

IUT-10 / IUT-11

Universal transmitter for applications in hazardous environments

GB

Universaltransmitter für den Einsatz in explosionsgefährdeten Bereichen

D



IUT-10



IUT-11

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WIKI

 Part of your business

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1 General Safety Instructions



- *Select the appropriate pressure transmitter with regard to scale range, performance and specific measurement conditions prior to installing and starting the instrument.*

- *Observe the relevant national regulations (e.g.: EN 50178, NEC, CEC) and observe the applicable standards and directives for special applications (e.g. with dangerous media such as oxygen, acetylene, flammable gases or liquids and toxic gases or liquids and with refrigeration plants or compressors).*

If you do not observe the appropriate regulations, serious injuries and/or damage can occur!

- ***Open pressure connections only after the system is without pressure!***
- *Please make sure that the pressure transmitter is only used within the overload threshold limit at all times!*
- *Observe the ambient and working conditions outlined in chapter 6 "Technical Data"*
- *Ensure that the pressure transmitter is only operated in accordance with the provisions, i.e. as described in the following instructions.*
- *Do not interfere with or change the pressure transmitter in any other way than described in these operating instructions...*
- *Remove the pressure transmitter from service and mark it to prevent it from being used again accidentally, if it becomes damaged or unsafe for operation..*
- ***Take precautions with regard to remaining media in removed pressure transmitter. Remaining media in the pressure port may be hazardous or toxic!***
- *Have repairs performed by the manufacturer only.*
- *Consider the details given in the EC-type examination certificate as well as the respective specifications for explosion hazard use of the country concerned (e.g.: IEC 60079, NEC, CEC). If you do not observe these stipulations, serious injuries and/or damage can occur.*



Other important safety guidelines can be found in the different sections of this instruction manual.

2 Special Intrinsic Safety Instructions

2.1 Protection of diaphragm



As soon as the diaphragm of an instrument gets damaged, absolutely no intrinsic safety can be guaranteed any longer! Thus the diaphragm must not come in contact with abrasive substances! The diaphragm must be protected against pressure peaks and must not be touched by tools! Information about material consistency against corrosion and diffusion can be found in our WIKA Handbook, 'Pressure and Temperature Measurement' (German: ISBN 3-9804074-0-3, English: ISBN 3-9804074-1-1).

2.2 Special wiring advice



The housing must always be connected to earth to protect the instrument against electromagnetic fields and electrostatic charges.

The cables and wires must not be damaged.

Cables for applications in **Zone 1 and 2** or **Zone 21 and 22** must be checked with a test voltage between conductor/earth, conductor/screen, screen/earth of more than 500 V (AC).

Flying leads with fine wires must be covered by an end splice (cable preparation). Both the internal capacity and inductivity must be considered.

Conductive screens may only be connected to earth one-sided and outside the hazardous area.

2.3 Connection to Zone 0



(In general **Zone 0** is given when the instrument is surrounded by a mixture of explosive gases more than 1.000 hours per year = continuous hazard. The transmitter may only be operated under **Zone 0** conditions, as long as an atmospherical pressure of 0.8 to 1.1 bar is guaranteed).

The circuits must be of type Ex ia.

The ingress protection must comply to IP 67 according to IEC 529.

2.4 Special precaution for connection to Zone 0 and or Zone 20



Make absolutely sure to follow the advice given in the IEC publication 60 529 for connection to **Zone 0** and/or **Zone 20** for IP 67 pressure connections!

Installation in non-metallic vessels:

All metallic parts reaching into **Zone 0** and/or **Zone 20** must be grounded.

The intrinsically safe circuit must be decoupled from the regular circuit.

If the mounting position is less than 1m away from the transition into **Zone 0** and/or **Zone 20** an overvoltage protection must be integrated. This can either be done within the transmitter (option: overvoltage protection), or outside the transmitter by the customer himself.

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2.5 Instructions for temperature ranges



Warning

Observe the permissible surface temperatures applicable for this range according to the defined temperature classes.

Observe the maximum temperature value (of the temperature range defined under item 15.3.4 in the EC type test certificate at the hexagon of the process connection.

Protect the pressure transmitter against touching or affix a warning notice.

Insulate heat sources thermally from the pressure transmitter (e.g. pipes or tanks).

2.6 Special instructions for dust explosion protection



Warning

Ensure that under hazardous dust environments the pressure transmitter is mounted in a shielded section and protect it against shocks.

When installing the pressure transmitter or the cable gland into areas which require category 1D equipment, ensure that ingress protection IP 6X according to IEC 60 529 is guaranteed.

Observe the EN 50281-1-2 in relation to e.g. dust deposits and temperature.

The permissible ambient temperatures as well as the maximum surface temperatures are to be taken from the EC type test certificate.

3 EC-Declaration of Conformity



EG-Konformitäts- erklärung

Dokument Nr.:
11135212.01

Wir erklären in alleiniger
Verantwortung, dass die mit **CE**
gekennzeichneten Produkte

Typen:
IUT-10 / IUT-11

Beschreibung:
**Universaltransmitter
UniTrans**

gemäß gültigem Datenblatt:
PE 86.02

die grundlegenden Anforderungen
der folgenden Richtlinie(n)
erfüllen:

97/23/EG (DGRL) ⁽¹⁾,
89/336/EGW (EMV),
94/9/EG (ATEX) ⁽²⁾

Die Geräte wurden entsprechend
den folgenden Normen geprüft:

EN 61326:1997 +A1 +A2 +A3
EN 50014:1997 +A1 +A2
EN 50020:2002
EN 50281-1-1:1998 +A1
EN 20284:1999

- (1) PS > 200 bar:
Bewertungsverfahren Modul A
(2) EG-Baumusterprüfbescheinigung
DMT 99 ATEX E 093 von EXAM BGG
Prüf- und Zertifizier GmbH, Bochum
(Reg.-Nr. 0158).

WIKAI Alexander Wiegand GmbH & Co. KG
Klingenberg, 2006-05-08

Geschäftsbereich TRONIC
Company division TRONIC
Ressort TRONIC

i. V. Stefan Richter

EC Declaration of Conformity

Document No.:
11135212.01

We declare under our sole
responsibility that the **CE**
marked products

Models:
IUT-10 / IUT-11

Description:
**Universal Pressure Transmitter
UniTrans**

according to the valid data-sheet:
PE 86.02

are in conformity with the essential
requirements of the directive(s)

97/23/EC (PED) ⁽¹⁾,
89/336/EEC (EMC),
94/9/EC (ATEX) ⁽²⁾

The devices have been tested
according to the standards:

EN 61326:1997 +A1 +A2 +A3
EN 50014:1997 +A1 +A2
EN 50020:2002
EN 50281-1-1:1998 +A1
EN 20284:1999

- (1) PS > 200 bar:
assessment procedure Module A
(2) EC-type-examination certificate
DMT 99 ATEX E 093 of EXAM BGG
Prüf- und Zertifizier GmbH, Bochum
(reg. no. 0158).

Qualitätsmanagement TRONIC
Quality management TRONIC
Management de la qualité TRONIC

i. A. Thomas Gerling

Déclaration de Conformité CE

Document No.:
11135212.01

Nous déclarons sous notre seule
responsabilité que les appareils
marqués **CE**

Types:
IUT-10 / IUT-11

Description:
**Transmetteur de pression
UniTrans**

selon fiche technique valide:
PE 86.02

sont conformes aux exigences
essentielles de la (les) directive(s)

97/23/CE (DESP) ⁽¹⁾,
89/336/CEE (CEM),
94/9/CE (ATEX) ⁽²⁾

Les appareils ont été vérifiés
suivant les normes:

EN 61326:1997 +A1 +A2 +A3
EN 50014:1997 +A1 +A2
EN 50020:2002
EN 50281-1-1:1998 +A1
EN 20284:1999

- (1) PS > 200 bar:
procédure d'évaluation Module A
(2) Attestation d'examen CE de type
DMT 99 ATEX E 093 de EXAM BGG
Prüf- und Zertifizier GmbH, Bochum
(reg. no. 0158).

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Kommanditgesellschaft:
Sitz Klingenberg
Amtsgericht Aschaffenburg
HRA 1819

Komplementärin: WIKAI Alexander Wiegand Verwaltungs GmbH
Sitz Klingenberg
Amtsgericht Aschaffenburg HRB 306
Geschäftsführer: Alexander Wiegand

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4 EC-Type Examination CertificateTranslation by **WIKAI****[Ex]****DMT****EC TYPE TEST CERTIFICATE**

- (1)
- (2) - Guideline 94/9/EG -
Instruments and Protective Systems for the Use in Hazardous Areas in Accordance with the Regulation
- (3) **DMT 99 ATEX E 093**
- (4) Instrument: Pressure Transmitter UniTrans model IUT-1*.....
- (5) Manufacturer: WIKAI Alexander Wiegand GmbH & Co.
- (6) Address: D 63911 Klingenberg / Main
- (7) The design of this instrument as well as the various approved versions are laid down in the appendix to this type test certificate.
- (8) In accordance with the Article 9 of the Directives of the European Communities of March 23, 1994 (94/9/EG), the certification agency of the DMT Association for Research and Testing mbH (DMT Gesellschaft für Forschung und Prüfung mbH), designated agency No. 0158, certifies the conformity of the instrument with the fundamental safety and health requirements for the conception and the construction of instruments and protective systems for the use in hazardous areas in accordance with the regulations mentioned in appendix II of the guideline. The results of this test have been laid down in the confidential test report No. BVS PP 99.2048 EG.
- (9) The fundamental safety and health requirements are complied with by conforming to:
EN 50014:1997 General regulations
EN 50020:1994 (VDE 0170/0171 part 7/4.96) Intrinsic safety, 'i'
EN 50284:1999 Group II, category 1G
- (10) Special conditions for the safe use of the instrument are referred to in the annex to this certificate, if the sign „X“ is attached to the certificate's number.
- (11) This EC type test certificate refers only to the conception and the construction of the instrument described. Further requirements of the guideline 94/9/EG have to be complied with for the production and distribution of the instrument.
- (12) The instrument is to be provided with the following marks:

[Ex] II ½ G Eex ia IIC T4/T5/T6DMT Association for Research and Testing GmbH
DMT Gesellschaft für Forschung und Prüfung mbH
Essen, November 24, 1999(Signature illegible)
DMT certification agency(Signature illegible)
Head of department in chargePage 1 of 3, DMT 99 ATEX E 093
This certificate may only be distributed in unaltered form.
Am Technologiepark 1, 45307 Essen, Telephone ++49-201-172-1416, Telefax ++49-201-172-1716

Translation by **WIKAI**

DMT

(13) Annex to

(14) **EC TYPE TEST CERTIFICATE**

DMT 99 ATEX E 093

(15) 15.1 Designation and Model

Pressure Transmitter UniTrans, Model IUT-1*-*****

In the full designation letters and figures identifying the details of the instrument type will be inserted instead of the "*".

Model IUT-1*-*****

output signal, pressure range, process connection

0 = standard or

1 = flush diaphragm

15.2 Description

The pressure transmitter can be used for continuous measurement of hydrostatic filling levels and the transformation of the measured values into a proportional electrical signal. The pressure transmitter consists of a processing unit Model EMP-P**-Ex (DMT 99 ATEX E 92 U), a display Model A-IRU-1-* (DMT 99 ATEX E 091 U) and a sensor Model TIS** (DMT 99 ATEX E 069 U). The connection to the intrinsically safe power supply is carried out via a cable or a plug.

15.3 Electrical, mechanical and thermal data

15.3.1 Supply and signal circuit (clamp '+' and '-' or plug 1 and 2) for the connection to an intrinsically circuit with the following maximum values:

Voltage:	U _I DC	= 30 V
Current:	I _I	= 100 mA
	for temperature class T4	= 100 mA
	for temperature class T5 and T6	= 93 mA

Load

for temperature class T4	= 750 mW
for temperature class T5 and T6	= 697 mW
effective internal capacity C _i	= 9 nF
effective internal inductivity L _i	= very low

15.3.2 Test circuit (clamps 'I' and '+') only for temporary connection to a potential free ammeter.

Page 2 of 3, DMT 99 ATEX E 093

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Translation by **WIKA****DMT**

15.3.3 Ambient temperature range T_a
for temperature class T4 = $-40\text{ °C} \leq T_a \leq +70\text{ °C}$
for temperature class T5 and T6 = $-40\text{ °C} \leq T_a \leq +60\text{ °C}$

15.3.4 Medium temperature
for temperature class T4 < 105 °C
for temperature class T5 and T6 < 60 °C

- (16) Test report
No. BVS PP 99.2084 EG
4 Pages
- (17) Special conditions for a safe operation
Not necessary

Page 3 of 3, DMT 99 ATEX E 093

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Franz-Fischer-Weg 61, 45307 Essen, Telephone (0201)172-1416, Telefax (0201)172-1716

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Translation


1st Supplement

(Supplement in accordance with Directive 94/9/EC Annex III number 6)

to the EC-Type Examination Certificate DMT 99 ATEX E 093

Equipment: Pressure transmitter UniTrans type IUT-1*-*****
Manufacturer: WIKA Alexander Wiegand GmbH & Co. KG
Address: D - 63911 Klingenberg/Main

Description

The pressure transmitter can be modified according to the descriptive documents as mentioned in the pertinent test and assessment report and the following variations are also available:
 type IUT-1*-*.****_**_***A**.*

Test and assessment report

BVS PP 99.2084 EG / N1 as of 28.05.02

Deutsche Montan Technologie GmbH

Essen, dated 28. May 2002

Jockers

DMT-Certification body

Eickhoff

Head of special services unit

We confirm the correctness of the translation from the German original.
 In the case of arbitration only the German wording shall be valid and binding.

45307 Essen, 28. May 2002
 BVS-Schu/Ar A 20020239

Deutsche Montan Technologie GmbH

Jockers
 DMT-Certification body

Eickhoff
 Head of special services unit

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Translation
2nd Supplement

(Supplement in accordance with Directive 94/9/EC Annex III number 6)

**to the EC-Type Examination Certificate
DMT 99 ATEX E 093**

Equipment: Pressure transmitter UniTrans type IUT-1*-...
Manufacturer: WIKAI Alexander Wiegand GmbH & Co. KG
Address: D - 63911 Klingenberg/Main

Description

The Pressure transmitter UniTrans type IUT-10-*.***.***A****** or type IUT-11-*.***.***A****X** with modified aluminium enclosure meets category 1/2 G and category 1/2 D and gets the marking:

Pressure transmitter UniTrans

type IUT-10-*.***.***A****X**



X - 1/2 G, 1/2 D
 A - aluminium enclosure, modified for dust

type IUT-11-*.***.***A****X**



X - 1/2 G, 1/2 D
 A - aluminium enclosure, modified for dust

The Essential Health and Safety Requirements of the modified equipment are assured by compliance with:

EN 50014:1997 + A1 - A2 General requirements
 EN 50020:2002 Intrinsic safety 'i'
 EN 50284:1999 Group II Category 1G
 EN 50281-1-1:1998 + A1 Dust explosion protection

Parameters

Electrical data without change

Page 1 of 3 to DMT 99 ATEX E 093 / N2

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Dinsendahlstrasse 9 44809 Bochum Germany Phone +49 234/3696-105 Fax +49 234/3696-110
 (until 31.05.2003: Deutsche Montan Technologie GmbH Am Technologiepark I 45307 Essen Germany)



BBG Prüf- und Zertifizier GmbH

Thermal data

ambient temperature range

for temperature class T4

$-40^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$

for temperature class T5 und T6

$-40^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$

process temperature

for temperature class T4

$< 105^{\circ}\text{C}$

for temperature class T5 und T6

$< 60^{\circ}\text{C}$

Maximum temperature at the process connection for applications requiring category 1/2D equipment

75°C

Maximum surface temperature T

for temperature class T4

at the sensor (category 1D)

$\leq 130^{\circ}\text{C}$

at the enclosure (category 2D)

$\leq 75^{\circ}\text{C}$

for temperature class T5

at the sensor (category 1D)

$\leq 95^{\circ}\text{C}$

at the enclosure (category 2D)

$\leq 75^{\circ}\text{C}$

for temperature class T6

at the sensor (category 1D)

$\leq 80^{\circ}\text{C}$

at the enclosure (category 2D)

$\leq 75^{\circ}\text{C}$

Degrees of protection according to EN 60529

IP6X

The marking of the equipment shall include the following:

existing types



II 1/2G EEx ia IIC T4/T5/6

type IUT-10-*...*A***X** or type IUT-11-*...*A***X**



II 1/2G EEx ia IIC T4/T5/6

II 1/2D IP6X T see manual

Test and assessment report

BVS PP 99.2084 EG as of 14.12.2004

EXAM BBG Prüf- und Zertifizier GmbH

Bochum, dated 14. Dezember 2004

Signed: Dr. Jockers

Signed: Dr. Eickhoff

Certification body

Special services unit

Page 2 of 3 to DMT 99 ATEX E 093 / N2

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(until 31.05.2003: Deutsche Montan Technologie GmbH Am Technologiepark 1 45307 Essen Germany)

2266939.05 DGB 06/2006



We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

44809 Bochum, 08.06.2005
BVS-Hk/Mi E 0816/05

EXAM BBG Prüf- und Zertifizier GmbH



Certification Body

Special services unit

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(until 31.05.2003: Deutsche Montan Technologie GmbH Am Technologiepark 1 45307 Essen Germany)


Translation
3rd Supplement

(Supplement in accordance with Directive 94/9/EC Annex III number 6)

**to the EC-Type Examination Certificate
DMT 99 ATEX E 093**

Equipment: Pressure transmitter UniTrans type IUT-1*-...
Manufacturer: WIKA Alexander Wiegand GmbH & Co. KG
Address: 63911 Klingenberg/Main, Germany

Description

The pressure transmitter can be modified according to the descriptive documents as mentioned in the pertinent test and assessment report.

The Essential Health and Safety Requirements of the modified equipment are assured by compliance with:

EN 50014:1997 + A1 – A2 General requirements
 EN 50020:2002 Intrinsic safety 'i'
 EN 50284:1999 Group II Category 1G
 EN 50281-1-1:1998 + A1 Dust explosion protection

The marking of the equipment shall include the following:



II 1/2G EEx ia IIC T4/T5/6
II 1/2D IP6X T see manual

Test and assessment report

BVS PP 99.2084 EG as of 28.07.2005

EXAM BBG Prüf- und Zertifizier GmbH

Bochum, dated 28. July 2005

Signed: Migenda

Certification body

Signed: Dr. Eickhoff

Special services unit

Page 1 of 2 to DMT 99 ATEX E 093 / ND

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 (until 31.05.2003: Deutsche Montan Technologie GmbH Am Technologiepark 1 45307 Essen Germany)

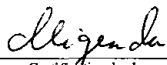
2266939.05 DGB 06/2006



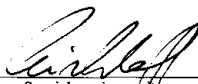
We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

44809 Bochum, 28. July 2005
BVS-Schu/Kw A 20050409

EXAM BBG Prüf- und Zertifizier GmbH



Certification body



Special services unit

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Page 2 of 2 to DMT 99 ATEX E 093 / N3

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Dimendahlstrasse 9 44809 Bochum Germany Phone +49 234/3696-105 Fax +49 234/3696-110
(until 31.05.2003: Deutsche Montan Technologie GmbH Am Technologiepark 1 45307 Essen Germany)

Translation by **WIKAI**
[Ex]
DMT
EC TYPE TEST CERTIFICATE

(1)

- Guideline 94/9/EG -

(2)

Instruments and Protective Systems for the Use in Hazardous Areas in Accordance with the Regulation

(3)

DMT 99 ATEX E 091 U

(4)

Component: Display model IRU-1*-

(5)

Manufacturer: WIKAI Alexander Wiegand GmbH & Co.

(6)

Address: D 63911 Klingenberg / Main

(7)

The design of this component as well as the various approved versions are laid down in the appendix to this type test certificate.

(8)

In accordance with the Article 9 of the Directives of the European Communities of March 23, 1994 (94/9/EG), the certification agency of the DMT Association for Research and Testing mbH (DMT Gesellschaft für Forschung und Prüfung mbH), designated agency No. 0158, certifies the conformity of the instrument with the fundamental safety and health requirements for the conception and the construction of instruments and protective systems for the use in hazardous areas in accordance with the regulations mentioned in appendix II of the guideline. The results of this test have been laid down in the confidential test report No. BVS PP 99.2082 EG.

(9)

The fundamental safety and health requirements are complied with by conforming to:

EN 50014:1997 General regulations
EN 50020:1994 (VDE 0170/0171 part 7/4.96) Intrinsic safety „I“

(10)

The symbol „U“ behind the certificate number determines that this certificate must not be taken for a certificate written for an instrument or a protective system. This certificate can only be used as a basis for the approval of an instrument or protective system.

(11)

This EC type test certificate refers only to the conception and the construction of the component described. Further requirements of the guideline 94/9/EG have to be complied with for the production and distribution of the instrument.

(12)

The instrument is to be provided with the following marks:

[Ex] II 2G EEx ia IIC T4/T5/T6

DMT Association for Research and Testing GmbH
DMT Gesellschaft für Forschung und Prüfung mbH
Essen, November 15, 1999

(Signature illegible)

DMT certification agency

(Signature illegible)

Head of department in charge

Page 1 of 2, DMT 99 ATEX E 091 U

This certificate may only be distributed in unaltered form.

Am Technologiepark 1, 45307 Essen, Telephone ++49-201-172-1416, Telefax ++49-201-172-1716

2266939.05 DGB 06/2006

Translation by **WIKAI**

DMT

(13) Annex to

(14) **EC TYPE TEST CERTIFICATE**

DMT 99 ATEX E 091 U

(15) 15.1 Model name for display model A-IRU-1-*-*

In the full designation letters and figures identifying the details of the instrument type will be inserted instead of the "****".

15.2 Description

The display is mounted to intrinsically safe instrument for the visualisation of process data. The electronic components are installed in a housing of plastic (surface resistance $\leq 10^9 \Omega$). This housing is used as cover of the intrinsically safe instrument.

15.3 Electrical, mechanical and thermal data

for the connection to an intrinsically safe circuit with the following maximum values:

Voltage:	Ui DC	=	9.2 V
Current:	Ii	=	115 mA
max. Load			
for temperature class	T4 and T5	=	0.133 W
for temperature class	T6	=	0.066 W
effective internal capacity	Ci	=	2 nF
effective internal inductivity	Li	=	very low

Ambient temperatures:

temperature class T4 -40 °C ... + 70 °C

temperature class T5 and T6 -40 °C ... + 60 °C

(16) Test report
No. BVS PP 99.2082 EG
3 Pages

(17) Special conditions for a safe operation

17.1 The display can be used under the following ambient temperatures:

temperature class T4 -40 °C ... + 70 °C

temperature class T5 and T6 -40 °C ... + 60 °C

17.2 When the display is mounted to an intrinsically safe instrument the result must be checked and approved. For the resulting complete instrument a minimum overall ingress protection of IP 20 according to EN 60529 must be guaranteed.

Page 2 of 2, DMT 99 ATEX E 091 U

This certificate may only be distributed in unaltered form.

Franz-Fischer-Weg 81, 45307 Essen, Telephone (0201)172-1416, Telefax (0201)172-1716

Translation by **WIKAI****DMT****1st Addendum**

(addition according to Guideline 94/9/EG, appendix III, number 6)

**to the EC TYPE TEST CERTIFICATE
DMT 99 ATEX E 091 U**

Component: Display model IRU-1*-*
Manufacturer: WIKAI Alexander Wiegand GmbH & Co.
Address: D 63911 Klingenberg / Main

Description

The display can also be manufactured in compliance with the test documents mentioned in the related test certificate No. BVS PP 99.2082 EG / N1

Test report

No. BVS PP 99.2082 EG / N1, edition 04/28/2000, 3 Pages

DMT Deutsche Montan Technologie GmbH
DMT Association for Research and Testing GmbH
Essen, April 24, 2000

(Signature illegible)

DMT certification agency

(Signature illegible)

Head of department in charge

Page 1 of 1, of the addendum to the DMT 99 ATEX E 091 U
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Translation

**2nd Supplement**

(Supplement in accordance with Directive 94/9/EC Annex III number 6)

**to the EC-Type Examination Certificate
DMT 99 ATEX E 091 U**

Equipment: Display type A-IRU-1-*.*

Manufacturer: WIKAI Alexander Wiegand GmbH & Co. KG

Address: D - 63911 Klingenberg/Main

Description

The display can be modified according to the descriptive documents as mentioned in the pertinent test and assessment report

Test and assessment report

BVS PP 99.2082 EG / N2 as of 28.05.02

Deutsche Montan Technologie GmbH

Essen, dated 28. May 2002

signed: Jockers
DMT-Certification body

signed: Eickhoff
Head of special services unit

We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

45307 Essen, 28. May 2002
BVS-Schu/Ar A 20020238

Deutsche Montan Technologie GmbH

DMT-Certification body

Head of special services unit



Translation



3rd Supplement

(Supplement in accordance with Directive 94/9/EC Annex III number 6)

to the EC-Type Examination Certificate DMT 99 ATEX E 091 U

Equipment: Display type A-IRU-I-**-*

Manufacturer: WIKA Alexander Wiegand GmbH & Co. KG

Address: D - 63911 Klingenberg/Main

Description

The display can be also be manufactured according to the descriptive documents as mentioned in the pertinent test and assessment report

The Essential Health and Safety Requirements of the modified equipment are assured by compliance with:

EN 50014:1997+A1-A2 General requirements
EN 50020:1994 Intrinsic safety 'i'

Test and assessment report

BVS PP 99.2082 EG as of 09.04.2003

Deutsche Montan Technologie GmbH

Essen, dated 09. April 2003

signed: Jockers
DMT-Certification body

signed: Eickhoff
Head of special services unit

We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

45307 Essen, 09.04.2003
BVS-Schu/Mi A 20020609

Deutsche Montan Technologie GmbH

Olligenda
DMT-Certification body

Eickhoff
Head of special services unit

Page 1 of 1 to DMT 99 ATEX E 091 U / N3
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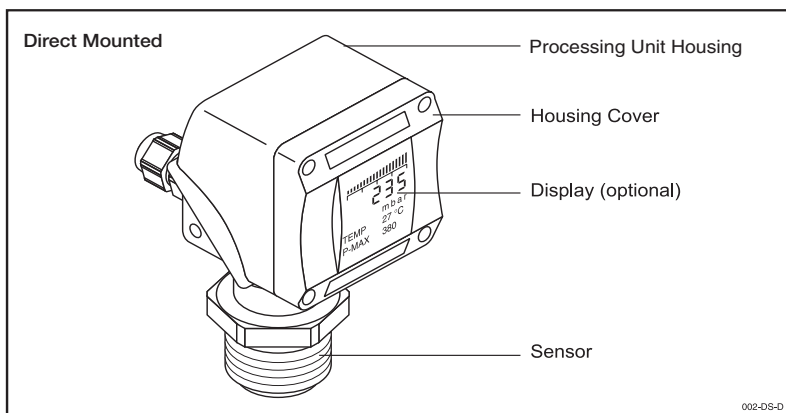
2266939.05 DGB 09/2006

5 Product Description

The intrinsically safe pressure transmitter UniTrans can be used in level control applications as well as for pressure measurement applications in process industry. A variety of process connections, measurement ranges, main boards and display options result in a product for a wide range of applications.

5.1 Construction

The UniTrans consists of a pressure sensor, a control interface unit and a housing cover with optional display. Due to this modular design, different transmitter versions can be mounted (see "Model Key" on page 151).



5.1.1 Pressure Transducer

The pressure transducer has a piezo-resistive or thinfilm measurement cell depending on the pressure range. The sensors are temperature compensated, and have a hermetically welded membrane which is "helium" leak-tested. The pressure transducers do not have internal sealing elements.

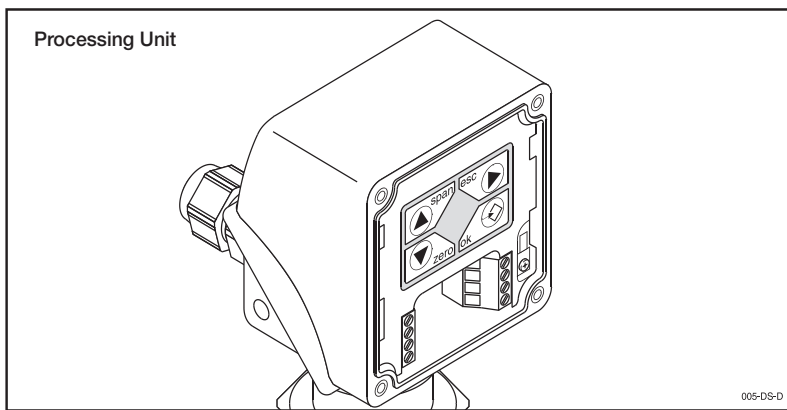
Pressure transducers further distinguish themselves from one another based on their pressure ranges and the different materials of wetted parts. Different process connections can be selected to serve a wide range of applications.



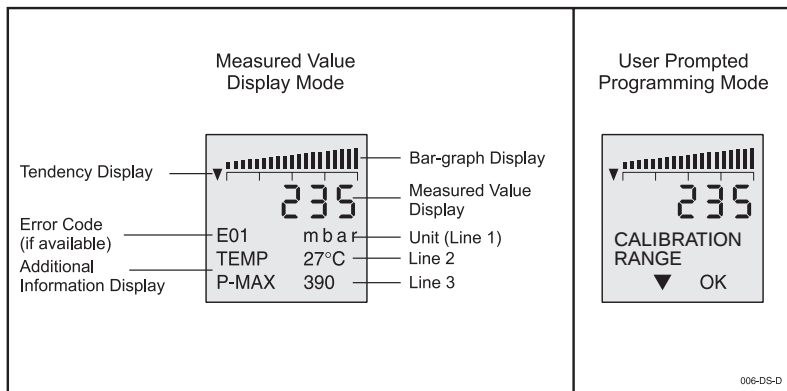
Never exceed the overpressure limit of the respective pressure transducer.

5.1.2 Processing Unit

The processing unit, which is integrated in the housing contains the terminal compartment and the keypad used for programming the transmitter. The four keys must be activated (unlocked) before use. During normal operation the keypad is locked to protect data and functions previously entered. The keypad is automatically locked when no key is hit for 10 minutes. The processing unit converts the digitalized signal from the measuring unit into a standard 4...20 mA current signal.



5.1.3 Display Unit



The measured-value indicator has four digits (in a 7-segment display) + symbols. Below it, is line 1 (16-segment display) used to display error codes and the signal's unit of measure. The unit of measure can be selected by the operator. Measurements over 9999 can not be correctly displayed. Please note this when choosing the unit (e.g. 9999 Pascal = 0,09999 bar). Additional information is displayed in lines 2 and 3 (16-segment display). The operator can enter commands in the programming mode on the display unit by means of menu guided, clear-text prompts.

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Transmitters with displays offer a larger number of programming and processing options. These options include alarm status, damping, signal inversion, tank linearization and diagnostic messages.



Display units can be easily upgraded (see chapter 7.2).

5.2 Function

The pressure transducer converts the existing pressure into an electrical signal. Microelectronics further process the input signal and produce a proportional 4-20 mA standard signal.

The display-version allows programming (parameterization) and the display of extended functions such as inversion, damping, alarm status and linearization.

5.2.1 Functions of Transmitters without Displays

- Calibration of zero and span under pressure (see 8.3)
- Calibration of zero and span without pressure (dry adjustment) (see 8.4)
- Setting the dampening / integration of the output signal 0-40 s (see 8.5)
- Reset to manufacturer's default values (see 8.6)
- Mounting correction of the sensor (beginning with software version 1.05, see 8.4.3)

5.2.2 Functions of Transmitters with Displays

- Settable units of measurement (mbar, bar, psi, mA, %, m, mm WS) (see 9.5.1)
- Volume-related unit of measuring value can be set (l, kg, t, m³, gal, lb) (see 9.5.1)
- Temperature and Min/Max values shown in display (see 9.5.1)
- Nominal pressure range of the sensor shown in display (see 9.5.1)
- Zero and span calibration (with/without pressure) (see 9.5.2)
- Setting of damping / integration of output signal 0-40 s (see 9.5.3)
- Inversion of the output current signal (see 9.5.3)
- Setting the output current value in case of alarm (3.6 mA or 21 mA) (see 9.5.3)
- Setting the limits of the output signal (see 9.5.3)
- Offset of the output signal (see 9.5.3)
- Mounting correction of the sensor (beginning with software version 1.05, see 8.4.3)
- Measuring circuit test function (see 9.5.4)
- Reset functions (see 9.5.4)
- Password activation (see 9.5.4)
- Selecting the language of the display (see 9.5.5)
- Entering of a table function for the linearization of the output signal (see 9.5.6)
- Entering the medium density (see 9.5.6)

5.2.3 Functional features of transmitters with HART-Communication

Universal commands

- Displayed unit can be set (mbar, bar, psi, mA, %, m, mm WS ...) (see chapter 10.2.3)
- Definition of measuring site description and tag number (see 10.2.3)
- Measuring circuit test function (see 10.2.8)
- Temperature and min. / max values can be displayed (see chapter 10.2.3)
- Nominal pressure range of sensor can be displayed (see chapter 10.2.3)
- Cyclic measurement and transmission of the measured value (see chapter 10.2.3)

Common commands

- Calibration of zero point and span (under/without pressure) (see chapter 10.2.4)
- Adjustment of damping/integration of the output signal 0 s ... 40 s (see chapter 10.2.5)

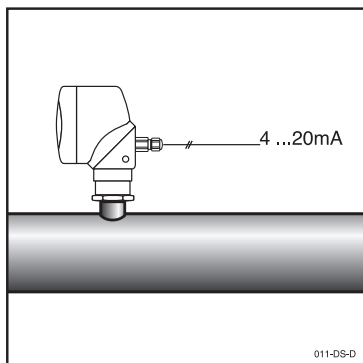
Device-specific commands

- Inversion of output current signal (see chapter 10.2.5)
- Adjustment of alarm values for the output current (3.6 mA or 21 mA) (see chapter 10.2.5)
- Adjustment of output signal limits (see chapter 10.2.5)
- Mounting correction of the sensor (see chapter 10.2.7)
- Reset functions (see chapter 10.2.7)
- Password activation (see chapter 10.2.7)
- Setting up a table function for a linearisation of the output signal (see 10.2.6)
- Entering the medium density (see chapter 10.2.6)
- Volume-related units of measured value can be set (l, kg, t, m3, gal, lb) (see 10.2.3)
- Display and graphical illustration of the measuring value over time (see 10.2.10)

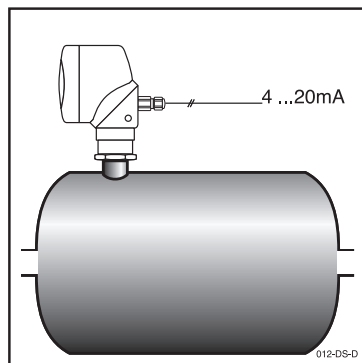
5.3 Installation Examples

The UniTrans is primarily used to monitor the pressure in pipes, technical equipment and tanks. Depending on the pressure range pressures between 20 mbar up to 4000 bar can be measured. The pressure is measured using absolute (against a vacuum) or relative (against external or air pressure) measurement depending on the type of sensor selected.

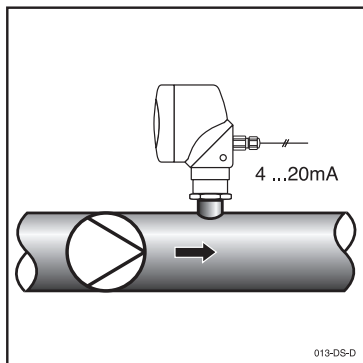
The UniTrans is also used for hydrostatic pressure measurement within liquid filled pipes and containers.



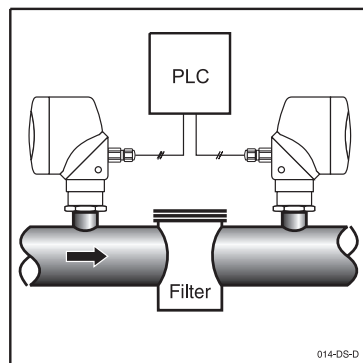
*Process Pressure Measurement:
Used to measure pressure of liquids
or gases in pipelines.*



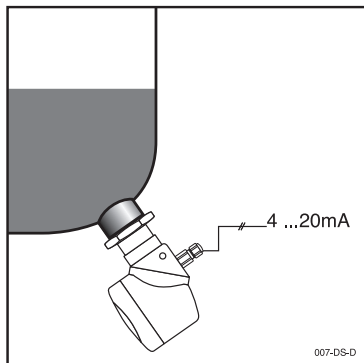
*Process Pressure Measurement:
Used to measure container pressure.*



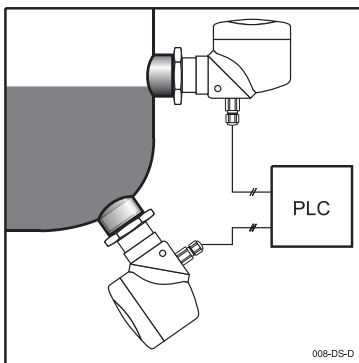
*Process Pressure Measurement:
Installed behind feed pumps for
process control or monitoring of pump
functions.*



*Process Pressure Measurement:
Installed in front of and behind the filter.
Uses the pressure differential for moni-
toring the function or accumulation of dirt
in the filter. Both output signals are pro-
cessed by a PLC or signal converter.*



*Level Control:
Externally mounted
(with front flat diaphragm)*



*Level Control:
Combined pressure and head pressure
are measured by two externally mounted
pressure transducers. The two signals
are analyzed and the differential is cal-
culated by a PLC or suitable signal
converter.*

6 Technical Data

6.1 Input-values

Pressure Ranges (Absolute pressure upon request)	/ overpressure limit /	Burst pressure
0 ... 0.4 bar	2	2.4
0 ... 1,6 bar	10	12
0 ... 6 bar	35	42
0 ... 16 bar	80	96
0 ... 40 bar	80	400
0 ... 100 bar	200	800
0 ... 250 bar	500	1200
0 ... 600 bar	1200	2400
0 ... 1.000 bar	1500	3000
0 ... 1,600 bar	2000	4000
0 ... 2,500 bar	3000	5000
0 ... 4,000 bar	4400	7000
-1 ... +0 bar*	2	2.4
-1 ... +0,6 bar*	10	12
-1 ... +3 bar*	35	42
-1 ... +5 bar*	35	42
-1 ... +15 bar*	80	96
* only relative pressure		
Do not exceed the nominal pressure!		

6.2 Output-values

Output signal	4 ... 20 mA, two-wire, optionally with modulated HART signal
Accuracy [% of span] (incl. non-linearity, hysteresis, non-repeatability, zero signal and full scale error)	≤ 0.10 at ranges ≤ 1000 bar ≤ 0.30 at ranges > 1000 bar
Non-linearity	$\leq 0.05\%$ of span (BFSL) per IEC 61298-2 at ranges ≤ 1000 bar $\leq 0.20\%$ of span at ranges > 1000 bar
Turn down behavior: (1/k) up to 1 : 5 1 : 5 to 1 : 20	no changes of deviation the accuracy must be multiplied by the factor (turn down / 5) example for TD = 1:15, (k = 15) accuracy = $0.10 \cdot (15/5) = 0.3$

Overall deviation (at +10 °C ... +40 °C)	better than 0.15 % of span for pressure ranges of ≤ 1000 bar better than 0.6 % for pressure ranges of > 1000 bar
Load	$R_A \leq (U_B - 12 \text{ V}) / 0.023 \text{ A}$ with R_A in Ohm and U_B in Volt
Fault signal	3.6 mA or 21 mA, programmable
Integration time	0 s, 1 s, 5 s, 20 s, 40 s, programmable
Adjustment of the span	Up to Turn Down 1 : 20
Integrated lightning protection	optional
Zero point adjustment	-2.5 ... 99 %

6.3 Construction

Process connections		
Model IUT-10	G 1/2 1/2 NPT	per EN 837 (max. 1600 bar) per "nominal size for US standard tapered pipe thread NPT" (max. 1600 bar)
	M 16 x 1,5 with sealing cone	(≥ 1600 bar)
	M 20 x 1,5 with sealing cone	(≥ 1600 bar)
	9/16 - 18 UNF innen F 250-C	(≥ 1600 bar)
Model IUT-11	G 1	flush diaphragm with o-ring (0 ... 0.4 up to 0 ... 1.6 bar)
	G 1/2	flush diaphragm with o-ring (0 ... 6 bis 0 ... 600 bar)
	G 1 1/2	flush diaphragm with o-ring (0 ... 0.4 bis 0 ... 16 bar)
Model IUT-11 EHEDG version	G 1	flush diaphragm with o-ring (0...0.4 bis 0...16 bar)

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Materials	
Housing	highly resistive, fiberglass-enforced plastic (PBT); optionally aluminium
Wetted parts (IUT-10) (IUT-11)	CrNi-steel 1.4571 and 2.4711 CrNi-steel 1.4571, o-ring: NBR {Viton or EPDM}; {Hastelloy C4}
Wetted parts (IUT-11 EHEDG version)	CrNi-steel 1.4435
Internal transmission fluid	Standard {Halocarbon oil for oxygen-applications}; {FDA-approved}
Electrical connection per EN 60 529/ IEC529	M 20 x 1.5 cable gland with internal terminal block. For the dust approval version, only cable glands and blind plugs with the appropriate ATEX approval may be used. M12x1 plug, 4-pin (pin allocation: 1+ 3-) (not in conjunction with dust approval) [3/4" NPT female conduit (only with aluminum case)] (see 7.4)
Electric protection	Reverse polarity, overload and short circuit protection

6.4 Auxilliary Power

Power supply	12 ... 36 V DC
 Attention	Please consider the safety related values according to EC-Type Examination Certificate (see chapter 3)

6.5 Ambient Conditions

$$^{\circ}\text{F} = (^{\circ}\text{C} \cdot 1.8) + 32$$

Ambient temperature	– 40 °C ... + 85 °C (– 20 °C ... 70 °C with display)
 Attention	Please consider the safety related values according to EC-Type Examination Certificate (see chapter 3)

Storage temperature	– 40 °C ... + 85 °C (– 35 °C ... 80 °C with display)
Climate class	D per DIN IEC 654-1
Ingress protection per EN 60 529	IP 65 for plastic case IP 67 for aluminium case
EMC per	EN 50 081-2, EN 50 082-2, NAMUR NE 21

6.6 Process Conditions

$$^{\circ}\text{F} = (^{\circ}\text{C} \cdot 1.8) + 32$$

Medium temperatures	– 30 °C ... + 105 °C
 Attention	Please consider the safety related values according to EC-Type Examination Certificate (see chapter 3)

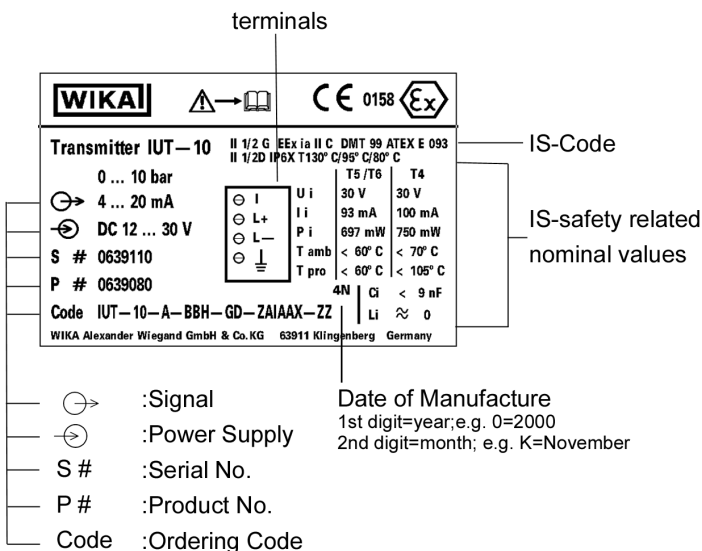
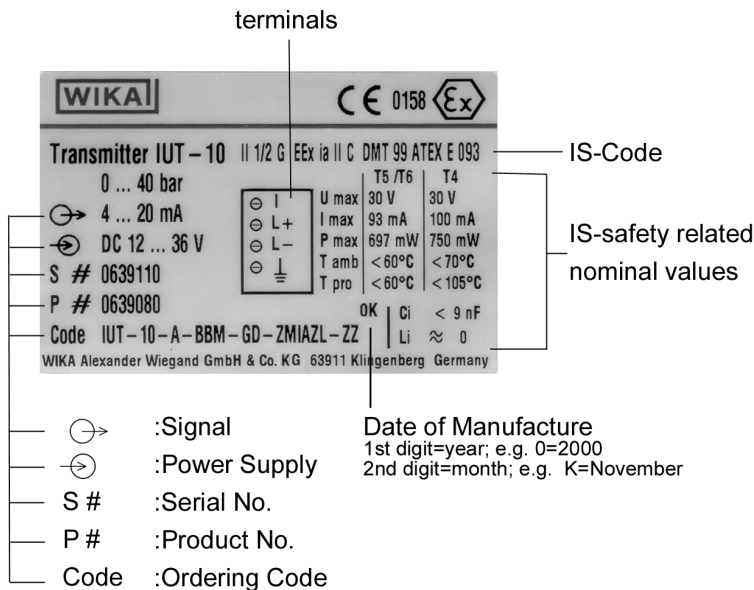
6.7 Safety-related nominal values for IS protection conditions

Ex -protection: The instruments are approved for IS zones, which require the categories 1/2G, 2G,3G. Dust approval 1/2D, 2D, 3D is available as an option.		
Output signal	4 ... 20 mA, two-wire, optionally with modulated HART signal	
Ignition protection class	EEx ia IIC T4	EEx ia IIC T5 / T6
Available as an option	IP 6X T130°C / 95°C / 80°C	
Certificate no. (display)	(DMT 99 ATEX E 091 U)	
Certificate no. (pressure transmitter)	(DMT 99 ATEX E 093)	
Power supply Ui	30 V DC	30 V DC
Short-circuit current Ii	100 mA	93 mA
Maximum load Pi	750 mW	697 mW
Medium temperature	–40°C ... +105°C	–40°C ... +60°C
Ambient temperature	–40°C ... +70°C	–40°C ... +60°C
Internal capacity Ci	9 nF	
Internal inductivity Li	very small	

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Please pay attention to the information in chapter 7.4.

6.8 Product labels (example)



7 Installation

The device should be installed/operated in accordance with the regulations of ElexV, the Device Safety Regulation, this operating manual and generally recognized industry standards.



Warning

Before mounting the transmitter make sure to read the operating manual, as well as the EC-type examination certificate.

7.1 Pressure Transmitter Installation



Warning

The pressure transmitter's diaphragm should not come into contact with hard or sharp objects.

Installation Using a Weld-on Adapter:

- Insert a filler piece (a pressure transmitter dummy) into the weld-on adapter.
- Weld the adapter into the container/pipe wall (section-weld process).
- Remove the filler piece.
- Install the pressure transmitter in the weld-on adapter.

7.2 Display Unit Upgrades

The display unit can be easily upgraded at any time.

- Remove the housing cover and the supporting string.
- Attach the display unit's supporting string to the same place.
- Plug the display unit's connector into the appropriate jack.

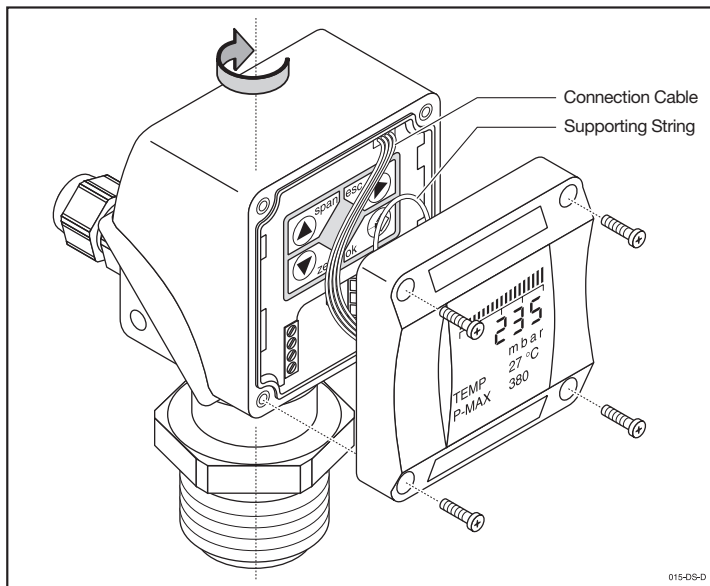


Warning

When installing the display unit, make sure that the connection cable and the supporting string are not kinked or pinched. If the cable is damaged, correct function may be impaired..

On Model IUT the Ex-protection of the transmitter will no longer exist. Only the model A-IRU can be mounted as display for upgrading .

- The display unit can be mounted at 90° angles.
- Fasten the display unit with screws.



All functions are programmable once the pressure transmitter has been upgraded with a display unit. The adjusted parameters are stored after the display unit is removed.

The display unit can be rotated in 300°, so that it can be read under various installation conditions. The housing cover with built-in display can be fastened to the housing at all four side positions.

7.3 Housing Reconfiguration

Rotate the housing of the display unit in order to be able to read the display from above when the pressure transmitter is installed in an upright position.

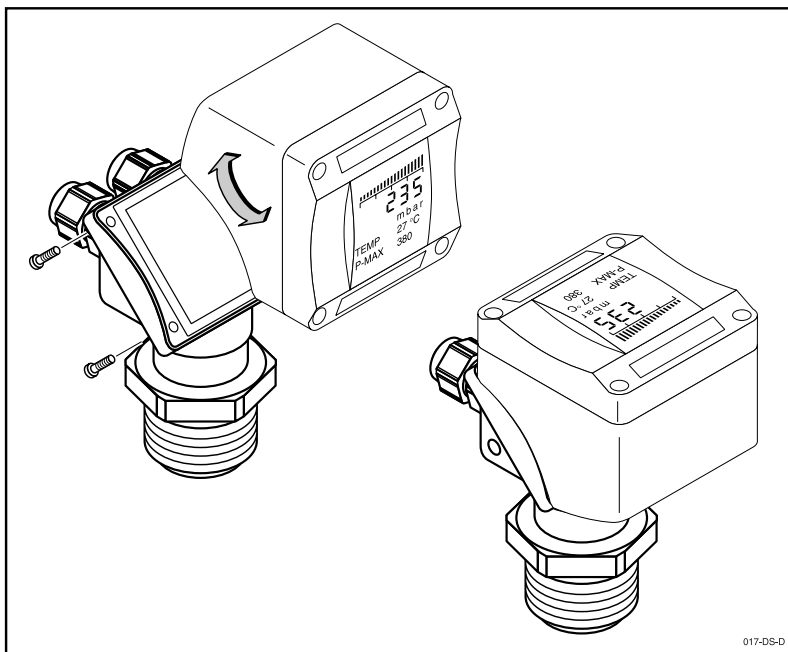
- Loosen the 4 internal hexagonal screws.
- Lightly lift off the housing with the display unit.
- Carefully turn the housing by 180°.
- Re-tighten the screws.



Warning

When tightening the 4 hollow screws, make sure that they are adequately and securely seated in order to ensure that the transmitter is properly sealed.

When reconfiguring the housing, the spiral cable must not be damaged.



017-DS-D

7.4 Electrical Connection



Warning

For the dust approval version, only cable glands and blind plugs with the appropriate ATEX approval may be used. The M12x1 plug may not be used in conjunction with dust approval. (See chapter 2.2)

*Please observe local installation regulations (Germany: VDE-Standard).
The terminal voltage should not exceed 30 V.
The transmitter is only to be connected to approved intrinsically safe measuring instruments.*

The supply voltage is between 12 and 30 V. The power supply and the output signal are transmitted via a two-wire cable (max. 12 mm outer diameter, max. 14 AWG) and connected in accordance with the pin configuration.



Warning

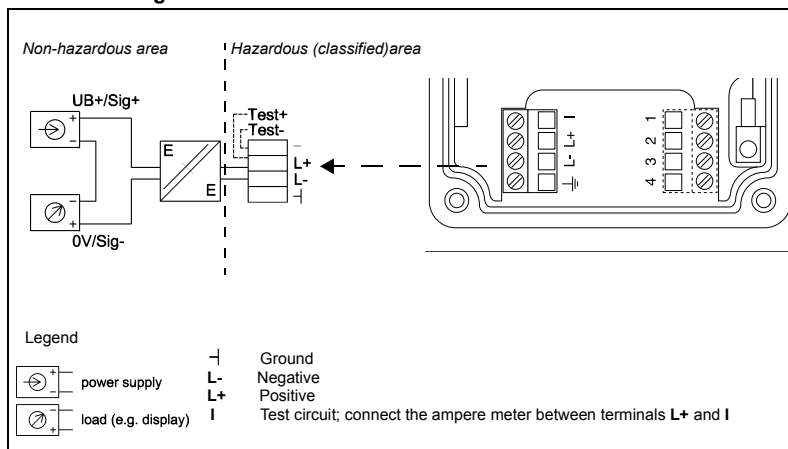
*When selecting a cable make sure that it complies with the capacity and inductivity values as well as the voltage resistance values (see "Technical Data" on page 103).
The given operating temperatures must not be exceeded.
For the connection of the cable the leads must be covered by end bushings. The cable must not be damaged.*

Supply voltage can be supplied by a power unit, a transmitter power supply or by means of a PLC connection.

It is suggested to use a model with integrated lightning protection for preventing damage due to voltage peaks.

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Terminal Configuration



For transmitters with M12 x 1 circular connector, below are the wiring details:

- 1 Positive
- 3 Negative



Warning

When connecting the clamps 'L+' and 'I' the safety-related nominal values (See chapter 6.7) must be observed.

Only approved intrinsically safe ammeters may be connected to the test circuit between the clamps 'L+' and 'I'.



Information

The internal resistance of the multimeter must be $< 100 \Omega$.

The unit must be properly grounded in order to guarantee EMC resistance.

7.5 Pressure Compensation when using a Relative Pressure Sensor

A Goretex diaphragm is used to compensate for the atmospheric pressure under the IP 65 Protection Method.

A special cable with capillaries for relative pressurization is used for Ingress Protection IP 67.

8 Operation of Devices without Displays

8.1 Preparation

This unit can be programmed before or after installation.

- Connect an ampere meter to the device's output (between terminals I and L+).
- Note that after each action, a brief oscillation/deflection of 20 mA occurs (verification of a successful action).

The following functions can be programmed without a display unit:

- Zero point adjustment with a full or empty container (with/without pressure)
- Span adjustment with a full or empty container (with/without pressure)
- Integration time
- Mounting correction of the sensor (beginning with software version 1.05)
- Reset to manufacturer's defaults



An error signal is caused by a current surge (21 mA or 3.6 mA; 5 sec) when the zero point or span setting fall outside of the sensor's nominal pressure range during adjustments with existing pressure. No values are stored.

The keypad becomes inactive after 10 min. of disuse. All settings will default to previously stored values. Only settings that have been confirmed with the "OK" function are stored.

8.2 Key Functions (only for transmitters without display)

Function 1		Function 2	
	Basic setting, store span (2 s)		Action: upward, increase value
	Basic setting, store zero point (2 s)		Action: downward, decrease value
	Exit key or programming mode (2 s)	 	Activate keys (push simultaneously for 2 sec.)
	Verification (store 2 s)	 	Mounting correction of the sensor (push simultaneously for 2 sec.)
 	Basic setting Integration time/damping (push simultaneously for 2 sec.)	 	Reset to default (push simultaneously for 2 sec.)

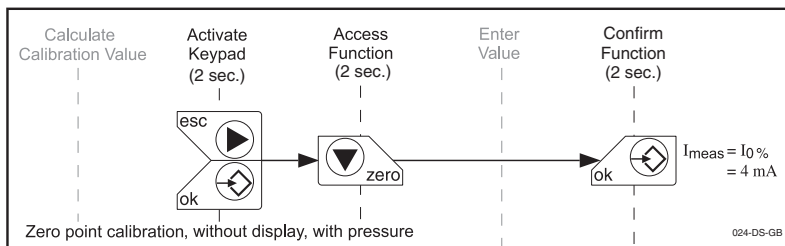
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8.3 Calibration with Pressure

8.3.1 Zero Point Calibration



Make sure that the pressure to be used as the zero point ($P\ 0\ %$), is present at the transmitter diaphragm before calibration.

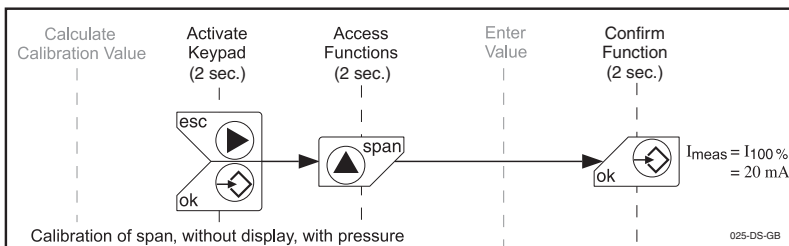


8.3.2 Span Calibration

Calibration of the measurement range (span).



Make sure that the pressure to be used as the span end-point ($P\ 100\ %$) is present at the transmitter diaphragm. The measuring range between zero and end value of span is saved as span.



A change in the zero point has no effect on the calibrated span. However, if the span end-point is higher than the peak value of the sensor's nominal pressure range, then span end-point is fixed at this peak value and the span is reduced accordingly.

A change in the span setting has no effect on the zero point. The zero point and span end-point must fall within the sensor's nominal pressure range.

A mounting correction must not be carried out when making an adjustment with pressure (wet adjustment). Otherwise, the mounting correction must be carried out before saving the zero point and the end value of span.

8.4 Calibration without Pressure

Determine the current reference values for the zero point and the span to be entered in the transmitter before calibration. This is done as follows:

8.4.1 Zero Point Calibration

- Determine the hydrostatic pressure of the liquid's surface that meets the zero point.
- Adjust this pressure in proportion to the sensor's nominal pressure range.
- Multiply this proportion by 16 mA and add 4 mA to the result.

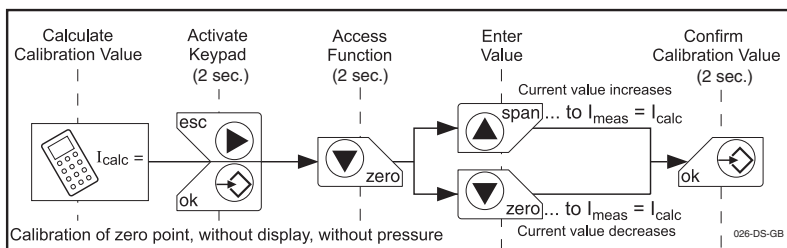
This produces the calculated current (value I_{calc}), which is entered in the transmitter and used to program the zero point (0%).

Example:

A pressure transducer with 0 ... 400 mbar (nominal pressure) needs to be programmed. The liquid's surface (with a density of 1) is 1 m above the diaphragm at the zero point producing a pressure of 100 mbar.

$$I_{calc} = \frac{\text{Zero point pressure (0\%)} \ 100 \text{ mbar}}{\text{Sensors nominal pressure } 400 \text{ mbar}} \cdot 16 \text{ mA} + 4 \text{ mA} = 8 \text{ mA}$$

This means that the device's current value must be set to 8 mA when performing a dry (empty) calibration.



8.4.2 Span Calibration

- Determine the hydrostatic pressure of the liquid's surface, which corresponds to the span end-point.
- Calculate the difference of the pressure value between span end-point and zero point and divide this difference by the nominal pressure range of the sensor.
- Multiply this proportion by 16 mA and add 4 mA to the result.

This produces the calculated current (value I_{calc}), which is entered in the transmitter and used to program the span end-point (100%).

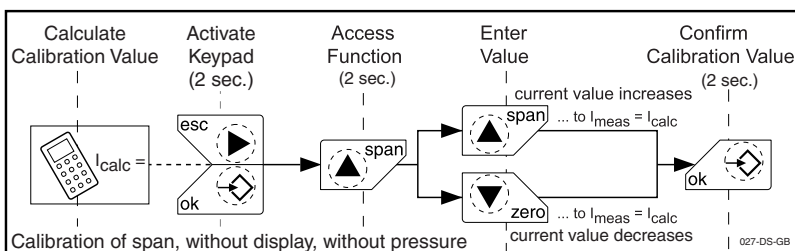
The measurement range between zero point and span end-point will be stored as span.

Example:

A pressure transmitter with 0 ... 400 mbar (nominal pressure) is to be programmed. The liquid's surface (with a density of 1) is 1 m above the diaphragm at the zero point. The maximum (span end-point) should be 3 m. The measuring range (span) is 200 mbar.

$$I_{calc} = \frac{\text{pressure difference (span) (300 mbar - 100 mbar)}}{\text{Sensors nominal pressure 400 mbar}} \cdot 16 \text{ mA} + 4 \text{ mA} = 12 \text{ mA}$$

This means that the output must be set to 12 mA during programming.



A change in the zero point has no effect on the adjusted span.

However, if the span end-point is higher than the peak value of the transmitter's nominal pressure range, then the span end-point is fixed at this peak value and the span is reduced accordingly.

A change in the span setting has no effect on the zero point. The zero point and span end-point must fall within the transmitter's nominal pressure range.



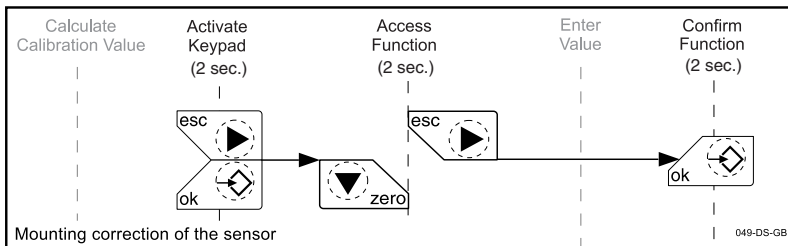
Important

A test / correction of the zero point is suggested after adjusting the span in order to maintain optimum accuracy.

A mounting correction should be carried out before or after making an adjustment without pressure (dry adjustment) (see 8.4.3). The transmitter must therefore be placed in the reference position for the measurement (installation site) without pressure on the diaphragm.

8.4.3 Mounting correction of the sensor

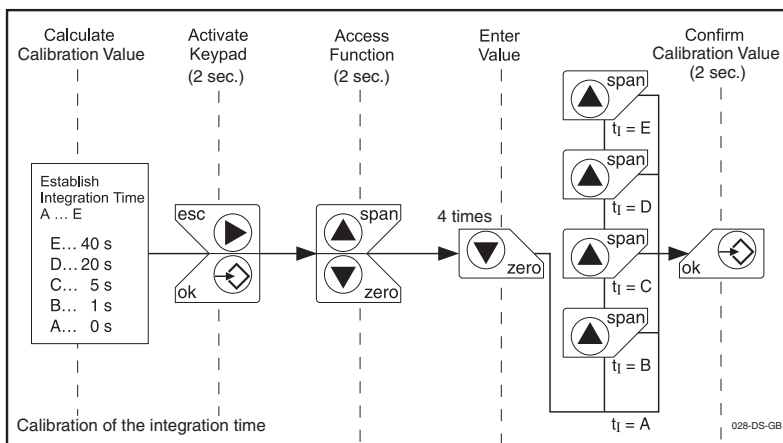
The position of the measuring cell is entered by simultaneously pressing (2 sec.) the "zero" and "esc" buttons.



8.5 Integration Time (Damping) Adjustment

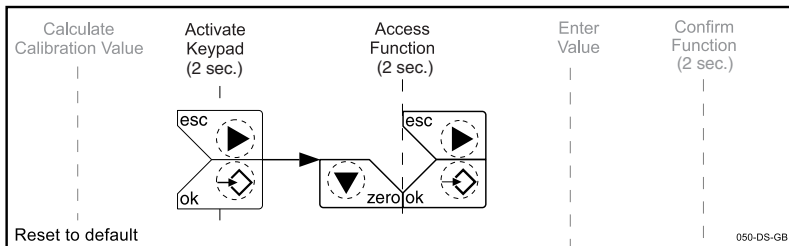
The following integration time settings can be used: 0, 1, 5, 20 and 40 s.

The sensor's measured values can then be averaged using the adjusted integration time.



8.6 Reset to Default

All default data settings are restored by simultaneously pressing the "zero", "esc" and the "ok" buttons for 2 seconds (see chapter 9.4)



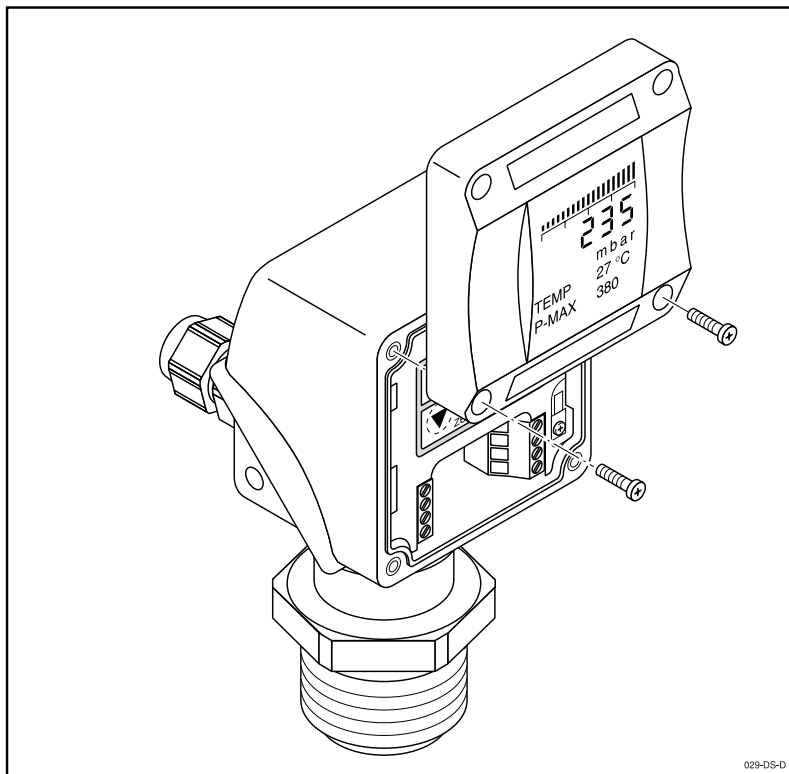
Important

Calibrated special measurement ranges i. e. 4 bar on a 6 bar transmitter can be adjusted by factory pre-setting. A reset to default will reset the sensor back to its nominal range (i. e. 6 bar). The factory pre-setting gets lost.

9 Operation of Transmitters with Display

9.1 The Display

In order to program the device, remove the display with a screwdriver and re-attach it to the housing as shown in the diagram below.



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9.2 Key Functions

Button	Functions		
	Main Menu	Sub-menu	Edit Functions
	back to the previous menu option	back to the previous menu option	increase value
	forward to next menu option	forward to next menu option	decrease value
	back to value display without saving	back to main menu without saving	back without saving
	to the sub-menu	to the edit functions	save value
 	activate keypad (push simultaneously; 2 s)		

9.3 The Programming Mode

The transmitter can be programmed before or after installation.

The keypad is activated and the device can be programmed by simultaneously pressing the "esc" and "ok" keys (for 2 sec.). This method is used to access the main menus. Each main menu has one or more sub-menus and each sub-menu, may have its own sub-menus.



The keypad becomes inactive after 10 min. of disuse. All settings will default to previously stored values. Only settings that have been confirmed with the "OK" function are stored.

A change in the starting measurement (zero point) has no effect on the measurement span. Likewise, a change in the span has no effect on the starting measurement.

An error signal occurs when the zero point or span settings fall outside of the sensor's nominal pressure range during calibration with pressure. Nothing is saved.

9.4 Default Data (factory settings)

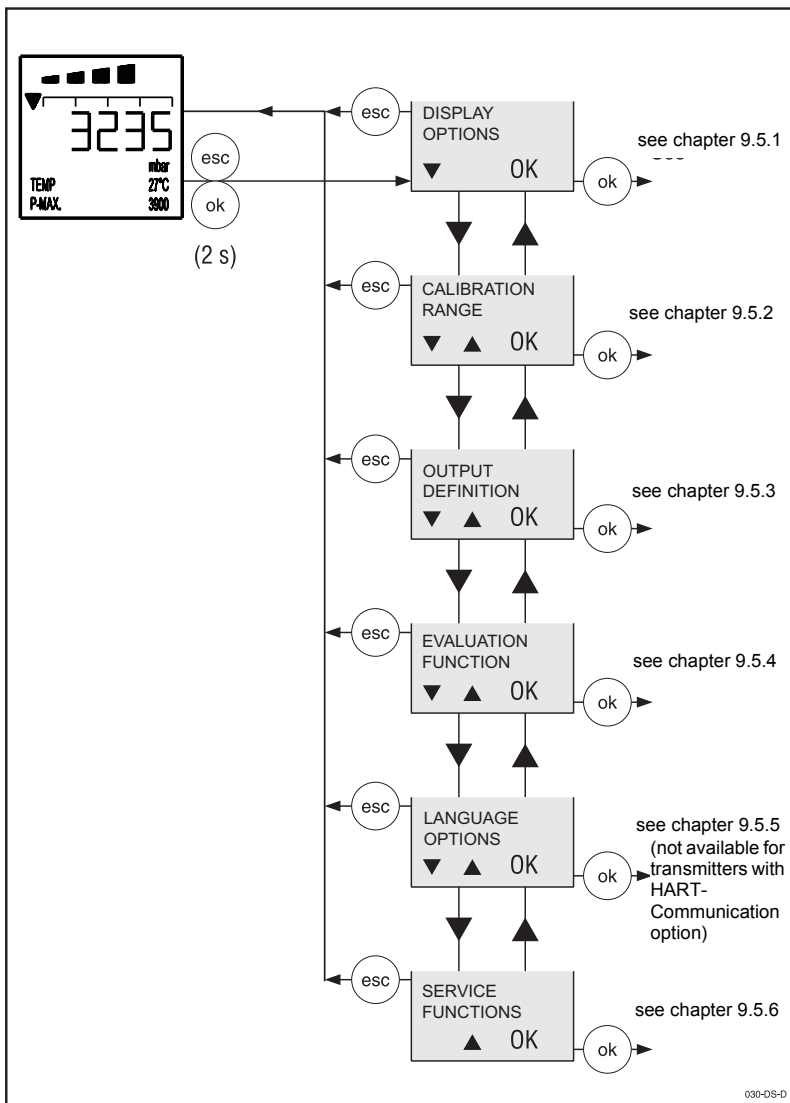
Function		Defaults
Display	Unit of measurement (Line 1)	Pressure display (in bar)
	Line 2	Temperature display (in °C)
	Line 3	Sensor's nominal pressure range (in bar)
Calibration	zero 4 mA	nom. pressure range start
	span 20 mA	nom. pressure range end
Output	Damping	0 s
	Inversion	no
	Fault	21 mA (upscale)
	Limits	3.8 ... 20.5 mA
	I-offset	0 mA
Service password		no active password
Service mounting correction		not activated
Language		English
Evaluation	linear	yes
	density	1 g/cm ³



Important

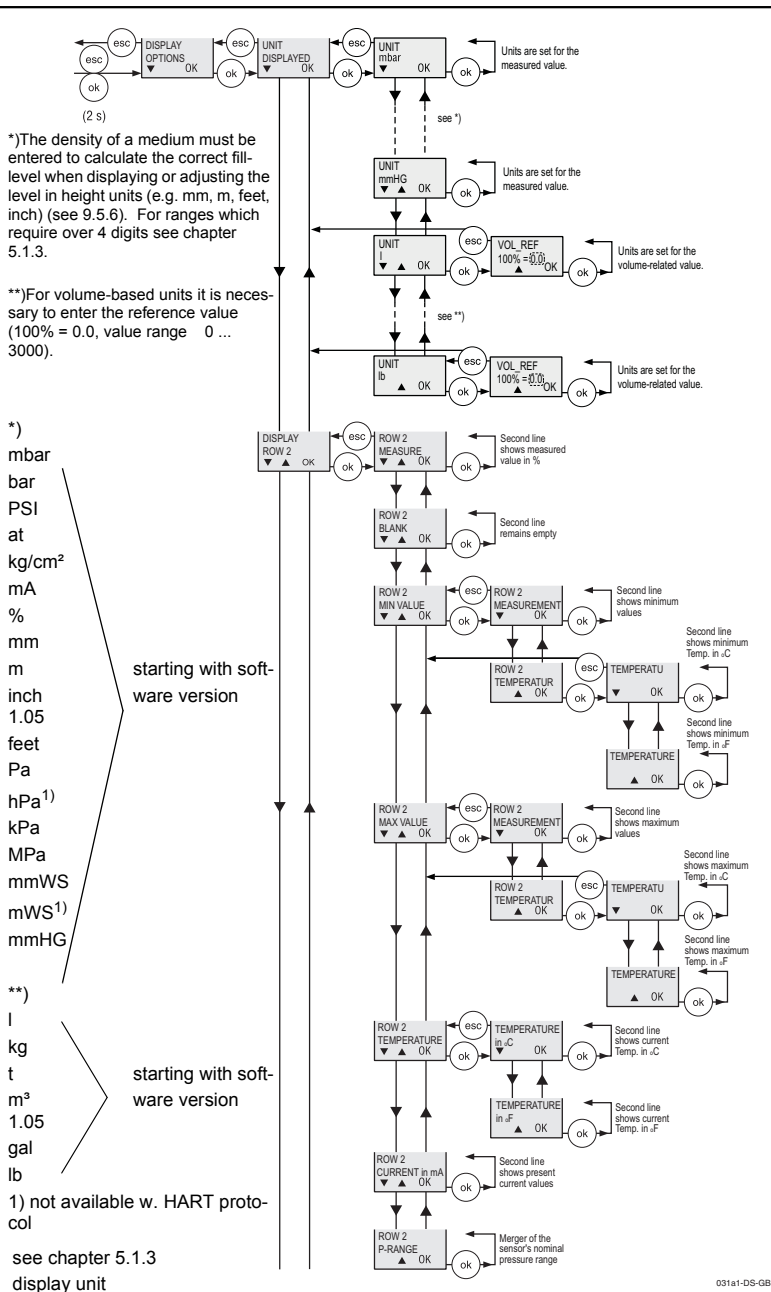
Calibrated special measurement ranges i. e. 4 bar on a 6 bar transmitter can be adjusted by factory pre-setting. A reset to default will reset the sensor back to its nominal range (i. e. 6 bar). The factory pre-setting gets lost.

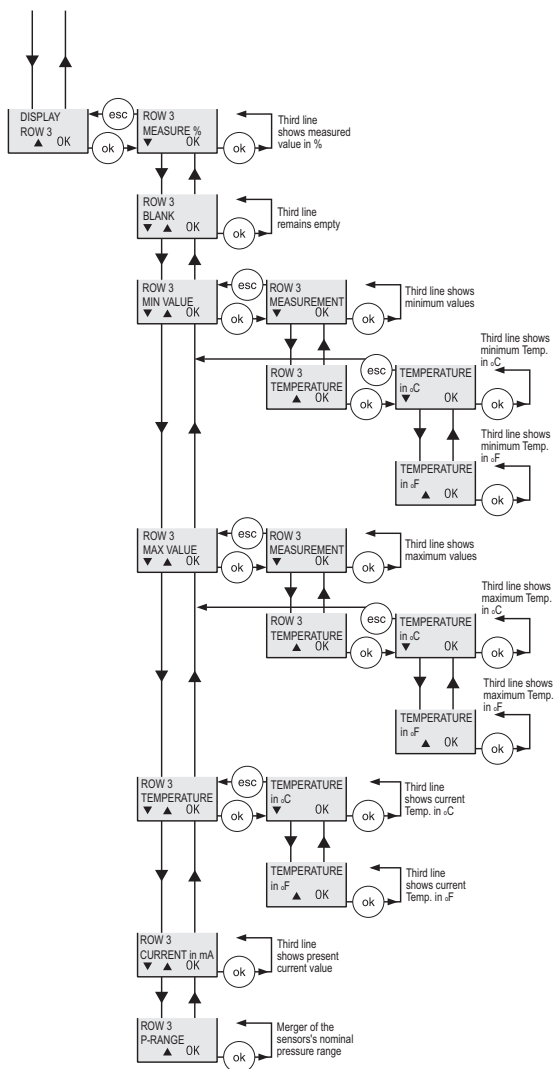
9.5 Main Menu



030-DS-D

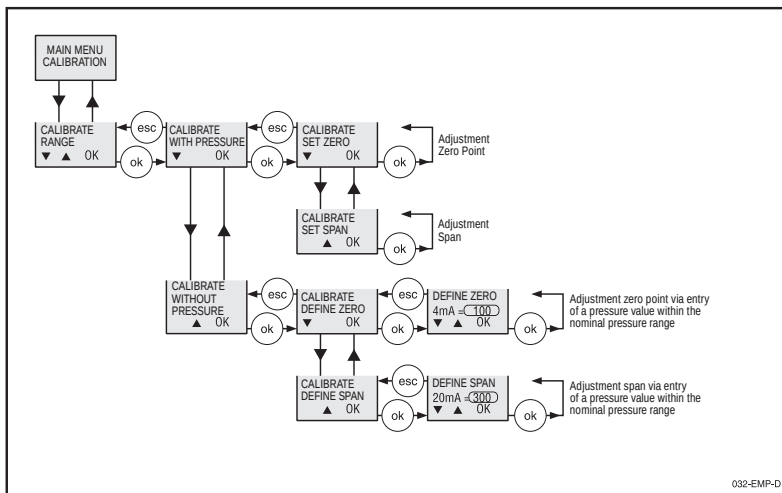
9.5.1 Main Menu: Display





031b-DS-D

9.5.2 Main Menu: Calibration of zero and span (with / without pressure)



A single pressure value is set for the zero point or the span end-point within the sensor's nominal pressure range, and assigned to the associated output current signal when making adjustments with existing pressure. An error signal occurs when the existing pressure lies outside of the sensor's nominal pressure range. The value is not saved in this case.



Important

A mounting correction should be performed before or after making an adjustment without pressure (dry adjustment) (see 8.4.3). The sensor must therefore be placed in the reference position for the measurement (installation site) without pressure on the diaphragm.



A mounting correction is unnecessary when making an adjustment with pressure (wet adjustment). Otherwise, the mounting correction must be performed before saving the zero point and span end-point.

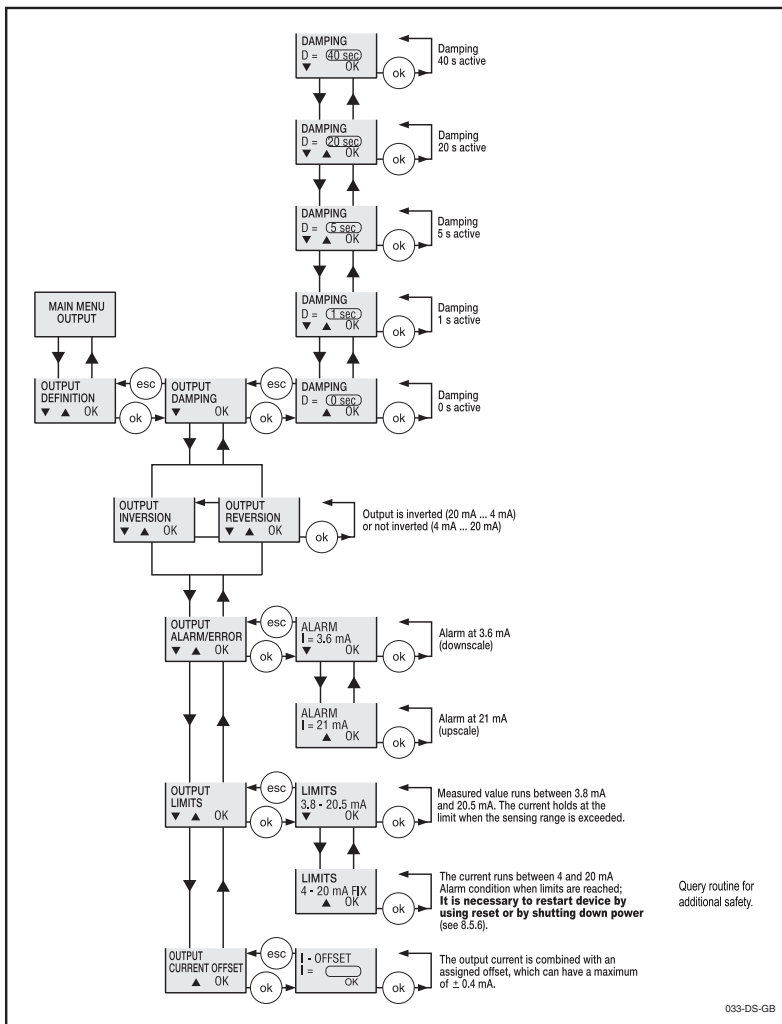


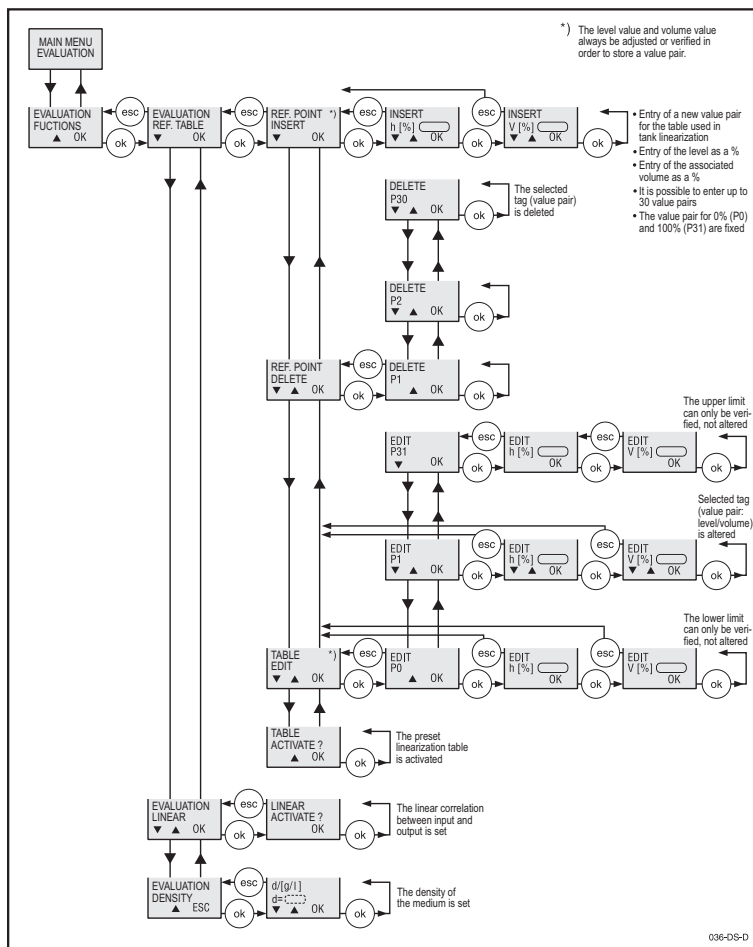
Important

A test / correction of the zero point is suggested after adjusting the span in order to maintain optimum accuracy.

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9.5.3 Main Menu: Output





Information



Please check the following if "Wrong Entry" appears in the Evaluation menu:

- whether or not more than 32 value pairs are entered in the table for tank linearization (please note: P 0 and P 31 are fixed at 0% and 100% respectively)
- whether or not an existing height value was tried to be stored again
Please enter correct values.

Example:

Level 100 %:	4000 mm
Density:	1 g/cm ³
Density correction:	0.9 g/cm ³
Span end point:	$\frac{4000 \text{ mm} \cdot 1 \text{ g/cm}^3}{0.9 \text{ g/cm}^3} = 4444 \text{ mm}$

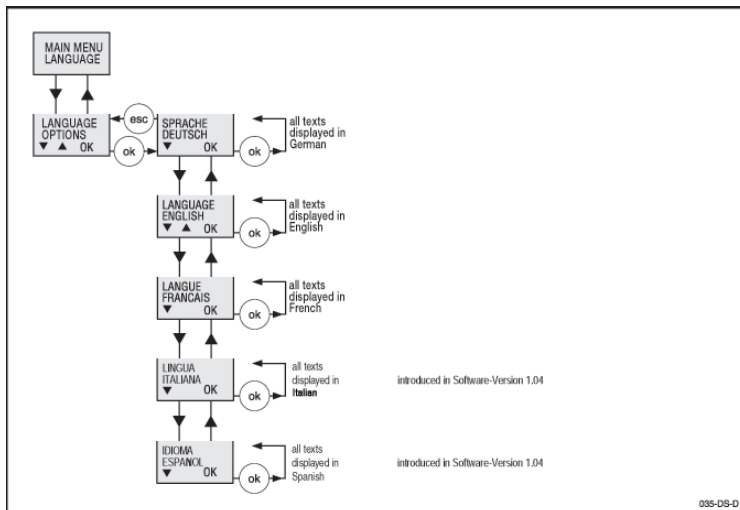
The span (end-point) must be re-calibrated (with or without pressure) to 4000 mm in order to prevent a 4000 mm level tank from being overfilled.



Important

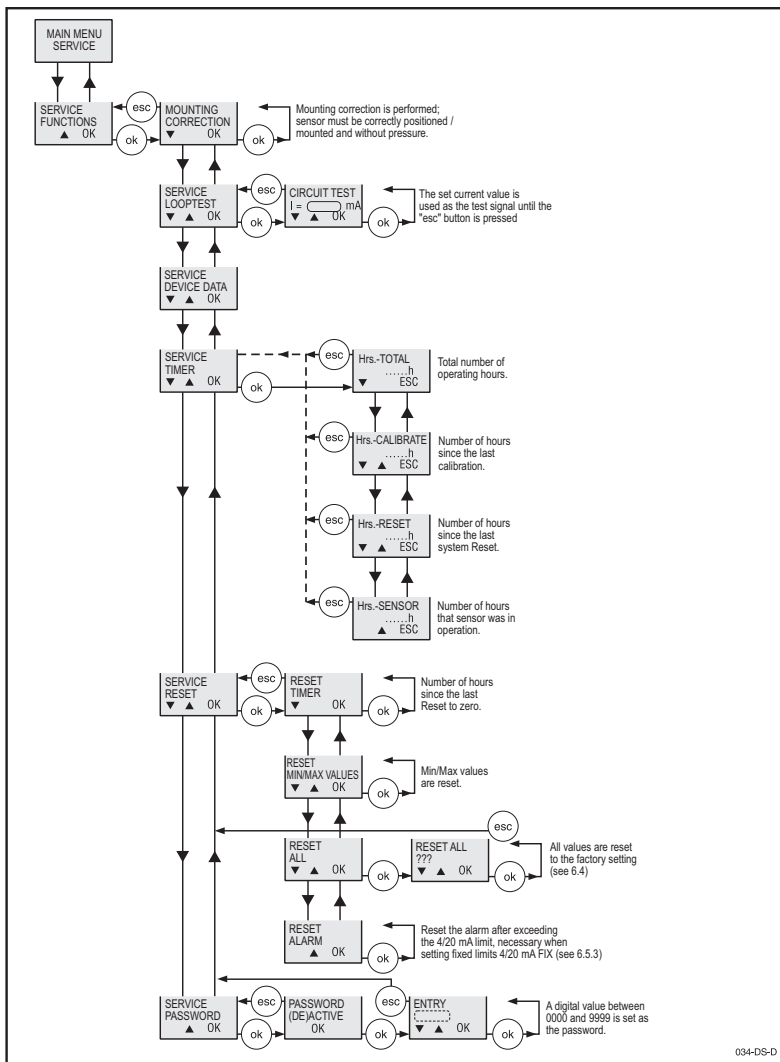
A change or correction in the density causes a change in the span end-point's unit of measure (mm, m, inch, feet). The span end-point must be re-calibrated when changing the medium to be measured (due to a change in density).

9.5.5 Main Menu: Language



The displayed language for transmitters with HART®-Communication is always English. No other language can be selected.

9.5.6 Main Menu: Service



034-DS-D

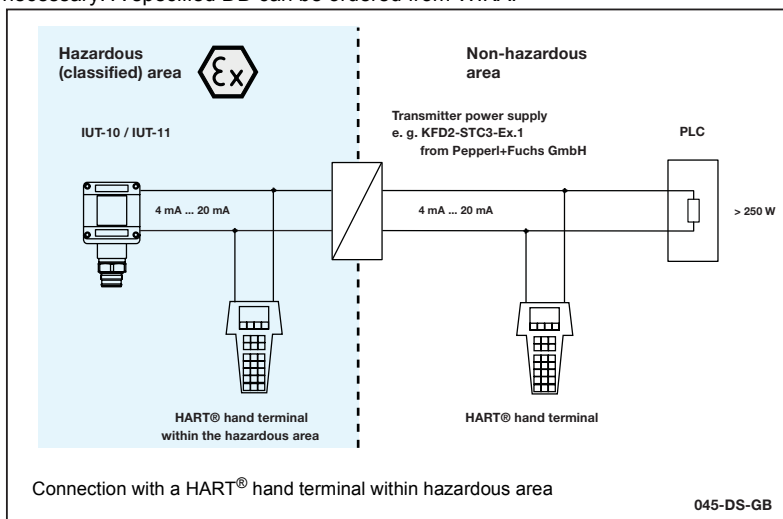
10 Transmitter Operation with HART®-functionality

10.1 Possible HART® connections

Transmitters with HART®-functionality can be operated via a HART®-hand terminal (HC 275), via PC with PactWare and HART®-Modem, or with a remote-I/O-system with HART®-ability (e.g. Pepperl+Fuchs HART®-Multiplexer or Pepperl+Fuchs RPI-System).

10.1.1 Connection of the HART®-hand terminal

The pressure transmitters IUT-10 and IUT-11 can be operated with the standard menus of the HART®-operating unit. A special DD (Device Description) is not necessary. A specified DD can be ordered from WIKAI.



The termination resistor in the loop must have a minimum value of 250 Ω

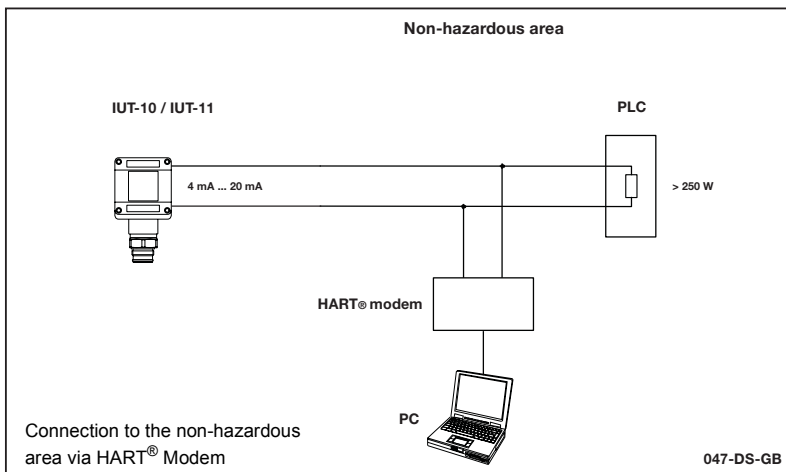
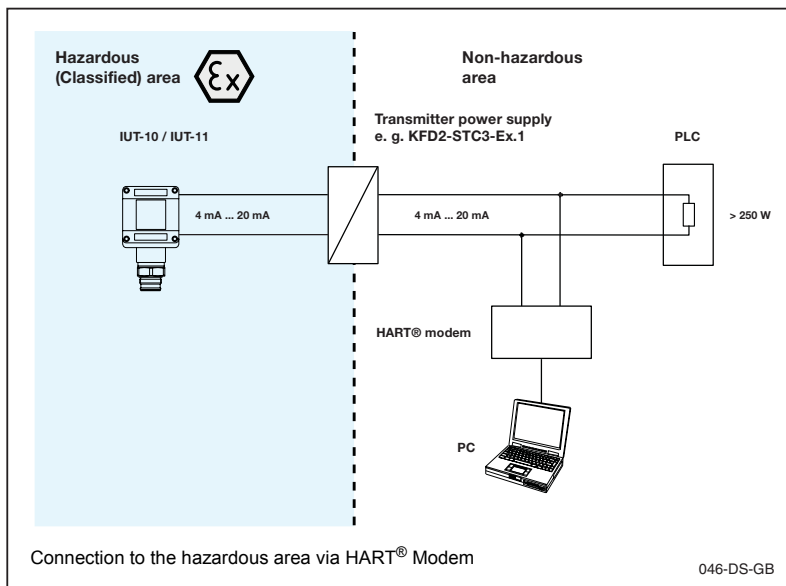


*The HART®-hand terminal and its operation is described in the respective manual of the unit.
Further information about the connection via remote-I/O-systems with HART®-ability can be found in the respective system descriptions.*

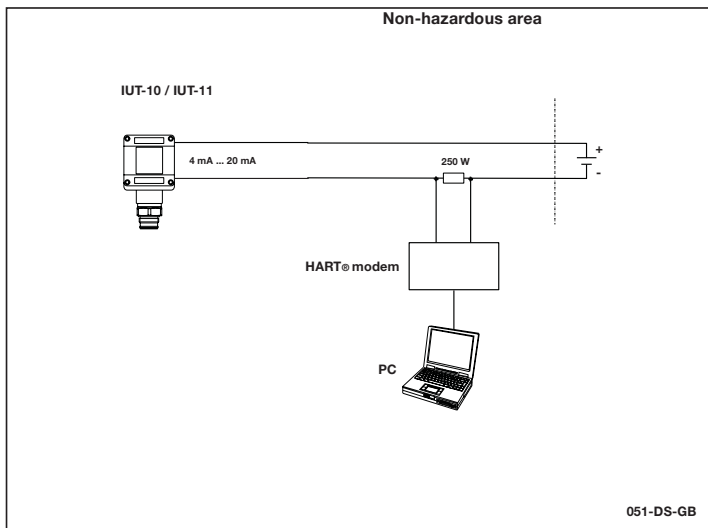
10.1.2 Connecting the HART®-modem for PC operation

The HART®-modem connects the pressure transmitter with HART®-functionality with the serial RS 232 C interface of a PC. In this constellation the parameters of the pressure transmitter can be set via the software **PACTware™**.

A respective HART® modem can be ordered from WIKA.



If the resistances of the devices connected to the power supply/signal line (voltage source) are less than 250Ω , a minimum resistance of 250Ω must be installed in the power supply line. The sum of the internal capacitances and inductances of the components used must not exceed the highest permissible values of the IIC circuit.



Warning

Please note the different safety-related values according to the EC-type examination certificate (see also chapter 6.7) and note the permissible cable

length for devices with HART® communication. The termination resistor in the loop must have a minimum value of 250Ω



Information

*The necessary operating software **PACTware™** is described in chapter 10.2.*

10.2 Operation via PC and the software **PACTware™**

The **PACTware™** software with the necessary device driver (DTM) can be ordered from WIKA. An integration in other HART® management systems or FDT management systems is possible.

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10.2.1 Menu 'Device info'

The screen '**Device info**' displays all important information of the transmitter, which cannot be modified.

10.2.2 Menu 'Description'

In the fields of the menu '**Description**' the name and description of the selected instrument are given. The texts can be edited and saved in a file, but not in the transmitter.

10.2.3 Submenu 'Parameter' - *Device info*

Polling address:

Address of the UniTrans in "short integer" format.

Change in dev.:

Modify polling address in the transmitter

When this message pops up you should consider the described consequences and then decide whether to change the address or stay with the actual address.

Long address:

38-bit-address as worldwide device-unique identifier

Tag:

The tag number is to be entered (identification code of measuring site)

Desc. of measurement point:

An explicit description of the measuring site is to be entered

Last parametrization:

Date of last parametrization

Unit of measured value:

Units of measured value:

- mbar, bar PSI, atm, mA, %, mm, m, inch, feet, Pa, kPa, Mpa, mmWS, mmHG

Volume-related units:

- l, kg, t, m³, gal, lb



When height is displayed or calibrated (e. g. mm, m, feet, inch) the density value of the respective medium must be entered in order to calculate the correct filling level (see also chapter 10.2.6).

Reference:

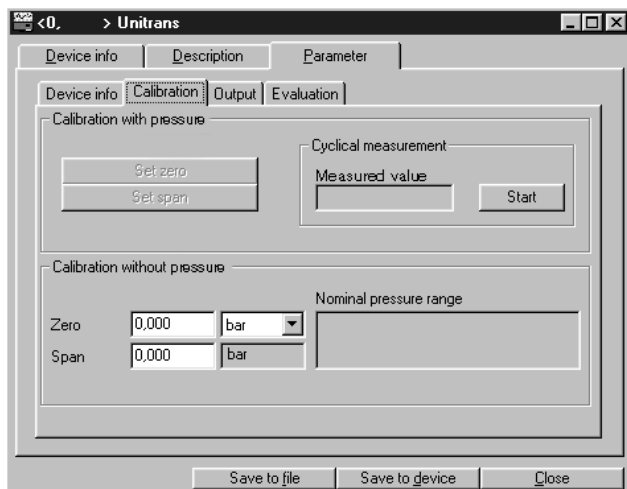
The reference value of the volume-related units is only active when volume units have been activated.

- 100% = 0,0 value range 0 ... 3000,0

Display row 2 / row 3:

Here the display of several temperature, pressure and min./max. values can be set.

10.2.4 Submenu 'Parameter' - *Calibration*



Calibration with pressure:

The calibration with pressure is only possible when the cyclic measurement is activated.

Set zero:

Before starting the calibration make sure that the pressure applied to the transmitter has the value you want to set as zero point (P 0 %).

Set span:

Make sure that the pressure applied to the transmitter has the value you want to set as upper end of span (P 100 %). The measuring range between zero point and upper end of span will be saved as span.

In general the preset span is not affected when the zero point is changed. When, however, the zero point is increased in a way that the upper end of span would reach beyond the maximum nominal pressure of the transmitter, this maximum nominal pressure value is defined as new upper end of span and the span is reduced respectively. A modification of the span settings does not affect the zero point.

During a calibration under pressure two pressure values are set respectively for zero and upper end point of span. These values, which must lie within the nominal pressure range of the transmitter are respectively assigned to an output current signal. When the applied pressure lies beyond the nominal pressure range of the transmitter an error message is displayed. In this case the value is not saved.

Cyclic measurement (measured value):

The actual measured value for the calibration under pressure is displayed (automatic actualisation).

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Calibration without pressure:**Zero:**

- Here a pressure value within the nominal pressure range of the transmitter must be entered.

Span:

- Here a pressure value for the span within the nominal pressure range of the transmitter must be entered.



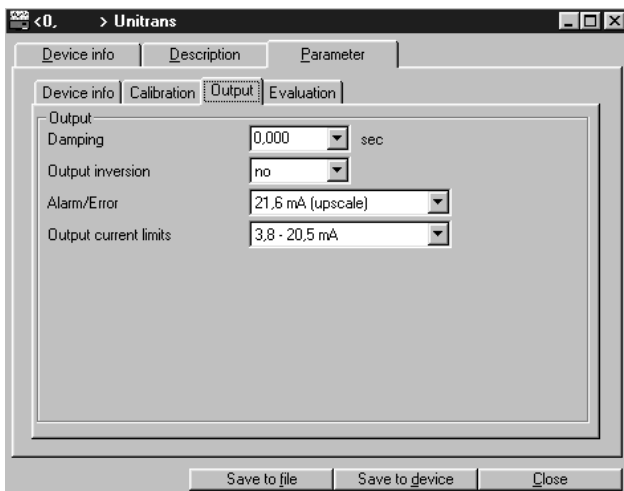
When calibrating without pressure (dry calibration), a sensor mounting correction should be carried out before or after the calibration (see also chapter 10.2.7). For this, the sensor must be placed in the reference position for the measurement (mounting position) and must not be under pressure.

When calibrating with pressure (wet calibration), the mounting correction is unnecessary, or it must be carried out before the zero point and end of span are saved.

Nominal pressure range:

Here the sensor's pressure range is displayed

10.2.5 Submenu 'Parameter' - *Output*



Damping:

An average value of the pressure values applied to the sensor is calculated over the predefined integration time. The following integration times can be set:

- 0, 1, 5, 20 and 40 s.

Output inversion:

The output signal can be inverted or not inverted.

- inverted 20 ... 4 mA
- not inverted 4 ... 20 mA

Alarm/Error:

Here the current value is displayed, which is set for an error message:

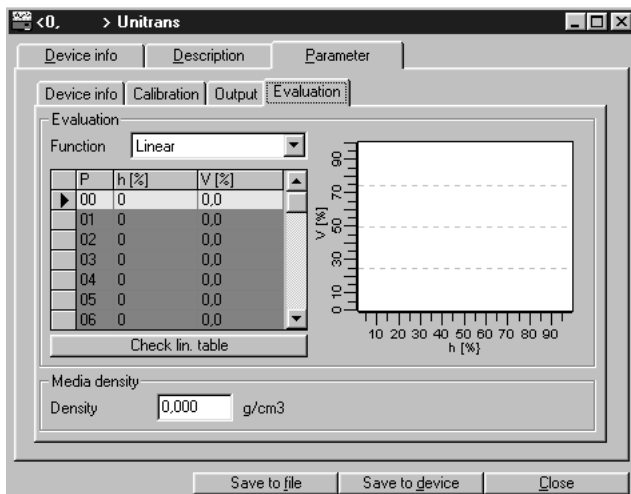
- 21.0 mA (upscale) or
- 36 mA (downscale).

Output current limits:

Here the range of output current is set.

- 3.8 ... 20.5 mA
When the applied pressure rises beyond the nominal range the current value ends at the set limit value.
- 4 ... 20 mA
When the applied pressure rises beyond the nominal range and the alarm goes off a reset must be carried out, or the power supply must be cut (see also chapter 10.2.7).

10.2.6 Submenu 'Parameter' - *Evaluation*



Evaluation:

Here the relation between height values and volume values is given in a graph.

Function:

- **Linear:**

Here a linear relation between height and volume values is set.

- **Table:**

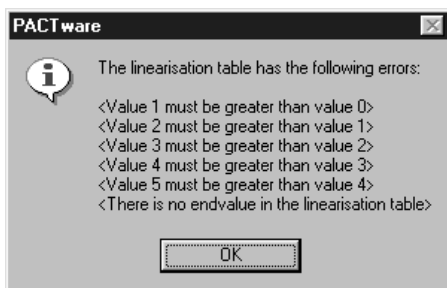
The values of the table are set as linearisation graph between height and volume value.

For liquid level measurements in tanks, values of height (level) must be entered and a respective volume is assigned to each value. These value pairs are used to determine the linear relationship and to assign the 4 mA ... 20 mA output signal to values of tank volume (P 0 and P 31 are fixed at 0 % and 100 %).

Check lin. table:

The entered linearization table is subject to a plausibility check.

If wrong or incomplete values are entered the following **error window** pops up.



Media density:

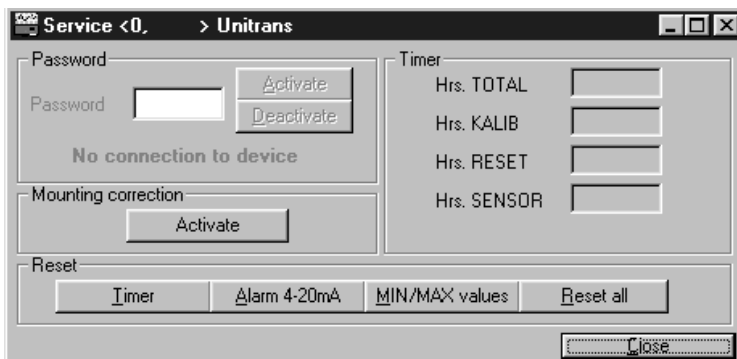
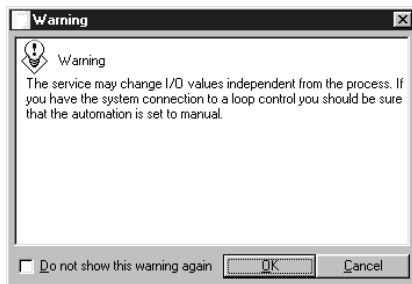
Here the density of the medium is given in g/cm³

The consequence of a correction or modification of the density value is that also the respective values of the upper end of span are changed for the related measuring values (mm, m, inch, feet). In some cases after a media change (change of density) the upper end of span must be recalibrated.

10.2.7 Window 'Service'

You can open the 'Service' window under '**Device**' via the '**Service**' menu item or in the 'Context' menu (right mouse button) for the device that is selected in the navigation window (project view).

The following warning will pop up while you browse to the window '**Service**'. After reading the information you can just confirm, or mark the check box below on the left side '**Do not show this warning again**'. Then the window 'Service' will open.



Password:

Activate / Deactivate

Via these fields the password function can be activated or deactivated. In both fields the same four digits between 0000 and 9999 must be set.

When a password is activated transmitter settings can only be changed after the password has been entered. In the case of a transmitter without display no settings can be changed at the transmitter.

Mounting correction (Activate):

A mounting correction is carried out. Before the correction is activated the sensor must be in mounting position and pressureless.

Timer:

- Hrs-TOTAL: display of overall operating hours
- Hrs-CALIB: display of operating hours since last calibration
- Hrs-RESET: display of operating hours since last reset
- Hrs-SENSOR: display of sensor operating hours

Reset:

Via the four buttons certain functions of the transmitter are reset.

- Timer: Reset of operating hours
- Alarm 4 - 20 mA: Alarm reset when the 4 ... 20 mA-limit has been exceeded
- MIN/MAX values: Reset of MIN/MAX-values in the display
- Reset all: Reset of all settable values to factory settings
(see also chapter 9.4)



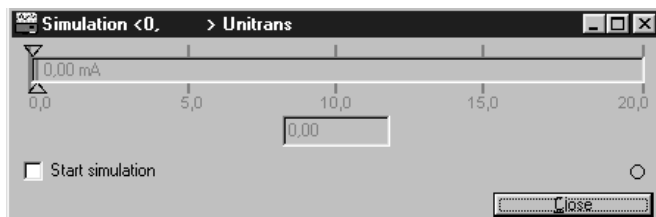
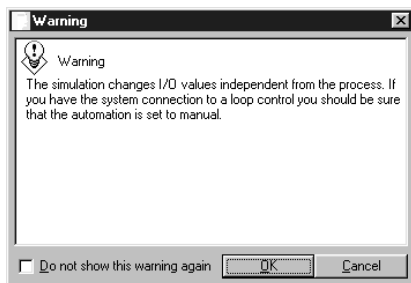
Important

Calibrated special measuring ranges i. e. 4 bar together with a 6 bar transmitter can be adjusted by factory pre-setting. A reset to default will reset the sensor to its nominal range (i. e. 6 bar). The factory pre-setting gets lost.

10.2.8 Window 'Simulation'

You can open the 'Simulation' window under '**Device**' via the '**Simulation**' menu item or in the 'Context' menu (right mouse button) for the device that is selected in the navigation window (project view).

The following warning will pop up while you browse to the window '**Simulation**'. After reading the information you can just confirm, or mark the check box below on the left side '**Do not show this warning again**'. Then the window 'Simulation' will open.



During online operation, the measured value is given as a current output.



Attention

A set current value is given as a test signal until online operation is selected.

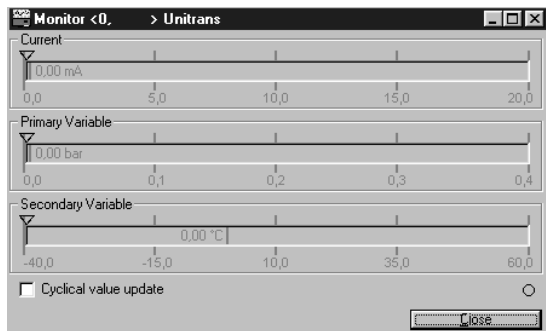


Information

Before changing and storing the parameter setting menu item 'Simulation' has to be closed.

10.2.9 Window 'Measured value'

You can open the 'measured value' window under **'Device' - 'Display'** in the **'Measured value'** menu item or in the 'Context' menu (right mouse button) for the instrument that has been selected in the navigation window (project view).



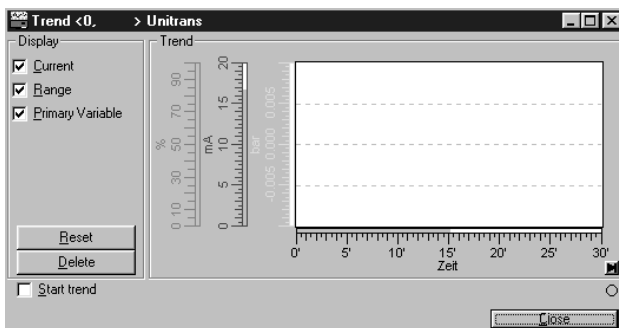
Continuous display of actual current, temperature and measuring values



Before changing and storing the parameter setting menu item 'Measured value' has to be closed.

10.2.10 Window 'Trend'

You can open the 'trend' window under **'Device' - 'Display'** via the **'Trend'** menu item or in the 'Context' menu (right mouse button) for the device that is selected in the navigation window (project view).



This display provides information about the change of the measured value over time (recorder function). The scale can be changed by clicking on the time or the scaling axis.

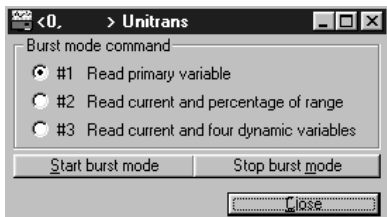


Before changing and storing the parameter setting menu item 'Trend' has to be closed.

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10.2.11 Window 'Burst mode'

You can open the 'Burst mode' window in the 'Context' menu (right mouse button) for the device that is selected in the navigation window (project view).



In the burst mode UniTrans sends actual values to the master on a cyclic basis.

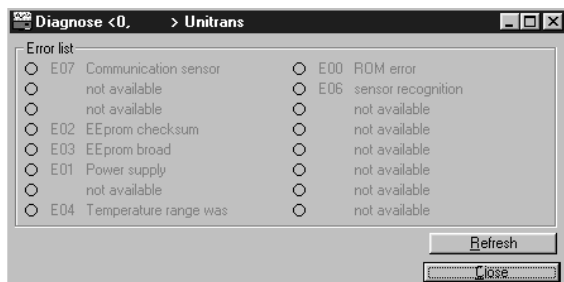
- Current
- %-value and current
- Pressure, temperature and current



If Burst mode is active a parametrization is not possible.

10.2.12 Window 'Diagnosis'

You can open the 'Diagnosis' window under '**Device**' - '**Display**' via the '**Diagnosis**' menu item or in the 'Context' menu (right mouse button) for the device that is selected in the navigation window (project view).



Possible errors and their short description are indicated (see also chapter 11).



Before changing and storing the parameter setting menu item 'Diagnosis' has to be closed.

11 Diagnostics and Service



Attention

If a failure cannot be repaired, the transmitter must be switched off. The operator then must make sure that it is only switched on again after the failure has been repaired.

Repairs should only be carried out by the manufacturer. All other repairs or modifications are unauthorized.

The following error messages can appear on devices with displays
(see chapter 5.1.3):

Error Code	Error	Error Correction Measures
E00	ROM-error	Return device to manufacturer
E01	Power supply error	Check power supply
E03	E ² PROM communications error	Disconnect and reconnect power supply
E04	Sensor's temperature range was exceeded	Return sensor's temperature to specified limits
E06	Sensor recognition	Disconnect and reconnect power supply
E07	General communications error between the sensor and the control interface unit	Check the connection between the sensor and the control interface unit
E08	Error E ² PROM	send in transmitter for service
Sen Error 0	Sensor recognition	Check the connection between the sensor and the control interface unit

12 Disposal



Important

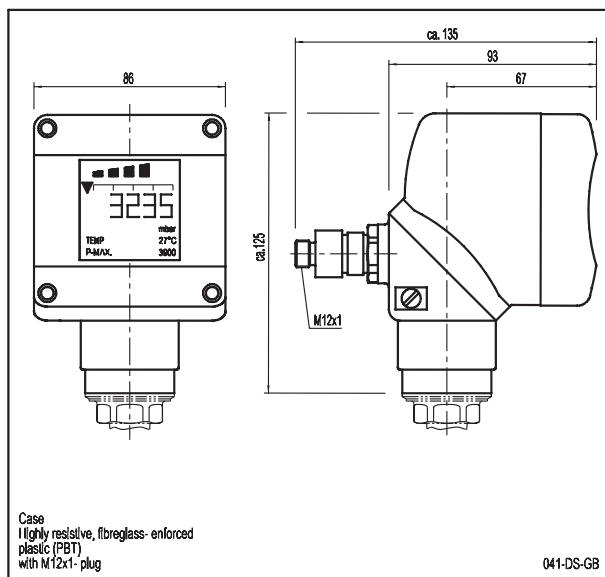
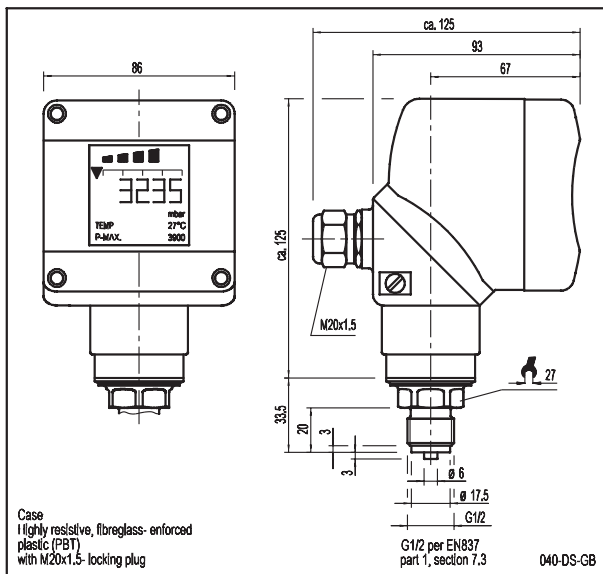
When storing or disposing the pressure transmitter, take precautions with regard to remaining media. Remaining media in the pressure port may be hazardous or toxic!

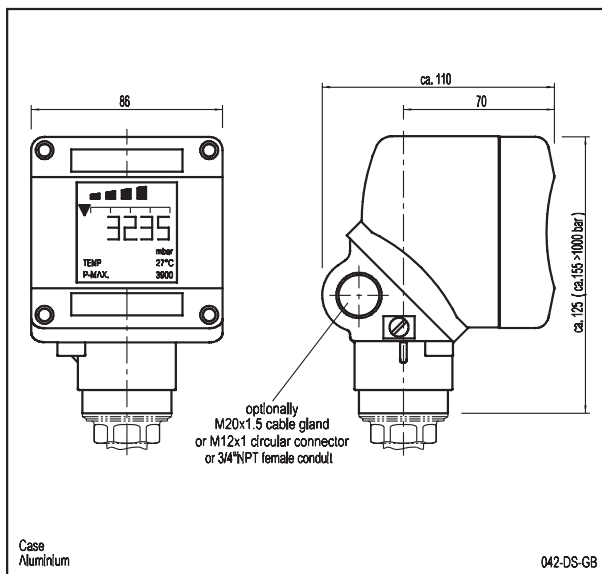
Dispose of instrument components and packaging materials in accordance with the respective waste treatment and disposal regulations of the region or country to which the instrument was supplied.

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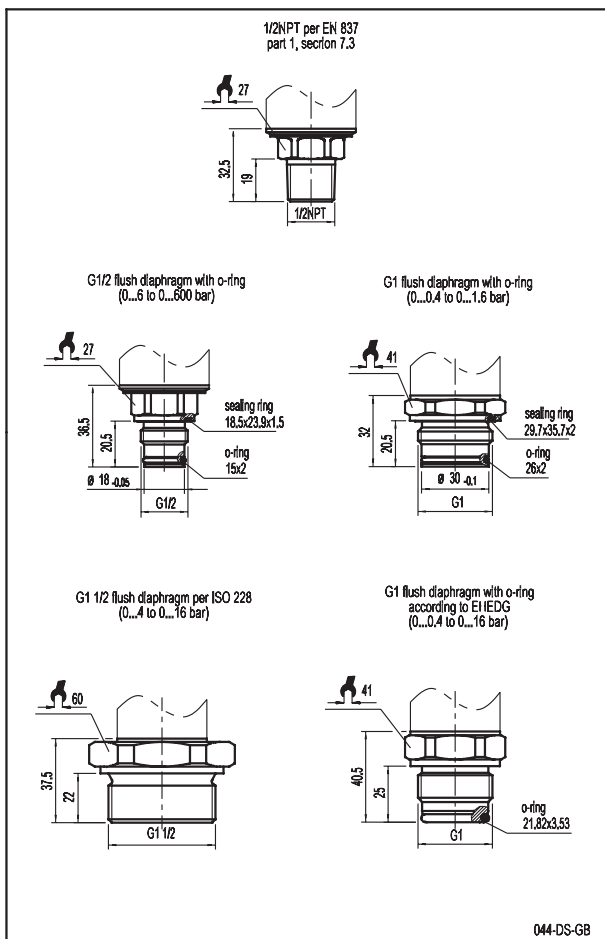
13 Appendix

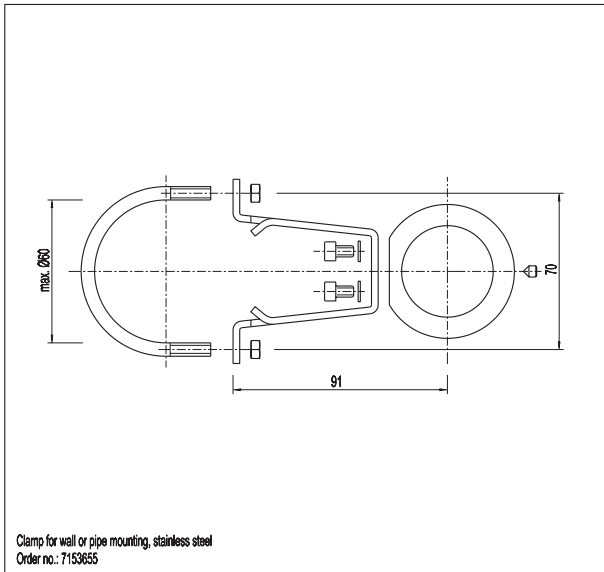
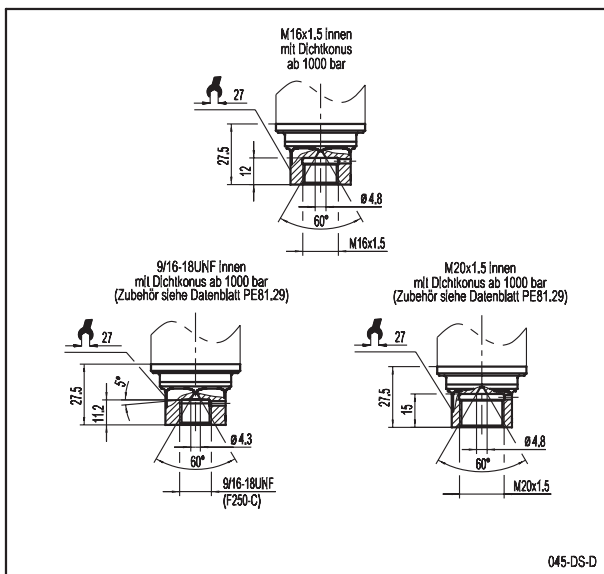
13.1 Dimension Diagrams





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13.2 Model Key

Signal output	
1	A 4 ... 20 mA, 2-wire R 4 ... 20 mA with HART® protocol, 2-wire¹⁾
Unit	
2	B bar S bar absolut <i>bis 16 bar abs</i>
Pressure range	
3	CA -1 bar ... 0 bar BM 0 bar ... 40 bar
	CD -1 bar ... 0,6 bar BO 0 bar ... 100 bar
	CH -1 bar ... 3 bar BQ 0 bar ... 250 bar
	CK -1 bar ... 5 bar BT 0 bar ... 600 bar
	CP -1 bar ... 15 bar BU 0 bar ... 1000 bar
	BB 0 bar ... 0,4 bar / bar absolute BV 0 bar ... 1600 bar²⁾ <i>only with aluminium case</i>
	BE 0 bar ... 1,6 bar / bar absolute BX 0 bar ... 2500 bar²⁾ <i>only with aluminium case</i>
	BH 0 bar ... 6 bar / bar absolute BZ 0 bar ... 4000 bar²⁾ <i>only with aluminium case</i>
	BK 0 bar ... 16 bar / bar absolute
Process connection	
4	GD G ½ B ML M16 x 1,5 female, with sealing cone <i>from 1600 bar</i>
	ND ½ NPT MP M20 x 1,5 female, with sealing cone <i>from 1600 bar</i>
	VZ 9/16 - 18 UNF female F 250-C <i>from 1600 bar</i>
	CS chemical seal <i>prices and designs according to chemical seals product range</i>
Special design features	
5	Z without
	E oil and grease free
	A oxygen, oil and grease free³⁾ <i>up to 1000 bar abs</i>
	O overvoltage protection according to IEC 801-5
Case material	
6	M highly resistive, fiberglass-enforced plastic (PBT)
	A Aluminium <i>Ingress protection IP 67</i>
Temperature range of medium	
7	T -30 ... +105 °C (-22 ... +221 °F)
	E -20 ... +60 °C (-4 ... +140 °F) <i>only for oxygen version</i>
Electrical connection	
8	A cable gland M20x1,5 with internal terminal block <i>standard</i>
	M 4 pin locking plug M12x1
Digital display	
9	Z without
	A with integrated 4-digit LCD-display
Approvals	
10	L EEx ia IIC T4-T6 in compliance with ATEX 100a <i>II 1/2 G for connection to zone 0</i>
	X EEx IP6X 1/2D, 2D + EEx ia IIC T4-T6 1/2G, 2G per ATEX⁴⁾
	C CSA
Additional order info	
11	YES NO
	1 Z quality certificates
12	T Z additional text

1) inclusive PACTware™ Starter Version for configuration

2) only with accuracy 0.5%; max. Turndown 2:1

3) max. temperature of medium 60°C

4) only in conjunction with aluminium case; not in conjunction with electrical connection code M (M12x1 plug)

Order code:

IUT-10	-	1	-	2	3	-	4	-	5	6	7	8	9	10	-	11	12

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		Signal output	
1	☐	A	4 ... 20 mA, 2-wire
	☐	R	4 ... 20 mA with HART [®] protocol, 2-wire ¹⁾
		Unit	
2	☐	B	bar
	☐	S	bar absolut <i>bis 16 bar abs</i>
		Pressure range	
3	☐	CA	-1 bar ... 0 bar
	☐	CD	-1 bar ... 0,6 bar
	☐	CH	-1 bar ... 3 bar
	☐	CK	-1 bar ... 5 bar
	☐	CP	-1 bar ... 15 bar
	☐	BB	0 bar ... 0,4 bar / bar absolute
	☐	BE	0 bar ... 1,6 bar / bar absolute
	☐	BH	0 bar ... 6 bar / bar absolut
4	☐	BK	0 bar ... 16 bar / bar absolut
	☐	BM	0 bar ... 40 bar
	☐	BO	0 bar ... 100 bar
	☐	BQ	0 bar ... 250 bar
5	☐	BT	0 bar ... 600 bar
	Process connection		
	☐	85	G 1 B, flush diaphragm with O-ring <i>up to 1,6 bar</i>
	☐	86	G 1/2 B flush diaphragm with O-Ring <i>> 1,6 bar</i>
6	☐	G6	G 1 1/2 B flush diaphragm <i>up to 16 bar</i>
	☐	83	G 1 flush diaphragm according to EHEDG <i>up to 16 bar</i>
		Material of wetted parts	
7	☐	1	stainless steel and O-ring from NBR <i>G 1 1/2 without O-ring</i>
	☐	L	stainless steel and O-ring from Viton
	☐	B	stainless steel and O-ring from EPDM
	☐	S	Hastelloy C4
		Special design features	
8	☐	Z	without
	☐	E	oil and grease free
	☐	O	overvoltage protection according to IEC 801-5
		Case material	
9	☐	M	highly resistive, fiberglass-enforced plastic (PBT)
	☐	A	Aluminium <i>Ingress protection IP 67</i>
		Electrical connection	
10	☐	A	cable gland M20x1.5 with internal terminal block <i>standard</i>
	☐	M	4 pin locking plug M12x1
		Digital display	
11	☐	Z	without
	☐	A	with integrated 4-digit LCD-display
		Approvals	
12	☐	L	EEEx ia IIC T4-T6 in compliance with ATEX 100a <i>II 1/2 G for connection to zone 0</i>
	☐	X	EEEx IP6X 1/2D, 2D + EEEx ia IIC T4-T6 1/2G, 2G per ATEX ²⁾
	☐	C	CSA
		Additional order info	
13	☐	YES	NO
	☐	1	Z
14	☐	T	Z
	☐	1	Z

1) inclusive PACT^{ware}™ Starter Version for configuration

2) only in conjunction with aluminum case; not in conjunction with electrical connection code M (M12x1 plug)

Order code:

IUT-11	-		-			-		-				S				-		
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13.3 Warranty Conditions

The pressure transmitter has a 24 month warranty in accordance with the WIKA General Terms of Delivery.



Warning

Repairs may only be carried out by the manufacturer. All other repairs and device modifications are unauthorized and will void the warranty.

13.4 Glossary

Adjustment	Allocation of the signal output range (4 ... 20 mA) to the desired pressure measurement range or level measurement range.
Integration	Also damping: timely communication of the measurement signal; rise time of the current output signal after a signal surge
Inversion	Conversion of the output signal from 4 ... 20 mA to 20 ... 4 mA
Nom. press. range	The operating pressure range for which the sensor is designed
Zero point	Start of the pressure measurement range
Parameterization	Also configuration: programming of the relevant parameters and the pressure measurement range specific to the application and measurement location.
Span	The programmed pressure measurement range
Span end point	The highest pressure value of the programmed measurement span (end-point of the span)
Tank linearization	Determination of approximate volume/pressure ratio values with non-linear correlations based on varying container designs For example, a non-linear correlation exists between the filling level and the volume in spherical containers. During linearization, the non-linear volume is assigned the 4 ... 20 mA output signal from a table of values (proximity process by means of up to 32 support points).
Defaults	The sensor parameters are programmed by the manufacturer

13.5 Units of Pressure Measurement

1 atm (atmospheres)	= 760 mm Hg = 760 Torr = 1.033 kp/cm ² = 0.1013 MPa
1 Torr	= 133.3 Pa
1 kp/mm ²	= 9.81 N/mm ² = 9.81 MPa
1 bar	= 0.1 MPa
1 mbar	= 1 hPa (Hektopascal)
1 psi (pound per square inch)	= 6.895 · 10 ³ Pa
1 bar	= 33.5 feet of water
1 Pa	= 1,000 · 10 ⁻⁵ bar
1 mmHG	= 1,333 mbar