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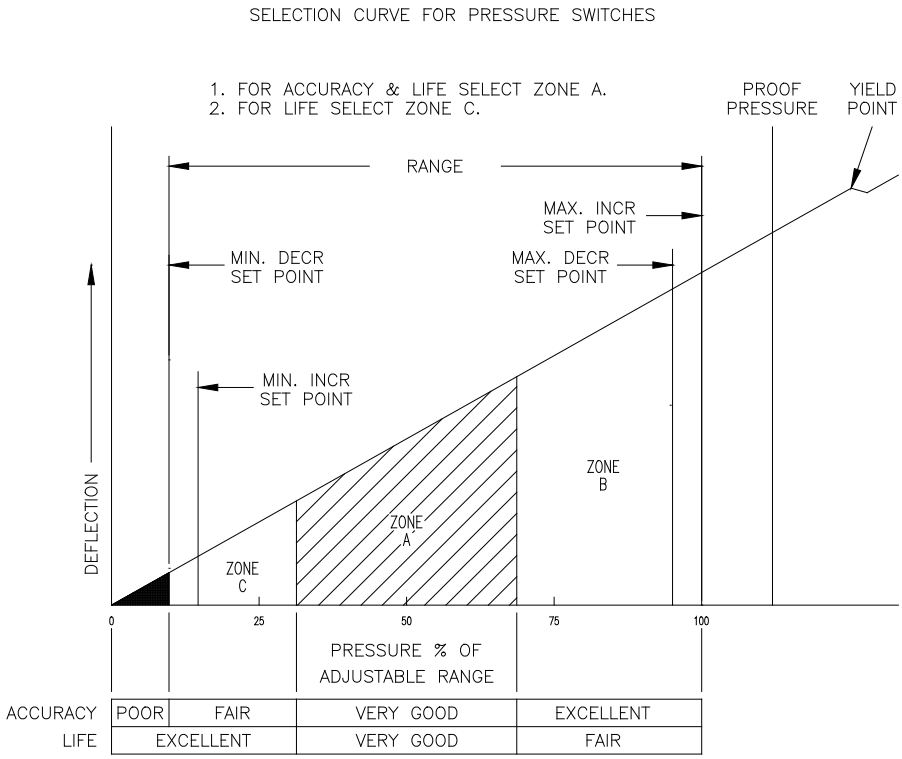
INSTALLATION AND MAINTENANCE INSTRUCTIONS

SERIES 4000 PRESSURE SWITCHES

ONLY THOSE INSTRUCTIONS APPLICABLE TO THE SWITCH BEING ATTENDED TO SHOULD BE EXTRACTED AND ACTED UPON – NOT ALL THE INSTRUCTIONS ARE APPLICABLE TO EVERY SWITCH

A483

SELECTION CURVE FOR PRESSURE SWITCHES



ACCURACY ZONE	ACCURACY CLASS PER CENT OF OPERATING RANGE
Zone B	1%
Zone A	2%
Zone C	5%

LIFE

Zone C	Excellent
Zone A	Very Good
Zone B	Fair

On Differential Pressure Switches, these accuracies are for constant static pressures only.

7. Remove housing assembly from vice and after fitting microswitch to switch plate, secure the unit inside the housing case by means of two screws through the slotted holes on each side of the plate (see photo H/4).

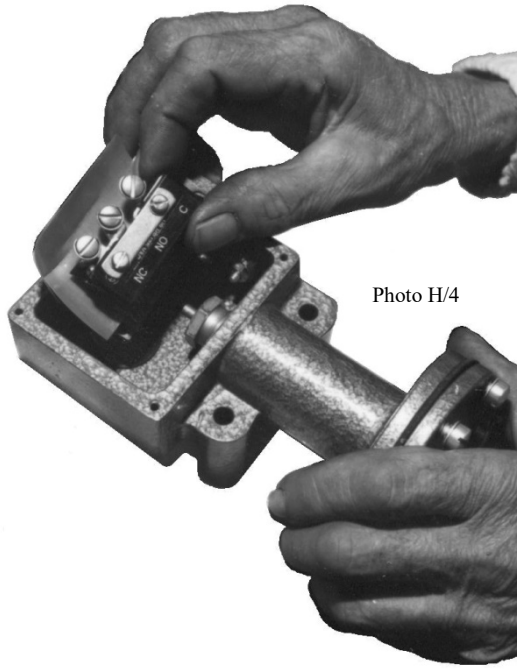


Photo H/4

8. To zero the pressure switch, loosen or tighten the range screw until it just comes into contact with the range spring. This can be done by shaking the switch up and down, the spring can be heard rattling inside. Tighten down the range screw gradually until the rattle stops.

9. The next step is to secure the left hand side of the switch plate to act as a tight pivot and to move the right of the plate up or down so that the pip on the microswitch is just about to come in contact with the pushrod. Tighten the plate screw on right (see photo J/4).

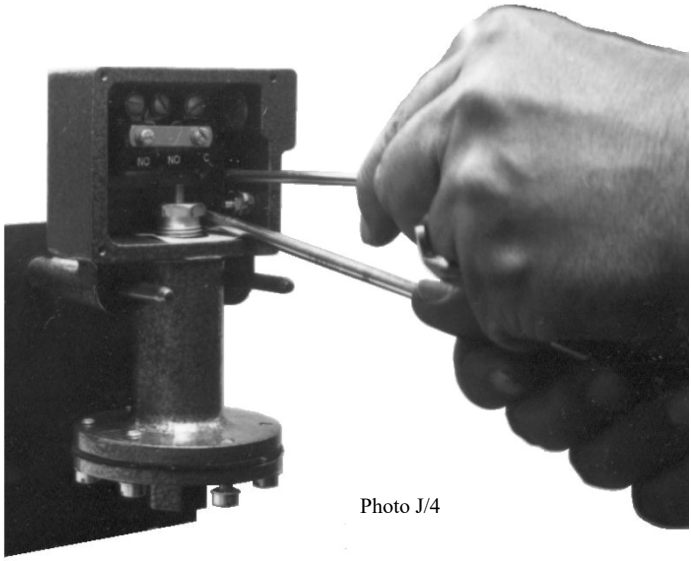


Photo J/4

10. Place gasket and cover on housing and secure with appropriate screws.

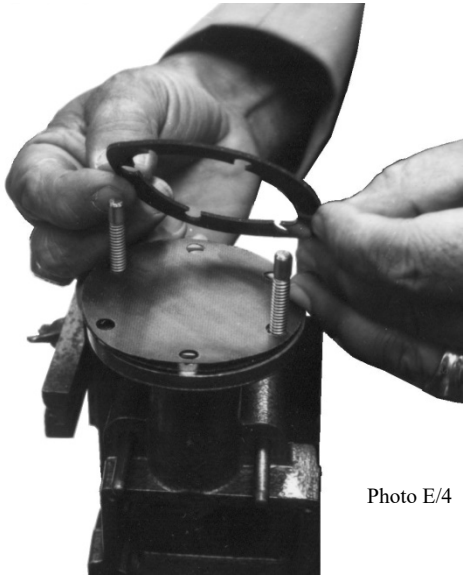


Photo E/4

5. Now screw two locating pegs opposite each other in the base. Place the diaphragm and gasket over the pegs to locate the holes and press down firmly (see photo E/4).

6. Place pressure chamber over locating pegs and tighten down firmly with appropriate screws, using a suitable screwdriver with right angled leverage (see Photo's F/4 & G/4).

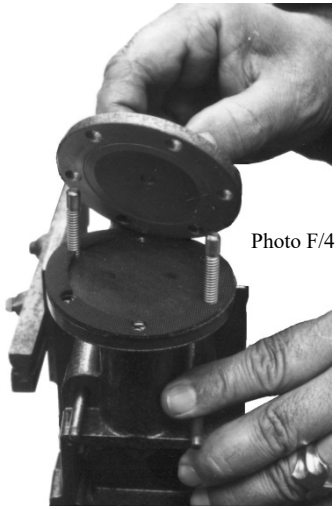


Photo F/4

Photo G/4

CONTROLS AND CONTROL SYSTEMS

GUARANTEE

We guarantee Sirco products to be free from defects in workmanship or material and will, without charge, replace or repair within one year from the date of shipment from our factory, any product that may be found defective upon inspection at our factory. This guarantee does not obligate us where products have been subjected to careless handling, improper application or faulty installation and we expressly disclaim any obligation, guarantee or liability whatsoever except as stated above.

NOTES:

Every SIRCO product is thoroughly tested and inspected before leaving the factory and under normal use will give years of effective automatic operation without further attention, but in an effort to prevent misuse we emphasise the following points.

HANDLING: SIRCO controls are sturdily constructed, but must be handled with the reasonable caution that any instrument of close accuracy requires.

APPLICATION: The descriptive data in the catalogue, facilitates the selection of the proper control for every purpose. Mistakes as to primary function, operating range, electrical load, etc., can be avoided by observance of specifications and ordering data.

INSTALLATION: Every SIRCO control shipped is accompanied by complete installation instructions. Strict compliance ensures service free operation and eliminates unnecessary complaints.

REPAIRS: In the field in most cases are impractical. We are equipped to do this work in our factory at reasonable cost.

RETURNS: Must not be made without our consent and goods must in all cases be carefully handled, properly packed, and shipped prepaid. If credit is allowed, we deduct 20% for handling and inspection, with further deductions for recalibrating or refurbishing if necessary. Specially made instruments will only be credited at a value we determine to be fair to us.

DO NOT RETURN GOODS WITHOUT OUR CONSENT

WE RESERVE THE RIGHT TO IMPROVE, INCORPORATE AND CHANGE DESIGN WITHOUT NOTICE

Sirco Controls Limited, Sweynes Industrial Estate, Ashingdon Road, Rochford, Essex.

PLEASE READ CAREFULLY

RECOMMENDED PRACTICES IN SELECTING, SPECIFYING AND INSTALLING SIRCO CONTROLS

For all controls purchased, SIRCO recommend the following procedures:-

- Install a back-up control for all critical applications where a control failure could endanger life, limb or property. A back-up control to serve as a high or low limit control is especially recommended for applications where a temperature or pressure runaway condition could result.
- Provide preventative maintenance or periodic testing, particularly in critical applications. Factory set units should be tested on all applications prior to start up.
- Electrical ratings stated in literature and on name plates should not be exceeded. Overload on a switch or control can cause failure on the first cycle. Always wire devices to national and local electrical codes using the correct wire size.
- Avoid mechanical cycling (5 c.p.m. average).
- Note warning signs of possible failure – such as drift in set-point and check controls immediately.
- For explosionproof controls, always be sure that all electrical circuits are shut off before removing cover.
- Use only factory authorised replacement parts and procedures.
- Install units away from shock and vibration and orient so that moisture is prevented from entering the enclosure. Proper electrical fittings should be used to prevent moisture entering the enclosure via the conduit.
- The purchaser should make the manufacturer aware of any external effects or aggressive substances that the equipment maybe exposed to.
- With temperature controls – long capillary lengths (greater then three metres) can increase chances of error and may require re-calibration of the set-point with a change in ambient.
- Avoid mounting all controls in extremes of ambient.

CAREFULLY READ THE NEXT SECTION ON CARE AND MAINTANCE

3. Insert spring and backing plate assembly into chamber at base of switch (see photo C/4)

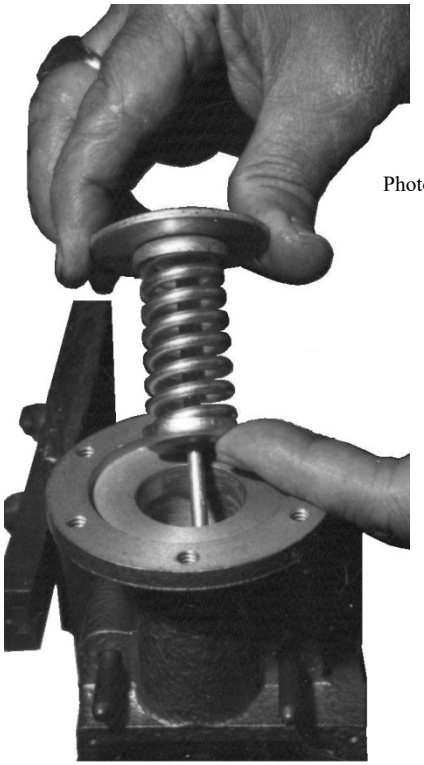


Photo C/4

4. Place zero ring over backing plate, making sure the edge is over the recess on the plate (see photo D/4)

Photo D/4

SIRCO CONTROLS LIMITED

A SIRCO PRODUCT

BUILDING A SIRCO PRESSURE SWITCH

Standard Model 4000

1. Fit the range screw in the housing (which has already been fitted with an earthing screw), by turning clockwise into the threaded hole at the base of the switch box (see photo A/4). Secure housing in vice.

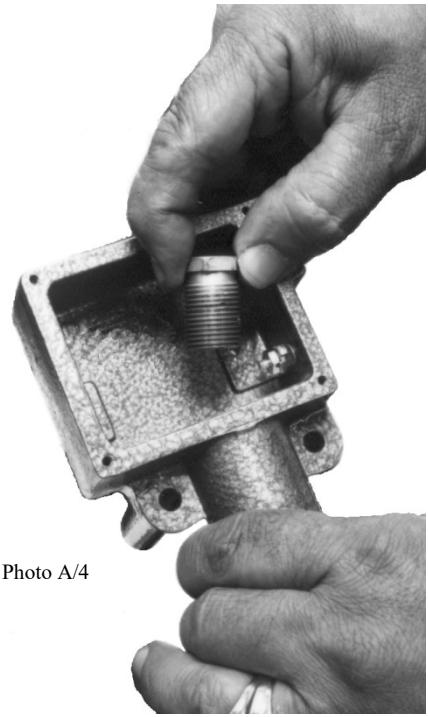


Photo A/4

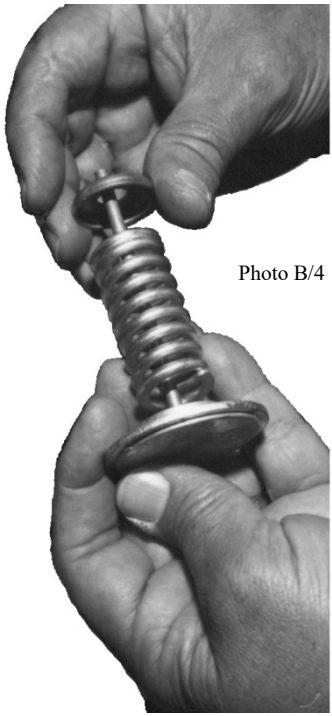


Photo B/4

2. Pick up backing plate and push-rod assembly. Place correct range spring over push-rod unit until it fits into spring seat, then fit spring button over it (see photo B/4).

CARE AND MAINTENANCE

Whilst every care is taken to test the accuracy, repeatability and correct functioning of all pressure, pressure difference and vacuum switches before they leave the factory, it must be constantly borne in mind that the tests are carried out in ideal conditions and no amount of testing can accurately simulate the actual environment or the conditions, using the process fluids at the site of their ultimate installation.

It is for this reason that regular care and maintenance must be carried out to ensure that they are restored to their original state of operation if necessary.

Like all electro-mechanical devices, whose correct function depends on accurate wear-free movements and positively repeated signals within the given parameters of a detailed specification, it is necessary in the interests of HEALTH AND SAFETY, to ensure that regular checks and preventative maintenance is carried out by QUALIFIED Instrument Engineers. Qualified that is – in respect of the particular switches they are checking or maintaining – without a tendency toward experimentation. There is no substitute for experience - and no excuse for dismissing these instructions, by equating experience with long and faithful service and a working knowledge of similar instruments; especially where life and limb and/or production loss results from a malfunction, through lack of maintenance.

PERIODIC FUNCTION CHECKS

1. In most cases, when pressure, pressure difference or vacuum switches are fitted to process lines, where the actuation is frequent, it is possible to observe and record the accuracy and repeatability by reference to the process cycles and gauges.
2. When switches are fitted to detect an abnormal or alarm condition and may never work, because of primary interlocking or back-up systems - it is recommended that a two-way shut off valve be installed immediately below the process connection, thus enabling the process fluid to be isolated and at the same time opening a test point to enable a pressure to be introduced to check the switch. (See Fig. 1.)

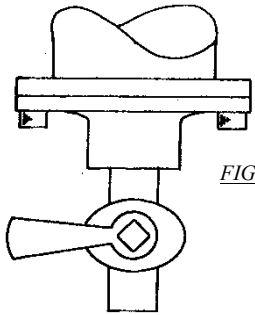


FIG 1

PREVENTATIVE MAINTENANCE

INSTALLATION

All switches are shipped with paint work intact (scratch free) covers tightly in place, gaskets and weather-proof caps fitted. All hardware (nuts, bolts, etc.), and exposed metal surfaces are sprayed with special Rocol Rust Shield Anti Corrosive Spray.

1. Transport switches, as you would a delicate instrument.
2. When installing, ensure that all the above are fitted and secure.
3. When wiring-up to the terminals, ensure that the correct size cable of the correct rating is used - using a water-proof gland or conduit fitting, or explosion proof gland where necessary. Replace covers and gaskets.
4. Once installed and setup correctly (see setting instructions), apply a coat of suitable inhibitor liberally, (Rocol Rust Shield is recommended).

MONTHLY CHECK

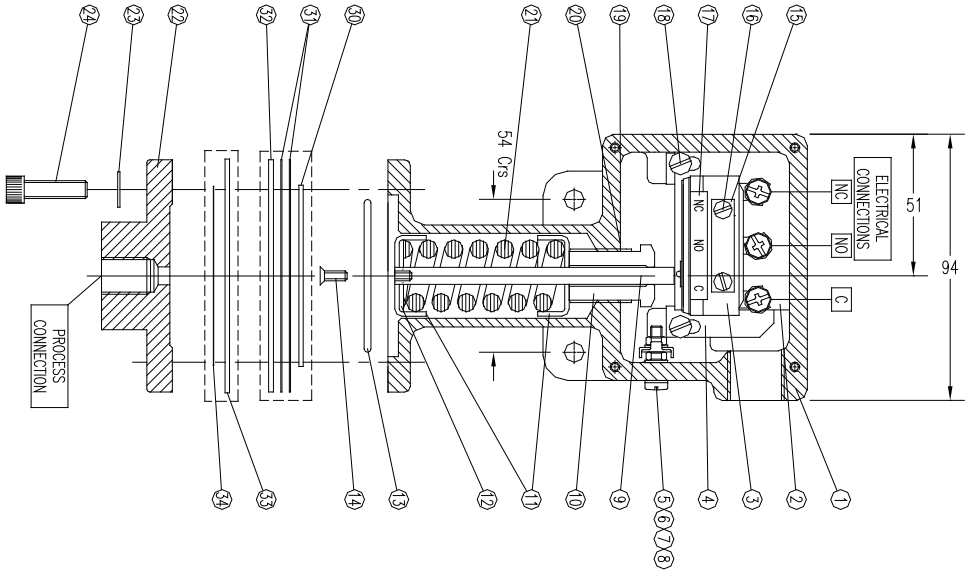
1. Visual checks should be carried out to ensure that no covers are out of place and that the inhibitor and paint is keeping out corrosion. At the slightest sign of rust or corrosion clean and re-apply inhibitor.
2. Report any unusual appearance or signs of interference or tampering.

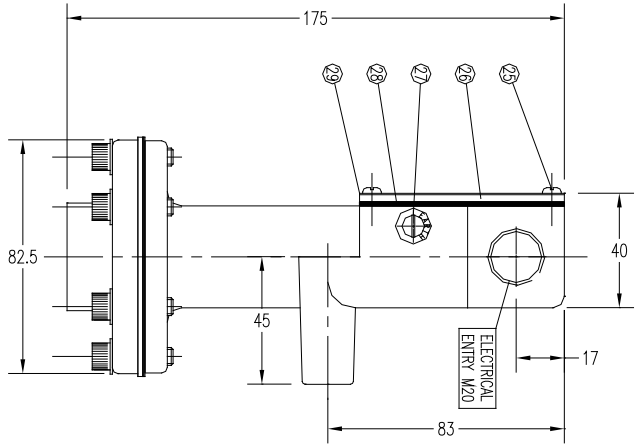
QUARTERLY MAINTENANCE

1. Isolate electrical supply.
2. Isolate process.
3. Open front cover and terminal box cover.
4. Check all internal components visually for corrosion or ingress of moisture.
5. Check that microswitch terminals are intact.
6. Using an Avo or other signal device, manually operate the microswitch pip both at the normally open and normally closed terminals.
7. With the thumb and forefinger, check the actuator for free movement.

   DO NOT REMOVE SPRINGS OR ANY OF THE COMPONENTS.
8. Check all screws and fastenings for tightness.
9. Connect independent pressure or vacuum source and check setpoint (five times), raising the pressure or dropping it from the normal working pressure of the process line (depending on whether the function is on a rising or falling pressure). Remember, that the first operation from zero will always be slightly in advance of the set point.

COMMON PARTS FOR ONE UNIT					
No.	Part No.	Description	Qty.	Remarks	Drg. No.
1		Housing	1	Aluminium Alloy	
2	A126	Insulating Cloth	1		PSD-1336
3	A43	Microswitch BZ-R-P1	1	Model RA & RC	
	A45	Microswitch BZ-2R-P1		Model RB & RD	
4	A125	Switch plate	1		A4-2466
5		M4 x 20 St/St Pan Head Screw	1		
6		M4 St/St shakeproof Washer	2		
7	A875	M4 Copper Clamp Washer	2		
8		M4 St/St Nut	2		
9	A113	Actuator Rod	1		G-144
10	A116	Range Screw	1		SP-122
11	A108	Spring Cup	2		S-P683
12	A895	Mudguard Washer St/St 1" x ¼"	1		
13	A110	Backing Plate	1		G-146
14	A314	M4 x 12mm CSK HD St/St screw	1		
15	A5	Switch Plate	1		PSD-1330
16	A236	6 UNC x 7/8" Pan HD St/St Screw	2		
17	A461	Terminal Label	1		SP-536/1
18	A231	8 UNC x 3/8" Pan HD St/St Screw	2		
19	A470	Adjustment Label	1		PSD-1405
20	A116	Range Screw	1		SP-122
21	A191	Range Spring HT-MB-9	1	RA & RB	
	A186	Range Spring HT-MB-6		RC & RD	
22		Pressure Chamber Cast	1		G-143
		Pressure Chamber Barstock	1		A4-2969/1
23	A864	6mm Int. Shakeproof Washer	6		
24	A392	1/4" UNC Socket Cap Head Screw	6	Tightened to 150 lbf/in Torque	
25	A245	6 UNC x 1/2" Pan Head St/St Screw	4		
26	A83	Cover	1		PSD-1324
27	A476	Earth Label	1		PSD-1643
28	A120	Cover Gasket	1		G-153/1
29	A121	Label	1		G-153
30	A115	Zero Ring	1	Fabric Diaphragm Build-up *If process diaphragm PTFE (A119), fit 2 x G-152/3 with a G-152/1 between	G-149
31	A117	Buna N Diaphragm *	2		G-152/1
32	A122	Gasket	1		G-155
33	A123	Zero Ring	1	Metallic Diaphragm Build-up	SP-602
34		Metal Diaphragm	1		SP-585


54 C/s
ELECTRICAL CONNECTIONS
NC
NO
C
51
94
PROCESS CONNECTION


175
82.5
45
40
17
83
ELECTRICAL ENTRY M20

10. Replace all covers and gaskets and apply inhibitor. (Rocol Rust Shield).

HALF YEARLY OR SHUT DOWN MAINTENANCE

1. Isolate the electrical supply.
2. Isolate process.
3. Remove all covers and gaskets from switch.
4. Loosen the range screw and remove the spring and associated cup and cap.
5. Check for ingress of dust or moisture, clean the inside of the switch making sure that the actuator is free and has no excessive wear.
6. Check the microswitch or pneumatic valve for correct functioning.
7. Clean out process chamber cavity, and flush out if necessary check threads and ensure all pressure retaining bolts are tight.
8. In the case of flameproof or explosion proof switches, check that the glands or fittings are in good condition and ensure that the mating surfaces of cover and box are free from damage.
9. If switches are subject to more than normal cycling (above 5 per min.), and they have metallic diaphragms, then remove the pressure chambers and replace the diaphragms (taking care to use NEW diaphragms and destroying the old ones at once.)
10. Re-assemble the switch (see leaflet 'Building Pressure Switch') re-zero, replace all components – in reverse order, re-zero and re-calibrate, following the 'Calibration and Installation Instruction' leaflet.

SERIES 4000 PRESSURE SWITCHES

BASIC CONSTRUCTION

1.1 All Series 4000 Models are built around an aluminium housing, and its basic pattern is the same throughout.

1.2 The upper part of the housing consists of a microswitch or pneumatic output Unit and the range adjustment screw, Two separate microswitches for simultaneous operation can be fitted,

2. The lower part of the housing consists of a diaphragm, backing plate, push rod and range spring, The range spring opposes the diaphragm, and any tightening of the range screw raises the point at which the microswitch will operate.

INSTALLATION AND SERVICE INSTRUCTIONS FOR

SERIES 4000 PRESSURE SWITCH

INSTALLATION

Before mounting switches ensure pipe is clean and the process orifice free from dirt. Switches should not be installed on dead end pipes – install on lead off or pigtail pipe, and if possible avoid direct mounting.

SETTING UP

Switches are single pole double throw (unless otherwise stated) and can be connected to switch either 'on' or 'off' on pressure rise. See diagram for connections.

RANGE SETTING

a) Remove cover and gasket from switch housing.
b) Connect supply to the pressure connection, ensuring that gauge indicating supply line pressure is working correctly.
c) Turn Range Screw (20) clockwise to increase the pressure at which the switch will operate. (Ascertain by connecting meter or suitable signal to leads or terminals.)

SERVICE INSTRUCTIONS

It rarely becomes necessary to replace components on these switches, but if the occasion arises, it should be done only by a qualified service engineer.

NOTE:

1. To replace Diaphragm (31 or 34), first slacken off range screw (20) to ensure range spring (21) is not compressed, then remove the Pressure Chamber (22) and replace damaged diaphragms with a new set, taking care to replace the zero Ring (30 or 33) under the diaphragms.
2. Switch Plate screws (18) should not normally be tampered with, but should it become necessary to re-zero the microswitch, the following procedure should be adopted. Disconnect supply pressure, release range screw (20), clamp one side of switch plate (4), and on this pivot move switch till plunger is just compressed by the actuator rod (9), but not sufficiently to operate the switch (Test with suitable meter or signal). Tighten switch plate screws.

SERIES AD4000 PRESSURE SWITCH

ADJUSTABLE DIFFERENTIAL.

For minimum differential, turn wheel on microswitch anti-clockwise – and for maximum differential, turn wheel on microswitch clockwise.

ALL OTHER INSTRUCTIONS AS FOR STANDARD 4000 SERIES.