OPERATING MANUAL

Universal measuring instrument for Pressure, Level, Temperature and Volume Flow measuring

Typ SMALL-Ex®

I Ex ia/ib I Ma/Mb
Ex ia/ib I Ma/Mb
PO Ex ia I X

II 1/2 G Ex ia IIC T4/T6 Ga/Gb
Ex ia IIC T4/T6 Ga/Gb

subject to modifications 04/17

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

General Information

Dear Customer,

The flow control device purchased, is a product of **Grünewald GmbH, 59069 Hamm** and is manufactured as a SMALL-Device for Pressure, Level and Temperature measuring for the use for liquid media in closed and filled systems.
To ensure long term and safe operation of the control device, read the operating manual attentively.
If further information is required please do not hesitate to contact our technical support via Grünewald GmbH, Oberallener Weg 7, 59069 Hamm, Tel. +49 (0)2385 922670,
Fax +49 (0)2385 922672.
Internet: www.gruenewald.eu
E-Mail: info@gruenewald.eu

SUMMARY

1. INTRODUCTION 3
2. GENERAL 3
   - 2.1 GENERAL INFORMATION TO THE OPERATING MANUAL 3
   - 2.2 GENERAL SAFETY INSTRUCTIONS 3
3. OBLIGATIONS OF THE OPERATOR 4
4. OBLIGATIONS OF USER PERSONNEL 4
   - 4.1 QUALIFIED PERSONNEL 5
5. WARRANTY AND LIABILITY 5
6. WARNINGS AND SAFETY RELEVANT STANDARDS 6
7. OBSERVING OF ENVIRONMENTAL RULES AND REGULATIONS 6
8. INTENDED PURPOSE OF USE 7
   - 8.1 RANGE OF APPLICATION 7
9. INSTALLATION / COMMISSIONING / ASSEMBLY INSTRUCTIONS 7
   - 9.1 INSTALLATION DIRECTIONS FOR THE SMALL DIFFERENTIAL PRESSURE MEASURING INSTRUMENT 8
   - 9.2 INSTALLATION DIRECTIONS FOR THE SMALL LEVEL MEASURING INSTRUMENT 9
   - 9.3 INSTALLATION DIRECTIONS FOR THE SMALL TEMPERATURE MEASURING INSTRUMENT 9
   - 9.4 INSTALLATION DIRECTIONS FOR THE SMALL VOLUME FLOW MEASURING INSTRUMENT 10
   - 9.5 INSTALLATION DIRECTIONS FOR THE SMALL MICROFLOW 10
   - 9.6 INSTALLATION DIRECTIONS FOR THE SMALL VISCOFLOW 11
   - 9.7 INSTALLATION DIRECTIONS FOR THE SMALL INCLINOMETER 12
10. CONNECTIONS 13
11. OPERATION, MAINTENANCE AND REPAIR 14
12. TRANSPORTATION / STORAGE 15
13. DESCRIPTION OF THE DEVICE 15
14. FUNCTIONING OF THE SMALL-DEVICE 16
15. HAZARDS 16
16. TECHNICAL ASSISTANCE 16
17. SCOPE OF DELIVERY 16
18. MODEL KEY 17
19. TECHNICAL DETAILS 20
20. 20.1 EG-MODEL TEST CERTIFICATE 22
    - 20.2 IECEX - CERTIFICATE 28
    - 20.3 IECEX – CERTIFICATE AUSTRALIA 29
    - 20.4 MA – CERTIFICATES 30
    - 20.5 EAC EX – CERTIFICATE 31

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

21. EU-DECLARATION OF CONFORMITY 32

1. Introduction

This operating manual will assist to operate SMALL-Device for Pressure, Level and Temperature measuring in a safe, proper and economical manner.

Observing the instructions of this manual will:
- Increase reliability and lifespan of the control facility.
- Prevent possible danger.
- Avoid down times caused by failures and repairs.

This manual must:
- be present whilst any installation, maintenance and repair work is performed.
- be read, acknowledged and applied by any person performing tasks to and at the SMALL-Device for Pressure, Level and Temperature measuring.

Grünewald monitoring and measuring devices are delivered ready for installation. No other preparations of the device are necessary.
The general installation and operating manuals as well as the product information's do therefore refer to the mechanical and electrical data of the individual device or assembly.

The SMALL-Device for Pressure, Level and Temperature measuring is manufactured to latest technical and safety relevant standards, rules and regulations. However, abuse and operation of the device within incorrect applications may result in serious injury or death of the user and/or a third party, as well as it may endanger equipment and other property.

2. General

2.1 General information to the operating manual

This operating manual contains all necessary information required, to ensure correct and safe installation as well as operation of the device. The manufacturer or distributor must be contacted for further information and assistance, if arising difficulties and problems can not be solved within the operating manual provided information. Changes to specification and design as well as improvements to the device are subject to change with out notice and are fully to the discretion of the manufacturer. Users of this operating manual must fulfil required qualification standards. Operating personnel must be trained in accordance to the operating manual.

2.2 General safety instructions

Read the operating manual of the SMALL-Device for Pressure, Level and Temperature measuring prior commencement of any work and acknowledge instructions during execution and operation.

The correct condition and operation of the device as well as the compliance with safety rules and regulations is to the full responsibility of the operator. The SMALL- Device is manufactured to latest technical and safety relevant standards, rules and regulations. However, abuse and operation

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

of the device within incorrect applications may result in serious injury or death of the user and/or a third party, as well as it may endanger equipment and other property.

Use and operation of the flow control device is only permitted when:

- the compliance with the intended purpose of use is granted.
- the condition of the device complies with safety relevant rules.

Take note of the technical data of the SMALL-Device for Pressure, Level and Temperature measuring and the ambient temperatures. The intended purpose of use of SMALL-Device for Pressure, Level and Temperature measuring is described with in chapter 8 of this Documentation and must be acknowledged. Awareness of the basic safety instructions and rules is the minimal requirement for the safe use and trouble free operation of SMALL-Device for Pressure, Level and Temperature measuring Additionally, all site specific rules and regulations, such as, but not limited to, occupational health and safety rules, rules and standards for erecting and using of electric and mechanical facilities, as well as radio noise suppression rules and standards, must be complied with.

Pay attention and care to tidiness of workspace during performance of repair and maintenance tasks. Do not eat or smoke during work. Unauthorized altering or modifying the equipment will cause loss of any warranty and liability provided by the manufacturer.

Take note of the operating manual and pay special attention to safety symbols and safety instructions on the device and the documentation. Please store the operating manual carefully.

3. Obligations of the Operator

It is the full responsibility of the operator that only persons complying with below out lined regulations are authorized to work on and with the devices.

Persons authorised must,

- be confident and trained with rules of occupational health and safety und the handling and operation of the equipment.
- has read, understood and acknowledged the safety instructions and warnings of this operating manual and all other, with the device associated documentations.
- is examined for compliance and consciousness of work place safety rules on regular bases.

Installation, maintenance and repair work must be performed by trained and qualified personnel only. Faults, which may influence safety, must be rectified immediately.

4. Obligations of User Personnel

Personnel authorized to fulfil tasks at the SMALL-Device for Pressure, Level and Temperature measuring must be familiar with the operating manual.

Persons authorized to work on the device must permanently commit them self's to:

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

- Acknowledge the basic occupational health and safety rules at all times.
- Read and acknowledge safety instructions and warnings of this operating manual.

4.1 Qualified personnel

These are persons, familiar with the installation, assembly, commissioning and operation of the product. Furthermore these persons must be qualified and trained for tasks, these persons are authorized to perform. (E.g. training and obligation to maintain required operating conditions in accordance to regional and site-specific rules and regulations).

Education or training for care and use of safety and protective equipment, according relevant standards of safety techniques.

5. Warranty and Liability

Our standard terms and conditions of sale and delivery apply, unless other conditions for warranty and liability were explicitly mutually agreed upon. Claims of warranty or liability leading back to any of the below described causes is not legitimate.

- Using the SMALL-Device for Pressure, Level and Temperature measuring not in compliance with the intended purpose of use of this item.
- Incorrect installation, commissioning, operation and maintenance of the SMALL-Device for Pressure, Level and Temperature measuring
- Operation of the SMALL-Device for Pressure, Level and Temperature measuring in conjunction with defective safety devices or in correctly installed safety and protective devices.
- Neglecting of instructions regarding transportation, storing, installation, commissioning, operation and maintenance of the SMALL-Device for Pressure, Level and Temperature measuring
- Unauthorized modification or adjustments of the SMALL-Device for Pressure, Level and Temperature measuring.
- Inappropriate condition monitoring of parts subject to wear.
- Incorrect repairs, inspections and maintenance.
- Catastrophic failures caused by external forces and force majeure.

Any liability for damages caused by in correct operation of the SMALL-Device for Pressure, Level and Temperature measuring will be rejected.

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

6. Warnings and Safety relevant Standards

For references to special hazards and uncommon information's signal the terms **DANGER, WARNING, ATTENTION** and **REMARK** are used within this operating manual.

DANGER neglecting may cause danger to life and/or serious damage to property.

WARNING neglecting may cause, serious injury and/or damage to property.

ATTENTION neglecting may cause, injury and/or damage to property.

REMARK indicates that special attention to technical correlations is required.

To prevent injury and damage of property due to failure of the device, the acknowledgement of the not specially marked instructions for transportation, installation, product range and maintenance is an absolute necessity.

7. Observing of Environmental Rules and Regulations

Rules and regulations for waste prevention and disposal must be followed at all times when working with or at the SMALL-Device for Pressure, Level and Temperature measuring Materials that may endanger and pollute water such as:

- Grease, oil and Lubricants
- Hydraulic fluids
- Coolants
- Cleaning fluids containing solvents

must not be emitted to surrounding soil, waters and drains. Such materials must be stored, transported and caught, in suitable containers. For safe and environmentally friendly disposal of hydraulic fluids and with such fluids contaminated materials, national and international laws, rules and regulations must be acknowledged.

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

8. Intended Purpose of Use

The SMALL-Device for Pressure, Level and Temperature measuring is exclusively designed to monitor liquid mediums within closed and filled systems.
Any adaptation as well as modification or extension of the device, not complying with the intended purpose of use is prohibited and requires the explicit and exclusive approval of the manufacturer.

Acknowledgement of the operating manual and instructions for inspection and maintenance as well as the observance of inspection and maintenance intervals are subject of the intended purpose of use.

Any damage that may arise out of the incorrect use will not be at the responsibility of the manufacturer. The sole risk devolves at the user.

8.1 Range of Application

The usage of the SMALL-Device for Pressure, Level and Temperature measuring is only allowed in pipelines which are suitable in diameter and pressure, and are only for water or water like mediums without a great deal of pollution.

Changes to specifications are only permitted prior to consent from Grünewald GmbH, 59069 Hamm.

9. Installation / Commissioning / Assembly Instructions

- **DANGER**
  - Take notice of operating pressure and pressure level
  - Use device with fluids specified only
  - Take notice of maximum flow
  - Bleed system prior start up

- **WARNING**
  - Take notice of flow direction
  - Do not install directly after a pump
  - **Do not weld with built-in unit!**
    The device will be destroyed

- **ATTENTION**
  - Seal during installation
  - Use circuit diagram when wiring
  - Check circuit to prevent overloading

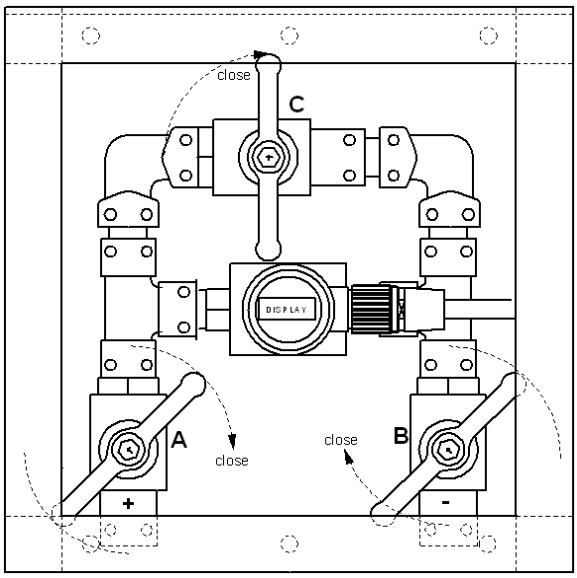
- **NOTE**
  - If required take notice of mounting position
  - Notice the specifications of the switch and gauge tolerances
  - A tranquilliser length of 5 x pipe diameter is recommended
  - The System pressure must exceed the pressure drop caused by the device
  - Overhead assembly only for clean medium

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

9.1 Installation directions for the SMALL differential pressure measuring instrument

When installing-/ commissioning the differential measuring instrument the following installation directions must be heeded:

(For a secure and safe operation of the differential measuring instrument, we recommend an installation frame from Grünewald GmbH)
The installation of the measuring instrument with frame should be carried out as follows:



Commissioning the Differential pressure measuring instrument

Before installing the frame, all of the valves must be closed and the connection pipes must be pressureless. Connection of the pressure pipes and electrical parts are only allowed to be carried out by qualified personnel. The technical handbook must be read and understood before installation.

1.) At first open valve in the middle (C) position.
2.) Then left valve (A) and right valve (B) in "open" position
3.) Let removing whole air from system.
4.) Close middle valve (C).
5.) Measurement can be started.

Notice/Important:

If more than 7,5 / 15 bar maximal pressure is applied from one side, the measuring instrument will fail.

Measuring Range 0 – 2 bar: max. Differential pressure 7,5 bar
Measuring Range 0 – 5 bar: max. Differential pressure 15 bar

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

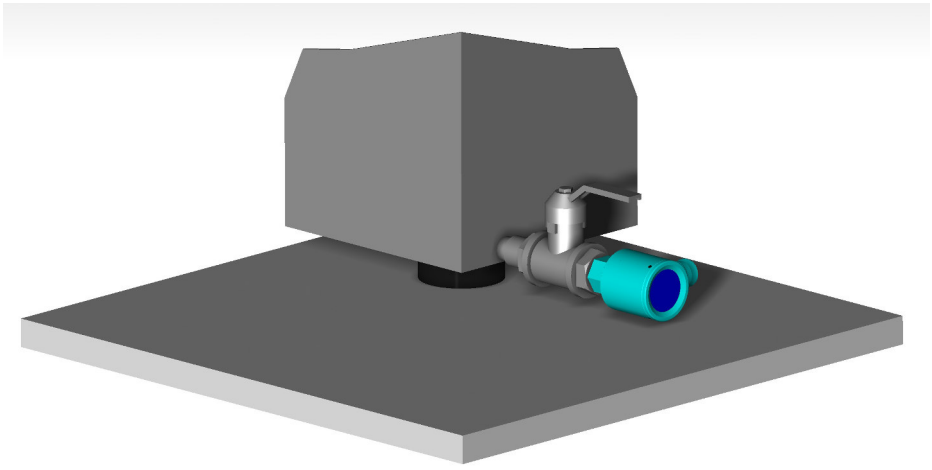
9.2 Installation information only for the pipe less Small level measuring device.

When installing/commissioning the pipe less level measuring device, the following instructions must be heeded to ensure that the level device operates correctly.

Owing to the low operating area of the level device, it must not be mounted next to a closed shut off valve or in/outlet pipe.

Strong circulation velocity inside the measuring tank may lead to incorrect measuring, if needed, the measuring device can be separated by mounting a bulkhead in front of the measuring device.

The housing connection for the internal pressure equalisation, must be mounted facing downwards to protect the device from moisture (see sketch).



9.3 Installation information for the Small temperature measuring device.

When installing/commissioning the temperature measuring device, the following instructions must be heeded to ensure that the temperature device operates correctly.

The device probe length must be coherent to the pipe diameter.

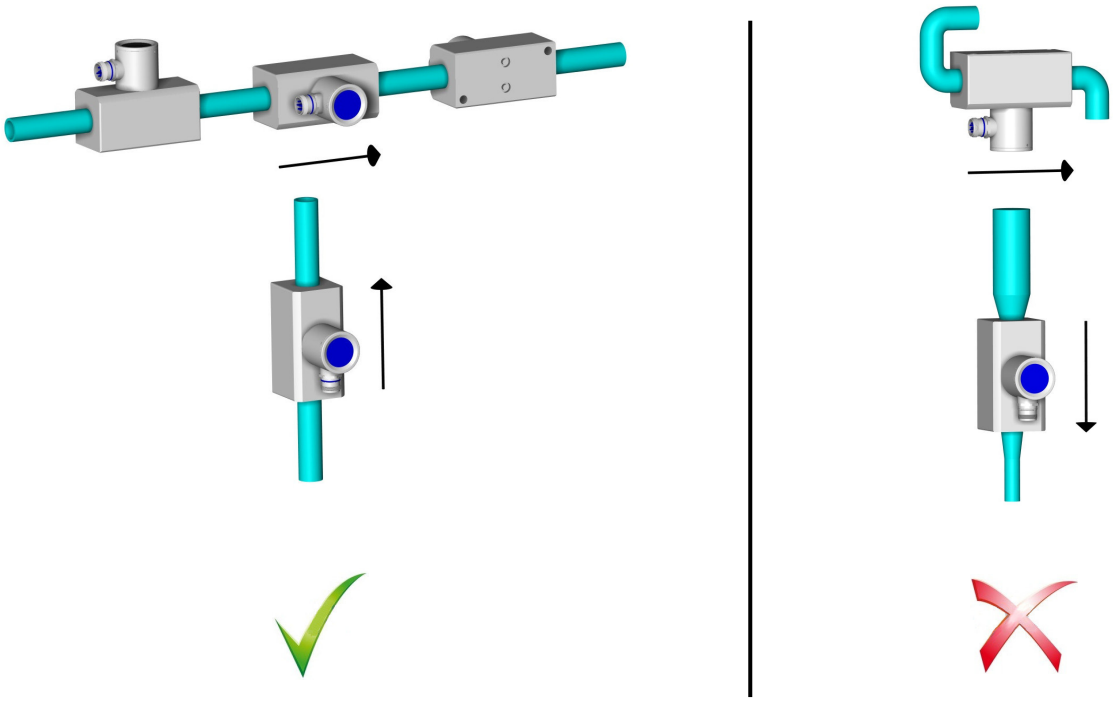
The measuring device can be directly installed into a maximum pressure system of 80 bars (1160 psi).

When using an immersion sleeve, the temperature device must have adequate conductivity paste between the housings. (Art Nr 7-05-99-024).

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

9.4 Installation information for the Small Volume Flow measuring instrument

- only for use in defined medium (water)
- pay attention to maximum volume flow
- pay attention to maximum pressure
- exhaust the system before commissioning
- attend the direction of flow
- avoid the installation with adaptors/reducers and 90° bends
- straight unimpeded in- and outflow section of 5xD (before and behind the instrument) is recommended
- avoid to install the instrument directly behind a pump station
- use seals at the mechanical connection



9.5 Installation information SMALL-V "MicroFlow"

It is important to ensure that magnetic and inductive effects are minimized.

The device should only be horizontally mounted with the electronics up through the mounting holes on the bottom.

Avoided any type of mechanical Adapters (like connect-o) unless they are pre-assembled by Gruenewald.

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

9.6 Installation information SMALL-V "ViscoFlow"

The SMALL "ViscoFlow" is made to measure the volume flow of pure oil. It is important **not** to use this instrument for other liquids especially water!

It is important to ensure that only filtered oil flows through the instrument.

Because of the measuring principle the ViscoFlow generates a differential pressure in the system. Make sure the differential pressure is much lower than the system pressure! Please ask Gruenewald for the differential pressure of your instrument which depends on the used instrument, max. volume flow and viscosity of the measured oil.

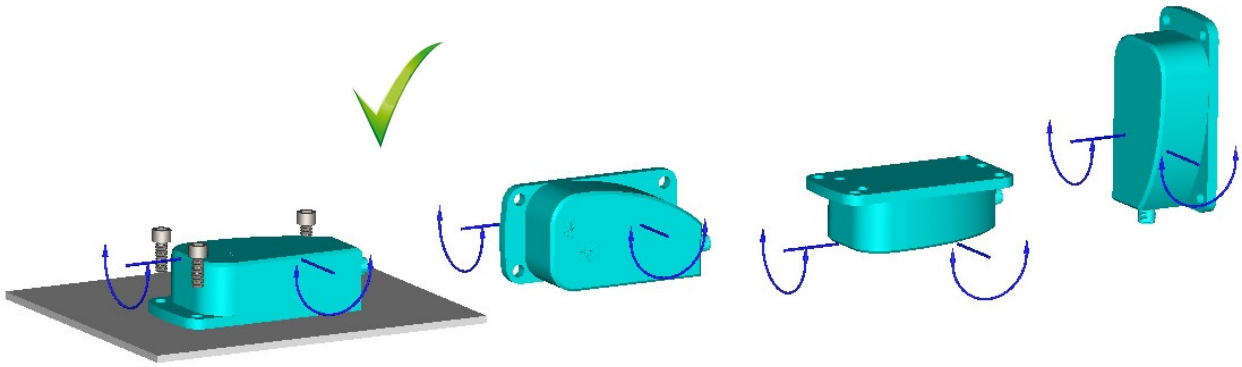
You do not need to install the instrument in special direction, horizontal or vertical. You also do not need to use in- and outflow section of 5xD.

It is important to ensure that magnetic and inductive effects are minimized.

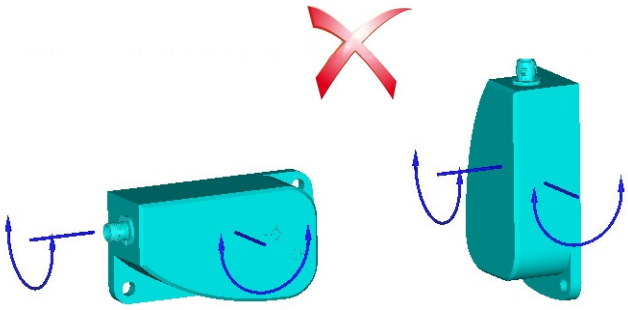
Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

9.7 Installation information SMALL Inclinometer

The sensor is mounted on a level, even in the X and Y plane horizontally aligned surface. The mounting surface must be free of any irregularities and surface contaminants otherwise. The mounting of the tilt sensor must be carried out safely and permanently resistant in accordance with local conditions.



Mounting position: A B C D



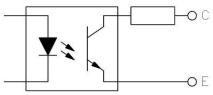
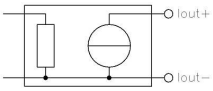
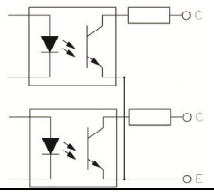
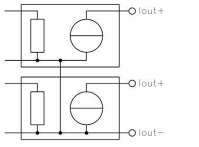
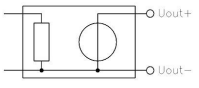
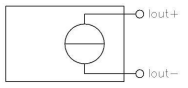
The angle association with the x- and y- axis is seen from the axis from zero:

-	Clockwise:	Positive	e.g. -70° ... +70° e.g. 4 ... 20mA
-	Counter clockwise:	Negative	e.g. +70° ... -70° e.g. 20 ... 4mA

The relevant axis (X or Y) applies when viewing always considered the evaluated rotational axis.

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

10. Connections

		Wire connection [Wire type A, DIN EN 50394-1]	Wire connection	Plug connector PROMOS system	Plug connector HARTING system	Plug connector SOURIAU system
Supply voltage V_{cc} 12V DC 24V DC		white	Wire 1	PIN 7	PIN 1	PIN 1
Supply voltage GND 0V		brown	Wire 2 = I_{out}- = U_{out}-	PIN 5	PIN 2	PIN 2
SMALL ... F		green = C yellow = E (galvanically separated)		PIN 4 = C PIN 5 = E	PIN 4 = C PIN 5 = E PIN 3 = Screen (galvanically separated)	PIN 3 = C PIN 2 = E
SMALL ... S0 SMALL ... S4			Wire 2 = I_{out}- Wire 3 = I_{out}+	PIN 4 = I_{out}+ PIN 5 = I_{out}-	PIN 4 = I_{out}+ PIN 5 = I_{out}- Pin 3 = Screen	PIN 3 = I_{out}+ PIN 2 = I_{out}-
SMALL N+T ... F		--	Wire 5 (N) = C Wire 4 (T) = C Wire 3 = E	--	PIN 5 (N) = C PIN 4 (T) = C PIN 3 = E	--
SMALL N+T ... S0 SMALL N+T ... S4		--	Wire 5 (N) = I_{out}+ Wire 4 (T) = I_{out}+ Wire 3 = I_{out}-	--	--	--
SMALL ... U		--	Wire 3 = U_{out}	PIN 4 = U_{out}+ PIN 5 = U_{out}-	PIN 4 = U_{out}+ PIN 5 = U_{out}- Pin 3 = Screen	PIN 3 = U_{out}+ PIN 2 = U_{out}-
SMALL..24...S4 (2- Leiter)		white (+24V) Iout+ brown (0V) Iout-	wire 1 (+24V) Iout+ wire 2 (0V) Iout-	--	Pin 1 (+24V) Iout+ Pin 2 (0V) Iout-	Pin 1 (+24V) Iout+ Pin 2 (0V) Iout-

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

If not otherwise stated, the supply voltage and the exit signal are not galvanically separated.

Devices with 2 combined measuring systems (for example level and temperature measuring), the power supply must be used corporately by one power supply unit exclusively.

When connecting the power supply cable, the earthing from the supply unit must be connected.

11. Operation, Maintenance and Repair

Rules and regulations for workplace safety and occupational health and safety apply for the operation of the device.

Modifications, add-ons and / or changes to the SMALL-Device for Pressure, Level and Temperature measuring may influence safety and must not be performed unless approved by the manufacturer.

The devices are maintenance-free apart from periodically cleaning which depends on the amount of contamination in the medium and the surrounding environment.

- Appropriate workshop equipment is absolutely necessary for the execution of maintenance measures.
- Regulations for electrical equipment must be observed.
- Incorrect use, operation or repair may result in severe injury or death.
- Prior any repair or maintenance task commences local rules and regulations must be acknowledged.

Special note for the explosion-protection:

- The devices may be installed inside the - **group 1, category M1**
  - **group 2, category 1/2**

  The construction of the installation of the intrinsically safe electric circuit is to conduct accordingly of the effective mounting-appointment (by specialists).
  (Competence of assembler verified, protected transferring of the intrinsically safe electric circuit, etc.)
- The devices are constructed in the protection category IP67 and the level instruments IP 54 and therefore they must be protected accordingly at adverse environmental requirements for example splash water or dirt above pollution degree 2.

The **EG-mark-verification certificate** contains "special term" restrictions <u>exclusively</u> on the mechanical device-mounting by usage in group 2.
By usage of the devices in group 1, <u>no</u> special requirements exist.

Excerpt from the type examination certificate:

(17) <u>Special terms for safe application:</u>

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

17.1 The installation of the sensor and the connector when mounting the device on the wall, that category 1 G equipment needs, must be carried out in such a way that the protection class IP67 according to EN 60529 is heeded and that the metal sensor housing/connector pin inside the potential equalisation is taken into consideration.

17.3 The technical information from the manufacturer of the application of the sensor in connection with aggressive and/or corrosive mediums and to prevent mechanical hazards are to be heeded.

- The device must only be used according to construction regulations.
- The connection to the power supply must be checked and tested.
- **Fluid technical connection:** before connection to the pipeline, **check pipleline for pollution and contamination.**
- Only after **correct fitting and examination** are the medium supply to be opened.

The electrical connections are to use the connection clamps and/or plug. A professional and secure installation and a continual maintenance of the IP protection is required.

12. Transportation / Storage

- Transport temperatures shall not exceed the range of -20°C to 60°C within a dry and clean environment.
- Protect against external forces.
- Storage temperatures shall not exceed the range of -20°C to 60°C within a dry and clean environment.
- To prevent any condensation of water when stored in rooms with a high degree of humidity, measures such as heating of the room or application of drying agents is required.

13. Description of the device

The universal measuring device type SMALL is an uniformed standardised device for Pressure, Level and Temperature measuring. The devices are made to withstand very hard and difficult areas of deployment. Because of their very solid construction they are able to withstand very high levels of burden.
The round device version are fitted with or without a digital display optionally. The In-Line version are categorically not fitted with a digital display.
The mechanical fitting can be optionally be fitted with a thread selectively, flange or a coupling system. The electrical fitting can be optionally fitted with a coupling plug in any chosen form, a PROMOS connector or wire connection in various lengths.
For the subsequent measuring value transmission there are various exit signals available, they are 5 – 15 Hz optionally 0 – 20 mA or 4 – 20 mA and optionally a currant with * to ** V.
When using measuring devices with stepped sensor and evaluation unit, the corresponding sensor must be used.

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

14. Functioning of the SMALL-Device

The SMALL-Device for Pressure, Level and Temperature measuring transforms the physical quantities of the medium (pressure, temperature) into an electrical signal. These measurable quantities are available and stand behind the following superior systems (control system).

The measuring signals can be:
- Frequency: (5-15Hz)
- Current: (0/4-20mA)
- Voltage: (*-**V)

A direct display of the locally measured data is possible, using the optional digital display. Because of good readability the digital display is generously dimensioned. Because of safety technical reasons the exit signals have a minimal offset tolerance programmed.

These are as follows:			
	Frequency:	+0,05Hz	(5,05Hz)
	Current:	+0,1mA	(0,1/4,1mA)
	Voltage:	+0,1V	(*+0,1V)

The following signal evaluations are to be accordingly matched and adjusted.
If the range is exceeded by more than + 10%, a fault message is given in the form of P_High, and a P_Low is displayed if the measuring range is below -10%.
The display also performs an internal system check at regular intervals.

15. Hazards

To avoid risk of damage or injury, the safety instructions of this operating manual must be applied and carried out!
When fitting or dismantling the device, the safety regulations of the country regarded must be applied by. Especially when working on electrical components, are the work safety rules to be followed. In Germany the ZH 1/94 "Safety handbook for qualified craftsmen" is to be applied.

It is not known that the device concerning the guidelines 89/336/EWG is not affected against electromagnetic disturbance that occur during normal operating procedures.
Special terms, that are given from the EMV-environment are to be applied and the manufacturer is to be notified.

Dangers that arise whilst fitting and connecting the device are to be considered and the corresponding actions are to be taken and a hazard analysis is to be rendered.

16. Technical assistance

For assistance in an event of malfunctioning or failure of the device please contact

Grünewald GmbH, 59069 Hamm

Tel. *+49 02385 922670, Fax +49 02385 922672*

or *E-Mail: info@gruenewald.eu*

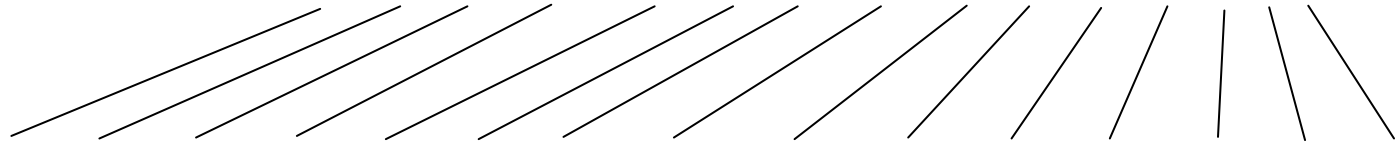
17. Scope of delivery

- SMALL-Device for Pressure, Level and Temperature measuring
- Operating manual
- Additional documentation: Datasheets

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

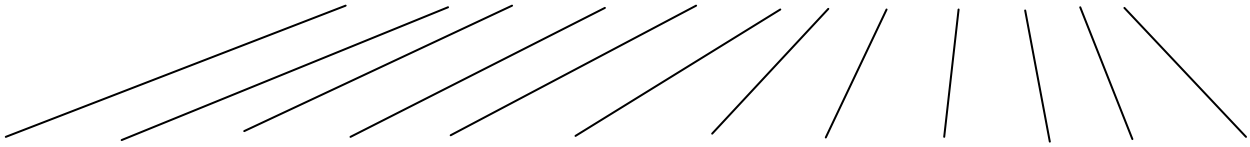
18. Model Key

SMALL-V //**/*** ***/**/**/***/**/**/**/**/*/*/***



Meas. mode	Constr.	Nominal Voltage	Range	Scale Unit	Diame-ter	Max. System-pressure	Additional measuring	Mech. connection	Electr. connection	Display	Sensor adjustment	Port 1	Port 2	Port 3
V Volumen	**RG** [Round]	**12** [12V DC] **E12** [12V DC Extern] **24** [24V DC nur 2-Leiter Ausf.]	*** [0-***]	**L** [l/min] **cbm** [cbm/h] **%** [%] * [Sonder]	*** [DN***]	*** [PN***]	***C** [0-** °C] ***b** [0-** bar]	**G** [Inside thread] **F** [Flange] **O** [Connect- O] ** [Special]	**B** [PROMOS BN41...AT] **H** [HARTING] **S** [SOURIAU] **L...m** [Leitung mit Länge in m] ** [System **]	**A** [with dis-play] **KA** [without display] – [no display]	**KG** [compact design] **AS...m** [Split sensor with cabling in m] – [no split sensor]	**S0** [0-20 mA] **S4** [4-20 mA] **S..-..** [*-** mA] **U..-..** [*-**V max. 10V]	**F** [5-15 Hz]	**3-Wire** **C** [CAN-Open] **P** [PROFI-BUS RS485] **2-Wire** **H** [HART]
	IL [In- Line]	**12** [12V DC] **24** [24V DC nur 2-Leiter Ausf.]												

SMALL-P //**/*** ***/**/*/**/**/**/*/***



Meas. mode	Constr.	Nominal Voltage	Range	Scale Unit	Mech. connection	Electr. connection	Display	Sensor ad-justment	Port 1	Port 2	Port 3
P Pressure	**RG** [Round]	**12** [12V DC] **E12** [12V DC Ex-tern] **24** [24V DC only 2-Wire]	*** [0-***]	**mb** [mbar] **b** [bar] ** [Special]	**G1** [G¼ A] **G2** [G½ A] **G3** [G¾ A] **O** [Connect- O] ** [Special]	**B** [PROMOS BN 41...AT] **H** [HARTING] **S** [SOURIAU] **L...m** [Wiring with Length in m] ** [System **]	**A** [with Display] **KA** [without Display] – [no Dis-play]	**KG** [Compact Design] **AS...m** [Split sensor with length in m] – [no Split sensor]	**S0** [0-20 mA] **S4** [4-20 mA] **S..-..** [*-** mA] **U..-..** [*-**V max. 10V]	**F** [5-15 Hz]	**3-Wire** **C** [CAN-Open] **P** [PROFIBUS RS485] **2-Wire** **H** [HART]
	IL [In-Line]	**12** [12V DC] **24** [24V DC only 2-Wire]									

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

SMALL-T /**/**/*** ***/**/***/***/**/***/**/*/*

Meas. mode	Constr.	Nominal Voltage	Range	Scale Unit	Mech. connection	Probe lenngth	Electrical connection	Display	Sensor adjustment	Port 1	Port 2	Port 3
T Temperature	RG [Round]	12 [12V DC] E12 [12V DC Extern] 24 [24V DC only 2-Wire]	*** [0-***]	C [°C] F [°F] * [Special]	G1 [G¼ A] G2 [G½ A] G3 [G¾ A] O [Connect- O] ** [Special]	50 [50mm] 100 [100mm] 150 [150mm] 200 [200mm] *** [***mm]	B [PROMOS BN 41...AT] H [HARTING] S [SOURIAU] L...m [Wiring with Length in m] ** [System **]	A [with Display] KA [without Display]	KG [Compact Design] AS...m [Split Sensor with length in m]	S0 [0-20 mA] S4 [4-20 mA] S..-.. [*-** mA] U..-.. [*-**V max. 10V]	F [5-15 Hz]	3-Wire C [CAN-Open] P [PROFIBUS RS485] 2-Wire H [HART]
	IL [In-Line]	12 [12V DC] 24 [24V DC only 2-Wire]						– [no Display]	– [no Split Sensor]			

SMALL-TS /**/**/*** ***/**/***/**/***/**/*/*

Meas. mode	Constr.	Nominal Voltage	Range	Scale Unit	Mech. connection	Electrical connection	Display	Sensor adjustment	Port 1	Port 2	Port 3
TS Temperature-switch	RG [Round]	12 [12V DC] E12 [12V DC Extern] 24 [24V DC only 2-Wire]	*** [0-***]	C [°C] F [°F] * [Special]	F [Flange] G1 [G¼ A] G2 [G½ A] G3 [G¾ A] O [Connect- O] ** [Special]	B [PROMOS BN 41...AT] H [HARTING] S [SOURIAU] L...m [Wiring with length in m] ** [System **]	A [with Display] KA [without Display]	KG [Compact Design] AS...m [Split Sensor with length in m]	S0 [0-20 mA] S4 [4-20 mA] S..-.. [*-** mA] U..-.. [*-**V max. 10V]	F [5-15 Hz]	3-Wire C [CAN-Open] P [PROFIBUS RS485] 2-Wire H [HART]
	IL [In-Line]	12 [12V DC] 24 [24V DC only 2-Wire]					– [no Display]	– [no Split Sensor]			

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

SMALL-N /**/**/*** ***/**/**/***/***/**/***/**/*/*

Measuring Mode	Design	Nominal Voltage	Measuring Range	Unit	Difference	Additional Measuring	Mechanical Connection	Electrical Connection	Display	Sensors Adjustment	Port 1	Port 2	Port 3
N Level	RG [Round-Instr.]	12 [12V DC] E12 [12V DC external] 24 [24V DC only 2-wire Techn.]	*** [0-***]	mm [mm / mmWs Construction with probe tube] mb [mm / mmWs construction without probe tube] % [%] * [special]	D Difference-measuring	– [no specifications] **C [0-***C for construction with internal temperature measuring]	construction with probe tube G [G1¼ A] F [Flange] construction without probe tube G1 [G¼ A] G2 [G½ A] G3 [G¾ A] O [Connect- O] ** [special]	B [PROMOS BN 41...AT] H [HARTING] S [SOURIAU] L...m [Cable with length in m] ** [special **]	A [with display] KA [without display]	KG [Compact-Instrument] AS...m [Stepped sensors with length in m]	S0 [0-20 mA] S4 [4-20 mA] S..- .. [*-** mA] U..- .. [*-**V max. 10V]	F [5-15 Hz]	3-Wire Techn. C [CAN-Open] P [PROFIBUS RS485] 2-Wire Techn. H [HART]
	IL [In-Line-Instr.]	12 [12V DC] 24 [24V DC only 2-wire Techn.]							– [without display]	– [no stepped sensors]			

Other types of connections, fittings, measuring-ranges, ... on request.

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

19. Technical Details

Nominal voltage:			7,5 – 14,0 V DC (3 – wire) 9,6 – 16,1 V DC (3 – wire) 20,4 – 26,6 V DC (2 – wire) 8,0 – 14,0 VDC (CANOpen)
Nominal current pro measuring system:			12mA (Frequency output); 21mA with Dspl. 12/16 – 32mA (0/4–20mA currency output) 21/25-41 mA with Display 16mA (Voltage output); 25mA with Dspl. 31mA (incl. 20mA Output) 11mA (without 20mA Output) With multiple measurements may be dependent on the configuration of the total rated current of up to 130mA at maximum expansion. Detailed data are available on request from the manufacturer.
Output Signal:			5 – 15Hz using Optocoupler 0 – 10V active output (potential linked) Working resistance min.15KΩ 0/4 – 20mA active output (potential linked) Working resistance max. 200Ω CAN-Open (High speed)
Signal range:			5 – 15,2Hz, 0 – 10,75V, 0/4 – 21,5mA
Dimensions: (without Sensor, without connector)	Round-Design: Ø = 50mm H = 55mm		In- Line- Design: Ø = 30mm L = 100mm
Weight:	depending on type		depending on type
Environmental Temperature:	-50 to +100°C -50 to +80°C		at group I at group II and at level-measuring
Measuring ranges:	Pressure:	- 0 to 0,3bar - 0 to 1,0bar - 0 to 5,0bar - 0 to 20bar - 0 to 100bar - 0 to 400bar - 0 to 1000bar (1000bar with reservation / after consulting)	- 0 to 0,5bar - 0 to 2,0bar - 0 to 10bar - 0 to 50bar - 0 to 200bar - 0 to 600bar
	Level:	- 0 to ***mm	

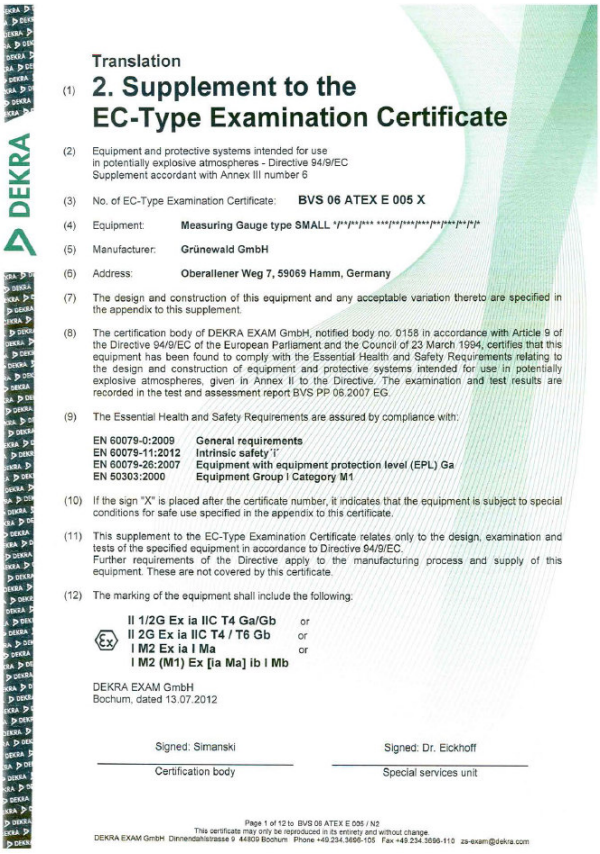
Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

Temperature:	- 0 to 40°C - 0 to 60°C
Gauging accuracy:	± 0,5 % FS
EG- mark-verification- certificate:	BVS 06 ATEX E 005 X IECEx BVS 09.0056X IECEx TSA 13.0023X ROSS DE.GB 05.W02997 18-ISA 15 0004-0
Marking:	Ⓔx I Ex ia/ib I Ma/Mb Ex ia/ib I Ma/Mb
	Ⓔx II 1/2 G Ex ia IIC T4/T6 Ga/Gb Ex ia IIC T4/T6 Ga/Gb
	PO Ex ia I X

We reserve the right to make changes to our equipment that are due to technical progress.

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

20.1 EG-Model test certificate



Translation

(1) **2. Supplement to the EC-Type Examination Certificate**

(2) Equipment and protective systems intended for use in potentially explosive atmospheres - Directive 94/9/EC
Supplement accordant with Annex III number 6

(3) No. of EC-Type Examination Certificate: **BVS 06 ATEX E 005 X**

(4) Equipment: **Measuring Gauge type SMALL */**/**/*** ***/**/***/***/**/**/**/*/***

(5) Manufacturer: **Grünewald GmbH**

(6) Address: **Oberallener Weg 7, 59069 Hamm, Germany**

(7) The design and construction of this equipment and any acceptable variation thereto are specified in the appendix to this supplement.

(8) The certification body of DEKRA EXAM GmbH, notified body no. 0158 in accordance with Article 9 of the Directive 94/9/EC of the European Parliament and the Council of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive. The examination and test results are recorded in the test and assessment report BVS PP 06.2007 EG.

(9) The Essential Health and Safety Requirements are assured by compliance with:

EN 60079-0:2009	General requirements
EN 60079-11:2012	Intrinsic safety 'i'
EN 60079-26:2007	Equipment with equipment protection level (EPL) Ga
EN 50303:2000	Equipment Group I Category M1

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the appendix to this certificate.

(11) This supplement to the EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to Directive 94/9/EC.
Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

II 1/2G Ex ia IIC T4 Ga/Gb or
II 2G Ex ia IIC T4 / T6 Gb or
I M2 Ex ia I Ma or
I M2 (M1) Ex [ia Ma] ib I Mb

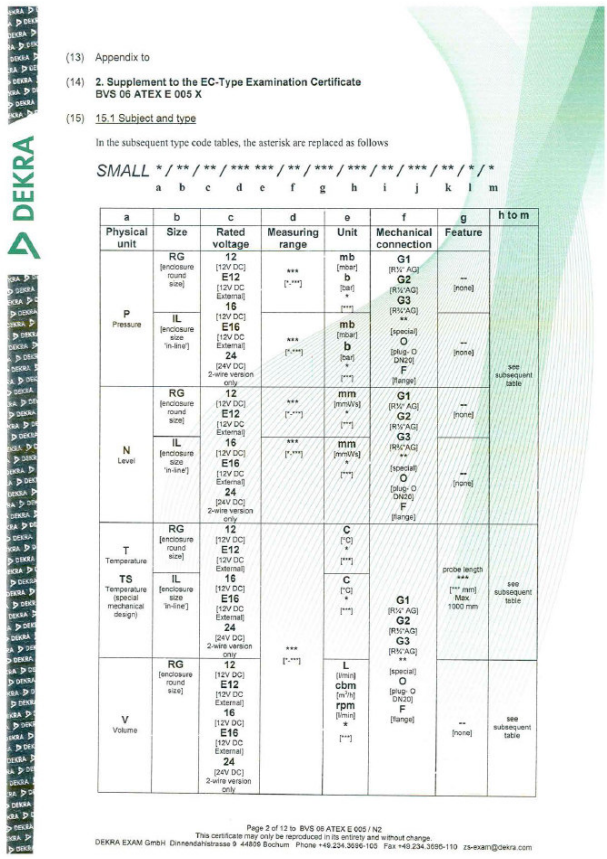
DEKRA EXAM GmbH
Bochum, dated 13.07.2012

Signed: Simanski — Certification body

Signed: Dr. Eickhoff — Special services unit

DEKRA EXAM GmbH Dinnendahlstrasse 9 44809 Bochum Phone +49.234.3696-105 Fax +49.234.3696-110 zs-exam@dekra.com

Page 1 / 12



(13) Appendix to

(14) **2. Supplement to the EC-Type Examination Certificate BVS 06 ATEX E 005 X**

(15) 15.1 Subject and type

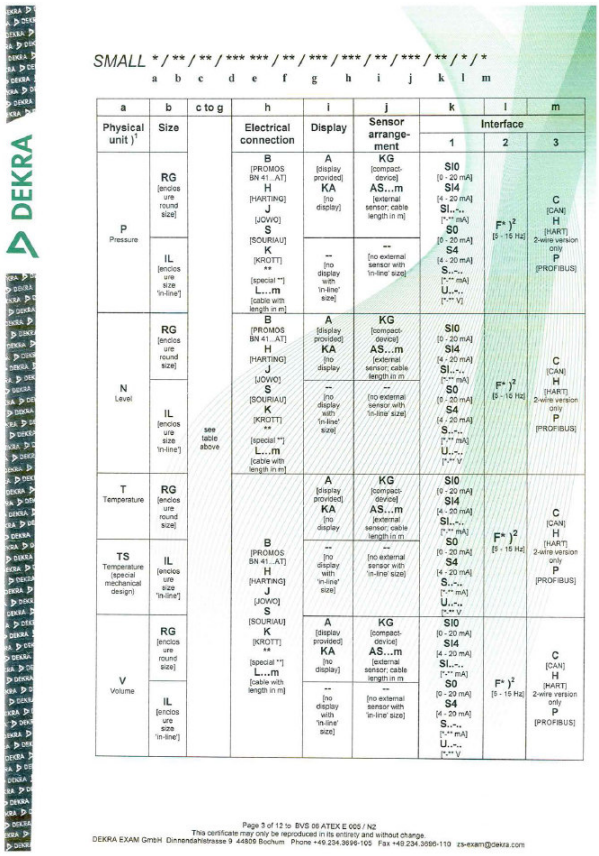
In the subsequent type code tables, the asterisk are replaced as follows

*SMALL * / ** / ** / *** *** / ** / *** / *** / ** / *** / ** / * / **
a b c d e f g h i j k l m

a	b	c	d	e	f	g	h to m
Physical unit	Size	Rated voltage	Measuring range	Unit	Mechanical connection	Feature	
P Pressure	RG [enclosure round size]	12 [12V DC] E12 [12V DC External] 16 [12V DC] E16 [12V DC External] 24 [24V DC] 2-wire version only	*** [*.***]	mb [mbar] b [bar] * [***]	G1 [R¼" AG] G2 [R½"AG] G3 [R¾"AG] ** [special] O [plug- O DN20] F [flange]	-- [none]	see subsequent table
	IL [enclosure size 'in-line']		*** [*.***]	mb [mbar] b [bar] * [***]		-- [none]	
N Level	RG [enclosure round size]	12 [12V DC] E12 [12V DC External] 16 [12V DC] E16 [12V DC External] 24 [24V DC] 2-wire version only	*** [*.***]	mm [mmWs] * [***]	G1 [R¼" AG] G2 [R½"AG] G3 [R¾"AG] ** [special] O [plug- O DN20] F [flange]	-- [none]	
	IL [enclosure size 'in-line']		*** [*.***]	mm [mmWs] * [***]		-- [none]	
T Temperature	RG [enclosure round size]	12 [12V DC] E12 [12V DC External] 16 [12V DC] E16 [12V DC External] 24 [24V DC] 2-wire version only	*** [*.***]	C [°C] * [***]	G1 [R¼" AG] G2 [R½"AG] G3 [R¾"AG] ** [special] O [plug- O DN20] F [flange]	probe length *** [*** mm] Max. 1000 mm	see subsequent table
TS Temperature (special mechanical design)	IL [enclosure size 'in-line']			C [°C] * [***]			
V Volume	RG [enclosure round size]	12 [12V DC] E12 [12V DC External] 16 [12V DC] E16 [12V DC External] 24 [24V DC] 2-wire version only		L [l/min] cbm [m³/h] rpm [l/min] * [***]		-- [none]	see subsequent table

DEKRA EXAM GmbH Dinnendahlstrasse 9 44809 Bochum Phone +49.234.3696-105 Fax +49.234.3696-110 zs-exam@dekra.com

Page 2 / 12

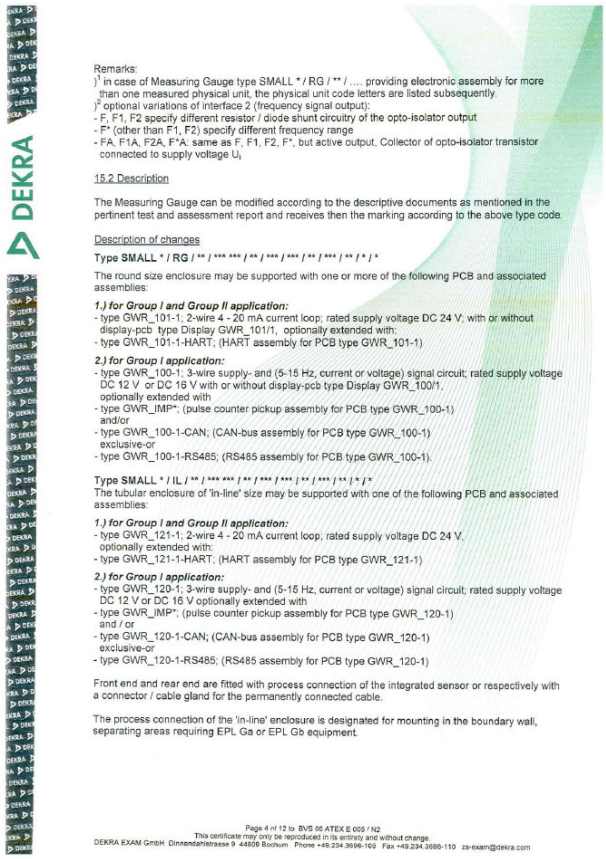


SMALL * / ** / ** / *** *** / ** / *** / *** / ** / *** / ** / * / *

a b c d e f g h i j k l m

a	b	c to g	h	i	j	k	l	m
Physical unit)[1]	Size		Electrical connection	Display	Sensor arrange-ment	Interface 1	Interface 2	Interface 3
P Pressure	RG [enclosure round size]	see table above	B [PROMOS BN 41...AT] H [HARTING] J [JOVIO] S [SOURIAU] K [KROTT] ** [special **] L...m [cable with length in m]	A [display provided] KA [no display]	KG [compact-device] AS...m [external sensor; cable length in m]	SI0 [0 - 20 mA] SI4 [4 - 20 mA] SI..-.. [*.** mA] S0 [0 - 20 mA] S4 [4 - 20 mA] S..-.. [*.** mA] U..-.. [*.** V]	F*)[2] [5 - 15 Hz]	C [CAN] H [HART] 2-wire version only P [PROFIBUS]
	IL [enclosure size 'in-line']			-- [no display with 'in-line' size]	-- [no external sensor with 'in-line' size]			
N Level	RG [enclosure round size]		B [PROMOS BN 41...AT] H [HARTING] J [JOVIO] S [SOURIAU] K [KROTT] ** [special **] L...m [cable with length in m]	A [display provided] KA [no display]	KG [compact-device] AS...m [external sensor; cable length in m]	SI0 [0 - 20 mA] SI4 [4 - 20 mA] SI..-.. [*.** mA] S0 [0 - 20 mA] S4 [4 - 20 mA] S..-.. [*.** mA] U..-.. [*.** V]	F*)[2] [5 - 15 Hz]	C [CAN] H [HART] 2-wire version only P [PROFIBUS]
	IL [enclosure size 'in-line']			-- [no display with 'in-line' size]	-- [no external sensor with 'in-line' size]			
T Temperature	RG [enclosure round size]		B [PROMOS BN 41...AT] H [HARTING] J [JOVIO] S [SOURIAU] K [KROTT] ** [special **] L...m [cable with length in m]	A [display provided] KA [no display]	KG [compact-device] AS...m [external sensor; cable length in m]	SI0 [0 - 20 mA] SI4 [4 - 20 mA] SI..-.. [*.** mA] S0 [0 - 20 mA] S4 [4 - 20 mA] S..-.. [*.** mA] U..-.. [*.** V]	F*)[2] [5 - 15 Hz]	C [CAN] H [HART] 2-wire version only P [PROFIBUS]
TS Temperature (special mechanical design)	IL [enclosure size 'in-line']			-- [no display with 'in-line' size]	-- [no external sensor with 'in-line' size]			
V Volume	RG [enclosure round size]			A [display provided] KA [no display]	KG [compact-device] AS...m [external sensor; cable length in m]	SI0 [0 - 20 mA] SI4 [4 - 20 mA] SI..-.. [*.** mA] S0 [0 - 20 mA] S4 [4 - 20 mA] S..-.. [*.** mA] U..-.. [*.** V]	F*)[2] [5 - 15 Hz]	C [CAN] H [HART] 2-wire version only P [PROFIBUS]
	IL [enclosure size 'in-line']			-- [no display with 'in-line' size]	-- [no external sensor with 'in-line' size]			

DEKRA EXAM GmbH Dinnendahlstrasse 9 44809 Bochum Phone +49.234.3696-105 Fax +49.234.3696-110 zs-exam@dekra.com



Remarks:
)[1] in case of Measuring Gauge type SMALL * / RG / ** / .... providing electronic assembly for more than one measured physical unit, the physical unit code letters are listed subsequently.
)[2] optional variations of interface 2 (frequency signal output):
- F, F1, F2 specify different resistor / diode shunt circuitry of the opto-isolator output
- F* (other than F1, F2) specify different frequency range
- FA, F1A, F2A, F*A: same as F, F1, F2, F*, but active output. Collector of opto-isolator transistor connected to supply voltage U_i

15.2 Description

The Measuring Gauge can be modified according to the descriptive documents as mentioned in the pertinent test and assessment report and receives then the marking according to the above type code.

Description of changes

Type SMALL * / RG / ** / * *** / ** / *** / ** / *** / ** / ** / * / ***

The round size enclosure may be supported with one or more of the following PCB and associated assemblies:

1.) for Group I and Group II application:
- type GWR_101-1; 2-wire 4 - 20 mA current loop; rated supply voltage DC 24 V; with or without display-pcb type Display GWR_101/1, optionally extended with:
- type GWR_101-1-HART; (HART assembly for PCB type GWR_101-1)

2.) for Group I application:
- type GWR_100-1; 3-wire supply- and (5-15 Hz, current or voltage) signal circuit; rated supply voltage DC 12 V or DC 16 V with or without display-pcb type Display GWR_100/1, optionally extended with
- type GWR_IMP*; (pulse counter pickup assembly for PCB type GWR_100-1) and/or
- type GWR_100-1-CAN; (CAN-bus assembly for PCB type GWR_100-1) exclusive-or
- type GWR_100-1-RS485; (RS485 assembly for PCB type GWR_100-1).

Type SMALL * / IL / ** / * *** / ** / *** / ** / *** / ** / * / ***

The tubular enclosure of 'in-line' size may be supported with one of the following PCB and associated assemblies:

1.) for Group I and Group II application:
- type GWR_121-1; 2-wire 4 - 20 mA current loop; rated supply voltage DC 24 V, optionally extended with:
- type GWR_121-1-HART; (HART assembly for PCB type GWR_121-1)

2.) for Group I application:
- type GWR_120-1; 3-wire supply- and (5-15 Hz, current or voltage) signal circuit; rated supply voltage DC 12 V or DC 16 V optionally extended with
- type GWR_IMP*; (pulse counter pickup assembly for PCB type GWR_120-1) and / or
- type GWR_120-1-CAN; (CAN-bus assembly for PCB type GWR_120-1) exclusive-or
- type GWR_120-1-RS485; (RS485 assembly for PCB type GWR_120-1)

Front end and rear end are fitted with process connection of the integrated sensor or respectively with a connector / cable gland for the permanently connected cable.

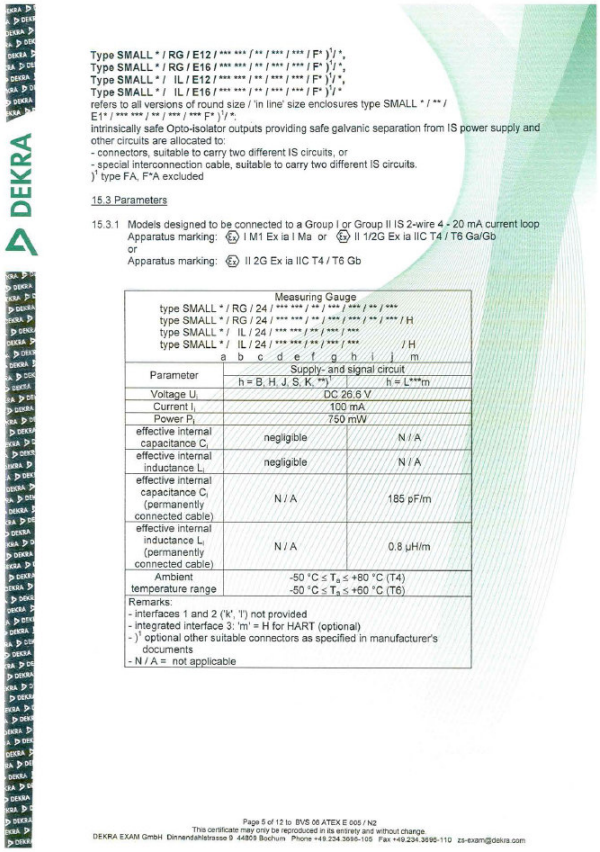
The process connection of the 'in-line' enclosure is designated for mounting in the boundary wall, separating areas requiring EPL Ga or EPL Gb equipment.

DEKRA EXAM GmbH Dinnendahlstrasse 9 44809 Bochum Phone +49.234.3696-105 Fax +49.234.3696-110 zs-exam@dekra.com

Page 3 / 12

Page 4 / 12

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu



Type SMALL * / RG / E12 / * *** / ** / *** / *** / F*)[1] / *,**
Type SMALL * / RG / E16 / * *** / ** / *** / *** / F*)[1] / *,**
Type SMALL * / IL / E12 / * *** / ** / *** / *** / F*)[1] / *,**
Type SMALL * / IL / E16 / * *** / ** / *** / *** / F*)[1] / ***
refers to all versions of round size / 'in line' size enclosures type SMALL * / ** / E1* / *** *** / ** / *** / *** F*)[1] / *.
Intrinsically safe Opto-isolator outputs providing safe galvanic separation from IS power supply and other circuits are allocated to:
- connectors, suitable to carry two different IS circuits, or
- special interconnection cable, suitable to carry two different IS circuits.
)[1] type FA, F*A excluded

15.3 Parameters

15.3.1 Models designed to be connected to a Group I or Group II IS 2-wire 4 ÷ 20 mA current loop
Apparatus marking: Ex I M1 Ex ia I Ma or Ex II 1/2G Ex ia IIC T4 / T6 Ga/Gb
or
Apparatus marking: Ex II 2G Ex ia IIC T4 / T6 Gb

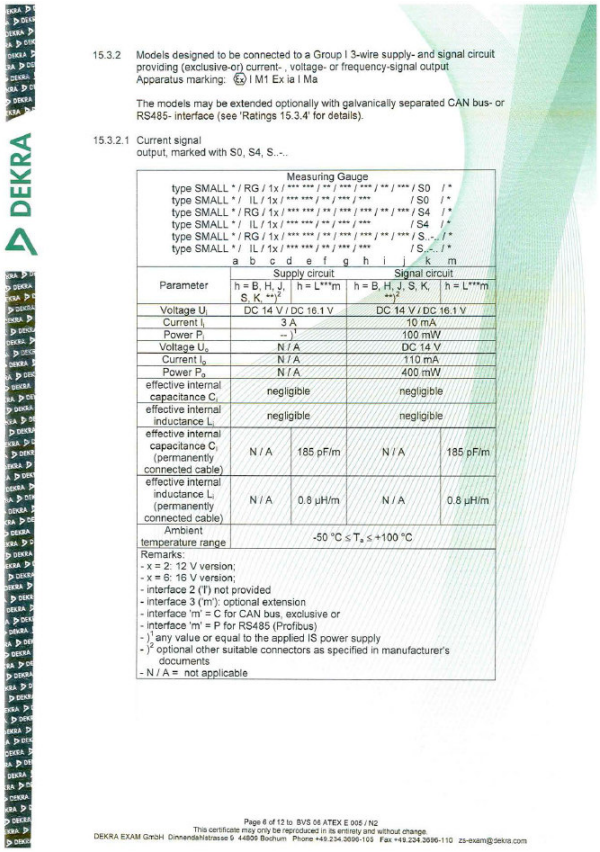
Measuring Gauge
type SMALL * / RG / 24 / *** *** / ** / *** / *** / ***
type SMALL * / RG / 24 / *** *** / ** / *** / *** / ** / *** / H
type SMALL * / IL / 24 / *** *** / ** / *** / ***
type SMALL * / IL / 24 / *** *** / ** / *** / *** / H
a b c d e f g h i j m

Parameter	Supply- and signal circuit	
	h = B, H, J, S, K, **)[1]	h = L***m
Voltage U_i	DC 26.6 V	
Current I_i	100 mA	
Power P_i	750 mW	
effective internal capacitance C_i	negligible	N / A
effective internal inductance L_i	negligible	N / A
effective internal capacitance C_i (permanently connected cable)	N / A	185 pF/m
effective internal inductance L_i (permanently connected cable)	N / A	0.8 µH/m
Ambient temperature range	-50 °C ≤ T_a ≤ +80 °C (T4) -50 °C ≤ T_a ≤ +60 °C (T6)	

Remarks:
- interfaces 1 and 2 ('k', 'l') not provided
- integrated interface 3: 'm' = H for HART (optional)
-)[1] optional other suitable connectors as specified in manufacturer's documents
- N / A = not applicable

DEKRA EXAM GmbH Dinnendahlstrasse 9 44809 Bochum Phone +49.234.3696-105 Fax +49.234.3696-110 zs-exam@dekra.com

Page 5 / 12



15.3.2 Models designed to be connected to a Group I 3-wire supply- and signal circuit providing (exclusive-or) current- , voltage- or frequency-signal output
Apparatus marking: Ex I M1 Ex ia I Ma

The models may be extended optionally with galvanically separated CAN bus- or RS485- interface (see 'Ratings 15.3.4' for details).

15.3.2.1 Current signal
output, marked with S0, S4, S..-..

Measuring Gauge
type SMALL * / RG / 1x / *** *** / ** / *** / *** / ** / *** / S0 / *
type SMALL * / IL / 1x / *** *** / ** / *** / *** / S0 / *
type SMALL * / RG / 1x / *** *** / ** / *** / *** / ** / *** / S4 / *
type SMALL * / IL / 1x / *** *** / ** / *** / *** / S4 / *
type SMALL * / RG / 1x / *** *** / ** / *** / *** / ** / *** / S..-.. / *
type SMALL * / IL / 1x / *** *** / ** / *** / *** / S..-.. / *
a b c d e f g h i j k m

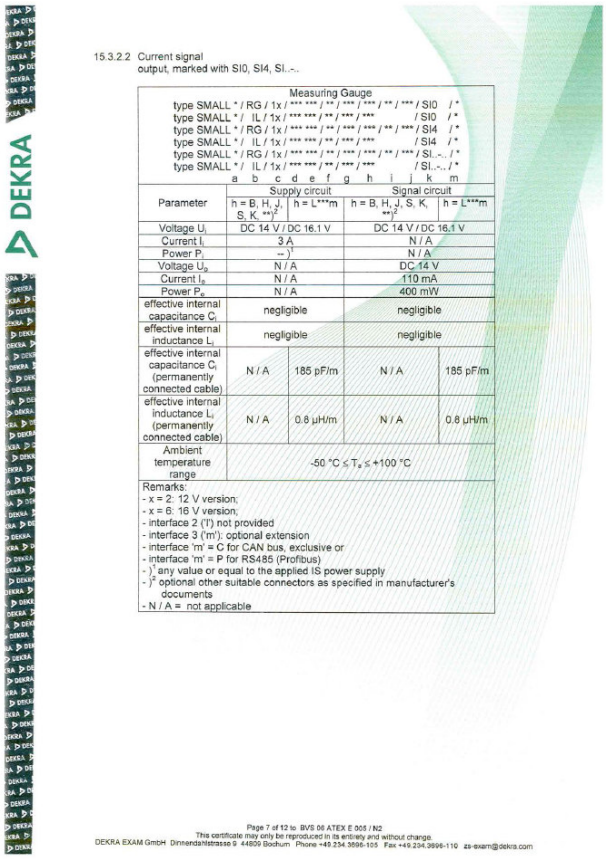
Parameter	Supply circuit		Signal circuit	
	h = B, H, J, S, K, **)[2]	h = L***m	h = B, H, J, S, K, **)[2]	h = L***m
Voltage U_i	DC 14 V / DC 16.1 V		DC 14 V / DC 16.1 V	
Current I_i	3 A		10 mA	
Power P_i	–)[1]		100 mW	
Voltage U_o	N / A		DC 14 V	
Current I_o	N / A		110 mA	
Power P_o	N / A		400 mW	
effective internal capacitance C_i	negligible		negligible	
effective internal inductance L_i	negligible		negligible	
effective internal capacitance C_i (permanently connected cable)	N / A	185 pF/m	N / A	185 pF/m
effective internal inductance L_i (permanently connected cable)	N / A	0.8 µH/m	N / A	0.8 µH/m
Ambient temperature range	-50 °C ≤ T_a ≤ +100 °C			

Remarks:
- x = 2: 12 V version;
- x = 6: 16 V version;
- interface 2 (I) not provided
- interface 3 ('m'): optional extension
- interface 'm' = C for CAN bus, exclusive or
- interface 'm' = P for RS485 (Profibus)
-)[1] any value or equal to the applied IS power supply
-)[2] optional other suitable connectors as specified in manufacturer's documents
- N / A = not applicable

DEKRA EXAM GmbH Dinnendahlstrasse 9 44809 Bochum Phone +49.234.3696-105 Fax +49.234.3696-110 zs-exam@dekra.com

Page 6/ 12

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu



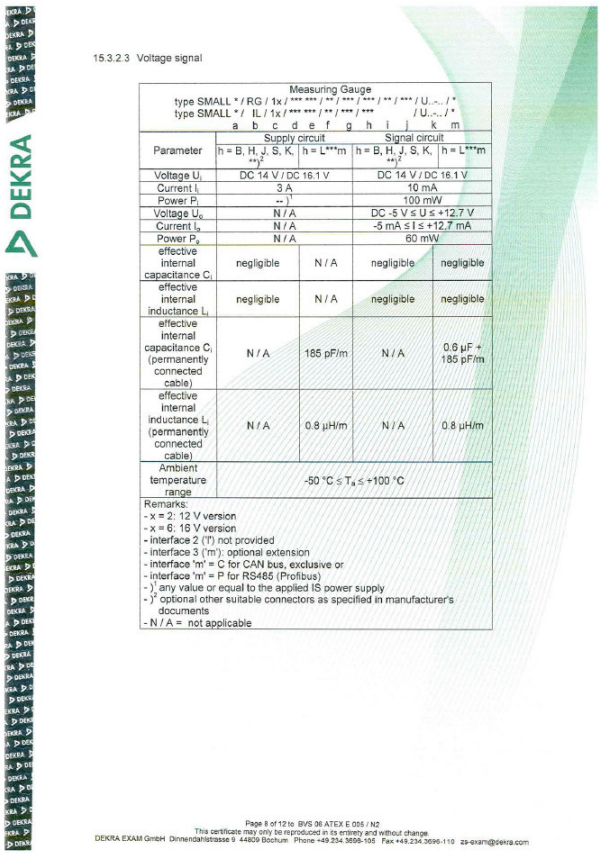
15.3.2.2 Current signal output, marked with SI0, SI4, SI..-..

Measuring Gauge type SMALL * / RG / 1x / *** *** / ** / *** / *** / ** / *** / SI0 / * type SMALL * / IL / 1x / *** *** / ** / *** / *** / SI0 / * type SMALL * / RG / 1x / *** *** / ** / *** / *** / ** / *** / SI4 / * type SMALL * / IL / 1x / *** *** / ** / *** / *** / SI4 / * type SMALL * / RG / 1x / *** *** / ** / *** / *** / ** / *** / SI..-.. / * type SMALL * / IL / 1x / *** *** / ** / *** / *** / SI..-.. / * a b c d e f g h i j k m				
Parameter	Supply circuit		Signal circuit	
	h = B, H, J, S, K, **)[2]	h = L***m	h = B, H, J, S, K, **)[2]	h = L***m
Voltage U_i	DC 14 V / DC 16.1 V		DC 14 V / DC 16.1 V	
Current I_i	3 A		N / A	
Power P_i	--)[1]		N / A	
Voltage U_o	N / A		DC 14 V	
Current I_o	N / A		110 mA	
Power P_o	N / A		400 mW	
effective internal capacitance C_i	negligible		negligible	
effective internal inductance L_i	negligible		negligible	
effective internal capacitance C_i (permanently connected cable)	N / A	185 pF/m	N / A	185 pF/m
effective internal inductance L_i (permanently connected cable)	N / A	0.6 µH/m	N / A	0.6 µH/m
Ambient temperature range	-50 °C ≤ T_a ≤ +100 °C			

Remarks:
- x = 2: 12 V version;
- x = 6: 16 V version;
- interface 2 ('I') not provided
- interface 3 ('m'): optional extension
- interface 'm' = C for CAN bus, exclusive or
- interface 'm' = P for RS485 (Profibus)
-)[1] any value or equal to the applied IS power supply
-)[2] optional other suitable connectors as specified in manufacturer's documents
- N / A = not applicable

DEKRA EXAM GmbH Dinnendahlstrasse 9 44809 Bochum Phone +49.234.3696-105 Fax +49.234.3696-110 zs-exam@dekra.com

Page 7 / 12



15.3.2.3 Voltage signal

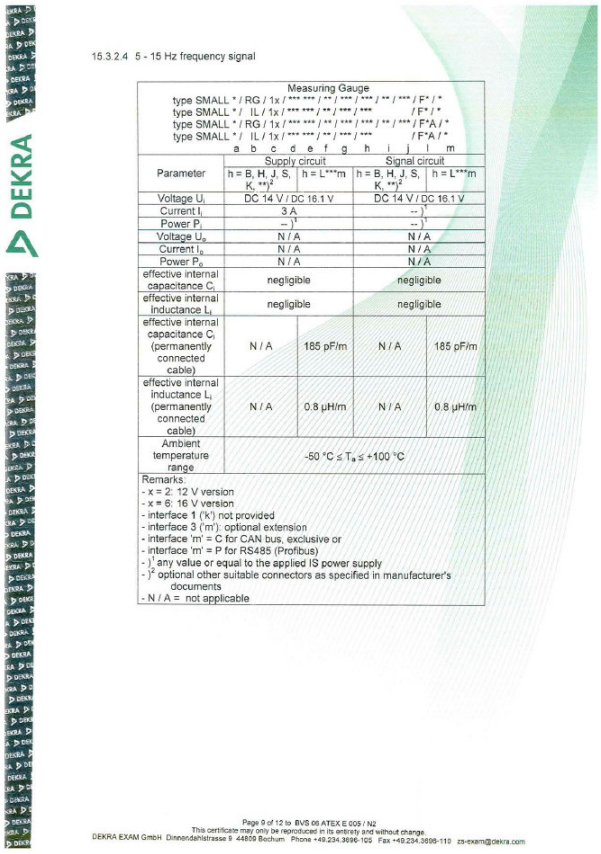
Measuring Gauge type SMALL * / RG / 1x / *** *** / ** / *** / *** / ** / *** / U..-.. / * type SMALL * / IL / 1x / *** *** / ** / *** / U..-.. / * a b c d e f g h i j k m				
Parameter	Supply circuit		Signal circuit	
	h = B, H, J, S, K, **)[2]	h = L***m	h = B, H, J, S, K, **)[2]	h = L***m
Voltage U_i	DC 14 V / DC 16.1 V		DC 14 V / DC 16.1 V	
Current I_i	3 A		10 mA	
Power P_i	--)[1]		100 mW	
Voltage U_o	N / A		DC -5 V ≤ U ≤ +12.7 V	
Current I_o	N / A		-5 mA ≤ I ≤ +12.7 mA	
Power P_o	N / A		60 mW	
effective internal capacitance C_i	negligible	N / A	negligible	negligible
effective internal inductance L_i	negligible	N / A	negligible	negligible
effective internal capacitance C_i (permanently connected cable)	N / A	185 pF/m	N / A	0.6 µF + 185 pF/m
effective internal inductance L_i (permanently connected cable)	N / A	0.6 µH/m	N / A	0.6 µH/m
Ambient temperature range	-50 °C ≤ T_a ≤ +100 °C			

Remarks:
- x = 2: 12 V version
- x = 6: 16 V version
- interface 2 ('I') not provided
- interface 3 ('m'): optional extension
- interface 'm' = C for CAN bus, exclusive or
- interface 'm' = P for RS485 (Profibus)
-)[1] any value or equal to the applied IS power supply
-)[2] optional other suitable connectors as specified in manufacturer's documents
- N / A = not applicable

DEKRA EXAM GmbH Dinnendahlstrasse 9 44809 Bochum Phone +49.234.3696-105 Fax +49.234.3696-110 zs-exam@dekra.com

Page 8 / 12

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu



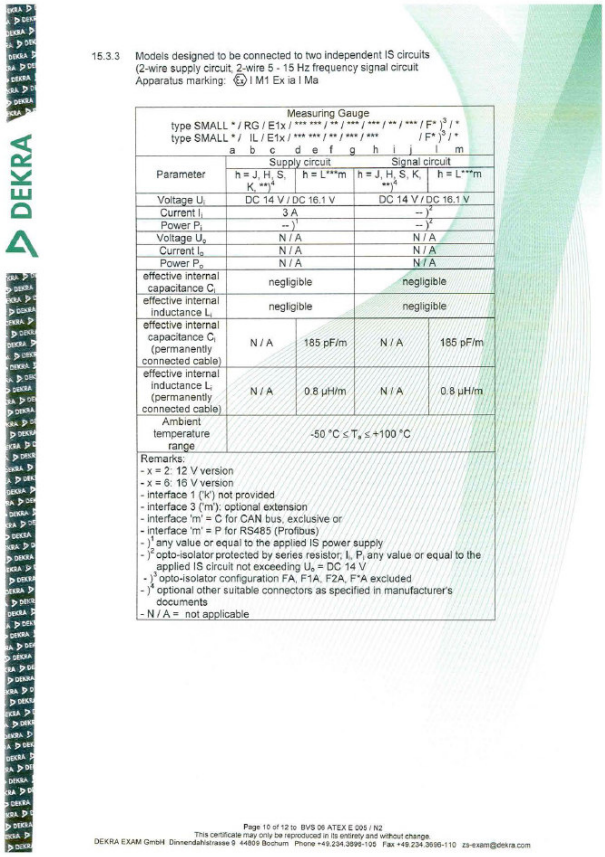
15.3.2.4 5 - 15 Hz frequency signal

Measuring Gauge type SMALL * / RG / 1x / *** *** / ** / *** / *** / ** / *** / F* / * type SMALL * / IL / 1x / *** *** / ** / *** / *** / F* / * type SMALL * / RG / 1x / *** *** / ** / *** / ** / *** / F*A / * type SMALL * / IL / 1x / *** *** / ** / *** / *** / F*A / * a b c d e f g h i j l m				
Parameter	Supply circuit		Signal circuit	
	h = B, H, J, S, K, **)[2]	h = L***m	h = B, H, J, S, K, **)[2]	h = L***m
Voltage U_i	DC 14 V / DC 16.1 V		DC 14 V / DC 16.1 V	
Current I_i	3 A		--)[1]	
Power P_i	--)[1]		--)[1]	
Voltage U_o	N / A		N / A	
Current I_o	N / A		N / A	
Power P_o	N / A		N / A	
effective internal capacitance C_i	negligible		negligible	
effective internal inductance L_i	negligible		negligible	
effective internal capacitance C_i (permanently connected cable)	N / A	185 pF/m	N / A	185 pF/m
effective internal inductance L_i (permanently connected cable)	N / A	0.8 µH/m	N / A	0.8 µH/m
Ambient temperature range	-50 °C ≤ T_a ≤ +100 °C			

Remarks:
- x = 2: 12 V version
- x = 6: 16 V version
- interface 1 ('k') not provided
- interface 3 ('m'): optional extension
- interface 'm' = C for CAN bus, exclusive or
- interface 'm' = P for RS485 (Profibus)
-)[1] any value or equal to the applied IS power supply
-)[2] optional other suitable connectors as specified in manufacturer's documents
- N / A = not applicable

DEKRA EXAM GmbH Dinnendahlstrasse 9 44809 Bochum Phone +49.234.3696-105 Fax +49.234.3696-110 zs-exam@dekra.com

Page 9 / 12



15.3.3 Models designed to be connected to two independent IS circuits
(2-wire supply circuit, 2-wire 5 - 15 Hz frequency signal circuit
Apparatus marking: Ex I M1 Ex ia I Ma

Measuring Gauge type SMALL * / RG / E1x / *** *** / ** / *** / *** / ** / *** / F*)[3] / * type SMALL * / IL / E1x / *** *** / ** / *** / *** / F*)[3] / * a b c d e f g h i j l m				
Parameter	Supply circuit		Signal circuit	
	h = J, H, S, K, **)[4]	h = L***m	h = J, H, S, K, **)[4]	h = L***m
Voltage U_i	DC 14 V / DC 16.1 V		DC 14 V / DC 16.1 V	
Current I_i	3 A		--)[2]	
Power P_i	--)[1]		--)[2]	
Voltage U_o	N / A		N / A	
Current I_o	N / A		N / A	
Power P_o	N / A		N / A	
effective internal capacitance C_i	negligible		negligible	
effective internal inductance L_i	negligible		negligible	
effective internal capacitance C_i (permanently connected cable)	N / A	185 pF/m	N / A	185 pF/m
effective internal inductance L_i (permanently connected cable)	N / A	0.8 µH/m	N / A	0.8 µH/m
Ambient temperature range	-50 °C ≤ T_a ≤ +100 °C			

Remarks:
- x = 2: 12 V version
- x = 6: 16 V version
- interface 1 ('k') not provided
- interface 3 ('m'): optional extension
- interface 'm' = C for CAN bus, exclusive or
- interface 'm' = P for RS485 (Profibus)
-)[1] any value or equal to the applied IS power supply
-)[2] opto-isolator protected by series resistor; I_i, P_i any value or equal to the applied IS circuit not exceeding U_o = DC 14 V
-)[3] opto-isolator configuration FA, F1A, F2A, F*A excluded
-)[4] optional other suitable connectors as specified in manufacturer's documents
- N / A = not applicable

DEKRA EXAM GmbH Dinnendahlstrasse 9 44809 Bochum Phone +49.234.3696-105 Fax +49.234.3696-110 zs-exam@dekra.com

Page 10 / 12

15.3.4 Optional extension: interface 3 ('m')
Interface circuit CAN bus or RS485 type of protection Ex ib I
Apparatus marking: ⟨Ex⟩ I M2 (M1) Ex [ia Ma] ib I Mb

Measuring Gauge type SMALL */RG/1x/***.***/**/***/***/**/**/*/* type SMALL */IL/1x/***.***/**/***/*** /**/*/* a b c d e f g h i j k l m				
Parameter	Interface 3			
	m = C CAN bus		m = P RS485 (Profibus)	
	h = J, H, S, K, **)[1]	h = L***m	h = J, H, S, K, **)[1]	h = L***m
Voltage U_i	equal to U_o		equal to U_o	
Current I_i	equal to I_o		equal to I_o	
Power P_i	equal to P_o		equal to P_o	
Voltage U_o	6 V		6 V	
Current I_o	100 mA		100 mA	
Power P_o	600 mW		600 mW	
effective internal capacitance C_i	3 µF		3 µF	
effective internal inductance L_i	negligible		negligible	
effective internal capacitance C_i (permanently connected cable)	N / A	185 pF/m	N / A	185 pF/m
effective internal inductance L_i (permanently connected cable)	N / A	0.8 µH/m	N / A	0.8 µH/m
Characteristic	rectangular		rectangular	
Remarks: - x = 2: 12 V version - x = 6: 16 V version -)[1] optional other suitable connectors as specified in manufacturer's documents - N / A = not applicable				

(16) Test and Assessment Report

BVS PP 06.2007 EG as of 13.07.2012

DEKRA EXAM GmbH Dinnendahlstrasse 9 44809 Bochum Phone +49.234.3696-105 Fax +49.234.3696-110 zs-exam@dekra.com

Page 11 / 12

(17) Special conditions for safe use Installation

17.1 The installation of the sensor / the process connection of the Measuring Gauge in the wall to areas requiring EPL Ga equipment shall provide a degree of protection IP67 according to EN 60529.

17.2 The installation of the sensor of the Measuring Gauge in the wall to areas requiring category EPL Ga shall be carried out in such a way, that the metallic sensor enclosure / the process connection is included in the local equipotential bonding / grounding.

17.3 Manufacturer's technical information related to use of the Measuring Gauge in contact with aggressive / corrosive media and to avoid any risk of mechanical impact shall be observed.

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.

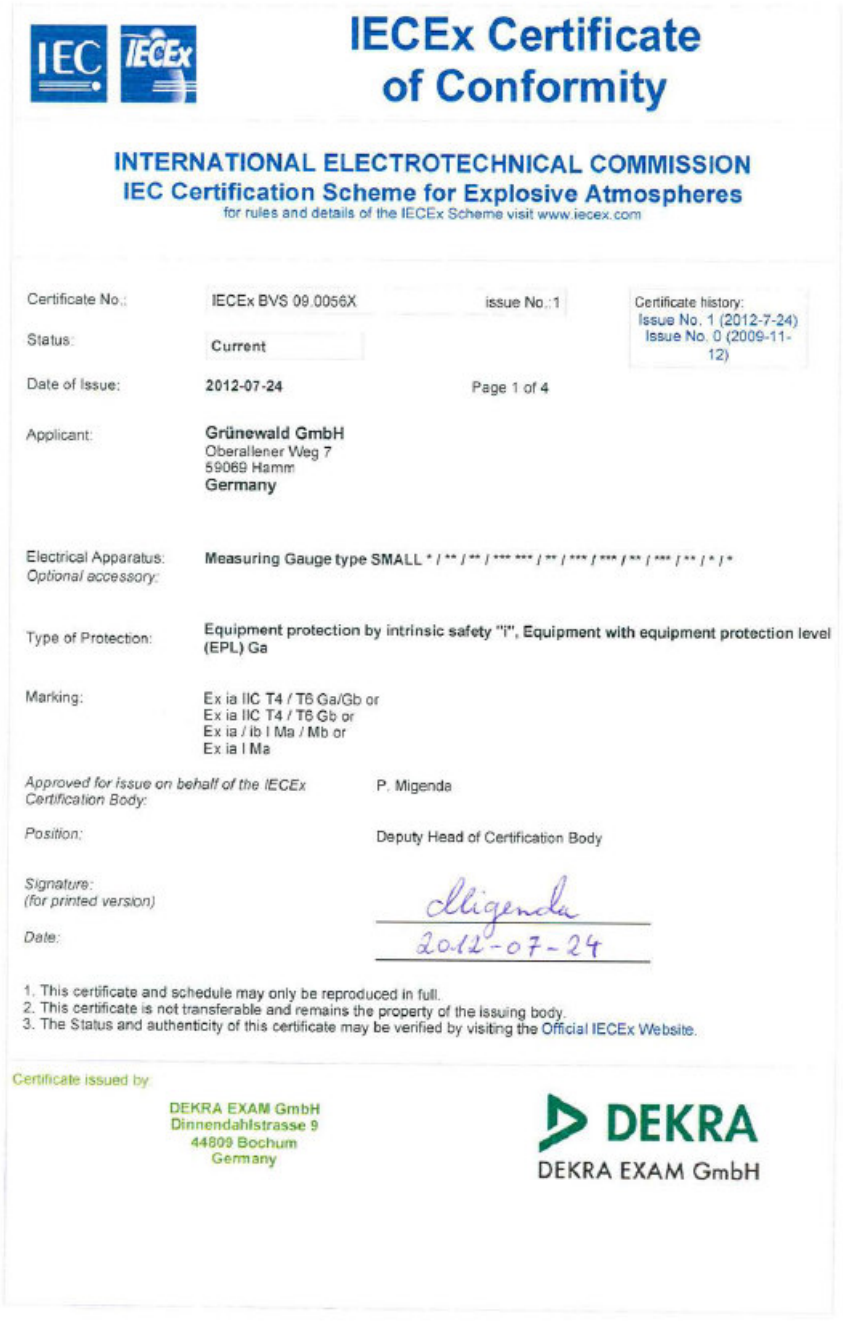
DEKRA EXAM GmbH
44809 Bochum, 13.07.2012
BVS-Scha/Sch A 20120574

Certification body Special services unit

DEKRA EXAM GmbH Dinnendahlstrasse 9 44809 Bochum Phone +49.234.3696-105 Fax +49.234.3696-110 zs-exam@dekra.com

Page 12 / 12

20.2 IECEx - Certificate



IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres
for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx BVS 09.0056X	issue No.:1	Certificate history: Issue No. 1 (2012-7-24) Issue No. 0 (2009-11-12)
Status:	Current		
Date of Issue:	2012-07-24	Page 1 of 4	

Applicant: **Grünewald GmbH**
Oberallener Weg 7
59069 Hamm
Germany

Electrical Apparatus: **Measuring Gauge type SMALL * / ** / ** / *** *** / ** / *** / *** / ** / *** / ** / * / ***
Optional accessory:

Type of Protection: **Equipment protection by intrinsic safety "i", Equipment with equipment protection level (EPL) Ga**

Marking: Ex ia IIC T4 / T6 Ga/Gb or
Ex ia IIC T4 / T6 Gb or
Ex ia / ib I Ma / Mb or
Ex ia I Ma

Approved for issue on behalf of the IECEx Certification Body: P. Migenda

Position: Deputy Head of Certification Body

Signature: (for printed version) Migenda

Date: 2012-07-24

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

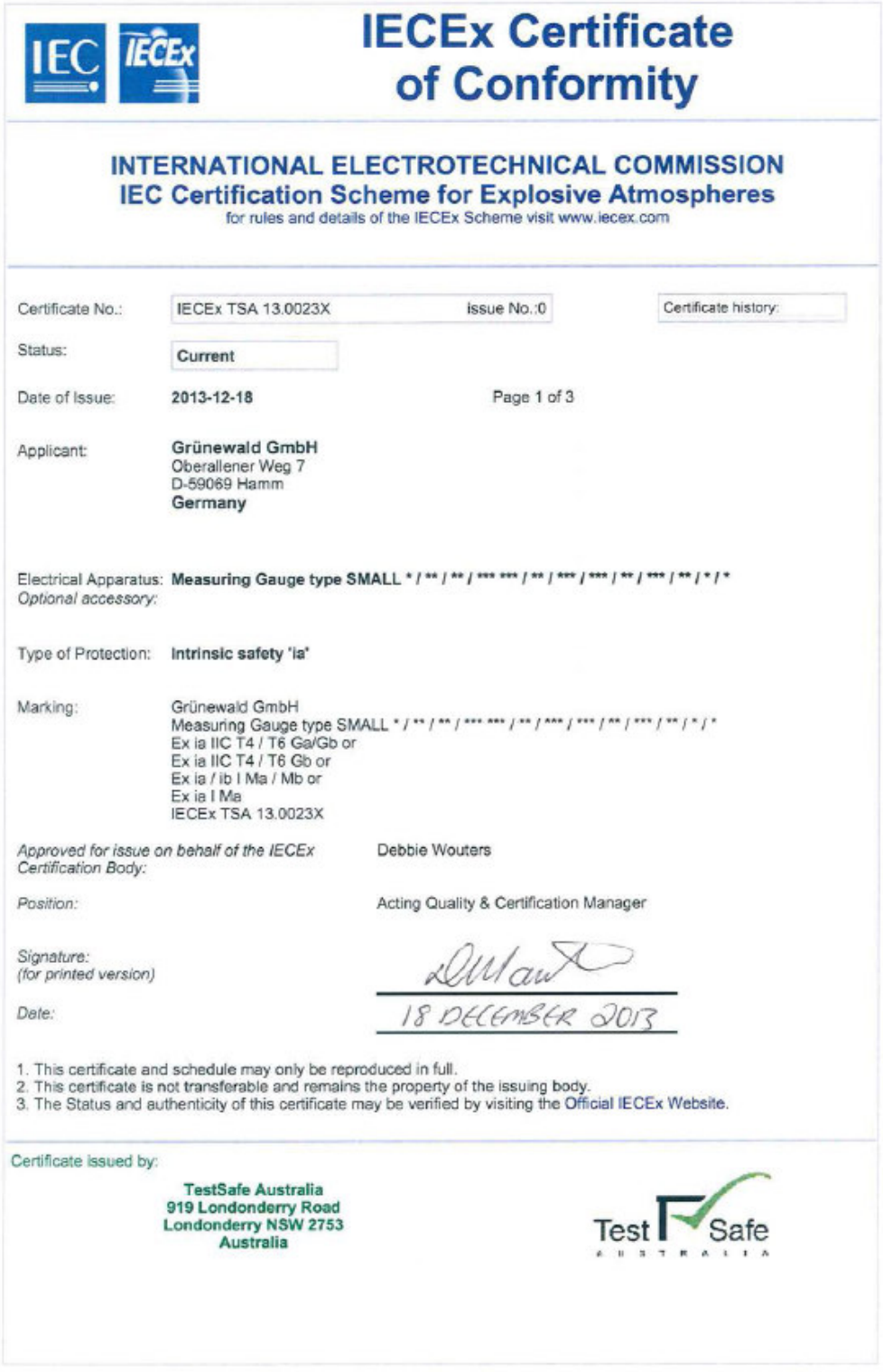
Certificate issued by:
DEKRA EXAM GmbH
Dinnendahlstrasse 9
44809 Bochum
Germany

DEKRA
DEKRA EXAM GmbH

Page 1/ 1

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

20.3 IECEx – Certificate Australia



IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres
for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: IECEx TSA 13.0023X Issue No.:0 Certificate history:

Status: **Current**

Date of Issue: **2013-12-18** Page 1 of 3

Applicant: **Grünewald GmbH**
Oberallener Weg 7
D-59069 Hamm
Germany

Electrical Apparatus: **Measuring Gauge type SMALL * / ** / ** / *** *** / ** / *** / *** / ** / *** / ** / * / ***
Optional accessory:

Type of Protection: **Intrinsic safety 'ia'**

Marking: Grünewald GmbH
Measuring Gauge type SMALL * / ** / ** / *** *** / ** / *** / *** / ** / *** / ** / * / *
Ex ia IIC T4 / T6 Ga/Gb or
Ex ia IIC T4 / T6 Gb or
Ex ia / ib I Ma / Mb or
Ex ia I Ma
IECEx TSA 13.0023X

Approved for issue on behalf of the IECEx Certification Body: Debbie Wouters

Position: Acting Quality & Certification Manager

Signature: (for printed version)

Date: 18 DECEMBER 2013

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:

TestSafe Australia
919 Londonderry Road
Londonderry NSW 2753
Australia

Test Safe AUSTRALIA

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

20.4 MA - Certificates


矿用产品安全标志证书
SAFETY CERTIFICATE OF APPROVAL FOR MINING PRODUCTS
安全标志编号：J2012338 有效期：2012.10.10 ～ 2017.10.10
单位名称：Grunewald GmbH (Grunewald GmbH)
产品名称：SMALL-P/.../A... 压力传感器
使用场所：严格按煤矿安全有关规定使用。
执行标准：GB3836.1-2000、GB3836.4-2000
备注：/
发证部门 2012-10-19


矿用产品安全标志证书
SAFETY CERTIFICATE OF APPROVAL FOR MINING PRODUCTS
安全标志编号：J2012337 有效期：2012.10.10 ～ 2017.10.10
单位名称：Grunewald GmbH (Grunewald GmbH)
产品名称：SMALL-P/.../KA... 压力传感器
使用场所：严格按煤矿安全有关规定使用。
执行标准：GB3836.1-2000、GB3836.4-2000
备注：/
发证部门 2012-10-19


矿用产品安全标志证书
SAFETY CERTIFICATE OF APPROVAL FOR MINING PRODUCTS
安全标志编号：J2012334 有效期：2012.10.10 ～ 2017.10.10
单位名称：Grunewald GmbH (Grunewald GmbH)
产品名称：SMALL-T/.../A... 温度传感器
使用场所：严格按煤矿安全有关规定使用。
执行标准：GB3836.1-2000、GB3836.4-2000
备注：/
发证部门 2012-10-19


矿用产品安全标志证书
SAFETY CERTIFICATE OF APPROVAL FOR MINING PRODUCTS
安全标志编号：J2012333 有效期：2012.10.10 ～ 2017.10.10
单位名称：Grunewald GmbH (Grunewald GmbH)
产品名称：SMALL-T/.../KA... 温度传感器
使用场所：严格按煤矿安全有关规定使用。
执行标准：GB3836.1-2000、GB3836.4-2000
备注：/
发证部门 2012-10-19


矿用产品安全标志证书
SAFETY CERTIFICATE OF APPROVAL FOR MINING PRODUCTS
安全标志编号：J2012332 有效期：2012.10.10 ～ 2017.10.10
单位名称：Grunewald GmbH (Grunewald GmbH)
产品名称：SMALL-TS/.../A... 温度传感器
使用场所：严格按煤矿安全有关规定使用。
执行标准：GB3836.1-2000、GB3836.4-2000
备注：/
发证部门 2012-10-19


矿用产品安全标志证书
SAFETY CERTIFICATE OF APPROVAL FOR MINING PRODUCTS
安全标志编号：J2012331 有效期：2012.10.10 ～ 2017.10.10
单位名称：Grunewald GmbH (Grunewald GmbH)
产品名称：SMALL-TS/.../KA... 温度传感器
使用场所：严格按煤矿安全有关规定使用。
执行标准：GB3836.1-2000、GB3836.4-2000
备注：/
发证部门 2012-10-19


矿用产品安全标志证书
SAFETY CERTIFICATE OF APPROVAL FOR MINING PRODUCTS
安全标志编号：J2012336 有效期：2012.10.10 ～ 2017.10.10
单位名称：Grunewald GmbH (Grunewald GmbH)
产品名称：SMALL-N/.../A... 液位传感器
使用场所：严格按煤矿安全有关规定使用。
执行标准：GB3836.1-2000、GB3836.4-2000
备注：/
发证部门 2012-10-19

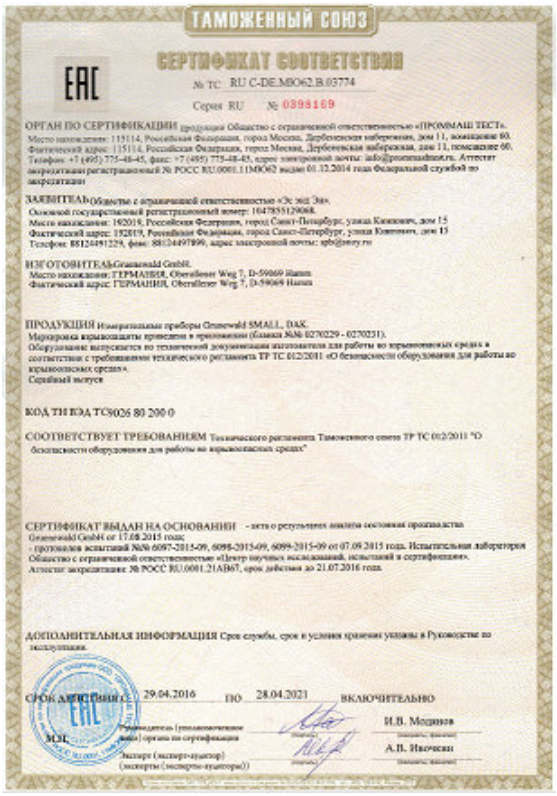

矿用产品安全标志证书
SAFETY CERTIFICATE OF APPROVAL FOR MINING PRODUCTS
安全标志编号：J2012335 有效期：2012.10.10 ～ 2017.10.10
单位名称：Grunewald GmbH (Grunewald GmbH)
产品名称：SMALL-N/.../KA... 液位传感器
使用场所：严格按煤矿安全有关规定使用。
执行标准：GB3836.1-2000、GB3836.4-2000
备注：/
发证部门 2012-10-19


矿用产品安全标志证书
SAFETY CERTIFICATE OF APPROVAL FOR MINING PRODUCTS
安全标志编号：J2012330 有效期：2012.10.10 ～ 2017.10.10
单位名称：Grunewald GmbH (Grunewald GmbH)
产品名称：SMALL-V/.../A... 流量传感器
使用场所：严格按煤矿安全有关规定使用。
执行标准：GB3836.1-2000、GB3836.4-2000
备注：/
发证部门 2012-10-19


矿用产品安全标志证书
SAFETY CERTIFICATE OF APPROVAL FOR MINING PRODUCTS
安全标志编号：J2012329 有效期：2012.10.10 ～ 2017.10.10
单位名称：Grunewald GmbH (Grunewald GmbH)
产品名称：SMALL-V/.../ KA... 流量传感器
使用场所：严格按煤矿安全有关规定使用。
执行标准：GB3836.1-2000、GB3836.4-2000
备注：/
发证部门 2012-10-19

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

20.5 EAC Ex- Certificate



ТАМОЖЕННЫЙ СОЮЗ

СЕРТИФИКАТ СООТВЕТСТВИЯ

№ ТС RU C-DE.МЮ62.В.03774

Серия RU № 0398169

ОРГАН ПО СЕРТИФИКАЦИИ Продукция Общество с ограниченной ответственностью «ПРОММАШ ТЕСТ». Место нахождения: 115114, Российская Федерация, город Москва, Дербеневская набережная, дом 11, помещение 60. Фактический адрес: 115114, Российская Федерация, город Москва, Дербеневская набережная, дом 11, помещение 60. Телефон: +7 (495) 775-48-45, факс: +7 (495) 775-48-45, адрес электронной почты: info@prommashtest.ru. Аттестат аккредитации регистрационный № РОСС RU.0001.11МО62 выдан 01.12.2014 года Федеральной службой по аккредитации

ЗАЯВИТЕЛЬ Общество с ограниченной ответственностью «Эс энд Эм». Основной государственный регистрационный номер: 1047855129068. Место нахождения: 192019, Российская Федерация, город Санкт-Петербург, улица Киевская, дом 15. Фактический адрес: 192019, Российская Федерация, город Санкт-Петербург, улица Киевская, дом 15. Телефон: 88124491229, факс: 88124497899, адрес электронной почты: spb@smv.ru

ИЗГОТОВИТЕЛЬ Grunewald GmbH. Место нахождения: ГЕРМАНИЯ, Oberallener Weg 7, D-59069 Hamm. Фактический адрес: ГЕРМАНИЯ, Oberallener Weg 7, D-59069 Hamm

ПРОДУКЦИЯ Измерительные приборы Grunewald SMALL, DAK. Маркировка взрывозащиты приведена в приложении (бланки №№ 0270229 - 0270231). Оборудование выпускается по технической документации изготовителя для работы во взрывоопасных средах в соответствии с требованиями технического регламента ТР ТС 012/2011 «О безопасности оборудования для работы во взрывоопасных средах». Серийный выпуск

КОД ТН ВЭД ТС 9026 80 200 0

СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ Технического регламента Таможенного союза ТР ТС 012/2011 "О безопасности оборудования для работы во взрывоопасных средах"

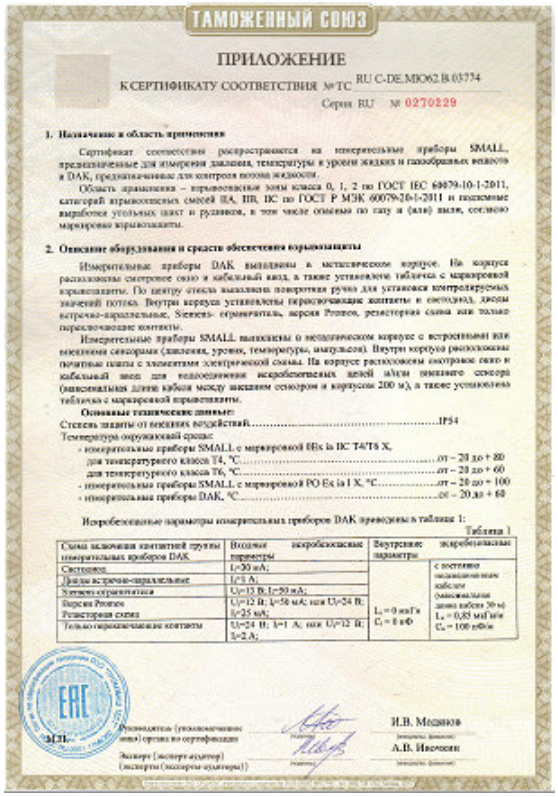
СЕРТИФИКАТ ВЫДАН НА ОСНОВАНИИ - акта о результатах анализа состояния производства Grunewald GmbH от 17.08.2015 года; - протоколов испытаний №№ 6097-2015-09, 6098-2015-09, 6099-2015-09 от 07.09.2015 года. Испытательная лаборатория Общества с ограниченной ответственностью «Центр научных исследований, испытаний и сертификации». Аттестат аккредитации № РОСС RU.0001.21АВ67, срок действия до 21.07.2016 года.

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ Срок службы, срок и условия хранения указаны в Руководстве по эксплуатации.

СРОК ДЕЙСТВИЯ С 29.04.2016 ПО 28.04.2021 ВКЛЮЧИТЕЛЬНО

М.П. Руководитель (уполномоченное лицо) органа по сертификации И.В. Медников

Эксперт (эксперт-аудитор) (эксперты (эксперты-аудиторы)) А.В. Ивочкин



ТАМОЖЕННЫЙ СОЮЗ

ПРИЛОЖЕНИЕ

К СЕРТИФИКАТУ СООТВЕТСТВИЯ № ТС RU C-DE.МЮ62.В.03774

Серия RU № 0270229

1. Назначение и область применения

Сертификат соответствия распространяется на измерительные приборы SMALL, предназначенные для измерения давления, температуры и уровня жидких и газообразных веществ и DAK, предназначенные для контроля потока жидкости.

Область применения – взрывоопасные зоны класса 0, 1, 2 по ГОСТ IEC 60079-10-1-2011, категорий взрывоопасных смесей IIA, IIB, IIC по ГОСТ Р МЭК 60079-20-1-2011 и подземные выработки угольных шахт и рудников, в том числе опасные по газу и (или) пыли, согласно маркировке взрывозащиты.

2. Описание оборудования и средств обеспечения взрывозащиты

Измерительные приборы DAK выполнены в металлическом корпусе. На корпусе расположены смотровое окно и кабельный ввод, а также установлена табличка с маркировкой взрывозащиты. По центру стекла выполнена поворотная ручка для установки контролируемых значений потока. Внутри корпуса установлены нормально разомкнутые контакты и светодиод, диоды встречно-параллельные, Sieners- ограничитель, версия Proteos, регистрация схема или только нормально разомкнутые контакты.

Измерительные приборы SMALL выполнены с металлическом корпусе с встроенным или внешними сенсорами (давления, уровня, температуры, импульсов). Внутри корпуса расположены печатные платы с элементами электронной схемы. На корпусе расположены смотровое окно и кабельный ввод для подсоединения искробезопасных цепей от/до внешнего сенсора (максимальная длина кабеля между внешним сенсором и корпусом 200 м), а также установлена табличка с маркировкой взрывозащиты.

Основные технические данные:

Степень защиты от внешних воздействий IP54

Температура окружающей среды:

- измерительные приборы SMALL с маркировкой 0Ex ia IIC T4/T6 X,
  для температурного класса T4, °C ..... от – 20 до + 80
  для температурного класса T6, °C ..... от – 20 до + 60
- измерительные приборы SMALL с маркировкой PO Ex ia I X, °C ..... от – 20 до + 100
- измерительные приборы DAK, °C ..... от – 20 до + 60

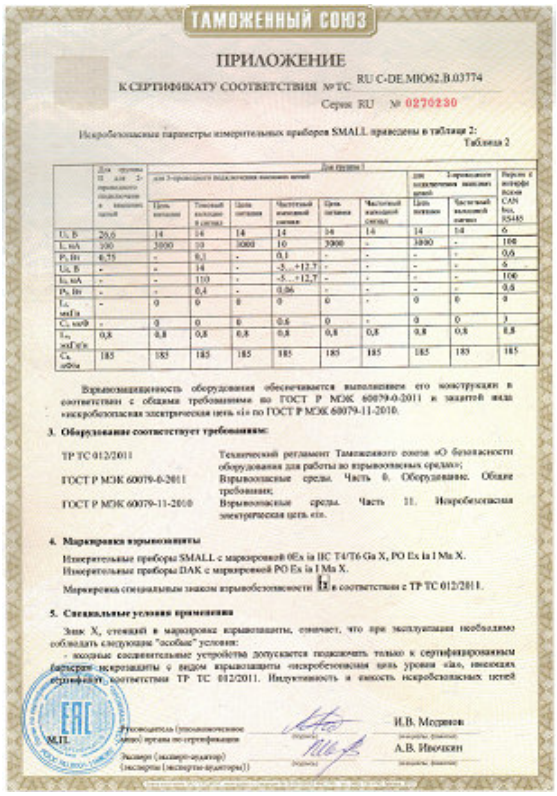
Искробезопасные параметры измерительных приборов DAK приведены в таблице 1:

Таблица 1

Схема включения контактной группы измерительных приборов DAK	Входные искробезопасные параметры	Внутренние искробезопасные параметры	
Системное	I_i=30 мА;	L_i = 0 мкГн C_i = 0 нФ	с постоянно подключенным кабелем (максимальная длина кабеля 30 м) L_i = 0,85 мкГн/м C_i = 100 пФ/м
Диод встречно-параллельные	I_i=1 А;		
Sieners-ограничитель	U_i=15 В; I_i=50 мА;		
Версия Proteos	U_i=12 В; I_i=56 мА; или U_i=24 В; I_i=25 мА;		
Регистрация схема			
Только нормально разомкнутые контакты	U_i=24 В; I_i=1 А; или U_i=12 В; I_i=2 А;		

М.П. Руководитель (уполномоченное лицо) органа по сертификации И.В. Медников

Эксперт (эксперт-аудитор) (эксперты (эксперты-аудиторы)) А.В. Ивочкин



ТАМОЖЕННЫЙ СОЮЗ

ПРИЛОЖЕНИЕ

К СЕРТИФИКАТУ СООТВЕТСТВИЯ № ТС RU C-DE.МЮ62.В.03774

Серия RU № 0270230

Искробезопасные параметры измерительных приборов SMALL приведены в таблице 2:

Таблица 2

	Для группы II или 2-проводного подключения с внешним питанием	Для группы I						для 2-проводного подключения внешним питанием		Версия с выходом CAN bus RS485
		Цепь питания	Токовый выходной 4 (цифра)	Цепь питания	Частотный выходной сигнал	Цепь питания	Частотный выходной сигнал	Цепь питания	Частотный выходной сигнал	
U_i, В	28,0	14	14	14	14	14	14	14	14	6
I_i, мА	100	3000	10	3000	10	3000	-	3000	-	100
P_i, Вт	0,75	-	0,1	-	0,1	-	-	-	-	0,6
U_o, В	-	-	14	-	-5...+12,7	-	-	-	-	6
I_o, мА	-	-	110	-	-5...+12,7	-	-	-	-	100
P_o, Вт	-	-	0,4	-	0,86	-	-	-	-	0,6
L_i, мкГн	-	0	0	0	0	0	-	0	0	0
C_i, нФ	-	0	0	0	0,6	0	-	0	0	3
L_o, мкГн/м	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8
C_o, нФ/м	185	185	185	185	185	185	185	185	185	185

Взрывозащищенность оборудования обеспечивается выполнением его конструкции в соответствии с общими требованиями по ГОСТ Р МЭК 60079-0-2011 и защитой вида искробезопасная электрическая цепь «i» по ГОСТ Р МЭК 60079-11-2010.

3. Оборудование соответствует требованиям:

ТР ТС 012/2011	Технический регламент Таможенного союза «О безопасности оборудования для работы во взрывоопасных средах»;
ГОСТ Р МЭК 60079-0-2011	Взрывоопасные среды. Часть 0. Оборудование. Общие требования;
ГОСТ Р МЭК 60079-11-2010	Взрывоопасные среды. Часть 11. Искробезопасная электрическая цепь «i».

4. Маркировка взрывозащиты

Измерительные приборы SMALL с маркировкой 0Ex ia IIC T4/T6 Ga X, PO Ex ia I Ma X.
Измерительные приборы DAK с маркировкой PO Ex ia I Ma X.

Маркировка специальным знаком взрывобезопасности Ex в соответствии с ТР ТС 012/2011.

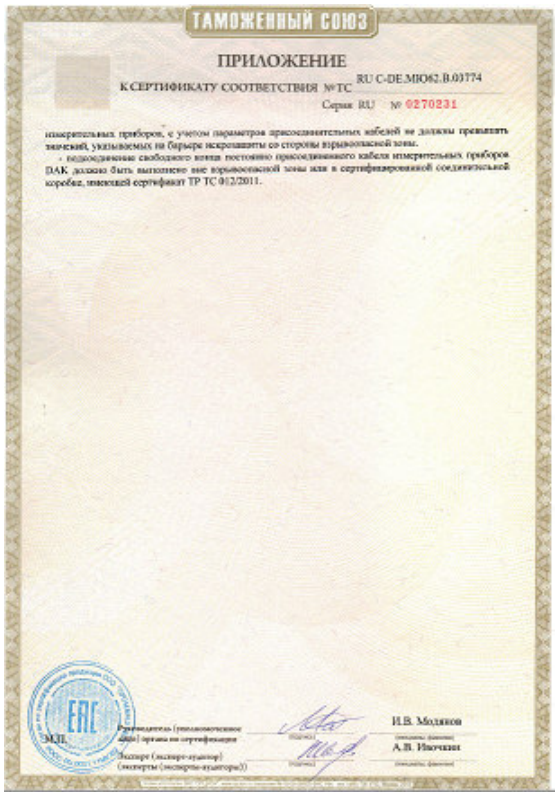
5. Специальные условия применения

Знак X, стоящий в маркировке взрывозащиты, означает, что при эксплуатации необходимо соблюдать следующие "особые" условия:

- входные соединительные устройства допускается подключать только к сертифицированным барьерам искрозащиты с видом взрывозащиты «искробезопасная цепь уровня «ia», имеющих сертификат соответствия ТР ТС 012/2011. Индуктивность и емкость искробезопасных цепей

М.П. Руководитель (уполномоченное лицо) органа по сертификации И.В. Медников

Эксперт (эксперт-аудитор) (эксперты (эксперты-аудиторы)) А.В. Ивочкин



ТАМОЖЕННЫЙ СОЮЗ

ПРИЛОЖЕНИЕ

К СЕРТИФИКАТУ СООТВЕТСТВИЯ № ТС RU C-DE.МЮ62.В.03774

Серия RU № 0270231

измерительных приборов, с учетом параметров присоединительных кабелей не должны превышать значений, указываемых на барьере искрозащиты со стороны взрывоопасной зоны.

- недопустимое свободного конца постоянно присоединенного кабеля измерительных приборов DAK должно быть выполнено вне взрывоопасной зоны или в сертифицированной соединительной коробке, имеющей сертификат ТР ТС 012/2011.

М.П. Руководитель (уполномоченное лицо) органа по сертификации И.В. Медников

Эксперт (эксперт-аудитор) (эксперты (эксперты-аудиторы)) А.В. Ивочкин

Grünewald GmbH • Oberallener Weg 7 • D-59069 Hamm • Tel.: (+49) 0 2385 922670
Fax: (+49) 0 2385 922672 • www.gruenewald.eu • E-Mail: info@gruenewald.eu

21 EU-Declaration of Conformity

EU-Konformitätserklärung
EU Declaration of Conformity

Im Sinne der: ***In the legal scene of:***

- EU- Richtlinie Explosionsschutz 2014/34/EU
  EU direction 2014/34/EU for equipment and protective systems intended for use in potentially explosive atmospheres explosion prevention
- EU- Richtlinie über die elektromagnetische Verträglichkeit EMV- Richtlinie 2014/30/EU
  EU- guidelines over the electromagnetic sociability EMV- guidelines 2014/30/EU

Für das: ***For:***

Bezeichnung / *description*	**SMALL- */**/*** ***/**/***/***/**/***/**/*/*
Kennzeichnung / *marking*	Ⓔx I M1 Ex ia I Ma I M2 (M1) Ex [ia Ma] ib I Mb Ⓔx II 1/2 G Ex ia IIC T4/T6 Ga/Gb II 2G Ex ia IIC T4/T6 Gb
Zulassung / *certification*	BVS 06 ATEX E 005 X IECEx BVS 09.0056X
Seriennummer / *serial number*	Lt. Lieferpapieren / *according to delivery documets*
Notifizierte Stelle / *notified body*	CE 0158 **DEKRA EXAM GmbH,** **Dinnendahlstraße 9, D- 44809 Bochum**
EU- Baumusterprüfbescheinigung / *EU- Type Examination Certificate:*	BVS 06 ATEX E 005 X

Der Hersteller / the manufacturer

Grünewald GmbH **Tel.: +49 (0) 2385 / 922670**
Oberallener Weg 7 **Fax: +49 (0) 2385 / 922672**
D- 59069 Hamm **Mail: info@gruenewald.eu**

Hiermit bestätigen wir, dass die vorgenannten ***SMALL der Grünewald GmbH, Mess- u. Regeltechnik*** den wesentlichen Anforderungen entsprechen, die in den Richtlinien des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen (2014/34/EU, 2014/30/EU) in der aktuellen Fassung festgelegt ist. Die Erklärung gilt für alle Exemplare, die nach den beim Hersteller hinterlegten Fertigungsunterlagen - die Bestandteil dieser Erklärung sind - hergestellt wurden.
*We herewith declare conformity of the above mentioned **SMALL** of **Grünewald GmbH, Mess- u. Regeltechnik,** with the general directives outlined in the actual edition of the guidelines (2014/34/EU, 2014/30/EU) for equipment and protective systems with the intended purpose of use within explosive environment / atmospheres, of the council for approximation of laws of the member states. This declaration is valid for all issues produced in accordance to the manufacturing documents of the manufacturer, which also form part of this declaration.*

Zur Beurteilung der Erzeugnisse wurden folgende Normen herangezogen:
Following standards were used for the assessment of the products:

EN 60079-0:2015	Explosionsgefährdete Bereiche – Teil 0: Allgemeine Anforderungen *Explosive atmospheres - Part 0: Equipment - General requirements*
EN 60079-11:2012	Explosionsgefährdete Bereiche – Teil 11: Geräteschutz durch Eigensicherheit „i" *Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"*
EN 60079-26:2015	Explosionsgefährdete Bereiche - Teil 26: Betriebsmittel mit Geräteschutzniveau (EPL) Ga *Explosive atmospheres - Part 26: Equipment with Equipment protection level (EPL) Ga*
IEC 60079-0 : 2011	Explosive atmospheres - Part 0: Equipment - General requirements
IEC 60079-11 : 2011	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
IEC 60079-26 : 2014	Explosive atmospheres - Part 26: Equipment with Equipment protection level (EPL) Ga

EN 50303 : 2001	Gruppe I, Kategorie-M1-Geräte für den Einsatz in Atmosphären die durch Grubengas und / oder brennbare Stäube gefährdet sind *Group I, category M1 equipment intended to remain functional in atmospheres endagered by firedamp and/or coal dust*
EN 61000-4-2	Elektromagnetische Verträglichkeit (EMV) - Teil 4-2: Prüf- und Messverfahren - Prüfung der Störfestigkeit gegen die Entladung statischer Elektrizität *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*
EN 61000-4-4	Elektromagnetische Verträglichkeit (EMV) - Teil 4-4: Prüf- und Messverfahren - Prüfung der Störfestigkeit gegen schnelle transiente elektrische Störgrößen/Burst *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*
EN 61326-1	Elektrische Mess-, Steuer-, Regel- und Laborgeräte- EMV- Anforderungen- Teil 1: Allgemeine Anforderungen *Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements*
EN 61326-3-1	Elektrische Mess-, Steuer-, Regel- und Laborgeräte- EMV- Anforderungen- Teil 3-1: Störfestigkeitsanforderungen für sicherheitsbezogene Systeme und Geräte, die für sicherheitsbezogene Funktionen vorgesehen sind (Funktionale Sicherheit) – Allgemeine industrielle Anwendungen *Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 3-1: immunity requirements for safety-related functions (functional safety) – General industrial applications*
EN 61326-3-2	Elektrische Mess-, Steuer-, Regel- und Laborgeräte- EMV- Anforderungen- Teil 3-2: Störfestigkeitsanforderungen für sicherheitsbezogene Systeme und Geräte, die für sicherheitsbezogene Funktionen vorgesehen sind (Funktionale Sicherheit) – Industrielle Anwendungen in spezifizierter elektromagnetischer Umgebung *Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 3-2: immunity requirements for safety-related functions (functional safety) – General industrial applications with specified electromagnetic environment*

Im Sinne der EG- Richtlinie Maschinen 2006/42/EG handelt es sich hier um eine auswechselbare Ausrüstung für eine übergeordnete Maschine. Die Gefährdungsanalyse der übergeordneten Maschine muss alle wesentlichen Risiken, die durch den Zusammenbau entstehen oder dem Hersteller nicht bekanntes EMV- Umfeld, überprüfen und in eine Risikokategorie einteilen. Entsprechende Maßnahmen sind durch die Gesamtmaschine zu gewährleisten.
For the purposes of the EC Machinery Directive 2006/42/EG, these are interchangeable equipment for a superordinated machine. The hazard analysis of the superordinated machine has substantially all the risks incurred by the assembly or producer check-known EMC environment, and classified into a risk category. Appropriate measures have to be guaranteed by the entire machine.

Ausgefertigt in / *done at* Hamm
Am / *on* March, 08th 2016
Name des Unterzeichners / *name of signatory* Michael Wolf, Geschäftsführer oder Vertretung / *General manager or representative*

Unterschrift / *Signature*

(Maschinelle Unterschrift / *machine- signature*)

Grünewald GmbH
Oberallener Weg 7
59069 Hamm / Germany
Phone +49 (0) 23 85 92 26 70
Fax +49 (0) 23 85 92 26 72
info@gruenewald.eu
www.gruenewald.eu