Sensor Configuration for Individual Applications

**WLL190T-2**

**Max. Teach-in**
Teach-in to maximum sensitivity. Stable object detection without background effect.

**1-point Teach-in**
Teach-in – quick and easy for standard applications.

**2-point Teach-in**
Exact switching threshold adjustment at the object and of the environment. Ideal for applications with small system reserves.

**Auto Teach-in**
Fully automatic switching threshold adjustment of moving objects. Even falling or tiny objects are reliably detected.

**Zone Teach-in**
This so-called window technology learns the object within a definable bandwidth of the switching threshold. Ideal for the detection of marks, or simultaneous foreground and background suppression.

**Teach-in of transparent objects**
Teach-in with minimum sensitivity, reliably detecting glass, films or small objects.

Fast and reliable programming menu driven and at the push of a button: sensor properties and parameters are individually determined directly on the sensor.
Selection of the menu levels

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Photoelectric switch for fibre-optic cables WLL190T-2 – Easy handling, structured functions and maximum functionality.

The photoelectric switch for fibre-optic cables WLL190T-2 with the SICK fibre-optic cables is especially suited to detecting very small objects, objects in front of interfering backgrounds, and transparent and moving objects. Fibre-optic cables are ideal for use in installations where space is restricted.
For standard applications: Teach-in and the commissioning is complete.
The automatic learning with Teach-in is always the first step. The six different Teach-in versions can be quickly and easily selected. For standard applications, the settings automatically selected by the sensor are sufficient for stable operation.

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Manual adaptation of the switching threshold

- **Manual adaptation of the switching threshold**
  - **Wild jump back** from configuration mode to operating mode.
    - By pressing the **-** key for at least 2 seconds, the display jumps from any position in the configuration menu to the operational status indicator.
  - **Keylocks**
    - Simultaneously pressing the arrow keys for at least 2 seconds in the RUN mode, locks or unlocks the keys (display Loc/unloc).
  - **Channel switching (ch1, ch2)**
    - Changing the switching channel by pressing the **ch** key in RUN mode. Active channel ch1 or ch2 is shown in the display. Active channel can be taught, and measurement value is shown in the display.

Function keys of the evaluation unit

- **Display, numeric: 4-digit display**
  - Green: switching threshold, operating mode
  - Red: current reception value, Teach-in/function parameter

- **Arrow key < (manual switching threshold: higher resp. next function parameter)**
  - Arrow key > (manual switching threshold: lower or previous parameter)

- **“Teach-in” key**
  - Mode/Enter key (programming key)

- **Selector switch, operating mode:**
  - “SET” Teach-in switching thresholds active
  - “RUN” sensor mode and selection of function parameter
**Custom configuration: Utilising the entire functionality.**
If further adjustments need to be made beyond the normal Teach-in, the entire functionality can be selected via a comfortable menu.

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**Typical applications:**
- No background effects,
- No transparent objects,
- Max. system reserve,
- Max. sensitivity.

**In case of faulty input during Teach-in, the following messages are shown:**
- Indicates that light intensity is too low
- Indicates a non-detected, moving object
- Indicates a calculation error
- Indicates an interruption of the Teach-in

**Maximum sensitivity:**
- Diffuse type = object absent
- Through-beam = object present

**Through beam system:** to be adjusted in case an object is present

**Diffuse type:** to be adjusted in case no object is present
1.2 1-point Teach-in

1. Selector switch to SET

2. Operating mode
   Teach-in active

3. In the basic menu, select
   required mode by pressing
   the arrow keys

4. 1-point Teach-in is shown on
   the display

5. Adjust diffuse type fibre to the
   background without object
   and press Teach-in key

6. Teach-in successful

7. Selector switch to RUN

8. The switching threshold display
   briefly flashes, and the basic
   display is shown

   Easy setting of the switching threshold.
   Secondary condition:
   Diffuse type = object absent
   Through-beam = object present

   Adjust diffuse type to the background without object

   Typical applications:
   Standard applications,
   no spurious effects expected,
   max. system reserve.

   In case of faulty input during Teach-in,
   the following messages are shown:

   - Indicates that light intensity is too low
   - Indicates a non-detected,
     moving object
   - Indicates a calculation error
   - Indicates an interruption
     of the Teach-in

   Adjusts the switching threshold with + 5% according to the
   light received.

1.3 2-point Teach-in

1. Selector switch to SET

2. Operating mode
   Teach-in active

3. In the basic menu, select
   required mode by pressing
   the arrow keys

4. 2-point Teach-in is shown on
   the display

5. 1st point: adjust diffuse type
   fibre with object present

6. Press Teach-in key

7. 2nd point: adjust diffuse type
   fibre to the background
   without object

8. Press Teach-in key

9. Teach-in successful

10. Selector switch to RUN

11. The switching threshold display
    flashes, and the basic display
    is shown

   Exact adjustment of the switching threshold to object and ambient
   conditions, in any order:
   1st step: Teach-in with object
   2nd step: Teach-in without object

   The switching threshold is defined between the 1st and 2nd point.

   Typical applications:
   Exact switching point,
   switching threshold is adapted to the object and ambient
   conditions, create low system reserves.

   In case of faulty input during Teach-in,
   the following messages are shown:

   - Indicates that light intensity is too low
   - Indicates a non-detected,
     moving object
   - Indicates a calculation error
   - Indicates an interruption
     of the Teach-in

   Indicates that light intensity is too low
   Indicates a non-detected,
   moving object
   Indicates a calculation error
   Indicates an interruption
   of the Teach-in
1. Selector switch to SET
2. Operating mode
   Teach-in active
3. In the basic menu, select
   required mode by pressing
   the arrow keys
4. Auto Teach-in is shown on the
   display
5. Press Teach-in key
6. Adjust diffuse type fibre to the
   background without and with
   object
7. Selector switch to RUN
8. The switching threshold display
   flashes, and the basic display
   is shown
9. The switching threshold display
   flashes, and the basic display
   is shown
10. The switching threshold display
    flashes, and the basic display
    is shown

Automatic adjustment without stopping the production process. 1st step: start Teach procedure

Allow one object or, even better, for several objects to pass.

2nd step: stop Teach procedure

Typical applications: When objects can only be learned during the ongoing process, e.g. ejection control.

In case of faulty input during Teach-in, the following messages are shown:

- Indicates that light intensity is too low
- Indicates a non-detected, moving object
- Indicates a calculation error
- Indicates an interruption of the Teach-in

Typical applications: Ideal for mark detection, e.g. detecting No. 2 (see diagram above) with variable window. Or “foreground suppression” and “background suppression” simultaneously.

In case of faulty input during Teach-in, the following messages are shown:

- Indicates that light intensity is too low
- Indicates a non-detected, moving object
- Indicates a calculation error
- Indicates an interruption of the Teach-in

Adjust diffuse type fibre to the background without and with object.
1.6 Teach-in of transparent objects

1. Selector switch to SET

2. Operating mode
   Teach-in active

3. In the basic menu, select required mode by pressing the arrow keys

4. Teach-in of transparent objects is shown on the display

5. Press Teach-in key

6. Adjust diffuse type fibre without object with reflector

7. Selector switch to RUN

8. The switching threshold display flashes, and the basic display is shown

Mode is optimised for the detection of transparent objects.

Diffuse type:
Teach-in without object. Use reflector.

When using the Through-beam system:
Adjusts the switching threshold to 90% of the light received.

- Through-beam system:
  Perform Teach-in without object.

- Adjusts the switching threshold to 90% of the light received.

- Both channels (ch1 and ch2) are taught the same value.

- The switching threshold, however, can be manually readjusted for each channel.

2.1 Switching mode

1. Selector switch to RUN

2. Operating mode Configuring active

3. Press Mode key

4. In the basic menu, select required mode by pressing the arrow keys

5. Switching mode is shown on the display

6. Press Mode key, setting option flashes

7. Select between light-switching (L on) and dark-switching (d on) by pressing the arrow keys

8. Finish selection with Mode key

9. Select ending the adjustment (Exit)

10. Finish selection with Mode key

Typical applications:
Detection of objects with low attenuation, such as glass, clear film or very small objects.

In case of faulty input during Teach-in, the following messages are shown:

- Indicates that light intensity is too low
- Indicates a non-detected, moving object
- Indicates a calculation error
- Indicates an interruption of the Teach-in

Switching mode (L--d):
L on: light-switching (factory setting),
d on: dark-switching.
### 2.2 Response time

1. Selector switch to RUN

2. Operating mode Configuring active

3. Press Mode key

4. In the basic menu, select required mode by pressing the arrow keys

5. Response time is shown on the display

6. Press Mode key, setting option flashes

7. Select between high-precision setting (Stand) and fastest setting (Fast) by pressing the arrow keys

8. Finish selection with Mode key

9. Select ending the adjustment (Exit)

10. Finish selection with Mode key

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<td>high</td>
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### 2.3 Time delay setting

1. Selector switch to RUN

2. Operating mode Configuring active

3. Press Mode key

4. In the basic menu, select required mode by pressing the arrow keys

5. Time stage setting is shown on the display

6. Press Mode key, setting option flashes

7. Select between deactivation (Off), OFF delay (OffD), ON delay (OnD) and One-Shot (Shot) by pressing the arrow keys

8. For activated time stage, setting the time value

9. Changing the tens digit

10. Finish selection with Mode key

11. Select ending the adjustment (Exit)

12. Finish selection with Mode key

Option for various time delays and variable time range:
- Off = no time delay activated (factory setting),
- OffD = OFF delay (release delay),
- OnD = ON delay (on-delay),
- Shot = One-Shot (output active for set time window).

Time delay selectable from 1 ... 9999 (1 ms ... 9 s)
2.4 Automatic sensitivity correction

1. Selector switch to RUN

2. Operating mode Configuring active

3. Press Mode key

4. In the basic menu, select required mode by pressing the arrow keys

5. Automatic sensitivity correction is shown on the display

6. Switch sensitivity correction off/on by pressing the Mode key.
   The progress of the action is shown by a bar display.

7. Select ending the adjustment (Exit)

8. Finish selection with Mode key

Typical applications:
The measuring range is adapted to the service signal, to obtain an optimum resolution. This is especially useful for long range applications or objects with low reflectance (spreading the measuring range) or for the detection of very close objects or objects with very high reflectance (preventing saturation).

2.5 Expert menu/detailed settings

1. Selector switch to RUN

2. Operating mode Configuring active

3. Press Mode key

4. In the basic menu, select required mode by pressing the arrow keys

5. Detail adjustment is shown on the display

6. Press Mode key.
   Description of Expert menu from page 18

7. Select ending the adjustment (Exit)

8. Finish selection with Mode key
2.6 Reset

1. Selector switch to RUN

2. Operating mode Configuring active

3. Press Mode key

4. In the basic menu, select required mode by pressing the arrow keys

5. Reset is shown on the display

6. Press Mode key

7. Select between “no” and “YES” by pressing the arrow keys

8. Finish selection with Mode key

9. Select ending the adjustment (Exit)

10. Finish selection with Mode key

All operating modes are reset to the factory setting “as-delivered ex works”.

Factory settings:
- Switching mode: ON light-switching
- Response time: Standard = 250 ms
- Time stage: Off
- Sensitivity correction: Off
- Set display value to zero: Off
- Display: numeric display
- Detection mode: Standard = normal detection
- Counter: Off
- Input/output setting: Q1 + Q2: Switching output
- APC setting: On
- ASC setting: Off
- Power of the sender LED: Standard = highest power

3.1 Set display value to zero

1. Selector switch to RUN

2. Operating mode Configuring active

3. Press Mode key

4. In the basic menu, select Expert mode by pressing the arrow keys

5. Expert mode is shown on the display

6. Press Mode key

7. In Expert mode, select Set To Zero by pressing the arrow keys

8. Set To Zero is shown on the display

9. Press Mode key

10. Select between “on” and “off” by pressing the arrow keys

11. Finish selection with Mode key

12. Close Expert mode with arrow key

13. Finish selection with Mode key

14. Expert mode is shown on the display

15. Select ending the adjustment (Exit)

16. Finish selection with Mode key

The current reception value is set to zero. Adjusted switching threshold values are adapted.

- on: Function active
- off: Function deactivated (factory setting)
### 3.2 Display settings

1. Selector switch to RUN

2. Operating mode Configuring active

3. In the basic menu, select Expert mode by pressing the arrow keys.

4. Expert mode is shown on the display

5. Press Mode key

6. In Expert mode, select display settings by pressing the arrow keys

7. Display settings are shown

8. Press Mode key

9. Select between numeric display (dIG), bar display (bAr), percentage display (Pct), normal counting display (cnt), total count display (tcnt) and inactive display using arrow keys

10. Finish selection with Mode key

11. Close Expert mode with arrow key

12. Finish selection with Mode key

13. Expert mode is shown on the display

14. Select ending the adjustment (Exit)

15. Finish selection with Mode key

**dIG:** Numeric display (factory setting),

**bAr:** bar display,

**Pct:** Percentage display,

**cnt:** counting display,

**tcnt:** display total count

* Only for activated counting function (3.4 cnt):

### 3.3 Detection mode

1. Selector switch to RUN

2. Operating mode Configuring active

3. Press Mode key

4. In the basic menu, select Expert mode by pressing the arrow keys

5. Expert mode is shown on the display

6. Press Mode key

7. In Expert mode, select detection mode by pressing the arrow keys

8. Detection mode is shown on the display

9. Press Mode key

10. Select between normal detection (Stnd), detection – trailing edge (hd L) detection – rising edge (hd J) and differential detection (DIFF) by pressing the arrow keys

11. Finish selection with Mode key

12. Close Expert mode with arrow key

13. Finish selection with Mode key

14. Expert mode is shown on the display

15. Select ending the adjustment (Exit)

16. Finish selection with Mode key

- **Stnd:** Standard mode (factory setting),
- **hd L:** Dynamic switching threshold – trailing edge,
- **hd J:** Dynamic switching threshold – rising edge,
- **DIFF:** Differential detection (only available in bus mode).

The switching output is only activated dependent on the slope of the positive/negative edge of the signal path, with either the rising or the trailing edges being relevant.

Typical applications: undefined, changing scanning distances of the objects.
### 3.4 Counter setting

1. Selector switch to RUN

2. Operating mode Configuring active

3. Press Mode key

4. In the basic menu, select Expert mode by pressing the arrow keys

5. Expert mode is shown on the display

6. Press Mode key

7. In Expert mode, select counter setting by pressing the arrow keys

8. Counter setting is shown on the display

9. Press Mode key

10. Select between deactivation (off), count up function (up c) or count down function (dn c) by pressing the arrow keys

11. Finish selection with Mode key

12. For activated counting function, setting the counting value

13. Changing the decimal place setting the numbers 0 ... 9 via the arrow keys

When reaching the set counting value, the switching output is switched to active. With the next count signal, the operation is reset (not available for analogue devices):

- off: Counting function deactivated (factory setting),
- up c: count down function,
- dn c: count up function.

Number range: 0 ... 9999999

### 3.5 Input/output setting

1. Selector switch to RUN

2. Operating mode Configuring active

3. Press Mode key

4. In the basic menu, select Expert mode by pressing the arrow keys

5. Expert mode is shown on the display

6. Press Mode key

7. In Expert mode, select input/output setting by pressing the arrow keys

8. Input/output setting is shown on the display

9. Press Mode key

10. Select between Q1 + Q2: switching output (n--n), Q1: switching output/Q2: external input, n-- I: Q1: switching output, Q2: alarm output by pressing the arrow keys

11. Finish selection with Mode key

12. Close Expert mode with arrow key

13. Finish selection with Mode key

14. Expert mode is shown on the display

15. Select ending the adjustment (Exit)

16. Finish selection with Mode key

Configuration of the inputs/outputs (not available for analogue devices):

- n--n: Q1 + Q2: switching output (factory setting),
- n-- I: Q1: switching output, Q2: external input,
- n-- A: Q1: switching output, Q2: alarm output.
### 3.6 External Input Function

1. Selector switch to RUN
2. Operating mode Configuring active
3. Press Mode key
4. In the basic menu, select Expert mode by pressing the arrow keys
5. Expert mode is shown on the display
6. Press Mode key
7. In Expert mode, select external input function by pressing the arrow keys
8. External input function is shown on the display
9. Press Mode key
10. Select between external Teach-in (tch) and counter reset (crSt) by pressing the arrow keys
11. Finish selection with Mode key
12. Close Expert mode with arrow key
13. Finish selection with Mode key

- **tch**: External input is external Teach-in
- **crSt**: External input resets the counter

Setting is only available if “n--” was selected under input/output setting (3.5 i/o) (not available for analogue devices).

### 3.7 APC Setting

1. Selector switch to RUN
2. Operating mode Configuring active
3. Press Mode key
4. In the basic menu, select Expert mode by pressing the arrow keys
5. Expert mode is shown on the display
6. Press Mode key
7. In Expert mode, select APC setting by pressing the arrow keys
8. APC setting is shown on the display
9. Press Mode key
10. Select between “on” and “off” by pressing the arrow keys
11. Finish selection with Mode key
12. Select ending the adjustment (Exit)
13. Finish selection with Mode key
14. Expert mode is shown on the display
15. Select ending the adjustment (Exit)
16. Finish selection with Mode key

Compensates the natural attenuation of the sender LED. This achieves constant sender power for long, maintenance-free operation.

- **on**: Switch on APC (Automatic Power Control) (factory setting)
- **off**: Switch off APC
### 3.8 ASC setting

1. Selector switch to RUN

2. Operating mode Configuring active

3. Press Mode key

4. In the basic menu, select Expert mode by pressing the arrow keys

5. Expert mode is shown on the display

6. Press Mode key

7. In Expert mode, select ASC setting by pressing the arrow keys

8. ASC setting is shown on the display

9. Press Mode key

10. Select between “on” and “off” by pressing the arrow keys

11. Finish selection with Mode key

12. Close Expert mode with arrow key

13. Finish selection with Mode key

14. Expert mode is shown on the display

15. Select ending the adjustment (Exit)

16. Finish selection with Mode key

**on:** automatically adapting switching threshold to environment,
**off:** switch off ASC (factory setting).

Only for Teach-in of transparent objects:
The ASC function (Automatic Sensitivity Control) automatically corrects the switching threshold when detecting small differences in the light received from the reflector.

### 3.9 Strength setting of the sender LED

1. Selector switch to RUN

2. Operating mode Configuring active

3. Press Mode key

4. In the basic menu, select Expert mode by pressing the arrow keys

5. Expert mode is shown on the display

6. Press Mode key

7. In Expert mode, select strength setting by pressing the arrow keys

8. Illumination setting is shown on the display

9. Press Mode key

10. Select between standard setting, medium strength setting and low strength setting by pressing the arrow keys

11. Finish selection with Mode key

12. Close Expert mode with arrow key

13. Finish selection with Mode key

14. Expert mode is shown on the display

15. Select ending the adjustment (Exit)

16. Finish selection with Mode key

**Adjustment of the luminosity of the sender LED:**

- Full luminosity (factory setting),
- medium strength,
- low strength.

The power of the sender LED can be set in three stages: saturation, e.g., for highly reflective objects, is prevented, and the life of the sender LED is extended.

Typical applications: highly reflective objects, or very short distance to the object.
3.10 Copy mode

1. Selector switch to RUN
2. Operating mode Configuring active
3. Press Mode key
4. In the basic menu, select Expert mode by pressing the arrow keys
5. Expert mode is shown on the display
6. Press Mode key
7. In Expert mode, select Copy mode by pressing the arrow keys
8. Copy mode setting is shown on the display
9. Select between “no” and “YES” by pressing the arrow keys
10. Finish selection with Mode key
11. Close Expert mode with arrow key
12. Finish selection with Mode key

The copy function is only available in bus mode:
- no: No copy function
- yes: Copy function, all settings of the base unit are transmitted to the connected extension units.

Note:
In locked extension units (Loc), no data of the base unit is transmitted.

3.11 Set display value to zero

1. Selector switch to RUN
2. Operating mode Configuring active
3. Press Mode key
4. In the basic menu, select Expert mode by pressing the arrow keys
5. Expert mode is shown on the display
6. Press Mode key
7. In Expert mode, select setting the display value to zero by pressing the arrow keys
8. Set To Zero is shown on the display
9. Select between “no” and “YES” by pressing the arrow keys
10. Finish selection with Mode key
11. Close Expert mode with arrow key
12. Finish selection with Mode key

Setting values of the main display of the connected extension units to zero (only available in bus mode):
- no: Performs no zero value setting
- YES: performs zero value setting

Note:
The main display of locked (Loc) extension units is not set to “0”. 
1. Selector switch to RUN

2. Operating mode Configuring active

3. Press Mode key

4. In the basic menu, select Expert mode by pressing the arrow keys.

5. Expert mode is shown on the display

6. Press Mode key

7. In Expert mode, select Master teach-in by pressing the arrow keys

8. Master teach-in setting is shown on the display

9. Select between "no" and "YES" by pressing the arrow keys

10. Finish selection with Mode key

11. Close Expert mode with arrow keys

12. Finish selection with Mode key

13. Expert mode is shown on the display

14. Select ending the adjustment (Exit)

15. Finish selection with Mode key

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3.12 Master Teach-in

Teaching of all connected extension units (only available in bus mode):

no: Does not perform teach-in,
YES: Performs 1-point teach-in for all connected extension units (see page 7).

Note:
Locked [Loc] extension units are not taught.

3.13 Selection, analogue menu

Selection of the setting options for the analogue output.

Description of Analogue menu from page 31
### 4.1 Activation of analogue output

1. Selector switch to RUN

2. Operating mode Configuring active

3. Press Mode key

4. In the basic menu, select Expert mode by pressing the arrow keys

5. Expert mode is shown on the display

6. Press Mode key

7. In Expert mode, select Analogue menu by pressing the arrow keys

8. Analogue menu is shown on the display

9. Press Mode key

10. In the Analogue menu, select activation of analogue output by pressing the arrow keys

11. Activated Analogue output is shown on the display

12. Press Mode key

13. Select between “out” and “off” by pressing the arrow keys

14. Finish selection with Mode key

**This function is only available for the analogue devices.**

- **off**: Analogue output deactivated,
- **out**: Analogue output activated (factory setting).

The analogue output has a resolution of 12 bits.

### 4.2 Range adjustment

1. Selector switch to RUN

2. Operating mode Configuring active

3. Press Mode key

4. In the basic menu, select Expert mode by pressing the arrow keys

5. Expert mode is shown on the display

6. Press Mode key

7. In Expert mode, select Analogue menu by pressing the arrow keys

8. Analogue menu is shown on the display

9. Press Mode key

10. In the Analogue menu, select range adjustment by pressing the arrow keys

11. Range adjustment is shown on the display

12. Press Mode key

13. Setting the 4-mA-value using the arrow keys, changing decimal place using the Teach key

14. Press Mode key

15. The setting of the 20-mA-value is automatically switched to

16. Setting the value using the arrow keys, changing decimal place using the Teach key

17. Press Mode key for confirmation

18. Close Analogue menu with arrow key

19. Finish selection with Mode key

20. Analogue menu is shown on the display

21. Close Expert mode with arrow key

22. Finish selection with Mode key

23. Expert mode is shown on the display

24. Select ending the adjustment (Exit)

25. Finish selection with Mode key

**Allocation of display values to the respective current values of the analogue output (only available for analogue devices).**

After setting the 4 mA value, the display automatically changes to the 20 mA setting.

The maximum values to be allocated for transmission or reflection type are between 0 and 4000.
**4.3 Definition of invalid measurement values**

1. Selector switch to RUN
2. Operating mode Configuring active
3. Press Mode key
4. In the basic menu, select Expert mode by pressing the arrow keys
5. Expert mode is shown on the display
6. Press Mode key
7. In Expert mode, select Analogue menu by pressing the arrow keys
8. Analogue menu is shown on the display
9. Finish selection with Mode key
10. In the Analogue menu, select average values setting by pressing the arrow keys
11. Average values setting is shown on the display
12. Press Mode key
13. Select between setting of the output value (cLP) to 24 mA (factory setting), hold: Retains the last value before the invalid state.
14. Finish selection with Mode key
15. Close Analogue menu with arrow key
16. Finish selection with Mode key
17. Analogue menu is shown on the display
18. Close Expert mode with arrow key
19. Finish selection with Mode key
20. Expert mode is shown on the display
21. Select ending the adjustment (Exit)
22. Finish selection with Mode key

This function is only available for the analogue devices.

**4.4 Average values**

1. Selector switch to RUN
2. Operating mode Configuring active
3. Press Mode key
4. In the basic menu, select Expert mode by pressing the arrow keys
5. Expert mode is shown on the display
6. Press Mode key
7. In Expert mode, select Analogue menu by pressing the arrow keys
8. Analogue menu is shown on the display
9. Finish selection with Mode key
10. In the Analogue menu, select average values setting by pressing the arrow keys
11. Average values setting is shown on the display
12. Press Mode key
13. Select setting of the average values by pressing the arrow keys
14. Select number of average values by pressing the arrow keys
15. Finish selection with Mode key
16. Close Analogue menu with arrow key
17. Finish selection with Mode key
18. Analogue menu is shown on the display
19. Close Expert mode with arrow key
20. Finish selection with Mode key
21. Expert mode is shown on the display
22. Select ending the adjustment (Exit)
23. Finish selection with Mode key

This function is only available for the analogue devices. The average is formed from a block of n values. This value is applied to the output for the next n values, until it is replaced by the average value of the next block of n values. This number n can be set with the arrow keys in steps 1/4/8/16/32/64/128/256/512/1024/2048. The factory setting is 64.
4.5 Setting of extreme value memory

1. Selector switch to RUN

2. Operating mode Configuring

3. Press Mode key

4. In the basic menu, select Expert mode by pressing the arrow keys

5. Expert mode is shown on the display

6. Press Mode key

7. In Expert mode, select Analogue menu by pressing the arrow keys

8. Analogue menu is shown on the display

9. Finish selection with Mode key

10. In the Analogue menu, select setting of extreme value memory by pressing the arrow keys

11. Extreme value setting is shown on the display

12. Press Mode key

13. Select between "off", "PEA", "btt" and "P-P" by pressing the arrow keys

This function is only available for the analogue devices.

dFF: Extreme value memory deactivated,

PEA: Maximum value is applied to the output,

btt: Minimum value is applied to the output,

P-P: Difference value between minimum and maximum is applied to the output.

The values are applied to the output until the maximum resp. minimum is exceeded resp. fallen short of or the value is reset via the external input.

14. Finish selection with Mode key

15. Close Analogue menu with arrow key

16. Finish selection with Mode key

17. Analogue menu is shown on the display

18. Close Expert mode with arrow key

19. Finish selection with Mode key

20. Expert mode is shown on the display

21. Select ending the adjustment (Exit)

22. Finish selection with Mode key

This function is only available for the analogue devices.