



TI-P327-01
 CH Issue 4

TN2000 Series Pneumatic Piston Actuators for DN125 to DN300 SPIRA-TROL Series Control Valves

Description

The TN2000 series pneumatic piston actuators are designed for use with DN125 to DN300 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.

Technical data

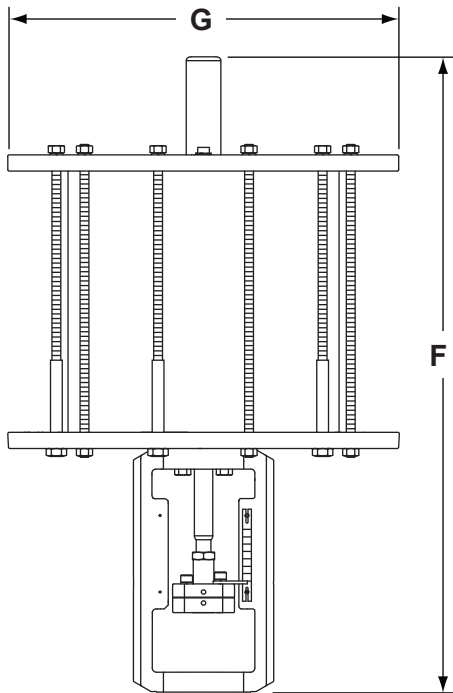
Temperature range	- 15°C to +110°C
Maximum operating inlet pressure	10 bar g
Air supply connection	3/8" screwed NPT
Actuator travel	70 mm

Available types

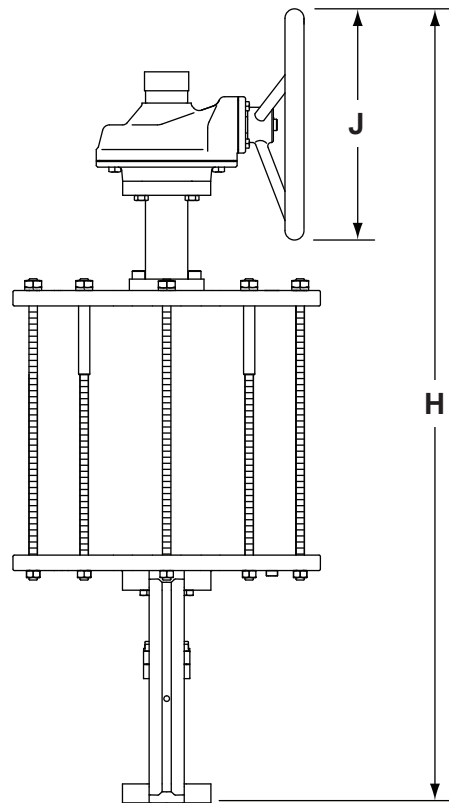
SE	= Single-acting, spring-extend
SR	= Single-acting, spring-retract
DE	= Double-acting, spring assisted (extend)
DR	= Double-acting, spring assisted (retract)
DA	= Double-acting, no spring

Optional extra

Manual handwheel



TN2277SE

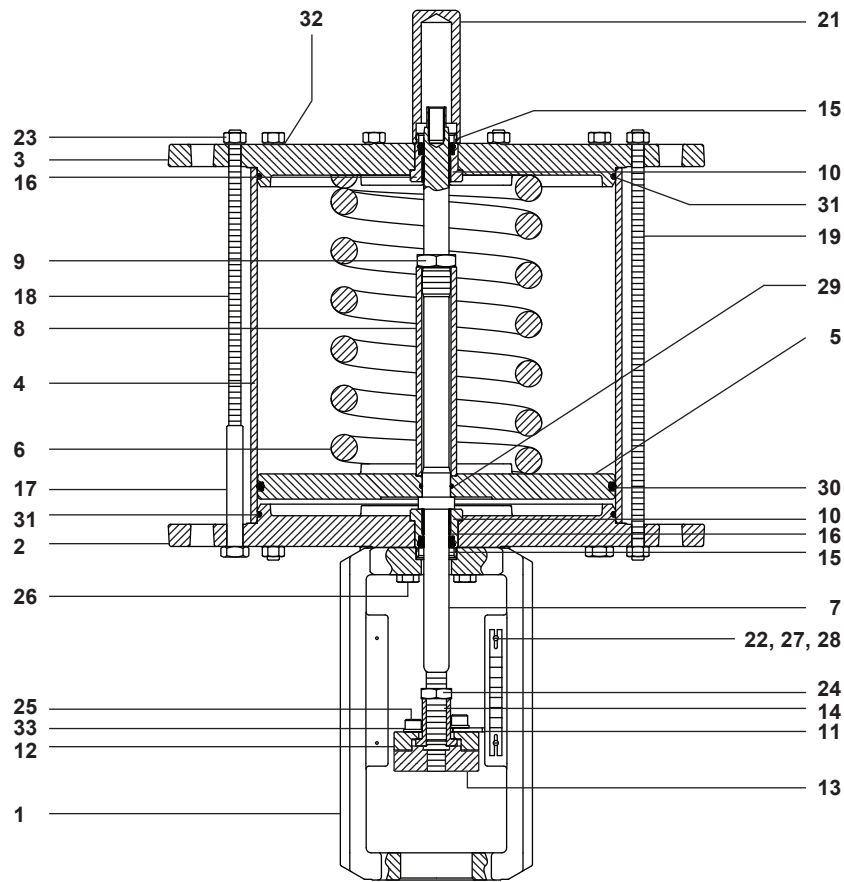


TN2277SRH

Dimensions / weights (approximate) in mm and kg

Actuator range	F	G	H	J	Weight	
					Actuator	With handwheel
TN2277SE and variants	863	532	1197	330	116	+ 21
TN2277DE and variants	863	532	1197	330	116	+ 21
TN2277SR and variants	863	532	1132	330	116	+ 19
TN2277DR and variants	863	532	1132	330	116	+ 19
TN227NDA and variants	863	532	-	330	98	-

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
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	3/8" NPT vent plug (not shown)	LD Polyethylene
21	Cover	PVC
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)

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 flow over applications
- Balanced 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 the maximum operating pressure condition, including any transient pressures likely to occur, within the selected column.
- Read back to the left hand side of the table to identify the suitable actuator for the application.

For conditions outside of those illustrated please contact Spirax Sarco.

Note: With exception to the TN2277SE, the values in the following tables are based on the air pressure indicated below the product nomenclature of the specific unit. In the event of air failure you will require an air pressurised tank to position the valve.

TN2277SE		Valve maximum differential pressure								
		DN125		DN150		DN200 DN250 DN300 reduced		DN300 full		
Flow		PTFE	Graphite	PTFE	Graphite	PTFE	Graphite	PTFE	Graphite	
Unbalanced	Under	Metal seated (T, W, S) Class IV	4.6	4.2	2.1	1.9				
		Metal seated (T, W, S) Class V	3.0	2.6	0.8	0.6				
		Soft seated (G, K) Class VI	10.8	10.4	7.3	7.0	4.1	3.9	1.5	1.4
		Soft seated (P) Class VI	10.7	10.3	7.1	6.9	4.0	3.8	1.4	1.4
Balanced		All seated (T, W, S, P, K, G) Class IV	87.0	83.0	72.0	69.0	40.0	38.0	20.0	19.0
Unbalanced	Over	All seated (T, W, S, P, K, G) Class IV, V, VI	13.2	12.8	8.9	8.6	5.0	4.9	1.8	1.8
Balanced		Metal seated (T, W, S) Class IV	26.0	22.0	14.0	11.0				
		Soft seated (G, K) Class IV	68.0	64.0	57.0	53.0	31.0	29.0	15.0	14.0
		Soft seated (P) Class IV	67.0	63.0	56.0	52.0	30.0	28.0	14.0	14.0

TN2277SR with 4 bar air supply		Valve maximum differential pressure								
		DN125		DN150		DN200 DN250 DN300 reduced		DN300 full		
Flow		PTFE	Graphite	PTFE	Graphite	PTFE	Graphite	PTFE	Graphite	
Unbalanced	Under	Metal seated (T, W, S) Class IV	7.0	6.0	3.0	3.0	1.0	1.0		
		Metal seated (T, W, S) Class V	5.0	5.0	2.0	2.0				
		Soft seated (G, K) Class VI	13.0	12.0	8.0	8.0	5.0	4.0	1.0	1.0
		Soft seated (P) Class VI	13.0	12.0	8.0	8.0	4.0	4.0	1.0	1.0
Balanced		All seated (T, W, S, P, K, G) Class IV	117.0	114.0	98.0	95.0	54.0	52.0	27.0	26.0
Unbalanced	Over	All seated (T, W, S, P, K, G) Class IV, V, VI	13.2	12.8	8.9	8.6	5.0	4.9	1.8	1.8
Balanced		Metal seated (T, W, S) Class IV	44.0	40.0	28.0	25.0	8.0	6.0		
		Soft seated (G, K) Class IV	86.0	82.0	71.0	68.0	39.0	38.0	20.0	19.0
		Soft seated (P) Class IV	85.0	81.0	70.0	67.0	38.0	37.0	19.0	18.0

TN2277DE with 8 bar air supply		Valve maximum differential pressure								
		DN125		DN150		DN200 DN250 DN300 reduced		DN300 full		
Flow		PTFE	Graphite	PTFE	Graphite	PTFE	Graphite	PTFE	Graphite	
Unbalanced	Under	Metal seated (T, W, S) Class IV	69	68	45	45	24	24	8	8
		Metal seated (T, W, S) Class V	67	67	44	44	23	23	7	7
		Soft seated (G, K) Class VI	75	75	50	50	28	28	10	10
		Soft seated (P) Class VI	75	75	50	50	28	28	10	10
Balanced		All seated (T, W, S, P, K, G) Class IV	306	302	255	251	141	139	71	70
Unbalanced		All seated (T, W, S, P, K, G) Class IV, V, VI	74	73	49	49	28	28	10	10
Balanced	Over	Metal seated (T, W, S) Class IV	464	460	378	375	202	200	91	90
		Soft seated (G, K) Class IV	506	502	421	418	233	231	118	117
		Soft seated (P) Class IV	505	501	420	417	232	231	117	116

TN2277DR with 8 bar air supply		Valve maximum differential pressure								
		DN125		DN150		DN200 DN250 DN300 reduced		DN300 full		
Flow		PTFE	Graphite	PTFE	Graphite	PTFE	Graphite	PTFE	Graphite	
Unbalanced	Under	Metal seated (T, W, S) Class IV	39	39	25	25	13	13	4	3
		Metal seated (T, W, S) Class V	37	37	24	24	12	12	3	3
		Soft seated (G, K) Class VI	45	45	30	30	17	17	6	6
		Soft seated (P) Class VI	45	45	30	30	17	17	6	6
Balanced		All seated (T, W, S, P, K, G) Class IV	555	551	462	459	256	254	129	128
Unbalanced		All seated (T, W, S, P, K, G) Class IV, V, VI	74	73	49	49	28	28	10	10
Balanced	Over	Metal seated (T, W, S) Class IV	262	259	211	207	109	107	44	43
		Soft seated (G, K) Class IV	305	301	253	250	140	138	71	70
		Soft seated (P) Class IV	304	300	252	249	139	138	70	69

TN227NDA with 5 bar air supply		Valve maximum differential pressure								
		DN125		DN150		DN200 DN250 DN300 reduced		DN300 full		
Flow		PTFE	Graphite	PTFE	Graphite	PTFE	Graphite	PTFE	Graphite	
Unbalanced	Under	Metal seated (T, W, S) Class IV	33	33	21	21	11	11	3	3
		Metal seated (T, W, S) Class V	32	31	20	20	10	10	2	2
		Soft seated (G, K) Class VI	39	39	26	26	15	14	5	5
		Soft seated (P) Class VI	39	39	26	26	14	14	5	5
Balanced		All seated (T, W, S, P, K, G) Class IV	266	262	222	218	123	121	62	61
Unbalanced		All seated (T, W, S, P, K, G) Class IV, V, VI	39	38	26	26	14	14	5	5
Balanced	Over	Metal seated (T, W, S) Class IV	223	219	178	175	90	89	35	34
		Soft seated (G, K) Class IV	265	261	221	217	122	120	61	60
		Soft seated (P) Class IV	264	260	219	216	121	119	61	60

Flow		Valve maximum differential pressure								
		DN125		DN150		DN200 DN250 DN300 reduced		DN300 full		
		PTFE	Graphite	PTFE	Graphite	PTFE	Graphite	PTFE	Graphite	
Unbalanced	Under	Metal seated (T, W, S) Class IV	41	41	27	26	14	14	4	4
		Metal seated (T, W, S) Class V	40	39	25	25	13	13	3	3
		Soft seated (G, K) Class VI	47	47	32	31	18	18	6	6
		Soft seated (P) Class VI	47	47	32	31	18	17	6	6
Balanced		All seated (T, W, S, P, K, G) Class IV	321	317	267	264	148	146	75	74
Unbalanced		All seated (T, W, S, P, K, G) Class IV, V, VI	47	46	31	31	17	17	6	6
Balanced	Over	Metal seated (T, W, S) Class IV	278	274	223	220	116	114	48	47
		Soft seated (G, K) Class IV	320	316	266	263	147	145	74	73
		Soft seated (P) Class IV	319	315	265	262	146	145	73	73

Flow		Valve maximum differential pressure								
		DN125		DN150		DN200 DN250 DN300 reduced		DN300 full		
		PTFE	Graphite	PTFE	Graphite	PTFE	Graphite	PTFE	Graphite	
Unbalanced	Under	Metal seated (T, W, S) Class IV	49	49	32	32	17	17	5	5
		Metal seated (T, W, S) Class V	48	47	31	30	16	16	4	4
		Soft seated (G, K) Class VI	56	55	37	37	21	21	7	7
		Soft seated (P) Class VI	55	55	37	37	21	20	7	7
Balanced		All seated (T, W, S, P, K, G) Class IV	376	372	313	310	173	171	88	87
Unbalanced		All seated (T, W, S, P, K, G) Class IV, V, VI	54	54	37	36	20	20	7	7
Balanced	Over	Metal seated (T, W, S) Class IV	332	329	269	366	141	139	61	60
		Soft seated (G, K) Class IV	375	371	312	308	172	171	87	86
		Soft seated (P) Class IV	373	370	311	307	172	170	86	85

Flow		Valve maximum differential pressure								
		DN125		DN150		DN200 DN250 DN300 reduced		DN300 full		
		PTFE	Graphite	PTFE	Graphite	PTFE	Graphite	PTFE	Graphite	
Unbalanced	Under	Metal seated (T, W, S) Class IV	57	57	37	37	20	20	6	6
		Metal seated (T, W, S) Class V	56	55	36	36	19	19	5	5
		Soft seated (G, K) Class VI	64	63	43	42	24	24	8	8
		Soft seated (P) Class VI	64	63	42	42	24	24	8	8
Balanced		All seated (T, W, S, P, K, G) Class IV	430	426	358	355	198	197	100	99
Unbalanced		All seated (T, W, S, P, K, G) Class IV, V, VI	62	62	42	42	23	23	8	8
Balanced	Over	Metal seated (T, W, S) Class IV	387	383	314	311	166	164	73	72
		Soft seated (G, K) Class IV	429	425	357	354	198	196	100	99
		Soft seated (P) Class IV	428	424	356	353	197	195	99	98

TN227NDA with 9 bar air supply		Valve maximum differential pressure								
		DN125		DN150		DN200 DN250 DN300 reduced		DN300 full		
		PTFE	Graphite	PTFE	Graphite	PTFE	Graphite	PTFE	Graphite	
Flow										
Unbalanced	Under	Metal seated (T, W, S) Class IV	66	65	43	43	23	23	7	7
		Metal seated (T, W, S) Class V	64	64	42	41	22	22	7	7
		Soft seated (G, K) Class VI	72	71	48	48	27	27	10	9
		Soft seated (P) Class VI	72	71	48	48	27	27	9	9
Balanced		All seated (T, W, S, P, K, G) Class IV	485	481	404	401	224	222	113	112
Unbalanced		All seated (T, W, S, P, K, G) Class IV, V, VI	70	70	47	47	26	26	9	9
Balanced	Over	Metal seated (T, W, S) Class IV	442	438	360	357	191	189	86	85
		Soft seated (G, K) Class IV	484	480	403	399	223	221	112	111
		Soft seated (P) Class IV	483	479	402	398	222	220	112	111

TN227NDA with 10 bar air supply		Valve maximum differential pressure								
		DN125		DN150		DN200 DN250 DN300 reduced		DN300 full		
		PTFE	Graphite	PTFE	Graphite	PTFE	Graphite	PTFE	Graphite	
Flow										
Unbalanced	Under	Metal seated (T, W, S) Class IV	74	73	48	48	26	26	8	8
		Metal seated (T, W, S) Class V	72	72	47	47	25	25	8	8
		Soft seated (G, K) Class VI	80	79	53	53	30	30	11	11
		Soft seated (P) Class VI	80	79	53	53	30	30	11	11
Balanced		All seated (T, W, S, P, K, G) Class IV	540	536	449	446	249	247	126	125
Unbalanced		All seated (T, W, S, P, K, G) Class IV, V, VI	78	78	53	52	29	29	10	10
Balanced	Over	Metal seated (T, W, S) Class IV	496	493	405	402	216	215	99	98
		Soft seated (G, K) Class IV	539	535	448	445	248	246	125	124
		Soft seated (P) Class IV	538	534	447	444	247	245	124	123

TN2000 series selection guide:

Type	TN
Series	2 = 2000 series
Actuator size	2 = 993 cm ²
Valve travel	7 = 70 mm
Spring rating	7 = with spring
	N = double-acting (no spring)
Action	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
Manual override	H = Handwheel (optional) not available for the NDA version

Selection example:	TN	2	2	7	7	SE	
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How to order

Example: 1 off Spirax Sarco TN2277SE pneumatic piston actuator.

TN2000 series selection guide:

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.

