

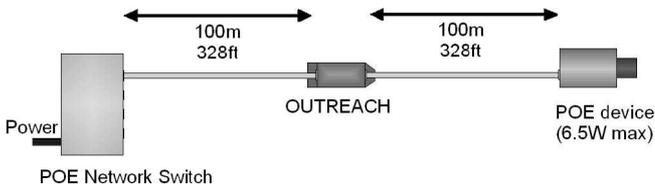
# OUTREACH INSTALLATION GUIDE



## Where to use OUTREACH™

Cables in an Ethernet network are limited in length to 100 metres (328 feet), however in some installations it is necessary to connect network devices that are more than 100 metres apart.

OUTREACH solves this problem by acting as a signal repeater, which can be used to join network cables together and create a longer overall network link.

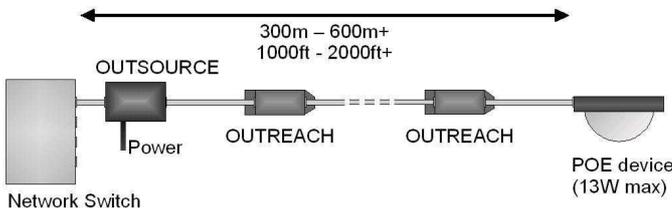


In the example above, a single OUTREACH allows a network camera to be installed up to 200 metres (656 feet) away from a network switch. The OUTREACH is connected in-line after the first 100 metres of cable have been laid, allowing a further length of up to 100 metres to be installed up to the camera.

The OUTREACH draws its own power from the network switch using Power Over Ethernet (POE), and also forwards POE to the camera. Power cable installation is only required at the network switch.

OUTREACH is compatible with all IEEE-compliant POE devices such as IP phones and Wireless Access Points and requires no setting-up on installation, as it configures its power and data forwarding functions automatically.

In addition, two or more OUTREACH units may be connected in a chain to extend cable reach beyond 200 metres (656 feet). Maximum range and POE power can also be increased by installing an OUTSOURCE power injector, as shown in the diagram below.



### EC Declaration of Conformity

In accordance with EN 45014:1998

We, Veracity UK Ltd. of 6 Barns Street, Ayr, KA7 1XA  
declare that the equipment "OUTREACH" Ethernet repeater  
model number VOR-OR01

conforms to the essential protection requirements of the EMC Directive 89/336/EEC as amended. The following EMC standards have been applied:

BS EN 55022:1998 Emissions (Class B Radiated)  
BS EN 55024:1998 Immunity (BS EN 61000-4-2:1995 Immunity to ESD, BS EN 61000-4-3:2000 Immunity to Radiated RF Fields (3V/m))

I hereby declare that the equipment named above has been found to comply with the relevant sections of the above referenced specifications. The unit complies with all essential requirements of the EMC Directive.

Responsible Person *Alastair McLeod* Mr Alastair McLeod, Director  
Issued 17<sup>th</sup> December 2007 at Ayr



This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## Installation



Quick installation sequence:

- Connect the POE IN connector to a POE source (such as a network switch)
- Connect the POE OUT connector to a POE powered device (such as an IP camera)
- Wait a few seconds for all devices to be enabled
- Check the status of the LED indicators

## LED indicators

Connector	LED	OFF	ON	FLASHING
POE IN	POWER GOOD	no power	power good	power marginal
	LINK / ACTIVITY	no Ethernet link	Ethernet link good	network activity
POE OUT	POE ENABLED	no POE enabled	POE out enabled	insufficient power / error
	LINK / ACTIVITY	no Ethernet link	Ethernet link good	network activity

In nearly all installations both green power LEDs will light solidly and both yellow network LEDs will light or blink, and no further action needs to be taken.

If either green LED blinks, or any LED fails to light, consult the detailed FAQ / troubleshooting section overleaf.

## Range

Max device power:	13 Watts (Class 3)	6.5 Watts (Class 2)	3.8 Watts (Class 1)	0 Watts (no POE)
Range with POE switch:	N/A	300m 984ft	400m 1310ft	700m 2300ft
Range with OUTSOURCE:	300m 984ft	500m 1640ft	700m 2300ft	1000m 3280ft

The maximum distances above are typical for installations using 24AWG Cat5 cable or better. Actual limits depend on cable and device characteristics and may not necessarily be multiples of 100 metres.

When designing your network installation, use the table above and locate an OUTREACH every 100 metres (328 feet) from the POE source.

If extra power or range is required post-installation, it is very straightforward to upgrade the link by fitting an OUTSOURCE.

## Technical specification

Power	Typical: 1 Watt, Maximum: 2.2 Watts
POE	IEEE 802.3af Class 0 device (0 – 13 Watts)
Ethernet	100BASE-TX Full Duplex only Auto-Negotiation and Auto-Crossover supported
Dimensions (WxDxH)	75x39x20mm / 2.9x1.5x0.8" 105x42x20mm / 4.1x1.7x 0.8" inc. screws and tabs
Mounting	Two 7mm / 0.28" dia holes, 89mm / 3.5" apart
Weight	105 g / 3.7 oz
Operating temp	-10 to 50°C / 14 to 122°F
Relative humidity	Up to 85%, non-condensing

## Frequently Asked Questions

### What are the benefits of using POE?

Using POE to power network devices leads to more straightforward installation, as devices can be installed and relocated without having to install new power cable. POE is limited to safe levels of voltage and current and is a universal standard, whereas there is a wide variation in power standards worldwide.

POE allows all devices to be powered from a central, controlled source, which may be an Uninterruptible Power Supply (UPS). Power management can be more sophisticated, and remote devices can be simply powered down or reset if necessary.

OUTREACH brings all these benefits to installations beyond 100m (328ft) at full 100Base-T capacity.

### What are POE power classes?

Powered devices can advertise the amount of power they require when they are enabled by a power source, as one of three classes as follows:

Class 1	0 - 3.8 Watts
Class 2	3.8 – 6.5 Watts
Class 3	6.5 – 13 Watts

For example, a 5 Watt network video camera would request Class 2 power, so its POE power source would allocate 6.5 Watts (7 Watts including losses) of its *power budget* to the camera.

Power classification is optional; devices that do not advertise a class are placed in Class 0 and allocated the full 13 Watts (around 15 Watts including losses). Some low cost devices may not implement power classification; if they only draw 1 Watt the POE source would have to allocate full-class power to them.

OUTREACH is a Class 0 device as it may draw the full range of power. A 30 Watt POE switch should therefore be able to enable 2 OUTREACHes from its power budget.

### What is Power Promise™?

Power Promise is Veracity's unique, patent-pending technology which gives OUTREACH the capability to detect the power characteristics of all POE devices and cables in the link. Only Power Promise technology enables OUTREACH to decide whether to enable POE to powered devices.

Installers can simply connect OUTREACH to their POE equipment without any setting-up or calculations required, and the Power Promise technology will ensure the power delivered does not violate the POE specification, which could in turn result in overloaded power supplies or incorrect operation of powered devices.

### Why are Ethernet connections limited to 100 metres / 330 feet?

This limit for cable length originated for previous Ethernet standards. 100Base-T Ethernet equipment must be sensitive enough to operate correctly over this distance, but in full-duplex mode there is no technical reason to prevent correct operation over longer distances.

OUTREACH uses class-leading Ethernet circuitry, and OUTREACH-to-OUTREACH connections may typically exceed 130 metres (430 feet). Although operation over 100m/330ft is not guaranteed, this does allow some overhead for longer cable runs in actual installations. Cable length to other devices will depend on the device's own Ethernet performance.

The POE specification also limits cable lengths to 100m/330ft, however OUTREACH's Power Promise technology allows installations to run beyond this safely.

### Do I need to configure OUTREACH for use on my network?

No, OUTREACH is a transparent Layer 1/2 device and requires no MAC or IP address. It introduces virtually no delay and other network devices will be unaware there is anything other than a cable between them.

OUTREACH is compatible with both patch and crossover cables.

### Can OUTSOURCE be used as a conventional POE injector (midspan)?

Yes, OUTSOURCE is a fully IEEE-compliant single channel POE midspan. It can be used to provide power for any compatible POE powered devices.

### Where should you install OUTSOURCE?

OUTSOURCE can be installed anywhere before the first OUTREACH in the chain, although normally it will be connected via a patch cable to a network switch with the longer cable running to the OUTREACH.

Note that OUTSOURCE is a passive device, it does not extend the signal so the total cable length on either side should not exceed 100m/330ft.

OUTSOURCE can safely be connected after a conventional POE switch. The switch will not enable power to the OUTSOURCE and the OUTSOURCE will only enable power to the OUTREACH.

### How can I extend both power and Ethernet to equipment that is not IEEE 802.3af POE compatible?

OUTBREAK is a POE splitter that divides its POE network connection into a non-POE Ethernet signal and a 12 Volt 1 Amp auxiliary supply. It can be used to power devices that are not POE compatible, devices which are compatible with older POE standards, or devices that are POE compatible but which require a shared 12V supply for other equipment.

Note that OUTBREAK is a maximum POE class device so must be used in conjunction with an OUTSOURCE.

### Can I use OUTREACH on cable types other than Cat5 or above?

Yes, OUTREACH will function correctly although this is not recommended. The Power Promise technology will account for extra power losses, but network range or performance will suffer if the cable does not meet the specifications for 100Base-T Ethernet.

### I have a CCTV installation which uses video baluns to transmit analogue video over twisted pair – can OUTREACH help me upgrade this to a digital link?

Yes – the cable should be 4-pair Cat5 or better for best performance. Cut the cable every 100 metres and install an OUTREACH to repeat the signal and forward POE to your IP camera.

## Troubleshooting

### OUTREACH not receiving power / all LEDs off

Confirm that the OUTREACH has been installed in the correct orientation, and allow 4 seconds for each POE source and OUTREACH in the chain to enable its POE output.

Check the cable for correct, secure wiring. The POE source will usually display an error indicator for some faults. If it indicates that its power budget has been exceeded then other POE devices must be disconnected or an OUTSOURCE or additional POE switch must be installed.

Some POE switches are not IEEE compliant by default. If conventional IEEE POE cannot be enabled, the link will have to be upgraded with an OUTSOURCE.

### No Ethernet connection / Link LED off

Check the cable condition and allow time for all powered devices to be enabled. A reliable Ethernet link is not guaranteed over individual cable segments exceeding 100m (328ft) in length, although power may still be carried.

All connected devices must be 100Base-T Full Duplex capable and preferably have Auto-Negotiation enabled (default for most basic 10/100 POE switches).

### Not forwarding power / POE Enabled LED off or blinking

The POE Enabled LED will flash in a repeating pattern to indicate the type of fault detected. 9 flashes in a row means that there is not enough power available to enable the connected device, given the cable length and device power class. Usually the link can be simply upgraded with an OUTSOURCE to remedy this.

If the LED is off or emitting any other pattern then there is a cable fault or the powered device is not IEEE 802.3af POE compliant.

### The OUTREACH is functioning but the Power Good LED is blinking

OUTREACH will only enable power to POE devices if it is guaranteed to meet the characteristics of the IEEE POE specification. The Power Good LED will blink if the characteristics for the power delivered are close to, but still within, the specified limits.

OUTREACH is intended for use with POE equipment from reputable manufacturers, which will have been tested over the full range of the POE specification. If there is any doubt over the operation of the installed equipment, the link can be upgraded with an OUTSOURCE.

### Maximum range is less than expected

Check the cable for faults. The cable should be Cat5 or higher specification and 24AWG or heavier duty (lower AWG).

Range varies depending on the characteristics of the cable and POE power source used. Also the powered device may be requesting a higher than necessary power class. In both cases the link can be simply upgraded with an OUTSOURCE to increase maximum range.