

## AL1820-P-K, AL1838-P-K

### Electric Linear Valve Actuators

#### SPECIFICATION DATA



### GENERAL

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

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

### FEATURES

- Quick and easy installation
- No separate linkage required
- No adjustments
- Force-limiting end switches
- Manual operator
- Synchronous motor
- Corrosion-resistant design
- Selectable 0...10 Vdc or 2...10 Vdc/ 0...20 mA or 4...20 mA input signal
- Position feedback signal
- Direct or reverse-acting adjustable
- Selectable stroke position on signal failure
- Maintenance-free

### SPECIFICATIONS

#### Temperature Limits

Ambient operating limits	-10...+50 °C @ 5...95%rh
Ambient storage limits	-40...+70 °C @ 5...95%rh
Medium valve temperature	Max. +150 °C (220 °C with High-Temperature Kit)

#### Safety

Protection class	II according to EN60730-1
Protection standard	IP54 according to EN60529
Flame retardant housing	V0 according to UL94, with metal cable gland

#### Noise level

≤45dB(A)

#### Signals

Input range	Y = 0(2)...10 Vdc, 0(4)...20 mA
Input impedance	
for voltage	R <sub>i</sub> = 100 kΩ
for mA	R <sub>i</sub> = 500 Ω

Signal source output impedance

Max. 1 kΩ

Output voltage range

Position: 2...10 Vdc

Output load

Max. 1 mA

#### Wiring

Wiring terminals	1.5 mm <sup>2</sup>
Cable entry	M20 x 1.5 cable gland (with strain relief) and PG11 knockout; knockout can be enlarged to PG16

#### Material

Cover	ABS-FR
Yoke and Base	Aluminum diecast

#### Weight

2.0 kg

#### Dimensions

see Fig. 2 and Fig. 3

Model Number	AL1820-P-K	AL1838-P-K
supply voltage	24 Vac (+10%/-15%); 50/60 Hz	
power consumption	14 VA (50 Hz) / 16 VA (60 Hz)	
signal input 0(2) Vdc	Actuator stem retracted. Two-way valve: open, three-way valve port A - AB: closed	
signal input 10 Vdc	Actuator stem extended. Two-way valve: closed, three-way valve port A - AB: open	
stroke	20 mm	38 mm
run-time at 50 Hz	1.9 min	3.5 min
nominal stem force	1800 N	

## OPERATION

### General

The drive of a synchronous motor is converted into linear motion of the actuator stem by using a worm gear transmission.

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

Via installed microswitches, the internal force sensor switches off the actuator precisely when the nominal stem force is reached.

If used as a replacement of an already-installed actuator AL1820-P-K, AL1838-P-K, the following issue is to be observed:

- Permanent power supply (see section "Electrical Installation")

### Manual Operation

The actuators 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 upward and counter-clockwise to move the stem downward. 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 is necessary to release the spindle one turn by turning the manual operator knob, thus ensuring that the manual operator will automatically disengage on power resumption.

### Electrical Installation

24 V~ and 24 V $\perp$  (see Fig. 3.) must be applied under all operating conditions.

Cable length/diameter for field mounting:

- Max. 200 m / 1.5 mm<sup>2</sup>

### Input Signal

The Vdc- or mA-input signal is selected by shifting jumper plug W4 (see Fig. 1). The factory setting of W4 is "Vdc". No external resistor for mA-input signal is necessary.

### Input Signal Range

The range of the analog input signal Y (0...10 Vdc / 0...20 mA or 2...10 Vdc / 4...20 mA) can be selected by changing the position of jumper plug W2 (Fig. 1). The factory set is at 0...10 Vdc.

### Direction of Action

The direction of action (direct or reverse) can be selected by changing the position of jumper plug W3 (Fig. 1). 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 (see Fig. 1).

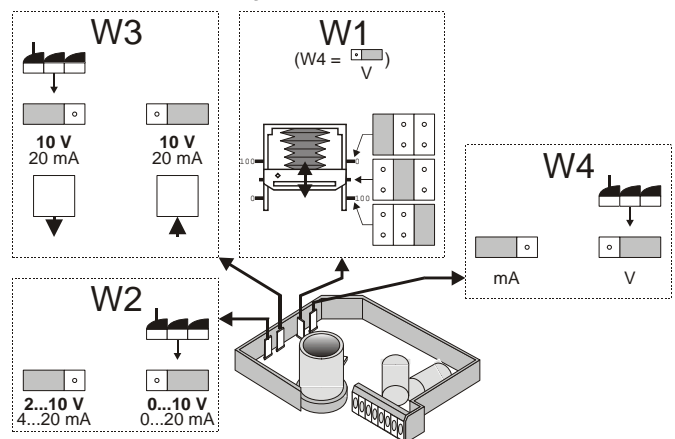


Fig. 1. Jumper plugs W1, W2, W3, W4

### Output Signal "POSITION"

An analog output signal 2...10 Vdc "POSITION" representing the actuator stroke 0...100% can be selected. It can be used for remote indication.

When the actuator stem is fully extended, the output signal is 10 Vdc.

### Y-Signal Override

To override the Y-signal, inputs 1 and 2 (see Fig. 3.) must be connected as follows:

- stem extended: 24 V<sub>L</sub> at input 1; input 2 not connected
  - stem retracted: 24 V<sub>L</sub> at input 2; input 1 not connected
- 24 Vac power and ground must be permanently connected.

### Input Signal Failure

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

- 0%: actuator stem position for 0(2) Vdc
- 50%: actuator stem in central position
- 100%: actuator stem position for 10 Vdc

The factory setting of W1 is "50%".

### Accessories

The following accessory is available upon request.

### Auxiliary Switches

The actuators can be equipped on-site with an auxiliary switch unit with two switches. Their switching points are adjustable over the full length of the actuator stroke.


The switches can be used e.g. to switch pumps or to provide remote indication of any stroke position.

Cable gland M20 x 1.5 (with strain relief) is delivered with the unit.

Type	for Stroke	Order No.
auxiliary switches; maximum 230 Vac , 5 A (resistive), 3 A (inductive); package contains two SPDT switches	20 mm 38 mm	ACCA-AL18-SW

## CLOSE-OFF PRESSURE RATINGS

Stroke		20 mm								38 mm		
Valve	mm	15	20	25	32	40	50	65	80	100	125	150
Size	inch	1/2	3/4	1	1 ¼	1 ½	2	2 ½	3	4	5	6
Valves		Close-Off Pressure Ratings (in kPa)										
V162N, V162X				1600	1600	1500	850					
V163N, V163X				1600	1600	1500	850					
V162F (20 mm)		1600	1600	1600	1600	1300	750	470	230			
V163F (20 mm)					1000	1000	1000	650	400			
V162F (38 mm)										230	90	90
V163F (38 mm)										230	90	90

 = Use 600 N actuator

For details on the valves, see the following Data Sheets:

V162N	TA200890	V163F (20 mm)	TA200893
V163N	TA200891	V163F (38 mm)	TA200895
V162F	TA200892	V162X, V163X	TA200897

## SCALING

For the position feedback signal, the IQ controller's input channel must be set for analog voltage (V) and the sensor type module must be set up with the sensor type scaling. Use sensor type scaling mode 5, Characterize, with input type set to 0 (volts) and the table below:

Y	Input type	0 (volts V)
E	Exponent	3
U	Upper	100
L	Lower	0
P	Points	2
n	ln	On
1	2	0
2	10	100

DIMENSIONS

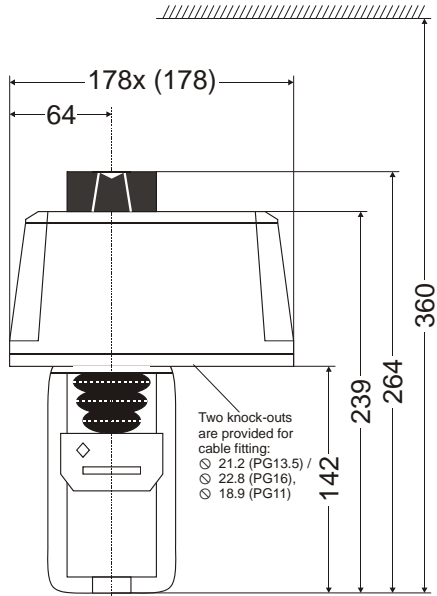


Fig. 2. AL1820-P-K (dimensions in mm)

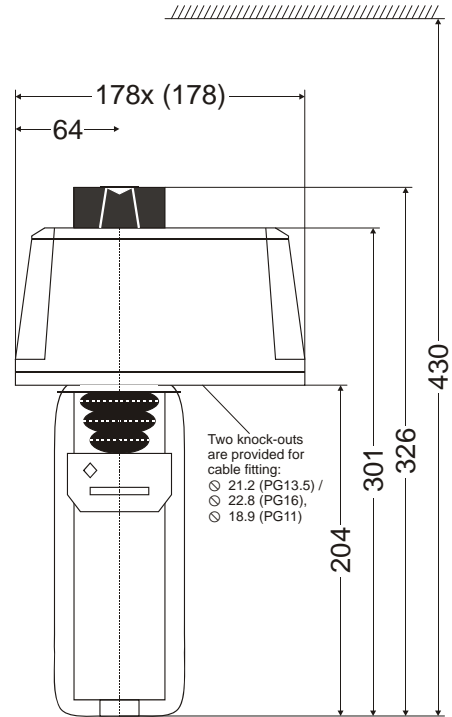


Fig. 3. AL1838-P-K (dimensions in mm)

WIRING

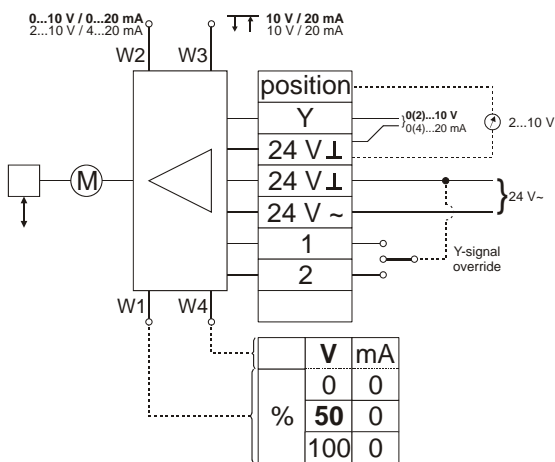
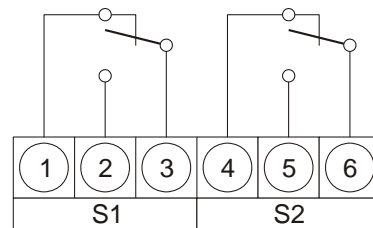


Fig. 4. Wiring AL1820-P-K, AL1838-P-K




auxiliary switches:

maximum rating  
230 Vac  
5 A (resistive load)  
3 A (inductive load)

Fig. 5. Accessory, ACCA-AL18-SW

DISPOSAL



**WEEE Directive:**

At the end of their useful life the packaging and product should be disposed of via a suitable recycling centre.

Do not dispose of with normal household waste.

Do not burn.

Manufactured for and on behalf of the Environmental and Combustion Controls Division of Honeywell Technologies Sarl, Ecublens, Route du Bois 37, Switzerland by its Authorized Representative.

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