Service Manual

Open front screen

LK1 Personnel Platform (Supplement)

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World Class Customer Support

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Notes:

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Introduction

General Information

Machine Model and Serial Number

This manual supplement provides information for the LK1 Work Platform, compatible with the following models in the JCB machine range:

3-Stage Boom Machines

- 532-120
- 535-125
- 535-140
- 537-135 (550)
- 540-140 (550-140)

4-Stage Boom Machines

- 540-170 (550-170, 5508)

About this Supplement

This manual is a supplement to the JCB Loadall Service Manual. The information covers JCB Loadall machines fitted with the LK1 Personnel Platform.

Note: *Only those areas of the machine which are different from the standard Loadall are dealt with here. For all other information refer to the appropriate Loadall Service Manual.*

Unless specified otherwise, all references to 'Service Manual' in this supplement are to be taken as meaning the Service Manual specific to the standard machine.

Read the standard Service Manual and this supplement completely to familiarise yourself with the machine before carrying out any servicing procedures.

Safety Check List

⚠ DANGER

Overhead Electrical Power Lines

You can be electrocuted if you get your machine too close to live electrical power lines. Before starting work, find out if there are electrical power lines on the jobsite. If there are, contact the local electricity supplier and ask what safety precautions you must take. Also find out if there are any local laws and regulations concerned with work near electrical power lines.

When you have found out what safety precautions, laws and regulations apply to the jobsite, make sure they are all obeyed.

5-1-5-6

⚠ DANGER

The machine must only be operated on firm ground within the limits of inclination as stated inside the cab.

0157

⚠ WARNING

Control lever/switch action may vary on machines, decals near the levers/switches show by symbols, which levers/switches cause what actions. Before operating control levers/switches check the decal to make sure you select the desired action.

5-2-2-9

⚠ WARNING

Controls

You or others can be killed or seriously injured if you operate the control levers from outside the cab. Operate the control levers only when you are correctly seated inside the cab.

INT-2-1-3

⚠ WARNING

Boom/Travelling

Operating the boom while travelling can cause accidents. You will not have total control of the machine. Never operate the boom while travelling.

5-1-5-2

⚠ WARNING

Make sure it is clear overhead before raising the boom. Keep an adequate safe distance from all electrical power lines. Contact your local power company for safety procedures.

5-2-1-5_1

⚠ WARNING

The fitting of notice boards to the platform will increase wind resistance and is prohibited.

0158

⚠ DANGER

Do not enter or exit platform with the boom in the raised position.

0159

⚠ DANGER

Machine must be in remote mode when using the platform. Do not use platform when machine is in cab mode.

0160

⚠ WARNING

Make sure that all tyres are inflated to the correct pressures as given in the relevant Manual.

0161

⚠ WARNING

Do not use the platform as a crane.

0162

⚠ WARNING

Do not extend the reach or height of the platform by the use of ladders or other equipment.

0163

⚠ WARNING

Do not use the platform when wind speed exceeds 12.5 m/s (41 ft/s).

0164_2

⚠ WARNING

Do not allow the machine into contact with fixed objects, buildings, etc.

0165

⚠ WARNING

Do not allow the machine into contact with moving objects, vehicles, cranes, etc.

0166

⚠ WARNING

Do not exceed the maximum rated load stated on the platform.

0167

⚠ WARNING

All operators must be adequately trained and authorised to use the machine.

0168

⚠ WARNING

All operators must enforce a restricted work area under the platform to safeguard against falling objects injuring bystanders.

0169

⚠ WARNING

All operators must use appropriate safety harnesses when operating from the platform. Hard hats with chin straps must also be worn.

0170

⚠ WARNING

Do not lower a slewed platform to a height below 2 metres (80 inches) from the ground as the platform could hit the front of the machine.

5-2-7-4

⚠ CAUTION

Before carrying out arc welding on the machine, disconnect the battery and alternator to protect the circuits and components.

The battery must still be disconnected even if a battery isolator is fitted.

The machine is equipped with electronic control units (E.C.U.s) and a radio receiver. Disconnect them before welding. Failure to disconnect these components could result in irreparable damage.

Make sure that the welding earth return path is kept as short as possible. This prevents high currents being induced in the machine chassis or wiring harnesses.

5-5-1-10

System Overview

⇨ *Fig 1. (🗋 6)*

Introduction

The LK1 personnel platform fits to the machine using the JCB Q-Fit design attachment. Loadalls become classed as MEWPs (Mobile Elevating Work Platforms) when this type of system is installed.

The system enables safe access to elevated positions during building/maintenance work.

Important: *It is not permitted for persons to enter or exit the platform once it has been raised above 500 mm (20 in) from the ground.*

Controls

Control of the boom is via a servo control lever **1** in the cab or a remote control unit **8** (RCU) from the LK1 platform **12**. Both control systems operate the same servo control valve **15** (pilot valve **16** on machines with 4-stage booms).

A safety key system prevents operation of the boom by the cab control lever **1** and RCU **8** at the same time. When the machine is operated from the cab it is in **Cabin Mode**. When the machine is operated from the RCU it is in **Remote Mode**.

All the control signals are processed by the LK1 ECU **9** located under the operator's seat.

Remote Servo Control

The LK1 work platform system enables remote control of the boom lift, lower, extend / retract and engine speed functions by an operator located in the platform **12**. The control of these functions is achieved through a remote control unit (RCU) radio transmitter **8** and radio receiver **3**. Before remote operation is enabled, there are safety interlocks which require the machine's park brake to be on and the stabilizer legs to be down. Switches **18** and **13** indicate the status of the park brake and stabilizers.

Inputs from boom angle proximity switches **7** limit the maximum boom angle when the boom is operated by the RCU. Proximity switches also isolate stabilizer and sway operation above pre-set boom angles.

The LMI transducer **5** measures the load exerted on the rear axle and sends a signal to the LK1 electronic control unit (ECU) **9**. When the machine is near its maximum working limit (when it could tip forward), the LK1 ECU prevents forward reach of the platform (extending and lowering).

Note: *When the system is operated in remote mode a safety system monitors operation of the remote control unit (RCU). If the unit is not operated during a 10 minute period the engine automatically stops. If necessary the engine can be re-started by use of the RCU.*

Emergency Operation

In case of emergency, (engine failure for example) an independent electrically driven hydraulic pump **4** is provided. The pump allows the platform to be safely lowered to the ground from the platform or the cab.

Pressing the machine isolation push button **10** stops the engine and hydraulic system in an emergency. The RCU also has an emergency stop (isolation) button.

Motion Cut Out (MC) (if fitted)

Machines fitted with MC have a load control mode selector switch **19** in the cab.

MC is always active when the LK1 personnel platform is operated by the remote control unit (RCU).

The MC system automatically reduces the speed of the boom hydraulic services. When the machine is nearing its maximum working limit (when it could tip forward) an intermittent audible alarm sounds. When the machine is at its maximum working limit forward reach of the platform is prevented. A continuous audible alarm sounds.

For information about the MC system refer to the applicable service manual supplement.

Component Location and Identification

⇨ *Fig 1. (🗋 6)*. The LK1 work platform system comprises several separate components. The illustration is intended as a guide to identifying the components.

Component Key:			
Item:	**Description:**	**Remarks:**	**Related Topic**(1)
1	Control lever		⇨ *Joystick (🗋 149)*
2	Battery charger	For RCU battery	
3	Radio receiver		⇨ *Radio Receiver (🗋 156)*
4	Emergency pump		⇨ *Emergency Pump (🗋 203)*
5	Load moment transducer		⇨ *LMI Transducers (🗋 150)*
6	Load moment electronic processor	4-Stage boom only	⇨ *LMI Transducers (🗋 150)*
7	Boom angle proximity sensors		⇨ *Proximity Switches (🗋 154)*
8	Remote control unit (RCU)		
9	LK1 Electronic control unit (ECU)		⇨ *Electronic Control Unit (LK1 ECU) (🗋 151)*
10	Machine isolation pushbutton		
11	Slew controls	Optional. Utilises machine auxiliary hydraulics	
12	Personnel platform		
13	Stabilizer pressure switches		⇨ *Stabilizer Pressure Switches (🗋 153)*
14	Engine throttle actuator	There are two types depending on the engine type	⇨ *Engine Speed Actuator (🗋 158)*
15	Main control valve	There are two types depending on the machine model	⇨ *Control Valve (3-Stage Boom Machines) (🗋 178)* and ⇨ *Control Valve (4-Stage Boom Machines) (🗋 195)*
16	Pilot valve (NEM)	4-Stage boom machines only	⇨ *Pilot Control Valves (4-Stage Boom Machines) (🗋 198)*
17	Slew valve (auxiliary pilot control valve)	4-Stage boom machines only	
18	Park brake switch		Refer to machine service manual
19	Load control mode selector switch	Machines with motion cut out (MC) only	Refer to machine operator manual

(1) Where applicable, the table contains cross-references to information related to the component.

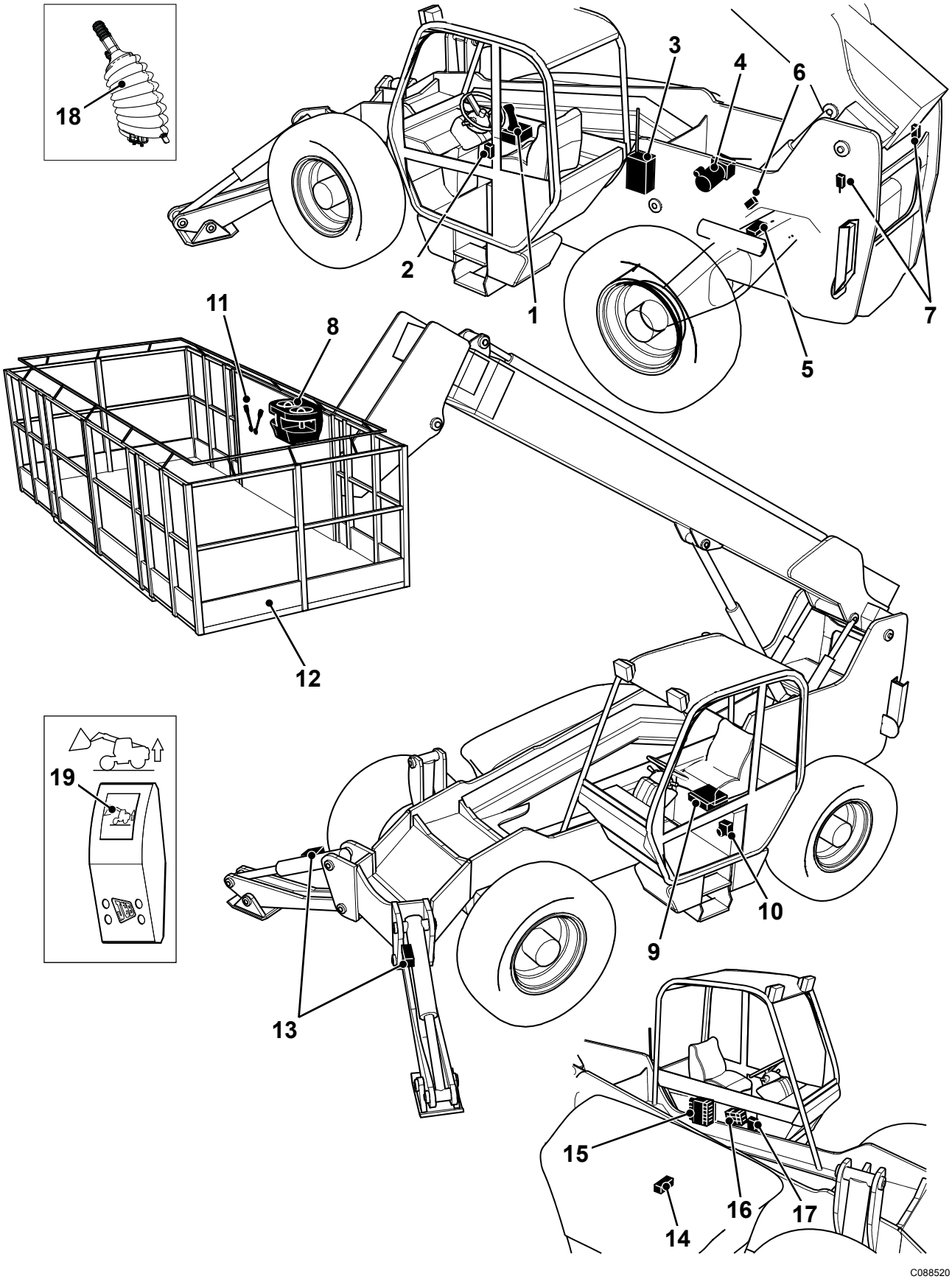

Fig 1. Component Location

System Operation

Interlocks are fitted to ensure cabin mode and remote mode operation is safe as possible. The table explains the operating logic.

Table 1.

Function	Cabin Mode	Remote Mode
Engine start	●	● (1)
Stabilizers	●	(2)
Sway	●	(3)
Boom raise	●	● (4)
Boom lower	●	●
Boom extend	●	●
Boom retract	●	●
Tilt	●	
Auxiliary hydraulics	●	
Platform slew (if fitted)		●
LCS/motion cut out	●	● (5)
LCS/motion cut out - ground mode	●	
Engine speed control	●	●
Automatic engine speed control		●
Engine stop	●	● (6)
Engine stop (after safety time period)		● (7)
Emergency stop (cab isolation button)	●	
Emergency stop (RCU isolation button)		●
Emergency boom operation	● (8)	● (8)

(1) Stabilizers must be down and the park brake must be on before engine will start.
(2) Stabilizer service is isolated. Control must be switched back to cabin mode to re-activate stabiliser service.
(3) Sway service is isolated. Control must be switched back to cabin mode to re-activate sway service.
(4) On machines with 4 stage booms the maximum boom angle is limited to 65°.
(5) The boom service speed control feature operates at the slowest speed at all times.
(6) If the engine is running when remote mode is selected, the engine will stop. The engine must be re-started by use of the remote control unit (RCU).
(7) If the remote control unit (RCU) is not operated during a 10 minute period the engine automatically stops. If necessary the engine can be re-started by use of the RCU.
(8) Enables the emergency electric hydraulic pump. Only boom lower and retract services operate. The system will not enable boom operation in the event of control valve failure.

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Service Procedures

RCU Engine Start Procedure

When in remote mode and the RCU is left on with the engine running, the RCU will switch itself off if it is not operated within 10 minutes. This will cause the engine to stop. To re-start, turn the RCU switch **2** anti-clockwise (off) and then clockwise (on). Wait for 5 seconds, then press and hold the system enable button **8**. Press the engine start button **6**.

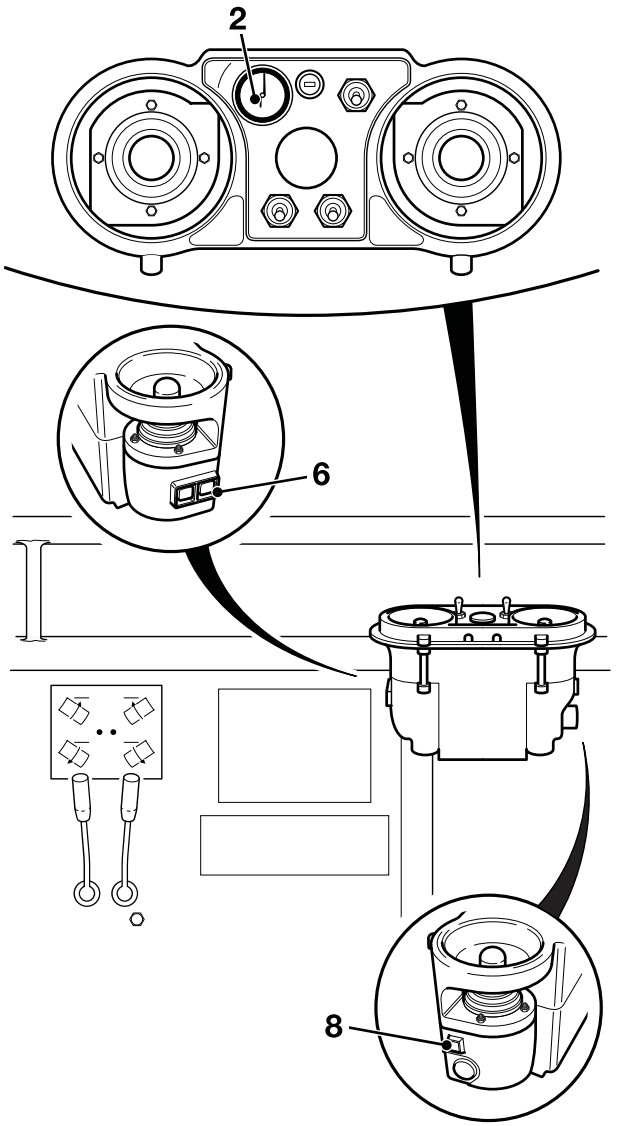

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Fig 2.

Fault Finding

Introduction

The LK1 personnel platform operating system has several interlocks and safety systems. When fault finding make sure you understand how to operate the system correctly. Refer to the correct Operator Manual.

The fault finding procedures are given in the form of tables. The tables are designed to identify possible causes by performing checks. The tables are designed to identify causes through a process of elimination, starting with the simplest, most easily rectified faults.

The LK1 ECU recieves inputs via a CAN bus system. The dual CAN bus system used to convey the signals has a self-diagnostic capability and will fail safe by isolating the fault and stopping the engine. By use of the JCB Servicemaster Manplatform Diagnostics tool the engineer can quickly identify faults with specific electrical circuits or devices. ⇨ *Manplatform Diagnostics - User Guide (🗋 14)*

Note: *When fault finding DO NOT use a multi meter on ECU connector pins. Only test the associated wires and connectors.*

Tables
⇨ *Remote Control Faults (🗋 11)*
⇨ *Engine Faults (🗋 11)*
⇨ *Hydraulic Service Faults (🗋 12)*

Tables

Table 2. Remote Control Faults

	Possible Cause	Action
Remote control unit (RCU) does not operate or engine fails to start from RCU	Safety key not installed in RCU	Select remote mode and transfer safety key to RCU
	Cab isolation button pressed	Release isolation button
	Stabilsers not lowered	Lower stabilisers
	Boom not fully retracted (4 stage boom only)	Retract boom
	Park brake not set to ON	Set park brake to ON
	Ignition set to OFF	Set ignition to ON
	RCU emergency stop button pressed	Release stop button
	Incorrect RCU engine start procedure	Follow the correct procedure. ⇒ ***RCU Engine Start Procedure (9)***
	RCU battery low	Charge or replace battery as applicable
	LK1 ECU battery low	Charge or replace battery as applicable. ⇒ ***Electronic Control Unit (LK1 ECU) Battery (152)***
	Cab isolation switch fault	Check switch function and associated wires and connectors
	Stabilizer switch fault	Check switch function and associated wires and connectors. ⇒ ***Stabilizer Legs Down (79)***
	Park brake switch fault	Check switch function and associated wires and connectors. ⇒ ***Park Brake ON (80)***
	Receiver fault	Check wires and connectors between receiver and LK1 ECU. ⇒ ***Receiver Signal Integrity (82)***

Table 3. Engine Faults

	Possible Cause	Action
Engine stops and will not restart	Starting procedure incorrect (starting from the RCU)	Follow correct procedure. ⇒ ***RCU Engine Start Procedure (9)***
	Receiver fault	Check wires and connectors between receiver and LK1 ECU. ⇒ ***Receiver Signal Integrity (82)***
Engine stops periodically when machine is in remote operation	Safety system operation	If the RCU is not operated during a 10 minute period the engine automatically stops for safety reasons (no fault)
Engine speed restricted	Engine speed actuator faulty	Adjust actuator. ⇒ ***Engine Speed Actuator (158)***

Table 4. Hydraulic Service Faults

	Possible Cause	Action
Boom fails to reach maximum angle when machine is in remote operation (4 stage boom only)	Safety system operation	Boom angle is automatically restricted for safety reasons (no fault)
One or more boom services start/ stop too slowly	Control sensitivity setting incorrect	Use JCB Servicemaster to set hydraulic sensitivity correctly. ⇨ *Manplatform Calibration - User Guide (30)*
One or more boom services start/ stop too suddenly	Control sensitivity setting incorrect	Use JCB Servicemaster to set hydraulic sensitivity correctly. ⇨ *Manplatform Calibration - User Guide (30)*
One or more boom services operate slowly (4 stage boom only)	Valve signal setting incorrect	Use JCB Servicemaster to set 540 valve correctly. ⇨ *Manplatform Calibration - User Guide (30)*
Platform slew function operates too slowly or too fast	Needle valve setting incorrect	Adjust needle valve to give correct ram operating speed. ⇨ *Needle Valve (Slewing Platforms only) (200)*

Servicemaster Tools

Tool	Icon	Description	User Guide
Manplatform	 C088710	Perform manplatform set up, calibration and diagnostics	⇨ *Manplatform Diagnostics - User Guide (14)*, ⇨ *Manplatform Calibration - User Guide (30)*
Manplatform LCS Enable	 C088700	Enables machine load control and motion cut out system for use with manplatform control system	⇨ *Manplatform Enable - Machines With Motion Cut Out (MCO) (36)*

Manplatform Diagnostics - User Guide

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Introduction

The **Manplatform Diagnostics** software tool is part of the **JCB Servicemaster** software suite.

Note: *This software also incorporates the calibration and set up for the LK1 platform. Refer to the correct part of the manual for set up and calibration procedures.*

Note: *This software guide is universal and some functions may not be available on particular machine variants.*

This software is intended for use on IBM Compatible Personal Computers **(PCs)** running **Windows 9x**, **Windows2000** and **WindowsXP** operating systems but is not compatible with either earlier versions of **Windows 3.x**. Ideally the computer should be a laptop type.

Care and Safety

⚠ WARNING

Be sure to read and follow any on screen instructions. Failure to follow correct procedure could result in death or injury.

2-4-5-5

Installing Manplatform Diagnostics

The **Manplatform Diagnostics** tool is fully integrated within JCB Servicemaster. To use Manplatform diagnostics you must install **JCB Servicemaster** onto a suitable laptop computer. Refer to the correct machine Service Manual.

Connecting Manplatform Diagnostics

Connection to a laptop computer can be made by using either a Serial or USB port.

Note: *Make sure that the laptop computer has a current version of the JCB Servicemaster software installed BEFORE you connect it to the machine. Refer to the machine Service Manual for the correct installation procedures.*

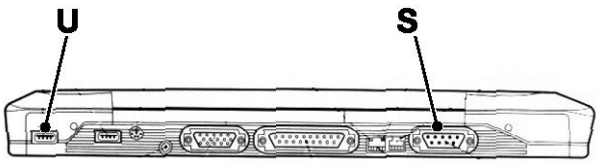

Fig 3.

S ⇒ *Connection Using a Serial Port (15)*

U ⇒ *Connection Using a USB Port (16)*

Connection Using a Serial Port

1 Switch OFF the ignition.

2 Remove four screws **A** and lift the joystick off its base. ⇒ *Fig 4. (15)*.

3 Connect a laptop computer to the machine using link harness **B** (JCB part number 721/11851) and the standard Servicemaster lead **C** (JCB part number 892/01066). ⇒ *Fig 5. (15)*.

Later machines will have the link harness already connected inside the joystick base as shown.

If the link harness **B** is not fitted, it must be connected as shown. When the link lead is fitted, connect the standard Servicemaster lead **C** between the link lead and the laptop serial port **S**.

4 Fit the joystick back into position and fit the screws finger-tight.

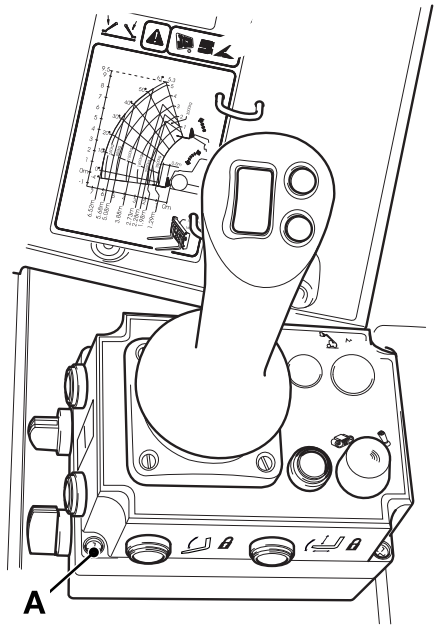

Fig 4.

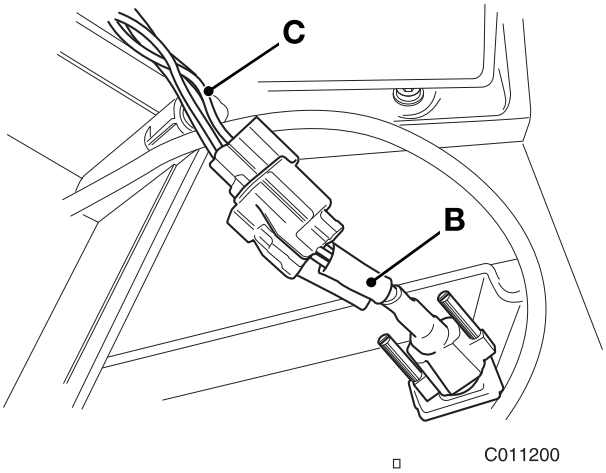

Fig 5.

Connection Using a USB Port

If your laptop computer has a USB port U but no serial port S, a converter lead is needed to allow the Servicemaster lead to be connected to the USB port.

There is no JCB part number for the converter lead as JCB cannot guarantee to provide a lead to suit all laptop computers. The converter lead should therefore be sourced locally; recommended specification is Belkin F5U103.

⚠ CAUTION

Do not alter the communication port settings with the laptop computer connected to the machine electrical system or permanent damage will result.

5-2-7-5

When the converter lead is available, proceed as follows:

1 Connect the converter lead between the USB port **U** and connector **D** on the standard Servicemaster lead part number 892/01066. ⇒ *Fig 6. (16)*.

Important: *Do not connect the Servicemaster Lead to the machine yet.*

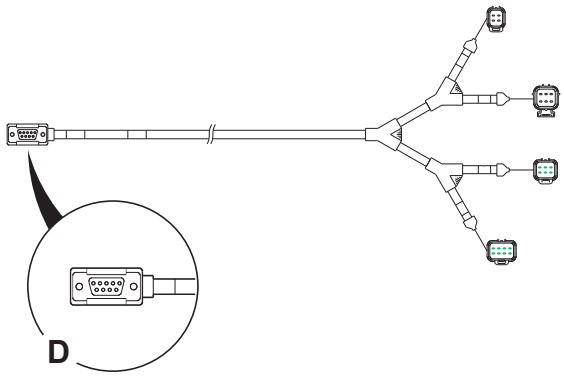

Fig 6. Servicemaster Lead

2 Open **Servicemaster**.

3 Select **Loadall 2007+**. ⇒ *Fig 7. (16)*

4 Double click on the **Manplatform** icon. ⇒ *Fig 7. (16)*

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Fig 7.

5 Click on the black circle (arrowed) in the bottom right hand corner of the screen. ⇒ *Fig 8. (16)*.

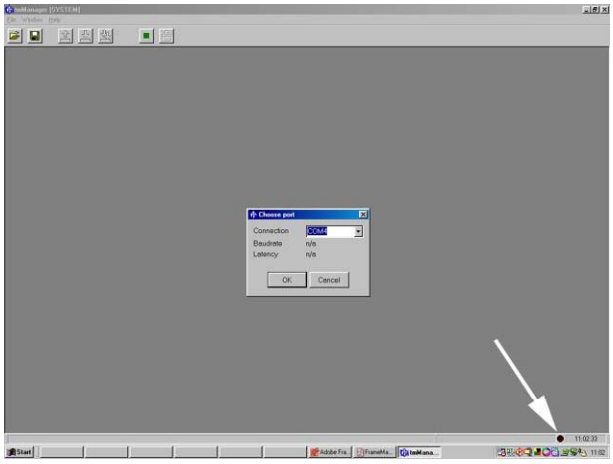


Fig 8.

6 The Choose port window will appear. ⇒ *Fig 9. (17)*. Choose the correct Connection (typically 'COM4' as shown).

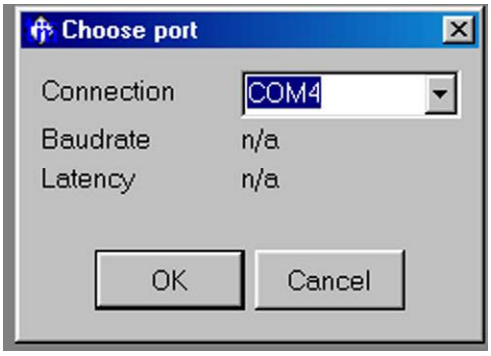


Fig 9.

7 Pull down the 'File' menu and select 'Preferences'.

8 In the 'Preferences' window, click on the 'Connection' tab. ⇒ *Fig 10. (17)*.

Note: *The 'Connection' previously selected appears in the Port window as arrowed.*

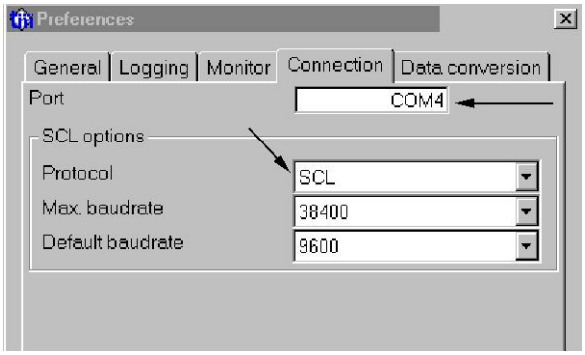


Fig 10.

9 Check that the 'Protocol' is set to 'SCL'. ⇒ *Fig 10. (17)*. Change to 'SCL' if not already set.

Important: *If there are any problems with this procedure, shut down the program and repeat from step 2.*

10 Switch OFF the ignition.

11 Remove four screws **A** and lift the joystick off its base.

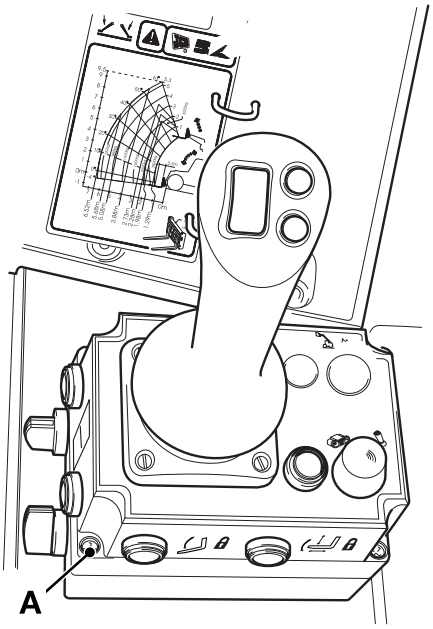


Fig 11.

12 Connect the Servicemaster lead **C** to the machine using link harness **B** (JCB part number 721/11851).

Later machines will have the link harness already connected inside the joystick base as shown. ⇒ *Fig 12. (18)*.

If the link harness **B** is not fitted, it must be connected as shown.

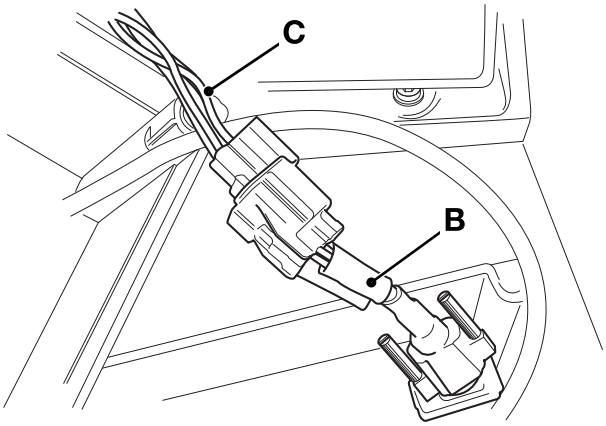


Fig 12.

13 Fit the joystick back into position and fit the screws finger-tight.

Starting the Manplatform Diagnostics Software

1 Connect a laptop computer to the machine. ⇒ *Connecting Manplatform Diagnostics (15)*

2 Set the machine ignition to 'ON'.

3 Open **Servicemaster.**

4 Select **'Loadall 2007+'**. ⇒ *Fig 13. (18)*

Note: *If the 'Manplatform LCS Enable' software is open, close it before opening the 'Manplatform' software.*

5 Double click on the **'Manplatform'** icon. ⇒ *Fig 13. (18)*

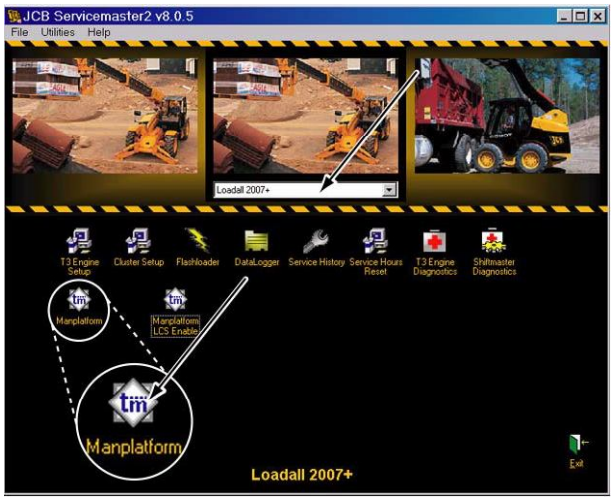


Fig 13.

Set the ignition to ON. Switch between 'cabin' and 'remote' operation modes as applicable.

Remote Control Unit Test

1 Set the system to ‘remote’ mode.

2 Open the ‘Setup’ window. Select the ‘Remote control’ tab. Click the ‘Test remote control’ button. ‘LED lights’ show the system status. The window displays 'real time' functions that apply at the moment they are viewed as the machine is operating. ⇒ *Fig 14. (19)*

The table shows the LEDs status for each operating mode (cabin and remote modes). ⇒ *Table 5. (19)*

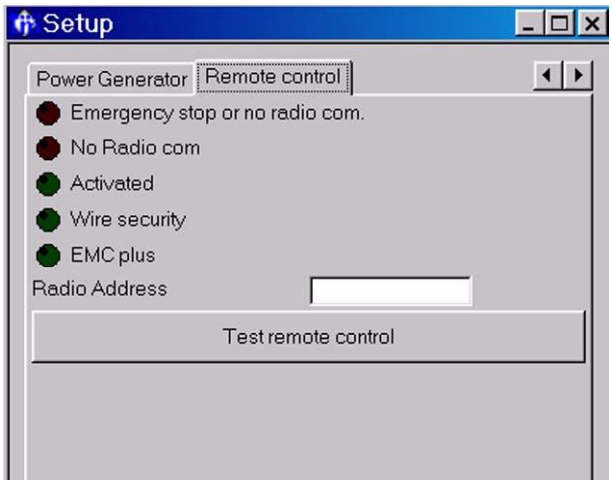


Fig 14.

Table 5.

Description	Status - Cabin Mode	Status - Remote Mode
Emergency stop or no radio com	LED OFF	LED ON (red) = emergency button on remote control unit pressed
No radio com	LED ON (red)	LED OFF
Activated	LED OFF	LED ON (green)
Wire security	LED OFF	LED ON (green) LED OFF = emergency button on remote control unit pressed
EMC plus radio address	LED OFF = emergency button in cab or on remore control unit pressed	

Internal Monitor

1 Open the ‘Internal monitor’ window. Note the data shown in the ‘System Mode window. The window displays 'real time' data that applies at the moment it is viewed as the machine is operating. ⇒ *Fig 15. (20)*

The table shows the machine status and the expected data displayed. ⇒ *Table 6. (20)*

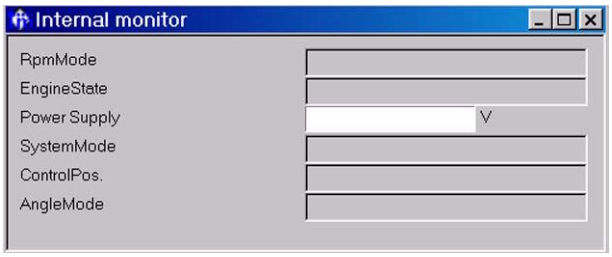


Fig 15.

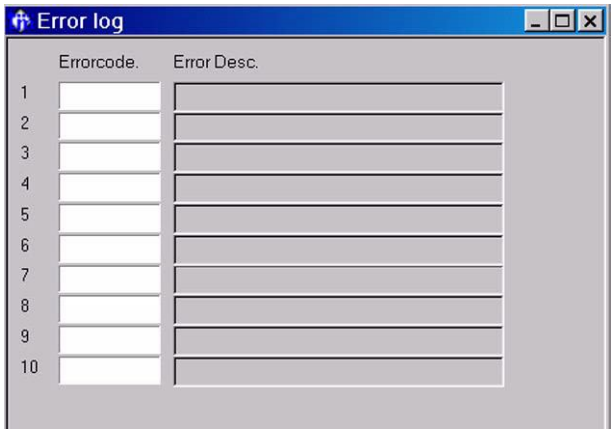
Table 6.

Description	Data	Machine Status
Rpm Mode	Normal	
Engine State	ENGINE_STOPPED	Engine not running
	ENGINE_STARTED	Engine running
Power Supply	11.84V (typical battery voltage)	Ignition ON
	13.5V (typical)	Engine running (alternator charging)
System Mode	Block All	Engine not running. MC(1) system inoperative
	Normal	MC(1) system ON
	Override Security	MC(1) override switch pressed
Control Pos.	Remote	Remote mode selected
	Cabine	Cabin mode selected
Angle Mode	Below 45deg	Boom angle less than 45^0
	Above 45deg	Boom angle more than 45^0
	Above 65deg	Boom angle more than 65^0
	Not supported	MC(1) system is not enabled by the LK1 ECU

(1) MC = Motion Cut Out system

Error log

1 Open the ‘Error log’ window. The log displays 'real time' functions or errors that apply at the moment they are viewed and as the machine is working. There is no memory bank of faults that may have occurred previously. ⇒ *Fig 16. (21)*

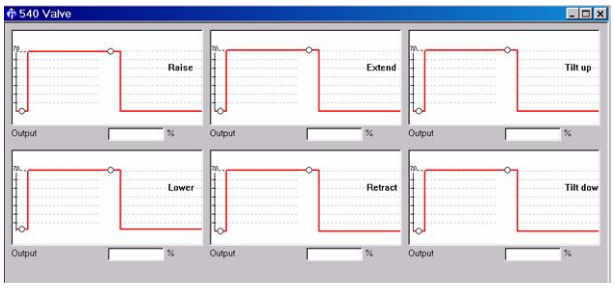


C088610

Fig 16.

540 Valve (540-170 machine only)

1 Open the ‘540 Valve’ window. The settings must be at 70%. If necessary re-set to 70%. ⇒ *Fig 17. (21)*



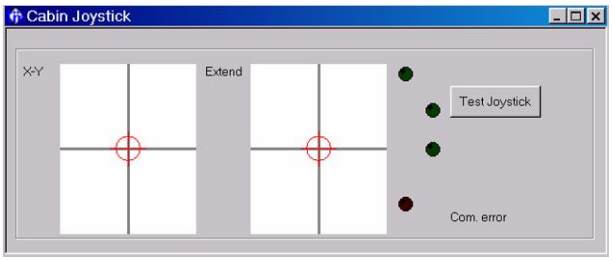
C088540

Fig 17.

Cabin Joystick

1 Open the ‘Cabin Joystick’ window. Click the ‘Test Joystick’ button to display the joystick outputs to the ECU. The red circle on the ‘X-Y’ and ‘Extend’ screens will move accordingly with the movement of the cab joystick (e.g. push joystick forward, red circle moves up the Y axis).

Three indicator lights are used to represent the buttons on the joystick and illuminate when the button is pressed (e.g. 2nd auxiliary, transmission dump). The bottom indicator light ‘Com. Error’, will illuminate if there is a problem with the CAN connection between the joystick and the ECU. The joystick will not operate when this light is on. ⇒ *Fig 18. (21)*



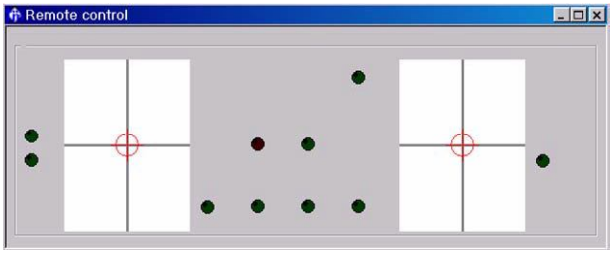
C088660

Fig 18.

Remote Control

1 Open the ‘Remote Control’ window. The red circle on the screens will move accordingly with the movement of the remote control unit (RCU) joysticks.

Indicator lights are used to represent the switches on the remote control unit (RCU) and illuminate when the switch is operated. ⇒ *Fig 19. (21)*



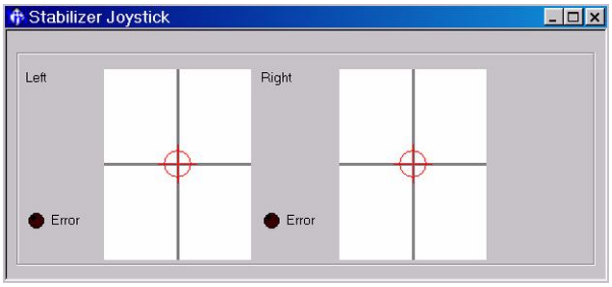
C088670

Fig 19.

Stabilizer Joystick (3 Stage Only)

1 Open the ‘Stabilizer Joystick’ window. The red circle on the ‘Left’ and ‘Right’ screens will move accordingly with the movement of the stabilizer joystick.

The relevant ‘Error’ indicator light will illuminate if there is a problem with the stabilizer ‘down’ input to the ECU. ⇒ *Fig 20. (🗋 22)*

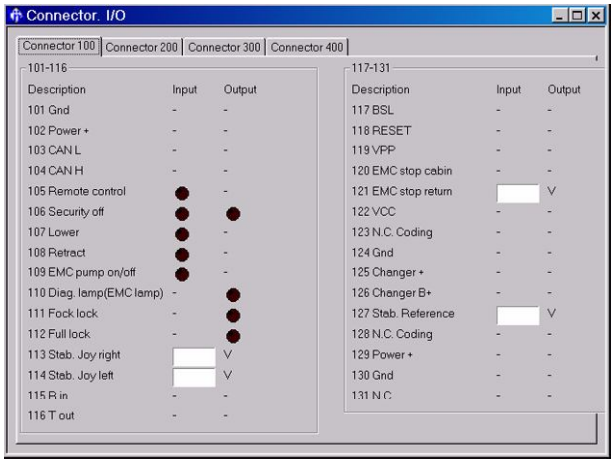


C088680

Fig 20.

Connector I/O

1 Open the ‘Connector I/O’ window. There are four connector I/O screens. Each screen represents the input/output status for one ECU connector, for example ‘Connector 100’. The window displays 'real time' functions that apply at the moment they are viewed as the machine is operating. ⇒ *Fig 21. (🗋 23)*



C088620

Fig 21.

2 View each connector screen in turn and note the displayed data.

The following tables explain the input and output status display at the connector pins (where applicable). The displays take the form of a ‘LED light’ or a numerical value. The tables explain when the LEDs come on and what numerical values to expect when different machine functions are selected or operated.

Note: *While the displays are useful when fault finding, it is important to remember that they indicate the status of the system and not faults.*

Table 7.

Item to select	Provides connection to
Connector 100	Joystick inputs. ⇒ *Table 8. Connector 100 (🗋 24)*
Connector 200	Interface with Loadall electrics. ⇒ *Table 9. Connector 200 (🗋 25)*
Connector 300	Control valve outputs . ⇒ *Table 10. Connector 300 (🗋 27)*
Connector 400	Radio system (RCU) inputs. ⇒ *Table 11. Connector 400 (🗋 29)*

Table 8. Connector 100

Description	Status Explanation
101 Gnd	-
102 Power +	-
103 CAN L	-
104 CAN H	-
105 Remote control	LED ON = system in remote mode LED OFF = system in cabin mode
106 Security off	LED ON = Load control selector switch pressed
107 Lower	LED ON = Emergency retract selected (LED 109 will also come ON)
108 Retract	LED ON = Emergency pump selected (LED 109 will also come ON)
109 EMC pump on/off	LED ON = Emergency lower selected
110 Diag. lamp (EMC lamp)	LED ON = Error code present. ⇨ *Error log (🗋 21)*
111 Fock lock	LED ON = Fork lock selected
112 Full lock	LED ON = Full lock seleced (LED 111 will also come ON)
113 Stab. Joy right	Typical voltage value = 6.3 V (value for 4 stage boom machines = 0 V)(1)
114 Stab. Joy left	Typical voltage value = 6.3 V (value for 4 stage boom machines = 12.3 V (battery voltage))(1)
115 R in	-
116 T out	-
117 BSL	-
118 RESET	-
119 VPP	-
120 EMC stop cabin	-
121 EMC stop return	12 V = Cab machine isolation button not pressed (machine isolation not selected) 0 V = Cab machine isolation button pressed (machine isolation selected)
122 VCC	-
123 N.C. Coding	-
124 Gnd	-
125 Changer +	-
126 Changer B+	-
127 Stab. Reference	Typical Voltage value = 6.3 V stabiliser reference voltage (value for 4 stage boom machines = 0 V)(1)
128 N.C. Coding	-
129 Power +	-
130 Gnd	-
131 N.C.	-

(1) 4 stage boom machines do not have ECU controlled stabilizers.

Table 9. Connector 200

Description	Status Explanation
201 Gnd	-
202 Gnd	-
203 Key+	-
204 Key+	-
205 Left stab	LED ON = Pressure switch signal from right stabiliser present (stabiliser DOWN)
206 Park break	LED ON = Park brake ON
	LED OFF = Park brake OFF
207 D+ current sig.	LED ON = Output from alternator present
208 Right stab	LED ON = Pressure switch signal from left stabiliser present (stabiliser DOWN)
209 Trans dump	LED ON = Transmission dump selected (joystick transmission dump button pressed)
210 Ext boost (sol)	LED ON = Boom extension boost isolator switch electrical feed present
	LED OFF = boom 4th extension selected(1)
211 -	-
212 LMI (readout)	-
213 LMI transd.	-
214 Sway sol	LED not used
215 Sway sign.	-
216 Stab. isol. (sol)	LED ON = Stabiliser isolation not selected LED OFF = Stabiliser isolation selected
217 Retract/stab ok(1)	LED ON = Boom fully retracted (signal from stabiliser lift isolation switch)
	LED OFF = Boom not fully retracted (signal from stabiliser lift isolation switch)
218 Load celle 1	Typical value = 0.2 - 0.3 (LED flashes)
219 Load celle 2	Typical value = 0.2 - 0.3 (LED flashes)
220 K1 Ignition	Cabin mode: LED ON = Ignition ON, engine running
	Remote mode: LED ON = Engine running
221 K2 start	Remote mode:
	LED ON = Engine starter motor engaged
	LED OFF = Engine running
222 Ext boost (sig)	-
223 Fork lock	LED ON = Fork lock selected
224 Full lock	LED ON = Full lock selected (LED 223 will also come ON)
225 Ext. Diverter (Sol)(1)	LED ON = Boom 4th extension selected
226 Ext. Diverter (Sig.)(1)	Cabin mode: LED ON = Boom 4th extension selected
227 Rpm	-