LOAD CELL 3100P

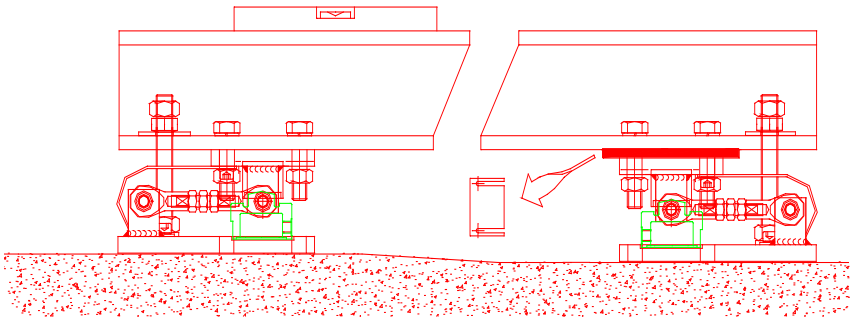
INSTRUCTIONS

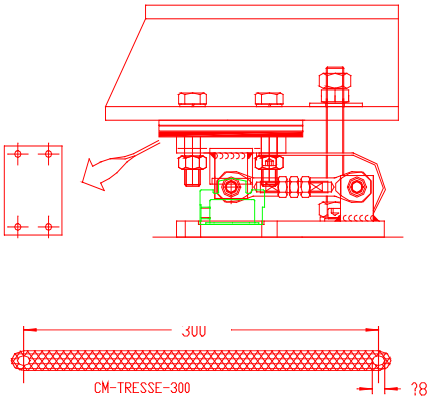
Rev.	Date	Reason
1	24/10/2012	Text correction
2	05/03/2019	EU Declaration of conformity
3	27/10/2020	Modification of the ATEX label CE 0492 becomes CE 2813

1. GENERAL INFORMATION

1.1. Leveling

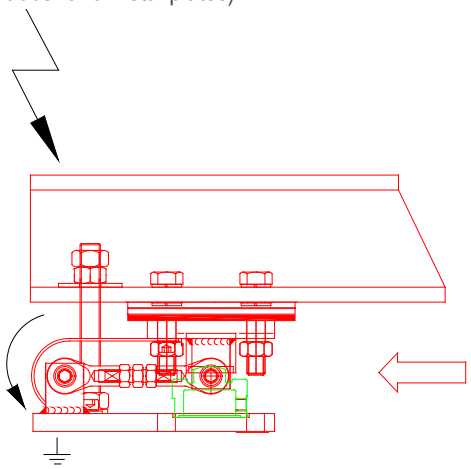
This operation guarantees a good distribution of the loads, as well as the verticality of the effort. It is advisable to ensure that a good leveling of the cells and the support elements is carried out. Use thickness chocks if necessary.





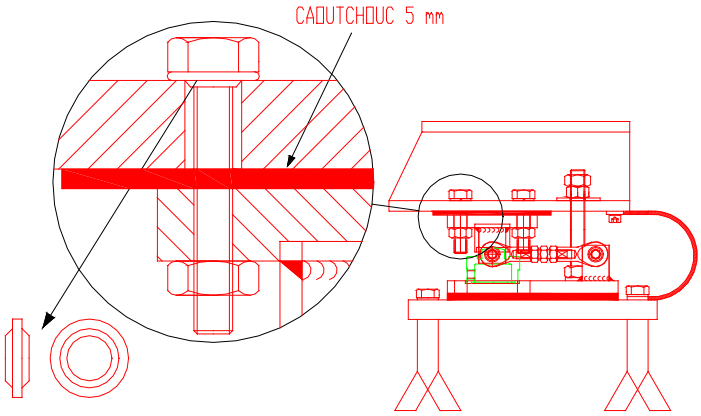
1.2. Shocks

An important shock may damage the cell when this shock corresponds to 1,5 to 3 times to the nominal load; it is in this case preferable to install a shock absorber between the load and the cell.
(Ex: piling of rubber and metal plates)



1.3. Electrical soldering

When arc welding must be done on the structure, we advise to install stranded ground wire, in order that the derived current does not pass through the cell, damaging it.
It is also advisable to disconnect the cells from the measurement instrument.



Direct earthing through the electrical ground strap.

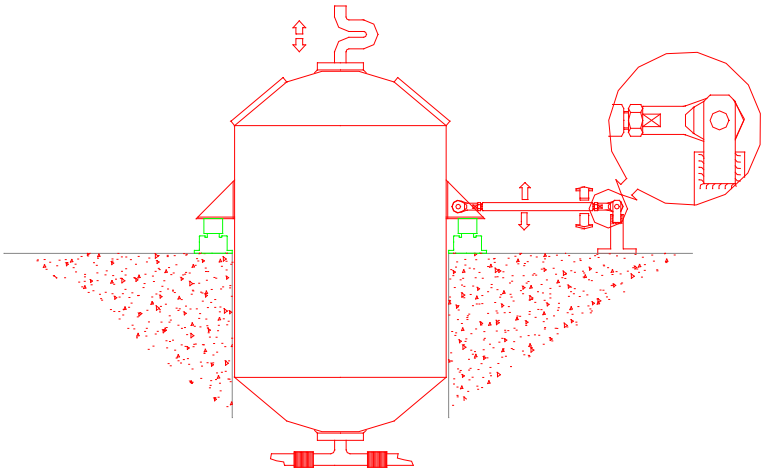
1.4. Lightning

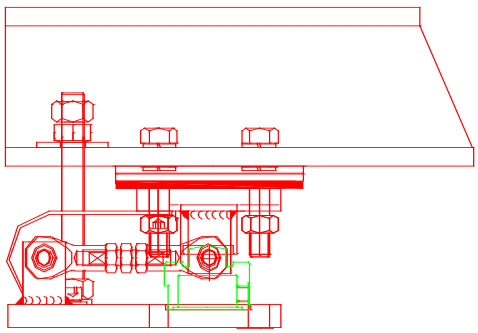
If there is a risk of lightning, it is advisable to insulate the cell the best possible, and to derive the former by stranded wire.

To do that, place a rubber sheet under the sole and polyamide waterproof washers under the fixing screws.

1.5. Outer mechanical influences

In order to avoid measurement errors, the load to be weighed should not be subject to parasitic contributions: connecting pipes, cables and stops or draw-bolts. If there are any, they must be installed with the greatest flexibility.
Also ladders, bridges for access should be suitably articulated, etc... (clamping).





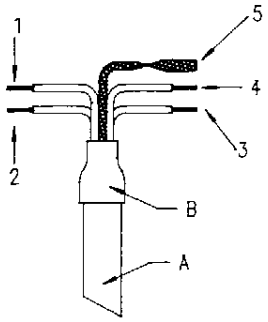
1.6. Adjustment of the thrusts (setting of the counter force)

This setting must be done when the cell is UNLOADED.
With the hand, bring nut A at 1mm of the structure, then screw B against A.
Finally, using a wrench, block nut A upon nut B, so that no effort is exerted on the load cell.

2. CABLING

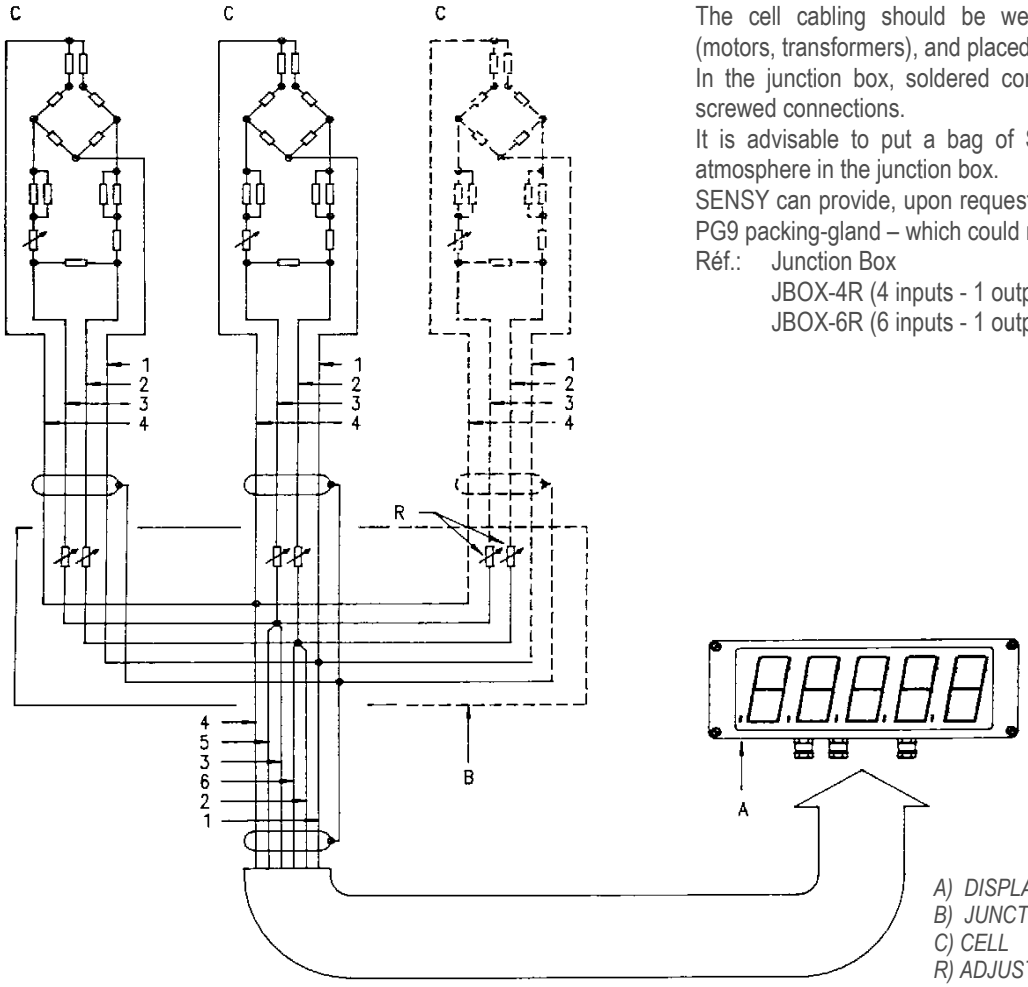
2.1. Cable

The cells are delivered with a 4-wire screened cable. The screen (faradized stranded wire) cannot in any case be in contact with the ground, e.g.; in metallic junction boxes, it is necessary to insulate the screen with a sheath (thermal).
The screen can only be connected to standardized earth.
At the end of the cable, it is better to install a thermo-retractable sheath (retracted 4x) with, inside, a waterproof paste, in order to avoid all migration of humidity towards the inside.
If the cable risks getting cut or damaged along the way, it will be necessary to make it pass through a pipe (steel, preferably).



2.2. Cabling

The cell cabling should be well away from power lines (motors, transformers), and placed in separate pipes.
In the junction box, soldered connections are preferable to screwed connections.
It is advisable to put a bag of SILICA-GEL to keep a dry atmosphere in the junction box.
SENSY can provide, upon request, a PVC junction box with a PG9 packing-gland – which could receive 4 or 6 parallel cells.
Réf.: Junction Box
JBOX-4R (4 inputs - 1 output)
JBOX-6R (6 inputs - 1 output)



A) DISPLAY (Ex. DV680)
B) JUNCTION BOX
C) CELL
R) ADJUSTMENT RESISTANCE

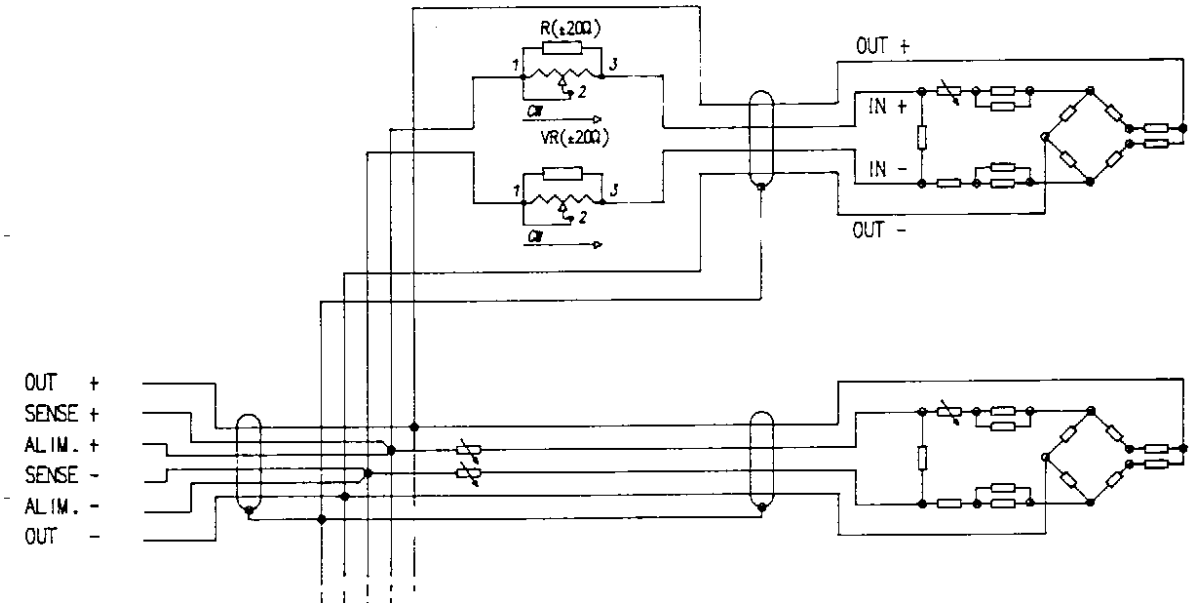
1) SIGNAL (OUT)	-	*(White)*
2) EXCITATION	-	*(Yellow)*
3) EXCITATION	+	*(Brown)*
4) SIGNAL (OUT)	+	*(Green)*
5) REF. (SENSE)	+	*(Pink)*
6) REF. (SENSE)	+	*(Grey)*

2.3. Parallel connection

The cells must be installed in parallel, with the stranded mass wire joined to itself. The sense must be joined to the cell supply, before the points of parallel wiring and the stabilizing resistances.

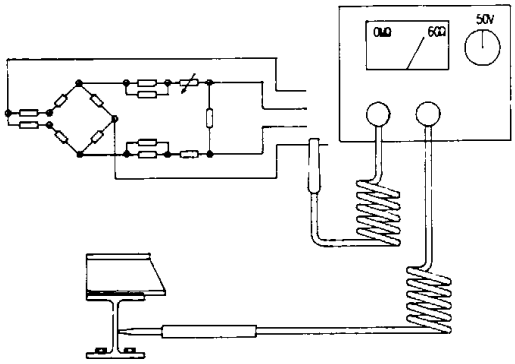
2.4. Calibration

It must be done after the sensor has been turned on for a while (10-15 minutes) to obtain a uniform temperature of the installation. The cells do not usually need to be adjusted with each other.
However, when greater precision is needed, it is sometimes necessary to stabilise the cells individually with the resistances in the junction box. Those resistances are of several ohms (±10) and are installed in the supply circuit. A parallel adjustable resistance is mounted with a fixed resistance.
The most sensitive cell will have its input resistance increased and the least sensitive will have its lowest input resistance. You will see that it is preferable to work on both supply cables: schematic mounting is given for your information and allows a variation of 0 to 20 ohms in series on the input impedance (2x10 ohms).
Note: A well known weight of more than 20% of the nominal load of the system can be expected. The calibration error is always much higher than the error made on the evaluation of the load.



2.5. Measurement errors

When the calibration is difficult and measurement errors are observed, it is necessary to check the installation. Mechanically, the cells must be free in the direction of the load and well positioned. Electrically, the connections must be secure, the junction boxes exempt from humidity and the cables intact. If there is no fault to be seen, it is necessary to verify the internal circuit.
SENSY can help to diagnose based on the associated diagnosis sheet provided in the appendix and filled in beforehand.



2.6. Insulation test

The measuring of the insulating resistance is done with a gigaohmmeter. The standardized testing voltage is 10 V. It is applied to a conductor.

It can be determined by disconnecting the measurement instrument and applying voltage between one of the conductors and the metallic mounting structure - or individually, cell by cell, to locate the leakage with precision.

The insulation must not, in any case, be lower than 2 GΩ for a 10 V voltage. This insulation default will generate measurement errors if the insulation resistance is lower than several hundred MΩ.

But the insulation default can also fluctuate along with atmospheric conditions (temperature, humidity).

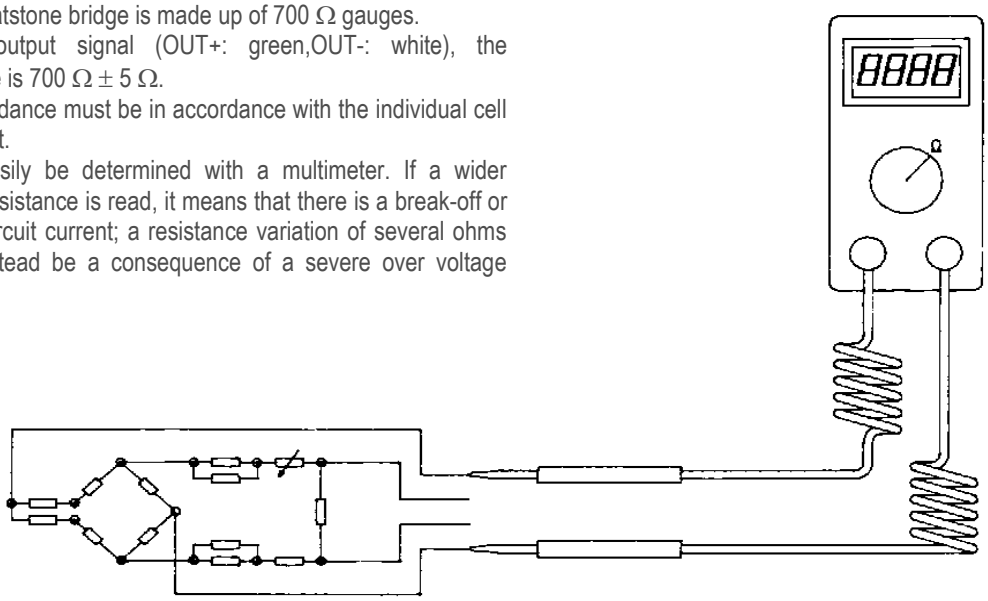
2.7. Output impedance

The Wheatstone bridge is made up of 700 Ω gauges.

At the output signal (OUT+: green,OUT-: white), the resistance is 700 Ω ± 5 Ω.

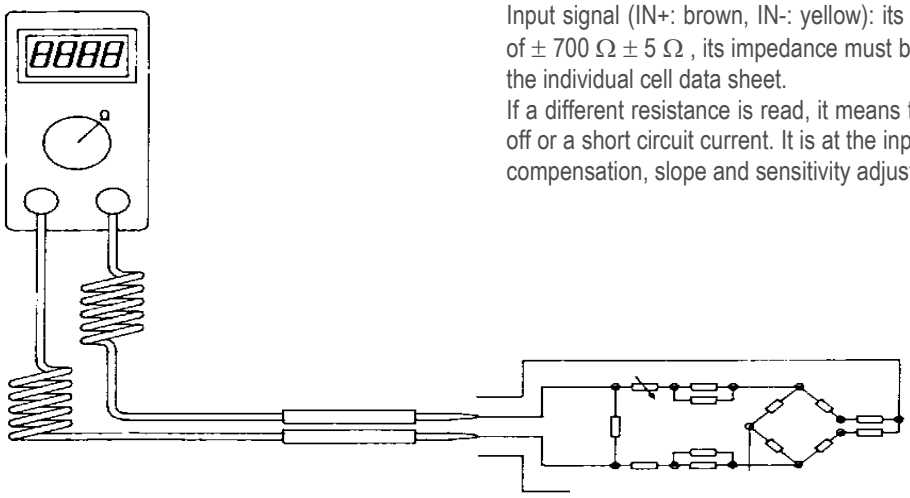
This impedance must be in accordance with the individual cell data sheet.

It can easily be determined with a multimeter. If a wider varying resistance is read, it means that there is a break-off or a short circuit current; a resistance variation of several ohms would instead be a consequence of a severe over voltage problem.

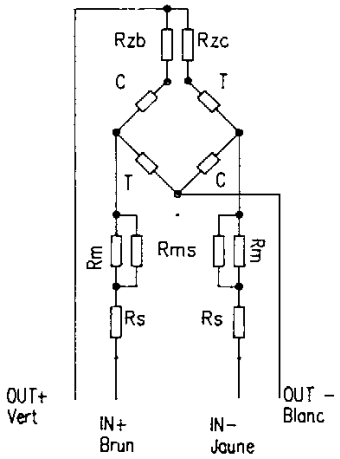


2.8. Input impedance

Input signal (IN+: brown, IN-: yellow): its resistance is usually of ± 700 Ω ± 5 Ω , its impedance must be in accordance with the individual cell data sheet.
If a different resistance is read, it means that there is a break-off or a short circuit current. It is at the input that one finds drift compensation, slope and sensitivity adjusted resistance.



Rm	*Sensitivity drift compensation*
Rms	*Sensitivity drift adjustment*
Rs	*Sensitivity calibration*
Rzb	*Zero calibration*
Rzc	*Zero drift compensation*

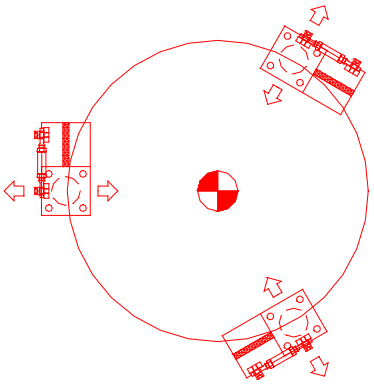


3. MOUNTING

The EASY MOUNT integrates the fixing plates, the support elements, as well as the anti-reversing and the anti-rotation (shifting) in one direction.
This kit with knee joint absorbs forces up to 20 kN in the X-direction and lets enough movement space in the Z-direction for the dilatations.

3.1. Mounting with 3 load cells

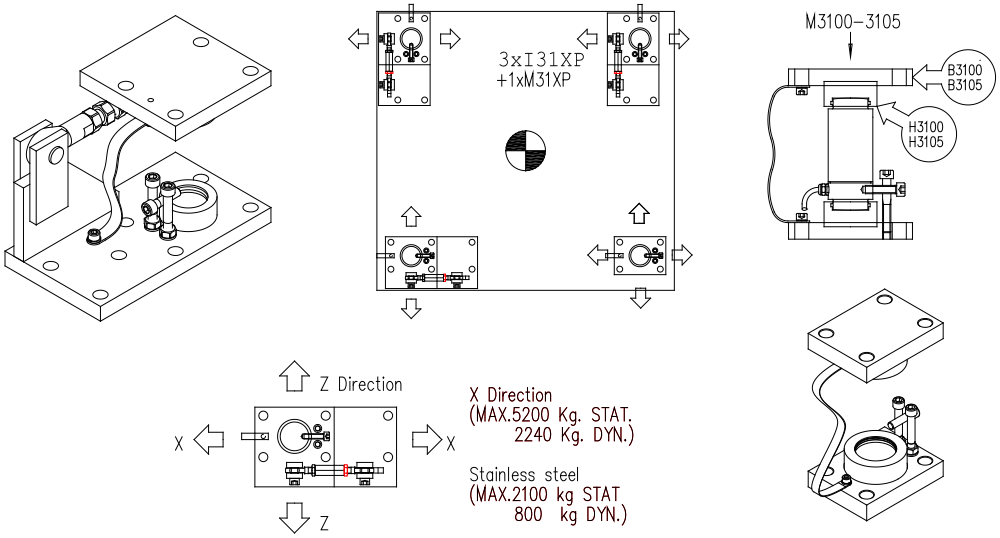
This mounting offers the best load repartition properties and movement space for the element to weigh.



3.2. Mounting with more than 3 load cells

When using more than 3 load cells, each element has to be placed at the same level, in order to obtain an optimal distribution of the loads. The output signals of each cell with the element to weight, empty, have to be identical (case of a symmetrical element).
In order not to clamp the movements (dilatation) of the element to weigh, a maximum of three I3100 used together has to be respected. For the other cells, use the mounting kit M3100. In cases for which the dimension variations are slight, the use of a mounting system with four I3100 is authorized – which offers the best characteristics as far as the resistance against parasitic efforts are concerned.

Remark: the characteristics of the cells are guaranteed between –10°C et 45°c without thermal gradient at the level of the cell and quick temperature variation, use of protecting screen and an insulated element to form a barrier between the warmth source and the cell (sun, wind, thermal striking, conduction).



4. USE IN POTENTIALLY EXPLOSIVE ATMOSPHERE (OPTION)

4.1. Intrinsic safety protection

Use of sensors in hazardous zones can only be done with Ex marked sensors, delivered with one or more of the certificates hereunder:

ATEX: ISSeP07ATEX012X

SENSY's load cells which are marked Ex i comply with the following standards:

ATEX
EN 60079-0: 2012
EN 60079-26: 2007
EN 60079-11: 2012

The use of junction boxes or additional cable lengths must be considered in the choice of protection. The electrical characteristics of the cable being limited (see certification), it is recommended to carefully chose the cable length and avoid any winding of the cable. After having defined all elements, it is mandatory to control if the sensor's output tension is still compatible with the electronic device in use and the requested accuracy.
See certificate for the special conditions for safe use.

5. PERIODIC INSPECTIONS

1. Check output for zero load (annually)

Output signal	Min acceptable	Max acceptable
mV/V / 4 wires	-0.15 mV/V	0.15 mV/V
4-20mA / 2 wires	3 mA	6 mA
4-20mA / 3 wires	3 mA	6 mA
0- 5V / 3 wires	0 V	0.8 V
0- 10V / 3 wires	0 V	0.8 V
1-5V / 3 wires	0.5 V	1.5 V
1 -10V / 3 wires	0.5 V	1.5 V
-10 / 0 / + 10V	-1.5 V	1.5 V

2. Make sure that the axle beam has not been knocked (markings) or chemically attacked (some corrosive greases). If points 1 and 2 are not accounted for, just take preventive measures. (annually)
3. In case of doubt, reply to the diagnostic questionnaire available on Web: www.sensy.com/support.
4. Verify the integrity of the cable.
5. After any serious functioning incident, repeat operations 1 to 4.

6. USE FEATURES

(The exact characteristics are systematically given in the control sheet delivered with every load cell and function of the output signal!)

Output signal:	mV/V	4-20 mA 2 wires	4-20 mA 3 wires	1-5 V 3 wires	0-10 V 3 wires	-10…0…+10 V 3 wires	RS-232 RS-485
Compensated temp. range	-10…+45°C						
Operating temperature range	-30… +70°C[1]						
Storage temperature range	-50…+85°C	-50…+85°C					
Power supply (VDC)	5…10…15[2]	9 – 30[3]	13 – 30	13 – 30		15 - 18[4]	6…12…18
Load impedance e (Ω)	NA	≤ 750	≤ 1.000	> 5k			
Nominal sig. range	0 – 1…2 mV/V	4 - 20 mA	4 - 20 mA	0.1-5 V	0.1-10 V	-10…0…+10 V	
Saturation	> 3 mV/V	> 24 mA	> 24 mA	> 11 V			

[1] Max +60°C for EX-I T4, T6 and C6 options
[2] 5 to 12VDC for EX-I T2 GD, EX-I T4 GD and EX-I T6 GD options
[3] 9-28VDC for EX-I C6 options
[4] 15 to 27VDC with a 1000 Ω bridge

7. GUARANTEE

The manufacturer's guarantee is applicable as far as mounting recommendations and general use principle, like above described, are respected.

For any particular use, not described in this document, it is mandatory to obtain a prior written agreement from SENSY S.A. for the validity of the guarantee.

8. DRAWINGS AND WIRING DIAGRAMS

9. EU DECLARATION OF CONFORMITY

Manufactured by:
SENSY SA
Z.I. Jumet – Allée Centrale
B – 6040 JUMET
Phone: +32 71 25.82.00
Fax: +32 71 37.09.11
Website: http://www.sensy.com

CONCERNED ITEMS: 3100P, see calibration certificate related to model and serial number.

SENSY S.A. certify that the items described here above have been duly designed, manufactured and tested for use in accordance with the essential requirements defined in the European Directives listed here under.

2014/30/EU	Electro-Magnetic Compatibility Directive
2011/65/EU modified by the standard EU/2017/2102	Restriction of the use of certain hazardous substances in the electrical and electronic equipment (RoHS)
2014/35/EU	Safety / low voltage directive

Conception and compliance of this equipment is made according to all of part of the following standards:
EN 61326 (2006)

If designed, manufactured and tested safety ref. D-DP SIL3 READY (option):
see specific and separate certificate according to ISO 13849-1 and/or EN 62061

If designed, manufactured and tested for use in potentially explosive atmospheres (option):
see specific and separate certificate.

Jumet,
March 05th 2019

Augustin DUBOIS
Product Development Division