MCQ INSTRUMENTS

GAS BLENDER 4000 (4 Channels)

Family name: GB4000 Series

GETTING STARTED - Rev. 05

ESSENTIAL INSTRUCTION

Read carefully before proceeding!

MCQ INSTRUMENTS tests its products to meet many national and international standards. For these instruments are sophisticated technical products, proper install, use and maintenance are required to ensure their right functioning. The following instructions must be adhered to and integrated into your safety program when installing, using and maintaining MCQ INSTRUMENTS products.

ESD (Electrostatic Discharge)

CAUTION!

This instrument contains electronic components that are susceptible to damage by static electricity. Proper handling procedures must be observed during the removal, installation and other handling of circuit boards or devices.

Handling procedures:

- Power to unit must be removed.
- Personnel must be grounded, via a wrist strap or other safe, suitable means before any circuit card or other internal device is installed, removed or adjusted.
- Printed circuit cards must be transported in a conductive container. Board must not be removed from protective enclosure until immediately before installation. Removed boards must immediately be placed in protective container for transport, storage or return to factory.

PRE-INSTALLATION CHECK-LIST

⚠WARNING!

1. Double check that gas to be measured are compatible with the instrument.
2. The use of appropriate tubes is strongly recommended for the right functioning of the instrument.
3. No need for pipes installation.
4. This instrument has internal filters.
5. The instrument has specific power supply requirements.
6. 110-240 Vac / 50-60 Hz
7. Do not locate the instrument in areas subject to sudden temperature changes, excessive moisture or near equipment radiating significant amount of heats.

   Moreover, be sure to allow adequate space for cable connectors and wiring.
8. ⚠The instrument must be used under suction hood.
9. ⚠ **Purge**: In case of use of any gas different from N2, or He, or AIR it is mandatory to purge all system's pipes with N2 for at least 30 min before and after use, in order to avoid moisture residues that can damage the instrument, activating corrosion effects, etc.
10. ⚠If you use flammable gases (CH4, H2) be sure that the suction hood is ATEX type.
11. ⚠Maximum inlet gas pressure is 3 bar.

WARNING AND IMPROPER USE

- Do not modify the device or substitute parts
- The improper use of the Gas Blender could compromise the expected protection
- Service by qualified personnel only
- Do not use any type of liquids in the tubes
- Do not use aggressive gases (e.g. H2S)
- Do not step on the device
- Do not power the device with different voltages than those indicated (110-240 Vac 50/60Hz)
- Do not operate at pressures higher than the rated maximum pressure
- Use flammable gases (e.g. H2, CH4) only under a proper atex ventilation hood
- Use dangerous gases (e.g. CO2, CO, NOx) only under a ventilation hood
- Do not place fluid containers above the device

1. GAS BLENDER 4000 (4 Channels) HARDWARE INSTALLATION

⚠CAUTION!

Before connecting the gas through the equipment, please verify that the gas pressure set on cylinder pressure regulator is compatible with the instrument specifications (see the PERFORMANCE SPECIFICATIONS, page 15).

⚠INLET PRESSURE MAXIMUM 3 BAR⚠

This section provides a simple step-to-step method for a quick and safe installation of the Gas Blender.

1. **Gas cylinders** - Close the cylinder's main valve. Take a 6 mm external diameter tube and proceed connecting it to the cylinder pressure regulator. For a safe connection, a specific rubber holder adapter is usually required (Fig. 1). This procedure must be repeated for each gas cylinder in use.

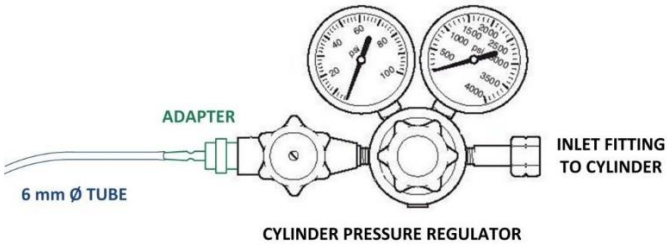

Figure 1

2. **One Touch Valves** - Install the One Touch Valves (provided in the package) along the gas line for each of the gas source in use (Except for CO2). In order to do so, take the free end of the tube previously connected to the pressure regulator and insert it in the valve through the push-in connector. In case of different valves type use, please contact the MCQ INSTRUMENTS support center.

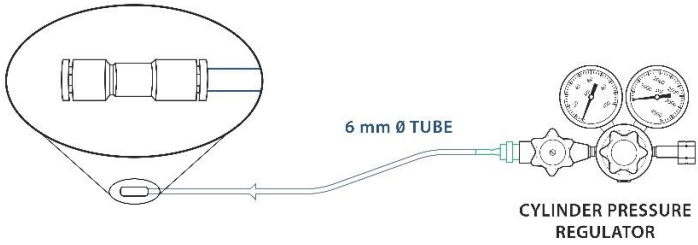

Figure 2

3. **Check valves (Only for CO2)** - Install the Check valve (provided in the package) along the gas line of CO2 gas source in use. In order to do so, take the free end of the tube previously connected to the pressure regulator and insert it in the check valve through the push-in connector. Check valves allows the gas to flow through them in only one direction. Therefore, the check valves must be installed in the direction of flow sense, i.e. form the cylinder to the Gas blender (Fig. 3). In case of different valves type use, please contact the MCQ INSTRUMENTS support center.

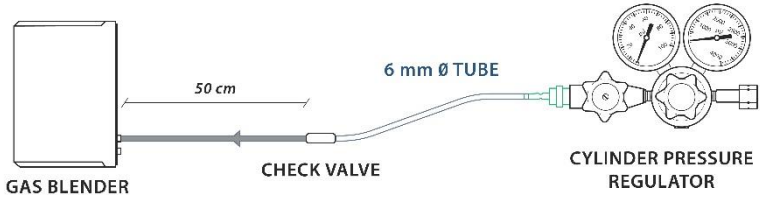

Figure 3

4. **Gas Blender Inlets** - Valves must be positioned at a distance of 50 cm from the Gas Blender inlets to secure a proper working of the instrument. For this purpose, four 6mm diameter tubes 50 cm long, on different colors based on the gas type, are provided in the package. Take the 50 cm long tube and connect one end with the valve. Then connect the other end to the instrument inlet with same color, positioned on the Gas Blender rear panel (Fig. 4). This procedure must be repeated for each gas cylinder in use.

Figure 4: Inlets

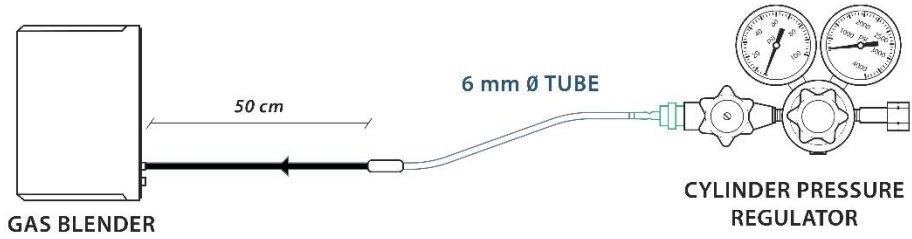

Figure 5: N2

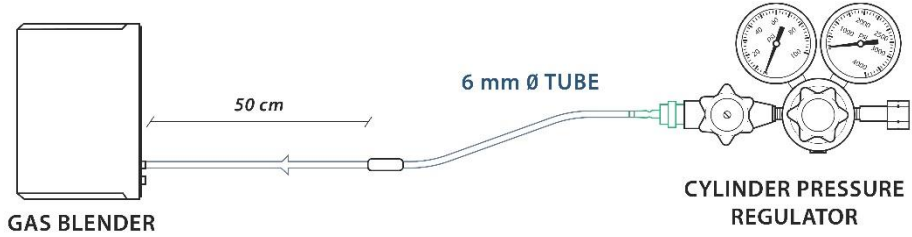

Figure 6: O2

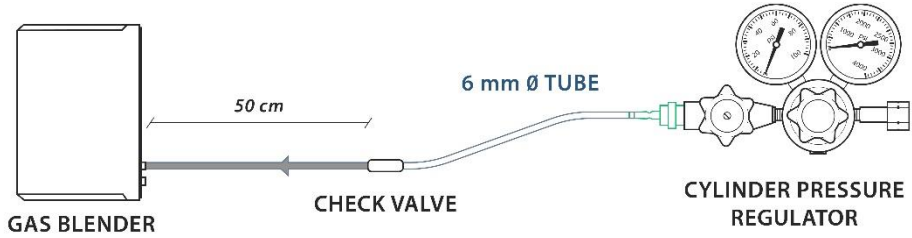

Figure 7: CO2

Note: Colors:

N2: Black tube

O2: White tube

Air: Green tube

CO2: Grey tube

H2, CH4, Flammable gases: Red tube

Other Gases: Yellow tube

Note: For Swagelok connections, please look at the video provided in the USB pen.

5. **Gas Blender Outlet** – Another One Touch valve must be positioned at a distance of 50 cm from the Gas Blender outlet to secure a proper working of the instrument. Take the 50 cm long tube and connect one end with the valve, then connect the other end to your system, as shown in the pictures below (Fig. 8).

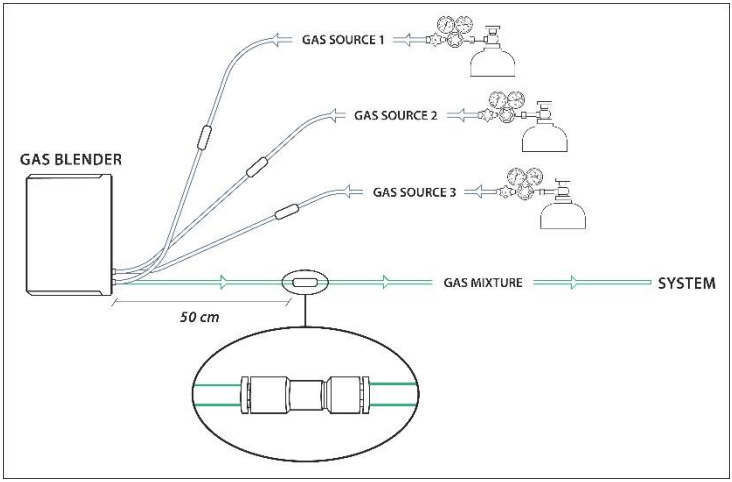

Figure 8

6. **Power** - Connect the bundled power cord to the back dedicated plug of the instrument. Make sure the power plug is connected securely to the instrument. Then, plug the unit into an electrical outlet. Turn on the switch.
7. **Console** - Connect the Gas Blender to you PC with the USB cable (provided with the instrument).

GAS BLENDER 4000 (4 Channels) SOFTWARE INSTALLATION

Gas Mixture Creator

BEFORE YOU BEGIN:

Gas Mixture Creator compatibility

The MCQ INSTRUMENTS Gas Mixture Creator is compatible with the following Microsoft Operative Systems:

- **Windows ® XP Home edition with Service Pack 3 or more**
- **Windows ® XP Professional with Service Pack 3 or more**
- **Windows ® Vista**
- **Windows ® 7**
- **Windows ® 8**
- **Windows ® 8.1**
- **Windows ® 10**
- **Windows ® 11**

NET Framework 3.5 installation required

To use the MCQ INSTRUMENTS Gas Mixture Creator, the Microsoft .NET Framework 3.5 (or higher) must be installed on your computer. Visit the Microsoft official website, download and install the .NET Framework 3.5 (or higher) version. Installing the .NET Framework libraries will let you work with the Gas Mixture Creator and with all the software designed for the .NET Framework platform.

Gas Mixture Creator Software installation

The MCQ INSTRUMENTS Gas Mixture Creator is a unique and fundamental tool provided by MCQ INSTRUMENTS for the GAS BLENDER 4000 (4 Channels) control.

In order to install the software, put the MCQ INSTRUMENTS Gas Mixture Creator Installation USB (provided in the package) in your USB port, navigate to the USB directory, double click on it and then follow the simple installation steps. (Fig. 9-10-11)

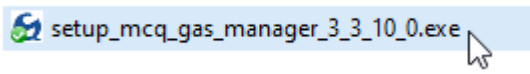

Figure 9

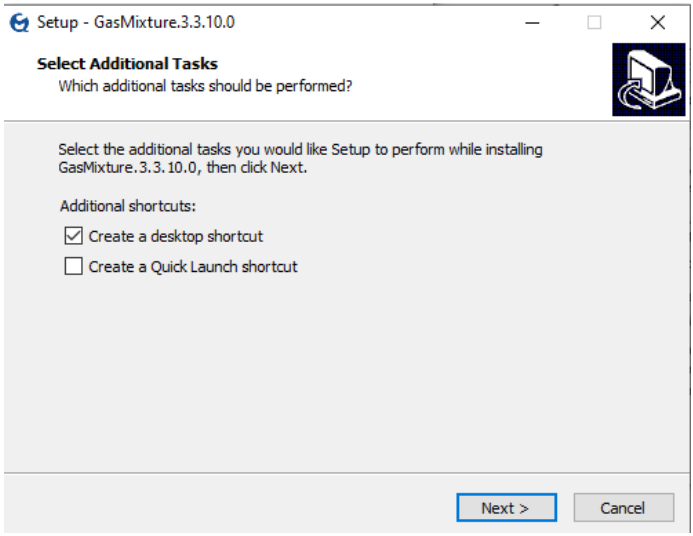

Figure 10

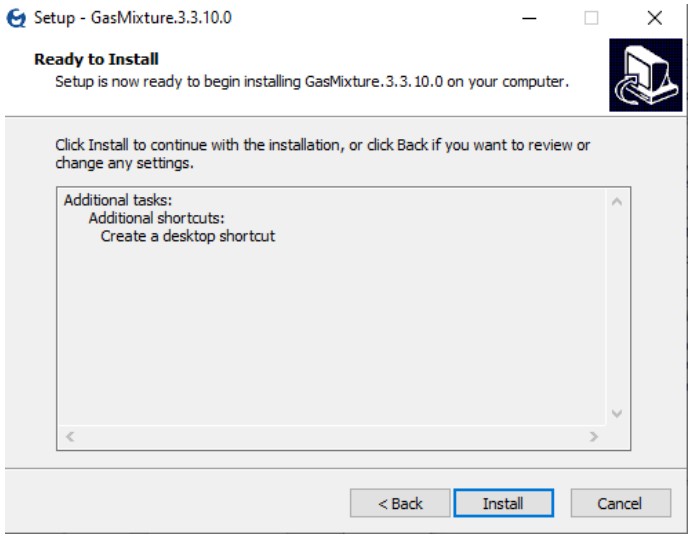

Figure 11

Launch the software double-clicking on the MCQ INSTRUMENTS Gas Mixture Creator's shortcut icon located on your desktop. Copy the "KEY PRO SOFTWARE" provided in the USB pen (Fig. 12) and press "Ok".

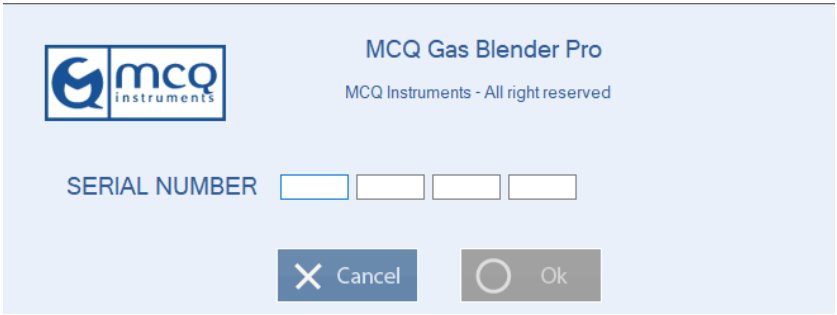

Figure 12

GAS BLENDER 4000 (4 Channels) CONSOLE CONNECTION

After the MCQ INSTRUMENTS Gas Mixture Creator installation, select the proper driver for your computer (Fig. 13).

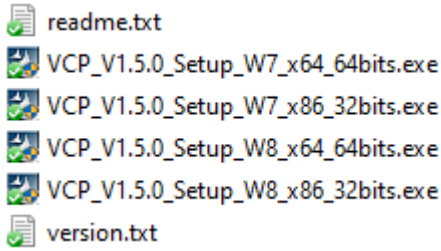

Figure 13

In order to install the driver, follow the simple step-to-step guide (optimized for **Windows 10** users) provided in this section (Fig. 14-16).

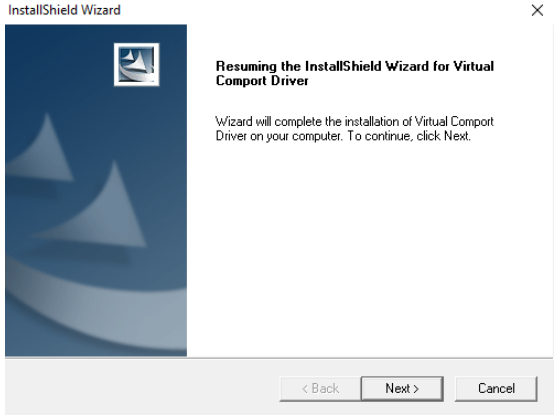

Figure 14

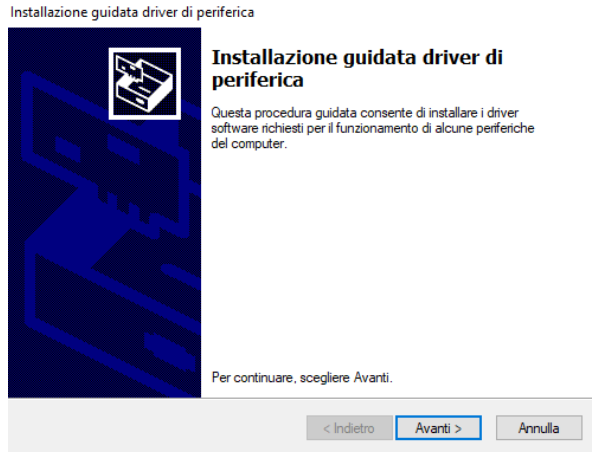

Figure 15

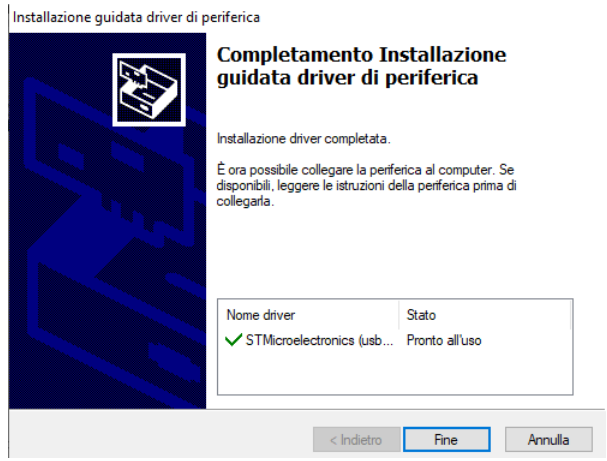

Figure 16

After the MCQ INSTRUMENTS Gas Mixture Creator installation the Gas Blender must be connected to your console.

- **Power Cord** - Connect the bundled power cord to the back dedicated plug of the instrument, then turn on the instrument.
- **USB** - Connect the instrument to your console via the USB cable provided in the package. After this operation, you can use the instrument and the Gas Mixture Creator Software.

GAS MEDIA COMPATIBILITY

The MCQ INSTRUMENTS GAS BLENDER 4000 (4 Channels) incorporates components made of non-reactive material that are compatible with a wide variety of gaseous media. This Appendix provides a list of non-corrosive gases compatible with the instrument.

Gas Media	MCQ GAS BLENDER 4000 (4 Channels)
Air	
Nitrogen	
Oxygen	
Argon	
Natural Gas	
Nitrous Oxide	
Anesthetic Gasses	N/A
Carbon Dioxide	
Hydrogen	
Helium	
Methane	
Ethylene	
Ethane	
Sulfur Exafluoride	
Propane	
Butane	
DME (C2H6O)	
Tetrafluoropropene HFO1234ze	
Nitrous Oxide	Dry Gas Only
Nitric Oxide	Dry Gas Only
Sulfur Oxide	Dry Gas Only
Water Vapor	Non-condensing
Ammonia Gas	Dry Gas Only, <0,1%
Chlorine Gas	<0,1%
Hydrogen Sulfide	<0,1%

COMPATIBLE TUBES LIST

This appendix provides you a list of tube compatible with the MCQ INSTRUMENTS GAS BLENDER 4000 (4 Channels). For your laboratory applications involving the Gas Blender the following type of tube can be used:

- **Polyurethane (SMC TU Series)**
- **Fluorinated Ethylene Propylene (FEP)**
- **Stainless Steel (only with Swagelok)**

PERFORMANCE SPECIFICATIONS

In this appendix, the GAS BLENDER 4000 (4 Channels) internal and external working specifications are listed. Use this performance specifications to ensure a safe and proper use of the Gas Blender. MCQ INSTRUMENTS is not responsible for any instrument damage caused by an inappropriate use of the instrument itself.

Internal specifications

	N2, 20°C, 101.325 KPa (1 atm)
Accuracy	10-100% FS: 0,2% of FS <10% FS: 1% of FS
Repeatability	0.10% of reading
Response time (for each channel)	200 ms
Channel step regulation	1% from touch panel 0,1% from software PC
Power Supply Requirements	Internal, power cord in bundle 110-240 Vac / 50-60 Hz
Main Supply Voltage Fluctuations	±10%
Operating Pressure	Max 3 bar
Working Temperature	15-45 °C

External specifications

Operating External Temperature Range	15-45 °C
Optimal External Pressure	100 kPa (1 bar)
Optimal External Humidity	30 to 50 % relative humidity
Maximum Operative Altitude	2000 m

Size and Weight

Length	25,5 cm
Height	10,5 cm
Depth	28,7 cm
Weight	3,2 kg

OPERATING SPECIFICATIONS

In this appendix, the GAS BLENDER 4000 (4 Channels) operating specifications are listed. These specifications must be followed to ensure the proper use of the Gas Blender. MCQ INSTRUMENTS is not responsible for any instrument damage caused by an inappropriate use of the instrument itself.

Mass Flow Rates (for each channel)	0-5000 sccm on N2 (standard)
Total Output Mass Flow Rate	up to 20000 ml/min
Gases *	N2, O2, CO2, CH4, Air, He, H2, etc.
Inlet Gas Channel	4 Input
Outlet Gas Channel	1 Output of mixed gases
Channel's Fittings **	NPT Swagelok or push-in fittings, for 6 mm OD tubes and ¼ inch tubes.
Input Channel	USB PC Interface, RS485
User Interface	Touch display, Gas Mixing Software

***** Additional gases supported on request

** Additional on request

STATEMENTS

CONTACTS

In case you need technical assistance do not hesitate to contact MCQ INSTRUMENTS:

- **E-mail: support@mcqinst.com**