



Fig. 1

1. Important Information

Dear Customer,

You have purchased an instrument that was manufactured in our company, which is certified according to DIN EN ISO 9001.

The pressure controllers are manufactured according to the valid standards. Their designs, dimensions and materials represent the state of engineering at the time of printing.

We reserve the right to change and replace components without further notice.

The integrated pressure sensors are, unless otherwise agreed, calibrated in compliance with inspection certificate 3.1 according to DIN EN 10204, and thus traceable to a national standard.


Please read these operating instructions carefully before taking the precision pressure controller / calibrator DPC 4800 (⇒ fig. 1) into operation.

The following operating instruction was composed with due care. The following chapters provide you with all information necessary for a safe handling.

Please ensure that all persons, who operate the device, have read and understood these operating instructions.

It is, however, not possible to take into account all versions and possible fields of application in this manual.

If you have any questions regarding a special application, regarding the devices, storage, mounting or operation, please contact us as manufacturer or the supplier.

 All applications according to regulations are explicitly stated, any other application is considered improper use!

Should a reason for complaint however arise, please return your device to our factory including a detailed description of faults.

For special versions, please note the specifications indicated on the delivery note.

Please support us in improving this operating instruction. We will gladly accept your advice.

The ARMANO Messtechnik GmbH does not assume liability for any damage that arises from incorrect use of the device or from disregard of the information contained in this manual.

Do not tamper with the device on your own. Otherwise, all warranty claims will be void.

Please keep the operating instructions in a safe place to draw on it as and when required.

No reproduction of this operating instruction (in whole or in part) is allowed.

Not all functions that are depicted and described in this manual are available for every instrument version.

Operating Instructions

Automatic Calibration System DPC 4800

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3. General Information

- The qualified personnel must carefully read and understand the operating instructions before starting any work.
- Please read the instructions carefully before carrying out any operation and keep the specified order.
- Thoroughly read and understand the information in chapter 4 "General Safety Instructions".

If you have any problems or questions, please contact your supplier or contact us directly at:

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3.1 Pictographs Used

In this manual, pictographs are used as hazard warnings.

Particular information, instructions and restrictions designed for the prevention of personal or substantial property damage:



WARNING! Is used to warn you against an imminent danger that may result in personal injury or death.

IMPORTANT! Is used to warn you against a possibly hazardous situation that may result in personal, property or environmental damage.

CAUTION! Is used to draw your attention to important recommendations to be observed. Disregarding them may result in property damage.



DANGER! This symbol is used for hazards generated by electric current. Disregarding these safety instructions may result in serious or fatal injuries.



Passages in the text containing **explanations, information or advice** are highlighted with this pictograph.



The following symbol highlights **actions** you have to conduct or **instructions** that have to be strictly observed.

4. General Safety Instructions

Please read this operating instruction thoroughly before operating the device. Disregarding the containing warnings, especially the safety instructions, results in a risk of fatal injury. Severe personal injuries as well as property damage may arise.

Any use of the instrument diverting from or exceeding the set applications according to the regulations is not allowed.

It is required to comply with all technical specifications of the precision pressure controller and its permissible ambient conditions according to data sheet 10465. The device is to be handled with care.

The device is supplied with hazardous voltages via mains cable. Even after the disconnection from the power supply, dangerous voltages may be temporarily present due to capacities.



WARNING! Before mounting, commissioning and operating, it is necessary to ensure that the device is suitable concerning pressure range, version and specific measuring conditions.

Do not open the device.



DANGER! The device may only be opened by trained and qualified personnel. There is a risk of an electric shock.

Transporting the device from a cold to a warm environment, condensation may result in a failure of the function. In such a case, make sure the device temperature has adjusted to the ambient temperature before putting it into operation again.

If faults cannot be corrected with the help of this operating instruction, the device has to be decommissioned instantly and secured against unintentional commissioning.

The manufacturer shall not be held liable for any damage due to misuse of the device. Repairs shall only be performed by the manufacturer. Any modifications or changes to the device are not permissible.

4.1 Operator's Obligation to Exercise Diligence

The pressure controller DPC 4800 was designed and manufactured following a careful selection of standards to be complied with as well as further technical specifications. It therefore complies with the state of the art and guarantees maximum safety.

This safety is achieved in industrial practice only if all necessary measures are taken. The necessary measures are subject to the due diligence of the user of the device.

In particular, the user shall ensure that

- the instrument is only used according to the regulations (⇒ chapter 6 "Product Description").
- there exist proved safety mechanisms, which avoid any risks for personnel or devices, especially test items (UUT/DUT) in case of undue pressurisation or leakage of the applied pressure media.
- the device and all components involved are only operated when in a flawless and fully functional condition.
- the installation and commissioning was carried out correctly and regular maintenance is conducted.
- the persons, who operate the pressure controller have access to this manual at all times and that they have read and understood this manual.
- the pressure controller shall only be mounted and commissioned, maintained and put out of operation by authorised, trained and instructed personnel, who are able to independently recognise potential hazards.
- the pressure controller is always handled with the care necessary for an electronic precision measuring device.

4.2 Personnel Qualification



WARNING! Risk of injury in case of insufficient qualification!

Personnel, responsible for mounting, commissioning, operating and decommissioning has to be adequately qualified for these tasks. Qualified personnel are those persons, who are familiar with setting up, mounting, commissioning and operating this pressure controller and those, who have an appropriate qualification corresponding to their function.

Attention should be paid to directions concerning occupational safety and regulations of the employer's liability insurance association.

4.3 Personal Protective Equipment



WARNING! High sound pressure due to outpouring medium.



Wear ear protection!



When working with and on the device, wear safety glasses!

4.4 Basic Safety Instructions

Sound and safe operation of the pressure controller requires proper transport, professional storage, set-up, mounting and intended use. A careful operation and scheduled interval maintenance is required for an electronic precision measuring device.

In the case of an error, a high medium pressure or vacuum may be applied on the input and output connections. An unregulated release of hydraulic or gas pressure poses a serious danger for humans and the environment.

If the display is damaged, please pay attention to glass fragments since you might cut or injure yourself.



Further important safety instructions can be found in the various sections of this operating instruction.

4.5 Safety Instructions Concerning the Operation

Before pressurisation of the pressure controller, all involved components shall be in a flawless and fully functional condition. The attached components shall be suitable for the applied maximum pressure. Check the screw fittings for leaks and that they are firmly seated. The used medium shall meet the requirements according to the operating instruction.

During maintenance, cleaning and service works on the pressure controller, make sure that the system is always in a voltage-free and unpressurised state.

Ensure that a safe pressure release is possible on the rear side of the device. The limit values for voltage and current must not be exceeded.

4.6 Safety Markings on the Pressure Controller



This operating instruction is to be read prior to mounting and commissioning by all means!



The CE marking confirms that the device complies with the applicable European Directives.



For disposal, either return the product to the manufacturer or bring it to a designated collection facility. See Directives 2011/65/EU (RoHS), 2012/19/EU (WEEE) and chapter 12.

4.7 Information on the Electromagnetic Compatibility (EMC), EN 55011 or CISPR 11



WARNING! This is a device of class A for interference emission, which is designed for use in an industrial environment.

In other environments, e.g. living and business areas, it might possibly interfere with other devices. In this case, the user may be required to take appropriate corrective action.

5. Device Description

5.1 Features / Specialties

The pressure controller features a wide range of industrial capabilities.

The advantages of the device are:

- Fully digital measuring instrument
- Up to 3 precision pressure sensors can be actuated automatically (plus barometric reference)
- Colour touchscreen with LED backlight
- Very high measuring rate
- Easily calibrated
- Modular construction
- Customised configurations of the pressure controller available
- Automatic creation of test certificates via calibration software

5.2 Instrument Versions

The various instrument versions can be found in our data sheet 10465.

Please refer to the delivery note of your device for detailed information on the range of function and on the scope of delivery.

5.3 Software License

This product contains intellectual property, i.e. software programmes that are licensed for use by the end user / customer (hereinafter "end user").

This is not a sale of such intellectual property. The end user shall not copy, disassemble or reverse compile the software programme.

The software programme is provided to the end user "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability and fitness for a particular purpose. The entire risk of the quality and performance of the software programme is with the end user.

The ARMANO Messtechnik GmbH shall not be held liable for any damage suffered or incurred (including, but not limited to, general, special, consequential or incidental damage including damage for loss of business profits, business interruption, loss of business information and the like), arising from or in connection with the delivery, use and performance of the software programme.

6. Product Description

6.1 Intended Use

The modular pressure controller is equipped with up to three precision sensors and an optional barometric reference. The pressure connections of the device are located on the rear side. Due to its measurement uncertainty of the entire measuring chain and its control stability, the device is suited for the automatic calibration of pressure measuring instruments.



WARNING! The drive component of the device shall only be used with clean dry air, nitrogen and workshop air. According to Article 3 of the Regulation (EC) No. 1272/2008 (CLP), it is essential to avoid using hazardous media as pressure medium.

The medium, which was used as pressure transmission medium during calibration, shall be used preferably (⇒ calibration certificate included in the delivery).

Strictly adhere to the indicated limit values of the individual pressure sensors as well as all other technical specifications listed in this manual.

Extremely fast pressure change rates pose a danger for the sensor technology. Especially if they result in an internal pressure, which exceeds the upper range value of the controller (even for a short time), since they mean a high mechanical stress for the sensor technology. A protection by means of the integrated overload device cannot be guaranteed in such a case, since there is a certain response time required for actuation.

All integrated pressure sensors are equipped with a calibration certificate for the entire measuring chain (⇒ enclosure). Improper handling or exceeding the maximum pressure range might possibly require recalibration and adjustment. In this case, please return the device immediately to the manufacturer.

The device is not suitable for the operation in potentially explosive areas. The instrument is no safety component according to the pressure equipment directive and must not be used as such. If not used according to this operating instruction, no safe operation of the device is ensured.

The operator of the device is solely liable for any personal and material damage that arises from unintended use!

6.2 Design

The precision pressure controller of the DPC 4800 series is available as stackable desktop case or optional as 19" rack mounting with side panels including mounting kit. Furthermore, an optional barometric reference sensor is available.

The main components of the precision pressure controller DPC 4800 are the measuring and control electronics, four or six magnetic valves, evaluation unit, touchscreen and the interfaces.

6.3 General Description of Function

- Up to three temperature compensated high-precision pressure sensors can be installed.
- An optional internal, highly precise barometric reference sensor indicates the pressure change from differential pressure to absolute pressure.
- Control of (positive or negative) pressure changes of 10 % FS at a test volume of 50 ml within ≤ 10 sec.
- Measurement uncertainty (k=2): depending on instrument version from 0.02 % FS + 0.02 % rdg up to 0.006 % FS + 0.003 % rdg.
- Recommended calibration interval: 1 year.
- Compact case or 19" rack mounting available.
- Remote operation via RS-232 or Ethernet.
- Emulation of other standard controllers available.

6.4 Operating Principle of the Multiple Range Version

Besides the main sensor, the pressure controller multiple range version includes a second or third precision sensor in order to increase the accuracy of the lower part of the pressure range.

Depending on the required working pressure, the controller can then choose the most suitable sensor automatically.

This is carried out regardless of whether the set pressure was entered via touchscreen or sent via interface. The combination of the precision pressure sensors can either be optimally selected to maximize measurement flexibility, or selected according to special customer requirements.

Sensors with a pressure range ratio of up to 1:10 may be combined to ensure a wide calibration range.

6.5 Interfaces

For integration in existing systems RS-232, Ethernet or optionally IEEE-488.2 interfaces or analogue outputs are available.

6.5.1 Ethernet – Interface

The Ethernet communication port enables the device to communicate with a host computer via 10/100 Base-T specifications. Ethernet communications are transmitted via RJ-45 standard cable.

6.5.2 RS-232 – Interface

When using the RS-232 interface, a cable must be connected directly from the instrument to a suitable port on the computer ('point to point' link).

6.5.3 IEEE-488.2 – Optional Interface

The connection of the IEEE-488.2 interface is designed as a 24-pin IEEE-488 socket. The manufacturer of the IEEE-488 interface board provides software to allow communication with the DPC 4800 in various programming languages.

6.5.4 Relay Output

The relay output is used to connect an external push-button, e.g. a foot switch (optional).

6.5.5 Service Connection

The USB 2.0 connection on the rear side of the device is a socket type USB-B. It is required for service purposes and is not primarily used for communication between device and host computer.

7. Transport, Packing and Storage

7.1 Transport

The system shall be clean and free of dirt before shipping. This is especially important if the medium is health-damaging, e.g. toxic, corrosive, carcinogenic or radioactive.

The pressure controller DPC 4800 shall only be sent in transport boxes that are especially designed for this. Please request such a transport box if necessary.

- Please wrap the device in an antistatic plastic foil.
- Put the device into the box and make sure that it is tightly packed with the protective material.
- If possible, place a bag containing desiccant inside the box.
- Please make sure that the consignment is labelled as carriage of a highly sensitive measuring instrument.

7.2 Packing

The packing shall only be removed immediately before installing / mounting the DPC 4800.

Please keep all packing materials, since they offer ideal protection for transporting in case of changing operation sites or repair return consignments.

7.3 Storage

The system shall be clean and free of dirt before storage. This is especially important if the medium is health-damaging, e.g. toxic, corrosive, carcinogenic or radioactive.

The storage location shall comply with the following conditions:

- Ambient temperature: 0 to 70 °C (32 to 158 °F)
- Humidity: 35 to 85 % relative humidity, non-condensing

Avoid the following influences:

- Direct sunlight or vicinity to hot objects
- Mechanical vibration / mechanical shock (by putting it down hard)
- Soot, vapour, dust and corrosive gases
- Potentially explosive environments, flammable atmospheres

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The device should be stored in its original transport box, in a place that meets the aforementioned conditions.

Follow the instructions below to avoid damage:

- Wrap the device in an antistatic plastic foil.
- Place the device in the box using the protective material.
- If stored for a prolonged period of time (more than 30 days), add a bag with desiccant to the box.

8. Installation – Configuration and Function

8.1 Introduction

The following chapter contains recommendations concerning the initial installation of the DPC 4800. The installation is carried out as follows:

- Unpack the device.
- Set it up at an appropriate place.
- Connect it.
- Switch it on.
- Configure the system if necessary.

8.2 Scope of Delivery

Apart from additional parts you may have ordered, the delivery consists of:

- Basic device precision pressure controller / calibrator
- Mains cable 1.5 m (CEE 7/7 plug)
- Operating instructions
- Calibration certificate

Optionally enclosed with the delivery:

- Recommended interface cables
- Data carrier with software

8.3 Unpacking

Please unpack all components of the device carefully and check the individual parts for damage. Immediately report any damage to the shipping company.

8.4 Setting Up

The installation site shall comply with the following conditions:

- Ambient temperature: 15 to 35 °C (59 to 95 °F)
- Humidity: 0 to 95 % relative humidity, without condensation
- Flat, horizontal position; secure and fixed working surface (desktop version) or proper installation in a solid 19" mounting frame / 4HE (19" rack mounting, optional)
- During operation, pressure escapes at the rear side of the device. Therefore, make sure that personnel has no access to the rear side during operation. In case of piped **Vent / Supply** port, make sure that personnel has no access to the vent opening.

Avoid the following influences:

- Direct sunlight or vicinity to hot objects
- Unstable or highly inclined installation position
- Mechanical vibrations
- Proximity to disturbing sources with strong electromagnetic fields, such as high voltage appliances, mobile phones or power lines
- Soot, vapour, dust and corrosive gases
- Potentially explosive environments

Pressure supply requirements:

- Stable supply pressure: slightly above the full scale value of the controller (recommended: 110 % FS)
- Permissible media: dry, clean air or nitrogen
- Vacuum: at least 50 litres / min (if required)

8.5 Pressure Connections

All pressure connections (except for the **Ref.** connection) have G 1/8" female connections at the rear side of the instrument. The cross-section of the piping shall be selected according to length and pressure.

8.5.1 Test

Below the label **Test** is the pressure connection, where the pressure, which is precisely regulated by the controller, is applied or an applied pressure is precisely measured by the device.

8.5.2 Supply

Below the label **Supply** is the pressure connection for the supply pressure, which should be slightly higher than the full scale value of the controller.

8.5.3 Vac

Below the label **Vac** is the pressure connection for the vacuum supply (only for supply pressure <40 bar). In case of an overpressure version, atmospheric pressure may be applied here optionally.

8.5.4 Vent

Below the label **Vent** is the pressure connection, with which the system is abruptly vented to atmosphere.

8.5.5 Ref.

If there is no blind plug available, the **Ref.** port is the connection to the optional barometric reference as well as to the reference port of the pressure sensors with overpressure measuring ranges <4 bar. This connection must be left open to atmosphere and external pressure must not be applied.

8.5.6 Instructions on the Pressure Connections

The user has to ensure that any medium that escapes from the **Vent** or **Supply** ports is released in a suitable manner without danger for humans or the environment. Furthermore, suitable sound dampers shall be used.

The higher the supply pressure at the **Supply** connection (inlet port of the control unit), the higher the possible pressure, which can leave the system through the **Vent** connection (outlet port of the control unit).

If a vacuum pump is connected to the **Vac** port, appropriate protective measures have to be taken by the user, so that the vacuum pump will not be damaged.

Furthermore, the maximum supply pressure shall not endanger the vacuum pump. Therefore, the technical data of the vacuum pump have to be checked beforehand.

If a vacuum is applied to the **Supply** port of the controller, negative pressure peaks of several -100 mbar might occur at the **Test** port for a short time when changing from the measuring mode to the control mode.

Prior to the connection of the device, it must be ensured that there exist appropriate protective measures, which prevent an overload of the test item or the device.

The pressure pipes, couplings and other components used for piping must be suitable for the occurring pressures.

8.5.7 Recommendation Concerning the Pressure Piping

The user must ensure that the used media are available in clean and dry form. If necessary, the sensors have to be protected by using sediment bowls, particle filters or humidity filters.

8.6 Electrical Connections on the Rear Side

The electrical installation has to be carried out according to the following instructions while observing all relevant regulations. It is to be carried out by personnel that is familiar with the safety regulations for working on electrical plants and who can work according to them.

8.6.1 Connection of the Mains Input Socket

Before connecting the mains input socket, make sure that the mains voltage corresponds to the specification of the power supply unit. Switch off the device before connecting it with the mains. Only the provided mains cable should be used. The provided 3-pin mains cable is equipped with a protective conductor. Hence, operate the device only from an earthed socket and always make sure that the earth conductor is properly connected. The mains input socket is to be connected, according to the regulations, to a power supply with the provided country-specific connection cable, which is within the stipulated specification.

8.6.2 Connection of the Interfaces

The interface cables must not be longer than 3 m and must be laid separate from cables with voltages > 60 V. Devices, which are connected to the interfaces, have to comply with the standard IEC 60950.

RS-232 interface:

The RS-232 interface is designed as a 9-pin Sub-D socket and is to be connected as required according to the regulations with the cable mentioned below or a 9-pin 1:1 cable of similar quality:
3 m Data Extension Cable; DB9 Male / DB9 Female

Table 1 shows the pin connections for the 9-pin RS-232 Sub-D connector. The device is configured as data terminal equipment (DTE).

PIN	Configuration	Wire colour	Description
1	–		
2	RX	yellow	transmission
3	TX	green	receive path
4	–		
5	GND	brown	ground
6	DSR	white	“dataset ready”
7	–		
8	–		
9	–		

Table 1: Pin assignment of the RS-232 interface (socket)

IEEE-488 interface (optional):

The connection of the IEEE-488 interface is designed as a 24-pin IEEE socket and is to be connected as required according to the regulations with the cable mentioned below or a cable of similar quality:
2 m IEEE-488-2 MPB CABLE

Relay outputs:

When connecting the relay outputs, the national installation regulations (e.g. Germany: VDE standard) and the Appliance Safety Law are to be observed and followed. The limit values of the relays for current and voltage must not be exceeded. The relays must not have any direct or indirect influence on critical processes. Table 2 shows the pin assignment of the relay output interface.

PIN	Configuration	Description
1	Vent 1 CNT	valve 1 control output cut off control unit
2	Vent 1 GND	valve 1 ground
3	Vent 2 CNT	valve 2 control output exhaust UUT (test item)
4	Vent 2 GND	valve 2 ground
5	–	
6	–	
7	–	
8	–	
9	+ 24 V	supply for control gate input
10	Input	control gate input (pedal button)

Table 2: Pin assignment of the relay output

Service connection:

The USB interface, type USB 2.0, Form B is required for service purposes and is not primarily used for communication between device and host computer.

9. Commissioning and Operating

Prior to switching on the device, it must be ensured that the device was installed according to the instructions of the previous chapter and that all connections installed are fitted or carried out according to the regulations.

It is necessary to ensure that all specifications, such as supply voltage, supply pressure, operating temperature, humidity, specified media and pressure range are met. Rapid temperature changes might cause condensation within the device. In such a case, allow the device to acclimatise.

Before pressurising, appropriate protective measures must be taken to ensure that the device or the test item will not be overloaded. When working on or with the device, safety glasses must be worn. When the supply pressure exceeds 40 bar, ear protection must be worn.

When working with inert gases, these might leak. This is why premises, in which the pressure controller is operated, require sufficient air ventilation systems.



WARNING! Pressure can accelerate loose components in a hazardous manner.

After thermal balancing with the installation place, the controller is immediately ready for operation. However, in order to achieve the ideal precision of the system, the device should be switched on about 10 minutes prior to its use.

10. Operation

10.1 Preparations



Instrument displays may differ from the figures in this manual, depending on the selected instrument configuration.



Please ensure that electrical cables and pressure pipes comply with the installation requirements in chapters 8 and 9.

A proper connection of the required components will be accomplished by following the directions below:

- Make sure that the power switch on the rear side is turned off (push the part of the flip switch marked **0**).
- Connect the supplied mains cable to the power supply.
- Check the pressure hoses of your pressure supply for damage and exclude infiltrating dirt and moisture.
- Connect a device for pressure supply to the **Supply** port. As measured by the stationary pressure sensors, a pressure supply about 10 % above the highest installed pressure range shall be connected in order to guarantee complete control. A compressor is available separately.
- Connect a filter to the **Vent** port. If no filter is used, this connection must be left open to atmosphere and external pressure must not be applied.
- Connect a calibration object or a device for pressure testing to the **Test** port. A test item (UUT/DUT) is available separately.



CAUTION! The test item might be damaged due to overpressure. Therefore, please bear in mind the permissible maximum pressure of the test item during control and make necessary adjustments on your pressure controller (⇒ chapter 10.4.2).

- If required, connect a vacuum pump to the **Vac** port. Such a vacuum pump is also available separately.
- Get an overview and acquaint yourself with the complete procedure before starting a process on a component or system.
- Please test the device prior to use.

For further connection options for external operation please refer to chapter 10.6.

10.2 Switching On and Off

After completing all preparations, turn on the device by pressing the **flip switch** next to the mains input socket on the rear side of the device.

Wait a few seconds for the main menu to appear on the screen (⇒ chapter 10.4.1 “Main Menu”). The device is now ready for operation.



In order to achieve the ideal precision of the system, the device should be switched on about 10 minutes prior to its use.

Before switching off the device, we recommend to release the pressure, which might be within the device, by venting it. To do so, press the **Vent** button via touchscreen in the main menu (⇒ chapter 10.4.1 “Main Menu”). When the device is vented successfully, turn it off by pressing the **flip switch** on the rear side of the device.



CAUTION! Protect your device from a too high permanent load. If you are not going to use the device for a considerable time, please turn off the pressure supply as well as the device itself.

10.3 Basic Settings

To remove the factory settings, please make the following adjustments once during first use:

10.3.1 Operating Language

In the set up menu (⇒ chapter 10.4.2 “Set Up Menu”), the desired operating language can be selected via **Display** button.

10.3.2 Pressure Unit

Select the desired pressure unit by pressing the button **Unit** via touchscreen in the main menu (⇒ chapter 10.4.1 “Main Menu”).

10.3.3 Control Mode

Set the **control mode** in the set up menu to **Fast** (⇒ chapter 10.4.2 “Set Up Menu”).

10.4 Menu Navigation and Buttons

Active buttons are always highlighted white, the activation is done via touchscreen.

Numerical values are entered via an extended on-screen keypad, also using touch control.

All screens contain the main control buttons **Vent**, **Control**, **Measure**, as well as the possibility to return to the previous screen. The function of these four buttons is explained once in chapter 10.4.1 “Main menu” and will not be described repeatedly for the other individual menus.

10.4.1 Main Menu

The main menu is the main screen of the device and appears right after the device is switched on. Here, you can read the actual pressure and the set pressure and you can make the main settings by using the buttons.

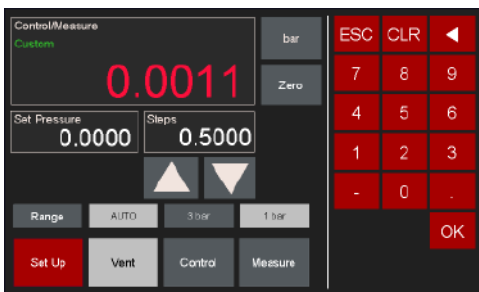


Fig. 10.4.1-1 Main menu

The following buttons and values can be operated or displayed in the main menu:

Zero:

The displayed actual pressure value can be saved as tare value. By pressing this button, the actual pressure value is defined as zero pressure.



CAUTION! The device might be damaged due to overpressure. Please bear in mind that the actual pressure is not released when set to zero, but is still within the device. During control, this value is further increased by the set pressure.

Operating Instructions

Automatic Calibration System DPC 4800

Abs (only with integrated barometer):

By activating the **Abs** function, the pressure range is switched from gauge pressure to absolute pressure. This setting is only available if a barometer is integrated. The **Zero** button is locked or not available in the absolute pressure mode.

Vent:

By pressing this button, you deactivate the controller and vent the device.

Control:

By pressing this button, you start the control process. Here, the actual pressure is equalised to the set pressure. The control rate is depending on the selected control mode and the media volume to be regulated.

Measure:

By pressing this button, you deactivate the controller and the device measures the applied working pressure.

Unit:

By pressing this button, you access another menu that will enable you to select the required pressure unit via the according button. Via touchscreen, you can choose between 20 different units.



Fig. 10.4.1-2 Unit menu



User-defined units can be implemented on customer request. Please contact us for further information.

Set Up:

By pressing this button, you access the set up menu. There you can adjust more precise parameters for the control process. For further information, please refer to chapter 10.4.2. "Set Up Menu".

Pressure range (single range device):

The button with the indicated pressure range (e.g. 0 – 2 bar) represents a sensor with a defined pressure measuring range.

Pressure ranges (multiple range device):

Additional buttons with different pressure ranges represent further sensors with their respective pressure measuring ranges. The actual pressure changes accordingly within this range if a button, and therefore the associated pressure sensor, is selected manually. If the **Auto** button is activated (highlighted in white), the device automatically selects the ideal pressure range for the pressure to be controlled or the pressure applied.

Control/Measure:

This value indicates the currently applied actual pressure in the selected pressure unit (e.g. bar) and cannot be modified manually.

As soon as the actual pressure is equal to the set pressure within a specified tolerance, the measured value is highlighted in green.

Control deviation dP:

The value of the permissible control deviation is determined by the selection of the control strategy **Fast**, **Normal** and **Precision** (⇒ chapter 10.3.3 "Control Mode").

If the control is in the stable state, the current control deviation (difference between actual pressure and set pressure) is displayed separately above the actual pressure (⇒ chapter 10.4.2 "Set Up Menu, Controller"). Even if the device is in the stable state, the controller tries to minimise the control deviation to at least one third of the defined limit value.

Operating Instructions

Automatic Calibration System DPC 4800

Set Pressure:

By pressing the display field, the set pressure can be changed. The numerical on-screen keypad will be activated on the right side of the screen and allows the entry of numerical values.

Previous entries can be deleted with CLR or the cursor key. Confirm with OK. Press ESC if you choose not to save the changes.

If the entered value is not accepted, the permissible set pressure range might be exceeded (⇒ chapter 10.4.2 "Set Up Menu, Controller").

Steps:

This button displays the interval, by which the set pressure can be increased or decreased gradually. This value can be changed by pressing the steps field. Now enter the required interval via the numerical keypad. The entry is made in the same way as the entry of the set pressure.

▲/▼:

With these buttons you can gradually increase (▲) or decrease (▼) the set pressure. The interval is defined via the value in the field `Steps`.

10.4.2 Set Up Menu

The set up menu is used to set general configuration options such as:

- control strategy Controller
- screen Display
- units Unit
- serial numbers Information
- basic settings Service

You access the set up menu by pressing the button `Set Up` in the main menu:

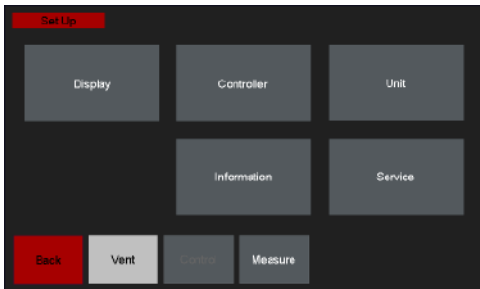


Fig. 10.4.2-1 Set up menu

Display:

In this menu, the desired operating language can be selected. Up to now, the languages English, German, Italian, Russian, French and Spanish are available as operating language. The button of the selected language is highlighted in white.



Fig. 10.4.2-2 Display menu

Here, also the screen brightness can be adjusted. The percentage changes are made via the +/– buttons.

Controller:

Four selection options are available for the control strategy: Fast, Normal, Precision and Custom. The key data for each control strategy are given. The currently active mode is highlighted in white.

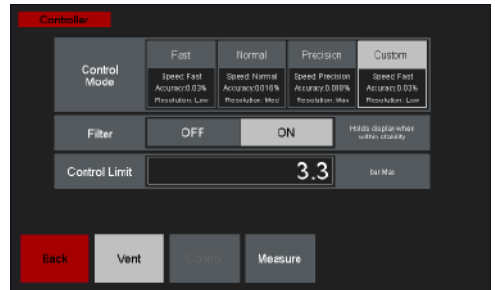


Fig. 10.4.2-3 Controller menu

If the option `Filter` is activated, noise suppression of the non-significant decimal places is carried out during the `Stable` control state.

Operating Instructions

Automatic Calibration System DPC 4800

The **Control Limit** indicates from which pressure onwards the safety ventilation shall be activated. This safety ventilation aims to protect the test item. This value can be set by pressing the field **Control Limit** and entering the required value via numerical keypad. If you want to tap the full potential of a pressure sensor, entering a value slightly above the limit of the pressure sensor is recommended.

Unit:

By pressing this button, a menu appears in which you can select the desired pressure unit out of 20 different units via the corresponding button.



Fig. 10.4.2-4 Pressure units



User-defined units can be implemented on customer request. Please contact us for further information.

Information:

By pressing this button, general device information, such as serial number and the BIOS version of the device is displayed.

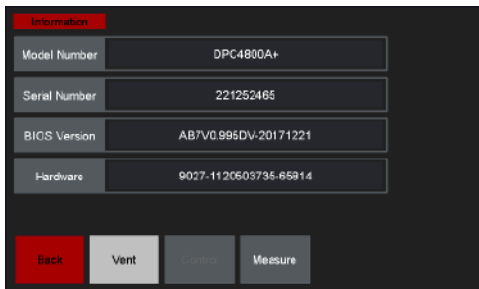


Fig. 10.4.2-5 Information menu

Service:

By pressing this button, you can log on to the service menu. Here, extensive adjustments of the device behaviour are possible. For details, see chapter 10.4.3 "Service Menu".

10.4.3 Service Menu

The service menu offers setting options that usually do not need to be changed directly during normal operation.

From the set up menu (⇒ chapter 10.4.2 "Set Up Menu") you can access the service menu by pressing the button **Service**. Then, enter the service number 48485 and confirm with **OK**.

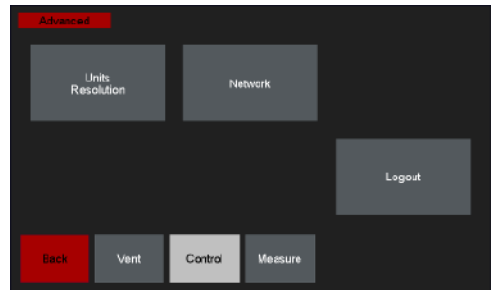


Fig. 10.4.2-6 Service menu

Units Resolution:

With the button **Units Resolution** it is possible to set the desired decimal places of the units (depending on the control mode). Select the unit for which you want to change the decimal places. A numerical keypad appears in which you can set the number of decimal places.

Network:

Press the **Network** button to configure the device for the integration into an existing network (⇒ chapter 10.4.4 "Network Menu").

Logout:

Close the service menu and return to the set up menu.

10.4.4 Network Menu

In the network menu, IP address, subnet mask and, if required, a gateway address are set, which allows the device to be controlled in remote operation. For more information on the external (remote) operation → chapter 10.6 "External Operation".

IP Address:

The IP is a unique device address in the network, which is assigned depending on the network configuration. Common settings for private networks are e.g. 192.168.10.X or 10.0.1.X, with X being a number between 1 and 254.

Subnet:

In connection with the IP address of a device, the subnet determines which IP addresses this device can reach in its own network without the aid of a router and for which destination networks the device must deliver packets to a router for the purpose of further routing to other networks. A frequently used subnet is 255.255.255.0 (24-bit network segment, max. 254 devices).

Gateway:

The device sends all communication requests outside its own network to a router for further routing to other networks. The IP address of this router is the gateway. Usually (if both the controller and the PC are in the same network segment), this setting can be left at 0.0.0.0.

Save:

By pressing the **Save** button, the entered values are accepted and become effective.

10.5 Control

The core function of this device is the pressure regulation for the calibration of pressure measuring instruments. Please regard the following directions for successful control:

- Make sure you have set the desired pressure unit via the main menu **Unit**.
- If necessary, enter the decimal places (units), the control tolerance as well as the control limit via the set up menu.
- Enter the set pressure in the main menu.
- Enter a step interval suitable for the measuring range via the field **Steps**.
- Afterwards, press the button **Control**. The actual pressure will now be adjusted to the set pressure.
- If applicable, please pay attention whether the test item indicates the settled pressure correctly.
- Press the + or the - button to increase or decrease the set pressure gradually.
- When you finished the control process, you can manually release the pressure from the device by pressing the button **Vent** in the main menu.



If the actual pressure exceeds the previously set control limit, the safety ventilation will be initiated automatically to protect the test item.



CAUTION! The device may be damaged by overpressurisation. Therefore, please follow the directions on the button **Zero** in chapter 10.4.1 "Main Menu".

10.6 External Operation

You have the following options if you want to control the device externally:

10.6.1 Ethernet – Interface

The Ethernet connection enables the device to communicate with a computer via 10/100 Base-T specifications. The Ethernet communication is transmitted via RJ-45 standard cable.

Prior to the first use, the network parameters must be set in the device (⇒ chapter 10.4.4 “Network Menu”).



Please consult your network administrator before connecting the device with your network to avoid conflicts with existing IP addresses.

The communication port is set to TCP 2100.

10.6.2 RS-232 – Interface

When using the RS-232 interface, a cable must be connected directly from the instrument to a suitable port on the computer (‘point to point’ link). The device is configured as data terminal equipment (DTE) (⇒ chapter 6.5.2 “RS-232 – Interface”).

10.6.3 IEEE-488.2 – Interface (Optional)

The manufacturer of the IEEE-488 interfaces provides software to allow communication between the DPC 4800 and various programming languages.

Usually, also an interactive troubleshooting programme is provided.

For further details on this, please read the included documentation of the IEEE-488 interface.

10.6.4 Interface Commands

A text-based command protocol is used to communicate with the device via the Ethernet or RS-232 interface, allowing a wide range of functions and actions of the device to be addressed.

Details regarding this command protocol can be found in the technical information sheet **T10-000-006 Automatic Calibration System DPC 4800 – Interface Protocol**, please contact us for details.

10.6.5 Software

Remote control software ARMANO DynaClone

This allows operating the pressure controller via a PC. The advantage is that the pressure controller does not have to stand next to the PC. The software “clones” the menu of the pressure controller and offers additional features such as shortcuts for adjusting freely definable, often required fixed pressure values.

Calibration software ARMANO DynaCal2

DynaCal2 allows for comfortable calibration of pressure measuring instruments, including automatic creation of test certificates. Measured values can be entered manually or recorded automatically using optional sensors. Please contact us for details.

Calibration software ARMANO DynaCal2_DAKkS (optional)

DynaCal2 DAKkS allows for comfortable calibration of pressure measuring instruments according to DKD-R-6-1 and is able to issue a corresponding calibration certificate. Please contact us for details.

LabVIEW

The instrument can be addressed and operated via LabVIEW.

Operating Instructions

Automatic Calibration System DPC 4800

11. Maintenance



CAUTION! Material damage and loss of warranty!

Any modifications or interventions in the device, made by the customer, might damage important parts or components. Such intervention leads to the loss of any warranty and manufacturer's responsibility!

→ Never modify the device or perform any repairs yourself.

Have your device maintained regularly to ensure proper function of the instrument. For this purpose, please contact authorised service partners or contact us directly.

Both the service partners and the manufacturer offer you the expertise and the qualifications necessary for proper maintenance of your instrument.

In order to avoid impairment or loss of functionality, ARMANO recommends the following maintenance intervals:

- Recalibration of the sensor technology at an interval of 1 year
- Maintenance of the mechanical components incl. cleaning and the replacement of the backup battery at an interval of 2 years

12. Dismounting and Disposal



WARNING! Risk of injury!

Never remove the device from a system in operation.

Make sure that the system is switched off professionally.

Work on electrical or pneumatic / hydraulic equipment must be carried out by qualified and authorised technical staff only, observing the corresponding safety regulations and according to the operating instruction.

Dismounting:

- Make sure that there is no positive or negative overpressure on the device and that all components are at room temperature.
- Switch off the device by pressing the main switch on the rear side of the device.
- Pull out the mains cable from the power socket and then from the mains input socket of the device.
- Remove the pressure connections: when removing the outer pressure connections, make sure that the connections on and in the device are not overtightened or loosened.
- Remove the device if necessary.
- Make sure that the device is free of any medium.
- Protect the connections with the supplied protective caps.

Disposal:

Prior to disposal of the device, all adhering medium residues have to be removed. This is especially important if the medium is health-damaging, e.g. corrosive, toxic, carcinogenic or radioactive.

In compliance with the directives 2011/65/EU (RoHS) and 2012/19/EU (WEEE), the device must be disposed of separately as electrical and electronic waste. Please regard legal regulations of the country of distribution.



NO DOMESTIC WASTE!

The instrument comprises various materials. It shall not be disposed of together with domestic waste.

→ Bring the instrument to your local recycling plant

or

→ send the instrument back to your supplier or to the ARMANO Messtechnik GmbH.

13. CE Conformity



The CE marking of the instruments certifies the conformity with prevailing EU directives for placing products on the market within the European Union.

The corresponding declaration of conformity is part of this manual (⇒ chapter 15 "Declaration of Conformity").

14. Troubleshooting Measures

If faults cannot be corrected with the help of this operating instruction, the device has to be decommissioned instantly, it must be ensured that no pressure is applied anymore and secured against unintentional commissioning. Following this, the information has to be given to a superior and to authorised service personnel.

In case of faults caused by defects of the electrical or pneumatic / hydraulic equipment, the operators must inform their superiors immediately and consult qualified and authorised technical staff for maintenance.

Repairs shall only be carried out by the manufacturer. Any modifications or changes by the operator to the device are not permissible. Such intervention leads to the loss of any warranty and manufacturer's responsibility. Work on electrical or pneumatic / hydraulic equipment must be carried out by qualified and authorised technical staff only, observing the corresponding safety regulations.

14.1 Description of Faults and Measures

Description of Faults	Measures
When switching on the device, no measuring value(s) appear(s) after 10 seconds, but the entire screen remains white or dark. The screen remains dark and the previously described measures are without effect.	Turn off the device, wait about 5 seconds, and turn it on again. First, pull out the mains cable from the power socket and then from the mains input socket of the device. After that, pull out the fuse holder and check the fuses. If the fuses of the mains input socket have to be replaced, only suitable 2 ampere fuses type T2L250V must be used. Have also authorised technical staff check whether the supply voltage is correct.
Unstable control.	Check the control mode. Check the piping for leakages.
Intensified release of medium at the Supply port during pressure controlling.	Turn off the device, wait about 5 seconds, and turn it on again. (Controller will be reinitialised.)
The set pressure is not reached.	Check, whether the supply pressure at the Supply or Vac port is at the required level (⇒ chapter 8.5 "Pressure Connections"). Check the piping for leakages. Check the setting of the value <code>control limit</code> (⇒ chapter 10.4.2 "Set Up Menu"). When using a gaseous pressure transfer medium, check the piping for liquid ingress or contamination.
Malfunctions during operation.	Turn off the device, wait about 5 seconds, and turn it on again.
The control rate has decreased noticeably, although the connected system volume and the device parameters have not been altered. The set pressure is reached (delayed); leakage cannot be detected.	When using a gaseous pressure transfer medium, check the piping for liquid ingress or contamination.

15. Declaration of Conformity

EU-Konformitätserklärung

EU Declaration of Conformity

Für die nachfolgend bezeichneten Erzeugnisse

Digitales Präzisions-Druckmessgerät
Typen DPG 3600, DPG 3600 HD
Präzisions-Druckkalibrator
Typen DPC 3800, DPC 3800HD, DPC 3800 HDG,
DPC 4800 A, DPC 4800 A+, DPC 4800 P

wird hiermit erklärt, dass sie den wesentlichen Schutzanforderungen entsprechen, die in nachfolgend bezeichneten Richtlinien festgelegt sind:

RICHTLINIE 2014/30/EU DES EUROPÄISCHEN PARLAMENTES UND DES RATES vom 26. Februar 2014
zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit – kurz: **EMV-Richtlinie**

RICHTLINIE 2014/35/EU DES EUROPÄISCHEN PARLAMENTES UND DES RATES vom 26. Februar 2014
zur Angleichung der Rechtsvorschriften der Mitgliedstaaten betreffend elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen – kurz: **Niederspannungsrichtlinie**

RICHTLINIE 2011/65/EU DES EUROPÄISCHEN PARLAMENTES UND DES RATES vom 8. Juni 2011
zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten – kurz: **RoHS-Richtlinie**

Zur Beurteilung des Erzeugnisses hinsichtlich der Richtlinien wurden folgende Normen herangezogen:

Norm: Standard: EN 61326-1: 2013-07	Richtlinienbezug Reference to directive EMV-Richtlinie 2014/30/EU EMC Directive 2014/30/EU
EN 61010-1: 2011-07	Niederspannungsrichtlinie 2014/35/EU Low Voltage Directive 2014/35/EU
DIN EN 50581:2020-03	RoHS-Richtlinie 2011/65/EU RoHS Directive 2011/65/EU

Diese Erklärung gilt für alle nach Datenblätter 10261, 10262, 10461, 10462, 10463 und 10465 hergestellten Exemplare.

We hereby declare for the following named goods

Digital Precision Pressure Indicator
Models DPG 3600, DPG 3600 HD
Precision Pressure Controller
Models DPC 3800, DPC 3800HD, DPC 3800 HDG,
DPC 4800 A, DPC 4800 A+, DPC 4800 P

that they meet the essential protective requirements, which have been fixed in the following directives:

DIRECTIVE 2014/30/EU OF THE EUROPEAN PARLIAMENT AND THE COUNCIL from February 26, 2014
on the approximation of the laws of the Member States relating to the electromagnetic compatibility – short: **EMC Directive**

DIRECTIVE 2014/35/EU OF THE EUROPEAN PARLIAMENT AND THE COUNCIL from February 26, 2014
on the approximation of the laws of the Member States relating to electrical equipment designed for the use within certain voltage limits – short: **Low Voltage Directive**

DIRECTIVE 2011/65/EU OF THE EUROPEAN PARLIAMENT AND THE COUNCIL from June 8, 2011
on the restriction of the use of certain hazardous substances in electrical and electronic equipment – short: **RoHS Directive**

The following standards have been used to assess the goods regarding the directives:

This declaration applies to any specimen manufactured according to the data sheets 10261, 10262, 10461, 10462, 10463 and 10465.

Diese Erklärung wird verantwortlich für den Hersteller:
This declaration is issued under the sole responsibility of the manufacturer:

ARMANO Messtechnik GmbH
abgegeben durch/by
Grünhain-Beierfeld, 2021-05-03



Bernd Vetter
Geschäftsführender Gesellschafter / Managing Director



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