

# C16A...

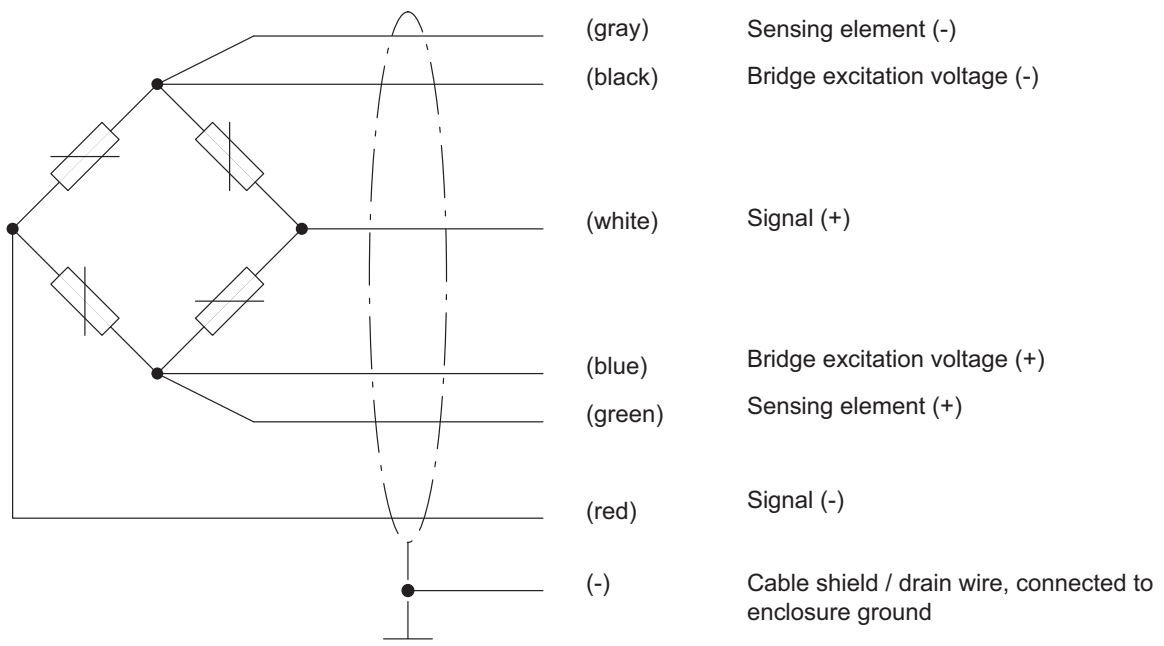
## Self-centering pendulum load cell



### Special features

- Self-restoring function
- Maximum capacities: 20 t ... 100 t
- Easy installation
- Stainless materials, laser welded, IP68/IP69K
- Legal for trade
  - up to 5000 d (OIML R60)
  - up to 10000 d (NTEP class III LM)
  - 3000 d NMIA (Australia)
- Optimized for parallel connection by off-center load compensation
- Meets EMC requirements as per EN 45 501:2015
- Explosion protection versions as per ATEX, IECEx EAC-Ex and FM (US/CA)

### Cable assignment (6-wire configuration)



# Specifications

Type	C16A															
<b>Accuracy class (OIML R60)</b>			<b>D1</b>					<b>C3</b>					<b>C4</b>		<b>C5</b>	
<b>Number of load cell verification interval</b>	$n_{LC}$		1000					3000 <sup>1)</sup>					4000		5000	
<b>Maximum capacity</b>	$E_{max}$	t	20	30	40	60	100	20	30	40	60	100	30; 40	60	30; 40	60
<b>Minimum load cell verification interval of the load cell</b>	$v_{min}$	% of $E_{max}$	0.0200					0.0100	0.0083	0.0167	0.0100	0.0083	0.0100	0.0083		
								[Option: 0.0050]								
<b>Ratio of minimum verification interval</b>	Y		5000					10000	12000	5988	10000	12000	10000	12000		
								[Option: 20,000]								
<b>Accuracy class (NTEP)</b>			<b>III LM</b>													
<b>Number of load cell verification interval</b>	$n_{LC}$		1000													
<b>Maximum capacity</b>	$E_{max}$	t	20	30	40	60	100									
<b>Minimum load cell verification interval of the load cell</b>	$v_{min}$	% of $E_{max}$	0.0068													
<b>Maximum scale interval factor</b>	Y		14700													
<b>General specifications</b>																
<b>Rated output (nominal)</b>	$C_n$	mV/V	2													
<b>Rated output tolerance<sup>2)</sup></b>		%	$\pm 0.5^2)$													
<b>Temperature coefficient of the rated output<sup>3)</sup></b>	$TC_S$	% of $C_n$	$\pm 0.0250^3)$					$\pm 0.0080^3)$					$\pm 0.0070^3)$		$\pm 0.0060^3)$	
<b>Temperature coefficient of zero signal</b>	$TC_0$	% of $C_n / 10\text{ K}$	$\pm 0.0285$					$\pm 0.0140$	$\pm 0.0116$	$\pm 0.0234$	$\pm 0.0140$	$\pm 0.0116$	$\pm 0.0140$	$\pm 0.0116$		
<b>Relative reversibility error<sup>3)</sup></b>	$d_{hy}$	% of $C_n$	$\pm 0.0330^3)$					$\pm 0.0170^3)$					$\pm 0.0140$		$\pm 0.0120$	
<b>Non-linearity<sup>3)</sup></b>	$d_{lin}$		$\pm 0.0300^3)$					$\pm 0.0180^3)$					$\pm 0.0120$		$\pm 0.0100$	
<b>Creep upon loading over 30 min.</b>	$d_{cr}$		$\pm 0.0330$					$\pm 0.0167$					$\pm 0.0125$		$\pm 0.0100$	
<b>Minimum dead load output return, 30 min.</b>	DR		$\pm 0.0330$ ( $\pm 0.0150$ NTEP III LM)					$\pm 0.0167$					$\pm 0.0125$		$\pm 0.0100$	
<b>Repeatability error</b> (max. variation in the load cell output with repeat loading)			$\pm 0.005$													
<b>Input resistance</b> (black-blue)	$R_{LC}$		$\Omega$	700 $\pm 20$												
<b>Output resistance<sup>2)</sup></b> (red-white)	$R_0$	706 $\pm 3.5^2)$														
<b>Reference excitation voltage</b>	$U_{ref}$	V	5													
<b>Nominal (rated) range of the excitation voltage</b>	$B_U$		0.5 ... 12													
<b>Insulation resistance</b>	$R_{is}$	G $\Omega$	> 5													
<b>Nominal (rated) range of the ambient temperature</b>	$B_T$	$^{\circ}\text{C}$	-10 ... +40													
<b>Operating temperature range</b>	$B_{tu}$		-50 ... +70													
<b>Storage temperature range</b>	$B_{tl}$		-50 ... +85													

<b>Limit load</b>	$E_L$	% of $E_{max}$	150
<b>Breaking load</b>	$E_d$		> 350
<b>Relative permissible oscillatory stress</b> (oscillation width (peak-to-peak) as per DIN 50100 with 10,000,000 loading cycles)	$F_{srel}$		70

<b>Maximum capacity</b>	$E_{max}$	t	20	30	40	60	100
<b>Rated displacement at <math>E_{max}</math>, approx.</b>	$s_{nom}$	mm	0.65	0.75	0.85	1.22	1.57
<b>Weight with cable, approx.</b>	G	kg	2.1	2.3	2.9	3.7	8
<b>Degree of protection per EN60529 (IEC529)</b>			IP68 (test conditions 2 m water column /10,000 h) IP69 K (water at high pressure, steam cleaning)				
<b>Material</b>	Measuring body Housing Cable entry Seal Cable sheath			Stainless steel <sup>4)</sup> 20 t to 60 t: 1.4404; 100 t: 1.4301 Stainless steel <sup>4)</sup> (for $E_{max} = 100$ t: Nickel-plated brass) Viton <sup>®</sup> (for $E_{max} = 100$ t: silicone) Thermoplastic elastomer			

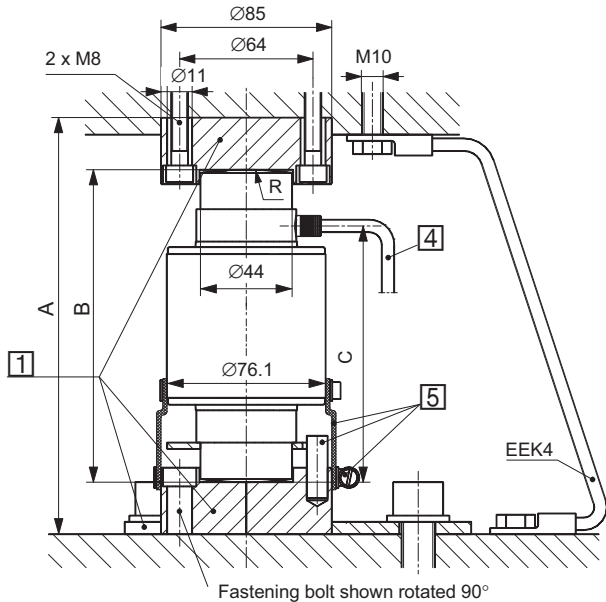
- 1) Load cells of accuracy class OIML C3 come with an additional label for the Australian market (No. S390)
- 2) Because of the off-center load compensation, the sensitivity and output resistance are matched in such a way that when there is eccentric loading, the scale display is within the permissible error limits (mpe).
- 3) The values for non-linearity ( $d_{lin}$ ), relative reversibility error ( $d_{hy}$ ) and temperature coefficient of sensitivity ( $TC_S$ ) are recommended values. The sum of these values is within the accumulated error limit for  $p_{LC} = 0.7$  as per OIML R60 or NTEP.
- 4) As per EN 10088-1

# Dimensions and loading fittings for maximum capacities 20 t ... 60 t

## Installation variant 1:

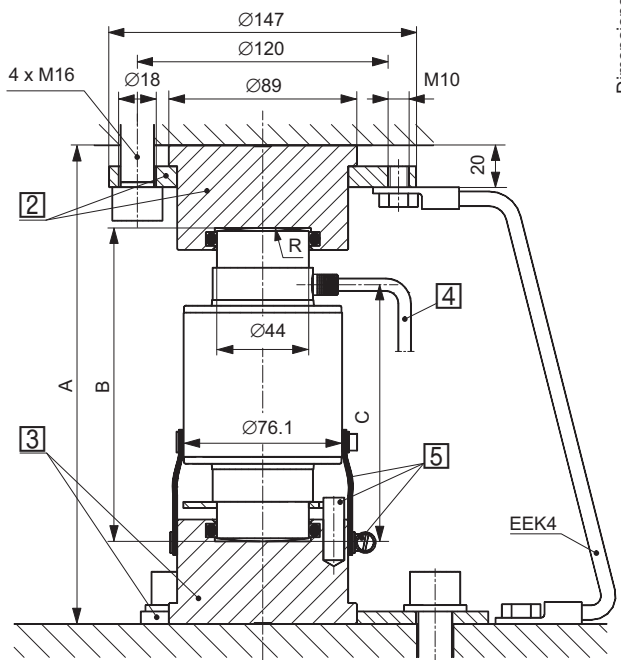
C16.../≤60 t + C16/ZOU44A

(max. load per load cell = 40 t)



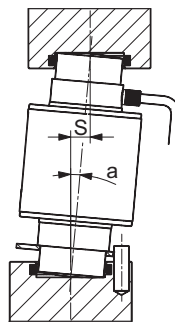
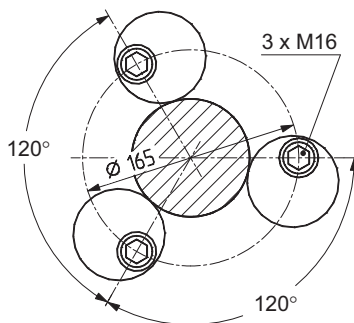
## Installation variant 2:

C16.../≤60 t + EPO3/50 t + C16/EPU44A



Dimensions in mm

## View from above



- 1 C16/ZOU44A
- 2 EPO3/50 t
- 3 C16/EPU44A
- 4 Cable length (standard):  
20 t + 30 t = 12 m;  
40 t + 60 t = 20 m
- 5 Dowel pin Ø10 x 30 (rotation stop), sealing sleeve and hose clamp included in load cell scope of supply

Cable:  
Ø 5.4 mm (standard)  
Ø 6.4 mm with braided wire option (20R)

Installation variant 1	E <sub>max</sub> C16...	Thrust pieces top + bottom (1 set = 2 pieces)		A	B	C	R ball	a <sub>max</sub> <sup>2)</sup>	S <sub>max</sub> <sup>3)</sup>	F <sub>R</sub> <sup>4)</sup> (% of applied load)	
		C16/ZOU44A <sup>1)</sup>								at S <sub>max</sub>	at S = 1 mm
	20 t			200	150	123	130	5°	13	6.4	0.49
	30 t			200	150	123	160	5°	13	9.9	0.76
	40 t			200	150	123	180	5°	13	12.2	0.94
	60 t			260	210	157	220	3°	11	5.7	0.52

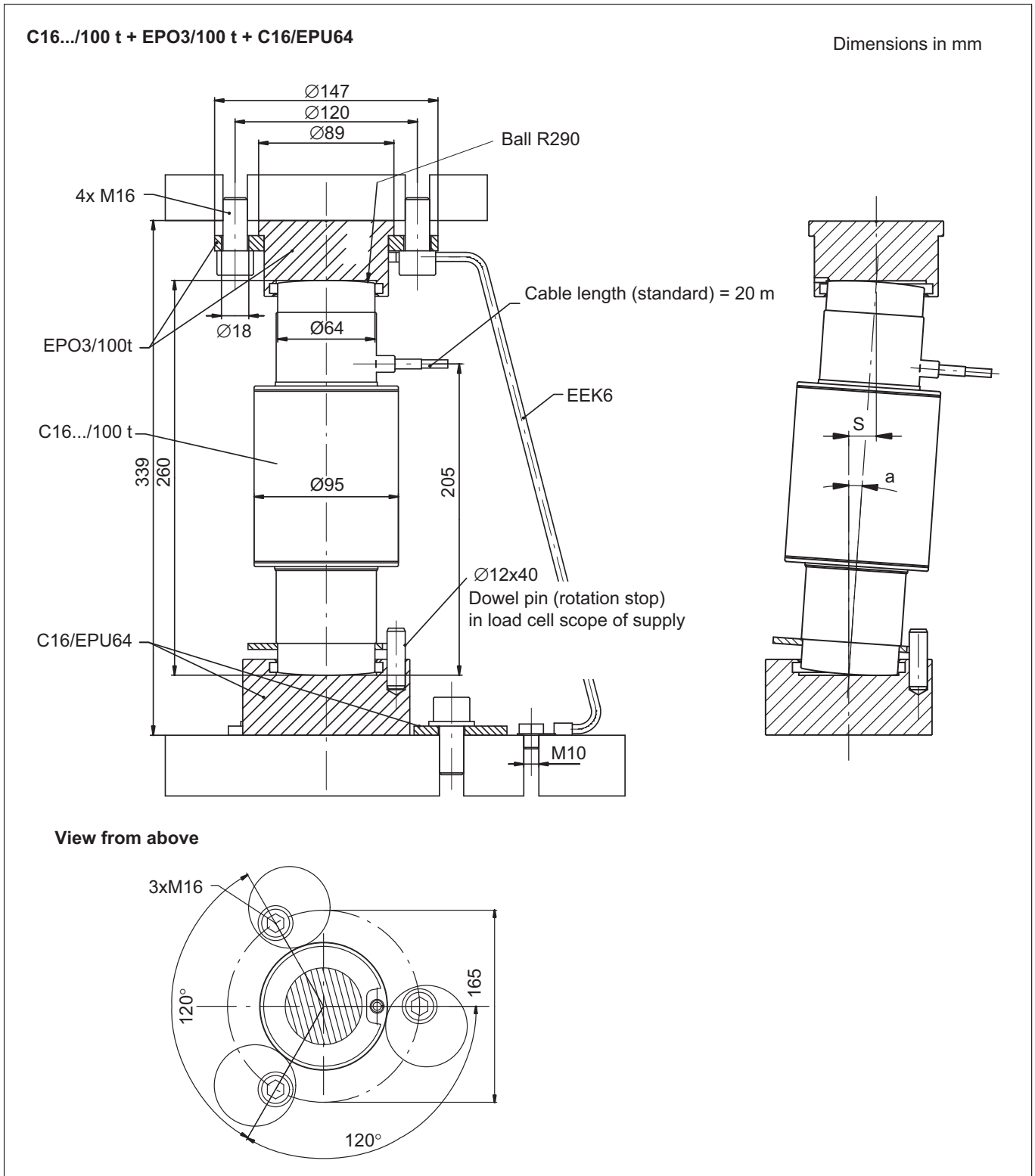
  

Installation variant 2	E <sub>max</sub> C16...	Thrust pieces		A	B	C	R ball	a <sub>max</sub> <sup>2)</sup>	S <sub>max</sub> <sup>3)</sup>	F <sub>R</sub> <sup>4)</sup> (% of applied load)	
		top	bottom							at S <sub>max</sub>	at S = 1 mm
	20 t	EPO3/50 t	C16/EPU44 A	229	150	123	130	5°	13	6.4	0.49
	30 t			229	150	123	160	5°	13	9.9	0.76
	40 t			229	150	123	180	5°	13	12.2	0.94
	60 t			289	210	157	220	3°	11	5.7	0.52

1) Max. loading: 40 t  
2) Max. allowed misalignment

3) Max. allowed lateral displacement of load application  
4) Restoring force

# Dimensions and loading fittings for maximum capacity 100 t



$a_{max}$ Max. allowed misalignment	$S_{max}$ Max. allowed lateral displacement of load application	$F_R$ Restoring force, % of applied load	
		at $S_{max}$	at $S = 1 \text{ mm}$
4°	18	8.6	0.48

Other available maximum capacities: 200 t and 400 t (see separate data sheet)

## Options for C16A

- Explosion protection versions as per ATEX, IECEx and FM (US/CA)**

- AI1/21\* ATEX+IECEx+FM Zone 1/21, intrinsically safe;  
 - ATEX/IECEx: II 2G Ex ia IIC T6/T4 Gb + II 2D Ex ia IIIC T125°C Db  
 - FM(US/CA): Class I Zone 1 AEx/Ex ia IIC T4 Gb + Zone 21 AEx/Ex ia IIIC T125°C Db  
 - FM(US): Class I, II, III Division 1, Groups A, B, C, D, E, F, G T4

- AI2/21\*\* ATEX+IECEx Zone 2/21, not intrinsically safe;  
 - ATEX/IECEx: II 3G Ex ec IIC T6/T4 Gc + II 2D Ex tb IIIC T125°C Db

\* With EC Type Approval Certificate BVS 13 ATEX E 108 X, IECEx Certificate of Conformity IECEx BVS 13.0109 X, Certificate of Conformity FM 18 US 0176 X and Certificate of Conformity FM 18 CA 0144 X.

\*\* With EC Type Approval Certificate BVS 13 ATEX E 108 X, IECEx Certificate of Conformity IECEx BVS 13.0109 X. The optional AI2/21 IECEx+ATEX Zone 2/21 also includes Zone 2/22.

- Explosion protection versions as per EAC mark (Eurasian Economic Union with member states: Russia, Belarus, Armenia, Kazakhstan, Kirghistan)**

- R1/21 EAC Ex Zone 1/21, intrinsically safe,\*  
 - EAC Ex: 1Ex ia IIC T4/T6 Gb X + Ex ia IIIC T125°C Db X

- R2/21 EAC Ex Zone 2/21, not intrinsically safe;  
 - EAC Ex: 2Ex e IIC T6/T4 Gc X + Ex tb IIIC T125°C Db X

\* Please note that the electrical values of the new type approval may differ from the previous version (the new certificate can be found on the C16A product page).

- Overvoltage protection**

- Minimum load cell verification interval ( $v_{min}$ ) = 0.0050 % (Y=20000)**

- Accuracy class C5 (OIML) on request**

- Cable length 20 m (maximum capacity ( $E_{max}$ ) = 20 t + 30 t) / • Cable length 40 m (maximum capacity ( $E_{max}$ ) = 20 t ... 100 t)**

- 20 m cable with braided wire (maximum capacity ( $E_{max}$ ) = 20 t ... 60 t)**

## Product numbers

When placing an order please specify the ordering numbers from the tables. If you need other versions (accuracy classes, explosion protection, other cable lengths or materials, overvoltage protection, etc.) for the available products, please look in the overview: "C16A load cells, optional versions". You can generate a specific ordering number there from your individual requirements.

Accuracy class	D1 (OIML)	C3 (OIML)			C4 (OIML)
Version	Standard	Standard	With overvoltage protection	With braided wire cable	Standard
Replaces configurable options			Option 6 (code L)	Option 5 (code 20R)	
Maximum capacities	Ordering number	Ordering number			Ordering number
20t	1-C16A3D1/20T/NN-1	1-C16A3C3/20T-1	1-C16A3C3/20T/L-1	-	-
30t	1-C16A3D1/30T/NN-1	1-C16A3C3/30T-1	1-C16A3C3/30T/L-1 1-C16A3C3/30T/L2-1*	1-C16A3C3/30T/L2R	1-C16A3C4/30T/L-1
40t	1-C16A2D1/40T/NN-1	1-C16A2C3/40T-1	1-C16A2C3/40T/L-1	1-C16A2C3/40T/L2R	1-C16A2C4/40T
60t	1-C16A2D1/60T/NN	1-C16A2C3/60T	-	-	1-C16A2C4/60T
100t	1-C16A2D1/100T/NN	1-C16A2C3/100T	-	-	-

\* With cable length 20 m and overvoltage protection

### Cable lengths

Maximum capacities 20 t and 30 t: 12 m cable standard  
 maximum capacities 40 t to 100 t: 20 m cable standard

## Accessories (to be ordered separately)

### C16 load corner

Type	C16A	
Accuracy class	C3 (OIML)	
Ordering number	Standard	With overvoltage protection
Maximum capacity	Ordering number	Ordering number
20 t	1-C16A3C3/20T/CO	1-C16A3C3/20T/L/CO
30 t	1-C16A3C3/30T/CO	1-C16A3C3/30T/L/CO
40 t	1-C16A3C3/40T/CO	1-C16A3C3/40T/L/CO



Each order for the C16A load corner includes a C16A load cell with accuracy class C3 and rack mount kit 1-C16/ZOU44A3.

### Thrust pieces

- Maximum capacities 20 t ... 60 t - installation variant 1:
  - **C16/ZOU44A** Thrust pieces (stainless) for above and below (1 set = 2 pieces), can be used with C16.../≤60 t up to a max. loading per load cell of 40 t, incl. 3 eccentric disks
- Maximum capacities 20 t ... 60 t - installation variant 2:
  - **EPO3/50t** Thrust piece for above, incl. clamping ring
  - **C16/EPU44A** Thrust piece for below, incl. 3 eccentric disks
- Maximum capacity 100 t:
  - **EPO3/100t** Thrust piece for above, incl. clamping ring
  - **C16/EPU64** Thrust piece for below, incl. 3 eccentric disks

Maximum capacity	20 t ... 60 t		100 t
Version	Installation variant 1	Installation variant 2	
Ordering number	1-C16/ZOU44A3	1-EPO3/50T	1-EPO3/100T
		1-C16/EPU44A	1-C16/EPU64

# C16A load cells, optional versions

Ordering number
<b>K-C16A2</b>

Code	Option 1: Mechanical design
<b>S</b>	Standard

Code	Option 2: Accuracy class
<b>D1</b>	D1 (OIML)
<b>C3</b>	C3 (OIML) [only with option 3 = 20 / 30 / 40 / 60 / 100]
<b>C4</b>	C4 (OIML) [only with option 3 = 30 / 40 / 60]
<b>C5</b>	C5 (OIML) [only with option 3 = 30 / 40 / 60] (on request)

Code	Option 3: Maximum capacity
<b>20</b>	20t [only with option 2 = D1 / C3]
<b>30</b>	30t [only with option 2 = D1 / C3 / C4 / (C5 on request)]
<b>40</b>	40t [only with option 2 = D1 / C3 / C4 / (C5 on request)]
<b>60</b>	60t [only with option 2 = D1 / C3 / C4 / (C5 on request)]
<b>100</b>	100t [only with option 2 = D1 / C3]
<b>200</b>	200t [only with option 2 = D1 + option 6 = N]
<b>400</b>	400t [only with option 2 = D1 + option 6 = N]

Code	Option 4: Explosion protection
<b>N</b>	No explosion protection
<b>AI1/21</b>	ATEX + IECEx + FM zone 1/21 [only with option 6 = N]
<b>AI2/21</b>	ATEX + IECEx zone 2/21
<b>R1/21</b>	EAC-Ex zone 1/21 <sup>1)</sup>
<b>R2/21</b>	EAC-Ex zone 2/21

Code	Option 5: Cable length
<b>S12</b>	12 m (standard) [only with option 3 = 20 / 30]
<b>S20</b>	20 m (standard) [only with option 3 = 40 / 60 / 100 / 200]
<b>20</b>	20 m [only with option 3 = 20 / 30]
<b>40</b>	40 m
<b>20R</b>	20 m (braided wire) [only with option 3 = 20 / 30 / 40 / 60]

Code	Option 6: Overvoltage protection
<b>N</b>	None
<b>L</b>	With overvoltage protection

Code	Option 7: Other
<b>N</b>	None
<b>Y</b>	Y=20000 [only with option 2 = C3 + option 3 = 30/40/60]



<sup>1)</sup> Please note that the electrical values of the new type approval may differ from the previous version (the new certificate can be found on the C16A product page).

**Not all codes can be combined with one another. Take note of the conditions in square brackets!**

