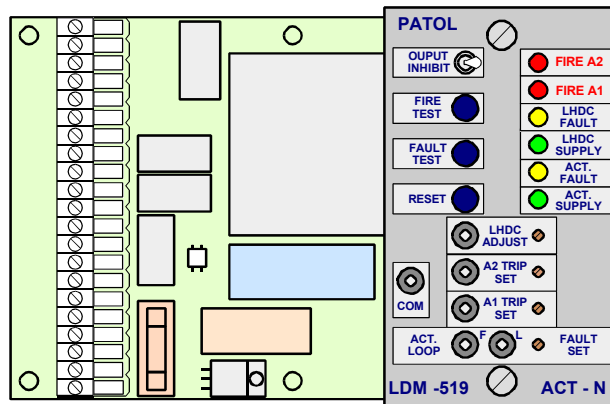


LDM-519-ACT-N LHDC MONITOR / CONTROLLER Fire Zone Monitoring with Actuation Output



The module is designed to monitor a length of analogue Linear Heat Detecting Cable (LHDC) for elevated temperature states. Two adjustable levels of alarm are provided (A1 & A2), one of which may be optionally employed as a "Pre-Alarm".

The LHDC is also monitored for fault conditions (open & short circuit).

The unit is provided with an output for the initiation of extinguishing media. This actuation output is primarily intended for use with electrically operated chemical protractors (Metrons). The output has fault monitoring circuitry appropriate to the series firing of these devices using an "All fire" actuation loop configuration.

The unit can be provided fully cased or as a PCB module. Both formats are electrically and mechanically compatible with many existing installations and may be readily used as service replacement spares.

The primary features of the control units are:-

- .. **Linear Heat Detecting Cable fire & fault monitoring.**
- .. **Two adjustable levels of alarm set point / Pre-Alarm operation.**
- .. **Extinguishant actuation output, with loop analogue & fault level adjustment.**
- .. **Separate LHDC monitoring & Actuation supplies - Electrically isolated.**
- .. **Wide d.c. supply operation - Monitoring 20V to 60V - Actuation 20V to 130V**
- .. **LED indication of Fire, Fault & Supply status.**
- .. **Actuation inhibit switch**
- .. **Selectable latching / auto-reset operation.**
- .. **Integral Test & Reset push-buttons - Remote Test & Reset signal inputs.**
- .. **Volt free contact outputs for Pre-Alarm (A1), Fire(A2), & Fault conditions.**
- .. **Maintenance test meter jacks for both LHDC and Actuation loop analogue outputs, Alarm set points & Actuation Loop resistance fault level.**
- .. **PCB module readily installed in existing FDS-5 housings.**
- .. **Cased unit mounting points identical to FDS-5 enclosures.**

LDM-519-ACT-N LHDC CONTROLLER

Fire Zone Monitoring Unit with Actuation Output

Principles

The unit is operated in conjunction with a length of Line Heat Detector Cable (LHDC) and an 'end of line' (EOL) terminator. The LHDC is a coaxial cable which may be installed in considerable lengths whilst maintaining the ability for the monitoring unit to provide early warning of 'hot spots' and fire conditions on short sections of the overall zone length. Reference should be made to the (separate) data sheet on the Line Heat Detector for specification of its performance.

Also connected to the unit is electrically initiated extinguishing equipment. The unit is primarily intended to interface with the extinguishing equipment by means of electrically operated chemical actuators (protractors). These devices, often known as Metrons® (ICI Nobel), are in effect small chemical charges that are initiated when an appropriate firing current is applied. On firing, the devices protract a steel pin which may be used to shatter the quartzoid bulbs of sprinkler heads & multiple jet controllers (MJC) or rupture the frangible disks of extinguishant cylinder valves. The devices are "one shot" and on operation the electrical element becomes open circuit.

Often the requirement is to operate a number of these devices simultaneously, this especially in the case of sprinkler heads, where a number may be resident within the zone of LHDC detection. As the actuators require a (short term) current application in excess of 1A the most efficient configuration, both in respect of cabling and electrical load, is a series loop.

However, with a series configuration if any element is ruptured prematurely (either prior to, or during firing) the rest of the actuators within the zone may be disabled. In order to obviate this, non linear bypass devices are connected across each actuator. The LDM-519 controller incorporates the specialist circuitry that enables the reporting of a single element failure whilst retaining the ability to operate all other serviceable actuators. (Contact Patol Ltd. for more detail on "All Fire" actuation loop configurations)

Figure 1 shows a typical minimum system where a single alarm level is employed by adjusting the A2 set-point less than that for A1. Thus both A1 & A2 trips occur simultaneously - **At the A1 set point.**

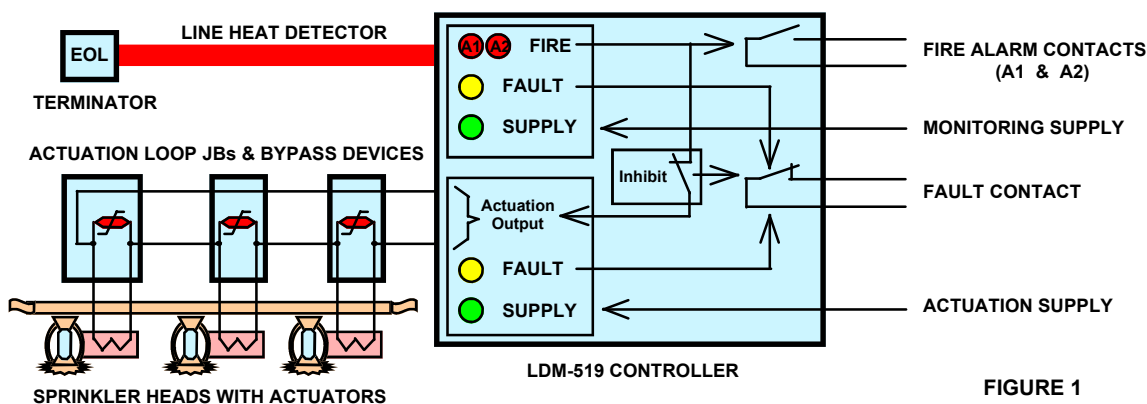


FIGURE 1

In some applications abnormal ambient conditions can arise that must be notified, but for which immediate extinguishant operation would not be appropriate. By using A1 Pre-Alarm (e.g. A1 contacts combined with A2-Fire signal) operators are provided with an "abort" period prior to extinguishant release. **Figure 2** shows a more comprehensive configuration including Pre Alarm.

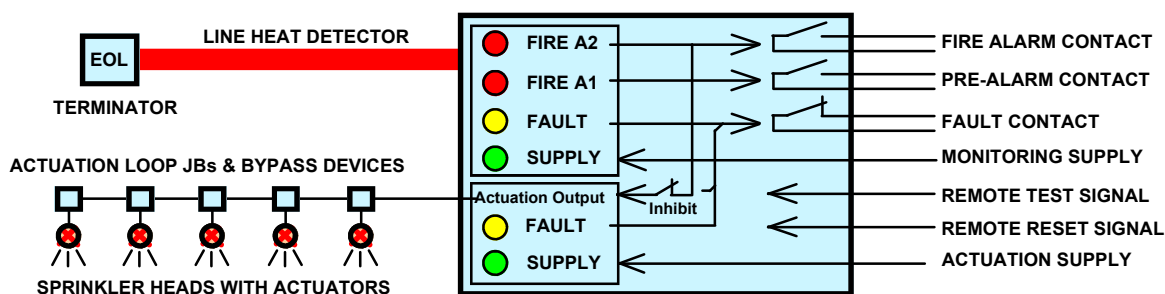


FIGURE 2

LDM-519-ACT-N LHDC CONTROLLER

Fire Zone Monitoring Unit with Actuation Output

Module Arrangement

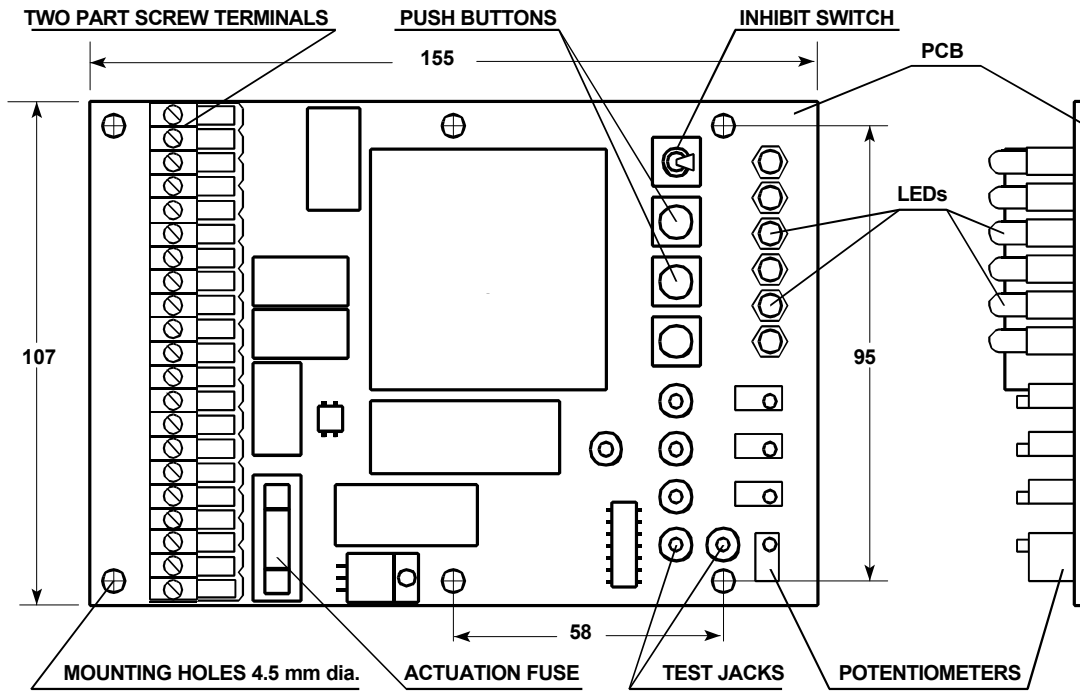


Figure 3 - PCB Module - Shown without fascia plate

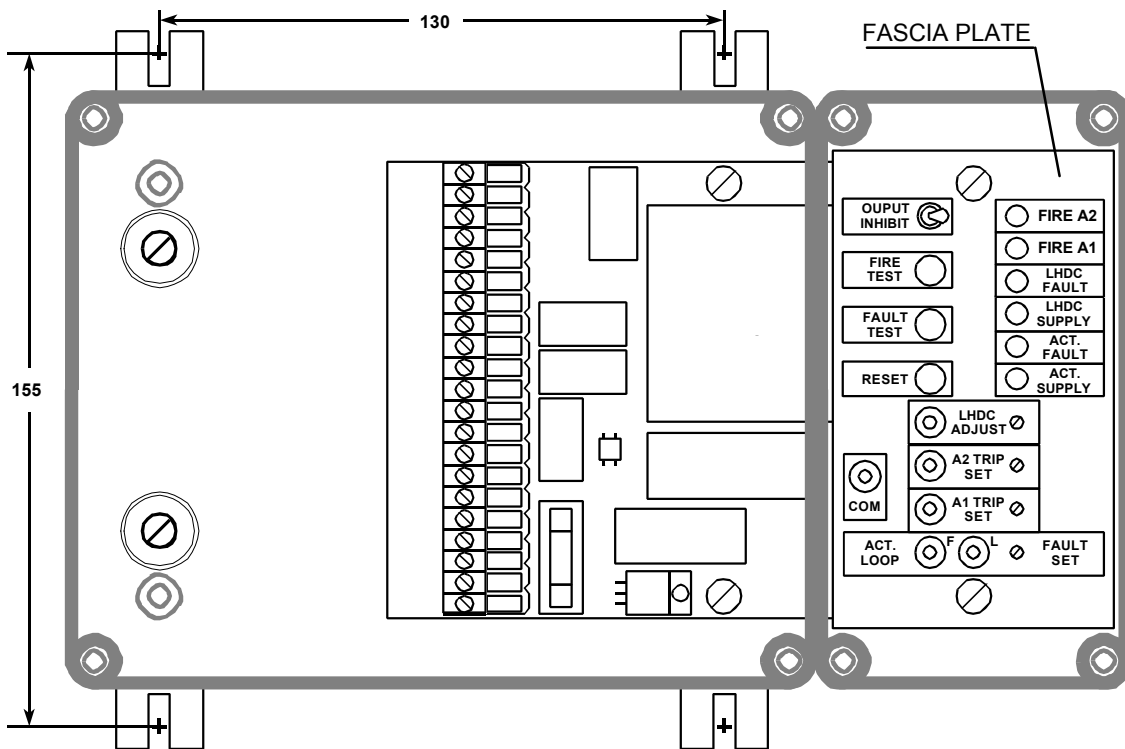


Figure 4 - LDM-519 Module installed as retrofit to existing FDS-5 Housing

LDM-519-ACT-N LHDC CONTROLLER
Fire Zone Monitoring Unit with Actuation Output

Connections

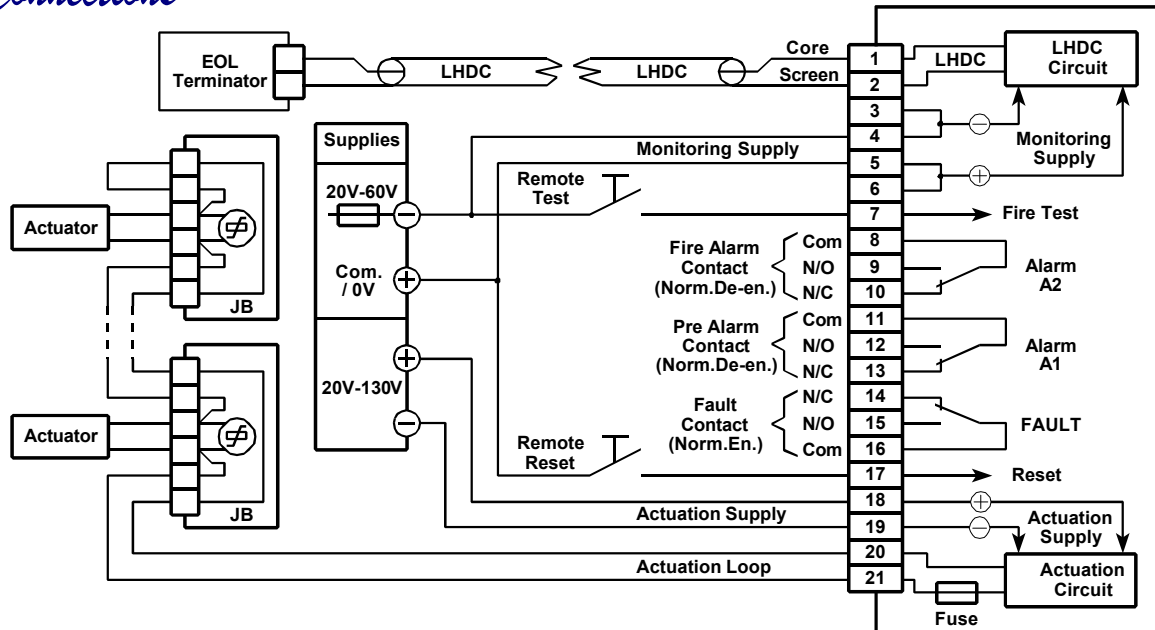


Figure 5 - LDM-519 Module terminals showing typical external connections.

Operational Specification

Monitoring Supply: +ve common to LHDC screen
Voltage: -20 Vdc to -60 Vdc

Current: Quiescent - < 18 mA
Max (Alarm) - < 60 mA

Actuation Supply: Fully isolated from Mon. Sup.
Voltage: 20 Vdc to 130 Vdc

Current: Quiescent - < 10 mA
Firing Pulse - 4 A (nom)
Dependant on actuation load.

LHDC Input: Two levels of alarm - A1 & A2
Fault monitored. - O/C & S/C

Actuation Output: Thyristor switched - > 8 A
Fuse protected - 2A 20mm
Relay isolated fault monitoring
Loop increment fault set point.
Earth / common mode fault.

Relay Contacts: 1 A @ 24 Vdc / 120 Vac
Fire Alarm A2: 1 set - One pole change over

Fire Alarm A1: 1 set - One pole change over

Fault: 1 set - One pole change over

Remote Reset I/P Switch to +ve Monitoring Sup.

Indications:
Fire Alarm: 2 off - A1(pre) & A2 (full)

Red LEDs
Fault: 2 off - LHDC & Actuation loop
Yellow LEDs

Supply: 2 off - Monitoring & Actuation.
Green LEDs

Controls:
Fire Test P.B. : Simulates LHDC fire condition

Fault Test P.B. : Simulates LHDC fault warning

Reset P.B. : Resets fire alarm

Inhibit Switch: Inhibits Actuation
Enables fire test P.B.
Activates fault relay

Adjustments & Test Points:

LHDC Analogue: 2mm meter probe socket

A1 Trip Set: Potentiometer & 2mm socket

A2 Trip Set: Potentiometer & 2mm socket

Loop Analogue: 2mm meter probe socket

Loop Fault Set: Potentiometer & 2mm socket

Meter Common 2mm meter probe socket

Remote Fire Test: Switch to -ve Monitoring Sup.

LDM-519-ACT-N LHDC CONTROLLER
 Fire Zone Monitoring Unit with Actuation Output

Cased Units - Enclosures

The design of the LDM-519-ACT-N module is such that it may be fitted to a variety of enclosures. Demands in respect of environmental, aesthetic or project specific requirements are readily accommodated by the ease with which the module may be fitted to virtually any enclosure type or control panel configuration. Patol should be consulted with regard to special housing provisions.

The module is also an enhanced and current technology 'replacement spare' (retro-fit) to existing FDS-5 housings. (see Figure 4 - Page 3)

Figures 6 & 7 show one of a number of 'standard' cased module configurations. This particular type has two notable features. Firstly the enclosure may be cabled prior to fitting of the LDM-519 module. Secondly the mounting points are identical to obsolete FDS-5 housings thus making the unit ideal as a service spare.

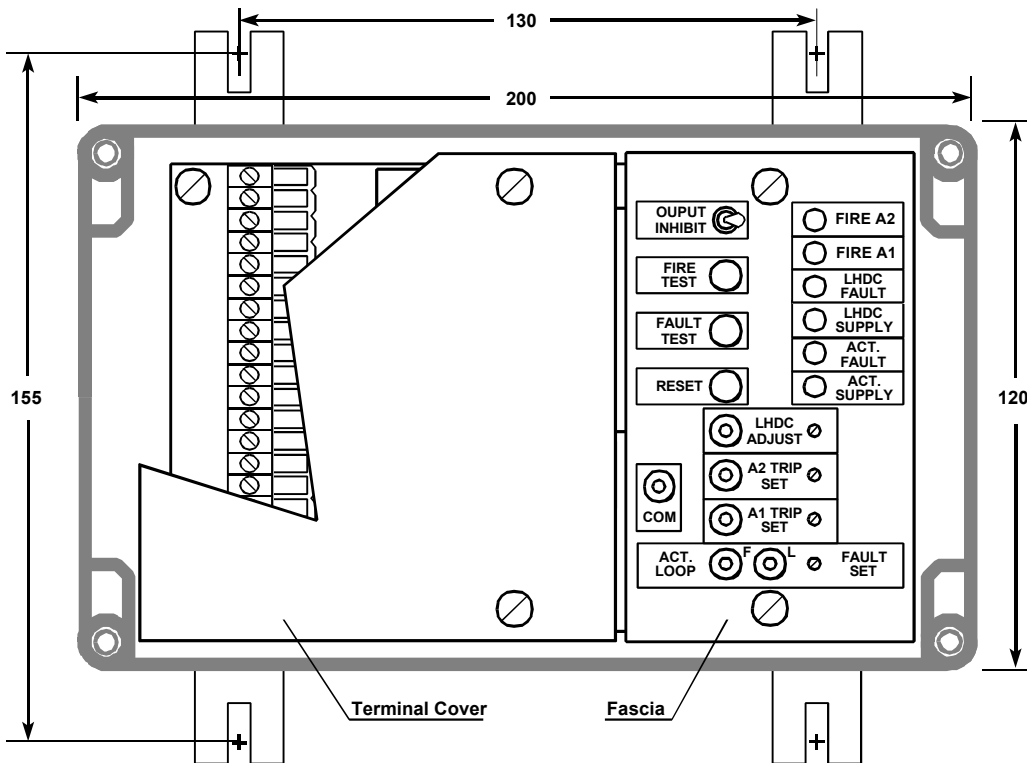


Figure 6 - Enclosure front view with cover removed.

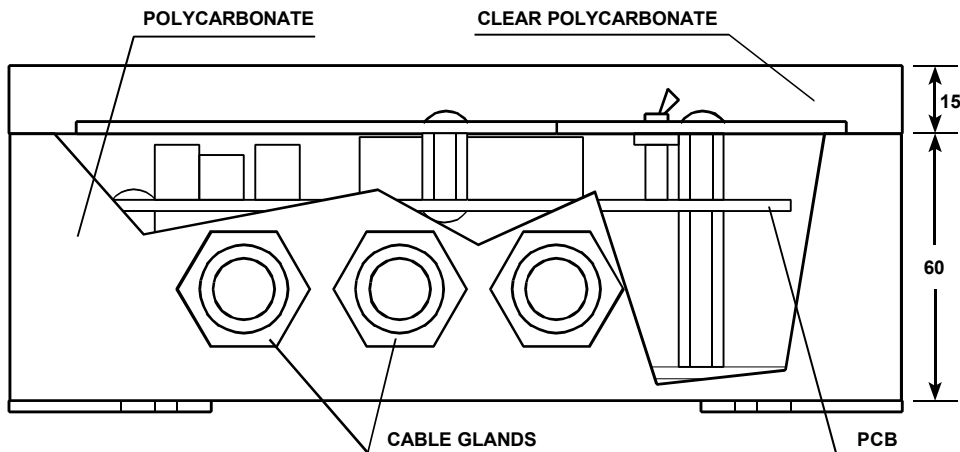


Figure 7 - Enclosure bottom view showing gland positions and internal arrangement

LDM-519-ACT-N LHDC CONTROLLER
 Fire Zone Monitoring Unit with Actuation Output

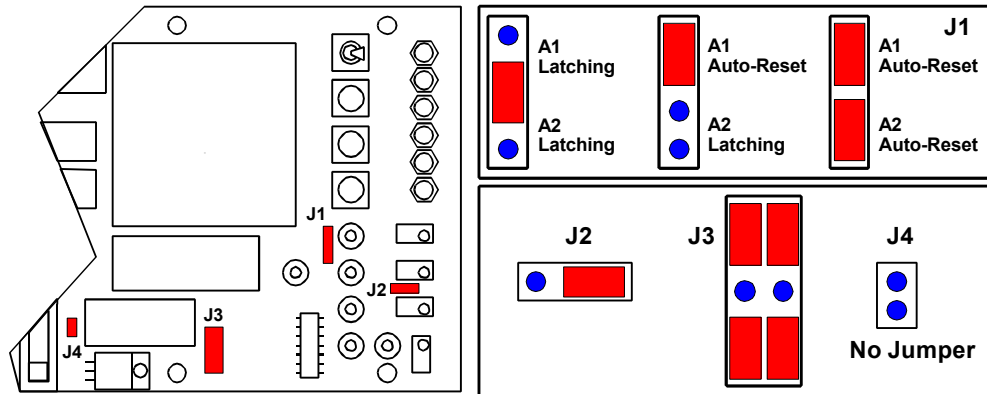
Module selector links

The LDM-519-ACT-N module is fitted with a number of jumper links which permit selection of operating parameters.

J1 permits the selection of Latching or Auto-Resetting modes for both A1 & A2 alarms. J2, J3 & J4 are related to the operation of the "Actuation" output.

Figure 8 shows the Latching / Auto-Reset options as set by J1 and the Standard (default) settings of J2, J3 & J4 for unit use in conjunction with a series "loop" of chemical actuators.

Figure 8



LHDC Analogue & Trip Set Adjustments

These are conducted by means of a high impedance volt meter using the 2mm meter sockets (test points)

and potentiometers located on the fascia. All readings should be made with respect to the common socket.

Reference should be made to the data sheet on LHDC for the expected performance and associated trip settings

Where a "two level" system is implemented A2 should be set at a greater level than A1.

If a single trip level is required A1 should be set to the required trip level.

A2 should be set slightly less than A1. A1 alarm, A2 alarm & actuation will occur at the A1 set point.

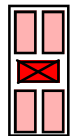
Loop Analogue & Fault level

The readings should be made using a high impedance volt meter with respect to the common (com) socket.

The reading at "L" is an analogue of the actuation loop resistance. The scaling is approx. 30 mV per ohm. The fault level at "F" should be set approximately 12 ohms above the normal loop resistance. i.e. 360 mV.

Sense Only operation

A Sense Only version of the unit is available which is of the same general format to the LDM-519-ACT-N, but is not equipped with the actuation circuitry. Refer to separate data sheet. However, in certain circumstances such as to minimise site spares holding, it may be desirable to operate the LDM-519-ACT-N in a "sense only" mode. This is readily accomplished by simply linking the actuation supply terminals to the monitoring supply and making NO connection to the actuation loop. An additional jumper must be inserted at J3 in order to inhibit the Actuation Fault warning.



J3

Solenoid Outputs & Special Configurations

The unit can be configured to operate solenoids, contactors and other special functions from the "actuation" circuit whilst maintaining fault monitoring. These configurations are covered in separate application sheets which include the special J2, J3 & J4 settings required. Contact Patol Limited.