ACEMO
une technologie d'avance

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ELECTRONIC WEIGHING INDICATORS

DATAFARM 200 and 200M

VERSION 1.06

CONTENTS.

SAFETY PROCEDURES

⚠ SECURITY AND MAINTENANCE PRECAUTIONS

COMPULSORY PROCEDURE BEFORE WORKING ON THE EQUIPMENT

Before carrying out any work of any sort, on either mechanical, electrical, or pneumatic components, it is compulsory to cut the energy supplies.

✍ ELECTRICAL SHUT-DOWN

a) Cut the main electrical supply, via the general cut-out means available(circuit-breaker, plug and socket, fuses...).

b)   Lock the circuit-breaker in the OFF position.
If possible, use a padlock through the holes provided in the switch lever.

It is important to be sure, that under all circumstances, nobody can switch the power back on again, before he that switched it off, has finished his work.

✍ PNEUMATIC SHUT-DOWN

a)   Close the tap on the main air-line.
b)   Padlock, if possible, in the closed position.
c)   Purge the air-lines.
d)   Check that the air-lines have no remaining pressure in them.

⚠ IMPORTANT

During starting up operations, ALL the programmable values must be systematically checked and adjusted to the installations requirements.
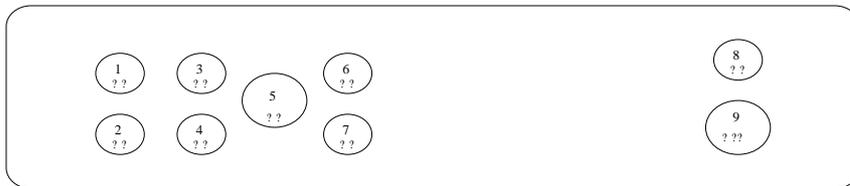
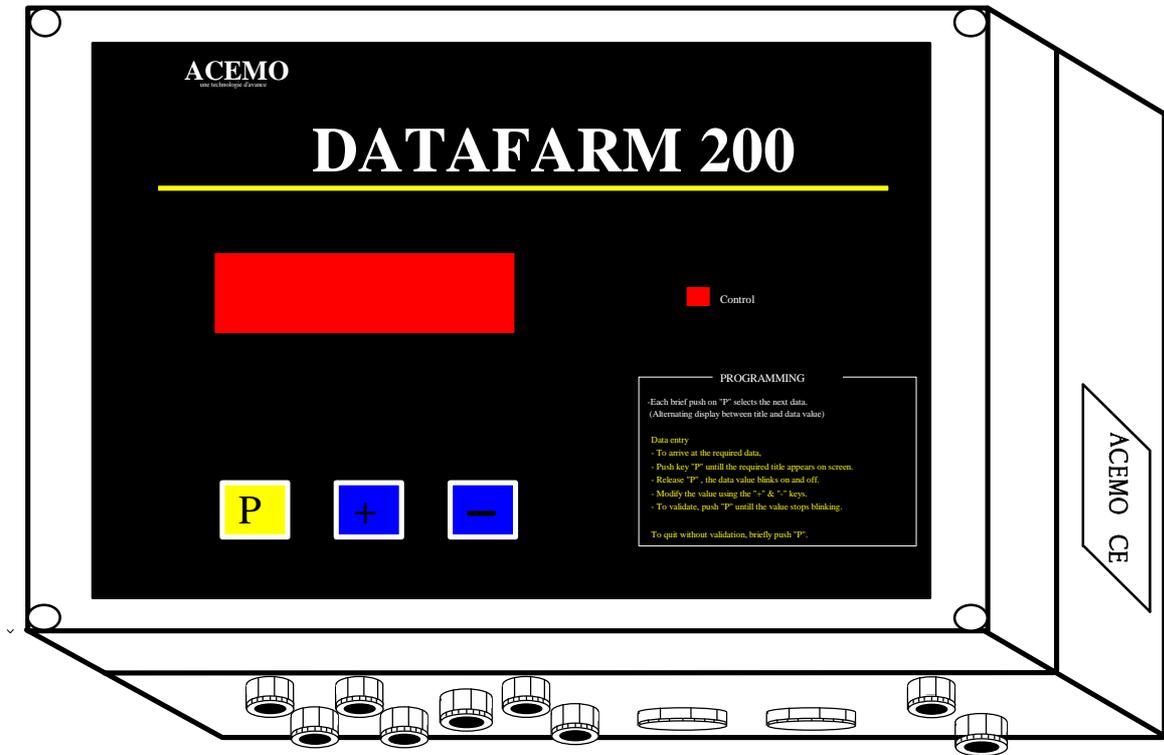The examples given in this guide are used to help understand the operations, but are not intended as representative values.

The measuring cells (temperature probes, load-cells, etc...) should be calibrated after several hours operation, and then periodically.

ACEMO CANNOT BE HELD RESPONSIBLE for damages caused by:

Programming values that are unsuitable for the installation.
Bad maintenance.
Any eventual errors in this Manual.

DATAFARM 200 .

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DATAFARM 200

Control

PROGRAMMING

-Each brief push on "P" selects the next data.
(Alternating display between title and data value)

Data entry
- To arrive at the required data,
- Push key "P" untill the required title appears on screen.
- Release "P" , the data value blinks on and off.
- Modify the value using the "+" & "-" keys.
- To validate, push "P" untill the value stops blinking.

To quit without validation, briefly push "P".

P   +   —

ACEMO CE

Cable gland layout .

1 à 4 - Load-cells
5   - Load-cell extension lead
6   - Unused
7   - RS232 serial link
8   - Earthing lead
9   - Power input

INSTALLATION .

FIXING :

The DATAFARM 200 control box should be situated inside a building, near the weighing platform or tank, and placed so that the LCD screen is easy to read with easy access to the unit.

The Load-cells connect directly to terminals inside the Datafarm 200. If the control box is too far away to do this, then an intermediate connecting box and a special cable can be added.

The Datafarm 200 is wall mounted, and should be fixed at a height of about 1m40 from the floor using either of the 2 following methods.

1) External fixing holes (A) :
- Open the box.
- Unscrew the 2 hinge fixing screws from the bottom part of the box.. (voir fig. 1).
- Remove the cover.
- Fix the bottom part of the box using 4 screws (not supplied), in each hole (A).
- Reassemble the cover and hinges.

2) Internal fixing holes (B) :
- Open the box.
- Fix the bottom of the box using 4 screws (not supplied) positioned in the holes (B).(see fig.2) .
- Push the 4 sealing covers over the heads of the screws.

Figure 1 .

4
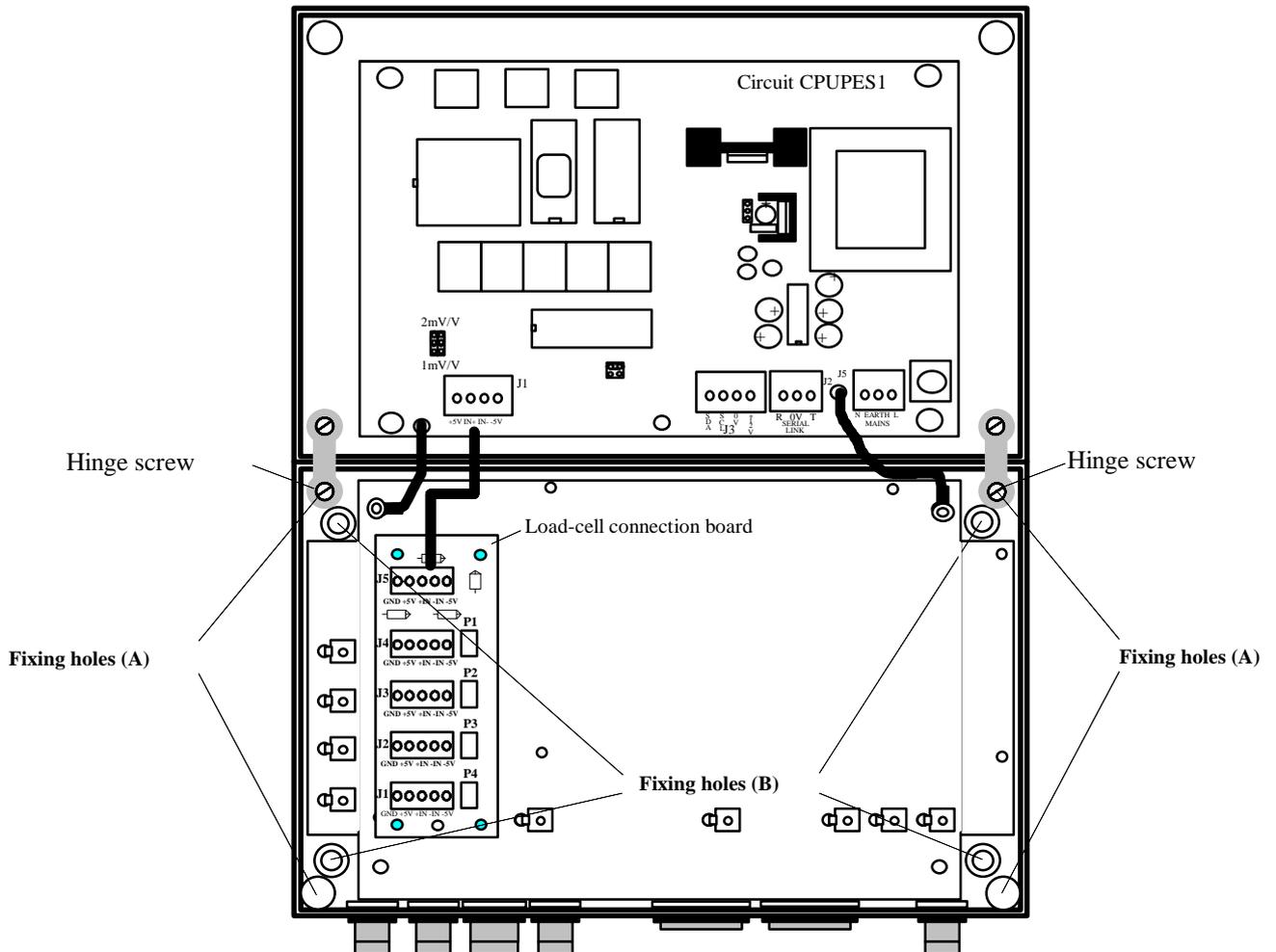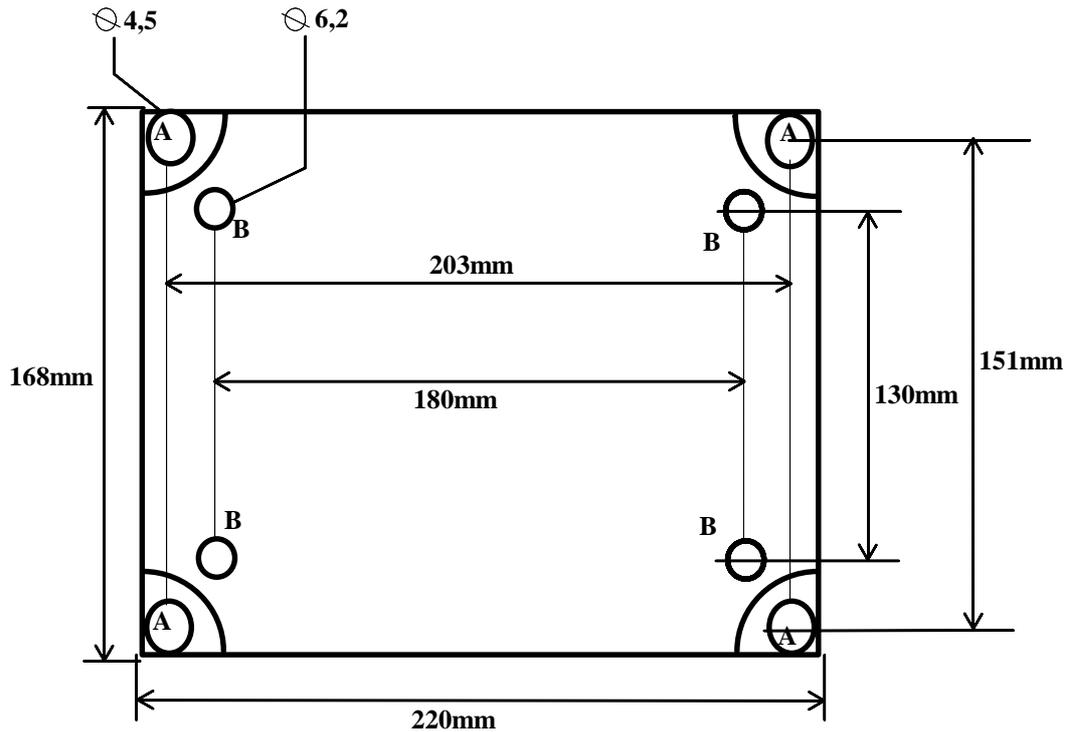
Figure 2: Fixing holes on bottom of box.

MAINS POWER SUPPLY.

To guaranty correct and safe operation, the DATAFARM 200 must be installed and commissioned by qualified personnel in compliance with the specifications laid down in these operating instructions.

- Installed to national specifications.
- Rated supply voltage = 207 to 244 volts.
- Frequency 50 Hz.
- Grounded impedance lower than 5 Ohms
- Balanced potential along Ground line.

When using a Datafarm weighing indicator in conjunction with an electromechanical control panel the power to the Datafarm should come from this panel in order to profit from the overload protections.

5

CABLING INSTRUCTIONS.

1) Inside the Datafarm 200:
- The cable shielding and the Ground leads must be connected to the Earth terminals.
- Use only one cable per cable gland:
  - Cable gland 7 => cable   3 to 6 mm.
  - Cable gland 9 => cable   5 to 8 mm.
- Cable lengths inside the box should be kept to a minimum.

2) Outside the Datafarm 200 :
- Use a metallic cable-run to fix the cables linking different elements of the same installation (load-cells, junction boxes, Datafarm 200, electromechanical control panel, computer).
- A mild-steel perforated cable-run is better than a version made from wire frame.
- The link between each section of cable-run should be made using the correct joining pieces to ensure a good metal to metal contact.
- If it is impossible to use a metallic cable-run, then this must be replaced by a separate green and yellow cable of at least 6mm² section.
- In an open metallic cable-run, power lines and signal lines can coexist on the condition that they are separated by at least 5cm. If they are not in a cable-run then they should be separated by at least 20cm.
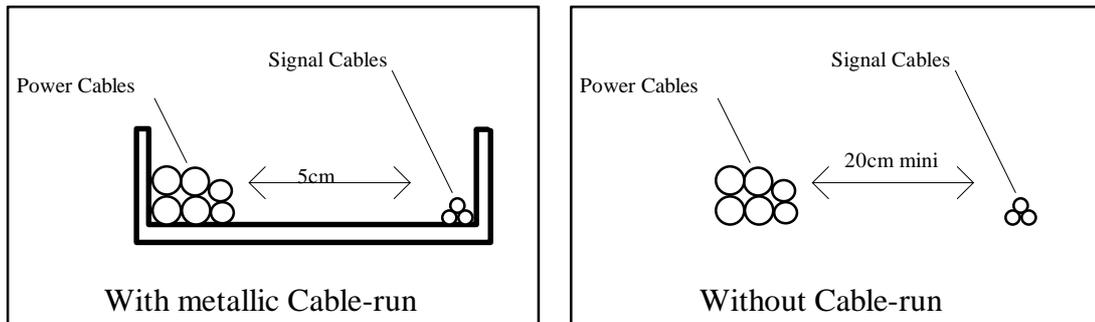
- Connect a 6mm² section yellow and green cable between each load-cell support and the cable-run that holds the load-cell cables running to the Datafarm 200.
- If the load-cells are all mounted on the same metallic chassis , connect a single 6mm² section yellow and green cable between the chassis and the cable-run. – Appendix 1 illustrates these recommendations.

CABLE CHOICE :

DATAFARM 200 terminals	Cable gland number	Voltage / Current	Type	Cable characteristics	Reference
Load-cell connection J1 to J4 on connecting board . J1 on circuit board CPUPES1 (+5V , IN+ , IN- , -5V) .	1 to 4 5	10V / 20 mA	Signal	Cables on load-cells 5x 0,5 shielded copper braid	M811915
RS232 serial link R-0V-T on board CPUPES1	7	∓ 12V ./ 20 mA	Signal	2 pair shielded copper braid	M811912
Mains N-EARTH-L	9	207 - 244V / 50 mA	Power	- 3 x 0,4mm² mini - 3 x 1,5mm²	
GROUND LINE	8			1 x 6mm² green/yellow (mini)	

Table N°1

CONNECTION TO MAINS SUPPLY.

The Earth lead should be as short as possible and connected to the metal back plate.

? **For the Datafarm 200 :**
Connect to Mains terminals on CPUPES1circuit board**.**

? **For the Datafarm 200 M .**
Connect to Mains terminals on ENSO-P 1 relay board.

LOAD-CELL CONNECTIONS.

? **Never cut the load-cell cables .**
? **Load-cells close to Datafarm :**
The load-cells are wired directly inside the Datafarm200 on the connection board.
(See chapter " Connections and Load-cell sensitivity ")

Load-cells close to Datafarm 200 .

DATAFARM 200

Load-cell connecting board
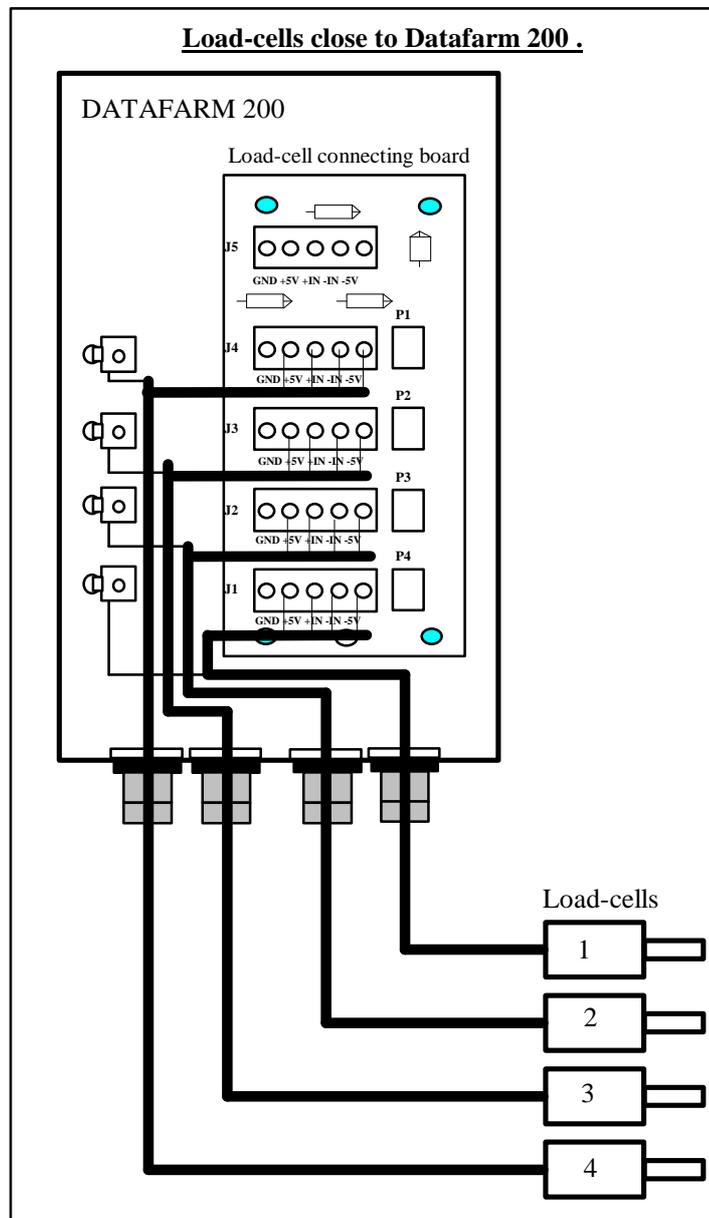
Note : The shielding braid from the load-cell cables is connected to the metal base plate in the box.

7

? Load-cells at a distance from the Datafarm 200:

The load-cells are connected via an intermediate connection box containing the load-cell connecting board that is recuperated from inside the Datafarm 200.

A specific extension cable (Ref.: M818515), is then used to link the connection box to the Datafarm 200. (See chapter " Connections and Load-cell sensitivity ").

Load-cells at a distance from the Datafarm 200 .

CONNECTIONS AND LOAD-CELL SENSITIVITY.

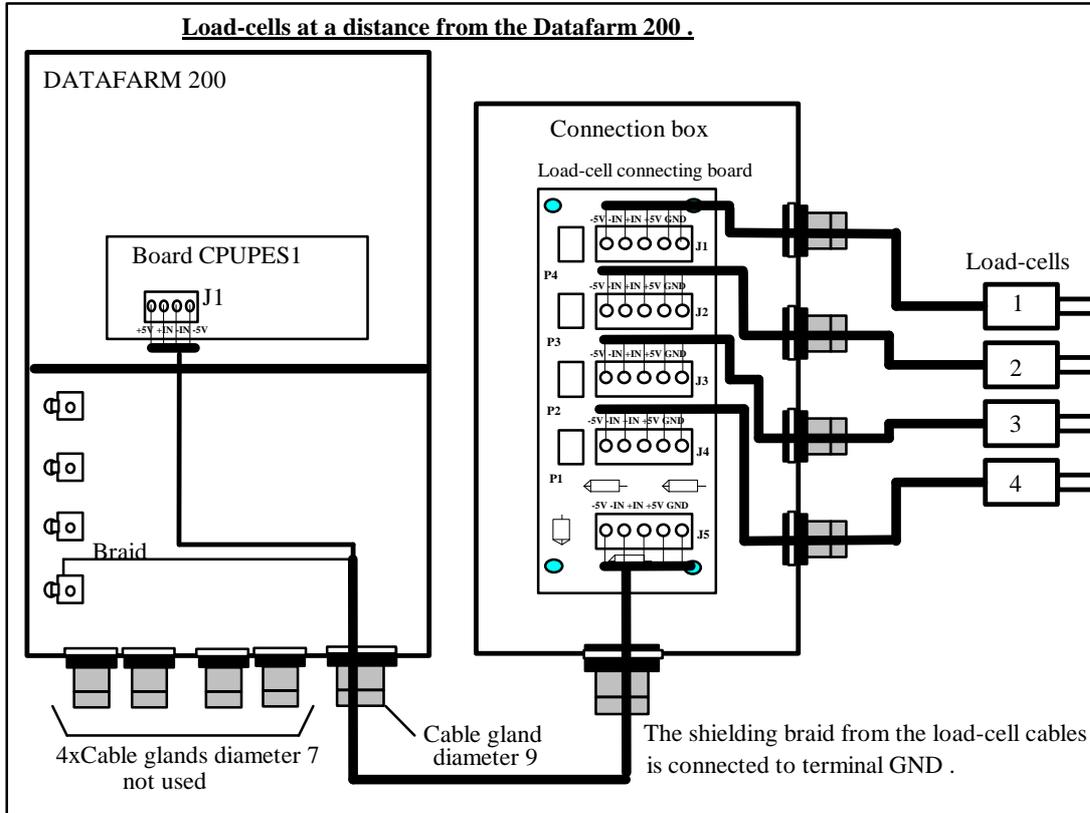| Load-cell / Datafarm	+ 5V	IN+	IN-	- 5V	Sensitivity
Sensy 5510	brown	green	white	yellow	2 mV/V
Sensy 4500	brown	green	white	yellow	2 mV/V
Sensy 4500	grey/brown	pink	white	yellow/green	2 mV/V
Sensy 4000	brown	green	white	yellow	1 mV/V
Sensy 2000 (50kg)	grey/brown	pink	white	yellow/green	2 mV/V
MOBA	b 4*	c 3*	a 2*	d 1*	0,8 mV/V
Sensy 202L (300kg)	brown	green	white	yellow	2 mV/V
MCBU	green	red	white	black	3 mV/V
Captel 1,5T CAX1.5	black	green	white	red	2 mV/V
Captel 3T CAX3.0	green	brown	white	yellow	2 mV/V
Sensy 2712 (30kg or 20kg)	brown	green	white	yellow	2 mV/V
Man 300kg	green	red	black	white	2 mV/V
Adaptor Datafarm 200	black	brown	grey	blue	

* Terminal N° on MOBA connectors.

This table gives the wiring connections for most of the load-cells used by ACEMO to date. For any other model, please contact us.

SERIAL LINK CONNECTIONS .

- This concerns an RS232 serial link, as follows:

    1200 baudrate
    1 start bit
    1 stop bit
    No parity

The link transfers the weight value to a computer, either permanently (data flow), or on request (data request).

Connect the transmission cable to terminals R , 0V , T " Serial Liaison " on the CPUPES1 circuit board.

a) Multifarm computer connection:
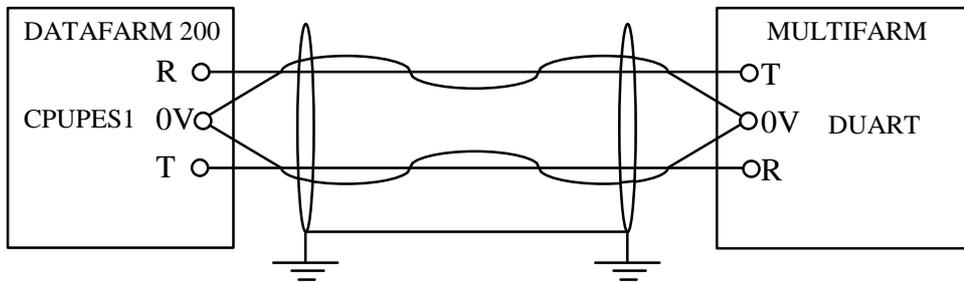
b) MR88 computer connection:
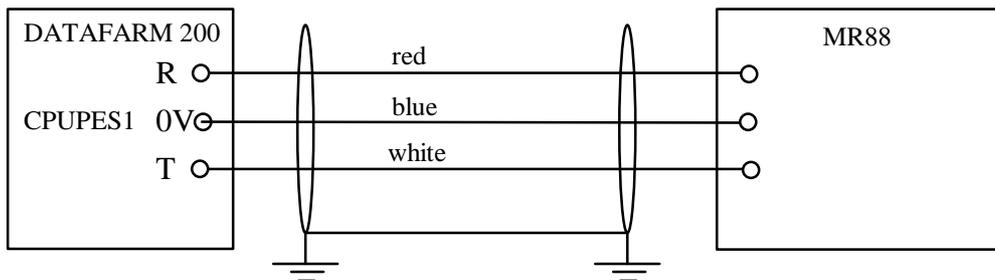
RELAY CONNECTION FOR THE VERSION 200M.

A relay with a floating on/off contact, is set with a value programmed by the user.
Two operating modes are possible:

1) Loading mode .

2) Unloading mode .

the choice between loading and unloading is programmed with the parameter "CONSI" when the Datafarm is in 'User' mode.
The hysterisis value is programmed when the Datafarm is in 'Configuration' mode.

Floating contact relay 250V , 2A maxi

PRESENTATION .

- The DATAFARM 200 is a unit that measures , displays , and transmits via a serial link the weight resting on load-cells. After validating an access code, an easy to use 'configuration' mode allows the technician to adapt the Datafarm to different types of load-cells. The Datafarm 200 exists in two versions:
- The 'standard' Datafarm 200 that is used to weigh a tank or an animal weighing platform.
- The Datafarm 200M that handles a floating relay contact with a programmable weight value.

- The Datafarms 200 and 200M are usually used in conjunction with ACEMO computers (MR88, Multifarm, etc . . .).

EQUIPMENT CHARACTERISTICS.
- PVC plastic box, IP45, containing:-
- A microprocessor board CPUPES1.
- A load-cell connection board.
- A front panel with: ? 5 digit LED screen.
  ? 3 keys.
  ? 1 indicator lamp.
- 9 Cable glands.
- Connection terminals for load-cells, transmission cable and mains input.
- Internal resolution 20000 points.
- 10 measures per second.
- Programmable measuring chain: ? Sensitivity 1mV/V or 2mV/V .
  ? Calibration.
  ? Filtering.
- CEM compliance.
- For the 'M' version : 1 output relay (floating contact 250V ,2A maxi) .
- Dimensions : L x W x D = 220mm x 190mm x 110mm .
- Weight : 2700gr .

Software characteristics .
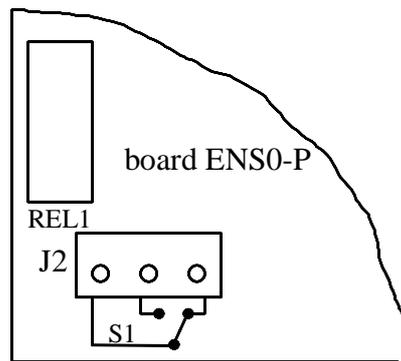In order to avoid manipulation mistakes, the software separates the operations that can be used by the technician, and those that are accessible to the user.
- **User mode :**
  - Weight value
  - Tare adjustment.
  - Set value programming.
  - Access to configuration mode(with code).
- **Configuration mode (technician) :**
  - Value of Gross weight .
  - Programming of Coefficient. 'A'.
  - Programming of Coefficient. 'B'.
  - Programming of the scale.
  - Filter programming.
  - Transmission mode programming.
  - Operating mode selection.
  - Programming the hysterisis value used with the chosen weight value.
  - Relay simulation

Key use:
- Three keys are used to read or write on the Datafarm 200.
- At rest the screen indicates the weight, with the possibility of effectuating a "momentary zero"
???????????? "minus" key to reset the zero.
???????????? "plus" key to pass more from Add-on" mode to original weight and conversely.
- To read data:???? Select the required data using the "P" key.
- To write data : ? Select the required data.
???????????????????????????????????? Push the "P" key until the required data appears on screen.
  ? Release "P", the value start blinking.
  ? Modify the value using the keys "+" and "-" .
???????????????????????????????????? To validate , push "P" until the value stops blinking.????
???????????????????????????????????? To quit without validating , push "P" quickly.

USER PROGRAMMING

User mode

- When the power to the Dataform 200 is switched on, the screen at first indicates " 8.8.8.8.8. " during a couple of seconds, and then the software reference. After this initialisation, the weight on the load-cells appears on the screen and on the serial link. The user can then either effectuate an 'Add-on' weighing, modify the Tare or relay trip value, or using a code, enter into the 'configuration' programming.

" ADD-ON WEIGHING " - Add the load to be weighed . The screen will show the weight of the load that has been added.Pushing the key "minus" will reset the indicator to zero and the relay is activated for a new loading or unloading .

Remarks : The weight shown on the screen after pushing the "minus" key will blink to inform the user that the Dataform is in 'Add-on' mode. Pushing the "plus" key to pass more from Add-on" mode to original weight and conversely. During 'Add-on weighing' the weight transferred along the serial link corresponds to the total weight on the scale.

" TARE " – This operation allows the user to adjust the value on the screen of the Dataform to the real weight on the scale .To do this : ? Empty the tank or hopper, select 'Tare' mode via the keys, adjust the value, then validate.
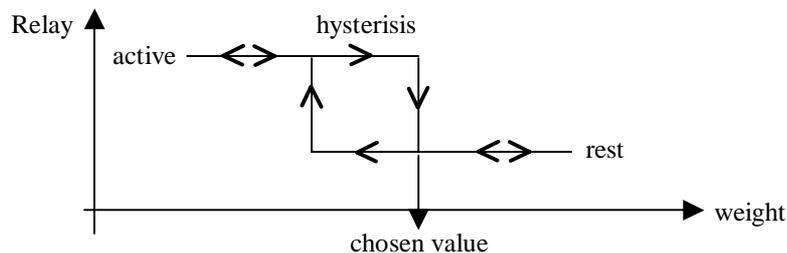
" CONSI " – This concerns only the Dataform 200M. These versions are equipped with an ENSO-P circuit board, with an operating mode as "loading" or "unloading":

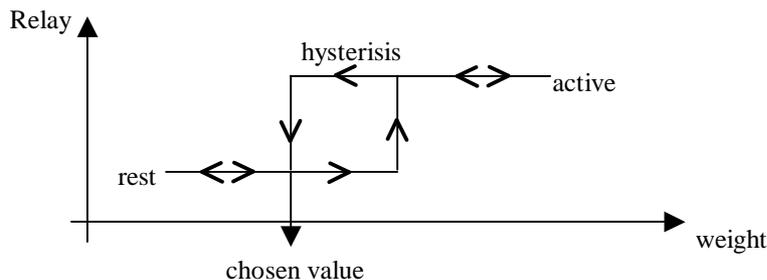   ✏ loading mode if the value is positive (example: 50).
    ✏ unloading mode if the value is negative (example -50).
    Via this operation the dataform200M determines the value at which the relay will switch.

    1) **Operating mode = loading**

    2) **Operating mode = unloading**

    " CONFI " : After entering and validating the code '38' the Dataform enters into the 'Configuration' mode.
    Attention ! : This operation should only be carried out by a qualified technician.
    To leave this mode, simultaneously push the "+"and "-" keys.

Under certain conditions an error message may appear on screen.

Message	Meaning	Cause
Err.2	overload	Badly connected load-cells
Err.3		Load-cells overloaded
Err.4		Load-cell not working
Err.5	Conversion error	Dataform not working

INSTALLER PROGRAMMING.

The 'Configuration' mode.

- Installer programming is possible only when the Datafarm200 is in 'Configuration' mode. To enter this mode, from 'User' mode, select the heading " CONFI " then write and validate the number " 38 ". To return to user mode, push simultaneously on keys " + " and " - "

- Each push on the " P " key, will advance the reader to the next value. To modify a value, see chapter " Key Use ". This mode is reserved for the use of the Installer or After-sales technician.

Description of different functions:

- " **Brut** " : Gross weight, result given by conversion This value is between 0 and 99999.

- " **Coef A** " : Coefficient A , this value is either factory set, or can be modified during installation, and depends on the amplifier gain (1mV/V to 2mV/V) , the amplifier coefficient used, and the type of load-cells installed. If the Load-cell coefficient is known, it can be obtained by calculation, if not, it must be obtained experimentally

- By calculation : Coefficient A = Amplifier coefficient * Load-cell coefficient .

The amplifier coefficient depends on the CPU PES1 circuit board, and is written on this board.

The Load-cell coefficient is given by the table "Load-cell characteristics " in appendix 2.

- Experimentally:

1) Choose the weight unit (kilograms, hectograms, decagrams, or grams) that best represent the maximum load on all the load-cells, using a maximum of 5 digits.

Examples: * 10000 kg   - > 10000 kg
                        * 4500 kg   - > 45000 hectograms
                        * 300 kg- > 30000 decagrams
                        * 10 kg   - > 10000 grams

2) Use a known weight, that represents at least 25 % of the total capacity of the sum of the Load-cells. The value of this weight must be converted into the same units as those selected above.

Delta points = 'Brut' weight with load added – 'Brut' weight without load
Coeff A = Known weight / Delta points

Examples:

Max.Scale value	Weight Unit	Known Weight	Result for Coeff. A
10000 kg	kilogram	3000 kg	3000 / (delta points)
4500 kg	hectogram	1200.5 kg	12005 / (delta points)
300 kg	decagram	70.23 kg	7023 / (delta points)
10 kg	gram	9.67 kg	9670 / (delta points)

3) Adjust the position of the decimal point in order to read in kilograms (see " **Affich** ")

- " **Coef B**" : Coefficient B. This value is the result of the 'Tare' operation carried out in the User mode, and cannot be modified in this programme.

$$\text{Weight indicated on screen} = \text{Coeff A} \times \text{'Brut' weight} - \text{Coeff B}$$

- " **Echel** ": Scale. This value (01 , 02 , 05 , 10 , 20 , 50) represents the step between 2 consecutive values. It has been factory set to suit the type of Load-cells.

- " **Filtr** " : Filter. This value (04 , 08 or 16) represents the filtering amplitude. Again, it has been factory set to suit the type of Load-cells. For pig weighing platforms (mode = "P"), this value isn't used, as the filtering is automatic.

- " **Affich** " : Display. This value (0 , 1 , 2 , 3) indicates the position of the decimal point, in order to display the weight on screen in kilograms. It has been factory set to suit the type of Load-cell.

Affich = 0   > If weight unit is in kilograms
Affich = 1   > If weight unit is in hectograms
Affich = 2   > If weight unit is in decagrams
Affich = 3   > If weight unit is in grams

- " **DATA** " : This value determines the operation mode of the RS232 data link between Datafarm200 and the computer.

r ? ?data request (Multifarm) .
F? ?data flow (MR88) .
p ? ?transmission to a 3 digits indicator panel .
     Indicator mode:
          1 - The weight value is between 0 and 999 :
          the weight appears normally on the 3 digits screen .
          2 - The weight value is higher than 999 :
          the weight appears using in a sequence corresponding to 2 digits for tons , and then 3 digits for the remaining kilograms . The ton value appears on screen for half a second, the kilogram value then appears 2 seconds .
          3 - The weight value is negative :
          the panel indicates a blinking '888' sequence .

- " **Mode**" : This value sets the operating mode of the Datafarm 200:
          - "0" : ?standard weighing mode,
          - "P" ??pig weighing platform mode,
          - " d" Unloading mode, (Not used in version 1.06)
          - "c" Loading mode. (Not used in version 1.06)

- " **Hyst** ": Hysterisis: Value in Kg, between 0 and 9999, indicating the Hysterisis value applied to the relay trip value, to prevent the relay swinging back and forth when the weight reaches the chosen value.

- " **REL1** ": Simulates relay activation:
? ?'ON" = Relay activated ,?'OFF" = Relay at rest .

Reset of EEprom memory.

To reset the memory, the " - " key must be pushed 5 times during the initialisation period, while the software version is on the screen.
After a memory reset, all values that have manually programmed are replaced by the factory determined values.

14

OPERATING INSTRUCTIONS.

- Read through the entire manual carefully.
- Carry out the electrical connections.
- Adjust the 'Tare' after several hours operation.
- Check the weight indicated on the screen by using a known value representing at least 20% of the nominal
  load.
- Check the operation of the serial link, if connected.
- For the 'M' version.
    Programme a 'Set Value' .
    Programme the Hysterisis value.
    Select the operation mode.
    Carry out a test, to validate the data entered.

MAINTENANCE :

⚠   - Before cleaning the control box, ensure that the safety precautions have been respected and that the electricity supply has been cut correctly (see page 2).

    - Keep the control box and load-cells clean using only a damp sponge. Do not use detergent or solvents, and do not use either a hose or a high-pressure washer.

    - A weighing system under a tank or hopper should have its tare weight checked once a month by the user.

    - The calibration is controlled during starting-up operations, and then a minimun of once every 6 months, by a qualified and authorised service technician, using test weights (control empty tank and maximun load).

1) Removing the CPUPES1 circuit board:
- Cut the power and follow the safety procedure (see page 2).
- Open the control box.
- Disconnect the terminals on the CPUPES1 board.
- Unscrew the 4 fixing screws.
- Remove the board .
- Replace with a new board, and carry out the above operations backwards.
- Switch the power back on.
- Check the operation and the programme values .
- **Important :**

Each time a CPUPES1 board is changed , it is necessary to:

    ? Run a calibration check.
? ? ? ?   ?   ?   ? Programme all the data in 'Configuration' mode.
? ? ? ?   ?   ?   ? Carry out a system 'Tare' (User mode).
? ? ? ?   ?   ?   ? Check the weight on the screen using known weights .

2) Removing the ENSO-P circuit board:
- Cut the power and follow the safety procedure (see page 2).
- Open the control box.
- Disconnect the terminals on the ENSO-P board.
- Unscrew the 4 fixing screws.
- Remove the board .
- Replace with a new board, and carry out the above operations backwards.
- Switch the power back on.
- Check the operation and the programme values .

3) Spare parts :

Description	Reference
Temporised Fuse 100mA Size 5x20	M648512
CPUPES1 circuit board	EL0553
ENSO-P 1 relay board	EL0556
Load-cell connecting board	SC0343
Datafarm 200	10 40 00
Datafarm 200M	10 40 01
Load-cells	Depending on type

4) Accessories :

Description	Reference
Box for load-cell connection board	10 40 02
Shielded load-cell extension cable	10 40 03Z
RS232 serial link cable	M811912

CEM COMPLIANCE CABLE INSTRUCTIONS

APPENDIX 1.

Power 230V(L+N+EARTH)

DATAFARM 200

Load-cell
connecting
box

RS 232 transmission
Weighing Output

Detaill A
or
Detail B

height 20cm maxi

Detail A
or
Detail B

Metallic cable-run

Detail A
or
Detail B

Earth conductors diametre 6 mm² minimum

Detail A

Braid joining the
2 parts of support

Earth lead

Cell type 4500

Detail B

Earth lead

Cell type 5510
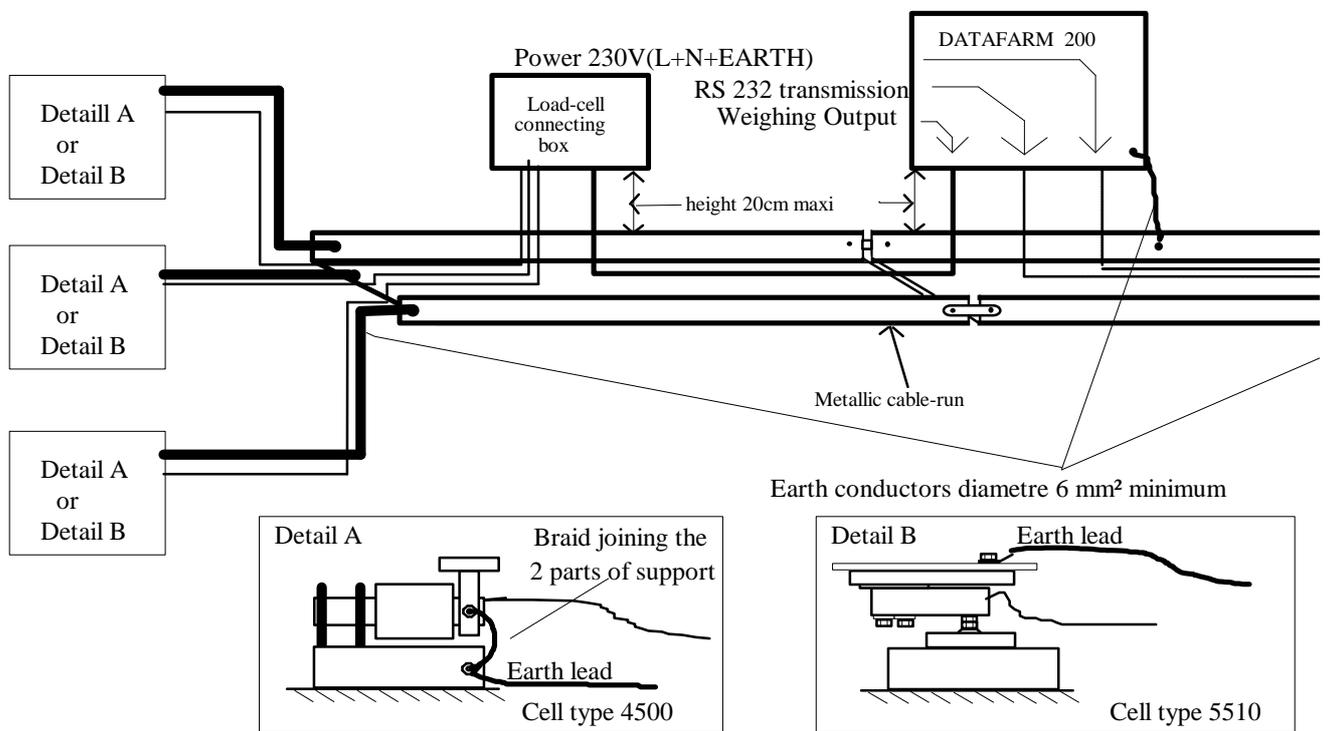
- - Detail A. The lower part of each Load-cell support is connected with an Earth lead to the metallic cable -run, keeping the
- A perforated metallic cable -run is to be preferred to a wire-framed version.
- Links between different sections of cable -run must ensure good electrical continuity.
- Cables should be laid and attached in the corners of the cable -run.
- If impossible to use a cable -run, it must be replaced by a green and yellow ground lead of at least a section of 6mm².

General reminder- In a metallic cable -run, power cables and signal cables can coexist on the condition that they are placed
centimetres between them.

Appendix2

LOAD-CELL CHARACTERISTICS

Type of Load-cell	Qty	Sensitivity	Scale	Filter	Display	Coef. load-cell
Sensy 5510/4500 500Kg	3	2 mV/V	02	08	1	0.7462
Sensy 5510/4500 500Kg	4	2 mV/V	02	08	1	0.9950
Sensy 5510/4500 1T	3	2 mV/V	02	08	1	1.4910
Sensy 5510/4500 1T	4	2 mV/V	02	08	1	1.9880
Sensy 5510/4500 1.5T	3	2 mV/V	02	08	1	2.1900
Sensy 5510/4500 1.5T	4	2 mV/V	05	08	1	2.8990
Sensy 5510/4500 3T	3	2 mV/V	01	08	0	0.4473
Sensy 5510/4500 3T	4	2 mV/V	01	08	0	0.5964
Sensy 4000 3T	3	1 mV/V				
Sensy 4000 3T	4	1 mV/V				
Sensy 202L 300Kg	1	2 mV/V	01	08	1	0.1588
Sensy 2712 20Kg	1	2 mV/V				
Sensy 2712 30Kg	1	2 mV/V				
Moba 300Kg	3	1 mV/V				
Moba 300Kg	4	1 mV/V				
Moba 3T	3	1 mV/V				
Moba 3T	4	1 mV/V				
MCBU	1	2 mV/V				
MAN 300Kg	1	2 mV/V	01	08	1	0.1434
Captel CAX 1.5 1.5T	3	2 mV/V	05	08	1	1.8769
Captel CAX 1.5 1.5T	4	2 mV/V	05	08	1	2.5025

REMEMBER :   coefficient A = Amplifier coefficient * Load-cell coefficient .
The Amplifier coefficient is written on the CPU PES1 board.
When the load-cell coefficient is unknown, an experimental calibration must be carried out using at least 25% of the nominal charge of the load-cells.

$$\text{Coef A} = \frac{\text{Weight of load}}{\text{Gross weight with load - Gross weight without load}}$$

WIRING DIAGRAM OF A 3 DIGITS INDICATOR PANEL WITH A DATAFARM

DATAFARM 200

serial link
R 0V T

N   L

Power supply 26V-2A-DELAYED

26V
26V
0V
0V

230V
230V

R 0V 0V 26V

INTERFACE
AF3

T 0V 26V

Fuse 1A

LIGHTING PROTECTION

hearth

L   N

230V