
Instruction Manual

BA90 Precision Barometer



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Purpose of this instruction manual

This instruction manual describes the features of the BA 90 precision barometer and provides guidelines for its use.

Improper use of this instrument or failure to follow these instructions may cause injury or equipment damage. All individuals responsible for operating this instrument must therefore be properly trained and aware of the hazards, and must carefully follow these operating instructions and the safety precautions detailed within. **Contact the manufacturer if you do not understand any part of this instruction manual.**

Handle this manual with care:

- It must be readily available throughout the lifecycle of the instrument.
- It must be provided to any individuals who assume responsibility for operating the instrument at a later date.
- It must include any supplementary materials provided by the manufacturer.

The manufacturer reserves the right to continue developing this instrument model without documenting such development in each individual case. The manufacturer will be happy to determine whether this manual is up-to-date.

Conformity

This instrument corresponds to the state of the art and meets all legal requirements set forth in EC directives as evidenced by the CE label.



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1 Safety precautions

1.1 Appropriate use

The BA 90 precision barometer is used for measuring the prevailing barometric pressure at the location where it has been installed.

Always observe the operating requirements—particularly the permissible supply voltage—indicated on the rating plate and in the “Technical data” section of this manual.

The instrument may only be handled as indicated in this manual. Modifications to the instrument are prohibited. The manufacturer is not liable for damages caused by improper use or failure to follow these instructions. Such violations render all warranty claims null and void.

1.2 Shipping, assembly, electrical connections and startup

Do not close the pressure inputs when shipping, as changes in barometric pressure could damage instruments with low measuring ranges.

Only technical personnel who are appropriately trained and authorized by the operator of the facility may assemble the instrument and set up its electrical connections.

The instrument may only be operated by appropriately trained individuals who have been authorized by the operator of the facility.

Pressurized air or human breath is not to be used for performance tests, as this could damage instruments with low measurement ranges.

Measurement errors may occur if the instrument is not kept protected from sunlight.

Specific safety precautions are given in individual sections of this manual.

1.3 Troubleshooting, maintenance, repairs, disposal

The individual responsible for the electrical connections must be notified immediately if the instrument is damaged or if errors occur that cannot be corrected as indicated in section 5.

This individual must take the instrument out of service until the error has been corrected and ensure that it cannot be used unintentionally.

Always unplug the power cord before opening the instrument!

This instrument requires no maintenance.

Only the manufacturer may perform repairs that require the housing to be opened.

The electronic components of the instrument contain environmentally hazardous materials and materials that can be reused. For this reason the instrument must be

recycled in accordance with the environmental guidelines of the jurisdiction in question once it has been taken permanently out of service.

1.4 Symbols

The symbols given below are used throughout this manual to indicate instances when improper operation could result in the following hazards:



WARNING! This warns you of a potential hazard that could lead to bodily injury up to and including death if the corresponding instructions are not followed.



WARNING: This warns you of a potential hazard that could lead to significant property damage if corresponding instructions are not followed.



INFORMATION This indicates that the corresponding information is important for operating the instrument properly.

2 Instrument description

The BA90 precision barometer measures the barometric pressure at the location where it has been installed; pressure range = 913.3 hPa to 1113.3 hPa.

It is important to keep in mind that atmospheric pressure varies according to the altitude of the installment site. Meteorological measurements of barometric pressure, however, are adjusted to sea level values (SLP = Sea Level Pressure) using a process known as “reduction”.

The BA90 allows operators to reduce the displayed value themselves. This requires knowing the height of the measuring station above sea level. (This information is often found in a building’s floor plan.)

The display values do not need to be reduced if installing the BA90 on the sea coast. Atmospheric pressure at higher altitudes is less than at sea level and varies according to an altitude-dependent formula.

Typical variations in barometric pressure are in the area of +/- 30 hPa.

3 Electrical connections

Terminals located on the rear wall of the instrument’s housing are used for connecting the instrument to the power supply and analog output.

Note that the instrument can accommodate three possible power supply options: every BA90 can be operated on 230 VAC, 115 VAC or 12-28 VDC by applying the desired supply voltage to the corresponding terminal.



Do not connect anything to unused supply terminals!

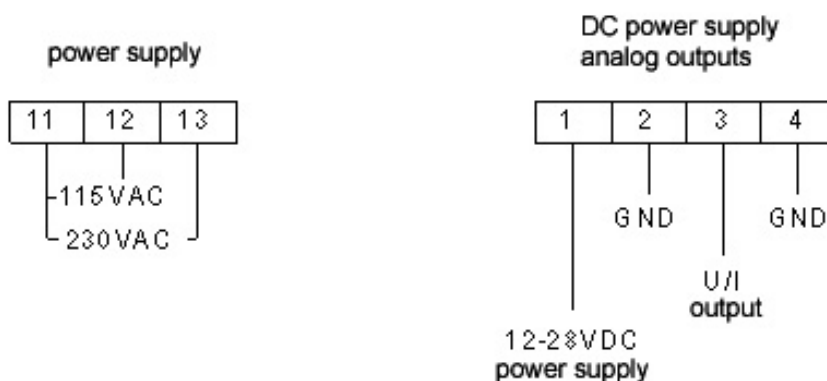
If using a 12-28 VDC power supply, the analog output and power supply should NOT be galvanically separated.

The type of analog output (+/-2 V, 0...20 mA or 4...20 mA) must be indicated when placing the order, as this cannot be reset after the fact.

Cable connectors:

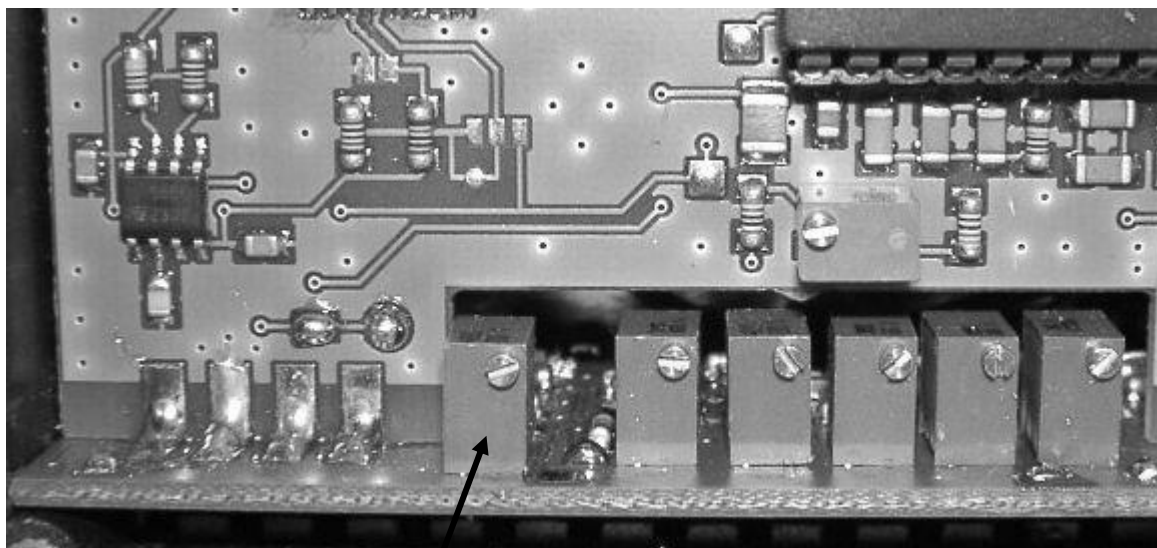
3-pin screw terminal for power supply: Phönix, MC1.5/3-STF-5.08

4-pin screw terminal for DC power supply and analog output: MC1.5/4-STF-3.81



4 Reducing display values

The reduction potentiometer (lower left) may be accessed by removing the front panel.



reduction potentiometer

The instrument is set to SLP at the factory (reduction potentiometer on left-hand block).

- Allow the instrument to warm up for 5 hours
- Look in the table to find the differential value (correction factor) corresponding to the altitude of the location where the barometer has been installed. Add this value to the displayed value.
- Set the resulting new value on the display by the turning the reduction potentiometer to the right

Example:

Barometer location: Kirchzarten, 390 m above sea level

Correction factor: 46.0 hPa

Displayed value: e.g., 971.4 hPa

Use reduction potentiometer to adjust display as follows: $971.4 \text{ hPa} + 46.0 \text{ Pa} = 1017.4 \text{ hPa}$


Reduction can be performed for an altitude of up to 860 m above sea level.

An analog output (voltage or current signal) which also shows the reduced display value is available if you wish to process the measured value further.

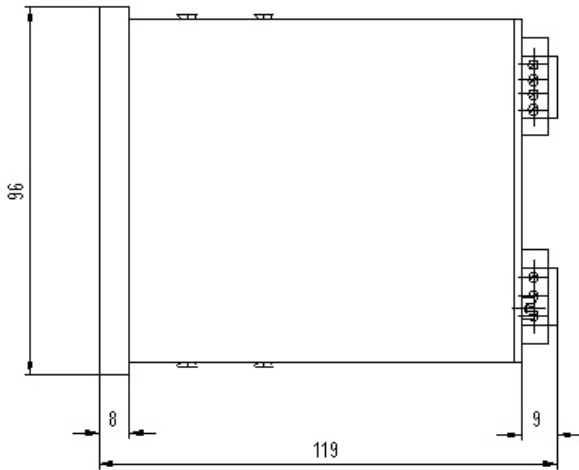
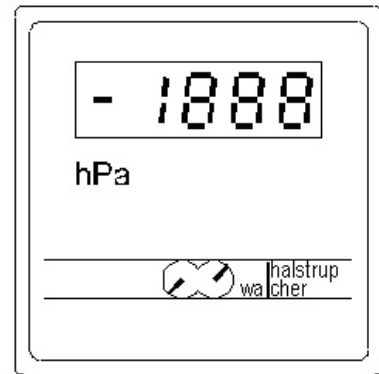
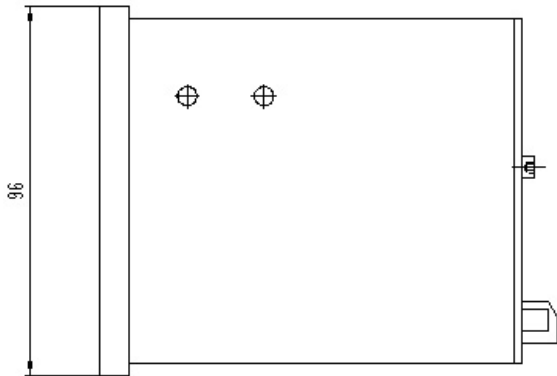
5 Troubleshooting

Problem	Cause	Corrective Action
Instrument does not work, Display does not light up	No power	→ Check to see if the electrical cord is plugged in properly → Check to see if the supply voltage is available
Instrument does not work, Display does not light up	Defective component	→ Send the instrument to the manufacturer for repair

6 Technical data

Measurement data	
measurement ranges	913.3 hPa to 1113.3 hPa
accuracy	0.5 hPa with respect to sea level
resolution	0.1 hPa
reduction	0 ..850 m above sea level, via potentiometer
long-term drift	0.3 hPa / year
Ambient conditions	
medium	air
operating temperature	+10 °C to +50 °C
storage temperature	-10 °C to +70 °C
temperature effect	±0.2 hPa/°C within a temperature range of 20...50 °C
calibration temperature	22 °C
relative humidity	0...80 %
EMC standards	EN 61000-6-3, EN 61000-6-1
conformity	 Declaration of conformity available upon request
Electrical data	
power consumption	3 VA
supply voltage options	230 VAC/115 VAC +6 %/ -15 % (50...60 Hz) 12...28 VDC Supply voltage may be selected by connecting to corresponding terminal
electrical connections	Phoenix screw terminals power supply: MC1.5/3-STF-5.08 DC power supply and analog output: MC1.5/4-STF-3.81
output signals	-2 ... +2 V ($R_L \geq 5 \text{ k}\Omega$) or 0 ... 20 mA ($R_L \leq 250 \text{ k}\Omega$) or 4 ... 20 mA ($R_L \leq 250 \text{ k}\Omega$) (please indicate when placing order)
display	red, 7-segment LED display, h=14mm
Physical data	
dimensions (w x h x d)	96 x 96 x 119 mm panel housing (DIN 43700)
weight	0.8 kg
operating position	horizontal
positional error	±0.1 hPa for every 10° of inclination

7 Dimension drawing



Control panel window
 $92+0.8 \times 92+0.8$
 DIN43700

8 Barometric pressure as function of sea level

Barometric pressure as function of sea level and difference to 1013,3 hPa
(according to DIN ISO 2533)

above sea level		above sea level		above sea level	
in meters	difference in hPa	in meters	difference in hPa	in meters	difference in hPa
0	0,0	500	58,6	1000	114,5
10	1,2	510	59,8	1010	115,6
20	2,4	520	60,9	1020	116,7
30	3,6	530	62,1	1030	117,8
40	4,8	540	63,2	1040	118,9
50	6,0	550	64,4	1050	119,9
60	7,2	560	65,5	1060	121,0
70	8,4	570	66,6	1070	122,1
80	9,6	580	67,8	1080	123,2
90	10,8	590	68,9	1090	124,3
100	12,0	600	70,0	1100	125,4
110	13,1	610	71,2	1110	126,4
120	14,3	620	72,3	1120	127,5
130	15,5	630	73,4	1130	128,6
140	16,7	640	74,6	1140	129,7
150	17,9	650	75,7	1150	130,7
160	19,1	660	76,8	1160	131,8
170	20,3	670	77,9	1170	132,9
180	21,4	680	79,1	1180	134,0
190	22,6	690	80,2	1190	135,0
200	23,8	700	81,3	1200	136,1
210	25,0	710	82,4	1210	137,2
220	26,2	720	83,6	1220	138,2
230	27,3	730	84,7	1230	139,3
240	28,5	740	85,8	1240	140,4
250	29,7	750	86,9	1250	141,4
260	30,8	760	88,0	1260	142,5
270	32,0	770	89,1	1270	143,6
280	33,2	780	90,3	1280	144,6
290	34,4	790	91,4	1290	145,7
300	35,5	800	92,5	1300	146,7
310	36,7	810	93,6	1310	147,8
320	37,9	820	94,7	1320	148,8
330	39,0	830	95,8	1330	149,9
340	40,2	840	96,9	1340	151,0
350	41,3	850	98,0	1350	152,0
360	42,5	860	99,1	1360	153,1
370	43,7	870	100,2	1370	154,1
380	44,8	880	101,3	1380	155,2
390	46,0	890	102,4	1390	156,2
400	47,1	900	103,5	1400	157,3
410	48,3	910	104,6	1410	158,3
420	49,4	920	105,7	1420	159,4
430	50,6	930	106,8	1430	160,4
440	51,8	940	107,9	1440	161,4
450	52,9	950	109,0	1450	162,5
460	54,1	960	110,1	1460	163,5
470	55,2	970	111,2	1470	164,6
480	56,4	980	120,3	1480	165,6
490	57,5	990	113,4	1490	166,7
500	58,6	1000	114,5	1500	167,7