

Electrohydraulic Actuators

Type 3274 -11 to -23



Application

The electrohydraulic linear actuators receive their input from electric controllers and are used to operate control valves and other equipment. They accept a three-step or analogue control signal.

Nominal thrusts up to 1640 lbf (7300 N)
Rated travels of 0.6" and 1.2" (15 and 30 mm)

The Type 3274-11 to -23 Electrohydraulic Actuators provide a constant stem positioning rate. Binary pilot valves operated by the controller signal regulate the inlet and outlet flow of the hydraulic oil acting on the piston. The actuators can be equipped with a spring return mechanism for fail-safe action.

Features

- Exceptionally high thrust, compact design
- Various thrust combinations
- Fail-safe version
- Electric or mechanical override
- Motor overload protected
- Optional accessories include positioners, potentiometers and limit switches

Versions

With electric override (Fig. 1)

Manual override operated by push-button.

	F _{IN}	F _{OUT}	F _{IN}	F _{OUT}
Type 3274-11	470 lbf	405 lbf	2100 N	1800 N
Type 3274-12	110 lbf	675 lbf	500 N	3000 N
Type 3274-13	965 lbf	965 lbf	4300 N	4300 N
Type 3274-14	110 lbf	1640 lbf	500 N	7300 N

With mechanical override (Fig. 2)

Mechanical version operated via a socket wrench.

	F _{IN}	F _{OUT}	F _{IN}	F _{OUT}
Type 3274-15	470 lbf	405 lbf	2100 N	1800 N
Type 3274-16	110 lbf	675 lbf	500 N	3000 N
Type 3274-17	965 lbf	965 lbf	4300 N	4300 N
Type 3274-18	110 lbf	1640 lbf	500 N	7300 N

With fail-safe action and electric override

Spring return mechanism (fail-safe action) according to Fig. 1.

	F _{IN}	F _{OUT}	F _{IN}	F _{OUT}	Fail
Type 3274-21	470 lbf	405 lbf	2100 N	1800 N	"Out"
Type 3274-22	405 lbf	470 lbf	1800 N	2100 N	"In"
Type 3274-23	110 lbf	675 lbf	500 N	3000 N	"Out"

Actuators with fail-safe action include a spring return mechanism and a solenoid valve which opens when the power supply is interrupted, reducing the oil pressure in the cylinder chamber. The actuator stem is forced to the fail-safe position by the spring return mechanism. The fail-safe action (retracts "IN" or extends "OUT") depends on the arrangement of the actuator springs.

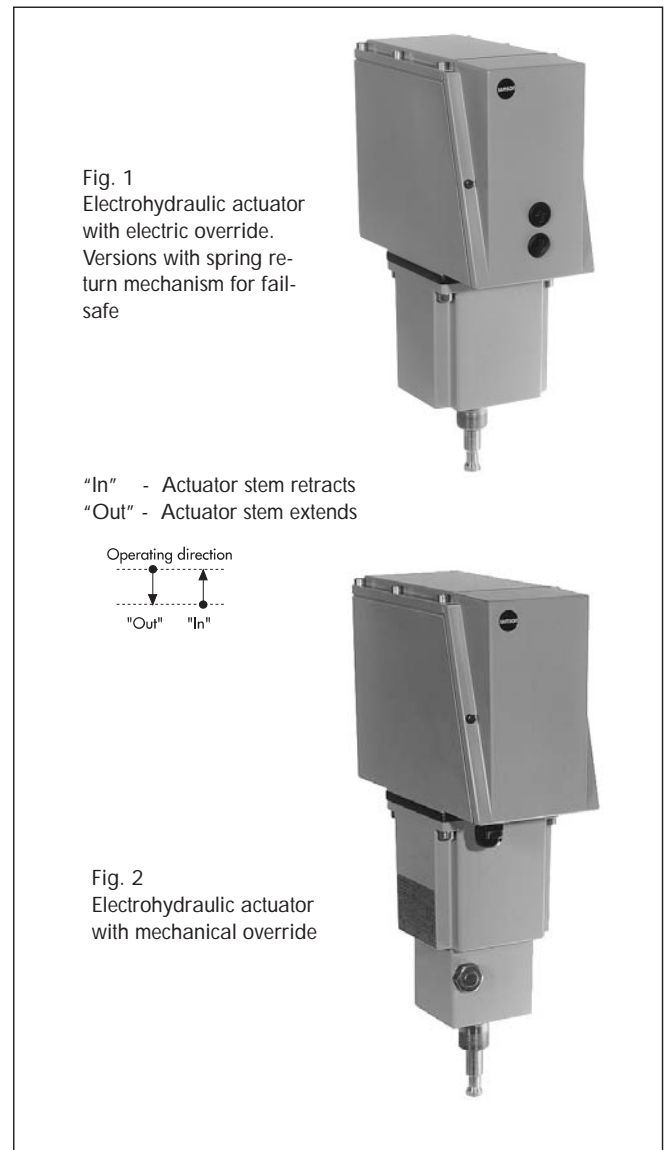


Fig. 1
 Electrohydraulic actuator with electric override.
 Versions with spring return mechanism for fail-safe

"In" - Actuator stem retracts
 "Out" - Actuator stem extends

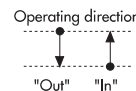


Fig. 2
 Electrohydraulic actuator with mechanical override

For rotary motion electrohydraulic actuators, see Technical Data Sheet T 8342.

Principle of operation (Fig. 3)

Apart from the cylinder housing (2), cylinder (5.1) and piston (5.2), the pressure-sealed actuator case (1) contains the motor (6.1), gear pump (6.2) and the solenoid pilot valves (6.4). It also serves as an oil reservoir. The required electric lines are oil and pressure-sealed, and are led from the terminal box (3) to the actuator case.

The gear pump (6.2), which is operated by the motor (6.1), delivers the oil into the corresponding cylinder chamber via both the check valve (6.3) and the pilot valve (6.4). The solenoid valves are open as long as the controller generates an active output signal and are closed when the power supply is interrupted. Depending on the actuator version, the selected version is equipped either with or without one or two compression springs (5.10, 5.11). Depending on the type, the desired actuator position and thrust can be obtained using the motor, pump and springs.

The oil-feed pump is operated by a split-pole motor which is energized by a relay. The electronic section is directly supplied from the power connection. Therefore, the contacts of the external controller are only loaded by a maximum of two solenoid valves and the electronic section.

Versions with fail-safe action feature a spring return mechanism and a supplemental safety solenoid valve which opens when the power supply is interrupted, reducing the oil pressure in the cylinder chamber. In this case, the electric override is also interrupted.

Automatic disconnection of the motor - When the connected control equipment reaches its end positions or the nominal thrust of the actuator is exceeded due to the external forces acting upon it, the motor is switched off by the limit switches (4.3) or (4.4).

Manual override

The standard actuator versions are equipped with an electric or optional mechanical override. Versions featuring fail-safe spring-return are only available with an electric override.

With the **electric override**, each position of travel can be reached using the two push-buttons located on the front cover (3.1) independent of the applied control signal. After releasing the button, the actuator uses the controller signal again. The control signal can be interrupted by disconnecting the isolating terminal (81 in Figs. 5 and 6).

With the **mechanical override**, first the release button on the top of the actuator must be pressed. Afterwards, a hexagon wrench size 24 can be used to make adjustments. As soon as the button is released, the actuator is operated according to the controller signal again.

Additional electrical equipment

All additional electric equipment can be accessed in the terminal box (3) after the cover (3.1) has been removed. Re-equipping is not possible by the user. The maximum equipment configuration is shown in Table 2.

Electric positioners

Electric positioners compare the output signal of either 4(0) to 20 mA or 0(2) to 10 V from an electric controller with the position of the potentiometer (proportional to the travel of the control valve) and produce a three-step output signal.

For normal and split-range operation, ZERO and SPAN can be adjusted in wide ranges. The operating direction, direct or reverse, can be selected. Additionally, the control equipment can also be

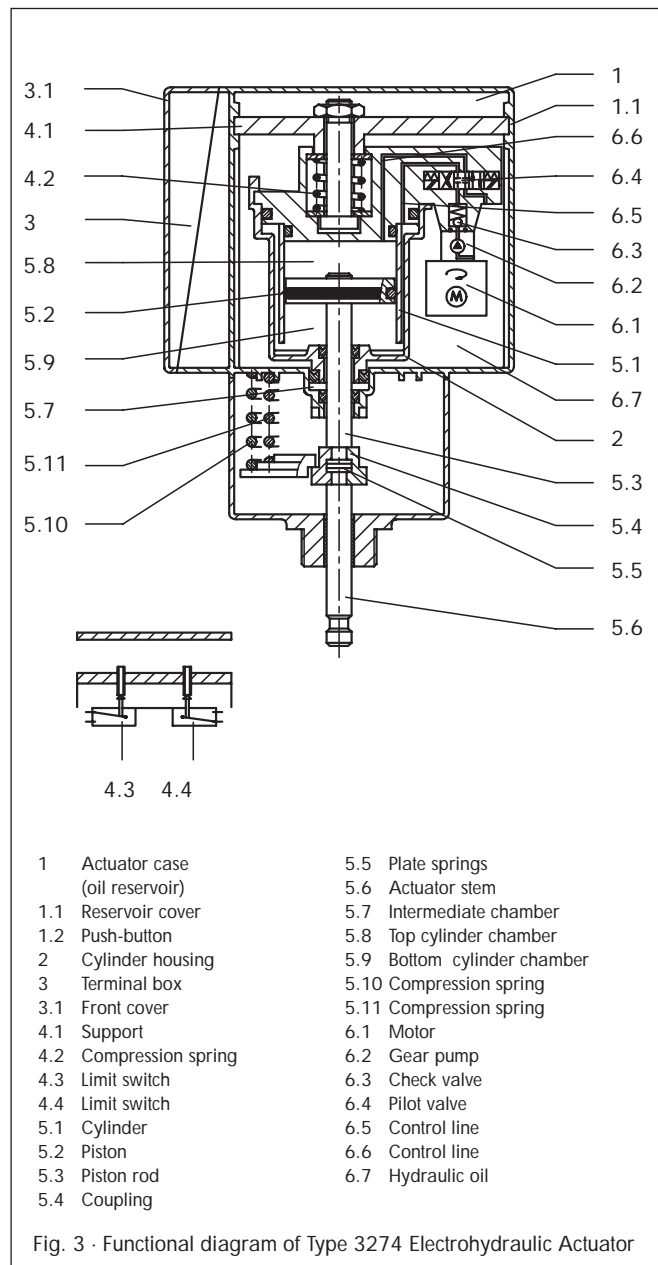


Fig. 3 · Functional diagram of Type 3274 Electrohydraulic Actuator

moved to its end positions, either "In" or "Out", via an external contact. This does not influence the fail-safe action. The positioner contains an additional **output for position feedback**.

Potentiometers

The actuators can be equipped with one or two potentiometers with 0 to 1000, 0 to 200 or 0 to 100 ohm. For versions with an attached positioner, a potentiometer is required for position feedback to the positioner.

Electric limit switches

If desired, the actuators can be optionally equipped with a maximum of three electric or inductive limit switches with adjustable cams.

The hydraulic oil reservoir cover (1.1) is secured by special screws and should only be opened by factory authorized personnel.

Table 1 · Technical data

Electrohydraulic Actuator Type	3274-11	3274-12	3274-13	3274-14	3274-15	3274-16	3274-17	3274-18	3274-21	3274-22	3274-23			
Version	With electric override				With mechanical override				With electric override					
Fail-safe action	Without								With					
Fail-safe direction									"Out"	"In"	"Out"			
Rated travel	0.6" or 1.2" (15 or 30 mm)													
Nominal transit time in seconds ²⁾	60 s for 0.6"; 120 s for 1.2" (60 s for 15 mm; 120 s for 30 mm)													
Positioning rate for fail-safe action									0.03	0.04	0.03			
									in/s	0.7	1	0.7		
Thrust lbf	For 0.6"	Stem	"In"	470	110	965	110	470	110	965	110	470	405	110
		Travel	"Out"	450	765	965	1730	450	765	965	1730	450	515	765
	For 1.2"	Stem	"In"	470	110	965	110	470	110	965	110	470	405	110
		Travel	"Out"	405	675	965	1730	405	675	965	1730	405	470	675
Thrust N	For 15 mm	Stem	"In"	2100	500	4300	500	2100	500	4300	500	2100	1800	500
		Travel	"Out"	2000	3400	4300	7700	2000	3400	4300	7700	2000	2300	3400
	For 30 mm	Stem	"In"	2100	500	4300	500	2100	500	4300	500	2100	1800	500
		Travel	"Out"	1800	3000	4300	7300	1800	3000	4300	7300	1800	2100	3000
Power supply	110 V, 60 Hz ¹⁾													
Power consumption	80 VA													
Permissible ambient temperature	15 °F to +140 °F (-10 °C to +60 °C) with optional heating module: -22 °F (-30 °C)													
Permissible storage temperature	-15 °F to +160 °F (-25 °C to +70 °C)													
Enclosure classification	IP 65 (vertically upright), NEMA 4 (pending)													
Approximate weight	26 lb (12 kg)				33 lb (15 kg)				26 lb (12 kg)					
Electronic section of motor	Radio interference level according to DIN VDE 0875													
Additional electrical equipment														
Electric positioner	Supply same as Power supply ¹⁾													
Control signal	4 to 20 mA, 0 to 20 mA (Ri = 50 Ω), 0 to 10 VAC, 2 to 10 VAC (Ri = 10 kΩ)													
Zero shift	0 to 100 %													
Change of range	30 to 100 %													
Output (feedback)	4(0) to 20 mA, R ≤ 200 Ω; 0(2) to 10 V, R ≥ 2 kΩ													
Potentiometer	0 to 1000 Ω; 0 to 200 Ω, 0 to 100 Ω; 0 to 275 Ω; 0 to 13 Ω (for rated travel 80 % of the end value); permissible load 0.5 W													
Electric limit switch	Maximum of three separately adjustable contacts (see Table 2)													
Permissible load	250 VAC, 5 A													
Inductive limit switch	Proximity switch SJ 2-N													
Control circuit	Rating according to the connected transistor relay													

¹⁾ 230 V or 24 V, 60 Hz or 50 Hz on request.

Table 2 Electrical accessory combinations

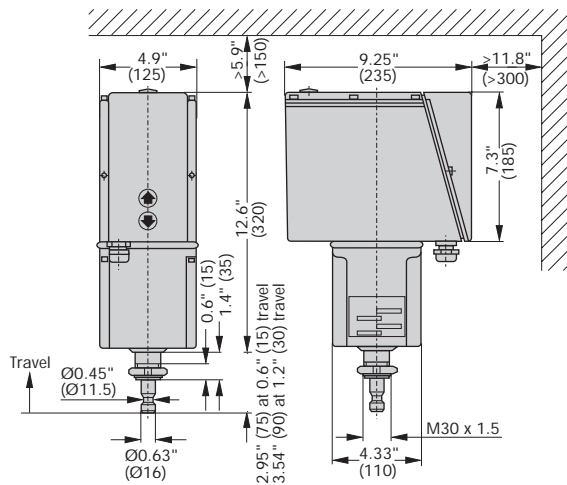
Possibilities indicated by "•", shown in the vertical columns.

Electric positioner	•	•	-	-	-	-	-	-
Potentiometer 1	• ¹⁾	• ¹⁾	•	•	•	•	-	-
Potentiometer 2	•	•	•	•	-	-	-	-
Electric limit switch 1	-	-	-	-	-	-	•	•
Electric limit switch 2	•	-	•	-	•	-	•	-
Electric limit switch 3	•	-	•	-	•	-	•	-
Inductive limit switch 1	-	•	-	•	-	•	-	•
Inductive limit switch 2	-	•	-	•	-	•	-	•

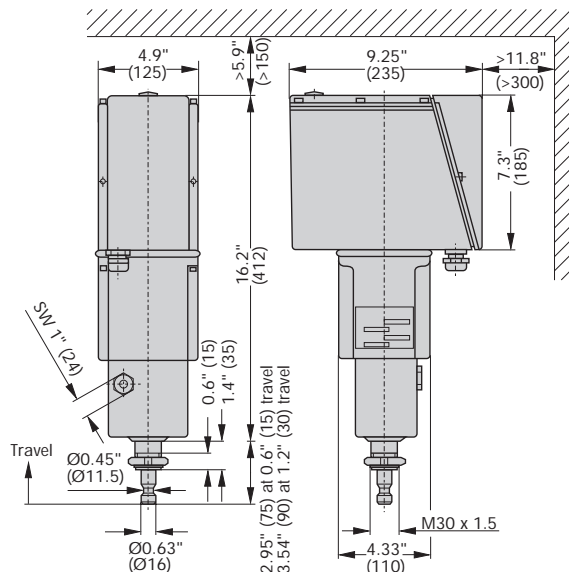
¹⁾ Required for position feedback

Table 3 · Materials

Case, case cover	Die-cast aluminum, plastic-coated
Cylinder	Hydraulic cylinder tube
Piston	Steel NBR combination
Piston rod	AISI 1045 (C45) · Chromium-plated
Actuator stem	AISI 430F (WN 1.4104)
Hydraulic oil	Special HLP, silicon free



Type 3274-... With electric override



Type 3274-... With mechanical override

Fig. 4 · Dimensions in inches; dimensions in parentheses () in mm

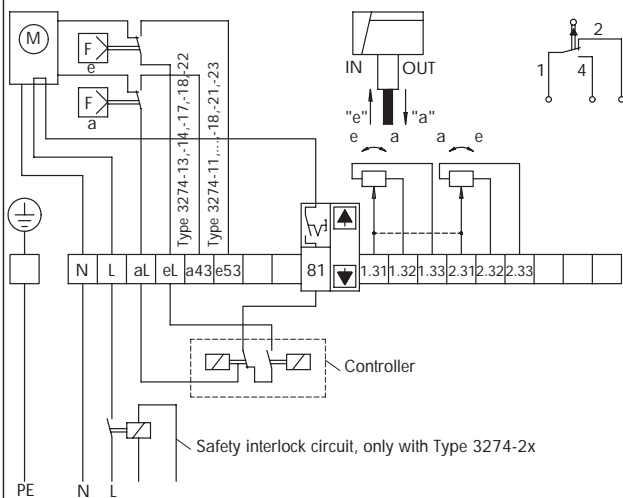


Fig. 5 · Connection diagram for actuators without positioners

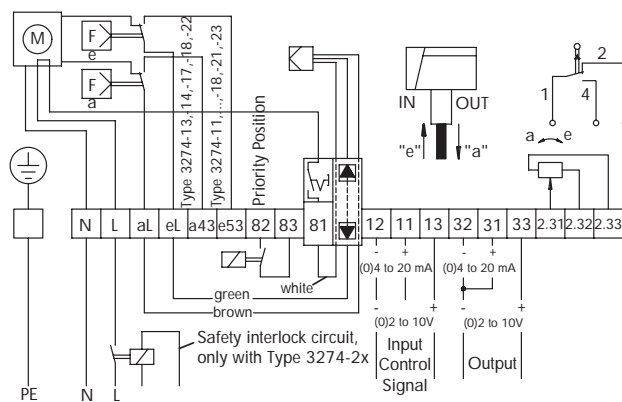


Fig. 6 · Connection diagram for actuators with positioners

Mounting position

Actuator can be mounted in any position except for IP 65 (NEMA 4 - pending), vertically upright.

Electrical connection (Figs. 5 and 6)

Figs. 5 and 6 illustrate the different means of electrical connections depending on the version. The electric limit switches are provided with screw terminals and are connected directly, not via the terminal block.

Note concerning actuators for 24 V

With wires of sufficient cross section, permissible voltage tolerances of $\pm 10\%$ can be maintained. A minimum of 100 to 150 VA is required from transformers and a minimum of 22 V is required during operation.

Ordering text

Electrohydraulic Actuator **Type 3274-...**

Rated travel 0.6"/1.2" (15/30 mm)

With electric/mechanical override

Without/with fail-safe action, operating direction "In"/"Out"

Power supply 110 V; 60 Hz (230 V, 24 V; 60 Hz or 50 Hz)

Optionally with electric positioner, input signal ... mA/... V

Including potentiometer 0 to 1000 ohm

With ... potentiometers 0 to ... ohm

With ... electric/inductive limit switches

Specifications subject to change without notice.



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