

OIL BURNER PRIMARY CONTROLS



Danfoss OIL BURNER CONTROLS

APPLICATION

This series is designed for the full automatic control and protection of pressure jet oil burners and should be used in conjunction with one of the photo resistor units types FD or PCF. The oil burner controls attempt immediate re-ignition in the event of flame failure and are intended for use with both intermittent and continuous ignition. They are designed for oil burners having single or three-phase motors.

CAT. NO.	MODEL	CODE No.	APPLICATION	LOCK OUT TIME	PRE/POST PURGE	PHOTO RESISTOR UNIT	
						TYPE	APPLICATION
5381	57H1	57H0062	Single Phase Motor	10 to 25 sec.	20/15 sec.	LD	Sights — Side and End
5383	57L1	57L0001	Single or Three Phase Motors	15 sec.	20/20 sec.	FD or PCF	Blower tube side or end
5385	57L3	57L0003	Single or Three Phase Motors	15 sec.	Nil	PCF	1/4" Light Channel Tube

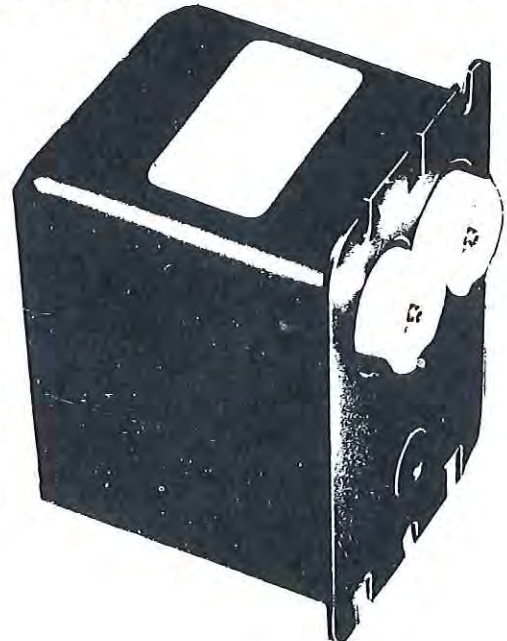
PHOTO RESISTOR UNITS

CAT. NO.	TYPE	CODE No.	APPLICATION
5387	FD	57L0031	For fitting in blower tube. Side or end light
53810	LD	57H0020	For fitting in burner tube. Side or end light
53812	LDC	57H0030	For fitting in 1/4" light channel tube

Danfoss INTERMITTENT DUTY ONLY

IGNITION TRANSFORMERS

CAT. NO.	CODE NO.	RATING	DESCRIPTION
53855	52L0001	10 KV	Bottom Connections
53856	52L0003	10 KV	Side Connections
53861	52L0030	8 KV	Side Connections for Gas



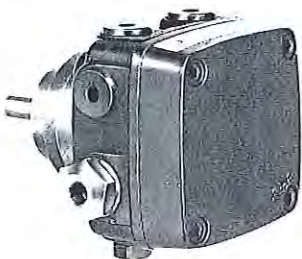
ALLANSON CONTINUOUSLY RATED

CAT. NO.	TYPE	RATING	DESCRIPTION
53878	911-389	10 KV Cont.	Two Pin — Enclosed Type
53879	911-360G	10 KV Cont.	Two Pin
53880	911-347	10 KV Cont.	Two Pin — Hinged Mounting
53882	911-406	10 KV Cont.	Two Pin with Junction Box

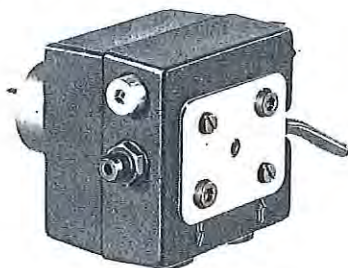
ACCESSORIES

CAT. NO.	TYPE	CODE NO.	SYMBOL	DESCRIPTION
53872	IGNITION ELECTRODE TYPE 52	52-0006		Ø 14 mm (9/16 in.) porcelain insulator
53873		52-0007		Ø 16 mm (5/8 in.) porcelain insulator
53890	52D	52D0382		High Voltage Cable Adaptor
53889				High Voltage Terminal Clips

FUEL OIL PUMPS



TYPE RSA



TYPE MSLA

CROSS REFERENCE CHART TYPES RSA / TYPES RS

As shown in the Cross Reference Chart below, Type RSA Pumps can be used to replace Type RS Pumps.

RS 28 070-5300	⇒	RSA 28 070-5370
RS 28 070-5302	⇒	RSA 28 070-5372
RS 28 070-5310	⇒	RSA 28 070-5380
RS 28 070-5312	⇒	RSA 28 070-5382
RS 28 070-5322	⇒	RSA 28 070-5332
RS 28 070L5300	⇒	RSA 28 070L5370
RS 28 070L5302	⇒	RSA 28 070L5372
RS 28 070L5310	⇒	RSA 28 070L5380
RS 28 070L5312	⇒	RSA 28 070L5382
RS 28 070L5322	⇒	RSA 28 070L5332
RS 40 070-3200	⇒	RSA 40 070-3230
RS 40 070-3202	⇒	RSA 40 070-3232
RS 40 070-3210	⇒	RSA 40 070-3240
RS 40 070-3212	⇒	RSA 40 070-3242
RS 40 070-3222	⇒	RSA 40 070-3249
RS 40 070L3200	⇒	RSA 40 070L3230
RS 40 070L3202	⇒	RSA 40 070L3232
RS 40 070L3210	⇒	RSA 40 070L3240
RS 40 070L3212	⇒	RSA 40 070L3242
RS 40 070L3222	⇒	RSA 40 070L3249
RS 60 070-3300	⇒	RSA 60 070-3350
RS 60 070-3302	⇒	RSA 60 070-3352
RS 60 070-3310	⇒	RSA 60 070-3360
RS 60 070-3312	⇒	RSA 60 070-3362
RS 60 070L3300	⇒	RSA 60 070L3350
RS 60 070L3302	⇒	RSA 60 070L3352
RS 60 070L3310	⇒	RSA 60 070L3360
RS 60 070L3312	⇒	RSA 60 070L3362

CAT. NO.	TYPE	CODE No.	DIRECTION OF ROTATION VIEWED FROM SHAFT END	DESCRIPTION
54022	MSLA 032	71B-0101	Clockwise	Oil Pump with built-in Solenoid Valve
54023	MSLA 032	71B-1101	Anti-Clockwise	
54024	MSLB 032	71B-2101	Clockwise	Oil Pump for Solenoid Valve in nozzle line
54025	MSLB 032	71B-3101	Anti-Clockwise	
54027	RSLB 050	70-4130	Clockwise	
	RSLB 050	70L-4140	Anti-Clockwise	
54013	RSL 028	70-4340	Clockwise	Oil Pump with hydraulic Cut-Off
	RSL 028	70L-4330	Anti-Clockwise	
54014	RSL 028	70L-4340	Anti-Clockwise	
54010	RSA 40	70-3240	Clockwise	Oil Pump for One, Two or Multi - Stage Operation
54029	RSA 40	70-3230	Anti-Clockwise	
5409	RSA 40	70L-3240	Anti-Clockwise	
	RSA 40	70L-3230	Anti-Clockwise	
54043	RSA 60	70-3350	Clockwise	
54011	RSA 60	70-3360	Clockwise	
54044	RSA 60	70L-3350	Anti-Clockwise	
54012	RSA 60	70L-3360	Anti-Clockwise	
54026	RSA 125	70-3400	Clockwise	
54045	RSA 125	70-3410	Clockwise	
	RSA 125	70L-3400	Anti-Clockwise	
54028	RSA 125	70L-3410	Anti-Clockwise	

OIL STRAINERS

SPECIFICALLY DESIGNED FOR FITTING ON OIL BURNERS

DANFOSS TYPE "OF"



CAT. NO.	TYPE	CODE No.	CONNECTION
54063	OF	23N 0010	1/4" NPSF
54064	OF	23N 0011	3/8" BSP

NOTE : FIRST 3 NUMERALS OF CAT. No. INDICATES PAGE No.

CHECK VALVES



If the oil tank is situated at a lower level than the oil pump, it is necessary to provide a check valve in the suction line to prevent the oil flowing back to the tank when the burner is standing.

The check valve may be mounted either at the end of the suction line at the bottom of the tank, or in the burner room at the point where the suction line is carried through the wall.

Furthermore, it is advisable to fit a check valve in the return line. As the oil flowing through the return line is strained, there is no risk of the check valve in the return line failing on account of dirt.

CAT. NO.	HELDON PART No.	CONN. Flare
54071	3365 / 5	5/16"
54072	3365 / 6	3/8"
54073	3365 / 8	1/2"

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ACCESSORIES FOR HYDRONIC SYSTEMS

Onga twin tanks

All multi stage pressure systems are supplied with two or more twin tanks to give the correct water draw-off. This twin tank is compact and light in weight so installation and maintenance become simple. As the initial air charge is long lasting, the twin tank eliminates the greatest source of trouble experience with water pressure systems; the malfunctioning of the air volume control, which results in rapid cycling of the system and eventual motor troubles. The twin tank has an expandable liner that completely protects the tank from corrosion and the water from contamination and discoloration by rust. These tanks are pipe-mounted and can be installed anywhere in the delivery line; this allows the pump to be located more conveniently.



CAT. NO.	SIZE
5441	2 GALL. TWIN
5442	8 GALL. TWIN

The Onga Twin Tanks are made of steel with a non-toxic, non-tasting, non-corrosive expandable liner. This liner completely separates the water from the tank so that no corrosion, contamination or discoloration can take place. Because initial air charge lasts a long time waterlogging and motor troubles do not occur.

Can be pipe mounted remotely from the pump so that pump can be installed under house or in confined space. Increased performance can be obtained in installations with high static heads.

Multiple standardized tanks are used to tailor the draw-off required to your exact application.

Replaceable liner — the liner can be replaced using the existing tank shell.

Versatility. Onga Twin Tank can be used with any make of water pressure system to add reliability to the system and give more water draw-off.

Compact. The tank is small in size and light in weight — one man can easily install the whole water pressure system. Because of size, the unit takes up less space and lends itself to installation in existing buildings.

Bad Water protection. No contamination or corrosion will result if very bad water is being pumped. For complete pressure switch protection against corrosion and blocking it can be mounted on air side of the tank.

Liner Protection. If the tank accidentally loses air charge, the liner will not be damaged.

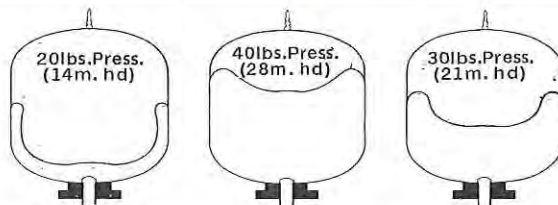
How to install an Onga twin tank

1. Tank should be pipe-mounted vertically.
2. Initial air charge should be 10% below pressure switch cut-in pressure (this should be checked every 12 months).
3. Tank is best mounted under cover in a cool situation.
4. Use recommended number of twin tanks.



Operation of tank

When the pump first starts no water will enter the tank until the pump pressure is greater than the air supercharge in the tank. As pump pressure increases, water enters the tank expanding the liner and further compressing the air until top pressure is reached and pump is shut off. When a tap is turned on fresh non-contaminated water flows out of the tank. The air expands, the pump turns on and the cycle is repeated.



Imperial Units				ONGA TWIN TANK DRAW-OFF TABLE				Metric Units			
	Pressure Switch Setting	Draw-off Imperial gallons.	Size of Conventional Tank for equivalent draw-off Imp gallons		Pressure Switch Setting Metres hd.	Draw-off litres	Size of Conventional Tank for equivalent draw-off litres				
8 gallon twin tanks Max flow 20 g.p.m.	11/22	2.2	13.4		8 gallon twin tanks Max flow 90 litres p.m.	8/16	10.0	60.9			
	15/30	2.4	15.3			Standard tank	11/22	10.9			69.5
	20/40	2.6	17.8			70 metres hd. working pressure	15/30	11.8			80.9
	30/50	2.2	22.7				20/35	10.0			103.2
	40/65	2.2	27.6				28/45	10.0			125.4
	50/80	2.2	32.5				35/56	10.0			147.7
100 p.s.i. working pressure	60/90	2.0	37.4		42/63	9.1	170.0				
	70/100	1.8	42.3		50/70	8.2	192.3				
	90/120	1.5	52.1		63/85	6.8	236.8				
	110/150	1.6	61.9		77/106	7.3	281.3				
High pressure tank 200 p.s.i. working pressure	140/180	1.4	76.6		100/127	6.4	348.2				
	160/200	1.3	86.3		113/140	5.9	392.2				
2 gallon twin tank Max flow 10 g.p.m. Max pressure 60 lbs. p.s.i.	11/22	0.57	3.3		2 gallon twin tank Max flow 45 litres p.m. Max pressure 45 metres hd.	8/16	2.6	15.0			
	15/30	0.62	3.7				11/22	2.8			16.8
	20/40	0.69	4.4				15/30	3.2			20.0
	30/50	0.58	5.6				20/35	2.6			25.5
	40/60	0.53	6.2				28/45	2.4			28.2

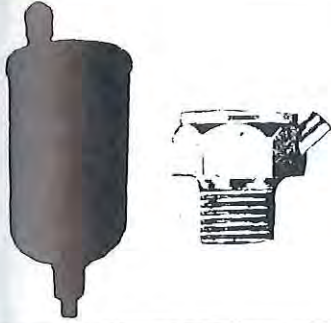
ACCESSORIES FOR HYDRONIC SYSTEMS

PRESSURE REDUCING AND RELIEF VALVES



CAT. NO.	TYPE	DESCRIPTION	SETTING
54416	A40C	PRESSURE REDUCING	83 - 97 kPa (12-14 PSI)
54419	M330	RELIEF VALVE	207 kPa (30 PSI)
54417	AC50	REDUCING VALVE	0-517 kPa(0-75PSI) Adjustable
54420	LV50	RELIEF VALVE	207 kPa (30 PSI)
54424	VR 2	VACUUM RELIEF	

AUTOMATIC AND MANUAL AIR VENTS



CAT. NO.	TYPE	DESCRIPTION
54411	67	AUTO AIR VENT 1/8 MALE CONNECTION
54413	17	MANUAL AIR VENT KEY OPERATION
54415	19	KEY TO OPERATE NO. 17 VENT

HYDRAULIC ENGINEERING— TECHNICAL DATA

METRIC — ENGLISH APPROXIMATIONS

100 p.s.i. =	70 metres head of water (70.4)
	700 kilopascals (690)
100 ft. head of water =	30 metres head of water (30.48)
	300 kilopascals (298.9)
100 kilopascals =	14.5 p.s.i. (14.48)
	34 ft. head of water (33.456)
	10 metres head of water (10.197)
	1 atmosphere (1.013)
	30 inches head of mercury (30.397)
100 metres head of water =	330 ft. head of water (328.08)
	1000 kilopascals (980.6)
100 imperial gallons =	450 litres (454.6)
1 cubic metre =	1000 litres (exactly)
	220 gallons (219.96)
1000 cubic metres =	0.8 acre ft. (0.811)

Practical suction lift of water at 20°C

Elevation		Barometric reading		Suction lift			
Feet	Metres	p.s.i.	Mili-bars	Theoretical		Practical	
				Feet	Metres	Feet	Metres
Sea level		14.7	1013	34.0	10.36	22.0	6.71
1300	396	14.0	966	32.4	9.88	21.0	6.40
2600	792	13.3	918	30.8	9.39	20.0	6.01
2900	883	12.7	877	29.2	8.90	18.0	5.49
5200	1584	12.0	828	27.8	8.47	17.0	5.18

Practical suction lift of water in metres at elevated temperatures at sea level

Temp.	Max. suction lift ←				→ Min. positive head					
	50°C	55°C	60°C	65°C	70°C	75°C	80°C	85°C	90°C	95°C
Metres	2.6	1.9	1.2	0.7	0	0.7	1.2	1.9	2.6	3.3

VELOCITY OF WATER IN PIPES

(1) Feet per second

Galls. per minute	Pipe size				
	1"	1 1/4"	1 1/2"	2"	2 1/2"
5	2.45	1.57	1.09	0.61	0.39
10	4.90	3.14	2.18	1.23	0.78
15	7.35	4.71	3.27	1.84	1.18
20	9.81	6.28	4.36	2.46	1.57
30	14.71	9.41	6.54	3.68	2.35
40	19.61	12.56	8.72	4.90	3.14
50	24.52	15.69	10.90	6.13	3.92
60	29.42	18.83	13.08	7.35	4.71
70	34.32	21.97	15.26	8.58	5.49
90	44.13	28.24	19.62	11.03	7.06

(2) Metres per second

Litres per minute	Pipe size Millimetres				
	25	32	40	50	65
25	0.82	0.53	0.37	0.21	0.13
50	1.64	1.05	0.73	0.41	0.26
75	2.47	1.58	1.10	0.62	0.39
100	3.29	2.11	1.46	0.82	0.53
150	4.93	3.16	2.19	1.23	0.79
200	6.58	4.21	2.92	1.64	1.05
250	8.22	5.26	3.65	2.05	1.32
300	9.87	6.32	4.39	2.47	1.58
350	11.51	7.37	5.12	2.88	1.84
400	13.16	8.42	5.85	3.29	2.11

Values enclosed by shaded area are recommended suction velocities.

HYDRAULIC ENGINEERING

CONVERSION DATA

LITRES TO IMPERIAL GALLONS

Litres	0	1	2	3	4	5	6	7	8	9
	Gallons									
0		.22	.44	.66	.88	1.1	1.32	1.54	1.76	1.98
10	2.20	2.42	2.64	2.86	3.08	3.30	3.52	3.74	3.96	4.18
20	4.40	4.62	4.84	5.06	5.28	5.50	5.72	5.94	6.16	6.38
30	6.60	6.82	7.04	7.26	7.48	7.70	7.92	8.14	8.36	8.58
40	8.80	9.02	9.24	9.46	9.68	9.90	10.12	10.34	10.56	10.78
50	11.00	11.22	11.44	11.66	11.88	12.10	12.32	12.54	12.76	12.98
60	13.20	13.42	13.64	13.86	14.08	14.30	14.52	14.74	14.96	15.18
70	15.40	15.62	15.84	16.06	16.28	16.50	16.72	16.94	17.16	17.38
80	17.60	17.82	18.04	18.26	18.48	18.70	18.92	19.14	19.36	19.58
90	19.80	20.02	20.24	20.46	20.68	20.90	21.12	21.34	21.56	21.78
100	22.00	22.22	22.44	22.66	22.88	23.10	23.32	23.54	23.76	23.98
110	24.20	24.42	24.64	24.86	25.08	25.30	25.52	25.74	25.96	26.18
120	26.40	26.62	26.84	27.06	27.28	27.50	27.72	27.94	28.16	28.38
130	28.60	28.82	29.04	29.26	29.48	29.70	29.92	30.14	30.36	30.58
140	30.80	31.02	31.24	31.46	31.68	31.90	32.12	32.34	32.56	32.78
150	33.00	33.22	33.44	33.66	33.88	34.10	34.32	34.54	34.76	34.98
160	35.20	35.42	35.64	34.86	36.08	36.30	36.52	36.74	36.96	37.18
170	37.40	37.62	37.83	38.05	38.27	38.49	38.71	38.93	39.15	39.37
180	39.59	39.81	40.03	40.25	40.47	40.69	40.91	41.13	41.35	41.57
190	41.79	42.01	42.23	42.45	42.67	42.89	43.11	43.33	43.55	43.77
200	43.99	44.21	44.43	44.65	44.87	45.09	45.31	45.53	45.75	45.97
210	46.19	46.41	46.63	46.85	47.07	47.29	47.51	47.73	47.95	48.17
220	48.39	48.61	48.83	49.05	49.27	49.49	49.71	49.93	50.15	50.37
230	50.59	50.81	51.03	51.25	51.47	51.69	51.91	52.13	52.35	52.57
240	52.79	53.01	53.23	53.45	53.67	53.89	54.11	54.33	54.55	54.77
250	54.99	55.21	55.43	55.65	55.87	56.09	56.31	56.53	56.75	56.97
260	57.19	57.41	57.63	57.85	58.07	58.29	58.51	58.73	58.95	59.17
270	59.39	59.61	59.83	60.05	60.27	60.49	60.71	60.93	61.15	61.37
280	61.59	61.81	62.03	62.25	62.47	62.69	62.91	73.13	63.35	63.57
290	63.79	64.01	64.23	64.45	64.67	64.89	65.11	65.33	65.55	65.77
300	65.99	66.21	66.43	66.65	66.87	67.09	67.31	67.53	67.75	67.97

IMPERIAL GALLONS TO LITRES

Gallons	0	1	2	3	4	5	6	7	8	9
	Litres									
0		4.55	9.09	13.64	18.18	22.73	27.28	31.82	36.37	40.91
10	45.5	50.0	54.6	59.1	63.6	68.2	72.7	77.3	81.8	86.4
20	90.9	95.5	100	104.6	109.1	113.7	118.2	122.7	127.3	131.8
30	136.4	141.0	145.5	150	154.6	159.11	163.7	168.2	172.8	177.3
40	182	186	191	195	200	205	209	214	218	223
50	227	232	236	241	245	250	255	259	264	268
60	273	277	282	286	291	295	300	305	309	314
70	318	323	327	332	336	341	346	350	355	359
80	364	368	373	377	382	386	391	396	400	405
90	409	414	418	423	427	432	436	441	446	450
100	455	459	464	468	473	477	482	486	491	496
110	500	505	509	514	518	523	527	532	536	541
120	546	550	555	559	564	568	573	577	582	586
130	591	596	600	605	609	614	618	623	627	732
140	636	641	646	650	655	659	664	668	673	677
150	682	686	691	696	700	705	709	714	718	723

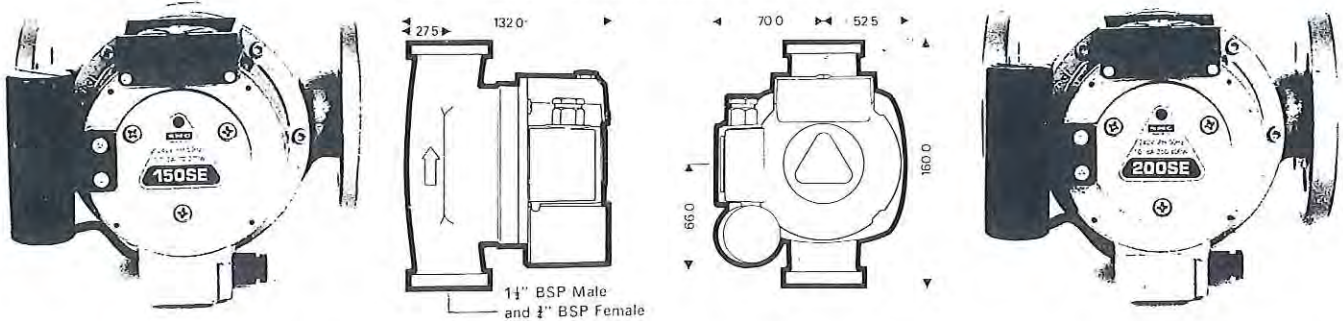
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HOT WATER CIRCULATORS



COMMODORE BRONZE &
COMMODORE MINI BRONZE

ALL DIMENSIONS UNLESS OTHERWISE STATED ARE IN MILLIMETRES



SMC PUMPS are supplied in two main categories:

- 1. Cast Iron Pumps (Blue enamel finish)**
Suitable for circulating hot water in pressurised or open vented "indirect" heating system circuits or in the "indirect" circuits of hot water supply systems.
Max. Working Pressure 100 kPa
Max. Water Temp. 110°C
Max. ambient air Temp. 60°C (when water at 110°C)
Max. ambient air Temp. 70°C (when water at 90°C).

IMPORTANT: On no account should Cast Iron Pumps be used in a "direct" system application.

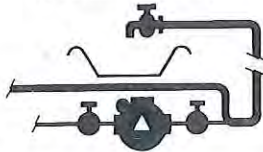
- 2. Bronze Pumps (Bronze enamel finish)**
Suitable for use in "direct" system application, such as circulating hot water in secondary circulations servicing draw-off water to taps and showers.

Pumps may be fitted in either flow or return position, though it is preferable to avoid the lowest point in the system where foreign matter or sediment could collect. All SMC domestic pumps are designed to operate at up to 60 starts per hour.

CAST IRON PUMPS
("Indirect Systems")



BRONZE PUMPS
("Direct" Systems)

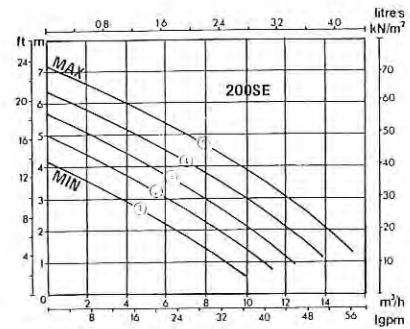
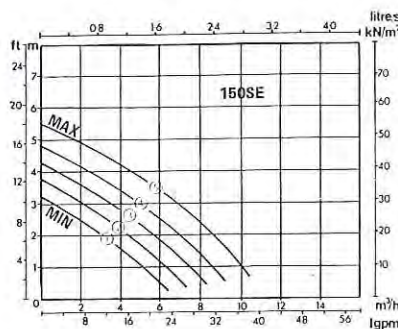
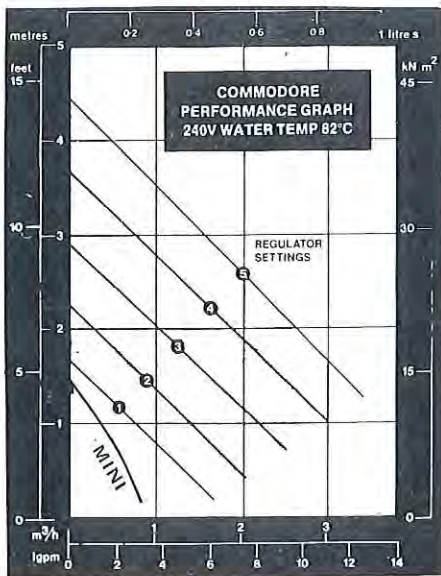
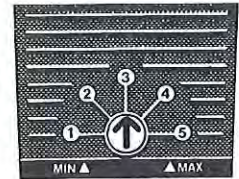


CONSTRUCTION: These pumps offer unique design features. The design is based upon the disc motor, with hydramatic float action, producing maximum torque at start-up. The use of ceramic double thrust bearings ensures smooth and quiet running, minimal wear and long maintenance free life.

LEAKPROOF: Having no gland or mechanical seal, periodic renewal or replacement is eliminated. The disc motor design permits the use of a positively located joint ring to seal the hydraulic section of the pump.

ELECTRICAL FEATURES: The disc motor provides both high starting torque and low starting and running current. With its new dry capacitor, reduces power consumption by approx. 10% whilst giving increased hydraulic performance.

ELECTRIC REGULATOR: The patented electric regulator, built integrally into the pump, offers a choice of 5 positions (Except for Mini-Bronze Model) enabling the circulation rate to be selected at will. This unique regulator is far simpler than the changing of impellers or pulleys as with other heating circulators. The regulator simplifies circuit balancing, can give increased output as building extensions are added and enables identical pumps to be used in multizone heating systems. Output charts indicate the regulator settings for each pump size.



CAT. NO.	MODEL	CODE No.	CONNECTIONS	CAPACITY *
CAST IRON PUMPS				
	Commodore 130	H1000130CI	1" BSP Female	5 IGPM @ 12' Head
5503	150SE	H1000150CI	1 1/4" BSP Flanges	18 IGPM @ 13' Head
5504	200SE	H1000200CI	2" BSP Flanges	25 IGPM @ 15' Head
BRONZE PUMPS				
5505	Commodore 160B Bronze	H1000160BR	1" BSP Female	5 IGPM @ 12' Head
5502	150SE Bronze	H1000150BR	1 1/2" BSP Flanges	20 IGPM @ 12' Head
	Commodore Bronze Solar Mini 130	H100000SMB	1" BSP Female	2 IGPM @ 2' Head

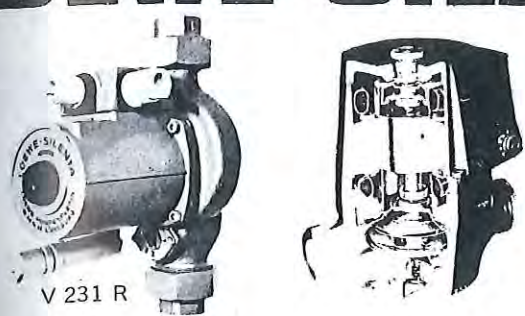
* Capacity is based on the highest setting. Refer Charts for full performance details.

550-a

HOT WATER CIRCULATORS

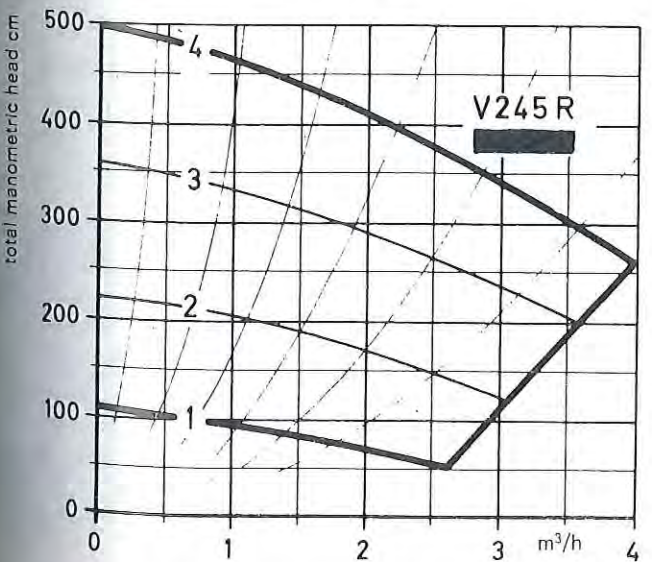
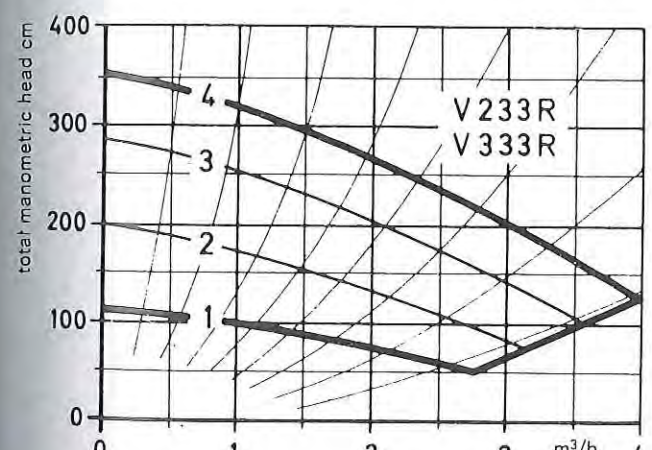
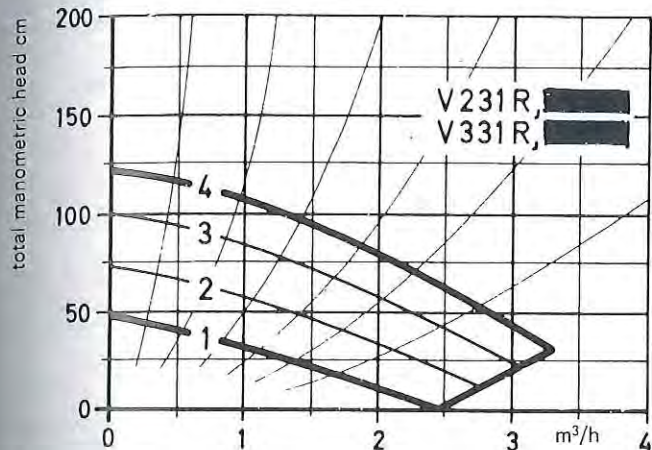
LOEWE-SILENTA

Circulating Pumps
glandless, for central heating systems



CAT. NO.	MODEL
55011	V231R
55012	V331R
55013	V233R
55014	V333R
55015	V245R

Characteristic curves 4 3 2 1: output control settings



APPLICATION

SILENTA Circulators have been designed for installation in hot-water central heating systems. They can be used in "gravity" circulation systems and in pumped systems. The circulators can be installed in the flow or return pipe.

DESIGN

The pump's volute casing of special cast iron is provided with screwed connections or flanges (larger models). Due to its glandless construction, the circulator does not require any maintenance.

Can and sealing:

The stator space is separated from the pumped liquid by means of a nonmagnetic can of nichrome steel. Two NU-LIP seals guarantee perfect tightness of the can between rotor and stator.

Checking the direction of rotation:

A mechanical device of simple and sturdy design allows quick checking of the direction of rotation.

Bearings:

At the bearing points, the shafts of the SILENTA are either protected by shaft sleeves of wear-resisting stainless casting alloy, or they are of massive hardened stainless steel. The bearing bush is of graphitic carbon (with metallic impregnation) which has specially been developed for hot-water lubrication. This combination of bearing material ensures, even after many years, service reliability and unchanged silent operation.

Corrosion protection:

Every SILENTA is provided with a high grade corrosion protection. Pump casing, motor casing and bearing flange are subjected to a special dipcoating process with subsequent oven-baking at a temperature of 150°C.

Deaeration:

Deaeration of the rotor space is effected automatically, which ensures proper lubrication of the bearings and smooth running of the pump.

Variable SILENTA-V:

The output of these circulators is adjustable by internal by-pass. The desired output and head are obtained by setting the output control device. The figures 1-4 on the output control device correspond to the figures identifying the characteristic curves of the respective pump model. Regulation is infinitely variable and, of course, intermediate values can be set, too.

Minimum static pressure:

In case of low intake or working pressures, especially in conjunction with high temperatures of the pumped liquid, it will be advisable to exactly determine the necessary intake pressure, in order to avoid cavitation noises. Net positive suction head H_H on request.

OPERATING DATA

- Capacities up to 60 m³/h
- Heads up to 1050 cm
- Max. working pressure: 6 atm. gauge
special execution 10 atm. gauge (casing and flanges according to NP 10) on request.
- Admissible water temperature +20°C up to 130°C.

All SILENTA Circulators have been constructed for silent operation. The output ranges or characteristic curves have been adapted to the requirements of the heating technique. If the working point of the SILENTA is within the output limits shown, there will be no cavitation noises, even in case of very low working pressure. The capacity limits shown are however not equivalent to the max. motor output.

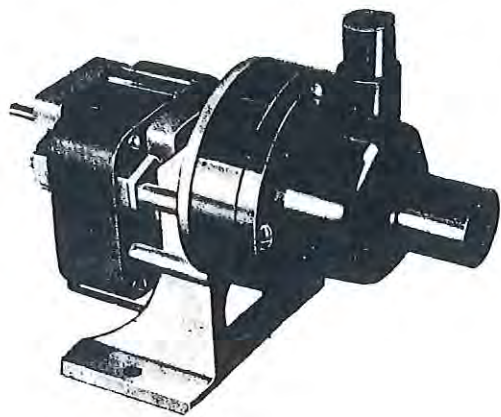


KLECK KUBE (02)
 CLEAR KUBE .ph.
 533 3122

SINGER PUMP UNITS

MAGNETIC COUPLED PUMP UNIT

The SINGER Magnetic Coupled Pump Unit (with plastic pump body) is different from other pumps in that it has neither seal nor glands. The impeller, on Acetal bearings, is driven by a magnet behind a membrane of polypropylene. The unit will therefore pump a large variety of different and difficult liquids. The pump is powered by a sub-fractional horsepower Ball Race Motor and has a capacity of 13.63 litres at 914mm (3 gals. at 3') (Nett head.)



DIRECT DRIVE PUMP UNITS

SINGER Direct Drive Pump units are precision engineered to meet the requirements of appliance manufacturers who specialise in the manufacture of washing machines, dish washers and allied products. They are also ideally suited for indoor garden fountains and landscape garden applications, waterfalls, etc. The units may also be used in home swimming pool filter systems

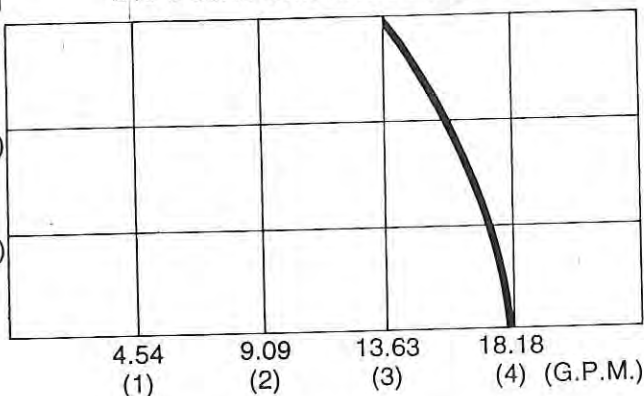
SPECIFICATIONS

MAGNETIC COUPLED PUMP UNIT	
SINGER PART NO.	17266
CAT. NO.	55018
VOLTAGE	240
FREQUENCY Hz	50
WATTS, FREE	40
WATTS, PUMPING	42
WATTS, LOCKED	52
AMPERES, FREE	.265
AMPERES, PUMPING	.3
AMPERES, LOCKED	.362
RATING	CONT.

HEAD IN MM

914 MM (36")
 610 MM (24")
 305 MM (12")

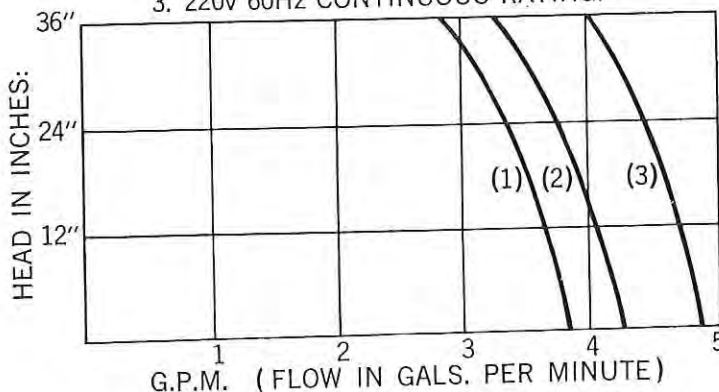
240 V 50Hz CONTINUOUS RATING



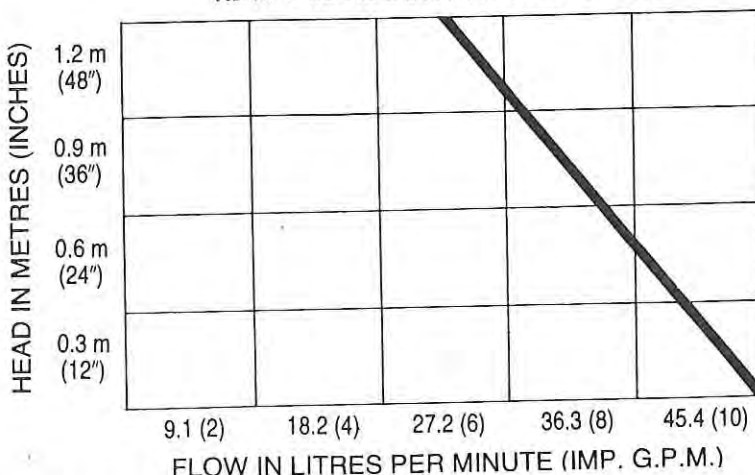
(FLOW IN LITRES PER MINUTE)

- 240v 50Hz CONTINUOUS RATING.
- 240v 50Hz INTERMITTENT RATING.
- 220v 60Hz CONTINUOUS RATING.

DIRECT DRIVE PUMP UNIT		
SINGER PART NO.	15391	
CAT. NO.	55019	
VOLTAGE	240	240
FREQUENCY Hz	50	50
WATTS, FREE	57	38
WATTS, PUMPING	60	47
WATTS, LOCKED	102	65
AMPERES, FREE	.72	.30
AMPERES, PUMPING	.75	.33
AMPERES, LOCKED	.96	.46
RATING	INT.	CONT.



1.240 V 50 Hz CONTINUOUS RATING



DIRECT DRIVE PUMP UNIT	
SINGER PART NO.	16030
CAT. NO.	55020
VOLTAGE	240
FREQUENCY Hz	50
WATTS, FREE	50
WATTS, PUMPING	62
WATTS, LOCKED	96
AMPERES, FREE	.44
AMPERES, PUMPING	.48
AMPERES, LOCKED	.70
RATING	CONT.

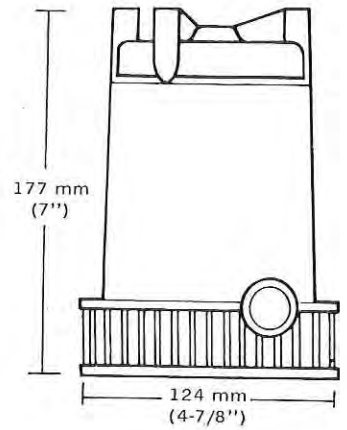
SINGER

Fully Submersible Bilge

PUMP

5500 LPH
12 - 24 - 32 VOLTS DC

550-c



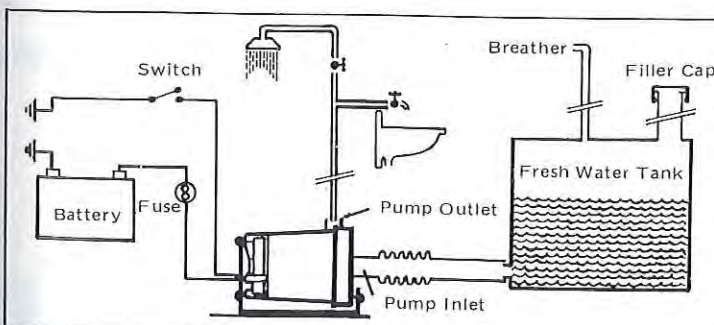
SUPER SEAL BILGE PUMPS are totally submersible. The one piece case is moulded in high-impact acetal material and incorporates Teflon seals (no unreliable gaskets). It can't be overwhelmed by water — once you switch it on, it works away swiftly until the water is back where it belongs. Over the side. Super Seal can be run continuously fully submerged or for 30 minutes half submerged.

5500 LITRES PER HOUR. At free discharge, Super Seal pumps 5500 litres per hour (1450 U.S. G.P.H.), drawing 7.0amps at 12 volts. There's no vibration, because shock-mounted internal parts ensure smooth, quiet running. Conversation doesn't stop when Super Seal starts.

ROUGH WEATHER RELIABILITY. When you're shipping it green, you need a pump you can trust. Super Seal is the one. A fail-safe back-up seal system means water can't get in, even if one seal should give way. All Super Seal parts are non-electrolytic and can't be harmed by petrol, diesel fuel, oil, salts, weak acid, or water. Open impeller design prevents clogging, pumps dirt and particles overboard. Stainless steel shaft and Teflon seals eliminate corrosion problems, and ensure a long, trouble-free life. Even if Super Seal runs dry, the self-lubricating properties of the Teflon will prevent severe seal damage.

EASY TO INSTALL. Super Seal is just 177mm (7") tall, ("Electronic" — 219mm or 8.5/8") including strainer, and 124mm (4.7/8") in diameter over the base. So it fits easily in the bilge, where it's completely out of sight and ready for work. And once the base is installed, the rest of the pump snaps on and off without tools, screws or bolts.

FULLY GUARANTEED. Super Seal is fully guaranteed. You can trust it for years of dependable service. Whether your boat is for fun or for work a Super Seal will make her safer, more comfortable and easier to handle.



General purpose pump kit

With the help of a simple adaptor kit Super Seal can be modified to serve as a general purpose pump to move all the fresh water you need from tank to tap. It can be operated from a convenient electrical footswitch, and doesn't need a pressure tank. It's ideal for your boat, regardless of size or age. It also has many other practical applications. Installation is quick and simple.

CAT. NO.	PART No.	CAPACITY	VOLTS DC	DESCRIPTION
55031	19375	5500	12	Standard Super Seal. Fully Submersible Bilge Pump
55032	19381	litres/hour	24	
	19385		32	
	18240			General Purpose Pump Kit — Mounting Bracket
	18241			General Purpose Pump Kit — Adaptor

SATCHWELL TEMPERATURE DETECTORS & CONTROLLERS

TEMPERATURE DETECTORS

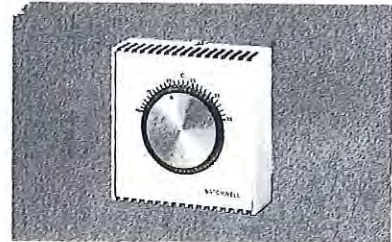
TYPE DR ROOM AIR TEMPERATURE DETECTORS

Type DR Room Air Temperature Detectors

For use with Satchwell controllers to provide temperature control of heating and air conditioning plant. Thermistor detector circuit. Suitable for surface or conduit box mounting.

Approximate size:
86mm high x 86mm wide x 30mm deep.

For full specification see leaflet DS 1.1.



CAT. NO.	TYPE	SCALE	CONTROL RANGE	ADJUSTMENT
5601	DR2251	10° to 35°C	-5° to +40°C	Exposed
5602	DR2252	10° to 35°C	-5° to +40°C	Concealed
5603	DR2253	None	-5° to +40°C	None

TYPE DD AIR DUCT TEMPERATURE DETECTORS

Type DD Air Duct Temperature Detectors

For use with Satchwell controllers to provide temperature control of heating and air conditioning plant. Moisture proofed resin bonded stem. Thermistor detecting circuit.

Approximate head size:
85mm high x 63mm wide x 42mm deep.

For full specification see leaflet DS 1.1.



CAT. NO.	TYPE	STEM LENGTH	SCALE	CONTROL RANGE	ADJUSTMENT
5604	DD1204	300mm	5° to 50°C	-5° to +70°C	Concealed
5605	DD1401	300mm	None	-5° to +70°C	None
5606	DD1403	460mm	None	-5° to +70°C	None

CONTROLLERS

CLIMATRONIC TYPE CZT TEMPERATURE CONTROLLERS

CONTROLLERS

Climatronic Type CZT Temperature Controllers

Designed for use with Satchwell temperature detectors to provide proportional control for heating and air conditioning plant. Additional facilities include detector averaging, set-up and set-back, motor override, high temperature limit and deadzone.

Approximate size:
123mm high x 184mm wide x 103mm deep.

For full specification see leaflet DS 2.1.



CAT. NO.	TYPE	CONTROL RANGE	PROPORTIONAL BAND SCALE	CONTROL FACILITY
5607	CZT3301	-5° to +40°C	1° to 20°C	1 stage
5608	CZT3302	-5° to +40°C	1° to 10°C per stage	2 stage
5609	CZT3303	35° to 120°C	2° to 20°C	1 or 2 stage

THIS CATALOGUE INCLUDES ONLY A SMALL SELECTION OF AVAILABLE SATCHWELL EQUIPMENT
We will be pleased to supply additional information on the comprehensive range available, together with Technical literature

SATCHWELL

CONTROLLER ACTUATORS & ACTUATORS MODULATING CONTROLLER ACTUATORS

CLIMATRONIC TYPE AZT TEMPERATURE CONTROLLER-ACTUATOR



A compact unit combining a proportional controller with an actuator. It provides a simple means of operating valves, dampers and step controllers in heating and air conditioning systems.

Power supply: 210-240V 50-60 Hz.

Approximate size:
194mm high x 117mm wide x
80mm deep.

For full specification see leaflet
DS 3.20.

CAT. NO.	TYPE	CONTROL RANGE	PROPORTIONAL BAND SCALE	CONTROL FACILITY	OUTPUT SHAFT ROTATION	TORQUE
5651	AZT3302	10° to 35°C if used with DR detector or 5° to 50°C if used with DD detector	1° to 10°C per stage	1 or 2 stage	160° in 180 secs.	50 Nm
5652	AZT3304		1° to 10°C	1 stage with Heating-Cooling Switch	160° in 180 secs.	50 Nm
5653	AZT3352		1° to 10°C per stage	1 or 2 stage	90° in 100 secs.	50 Nm
5654	AZT3354		1° to 10°C	1 stage with Heating-Cooling Switch	90° in 100 secs.	50 Nm

ACTUATORS — MODULATING

TYPE XRM & ZRM MODULATING ACTUATORS FOR MB VALVES & STEP CONTROLLERS



Modulating light duty two position actuators designed primarily for use with Climatronic integral or proportional controllers and with Modular System 565 controllers. Power supply: 24V 50 Hz.

Approximate size:
143mm high x 100mm wide x
117mm deep.

For full specification see leaflet
DS 3.1.

CAT. NO.	TYPE	STROKE	TORQUE	FEEDBACK POTENTIOMETER	AUXIL. SWITCH
5655	ZRM1201	90° in 4 minutes. Reversing.	2 Nm	One 135 Ohm	—
5656	ZRM1202	90° in 4 minutes. Reversing.	2 Nm	Two 135 Ohm	—
5657	ZRM1203	90° in 4 minutes. Reversing.	2 Nm	One 135 Ohm	2A 250V ac
5658	XRM1201	90° in 4 minutes. Reversing.	2 Nm	—	—

TYPE AXM & AZM MEDIUM DUTY MODULATING ACTUATORS



Designed to operate valves and dampers, the AXM is for use with integral controllers and AZM incorporates a feedback potentiometer for use with proportional controllers.

Power supply: 24V 50-60 Hz.

Approximate size:
194mm high x 117mm wide x
80mm deep.

For full specifications see leaflet
DS 3.2.

CAT. NO.	TYPE	APPLICATION	STROKE	TORQUE	FEEDBACK POTENTIOMETER	AUXILIARY SWITCH
5659	AXM1201	Integral control	160° in 3 minutes. (Reversing.)	5.6 Nm	—	—
56510	AXM1202	Integral control	160° in 3 minutes. (Reversing.)	5.6 Nm	—	2
56511	AXM1251 *	Integral control	90° in 2 minutes. (Reversing.)	5.6 Nm	—	—
56512	AZM1401	Proportional control	160° in 3 minutes. (Reversing.)	5.6 Nm	135 Ohm	—
56513	AZM1402	Proportional control	160° in 3 minutes. (Reversing.)	5.6 Nm	135 Ohm	2
56514	AZM1451 *	Proportional control	90° in 2 minutes. (Reversing.)	5.6 Nm	135 Ohm	—

* AXM1251 and AZM1451 are for operating type MB valves only.

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SATCHWELL ACTUATORS, CONTROLLERS & VALVES MODULATING ACTUATORS TYPES XKM & ZKM HEAVY DUTY

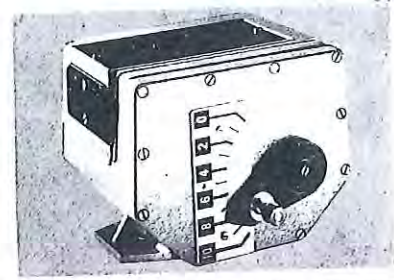
Powerful modulating actuators designed to operate large valves and dampers. Type XKM is designed for integral controlled operation. Type ZKM for proportional controlled operation, using an appropriate Satchwell controller in each case. Power supply: 24V 50-60 Hz.

Stroke: 90° in 2 minutes. Reversing.

Torque: 16.8 Nm

Approximate size: 125mm high x 156mm wide x 222mm deep.

For full specifications, see leaflet DS 3.3.



CAT. NO.	TYPE	POTENTIOMETERS		AUXILIARY SWITCHES	TRANSFER SWITCHES	ACCESSORY KITS *
		INTERNAL	EXTERNAL			
5661	XKM2201	None	None	None*	Two	831-1-203 (2 auxiliary switches) or 831-1-204 (2 auxiliary switches & 145 Ohm potentiometer)
5662	XKM2301	None	None	Two	Two	
5663	ZKM2201	135 Ohm	None	None*	Two	
5664	ZKM2202	135 & 145 Ohm	None	None*	None	
5665	ZKM2301	135 Ohm	None	Two	Two	
5666	ZKM2302	135 & 145 Ohm	None	Two	None	
5667	ZKM2303	135 Ohm	145 Ohm	Two	Two	
5668	ZKM2304	135 & 145 Ohm	145 Ohm	Two	None	

STEP CONTROLLERS TYPE MC AND MD

STEP CONTROLLERS

Step Controllers Type MC & MD

These controllers comprise a number of electrically separate switches operated in sequence by Satchwell 'R' type motors. For use with Satchwell modulating controllers, or suitable two-position switching device.

A 'recycling' switch used with appropriate relays returns the

controller to the 'start' position before the load is reconnected in the event of power failure.

Approximate size: 136mm high x 391mm wide x 102mm deep.

For full specification see leaflet DS 4.6.



CAT. NO.	CONTROLLER TYPE	NO. OF STEPS	SWITCH DIFFERENTIAL	CURRENT RATINGS	
				SEQUENCE SWITCHES	RECYCLING SWITCH
5669	MC1201	6	Adjustable 5% to 80% of full stroke	Single pole double-throw 6A, 380V ac	Single pole double-throw 6A, 380V ac
56610	MC1202	9			
56611	MC1203	12			
56612	MD3201	5	Fixed at approx. 5% of full stroke	Single pole single- throw 20A, 380V ac 15A, 440V ac	
56613	MD3226	10			

CONTROL VALVES TYPE MB THREE-PORT ROTATING SHOE VALVES

The MB Types are 3-port valves for the mixing or diverting of hot or chilled water. They can be operated by the R and A series actuators and the Satchwell controller-actuators.

For full specification see leaflet DS 4.31.



CAT. NO.	VALVE TYPE	SIZE	Cv or Kv VALUE	MAXIMUM DIFFERENTIAL PRESSURE	LINKAGE TYPE (90° ROTATION)	
56614	MB1402	1/2 in. BSP	1.8	0.7 bar (10 lbf/in ²)	826-1-652	RM XRM ZRM and CD no linkage required Hot water only
56615	MB1452	3/4 in. BSP	4.0	0.7 bar (10 lbf/in ²)	826-1-652	
56616	MB1502	1 in. BSP	8.0	0.7 bar (10 lbf/in ²)	826-1-652	
56617	MB1552	1.1/4 in. BSP	12	0.35 bar (5 lbf/in ²)	826-1-652	
56618	MB1602	1.1/2 in. BSP	20	0.35 bar (5 lbf/in ²)	826-1-652	
56619	MB1652	2 in. BSP	32	0.35 bar (5 lbf/in ²)	826-1-652	

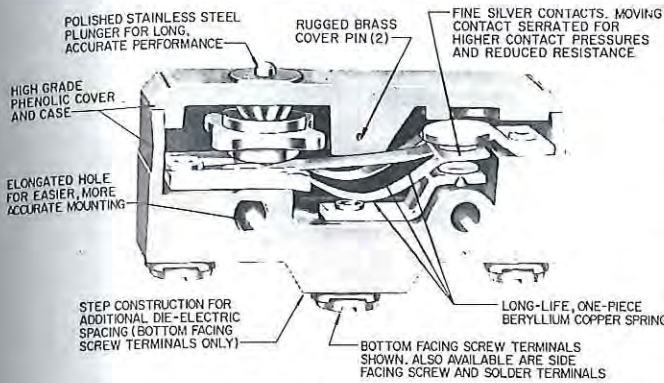
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HONEYWELL CONTROLS MICRO SWITCH

A WIDE RANGE OF SWITCHES — STANDARD SIZE BASICS — MINIATURE AND SPECIAL BASICS — DESIGNED TO MEET MOST SWITCH REQUIREMENTS IN ALL TYPES OF MACHINES, APPLIANCES AND INSTRUMENTS

STANDARD SIZE BASICS



MICRO SWITCH Basic switches are a precision snap-action mechanism enclosed in an accurately moulded plastic case. Switches are carefully manufactured and thoroughly tested. They are industry-known for their compactness, light-weight accurate repeatability and long life.

The cut-a-way illustrated is representative of the basic switches described on this page. Close tolerances between cover and case, moulded terminals, enclosed mounting holes, and low moisture absorbing plastics protect the precision switching mechanism. Where switches are exposed to excessive moisture, oil and dust conditions, sealed switches are recommended.

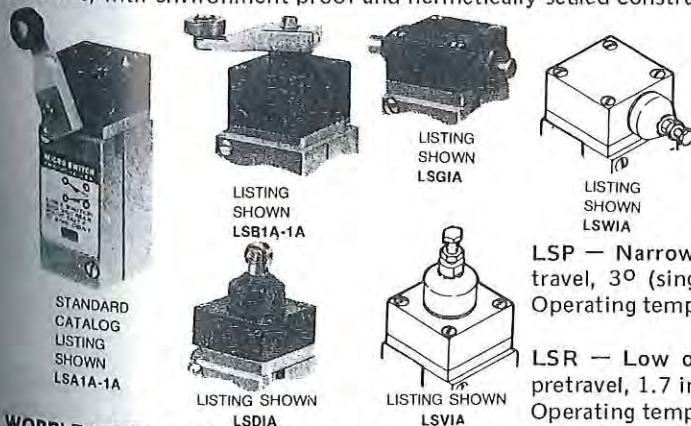
Standard size basics



Type	General Purpose				Special purpose			
	BZ	BA	BM	BE	DT	MT	6AS	3MN
Feature								
Max. current amps	15	20	22	25	10	10	15	15
Circuitry	SPDT Specials	SPDT	SPDT	SPDT	DPDT	SPST SPDT	SPDT 2CKT DB	2CKT DB
Low energy gold contacts	x							
Contact action	momentary	x	x	x	x	x	x	x
	maintained	x						
Min. operating force (OZ.)	1	14	7	14	3.5	2	6	7
Min. differential travel (IN.)	.0004	.002	.0005	.002	.020	.004	.109	.015
Upper temperature limits °F	nominal	180	180	180	180	180	180	180
	high	400						
Actuation	plunger	x	x	x		x		x
	lever	x	x	x	x	x	x	

Miniature and special basics

MICRO SWITCH miniature and special basic switches combine precision operation and long life in the smallest possible package. They are ideal components for electronic equipment or any application where size and weight are critical factors. Switches, with environment-proof and hermetically-sealed construction, are included in the range available.



SIDE ROTARY ACTUATION

Available levers provide greater versatility. Heads may be positioned with shaft on any side. All are momentary action except maintained head.

LSA — Standard : 60° minimum overtravel, 15° maximum pretravel, 5° (single-pole) and 7° (double-pole) maximum differential travel. Operating temperature range is 10° to 250°F (-12 to 121°C).

LSP — Narrow differential : 68° minimum overtravel, 7° maximum pretravel, 3° (single-pole) and 4° (double-pole) maximum differential travel. Operating temperature range is 10° to 250°F (-12° to 121°C).

LSR — Low operating torque : 60° minimum overtravel, 15° maximum pretravel, 1.7 in.-lbs. (.19Nm) maximum operating torque. Operating temperature range is 30° to 250°F (-1° to 121°C).

WOBBLE LEVER ACTUATORS These heads come with either a spring wire, a delrin rod, or a steel cat whisker. Any movement of the lever (except pull) will actuate the switch. Standard temperature range 10° to 200°F (-12 to 93°C).



LSJIA-7M
Spring wire
may be formed for
special applications.

LSJIA-7N
Flexible actuator,
cadmium plated
cable.

LSKIA-8C
Stainless Steel
coil spring.

LSJIA-7A
Delrin rod
is
recommended
where
possible
scratching or
marring by
the actuator
is to be
avoided.

LSKIA-8A
Cat whisker
is designed for
low operating
force
applications.

HONEYWELL CONTROLS MICRO SWITCH NO TOUCH CONTROLS

THESE PHOTOELECTRIC AND PROXIMITY CONTROLS REQUIRE "NO TOUCH" (ARE ACTUATED WITHOUT PHYSICAL CONTACT) AND CAN OFTEN SATISFY SWITCHING NEEDS WHERE ELECTROMECHANICAL SWITCHES ARE DIFFICULT TO APPLY. Photoelectric controls respond to a change in light intensity at a photo-receiver, and will detect opaque or translucent materials at short or long range.

Proximity controls respond to the nearness of metal only, and will detect metallic objects a few inches or less from the sensor. They will detect through non-metallic materials. (Ferromagnetic proximity controls will detect through non-ferrous metals also.)

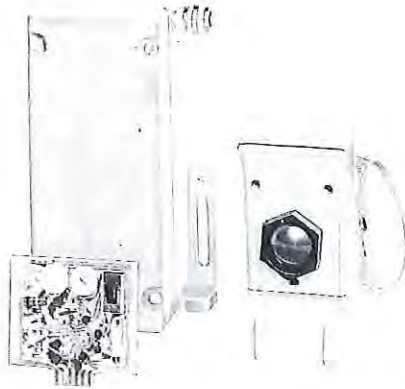
No-touch controls perform as limit switches, positioning devices, speed controls, counters, inspection tools, and in many other functions. The static design of these controls prevents them from wearing out mechanically — either from constant use, or from detecting rough or abrasive parts or materials. No-touch controls can detect small, lightweight parts without detaching them; delicate, painted, or polished surfaces without marring them. They can detect irregularly shaped objects, and respond to objects regardless of their direction of entry into the sensing field. Controls can perform a variety of logic functions at electronic speeds.

MICRO SWITCH photoelectric and proximity devices offer you high quality and reliable performance.

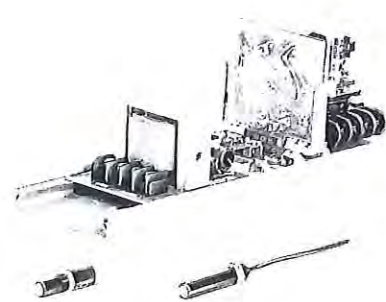
Contemporary...with a plug-in "brain"



Self-contained : light source, photo receiver, amplifier, plug-in LOG logic card and output relay in a sturdy NEMA rated housing.



Self-contained/modular hybrid : light source and photo receiver in one housing wired to a control base (NEMA rated housing) containing the amplifier, plug-in LOG logic card and output relay.

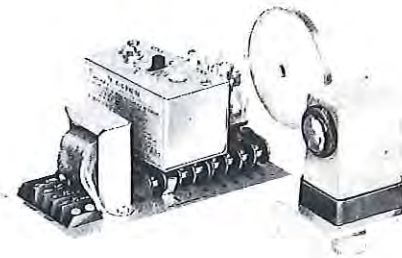


Modular : separate light source and photo receiver wired to individual rack mounted modular printed circuit boards containing the power supply, the plug-in LOG logic card base/amplifier, and the output relay.

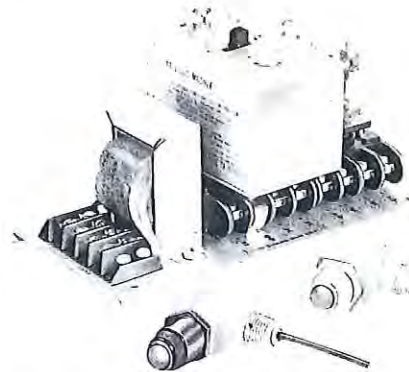
Traditional...with TR logic modules



Self-contained: light source photo receiver predetermined logic amplifier and output relay in a common sealed housing.



Self-contained/modular hybrid : light source and photo receiver in a common housing, wired to an open control chassis containing the amplifier, plug-in TR logic module and output relay.



Modular : separate light source and photo receiver wired to an open control chassis with an amplifier, plug-in TR logic module and output relay.

THESE TWO PAGES OFFER ONLY A "GLIMPSE" OF THE VAST RANGE OF HONEYWELL MICRO SWITCH CONTROLS AVAILABLE

PLEASE CONTACT US FOR COMPREHENSIVE SPECIFICATIONS AND DETAILS TO SUIT YOU REQUIREMENTS

MANUFACTURERS CATALOGUES ARE AVAILABLE ON REQUEST

ORDERING PROCEDURES

ORDER BY HONEYWELL CATALOGUE/PART NO. ONLY

REFER PAGES 476 & 477 FOR HONEYWELL RESIDENTIAL REFRIGERATION & AIR CONDITIONING CONTROLS

HONEYWELL CONTROLS

RESIDENTIAL TRADELINE CONTROLS

A SUMMARY OF THE WIDE RANGE OF REFRIGERATION AND AIR CONDITIONING CONTROLS FOR RESIDENTIAL, COMMERCIAL AND INDUSTRIAL APPLICATIONS

DAMPERS

ELECTRIC HEATING CONTROLS

ELECTRONIC AIR CLEANERS

FLAME SAFEGUARD CONTROLS

Primary Controls, Detectors, Flame Rods and Holders, Photocells, Rectifier Pilots.

FLAME SAFEGUARD COMMERCIAL/INDUSTRIAL AND PROCESS BURNER CONTROLS

GAS BURNER CONTROLS

Residential Gas Combination Controls and Components, Direct Spark Ignition System, Thermocouples, Pilot Burners, Pilot Generators, Recreational Vehicle Controls.

HUMIDITY CONTROLLERS

HYDRONIC CONTROLS

MOTORS AND VALVES

Motors: Damper Actuators, Valve Actuators, Linkages, Zone Motor, Proportional Motors, Potentiometer, Auxiliary Switches, Balancing Relays.

Valves: Gas, Motorized, Radiator, Steam.

OIL BURNER CONTROLS

Detectors, Cad Cell Controls, Stack Controls, Magnetic Valve, Time Delay Relay.

PRESSURE CONTROLLERS

Proportional, Controllers for oil, steam, water and air pressure, Pressure Switches.

REFRIGERATION AND AIR CONDITIONING CONTROLS

Contactors, Fan Centres, Relays, Temperature Controllers, Pressure-actuated Controllers.

SERVICE AIDS

STEP CONTROLLERS

STOKER CONTROLS

SWITCHES

SWITCHING RELAYS

General Purpose, Medium Duty, Heavy Duty.

TEMPERATURE CONTROLLERS

Agricultural, Changeover, Indoor-Outdoor, Outdoor Reset, Proportional, Multi-stage, Remote Bulb.

THERMOSTATS

Heating, Cooling, Heating-Cooling, Day-Nite, Heavy Duty, Light Duty, Fan-Coil, Clock, Proportional, Multi-stage, Subbases, Guards.

TRANSFORMERS

Clock, General Purpose, Heavy Duty, Plug-in Multi-mount.

WARM AIR LIMITS

Fan, Limit, Combination Fan-Limit.

ZONE CONTROL SYSTEMS

PARTS AND ACCESSORIES

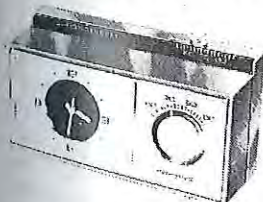
SUPER TRADELINE CONTROLS

T872 MULTISTAGE THERMOSTATS



LOW VOLT THERMOSTATS FOR 1- OR 2-STAGE HEATING AND/OR COOLING SYSTEMS.

T282A, T882A, TS882A CHRONOTHERM CLOCK THERMOSTATS



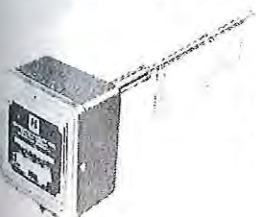
FOR COMPLETELY AUTOMATIC NIGHT SETBACK — MORNING PICKUP TEMPERATURE CONTROL OF A HEATING SYSTEM OR AUTOMATIC DAY SETUP FOR COOLING SYSTEMS.

H600A HUMIDIFIER CONTROL



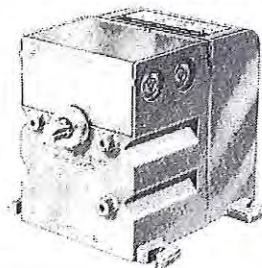
OPERATES HUMIDIFICATION EQUIPMENT ON RH FALL OR DEHUMIDIFICATION EQUIPMENT ON RH RISE.

S43A,B,D SAIL SWITCHES



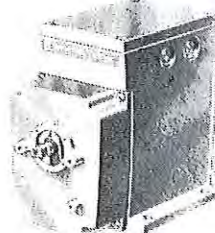
SWITCH MAKES AN ELECTRICAL CIRCUIT ON AN INCREASE IN AIR VELOCITY.

M934A MODUTROL MOTOR



REVERSING, PROPORTIONAL, SHADED POLE MOTOR.

M945A-H,M MODUTROL MOTORS



MODULATING, SPRING-RETURN MOTORS USED TO OPERATE DAMPERS AND VALVES

V5011A,B,C SINGLE SEATED VALVES



USED FOR 2-POSITION AND MODULATING CONTROL OF STEAM AND WATER IN HEATING OR COOLING SYSTEMS.

S684D,F; S984D,E,F,J STEP CONTROLLERS



USED FOR SWITCHING MULTIPLE LOADS IN A PREDETERMINED SEQUENCE.

HONEYWELL CONTROLS RESIDENTIAL TRADELINE CONTROLS



**RA890G PROTECTOR RELAY
PRIMARY CONTROL**
NON PROGRAMMING.
SOLID STATE ELECTRONIC RELAY FOR USE ON INDUSTRIAL AND COMMERCIAL GAS OIL, OR COMBINATION GAS-OIL BURNERS.



C645A,B



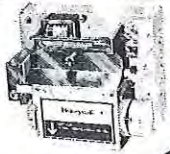
C645C

**C645A,B GAS PRESSURE SWITCHES
C645C,D AIR PRESSURE SWITCHES**



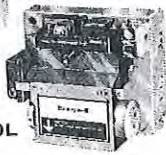
C645D

SAFETY DEVICES, USED IN POSITIVE-PRESSURE OR DIFFERENTIAL-PRESSURE SYSTEMS TO SENSE GAS OR AIR PRESSURE CHANGES.



R4140G,M

R4140L



**R4140G,L,M,
FSG PROGRAMMING CONTROL**

Provides flameout protection plus automatic sequencing of burner motor, firing rate motor (L and G only), ignition, pilot valve, and main fuel valve(s). Use with rectifying, infrared, or ultraviolet flame detectors.



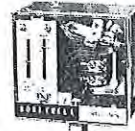
**C437D-H,J,K
GAS PRESSURE SWITCHES**

FOR SAFETY SHUTOFF, PRESSURE CONTROL, AND DIFFERENTIAL PRESSURE CONTROL IN INDUSTRIAL GAS SYSTEMS. WITH DIRECT AND REVERSE-ACTING SWITCHING (SPST).

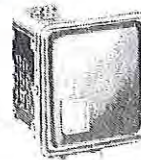


**L91 PROPORTIONAL
PRESSURE RETROL CONTROLLER**

MODULATING PRESSURE OPERATED CONTROL USED AS A HIGH LIMIT CONTROLLER OR, IN STEAM HEATING SYSTEMS, AS A DIRECT CONTROLLER FOR A PROPORTIONAL MOTOR OPERATING AN AUTOMATIC BURNER.



L404A,B,C,D,F
L604A,L



L404L

**L404A,B,C,D,F,L; L604A,L
PRESSURE RETROL CONTROLLERS**

PROVIDE OPERATING CONTROL, AUTOMATIC LIMIT OR MANUAL RESET LIMIT PROTECTION FOR PRESSURE SYSTEMS UP TO 300 PSI

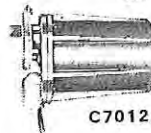
**V5055 INDUSTRIAL GAS VALVES WITH V4055,
V4062 OR V9055 FLUID POWER ACTUATORS**

V4055

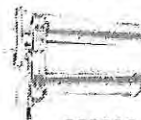


V5055

PROVIDE LINE VOLTAGE CONTROL OF GAS SUPPLY TO COMMERCIAL AND INDUSTRIAL BURNERS. COMBINATIONS OF VALVES AND ACTUATORS PROVIDE ON-OFF, OFF-LO-HI, AND MODULATING CONTROL.



C7012,A,C,E,F



C7020A

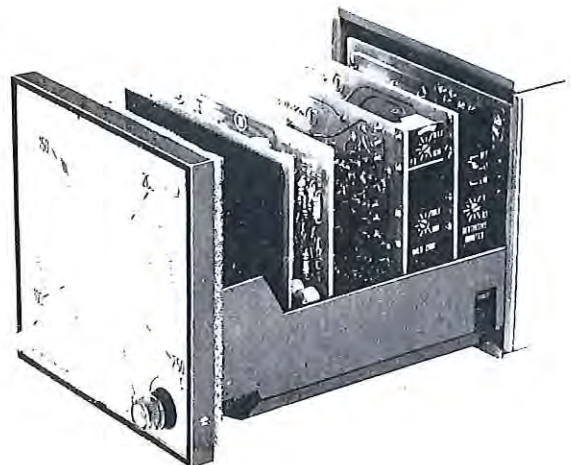
**C7012A,C,E,F (PURPLE PEEPER),
C7020A ULTRAVIOLET
FLAME DETECTORS**

ELECTRONIC FLAME DETECTORS FOR SENSING ULTRAVIOLET RADIATION OF INDUSTRIAL GAS, OIL, OR COMBINATION GAS-OIL FLAMES.

VERSAPAK II CONTROLLERS

Product Description

The Versapak II features a family of electronic control instruments with a wide variety of input and output signals. Specifically designed to meet modern industry's requirements for flexibility, reliability, and low installation and maintenance costs, the Versapak II incorporates the latest electronic techniques for analog process instrumentation. Integrated circuitry and a minimum of moving parts ensure a high degree of reliability and virtually no maintenance. The compact DIN size case allows high density mounting in both the vertical and horizontal directions, thus minimizing panel space and cost.



REFER PAGES 573 & 574 FOR HONEYWELL MICRO SWITCH CONTROLS.
ORDERING PROCEDURE

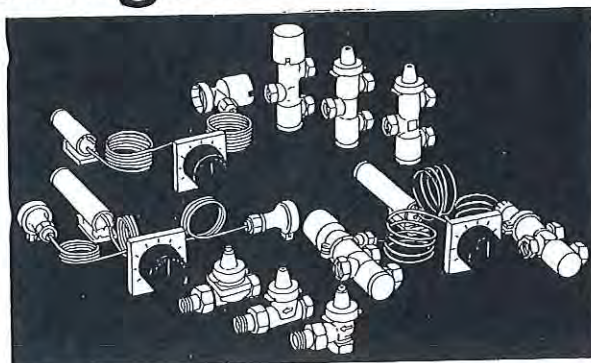
ORDER BY HONEYWELL CATALOGUE/PART NO. USING HONEYWELL LITERATURE AVAILABLE ON REQUEST
577 Tech. Page SECTION 7



Thermostatic valves for terminal regulation

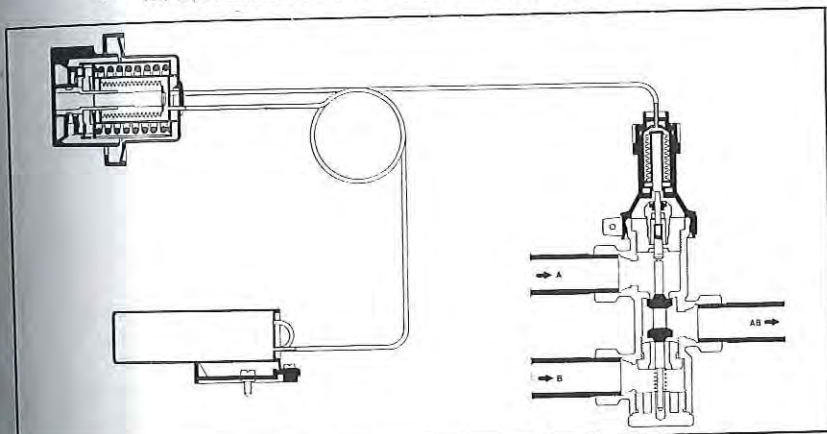
Danfoss automatic terminals controls for ventilation and air conditioning systems in offices, schools, hospitals, computer rooms, laboratories, hotels, etc.

Danfoss air conditioning valves consist of a series of thermostatic elements and valves which are combined to make up a range of proportional regulators. The proportional regulators automatically maintain stable room temperature, relative to the setting chosen.



ADVANTAGES

- SELF-ACTING SYSTEM
- MINIMUM MAINTENANCE
- SEATED VALVE
- SIMPLE INSTALLATION
- MAINTENANCE WITHOUT DRAINING DOWN
- SUITABLE FOR ALL WATER SYSTEMS
- 2 - PIPE SYSTEMS
- 4 - PIPE SYSTEMS
- WITH OR WITHOUT CHANGEOVER
- FAN-COIL AND INDUCTION UNITS



Thermostatic Elements

Control elements are based on the familiar Danfoss bellows system which guarantees excellent performance and long life.

Valves

The Danfoss program of air conditioning valves makes it possible to regulate all normal water systems incorporating terminals, for example, fan-coil units, induction units, etc.

The elements consist of a setting unit, a sensor and one, or two actuators. They operate by modulation.

A temperature rise at the sensor causes a pressure increase in the thermostatic system. This pressure is transferred to the actuator which opens/closes the air conditioning valve.

The elements operate without external power, i.e. no electrical leads or pneumatic lines.

CONTROL ELEMENTS

CAT. NO.	TYPE	CODE No.	Setting Range °C	Neutral Zone °C	Max. Sensor Temp. °C	Capillary tube lengths from setting unit to sensor/actuator metres
58051	CEV	13F3122	16-27		60	2 + 2
		13F3111				1 + 1
	CEK	13F3177	(1)		60	2 + 2
		13F3166				1 + 1
	CES	13F3022	18-25	2.0	60	2 + 2
		13F3011		1 + 1		
	CED	13F3077	(2)	1.5	60	2 + 2
		13F3066				1 + 1

Note (1): The setting range of 11°C is factory set but can be changed by readjustment within the limits 10 - 35°C.

Note (2): The setting range of 7°C is factory set but can be changed by readjustment within the limits 15 - 30°C.

VALVES

CAT. NO.	TYPE	Designation	CODE No.	Valve Type	Conn.	Kv
58015	RAV15/8	Valve for hot water	13U0016	Angle	½" BSP	1.6
58016			13U0017	Straight		
58019	RAV20/8	Valve for hot water	13U0021	Angle	¾" BSP	2.3
58020			13U0022	Straight		
58022	RAV25/8	Valve for hot water	13U0027	Straight	1" BSP	2.6
58028	RAV15/2	Valve for hot water	13U0216	Angle	½" BSP	2.9
58029			13U0217	Straight		
58032	RAV20/2	Valve for hot water	13U0221	Angle	¾" BSP	4.2
58033			13U0222	Straight		
58035	RAV25/2	Valve for hot water	13U0227	Straight	1" BSP	5.8
58037	KOVM	Valve for cold or hot water	13U3015	—	½" BSP	1.5
58040	KOVC	Changeover Valve	13U3025	—	½" BSP	1.5
58039	KOVS	Sequence Valve	13U3035	—	½" BSP	0.63
58038	KOVD	Distributor Valve	13U3030	—	½" BSP	0.85

TYPE RAV PHIAL UNITS

CAT. NO.	CODE No.	DESCRIPTION	CAT. NO.	CODE No.	DESCRIPTION
	13U1100	Fixed		13U1105	Remote
	13U1110	Fixed - Series N		13U1115	Remote - Series N
	13U1102	Remote		13U1108	Remote
	13U1112	Remote - Series N		13U1118	Remote - Series N

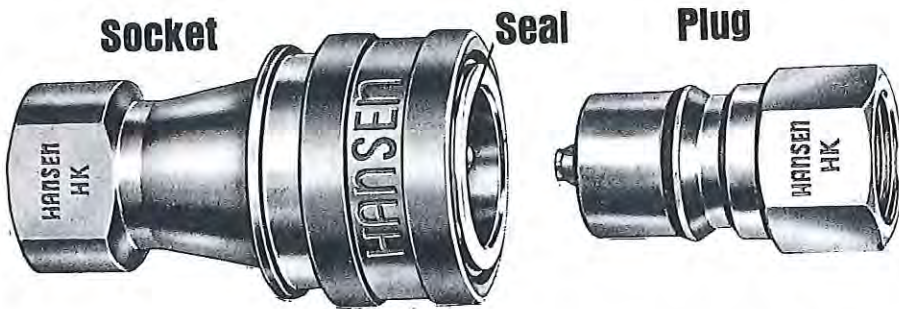
IT IS RECOMMENDED THAT MANUFACTURERS LITERATURE (AVAILABLE ON REQUEST) BE CONSULTED FOR DETAILED INFORMATION AND APPLICATION OF THESE UNITS

7

HANSEN COUPLINGS

HANSEN COUPLINGS ARE AVAILABLE IN THREE TYPES
 2-WAY SHUT-OFF — 1-WAY SHUT-OFF — STRAIGHT THROUGH
 THIS CATALOGUE LISTS THE MORE COMMONLY USED TYPES AND SIZES. LITERATURE DETAILING THE
 FULL RANGE, INCLUDING DIMENSIONS AND ADDITIONAL TECHNICAL DATA IS AVAILABLE ON REQUEST

- 2-WAY SHUT-OFF COUPLINGS —** These have a valve in both Socket and Plug, which automatically closes when the coupling is disconnected.
- 1-WAY SHUT-OFF COUPLINGS —** This type has a valve in the Socket only, so that when the coupling is disconnected only the Socket closes off, preventing further flow.
- STRAIGHT THROUGH COUPLINGS —** These couplings do not have valves in either Socket or Plug, and provide a smooth bore for maximum unrestricted flow.



IDENTIFICATION & ORDERING
 PROVIDED THE INFORMATION IN THIS CATALOGUE IDENTIFIES YOUR EXACT REQUIREMENTS, IT IS RECOMMENDED THAT YOU ORDER BY OUR CATALOGUE NO. IF UNSURE — ORDER AS FOLLOWS:-

TYPICAL EXAMPLE — ORDER BY : 1. SOCKET NO. 2. PLUG NO. 3. SEAL NO.
 (Omit SEAL NO. if Standard Seal is desired)
 E.G. "2-WAY" — 1. Socket No. B4-H26 2. Plug No. B4-K26 3. Standard Seal — Omit.
 COMBINATION SOCKET & PLUG = B4 - HK26

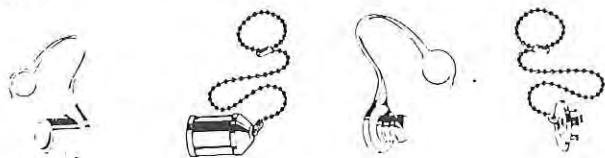
Note: Prefix "B" is for Brass, Nil for Steel, "LL" for Stainless Steel.
WHEN IN DOUBT — PROVIDE THE FOLLOWING INFORMATION

1. 2-WAY, 1-WAY OR STRAIGHT THROUGH
2. SIZE
3. MATERIAL
4. FLUID OR GAS HANDLED
5. TEMPERATURE (AMBIENT & FLUID OR GAS)
6. PRESSURE

TYPE	SERIES	APPLICATIONS
2-WAY	HK	Hydraulic Service, Vacuum (selected sizes) low micron range, Water, Compressed Air, Various Liquids and Gases, LP Gas, Anhydrous Ammonia, Fluorinated Refrigerants, Paint.
	HDK	Steam line connections for Tyre Retreading and other equipment.
	2-HKIG & 2-HKIL	Gas and Liquid lines, Compressed Air, Water — Provides foolproof Non-Interchangeable feature for Unlike fluids and gases in parallel lines.
1-WAY	PUSH-TITE	
	3000	Compressed Air, Gases, Grease/Oil, Paint, Vacuum (limited)
	4000	
	5000	
	6000	
	100	Compressed Air, Gases, Grease/Oil, Liquids, Vacuum (limited)
	400	Compressed Air, Gases, Grease/Oil, Paint, Vacuum (limited)
	500	Compressed Air, Gases, Grease/Oil, Paint, Vacuum (limited)
	600	Oxygen Service, Gases, Nitrous Oxide, Vacuum (limited), Water
700	Acetylene Service, Gases, Nitrous Oxide, Vacuum (limited), Water	
STRAIGHT THROUGH	1000	Compressed Air, Gases, Grease/Oil, Paint, Vacuum (limited)
	2-RL	Compressed Air, Vacuum (limited)
	3-RL	Compressed Air, Gases, Hydraulic Fluids, Liquids, Vacuum, Water
	ST	Compressed Air, Gases, Hydraulic Fluids, Liquids, Vacuum, Water
	GH	Water

ACCESSORIES

DUST CAPS : Dust Caps are available for most Couplings where protection is necessary against excessive flying grit or dust. The Socket Dust Cap is easily applied by pulling back sleeve of Socket and inserting Dust Cap. The Plug Dust Cap covers the entire machined surface of the Plug. It is applied and held in place by friction on locking portion of the Plug. Metal Dust Caps are supplied with chain and attachment ring. Plastic Dust Caps have integral plastic strap and attachment loop.



SPECIALS

Present us with your problem — We will endeavour to help you.
REFER FOLLOWING PAGES FOR ADDITIONAL DETAILS SECTION 7

HANSEN COUPLINGS

ELASTOMER (SEAL MATERIAL) SELECTION GUIDE

O-RINGS, WASHERS, OTHER SEALS

Select seals that are compatible with the service you intend for your couplings. You must allow for the kind of fluid to be conveyed and its temperature. Chemically active fluids will destroy some seal materials. And certain seals withstand high temperatures, whereas others cannot. Use this Elastomer Selection Guide to find the seal you need.

NOTE : Elastomer, or seal material listed as "Standard" is supplied in most Hansen Couplings. Elastomers designated as "118", "123", "146" etc. are available as optional seal material for Series HK, Series 8000 and Series ST Couplings. Other seal materials available upon request (some ex USA) to suit specific requirements.

NOTE : The following information is accurate to the best of our knowledge; however since the conditions of use vary widely and are beyond our control, specific applications may result in shortened seal life or require other elastomeric compounds.

Fluid	TEMPERATURE RANGE		Hansen Elastomer
	°F	°C	
Air	-40 to +250	-40 to +121	Standard
Air (above 200°F)	-20 to +500	-29 to +260	-143
Acetylene Gas	-40 to +200	-40 to + 93	Standard
Acids (Mild)	-40 to +200	-40 to + 93	-123.
Alkalies	-40 to +160	-40 to + 71	Standard
Ammonia, Anhydrous	-40 to +120	-40 to + 49	-146
Ammonia, Anhydrous	-65 to +240	-54 to +116	-192*
Ammonia, Aqueous	-65 to +200	-54 to + 93	-192*
Brake Fluid (Non-Petroleum)	-65 to +250	-54 to +121	-192*
Brake Fluid (Petroleum)	-40 to +250	-40 to +121	-123
Butane	-40 to +200	-40 to + 93	-146
Carbon Dioxide (Max. Pressure 150 psi)	-65 to +200	-54 to + 93	-213
Carbon Tetrachloride	-20 to +250	-29 to +121	-143
Diesel Fuel	-40 to +250	-40 to +121	-146
Freon	-40 to +200	-40 to + 93	
11	-40 to +200	-40 to + 93	-146
12, 13, 14, 22, 113, 114, 114B2, 115, 218, C-316 & 502. With Oils of 200°F Aniline Point and Lower	-40 to +200	-40 to + 93	-118
Freon 12, 13, 14, 22, 113, 114, 114B2, 115, 218, C-316 and 502. With Oils of over 200°F Aniline Point	-40 to +200	-40 to + 93	Standard
Gasoline (Aromatic & Non Aromatic)	-40 to +160	-40 to + 71	-146

Fluid	TEMPERATURE RANGE		Hansen Elastomer
	°F	°C	
Helium Gas	-65 to +200	-54 to + 93	Standard
Hydraulic Fluid, Petroleum Base with Aniline Point above 160°F	-65 to +250	-54 to +121	Standard
Hydrogen Gas	-65 to +200	-54 to + 93	Standard
Kerosene	-40 to +120	-40 to + 49	-146
L.P. Gases	-40 to +120	-40 to + 49	-146
Methane	-40 to +120	-40 to + 49	-146
Mineral Spirits	-40 to +160	-40 to + 71	-146
Nitrogen Gas	-65 to +200	-54 to + 93	Standard
Oxygen	Service Conditions Dictate Elastomer Selection		
Oils			
Animal *	-40 to +160	-40 to + 71	Standard
Mineral Oil with Aniline Point Above 160°F	-40 to +250	-40 to +121	Standard
Vegetable-Non Food Service	-40 to +250	-40 to +121	Standard
Propane	-40 to +120	-40 to + 49	-146
Propylene	-40 to +250	-40 to +121	Standard
Steam, Saturated	Max.338° (100 psig)	Max. 170° (690kPa)	-192*
Transmission Oil (Automotive)	-40 to +250	-40 to +121	Standard
Trichloroethylene	-20 to +200	-29 to + 93	-143
Turpentine	-40 to +200	-40 to + 93	Standard
Water to 180°F	To + 180	To +82	Standard

* -192 compound is not compatible with mineral base greases or oils.

Pressure Ratings & Flow Capacity for Two-Way Shut-Off Couplings

SERVICE: The SERVICE pressure rating provides optimum service life in most applications. Subjecting a Coupling to higher pressures may result in a reduction in service life.

FAILURE: FAILURE pressure is based on a one time pressure application to a new unit and is the pressure at which the Coupling became inoperative or started to leak. Suitable safety factors* depending on application conditions, should be used if SERVICE pressure is exceeded.

Cv FACTOR: The quantity of 60°F water, in U.S. GPM, which will flow through a Coupling with a pressure drop of 1 psi.

To find pressure drop:

$$PD = \left[\frac{U.S. GPM}{Cv} \right]^2$$

Ac NUMBER: The amount of air, in SCFM, which will flow through a Coupling with an inlet pressure of 100 psig and a pressure drop of 5 psi.

*** SAFETY FACTORS:**
 For Liquids: Maximum safe pressure suitable for many liquid applications may be calculated by dividing the Failure Pressure by 2.5.
 For Gases: Maximum safe pressure suitable for many gas applications may be calculated by dividing the Failure Pressure by 4.0.

SERIES	STEEL (Standard) psi		STEEL (High Pressure) psi		BRASS psi		Cv	Ac
	Service	Failure †	Service	Failure †	Service	Failure †		
1-HK	4000	16000	—	—	1000	12000	0.5	12
2-HK	3000	15000	7500	30000 (connected) 15000 (disconnected)	800	15000	1.1	28
3-HK	2000	16000	5000	16000	500	11000	1.9	48
4-HK	2000	15000	5000	20000	500	14000	3.2	80
4-HKA	500	800	psi disconnected (Failure † pressure 15000 when connected).				3.3	82
6-HK	1500	8000	3000	15000	500	9000	8.2	205
8-HK	1000	6000	2000	15000	500	6000	11.4	285
2-HKIG	—	—	—	—	—	—	1.1	28
2-HKIL	—	—	—	—	—	—	1.1	28
B3-HDK-Y	—	—	—	—	—	—	1.9	48
B4-HDK	—	—	—	—	—	—	3.2	80
B6-HDK	—	—	—	—	—	—	8.2	205
B8-HDK	—	—	—	—	—	—	11.4	285
B12-HDK	—	—	—	—	—	—	24.0	600

TWO-WAY SHUT-OFF COUPLINGS ARE DETAILED ON PAGE 586-b
 1-Way Couplings — Refer Pages 586-c, 586-d and 586-e
 Straight Through Couplings — Refer Page 586-f

586-b HANSEN 2-WAY SHUT-OFF COUPLINGS

These Couplings provide positive shut-off of both ends of pressurized lines when disconnected. They put an end to the loss of gas or liquids. As soon as you release the locking sleeve, valves in both socket and plug close, shutting off flow.

When connecting, the Plug contacts an O-ring in the socket creating a positive seal. There is no chance of premature flow or waste due to a partial connection. The Plug must be fully sealed in the Socket before the valves will open.

Series 1-HK to 8-HK



SOCKETS with female pipe threads

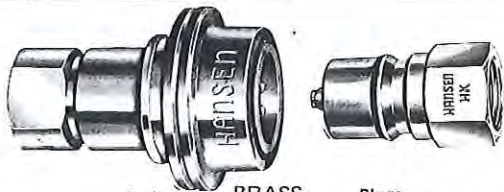


PLUGS with female pipe threads

Any Plug and Socket from the same Series, regardless of end connection, fit together to make a Coupling assembly.

TYPE	SIZE FPT	SOCKET		PLUG		COMBINATION SOCKET & PLUG P/N
		CAT. NO.	PART NO.	CAT. NO.	PART NO.	
STEEL STANDARD SEAL	1/8"	5861	1-H11	586101	1-K11	1-HK11
	1/4"	5862	2-H16	586102	2-K16	2-HK16
	3/8"	5863	3-H21	586103	3-K21	3-HK21
	1/2"	5864	4-H26	586104	4-K26	4-HK26
	3/4"	5867	6-H31	586107	6-K31	6-HK31
	1"	5868	8-H36	586108	8-K36	8-HK36
	1.1/4"	58698	12-H41	586211	12-K41	12-HK41
BRASS STANDARD SEAL	1/8"	5869	B1-H11	586109	B1-K11	B1-HK11
	1/4"	58610	B2-H16	586110	B2-K16	B2-HK16
	3/8"	58611	B3-H21	586111	B3-K21	B3-HK21
	1/2"	58612	B4-H26	586112	B4-K26	B4-HK26
	3/4"	58613	B6-H31	586113	B6-K31	B6-HK31
	1"	58614	B8-H36	586114	B8-K36	B8-HK36
	1.1/4"	58699	B12-H41	586212	B12-K41	B12-HK41
STEEL HIGH PRESS SEAL	1/4"	58692	2-H16C	586205	2-K16C	2-HK16C
	3/8"	58693	3-H21C	586206	3-K21C	3-HK21C
	1/2"	5866	4-H26C	586106	4-K26C	4-HK26C
	3/4"	58694	6-H31C	586207	6-K31C	6-HK31C
Steel-Ammonia	1/2"	5865	4-H26A	586105	4-K26A	4-HK26A

Note: Larger sizes available on application (ex-USA).
Stainless Steel Couplings (Prefix "LL") also available ex-USA.



Sockets Female Connections BRASS Plugs Female Connections
DOUBLE O-RING SEALS
TWO-WAY SHUT-OFF

Provides quick, dependable connection and disconnection of steam lines. At instant of connection, double O-ring seals effect leak-proof Seal before valves in Socket and Plug release flow of steam. During instant of disconnection, Coupling remains sealed until valves effect complete shut-off of steam - on both sides of line.

Series HDK steam

Any Plug and Socket from the same Series, regardless of end connection, fit together to make a Coupling assembly.

SIZE FPT	SOCKET		PLUG	
	CAT. NO.	PART NO.	CAT. NO.	PART NO.
3/8"	58690	B3-HD21-Y *	586203	B3-K21-192
1/2"	58695	B4-HD26-192	586208	B4-K26-192
3/4"	58696	B6-HD31-192	586209	B6-K31-192
1"	58697	B8-HD36-192	586210	B8-K36-192
1.1/4"		B12-HD41-192		B12-K41-192
1.1/2"		B12-HD46-192		B12-K46-192

* Includes Easy-to-Grip sleeve flange.

STAINLESS STEEL

Series 2-HKIG & Series 2-HKIL Non-interchangeable Couplings for liquids/gases



SOCKET - SERIES 2-HKIG - PLUG
With male end connections



SOCKET - SERIES 2-HKIL - PLUG
With male end connections

Series 2 - HKIG and 2 - HKIL with female end connections are included in Table but not illustrated.

For Elastomer (Seal Material) Chart, Pressure Ratings and Flow Capacities — Refer Tech. Page 186-a.

EXTENSIONS TO RANGE SHOWN ABOVE ARE AVAILABLE — CATALOGUE SUPPLIED ON REQUEST.

These Couplings are designed with a different contour of mating parts to eliminate the possibility of wrong routine connection of these Couplings with others. When 2-HKIG and 2-HKIL Couplings are used for parallel gas or liquid lines, there is no risk of wrong connection. Foolproof connection of unlike fluids in parallel lines is assured.

SIZE FPT	SOCKET		PLUG	
	CAT. NO.	PART NO.	CAT. NO.	PART NO.

SERIES 2 - HKIG

With Male end connections

1/8"	586520	2-HIG10	586220	2-KIG10
1/4"	586521	2-HIG15	586221	2-KIG15
3/8"	586522	2-HIG20	586222	2-KIG20

With Female end connections

1/8"	586523	2-HIG11	586223	2-KIG11
1/4"	586524	2-HIG16	586224	2-KIG16

SERIES 2 - HKIL

With Male end connections

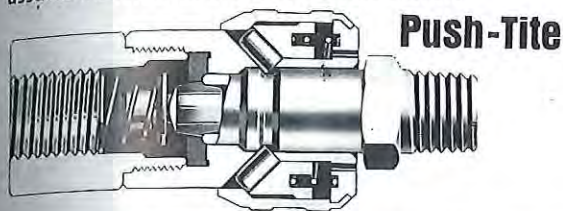
1/8"	586525	2-HIL10	586225	2-KIL10
1/4"	586526	2-HIL15	586226	2-KIL15
3/8"	586527	2-HIL20	586227	2-KIL20

With Female end connections

1/8"	586528	2-HIL11	586228	2-KIL11
1/4"	586529	2-HIL16	586229	2-KIL16

HANSEN 1-WAY SHUT-OFF COUPLINGS

Where only automatic shut-off of Socket end of line is required, use this type of Hansen Coupling. Spring actuated valve assures instant shut-off upon disconnection.



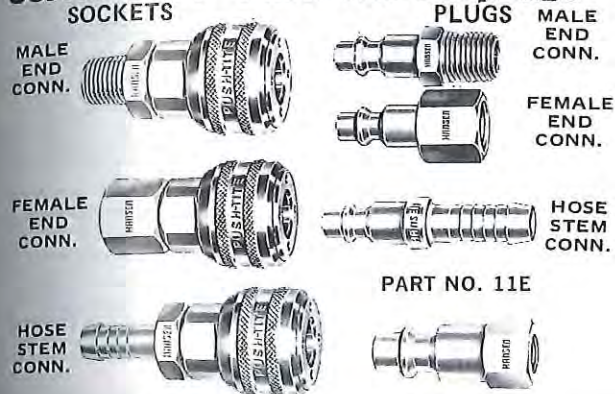
Series 3000, 4000, 5000, 6000

Instantaneous connection and disconnection of fluid lines with automatic shut-off of Socket end of line. When connected, Plug is free to swivel eliminating any kinks in the hose.

Socket is machined from solid brass bar stock. Steel Plug is fully hardened and rustproofed.

Locking pawls, sleeve spring and valve springs are of stainless steel.

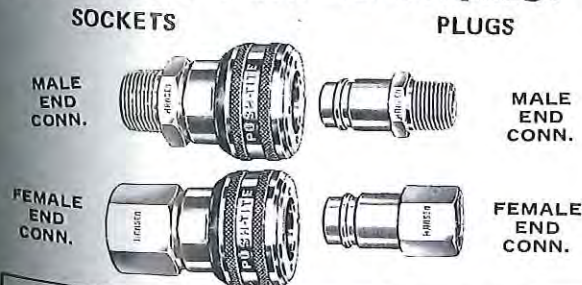
Series 3000—Push-Tite Couplings



END CONNECTION TYPE	SIZE	CAT. NO.	PART NO.	Material
SOCKETS				
Male End	1/8" MPT	58624	2900	Brass
	1/4" MPT	58626	3100	
	3/8" MPT	58623	3000	
Female End	1/4" FPT	58625	3200	Brass
	3/8" FPT	586533	3600	
Hose Stem Conn.	1/4" H.S.	586534	3700	Brass
	3/8" H.S.			

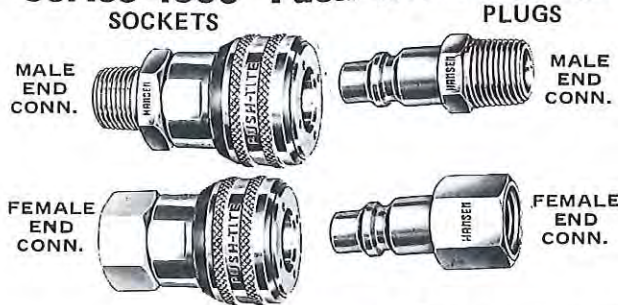
END CONNECTION TYPE	SIZE	CAT. NO.	PART NO.	Material
PLUGS				
Male End	1/4" MPT	586127	10	Steel
	1/4" MPT	586128	B-10	Brass
	1/8" MPT	586130	12	Steel
	3/8" MPT	586131	14	
Female End	1/4" FPT	586129	11	Steel
	1/8" FPT	586132	15	
	3/8" FPT	586133	16	
Hose End	1/4" H.S.	586134	17	Steel
	3/8" H.S.	586238	11E	

Series 6000—Push-Tite Couplings



END CONNECTION TYPE	SIZE	CAT. NO.	PART NO.	Material
SOCKETS				
Female	3/4" FPT	58640	6400	Brass
PLUGS				
Male	1" MPT	586152	68	Steel
Female	1/2" FPT	586149	65	Steel
	3/4" FPT	586151	67	

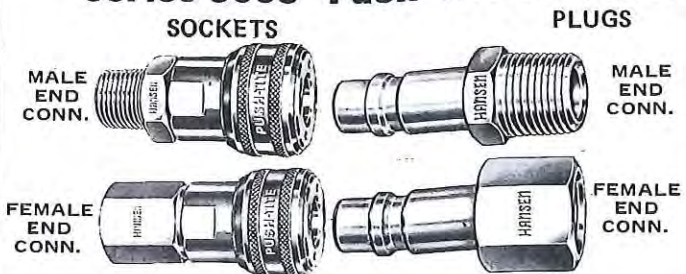
Series 4000—Push-Tite Couplings



END CONNECTION TYPE	SIZE	CAT. NO.	PART NO.	Material
SOCKETS				
Male	1/2" MPT	58632	4500	Brass
Female	1/2" FPT	58631	4400	

END CONNECTION TYPE	SIZE	CAT. NO.	PART NO.	Material
PLUGS				
Male	1/4" MPT	586135	40	Steel
	3/8" MPT	586137	42	Brass
	3/8" MPT	586245	B-42	
	1/2" MPT	586139	44	
Female	1/4" FPT	586136	41	Steel
	3/8" FPT	586138	43	
	1/2" FPT	586140	45	

Series 5000—Push-Tite Couplings



END CONNECTION TYPE	SIZE	CAT. NO.	PART NO.	Material
SOCKETS				
Female	1/2" FPT	58635	5200	Brass
	3/4" FPT	58637	5400	

END CONNECTION TYPE	SIZE	CAT. NO.	PART NO.	Material
PLUGS				
Male	1/4" MPT	586141	50	Steel
	3/8" MPT	586142	52	
	1/2" MPT	586144	54	
Female	1/2" MPT	586216	B54	Brass
	3/8" FPT	586143	53	
	1/2" FPT	586145	55	Steel
	3/4" FPT	586147	57	

Any Plug and Socket from the same Series, regardless of end connection, fit together to make a Coupling assembly.

FOR ELASTOMER (SEAL MATERIAL) CHART

REFER Tech. Page 186-a
REFER PAGES 586-d and 586-e FOR
ADDITIONAL 1-WAY COUPLINGS

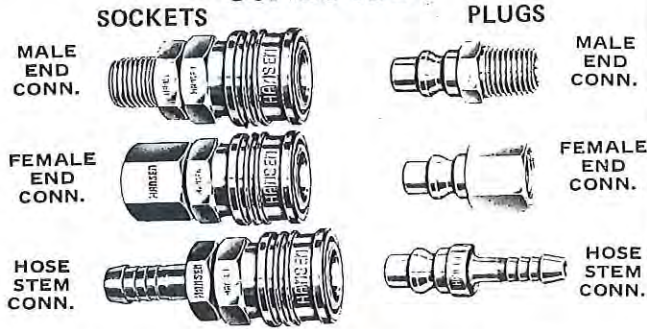
NOTE: FIRST 3 NUMERALS OF CAT. No. INDICATES PAGE No.

EXTENSIONS TO RANGE SHOWN ABOVE ARE AVAILABLE — CATALOGUE SUPPLIED ON REQUEST

586-d

HANSEN 1-WAY SHUT-OFF COUPLINGS — Cont'd.

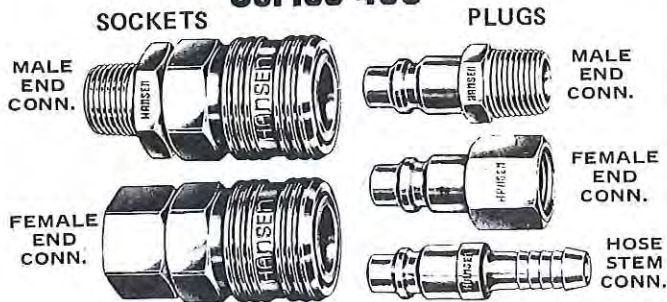
Series 100



END CONNECTION		CAT. NO.	PART NO.	Material
TYPE	SIZE			
SOCKETS				
Male	1/8" MPT	58658	101	Brass
	1/4" MPT	58660	103	
	3/8" MPT	58662	105	
Female	1/8" FPT	58657	100	Brass
	1/4" FPT	58659	102	
	3/8" FPT	58661	104	
Hose Stem	1/4" H.S.	58663	110	Brass
	3/8" H.S.		112	

END CONNECTION		CAT. NO.	PART NO.	Material
TYPE	SIZE			
PLUGS				
Male	1/8" MPT	586184	1G1	Steel
	1/4" MPT	586186	1G3	
	3/8" MPT	586188	1G5	
Female	1/4" FPT	586185	1G2	Steel
	3/8" FPT	586187	1G4	
Hose Stem	1/4" H.S.	586189	1G10	Steel
	3/8" H.S.	586190	1G12	

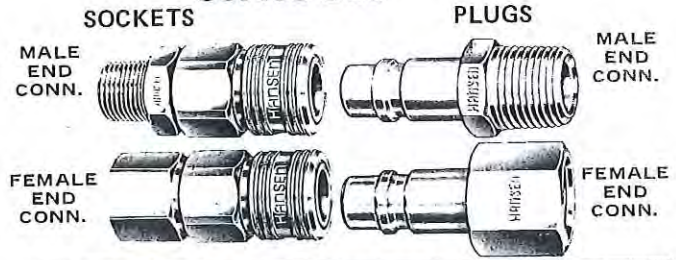
Series 400



END CONNECTIONS		CAT. NO.	PART NO.	Material
TYPE	SIZE			
SOCKETS				
Male	1/4" MPT	58673	410	Brass
Female	1/4" FPT	58672	400	Brass
	3/8" FPT	58674	420	
	1/2" FPT	58676	440	

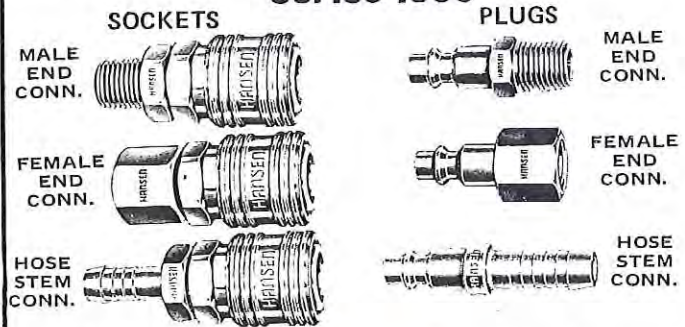
END CONNECTIONS		CAT. NO.	PART NO.	Material
TYPE	SIZE			
PLUGS				
Male	1/4" MPT	586135	40	Steel
	3/8" MPT	586137	42	Brass
	3/8" MPT	586245	B-42	
	1/2" MPT	586139	44	Steel
Female	1/4" FPT	586136	41	Steel
	3/8" FPT	586138	43	
	1/2" FPT	586140	45	
Hose Stem	3/8" H.S.	586246	B406	Brass
	1/2" H.S.	586247	408	Steel

Series 500



END CONNECTIONS		CAT. NO.	PART NO.	Material
TYPE	SIZE			
SOCKETS				
Male	3/8" MPT	58679	510	Brass
	1/2" MPT	58681	530	
Female	3/8" FPT	58678	500	Brass
	1/2" FPT	58680	520	
	3/4" FPT	58682	540	
PLUGS				
Male	1/4" MPT	586141	50	Steel
	3/8" MPT	586142	52	
	1/2" MPT	586144	54	Brass
	1/2" MPT	586216	B-54	
Female	3/8" FPT	586143	53	Steel
	1/2" FPT	586145	55	
	3/4" FPT	586147	57	

Series 1000



END CONNECTIONS		CAT. NO.	PART NO.	Material
TYPE	SIZE			
SOCKETS				
Male	1/4" MPT	58669	1100	Brass
	3/8" MPT	58671	1300	
Female	1/4" FPT	58668	1000	Brass
	3/8" FPT	58670	1200	
Hose Stem	1/4" H.S.	586502	1600	Brass
	3/8" H.S.	586501	1700	

END CONNECTIONS		CAT. NO.	PART NO.	Material
TYPE	SIZE			
PLUGS				
Male	1/4" MPT	586127	10	Steel
	1/4" MPT	586128	B-10	Brass
	1/8" MPT	586130	12	Steel
	3/8" MPT	586131	14	
Female	1/4" FPT	586129	11	Steel
	1/8" FPT		13	
Hose Stem	3/8" FPT	586132	15	Steel
	1/4" H.S.	586133	16	
	3/8" H.S.	586134	17	
Special *	5/16" — 32 F.Th.	586238	11E	

*Supplied with fibre Washer — Fits tyre valve stem.

Any Plug and Socket from the same Series, regardless of end connection, fit together to make a Coupling assembly.

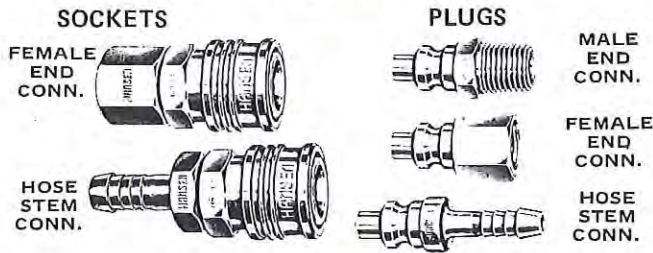
FOR ELASTOMER (SEAL MATERIAL) CHART — REFER Tech. Page 586-a

REFER PAGES 586-c and 586-e FOR ADDITIONAL 1-WAY COUPLINGS

EXTENSIONS TO RANGE SHOWN ABOVE ARE AVAILABLE — CATALOGUE SUPPLIED ON REQUEST

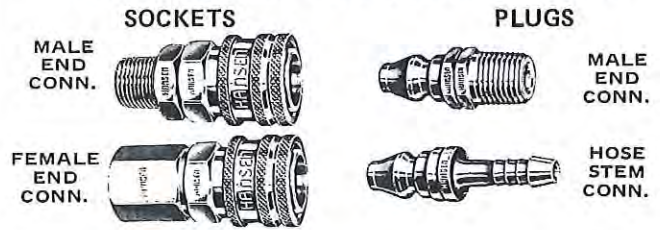
HANSEN 1-WAY SHUT-OFF COUPLINGS — Cont'd.

Series 600 Quick-Connective Couplings for Oxygen Service



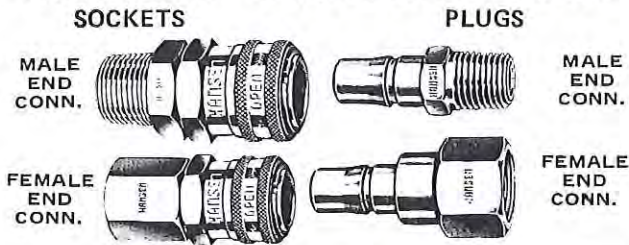
END CONNECTIONS		CAT. NO.	PART NO.	Material
TYPE	SIZE			
S O C K E T S				
Female	1/4" FPT	58665	GR-602	Brass
Hose Stem	3/8" H.S.	586508	GR-608	
P L U G S				
Male	1/4" MPT	586233	03	Brass
Female	1/4" FPT	586191	02	
Hose Stem	3/8" H.S.	586214	09	

Series 700 Quick-Connective Couplings for Acetylene Service



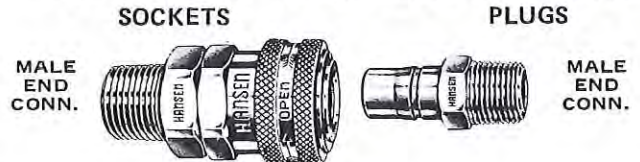
END CONNECTIONS		CAT. NO.	PART NO.	Material
TYPE	SIZE			
S O C K E T S				
Male	1/4" MPT	58667	RD-703	Brass
Female	1/4" FPT	58666	RD-702	
P L U G S				
Male	1/4" MPT		A3P	Brass
Hose Stem	1/4" H.S.	586217	A7	
	3/8" H.S.	586219	A9	

Series 2-RL—Ring-Lock Couplings



END CONNECTIONS		CAT. NO.	PART NO.	Material
TYPE	SIZE			
S O C K E T S				
Male	1/8" MPT	586540	2-R10	Steel
	1/4" MPT	586541	2-R15	
Female	3/8" FPT	586542	2-R21	Steel
P L U G S				
Male	1/8" MPT	586240	2-L10	Steel
	1/4" MPT	586241	2-L15	
	3/8" MPT	586242	2-L20	
Female	3/8" FPT	586243	2-L21	Steel

Series 3-RL—Ring-Lock Couplings



END CONNECTIONS		CAT. NO.	PART NO.	Material
TYPE	SIZE			
S O C K E T S				
Male	1/2" MPT	586543	3-R25	Steel
P L U G S				
Male	1/2" MPT	586244	3-L25	Steel

Gas-Mate Couplings ONE-WAY SHUT-OFF

A.G.A. certified for Natural Gas,
 Manufactured Gas, Mixed Gas, and for
 Liquefied Petroleum and LP Gas-Air Mixtures
AVAILABLE EX USA ON APPLICATION

Pressure Ratings & Flow Capacities

Series	Connected - psi		Disconnected - psi		Cv	Ac
	Service	Failure †	Service	Failure †		
3000	1500	12000	900	8000	1.1	28
4000	1500	18000	700	4000	1.8	45
5000	1500	14000	500	2000	3.0	75
6000	1500	9000	400	9000	5.0	125
2-RL	300	15000	300	4000	1.9	48
3-RL	300	15000	300	2000	3.2	80
100	1000	10000	300	3000	0.8	20
400	700	18000	700	4000	1.8	45
500	500	14000	500	2000	2.9	72
600	500	10000	500	6000	0.8	20
700	500	10000	500	6000	0.8	20
1000	1500	12000	900	8000	1.1	28

SERVICE: The SERVICE pressure rating provides optimum service life in most applications. Subjecting a Coupling to higher pressures may result in a reduction in service life.

† **FAILURE:** FAILURE pressure is based on a one time pressure application to a new unit and is the pressure at which the Coupling became inoperative or started to leak. Suitable safety factors* depending on application conditions, should be used if SERVICE pressure is exceeded.

Cv FACTOR: The quantity of 60°F water, in U.S. GPM, which will flow through a Coupling with a pressure drop of 1 psi.

To find pressure drop:

$$PD = \left[\frac{\text{U.S. GPM}}{Cv} \right]^2$$

Ac NUMBER: The amount of air, in SCFM, which will flow through a Coupling with an inlet pressure of 100 psig and a pressure drop of 5 psi.

*** SAFETY FACTORS**

For Liquids : Maximum safe pressure suitable for many liquid applications may be calculated by dividing the Failure Pressure by 2.5.

For Gases : Maximum safe pressure suitable for many gas applications may be calculated by dividing the Failure Pressure by 4.0.

* NOTE : Cv FACTOR IS IN US galls/min.

Any Plug and Socket from the same Series, regardless of end connection, fit together to make a Coupling assembly.

FOR ELASTOMER (SEAL MATERIAL) CHART — REFER Tech. Page 586-a

REFER PAGES 586-c and 586-e FOR ADDITIONAL 1-WAY COUPLINGS

EXTENSIONS TO RANGE SHOWN ABOVE ARE AVAILABLE — CATALOGUE SUPPLIED ON REQUEST

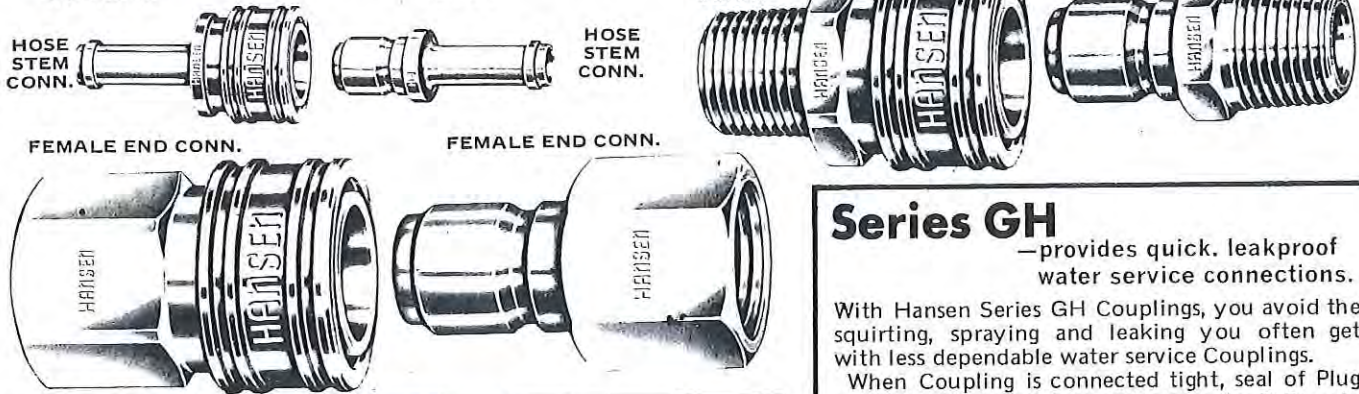


586-f

HANSEN STRAIGHT THROUGH COUPLINGS

Hansen Straight Through Couplings are recommended for lines where quickly detachable Coupling without automatic shut-off valves are needed. Smooth unrestricted bore permits full flow of fluids. The Plug automatically locks in place when connected. An O-ring seal eliminates any possibility of fluid leak when connected.

Series ST —without Shut-off Valves



END CONNECTION		CAT. NO.	PART NO.	Material
TYPE	SIZE			
S O C K E T S				
Male	1/4" MPT	58642	2-S15	Brass
	3/8" MPT	58645	3-S20	
	1/2" MPT	58648	4-S25	
	3/4" MPT	58651	6-S30	
	1" MPT	58654	8-S35	
Female	1/4" FPT	58643	2-S16	Brass
	3/8" FPT	58646	3-S21	
	1/2" FPT	58649	4-S26	
	3/4" FPT	58652	6-S31	
	1" FPT	58655	8-S36	
Hose Stem	1/4" H.S.	58644	2-S17	Brass
	3/8" H.S.	58647	3-S22	
	1/2" H.S.	58650	4-S27	
	3/4" H.S.	58653	6-S32	

END CONNECTION		CAT. NO.	PART NO.	Material	
TYPE	SIZE				
P L U G S					
Male	1/4" MPT	586153	2-T15	Steel	
	3/8" MPT	586159	3-T20		
	1/2" MPT	586165	4-T25		
	3/4" MPT	586171	6-T30		
	1" MPT	586177	8-T35		
	Female	1/4" MPT	586156	B2-T15	Brass
		3/8" MPT	586162	B3-T20	
		1/2" MPT	586168	B4-T25	
		3/4" MPT	586174	B6-T30	
		1" MPT	586178	B8-T35	
Hose Stem		1/4" FPT	586154	2-T16	Steel
		3/8" FPT	586160	3-T21	
		1/2" FPT	586166	4-T26	
		3/4" FPT	586172	6-T31	
		1" FPT	586178	8-T36	
	Hose Stem	1/4" FPT	586157	B2-T16	Brass
		3/8" FPT	586163	B3-T21	
		1/2" FPT	586169	B4-T26	
		3/4" FPT	586175	B6-T31	
		1" FPT	586178	B8-T36	
Hose Stem		1/4" H.S.	586155	2-T17	Steel
		3/8" H.S.	586164	B3-T22	
		1/2" H.S.	586170	B4-T27	
		3/4" H.S.	586173	6-T32	

Series GH

—provides quick, leakproof water service connections.

With Hansen Series GH Couplings, you avoid the squirting, spraying and leaking you often get with less dependable water service Couplings.

When Coupling is connected tight, seal of Plug to Socket is insured by a high grade O-Ring in Socket.

Both Socket and Plug are of Brass construction with stainless steel internal parts.

To connect the Hansen water service Couplings, you merely push back the Socket Sleeve and push in Plug. To disconnect, push back Socket Sleeve and pull out Plug.



END CONNECTION	CAT. NO.	PART NO.
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S O C K E T

1.1/16" 11-1/2 Female Water Hose Thread		GHS-12
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P L U G

1.1/16" 11-1/2 Male Water Hose Thread		GHP-11
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S O C K E T

3/4" — 14 FPT	586512	8-GHS-75FS
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P L U G

3/4" — 14 MPT	586213	8-GHP-75MS
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pressure ratings & flow capacity

SERVICE: The SERVICE pressure rating provides optimum service life in most applications. Subjecting a Coupling to higher pressures may result in a reduction in service life.

† FAILURE: FAILURE pressure is based on a one time pressure application to a new unit and is the pressure at which the Coupling became inoperative or started to leak. Suitable safety factors* depending on application conditions, should be used if SERVICE pressure is exceeded.

Cv FACTOR: The quantity of 60°F water, in U.S. GPM, which will flow through a Coupling with a pressure drop of 1 psi.

To find pressure drop:

$$PD = \left[\frac{\text{U.S. GPM}}{Cv} \right]^2$$

NOTE: Cv is in US galls/min.

Ac NUMBER: The amount of air, in SCFM, which will flow through a Coupling with an inlet pressure of 100 psig and a pressure drop of 5 psi.

Any Plug and Socket from the same Series, regardless of end connection, fit together to make a Coupling assembly.

Series	With Steel Plug-psi		With Brass Plug-psi		Cv	Ac
	Service	Failure †	Service	Failure †		
2-ST	1800	22000	1200	21000	2.5	62
3-ST	800	14000	800	11000	6.6	165
4-ST	500	11000	500	9000	9.7	242
6-ST	500	7000	500	7000	29.6	740
8-ST	300	8000	300	5000	62.7	1570
GH	—	—	200	—	10.2	255

* SAFETY FACTORS

For Liquids: Maximum safe pressure suitable for many liquid applications may be calculated by dividing the Failure Pressure by 2.5.

For Gases: Maximum safe pressure suitable for many gas applications may be calculated by dividing the Failure Pressure by 4.0.

FOR ELASTOMER (SEAL MATERIAL) CHART — REFER Tech. Page 586-a

EXTENSIONS TO RANGE SHOWN ABOVE ARE AVAILABLE — CATALOGUE SUPPLIED ON REQUEST

VIBRA-CONTROL ANTI-VIBRATION EQUIPMENT

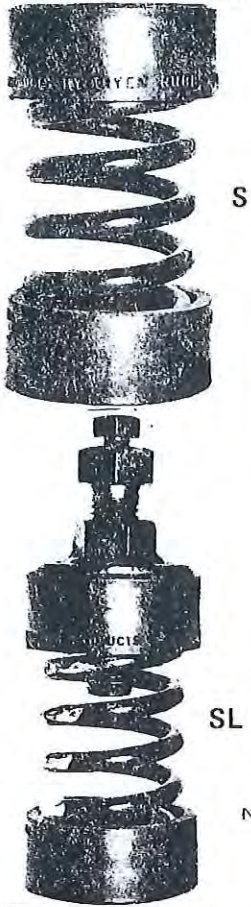
TYPE S & SL 1" Deflection SPRING MOUNTS

TYPE S — COMMON APPLICATIONS :

Fan Coil Units, both suspended and floor mounted, Fan assemblies, Hanger assemblies.

TYPE SL — COMMON APPLICATIONS :

Fan assemblies, Pumps, Refrigeration and Air Compressors, Reciprocating Chiller Sets, Stationary Engines.

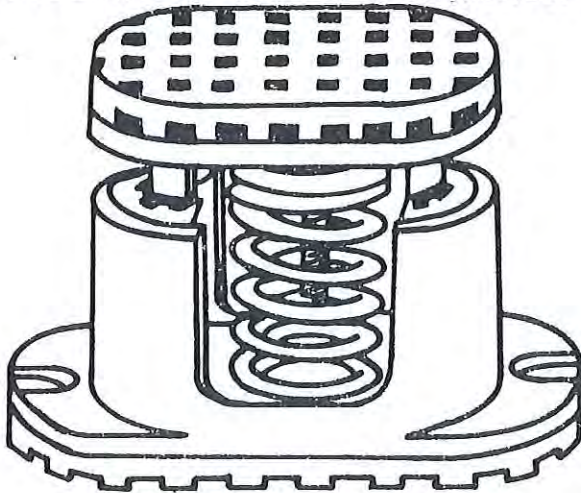


MODEL S		MODEL SL		LOAD		COLOUR CODE
WITHOUT LEVELLING ASSEMBLY		WITH LEVELLING ASSEMBLY		LBS.	kg.	
CAT. NO.	MODEL	CAT. NO.	MODEL			
5903	S-A- 10	59040	SL-A - 10	10	4.5	Brown and White
5904	- 20	59041	- 20	20	9.1	Silver and Yellow
5905	- 30	59042	- 30	30	13.6	White and Orange
5906	- 40	59043	- 40	40	18.2	Gray and Red
5907	- 60	59044	- 60	60	27.3	Black
5908	- 80	59045	- 80	80	36.4	Purple and White
5909	- 100	59046	- 100	100	45.5	Blue
59010	- 125	59047	- 125	125	56.8	Green
59011	- 150	59048	- 150	150	68.2	Yellow
59012	- 200	59049	- 200	200	90.9	Orange
59013	- 300	59050	- 300	300	136.4	Red
59014	S-B- 200	59051	SL-B - 200	200	90.9	Purple and White
59015	- 300	59052	- 300	300	136.4	Blue
59016	- 400	59053	- 400	400	181.8	Green
59017	- 500	59054	- 500	500	227.3	Yellow
59018	- 600	59055	- 600	600	272.7	Orange
59019	- 800	59056	- 800	800	363.6	Red
59026	S-C- 600	59057	SL-C - 600	600	272.7	Blue
59027	- 800	59058	- 800	800	363.6	Green
59028	-1000	59059	-1000	1000	454.5	Yellow
59029	-1250	59060	-1250	1250	568.2	Orange
59030	-1500	59061	-1500	1500	681.8	Red
59031	-1750	59062	-1750	1750	795.5	Red. Tan Inner Spring.
59032	-2000	59063	-2000	2000	909.0	Red. Silver Inner Spring.

- NOTES : 1. Type SL Spring Mounts are also available as "SL-2" to 4000 lbs. and "SL-4" to 8000 lbs. Loading.
 2. 2", 3" and 4" Deflection Spring Mounts with or without levelling assembly, available on application.
 3. Loading and Colour Code applies to both "S" and "SL" Types.

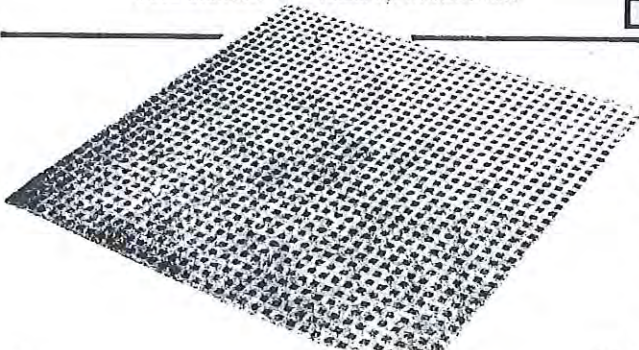
SNUB MOUNTS — 1" Deflection

COMMON APPLICATIONS : This Type as the name indicates is a snubbed mount and is especially suitable for absorbing shock loads under such machines as heavy presses. It is also used for reciprocating and centrifugal chiller sets.



Adjustment is by means of internal screw.
 Also available with loads up to 8000 lbs.

CAT. NO.	MODEL	COLOUR CODE	LOAD	
			LBS.	kg.
590133	SNUB-A - 80	Purple and White	80	36.4
590134	- 100	Blue	100	45.5
590135	- 125	Green	125	56.8
590136	- 150	Yellow	150	68.2
590137	- 200	Orange	200	90.9
590138	- 300	Red	300	136.4
590139	SNUB-B - 200	Purple and White	200	90.9
590140	- 300	Blue	300	136.4
590141	- 400	Green	400	181.8
590142	- 500	Yellow	500	227.3
590143	- 600	Orange	600	272.7
590144	- 800	Red	800	363.6
590145	SNUB-C - 600	Blue	600	272.7
590146	- 800	Green	800	363.6
590147	-1000	Yellow	1000	454.5
590148	-1250	Orange	1250	568.2
590149	-1500	Red	1500	681.8
590150	-1750	Red. Tan Inner Spring	1750	795.5
	-2000	Red. Silver Inner Spring	2000	909.0



TYPE NP NEOPRENE MOUNTING PADS

Type NP is a general purpose pad and is freely used in conjunction with spring housings both as a high frequency isolator and as a friction pad which obviates the need for holding down bolts. It may be laminated with other alternate layers of NP and metal to provide greater isolation. Applications : It is used for the isolation of high frequency vibration. It is good for non-critical isolation of pumps, fans, fan coil units etc. It is oil resistant and weatherproof.

CAT. NO.	MODEL	SIZE	LOAD PSI (kPa)
590212	NP	18" x 18"	30 to 80 [Optimum 60] (207 to 552 [Optimum 414])

Smaller sizes available on request.

VIBRA - CONTROL EQUIPMENT — CONTINUED NEXT PAGE.