



INSTALLATION AND USER MANUAL RAVAS SAFECHECK



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More information can be found on our website www.ravas.com.

Rev.20240924
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If you have any queries concerning the duration and terms of the guarantee, please contact your supplier. We would also refer you to our General Sale and Supply Conditions, which are available on request.

The manufacturer accepts no liability for any damage or injury caused by failure to follow these instructions, or from negligent operation or assembly, even if this is not expressly stated in this instruction manual.

In light of our policy of continuous improvement, it is possible that details of the product may differ from those described in this manual. For this reason, these instructions should only be treated as guidelines for the installation of the relevant product. This manual has been compiled with all due care, but the manufacturer cannot be held responsible for any consequences of errors. All rights are reserved and no part of this manual may be reproduced in any way.

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1. Introduction

This manual describes the installation and use of the SafeCheck. The SafeCheck is a hydraulic measuring system for forklift trucks and stackers. The installer must be informed of the contents of this manual.

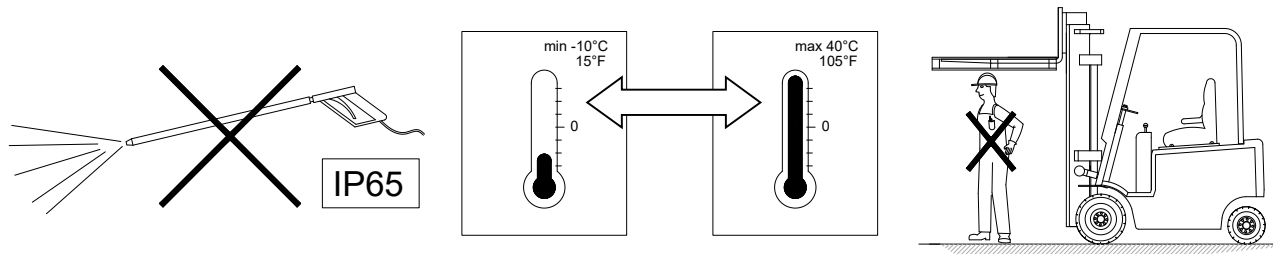
Follow the contents of the manual precisely. This manual should be kept on a safe and dry place. In case of damage or loss the user may request a new copy of the manual from RAVAS.

2. Warnings & Safety measures

When installing the SafeCheck please observe the instructions and guidelines in this manual carefully. Always perform each step in sequence. If any of the instructions are not clear, please contact RAVAS.



- All safety regulations that apply on the truck remain valid and unchanged;
- No weighing operations are allowed if any persons or objects are in the vicinity; around, under or close to the load;
- Any modifications done to the system must be approved in writing from the supplier, prior to any work being completed;
- It is the sole responsibility of the purchaser to train their own employees in the proper use and maintenance of this equipment;
- Do not operate this unit unless you have been fully trained of its capabilities;
- Check the accuracy of the scale on a regular basis to prevent faulty readings;
- Only trained and authorized personnel are allowed to service the scale;
- Always follow the operating, maintenance and repair instructions of this truck and ask the supplier when in doubt;
- RAVAS is not responsible for errors that occur due to incorrect weightings or inaccurate scales;
- A weighing is performed by slowly lowering the forks, this movement can be stopped at any time by pressing the on/off button on the indicator.



Should you have any further questions after reading this manual, please contact us at:

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3. Principles

3.1 How the hydraulic system works

The SafeCheck is an hydraulic weighing system for forklift trucks and stackers. The load measurement system measures the oil pressure with an oil pressure sensor. The pressure in the lifting system depends on the load on the fork lift system. By measuring the oil pressure in the cylinder, you will get an indication of the weight that you are lifting.

3.2 The weighing height

Although weighing can be performed at all heights, it is advised to limit weighing to a height between 30 and 200 cm. This will reduce the influence of the condition of the mast and the cylinder. Weighings done above 200 cm are more likely to have a deviation. In addition, weighings done on a higher extended mast will be perceived as heavier, which will also cause the alarm to go off sooner.

3.3 Accuracy

Measuring the oil pressure is a very precise job, but mechanical parts in the lifting mechanism and the position of the mast can adversely affect the accuracy.

The friction/resistance of the rollers with which it moves in the mast is a major influence on the weighing. The resistance of the rollers by dirt or bad bearings increase the inaccuracy caused by:

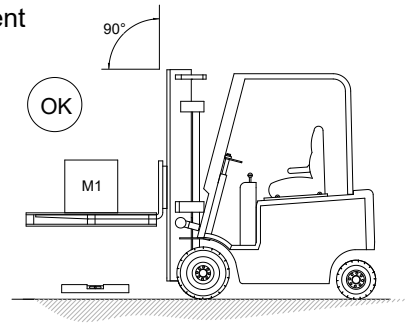
- internal leakage in the oil circuit;
- eccentric load of the forks (the load is not centered on the forks);
- the difference at slow or fast approaching of the reference altitude.

With more 'stick and slip effect', there is less repeatability, so less accuracy. Repeatability means that when you measure the same weight in succession, every time about the same weight appears in the display.

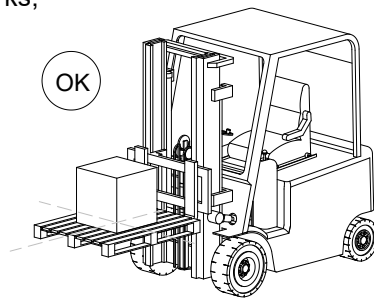
3.4 Recommendations to increase the accuracy

By using the following points, you can ensure that the system works as precisely as possible.
(see also chapter 8.1)

- By keeping the mast vertical during the load measurement (an angle of 2 to 3 degrees has almost no influence);



- By putting the centre of gravity in the middle of the forks;



- Friction in mechanical parts such as the mast, the precision rollers and bearings influence the accuracy of the weighing. Therefore it is important that these parts are in good condition:
 - No local wear
 - Clean
 - Well lubricated mast and chains
 - Regular maintenance
- Use the lift truck at least for 5 minutes or move the forks up and down several times (5x) before the zero weighting and/or the first weighing is carried out;
- Weigh on a fixed height;
- Do not rise the forks to the reference point too fast. The best way is to raise the forks above the reference point (the point where the stickers on the fork carriage and the mast are opposite of each other) and then lower them down to the reference point. Do this slowly, without sudden stop;
- When reaching the reference height, the weight will be fixated on the display. The weight is not secured at loads below 20 reading steps;
- Make sure the system is relieved before beginning a new weighting;
- If the SafeCheck system is installed on a new lifttruck, it is recommended that you perform a recalibration after 3 months and 1 year.

4. Overview of the parts

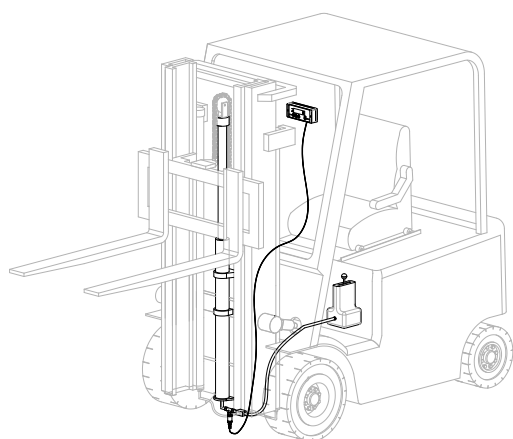
The SafeCheck weighing system exists of two main parts:

1. Indicator
2. Sensor

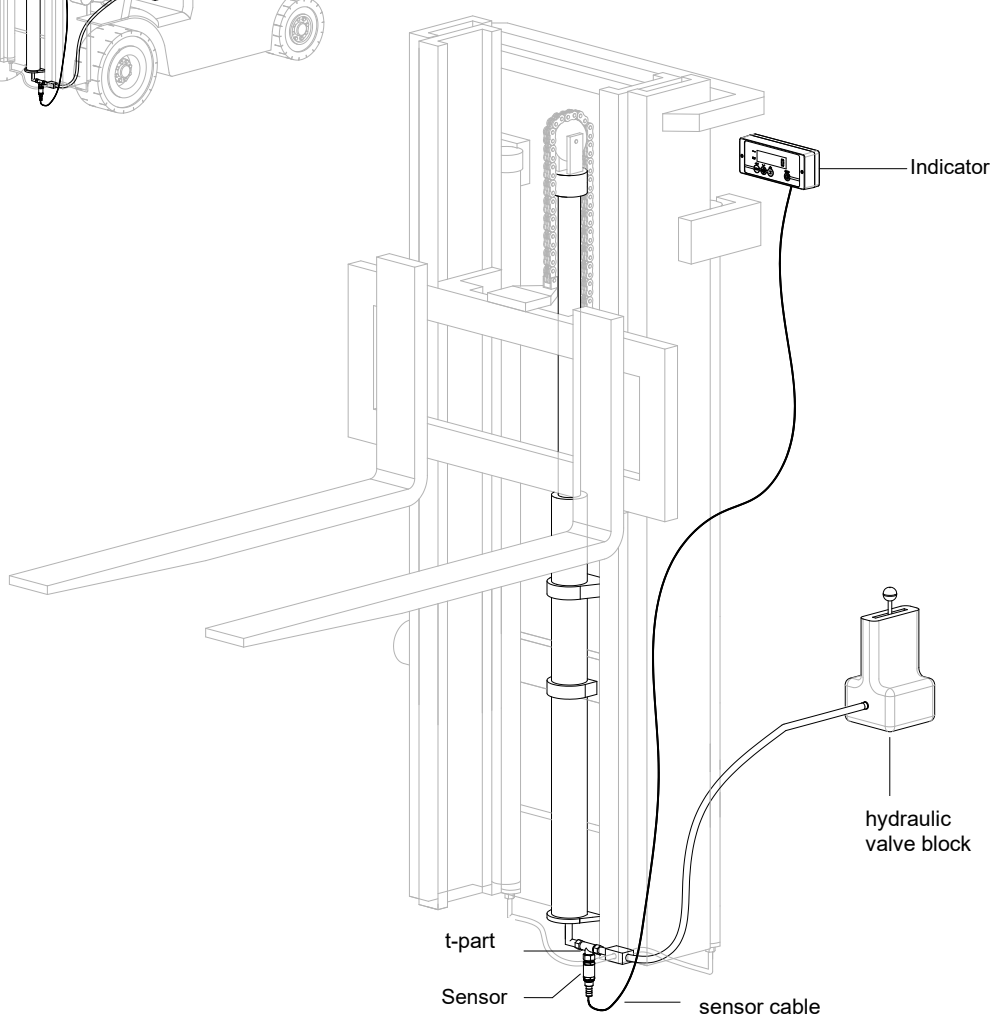
The sensor has to be connected to a T-link on the hydraulic system of the forklift truck. The indicator, the control panel, runs on 6 Volt batteries. On the drawing below you can find the parts of this sytem.



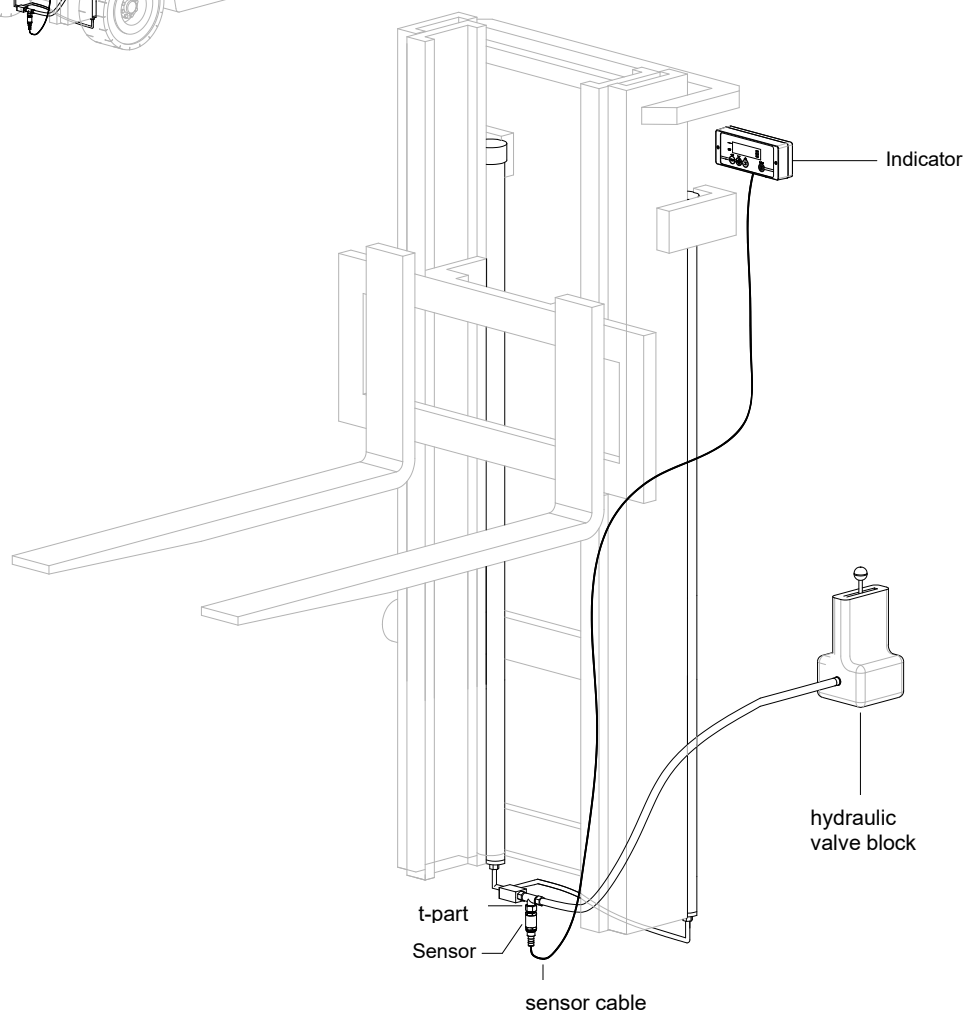
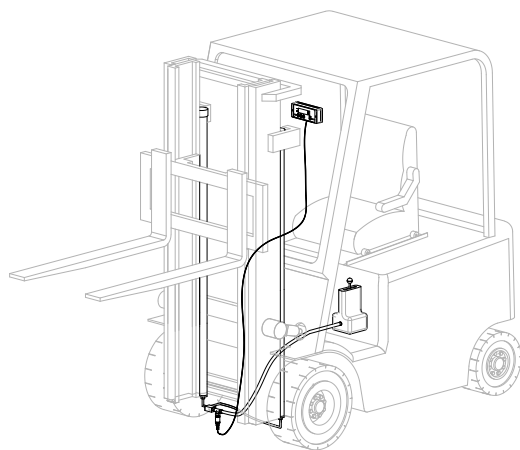
We recommend to have the installation of the sensor in the hydraulic system of the forklift performed by an authorized lift truck dealer.



Type A: 1 central cylinder



Type B: 2 cylinders on both sides



5. Before setup

Check the forklift truck on the following points before you begin the installation:

5.1 Capacity of the forklift truck

The SafeCheck system can be installed on a forklift truck with a maximum capacity of 99 ton.

5.2 Maximum pressure in the hydraulic system

The SafeCheck works optimally at an oil pressure up to 350 bar.

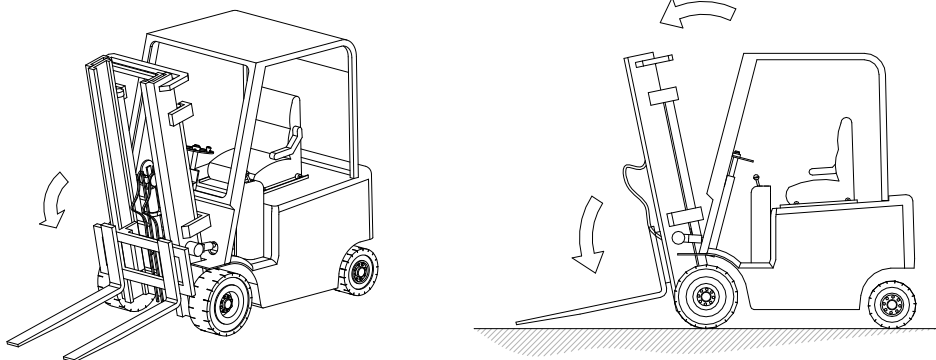
5.3 Power supply

The power supply of the indicator can be connected to the battery of the forklift. The most common voltages for forklift trucks are 12, 24, 48 and 80 V. If the battery voltage is higher than 12 Vdc, the system demands a DC-DC voltage converter with an output of 12 Vdc.

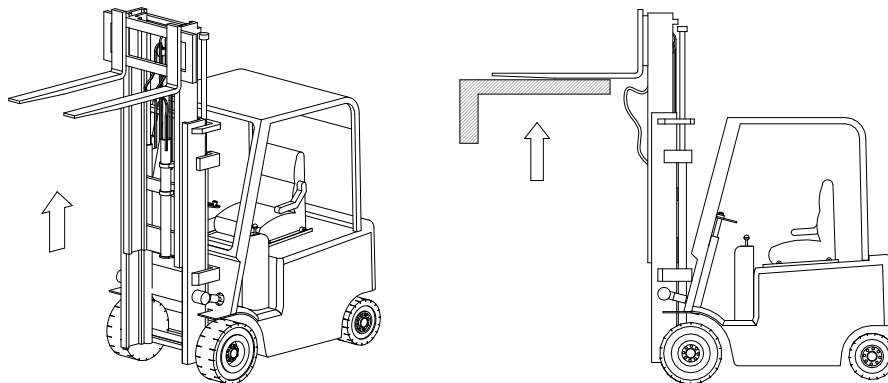
5.4 Make the system free of oil pressure

The forklift truck has to be free of oil pressure. There are two ways to do this:

Option 1: Lower the forks to the ground in the lowest position and make sure the system is without oil pressure, you can do this by tending the mast forwards. Make sure the chain hangs loose.



Option 2: Raise the forks and place them on a pallet or another stable object. Make sure the system is without oil pressure by putting the cylinder in the lowest position. Make sure the chain hangs loose.

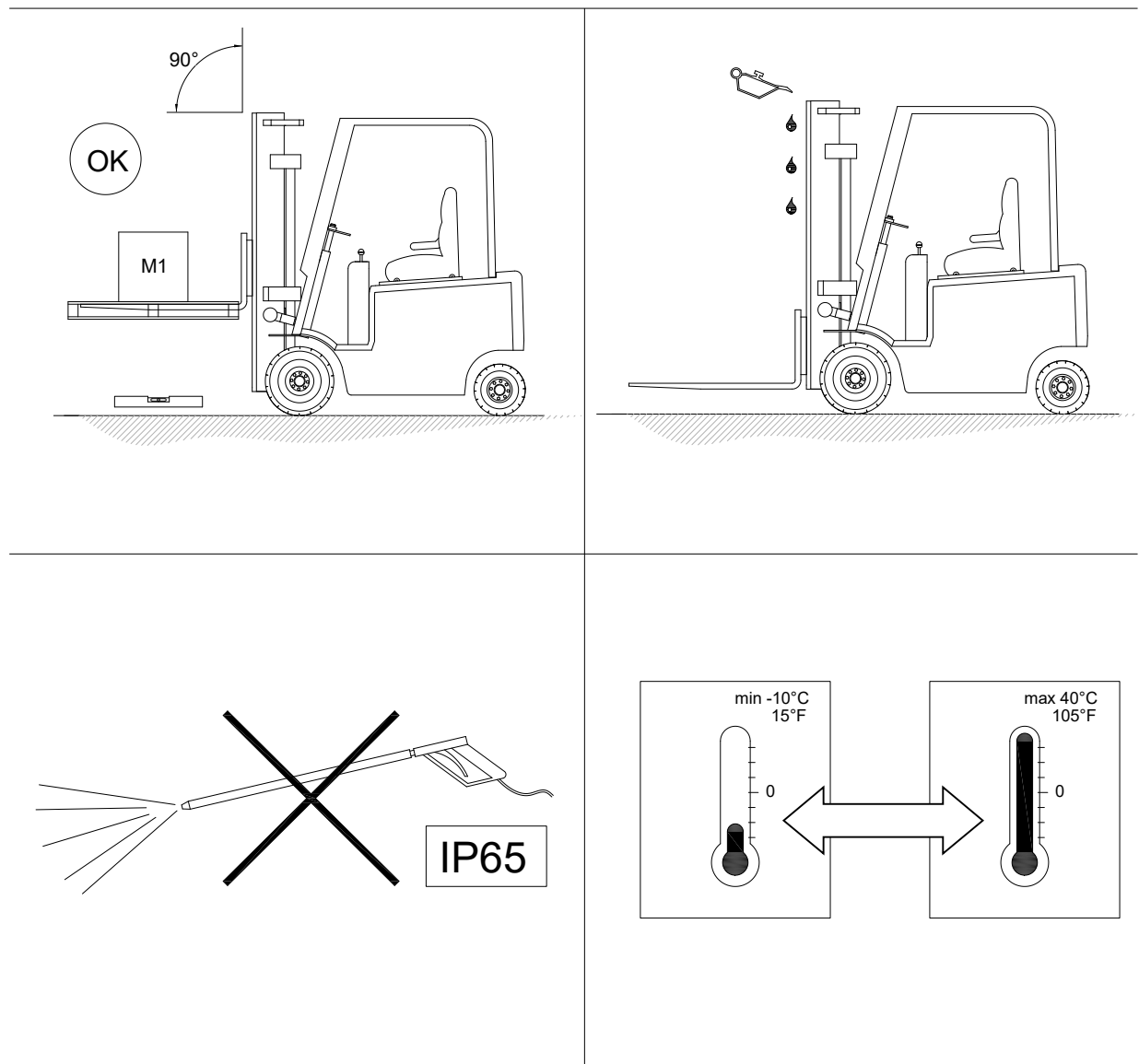


5.5 The condition of the mechanical parts of the forklift truck

After you have installed the SafeCheck on the forklift truck, the weighing system will be part of the truck. Especially the mechanical parts of the forklift truck, such as the mast, the mast rollers and the ball bearings can influence the accuracy of the weightings.

Because of this it is important to keep the parts in good condition;

- make sure there is no local friction in the mast of the forklift;
- keep the system clean;
- make sure you get a good lubrication of the mast and the chains;
- take care for regular maintenance so that the condition of the system is constant;
- lifting and lowering of the forks should be as silent as possible.



6. System setup

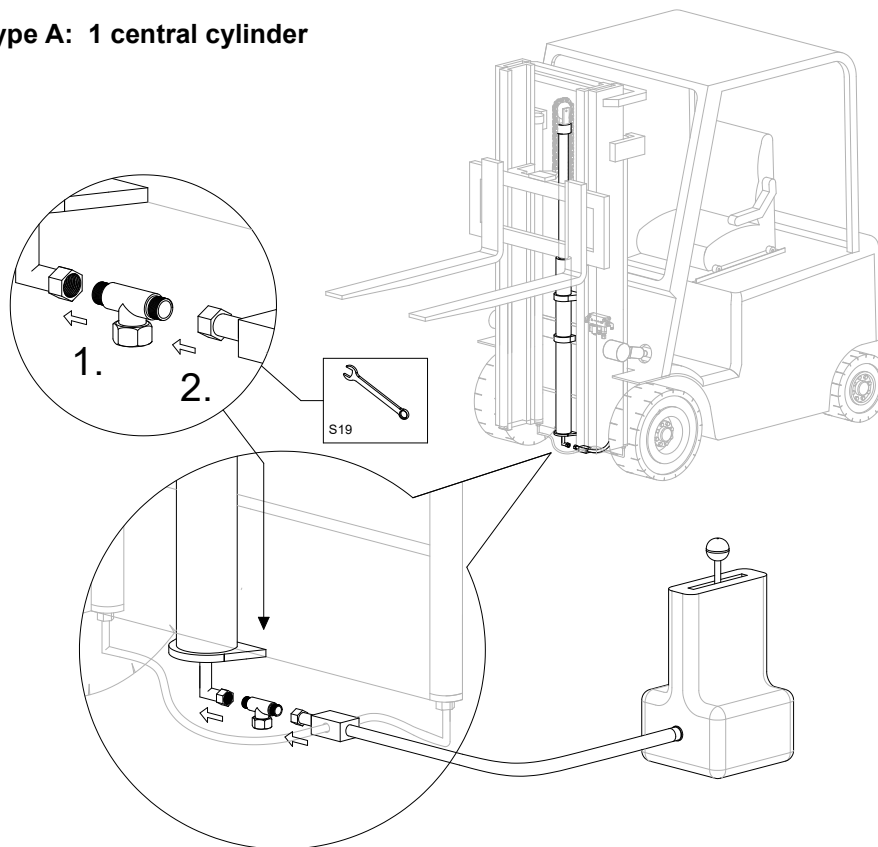
6.1 Installing the T-part

- Ensure that there is no pressure on the high-pressure hose.
- The sensor is mounted with a T-piece in the high-pressure hose, between the valves and the cylinder.
- The connection on the sensor is G $\frac{1}{4}$ " BSP male.
- Mount the T-piece so that the sensor and the cable connection are pointing downwards. This will prevent air getting into the sensor.
- Protect the cable against moving, sharp or warm parts with the supplied protective cover.

Choose a place where you can mount the sensor:

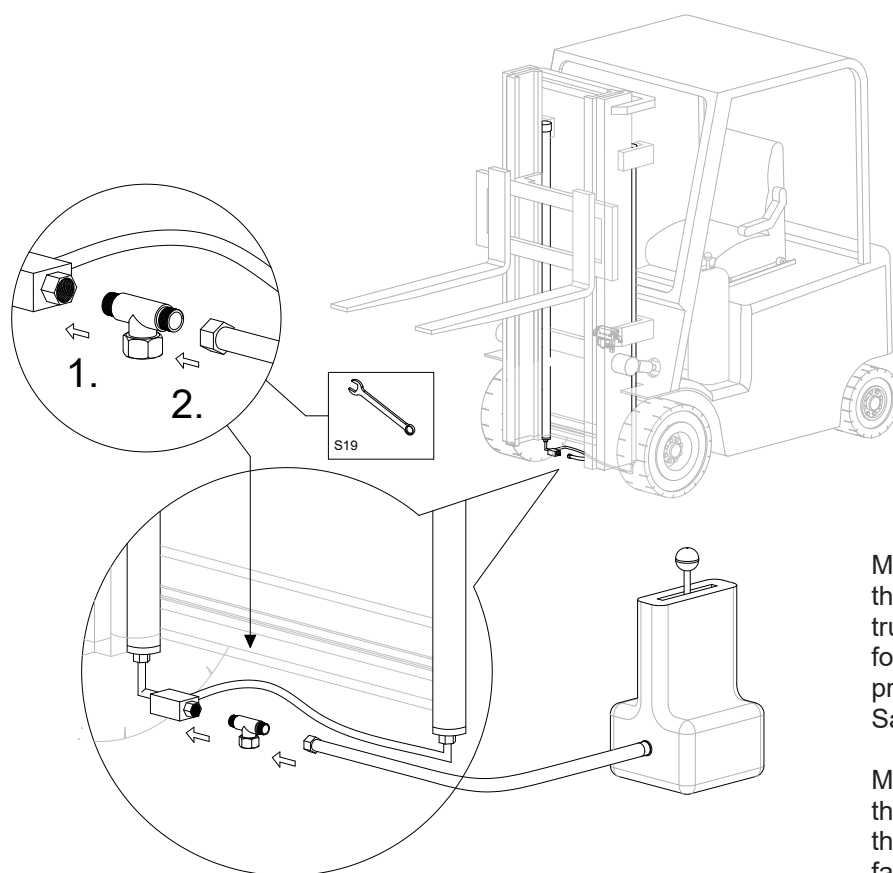
- Mount the sensor in the pressure hose that steers the cylinder. In most cases there is one cylinder which moves the carriage plate. The sensor is mounted as close to the cylinder as possible.
- When the pressure hose splits to multiple cylinders, the sensor has to be mounted before the split.
- Do not mount the sensor too close to the engine. Large differences in temperature can influence the accuracy of the system.
- If the truck is used intensively, a piece of pipe or hose of ± 50 cm can be mounted between the sensor and the T-piece. The sensor is sensitive to temperature differences. If the moving oil becomes warm, the standing oil in this pipe or hose will remain cool. The sensor will not be effected by temperature differences.
- Place the sensor close to the cylinder. There is often more room there and it is easier to reach.
- Choose, if possible, a place to mount the sensor where there are the least steering and safety valves between the sensor and the cylinder.

Type A: 1 central cylinder



Mount the T-piece into the delivery pipe of the truck near the cylinder for the diversion of the pressure to the SafeCheck.

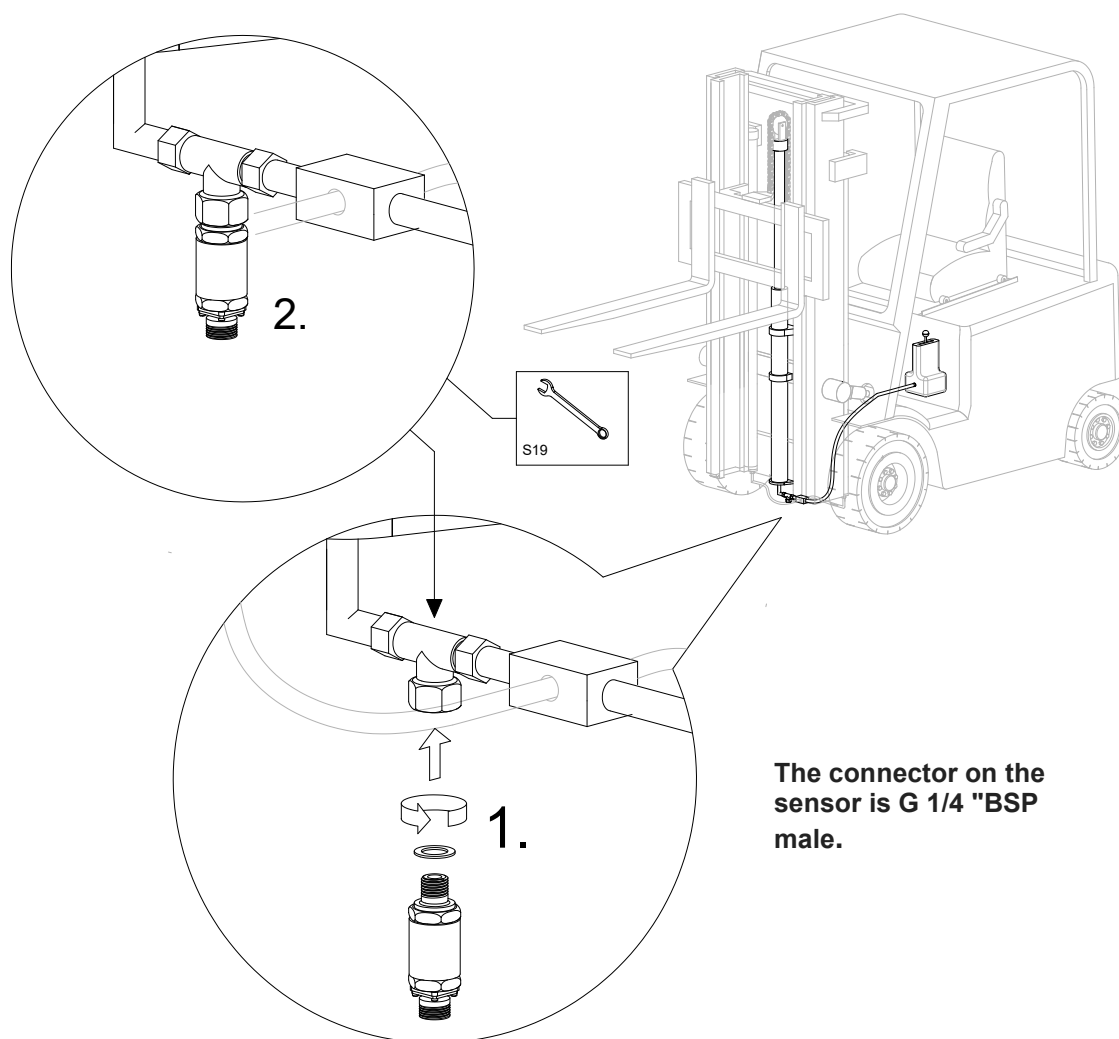
Type B: 2 cylinders on both sides



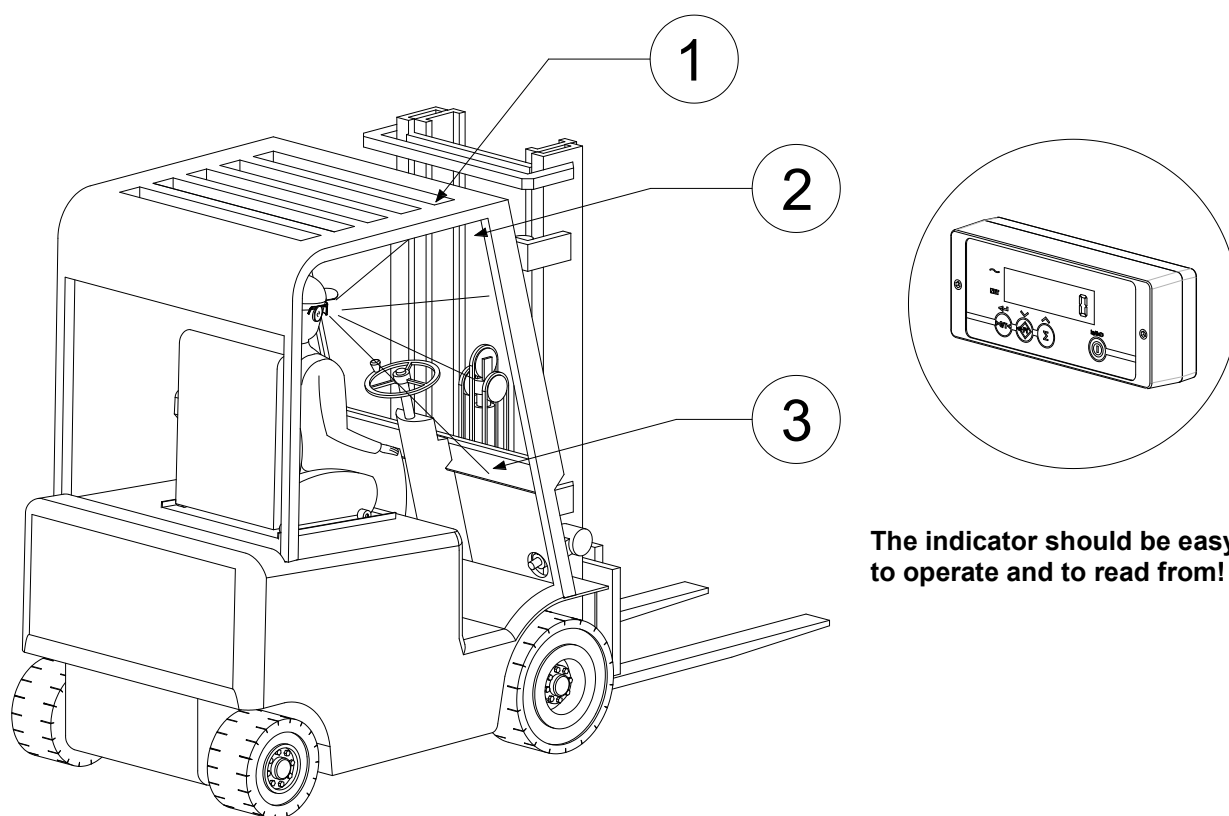
Mount the T-piece into the delivery pipe of the truck near the cylinder for the diversion of the pressure to the SafeCheck.

Mount the T-piece so that the sensor with the cable connector is facing down. This is to prevent that there remains air in the sensor.

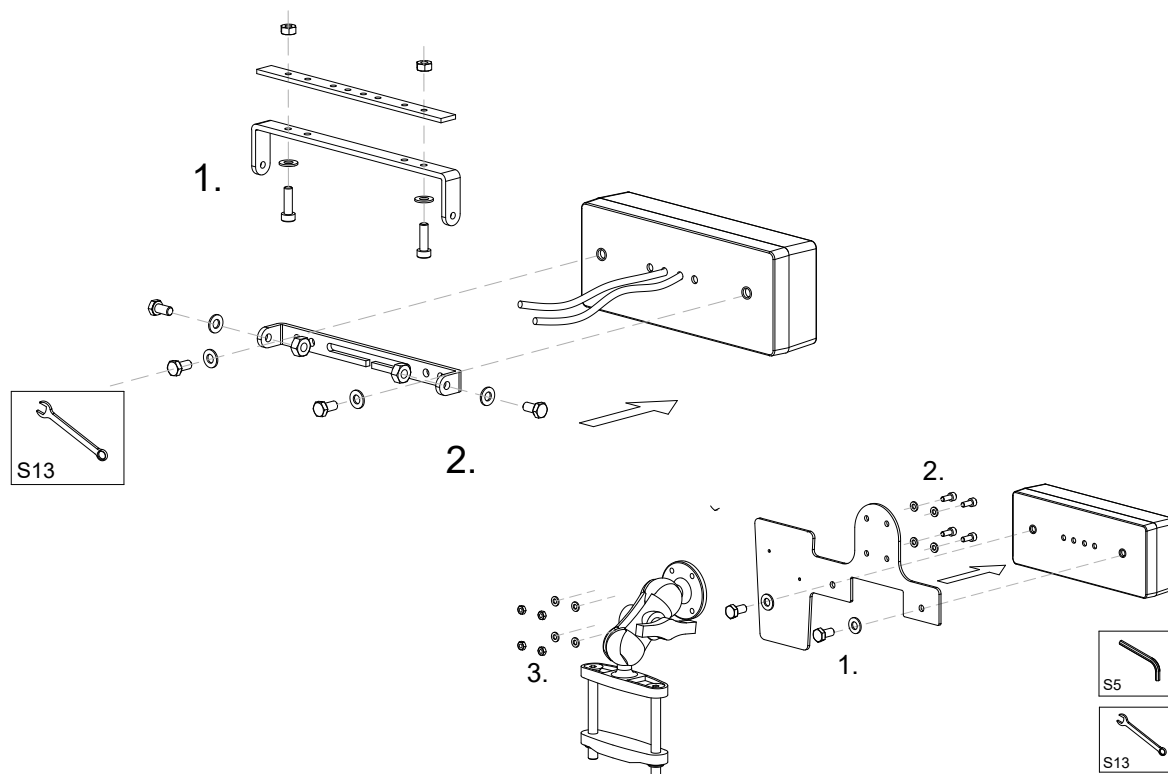
6.2 Mounting the sensor



6.3 Position of the indicator



6.4 Installing the indicator bracket and the indicator



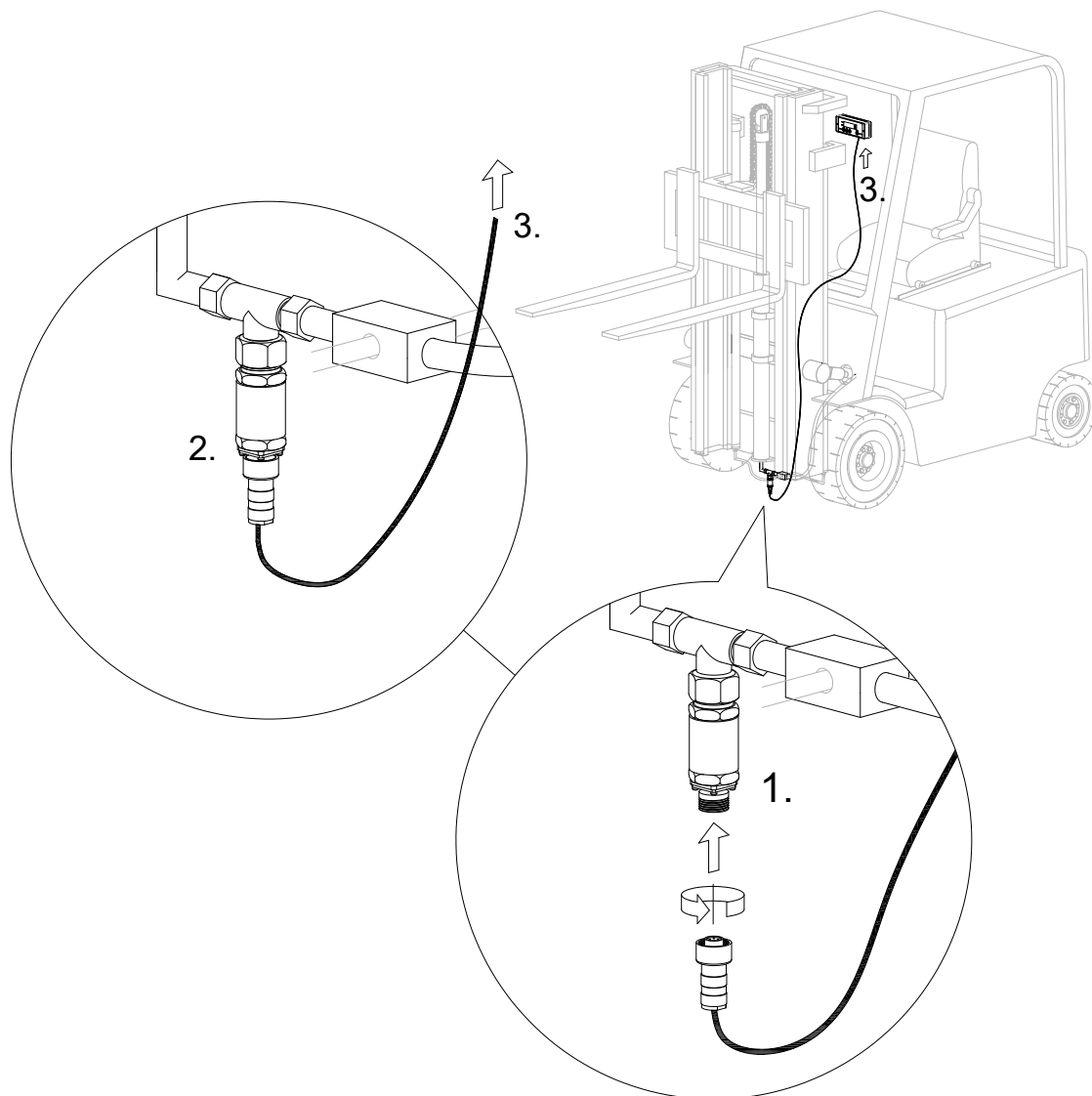
6.5 Mounting the sensor cable

When mounting the cable, it is important that the cable is kept tidy and protected. Keep the cable out of sight as much as possible, this keeps the system tidy and it minimizes the possibility of damage to the cable.

It may be necessary to thread the cable through small openings, openings through which the 18mm connector does not fit. In that case disconnect the cable at the indicator.

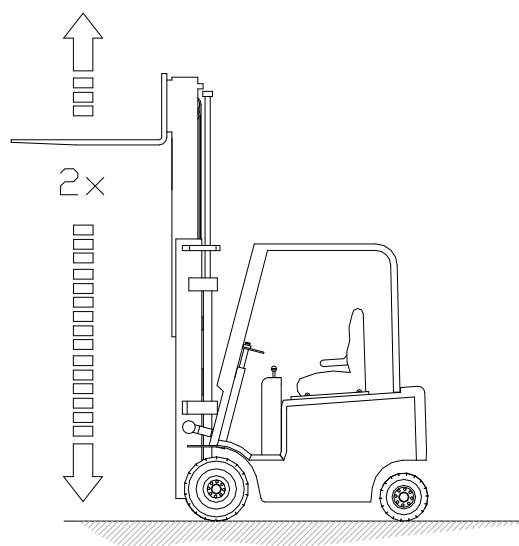
The system is supplied with a protective cover for the cable. This can be used when:

- the cable is near parts of the lift truck that become hot;
- the cable is mounted near moving parts.



6.6 Remove any air from the hydraulic system

Bring the forks to maximum height twice to remove any remaining air from the hydraulic system.

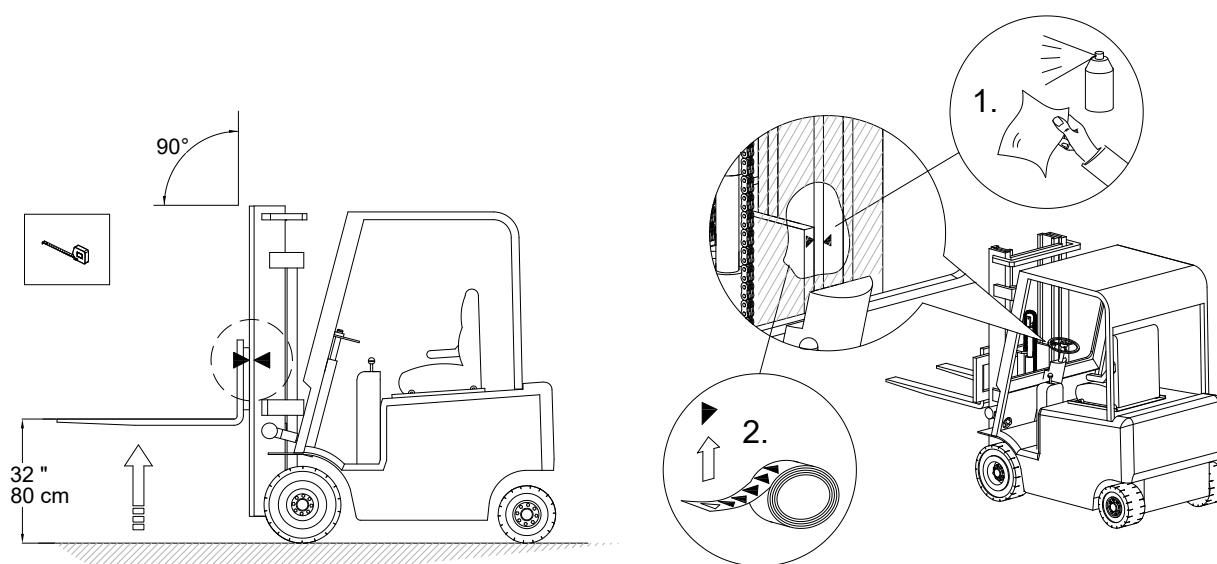


6.7 Placing stickers, marking the reference altitude

Two stickers are supplied with this kit. One of the stickers is placed on the mast and one on the carriage plate. The arrow stickers are used to show the reference height.

Attention:

- Make sure that the chauffeur can see the stickers;
- Make sure that there is minimal distance between the two arrows. The larger the distance, the more difficult it will be to gauge the height accurately;
- Choose a practical height: not too high, because then lifting will take more time. Moreover, it may be dangerous to lift heavy loads too high.



Attention:
In a dirty operating environment it is better to mark the reference altitude permanently.

7. Settings

7.1 Determining the capacity of the truck

The graduation of the indicator depends on the capacity of the lift truck.

The European directives for weighing systems state that the machine stickers should show the producer, the capacity and the graduation. The kit contains a number of stickers with different capacities and graduations.

- For a capacity of 5.000 kg the weight is shown in 50 kg steps;
- For a capacity of 10.000 kg the weight is shown in 100 kg steps.

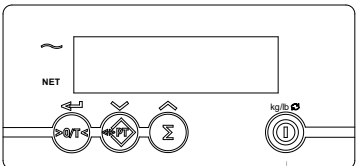


Important !

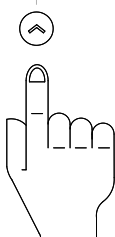
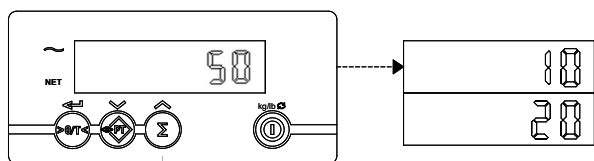
If the lifting capacity of the forklift truck is different then the above-mentioned e.g. 1.500 kg or 3.000 kg, a higher capacity should be chosen. For 1.500 kg the capacity will be 2.500 kg; for 3.000 kg it will be 5.000 kg. If you choose a setting and machine sticker with a smaller capacity, and therefore a smaller graduation, then the measurement range and accuracy will not be in accordance with the specifications.

The standard setting of the indicator is a capacity of 2.500 kg and a graduation of 50 kg. The following procedure should be followed to change the settings.

7.2 Interval setting

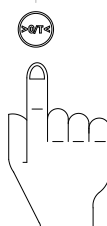
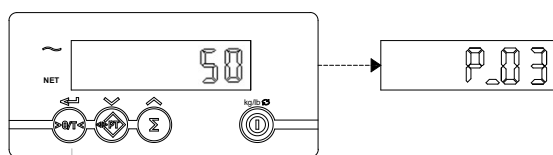
<div>1</div>  <p>Switch off the indicator with the on/off key.</p>
--

5



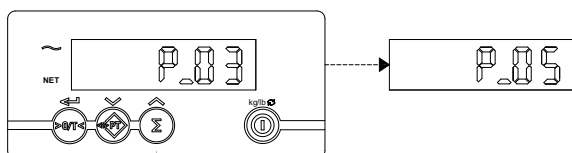
Change the values of the reading steps with the keys \wedge and \vee .
 10 for capacity
 3.000 – 5.000 kg.
 20 for capacity
 > 5.000 kg.

6



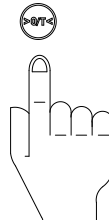
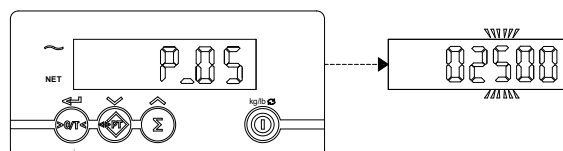
Insert the value.

7



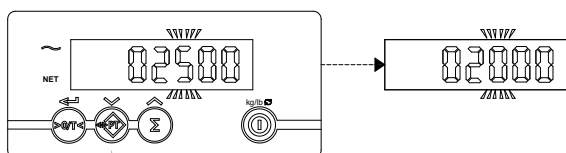
Use the \wedge and \vee keys
 and go to P05 for
 setting the
 appropriate capacity.

8



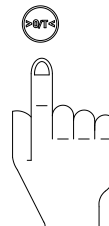
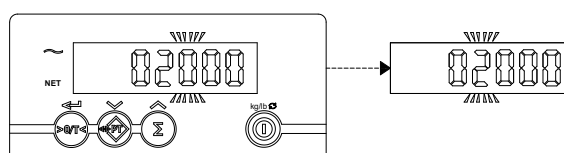
Confirm P05.
 The indicator shows
 the capacity 2500 kg.

9



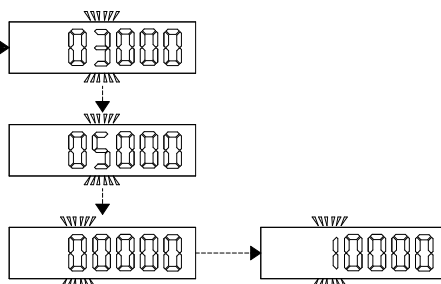
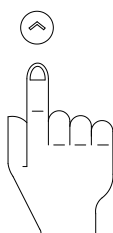
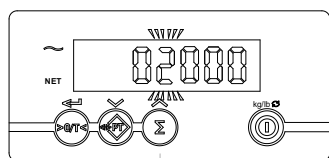
5 x

10



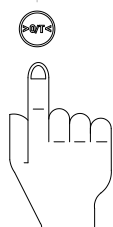
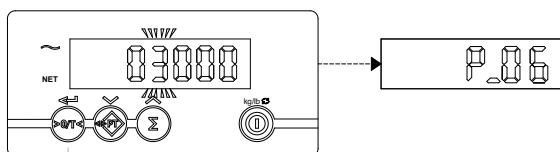
1 x

11



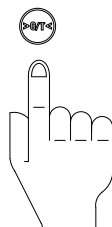
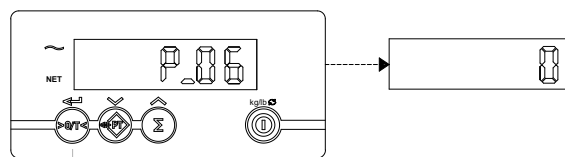
Use the keys \vee and \wedge and change the value to:
3 for 3.000 kg
5 for 5.000 kg
10 for 10.000 kg

12



Confirm the value of the capacity.

13

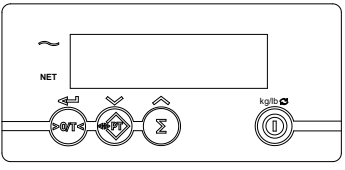
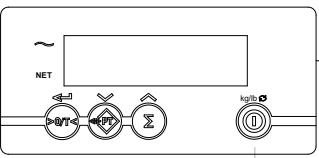
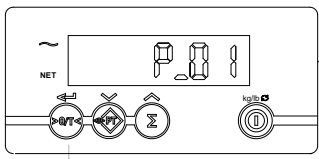
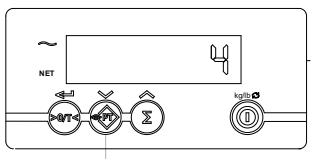
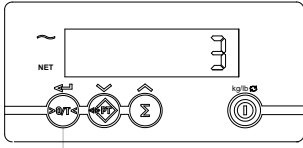
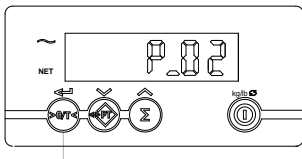


3 sec.



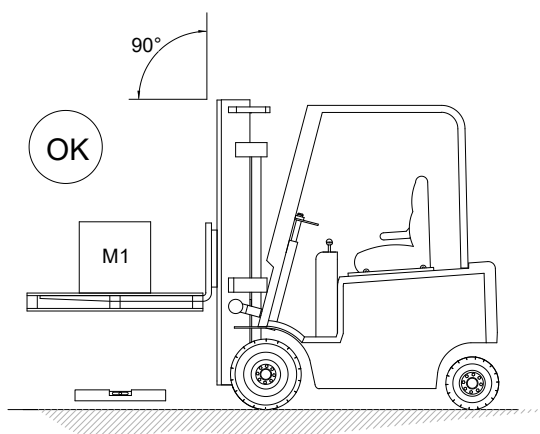
Press Enter to return to the normal weighing mode.

7.3 Change the delay-time

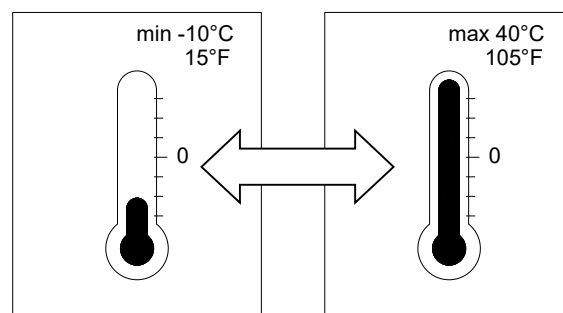
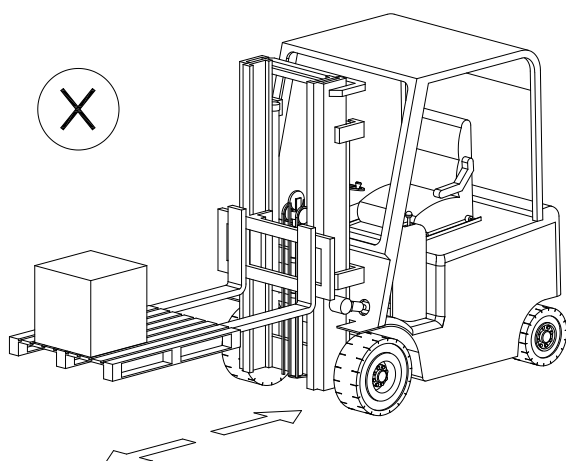
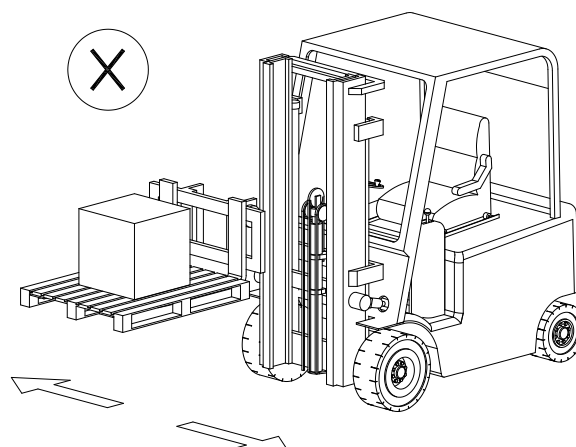
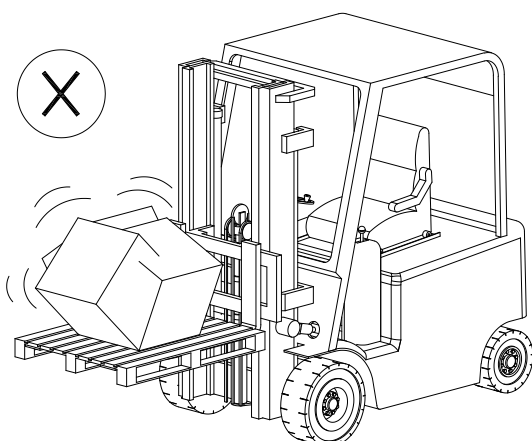
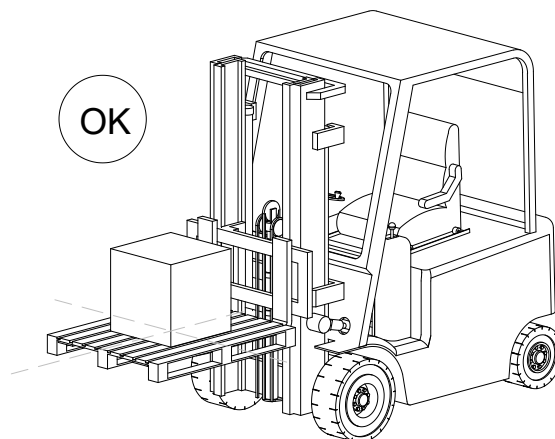
<p>1</p>  <p>Turn the indicator off.</p>	<p>2</p>  <p>23 sec.</p> <p>Press on the on/off button for 23 sec. until the indicator shows P01 (do not let go)</p>
<p>3</p>  <p>Confirm with the →0/T← button. The indicator shows a delay time 4 (sec.)</p>	<p>4</p>  <p>1x</p> <p>Change the value to 3 seconds using the ^ and v button.</p> <p>Delay time: 0–7 sec. Depending on the type of pallet truck.</p>
<p>5</p>  <p>Confirm with the →0/T← button. The indicator now shows P02.</p>	<p>6</p>  <p>3 sec.</p> <p>Push the →0/T← button for 3 seconds to return to the weighing mode.</p>

8. Calibration

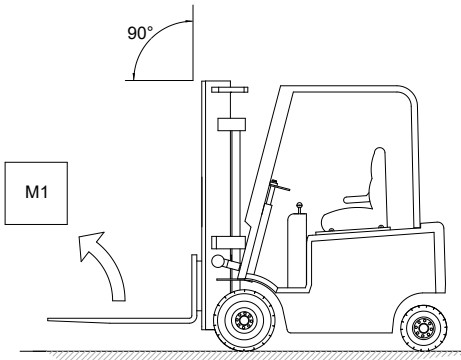
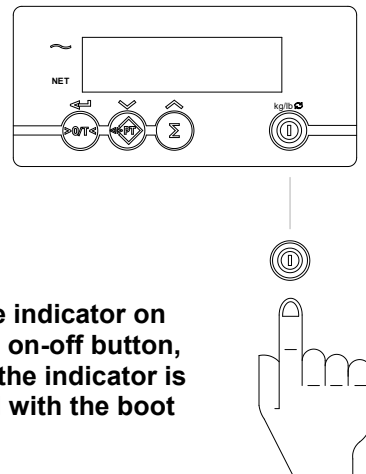
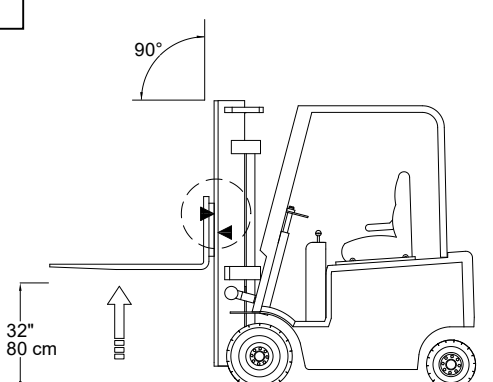
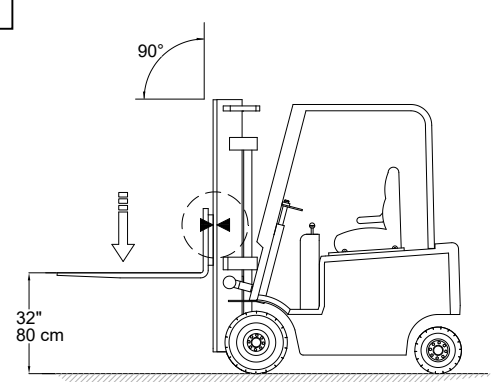
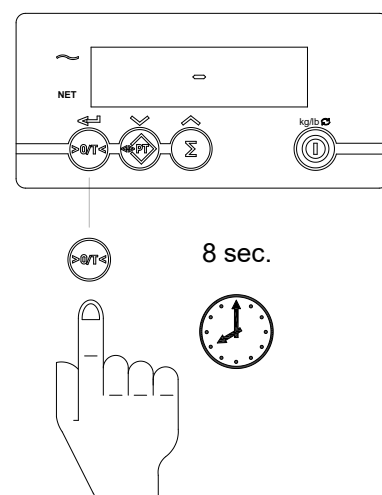
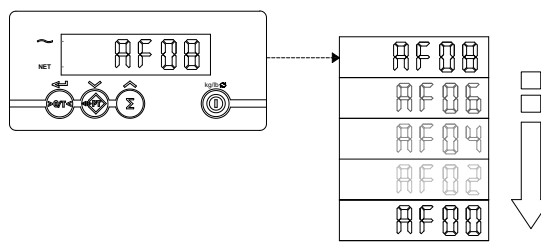
8.1 Preparing for calibration



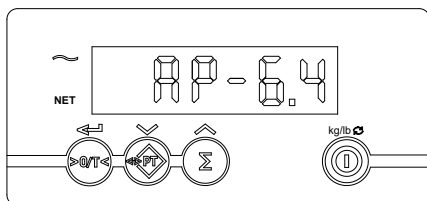
Recommended calibration weight:
M1=+/- 2/3 of the trucks lift capacity.
Example#1: 2.2t truck => M1 = 1500



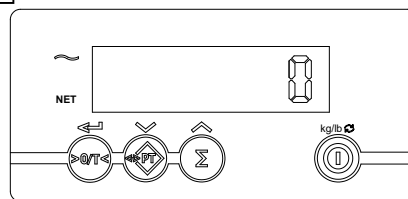
8.2 Correcting the zero point

<p>1</p> 	<p>2</p>  <p>Turn the indicator on with the on-off button, wait till the indicator is finished with the boot routine.</p>
<p>3</p>  <p>Lift the system beyond the reference altitude</p>	<p>4</p>  <p>Lower the forks till the reference altitude.</p>
<p>5</p>  <p>8 sec.</p>	<p>6</p> 

7



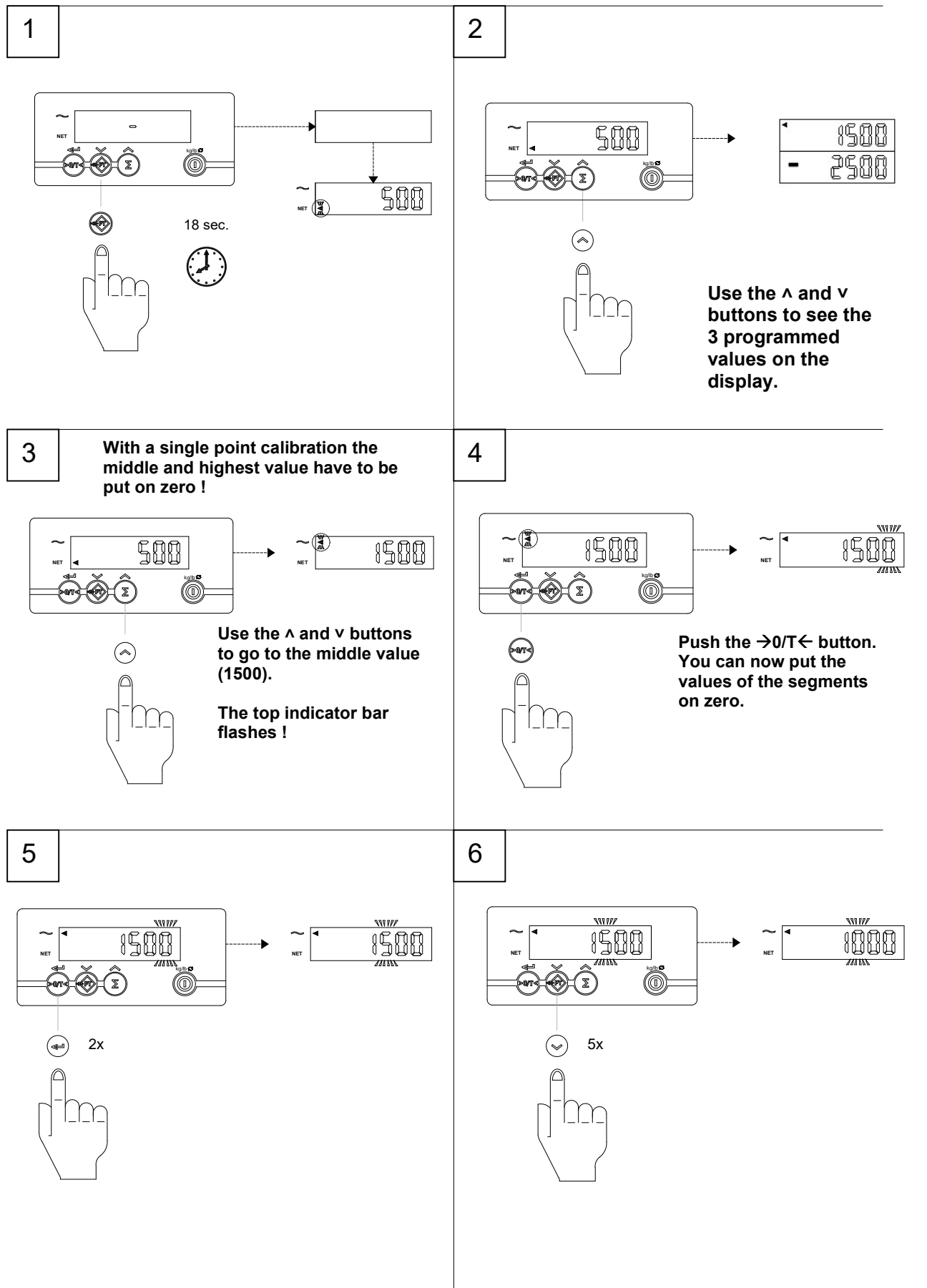
8



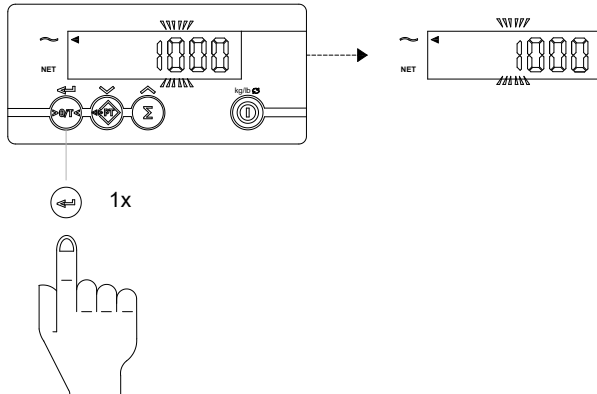
Zero-calibration is finished!

The indicator returns to the weighing mode automatically.

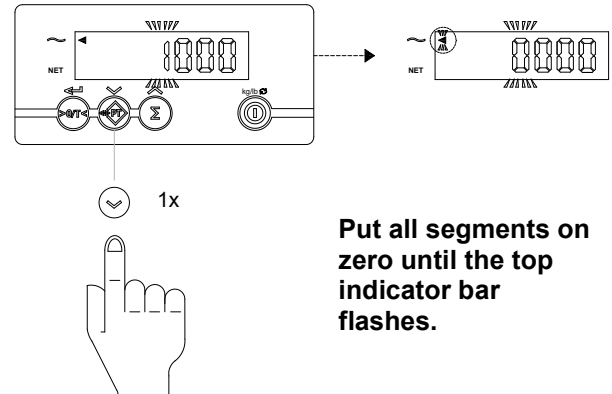
8.3 Weight calibration (single point)



7

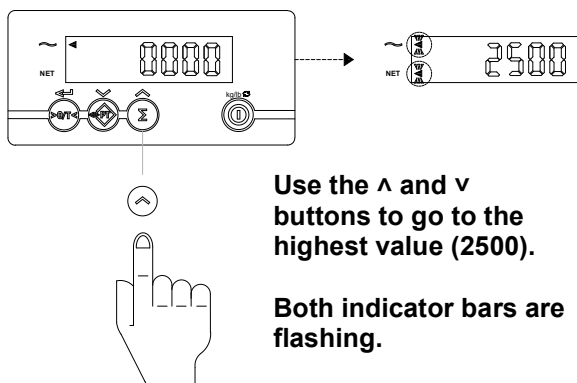


8



Put all segments on zero until the top indicator bar flashes.

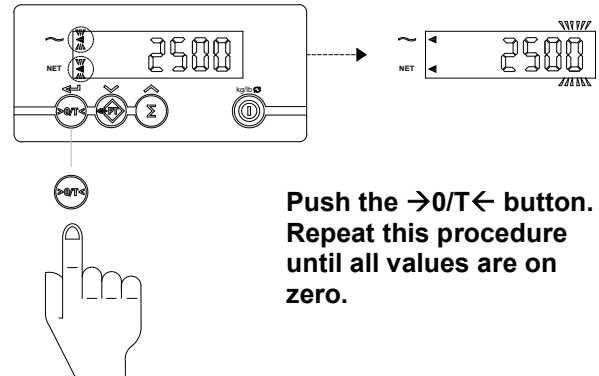
9



Use the \wedge and \vee buttons to go to the highest value (2500).

Both indicator bars are flashing.

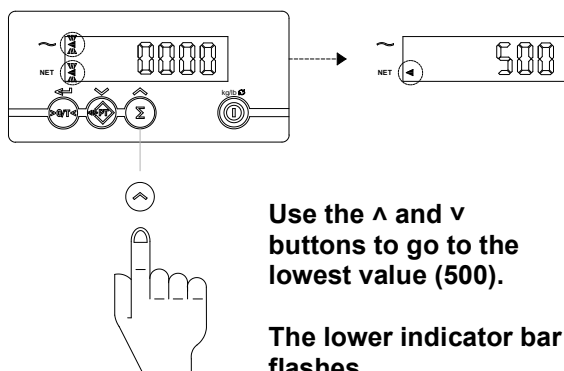
10



Push the $\rightarrow 0/T \leftarrow$ button. Repeat this procedure until all values are on zero.

11

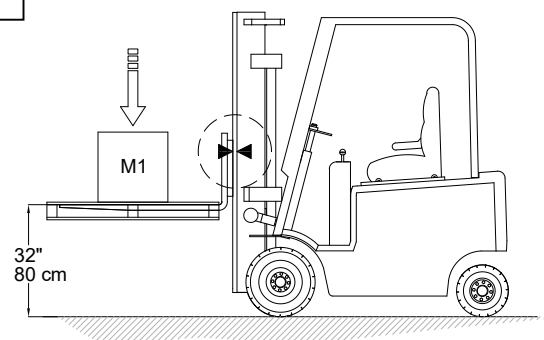
Single point calibration



Use the \wedge and \vee buttons to go to the lowest value (500).

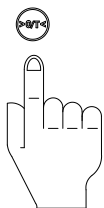
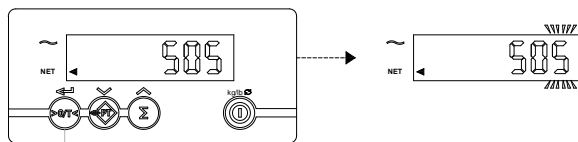
The lower indicator bar flashes.

12



Place a known weight on the forks. (M1 = 500kg)

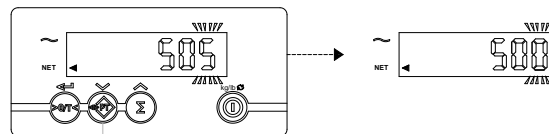
13



The indicator shows the weight.

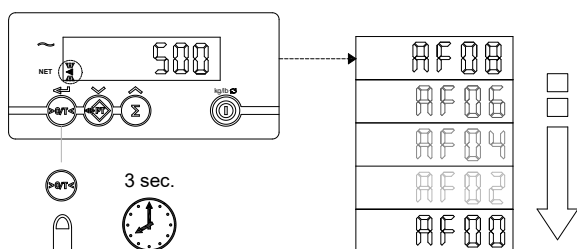
Push the $\rightarrow 0/T \leftarrow$ button briefly. The first segment starts flickering.

14



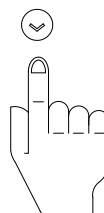
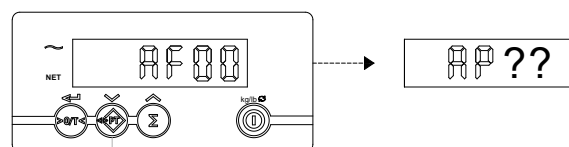
Use the \wedge and \vee buttons to enter the right values.

15



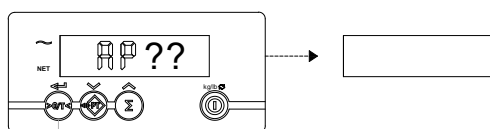
Confirm the entered weight by pushing the $\rightarrow 0/T \leftarrow$ button for 3 seconds. The display counts down and the first calibration point is entered.

16



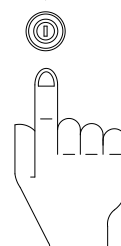
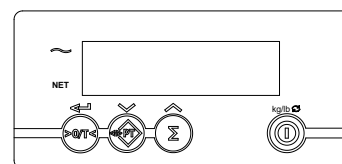
Push the \wedge or \vee button until AP XX appears to leave the calibration-menu.

17



Push the $\rightarrow 0/T \leftarrow$ button until the screen shuts itself down.

18



Turn the indicator off and restart it.

9. Bringing the system into service

9.1 Auto start

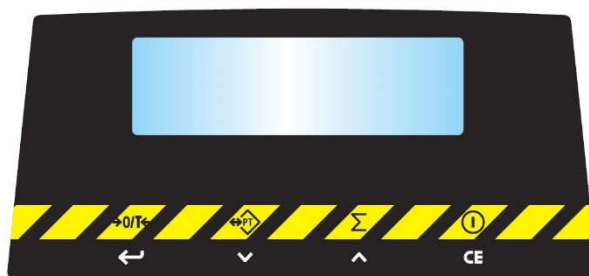
The system will turn on automatically whenever the truck is started.

Attention! It is only possible to press a key when the weight in the display is stable, the “load stable” indication can be seen in the indicator display. If the load is not stable the keys will not react, this to prevent mistakes. Weighing or adding a moving load is not accurate.

9.2 Using the reference height

Lift the forks a little bit higher than the point at which the stickers are on the carriage plate and lower them to the reference height. For more information on the reference height see chapter 4.2

9.3 The indicator



Display functions

The SafeCheck has a LCD display which shows the weight that is on the forks.








Help messages

The following messages can be shown in the display:

- | | |
|--------|---|
| HELP 1 | The load measurement system has been overloaded. |
| HELP 2 | The zero point is below the originally calibrated zero point. See load measurement system calibration. |
| HELP 3 | Negative signal from the sensor. |
| HELP 4 | The tare value entered (manually) is too high. Press key ↕PT again to delete this help message and key in a lower tare value. |
| HELP 7 | Signal from the sensor is too high. |

9.4 The touch panel of the SafeCheck

Each key has an operational and an entry function.

Operational function		Entry function	
	zero setting and automatic tare		confirm and digit to the left
	enter set point (limit value)		decrease flashing digit
	totaling		increase flashing digit
	on/off		

9.5 Enter setpoint value (limit value)

IMPORTANT: To activate the limit value of the relays you have to go into the parameter menu and change P13 to '0'. Go back into the weighing mode and enter the limit value by pressing the <-PT> key.

A setpoint can be used to activate a buzzer.

To activate the last entered setpoint value:

- Press the <-PT> key.
 - ❑ The display shows the current setpoint value.
 - ❑ The digit on the right flashes.
- Press ENTER (↵) for three seconds if the current setpoint value is required.

To enter a new setpoint value:

- Press the <-PT> key.
 - ❑ The display shows the current setpoint value.
 - ❑ The digit on the right flashes.
- Press the ^ key to go up a value or press the v key to go down a value until the required value is reached.
- Press ENTER (↵) to change the next value.
- Repeat this procedure until the required limit value is displayed.
- Press ENTER (↵) until the last segment has stopped flashing.
 - ❑ The new setpoint is saved and activated.
 - ❑ The gross weight is being displayed.
 - ❑ The new setpoint will be active until a new setpoint value has been entered.

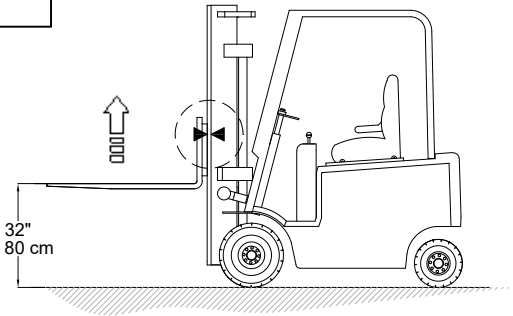
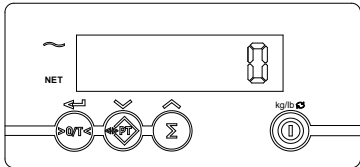
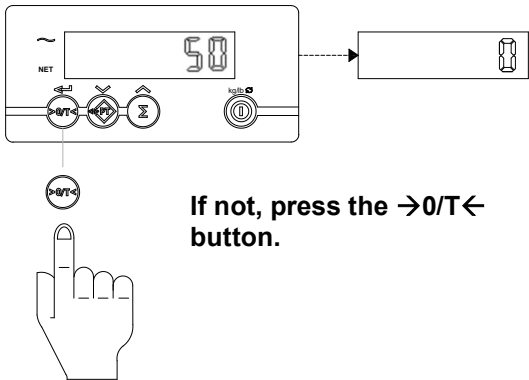
NOTE: After the limit value is set, put P13 back to '1'!

The relay output will be activated when the gross weight exceeds the setpoint value and will be deactivated subsequently when the gross weight becomes less than the setpoint value.

10. The functions of the SafeCheck

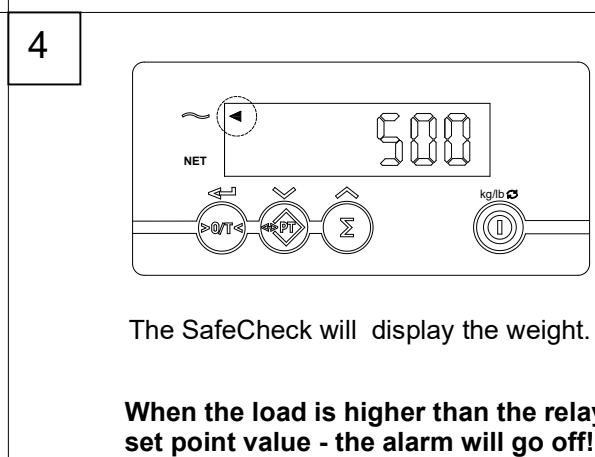
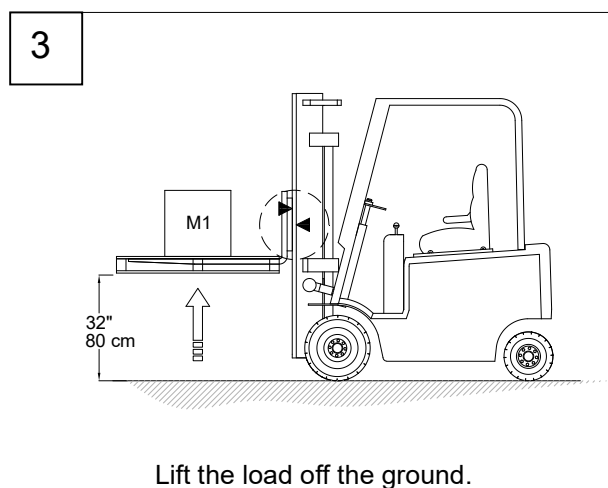
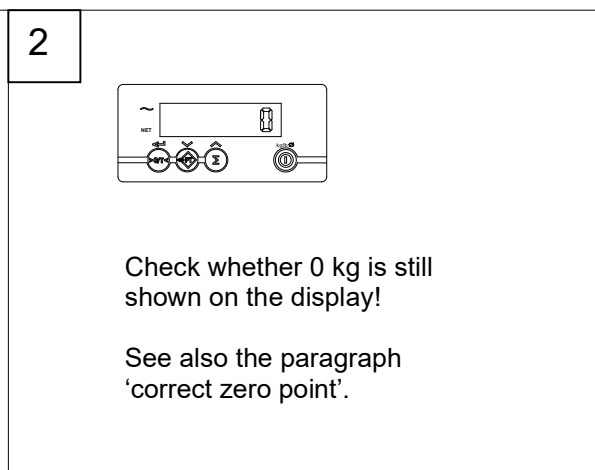
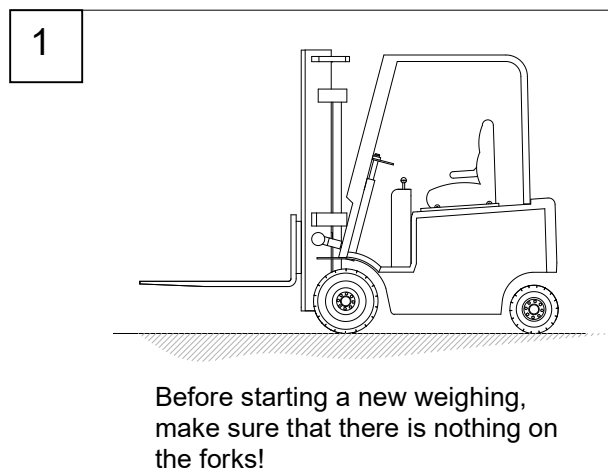
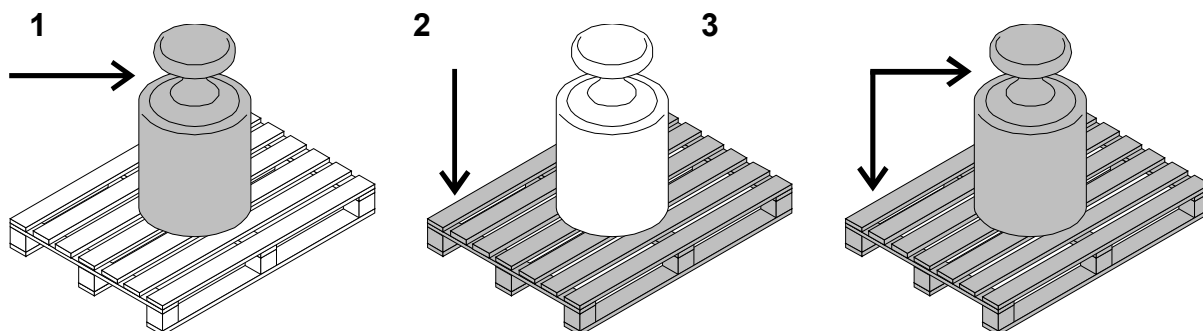
10.1 Correct zero point

To check the zero point the forks have to be freestanding and they may not touch the ground. They should, of course, be empty.

<div>1</div> <div></div> <div>Lift the forks free from the ground.</div>	<div>2</div> <div></div> <div>Check whether the display on the indicator shows a zero!</div>
<div>3</div> <div></div> <div>If not, press the →0/T← button.</div>	

10.2 Gross weighing

EXPLANATION: Net(1) + Tare(2) = Bruto (3)



11. Power supply

These options can not be added once the system is mounted and can only be bought with a new system.

11.1 Power supply by the truck's battery

The indicator is installed in the cabin of the forklift truck. Optionally, the power supply of the indicator can be connected to the battery of the forklift truck. The most common voltages for forklift trucks are 12, 24, 48 or 80 V.

In case where the battery voltage is higher than 12 Vdc, the system requires a DC-DC voltage converter with an output voltage of 12 Vdc and possibly a filter.

In addition, the power cable of the indicator with a floating fuse holder with 3.15A safety fuse.

11.1.1 Guidelines to connect the power supply

- Make sure that the fuse is as close to the power source as possible.
- The fuse must be mounted safely and in an accessible location.
- On electric forklifts:
Connect the power supply to the battery as close as possible, do not mount it directly on the battery or in front of a fuse.
- On petrol, diesel or propane forklifts:
Connect the power supply as close to the battery as possible, and avoid the use of existing wiring.

11.1.2 Guidelines for installation

Please note: always turn off the power supply before installation!

The installer should be familiar with the brands and models of equipment on which this converter is installed. The installer should also be trained and have experience in electrical systems of forklifts.

Follow the guidelines and the installation procedures as well as the guidelines of the forklift manufacturer to guarantee a safe and reliable installation.

- Make sure that the power supply is connected safely;
- Make sure the mounting surface is firm;
- Make sure the mounting surface can dissipate the heat from the power supply good;
- Make sure that the fuse is close to the battery of the forklift and matched with related weighing equipment;
- Keep the cables as short as possible, fixate it at least every 45 cm (18 inch).

Make sure you become familiar with the requirements of the lift truck manufacturer and make sure you have the right qualifications to perform the installation of the power supply.

The converter must be installed in a suitable location.

See installation steps below:

Step 1. Plan the installation and get the hardware

Step 2. Install the indicator

Step 3. Install the converter (if necessary)

Step 4. Install the further options such as printers, mobile computer and connections

Use only an approved and properly tuned power supply suitable for the country of operation. Use of alternative power supplies will void the system's warranty and can be dangerous.

WARNING! Only qualified personnel should perform an installation to a forklift. Improper installation can injure the operator or cause damage to the system, inverter, and/or the other options!

11.1.3 Connection to electric forklifts

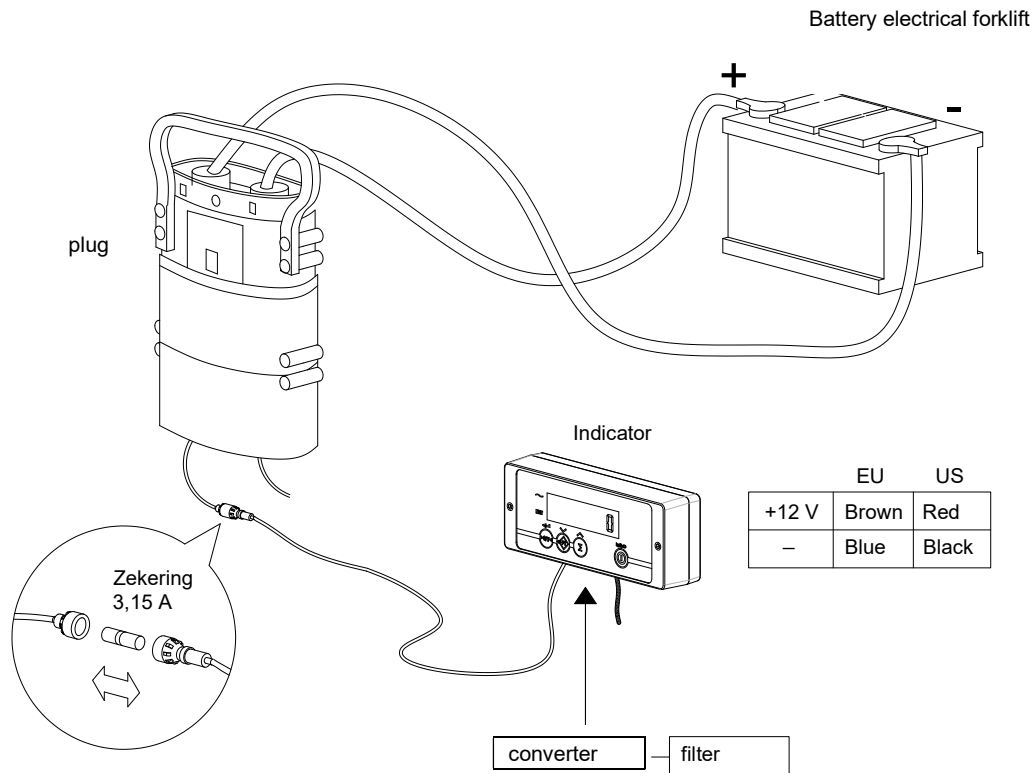
Connect the power supply to the battery as close as possible to, but not directly on, the battery and not in front of a main breaker.

Connect the red wire (indirectly: with plug in between) with the positive energy source (plus pole of the battery) of the forklift.

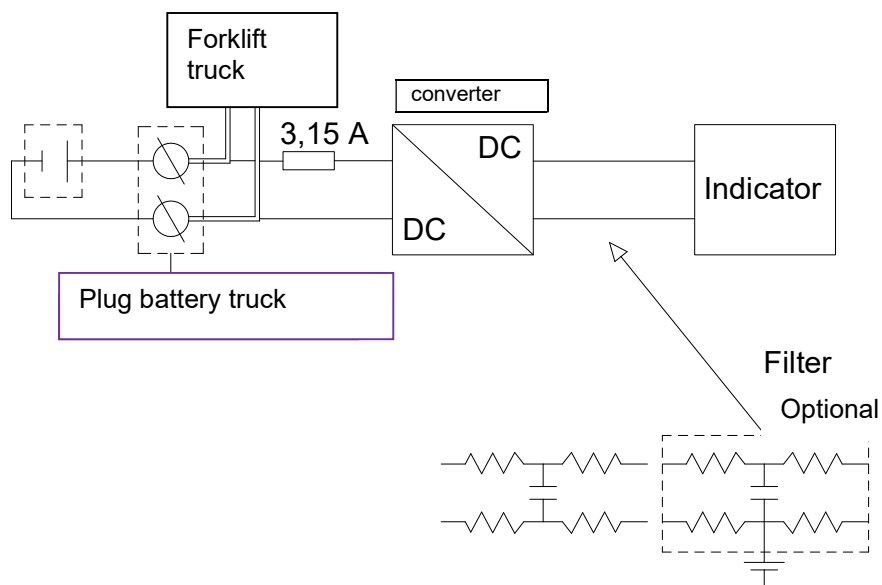
Connect the black wire (indirectly: with plug in between) to the negative power source (negative pole of the battery) of the lift truck.

Make sure the wire connectors are sufficiently isolated from each other.

Connect the battery back on the fork-lift truck.



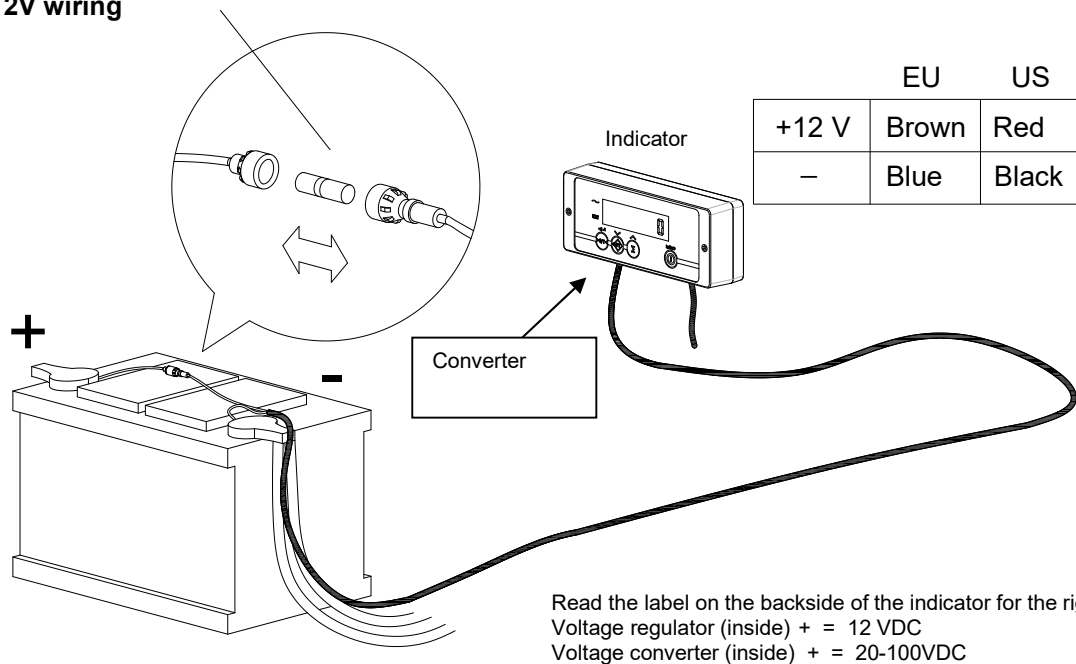
Electrical forklift



11.1.4 Connection to gasoline, diesel or propane forklifts

Connect the power supply as close as possible to the battery and avoid the use of the existing wiring. Connect the red wire to the positive energy source (plus pole of the battery) of the pallet truck. Connect the black wire to the negative energy source (negative pole of the battery) of the pallet truck. Make sure the wire connectors are sufficiently isolated from each other. Connect the battery back on the fork-lift truck.

3.15A safety fuse in 12V wiring



Forklift battery power supply

Combustion truck

