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Operating Instruction

PPC-04 /2



Please read carefully before use!

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1 General Introduction

1.1 Notes on safety / product selection

Correct functioning of the PPC-04 /2 unit in accordance with these operating instructions can only be guaranteed when the specifications detailed in these operation instructions are adhered to. In particular, specifications relating to the permissible measurement ranges must be observed.



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 specifications or from disregarding the operating instructions.

Pressure sensors are particularly suitable for high-pressure applications. Please abide by the instructions and observe the correct torques (30 Nm) for the fittings or adapters used. Please observe the highest pressures detailed in the catalogues for hydraulic fittings or hydraulic hoses from STAUFF.

For repairs or calibration of the measurement instruments, please contact a STAUFF sales branch.

1.2 Device versions and range of delivery

The PPC-04 /2 measurement instruments and sensors for:

- Pressure, Δp (load sensing pumps) [bar/PSI]
- Temperature [$^{\circ}\text{C}/^{\circ}\text{F}$],
- Volumetric flow rate [LPM/GPM (U.S)]
- RPM [1/min],

allows the user to measure all relevant parameters in a hydraulic system..

Automatic sensor recognition means the PPC-04 /2 is simple to operate.

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

Range of delivery	
Order No.	Description
	PPC-04 /2 two-line display
PPC-04-B /2	2 Inputs (5-pin) push-pull with batteries 9V / 110 mA/h
PPC-04-A /2	2 Inputs (5-pin) push-pull with power supply / recharger PPC-04/12- 110/220VUK, US. and EURO connector
PPC-04-AP /2	2 Inputs (5-pin) push-pull with power supply / recharger PPC-04/12- 110/220V , UK, US. and EURO connector PC Interface (RS-232)

2 Commissioning

The PPC-04 /2 is supplied with a factory-fitted, rechargeable battery. The rechargeable battery must be charged for at least 14 hours before using the first time. The PPC-04 /2 is then ready for use.

2.1 Charging the battery / battery status indicator

The battery must either be replaced or recharged when "**LOBAT**" is displayed. The PPC-04 /2 can be operated using the external power supply / recharger PPC-04/12-110/220V or the car adapter cable PPC-04/12-CAB-MOB. The battery can be directly recharged.

The recharging process begins as soon as the battery charger is connected.



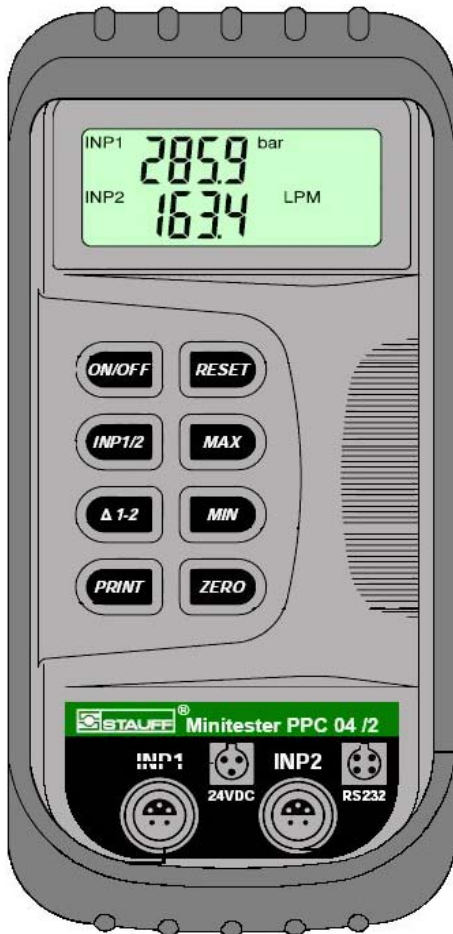
Please ensure that the PPC-04 /2 is fitted with a rechargeable (accumulator) battery when being operated using an external power supply. Do not use the external power supply when a non-rechargeable battery is fitted. Otherwise, the electronics could be destroyed!!

2.2 Replacing the battery



When in continuous operation (without light), the service life of the battery is 8 hours.

3 Functions and keys



4-digit LC Display

Two-line display INP1/ INP2

Input, measurement value, unit and battery status

ON/OFF Turns device on and off

INP1 - INP2

Displays differential value

Δ 1-2

2 inputs Sensor PPC-04/12-PT-600 /2 (600 bar)
2 inputs Flow Meter PPC-04/12-SFM-300 (300 lpm)

INP1 / INP2 (Input selection)

INP1/2

Displays INP1 / INP2.

Resets the Δ1-2 Display

Print Function (PPC-04-AP /2)

PRINT

The ACT, MAX or MIN values are measured in a numerical format and with the PC Adapter Set PC-SET PPC-04-SW-CAB the data can be uploaded to a PC.

RESET

Erases the MAX / MIN value from the memory.

MAX Display

MAX

Displays the highest (MAX) measured value. 500 measurement values are measured per second. The PPC-04 /2 measures all pressure peaks at an interval of 2ms.

MIN

Displays the lowest (MIN) measured value.

ZERO

Zero point calibration.

The Maximum range is 5% of FS (FullScale).

INP 1 ↔ INP2

To connect all sensors from the product program PPC-04/06/08/12 (see catalogue).

24VDC

To connect the external power supply / recharger:

Power supply PPC-04/12-110/220V or car adapter cable PPC-04/12-CAB-MOB

RS232 (PPC-04-AP /2)

PC connection

4 Connecting the sensors

When turned on, all functions 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. „noSE" is displayed if no sensor is connected to the device

4.1 Connecting the PPC-04 /2:



Please observe the red dot



Insert the push-pull connector.

Note:

The temperature values of the pressure sensors PPC-04/12-PT /2 are not displayed on the display of the PPC-04 /2 units!!



Safety instructions for using the 1.000 bar pressure sensor:

Please pay attention to built in test points acc. to rated nominal pressure and specified safety factors.

5 Operating and setting

5.1 Selecting the unit of measurement

The following units are set at the factory: bar; °C; LPM
 These units can be changed:

Ensure the PPC-04 /2 is turned off.

- **RESET** Press and hold
- **ON/OFF** Press and release **unit** is displayed
- **RESET** Release **bar** is displayed.

	Setting		Confirm
(1)	bar ↔ PSI	MIN ↔ MAX	ZERO
(2)	LPM ↔ GPM	MIN ↔ MAX	ZERO
(3)	°C ↔ °F	MIN ↔ MAX	ZERO
	RPM for rotational speed measurement cannot be altered.		

The PPC-04 /2 then switches to the display mode.

5.2 MIN- / MAX indication

MAX Press and hold The highest value is displayed

MIN Press and hold The lowest value is displayed

The indicated value is stored to memory until it is overwritten with a new value. (Dynamic MIN / MAX memory).

5.3 Erasing MIN- / MAX values

Press the RESET key to erase the MIN- / MAX values.

5.4 ZERO function



Press

-00- is displayed


The PPC-04 /2 then switches automatically to the display mode. A span of 5% of the respective measurement range can be set to zero. „OL“ is displayed if the span is greater than 5% of the measurement range.



Ensure no system pressure is applied to the device when performing the zero point calibration.

5.5 Auto Power Off

The PPC-04 /2 switches off automatically after approximately 15 minutes operating time.

Press the  key to deactivate the "Auto Power Off" function.

5.6 Error Messages / Warnings

Display	Description	Remedial action ?
%	Sensor recognition has been interrupted (cable breakage or input defective)	Connect the sensor with a different input. Send the PPC-04 /2, sensor and connection cable to STAUFF.
LO BAT	The battery capacity is too low.	Replace the battery. Recharge rechargeable battery.
Unit symbol „PSI“ flashes	The measurement value is greater than 9999 PSI, e.g. 10.000 PSI (690 bar)	The indicated value must be multiplied by 1000. Display = 10.0 Measurement value = 10.000 PSI
OL	Overload	The measurement value is not within the measurement range. The calibration value of the ZERO function is not within the permissible 5% FS span.
noSE	No Sensor	No sensor connected. No sensor signal.
rSt	Reset	Erase the MIN- / MAX values.

6 Measuring differential values

6.1 Differential value indication

Press the **$\Delta 1-2$** key to generate the differential value between INP1 and INP2. For differential pressure measurements, two pressure sensors are used employing the same scale. (INP1 – INP2) function available only with sensors using the same scale for example, Sensor PPC-04/12-PT-600 /2.

6.2 Differential value calibration

To adjust for pressure discrepancies between both pressure sensors during Δp measurements, the difference between the measurement values is set to 0.

Press **$\Delta 1-2$** **Press** **$-\text{diff}-$** is displayed

Press **$\Delta 1-2$** and **RESET** **simultaneously** then release. **$\Delta 1-2$** is displayed

A zero is indicated in the display. The tolerance between the two sensors has been calibrated. Now mount the pressure sensors at the required measuring point. In particular for Load Sensing control. It is possible to achieve extremely accurate measurement values.



Calibrate the pressure sensors at the operating pressure of the machine.

Two same-scale pressure sensors (f.e. Sensor PPC-04/12-PT-600 /2) are connected to a common pressure connection of a hydraulic system.

The tolerance of both sensors (± 3 bar) is set to zero by the Δp calibration. This setting remains stored; it is only valid for the respective operating pressure of the hydraulics (e.g. 325 bar).

7 Uploading measurement values to a PC

7.1 Data interface (RS-232)

Devices of the type PPC-04-AP /2 are equipped with an RS-232 serial interface. The PC-adapter set (PC-SET PPC-04-SW-CAB) can be connected to the PPC-04-AP /2. Please observe the respective user information.

7.2 Setting up data transfer

Ensure the PPC-04-AP /2 is turned off.

PRINT Press and hold.

ON/OFF Press and release.

PRINT Release

PC ↔ **Pr** is displayed

Press **RESET** and "PC" to select PC function.

	Setting	Key	Confirm
PC function	PC	RESET	ZERO

P int is displayed

	Setting	Key	Confirm
Interval	1 . . 100 s	MIN ↔ MAX	ZERO

Press **PRINT** to start data transfer.

If the PPC-04-AP /2 is connected to a PC, the measurement data will be transferred to the PC at the set interval in a numerical format.

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I1 = bar
I2 = LPM

	I ACT	MAX	MIN
1	45,69	48,69	27,89
2	15,34	18,45	9,34

ATTENTION!

The settings are stored. The MIN / MAX values are erased from the memory after printing.

7.3 Pressing the "PRINT" key to initiate data transfer

If the data is only to be printed when the key is pressed, set the interval ***Pint*** = 0. Thus set, a single measurement value only is transferred to a PC when the "PRINT" key is pressed.

8 Accessories

	Device (5pin) PPC-04-B/2, PPC-04-A /2 PPC-04-AP /2
Connection cable	Cable PPC-04/12-CAB3 (3 m)
Extension (5 m)	Cable PPC-04/12-CAB5-EXT
Sensors with connection socket (5pin)	
Sensor PPC-04/12-PT-xxx /2	bar / PSI
Flow meter PPC-04/12-SFM-xxx Flow meter PPC-04/12-SVC-xxx	LPM
Sensor PPC-04/12-TS	°C / °F
Sensor PPC-04/12-SDS-CAB (with integrated cable)	RPM

Power supply and PC accessories		
Designation	Function	Remarks
PC-SET PPC-04-SW-CAB	PC-Adapter Set	Data transfer to PC
Power supply PPC-04/12-110/220V	Power supply 110/220 VDC	EUR/UK/US compatible
Cable PPC-04/12-CAB-MOB	Power supply 12/24 VDC	Car adapter

9 Technical Data

Input	<ul style="list-style-type: none">- Sensors from the STAUFF PPC-04/06/08/12 range- Scanning rate 2 ms = 500 measurements / s- A/D converter 12 bit- 4096 level resolution
Accuracy	<ul style="list-style-type: none">- $\pm 0,25$ % FS (FullScale = upper limit of the measurement range)- ± 2 Digit
Ambient conditions	<ul style="list-style-type: none">- Temperature: 0. . +50 °C- Storage temperature: -20. . +60 °C- Rel. humidity < 85 %- Protection class to EN 60529 / IP 54 (splashed water protection)
Power supply	<ul style="list-style-type: none">- Battery or rechargeable battery, 9 VDC (IEC 6F 22)- The rechargeable battery can be charged using the PPC-04/12-110/220V power supply.- Car adapter (12VDC) with cable PPC-04/12-CAB-MOB

The PPC-04 /2 meets the guidelines of the European Community (EU). It is confirmed that this product is approved according to following standards.



DIN / EN 61000-6-2
DIN / EN 61000-6-3

Technical subject to change.

November 2006