EQUILIBAR®
PRECISION FLUID CONTROL

EHP

Electronic High Pressure Controller

INSTALLATION & OPERATING INSTRUCTIONS

The EHP is a complete closed loop controller consisting of two internal solenoid valves, a manifold, an electronic control circuit and a pressure transducer all contained in a protective IP65 rated housing. It controls the downstream pressure under static conditions in a range of calibrated pressures up to 500 psig (35 bar(g)).

Contents

Equilibar's quality system is **ISO 9001:2015** certified.

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SAFETY PRECAUTIONS

Please read all of the following Safety Precautions before installing or operating any Equilibar, LLC. equipment or accessories. To confirm safety, be sure to observe 'ISO 4414: Pneumatic Fluid Power - General rules relating to systems' and other safety practices. Improper operation could result in serious injury to persons or loss of life!

1. OVERPRESSURIZATION

The EHP electronic pressure regulator is not a safety device and must not be relied upon to prevent dangerously high pressures. Where danger from overpressurization exists then an additional valve that is designed and marketed as a safety pressure relief valve must be used to protect the EHP against excess supply pressure and to protect the system should the EHP produce excess pressure on its outlet.

2. PRODUCT COMPATIBILITY

Equilibar EHP and accessories are for use in industrial pneumatic applications with compressed air or inert gas media. The compatibility of the equipment is the responsibility of the end user. Product performance and safety are the responsibility of the person who determined the compatibility of the system. Also, this person is responsible for continuously reviewing the suitability of the products specified for the system, referencing the latest catalog, installation manual, Safety Precautions and all materials related to the product.

3. EMERGENCY SHUTOFF

Equilibar products cannot be used as an emergency shutoff. A redundant safety system should be installed in the system to prevent serious injury or loss of life.

4. EXPLOSIVE ATMOSPHERES

The EHP Series should not be used where harmful, corrosive or explosive materials or gases are present. Unless specifically certified and labeled, Equilibar, Inc. products cannot be used with flammable gases or in hazardous environments.

5. COMPRESSED GAS QUALITY

Filtered, clean, dry, non corrosive compressed gas is required for this product. Additionally, a 40 micron particulate filter is installed by the factory to prevent solid contamination from entering the product. Do not remove this filter. This filter is intended as a last ditch defense and does not negate the need for the user to supply filtered, clean, dry, non corrosive compressed gas. Only neutral gases should be used.

6. TEMPERATURE

Products should be used with a media and ambient environment inside of the specified temperature range of 32°F to 158°F. Consult factory for expanded temperature ranges.

7. OPERATION

Only trained and certified personnel should operate electronic and pneumatic machinery and equipment. Electronics and pneumatics are very dangerous when handled incorrectly. All industry standard safety guidelines should be observed.

8. SERVICE AND MAINTENANCE

Service and maintenance of machinery and equipment should only be handled by trained and experienced operators. Inspection should only be performed after safety has been confirmed. Ensure all supply pressure has been exhausted and residual energy (compressed gas, springs, gravity, etc.) has been released in the entire system prior to removing equipment for service or maintenance. Be sure to employ lock out / tag out procedures.

WARNING Improper operation could result in serious injury to persons or damages to equipment

1. PNEUMATIC CONNECTION

All pipes, pneumatic hose and tubing should be free of all contamination, debris and chips prior to installation. Flush pipes with compressed air to remove any loose particles. EPC ships with sintered filter installed in the inlet with at least 40-micron filtration. The EPC is extremely sensitive to dirt and debris..

2. THREAD SEALANT

To prevent product contamination, thread tape is not recommended. Instead, a non- migrating thread sealant is recommended for installation. Preferred sealant for 1/8" NPT port is Loctite 545 or face seal. Apply sealant two threads from the end of the pipe thread to prevent contamination.

3. ELECTRICAL CONNECTION

To prevent electronic damage, all electrical specifications should be reviewed and all electrical connections should be verified prior to operation.

EHP Electronic Pressure Controller

INSTALLATION AND MAINTENANCE INSTRUCTIONS

OPERATIONAL DESCRIPTION

The EHP is an electronic high pressure regulator that controls the pressure at its outlet port based on an electrical command signal input. The EHP is available in a range of calibrated pressures up to 500 psig (35 bar(g)). It can be configured for 0 -10 VDC or 4-20 mA analog signal types or 3.3V serial digital.

The EHP is a complete closed loop controller consisting of two internal solenoid valves, a manifold, an electronic control circuit and a pressure transducer all contained in a protective IP65 rated housing. One solenoid valve functions as inlet control allowing supply media into the system which increases the controlled pressure. The other solenoid valve acts as the exhaust and will decrease the controlled pressure by venting to atmosphere.

The controlled output pressure is measured by the onboard pneumatic pressure sensor and compared to the desired (target) pressure by the EHP's internal electronics. When the circuit detects a difference between the targeted command pressure and the actual output pressure, the circuit will energize the appropriate solenoid valve to raise or lower the pressure back to the targeted value.

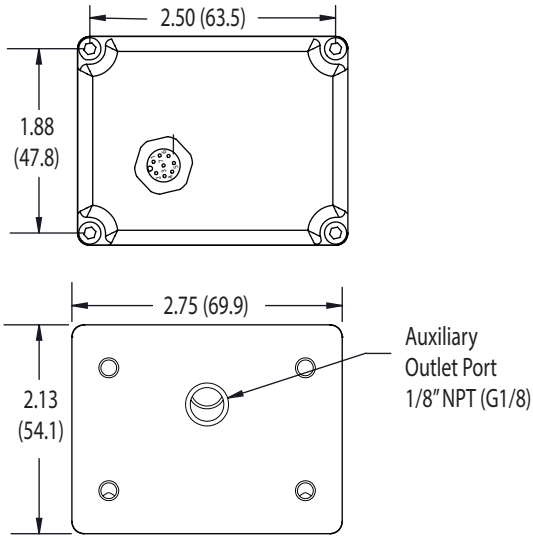
The EHP is a relatively low flow regulator. This makes it a great choice any time low flow rates or small volumes require precise pressure control. The EHP can be used to provide the pilot pressure signal to the dome of an Equilibar® back pressure regulator allowing electronic control of back pressure in line sizes from 1/8 inch through 4 inch by pilot operating the appropriately sized regulator.

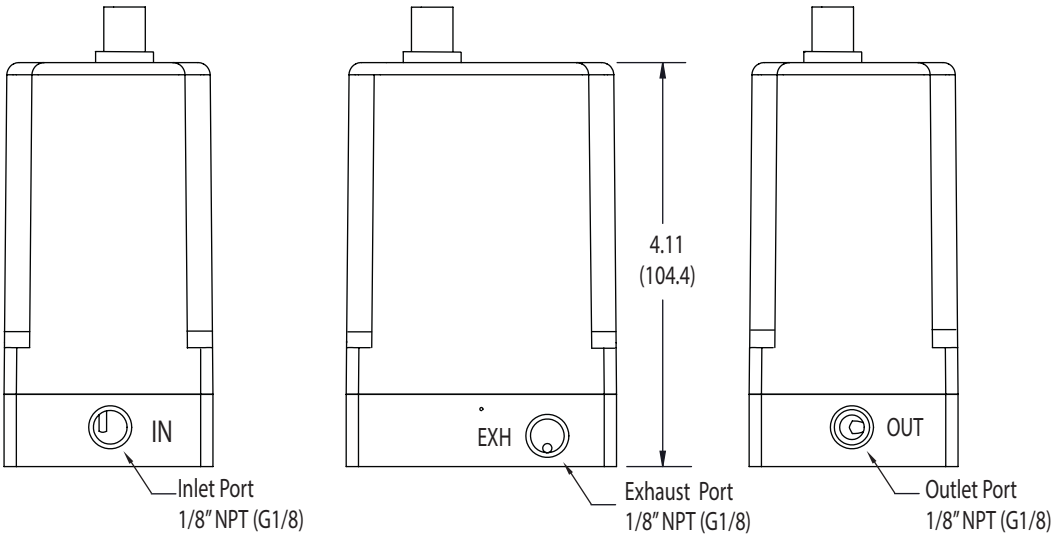
SPECIFICATIONS

ELECTRICAL	
SUPPLY VOLTAGE	15-24 VDC
SUPPLY CURRENT	<250 mA max.
COMMAND SIGNAL OPTIONS	0-10 VDC 4-20 mA (differential) 3.3 V Serial Digital
PERFORMANCE	
ACCURACY	±0.5% of Full Scale
RESOLUTION	≤ 50 mV
LINEARITY	≤ 0.2%
MAX HYSTERESIS	≤ 0.25%
RESPONSE TIME	< 20 ms typical (application dependent)
OPERATING CONDITIONS	
PRESSURE RANGE	0 - 500 psig
MEDIUM	Clean, dry, non-corrosive gases
OPERATING TEMPERATURE	32 to 180 °F (0 to 82°C)
RECOMMENDED FILTRATION	40 micron nominal
MOUNTING ORIENTATION	ANY
PHYSICAL	
PORT SIZE	1/8" NPT
WETTED PARTS	Elastomers - Flourocarbon Manifold - Anodized aluminum Valves - Nickel plated brass Pressure sensor - 17-4 PH Stainless Steel
HOUSING	Polycarbonate
PROTECTION RATING	IP65

Equipment used for test and calibration is NIST traceable

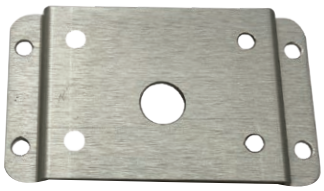
EHP DIMENSIONS



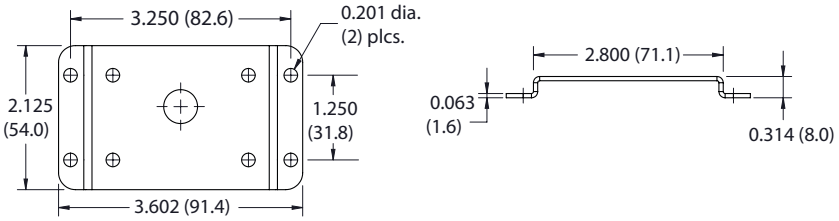


MOUNTING

The EHP is not sensitive to position and may be mounted in any orientation. It comes standard with convenient (bottom or side) mounting holes for easy mounting to most flat surfaces. An optional sheet metal bracket is available that allows the EHP to be rear mounted or foot mounted. See page 12 for bracket ordering information.



Mounting Bracket (optional)



EHP Electronic Pressure Controller

PNEUMATIC PLUMBING CONNECTIONS

The inlet (IN) port connects to the supply pressure with a 1/8” NPT fitting. A 40 micron sintered filter is pre-installed in the inlet port. Do not remove this filter. The recommended supply pressure depends on the calibrated range and is listed in Table 2 below. Supply the EHP with only clean, dry, non-corrosive gas.

The outlet (OUT) port connects to the process to be controlled with a 1/8” NPT fitting. For best stability, the tubing between the outlet and the controlled process requires a minimum volume of 2 cubic inches. The EHP is commonly used as a pilot pressure controller for an Equilibar fluid control valve. In that case, the outlet piping would lead to the pilot port of the Equilibar back pressure regulator or flow control valve.

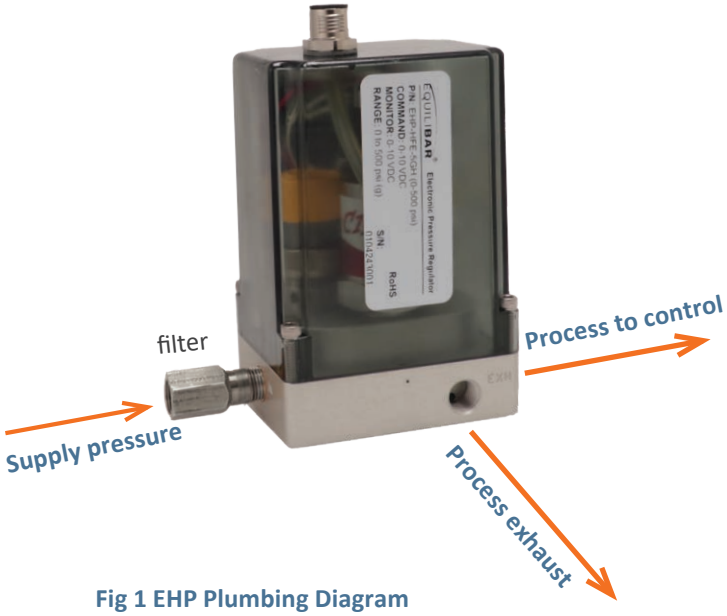


Fig 1 EHP Plumbing Diagram

CALIBRATION / RECALIBRATION

All EHP control valves come calibrated from the factory by trained personnel using precision calibration equipment. The calibration and operation of each EHP valve is checked by two different operators using independent test equipment. The EHP valve is a closed loop control valve using a precision electronic pressure sensor. Typical drift is less than 1% over the life of the product.

The EHP is calibrated to NIST standards when manufactured and the PID values are set to the EHP standard tuning. If specific application details are known prior to manufacture (recommended), the PID values may be tuned in accordance with the known specifications to provide the most stable and repeatable control.

If your EHP valve appears to be out of calibration by more than 1%, it is not likely to be the EHP. Check the system for adequate supply pressure, wiring and electronic signal levels. Verify the accuracy of your measuring equipment before re-calibrating. Consult factory if you have any questions or require assistance. If the calibration needs to be changed or modified, the unit must be returned to Equilibar. Any attempt to recalibrate in the field without prior authorization will void the warranty.

Table 2

Rated Inlet Pressure for Calibrated Range

CALIBRATED RANGE	MIN INLET PRESSURE[1]
0 to 200 psig	220 psig
0 to 300 psig	330 psig
0 to 400 psig	520 psig

[1] MAX INLET PRESSURE for all calibrated ranges is 550 psig

EHP Electronic Pressure Controller

ANALOG ELECTRICAL CONNECTION FOR 0-10 VDC INPUT COMMAND SIGNAL

Make sure AC power is disconnected before DC connections are made

The EHP requires 15 to 24 VDC on **Pin 8** of the electrical connector. It uses 0 to 10 VDC command signal on **Pin 1** of the electrical connector. The power supply ground, command source ground and **Pin 3** must be tied together. If the analog monitor signal is being used, utilize **Pin 5** to send the 0 to 10 VDC signal to a measuring device like a volt meter, panel meter or acquisition device.

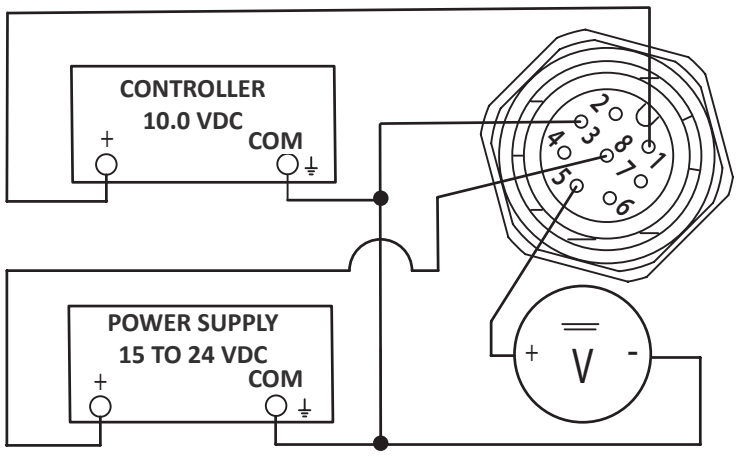


Fig:4

Table 3 EHP Electrical Pin-out for 0-10V Command

PIN NUMBER	FUNCTION	COLOR
1	+Command Input	White
2	3.3 V Serial TX	Brown
3	DC Common/Ground	Green
4	Not Used	Yellow
5	Analog VDC Output	Gray
6	Not Used	Pink
7	3.3 V Serial RX	Blue
8	Power, 15-24 VDC	Red

Red LED: Power to Unit ON
Solid Blue LED: Analog Mode
Flashing Blue LED: 3.3 VDC Serial Mode

Reference Serial Configuration Section for Command Change Instructions

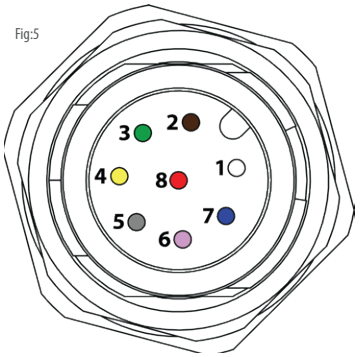


Fig:5

EHP Electronic Pressure Controller

ANALOG ELECTRICAL CONNECTION FOR 4-20 MA COMMAND SIGNAL

Make sure AC power is disconnected before DC connections are made

The EHP requires 15 to 24 VDC on **Pin 8** of the electrical connector. An EHP configured for Current Command uses a differential current loop scheme (not isolated), meaning current flow is from **Pin 6** to **Pin 4.** Some applications may require the common of the power supply that provides loop power for the 4-20mA command to be tied to power supply common **pin 3**. If the analog monitor signal is being used, utilize **Pin 5** to send the 4 to 20 mA signal to a measuring device like a ammeter, panel meter or acquisition device.

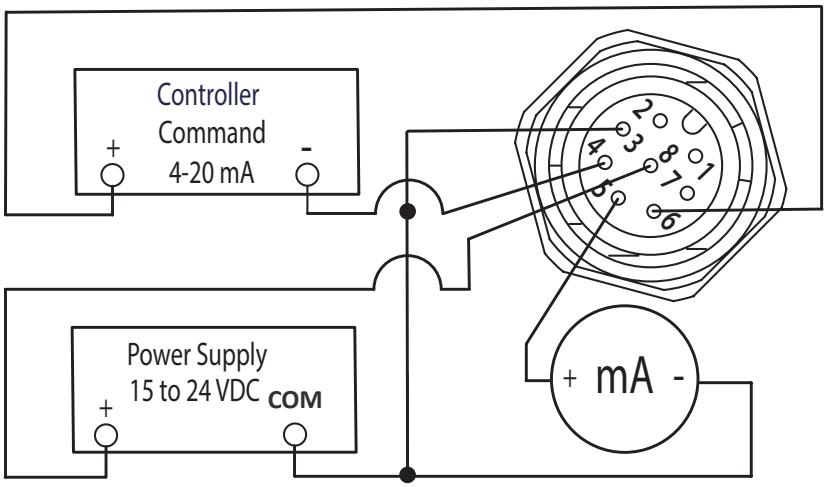


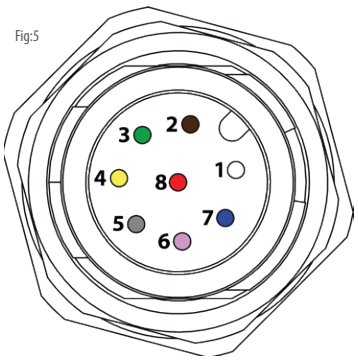
Table 4 **EHP Electrical Pin-out for 4-20mA Command**

PIN NUMBER	FUNCTION	COLOR
1	Not Used	White
2	3.3 V Serial TX	Brown
3	DC Common/Ground	Green
4	-4 to 20 mA Command Return	Yellow
5	4 to 20 mA Output	Gray
6	+4 to 20 mA Command Input	Pink
7	3.3 V Serial RX	Blue
8	Power, 15-24 VDC	Red

Red LED: Power to Unit ON
Solid Blue LED: Analog Mode
Flashing Blue LED: 3.3 VDC Serial Mode

Reference Serial Configuration Section for Command Change Instructions

Fig:5



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SERIAL CONFIGURATION

EHP serial command version utilizes a 3.3 V Serial Digital communication signal

Software is required in order to communicate via 3.3V serial with the EHP. Many serial software communication solutions are available; If you already have a software solution, please ensure it is configured with the specifications listed in Table 6 prior to making the electrical connections to EHP. The commands can be found in Table 7 on Page 10.

If you do not already have a serial software solution, we recommend PuTTY as a free and open-source solution. PuTTY is one of the most common software packages used for serial communication and can be downloaded here: https://putty.org/

Once downloaded and installed on your windows-based machine, please follow the steps on the following pages to configure the software prior to making the electrical connections to the EHP. The specifications to configure and/or confirm within PuTTY are listed in Table 6.

Table 6 Serial Software Configuration (PuTTY)

SETTING LABEL	SPECIFICATION
Speed (baud)	57600
Data Bits	8
Stop Bits	1
Parity	None
Flow Control	None
Serial Line	See Steps 1&2

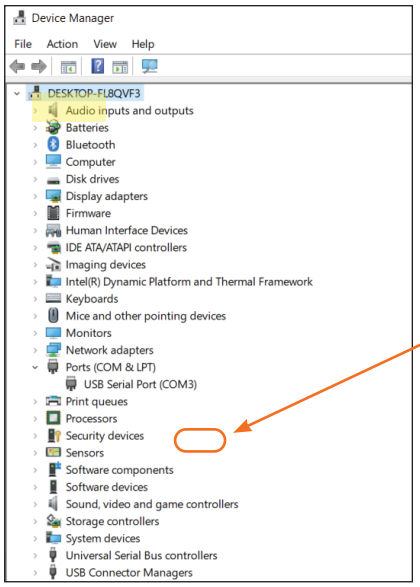
Recommended Proportional Adjustment Values

ORIFICE SIZE	ADJUSTMENT
0.009”	25
0.013”	10
0.026”	5
0.052”	1

Recommended Integral Adjustment Values

ORIFICE SIZE	ADJUSTMENT
0.009”	0.1
0.013”	0.05
0.026”	0.05
0.052”	0.05

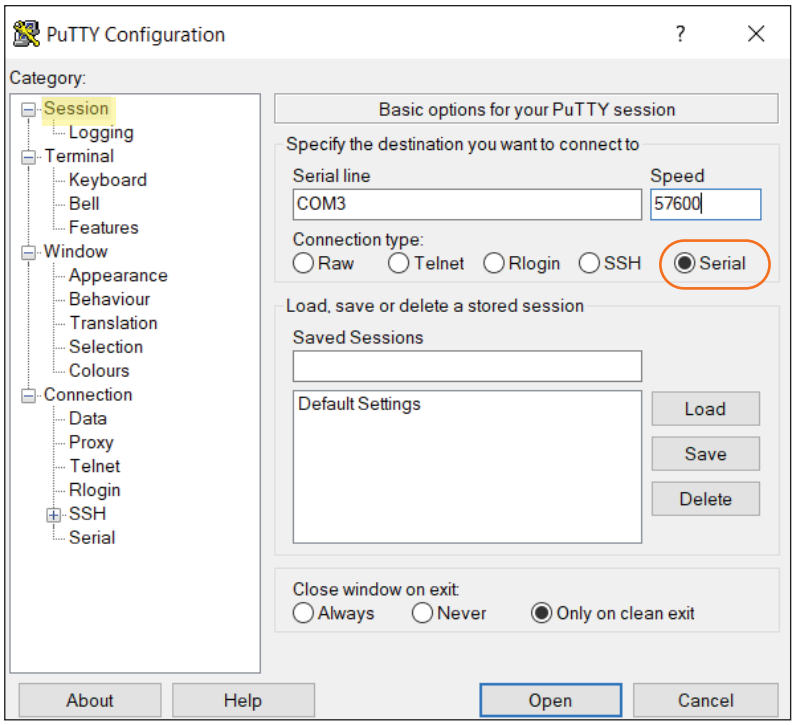
STEP - 1



1. Ensure proper serial connection to EHP unit and then connect 3.3 V serial to the control device. The wiring schematics can be found on page 11.
2. Open Device Manager and identify the serial port assigned to the serial cable.

>>> Website: Many ways to open Device Manager
https://www.digitalcitizen.life/ways-open-device-manager-windows

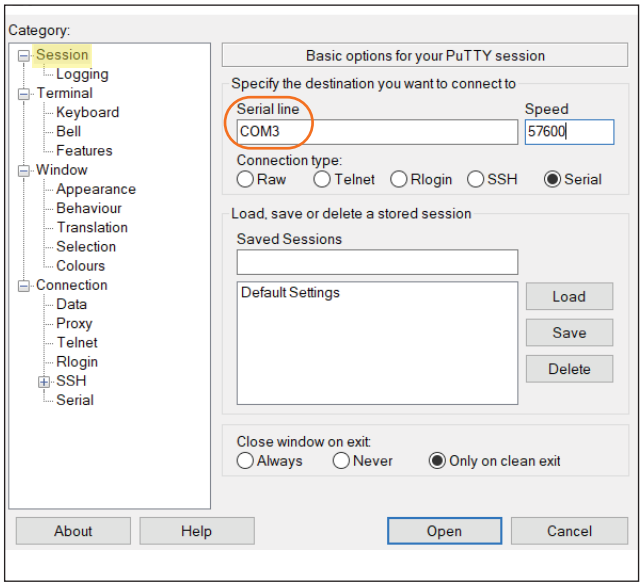
STEP - 2



1. Open installed Putty program
2. Ensure ‘Serial’ is selected

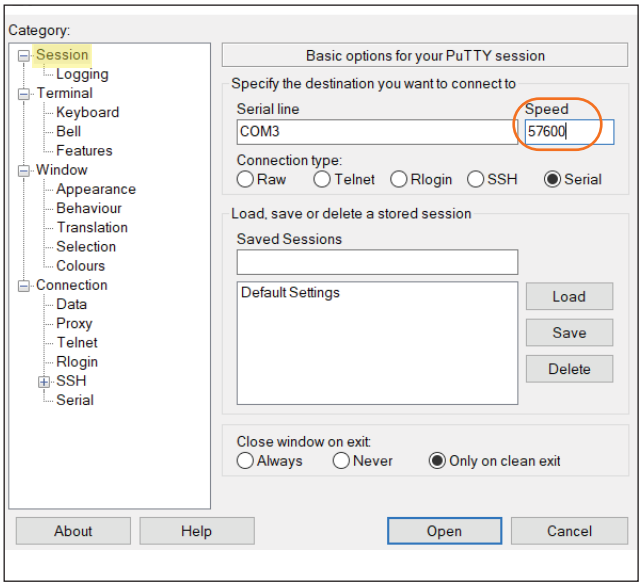
STEP - 3

Input the port identified in Step-1 into the Serial line, as shown



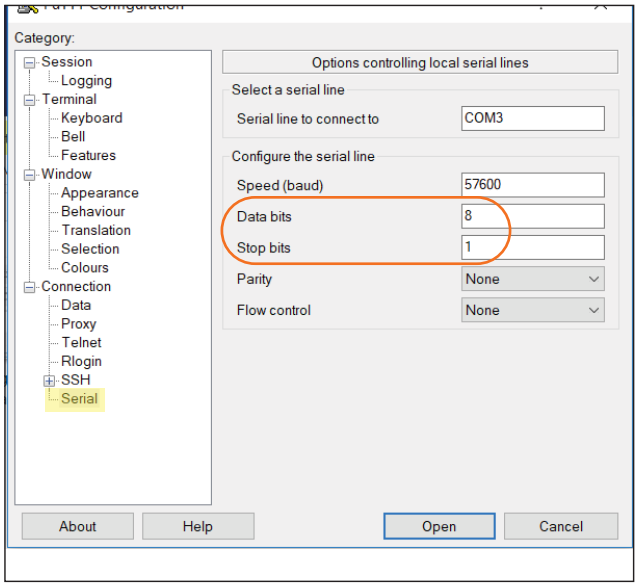
STEP - 4

Change the speed (baud) setting to:
57600



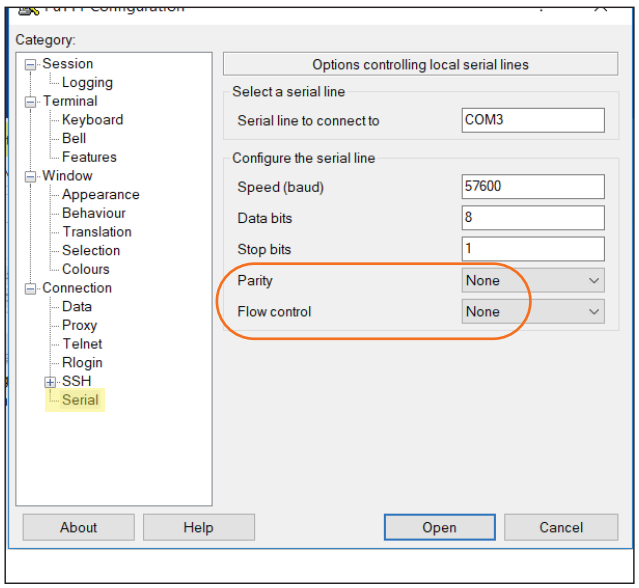
STEP - 5

Change Data Bits to 8 and Stop Bits to 1



STEP - 6

Ensure both Parity and Flow Control are set to None



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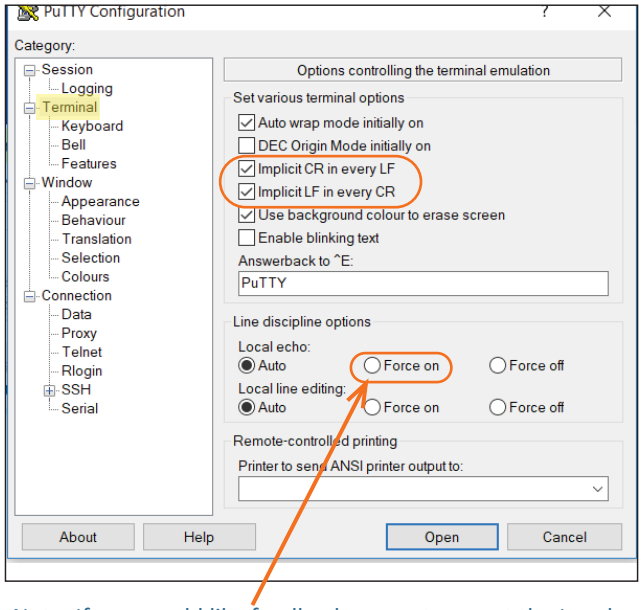
SERIAL CONFIGURATION | CONTINUED

STEP - 7

In Terminal settings, check the boxes for:
Implicit CR in every LF & Implicit LF in every CR



Note: If you would like feedback as you type, set the Local Echo to "**Force On**"

STEP - 8

Proceed to making the electrical connections for the EHP following the wiring schematics on the next page.

Once the EHP is connected and the software is configured, the commands in Table 7 below can be used to change settings, request feedback and control the device.

SERIAL COMMANDS

Table 7 — **EHP | Serial Commands**

DESCRIPTION	COMMAND ABREVIATION	INSERT TO SEE CURRENT VALUES[1]	INSERTED EXAMPLE CHANGES[2]	READABLE	WRITABLE
Model No.	ID	?ID	n/a	Y	N
Serial Number	SN	?SN	n/a	Y	N
Proportional "P" Value	PIDP	?PIDP	PIDP: 100	Y	Y
Integral "I" Value	PIDI	?PIDI	PIDI: 0.75	Y	Y
Command Type (0=Analog, 1=Digital)	CT	?CT	CT: 1	Y	Y
Current Command (0 - 100% of Full Scale)	CC	?CC	CC: 50	Y	Y
Monitor Output Signal from Internal Sensor	MON	?MON	n/a	Y	N
Save Settings to ROM	SAVE	n/a	SAVE	N	Y

[1]When entering any reading command, always prefix with "?". Example- ?PIDP
[2]Be sure to leave one space between the colon and the value when making changes. Example- PIDP: 100

EHP Electronic Pressure Controller

SERIAL CONNECTIONS

Make sure AC power is disconnected before DC connections are made

The EHP requires 15 to 24 VDC on **Pin 8** of the electrical connector. It uses serial communication on **Pin 7** to receive and **Pin 2** to send digital responses. The power supply ground, command source ground and **Pin 3** must be tied together.

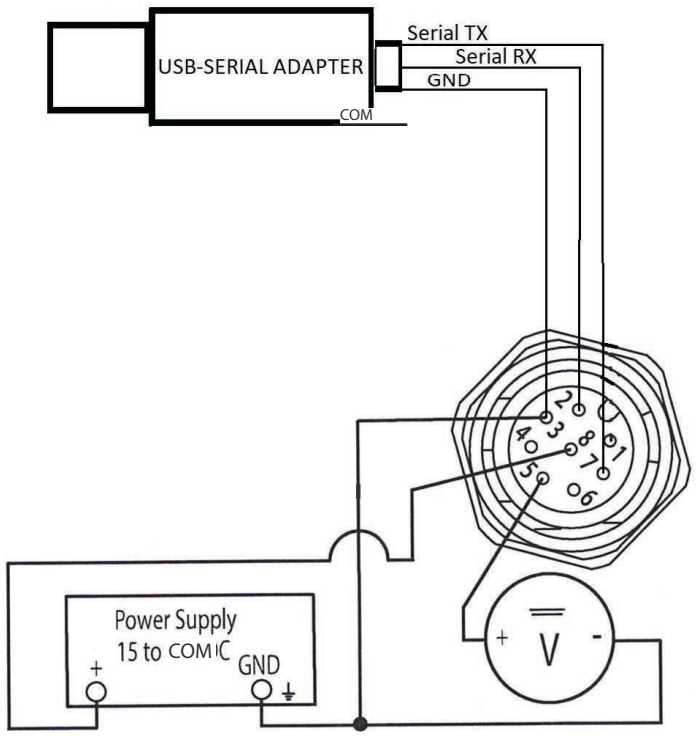
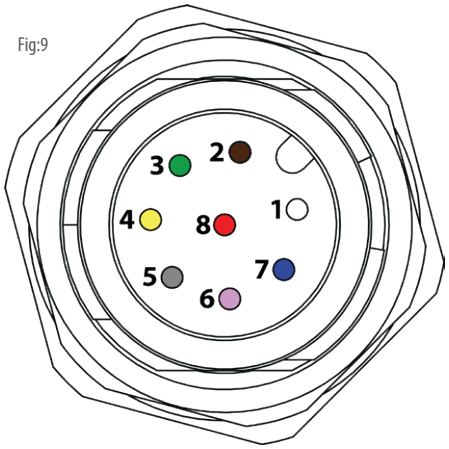


Table 9 **EHP Electrical Pin-out for Serial Connection**

PIN NUMBER	FUNCTION	COLOR
1	+Command Input	White
2	3.3 V Serial Digital TX	Brown
3	DC Common/Ground	Green
4	Not Used	Yellow
5	Analog VDC Output	Gray
6	Not Used	Pink
7	3.3 V Serial Digital RX	Blue
8	Power, 15-24 VDC	Red

Fig:9



EHP Electronic Pressure Controller

ORDERING INFORMATION

(Items listed in blue are often in stock for faster delivery)

	1	2	3	4	5	6
EXAMPLE PART NUMBER	**EHP**	**H**	**F**	**E**	**3G**	**H**
Your Part Number:	EHP	H				

1	MODEL
EHP	Electronic High Pressure

2	TYPE
H	IP65 Housing

3	PORT THREAD TYPE
F	1/8" NPT
G	G1/8 (option available)

4	INPUT SIGNAL COMMAND
E	0 to 10 VDC
I	4 to 20 mA (differential)
R	3.3V Serial Digital

5	PRESSURE RANGE
2G	0 to 200 psig
3G	0 to 300 psig
5G	0 to 500 psig

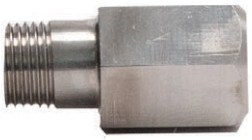
6	MIN VOLUME / MAX FLOW RATE
G	≥0.75 in³ / 3.0 lpm
H	≥1.00 in³ / 6.5 lpm
I	≥2.00 in³ / 12.5 lpm

Accessories | Cables

Molded Actuation Cable, 8-Pin, 6'

3.3 V Serial Cable, 3'

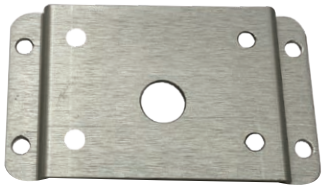
Accessories | Filter



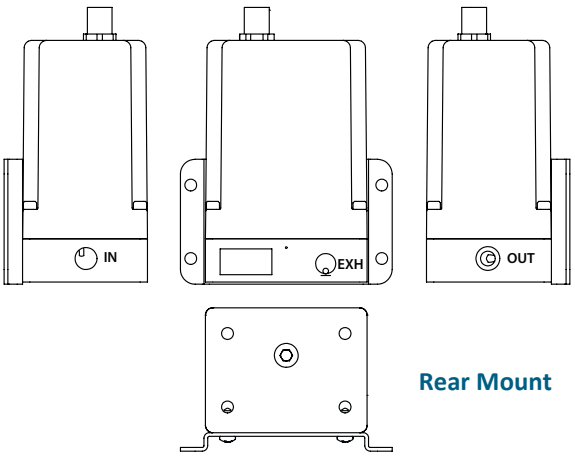
Replacement Filter

Accessories | Mounting Bracket

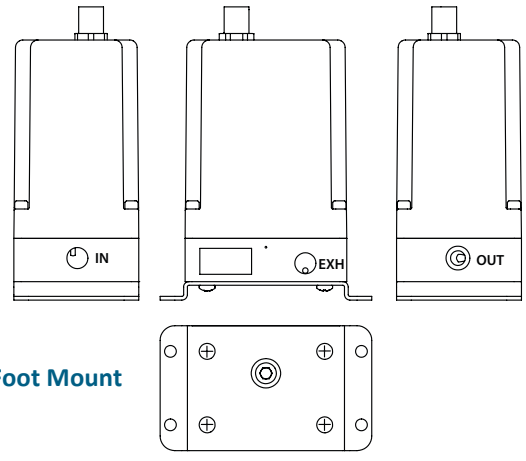
EPCH-B2



Bracket: Same bracket can be used for foot mounting or rear mounting.



Rear Mount



Foot Mount

LIMITED WARRANTY

All information contained in this publication is for reference only. Proper design engineering procedures should be used to assure any compliances. Equilibar, LLC. reserves the right to make changes without notice and does not warrant or guarantee the information contained herein.

Equilibar, LLC (Seller) warrants its products to be free from defects in material and workmanship for a period of one (1) year from the date of sale. Seller's liability shall be limited at seller's option to repair, replace or refund purchase price of product found by seller's examination to be defective. All claims under this warranty must be made in writing to seller's factory sales department giving full details, prior to return of product, postpaid, to factory. Seller shall not be responsible for product failure due to normal wear, accident, buyer's misapplication, abuse, neglect or alteration of product. Seller will not be responsible for any consequential damages. Equilibar makes no other warranty of any kind, expressed or implied. Circuits shown in this manual are for instructional purposes only. All circuits used on equipment and machinery should be thoroughly tested by qualified personnel under actual working conditions to determine their suitability for buyer's intended use. All technical data and operations are average values based on standard production models. Some deviations can be expected, and considerations should be given during initial design stages. All operating characteristics are based on new equipment, under normal conditions of use and environments and clean, dry, oil-free air supply. Dimensions stated may be nominal and are subject to change without notice. Contact Equilibar for specific dimensional tolerances when dimensions are critical.

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Equilibar's quality system is
ISO 9001:2015 certified.