Linear Actuators
ML7421
Linear Actuator, 0(2)...10V DC Signal, 1800N

Application
These actuators enable modulating control in conjunction with controls providing an analogue output. The direction of movement is reversible by means of an internal selector plug.

They operate Resideo's standard valves in heating, ventilation, and air conditioning (HVAC) applications.

Approvals
- CE

Special Features
- Easy and quick installation
- No separate linkage required
- No adjustments
- Force-limiting end switches
- Manual operator
- Synchronous motor
- Corrosion-resistant design
- 0...10 V DC or 2...10 V DC signal input selectable
- Position feedback signal
- Direct / reverse action selectable
- Stroke position on signal failure selectable
- Maintenance-free

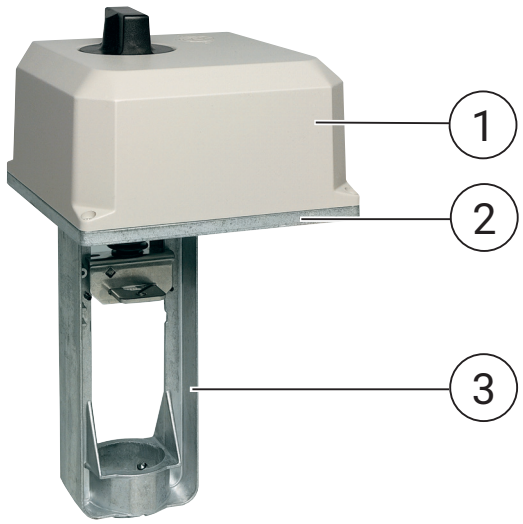


Technical Data

Temperature	
Operating temperature:	-10 … +50 °C at 5...95 % rh
Max. medium temperature for Resideo linear valves*:	150 °C
Weight	
Weight:	2.0 kg
Specifications	
Protection standard:	IP54 per DIN EN60529
Protection class:	Class III per EN60730-1
Flame retardant housing:	UL 94-V0 (with metal cable gland)
Noise level:	≤45dB(A)
Wiring terminals:	1.5 mm^2
Stroke:	20 mm / 38 mm
Closing force:	1800 N
Signals	
Input voltage: for voltage: for mA:	y = 0...10 V DC or 2...10 V DC 0...20 mA or 4...20 mA R_i = 100 kΩ R_i = 500 kΩ
Signal source:	1 kΩ max.
Position feedback signal:	x = 2...10 V DC
Load:	1 mA max.

* When equipped with the High-Temp. Kit (see section Accessories), all actuators are suitable for medium valve temperatures of up to 220 °C.

Construction

Overview		Components	Materials
	**1**	Cover	ABS
	2	Base	aluminum diecast
	3	Yoke	aluminum diecast

Transportation and Storage

Keep parts in their original packaging and unpack them shortly before use.

The following parameters apply during transportation and storage:

Parameter	Value
Environment:	clean, dry and dust free
Min. ambient temperature:	-40 °C
Max. ambient temperature:	70 °C
Min. ambient relative humidity:	5 % *
Max. ambient relative humidity:	95 % *

*non condensing

Method of Operation

The drive of a synchronous motor is converted into linear motion of the actuator stem by using a spur gear transmission. The actuator stem is connected with the valve stem by a button keyed retainer connection.

The actuator stem is connected with the valve stem by a button keyed retainer connection.

The force sensor switches off the motor precisely when the nominal stem force is reached.

If used as a replacement of an already-installed actuator ML7421 the permanent power supply is to be observed.

Manual Operation

Actuators without spring return are equipped with a manual operator used in case of power failure. Manual operation is possible only after the power supply has been switched off or disconnected.

To operate, push the manual operator knob down and turn clockwise to move the stem downward and counter-clockwise to move the stem upward. If the actuator returns to automatic control, the manual operator knob unlocks automatically.

Note: Manual operation allows a very high closing force capable of jamming the actuator spindle and exceeding the rating of the force switches, so that the motor cannot move. Therefore, after a manually close-off operation, it may be necessary to release the spindle one turn by turning the manual operator knob, so that the manual operator will automatically disengage on power resumption.

Installation Guidelines

Electrical Installation

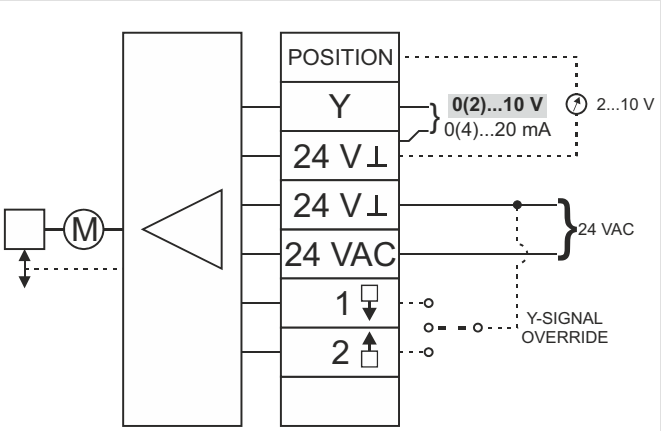
24 V AC and 24 V AC must be applied under all operating conditions.

Max. cable length/diameter for field mounting:

- 200 m / 1.5 mm^2

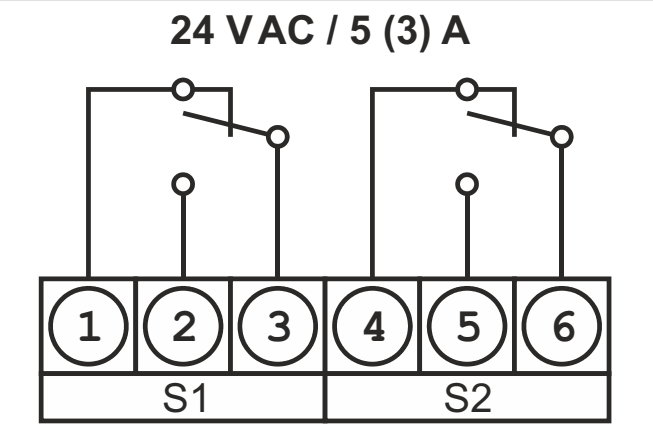
Wiring

0/2...10 V



Auxiliary switches

The actuators can be equipped on site with an auxiliary switch unit consisting of two switches. Their switching points are adjustable over the full length of the actuator stroke. The switches can be used to switch pumps or provide remote indication of any stroke position. A cable gland M20x1.5 is delivered with the unit.



Action

The direction of action (direct or reverse) can be selected by changing the position of jumper plug W3. The factory set is: stem extends at increasing signal (direct acting).

Note: Jumper plugs W1, W2, W3, and W4 are accessible after the cover has been removed. They are located on top side of the printed circuit board.

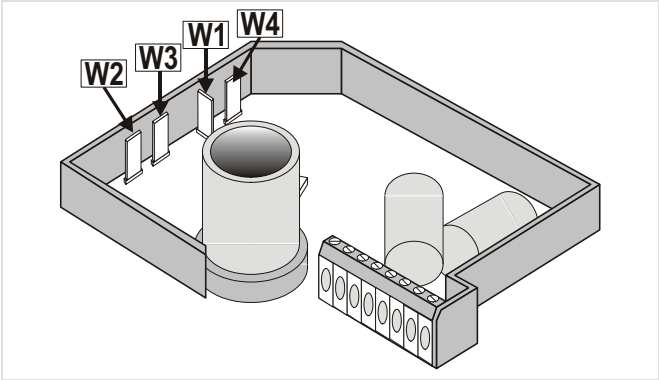


Fig. 1 Location of jumper plugs W1, W2, W3, W4

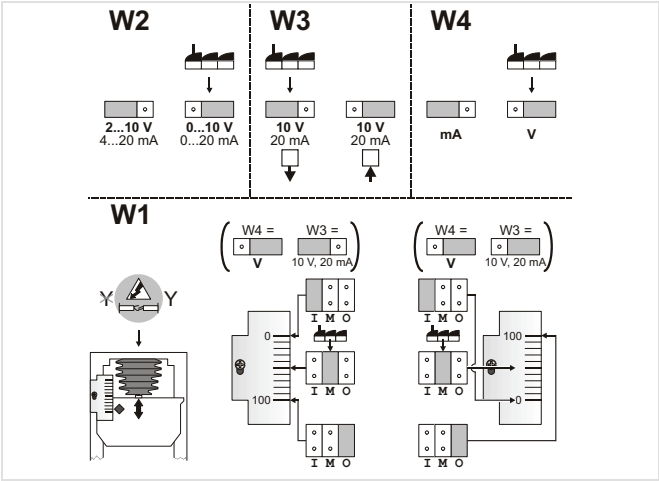


Fig. 2 Effects of jumper plugs W1, W2, W3, W4

Input Signal Range

The V DC- or mA-input signal is selected by shifting jumper plug W4 The factory setting of W4 is "V DC". No external resistor for mA-input signal is necessary.

The range of the analog input signal Y (0...10 V DC / 0...20 mA or 2...10 V DC / 4...20 mA) can be selected by changing the position of jumper plug W2. The factory set is at 0...10 V DC.

Input Signal Failure

In case of a failure of the signal input (Y) caused, e.g., by a broken wire, the actuator will run to one of the three positions (possible only if W4 has been set to the "V" position):

W1 setting	Position after failure	Input range	effective current	Burden
	0 %	0…10 V 2…10 V	+0…0.1 mA	"pull down" at 0 V
	50 %		-0.06…+0.04 mA	100 kΩ at 6 V
	100 %		-0.15 … -0.05 mA	"pull up" at 15 V

Output Signal "POSITION"

An analogue output signal 2...10 V DC ”POSITION” is available which represents the actual actuator position. It can be used for remote indication.

When the actuator stem is extended, the output signal is 10 V DC.

Y-Signal Override

To override the Y-signal, inputs 1 and 2 must be connected as follows:

- stem extended: 24 V AC at input 1; input 2 not connected
- stem extended: 24 V AC at input 2; input 1 not connected

24 V AC power and ground must be permanently connected.

Technical Characteristics

Operation mode

	ML7421A3004	ML7421A3004
Voltage	24 V AC (+10%/-15%), 50/60 Hz	
Signal input 0(2) V DC	Stem retracted 2-way valve: “open“ 3-way valve port A-AB: “closed“	
Signal input 10 V DC	Stem extended 2-way valve: “closed" 3-way valve port A-AB: “open“	

Close off pressure ratings in kPa

Valves	Valve size											
	20 mm								38 mm			
	DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN80	DN100	DN125	DN150
DE/DI	*	*	1600	1600	1300	850	-	-	-	-	-	-
DF-B-CI	1600	1600	1600	1600	1300	750	470	230	-	230	90	90
DF-B-NI/DF-C	-	-	-	-	-	-	-	-	-	2500	2500	2500
DF-D	2500	2500	2500	2000	1300	750	500	-	230	230	90	90
XE/XI	*	*	1600	1600	1300	850	-	-	-	-	-	-
XF-B	-	-	-	1000	1000	1000	650	400	-	230	90	90
XF-A	-	-	-	-	600	600	600	400	-	150	120	80

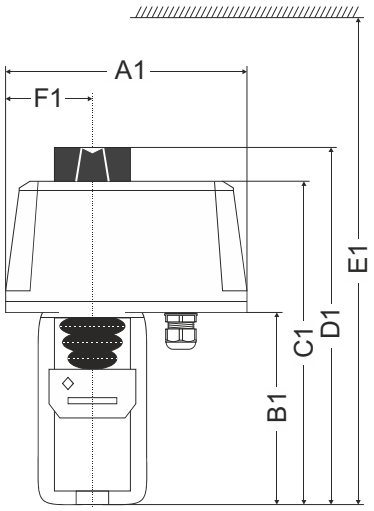
* Use 600Nm Version

For details on the valves, see following data sheets:

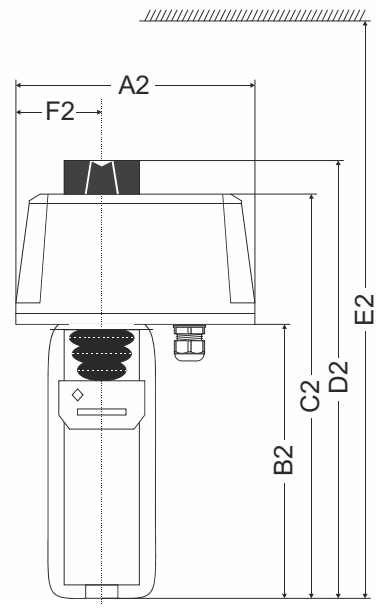
DE/DI	EN0H-1773GE23	XE/XI	EN0H-1771GE23
DF-B-CI	EN0H-1769GE23	XF-A	EN0H-1778GE23
DF-B-NI	EN0H-1776GE23	XF-B	EN0H-1780GE23
DF-C	EN0H-1783GE23	XF-D	EN0H-1777GE23
DF-D	EN0H-1775GE23		

Dimensions

Overview



ML7421A



ML7421B

A1	B1	C1	D1	E1	F1	A2	B2	C2	D2	E2	F2
178 x 178	142	239	264	360	64	178 x 178	204	301	326	430	64

Note: All dimensions in mm unless stated otherwise.

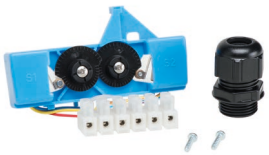
Ordering Information

The following tables contain all the information you need to make an order of an item of your choice.
When ordering, please always state the type, the ordering or the part number.

Options

Supply voltage	Stroke	Power consumption	Run time at 50 Hz	Item No.
24 V AC	20 mm	14 VA (50 Hz) / 16 VA (60 Hz)	1.9 min	ML7421A3004
	38 mm		3.5 min	ML7421B3003

Accessories

	Description	Dimension	Item No.
	**Auxiliary switches**		
	auxiliary switches; 24 V AC / 5 (3) A (package contains 2 SPDT switches)		43191680-002
	**High-Temperature Kit** Note: For applications >150 °C and < 220 °C medium temperature		
	DE/DI	DN15 - DN50	43196000-001
	XE/XI	DN15 - DN50	
	DF-B-CI/XF-B	DN15 - DN32	
	DF-B-CI/XF-B	DN40 - DN80	43196000-002
	DF-D	DN15 - DN65	
	DF-B-NI/DF-C/XF-D	DN15 - DN80	
	DF-B-CI	DN100 - DN150	43196000-038
	DF-B-NI	DN100 - DN150	
	DF-C	DN100 - DN150	
	DF-D	DN80 - DN100	
	XF-B	DN100 - DN150	
	XF-D	DN100	

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