A 800

A-800 DC PROXIMITY SWITCH TEST UNIT

The A-800 is fitted with 2 PP3 batteries ready for use. This unit will test most 3 wire DC proximity switches, inductives [metal sensing] or capacitives photoelectrics or ultrasonics [which sense most materials].

Standard color coding for 3 wire proximity switches is Brown = Positive (+), Black = Load, Blue = Negative (-) [Note: some universal DC switches can vary, try to follow makers wiring instructions]

TESTING INSTRUCTIONS

Connect the switch to the A-800. Place a suitable target in front of the switch. If the switch is functioning correctly, the unit will give audio and visual indication showing the switch operates and indicating the functionality of the switch according to the chart below.

A-800 DC Test unit

Switch type	Buzzer & LED on when	LED
PNP normally open	target in range	PNP
PNP normally closed	target not in range	PNP
NPN normally open	target in range	NPN
NPN normally closed	target not in range	NPN

If the proximity switch does not give such feedback when correctly connected to the tester it has probably failed.
[Note: The A-800 will not test 2 wire AC or DC switches]

LED Functions

Green I/O LED	Switch connected & unit on
Red (Batt) LED	battery low indicator
PNP or NPN LED	indicated switch type

Further information:

Proximity is a division of Dwyer Instruments Inc. For further information, a copy of our latest catalog or details of our nearest distributor please call our sales office.

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PROXIMITY

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INSTALLATION AND WIRING INSTRUCTIONS

- INDUCTIVES
- CAPACITIVES
- TEST UNIT

I. INTRODUCTION

The Proximity range includes Inductive and Capacitive proximity switches and a Test unit. These are listed and stocked in our catalog for fast service. Should you need a non listed variant please contact the sales office.

Inductive switches will detect all metals. Capacitive switches will detect nearly all solids, powders and liquids, and the A-800 test unit will give a functionality test to all versions stocked in the catalog and will test most three wire DC proximity switches from other manufacturers.

This range covers many industrial applications.

2. SENSING DISTANCE

2.1 Inductive and Capacitive

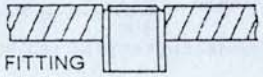
Sensing ranges refer to a 1mm thick square target of earthed mild steel with sides of 3 x the nominal sensing distance. If the target is of other material, or a different size, there will be variation in the sensing distance.

Material	Material Factors Inductive	Capacitive
Mild Steel	1.0	1.0
Cast Iron	1.1	1.0
Aluminium Foil	0.9	1.0
Stainless Steel	0.7	1.0
Brass	0.4	1.0
Aluminium	0.35	1.0
Copper	0.3	1.0
Water	0.0	0.9
PVC	0.0	0.9
Glass	0.0	0.5
Ceramics	0.0	0.4
Wood	0.0	from 0.2
Beer	0.0	0.9
Coca Cola	0.0	0.9
Lubricating Oil	0.0	0.1

3. INSTALLATION (MECHANICAL)

3.1 Flush Mounting

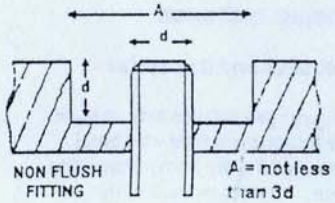
Units designed for flush mounting which include all inductives listed in the catalog may be fitted in surrounding metal (or other material) as shown.



FLUSH FITTING

3.2 Non-Flush Mounting

Units designed for non-flush mounting which includes the Capacitive switches must be separated from surrounding metal as shown overleaf.



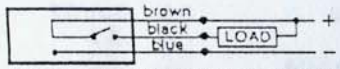
Note: Capacitive switches can, if required, be tuned down to be fitted flush in metal. See section 5.1 for reducing sensitivity.

4. INSTALLATION (ELECTRICAL)

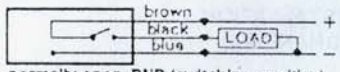
4.1 Single Units

DC units have transistor output, and normally have three wires, but NAMUR standard DC sensors have two wires.

3 Wire DC Switch

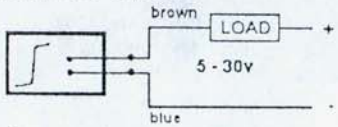


normally open, NPN (switching negative)



normally open, PNP (switching positive)

2 Wire DC Sensor



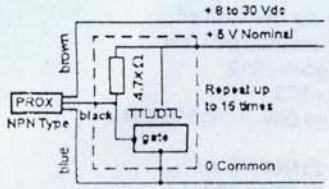
Namur device used as DC sensor

Note that all units with two wires must be connected to their power supply with a load in series, or they will be damaged.

Consult catalog for load rating.

4.2 Logic Interface

Proximity sensors may be interfaced with most types of industrial logic. Most DC units are open collector type and therefore require an external pull up resistor when used with TTL as shown.

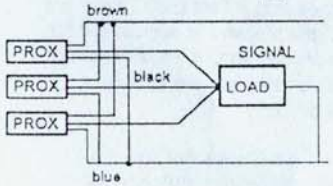


Note: 3 wire DC-Compact V3 bodied switches are designed for use directly with TTL and have a built-in pull up resistor.

4.3 Multiple Units: Parallel

DC sensors may be connected directly in parallel as shown. The number (N) of switches is usually only limited by the availability of sufficient supply current. Note that Compact V bodied switches have an internal pull-up resistor with a resistance of 12kilohms. The maximum number of Compact switches in parallel is limited to:

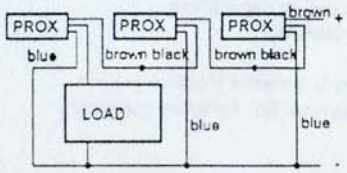
$$N = ((mA)\text{rating-load current}) \times \frac{12\text{kilohms}}{V\ \text{supply}}$$



4.4 Multiple Units: Series

DC the maximum number of DC sensors in series is limited by the supply voltage (V supply) the voltage drop across a closed switch (V switch), and either the minimum working voltage of the switch or the minimum working voltage of the load, whichever is greater (V min).

$$N = \frac{\text{supply} - V\ \text{min}}{V\ \text{switch}}$$



The diagram shows a typical series configuration of PNP sensors. For NPN types swop the blue for the brown wire and reconnect.

5. SENSITIVITY ADJUSTMENT

Inductive sensors are not adjustable.

5.1 Capacitive Switches

Install the capacitive sensor in its final position. Remove the black cover screw to gain access to the adjustment potentiometer. Turn the adjusting potentiometer clockwise to increase sensitivity or anticlockwise to reduce sensitivity.

For example, the range and sensitivity of capacitive sensors can be adjusted to tune out the sidewall of a plastic container or the glass window of a sight glass such that the level of liquid, granules or powders on the other side of the container wall or sight glass can be detected.

For this application tune out the sight glass or wall with the container empty, detune the sensor until it cannot see the window or wall, and test your settings by introducing the target material inside the container. Caution should be taken with materials that leave a residue inside the container.

5.5 Replace cover over adjusting potentiometer

To maintain the IP65 rating on capacitive sensors it is imperative the black cover screw is replaced after adjustment.

6. GENERAL INFORMATION

6.1 Most Proximity sensors are fitted with indicator lights (LEDs) at the cable end. The LED indicates the state of the switch output.

6.2 The maximum voltage of d.c. PROXIMITY sensors is 30V. It is sometimes forgotten that a rectified 24V a.c. supply has peak value of 1.4 x the a.c.RMS value (34V)

7. IMPORTANT

These switches should be installed by competent personnel only. Please check wiring and supply voltages before switching on.

8. TECHNICAL INFORMATION

If there are any technical inquiries regarding the installation or application of Proximity sensors please contact the Technical Sales Department.