

## Load cells

Typ: RTN... 2GD, RTN ... 2D3G; VBB... 2GD,  
VBB... 2D3G; PWS... 1D2G, PWS... 3GD

Safety Instructions



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**Note:** The original manual is in German. This is a translation.

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# 1 General Load Cell Safety Information

## Personnel

Preparation, assembly, commissioning, operation, maintenance and servicing may only be carried out by qualified personnel.

All persons working on the system are required to observe the safety hints and know the parts of the technical documentation relevant to their work.

The operating company is responsible for instructing his operators to observe all regulations and instructions given.

## Qualification of personnel

"Qualified personnel" refers to persons familiar with installation, commissioning and operation of the system as well as with the type protection concept, and qualified in accordance with the standards applicable to their professional activities.

## Use as Originally Intended

The field of application is defined by the information and technical data supplied by the manufacturer of the corresponding electrical equipment and by the installation provisions. The load cells are intended for use in weighing systems and for weighing purposes. All other uses are unauthorized.

Please observe the respective local legal and safety provisions for the use of load cells in explosion hazard areas. The installation of intrinsically safe circuits requires an inherent safety certificate.

Vibrations during operation must not exceed the specifications in the applicable data sheets.

The load cells must not be exposed to stress associated with vibrations.

When used in open air, it is necessary to prevent ice formation on the load cells.

Changing or modifying load cells is not authorized.

Use of the load cells outside of the areas for which they have been approved is prohibited and is considered unauthorized.

### Assembly and Establishing an Electrical Connection

Ensure that the load cells are in direct conductive contact with the surrounding construction which, in turn, must be incorporated into the potential equalization of the entire system.

They are connected as described in the relevant weighing electronics manuals or in the detailed documentation. Load cells designated as intrinsically safe must be connected using Zener barriers or switch amplifiers.

The connecting cable must be laid so that it is protected from damages.

### Constraints on the Use of Load Cells of Stainless Steel

Bear in mind for your field of application that stainless steels and their welding seams also may be corroded by aggressive media. If such media are present in your case, take additional protective measures.

### Regular Maintenance and Inspection



#### **DANGER**

#### **Explosions triggered by electrostatic discharge**

Danger of life from explosion.

1. The housing elements must be grounded among themselves.
2. The entire machine must be grounded.
3. The leakage resistance to earth must be  $< 10^6 \Omega$ .
4. **In a gas explosion hazard area:** avoid direct electrostatic discharges (e.g. never wipe off plastic surfaces with a dry rag).

Check the protective measures regularly to ensure effectiveness. All components inside explosion-protection areas must be inspected regularly.

We suggest the following intervals:

Activity	Interval
Visual inspection, removal of dust deposits.	On a monthly basis
Check clamp and adjust. Check load cells for cracks, replace load cells when cracks are discovered.	Every 6 months
Performance test of the electrical system, check cables for damage.	Annually

The intervals can be extended or shortened based on the experience of the operator, provided that this does not create a safety risk.

### Repair and Replacement

Damaged load cells must be replaced and returned to the manufacturer for inspection. The interior parts of the load cell cannot be repaired by the operator.

### Disposal

Observe the relevant national provisions for disposal of devices and components.



## 2 Basic Information on Explosion Protection

### Description of the load cells in this manual

The type designation RTN ... 2GD, VBB ... 2GD and platform load cell ... 1D2G denote intrinsically safe load cells for connection. The descriptions in the following chapters apply to the connection. These load cells are carried out in protection class "ia" - see rating plate.

The type designation RTN ... 2D3G, VBB ... 2D3G and PWS ... 3GD denote the model for connection to a non-intrinsically safe circuit. The descriptions in the following chapters apply to these types. These load cells are carried out in protection class "tb", "tc" or "nA" – see rating plate.

For reasons of simplicity, these are only referred to as RTN, VBB and PWS.

The reference to the tables with the connection values is based on the ex-denotation, which is stated once again explicitly in each section and each table for all types.

### Special Instructions for RTN, VBB and PWS Load Cells

- If the load cells are installed in an environment where the EPL should be Da or Db, the connecting cable must be installed in such a way that prevents electrostatic charge.
- The enclosures of all load cells must be grounded.
- The thickness of the dust deposits must not exceed 5 mm in dust explosion zones.
- If the load cells are not connected to an intrinsically safe electric circuit, the free end of the fixed connected cable must be connected outside of the explosion hazard area. If it is connected inside the explosion hazard area, this connection must be made inside an enclosure of a suitable protection class.
- The screen of the RTN load cells is grounded to the enclosure using a 1 nF condenser. To avoid exceeding the total permissible capacity of 10 nF, no more than 8 load cells can be connected.
- On the VBB and PWS load cells, the screen must be grounded directly to the enclosure.

### Fields of Use

The load cells can be used as follows:

- RTN, VBB, PWS: Zone 1, EPL Gb, gas group IIC
- RTN, VBB, PWS: Zone 2, EPL Gc, gas group IIC
- PWS: Zone 20, EPL Da, dust group IIIC
- RTN, VBB, (PW\*): Zone 21, EPL Db, dust group IIIC
- PWS: Zone 22, EPL Dc, dust group IIIC

Details concerning the connection are found in the following chapters.

### 3 Connecting the Load Cells

#### General Information on Connecting Load Cells

- The instructions in the relevant product data sheets must be followed.
- The connecting cable used by the operator should be tested with a testing voltage of at least 500 V.
- The connecting cable must be suitable for use under the planned site conditions with regard to mechanical strength, temperature resistance, and electrical properties. Connecting cables can be obtained from Schenck Process.

#### Load cell type: PWS

Supply circuit:	green (+) and black (-)
Output circuit:	white (+) and red (-)
Sensor circuit:	orange (+) and blue (-)
Shield:	yellow or blanked copper wire

*Tab. 1 : Type PWS: cable with 6 connecting wires*

#### Load cell type: RTN

Supply circuit:	black (+) and blue (-)
Output circuit:	red (+) and white (-)
Shield:	yellow or blanked copper wire

*Tab. 2 : Type RTN: cable with 4 connecting wires*

#### Load cell type: VBB

Supply circuit:	blue (+) and black (-)
Output circuit:	white (+) and red (-)
Sensor circuit:	green (+) and gray (-)
Shield:	yellow or blanked copper wire

*Tab. 3 : Type VBB: cable with 6 connecting wires*



## 4 RTN, VBB and PWS load cells for connection to intrinsically safe circuits

### RTN and VBB load cells

RTN and VBB load cells are passive apparatus belonging to **equipment group II** in the intrinsic safety protection class "**ia**" potentially hazardous areas of **Zone 1 and 21 (category 2G, 2D / EPL Gb, Db)**.

**II 2G Ex ia IIC T4 Gb**

**II 2D Ex ia IIIC T125 °C Db**

### PWS load cells

PWS load cells are passive apparatus belonging to equipment group II in the 'intrinsic safety' protection class "ia" potentially hazardous areas of Zone 1 and 20 (category 2G, 1D / EPL Gb, Da).

**II 2G Ex ia IIC T4 Gb**

**II 1D Ex ia IIIC T125 °C Da**

The load cells are suitable for connection to a certified intrinsically safe circuit with the following maximum values.

Type series	RTN / VBB / PWS
Approval no.	BVS 14 ATEX E 108 X IECEx BVS 14.0067X
Explosion protection designation	<b>II 2G</b> <b>Ex ia IIC T4 Gb</b>
$U_i$	30 V
$I_i$	500 mA
$P_i$	4.0 W
Temperature class	T4
$T_{amb}$	-30 °C ... +70 °C
$L_i$	0.85 µH/m
$C_i$	0.162 nF/m

Type Series	RTN / VBB	PWS
Approval no.	BVS 14 ATEX E 108 X IECEx BVS 14.0067X	
Explosion protection designation	<b>II 2D</b> <b>Ex ia IIIC T125°C Db</b>	<b>II 1D</b> <b>Ex ia IIIC T125°C Da</b>
$U_i$	30 V	
$I_i$	500 mA	
$P_i$	4.0 W	
Maximum Surface Temperature	125 °C	
$L_i$	0.85 $\mu$ H/m	
$C_i$	0.162 nF/m	
$T_{amb}$	-30 °C ... +70 °C	

## 5 RTN, VBB and PWS load cells for connection to non-intrinsically safe current circuits

### RTN and VBB load cells

RTN and VBB load cells are passive apparatus belonging to **equipment group II** in the protection class "**tb**" and "**nA**" for use in potentially hazardous areas of **Zone 21 and 2 (category 2D, 3G / EPL Db, Gc)**.

**II 2D Ex tb IIIC T125 °C Db**

**II 3G Ex nA IIC T4 Gc**

The load cells are suitable for connection to a non-intrinsically safe current circuit with the following maximum values.

Type Series	RTN, VBB
Approval no.	BVS 14 ATEX E 108 X IECEX BVS 14.0067X
Explosion protection designation	<b>II 2D</b> <b>Ex tb IIIC T125°C Db</b>
Protection class	IP67
Maximum supply voltage	30 VDC
Maximum current	500 mA
Maximum Surface Temperature	125 °C
T <sub>amb</sub>	-30 °C ... +70 °C

Approval no.	IECEX BVS 14.0067X BVS 14 ATEX E 108 X
Explosion protection designation	<b>II 3G</b> <b>Ex nA IIC T4 Gc</b>
Protection class	IP67
Maximum supply voltage	30 VDC
Maximum current	500 mA
Maximum Surface Temperature	T4
T <sub>amb</sub>	-30 °C ... +70 °C

### PWS load cells

PWS load cells are passive apparatus belonging to **equipment group II** in the protection class "**tc**" and "**nA**" for use in potentially hazardous areas of **Zone 22 and 2 (category 3D, 3G / EPL Dc, Gc)**.

**II 3D Ex tc IIIC T125 °C Dc**

**II 3G Ex nA IIC T4 Gc**

The load cells are suitable for connection to a non-intrinsically safe current circuit with the following maximum values.

Type Series	PWS
Approval no.	IECEX BVS 14.0067X
Explosion protection designation	<b>Ex tc IIIC T125°C Dc</b>
Protection class	IP67
Maximum supply voltage	30 VDC
Maximum current	500 mA
Maximum Surface Temperature	125 °C
T <sub>amb</sub>	-30 °C ... +70 °C

Approval no.	IECEX BVS 14.0067X
Explosion protection designation	<b>Ex nA IIC T4 Gc</b>
Protection class	IP67
Maximum supply voltage	30 VDC
Maximum current	500 mA
Maximum Surface Temperature	T4
T <sub>amb</sub>	-30 °C ... +70 °C

## 6 Standards Applied

### Standards for RTN, VBB and PWS load cells applicable

- EN 60079-0:2012 (IEC 60079-0:2011) Potentially Explosive Atmosphere, Part 0: Devices – General Requirements
- EN 60079-11:2012 (IEC 60079-11:2011) Potentially Explosive Atmosphere, Part 11: Equipment Protection with Intrinsic Safety "i"
- EN 60079-15:2011 (IEC 60079-15:2010) Potentially Explosive atmospheres, Section 15: Equipment protection by means of ignition protection "n"
- EN 60079-31:2009 (IEC 60079-31:2008) Potentially Explosive Atmosphere, Part 31: Equipment Dust Explosion Protection with Housing "t"

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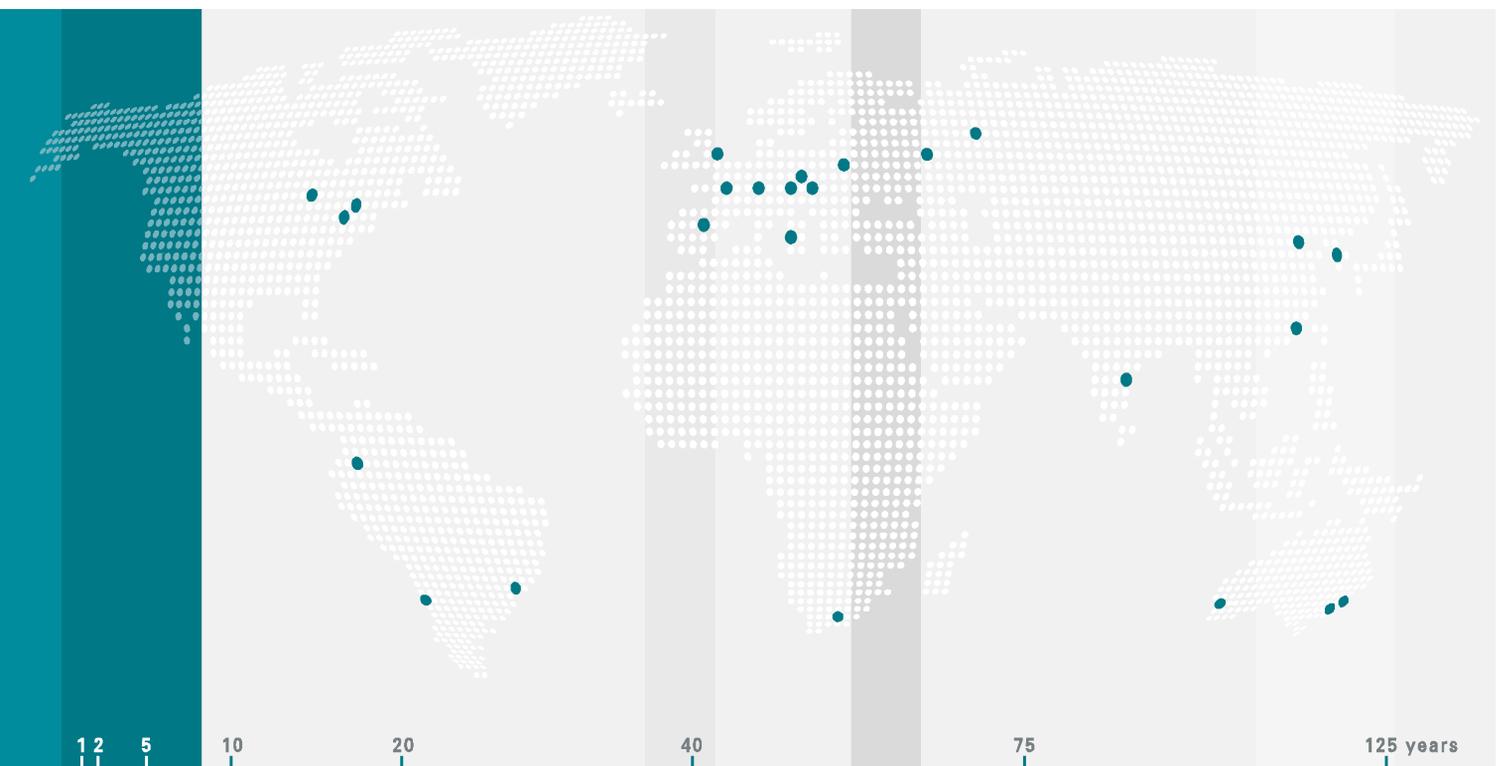


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Schenck Process ist weltweit führend in allen Bereichen der Mess- und Verfahrenstechnik und bietet Lösungen für das Wägen, Dosieren, Messen und Automatisieren an.

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Schenck Process is the global market leader of solutions in screening and process technologies in industrial weighing, feeding, screening and automation.

Schenck Process develops, manufactures, assembles, markets and sells a full range of solutions, products and turnkey systems on the basis of combining process engineering expertise, reliable components and field-proven technology.