

# Installation and Maintenance Instruction Manual



## Differential pressure gauge, model F5510

(non-electrical device) in a 100=F5510=###=ATEX configuration

for explosion risk areas pursuant to Directive 2014/34/EU (ATEX)

Zone 1 and 2, and Zone 21 and 22; risk from gases and dry dust



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# 1 General remarks

## 1.1 Purpose of this Manual



This Operating Manual contains fundamental and essential advice to be followed for the installation, operation and servicing of the device. It must be read without fail before installation and start-up of the device by the fitter, the operator and the specialist personnel responsible for the device. This Operating Manual must be available at the point of use of the device at all times.

The following sections about Safety (2) and also the following specific advice regarding the Use in accordance with intended purpose (2.2) and through to Disposal (11.3) contain important safety information which, if not followed, may result in risks for people and animals, or to property and buildings.

## 1.2 Symbols



### **Warning!**

This indicates a possibly hazardous situation where failing to follow advice may result in risks to people, animals, the environment and buildings.



### **Information!**

This emphasizes key information for efficient, fault-free operation.

## 1.3 Limits of liability

Failure to respect this safety information, the intended uses or the limit values relating to use indicated in the technical data for the device may result in risk or to injury to people, the environment or the plant.

Claims for compensation for damage against the device supplier are excluded in such an eventuality.

## 1.4 Copyright

Without special permission from the publisher, this Operating Manual may be copied and passed on as a complete document only.

## 1.5 Warranty

For the product described here, we offer a warranty pursuant to Section 6, 'Guarantee in Respect of Defects' in our General Terms and Conditions of Delivery and Payment.

## 1.6 Manufacturer's address, customer services

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Max-Planck-Strasse 1  
D-52499 Baesweiler. Germany

Tel.: +49 (0) 2401/808-888  
Fax.: +49 (0) 2401/808-999  
E-mail: [customer.service@ashcroft.com](mailto:customer.service@ashcroft.com)  
Web: [www.ashcroft.eu](http://www.ashcroft.eu)

# 2 Safety

## 2.1 General sources of hazards

Pressure gauges are pressurized parts where failure can result in hazardous situations. The selection of pressure gauge should be made in accordance with the rules set out in EN 837-2 & DIN 16003.

## 2.2 Use in accordance with intended purpose

The devices are only to be used for the intended purpose as described by the manufacturer.

The devices are used for direct display of differential pressures.

For each use scenario, the corresponding set-up regulations must be respected. If used in explosion risk areas, the following conditions must be respected.

## 2.3 Operator's responsibility

Safety instructions for proper operation of the device must be respected. They must be provided by the operator for use by the respective personnel for installation, servicing, inspection and operation. Risks from electrical energy and from the released energy of the medium, from escaping media and from improper connection of the device must be

eliminated. The details for this are to be found in the corresponding applicable set of regulations, such as DIN EN, UVV (accident prevention regulations) and in sector-specific instances of use (DVWG, Ex- GL, etc.) the VDE guidelines and the regulations supplied by local utilities companies.

The device must be taken out of service and secured against inadvertently being restarted, if the presumption is that risk-free operation is no longer possible (see Chapter 0

Faults).

Conversion works or other technical alterations to the device by the customer are not permitted. This also applies to installation of spare parts. Possible conversions or alterations may only be carried out by the manufacturer.

The operational safety of the device is only guaranteed where it is used for its intended purpose. The specification of the device must be suited to the medium used in the plant. The limit values indicated in the technical data must not be exceeded.

The safety information detailed in this Operating Manual, existing national regulations for accident prevention, and the operator's internal regulations regarding working, operations and safety must be respected.

The operator is responsible for all specified servicing, inspection and installation works being carried out by authorized and qualified specialists.

The operator is responsible that the device is used in the correct ATEX zone.

## 2.4 Staff qualifications (target group assessment)

The device may only be installed and started up by specialist staff who are qualified for installation, start-up and operation of the product.

Specialist staff are people who are able to assess the work assigned to them on the basis of their specialist training, their knowledge and experience and their knowledge of the relevant standards, and can identify possible risks.

For devices in explosion-protected configuration, these staff must have been trained or instructed in, or be authorized for, working on explosion-protected devices in potentially explosive plants.

## 2.5 Signs/Safety markings

The pressure gauge and its surrounding packaging carry markings. These markings show the article number, measurement range and manufacturer. The pressure gauge can be provided with additional signs and safety markings advising on special conditions:

- Advice on the filling liquid
- Advice on calibration
- Ex (for ATEX configuration)
- Oil-can deleted (if oxygen is used)

## 2.6 Safety equipment

The window uses multi-layer safety glass.

## 2.7 Environmental protection

This device may optionally contain a filling liquid (e.g. glycerin or silicone oil). The provisions set out in the REACH regulation on production and use of chemicals must be respected, and the relevant safety data sheets from the manufacturers of the chemicals are available on our website for download.

### 3 Use in explosion risk areas pursuant to Directive 2014/34/EU (ATEX)

#### Area of use:

Explosion risk areas Zone 1 and 2, and 21 and 22, risk from gases and dry dust.

#### Permitted temperatures:

The maximum occurring surface temperature of 95 °C was determined with no covering of dust and with no safety factor.

For dust clouds and dust layers the ignition temperature must be specified pursuant to ISO / IEC 80079-20-2

- For dust clouds the maximum allowable medium temperature inside of the measuring instrument must not exceed 2/3 of the dust ignition temperature
- For dust layer the maximum allowable medium temperature inside of the measuring instrument must be 75K lower than the dust ignition temperature

Permitted ambient temperature -20 °C to +60 °C.

Permitted medium temperature in the pressure gage < 85 °C.

Permitted environment air with usual oxygen content (21%), ambient pressure 80 kPa (0,8 bar) to 110 kPa (1,1 bar)



**Warning! With gaseous media, the device temperature may increase due to compression heat. In such cases, the rate of the pressure change must be regulated or the permitted temperature of the measuring medium reduced.**

#### Note:


For a change in differential pressure between 10 % and 90 % of the measuring range and a pulse frequency of < 0.06 Hz, the temperature increase is <10 K.

To avoid additional temperature increase, the devices should not be exposed to direct exposure to sunlight when in operation!

For the non-electrical part of the devices, the standards EN ISO 80079-36, EN ISO 80079-37, EN 60079-0 and EN 60079-31 are applicable with regard to explosion protection. The relevant requirements of these standards are satisfied.

The documentation has been filed with TÜV-Nord-Cert NB 0044 (see declaration of conformity).

Labeling:

CE  II 2G Ex h IIC T4 Gb  
II 2D Ex h IIIC T95°C Db  
Ta = -20°C to +60°C

### 4 Technical data

The detailed technical information can be found in the documents in the Appendix, Chapter 12.

### 5 Labeling on the device

The label with the serial number and type designation is located on the outside right of the housing. The materials identifier is encoded in the type designation.

#### 5.1 Labeling on the device for explosion risk areas (ATEX)

The label with the marking for explosion risk areas is located on the outside left of the housing.

Type designation

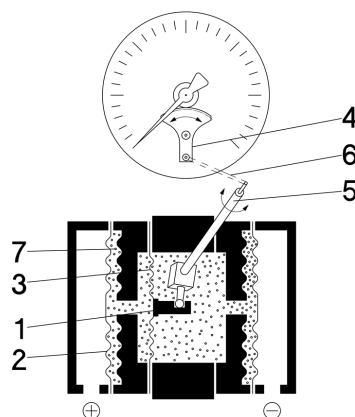
100=F5510=####=ATEX



## 6 Construction and function

### 6.1 Overview

- 1 Coupling rod
- 2 Separating diaphragm
- 3 Measuring diaphragm
- 4 Movement
- 5 Torsion tube
- 6 Transfer lever
- 7 Pressure transfer liquid



### 6.2 Description of function

The pressures to be compared act hydraulically via the separating diaphragm on the measuring diaphragm. When the pressure is equal, the measuring diaphragm is in the rest position. In the event of a pressure difference, a force is generated on the measuring diaphragm which causes it to be deflected in the direction of the lower pressure. Using a torsion tube, the movement along the measurement path is conveyed out of the closed measurement system as a rotary movement, and translated via the attached movement into an angle of turn of between 0 and 270°.

If a unilateral stress on the measurement system occurs which exceeds the measurement range, the separating diaphragms are supported on similarly-contoured molded parts of the system housing, thereby protecting the measurement system against overload.

### 6.3 Description of components

#### 6.3.1 Scale with pointer

The pressure gauge is equipped with a dial and pointer pursuant to DIN 16003, nominal size 100 mm.

#### 6.3.2 Instrument connection

The instrument connection is located on the underside of the pressure gauge and can be a threaded or flanged connector pursuant to DIN EN 61518.

### 6.4 Accessories

Please contact the manufacturer regarding special tools and accessories.

## 7 Transport

### 7.1 Safety

The pressure gauge should be protected against the effects of knocks and impacts. The device should only be transported in the packaging provided, to protect against glass breakage. The device should only be transported in a clean condition (free from residues of measuring media).

### 7.2 Transport inspection

The delivery must be checked for completeness and damage during transport. In the event of damage during transport, the delivery must not be accepted, or only accepted subject to reservation of the scope of the damage being recorded and, if necessary, a complaint initiated.

### 7.3 Storage

The pressure gauge must be stored in dry, clean conditions, within a temperature range of -40 to +60 °C, protected against direct exposure to sunlight and protected against impact damage.

## 8 Mounting/Installation

### 8.1 Safety

To ensure safe working during installation and servicing, suitable shut-off valves must be installed in the plant (see 6.4 Accessories), enabling the device:

- To be depressurized or taken out of operation;
- To be disconnected from the mains supply for repair or checks within the relevant plant;
- Or to enable function tests of the device to be performed “on site”.

During the works to mount/install the gauge, the plant must be protected against being switched back on.

### 8.2 Preparations (requirements for the installation location)

- A check on suitability of the device for the medium to be measured, the scope of the measurement range and the extent of the protection against special conditions such as vibrations, pulsations and pressure blows.
- A bracket must be installed to support the pressure gauge if the pipe is not able to provide adequate support.
- The installation location should be chosen such that the work-spaces for operating personnel are not located to the rear of the pressure gage.

### 8.3 Assembly/Installation

Using appropriate accessories, the device can be installed on flat walls, mounting plates, on pipes or in panels or boards.

Ex works, the device is supplied and calibrated for vertical installation. In the event of an installation orientation deviating from the vertical (max.  $\pm 10^\circ$ ), the zero setting of the display must be corrected (see 8.4.1 Zero point adjustment).

#### 8.3.1 Process connection

- Connection must be undertaken by authorized and qualified specialist staff only.
- Use only with the mechanical process connection provided – regarding the configuration, see order code on the device type label, with a matching threaded seal.
- When connecting the device, the pipes must be depressurized.
- The pressure metering pipe must be laid inclined in such a way that, for example, for measurements of fluids no air pockets can form, and for measurements of gases no water pockets. If the necessary incline is not achieved, then at suitable points water separators or air separators must be installed.
- The pressure metering pipe must be kept as short as possible and laid without sharp bends, to avoid the occurrence of irritating delays.
- The pressure connectors are labeled with + and – symbols on the device. The pressure connection pipes must be fitted in accordance with this labeling.
  - + high pressure port
  - low pressure port
- With liquid measurement media, the pressurized connection pipe must be degassed, since any gas bubble inclusions result in measurement error.
- If water is used as the measurement medium, the device must be frost-protected.



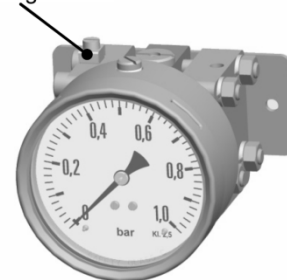
**Safety notice:** Only mount using the correct open-jawed wrench, and do not twist the device itself.



### 8.3.2 Grounding

For grounding, an external connection to ground for fine-wire conductors up to 4 mm<sup>2</sup> or single-wire conductors up to 6 mm<sup>2</sup> is provided.

Grounding connection



## 8.4 Starting up

The precondition for start-up is proper installation of all electrical feed lines and metering pipes. All connecting pipes must be laid such that no mechanical forces can act on the device.

Before start-up, the seal on the pressurized connection line must be checked.

### 8.4.1 Zero point adjustment

The devices are supplied calibrated ex works, so that as a rule there is no need for calibration operations at the installation point. However, it is possible to adjust the zero point on site, and this is performed as follows:

- Switch the pressure metering pipe so that it is depressurized, or charge it with the existing static pressure.
- Open the front face of the device, by loosening the bayonet ring. This may require a belt wrench.
- Hold the pointer in place and adjust the pointer bushing using a screwdriver, until the pointer (when released) is pointing correctly to zero.
- Close the case again and ensure that the seal, glass plate and locking ring are seated correctly.



Liquid-filled devices must be dismantled for the zero point adjustment, and placed on a horizontal surface for adjustment, since otherwise the liquid would run out.

## 8.5 Subsequent relocation of the gauge (by the customer)



**Recommendation:** Do not remove the pressure gauge from one metering point and fit it in a different place, as there is a risk of the measuring media being mixed, with unforeseeable chemical reactions.

## 9 Servicing

The device is maintenance-free. However, to ensure reliable operation and a long lifetime for the device, we recommend that it is checked regularly.

### 9.1 Safety

When undertaking servicing work on the device, the pressure lines must be depressurized and the plant secured against being switched on again.

### 9.2 Check on function, and recalibration

The check on function and recalibration is carried out at regular intervals, depending on the application. The precise testing cycles should be adjusted in line with the operating conditions and ambient conditions. In the event of various device components interacting, the operating instructions for all other devices should also be taken into account.

- Check on display.
- Check on function, in conjunction with downstream components.
- Check of pressurized connection pipes for seal condition.
- Check of electrical connections.

## **9.3 Cleaning and maintenance**

Cleaning is carried out using a non-aggressive cleaning agent, respecting the protection category of the device.

# **10 Faults**

## **10.1 Safety**

Defective or faulty pressure gauges put the operational safety and process safety of the plant at risk, and can lead to a risk of injury to persons, the environment or the plant.

## **10.2 Conduct in the event of faults**

All defective or faulty devices must be taken out of service. If a repair is required, the device must be sent directly to our Repairs Department. We request that all returns of devices are agreed with our Service Department.

## **10.3 Fault table**

Possible situations indicating a fault:

- Jerky or random movement of the pointer
- Pointer does not set to zero for pressure-less display
- Bent or loose pointer
- Cracked window
- Leaks when the device is filled
- Damage to housing
- Indications that the measurement system seal is imperfect (discoloration to dial or of filling liquid)
- Extended storage at temperatures above 60 °C

In these instances, replacement of the gage is always required.

## **10.4 Conduct following fault rectification**

See Chapter 0

Mounting/Installation.

## 11 Removal, disposal

### 11.1 Safety



Residues of measuring media in and on removed gauges can constitute a risk to people, the environment and equipment. Adequate precautionary measures must be adopted. If necessary, the devices must be cleaned thoroughly (see advice in safety data sheets).

### 11.2 Removal

- When undertaking servicing work on the device, the pressure lines must be depressurized and the plant secured against being switched on again.
- Remove the gauge using a suitable tool.







### 11.3 Disposal



Please help to protect the environment and dispose of or recycle the devices and components used in accordance with the applicable regulations.

## 12 Appendix

### 12.1 Declaration of conformity

|   |  |   |   |
|---|--|---|---|
|    | <b>EU-Konformitätserklärung</b><br><b>EU-Declaration of Conformity</b><br>DIN EN ISO IEC 17050-1:2010  |   | <br>Management<br>Systems<br>ISO 9001:2015 |
| <b>Ashcroft Instruments GmbH</b><br>Max-Planck-Straße 1<br>52499 Baesweiler   |  |   |   |
| erklärt in alleiniger Verantwortung, dass das mit CE gekennzeichnete Produkt<br><i>declares in sole responsibility that the product marked with CE</i>  |  |   |   |
| Gerät:<br>Equipment:  | Differenzdruckmanometer vom Typ F5510<br>Differential Pressure Gauge Type F5510  |   |   |
| Kennzeichnung:<br>Marking:  |   II 2G Ex h IIC T4 Gb<br>II 2D Ex h IIC T95°C Db<br>Ta = -20°C to +60°C |   |   |
| Herstellungsdatum:<br>Date of manufacture:  | ab 04.11.2019<br>from 04.11.2019   |   |   |
| die grundlegenden Sicherheits- und Schutzanforderungen erfüllen, in Übereinstimmung mit<br>den unten genannten Richtlinien und Normen. Die Konformitätsaussage bezieht sich auf die<br>Konzeption und Fertigung des oben genannten Produktes.<br><i>the fundamental safety and protection requirements passed in accordance with the guidelines and<br/>         standards listed below. This declaration of conformity refers to the design and manufacture of the<br/>         above product.</i> |  |   |   |
| Richtlinie<br>Directive   | 2014/34/EU „Geräte und Schutzsysteme zur bestimmungs-<br>gemäßen Verwendung in explosionsgefährdeten Bereichen“<br><i>“equipment and protective systems intended for use in potentially explosive atmospheres”</i>                         |   |   |
| Angewendete harmonisierte<br>Normen<br>Used harmonized Standards  | EN 60079-0:2014, EN 60079-31:2014, EN ISO 80079-36:2016,<br>EN ISO 80079-37:2016   |   |   |
| Benannte Stelle<br>Notification Body  | Code number of notified Body: 0044<br>TÜV NORD CERT<br>Langemarkstrasse 20, 45141 Essen, Germany   |   |   |
| Hinterlegungsnummer:<br>Dossier File No.:   | 35078199   |   |   |
| Richtlinie<br>Directive   | <sup>(1)</sup> 2014/68/EU „Druckgeräte richtlinie“<br><i>„Pressure Equipment Directive“</i>  |   |   |
| Angewendete Prüfnormen:<br>Used test standards:   | EN 837-1,2,3:1996, DIN 16003:2018  |   |   |
| <sup>(1)</sup> PS >200 bar und V <0,1l, Artikel 4 Drucktragende Ausrüstungsteile, Modul A<br><i>PS &gt;200 bar and V &lt;0,1l, Article 4 Pressure Accessories, Module A</i>   |  |   |   |
| Richtlinie<br>Directive   | 1907/2006 „Verordnungen zur Registrierung, Bewertung,<br>Zulassung und Beschränkung chemischer Stoffe (REACH)“<br><i>“Regulations on the Registration, Evaluation, Authorisation and Restriction of Chemicals<br/>(REACH)”</i>             |   |   |
| Besonders<br>besorgniserregende Stoffe<br>Substances of Very High Concern   | SVHC-Liste der Europäischen Chemikalienagentur ECHA<br>SVHC List of the European Chemicals Agency ECHA<br><a href="http://echa.europa.eu/candidate-list-table">http://echa.europa.eu/candidate-list-table</a>                              |   |   |
| Keines unserer Produkte wird mit Chemikalien hergestellt, die als besonders besorgniserregend<br>identifiziert wurden.<br><i>None of our products are produced with chemicals identified as Substance of very high concern identification.</i>  |  |   |   |
| Ashcroft Instruments GmbH   | Fon: +49 (0)2401-808-888   | eMail: <a href="mailto:customer.service@ashcroft.com">customer.service@ashcroft.com</a> | <a href="http://www.ashcroft.eu">www.ashcroft.eu</a>  |
|    |   |   |   |

|  |  |
|--|--|
| <b>Richtlinie</b><br><i>Directive</i>  | 2011/65/EU „Richtlinie zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten“<br><i>"Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment"</i><br>2015/863/EU „Änderung von Anhang II der Richtlinie 2011/65/EU“<br><i>"Amending Annex II to Directive 2011/65/EU"</i>  |
| <b>Einstufung</b><br><i>Classification</i>   | Einstufung des Produktes nach Anhang II Punkt 9 der Richtlinie „Überwachungs- und Kontrollinstrumente einschließlich Überwachungs- und Kontrollinstrumente in der Industrie“<br><i>Classification of the product according to Annex II, point 9 of the Directive "Monitoring and control instruments, including industrial monitoring and control instruments"</i>   |
| <b>Stoffbeschränkungen</b><br><i>Substance restrictions</i>  | <b>Beschränkungen und Höchstkonzentrationen in homogenen Werkstoffen in Gewichtsprozent:</b><br><i>Limitations and maximum concentrations in homogeneous materials in percent by weight:</i><br><br>Blei (0,1 %) <i>Lead (0,1 %)</i><br>Quecksilber (0,1 %) <i>Mercury (0,1 %)</i><br>Cadmium (0,01 %) <i>Cadmium (0,01 %)</i><br>Sechswertiges Chrom (0,1 %) <i>Hexavalent chromium (0,1 %)</i><br>Polybromierte Biphenyle (PBB) (0,1 %) <i>Polybrominated biphenyls (PBB) (0,1 %)</i><br>Polybromierte Diphenylether (PBDE) (0,1 %) <i>Polybrominated diphenyl ethers (PBDE) (0,1 %)</i><br>Di(2-ethylhexyl)phthalat (DEHP) (0,1 %) <i>Bis(2-ethylhexyl) phthalate (DEHP) (0,1 %)</i><br>Butylbenzylphthalat (BBP) (0,1 %) <i>Butyl benzyl phthalate (BBP) (0,1 %)</i><br>Dibutylphthalat (DBP) (0,1 %) <i>Dibutyl phthalate (DBP) (0,1 %)</i><br>Diisobutylphthalat (DIBP) (0,1 %) <i>Diisobutyl phthalate (DIBP) (0,1 %)</i> |
| Das oben benannte Produkt erfüllt die derzeit gültigen Vorschriften der Richtlinie 2011/65/EU des Europäischen Parlaments und des Rates vom 8. Juni 2011 sowie der Delegierten Richtlinie 2015/863/EU der Kommission vom 31.03.2015.<br><i>The above-mentioned product comply with the currently valid provisions of Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 and the Commission Delegate Directive 2015/863/EU of 31 March 2015.</i> |  |

 Baesweiler, den 10.02.2020  
 Ort und Datum  
*Place and date*
  
 Werksleiter  
*Operations Manager*

## 12.2 Data sheet for the F5510 Differential Pressure Gauge

More detailed datasheets are available direct from the manufacturer (see 1.6 Manufacturer address, customer services).

The table below contains an overview of the individual documents.

| <b>Model</b> | <b>Description</b>                      | <b>Document</b> |
|--------------|---|-----------------|
| F5510        | Differential pressure gauge model F5510 | G1.F5510        |