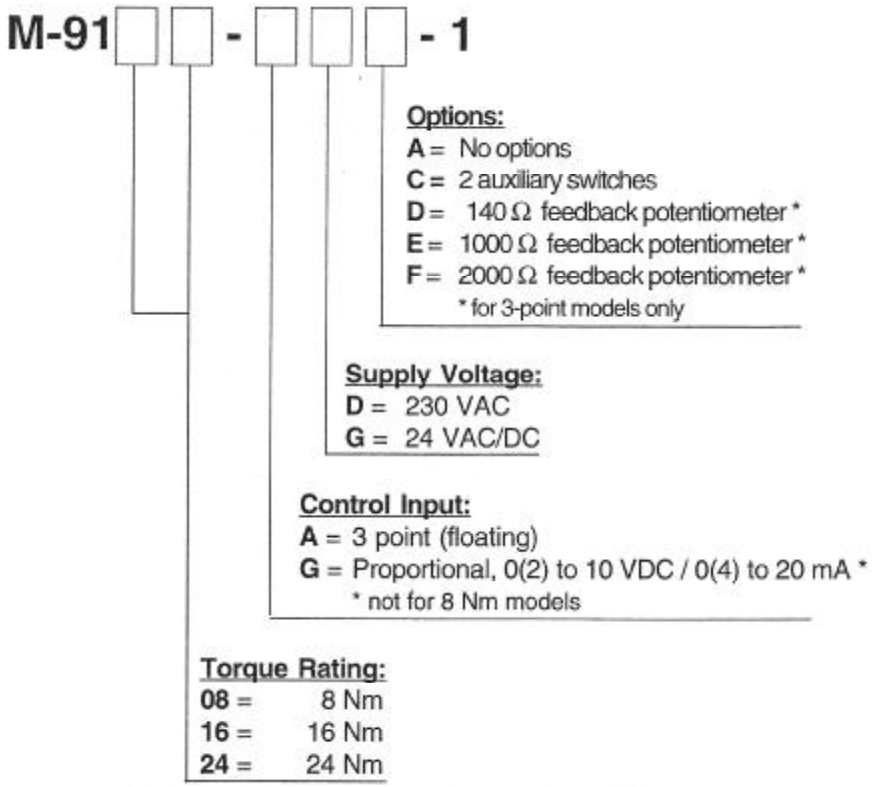
Features

- **Direct-mount. No linkage required**
  Saves installation time and cost; fewer moving parts to adjust and replace.
- **Electronic overload protection**
  Eliminates the need for end-switches. Reduces power consumption of the motor. Improves reliability of the actuator.
- **Manual override**
  Simplifies set-up and facilitates field adjustments. Allows emergency positioning.
- **Universal collar design**
  Provides a simple method for field adjustment of the angle of rotation.
- **Position indication**
  Damper blade position can easily be verified.
- **Available in three torque ratings**
  Position dampers up to approx. 6 m² to accomodate typical HVAC applications.

Specifications

Product	M-9108-A	M-9116-A	M-9124-A	M-9116-G	M-9124-G
Mechanical Outpurt (Torque)	8 Nm	16 Nm	24 Nm	16 Nm	24 Nm
Nominal 90 ° rotation Time (s)	30	80	125	80	125
Span Adjustment Range	0 to 90° in 5° increments				
Max. Damper Size (approx.)	2m²	4m²	6m²	4m²	6m²
Supply Voltage	230 VAC ± 10% 50-60 Hz or 24 VAC ± 20%50-60 Hz / 24 VDC ± 10%			24 VAC ± 20%50-60 Hz / 24 VDC ± 10%	
Power Rating	5.5 VA at 230 VAC and 6.5 VA at 24 VAC/DC			7.5 VA	
Control Input	3-point (floating)			0(2)...10V/ 0(4)...20mA	
Position Output	None			0(2)-10V, max. 2µA	
Electrical Connections	Screw terminals for 1.5 mm dia.				
Drive Shaft Dimensions	20 mm dia. round shaft 16 mm square shaft				
Case Dimensions	(L x W x H) 100 x 180 x 64.5 mm				
Case Material	Polycarbonate / ABS Plastic, Flame resistant				
Ambient Temp.	Operating: -20 to +50°C Shipping: -40 to +80°C				
Ambient R. H.	0 to 95% R. H. Non-condensing; max. dew point 29°C				
Protection Class	IP44 IP54 with cable entry PG11 (order separately)				
Noise Level	max. 45 dB (A)				
Auxiliary Switches (option)	2 Switches, rating 10(2)A 230V				
Feedback Pot. (option)	2000 Ω (140 Ω, 1000 Ω on request only)				
Shipping Weight	1100 g (24V Models) 1200 g (230V Models)				

Ordering Codes for Actuators



Ordering Codes for Mounting Accessories

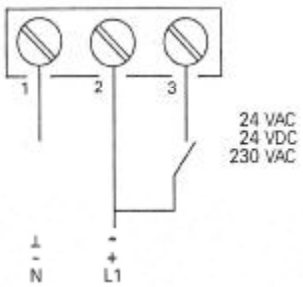
Ordering Code	Description
Accessories for indirect coupling (see page 8)	
M-9000-ZK	Complete set of accessories for indirect coupling
M-9000-ZKA	Crank arm to be fitted to the damper shaft
M-9000-ZKH	Crank arm/centre bolt to be fixed on the actuator
M-9000-ZKG	Two ball joints fixed to M-9000-ZKA and -ZKH
Mounting Bracket (see page 7)	

Connections and Settings on 3-point Models: M-9100-A

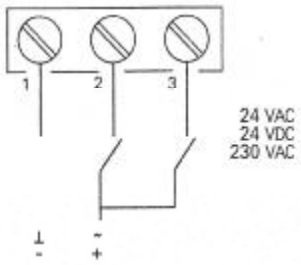
The M-9100-A actuators can be operated by a 3-point floating or ON/OFF signal on 24 V AC/DC or on 230 V AC. Triacs must not be used for DC operation of the actuators.

Electrical Connections 24 V AC/DC, 230 V AC

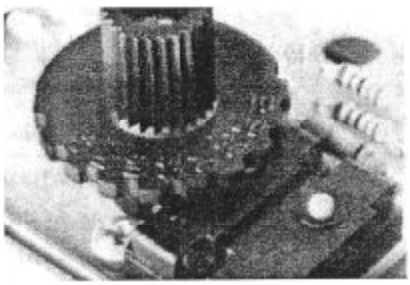
On/Off Control



Three point Control

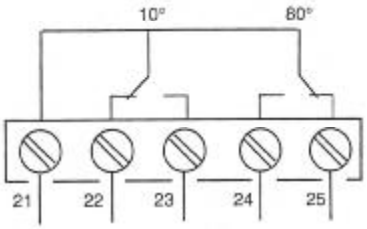


Auxiliary Switch Adjustment

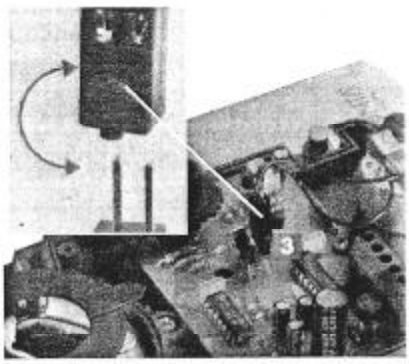


The built-in auxiliary swiches can be used for signalling end-positions or for performing switching functions at any angle between 0 and 90°.
(Factory adjustment 10°/80°)

Auxiliary Switches

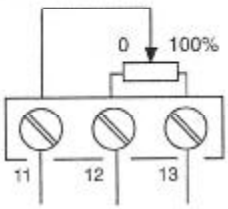


Direction of Rotation

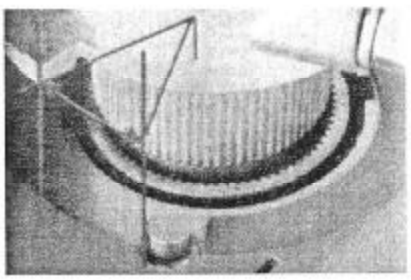


The direction of rotation of the actuator can be reversed by simply reversing the polarity of the **motor plug**.
(Factory adjustment: CW)

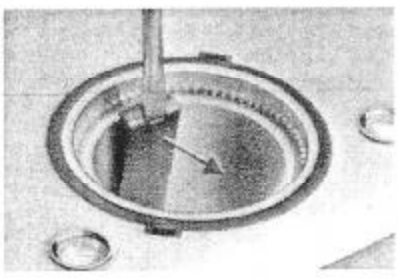
Potentiometer



Angle-of-Rotation Limiting



The angle-of-rotation or the working range can be limited mechanically by simply repositioning the adapter in 5° steps. The adapter is released by pressing the locking clip on the underside of the actuator.

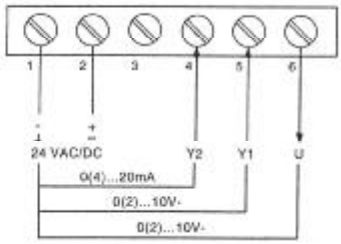


Connections and Settings on Proportional 0 to 10 V Models: M-9100-G

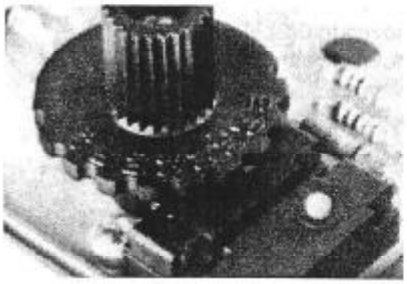
The M-9100-G actuators can be operated by electronic controllers with a control signal of 0(2)...10 V or 0(4)...20 mA.

Control signal Y1	0(2)...10 V
Input resistance Y1	100 kΩ
Control signal Y2	0(4)...20 mA
Input resistance Y2	max. 500 Ω
Output signal U	0(2)...10 V
Output resistance on signal U	>50 kΩ

Actuator Connections

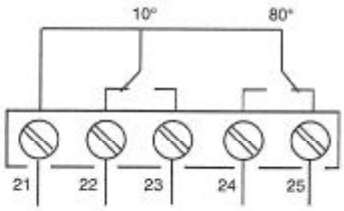


Auxiliary Switch Adjustment

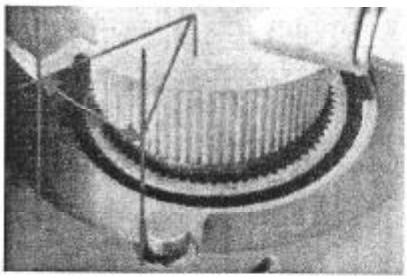


The built-in auxiliary swiches can be used for signalling end-positions or for performing switching functions at any angle between 0 and 90°.
(Factory adjustment 10°/80°)

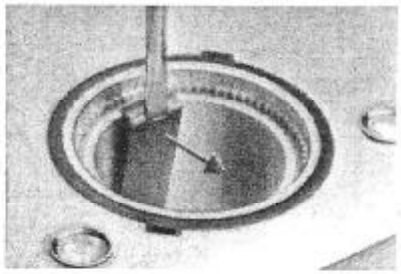
Auxiliary Swiches



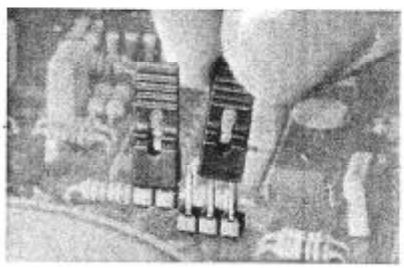
Angle of Rotation Limiting



The angle-of-rotation or the working range can be limited mechanically by simply repositioning the adapter in 5° steps. The adapter is released by pressing the locking clip on the underside of the actuator.



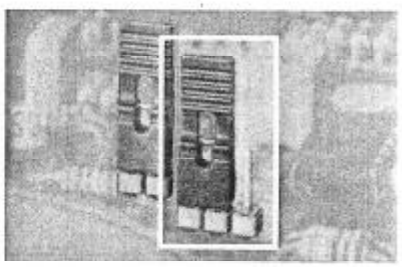
Direction of Rotation



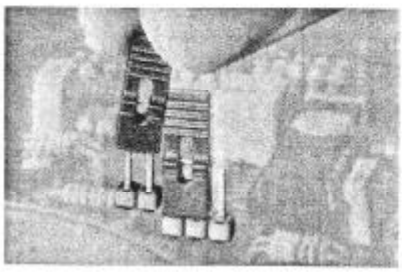
The direction of rotation of the actuator can be reversed by simply moving the **three pin connecting plug**. At the same time the output signal U (0(2)...10V) is reversed as well.

Important! For functional reasons the motor plug must not be reversed. (see page 4)

Factory Setting

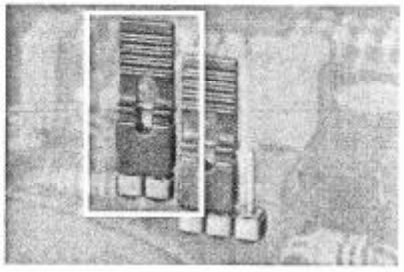


Control Signal

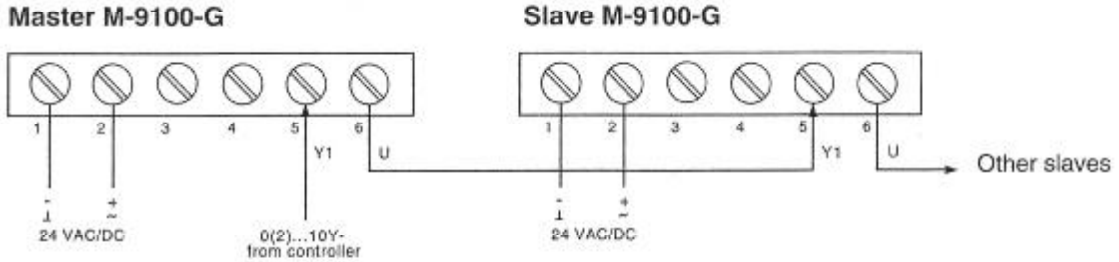


The control signals are set at 0...10V- and 0...20 mA. By removing the **two pin connecting plug** the control signals can be changed to 2...10 V- and 4...20 mA.

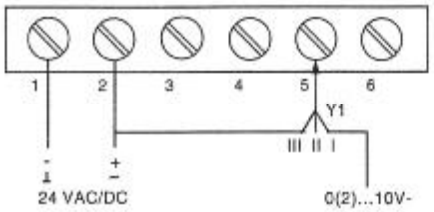
Factory Setting



Master/Slave control with M-9100-G Actuators

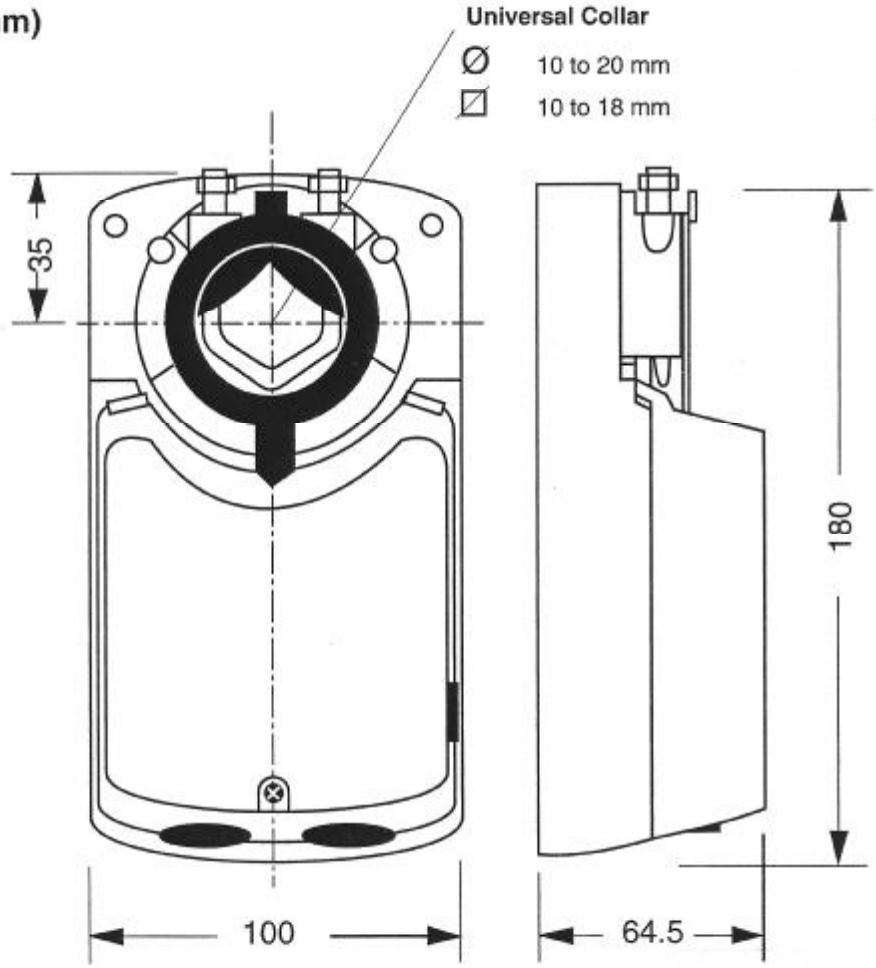


Override control with M-9100-G Actuator



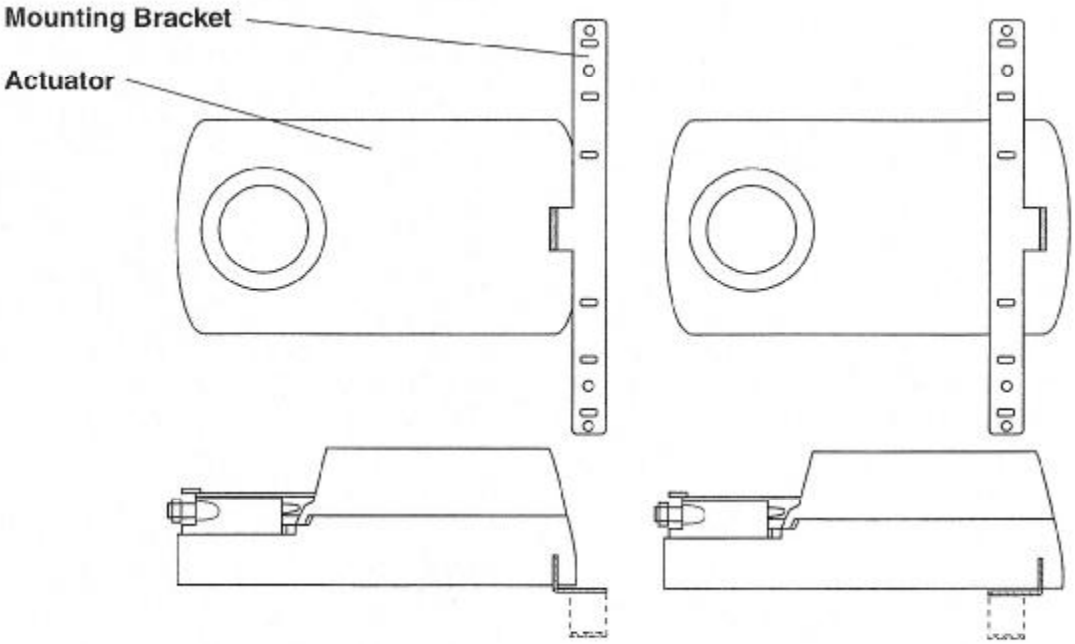
I = Normal control mode
II = Actuator moves to 0(2) V
III = Actuator moves towards 10 V

Dimensions (mm)

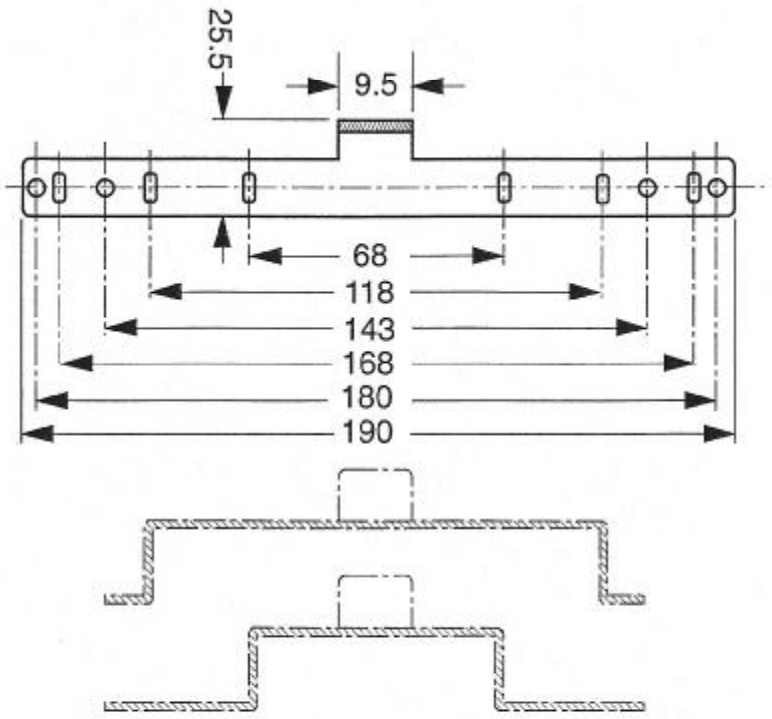


Actuator M-9100

Mounting Options



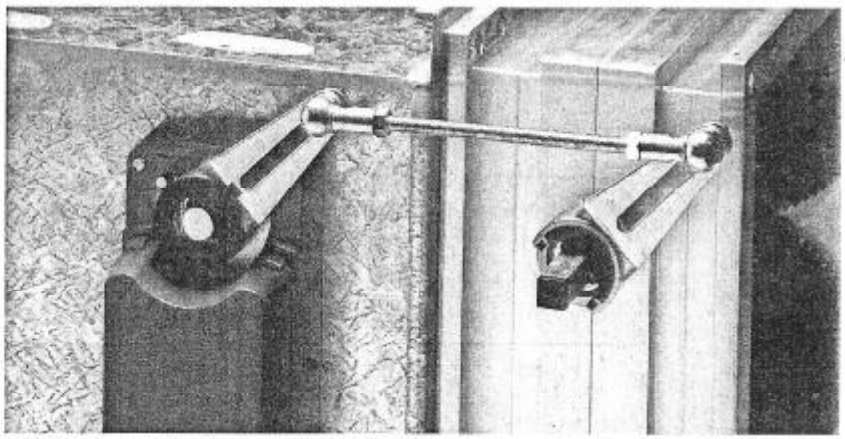
Dimensions (mm)



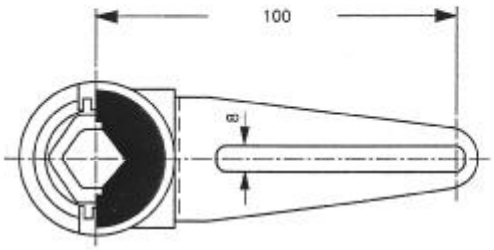
Mounting Bracket
(supplied with the actuator and suitable for various mounting arrangements)

Accessories for Indirect Coupling of Damper Actuator

The accessories are used in case direct mounting of the actuator to the damper shaft is impossible. The actuator is mounted on the duct and by means of the accessories, shown on this page, linked to the damper shaft. The rod for linkage between the crank arms needs to be supplied by the contractor/ installer.



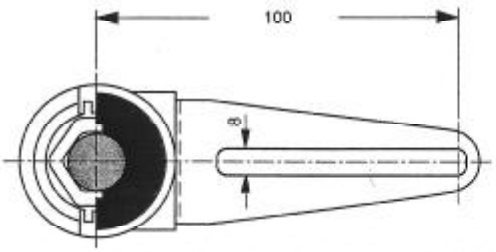
M-9000-ZKA Crank Arm for the Damper Shaft



Mounting

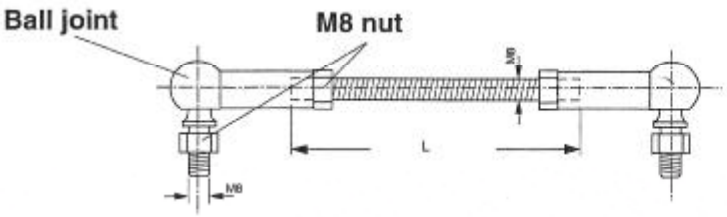
The crank arm M-9000-ZKA with the adapter is fitted to the damper shaft by means of the prism and the clamp. One of the ball joints is fitted to the crank arm.

M-9000-ZKH Crank Arm/Centre Bolt for the Damper Shaft



The centre bolt is inserted into the prism and the crank arm M-9000-ZKH is fitted to the actuator by means of the clamp. One of the ball joints is fitted to the crank arm.

M-9000-ZKG incl. (2) Ball Joints and (4) Nuts M8



The two ball joints M-9000-ZKG are connected by a rod (length L) with an 8 mm thread. 8 mm rod should be supplied by installer.

Johnson Controls International, Inc.
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