



E-LINK RP 420 / RP 520



GB Operating Manual

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10.04

E-Link for RP 420 MASTER / RP 520 MASTER

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1 Introduction

The control unit of the E-Link is mounted directly on the baler in a sealed housing.

The control box serves to select the E-Link functions.

The control unit and the control box, as well as the respective program contained therein, are provided with their own serial numbers.

To deal with any queries it is necessary that the serial numbers are stated. Please enter these numbers here immediately after delivery:

Part	Serial number	How to find the serial number
 <p>Control box</p>	SW rev. dd	Keep any key on the control box pressed when connecting the power supply.
 <p>Control unit</p>	Serial no. SW version SW date Memory	Press button  several times until "Systeminfo" appears.

2 Requirements on the machine

- On-board power supply 12 V
- Fuse protection, machine: 20 A

Operation with 24 V power supply is not permissible.

3 Safety instructions



Prior to first commissioning read and observe the operating manual and safety instructions. In this operating manual all points concerning your safety have been provided with the warning sign. Pass on all safety instructions also to other users! The warning and information plates attached to the machine provide important instructions for safe operation. Observing these instructions serves your own safety!

- It is not permissible to enter the working range of the machine or to approach the working range of the machine as long as the electronics are supplied with power.
- Prior to any kind of assembly and maintenance work, the control electronics must be disconnected from power supply.
- Check correct setting of all sensors regularly and check that all sensors (proximity switches) and actors (plugs on hydraulic system, mains coupling plug) are tightened properly.
- The power supply of the electronics is allowed to be switched only if the machine is to be operated. After termination of work, the control system must immediately be disconnected from power supply.
- During cleaning work, the electronics must not be exposed to a direct water jet (in particular high-pressure cleaners).
- Before starting up the machine read the pertinent documentation. In case you do not understand all details, please contact the Service Department.
- The E-Link control system has been developed and manufactured with utmost care. Each unit has been checked for correct functioning prior to delivery. Despite all precautions, malfunctions may occasionally occur. The E-Link control system and the corresponding baler should, therefore, always be operated in such a way that no personal injury or material damage can occur.
- Never carry out any adjustments and repairs or maintenance and service work on the E-Link while the drive is running. Always first disconnect the power take-off shaft and withdraw the drive shaft from the end of the power take-off shaft before working near moving machine parts.

3.1 Instructions for fire protection

- In certain conditions the harvested crop is easily inflammable.
- Keep the baler always free from crop remains and oil leaks. This applies in particular to the time after baling has been terminated.
- The cabling provided for the E-Link and the pertinent machine must not be used for any other electric consumers than those installed or approved by the factory. Overloading of the electric cables will cause undue overheating.
- Always keep a working fire extinguisher within reach.

3.2 Protection of the electronic control system

- All assembly work (connection and disconnection of sensors, valves, control box etc., replacement of fuses) must be carried out with the power supply switched off.
- E-Link is designed for operation with 12-Volt. Operation with other on-board power supply systems is not permissible!
- In case of welding work on the baler:
 - Do not permit welding current to flow through the control unit.
 - Interrupt power supply between tractor and baler.
 - Take heat generation at the welding points into account; if necessary remove sensitive parts (cables, sensors or the like) prior to welding.

4 Monitor

Normal machine operation is displayed on the monitor; the monitor appears automatically as soon as the power supply is connected to the control unit.

The following information is shown in the display:

Central main field

- Machine status (baling, tying, ...)
- Bar graph for actual and preselected bale diameter
- Soft-center mode
- Knife in cutting position

Beside the main field

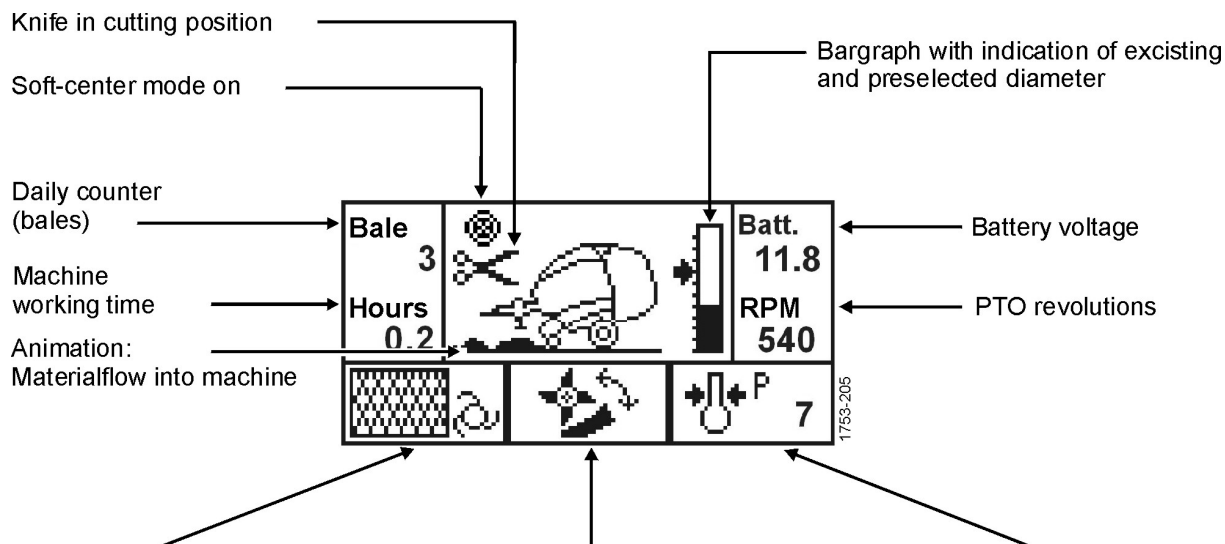
- Actual day counter
- Machine working time
- Battery voltage
- PTO speed

Below the main field

- Tying mode
- Hydraulic valve block
- Bale diameter/pressure presetting

4.1 Machine status: Baling

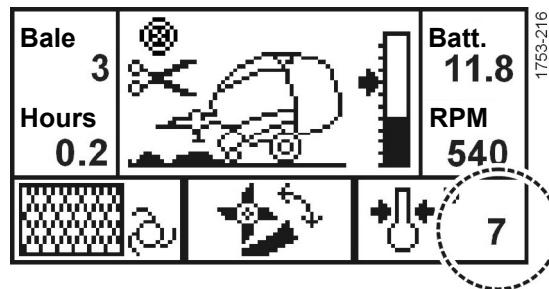
The baling machine status is displayed by an animated material flow into the baler.



	Tying mode		Hydraulic valve block		Setting preselection
	Net manual		Adjustment Bottom door		Bale diameter
	Net automatic		Adjustment Pickup		Pressure
	Twine manual		Adjustment Cutting device		
	Twine automatic				

4.2 Bale diameter display

The following tables show the possible numerical values for the bale diameter display:

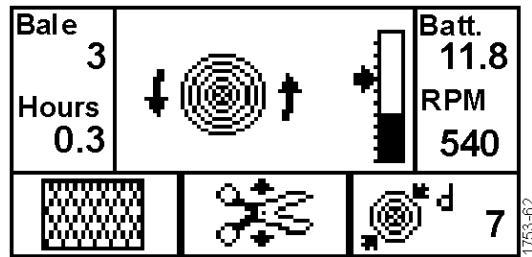


	RP 420
smallest bale diameter	*90
	*95
	00
	05
	10
	15
	20
	...
largest bale diameter	60

	RP 520
smallest bale diameter	1
	2
	3
	4
	5
	...
largest bale diameter	10

4.3 Machine status: Tying

Two rotating arrows indicate that tying is being carried out.



4.4 Machine status: Open tail gate

After tying has been finished, the electronics indicate with a flashing arrow and a beep to open the tail gate. No material flows any more into baler.



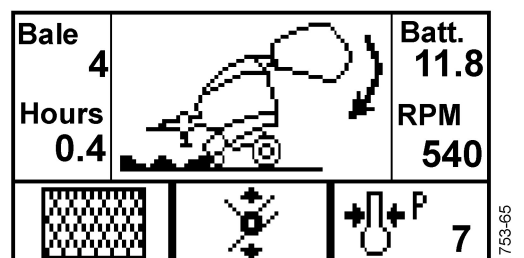
4.5 Machine status: Tail gate opened

The open tail gate is displayed in the main window. There is no material flow.






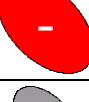





4.6 Machine status: Close tail gate





After the bale has left the baler, the electronics indicate with a flashing arrow to close the tail gate. No material flows into baler.

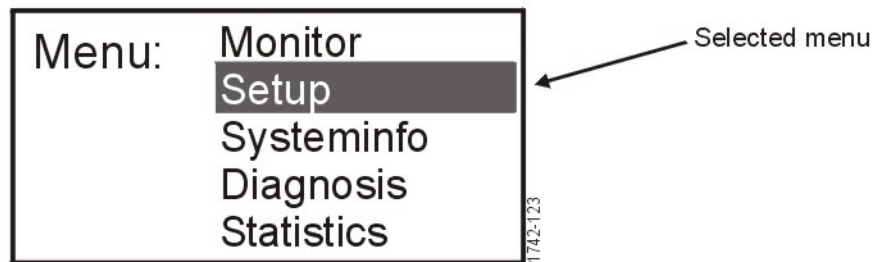


4.7 Overview of the button functions in "Monitor"






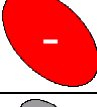



Button	Function in Monitor
	Toggle tying mode Net manual - Net Automatic – Twine manual – Twine Automatic)
	Toggle hydraulic valve block (Pickup - Bottom door - Cutting device)
	Toggle system presetting (Pressure - Diameter)
	Start tying
	Increase selected system presetting Pressure or Diameter
	Reduce selected system presetting Pressure or Diameter
	
	"Remove" error message
	Call up menu

5 Menu

- The "Menu" permits display of the other screen pages.
- Call up from "Monitor" (see chap. 4) with the button 
- Selection of a menu item by means of the buttons  or 
- Confirm with 
- Should no menu be selected automatic return to the "Monitor" menu is effected after 5 s.







Overview of the button functions in "menu"

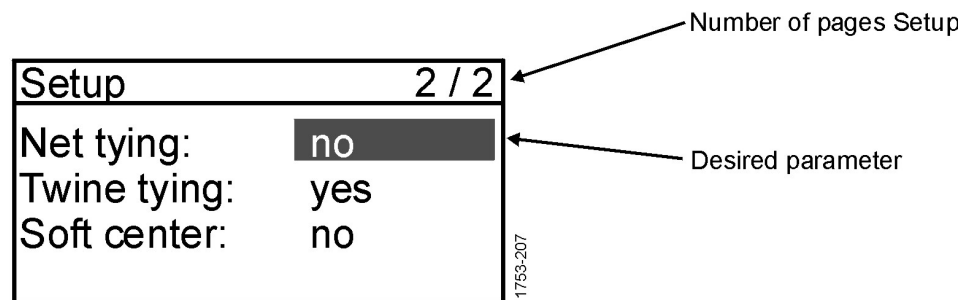
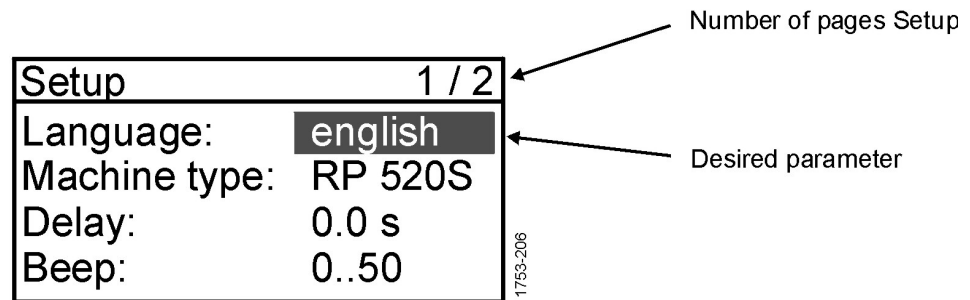
Button	Function in Menu
	
	
	
	
	
	
	Move selection bar up
	Move selection bar down
	Call up selected menu

6 Setup

The "Setup" menu serves for setting various machine parameters.

Select the desired parameter with a short press on the button  and change the set value by










pressing  or . A long press on the button  causes return to Monitor.



The following setting values can be selected for the parameters:

Setup parameter	Setting range
Language	German – English – French – Swedish – Norwegian – Finnish – Spanish – Italian
Machine type	RP 420 RP 420 S (with cutting device) RP 520 RP 520 S (with cutting device)
Delay (in tying process, see appendix)	0 s / 2.5 s / 5 s
Beep	0 .. 50
Net tying	yes / no
Twine tying	no / yes
Soft center	yes / no „yes“ means: The bale is to be produced with a softer center. Therefore the preset pressure in the baling chamber does not build up completely before the bale diameter has reached 75 % of the preset value.

Overview of the button functions in "Menu"

Button	Function in Setup
 A	Page backwards
 B	
 C	Page forwards
	
	Change parameter
	Change parameter
	Select parameter
	Select parameter
 Pr	Call up menu (3sec.:Monitor)

7 Systeminfo










"Systeminfo" supplies information about important system data, as for example the software version.

A long press on the button  causes return to "Monitor".

Systeminfo	
Serial No.:	024013
SW Rev:	1.05i
SW Date:	18.10.2003
Memory:	128kB/1kB

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Overview of the button functions in the "Systeminfo":

Button	Function in Systeminfo
 A	
 B	
 C	
	
	
	
	
	
 Pr	Call up menu (3sec.:Monitor)

8 Diagnosis

The E-Link software includes extensive diagnostic functions to test the functioning of the electrical equipment. Two basic diagnostic functions are available:

Standard diagnosis:

- Diagnostic functions with machines stopped.
- Machine functions are completely switched off (corresponds to diagnosis performed till now). In addition a fully automatic actor test is possible.
- Standard diagnosis may only be started after the machine has been stopped.

Extended diagnosis

- Entry via special key combination + <Pr> in the Menu.
- Machine operation is continued, therefore all sensor/actor channels can be observed.



Standard diagnosis may only be carried out after the machine has been stopped.

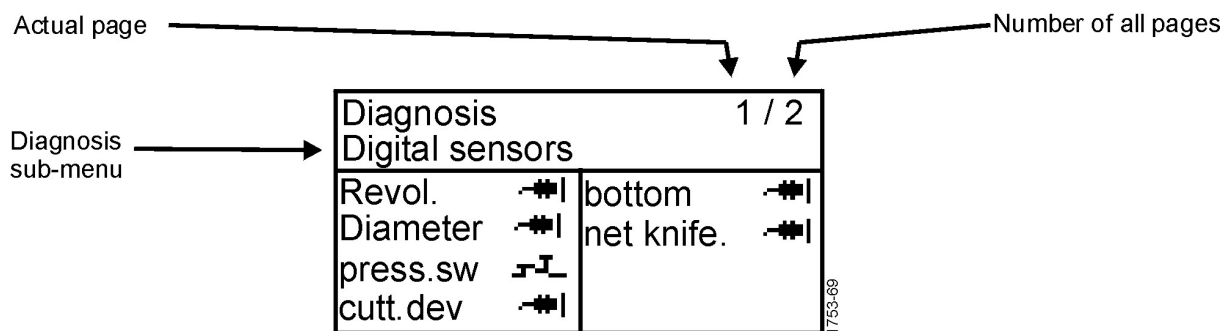
8.1 Standard diagnosis

- After entry no machine function.
- Switch to diagnosis only when machine has stopped!
- Long press on the button <Pr> causes return to "Monitor".
- Short press on the button <Pr> causes return to "Menu".

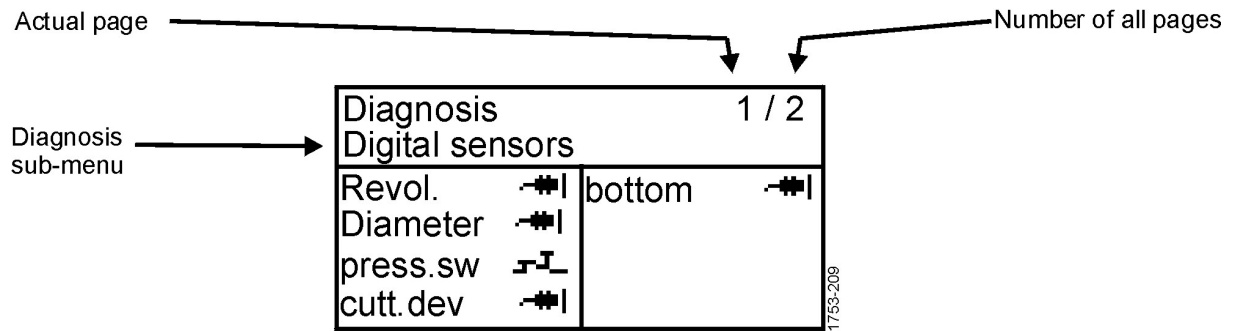
8.1.1 Digital sensor diagnosis

In the digital sensor diagnosis the status of inductive proximity sensors and switches is displayed by means of symbols. The number of sensors or pages displayed depends on the settings in the Setup. A long press on the button <Pr> causes return to "Monitor".

Net tying



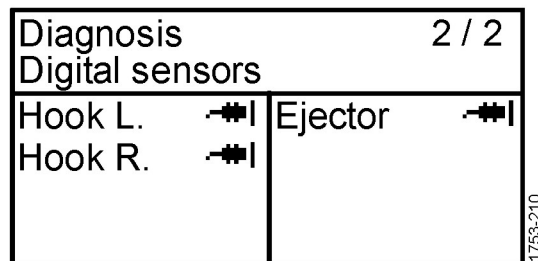
Twine tying



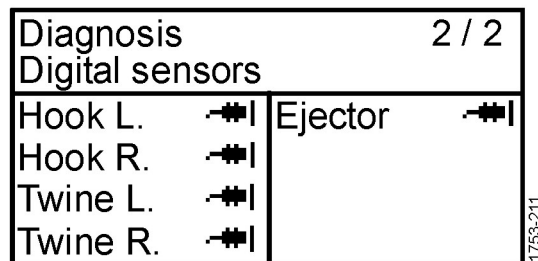
The following symbols are used for the sensor status:

Sensor type	Symbol	Status
Inductive proximity switch		damped
		undamped
Switch		opened
		closed

Net tying



Twine tying



8.1.2 Actor diagnosis

In the actor diagnosis the state of the actor channels is displayed by symbols. The functions can be tested manually or automatically. For this purpose select the desired actor channel with the buttons <▲>/<▼> and switch it on and off with the buttons <+>/<->. The number of actors or pages displayed depends on the settings in "Setup". A short press on the button <Pr> leads to the Menu, a long press on the button <Pr> causes return to "Monitor".

Net tying

Manual diagnosis →

Desired actor channel →

Diagnosis actors		1 / 1
manual		
valve A	++	P valve --
valveA1	--	Net clut --
valveA2	--	
valveA4	--	

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Twine tying

Manual diagnosis →

Desired actor channel →

Diagnosis actors		1 / 1
manual		
valve A	++	P valve --
valveA1	--	
valveA2	--	
valveA4	--	TwineMot --

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The following symbols are used for the actor status:

Symbol	Actor status
++	Actor is activated and current is flowing
+	Actor is activated, but no current is flowing (attention: fault, e.g. actor channel defective)
-	Actor not activated, current is flowing (attention: fault, e.g. short circuit to chassis)
--	Actor not activated and no current flowing

A short press on the button <**START/STOP**> toggles Automatic and Manual. In the Automatic mode all channels are automatically activated and tested in succession.



Attention! In case of automatic diagnosis the pickup can lower.

Net tying

Automatic diagnosis

Diagnosis actors		1 / 1	
automatic			
valveA	✓	P valve	✓
ValveA1	✓	Net clut	✓
ValveA2	✓		
valveA4	✓		

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Twine tying

Automatic diagnosis

Diagnosis actors		1 / 1	
Automatic			
MagA	✓	PVentil	✓
MagA1	✓		
MagA2	✓		
MagA4	✓	Twi Mot	✓

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The following symbols are used for the actor status:

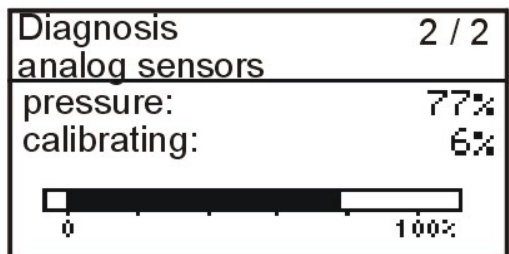
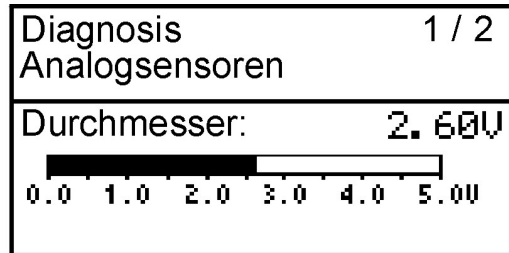
Symbol	Status
✓	Actor channel is OK.
⚡	Actor channel is faulty.

8.1.3 Analog sensor diagnosis

In the analog sensor diagnostic screen, the signals of the diameter potis and of the pressure sensor are displayed numerically and as a bar graph.

RP 420:0.5 volt (with chamber empty)








RP 520:0.45 Volt (with chamber empty)




8.2 Extended diagnosis







The Extended Diagnosis offers a possibility of observing sensor/actor screens during machine operation. It is called up by holding down the <Soft B> button in the menu and starting diagnosis by pressing the button <Pr>. A short press on the button <Pr> leads to the menu, a long press on the button <Pr> causes return to Monitor.


Net tying

Diagnosis				
Digital sensors				
Revol.		bottom		1753-77
Diameter		net knife.		
press.sw				
cutt.dev				

Symbol of the extended diagnosis
(Symbol  flashes)

Twine tying

Diagnosis				
Digital sensors				
Revol.		bottom		1753-214
Diameter				
press.sw				
cutt.dev				

Symbol of the extended diagnosis
(Symbol  flashes)

Operation of the Extended Diagnosis is absolutely identical to the standard diagnosis. Here, however, the operator has the function of an observer. Every intervention in machine operation, e.g. starting of the fully automatic actor diagnosis or switching of a selected actor channel, immediately terminates machine operation and thus the Extended Diagnosis.

Net tying

Diagnosis actors			
valve A	— —	P valve	— —
valveA1	— —	Net clut	— —
valveA2	— —		
valveA4	— —		










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Twine tying

Diagnosis actors			
valve A	— —	P valve	— —
valveA1	— —		
valveA2	— —		
valveA4	— —	Twine.mot.	— —

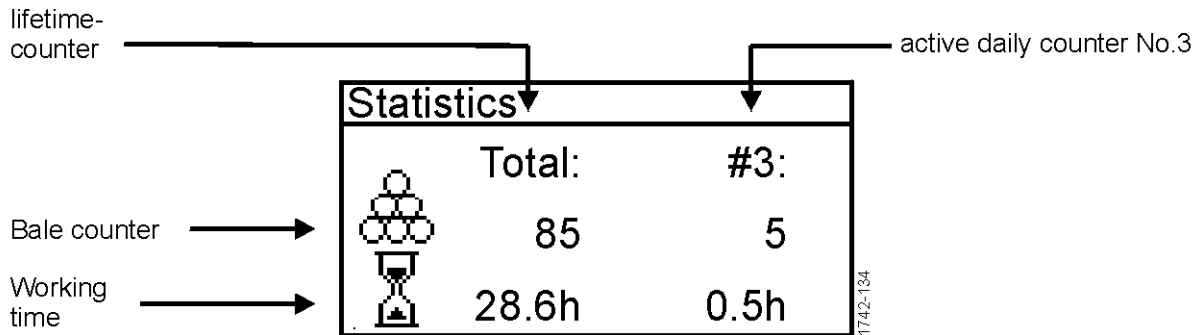
1753-215

8.3 Overview of the button functions in Diagnosis

Button	Function in Diagnosis
	Page backwards
	Call up scope
	Page forwards
	Toggleing between automatic and manual actor diagnosis.
	Actor channel On
	Actor channel Off
	Select actor
	Select actor
	Call up menu (3sec.:Monitor)

9 Statistics

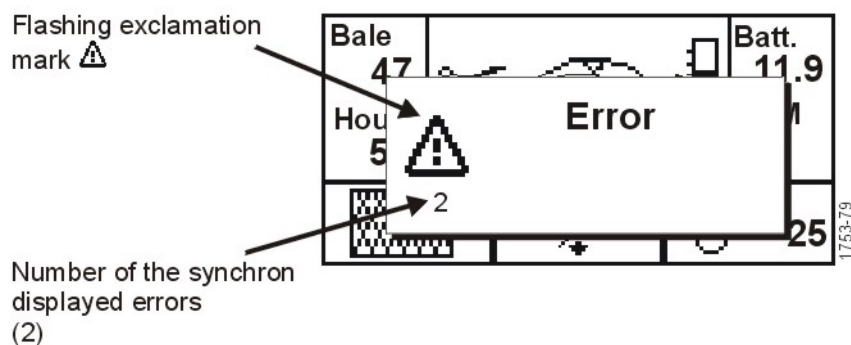
The statistics screen provides information about machine operation time and service life and day counters. The current software supports 20 day counters. They can be selected with the buttons <▲>/<▼> and deleted with a long press on the buttons <+> and <->. A short press on the button <Pr> leads to the menu, a long press on the button <Pr> causes return to Monitor.



Button	Function in Statistics
	Long press on button together with <-> deletes the current day counter
	Long press on button together with <+> deletes the current day counter
	Select day counter
	Select day counter
	Call up menu (3sec.:Monitor)

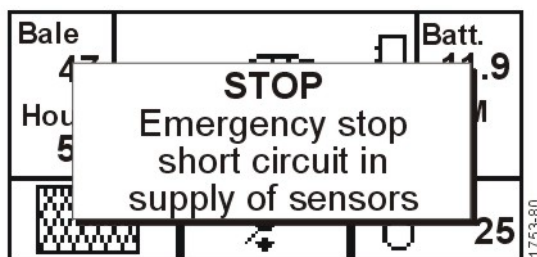
10 Error messages

Error messages are displayed in a separate window on top of the current screen. They can be removed only by pressing the button <▼>. This does not apply, however, to system errors. Error messages appear in all menus except standard diagnosis, since here no machine functions are running. If several errors occur simultaneously, the highest priority error message is displayed first.



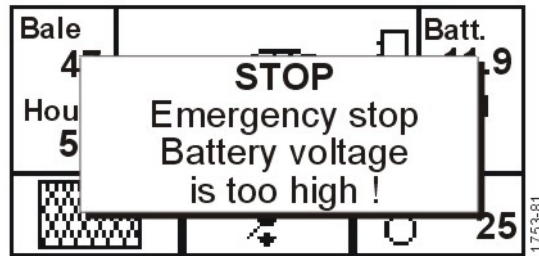
10.1 System error: Short circuit in supply of sensors

- In case of poor power supply, in case of short circuit or in case of overload in the sensor supply, the sensor and actor supply of the control unit is switched off, an error window is opened and a buzzer gives a permanent sound.
- System error messages cannot be removed by pressing the button <▼>.
- In case of system errors: Switch control system off (pull the power supply plug on the tractor). Then switch control system on again (reinsert power supply plug on the tractor).
- If the system error still occurs after switching the control system on again, please contact the customer's service.



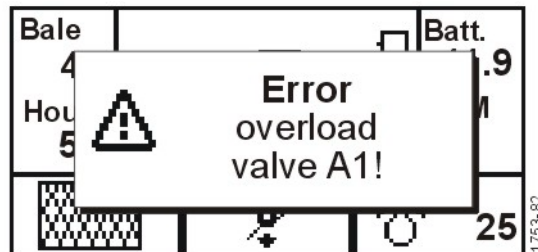
10.2 System error: Excess voltage in on-board power supply

- In case of excess voltage in the on-board power supply (battery voltage > 17Volt), the sensor and actor supply of the control unit is switched off, an error window is opened and the buzzer gives a permanent sound.
- System error messages cannot be removed by pressing the button <▼>.
- In case of system errors: Switch control system off (pull the power supply plug on the tractor). Then switch control system on again (reinsert power supply plug on the tractor).
- If the system error still occurs after switching the control system on again, please contact the customer's service.



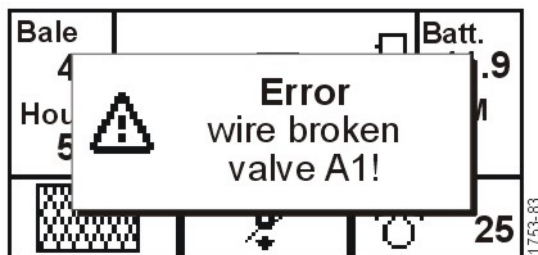
10.3 Error message: "Overload"

- An error has occurred which has caused overload of an output channel. The output has been switched off.
- The error message can be removed by pressing the button <▼>, the output remains, however, blocked until restart of the system (pull the power supply plug).



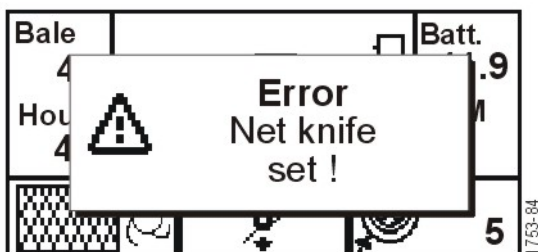
10.4 Error message: "Wire broken"

- A broken wire or a non-connected load has been recognized.
- The error message can be removed by pressing the button <▼> or disappears automatically when the load is connected again.



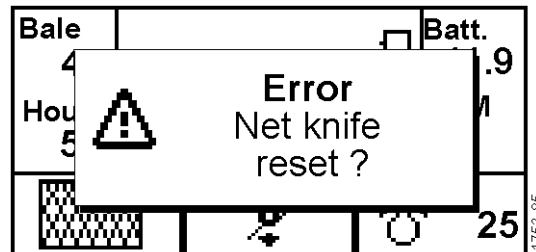
10.5 Error message: "Net knife set !"

- Automatic net wrapping should have been started, but the net knife sensor is not damped.
- After removal of the error message, net wrapping can be started manually (net knife sensor is ignored).



10.6 Error message: "Net knife reset ?"

- Manual net wrapping should have been started, but the net knife sensor is not damped.
- After removal of the error message, net wrapping can be started manually (net knife sensor is ignored).



10.7 Error message: "1 tailgate hook open"

- A locking hook is open.
- The error message can be removed by pressing the button <▼>, or disappears automatically when both locking hooks are open or both locking hooks are closed.



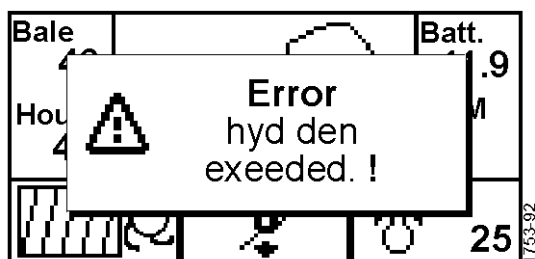
10.8 Error message: "no pressure increase!"

- No pressure is built up in the hydraulic tensioning system during baling.
- The error message can be removed by pressing the button <▼>.



10.9 Error message: "hyd den exeeded.!"

- After opening of the tail gate, hydraulic pressure is not released.
- The error message can be removed by pressing the button <▼>.

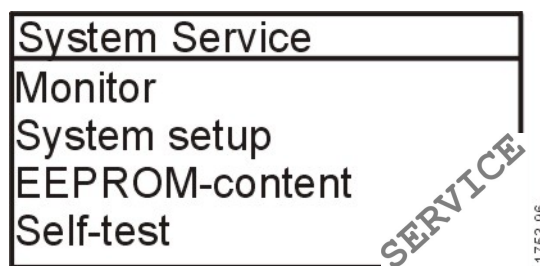


The following chapters are intended exclusively for trained and instructed service staff!

11 Appendix

11.1 System Service










The System Service menu is called up by a long press (about 10 sec.) on the button on switching-on of the system. This menu contains functions for first commissioning and/or machine servicing. Select the desired submenu with the buttons <▲>/<▼> and call it up with the button <Pr>.



The System Service menu provides the following functions:

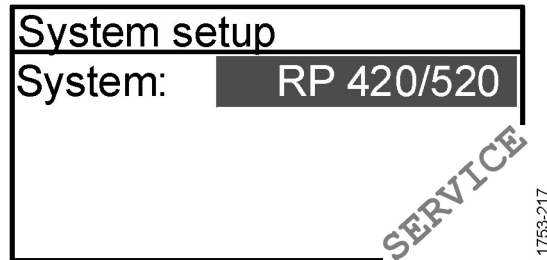
Menu item System Service	Function
Monitor	Terminates the System Service and starts the Monitor of the set machine family.
System setup	Machine family toggling, if several user interfaces are available.
EEPROM-content	Displays the contents of the nonvolatile memory (EEPROM).
Self-test	Self-test of the E-LINK control unit in connection with test equipment.

Overview of the button functions in the System Service:










Button	Function in System Service
 A	
 B	
 C	
	
	
	
	Select submenu
	Select submenu
 Pr	Call up menu

11.1.1 System Setup

Through the E-Link graphics interface it is possible to select the desired machine family from several machine families available. Using the buttons <+>/<-> in the System Setup you can toggle the machine families, if several user interfaces are available. The control software is selected by pressing the button <Pr>, which causes automatic jump to the Setup menu.



Overview of the button functions in System Setup:

Button	Function in System Setup
	
	
	
	
	Select machine family
	Select machine family
	
	
	Calling of SETUP of the desired machine family

11.1.2 EEPROM-Inhalt










For diagnostic purposes the contents of the nonvolatile memory (EEPROM) are displayed here in hexadecimal form. Scrolling of the displayed memory section is possible line by line with the buttons <+>/<-> and page by page with the buttons <▲>/<▼>. The button <Pr> leads back to the System Service.

```

EE-DUMP, Line: +/-, Page: Up/Down
0008: 50 50 50 50 00 00 00 00
0010: 23 23 23 23 00 00 00 00
0018: 00 00 00 00 00 00 00 00
0020: 01 01 01 01 00 0  . . .
0028: 02 02 02 02 28 2
0030: 00 00 00 00 C5 C
0038: 55 55 55 55 54 5
0040: 02 02 02 02 32 3
  
```

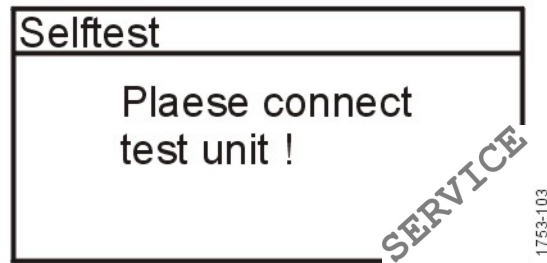
1753-102

Overview of the button functions in the EEPROM-Inhalt menu:










Button	Function in EEPROM-Inhalt
	
	
	
	
	Scroll up by one line
	Scroll down by one line
	Scroll down by one page
	Scroll up by one page
	Return to SYSTEM SERVICE

11.1.3 Self-test

A fully automatic self-test can be executed by means of test equipment specifically designed for this purpose. The self-test cannot be started without this test equipment, and is, therefore, not described here. The button <Pr> causes return to the System Service.



Overview of the button functions in the Selbsttest menu:

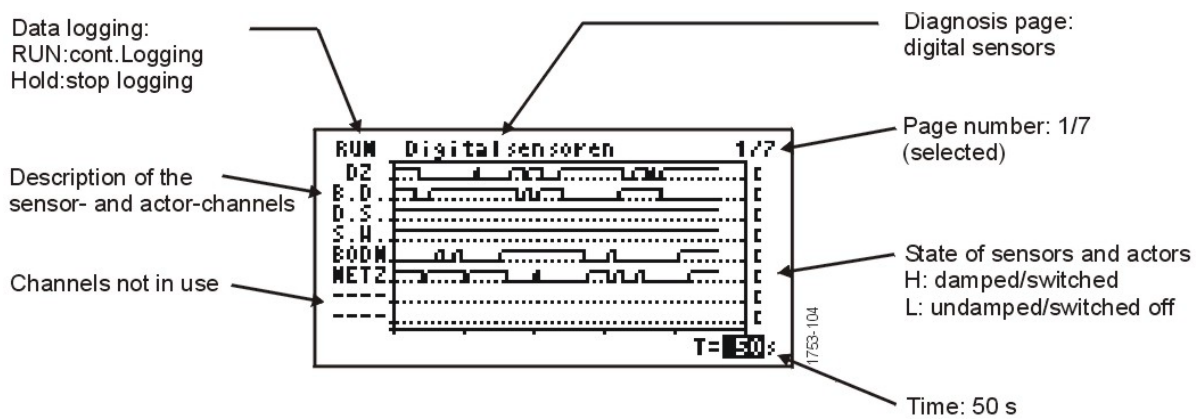
Button	Function in Self-test
 A	
 B	
 C	
	
	
	
	
	
 Pr	Return to SYSTEM SERVICE

11.2 Special diagnostic facility "Digital Scope"

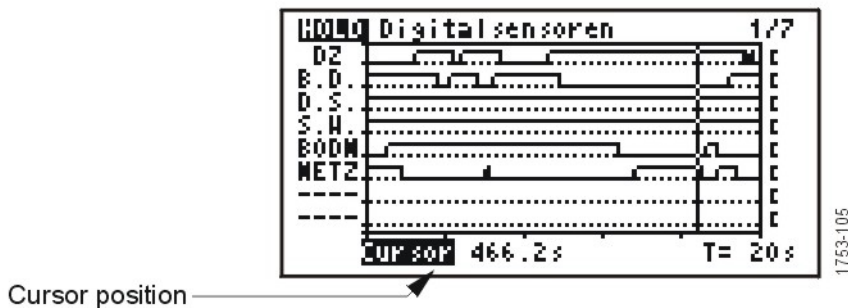
In the graphics version of the E-Link control unit, a digital scope is available for the machine control systems, in addition to the large number of diagnostic functions. By means of the digital scope it is possible to observe and analyze the status of all sensors and actors during the last 500 sec. Observation of all signals in real time is also possible. In every diagnostic screen, a press on the button opens the pertinent scope screen.

11.2.1 Digital Scope

The digital scope is used for the digital sensors and actors.



When recording has been stopped (HOLD mode), an additional CURSOR function is available.



List of the abbreviations used:









Net tying

Abbreviation Sensors	Channel designation Sensors	Abbreviation Actors	Channel designation Actors
DZ	Speed	A	Valve A
B.D.	Max. bale diameter	1 A	Valve A1
D.S.	Pressure switch	2 A	Valve A2
S.W.	Cutting device	4 A	Valve A4
BODN	Bottom door	NETZ	Net coupling
N.M.	Net knife		
V.L.	Locking device, left		
V.R.	Locking device, right		
BAW	Bale ejector		

Twine tying

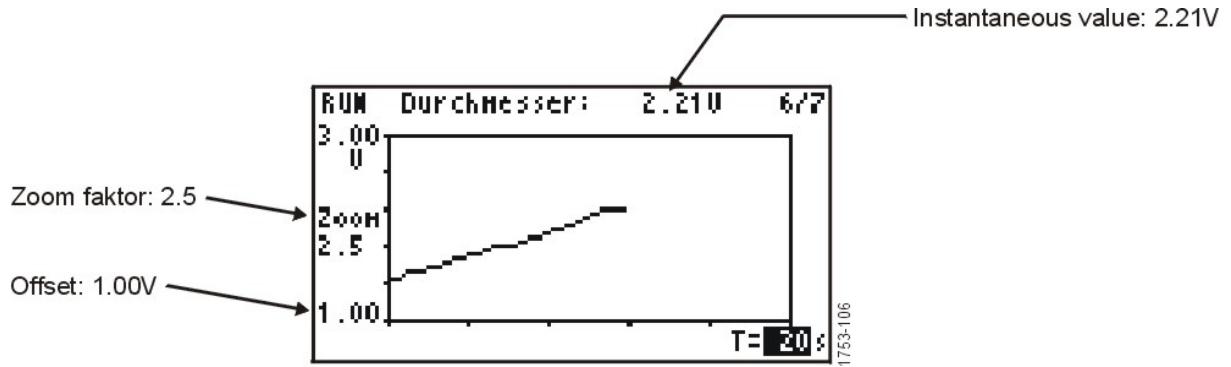
Abbreviation Sensors	Channel designation Sensors	Abbreviation Actors	Channel designation Actors
DZ	Speed	A	Valve A
B.D.	Max. bale diameter	1 A	Valve A1
D.S.	Pressure switch	2 A	Valve A2
S.W.	Cutting device	4 A	Valve A4
BODN	Bottom door	GARN	Twine motor
FA.L.	Twine run left		
FA.R.	Twine run right		
V.L.	Locking device, left		
V.R.	Locking device, right		
BAW	Bale ejector		

Overview of the button functions in the Digital Scope:

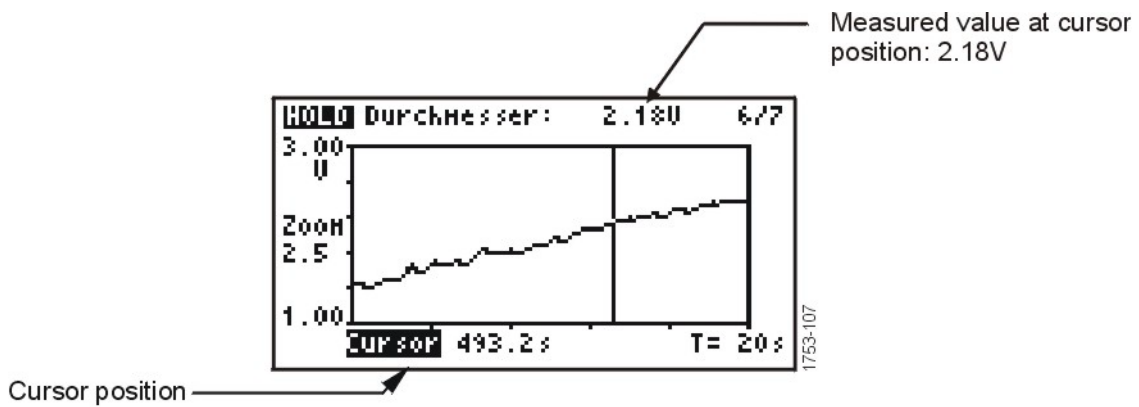
Button	Function in Digital Scope
	Page up
	Entry / exit scope
	Page down
	Toggling RUN/HOLD mode (start/stop recording)
	Increase selected scope parameters
	Reduce selected scope parameters
	Select scope parameters Options : - Page shown - Time window set (10s - 20s - 50s - 100s - 200s - 500s) - Cursor position (in HOLD mode only)
	Return to SYSTEM SERVICE

11.2.2 Analog Scope









The Analog Scope is used for diameter recording and pressure monitoring.




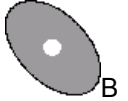
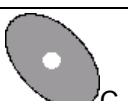

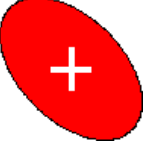
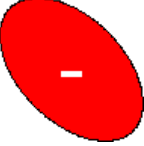



When recording has been stopped (HOLD mode), an additional CURSOR function is available.



Overview of the button functions in the Analog Scope:

Button	Function in Analog Scope
	Page up
	Entry / exit scope
	Page down
	Toggling RUN/HOLD mode (start/stop recording)
	Increase selected scope parameters
	Reduce selected scope parameters
	Select scope parameters Options : - Page shown - Time window set (10s - 20s - 50s - 100s - 200s - 500s) - Cursor position (in HOLD mode only) - Offset (0..90% measuring range) - Zoom factor (1x - 2.5x - 5x - 10x)
	Return to SYSTEM SERVICE

11.3 Button functions in summary

Button	Monitor	Menu	Setup	System info	Diagnosis	Scope	Statistics
	Toggle tying mode (Net manual - Net Automatic)		Page backwards		Page backwards	Page backwards	
	Toggle hydraulic valve block (Pickup - Bottom door - Cutting device)				Call up scope	Entry / exit scope	
	Toggle system presetting (Pressure Diameter)		Page forwards		Page forwards	Page forwards	
	Start selected tying mode				Toggling between automatic and manual actor diagnosis:	Toggling RUN/HOLD mode (start/stop recording)	
	Increase selected system presetting Pressure or Diameter		Change parameter		Actor channel On	Increase selected scope parameters	Long press on button together with <-> deletes the current day counter
	reduce selected system presetting Pressure or Diameter		Change parameter		Actor channel Off	Reduce selected scope parameters	Long press on button together with <+> deletes the current day counter
		Move selection bar up	Select parameter		Select actor	Select scope parameters	Select day counter
	"Remove" error message	Move selection bar down	Select parameter		Select actor	Select scope parameters	Select day counter
	Call up menu	Call up selected menu	Call up menu (3sec.: Monitor)	Call up menu (3sec.:Monitor)	Call up menu (3sec.:Monitor)	Return to SYSTEM SERVICE	Call up menu (3sec.: Monitor)