

Sanitary Diaphragm Valve

Pneumatically Operated

Description

The type 687 is a compact valve with many features which make it ideal for pharmaceutical and bio-processing applications.

Standard Features

- Compact design
- Sanitary internals
- FDA compliant diaphragms
- 316L stainless steel body
- Triclamp®, O.D. Tubing, ISO, and DIN end connections
- Sizes 1/2" - 4"

Available Options

- Handwheel, manual override
- Electrical limit and proximity switches
- Visual position indicator
- Pneumatic and electro-pneumatic positioners
- Stroke limiters
- Safety packing
- "V" notch vent plug
-

Special connections

Hose barb, tube extensions, Swagelok®, Cajon VCR®, Ingold®, and others available upon request.

Fabrications

Cluster valve assemblies for both horizontal and vertical orientations, Zero Static T-valves, Duplex, Multiported, Tank Bottom, and custom fabrications upon request.

Materials

AL-6XN®, Hastelloy®, Titanium®, and others available upon request.

Typical Applications

- Pharmaceutical manufacturing
- Bioprocessing
- Cosmetic
- Brewery Service
- Food and Beverage
- Semiconductor
- High Purity Chemicals



Type 687

Type 687 Technical Data

Max permissible working temperature:
302°F (depending on diaphragm and body materials).

The valve will seal against flow in either direction up to full working pressure.

Control Medium DN 15-50 DN 80 + 100
Min. Required control pressure: 45 psi 82.5 psi
Max. Permissible control pressure: 90 psi 105 psi
Max. Permissible temp. of control medium: 104°F

Actuator volume: DN 15 - 25 9.2 cubic inches
 DN 32 + 40 21.4 cubic inches

Body Configuration	Ref.no.
Tank bottom valve body	B
2-way valve body	D
2-way angled valve body	E
Multiported valve body	M
Zero Static T-Valve	T
U-bend	U

Connection	Ref.no.
DIN	0
DIN 11850/Series 1	16
DIN 11850/Series 2	17
DIN 11850/Series 3	18
Butt weld O.D. Tubing	59
Sizes 1/4-3/8" 20 gauge .035" wall	
Sizes 1/2-3" 16 gauge .065" wall	
Sizes 4" 14 gauge .083" wall	
ISO	60
Schedule 10 pipe	63
Tri-clamp®	80
O.D. Tubing by Triclamper®	93
Extended O.D. Tubing	94
Extended O.D. Tubing by Triclamper®	95

Body material	Ref.no.
Investment cast body	
Stainless steel 316 L \geq 1.4435 (BN2) Fe < 0.5%	32
Stainless steel 1.4539 (UNS N 08904)	33
Forged Body	
Stainless steel 316 L \geq 1.4435 (ASTM A 182)	40
Stainless steel 316 L \geq 1.4435 (BN2) Fe < 0.5%	42
Machined block	
Stainless steel 316 L \geq 1.4435 (ASTMA 479)	41
Special versions (Consult factory for special material reference numbers)	91

Diaphragm material	Ref.no.
2nd generation, modified Teflon® with Ethylene-propylene backing 2-piece molded closed	TFM/EPDM 5E
2nd generation, modified Teflon® with Silicone backing 2-piece molded closed	TFM/VMQ 5S
Ethylene-propylene Rubber for saturated steam max 302° F	EPDM 13
Ethylene-propylene Rubber for saturated steam max 302° F	EPDM 16
2nd generation, modified Teflon® with Ethylene-propylene backing (2-piece)	TFM/EPDM 50
2nd generation, modified Teflon® with Ethylene-propylene backing	TFM/EPDM 52

All diaphragms listed conform to the FDA code of Federal Regulations paragraph 177.2600 of section 21.

Control function	Ref.no.
Normally closed	1
Normally open	2
Double acting	3

Surface finish						Ref.no.	
μ-in.	Mechanical Designation	BPE Surface Designation	Ra Average [Note (1)]		Ra Max		
			μ-in.	μm	μ-in.	μm	
32	Mechanical	SFV3	25	0.625	30	0.750	3
25	Mechanical	SFV6	20	0.500	25	0.625	1502
20	E-pol	SFV6	20	0.500	25	0.625	1508
20	Mechanical	SFV2	20	0.500	25	0.625	1507
15	E-pol	SFV5	15	0.375	20	0.500	1537
11	Mechanical	SFV1	15	0.375	20	0.500	1536
10	E-pol	SFV4	10	0.250	15	0.375	1516

GENERAL NOTE: All Ra readings are taken across the grain.
 NOTE: (1) The average Ra is derived from two readings taken at different locations.

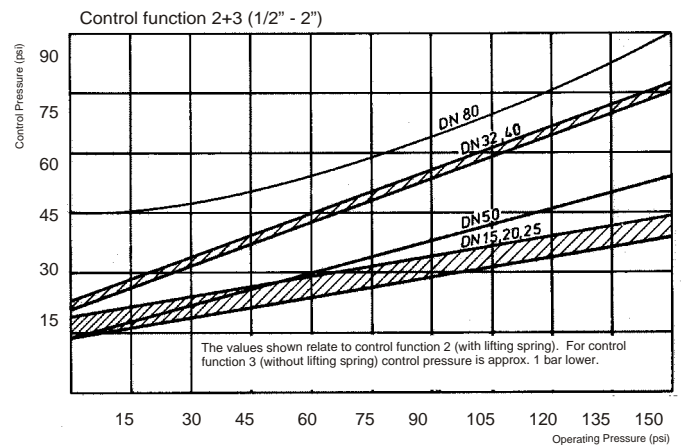
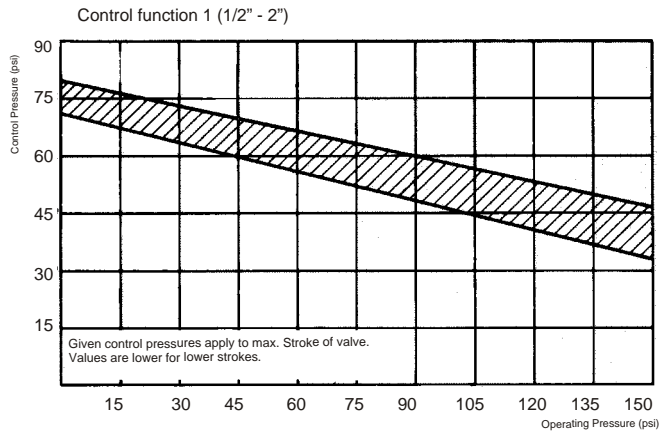
Special Versions	Ref.no.
Special versions	UXXXX

Order Example	-687	015	U	80	41	13	1		040	94	1537	
Type of valve	-687											
Size DN		015										
Body configuration			U									
Connection (valve body)				80								
Body material					41							
Diaphragm material						13						
Control function							1					
Actuator size												
Locking device												
Pipe main size									040			
Pipe main connection										94		
Surface finish											1537	
Special versions (XXXX)												

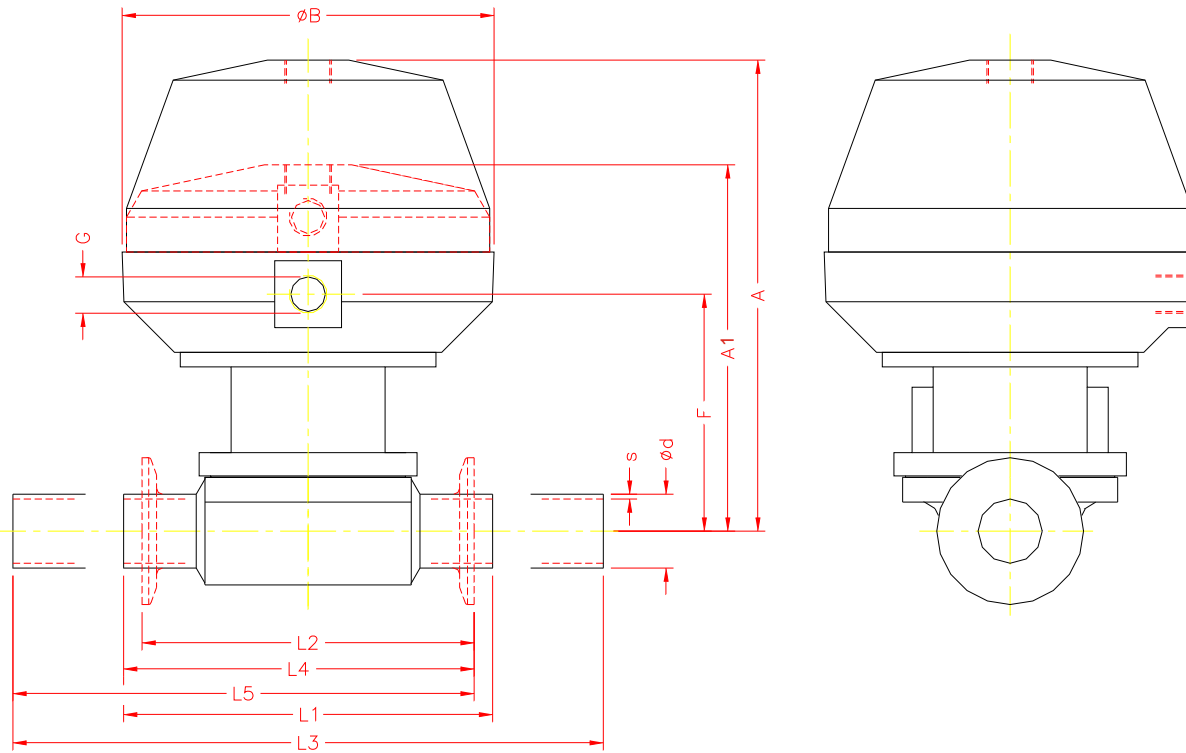
Type 687 Technical Data

Size (In.)	Size (mm)	Body Configuration D= straight through	Control function 1		Control function 2		Control function 3		C _v -value (gpm)		Weight (lbs)
			Working pressure (psi)		Working pressure (psi)		Working pressure (psi)		ISO Connections	O.D. Tubing	
			EPDM, Viton, Silicon	Teflon	EPDM, Viton, Silicon	Teflon	EPDM, Viton, Silicon	Teflon			
1/2	15	D	0 - 150	0 - 90	0 - 150	0 - 90	0 - 150	0 - 90	12.3	5.9	6.1
3/4	20	D	0 - 150	0 - 90	0 - 150	0 - 90	0 - 150	0 - 90	15.2	12.3	6.1
1	25	D	0 - 150	0 - 90	0 - 150	0 - 90	0 - 150	0 - 90	31.6	13.5	6.1
1 1/4	32	D	0 - 150	0 - 90	0 - 150	0 - 90	0 - 150	0 - 90	50.3	29.3	12.1
1 1/2	40	D	0 - 150	0 - 90	0 - 150	0 - 90	0 - 150	0 - 90	58.5	46.8	14.7
2	50	D	0 - 150	0 - 90	0 - 150	0 - 90	0 - 150	0 - 90	74.9	67.9	20.5
2 1/2	65	D	0 - 120	0 - 75	0 - 150	0 - 90	0 - 150	0 - 90	111.2	99.5	51.1
3	80	D	0 - 120	0 - 75	0 - 150	0 - 90	0 - 150	0 - 90	148.6	128.7	51.1
4	100	D	0 - 90	0 - 60	0 - 150	0 - 90	0 - 90	0 - 45	239.9	216.5	79.8

All pressures are gauge pressures when applied upstream . The C_v values vary due to differences in valve construction (i.e., Port size, body material, diaphragm material, etc.)



Type 687 Dimensional Data



Take Out Dimensions for Standard Connections

Size	DN	Units	Con. Ref. No.	$\varnothing d$	s	(59) L1	(80) L2	(94) L3	(93) L4	(95) L5
1/2	15	mm	12.70	1.65	120.00	101.60	184.15	110.80	142.88	
		in	0.500	0.065	4.724	4.000	7.250	4.362	5.625	
3/4	20	mm	19.05	1.65	120.00	101.60	190.50	110.80	146.05	
		in	0.750	0.065	4.724	4.000	7.500	4.362	5.750	
1	25	mm	25.40	1.65	120.00	114.30	203.20	117.15	158.75	
		in	1.000	0.065	4.724	4.500	8.000	4.612	6.250	
1 1/2	40	mm	38.10	1.65	153.00	139.70	234.95	146.35	187.33	
		in	1.500	0.065	6.024	5.500	9.250	5.762	7.375	
2	50	mm	50.80	1.65	173.00	158.75	266.70	165.88	212.73	
		in	2.000	0.065	6.811	6.250	10.500	6.531	8.375	
2 1/2	65	mm	63.50	1.65	216.00	193.68	292.10	204.84	242.89	
		in	2.500	0.065	8.504	7.625	11.500	8.065	9.563	
3	80	mm	76.20	1.65	254.00	222.25	333.38	238.13	277.82	
		in	3.000	0.065	10.000	8.750	13.125	9.375	10.938	
4	100	mm	101.60	2.10	305.00	292.10	406.40	298.55	349.25	
		in	4.000	0.083	12.008	11.500	16.000	11.754	13.750	

Drain Angles

Size	DN	Degrees
1/2	15	46°
3/4	20	55°
1	25	60°
1 1/4	32	65°
1 1/2	40	65°
2	50	70°
2 1/2	65	70°
3	80	70°
4	100	70°

Drain angles are for BS O.D. Tubing only.

- L1 = Connection Code 59 = Standard butt-weld
- L2 = Connection Code 80 = Standard clamp
- L3 = Connection Code 94 = Standard butt-weld extension (AWF)
- L4 = Connection Code 93 = Standard clamp X butt-weld
- L5 = Connection Code 95 = Standard clamp X butt-weld extension (AWF)

Optional Spigot Dimensions

Connection Ref. No.	60	0	16	17	18	37							
Size DN	L ₁	d	s	d	s	d	s	d	s	d	s		
1/2" 15	120	21.3	1.6	18	1.5	18	1	19	1.5	20	2	-	-
3/4" 20	120	26.9	1.6	22	1.5	22	1	23	1.5	24	2	-	-
1" 25	120	33.7	2.0	28	1.5	28	1	29	1.5	30	2	25.0	1.2
1 1/4" 32	153	42.4	2.0	34	1.5	34	1	35	1.5	36	2	33.7	1.2
1 1/2" 40	153	48.3	2.0	40	1.5	40	1	41	1.5	42	2	38.0	1.2
2" 50	173	60.3	2.3	52	1.5	52	1	53	1.5	54	2	51.0	1.2
2 1/2" 65	216	76.1	2.6	-	-	70.2	2	-	-	-	-	63.5	1.6
3" 80	254	88.9	2.6	-	-	85	2	-	-	-	-	76.1	1.6
4" 100	305	114.3	2.6	-	-	104	2	-	-	-	-	101.6	2.0

Dimensions

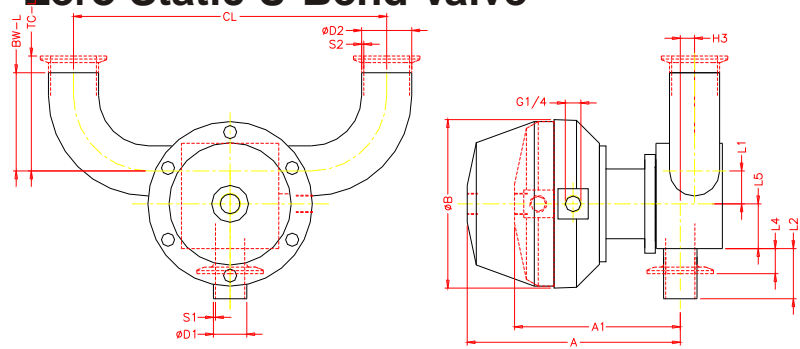
Size	DN	Units	CF 1 A	CF 2, 3 A1	F	G	$\varnothing B$	Weight (lbs)
1/2	15	mm	160.5	131.0	78.5	G1/4	125.0	6.0
		in	6.32	5.16	3.09		4.92	
3/4	20	mm	163.5	134.0	81.5	G1/4	125.0	6.0
		in	6.44	5.28	3.21		4.92	
1	25	mm	168.5	137.0	84.5	G1/4	125.0	6.0
		in	6.63	5.39	3.33		4.92	
1 1/4	32	mm	208.5	164.0	109.5	G1/4	155.0	13.9
		in	8.21	6.46	4.31		6.10	
1 1/2	40	mm	210.5	166.0	111.5	G1/4	155.0	13.9
		in	8.29	6.54	4.39		6.10	
2	50	mm	252.5	197.0	129.5	G1/4	210.0	22.3
		in	9.94	7.76	5.10		8.27	
3	80	mm	382.0	341.0	234.0	G1/4	258.0	53.0
		in	15.04	13.43	9.21		10.16	
4	100	mm	391.0	350.0	243.0	G1/4	328.0	66.0
		in	15.39	13.78	9.57		12.91	

Type 687 Dimensional Data

GEMU® Zero Static U-Bend Valve

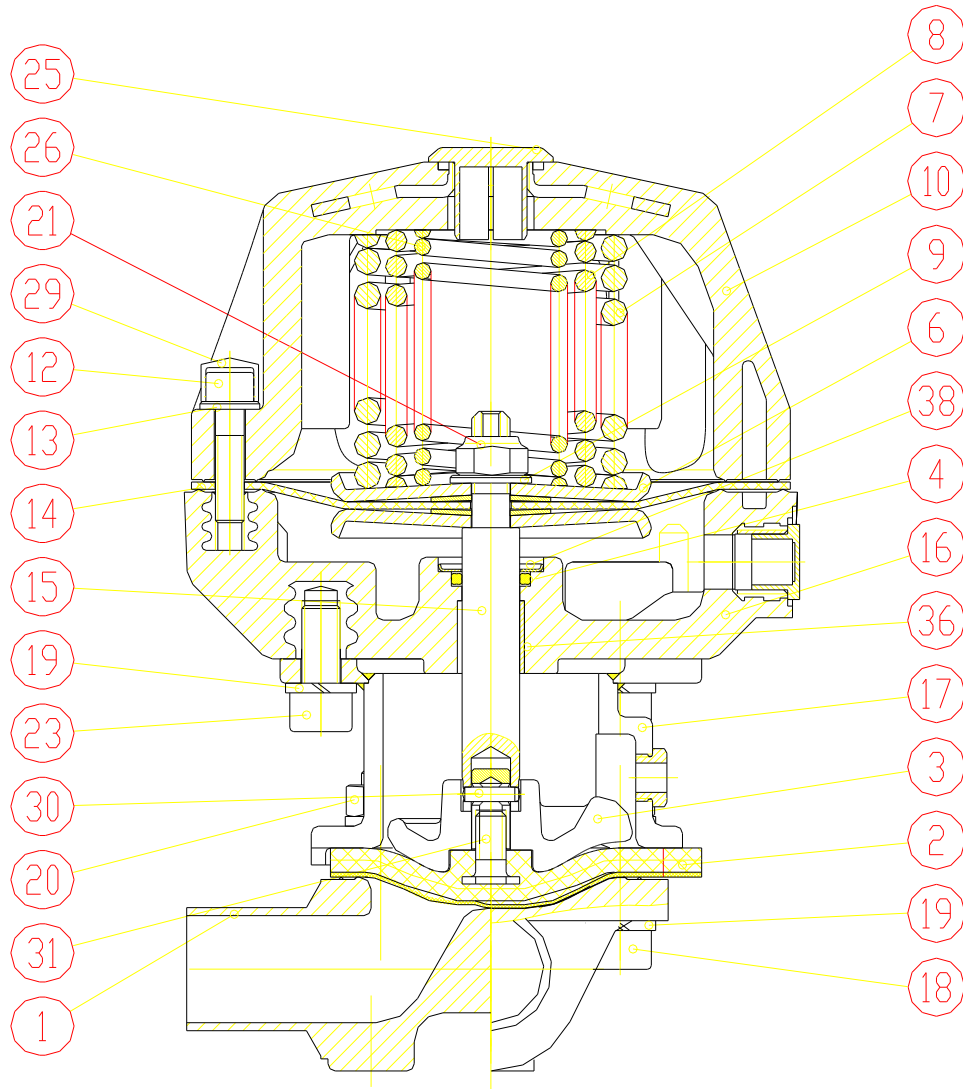
Standard Features

- Sterile design
- Mechanical parts isolated from process
- Zero dead-leg with no bacteria entrapment
- Maximum drainage, leaving virtually no residue
- Body machined from 316L stainless steel solid bar stock or specified material
- Compact design
- Minimum tube length of 1.5" for automatic orbital welding



D1 x D2	Units	D1	s1	D2	s2	H3	L1	Code 59		Code 94		L4	L5	CL	BW-L	Code 80		CF 1	CF 2, 3	F	G	ØB
								L2	L2	TC-L	A					A1						
1/2 x 1	mm	12.7	1.65	25.4	1.65	4.5	17.9	20.0	38.1	19.7	34.0	240.4	76.2	50.8	162.00	133.50	78.50	G1/4	125.00			
	in	0.500	0.065	1.000	0.065	0.2	0.7	0.8	1.5	0.8	1.3	9.5	3.0	2.0	6.4	5.3	3.1					
1/2 x 1 1/2	mm	12.7	1.65	38.1	1.65	10.85	25.0	20.0	38.1	19.7	34.0	278.5	95.3	69.9	162.00	133.50	78.50	G1/4	125.00			
	in	0.500	0.065	1.500	0.065	0.4	1.0	0.8	1.5	0.8	1.3	11.0	3.8	2.8	6.4	5.3	3.1					
1/2 x 2	mm	12.7	1.65	50.8	1.65	17.2	32.0	20.0	38.1	19.7	34.0	329.3	120.7	88.9	162.00	133.50	78.50	G1/4	125.00			
	in	0.500	0.065	2.000	0.065	0.7	1.3	0.8	1.5	0.8	1.3	13.0	4.8	3.5	6.4	5.3	3.1					
1/2 x 2 1/2	mm	12.7	1.65	63.5	1.65	23.55	39.1	20.0	38.1	19.7	34.0	367.4	139.7	108.0	162.00	133.50	78.50	G1/4	125.00			
	in	0.500	0.065	2.500	0.065	0.9	1.5	0.8	1.5	0.8	1.3	14.5	5.5	4.3	6.4	5.3	3.1					
1/2 x 3	mm	12.7	1.65	76.2	1.65	29.9	46.1	20.0	38.1	19.7	34.0	405.5	158.8	127.0	162.00	133.50	78.50	G1/4	125.00			
	in	0.500	0.065	3.000	0.065	1.2	1.8	0.8	1.5	0.8	1.3	16.0	6.3	5.0	6.4	5.3	3.1					
1/2 x 4	mm	12.7	1.65	101.6	1.65	42.6	59.8	20.0	38.1	19.7	34.0	494.4	203.2	168.3	162.00	133.50	78.50	G1/4	125.00			
	in	0.500	0.065	4.000	0.065	1.7	2.4	0.8	1.5	0.8	1.3	19.5	8.0	6.6	6.4	5.3	3.1					
3/4 x 3/4	mm	19.05	1.65	19.05	1.65	1.33	14.4	25.0	38.1	19.7	34.0	240.4	76.2	41.3	162.00	133.50	78.50	G1/4	125.00			
	in	0.750	0.065	0.750	0.065	0.1	0.6	1.0	1.5	0.8	1.3	9.5	3.0	1.6	6.4	5.3	3.1					
3/4 x 1	mm	19.05	1.65	25.4	1.65	4.5	17.9	25.0	38.1	19.7	34.0	240.4	76.2	50.8	162.00	133.50	78.50	G1/4	125.00			
	in	0.750	0.065	1.000	0.065	0.2	0.7	1.0	1.5	0.8	1.3	9.5	3.0	2.0	6.4	5.3	3.1					
3/4 x 1 1/2	mm	19.05	1.65	38.1	1.65	10.85	25.0	25.0	38.1	19.7	34.0	278.5	95.3	69.9	162.00	133.50	78.50	G1/4	125.00			
	in	0.750	0.065	1.500	0.065	0.4	1.0	1.0	1.5	0.8	1.3	11.0	3.8	2.8	6.4	5.3	3.1					
3/4 x 2	mm	19.05	1.65	50.8	1.65	17.2	32.0	25.0	38.1	19.7	34.0	329.3	120.7	88.9	162.00	133.50	78.50	G1/4	125.00			
	in	0.750	0.065	2.000	0.065	0.7	1.3	1.0	1.5	0.8	1.3	13.0	4.8	3.5	6.4	5.3	3.1					
3/4 x 3	mm	19.05	1.65	76.2	1.65	29.9	46.1	25.0	38.1	19.7	34.0	405.5	158.8	127.0	162.00	133.50	78.50	G1/4	125.00			
	in	0.750	0.065	3.000	0.065	1.2	1.8	1.0	1.5	0.8	1.3	16.0	6.3	5.0	6.4	5.3	3.1					
3/4 x 4	mm	19.05	1.65	101.6	1.65	42.6	59.8	25.0	38.1	19.7	34.0	494.4	203.2	168.3	162.00	133.50	78.50	G1/4	125.00			
	in	0.750	0.065	4.000	0.065	1.7	2.4	1.0	1.5	0.8	1.3	19.5	8.0	6.6	6.4	5.3	3.1					
1 x 1	mm	25.4	1.65	25.4	1.65	4.5	17.9	25.0	38.1	19.7	34.0	240.4	76.2	50.8	162.00	133.50	78.50	G1/4	125.00			
	in	1.000	0.065	1.000	0.065	0.2	0.7	1.0	1.5	0.8	1.3	9.5	3.0	2.0	6.4	5.3	3.1					
1 x 1 1/2	mm	25.4	1.65	38.1	1.65	10.85	25.0	25.0	38.1	19.7	34.0	278.5	95.3	69.9	162.00	133.50	78.50	G1/4	125.00			
	in	1.000	0.065	1.500	0.065	0.4	1.0	1.0	1.5	0.8	1.3	11.0	3.8	2.8	6.4	5.3	3.1					
1 x 2	mm	25.4	1.65	50.8	1.65	17.2	32.0	25.0	38.1	19.7	34.0	329.3	120.7	88.9	162.00	133.50	78.50	G1/4	125.00			
	in	1.000	0.065	2.000	0.065	0.7	1.3	1.0	1.5	0.8	1.3	13.0	4.8	3.5	6.4	5.3	3.1					
1 x 2 1/2	mm	25.4	1.65	63.5	1.65	23.55	39.1	25.0	38.1	19.7	34.0	367.4	139.7	108.0	162.00	133.50	78.50	G1/4	125.00			
	in	1.000	0.065	2.500	0.065	0.9	1.5	1.0	1.5	0.8	1.3	14.5	5.5	4.3	6.4	5.3	3.1					
1 x 3	mm	25.4	1.65	76.2	1.65	29.9	46.1	25.0	38.1	19.7	34.0	405.5	158.8	127.0	162.00	133.50	78.50	G1/4	125.00			
	in	1.000	0.065	3.000	0.065	1.2	1.8	1.0	1.5	0.8	1.3	16.0	6.3	5.0	6.4	5.3	3.1					
1 x 4	mm	25.4	1.65	101.6	1.65	42.6	59.8	25.0	38.1	19.7	34.0	494.4	203.2	168.3	162.00	133.50	78.50	G1/4	125.00			
	in	1.000	0.065	4.000	0.065	1.7	2.4	1.0	1.5	0.8	1.3	19.5	8.0	6.6	6.4	5.3	3.1					
1 x 6	mm	25.4	1.65	152.4	1.65	68	87.3	25.0	38.1	19.7	34.0	672.2	292.1	266.7	162.00	133.50	78.50	G1/4	125.00			
	in	1.000	0.065	6.000	0.109	2.7	3.4	1.0	1.5	0.8	1.3	26.5	11.5	10.5	6.4	5.3	3.1					
1 1/2 x 1 1/2	mm	38.1	1.65	38.1	1.65	6.75	27.1	25.0	38.1	19.7	46.0	306.5	95.3	69.9	210.50	166.00	111.50	G1/4	155.00			
	in	1.500	0.065	1.500	0.065	0.3	1.1	1.0	1.5	0.8	1.8	12.1	3.8	2.8	8.3	6.5	4.4					
1 1/2 x 2	mm	38.1	1.65	50.8	1.65	13.1	34.1	25.0	38.1	19.7	46.0	357.3	120.7	88.9	210.50	166.00	111.50	G1/4	155.00			
	in	1.500	0.065	2.000	0.065	0.5	1.3	1.0	1.5	0.8	1.8	14.1	4.8	3.5	8.3	6.5	4.4					
1 1/2 x 2 1/2	mm	38.1	1.65	63.5	1.65	19.45	41.2	25.0	38.1	19.7	46.0	395.4	139.7	108.0	210.50	166.00	111.50	G1/4	155.00			
	in	1.500	0.065	2.500	0.065	0.8	1.6	1.0	1.5	0.8	1.8	15.6	5.5	4.3	8.3	6.5	4.4					
1 1/2 x 3	mm	38.1	1.65	76.2	1.65	25.8	48.2	25.0	38.1	19.7	46.0	433.5	158.8	127.0	210.50	166.00	111.50	G1/4	155.00			
	in	1.500	0.065	3.000	0.065	1.0	1.9	1.0	1.5	0.8	1.8	17.1	6.3	5.0	8.3	6.5	4.4					
1 1/2 x 4	mm	38.1	1.65	101.6	1.65	38.5	61.9	25.0	38.1	19.7	46.0	522.4	203.2	168.3	210.50	166.00	111.50	G1/4	155.00			
	in	1.500	0.065	4.000	0.065	1.5	2.4	1.0	1.5	0.8	1.8	20.6	8.0	6.6	8.3	6.5	4.4					
1 1/2 x 6	mm	38.1	1.65	152.4	1.65	63.9	89.4	25.0	38.1	19.7	46.0	700.2	292.1	266.7	210.50	166.00	111.50	G1/4	155.00			
	in	1.500	0.065	6.000	0.109	2.5	3.5	1.0	1.5	0.8	1.8	27.6	11.5	10.5	8.3	6.5	4.4					
2 x 2	mm	50.8	1.65	50.8	1.65	9.2	35.3	30.0	44.5	19.7	55.0	379.3	120.7	88.9	252.50	197.00	129.50	G1/4	210.00			
	in	2.000	0.065	2.000	0.065	0.4	1.4	1.2	1.8	0.8	2.2	14.9	4.8	3.5	9.9	7.8	5.1					
2 x 2 1/2	mm	50.8	1.65	63.5	1.65	15.55	42.4	30.0	44.5	19.7	55.0	417.4	139.7	108.0	252.50	197.00	129.50	G1/4	210.00			
	in	2.000	0.065	2.500	0.065	0.6	1.7	1.2	1.8	0.8	2.2	16.4	5.5	4.3	9.9	7.8	5.1					
2 x 3	mm	50.8	1.65	76.2	1.65	21.9	49.4	30.0	44.5	19.7												

Type 687 Spare Parts



ITEM	PART
1	Valve Body
2	Diaphragm
3	Compressor
4	Quadrang
6	Membrane Plate
7	Spring
8	Spring
9	Washer
10	Actuator Dome
12	Socket-Head Bolt
13	Washer
14	Membrane
15	Spindle
16	Actuator Base
17	Extension Piece
18	Socket-Head Bolt
19	Spring Washer
20	Nut
21	Locking Nut
22	Washer
23	Socket-Head Bolt
25	Cap
26	Spring
29	Cap
30	Pin
31	Stem
33	Nut
34	Cap
35	Nut
36	DU-Bearing
37	Lock Ring
38	Washer
39	Seal Ring