

Instruction manual

PX Combi 842



System	Lykketronic PX Combi 842
Part number	
Serial number	
Installed by	
Installation date	

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1. General use

Congratulations with your new PX Combi 842.

The PX Combi 842 includes a wide selection of useful features, which enable it to be used in connection with almost any agricultural implement.

If the monitor is used in accordance with the guidelines in this manual, the PX Combi 842 will be a useful and reliable tool for many years to come.

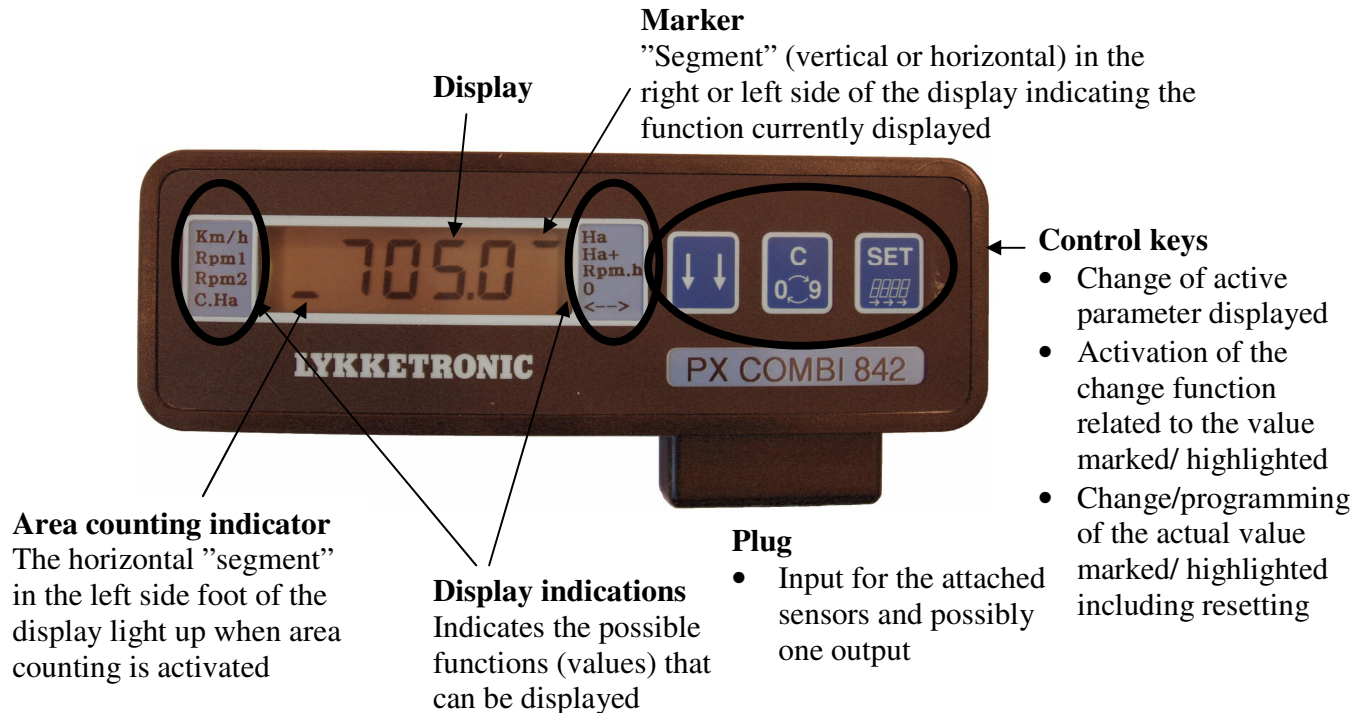
1.1 Overview of included functions and displays

The following functions is included in the computer:

"Km/h"	Forward driving speed (km/h).
"Rpm1"	Programmable rotation counter with audio- and visual alarm (revolutions per minute). Can be connected to generator terminals or can be used with sensor to monitor shaft speeds.
"Rpm2"	Programmable rotation counter with audio- and visual alarm (revolutions per minute). Can be connected to generator terminals or can be used with sensor to monitor shaft speeds.
"Ha"	Area trip counter (hectare).
"Ha+"	Area total counter (hectare).
"Rpmh"	Aggregated rotation time on the Rpm1 input i.e. total working time of generator/shaft/axle (times/minutes) – no display marker
"⊙"	Encoding forward speed calibration (wheel circumference or pulse distance) in centimeters (cm)
"↔"	Encoding working width in centimeters (cm)
"A on/off"	Enabling/disabling acoustic alarm – no display marker

The individual functions and their characteristics are described in chapter 2.

1.2 Overview of monitor



1.3 Brief explanation of control keys

-Key

Pressing the key  shifts between the different display indications (indicated in the two end fields of the display), i.e. shifts between the different monitor functions. For each push on the button the marker will change position by one step. The marker will start in the upper left hand corner and move downwards (hereafter the marker will move to the upper right hand corner and move downwards). On the figure the marker is placed opposite the display indication of area trip counting (705,0 Hectare).

- Please note, that the display indications for aggregated rotation time on the Rpm1 input (Rpm.h) and enabling/disabling of the acoustic alarm do not have a marker indication

Irrespective of display indication the user can always return to the standard display (i.e. km/h) by pressing the key for approx. 1 sec.

Furthermore the key is used to quit the change menu (cf. next paragraph).

-Key

The -key is used to enter the change menu where parameters/values in the computer can be changed/reset, e.g. programming of wheel circumference or working width of actual implement.

Initially the user must navigate to the function or display indication that needs to be changed by using the -key. Hereafter the -key is pressed for approx. 1 sec. until the display value starts flashing. With the -key the first digit can now be changed/reset. By subsequently pressing the -key the marker will move to the next digit of the display value. This is done until all digits have been changed. At the end the change menu is quitted by pressing the -key.

-Key

The -key is used to change/reset parameters and values (after entering the change menu by using the -key).

Besides, please see the examples in the following chapters and paragraphs.

1.4 Area counting indicator

The horizontal "segment" in the left side foot of the display (opposite the text "C.Ha") light up when the computer is counting hectares, cf. the previous figure. In case the "segment" is not lit no hectare counting is carried out.

- The following conditions must be fulfilled in order to count hectares: 1) Wheel circumference must be entered, 2) working width of implement must be entered and 3) the area cut-off sensor must *NOT* be activated (the area cut-off sensor is used to control that the implement is sufficiently lifted when driving at the end of the fields or on the roads).

2. Operating the functions

2.1 Specification of functions, calibration parameters and threshold values

Symbol:	Explanation:	Threshold value:
Km/h	Forward driving speed	0.1 - 999.9 Km/hour
Rpm1	Rotation counter1 with alarm	12 – 9999 Revolutions/min.
Rpm2	Rotation counter 2 with alarm	12 – 9999 Revolutions/min.
Ha	Area trip counter (treated area)	0.000 – 9999 Hectare
Ha+	Area total counter (treated area)	0.000 – 9999 Hectare
Rpm.h	Aggregated rotation time on the Rpm1 sensor	0:0 – 9999:59 Hours:minutes
"⊙"	Wheel circumference (distance between pulses)	0.01 - 999.9 Centimeters (cm)
"↔"	Working width	0.00 - 99.99 Meter

The computer is supplied with an internal memory that safes all values and parameters when the power supply is cut-off.

2.2 Forward driving speed (km/h)

The standard display indication is the forward driving speed. In this display indication the upper horizontal marker is activated, cf. the following figure (driving speed: 5,4 km/h).



2.3 Rotation counter and alarm (revolutions per minute) – Rpm1 and Rpm2

The alarm functions of the rotation counters are programmable, i.e. it is possible to key in or alter the threshold values of the alarms. Both upper and lower threshold levels can be programmed.

2.3.1 Display of current revolutions per minute

In this display indication the upper vertical (opposite the text "Rpm1") or lower vertical (opposite the text "Rpm2") marker is activated, cf. the following figure (Rpm1: 2179)



Marker position when
displaying Rpm1

2.3.2 Encoding the alarm threshold values

An example of how to program the alarm threshold values on rotation counter 1 or 2 is represented in the following scheme.

Example: Changing the lower limit to 110 rpm and the upper limit to 1356 rpm		
Key press:	Display indication:	Explanation:
	0	Find rotation counter 1 or 2 by pressing the key repeatedly
	L _ _ _ 0	Hold the key for 1 sec. until "L" is lit at the left side and the first (out of four) digit is flashing.
	L <u>X</u> _ _ _	Press the key until the digit has the correct value. Please note, that zero (0) cannot be entered in this position.
	L _ <u>X</u> _ _	Press the key to set/change the next digit (the second digit will now start to flash)
	L _ _ <u>100</u>	Press the key until the digit has the correct value
	L _ _ <u>100</u>	Press the key to set/change the next digit (the third digit will now start to flash)
	L _ _ <u>110</u>	Press the key until the digit has the correct value
	L _ _ <u>110</u>	Press the key to set/change the last digit
	L _ _ <u>100</u>	Press the key until the digit has the correct value
	H <u>X</u> 000	Press the "arrow" key for 1 sec. until "H" (high) is lit at the left side and the first digit starts to flash.
	H _ <u>1000</u>	Press the key until the digit has the correct value

	H 1 <u>0</u> 00	Press the key to set/change the next digit (the second digit will now start to flash)
	H 13 <u>0</u> 0	Press the key until the digit has the correct value
	H 13 <u>0</u> 0	Press the key to set/change the next digit (the third digit will now start to flash)
	H 13 <u>5</u> 0	Press the key until the digit has the correct value
	H 135 <u>0</u>	Press the key to set/change the last digit
	H 135 <u>6</u>	Press the key until the digit has the correct value
		Press the "arrow" key to quit the change menu

An illustration of the change menu for setting the lower respectively the upper threshold value is represented below.



Marker position for display of Rpm1 Change of lower threshold value to 2000 rpm on Rpm1



Change of upper threshold value to 3500 rpm on Rpm1

Exceeding the threshold values will activate the visual alarm (and acoustic alarm if this is activated) by flashing the marker opposite the text "Rpm1" or "Rpm2".

2.3.3 Enabling/disabling the acoustic alarm

The PX Combi is provided with an optional internal acoustic alarm, which can be activated when one of the rotation counters (Rpm1/Rpm2) exceeds the programmed alarm threshold value.

An example on how to enable the acoustic alarm is represented in the following:

The -key is pressed until the alarm display "A on" or "A off" appears, cf. the following figure.



Hereafter the following is keyed in:

Key press:	Display indication:	Explanation:
	A <u>off</u>	Hold the key for approx. 1 sec. until "on" or "oFF" starts flashing.
	A on	Press the key until the acoustic alarm is enabled or disabled (on/oFF).
	A on	Press the "arrow" key to quit the change menu.

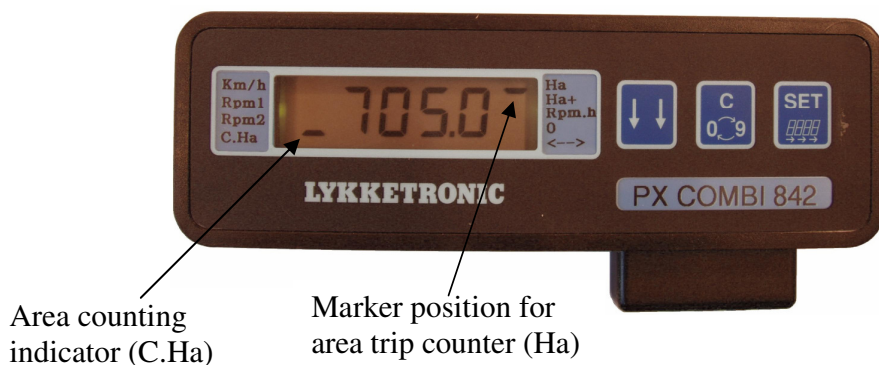
- The visual alarm (i.e. the flashing marker opposite the text "Rpm1" or "Rpm2") will continue to be displayed even though the acoustic alarm is disabled.

2.4 Area counters (hectare) – Ha and Ha+

Through the Area counting indicator (cf. chapter 1) it is always possible to see whether area counting is active.

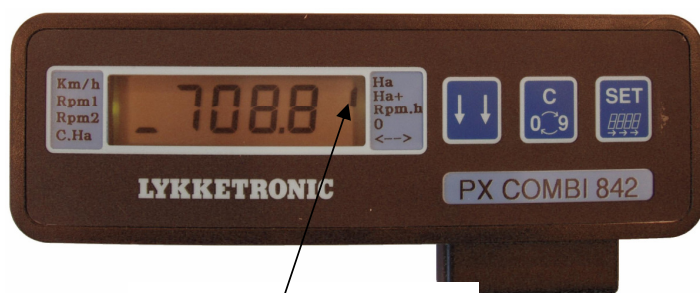
2.4.1 Display of area trip counter (Ha)

In this display indication the upper *horizontal* marker in the right column is activated, please see the figure below (Ha:705,0).



2.4.2 Display of area total counter (Ha+)

In this display indication the upper *vertical* marker in the right column is activated, please see the figure below (Ha+:708,8).



Marker position for area
total counter (Ha+)

2.4.3 Resetting area counters

The area counters can be reset at any time. In this way "Area trip counter" can be used to register data for a single customer or field. Thus "Area total counter" can be used to register the aggregate data for the day, the week or over a time-frame of one year.

The -key is pressed until the display indications "Ha" or "Ha+" appear.

Hereafter the following is keyed in:

Key press:	Display indication:	Explanation:
	7.852 (Example)	Press the key for 1 sec. until value starts flashing
	0.000	Press the key to reset area trip counter (or area total counter).
	0.000	Press the "arrow" key to quit the change menu.

2.4.4 Distance counters (instead of area counters)

Set the *working width of the implement to 10 meter* (cf. chapter 3). The function "Ha" will hereafter work as distance trip counter and the function "Ha+" will work as distance total counter. Both indications will be displayed in kilometers (km).

2.5 Working time/aggregated rotation time on the Rpm1 sensor - Rpm.h

In this display indication *no marker* is displayed. This display is found by pressing the -key once when the computer displays (Ha+). Hereafter the aggregated rotation time will be displayed as indicated in the following figure (Total working time: 522 hours and 31 minutes).



- The working time counter *cannot* be reset.

Above 999:59 hours/minutes only total hours is displayed.

3. Encoding the PX Combi

3.1 Encoding the wheel circumference

To calculate the forward driving speed, the computer requires to be programmed with the wheel circumference from which the wheel sensor receives its impulses.

The wheel circumference can be given from the tractor vendor but it is recommended to control the wheel circumference since factors such as air-pressure, tyre wear, accumulated weight of tractor, weight distribution and soil conditions all affects the actual wheel circumference during use.

A distance equal to ten (10) wheel revolutions is driven. This distance is measured and divided by ten. The resulting factor is the wheel circumference. Since the condition of the soil affects the accuracy of the circumference it is therefore an advantage to generate a circumference for hard, soft and very soft soil. In this way the right factor is available for the various conditions.

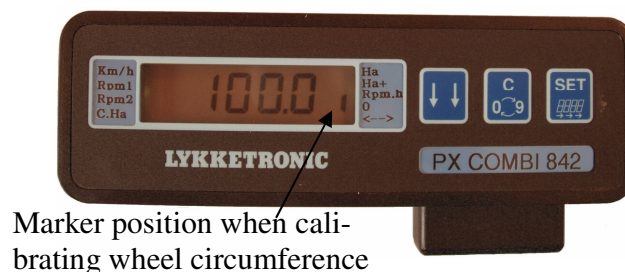
- By mounting additional magnets on the wheel a faster registration of actual speed changes (e.g. when starting up) can be obtained. In this case it is important that the magnets are placed with equal distance and that the number of magnets applied divides the circumference

The wheel circumference should be entered in cm. The figure below indicates how different circumferences are displayed and how the comma should be placed.

Intervals for entering wheel circumference	
Interval	Display example
< 100 cm	87,25
=> 100 cm	315,8

An example of how to enter a circumference of 315,8 cm. (changed from 87,25 cm.) is given in the following:

Press the -key until the wheel circumference display "O" appears, cf. the figure below.



Hereafter the following is keyed in:

Key press:	Display indication:	Explanation:
	87.25	Press the key until the comma starts flashing.
	872.5	Press the key until the comma is correctly placed.
	872.5	Press the key to set/change the first digit (the first digit will now start to flash)
	372.5	Press the key until the digit has the correct value
	372.5	Press the key to set/change the next digit
	312.5	Press the key until the digit has the correct value
	312.5	Press the key to set/change the next digit
	315.5	Press the key until the digit has the correct value
	315.5	Press the key to set/change the last digit
	315.8	Press the key until the digit has the correct value
	315.8	Press the "arrow" key to quit the change menu

- When using a radar signal with 130 pulses/meter a distance of 0,77 cm is used as circumference.

3.2 Encoding working width

In order to use the area counters, the working width of the implement used must first be entered.

An example of how to enter a working width of 4,50 meters (changed from 10,00 meter) is given in the following:

Press the -key until the working width display " <==> " appears, cf. the figure below.



Marker position when
calibrating working width

Hereafter the following is keyed in

Key press:	Display indication:	Explanation:
	10.00	Press the key until the first digit starts flashing.
	_ 0.00	Press the key until the digit has the correct value
	<u>0</u> .00	Press the key to set/change the next digit
	<u>4</u> .00	Press the key until the digit has the correct value
	_ 4. <u>00</u>	Press the key to set/change the next digit
	_ 4. <u>50</u>	Press the key until the digit has the correct value
	_ 4.5 <u>0</u>	Press the key to set/change the last digit
	_ 4.5 <u>0</u>	Press the key until the digit has the correct value
	_ 4.50	Press the "arrow" key to quit the change menu

3.3 Encoding number of pulses per revolution for Rpm1 and Rpm2

In order to use the revolution counters (Rpm1 and Rpm2), the impulses per revolution for both sensor inputs must first be entered.

An example of how to enter 6 pulses per revolution for the Rpm2 sensor input (changed from 1,00 pulse per revolution) is given in the following:

Press the -key until the display " Rpm2" appears. Hereafter the following is keyed in:

Key press:	Display indication:	Explanation:
	L _ _ _ 0	Hold the key for 1 sec. until "L" is lit at the left side and the first (out of four) digit is flashing.
NB: 	_ 1.00	Press the key <i>again</i> for additional 3 sec. until the first digit starts flashing
	_ 1.00	Press the key until the digit has the correct value
	<u>1</u> .00	Press the key to set/change the next digit
	<u>6</u> .00	Press the key until the digit has the correct value
	_ 6. <u>00</u>	Press the key to set/change the next digit
	_ 6. <u>00</u>	Press the key until the digit has the correct value
	_ 6.0 <u>0</u>	Press the key to set/change the last digit
	_ 6.0 <u>0</u>	Press the key until the digit has the correct value
	0	Press the key repeatedly to quit the change menu (via menu for setting Rpm threshold values)

4. Installation guide

4.1 Fitting the computer

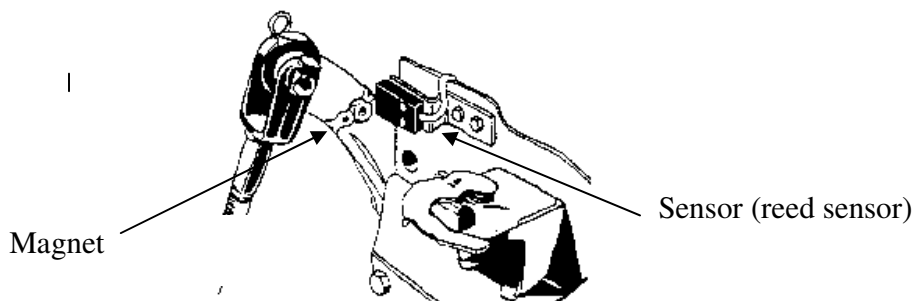
The back panel of the computer is equipped with 2 slots in which the mounting bracket is to be slit into for fixation of the computer. The mounting bracket is fitted in the drivers cabin in a way that suits the driver the best.

The sensors to the computer are to be connected as indicated in the supplied diagram. Lead the cables in a way so they are as protected as possible when the tractor turns and the hydraulics is operated. If possible it is recommended to lead the cables alongside existing cables, hydraulic pipes etc.

4.2 Fitting the area cut-off sensor

In order to assure that hectare counting is only done when the implement is in actual use a magnet and a sensor is fitted on the tractors lift arm.

- The magnet and the sensor should be situated opposite each other when the lift arm is in top position.

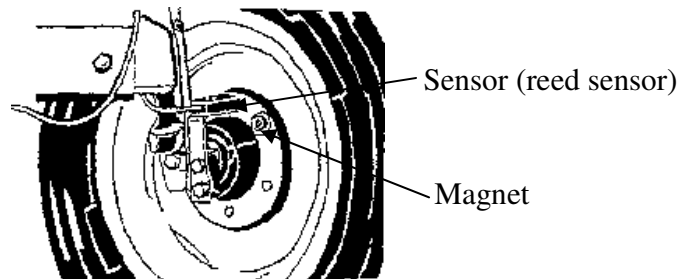


By implementing the area cut-off sensor as indicated the computer can be used for speed- and area measurement in connection with many different types of implements.

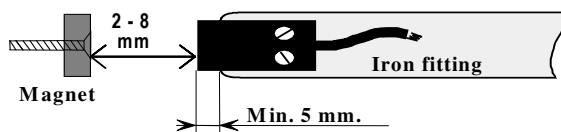
The area cut-off sensor can be placed in other optional positions depending on the actual task to be performed, e.g. in connection with hydraulic cylinders, handles etc.

4.3 Fitting sensors for driving speed and rotation measurements

The magnet is fitted next to the wheel bolts, on an axle or pulley and the sensor is fitted on a fitting plate, please see the example below for fitting next to the wheel bolts.



The distance between the magnet and sensor must be between 2 - 8 mm.:



- In case the sensor is fitted on a mounting bracket of a material that can be magnetized (e.g. iron) it should be emphasized that the sensor must be placed at least 5 mm. beyond the edge of the mounting bracket

It is recommended that the wheel sensor be fitted on a trailing wheel. On a four-wheel drive vehicle it is recommended to fit the sensor on the rear wheel. By mounting additional magnets on the wheel a faster registration of actual speed changes (e.g. when starting up) can be obtained.

- In this case it is important that the magnets are placed with equal distance and that the number of magnets applied divides the circumference

4.4 Different types of sensors

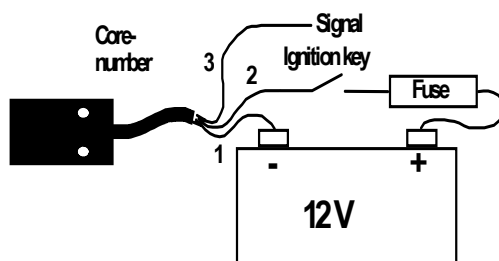
Primarily two different types of sensors are available:

- Mechanical, with 2 core cable (- 0V and signal) – often referred to as "reed sensor"
- Electronically, with 3 core cable (+V, -0V and signal) – often referred to as "hall sensor"

As wheel sensor and area cut-off sensor it is recommended to use mechanical sensors (reed).

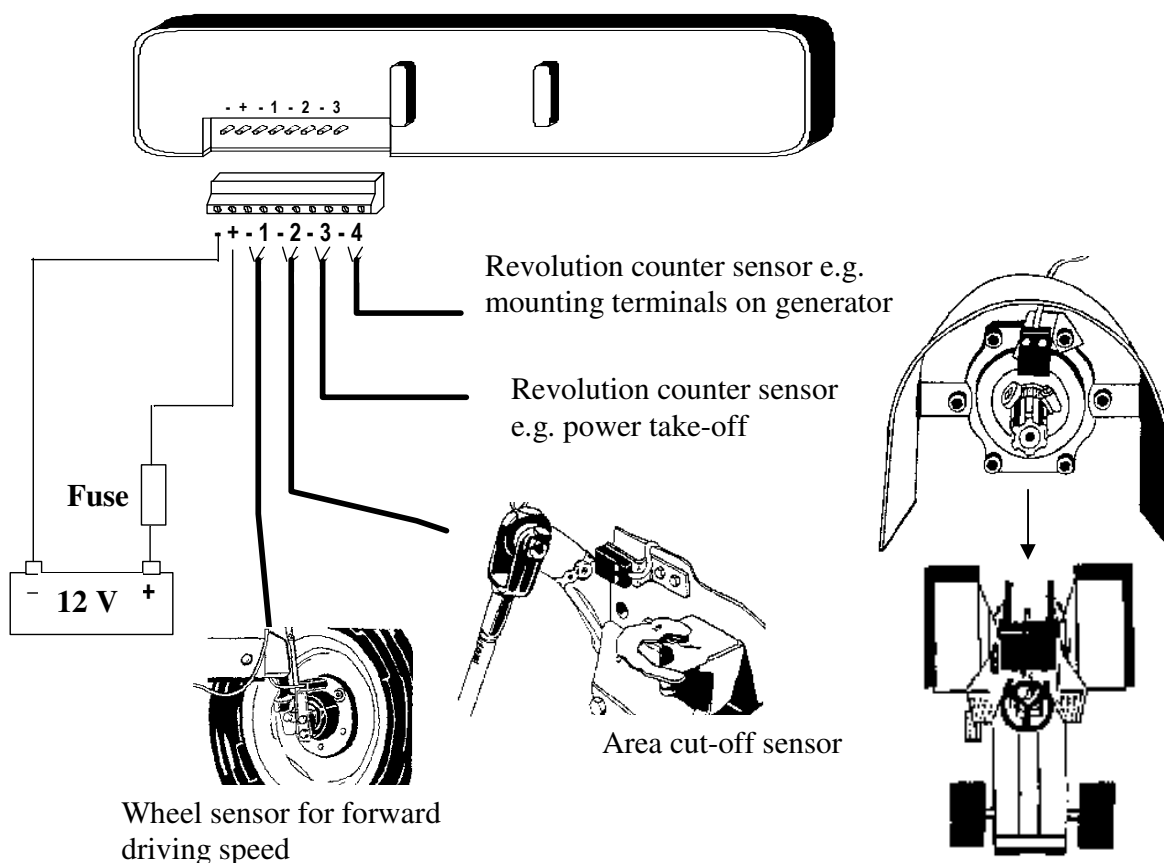
As sensors for rotation counting both the mechanical and the electronical sensors can be applied. In case of a large number of revolutions per minute the electronical sensor is often used due to larger resistance towards vibrations from rotating axles or similar.

- The electronic sensor (hall) consumes power. In order to prevent power loss from the battery when the vehicle is stopped it is recommended that "+V" on these sensors should be connected over the ignition key as shown on the diagram below.



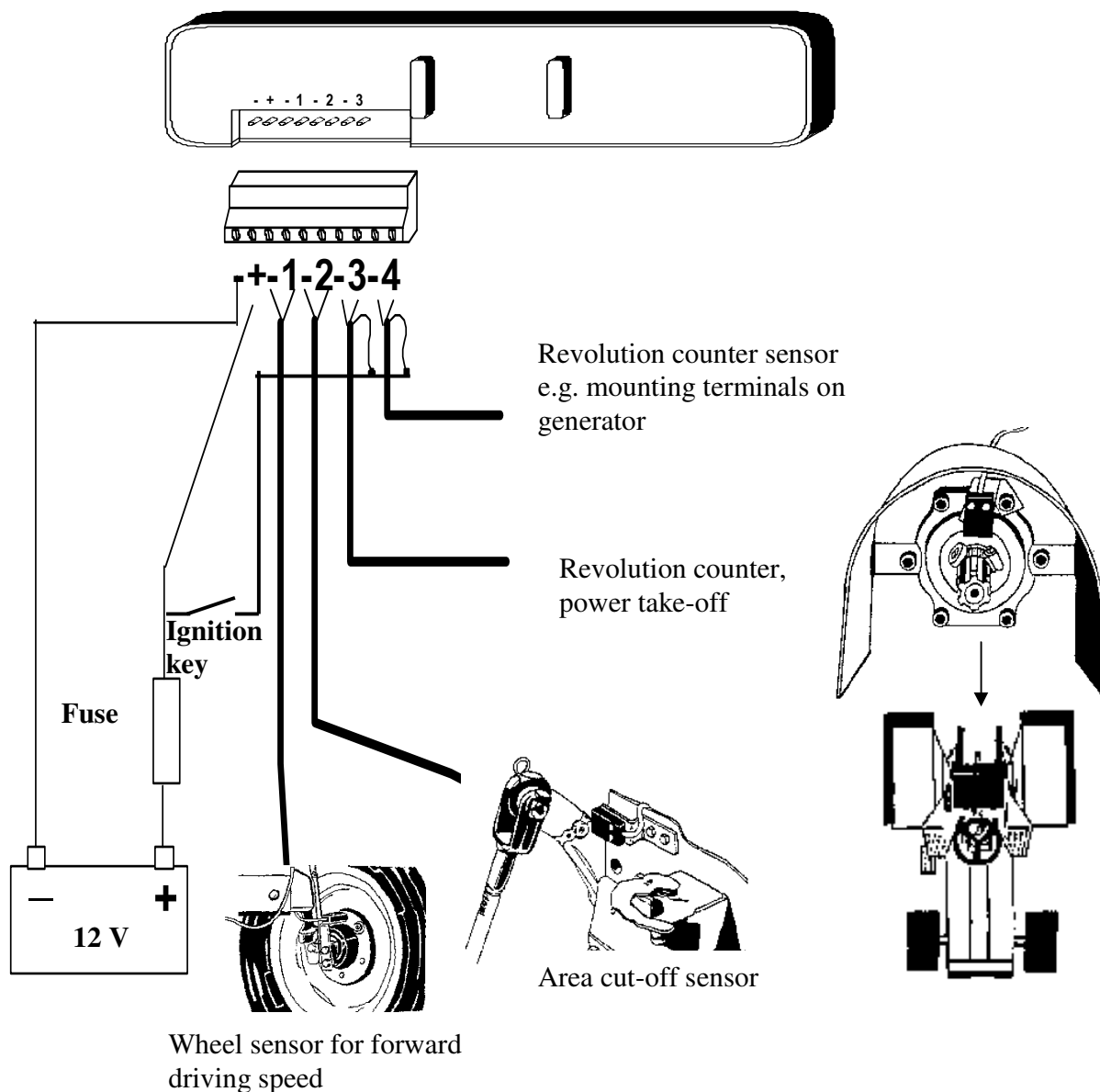
4.5 Fitting diagram

Fitting diagram to be used for mechanical sensors (reed sensors):



In case electronic sensors (hall or inductive) are used their "+"-core is mounted over the ignition key to the "+"-pole of the battery. The power supply to the computer is still taken round the ignition key.

Fitting diagram to be used for electronic sensors (hall or inductive sensors):



5. Technical data

Display:	6 digits.
Power supply:	12 Vdc
Temperature limits:	The PX Combi is fully operational within -10 - 70c ⁰ .
Pulse signals from the sensor:	Max. 1500 pulses/second

6. Final remarks

The controller/monitor is only to be used in connection with the functions described in this instruction manual. Any other use of the controller/monitor can potentially involve significant risk and disclaim the supplier of this controller/monitor for any responsibilities/liabilities.

Please note, that Lykketronic A/S solely is responsible for the electronic controller/monitor and not for the complete function of the machine, including the safety aspects of the entire machine.