TN2000 Series
Pneumatic Piston Actuators for DN125 to DN300 (5" to 12") Spira-trol™ Series Control Valves

Description

The TN2000 series pneumatic piston actuators are designed for use with DN125 to DN300 (5" to 12") Spira-trol™ control valves. There are three versions available: Single-acting (with spring), Double-acting (with spring) and Double-acting (no spring) for matching the requirements of valves at various differential pressures and in a variety of applications.

Available types

SE	=	Single-acting, spring-extend
SR	=	Single-acting, spring-retract
DE	=	Double-acting, spring assisted (extend)
DR	=	Double-acting, spring assisted (retract)
DA	=	Double-acting, no spring

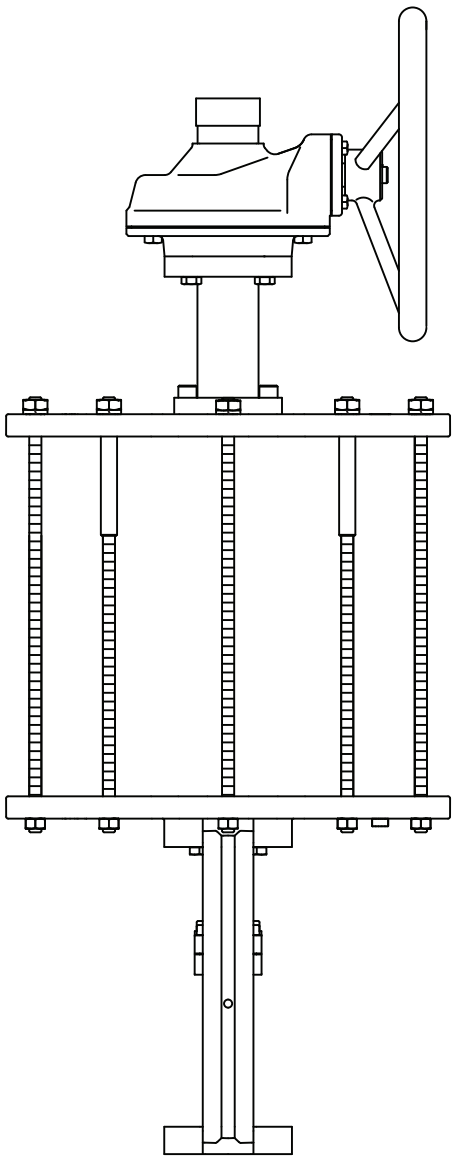
Optional extra

Manual handwheel

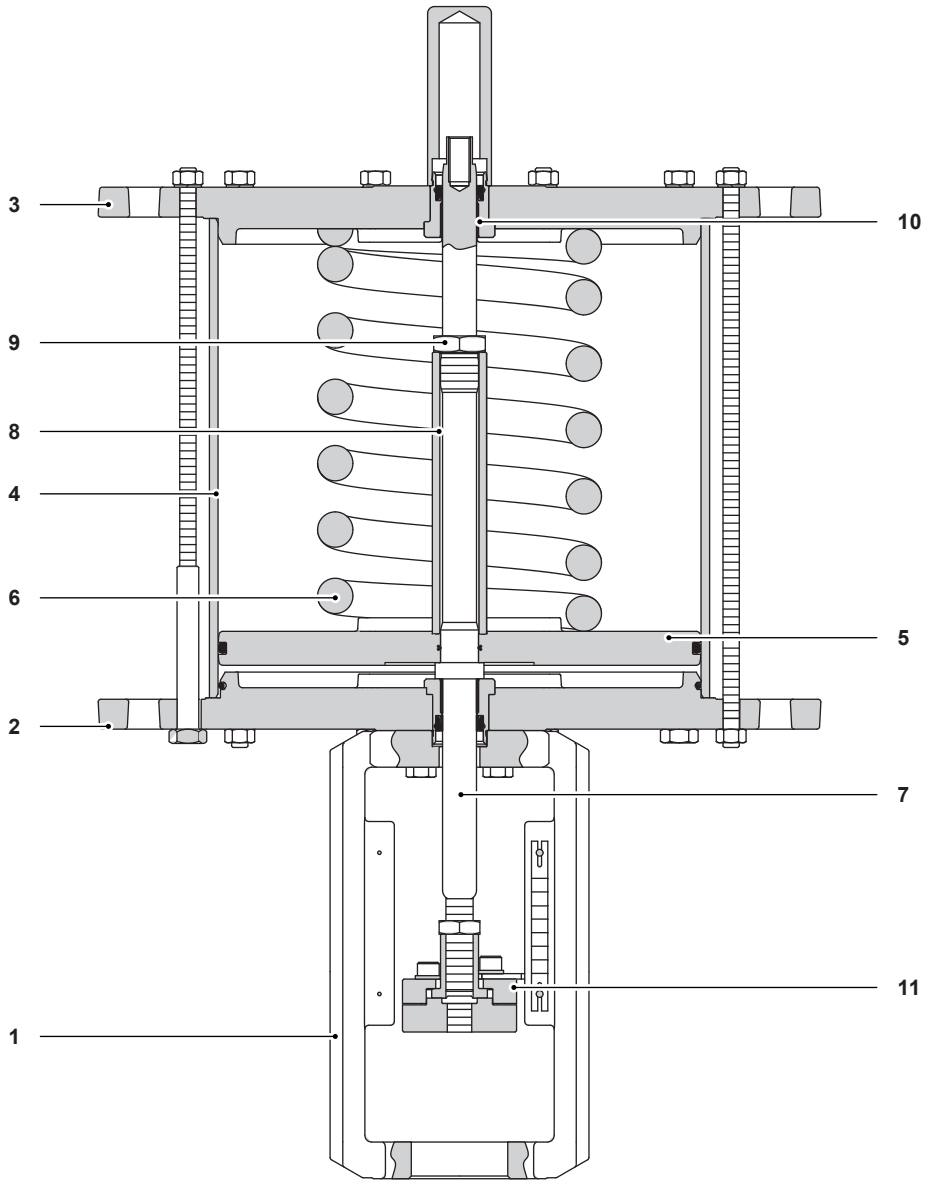
Technical data

Temperature range	- 15 °C to +110 °C (5 °F to 230 °F)
Maximum operating inlet temperature	10 bar g (150 psi g)
Air supply connection	⅜" screwed NPT
Actuator level	70 mm (2¾")

Note: Volume booster is recommended for use with this type of actuator.



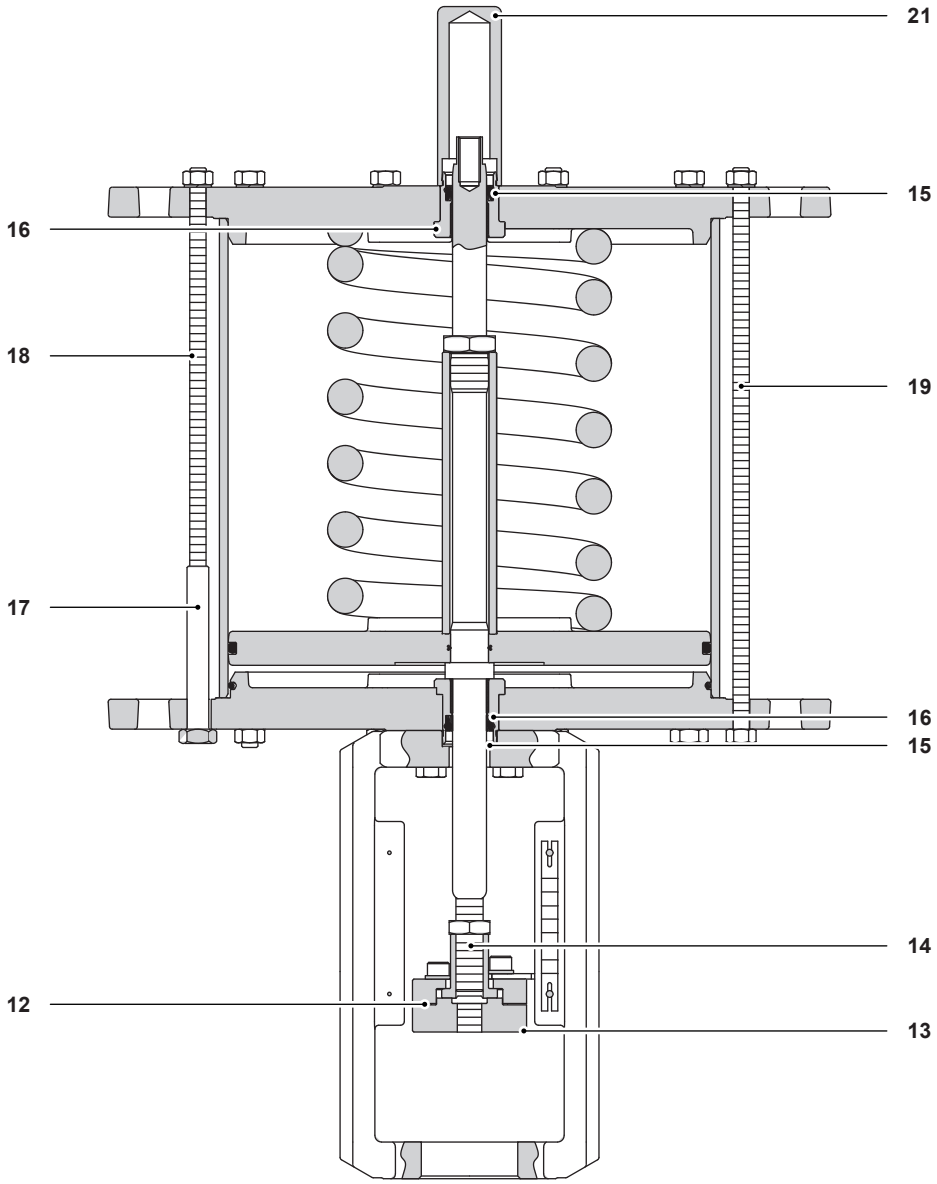
Materials



No.	Part		Material
1	Yoke		SG iron
2	Lower cylinder end cap		SG iron BS EN 1563 GJS 400 18U-LT
3	Upper cylinder end cap		SG iron BS EN 1563 GJS 400 18U-LT
4	Cylinder		Composite tube
5	Piston		SG iron
6	Spring		Chrome vanadium steel
7	Spindle		Stainless steel
8	Spindle sleeve		Carbon steel (plated)
9	Lock-nut	M27	Carbon steel (plated)
10	Bearing and seal insert		Carbon steel (plated)
11	Indicator plate		Stainless steel

Materials continued on next page

Materials (continued)



No.	Part		Material
12	Top connector		Carbon steel (plated)
13	Bottom connector		Carbon steel (plated)
14	Connector		Stainless steel
15	Rod seal wiper		Polyurethane
16	DU plain bearing		PTFE/steel composite
17	Long nut		Carbon steel (plated)
18	Nut and threaded bar		Carbon steel (plated)
19	Threaded bar	M12	Carbon steel (plated)
20	⅜" NPT vent plug (not shown)		LD Polyethylene
21	Cover		PVC

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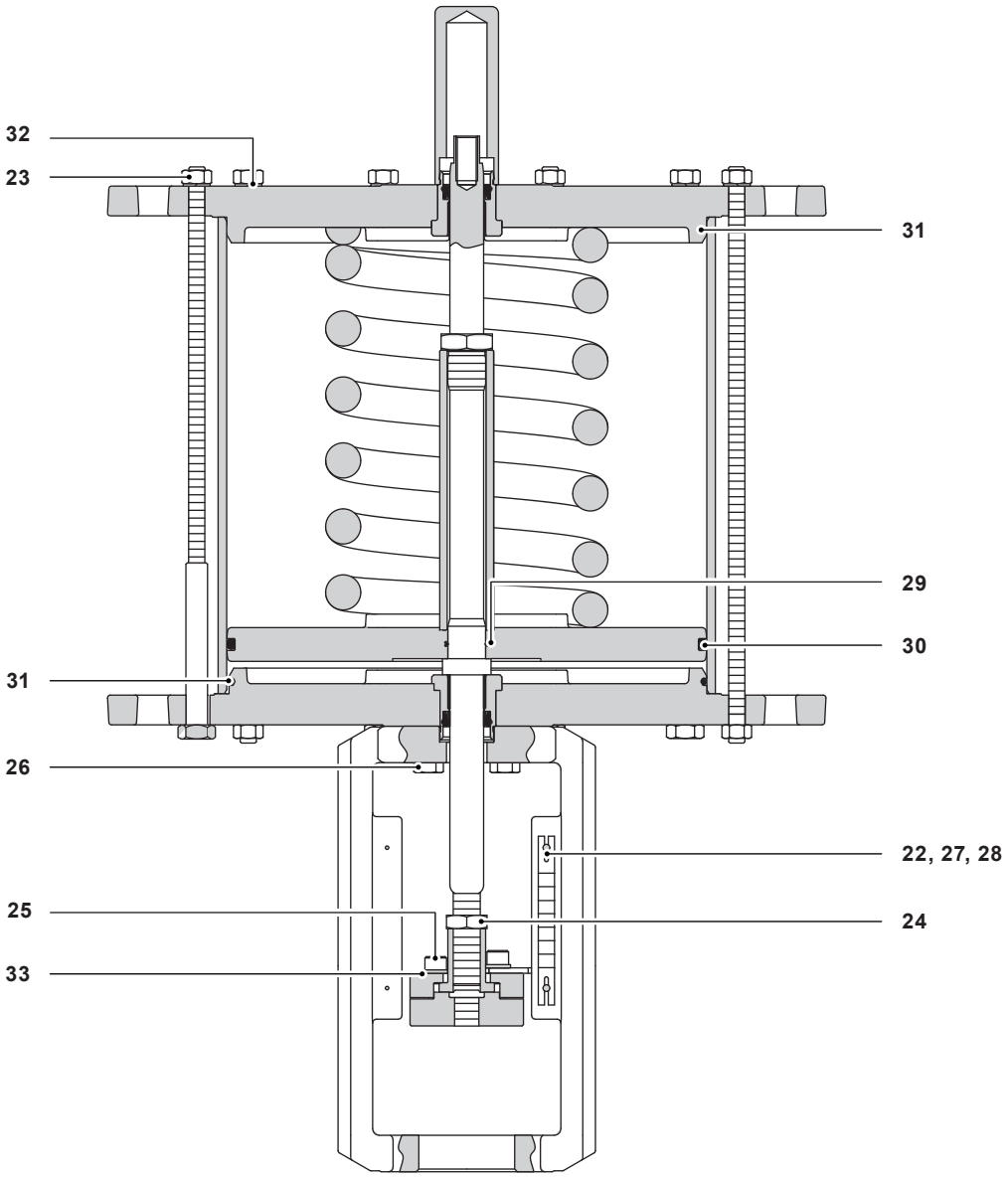
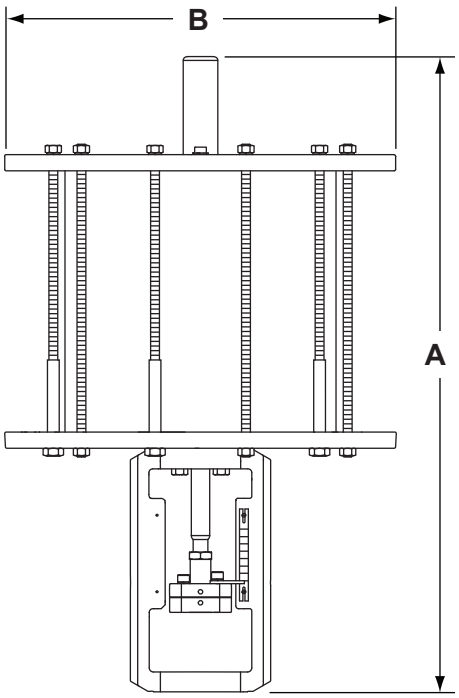
Materials (continued)

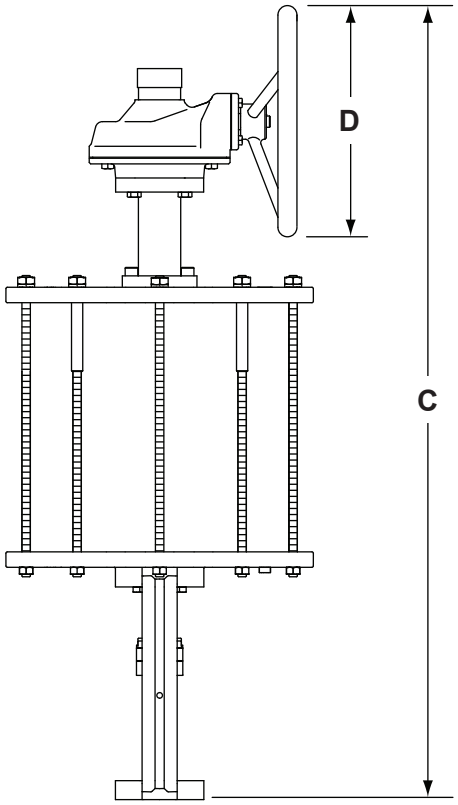


No.	Part		Material
22	Scale		Stainless steel
23	Nut	M12	Carbon steel (plated)
24	Lock-nut	M20	Stainless steel
25	Cap screw		Carbon steel (plated)
26	Bolt	M12	Stainless steel
27	Pan head screw		Carbon steel (plated)
28	Nut	M2.5	Carbon steel (plated)
29	'O' ring		Fluorocarbon rubber (Viton)
30	'O' ring		Fluorocarbon rubber (Viton)
31	'O' ring		Fluorocarbon rubber (Viton)
32	Spring washer	M12	Carbon steel (plated)
33	Spring washer	M10	Carbon steel (plated)

Dimensions/weights (approximate) in mm (inches) and kg (lbs)



TN2277SE



TN2277SRH

Actuator range	A	B	C	D	Weight	
					Actuator	With handwheel
TN2277SE and variants	863 (34)	532 (21)	1197 (47)	330 (13)	116 (255)	+21 (+46)
TN2277DE and variants						
TN2277SR and variants			1132 (44.5)			+19 (+42)
TN2277DR and variants						
TN227NDA and variants					98 (216)	

How to use the sizing data:

The following tables supply guidance as to the sizing of the TN2000 when it is used on the SPIRA-TROL series control valves.

There are three applications:

Unbalanced flow under applications	Unbalanced on/off flow over applications	Balanced flow under applications

Two conditions are illustrated in tabular form in each of the applications:
Class IV shut-off - Providing shut-off of the valve to the requirements of EN 60534-4 (IEC 60534-4) Class IV.
Class VI shut-off - Providing shut-off of the valve to the requirements of EN 60534-4 (IEC 60534-4) Class VI.
Class V shut-off - Providing shut-off of the valve to the requirements of EN 60534-4 (IEC 60534-4) Class V.

To select a suitable actuator:

- Identify the column containing the valve and gland material selected.
- Identify and compare the maximum operating pressure condition, including any transient pressures likely to occur, within the selected column.

Note: Flow over the plug for modulating control is not recommended. Flow over is only suitable for on/off applications.

For conditions outside of those illustrated, including double acting versions, please contact Spirax Sarco.

Note: For TN2277SR, the values in the following tables are based on the air pressure indicated below the product nomenclature of the specific unit. For double acting actuators in the event of air failure you will require an air pressurised tank to position the valve.
For fluctuating pressure control applications, or applications requiring rapid response (e.g. accumulator control)a pneumatic volume booster is recommended.

TN2277SE

Flow			Valve maximum differential pressure							
			DN125 (5")		DN150 (6")		DN200 (8") DN250 (10") DN300 (12") reduced		DN300 full (12")	
			PTFE	Graphite	PTFE	Graphite	PTFE	Graphite	PTFE	Graphite
			bar g (psi g)	bar g (psi g)	bar g (psi g)	bar g (psi g)	bar g (psi g)	bar g (psi g)	bar g (psi g)	bar g (psi g)
Unbalanced	Under	Metal seated (T, W) Class IV	7.8 (113.1)	7 (101.5)	4.8 (69.6)	4.2 (60.9)	2.2 (31.9)	1.9 (27.6)		
		Metal seated (T, W) Class V**	3.0 (43.5)	2.2 (31.9)	0.8 (11.6)	0.3 (4.35)				
		Soft seated (G, K) Class VI	10.9 (158.1)	10.0 (145.0)	7.3 (105.9)	6.7 (97.2)	4.1 (59.5)	3.7 (53.7)	1.4 (20.3)	1.3 (18.9)
		Soft seated (P) Class VI	10.4 (150.8)	9.6 (139.2)	6.9 (100.1)	6.3 (91.4)	3.8 (55.1)	3.4 (49.3)	1.3 (18.9)	1.1 (16.0)
Balanced		All seated (T, W, P, K, G) Class IV	103.4 (1,500)	96.2 (1395.3)	71.6 (1038.5)	64.8 (939.8)	32.5 (471.4)	29.3 (425)	11.8 (171.1)	10.4 (150.8)
Unbalanced	Over	All seated (T, W, P, K, G) Class IV, V, VI	29.8 (432.2)	29.0 (420.1)	19.6 (284.3)	19 (275.6)	10.8 (156.6)	10.5 (152.3)	3.9 (56.6)	3.8 (55.1)

Flow over : on/off application only with unbalanced trim only.
For flow over maximum differential pressure, 6 bar g (87 psi g) air supply is considered for others air pressure please consult Spirax Sarco.

TN2277SR
with 6 bar air supply*

Flow			Valve maximum differential pressure							
			DN125 (5")		DN150 (6")		DN200 (8") DN250 (10") DN300 (12") reduced		DN300 full (12")	
			PTFE	Graphite	PTFE	Graphite	PTFE	Graphite	PTFE	Graphite
Unbalanced	Under	Metal seated (T, W) Class IV	24.7 (358.2)	23.8 (345.2)	16.1 (233.5)	15.5 (224.8)	8.6 (124.7)	8.3 (120.4)	2.6 (37.7)	2.5 (36.3)
		Metal seated (T, W) Class V**	19.9 (288.6)	19.0 (275.6)	12.1 (175.5)	11.6 (168.2)	5.6 (81.2)	5.3 (76.9)	0.7 (10.2)	0.9 (13.1)
		Soft seated (G, K) Class VI	27.7 (401.8)	26.9 (390.2)	18.6 (269.8)	18.0 (261.1)	10.4 (150.8)	10.1 (146.5)	3.8 (55.1)	3.7 (53.7)
		Soft seated (P) Class VI	27.2 (394.5)	26.4 (382.9)	18.2 (264.0)	17.6 (255.3)	10.1 (146.5)	9.8 (142.1)	3.6 (52.2)	3.5 (50.8)
Balanced		All seated (T, W, P, K, G) Class IV	103.4 (1,500)	96.2 (1395.3)	71.6 (1038.5)	64.8 (939.8)	32.5 (471.4)	29.3 (425)	11.8 (171.1)	10.4 (150.8)
Unbalanced	Over	All seated (T, W, P, K, G) Class IV, V, VI	11.8 (171.1)	10.9 (158.1)	7.7 (111.7)	7.2 (104.4)	4.3 (62.4)	3.9 (56.6)	1.5 (21.8)	1.4 (20.3)

*For other air supply pressures please consult Spirax Sarco.
Flow over are for on/off application only and unbalanced trim only.

** Class V has an additional cost impact on the valve. Please contatct Spirax Sarco for details.

Note: The differential pressures stated are at 100% of actuator thrust. It is recommended that valve assemblies are not selected to operate at the absolute maximum differential pressure, especially for steam applications where the downstream pressure can operate in vacuum. Please contact Spirax Sarco for further information.

How to order

Ordering a TN2000 Series Actuator

Type	TN			TN
Series	**2**	=	2000 series	**2**
Actuator size	**2**	=	993 cm^2	**2**
Valve travel	**7**	=	70 mm	**7**
Spring rating	**7**	=	with spring	**7**
	N	=	double-acting (no spring)	
Action	**SE**	=	Single-acting, spring-extend	**SE**
	SR	=	Single-acting, spring-retract	
	DE	=	Double-acting, spring assisted (extend)	
	DR	=	Double-acting, spring assisted (retract)	
	DA	=	Double-acting, no spring	
Manual override	**H**	=	Handwheel (optional) not available for the NDA version	

Ordering example:

1 off Spirax Sarco TN2277SE pneumatic piston actuator.

Spare parts

The spare parts available are common across the range of actuators detailed in this document. No other parts are available as spares.

Available spares	
'O' ring kit	**15, 29, 30, 31**
Travel indicator kit	**22, 27, 28**
Spring	**6**
Handwheel	**A**
EH kit	**B**
RH kit	**C**

How to order spares

Always order spares by using the description given in the column headed 'Available spares' and state the actuator model.
Example: 1 - 'O' ring kit for a Spirax Sarco TN2277SE pneumatic piston actuator.