

EC type-examination certificate UK/0126/0041 Revision 1

Issued by:
The National Measurement Office
Notified Body Number 0126

In accordance with the requirements of the Measuring Instruments (Automatic Catchweighers) Regulations 2006 (SI 2006/1257) and the Measuring Instruments (Non-Prescribed Instruments) Regulations 2006 which implement, in the United Kingdom, Council Directive 2004/22/EC, this EC type-examination certificate has been issued to:

RDS Technology Ltd
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United Kingdom

in respect of a vehicle-mounted automatic catchweighing instrument designated the RDS Loadmaster 9000i and having the following characteristics:

Maximum capacity	: Max	≤	25 000 kg
Minimum capacity	: Min	≥	10 e
Scale interval	: e	≥	10 kg
Number of scale intervals	: n	≤	250
Accuracy Class	: Y	(b)	

The necessary data (principal characteristics, alterations, securing, functioning etc) for identification purposes and conditions (when applicable) are set out in the descriptive annex to this certificate.

This revision replaces previous versions of the certificate.

Issue Date: 21 October 2011
Valid Until: 18 December 2018
Reference No: T1109/0025



Signatory: G E Stones
for Chief Executive

Descriptive Annex

1 INTRODUCTION

This pattern of a battery-operated automatic catchweighing instrument, designated the Loadmaster 9000i, comprises an electronic indicator, pressure transducers and sensors mounted on a wheeled loader (Figure 1). This pattern automatically determines the load in the bucket during the lifting process, the hydraulic pressure in the loader's arms is converted by a pressure transducer, the output being used by the indicator to display the corresponding weight.

2 FUNCTIONAL DESCRIPTION

2.1 Mechanical

Figure 2 shows the system overview.

2.1.1 Pressure transducers

The sensors measure the difference of the pressures acting on both sides of the piston in the lift cylinder(s).

The pressure transducers are two pressure sensors, equipped with strain gauges, connected to the electronic indicator, which indicates the load in terms of mass. Two types of sensors are used; RDS Part No. S/SR/500-2-027 or S/SR/500-2-072 made by Danfoss & Wika respectively.

2.1.2 Reference/direction sensors

The correct position for a weight determination is when the loading arm is between the two sensors. The first sensor detects the magnet attached to the loading arm as it passes, the weight in the bucket is then determined. After the second sensor detects the magnet attached to the loading arm as it passes, the display indicates the weight value. The direction of travel of the loading arm is established by the operational sequence of the sensors.

2.1.3 Bucket sensor

This sensor is used to ensure that the weighing sample only occurs when the attachment (bucket or other load receptor) is in the correct weighing position.

2.1.4 Boom sensor (Telescopic Loaders Only)

This sensor is used to ensure that the weighing sample only occurs when the telescopic boom is in the correct weighing position on a telescopic loader.

2.1.5 Temperature sensor

This sensor is clamped to the outside of the pipe from the hydraulic control valve, connected to the main lift cylinder(s). This sensor will inhibit the system from working until the hydraulic oil has reached the correct operating temperature.

2.1.6 Inclinometer

The inclinometer may be a MK3 dual-axis angle sensor installed within the MK3 Junction box, and will inhibit the weight readings if the instrument is tilted to an angle of more than 5 degrees.

The inclinometer may be an MK6 dual-axis angle sensor which will inhibit the weight readings if the instrument is tilted to an angle of more than 10 degrees, and will compensate the weight readings for tilt angles up to 10 degrees (N.B. the angle may reduce due to application safety reasons).

The MK6 inclinometer may be mounted inside the junction box (either type). With the MK4 junction box, there is the option to use the MK6 externally encased inclinometer according to drawing 10-002.pdf. (RDS Part No. S/SR/182-10-002).

2.1.7 Junction box

The junction box houses all the terminations for the sensor inputs and outputs. The junction box design may be a type MK3 (RDS Part No. S/AC/268-8-048, drawing 8-048-05.pdf) or type MK4 (RDS Part No. S/AC/268-8-055, drawing 8-055(a-b).pdf).

2.1.8 Indicator

The display unit is a type PSI (Figure 3) and is located inside the cabin and is mounted to the loader's inner frame. It comprises LCD screen, keypad and an optional digital card reader. The keypad includes ON/OFF button, Enter button, nine function keys adjacent to the screen, and another 13 keys for alphanumeric entry.

2.2 **Electrical**

The system operates from 11-32 V DC, supplied from the vehicle battery (12 or 24V DC). The indicator console is fitted with a non-volatile static RAM with integrated Lithium battery to maintain the basic functions such as clock etc. Failure of this integrated battery causes the system to reset and inhibit any further use of the system.

2.3 **Devices**

2.3.1 On power up the LCD display shows a start up screen with the following information:

- name of manufacturer
- name of the system
- software issue number
- cal number

2.3.2 The instrument is fitted with a semi-automatic zero-setting. Loads that are outside of the zero capture range produce a visible and audible warning. The "Check Zero" prompt will be displayed on the screen if the system has been switched off or has not recognised any lifts for more than 15 minutes. A visible and audible warning will be repeated every 60 seconds until the load bucket has been raised and lowered three times and the zero has been set. The zero-setting must be repeated after the first 10 minutes from switch on, and again after another 10 minutes. The zero-setting prompt will then occur every 30 minutes.

2.3.3 Loads over Max +9e and unsteady weights produce a visible and audible warning. At overload the weight value is replaced by an overload symbol. When the weight is unsteady a warning symbol is shown and "Too much bounce lift again" is displayed. Loads below zero will be displayed but will not be added to the total load and will not be printed.

2.3.4 The instrument is fitted with a preset tare device. Tare weights are entered manually via the keypad. The display indicates the entered tare value, followed by the symbol PT. The tare weights are summated on the printout or data storage.

2.3.5 An ICP 300 thermal printer may be connected to the display console allowing load tickets to be printed automatically or by manual command. The printout produced will show a unique job number, product, customer, time/date and weight information. An option is available for the name, address and space for a signature to be printed (Figure 4a). It is possible to produce a second printout for the same weighing operation. The header and footer of the second ticket bear the legend "Duplicate Copy". Software variant DMM (PS306) described in 7.3 produces a print similar to Figure 4b. The order and amount of data on this print varies according to the application, as well as the company Header lines and Logo.

2.3.6 In the absence of a printer, the display console must be fitted with an SD Card Reader. Weighing data is stored in a secure file (RDS_DATA.XXX) that can later be exported for processing.

2.3.7 It is possible to switch the instrument into a "Non-Approved" mode (PS312), in which case "Loadmaster 8000" is displayed on the screen at switch on and the SI units will not be shown. Any tickets printed (Figure 4c) will show "Not for trade use or applications under article 2, 2004/22/EC", any weighing data stored on the SD card will bear the same wording, and any weighing data transmitted via telemetry will bear the LM8000 identification.

2.3.8 The instrument can display for 5 seconds the current weight reading with a 0.1e resolution (extended indication) for field verification, by pressing and holding for 3 seconds the MAIN screen key also marked "RES" (Top right of the screen) after each lift.

3 TECHNICAL DATA

3.1 The system has the following technical characteristics:

Maximum capacity (Max)	: ≤ 25,000 kg
Scale interval	: ≥ 10 kg
Minimum capacity (Min)	: ≥ 10 e
Pressure transducer	: RDS part No.S/SR/500-2-027 or S/SR/500-2-072
Transducer measuring range	: 0...250 bar
Transducer output signal	: 2740 ... 5780 Hz
Climatic environment	: -20 °C to +40 °C Indicator, printer: non-condensing, closed Transducer, sensors: condensing, open
Electromagnetic environment	: E3
Mechanical environment	: Vehicle mounted
Power supply	: 11-32 V DC
Display/keyboard location	: Indicator console in cabin
Accuracy class	: Y(b)

3.2 Documentation and drawings

Installation Manual	
All variants, MK3 junction box	S/DC/500-10-286
All variants, MK4 junction box	S/DC/500-10-630
Operation Manual	S/DC/500-10-587
Operation Manual (DMM)	S/DC/500-10-589
Operation Manual(Scanner Module)	S/DC/500-10-590
PSI Assembly drawing	PSI MAJOR COMPONENT ASSY.pdf
PSI PCB Circuit diagram	P586-043 (5 sheets)

3.3 Software

3.3.1 All calibration values, compensation factors and sensor data are stored in a removable EPROM module in the Loadmaster display unit, this module is identified by a unique serial number. In the event of a display failure the Module can be transferred into a new display, taking with it the original data and calibration values.

3.3.2 The software issue number is PS314-002, and is displayed at power-up or on command by printing the calibration data.

3.3.3 The system is password-protected, all internal weighing setup parameters and calibration data are audit counter protected (non reset able setup and calibration counter). The setup and calibration counter is displayed by the indicator at start up and any changes to any parameters will increment the counter on power up of the instrument. . The number displayed must be written on the rating plate or tamper evident “void” label.

4 PERIPHERAL DEVICES AND INTERFACES

4.1 Interfaces

The indicator may be fitted with the following interfaces:

- 1 off 50 way Junction box interface
- 2 off RS232

4.2 Peripheral devices

The instrument may be connected to any peripheral device that has been issued with a test certificate or parts certificate by a Notified Body responsible for Annex B (MI-###) under Directive 2004/22/EC in any Member State and bears the CE marking of conformity to the relevant directives; or

A peripheral device without a test certificate may be connected under the following conditions:

- it bears the CE marking for conformity to the EMC Directive;
- it is not capable of transmitting any data or instruction into the weighing instrument, other than to release a printout, checking for correct data transmission or validation;
- it prints weighing results and other data as received from the weighing instrument without any modification or further processing; and
- it complies with the applicable requirements of Paragraph 8.1 of Annex I.

5 APPROVAL CONDITIONS

The certificate is issued subject to the following conditions:

5.1 Legends and inscriptions

5.1.1 The following legends are durably and legibly marked on a label located on the display console (Figure 5):

- 'CE' marking
- Supplementary metrology marking
- Notified Body verification mark
- Accuracy class
- Serial number
- Manufacturers mark or name
- Certificate number
- Power supply
- Pressure range
- Temperature range

6 LOCATION OF SEALS AND VERIFICATION MARKS

6.1 The CE mark shall be impossible to remove without damaging it. The rating plate is secured by a tamper-evident label.

The markings and inscriptions shall fulfil the requirements of Paragraph 9 of Annex I of the Directive 2004/22/EC.

6.2 Each time the set-up and calibration audit counter changes, the updated number must be recorded on the rating plate located on either side of the indicator.

6.3 Components that may not be dismantled or adjusted by the user (junction box, pressure sensors) will be secured by either a wire and seal or tamper evident label/tag and securing mark. The securing mark may be either:

- a mark of the manufacturer and/or manufacturer's representative, or
- an official mark of a verification officer.

7 ALTERNATIVES

7.1 Having the instrument fitted to a single acting hydraulic ram i.e. fork lift truck (Figure 6), provided no back pressure can occur. The second pressure sensor is not connected.

7.2 Having the instrument fitted to a Telescopic loader with a boom extension sensor.

7.3 Having the instrument designated the Loadmaster 9000i DMM (PS306), comprising modified software with improved printing (see figure 4b) and data management facilities. The software version number is PS306-051.

7.4 Having the instrument designated the Loadmaster 9000i Scanner Module (PS309) comprising a modified software allowing any RS232 data transmission from any CE marked scanner device such as a bar code scanner. Manual data input is also allowed. The software version number is PS309-003.

7.5 Having the instrument set-up with up to 8 different attachments (bucket, grabs, tines, etc.). The attachment identification is displayed at the top of the display.

7.6 Having the instrument operating with “kick out” relay automatically stopping the loading arm at the reference point during the lifting cycle.

7.7 Having the instrument connected to a Radio Modem via RS232 to allow communication with a Base station, equipped with a PC. The object of the Telemetry system is to transmit to the Mobile unit load information. Once a job has been completed on the Mobile unit, the Base Station then collects the job information from the Mobile, over the radio link. The Base Station then logs the returned information, via the PC, to a database. The transmitted weighing data is secured and consists of weighing totals with job references, stored internally. Individual weights and references for the jobs are also stored in the SD Card (with an identical job number), acting as a backup.

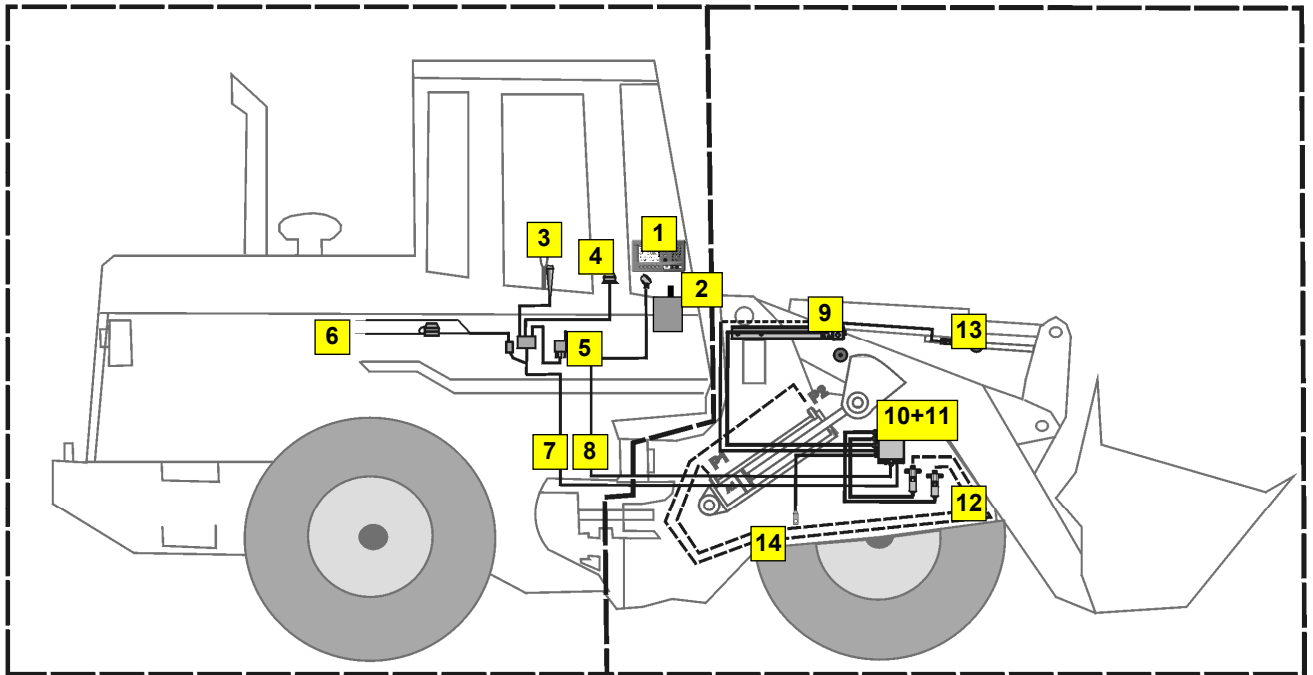
7.8 The junction box described in section 2.1.7 may be a type MK5 (RDS part no. S/AC/268-8-056, drawing 8-056). The associated installation manual is Part No. S/DC/500-10-672.

8 ILLUSTRATIONS

- Figure 1 Typical installation
- Figure 2 System overview (with MK3 or MK4 junction boxes)
- Figure 3 Display console type PSI
- Figure 4a Typical ticket printout (PS314 & PS309)
- Figure 4b Typical ticket printout (PS306)
- Figure 4c Typical ticket printout (PS312) Issued from Non-approved software
- Figure 5 Rating plate and seal
- Figure 6 Typical installation on forklift
- Figure 7 Typical installation on telescopic loader

9 CERTIFICATE HISTORY

ISSUE NO.	DATE	DESCRIPTION
UK/0126/0041	19 December 2007	Type examination certificate first issued.
UK/0126/0041 rev 1	21 October 2011	Issue numbers removed from section 3.2. PCB drawing number corrected in section 3.2 (P586-041 changed to P586-043) Alternative 7.8 added.



Component	Description	LM9000i
1	Head Unit	
2	Printer	
3	Remote Enter Switch	
4	External Alarm	optional
5	Kickout Relay	optional
6	Power Supply	
7	Junction Box Link Cable (MK3 only) (MK4 to indicator)	
8	Instrument Connecting Cable	
9	Reference/Direction Sensor + Magnet	
10	Junction Box	
11	Angle Sensor	
12	Pressure Sensors (x 2)	
13	Bucket Crowd Sensor	
14	Temperature Sensor	

Figure 1 Typical installation

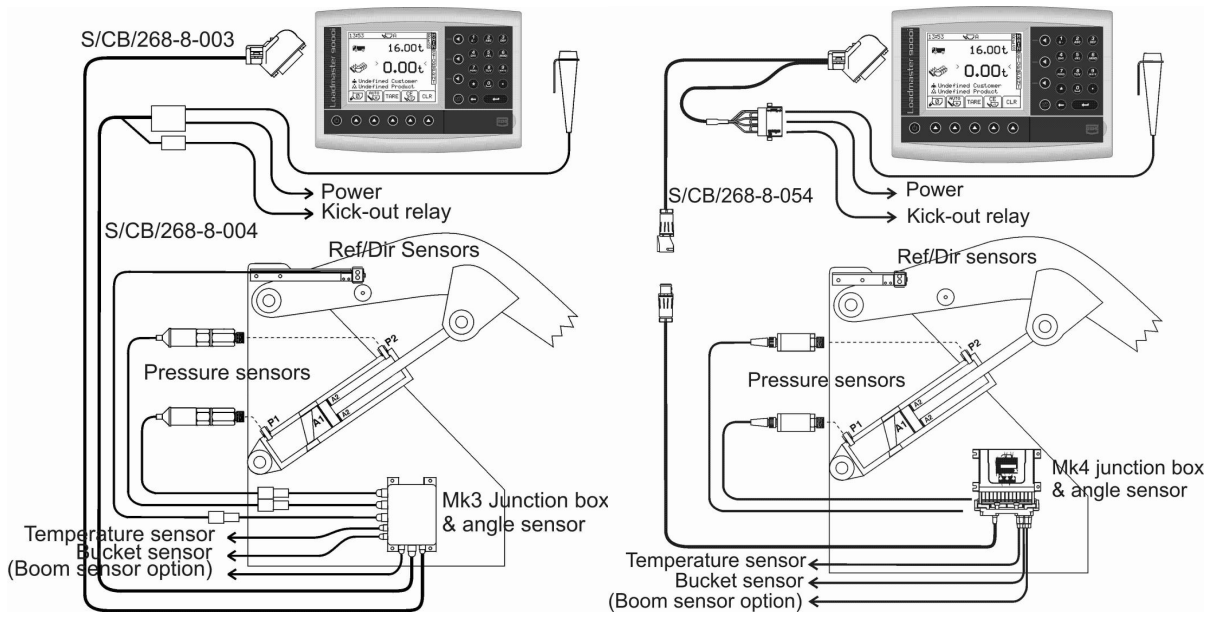


Figure 2 System overview (with MK3 or MK4 junction boxes)



Figure 3 Display console type PSI

```

=====
Job Number: 10
=====

RDS
RDS Technology Ltd

-----
RDS Loadmaster 9000 DMM
-----
Company Name
ID 2
Road
Town
Region
Post Code
Tel
Fax
-----

-----
RDS LM9000
Instrument ID
-----
Job Number 22
Date 04/12/2008
Time 15:22
Weight 4.08 t

Product (2):
Product 2
Customer (1):
Customer i
Reference 1 :
ABC123
Name:

Address:

Sign:

-----
15:22:59 on 04/12/2008
-----

```

Figure 4 a
Typical ticket printout
(PS314 & PS309)

```

=====
Job Number: 10
=====

RDS
RDS Technology Ltd

-----
RDS Loadmaster 9000 DMM
-----
Company Name
ID 2
Road
Town
Region
Post Code
Tel
Fax
-----

-----
Product: (10)
COARSE AGGREGATE
CE
1137
Gc90/10
-----
Customer (Ref2): (11)
JOHN SMITH LTD
WESTBURY
WILTSHIRE
0123 456789
-----
TRUCK: (10)
ABC 123
A. J. HAULAGE
CHIPPENHAM
WILTSHIRE
-----
Lift
1 4.03 t
2 5.21 t
3 5.21 t
4 5.21 t
5 1.43 t
Weight 21.09 t

-----
Date 04/12/2008
Time 15:44
-----
15:44:12 on 04/12/2008
Ticket Number: 3
-----

```

Figure 4 b
Typical ticket printout
(PS306)

```

-----
RDS LM8000
Job Record
-----
Job Number 1
Date 16/12/2008
Time 15:37
Weight 8.22

Product (2):
Product 2
Customer (1):
Customer 1
Reference 1 :
ABC
Name:

Address:

Sign:

-----
Not for Trade use
or applications under
Article 2 2004/22/EC
-----
15:37:31 on 16/12/2008
-----

```

Figure 4 c
Typical ticket printout
(PS312)

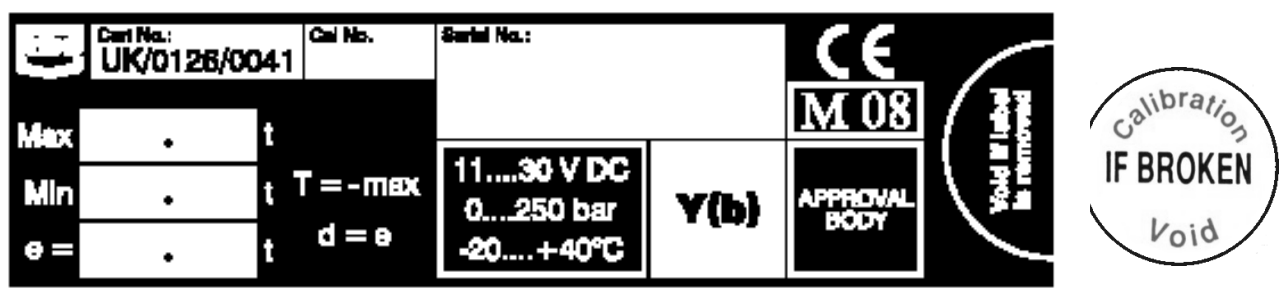
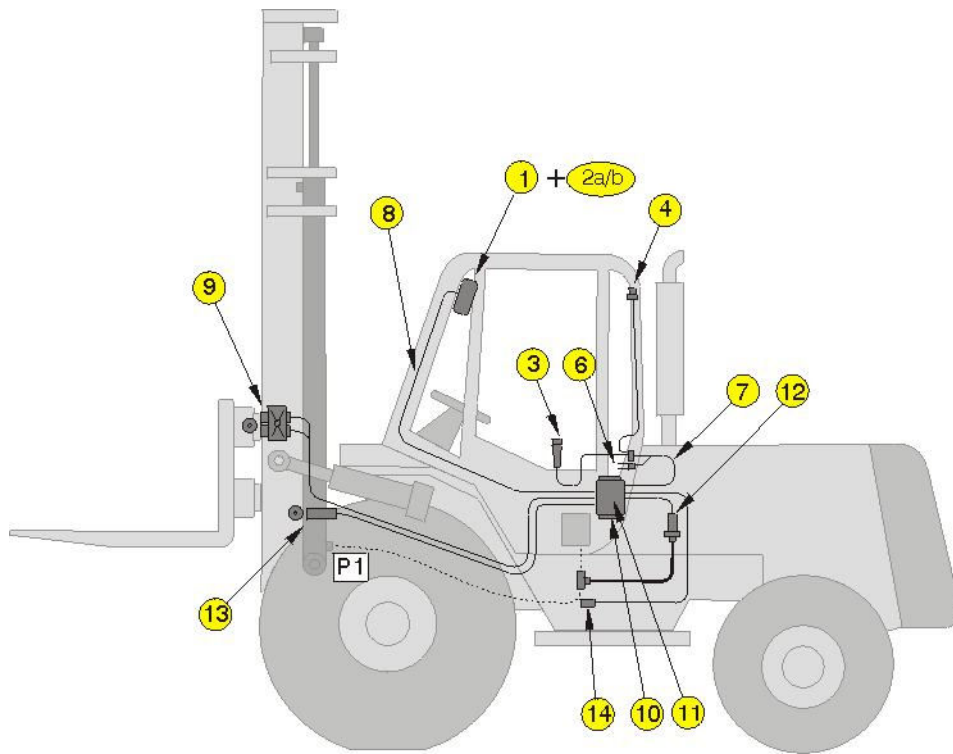
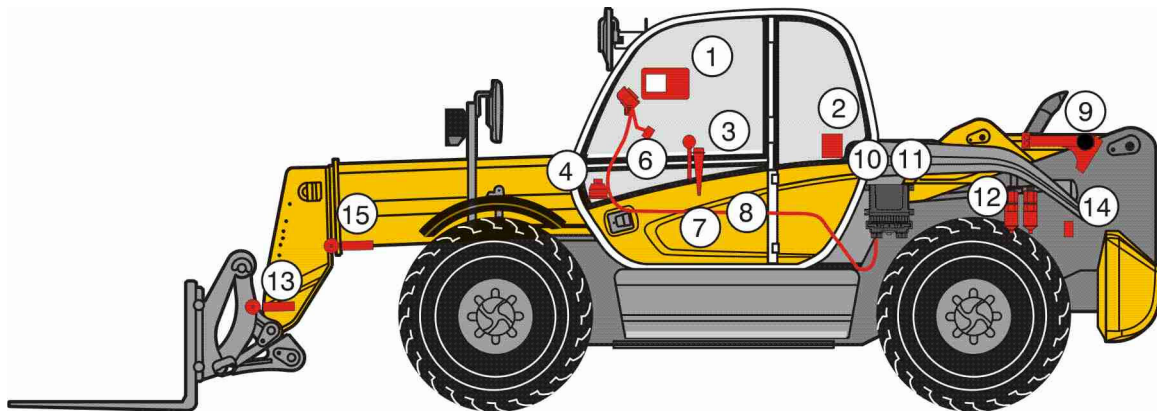


Figure 5 Rating plate and seal



Component	Description	LM9000i
1	Head Unit	
2a	Printer	
2b	Data Card Module	optional
3	Remote Enter Switch	
4	External Alarm	optional
5	Kickout Relay	Not Used
6	Power Supply	
7	Junction Box Link Cable	
8	Instrument Connecting Cable	
9	Reference/Direction Sensor + Magnet	
10	Junction Box	
11	Angle Sensor	
12	Pressure Sensor	
13	Bucket Crowd Sensor	
14	Temperature Sensor	

Figure 6 Typical installation on forklift



Component	Description	LM9000i
1	Head Unit (with internal SD flash card)	
2	Printer	
3	Remote Enter Switch	
4	External Alarm	optional
5	Kickout Relay	optional
6	Power Supply	
7	Junction Box Link Cable (MK3 only) (MK4 to indicator)	
8	Instrument Connecting Cable	
9	Reference/Direction Sensor + Magnet	
10	Junction Box	
11	Angle Sensor (or external option)	
12	Pressure Sensor	
13	Bucket Crowd Sensor	
14	Temperature Sensor	
15	Boom Sensor	optional

Figure 7 Typical installation on telescopic loader