The Parker Service Master Easy

Operating instructions

Foreword

Revisions

Version	Date	Change
1.0	12/2006	First edition

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Contents

1. 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 utilised.
Connector thread: ½" BSP = 90 Nm
¼" BSP = 30 Nm

Please observe the highest pressures detailed in the catalogues for hydraulic fittings (ERMETO) or hydraulic hoses from Parker Hannifin.

1.5 Service/repair

For repairs to or calibration of the measurement instruments, please contact a Parker Hannifin sales branch.

1.6 Notes on disposal

Recycling in compliance with WEEE

Purchasing our product gives you the opportunity to return the device to Parker Hannifin 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 13/8/2005 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 of assistance?

Parker Hannifin offers you the option of returning your old device to us at no extra charge. Parker Hannifin 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 Parker Hannifin 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.parker.com

2. Device version/range of supply

The measuring instrument and sensors enable the user to measure all relevant parameters in a hydraulic system.

Parameters:

- [bar/psi] Pressure, Δp (load sensing pumps)
- [°C/°F] Temperature
- [L/min/G/min] (U.S) volumetric flow rate
- [1/min] RPM

Automatic sensor recognition means the measuring instrument is simple to operate. It is not necessary to carry out any further settings to the device.

Plug & Work is one of the more important attributes of the device. It allows the measuring instrument to be ready to operate in an instance, and excludes erroneous measurements.

3. 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 for 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 instrument turns off automatically.

 Battery symbol

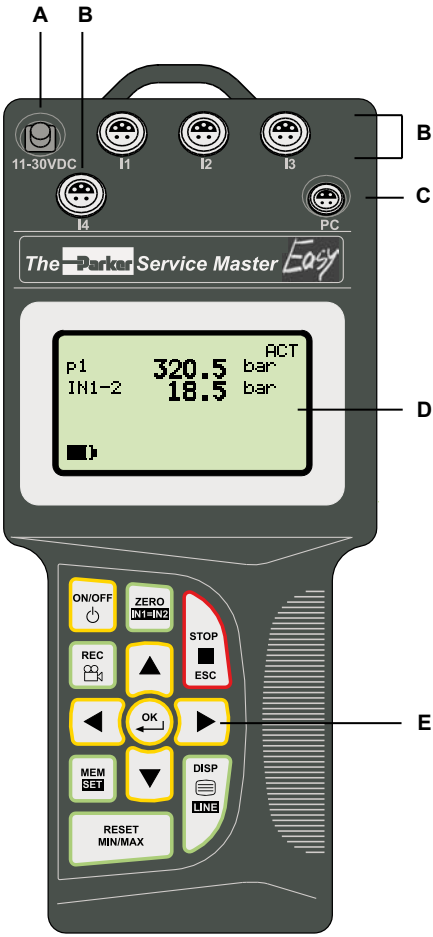
The measuring instrument is powered using the external power supply unit or via the car adapter. The battery can be recharged directly. The recharging process begins as soon as the power supply unit is connected.

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

3.2 Replacing the batteries

Replacing the batteries

4. Keys and functions



A **11-30 VDC**
power supply unit
110/220 VAC-15 VDC

Car adapter
12/24 VDC

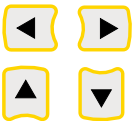
B **I1 . . I4**
Sensor ports

C **PC (USB)**

D **Display**

E **Keypad**

Function keys

	**ON/OFF**
	**Confirms** function/value
	**Selects** function/value
	**STOP/ESC**

Menu keys

* These menu keys are assigned dual functions:
Assignment 1. Menu level = 1 x press
Assignment 2. Menu level (black background) = 1 x hold key pressed down (2 s)

	**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 measured values	
	**Delete** MIN/MAX values		

4.1 Symbols and using the menus

If the 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 symbols	Key	Function	Example
>		Call up a submenu/ setting	UNIT>
:		Confirm	AUTO POWER: OFF
▲ ▼		Select	--SET--

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

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.

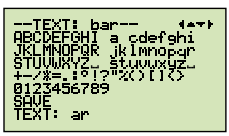
Press the OK key each time you wish select a function or submenu; when making alterations or adding values you must press OK to confirm your action. The OK key is used to save all settings. Press the STOP/ ESC key if you wish to leave a menu or do not wish to save an entry. Key assignment and mode of 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.

Example: setting the unit (text) and the measurement range (numerical)

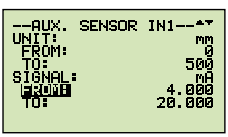
Text input:

to set the units (max. 15 characters)



Numerical input:

to set the measurement range and signal span

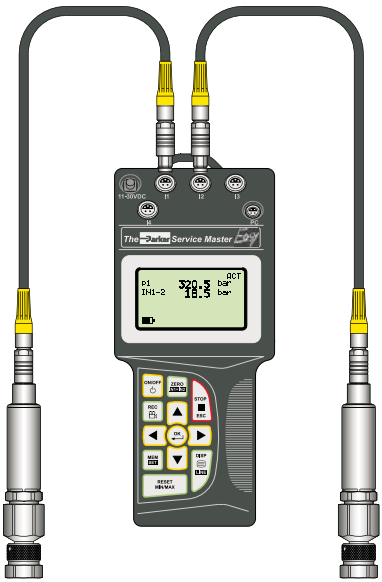


5. Connecting the sensors/display functions

To avoid electrical interference, please observe the following steps:

1 Connect the sensor to the measuring instrument using the connection cable.

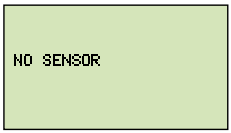
2 Turn on the measuring instrument.



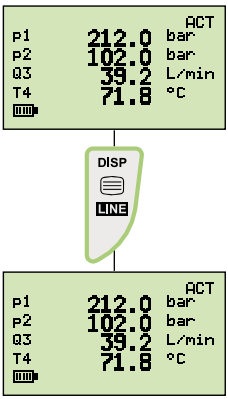
Measuring instrument with two pressure sensors

- 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)

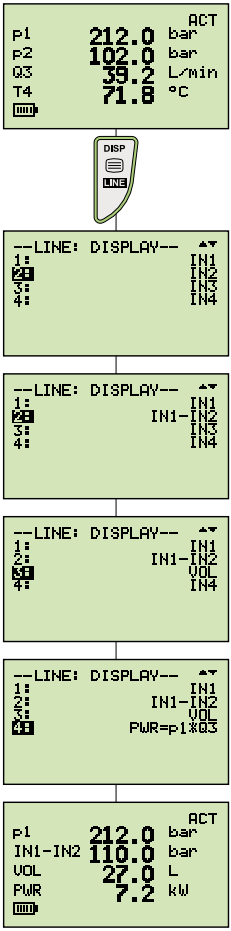
It is possible to change the display format by pressing **DISP** (once only).

Available for 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 'SCPT' type sensors.

5.2 Display configuration (LINE)



Press and hold **LINE** (2 s)

Line:

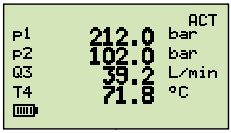
1: No setting possible
cannot be selected

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

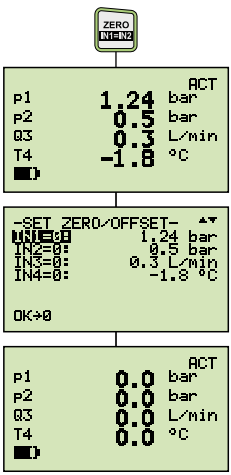
5.3 Zero point calibration (ZERO)

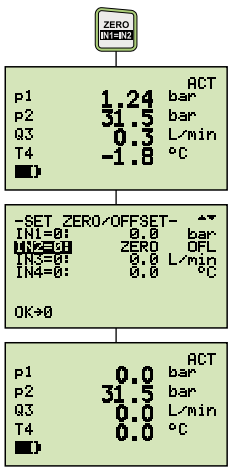


If the alignment values are within the permissible tolerance (2 % of FS), the values are set to zero.

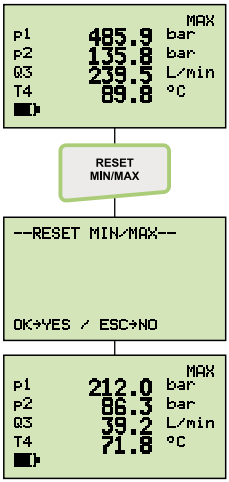
If the alignment values exceed the permissible tolerance (2 % of FS), the following is displayed: ZERO OFL.

Press **ZERO** (once)





5.4 Deleting MIN/MAX values (RESET)



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

Deleting MIN/MAX values.

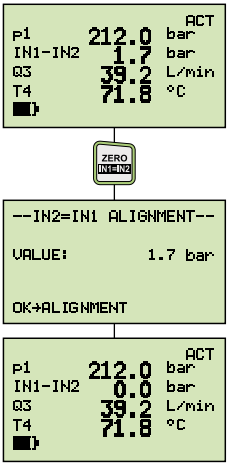
The updated MAX values are displayed in the MAX display.

Example: Loss of pressure in the hydraulic system

5.5 Differential value display

► The settings IN1 – IN2 are described in the chapter 'Display configuration (LINE)'.

5.6 Differential value alignment (IN1=IN2)



Press and hold **IN1=IN2** (2 s)

ENGLISH

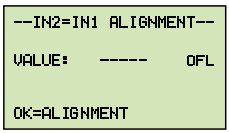
Carry out differential value alignments at below operating pressure. Connect two pressure sensors to the same connection (T-adapter). Δp-calibration sets the tolerance of the sensors in relation to one another to zero.

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

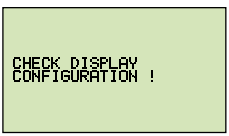
Three error messages are possible for IN1=IN2:

1 Alignment values exceed the permissible tolerance:

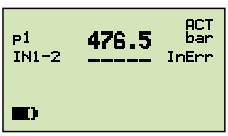
- For sensors with automatic sensor recognition, 5 % of the upper range value (FS)
- For auxiliary sensors, 10 % of the upper range value (FS)



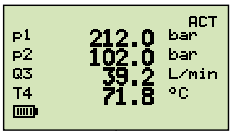
2 IN1 - IN2 is not configured (DISP-LINE):



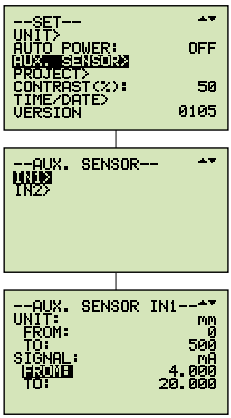
3 Measured variables are not the same (IN1=bar/IN2=L/min)



5.7 Connecting auxiliary sensors (SET AUX. SENSOR)



Press and hold **SET** (2 s)

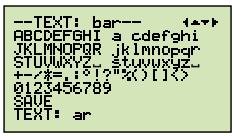


Ensure that the electrical specifications of the auxiliary sensors are compatible with the measuring instrument/adapter. Please ensure correct PIN assignment and supply voltage and avoid short-circuits!

ENGLISH

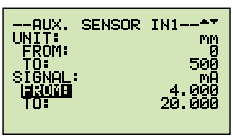
Text input for UNIT/SIGNAL

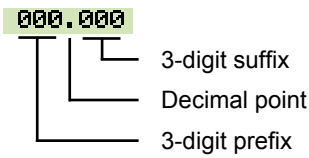
To set the units:
Text input up to max. 15 characters.



Numerical input for FROM/TO

To set the measurement range and signal span
3-digit prefix, decimal point, 3-digit suffix.

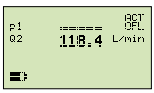
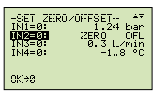
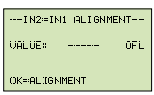
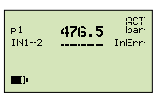


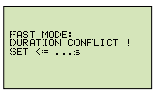
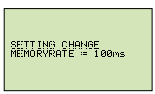


Connecting auxiliary sensors:

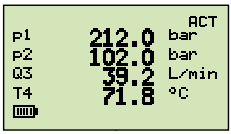
Measuring instrument with connector adapter and sensors for distance (mm) and force (kN).

5.8 Error messages/warnings

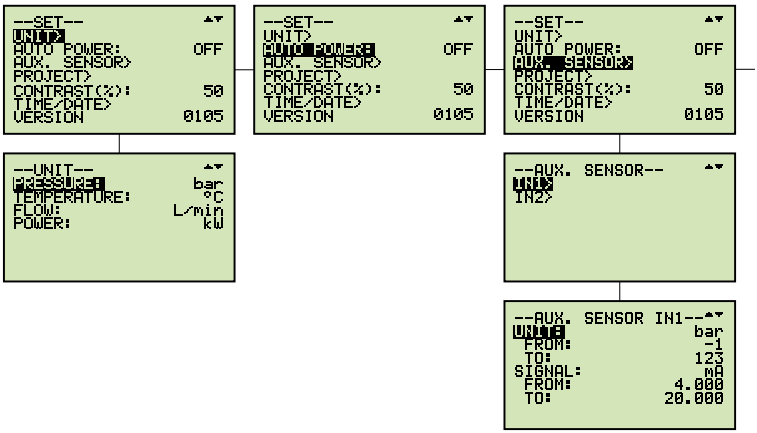
Display	Description	What action to take?
	No sensor is connected	Turn off the measuring instrument Connect sensor Turn on the measuring instrument
%	An auxiliary sensor is connected.	Carry out settings in the menu SET- AUX.SENSOR
	Sensor recognition interrupted (cable break or input defect)	Send measuring instrument, sensor and connection cable to Parker Hannifin.
	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	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

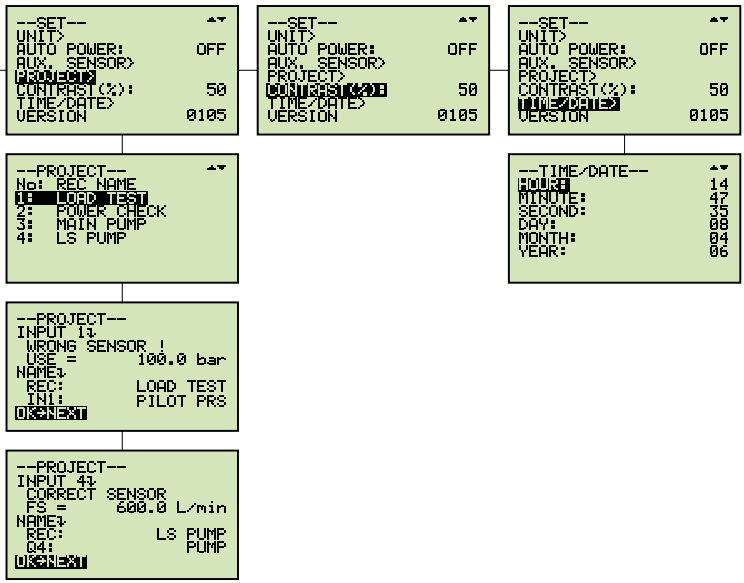
Display	Description	What action to take?
	Do not use in FAST MODE	Setting REC: START-STOP/POINT FAST MODE only for AUTO TRIGGER MANUAL possible
	Recording time conflict (DURATION) FAST MODE (0.5 ms)	REC setting AUTO TRIGGER MANUAL Alter recording time DURATION
	Recording time conflict (REC RATE)	Setting MEM-SET REC CONFIG REC RATE Alter recording interval REC RATE. Press OK to confirm

6. Device settings (SET)

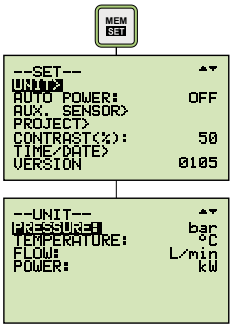


Press and hold **SET** (2 s)




--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: LOAD TEST
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
IN1: PILOT PRS
OK→NEXT
--PROJECT--
INPUT 4↓
CORRECT SENSOR
FS = 600.0 L/min
NAME↓
REC: LS PUMP
04: PUMP
OK→NEXT

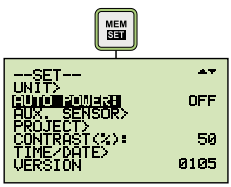
6.1 Setting the units (SET-UNIT)



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:

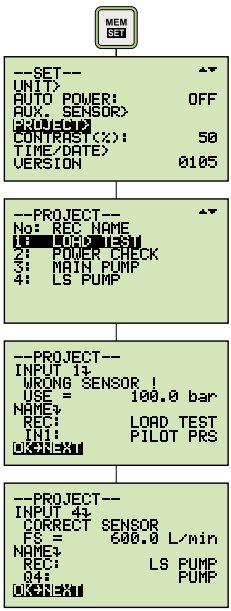
AUTO POWER: OFF, ON

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.

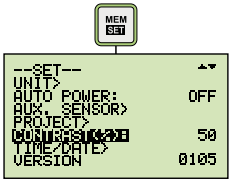


Input 1
Wrong sensor connected!
Please use measurement range 100 bar.

Input 4
Correct sensor connected
FS = 600 L/min

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

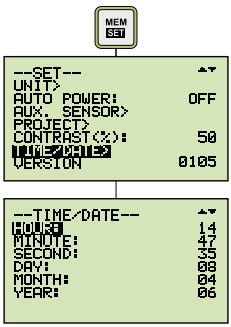
6.5 Setting the contrast (SET-CONTRAST)



Available for selection:

CONTRAST: 10 . . 100 %

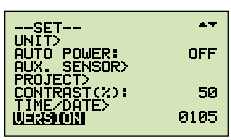
6.6 Setting the time/date (SET-TIME/DATE)



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)



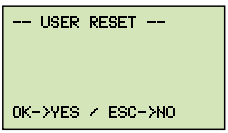
6.8 Factory setting (USER RESET)

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 USER RESET

7. Configuring the measured value memory (MEMORY SET)

The following settings will be undertaken:

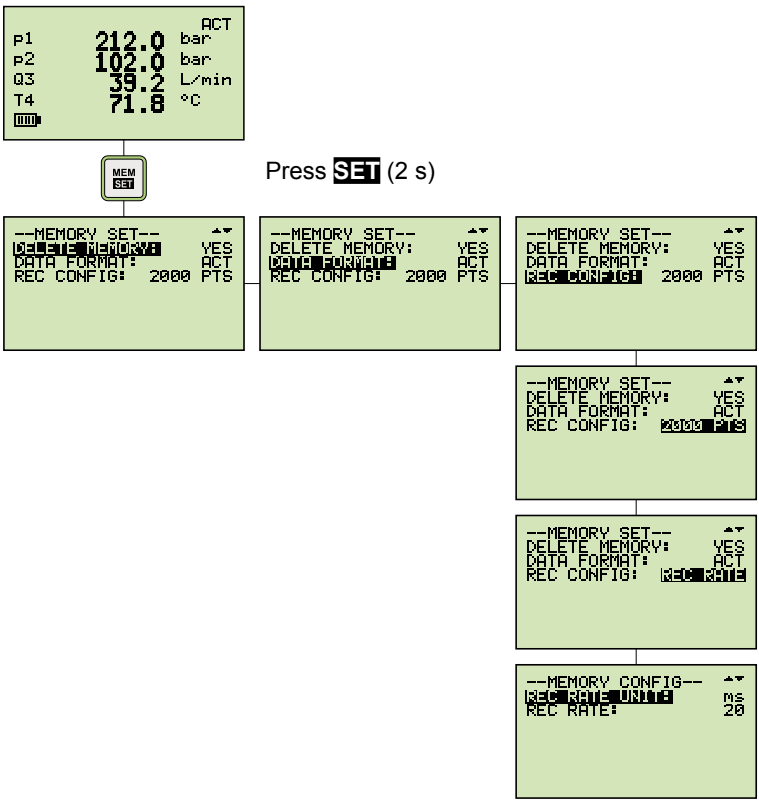
- Delete measured value memory
- Configure data format of the measured values
- Configure recording intervals

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 recording interval is set to 200 milliseconds. Therefore, the setting MIN-MAX is recommended for dynamic measurements (pressure spikes).



7.1 Deleting measured value memory (MEM-DELETE MEMORY)

MEM SET 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.

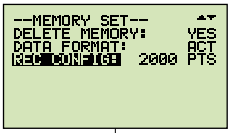
7.2 Setting the data format (MEM-DATA FORMAT)

Available for selection:

DATA FORMAT: ACT
MIN/MAX
FAST

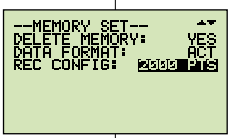
When set to FAST, the recording interval for measuring and storing at IN1 is 0.5 ms.

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



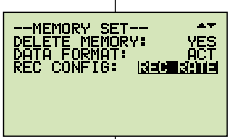
REC CONFIG

Two different formats can be set:



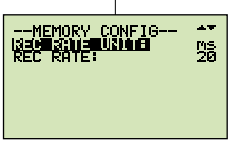
a. Format 2.000 PTS

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



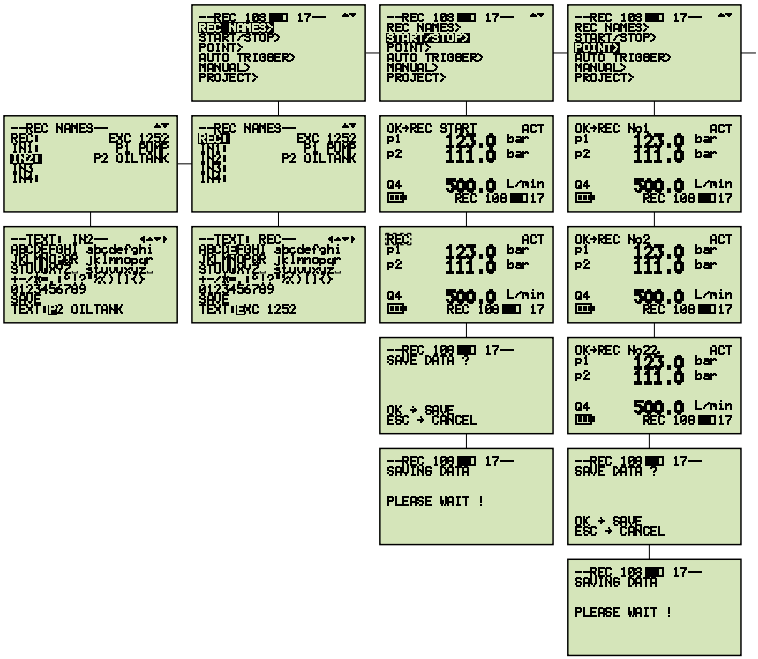
b. Format REC RATE

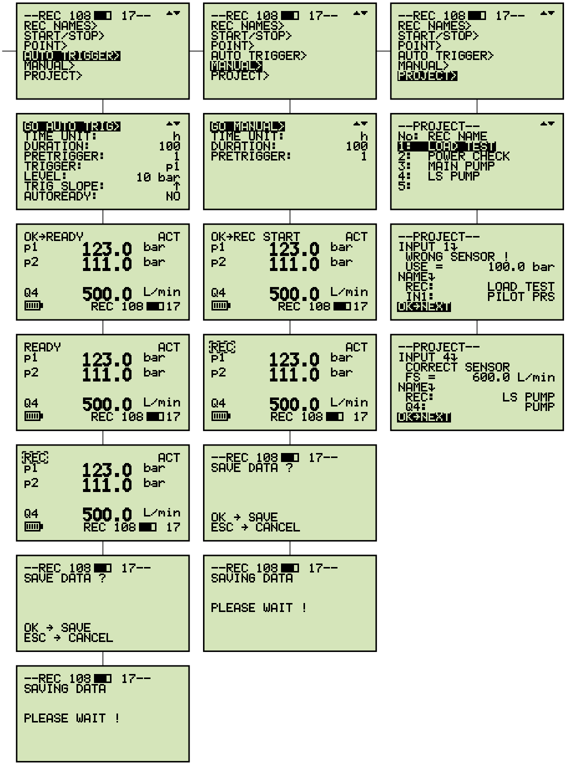
The measurement curves are saved at a defined interval.



Example: 20 ms

8. The REC menu

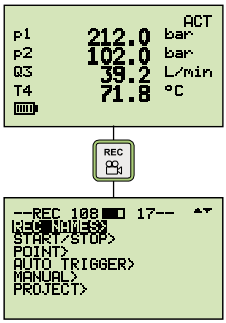



--REC 108 17--
REC NAMES>
START/STOP>
POINT>
AUTO TRIGGER>
MANUAL>
PROJECT>
GO AUTO TRIG>
TIME UNIT: h
DURATION: 100
PRETRIGGER: 1
TRIGGER: p1
LEVEL: 10 bar
TRIG SLOPE: ↑
AUTOREADY: NO
GO MANUAL>
--PROJECT--
No: REC NAME
1: LOAD TEST
2: POWER CHECK
3: MAIN PUMP
4: LS PUMP
5:
OK→READY ACT
p1 123.0 bar
p2 111.0 bar
Q4 500.0 L/min
REC 108 17
OK→REC START ACT
INPUT 1↓
WRONG SENSOR !
USE = 100.0 bar
NAME↓
REC: LOAD TEST
IN1: PILOT PRS
OK→NEXT
READY ACT
REC ACT
INPUT 4↓
CORRECT SENSOR
FS = 600.0 L/min
REC: LS PUMP
Q4: PUMP
SAVE DATA ?
OK → SAVE
ESC → CANCEL
SAVING DATA
PLEASE WAIT !

ENGLISH

9. Recording measured values

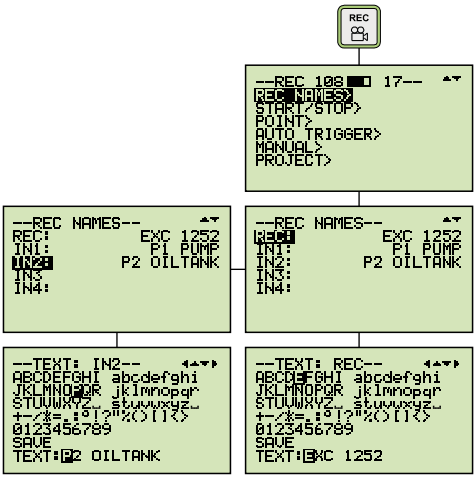
9.1 Settings for recording measured values (REC)



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.

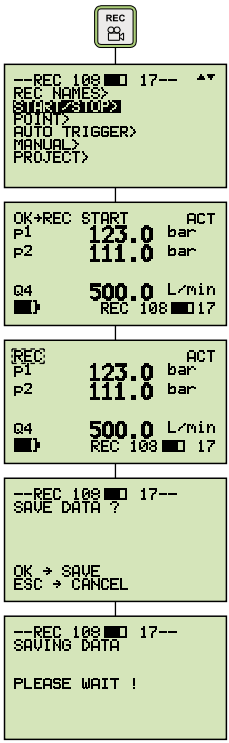
9.2 The REC NAMES setting



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.

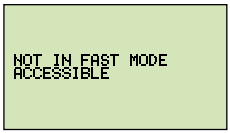
Memory function START/STOP

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

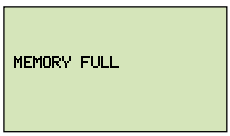


The data format FAST (recording interval ACT values in 0.5 ms) cannot be used when the device is in the START/STOP mode.

The following message is displayed:

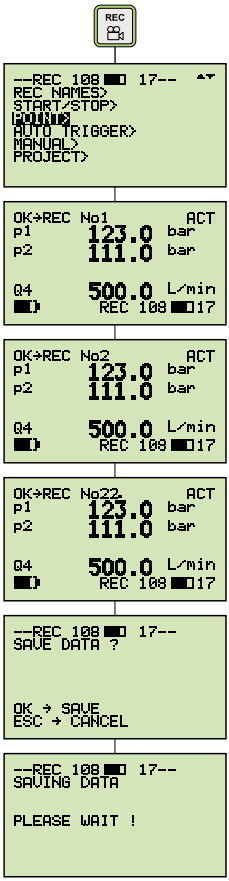


If the measured value memory is full, the following message is displayed:



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.



The first data record will be saved; for example, p1, p2 and Q4

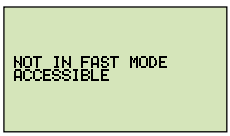
The second data record will be saved; for example, p1, p2 and Q4

The third data record will be saved; for example, p1, p2 and Q4

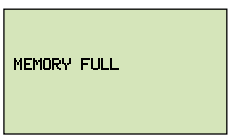
Press the OK key to save the data records. Press the STOP/ESC key to end recording measured values; all data records will be written in the measured value memory.

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:



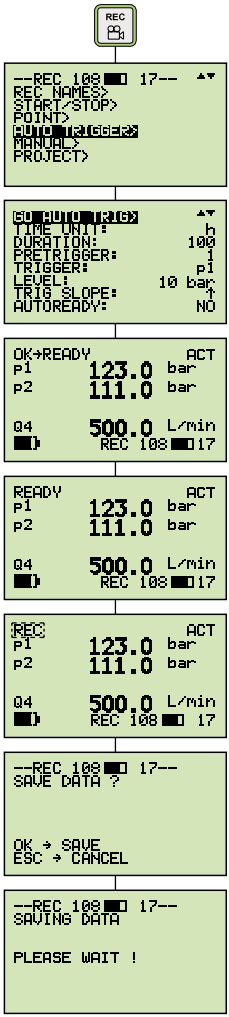
Memory function AUTO TRIGGER

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 are 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.

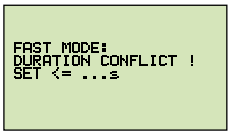
The following parameters must be set:

Menu	Setting/ pre-selection	Values	Notes
TIME UNIT>	sec, hrs	h	Pre-selected time unit (trigger/pre-trigger)
DURATION>	Number	100	Recording time
PRE TRIGGER>	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


REC
--REC 108 17--
REC NAMES>
START/STOP>
POINT>
AUTO TRIGGER>
MANUAL>
PROJECT>
GO AUTO TRIG
TIME UNIT: h
DURATION: 100
PRETRIGGER: 1
TRIGGER: p1
LEVEL: 10 bar
TRIG SLOPE: ↑
AUTOREADY: NO
OK→READY ACT
p1 123.0 bar
p2 111.0 bar
Q4 500.0 L/min
REC 108 17
READY ACT
p1 123.0 bar
p2 111.0 bar
Q4 500.0 L/min
REC 108 17
REC ACT
p1 123.0 bar
p2 111.0 bar
Q4 500.0 L/min
REC 108 17
--REC 108 17--
SAVE DATA ?
OK → SAVE
ESC → CANCEL
--REC 108 17--
SAVING DATA
PLEASE WAIT !

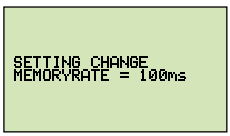
If conflicts arise between the recording time and the set recording interval, the following message is displayed:

1. FAST MODE



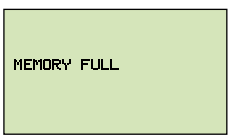
Configuring a longer recording interval

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.

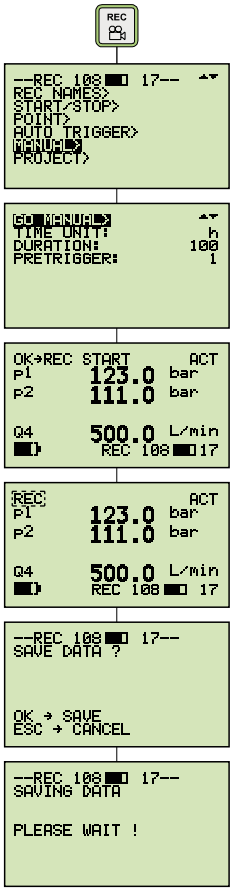
Memory function MANUAL

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 a predetermined measurement time.

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

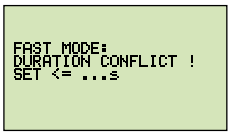
The following parameters must be set:

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


REC
--REC 108 17--
REC NAME>
START/STOP>
POINT>
AUTO TRIGGER>
MANUAL>
PROJECT>
GO MANUAL>
TIME UNIT: h
DURATION: 100
PRETRIGGER: 1
OK→REC START ACT
p1 123.0 bar
p2 111.0 bar
Q4 500.0 L/min
REC 108 17
REC ACT
p1 123.0 bar
p2 111.0 bar
Q4 500.0 L/min
REC 108 17
--REC 108 17--
SAVE DATA ?
OK → SAVE
ESC → CANCEL
--REC 108 17--
SAVING DATA
PLEASE WAIT !

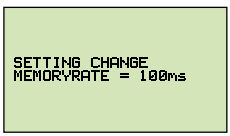
If conflicts arise between the recording time and the set recording interval, the following message is displayed.

1. FAST MODE



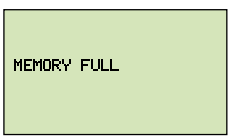
Configuring a longer recording interval

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.

Recording measured values with default PROJECT settings

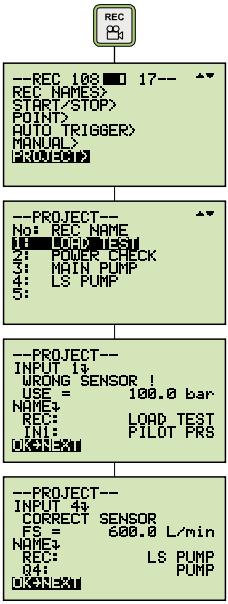
In this setting, measurements are made using a defined sensor configuration. This configuration is defined by the user using the PC software. This avoids false measurements and wrong settings.

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		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 pressures 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.


REC
--REC 108 17--
REC NAMES>
START/STOP>
POINT>
AUTO TRIGGER>
MANUAL>
PROJECT>
--PROJECT--
No: REC NAME
1: LOAD TEST
2: POWER CHECK
3: MAIN PUMP
4: LS PUMP
5:
--PROJECT--
INPUT 1↓
WRONG SENSOR !
USE = 100.0 bar
NAME↓
REC: LOAD TEST
INI: PILOT PRS
OK>NEXT
--PROJECT--
INPUT 4↓
CORRECT SENSOR
FS = 600.0 L/min
NAME↓
REC: LS PUMP
04: PUMP
OK>NEXT

ENGLISH

10. Setting and operating via PC

10.1 Connecting to a PC

Measuring instrument, PC and USB cable

1 Connect the measuring instrument to the PC (USB cable)

2 Launch PC software.

The following screen is displayed:

Once the procedure has been confirmed, the measuring instrument will be initialised 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 analysing measurement curves

11. Accessories

Power supply unit 110/240 VAC EUR/US/UK/AUS	SCSN-450
Car adapter cable 12/24 VDC	SCK-318-05-21
Connection cable 3 m 5 m Extension (5 m)	 SCK-102-03-02 SCK-102-05-02 SCK-102-05-12
Pressure sensors -1 ... 15 bar 0 ... 60/150/400/600/1.000 bar	 SCPT-015-02-02 SCPT-xxx-02-02
Volumetric flow rate sensors -60 ... +60 L/min -150 ... 150 L/min	 SCQ-060-0-02 SCQ-150-0-02
Measurement turbines 15/060/150/300/600/750 L/min	 SCFT-xxx-02-02
Measurement turbines with load valve 150 L/min 300/600/750 L/min	 SCFT-150-DRV SCLV-PTQ-xxx
Volumetric flow meter 15/060/150/300 L/min	 SCVF-xxx-00-02
Temperature sensors (125 °C) Screw-in sensor (M10) Hand-held sensor	 SCT-150-04-02 SCT-150-0-02
Rotational speed sensor (10 000 RPM)	 SCRPM-220
Carry case with foam insert for SCFT-150-DRV Aluminum carry case SCLV-PTQ-300 SCLV-PTQ-600/750	 SCC-560 SCC-750 SCC-PTQ-300 SCC-PTQ-600

12. Technical data

Input	Sensor recognition (p/T/Q/n) Connecting auxiliary sensors Plug-in connection, 5-pin push-pull Resolution 12 bit + sign = 4.096 steps	
Sampling period	1 ms 0.25 ms FAST MODE (IN1)	
Display	LCD 128 x 64 pixels, size 72 x 40 mm Illumination Height of characters 6 mm	
Input	Membrane keypad	
Interface	USB 2.0 Online speed 20 ms ACT-MIN-MAX	
Display functions	Difference; addition; power; volumes ACT; MIN; MAX; FS; TEMP	
Measured value memory	Measured value memory: Curve memory: Data format: Memory configuration:	1 000 000 points 250 000 points ACT: MIN-MAX FAST (0.25 ms) interval (e.g. 5 ms) points per channel (2.000)
Environmental conditions	Ambient temperature: Storage temperature: Temperature error: Relative humidity: Degree of protection: Drop test	0 . . 50 °C -25 °C . . 60 °C 0.02 %/°C <80 % EN 60529 IP 54 (water splash/oil) IEC 60068-2-32
CE	DIN/EN 61000-6-2 DIN/EN 61000-6-3	
Power supply (external)	11 ... 30 VDC Power supply unit 110/240 VAC - 15 VDC Car adapter 12/24 VDC	
Battery	NiMH Charging time 180 minutes Operating time 8 hours	

Housing	Polyamide 235 x 106 x 53 mm Weight 530 g
PC software SensoWin	Read out/depict measurement data and analyse on PC Device settings read out/process Load device settings into measuring instrument from library

13. 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 divided into a fixed number of recording intervals per channel. Example: 10 min recording time = 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 on 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: SCPT pressure/temperature sensor 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	ACT 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

Important information about the START/STOP mode:	
START/STOP	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 optimised and appropriately adapted as the measured values are being recorded. The curve memory can store approx. 120.000 measured values. When SCPT sensors are connected, the measurement values for temperature and pressure are saved at the same recording interval.

1. Determining the number of recording intervals:			
Channels	**Measured variable**	**Number of measured values**	**Number of recording intervals**
			120.000 ÷ measurement values = number of recording intervals
Example ①			
4 (SCPT)	°C	4	
	bar	4	
	Measured values	8	120.000 ÷ 8 = 15.000
Example ②			
2 (SCPT)	°C	2	
	bar	2	
1 (SCFT)	L/min	1	
1 (SCRPM)	RPM	1	
	Measured values	6	120.000 ÷ 6 = 20.000

2. Determining the duration of the recording interval:			
Time	**Channels**	**Number of measured values**	**Duration of recording interval**
Example ①			
60 s 60.000 ms	4 (SCPT)	8	60.000 ÷ 15.000 = 4 ms
30 s 30.000 ms	4 (SCPT)	8	30.000 ÷ 15.000 = 2 ms
Example ②			
60 s 60.000 ms	2 (SCPT) 1 (SCFT) 1 (SCRPM)	6	60.000 ÷ 20.000 = 3 ms
40 s 40.000 ms	2 (SCPT) 1 (SCFT) 1 (SCRPM)	6	40.000 ÷ 20.000 = 2 ms

Important information about the AUTO/MANUAL TRIGGER modes	
AUTO/MANUAL TRIGGER	The settings made under REC CONFIG are relevant in this mode. The recording time is known when the process of recording measured values begins. The curve memory can store 250.000 measured values.
REC CONFIG 2 000 PTS	DURATION ÷ 2.000 = duration of the recording interval/channel When SCPT sensors are connected, the measured temperature values are saved at a recording interval of 1 second.
REC CONFIG REC RATE	Measured values are recorded at the set interval (REC RATE). When SCPT sensors are connected, the measured temperature values are saved at a recording interval of 1 second.

1. Determining the duration of the recording interval for REC CONFIG 2000 PTS:				
Time	**Channels**	**Measured variable**	**Number of measurement values**	**Duration of the recording interval**
60 s 60.000 ms	4 (SCPT)	°C bar	4 x 60 4 x 2.000	60.000 ÷ 2.000 = 30 ms
Stored measurement points			8.240	
30 s 30.000 ms	4 (SCPT)	°C bar	4 x 30 4 x 2.000	30.000 ÷ 2.000 = 15 ms
Stored measurement points			8.120	
60 s 60.000 ms	2 (SCPT) 1 (SCFT) 1 (SCRPM)	°C bar L/min RPM	2 x 60 2 x 2.000 1 x 2.000 1 x 2.000	60.000 ÷ 2.000 = 30 ms
Stored measurement points			8.120	
40 s 40.000 ms	2 (SCPT) 1 (SCFT) 1 (SCRPM)	°C bar L/min RPM	2 x 40 2 x 2.000 1 x 2.000 1 x 2.000	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 measured values**	**Number of recording intervals**
60 s 60.000 ms	4 (SCPT)	°C bar	4 x 60 4 x 12.000	60.000 ÷ 5 = 12.000
Stored measurement points			48.240	
30 s 30.000 ms	4 (SCPT)	°C bar	4 x 30 4 x 6.000	30.000 ÷ 5 = 6.000
Stored measurement points			24.120	
60 s 60.000 ms	2 (SCPT) 1 (SCFT) 1 (SCRPM)	°C bar L/min RPM	2 x 60 2 x 12.000 1 x 12.000 1 x 12.000	60.000 ÷ 5 = 12.000
Stored measurement points			48.120	
40 s 40.000 ms	2 (SCPT) 1 (SCFT) 1 (SCRPM)	°C bar L/min RPM	2 x 40 2 x 8.000 1 x 8.000 1 x 8.000	40.000 ÷ 5 = 8.000
Stored measurement points			32.080	

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