



Stauff Hydraulic Tester PPC 06/08 *plus*

Manual
Version 1.0
Part number: 181000267



Contact address

Walter Stauffenberg GmbH & Co. KG
Postfach 1745 58777 Werdohl
Im Ehrenfeld 4 58791 Werdohl
Germany

Phone: +49 2392 916-0
Fax: +49 2392 2505
E-Mail: sales@stauff.com
Internet: www.stauff.com

Version 1.0
April 2009

Contents

1.0	Notes on safety / Product selection.....	5
1.1.	Approved use	5
1.2.	Skilled Personnel.....	5
1.3.	Accuracy of the technical documentation	5
1.4.	High-pressure applications.....	5
1.5.	Service / Repair.....	6
1.6.	Notes on disposal.....	6
2.0	Device version / Scope of delivery.....	7
3.0	Initial use.....	8
3.1.	Charging the batteries / Battery status indicator.....	8
4.0	Keys and Functions	9
4.1.	Keys and Functions.....	9
4.2.	Function Keys and Menu Keys.....	10
4.3.	Symbols and using the menus	11
4.4.	What the function keys do within the menus	11
5.0	Connecting the sensors / Display functions	12
5.1.	Display format (DISP).....	13
5.2.	Display Configuration (LINE).....	14
5.3.	Zero Point Calibration (ZERO)	15
5.4.	Deleting MIN / MAX values (RESET)	16
5.5.	Difference for measuring values.....	16
5.6.	Differential value alignment (IN1=IN2).....	17
5.7.	Connecting auxiliary sensors (SET AUX: SENSOR).....	19
5.8.	Error messages / Warnings.....	21
6.0	Device settings (SET)	22
6.1.	Setting the units (SET-UNIT).....	23
6.2.	Auto power off (SET-AUTO POWER)	23
6.3.	Setting auxiliary sensors (SET-AUX.SENSOR).....	23
6.4.	Displaying defined measurement tasks (SET-PROJECT).....	24
6.5.	Setting the contrast (SET-CONTRAST)	24
6.6.	Setting the time / date (SET-TIME/DATE).....	25
6.7.	Displaying the device version (SET-VERSION)	25
6.8.	Factory setting (USER RESET).....	25
7.0	Configuring the measured value memory (MEMORY SET).....	26
7.1.	Deleting the measured value memory (MEM-DELETE MEMORY)	28
7.2.	Setting the data format (MEM-DATA FORMAT).....	28
7.3.	Setting the recording format(MEM-REC-CONFIG).....	28
8.0	The REC menu	29
9.0	Recording measured values	31
9.1.	Settings for recording measured values (REC)	31
9.2.	The REC NAMES setting	32
9.3.	Memory function START/STOP	33
9.4.	Memory function POINT.....	35
9.5.	Memory function AUTO TRIGGER.....	37
9.6.	Memory function MANUAL.....	39
9.7.	Recording measured values with default PROJECT settings.....	41

10.0	Setting and operating via PC.....	42
10.1.	Connecting to a PC	42
10.2.	Operating / Configuring via PC.....	42
11.0	Accessories.....	43
12.0	Technical Data	44
13.0	Description of the memory functions	45

1.0 Notes on safety / Product selection

1.1. Approved use

The device is approved for use in applications described in the Operating instructions only. Any other use is not approved and can lead to accidents or the destruction of the device. Non-approved use will result in the immediate expiry of all guarantee and warranty claims against the manufacturer.



Serious malfunctions leading to personal injury or damage to property can result from using the chosen product in applications that do not comply with the given specifications or from disregarding the operating instructions and warning notes.

1.2. Skilled Personnel

These operating instructions have been written for skilled personnel who are familiar with the valid regulations and standards applicable to the field of application.

1.3. Accuracy of the technical documentation

These operating instructions were created with the utmost care and attention. However, we offer no guarantee that the data, graphics and drawings are correct or complete. Subject to alteration without notice.

1.4. High-pressure applications



Selection

When selecting pressure components, ensure that the overload pressure will not be exceeded.

It is possible that the pressure cell can be deformed when the overload pressure is exceeded (depending on the duration / frequency and level of the pressure spike).

The "diesel effect" caused by entrapped air can result in pressure spikes that far exceed the overload pressure. The nominal pressure of the pressure component should be higher than the nominal pressure of the system to be measured.

Mounting



Please abide by the instructions and observe the correct tightening torques for the fittings or adapters being utilized:

Connector thread: $\frac{1}{2}$ " BSP = 90 Nm
 $\frac{1}{4}$ " BSP = 30 Nm



Please observe the highest pressures detailed in the catalogues for hydraulic hoses from the Walter Stauffenberg GmbH & Co. KG.

1.5. Service / Repair

For repairs to or calibration of the measurement instruments, please contact your local STAUFF sales branch.

1.6. Notes on disposal

Recycling in accordance with WEEE

Purchasing our product gives you the opportunity to return the device to STAUFF at the end of its life cycle.

The EU Directive 2002/96 EC (WEEE) regulates the return and recycling of waste electrical and electronics equipment.



As of 13/08/2005 manufacturers of electrical and electronics equipment in the B2B (business-to-business) category are obliged to take back and recycle WEEE free of charge sold after this date. After that date, electrical equipment must not be disposed of through the "normal" waste disposal channels. Electrical equipment must be disposed of and recycled separately. All devices that fall under the directive must feature this logo:

Can we be assistance?

The Walter Stauffenberg Company offers you the option of returning your old device to us at no extra charge. STAUFF will then professionally recycle and dispose of your device in accordance with the applicable law.

What do you have to do?

Once your device has reached the end of its service life, simply return it by parcel service (in the box) to your STAUFF sales branch responsible for customer care – we will then initiate the necessary recycling and disposal measures. You will incur no costs or suffer any inconvenience.

Any questions?

If you have any questions, please contact us or visit our website: www.stauff.com

2.0 Device version / Scope of delivery

According to your order the Walter Stauffenberg Company will supply you one of the following devices:

PPC-06 <i>plus</i>	device with 3 sensor inputs
PPC-08 <i>plus</i>	device with 4 sensor inputs

Every measurement device is supplied with the following components:

- Power supply PPC-04/12-110V/230V (110/230 V AC)
- PC connection cable (USB)
- Diagtronics-CD (incl. PC-software, manual and product catalogues as files)

3.0 Initial use

The measuring instrument is supplied with rechargeable batteries fitted at the factory.

Charge the rechargeable batteries for at least 3 hours before using the first time.

The device is then ready for use.

3.1. Charging the batteries / Battery status indicator

If the battery power is too low, the battery symbol flashes and the measuring turns off automatically.



Battery symbol

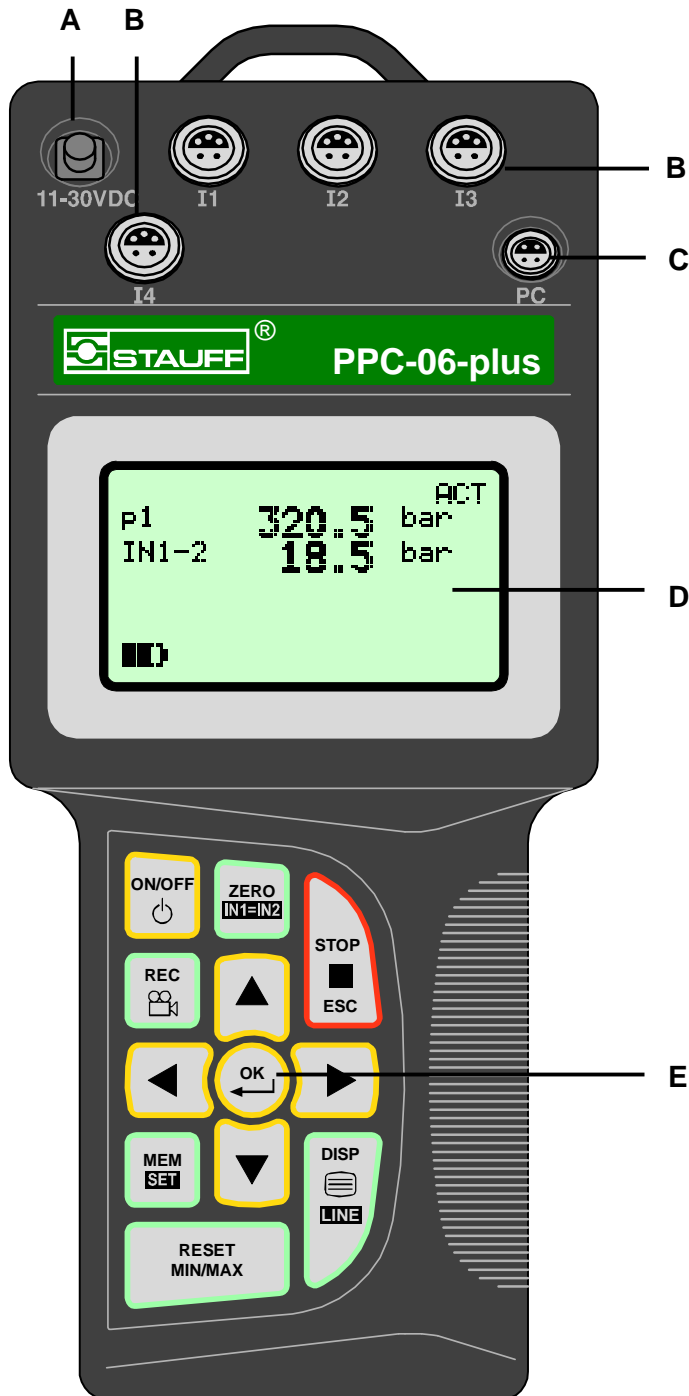
The measuring instrument is powered using the external power supply (Power supply PPC-04/12-110V/230V) or via the car adapter (Cable PPC-04/12-CAB-MOB).

The battery can be recharged directly. The charging process begins as soon as the power supply unit is connected.

Please refer to the chapter "Accessories" for more information about the external power supply unit and the car adapter.

4.0 Keys and Functions



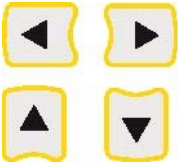

4.1. Keys and Functions



- A** **11-30VDC**
Power supply unit
110/230 VAC-15 VDC or
Car adapter cable 12/24 VDC
- B** **I1 ... I3 (PPC-06 plus)**
I1 ... I4 (PPC-08 plus)
Sensor ports
- C** **PC (USB)**
Port for PC-cable
(to USB)
- D** **Display**
Displaying the measurements
- E** **Keypad**
Moving in the menus

4.2. Function Keys and Menu Keys






Function Keys

	ON / OFF
	Confirms functions / values
	Selects functions / values
	STOP / ESC

Menu Keys

These keys are assigned dual functions:

- Assignment 1. Menu level = 1 x press
- Assignment 2. Menu level (black background) = 1 x hold key (2 seconds)

	ZERO IN1 = IN2	Zero point calibration Differential value alignment
	MEM SET	Memory configuration Main menu (Device Settings)
	DISP LINE	MIN-MAX / ACTUAL or FS display Display configuration
	REC	Record measurement values
	Delete	Deleting MIN / MAX values

4.3. Symbols and using the menus



If the sign ">" is displayed at the end of a menu function, press the "OK" key to enter an associated submenu.

If the sign ":" is displayed, press the "OK" key to confirm the respective entry.

Menu symbol	Key	Function	Example
>		Call up a submenu / Setting	UNIT > _____
:		Confirm	AUTO POWER : OFF
▲ ▼		Select	--SET-- _____ ▲ ▼



Key assignment and symbols associated with the menu functions are consistent throughout this device; therefore will be no further explicit explanation given.

4.4. What the function keys do within the menus

Use the arrow keys to scroll between functions when several functions are available for selection in a window or a menu. The arrow keys move the cursor in the direction in which the arrow is pointing.

Press the "OK" key each time you wish to select a function or submenu; when making alterations or adding values you must press "OK" to confirm your action. The "OK" key is used to save all settings.

Press the "STOP / ESC" key if you wish to leave a menu or do not wish to save an entry.

Key assignment and mode of operation of these three keys is always the same no matter in which menu they are used.



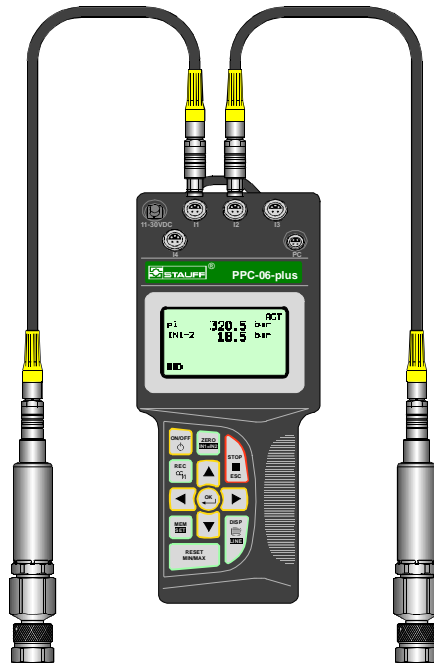
As the function keys are easy to understand and always function in the same manner, actuating the function keys has not been included in the example sequences to ensure that the content of the menus remain central to the descriptions. It is a pre-condition for replicating the examples that the function keys are used as described above.

5.0 Connecting the sensors / Display functions

To avoid electrical interference, please observe the following steps:



- 1 Connect the sensor to the measuring instrument using the connection cable.
- 2 Turn on the measuring instrument.

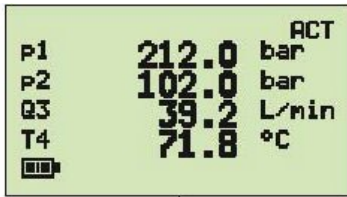


Measuring instrument with two pressure sensors

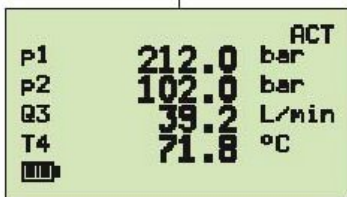
- Once turned on, all measured values are visible in the display.
- Automatic sensor recognition ensures that the measured value is indicated in the correct unit.
- No further settings to the device are required.
- The following message will be displayed if no sensor is connected to the device.



5.1. Display format (DISP)



Press **DISP** (once)



It is possible to change the display format by pressing **DISP** (once only).

Available selection:

ACT	=	Actual values
MIN	=	Minimum values
MAX	=	Maximum values (pressure spikes)
FS	=	Full scale (upper range value)
TEMP	=	Temperature display



The **TEMP** display applies only to the sensor type PPC-04/12-PT.

5.2. Display Configuration (LINE)



 Press and hold (2 seconds)



Line:

1: No settings possible; cannot be selected



2:

Available for selection:
Difference (IN1 – IN2)
Addition (IN1 + IN2)



3:

Volume VOL = Q3 x time

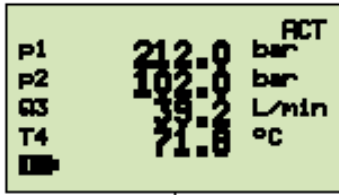


4:

Available for selection
Power
PWR1 = p1 x Q3
PWR2 = (p1-p2) x Q3



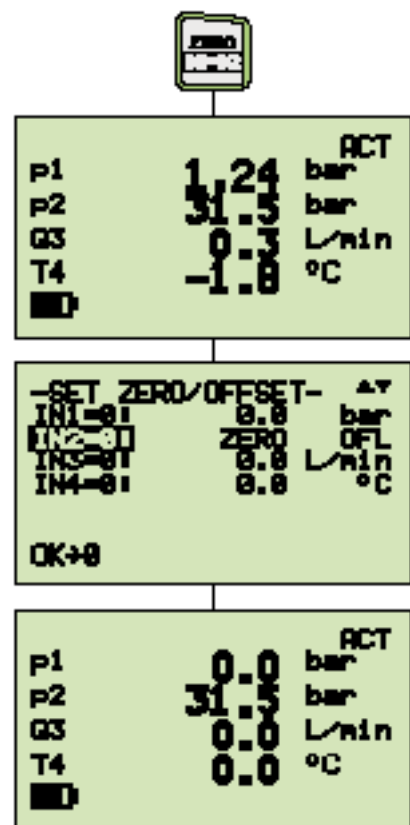
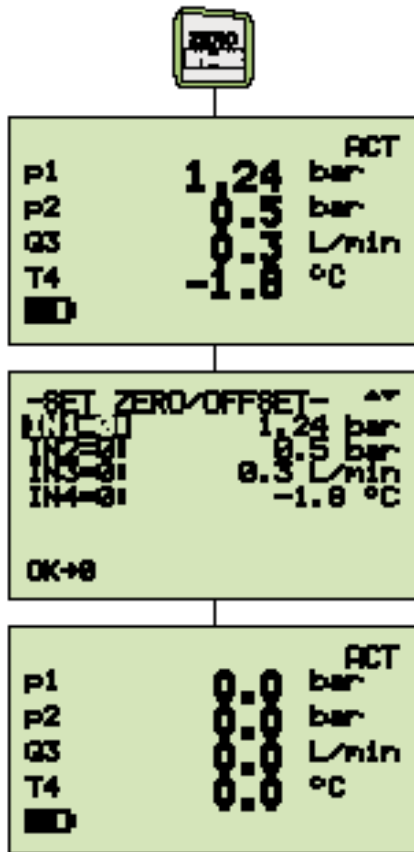
5.3. Zero Point Calibration (ZERO)



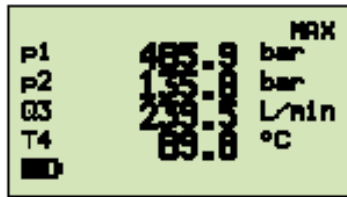
If the alignment values are within the permissible tolerance (2% of FS), the values are set to zero.

If the alignment values exceed the permissible tolerance (2% of FS), the following is displayed: "ZERO OFL"

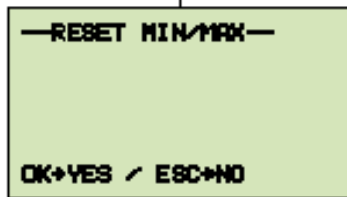
Press **ZERO** once



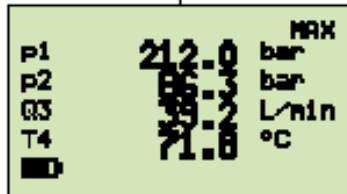
5.4. Deleting MIN / MAX values (RESET)



The MAX values measured until now are displayed in the MAX display



Deleting MAX values



The updated MAX values are displayed in the MAX display.

Example: Loss of pressure in the hydraulic system.

5.5. Difference for measuring values

- ▶ The settings IN1 – IN2 are described in the chapter "Display configuration (LINE)"

5.6. Differential value alignment (IN1=IN2)

Before running the differential value alignment of two sensors of the same type it is necessary to run a configuration first.

Herefor follow the instructions in chapter 5.2 and calculate the difference of both sensors.

```
P1      212.0  bar  ACT
IN1-IN2  1.7  bar
Q3      39.2  L/min
T4      71.8  °C
█
```



IN1 = IN2

Press and hold (2 seconds)

```
--IN2=IN1 ALIGNMENT--
VALUE:      1.7 bar
OK->ALIGNMENT
```

```
P1      212.0  bar  ACT
IN1-IN2  0.0  bar
Q3      39.2  L/min
T4      71.8  °C
█
```

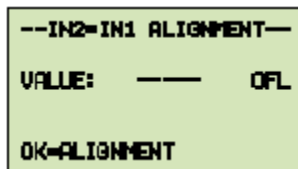


Carry out differential value alignment at below operating pressure. Connect two pressure sensors to the same connection (T-adapter). Δp -calibration sets the tolerance of the sensors in relation to one another to zero.

This setting remains stored; it is valid only for the respective operating pressure.

Error messages

Three error messages are possible for IN1 = IN2:

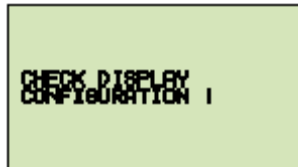


```
--IN2=IN1 ALIGNMENT--  
VALUE: --- OFL  
OK=ALIGNMENT
```

1

Alignment value exceed the permissible tolerance:

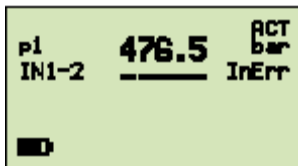
- For sensors with automatic sensor recognition, 5% of the upper range value (FS)
- For auxiliary sensors, 10% of the upper range value (FS)



```
CHECK DISPLAY  
CONFIGURATION I
```

2

IN1 – IN2 is not configured (DISP-LINE)



```
p1 476.5 ACT bar  
IN1-2 InErr InErr  
InErr
```

3

Measured variables are not the same

(e.g. IN1=bar, IN2=l/min)

5.7. Connecting auxiliary sensors (SET AUX: SENSOR)

```

P1      212.0  bar ACT
P2      102.0  bar
G3      39.2   L/min
T4      71.8   °C

```



SET

Press and hold (2 seconds)

```

--SET--
UNIT >
AUTO POWER  OFF
AUX. SENSOR
PROTECT 2
CONTRAST (%) 58
TIME / DATE
VERSION 8185

```

```

--AUX. SENSOR--
UNIT >
IN1
IN2

```

```

--AUX. SENSOR IN1--
UNIT 1
FROM 1
TO 58
SIGNAL 1
GROUND 4.000
TO 28.888

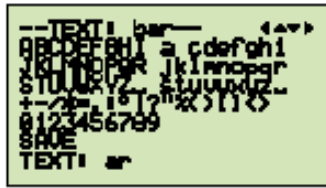
```



Ensure that the electrical specifications of the auxiliary sensors are compatible with the measuring instrument / adapter. Please ensure correct PIN assignment and supply voltage and avoid short-circuits!

Text input for UNIT / SIGNAL

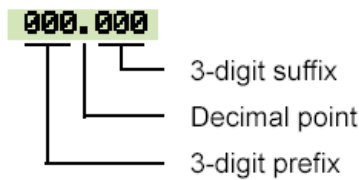
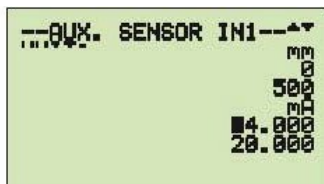
To set the units: Text input up to (max. 15 characters)



Numerical input for FROM / TO

To set the measurement range and signal span:


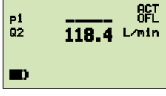
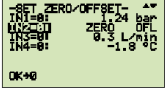
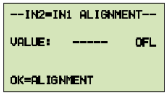

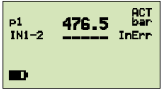
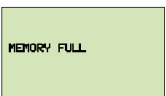
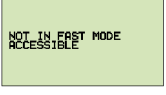
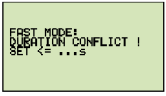
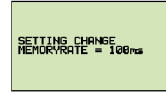
- 3-digit prefix
- Decimal point
- 3-digit suffix.



Measuring instrument with connector adapter and sensors for distance (mm) and force (kN).



5.8. Error messages / Warnings

Display	Description	What action to take?
	No sensor is connected	Turn off the measuring instrument Connect sensor Turn on the measuring instrument
%	An auxiliary sensor is connected	Carry out settings in the menu SET-AUX.SENSOR
	Sensor recognition interrupted (cable break or input defect)	Send measuring instrument, sensor and connection to the Walter Stauffenberg GmbH & Co. KG
	Measurement range overflow. The measured pressure is outside of the measurement range	Release pressure from the system. Use sensor with wider measurement range.
	Overflow ZERO The zero point offset value exceeds the tolerance	Check only when no pressure is applied.
	Overflow IN1 = IN2 Differential value alignment. The alignment value exceeds the tolerance	Test system pressure. Use sensors with wider measurement range.
	DISP LINE IN1 = IN2 Wrong setting	Configure IN1 – IN2.
	Overflow IN1 – IN2 Differential value alignment. Wrong sensor	Measured variables (sensors) must be the same IN1 / IN2 = bar IN1 / IN2 = l/min IN1 / IN2 = °C
	Measured value memory full	Download measured values to PC. Delete measured value memory.
	Do not use in FAST MODE	Setting REC: START-STOP/POINT FAST MODE only for AUTO TRIGGER MANUAL possible
	Recording time conflict (DURATION) FAST MODE (0,5 ms)	REC setting AUTO TRIGGER MANUAL Alter recording time DURATION
	Recording time conflict (REC RATE)	Setting MEM-SET REC CONFIG REC RATE Alter recording interval REC RATE Press "OK" to confirm

6.0 Device settings (SET)

```

P1      212.0  bar ACT
P2      102.0  bar
Q3      39.2   L/min
T4      71.8   °C

```



SET

Press and hold (2 seconds)

```

--SET--
UNIT>
AUTO POWER: OFF
AUX. SENSOR>
PROJECT>
CONTRAST(%): 50
TIME/DATE>
VERSION      0105

```

```

--SET--
UNIT>
AUTO POWER: OFF
AUX. SENSOR>
PROJECT>
CONTRAST(%): 50
TIME/DATE>
VERSION      0105

```

```

--SET--
UNIT>
AUTO POWER: OFF
AUX. SENSOR>
PROJECT>
CONTRAST(%): 50
TIME/DATE>
VERSION      0105

```

```

--UNIT--
PRESSURE: bar
TEMPERATURE: °C
FLOW: L/min
POWER: kw

```

```

--AUX. SENSOR--
UNIT>
IN2>

```

```

--AUX. SENSOR IN1--
UNIT> bar
FROM: -1
TO: 123
SIGNAL: mA
FROM: 4.000
TO: 20.000

```

```

--SET--
UNIT>
AUTO POWER: OFF
AUX. SENSOR>
PROJECT>
CONTRAST(%): 50
TIME/DATE>
VERSION      0105

```

```

--SET--
UNIT>
AUTO POWER: OFF
AUX. SENSOR>
PROJECT>
CONTRAST(%): 50
TIME/DATE>
VERSION      0105

```

```

--SET--
UNIT>
AUTO POWER: OFF
AUX. SENSOR>
PROJECT>
CONTRAST(%): 50
TIME/DATE>
VERSION      0105

```

```

--PROJECT--
No: REC NAME
1: POWER CHECK
2: POWER CHECK
3: MAIN PUMP
4: LS PUMP

```

```

--TIME/DATE--
HOUR: 14
MINUTE: 47
SECOND: 35
DAY: 08
MONTH: 04
YEAR: 06

```

```

--PROJECT--
INPUT 1:
WRONG SENSOR !
USE = 100.0 bar
NAME:
REC: LOAD TEST
INI: PILOT PRS
OKNEXT

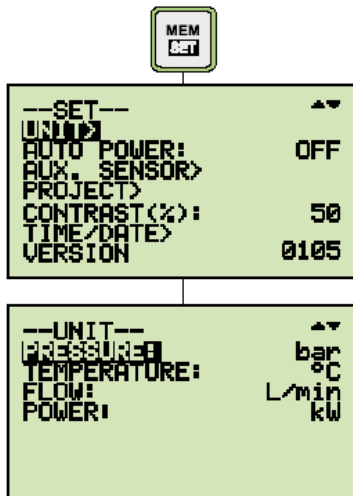
```

```

--PROJECT--
INPUT 4:
CORRECT SENSOR
FS = 600.0 L/min
NAME:
REC: LS PUMP
INI: PUMP
OKNEXT

```

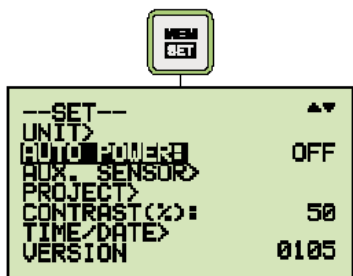
6.1. Setting the units (SET-UNIT)



Available for selection:

PRESSURE: bar, mbar, psi, Mpa, kPa
TEMPERATURE: °C, °F
FLOW: l/min, G/min (US)
POWER: kW, HP (US)

6.2. Auto power off (SET-AUTO POWER)



Available for selection:

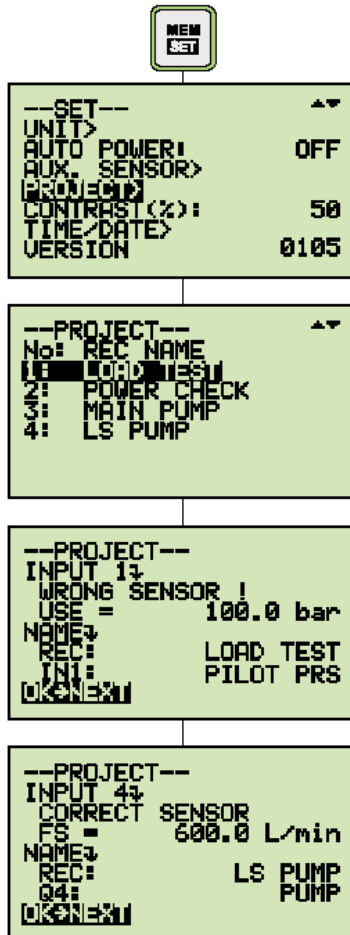
AUTO POWER: OFF, ON

6.3. Setting auxiliary sensors (SET-AUX.SENSOR)

- ▶ Further information is available in the chapter "Connecting auxiliary sensors".

6.4. Displaying defined measurement tasks (SET-PROJECT)

Up to five different measurement tasks (PROJECT) can be configured in the PC software. Certain sensors are defined for each input. These definitions can be retrieved in Set-PROJECT.

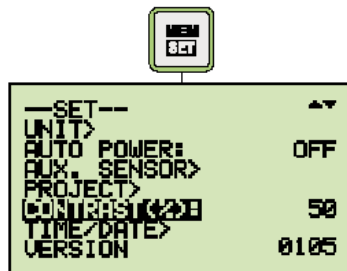


i Input 1
Wrong sensor connected!
Please use measurement range 100.

i Input 4
Correct sensor connected.
FS = 600 l/min.

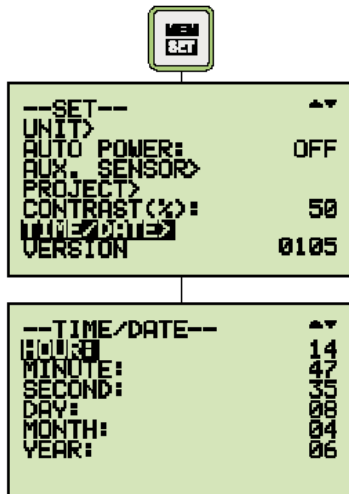
i It is possible to alter this setting using the PC software.

6.5. Setting the contrast (SET-CONTRAST)



Available for selection:
CONTRAST: 10 ... 100 %

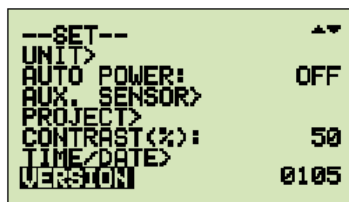
6.6. Setting the time / date (SET-TIME/DATE)



Available for selection:

HOUR: 0 ... 23
MINUTE: 0 ... 59
SECOND: 0 ... 59
DAY: 1 ... 31
MONTH: 1 ... 12
YEAR: 1 ... 99

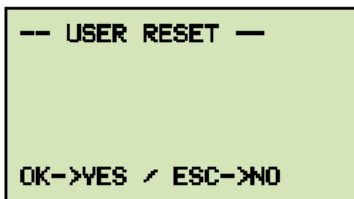
6.7. Displaying the device version (SET-VERSION)



6.8. Factory setting (USER RESET)

Proceed as follows to restore the measuring instrument to its factory-set default settings:

- 1 Turn off the measuring instrument.
- 2 Press and hold down the "MEM-SET" key.
- 3 Press the "ON/OFF" key.



- 4 Press "OK" to confirm the USER RESET

7.0 Configuring the measured value memory (MEMORY SET)

The following settings will be undertaken:

- Delete measured value memory
- Configure data format of the measured values
- Configure recording intervals

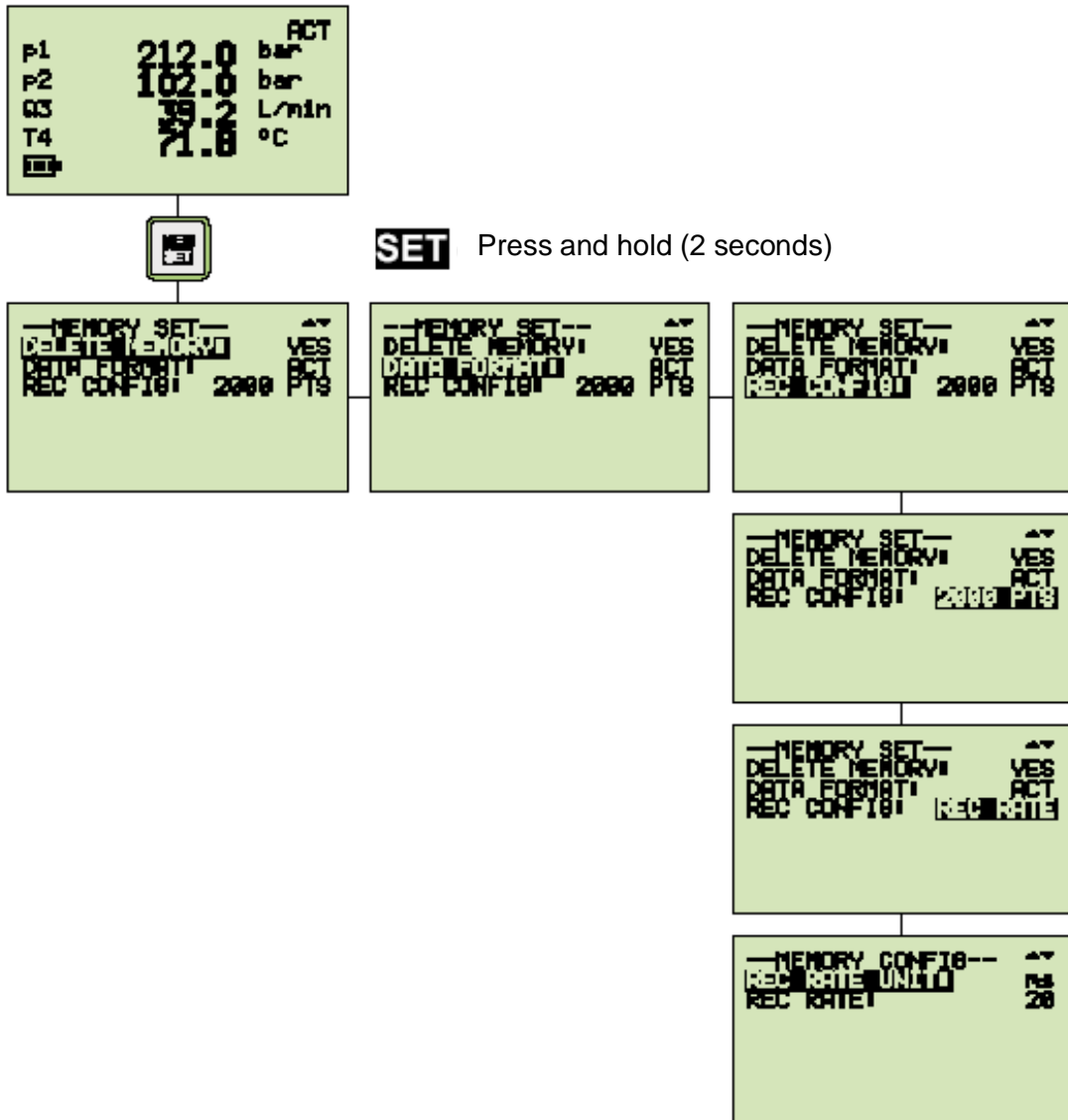
Menu	Setting / pre-selection	Example	Notes
DELETE MEMORY:	YES NO	YES	Delete the measured value memory
DATA FORMAT:	ACT MIN-MAX	ACT	Data format of the measured values ACT = Save actual values MIN-MAX = Save MIN/MAX values
REC CONFIG:	REC RATE 2.000 PTS	2.000 PTS	REC RATE = Setting an individual recording interval 2.000 PTS = Dividing the recording time in 2.000 recording intervals
REC RATE UNIT:	ms s h	ms	Pre-selecting time unit (recording interval)
REC RATE:	Number	20	Setting 20 ms



When defining ACT values, it is possible that important measurement values will not be saved if the selected recording interval is too great.

Example:

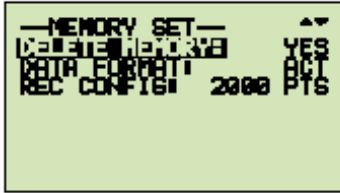
No dynamic MIN-MAX values are saved when the recoding interval is set to 200 milliseconds. Therefore, the setting MIN-MAX is recommended for dynamic measurements (pressure spikes).



7.1. Deleting the measured value memory (MEM-DELETE MEMORY)



Press once (briefly)



Available for selection:

DELETE MEMORY: YES / NO



The measured value memory will be deleted when the "OK" key is pressed to confirm the action

7.2. Setting the data format (MEM-DATA FORMAT)



Available selection:

DATA FORMAT: ACT
MIN/MAX
FAST



When set to FAST, the recording interval for measuring and storing at IN1 is 0.5 ms

7.3. Setting the recording format (MEM-REC-CONFIG)

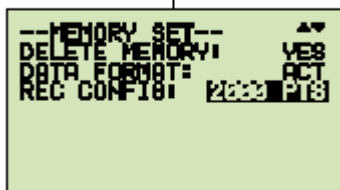


REC CONFIG

Two different formats can be set:

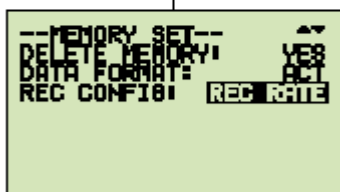
a. Format 2.000 PTS

The measurement curves are saved with a resolution of 2.000 intervals (points).

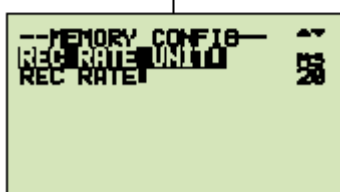


b. Format REC RATE

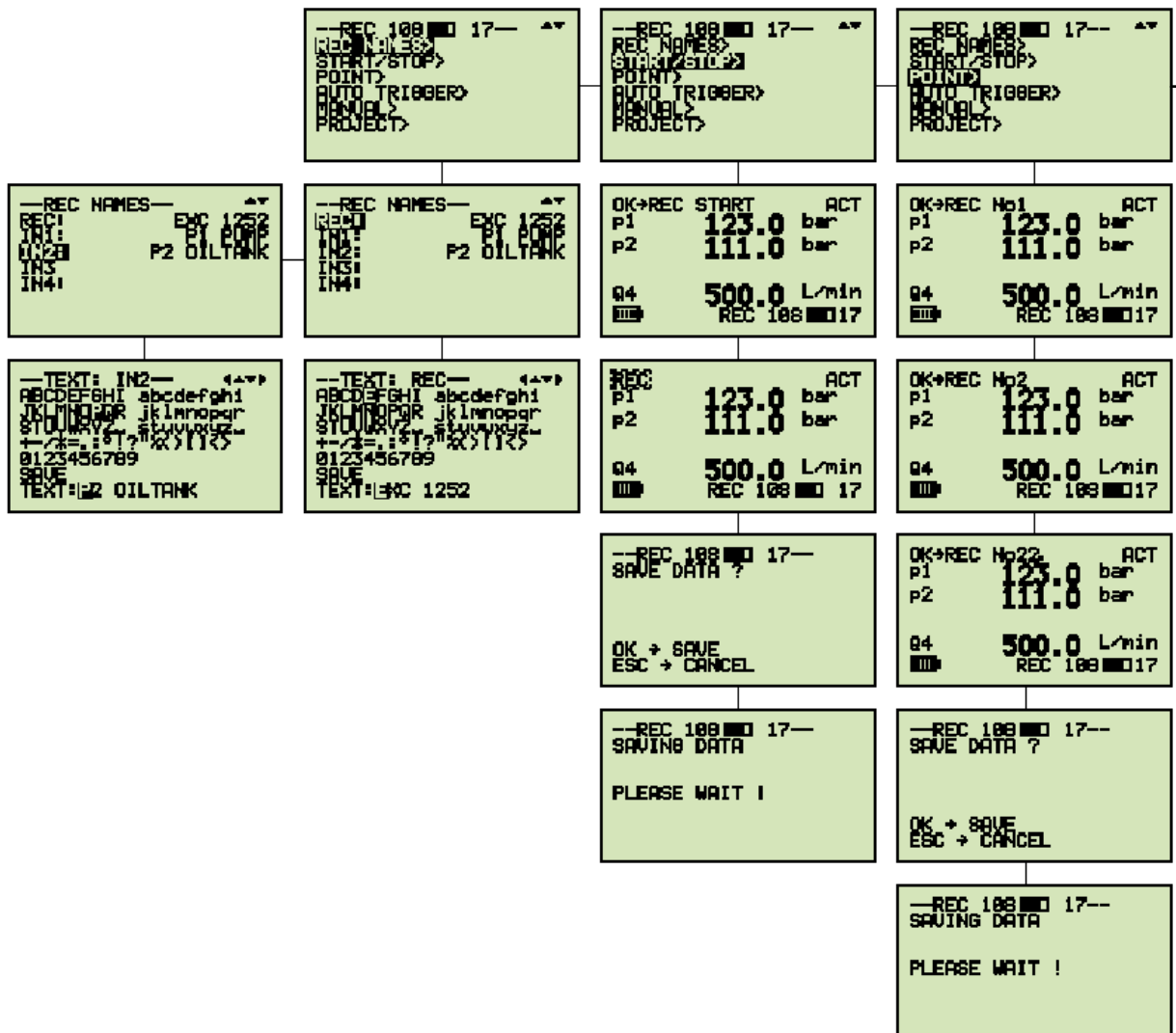
The measurement curves are saved at a resolution defined interval.

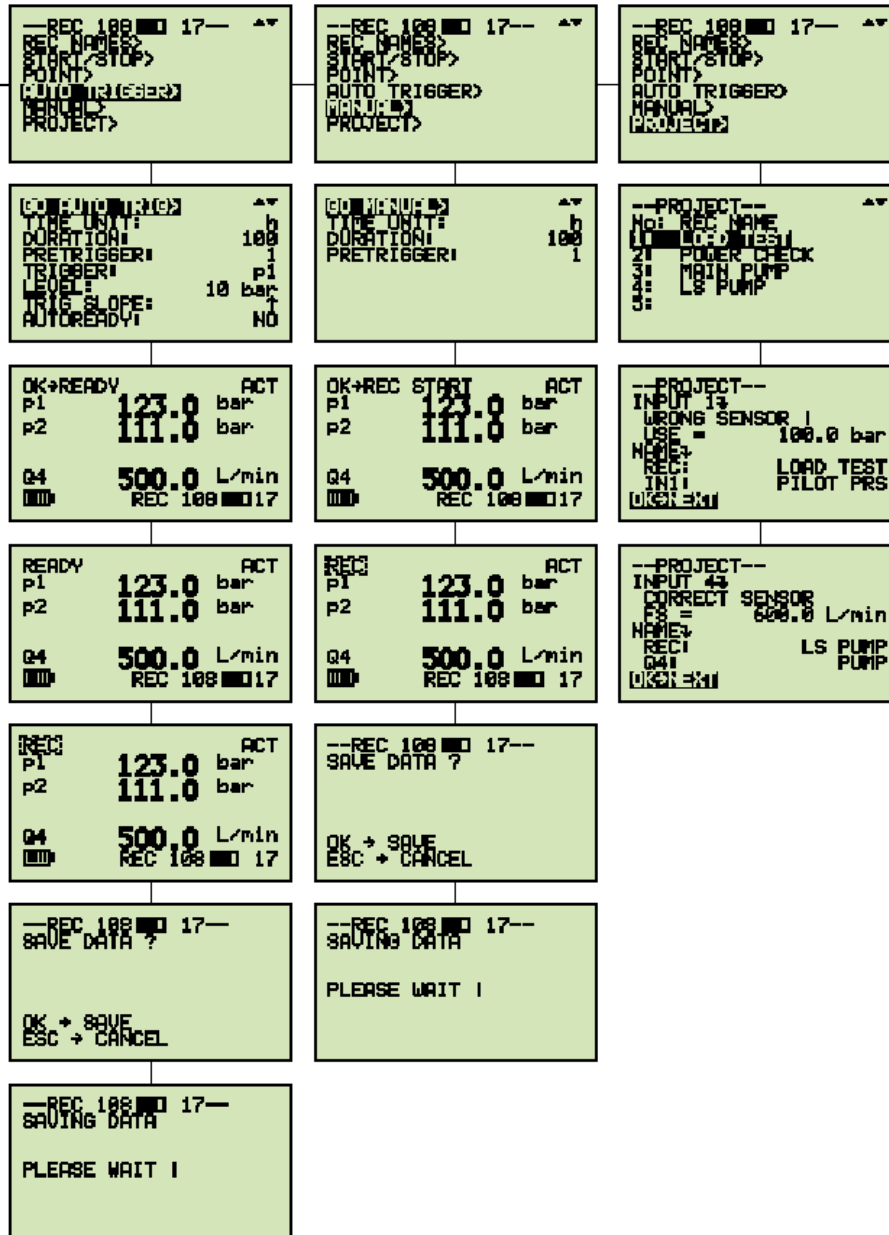


Example: 20 ms



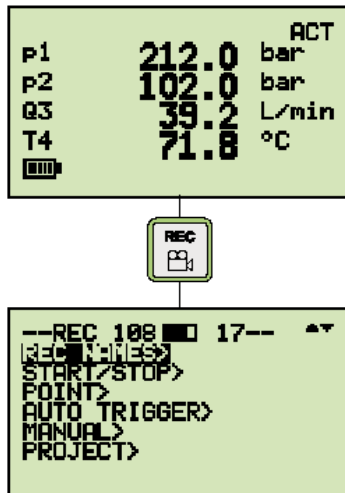
8.0 The REC menu







9.0 Recording measured values

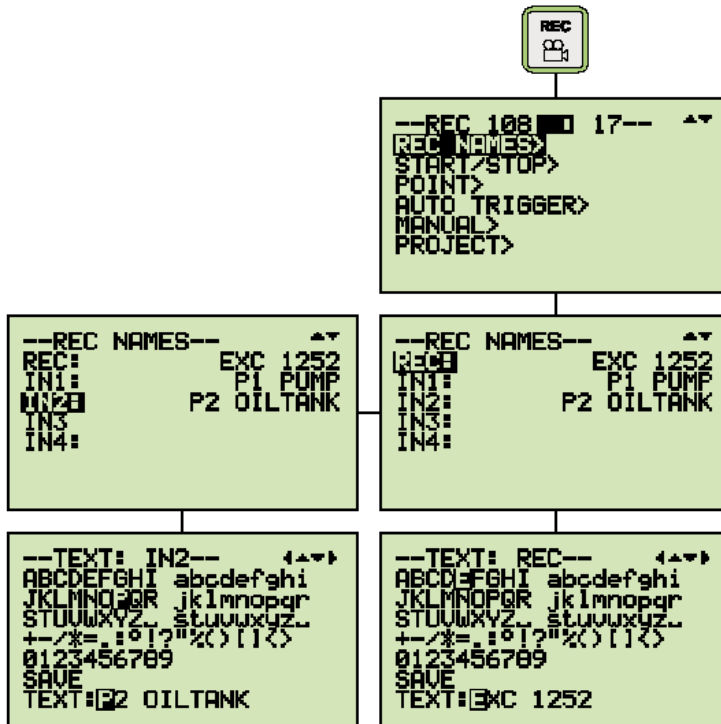
9.1. Settings for recording measured values (REC)



The following parameters are displayed in the information bar:

REC 108	Number of recorded measured values. In this example there are 108 measurements saved to memory..
	Memory allocation
17--	Number of measured values that can still be recorded. With the current setting / configuration it is possible to save a further 17 measurements.
	The REC symbol flashes when measured values are being written to memory

9.2. The REC NAMES setting

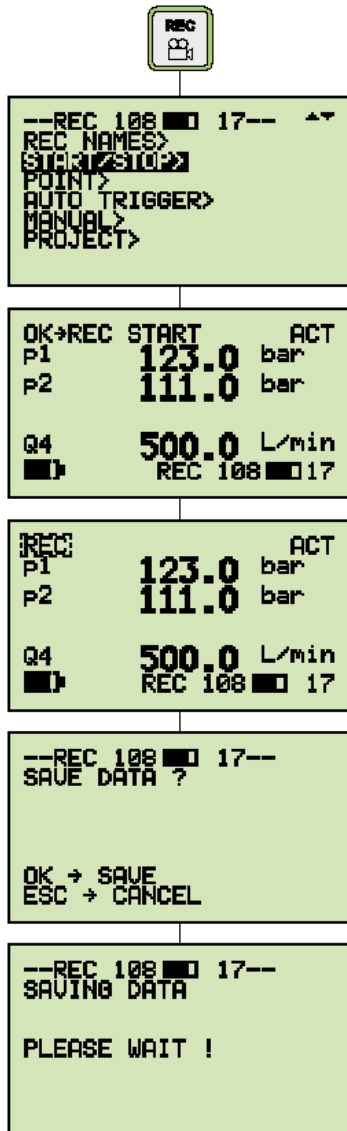


Designations (names) for measurements and channels IN1 / IN2 / IN3 / IN4 are defined through the text / numerical input.

These settings remain saved in the measuring instrument

9.3. Memory function START/STOP

The user controls the recording of measured values using START and STOP / ESC keys.



The data format FAST (recording interval ACT values in 0.5 ms) cannot be used when the device is in the START / STOP mode.

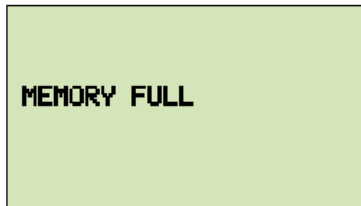
The following message is displayed:



**NOT IN FAST MODE
ACCESSIBLE**



If the measured value memory is full, the following message is displayed:

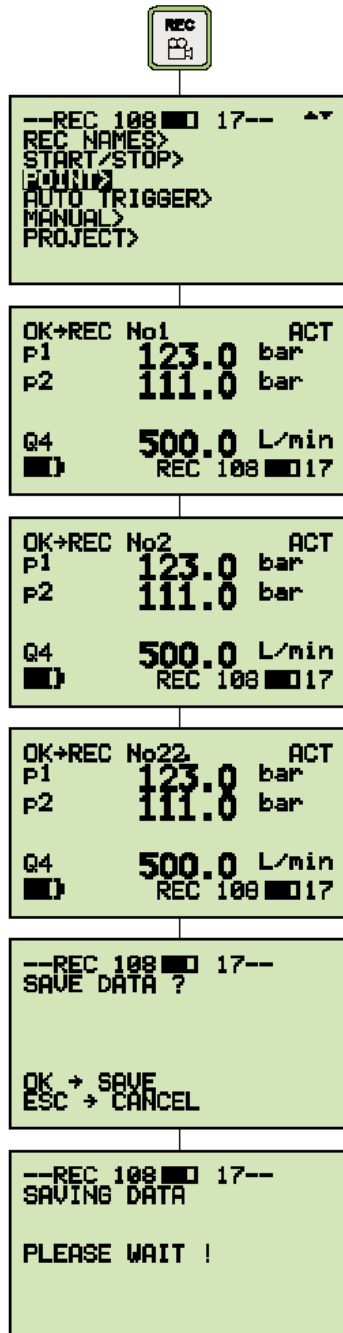



MEMORY FULL


9.4. Memory function POINT

Measurement points representing a given machine sequence (for example: lifting, sinking, operation under load, off-load operation etc.) are saved in a "point-to-point curve". In the example shown, the channels p1, p2 and Q4 are connected.

Pressing the "OK" key saves the measured values Pressing "STOP/ESC" stops the recording and all measured values are saved in the measured value memory.



Press  to save first data record
For example. p1, p2 and Q4

Press  to save second data record
For example. p1, p2 and Q4

Save arbitrary data record

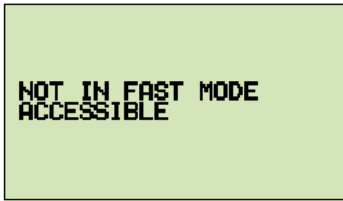
Pressing  stops the recording

All data records will be written in the measured value memory

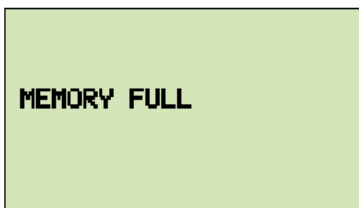


The data format FAST (recording interval ACT values in 0.5 ms) cannot be used when the device is in the START / STOP mode.

The following message is displayed:



If the measured value memory is full, the following message is displayed:



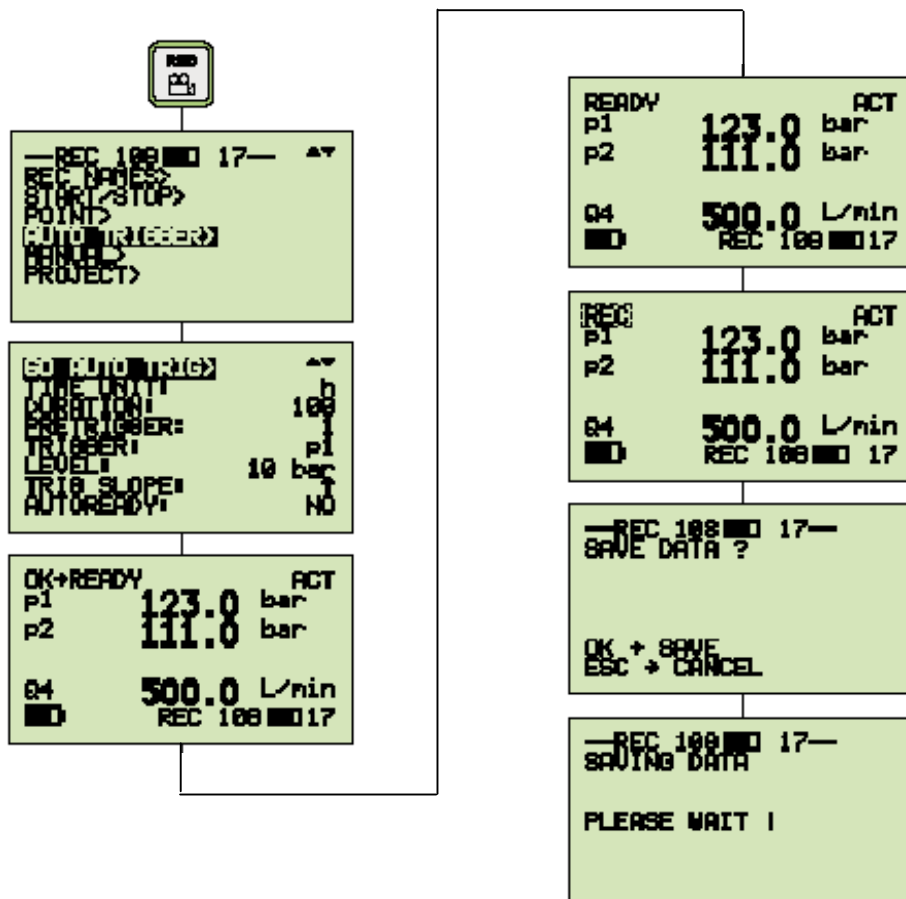
9.5. Memory function AUTO TRIGGER

The function Auto Trigger documents the process of recording measured values triggered by a defined start signal (for example pressure on channel 2 >> 125 bar). In response, a sequence of measured values is automatically recorded until the previously set measurement time expires.

Time-dependent functions (for example making operations or production cycles) are measured when recording measured values.

The following parameters must be set:

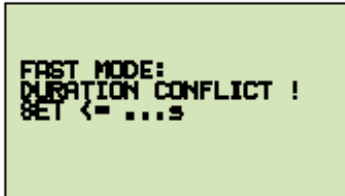
Menu	Setting/ Pre-selection	Values	Notes
TIME UNIT>	sec hrs	h	Pre-selected time unit (trigger / pre-trigger)
DURATION	Number	100	Recording time
PRETRIGGER>	Number	1	Pre-trigger time (time before the trigger signal)
TRIGGER>	IN	p1	Starting-point measuring channel
LEVEL>	Number	125 bar	Start-point value
TRIG SLOPE>	▲▼	▲	Ascending or descending edge
AUTO READY>	YES, NO	YES	Recording of measured values is repeated automatically





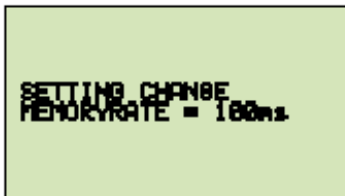
If conflicts arise between the recording time and the set recording interval, the following message is displayed:

1. **FAST MODE**



Configuring a longer recording interval.

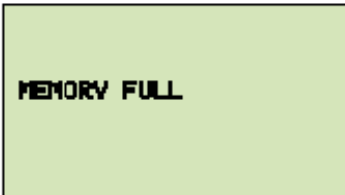
2. **REC RATE**



Configuring a longer recording interval.



If the measured value memory is full, the following message is displayed:



Delete measured value memory or transfer to PC.

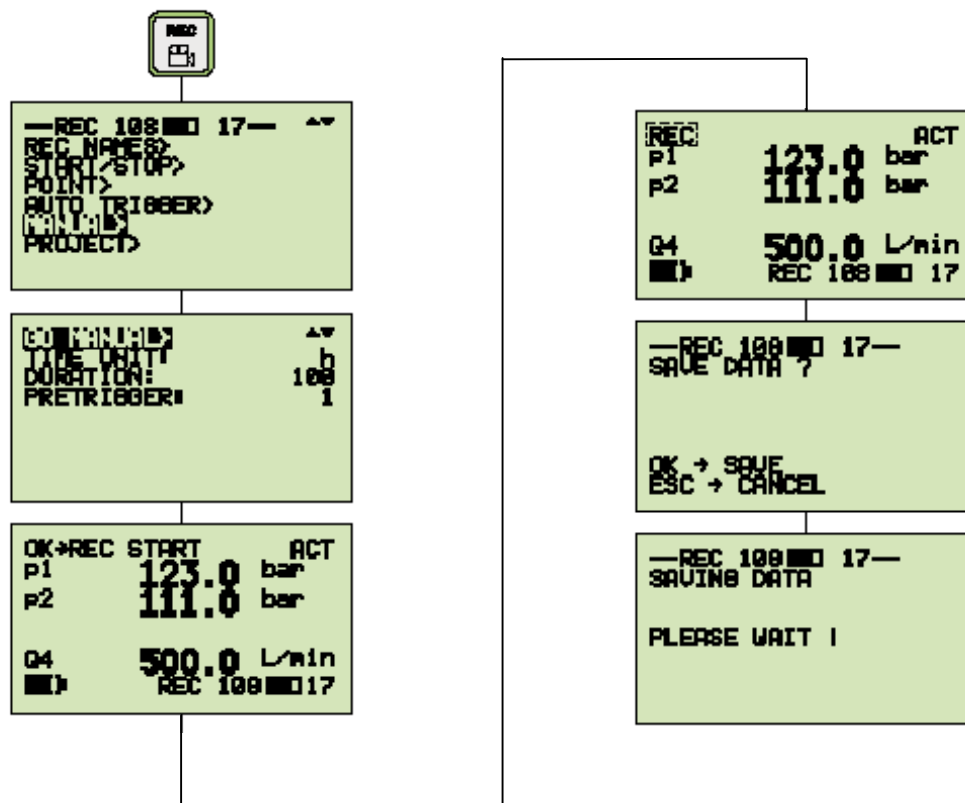
9.6. Memory function MANUAL

The manual trigger function documents the process of recording measured values triggered by a manual start signal initiated by the user. Automatic recording of measured values ends after predetermined measurement time.

For this reason, time-dependent recordings of measured values are started manually.

The following parameters must be set:

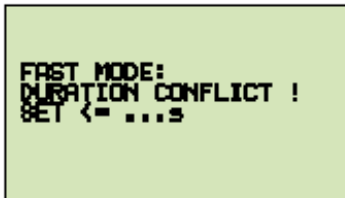
Menu	Setting/ Pre-selection	Example	Notes
TIME UNIT>	sec hrs	h	Pre-selection time unit (trigger / pre-trigger)
DURATION	Number	100	Recording time
PRETRIGGER>	Number	1	Pre-trigger time (time before the trigger signal)
TRIGGER>	IN	p1	Starting-point measuring channel





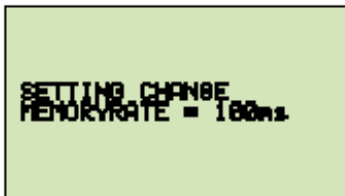
If conflicts arise between the recording time and the set recording interval, the following message is displayed:

1. **FAST MODE**



Configure a longer recording interval.

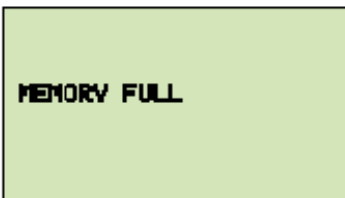
2. **REC RATE**



Configure a longer recording interval.



If the measured value memory is full, the following message is displayed:



Delete measured value memory or transfer to PC.

9.7. Recording measured values with default PROJECT settings

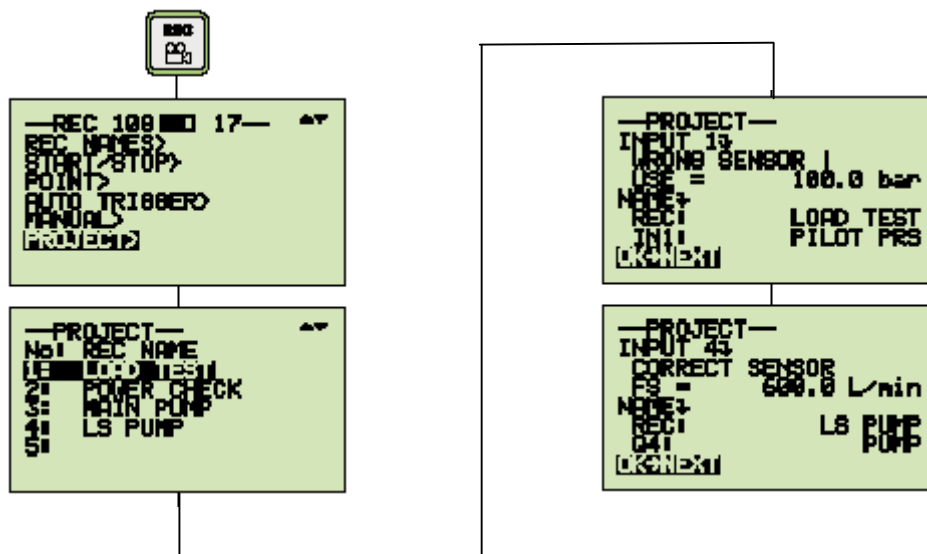
In this setting, measurements are made using a defined sensor configuration. The user using the PC software defines this configuration. This avoids false measurements and wrong settings.

The preset parameters are altered in the PC software and transferred to the measuring instrument.

The following parameters can be set:

Menu	Setting/ Pre-selection	Example	Notes
REC NAME>	No 1 ... 5	Load Test	There are max. 5 predefined settings (tests) available for selection
INPUT>	PILOT PRS		Defined sensors are defined for each channel
WRONG SENSOR!	USE	150 bar	Warns of wrong sensor: A pressure sensor with the corresponding FS (full scale) must be connected to this channel
CORRECT SENSOR!	FS	600 l/min	Indicates correct sensor. The next channel can be connected.

When all of the sensors are connected, the respective type of recording (START/STOP, POINT, AUTO TRIGGER, MANUAL) is selected and performed automatically. An internal query of the connected sensors occurs only before choosing the project setting.



10.0 Setting and operating via PC

10.1. Connecting to a PC



Steps:

- 1 Connect the measuring instrument to the PC via the USB cable
- 2 Launch PC software

Run through the PC software. Once the procedure has been confirmed, the measuring instrument will be initialized and can communicate with the PC.

10.2. Operating / Configuring via PC

All further steps and settings are described in detail in the PC software:

- Online measurement
- Reading out the measured value memory
- PROJECT definition
- Administering and analyzing measurement curves

11.0 Accessories

Power supply unit 110/230 VAC (EUR / US / UK / AUS)	Power supply PPC-04/12-110V/230V
Car adapter cable 12/24 VDC	Cable PPC-04/12-CAB-MOB
Connecting cable 3 m 5 m	Cable PPC-04/12-CAB3 Cable PPC-04/12-EXT5
Pressure Sensors -1 ... 15 bar 0 ... 60 bar 0 ... 150 bar 0 ... 400 bar 0 ... 600 bar	Sensor PPC-04/12-PT-015 /2 Sensor PPC-04/12-PT-060 /2 Sensor PPC-04/12-PT-150 /2 Sensor PPC-04/12-PT-400 /2 Sensor PPC-04/12-PT-600 /2
Pressure peak sensor 0 ... 1000 bar	Sensor PPC-04/12-PT-601 /2
Temperature sensors Screw-in sensor (M10) -25°C ... 125°C (-13°F ... 257°F) Hand-held sensor -25°C ... 125°C (-13°F ... 257°F)	Sensor PPC-04/12-TS Sensor PPC-04/12-TSH
Flow meter 1 ... 15 l/min 4 ... 60 l/min 6 ... 150 l/min 10 ... 300 l/min 20 ... 600 l/min 25 ... 750 l/min	Flow meter PPC-04/12-SFM-015 Flow meter PPC-04/12-SFM-060 Flow meter PPC-04/12-SFM-150 Flow meter PPC-04/12-SFM-300 Flow meter PPC-04/12-SFM-600 Flow meter PPC-04/12-SFM-750
Gear flow meter 0,2 ... 15 l/min 0,4 ... 60 l/min 0,6 ... 150 l/min 1 ... 300 l/min	Flow meter PPC-04/12-SVC-015 Flow meter PPC-04/12-SVC-060 Flow meter PPC-04/12-SVC-150 Flow meter PPC-04/12-SVC-300
Rotational speed sensor 0 ... 10.000 RPM	Sensor PPC-04/12-SDS-CAB
Case (aluminum)	Case PPC-06/12

- For further details and other accessories please have a look at our catalog "Diagtronics".

12.0 Technical Data

Sensor input	Sensor recognition (p/T/Q/n) Connecting auxiliary sensors Plug-in connection, 5pin Push-pull Resolution 12 bit + sign = 4.096 steps
Sampling period	1 ms 0,25 ms FAST MODE (IN1)
Display	LCD 128x64 Pixel Display size 72x40 mm (2,84 x 1,58 inch) Illumination Height of characters 6 mm (0,24 inch)
Input	Membrane keypad
Interface	USB 2.0 Online speed 20 ms ACT-MIN-MAX
Display functions	Difference; addition; power; volume ACT; MIN; MAX; FS; TEMP
Measured value memory	Measured value memory 1.000.000 points Curve memory: 250.000 points Data format: ACT; MIN-MAX; FAST (0,25 ms) Memory configuration: Interval (e.g. 5 ms) Points per channel (2.000)
Environmental conditions	Ambient temperature: 0 ... 50°C (32°F... 122°F) Storage temperature: -25°C ... 60°C (-13°F... 140°F) Temperature error: 0,02 %/°C Relative humidity: <80 % Degree of protection: EN60529; IP54 (water splash/oil) Drop test: IEC 60068-2-32
CE	DIN/EN 61000-6-2 DIN/EN 61000-6-3
Power supply (external)	11 ... 30 VDC Power supply 110/230 VAC-15 VDC car-adapter 12/24 VDC
Battery	NiMH Charging time: 3 hours Operating time: 8 hours
Housing	Material: Polyamide Dimension: 235x106x53 mm (9,25 x 4,17 x 2,09 inch) Weight: 530 g (1,17 lbs.)
PC Software	Read out / depict measurement data and analyze on PC Device settings read out / process Load device settings into measuring instrument from library

13.0 Description of the memory functions

Configuring the measured value memory		
DATA FORMAT	ACT	During the recording interval (for example, 50 ms), the current measurement value (ACT) only will be written to the measured value memory.
	MIN-MAX	During the recording interval (for example, 50 ms), one MIN and one MAX value will be written to the measured value memory
REC CONFIG	2.000 PTS	The selected recording time is automatically defined into a fixed number of recording intervals per channel. Example: Recording time 10 min = 600 s Duration of recording interval = 600 s / 2.000 = 300 ms
	REC RATE	Definition of an individual recording interval (for example. 5 ms) Based in the settings (DATA FORMAT/REC RATE), the measuring instrument examines if the selected recording time must be extended. Example: Recording time 100 h/ conflict Recording time
FAST MODE		ACT measured values only are saved at a fixed recording interval of 0.5 ms via IN1. All other inputs (Inx) are not in function.

Selecting the memory function: sensor PPC-04/12-PT-XXX /2				
Recording time 60 s				
Memory function	Setting DATA FORMAT	Setting REC CONFIG	Curve memory (points)	Number of measured values / points p (bar), T (°C)
START / STOP	ACT MIN-MAX	-	120.000	p (bar) = 15.000 T (°C) = 15.000
AUTO / MANUAL TRIGGER	AC MIN-MAX	2.000 PTS	250.000	p (bar) = 2.000 T (°C) = 60
		REC RATE (5 ms)	250.000	p (bar) = 12.000 T (°C) = 60

1. Determining the number of the memory functions:			
Channels	Measured variable	Number of measured values	Number of recording intervals
			120.000 / measurement values = number of recording intervals
<i>Example 1</i>			
4 Sensor PPC-04/12-PT	°C	4	120.000 / 8 = 15.000
	bar	4	
	values	8	
<i>Example 2</i>			
2 Sensor PPC-04/12-PT	°C	2	120.000 / 6 = 20.000
	bar	2	
1 Flow meter PPC-04/12-SFM	l/min	1	
1 Sensor PPC-04/12-SDS-CAB	RPM	1	
	values	6	

2. Determining the duration of the recording interval:			
Time	Channels	Number of measured values	Duration of recording interval
<i>Example 1</i>			
60s 60.000 ms	4 Sensor PPC-04/12-PT	8	60.000 / 15.000 = 4 ms
30s 30.000 ms	4 Sensor PPC-04/12-PT	8	40.000 / 15.000 = 2 ms
<i>Example 2</i>			
60s 60.000 ms	2 Sensor PPC-04/12-PT 1 Flow meter PPC-04/12-SFM 1 Sensor PPC-04/12-SDS-CAB	6	60.000 / 20.000 = 3 ms
40s 40.000 ms	2 Sensor PPC-04/12-PT 1 Flow meter PPC-04/12-SFM 1 Sensor PPC-04/12-SDS-CAB	6	40.000 / 20.000 = 2 ms

Important information about the START/STOP mode	
START STOP	<p>The settings made under REC CONFIG are not relevant in this mode. The recording time is still unknown when the process of recording measured values begins. For this reason, the recording interval is dynamically optimized and appropriately adapted as the measured values are being recorded. The curve memory can store approx. 120.000 measured values.</p> <p>When sensors types PPC-04/12-PT are connected, the measurement values for temperature and pressure are saved at the same recording interval.</p>

Important information about the AUTO / MANUAL TRIGGER modes:	
AUTO/MANUAL TRIGGER	<p>The settings made under REC CONFIG are relevant in this mode. The recording time is known when the process of recording measured values begins.</p> <p>The curve memory can store 250.000 measured values.</p>
REC CONFIG 2.000 PTS	<p>$DURATION / 2000 = \text{duration of the recording interval} / \text{channel}$</p> <p>When sensors types PPC-04/12-PT are connected, the measured temperature values are saved at a recording interval of 1 second.</p>
REC CONFIG REC RATE	<p>Measured values are recorded at the set interval (REC RATE).</p> <p>When sensors types PPC-04/12-PT are connected, the measured temperature values are saved at a recording interval of 1 second.</p>

1. Determining the duration of the recording interval for REC CONFIG 2000 PTS:				
Time	Channels	Measured values	Number of measurement values	Duration of the recording interval
60s 60.000 ms	4 Sensor PPC-04/12-PT	°C bar	4x60 4x2.000	$60.000 / 2.000 = 30$ ms
Stored measurement points		8.240		
30s 30.000 ms	4 Sensor PPC-04/12-PT	°C bar	4x30 4x2.000	$30.000 / 2.000 = 15$ ms
Stored measurement points		8.120		
60s 60.000 ms	2 Sensor PPC-04/12-PT 1 Flow meter PPC-04/12-SFM 1 Sensor PPC-04/12-SDS-CAB	°C bar l/min RPM	2x60 2x2.000 1x2.000 1x2.000	$60.000 / 2.000 = 30$ ms
Stored measurement points		8.120		
40s 40.000 ms	2 Sensor PPC-04/12-PT 1 Flow meter PPC-04/12-SFM 1 Sensor PPC-04/12-SDS-CAB	°C bar l/min RPM	2x40 2x2.000 1x2.000 1x2.000	$40.000 / 2.000 = 20$ ms
Stored measurement points		8.080		

2. Determining the number of recording intervals for REC CONFIG/REC RATE 5 ms:				
Time	Channels	Measured variable	Number of measurement values	Number of recording intervals
60s 60.000 ms	4 Sensor PPC-04/12-PT	°C bar	4x60 4x12.000	$60.000 / 5 = 12.000$
Stored measurement points		48.240		
30s 30.000 ms	4 Sensor PPC-04/12-PT	°C bar	4x30 4x6.000	$30.000 / 5 = 6.000$
Stored measurement points		24.120		
60s 60.000 ms	2 Sensor PPC-04/12-PT 1 Flow meter PPC-04/12-SFM 1 Sensor PPC-04/12-SDS-CAB	°C bar l/min RPM	2x60 2x12.000 1x12.000 1x12.000	$60.000 / 5 = 12.000$
Stored measurement points		48.120		
40s 40.000 ms	2 Sensor PPC-04/12-PT 1 Flow meter PPC-04/12-SFM 1 Sensor PPC-04/12-SDS-CAB	°C bar l/min RPM	2x40 2x8.000 1x8.000 1x8.000	$40.000 / 5 = 8.000$
Stored measurement points		32.080		



Walter Stauffenberg GmbH & Co. KG
Postfach 1745 58777 Werdohl
Im Ehrenfeld 4 58791 Werdohl
Deutschland

Phone: +49 2392 916-0
Fax: +49 2392 2505
E-Mail: sales@stauff.com
Internet: www.stauff.com

Subject to alteration
Technische Änderung vorbehalten /