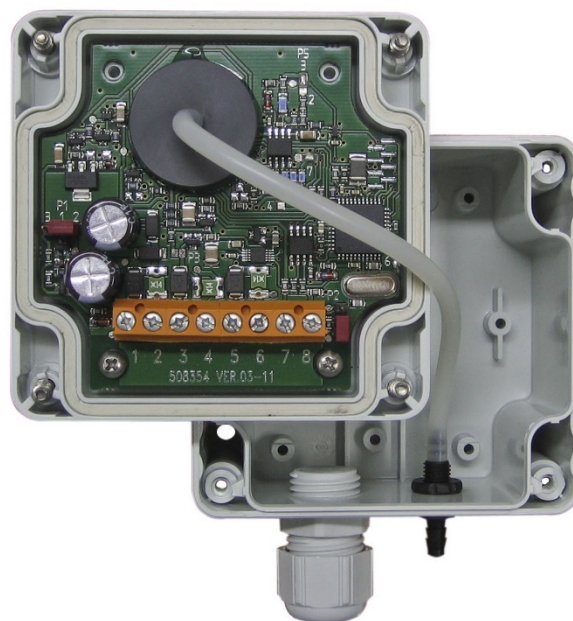# Baro Transmitter
Instruction for Use

3.1157.10.xxx

Dok. No. 021578/06/22

THE WORLD OF WEATHER DATA

Safety Instructions

- Before operating with or at the device/product, read through the operating instructions.
  This manual contains instructions which should be followed on mounting, start-up, and operation.
  A non-observance might cause:
  - failure of important functions
  - endangerment of persons by electrical or mechanical effect
  - damage to objects

- Mounting, electrical connection and wiring of the device/product must be carried out only by a qualified technician who is familiar with and observes the engineering regulations, provisions and standards applicable in each case.

- Repairs and maintenance may only be carried out by trained staff or **Adolf Thies GmbH & Co. KG**. Only components and spare parts supplied and/or recommended by **Adolf Thies GmbH & Co. KG** should be used for repairs.

- Electrical devices/products must be mounted and wired only in a voltage-free state.

- **Adolf Thies GmbH & Co KG** guarantees proper functioning of the device/products provided that no modifications have been made to the mechanics, electronics or software, and that the following points are observed:

- All information, warnings and instructions for use included in these operating instructions must be taken into account and observed as this is essential to ensure trouble-free operation and a safe condition of the measuring system / device / product.

- The device / product is designed for a specific application as described in these operating instructions.

- The device / product should be operated with the accessories and consumables supplied and/or recommended by **Adolf Thies GmbH & Co KG.**

- Recommendation: As it is possible that each measuring system / device / product may, under certain conditions, and in rare cases, may also output erroneous measuring values, it is recommended using redundant systems with plausibility checks for **security-relevant applications**.

Environment

- As a longstanding manufacturer of sensors Adolf Thies GmbH & Co KG is committed to the objectives of environmental protection and is therefore willing to take back all supplied products governed by the provisions of "*ElektroG*" (German Electrical and Electronic Equipment Act) and to perform environmentally compatible disposal and recycling. We are prepared to take back all Thies products concerned free of charge if returned to Thies by our customers carriage-paid.

- Make sure you retain packaging for storage or transport of products. Should packaging however no longer be required, please arrange for recycling as the packaging materials are designed to be recycled.

Documentation

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- Although these operating instruction has been drawn up with due care, **Adolf Thies GmbH & Co KG** can accept no liability whatsoever for any technical and typographical errors or omissions in this document that might remain.

- We can accept no liability whatsoever for any losses arising from the information contained in this document.

- Subject to modification in terms of content.

- The device / product should not be passed on without the/these operating instructions.

Contents

Tables

Figures

Shipment

1 x Baro Transmitter
1 x Short Instructions for use (the complete instructions for use is available for download)

The instructions for use are available for download under the following link:

https://www.thiesclima.com/db/dnl/3.1157.10.xxx_Baro_Transmitter_eng.pdf

1 Models available

Description	Order-No.	Electrical Output	Meas. Range	Operating voltage
Baro Transmitter	3.1157.10.000	Digital: 1 x RS485 1 x 260...1260Hz	260...1260hPa	5…24V DC
		Analogue: 1 x 0...5V set: 800...1060hPa	scalable: 300...1100hPa	8...24V DC
Baro Transmitter	3.1157.10.040	Digital: 1 x RS485 1 x 260...1260Hz	260...1260hPa	5…24V DC
		Analogue: 1 x 0...20mA set: 600...1060hPa	scalable: 300...1100hPa	12…24V DC
Baro Transmitter	3.1157.10.041	Digital: 1 x RS485 1 x 260...1260Hz	260...1260hPa	5…24V DC
		Analogue: 1 x 4... 20mA set: 600...1060hPa	scalable: 300...1100hPa	12...24V DC
Baro Transmitter	3.1157.10.061	Digital: 1 x RS485 1 x 260...1260Hz	260...1260hPa	5…24V DC
		Analogue: 1 x 0...10V set: 600...1060hPa	scalable: 300...1100hPa	12...24V DC
Baro Transmitter	3.1157.10.140	Digital: 1 x RS485 1 x 260...1260Hz	260...1260hPa	5…24V DC
		Analogue: 1 x 0...20mA set: 800...1060hPa	scalable: 300...1100hPa	12…24V DC
Baro Transmitter	3.1157.10.141	Digital: 1 x RS485 1 x 260...1260Hz	260...1260hPa	5…24V DC
		Analogue: 1 x 4... 20mA set: 800...1060hPa	scalable: 300...1100hPa	12...24V DC
Baro Transmitter	3.1157.10.161	Digital: 1 x RS485 1 x 260...1260Hz	260...1260hPa	5…24V DC
		Analogue: 1 x 0...10V set: 800...1060hPa	scalable: 300...1100hPa	12...24V DC

2 Application

Application:

The intended use of the baro transmitter is the measurement of „barometric air pressure". The instrument is designed for application in the field of meteorology and environmental protection, where high accuracy, quick responding behaviour, long-term sturdiness and reliability are required.

The baro transmitter measures the „ABSOLUTE AIR PRESSURE" [*] or calculates the „REDUCED AIR PRESSURE".

The measuring results are available to the user via an analogue or digital interface.

The instrument is suited for indoor- and outdoor application.
- For outdoor application we recommend to use an additional weather shield or protective housing with pressure balance function.
- With the use in buildings, rooms, housings, etc. a pressure balance to the ambient pressure that has to be measured, must be given.

Definition:

- *Absolute air pressure: air pressure measured in altitude of barometer.*

  Other description of the „absolute air pressure":
  "QFE", used by ICAO (International Civil Aviation Organization).

- *Reduced air pressure: calculated air pressure, referring to sea level.*

  Other description of the „reduced air pressure":
  "QNH" used by ICAO.
  "QFF" for synoptic presentation.

Construction:

The applied sensor is a tempered, piezo-ceramic absolute-pressure sensor, which shows excellent thermal and mechanical stability.

The baro transmitter housing is equipped with a 1/8"-hose connection. By means of this connection the integrated absolute-pressure sensor acquires the prevailing air pressure of the atmosphere.

In rooms, housings, etc. where no pressure balance is prevailing, a hose can be plugged on the hose connection. The other end of the hose is then to be installed in free atmosphere or in rooms, where a pressure balance is given.

---

[*] Factory setting

The following outputs are available:

Analogue:

> 1 x voltage-/ current output,
>> for the „absolute air pressure" **or** for the „reduced air pressure".

Digital:

> 1 x frequency output,
>> for the „absolute air pressure" or for the „ reduced air pressure".

> 1 x serial interface,
>> for communication and data output; output parameter see chapter 7.1).

Info:

In order to compare air pressure values, which have been measured at different sites, reasonably with each other, they have to be converted to a mutual reference height **(air pressure at sea level).**

The calculation is referring to sea level (QNH) acc. to the international altitude formula (DIN ISO2533).

$$p(h) = p_b(1 + \frac{\beta}{T_b} \cdot h)^{-\frac{g_n}{\beta \cdot R}}$$

> p_h = Air pressure on local height
>
> p_b = Air pressure on sea level
>
> β = -0065K/m
>
> g_n = 9,80665m/s^2
>
> R = 287,05287m^2/K/s^2
>
> T_b = 288,15K

The formula is implemented in the firmware of the baro transmitter. The input of the station height is done via the serial interface by command "SH".

3 Installation

> **Attention:**
> **The electrical connection is to be carried out by experts only.**
> **The electronics is situated in the cover of the baro transmitter.**
> **The instrument has to be opened only in dry ambience.**
> **The exposed electronics must not be damaged.**

> **Attention:**
> **At the location of the baro transmitter as well as on application in a housing a pressure _compensation to the atmospheric air pressure must be possible_.**

3.1 Mechanical Mounting

The housing of the baro transmitter is suited for wall mounting or installation on other plane surfaces. For mounting, please remove the cover. The housing lower part can be mounted by appropriate screws through the now visible and accessible fixing borings ($\varnothing$ 4mm).

> **Note**
> *Position: The cable gland and the hose connection must point downwards.*

In case there is no sufficient pressure balance for the baro transmitter at an installation site, a hose can be plugged on via the 1/8"-hose connection. The open side of the hose is to be place in an area where a pressure balance is prevailing.

3.2 Electrical Mounting

8-pole terminal strip		
No.	**Description**	**Function**
1	SHUTDOWN	Shutdown of baro transmitter
2	SUPPLY	5 - 24VDC supply (+)
3	GND*	Supply, ground (-)
4	FREQUENCY	Frequency output
5	AGND*	Analogue signal, ground (-)
6	V_{OUT} / I_{OUT}	Analogue output
7	B	RS485 (Data+)
8	A	RS485 (Data-)
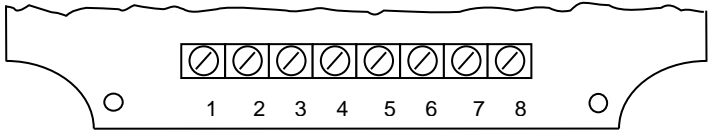
Table 1: Pin Assignment of Terminal Strip

* The pins AGND and GND are connected to the same electrical potential

The different outputs are usable at the same time. With the analogue output the analogue ground (AGND) has to be applied. For the frequency output AGND or GND is allowable. The baro transmitter is protected against polarity reversal.

4 Operating Mode

The baro transmitter can be used alternatively in two operating modes:

Active *mode* or ***Shutdown mode***.

In the **active mode** the baro transmitter outputs continuously measuring values after connection of power supply.

In the *shutdown mode* the baro transmitter can be turned on and off via an external trigger signal.

0V = Baro transmitter off.

5 ... 24V = Baro transmitter on.

Remark:

The baro transmitter is delivered with factory-setting „active mode".

The respective operating mode is selected by means of the jumper P1 (see **chapter 5**).

5 Settings (Operation Mode / termination)

- Operation Mode „Active mode" or „Shutdown Modus"

- Termination resistor „Off" or „On"

The baro transmitter can be configured by means of jumpers. The following figures show the position of the bridges and the coding table:
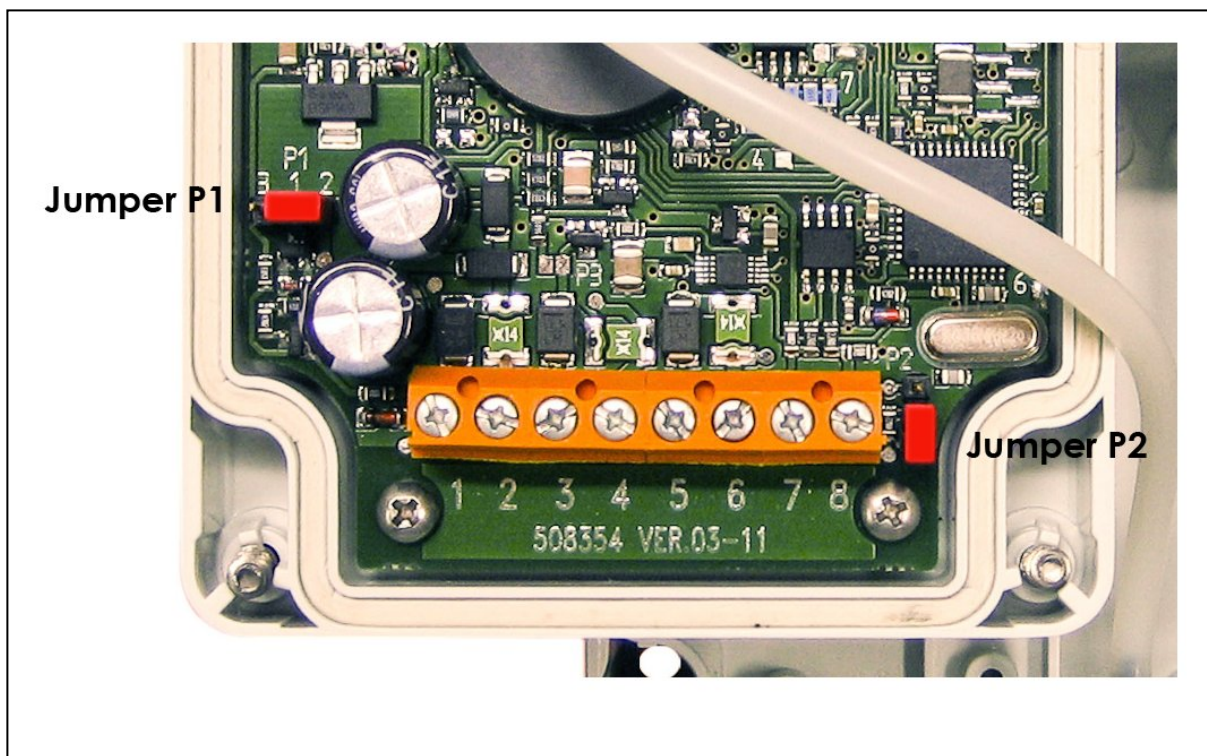
Figure 1: Position Jumper

Function	Jumper		Soldered bridge
	P1	**P2**	**P3**
SHUTDOWN Off *	1-2		
SHUTDOWN On	1-3		
RS485 termination off *		1-2	
RS485 termination on (120Ohm)		1-3	
Pull-up- resistance inactive *			O
Pull-up- resistance active (5,6kOhm)**			X

Table 2: Coding jumper

O: open
X: closed
*: factory-setting
**: resistance at the frequency output (open collector output)

6 Analysis

Mathematical correlation between output variable and air pressure:

Output	Formula
Voltage output: 0...5V @ 800...1060hPa	$p = 800hPa + \dfrac{260hPa}{5V} \cdot U\,[\,V\,]$
Voltage output: 0...10V @ 800...1060hPa	$p = 800hPa + \dfrac{260hPa}{10V} \cdot U\,[\,V\,]$
Current output: 0...20mA @ 800...1060hPa	$p = 800hPa + \dfrac{260hPa}{20mA} \cdot I\,[\,mA\,]$
Current output: 4...20mA @ 800...1060hPa	$p = 800hPa + \dfrac{260hPa}{16mA} \cdot (\,I\,[\,mA\,] - 4mA\,)$
Voltage output: 0...10V @ 600...1060hPa	$p = 600hPa + \dfrac{460hPa}{10V} \cdot U\,[\,V\,]$
Voltage output: 0...20mA @ 600...1060hPa	$p = 600hPa + \dfrac{460hPa}{20mA} \cdot I\,[\,mA\,]$
Voltage output: 4...20mA @ 600...1060hPa	$p = 600hPa + \dfrac{460hPa}{16mA} \cdot (\,I\,[\,mA\,] - 4mA\,)$
Frequency output: 300...1100Hz @ 300...1100hPa	$p = 1\dfrac{hPa}{Hz} \cdot f\,[Hz]$

7 Serial Communication

An RS485 interface is available for serial communication. It can be operated in half duplex mode at different baud rates.

A terminating resistor (120Ω) can be hardware-connected by the jumper P2 (see **chapter 5**).

Software version number and bus-ID are output on starting the baro transmitter. Output with the selected baud rate.

Example:
THIES Baro comp.
V0.04-04
ID02

Factory-setting: ID = 0, baud rate = 9600, frame = 8N1

Bus operation

Thanks to the concept of the ID-based communication an operation in bus assembly is possible.   Prerequisites are as follows:

- Different IDs of the individual bus parties.
- Master- Slave structure, i.e. there is one instrument in the bus that queries cyclically the data of the individual instruments.

7.1 Data Telegram

The data output is carried out on query of the command TR.

The detailed construction is given in the following:

Data telegram:
<(STX)><pressure>;<temperature>;<Station height>;<QNH><status>*<check sum><CR><LF><ETX>

Character No.	Function
1	STX (HEX 02)
2	10^3 Air pressure in hPa
3	10^2 Air pressure in hPa
4	10^1 Air pressure in hPa
5	10^0 Air pressure in hPa
6	. Dezimalpunkt (HEX 2E)
7	10^{-1} Air pressure in hPa
8	10^{-2} Air pressure in hPa
9	Semicolon (HEX 3B)
10	Sign temperature („+' or „-')
11	10^1 Sensor temperature in °C
12	10^0 Sensor temperature in °C
13	. Decimal pont (HEX 2E)
14	10^{-1} Sensor temperature in °C
15	Semicolon (HEX 3B)
16	10^3 Station height in m
17	10^2 Station height in m
18	10^1 Station height in m
19	10^0 Station height in m
20	Semicolon (HEX 3B)
21	10^3 Air pressure in hPa calculated to sea level
22	10^2 Air pressure in hPa calculated to sea level
23	10^1 Air pressure in hPa calculated to sea level
24	10^0 Air pressure in hPa calculated to sea level
25	. Dezimalpunkt (HEX 2E)
26	10^{-1} Air pressure in hPa calculated to sea level
27	10^{-2} Air pressure in hPa calculated to sea level
28	Semicolon (HEX 3B)
29	High nibble status byte in HEX
30	Low nibble status byte in HEX
31	* (HEX 2A) check sum identification
32	High nibble check sum in HEX
33	Low nibble check sum in HEX
34	CR (HEX 0D) Carriage Return
35	LF (HEX 0A) line feed
36	ETX (HEX 03)

Control character:

CR – Carriage Return (13$_{dec}$; 0x0D)
LF – Line Feed (10$_{dec}$; 0x0A)
STX – Start of Text (2$_{dec}$; 0x02)
ETX – End of Text (3$_{dec}$; 0x03)

Separation character:

Separation character between the individual measuring values in the string is the semicolon ';'.
The check sum separation character is the multiplication sign '*'.

Check sum:

The check sum is the XOR relation of all characters between <STX> and the byte <*>.
The star serves as separation character of the check sum, and is not factored any more in the check sum.

Status:

In the baro transmitter there is a status byte available that outputs information on the status of the sensor.

Bit-Number	Function	Description
Bit 0	General malfunction	In case the internal pressure sensor is not correctly identified, bit 0 is set. Thus, all measured values of the telegram are invalid.
Bit 1	Heating control	Is one in case the heating control is active and the temperature is >49°C or <51°C. That way, this bit indicates if the standard deviation of temperature controller is within the range of +-1°C.
Bit 2	Heating on	Is one when the heating is active.
Bit 3	Excess temperature	Is one if the temperature at the sensor is higher than 60°C.
Bit 4... Bit 7	Unused	These bits are presently not used and are always 0.

7.2 General Construction on Sending a Command

The baro transmitter has a command interpreter that can change the behaviour of the instrument. That way, for ex. the baud rate, the instrument ID can be modified:
Generally, a command is constructed as follows:

<id><command><CR>   or
<id><command><parameter><CR>

id: Baro transmitter – ID. It is always binary and in the range 00... 99.

Command :   see list of commands

Parameter: A **five-digit** value for setting a new parameter value.

<CR>:   Carriage Return (13_{dec}; 0x0D)

In the baro transmitter a verification of the command-syntax is carried out. IF a correct command has been received, this is acknowledged by an „echo telegram".

Example: 00BR00005<CR>   transmission command.

             !00BR00005<CR>   Echo telegram.

If a command is sent to the instrument without the parameter value, that value is transmitted which was currently set.

Example: 00BR<CR>   transmission command.

             !00BR00005<CR>   Echo telegram.

In order to avoid an unintentional changing of parameter some commands (see list of commands) are saved by a "key". This „key" has to be transmitted before the actual command.

Example: Changing of Baud Rate

00KY00234<CR>   Key-saved command released

00BR00006<CR>   Baud rate set to 19200

> **Attention:**
> **The key-saved commands are released as long as the supply voltage is connected, or the command 00KY00000<CR> is transmitted.**

7.3 List of Commands

	Command	Initial value factory setting	Description	KEY
Command AM	<id>AM<para>	depending on model	Modus for analogue output	yes
Command AY	<id>AY<para>	600 (with 3.1157.10.040/ 041/061) 800 (with 3.1157.10.000)	Minimum value of the analogue output	yes
Command AZ	<id>AZ<para>	1060	Maximum value of the analogue output	yes
Command BR	<id>BR<para>	5	Selecting the baud rate	yes
Command DP	<id>DP<para>	4	Time for mean value calculation	yes
Command HT	<id>HT<para>	1	Mode of heating control	yes
Command ID	<id>ID<para>	0	Instrument- ID	yes
Command KY	<id>KY<para>	0	Set key/pass word	no
Command OR	<id>OR<para>	10	Output rate Telegram	yes
Command PP	<id>PP<para>	--	Output of calibration value	no
Command PS	<id>PS<para>	0	Energy saving mode	yes
Command SH	<id>SH<para>	0	Station height	yes
Command TR	<id>TR<para>	--	Telegram query	no
Command TT	<id>TT<para>	0	Automatic telegram output	no

7.4 Command Description

Command AM

<id>AY<parameter><CR>	Is setting the mode for the analogue output.
Echo of command	!xxAMxxxxx<CR>
Access:	read / write.
Description:	The mode for the analogue output is stated by the command AM.

Parameter description:

Parameter	Description
1	0...20mA
2	4...20mA
3	0...5V
4	0...10V

Value range:	1...4
Initial value:	depending on model (1…4)

Command AY

<id>AY<parameter><CR>	Scales the minimum value of the analogue output.
Echo of command	!xxAYxxxxx<CR>
Access:	read / write.
Description:	By the command AY the pressure value for the lower analogue output value is stated.
Value range:	300...1000
Initial value:	600 with 3.1157.10.040/041/061
	800 with 3.1157.10.000

Command AZ

<id>AZ<parameter><CR>	Scales the maximum value of the analogue output.
Echo of command	!xxAZxxxxx<CR>
Access:	read / write.
Description:	By command AZ the pressure value is given for the upper analogue. output value.
Value range:	400...1100
Initial value:	1060

Command BR

<id>BR<parameter><CR>	Setting the baud rate.
<id>BR<CR>	Query of the current BR-parameter.
Echo of command	!xxBRxxxxx<CR>
Access:	read / write.
Description:	The required baud rate is set by the BR-command and the parameter 0000x.

Parameter description:

Parameter	Description
00002	1200 baud (8n1)
00003	2400 baud (8n1)
00004	4800 baud (8n1)
00005	9600 baud (8n1)
00006	19200 baud (8n1)
00007	38400 baud (8n1)
00008	57600 baud (8n1)

Value range:	2 to 8
Initial value:	5

Command DP

<id>DP<parameter><CR>	mean value time.
<id>DP<CR>	Query of the current DP-Parameter.
Echo of command	!xxDPxxxxx<CR>
Access:	read / write.
Description:	By command „DP" is set the time for the gliding mean value calculation of the pressure value.
Parameter description:	0: 1 second
	1: 2 seconds
	2: 4 seconds
	3: 8 seconds
	4: 16 seconds
Value range:	0...4
Initial value:	4

Command HT

<id>HT<parameter><CR>	Mode of the heating control.
<id>HT<CR>	Query of the current HT-parameter.
Echo of command	!xxHTxxxxx<CR>
Access:	read / write.
Description:	The command „HT" is setting the mode of the heating control. Adjusting of sensor temperature to 17°C.
Parameter description:	0: heating off
	1: heating on
Value range:	0...1
Initial value:	1

Command ID

<id>ID<parameter><CR>	Setting the identification number.
<id>ID<CR>	Query of current ID-parameter.
Echo of command	!xxIDxxxxx<CR>
Access:	read / write.
Description:	This command is setting the identification number. The ‚id' is used in every telegram of the instrument. After the ‚id' has been changed the instrument replies immediately with the new ‚id'.
Value range:	0 to 99
Initial value:	0

Command KY

<id>KY<parameter><CR>	Key
Echo of command	!xxKYxxxxx<CR>
Access:	read / write.
Description:	The value for the key (password) is set by the command „KY". A change of parameters is possible only when this value is set to „234".
Value range:	0 / 234
Initial value:	0

Command OR

<id>OR<parameter><CR>	Output rate telegram.
<id>ID<CR>	Query of the current OR parameter.
Command echo	!xxORxxxxx<CR>
Access:	read / write.
Description:	This command is used to set the output rate for the automatic telegram output (command TT). The statement of the parameter is carried out in seconds.
Value range:	1 to 60
Initial value:	10

Command PP

<id>PP<CR>	Query of the current calibration parameters.
Echo of command	--
Access: read	
Description:	The calibration parameters of the pressure sensor are output by the command „PP".
Response telegram:	< AC1=10459; // Parameter AC1
	< AC2=64447;// Parameter AC2
	< AC3=51002;// Parameter AC3
	< AC4=32770;// Parameter AC4
	< AC5=26335;// Parameter AC5
	< AC6=23458;// Parameter AC6
	< B1= 06348; // Parameter B1
	< B2= 00059; // Parameter B2
	< MB= 32768; // Parameter MB
	< MC= 54561; // Parameter MC
	< MD= 02400; // Parameter MD
Value range:	--
Initial value:	--

Command PS

<id>PS<parameter><CR>	Power Save.
<id>PS<CR>	Query of the current PS parameter.
Echo of command	!xxPSxxxxx<CR>

Access: read / write.

Description: Energy saving mode is set by the command „PS".

In case a mode is set without active RS 485 interface the following output is given when starting the baro transmitter:

THIES Baro komp.
v0.03-30
ID02
ESC
RS485off

After the output of „ESC" the user has to reactivate the interface within approx. 0,5 s by sending the ESCAPE character. The activation of the interface is signalized by the output of „RS485on".

Parameter description: 0: all outputs active.

1: only RS485 active.

2: only analogue output active.

3: only frequency output active.

4: only analogue- and frequency output active.

5: only RS485 and analogue output active.

6: only RS485 and frequency output active.

7: only RS485 Receiver active (start-up via receipt of a sign).

8: all deactivated (start-up only via power-on-reset).

PS - mode	Power consumption @ 5V (in mA)	Power consumption @ 12V (in mA)	Power consumption @ 24V (in mA)
0	4.0	4.1	4.7
1	2.1	2.3	2.8
2	3.0	3.1	3.9
3	2.1	2.2	2.7
4	3.4	3.6	4.2
5	3.1	3.2	3.8
6	2.5	2.6	3.2
7	0.5	0.6	1.1
8	0.2	0.2	0.7
Shutdown=0	1µA	1µA	1µA

Value range: 0...8

Initial value: 0

Remark:

If the selected mode is without RS485 interface, the user cannot communicate with the baro transmitter.
In order to change the interface in this status, the ESCAPE character must be transmitted during the start process (see description command PS).

Command SH

<id>SH<Hoehe><CR>	Station height.
Command echo	--
Access:	read / write.
Description:	The command is used to set the station height at the site of the baro transmitter.
Parameter description:	Height above sea level (NHN) in meters.
Value range:	0...3000
Initial value:	0

- When set station height **equals 0,** the „ABSOLUTE AIR PRESSURE" is transmitted at the **analogue output**.

- When the set station height **does not equal 0,** the „REDUCED AIR PRESSURE" is delivered at the **analogue output**.

Command TR

<id>TR<00001><CR>	Query of measuring value.
Echo of command --	
Access:	read.
Description:	The command triggers a single transmission of the current measuring value.
Response telegram:	<(STX)><pressure>;<temperature>;<station height>;<QNH><status>*<check sum><CR><LF><ETX>
Value range:	1
Initial value:	--

Command TT

<id>TT<parameter><CR>	Automatic output of measuring value.
Command echo	!xxTTxxxxx<CR>
Access:	read / write.
Description:	This command is used to activate or resp. deactivate the automatic output of the current measuring value. The output interval is set by the command OR.
	No output occurs during the first 10 seconds after restarting the sensor.
Parameter description:	0: automatic output deactivated.
	1: automatic output activated.
Value range:	0 / 1
Initial value:	0

8 Maintenance

With proper mounting the instrument operates maintenance-free.

The measuring results are effective at the moment of factory-calibration. The user is responsible for repeat of calibration and determination of the date.
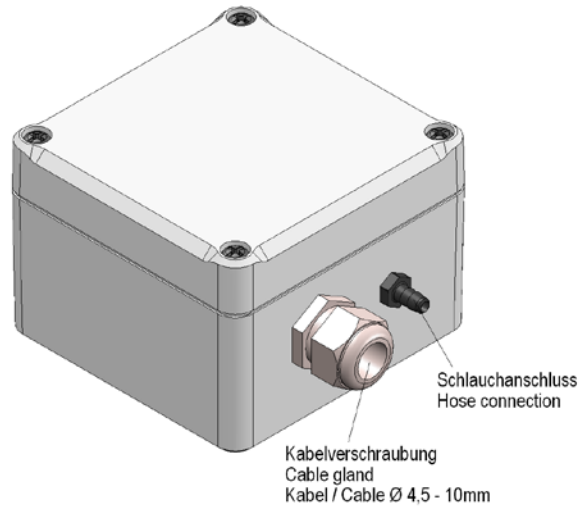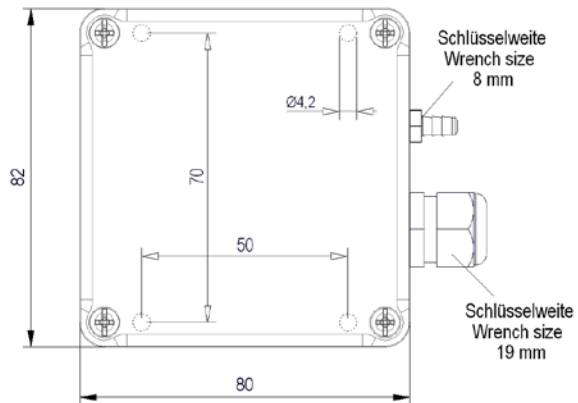
9 Technical Data

Pressure sensor		
	Type	Piezo resistive
Barometr. Air pressure	Measuring range	260...1260hPa
	Resolution	0.01hPa
Digital output	Accuracy with sensor heating @ -40…+65°C @ 800-1100hPa	± 0.25hPa
	Accuracy with sensor heating @ -40…+65°C @ 600-800hPa	± 0.50hPa
	Accuracy w/o sensor heating @ -40...+65°C @ 600-1100hPa	± 1.00hPa
	Long-term stability	± 0.3hPa / year
Pressure sensor heating	Control temperature	17°C ±1°K
Serial Interface		
	Type	RS485
	Mode of operation	Half-duplex mode
	Data format	8N1
	Baud rate	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200

Frequency output		
	Measuring range	260 ...1260hPa
	Frequency	260... 1260Hz
Definition	Open collector, sink	$U_{max} \leq 30$ V, $I_{max} \leq 20mA$
	Pull-up-resistance active	$U_{low} = 0V$, $U_{high} = 3V$
Analogue output		
	Measuring range scalable Accuracy plus. to digital output	300...1100hPa, factury setting please see **models available page 4.** ± 0.10hPa
Voltage	Output (3.1157.10.000)	0...5V @ $U_B \geq 8V$ DC
	Output (3.1157.10.061/161)	0...10V @ $U_B \geq 12V$ DC
	R (load)	>50kΩ (output 0.. 10V), >10kΩ (output 0... 5V)
Current	Output (3.1157.10.040/140)	0...20mA
	Output (3.1157.10.041/141)	4...20mA
	R_L(load)	$\leq 350\Omega$ @ $U_B \geq 12V$ DC $\leq 500\Omega$ @ $U_B \geq 15V$ DC
General		
Operating voltage		(8)12...24VDC
	On using digital outputs	5...24VDC

	Power consumption at @ 12V DC	4.1mA (max. 115mA with heating) 2.3mA (only RS485 active) 3.1mA (only analogue output active) 2.2mA (only frequency output active) 3.6mA (only analogue- and frequency- output active) 3.2mA (only RS485 and analogue-output active) 2.6mA (only RS485 and frequency output active) 0.6mA (only RS485 Receiver active) 1µA (in shutdown mode)
External Control	Shutdown mode	0V = Baro transmitter off 5... 24V = Baro transmitter on
Gliding mean value		1, 2, 4, 8, 16sec
Settling time	without Heating with Heating	20s 200s
Ambient conditions	Temperature range	-40... +65 °C
	Humidity range	Non-condensing
	Storage temperature	-30...+70°C
Housing	Material	Polycarbonat
	Dimensions	See dimensional drawing
	Weight	Ca. 0.15Kg
	Protection	IP54 (in-use postion)
	Connection - for the electrical supply	Screwed cable gland M 16 x 1.5 and 8-pole terminal strip
	Connection - for the air pressure balance	Hose connection nozzle 1/8" (Ø 4,76mm)

10 Dimension drawing (in mm)

57

25

Schlüsselweite
Wrench size
8 mm

Ø4,2

82

70

50

Schlüsselweite
Wrench size
19 mm

80

Schlauchanschluss
Hose connection

Kabelverschraubung
Cable gland
Kabel / Cable Ø 4,5 - 10mm

11 EC-Declaration of Conformity

Manufacturer: Adolf Thies GmbH & Co. KG

Hauptstraße 76

37083 Göttingen, Germany

http://www.thiesclima.com

Product: Baro Transmitter

Doc. Nr. 113-44739_CE

Article Overview:

3.1157.10.000	3.1157.10.040	3.1157.10.041	3.1157.10.061	3.1157.10.140	3.1157.10.141	3.1157.10.161	3..1157.10.500

The indicated products correspond to the essential requirement of the following European Directives and Regulations:

2014/30/EU	26.02.2014	DIRECTIVE 2014/30/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility.
2014/35/EU	26.02.2014	DIRECTIVE 2014/35/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits.
2017/2102/EU	15.11.2017	DIRECTIVE (EU) 2017/2102 of the European Parliament and of the Council of November 15, 2017 amending Directive 2011/65 / EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
2012/19/EU	13.08.2012	DIRECTIVE 2012/19/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 on waste electrical and electronic equipment (WEEE).
2018/1139/EU	04.07.2018	Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency.

The indicated products comply with the regulations of the directives. This is proved by the compliance with the following standards:

DIN EN 61000-6-2	2019-11	Electromagnetic compatibility Immunity for industrial environment
DIN EN 61000-6-3:2007 + A1:2011	2011-09	Electromagnetic compatibility (EMC). Generic standards. Emission standard for residential, commercial and light-industrial environments
DIN EN 61010-1	2020-03	Safety requirements for electrical equipment for measurement, control, and laboratory use. General requirements
DIN EN 63000	2019-05	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

Legally binding signature:

General Manager - Dr. Christoph Peper

Legally binding signature:

Development Manager - ppa. Jörg Petereit

This declaration certificates the compliance with the mentioned directives, however does not include any warranty of characteristics.

Please pay attention to the security advises of the provided instructions for use.

12 UK-CA-Declaration of Conformity

Manufacturer: Adolf Thies GmbH & Co. KG

Hauptstraße 76

37083 Göttingen, Germany

http://www.thiesclima.com

Product: Baro Transmitter

Doc. Nr. 113-44739_CA

Article Overview:

3.1157.10.000   3.1157.10.040   3.1157.10.041 3.1157.10.061 3.1157.10.140 3.1157.10.141 3.1157.10.161 3..1157.10.500

The indicated products correspond to the essential requirement of the following Directives and Regulations:

1091	08.12.2016	The Electromagnetic Compatibility Regulations 2016
1101	08.12.2016	The Electrical Equipment (Safety) Regulations 2016
RoHS Regulations 2012	01.01.2021	The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012
3113	01.01.2021	Regulations: waste electrical and electronic equipment (WEEE)
2018/1139/EU	04.07.2018	Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency.

The indicated products comply with the regulations of the directives. This is proved by the compliance with the following standards:

BS EN IEC 61000-6-2	25.02.2019	Electromagnetic compatibility (EMC). Generic standards. Immunity standard for industrial environments
BS EN IEC 61000-6-3	30.03.2021	Electromagnetic compatibility (EMC). Generic standards. Emission standard for equipment in residential environments
BS EN 61010-1+A1	31.03.2017	Safety requirements for electrical equipment for measurement, control, and laboratory use. General requirements
BS EN IEC 63000	10.12.2018	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Legally binding signature:

Legally binding signature:

General Manager - Dr. Christoph Peper

Development Manager - ppa. Jörg Petereit

This declaration certificates the compliance with the mentioned directives, however does not include any warranty of characteristics.

Please pay attention to the security advises of the provided instructions for use.

13 More Information / Documents as download

Further information can be found in the short instructions for use. These document and also the instruction for use are available for download under the following links.

Short instruction for use

https://www.thiesclima.com/db/dnl/3.1157.10.xxx_Baro_Transmitter_eng_short.pdf

Instruction for use

https://www.thiesclima.com/db/dnl/3.1157.10.xxx_Baro_Transmitter_eng.pdf

Please contact us for your system requirements.
We advise you gladly.

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