

10 ELECTRICAL PORTS

10.1 CAUTIONS AND DEFINITIONS

CAUTIONS

Ordinary Locations

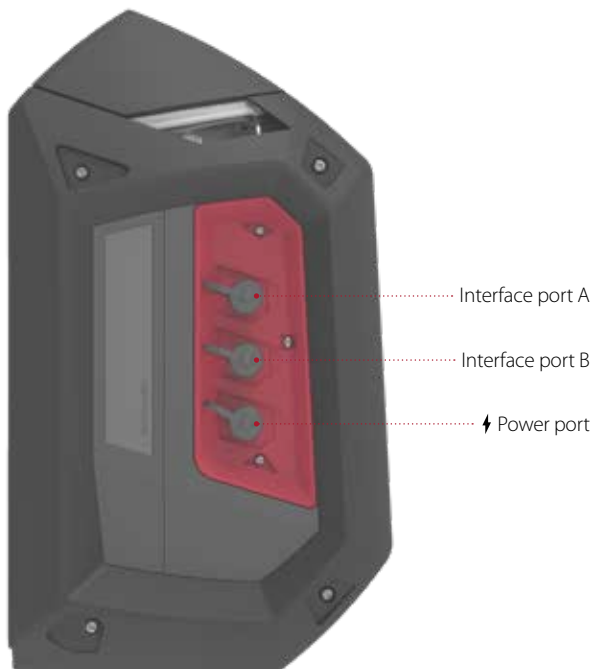
When used in a non-Hazardous (Classified) Location cables attached to the power port and Pins 1 and 2 of the A/B interface ports must be supplied by a Class 2 circuit, a limited energy circuit or a limited power source (LPS) as per IEC 61010-1, IEC 60950-1, or an equivalent IEC standard. The output should not exceed any of the applicable input entity parameters.

Follow local electrical codes

The wiring method used to install EXO's electrical port accessories should be in accordance to local electrical code. Installations are subject to acceptance by the authority having jurisdiction.

Barriers required

A barrier is required for each interface port when EXO is in a Class I, Division 1, Groups A,B,C,D or Class I, Zone 0/1, Group IIC. See diagram 10.3.6 for more information.



DEFINITIONS

Low-side switch

A low-side switch completes the circuit on the ground side. It is intended to sink power rather than provide power.

Ui – Maximum input voltage

The maximum voltage (peak a.c. or d.c.) that can be applied to the connection facilities of apparatus without invalidating the type of protection.

Ii – Maximum input current

The maximum current (peak a.c. or d.c.) that can be applied to the connection facilities of apparatus without invalidating the type of protection.

Pi – Maximum input power

The maximum power that can be applied to the connection facilities of apparatus without invalidating the type of protection.

Ci – Maximum internal capacitance

The maximum equivalent internal capacitance of the apparatus which is considered as appearing across the connection facilities.

Li – Maximum internal inductance

The maximum equivalent internal inductance of the apparatus which is considered as appearing at the connection facilities.

Uo – Maximum output voltage

The maximum voltage (peak a.c. or d.c.) that can appear at the connection facilities of the apparatus at any applied voltage up to the maximum voltage.

Io – Maximum output current

The maximum current (peak a.c. or d.c.) in apparatus that can be taken from the connection facilities of the apparatus.

Po – Maximum output power

The maximum electrical power that can be taken from the apparatus.

Co – Maximum external capacitance

The maximum capacitance that can be connected to the connection facilities of the apparatus without invalidating the type of protection.

Lo – Maximum external inductance

The maximum value of inductance that can be connected to the connection facilities of the apparatus without invalidating the type of protection.

Lo/Ro – Maximum external inductance to resistance ratio

Maximum value of ratio of inductance to resistance that can be connected to the external connection facilities of the electrical apparatus without invalidating intrinsic safety.

10.2 POWER PORT

This electrical port allows EXO to connect to a power supply and charge its battery pack while it continues to monitor an area. Currently, two Blackline G7 EXO accessories can attach to this port:

Trickle Charger allows EXO to be hardwired directly to a power source

Solar Panel allows EXO to be powered in remote areas through solar energy.

▲ SAFETY WARNING: Cables attached to the power port are only intrinsically safe when properly set up with an electrical barrier.

Cable requirements

EXO's power port is fitted with a male M12 4 pin plug. Electrical cables with a female M12 4 pin receptacle are required to connect to this port.

INSTALLING ACCESSORIES

Install EXO power port accessories as shown in the following electrical diagram to ensure intrinsic safety.

Diagram 10.2.3
Power port parameters

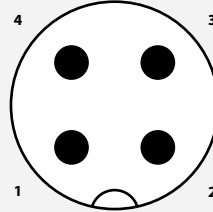
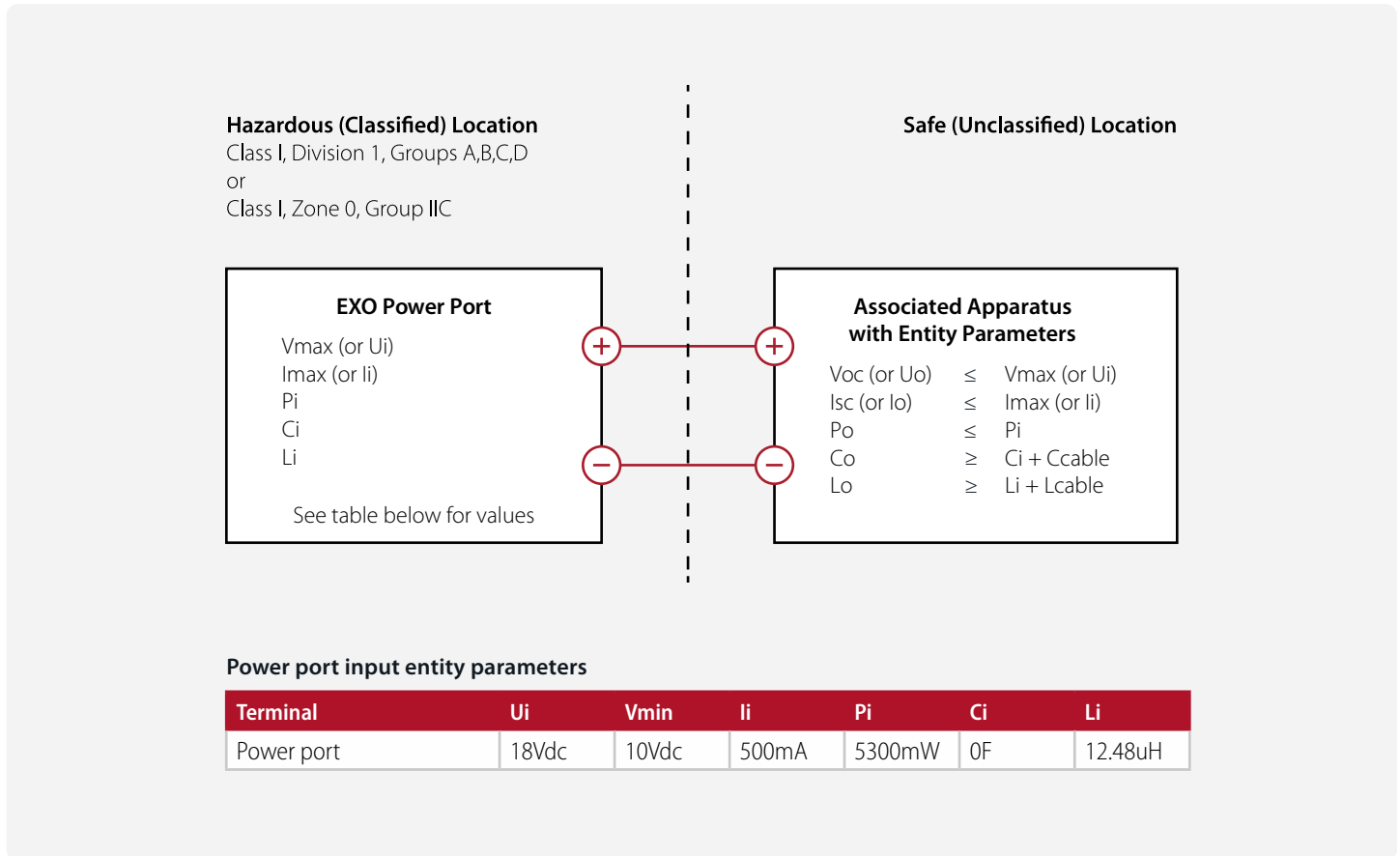


Diagram 10.2.1
Power port schematic diagram
Male plug
Pin assignment M12 plug, 4-pos., A-coded, view plug side

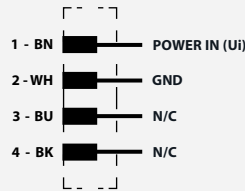


Diagram 10.2.2
Power port circuit diagram
Contact assignment of the M12 plug and M12 receptacles

10.3 A/B INTERFACE PORTS

When safety notifications are triggered on EXO, A/B interface ports act as switches by sending ON or OFF signals to connected accessories. Ask your Blackline Safety distributor or sales representative for a list of Blackline G7 EXO accessories that attach to the A/B interface ports.

If a high gas threshold is reached, port A will turn ON. Any device connected to port A will be active. The port will turn OFF when gas levels go back to normal on EXO.

If a low gas threshold is reached, port B will turn ON. Any device connected to port B will be active. The port will turn OFF when gas levels go back to normal on EXO.

Cable requirements

Both of EXO's A/B interface ports are fitted with a female M12 4 pin receptacle. Electrical cables with a male M12 4 pin plug are required to connect to these ports.

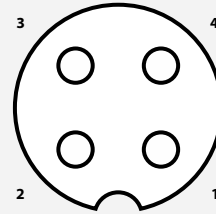


Diagram 10.3.1
Interface port schematic diagram
Female receptacle
Pin assignment M12 socket, 4-pos.,
A-coded, view receptacle side

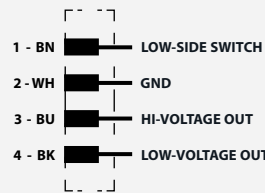
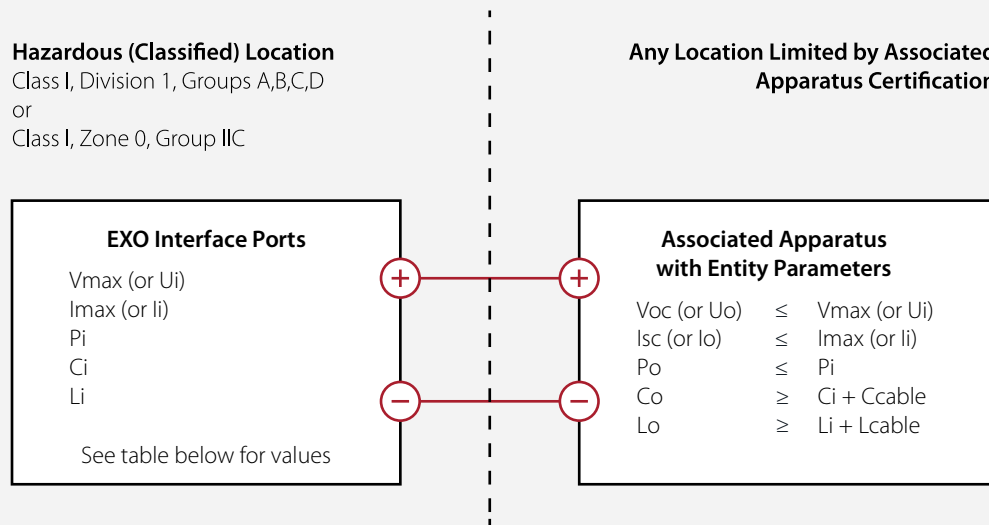


Diagram 10.3.2
Interface port circuit diagram
Contact assignment of the M12
plug and M12 receptacles

INSTALLING ACCESSORIES

Install EXO interface port accessories as shown in the following electrical diagrams to ensure intrinsic safety.

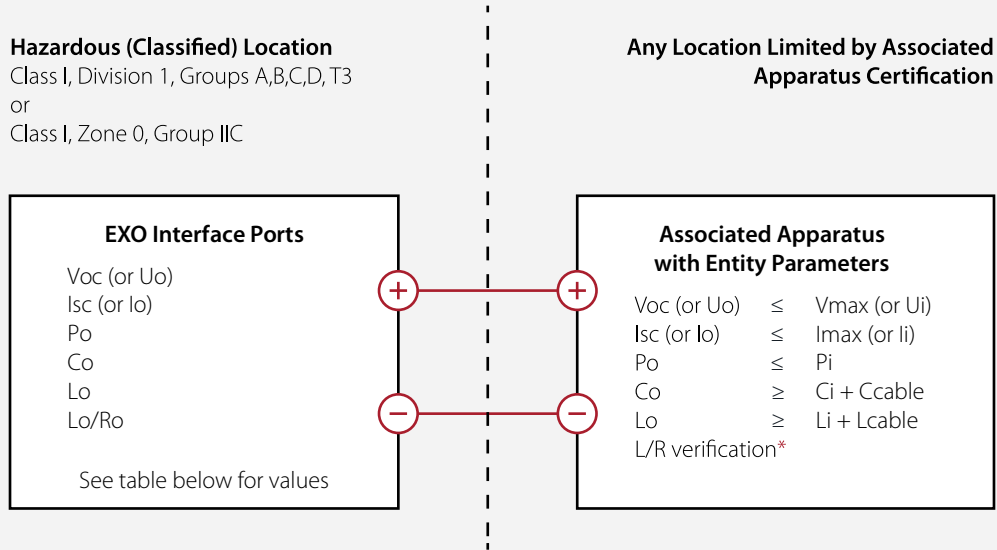
Diagram 10.3.3
Interface port parameters – Low-side switch



Input entity parameters (low side switch)

Terminal	U _i	I _i	P _i	C _i	L _i
Pin 1 to pin 2 (GND)	24Vdc	3.33A	1.25W	0F	0H

Diagram 10.3.4
Interface port parameters – pins 3 & 4



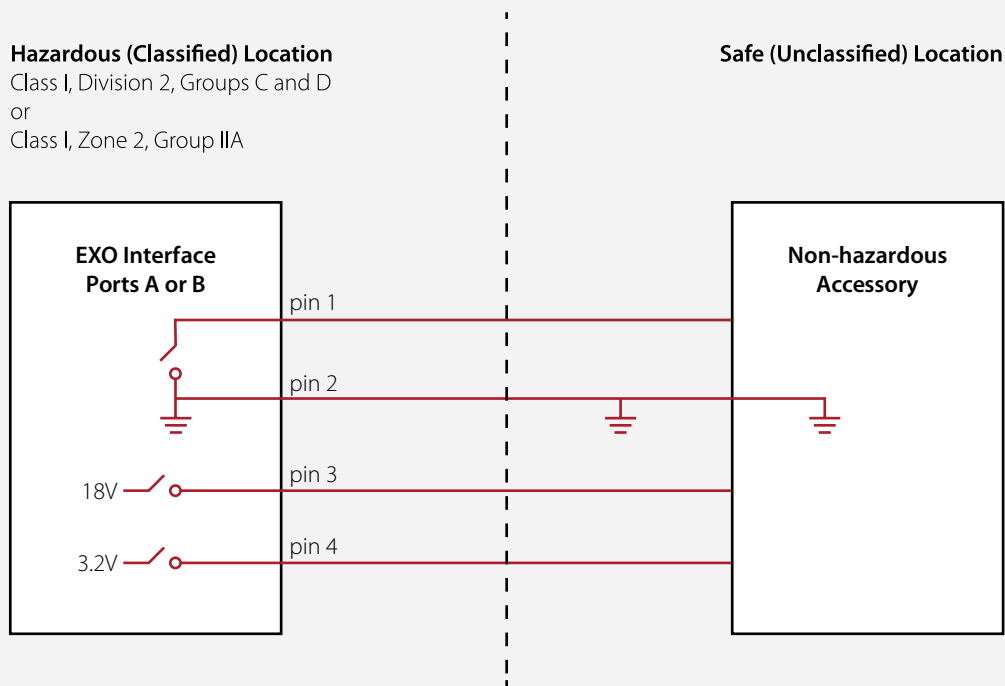
Output entity parameters

Terminal	Uo	Io	Po	Co	Lo	Lo/Ro*
Pin 3 to pin 2 (GND)	20.76Vdc	268mA	1.39W	0.194uF	495uH	6.39uH/Ω
Pin 4 to pin 2 (GND)	4.94Vdc	108mA	97mW	100uF	3.05mH	91.68uH/Ω

* Li may be greater than Lo and the cable length restrictions due to cable inductance (Lcable), and can be ignored if both of the following conditions are met:

$$\begin{aligned} Lo/Ro &\geq Li/Ri \\ Lo/Ro &\geq Lcable/Rcable \end{aligned}$$

Diagram 10.3.5
Interface port functional parameters



Functional output parameters for interface ports A and B

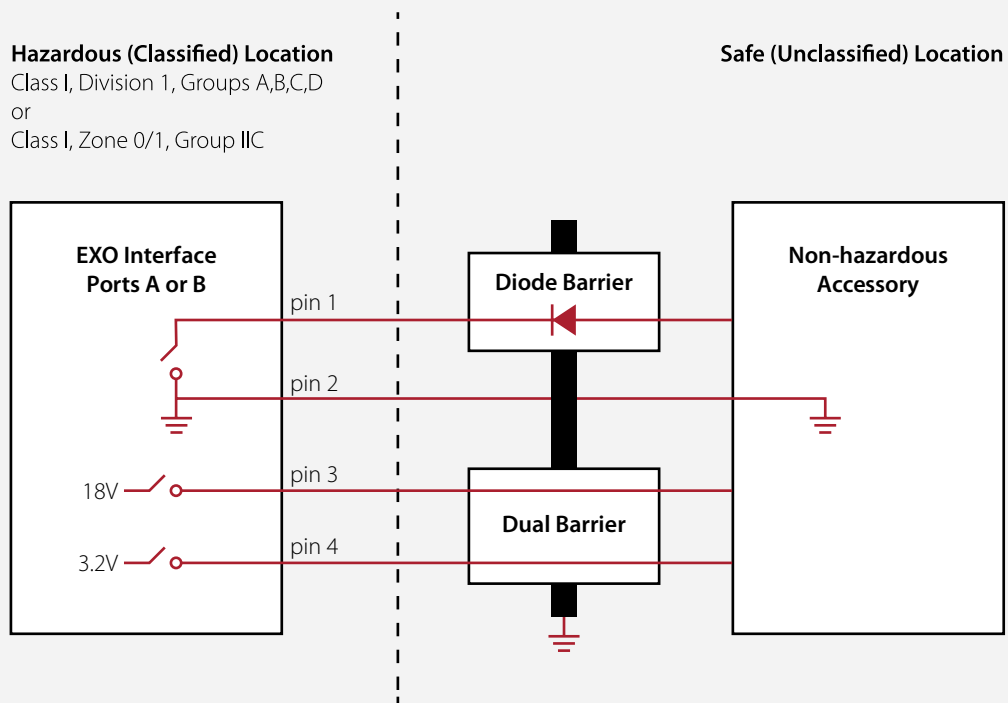
Terminal	U _o	I _o [†]	P _o [†]	C _o	L _o
Pin 3 to pin 2 (GND)	18Vdc	268mA	850mW	0.194uF	495uH
Pin 4 to pin 2 (GND)	3.2Vdc	32mA	25mW	100uF	23.9uH

[†] I_o and P_o will be reduced if both pin 3 and pin 4 are utilized simultaneously.

Functional input parameters (low side switch) for interface ports A and B

Terminal	U _i	I _i	P _i	C _i	L _i
Pin 1 to pin 2 (GND)	24Vdc	3.33A	1.25W	0F	0H

Diagram 10.3.6
Interface port functional diagram with barriers



NOTE: A barrier is required for each interface port. The diode barrier and dual barrier can be individual units or a joint unit.

Functional output parameters for interface ports A and B

Terminal	U _o	I _o [†]	P _o [†]	C _o	L _o
Pin 3 to pin 2 (GND)	18Vdc	268mA	850mW	0.194uF	495uH
Pin 4 to pin 2 (GND)	3.2Vdc	32mA	25mW	100uF	23.9uH

[†] I_o and P_o will be reduced if both pin 3 and pin 4 are utilized simultaneously.

Functional input parameters (low side switch) for interface ports A and B

Terminal	U _i	I _i	P _i	C _i	L _i
Pin 1 to pin 2 (GND)	24Vdc	3.33A	1.25W	0F	0H