

# FORCE TRANSDUCERS



LOAD CELL  
MANUFACTURER



# TECHNICAL DATA

## Accuracy class

	SL	1	0.5	0.25	0.1	C1 (1000 d OIML)	0.05 (2000 d)	A3	0.03 (3000 d)	C3 (3000 d OIML)	0.02 (5000 d)
Combined error *	±0.5 ... 1	< ±1	< ±0.5	< ±0.25	< ±0.1	< ±0.03	< ±0.05	< ±0.03	< ±0.025	< ±0.020	< ±0.015
Non-repeatability	< ±0.25	< ±0.5	< ±0.25	< ±0.1	< ±0.03	< ±0.02	< ±0.02	< ±0.015	< ±0.015	< ±0.01	< ±0.01
Creep error over 30 min	< ±0.3	< ±0.25	< ±0.1	< ±0.075	< ±0.06	< ±0.04	< ±0.04	< ±0.03	< ±0.025	< ±0.020	< ±0.015
Reference temperature	23										
Temperature coefficient of sensitivity per 10°C	< ±0.2	< ±0.2	< ±0.1	< ±0.05	< ±0.05	< ±0.02	< ±0.035	< ±0.05	< ±0.015	< ±0.009	< ±0.008
Temperature coefficient of zero signal per 10°C	< ±0.2	< ±0.2	< ±0.1	< ±0.035	< ±0.035	< ±0.03	< ±0.03	< ±0.05	< ±0.023	< ±0.015	< ±0.013
Nominal sensitivity	1 ... 1.5		1 ... 2		1 ... 3		2 ... 3				
Sensitivity tolerance	< ±0.3										
Nominal range of the excitation voltage	5 to 10 if input resistance = 350 Ω; 5 to 18 if input resistance = 700 Ω										
Maximum excitation voltage	15 if input resistance = 350 Ω; 20 if input resistance = 700 Ω										

\* Combined error = non-linearity + hysteresis.

The temperature coefficient of sensitivity and the combined error are balanced in such a way that their sum is less than 70 % of the error limit of the scale, class III, according to the OIML R60 and EN 45501 standards.

F.S.: Full Scale

g= 9.8107 m/s<sup>2</sup> (Jumet, Belgium)

Specifications are subject to change without notice.

# PRODUCTS OVERVIEW - FORCE

MODEL	DESCRIPTION	ACCURACY CLASSES												CAPACITIES (N)												CAPACITIES (kN)												CAPACITIES (MN)												Page	Certifications
		1%	0.5%	0.25%	0.1%	0.05%	0.02%	0.01%	0.005%	0.002%	0.001%	0.0005%	0.0002%	0.0001%	100	150	200	300	500	1000	1500	2000	3000	5000	10000	15000	20000	30000	50000	100000	150000	200000	300000	500000	1000000	1500000	2000000	3000000	5000000												
2710	Tension and compression load cells	●												●												●												●												p. 8	ATEX certified
2715		●												●												●												●													
2712	Tension and compression load cells	●												●												●												●												p. 10	ATEX certified
2960		●												●												●												●													
2962	Low-profile (pancake) load cells	●												●												●												●												p. 12	ATEX certified SP <sup>®</sup> C US IECEX
2965		●												●												●												●													
3110	Heavy compression load cells (very high capacities)	●												●												●												●												p. 16	ATEX certified
3115		●												●												●												●													
5100	Tension and compression load cells (very high capacities)	●												●												●												●												p. 18	ATEX certified SP <sup>®</sup> C US IECEX
5105		●												●												●												●													
5180	Compression washer load cells	●												●												●												●												p. 20	ATEX certified
5182		●												●												●												●													
5190	Through hole (annular) heavy-capacity load cells	●												●												●												●												p. 22	ATEX certified
5195		●												●												●												●													
5200	Tension link load cells	●												●												●												●												p. 24	ATEX certified CE -OSTING
5205		●												●												●												●													
5300	Standard load pins	●												●												●												●												p. 26	ATEX certified SP <sup>®</sup> C US IECEX CE -OSTING
5900		●												●												●												●													
5930	Miniature tension and compression load cells	●												●												●												●												p. 28	ATEX certified CE -OSTING
5932		●												●												●												●													
5960	Miniature compression load cells	●												●												●												●												p. 32	ATEX certified
5962		●												●												●												●													

Capacities and dimensions to be defined (from 75 kN to 5 MN)

## ASSOCIATED ELECTRONICS

ANALOGUE AMPLIFIERS	p. 290
COND-A420	p. 226
COND-SGA	p. 222
INDI-PAXS DISP-PAX	p. 210
INDI-5250	p. 234
INDI-PSD	p. 236
DISP-PAXDP	p. 212
DISP-F	p. 286
DIGITAL CONVERTERS / COND-USB	p. 292 / 228
WI-T24TR-ACM	p. 238
WI-T24RE-AO1	p. 242
WI-T24RE-Hx	p. 240
WI-T24RE-SO	p. 246
WI-T24RE-BSx	p. 244
JBOX-LCI	p. 280

● Standard ■ Optional

Note: CSA and/or IECEx options are available only for 2960, 5100 and 5300 models.

## 2710-2715

## TENSION AND COMPRESSION LOAD CELLS

Universal load cells combining accuracy, sturdiness and easy installation



Model 2710 - 30 kN



### Features

- o Material:
  - 2710: stainless steel
  - 2715: alloy steel
- o Protection class: IP67
- o Compact design
- o Cable length: see drawing table - CL (other lengths available on request)

### Most popular options (see more in ANNEX)



Ex i



**Application(s)** SENSY's load cells 2710-2715 are perfectly designed for the following applications:

- Tank / Silo / Hopper / Vessel weighing,
- Conveyor belts weighing.

### Capacities

2710: 5 - (7.5) - 10 - (15) - 20 - 30 - 50 - 75 - 100 kN

2715: 20 - 30 - 50 - 75 - 100 kN

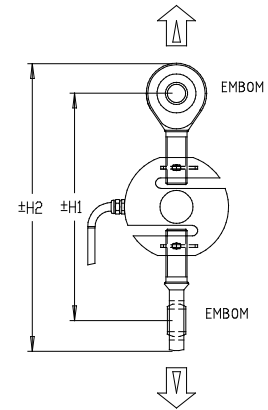
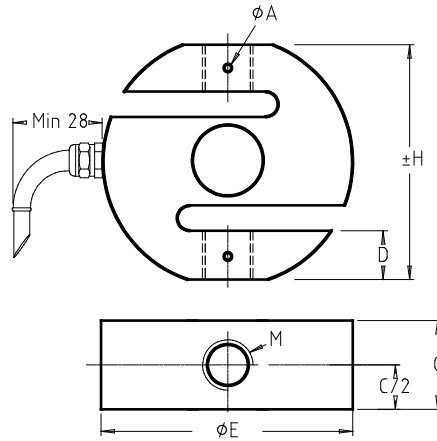
Specifications	0.1 %	0.03 %	
Accuracy class	0.1% F.S.*	0.03% F.S.*	-
Combined error (non-linearity + hysteresis)	<± 0.1	<± 0.03	% F.S.*
Repeatability error	<± 0.03	<± 0.015	% F.S.*
Creep error over 30 min.	<± 0.06	<± 0.025	% F.S.*
Zero shift after loading	<± 0.015	<± 0.0075	% F.S.*
Reference temperature	23	23	°C
Compensated temperature range	-10...+45	-10...+45	°C
Service temperature range	-25...+70	-25...+70	°C
Storage temperature range	-50...+85	-50...+85	°C
Temperature coefficient of the sensitivity	<± 0.05	<± 0.015	% F.S./10°C
Temperature coefficient of zero signal	<± 0.035	<± 0.023	% F.S./10°C
Zero balance	± 0.02	± 0.02	mVV
Nominal sensitivity	2	2	mVV
Sensitivity tolerance	<± 0.3	<± 0.2	%
Input resistance	350 ± 2	350 ± 2	ohm(s)
Output resistance	350 ± 2	350 ± 2	ohm(s)
Insulation resistance (50 V)	> 5000	> 5000	Mohm(s)
Reference excitation voltage	10	10	VDC
Permissible nominal range of excitation voltage	3...12	3...12	VDC
Safe load limit	120	120	% F.S.*
Breaking load	>300	>300	% F.S.*
Permissible dynamic loading	60	60	% F.S.*
Static lateral force limit	50	50	% F.S.*

\* F.S. : Full Scale.

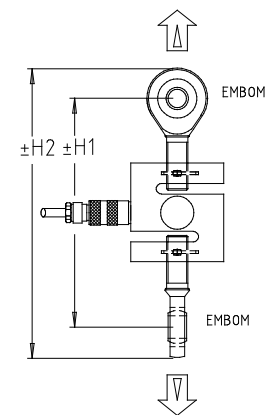
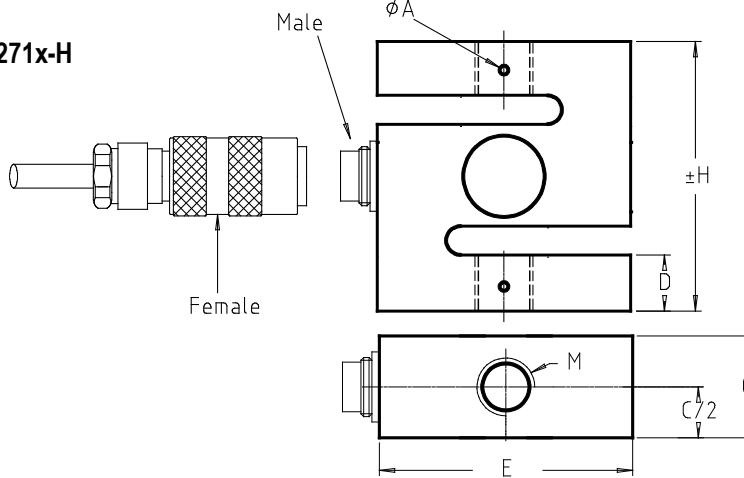
Specifications subject to change without notice..

2710-2715 > STANDARD DIMENSIONS

2710-E / 2710-F



271x-G / 271x-H



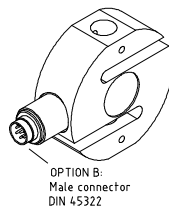
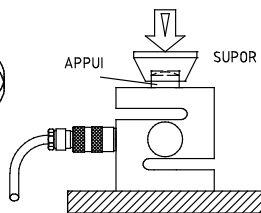
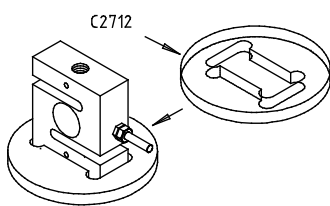
Ref. Item*	Capacities	ØA	H	C	D	E	ØE	M	H1	H2	CL (m)	Max. Deflexion (mm)	Weight (kg)	ACCESSORIES			
														APPUI	SUPOR	EMBOM	C2712
2710-E	5 - 15 kN	4	76	28	16	/	79	M16	177	222	3	0.30	0.85	APPUI-16	SUPOR-30	EMBOM-M16-BA	/
2710-F	20 - 50 kN	4	116	38	30	/	128	M24x2	238	302	3	0.35	2.6	APPUI-24	SUPOR-36	EMBOM-M24x2-BA	/
271x-G	20 - 50 kN	4	116	38	30	98	/	M24x2	238	302	3	0.35	2.6	APPUI-24	SUPOR-36	EMBOM-M24x2-BA	C2712-G
271x-H	75 - 100 kN	6	130	56	33	118	/	M36x3	318	402	6	0.60	5.2	APPUI-36	SUPOR-56	EMBOM-M36x3-PTFE	C2712-H

\*x=Material: 2710 - stainless steel; 2715 - alloy steel

→ Other capacities and dimensions available on request

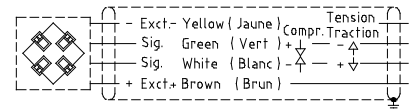
Dimensions in mm

Accessories



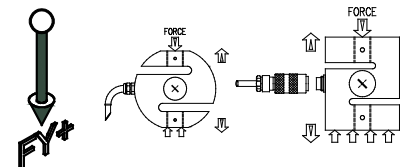
Wiring

Note: standard wiring for compression



Standard : Cable screen not connected to transducer / Faradisation non connectée au capteur

Load direction



High-accuracy universal load cells, easy to install.



Features

- o Wide range of capacities: from 100 N to 10 kN
- o Overload protection in tension and compression (only for 2712-A and 2712-C)
- o Compact design
- o Protection class: IP54 / IP65 (see drawing)
- o Material: anodised aluminium alloy
- o Cable length: 3 m (other lengths available on request)
- o Also available as standard reference load cells according to ISO 376 (classes "1", "0,5" and "00" - see specific data sheet 2712-ISO)

Most popular options (see more in ANNEX)



Model 2712 - 250 N



Application(s) SENSY's load cells 2712 are perfectly designed for the following applications:

- Industrial force measurement,
- Suspended reactors or hoppers, conveyor belts weighing,
- Primary transducer for universal testing machine.

Capacities

2712: 100 - (150) - 200 - (300) - 500 - (750) N  
 1 - (1.5) - 2 - (3) - 5 - (7.5) - 10 kN

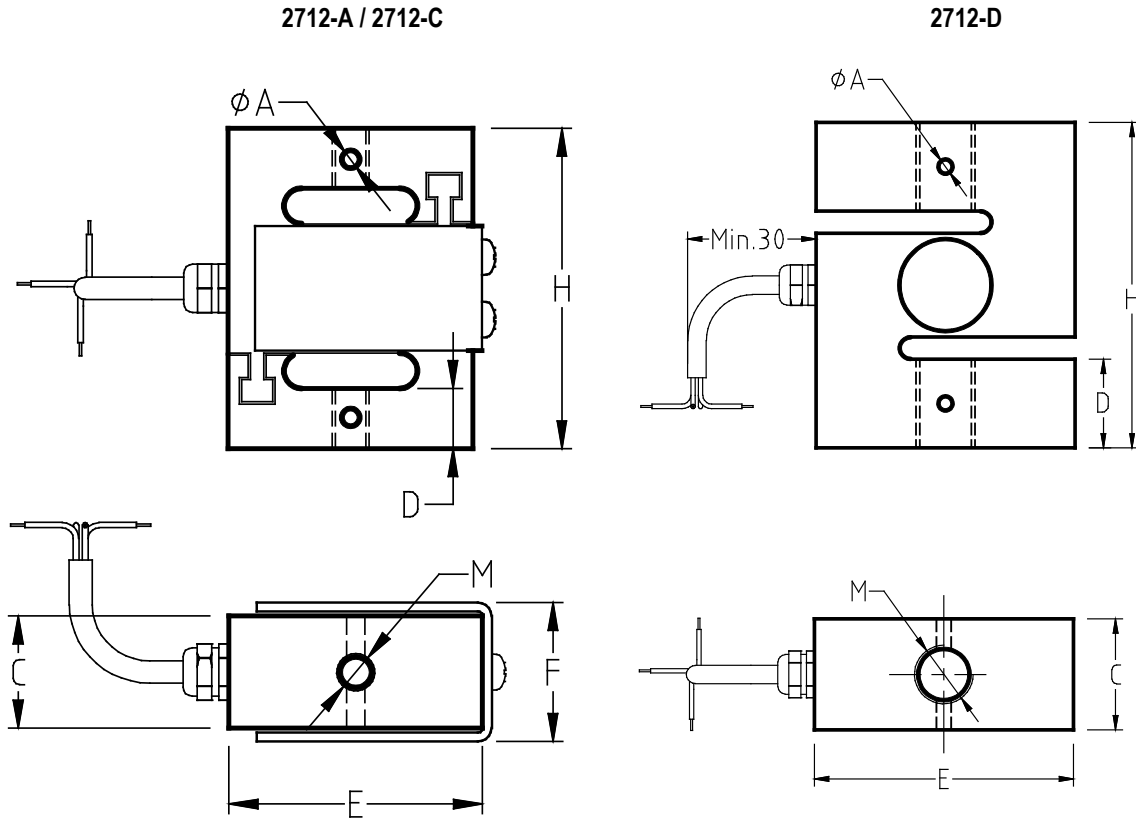
Specifications	0.1 %	0.03 %	0.02 %	
Accuracy class	0.1% F.S.*	0.03% F.S.*	0.02 % F.S.*	-
Combined error (non-linearity + hysteresis)	< ± 0.1	<± 0.03	<± 0.012	% F.S.*
Repeatability error	<± 0.03	<± 0.015	<± 0.01	% F.S.*
Creep error over 30 min.	<± 0.06	<± 0.025	<± 0.015	% F.S.*
Reference temperature	23	23	23	°C
Compensated temperature range	-10...+45	-10...+45	-10...+45	°C
Service temperature range	-30...+70	-30...+70	-30...+70	°C
Storage temperature range	-50...+85	-50...+85	-50...+85	°C
Temperature coefficient of the sensitivity	<± 0.05	<± 0.015	<± 0.008	% F.S./10°C
Temperature coefficient of zero signal	<± 0.035	<± 0.023	<± 0.013	% F.S./10°C
Nominal sensitivity	2.038	2.038	2.038	mV/V
Sensitivity tolerance	<± 0.3	<± 0.2	<± 0.2	%
Input resistance	350 ± 2	350 ± 2	350 ± 2	ohm(s)
Output resistance	350 ± 2	350 ± 2	352 ± 2	ohm(s)
Insulation resistance (50 V)	> 5000	> 5000	> 5000	Mohm(s)
Reference excitation voltage	10	10	10	VDC
Permissible nominal range of excitation voltage	3...12	3...12	3...12	VDC
Safe load limit	120	120	120	% F.S.*
Breaking load	>300**	>300**	>300**	% F.S.*
Permissible dynamic loading	50	50	50	% F.S.*
Static lateral force limit	50	50	50	% F.S.*

\* F.S. : Full Scale.

\*\* : see drawing table

Specifications subject to change without notice..

2712 > STANDARD DIMENSIONS



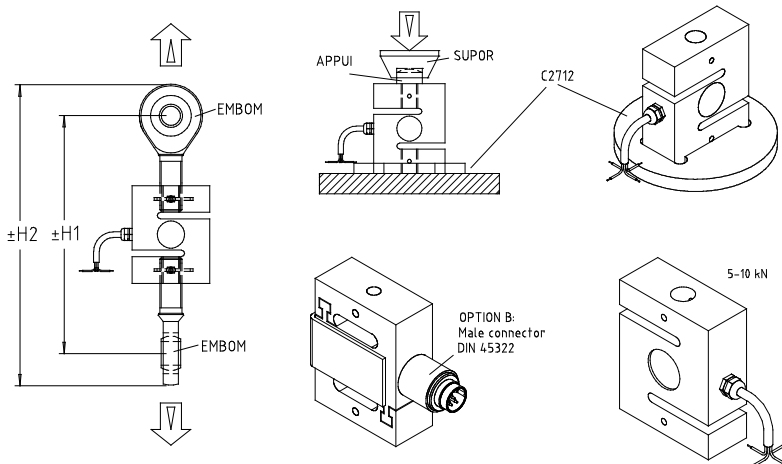
Ref. Item	Capacities	ØA	H	C	D	E	F	M	H1	H2	Breaking load	Max. Deflexion (mm)	IP	Weight (kg)	ACCESSORIES			
															APPUI	SUPOR	EMBOM	C2712
2712-A	100 - 1000 N	4	72	25	13.5	55	±32	M8	127	151	1000 %	0.40	IP54	0.42	APPUI-8	SUPOR-20	EMBOM-M8-BA	C2712-ABC
2712-C	(*) 1500 - 5000 N	4	72	25	13.5	55	±32	M12	151	185	600 % max. 20 kN	0.35	IP65	0.42	APPUI-12	SUPOR-20	EMBOM-M12-BA	C2712-C
2712-D	5 - 10 kN	4	88	30	24	70	/	M16	188	233	> 300 %	0.30	IP65	0.6	APPUI-16	SUPOR-30	EMBOM-M16-BA	C2712-D

(\*): 5000 N accuracy class: 0.1 % only

→ Other capacities and dimensions available on request

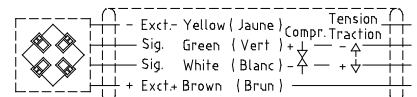
Dimensions in mm

Accessories



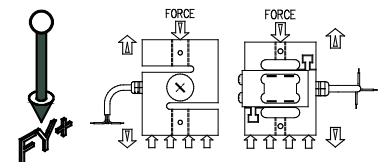
Wiring

Note: standard wiring for compression



Standard : Cable screen not connected to transducer  
Faradisation non connectée au capteur

Load direction





## 2960-2962-2965

## LOW-PROFILE (PANCAKE) LOAD CELLS

Universal tension and compression load cells for industrial force measurement.



### Features

- o Flat design
- o High stiffness and fatigue resistant
- o Highly resistant to transverse forces
- o Protection class: IP66
- o Complete range of mounting accessories available
- o Material: stainless steel (2960)\*\*, anodised aluminium alloy (2962), alloy steel (2965)
- o Cable length: see drawing table - CL (other lengths available on request)

### Most popular options (see more in ANNEX)



Model 2960 - 300 kN



**Application(s)** SENSY's load cells 2960-2962-2965 are perfectly designed for the following applications:

- Force measurement on machines, industrial process control, hydraulic cylinders monitoring, fatigue tests,
- Hydraulic cylinders monitoring.

### Capacities

2962: (3) - 5 - 7.5 kN

2960 - 2965: 10 - (15) - 20 - (30) - 50 - (75) - 100 - 150 - 200 - 300 - 500 - (750) - 1.000 - (1500) - 2.000 - 3.000 kN

Specifications	0.25 %	0.1 %	0.03 %	
Accuracy class	0.25 % F.S.*	0.1% F.S.*	0.03% F.S.*	-
Combined error (non-linearity + hysteresis)	<± 0.25	<± 0.1	<± 0.03	% F.S.*
Repeatability error	<± 0.1	<± 0.03	<± 0.015	% F.S.*
Creep error over 30 min.	<± 0.1	<± 0.06	<± 0.025	% F.S.*
Reference temperature	23	23	23	°C
Compensated temperature range	-10...+45	-10...+45	-10...+45	°C
Service temperature range	-25...+70	-25...+70	-25...+70	°C
Storage temperature range	-50...+85	-50...+85	-50...+85	°C
Temperature coefficient of the sensitivity	<± 0.05	<± 0.05	<± 0.015	% F.S./10°C
Temperature coefficient of zero signal	<± 0.035	<± 0.035	<± 0.023	% F.S./10°C
Nominal sensitivity	2	2	2	mV/V
Sensitivity tolerance	<± 0.3	<± 0.3	<± 0.2	%
Input resistance	700 ± 2	700 ± 2	700 ± 2	ohm(s)
Output resistance	700 ± 2	700 ± 2	700 ± 2	ohm(s)
Insulation resistance (50 V)	> 5000	> 5000	> 5000	Mohm(s)
Reference excitation voltage	10	10	10	VDC
Permissible nominal range of excitation voltage	3...12	3...12	3...12	VDC
Safe load limit	150	150	150	% F.S.*
Breaking load	>300	>300	>300	% F.S.*
Permissible dynamic loading	70	70	70	% F.S.*
Static lateral force limit	50	50	50	% F.S.*

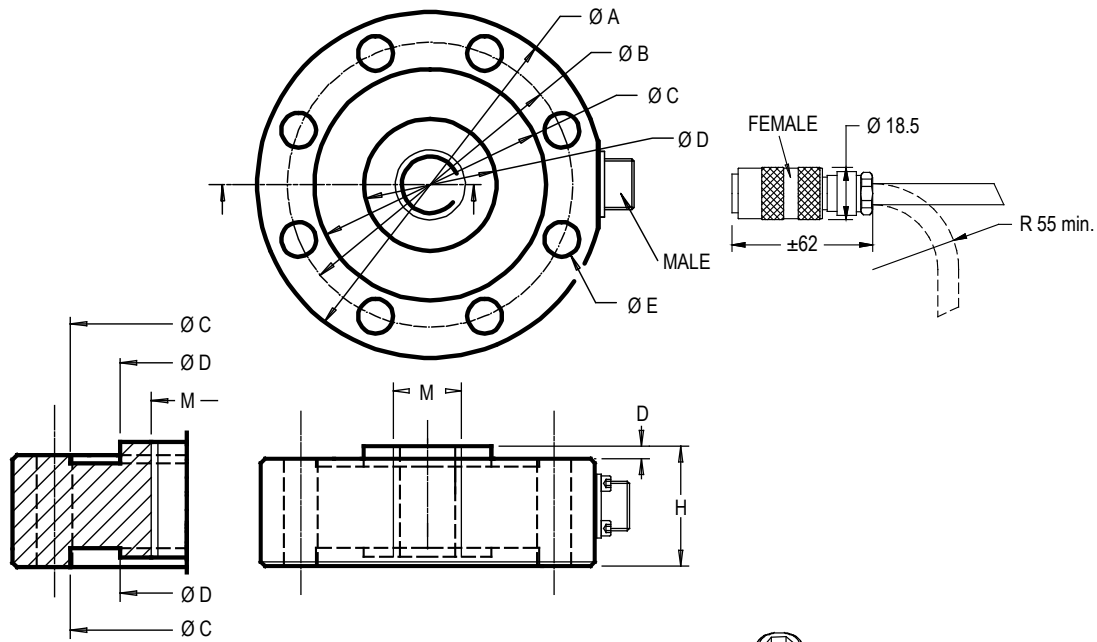
\* F.S. : Full Scale.

\*\* CSA and IECEx options are available only for stainless steel (2960) version.

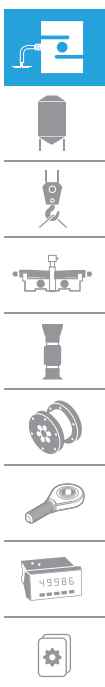
Note: 0.03% only for anodised aluminium alloy (2962) version.

Specifications subject to change without notice..

2960-2962-2965 > STANDARD DIMENSIONS



Fastener quality: 10.9 or 12.9



Ref. Item*	Capacities	Ø A	Ø B	Ø C	Ø D	Ø E	M	H	D	CL (m)	H1	Max. Deflexion	Torque (N·m)	Weight (kg)	ACCESSORIES		
															APPUI	SUPOR	EMBOM
2962-A	3 - 7.5 kN	89	72	59	33	8xØ8.2	M16	28	2	3	40	0.05	15 (M8)	0.3	APPUI-16B	SUPOR-36	EMBOM-M16-BA
296x-B	10 - 50 kN	89	72	59	33	8xØ8.2	M20x1.5	28	2	3	40	0.04	40 (M8)	0.9	APPUI-20	SUPOR-36	EMBOM-M20x1.5-BA
296x-C	75 - 100 kN	149	125	106	46	8xØ12.5	M30x2	38.5	2	6	53.5	0.05	130 (M12)	3.5	APPUI-30	SUPOR-45	EMBOM-M30x2-BA
296x-D	150 - 200 kN	178	145	115	69	8xØ16.5	M36x3	50	2	6	70	0.06	320 (M16)	7	APPUI-36B	SUPOR-69	EMBOM-M36x3-BA**
296x-E	300 - 500 kN	198	172	140	90	16xØ16.5	M60x4	65	3	12	92	0.07	320 (M16)	12	APPUI-60	SUPOR-90	EMBOM-M60x4-PTFE**
296x-F	0.75 - 1 MN	279	229	180	120	16xØ24.5	M64x4***	70	3	12	103	0.08	1000 (M24)	28	APPUI-64	SUPOR-90	EMBOM-M64x4-PTFE**
296x-G	1.5 - 2 MN	345	290	240	156	16xØ32	M110x4	115	15	12	/	0.10	1300 (M30)	50	According to customer's design specifications		
296x-H	3 MN	390	335	280	195	24xØ24.5	M125x4	130	7	12	/	0.15	1000 (M24)	86	According to customer's design specifications		

\*x=Material: 2960 - stainless steel; 2965 - alloy steel

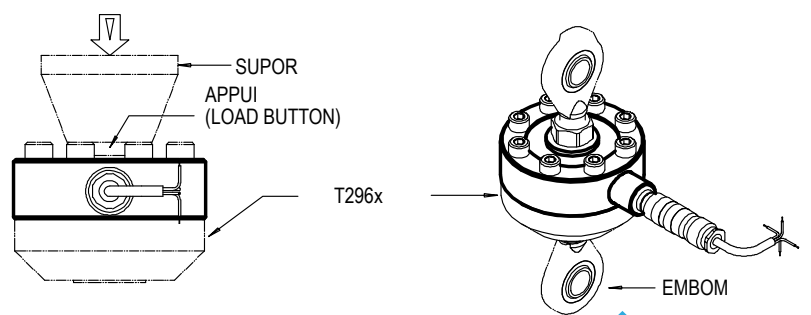
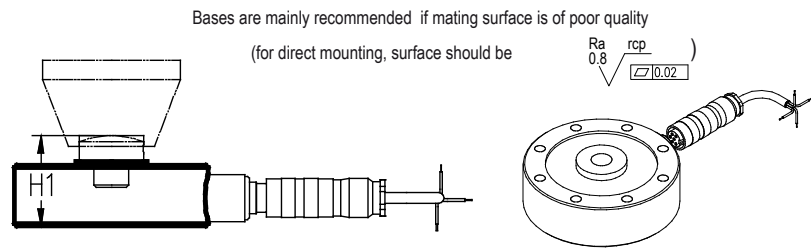
\*\*See EMBOM data sheet (ACCESSORIES section)

\*\*\*M90x4 available on request

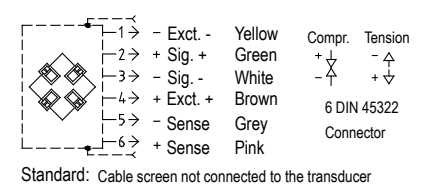
Other capacities and dimensions available on request

Dimensions in mm

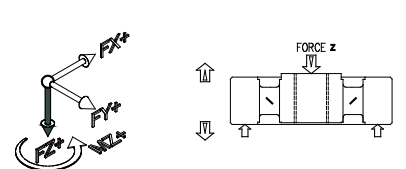
Accessories



Wiring

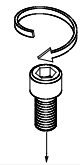
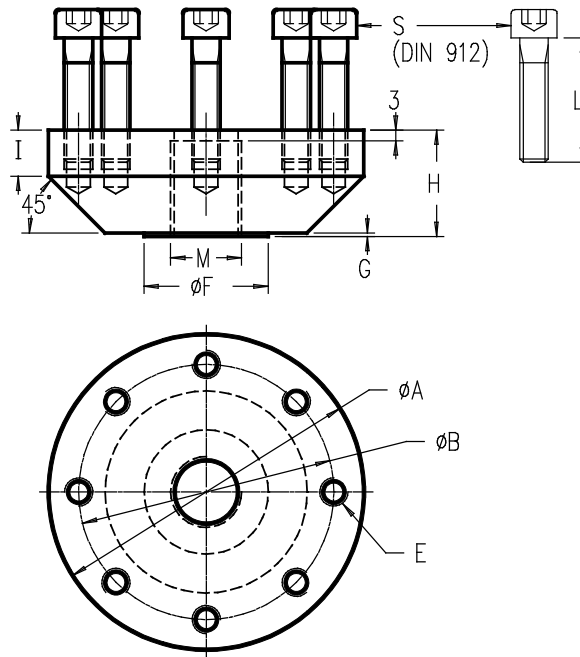


Load direction



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T2960-T2962-T2965 > STANDARD DIMENSIONS



Ref. Item**	Capacities	Ø A	Ø B	E	Ø F	G	I	S	M	H	H1	H2	H3	H4	Torque (N·m)	Weight (kg)
T2962-A	3 - 7.5 kN	89	72	8xM8	25	1	13	8xM8 L=35	M16	30	70	105	58	143	15 (M8)	0.57
T296x-B	10 - 50 kN	89	72	8xM8	35	1	13	8xM8 L=35	M20x1.5	30	70	109	58	160	40 (M8)	1.19
T296x-C	75 - 100 kN	149	125	8xM12	52	1	20	8xM12 L=50	M30x2	46	99.5	140.5	84.5	225	130 (M12)	5.25
T296x-D	150 - 200 kN	178	145	8xM16	70	1	23	8xM16 L=70	M36x3	50	120	160	100	285	320 (M16)	8.7
T296x-E	300 - 500 kN	198	172	16xM16	115	1	35	16xM16 L=80	M60x4	65	157	219	130	455	320 (M16)	14.5
T296x-F	0.75 - 1 MN	279	229	16xM24	162	1	36	16xM24 L=100	M64x4	75	172	247	145	550	1000 (M24)*	35.5
T296x-G	1.5 - 2 MN	According to customer's design specifications														
T296x-H	3 MN	According to customer's design specifications														

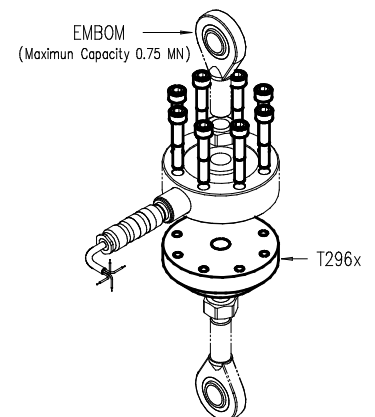
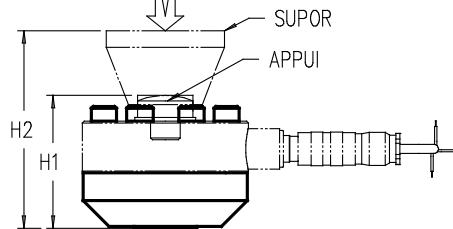
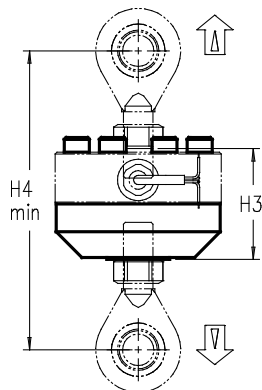
\*Fastener quality 10.9 or 12.9

\*\* x=Material: T2960 - stainless steel; T2965 - alloy steel

→ Other capacities and dimensions available on request

Dimensions in mm

Other views



3110-3115

## HEAVY COMPRESSION LOAD CELLS (VERY HIGH CAPACITIES)

High-capacity compression load cells.



### Features

- o Wide range of capacities: 30 kN (3 t) up to 50 MN (5.000 t)
- o Material: nickel-plated steel (3115) or stainless steel (3110)
- o Protection class: IP65
- o A whole range of mounting accessories is available
- o Cable length: see drawing table - CL (other lengths available on request)
- o Also available as standard reference load cells according to ISO 376 (classes 1, 0,5 and 00 - see specific data sheet 3115-ISO)

### Most popular options (see more in ANNEX)



Ex i



Model 3115 - 3 MN



**Application(s)** SENSY's load cells 3110-3115 are perfectly designed for the following applications:

- Industrial force measurement, industrial process control (ISO 9000, ...),
- Primary transducer for universal testing machine, structure weighing.

### Capacities

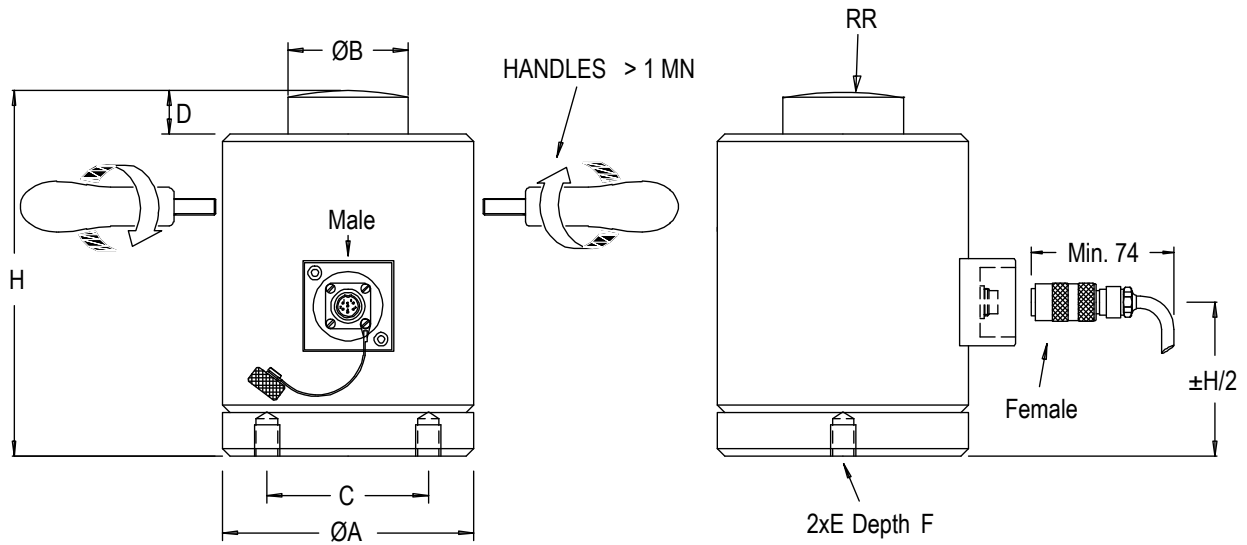
3110 - 3115: 30 - 50 - (75) - 100 - (150) - 200 - 300 - 500 kN  
(0.75) - 1 - 1.5 - 2 - 3 - 5 - 7.5 - 10 - 15 - 20 - 30 - 40 - 50 MN

Specifications	0.25 %	0.1 %	0.05 %	0.03 %	
Accuracy class	0.25 % F.S.*	0.1% F.S.*	0.05 % F.S.*	0.03% F.S.*	-
Combined error (non-linearity + hysteresis)	<± 0.25	< ± 0.1	<± 0.05	<± 0.03	% F.S.*
Repeatability error	<± 0.1	<± 0.03	<± 0.02	<± 0.015	% F.S.*
Creep error over 30 min.	<± 0.1	<± 0.06	<± 0.04	<± 0.025	% F.S.*
Reference temperature	23	23	23	23	°C
Compensated temperature range	-10...+45	-10...+45	-10...+45	-10...+45	°C
Service temperature range	-30...+70	-30...+70	-30...+70	-30...+70	°C
Storage temperature range	-50...+85	-50...+85	-50...+85	-50...+85	°C
Temperature coefficient of the sensitivity	<± 0.05	<± 0.05	<± 0.035	<± 0.015	% F.S./10°C
Temperature coefficient of zero signal	<± 0.035	<± 0.035	<± 0.03	<± 0.023	% F.S./10°C
Zero balance	± 0.02	± 0.02	± 0.02	± 0.02	mVV
Nominal sensitivity	1.5	1.5	1.5	1.5	mVV
Sensitivity tolerance	<± 0.3	<± 0.3	<± 0.3	<± 0.2	%
Input resistance	350..700 ± 2	350..700 ± 2	350..700 ± 2	350..700 ± 2	ohm(s)
Output resistance	350..700 ± 2	350..700 ± 2	350..700 ± 2	350..700 ± 2	ohm(s)
Insulation resistance (50 V)	> 5000	> 5000	> 5000	> 5000	Mohm(s)
Reference excitation voltage	10	10	10	10	VDC
Permissible nominal range of excitation voltage	3...12	3...12	3...12	3...12	VDC
Safe load limit	150	150	150	150	% F.S.*
Breaking load	>300	>300	>300	>300	% F.S.*
Permissible dynamic loading	50	50	50	50	% F.S.*
Static lateral force limit	15	15	15	15	% F.S.*

\* F.S. : Full Scale.

Specifications subject to change without notice..

3110-3115 > STANDARD DIMENSIONS



Ref. Item*	Capacities	ØA	ØB	C	D	E	F	H	RR	CL (m)	Max. Deflexion	Weight (kg)
311x-A	30 - 50 kN	64	36	45	20	M10	12	135	250	6	0.12	2
311x-B	75 - 200 kN	64	36	45	20	M10	12	135	250	6	0.16-0.18	2.2
311x-C	300 - 500 kN	89	56	60	30	M12	15	160	300	6	0.18-0.20	4.5
311x-D	0.75 - 1 MN	99	64	65	30	M16	16	190	400	6	0.33-0.34	6
311x-E	1.5 - 2 MN	119	90	90	30	M16	16	225	400	6	0.29-0.35	20
311x-F	3 MN	159	125	100	40	M20	20	270	450	12	±0.4	42
311x-G	5 MN	205	160	125	50	M20	35	350	500	12	±0.5	90
311x-H	7.5 - 10 MN	294	200	200	60	M30	40	460	600	12	±0.7	243
311x-I	15 MN	330	250	250	65	M30	40	510	800	12	±0.75	330
311x-J	20 MN	364	250	270	75	M36	50	550	800	12	±0.8	446
311x-K	30 MN	445	300	300	75	M36	50	660	1000	12	±1	770
311x-L	40 MN	495	360	330	90	M36	50	730	1200	12	±1.1	1060
311x-M	50 MN	540	430	360	90	M36	50	900	2000	12	±1.2	1587

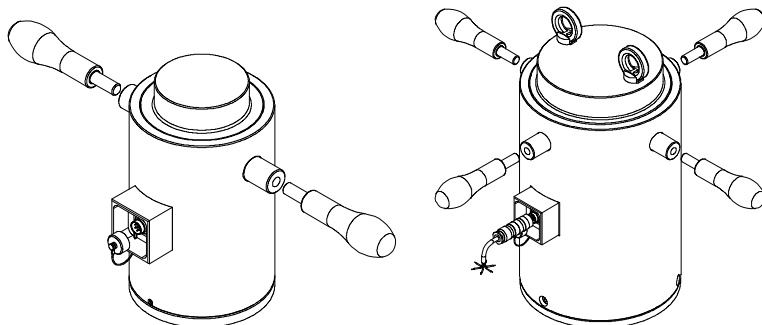
Note: 2 - 50 MN (200 - 5000 t) usually according to customer's design specifications.

\*x=Material: 3110 - stainless steel; 3115 - alloy steel

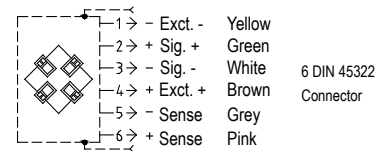
→ Other capacities and dimensions available on request

Dimensions in mm

Other views

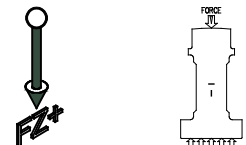


Wiring



Standard: Cable screen not connected to the transducer

Load direction



5100-5105

## TENSION AND COMPRESSION LOAD CELLS (VERY HIGH CAPACITIES)

Accuracy universal load cells, easy to install.



### Features

- o Wide range of capacities: 10 kN (1 t) up to 50 MN (5.000 t)
- o Compact design
- o Protection class: IP66
- o Material: stainless steel (5100)\*\*, nickel-plated steel (5105)
- o Cable length: see drawing table - CL (other lengths available on request)
- o Also available as standard reference load cells according to ISO 376 (classes "1", "0,5" and "00" - see specific data sheet 5105-ISO)

Most popular options (see more in ANNEX)



Model 5105



Application(s) SENSY's load cells 5100-5105 are perfectly designed for the following applications:

- Industrial force measurement
- Force measurement test bench, hanging load weighing.

### Capacities

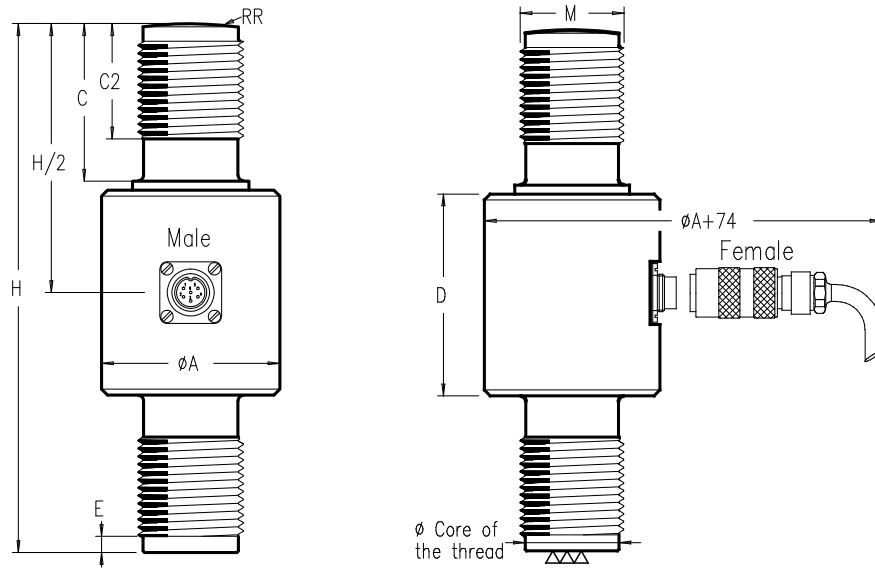
5100 - 5105: (10) - (15) - 20 - 30 - 50 - (75) - 100 - (150) - 200 - 300 - 500 kN  
(0.75) - 1 - 1.5 - 2 - 3 - 5 - 7.5 - 10 - 15 - 20 - 30 - 40 - 50 MN

Specifications	0.25 %	0.1 %	0.05 %	0.03 %	
Accuracy class	0.25 % F.S.*	0.1% F.S.*	0.05 % F.S.*	0.03% F.S.*	-
Combined error (non-linearity + hysteresis)	<± 0.25	< ± 0.1	<± 0.05	<± 0.03	% F.S.*
Repeatability error	<± 0.1	<± 0.03	<± 0.02	<± 0.015	% F.S.*
Creep error over 30 min.	<± 0.1	<± 0.06	<± 0.04	<± 0.025	% F.S.*
Zero shift after loading	<± 0.025	<± 0.015	<± 0.01	<± 0.0075	% F.S.*
Reference temperature	23	23	23	23	°C
Compensated temperature range	-10...+45	-10...+45	-10...+45	-10...+45	°C
Service temperature range	-25...+70	-25...+70	-25...+70	-25...+70	°C
Storage temperature range	-50...+85	-50...+85	-50...+85	-50...+85	°C
Temperature coefficient of the sensitivity	<± 0.05	<± 0.05	<± 0.035	<± 0.015	% F.S./10°C
Temperature coefficient of zero signal	<± 0.035	<± 0.035	<± 0.03	<± 0.023	% F.S./10°C
Zero balance	± 0.02	± 0.02	± 0.02	± 0.02	mVV
Nominal sensitivity	1...2	1...2	1...2	1...2	mVV
Sensitivity tolerance	<± 0.3	<± 0.3	<± 0.3	<± 0.2	%
Input resistance	350...700 ± 2	350...700 ± 2	350...700 ± 2	350...700 ± 2	ohm(s)
Output resistance	350...700 ± 2	350...700 ± 2	350...700 ± 2	350...700 ± 2	ohm(s)
Insulation resistance (50 V)	> 5000	> 5000	> 5000	> 5000	Mohm(s)
Reference excitation voltage	10	10	10	10	VDC
Permissible nominal range of excitation voltage	3...12	3...12	3...12	3...12	VDC
Safe load limit	150	150	150	150	% F.S.*
Breaking load	>300	>300	>300	>300	% F.S.*

\* F.S. : Full Scale.

\*\* CSA and IECEx options are available only for stainless steel model - 5100  
Specifications subject to change without notice..

5100-5105 > STANDARD DIMENSIONS



Ref. Item*	Capacities	Ø A	C	C2	D	E	H	RR	CL (m)	M	H1	H2	Max. Deflexion (mm)	Weight (kg)	ACCESSORIES		
															EMBOF	PADIN	SUPOR
510x-A	10 - 50 kN	50	36	26	47	3	125	75	3	M24x2	245	307	0.02 - 0.08	0.8	EMBOF-M24x2-BA	PADIN-24**	SUPOR-24
510x-B	75 - 100 kN	60	48	35	73	3	170	80	3	M30x2	320	402	0.13 - 0.15	1.9	EMBOF-M30x2-BA	PADIN-30	SUPOR-30
510x-C	150 - 200 kN	75	49	44	87	4	190	350	6	M45x3	398	510	0.14 - 0.16	3.65	EMBOF-45x3-PTFE	PADIN-45	SUPOR-45
510x-D	300 - 500 kN	88.5	69	59	119	5	265	400	6	M64x4	560	740	0.19 - 0.25	9.8	EMBOF-64x4-PTFE	PADIN-64	SUPOR-64
510x-E	0.75 - 1.5 MN	111	95	80	145	5	340	400	6	M90x4	/	/	0.30 - 0.42	21	/	PADIN-100A	SUPOR-90
510x-G	2 MN	150	128	120	165	7	430	600	6	M125x4	/	/	0.35 - 0.65	38	/	PADIN-125A	SUPOR-125A
	3 MN															PADIN-125B	SUPOR-125B
510x-H	5 MN	180	162	158	180	8	520	800	6	M160x6	/	/	0.73	87	/	PADIN-160	SUPOR-160
510x-I	7.5 MN	220	205	175	200	10	590	1000	6	M200x6	/	/	0.83	151	/	PADIN-200A	SUPOR-200A
	10 MN															PADIN-200B	SUPOR-200B
510x-K	15 MN	280	250	230	230	10	710	1200	12	M250x6	/	/	1	292	/	PADIN-250	SUPOR-250A
510x-L	20 MN	360	380	340	320	36x30°	1080	1500	12	TR 330x24	/	/	1.7	700	/	PADIN-330A	SUPOR-330A
510x-M	30 MN	450	460	420	540	36x30°	1460	2000	12	TR 400x24	/	/	2.26	1420	/	PADIN-400A	SUPOR-400A
-	40 - 50 MN	According to customer's design specifications															

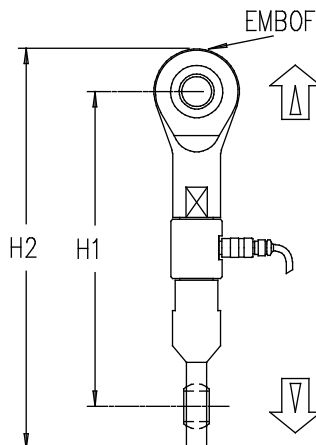
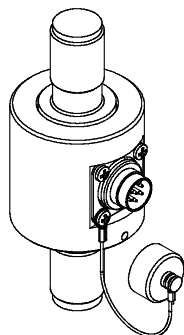
\*x=Material: 5100 - stainless steel; 5105 - alloy steel

\*\* PADIN-24 only for 50 kN; PADIN not necessary for < 50 kN load cells

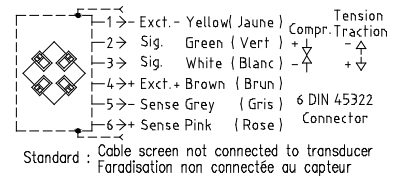
→ Other capacities and dimensions available on request

Dimensions in mm

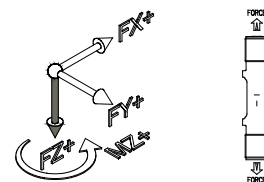
Accessories



Wiring



Load direction



www.sensy.com

Rev. 18/11/2019



## 5180-5182

## COMPRESSION WASHER LOAD CELLS

Compression washer annular load cells specially designed for force measurement on bolts.



### Features

- o Very low profile for high-capacity load cells
- o Material:
  - stainless steel body; aluminium housing (5180)
  - anodised aluminium alloy (5182)
  - 2 washers (included): stainless steel
- o Protection class: IP65
- o Very competitive prices
- o Cable length: see drawing table - CL (other lengths available on request)

Most popular options (see more in ANNEX)



Ex i

Model 5180 - 300 kN



### Application(s)

SENSY's load cells 5180-5182 are perfectly designed for the following applications:

- Bolts tightening measurement,
- Industrial force measurement in confined spaces.

### Capacities

5182: 20 - 30 kN

5180: 50 - 75 - (100) - 150 - 200 - 300 - 500 - 750 kN

### Specifications

Specifications	SL	
Reference temperature	23	°C
Compensated temperature range	-10...+45	°C
Service temperature range	-30...+70	°C
Storage temperature range	-50...+85	°C
Temperature coefficient of the sensitivity	<± 0.2	% F.S./10°C
Temperature coefficient of zero signal	<± 0.2	% F.S./10°C
Zero balance	± 0.02	mV/V
Input resistance	700 ± 2	ohm(s)
Output resistance	700 ± 2	ohm(s)
Insulation resistance (50 V)	> 5000	Mohm(s)
Reference excitation voltage	5	VDC
Permissible nominal range of excitation voltage	3..10	VDC
Safe load limit	150	% F.S.*
Breaking load	> 300	% F.S.*
Permissible dynamic loading	50	% F.S.*
Static lateral force limit	25	% F.S.*

\* F.S. : Full Scale.

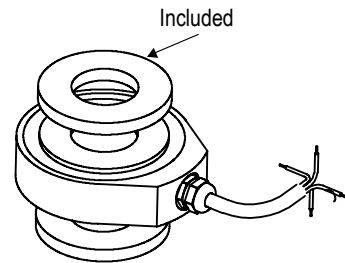
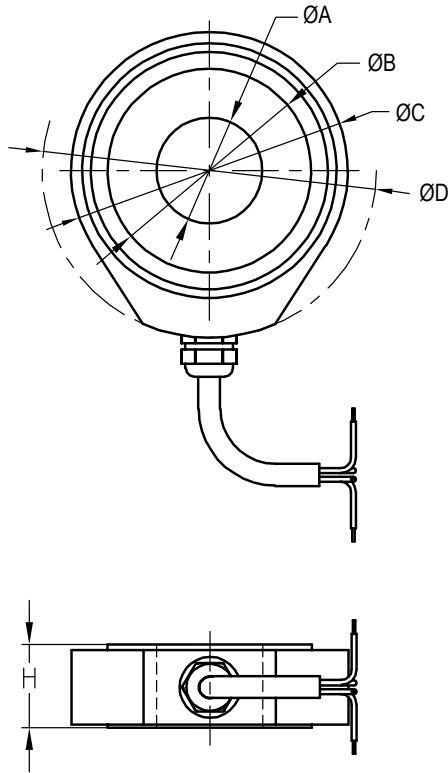
Specifications subject to change without notice..



ISO 9001 certified

rev. : 18/10/2021

5180-5182 > STANDARD DIMENSIONS



Ref. Item	Capacities	M	ØA	ØB	ØC	ØD	ØE	H	E	CL (m)	Weight (kg)
5182-A *	20 kN	6	6.1	17	34	40	12.7	11	3	2	0.1
5182-B *	30 kN	8	8.1	19.5	34	40	19	11	3	2	0.1
5180-C	50 kN	10	10.1	19.5	34	40	22	11	3	2	0.1
5180-D	75 kN	12	12.1	24	38	47	25	12.5	3	2	0.1
5180-E	150 kN	16	16.1	29	45	55	32	15	5	3	0.12
5180-F	200 kN	20	20.1	36	53	62	38	17	5	3	0.15
5180-G	300 kN	24	24.1	44.9	63	70	48	19	5	3	0.25
5180-H	500 kN	30	30.25	53	70	79	54	26	6	3	0.5
5180-I	750 kN	36	36.5	76	99	99	74	35	6	3	1.3

\*: Aluminium models limited to + 130°

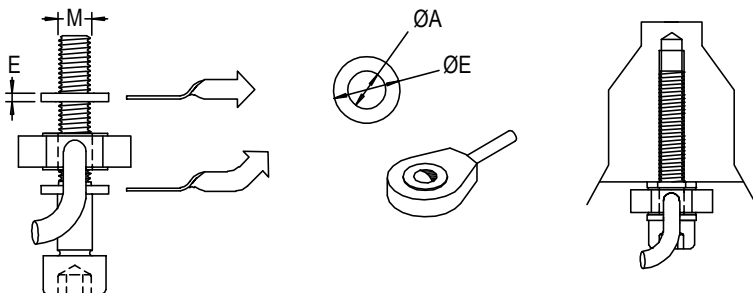
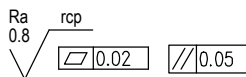
→ Other capacities and dimensions available on request

(For more drawings of accessories, please see page 193)

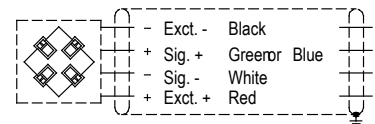
Dimensions in mm

Other views

The minimum roughness of mating surfaces has to be

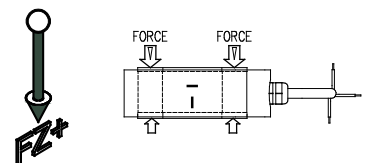


Wiring



Standard: Cable screen not connected to the transducer

Load direction



5190-5195

## THROUGH HOLE (ANNULAR) HEAVY-CAPACITY LOAD CELLS

Annular compression load cells.



### Features

- o Low profile for high-capacity load cells
- o Material: stainless steel (5190) or nickel-plated steel (5195)
- o Protection class: IP65
- o Sturdy design
- o Cable length: see drawing table - CL (other lengths available on request)

Most popular options (see more in ANNEX)



Ex i



Model 5190 - 500 kN



Application(s) SENSY's load cells 5190-5195 are perfectly designed for the following applications:

- Primary transducer on tensile test machine,
- Pre-stressed rods measurement (concrete, snow, earth pressure, rocks,...),
- Industrial force measurement in confined spaces.

### Capacities

5190 - 5195: 200 - 300 - 500 kN / (0.75) - 1 - 1.5 - 2 - 3 - 5 MN

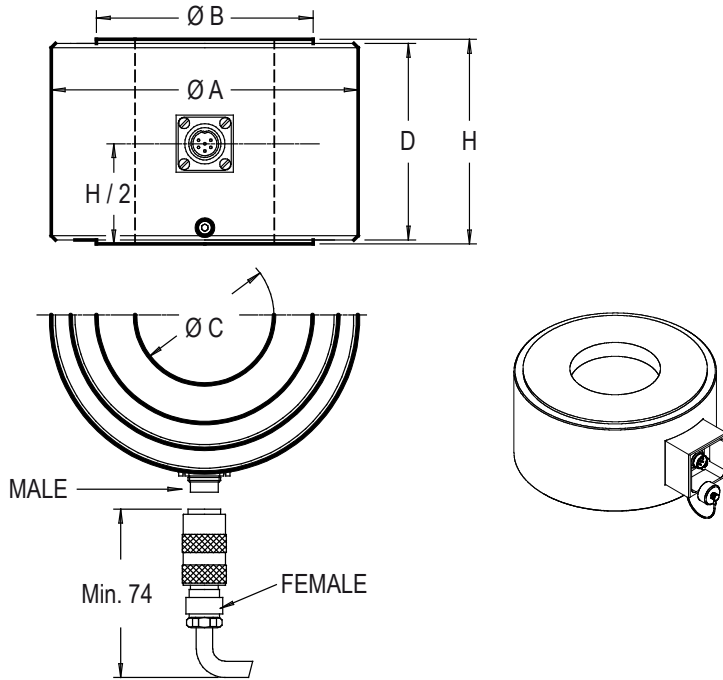
5195: (7.5) -10 - 15 - 20 - (30) MN

Specifications	SL	
Repeatability error	<± 0.25	% F.S.*
Creep error over 30 min.	<± 0.3	% F.S.*
Zero shift after loading	<± 0.5	% F.S.*
Reference temperature	23	°C
Compensated temperature range	-10...+45	°C
Service temperature range	-30...+70	°C
Storage temperature range	-50...+85	°C
Temperature coefficient of the sensitivity	<± 0.2	% F.S./10°C
Temperature coefficient of zero signal	<± 0.2	% F.S./10°C
Zero balance	± 0.02	mVV
Nominal sensitivity	1.5	mVV
Input resistance	700 ± 2	ohm(s)
Output resistance	700 ± 2	ohm(s)
Insulation resistance (50 V)	> 5000	Mohm(s)
Reference excitation voltage	10	VDC
Permissible nominal range of excitation voltage	3...12	VDC
Safe load limit	150	% F.S.*
Breaking load	> 300	% F.S.*
Permissible dynamic loading	50	% F.S.*
Static lateral force limit	25	% F.S.*

\* F.S.: Full Scale.

Specifications subject to change without notice..

5190-5195 > STANDARD DIMENSIONS



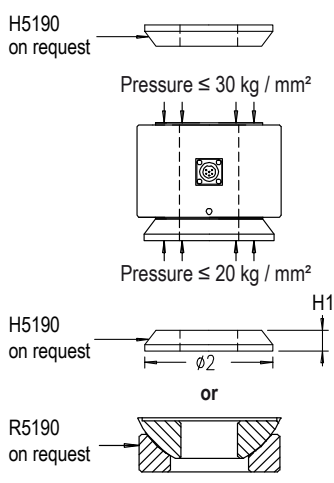
Ref. Item*	Capacities	ØA	ØB	ØC	D	H	H1	Ø2	Max. Deflexion (mm)	CL (m)	Weight (kg)
519x-A	200 - 300 kN	60	49	20	66	70	22	57	0.08	3	1.4
519x-B	500 kN	80	59	30	66	90	28	66	0.1	6	3.2
519x-C	0.75 - 1 MN	110	89	50	81	100	40	97	0.12	6	5.5
519x-D	1.5 - 2 MN	148	120	64	96	140	50	129	0.15	12	17
519x-E	3 MN	180	155	80	124	160	65	172	0.17	12	26
519x-F	5 MN	230	200	105	150	190	75	225	0.2	12	50
5195-G	7.5 - 10 MN	290	290	150	/	260	60	387	0.3	20	100
5195-H	15 MN	340	340	165	/	290	80	480	0.34	20	175
5195-I	20 MN	390	390	200	/	330	110	545	0.38	20	260
-	30 MN	According to customer's design specifications									

Other dimensions ØA, ØB, and H on request  
 \*x=Material: 5190 - stainless steel; 5195 - nickel-plated steel

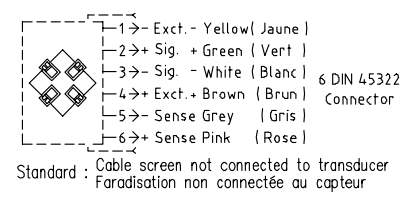
Other capacities and dimensions available on request

Dimensions in mm

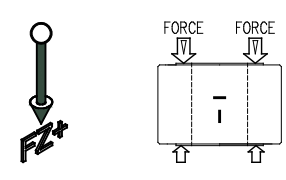
Accessories



Wiring



Load direction



## 5200-5205

## TENSION LINK LOAD CELLS

Tension link load cells specially adapted for standard shackles.



### Features

- o Sturdy design
- o Protection class: IP66
- o Cable length: see drawing table - CL (other lengths available on request)
- o Material: stainless steel (5200), nickel-plated steel (5205)

### Most popular options (see more in ANNEX)



Ex i



IP67  
MARINE

Model 5205 - 25 kN



Application(s) SENSY's load cells 5200-5205 are perfectly designed for the following applications:

- Tension force measurement,
- Suspended industrial weighing,
- Winch monitoring.

### Capacities

5200-5205 FORCE: from 75 kN to 5 MN

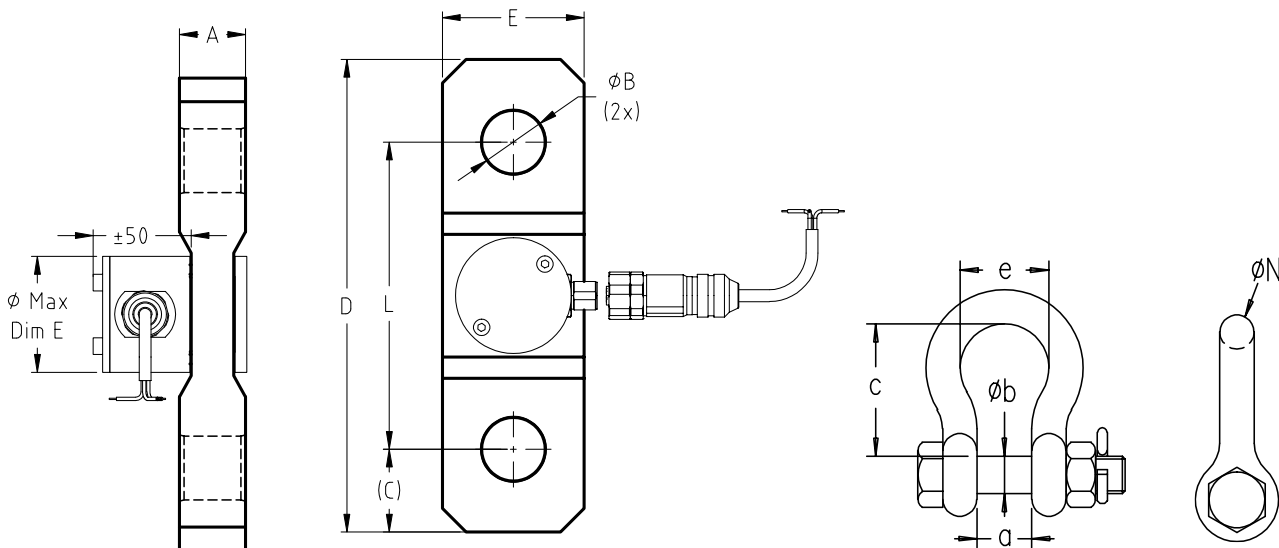
5200-5205 HOIST: from 7.5 t to 500 t

Specifications	0.5 %	
Combined error (non-linearity + hysteresis)	< ± 0.5	% F.S.*
Repeatability error	< ± 0.25	% F.S.*
Creep error over 30 min.	< ± 0.2	% F.S.*
Zero shift after loading	< ± 0.1	% F.S.*
Reference temperature	23	°C
Compensated temperature range	-10...+45	°C
Service temperature range	-25...+70	°C
Storage temperature range	-50...+85	°C
Temperature coefficient of the sensitivity	< ± 0.1	% F.S./10°C
Temperature coefficient of zero signal	< ± 0.1	% F.S./10°C
Zero balance	± 0.02	mV/V
Input resistance	352 ± 2	ohm(s)
Output resistance	352 ± 2	ohm(s)
Insulation resistance (50 V)	> 5000	Mohm(s)
Reference excitation voltage	10	VDC
Permissible nominal range of excitation voltage	3...12	VDC
Safe load limit	150	% F.S.*
Breaking load	> 300	% F.S.*

\* F.S. : Full Scale.

Specifications subject to change without notice..

5200-5205 > STANDARD DIMENSIONS



LOAD CELLS										
Ref. Item*	Capacities		A	Ø B	(C)	D	E	L	CL (m)	Weight (kg)
	Force > 300 %**	Hoist > 500 %**								
520x-A	75 kN	See 5200L-5205L sheet	22	27	32	179	60	115	3	2
520x-B	150 kN	See 5200L-5205L sheet	30	38	46	277	80	185	6	6
520x-C	250 kN	15 t	40	45	54	327	90	219	6	9.5
520x-D	300 kN	20 t	40	54	65	392	110	262	6	13
520x-E	500 kN	30 t	50	60	72	436	135	292	6	22
520x-F	750 kN	50 t	50	74	89	538	185	360	12	37
520x-G	1.25 MN	75 t	78	88	106	640	200	428	12	73
520x-H	1.5 MN	100 t	88	98	123	722	235	476	12	111
520x-I	2.5 MN	150 t	138	112	140	824	240	544	12	200
520x-J	3 MN	200 t	148	135	169	994	310	656	12	333
-	4 - 5 MN	400 - 500 t	According to customer's design specifications							

\*x=Material: 5200 - stainless steel; 5205 - nickel-plated steel  
 \*\*Breaking load (% full scale)

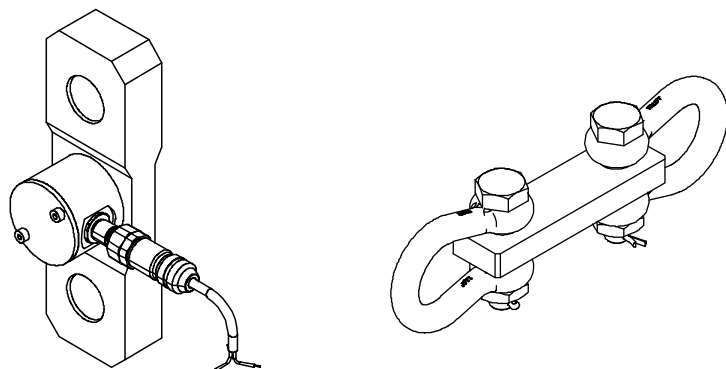
ASSOCIATED SHACKLES						
S.W.L.**	a	Ø b	c	e	Ø N	
					mm	inch
6.5 t	36±2.2	25+0.9	83±6.4	58±2.6	22+0.9	7/8"
12 t	51±3.2	35+1	115±6.4	83±4.2	32+1	1 1/4"
17 t	60±4	42+1.5	146±6.4	99±5	38+1.5	1 1/2"
25 t	74±4	50+2	178±6.4	126±6.3	45+2	1 3/4"
35 t	83±4.2	57+2	197±12.7	138±7.5	50+2	2"
55 t	105±4.7	70+2.5	260±12.7	180±9	65+2.5	2 1/2"
85 t	127±5	83+3	329±29	190±9.5	75+3	3"
120 t	147±5	95+2	400±19	238±12	95±2	3 3/4"
150 t	169±5	108±2	410±12	275±14	105±2	4 1/8"
200 t	179±5	130±3	513±13	290±15	120±3	4 23/32"

\*\*\*SWL: Safe Working Load

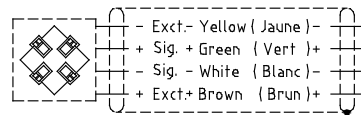
→ Other capacities and dimensions available on request

Dimensions in mm

Other views

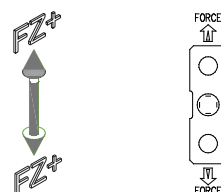


Wiring



Standard : Cable screen not connected to transducer  
 Faradisation non connectée au capteur

Load direction



Load pins with standard dimensions.



Features

- o CE certified for hoisting applications
- o Sturdy design
- o Material: stainless steel
- o Protection class: IP65
- o Easy to install
- o Complete range of CE certified electronics and load limiters
- o Cable length: 6 m (other lengths available on request)

Most popular options (see more in ANNEX)



Model 5300 - 20 t



Application(s) SENSY's load cells 5300 are perfectly designed for the following applications:

- Hoisting devices and crane security in combination with load limitation electronics (e.g.: BRIDGE-BOY, CRANE-BOY, ...),
- Agriculture machines, theater equipment, elevators, hydraulic cylinders monitoring.

Capacities

5300: 0.5 - 1 - 2 - 3 - 5 - 10 - 20 - 30 - 50 - 75 - 100 - 125\*\*\* t

Specifications	SL - FORCE	SL - HOIST	SL - LIFT	
Combined error (non-linearity + hysteresis)	0.25 - 1**	0.5 - 2**	0.5 - 2**	% F.S.*
Repeatability error	<± 0.25	<± 0.25	<± 0.25	% F.S.*
Creep error over 30 min.	<± 0.3	<± 0.3	<± 0.2	% F.S.*
Zero shift after loading	<± 0.5	<± 0.5	<± 0.5	% F.S.*
Reference temperature	23	23	23	°C
Compensated temperature range	-10...+45	-10...+45	-10...+45	°C
Service temperature range	-25...+70	-25...+70	-25...+70	°C
Storage temperature range	-50...+85	-50...+85	-50...+85	°C
Temperature coefficient of the sensitivity	<± 0.2	<± 0.2	<± 0.2	% F.S./10°C
Temperature coefficient of zero signal	<± 0.2	<± 0.2	<± 0.2	% F.S./10°C
Zero balance	± 0.02	± 0.02	± 0.02	mV/V
Nominal sensitivity	± 1.5	± 1	± 0.5	mV/V
Input resistance	350 ± 2	350 ± 2	350 ± 2	ohm(s)
Output resistance	350 ± 2	350 ± 2	350 ± 2	ohm(s)
Insulation resistance (50 V)	> 5000	> 5000	> 5000	Mohm(s)
Reference excitation voltage	10	10	10	VDC
Permissible nominal range of excitation voltage	3...12	3...12	3...12	VDC
Safe load limit	150	200	300	% F.S.*
Breaking load	> 300	> 500	> 1000	% F.S.*
Permissible dynamic loading	50	75	100	% F.S.*
Static lateral force limit	100	150	200	% F.S.*

\* F.S. : Full Scale.

\*\* Typical range of accuracy, depending on design and dimensions.

\*\*\* 125 t only force version.

Specifications subject to change without notice..

5300 > TECHNICAL SPECIFICATIONS

Load pins range



**5000** (1 to 2000 t)  
CUSTOM-MADE LOAD PIN



**5050** (1 to 2000 t)  
SUBSEA LOAD PIN

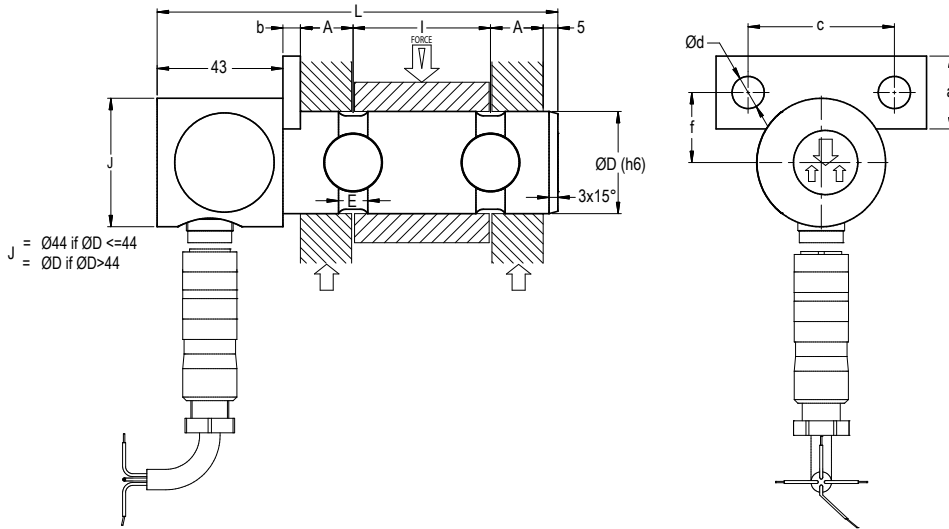


**5300** (0.5 to 125 t)  
STANDARD LOAD PIN



**5600** (0.5 to 14 t)  
ECONOMICAL LOAD PIN

5300 drawing



Ref. Item	CAPACITIES			ØD	A	E	l	a	b	c	Ød	f	L	Weight (kg)
	Force > 300 %*	Hoist > 500 %*	Lift > 1000 %*											
5300-A	0.75 t	0.5 t	0.25 t	25	13.5	8	31	25	6	50	11	20.5	112	1.02
5300-B	1.5 - 3 t	1 - 2 t	0.5 - 1 t	25	13.5	8	31	25	6	50	11	20.5	112	1.04
5300-C	5 - 7.5 t	3 - 5 t	1.5 - 2.5 t	35	18	10	47	25	6	50	11	24	137	1.44
5300-D	16.6 t	10 t	5 t	50	27	14	66	30	8	70	13	33	176	2.88
5300-E	30 t	20 t	10 t	65	32.5	18	90	30	8	70	13	38	211	5.44
5300-F	50 t	30 t	15 t	75	40	25	100	40	10	100	17	47	241	8.15
5300-G	75 t	50 t	-	85	49	20	117	40	10	100	17	50.5	271	12
5300-H	100 t	75 t	-	100	72.5	35	155	40	10	100	17	56	354	21.1
5300-I	125 t	100 t	-	120	72.5	35	155	50	12	140	21	68.5	354	31.4

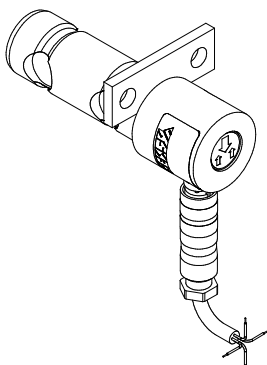
\* Breaking load (% full scale)

Other capacities and dimensions available on request

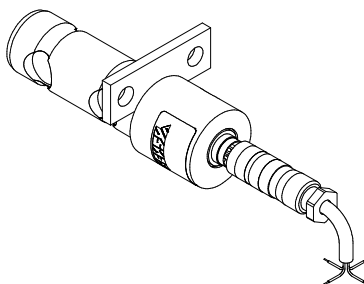
Dimensions in mm

Other views

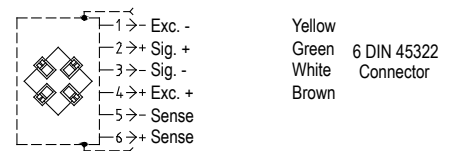
RADIAL OUTPUT (STANDARD)



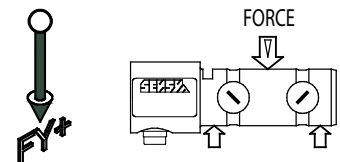
AXIAL OUTPUT (5300A-x) - OPTION



Wiring



Load direction





Annular force transducers specially designed for applications requiring a load measurement through a centred hole.



### Features

- o Sturdy design
- o Material: stainless steel
- o Protection class: IP67
- o Easy to install
- o CE certified for hoisting applications
- o Complete range of "CE" certified electronics and load limiters
- o Cable length: 6 m (other lengths available on request)

Most popular options (see more in ANNEX)



Model 5900 - 20 t



**Application(s)** SENSY's load cells 5900 are perfectly designed for the following applications:

Load limitation on EOT cranes, industrial weighing, force measurement,...

### Capacities

5900 FORCE: 3 - 5 - (7.5) - 10 - (15) - 20 - 30 - 50 - 75 - 100 - 150 - (200) kN

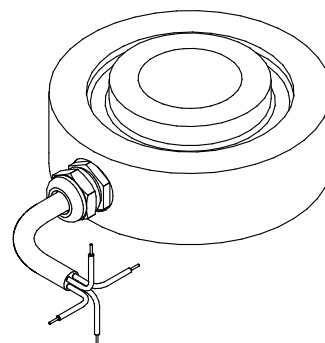
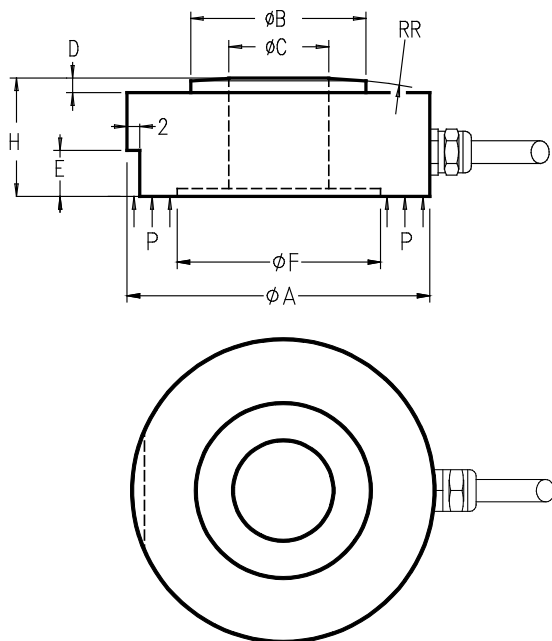
5900 HOIST: 0.2 - 0.5 - (0.75) - 1 - (1.5) - 2 - 3 - 5 - 7.5 - 10 - 15 t

Specifications	0.25 %	SL - FORCE	SL - HOIST	
Combined error (non-linearity + hysteresis)	<± 0.25	0.25 - 1**	0.5 - 2**	% F.S.*
Repeatability error	<± 0.1	<± 0.25	<± 0.25	% F.S.*
Creep error over 30 min.	<± 0.1	<± 0.3	<± 0.3	% F.S.*
Zero shift after loading	<± 0.025	<± 0.5	<± 0.5	% F.S.*
Reference temperature	23	23	23	°C
Compensated temperature range	-10...+45	-10...+45	-10...+45	°C
Service temperature range	-25...+70	-25...+70	-25...+70	°C
Storage temperature range	-50...+85	-50...+85	-50...+85	°C
Temperature coefficient of the sensitivity	<± 0.05	<± 0.2	<± 0.2	% F.S./10°C
Temperature coefficient of zero signal	<± 0.035	<± 0.2	<± 0.2	% F.S./10°C
Zero balance	± 0.02	± 0.02	± 0.02	mV/V
Nominal sensitivity	1.5	± 1.5	± 1	mV/V
Sensitivity tolerance	<± 0.3	<± 0.5	<± 0.5	%
Input resistance	700 ± 2	700 ± 2	700 ± 2	ohm(s)
Output resistance	700 ± 2	700 ± 2	700 ± 2	ohm(s)
Insulation resistance (50 V)	> 5000	> 5000	> 5000	Mohm(s)
Reference excitation voltage	10	10	10	VDC
Permissible nominal range of excitation voltage	3...12	3...12	3...12	VDC
Safe load limit	150	150	200	% F.S.*
Breaking load	> 300	> 300	> 500	% F.S.*
Permissible dynamic loading	40	50	75	% F.S.*
Static lateral force limit	10	10	10	% F.S.*

\* F.S.: Full Scale.

\*\* Typical range of accuracy, depending on design and dimensions. Specifications subject to change without notice..

5900 > STANDARD DIMENSIONS



STANDARD													
Ref. Item	Capacities		ØA	ØB	ØC	D	E	ØF	H	P (N/mm²)	RR	Max. Deflexion (mm)	Weight (kg)
	Force > 300 %*	Hoist > 500 %*											
5900-A	3 - 30 kN	0.2 - 2 t	59	30	16	4	13	49	25	4 - 24.5	300	0.05-0.15	0.5
5900-B	30 - 100 kN	3 - 7.5 t	79	50	30	5	14	70	31	30 - 74	500	0.20-0.35	1
5900-C	100 - 150 (200) kN	10 - 15 t	119	80	50	6	14.5	105	40	42 - 83	750	0.30-0.40	3.2

\* Breaking load (% full scale)

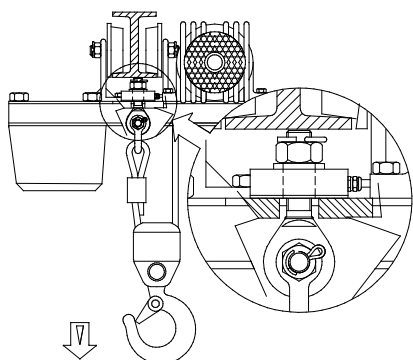
CUSTOM-MADE						
Capacities		ØC	ØB	ØA	H	
Force > 300 %*	Hoist > 500 %*					
3 - 30 kN	0.2 - 2 t	ØX	ØX+14	±ØX+43	23...25	
30 - 100 kN	3 - 7.5 t	ØX	ØX+20	±ØX+49	27...31	
100 - 150 (200) kN	10 - 15 t	ØX	ØX+30	±ØX+69	35...40	

\* Breaking load (% full scale)

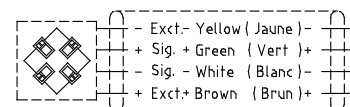
→ Other capacities and dimensions available on request

Dimensions in mm

Accessories

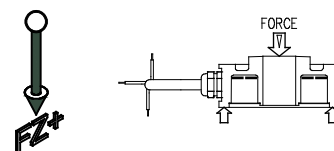


Wiring

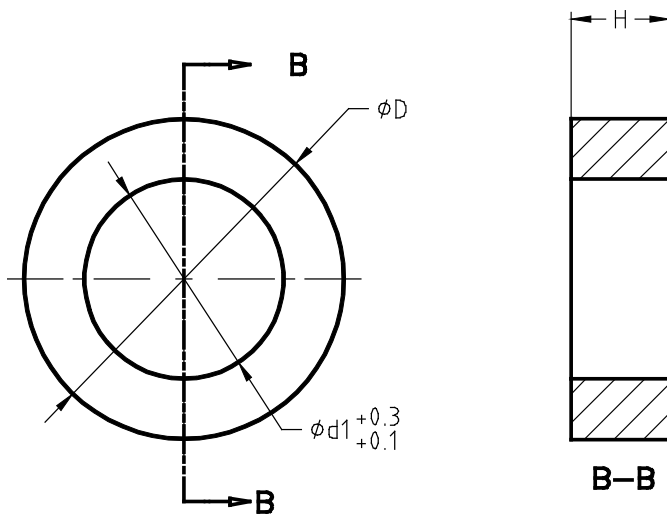


Standard : Cable screen not connected to transducer  
Faradisation non connectée au capteur

Load direction



A5900 > STANDARD DIMENSIONS



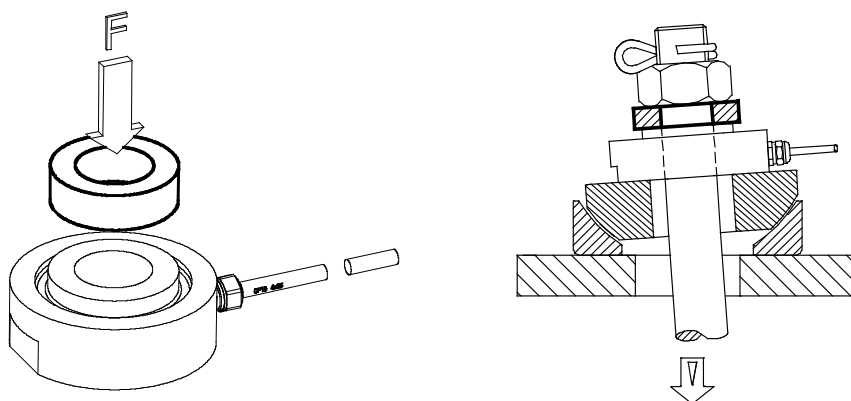
Ref. Item*	Capacities		$\phi d1$	$\phi D$	H	Weight (kg)
	Force > 300 %**	Hoist > 500 %**				
A5900-A	3 - 30 kN	0.2 - 2 t	16	39	10	0.08
A5900-B	30 - 100 kN	3 - 7.5 t	30	49	15	0.14
A5900-C	100 - 150 (200) kN	10 - 15 t	50	89	20	0.68

\* Material: stainless steel  
 \*\*Breaking load (% full scale)

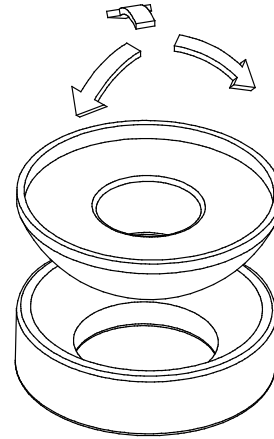
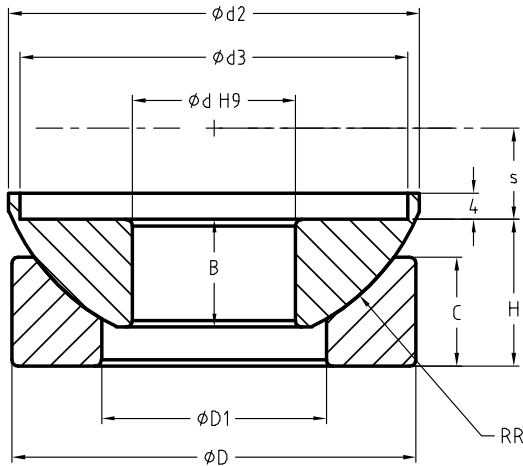
→ Other capacities and dimensions available on request

Dimensions in mm

Other views



R5900 > STANDARD DIMENSIONS



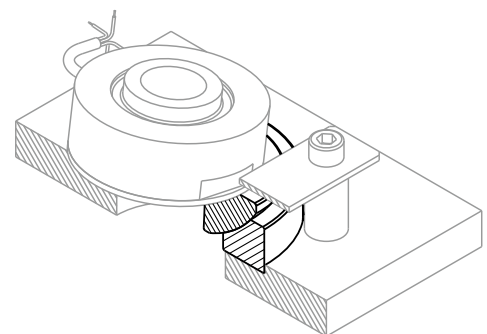
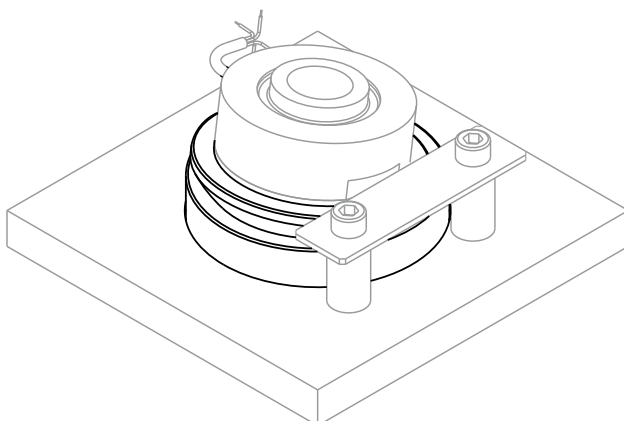
Ref. Item*	Capacities		Ød	ØD	ØD1	H	Ød2	Ød3	RR	B	C	s	Weight (kg)
	Force > 300 %**	Hoist > 500 %**											
R5900-A	3 - 30 kN	0.2 - 2 t	25	62	34.5	22.5	63	59.5	34	16.5	16.7	14	0.43
R5900-B	30 - 100 kN	3 - 7.5 t	35	90	50.5	28	84	79.5	49	22	20.7	22	1.2
R5900-C	100 - 150 (200) kN	10 - 15 t	80	180	107.5	50	172	119.5	98.5	43.5	38	42.5	8

\* Material: stainless steel  
 \*\*Breaking load (% full scale)

— Other capacities and dimensions available on request

Dimensions in mm

Other views



Sealed and compact tension and compression sensors.



Model 5930 - 1 kN



Features

- o Protection class: IP65
- o Very competitive prices
- o Tension and / or compression (universal)
- o Load accessories available
- o Material:
  - stainless steel (5930)
  - anodised aluminium alloy (5932)
- o Cable length: 1.5 m (other lengths available on request)

Most popular options (see more in ANNEX)



Ex i

IP67  
MARINE

IP68

Application(s) SENSY's load cells 5930-5932 are perfectly designed for the following applications:

- Industrial force measurement in small spaces.

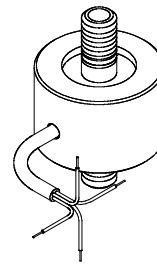
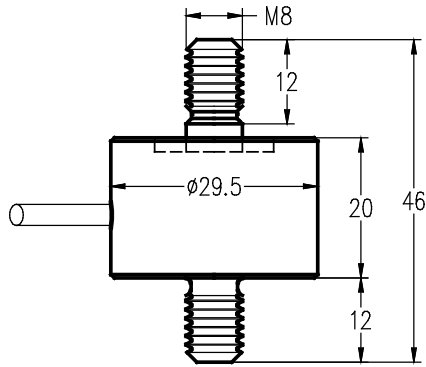
Capacities

- 5932: 200 - 300 - 500 N
- 5930: 1 - (1.5) - 2 - (3) - 5 kN

Specifications	1 %	
Combined error (non-linearity + hysteresis)	<± 1	% F.S.*
Repeatability error	<± 0.5	% F.S.*
Creep error over 30 min.	<± 0.25	% F.S.*
Zero shift after loading	<± 0.2	% F.S.*
Reference temperature	23	°C
Compensated temperature range	-10...+45	°C
Service temperature range	-25...+70	°C
Storage temperature range	-50...+85	°C
Temperature coefficient of the sensitivity	<± 0.2	% F.S./10°C
Temperature coefficient of zero signal	<± 0.2	% F.S./10°C
Zero balance	± 0.05	mV/V
Nominal sensitivity	1.5	mV/V
Input resistance	1000 ± 100	ohm(s)
Output resistance	1000 ± 100	ohm(s)
Insulation resistance (50 V)	> 5000	Mohm(s)
Reference excitation voltage	10	VDC
Reference excitation voltage	5	-
Permissible nominal range of excitation voltage	3...10	VDC
Safe load limit	120	% F.S.*
Breaking load	>300	% F.S.*
Permissible dynamic loading	40	% F.S.*

\* F.S. : Full Scale.  
Specifications subject to change without notice..

5930-5932 > **STANDARD DIMENSIONS**

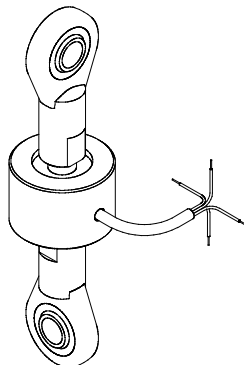
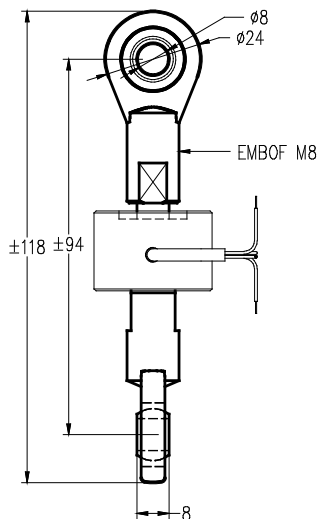


Ref. Item*	Capacities	Weight (kg)
5932-A	200 - 500 N (20 - 50 kg)	0.051
5930-A	1 - 5 kN (100 - 500 kg)	0.098

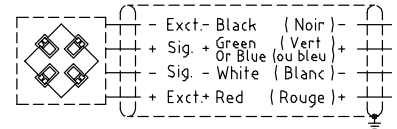
→ Other capacities and dimensions available on request

Dimensions in mm

Accessories

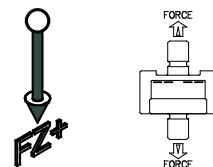


Wiring



Standard : Cable screen not connected to transducer  
Faradisation non connectée au capteur

Load direction



## 5960-5962

## MINIATURE COMPRESSION LOAD CELLS

Sealed and compact compression sensors.



### Features

- o Protection class: IP65
- o Very competitive prices
- o Material:
  - stainless steel (5960)
  - anodised aluminium alloy (5962)
- o Cable length: 1.5 m (other lengths available on request)

Most popular options (see more in ANNEX)



Ex i

IP67  
MARINE

IP68

Model 5960 - 5 kN



### Application(s)

SENSY's load cell 5960-5962 are perfectly designed for the following applications:

- Industrial force measurement in confined spaces,
- Weight control.

### Capacities

5962: 200 - 300 - 500 N

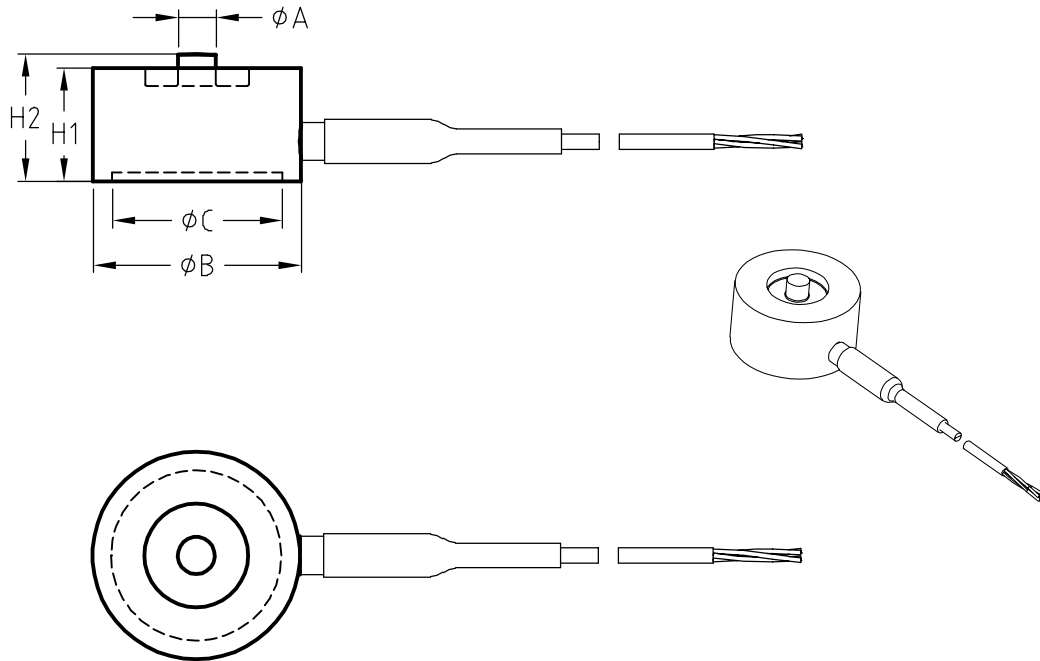
5960: (0.75) - 1 - (1.5) - 2 - (3) - 5 - (7.5) - 10 - (15) - 20 kN

Specifications	1 %	
Combined error (non-linearity + hysteresis)	<± 1	% F.S.*
Repeatability error	<± 0.5	% F.S.*
Creep error over 30 min.	<± 0.25	% F.S.*
Zero shift after loading	<± 0.2	% F.S.*
Reference temperature	23	°C
Compensated temperature range	-10...+45	°C
Service temperature range	-25...+70	°C
Storage temperature range	-50...+85	°C
Temperature coefficient of the sensitivity	<± 0.2	% F.S./10°C
Temperature coefficient of zero signal	<± 0.2	% F.S./10°C
Zero balance	± 0.05	mVV
Nominal sensitivity	1.5	mVV
Input resistance	1000 ± 3	ohm(s)
Output resistance	1000 ± 3	ohm(s)
Insulation resistance (50 V)	> 5000	Mohm(s)
Reference excitation voltage	5	VDC
Permissible nominal range of excitation voltage	3..10	VDC
Safe load limit	120	% F.S.*
Breaking load	>300	% F.S.*
Permissible dynamic loading	40	% F.S.*

\* F.S. : Full Scale.

Specifications subject to change without notice..

5960-5962 > STANDARD DIMENSIONS

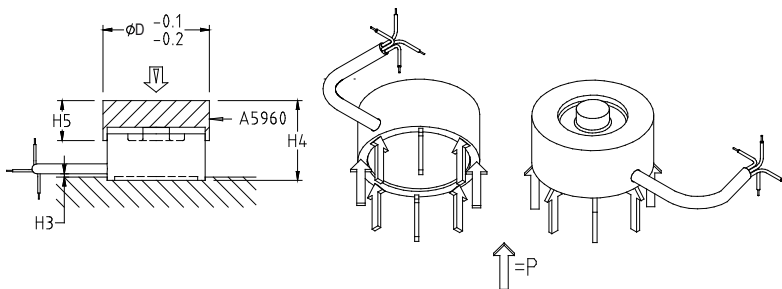


Ref. Item*	Capacities	ØA	ØB	ØC	H1	H2	P (N/mm <sup>2</sup> )	Max. Deflexion (mm)	H3 (Max)	H4	H5	ØD	Weight (kg)
5962-A	200 - 500 N	4	22	19.75	12	13.5	2.7 to 6.8	0.08 to 0.12	1.5	17.5	8	24	± 0.042
5960-B	750 - 5000 N	4	22	19.75	12	13.5	10.16 to 68	0.08 to 0.12	1.5	17.5	8	24	± 0.052
5960-C	10 - 20 kN	8	29.5	23	14	16	37.3 to 0.20	0.14 to 0.20	2	24	12	32	± 0.091

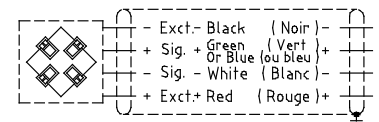
→ Other capacities and dimensions available on request

Dimensions in mm

Other views

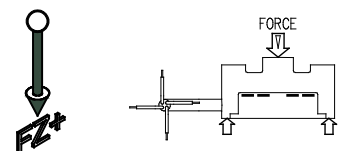


Wiring



Standard : Cable screen not connected to transducer  
Faradisation non connectée au capteur

Load direction









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# ANNEXES

- Definitions: Most popular options	p. 296
- Option cards for PAX, CRANE-BOY, INDI-BOY, DISP-BOY family	p. 303
- Definitions: Certifications	p. 304
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- SENSY software	p. 306
- Stainless steel screws: Features and references	p. 310
- IP codes (International Protection Marking)	p. 311

# DESCRIPTION OF MOST USED OPTIONS

OPTION	DESCRIPTION
 Amplified output	<b>Amplified output</b> Signal conditioners for strain gauges are high-performance amplifiers built into the load cell. They amplify and convert the input signal (mV) into an output signal (mA or V). The current amplifiers make it possible to maintain an accuracy higher than 0.1 % at the different temperatures used. Robust and small in design (with an optional housing), their installation is easy and their temperature range is -40°C to +85°C. These analogue amplification boards are designed to work in an industrial environment and offer both high stability and fast response. The directly amplified force transducer can be applied where space, weight and cost are limited as well as in areas where there are many electromagnetic signal disturbances.
 Angle Measurement	<b>Angle measurement</b> This allows the angle of rotation to be measured at the same time as the torque. This information is provided in the form of two square waveforms providing 360 periods per revolution and offset by a quarter of a period to determine the direction of rotation.
 Attachment arm	<b>Articulated arm</b> This accessory makes it possible to fix the running line tensiometer to the structure while leaving it sufficient freedom to follow the movements of the rope.
 ASTM E74	<b>ASTM E74</b> The ASTM E74 standard is unique to the USA and serves the same purpose as the international standard ISO 376, i.e.: "Calibration of force measuring instruments used for the verification of uniaxial testing machines". It deals more generally with the calibration methods which can be used to perform the calibration. Two categories of force transducers are differentiated: <ul style="list-style-type: none"><li>• class AA: for secondary force standard dynamometers, i.e. used as references for calibrating other dynamometers.</li><li>• class A: for dynamometers used for checking testing machines.</li></ul> This distinction introduces differences in the calibration procedure. The results of the calibration are used to define the area of use in the category to which the dynamometer belongs. A key difference from ISO 376 is that the ASTM protocol is based in part on calibration uncertainty.
 Cable length	<b>Cable length</b> Transducers are defined as standard with a typical cable length. (e.g. 8 m for the '5510' model). It is possible to modify this length on request. Note: the maximum length can be limited especially in particular: <ul style="list-style-type: none"><li>• by the presence of electromagnetic disturbances which then require amplification of the signal at the transducer to convey a robust signal of type 4 ... 20 mA / 0...10 V;</li><li>• for Ex i-certified transducers for operation in explosive zones for which the solution is to use a local amplification (e.g.: option C6 - model 'ANALOGUE AMPLIFIER' - delivering a signal 4 ... 20 mA 2 wires) enabling the use of a loop insulator accepting longer cables than the Zener barriers.</li></ul>
 Calculation note	<b>Calculation note</b> Calculation note to demonstrate the mechanical strength and technical relevance of the design of a transducer according to its measurement range, its safety factor, the fatigue strength required and the characteristics of the material used.
 Calibration resistance	<b>Calibration resistance</b> A resistor intended to be connected in parallel on one of the Wheatstone bridge branches in order to create a known imbalance and thus to simulate a known force or torque. This makes it possible to calibrate and verify the control electronics without applying a physical quantity to the force transducer or torque meter. A calibration resistor is therefore determined for a specific branch of a specific force transducer. It can be internal to the transducer and activated by connecting two wires. It can also be external (supplied in a sachet).

# DESCRIPTION OF MOST USED OPTIONS



OPTION DESCRIPTION



## CE hoisting

CE Hoisting logo is SENSY specific. This means that the material is certified by SENSY to be integrated in the kinematic chain of a lifting system.

To do this, SENSY provides a manufacturer folder which guarantees the overload resistance (breaking load coefficient of 5 for lifting systems and 10 for elevators) as well as the fatigue resistance.

The CE Hoisting certification is not enough for the use of load cells in an overload protection systems. Indeed, in addition, a load cell used for crane overload protection must be conform to the concept of "fail safe"; namely that it must stop the lifting in case of any anomaly. This is for example not the case for load cells with wireless transmission like models: 5000-WI, 5000M-WI, 5050-WI and 5050M-WI...

OPTION DESCRIPTION



Charpy certificate

## Charpy certificate

This type of test makes it possible to control the impact resistance or the ductility of the proof body of a force transducer.

The Charpy test is carried out on a specimen in the same material as that of the force transducer accompanied by a test report certified by an approved laboratory.

OPTION DESCRIPTION



## Connector output

As the standard, industrial and weighing transducers are generally equipped with a cable gland. This option replaces the latter with a connector so that it is easy to disconnect from the cable. These connectors are chosen according to the transducer's environment. Some very specific connectors can also be used underwater (they can even be disconnected and connected underwater) while being subjected to high pressure.

OPTION DESCRIPTION



Digital output

## Digital output

The RS-232 and RS-485 options are high-performance digital amplifier boards for analogue / digital signal conversion which are typically used for high-accuracy transducers. The board has been developed for mounting in most of our strain gauge force transducers and provides a very stable RS-232 / RS-485 digital output signal in the MODBUS or ASCII protocol.

OPTION DESCRIPTION



Dual Wheatstone bridge

## Dual Wheatstone bridge

A double bridge force transducer is a transducer with two independent Wheatstone bridges equipped with strain gauges. In the context of high-risk industrial applications where, according to the Machine Directive, high levels of SIL (Safety Integrity Levels) or PL (Performance Levels) are required, safety is provided by an independent safety control device. The device's critical point of performance lies in its resistance to defects. This resistance depends on both the quality and reliability of the components, and in particular on its structure (or architecture). These safety devices are essentially built according to the well-known 'measurement signal / control logic / actuator' architecture. High SIL or PL levels can only be achieved by using the redundancy of the parts. Thanks to these double bridge measuring force transducers, SENSY technology enables the redundancy of the required measuring signal to be supplied to the safety control logic device. The monitoring and comparison of these redundant signals, performed by the control logic (safety PLC, configurable logic block 'fail-safe') provides the means of avoiding, detecting or tolerating defects. In this case, a fault in the measurement signal will be detected and processed before the next request for the safety function. Another reason to employ a second bridge is to have a spare bridge for very large capacity transducers or for transducers placed where mounting and accessibility are very difficult in order to facilitate dealing with the problem of signal drift or ripped cable.

OPTION DESCRIPTION



Dye penetrant certificate

## Dye penetrant certificate

Dye penetrant test certificate after machining.

This type of test makes it possible to check the absence of any micro-cracks likely to cause the rupture of certain fatigue-rated transducers.

OPTION DESCRIPTION

EN 12390

Accredited laboratory certificate

## EN 12390

The EN 12390 and EN 12350 series of standards deal with concrete tests. The machines used for compressive strength testing of hardened concrete are tested according to the European standard EN 12390-4. The standard transducers manufactured by SENSY, have four separate gauge bridges to identify any parallelism anomaly on the machine. They may also be associated with an ISO 376 qualification and require an official certificate from a certified body based on tests carried out according to EN 12390-4.

OPTION DESCRIPTION




Ex i

## Ex i

Type of protection is based on the limitation of electrical energy provided to an equipment and its wiring exposed to explosive atmosphere at a level below that which may cause ignition by a spark or thermal effect.

Force transducers and torque meters equipped with this option are considered to be intrinsically safe, which allows them to work in explosives areas. SENSY load cells are ATEX Ex ia IIC T4 and T6, IECEx Ex ia IIC T6 and CSA (Canada and US) Class 1 Div 1 certified.


# DESCRIPTION OF MOST USED OPTIONS


OPTION	DESCRIPTION
<b>Ex d</b>	<p><b>Ex d</b></p> <p>This is an envelope (housing or proof body of the force transducer) enclosing components that can ignite an explosive gaseous atmosphere. The transducer structure is therefore designed to resist the pressure developed during an internal explosion of an explosive mixture and prevents the transmission of this one to the surrounding explosive atmosphere of the envelope.</p> <p>We offer this type of option on our load pin model '5050' or for some of our electronics (displays, load limiters, etc.). In the latter case, these are placed in suitable explosion-proof housings.</p>
 Up to 800 m	<p><b>External antenna</b></p> <p>Options for the wireless transmission of measurements have an internal antenna as standard. Depending on the application, it is sometimes necessary to increase the range of our wireless transmitters.</p> <p>We also offer external antennas for the industrial sector as well as for explosive areas with our Ex i wireless transmitters.</p>
20... 100 kHz Frequency output	<p><b>Frequency output</b></p> <p>This provides a signal in the form of frequency modulation to overcome electromagnetic disturbances.</p>
 High pressure resistance	<p><b>High-pressure resistance</b></p> <p>This option involves design and components (e.g. gaskets) that can withstand high pressures. It is therefore necessary to know the nature of the fluid under pressure (water, air, oil, etc. ...), the maximum pressure to which the transducer will be subjected as well as the duration of exposure to this pressure.</p>
 Hydraulic hose	<p><b>Hydraulic hose</b></p> <p>Mechanical protection of the cable by using a hydraulic sheath. This option is recommended in environments where the cable is subject to mechanical and chemical aggressions.</p>
<b>IP64</b> Not for Angle Sensor	<p><b>IP64</b></p> <p>The protection rating of our force transducers is in accordance with the international standard of the International Electrotechnical Commission for waterproofing.</p>
<b>IP65</b> Not for Angle Sensor	<p><b>IP65</b></p> <p>The protection rating of our force transducers is in accordance with the international standard of the International Electrotechnical Commission for waterproofing.</p> <p>In the case of IP65, this corresponds to total protection against dust and strong jets of water in all directions.</p>
<b>IP67 MARINE</b>	<p><b>IP67 MARINE</b></p> <p>The protection rating of our force transducers is in accordance with the international standard of the International Electrotechnical Commission for waterproofing. In the case of IP67 MARINE, this corresponds to total protection against dust and the effects of immersion (1 m max) with corrosion resistance adapted to marine environments.</p>
<b>IP68</b>	<p><b>IP68</b></p> <p>The waterproofness is such that it is possible to immerse the transducer without altering its performance.</p> <p>In order to optimise the protection techniques, it is necessary to know the depth to which the transducer will be immersed as well as the duration of immersion and the characteristics of the liquid.</p>


# DESCRIPTION OF MOST USED OPTIONS




OPTION	DESCRIPTION
<b>IP69K</b>	<b>IP69K</b> The protection rating of our force transducers is in accordance with the international standard of the International Electrotechnical Commission for waterproofing.
	In the case of the IP69K, this corresponds to protection against high-pressure cleaning, at high temperature and coming from several directions.

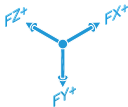
OPTION	DESCRIPTION
 <b>Class 00</b>	<b>ISO 376 - class 00</b> The purpose of ISO 376 is to calibrate force-measuring instruments used for the static verification of uniaxial testing machines (e.g. tension/compression testing machines). It describes a procedure for classifying these instruments. These high-precision, so-called "transfer" standard transducers make the link between national metrology and testing machines that must be (re)-calibrated.
	The class of the instrument must be equal to or better than the class for which the machine is to be calibrated according to ISO 7500-1. With this option, these high-accuracy-transducers not only allow the calibration of scale machines in classes 05, 1 or 2 but also enable intercomparison tests between national standards.

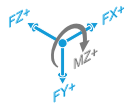
OPTION	DESCRIPTION
 <b>Class 0,5</b>	<b>ISO 376 - class 0,5</b> The purpose of ISO 376 is to calibrate force-measuring instruments used for the static verification of uniaxial testing machines (e.g. tension/compression testing machines). It describes a procedure for classifying these instruments. These high-precision, so-called "transfer" standard transducers make the link between national metrology and testing machines that must be (re)-calibrated.
	The class of the instrument must be equal to or better than the class for which the machine is to be calibrated according to ISO 7500-1. This option allows for the calibration of scale machines in classes 0,5, 1 or 2.

OPTION	DESCRIPTION
 <b>Class 1</b>	<b>ISO 376 - class 1</b> The purpose of ISO 376 is to calibrate force-measuring instruments used for the static verification of uniaxial testing machines (e.g. tension/compression testing machines). It describes a procedure for classifying these instruments. These high-precision, so-called "transfer" standard transducers make the link between national metrology and testing machines that must be (re)-calibrated.
	The class of the instrument must be equal to or better than the class for which the machine is to be calibrated according to ISO 7500-1. This option allows for the calibration of scale machines in classes 1 or 2.



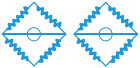
OPTION	DESCRIPTION
<b>ISO 376</b> Accredited laboratory certificate	<b>ISO 376 - Accredited laboratory certificate</b> The purpose of ISO 376 is the calibration of force-measuring instruments used for the static verification of uniaxial testing machines (e.g. tension/compression testing machines). It describes a procedure for classifying these instruments. These high-precision, so-called "transfer" standard transducers make the link between national metrology and testing machines that must be (re)-calibrated.

OPTION	DESCRIPTION
 Magnetic certificate	<b>Magnetoscopic test certificate</b> Magnetoscopic test certificate after machining. This method makes possible the detection of the presence of cracks that can cause the transducer to break.

OPTION	DESCRIPTION
	<b>Multi-axis load cells</b> For some types of proof bodies, it is possible to manufacture load cells with several gauge bridges in order to measure forces in different directions. In particular for load pins, it is allowed to measure the force in two orthogonal directions (Fx, Fy). This allows the resultant force to be calculated, without knowing the direction, by using the formula:  $F \text{ Result.} = \sqrt{(F_x^2 + F_y^2)}$

OPTION	DESCRIPTION
	<b>Multi-direction</b> For some applications it is necessary to know both the forces and the moments in several directions: for example, a torque wrench for which the torque as well as the thrust have to be measured. This can be done using a single transducer equipped with several gauge bridges in an appropriate design.

# DESCRIPTION OF MOST USED OPTIONS

OPTION	DESCRIPTION
	<b>Overload protection</b> <p>Transducers associated with overload protection electronics (crane, EOT crane, lift, nacelle, etc.) are defined as "safety components placed on the market separately" and must comply with the essential requirements of the Machine Directive 2006/42/EC for safety component aspects and the Electromagnetic Compatibility Directive 2014/30/EU.</p> <p>They are the subject of specific strain studies and a choice of appropriate material of aeronautical quality, to prevent any risk of rupture. SENSY S.A. keeps the technical file certifying the said conformity at the disposal of the authorities throughout the legal period (in reality, the documents are kept for more than 30 years, although the lifespan of a transducer may be more than 50 years).</p>
 COVER	<b>Protective cover</b> <p>The cover is designed to improve the mechanical protection of a transducer which, as the norm, only has a silicone layer on the strain gauges.</p>
 Sheaves of synthetic material	<b>REA synthetic option (tensiometer)</b> <p>Use of sheaves made from synthetic materials instead of metal sheaves for particular applications (cable type, cable diameter, weight, etc.).</p>
 SIL 3 COMPLIANT	<b>SIL (Safety Integrity Levels) / EN-61508 compliant</b> <p>In the context of high-risk industrial applications where, according to the Machine Directive, high levels of SIL (Safety Integrity Levels – EN 62061 standard) or PL (Performance Levels – ISO 13849 standard) are required, safety is provided by an independent safety control device. The critical point of the device's performance lies in its resistance to defects. This depends on the quality and reliability of the components, and in particular its structure (or architecture). These safety devices are essentially built according to the well-known architecture (measurement signal / control logic / actuator). High SIL or PL levels can only be achieved by using the redundancy of the parts. Thanks to these double-bridge measuring transducers, SENSY technology enables the redundancy of the required measuring signal to be supplied to the safety control logic device. The monitoring and comparison of these redundant signals, performed by the control logic (safety PLC, configurable logic block 'fail-safe') provides the means of avoiding, detecting or tolerating defects. In this case, a fault in the measurement signal will be detected and processed before the next request for the safety function.</p>
 SOFTWARE AVAILABLE	<b>Software</b> <p>The signals from our force transducers can be used either through industrial displays or via acquisition software. SENSY has developed a range of specialized software either for computers (SOFT-ISO376, SOFT-ISO7500, SOFT-EN12390, ...) or for industrial PLCs. These applications make it possible to acquire the signals of one or more force transducers/load pins via different types of interfaces (RS-232, RS-485, USB, wireless, etc.).</p> <p>For example, when supplying a complete measuring system, we also regularly offer to develop customised applications.</p>
 Special Impedance	<b>Special impedance</b> <p>The force transducers and the torque meters are made from strain gauges connected via a Wheatstone bridge. The impedance of this bridge depends on the type of gauges (usually 350 Ω) and the number of these in each of the branches. As a result, there is a standard impedance for each force transducer which depends on the model, the measurement range and finally the required accuracy.</p> <p>This impedance can be adapted (700, 1000, 5000 Ω) for certain applications: need for low consumption (e.g. battery operation, amplifier 4 ... 20 mA 2 wires) or the need to limit heat dissipation (Ex i certified transducers (intrinsic safety), small transducers).</p>
 Speed sensor	<b>Speed transducer</b> <p>Measurement of the rotation speed.</p> <p>This option is proposed for rotating torque meters and tensiometers to measure the running speed of the cable.</p>
 Spider lubrication hole	<b>Spider lubrication hole</b> <p>In the case of load pins, to avoid wear due to friction, it is possible to provide a lubrication hole(s) to lubricate the areas where the forces are applied to limit wear and avoid seizure. This lubrication hole can be a 'spider' to improve the distribution of the lubricant over the entire contact area.</p>



# DESCRIPTION OF MOST USED OPTIONS



OPTION

DESCRIPTION



STAINLESS STEEL

## Stainless steel connector

4 poles miniature standardised connector with mechanical parts made of stainless steel to replace the standard connector (9 pins binder according to DIN 45322 with chromed brass mechanical parts).

OPTION

DESCRIPTION



## Subsea load pin with 'wet mate' connector

This option allows the cable from a transducer to be connected or disconnected under water. This option is obviously expensive but is recommended for underwater applications where the connecting cable must be removable.

OPTION

DESCRIPTION



Submerged

## Subsea load pin with 'submersible' connector

Waterproofness of the proof body and connector for immersing the load pin. It is necessary to specify the depth and duration of immersion to optimise the design and life of its components.

OPTION

DESCRIPTION

ANODISING  
Surface treatment

## Surface treatment: anodising

Anodising refers to an electrolytic treatment that creates a thin layer of oxide on the surface of a metal body. It is used in particular for aluminum and its alloys on which a layer of alumina of 10 to 50 microns increases its resistance to wear and corrosion. Anodising also improves the visual appearance of the force transducer or accessory.

OPTION

DESCRIPTION

CHROME  
PLATING  
Surface treatment

## Surface treatment: chrome-plating

Application by electrolysis of a chromium layer on the surface of the proof body of a force transducer or its accessory to improve its resistance to corrosion. This operation enhances the product's visual appearance and makes it easier to clean (e.g. food industry).

OPTION

DESCRIPTION

NICKEL  
MARINE  
Surface treatment

## Surface treatment: nickel marine

Additional surface treatment to the proof body of a force transducer or its accessory made of alloy steel to increase its corrosion resistance for use in the marine environment.

OPTION

DESCRIPTION



Passivation  
treatment

## Surface treatment: passivation

Passivation is a surface treatment intended to create a protective film against corrosion on the surface of a metal body. For example, in the case of stainless steel, a tight protective layer of chromium oxide will be formed in the presence of oxygen in the air which is able to regenerate in case of accidental deterioration of the surface.

OPTION

DESCRIPTION

TEFLON  
Surface treatment

## Surface treatment: teflon

Application of a Teflon (PTFE) layer to the surface of the proof body of a force transducer or its accessory to improve its resistance to friction and corrosion, even at high temperatures.

OPTION

DESCRIPTION



Teds linearity


## TEDS (Transducer Electronic Data Sheet)


This technology is not only compatible with force transducers but has been designed to be used with all types of transducers (temperature, pressure, accelerometer, etc.). It consists of a digital circuit for transmitting the information necessary for its calibration to the measurement electronics.


Other information is stored in the memory of this chip: for example, transducer type, serial number, year of manufacture, manufacturer, etc. In this way, when the force transducer is connected to a TEDS-compatible indicator, it behaves like a fully 'plug and play' feature with automatic calibration which allows N, kg or t to be displayed directly, rather than mV.


Note: when necessary, and depending on the design of the transducer or application, it is also possible to improve the linearity of the transducer by integrating pairs of points and the corresponding adjustments into the memory.


# DESCRIPTION OF MOST USED OPTIONS


OPTION	DESCRIPTION
 -30°C...+130°C -40°C...+180°C -50°C...+130°C -50°C...+150°C -50°C...+180°C	<b>Temperature range</b> When manufacturing force transducers or torque meters, SENSY takes into account three types of temperature range: <ul style="list-style-type: none"><li>• The compensated temperature range where the thermal drift of the force transducer is corrected, optimised and verified during its manufacturing (standard: -10°C ... +45°C).</li><li>• The nominal operating temperature range (standard: -30°C ... +70°C) for which the transducer has been designed and qualified but which is not subjected to systematic temperature control. Nevertheless, the drift remains substantially the same as over the compensated temperature range. As an option and depending on the models, we propose to extend the operating temperature from to -50°C ... +180°C and, if necessary, to compensate for a part or all these temperatures.</li><li>• The storage temperature range (standard: -50°C ... +85°C) which is always adapted according to the chosen temperature option.</li></ul>


OPTION	DESCRIPTION
 Third inspection	<b>Third inspection</b> A request for an inspection by an authorised third party (e.g. Lloyd's) of an order during production and upon delivery.


OPTION	DESCRIPTION
 US control	<b>US control</b> Ultrasonic testing for fault detection within a material. This is based on ultrasonic waves transmission and reflection inside a material, such as the proof body of a transducer or loading accessory.

OPTION	DESCRIPTION
 USB	<b>USB</b> The COND-USB is a digital conditioner designed to convert the signal from the gauge bridge of our force transducers to a USB-type digital output. This product is totally 'plug and play' since it is directly powered by the USB port and no additional energy source is needed to power the force transducer. Thus, it is sufficient to connect it to a computer or PLC to recover the measurement of the force measured by the force transducer.  The rugged metal housing on the converter equips the device for use in all indoor environments.

OPTION	DESCRIPTION
 Vacuum proof	<b>Vacuum proof</b> This option involves the use of materials capable of withstanding the vacuum in the long term and in particular not to be subjected to degassing. It is necessary to know the value of the vacuum (absolute pressure) as well as the duration of exposure to this vacuum for an optimal definition of the required components.

OPTION	DESCRIPTION
 Tightness certificate	<b>Waterproofness certificate</b> Waterproofness certificate: this type of test makes it possible, for example, to check the waterproofness of a load pin intended for underwater use.

OPTION	DESCRIPTION
 Wireless	<b>Wireless</b> Depending on the application, it may be interesting to recover the signals from force transducers or load pins by replacing the wiring with a wireless link. Our wireless options enable us to provide wireless communications in industrial environments as well as in explosive areas.  The proposed solutions are suitable for measuring force as well as for lifting (for example, recovering the signal from load shackle on a portable indicator), but exclude safety functions such as overload protection. They are available as both single channel and multiplexed options to connect multiple transducers to the same wireless display.

OPTION	DESCRIPTION
 Xray proof	<b>X-ray proof</b> Withstand ionising radiation. This option involves the use of materials resistant to ionising radiation (radioactivity). It is necessary to know the type of radiation (alpha, beta, gamma or X), the dose rate as well as the total dose accumulated during the life of the transducer to obtain an optimal definition of the required components.

# OPTIONAL CARDS

## Communication cards (max. 1 choice)

### CARD-CDC10

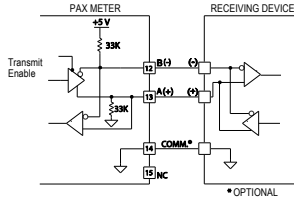


- RS-485 field bus communication interface

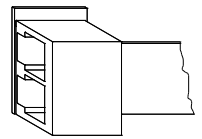
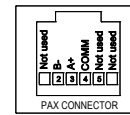
### CARD-CDC1C



### CARD-CDC10



### CARD-CDC1C



### CARD-CDC20

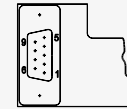
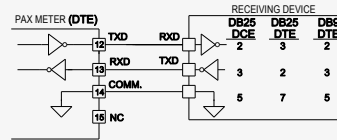


- RS-232 half-duplex communication interface  
Available with crew terminals or DB9 connector

### CARD-CDC2C



### CARD-CDC20



FEMALE  
PIN 2 TXD  
PIN 3 RXD  
PIN 5 COMMON

### CARD-CDC30



- DeviceNet communication interface

### CARD-CDC40



- Modbus communication interface

CARD-CDC40 is not necessary for models:

- INDI-PAXS2 DISP-PAXx2
- INDI-BOYS2 DISP-BOYP2
- CRANE-BOYS2 CRANE-BOYP2
- CRANE-SUMD2 DISP-SUMD2
- DISP-PAXDP, DISP-BOYDP, CRANE-BOYDP

### CARD-CDC50 / CARD-CDC50-CRANE\*



- Profibus-DP (EN 50170) communication interface

\* As the CARD-CDC50 is too long for the housing of the CRANE-BOY, the CARD-CDC50-CRANE is supplied with a spacer to be insert between the front of the electronics and the housing.

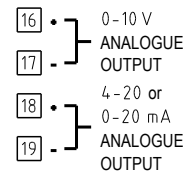
## Analogue output card

### CARD-CDL10



- Analogue output signal: 0-20 mA, 4-20 mA, 0-10 VDC

### CARD-CDL10



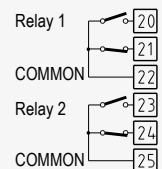
## Relay cards (max. 1 choice)

### CARD-CDS10 & CARD-CDS20

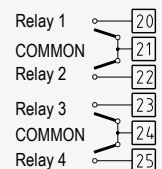


- 2 or 4 set-points activating each an independent relay

### CARD-CDS10



### CARD-CDS20



## Cards already included

- Analogue output card:

### CARD-CDL10

- Relay card:

### CARD-CDS20 (4 set-points)

- Models:

### CABIN-2xB1SUMD; CABIN-4xB1SUMD

- Models:

### INDI-BOY DISP-BOYP; CRANE-BOY CRANE-BOYP; DISP-BOYDP CRANE-BOYDP; CRANE-SUMD DISP-SUMD; CRANE-BOY-Exd; CABIN-2xB1SUMD; CABIN-4xB1SUMD.

# DEFINITIONS: CERTIFICATIONS

OPTION	DESCRIPTION
	<p><b>ATEX</b></p> <p>The ATEX (ATmosphère EXplosive in French) logo is specific to the European market and means that the material can be certified (option) to be used in an explosive environment.</p> <p>Most of the sensors can be Ex i certified (intrinsic safety) and some Ex d certified (explosion proof). The sensors with Ex i certification need to be connected to the electronics (located in a safe area) through Zener barriers or loop insulators that limit the transmitted energy. If the associated electronics need to function in an explosive environment, SENSY can integrate them in an explosion-proof certified housing.</p>
	<p><b>CE</b></p> <p>The CE logo means that the material corresponds to all the essential requirements for the different guidelines that are applicable in the European Union.</p>
	<p><b>CE Hoisting</b></p> <p>The CE Hoisting logo is SENSY-specific. This means that the material is certified by SENSY to be integrated in the kinematic chain of a lifting system.</p> <p>To do this, SENSY provides a manufacturer folder which guarantees the overload resistance (breaking load coefficient of 5 for lifting systems and 10 for elevators) as well as the fatigue resistance.</p> <p>The CE Hoisting certification is not sufficient for the use of load cells in an overload protection system. Indeed, in addition, a load cell used for crane overload protection must conform to the concept of "fail safe"; namely, it must stop the lifting in case of any anomaly. For example, this is not the case for load cells with wireless transmission, such as models: 5000-WI, 5000M-WI, 5050-WI and 5050M-WI...</p>
	<p><b>CSA</b></p> <p>The CSA logo is equivalent to the ATEX logo but is applicable to the North American markets (USA and Canada).</p>
	<p><b>IECEX</b></p> <p>The IECEX logo (International Electrotechnical Commission System for Certification to Standards Relating to Equipment for Use in Explosive Atmospheres) is equivalent to the ATEX logo but is applicable for the global market.</p>
	<p><b>ISO 376</b></p> <p>The purpose of ISO 376 is the calibration of force-measuring instruments used for the static verification of uniaxial testing machines (e.g. tension/compression testing machines). It describes a procedure for classifying these instruments. These high-precision, so-called "transfer" standard transducers make the link between national metrology and testing machines that must be (re)-calibrated.</p>
	<p><b>OIML</b></p> <p>OIML is the International Organization of Legal Metrology.</p> <p>In the SENSY documentation, the OIML logo means that the load cell or the weighing electronics are certified by an internationally recognised Metrology institute (PTB, NMI, NWML, etc.) as compliant to the international recommendation OIML concerning the type of material in order to integrate the sensor into a "legal" weighing system designed to measure the mass in order to determine its price.</p> <p>It is the R60 for the load cells and the R76 for the electronics (non-automatic weighing).</p>
	<p><b>OVERLOAD PROTECTION</b></p> <p>Transducers associated with overload protection electronics (crane, EOT crane, lift, nacelle, etc.) are defined as "safety components placed on the market separately" and must comply with the essential requirements of the Machine Directive 2006/42/EC for safety component aspects and the Electromagnetic Compatibility Directive 2014/30/EU.</p> <p>They are the subject of specific strain studies and a choice of appropriate material of aeronautical quality to prevent any risk of rupture. SENSY keeps the technical file certifying the said conformity at the disposal of the authorities throughout the legal period (in reality, the documents are kept for more than 30 years, although the lifespan of a transducer may be more than 50 years).</p>
	<p><b>EN 12390</b></p> <p>The EN 12390 and EN 12350 series of standards deal with concrete tests. The machines used for compressive strength testing of hardened concrete are tested according to the European standard EN 12390-4. The standard transducers manufactured by SENSY, have four separate gauge bridges to identify any parallelism anomaly on the machine. They may also be associated with an ISO 376 qualification and require an official certificate from a certified body based on tests carried out according to EN 12390-4.</p>



## DESCRIPTION

### Carbon cable

These small-diameter cables are made of carbon-fibre-reinforced materials. As there are many varieties it is essential to specify the characteristics of the cable concerned.

## DESCRIPTION

### Steel cable

A steel cable is an assembly of strands which are themselves an assembly of steel wires arranged in helical form around their respective core and assembled to become one. The cable allows for transmitting, force, movement and energy in an assembly of mechanical parts.

## DESCRIPTION

### Synthetic cable

Cable made from synthetic fibres (high-molecular-weight polyethylene) braided into 12 strands, with a hollow core. Its advantages over steel are: 8 x lighter, easier to handle, can hoist over longer distances, low elasticity, and in case of cutting there is no whiplash so it is safer.

## DESCRIPTION

### Deflection

Deformation along the main axis of a proof body, observed between a situation when no load is applied and nominal loading.

## DESCRIPTION

### Loading accessories

In order to verify the force sensors used in calibration or reference machines, loading wedges are employed to transmit the load to the measuring instrument. In the case of a wedge with two flat surfaces, to avoid any errors during the test they must be flat and parallel. In addition, the pressure on the machine trays must remain at less than 100 N/mm<sup>2</sup>. If necessary, it is possible to install intermediate plates with a force application diameter large enough to better distribute the pressure. Ideally, the effective height of a mounting compression accessory must be greater than or equal to half of the force application diameter of the latter. In addition, the cavity diameter of the accessory should be 0.1 to 0.2 mm greater than the diameter of the force-transmitting motor element to allow this part to be centred in the accessory without generating side contact between both parts.

## DESCRIPTION

### MTTFd

The reliability of components is obviously at the core of a system's ability to perform its security function. The lower the reliability of a component, the more likely it is that this component will cause failures (and therefore will be dangerous). However, it should be noted that it would be inconceivable to consider the reliability of a component as justification for achieving high levels of performance. Standard 13849 also provides a limit on the use of an MTTFd (100 years). This is because an MTTFd value is an average and does not reflect reality. It is therefore likely that a reliable product will fail, despite the small statistical probability. It is particularly true that, in the case of failure, this component will not immediately be identified as the probable cause of that failure.

## DESCRIPTION

### Wheatstone bridge

A Wheatstone bridge is an electrical circuit that can measure very small variations in electrical resistance. This technique is commonly used for strain gauge sensors because it accurately measures relative deformations of a few mm/m. If no force is applied to the sensor, the four gauges have the same resistance and the V. out output signal is zero.

If a force is applied in compression, gauges 1 and 4 become longer and consequently their resistance increases. Conversely, gauges 2 and 3 become shorter and their resistance decreases. As a result, the Wheatstone bridge is unbalanced and a positive V.out voltage can be measured. Conversely, this voltage becomes negative if a tension force is applied. If these relative variations are small (<1 %), we can consider that the relation (Force => Deformation => Resistance of the gauges => Electrical signal) is linear.

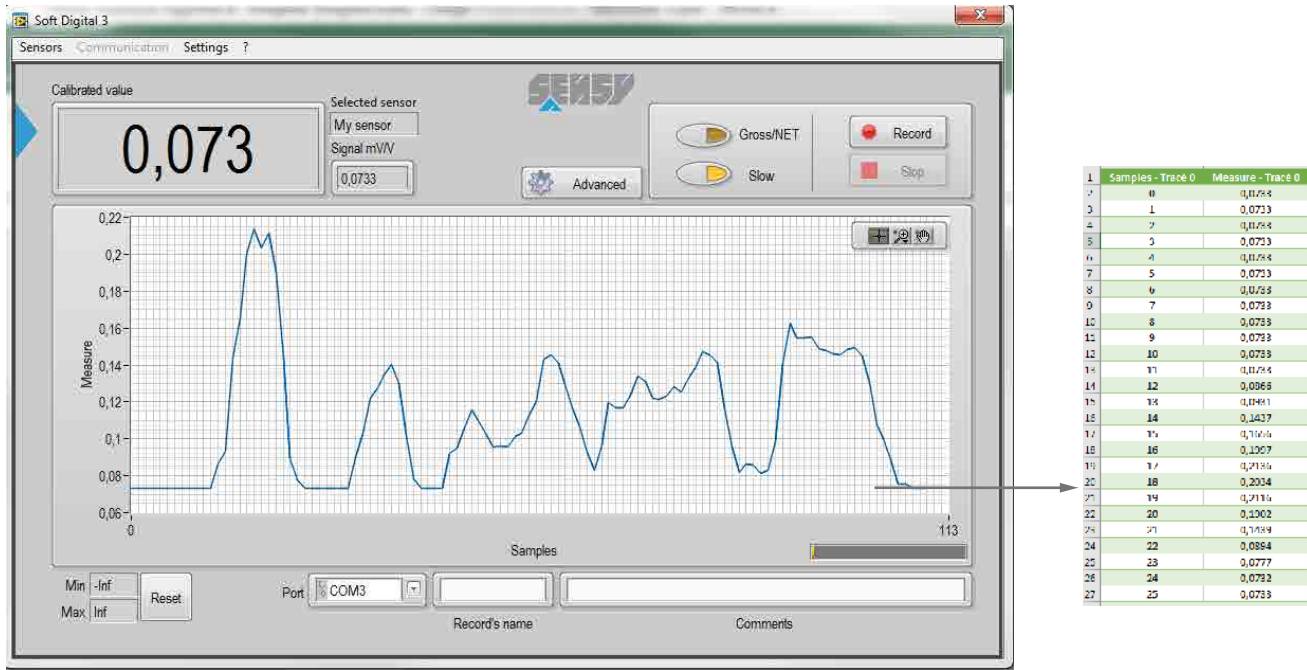
Furthermore, it should be noted that the output signal is also proportional to the supply voltage V. in. The sensitivity of the sensor is therefore expressed in mV/V where the denominator is equal to V. in. Thus for a sensor whose sensitivity is 2 mV/V and is supplied with 10 V, the output signal will evolve from 20 mV between zero and full scale. Typical sensitivities for metal gauge sensors change from 0.5 to 4 mV/V depending on:

- Principle of operation

For some sensors, the four gauges are deformed in the same proportion; for others, some gauges operate at 100 % and others at 30 % (Poisson's ratio).

- The required overload capacity, e.g. the breaking capacity must be 500 % for a hoisting device.
- Fatigue resistance.
- The type of material selected for the proof body.

SOFT-DIGITAL enables the reading, real-time display and recording of measurements of a SENSY load cell transmitted by the indicators for a standard reference force transducer called "INDI-00" and "INDI-ISO376", as well as the range of digital converters (USB, RS-232, RS-485) proposed by SENSY.

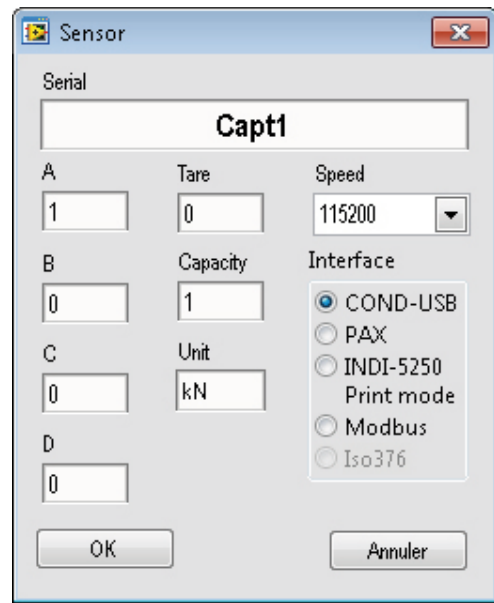
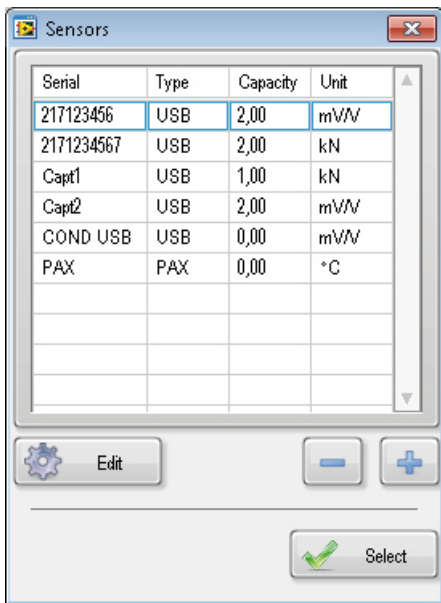


## LOAD CELLS CALIBRATIONS

Define all the coefficients from calibration sheet of several standard reference transducers.

Each one uses the following equation:  $F(x) = a \cdot x + b \cdot x^2 + c \cdot x^3$  Where F = force and x = electrical display signal .

The software calculates the applied force from the digitalised raw analogue signal x(mV/V) using the 3<sup>rd</sup> order function.





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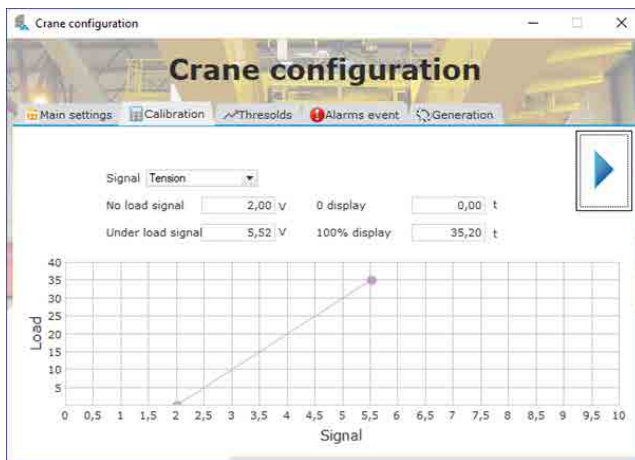
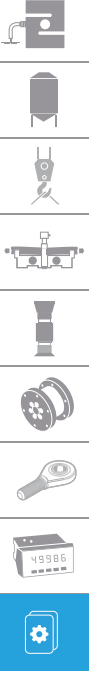


The COACHVIEW software is delivered with the COACH-II (data logger dedicated to hoisting equipment).

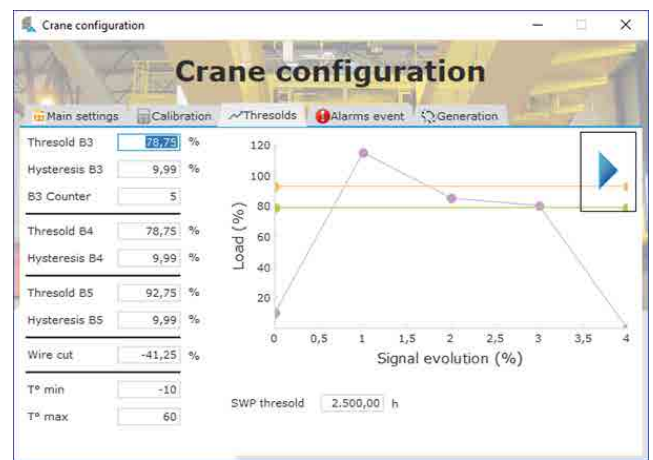
This very-user-friendly program allows for optimisation of the servicing schedule, the detection of downtimes and calculation of the FEM classification of the crane.

## The main functions of COACHVIEW are:

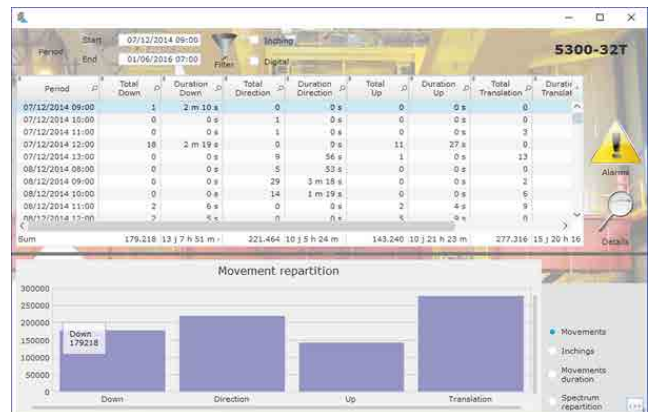
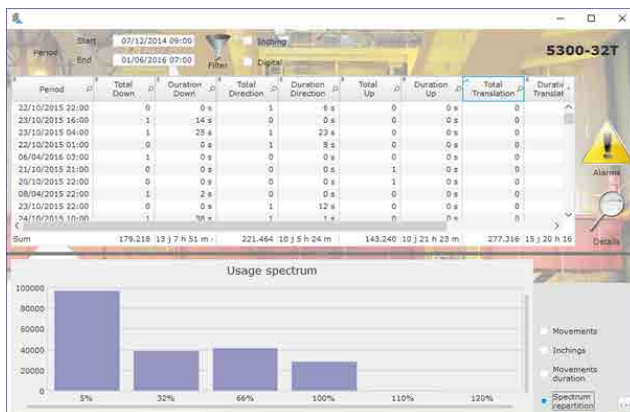
- Creation and management of configuration files for COACH-II (capacity, set-point, alarms, SWP),
- Analysis of the recordings performed by COACH-II,
- Generation of charts and tables.



**Usage spectrum**



**Movement repartition**



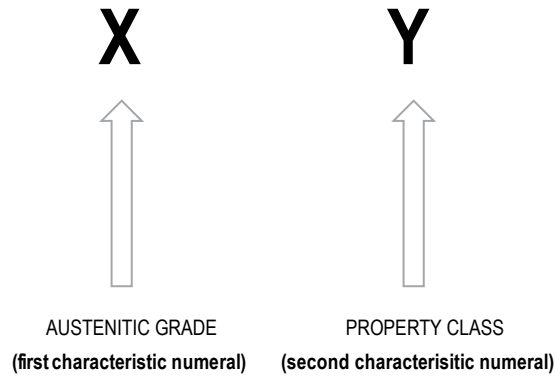
STAINLESS STEEL SCREWS > MECHANICAL AND CHEMICAL PROPERTIES

Mechanical properties of corrosion-resistant stainless steel fasteners:

- bolts, screws and studs (NF EN ISO 3506-2)
- nuts (NF EN ISO 3506-1)

SENSY mainly uses A2 and A4 stainless steels.

Mechanical properties of stainless steel screws are described below:



X: AUSTENITIC GRADE

First characteristic numeral	AISI nb	Properties
A2	A2	Good corrosion resistance in the open air and in fresh water
		Mainly used in food industry, chemical applications
A4	A4	Greater corrosion resistance in marine and coastal environment and chlorine pools
		Alloy steel with higher molybdenum concentration
		High resistance to alkaline and acidic solutions

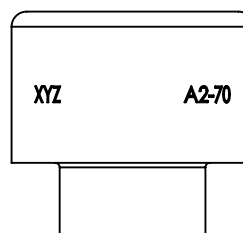
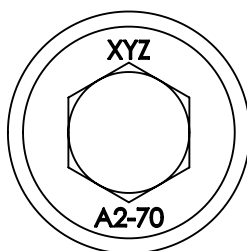
Y: PROPERTY CLASS<sup>(1)</sup>

Second characteristic numeral	Characteristics	Field of use
70	Cold-worked	SENSY standard
80	High tensile strength	SENSY option (mandatory for load cells used in EX d environment)

<sup>(1)</sup> : the class represents the minimum tensile strength of the bolt divided by ten; for example 70 is equal to 1/10 of the minimal tensile strength Rm = 700 MPa (N/mm<sup>2</sup>).

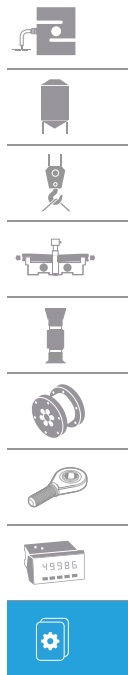
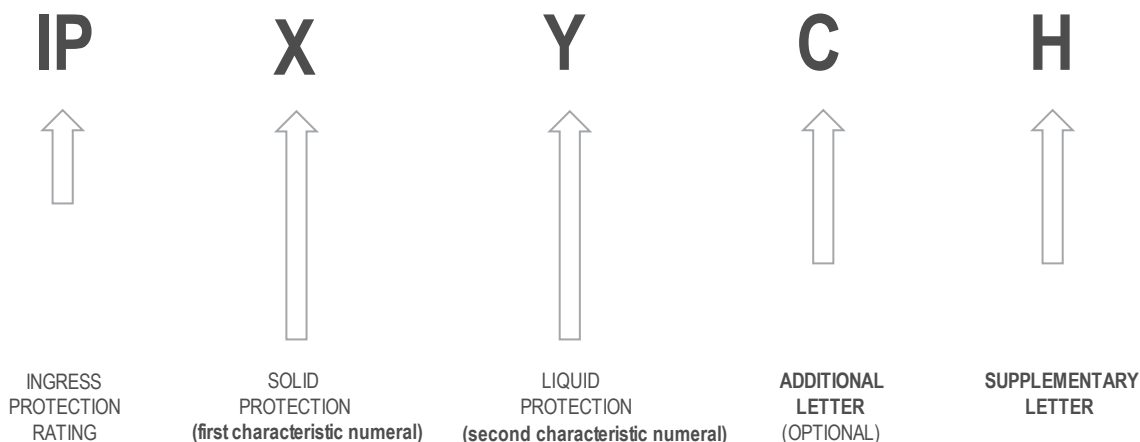
Screw marking:

Marking is mandatory for thread size ≥ 5mm



IP CODES > MEANING

International Protection Marking in accordance with DIN EN IEC 60529



First characteristic numeral	Description
0	Non-protected
1	Protected against solid foreign objects of 50 mm diameter or greater
2	Protected against solid foreign objects of 12.5 mm diameter or greater
3	Protected against solid foreign objects of 2.5 mm diameter or greater
4	Protected against solid foreign objects of 1 mm diameter or greater
5	Dust-protected
6	Dust-tight

Additional letter	Description
A	Protected against access with the back of the hand
B	Protected against access with a finger
C	Protected against access with a tool
D	Protected against access with a wire

Second characteristic numeral	Description
0	Non-protected
1	Protected against vertically falling water drops
2	Protected against vertically falling water drops when enclosure tilted up to 15°
3	Protected against spraying water
4	Protected against splashing water
5	Protected against water jets
6	Protected against powerful water jets
6K <sup>(1)</sup>	Protected against powerful water jets with increased pressure
7	Protected against the effects of temporary immersion in water (≤1m)
8	Protected against the effects of continuous immersion in water (>1m)
9K <sup>(1)</sup>	Protected against the effects of powerful water jets at high temperature

Supplementary letter	Description
H	High-voltage equipment
M	Device moving during water test
S	Device standing still during water test
W	Weather conditions

<sup>(1)</sup> : All tests with letter K are defined by ISO 20653 (replacing DIN 40050-9)

# OUR MARKETS



## KNOW HOW AND FLEXIBILITY THE WAY TO EXCELLENCE



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