Installation user's manual

AWT20L

AND

AWT20L5

WEIGHT TRANSMITTER

AWT20L_07.10_UK

LEGEND

Below are shown the simbologies used in the manual in order to warn the reader:

Caution ! High Voltage !

Caution ! This operation must be executed by skilled workers.

Read carefully the following indications.

Further information.

SYSTEM IDENTIFICATION

TABLE OF CONTENTS

RECOMMENDATIONS FOR THE CORRECT INSTALLATION OF THE LOAD CELLS AND THE MICROPROCESSOR SYSTEMS

1) Avoid welding while the load cells are installed.

2) By means of a copper wire connect the upper supporting plate with the lower supporting plate, then connect all the upper plates to the earthing system.

3) Use water-proof sheathes and joints in order to protect the cells' cables.

4) Carry out the parallel connection of the cells by using a water-proof junction box and terminal box complete with a plate cable clamp.

5) Both the extension cables connected to the load cells and the cables relevant to the signal amplifiers must be led alone into the piping or trough and laid as far as possible from the power cables.

6) The entry into the cable board of both cells and amplifiers must be independent (on one side or the other of the board) and directly connected to the terminal board of the device without being interrupted by bearing terminal boards or passing through troughs containing other cables.

7) Use the " RC " filters on the microprocessor-driven coils of the remote control switches.

8) It is a good norm to let the microprocessor always switch on to prevent the formation of condensation.

9) The installer of the board is responsible for securing the electrical safety of the instruments (fuses, door-locking switch, etc.).

AWT20L TRANSMITTER

DIMENSIONS: base 114 mm , depth 93 mm , high 60 mm.

MOUNTING: instrument for mounting back panel or in junction box.
BOX CONTAINER (in resin): for DIN or omega bar.

TECHNICAL FEATURES:

POWER from 20 to 28 Vdc
PRECISION 0,25 %
REPEATIBILITY 0,01 %
POWER CONSUMPTION 6 VA
PROTECTION DEGREE IP 50
CAPACITY 6 load cells in parallel 350 Ohm
LOAD CELL CONNECTION 4-wires technique
LOAD CELL SUPPLY 10 Vdc + / - 3%
MEASURING RANGE from 3,5 to 24 mV
COARSE ZERO by 4 dip-switches, 70% range
FINE ZERO by trimmer 10% range
COARSE FULL SCALE by 4 dip-switches
FINE FULL SCALE by trimmer, 10% range
OPERATING TEMPERATURE RANGE - 10 to + 50 °C
STORAGE TEMPERATURE RANGE - 20 to + 70 °C
THERMIC STABILITY 0,01 % of range for 10°C
TIME OF THERMIC STABILIZATION 10 minutes

ANALOG OUTPUT :

AWT20L is provided with the following outputs:

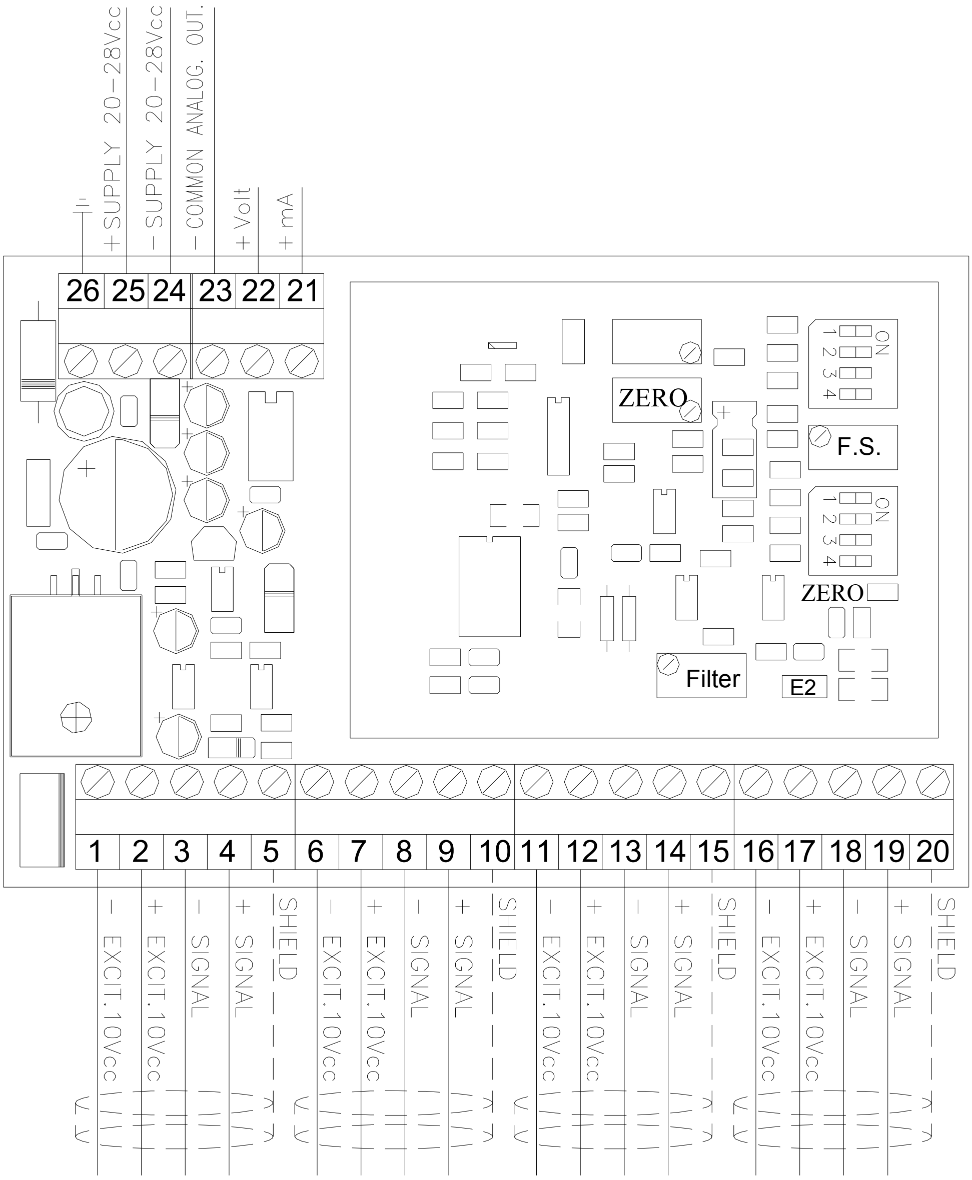
0 - 10 Vdc (terminals 22 - 23)
0 - 20 mA, 4 - 20 mA (terminals 21 - 23)

To modify the output follow the procedures at chapter ANALOG OUTPUT MODIFY. **In the standard version in order to increase the input field up to 35 mV enter in parallel a 49,9K resistance; see ANALOGUE OUTPUT MODIFICATION section for further details.**
NOTE:
There is also another version of the AWT20L transmitter which has an output voltage of +/-5Vcc.

USE:
Normally used with a 12 bit analog / digital boards installed on programmable logic (PLC)

ELECTRICAL CONNECTIONS

WARNING: The procedures here below described have to be carried out by specialized personnel only.



PUTTING INTO OPERATIONS

START-UP:

Supply the instrument and wait for about 10 minutes so that all components reach a steady temperature. Make sure that the container is empty and without mechanical constraints.
By using a tester make sure that the output is positive and it increases if you subject the container to a force weight, in case the output is negative check for the load cells connection and the correct load cells installation (direction of charge).

TARE ZERO-SETTING:

Make sure that the container is empty and set the tare to zero as follows:
Use the zero fine trimmer for little variations, if it isn't sufficient use the dip-switches of coarse zero to approach zero display as much as possible, then use the trimmer of fine zero again**.**

DIP-SWITCHES OF COARSE ZERO

0 = OFF 1 = ON

REGISTERED VALUES WITH 1001 AMPLIFICATION AND ALL AMPLIFICATION TRIMMER CLOCKWISE

DIP-SWITCHES POSITION	input mV to set to zero	
	from - mV ALL ZERO TRIMMER ANTICLOCKWISE	to - mV ALL ZERO TRIMMER CLOCKWISE
1 2 3 4	- - - -	- - - -
0 0 0 0	- 2,4	-0,4
1 0 0 0	-0,2	2,6
0 1 0 0	1,7	4,5
1 1 0 0	3,4	6,2
0 0 1 0	4,9	7,7
1 0 1 0	6,2	9,1
0 1 1 0	7,3	10,2
1 1 1 0	8,4	11,3
0 0 0 1	9,4	12,3
1 0 0 1	10,3	13,2
0 1 0 1	11,1	14,0
1 1 0 1	11,8	14,7
0 0 1 1	12,5	15,4
1 0 1 1	13,1	16,0
0 1 1 1	13,7	16,6
1 1 1 1	14,3	17,2

WEIGHT OSCILLATIONS:

If the displayed weight is not steady it is possible to use an analogic filter. Turn the trimmer clockwise in order to reduce the oscillations. To inactivate the filter remove the E2 jumper.

CALIBRATION CHECK:

The instrument has been supplied already calibrated. If you want to check it, after the tare zero-setting, put a calibrating weight equal to at least 50% of the max load capacity on the load system and check the value of the output signal; if the output is different from the calibrating weight verify that the weight difference does not depend from some mechanical cause, eventually move to the Mechanical Installation Check.

⚠ MECHANICAL INSTALLATION CHECK

With a tester measure the load cells supply on the terminals 1 and 2 and make sure that there is a supply of about 10 Vdc).
When the container is empty measure the signal in mV on the terminals 3 and 4.
Put a calibrating weight on the scale and measure the signal in mV again.
Make sure that the signal increase corresponds to the result of the following equation:

mVtot : F.S. cells = mVS : S

mVtot = Millivolt corresponding to load cells supply x rated output
F.S. load cells = Full Scale (number of load cells x rated load)
mVS = Millivolt increases because of calibrating weight
S = calibrating weight

EXAMPLE:

n° load cells = 3 ; rated load = 1500 kg ; rated output = 2mV / V ;
load cells supply = 9,98 Vdc; calibrating weight = 1000 kg ;

mVtot : F.S. cells = mVS : S

(9,98 x 2) : (1500 x 3) = x : 1000

19,96 : 4500 = x : 1000

x = (1000 x 19,96) : 4500 = 4,435

so with a calibrating weight of 1000Kg on full scale of 4500 Kg, the increment will be: 4,435 mV.

- If the value in mV is correct and the output signal is wrong, probably non-authorised operators have changed the full scale by mistake, therefore move on to the **Calibration** page.

- If the value in mV is lower than the calculated value, probably there are mechanical friction, after verifying them move on to the **Load cells check**.

- If the value in mV is superior to the calculated value move on to the **Load cells check**.

CALIBRATION

Make sure that the container is empty, verify that the output is 0Vdc or 0mA or 4 mA (in accordance with model used), then put a calibrating weight equal to at least 50% of the full scale and use the trimmer of fine full scale to move the corresponding output to the exact value, if the trimmer isn't sufficient use the dip-switches of coarse full scale. Then check the 0Vdc or 0mA or 4mA again, and if necessary adjust it again; put the calibrating weight and check the output, repeat this operation until the output is corrected.

DIP-SWITCHES OF COARSE FULL SCALE
to obtain 20 mA or 10 Vdc output corresponding to the input mV

0 = OFF 1 = ON

REGISTERED VALUES WITH ZERO DIP SWITCHES IN 0000 POSITION AND ALL ZERO TRIMMER ANTI CLOCKWISE

DIP-SWITCHES POSITION	input mV to obtain 10Vdc or 20mA output	
	from - mV ALL AMPLIFICATION TRIMMER ANTICLOCKWISE	to - mV ALL AMPLIFICATION TRIMMER CLOCKWISE
1 2 3 4	- - - -	- - - -
1 1 1 1	31,2	19,5
0 1 1 1	20,8	14,8
1 0 1 1	15,5	12,0
0 0 1 1	12,5	10,0
1 1 0 1	10,3	8,6
0 1 0 1	8,8	7,5
1 0 0 1	7,7	6,7
0 0 0 1	6,9	6,1
1 1 1 0	6,3	5,6
0 1 1 0	5,8	5,2
1 0 1 0	5,3	4,8
0 0 1 0	4,9	4,5
1 1 0 0	4,5	4,2
0 1 0 0	4,2	3,9
1 0 0 0	3,9	3,7
0 0 0 0	3,7	3,5

CALIBRATION THROUGH SIMULATOR

Use a cell simulator and a tester with scale in mV and at least a number after the comma.

Connect the simulator to the AWT20L.

Measure the mV in input on the terminals 4 (+) and 3 (-) and verify 0 mV; verify that the mA or Vdc output is 0-4 mA or 0 Vdc (in accordance with the model used) otherwise use the dip-switches of coarse zero and the trimmer of fine zero to move the output to those values (usually the dip-switch 1 is in position ON).

Measure the supply (about 10V +/- 3%) on the terminals 1 (-) and 2 (+).

Multiply this value by the rated output of the cells (mV/V) to obtain the mV value in input, rotate the simulator to obtain this value on the terminals 4 (+) and 3 (-).

Use the dip-switches and the trimmer of fine full scale to obtain in output 20 mA or 5 - 10 Vdc.

Bring the mV input to zero and check the 4 - 0 mA or 0 Vdc output, otherwise adjust the new value.

Move the mV input to the full scale (load cells supply x rated output) and make sure that the output signal is 20 mA or 10 Vdc.

Adjust the full scale if necessary.

If you want the signal 20mA or 10Vdc not at the cells full scale but at a middle value corresponding to the net weight, use the following equation to calculate the input value in mV :

mVtot : F.S. cells = mVS : S

mVtot = Millivolt corresponding to load cells supply x rated output
F.S. cells = Full Scale (number of load cells x rated load)
mVS = Millivolt input
S = weight for the one you want the 10Vdc or 20mA output

Example:

load cells supply = 9,99 ;
rated output = 2mV/V ;
n° cells = 4 ;
rated load = 2500 kg ;
weight for the one you want the 10 Vdc or 20 mA output = 4000 kg

mVtot : F.S. = mVS : S

(9,99 x 2) : (2500 x 4) = x : 4000

19,98 : 10000 = x : 4000

x = (19,98 x 4000) : 10000 = 7,992mV

so with a input signal of 7,99 mV the output signal obtained must be 10 Vdc or 20 mA.

LOAD CELL VERIFICATION

Load cells resistance measure:

Use a tester with a supply not higher than 9 Vdc.

- Disconnect the load cells from the AWT20L, make sure that there is not any moistness caused by condensed water or infiltration of water. If so, keep cleaning the system or replace it, if necessary.

- Carry out the measurement of the resistance as follows:

- The value between the positive supply and the negative supply must be about 350 ohm or similar to the one indicated on the load cell data sheet.

- Value between the positive signal and the negative signal must be about 350 ohm or similar to the one indicated on the load cell data sheet.

- The insulation value between the shield and any other cores must be higher than 20 millions ohm.

Load cells tension measure:

Use a tester with a supply not higher than 9Vdc.

- From underneath the container take out the cell you intend to check

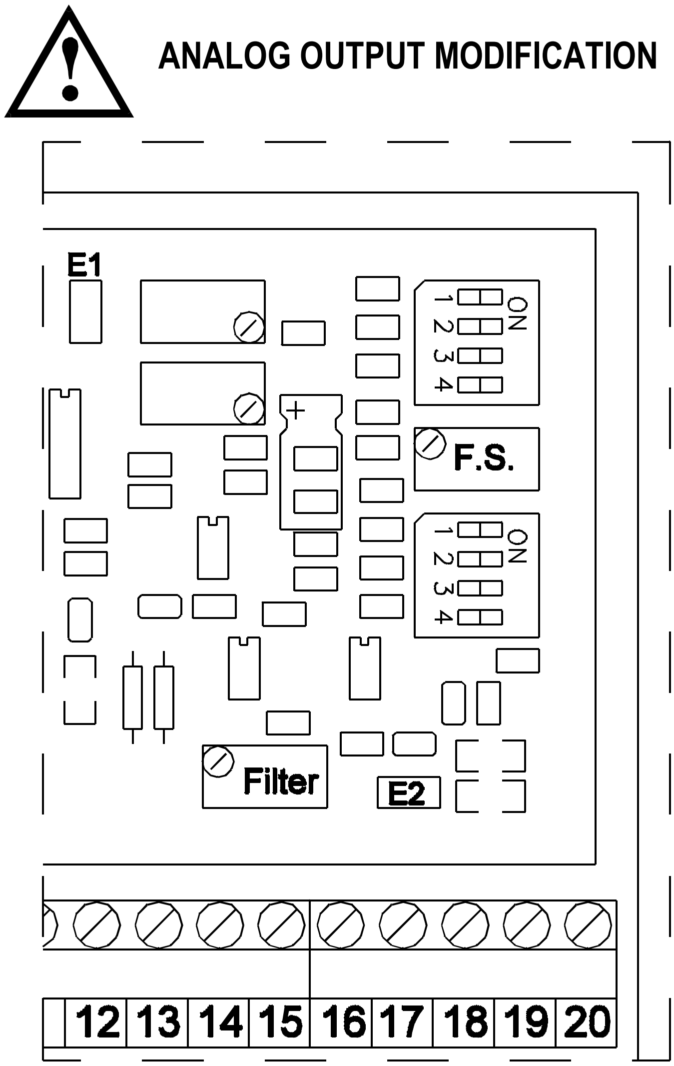
- Connect the positive and negative supply of the load cell to the AWT20L and make sure that there is a supply of 10 Vdc + / - 3 %.

- Measure the signal between the positive and the negative signal wires directly connected to the multimeter, make sure that there is a signal between 0 and 0,5 mV dc (thousandth of a Volt).

- Load the cell and make sure that there is an increase of the signal.

IN CASE ONE OF THE ABOVE CONDITIONS IS NOT MET, PLEASE CALL THE TECHNICAL ASSISTANCE SERVICE.

ANALOG OUTPUT MODIFICATION



- Remove the jumper E1 to obtain an analog output of 0 - 10 Vdc (output on terminals 22 - 23).

- Remove the jumper E1 to obtain an analog output of 0 - 20 mA (output on terminals 21 - 23).

- Close the jumper E1 to obtain an analog output of 4 - 20 mA (output on terminals 21 - 23).

- To increase the tare suppression over 17mV put a resistance of 10K (1/8 of Watt) instead of R33 (normally is 22 k).

- To have an analogue output with 35 mV in input one must enter a 49,9K resistance (1% precision and temperature precision of 15 ppm) in parallel to R11.

TRANSMITTER AWT20L +/- 5Vcc VERSION

For this version the calibration procedures are the same as the standard version: the values of the APPROXIMATE ZERO and APPROXIMATE F.S.O. tables.
With this version, the calibration can be made so that the range is:
from 0 to +5V if the instrument is cleared at ange beginning;
from -5V to 0 if cleared at ange end;
from -5V to +5V if cleared in the middle of the range.

TARE ZERO-SETTING:

Make sure that the container is empty and set the tare to zero as follows:
Use the zero fine trimmer for little variations, if it isn't sufficient use the dip-switches of coarse zero to approach zero display as much as possible, then use the trimmer of fine zero again**.**

DIP-SWITCHES OF COARSE ZERO

0 = OFF 1 = ON

REGISTERED VALUES WITH 1001 AMPLIFICATION AND ALL AMPLIFICATION TRIMMER CLOCKWISE

DIP-SWITCHES POSITION	input mV to set to zero	
	from - mV ALL ZERO TRIMMER ANTICLOCKWISE	to - mV ALL ZERO TRIMMER CLOCKWISE
1 2 3 4	- - - -	- - - -
0 0 0 0	-0.9	1.9
1 0 0 0	1,2	4,0
0 1 0 0	3,1	5,9
1 1 0 0	4,7	7,6
0 0 1 0	6,1	9,0
1 0 1 0	7,4	10,3
0 1 1 0	8,6	11,4
1 1 1 0	9,6	12,5
0 0 0 1	10,6	13,4
1 0 0 1	11,4	14,3
0 1 0 1	12,2	15,1
1 1 0 1	12,9	15,8
0 0 1 1	13,6	16,4
1 0 1 1	14,2	17,1
0 1 1 1	14,7	17,6
1 1 1 1	15,3	18,2

CALIBRATION

Make sure that the container is empty, verify that the output is 0Vdc (in accordance with model used), then put a calibrating weight equal to at least 50% of the full scale and use the trimmer of fine full scale to move the corresponding output to the exact value, if the trimmer isn't sufficient use the dip-switches of coarse full scale. Then check the 0Vdc again, and if necessary adjust it again; put the calibrating weight and check the output, repeat this operation until the output is corrected.

DIP-SWITCHES OF COARSE FULL SCALE
to obtain 10 Vdc output corresponding to the input mV

0 = OFF 1 = ON

REGISTERED VALUES WITH ZERO DIP SWITCHES IN 0000 POSITION AND ALL ZERO TRIMMER ANTI CLOCKWISE

DIP-SWITCHES POSITION	input mV to obtain 10Vdc	
	from - mV ALL AMPLIFICATION TRIMMER ANTICLOCKWISE	to - mV ALL AMPLIFICATION TRIMMER CLOCKWISE
1 2 3 4	- - - -	- - - -
1 1 1 1	27,0	24,4
0 1 1 1	24,9	22,7
1 0 1 1	23,1	21,3
0 0 1 1	21,6	20,1
1 1 0 1	20,4	19,0
0 1 0 1	19,3	18,1
1 0 0 1	18,3	17,3
0 0 0 1	17,5	16,6
1 1 1 0	16,6	15,9
0 1 1 0	16,0	15,3
1 0 1 0	15,5	14,8
0 0 1 0	14,9	14,4
1 1 0 0	14,5	14,0
0 1 0 0	14,1	13,6
1 0 0 0	13,7	13,2
0 0 0 0	13,3	12,9

EARTHING SYSTEM

For the right earthing and the ottimal functioning of the system, it is necessary to connect the indicator, the load cells, the possible junction box and the weighing structure to the earth.

TRANSMITTER

Ground terminal 26 (SHD) using a copper cable with a section not less than 16 mm^2.

LOAD CELLS AND JUNCTION BOX

- In the case the load cells are connected to the indicator through a junction box, it is necessary to connect the sheathing both of cells cables and of indicator cable to the earthing of the junction box (refer to the junction box manual) and connect this to the earth through copper cables having at least a 16 mm^2 cross-section.
- If the load cells are directly connected to the indicator (without the junction box), one should connect the shields of the load cell cables to the relative SHD terminals.

Moreover in both cases it is required to:

- Connect the upper side of every cells to the lower side using a copper braid having at least 16 mm^2 cross-section; the upper side must be short-circuited with the surface of the weighing structure and the lower one must be connected to the earth using a copper braid having at least 16 mm^2 cross-section.
- Use Earth plate of suitable length, in order to obtain a total resistance of earthing plant lower than 1 Ω.

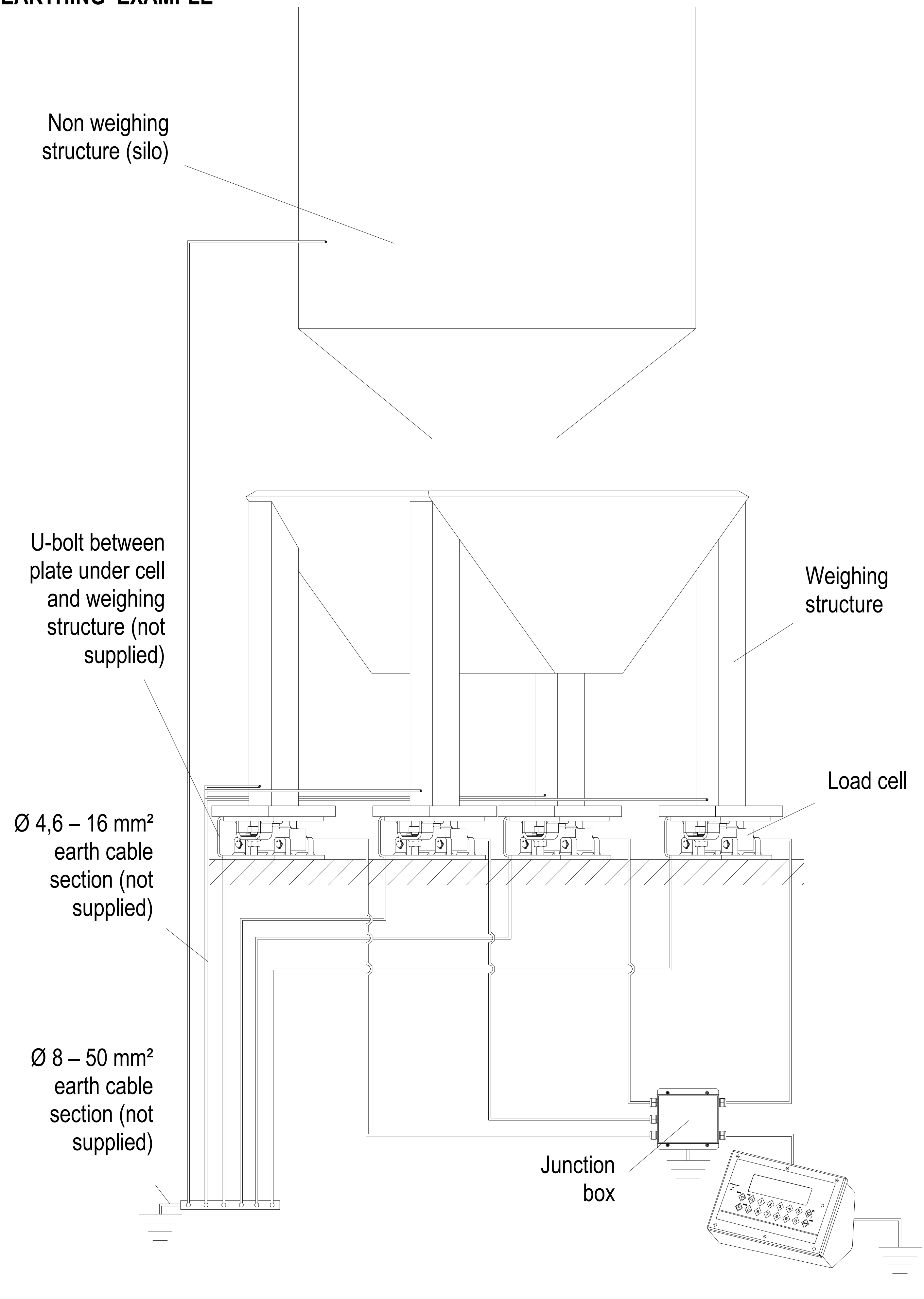
WEIGHING STRUCTURE

Connect the weighing structure and the possible connected structures (for example silos that release material on the weighing structure) to the earth through copper cables having at least a 16 mm^2 cross-section.

NOTES:

- In the case the weighing system regards great and/or outdoor structures, the cross-section must be greather (for example 50 mm2), because the voltage into play is greather (for example thunderbolts).
- In order to avoid possible undesired effects, if there are other shielded cable connected to the indicator (for instance, PC cable) the shield should be earthing only on the cable termination towards the indicator.
- Every shielded cable or not (for instance PC cable, cell cable, power supply cable) connected to the indicator should be as shorter as possible, then you have to come out of the shield the minimum length of cable, go three round around a ferrite ring and then connect to the terminal box.
- If the indicator is situated inside an electric panel, the power supply cable should be a shielded cable as shorter as possible, distant from every coil supply cable, inverter, electromotive force, etc. and in addition dedicate an uncoupler transformer in order to feed the indicator only.

EARTHING EXAMPLE



DECLARATION OF CONFORMITY

This device conforms to the essential standards and norms relative to the applicable European regulations. The Declaration of Conformity is available in the web site <u>www.diniargeo.com</u>