

Engine Safety Control I-530 Series

GENERAL DESCRIPTION

The I-530 Series is a dependable safety shutdown device which may be used to monitor lube oil pressure, jacket water temperature and overspeed.

This safety device will provide a signal to sound an alarm, block, or block and vent a fuel line as a result of high temperature, low pressure, or, with available option, overspeed condition. Pressure and temperature sensors are an integral part of the I-530. Overspeed shutdown is accomplished by a motion input from an external device.

All working mechanism is enclosed in a cast brass housing and requires no lubrication. The unit is easily field adjustable, and the cover screws are drilled to provide for a wire and lead seal on the cover.

SPECIFICATIONS

Temperature Ranges:

CAUTION: The temperature sensing bulb should not be subjected to temperatures greater than 50° F. (10° C.) above rating.

° Fahrenheit	° Celsius
135 - 165	57.2 - 71.1
160 - 190	71.1 - 87.8
180 - 210	82.2 - 98.8
190 - 220	87.8 - 104.4
205 - 235	96.1 - 112.8
230 - 260	110.0 - 126.7
295 - 340	146.1 - 171.1

Pressure Ranges:

CAUTION: Do not exceed maximum pressure ratings.

Working Pressure		Max. Press. Rating	
psig	bar	psig	bar
5-25	.35-1.7	75	5.2
*10-40	.69-2.8	75	5.2

*Special order at additional cost.

NOTE: These valves are unbalanced. Pressure against which the valve will operate depends upon port size.

Model No.	Type	Port Size	Maximum Pressure
95604	2 way	3/16" (4.762 mm)	150 psig (10.4 bar)
95714	3 way	3/16" (4.762 mm)	150 psig (10.4 bar)
95719	3 way	1/4" (6.350 mm)	30 psig (2 bar)
95690	3 way	3/8" (9.525 mm)	30 psig (2 bar)



Switch Ratings:

External explosion-proof switches (No. 93526) used on I-530-E and I-530-F are rated at 5 amps, 120 VAC* and .5 amps, 125 VDC.

Internal non-explosion-proof switches are rated as follows:

- AC Switch (92174) - 15 amps, 120 VAC.*
- DC Switch (95070) - 10 amps, 125 VDC.

*Switches may be used at higher AC voltages in benign environments. Contact Manager, Engine Controls for specifics.

Accessories:

- Pressure connecting tubing [5 ft. (1.52 m) length].
- Wire and lead seal on cover.
- Socket (copper or stainless steel).

Models Available:

An exact model number may be determined from the following tables:

	Guided Stem	Explosion-Proof Sw.	2 Explosion-Proof Sw.	2-Way Valve 3/16" Ports	3-Way Valve 3/16" Ports	3-Way Valve 1/4" Ports	3-Way Valve 3/8" Ports	Pressure Element	Thermostatic Element
I 530-D*	X							X	X
I 530-E	X	X						X	X
I 530-F	X		X					X	X
I 530-H	X			X				X	X
I 530-J	X				X			X	X
I 530-K	X					X		X	X
I 530-L	X						X	X	X

* Actuator Rod stroke = .24" (.9 mm)
 Actuator Rod force = 64 lbs. (29 Kg.)
 Lever Bar stroke = 1.3" (50 mm)
 Force required to trip overspeed lever w/30 psi (2 bar) in pressure pressure element = 1 lb. 5 oz. (.6 Kg)

The suffix of the basic model number is determined by the combination of optional features desired as indicated by the following table:

	Overspeed Trip	Reset Lock Lever	Non-Explosion Proof AC Switch Part No. 92174	Non-Explosion Proof DC Switch Part No. 95970
1				
2	X			
*3		X		
*4	X	X		
5*			X	
6*				X
7*	X		X	
8*	X			X
9		X	X	
10		X		X
11	X	X	X	
12	X	X		X

NOTE: *I-530-E and I-530-F may not be equipped with reset lock lever.
 •I-530-E, F not supplied with non-explosion-proof switch.

ORDERING INFORMATION

Specify:

1. Model number from tables above.
2. Temperature range, setpoint and tube lengths.
3. Pressure range, setpoint.
4. Accessories.
5. Shipping and invoicing instructions.

Sample:

Requirements call for a safety shutdown device to close a block and vent fuel valve with 1/4" (6.350 mm) ports to be closed when temperature rises above 188° F.

(86.7° C) or the oil pressured drops below 13 psi (.896 bar); 6 feet (1.85 m) of temperature capillary is required. Instrument is to be equipped with reset lock lever and signal and electric alarm horn upon shutdown.

Order:

Example: I-530-K9

Temperature Range 180° F. to 210° F. (82.2° C to 98.9° C), set at 188° F. (86.7° C) with 6 ft. (1.85 m) capillary.

Pressure Range 5 to 25 psig (.345 to 1.724 bar), set at 13 psi (.896 bar).

INSTALLATION

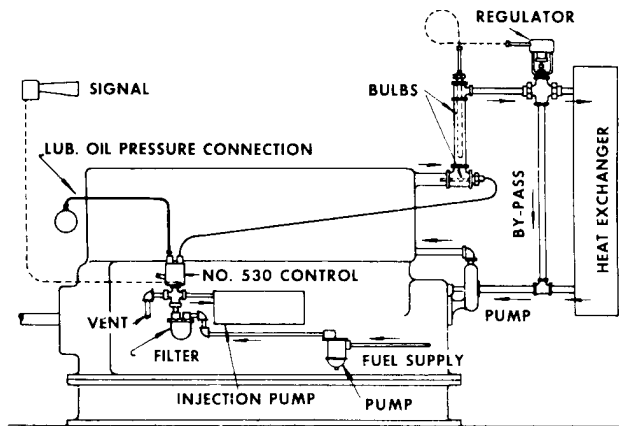


Figure 1

WARNING Turn off all electrical circuits before removing cover.

Prior to installation, the unit should be inspected to determine any damage incurring during shipment.

If the unit is to be installed in the fuel line, (I-530-H, J, K or L) it should be installed between the filter and the injection pump as shown in Figure 1. When the 3-way valves are used, the vent ports should be piped to reclaim the vented fuel.

When the explosion-proof switches are employed, the unit may be mounted by means of the mounting lugs provided on the body. All wiring must be according to the electrical code which applies to the hazardous location in which the unit is to be mounted.

The I-530-D is normally used to close an air damper on engines which are not readily shut down by closing a fuel valve. A suitable bracket must be provided which will permit the safety control to be mounted such that this may be accomplished.

When the thermo-sensitive bulb is installed, it must be mounted as shown in Figure 2.

To install bulb, loosen Union Nut X and Bushing Y and tighten Bushing Y into proper size tapped opening. Check "UP" imprinted on Position Disc for proper orientation (see Figure 2) and tighten Union Nut X. If Bushing Y is removed, care should be taken that the seal located between Union Nut X and Bushing Y is not lost and is reassembled in the proper position. If socket is used, Bushing Y is not needed.

Care must be taken to avoid lifting the instrument by the capillary tubing or bending tubing on less than a 3" (76.20 mm) radius. If capillary tubing is kinked, crushed or severed, the instrument is inoperative.

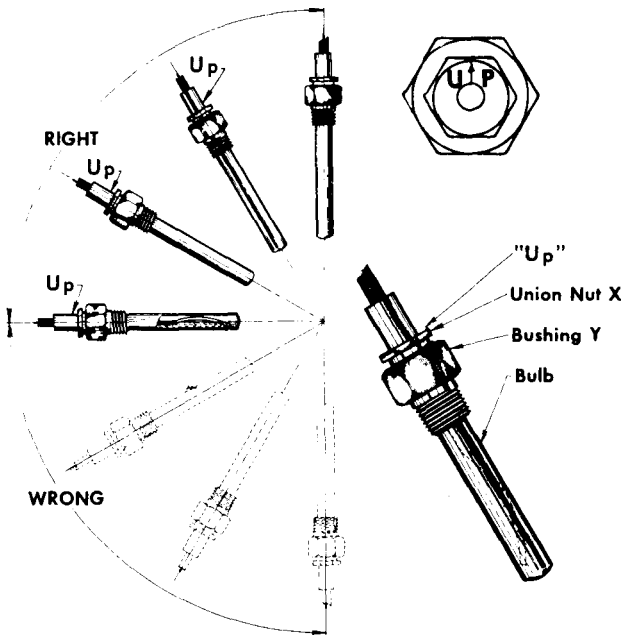


Figure 2

CAUTION: Do not place capillary on or near steam, hot oil, exhaust manifold or surfaces which have a temperature that would affect the operation of the instrument. Avoid unsupported lengths of capillary. Do not use the capillary as a support for other objects. Excessive lengths of capillary should be coiled and well supported. Avoid bending or twisting capillary at the connection between the bellows cup or the bulb assembly.

The engine lube oil pressure may be monitored by connecting the pressure-sensitive element to the oil pressure line by means of copper tubing [1/4" (6.35mm)].

OPERATION - See Figure 3

To start the engine, lift Lever "A" and hold up until the engine lube oil pressure has had sufficient time to build up to a safe value. The reset lock lever assembly B is available to hold this lever up until lube oil pressure reaches 3 to 7 psig (.207 to .483 bar) greater than the trip point. The unit must be observed very closely during startup because the reset lock lever will not disengage if the engine lube oil pressure fails to build up.

If at any time the engine is running, jacket water temperature should exceed, or lube oil pressure should fall below a pre-determined setpoint, the unit will trip, causing Lever "A" to be released. Lever "A" will return to its original position to close the fuel valve, actuate an air damper, or actuate a switch which will initiate a safety shutdown.

Engine overspeed may also be monitored provided a governor is available which will exert a downward force when an overspeed condition exists. This force should be applied to Lever "C."

WARNING

If a cable is used for remote resetting, it must be installed to prohibit defeating the shutdown capabilities.

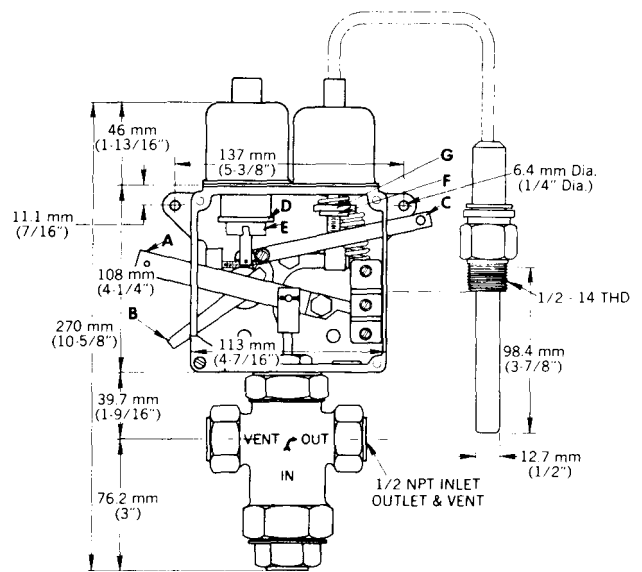


Figure 3

ADJUSTMENTS - See Figure 3

WARNING

Turn off all electrical circuits before removing cover.

To change the pressure setting, the following steps should be followed:

1. Disconnect the oil line from the pressure element and cap it to prevent oil from draining out.
2. Loosen Nut "D."
3. Back the Adjusting Nut "E" out until all spring force is lost.
4. Supply the pressure element with the trip point pressure.
5. Lift Lever "A."
6. Turn Nut "E" slowly until the unit trips.
7. Tighten Nut "D" and check the setting by resetting the unit and gradually decreasing the supply pressure until the unit trips.

To change the temperature setting, the following steps should be followed:

1. Supply sufficient pressure to the pressure assembly to prevent it from tripping.
2. Loosen Nut "F."
3. Back Adjusting Nut "G" off until no spring force is present.
4. Remove the temperature sensing bulb from the engine and subject it to a temperature which corresponds to the new setpoint.
5. Tighten the adjusting nut until the unit trips and tighten the locknut.
6. Check the temperature setting by resetting the unit and reheating the bulb.

TROUBLESHOOTING

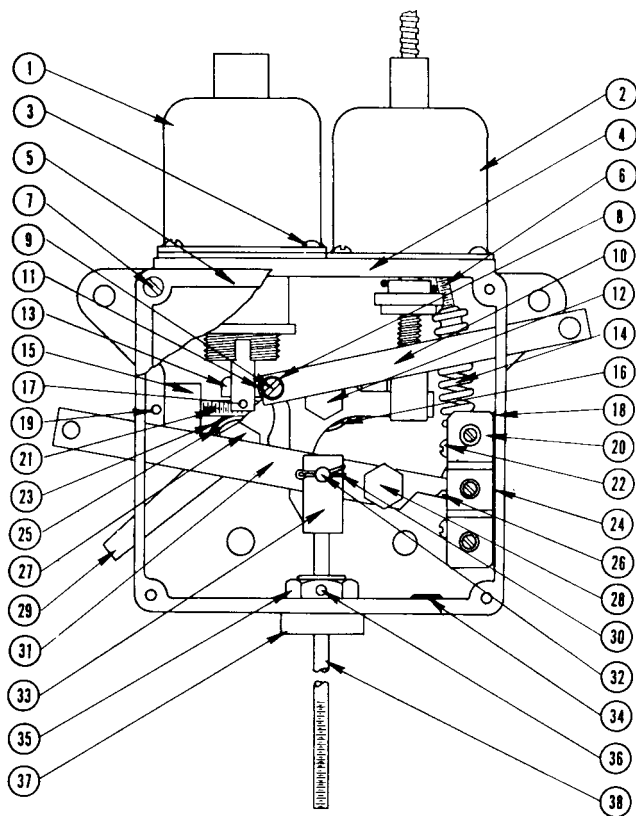
A damaged pressure assembly will display any one or a combination of the following symptoms:

1. Lube oil will be present in the housing.
2. Lever "A," Figure 3, will not stay in the UP position.

A damaged thermostatic unit will display any one or a combination of the following symptoms:

1. Lever "A," Figure 3, will not stay in the UP position.
2. No stem movement will be observed when the thermosensitive bulb is heated.

For repair parts, refer to the Parts List on the following pages.



PARTS LIST I-530-D

NO.	DESCRIPTION	REQ'D	PART NO.
1	Pressure Assembly	1	See tabulation
2	Thermostatic Assembly	1	95518†
3	Machine Screw	8	33715-A1109
4	Body	1	22837
5	Name Plate	1	17372
6	Machine Screw	1	33713-L1900
7	Machine Screw	4	33715-J0704
8	Washer	1	15806-C
9	Screw	1	33711-A2309
10	Trip Bar	1	95726
11	Spacer	1	15804
12	Pivot Screw	1	8389
13	Latch	1	15803
14	Spring and Bushing	1	92255
15	Bushing	1	22841
16	Latch Spring	1	8371-C
17	Pin-Included in Detail 1	1	8374
18	Actuator Leaf	1	16587
19	Set Screw	1	19080
*20	Switch (AC)	1	92174
21	Screw	1	33717-J2600
22	Machine Screw	2	33711-E1900
23	Worm Gear	1	22838
24	Insulator Plate	1	18219
25	Latch Spring	1	22840
26	Spring Anchor	1	16586
27	Pivot Screw	1	8389
28	Pivot Screw	1	8389
29	Reset Lock Lever	1	18242
30	Cotter Pin	1	2673
31	Lever Bar	1	9037-T
32	Fulcrum Pin	1	8373-T
33	Stem Head	1	16291
34	Grommet	1	11518
35	Jam Nut	1	429
36	Set Screw	1	19080
37	Stem Guide	1	16292
38	Stem	1	16293

*DC Switch 95970 Weight: 6 3/4 lbs. (3.1 Kg)

†Specify temperature range and capillary tube length.

PRESSURE ASSEMBLY TABULATION

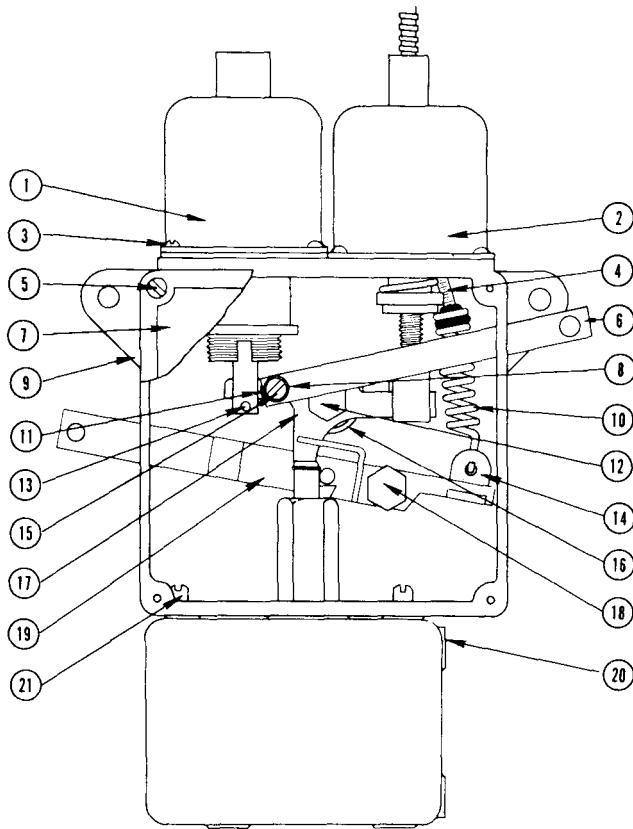
5-25 psi (.35 - 1.7 bar)	10-40 psi (.69 - 2.8 bar)
96078	96899

*Actuator Rod stroke = .24" (.9 mm)

Actuator Rod force = 64 lbs. (29 Kg.)

Lever Bar stroke = 1.3" (50 mm)

Force required to trip overspeed lever w/30 psi (2 bar) in pressure pressure element = 1 lb. 5 oz. (.6 Kg)



PARTS LIST I-530-E

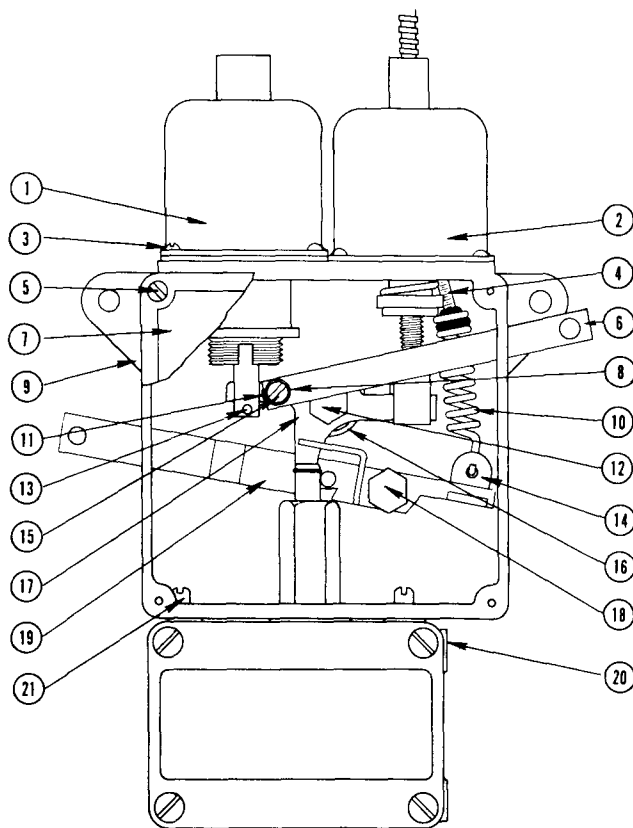
DET NO.	DESCRIPTION	REQ'D NO	PART NO.
1	Pressure Assembly	1	See Tab
2	Thermostatic Assembly	1	95518*
3	Machine Screw	8	33715-A1109
4	Screw	1	33713-L1900
5	Machine Screw	4	33715 J0704
6	Trip Bar	1	95726
7	Name Plate	1	17372
8	Washer	1	15806-C
9	Body	1	19295
10	Spring Assembly	1	92255
11	Spacer	1	15804
12	Pivot Screw	1	8389
13	Pin	1	8374
14	Spring Anchor	1	16586
15	Machine Screw	1	33711 A2309
16	Spring	1	8371-C
17	Latch	1	15803
18	Pivot Screw	1	8389
19	Lever Bar Assembly	1	94370-C
20	Switch	1	93526
21	Screw	4	33716-G1109

Weight: 9 1/4 lbs (4.2 Kg)

*Specify temperature range and capillary tube length

PRESSURE ASSEMBLY TABULATION

5-25 psi (35-1.7 bar)	10-40 psi (.69-2.8 bar)
96078	96899



PARTS LIST I-530-F

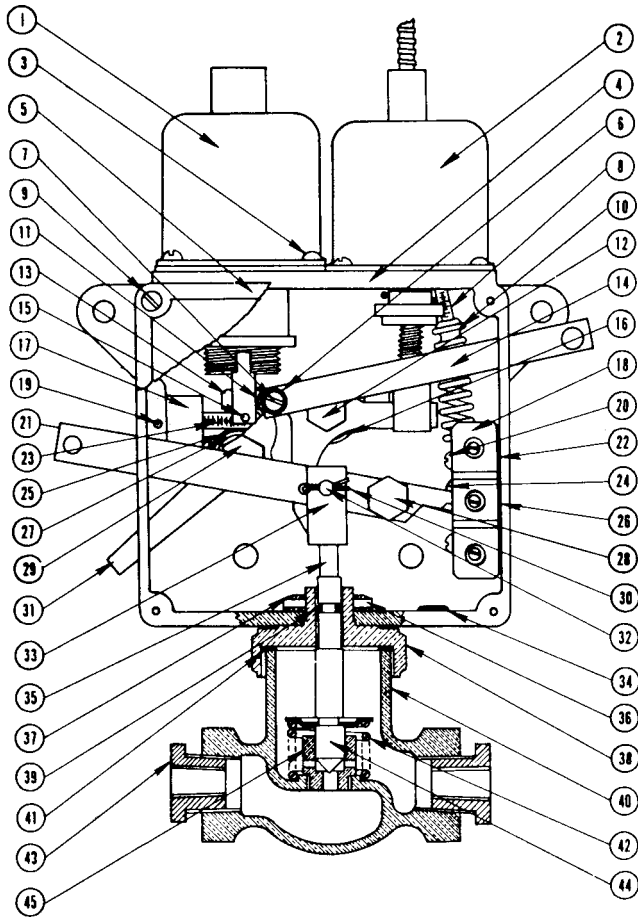
DET NO.	DESCRIPTION	REQ'D NO	PART NO.
1	Pressure Assembly	1	See Tab.
2	Thermostatic Assembly	1	95518*
3	Machine Screw	8	33715-A1109
4	Screw	1	33713-L1900
5	Machine Screw	4	33715-J0704
6	Trip Bar	1	95726
7	Name Plate	1	17372
8	Washer	1	15806-C
9	Body	1	19295
10	Spring Assembly	1	92255
11	Spacer	1	15804
2	Pivot Screw	1	8389
13	Pin	1	8374
14	Spring Anchor	1	16586
15	Machine Screw	1	33711-A2309
16	Spring	1	8371-C
17	Latch	1	15803
18	Pivot Screw	1	8389
19	Lever Bar Assembly	1	94370-C
20	Switch	2	93526
21	Screw	4	33716-G1109

Weight 9 1/4 lbs (4 2 Kg)

*Specify temperature range and capillary tube length.

PRESSURE ASSEMBLY TABULATION

5-25 psi (35-1.7 bar)	10-40 psi (.69-2.8 bar)
96078	96899



PARTS LIST I-530-H

N0.	DESCRIPTION	REQ'D	PART NO.
1	Pressure Assembly	1	See Tab.
2	Thermostatic Assembly	1	95518†
3	Machine Screw	8	33715-A1109
4	Body	1	22837
5	Name Plate	1	17372
6	Washer	1	15806-C
7	Screw	1	33711-A2309
8	Screw	1	33713-L1900
9	Machine Screw	4	33715-J0704
10	Spring Assembly	1	92255
11	Spacer	1	15804
12	Pivot Screw	1	8389
13	Latch	1	15803
14	Trip Bar	1	95726
15	Pin	1	8374
16	Latch Spring	1	8371-C
17	Bushing	1	22841
*18	Switch AC	1	92174
19	Set Screw	1	19080
20	Machine Screw	2	33711-E1900
21	Lever Bar	1	9037-T
22	Insulator Plate	1	18219
23	Screw	1	33717-J2600
24	Spring Anchor	1	16586
25	Worm Gear	1	22838
26	Actuator Leaf	1	16587
27	Spring	1	22840
28	Pivot Screw	1	8389
29	Pivot Screw	1	8389
30	Cotter Pin	1	2673
31	Reset Lock Lever	1	18242
32	Fulcrum Pin	1	8373-T
33	Stem Head	1	9038
34	Grommet	1	11518
35	Stem	1	18081
36	Set Screw	1	19080
37	Jam Nut	1	429
38	Cap Nut	1	18083
39	O-Ring	1	36240-N0007
40	Valve Body	1	15281
	Complete Valve Assembly	1	95604
41	Gasket	1	18084
42	Spring	1	15285
43	Bushing	2	17182
44	Poppet Assembly	1	95692
45	Poppet Guide	1	15284

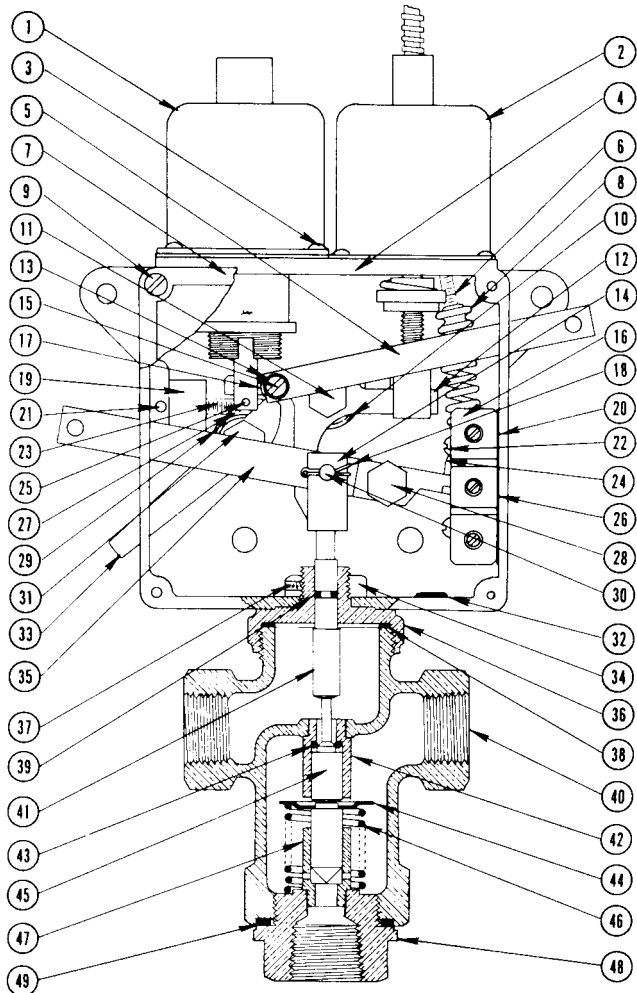
*DC Switch 95970

Weight: 8 1/4 lbs. (4 Kg)

†Specify temperature range and capillary tube length.

PRESSURE ASSEMBLY TABULATION

5-25 psi (35-1.7 bar)	10-40 psi (.69-2.8 bar)
96078	96899



PARTS LIST I-530-J, K, L					
DET. NO.	DESCRIPTION	NO. RE 'D	PART NO. J	PART NO. K	PART NO. L
1	Pressure Assembly	1	96078	96078	See Tab.
2	Thermostatic Assembly	1	95518†	95518†	95518†
3	Machine Screw	8	33715-A1109	33715-A1109	33715-A1109
4	Body	1	22837	22837	22837
5	Trip Bar	1	95726	95726	95726
6	Screw	1	33713-L1900	33713-L1900	33713-L1900
7	Name Plate	1	17372	17372	17372
8	Spring Assembly	1	92255	92255	92255
9	Machine Screw	4	33715-J0704	33715-J0704	33715-J0704
10	Latch Spring	1	8371-C	8371-C	8371-C
11	Pivot Screw	1	8389	8389	8389
12	Latch	1	15803	15803	15803
13	Washer	1	15806-C	15806-C	15806-C
14	Stem Head	1	9038	9038	9038
15	Machine Screw	1	33711-A2309	33711-A2309	33711-A2309
*16	Switch AC	1	92174	92174	92174
17	Spacer	1	15804	15804	15804
18	Cotter Pin	1	2673	2673	2673
19	Bushing	1	22841	22841	22841
20	Insulator Plate	1	18219	18219	18219
21	Set Screw	1	19080	19080	19080
22	Machine Screw	2	33711-E1900	33711-E1900	33711-E1900
23	Screw	1	33717-J2600	33717-J2600	33717-J2600
24	Spring Anchor	1	16586	16586	16586
25	Pin	1	8374	8374	8374
26	Actuator Leaf	1	16587	16587	16587
27	Worm Gear	1	22838	22838	22838
28	Pivot Screw	1	8389	8389	8389
29	Spring	1	22840	22840	22840
30	Fulcrum Pin	1	8373-T	8373-T	8373-T
31	Pivot Screw	1	8389	8389	8389
32	Grommet	1	11518	11518	11518
33	Reset Lock Lever	1	18242	18242	18242
34	Jam Nut	1	429	429	429
35	Lever Bar	1	9037-T	9037-T	9037-T
36	Ca Nut	1	18083	18083	18083
37	Set Screw	1	19080	19080	19080
38	Gasket	1	18084	18084	18084
39	O-Ring	1	36240-N0007	36240-N0007	36240-N0007
40	Valve Body	1	9056	9056	9056
	Complete Valve Assembly	1	95714	95719	95690
41	Stem	1	18231	18231	
42	O Ring & Insert Assembly	1	96959	96959	96959
43	O-Ring	1	**	**	**
44	Lower Poppet Assembly	1	95720	95720	95713
45	Upper Poppet	1	18217	18217	18233
46	Spring	1	9043	9043	9043
47	Poet Guide	1	9095	9041	9047
48	Plug	1	9045	9045	9045
49	Gasket	1	9053	9053	9053

* DC Switch 95970

** Supplied only as part of O-Ring and Insert Assembly
Weight 9 1/4 lbs. (4.2 Kg)

† Specify temperature range and capillary tube length.

PRESSURE ASSEMBLY TABULATION

5-25 psi (35-1.7 bar)	10-40 psi (.69-2.8 bar)
96078	96899

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