



**USER  
MANUAL**



SYSTEM  
**SMARTDRIVE**



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# USER MANUAL

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## SMARTDRIVE



EN

Translated language

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## 1 Important information

### 1.1 General information

This manual contains the installation information applicable to ADR Smartdrive steering system.

This manual should be kept with care.

In the event damages makes the copy of this manual in your possession unusable, the user can request a copy from customer service, specifying the type of product and serial number indicated on the product identification plate. Please contact customer service for information on updates ADR has made to its products. In any event, the latest version of this maintenance manual can be found in the *download* section on site [www.adraxles.com](http://www.adraxles.com).

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ADR cannot be held liable for damages caused by:

- improper product use.
- use by unqualified and/or unskilled personnel.
- incorrect installation (if by the customer);
- inadequate product maintenance or cleaning.
- unauthorised alterations or work.
- incorrect manoeuvres.
- use of non-original spare parts.
- use of unforeseen accessories or not authorised in writing.
- full or partial failure to follow the instructions.
- exceptional events.

### 1.2 Warranty conditions

As a memorandum for the user, ADR guarantees the technical specifications, part quality and good supplied product operations according to the stated parameters.

The manufacturer's warranty does not cover all parts whose repair or replacement is due to natural part wear or defects due to incorrect product use by the customer such as, for example but not limited to:

- unauthorised alterations.
- use other than that indicated by ADR.
- product overloads beyond that indicated by ADR.
- negligent or poor product part maintenance.
- work on products inconsistent with ADR instructions.
- failure to replace parts subject to wear, etc.






Please remember than every alteration to the vehicle voids original approval and requires new approval or forfeit the vehicle registration card until standardised.

In the event product defects are found, the customer must communicate them in writing.

This manual was originally drafted in Italian, and it is the only official language for which the manufacturer is liable in the event of translation inconsistencies.



### 1.3 Symbols and terms used in the manual

	<p><b>Warning</b> Indicates instructions that only if correctly followed avoid <b>personal hazard situations</b>, provides information on <b>hazards and how to avoid them</b>, suggests performance procedures.</p>
	<p><b>Attention to tightening torque</b> Indicates the tightening torque values to be applied to certain products to avoid <b>personal hazard situations, potential inefficiencies and product break downs</b>.</p>
	<p><b>Wrench</b> Indicates ordinary and scheduled maintenance procedures to be performed in safe conditions. These must be performed by an authorised individual trained for this purpose.</p>
	<p><b>Lubricant grease</b> Indicates ordinary and scheduled greasing procedures (lubrication with grease) to be performed in safe conditions. These must be performed by an authorised individual trained for this purpose.</p>
	<p><b>ADR customer service</b> Indicates the need to contact ADR customer service. In the event of particularly important part maintenance to guarantee normal product operations, contact <b>ADR</b> to set a service appointment on the customer's premises.</p>

### 1.4 Suggestions for your safety

#### 1.4.1 General rules

Vehicle repairs and maintenance may expose operators to unforeseen problems. This warning only illustrates some potential hazards, and its purpose is to make users aware of risks that may occur and guide them towards reasonable behaviour to promote safety.

ADR recommends having maintenance performed by specialised departments.

**Important:** Never overload your vehicle. The chassis, axles and brakes may suffer damages.

Never exceed the total vehicle weight admitted by the manufacturer, nor the maximum speed set by circulation rules. Your vehicle will thus operate in maximum safety, will always brake efficiently and reliably even on long descents. Tyre wear will be even and driving stability with many curves will always be ensured.

Place the load to evenly distribute the load on all wheels as much as possible. This achieves higher and safer driving performance; longer lasting tyres and the tractor will save fuel.

Only use tyres of the type and size indicated by the vehicle manufacturer according to axle design requirements. The use of wheels with disc offset must be authorised by the manufacturer. Constantly check braking system efficiency, periodically checking brake gasket wear, lever regulation and control cylinder conditions.



**Personal protection:** Wear all the equipment and protections necessary: goggles, masks, gloves, helmets, safety shoes, protective clothing, etc.; Work in pairs of two.

**Unstable vehicles:** Never work under or near a vehicle that was only lifted by a jack. When working under or near a lifted vehicle, always make sure the jack used is associated with supports or suitable blocks and that the material used is suited to the lifted load. Make sure the group is perfectly stable and that it will remain so during and after the forces applied to the material during maintenance. Also ensure ground stability.

**Hot parts:** Be careful of parts that may become very hot during use such as, for example, brake drums.

**Pressurised, hydraulic, or pneumatic circuit:** before working on the hydraulic or pneumatic circuit, oil and air may be pressurised, take all the necessary precautions to avoid accidental jets.

**Risks due to fires, tied to smoke, toxic gas and irritant substances:** All fuels are highly flammable and mix vapours explosive. To clean or degrease parts, only use retail products suited for this purpose and follow the instructions on the packaging. Never put these products into contact with skin and never inhale vapours, smoke, or gas.

**WARNING:** Smoking, the use of flames, producing sparks, etc. causes **explosion or fire hazards** due to vapours, fuels, oils, paints, solvents, dust, straw, etc.; keep an extinguisher at hand at the work site to meet these risks.

**Asbestos:** Our axle brake gaskets no longer contain asbestos and this long before European community provisions banned its use. In the event of doubt on asbestos (working on old material for example), handle parts as if they contained it, asbestos dust is extremely hazardous to health.

**Ecology:** Much care and focus were placed on the analysis of the negative effects of our products' impact on the environment. Similarly, do not discard oil, grease and used products in the environment, respect nature and the rules. Discard them at a collection point, dump, or recycling area. To receive the address of your nearest point, contact your local environmental service agency.



## 1.4.2 Safety

Observe the following safety measures before, during and after use. By following these measures and using common sense, injury to persons and damage to the equipment can be avoided.

Read this manual and the safety measures before operating the equipment.

Make sure that all safety devices are properly attached before operating the equipment.

Check that there are no personnel around the equipment, before or during operation (minimum 6m).

Do not overload the equipment. Respect the load limits.

Make sure the hitch sensor is securely attached to the vehicle according to the instructions in this manual.

Before starting the machine, check the safety of the machine at work and in traffic each time.

Before starting the machine, familiarize yourself with all drive elements and their operation.

Before working on the hydraulic system, remove the pressure from the corresponding circuit, stop the engine and switch off the equipment.

Under normal conditions, pipes and hoses in hydraulic circuits undergo a natural aging process.

The service life of these elements should not exceed 6 years. Periodically observe their condition and replace them after this time.

Be prepared in case of fire. Keep a first aid kit and a fire extinguisher handy.

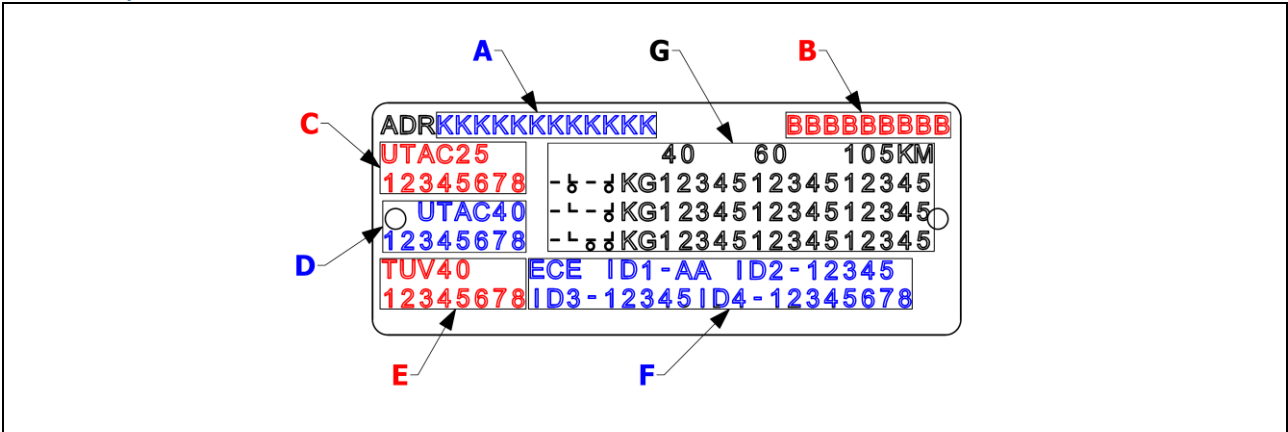
## 1.5 Product identification data

Product identification data is indicated on a specific **identification plate**, affixed or riveted to the product. Each **identification plate**, for both axle, suspension, and drawbar identification, indicates the items illustrated below.

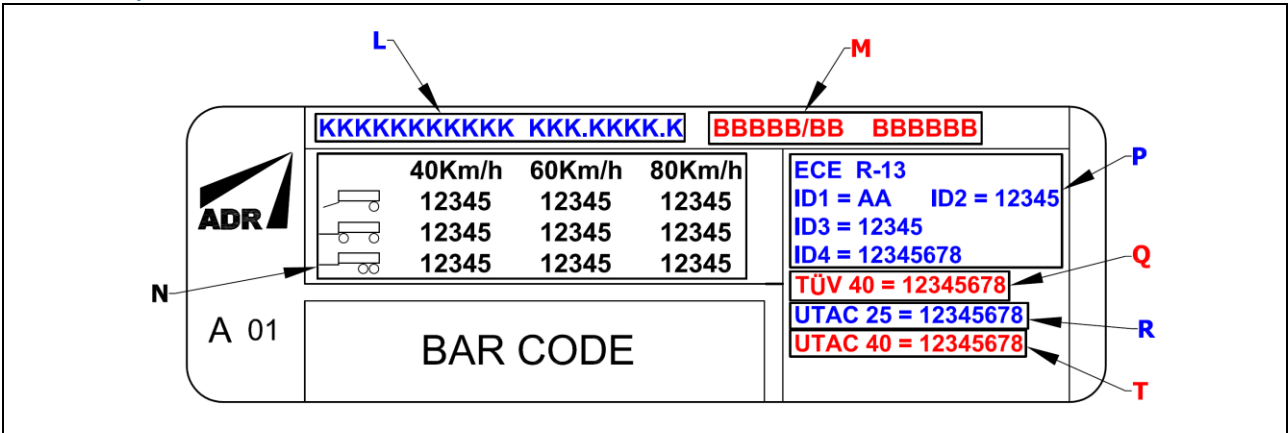
### 1.5.1 Axle identification plate

The typologies ID plate of the product found on ADR axles are visible in the following pictures.

#### Metallic ID plate



#### Adhesive ID plate





### 1.5.2 Product identification plate reading

The **axle identification plate** can be read as follows:

- **A** : axle identification code, the code is made up of 12 alphanumeric characters;
- **B** : order identification code, the code is made up of 9 alphanumeric characters;
- **C** : UTAC approval report identification code at 25 km/h, the code is made up of 8 characters;
- **D** : UTAC approval report identification code at 40 km/h, the code is made up of 8 characters;
- **E** : StVZO approval report identification code at 40 km/h, the code is made up of 8 characters;
- **F** : ECE-R13 approval identification data;
- **G** : maximum axle capacity data referred to the application and speed.

The adhesive ID plate in the case of an axle, instead, can be read as follows:

- **L** : Axle code;
- **M** : Customer code;
- **N** : Carrying capacity of the axle;
- **P** : **ECE-R13** test report data or **EU 2015/68** test report data;
- **Q** : StVZO at 40 km/h test report data;
- **R** : UTAC at 25 km/h test report data;
- **T** : UTAC at 40 km/h test report data;

Data on identification plates are indelible or silk screened.

**N.B. the data on the plate cannot be ALTERED for any reason.**

### 1.5.3 ECU identification plate

The ID plate of the product found on ADR is shown below.





## 2 Introduction

SMARTDRIVE is the system that allows to command the steering axles of a trailer. It can work in fully automatic mode, or in manual mode, it is suitable with the modern tractors equipped with LS system and power beyond.

Before starting the use of the machine equipped with SMARTDRIVE please read carefully the indications contained in the present manual.

- Its equipment meets all the necessary safety conditions. It is innovative, ergonomic product and has a long operating life. To keep it in good condition and functional, always use official spare parts.
- Before beginning any assembly operation, **YOU MUST READ AND UNDERSTAND** the operating and maintenance instructions given in this manual. Failure to do so can result in injury or damage from misuse and will decrease its performance and life.
- **THIS MANUAL REPORTS** only on those movements and actions that are permitted considering the limits prescribed by the controller's technical specifications.
- **NOTE THE PRODUCT SERIAL NUMBERS** to assist in the recovery of the machine in case of theft. The dealer also needs these numbers for parts orders. Keep these numbers in a safe place outside the machine.
- If you are not the original owner of the controller, you should contact your local Virkar Controls dealer to communicate the serial number of the unit. This way, Virkar Controls may notify you of any product enhancement programs.
- **THE MANUFACTURER RESERVES THE RIGHT TO MODIFY** illustrations and technical data in this manual if it considers that such modifications will improve the quality of the product.
- ADR's After-Sales Service is available to answer any questions you may have about the content of this manual.

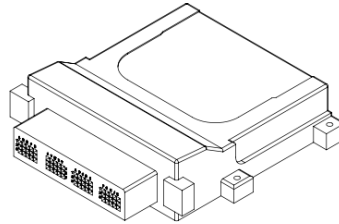


### 3 Updating and use

#### 3.1 Firmware update

The system consists of two programmable devices which are capable of being updated. During start-up you can see the firmware version installed.

Contact your authorized reseller for future updates.



#### 3.2 Notes on use

This platform is designed exclusively for use in common agricultural applications or related applications. Any other use is considered contrary to the intended use. The manufacturer is not responsible for any consequences.


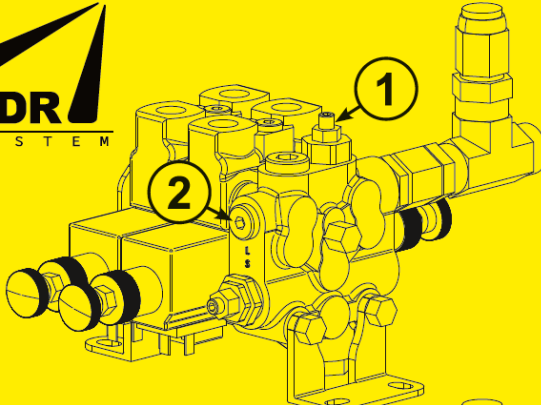
This manual is intended for workers performing the use, maintenance and installation of this driver. Each of them must read and understand each of the information regarding the safety and those related to the operations they will carry out.

## 4 Before starting

### 4.1 Functioning with LS or no LS tractor

The hydraulic unit can be connected to tractors equipped with Load Sensing and Power Beyond. With this functionality the system will be supplied with the needed flow rate and pressure, avoiding extra use of energy.

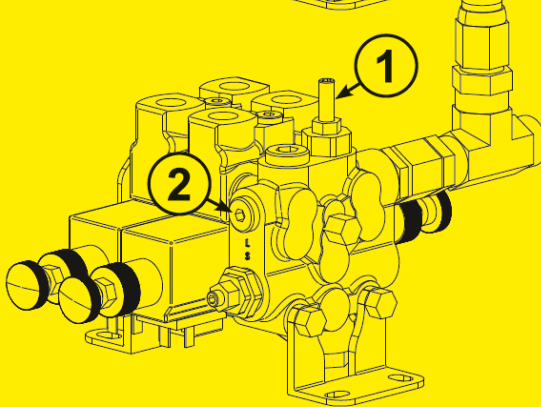
The hydraulic unit needs to be setup according to the indication below.

**FUNZIONE BLOCCO LS  
LS BLOCK FUNCTION**

**Per lavorare con LS:  
To work with LS:**

- 1. Stringere completamente la vite
- 1. Fully tighten the screw
- 2. Connettere tubo 3/8". L.S. distributore - trattore
- 2. Connect tube 3/8". L.S. distributor - tractor



**Per lavorare senza LS:  
To work without LS:**

- 1. Svitare completamente la vite
- 1. Completely untighten the screw
- 2. Mettere un tappo a tenuta nell' uscita LS 3/8"
- 2. Put a sealing cap in the port LS 3/8"



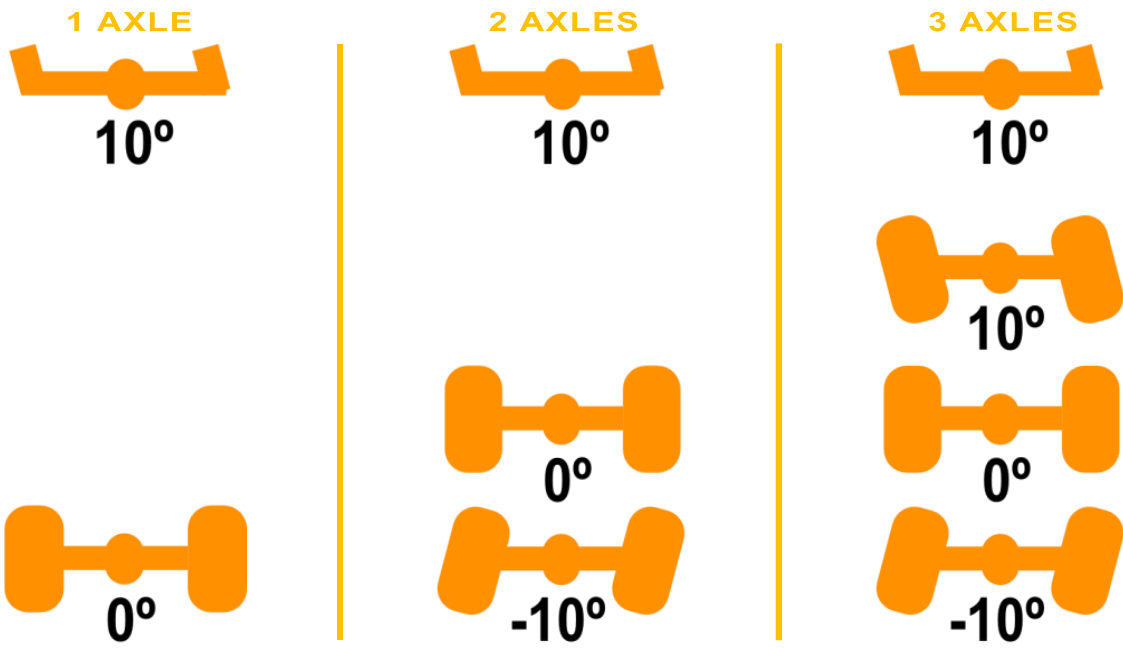
## 5 Functioning

Observe the following safety measures before, during and after use. By following these measures and with common sense, injury to persons and damage to equipment can be avoided.

### 5.1 General



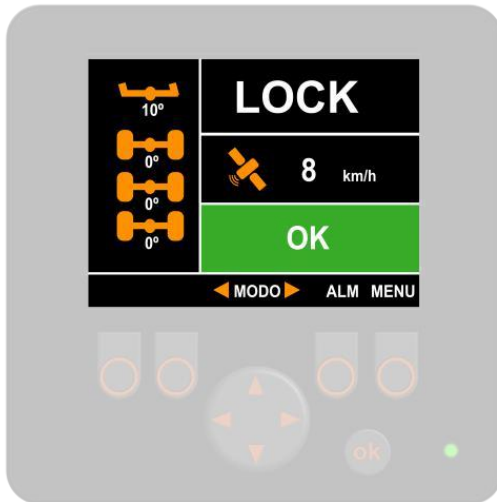
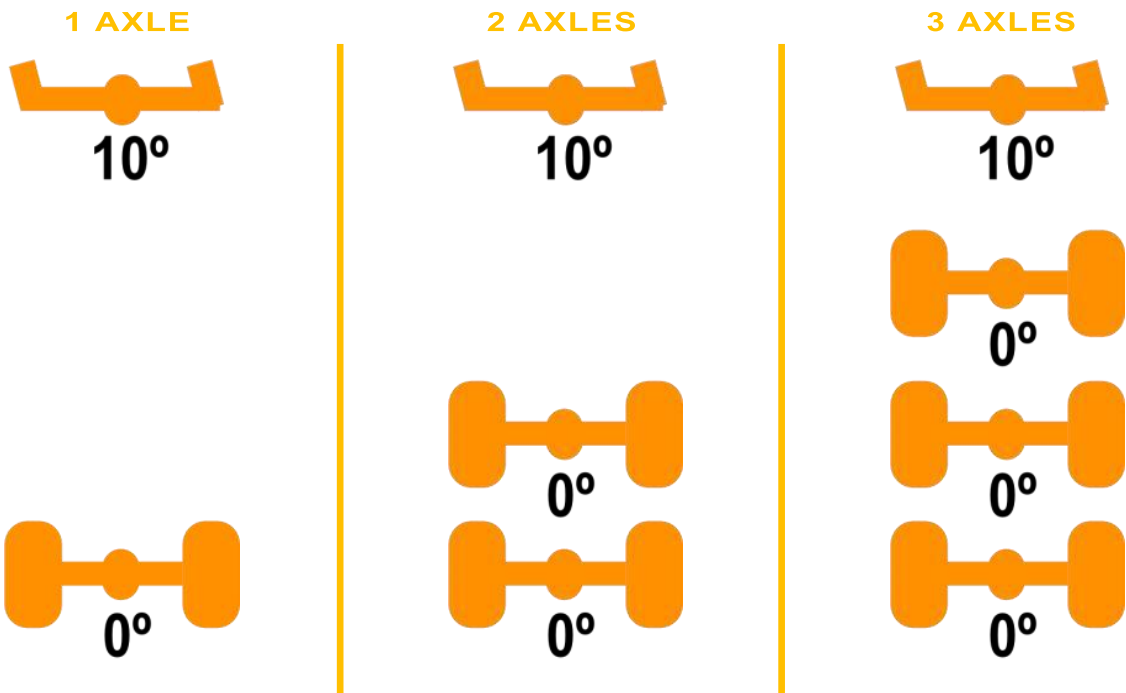
## 5.2 Mode: ROAD



In this mode the axles are controlled automatically, depending on the relative trailer tractor angle, and following the pre-established law.



### 5.3 Mode: LOCK



In this mode there is no directional control of the axes. The wheels are blocked and kept straight.

This mode automatically enters at high speeds for safety reasons.

The speed can be programmed entering in the menu

**MENU ⇒ SETTINGS ⇒ LOCK ⇒ ENTRY SPEED**

## 5.4 Mode: MANUAL



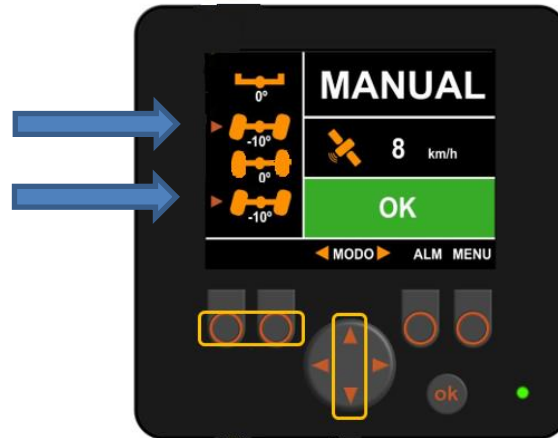
In this mode the axles can be commanded manually.

By acting on the central selector is possible to change the axle to be commanded, as below. They can be commanded according to the hitch sensor movement

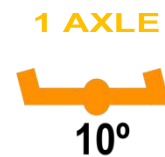




They can be commanded all together or one by one.  
If they are all selected, they move both in the same direction (Crab mode)



### 5.5 Mode: WORK (available on single axle version)



This mode is exclusive for field work.

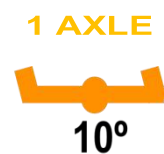
If speed exceeds, it automatically switches to ROAD mode (A). This speed is configurable.

To configure the speed, go in the menu

**MENU ⇒ SETTINGS ⇒ ROAD ⇒ ENTRY SPEED**

**And enter the value**

## 5.6 Mode: CRAB (available on single axle version)



***MENU ⇒ SETTINGS ⇒ ADDRESS CRAB***

If a configurable angle of rotation is exceeded, it switches to CRAB TURN mode until the value is recovered.

***MENU ⇒ SETTINGS ⇒ CRAB ANGLE***



## 6 Configuration

### 6.1 Source speed

Different sources can be configured to control speed.

By default, the system has to be set up on the pulse mode using the command below

- **PULSE:** Pulse speed sensor. You should calibrate the distance travelled per pulse:

**MENU ⇒ SPEED SOURCE ⇒ PULSES PER METER**

The system is equipped with a 20 teeth exciter. The pulses per meter value can be calculated with the following formula:

$$\text{PULSES PER METER} = 20 / (3.14 \times D)$$

where D is the diameter in meters of the tyre used (i.e., tyre diameter 1200 mm = 1.2 m ⇒ Enter 1,2)

Please always double check that the speed indicated on the screen is equal to the one indicated by the tractor (with a tolerance of +/- 10%).

In case of fault of the speed sensor the GPS mode can be selected

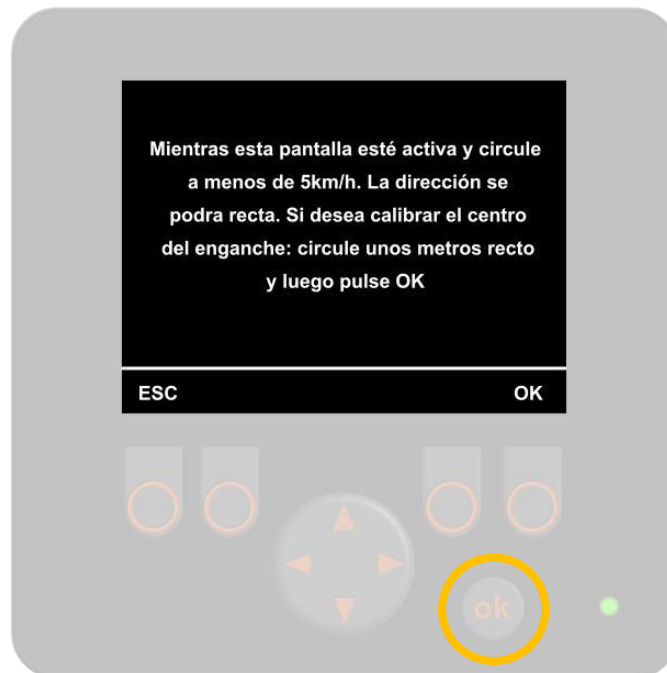
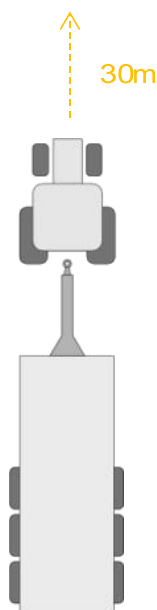
- **GPS:** GPS module with speed reading. You must correctly position the antenna.

In addition, another mode is available

- **SIMULATED:** Emergency mode for workshop calibration where a speed is simulated: **don't use this mode for normal working!**

### 6.2 Calibration

The hitch sensor must be calibrated (reset) once installed. Enter the menu and follow the instructions on the display.



## 7 Alarms



ALARM	COD.	CAUSE AND SOLUTION
Hitch sensor	101	There is no reading from the indicated sensor. It may be because the sensor is offline. Sensor faulty. Cable cut. Bad connection of connectors. Check wiring and connection to the sensors.
Axis 1 sensor	102	
Axis2 sensor	103	
Axis 3 sensor	104	
Axis 1 control	105	The control system could not position the axis in question to the required. It may be due to: <ul style="list-style-type: none"> <li>▪ Lack of oil flow or other hydraulic failure.</li> <li>▪ Connection failure of a solenoid valve.</li> <li>▪ Mechanical failure in any of the rotation sensors.</li> </ul> Check hydraulic flow. Check the connection and operation of the solenoid valves. Check hydraulic circuit. Check the assembly of the rotation sensors.
Axis 2 control	106	
Axis 3 control	107	
Low voltage	108	Voltage less than 10,5V. Check battery
Alarm 9		
Alarm 10		
Alarm 11		

The system has also an audible alarm.



## 8 Diagnostic (Troubleshooting)

*NOTE: Do not forget to explain the operation of the equipment to the end user. Make him read the user's manual and explain the system, especially the issue of coupling calibration is important, because every tractor or every time the coupling is changed the centre of this sensor must be calibrated.*

**The system is not working, nothing is moving. Check the oil pressure. Check that the system is not in LOCK mode.**

The system always remains in LOCK mode. Check that the speed is lower than the one set in "Speed input Lock" and that the speed signal (sensor or GPS) is valid.

**I cannot get into MANUAL mode.**

Check that the speed is lower than 2km/h and that the speed signal (sensor or GPS) is valid. If you do not get a speed because you have a problem with the sensor or the antenna, you can enter a simulated speed. Please note that the **simulated speed is for emergency situations only and it is not recommended to drive at a simulated speed normally.**

**One of the axes "bounces" from left to right continuously.**

You must reduce the speed of the wheels with the hydraulic regulators of this axle. The cold oil temperature may fool the first adjustments. Ideally, the equipment should be regulated with the oil warm (normal working temperature).

To check the speed, go in manual mode and make a complete steering left right of each axle: this operation must last 6-8 sec

**When a closed rotation is performed, the alarm is triggered on one of the axes.**

Check that this axis is not hitting the mechanical stop. If so, check the definition of the stop in the installer menu -> axis stops.

**In ROAD mode, when the tractor goes straight, the trailer does not.**

You must carry out the calibration of the hitch sensor. You can check the error if, in LOCK mode, when driving straight ahead, the hitch sensor indicates a value different from zero.

**One of the axles is not responding.**

Check electrical and hydraulic connections. Operate the valve in question manually, looking for the possible fault.

If any of the following symptoms are observed

- The display does not work properly
- The wheels are moving but the display does not show the angle of the wheels
- When the system is started, the screen stays on the startup screen
- When the mode change keys are pressed, no "beep" is heard.

Check the display connection cable to the ECU and all connections to the extensions. Disconnect them, check for corrosion, and clean them if necessary.

**What is the program version of the display and the ECU?**

The display and the ECU can have different program versions. Some bugs found have been corrected in newer versions.

Check your version in case of problems. This can be seen on the home screen as shown in the picture below:





## 9 Maintenance and assistance and breakdown register

The maintenance control record must be done by the owner, based on the European Directive 2006/42/EC.

This maintenance control record must be considered as a part of the machine and must always be kept with it, until the end of its service life.

The following situations should be filled out in the register:

- Change of ownership
- Replacement of motors, mechanisms, structural elements, electrical components, hydraulic components, safety devices and important components.
- Relatively important failures
- Periodic checks

### **IMPORTANT**

**If these record sheets are insufficient, the necessary sheets must be added to have the "history" perfectly recorded.**



Model: \_\_\_\_\_ Serial #: \_\_\_\_\_

Date: \_\_\_\_\_ Work order: \_\_\_\_\_

Periodic maintenance / annual maintenance / breakdowns  
Hours: \_\_\_\_\_

Description:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Materials / Replaced parts:

Quantity	Reference	Description

Comments:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Next maintenance date: \_\_\_\_\_

\_\_\_\_\_  
*Customer signature* *Authorized signature*



Model: \_\_\_\_\_ Serial #: \_\_\_\_\_

Date: \_\_\_\_\_ Work order: \_\_\_\_\_

Periodic maintenance / annual maintenance / breakdowns  
Hours: \_\_\_\_\_

Description:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Materials / Replaced parts:

Quantity	Reference	Description

Comments:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Next maintenance date: \_\_\_\_\_

\_\_\_\_\_  
*Customer signature* *Authorized signature*



Model: \_\_\_\_\_ Serial #: \_\_\_\_\_

Date: \_\_\_\_\_ Work order: \_\_\_\_\_

Periodic maintenance / annual maintenance / breakdowns  
Hours: \_\_\_\_\_

Description:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Materials / Replaced parts:

Quantity	Reference	Description

Comments:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Next maintenance date: \_\_\_\_\_

\_\_\_\_\_  
*Customer signature* *Authorized signature*



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