

Z Series

PISTON TYPE ACTUATOR



LINUO VALVE



LINUO PNEUMATIC PISTON ACTUATORS

have been **time tested** and **proven** to be excellent for both On/Off and Control Valve applications.

QUALITY and DURABILITY: are what drive the design and manufacture of Linuo actuators. Available in double acting or spring return models, our reliable products offer outstanding performance at competitive prices.

CYLINDER: Cylinders are polished to a mirror finish on the inside, before being coated with teflon - superior abrasion resistance with minimum friction!

HOUSING: Aluminum alloy housing for small sizes and cast steel for larger sizes. This is an upgrade compared to other actuators with cast iron bodies. These materials of construction make them suitable for offshore applications. Housings are machined to ISO 5211 standards.

PISTON: High strength aluminum is pressure die cast for strength and long service life. The piston is supported by RPTFE guide bearings, and is sealed to the cylinder with double o-rings.

WEAR RESISTANT BEARINGS: RPTFE support bearings are provided on all drive bearing surfaces. The wear resistant performance and self-lubricating function improve drive efficiency and extend service life.

ADJUSTABLE TRAVEL STOPS: Heavy duty stainless end stop adjustment bolts allow for $\pm 5^\circ$ adjustment range for both the open and closed positions.

SPRING SAFETY: Springs are provided in a self contained spring cartridge, increasing safety by eliminating chance of spring blow out during modifications.

INGRESS PROTECTION: Actuators are rated to IP 67 with full protection against dust. Protected also against ingress of water; submersible to depth of 1m.

WORKING CONDITIONS

MEDIUM: Clean, dry compressed air or erosion-free gas.

AIR SUPPLY RANGE: 60 to 100 psig

STANDARD TEMPERATURE RANGE: -4° F to 176° F

TRAVEL STROKE ADJUSTABLE RANGE: ± 5° of the travel stop of the 90° for 0° position.

LUBRICATION: No need to lubricate the actuator under normal operating conditions.

INSTALLATION: IP 67 rating makes Linuo actuators suitable for installation indoors or out.

DESIGNATIONS:

ZDAQ = Spring Return, Heavy Springs, Fail Close

ZDBQ = Spring Return, Heavy Springs, Fail Open

ZSQ = Double Acting Actuator

ZDALQ = Spring Return, Light Springs, Fail Close

ZDBLQ = Spring Return, Light Springs, Fail Open

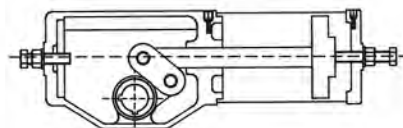
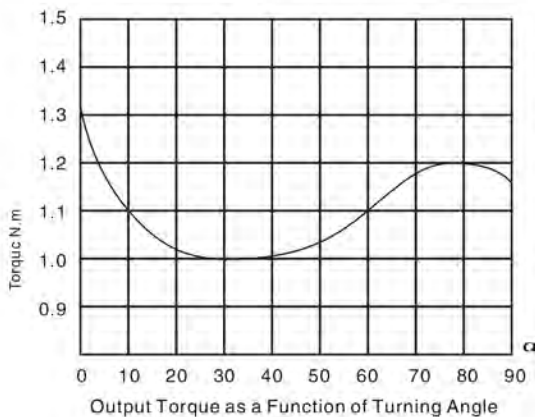
CONVERSIONS: It should be noted that double acting actuators may not be converted to spring return actuators, or vice versa. It is also not possible to convert a fail close actuator to fail open. For ball valve applications or butterfly valves that allow 360° rotation, a fail close actuator may be used for fail open application by rotating the mounting 90°.

ACCESSORIES: Linuo actuators are suitable for both on/off applications and control applications. Standard ISO mounting pads provided on the actuators allow for easy installation of limit switches or positioners.

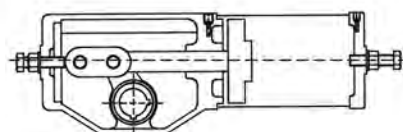
PRINCIPLE OF OPERATION

The force of air or springs on the piston, causes linear motion of the piston. The connecting linkage converts this linear motion into 90° rotation of the lever arm.

The effective arm of force of the actuator changes during the rotary motion, resulting in corresponding variable torque outputs. See the table below. In the table, it shows that the maximum torque output value is achieved at 0°, at which generally ball or butterfly valves require the most torque, to close the valve. Another peak can be seen at approximately 75°. This corresponds to the peak value of dynamic torque requirement for butterfly valves.



$\alpha = 0^\circ$ Valve is CLOSED



$\alpha = 90^\circ$ Valve is OPEN



ZSQ Double Acting Actuator Torque

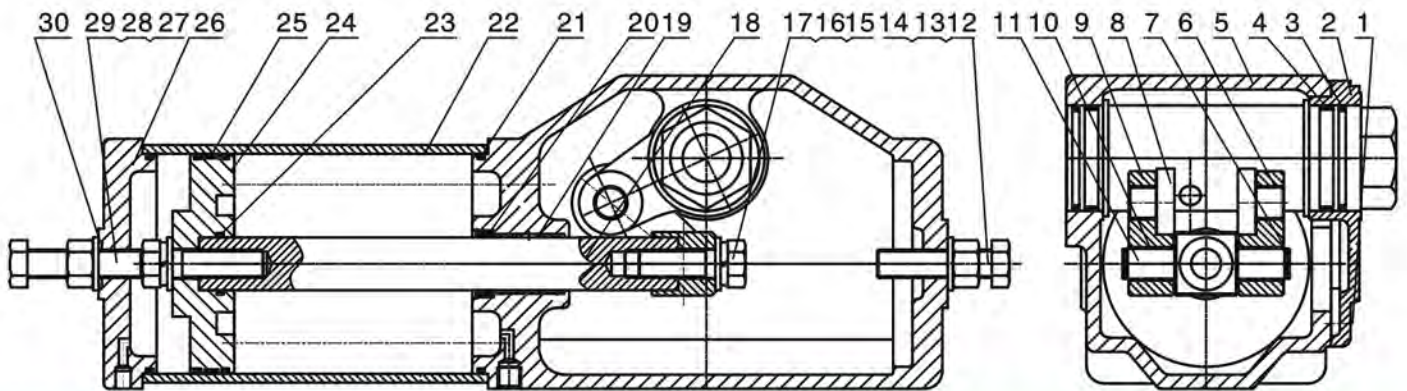
Model	Torque Output in In-Lb at Specified Supply Pressure in psi			
	58 psi	72 psi	87 psi	102 psi
ZSQ32-63	283	354	425	496
ZSQ41-80	566	708	850	991
ZSQ41-100	885	1106	1328	1593
ZSQ41-125	1381	1726	2071	2478
ZSQ50-100	1062	1328	1593	1859
ZSQ50-125	1699	2124	2549	2974
ZSQ50-160	2779	3452	4160	4868
ZSQ60-125	2319	2567	3469	4053
ZSQ60-160	3469	4337	5204	6018
ZSQ60-200	5204	6505	7806	9116
ZSQ80-200	6938	8673	10408	12125
ZSQ80-250	10832	13541	16249	18939
ZSQ100-300	19116	23895	28674	33453
ZSQ130-300	25488	31860	38232	44604
ZSQ130-350	29117	43365	52038	60711
ZSQ130-400	44958	56198	67437	78677
ZSQ160-400	61065	76110	91155	106200
ZSQ160-450	76110	96377	115050	132750

ZDLQ and ZDQ SPRING RETURN ACTUATOR TORQUE

Model	Spring Minimum Torque In-Lb	Torque Output in In-Lb at Specified Supply Pressure in psi				
		50 psi	60 psi	70 psi	80 psi	90psi
ZDLQ41-100	345	195	327	478	637	
ZDQ41-100	443		221	381	531	690
ZDLQ41-125	549	292	513	752	991	
ZDQ41-125	726		292	531	761	1018
ZDLQ50-125	708	354	620	920	1212	
ZDQ50-125	885		354	646	929	1239
ZDLQ50-160	1151	575	1018	1505	1991	
ZDQ50-160	1416		708	1195	1682	2124
ZDLQ60-160	1372	708	1195	1770	2345	
ZDQ60-160	1726		841	1416	1947	2567
ZDLQ60-200	2213	974	1770	2655	3540	
ZDQ60-200	2655		1106	2345	2921	3806
ZDLQ80-200	3009	1292	2345	3540	4717	
ZDQ80-200	3540		1478	3124	3894	5071
ZDLQ80-250	4691	2036	3673	5531	7346	
ZDQ80-250	5487		2390	4292	6195	8054
ZDLQ80-300	6903	2744	5089	7832	10532	
ZDQ80-300	8231		3717	6416	9160	11859
ZDLQ100-300	8585	3275	6195	9558	12833	
ZDQ100-300	10355		4337	7744	11151	14514
ZDLQ130-350	15266	5938	11063	17169	23187	
ZDQ130-350	17700		7965	14160	20090	25665
ZDLQ130-400	20355	7346	14160	22125	29913	
ZDQ130-400	23895		9912	17789	25665	33630
ZDLQ160-400	23895	11505	20709	30975	42038	
ZDQ160-400	32126		10974	21594	32338	43011
ZDLQ160-450	32126	15930	27435	40710	54605	
ZDQ160-450	39825		14160	27966	41507	54870

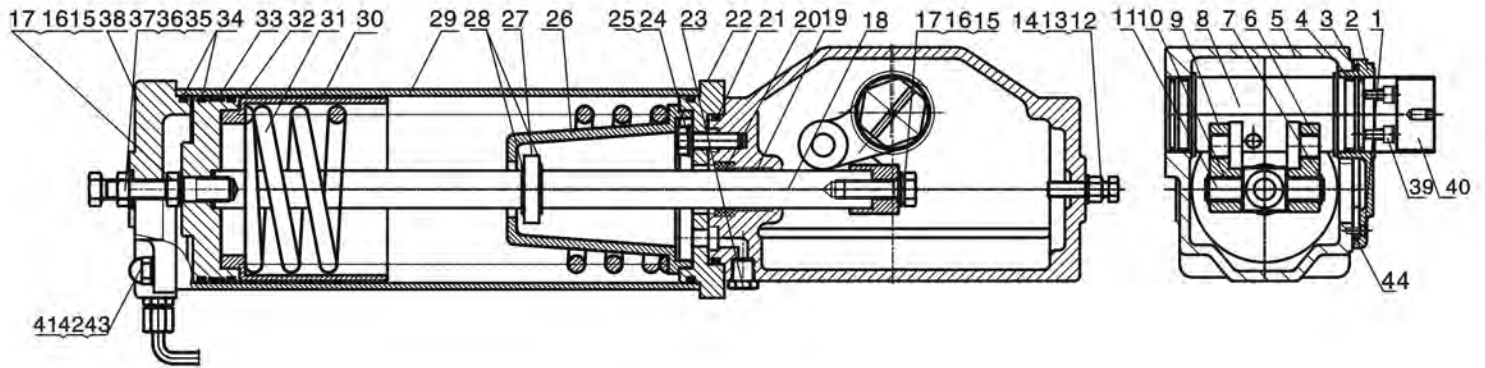
Air Volume and Weight

DA Model ZSQ	Air Volume Open (Outward) Stroke in Cubic In	Air Volume Close (Inward) Stroke in Cubic In	Weight in Lb	SR Model ZDLO Light Spring	Air Volume Open (Outward) Stroke in Cubic In	Air Volume Close (Inward) Stroke in Cubic In	Weight in Lb	SR Model ZDQ Heavy Spring	Air Volume Open (Outward) Stroke in Cubic In	Air Volume Close (Inward) Stroke in Cubic In	Weight in Lb
ZSQ32-63	21	20	7	ZDLO41-100	99	96	22	ZDQ41-100	99	96	23
ZSQ41-80	39	37	12	ZDLO41-125	160	157	26	ZDQ41-125	160	157	27
ZSQ41-100	63	61	14	ZDLO50-125	266	258	37	ZDQ50-125	266	258	40
ZSQ41-125	99	96	15	ZDLO50-160	471	463	62	ZDQ50-160	471	463	63
ZSQ50-100	73	69	18	ZDLO60-160	555	540	75	ZDQ60-160	555	540	77
ZSQ50-125	115	112	22	ZDLO60-200	946	930	88	ZDQ60-200	946	930	90
ZSQ50-160	206	203	31	ZDLO80-200	1240	1211	227	ZDQ80-200	1240	1211	246
ZSQ60-125	131	124	31	ZDLO80-250	1703	1677	279	ZDQ80-250	1703	1677	297
ZSQ60-160	229	223	42	ZDLO80-300	2908	2878	372	ZDQ80-300	2908	2878	396
ZSQ60-200	359	353	61	ZDLO100-300	3090	3037	469	ZDQ100-300	3090	3037	517
ZSQ80-200	469	458	165	ZDLO130-350	5066	4950	845	ZDQ130-350	5066	4950	895
ZSQ80-250	827	815	194	ZDLO130-400	7257	7132	880	ZDQ130-400	7257	7132	990
ZSQ100-300	1247	1225	420	ZDLO160-400	7877	7741	1214	ZDQ160-400	7877	7741	1335
ZSQ130-300	1631	1580	530	ZDLO160-450	10024	9887	1362	ZDQ160-450	10024	9887	1478
ZSQ130-350	2280	2227	594								
ZSQ130-400	3124	3069	651								
ZSQ160-400	3857	3789	862								
ZSQ160-450	4881	4814	944								



ZSQ DOUBLE ACTING ACTUATOR PARTS LIST

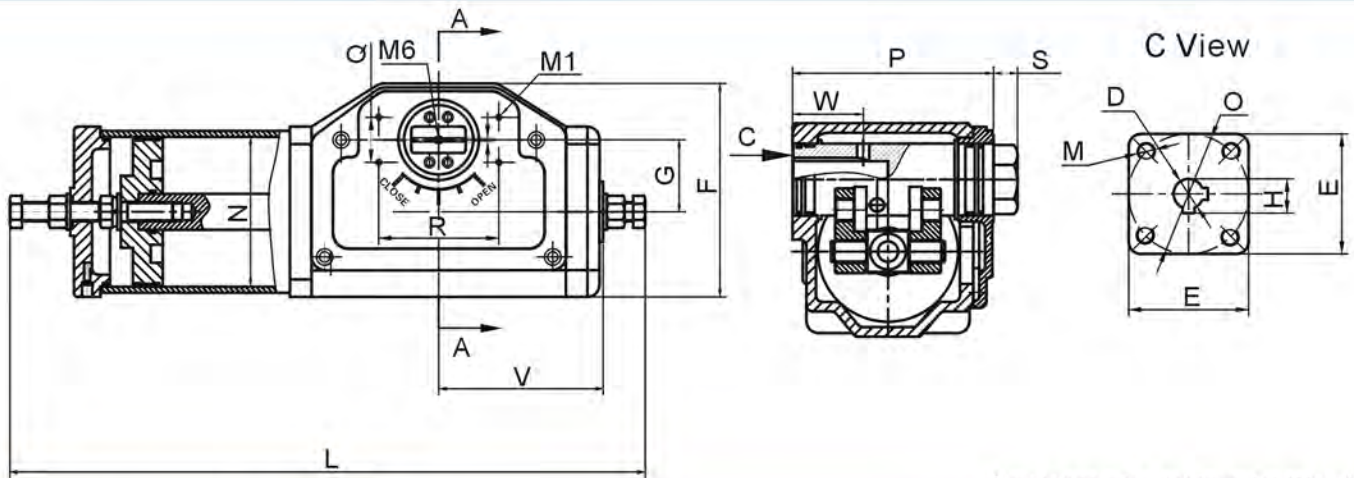
No.	Description	Qty	Material	No.	Description	Qty	Material
1	Screw	4	Stainless Steel	16	Spring Washer	1	Spring Steel
2	Cover	1	Aluminum or Steel	17	Washer	1	Stainless Steel
3	O-ring	2	NBR	18	Piston Rod	1	45# Steel + Cr
4	Pinion Guide Bearing	2	Reinforced PTFE	19	Boundary Lube Bearing	1	Composite Plastic
5	Housing	1	Aluminum or Steel	20	Y-ring	1	Rubber
6	Boundary Lube Bearing	2	Composite Plastic	21	O-ring	4	NBR
7	Retaining Ring	2	Spring Steel	22	Cylinder	1	Alum Alloy / Steel + Cr
8	Lever Arm	1	Cast Iron	23	O-ring	1	NBR
9	Connecting Arm	1	Steel	24	Piston	1	Aluminum Alloy
10	Boundary Lube Bearing	2	Composite Plastic	25	Guide Bearing	1	Reinforced PTFE
11	Cardan Shaft	1	45# Steel	26	Cylinder End	1	Cast Steel
12	Travel Stop Bolt	1	Stainless Steel	27	Bolt	1	Stainless Steel
13	Nut	1	Stainless Steel	28	Nut	1	Stainless Steel
14	Washer	1	Stainless Steel	29	Washer	1	Stainless Steel
15	Bolt	1	Stainless Steel	30	Gasket	1	PTFE



ZDQ SPRING RETURN ACTUATOR PARTS LIST

No.	Description	Qty	Material
1	Screw	4	Stainless Steel
2	Cover	1	Aluminum or Steel
3	O-ring	2	NBR
4	Pinion Guide Bearing	2	Reinforced PTFE
5	Housing	1	Aluminum or Steel
6	Boundary Lube Bearing	2	Composite Plastic
7	Retaining Ring	2	Spring Steel
8	Lever Arm	1	Cast Iron
9	Connecting Arm	2	Steel
10	Boundary Lube Bearing	2	Composite Plastic
11	Cardan Shaft	1	45# Steel
12	Nut	1	Stainless Steel
13	Travel Stop Bolt	1	Stainless Steel
14	Washer	1	Stainless Steel
15	Washer	1	Stainless Steel
16	Spring Washer	1	Spring Steel
17	Bolt	1	Stainless Steel
18	Piston Rod	1	45# Steel + Cr
19	Boundary Lube Bearing	1	Composite Plastic
20	Y-ring	1	Rubber
21	O-ring	1	NBR
22	Filter Flange	1	Cast Steel

No.	Description	Qty	Material
23	Muffler	1	Steel
24	Bolt	4	Stainless Steel
25	Washer	4	Stainless Steel
26	Rear Spring Seat	1	Steel
27	Spring Retainer	1	Steel
28	Spring Retaining Ring	2	Spring Steel
29	Cylinder	1	Alum Alloy / Steel + Cr
30	Spring Guide Bushing	1	Steel
31	Spring	1	Spring Steel
32	Piston	1	Aluminum Alloy
33	Guide Bearing	1	Reinforced PTFE
34	O-ring	4	NBR
35	Gasket	1	PTFE
36	Nut	1	Stainless Steel
37	Travel Stop Bolt	1	Stainless Steel
38	Cylinder End	1	Cast Steel
39	Screw	4	Stainless Steel
40	Lever Arm End	1	Stainless Steel
41	Bolt Stud	4	45# Steel + Zn
42	Nut	4	Stainless Steel
43	Washer	4	Stainless Steel
44	Waterproof Gasket	1	Rubber



Dimensions are in inches unless otherwise noted

ZSQ DOUBLE ACTING ACTUATOR DIMENSIONS

Model	ØN	L	V	G	F	P	W	S in mm	ØO	ØD	B in mm	H	M in mm	E	R in mm	Q in mm	M1 in mm
ZSQ32-63-16	2.48	12.99	4.33	1.26	4.17	4.02	1.97	20.00	2.36	0.63	2-5	0.72	4-M8	2.52	80.00	30.00	4-M5
ZSQ41-80-16	3.15	16.06	5.31	1.61	4.92	4.80	2.36	20.00	2.36	0.63	2-5	0.72	4-M8	2.76	80.00	30.00	4-M5
ZSQ41-100-20	3.94	17.17	5.31	1.61	4.92	4.80	2.36	20.00	2.36	0.79	2-6	0.90	4-M8	2.76	80.00	30.00	4-M5
ZSQ41-125-20	4.92	17.17	5.31	1.61	4.92	4.80	2.36	20.00	2.36	0.79	2-6	0.90	4-M8	2.76	80.00	30.00	4-M5
ZSQ50-100-20	3.94	17.72	5.91	1.97	5.94	5.20	2.36	20.00	2.95	0.79	2-6	0.90	4-M8	3.39	80.00	30.00	4-M5
ZSQ50-125-25	4.92	19.45	5.91	1.97	5.94	5.20	2.36	20.00	2.95	0.98	2-8	1.11	4-M8	3.39	80.00	30.00	4-M5
ZSQ50-160-30	6.30	21.65	5.91	1.97	5.94	5.20	2.36	20.00	2.95	1.18	2-10	1.31	4-M8	3.39	80.00	30.00	4-M5
ZSQ60-125-30	4.92	22.95	6.85	2.36	7.01	6.61	2.76	20.00	3.35	1.18	2-10	1.31	4-M10	3.94	80.00	30.00	4-M5
ZSQ60-160-40	6.30	22.95	6.85	2.36	7.01	6.61	2.76	20.00	3.35	1.57	2-12	1.70	4-M10	3.94	80.00	30.00	4-M5
ZSQ60-200-40	7.87	22.95	6.85	2.36	7.01	6.61	2.76	20.00	3.35	1.57	2-12	1.70	4-M10	3.94	80.00	30.00	4-M5
ZSQ80-200-40	7.87	30.43	9.72	3.15	9.06	7.95	3.35	30.00	4.72	1.57	2-12	1.70	4-M16	5.91	130.00	30.00	4-M5
ZSQ80-200-45	7.87	30.43	9.72	3.15	9.06	7.95	3.35	30.00	4.72	1.77	2-14	1.92	4-M16	5.91	130.00	30.00	4-M5
ZSQ80-250-50	9.84	30.43	9.72	3.15	9.06	7.95	3.35	30.00	4.72	1.97	2-16	2.14	4-M16	5.91	130.00	30.00	4-M5
ZSQ80-250-55	9.84	30.43	9.72	3.15	9.06	7.95	3.35	30.00	4.72	2.17	2-16	2.33	4-M16	5.91	130.00	30.00	4-M5
ZSQ100-300-40	11.81	35.12	10.75	3.94	11.02	8.50	3.35	30.00	6.50	1.57	2-12	1.70	4-M20	6.73	130.00	30.00	4-M5
ZSQ100-300-45	11.81	35.12	10.75	3.94	11.02	8.50	3.35	30.00	6.50	1.77	2-14	1.92	4-M20	6.73	130.00	30.00	4-M5
ZSQ100-300-50	11.81	35.12	10.75	3.94	11.02	8.50	3.35	30.00	6.50	1.97	2-16	2.14	4-M20	6.73	130.00	30.00	4-M5
ZSQ100-300-55	11.81	35.12	10.75	3.94	11.02	8.50	3.35	30.00	6.50	2.17	2-16	2.33	4-M20	6.73	130.00	30.00	4-M5
ZSQ130-300-50	11.81	39.96	14.37	5.12	13.19	10.16	4.92	30.00	6.89	1.97	2-16	2.14	4-M20	7.09	130.00	30.00	4-M5
ZSQ130-350-60	13.78	45.87	14.37	5.12	13.19	10.16	4.92	30.00	6.89	2.36	2-18	2.53	4-M20	7.09	130.00	30.00	4-M5
ZSQ130-400-70	15.75	45.87	14.37	5.12	13.19	10.16	4.92	30.00	6.89	2.76	2-20	2.95	4-M20	7.09	130.00	30.00	4-M5
ZSQ130-400-80	15.75	45.87	14.37	5.12	13.19	10.16	4.92	30.00	6.89	3.15	2-22	3.36	4-M20	7.09	130.00	30.00	4-M5
ZSQ160-400-70	15.75	47.24	15.35	6.30	16.42	12.52	6.69	30.00	9.92	2.76	2-20	2.95	8-M20	10.7/10.5	240.00	40.00	4-M8
ZSQ160-450-80	17.72	47.24	15.35	6.30	16.42	12.52	6.69	30.00	9.92	3.15	2-22	3.36	8-M20	10.7/10.5	240.00	40.00	4-M8

ZDQ SPRING RETURN ACTUATOR DIMENSIONS

Dimensions of ZDLQ light spring actuators and ZDQ heavy spring actuators are the same.

Model	ØN	L	V	G	F	P	W	S in mm	ØO	ØD	B in mm	H	M in mm	E	R in mm	Q in mm	M1 in mm
ZDQ41-100-16	3.94	22.05	5.31	1.61	4.92	4.80	2.36	20.00	2.36	0.63	2-5	0.72	4-M8	2.76	80.00	30.00	4-M5
ZDQ41-125-20	4.92	23.23	5.31	1.61	4.92	4.80	2.36	20.00	2.36	0.79	2-6	0.90	4-M8	2.76	80.00	30.00	4-M5
ZDQ50-125-20	4.92	26.38	5.91	1.97	5.63	5.20	2.36	20.00	2.95	0.79	2-6	0.90	4-M8	3.39	80.00	30.00	4-M5
ZDQ50-160-25	6.30	27.76	5.91	1.97	5.63	5.20	2.36	20.00	2.95	0.98	2-8	1.11	4-M8	3.39	80.00	30.00	4-M5
ZDQ50-160-30	6.30	27.76	5.91	1.97	5.63	5.20	2.36	20.00	2.95	1.18	2-10	1.31	4-M8	3.39	80.00	30.00	4-M5
ZDQ60-160-30	6.30	30.51	6.85	2.36	7.01	6.61	2.76	20.00	3.35	1.18	2-10	1.31	4-M10	3.94	80.00	30.00	4-M5
ZDQ60-200-40	7.87	32.28	6.85	2.36	7.01	6.61	2.76	20.00	3.35	1.57	2-12	1.70	4-M10	3.94	80.00	30.00	4-M5
ZDQ80-200-40	7.87	38.19	9.72	3.15	9.41	7.95	3.35	30.00	4.72	1.57	2-12	1.70	4-M16	5.91	130.00	30.00	4-M5
ZDQ80-250-30	11.81	39.17	9.72	3.15	9.41	7.95	3.35	30.00	4.72	1.18	2-10	1.31	4-M16	5.91	130.00	30.00	4-M5
ZDQ80-250-40	11.81	39.17	9.72	3.15	9.41	7.95	3.35	30.00	4.72	1.57	2-12	1.70	4-M16	5.91	130.00	30.00	4-M5
ZDQ80-250-45	9.84	39.17	9.72	3.15	9.41	7.95	3.35	30.00	4.72	1.77	2-14	1.92	4-M16	5.91	130.00	30.00	4-M5
ZDQ80-300-50	11.81	43.50	9.72	3.15	9.41	7.95	3.35	30.00	4.72	1.97	2-16	2.14	4-M16	5.91	130.00	30.00	4-M5
ZDQ80-300-55	11.81	43.50	9.72	3.15	9.41	7.95	3.35	30.00	4.72	2.17	2-16	2.33	4-M16	5.91	130.00	30.00	4-M5
ZDQ100-300-40	11.81	47.64	10.75	3.94	11.02	9.41	3.35	30.00	6.50	1.57	2-12	1.70	4-M20	6.73	130.00	30.00	4-M5
ZDQ100-300-45	11.81	47.64	10.75	3.94	11.02	9.41	3.35	30.00	6.50	1.77	2-14	1.92	4-M20	6.73	130.00	30.00	4-M5
ZDQ100-300-50	11.81	47.64	10.75	3.94	11.02	9.41	3.35	30.00	6.50	1.97	2-16	2.14	4-M20	6.73	130.00	30.00	4-M5
ZDQ100-300-55	11.81	47.64	10.75	3.94	11.02	9.41	3.35	30.00	6.50	2.17	2-16	2.33	4-M20	6.73	130.00	30.00	4-M5
ZDQ130-350-50	13.78	56.30	14.37	5.12	13.54	12.13	4.92	30.00	6.89	1.97	2-16	2.14	4-M20	7.09	130.00	30.00	4-M5
ZDQ130-350-60	13.78	56.30	14.37	5.12	13.54	12.13	4.92	30.00	6.89	2.36	2-18	2.53	4-M20	7.09	130.00	30.00	4-M5
ZDQ130-400-70	15.75	58.86	14.37	5.12	13.54	12.13	4.92	30.00	6.89	2.76	2-20	2.95	4-M20	7.09	130.00	30.00	4-M5
ZDQ130-400-80	15.75	58.86	14.37	5.12	13.54	12.13	4.92	30.00	6.89	3.15	2-22	3.36	4-M20	7.09	130.00	30.00	4-M5
ZDQ160-400-70	15.75	63.98	15.35	6.30	16.42	12.52	6.69	30.00	9.92	2.76	2-20	2.95	8-M20	10.7/10.5	240.00	40.00	4-M8
ZDQ160-450-80	17.72	64.37	15.35	6.30	16.42	12.52	6.69	30.00	9.92	3.15	2-22	3.36	8-M20	10.7/10.5	240.00	40.00	4-M8

How To Order – Piston Type Actuator

ZDALQ 80–300–50



1 Actuator Type

ZSQ	Double Acting
ZDAQ	Spring Return, Heavy Spring, Fail CLOSED
ZDBQ	Spring Return, Heavy Spring, Fail OPEN
ZDALQ	Spring Return, Light Spring, Fail CLOSED
ZDBLQ	Spring Return, Light Spring, Fail OPEN

2 Housing Size Code

32	41	50	60	80	100	130	160	
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3 Cylinder Bore in mm

63	80	100	125	160	200	250	300	350	400	450
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4 Shaft Bore in mm

16	20	25	30	40	45	50	55	60	70	80
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<p>Linuo Valve 21 Sullivan Parkway Fort Edward, NY 12828 sales@linuovalves.com 518-747-2748</p>						
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Specifications of the product may be changed without notice; color of the items listed may differ from actual specification due to printing; please refer to actual color.
 LVPPA04/2011