

Replaced by: Modif.-Nmb: Index: a Date:

Software Description

R902135651 DYNP100 V02.04

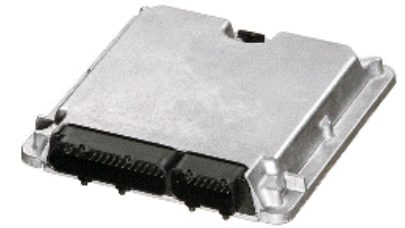
Customer: Dynapac

Machine: Paver 890, 891 (track), 896(wheel)

Control unit: RC8-8/22

BODAS-design: V3.0.15A, Compiler 2.3.9.26, Target RC8-8_22

Standard V1.4



Rexroth Controller RC

Contents

1	About this Document.....	3			
1.1	History.....	3			
1.2	Abbreviations.....	4			
1.3	Valid separate Documentation.....	5			
2	Basic Safety instructions	6			
2.1	Scope.....	6			
2.1.1	Conventional usage.....	6			
2.1.2	Safety Risks.....	7			
2.2	Basic conditions.....	7			
2.2.1	Usage of the information in this document.....	7			
2.2.2	Operating conditions and limits.....	7			
2.2.3	Installation und Commissioning.....	7			
2.2.4	Repair and service.....	8			
3	Safety requirements at the machine.....	9			
3.1	General considerations.....	9			
			3.2	Safety function related considerations.....	10
			3.3	Measures to reduce the risk without the control unit.....	10
			3.3.1	Measures defined in the risk analysis.....	10
			3.3.2	Additional measures.....	10
4	Functional description	11			
4.1	General.....	11			
4.2	Connector.....	11			
4.3	Operational States.....	11			
5	Diagnostic Tool BODAS-service	12			
5.1	Process data.....	12			
5.2	Parameter.....	16			
5.3	Diagnosis.....	31			
6	General Settings	39			
6.1	Preparation.....	39			
6.2	Optionally: single Lever and Potentiometer Calibration.....	39			

Replaced by:	Modif.-Nmb:	Index: a	Date:
6.2.1	Drive Lever (joystick)	39	
6.2.2	Drive Limit Potentiometer	40	
6.2.3	Steering	40	
6.2.4	Trim Potentiometer	40	
			6.2.5 Throttle Potentiometer
			6.3 Password for Cummins torque configuration
			6.4 Optionally: Save Parameters in a file on PC/Laptop
			7 Optional settings
			43

Replaced by:

Modif.-Nmb:

Index: a

Date:

1 About this Document

History

Tabelle 1: History

Version	Date	Author	Description
V1.0	2009-12-21	Rueckert DCH/SAE1	initial release
V1.1	2011-04-01	Hermann, DC-MA/EMF2	Update according to software version DYNP100 v1.10
V1.2	2011-06-07	Rückert DC-MA/EMF2	Update according to software version DYNP100 V1.11
V1.3	2011-06-09	Rückert DC-MA/EMF2	Update according to software version DYNP100 V1.12
V1.4	2012-01-02	Rückert DC-MA/EMF2	Update according to software version DYNP100 V1.16

Replaced by:

Modif.-Nmb:

Index: a

Date:

Abbreviations

Tabelle 2: Abbreviations

Abbreviation	Description
RC	Rexroth Controller
EOL	End of Line Test
ECU	Electronic Control Unit
SBE	Software description
ASB	Schematic
DRCE	Software type Drive Control EP
EP	Electronic Proportional Control
CAN	Controller Area Network

Replaced by:

Modif.-Nmb:

Index: a

Date:

Valid separate Documentation

Tabelle 3: Valid separate Documentation

Reference	Document	Contents
1	RE95202_2009-03	data sheet RC controllers
2	RE95086	data sheet BODAS-service Diagnostic Tool
3	RE90300-01-B	Data sheet Installation notes for electronic control
4	02135655_Stand_10_12_09_a_1.pdf	Schematic
5	PH-DYNP100_V1_3.pdf	specification
6		

Replaced by:

Modif.-Nmb:

Index: a

Date:

2 Basic Safety instructions

Scope

The document describes the functions of the control unit.

Conventional usage

The control unit together with the application software is used at the machine for the following main functions:

- Electro hydraulic control of the drive transmission
- Electro hydraulic control of the implement hydraulic

The detailed functions are described in Chapter 4 "Functional description"

The machine has the following characteristics and is used on the following conditions and limitations:

mass:

paver type1 16500kg..29500kg

paver type2 16500kg..29500kg

tracked drive: max.4km/h

wheeled drive: max. 15km/h

Emergency circuit: Hardware with well-tried electro-mechanic components (without redundancy), no electronic components are used in emergency circuit .

So there is no need to use EN ISO 13849 for this emergency circuit.

Safe state: standstill

Replaced by:

Modif.-Nmb:

Index: a

Date:

Safety Risks

DANGER

Risk of injury or death!

Due to wrong installation or incorrect usage of the control unit, the machine may move unintentionally also possibly in the wrong driving direction.

- ▶ Adequate installation of the wiring and correct usage of the control unit has to be assured.

Basic conditions

Usage of the information in this document

The document is the basis for the instruction manual of the machine, it has to be used for the adjustments at the end of production line and is has to be used for service at the machine in the field.

Bosch Rexroth assumes that only people that are adequately trained are using the information in the document. In case of doubts about the meaning of the information it is necessary to consult Bosch Rexroth before continuing using this information.

Operating conditions and limits

The control unit and the application software described in this document may only be used in machines described in Chapter 2 Basic Safety instructions“ with the defined operating conditions and limits.

Installation und Commissioning

DANGER

Replaced by:

Modif.-Nmb:

Index: a

Date:

Risk of injury or death !

During the commissioning unintended movement of the machine may happen.

Before running the engine ensure the following measures:

- ▶ There is nobody in the dangerous area around the machine
- ▶ All components are adequately installed
- ▶ All settings for the control unit has been performed carefully.

The control unit has to be wired by a short, low-resistance connection from a housing screw to the unit or vehicle ground. See „Valid separate Documentation“ Reference 3 Data sheet Installation notes for electronic control and 4 schematic.

All connectors must be unplugged from the control unit during any welding operation.

Repair and service

After repairing or service at the machine the machine functions have to be tested.

Replaced by:

Modif.-Nmb:

Index: a

Date:

3 Safety requirements at the machine

The following items have to be fulfilled to maintain functional safety according to DIN EN ISO 13849: 2008.

General considerations

The safety instructions in the RE sheet of the control unit and the installation notes have to be followed. See „Valid separate Documentation“ Reference 1: RE sheet, Reference 3: Data sheet Installation notes for electronic control and Reference 4: Schematic.

The control unit has to be operated in intermittent operating mode with a maximum operating time of 10h without switching off ignition. After that time latest, the control unit has to start up after power interruption so that the power on tests can be executed.

After modifications at safety functions or components related to safety functions a validation of the correct and safe functions must be performed and documented. This is also valid in case of parameter modifications that are influencing safety functions. See Chapter 0 Parameter

The operators, service and repair staff at the end user of the machine has to be informed about the safety functions and needs to be informed that no modifications are allowed that mute or modify the behaviour of safety functions .

The machine producer is responsible to inform the machine operator about all necessary measures that are related to safety relevant functions. (e.g. within the machine manual)

The environmental conditions and other restrictions defined in the datasheets of the used components have to be ensured. See „Valid separate Documentation“ Reference 1: RE sheet.

Defect control units and sensors have to be replaced and may not be repaired.

If the operator directly or via the control unit detects a failure, the replacement of the faulty component must be within 10 hours.

Replaced by:

Modif.-Nmb:

Index: a

Date:

Safety function related considerations

In the following list an overview of all realized safety function for the machine can be found:

Attention: Safety functions that are not influenced by the control unit are not listed below and measures regarding these functions are not mentioned. Therefore this list is NOT complete relating to the overall machine functions.

There are no safety functions in the software DYNP100.

Measures to reduce the risk without the control unit

Measures defined in the risk analysis

none

Additional measures

none

Replaced by:

Modif.-Nmb:

Index: a

Date:

4 Functional description

General

After first switching-on:

See chapter general settings.

Connector

See "Valid separate Documentation", Reference 4 „Wiring schematic“.

Operational States

Start condition after switching-on of supply voltage:

joystick in neutral position

counterrotation is allowed if

switch work on

and switch counterrotation on

and joystick in neutral position

The machine is set to standstill if switch counterrotation is set to on during driving.

Replaced by:

Modif.-Nmb:

Index: a

Date:

5 Diagnostic Tool BODAS-service

The general functions of BODAS-service are described in „Valid separate Documentation“ Reference 2: BODAS-service Diagnostic Tool. Use the online help of BODAS-service to get a complete overview of all functions and their handling. Choose in the menu help the item BODAS-service Diagnosis.

Short form: Menu → Help → Help → BODAS-service Diagnosis

Process data

BODAS-service: Available ECUs → ECU → Processdata → All Processdata

Tabelle 4: Process data

Set 1: Hall Units/Potis		
Process Value	Unit	Description
1 Drive lever	V	joystick (direction: backward about 0,5V..forward about 4,5V) pin76
2 Drive Limit Poti	V	drive limit (0..5V) pin62
3 Steering	V	steering (direction: right about 0,5V..left about 4,5V) pin55
4 Trim	V	steering trim (0..5V) pin68
5 Drive lever	bit	0..1000bit related to calibration of mechanically used potentiometer range
6 Drive Limit Poti	bit	0..1000bit related to calibration of mechanically used potentiometer range
7 Steering	bit	0..1000bit related to calibration of mechanically used potentiometer range
8 Trim	bit	0..1000bit related to calibration of mechanically used potentiometer range

Set 2: States		
Process Value	Unit	Description

Replaced by:

Modif.-Nmb:

Index: a

Date:

1 Drive State	NEUTRAL (16#0000); (* drive lever neutral, wait to allow backwd*) FORWARD (16#0003); (* drive lever forward, forward driving *) BACKWARD (16#0006); (* drive lever forward, forward driving *) COUNTER_ROTATE (16#0009); (* counterrotation, forces work mode *) COUNTER_ROTATE_TO_NEUTRAL (16#000C); (* counterrotation to neutral ramp *) AUTOCALIB_PUMPS (16#000F); (* pump autocalibration in progress *)
2 Auto Calib Pump Currents state	CALIB_LEFT_FORWARD (16#0000); CALIB_RIGHT_FORWARD (16#0003); CALIB_LEFT_BACKWARD (16#0006); CALIB_RIGHT_BACKWARD (16#0009); CALIB_SUCCESS (16#000C); (* auto calibration of pump imin finished, success *) CALIB_FAILURE (16#000F); (* auto calibration of pump imin finished, failure *) CALIB_SAVE (16#0030); (* auto calibration of pump, save lmins *)
3 Distance sensor	sensor paver stop, input pin7
4 Counterrotation	driving: 0; counterrotation: 1 input pin11
5 Transport	work: 0; transport: 1 input pin38
6 Wheel	track(16#0000), wheel(16#0007)
7 Engine torque code	from RC generated code to put into PC-tool
8 Engine torque	engine torque: 100% means full torque

Set 3: Engine		
Process Value	Unit	Description
1 Throttle	V	steering trim (0..5V) pin61
2 Throttle	bit	0..1000bit related to calibration of mechanically used potentiometer range
3 Set Engine Speed	rpm	nominal engine speed
4 Act.Engine Speed	rpm	actual engine speed
5 D plus		D+ engine generator Pin64
6 battery voltage	V	battery voltage
7 voltage after central switch	V	voltage after central switch
8 5V sensor voltage	V	5V sensor voltage

Replaced by:

Modif.-Nmb:

Index: a

Date:

Set 4: Speed		
Process Value	Unit	Description
1 ---		
2 ---		
3 Steer Corr left		steer controller correction left, quicker track will be reduced
4 Steer Corr right		steer controller correction right, quicker track will be reduced
5 Set Speed Mean Value	m/min	nominal paver mean speed
6 Front wheel drive		Ouput pin35 on/off, Ventil Y52
7 Free Wheeling output		Ouput pin4 on/off, Ventil Y45, Y46 und Y53
8 Output vibration	mA	actual proportional output pin43

Set 5: Pumps		
Process Value	Unit	Description
1 Pump left forwd.	%	0..100% proportional output
2 Pump left backwd.	%	0..100% proportional output
3 Pump rechts forwd.	%	0..100% proportional output
4 Pump rechts backwd.	%	0..100% proportional output
5 Pump left forwd.	mA	actual proportional output pin42, 78
6 Pump left backwd.	mA	actual proportional output pin29, 78
7 Pump rechts forwd.	mA	actual proportional output pi15, 72
8 Pump rechts backwd.	mA	actual proportional output pin3, 72

Set 6: Motors/Brake/Clutch		
Process Value	Unit	Description
1 ---		

Replaced by:

Modif.-Nmb:

Index: a

Date:

2 ---		
3 Work		transport: 0, motors on vgmin; work: 1, HA override, motors on vgmax, output pin47
4 Brake release		closed: 0; applied: 1 output pin46
5 Clutch 1		open: 0; closed: 1 output pin31
6 Clutch 2	%	0..100% proportional output
7 Output tamper	mA	actual proportional output pin30
8 Idle time	ms	

Set 7: Tamper/Vibration		
Process Value	Unit	Description
1 Tamper target	rpm	nominal value
2 Tamper act	rpm	actual speed Pin20
3 Vibration Target	rpm	nominal value
4 Vibration act	rpm	actual speed Pin 13
5 Input Tamper Auto		0=Off; 1=ON
6 Input Tamper manu		0=Off; 1=ON
7 Input Vibration Auto		0=Off; 1=ON
8 Input Vibration manu		0=Off; 1=ON

Replaced by:

Modif.-Nmb:

Index: a

Date:

Parameter

BODAS-service: Available ECUs → ECU → Parameter → Parameter display/edit

Tabelle 5: Parameter

Menu 1: Configuration/Calibration

1 Machine Setting							
Parameter	Unit				Range	Description	Level
1 Paver Type		F2500C	F2500CS	F2500W	F2500C, F2500CS, F2500W	set paver type 1,2 (track) or A(wheel) ATTENTION! change of Paver Type will set ALL parameters to default as defined for this type, so a calibration has to be done afterwards!	-
2 front wheel drive	on/off	OFF	OFF	OFF	OFF, ON	Enable/Disable front wheel drive	-
3 ---							-
4 ---							-
5 ---							-
6 ---							-
7 Vibration motor		Parker	Parker	Parker	Parker, Bosch		-
8 CAN Test output On		OFF	OFF	OFF	OFF, ON	switch CAN1 auxiliary output on or off	-

2 Pump							
Parameter	Unit				Range	Description	Level
1 Pump Left Forw.lmin	mA	180	180	180	150 - 400	pump minimum current	-
2 Pump Left Forw.lmax	mA	620	620	620	500 - 650	pump maximum current	-
3 Pump Left Backw.lmin	mA	180	180	180	150 - 400	pump minimum current	-
4 Pump Left Backw.lmax	mA	620	620	620	500 - 650	pump maximum current	-
5 Pump Right Forw.lmin	mA	180	180	180	150 - 400	pump minimum current	-

Replaced by:

Modif.-Nmb:

Index: a

Date:

6 Pump Right Forw.lmax	mA	620	620	620	500 - 650	pump maximum current	-
7 Pump Right Backw.lmin	mA	180	180	180	150 - 400	pump minimum current	-
8 Pump Right Backw.lmax	mA	620	620	620	500 - 650	pump maximum current	-

3 Pump Test

Parameter	Unit				Range	Description	Level
1 ---							-
2 ---							-
3 ---							-
4 ---							-
5 ---							-
6 ---							-
7 ---							-
8 Pump Motor Test Engine off	on/off					Muting of second start condition: If engine is off and engine speed <50rpm will be received via J1939 by RC AND this parameter is on THEN works drive lever forward / backward on pump and motor currents	-

4 Speed

Parameter	Unit				Range	Description	Level
1 Pump speed max	m/h	1950	1920	4850	100 - 10000	paver speed at maximum pump displacement	A
2 Work max.Speed	m/min	30	30	30	10 - 35	work: maximum paver speed	A
3 Transp. max.Speed	m/h	4007	3970	15000	3000 - 20000	transport: maximum paver speed	A
4 Rev max.speed	m/min	20	20	80	20 - 100	maximum backward speed (for wheel only)	A

Replaced by:

Modif.-Nmb:

Index: a

Date:

5 Drive limit poti min		50	50	50	0 - 500	drive limit factor at minimum limit poti position	A
6 Mech.Gear ratio * 10000		8214	8230	30102	5000 - 32000	mechanical gear ratio	A
7 Corr * 1000		1000	1000	1000	800 - 1200	speed correction factor	A
8 Counter.Rot.Limit	%	75	75	75	30 - 100	maximum counterrotation speed related to pump	A

5 Brake, Clutch

Parameter	Unit				Range	Description	Level
1 Brake open delay	ms	50	50	50	50 - 500	delay to open brake before driving	A
2 Brake close delay	ms	1000	1000	1000	1000 - 5000	delay to close brake after driving	A
3 Clutch 1 speed	rpm	900	900	900	100 - 1200	engine speed to close clutch 1	C
4 Clutch 2 speed	rpm	950	950	950	100 - 1200	engine speed to start clutch 2 delay	C
5 ---							-
6 Clutch 2 ramp up	ms	4500	4500	4500	100 - 6000	ramp from lmin to lmax of clutch 2	C
7 Clutch 2 lmin	mA	50	50	50	50 - 550	clutch 2 minimum current	C
8 Clutch 2 lmax	mA	950	950	950	500 - 1000	clutch 2 maximum current	C

6 Calibration

Parameter	Unit				Range	Description	Level
1 Calib. Driving lever	V					calibration of minimum and maximum voltage for drive lever joystick (direction: backward about 0,5V..forward about 4,5V)	-
2 Calib.Driving mid	V					calibration of neutral joystick position voltage	-
3 Calib. Drive limit poti	V					calibration of minimum and maximum voltage for drive limit potentiometer	-

Replaced by:

Modif.-Nmb:

Index: a

Date:

4 Calib.Steer.	V					calibration of minimum and maximum voltage for steering (direction: right about 0,5V..left about 4,5V)	-
5 Calib. Steer. mid	V					calibration of straight steering voltage	-
6 Calib. Trim poti	V					calibration of minimum and maximum voltage for steering trim potentiometer	-
7 Calib. Trim mid	V					calibration of straight trim potentiometer	-
8 Calib. Throttle poti	V					calibration of minimum and maximum voltage for throttle potentiometer	-

7 Driving

Parameter	Unit				Range	Description	Level
1 Drive Deathband	%	20	20	20	5 - 20	deathband of neutral position of drive joystick	-
2 Drive Filter Time	ms	200	200	200	50 - 500	drive joystick signal filter time	C
3 ---							-
4 Err Debounce Time Potis	ms	500	500	500	200 - 1000	error debounce time for joystick, drive limit and steering	C
5 Tolerance Red.Potis	%	8	8	8	5 - 20	allowed tolerance of redundancy signal	C
6 Backward Pump Delay	ms	0	0	400	0 - 5000	Pump backward delay in work mode after Joystick has be moved to backward direction	C
7 Backward Delay	ms	200	200	400	0 - 2000	forward driving, then delay to wait in neutral until backward driving is allowed	C
8 Drive Ramp Filter Time	ms	200	200	200	50 - 500	to smooth drive ramp	C

8 Driving Ramps

Parameter	Unit				Range	Description	Level
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Replaced by:

Modif.-Nmb:

Index: a

Date:

1 Work Pump Ramp up	ms	1000	1000	2000	200 - 8000	work: pump acceleration ramp	A
2 Work Pump Ramp down	ms	1200	1200	2000	200 - 8000	work: pump deceleration ramp	A
3 ---							-
4 ---							-
5 Transp.Pump Ramp up	ms	2250	2250	5000	200 - 8000	transport: pump acceleration ramp	A
6 Transp.Pump Ramp down	ms	2000	2000	3000	200 - 8000	transport: pump deceleration ramp	A
7 ---							-
8 Work start delay	ms	1200	1200	1200	200 - 2000	delay from driving start until setting of output DIGL_A4 (Pin36) to enable tamper, vibration	A

Menu 2: Steering, front wheel, Control

1 Steering

Parameter	Unit				Range	Description	Level
1 Steer.Deathband	%	10	10	10	5 - 20	deathband of straight steering position	A
2 Steer. Filter Time	ms	200	200	200	50 - 500	steering signal filter time	A
3 Steer.Curve		Normal	Normal	Normal	Smooth, Normal, Fast	steering effect related to steering wheel movement smooth: small steering at small steering wheel angle normal: linear steering related to steering wheel angle fast: big steering at small steering wheel angle	-
4 Trim Deathband	%	10	10	10	5 - 20	deathband of trim potentiometer	-
5 Aut.Steer.Deathband	%	10	10	10	2 - 10	deathband of straight external steering	C

Replaced by: Modif.-Nmb: Index: a Date:

6 Start Steer. Reduct.Mot.	%	20	20	20	10 - 30	motor reduction starts at this steering signal	C
7 End Steer.Reduct.Mot.	%	80	80	80	60 - 100	motor reduction ends at this steering signal	C
8 Value Steer. Reduct.Mot.	%	15	15	15	5 - 30	maximum reduction of motor displacement at previous parameter	C

2 ---

Parameter	Unit				Range	Description	Level
1 Delay Front wheel on	ms	0	0	2000	0 - 5000	Delay to switch on the front wheel output after freewheel output is switched on	C
2 Delay freewheel output off	ms	0	0	200	0 - 5000	Delay to switch off freewheel output after front wheel output has been switched off	C
3 ---							-
4 ---							-
5 ---							-
6 ---							-
7 ---							-
8 ---							-

3 ---

Parameter	Unit				Range	Description	Level
1 ---							-
2 ---							-
3 ---							-
4 ---							-
5 ---							-
6 ---							-
7 ---							-
8 ---							-

Replaced by:

Modif.-Nmb:

Index: a

Date:

4 Engine							
Parameter	Unit				Range	Description	Level
1 ---							-
2 Low idle	rpm	1000	1000	1000	500 - 1200	engine low idle speed	-
3 High idle	rpm	2200	2200	2200	1000 - 2200	engine high idle speed	-
4 Engine tamper start	rpm	1100	1100	1100	1100 - 1300		-
5 Code calculation	on/off	OFF	OFF	OFF	OFF, ON	OFF->ON edge starts code calculation	-
6 Torque password		500	500	500	0 - 1000	put in password from PC tool	-
7 ---							-
8 ---							-

5 ---							
Parameter	Unit				Range	Description	Level
1 ---							-
2 ---							-
3 ---							-
4 ---							-
5 ---							-
6 ---							-
7 ---							-
8 ---							-

6 ---							
Parameter	Unit				Range	Description	Level
1 ---							-
2 ---							-
3 ---							-
4 ---							-
5 ---							-
6 ---							-

Replaced by:

Modif.-Nmb:

Index: a

Date:

1 ramp accel min	ms	5000	5000	6000	1000 - 32000	maximum transport mode acceleration ramp at low speed	C
2 ramp accel mid	ms	5000	5000	5000	1000 - 32000	maximum transport mode acceleration ramp at medium speed	C
3 ramp accel max	ms	5000	5000	3000	1000 - 32000	maximum transport mode acceleration ramp at high speed	C
4 ramp accel delta min	ms	5000	5000	7500	1000 - 32000	transport mode acceleration ramp at slow lever movement	C
5 ramp accel delta max	ms	5000	5000	4000	1000 - 32000	transport mode acceleration ramp at fast lever movement	C
6 ---							-
7 ---							-
8 ramp mid	m/h	10000	10000	8000	1000 - 15000	defining medium speed for parameter 3.1.2	C

2 transport ramp decel							
Parameter	Unit				Range	Description	Level
1 ramp decel min	ms	5000	5000	2500	1000 - 32000	maximum transport mode deceleration ramp at low speed	C
2 ramp decel mid	ms	5000	5000	2500	1000 - 32000	maximum transport mode deceleration ramp at medium speed	C
3 ramp decel max	ms	5000	5000	2500	1000 - 32000	maximum transport mode deceleration ramp at high speed	C
4 ramp decel delta min	ms	5000	5000	2500	1000 - 32000	transport mode deceleration ramp at slow lever movement	C
5 ramp decel delta max	ms	5000	5000	2500	1000 - 32000	transport mode deceleration ramp at fast lever movement	C
6 dieselspeed over	rpm	2500	2500	2500	1000 - 4000	maximum allowed diesel speed for diesel protect function	C
7 factor diesel protect	rpm	700	700	700	100 - 1000	factor for deceleration, after diesel speed of parameter 3.2.6 has been exceeded	C

Replaced by:

Modif.-Nmb:

Index: a

Date:

8 ramp decel error stop	ms	3000	3000	5000	1000 - 32000	stop ramp in case of error	C
--------------------------------	----	------	------	------	-----------------	----------------------------	---

3 work ramp accel

Parameter	Unit				Range	Description	Level
1 ramp accel min	ms	5000	5000	3000	1000 - 32000	maximum work mode acceleration ramp at low speed	C
2 ramp accel mid	ms	5000	5000	3000	1000 - 32000	maximum work mode acceleration ramp at medium speed	C
3 ramp accel max	ms	5000	5000	3000	1000 - 32000	maximum work mode acceleration ramp at high speed	C
4 ramp accel delta min	ms	5000	5000	4000	1000 - 32000	work mode acceleration ramp at slow lever movement	C
5 ramp accel delta max	ms	5000	5000	2000	1000 - 32000	work mode acceleration ramp at fast lever movement	C
6 ---							-
7 ---							-
8 ramp mid		10000	10000	8000	1000 - 10000	defining medium speed for parameter 3.3.2	C

4 work ramp decel

Parameter	Unit				Range	Description	Level
1 ramp decel min	ms	5000	5000	1000	1000 - 32000	maximum work mode deceleration ramp at low speed	C
2 ramp decel mid	ms	5000	5000	1000	1000 - 32000	maximum work mode deceleration ramp at medium speed	C
3 ramp decel max	ms	5000	5000	1000	1000 - 32000	maximum work mode deceleration ramp at high speed	C
4 ramp decel delta min	ms	5000	5000	2000	1000 - 32000	work mode deceleration ramp at slow lever movement	C
5 ramp decel delta max	ms	5000	5000	1000	1000 - 32000	work mode deceleration ramp at fast lever movement	C

Replaced by: Modif.-Nmb: Index: a Date:

4 ---								-
5 ---								-
6 ---								-
7 ---								-
8 ---								-

8 ---

Parameter	Unit				Range	Description	Level
1 ---							-
2 ---							-
3 ---							-
4 ---							-
5 ---							-
6 ---							-
7 ---							-
8 ---							-

Menu 4: Tamper, Vibration

1 Tamper Vibration Calib

Parameter	Unit				Range	Description	Level
1 Calib. Tamper poti	V					calibration of minimum and maximum voltage for tamper poti (min about 0,5V..max about 4,5V)	-
2 Calib. Vibration poti	V					calibration of minimum and maximum voltage for vibration poti (min about 0,5V..max about 4,5V)	-
3 ---							-
4 ---							-
5 ---							-

Replaced by:

Modif.-Nmb:

Index: a

Date:

6 ---							-
7 ---							-
8 ---							-

2 Tamper Vibration Contr.

Parameter	Unit				Range	Description	Level
1 Tamper controller	on/off	ON	ON	ON		switch tamper controller on or off	-
2 Vibration controller	on/off	OFF	OFF	OFF		switch vibration controller on or off	-
3 Tamper Kp*100		1000	1000	1000	0 - 1000	tamper: proportional gain *100	C
4 Tamper Ki*100		150	150	150	0 - 1000	tamper: integral gain *100	C
5 Tamper Kd*100		0	0	0	0 - 1000	tamper: differential gain *100	C
6 Vibration Kp*100		100	100	100	0 - 1000	vibration: proportional gain *100	C
7 Vibration Ki*100		50	50	50	0 - 1000	vibration: integral gain *100	C
8 Vibration Kd*100		0	0	0	0 - 1000	vibration: differential gain *100	C

3 Tamper Precontrol

Parameter	Unit				Range	Description	Level
1 Tamper prectrl. 500rpm	bit	420	420	420	0 - 1000	tamper precontrol value at tamper speed	A
2 Tamper prectrl. 650rpm	bit	530	530	530	0 - 1000	tamper precontrol value at tamper speed	A
3 Tamper prectrl. 1000rpm	bit	690	690	690	0 - 1000	tamper precontrol value at tamper speed	A
4 Tamper prectrl. 1200rpm	bit	785	785	785	0 - 1000	tamper precontrol value at tamper speed	A
5 Tamper prectrl. 1500rpm	bit	970	970	970	0 - 1000	tamper precontrol value at tamper speed	A
6 Tamper min rpm	bit	500	500	500	200 - 500	min rpm for tamper	C
7 ---							-
8 Tamper freq filter time	ms	500	500	500	50 - 2000	filter for DI3 tamper speed value	A

Replaced by:

Modif.-Nmb:

Index: a

Date:

4 Vibration Precontrol							
Parameter	Unit				Range	Description	Level
1 Vibration prectrl. 500rpm	bit	180	180	180	0 - 1000	vibration precontrol value at vibration speed	A
2 Vibration prectrl. 650rpm	bit	210	210	210	0 - 1000	vibration precontrol value at vibration speed	A
3 Vibration prectrl. 1000rpm	bit	300	300	300	0 - 1000	vibration precontrol value at vibration speed	A
4 Vibration prectrl. 1500rpm	bit	400	400	400	0 - 1000	vibration precontrol value at vibration speed	A
5 Vibration prectrl. 2000rpm	bit	500	500	500	0 - 1000	vibration precontrol value at vibration speed	A
6 Vibration prectrl. 2500rpm	bit	600	600	600	0 - 1000	vibration precontrol value at vibration speed	A
7 Vibration prectrl. 3000rpm	bit	700	700	700	0 - 1000	vibration precontrol value at vibration speed	A
8 Vibration min rpm	bit	500	500	500	200 - 500	min rpm for vibration	A

5 Prectrl Engine adaption							
Parameter	Unit				Range	Description	Level
1 Tamper corr. engine 1600rpm	bit	80	80	80	40 - 100	tamper precontrol adaption at engine speed	A
2 Vibration corr. engine 1600rpm	bit	80	80	80	40 - 100	vibration precontrol adaption at engine speed	A
3 ---						compaction precontrol adaption at engine speed	-
4 LLC engine boost on		95	95	95	0 - 100		A
5 LLC engine boost off		85	85	85	0 - 100		A
6 LLC auger allowed droop		100	100	100	0 - 300	allowed engine droop before load limiting for auger and screed heating is working	A
7 LLC auger	on/off	ON	ON	ON		load limiting for auger, screed heating 2 sections on/off	A

Replaced by:

Modif.-Nmb:

Index: a

Date:

Steer Lever	0x8004	yes	steering signal redundancy error (direction: direction: left about 0,5V..right about 4,5V) pin141 does not fit with opposite signal at pin redundancy input pin231	steering middle, trimming possible and limp home 4m/min	no	check cable, pin55, 75 make a new calibration with BODAS-service
Trim	0x8005	yes	steering trim potentiometer value outside of calibrated value	no trimming possible	active error will be deleted if error condition is not true and joystick neutral	check cable, pin68 make a new poti calibration with BODAS-service
Throttle	0x8006	yes	throttle potentiometer value outside of calibrated value	full throttle, driving with limp home possible	active error will be deleted if error condition is not true and joystick neutral	check cable, pin61 make a new poti calibration with BODAS-service
Speed Sensor Left	0x8007		not used			
Speed Sensor Right	0x8008		not used			
Start Condition	0x8009	no	joystick not neutral at power on	no driving possible	active error will be deleted as soon as start condition is fulfilled	set joystick to neutral position before turning on ignition key

Replaced by:

Modif.-Nmb:

Index: a

Date:

Calib Pump Currents	0x800A	yes	automatic calibration of minimum pump currents fault	calibration not completed, currents not stored in EEPROM	no	turn ignition key off, wait 2s and then turn on again; try new calibration
Calib Potis Levers	0x800B	yes	calibration of potentiometers, levers fault	calibration not completed, currents not stored in EEPROM	no	turn ignition key off, wait 2s and then turn on again; try new calibration
Drive Limp	0x800C		not used			
Voltage low	0x800D	yes	voltage at ignition key <17V	warning	active error will be deleted if error condition is not true	fuse?
Voltage high	0x800E	yes	voltage at ignition key >30V	warning	active error will be deleted if error condition is not true	check battery voltage
Voltage after central switch off	0x800F	yes	voltage after central switch >4V when central switch is off	no driving possible	no	backward feeding of central switch due to a wiring harness failure
Voltage after central switch low	0x8010	yes	voltage after central switch <17V when central switch is on	warning	active error will be deleted if error condition is not true	central switch was switched off because of other errors or short circuit after central switch

Replaced by:

Modif.-Nmb:

Index: a

Date:

Voltage Sensor 5V low	0x8011	yes	5V sensor voltage <4,5V	no driving possible	active error will be deleted if error condition is not true	check sensor voltage pin 67 and cables, sensors, potentiometers
Voltage Sensor 5V high	0x8012	yes	5V sensor voltage >5,5V	no driving possible	active error will be deleted if error condition is not true	check sensor voltage pin 67 and cables, sensors, potentiometers
Voltage Sensor 8V low	0x8013	yes	8V sensor voltage <7,5V	warning	active error will be deleted if error condition is not true	check sensor voltage pin 51
Voltage Sensor 8V high	0x8014	yes	8V sensor voltage >8,5V	warning	active error will be deleted if error condition is not true	check sensor voltage pin 51
SYS check	0x8015	yes	internal fault of RC8-8/22	no driving possible	no	turn ignition key off, wait 2s and then turn on again

Replaced by:

Modif.-Nmb:

Index: a

Date:

CAN_1 Bus off	0x8016	yes	CAN_1 bus off, probably too many error frames	no communication with BODAS-design or BODAS-service possible	active error will be deleted if error condition is not true and joystick neutral	check cable and CAN H pin40, CAN L pin39 switch off ignition key and measure 60Ohm resistance between CAN_L and CAN_H
CAN_2 Bus off	0x8017	yes	CAN_2 bus off, probably too many error frames	no driving possible	active error will be deleted if error condition is not true and joystick neutral	check cable and CAN H pin26, CAN L pin25 switch off ignition key and measure 60Ohm resistance between CAN_L and CAN_H
CAN_2 engine EEC1	0x8018	yes	engine ECU is not working	no driving possible	active error will be deleted if error condition is not true and joystick neutral	check power of engine ECU
Pump left forwd.	0x8019	yes	solenoid faulty short circuit / broken solenoid or cable The fault can detected only if this proportional output feeds current trough the solenoid.	no forward driving possible after 0,8s	active error will be deleted if error condition is not true and joystick neutral	check cable, pin42, 78

Replaced by:

Modif.-Nmb:

Index: a

Date:

Pump left backwd.	0x801A	yes	solenoid faulty short circuit / broken solenoid or cable The fault can detected only if this proportional output feeds current through the solenoid.	no backward driving possible after 0,8s	active error will be deleted if error condition is not true and joystick neutral	check cable, pin29, 78
Pump right forwd.	0x801B	yes	solenoid faulty short circuit / broken solenoid or cable The fault can detected only if this proportional output feeds current through the solenoid.	no forward driving possible after 0,8s	active error will be deleted if error condition is not true and joystick neutral	check cable, pin15, 72
Pump right backwd.	0x801C	yes	solenoid faulty short circuit / broken solenoid or cable The fault can detected only if this proportional output feeds current through the solenoid.	no backward driving possible after 0,8s	active error will be deleted if error condition is not true and joystick neutral	check cable, pin3, 72
Clutch 1	0x801D		not used			
Clutch 2	0x801E		not used			

Replaced by:

Modif.-Nmb:

Index: a

Date:

Wheel differential disable	0x801F	yes	solenoid faulty short circuit / broken solenoid or cable The fault can detected only if this proportional output feeds current through the solenoid.	warning	active error will be deleted if error condition is not true and joystick neutral	check cable, pin32
Backward Beep	0x8020		not used			
Wheel brake light	0x8021		not used			
Brake release	0x8022		solenoid faulty short circuit / broken solenoid or cable	manually pumping of brake pressure necessary, then driving with limp home 4m/min possible	active error will be deleted if error condition is not true and joystick neutral	check cable, pin46
Work	0x8023		solenoid faulty short circuit / broken solenoid or cable	work speed only	active error will be deleted if error condition is not true and joystick neutral	check cable, pin47
Drive signal	0x8024		not used			
Tamper	0x8025	yes	solenoid tamper faulty short circuit / broken solenoid or cable		no	check cable, pin30
Vibration	0x8026	yes	solenoid vibration faulty short circuit / broken solenoid or cable		no	check cable, pin43

Replaced by:

Modif.-Nmb:

Index: a

Date:

Sensor tamper	0x8027	yes	no signal from sensor	controller will be switched off	no	check cable, pin 20
Sensor vibration	0x8028	yes	no signal from sensor	controller will be switched off	no	check cable, pin 13
tamper poti	0x8029	yes	tamper potentiometer value outside of calibrated value	value set to max	no	check cable, pin 59
vibration poti	0x802A	yes	vibration potentiometer value outside of calibrated value	value set to max	no	check cable, pin 65
Front wheel	0x802B	yes	solenoid faulty short circuit / broken solenoid or cable. The fault can detected only if this output feeds current trough the solenoid.	Front wheel drive deactivated	active error will be deleted if error condition is not true and joystick set to neutral	check cable, pin 35, Valve Y52

Replaced by:

Modif.-Nmb:

Index: a

Date:

6 General Settings

Preparation

1. Ignition off
2. joystick in neutral position
3. Laptop with diagnosis cable is connected to CAN_1 plug
4. start BODAS-service diagnosis tool
5. Ignition on → controller powers up



6. scan for controller

7. Select ECU and confirm

Optionally: single Lever and Potentiometer Calibration

ATTENTION Be sure nobody is near the machine before this parameter is set to ON! Diesel engine off!

Drive Lever (joystick)

1. ECU → Parameter → Parameter configuration: Select by double click:
Parameter: <1 Menu><1.6 Calibration><1.6.1 Calib. Driving lever>
2. start adjustment with
3. set drive lever to minimum position=**backward** →
4. set drive lever to maximum position=**forward** →

Replaced by: Modif.-Nmb: Index: a Date:

5. ECU → Parameter → Parameter configuration: Select by double click:
6. Parameter: <1 Menu><1.6 Calibration><1.6.2 Calib.Driving mid>
7. start adjustment with
8. set drive lever to neutral position →

Drive Limit Potentiometer

9. ECU → Parameter → Parameter configuration: Select by double click:
Parameter: <1 Menu><1.6 Calibration><1.6.3 Calib. Drive limit poti>
10. start adjustment with
11. set drive limit potentiometer to minimum position →
12. set drive limit potentiometer to maximum position →

Steering

13. ECU → Parameter → Parameter configuration: Select by double click:
Parameter: <1 Menu><1.6 Calibration><1.6.4 Calib.Steer. >
14. start adjustment with
15. set steering to minimum position=**right** →
16. set steering to maximum position=**left** →

17. ECU → Parameter → Parameter configuration: Select by double click:
18. Parameter: <1 Menu><1.6 Calibration><1.6.5 Calib. Steer. mid >
19. start adjustment with
20. set steering to straight position →

Trim Potentiometer

21. ECU → Parameter → Parameter configuration: Select by double click:
Parameter: <1 Menu><1.6 Calibration><1.6.6 Calib. Trim poti>

Replaced by: Modif.-Nmb: Index: a Date:

7. ECU → Processdata → All Processdata: Select by double click
check Processdata: <1.3 States><1.3.8 Engine torque> should be 100 to enable full torque

Use **Save** to EEPROM to store adjustment data

Optionally: Save Parameters in a file on PC/Laptop

For each vehicle the parameters set can be saved by BODAS-service in a file on PC/Laptop after parameterization (adjustment, etc.). This way it is possible to exchange the controller of a vehicle without being forced to start the complete adjustment procedure again.

Saving of Parameter set:

8. All input signals are set to neutral position
9. **Controller → PC** activate saving of EEPROM
10. define file name (e.G. 0001.EPR)
11. **Save** start file transfer from controller to PC/Laptop

The parameter set of the actual vehicle is saved now

Restoring of a parameter set::

1. all input signals are set to neutral position
2. **PC → Controller** activate restoring of EEPROMs and confirm with **Yes**
3. select EPR file according to vehicle (e.g. 0001.EPR)
4. **Open** start data transfer from PC/Laptop to the Controller

The parameter set is now restored for the actual vehicle.

Replaced by:

Modif.-Nmb:

Index: a

Date:

7 Optional settings

none

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- Operation of the software must generally not exceed the operating ranges specified.
- Usage outside of the specified and released boundary conditions may result in danger to life and/or cause damage to components or to the complete system.
- Damages which result from improper use and/or from unauthorized, unintended interventions in the device not described in this data sheet render all warranty and liability claims with respect to the manufacturer void.

Date**Name****Edited / checked:****Seen:**