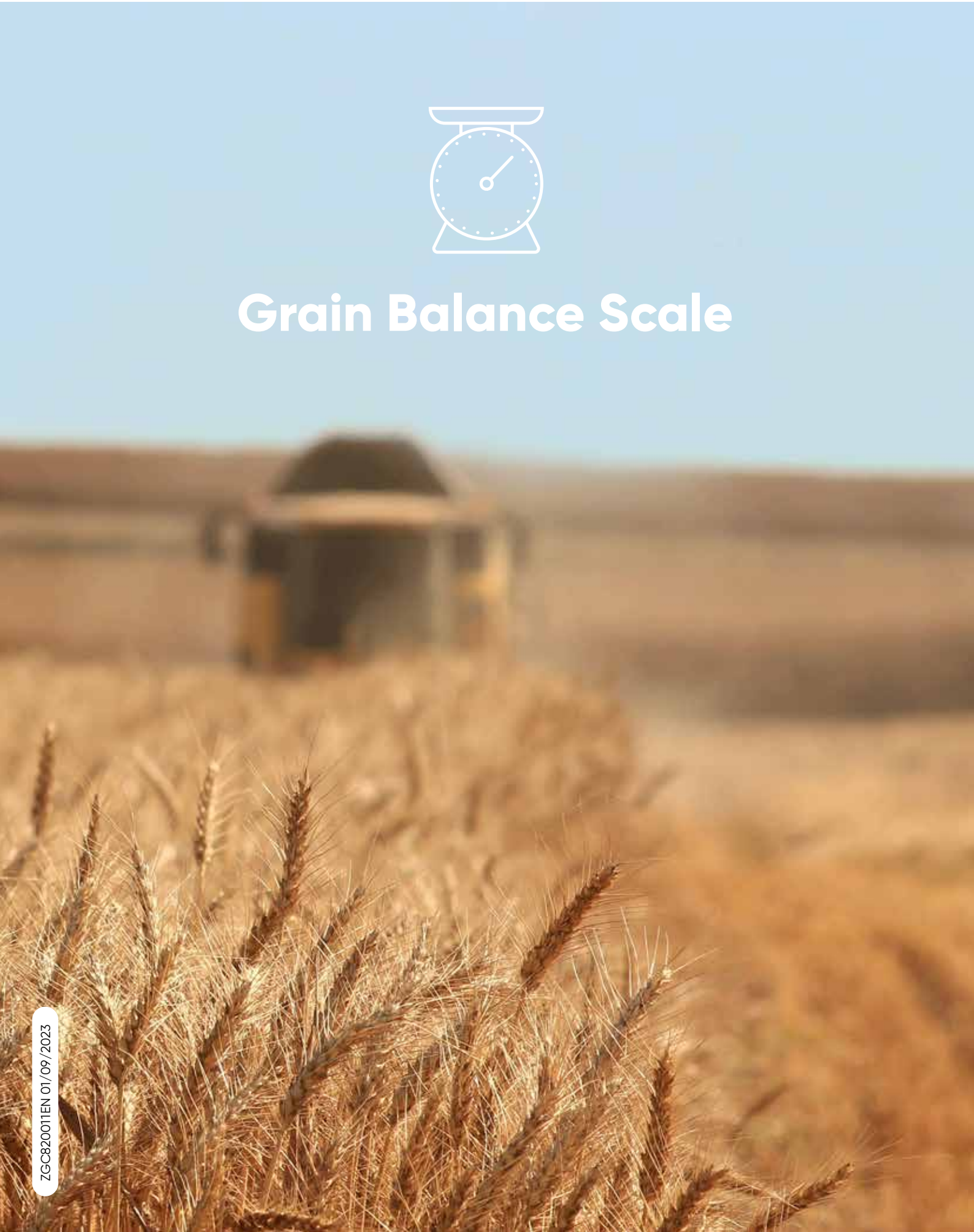
Assembly/Connection/Maintenance



Grain Balance Scale

ZGC820011EN 01/09/2023

Contents

Thank you for choosing Grain Balance Scale!

Grain Balance Scale must be assembled correctly and maintained thoroughly if it is to operate satisfactorily. These instructions for assembly. connection and maintenance must be followed for our warranty to be valid.

We hope you will be pleased with your equipement for a long time.

Grain Cloud and its sub-products are trademarks of Skandia Elevator AB and therefore Skandia Elevator AB is responsible for the warranty, CE marking and EC declaration according to this chapter.

Goods inspection

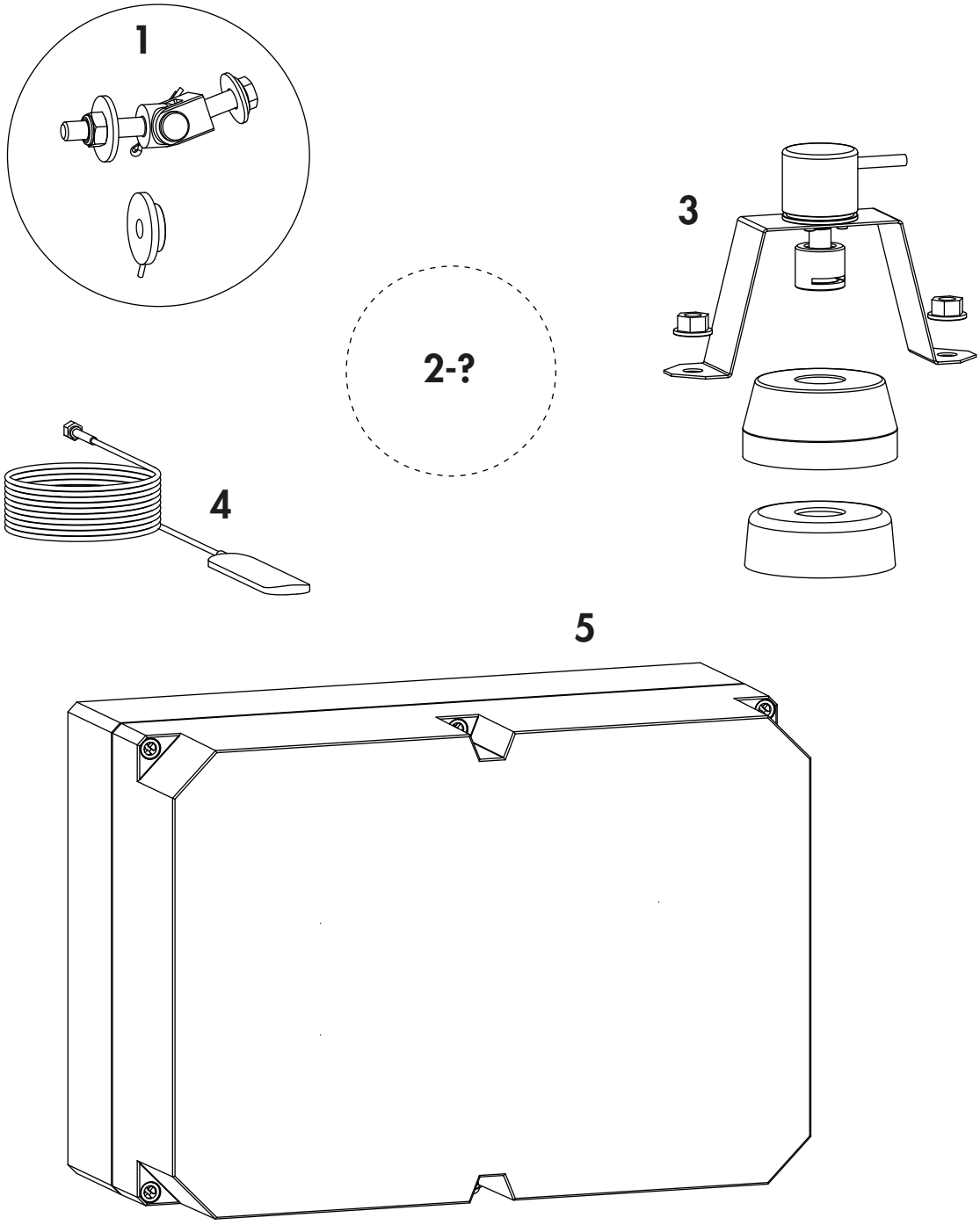
Check that the number of packages agrees with the delivery note and that the packing and goods are not damaged. Make a note of any damage and missing materials on the consignment note and report it to the carrier and to us. Make sure the delivery is complete after unpacking the goods. Any materials that are found to be incorrect must not be assembled.

Warranty

A 2-year factory warranty from the day of delivery applies to all Skandia Elevator AB products. A condition of the warranty and any subsequent compensation is that Skandia Elevator AB is contacted and an agreement reached between the customer and Skandia Elevator AB on how any faults must be rectified. The warranty covers all parts that are damaged or break due to faulty design or manufacture. Faults and damage caused by faulty assembly, incorrect use or lack of maintenance will not be covered by the warranty.

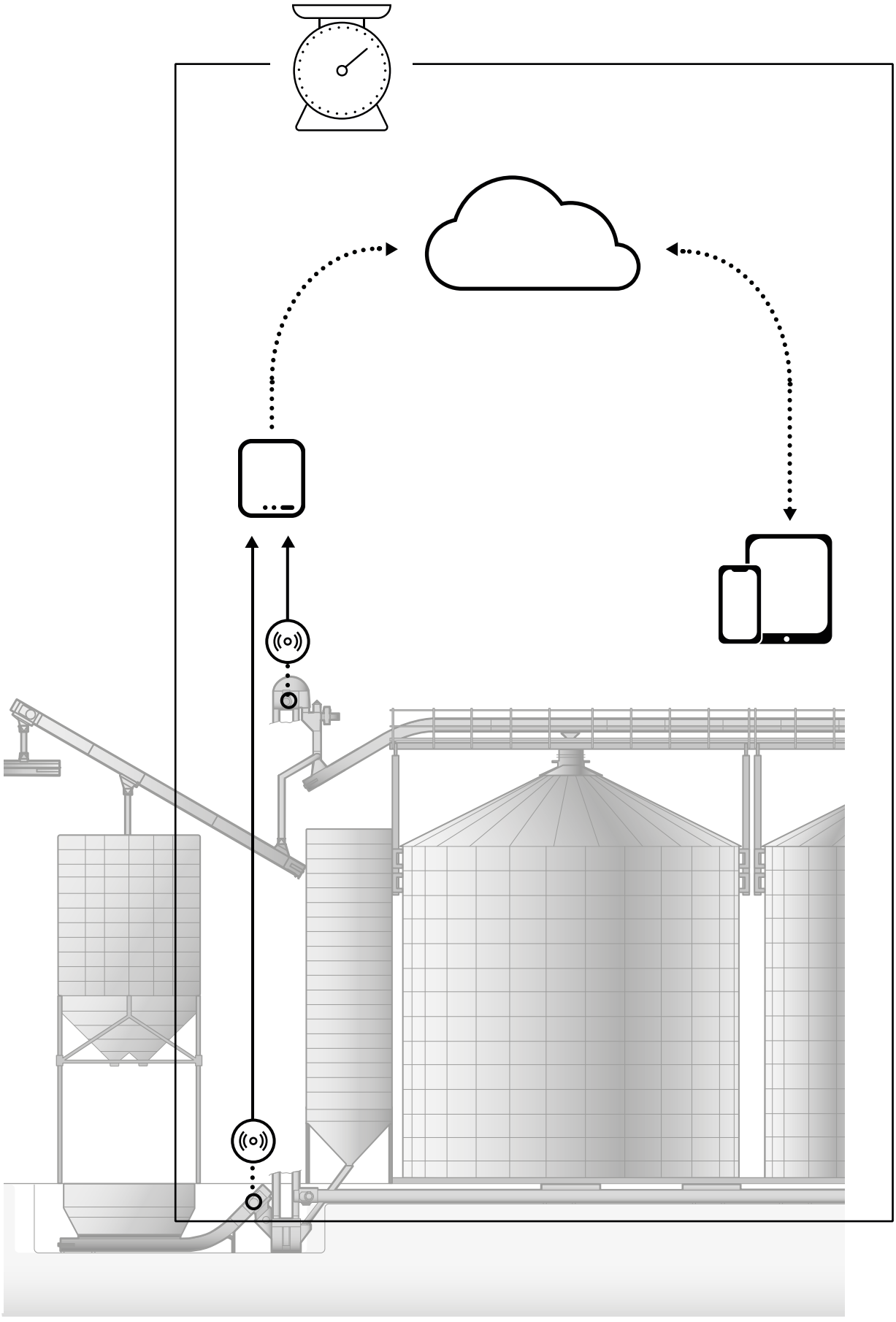
CE mark

The CE mark is located on the outside of the product's connection unit and is proof that the product is manufactured in accordance with EU directives regarding electronics and meets safety requirements. The CE mark contains information about the year of manufacture and which week, model designation, part number, serial number, voltage, IP class and working temperature. Always state the serial number when making a complaint or ordering spare parts.



Parts	Pos.
Weight sensor - Supplied with load cell separately.	1
Positioning support - NB! Has different components depending on the design of the torque rod. See the separate detailed drawing enclosed with the weight sensor.	2-?
Rotation sensor - Only included for installations with trench intake conveyor loading where the elevator is also used for transport other than loading.	3
Modem antenna	4
Connection device including modem	5

System overview



The owner of the transport equipment is responsible for these assembly instructions always being available to the fitters, electricians, maintenance technicians and engineering technicians concerned.

Incorrect assembly and/or operation may lead to personal injury or damage to the transport equipment and/or other equipment. It can also cause malfunctions or a reduction in capacity.

Read the assembly instructions carefully before assembly, electrical connection, maintenance or operation commences. If any part of these instructions should be difficult to comprehend, please get in touch with your reseller for assistance.

The safety information is presented and interpreted as follows:

⚠ **WARNING!**
Disregarding instructions given in warnings can cause serious personal injury or death.

⚠ **IMPORTANT!**
Ignoring the instructions given in important texts may cause damage to the transport equipment and/or other equipment. It can also cause malfunctions or a reduction in capacity.

NB! indicates that the text contains information that will simplify the assembly process.

General safety information

⚠ **WARNING!**

- Use protective gloves, helmet, steel-toed boots, ear defenders, protective goggles and high-vis vest when carrying out assembly, electrical connection, maintenance and operation of transport equipment.
- Stop the machinery and turn off electric power before attempting any type of assembly, electrical connection or maintenance work.
- All electrical equipment must to be connected by a qualified electrician.
- Do not start the machinery without the lid, hatches, covers, guards and connections being fitted in such a way they can only be opened with tools.

Tools

Required tools:

- Block wrench set and socket wrench set with extender.
- Large wrench.
- Mobile phone with internet connection.
- The Grain App s installed and the facility is connected, this is arranged by the sales manager when ordering Grain Balance.

Additional materials and safety equipment

Additional materials and safety equipment required but not included in the delivery:

Wiring

⚠ **IMPORTANT!**

15 m of cable is included in the weight sensor on delivery and must not be cut or extended.

- Power supply wiring to the connection unit must be procured for 230V AC.

⚠ **WARNING!**

The power supply wiring must be fused. Connect the connection unit via an earthed plug or a control switch.

- 3 m of wiring is included in the rotation sensor (if included in the batch) on delivery. NB! Shielded signal cable with at least 3 conductors (3 x 0.14 mm^2) must be procured for the Installation wiring with a length of approximately 1.5 x the elevator height.

Junction box

A junction box between the rotation sensor wiring and the installation wiring must be procured if the rotation sensor is included in the batch.

⚠ **IMPORTANT!**

Ensure moisture-resistant cable connections and strain relief in the junction box.

Attaching material

Material for attaching wiring.

Preparations

Find a mounting location for the connection unit near the elevator head, such as on a cable ladder. NB! Be sure to position the connection unit well in relation to the wiring for the weight sensor, power supply, modem antenna and any rotation sensor.

Ensuring clean run times

⚠ **IMPORTANT!**

For Grain Balance to work well, it is important to have sufficient clean run times. Set them to at least 60 seconds if there is a control system with sensing. If there is no control system with sensing, ensure that shutdown occurs at least 60 seconds after no grain is left in the intake pit.

Weight sensor Elevator

Weather cover - Adjustments in certain instances

⚠ **IMPORTANT!**

Ensure that the gearbox motor does not catch the weather cover in any way, as this may affect the weighing.

For some gears and mainly right-hand mounted ones, the weather cover of the gearbox motor needs to be adjusted after installation of the weight sensor in order to fit the junction box on the motor. For some variants it is sufficient to knock the cover out slightly, for others a hole has to be made and an extra cover is supplied to fit over the hole. For some other variants, a new weather cover is included. Assemble according to separate assembly instructions.

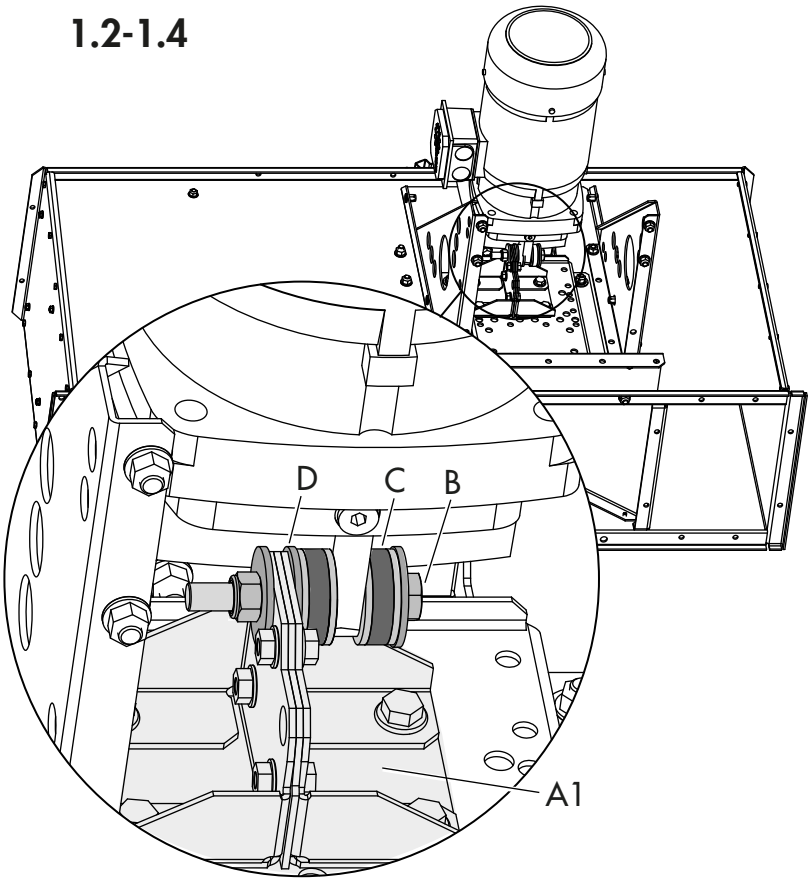
Disassembly

1.1 Remove any weather cover from the elevator's gearbox motor.

1.2 Loosen the torque rod (A1) bolted joint (B).

1.3 Relieve the weight of the gearbox motor, by using tensioning straps for example.

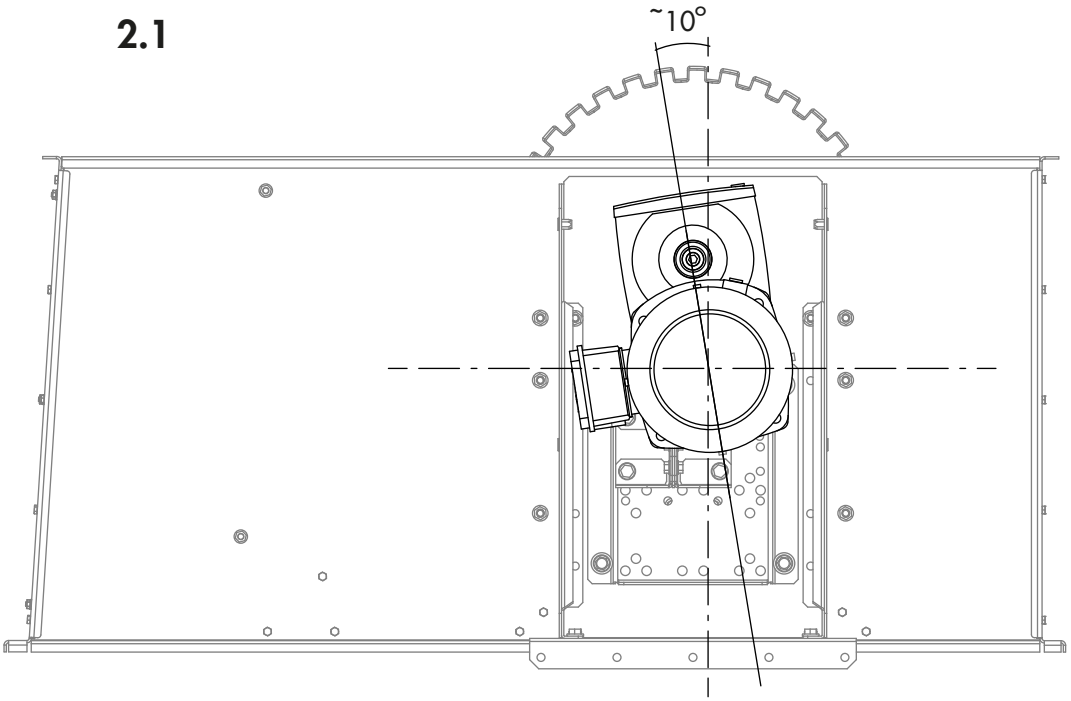
1.4 Remove the screw (B), the rubber bushings (C) and the washers (D). NB! Save for possible resetting.



Assembly

2.1 Tension the gearbox motor to about 10 degrees of inclination.

2.1



2.2 Special steps for certain gears, see below, other gears go directly to step 3.

For gears SEH new generation SK4282 and SK6282

The delivery includes a new torque rod to replace the existing one. It is installed in the same place and with the existing screw.

Only for gears SK1282 and SK4282

Check that the motor can be tensioned to 8-10 degrees of inclination and that the distance (X) between the torque arm and the gearbox is greater than 2 mm. If the distance is correct, proceed to step 3. If not, carry out the following:

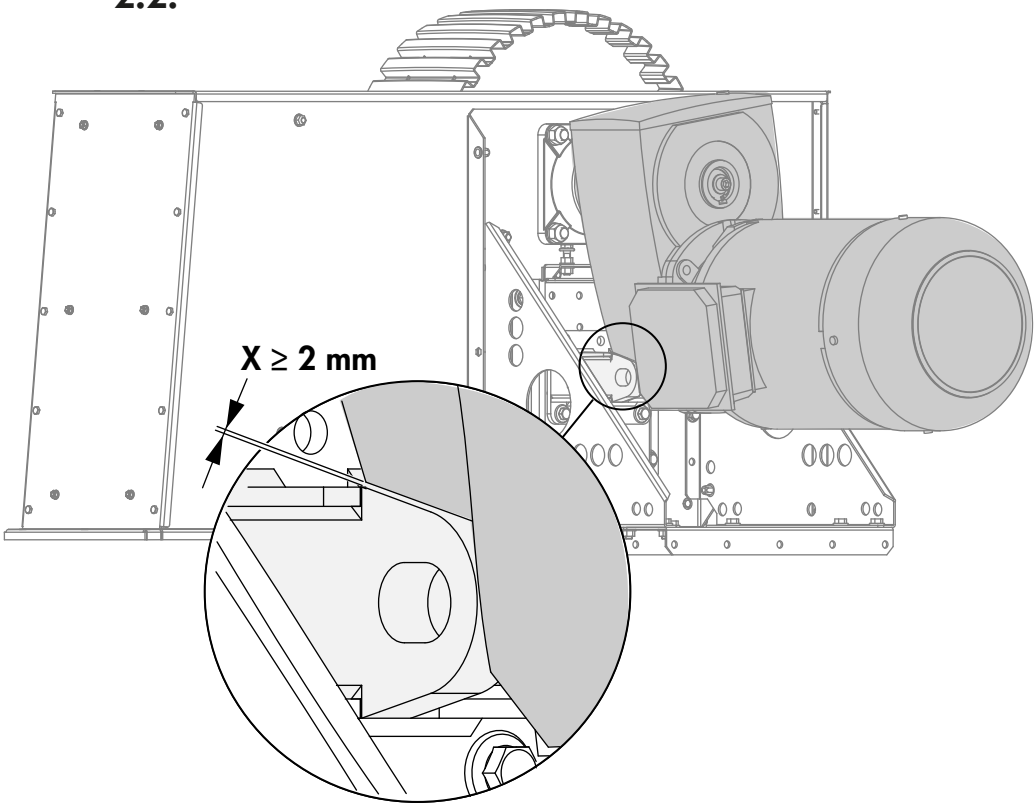
2.2.1 Loosen the bolted joints (E). NB! The screw heads are on the inside so secure the tool with a cord to avoid dropping it in the elevator. In some cases, however, it may be sufficient to loosen the nuts slightly from the outside and then tap down the torque rod mounting plate (A2) according to step 2.2.3.

2.2.2 Remove the bolted joints (G). NB! They are on the outside.

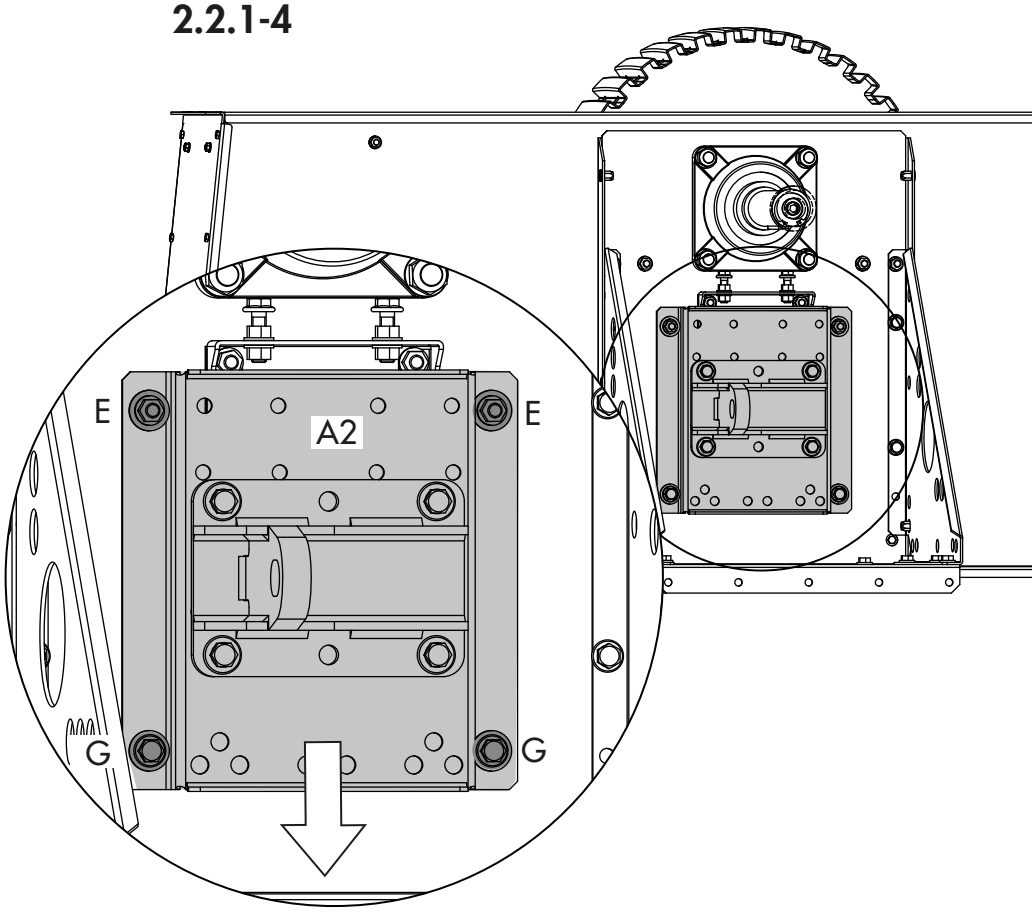
2.2.3 Slide the torque rod mounting plate (A2) downwards as far as possible.

2.2.4 Reassemble the bolted joints (E & G).

2.2.



2.2.1-4



3.1

⚠ **IMPORTANT!**

- Figure 3.1-6 only shows one variant of the weight sensor and its mounting parts. The positioning support parts (I) may look different and contain different parts. Washer(s) (L1/L2) are not included in certain batches. For correct parts and assembly procedure, please read the following instructions together with the separate part drawing supplied with the weight sensor.
- Ensure that the link fork (H) is mounted with the grey marked side parallel to the side of the elevator head. The tolerance is +/- 2°. See figure 3.X
- Be sure to mount the load cell (F) the right way round as shown in figure 3.Y.
  NB! When mounting on the right side, all parts must be mirror-inverted as shown in figure 3.Z.

3.2 **A** **Variant A - If the positioning support is designed according to a similar principle as in figures 3.1-6**
Position all corresponding parts, except (J) and (K) in figure 3.1-6, in place according to the separate part drawing but without tightening any screws or nuts. NB! Washer(s) (L1/L2) are put in place in case any of them are included in the batch.

3.2 **B** **Variant B - If the positioning support is designed according to the principle where the screw forms the support under the nut (J)**
Position all the corresponding parts in place according to the separate parts drawing but without tightening any screws or nuts. NB! Washer(s) (L1/L2) are put in place in case any of them are included in the batch.

3.3 **A & B**
Tighten the screw (M) according to the standard torque, counterhold in the link fork (H). NB! Be sure to hold the link fork (H) so that it does not move out of the position in which it is to be mounted as shown in figure 3.X.

3.4 **A** NB! Tighten the bolted joints for the positioning support (I), see the separate parts drawing, so that the part (O) is supported but not held in place when the weight of the motor is relieved by a few millimetres.

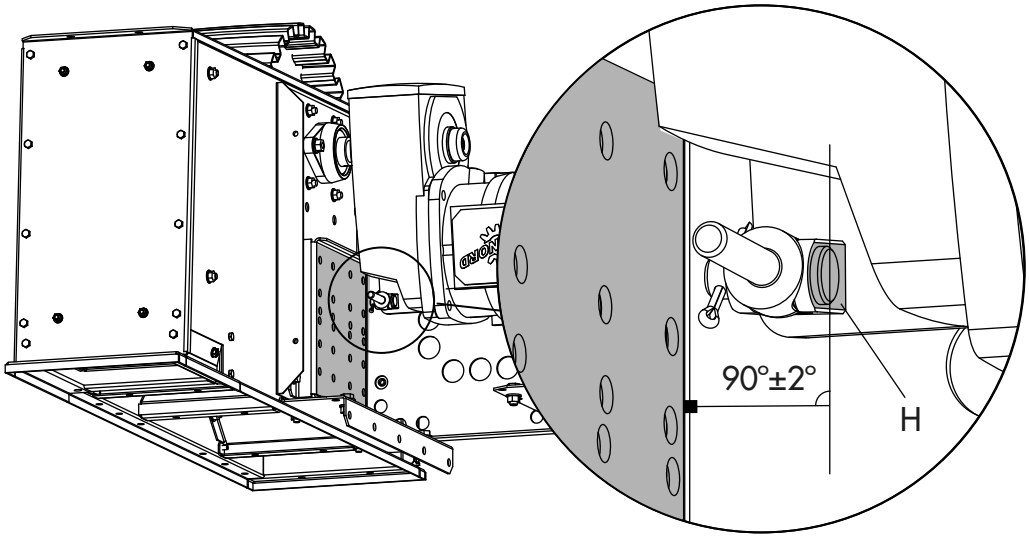
3.4 **B**
⚠ **IMPORTANT!**
Tighten the nut (J) until the washer (K) can rotate freely with less than 1 mm play.

Tighten and then adjust the bolted joints for the positioning support (I), see the separate parts drawing, so that the part (O) is supported but not held in place when the weight of the motor is relieved by a few millimetres.

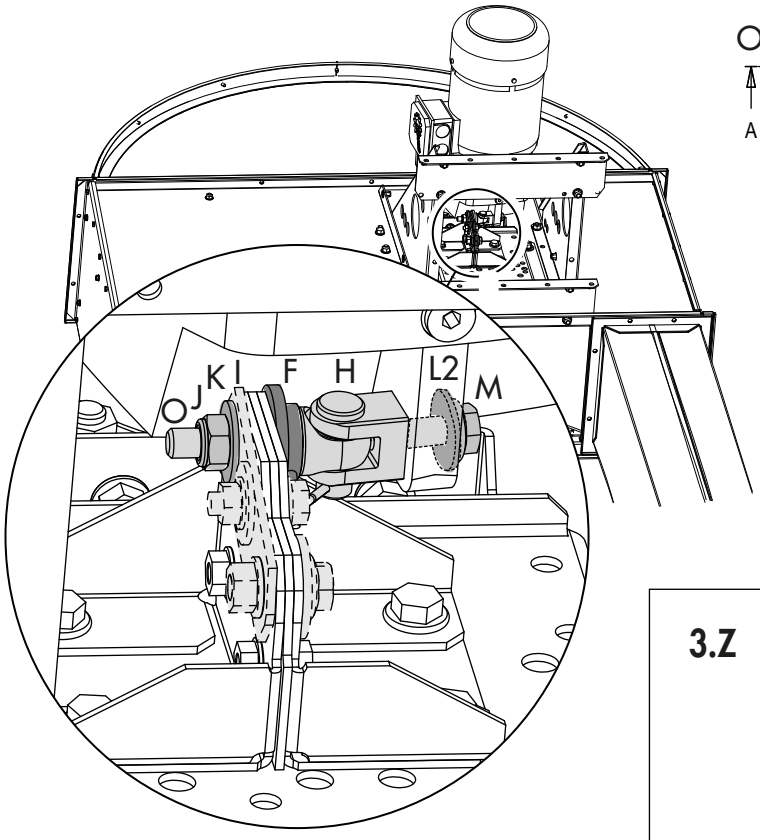
3.5 **A & B**
⚠ **IMPORTANT!**
The load cell (F) must be completely parallel to the surface of the torque rod. Check that the correct position/angle of the load cell is not affected if the weight of the motor is relieved by a few millimetres and then released back. If necessary, adjust the parts of the positioning support (I).

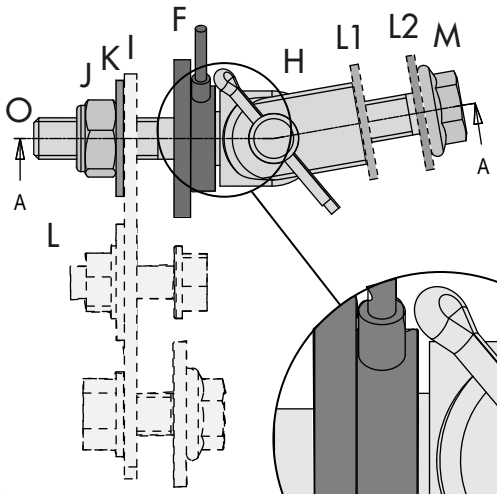
3.6 **A**
⚠ **IMPORTANT!**
Mount the corresponding parts (J and K) and then tighten the nut (J) until the washer (K) can rotate freely with less than 1 mm play.

3.X

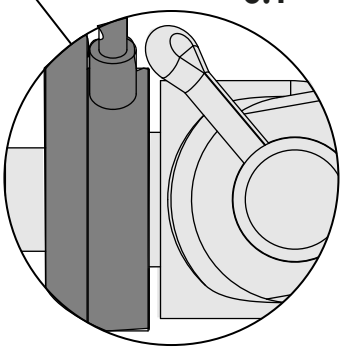


3.1-6

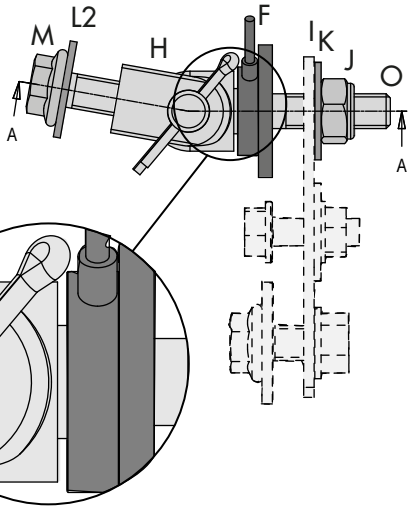




3.Y



3.Z



Rotation sensor trench intake conveyor
(not included in all batches)

Disassembly

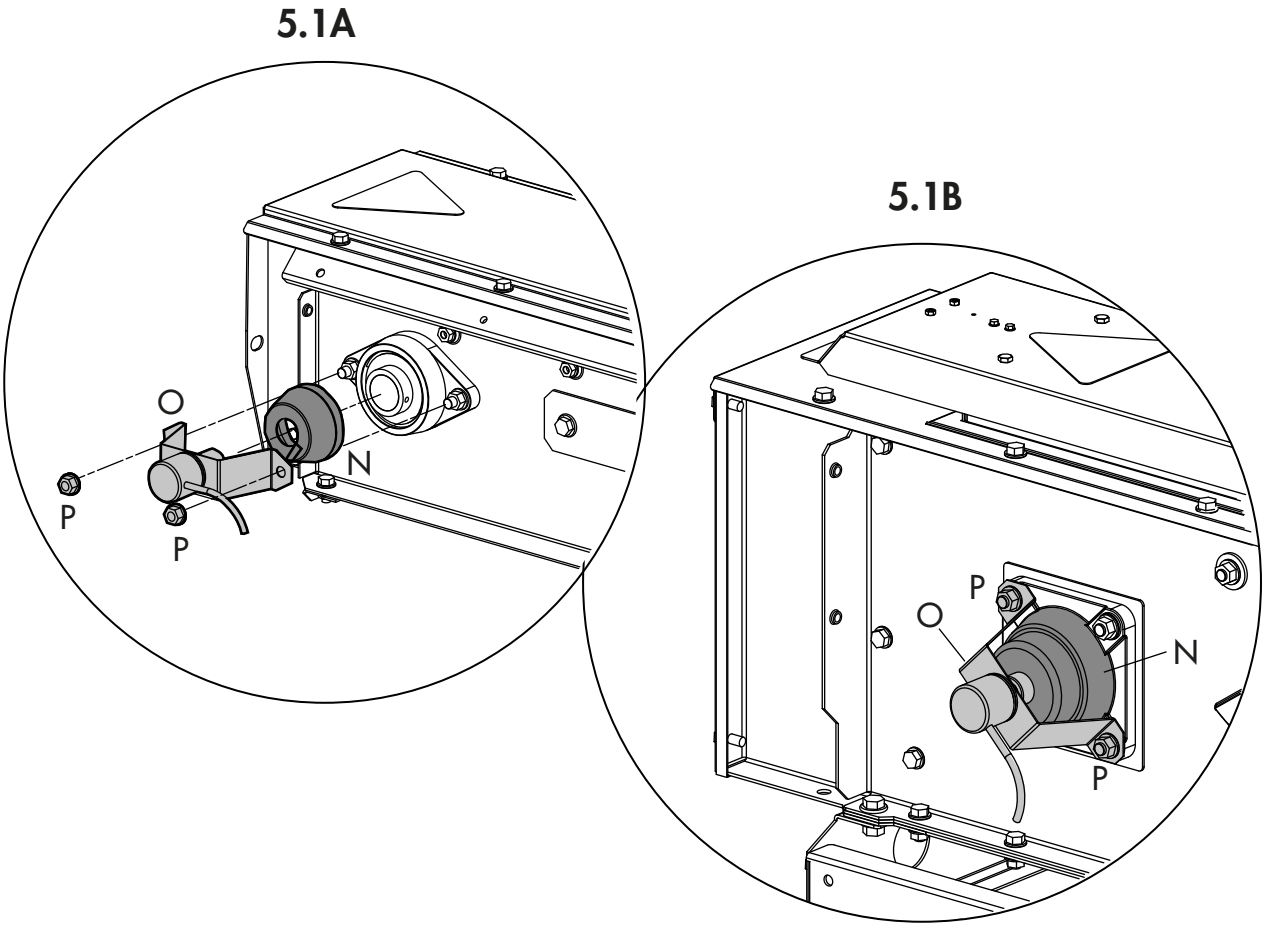
4.1 Remove the black touch guard (N) from the trench intake conveyor or drive shaft bearing and replace with the touch guard (N) included in the batch.

Assembly

5.1 **Variant A - Drive shaft bearing with 2-4 mounting screws with protruding bolted joint**
Mount the rotation sensor (O) with the nuts (P) on top of the existing bolted connection of the drive shaft bearing. NB! The rotation sensor attaches magnetically to the end surface of the drive shaft.

5.1 **Variant B - Drive shaft bearing with 4 mounting screws with non-protruding bolted joint**
Remove two opposing nuts. NB! Select the screws that are deemed to be most accessible for tightening on the inside of the trench intake conveyor. If space becomes tight, temporarily remove the flight from the conveyor chain.

Mount the rotation sensor (O) on the existing screw of the drive shaft bearing with the nuts (P). Tighten to standard torque. NB! The rotation sensor attaches magnetically to the end surface of the drive shaft.



Connection unit

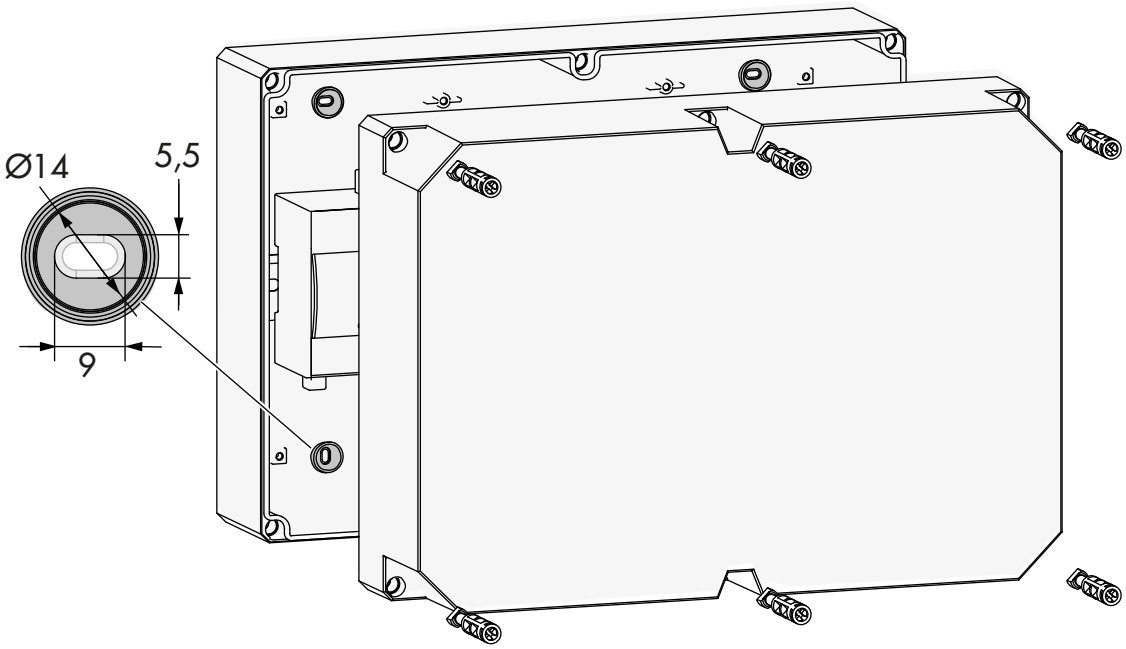
7.1 Find a mounting location for the connection unit near the elevator head, such as on a cable ladder. NB! Be sure to position the connection unit well in relation to the wiring for the weight sensor, power supply, modem antenna and any rotation sensor

7.2 Mount the connection unit with the appropriate screw, not included in the batch. See hole dimensions in figure 7.2. NB! If the screw head is smaller than 8 mm, use a washer that is either larger or smaller than 14 mm.

For connection instructions, see the following chapter "Connection".

⚠ **WARNING!**
All electrical equipment must be connected by a qualified electrician.

7.2



8. Open the connection unit cover.
   NB! The following assembly step numbers are illustrated in both the drawing figure of the physical layout of the connection unit and in the wiring diagram of this reference.

⚠ WARNING!

- All electrical equipment must be connected by a qualified electrician.
- Ensure moisture-resistant cable connections and strain relief in the junction box.

Modem

9. Plug the modem antenna connector into the socket (Q) and mount the antenna cable for the best possible transmission speed. Strain relieve the antenna cable and attach it appropriately.

Weight sensor elevator

10. Connect the weight sensor to the connection unit according to the wiring diagram. Strain relieve the wiring and attach it appropriately.

⚠ IMPORTANT!

15 m of cable is included in the weight sensor on delivery and must not be cut or extended. If there is a long piece of cable left over, it should be secured in several large loops to avoid the cable forming a coil that negatively affects the reading.

Rotation sensor trench intake conveyor (not included in all batches)

11. Connect the rotation sensor to the connection unit according to the wiring diagram. Strain relieve the wiring and attach it appropriately.

⚠ IMPORTANT!

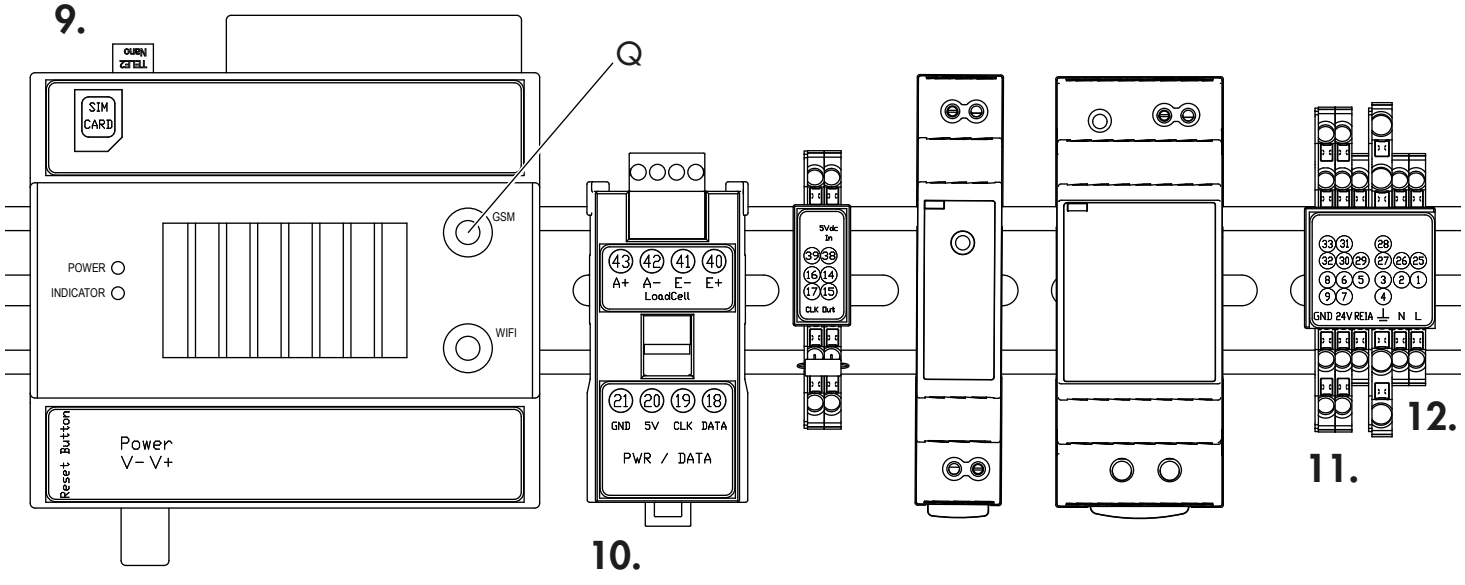
Installation wiring (not included in the delivery) must be shielded signal cable with at least 3 conductors (3 x 0.14 mm^2) with a length of approximately 1.5 x the elevator height.

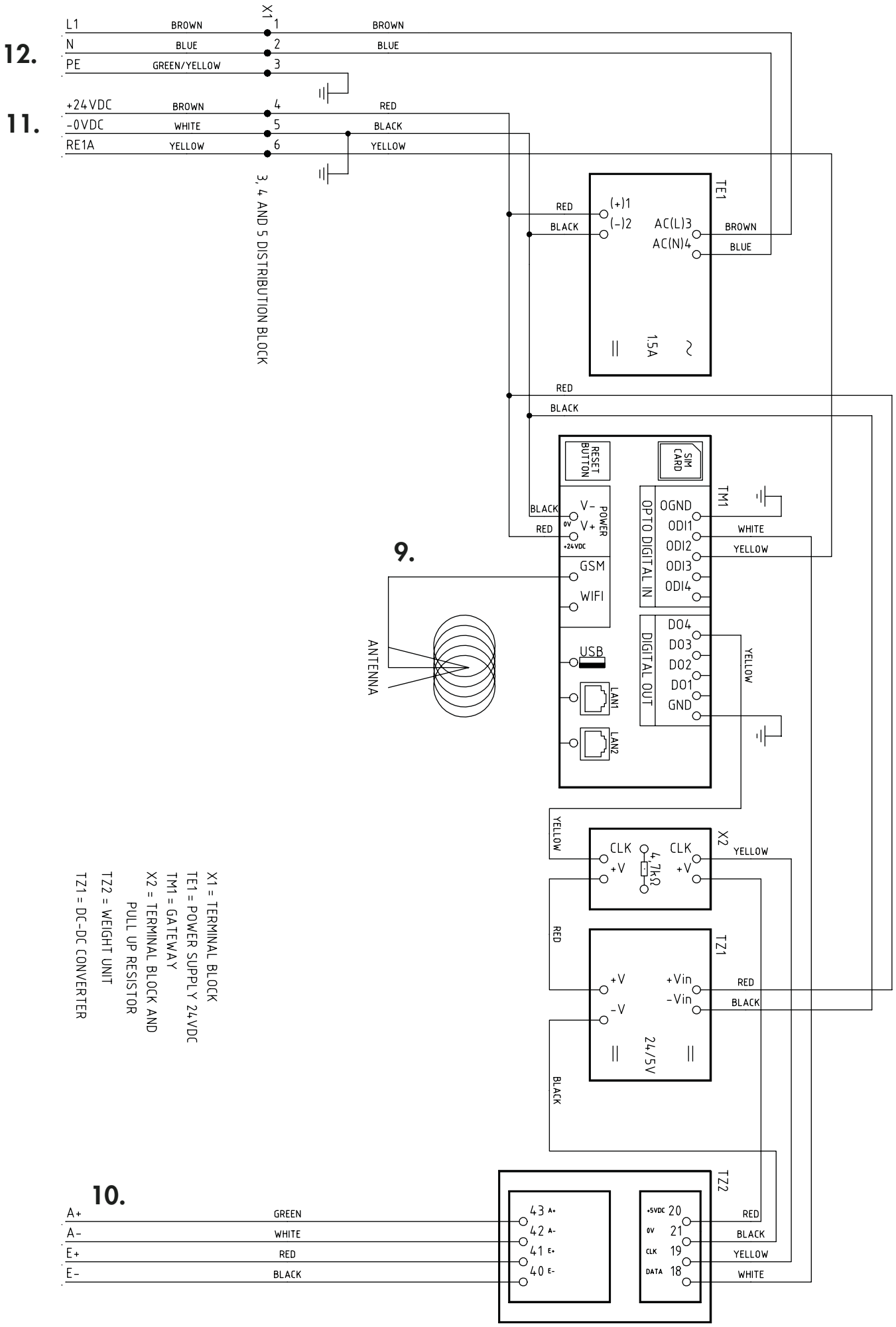
Power supply wiring

12. Connect the power supply wiring (not included in delivery) according to the wiring diagram. Strain relieve the wiring and attach it appropriately.

⚠ WARNING!

The power supply wiring must be fused. Connect the connection unit via an earthed plug or a control switch.




12.
11.
9.
10.
X1
L1
BROWN
1
BROWN
N
BLUE
2
BLUE
PE
GREEN/YELLOW
3
+24VDC
BROWN
4
RED
-0VDC
WHITE
5
BLACK
RE1A
YELLOW
6
YELLOW
3, 4 AND 5 DISTRIBUTION BLOCK
TE1
(+)1
(-)2
AC(L)3
AC(N)4
BROWN
BLUE
1.5A
RED
BLACK
RESET BUTTON
SIM CARD
TM1
V- POWER
0V
V+
+24VDC
BLACK
RED
GSM
WIFI
USB
LAN1
LAN2
OPTO DIGITAL IN
OGND
ODI1
ODI2
ODI3
ODI4
WHITE
YELLOW
DIGITAL OUT
DO4
DO3
DO2
DO1
GND
YELLOW
ANTENNA
X2
CLK
+V
4.7kΩ
CLK
+V
YELLOW
YELLOW
RED
TZ1
+V
-V
+Vin
-Vin
24/5V
RED
BLACK
BLACK
TZ2
A+
GREEN
A-
WHITE
E+
RED
E-
BLACK
43 A+
42 A-
41 E+
40 E-
+5VDC 20
0V 21
CLK 19
DATA 18
RED
BLACK
YELLOW
WHITE
X1 = TERMINAL BLOCK
TE1 = POWER SUPPLY 24VDC
TM1 = GATEWAY
X2 = TERMINAL BLOCK AND
PULL UP RESISTOR
TZ2 = WEIGHT UNIT
TZ1 = DC-DC CONVERTER

13. Power on the facility and the connection unit.

Checking gateway and mobile modem

14. Check the power supply and modem connection via the following LEDs (R) on the gateway located in the connection unit.

    Power LED indicates power on

    Red solid light = Gateway powered.

    Lamp off = Gateway not powered, check what is wrong. Is a control switch off, is there an open-circuit or something else preventing power?

    Indicator LED shows modem function

    Solid green light = Successful connection

    Red flashes in different sequences:

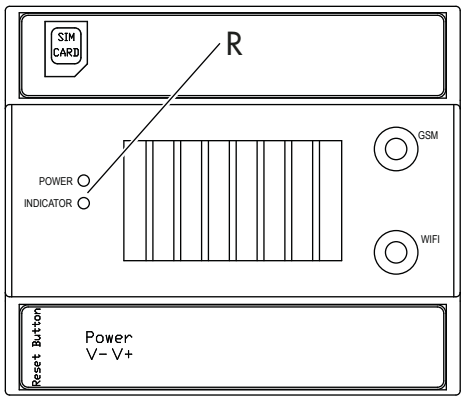
    1-3 flashes = Poor or no signal strength. Check that the antenna cable is connected correctly and that it is positioned for the best possible reception!

    4 flashes = SIM card not correctly inserted.

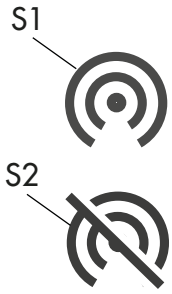
    6 flashes = Modem error.

    NB! In case of functional problems and error codes in addition to those mentioned above, contact Skandia Elevator.

14.



15.



Checking connection to Grain Cloud

15. The gateway automatically connects to Grain Cloud upon power-up and a working modem connection with good upload speed.

    Check if the connection is working by opening the Grain App and going to "Loadings". At the top right corner there is a connection symbol, if it is green (not crossed out, S1)) then the connection is working. NB! If you click on the symbol you will see when the status was confirmed. The status is confirmed by the system at power-up/ connection, at loadings and once an hour.

    NB! It may take a few minutes after the facility has been powered up until the connection is confirmed as working and the symbol is green.

    If the connection symbol is red (crossed out, S2), the connection is not working. Check if the gateway is powered and the modem is connected, see previous section. Correct any errors. If everything is working correctly according to the LED lights on the Gateway and the symbol is still red and crossed out in the app, contact Grain Cloud support via the app for further assistance.

Ensuring clean run times

16.

⚠ **IMPORTANT!**

For Grain Balance to work well, it is important to have sufficient clean run times. Set them to at least 60 seconds if there is a control system with sensing. If there is no control system with sensing, ensure that shutdown occurs at least 60 seconds after no grain is left in the intake pit.

Calibration runs

⚠ **IMPORTANT!**

- For Grain Balance to work well, it must be calibrated with the crops to be weighed. Follow the procedure below.
- Before calibration runs are made, at least one field per crop to be calibrated must be entered in the app. Go to "Settings" in the main menu to do this. NB! Once a field is created it will always remain in the app so ensure that it is correctly entered.

17.1 First carefully measure the weight and moisture content of a crop batch and then run it through loading.

⚠ **IMPORTANT!**

- The weight of the crop should be at least about 10% of the hourly capacity of the elevator.
- Calibration runs should always be made via the transport route in which new batches are loaded.

17.2 Open the Grain App and go to ”Loadings”. Open up the last card that was automatically created when the known calibration batch was run. Select the field with the crop to be calibrated, update the values for "Weight" and "Water content" to the known measured values. Confirm calibration by pressing the "Use the values for calibration" control, then press 'SAVE' in the top right corner.

17.3 Run another accurately measured batch of the same crop through the same transport route and repeat step 17.2.

⚠ **IMPORTANT!**

- A few more calibration runs for the same crop may be needed to achieve good accuracy of the measurement function. NB! If the first crop variety is calibrated thoroughly, subsequent crop varieties will require fewer calibration runs to achieve good accuracy.
- After the calibration runs are completed, remember to move the runs that are not left in storage after the calibration run to the type "Other". Go to the cards for the runs and make the change there.

17.4 Repeat the calibration run procedure per each type of crop to be weighed with the Grain Balance function.

Maintenance

Regularly check that all installed equipment is clean of dirt and dust and that there are no open-circuits.

Check annually before the season;

- that the weight sensor has not been twisted out of its mounting position, see figure 3.X in the chapter "assembly", and that its cotter pin is undamaged.
- that all the bolted joints for the sensors are tightened according to the chapter "Assembly" of this manual.

⚠ **IMPORTANT!**
All bolted joints for the weight sensor must not be fully tightened so ensure to read the instructions on mounting the weight sensor in the "Assembly" chapter before performing any maintenance.

Trouble shooting

Power and modem function

Check power and modem function via the gateway LED lights, for more detailed information see the section "Checking the gateway and mobile modem" in the previous chapter.

Connection status

Check the connection status to Grain Cloud in the app, for more detailed information see the section "Checking the connection to Grain Cloud" in the previous chapter.

Grain Balance function switched on

Check if the Grain Balance function is on in the app. Go to settings in the main menu and see if the "Measuring" control is set to "On".

Wiring diagram connection unit

For the wiring diagram of the connection unit, see the previous chapter.

Grain
Balance

Part of Grain Cloud

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