User Manual - Beamex® CENTRiCAL and Supporting Modules

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 OY AB
Ristisuonraitti 10
FIN-68600 Pietarsaari
FINLAND
Tel +358 - 10 – 5505000
E-mail: sales@beamex.com
service@beamex.com
Internet: http://www.beamex.com

8888200 / CENTRiCALSuEng / Version 1a

CONTENTS

Appendix

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 in filling this form. All respondents will receive a surprise gift in return.

Certain questions can be answered immediately after receiving the product. Others require some use of the product before You are able to answer them. The best way to fill the form is to answer the items as it applies, and send the form to us when all items are answered. There are however no definite restrictions; fill in the form when you feel like it (all items need not be answered). Then send it to Beamex using one of the possibilities listed to the right.

Mail:	**Beamex Oy Ab** **Quality Feedback** **Ristisuonraitti 10** **FIN-68600 Pietarsaari** **FINLAND**
Internet:	**http://www.beamex.com** *A similar form is available as a web page*
E-mail:	**support@beamex.com** *Refer to the numbered items on the next page in Your e-mail message.*

1. Name of the product you give feedback of: **{**xe "Feedback form"**}**

   _____

2. Serial number and software version number

   _____ / _____ *(if applicable)*

3. Any comments when receiving the product. Did the package contain all required items and was it as expected?

   _____

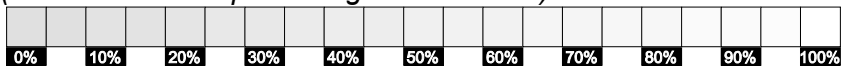
   _____

   _____

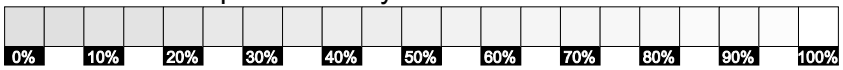
4. For how long have you been using the product?

   _____

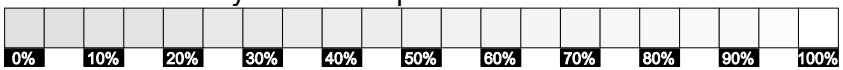
5. How helpful was the manual in using the product?
   (Tick a box in the percentage scale below)

6. How well did the product suit your needs?

7. How satisfied are you with the product?

8. Did anything in the product exceed your expectations? In that case, what was it?

   _____

   _____

   _____

9. Did anything in the product disappoint you? In that case, please specify.

   _____

   _____

   _____

10. Any ideas You want to propose to Beamex so that we can improve our products, operations and/or services.

    _____

    _____

    _____

Please fill in these fields in order to receive your surprise gift.

Title & Name: _____

Address: _____

_____

_____

☐ Please contact me concerning the Feedback I have given.

☐ I want to receive more information on Beamex products.

Size (tick one)
☐XS ☐S ☐M ☐L ☐XL ☐XXL

Part 1

Things discussed in this part:

- About this manual.
- Unpacking CENTRiCAL.

Introduction

GENERAL

This manual presents information of Beamex® CENTRiCAL's Supporting Modules. The modules in the CENTRiCAL can be grouped into four main types:

1. Host modules (Calibrator modules):
   - MC6-WS Calibration Host Module
2. **Supporting modules**, divided into:
   - P's, i.e. Pressure Measurement Modules,
   - PO's, i.e. Manual Pressure Output Modules,
3. HERA and third party modules
4. POC8 Automatic Pressure Controller module

Using MC6-WS Calibration Host Module, POC8 Automatic Pressure Controller, Power Supplies, Measuring instruments and other modules are covered in separate manuals.

Attention!
Before taking CENTRiCAL and its Modules into use, please read the warnings available in Part A, Appendix.

ABOUT THIS MANUAL

CENTRiCAL User Manual for Supporting Modules is divided into several parts as follows:

- **Part 1, Introduction** discusses general matters.
- **Part 2, CENTRiCAL** discusses CENTRiCAL related matters.
- **Part 3, CENTRiCAL Trolley** discusses movable Calibration Solution related matters.
- **Part 4, Pressure Measurement Modules** discusses Pressure Measurement Modules used in conjunction with MC6-WS.
- **Part 5, Pressure Output Modules** are tools for creating exact pressure for calibration needs.
- **Part A, Appendix** discusses pressure connections, safety, warnings etc.

Where Am I?

The header of each spread in CENTRiCAL User Manual informs you of where you are: The even page shows the part you are in and the odd page shows the main topic you are currently viewing.

Example of even page header:
2 CENTRiCAL User Manual – Part 1, Introduction
Example of odd page header:
General - About This Manual 3

Typographical Conventions

The following typographical conventions apply to CENTRiCAL User Manual:

Bold text is used in following situations:

- References to User Manual topics and parts and
- Keywords, i.e. terms shown in the related to CENTRiCAL or its modules.

Notes are shown in Narrow text with a border above and to the left of the note text. Notes typically inform you of something useful concerning the current topic.

Warnings are shown in Narrow and Bold. They also have a shaded background and are surrounded by a border line. 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 the CENTRiCAL are pre-installed in the Instrument Panel at the factory except POC8 which is packed in a cardboard box and needs to be installed on a POC8 Holder by the customer. Pressure Module installation specifics can be found is this manual's **Part 4, Pressure Measurement Modules.**

If you have to return a module or another part of the CENTRiCAL to the factory for any reason, include a detailed description of the reason for the return. Read also chapter **Service** in **Part A, Appendix**.

Standard accessories:

- Accredited calibration certificate, for modules requiring one,
- this User Manual,
- Warranty Card,
- depending on the included modules: pressure hoses, test leads and/or clips.

Part 2

Things discussed in this part:

- A presentation of CENTRiCAL Calibration Solutions

CENTRiCAL

CENTRiCAL

General

The CENTRiCAL is a Modular Calibration Solution for calibration and maintenance of process instruments, like transmitters, converters, temperature probes, recorders, indicators, etc. The solution is designed for instrument/electrical workshops and laboratories.

The modular construction of the solution allows the user to customize the CENTRiCAL to practically any measurement and calibration application.

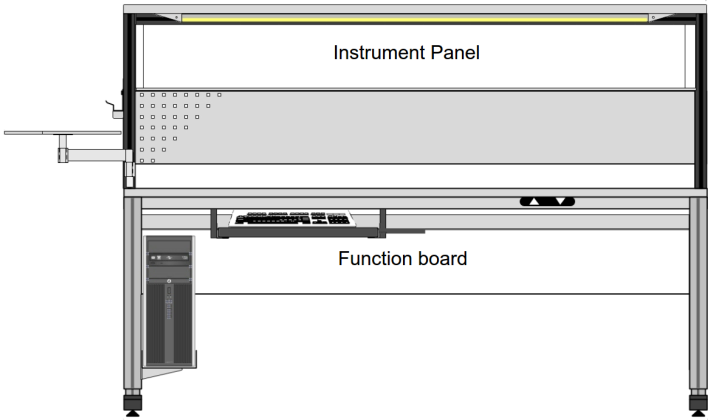
The modules in the CENTRiCAL can be grouped into four main types:

1. Host modules (Calibrator modules):
    - MC6-WS Calibration Host Module.
2. Supporting modules, divided into:
    - P's, i.e. Pressure Measurement Modules,
    - PO's, i.e. Manual Pressure Output Modules and
3. HERA and third party modules
4. POC8 Automatic Pressure Controller module

CENTRiCAL M AND F MODELS

CENTRiCAL Calibration Solution is available as following models:

- CENTRiCAL M, motor operated height adjustment for table top and Instrument Panel
- CENTRiCAL F, fixed 78 cm high table top and Instrument Panel



Each version consists of

- a table frame
- a table top
- a Function Board
- an Equipment Panel and
- an Instrument Panel

All the modules purchased with the CENTRiCAL are pre-installed in the Instrument Panel at the factory except POC8 which is packed in a cardboard box and needs to be installed on a POC8 Holder by the customer.

CORNER UNIT, MODELS CM AND CF

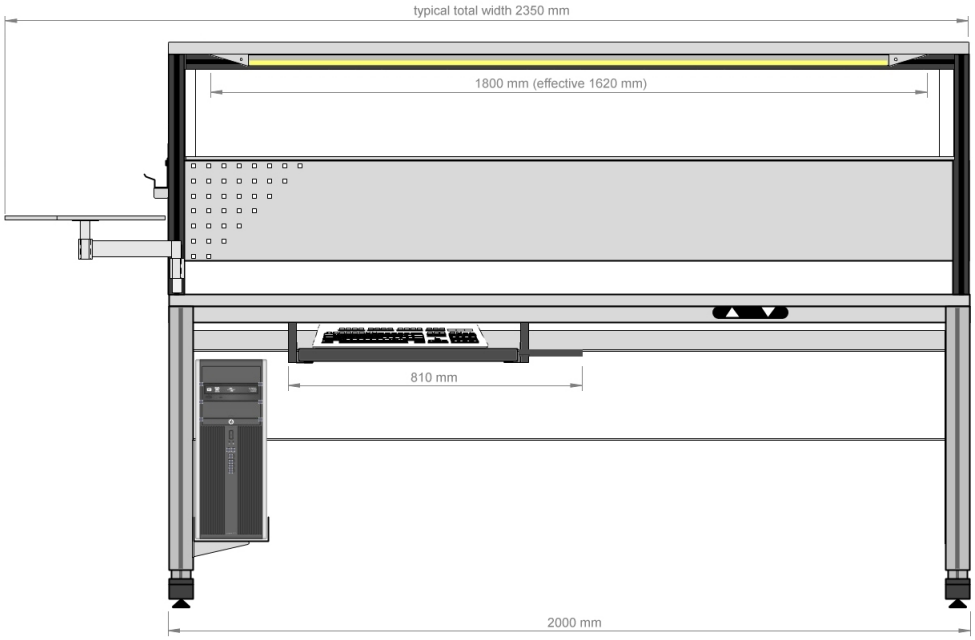
Corner unit is available as following models:

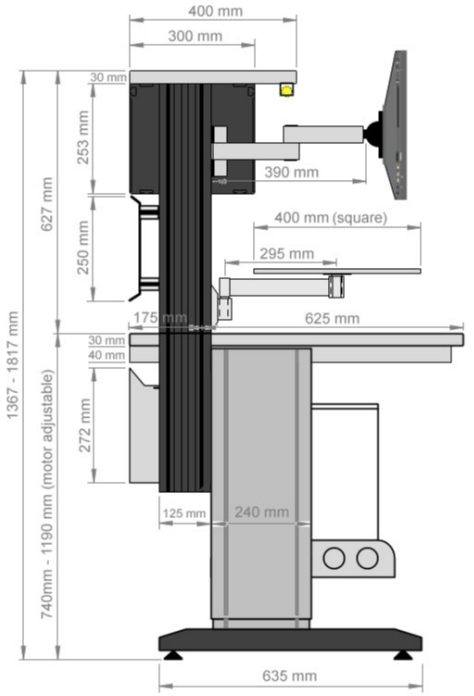
- Corner CM, motor operated height adjustment for table top and Instrument Panel
- Corner CF, fixed 78 cm high table top and Instrument Panel

With a Corner Unit you are able to group two separate CENTRiCAL M or F Models together to form a larger entity.

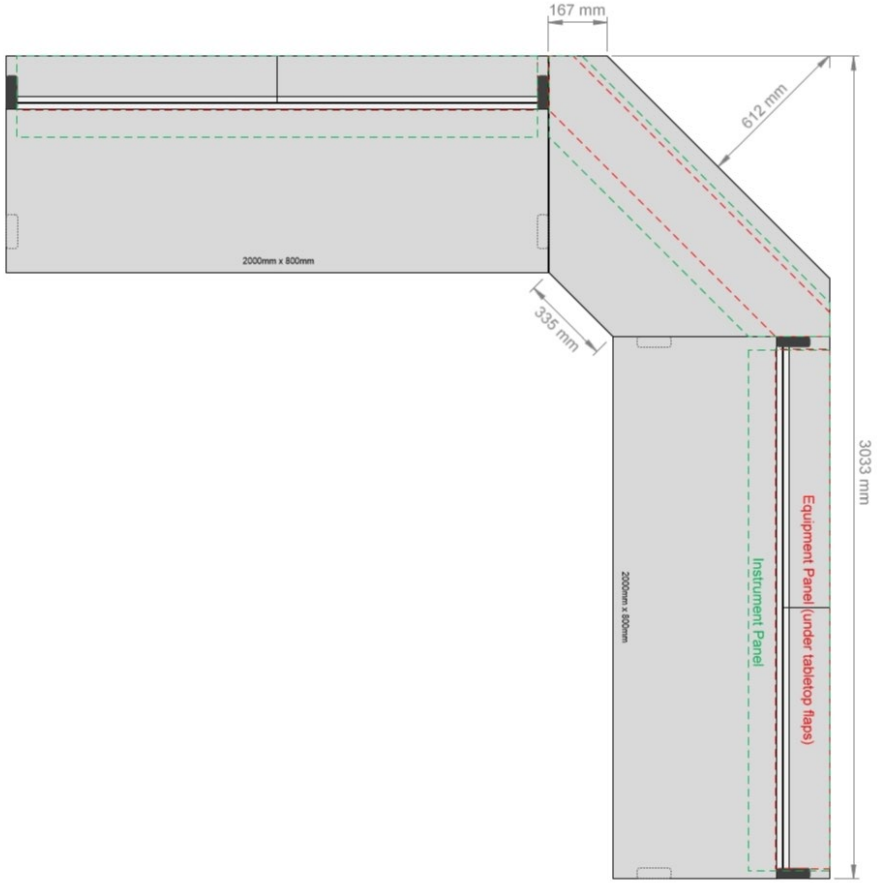
DIMENSIONS

The dimensions for the CENTRiCAL M and F models are the same:





The dimensions for the Corner CM and CF models are also the same:



CONNECTING THE CENTRiCAL TO THE ELECTRICAL NETWORK

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 from the Instrument Panel. To turn it off, just 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 module rack are switched OFF.
2. Connect the mains cables to an earthed AC outlet (wall socket).
3. Turn the main switch of the workstation 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.

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

PRESSURE SUPPLY CONNECTIONS

The pressure supply connections are located in the middle of the Function board under the table top (marked with a sticker). Pressure supply is required for Pressure Output Modules.

Vacuum pump (if ordered) is pre-installed and connected at the factory to vacuum supply line for POC8 all models and PO8C.

CENTRiCAL requires clean, dry and oil free instrument air supply. Filtering of the instrument air supply is included in the base unit. The filter may be located according to user's needs, but it needs to be part of the instrument air supply system at all times.

High pressure supply is needed for PO20, PO210 and POC8 100 bar and 210 bar models.

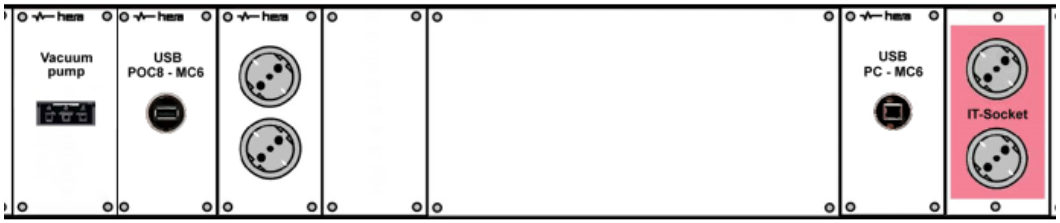
Instrument air and high-pressure supply hoses need to be connected to the corresponding connectors. Suitable hoses for output are optional and should be ordered separately.

Instrument air supply is needs for AIRSUP, PO8C and POC8 10 bar model.

ELECTRICAL CONNECTIONS

Electrical connections are located either in Instrument Panel or Equipment Panel.

Equipment Panel is located in the Function Board at the back of the table top under flaps. There are e.g connectors for MC6 - POC8 communication and computer interface for MC6-WS.



Part 3

Things discussed in this part:

- A presentation of CENTRiCAL Trolley movable Calibration Solution

CENTRiCAL Trolley

CENTRiCAL Trolley

General

The CENTRiCAL Trolley is a movable Modular Calibration Solution for calibration and maintenance of process instruments, like transmitters, converters, temperature probes, recorders, indicators, etc. The system is designed for instrument/electrical workshops and laboratories.

The modular construction of the solution allows the user to customize the CENTRiCAL Trolley to measurement and calibration application. The installation and uninstallation of modules is, in principle, done similarly as for CENTRiCAL M and F models.

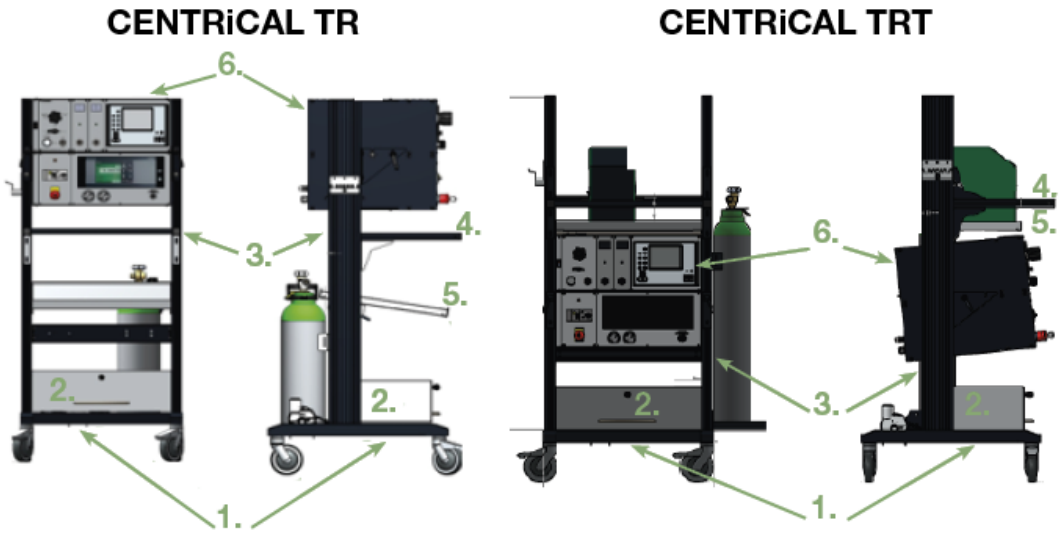
The modules in the CENTRiCAL Trolley can be grouped into four main types:

1. Host modules (Calibrator modules):
    - MC6-WS Calibration Host Module
2. Supporting modules, divided into:
    - P's, i.e. Pressure Measurement Modules,
    - PO's, i.e. Manual Pressure Output Modules and
3. HERA and third party modules
4. POC8 Automatic Pressure Controller module

CENTRiCAL Trolley

CENTRiCAL Trolley is available as a following models:

- CENTRiCAL TR calibration trolley
- CENTRiCAL TRT temperature calibration trolley



Each version consists of

- a base shelf with casters (1.)
- a container (2.)
- columns (3.)
- a handle (4.)
- a table top (5.)
- a Mobile Rack (6.)
- a gas bottle holder (optional)

All the modules purchased with the CENTRiCAL TR and CENTRiCAL TRT are pre-installed in the Mobile Rack at the factory. Temperature dry block is packed separately and before use it must be placed on the table top (5.) and its support bars must be set in place.

Connecting the CENTRiCAL to the Electrical Network

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

1. Be sure that all the ON-OFF -switches in the module rack are switched OFF.
2. Connect the mains cables to an earthed AC outlet (wall socket).
3. Turn the main switch of the workstation 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.

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

Pressure Supply Connections

The pressure supply connections are located in the back of the Mobile Rack (marked with a sticker). Pressure supply is required for Pressure Output Modules.

Vacuum pump (if ordered) is pre-installed and connected at the factory to vacuum supply.

CENTRiCAL TR and CENTRiCAL TRT require clean, dry and oil free instrument air supply. Filtering of the instrument air supply is included in the base unit. The filter may be located according to user's needs, but it needs to be part of the instrument air supply system at all times.

High pressure supply is needed for PO20 and PO210.

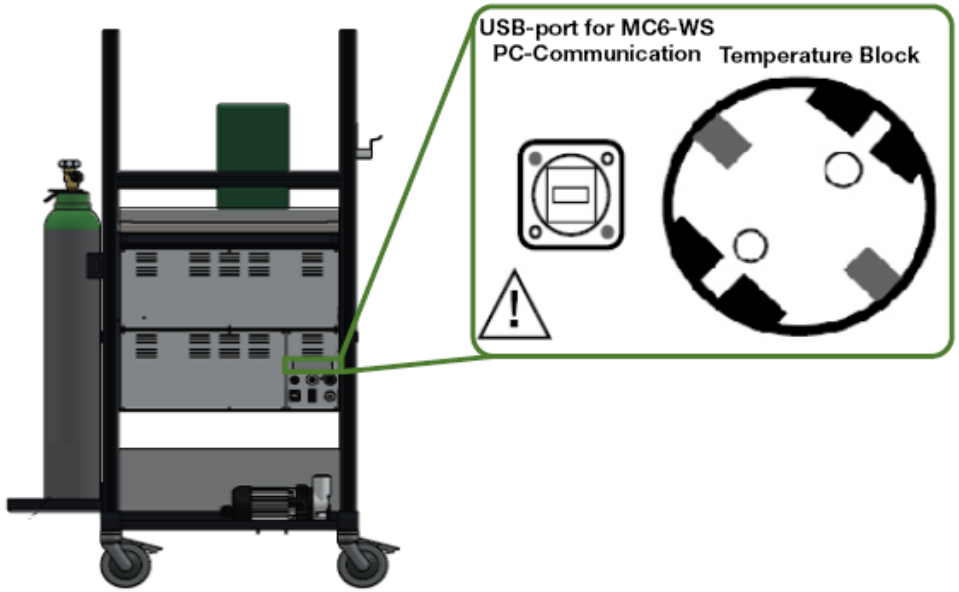
Instrument air and high-pressure supply hoses need to be connected to the corresponding connectors. Suitable hoses for output are optional and should be ordered separately.

ELECTRICAL CONNECTIONS

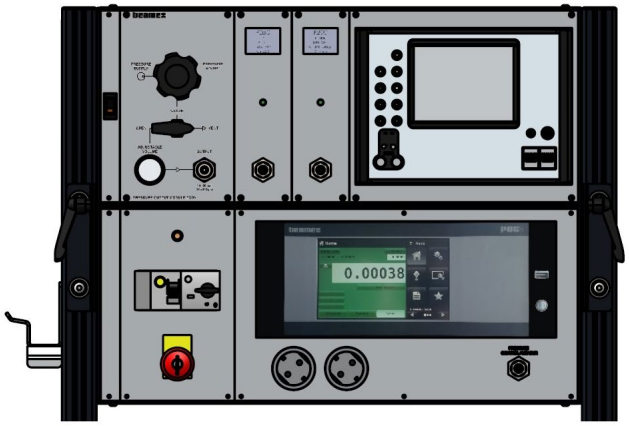
Electrical connections are located either in module's front panel or in the back of the Mobile Rack. Please note that sockets in the front panel are optional.

When the temperature dry block (e.g. Beamex FB, MB or MC6-T series) is attached to CENTRiCAL TRT **plug the temperature dry block 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.



Warning!
Plug the temperature dry block into the socket that is located at the back of the trolley (see picture above).



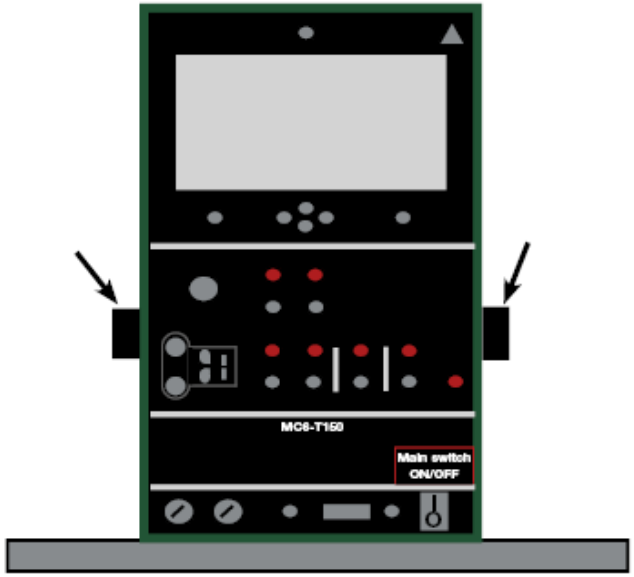
Support Bars of the Temperature Dry Block

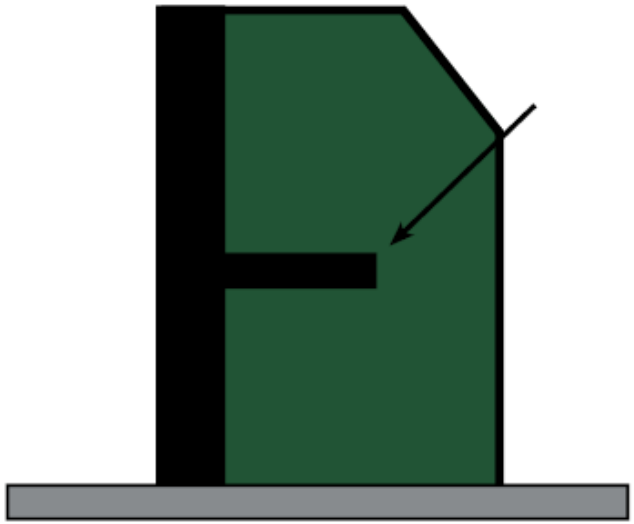
There are support bars on both sides of the temperature fry block (see pictures on the right) that make the temperature dry block stay still and prevent it from dropping or moving.

Please notice! Temperature dry block can get very hot during the use.

Temperature dry block is packed separately and before use it must be placed on the table top of the temperature calibration trolley. The support bars must be set to the correct width and firmly attached to the temperature dry block.

Please notice! Make sure that the support bars do not block the ventilation holes that are on the sides of the temperature dry block.



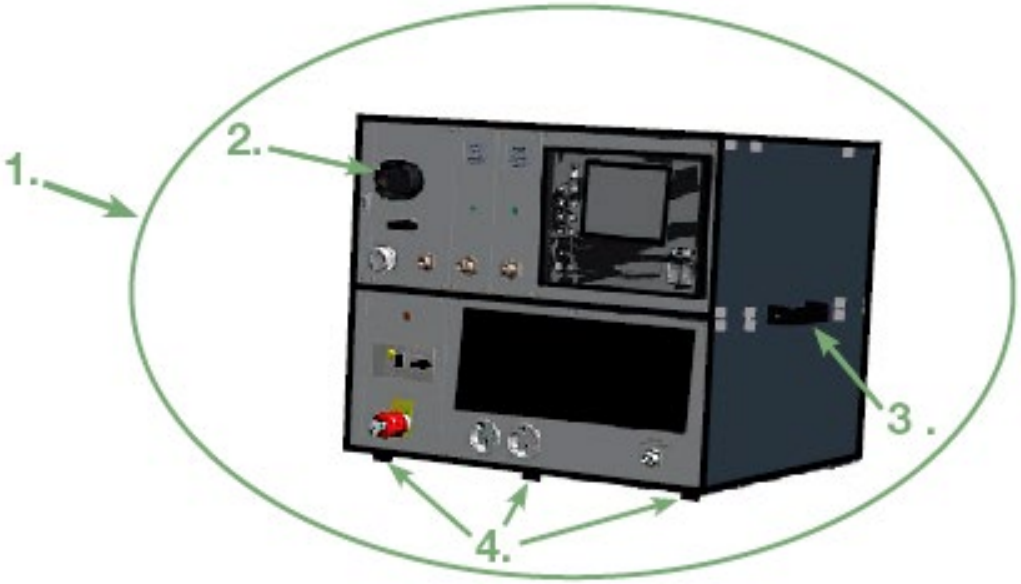


TT TABLETOP CASE

CENTRiCAL TT calibration tabletop case consists of

- Instrument Panel (1.)
- power socket (2.)
- handles on both sides (.3.)
- rubber feet (6pcs) (4.)

In the rear side of Instrument Panel are blank panels, power cable, 1MP panel for pressure connections and vacuum pump.



Part 4

Things discussed in this part:

- A presentation of Pressure Measurement Modules used in conjunction with MC6-WS Calibration Host Module.

Pressure Measurement Modules

GENERAL

Pressure Measurement Modules are used in conjunction with the MC6-WS Calibration Host Module. Refer to MC6-WS User Guide 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.

For pressure connector info, see chapter **Pressure Connections** in Appendix section.

Warnings!

Do not apply a higher pressure to any of the P pressure measurement modules than what has been designated on the connection panel.

Pressure is always dangerous. Read carefully the warnings found in Part A, Appendix in this manual.

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Available Pressure Measurement Module Types and Their Measurement Ranges

Internal Pressure Modules	External Pressure Modules	Range
PB*	**EXT B CENTRiCAL**	700 to 1200 mbar a / 10.15 to 17.4 psi
P10mD	**EXT10mD CENTRiCAL**	±10 mbar diff. / ±4 iwc
P100m	**EXT100m CENTRiCAL**	0 to 100 mbar / 0 to 40 iwc
P400mC	**EXT400mC CENTRiCAL**	±400 mbar / ±160 iwc
P1C	**EXT1C CENTRiCAL**	±1 bar / -14.5 to 15 psi
P2C	**EXT2C CENTRiCAL**	-1 to 2 bar / -14.5 to 30 psi
P6C	**EXT6C CENTRiCAL**	-1 to 6 bar / -14.5 to 90 psi
P20C	**EXT20C CENTRiCAL**	-1 to 20 bar / -14.5 to 300 psi
P60	**EXT60 CENTRiCAL**	0 to 60 bar / 0 to 900 psi
P100	**EXT100 CENTRiCAL**	0 to 100 bar / 0 to 1500 psi
P160	**EXT160 CENTRiCAL**	0 to 160 bar / 0 to 2400 psi
P250	**EXT250 CENTRiCAL**	0 to 250 bar / 0 to 3700 psi
P600	**EXT600 CENTRiCAL**	0 to 600 bar / 0 to 9000 psi

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

Please notice! 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

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

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

Removing a Pressure Measurement Module

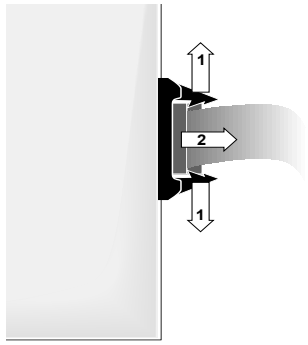
The Pressure Measurement Modules are connected only to the MC6-WS Host Module

To disconnect the 20 pin connector from the Pressure Measurement Module:

- Unscrew the screws that holds the Pressure Measurement Module in the CENTRiCAL's Instrument Panel (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.

1. Pull the locking hooks away from the cable connector
2. Pull the cable connector off from the Pressure Measurement Module.

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



Disconnecting a Pressure Module.

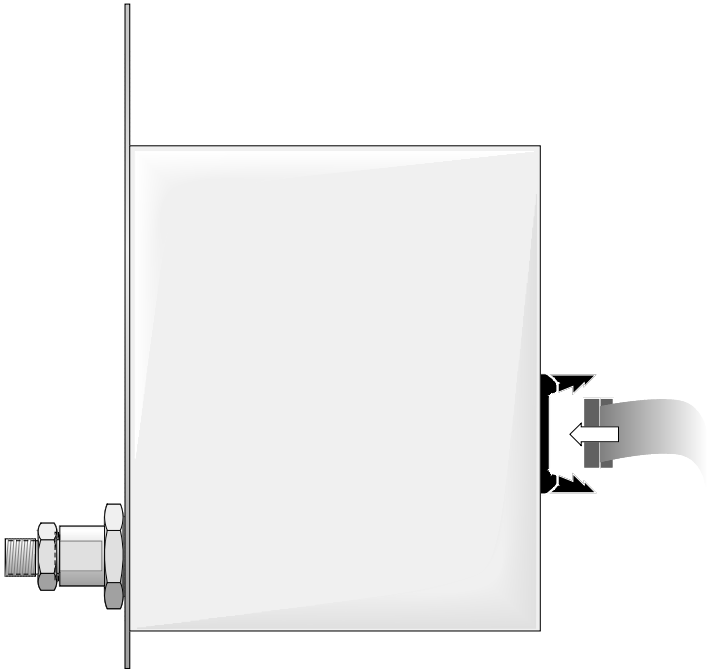
Adding a Pressure Measurement Module

MC6-WS Host Module automatically identifies all pressure modules connected to it based on their programmable ID numbers (seen in MC6-WS's User Interface). 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 is on this manual's prepages.

The Pressure Measurement Module communicates with the MC6-WS Host Module via a flat data cable. 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 Host Module and check the electrical function of the new pressure module by selecting it from the calibrator.



Part 5

Things discussed in this part:

- Using Pressure Output Modules

Pressure Output Modules

GENERAL

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

Pressure connections are presented in Part A, Appendix of this manual.

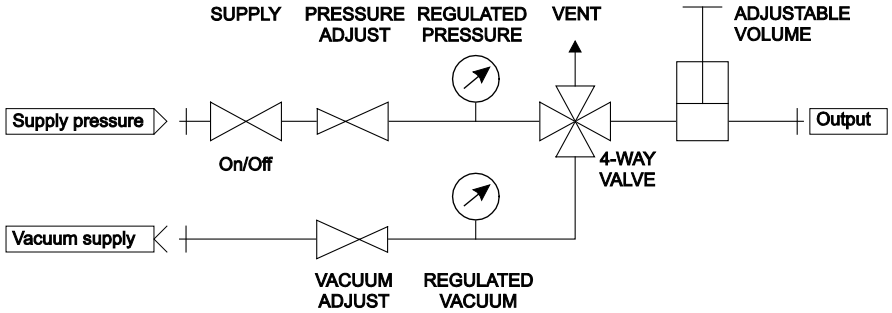
Note!
Read carefully the warnings found in the Part A, Appendix of this manual.

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.

Diagrams of output modules using an adjustable volume.

Vacuum/Pressure Output Module PO8C:



Pressure Output Module PO20:

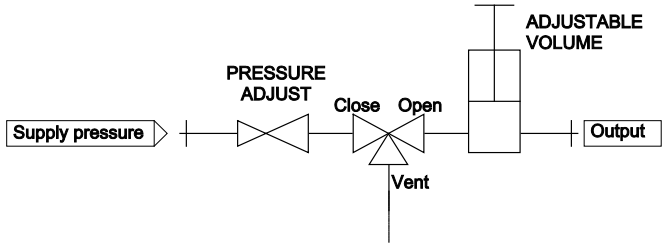
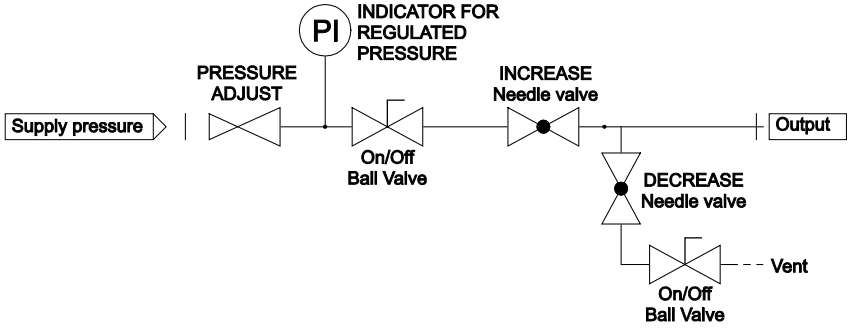
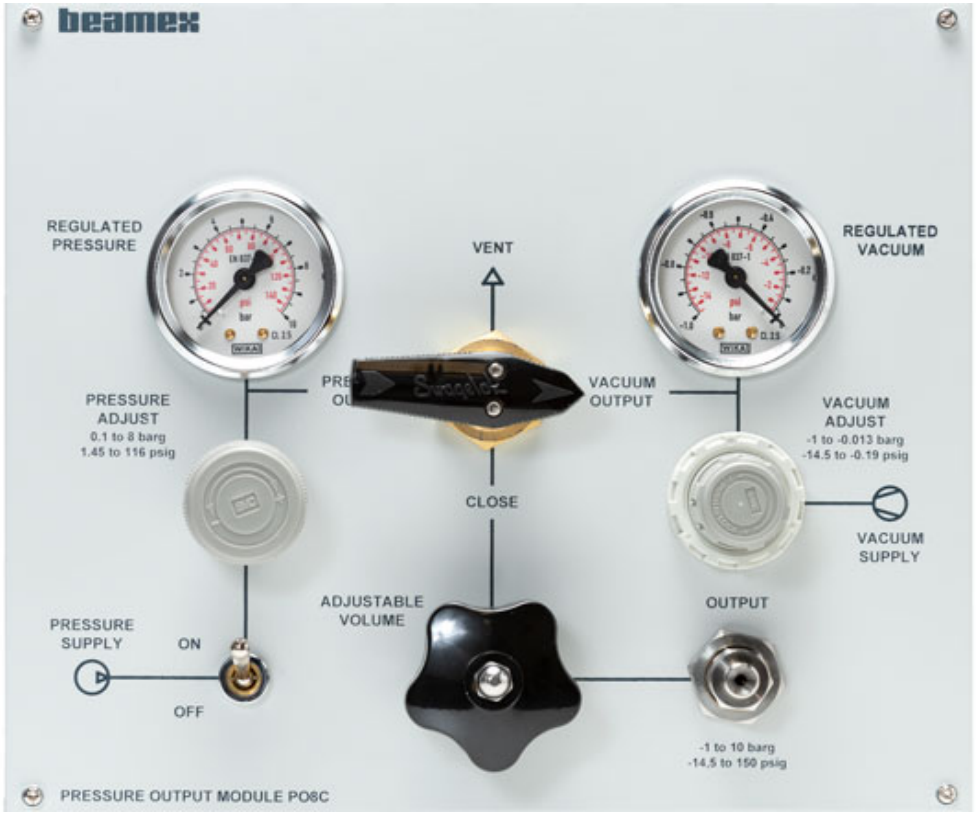


Diagram of the Pressure Output Module PO210 using needle valves:



PO8C



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

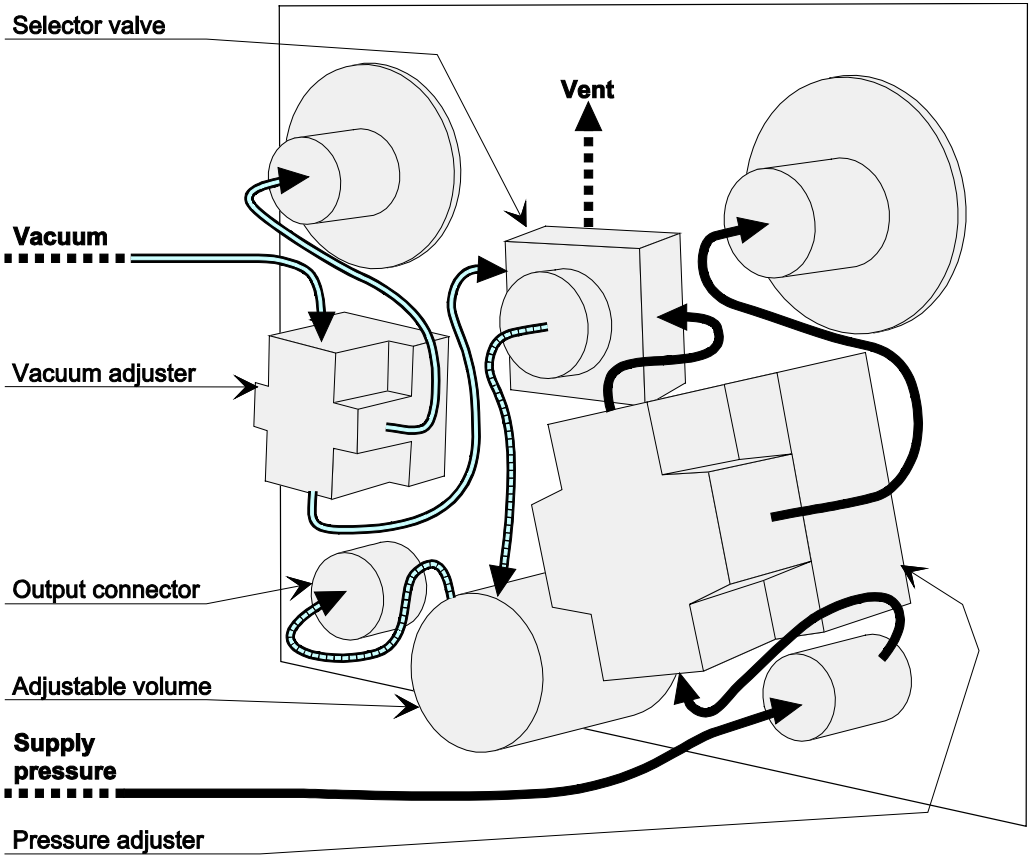
PO8C includes

- 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.

CONNECTIONS



Simplified diagram of the connections on the rear side of PO8C.

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.

Note.
The total volume of measurement hoses and instrument measurement chambers connected to the PO8C's Output connector should not exceed 100ml (6.1 in^3).

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. Storage	10 to 60 °C -20 to 60°C	50 to 150 °F -4 to 140 °F
Sensitivity better than (depends on user)	1 mbar	0.015 psi
Maximum pressure for the delivered pressure hose	20 barg	290 psi g

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 to 8 bar	1.45 to 116 psi
Air consumption (discharged to the atmosphere)		
• Bleed flow, max (ANR)[1] 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

If you are using Nitrogen, see Warnings in part Appendix of this manual.

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

Vacuum Adjuster

Feature	SI Unit	Imperial
Regulating pressure range[2]	-1 to -0.013 bar	
Maximum atmospheric intake consumption[3] (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 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

From min. to max. 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 **Part A, Appendix** in this manual.

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[2] Lowest possible pressure depends on the vacuum source and atmospheric pressure.

[3] Taking air from atmosphere all the time

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 is on the prepages of this manual.

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

SELECTOR VALVE

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.

WARNING!
Failure to periodically inspect and maintain valve packing may lead to product malfunction.

OPERATION

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

To regulate the pressure, use either PRESSURE ADJUST or VACUUM ADJUST[4] 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 selector valve to VENT position. To avoid pressure shocks, rotate the selector valve to 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 CLOSE position.

Warning!
High pressure is always dangerous. Read carefully the warnings in part Appendix of this manual.

[4] Vacuum adjuster: Pull to adjust, push to lock.

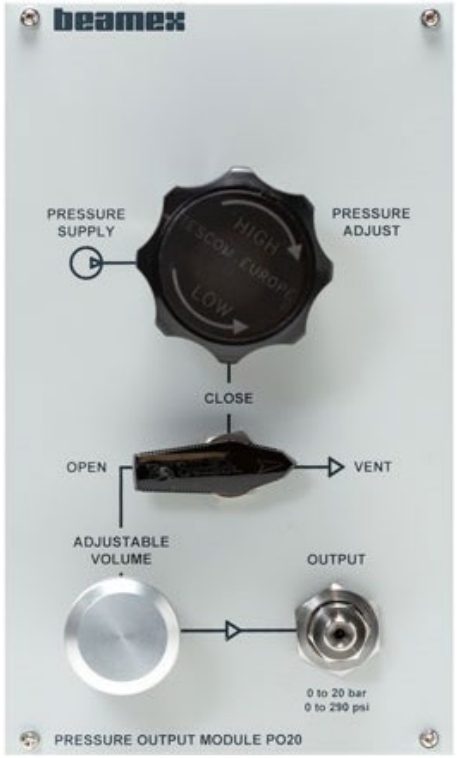
PO20

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

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 connector info, see chapter See part **Pressure Measurement Modules** of this manual.



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”).

OPERATION

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 OPEN position.

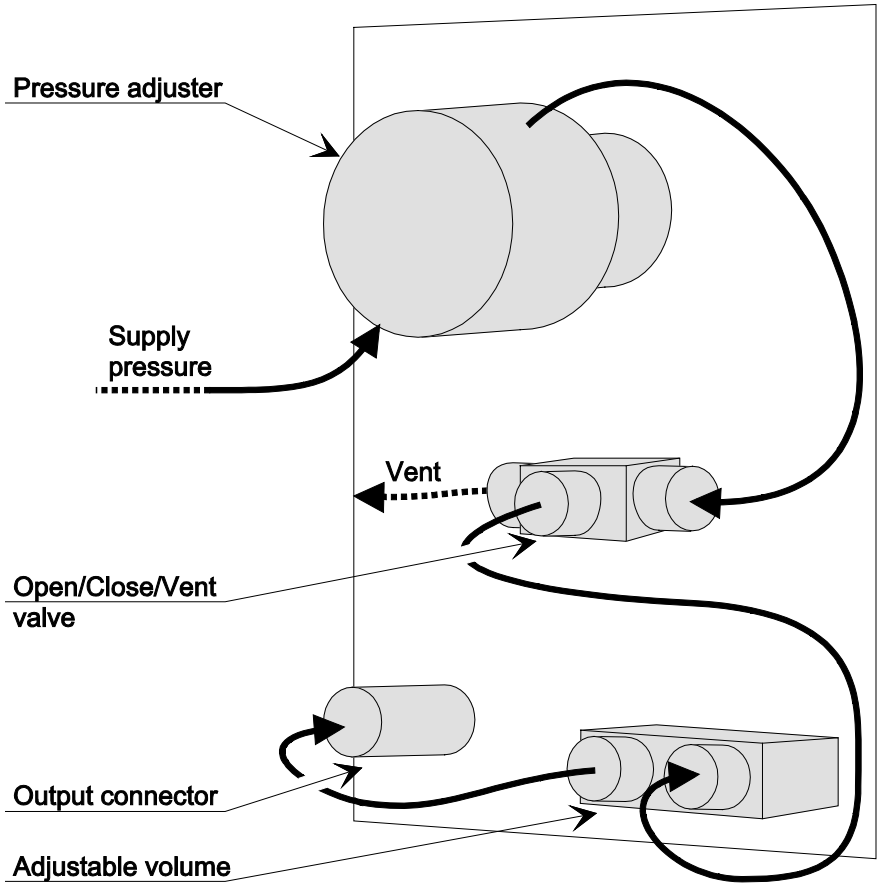
To regulate the pressure, use the PRESSURE ADJUST knob. Observe the pressure value from the pressure calibrator's display. For exact pressure adjustment, turn the 3-way valve to CLOSE position and use the ADJUSTABLE VOLUME knob.

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 CLOSE position when the module is not in use.

Warning!
High pressure is always dangerous. Read carefully the warnings in part Appendix of this manual.

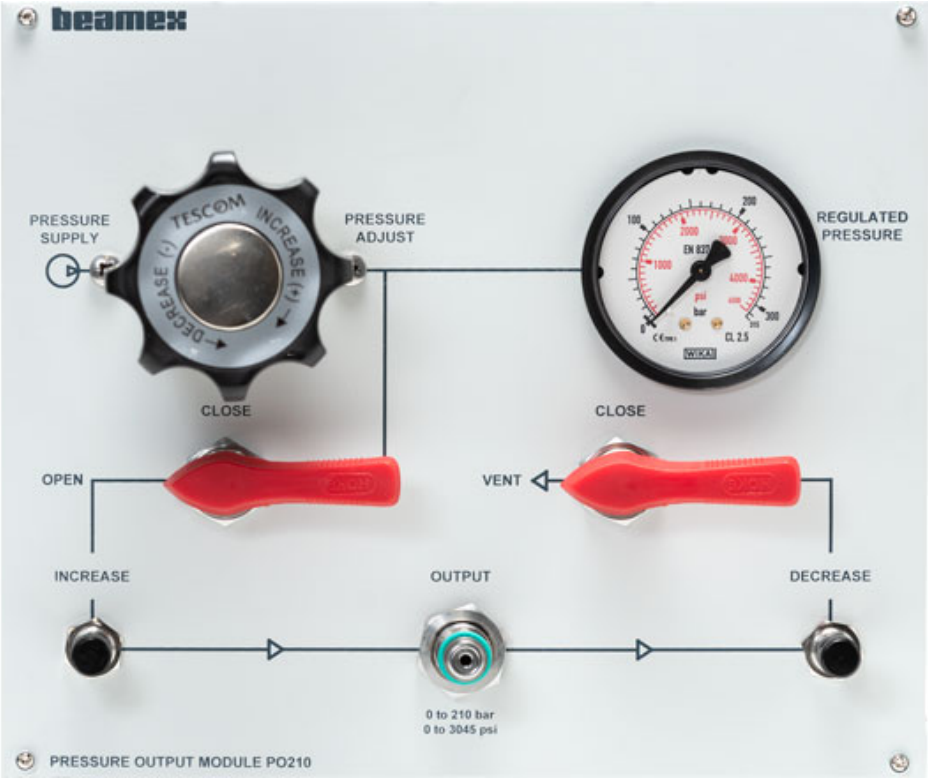
CONNECTIONS



Simplified diagram of the connections on the rear side of PO20.

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.

PO210



Width of each module: 264 mm (Approx. 10.39”).

Height of each module: 221 mm (8.70”).

See part **Pressure Measurement Modules** of this manual.

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 to 210 bar gauge (0 to 3045 psi)	230 bar (3335 psi)

PO210 include

- 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.

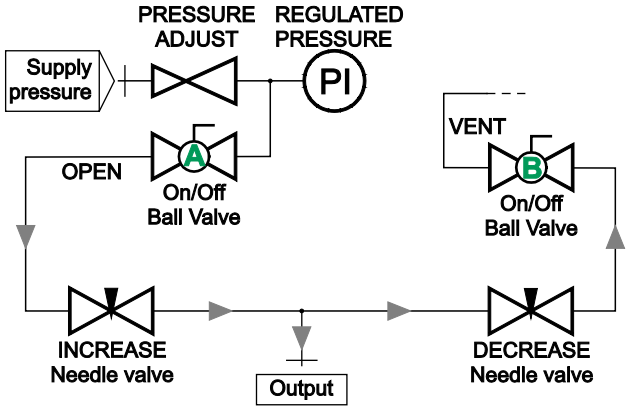
PREPARATION

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 and
- 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" 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.



OPERATION

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 counter-clockwise. Connect the instrument under test and a suitable pressure measurement module to PO Module's OUTPUT connector.

Warning!
High pressure is always dangerous. Read carefully the warnings in part Appendix of this manual.

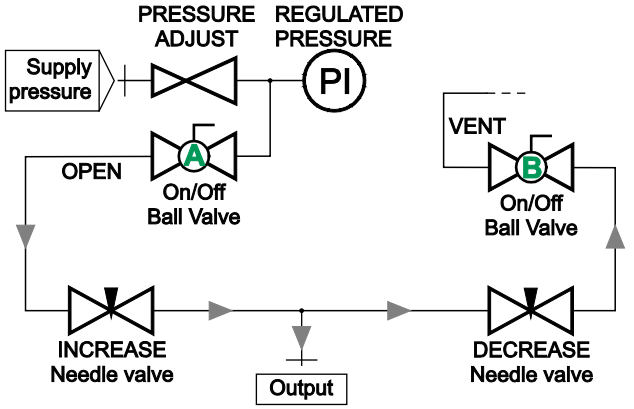
Increasing the Pressure, i.e. Stepping Up

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.

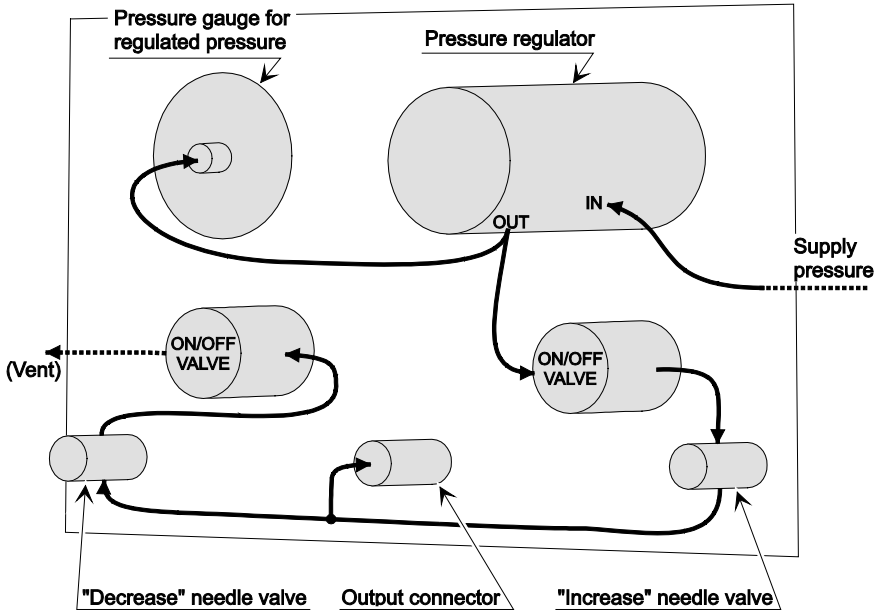
Decreasing the Pressure, i.e. Stepping Down

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 next point by starting from the beginning of this paragraph.

> 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



Simplified diagram of the connections on the rear side of PO210.

The PO210 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.

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

Things discussed in this part:

- Pressure Connections
- Safety Issues and Warnings
- Disposal of Waste Electrical and Electronic Equipment
- Briefly About Servicing CENTRiCAL and Supporting Modules
- Statements and Warranty
- Index

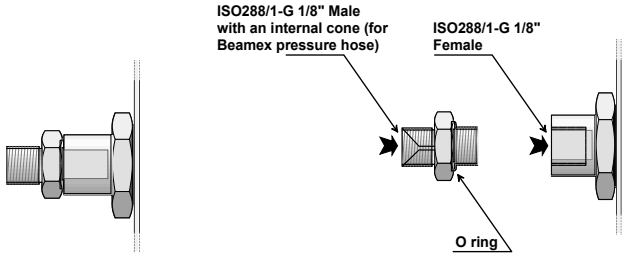
APPENDIX

Pressure Connections

Pressure Output Modules, Pressure Supply Module and Pressure Measurement Modules have the following connectors.

For pressures from up to 40 bar

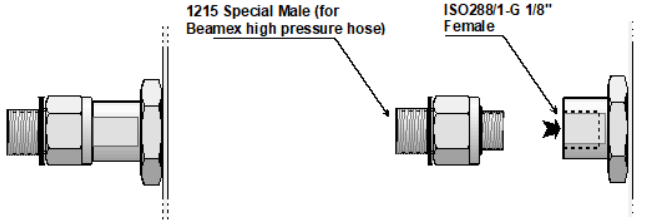
The connector is delivered as shown in the upper picture to the right. The connector includes an adapter to make it easy to connect pressure hoses delivered by Beamex. By removing the adapter a standard ISO288/1-G 1/8" (internal parallel) thread is revealed for connecting another type of pressure hose



For pressures up to 40 bar

For pressures from 40 up to 250 bar

The connector is delivered as shown in the upper picture to the right. The connector includes an adapter to make it easy to connect pressure hoses delivered by Beamex. By removing the adapter a standard 1215 Special Male -G 1/8" (internal parallel) thread is revealed for connecting another type of pressure hose.



For pressures from 40 up to 250 bar

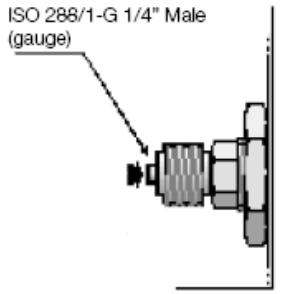
For pressures higher than 250 bar

The connector is delivered as shown in the picture to the right. As an option both Pressure fitting BX 1215 male to G1/4” and a high pressure hose are available for connecting another type of pressure hose in the above-mentioned connector.

Notes.

Use only hand tightening when connecting Beamex pressure hoses and Beamex high pressure hoses. Use of a wrench may damage the connector.

Older pressure modules may have a different type of connector. The connector is however suited either for Beamex pressure hoses or for Beamex high pressure hoses.

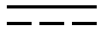


For pressures higher than 250 bar

SAFETY

SYMBOLS USED

The following symbols concerning electrical safety are used in CENTRiCAL.

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

ENVIRONMENTAL SPECIFICATIONS

STANDARD, DESKTOP, HEAVY DUTY & LOW WORKSTATIONS

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's Supporting Modules 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

Do not use CENTRiCAL or its Supporting 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.

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

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).

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.

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

Sometimes it is necessary to carry out measurements inside the module rack 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.

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-Polymer (LiPo) batteries. Read the warnings concerning Lithium-Polymer batteries from MC6-WS's manual.

General Warnings Concerning Pressure Measurement

The optional pressure T-hose is rated to the maximum pressure of 40 bar at 21°C (290 psi at 70°F). Applying higher pressure can be hazardous. We recommend the use of the optional pressure hose set. When using other hoses and connectors, make sure they are high quality products that withstand the used pressure.

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

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.

The allowed pressure media for internal 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.

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.

Never exceed the maximum pressure of a pressure module. The internal pressure module's maximum pressure is stated on calibrator's sticker. The maximum pressure of external modules is stated on module's sticker and mentioned in the Instruction Booklet that is provided with the external module.

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 blood circulation 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

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.

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 (30000 psi) or more.

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.

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.

Do not use the same tubing with different liquids or gases.

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.

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 blood circulation, it can cause death. The leak jet is particularly penetrative, if some liquid is coming with the gas.

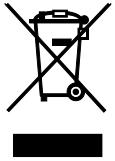
Disposal of Waste Electrical and Electronic Equipment

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 product's back side. 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-Polymer (LiPo) batteries. Read warnings and recycling instructions concerning Lithium-Polymer batteries from MC6-WS's manual.

SERVICE

GENERAL

A module that requires service or calibration must be carefully packed and should be accompanied with a letter or note with the following information:

User's name
User's address
Module name
Serial number
Description of the problem

If the module requires calibration, it must be stated in the enclosed letter.

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

This product conforms to the European Union directives 2014/30/EU, 2014/35/EU, 2011/65/EU and 2015/863.

Intellectual Property Rights

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Trademarks

INDEX

Notes