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Ring-Torsion Load Cells RTB

- **PTB & OIML approved as suitable for trade use (up to 6000 d and 7500 d in case of multi-divisional scales)**
- **High accuracy, even for very small utilisation ranges (down to 15 % in case of trade use according to OIML)**
- **Low power consumption thanks to high impedance resistance of 1100 Ω**
- **Protection to EEx ib IIC T 6 for use in explosion hazardous areas**
- **Protection class IP68**

Application

Acting as a transducer, the load cell converts the mechanical input signal, the load, proportionally into the electrical output voltage.

The special design of the ring-torsion load cells offers particular benefits for the user:

- The extremely low headroom simplifies the use in almost all weighing applications
- The sturdy design enables easy transport, installation, and operation, even under harsh environmental conditions (interfering forces, or extreme temperatures)

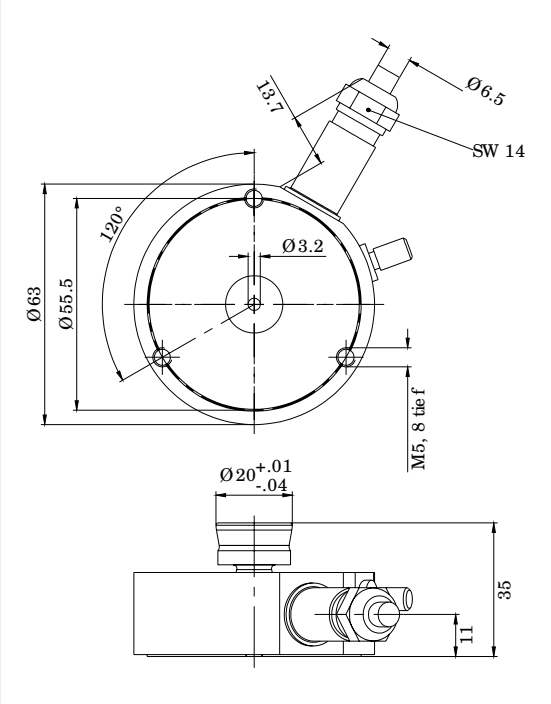
Construction

- Hermetically sealed due to laser welding and glass-metal transition (IP68)
- Corrosion protection due to the use of stainless steel
- All electrical components are inside the load cell and are thus optimally protected
- The high-quality, sturdy connection cable is lead radially into the load cell
- Mechanically compatible with the RTK series

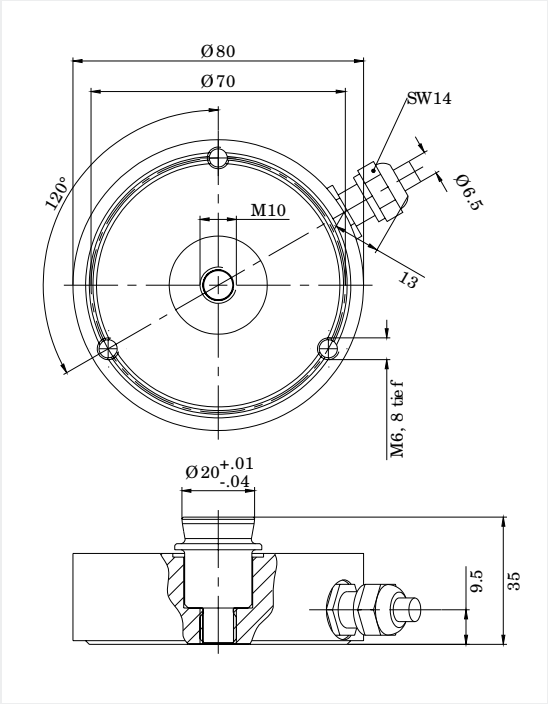
Functions

- High repeatability
- High long-term stability and thus continuing and consistently high accuracy
- Minimal effect on accuracy by side forces
- High reliability and availability, even in case of unavoidable shock loads, constraining forces or electrical interferences
- Moment-free load input/output due to direct, vertical force flow

RTB 0,13 t



RTB 0,25 t / 0,5 t



Order No.			
Variants	**Accuracy class**		
	C3	**C3MI7,5**	**C6**
0.13 t	V041085.B01	---	---
0.25 t	V041086.B01	---	---
0.50 t	V041087.B01	V041087.B03	V041087.B06
0.25 t MR	V041086.B07	---	---
0.50 t MR	V041087.B07	---	please enquire
Order No. Version ATEX II 2G; EEx ib IIC T6 / II 2D T70 °C			
0.13 t	V041085.B11	---	---
0.25 t	V041086.B11	---	---
0.50 t	V041087.B11	---	please enquire

Other Variants please enquire

Accessories:
Elastomer mount, Compact mount

Technical Data

Rated capacity	E_{max}	**0,13 t**	**0,25 t**	**0,5 t**			
Accurate class		C3	C3	C3	C3MI7.5	C6	Bezug
Sensitivity	C_n	1 mV/V ±0.1 mV/V	1.75 mV/V ±0.1 mV/V	2 mV/V ±0.1 mV/V			
Combined error	F_{comb}	±0.018 %	±0.023 %			±0.0115 %	C_n
Minimum dead load output return	F_{dr}	±0.0167 %	±0.0167 %		±0.0066 %	±0.0083 %	C_n
Creep (30 m)	F_{cr}	±0.012 %	±0.0245 %			±0.0123 %	C_n, B_{tn}
Hysteresis		±0.017 %	±0.0167 %			±0.0083 %	C_n, B_{tn}
Temperature effect on zero sensitivity per 10K	TK_0	±0.008 % ---	±0.014 % ±0.007 %		±0.014 % ---	±0.009 % ±0.005 %	C_n, B_{tn} Option **MR**
Temperature effect on sensitivity per 10K	TK_c	±0.008 %	±0.01 %			±0.005 %	C_n, B_{tn}
Maximum number of load cell intervals	n_{LC}	3000	3000			6000	
For multi-divisional scales:	Z				7500		
Minimum load cell verification interval	V_{min}	E_{max}/17500 -----	E_{max}/10000 E_{max}/20000		E_{max}/10000 ---	E_{max}/15000 E_{max}/28000	Standard Option **MR**
Min. utilisation range	B_{amin}	17 % ---	30 % 15 %		30 % --	40 % 21 %	E_{max} Option **MR**
Max. utilisation range	B_{amax}	100 %					E_{max}
Load limit *	L_l	150 %					E_{max}
Max. transverse load	L_q	100 %					E_{max}
Input resistance	R_e	1260 Ω ±100 Ω	1100 Ω ±50 Ω	1110 Ω ±50 Ω			
Output resistance	R_a	1020 Ω ±0.5 Ω	1025 Ω ±50 Ω	1025 Ω ±25 Ω			
Zero signal	S_0	1 %	1.5 %	1 %			C_n
Supply voltage	U_s	max. 30 V (recommended): 5 V … 15 V					
Nominal temperature range	B_{tn}	-10 °C … +40 °C					
Service temperature range	B_{tu}	-30 °C … +85 °C	-30 °C … +75 °C				
Storage temperature range		-50 °C … +95 °C	-50 °C … +80 °C				
Protection class		IP66 / IP68					
Cable specification		length of cable 5 m, Screen insulated from housing (0.13 t), or connected to housing (0.25 t – 0.50 t)					
Colour code		Input + 82: pink / input - 81: grey output + 28: brown / output - 27: white					
Material		Stainless steel					
Corrosion protection		see table of Chemical resistance DDP8 483					
Recommended torque for attachment bolts		8 Nm	12 – 14 Nm				
ATEX-approval		II 2G; EEx ib IIC T6 / II 2D T70 °C					

* Permitted vibration stress to DIN 50100: 70% E_{max}.
Peak value of stress must not exceed E_{max}.

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Ring-Torsion Load Cells RTN

- **OIML approved as suitable for trade use (up to 5000 d and 7500 d in case of multi-divisional scales)**
- **High accuracy, even for very small utilisation ranges (down to 15 % in case of trade use according to OIML)**
- **High output signal and, thus, high-resolution of useful signal range**
- **Low power consumption allows realisation of multi-scale systems with simple evaluation electronics**
- **Use in hazardous zone with protection class Ex ia IIC T4 Gb / Ex ia IIIC T125 °C Db or protection class Ex nA IIC T4 Gc / Ex tb IIIC T125 °C Db**
- **Protection class IP68**

Application

Acting as a transducer, the load cell converts the mechanical input signal, the load, proportionally into the electrical output voltage.

The consistent optimization of the ringtorsion load cells offers additional advantages:

- The extremely low headroom simplifies the use in almost all weighing applications
- The sturdy design enables easy transport, installation, and operation, even under very harsh environmental conditions (e.g. aggressive media, interfering forces, or extreme temperatures)

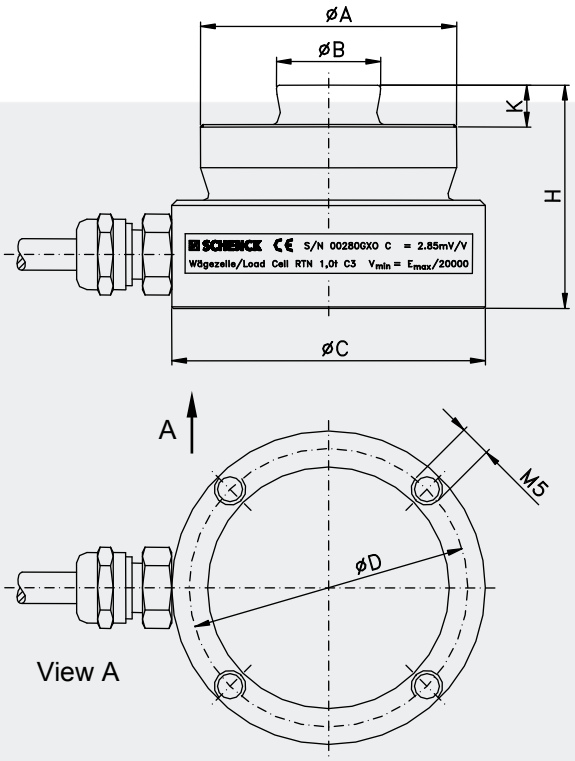
Construction

- Hermetically sealed due to laser welding; protection class IP68
- High corrosion protection due to the use of electrolytically polished stainless steel
- All electrical components are inside the load cell and are thus optimally protected
- The high-quality, sturdy connection cable is lead radially into the load cell
- The RTN load cells are compatible with earlier ring-torsion load cells if our adapter kits are used

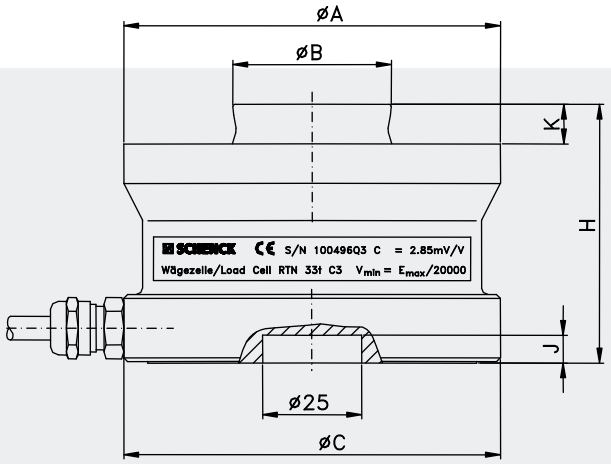
Functions

- High measuring sensitivity
- High repeatability
- High long-term stability and, thus, continuing and consistently high accuracy
- Minimal effect on accuracy by side forces
- High reliability and availability, even in case of unavoidable shock loads, constraining forces or electrical interferences
- Integral excessive voltage protection
- Moment-free load input/output due to direct, vertical force flow

RTN 1 t – 4.7 t



RTN 10 t - 470 t



Technical Data

Rated Capacity E_{max} t	Safe-Load-Limit L_l t	Breaking Load L_d t	Nominal displacement h_n mm	Dead weight kg
1	1.7	4	0.13	0.6
2.2	4	9	0.12	0.6
4.7	8	19	0.12	0.7
10	17	40	0.17	1.2
15	28	60	0.18	1.3
22	38	90	0.21	1.3
33	58	130	0.25	2.1
47	80	190	0.33	4.3
68	120	270	0.35	4.8
100	170	400	0.45	7.0
150	250	600	0.57	8.6
220	380	900	0.67	22.0
330	580	1200	0.85	29.0
470	700	1500	1.00	50.0

Dimensions

Type	Dimensions (mm)						
RTN	A	B	C	D	H	K	J
1 t	49	20	60	53	43	7.5	-
2.2 t	49	20	60	53	43	7.5	-
4.7 t	49	20	60	53	43	7.5	-
10 t	73	30	75	-	50	6.5	7
15 t	75	30	75	-	50	6.5	7
22 t	75	30	75	-	50	6.5	7
33 t	95	40	95	-	65	10	7
47 t	130	60	130	-	75	14	7
68 t	130	60	130	-	85	14	7
100 t	150	70	150	-	90	16	7
150 t	150	70	150	-	100	16	7
220 t	225	100	225	-	130	24	10
330 t	225	100	225	-	145	24	10
470 t	270	120	270	-	170	28	10

Admissible static side load $L_q = 0.5 (E_{max} – 0.8 L_z)$, but no higher than $L_{qmax} = 0.3 E_{max}$; E_{max} = rated capacity;
L_z = load in measuring direction
Admissible dynamic load to DIN 50100: 70 % E_{max}. Dynamic load value must not exceed E_{max}.

Technical Data

Rated capacity	E_{max}	**1 t – 470 t**		**1 t – 100 t**	
Accuracy class		0.05	C3	C5 / C4 Mi 7.5	Reference
Sensitivity	C_n	2.85 mV/V ±2.85 µV/V			
Combined error	F_{comb}	0.05 %	0.02 %	0.01 %	C_n
Minimum dead load output return	F_{dr}	±0.03 %	±0.016 %	±0.006 %	C_n
Creep (30 m)	F_{cr}	±0.04 %	±0.024 %	±0.009 %	C_n
Temperature effect on zero sensitivity per 10 K	TK_0	±0.03 % ±0.05 %	±0.007 % ±0.02 %	±0.0058 % ±0.02 %	C_n, B_{tn} C_n, B_{tu}
Temperature effect on sensitivity per 10 K	TK_c	±0.05 % ±0.07 %	±0.008 % ±0.02 %	±0.0062 % ±0.02 %	C_n, B_{tn} C_n, B_{tu}
Maximum number of scale intervalls	n_{LC}		3000	5000	
For multi-divisional scales	Z			7500	
Minimum load cell verification intervall	V_{min}		E_{max}/20000	E_{max}/24000	
Max. utilisation range	B_{amax}	$B_{amax} = E_{max}$			
Input resistance	R_e	4450 Ω ±100 Ω			T_r
Output resistance	R_a	4010 Ω ±2 Ω	4010 Ω ±0.5 Ω		T_r
Zero signal	S_0	±1 %			C_n
Max. supply voltage	U_{smax}	60 V			
Nominal temperature range	B_{tn}	-10 °C … +40 °C			
Service temperature range **Explosing-proof design**	B_{tu}	-40 °C … +80 °C, Option to +110 °C *) -30 °C … +70 °C			
Reference temperature	T_r	22 °C			
Storage temperature range	B_{ts}	-50 °C … +85 °C			
Protection class **Explosing-proof design**		IP68, 1 m / 100 h; (Option 110 °C: IP66) IP67			
Cable specification		TPE (grey) ∅ 6.5 mm, silicone and halogen free, -30 °C to +150 °C, Length 5 m for RTN 1 t - 15 t and RTN 150 t - 470 t Length 15 m for RTN 22 t - 100 t			
Colour code		Black: input + / blue: input - Red: output + / white: output - Yellow: screening			
Material		Stainless steel			
Corrosion protection		see Spec Sheet DDP8483 “Chemical resistance of RT Load Cells”			

*) Optional feature 110 °C not possible in combination with C5 or ATEX

Order No.

Variants	Accuracy class		
	0.05	**C3**	**C5 / C4 Mi 7.5**
RTN 1 t	D726173.04	D726173.02	D726173.10
RTN 2.2 t	D726174.04	D726174.02	D726174.10
RTN 4.7 t	D726175.04	D726175.02	D726175.10
RTN 10 t	D726176.04	D726176.02	D726176.10
RTN 15 t	D726177.04	D726177.02	D726177.10
RTN 22 t	D724781.04	D724781.02	D724781.10
RTN 33 t	D724754.04	D724754.02	D724754.10
RTN 47 t	D724782.04	D724782.02	D724782.10
RTN 68 t	D724783.04	D724783.02	D724783.10
RTN 100 t	D724784.04	D724784.02	D724784.10
RTN 150 t	D726178.04	D726178.02	
RTN 220 t	D726179.04	D726179.02	
RTN 330 t	D726180.04	D726180.02	
RTN 470 t	D726181.04	D726181.02	

Optional feature ATEX/IECEx approval
Intrinsically safe ATEX explosion-proof design category 2GD and IECEx EPL Gb, Db
Gas-Ex II 2G Ex ia IIC T4 Gb (Zone 1)
Dust-Ex II 2D Ex ia IIIC T125 °C Db, IP67 (Zone 21)
Warning: The verification of intrinsically safe circuit must be verified. New barriers are provided in particular for new systems. The verifications of intrinsically safe circuit are available for all load cells and barriers.

Accuracy class		
0.05 2GD	**C3 2GD**	**C5 / C4 MI 7,5 2GD**
Variant .82	Variant .81	Variant .83

Load cells marked as intrinsically safe - Ex "i" - are also operated intrinsically safely irrespective of the zone.

Non intrinsically safe ATEX explosion-proof design category 2D, 3G and IECEx EPL Db, Gc
Gas-Ex II 3G Ex nA IIC T4 Gc (Zone 2)
Dust-Ex II 2D Ex tb IIIC T125 °C Db, IP67 (Zone 21)

Accuracy class		
0.05 2D3G	**C3 2D3G**	**C5 / C4 MI 7,5 2D3G**
Variant .86	Variant .85	Variant .87

Example for ordering: 47 t, accuracy class C3, ATEX category 2D, 3G. Typ RTN 47 t C3 2D, 3G …;
Order No. D724782.85

Option	Accessories
■ Variant for service temperature range of up to 110 °C ■ Customized cable length ■ Special corrosion protection ■ Protection class IP69K ■ Cable resistant to gnawing rodents ■ Mounting holes	SENSiQ™ Elastomer Mount (SEM) SENSiQ™ Secure Mount (SSM) SENSiQ™ Pendulum Mount (SPM) SENSiQ™ Fixed Mount (SFM)

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Load Cells VBB and Load Cell Mounts VEB

- **Highest accuracies (up to 6000 increments to OIML R60)**
- **Hermetically sealed due to laser welding (IP68)**
- **Use in hazardous zone with protection class**
  Ex ia IIC T4 Gb / Ex ia IIIC T125 °C Db
  or protection class
  Ex nA IIC T4 Gc / Ex tb IIIC T125 °C Db
- **Optimized for parallel connection through perfect calibration**
- **6-wire circuit**
- **100 % stainless steel**

Application

Load cells of the VBB type are designed to convert the mechanical input signal, the load, proportionally into the electrical output voltage.

Combined with the corresponding VEB elastomer mounts, they are very suitable for use with platform, batching, and hopper scales. Their compact design simplifies the integration in any existing construction.

The rugged design of the load cells and mounts ensures reliable operation even in severe environments.

Construction

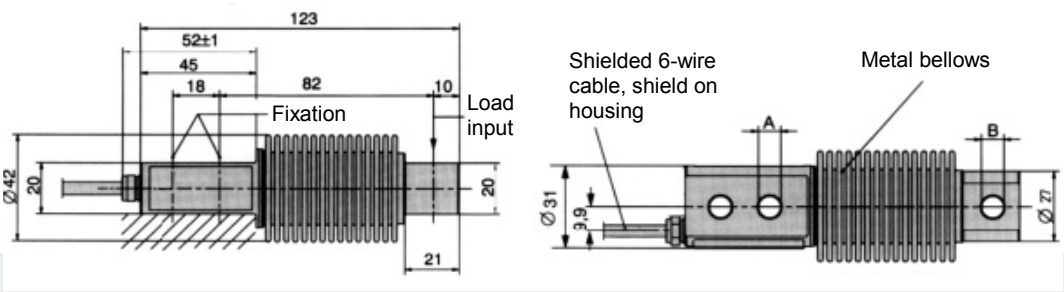
Entirely made of stainless steel and hermetically sealed by laser welding, the VBB load cells are connected by using a high-quality shielded 6-wire PVC cable.

The 6-wire circuit provides for a measuring signal which is insensitive to connecting cables of different lengths.

Functions

- High calibrating accuracy, thus, optimal prerequisites for the parallel connection of load cells
- High degree of measuring signals repeatability
- Damping of side forces through the elastomer mount
- Self-centering after side load
- Minimal effect on accuracy by side forces

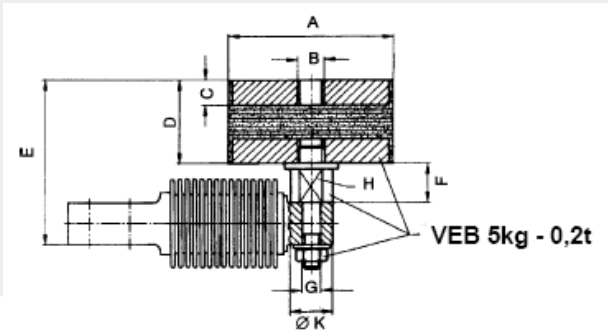
VBB Load Cells 5 kg – 0.5 t



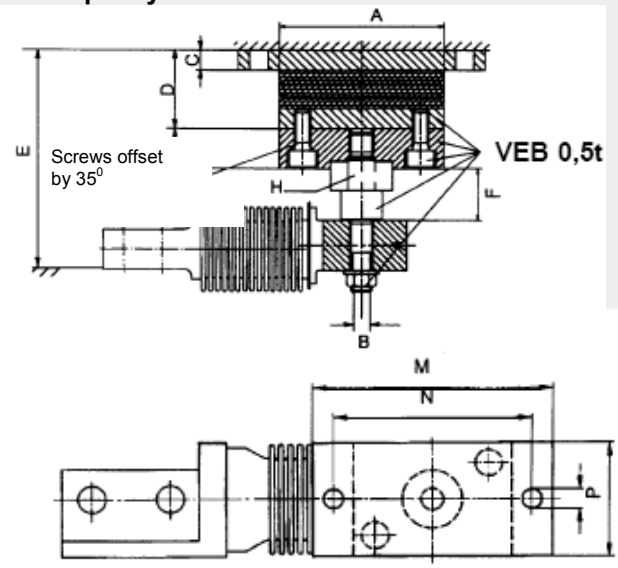
Variant	Dimensions (mm)	
	A	B
VBB 5 kg – 0.2 t	8.2	8.2
VBB 0.5 t	10.5	11.1

VEB Elastomer Mount 5 kg – 0.5 t for VBB Load Cells

Capacities 5 kg – 0.2 t



Capacity 0.5 t



Elastomer mount correct mounting position

Dimensions (mm)

Elastomer mount	A	B	C	D	E	F	G	H	K	L	M	N	P	R	F_R*	S_{max}**
VEB 5 kg – 0.2 t	75	M12	12	40	79 ±1,3	18.5	M8	SW 17	19	-	-	-	-	-	163	3
VEB 0.5 t	80	M10	10	39	$105^{+2,1}_{-2,2}$	26	-	SW 27	-	20	120	100	9	60	400	4.5

* F_R Restoring force in N with 1 mm lateral displacement
** $S_{max.}$, in mm, maximum adm. lateral displacement if loaded with rated capacity

Technical Data

Rated capacity	E_{max}	5 kg – 0.5 t				
Accuracy class		D1	C3*	C4**	C6***	Reference
Nominal characteristic value	C_n	2 mV/V +20 µV/V; -2 µV/V	2 mV/V ±1 µV/V			
Combined error	F_{comb}	0.05 %	0.02 %	0.013 %	0.01 %	C_n
Zero signal return after loading (30 min)	F_{dr}	±0.049 %	±0.016 %	±0.012 %	±0.008 %	C_n
Creep error during stress (30 min)	F_{cr}	±0.049 %	±0.016 %	±0.012 %	±0.008 %	C_n
Temperature coefficient of zero signal	TK_0	±0.05 %/10 K	±0.0125 %/10 K	±0.009 %/10 K	±0.009 %/10 K	C_n в B_{tn}
Temperature coefficient of characteristic value	TK_c	±0.05 %/10 K	±0.008 %/10 K	±0.007 %/10 K	±0.004 %/10 K	C_n в B_{tn}
Maximum number of increments in certified applications	n_{LC}	1000	3000	4000	6000	
Min. scale interval	v_{min}	0.036 %	0.009 %	0.0066 %	0.0066 %	E_{max}
Minimum utilisation rate	B_{amin}	36 %	27 %	26 %	39 %	E_{max}
Maximum utilisation rate	B_{amax}	B_{amax} = E_{max}				
Input resistance	R_e	350 Ω - 480 Ω				t_r
Output resistance	R_a	356 Ω ±0.2 Ω	356 Ω ±0.12 Ω			t_r
Zero signal	S_0	±1 %				C_n
Maximum supply voltage	U_{smax}	18 V				
Nominal temperature range	B_{tn}	-10 °C … +40 °C				
Service temperature range Explosion-proof design	B_{tu}	-40 °C … +70 °C -30 °C … +70 °C				
Reference temperature	t_r	23 °C				
Storage temperature range	B_{ts}	-50 °C … +85 °C				
Safe load limit	E_L	150 %				C_n
Breaking load	E_D	300 %				C_n
Displacement **** at rated capacity		0.25 mm	0.3 mm	0.4 mm	0.6 mm	
		5 kg	10 - 100 kg	200 kg	500 kg	
Protection class Explosion-proof design		IP68 (tightened test conditions: 1 m water gauge; 100 h) IP67				
Cable specification		3 m PVC cable, 6 wires, shielded, shield on housing				
Colour code		black: input - / blue : input + / black/yellow: shield red : output - / white : output + grey : sensor - / green : sensor +				
Corrosion protection		Stainless steel				

*: Quality C3 available for nominal loads ≥ 10 kg only
**: Quality C4 available for nominal loads ≥ 20 kg only
***: Quality C6 available for nominal loads ≥ 50 kg only
****: Please adjust the overload stops to nominal displacement +0.05 mm (unloaded scale)

Variants Load Cells	Order No.	Ex-Variants Load Cells	Order No. 2GD	Order No. 2D/3G
VBB 5 kg D1	D 725 417.01			
VBB 10 kg D1	D 725 417.02			
VBB 10 kg C3	D 725 419.02	VBB 10 kg C3 „Ex"	D 725 419.32	D 725 419.42
VBB 20 kg D1	D 725 417.03			
VBB 20 kg C3	D 725 419.03	VBB 20 kg C3 „Ex"	D 725 419.33	D 725 419.43
VBB 50 kg D1	D 725 417.04			
VBB 50 kg C3	D 725 419.04	VBB 50 kg C3 „Ex"	D 725 419.34	D 725 419.44
VBB 0.1 t D1	D 725 409.01	VBB 0,1 t D1 „Ex"	D 725 409.61	D 725 409.41
VBB 0.1 t C3	D 725 409.04	VBB 0,1 t C3 „Ex"	D 725 409.64	D 725 409.44
VBB 0.1 t C4	D 726 370.01	VBB 0,1 t C4 „Ex"	D 726 370.31	D 726 370.41
VBB 0.2 t D1	D 725 409.02	VBB 0,2 t D1 „Ex"	D 725 409.62	D 725 409.42
VBB 0.2 t C3	D 725 409.05	VBB 0,2 t C3 „Ex"	D 725 409.65	D 725 409.45
VBB 0.2 t C4	D 726 370.02	VBB 0,2 t C4 „Ex"	D 726 370.32	D 726 370.42
VBB 0.2 t C6	D 726 370.04	VBB 0,2 t C6 „Ex"	D 726 370.34	D 726 370.44
VBB 0.5 t D1	D 725 409.03	VBB 0,5 t D1 „Ex"	D 725 409.63	D 725 409.43
VBB 0.5 t C3	D 725 409.06	VBB 0,5 t C3 „Ex"	D 725 409.66	D 725 409.46
VBB 0.5 t C4	D 726 370.03	VBB 0,5 t C4 „Ex"	D 726 370.33	D 726 370.43

Variants Elastomer Mounts	Order No.
VEB 5 kg – 0.2 t	D 725 408.01
VEB 0.5 t	D 725 408.02

Example for ordering:
Rated Capacity 0.2 t, Accuracy Class C6: Variant VBB 0.2 t C6 – Ordering Number D726 370.04

Additional versions available upon request.

Optional feature ATEX/IECEx approval
Intrinsically safe ATEX explosion-proof design category 2GD and IECEx EPL Gb, Db
Gas-Ex II 2G Ex ia IIC T4 Gb (Zone 1)
Dust-Ex II 2D Ex ia IIIC T125 °C Db, IP67 (Zone 21)

Load cells marked as intrinsically safe - Ex "i" - are also operated intrinsically safely irrespective of the zone.
Warning: The verification of intrinsically safe circuit must be verified. New barriers are provided in particular for new systems. The verifications of intrinsically safe circuit are available for all load cells and barriers.

Non intrinsically safe ATEX explosion-proof design category 2D, 3G and IECEx EPL Db, Gc
Gas-Ex II 3G Ex nA IIC T4 Gc (Zone 2)
Dust-Ex II 2D Ex tb IIIC T125 °C Db, IP67 (Zone 21)

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VDW Self-Centering Pressure Load Cell

- **Legal for Trade Use Pressure Load Cell, Optimized for Use in Vehicle Scales**
- **Self-Straightening Function**
- **Simple Installation and Orientation thanks to Matching Accessories**
- **Comparison of Characteristic Value and Output Impedance Simplifies Corner-Load Comparison in Multiple-Cell Scales**
- **Excellent Protection Against Electromagnetic Influences thanks to an Optimized Screening Concept**
- **Integrated Over-Voltage Protection**
- **Laser-Welded, Protection Class IP 68 1m/100hr; IP69K**

Application

Acting as a measuring transducer, the load cell converts
the mechanical input variable load into the electrical output variable voltage.

The VDW has been consistently optimized for use in vehicle scales. :

- The design of the cell as a self-straightening stabilizer link keeps transverse forces away from it, even if the bridge is displaced horizontally to a large degree.
- The design allows for a rapid and cost-effective assembly of the cell with no expensive mounting parts.
- Matching accessories and fitting aids simplify installation.

Construction

- Hermetically sealed thanks to the laser-welding (IP68)
- High corrosion protection thanks to the use of rustproof materials - incl. high-grade steel cable screw connections
- Built-in over-voltage protection
- All electrical components are located in the interior of the load cell and are thus optimally protected.
- Laser-welded, protection class IP 68 1m immersion depth /100hr, or IP69K (steam jet cleaning)

Function

- High measuring sensitivity
- High reproducibility
- High long.term stability and thus continuously high accuracy over time.
- Characteristic value and output impedance of the VDW are compared to each other such that the corner-load comparison for a multiple-cell scales generally becomes redundant
- The optimized screening concept (no conductible connection from cable screen to load cell body) gives excellent protection against electromagnetic influences..