NEW PRODUCT

NEOS 30 OEM - DISTRIBUTOR MANUAL

Section 1 - Product Information

Section 2 - Technical & Installation

CONFIDENTIAL

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SECTION 1 - PRODUCT INFORMATION

1. BACKGROUND

NEOS

The standard NEOS Bars have become accepted as the most effective static eliminators in their respective classes:

from NEOS 12, which is the most effective short range Bar available

to NEOS 30, which is the most powerful long range Bar available

Please refer to the comparison between the Simco ThunderION 2.0 and the NEOS 30 which was sent to you in February 2019. It shows that the NEOS 30 is comprehensively better than the market leader at all distances.

Frequency and Long Range Static Neutralisation

It is useful to repeat these notes, as they are essential for understanding the benefits of the NEOS 30 OEM and where it fits into the NEOS range.

The method for neutralising at long distance without air assistance is to reduce the frequency of the ion emission so that it produces bigger fields of ions which propel each other outwards. This is the basic operation for all pulsed DC static neutralisation.

Generally:

- short distances are neutralised with higher frequency – for example, 50 Hz on the 3014 and 3024F

- longer distances are neutralised with slower frequency – for example, 5 Hz on the 3024L

When NEOS Bars are used in intelligent operating modes (AN or AL) they respond to the polarity of the electric field from the object and change the wave pattern to output more ions of the opposite polarity. This effect also compensates to a large degree for changes in distance within the sensing range. The unipolar fields in AN and AL modes can be larger and so act like slower frequency fields.

In AL mode the NEOS 30 can sense a strong electric field at distances up to about 750 mm. In this range there will effectively be automatic compensation for distance.

If the electric field is too weak, usually because the target is too far away, a Manual setting may produce better neutralisation. For example, the NEOS 30 in setting M1 (0.5 Hz) neutralises at distances over 750 mm more efficiently than in AL mode.

What if the object to be neutralised moves from a short distance to a distance over 750 mm?
For example, from 200 mm to over 1m?

The NEOS 30 OEM has been developed to deal with this problem.

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2. KEY NEW FEATURES

The essential and unique feature of a NEOS 30 OEM Bar is that it receives a signal from the PLC of the machine which indicates the distance between the charged material and the Bar. This tells the NEOS 30 OEM to adjust the frequency to the optimal setting for that distance.

In this way the output frequency of the Bar is directly controlled by the PLC of the production machine without the need for additional sensors.

It results in the best possible static neutralisation for difficult applications.

3. TYPICAL APPLICATIONS

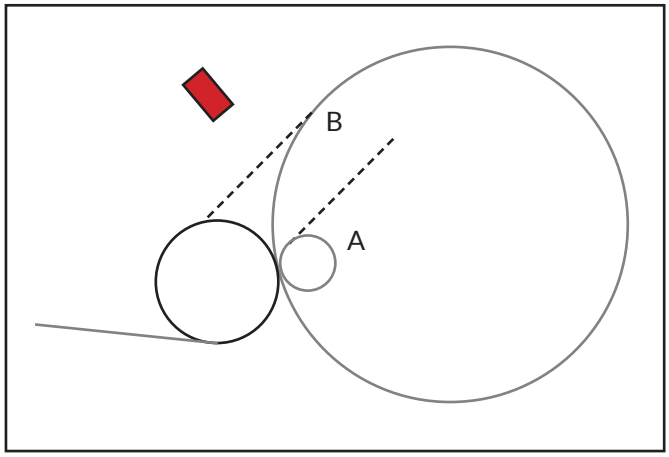
NEOS 30 OEM has been developed for dynamic applications where the distance between the charged material and the Bar changes significantly during the manufacturing process.

A large part of this market will be where winders and unwinders are used. High productivity, modern machinery in the converting, plastic, paper and related industries is designed to handle bigger reels of material, often with automated changeover.

This means that the distance between the static eliminator and the material can vary over a large range. This is where the NEOS 30 OEM has unrivalled advantages.

Typical Examples:

Winders:

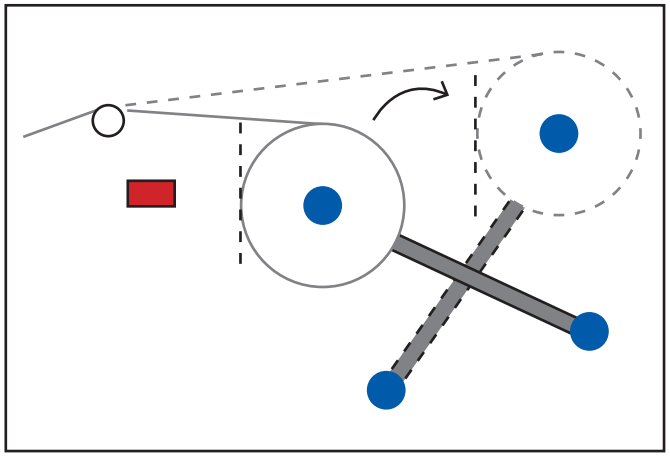


Lay-on Roller

At the start of the wind, position A, the material is over 1 m from the NEOS 30 Bar.

At the end of the wind, position B, the material is 200 mm from the NEOS 30 Bar.

The NEOS 30 OEM can automatically change frequency to cope with this change in distance.



Turret Rewinder

If the reel stays in a farther position before changeover for a significant period of time, then a NEOS 30 OEM will be able to neutralise the reel in both positions.

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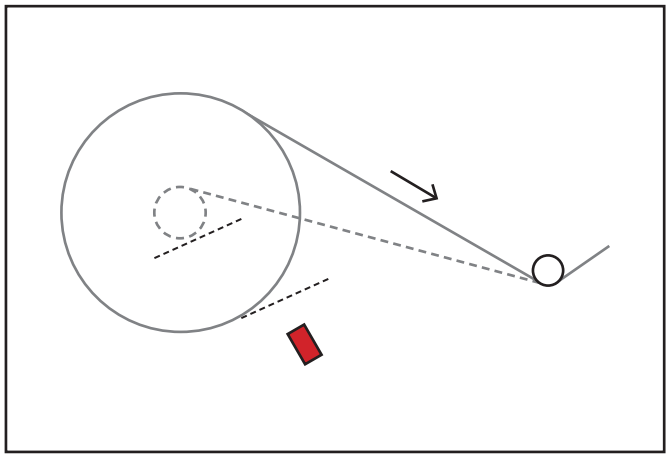
3. TYPICAL APPLICATIONS

Unwinders:



Unwinder

The NEOS Bar is 200 mm from the surface of a new reel, but the core is over 1 m away.

Usually the static charge becomes more severe as the reel reduces in size. It is important that the ionisation reaches the reel when it is small.

Winders and unwinders are found on hundreds of different types of production machinery.

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4. WHERE DOES NEOS 30 OEM FIT INTO THE NEOS RANGE?

NEOS 30 OEM does not replace the existing NEOS 30 Bar, but provides a powerful new ionisation system to cope with the difficult applications where the target distance changes substantially.

It is a long range static eliminator which can automatically adjust its ionised output to provide optimal performance at distances varying from 200 mm to 1500 mm.

The standard NEOS 30 has settings for most industrial requirements (see NEOS Distributor Manual):

NEOS 30 SETTING	FOR DISTANCES
AN	200 mm - 500 mm
AL	300 mm - 750 mm
M3	200 mm - 500 mm
M2	300 mm - 750 mm
M1	500 mm - 1000 mm
NEOS 30 OEM	**200 mm - 1500 mm**

The NEOS 30 OEM can be used for all of these distance ranges. Please see Performance section for more details.

5. WHY IS IT CALLED OEM?

It is called OEM because it has been developed for, and with the assistance of, OEMs and we see that its main market will be with machinery manufacturers.

We can customise the output to meet the special requirements of each type of OEM machine. For example, if a machine has a requirement for neutralisation at a distance from 500 mm to 1300 mm, we can optimise the ionisation for this distance range.

This gives our distributors and sales teams a great opportunity to work closely with OEMs and offer them unique benefits for their machines.

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6. WHAT ARE THE DIFFERENCES BETWEEN NEOS 30 OEM AND STANDARD NEOS 30?

Visually, the only differences are on the cable endcap:

- there are two connector sockets: the normal NEOS 30 M12 x 5 pin and an additional M8 x 3 pin which receives the signal from the machine's PLC.
- the selector dial for Automatic and Manual modes is not required for the NEOS 30 OEM.
- the LED is the same. It shows green for 'all OK', red for 'fault' and green/red for 'clean me'. When green, it flashes to show the operating frequency.

The endcap of the NEOS 30 OEM.

With an additional M8 x 3 pin connector for the signal from the machine's PLC.

With the same M12 x 5 pin connector.

In all other ways the NEOS 30 OEM is externally the same as the standard NEOS 30:

- same compact profile (half the size of the Simco ThunderION)
- same lengths available: 600 mm, 750 mm then in 250 mm steps to 5 m
- same fixings for installation
- same market-leading, replaceable tungsten emitters

Electrically, the OEM model incorporates a wiring improvement which will eventually be used in all NEOS Bars. We have eliminated the requirement for external pull-up resistors, which makes electrical installation much easier for the customer.

Please see section 7.3 of Operating Instructions in Section 2 of this manual.

Performance differences - see next section Performance.

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7. PERFORMANCE

How does NEOS 30 OEM Compare to the Manual NEOS Settings?

The NEOS 30 OEM has slightly better performance to the M1, M2 and M3 manual settings on the standard NEOS 30.

This is because, although the frequencies may be similar, the NEOS 30 OEM changes gradually, not in steps of 0.5 Hz, 1.0 Hz, 1.5 Hz etc. This fine tunes the performance for maximum efficiency as the distance changes.

The big difference, though, is that it changes automatically between these settings according to the distance signal from the PLC. In this way it is always at its most powerful manual setting for the job.

The operator does not have to change the setting between different jobs to ensure optimal performance.

How does the performance of NEOS 30 OEM compare to the 'intelligent' AN and AL Settings?

This is more difficult to answer because the effectiveness of the AL and AN setting depends on the size of the charge – the bigger the charge, the better the sensing.

We compared the performance of the NEOS 30 OEM and the standard 'intelligent' settings on our constant current charge plate monitor. We used a plate voltage of 25 kV to represent a typical charge and used distances from 200 mm to 1.5 mm. The results were:

- AN setting was better than NEOS 30 OEM at distances up to 470 mm
- AL setting was better at distances up to 625 mm

These results will vary with the size of the charge. However, the tests make it clear that at longer ranges, the NEOS 30 OEM will give a better overall result.

Please remember that we can customise the performance to meet the particular requirements of the machine. The default setting is for distances from 200 mm to 1500 mm. We can change this to meet the OEM`s machinery, for example:

If the distance changes from:	700 mm to 1500 mm
or	1100 mm to 500 mm
or	300 mm to 1400 mm to 300 mm

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SECTION 2 - TECHNICAL & INSTALLATION

1. INTRODUCTION

This manual applies to the NEOS 30 OEM Static Eliminator Bar supplied from December 2018.

It is essential that you read and understand the complete manual before installing and using this equipment. This is important for safety and for warranty cover.

1.1 Explanation of Symbols

Warning!

This symbol appearing in the operating instructions refers to operations which, if carried out improperly, may result in serious personal injuries.

Caution!

This symbol appearing in the operating instructions refers to operations which, if carried out improperly, may result in damage to property.

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2. SAFETY

Warnings:

- The Anti-Static Bar is only designed for neutralising surfaces with an electrostatic charge.
- Electrical installation must only be carried out by suitably qualified personnel.
- Adequate installation earth / ground is required to ensure safe and proper operation.
- The 0 V return of the 24 V DC electrical supply must be earthed.
- Disconnect the power supply before cleaning or handling the Bar.
- The emitters are sharp and can cause physical injury.
- There are no user serviceable parts inside the Bar.
- Ensure the Bar and connecting cable are free from damage prior to installation and check periodically once in use.
- Bar must be switched off before removing or reconnecting the signal cable.
- A small amount of ozone will be produced as part of the ionisation process. When installed correctly the level of concentration of ozone is less than 0.1 ppm and is within internationally accepted limits.

Any changes to the equipment without written consent of the manufacturer will nullify the warranty and CE certification.

As with all pulsed DC static eliminators, it is possible for the user to receive a small static shock as a result of their body being charged by the bar, and then discharging to a nearby earthed object. This is not dangerous, but may be uncomfortable and cause surprise. It is for this reason that the signal cable must not be removed or reconnected when the bar is powered.

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3. USE

The NEOS 30 OEM is a long range static eliminator designed to neutralise electrostatically charged surfaces at distances between 200mm and 1500mm. A signal on the 4-20mA current loop input allows the bar frequency to be varied as distance to the charged material varies, such that optimal electrostatic neutralisation can occur.

Powered by 24 V DC with integrated HV supplies and remote monitoring to check bar function remotely. Connection to 24 V DC is via a standard M12 5-Pin Connector. Connection to 4-20mA current loop signal is via a standard M8 3-Pin connector.

Not suitable for outdoor use.

4. CHECKING ON DELIVERED EQUIPMENT

The equipment leaves our factory in suitable protective packaging. Please check that it is undamaged when it arrives. If there is visible damage contact the Factory or one of our Distributors immediately, before carrying out any installation.

Check that the parts which have been delivered are the same as you have ordered.

Loose Parts: Mounting 'T' pieces and fixings - two for the lengths up to 1m plus one extra mounting bracket for every additional 500 mm.

NEOS 30 OEM: Emitter Key and two spare emitters.

M12 5-Pin Connector and lead(s) or Power Supply Unit - as per order.

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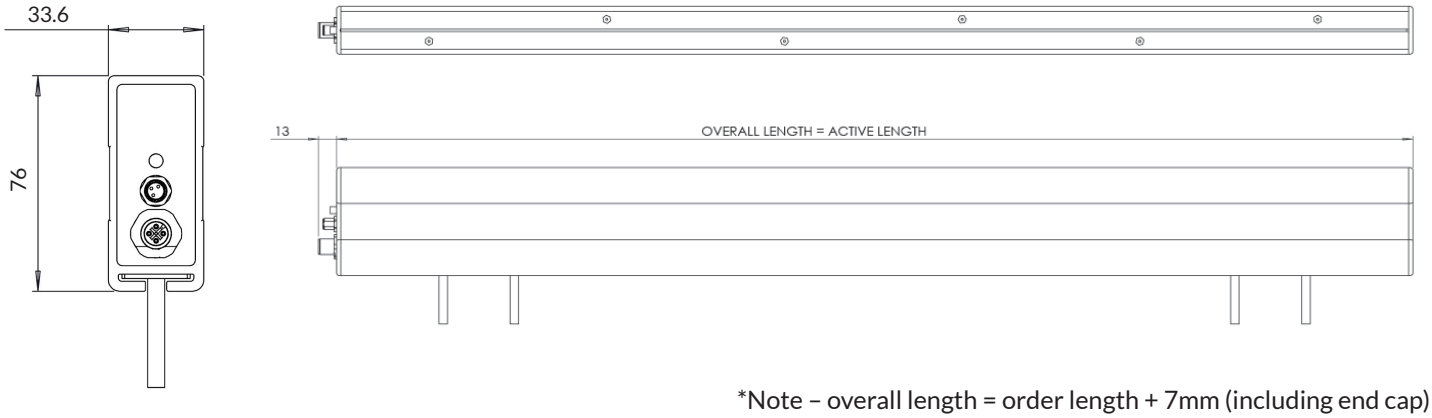
5. GENERAL SPECIFICATION AND DIMENSIONS

Power Supply:	Voltage: 24 V DC (21-27 V). Current: NEOS 30 OEM 2.5 A DC Max. Connection: M12 5-Pin. A-coded.
High Voltage:	NEOS 30 OEM - 30 kV integrated into Bar.
Supply Cable:	Low voltage, industry standard M12 5-Pin female connector.
Emitters:	Long life, high grade Tungsten.
Status Indication:	LED Green/Green Flashing = OK Flashing Red = Standby Red = Fault Red/Green Flashing = Attention required
Signalling:	OK/Attention Open-Collector outputs with internal 1k5 pull-up resistor. Remote DISABLE input.
Environmental:	IP67. Internal use. 0-55 °C Max. Dry: max 70% RH, non condensing.
Length:	NEOS 30 OEM available at 600 mm, then 750 mm to 5000 mm in 250 mm steps.
Weight:	NEOS 30 OEM - 3.6 kg/m.
Mounting:	M6 x 40 mm Fixing slides and Flange Nut.
Approvals:	CE, UL and CB.



*Note – overall length = order length + 7mm (including end cap)

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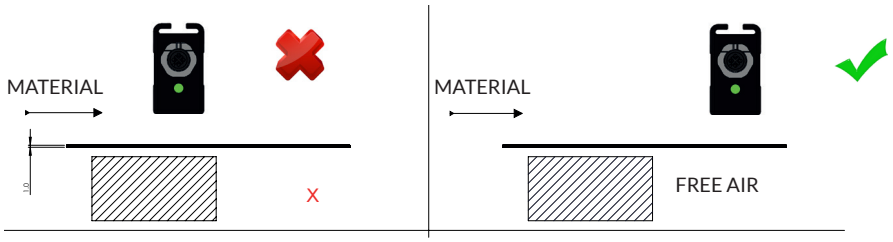
6. POSITIONING

i. The best location is at, or immediately before, the area where static is causing the problem. Remember that static can be regenerated if the material passes over rollers or through a process after neutralising. A Static Meter is useful to determine the best position.

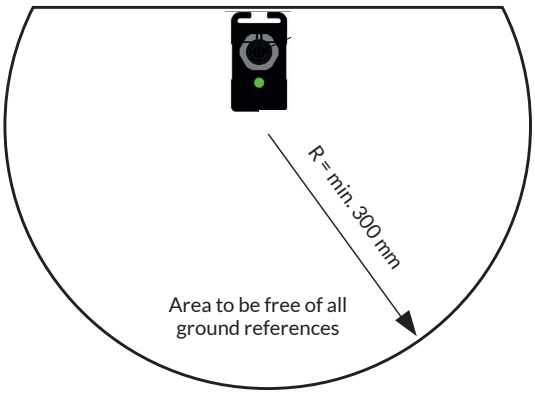
ii. Important: Except on a winding reel of material, the material to be neutralised should be in free air, not touching another surface as it passes the Bar. It is not possible to neutralise static electricity where the material is touching another surface or roller.



iii. The Bars must be dry and oil-free.

iv. It is important that the emitter pins are not touching, or close to metal objects, to avoid spark erosion that will damage both the Bar and the metal object.

v. The distance from the material should be:
NEOS 30 OEM: 200 - 1500 mm



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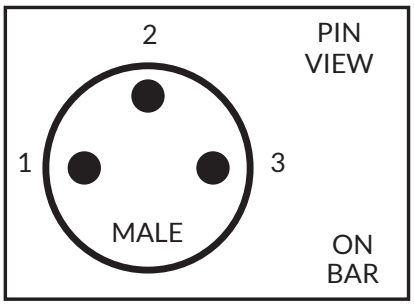
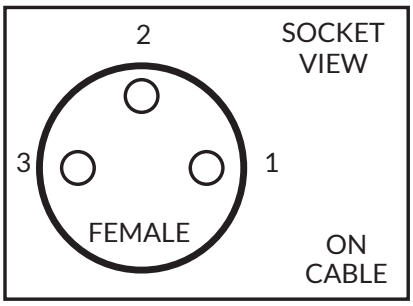
7. OPERATION & CONTROL





The pin assignment and typical wire colours are given in the table below:

Pin	Wire Colour	Function	Details
1	Brown	I in	Current loop input (+)
2*	Black	I out	Current loop output (-)
3	Blue	0 V + GND	0 V / GND, connected internally to power supply 0 V

*Pin 2 numbered pin 4 by some cable suppliers.

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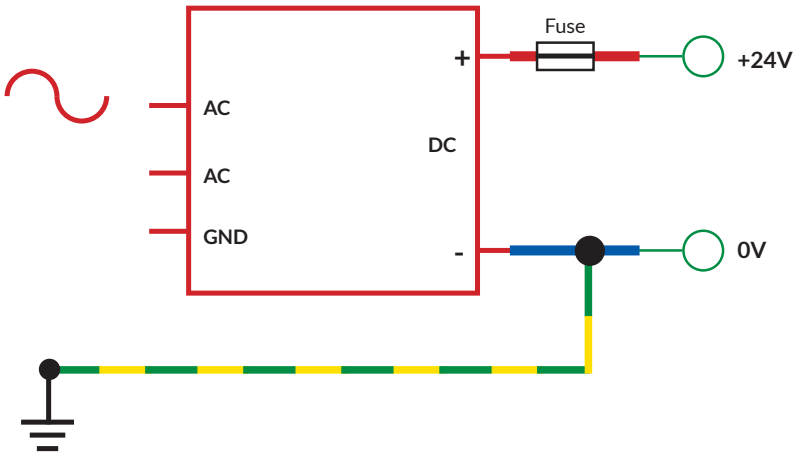
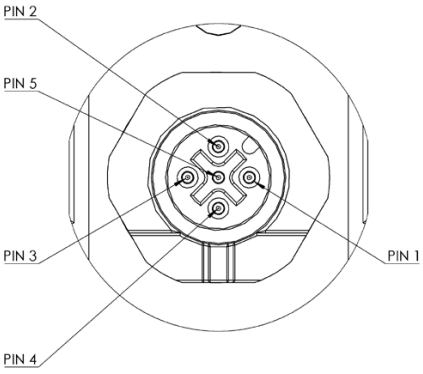
7. OPERATION & CONTROL

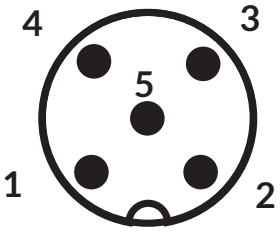
Electrical:

Using an existing 24 V DC supply the 24 V return must be fitted with:
2.5 Amp fuse e.g. Type : 2.5 AT 250 V.
The 0 V output must be connected to earth.

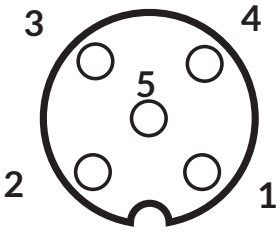




MALE PLUG



FEMALE SOCKET



Pin	Wire Colour	Function
1	Brown	24 V
2	White	OK
3	Blue	0 V & Earth
4	Black	Attention
5	Grey or Green / Yellow	Disable

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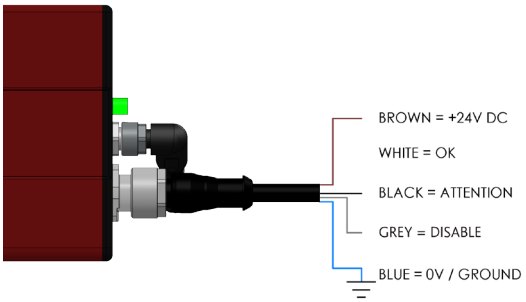
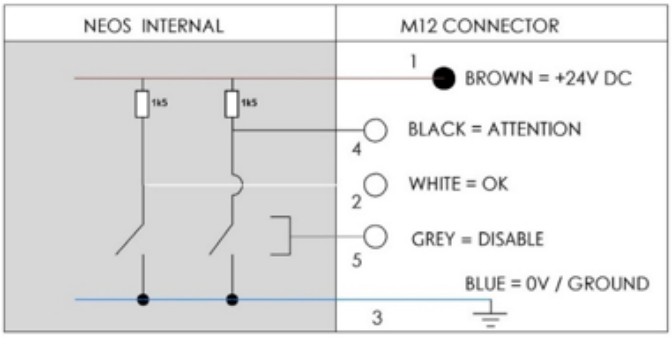
Signalling:

The NEOS Bars feature two open-collector outputs to enable remote monitoring of Bar status, and a logic-level DISABLE input to allow the HV supplies to be externally disabled when not required ("Standby" mode). For example, the bar can be linked into a machine's safety interlock system to ensure operator safety during changeover periods.

See wiring diagram and examples below.





Open-collector outputs (OK, ATTENTION)

Both open-collector outputs are capable of sinking a current of up to 200 mA, allowing direct driving of external lamps or relays, or an external LED with a suitable current limiting resistor. An internal 1k5 pull-up resistor provides a 24V signal suitable for driving a 24V PLC digital input compatible with IEC 61131-2 'Type 1' or 'Type 3'. See wiring diagram and examples in the next section.

Both output signals are active low, meaning that a signal is asserted by a connection to 0 V via a low-powered solid-state switch. The two signals are valid 5 seconds after power is applied, according to the following conditions:

Condition	Ionisation	OK (White, Pin 2)	Attention (Black, Pin 4)
Bar powered, all OK	ACTIVE (HV ON)	ACTIVE (connected to 0 V)	ACTIVE (connected to 0 V)
Bar powered, requires attention (e.g. cleaning)	ACTIVE (HV ON)	ACTIVE (connected to 0 V)	INACTIVE (open-circuit)
Bar not powered, overload or hardware fault	INACTIVE (HV OFF)	INACTIVE (open-circuit)	INACTIVE (open-circuit)
Standby mode	INACTIVE (HV OFF)	INACTIVE (open-circuit)	ACTIVE (connected to 0 V)

A working Bar in good operating condition will thus internally connect both opencollector outputs to 0 V, after a delay of up to 5 seconds after power is applied. Voltage applied to open collector outputs must not exceed 28 V DC, and must be of the correct polarity.

The current through the open collector switch must not exceed 200 mA. Failure to limit the current into the open collector outputs may cause permanent damage to the product. Do not connect the open collector outputs directly to 24 V.

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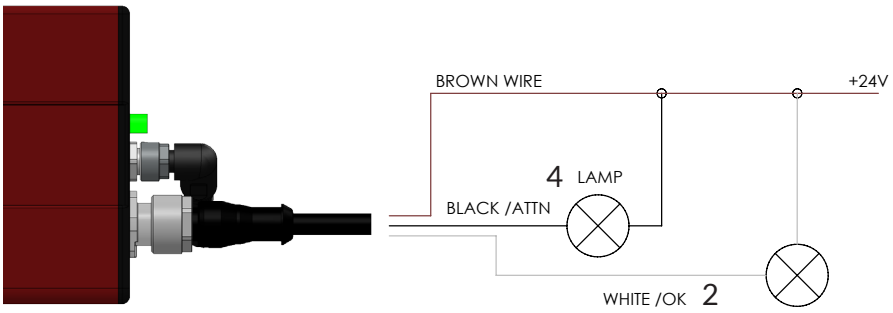
Example applications of open-collector outputs:

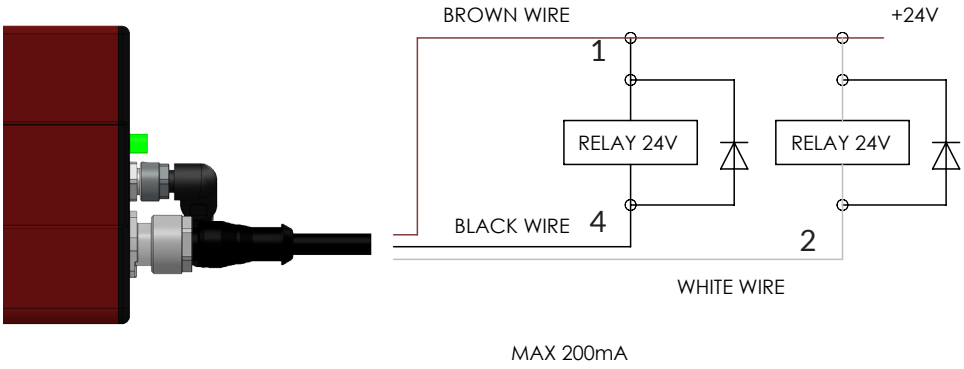
External lamp/indicator

External lamps or indicators can be connected to the OK or ATTENTION outputs to remotely display Bar status. This is useful for bars mounted in inaccessible areas. Lamp rating 24 V DC, maximum 5 W. A LED can also be used with a suitable resistor. Maximum lamp current 200 mA.



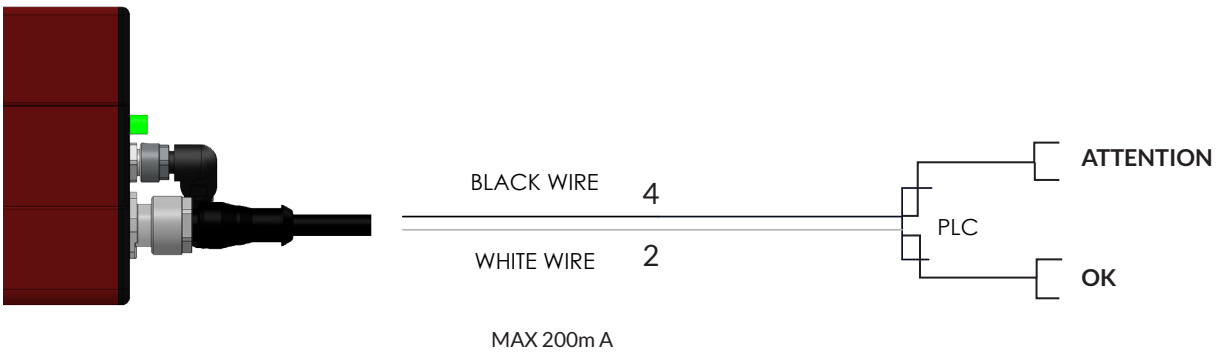
External relay

An external relay can be connected for additional control/feedback applications. Coil rating 24 V 5 W max.



External PLC 'Type 1' or 'Type 3'

Interfacing to an external 24V IEC 61131-2 'Type 1' or 'Type 3' PLC digital input can be achieved by direct connection.



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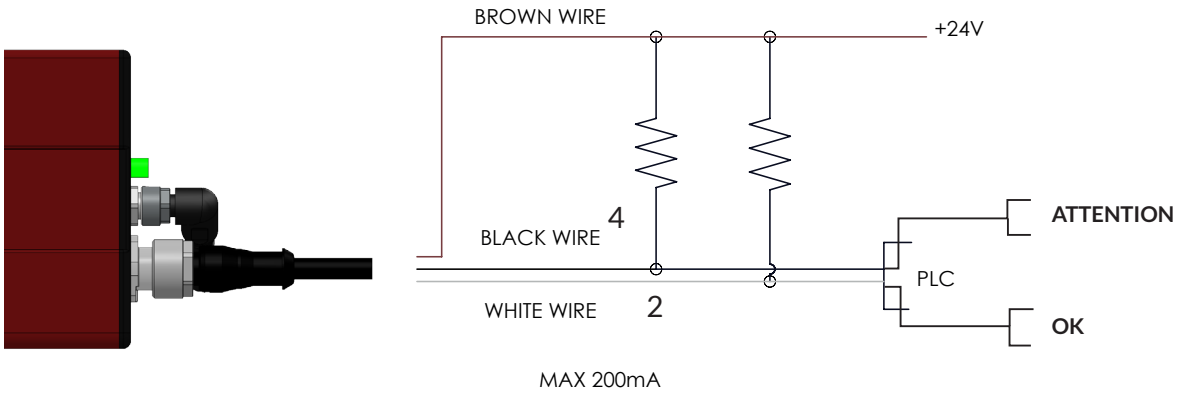
External PLC 'Type 2'

A voltage signal suitable for interfacing with a 24V IEC 61131-2 'Type 2' PLC input or other 24V control system can be obtained using an external pull-up resistor to 24V.



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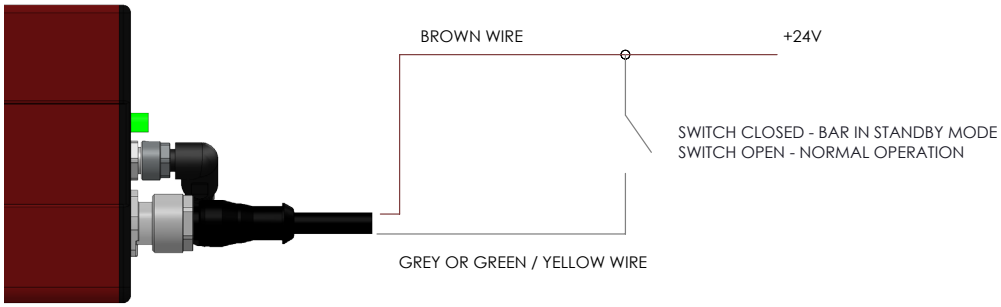
Remote DISABLE input

The NEOS Bars feature a remote DISABLE input signal (Grey or Green/Yellow wire). This may be useful for installations in which the Bar is not used continuously and it is desirable that the Bar should be inactive when not required, or in installations in which the operation of the Bar is to be interlocked with other machinery.

The HV supplies may be externally disabled (Standby mode) by applying any DC voltage between 3 V and 28 V to the DISABLE input, for example by using an external switch or relay contact between the DISABLE input and 24 V, or a logic-level voltage signal. Subsequently reducing the voltage at the DISABLE input to lessthan 0.5 V restores normal operation of the Bar.



In Standby mode the Bar internal HV supplies are disabled, the status LED flashes red, and the OK output is inactive (open circuit) to indicate that ionisation is disabled. The DISABLE signal has a weak internal pull-down resistor, thus if the DISABLE signal is left disconnected the Bar should operate normally. However, for added noise immunity it is recommended that the DISABLE input is externally connected to 0 V (blue wire) if not required.

Voltage applied to the DISABLE input must not exceed 28 V DC, and must be of the correct positive polarity. The Bar may be permanently damaged by connecting the DISABLE input to any voltage outside the range of 0 V to 28 V DC.

Where the optional SPX - 0724 AC Power Supply has been ordered ensure the Power Unit is connected to 3 wire AC mains supply, Live + Neutral + Ground, and that extra Earth wire from power supply is bonded to Ground. With this optional supply an interface cable is required to access the remote monitor feature.

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LED

Bar State	LED State	LED State (Intelligence Active)
Normal NEOS 30 OEM	Pulse Green	Rapid Flash Green

IONISATION ACTIVE IN THIS STATE

Bar State	LED State	Cause	Action
Attention	Red / Green Alternate Flash	Dirty or abnormal conditions	Clean Bar Check Installation Check Process

IONISATION ACTIVE IN THIS STATE

Bar State	LED State	Cause	Action
Fault	Solid Red	Power supply not within 21 - 27 V Internal fault Overload	Check power supply Check input voltage Check HV at pins Check Bar is correctly wired Check Bar is correctly positioned
Standby	Flashing Red	DISABLE signal active (3 - 28 V)	

IONISATION NOT ACTIVE IN THIS STATE

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8. MECHANICAL

Versatile mounting 'T' pieces slide into slot at the bottom of the Bar.
Two mounting slides for Bars up to 1 m, plus extra mounting brackets for each additional 500 mm.

9. MAINTENANCE

Turn off power supply to the Bar before doing any installation or maintenance work.

Cleaning is the only maintenance required. Dirt around the emitters will reduce efficiency and result in unsatisfactory performance.

Our Fraser cleaning kit (Part Number 81220) is ideal for use, alternatively a toothbrush or nail brush can be used. Do not use a wire brush as this could damage the Bar.

The Bar can be washed with soapy water or IPA, but it must be dry around the emitters before turning the power on.

Please note, when handling and cleaning, that the **emitter pins are sharp and care is needed!**

The emitter pins are shockless - there is a large resistor below each emitter reducing the current to a shockless level. However please note that DC current can transfer charge to a body if it is touching or close to an emitter for a longer period. This could give a shock when discharging.

The emitters on NEOS 30 OEM should be replaced every two years. Please use the emitter key supplied with the Bar to remove/replace.

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10. CERTIFICATION AND EU DECLARATION OF CONFORMITY

We declare that this equipment conforms to the Low Voltage Directive, and EMC Directive. It is entitled to display the CE and UL marks.

For further instructions and information, please contact the manufacturer.

11. TROUBLESHOOTING

On power-up, the status LED will be RED for up to 3 seconds while internal checks are being carried out inside the bar. After this time, if all operating conditions are normal, the status LED will turn GREEN.

If the status LED does not illuminate GREEN or RED, then check the electrical supply. If the electrical supply is OK, then check the connecting cables for damage.

If the status LED is in SOLID RED, then this indicates overload or other fault:

- Turn the power off and clean the bar.
- Check the electrical supply.
- Check the installation location is as described in this manual.

LED / Signal	Problem	Cause	Action
No LED	No 24 V power	No supply or voltage too low Faulty wiring	Check supply voltage Check wiring
Solid Red	No high voltage at emitter	Power supply out of voltage range Bar overloaded High voltage supply fault	Check power supply voltage Clean Bar
Flashing Red & Green	Poor ionisation	Dirty Bar Bar overloaded Bar incorrectly positioned	Clean Bar Check positioning of Bar Check emitters for damage

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12. SPARE PARTS & ACCESSORIES

Item Picture	Description	Part No.
	3 m cable M12 female, bare ends. Straight socket.	81193
	5 m cable M12 female, bare ends. Straight socket.	81194
	7.5 m cable M12 female, bare ends. Straight socket.	81195
	10 m cable M12 female, bare ends. Straight socket.	81196
	3 m cable M12 female, bare ends. 90° socket.	81199
	5 m cable M12 female, bare ends. 90° socket.	81200
	7.5 m cable M12 female, bare ends. 90° socket.	81201
	10 m cable M12 female, bare ends. 90° socket.	81202

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12. SPARE PARTS & ACCESSORIES

Item Picture	Description	Part No.
	Universal AC/DC power supply: 100-250 V AC, 24 V DC output Fitted with 1.5 m of cable.	NEOS-PSU
	Mounting 'T' Bracket, including flanged nut (40 mm)	34308
	Emitters for NEOS 20 & 30	34201
	Spare NEOS 20 & 30 Emitter & Key kits	342022
	Fraser Cleaning Kit	81220

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