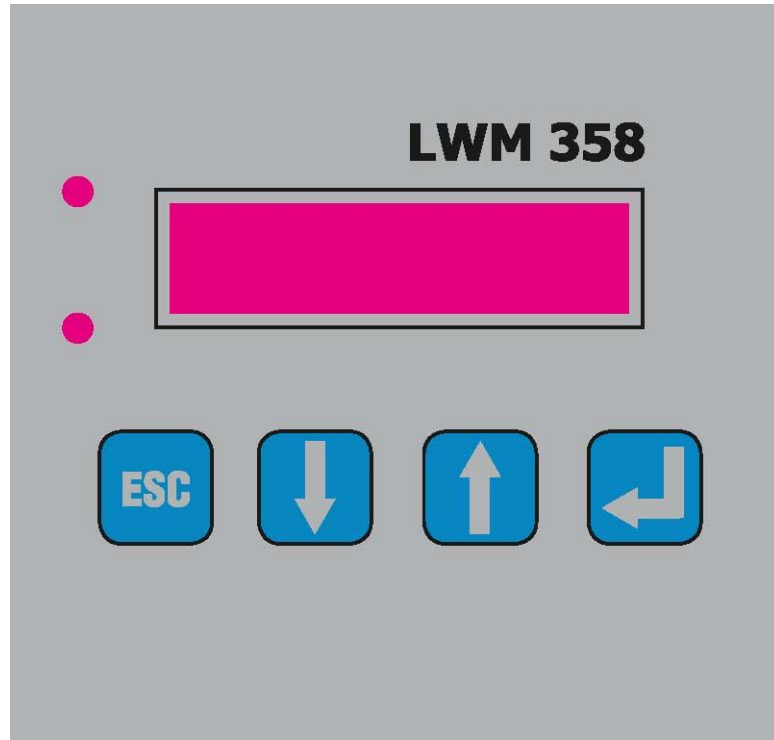

Operating Manual

LWM 358-S / LWM 358-W

Software V 0.2x



Revision	Date	Author	Remarks / Software Version
Preliminary version	20/01/10	Fei	
1	29/01/14	Bvt	update wiring diagram
2	18/02/14	Bvt	amendment note active AO
3	26/03/14	Mue	parameter 0/4-20mA
4	07/07/14	Bvt	amendments 0/4-20 mA
5	20/10/14	Mue	update wiring diagram
6	29.01.16	Mü	drawing:3x relais AA 4-20mA
7	24.10.16	Mü	4.2/11.1:apparent ohmic resistance
8	30.08.17	HK	Calibration of temperature
9	26.04.18	Rei	Layout revised
10	07.05.18	Rei	Calibration conductivity
11	13.02.19	Rei	Programming analogue output



Translation of the original instructions

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1 Electrical connection

1.1 Wiring at a glance



Warning

Danger of electric shock!

The entire electrical connection work may only be carried out while the device is disconnected from the mains.



Caution

Caution

- The protective earth connection must be carried out before any other connection. Danger may occur if the PE wire is interrupted
- Before performing the start-up, make sure that the supply voltage corresponds to the value indicated on the nameplate (right side or back side of casing)
- For the mains line current protection (nominal current ≤ 16 A) is required



Note!

Active analogue output; do not connect power (24V DC) on the 0/4-20 mA analogue outputs.

1.2 Terminal layout

terminal	function	type	comment
1	Power-In supply voltage 230VAC	N	internal fuse: 5 AT for Power-Out
2		L	
3		PE	
4	Power-Out supply voltage 230VAC	PE	max. 5 A
5		N	
6		L	
7	relay output 1 (K1)	NC	230 VAC max. 4 A 24 VDC max. 1 A
8		COM	
9		NO	
10	relay output 2 (K2)	NC	230 VAC max. 4 A 24 VDC max. 1 A
11		COM	
12		NO	
13	relay output 3 (K3)	NC	230 VAC max. 4 A 24 VDC max. 1 A
14		COM	
15		NO	
16	analogue output 2*	GND	**jumper between terminal 19 and terminal 39 required for power supply to AO-Modul ***see note chapter 2.1
17		0/4 – 20 mA***	
18			
19		IN 24 VDC**	
20	analogue output 1	GND	***see note chapter 2.1 apparent ohmic resistance max.400 ohm
21		0/4 – 20 mA***	
22	conductivity sensor	Shield	
23		COND A	
24		COND B	
25	temperature sensor	TEMP A	KTY 81-122
26		TEMP B	
27	digital input 1	GND	
28		IN	
29	digital input 2	GND	
30		IN	

* Optional in combination with analogue cartridge (item no. 090041)

1.2.1 Cable specifications

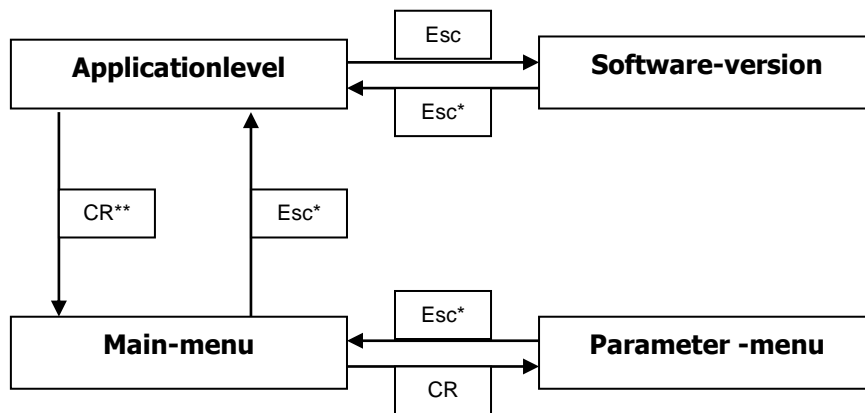
terminals	cable min.	cable max.	cable type
supply voltage	3x1.0 mm ²	3x1.5mm ²	NYM-J/Oilflex 110

1.3 Wiring diagrams

In the appendix you will find examples of the wiring configuration.

2 Handling

2.1 Menu configuration



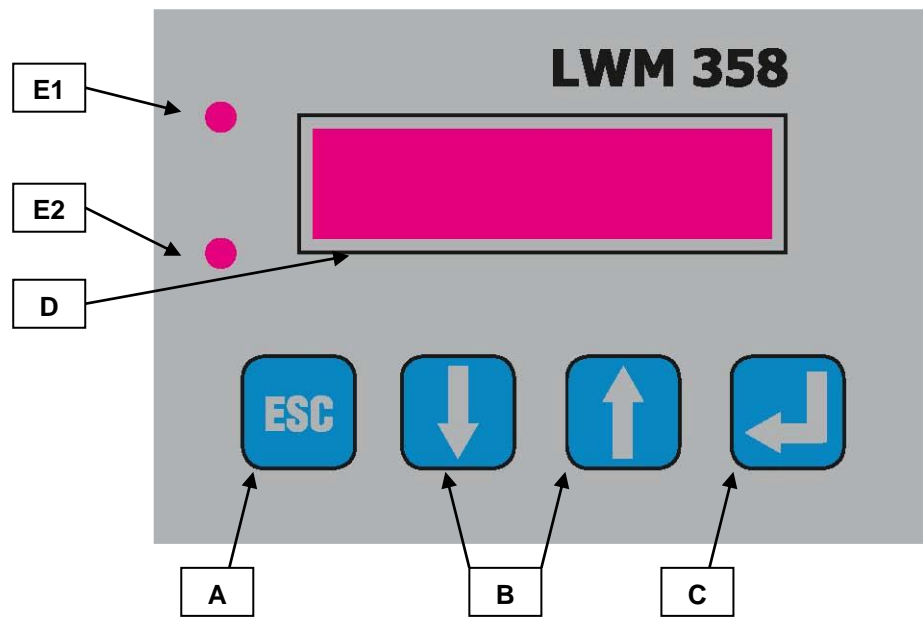
* After 10 minutes without any key activity the menu switches to application level.

** To enter the main menu enter the password (notificaton _ _ _ _)

Password 1 2 3 4

In case of entering the wrong password the menu switches to application level.

2.2 Operating elements



	Description	Function
A	ESC	- check out of menus - interruption of entries
B	↓ ↑	- password entry - menu selection - data editing
C	←	- confirmation of entries - menu request
D	Display	notificaton of: - conductivity and -temperature - status relay K1, K2, K3
E1	LED (gelb)	status digital input 1
E2	LED (gelb)	status digital input 2

2.3 Calibration of Temperature- and Conductivity probes

1. Open menu calibration conductivity, select metering range for the measuring cell (→ $\mu\text{S}/\text{cm}$ ←)
(Standard measuring cell: up to 100 $\mu\text{S}/\text{cm}$, electrode length 35 mm, MB-resistance 15 k Ω)
2. Calibration (gauging) of temperature :
 - select „reset gauging“(°C→?←) in the gauging temperature menu
 - do not modify „lower gauging point“ (→↓←°C)
 - select „higher gauging point“(→↑←°C) and enter reference value:
 - o put measuring cell in water with temperature ranging from 15 – 20 °C,
 - o stir slightly,
 - o await leveling of temperature
 - o take over the value
3. Calibration (gauging) of conductivity:
 - select gauging conductivity menu ($\mu\text{S}/\text{cm}$)
 - select „reset gauging“ in the gauging conductivity menu ($\mu\text{S}/\text{cm}$ →?←)
 - disconnect green or yellow wire for „lower gauging point“(→↓← $\mu\text{S}/\text{cm}$) (terminal 23 or 24) and enter value „00.0 $\mu\text{S}/\text{cm}$ “
 - reconnect wiring, select „higher gauging point“ (→↑← $\mu\text{S}/\text{cm}$) and enter reference value:
 - o put measuring cell in water with defined conductivity (approx. 80 % of measuring range)
 - o stir slightly
 - o await leveling of conductivity
 - o take over the value

2.4 Programming of outputs (analogue output):

Programming the analogue output:

- select menu item A01 0 / 4-20 mA in the menu
- in menu item A01 0 / 4-20 mA set analog signal output to 0-20 or 4-20 mA
- assign the lower measuring range of the measuring cell (0/4 mA =),
e.g. 4mA = 0.1 $\mu\text{S} / \text{cm}$
- assign the upper measuring range of the measuring cell (20 mA =),
e.g. 20mA = 200.0 $\mu\text{S} / \text{cm}$
- the assigned $\mu\text{S} / \text{cm}$ values must not exceed the measuring range of the measuring cell
- counter-check the given mA values after programming in the diagnosis menu, use an external current meter for this purpose

Calibration of analogue output:

- If the given mA values differ, the analogue output can be calibrated
- In relation to the set range of the measuring cell 0-20mA or 4-20 mA the output for the lower value is 0 or 4 mA. If there is a deviation between the value of the current meter and the LWM the lower point of calibration needs to be set in the LWM. (→↓← mA)

- For calibration the output of the upper value is 20 mA. If there is a deviation between the value of the current meter and the LWM the upper point of calibration needs to be set in the LWM. (→↑← mA)
- The shown values for calibration points are the results from the last calibration
- Conduct calibration always completely, first "low" then "high"
- Calibration process must not be interrupted (with ESC-button)
- It is not possible to check calibration values without automatic saving!

Accuracy is at 1% after calibration

relay output K1-K2-K3

DI1/DI2 activation of threshold value via digital input

Activate/ deactivate the relay outputs for monitoring of threshold values, for instance when a pump or solenoid valve is activated etc.

3 Parameters and settings

parameter	function	format/ unit	selection/ limit	default setting	individual setting
K1					
μS/cm↔→°C	select monitored parameter		μS/cm °C	μS/cm	
↑	max.-limit		metering range*	MB-final value	
↓	min.-limit		metering range*	MB-starting value	
t↑	time lag Max.-limit	s	0 - 999	0	
t↓	time lag Min.-limit	s	0 - 999	0	
DI1	limit activation by digital input 1		↑ - ↓	-	
DI2	limit activation by digital input 2		↑ - ↓	-	
K2					
μS/cm↔→°C	select monitored parameter		μS/cm °C	μS/cm	
↑	max.-limit		metering range*	MB-final value	
↓	min.-limit		metering range*	MB-starting value	
t↑	time lag Max.-limit	s	0 - 999	0	
t↓	time lag Min.-limit	s	0 - 999	0	
DI1	limit activation by digital input 1		↑ - ↓	-	
DI2	limit activation by digital input 2		↑ - ↓	-	
K3					
μS/cm↔→°C	select monitored parameter		μS/cm °C	μS/cm	
↑	max.-limit		metering range*	MB-final value	
↓	min.-limit		metering range*	MB-starting value	
t↑	time lag Max.-limit	s	0 - 999	0	
t↓	time lag Min.-limit	s	0 - 999	0	
DI1	limit activation by digital input 1		↑ - ↓	-	
DI2	limit activation by digital input 2		↑ - ↓	-	

parameter	function	format/ unit	selection/ limit	default setting	individual setting
AO1 0/4-20mA					
μS/cm ↔ °C	displayed value analogue output		- μS/cm - °C	μS/cm	
0/4-20mA	measuring range		-0-20 mA -4-20 mA		
0/4mA=	allocation min. display value		metering range*	MB- starting value t	
20mA=	allocation max. display value		metering range*	MB-final value	
→↓←mA	lower gauging point	mA	0/4 - 20		
→↑←mA	higher gauging point	mA	0/4 - 20		
AO2 0/4-20mA ***					
μS/cm ↔ °C	displayed value analogue output		- μS/cm - °C	μS/cm	
0/4-20mA	measuring range		-0-20 mA -4-20 mA		
0/4mA=	allocation min. display value		metering range*	MB- starting value t	
20mA=	allocation max. display value		metering range*	MB-final value	
→↓←mA	lower gauging point	mA	0/4 - 20		
→↑←mA	higher gauging point	mA	0/4 - 20		
μS/cm					
→μS/cm←	select metering range*		- 10 μS/cm - 100 μS/cm - 20 μS/cm - 200 μS/cm - 2000 μS/cm - 10 mS/cm	100 μS/cm	
→↓←μS/cm	lower gauging point		metering range*		
→↑←μS/cm	higher gauging point		metering range*		
μS/cm →?←	reset gauging				
°C					
→↓←°C	lower gauging point	°C	0.0 – 99.9		
→↑←°C	upper gauging point	°C	0.0 – 99.9		
°C →?←	reset gauging				
↑↓↔					
DI	diagnose digital input				
K1 K2 K3	diagnose digital output				
μS/cm °C	diagnose analog input				
0/4-20mA	diagnose analog output				

* Currently selected measuring range or temperature measuring range 0.0 – 99.9 °C

*** Menus are only displayed, if on clamp 16-19 AO-Module 0/4-20mA is connected.

4 Technical Appendices

4.1 Technical data

	min.	typ.	max.	unit
supply voltage (AC)	205	230	245	V
power frequency	47	50	63	Hz
nominal apparent power (without consumer)	3	4	5	VA
ambient temperature range (operation)	0		40	°C
ambient temperature range (storage)	-10		60	°C
rel. humidity (not condensing)	15		80	%
switching inputs (for external NO)				
– switch current			15	mA
– switching voltage			25	V
switching outlet (relay, unless otherwise stated)				
– dielectric strength			250	V
– load (AC)			4	A
– load (DC)			1	A
analogue output	0/4		20	mA
apparent ohmic resistance max.			400	ohm
temperature measurement				
- range	0		99.9	°C
- accuracy (+/- regarding full scale)		2		%
- linearity (+/-regarding full scale)		2		%
conductivity measurement				
- range 1	0,1		10	µS/cm
- range 2 (Standard)	1		100	µS/cm
- range 3	0,2		20	µS/cm
- range 4	2		200	µS/cm
- range 5	20		2.000	µS/cm
- range 6	0.1		10	mS/cm
- accuracy (+/- regarding full scale)		2		%
- linearity (+/-regarding full scale)		2		%
- temperature compensation to 25°C		2.2		%/K
protection	IP 65			
display	textdisplay 2x16 digits			
panel	3 buttons			
LEDs	- status digital input 1 (yellow) - status digital input 2 (yellow)			

4.2 Wiring diagram / Sample connection

1

2

3

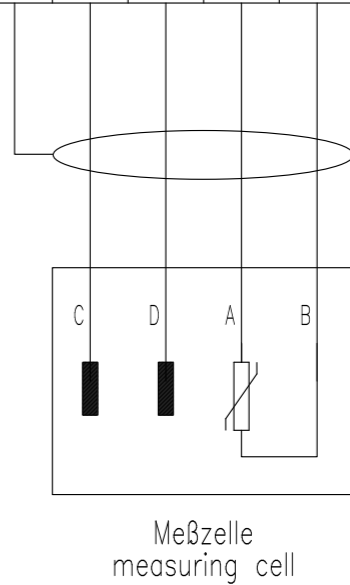
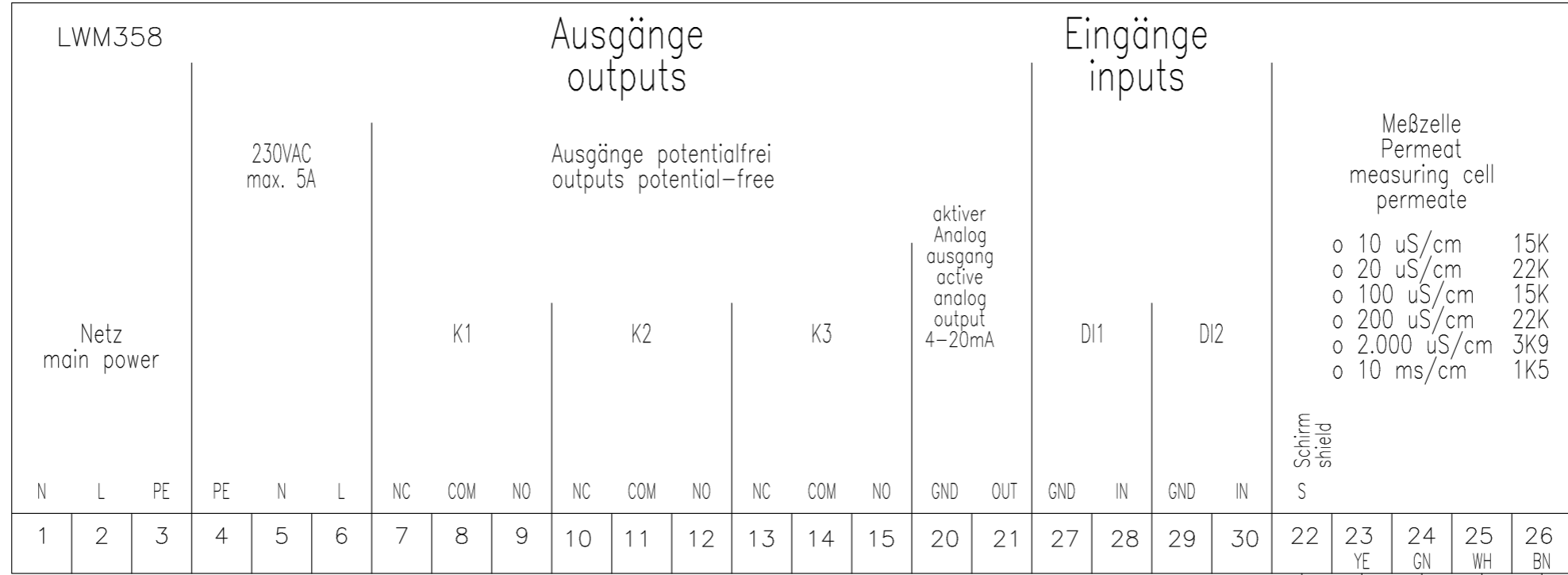
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	Revision	Datum	Name		Datum	Name
a				gez.	27.01.14	Ay
b						
c				gepr.	04.09.14	Lei
d						

Projektbez. LWM 358	=	
Auftragsnr.	+	
Zeichnungsnr. LWM 358		Blatt 1
		2 Bl.

1

2

3

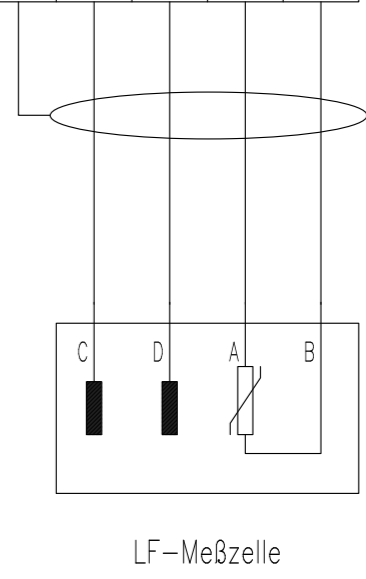
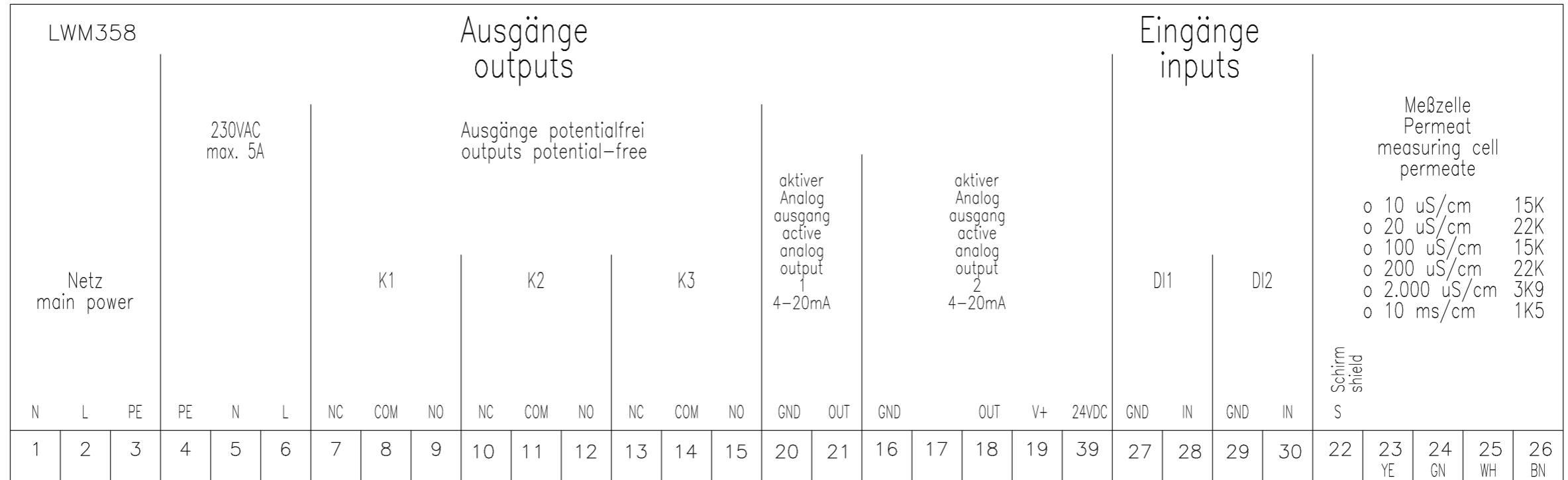
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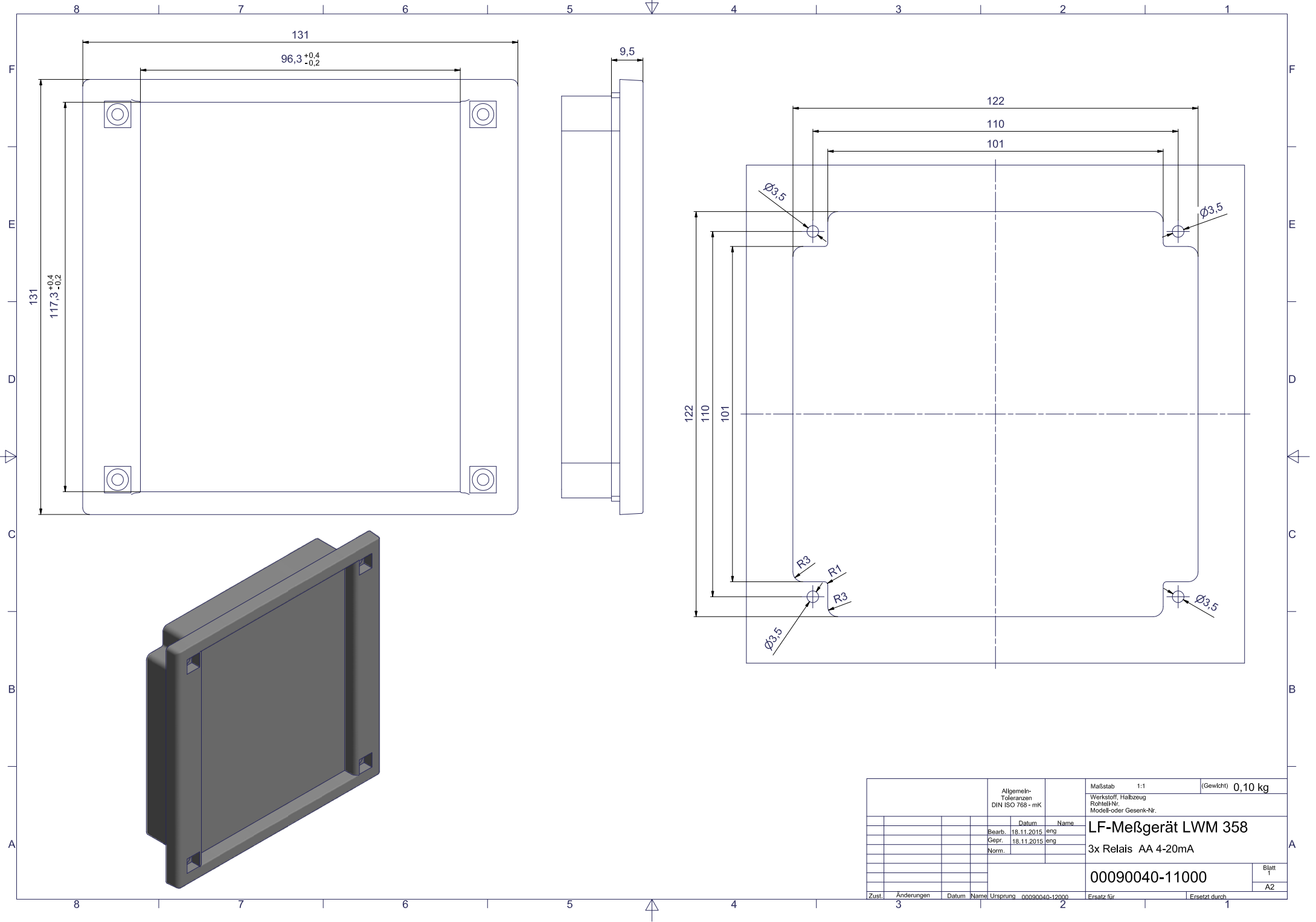


	Revision	Datum	Name		Datum	Name
a				gez.	27.01.14	Ay
b						
c				gepr.	04.09.14	Lei
d						

Projektbez. LWM 358	=
Auftragsnr.	+
Zeichnungsnr. LWM 358	Blatt 2
	2 Bl.

4.3 LF-measuring device LWM 358

3x relais AA 4-20mA



Allgemein-Toleranzen DIN ISO 768 - mK		Maßstab 1:1		(Gewicht) 0,10 kg
Datum		Name		
Bearb.	18.11.2015	eng	LF-Meßgerät LWM 358	
Gepr.	18.11.2015	eng		
Norm.				
Werkstoff, Halbzeug		Rohteil-Nr.		
Modell-oder Gesenk-Nr.		3x Relais AA 4-20mA		
00090040-11000				Blatt
				A2
Zust.	Änderungen	Datum	Name	Ursprung
3				00090040-12000
Ersatz für		Ersetzt durch		
		2		
		1		