

CRANE OVERLOAD PROTECTION



LOAD CELL
MANUFACTURER



00000

CRANE BOY
124.99

SENSY

SENSY
124.99

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5300

STANDARD LOAD PINS

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

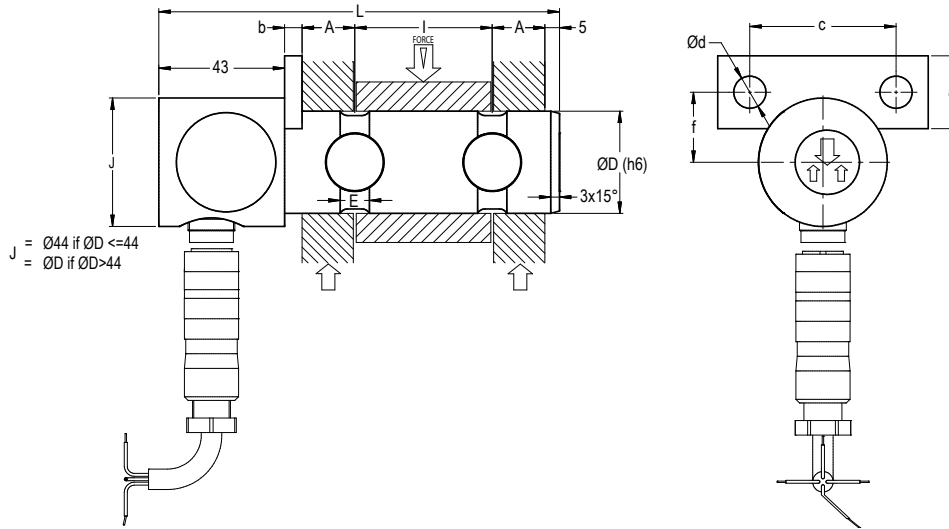


5300 (0.5 to 125 t)
STANDARD LOAD PIN



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

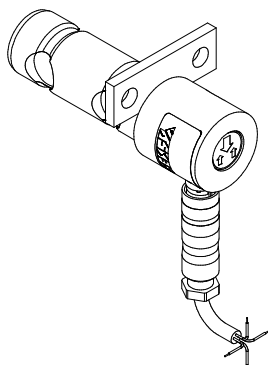
* Breaking load (% full scale)

→ Other capacities and dimensions available on request

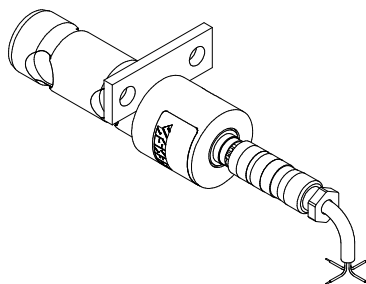
Dimensions in mm

Other views

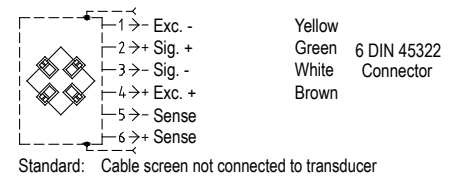
RADIAL OUTPUT (STANDARD)



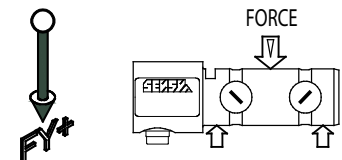
AXIAL OUTPUT (5300A-x) - OPTION



Wiring



Load direction



5000

CUSTOM-MADE LOAD PINS

Our model 5000 is designed to measure a force or constraint, without any change to the mechanical structure, simply by replacing the clevis pin with our custom-made load pin.



Features

- o Material: stainless steel
- o Protection class: IP65 (up to IP68: see options)
- o Sturdy design
- o Easy to install
- o Complete range of CE certified electronics, load limiters and displays available for hoisting applications and lifts
- o Cable length: 6 m (other lengths available on request)

Most popular options (see more in ANNEX)



Model 5000-XY-188 kN



Application(s) SENSY's load cells 5000 are perfectly designed for the following applications:

- SL - FORCE: - Force measurement on cylinders, industrial weighing / Winches monitoring, agriculture machinery, general machinery, test benches.
- SL - HOIST: Hoisting devices and crane's security in combination with a load limitation electronic,
- SL - LIFT: - Load limitation for elevators and cable cars / Rigging of theater equipment.

Capacities

from 0.5 to 2000 t

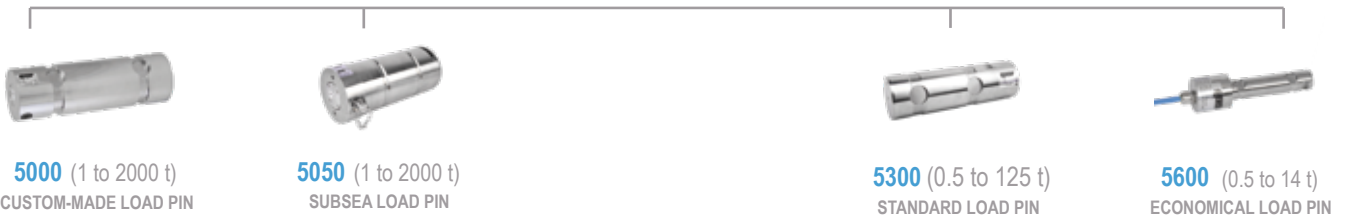
Specifications	SL - FORCE	SL - HOIST	SL - LIFT	
Combined error (non-linearity + hysteresis)	0.25 - 1**	0.5 - 2**	0.5 - 2**	% F.S.*
Repeatability error	<± 0.25	<± 0.25	<± 0.25	% F.S.*
Creep error over 30 min.	<± 0.3	<± 0.3	<± 0.2	% F.S.*
Zero shift after loading	<± 0.5	<± 0.5	<± 0.5	% F.S.*
Reference 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. Specifications subject to change without notice..

5000 > TECHNICAL SPECIFICATIONS

Load pins range



TOOLS

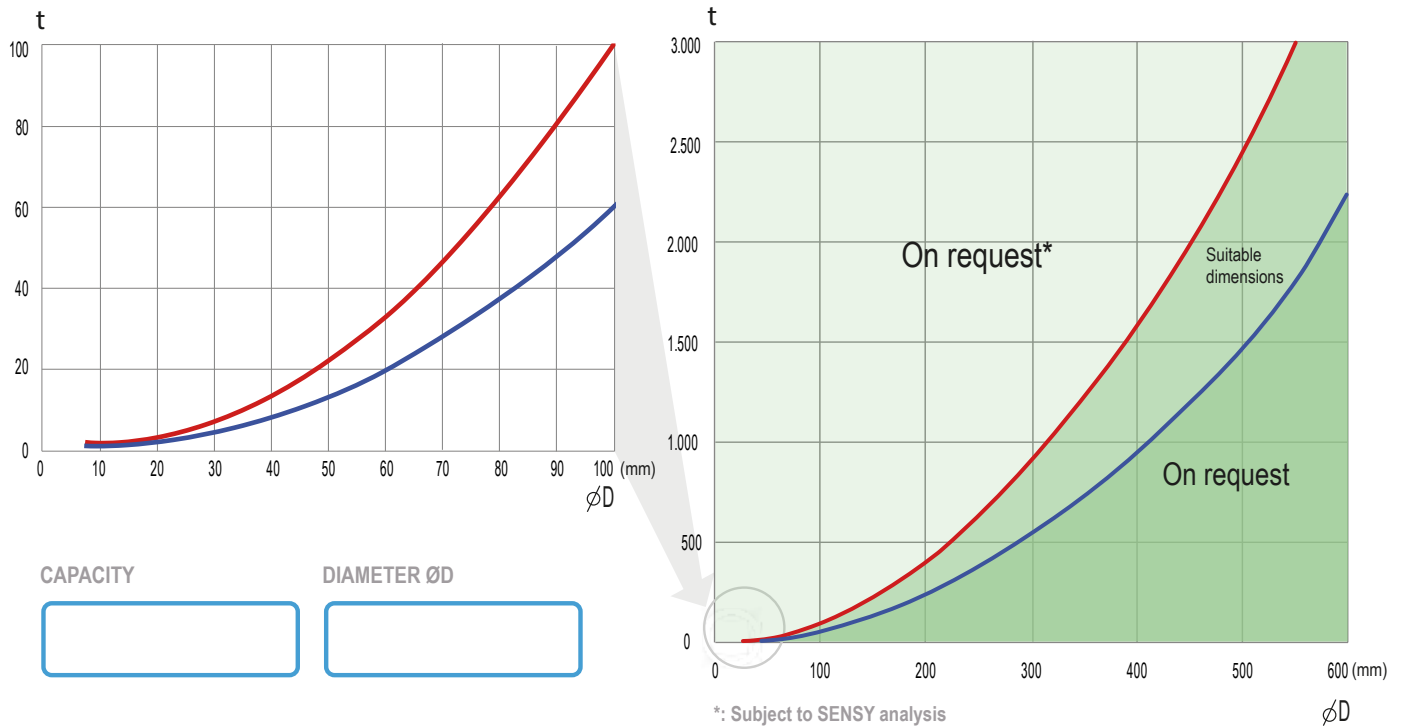
CONFIGURATOR

<https://www.sensy.com/en/load-pins-configurator/load-pin>

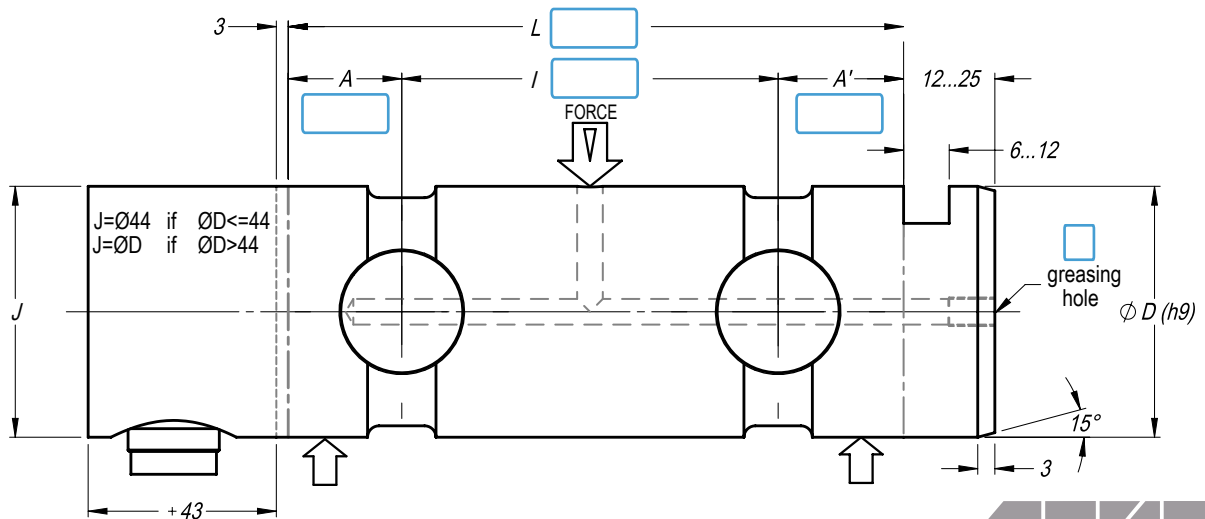
LOAD PIN DESIGN

<https://www.sensy.com/en/load-pins-configurator/load-pin-design>

Load-diameter relationship



Mechanical dimensions



5000 > **OPTIONS**

Configuration

Example: **CB HN**

C: Connector
B: Cable entry: 180°
H: Fixing plate: 0°
N: Position code

Example: **PB HC**

P: Cable gland
B: Cable entry: 180°
H: Fixing plate: 0°
C: Position code

Example: **PA DN**

P: Cable gland
A: Cable entry: axial
D: Fixing plate: 90°
N: Position code

Cable entry | Connector | Cable gland

Fixing plate nr.

if $\varnothing D \leq 100$ | 1 | 2 | 4

if $\varnothing D > 100$ | 2 | 4

Options

Type of application	FORCE (BL* > 300 %)	static dynamic		HOISTING (BL* > 500 %)	LIFT (BL* > 1000 %)	
Environment	IP65	IP66	IP67	IP67 MARINE	IP68	
	NORMAL	INDUSTRIAL	NUCLEAR	AERONAUTICS	Other:	
	SUBSEA		Immersion depth:		Immersion time:	
Output signal	mV/V	4-20 mA 2 wires 3 wires	0-10 V (force)	1-5 V (hoisting)	RS-485	WIRELESS Other:
Service temperature range	<p>Standard temperature range</p> <p>-20°C ←————→ 70°C</p> <p>←————→ Temperature range available (option)</p>					
Dual bridge circuit	NO		YES			
			Redundancy Safety SIL / PL Biaxial load pin, directions X and Y			
Cable length (m)	6	12	20	50	100	Other:
Intrinsically safe	Not applicable	ATEX	IECEX/ ATEX	CSA US/Canada	Triple certification	

* BL = Breaking load

Wiring

Std. cable (mV/V)

4-20 mA (3 wires) | 4-20 mA (2 wires)

Common (YELLOW) | Exc.+ (BROWN) | Sig.+ (GREEN) | Or | Exc.- (YELLOW) | Exc.+ (BROWN) | Exc.- (WHITE)

Load direction

5000 > EXAMPLES

5000-HOIS003158-12 t - SIL3



5000-FORC000678-12 t



5000-HOIS003629-60 t



5000-HOIS003043-15 klb
3053-3.5 klb



5000-FORC000474-778 t



5000-HOIS003025-16 t



5000-FORC003812-8 t



5000-FORC000025-150 kg



5000-FORC000492-226 t



5000-HOIS001860-105 t



5050

SUBSEA / SUBMERGED LOAD PINS

Design for underwater applications.



Features

- o Custom-made dimensioning
- o Sturdy design
- o Material: stainless steel
- o Protection class: IP68
- o Easy to install
- o Depth: up to -7500 m / -24 606 ft (750 bars / 11 000 psi) - deeper on request
- o Cable length: 6 m (other lengths available on request)

Most popular options (see more in ANNEX)



Ex d

Ex i



Model 5050



Application(s) SENSY's load cells 5050 are perfectly designed for the following applications:

- Shipbuilding / Monitoring system / Tank test / Oil exploration,
- Working at sea / Seabed mooring / ROV subsea tethers,
- Force testing / weighing inside pressure vessels.

Capacities

from 0.5 to 2000 t

Specifications	SL - FORCE	SL - HOIST	
Combined error (non-linearity + hysteresis)	0.25 - 1**	0.5 - 2**	% F.S.*
Repeatability error	<± 0.25	<± 0.25	% F.S.*
Creep error over 30 min.	<± 0.3	<± 0.3	% F.S.*
Zero shift after loading	<± 0.5	<± 0.5	% 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	<± 0.2	<± 0.2	% F.S./10°C
Temperature coefficient of zero signal	<± 0.2	<± 0.2	% F.S./10°C
Zero balance	± 0.02	± 0.02	mV/V
Nominal sensitivity	± 1.5	± 1	mV/V
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	150	200	% F.S.*
Breaking load	> 300	> 500	% F.S.*
Permissible dynamic loading	50	75	% F.S.*
Static lateral force limit	100	150	% F.S.*

* F.S. : Full Scale.

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

5050 > 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

TOOLS

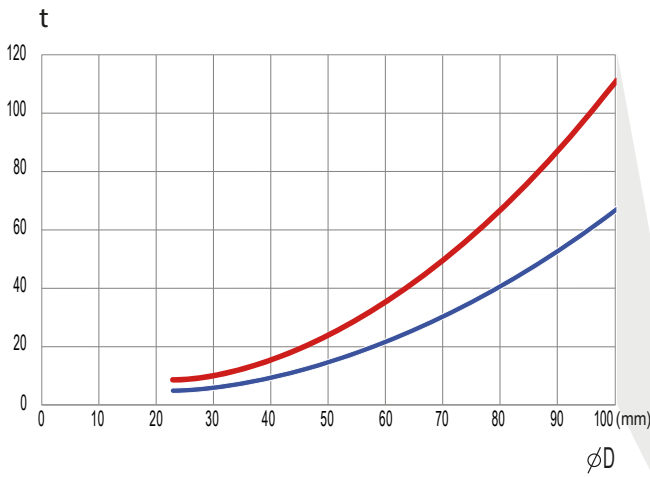
CONFIGURATOR

<https://www.sensy.com/en/load-pins-configurator/subsea-load-pin>

LOAD PIN DESIGN

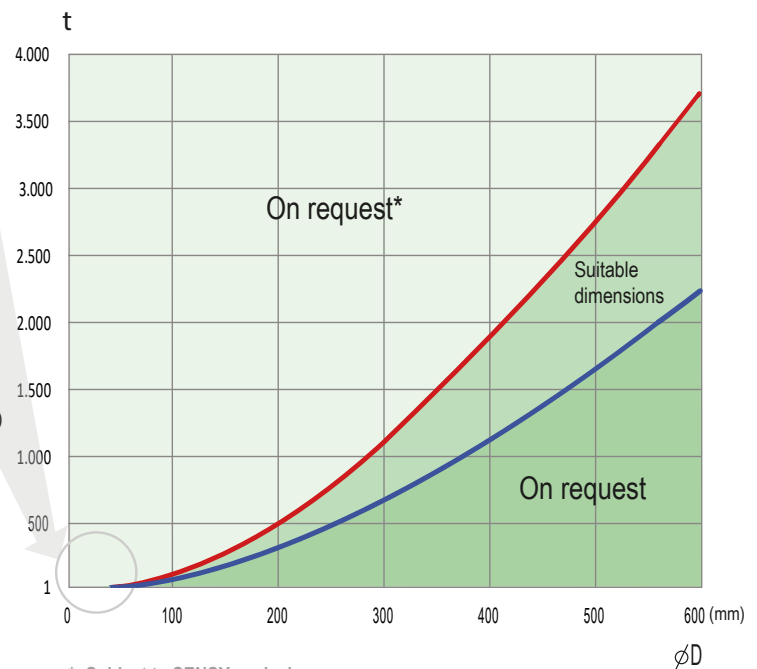
<https://www.sensy.com/en/load-pins-configurator/load-pin-design>

Load-diameter relationship



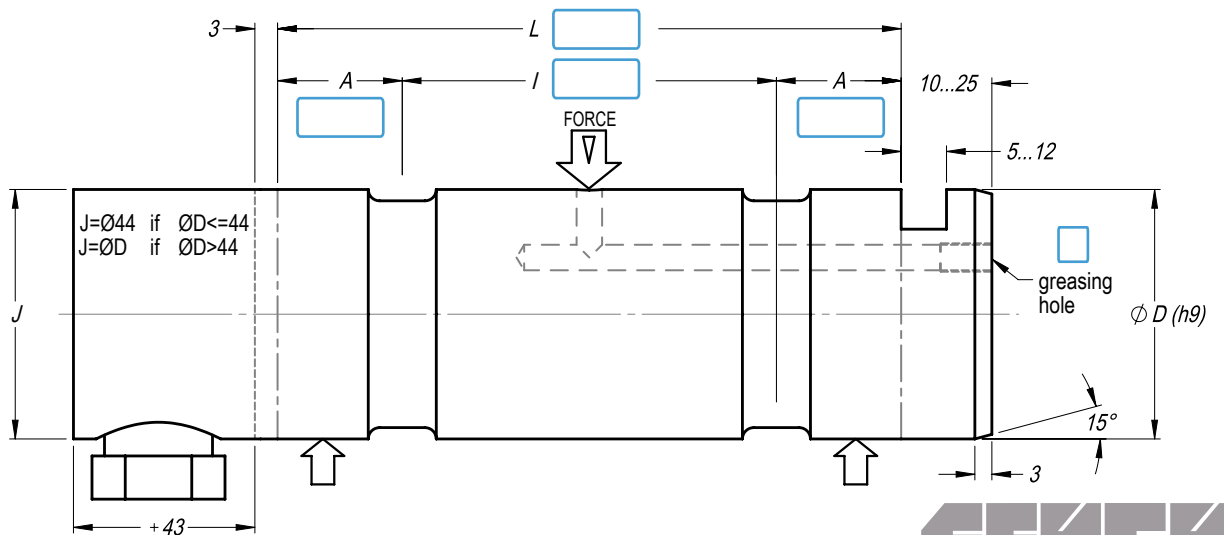
CAPACITY

DIAMETER ØD



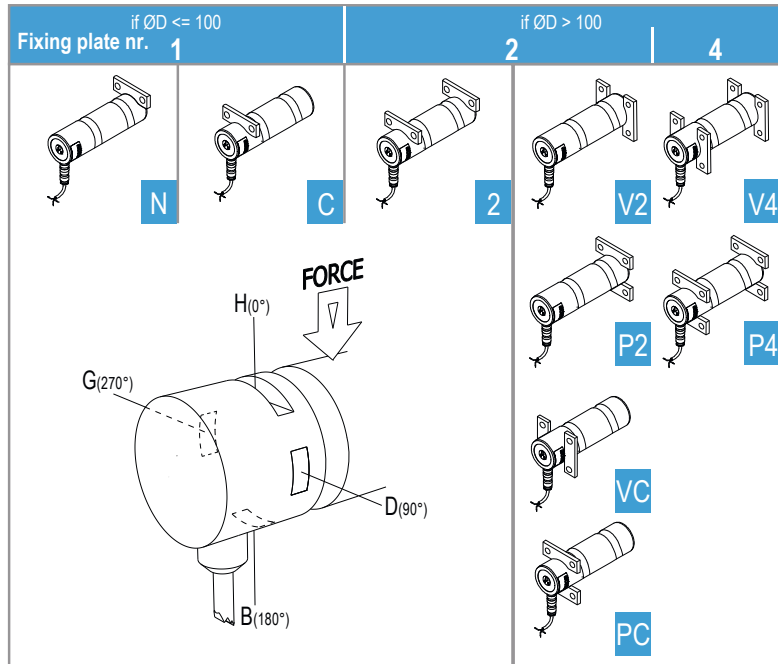
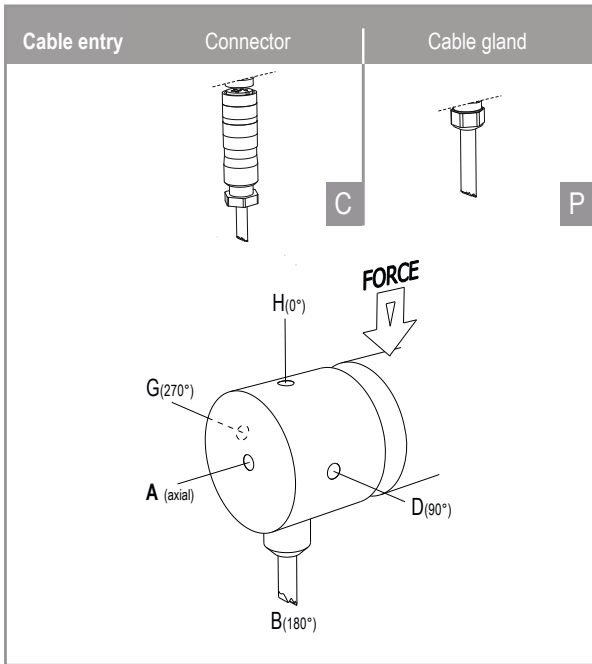
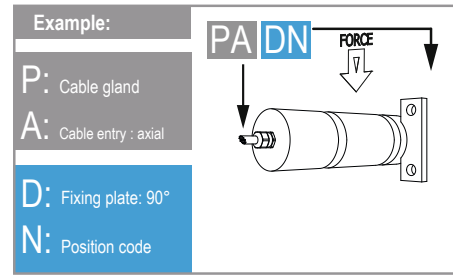
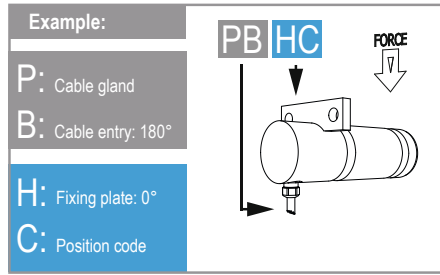
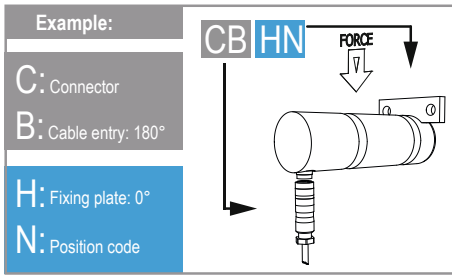
*: Subject to SENSY analysis

Mechanical dimensions



5050 > OPTIONS

Configuration

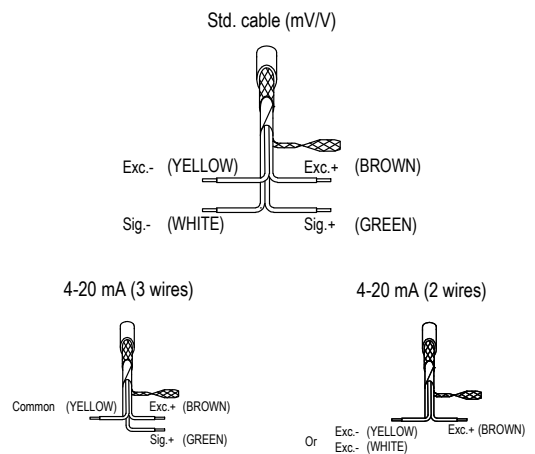


Options

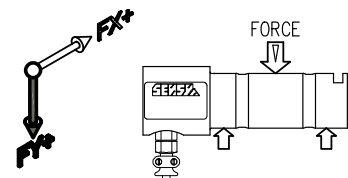
Type of application	FORCE (BL* > 300 %)		static dynamic		HOISTING (BL* > 500 %)		LIFT (BL* > 1000 %)	
Environment	NORMAL		INDUSTRIAL		NUCLEAR		AERONAUTICS	
	SUBSEA		Immersion depth:		Immersion time:		Other:.....	
Output signal	mV/V	4-20 mA 2 wires	0-10 V 3 wires (force)	1-5 V (hoisting)	RS-485	WIRELESS	Other:.....	
Service temperature range	<p>Standard temperature range</p> <p>-20°C ←————→ 70°C</p> <p>-50°C ←————→ +200°C</p> <p>Temperature range available (option)</p>							
Dual bridge circuit	NO		YES		Redundancy Safety SIL / PL Biaxial load pin, directions X and Y			
Cable length (m)	6	12	20	50	100	Other:.....		
Intrinsically safe	Not applicable		ATEX		IECEX/ ATEX		CSA (US/Canada)	
							Triple certification	

* BL = Breaking load

Wiring



Load direction



5050 > EXAMPLES

5050-CHHN-50 t



5050-CHxx-20 t



5050-SIL



5050-15 MN



5050-75 t



5050-CHHN-50 t



5050-30-kN



5050-75 t



5050-4.5 MN



5050-60 t



Custom-made load pins designed to be installed at the same place of a common axle without change to the existing mechanical environment. Economical version of model 5000.



Features

- o Complete range of CE certified electronics, load limiters and displays available for hoisting applications and lifts
- o Useful diameter smaller than or equal to 39 mm
- o With axial cable gland
- o Sturdy design
- o Material: stainless steel
- o Protection class: IP65
- o Cable length: 6 m (other lengths available on request).

Model 5600 - 0.5 t



Most popular options (see more in ANNEX)



Application(s) SENSY's load cells 5600 are perfectly designed for the following applications:

- SL-FORCE: Force measurement on cylinders / industrial weighing.
- SL-HOIST: Hoisting devices and crane security in combination with load limitation electronics.

Capacities

5600: 0.5 to 14 t

Specifications	SL - FORCE	SL - HOIST	
Combined error (non-linearity + hysteresis)	0.25 - 1**	0.5 - 2**	% F.S.*
Repeatability error	<± 0.25	<± 0.25	% F.S.*
Creep error over 30 min.	<± 0.3	<± 0.3	% F.S.*
Reference temperature	23	23	°C
Compensated temperature range	-10...+45	-10...+45	°C
Service temperature range	-30...+70	-30...+70	°C
Storage temperature range	-50...+85	-50...+85	°C
Temperature coefficient of the sensitivity	<± 0.2	<± 0.2	% F.S.*10°C
Temperature coefficient of zero signal	<± 0.2	<± 0.2	% F.S.*10°C
Zero balance	± 0.02	± 0.02	mV/V
Nominal sensitivity	± 1.5	± 1	mV/V
Sensitivity tolerance	< ± 0.5	< ± 0.5	%
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	150	200	% F.S.*
Breaking load	> 300	> 500	% F.S.*
Permissible dynamic loading	50	75	% F.S.*
Static lateral force limit	100	150	% F.S.*

* F.S.: Full Scale.

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

5600 > 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

TOOLS

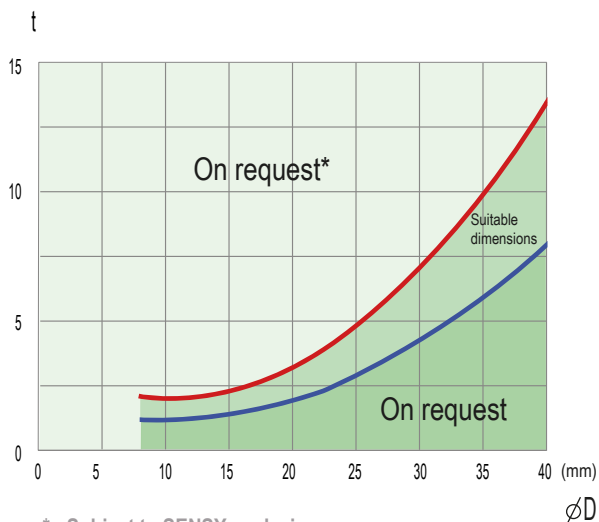
CONFIGURATOR

<https://www.sensy.com/en/load-pins-configurator/load-pin>

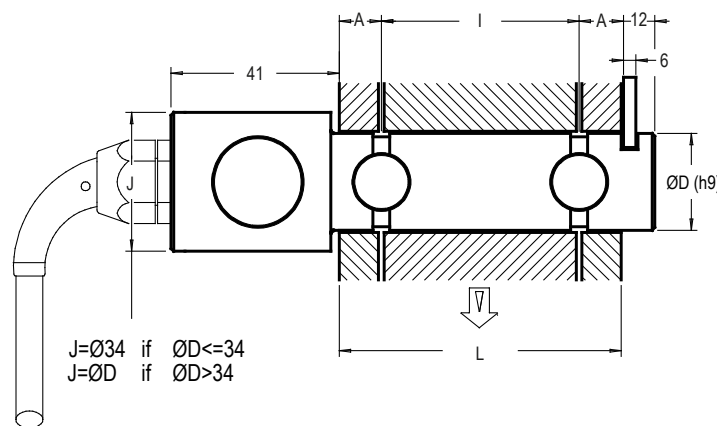
LOAD PIN DESIGN

<https://www.sensy.com/en/load-pins-configurator/load-pin-design>

Load-diameter relationship



* : Subject to SENSY analysis



$J = \varnothing 34$ if $\varnothing D \leq 34$
 $J = \varnothing D$ if $\varnothing D > 34$

CAPACITY

DIAMETER $\varnothing D$:

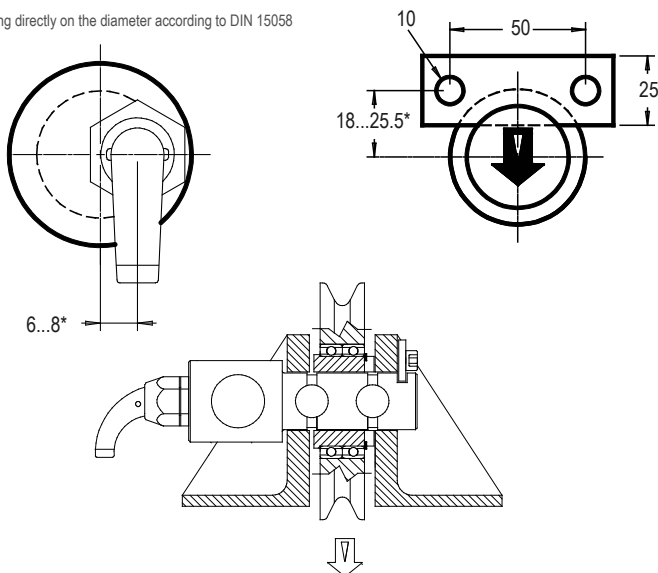
A:

I:

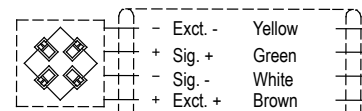
L:

Mechanical dimensions

*: Depending directly on the diameter according to DIN 15058

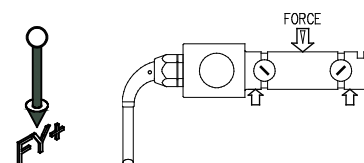


Wiring



Standard: Cable screen not connected to transducer

Load direction



5200-5205

TENSION LINK LOAD CELLS

Tension link load cells specially adapted for standard shackles.



Model 5205 - 25 kN



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

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.*

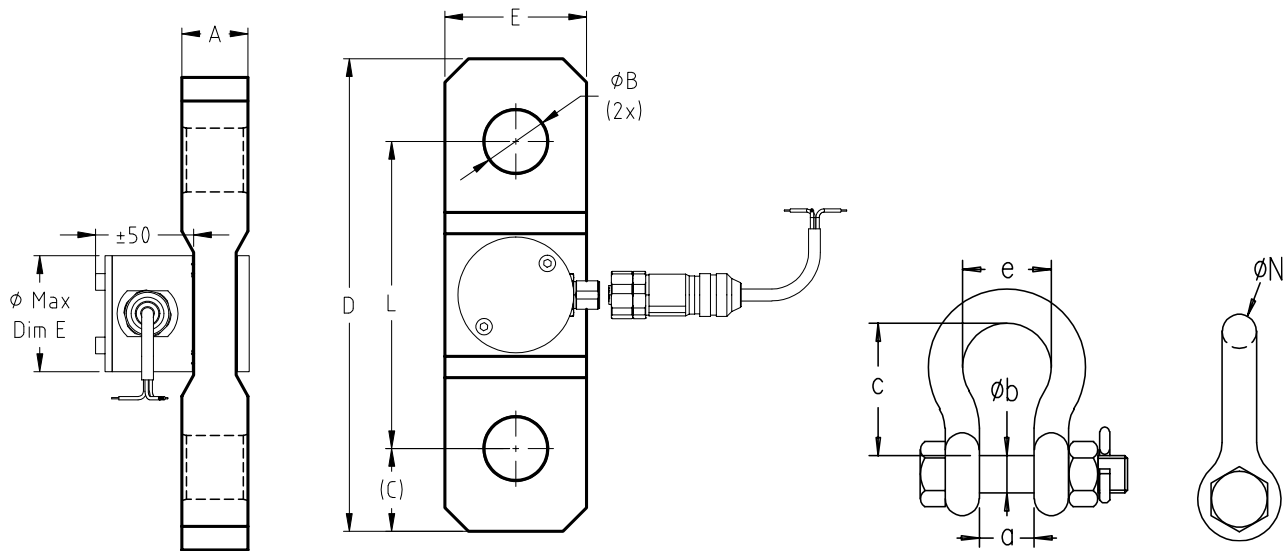
* F.S. : Full Scale.

Specifications subject to change without notice..



ISO 9001 certified

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							

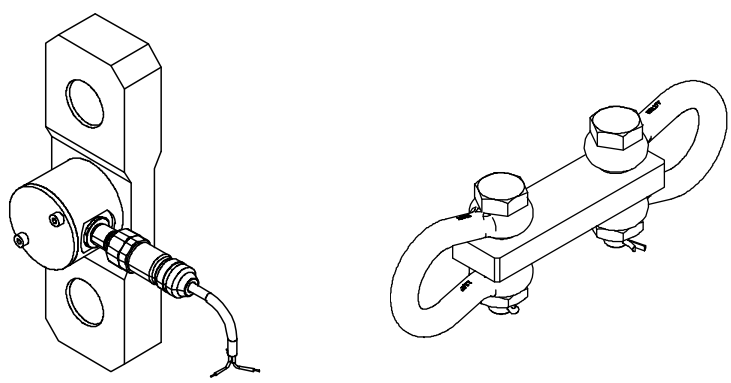
*x=Material: 5200 - stainless steel; 5205 - nickel-plated steel
 **Breaking load (% full scale)

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

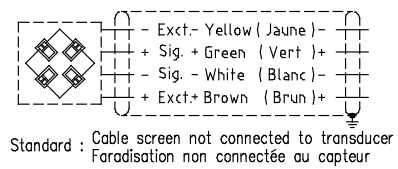
→ Other capacities and dimensions available on request

Other views

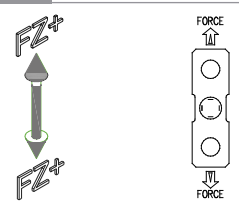


Dimensions in mm

Wiring



Load direction



5100L-5105L

TENSION LOAD CELLS

Robust and easy to install tension load cells.



Features

- o Wide range of capacities: 2 t up to 100 t
- o Compact design
- o Protection class: IP66
- o Material: stainless steel (5100L), nickel-plated steel (5105L)
- o Cable length: see drawing table - CL (other lengths available on request)

Most popular options (see more in ANNEX)



Ex i



IP68

Model : 5100L-50 t



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

- Towing force measurement (marine),
- Force measurement on rigging,
- Hanging load weighing,
- Tensile test benches.

Capacities

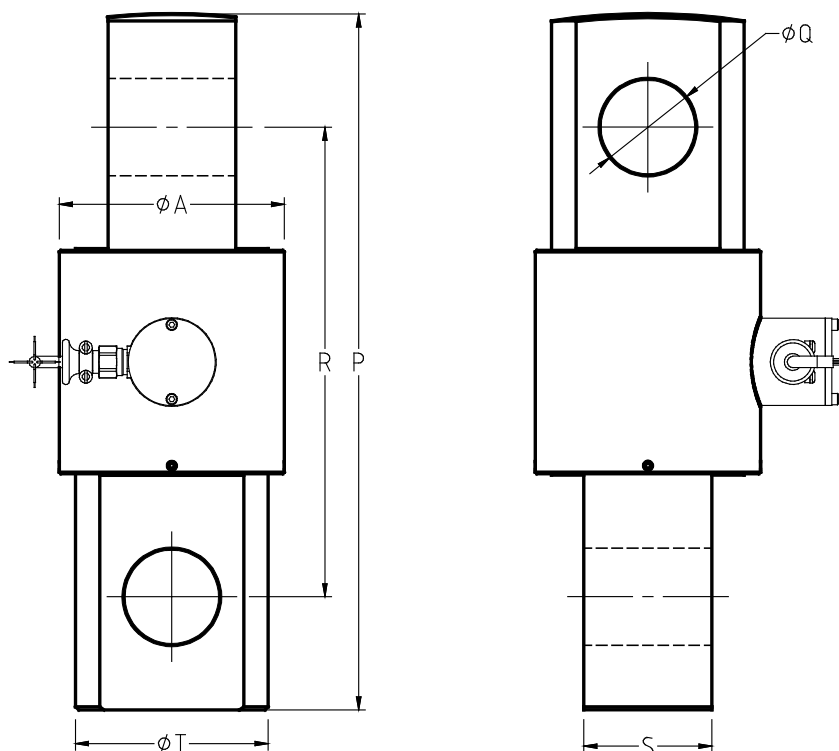
5100L - 5105L: 1 - 2 - 3 - 5 - 7.5 - 10 - 15 - 20 - 30 - 50 - 75 - 100 t

Specifications	SL - HOIST	0.25 %	
Combined error (non-linearity + hysteresis)	0.5 - 2**	<± 0.25	% F.S.*
Repeatability error	<± 0.25	<± 0.1	% F.S.*
Creep error over 30 min.	<± 0.3	<± 0.1	% F.S.*
Zero shift after loading	<± 0.5	<± 0.025	% 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	<± 0.2	<± 0.05	% F.S./10°C
Temperature coefficient of zero signal	<± 0.2	<± 0.035	% F.S./10°C
Zero balance	± 0.02	± 0.02	mV/V
Nominal sensitivity	± 1	1.5	mV/V
Sensitivity tolerance	< ± 0.5	<± 0.3	%
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	200	150	% F.S.*
Breaking load	> 500	> 300	% F.S.*
Permissible dynamic loading	75	40	% F.S.*
Static lateral force limit	10	10	% F.S.*

* F.S. : Full Scale.

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

5100L-5105L > STANDARD DIMENSIONS



Ref. Item*	Capacities		ØA	P	ØQ	R	S	ØT	CL (m)	Weight (kg)
	Hoist > 500 %**	Force > 300 %**								
510xL-A	1 - 2 t	2 - 3 t	50	144	18	108	20	35	3	±1.5
510xL-B	3 t	5 t	60	160	24	112	30	45	3	±2
510xL-C	4 - 7.5 t	7.5 - 10 t	80	240	35	170	44	64	3	±5.5
510xL-D	10 - 15 t	15 - 20 t	100	310	42	226	52	86	6	±12.8
510xL-E	20 - 30 t	30 - 50 t	139	430	58	290	78	109	6	±25
510xL-F	40 - 75 t	75 - 100 t	180	520	80	348	100	149	12	±65

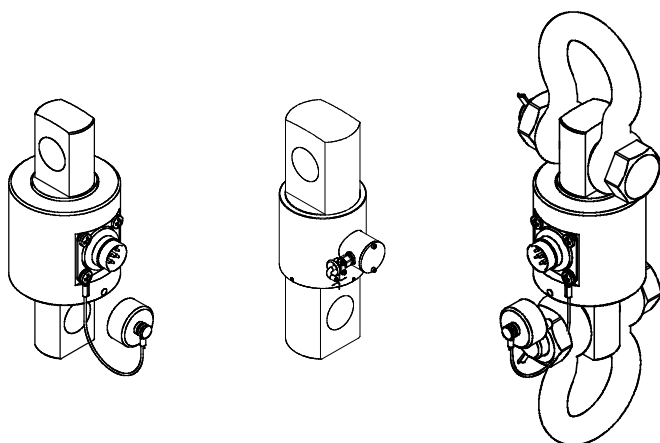
*x=Material: 5100L - stainless steel; 5105L - nickel-plated steel

** Breaking load (% full scale)

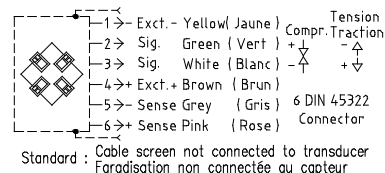
→ Other capacities and dimensions available on request

Dimensions in mm

Other views

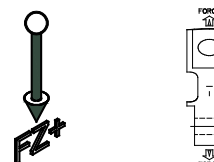


Wiring



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

Load direction



5200L-5205L

TENSION LINK LOAD CELLS

Tension link load cells specially designed for load limitation on hoisting devices.



Model 5205L - 10 t



Features

- o Sturdy design
- o Breaking load > 500 %
- o CE certified for hoisting devices
- o Protection class: IP66
- o Material: stainless steel (5200L), nickel-plated steel (5205L)
- o Easy to install (standard shackles)
- o Cable length: 0.5...5 t: 3 m (other lengths available on request)
10 t: 6 m (other lengths available on request)
- o Complete range of CE certified electronics and load limiters available

Most popular options (see more in ANNEX)



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

- Hoisting devices and crane security in combination with load limitation electronics (e.g.: BRIDGE-BOY, CRANE-BOY, ...),
- Tensile monitoring on winches,
- Load limitation for lifts.

Capacities

5200L: (0.5) - (0.75) - (1.5) - (3) - (5) - (10) - (15) t

5205L: 0.5 - 0.75 - 1.5 - 3 - 5 - 10 - 15 t

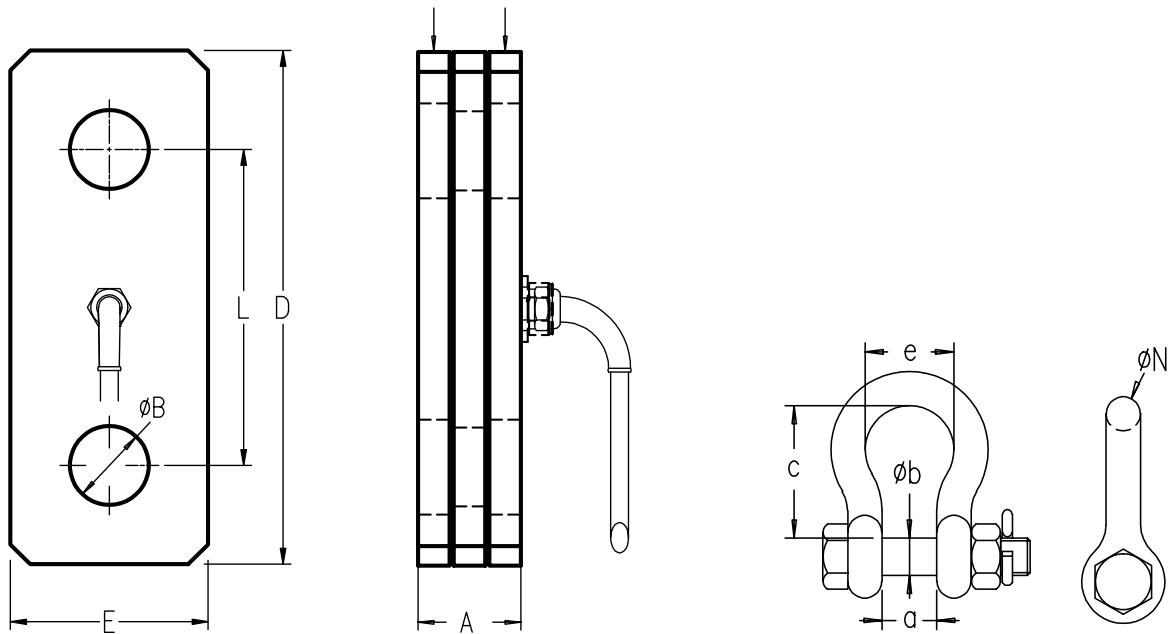
Specifications	SL - HOIST	SL - LIFT	
Combined error (non-linearity + hysteresis)	< ± 1	< ± 1	% F.S.*
Creep error over 30 min.	<± 0.3	<± 0.2	% F.S.*
Zero shift after loading	<± 0.5	<± 0.5	% F.S.*
Reference temperature	23	23	°C
Compensated temperature range	-10...+45	-10...+45	°C
Service temperature range	-25...+70	-25...+70	°C
Storage temperature range	-50...+85	-50...+85	°C
Temperature coefficient of the sensitivity	<± 0.2	<± 0.2	% F.S./10°C
Temperature coefficient of zero signal	<± 0.2	<± 0.2	% F.S./10°C
Zero balance	± 0.02	± 0.02	mV/V
Nominal sensitivity	± 1	± 0.5	mV/V
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	200	300	% F.S.*
Breaking load	> 500	> 1000	% F.S.*
Permissible dynamic loading	75	100	% F.S.*

* F.S. : Full Scale.

Specifications subject to change without notice..

5200L-5205L > STANDARD DIMENSIONS

Dual safety plates



LOAD CELLS									
Ref. Item*	Capacities		Range (t)	A±1	ØB	L	D	E	Weight (kg)
	Hoist > 500 %**	Lift > 1000 %**							
520xL-A	0.5 t	0.25 t	0.325 - 0.65	13	11.5	65	94	40	0.3
520xL-A	0.75 t	0.4 t	0.5 - 0.95	13	11.5	65	94	40	0.3
520xL-B	1.5 t	0.75 t	1 - 1.9	20	16.5	65	105	40	0.5
520xL-C	3 t	1.5 t	2 - 3.75	25	19.5	90	135	50	1.1
520xL-D	5 t	2.5 t	3.3 - 6.35	35	26	110	175	60	2.5
520xL-E	10 t	5 t	6.6 - 12	47	36	185	275	80	7.2
520xL-F	15 t	7.5 t	10 - 19	47	42	195	300	100	9.9

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

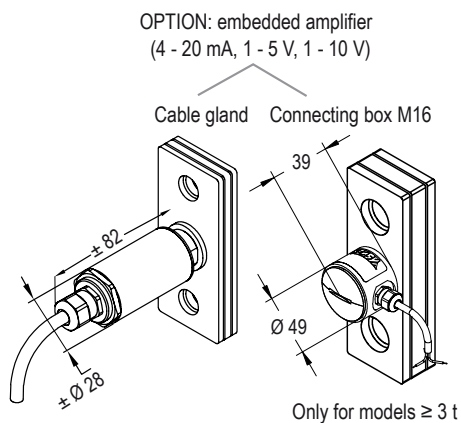
ASSOCIATED SHACKLES					
S.W.L.***	a	Øb	c	e	ØN
1 t	16.8	11.2	36.5	26.1	9.65
2 t	20.6	16	47.7	33.3	12.7
3.25 t	26.9	19.1	60.5	42.9	17.5
6.5 t	36.6	25.4	84	58	24.6
12 t	51.5	35.1	119	82.5	33.1
17 t	60.5	41.4	146	98.5	41.2

***SWL: Safe Working Load

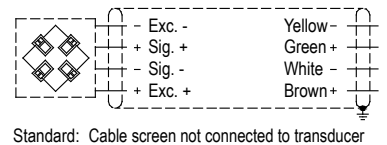
Other capacities and dimensions available on request

Dimensions in mm

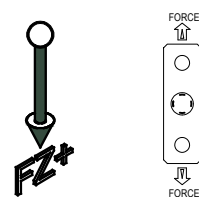
Other view



Wiring



Load direction



5000B

LOAD MEASURING WEDGE SOCKETS

Load measuring wedge sockets designed to measure the force applied on a cable end.



Features

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

Most popular options (see more in ANNEX)



Model 5000B - 8 t



Application(s) SENSY's load pins 5000B are perfectly designed for the following applications:

SL - HOIST: Hoisting devices and crane's security in combination with load limitation electronics.

Capacities

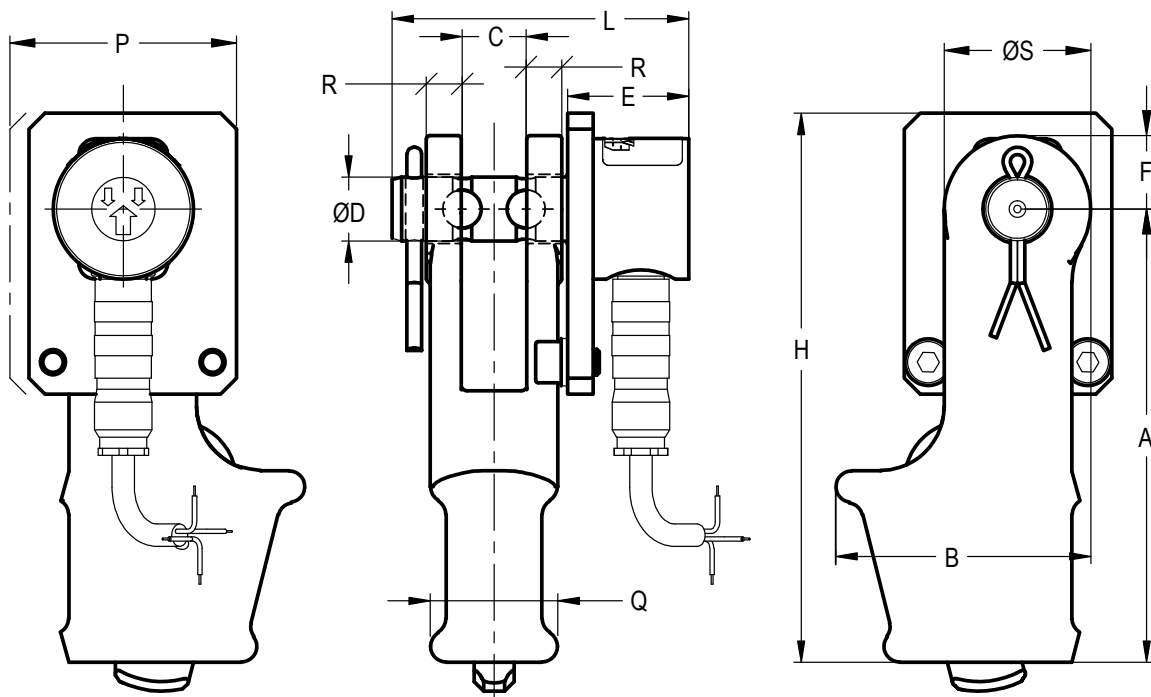
5000B: from 0.3 to 20 t (for cables of 9 to 39 mm in diameter)

Specifications	SL - HOIST	
Combined error (non-linearity + hysteresis)	0.5 - 2**	% F.S.*
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	-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	± 0.02	mV/V
Nominal sensitivity	± 1	mV/V
Input resistance	350 ± 2	ohm(s)
Output resistance	350 ± 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	200	% F.S.*
Breaking load	> 500	% F.S.*
Permissible dynamic loading	75	% F.S.*
Static lateral force limit	150	% F.S.*

* F.S. : Full Scale.

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

5000B > STANDARD DIMENSIONS

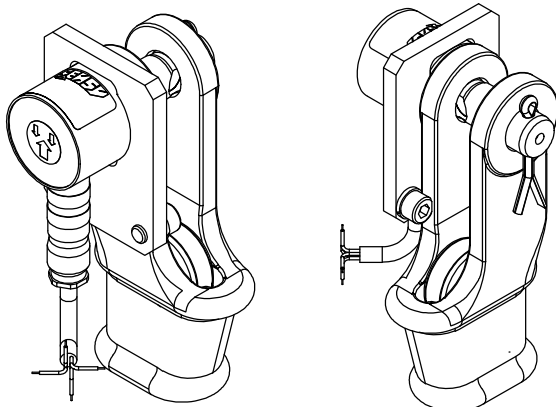


Ref. Item	Capacities	Size (Ø of cable)		A	B	C	ØD h9	E±	F	H	L±	P±	Q	R	ØS±	Weight (kg)
		(mm)	(inch)													
5000B-3/8"	0.3 - 2 t	9 - 10	3/8"	142±2.5	80±2.5	20.5±2	20	38	23±2	172±2.5	93	71	40±2	11±2	48	±1.8
5000B-1/2"	0.5 - 3 t	11 - 13	1/2"	146±2.5	109±2.5	25±2	25	53	29±2	175±3	114	80	46±2	12±2	59	±3.4
5000B-5/8"	0.75 - 5 t	14 - 16	5/8"	176±3	127±2.5	31±2	30	38	35±2	211±3	114	97	57±2	15±2	73	±6
5000B-3/4"	1 - 6 t	18 - 19	3/4"	212±3	154±2.5	38±2	35	60	40±2	252±3.5	142	120	67±2.5	16±2	83	±9.5
5000B-7/8"	1.5 - 8 t	20 - 22	7/8"	240±3	175±3	44±2	41	52	48±2	288±3.5	149	130	77±2.5	19±2	98	±13
5000B-1"	4 - 12.5 t	24 - 26	1"	274±3.5	198±3	51±2	50	52	55±2	329±3.5	165	145	89±2.5	22±2	113	±17
5000B-1" 1/8	5 - 16 t	27 - 29	1" 1/8	310±3.5	215±3	57±2	57	52	65±2.5	375±3.5	182	150	100±2.5	25±2	133	±23
5000B-1" 1/4	8 - 20 t	30 - 32	1" 1/4	350±3.5	246±3	63±2	64	52	73±2.5	423±4	191	190	111±2.5	28±2	149	±32
5000B-1" 3/8	8 - 20 t	34 - 36	1" 3/8	400±3.5	264±3.5	69±2.5	64	52	74±2.5	474±4	196	190	117±2.5	28±2	151	±37
5000B-1" 1/2	10 - 20 t	35 - 39	1" 1/2	450±4	280±3.5	76±2.5	70	52	77±2.5	527±4	208	190	128±2.5	30±2	156	±52

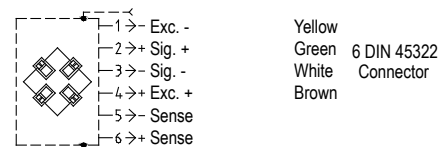
Other capacities and dimensions available on request

Dimensions in mm

Other views

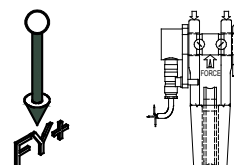


Wiring



Standard: Cable screen not connected to transducer

Load direction



5000M

LOAD SHACKLES

Load measuring shackles designed to measure tension force.



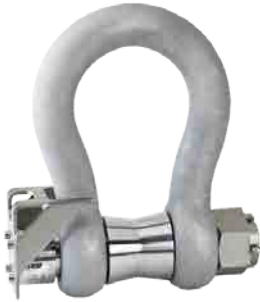
Features

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

Most popular options (see more in ANNEX)



Model 5000M - 30 t



Application(s) SENSY's load shackles 5000M are perfectly designed for the following applications:

- Hoisting devices and crane security in combination with load limitation electronics,
- Industrial weighing,
- Force measurement on test benches,
- Force measurement on rigging,
- Theater rigging equipment.

Capacities

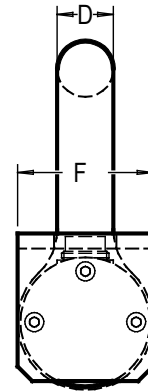
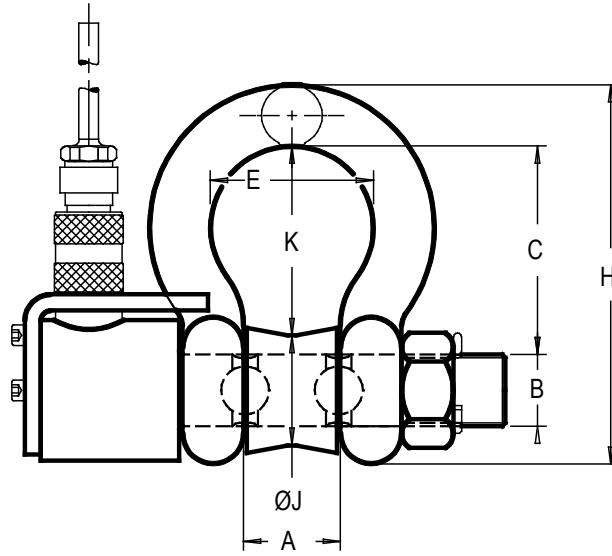
from 1.5 t to 400 t

Specifications	SL - FORCE	SL - HOIST	
Combined error (non-linearity + hysteresis)	0.25 - 1**	0.5 - 2**	% F.S.*
Repeatability error	<± 0.25	<± 0.25	% F.S.*
Creep error over 30 min.	<± 0.3	<± 0.3	% F.S.*
Zero shift after loading	<± 0.5	<± 0.5	% 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	<± 0.2	<± 0.2	% F.S./10°C
Temperature coefficient of zero signal	<± 0.2	<± 0.2	% F.S./10°C
Zero balance	± 0.02	± 0.02	mV/V
Nominal sensitivity	± 1.5	± 1	mV/V
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	150	200	% F.S.*
Breaking load	> 300	> 500	% F.S.*
Permissible dynamic loading	50	75	% F.S.*
Static lateral force limit	100	150	% F.S.*

* F.S. : Full Scale.

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

5000M > STANDARD DIMENSIONS



Ref. Item	Capacities			D		A	B	C	E	F	H	ØJ	K	Tolerances C & K	Total weight (kg)
	Force		Hoist	(mm)	(inch)										
	Standard > 300 %**	Extended capacity* > 300 %**	> 500 %**												
5000M-3/4"	2.5 t	3 t	1.5 t	19	3/4"	31.8±1.5	22.5	71.5	51	93±3	126±8.6	34	65	±6.4	2.18
5000M-7/8"	4 t	6 t	2.5 t	22	7/8"	36±2.2	25	83	58	93±3	143.5±8.6	35.5	78	±6.4	2.7
5000M-1"	6 t	8 t	4 t	25	1"	43±2.4	28	95	68	93±3	163.5±8.6	37	90.5	±6.4	3.832
5000M-1" 1/8	8 t	10 t	5 t	28	1" 1/8	47±2.4	32	108	75	93±3	185±8.9	40	104	±6.4	4.58
5000M-1" 1/2	12 t	15 t	8 t	38	1" 1/2	60±4	42	146	99	93±3	249±9.9	54	140	±6.4	9.473
5000M-1" 3/4	16 t	25 t	12 t	45	1" 3/4	74±4	50	178	126	103	299.5±11.2	65	171	±6.4	15.89
5000M-2"	30 t	40 t	20 t	50	2"	83±4.2	57	197	138	111	331±17.5	72	189.5	±12.7	21.62
5000M-2" 1/2	40 t	50 t	30 t	65	2" 1/2	105±4.7	70	260	180	145	432.5±18.7	90	250	±12.7	48.7
5000M-3"	60 t	75 t	45 t	75	3"	127±5	83	329	190	162	526.5±26	105	318	±19	68.3
5000M-3" 3/4	90 t	125 t	60 t	95	3" 3/4	147±5	95	400	238	208	647±25	117	389	±19	124.1
5000M-4" 1/8	100 t	150 t	75 t	105	4" 1/8	169±5	108	410	275	238	688±18	130	399	±12	168.2
5000M-5" 1/8	200 t	300 t	120 t	130	5" 1/8	205±6	140	554	305	299	904±22	165	541.5	±14	290.4
5000M-6" 11/16	300 t	400 t	200 t	170	6" 11/16	231±6	175	668	325	387	1114±27	200	655	±18	585

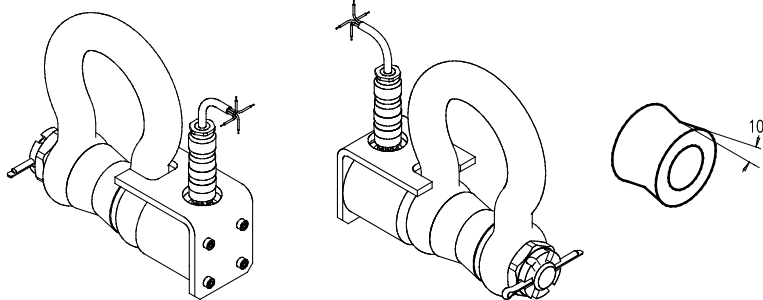
* Very high resistance load cell, special design

** Breaking load (% full scale)

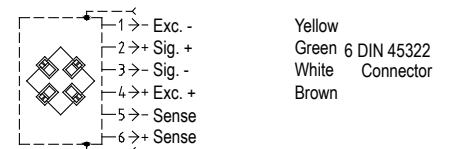
→ Other capacities and dimensions available on request

Dimensions in mm

Other views

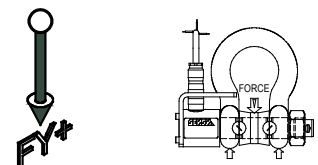


Wiring



Standard: Cable screen not connected to transducer

Load direction



5050M

SUBSEA LOAD SHACKLES

Load measuring shackles designed to measure subsea tension forces.



Features

- o CE certified for hoisting applications
- o Protection class: IP68
- o Depth: up to -7500 m / -24 606 ft (750 bars / 11 000 psi) - deeper on request
- o Sturdy design
- o Material: stainless steel except shackle bow
- o Easy to install
- o Complete range of CE certified electronics, load limiters and display available
- o Cable length: 6 m (other lengths available on request)

Most popular options (see more in ANNEX)



Ex i

Ex d

IP68

Model 5050M - 30 t



Application(s) SENSY's dynamometric load shackles 5050M are perfectly designed for the following applications:

SL-FORCE: Force measurement on subsea lines / Subsea mooring.

SL-HOIST: Load monitoring on subsea hoisting devices.

Capacities

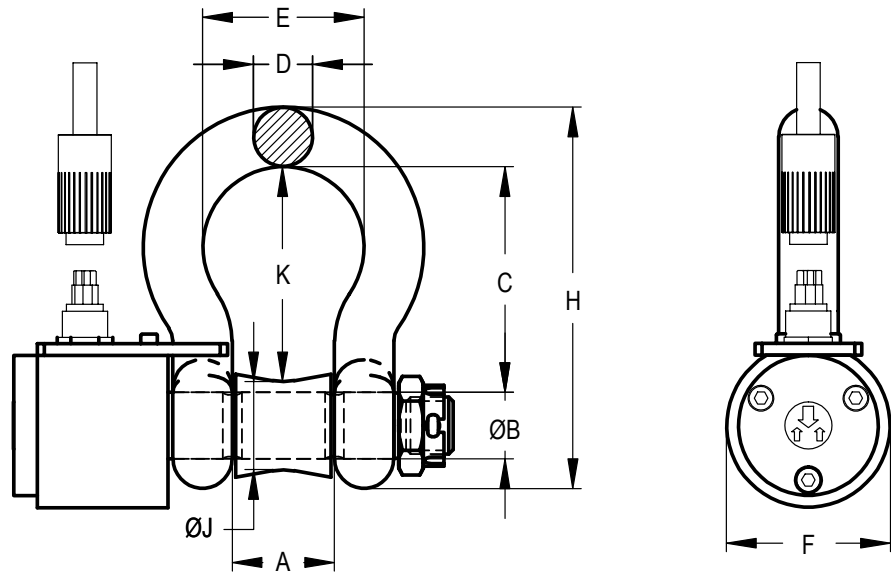
from 5 t to 400 t

Specifications	SL - FORCE	SL - HOIST	
Combined error (non-linearity + hysteresis)	0.25 - 1**	0.5 - 2**	% F.S.*
Repeatability error	<± 0.25	<± 0.25	% F.S.*
Creep error over 30 min.	<± 0.3	<± 0.3	% F.S.*
Zero shift after loading	<± 0.5	<± 0.5	% 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	<± 0.2	<± 0.2	% F.S./10°C
Temperature coefficient of zero signal	<± 0.2	<± 0.2	% F.S./10°C
Zero balance	± 0.02	± 0.02	mV/V
Nominal sensitivity	± 1.5	± 1	mV/V
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	150	200	% F.S.*
Breaking load	> 300	> 500	% F.S.*
Permissible dynamic loading	50	75	% F.S.*
Static lateral force limit	100	150	% F.S.*

* F.S. : Full Scale.

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

5050M > STANDARD DIMENSIONS



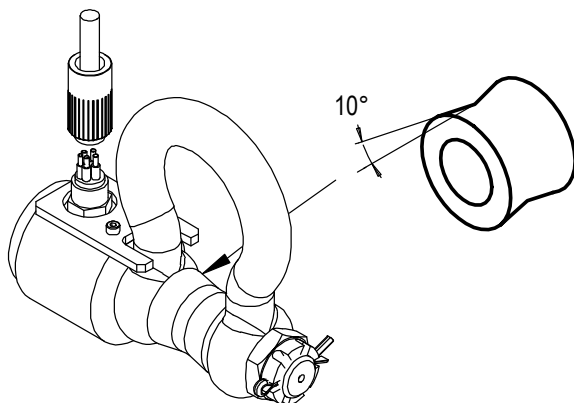
Ref. Item	Capacities			D		A	B	C	E	F±	H	ØJ	K	Tolerances C & K	Total weight (kg)
	Force		Hoist	(mm)	(inch)										
	Standard > 300 %**	Extended capacity* > 300 %**	> 500 %**												
5050M-1" 1/8	8 t	10 t	5 t	28	1 1/8"	47±2.4	32	108	75	68	185±8.9	40	104	±6.4	5
5050M-1" 1/2	12 t	15 t	8 t	38	1 1/2"	60±4	42	146	99	92	249±9.9	54	140	±6.4	12
5050M-1" 3/4	20 t	25 t	12 t	45	1 3/4"	74±4	50	178	126	106	299.5±11.2	65	171	±6.4	19
5050M-2"	33 t	40 t	20 t	50	2"	83±4.2	57	197	138	122	331±17.5	72	189	±12.7	28
5050M-2" 1/2	50 t	60 t	30 t	65	2 1/2"	105±4.7	70	260	180	145	432.5±18.7	90	250	±12.7	52
5050M-3"	75 t	85 t	45 t	75	3"	127±5	83	329	190	165	526.5±26	105	318	±19	90
5050M-3" 3/4	100 t	130 t	70 t	95	3 3/4"	147±5	95	400	238	208	647±25	117	389	±19	150
5050M-4" 1/8	110 t	150 t	85 t	105	4 1/8"	169±5	108	410	275	240	688±18	130	399	±12	190
5050M-5" 1/8	200 t	300 t	150 t	130	5 1/8"	205±6	140	554	305	308	904±22	165	541.5	±14	320
5050M-5" 1/2	250 t	300 t	150 t	140	5 1/2"	205±6	150	618	305	335	996±27	180	603	±18	350
5050M-6" 11/16	300 t	400 t	240 t	170	6 11/16"	231±6	175	668	325	387	1114±27	200	655	±18	585

* Very resistant load cell, special design
 ** Breaking load (% full scale)

→ Other capacities and dimensions available on request

Dimensions in mm

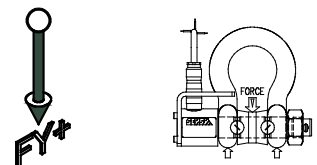
Other view



Wiring

SUBSEA CONNECTOR

Load direction



5000M-WI

WIRELESS LOAD SHACKLES

Wireless load-measuring shackles designed to measure tension force.



Model 5000M-WI - 20 t



Features

- o Sturdy design
- o Protection class: IP65
- o Easy to install
- o Load pin material: stainless steel
- o Standard dimensions
- o Frequencies: from 2.4000 to 2.4835 GHz
- o Power: 10 mW, licence: exempted
- o Range: 500 m open field (antenna integrated)
- o Sleep mode, remote wake-up mode, remote control of batteries
- o Not appropriate for overload protection

Most popular options (see more in ANNEX)



Ex i



Application(s) SENSY's wireless load shackles 5000M-WI are perfectly designed for the following applications:

- Load display on hoisting devices and EOT cranes,
- Industrial weighing / force measurement on test benches,
- Theater rigging equipment,
- Mooring - tow forces measurement / Winches monitoring, agriculture machinery, general machinery, test benches.

Capacities

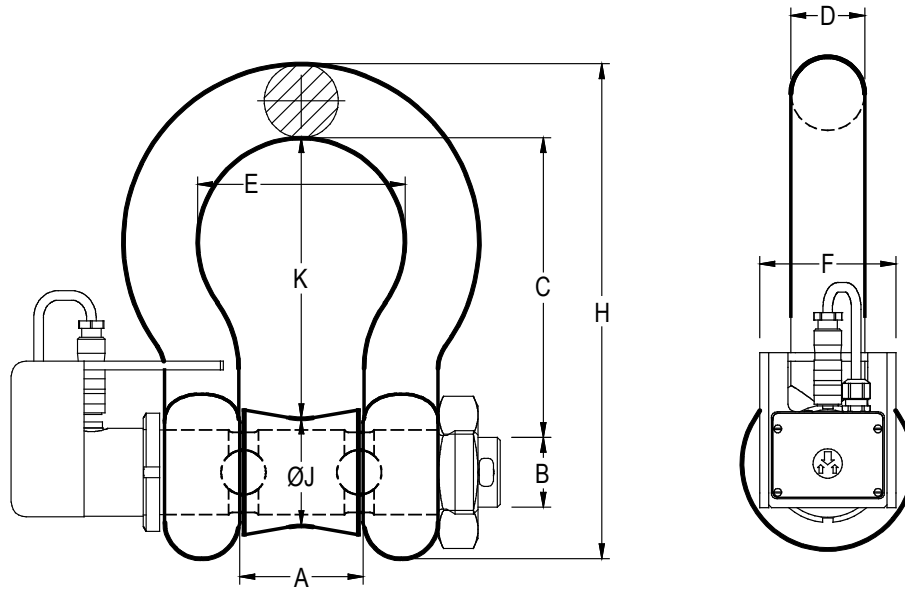
from 1 t to 400 t

Specifications	SL - FORCE	SL - HOIST	
Combined error (non-linearity + hysteresis)	0.25 - 1**	0.5 - 2**	% F.S.*
Repeatability error	<± 0.25	<± 0.25	% F.S.*
Creep error over 30 min.	<± 0.3	<± 0.3	% 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	<± 0.2	<± 0.2	% F.S./10°C
Temperature coefficient of zero signal	<± 0.2	<± 0.2	% F.S./10°C
Nominal sensitivity	± 1.5	± 1	mV/V
Reference excitation voltage	3 VDC (2 x AA batteries)	3 VDC (2 x AA batteries)	-
Consumption	65 mA	65 mA	-
Current @ stand-by mode	20	20	µA
Autonomy @ normal mode (2 batteries)	1 month	1 month	-
Autonomy @ 12 x 5mn/day mode (2 D batteries)	2	2	years
Safe load limit	150	200	% F.S.*
Breaking load	> 300	> 500	% F.S.*
Permissible dynamic loading	50	75	% F.S.*
Static lateral force limit	100	150	% F.S.*

* F.S. : Full Scale.

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

5000M-WI > STANDARD DIMENSIONS



Ref. Item	Capacities			D		A	B	C	E	F	H	ØJ	K	Tolerances C & K	Total weight (kg)
	Force		Hoist												
	Standard > 300 %**	Extended capacity* > 300 %**		> 500 %**	(mm)										
5000M-WI-3/4"	2.5 t	3 t	1.5 t	19	3/4"	31.8±2.2	22.5	71.5	51	93±3	126±8.6	34	65	±6.4	3
5000M-WI-7/8"	4 t	6 t	2.5 t	22	7/8"	36±2.2	25	83	58	93±3	143.5±8.6	35.5	78	±6.4	3.5
5000M-WI-1"	6 t	8 t	4 t	25	1"	43±2.4	28	95	68	93±3	163.5±8.6	37	90.5	±6.4	4
5000M-WI-1" 1/8	8 t	10 t	5 t	28	1 1/8"	47±2.4	32	108	75	93±3	185±8.9	40	104	±6.4	5
5000M-WI-1" 1/2	12 t	15 t	8 t	38	1 1/2"	60±4	42	146	99	93±3	249±9.9	54	140	±6.4	12
5000M-WI-1" 3/4	16 t	25 t	12 t	45	1 3/4"	74±4	50	178	126	106	299.5±11.2	65	171	±6.4	19
5000M-WI-2"	30 t	40 t	20 t	50	2"	83±4.2	57	197	138	122	331±17.5	72	189.5	±12.7	28
5000M-WI-2" 1/2	40 t	50 t	30 t	65	2 1/2"	105±4.7	70	260	180	145	432.5±18.7	90	250	±12.7	52
5000M-WI-3"	60 t	75 t	45 t	75	3"	127±5	83	329	190	165	526.5±26	105	318	±19	90
5000M-WI-3" 3/4	90 t	125 t	60 t	95	3 3/4"	147±5	95	400	238	208	647±25	117	389	±19	150
5000M-WI-4" 1/8	100 t	150 t	75 t	105	4 1/8"	169±5	108	410	275	240	688±18	130	399	±12	190
5000M-WI-5" 1/8	200 t	300 t	120 t	130	5 1/8"	205±6	140	554	305	308	904±22	165	541.5	±14	320
5000M-WI-6" 11/16	300 t	400 t	200 t	170	6 11/16"	231±6	175	668	325	387	1114±27	200	655	±18	585

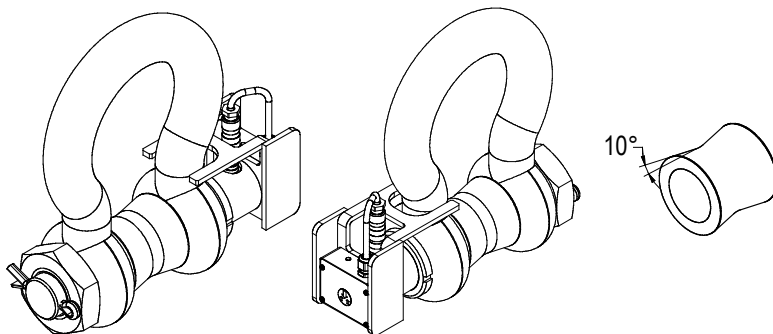
* Very resistant load cell, special design

** Breaking load (% full scale)

→ Other capacities and dimensions available on request

Dimensions in mm

Other views

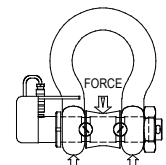


Wiring

Not applicable



Load direction



5500-5505

WIRE ROPE LOAD CELLS

Low cost load cells specially designed to measure the tension force on hoisting ropes.



Features

- o CE certified for hoisting applications
- o Easy installation directly without dismantling on the hoisting rope
- o Wide range of measured loads on cable (from 0.25 up to 24 t) and suitable cables (available diameters: from 6 up to 46 mm)
- o Material: - 5500: stainless steel
- 5505: nickel-plated steel
- o Protection class: IP65
- o Sturdy design
- o Reliable and economical solution
- o Complete range of "CE" certified electronics and load limiters available
- o Cable length: see drawing table - CL (other lengths available on request)

Most popular options (see more in ANNEX)



Ex i



Model 5500 - 2 t + accessories



Application(s) SENSY's load cells 5500-5505 are perfectly designed for the following applications:

- Hoisting devices and crane security in combination with load limitation electronics (e.g.: BRIDGE-BOY, CRANE-BOY, ...),
- Cost-effective solution for safety improvement on existing cranes.

Capacities

5500-5505: 0.25 to 24 t on the wire rope

Specifications	2 - 5 %	
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	<± 0.1	% F.S./10°C
Temperature coefficient of zero signal	<± 0.1	% F.S./10°C
Nominal sensitivity	± 1 **	mV/V
Input resistance	350 ± 2	ohm(s)
Output resistance	350 ± 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	200	% F.S.*
Breaking load	>300	% F.S.*
Permissible dynamic loading	70	% F.S.*

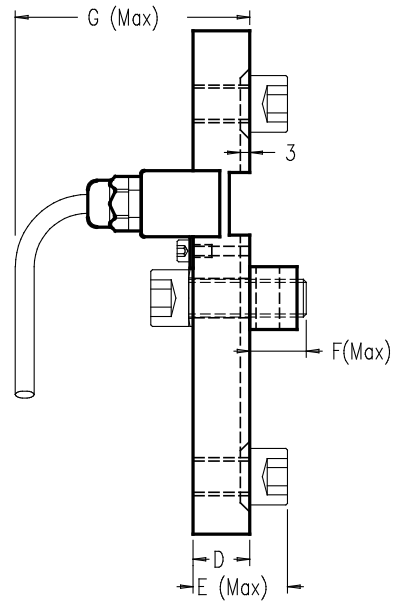
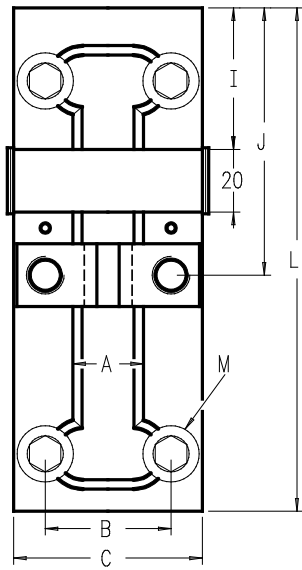
* F.S. : Full Scale.

** : can be different (according to the wire rope)

Combined error depends on rope material and on-site calibration

Specifications subject to change without notice..

5500-5505 > STANDARD DIMENSIONS



Ref. Item*	Capacities	Load range (t) Min-Max	Cable Ø (mm)	±A	B	C	D	E	±F	G	I	J	L	M	Torque (Optimum) (N·m)	CL (m)	Weight (kg)
550x-A	0.25 t (1TTSA)**	-	6 - 12	20	40	60	18	30	31	100	45	85	160	M12	10	3	1.75
550x-B	1 t (1TSA)	0.4 - 1.5	6 - 15	20	40	60	18	30	31	100	45	85	160	M12	15	3	1.75
550x-C	2 t (1SA)	0.75 - 2.8	6 - 22	20	40	60	18	30	31	100	45	85	160	M12	15	3	1.8
550x-D	3.5 t (1A)	1.6 - 5	6 - 22	20	40	60	18	30	31	100	45	85	160	M12	15	3	1.8
550x-E	5 t (2A)	2 - 7	14 - 28	20	50	75	18	30	40	100	45	85	160	M12	20	3	2.1
550x-F	10 t (3A)	5.5 - 16	26 - 36	25	68	100	25	41	55	115	55	95	200	M16	25	6	4.3
550x-G	15 t (4A)	10 - 24	30 - 46	35	75	115	26	46	70	116	55	110	230	M20	50	6	5.7

* x=Material: 5500 - stainless steel; 5505: alloy steel

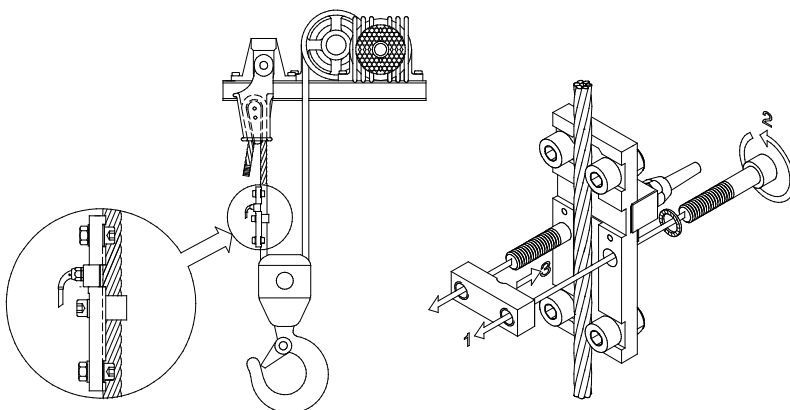
** Only for amplified version (4-20 mA 3 wires)

Table including sensitivity and SENSY electronics limits for each cable diameter, available upon request

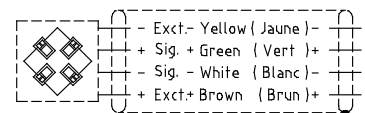
→ Other capacities and dimensions available on request

Dimensions in mm

Other views

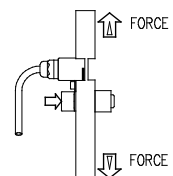


Wiring



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

Load direction



5900

THROUGH HOLE (ANNULAR) LOAD CELLS

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)

Model 5900 - 20 t



Most popular options (see more in ANNEX)



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

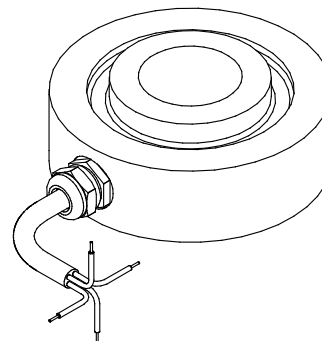
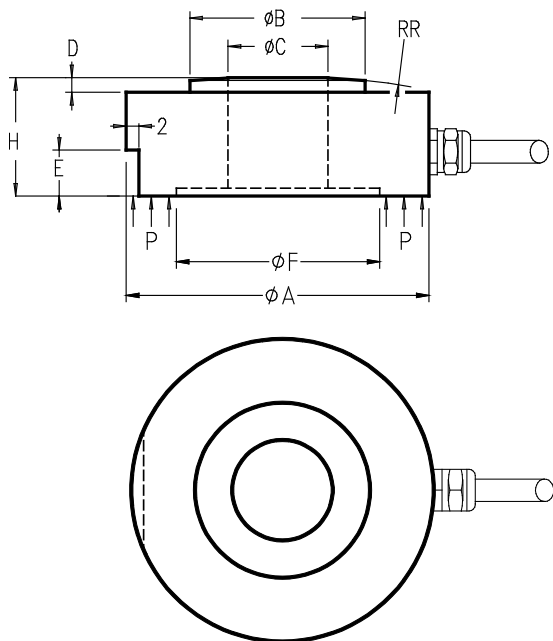
5900 HOIST: 0.2 - 0.5 - (0.75) - 1 - (1.5) - 2 - 3 - 5 - 7.5 - 10 - 15 t

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/mm ²)	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)

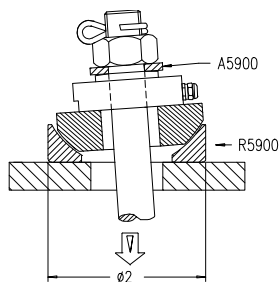
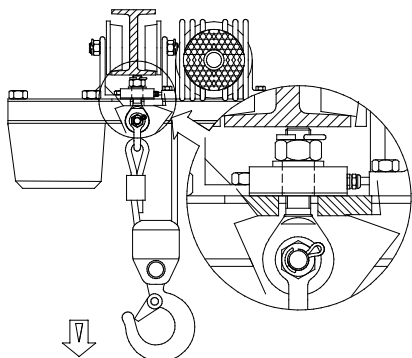
CUSTOM-MADE							
Capacities		ØC	ØB	ØA	H		
Force > 300 %*	Hoist > 500 %*						
3 - 30 kN	0.2 - 2 t	ØX	ØX+14	±ØX+43	23...25		
30 - 100 kN	3 - 7.5 t	ØX	ØX+20	±ØX+49	27...31		
100 - 150 (200) kN	10 - 15 t	ØX	ØX+30	±ØX+69	35...40		

* Breaking load (% full scale)

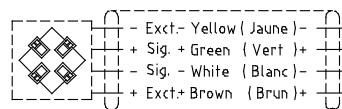
→ Other capacities and dimensions available on request

Dimensions in mm

Accessories

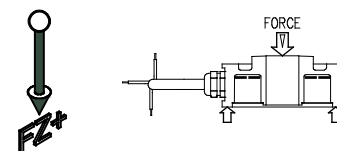


Wiring

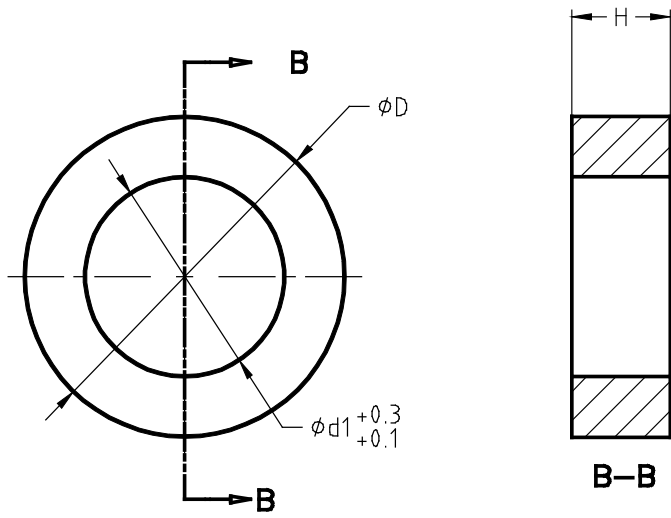


Standard : Cable screen not connected to transducer
Faradisation non connectée au capteur

Load direction



A5900 > STANDARD DIMENSIONS



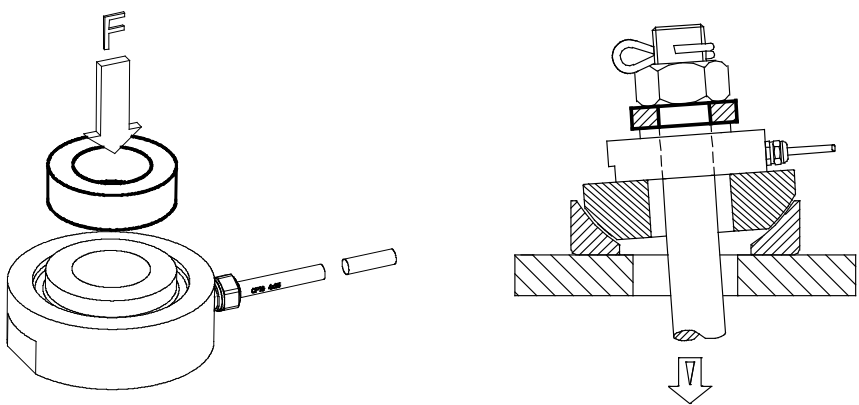
Ref. Item*	Capacities		$\phi d1$	ϕD	H	Weight (kg)
	Force > 300 %**	Hoist > 500 %**				
A5900-A	3 - 30 kN	0.2 - 2 t	16	39	10	0.08
A5900-B	30 - 100 kN	3 - 7.5 t	30	49	15	0.14
A5900-C	100 - 150 (200) kN	10 - 15 t	50	89	20	0.68

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

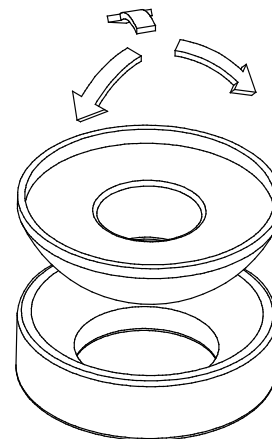
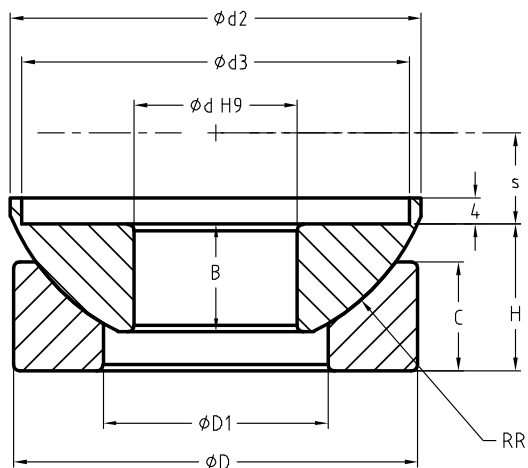
→ Other capacities and dimensions available on request

Dimensions in mm

Other views



R5900 > STANDARD DIMENSIONS



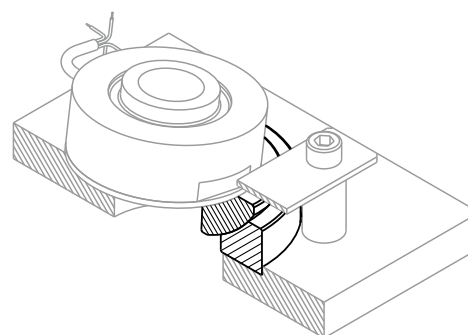
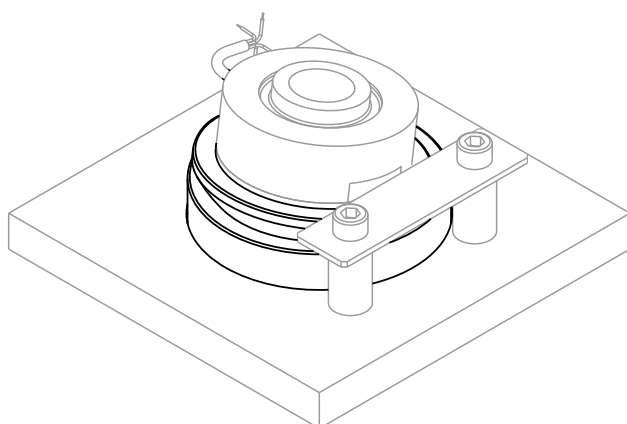
Ref. Item*	Capacities		ϕd	ϕD	$\phi D1$	H	$\phi d2$	$\phi d3$	RR	B	C	s	Weight (kg)
	Force > 300 %**	Hoist > 500 %**											
R5900-A	3 - 30 kN	0.2 - 2 t	25	62	34.5	22.5	63	59.5	34	16.5	16.7	14	0.43
R5900-B	30 - 100 kN	3 - 7.5 t	35	90	50.5	28	84	79.5	49	22	20.7	22	1.2
R5900-C	100 - 150 (200) kN	10 - 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



ANNEXES

- Definitions: Most popular options	p. 296
- Option cards for PAX, CRANE-BOY, INDI-BOY, DISP-BOY family	p. 303
- Definitions: Certifications	p. 304
- Definitions: Technical features	p. 305
- 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

Amplified output

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 $+85^{\circ}\text{C}$. 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.

OPTION DESCRIPTION



Angle Measurement

Angle measurement

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.

OPTION DESCRIPTION



Attachment arm

Articulated arm

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.

OPTION DESCRIPTION



ASTM E74

ASTM E74

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:

- class AA: for secondary force standard dynamometers, i.e. used as references for calibrating other dynamometers.
- class A: for dynamometers used for checking testing machines.

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.

OPTION DESCRIPTION



Cable length

Cable length

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:

- 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;
- 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.

OPTION DESCRIPTION



Calculation note

Calculation note

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.

OPTION DESCRIPTION



Calibration resistance







Calibration resistance

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
	<p>CE hoisting</p> <p>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 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...</p>
 <p>Charpy certificate</p>	<p>Charpy certificate</p> <p>This type of test makes it possible to control the impact resistance or the ductility of the proof body of a force transducer.</p> <p>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.</p>
	<p>Connector output</p> <p>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 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.</p>
 <p>Digital output</p>	<p>Digital output</p> <p>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.</p>
 <p>Dual Wheatstone bridge</p>	<p>Dual Wheatstone bridge</p> <p>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.</p>
 <p>Dye penetrant certificate</p>	<p>Dye penetrant certificate</p> <p>Dye penetrant test certificate after machining.</p> <p>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.</p>
<p>EN 12390</p> <p>Accredited laboratory certificate</p>	<p>EN 12390</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>
<p>Ex i</p>	<p>Ex i</p> <p>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.</p> <p>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.</p>


DESCRIPTION OF MOST USED OPTIONS


OPTION	DESCRIPTION
Ex d	<p>Ex d</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>External antenna</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>Frequency output</p> <p>This provides a signal in the form of frequency modulation to overcome electromagnetic disturbances.</p>
 High pressure resistance	<p>High-pressure resistance</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>Hydraulic hose</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>
IP64 Not for Angle Sensor	<p>IP64</p> <p>The protection rating of our force transducers is in accordance with the international standard of the International Electrotechnical Commission for waterproofing.</p>
IP65 Not for Angle Sensor	<p>IP65</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>
IP67 MARINE	<p>IP67 MARINE</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>
IP68	<p>IP68</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
IP69K	<p>IP69K</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 the IP69K, this corresponds to protection against high-pressure cleaning, at high temperature and coming from several directions.</p>

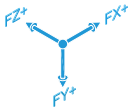
OPTION	DESCRIPTION
 Class 00	<p>ISO 376 - class 00</p> <p>The purpose of ISO 376 is to calibrate force-measuring instruments used for the static verification of uniaxial testing machines (e.g. tension/compression testing machines). It describes a procedure for classifying these instruments. These high-precision, so-called "transfer" standard transducers make the link between national metrology and testing machines that must be (re)-calibrated.</p> <p>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.</p>


OPTION	DESCRIPTION
 Class 0,5	<p>ISO 376 - class 0,5</p> <p>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.</p> <p>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.</p>

OPTION	DESCRIPTION
 Class 1	<p>ISO 376 - class 1</p> <p>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.</p> <p>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.</p>









OPTION	DESCRIPTION
ISO 376 Accredited laboratory certificate	<p>ISO 376 - Accredited laboratory certificate</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>

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

OPTION	DESCRIPTION
	<p>Multi-axis load cells</p> <p>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:</p> $F \text{ Result.} = \sqrt{(F_x^2 + F_y^2)}$

OPTION	DESCRIPTION
	<p>Multi-direction</p> <p>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.</p>

DESCRIPTION OF MOST USED OPTIONS

OPTION	DESCRIPTION
	Overload protection <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	Protective cover <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	REA synthetic option (tensiometer) <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	SIL (Safety Integrity Levels) / EN-61508 compliant <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	Software <p>The signals from our force transducers can be used either through industrial displays or via acquisition software.</p> <p>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	Special impedance <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	Speed transducer <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	Spider lubrication hole <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	Temperature range When manufacturing force transducers or torque meters, SENSY takes into account three types of temperature range: <ul style="list-style-type: none">• 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).• 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.• The storage temperature range (standard: -50°C ... +85°C) which is always adapted according to the chosen temperature option.

OPTION	DESCRIPTION
 Third inspection	Third inspection 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	US control 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	USB 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	Vacuum proof 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	Waterproofness certificate 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	Wireless 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	X-ray proof 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

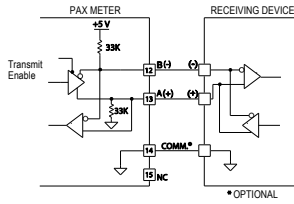


- RS-485 field bus communication interface

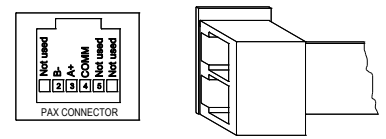
CARD-CDC1C



CARD-CDC10



CARD-CDC1C



CARD-CDC20

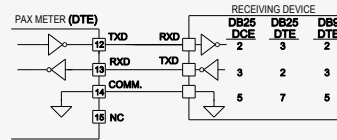


- RS-232 half-duplex communication interface
Available with crew terminals or DB9 connector

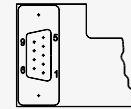
CARD-CDC2C



CARD-CDC20

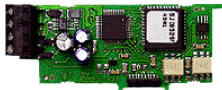


CARD-CDC2C



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.

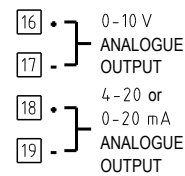
Analogue output card

CARD-CDL10



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

CARD-CDL10



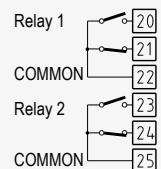
Relay cards (max. 1 choice)

CARD-CDS10 & CARD-CDS20

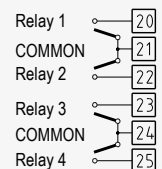


- 2 or 4 set-points activating each an independent relay

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>ATEX</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>CE</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>CE Hoisting</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>CSA</p> <p>The CSA logo is equivalent to the ATEX logo but is applicable to the North American markets (USA and Canada).</p>
	<p>IECEX</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>ISO 376</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>OIML</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>OVERLOAD PROTECTION</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>EN 12390</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/mm². 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.

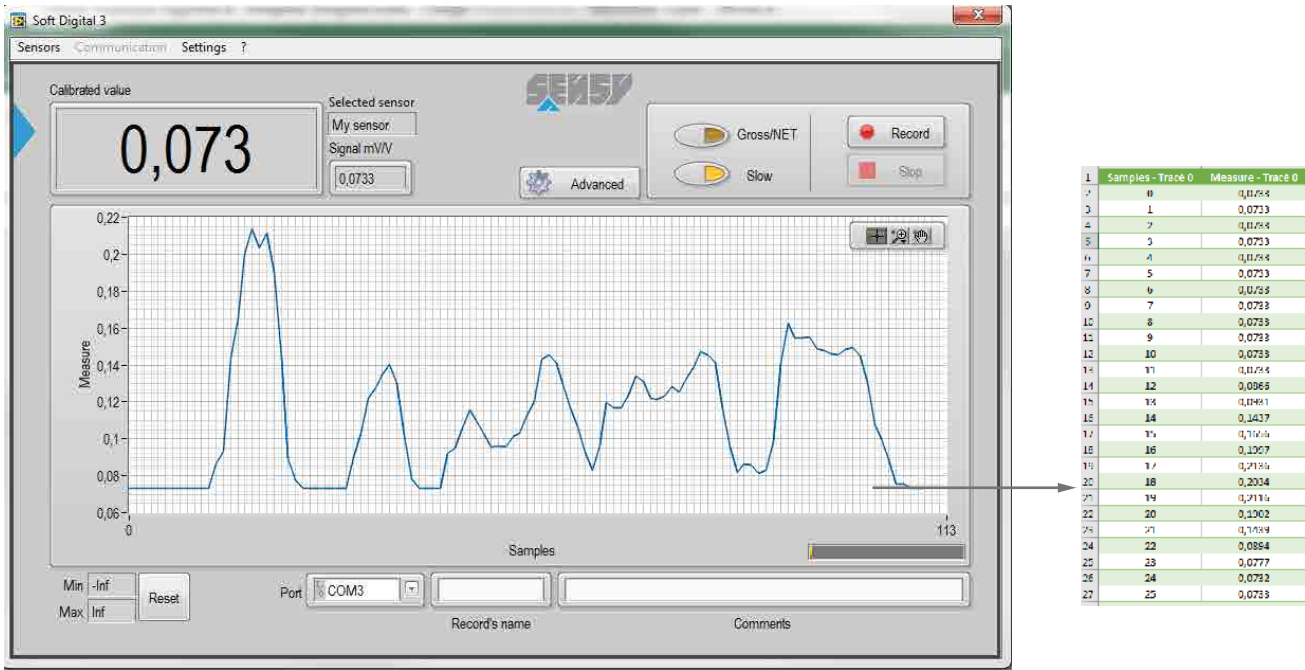
Furthermore, it should be noted that the output signal is also proportional to the supply voltage V. in. The sensitivity of the sensor is therefore expressed in mV/V where the denominator is equal to V. in. Thus for a sensor whose sensitivity is 2 mV/V and is supplied with 10 V, the output signal will 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.

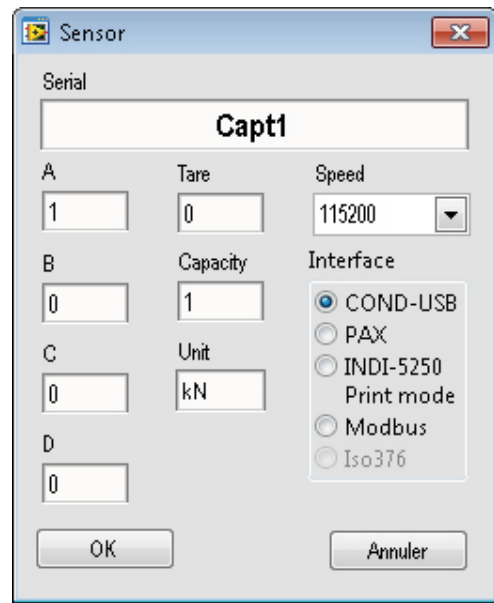
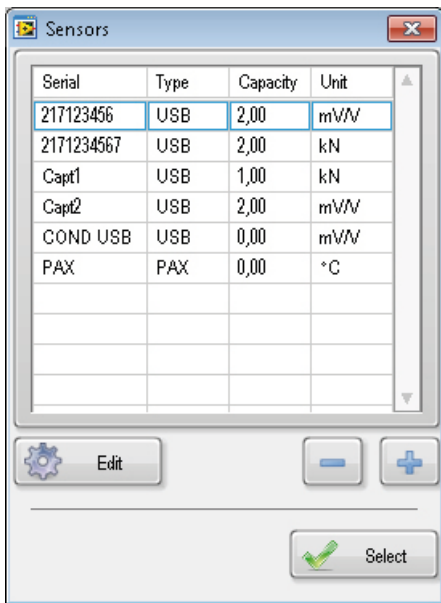


LOAD CELLS CALIBRATIONS

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 3rd order function.



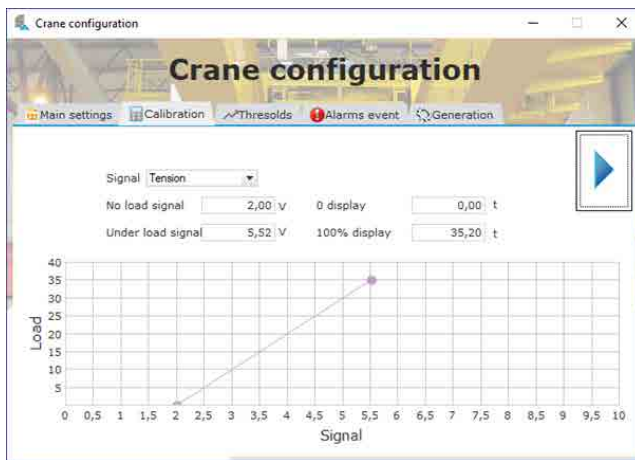
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The COACHVIEW software is delivered with the COACH-II (data logger dedicated to hoisting equipment).

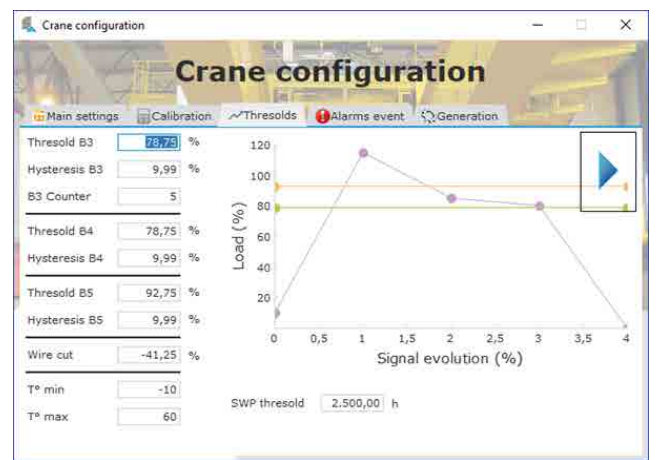
This very-user-friendly program allows for optimisation of the servicing schedule, the detection of downtimes and calculation of the FEM classification of the crane.

The main functions of COACHVIEW are:

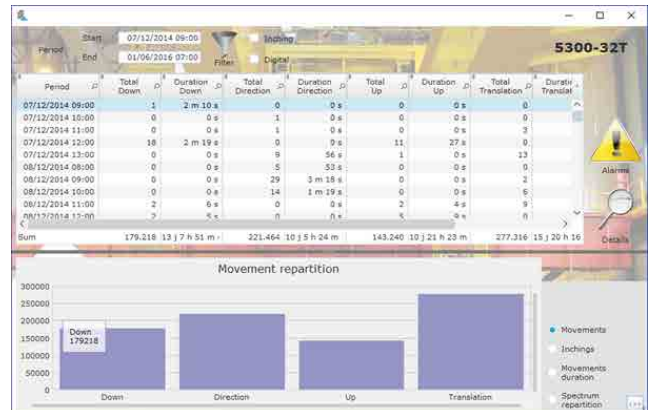
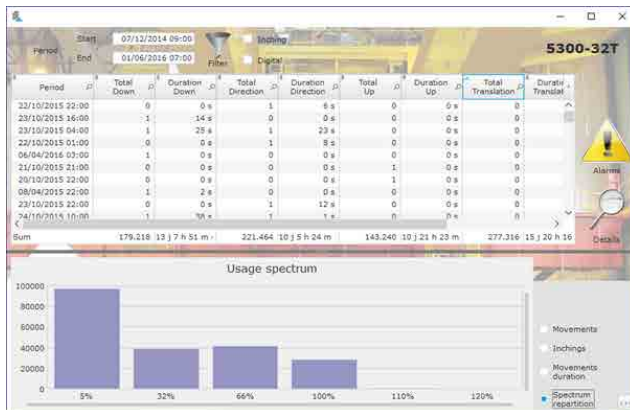
- Creation and management of configuration files for COACH-II (capacity, set-point, alarms, SWP),
- Analysis of the recordings performed by COACH-II,
- Generation of charts and tables.



Usage spectrum



Movement repartition



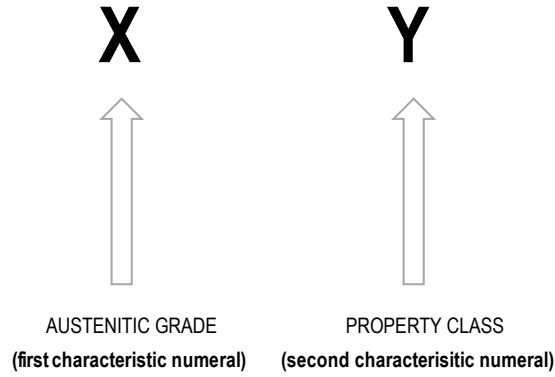
STAINLESS STEEL SCREWS > MECHANICAL AND CHEMICAL PROPERTIES

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

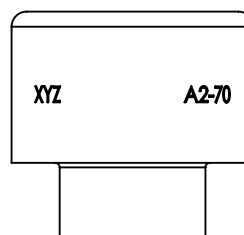
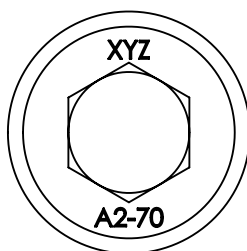
Y: PROPERTY CLASS⁽¹⁾

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)

⁽¹⁾ : 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/mm²).

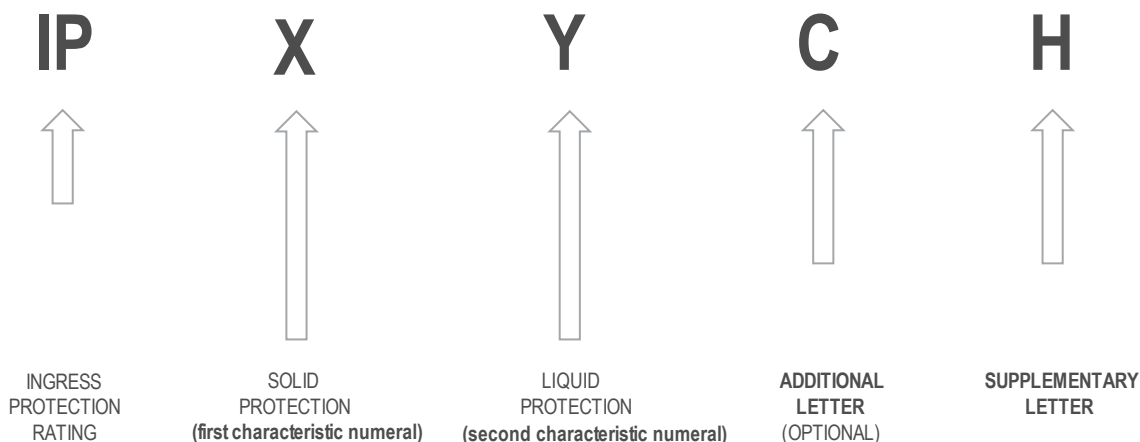
Screw marking:

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 ⁽¹⁾	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 ⁽¹⁾	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

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