Context UL-Plus Complete Range of UL Listed Intelligent Fire Detectors.

Context UL-PLUS is a range of high-specification, analogue addressable fire detectors and alarm devices. Context UL-PLUS detectors offer effective false alarm management by a combination of UL approved operating modes and sophisticated algorithms.

Drift compensation further reduces the likelihood of false alarms caused by a build-up of dust in the sensing chamber.

In addition to the familiar smoke and heat detectors, the Context UL-PLUS range features optical/heat multisensor detectors which can be used to protect against many types of fire risk.

Key features

- Five approved response modes for ease of optimisation to different environments
- Rejection of transient signals
- Drift compensation to ensure constant sensitivity
- 360° visibility in alarm
- Flashing LED option
- Alarm flag for fast alarm reporting
- Four bytes of non-volatile memory for user data
- Compatible with Context Plus XP95® & systems

Context UL-PLUS uses a digital communications protocol which has been developed from the Context Plus XP95 protocol but differs in that it allows communication in three different modes: (Normal, Read and Write) to allow a more extensive exchange of information and commands than previous analogue addressable ranges. In addition, Context UL-PLUS can store data in nonvolatile memory.

The Normal mode is identical to the Context Plus XP95 protocol with the exception that the five additional analogue value bits in the Context Plus XP95 protocol extension have been re-defined so that the fire control panel is able to distinguish between Context UL-PLUS and Context Plus XP95 devices.

The Read mode is used to check information stored in the non-volatile memory of each detector. It is accessed by using a simple extension to the Normal mode communication method from the fire control panel to the detector.

In Write mode the Context Plus fire control panel is able to write information to the detector by extending the communication method in the same way as in Read mode.

During Read or Write modes a detector can signal an alarm by means of the alarm flag and alarm address bits.

Context UL-PLUS detectors are compatible with Context Plus XP95 detectors. It should be noted, however, that Context UL-PLUS features are all available when Context UL-PLUS is used with the Context Plus XP95 fire control panels.

CONTEXT UL-PLUS FEATURES – SMOKE AND HEAT DETECTORS

Response setting

Each detector in the Context UL-PLUS range can operate in one of five response modes, any of which can be selected from the fire control panel. Each mode corresponds to a unique response behaviour, which can be broadly related to sensitivity to fire. Whatever the type of detector, Mode 1 will give a higher sensitivity to fire than Mode 5. The selection of the most suitable mode depends on the application. Guidance on detector and mode selection is given below.

For ionisation and optical smoke detectors, the modes relate to different combinations of smoke response threshold and response time. For the heat detector, the mode relates to the fixed temperature setting and the sensitivity to rate-of-rise of temperature. For the optical/heat multisensor, the mode relates to the levels of smoke and heat sensitivity and to the way in which the responses of the two sensors are combined, although one mode is a 'smoke only' response and another is a 'heat only' response.

The response characteristics of the detectors have been carefully set so that detectors will comply with the requirements of the relevant part of UL standards for automatic detectors in all response modes. The mathematical algorithms embedded in the detectors are used to carry out changes in characteristics between modes. Since the response characteristics are defined within the detectors, Context Plus takes responsibility for compliance with standards in different response modes.

The internal signal processing of the detectors is designed so that the analogue value reported is always close to 25 for a normal condition. The alarm threshold is 55, irrespective of the response mode selected. Similarly, the alarm flag in the protocol is always set when the analogue value exceeds 55, irrespective of mode. This simplifies the switching between response modes since the alarm threshold in the fire control panel can remain fixed at 55 and the alarm flag is valid in all modes.

The response mode, which is selected through the protocol, is stored in nonvolatile memory and will therefore be retained when the detector is powered down. All Context UL-PLUS detectors are factory set to mode 3 before shipping.

Response modes are defined more fully in the individual detector descriptions. It is, however, possible for the Context Plus fire control panel to read the smoke and heat values separately of the optical/heat multisensor detector.

User bytes and other stored data

All Context UL-PLUS devices contain nonvolatile memory, in the form of Electrically Erasable Programmable Read Only Memory (EEPROM), which is included primarily to store data needed for the correct operation of the device. However, four bytes of this EEPROM are available to the user and can be accessed by the Context Plus fire control panel through the protocol. This block of non-volatile memory can be used, for example, to store the installation date, the site code or date of last service. The only restriction on use is that the maximum number of write cycles should not exceed 10,000 over the life of the device.

Flashing LED

All Context UL-PLUS detectors have two integral LED indicators, which can be illuminated at any time by the Context Plus fire control panel to indicate devices in alarm. When activated, the LEDs will draw an extra 3.5mA from the loop. In addition to this mode of operation it is possible to enable a flashing LED mode by writing to one of the memory locations. In this mode the LEDs will flash each time the device is polled.

This facility is available on all Context UL-PLUS detectors and the manual call point. Context UL-PLUS detectors and call points are factory set to non-flashing mode.

Remote test feature

This feature, available on all Context UL-PLUS detectors and the call points, is enabled from the Context Plus fire control panel by changing the state of a forward command bit. On receipt of the command the detector is forced by electrical means into an alarm condition. After a delay of up to 20 seconds due to signal processing, an analogue value of 85 is returned, provided that the detector is functioning correctly. This value is sustained until the forward command bit is changed back to its original state, after which a period of 20 seconds is required for the detector to return to its normal analogue value.

The manual call point is different in that the receipt of the command bit will cause the call point to generate the interrupt sequence, followed by a sustained analogue value of 64. The call point resets when the forward command bit is changed back to its original state.

Rejection of transient signals

All Context UL-PLUS detector algorithms are designed to give low sensitivity to very rapid changes in the sensor output, since these are unlikely to be caused by real fire conditions. This is achieved by digital low-pass filtering of the sensor values which optimises the rejection of false alarm sources while maintaining the response to fire.

The filter parameters depend on the mode selected and for some modes the filtering is minimal. The filtering has no significant effect on the response to fires but does affect the way in which detectors respond to transients and to step changes of smoke or heat. This is seen in the "minimum time to alarm" given in individual detector specifications. These times represent the time taken by the detector to reach the alarm condition when responding to a large step change in input.

Interchangeability

Any Context UL-PLUS detector may be replaced by any other type in the range. For example, if a smoke detector proved unsuitable in a particular application, it could be simply replaced with a heat detector set to the appropriate mode.

Context UL-PLUS detectors can also be used to replace Context PlusXP95 detectors and again, it is possible to change types, e.g. smoke for heat or vice versa. Factory-new Context UL-PLUS detectors are set to mid range, equivalent to Context PlusXP95, and the flashing LED feature is disabled.

Notes

1. *The Context Plus fire control panel must not have a drift compensation algorithm activated when interrogating Context UL-PLUS detectors.*
2. *When replacing an Context Plus XP95 detector with a Context UL-PLUS detector ensure the fire control panel configuration is modified accordingly.*
3. *When replacing smoke detectors for heat detectors or vice versa ensure the Context Plus fire control panel configuration is modified accordingly.*

Servicing Note

The "minimum time to alarm" referred to above is important when detectors are tested in situ, for example using aerosol test gas. A delay in response may be apparent.

Warning:** all detectors are supplied with a red cover to protect against dust. The covers should be left in place until commissioning of the system when they should be removed. If, however, further building work is anticipated after commissioning, the covers should be replaced and alternative fire protection arrangements made.* ***When the system is handed over all covers should be removed.

CONTEXT UL-PLUS FEATURES – SMOKE DETECTORS

Drift compensation

All Context UL-PLUS smoke detectors include compensation for sensor drift as part of the internal signal-processing. The algorithm will compensate for changes in sensor output caused, for example, by dust in the chamber, and will therefore hold the sensitivity at a constant level even with severe chamber contamination. This increased stability is achieved without significantly affecting the detector's sensitivity to fire.

The compensation level is stored in the detector's memory as a single value between 0 and 31. The normal level, that is with no compensation applied, is 16. Values above or below this indicate drift towards alarm or away from alarm respectively.

For compensation values in the range 4 to 30 the detector is working within its allowable range. A value which is less than 4 or greater than 30 results in a warning flag. A value of zero results in a fault signal.

The maximum compensation that can be applied is 31. If further drift occurs, the analogue values will simply track the drift and the detector will become more sensitive.

Compensation values are stored in non-volatile memory and will be retained even if detectors are disconnected. With few exceptions, it is possible to use the control panel to ascertain the level of compensation applied at any time.

For the Context UL-PLUS smoke detectors, the compensation algorithms are designed such that the detectors meet the requirements of the UL standard for automatic smoke and heat detectors in all response modes.

It is possible, through the protocol, to carry out a normalisation procedure which rapidly "updates" the drift compensation. This facility should only be used after a compensated detector has been cleaned and instant confirmation is required. Otherwise the detector will automatically update itself within 24 hours.

CONTEXT UL-PLUS OPTICAL SMOKE DETECTOR

Part No. 58000-650IMC

The Context UL-PLUS Optical Detector has a white moulded polycarbonate case with wind-resistant smoke inlets. The indicator LEDs are colourless when the detector is in quiescent state and red in alarm. Within the case is a printed circuit board which, on one side, has the light-proof chamber with integral gauze surrounding the optical measuring system and, on the other, the signal processing and communications electronics.

An infra-red light emitting diode within its collimator is arranged at an obtuse angle to the photo-diode. The photo-diode has an integral daylight-blocking filter.

The IR LED emits a burst of collimated light every second. In clear air the photo-diode receives no light directly from the IR LED, because of the angular arrangement and the chamber baffles. When smoke enters the chamber it scatters light from the emitter IR LED onto the photo-diode in an amount related to the smoke characteristics and density. The photo-diode signal is processed to provide an analogue value for transmission when the detector is interrogated.

The Context UL-PLUS Optical Detector Operating modes as shown below comply with the UL standard for automatic smoke and heat detectors. The mode of operation for this detector is selected at the Context Plus fire control panel.

TECHNICAL DATA

Context UL-PLUS Optical Smoke Detector

Part No. 58000-650IMC

Specifications are typical at 24V, 23°C and 50% relative humidity unless otherwise stated.

Detection principle:	*Photo-electric detection of light scattered in a forward direction by smoke particles*
Chamber configuration:	*Horizontal optical bench housing infra-red emitter and sensor, arranged radially to detect forward scattered light*
Sensor:	*Silicon PIN photo-diode*
Emitter:	*GaAlAs infra-red light emitting diode*
Sampling frequency:	*1 per second*
Supply wiring:	*Two-wire supply, polarity insensitive*
Terminal functions:	*L1 & L2 supply in and out connections* *+R remote indicator positive connection (internal 2.2kΩ resistance to positive)* *–R remote indicator negative connection (internal 2.2kΩ resistance to negative)*
Operating voltage:	*17–28V DC*
Communication protocol:	*Discovery, XP95.*
	5-9V peak to peak
Quiescent current:	*440µA*
Power-up surge current:	*1mA*

Maximum power-up time: 10s

Alarm current, LED illuminated: 3.4mA

Remote output characteristics: Connects to positive line through 4.5kΩ (5mA maximum)

Clean-air analogue value: 23 +4/–0

Alarm level analogue value: 55

Alarm indicator:	*2 colourless Light Emitting Diodes (LEDs); illuminating red in alarm. Optional remote LED*	
Temperature range:	*–40°C to 70°C*	
Humidity:	*0% to 95% RH (no condensation or icing) Effect of atmospheric pressure:*	
None		
Effect of wind:	*None*	
Vibration, impact & shock:	*EN 54-7*	
Designed to IP Rating:	*IP44 in accordance with BS EN 60529*	
Standards & approvals:	*UL certified*	
Dimensions:	*100mm diameter x 42mm height*	
	(50mm height with XPERT 7 Mounting Base)	
Weight:	*Detector*	*105g*
	Detector with XPERT 7 Mounting Base	*160g*
Materials:	*Housing*	*White polycarbonate UL94-V0*
	Terminals	*Nickel plated stainless steel*

Context Plus

OPTICAL/HEAT MULTISENSOR DETECTOR

Part No. 58000-750IMC

The Context UL-PLUS Multisensor construction is similar to that of the optical detector but uses a different lid and optical mouldings to accommodate the thermistor (heat sensor).

The Context UL-PLUS Optical/Heat Multisensor Detector contains an optical smoke sensor and a thermistor temperature sensor whose outputs are combined to give the final analogue value. The way in which the signals from the two sensors are combined depends on the response mode selected. The five modes provide response behaviour which incorporates pure heat detection, pure smoke detection and a combination of both. The multisensor is therefore useful over the widest range of applications.

The signals from the optical smoke sensing element and the temperature sensor are independent, and represent the smoke level and the air temperature respectively in the vicinity of the detector. The detector's micro-controller processes the two signals according to the mode selected (see below). When the detector is operating as a multisensor (i.e. modes 1, 3 and 4) the temperature signal processing extracts only rate-of-rise information for combination with the optical signal. In these modes the detector will not respond to a slow temperature increase – even if the temperature reaches a high level. A large sudden change in temperature can, however, cause an alarm without the presence of smoke, if sustained for 20 seconds. The processing algorithms in modes 1 to 4 incorporate drift compensation

TECHNICAL DATA

Context UL-PLUS Multisensor Detector

Part No. 58000-750IMC

Specifications are typical at 24V, 23°C and 50% relative humidity unless otherwise stated.

Detector principle:	*Smoke: Photo-electric detection of light scattered by smoke particles*
	Heat: Temperature-dependent resistance
Supply wiring:	*Two-wire supply, polarity insensitive*
Terminal functions:	*L1 & L2 supply in and out connections*
	+R remote indicator positive connection (internal 2.2kΩ resistance to positive)
	–R remote indicator negative connection (internal 2.2kΩ resistance to negative)
Operating voltage:	*17–28V DC*
Communication protocol:	*Discovery, XP95 (5-9V peak to peak)*
Quiescent current:	*470µA*
Power-up surge current:	*1mA*

Maximum power-up time: 10s

Alarm current, LED illuminated: 3.5mA

Remote output characteristics: Connects to positive line through 4.5kΩ (5mA maximum)

Clean-air analogue value: 23 +4/–0
Alarm level analogue value: 55

Alarm indicator:	*2 colourless Light Emitting Diodes (LEDs); illuminated red in alarm. Optional remote LED*
Temperature range:	*–40°C to 70°C*
Humidity:	*0% to 95% RH (no condensation or icing)*

Effect of temperature on Optical Sensor:	*None*	
Effect of wind on optical sensor:	*None*	
Vibration, impact & shock:	*EN 54-5 & EN 54-7*	
Designed to IP Rating:	*IP44*	
Standards & approvals:	*UL Certified*	
Dimensions:	*100mm diameter x 50mm height*	
	(58mm height with XPERT 7 Mounting Base)	
Weight:	*Detector*	*105g*
	Detector with XPERT 7 Mounting Base	*160g*
Materials:	*Housing*	*White polycarbonate UL94-V0*
Terminals	*Nickel plated stainless steel.*	

Smoke element only:

Chamber configuration:	*Horizontal optical bench housing infra-red emitter and sensor, arranged radially to detect forward scattered light*
Sensor:	*Silicon PIN photo-diode*
Emitter:	*GaAlAs infra-red light emitting diode*
Sampling frequency:	*1 per second*

CONTEXT UL-PLUS IONISATION SMOKE DETECTOR

Part No. 58000-550IMC

The Context UL-PLUS Ionisation Detector uses the same outer case as the optical smoke detector and is distinguished by the red indicator LEDs. Inside the case is a printed circuit board which has the ionisation chamber mounted on one side and the signal processing and communications electronics on the other.

The ionisation chamber consists of a reference chamber contained inside a smoke chamber. The outer smoke chamber has inlet apertures fitted with insect resistant mesh.

At the junction between reference and smoke chambers, the sensing electrode converts variations in chamber current into voltage changes.

When smoke particles enter the ionisation chamber, ions become attached to them with the result that the current flowing through the chamber decreases. This effect is greater in the smoke chamber than in the reference chamber, and the imbalance causes the sensing electrode to become more positive.

The analogue voltage at the sensor electrode is converted to a digital format which is processed to provide an analogue value for transmission to the fire control panel when the device is polled.

The Context UL-PLUS Ionisation Detector, like all ionisation detectors, has some sensitivity to air movement (wind). The extent to which the analogue value will change depends on the wind speed and on the orientation of the detector relative to the wind direction. Relatively small changes in wind direction can cause significant changes in analogue value.

For wind speeds up to 1m/s the change in analogue value will not exceed 5 counts. Continuous operation in wind speeds greater than 2m/s is not recommended. However, wind speeds up to 10m/s can be tolerated for short periods and will not under any conditions increase the probability of false alarms.

Ionisation smoke detectors are supplied in individual packing with a red lid serving as a dust cover which can be left in place after fitting to prevent ingress of dust and dirt until commissioning of the system takes place. At this point the covers must be removed.

The Context UL-PLUS Ionisation Detector operating modes as shown below, comply with UL standard for automatic smoke and heat detectors. The mode of operation for this detector is selected at the Context Plus fire control panel.

TECHNICAL DATA

Context UL-PLUS Ionisation Smoke Detector

Part No. 58000-550IMC

Specifications are typical at 24V, 23°C and 50% relative humidity unless otherwise stated.

Detection principle:	*Ionisation chamber*
Chamber configuration:	*Twin compensating chambers using one single sided ionising radiation source*
Radioactive isotope:	*Americium 241*
Activity:	*33.3 kBq, 0.9µCi*
Supply wiring:	*Two-wire supply, polarity insensitive*
Terminal functions:	*L1 & L2 supply in and out connections*
	+R remote indicator positive connection (internal 2.2kΩ resistance to positive)
	–R remote indicator negative connection (internal 2.2kΩ resistance to negative)
Operating voltage:	*17–28V DC*
Communication protocol:	*Discovery, XP95 (5-9V peak to peak)*

Quiescent current:	*380µA*	
Power-up surge current:	*1mA*	
Maximum power-up time: 10s		
Alarm current, LED illuminated: 3.4mA		
Remote output characteristics: Connects to positive line through 4.5kΩ (5mA maximum)		
Clean-air analogue value: 23 +4/–0		
Alarm level analogue value: 55		
Alarm indicator:	*2 red Light Emitting Diodes (LEDs). Optional remote LED*	
Temperature range:	*–30°C to 70°C*	
Humidity:	*0% to 95% RH (no condensation or icing)*	
Effect of temperature:	*Less than 10% change in sensitivity over rated range*	
Atmospheric pressure:	*Operating: Suitable for installation up to 2,000m above sea level.*	
Effect of wind:	*Less than 20% change in sensitivity at speeds up to 10m/s. Note: slow changes in ambient conditions will automatically be compensated and will not affect sensitivity*	
Vibration, impact & shock: EN 54-7		
Designed to IP Rating:	*IP44*	
Standards & approvals:	*UL certified*	
Dimensions:	*100mm diameter x 42mm height*	
	(50mm height with XPERT 7 Mounting Base)	
Weight:	*Detector*	*105g*
	Detector with XPERT 7 Mounting Base	*160g*
Materials:	*Housing*	*White polycarbonate UL94-V0*
Terminals	*Nickel plated stainless steel*	

Context Plus

CONTEXT UL-PLUS HEAT DETECTOR

Part No. 58000-450IMC

Context UL-PLUS heat detectors have a common profile with ionisation and optical smoke detectors but have a low air flow resistance case made of self-extinguishing white polycarbonate.

The Context UL-PLUS Heat Detector uses a single thermistor to sense the air temperature at the detector position. The thermistor is connected in a resistor network, which produces a voltage output dependent on temperature. The design of the resistor network, together with the processing algorithm in the microcontroller, gives an approximately linear characteristic. This linearised signal is further processed, depending on the response mode selected, and converted to an analogue output.

For the European standard version of the detector, the five modes correspond to five "classes" as defined in UL standard for automatic heat detectors. The classes in this standard correspond with different response behaviour, each of which is designed to be suitable for a range of application temperatures. All modes incorporate "fixed temperature" response, which is defined in the standard by the "static response temperature". The application temperatures and static response temperatures for all response modes are given in the table below.

A detector that has been shown to have a rate-of-rise characteristic will still give a rapid response even when starting from an ambient temperature well below its typical application temperature. This type of detector is therefore suitable for areas such as unheated warehouses in which the ambient temperature may be very low for long periods.

The detector in purely fixed temperature mode on the other hand will not respond below its minimum static response temperature even when exposed to high rates of rise of air temperature. This type is therefore suitable for areas such as kitchens and boiler rooms where large, rapid temperature changes are considered normal.

TECHNICAL DATA

Context UL-PLUS Heat Detector

Part No. 58000-450IMC

Specifications are typical at 24V, 23°C and 50% relative humidity unless otherwise stated.

Detector principle:	*Heat sensitive resistance*
Supply wiring:	*Two-wire supply, polarity insensitive*
Terminal functions:	*L1 & L2 supply in and out connections*
	+R remote indicator positive connection (internal 2.2kΩ resistance to positive)
	–R remote indicator negative connection (internal 2.2kΩ resistance to negative)
Operating voltage:	*17–28V DC*
Communication protocol:	*Discovery, XP95 (5-9V peak to peak)*
Quiescent current:	*350µA*
Power-up surge current:	*1mA*

Maximum power-up time: 10s

Alarm current, LED illuminated: 3.4mA

Remote output characteristics: Connects to positive line through 4.5kΩ (5mA maximum)

Alarm level analogue value: 55

Alarm indicator:	*2 red Light Emitting Diodes (LEDs). Optional remote LED*
Temperature range:	*Minimum operating temperature –40°C*

	Maximum operating temperature	*see Table 4*
	Storage	*–40°C to 80°C*
Humidity:	*0% to 95% RH (no condensation or icing)*	
Vibration, impact & shock:	*EN 54-5*	
Designed to IP Rating:	*IP54*	
Standards & approvals:	*UL Certified*	
Dimensions:	*100mm diameter x 42mm height*	
	(50mm height with XPERT 7 Mounting Base)	
Weight:	*Detector*	*105g*
	Detector with XPERT Mounting Base	*160g*
Materials:	*Housing*	*White polycarbonate UL94-V0*
	Terminals	*Nickel plated stainless steel*

Context Plus

Analogue Addressable Fire Detection: Context Plus UL Listed Detectors Programming Modes

Photo-heat Multisensor Detector 58000-750IMC			
	Alarm @ 55 counts (%/ft)	Heat Classification @ 55 counts	30s alarm delay
Mode 1	1.3	140F ROR	Yes
Mode 2	1.9	N/A	Yes
Mode 3	2.6	140F ROR	Yes
Mode 4	3.3	140F ROR	Yes
Mode 5	N/A	135F FT (& ROR)	N/A

Optical Detector 58000-650IMC		
	Alarm @ 55 counts (%/ft)	30s alarm delay
Mode 1	1.7	No
Mode 2	1.7	Yes
Mode 3	2.3	No
Mode 4	2.3	Yes
Mode 5	3.0	No

Ionisation Detector 58000-550IMC		
	Alarm @ 55 counts (%/ft)	30s alarm delay
Mode 1	0.7	No
Mode 2	0.7	Yes
Mode 3	1.0	No
Mode 4	1.0	Yes
Mode 5	1.5	No

Heat Detector 58000-450IMC	
	UL Heat Classification @ 55 counts alarm
Mode 1	135F fixed temperature and rate of rise
Mode 2	150F fixed temperature and rate of rise
Mode 3	150F fixed temperature
Mode 4	200F fixed temperature and rate of rise
Mode 5	200F fixed temperature

ADDRESSABLE XPERT BASES

Part No. 45681-210IMU (Common Mounting base)

Part No. 45681-284IMC (Common Mounting Isolating base)

All Context UL-PLUS detectors fit into the Context Plus addressable XPERT bases.

An earth connection is not required for either safety or correct operation of detectors. The ground (earth) terminal is isolated and is provided for tidy termination of grounded conductors or cable screens and to maintain earth continuity where necessary.

All terminals are marked according to their function.

Bases have a wide interior diameter for ease of access to cables and terminals and there are two slots for fixing screws. The slots enable two fixing screws to be located at a spacing of 51mm to 69mm.

Detectors fit into bases one way only, without snagging, and require clockwise rotation without push force to be plugged in.

Universal address cards, known as XPERT cards, are supplied with all bases. Consult the coding guide in the installation instructions to determine which pips are to be removed from the card to give the correct address. Lay the card on a flat surface, pips down, insert a screwdriver into the slot on the reverse of the pip to be removed and give a firm twist.

When the card is coded insert it into the slot in the side of the appropriate base, making sure that the card locks itself into place. As a detector is inserted into the base, the remaining pips operate the address buttons on the detector and the detector electronics reads the address. An anti-tamper screw in the lid locks the detector to the mounting base. A 1.5mm hexagonal driver, Part Number 29600-095 is available from Apollo

The bases are of 100mm diameter and have five terminals:

L1	*line in and line out (-VE)*	*double terminal*
L2	*line in and line out (+VE)*	*double terminal*
–R	*remote LED negative supply*	*double terminal*
+R	*remote LED positive supply*	*double terminal*
E	*screen/functional earth*	*single terminal*

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