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OPERATING INSTRUCTIONS

Control
RC 20

for pneumatic machines 081-331

Contents

1 Introduction

We are certain that you have made the right choice with our product and thank you for your trust.

For your personal safety

Before carrying out any activities on or with the control unit, please carefully read these operating instructions first, in particular the chapter on "Safety regulations".

Application area of these operating instructions

These operating instructions describe the control unit and provide all information required for safe operation and maintenance of functionality. Please keep these operation instructions available at all times for all persons involved with the riveting machine.

Questions or unclear points

Please contact immediately if you have any questions or unclear points:

- BalTec Maschinenbau AG, Obermattstrasse 65 CH – 8330 Pfäffikon ZH
- BalTec – distributors (see representatives list in the appendix)

Please provide them with the document and page numbers located in the footer and the machine number listed on the title page of operating instructions.

Original language of assembly instructions

These assembly instructions was originally written in German language.

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2 Safety regulations

2.1 Introduction

The control unit may only be operated by qualified and appropriately trained personnel for safety reasons.

2.2 Information and symbols

2.2.1 Warning and safety notices

The warning and safety notices used in these operating instructions have the following significance:

	⚠ CAUTION
	Indicates a hazard with **low** risk which, if not avoided, could result in minor or moderate injury.

	⚠ WARNING
	Indicates a **possible** hazard with **medium** risk which, if not avoided, **could** result in death or serious injury.

	⚠ DANGER
	Indicates an **immediate** hazard with **high** risk which, if not avoided, **will** result in death or serious injury.

NOTICE
Indicates practical information and tips that permit the best use of machinery, system or equipment.

CAUTION
To warn of material damage.

2.3 Safety measures

⚠ CAUTION

Activation of riveting process with foot switch or pulse signal!

Danger of hand injuries!

The operator has to take safety measures against the intervention in danger area (e.g. separative protection device)!

3 Product description

3.1 Introduction

The **riveting machine RC 20 control unit** is a control unit designed for the operation of BALTEC radial riveting machines.

The control unit is modular and can be modified according to the applications for the following riveting machines:

- Pneumatic riveting machines (single or double riveting machine)
- Hydraulic riveting machines (single or double riveting machine)

3.2 Details RC 20 control unit

The RC 20 control unit is equipped with a modern operating and display interface (Man-Machine Interface MMI).

All operations, settings and information required for the operation of the riveting machine are accessible via this user interface.

Item	Name
1	Display (main menu)
2	Softkeys
3	Main switch

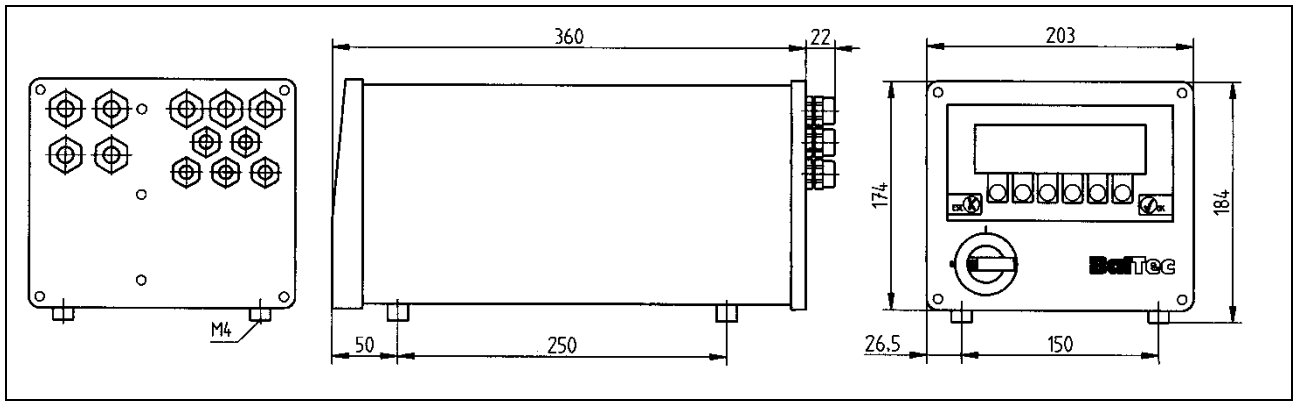
The base unit comprises:

- The housing
- The power supply module
- The processor module
- The control module
- Contactor modules
- The MMI (Man-Machine-Interface), comprising the main switch, keyboard and display

The base unit can be equipped with the following modules depending on the applications:

- Safety modules
- Proportional valve controller for hydraulic riveting machines (current chopper)

3.3 Dimensions drawing RC 20 control unit



3.4 Technical specifications RC 20 control unit

Construction	Al-housing, powder-coated, colours red/anthracite. Internal local separation between power and control section
Degree of protection	IP54
Cable entry	At the rear via cable glands
Power supply	Three-phase 50/60 Hz Terminals L1, L2, L3, PE Connectable wire cross-section, max. 4mm^2 Can be disconnected across all poles with lockable main switch Voltage group 1: 120/230/400/440 V Voltage group 2: 200/346/480/575 V Max. fuse rating of supply lead 16A Primary/secondary galvanically isolated 4kV
Connection	See applicable diagram on machine Connection cable with wire cross-section 1.5mm^2 as per VDE 0100
Fuses	Internal fine-wire fuses 5x20mm 12 VAC F1 = 1.6 AT 24 VAC F2 = 4.0 AT 24 VAC F3 = 1.0 AT
Inputs/outputs	24 VDC all galvanically isolated 500 V Connection terminals 1.5mm^2
Processor	Intel 80C32 / 7.3MHZ
Display	Graphics-capable display 180x70 mm, 240x64 dots FL backlit
Keyboard	Membrane with 8 keys, polyester
Environmental conditions	Operating temperature 0° C - + 50° C Storage temperature - 10° C - + 70° C
Weight	Control unit, depending on design, approx. 8.5 - 9.5 kg (Data on label 9 kg)

3.5 Control functions / Terms

Riveting procedure (RP)

The riveting procedure covers all functions that are required for complete riveting. The riveting procedure consists mainly of two functions, the operation of the spindle motor and the operation of the riveting spindle.

Riveting time (RT)

The duration of the riveting procedure is determined by the riveting time.

Operation of the spindle motor

3 types can be selected in setup:

- Permanently switched on
- Only switched on during riveting
- Only switched on during riveting, but with a switch-off lag of 0.1 to 24.9 seconds which can be selected in setup.

3.6 Operation of the riveting spindle

Pneumatic

Permanent current actuation with 5/2-way valve and spring resetting. The riveting spindle is only driven DOWN. UP is by means of the currentless valve with spring resetting.

Hydraulic

Permanent current actuation with 4/3-way valve and spring resetting (center position currentless). The riveting spindle is driven UP and DOWN. The upper end position is monitored by an initiator. The valve is switched up in the upper position.

With Rapid speed/Working speed (model series 481)

With restrictor valve. The riveting spindle is driven UP and DOWN. The restrictor valve is actuated with the output "Rapid speed/Working speed".

Valve currentless = Work operation

Valve active = during DOWN movement to "lower" initiator

Hydraulic proportional

With way-valve and proportional restrictor. The function is the same as the Rapid speed/Working speed.

3.6.1 Rivet initiation

To initiate riveting "Spindle valve DOWN", several elements are involved for safety reasons:

Riveting actuation

- Control contact manually activated or by external control unit
- Foot contact (foot switch, etc.)
- Two-hand contact

Safety circuit

Optional equipment for safety switches such as light barriers, door monitoring, foot mats, etc.

Safety module SIMOD

One of the following safety modules can be used according to the safety requirements.

Available:

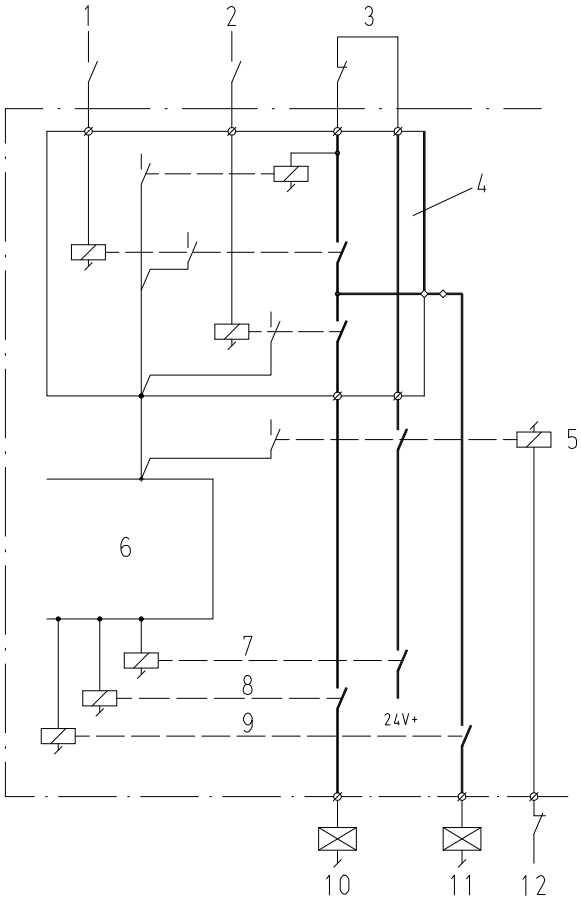
- **SIMOD AM / AMS** for riveting actuation via simple control contact (hand/foot switches, external control unit)
- **SIMOD 2HM / 2HMS** for rivet initiation with two-hand operating unit. Type approved module as per MRL Appendix IV.

The modules.... S are equipped with an input for release; they also have a logic system in order to implement pulse actuation, bridging initiator, etc.

3.6.2 Initiation monitoring

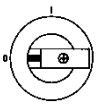
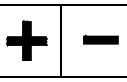
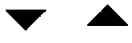
The processor checks the correct function of the riveting initiation and the safety module. If the function is NOK, the WatchDog relay triggers. The riveting initiation is blocked and the error is shown on the display!

Riveting initiation principle drawing



Item	Name
1	Riveting initiation
2	Release (optional)
3	Safety
4	Safety module (SIMOD)
5	Emergency stop
6	Function control and monitoring: processor
7	WatchDog (WD)
8	Spindle
9	Table
10	Spindle valve DOWN
11	Table valve
12	Emergency stop

3.7 Overview of abbreviations and symbols

Abbreviations	
RP	Riveting procedure
RT	Riveting time
SUP	Setup (user settings)
ERR	Error message
MES	Messages
Pn	Pneumatic riveting machine
Hyd	Hydraulic riveting machine
Operating symbols	
	Main switch Disconnection of mains supply at all poles
Green keys	
	Confirm, Accept, ENTER
	Cancel, Back, Exit
Symbols on the display (yellow keys)	
	Setup operating mode
	Single cycle operating mode
	Auto-cycle operating mode
	Increase/reduce values (riveting time, code, etc.)
	Info (Information)
	Switches the **Process Controller** on/off (option)
	Tools (utility programs)
	Motor ON / OFF
	Scroll page down / page up
	Cursor up / down
Double functions (simultaneous key pressing)	
 and 	Contrast setting (viewing angle modification) of display
 and **R**	Reset error <ERR>
 and **0**	Reset counter

4 Commissioning

4.1 Electric supply

The control unit is connected to the mains supply via the feed cable.
The feed cable is included in delivery.

Data for electrical connection			
Input voltage	**Max. fuse rating of supply lead**	**Connection cable specifications**	**Standard length connection cable**
see label	16A	3-phase with ground conductor	5m

DANGER

Electrical hazard!

Electric shock!

Operations on the control unit are only permitted with main switch set to “OFF“.

CAUTION

Incorrect input voltage can destroy the electrical and electronic components!
Input voltage must comply with the specification on the label or the front page of the riveting machine operating instructions.

NOTICE

To avoid interference effects on measuring signal and data lines, the lines from control unit to riveting machine must be installed separately from high voltage current and electromagnetic valve cables.
Install no external devices in the control unit if they send out interference signals.

4.2 Initial commissioning

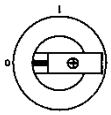
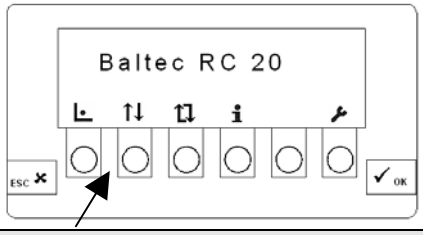
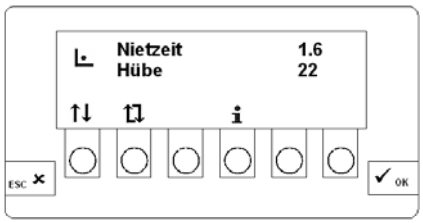
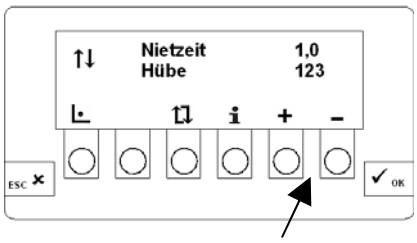
CAUTION

Riveting spindle position may be too close to the workpiece holder!

Workpiece holder or form tool could be damaged at actuation of riveting procedure!

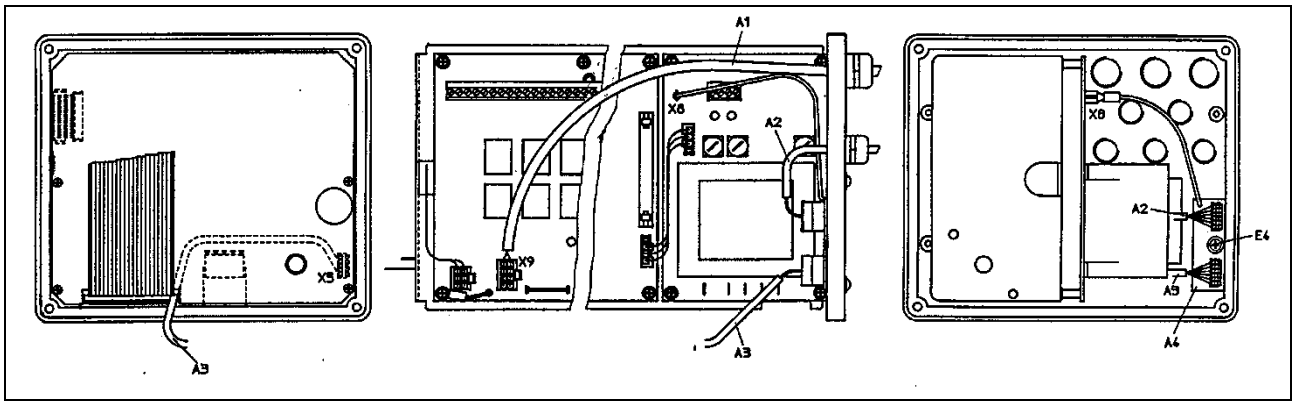
Move the riveting unit to the top position!

Procedure:

	1. Switch on main switch
	2. Wait until machine is ready for operation (main menu will appear on the display) 3. Select "Setup" or "Single cycle" operating mode
"Setup" operating mode	
	4. Press actuation device The riveting procedure continues for as long as the actuation device is pressed. The duration is shown on the display and includes the time from the start of the riveting spindle to the termination of the riveting procedure (excluding the return time of the riveting spindle)
"Single cycle" operating mode	
	4. Use the + / - keys to set the required riveting time 5. Press actuation device The actuation device must be pressed until the entered riveting time is completed and the riveting spindle is ready for the return stroke. If contact is interrupted beforehand, the riveting procedure will be terminated immediately. The riveting spindle will return to the start position.

If an ERR message appears on the display, see “List of error messages <ERR>".

4.3 Superordinate PLC control



Integration within a superordinate PLC means that the control unit must be opened at the back. Procedure:

Removal

1. Undo screw in main switch and pull main switch out
2. Undo the 4 screws in the corners of the rear panel
3. Pull cover with the chassis panel out approx 50mm
4. Disconnect the A3 cable in the back panel (see diagram 802897)
5. Unplug connector of communication cable (ribbon cable)
6. Pull out cover with the chassis panel

CAUTION

When removing and inserting the cover, ensure that the cover of the transformer supply (cardboard) is not trapped or damaged by the housing base!

Actuation (rivet start) takes place via a PLC potential-free relay output to the SIMOD (safety module) type AMS at terminal 51 and 52 (see diagram 802887).

Closing

Assembly occurs in the reverse order.

5 Operation

5.1 Switching on the control unit

The control unit is switched on using the main switch built into the front panel.

⚠ CAUTION

Danger of hand injuries!

After a long standstill the riveting spindle could sink. The riveting spindle will return automatically to the start position after switching-on the control unit!

Start-up

The processor runs through the initialization process and tests the safety conditions. If the processor is working correctly and all safety conditions are met, then the machine is ready for operation.

Machine ready for operation

The main menu appears on the display. It is possible to work, make settings and obtain information in the appropriate operating mode.

Machine not ready for operation

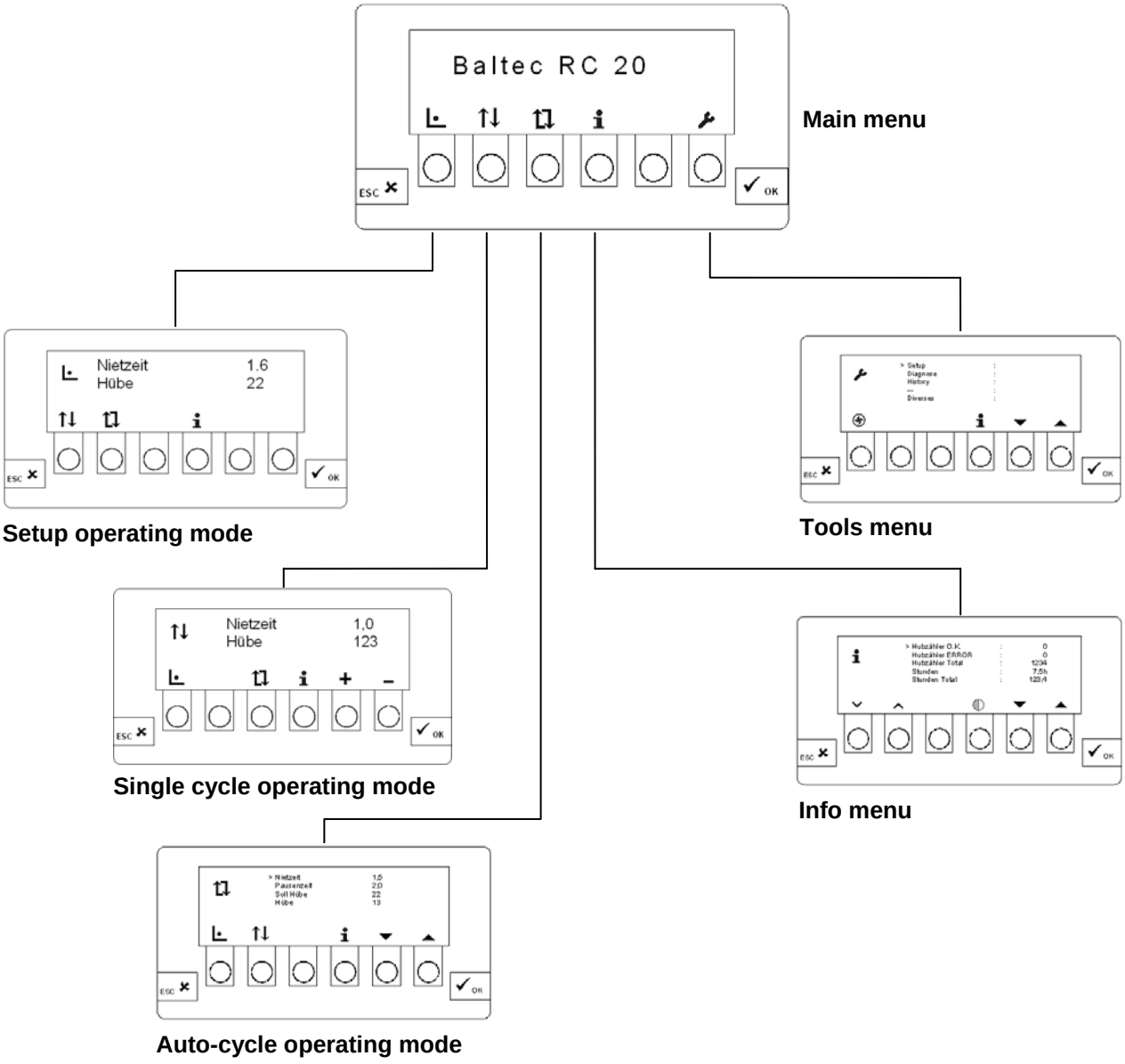
If the machine is not ready for operation, an <ERR> is displayed.

5.2 Main menu RC 20/RC 20A

Switch on the control unit via the main switch. If no changes have been made to the "Operating mode after switch-on" setup parameter, the main menu will appear.

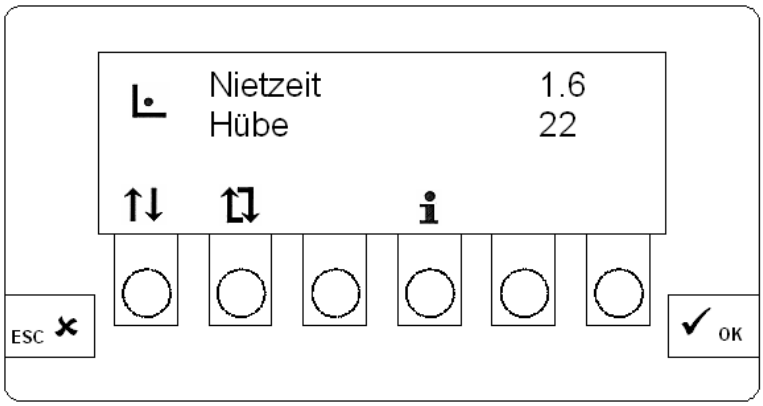
The required operating mode can be selected with the keyboard. The corresponding menu will appear. The current operating mode is shown top left.

In addition, the menus "Info", “Process-Controller“ and "Tools" can be selected.



5.2.1 Setup operating mode

In the "Setup" operating mode, the riveting procedure is active as long as the command device (foot switch, 2-hand operation, etc.) is pressed.



Symbol	Description of the softkey functions
↑↓	Selects the "Single cycle" operating mode
↻	Selects the "Auto-cycle" operating mode (only possible when the corresponding setup parameter is activated)
i	Selects the "Info" menu
ESC	Back to main menu

Riveting time

The riveting time is measured and indicated in the display.

Strokes

The strokes implemented are also displayed.

Operating mode after switch-on

In the setup parameter "Operating mode after power on", the control unit can be set so that this operating mode is actuated immediately after the mains voltage is switched on.

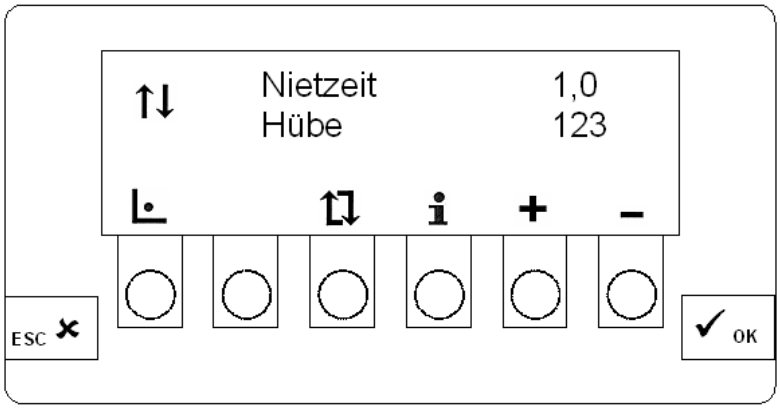
5.2.2 Single cycle operating mode

In the "Single cycle" operating mode the riveting procedure is active during the set riveting time.

The command device (foot switch, 2-hand operation, etc.) must remain active during the riveting time. If it is stopped before the riveting time is complete, the riveting procedure will be interrupted immediately. The interruption will be shown on the display.

Exception: Riveting initiation with pulse input.

After initiation of the riveting procedure, the programmed riveting time runs, independently of the time of the riveting actuation (pulse or permanent).



Symbol	Description of the softkey functions
	Selects the "Setup" operating mode
	Selects the "Auto-cycle" operating mode (only possible when the corresponding setup parameter is activated)
	Selects the "Info" menu
	Increases riveting time by 0.1 sec.
	Reduces riveting time by 0.1 sec.
ESC	Back to main menu

Riveting time

The riveting time can be adjusted using the "+" and "-" softkeys.

Strokes

The strokes implemented are also displayed.

Operating mode after switch-on

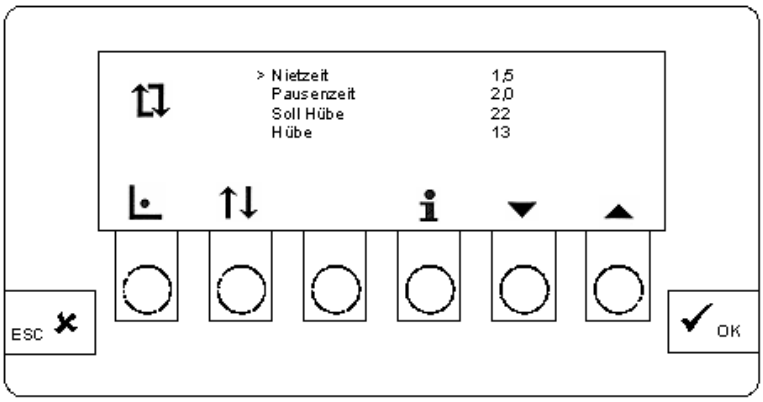
In the setup parameter "Operating mode after power on", the control unit can be set so that this operating mode is actuated immediately after the mains voltage is switched on.

5.2.3 Auto-cycle operating mode

The "Auto-cycle" operating mode is essentially the same as the "Single cycle" operating mode. The riveting procedure is however automatically repeated after a pause as long as the command device (foot switch, 2-hand operation, etc.) is active or until the "Set strokes" value is reached.

The strokes implemented are also displayed.

By default, the setup parameter for the "Auto-cycle" operating mode is set to disabled.



Symbol	Description of the softkey functions
	Selects the "Setup" operating mode
	Selects the "Auto-cycle" operating mode (only possible when the corresponding setup parameter is activated)
	Selects the "Info" menu
	Cursor (>) scrolls one line down
	Cursor (>) scrolls one line up
	After pressing the "OK" key, the corresponding value (riveting time, pause time or set strokes) can be changed with the "+" and "-" keys.
	Back to main menu

NOTICE

This operating mode is only used for the following applications:

- In connection with an appropriately secured rotary indexing table
- For demonstration purposes

Changing the riveting time

If the cursor (>) is positioned on the "Riveting time" line, the riveting time can be changed after pressing the OK key with the softkeys "+" and "-".

Changing the pause time

If the cursor (>) is positioned on the "Pause time" line, the pause time can be changed after pressing the OK key with the softkeys "+" and "-". The maximum pause time input can be set in the applicable setup parameter.

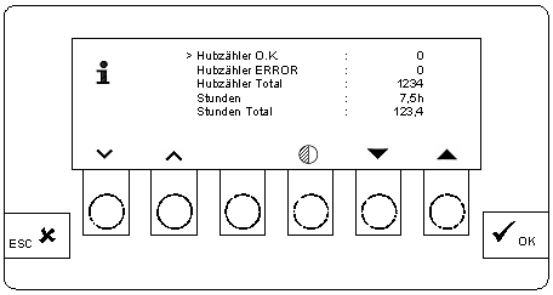
Changing the "Set strokes"

If the cursor (>) is positioned on the "Set strokes" line, the set number of strokes can be changed after pressing the OK key with the softkeys "+" and "-". Once this number of strokes has been reached, the auto-cycle stops and the machine waits for a new riveting initiation.

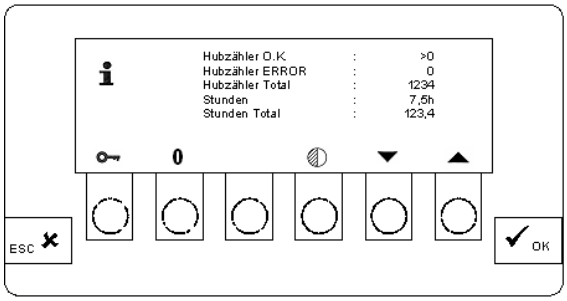
Operating mode after switch-on

In the "Operating mode after power on" setup parameter, the control unit can be set up so that this operating mode is actuated immediately after the mains voltage is switched on.

5.2.4 Info menu (Page 1)



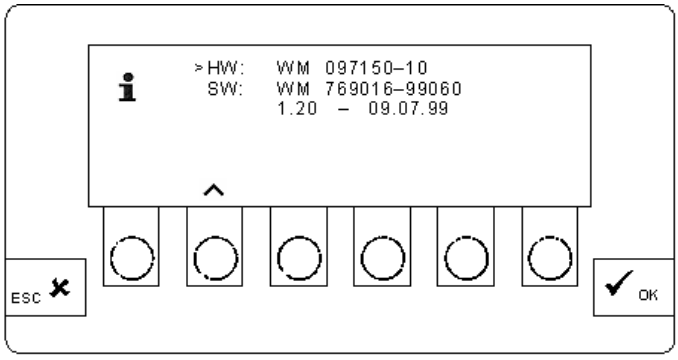
Display normal



Display when reset to 0

Display	Description	Range
Stroke counter OK	Counts all implemented riveting movements that have not caused an error message Reset to 0 possible - see below	0 – 99999
Stroke counter ERROR	Counts all implemented riveting movements that have caused an error message Reset to 0 possible - see below	0 – 99999
Stroke counter Total	Counts all stroke movements Reset only possible with code (Menu Tools -> Miscellaneous)	0 – 99999
Hours	Displays the operating hours (riveting motor) Reset to 0 possible - see below	0 – 99999.9
Hours Total	Displays the total operating hours (riveting motor) Reset only possible with code (Menu Tools -> Miscellaneous)	0 – 99999.9
Symbol	**Description of the softkey functions**	
⌄ ⌃	Scroll page down / page up	
▼ ▲	Cursor (>) up / down	
◐	Contrast setting (viewing angle) of display Press key simultaneously with the Cursor up / down key	
Symbol	**Reset to 0**	
🔑 **0**	1. Select text line (Stroke counter.../Hours...) with Cursor (>) and press OK 2. Press both keys simultaneously	

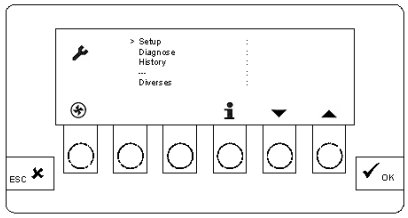
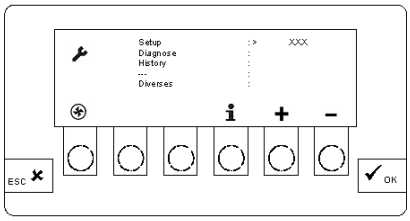
5.2.5 Info menu (Page 2)

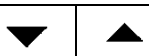
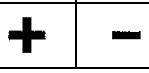


Display	Description
HW: WM XXXXXX - XX	Hardware Version
SW: WM XXXXXX – XXXXX X.XX - XX.XX.XX (Date)	Software Version

5.2.6 Tools menu

Press the "Tool" key to enter the menu. To select the sub-menus, proceed as follows:

	1. Use the cursor > to move to the required menu 2. Confirm with OK
	3. Enter access code with the + / - keys and confirm with OK The required menu will appear. The menu can be exited with ESC.

Menu	Function description
Setup	Operating and machine settings in the setup table (parameter list)
Diagnosis	Display of control states of the internal inputs and outputs
History	Display of <MES> and <ERR> messages
---	Reserve
Miscellaneous	Reset Pieces Total and Hours Total; Delete History Memory; Initialization setup to default values
Symbol	**Description**
	Switching the motor on and off
	Selects the "Info" menu
	Cursor up / down
	Increase/reduce value
	Back to main menu
	Confirm, Accept

NOTICE

Utilization of various menus is protected by an access code.

Entering the wrong code several times locks the access. <ERR> 104 is then displayed: Permission denied!

The error is recorded in the "History" memory.

5.2.6.1 Setup menu

5.2.6.1.1 Coding system for the individual setup parameter sectors

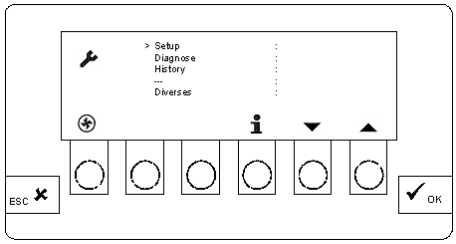
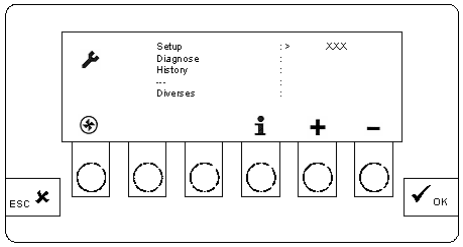
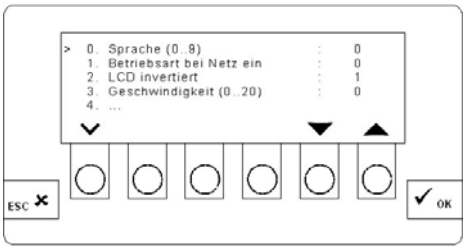
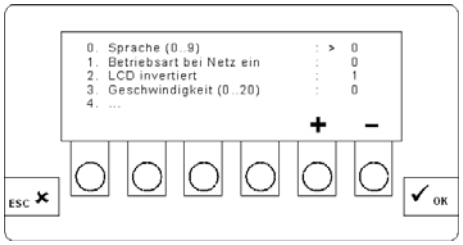
Setting or changing in setup is only possible after entering a code number. The access rights are structured as follows with 6 Levels:

Setup No.	Level	Access code	Display shows
0 to 4	1	1 (Default)	Setup No. and Text
5 to 9	2	27	Setup No. and Text
10 to 19	3	397	Setup No. and Text
20 to 29	4	Authorized persons only	Setup No.
30 to 49	5	Authorized persons only	Setup No.
50 to 59	6	Authorized persons only	Setup No.

The code numbers for Levels 4 to 6 are only available to authorized persons.

5.2.6.1.2 Changing setup parameters

Procedure to change a setup parameter:

	1. Cursor is positioned on "Setup". Confirm with OK
	2. Enter access code with the **+** / **-** keys (see setup table) and confirm with OK
	3. Use the keys ∧ ∨ (Scroll pages) and ▲ ▼ (Cursor up/down) to move to the required setup parameter and confirm with "OK"
	4. Change the required parameter with the keys **+** / **-** 5. Confirm with OK 6. Exit the menu with ESC

The following applies to the setup table (parameter list) below:

The factory settings are set according to the customer order. The values listed in the setup table are default values and may deviate from the factory settings!

5.2.6.1.3 Setup Table, SW-Version 2.05 A and 2.05 B

Setup No.	Function	Description		SW-Initialization Pn 901	SW-Initialization Hyd 902
Level 1 (Access code : 1)					
0	**Display text, language**	**SW-Version A** 0 = German 1 = English 2 = French 3 = Italian 4 = Spanish 5 = Portuguese	**SW-Version B** 0 = German 1 = English 2 = French 3 = Polish 4 = Czech 5 = Hungarian	0	0
1	**Operating mode after switch-on**	0 = Main 1 = Setup 2 = Single cycle 3 = Auto cycle		0	0
2	**LCD inverted** *Display mode of RC 20, only for invertible bright/black background.* *No effect if display with yellow background!*	Display background : 0 = black 1 = bright		1	1
3	**Speed working stroke** *(working stroke of hydraulic machine type 481)*	0 – 20 (pulse width modulated)		0	10
4	**Not allocated**				
Level 2 (Access code : 27)					
5	**Enable riveting time**	0 = barred 1 = enabled		1	1
6	**Enable counter zeroing**	0 = barred 1 = enabled		1	1
7	**Riveting motor OFF / Delay**	0 ... 254 = Delay in 100ms 255 = continuously on		250	250
8	**Lubrication interval** *(not applicable for „perma STAR CONTROL“)*	In Steps of 0.1 Std.		80	40
9	**Blockings**	0 = all enabled 1 = Setup (without SFT-1) 2 = STF-1 riveting in rows		0	0
Level 3 (Access code : 397) see operating instructions Process-Controller					
10	**Default NA plus**	0.01 mm		30	50
11	**Default NA minus**	0.01 mm		30	50
12	**Default S plus / minus**	0.01 mm		30	50
13	**Default t plus / minus**	0.01 sec.		30	30
14	**Default F plus / minus**	0.1 kN		5	10
15	**Status**	0 = OFF 1 = upper end position of spindle (OT) 2 = lower end position of spindle (UT) 3 = riveting time running 4 = ready for start 5 = Setup 6 = Cycle 7 = ERR-Status 8 = ERR-MesStatus 101 = ERR-auto Reset 102 = ERR-manual Reset 103 = ProcHandshake (see diagram 802939)		0	0

Setup No.	Function	Description	SW-Initialization	
			Pn 901	Hyd 902
16	**Not allocated**			
17	**Not allocated**			
18	**Not allocated**			
19		(1...8 = Relay X22)		
Level 4 (Access code : ...) see operating instructions Process-Controller				
20	**RN-Machine type for Process-Controller**	0 = without STF 1 = RN 081 2 = RN 181 3 = RN 231 4 = RN 241 5 = RN 281 6 = RN 331 7 = RN 381 100bar 8 = RN 381 150bar 9 = RN 381 200bar 10 = RN 481 11 = RN 181 reduced force 12 = RN 281 reduced force	0	0
21	**After-running riveting-time**	In 10 ms, effective after P27	30	30
22	**Mode Process Controller**	0 = Standard 2 = slow advance (special case)	0	0
23	**Spindle up for p reference**	In 10 ms (hydraulics only)	0	30
24	**Range riveting start**	In 1.0 mm (max. = 80)	40	50
25	**Absolute riveting path length**	In 1.0 mm (max. = 80)	40	50
26	**Filter**	Frequency in 0.1Hz, Offset 20.0Hz Range Controller = 50 to 180 4-pole motor 50 Hz = 95 4-pole motor 60 Hz = 155 6-pole motor 60 Hz = 50	95	95
27	**Slowing-down riveting time**	in 10 ms	0	0
28	**Max. running time**	in 100 ms; permitted range 20 to 100	100	100
29	**Program OK**	0 = all barred 1 = Enable Programming, Setup, MakroProg enabled 2 = Barred Programming, choice of program no. admitted	1	1
Level 5 (Access code : ...)				
30	**Machine type**	0 = pneumatic machine 1 = hydraulic machine	0	1
31	**Lubrication pulse** *(not applicable for "perma STAR CONTROL")*	in 100 ms 0 = Machine without automatic lubrication	50	50
32	**Grease container, fill level check** *(not applicable for "perma STAR CONTROL")*	0 = low OK 1 = high OK	0	0
33	**Machine with rotary table or sliding table**	0 = without rotary-table or pneumatic sliding-table 1 = with rotary-table or pneumatic sliding-table 2 = hand-sliding-table	0	0
34	**Reaction time: Rotary- or sliding-table or finger guard device**	in 100 ms, 0 = OFF	0	0
35	**Riveting time**	in 100 ms	100	100
36	**Pause time**	in 100 ms	100	100

Setup No.	Function	Description	SW-Initialization	
			Pn 901	Hyd 902
37	**Machine with rapid-/working- advance speed**	0 = no 1 = yes	0	0
38	**Not allocated**			
39	**Not allocated**			
40	**Timeout up** *(proximity switch upper end position)*	in 100 ms, 0 = no proximity switch installed	0	30
41	**Timeout not up** *(proximity switch upper end position)*	in 100 ms, 0 = no proximity switch installed	0	30
42	**Timeout down** *(proximity switch lower end position)*	in 100 ms, 0 = no proximity switch installed	100	100
43	**Timeout not down** *(proximity switch lower end position)*	in 100 ms, 0 = no proximity switch installed	250	250
44	**Timeout riveting stroke limit switch unit (NHE)**	in 100 ms, 0 = OFF	0	0
45	**Blocking time Proc-Cal**	in 100 ms, 0 = OFF	10	10
46	**Not allocated**			
47	**Not allocated**			
48	**Not allocated**			
49	**Not allocated**			
Level 6 (Access code : ...)				
50	**Auto cycle possible**	0 = no 1 = yes	0	0
51	**Start riveting time**	0 = normal 1 = signal from lower proximity switch	0	0
52	**Activation**	0 = continuous 1 = pulse 2 = bypassing	0	0
53	**Machine with finger guard device (BT002)**	0 = no 1 = yes	0	0
54	**Riveting stroke limit switch unit (NHE)**	0 = no 1 = yes	0	0
55	**MakroStepControl**	1 = control step with E//E14/E15 E7 = Bit 0 E14 = Bit 1 E15 = Bit 2 Step 1…8 with value 0…7 (if Set-No. 55 = 1, then Set-No. 42 and 43 = 0	0	0

5.2.6.2 Diagnosis menu

NOTICE

The access to the Diagnosis menu is only permitted for the manufacturer and service personnel specially trained by BalTec!

5.2.6.3 History menu

NOTICE

The access to the History menu is only permitted for the manufacturer and service personnel specially trained by BalTec!

5.2.6.4 Miscellaneous menu

NOTICE

The access to the Miscellaneous menu is only permitted for the manufacturer and service personnel specially trained by BalTec!

5.3 Troubleshooting and error rectification

5.3.1 Introduction

The control unit is equipped with various monitoring systems.

Two types of incorrect operating states are defined, namely:

- **Messages** **<MES>**
- **Errors** **<ERR>**

Messages are incorrect operating states that do not affect safety, e.g. such as "Riveting time interrupted too early".

Errors are impermissible or even dangerous operating states. Errors block the machine, the WD (Watchdog) relay is actuated, all actuators such as valves, contactors, etc. are without current or not actuated.

The error is recorded in the "History" memory. The control unit must be reactivated or the block released.

NOTICE

The error messages depend in part of the extension as well as of the settings in the setup. Therefore with new installations, you must specifically check whether the setup is correct for your application

5.3.2 List of messages <MES>

Message on display	Cause	Rectification information
<MES> 001: EMERGENCY STOP	Emergency stop triggered	Reset emergency stop
<MES> 002: Hydraulics ON	Hydraulics are switched off	Switch hydraulics on (only for hydraulically powered riveting machines)

5.3.3 List of error messages <ERR>

Error		Cause	Rectification information
<ERR> 101	Riveting motor	Thermopacket KM2 triggered	Riveting motor overloaded. Motor connection cable NOK
<ERR> 102	Hydraulic motor	Thermopacket KM1 triggered	Hydraulic motor overloaded Motor connection cable NOK
<ERR> 103	System	Corresponding auxiliary unit used	Without auxiliary unit: bridge X30-X60 or X61
<ERR> 104	Permission denied	Code for setup entered incorrectly several times	Enter valid code
<ERR> 105	External check	Open input "Safety" on SIMOD	Check external safety equipment
<ERR> 106	STF 1 communi-cation error	Always concerns communication between RC20 and STF-1	See STF-1 operating instructions
<ERR> 107	Under-voltage 24V	Supply voltage too low	Check supply (3x... V AC) Internal voltage program incorrect 24V = overloaded
<ERR> 108	Spindle up	Initiator "Spindle up"	Spindle not lowered after riveting procedure triggered. Initiator defective
<ERR> 109	Spindle not up	Initiator "Spindle up"	Spindle not moving to upper end position Initiator defective
		No upper initiator installed, but activated with program No.	Delete activation in program
<ERR> 110	Spindle down	Initiator "Spindle down"	Spindle remains down after riveting procedure completed Initiator defective
<ERR> 111	Spindle not down	Initiator "Spindle down"	Spindle does not reach lower end position within given time Initiator defective
		No lower initiator installed, but activated with program No.	Delete activation in program

Error		Cause	Rectification information
<ERR> 112	Table not in position	Initiator "Indexing table" Initiator "Manual sliding table" Solenoid switch "Pneumatic sliding table"	Table does not reach riveting position Table not in position during riveting Initiator defective
		No initiator installed, but activated with program No.	Delete activation in program
<ERR> 113	Finger guard	Limit switch finger guard device (FGD)	FGD does not reach set position FGD not in position during riveting
<ERR> 114	Grease container empty	Level monitoring grease lubrication	Top up with grease
<ERR> 115	Start antivalence	Monitoring of simultaneousness with 2-channel start initiation	Check SIMOD
<ERR> 116	Prog Data	Checksum error	Re-initialize STF (Switch control unit off - on)
<ERR> 117	SIMOD antivalence	Monitoring of simultaneousness with 2-channel bridging of activation	Check SIMOD
<ERR> 118	Feedback A2-E4/5	Monitoring of SIMOD self-holding	Check SIMOD
<ERR> 119	NHE incorrect at start	Riveting stroke limit switch unit (NHE)	NHE already triggered at start
<ERR> 120	Timeout NHE	Riveting stroke limit switch unit (NHE)	NHE does not end riveting procedure within maximum riveting time
<ERR> 121	Cancel	Riveting procedure cancelled by operator prematurely (permanent activation!)	Start again after manual reset
<ERR> 122	Interruption	Riveting procedure interrupted by opening the input "Release"	Start again after manual reset

5.3.4 General errors

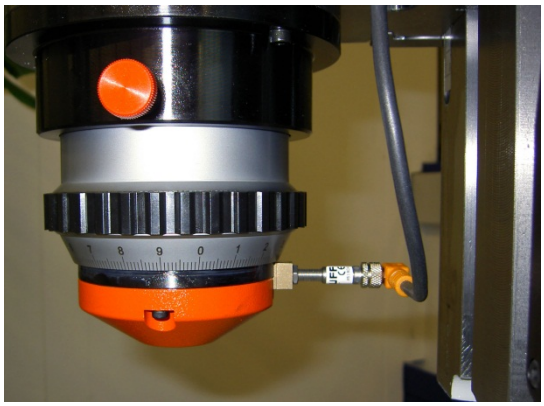
Error	Cause	Rectification information
Display is dark	Supply voltage missing or NOK Contrast incorrectly set	Switch on main switch Check F2 and F3 fuses on SUPMOD Check Frontprint ribbon cable Adjust contrast (see Chapter "Menu Info")
Display hard to read	Contrast incorrectly set	Adjust contrast (see Chapter "Info menu")
Working lamp not lit	Lamp not switched on Halogen bulb defective	Switch on lamp Replace halogen bulb Check F1 fuse on SUPMOD
Riveting motor not running, spindle moves down	Riveting motor not receiving power	Check all phases (including supply)!
Riveting motor running, but spindle does not move down	Riveting machine not receiving pressure	Check pressure Direction control valve may be defective
Riveting cannot be triggered, no error message appears	No riveting actuation occurs.	Check foot switch and two-hand button Check SIMOD

6 Options

6.1 Initiator lower end position (bridging initiator)

6.1.1 Function

The lower end position of the riveting spindle is monitored by an initiator. The initiator switching point is 4mm before the end of the stroke. As soon as the riveting spindle reaches this point the initiator switches and input E7 is set. From his point onward the two-hand control buttons can be released, since they are bridged by the initiator. The riveting spindle does not reverse direction but continues riveting in accordance with the programmed value.



6.1.2 Factory settings

If the radial riveting machine is not equipped with a lower end position initiator, the following factory settings (defaults) in the Setup are active :

Parameter no. 42 Timeout down : 100

Parameter no. 43 Timeout not down : 250

If the radial riveting machine is equipped with a lower end position initiator, the following factory settings (defaults) in the Setup are active :

Parameter no. 42 Timeout down : 30

Parameter no. 43 Timeout not down : 30

NOTICE

The monitoring time must always be less than the riveting time!

For example, if riveting takes more than 3 seconds and the initiator monitoring time has been set to the default value of 30 (3 sec.), the following error message is generated : “Spindle not down“ (ERR 111).

This means that the initiator lower end position monitoring time has to be adapted in Setup no. 42 and Setup no. 43 in accordance with the riveting work.

The bridging function is activated with setup parameter 52, value 2. This is a factory setting and should not be changed.

6.1.3 Switching status monitoring

The operational check of the initiator by the control unit is carried out continuously by polling the switching status with logical time windows (timeout).

This can detect the following possible faults and indicate these with error messages. The interpretation is as follows:

1. Defect in the open state

The initiator no longer closes. The riveting process is aborted after the monitoring time "Timeout not down“ (parameter 43) has expired. Error message ERR 111 “Spindle not down“ appears.

The reason for this is that the monitoring time has been set so that it is shorter than the riveting time (approach time and deformation time, without return stroke)

The spindle always returns after the 2-hand switch has been released, which results in the error message ERR 122 “Interruption“.

2. Defect in the closed state

The initiator no longer opens. After the monitoring time "Timeout down" (parameter 42) has expired, the error message ERR 110 "Spindle down" appears.

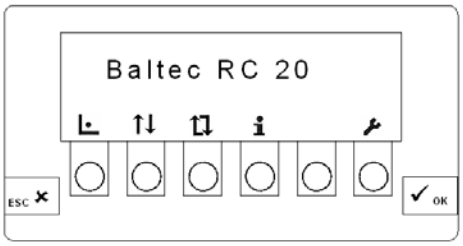
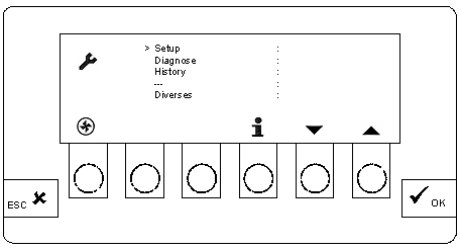
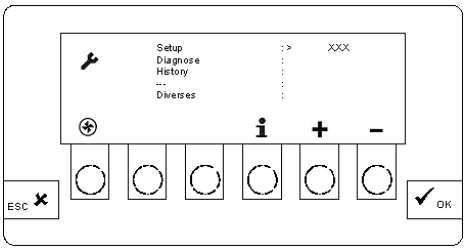
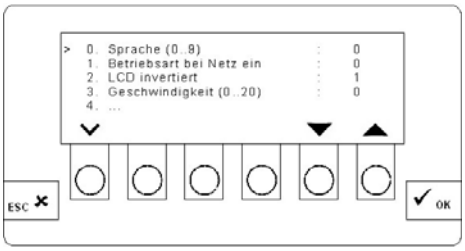
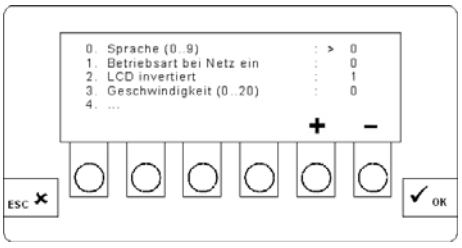
With this error, the 2-hand switch is permanently bridged to self-locking. Even after the initiation button has been let go, the riveting process is not aborted as expected, but continues to its programmed end.

NOTICE

If the riveting machine is set up so that it operates with self-locking of the 2-hand switch from a distance of 4 mm from the rivet header and the rivet, it is imperative that the initiator is replaced if it is defective.

6.1.4 Adjusting monitoring time in setup

The monitoring time of initiator lower end position can be set in the setup parameters 42 and 43 as follows:

	1. Press key „Tools“ in the main menu
	2. Cursor is positioned on “Setup”. Confirm with OK
	3. Enter access code with the +/- keys (see setup table) and confirm with OK
	4. Use the keys ∧ ∨ (scroll pages) and ▲ ▼ (cursor up/down) to move to the required setup parameter and confirm with OK
	5. Change the required parameter with the keys +/- and confirm with OK 6. Exit the menu with ESC

For more information see chapter „Tools menu“.

6.2 Change over from operation with two-hand operating unit to operation with foot switch

6.2.1 Key switch

Optionally, the control unit can be equipped with a key switch.

The machine can be switched from operation with two-hand operating unit to operation with foot switch.

⚠ CAUTION

Activation of riveting process with foot switch!

Danger of hand injuries!

Commissioning and operation may only be made by trained specialist personnel!

Operation with two-hand operating unit	Operation with foot switch
	
Key can be extracted	Key can not be extracted

7 Maintenance and repair work

7.1 Introduction

For safety reasons, maintenance and repair work may only be carried out by trained specialist personnel.

DANGER

Electrical hazard!

Electric shock!

Operations on the control unit are only permitted with main switch set to “OFF“.

7.2 Control unit maintenance

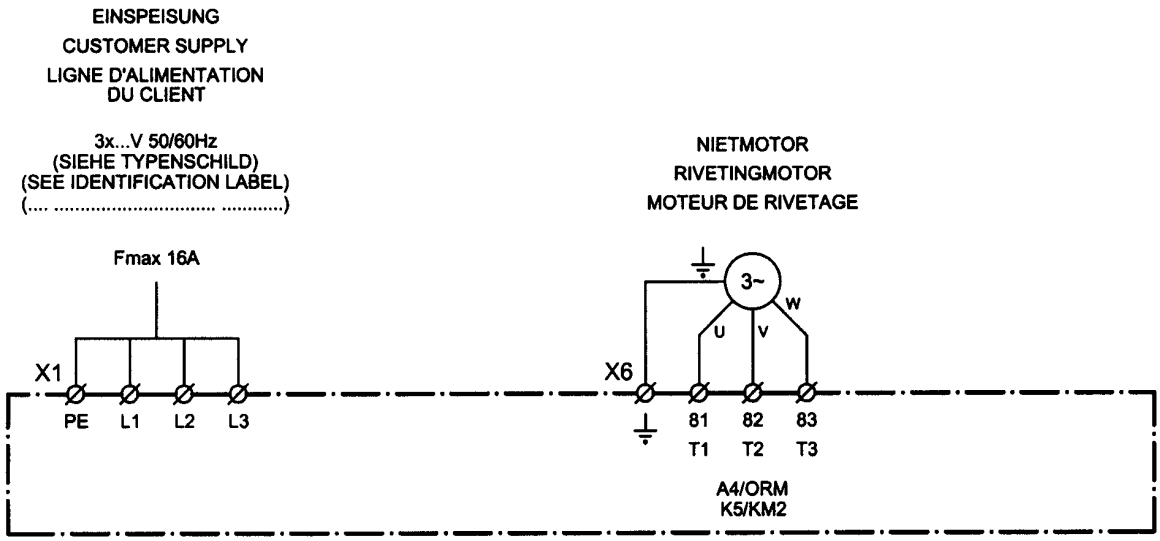
The maintenance for the riveting machine control unit is limited to regular cleaning of the housing and the display, as well as checking the

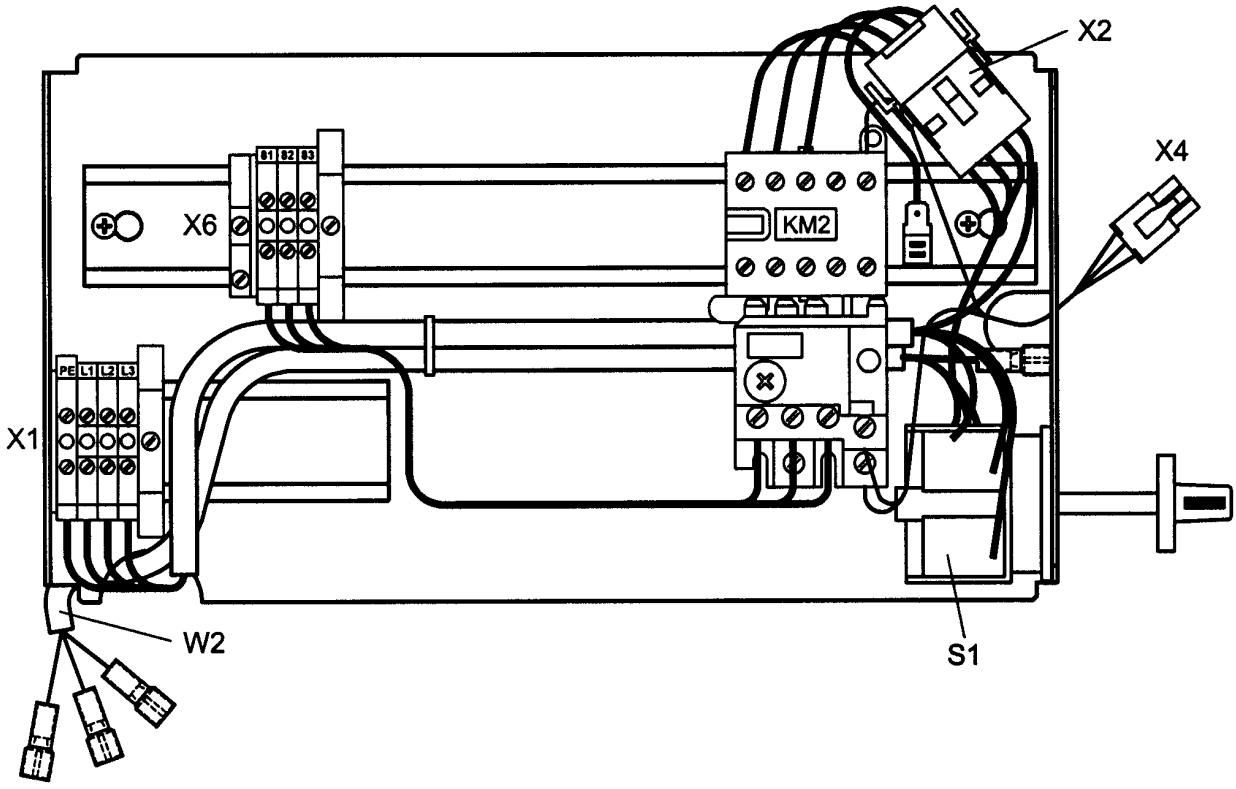
- Tightness of the housing
- Tightness of the cable glands
- State of the plugs
- Mechanical damage, especially to cables and their fastenings
- Contact protection of live parts

8 Appendix

8.1 Schemata

8.1.1 Power section RN pneumatic 802870

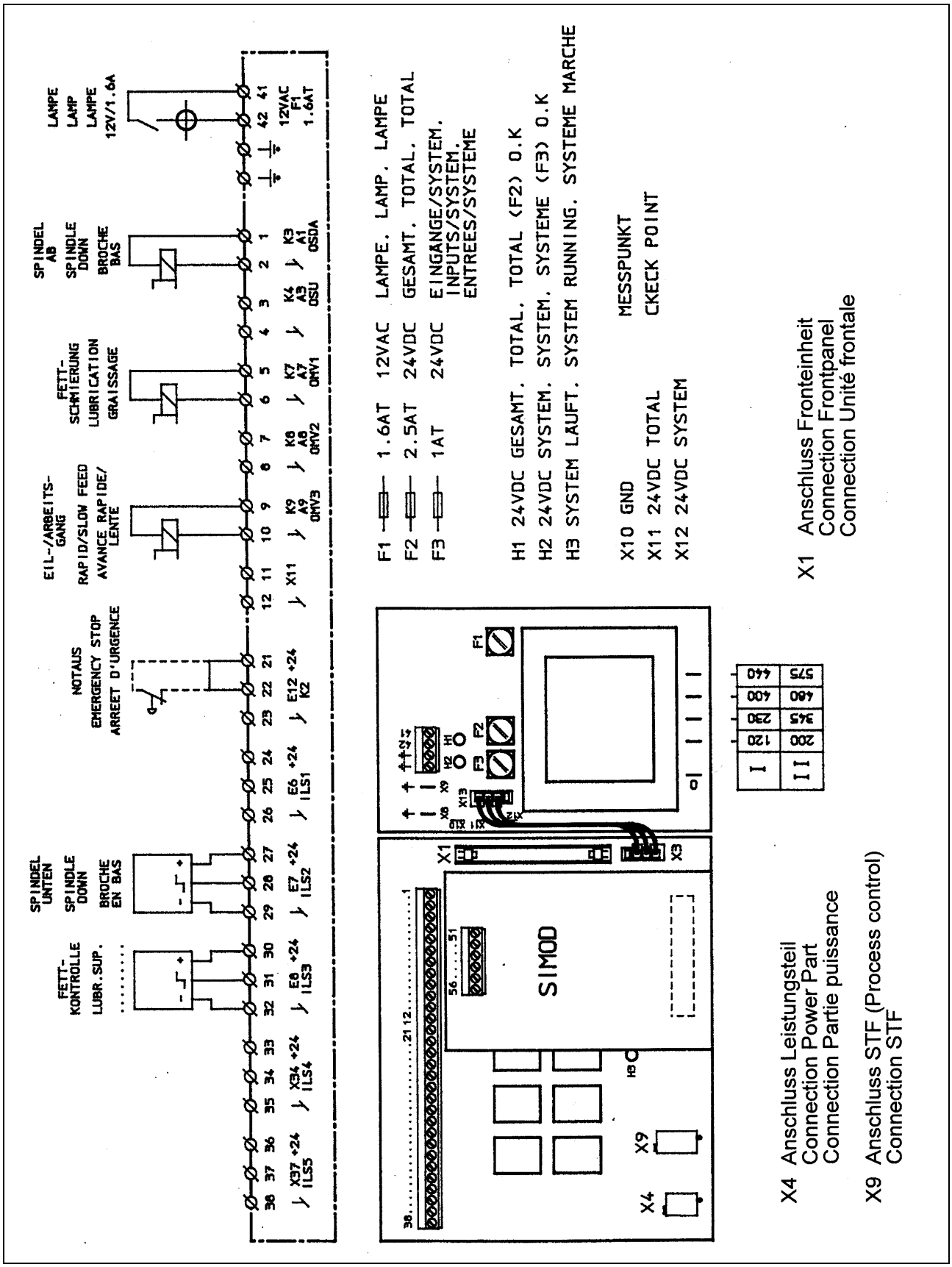




W2 Anschluss Trafo (SUPMOD)
Connection Trafo (SUPMOD)

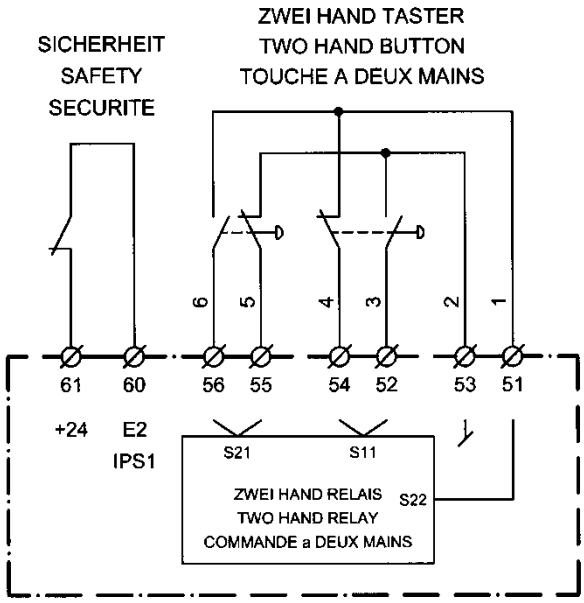
X4 Anschluss Steuerteil
Connection Control Part

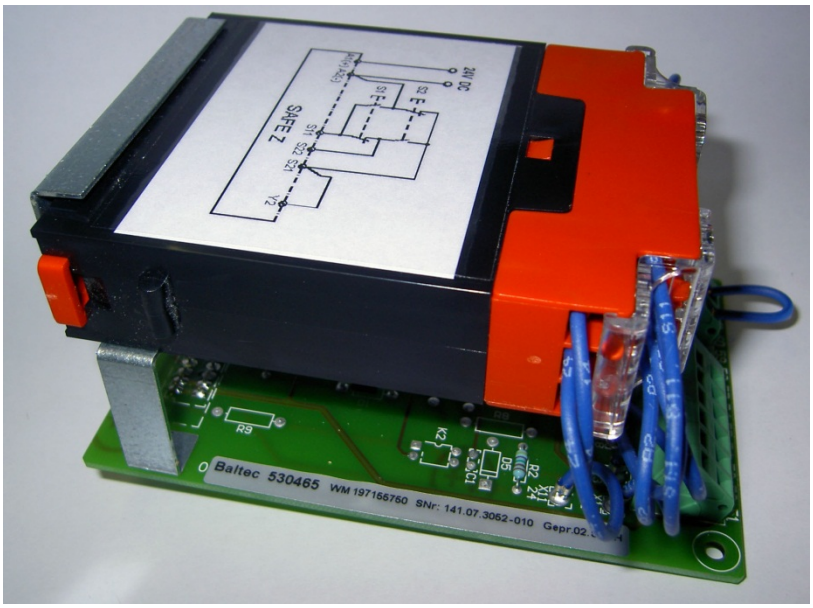
8.1.2 Control section RN pneumatic 802874



8.1.3 Connection diagram safety module (SIMOD) 2HMR-SSR 803162

Connection two-hand button, permanent activation

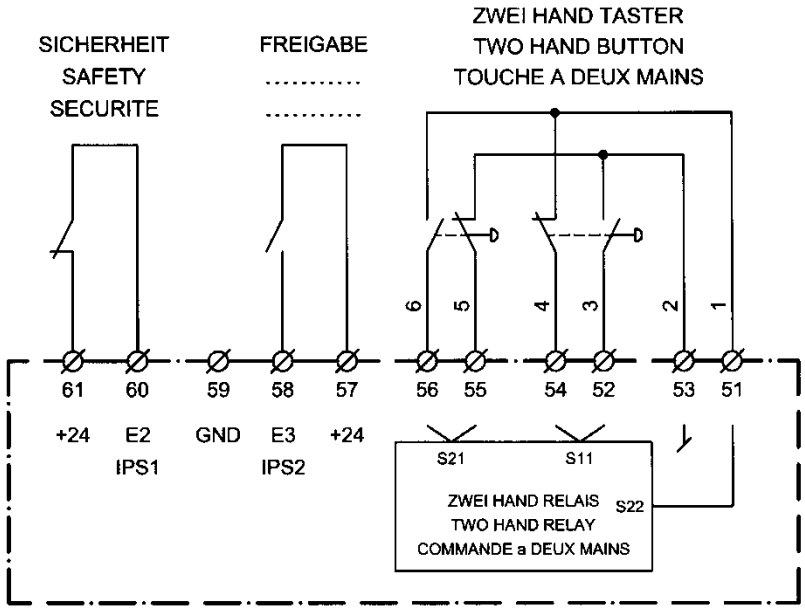


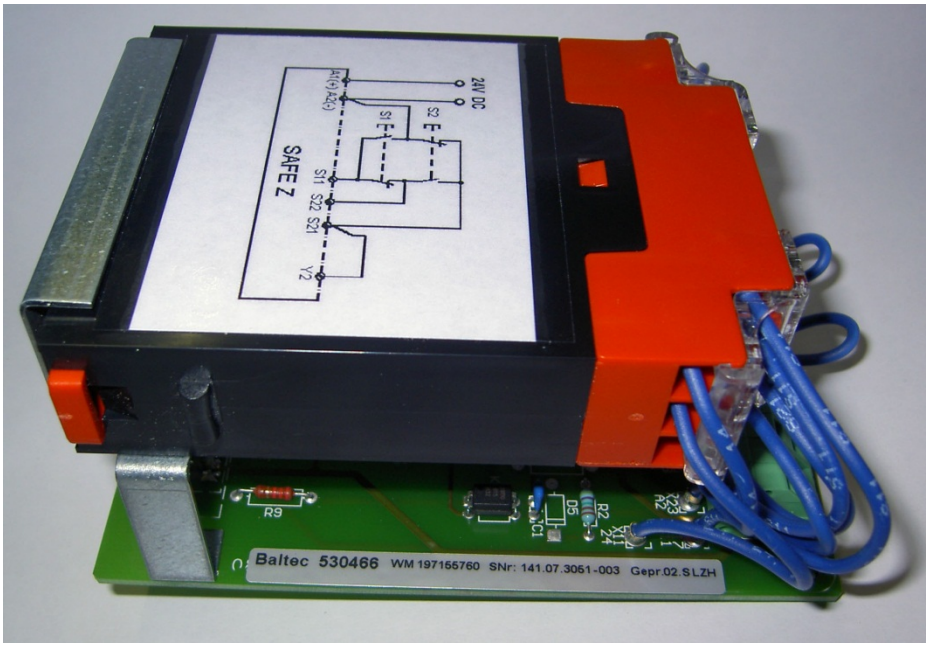


Baltec-No. 530465

8.1.4 Connection diagram safety module (SIMOD) 2HMRS-SSR 803163

Connection two-hand button, pulse or permanent activation, release input

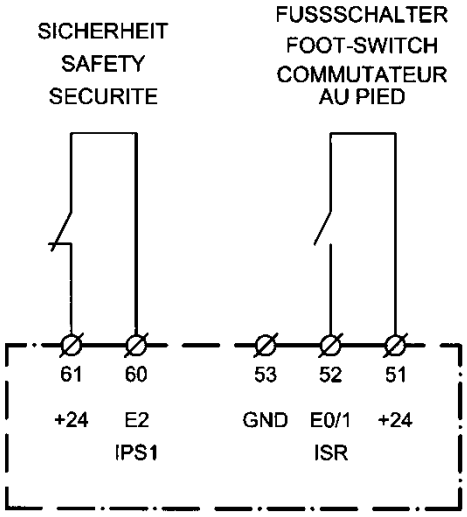


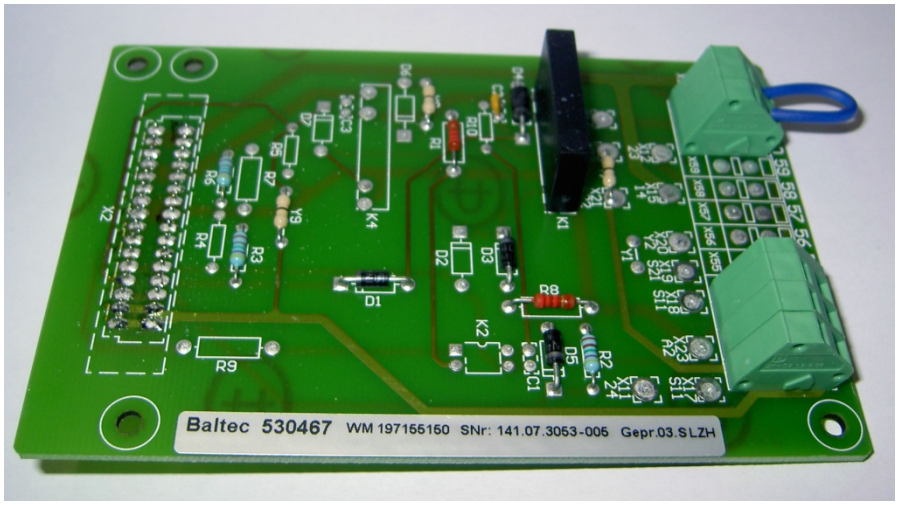


Baltec-No. 530466

8.1.5 Connection diagram safety module (SIMOD) AM-SSR 802885

Connection foot switch, permanent activation

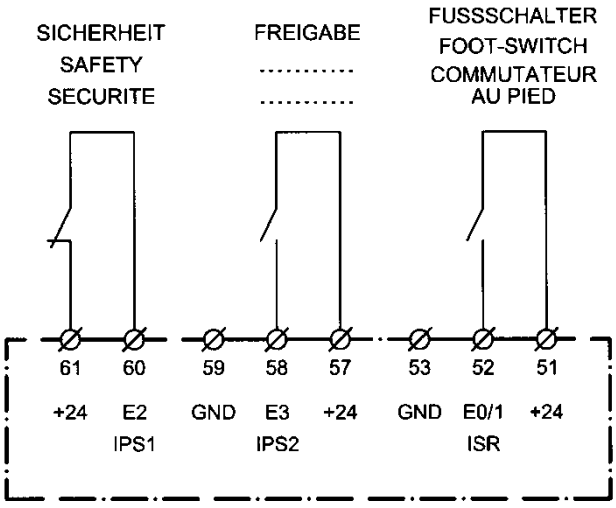


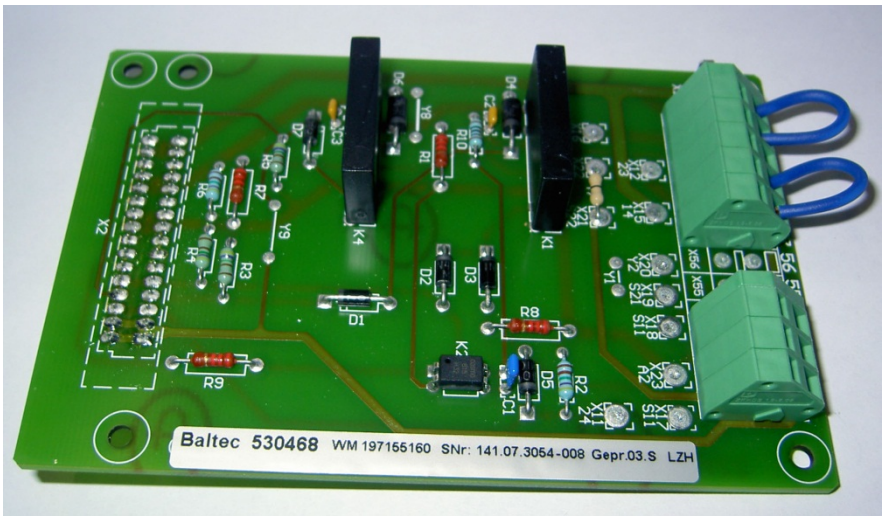


Baltec-No. 530467

8.1.6 Connection diagram safety module (SIMOD) AMS-SSR 802887-a

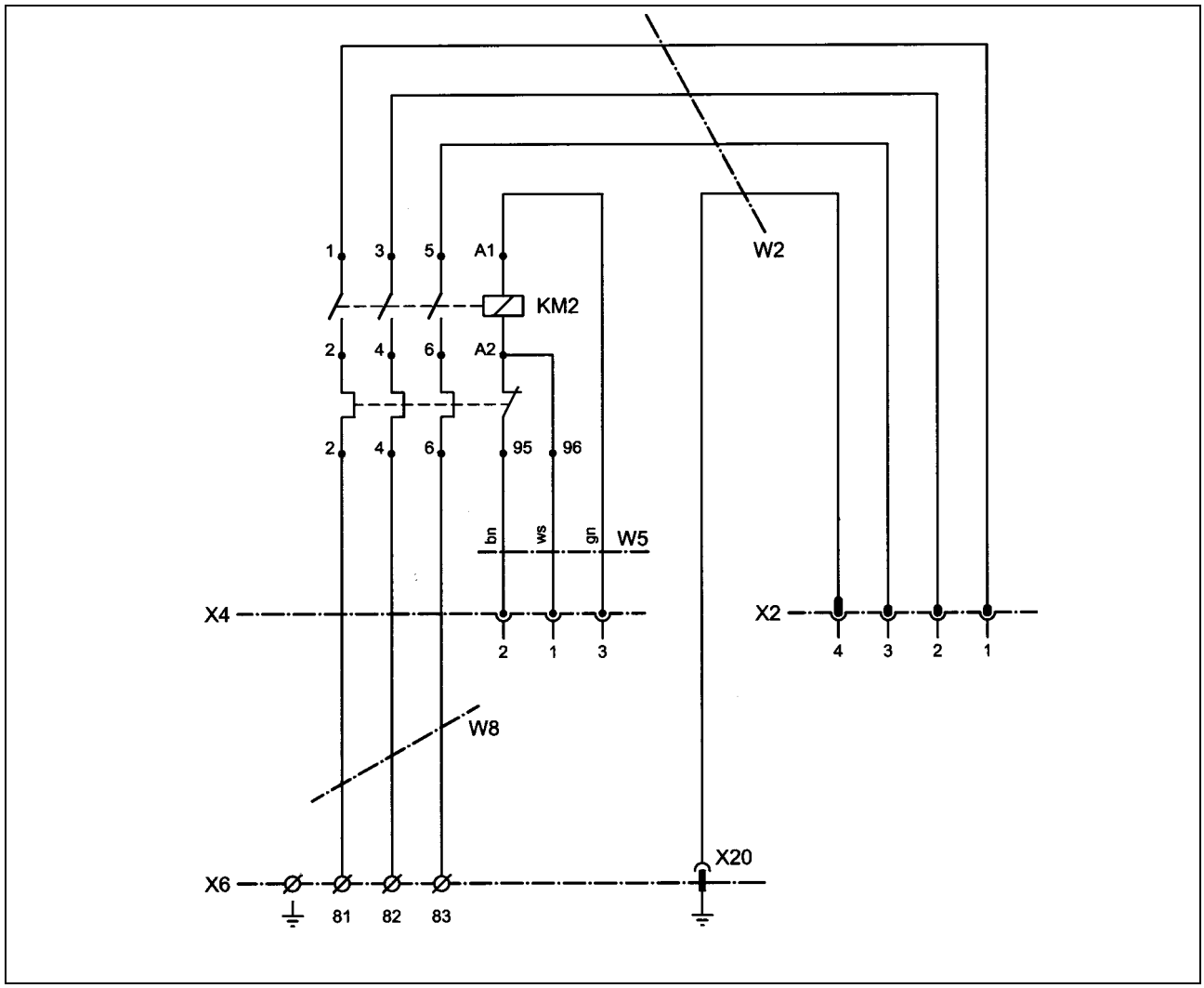
Connection foot switch, pulse or permanent activation, release input





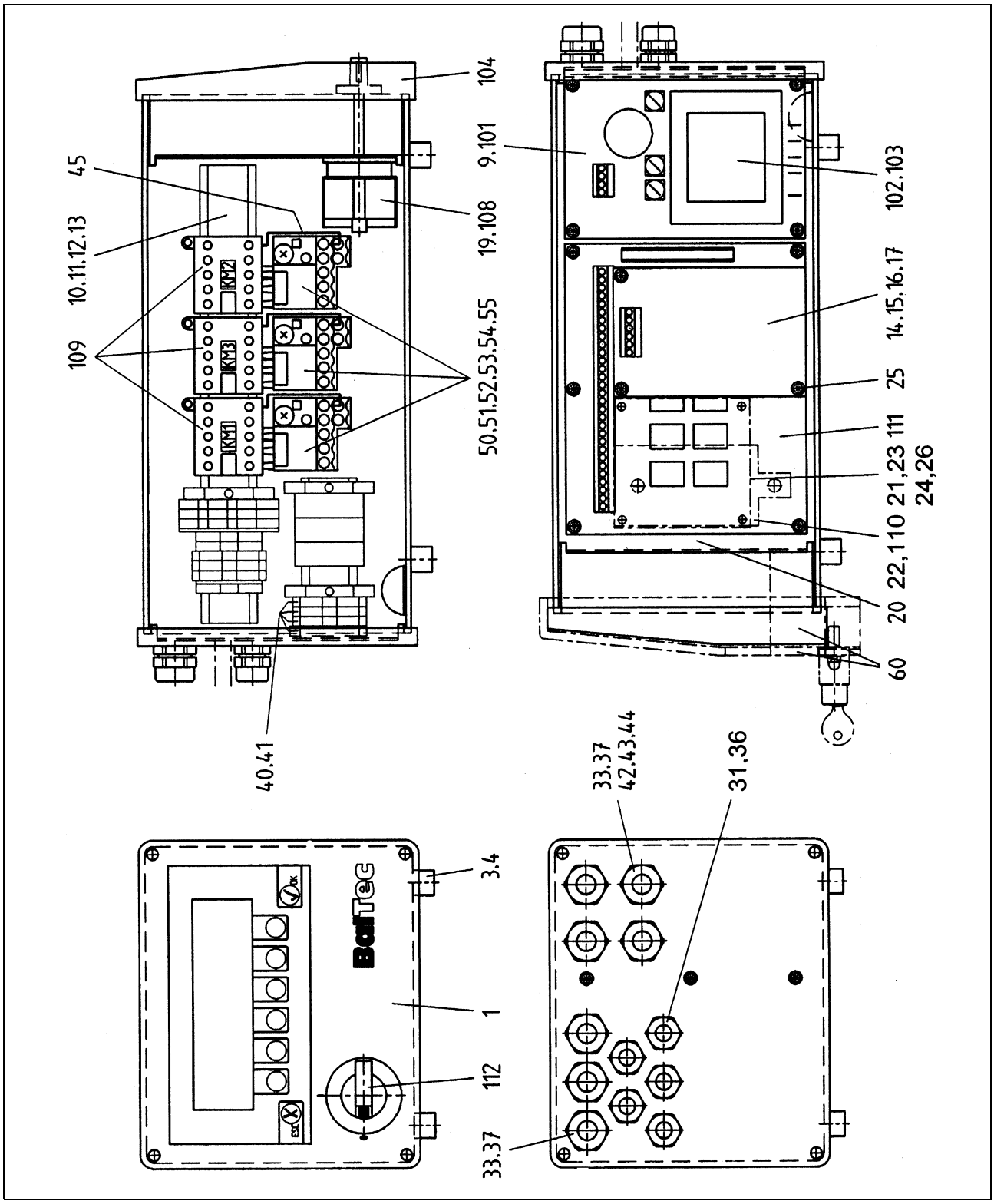
Baltec-No. 530468

8.1.7 Wiring diagram contactor module RN pneumatic 802908



8.2 Spare parts lists

8.2.1 Control unit RC 20, 814337-n



Pos.	No.	Spare name	Art. No.	Remarks
1	1	Basic unit	530354	120/230/400/440V
3	4	Shock absorber	391202	
4	4	Screw	341010	M4x10
9	1	Power supply unit incl. transformer	530355	200/345/480/575V
10	1	Contactor module	530356	
11	1	Contactor module	530357	
12	1	Contactor module	530358	
13	1	Contactor module	530359	
14	1	Safety module for permanent activation with foot switch	530467	SIMOD AM-SSR
15	1	Safety module for pulse or permanent activation with foot switch, release input	530468	SIMOD AMS-SSR
16	1	Safety module for for permanent activation with two-hand button	530465	SIMOD 2HMR-SSR
17	1	Safety module for pulse or permanent activation with two-hand button, release input	530466	SIMOD 2HMRS-SSR
19	1	Modification kit	570508	only RNE/RNS 481
20	1	Programmable control	530373	ALB 1761-L16 BWB
21	1	Proportional Valve Driver	530374	
22	1	Relay module	534081	
23	1	Additional relay	534087	
24	2	Distance bolt	530397	M4x60mm DIA SW6
25	3	Screw	346090	M3x6
26	1	Control cable	521078	XY 4x0.75mm^2
27	1	Pieces set	530460	RNR with rotary indexing unit MADER
31		Screwed cable gland	525795	M16x1.5 4.0-8.0mm
33		Screwed cable gland	525794	M20x1.5 5.5-12.0mm

Pos.	No.	Spare name	Art. No.	Remarks
36		Locking plug	371520	M16x1.5 K 295 No.149
37		Locking plug	371521	M20x1.5 K 295 No.188
40	1	Cable machine	520168	3-phase
41	1	Cable machine	520167	1-phase without USA
42	1	Tube fitting straight	525746	CSA, PA-GOB-12M20 NW12-M20x1.5 (Canada)
43	1	Tube fitting with 90° bow angle	525747	CSA, VP-BRB-12M20 NW12-M20x1.5 (Canada)
44	1	Lock nut	525748	CSA. 50.220 PA/SW M20x1.5 (Canada)
45	1	Cable	520230	Bridge
50	1	Thermal relay	524233	Type T16-1.3
51.1	1	Thermal relay	524234	Type T16-1.7
51.2	1	Thermal relay	524235	Type T16-2.3
52.1	1	Thermal relay	524236	Type T16-3.1
52.2	1	Thermal relay	524237	Type T16-4.2
53	1	Thermal relay	524238	Type T16-5.7
54.1	1	Thermal relay	524239	Type T16-7.6
54.2	1	Thermal relay	524240	Type T16-10
55	1	Thermal relay	524241	Type T16-13
60	1	Front cover	814080	optional
101		Power supply unit	530371	120/230/400/440V
102		Transformer	548079	120/230/400/440V
103		Transformer	548080	200/345/480/575V
104		Front unit complete	530367	
108		Main switch	522043	SNT A3-8E
109		Contactor 24V, 4kW	533222	KM1 = Riveting motor KM2 = Hydraulic aggregate motor KM3 = Second riveting motor (double riveting machines)
110		Relay	534080	24V Type 4KW
111		Control module	530481	PROMOD
112		Rotary knob to main switch	522102	→ Pos. 108

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