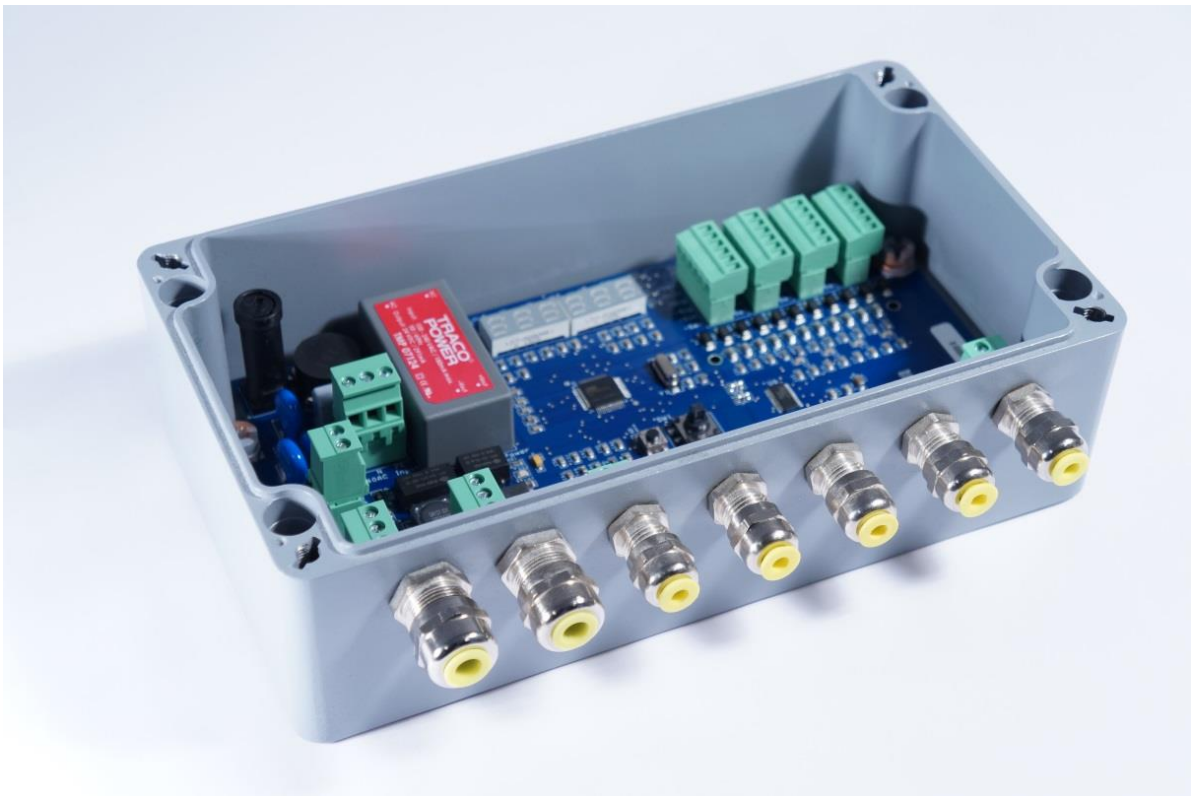
WEA-Base

User manual for load cell transmitters



Contents

1. Technical data

Technical data:	
Resolution	24 bit
Conversion Rate	600 Hz
Full Range	± 6 mV/V
Total number of load cells	Max. 12 x 350 ohm
Load cell channels	4
Linearity	<0.01% of full scale
Calibration	Data sheet or deadweight calibration
Power supply:	
Voltage	24 VDC ± 10% or 100-240 AC, 50/60 Hz
Power consumption	5 W
Isolation	1000 V
Analogue output:	
Type	Isolated 16 bit
Voltage / load	0-10 V, 2-10 V / >10000 ohm
Current / load	0-20 mA, 4-20 mA / <500 ohm - Active output
Digital IO:	
Digital input	2 x 24 VDC / 6 mA
Relay output	2 x NO - Max 250 VAC+VDC / 100 mA
Communication interface:	
Serial port	1 x RS485
USB	1 x Device 2.0
Mechanical data:	
Operating temperature	-10 °C to +60 °C
Storage temperature	-30 °C to +80 °C
Ingress Protection Rating	IP 66
Dimensions (H x W x D)	220 x 122 x 80 mm
Options:	
WEA-Base-RF (H x W x D)	WEA-Base in stainless steel (AISI 316) case. (250 x 210 x 80 mm)
WEA-Base-OP1 (H x W x D)	External display in stainless steel display IP65 - Red 75 mm digits (L716 x H250 x D100 mm)
WEA-Base-OP2 (H x W x D)	External display in stainless steel display IP65 - Red 57 mm digits (365 x 130 x 82 mm)

2. Assembly

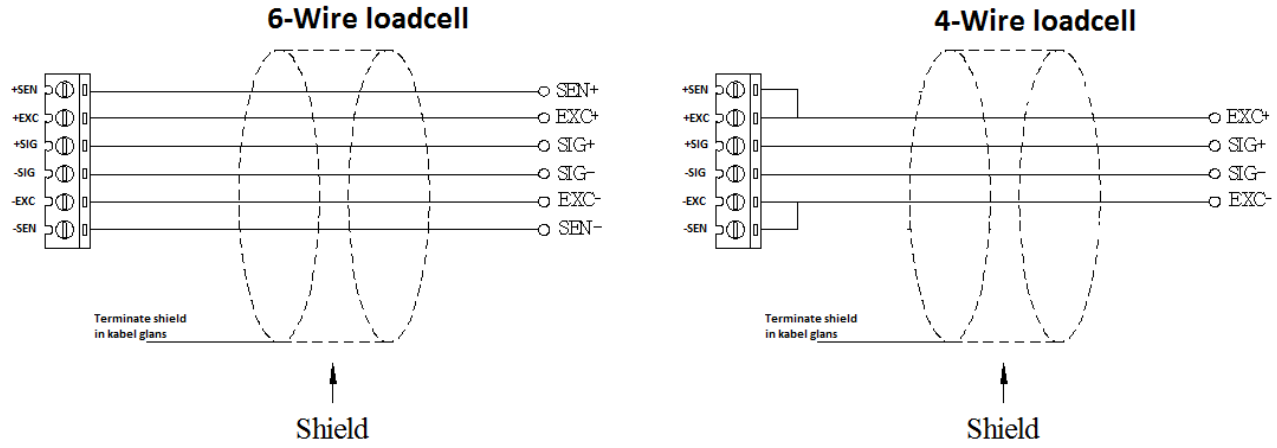
2.1 Power supply

Connect 230 VAC to terminal J13 phase (L1), neutral (N) and earth (PE).
Connect 24 VDC to terminal J14 plus(+) minus(-).
If both supplies are connected, the amplifier automatically selects only one of them. If one of the supplies is switched off, the amplifier automatically switches over to the other supply.

2.2 Load cells

Connect the load cells to terminals from J6 channel 1(CH1), to J11-channel 4(CH4), in the same order.
When connecting more than four load cells, the load cells must be distributed equally on each channel.
For example, with the use of six load cells, connect the load cells in pairs to CH1+2+3.

Power supply (±EXC), signal (±SIG) and sensor (±SEN). When connecting load cells with four conductors, a jumper must be fitted between +supply (+EXC) and +sensor (+SEN), and a jumper must be fitted between –supply (-EXC) and –sensor (-SEN).



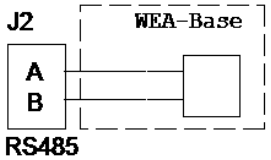
NB: Shield **must** be terminated in the adapter.

Status for each load cell channel, CH1 to CH4, is shown on LEDs above the individual channel:

- Green: channel in use, and no errors detected in channel.
- Flashing Green: channel in use, and error detected in channel.
- Off: Channel not in use

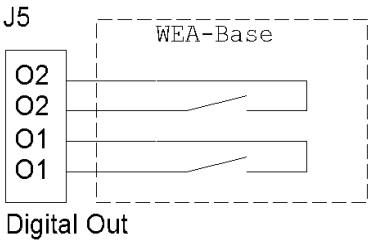
2.3 RS-485

Fit connection to terminal J2 for RS-485 communication - A & B



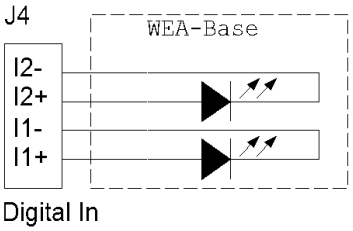
2.4 Relays

Fit connection to terminal J5 for 2 x relays - O1 & O2



2.5 Digital input

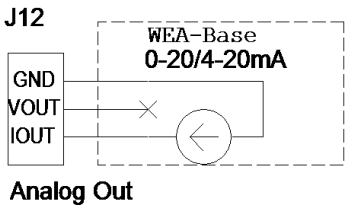
Fit connection to terminal J4 for 2 x digital inputs - I1 & I2
The inputs are 24 VDC compatible.

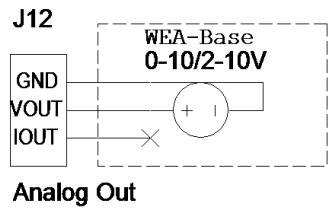


2.6 Analogue output

Fit connection to terminal J12 for 1 x analogue output.
Connect current output between IO and GND.
Connect voltage output between VO and GND.

NB: The analogue output is ACTIVE.

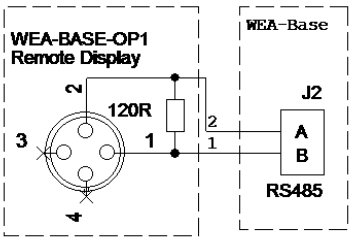




2.7 WEA-Base-OP1 - External display

Connect display to RS485 terminal J2.
See section 4.5.1 Set-up of transmitter functions.

NB: Shield must be terminated in the adapter.

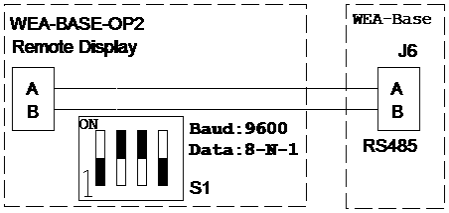


2.8 WEA-Base-OP2 - External display

Connect display to RS485 terminal J2.

See section 4.5.1 Set-up of transmitter functions.

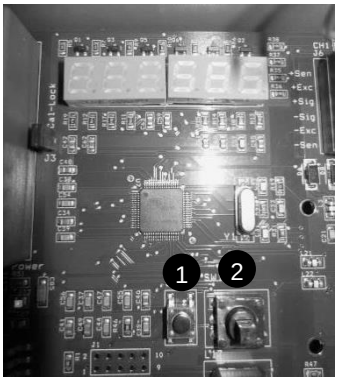
NB: Shield must be terminated in the adapter.



3. Parameters set-up

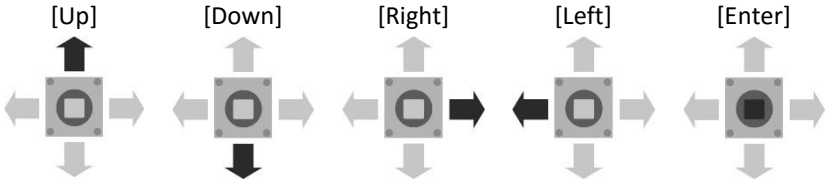
3.1 Operation

To navigate the parameters menu (see "5 Parameters menu"), use push button S1 and joystick SW1.



❶ Push button S1: Back [Escape]

❷ Joystick SW1: SW1 is shown with the following symbols:



To access the parameters menu, press [Enter].
To exit the menu, press [Escape], until the display flashes "SAVE".
To save changes, press [Enter].
To exit without saving changes, press [Escape] twice.
"SAVE" will not be displayed if the parameters are unchanged.

NB: Analogue and digital outputs are inactive when parameters are being set up

3.2 Calibration

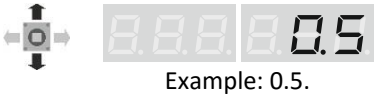
3.2.1 Theoretical calibration

Enter load cell data from the data sheet. Calibration is calculated in the load cell amplifier, based on the data entered.

3.2.2 Deadweight calibration

The scale is loaded with a known weight. It is recommended, that the known weight is at least 70 % of the scale capacity. Once the deadweight calibration is complete, the theoretical values are updated in the load cell amplifier. The theoretical values can be used to transfer the calibration from one load cell amplifier to another.

4. Calibration parameters

Parameters	Default	Operation	Display	Options
Total number of channels	One channel	Press [Enter] twice for menu 1.1		
		Press [Enter]		
		Move SW1 to [Up] or [Down]. Select the desired number of channels.	 Example: Four channels	1,2,3 or 4
Load cell capacity	100 kg	Press [Enter] twice.		
		Move SW1 to [Down], for menu 1.2.		
		Press [Enter]		
		Navigate to the desired digit by moving SW1 to [Right] or [Left].		
		Set the value by moving SW1 to [Up] or [Down]. Repeat this and the previous procedure for all of the other digits that must be set.	 Example: 1000 kg	
Resolution	0.1 kg	Press [Enter] twice.		
		Move SW1 to [Down] for menu 1.3.		
		Press [Enter]		
		Set the value by moving SW1 to [Up] or [Down].	 Example: 0.5.	0.001, 0.002, 0.005, 0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10, 20 and 50

Parameters	Default	Operation	Display	Options
The scale's capacity	100.0 kg	Press [Enter]	 	
		Press [Enter]	 	
		Move SW1 to [Down] for menu 1.4.	 	
		Press [Enter]	 	
		Navigate to the desired digit by moving SW1 to [Right] or [Left].		
		Set the value by moving SW1 to [Up] or [Down]. Repeat this and the previous procedure for all of the other digits that must be set.		
Filter	5	Press [Enter]	 	
		Press [Enter]	 	
		Move SW1 to [Down] for menu 1.5.	 	
		Press [Enter]	 	
		Set the value by moving SW1 to [Up] or [Down].	  Example: 5	1 = Min. filtering 10 = Max. filtering

4.1 Deadweight calibration

Deadweight calibration can be done as a zero point calibration or/and as a point calibration.

Parameters	Default	Operation	Display	Options
Zero point calibration		Press [Enter]		
		Press [Enter]		
		Move SW1 to [Down] for menu 1.6.		
		Press [Enter]		
		Press [Enter]		
		The display flashes, while the calibration is being executed.		
		Press [Enter] when the scale is empty.		
		Continue to "Point calibration or save the setting. Press S1 [Escape] to "SAVE".		
				
				
				
Point calibration Calibration with a known weight		Press [Enter]		
		Press [Enter]		
		Move SW1 to [Down] for menu 1.6.		
		Press [Enter]		
		Move SW1 to [Down] for menu 1.6.2 "Point calibration"		
		Press [Enter]		

Parameters	Default	Operation	Display	Options
		Place a known weight on the scale. NB: It is recommended, that the known weight is at least 70 % of the scale's capacity.		
		Navigate to the desired digit by moving SW1 to [Right] or [Left].		
		Set the value by moving SW1 to [Up] or [Down]. Repeat this and the previous procedure for all of the other digits that must be set.	  Example: 8110 kg	
		Press [Enter] to confirm.	 	
		Press [Enter] to confirm the known load is placed on the weight. The display shows DONE for 2 seconds if the calibration is accepted.	 	
		Press S1 [Escape] to "SAVE".	   	

4.2 Theoretical calibration

Only active load cell channels can be selected. The values in "Theoretical calibration" are updated automatically after a "Deadweight calibration" and can be used as a backup or to transfer a calibration from one transmitter to another.

Parameters	Default	Operation	Display	Options
Channel (theoretical zero point)	0mV/V	Press [Enter]	 	
		Press [Enter]	 	
		Move SW1 to [Down] for menu 1.7. "Theoretical zero point".	 	
		Press [Enter]	 	

		Press [Enter]		
		Set the desired channel by moving SW1 to [Up] or [Down].		 1,2,3 or 4.
		Press [Enter]		

Parameters	Default	Operation	Display	Options
		Enter zero point mV/V. The zero-point is calculated on the basis of the load cell's capacity, described in the data sheet. Navigate to the desired digit by moving SW1 to [Right] or [Left].		
		Set the value by moving SW1 to [Up] or [Down]. Repeat this and the previous procedure for all of the other digits that must be set.		

Parameters	Default	Operation	Display	Options
Channel (theoretical amplifica-tion)	2 mV/V	Press [Enter]		
		Press [Enter]		
		Move SW1 to [Down] for menu 1.7.		
		Press [Enter]		
		Move SW1 to [Down] for menu 1.7.2.		
		Press [Enter]		
		Set the desired channel by moving SW1 to [Up] or [Down].		
		Press [Enter]		
		Enter load-cell amplification from data sheet. Navigate to the desired digit by moving SW1 to [Right] or [Left].		

Set the value by moving SW1 to [Up] or [Down].
Repeat this and the previous procedure for all of the other digits that must be set.

4.3 Analogue output

Parameters	Default	Operation	Display	Options
Set analogue output type	4-20 mA	Press [Enter]	 	
		Move SW1 to [Down] for menu 2.	 	
		Press [Enter]	 	
		Press [Enter]	 	
		Set analogue output type by moving SW1 to [Up] or [Down].	  Example: 2-10 V	0-20 mA, 4-20 mA, 0-10 V, 2-10 V
Adjusting low analogue value The value changes automatically after the analogue output type is set.		Press [Enter]	 	
		Move SW1 to [Down] for menu 2.	 	
		Press [Enter]		
		Move SW1 to [Down] for menu 2.2.	 	
		Press [Enter]	 	0 - 65535
		Navigate to the desired digit by moving SW1 to [Right] or [Left].		
		Set the value by moving SW1 to [Up] or [Down]. Repeat this and the previous procedure for all of the other digits that must be set.		

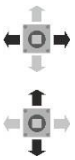
NB: The analogue signal is active in this menu point.

Parameters	Default	Operation		Display	Options
Adjusting high analogue value The value changes automati-cally after the analogue output type is set.		Press [Enter]			
		Move SW1 to [Down] for menu 2.			
		Press [Enter]			
		Move SW1 to [Down] for menu 2.3.			
		Press [Enter]			0 - 65535
		Navigate to the desired digit by moving SW1 to [Right] or [Left].			
		Set the value by moving SW1 to [Up] or [Down]. Repeat this and the previous procedure for all of the other digits that must be set.			

NB: The analogue signal is active in this menu point.

4.4 Communication

4.4.1 Setting RS485 communication

Parameters	Default	Operation	Display	Options
Set protocol		Press [Enter]	 	
		Move SW1 to [Down] for menu 3.	 	
		Press [Enter]	 	
		Press [Enter]	 	
		Set the value by moving SW1 to [Up] or [Down].		ASCII, MK485, External display
External display WEA-BASE-OP1.		The scale transmits to remote display.		
		Press [Enter]	 	
		Press [Enter]		
		Navigate to the desired digit by moving SW1 to [Right] or [Left]. Set the value by moving SW1 to [Up] or [Down]. Repeat this and the previous procedure for all of the other digits that must be set. • Set WEA-Base baud rate: 9600 • Set the address on the external display: "A" or "L" (Address settings are not valid for WEA-Base-OP2). Only baud rate setting is applied to external display WEA-BASE-OP2.	 	

Parameters	Default	Operation	Display	Options
Set Baud rate	115200	Press [Enter]		
		Move SW1 to [Down] for menu 3.		
		Press [Enter]		
		Move SW1 to [Down] for menu 3.2.		
		Press [Enter]		
		Set the value by moving SW1 to [Up] or [Down].		2400, 4800, 9600, 19200, 57600 & 115200.
Set address	1	Press [Enter]		
		Move SW1 to [Down] for menu 3.		
		Press [Enter]		
		Move SW1 to [Down] for menu 3.3.		
		Press [Enter]		
		Navigate to the desired digit by moving SW1 to [Right] or [Left].		
		Set the value by moving SW1 to [Up] or [Down]. Repeat this and the previous procedure for all of the other digits that must be set.		1-255

4.5 Function

4.5.1 Set-up of transmitter functions

Parameters	Default	Operation	Display	Options
Set "Mode"	Trans-mitter	Press [Enter]	 	
		Move SW1 to [Down] for menu 4.	 	
		Press [Enter]	 	
		Press [Enter]		
		Set the value by moving SW1 to [Up] or [Down].	 	trans, remote
		Transmitter: IO (Input/Output) is controlled by the load-cell amplifier. • Analogue output is set as a function of the weight. • Input 1 can be used for external tareing, where up to ±2 % of the scale's capacity can tare. • Output 1 is set, if an error is detected on one of the load cell channels.		
		Remote control, IO (Input/Output) is controlled by/via RS485/USB • IO is controlled via bus • If there has been no communication for at least 30 seconds, the analogue and digital outputs are reset.		

4.6 Diagnostics

Status of inputs and outputs, and general information about the load cell amplifier.

4.6.1 Diagnostics Parameters

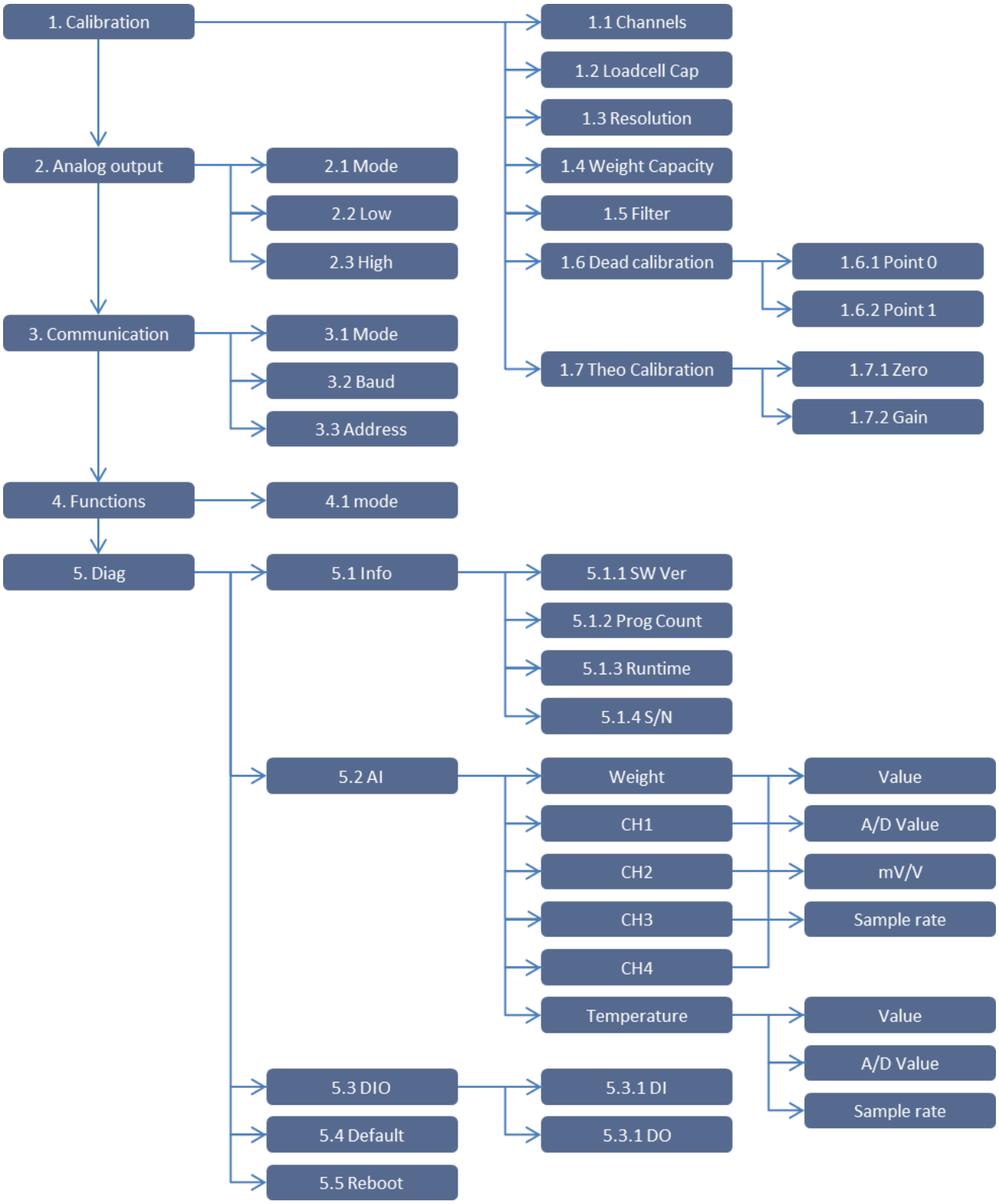
Parameters	Default	Operation	Display	Options
Information		Press [Enter]	 	
		Move SW1 to [Down] for menu 5.	 	
		Press [Enter]	 	
		Press [Enter] for submenu.		
Firmware version.		Current firmware version.		
Program counter		Number of times data has been saved in flash memory.		
Runtime		Uptime since the last power interruption.		
Serial number				
Information from analogue inputs		Press [Enter]	 	
		Move SW1 to [Down] for menu 5.	 	
		Move SW1 to [Down] for menu 5.2.	 	
		Press [Enter]	 	
Weight data		Depends on how the transmitter is set up.		
		Press [Down] on SW1, to the desired sub-menu.		
		Actual weight from the calibrated scale.		
		Actual divisor from the scale.		
		Actual mV/V from the scale.		

Parameters	Default	Operation	Display	Options
		Actual sample rate from the scale.		
Data from analogue input channel 1				
		Actual weight from load cell(s) on CH1.		
		Actual divisor from load-cell(s) on CH1.		
		Actual mV/V from load cell(s) on CH1.		
		Actual sample rate from the scale(s) on CH1		
		The same settings are used for channels 2. 3. and 4.		
Tempera-ture from WEA-Base		Temperature.		
		Actual temperature with WEA-Base.		
		Add value.		
		Actual sample rate for temperature.		
Information: Digital IO (Input/ Output)		Press [Enter]		
		Move SW1 to [Down] for menu 5.		
		Move SW1 to [Down] for menu 5.3.		
		Press [Enter]		
		See number of digital inputs.		
		See and set number of digital inputs.		

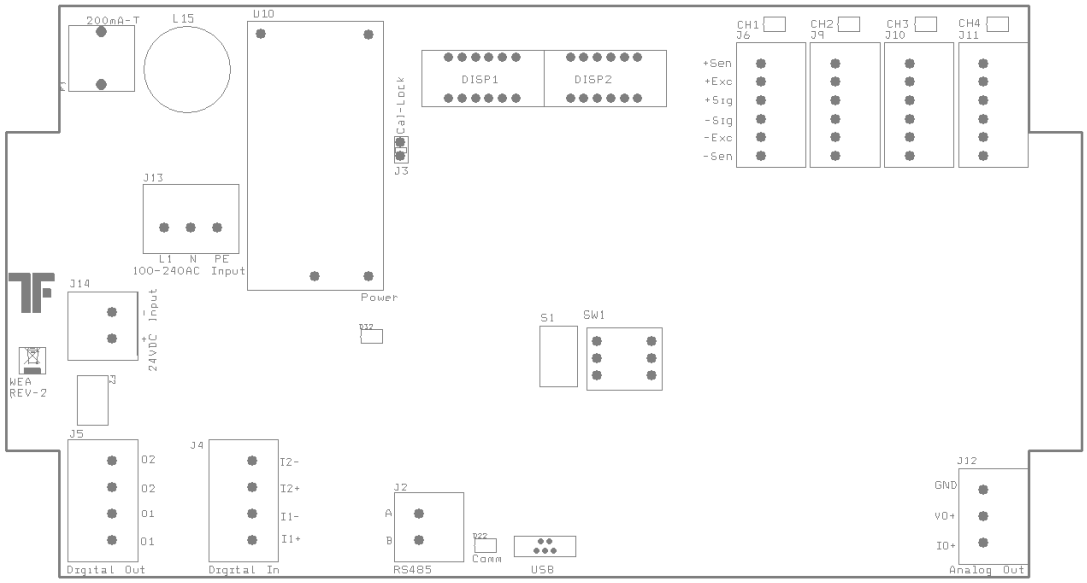
Parameters	Default	Operation	Display	Options
Reset WEA-Base parameter for default settings.		Press [Enter]	 	
		Move SW1 to [Down] for menu 5.	 	
		Press [Enter]		
		Move SW1 to [Down] for menu 5.4.	 	
		Press [Enter] to set parameter values to the default.		
Restart WEA-Base		Press [Enter]	 	
		Move SW1 to [Down] for menu 5.	 	
		Press [Enter]		
		Move SW1 to [Down] for menu 5.5.	 	
		Press [Enter] to restart WEA-Base.	 	

NB: Changed values in the parameter list are not saved.

5. Parameters menu



6. PCB overview



6.1 I/O list

6.1.1 Digital outputs

No.	Module terminal	Tag no.	Potential	Description
1	J5-01		Potential free	Relay output 1 – Transmitter Mode → Active with error detection
2	J5_02		Potential free	Relay output 2

6.1.2 Digital Inputs

No.	Terminal	Tag no.	Potential	Description
1	J4-I1+/-		24 VDC	Digital input 1 - Transmitter Mode → External zero calibration (MAX 2 %)
2	J4-I2+/-		24 VDC	Digital input 2

6.1.3 Analogue output

No.	Terminal	Tag no.	Potential	Description
1	J13 - VO+ IO+ / GND		0-10V 2-10V 0-20mA 4-20mA	Analogue output 1 - Transmitter Mode → Output is set as a function of the scale.

6.1.4 Load cell input

No.	Terminal	Tag no.	Potential	Description
1	J6 - CH1		6mV/V	Load cell, channel 1
2	J9 - CH2		6mV/V	Load cell, channel 2
3	J10 - CH3		6mV/V	Load cell, channel 3
4	J11 - CH4		6mV/V	Load cell, channel 4

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