

CENTRiCAL Workshop Calibration Solution



Dear user,

We have made every effort to ensure the accuracy of the contents of this manual. Should any errors be detected, we would greatly appreciate to receive suggestions to improve the quality of the contents of this manual.

For more detailed technical data about Beamex CENTRiCAL, please contact the manufacturer.

© Beamex 2024

Beamex Oy Ab

Ristisuonraitti 10

FIN-68600 Pietarsaari

Finland

Tel: +358-10-5505000

E-mail: sales@beamex.com

service@beamex.com

Website: <https://www.beamex.com>

Table of Contents

Feedback.....	4
Prologue.....	5
About this Manual.....	5
Typographical Conventions.....	6
Unpacking and Inspection.....	6
Safety.....	8
Symbols Used.....	8
Environmental Specifications.....	8
Safety Precautions and Warnings.....	8
General Warnings.....	9
Warnings concerning Pressure Measurement.....	10
Warnings concerning High Pressure.....	11
CENTRiCAL Calibration Bench.....	13
CENTRiCAL M and F Benches.....	13
Dimensions.....	14
Connecting CENTRiCAL to the Electrical Network.....	15
Connections.....	16
Pressure Supply Connections.....	16
Electrical Connections.....	17
CENTRiCAL Tabletop Solutions.....	19
CENTRiCAL Panel.....	19
Dimensions.....	20
Connections.....	20
TT Tabletop Case.....	22
CENTRiCAL Calibration Trolley.....	23
Contents.....	23
Connecting the CENTRiCAL Calibration Trolley to the Electrical Network.....	24
Connections.....	24
Pressure Supply Connections.....	24
Electrical Connections.....	25
Support Bars for the Temperature Dry Block.....	26
Pressure Measurement Modules.....	28
Available Pressure Measurement Module Types and their Measurement Ranges.....	29

Installing and Uninstalling Pressure Measurement Modules.....	30
Uninstalling a Pressure Measurement Module.....	30
Adding a Pressure Measurement Module.....	31
Pressure Output Modules.....	33
Diagrams of Pressure Output Modules.....	33
PO8C.....	34
Connections.....	35
Specifications.....	36
Service.....	38
Operation.....	38
PO20.....	39
Operation.....	40
Connections.....	41
PO210.....	41
Preparation.....	42
Operation.....	43
Connections.....	44
Maintenance of the Pressure Output Modules.....	45
Appendix.....	46
Pressure Fittings.....	46
Disposal of Waste Electrical and Electronic Equipment.....	47
Beamex and WEEE.....	47
Service.....	48
Statements.....	48
Disclaimer.....	48
EU.....	49
Intellectual Property Rights.....	49
Index.....	50

Feedback

We want to improve our products and services constantly. Therefore, we'd like to know your opinion of the product you use. Please spend a moment of your valuable time by giving us feedback about the product.

Address:	Beamex Oy Ab
----------	---------------------

	Quality Feedback
--	------------------

	Ristisuonraitti 10
--	--------------------

	FIN-68600 Pietarsaari
--	-----------------------

	FINLAND
--	---------

E-mail:	service@beamex.com
---------	--------------------

Website:	https://www.beamex.com
----------	---

Prologue

The Beamex CENTRiCAL Workshop Calibration Solution is a standard yet configurable solution that combines ease of use, versatility, ergonomics and provides a better way to perform calibrations in a workshop.

CENTRiCAL is available in various solutions: calibration bench, calibration trolley, and tabletop solution. Calibration benches are available as straight or corner bench versions, fixed height or with electronically adjustable height. A corner element can be used between two straight benches to form a corner bench combination. A trolley is the solution when you need to move the equipment around the workshop and the tabletop solutions are convenient for enhancing calibration capabilities in existing workshops.

The MC6-WS is a high-accuracy, panel-mounted workshop calibrator and communicator, that offers calibration capabilities for pressure, temperature, and various electrical signals. The MC6-WS is the heart of your CENTRiCAL Workshop Calibration Solution. Enhance your pressure calibration capabilities with automatic pressure controller, manual pressure generation modules or pressure measurement modules.

CENTRiCAL can be tailored according to your specific needs and is suitable for a wide variety of applications, including temperature and electrical calibrations. There are various electrical modules available, such as laboratory power supplies, multimeters or oscilloscopes. The modular design makes CENTRiCAL versatile and easy to configure according to your needs, with the ability to add or replace modules as needed. You can further enhance your CENTRiCAL workshop calibration solution with a wide variety of accessories.

All components in the CENTRiCAL solution are protected against electrostatic discharge (ESD), so it is safe to handle ESD-sensitive items on the bench or trolley. All the relevant modules in CENTRiCAL are calibrated before delivery and come with a calibration certificate, so you can start using the solution immediately

Beamex CENTRiCAL – a central place for all your workshop calibrations.

About this Manual

The CENTRiCAL user manual is divided into several chapters as follows:

- Chapter **Prologue** introduces CENTRiCAL.
- Chapter **Safety** discusses safety precautions and warnings.
- Chapter **CENTRiCAL Calibration Bench** discusses CENTRiCAL bench related matters.
- Chapter **CENTRiCAL Tabletop Solutions** discusses CENTRiCAL Tabletop related matters.

- Chapter **CENTRiCAL Calibration Trolley Solutions** discusses movable calibration system related matters.
- **Pressure Measurement Modules** discusses Pressure Measurement Modules used in conjunction with MC6-WS.
- **Pressure Output Modules** are tools for regulating vacuum and pressure sources with high precision.
- **Appendix** discusses pressure connections, equipment disposal, etc.

MC6-WS Advanced Workshop Calibrator and Communicator, POC8 Automatic Pressure Controller and all other modules mounted or delivered with the CENTRiCAL have their own manual, included in the delivery.

Typographical Conventions

The following typographical conventions apply to the CENTRiCAL user manual:



Note: This is a note. Notes typically inform you of something useful concerning the current topic.



Caution: This is a caution. Whenever you see a caution, read it carefully and take it seriously. By not observing cautions, you may damage the calibrator.



Warning: This is a warning. Whenever you see a warning, read it carefully and take it seriously. By not observing warnings, you may -at worst- damage the calibrator and/or even risk your life.

Unpacking and Inspection

At the factory each new CENTRiCAL module passes a careful inspection. It should be free of scrapes and scratches and in proper operation condition upon receipt. The receiver should, however, inspect the unit for any damage that may have occurred during transit. If there are signs of obvious mechanical damage, package contents are incomplete, or the module does not operate according to specifications, contact the purchasing sales office as soon as possible.

All the modules purchased with CENTRiCAL are pre-installed in the instrument panel at the factory. The POC8 is panel-mounted to CENTRiCAL calibration trolley or tabletop case. With CENTRiCAL benches, it is used on a swivel arm support and needs to be installed by the customer.

If you, for any reason, have to return a module or another part of the CENTRiCAL solution to the factory, contact Beamex first. Read also chapter [Service](#).


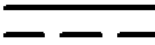

Standard Accessories:

CENTRiCAL Workshop Calibration Solution is available in various configurations and can be equipped with several different calibration products and modules. The delivery content for every CENTRiCAL solution is different since it depends on the configuration selected. If your CENTRiCAL contains MC6-WS Advanced Workshop Calibrator and Communicator, a leaflet listing the calibrator's standard accessories is included in the package. In order to verify the content of your delivery, please check the leaflet information.

Safety

Symbols Used

The following symbols concerning electrical safety are used in CENTRiCAL:

Symbol	Description
	Alternating current, AC
	Direct current, DC
	Caution! See manual for further information

Environmental Specifications

Environmental Specifications	
Operating temperature	-10 °C to 45 °C (14 °F to 113 °F)
Humidity	0 to 80 % R.H. non condensing
Protection	To IP20
Pressure media	Clean, dry and oil free instrument air

Safety Precautions and Warnings

CENTRiCAL contains precision tools that should be used by skilled people who have read and understood this and possible adjoining manuals. Working with CENTRiCAL involves the usage of pressure and/or electrical instruments. Be sure to know how to work with these instruments and how to safely connect/disconnect pressure hoses as well as electrical test leads clips, etc.

Sometimes it is necessary to use a portable radio transceiver while working with CENTRiCAL. To prevent calibration errors caused by the radio frequency interference, keep the radio far (at least 1 meter) from the calibrator and the circuit under calibration while sending.

Use CENTRiCAL only if you are certain of that it can be used safely. Safe use is no longer possible in the following cases:

- When the bench or a module has a clear visible damage
- When the device is not functioning as expected
- After prolonged storage in unfavorable conditions
- After serious damage during transport

General Warnings



Warning: Do not use CENTRiCAL or its modules in any other way than as described in this user manual. If this equipment is used in a manner not specified by the manufacturer, the protection provided by it against hazards may be impaired.



Warning: High voltage is dangerous. Getting into contact with high voltages can result in serious injuries, even death.



Warning: The power cable plug shall only be inserted into a socket with a protective earth contact in accordance with local electrical rules. The protective action must not be negated by the use of an extension cord without a protective conductor (grounding).



Warning: Make sure that only fuses with the required rated current and for the specified type (normal blow, time delay etc.) are used for replacement. The use of re-paired fuses and the short circuiting of fuse holders must be avoided.



Warning: Capacitors in the power supply unit may still be charged even if the power cable has been disconnected.



Warning: Sometimes it is necessary to carry out measurements inside the instrument panel with the mains power on. Make these measurements with extreme care and remove the power cable immediately after the measurements are completed. The operation should be carried out by a skilled person who is aware of the hazard involved.



Warning: In the occasion that a module is no longer operating safely, the module must be taken out of use and precautions must be taken against accidental use.



Note: If your CENTRICAL also includes an MC6-WS, it contains lithium-ion batteries. Read the warnings concerning lithium-ion batteries in the MC6-WS manual.

Warnings concerning Pressure Measurement



Warning: We recommend using only the optional pressure hose sets or pressure fittings delivered by Beamex. The maximum rated pressure is indicated on the hose. Applying higher pressure can be hazardous. When using other hoses and fittings, make sure they are high quality products that withstands the used pressure.



Warning: To avoid damaging the calibrator, use hand tightening only (max. torque 5 Nm) when connecting the pressure measurement hose to the pressure module. If the use of tools is required to secure the connection (typically a pressure module with a pressure range of 20 bar / 300 psi), apply the counterforce with a spanner on the connector body's hexagonal part.



Warning: Always depressurize the system before opening or connecting any pressure fittings or connectors. Use proper valves for venting the system. Ensure that all connections are made correctly and that the hose and the connectors are intact.



Warning: The allowed pressure media for pressure modules is inert, non- toxic, non-explosive media. External modules have the allowed media printed on the module's sticker. Using unsuitable pressure media may destroy the pressure module/calibrator.



Warning: External Pressure Modules: Use only the pressure media stated on the pressure module. Use of wrong type of Pressure Media may destroy the pressure module.



Warning: Never exceed the maximum pressure of a pressure module. The maximum pressure is indicated on a sticker on the module.



Warning: Never plug a hose with your hands or put hands in front of a gas spray coming from a leakage. A gas bubble in the circulatory system can cause death.



Note: Pressure modules with a measuring range of 6 bar (90 psi) or less are overpressure protected. If the measurement pressure of a pressure module exceeds the module's maximum pressure value, the overpressure protector vents excess pressure through a hole in the rear of the case.

Warnings concerning High Pressure



Warning: High pressure is always dangerous. Only personnel with good experience and knowledge of high pressure liquid, air and nitrogen operations are allowed to work with the module. Read carefully all these instructions and familiarize yourself with local safety instructions for high pressure operations before starting the use.



Warning: When using gas, the system must not contain any liquid, especially if you do not know how they may react under pressure. Use of clean air or nitrogen is recommended as gaseous pressure media. Liquid pressure media should be preferred when using modules with a pressure range of 60 bar (900 psi) or more.



Warning: If you use nitrogen, minimize the leak to the atmosphere and take care of sufficient ventilation. Close the valve of the nitrogen cylinder, when the system is not in use. Increase in the percentage of nitrogen in the ambient air may cause unconsciousness and death without warning. Read carefully the safety instructions for nitrogen and make sure that the other people in the same space are aware of the danger.



Warning: Use of liquid pressure medium is recommended with pressure measurement modules at higher pressure range. Use water or suitable hydraulic oil. Check that the used liquid is not aggressive against the materials used in the transducer or tubing. When using liquid, minimize the amount of air in the system. So you can minimize the amount of spilled liquid in case of leakage.



Warning: Do not use the same pressure hose with different liquids or gases.



Warning: Check what the local regulations say about construction and use of pressurized vessels. The regulations normally control construction and use of systems where the product of the pressure and volume exceeds a certain limit. The volume of this system depends on the instrument connected to it.



Warning: High pressure gas is dangerous because it can break the container and the flying splinters may cause injury. Also small leaks of gas may be dangerous because the high velocity of the leaking gas jet enables penetration through skin. If a gas bubble gets into the circulatory system, it can cause death. The leak jet is particularly penetrative, if some liquid is coming with the gas.

CENTRiCAL Calibration Bench

CENTRiCAL M and F Benches

The CENTRiCAL bench is available in the following models:

- CENTRiCAL M, with electronically adjustable height. The motor-lift benches allow you to adjust the table height to optimum working level. The height can be changed electrically from 740 - 1190 mm
- CENTRiCAL F, with a fixed height of 780 mm

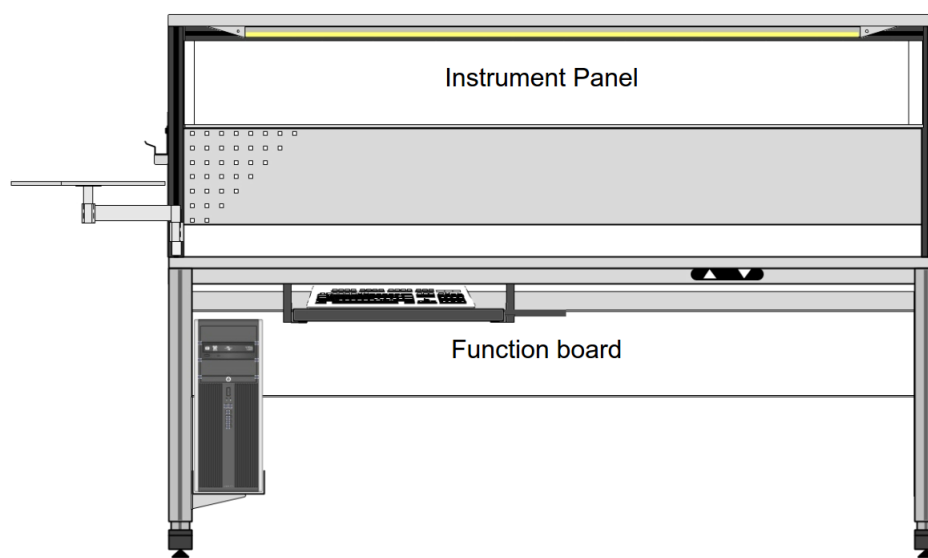


Figure 1: CENTRiCAL

A corner element (CM or CF) can be used between two straight benches to form a corner bench combination.

The calibration bench consists of the following elements:

- bench frame and columns
- table, depth 800 mm, fixed height or electronically adjustable height
- instrument panel for installing various calibration and electrical modules
- perforated back plate installed between bench columns
- dimmable LED workstation lamp
- function board includes pressure supply connections and equipment panel for electrical connections

Dimensions

The dimensions for the CENTRiCAL M and F models are the same and shown in the images below:

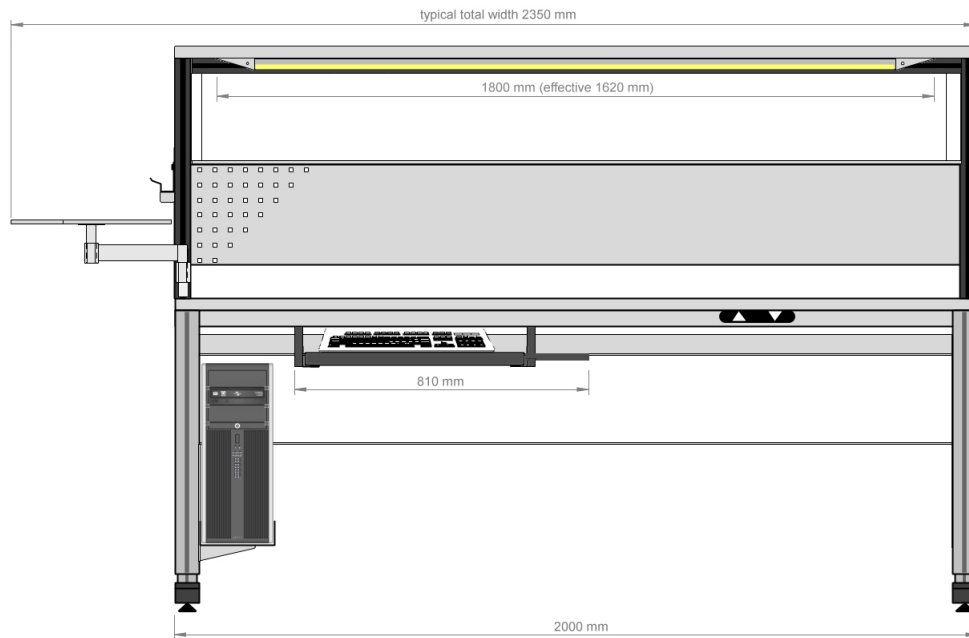


Figure 2: Dimensions: Front View

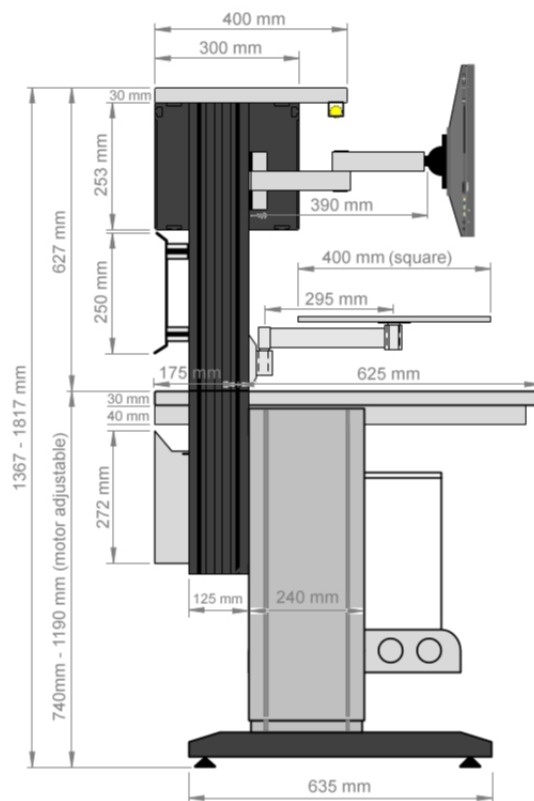


Figure 3: Dimensions: Side View

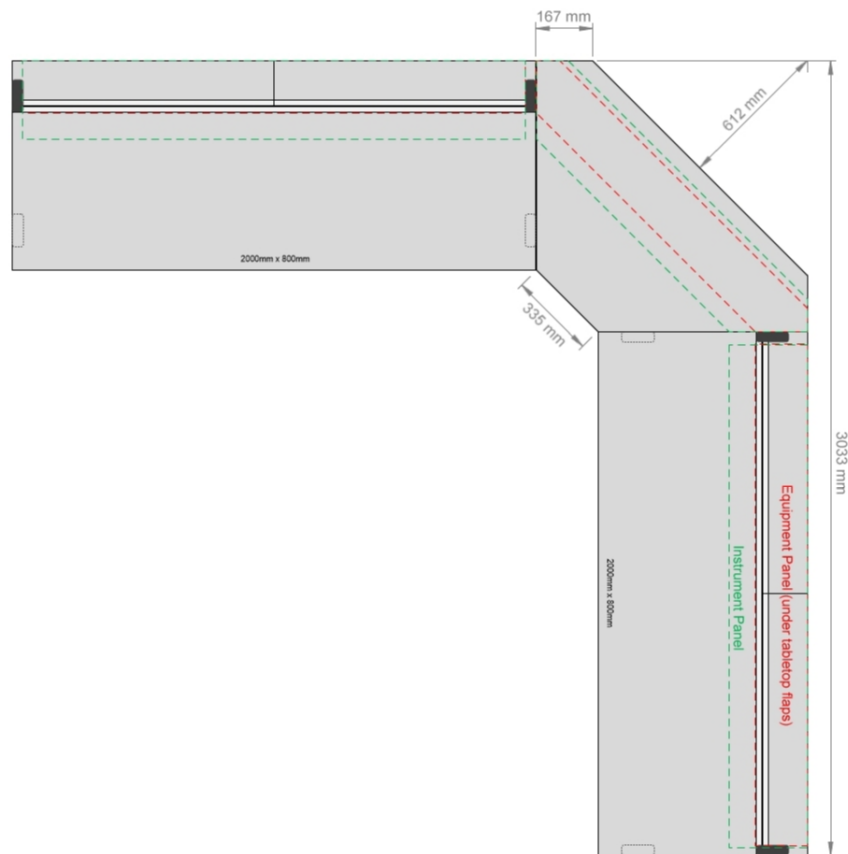


Figure 4: Dimensions: Top View

Connecting CENTRiCAL to the Electrical Network



Warning: Before connecting CENTRiCAL to the mains, check that the mains voltage is as marked on the rear panel of CENTRiCAL.

CENTRiCAL is equipped with two power cords. One of them is an IT-socket (marked) and meant for powering computers. It is always powered even if the power is turned off in the instrument panel. To turn it off, disconnect the power cord from the wall socket. The other cord is the mains cable (marked) and meant for powering the modules in the instrument panel and function board.

To connect the CENTRiCAL to the electrical network do the following:

1. Be sure that all the ON-OFF-switches in the instrument panel are switched OFF.
2. Connect the mains cables to an earthed AC outlet (wall socket).
3. Turn the main switch of CENTRiCAL ON (remember to check that the automatic fuses are in position I).

4. If any problems appear during the startup, please contact the manufacturer or your local distributors.

Connections

Pressure Supply Connections

The pressure supply connections are located in the middle of the function board under the table surface (marked with a sticker). POC8 and PO Modules require external pressure supply (instrument air, high pressure supply, typically a gas bottle, and/or vacuum pump).



Figure 5: Pressure Supply Connections

- The vacuum pump is installed in the bench frame with a power socket in the equipment panel and switch in the instrument panel.
- CENTRiCAL requires clean, dry and oil free instrument air supply.
- High pressure supply for POC8 Automatic Pressure Controller 100 bar and 210 bar units as well as Pressure Output Modules PO20 and PO210.
- Instrument air supply for POC8 Automatic Pressure Controller 10 bar unit, Pressure Output Module PO8C as well as AIRSUP module.

- Vacuum pump for POC8 Automatic Pressure Controller all units and Pressure Output Module PO8C.

Electrical Connections

Electrical connections are located either in the instrument panel or equipment panel.



Figure 6: Equipment Panel

The equipment panel is located in the function board at the back of the table top under the flaps. There are e.g. connectors for MC6 - POC8 communication and computer interface for MC6-WS.



Figure 7: Equipment Panel: Overview

The equipment panel includes electrical connections and is located at the back of the tabletop under standard flaps with high-quality hinges and gapless closing. It is included as standard in straight benches, not available for corner element.

The equipment panel includes:

- 2 x dual power socket panels, on the left and right side
- USB socket for charging, with silkscreen printing "Charging only"
- 1-2 x IT-socket for computers (Schuko 2 pcs, others 1 pc), which are powered even if the power is turned off in the mains module (powered with a separate power cord)
- USB-socket "PC > MC6-WS" for calibrator to PC communication
- USB-socket "POC8 > MC6-WS" for calibrator to POC8 communication

The equipment panel has two alternative layouts depending on the placement of the POC8 and vacuum pump in the bench.

CENTRiCAL Tabletop Solutions

A tabletop solution is a compact and convenient option for Beamex workshop products if you already have tables in your workshop. It can be placed on any surface and the modular construction allows you to customize the solution for most measurement and calibration applications.

CENTRiCAL Panel

Contents

The following products can be mounted in the CENTRiCAL Panel:

- MC6-WS Advanced Workshop Calibrator and Communicator
- Pressure Measurement Modules, to be used with MC6-WS only:
 - MC6-WS pressure modules
 - EXT CENTRiCAL pressure modules
- Pressure Output Modules:
 - PO8C
 - PO20
 - PO210



Figure 8: CENTRiCAL Panel

Please notice that the weight of the CENTRiCAL Panel is over 25kg and it should be lifted using the handles located on both sides. When lifting, it is recommended that there is one person on each side. Always use the correct lifting techniques, e.g. lift with your back straight.

CENTRiCAL Panel can easily be shipped back to Beamex in its original, hard transport case for recalibration or service, as the modules do not need to be detached from the Panel

Dimensions

The dimensions of the CENTRiCAL Panel:

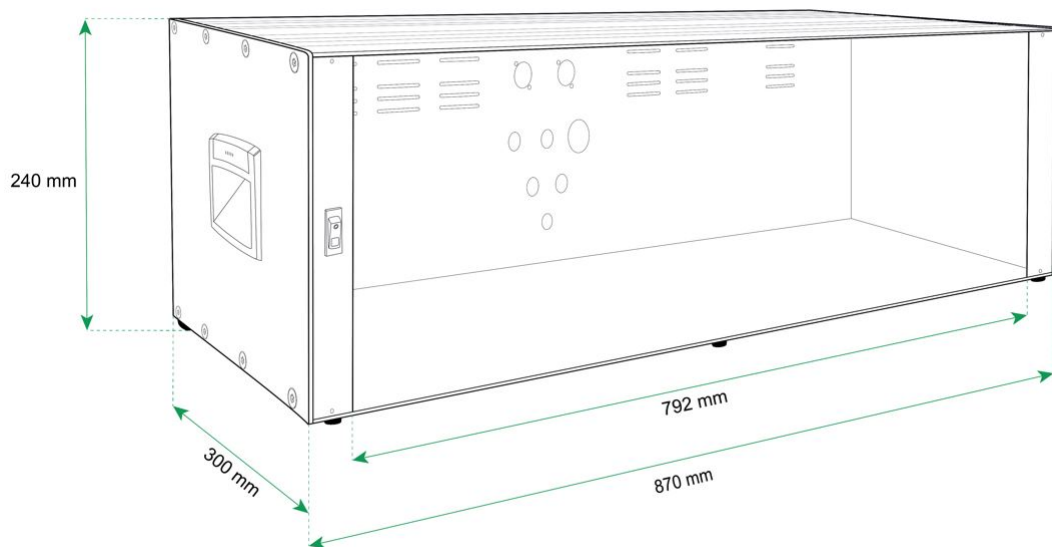


Figure 9: CENTRiCAL Panel Dimensions

Connections

All connections (except for product specific ones) needed for the products assembled to the CENTRiCAL Panel are located on the rear side of the panel (plugged if not in use).

The list below presents the connections:

1. **One shielded grounding point (yellow/green):** The CENTRiCAL Panel must be grounded with a cable (included in the delivery) to the appropriate grounding point (yellow/green).
2. **2 x plugs for Beamex BC15 (15VDC) chargers:** One of them is for the MC6-WS charger and the other is for internally assembled isolated USB-Hub (all external devices controlled by the MC6-WS are connected to the MC6-WS via the isolated USB-Hub).

Power requirements for Beamex BC15 (15VDC) chargers:

- Output: 15VDC / 4A / 60W each

3. **High Pressure Supply (max. 230 bar / 3300 psi):** High pressure supply for PO20 and PO210 Pressure Output Modules
4. **Vacuum Supply:** a pressure hose (included with the delivery if a vacuum pump is needed) from the vacuum pump must be connected to this connector.
5. **Pressure Supply (max. 10 bar / 150 psi):** Pressure supply (instrument air) for PO8C.
6. **USB-Port MC6-WS PC communication:** Used when a PC is connected to the MC6-WS, e.g., when the MC6-WS is used together with Beamex Calibration Management Software.
7. **USB-Port MC6-WS Controller communication:** An external device controlled by the MC6-WS can be connected to this connection (alternatively it can be connected to the front panel of the MC6-WS. All these ports are connected to the MC6-WS via the isolated USB-Hub).

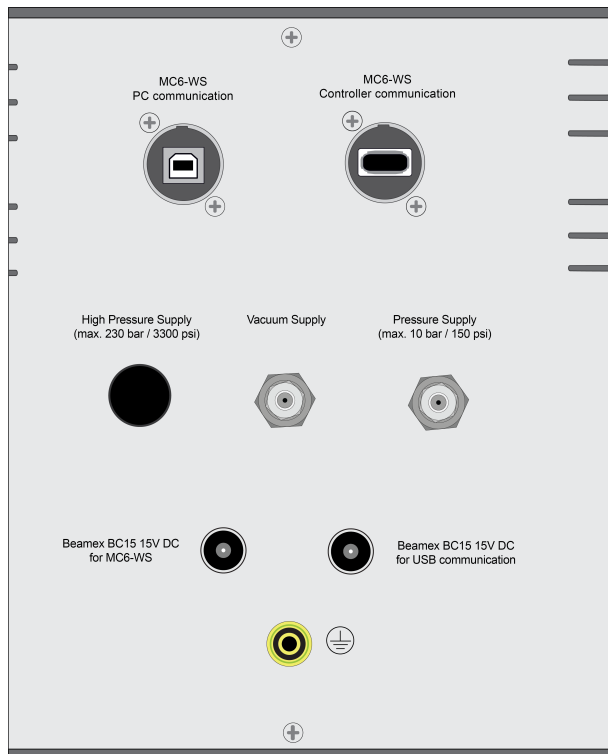


Figure 10: Close-up of the Connections

MC6-WS Main Switch

The MC6-WS main switch is located on the front of the panel on the left side. When the switch is turned off, you can still use the MC6-WS with the internal batteries until you turn it off in the User Interface.

TT Tabletop Case

The CENTRiCAL TT tabletop case consists of:

- Instrument panel (2 x 4 MP) for installing various calibration and electrical modules (1)
- power sockets (2)
- handles on both sides (3)

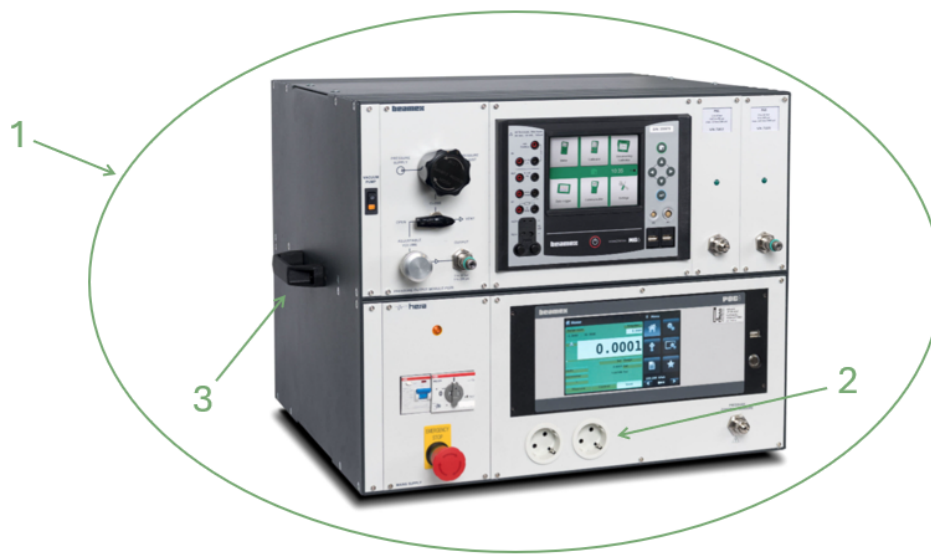


Figure 11: TT Tabletop Case

Contents

The following products can be mounted in the CENTRiCAL TT Tabletop case:

- MC6-WS Advanced Workshop Calibrator and Communicator
- Pressure Measurement Modules, to be used with MC6-WS only:
 - MC6-WS pressure modules
 - EXT CENTRiCAL pressure modules
- Pressure Output Modules:
 - PO8C
 - PO20
 - PO210
- Other modules:
 - POC8 Automatic Pressure Controller
 - All Hera modules

Electrical connections at the rear side of the Instrument Rack: power socket for the temperature dry block, vacuum pump power socket, USB-socket "PC > MC6-WS" and power cord according to mains module type.

Pressure supply connections are the same as in the trolley. Please see chapter [Pressure Supply Connections](#)

CENTRiCAL Calibration Trolley

A trolley is the solution when you need to move the equipment around the workshop. A calibration trolley (TR) and temperature calibration trolley (TRT) are available, both have instrument panel 2 x 4MP. All electrical and calibration modules, including MC6-WS and POC8, can be installed to the trolleys.

Contents

The CENTRiCAL Calibration Trolley is available in the following models:

- CENTRiCAL TR calibration trolley
- CENTRiCAL TRT temperature calibration trolley

Each version consists of:

- a trolley frame consisting of metal base with ESD caster wheels (1.), columns with horizontal supports (3.), and a handle bar (4.), allowing the user to move and steer the trolley
- a lockable sheet-steel drawer (2.)
- a tabletop (5.)
- a tiltable and detachable instrument panel (2 x 4 MP) for installing various calibration and electrical modules (6.)

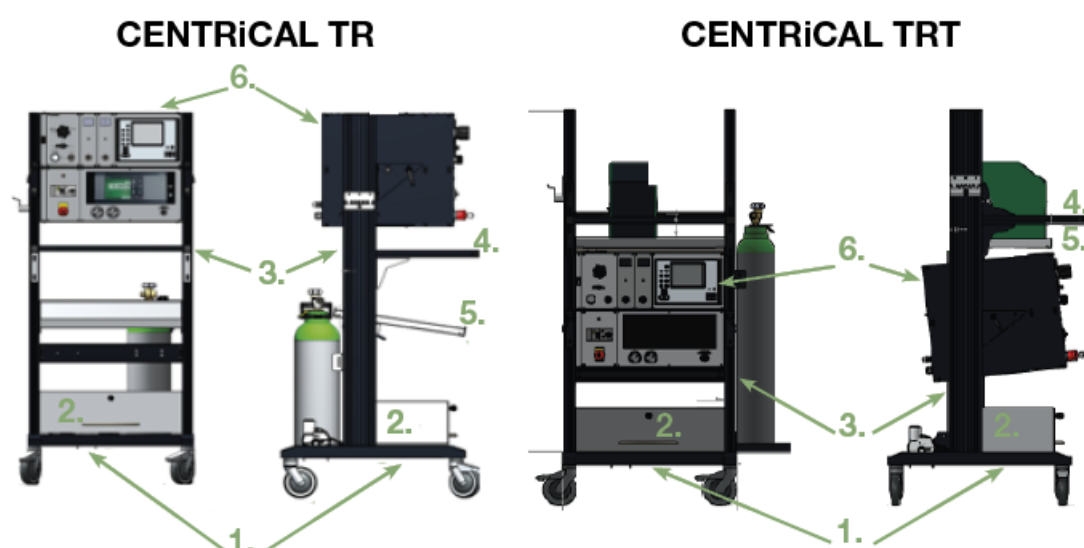


Figure 12: Calibration Trolley TR and TRT Contents

All the modules purchased with the CENTRiCAL TR and TRT are pre-installed in the instrument panel at the factory.

Connecting the CENTRiCAL Calibration Trolley to the Electrical Network



Warning: Before connecting CENTRiCAL to the mains, check that the mains voltage is as marked on the rear panel of the CENTRiCAL.

To connect CENTRiCAL to the electrical network do the following:

1. Be sure that all the ON-OFF-switches in the instrument panel are switched OFF.
2. Connect the mains cables to an earthed AC outlet (wall socket).
3. Turn the main switch of CENTRiCAL ON (remember to check that the automatic fuses are in position I).
4. If any problems appear during the startup, please contact the manufacturer or your local distributors.

Connections

Pressure Supply Connections

The pressure supply connections are located in the back of the instrument panel (marked with a sticker). Pressure supply is required for the pressure output modules.

The vacuum pump (if ordered) is installed in the trolley with a switch on the instrument panel. The pump is connected to the vacuum supply.

CENTRiCAL TR and TRT require clean, dry and oil free instrument air supply.

High pressure supply is needed for POC8 Automatic Pressure Controller 100 bar and 210 bar units as well as for Pressure Output Modules PO20 and PO210.

Instrument air is needed for POC8 Automatic Pressure Controller 10 bar unit, Pressure Output Module PO8C as well as for AIRSUP module.

Vacuum supply is needed for all POC8 Automatic Pressure Controller units and Pressure Output Module PO8C.



Figure 13: Pressure Supply Connections

Electrical Connections

The electrical connections are located either in module's front panel or in the back of the instrument panel. Please note that the sockets in the front panel are optional.

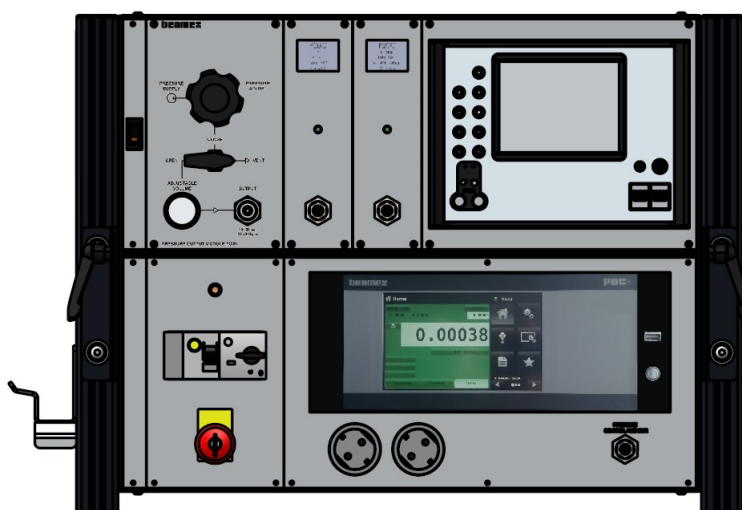


Figure 14: Electrical Connections

When the temperature dry block (e.g. Beamex FB, MB or MC6-T series) is being used, plug it into the socket that is located at the back of the trolley (see picture below).

When MC6-WS is attached to CENTRiCAL TR or TRT, you can use the USB-port (see picture below) to communicate between MC6-WS and PC.

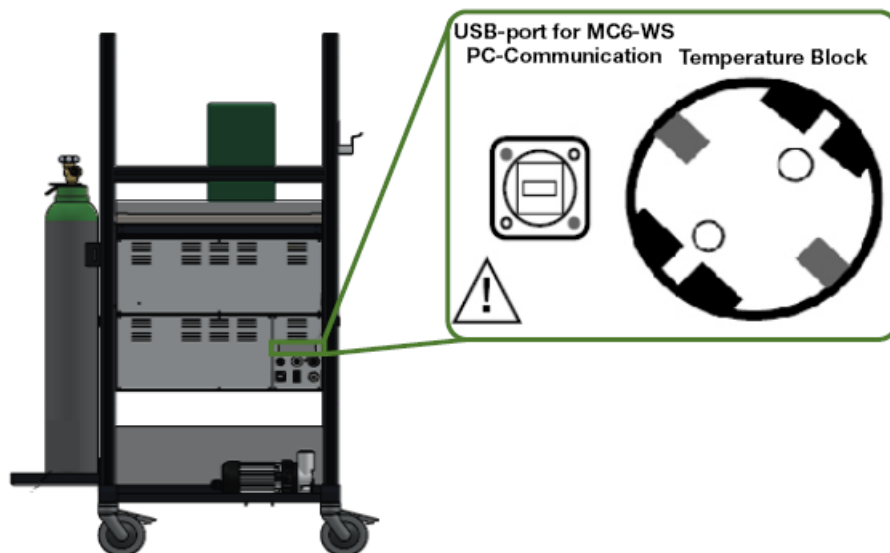


Figure 15: USB-port for MC6-WS



Warning: The power cord of the MC6-T calibrator or other temperature dry block must be plugged to the power socket on the rear side of the instrument panel.

Support Bars for the Temperature Dry Block

The CENTRiCAL TRT Temperature Calibration Trolley includes a table designed to accommodate the Beamex MC6-T Multifunction Temperature Calibrator or other temperature dry blocks. The table features width-adjustable safety stability holders with soft foam pads. These support bars ensure that the dry block remains stationary, preventing it from moving or falling during use when adjusted to the correct width.

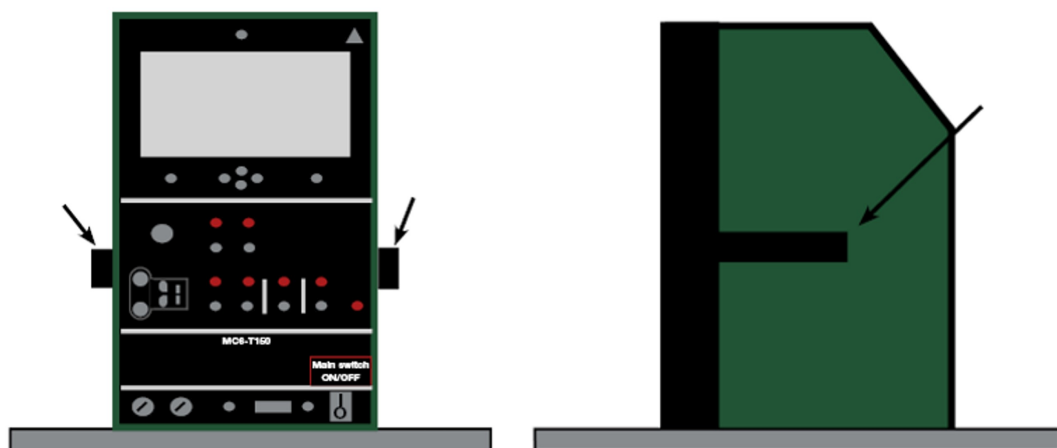


Figure 16: Temperature Block Support Bars



Warning: The temperature dry blocks can get very hot during use.



Caution: Make sure that the support bars do not block the ventilation holes that are on the sides of the temperature dry block.

Pressure Measurement Modules

Panel-mounted pressure modules are used in calibration workshops, and are installed in the instrument panel of the CENTRiCAL calibration bench, trolley or tabletop solutions. All panel-mounted pressure modules have a panel-width of 0.5 MP.

MC6-WS can hold up to 10 panel-mounted modules, connected to the calibrator internally. These modules can only be used with MC6-WS.

EXT CENTRiCAL is panel-mounted external pressure module that can be used with all Beamex multifunction calibrators. One external module at a time can be connected to the calibrator using the PX port on the calibrator and an EXT cable. EXT CENTRiCAL pressure modules can be used for example with temperature calibration trolley and MC6-T.

Refer to the MC6-WS user manual on how to measure pressure using the pressure measurement modules.

The recommended pressure medium for the modules are mentioned on the front panel. Use of other media may damage materials used in the pressure sensors. Wetted parts: AISI316, stainless steel, Hastelloy, Viton[®], Nitrile Rubber.



Figure 17: MC6-WS Pressure Module P20C

For pressure fitting info, see chapter [Pressure Fittings](#).



Warning: Do not apply a higher pressure to any of the pressure measurement modules than what is indicated on the nameplate or sticker.

Pressure is always dangerous. Carefully read the warnings found in chapter [Safety Precautions and Warnings](#) and the three following chapters.

VITON[®] is a registered trademark of DuPont Dow Elastomers L.L.C.

Available Pressure Measurement Module Types and their Measurement Ranges

MC6-WS Pressure Module	EXT CENTRiCAL	Range
PB ¹	EXT B CENTRiCAL	700 ... 1200 mbar a / 10.15 ... 17.4 psi a
P10mD	EXT10mD CENTRiCAL	±10 mbar diff. / ±4 iwc
P100m	EXT100m CENTRiCAL	0 ... 100 mbar / 0 ... 40 iwc
P400mC	EXT400mC CENTRiCAL	±400 mbar / ±160 iwc
P1C	EXT1C CENTRiCAL	±1 bar / -14.5 ... 15 psi
P2C	EXT2C CENTRiCAL	-1 ... 2 bar / -14.5 ... 30 psi
P6C	EXT6C CENTRiCAL	-1 ... 6 bar / -14.5 ... 90 psi
P20C	EXT20C CENTRiCAL	-1 ... 20 bar / -14.5 ... 300 psi
P60	EXT60 CENTRiCAL	0 ... 60 bar / 0 ... 900 psi
P100	EXT100 CENTRiCAL	0 ... 100 bar / 0 ... 1500 psi
P160	EXT160 CENTRiCAL	0 ... 160 bar / 0 ... 2400 psi

¹ PB is a barometric pressure measurement module. It enables absolute pressure measurement with other P modules.

MC6-WS Pressure Module	EXT CENTRiCAL	Range
P250	EXT250 CENTRiCAL	0 ... 250 bar / 0 ... 3700 psi
P600	EXT600 CENTRiCAL	0 ... 600 bar / 0 ... 9000 psi



Note: The panel mounted external pressure modules require communications cable for a calibrator, depending on the calibrator. The communications cable must be ordered separately.

Installing and Uninstalling Pressure Measurement Modules



Warning: Disconnect the mains cables and the pressure supply to your CENTRiCAL before you install or uninstall any modules.

To install or uninstall a module from your CENTRiCAL make sure both CENTRiCAL and the MC6-WS are shut off. Disconnect the mains cables from the wall outlet.

Uninstalling a Pressure Measurement Module

The pressure measurement modules are connected only to the MC6-WS.

How to disconnect the flat cable connector from the pressure measurement module:

1. Unscrew the screws that hold the pressure measurement module in the instrument panel of the CENTRiCAL (located in the corners of the front panel). Remove the module from the instrument panel. Note that the communication cable is long enough to allow pulling out the pressure measurement module out without problems.
2. Pull the locking hooks from the cable connector.
3. Pull the cable connector from the pressure measurement module.

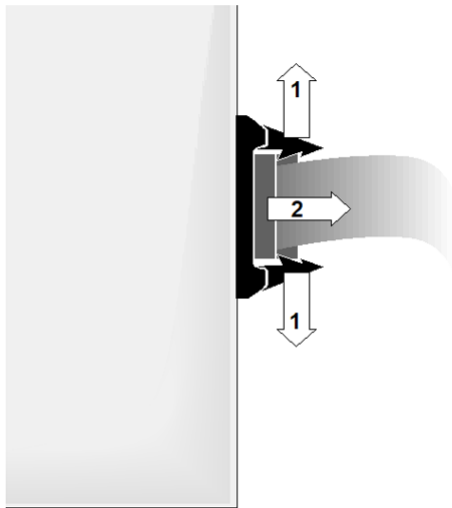


Figure 18: Disconnecting a Pressure Module

MC6-WS can be used without the removed module, if necessary. At startup MC6-WS automatically identifies all the pressure modules currently connected to it.

Adding a Pressure Measurement Module

The MC6-WS calibrator automatically identifies all pressure modules connected to it based on their programmable ID numbers (seen in the user interface of the MC6-WS). When you add a pressure measurement module to the CENTRICAL, the new module should have a unique number. This is normally pre-set by Beamex. If your MC6-WS has problems locating the new pressure measurement module, please contact Beamex. Contact info can be found on the front page of this user manual.

The pressure measurement module communicates with the MC6-WS calibrator via a flat data cable. The MC6-WS is able to communicate with ten Pressure Measurement Modules (the cable has 10 connectors in series).

To connect the communication cable to the pressure measurement module, push the cable connector into the respective connector in the pressure measurement module. The connectors lock together with a “click”.

After installation, switch on the MC6-WS calibrator and check the operation of the new pressure module by selecting it in the calibrator.

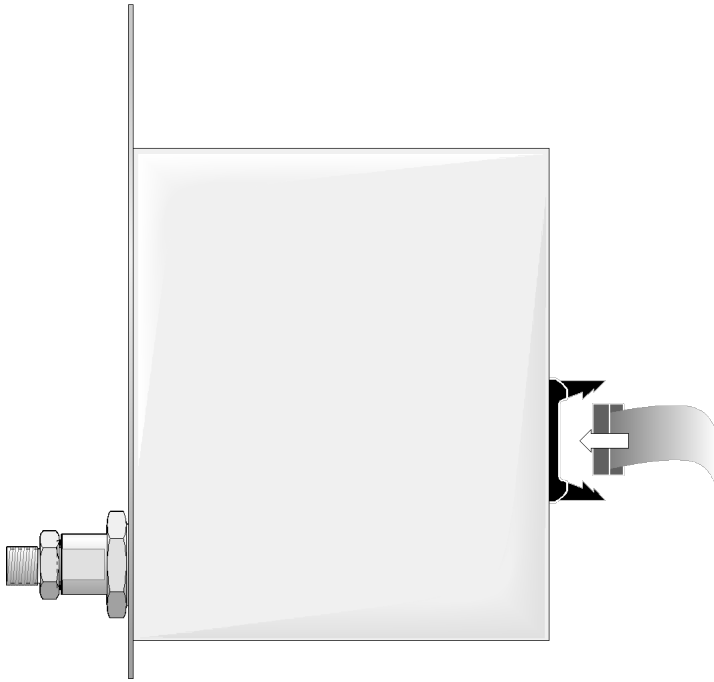


Figure 19: Adding a Pressure Measurement Module

For EXT CENTRiCAL modules, there are no cables on the back of the module.

Pressure Output Modules



Note: Carefully read the warnings found in chapter [Safety Precautions and Warnings](#) and the three following chapters.

The PO modules are variable pressure output modules that are designed to regulate vacuum and pressure sources with high precision. They are installed to the instrument panel of the CENTRICAL bench, trolley or tabletop solution.

This section presents the use of the manually controlled Pressure Output Modules. POC8 Automatic Pressure Controller has a separate manual delivered with CENTRICAL if it is included in the delivery.

For pressure fitting info, see chapter [Pressure Fittings](#).

Diagrams of Pressure Output Modules

The pressure output modules are designed to produce very accurate pressures when calibrating pressure instruments. For pressures up to 20 bar (290 psi) an adjustable volume is used to help achieving the exact pressure. Needle valves are used in high pressure modules.

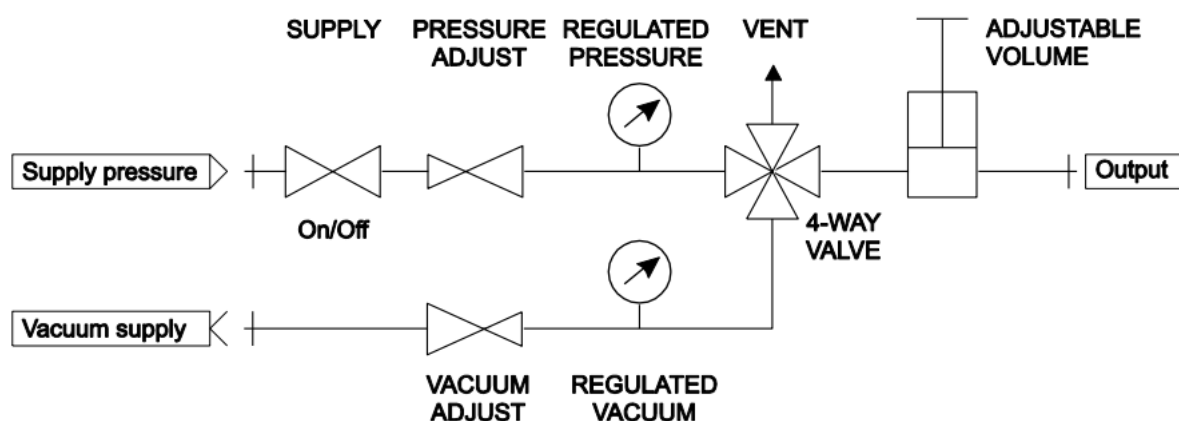


Figure 20: Vacuum/Pressure Output Module PO8C

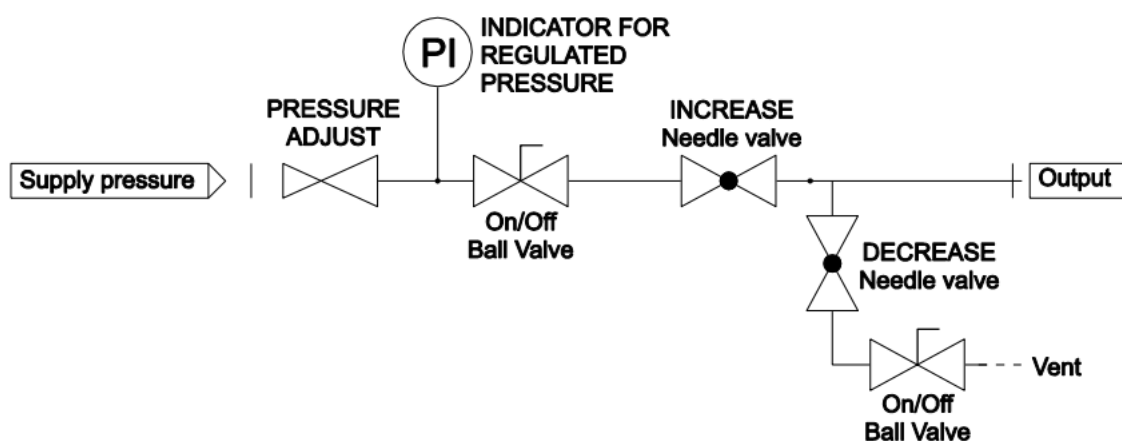


Figure 21: Diagram of the Pressure Output Module PO210 using needle valves

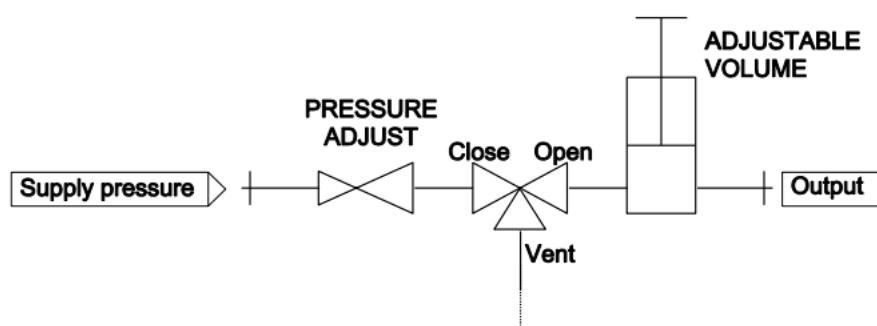


Figure 22: Pressure Output Module PO20

PO8C

PO8C is a variable pressure output module with an output range of -0.95 to 8 bar gauge (-13.7 to 116 psi).

PO8C includes:

- On/Off valve for supply pressure.
- Pressure adjuster for pressures above atmospheric pressure. The adjuster includes a nozzle flapper type pilot valve for precise pressure adjustment.
- Vacuum adjuster for pressures below atmospheric pressure. The adjuster includes a nozzle flapper type pilot valve for precise vacuum adjustment.
- Selector valve with four positions:
 - PRESSURE, VACUUM, CLOSE and VENT.
- Adjustable volume for exact pressure setting.

The maximum supply pressure to the PO8C Pressure Output Module is 10 bar (145 psi).

To achieve pressure values lower than the atmospheric pressure, a sufficient vacuum supply is required.



Figure 23: Close-up of the PO8C

Connections

The PO8C module is connected to the CENTRiCAL function board via the supply pressure hose and the vacuum hose. Usually the output of the vent valve is unconnected. Suitable hoses for output are optional and should be ordered separately.

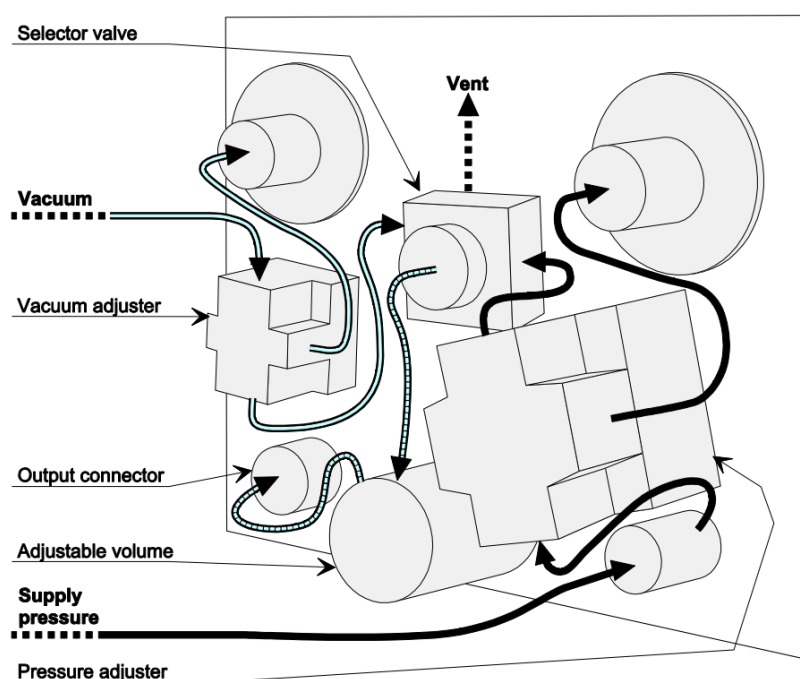


Figure 24: Simplified Diagram of the Connections on the Rear Side of the PO8C



Note: The total volume of measurement hoses and instrument measurement chambers connected to the PO8C's output connector should not exceed 100ml (6.1 in³).

Specifications

General

Feature	SI Unit	Imperial
Width of module	264 mm	10.39"
Height of module	221 mm	8.70"
Total weight of module	3.25 kg	7.2 lbs
Temperature range, operating	10 ... 60 °C	50 ... 150 °F
Storage	-20 ... 60°C	-4 ... 140 °F
Sensitivity better than (depends on user)	1 mbar	0.015 psi
Maximum pressure for the pressure hose (sold separately)	40 bar	580 psi

Pressure Adjuster

Feature	SI Unit	Imperial
Medium	Clean dry air or other inert, non-toxic, non-corrosive gas	
Maximum supply pressure	10 bar	145 psi
Minimum supply pressure	Set pressure + 0.5 bar	Set pressure + 7¼ psi
Regulating pressure range	0.1 ... 8 bar	1.45 ... 116 psi

Feature		SI Unit	Imperial
Air consumption (discharged to the atmosphere):	Bleed flow, max (ANR) ² with 10 bar (14.5 psi) supply	3.5 l/min	0.124 ft ³ /min
	Exhaust flow, max (ANR) at maximum set pressure	0.9 l/min	0.032 ft ³ /min



Note: If you are using nitrogen, read the warnings found in chapter [Safety Precautions and Warnings](#) and the three following chapters

Vacuum Adjuster

Feature	SI Unit	Imperial
Regulating pressure range ³	-1 ... -0.013 bar	-14.5 ... -0.1885 psi
Maximum atmospheric intake consumption ⁴ (ANR)	0.6 l/min	0.021 ft ³ /min

Adjustable Volume

Typical pressure changes using volume's full stroke length.

With a Beamex T-pressure hose connected to PO8C, MC6 family pressure module one end plugged.

From max. to min. volume, starting pressure	Final pressure SI Unit	Final pressure Imperial Unit
0 barg (0 psig)	0.83 barg	12 psig
7 barg (102 psig)	12.6 barg	183 psig

² ANR = "Atmosphere Normale de Reference", in English: "standard reference atmospheric conditions".

³ Lowest possible pressure depends on the vacuum source and atmospheric pressure.

⁴ Taking air from atmosphere all the time

From max. to min. volume, starting pressure	Final pressure SI Unit	Final pressure Imperial Unit
0 barg (0 psig)	-0.46 barg	-6.67 psig
7 barg (102 psig)	3.37 barg	48.9 psig
-0.5 barg (-7.25 psig)	-0.73 barg	-10.5 psig
-0.9 barg (-13.5 psig)	-0.94 barg	-13.6 psig

Output Connector

See chapter [Pressure Connections](#).

Service

No serviceable parts inside except as noted further on. In case PO8C needs service, contact Beamex or your local distributor. Beamex's contact info can be found on the front page of this user manual.

When disassembling PO8C, first make sure pressure and vacuum sources are disconnected.

Selector Valve



Warning: Failure to periodically inspect and maintain valve packing may lead to product malfunction.

Packing adjustments may be required for leak-tight performance. Before servicing any installed valve you must depressurize the system, cycle the valve and purge the valve. Adjust the packing bolt clockwise in 1/16 turn increments until leak-tight performance is achieved.

To adjust the packing, remove the directional handle to see the packing bolt. Then use Swagelok adapter MS-WK-43 or a suitable tool to adjust packing.

Operation



Warning: High pressure is always dangerous. Carefully read the warnings found in chapter [Safety Precautions and Warnings](#) and the three following chapters.

Turn the selector valve to the VENT position.

Ensure that the regulated pressure is set to zero by turning the PRESSURE ADJUST knob **counterclockwise**. Also turn the VACUUM ADJUST knob **counterclockwise** and set the ADJUSTABLE VOLUME to its midpoint.

Connect the output of PO8C module to the instrument under test and to a suitable pressure measurement module.

Turn the selector valve to either the PRESSURE or VACUUM position depending on your pressure needs. If you want to create pressures above atmospheric pressure, turn the SUPPLY valve to the ON position.

To regulate the pressure, use either the PRESSURE ADJUST or VACUUM ADJUST⁵ knobs (again, depending on your pressure needs). Observe the regulated pressure/vacuum value from the pressure calibrator's display. For exact pressure adjustment, close the selector valve and use the ADJUSTABLE VOLUME knob. Remember to make small changes and wait for the pressure to settle. Changes in gas pressure affects the gas temperature and the tension/ volume of the measurement hoses.

To vent pressure, turn the selector valve to the VENT position. To avoid pressure shocks, rotate the selector valve to the VENT position via the regulator used for creating the pressure.

When ready, ensure that the regulated pressure is set to zero by turning the PRESSURE ADJUST knob **counterclockwise**. Also turn the VACUUM ADJUST knob **counterclockwise**, return the ADJUSTABLE VOLUME to its midpoint and set the selector valve to the CLOSE position.

PO20

PO20 is a variable pressure output module with an output pressure of 0 to 20 bar gauge (0 to 290 psi).

The PO20 includes:

- precise calibration pressure adjuster
- 3-way valve (Open/Close/Vent) to separate the adjusted pressure from the output connector and vent the pressure when necessary.
- adjustable volume for exact pressure setting.

For pressure fitting info, see chapter [Pressure Measurement Modules](#).

The maximum supply pressure for the PO20 Pressure Output Module is 230 bar (3500 psi).

Typically, a high pressure cylinder is used for providing the required supply pressure. The use of liquid pressure medium is not possible.

Width of the module: 132 mm (5.20").

Height of the module: 221 mm (8.70").

⁵ Vacuum adjuster: pull to adjust, push to lock.



Figure 25: PO20 Pressure Output Module

Operation



Warning: High pressure is always dangerous. Carefully read the warnings found in chapter [Safety Precautions and Warnings](#) and the three following chapters.

Ensure that the regulated pressure is set to zero by turning the PRESSURE ADJUST knob counterclockwise. Also set the adjustable volume to its midpoint.

Connect the output of PO20 module to the instrument under test and to a suitable pressure measurement module. Turn the 3-way valve to the OPEN position.

To regulate the pressure, use the PRESSURE ADJUST knob. Observe the pressure value from the pressure calibrator's display. For exact pressure adjustment, turn the 3-way valve to the CLOSE position and use the ADJUSTABLE VOLUME knob.

To vent pressure turn the 3-way valve to VENT position.

The output pressure of the regulator should be set to zero and the 3-way valve should be in the CLOSE position when the module is not in use.

Connections

The PO20 module is connected to the CENTRiCAL function board via the supply pressure hose. Usually the output of the vent valve is unconnected. Suitable hoses for output are optional and should be ordered separately.

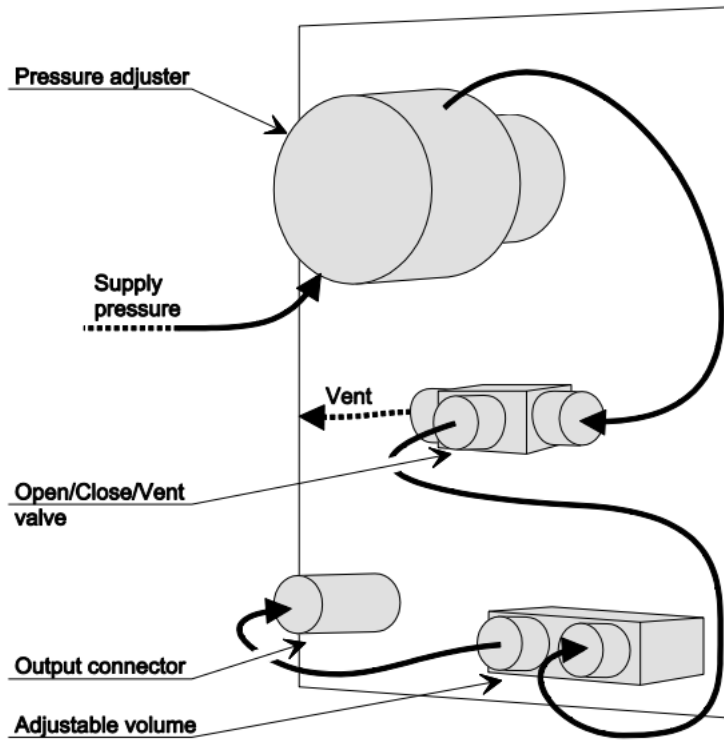


Figure 26: Simplified Diagram of the Connections on the Rear Side of the PO20

PO210

PO210 are variable pressure supply modules. The following table describes the output pressure and maximum supply pressure for each module:

Module Type	Output Pressure	Max. Supply Pressure
PO210	0 ... 210 bar gauge (0 ... 3045 psi)	230 bar (3335 psi)

The PO210 includes:

- precise calibration pressure adjuster
- pressure gauge for the regulated pressure
- needle valve for increasing the output pressure
- needle valves for decreasing the output pressure (venting)

- two on/off ball valves for sealing the system (when needed)

Typically, a high pressure cylinder is used for providing the required supply pressure. The use of liquid pressure medium is not possible.

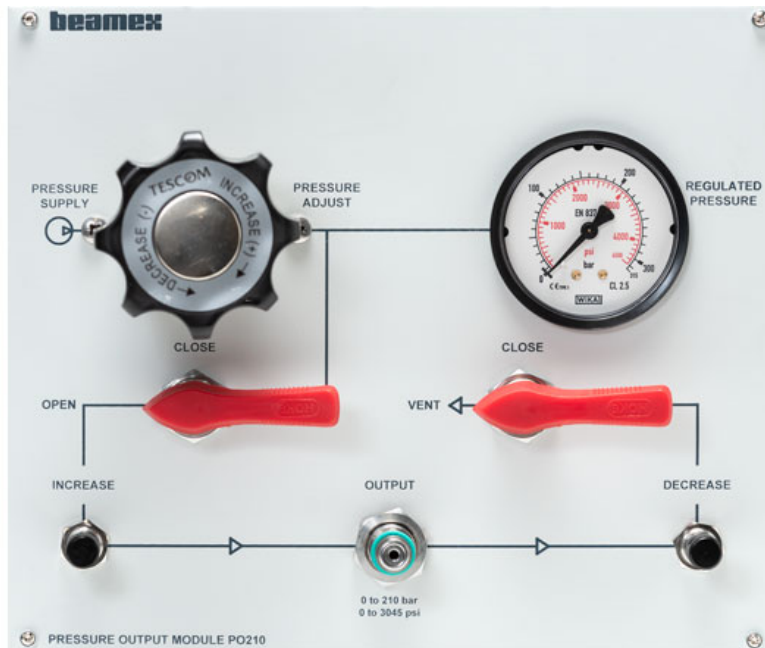


Figure 27: The PO210 Output Pressure Module

Width of each module: 264 mm (approx. 10.39").

Height of each module: 221 mm (approx. 8.70").

Please see chapter [Pressure Measurement Modules](#).

Preparation

Before the Pressure Output Module is taken into full use, the following should be taken into consideration.

All PO Modules have two pairs of valves:

- Two on/off ball valves marked **A** and **B** in the adjacent picture.
- Two needle valves. One for increasing the pressure and another for decreasing the pressure.

The on/off ball valve marked **A** is used when stepping up during a calibration run. Respectively, the on/off ball valve marked **B** is used when stepping down during a calibration run. The needle valves should be preset to have a suitable small "leakage" and then not touched at all during a calibration run. The needle valves may need to be preset once when taking your PO Module into use.

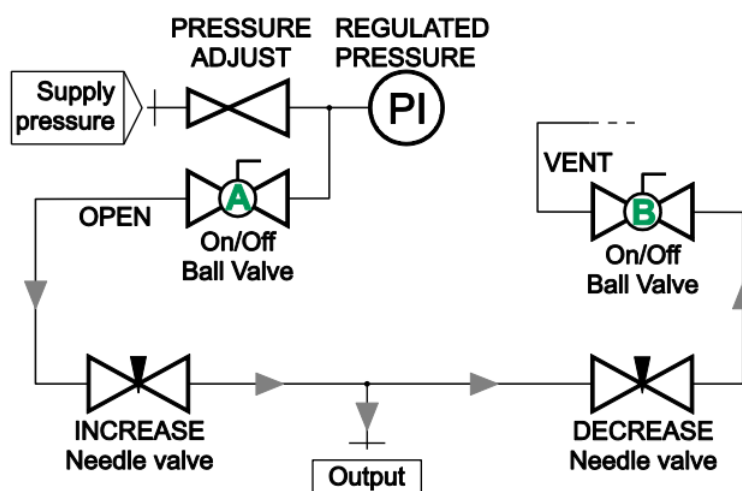


Figure 28: PO210: Valves

Operation



Warning:

High pressure is always dangerous. Carefully read the warnings found in chapter [Safety Precautions and Warnings](#) and the three following chapters.

To begin make sure that both ball valves (marked **A** and **B**) are closed. Set the regulated pressure to zero by turning the PRESSURE ADJUST knob counterclockwise. Connect the instrument under test and a suitable pressure measurement module to PO Module's OUTPUT connector.

Increasing the Pressure, i.e. Stepping Up

Use the pressure adjuster to raise the regulated pressure to a level slightly above the target pressure for the next calibration point. Open the ball valve marked **A**. Follow the pressure increase in the OUTPUT connector using the pressure measurement module. If the needle valve's setting is good and the regulated pressure is suitable, the pressure increase should slow down when reaching the next calibration point. When the pressure is as desired, close the ball valve marked **A** and wait for the pressure to stabilize. Read/save the readings and continue to next point by starting from the beginning of this paragraph.

Decreasing the Pressure, i.e. Stepping Down

To step down, open the ball valve marked **B**. Follow the pressure decrease in the output connector using the pressure measurement module. If the needle valve's setting is good, the pressure decrease should be adequately followed and stopped by closing the ball valve marked **B**. Wait for the pressure to stabilize. Read/save the readings and continue to the next point by starting from the beginning of this paragraph.

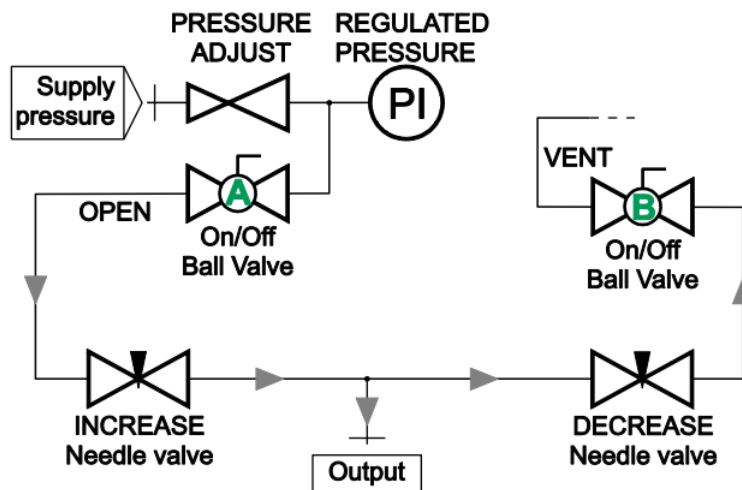


Figure 29: PO210: Valves



Note: When decreasing the pressure, you may also lower the speed of the pressure decrease using the ball valve marked **B**. Ball valves are not linear, so this may require some experience.

Connections

The PO210 module is connected to the CENTRiCAL function board via the supply pressure hose. Usually the output of the vent valve is disconnected. Suitable hoses for output are optional and should be ordered separately.

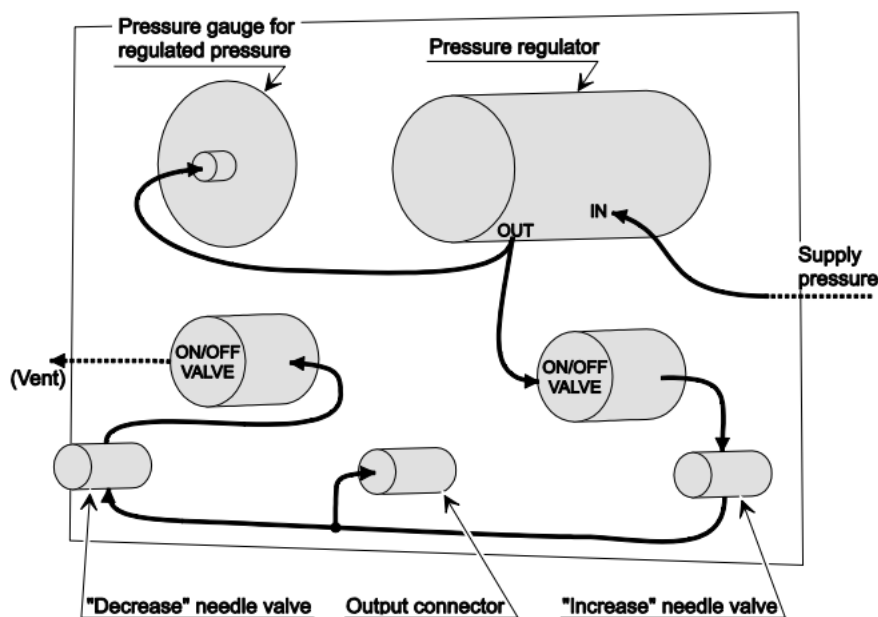


Figure 30: Simplified Diagram of the Connections on the Rear Side of PO210

Maintenance of the Pressure Output Modules

When properly used the Pressure Output Modules should not require any regular service. In case service is required, contact Beamex or your local representative.

The high pressure regulator in the Pressure Output Modules PO20 and PO210 may need service if the supply gas is not perfectly clean. If you are not qualified for this kind of service, contact Beamex or your local representative.

Installing and uninstalling a Pressure Output Module

The installation and uninstallation of modules is, in principle, done similarly as all other modules in CENTRiCAL.

Appendix

Pressure Fittings

Pressure output modules, automatic pressure controllers and pressure measurement modules have the following fittings.

For pressures from -1 up to 40 bar

The pressure modules P100m ... P20C have a G1/8" female thread (ISO 228-1 G1/8") with preinstalled Bx G1/8" male fitting, compatible with Beamex 40 bar hoses.

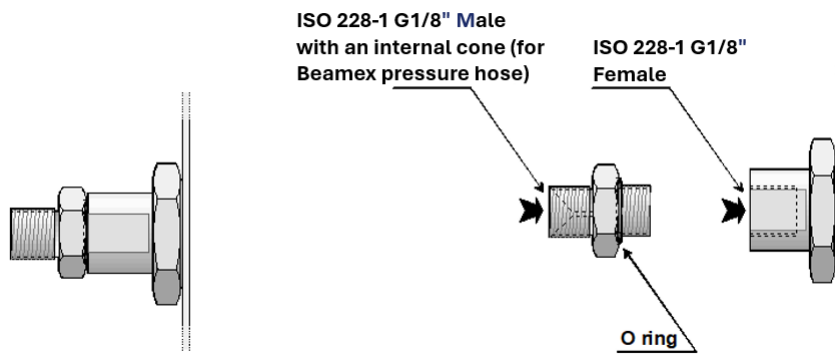


Figure 31: Pressures from -1 up to 40 bar

For pressures from 0 up to 250 bar

The pressure modules P60 ... P250 have a G1/8" female thread with preinstalled Bx 1215 male fitting compatible with Beamex 630 bar hoses.

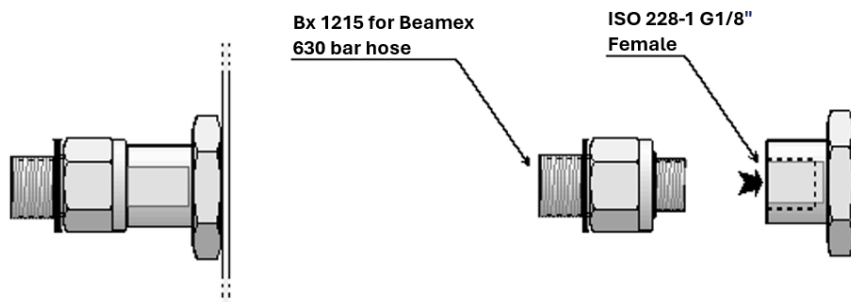


Figure 32: Pressures from 0 up to 250 bar

For pressures from 0 up to 600 bar

Module P600 has G1/4" B male thread. Use fitting 7108650 to connect to Beamex 630 bar hoses, available in Beamex webshop.

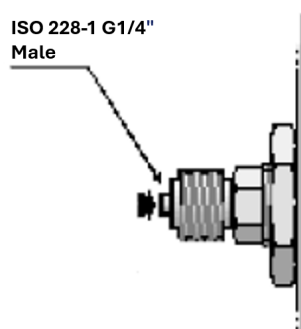


Figure 33: Pressures from 0 up to 600 bar



Note: Use only hand tightening when connecting Beamex pressure hoses. Use of a wrench may damage the fitting.

Disposal of Waste Electrical and Electronic Equipment

Beamex and WEEE

Beamex is an environmentally conscious company developing products with a view to ensure that they are easy to recycle and do not introduce hazardous materials into the environment.

In the European Union (EU) and other countries with separate collection systems, waste from electrical and electronic equipment (WEEE) is subject to regulations.

EU WEEE Directive 2012/19/EU (the WEEE Directive) requires that producers of electronic equipment are responsible for the collection, reuse, recycling and treatment of WEEE which the Producer places on the EU market after August 13, 2005. The objective of this regulation is to preserve, protect and improve the quality of the environment, protect human health, and conserve natural resources.



The symbol above can be found on the back of the product. It indicates that this product should be handed over to applicable collection point for the recycling of electrical and electronic equipment.

For more detailed information about recycling of this product, please contact your local distributor or your waste disposal service.



Note: If your CENTRiCAL also includes an MC6-WS, it contains lithium-ion batteries. Read warnings and recycling instructions concerning lithium-ion batteries in the MC6-WS manual.

Service

For any equipment requiring repair or recalibration, a service or quotation request must be submitted via the Beamex Service Portal before shipping the equipment to Beamex. You can find the portal at <https://services.beamex.com>.

It is highly recommended to trust a local calibration service provider for performing calibration of the Hera electrical modules at the customers' premises. This way, the modules do not need to be removed and electrical safety is not compromised.

Statements

Disclaimer

Beamex has taken great care to ensure that this manual contains both accurate and comprehensive information. Notwithstanding the foregoing, the content of this manual is provided "as is" without any representations, warranties or guarantees of any kind, whether express or implied, in relation to the accuracy, completeness, adequacy, currency, quality, timeliness or fitness for a particular purpose of the content and information provided on this manual. The content of this manual is for general informational purposes only. To the extent permitted by law, Beamex shall not be liable for any direct, indirect, special, consequential or incidental loss or damage (including but not limited to damage for third parties and loss of use, loss of profit and loss of production) in relation with the use of this manual, even if Beamex has been advised of the possibility of such damages.

Beamex reserves the right to amend this manual at any time without prior notice. Furthermore, the products this manual describes are subject to change without prior notice due to Beamex's continuous product development process.

EU

All available approvals and the Declaration of Conformity can be downloaded from <https://www.beamex.com>.

Intellectual Property Rights

Copyright

The content of this manual is the property of Beamex Oy Ab and/or its subsidiaries and affiliates (referred hereinafter as Beamex). This manual and its content are protected by international copyright laws and all copyrights are retained by Beamex. All rights reserved. Reproduction, distribution, transfer or storage of the content presented in this manual, in whole or in part, is illegal and prohibited without the prior written consent of Beamex.

Trademarks

“Beamex”, “Beamex – A better way to calibrate as well as the color combination of green and black as applied to the major part of the visible surfaces of a measurement device, are registered trademarks of Beamex Oy Ab. No content provided in this manual should be interpreted as a permission or license to use Beamex trademarks. The use of Beamex trademarks without the approval and consent of Beamex is prohibited and violates trademark laws.

All other trademarks or trade names mentioned in this manual are the property of their respective holders.

Index

A

About this Manual.....	5
Accessories.....	6

B

Barometric Module.....	29
Bench Models.....	13

C

CENTRiCAL Calibration Bench.....	13
CENTRiCAL Calibration Trolley.....	23
CENTRiCAL Panel.....	
Connections.....	20
Dimensions.....	20
Connections.....	16, 24
Copyright.....	49

D

Dimensions.....	14
Disclaimer.....	48
Disposal.....	47

E

Electrical Connections.....	17, 25
Environmental Specifications.....	8

I

Intellectual Property Rights.....	49
-----------------------------------	----

L

Lithium-ion Battery.....	9
--------------------------	---

P

PO20.....	
Connections.....	41
Operation.....	40
PO210.....	
Connections.....	44
Operation.....	43
Preparation.....	42
PO8C.....	
Connections.....	35

Operation.....	38
Service.....	38
Specifications.....	36
Pressure Fittings.....	46
Pressure Measurement Modules.....	
Adding.....	31
Ranges.....	29
Uninstalling.....	30
Pressure Output Modules.....	
Diagrams.....	33
Maintenance.....	45
PO20.....	39
PO210.....	41
PO8C.....	34
Pressure Supply Connections.....	16, 24
Prologue.....	5

R

Returning a Module.....	6, 48
-------------------------	-------

S

Safety.....	8
Safety Precautions.....	8
Service.....	48
Standard Accessories.....	6
Symbols.....	8

T

Temperature Dry Block.....	
Support Bars.....	26
Trademarks.....	49
TT Tabletop Case.....	22
Typographical Conventions.....	6

U

Unpacking.....	6
----------------	---

W

Warnings.....	
General.....	9
High Pressure.....	11
Pressure Measurement.....	10
WEE.....	47