



HD 9408T BARO - HD 9408TR BARO HD 9908T BARO - HD 9408PS 50



BAROMETRIC PRESSURE TRANSMITTERS - STATIC PORT FOR BAROMETRIC MEASUREMENTS

GENERAL DESCRIPTION

HD 9408T BARO, **HD 9408TR BARO** and **HD 9908T BARO** are analog output electronic barometers. They use a piezoresistive sensor element which gives extremely accurate and stable measurement of the atmospheric pressure and assures excellent repeatability, low hysteresis and very good temperature stability. The output signal of the sensor is conditioned to provide a voltage or a current output linearly proportional to the barometric pressure. The transmitters are ready to use as they have been factory calibrated. A zero adjustments potentiometer is available for offset to station elevation.

HD9408T BARO requires dc voltage excitation, its low power consumption (< 4 mA) makes it well-suited to portable and remote battery or solar powered applications. It is available in different kinds of analog output: 0-1 Vdc, 0-5 Vdc (1-5 Vdc, 1-6 Vdc on request) or 4-20 mA (two wires).

HD 9408TR BARO offers superior temperature performance: the internal circuitry allows the sensor to work at constant temperature so that it achieves accurate temperature compensation over the whole range from -40°C to +60°C.

HD 9408TR BARO requires a continuous dc voltage excitation and a differential cabling connection to achieve best results. It is available in different output versions: 0÷1 Vdc, 0÷5 Vdc (1÷5 Vdc, 1÷6 Vdc on request).

HD 9908T BARO, unlike the other models, is equipped with a display showing the pressure measurements, an analog output 0÷20 mA, 4÷20 mA, 0÷1 V and 0÷5 V (0÷10 V on request) configurable by the customer and with an ON/OFF relay output with programmable alarm threshold.

HD 9908T BARO requires a 24 Vac (or 220 Vac on request) power supply.

HD 9408T BARO, **HD 9408TR BARO** and **HD 9908T BARO** are low cost and excellent performance solutions for meteorological applications, environmental monitoring systems, weather and environmental data logging, altitude applications, barometric pressure compensation for internal combustion engine performance, cleanroom barometric pressure compensation, automotive emissions test equipment.

HOUSING AND INSTALLATION

In all models the sensor and the electronics are housed in a sturdy MACROLON case (degree of protection IP67). When the lid is opened, holes are accessible which allow the base of the transmitter to be fixed to a panel or surface. Precision of measurement does not depend on the position of the transmitter. However it is advisable to fit the transmitter in such a way that the sensor is facing downwards so as to minimize the accumulation of dust or dirt on the filter.

If the installation is in an outdoor location, it is recommended to use a pressure port which minimizes the errors caused by the wind flow.

CONNECTION DIAGRAM AND OPERATION

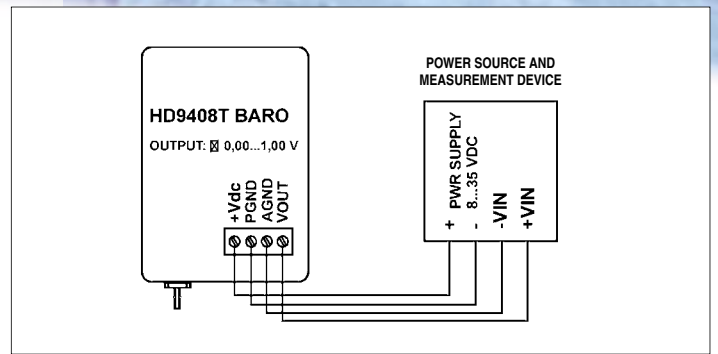
- Make the power connections for the HD 9908T BARO.
- Make the connections for the relay output, the relay contact is free.
- Select the analog output 0÷20 mA, 4÷20 mA, 0÷1 V, 0÷5 V by means of the jumper.
- Switch on the instrument, press the PUSH button and turn the SET trimmer to set the desired threshold value between 800 and 1100 mbar; the set value is shown on the LCD display.
- Using the trimmer i \square , set the desired HYS (=hysteresis) value between 5 and 50 mbar.
- The instrument will now indicate the barometric pressure; HI led, LO led or ALARM led and ALARM relay will switch on if one the following cases occurs (see table 1).

NOTE: the ALARM led comes on to indicate that the relay is energized and the contact is closed.

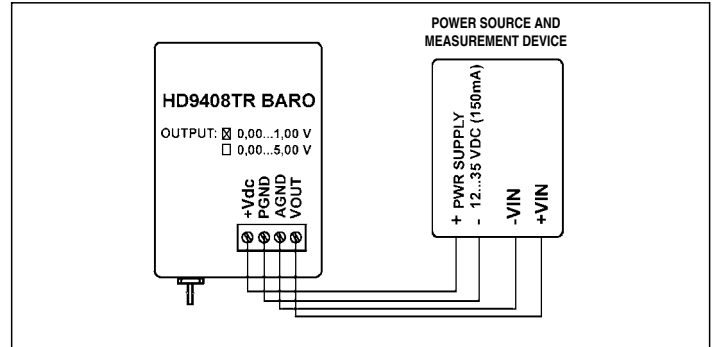
- **Once installation is complete, check that the cover is perfectly closed; the same applies to the grommets.**

TABLE 1	HI	LO	ALARM LED
MEASURE > SET, MEASURE < SET + HYS	ON	OFF	OFF
MEASURE > SET, MEASURE > SET + HYS	ON	OFF	ON
MEASURE < SET, MEASURE > SET - HYS	OFF	ON	OFF
MEASURE < SET, MEASURE < SET - HYS	OFF	ON	ON

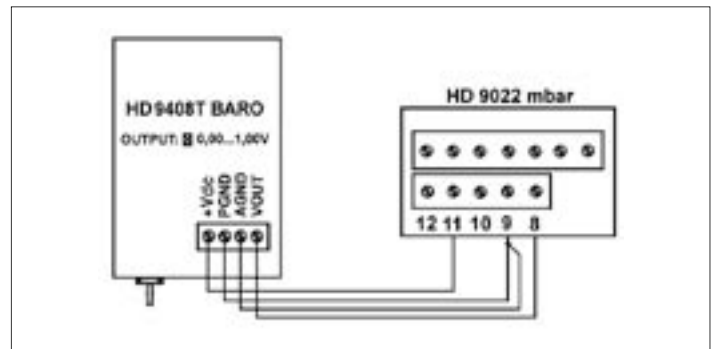
	HD9408T BARO	HD9408TR BARO	HD9908T BARO
Sensor type	Piezoresistive diaphragm		
Measuring range	800 ÷ 1100 mbar / 600 ÷ 1100 mbar on request		
Analog output	0 ÷ 1 Vdc standard; 0 ÷ 5 Vdc, 1 ÷ 5 Vdc, 1 ÷ 6 Vdc and 4 ÷ 20 mA (two wires) on request	0 ÷ 1 Vdc standard; 0 ÷ 5 Vdc, 1 ÷ 5 Vdc and 1 ÷ 6 Vdc on request	0 ÷ 20 mA, 4 ÷ 20 mA, 0 ÷ 1 V and 0 ÷ 5 V (0 ÷ 10 V on request), configurable by means of a jumper.
Accuracy	± 0.4 mbar, @ 20°C	± 0.4 mbar, @ 20°C	Display: Analog output: ± 1 mbar, @20°C ± 0.8 mbar, @ 20°C
Resolution	Infinite	Infinite	Display: Analog output: 1 mbar Infinite
Thermal effects	< 1% F.S., zero; < 1% F.S., span over -20°C to +60°C (-4° to 140°F)	± 0.8 mbar over -40°C to +60°C (-40° to 140°F)	< 1% F.S. zero, < 1% F.S. span over -20°C to +60°C (-4° to 140°F)
Long term stability	< 0.25 % F.S. over 6 months at 20°C	< 0.2 % F.S. over 6 months at 20°C	< 0.25 % F.S. over 6 months at 20°C
Turn on time	1 sec. to 99% of full scale reading	5 min @ 24 Vdc supply to 99% of full scale reading	5 sec. to 99% of full scale reading
Response time	< 200 msec. to reach full accuracy after a pressure step		
Relay contact output	Absent	Absent	3A/220 Vac resistive load
Set point	Absent	Absent	Configurable from 800 to 1100 mbar
Supply Voltage	8 ÷ 35 Vdc	12 ÷ 35 Vdc	24 Vac ±10% (230 Vac on request)
Supply current	< 4 mA	25 mA @ 20°C, 24 Vdc (warm-up 120 mA)	1VA
Operating Temperature	-30 ÷ +60°C	-40 ÷ +60°C	-20 ÷ +60°C
Media ompatibility	Air and dry gases only		
Overload pressure	30 psi		
Load resistance	Currente output R ≤ 500Ω	—	Current output R ≤ 500Ω
	VOLTAGE OUTPUT		
	R ≥ 10KΩ	R ≥ 10KΩ	R ≥ 100KΩ



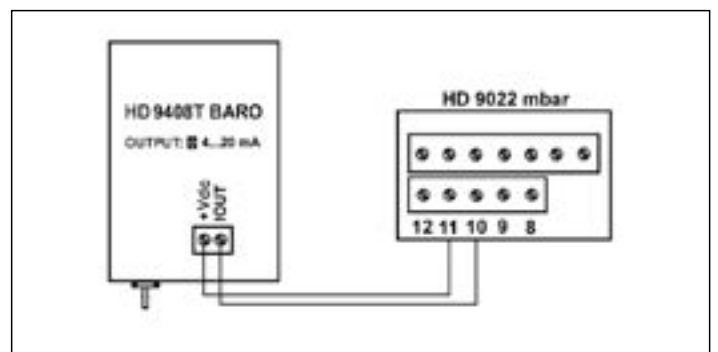
HD 9408T BARO 0÷1 V OUTPUT



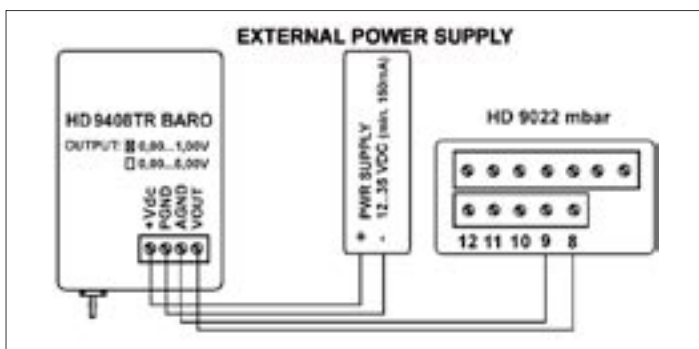
HD 9408TR BARO 0÷1 V OUTPUT



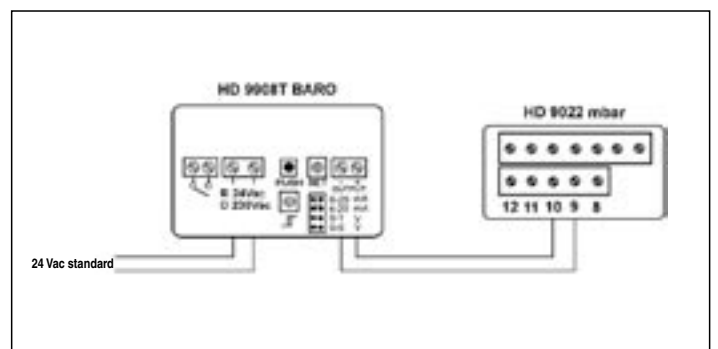
HD 9408T BARO 0÷1 V OUTPUT



HD 9408T BARO 4÷20 mA OUTPUT (two wire)

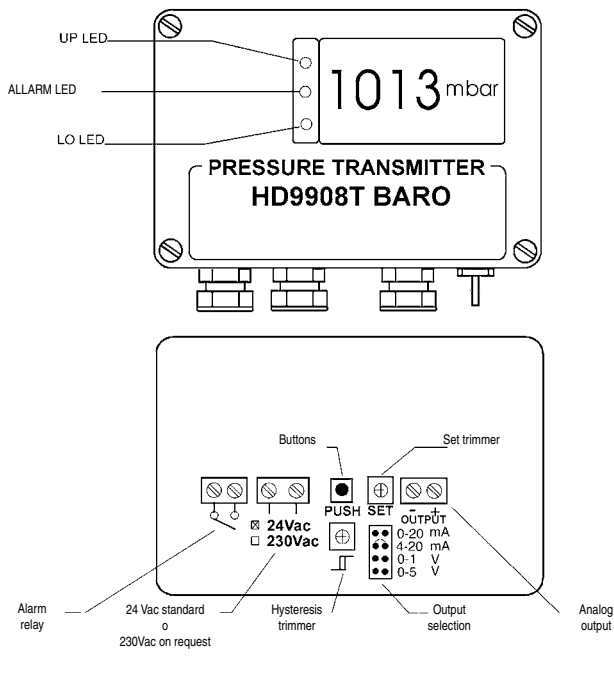


HD 9408TR BARO 0÷1 V OUTPUT



HD 9908T BARO 4÷20 mA OUTPUT

HD 9908T BARO



INSTALLATION AND CONNECTION

The instrument is easy to install and has to be placed far from buildings, trees or any other source that might disturb the flow of the wind. HD9408PS 56 mounting bracket and three M5x16 Stainless Steel screws are available to fix the port properly. The connection of the static port to the barometer, i.e. either to a HD9408T or to a HD9408TR, is carried out through the HV55 UV-resistant special tube (inside \varnothing : 3mm, outside \varnothing : 6mm), which resists to climate changes, as well. Maintenance and cleaning are very simple. Plastic details are in LURAN S777K, manufactured by BASF. It is strongly suggested to use non-aggressive cleansers, compatible with the plastic material.

TECHNICAL SPECIFICATIONS

According to the WMO directions, the allowed measurement deviation at a 20meters/second wind speed is 0.3mbar, corresponding to 300 Pascal. The HD9408PS 50 static port for barometric measurements falls into such a value. The following tables show the values resulted from the tests made in the wind tunnel.

ORDERING CODE

HD9408T BARO Barometric transmitter output 0÷1Vdc, measuring range 800÷1100mbar. On request output: 0÷5Vdc, 1÷5Vdc, 1÷6Vdc, 4÷20mA. Working temperature $-30^{\circ}\text{C} \div +60^{\circ}\text{C}$.

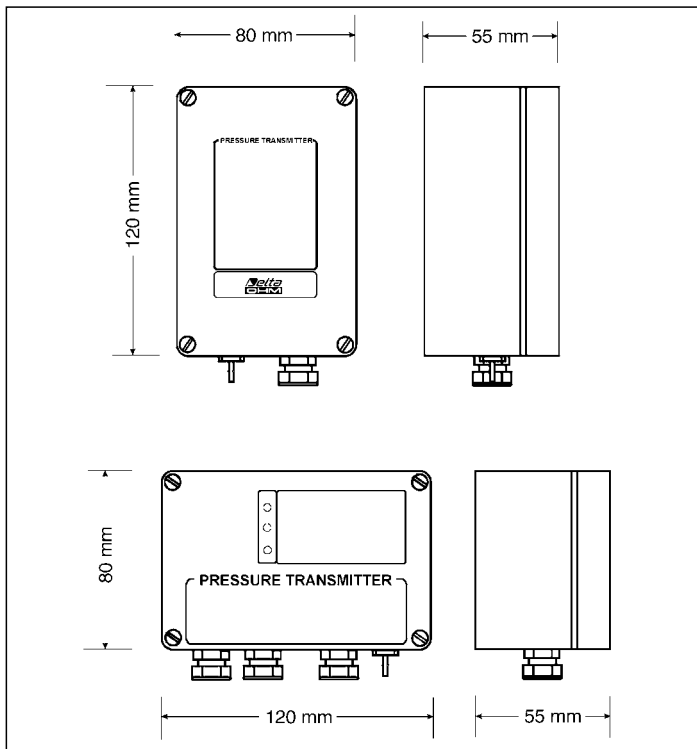
HD9408TR BARO Barometric transmitter 800÷1100mbar output 0÷1Vdc. On request output 0÷5Vdc, 1÷5Vdc. Temperature working range $-40^{\circ}\text{C} \div +60^{\circ}\text{C}$, sensor heater.

HD9908T BARO Digital barometric transmitter 800÷1100mbar with LCD indication. Outputs: 0÷20mA, 4÷20mA, 0÷1Vdc, 0÷5Vdc. Working temperature $-20^{\circ}\text{C} \div +60^{\circ}\text{C}$.

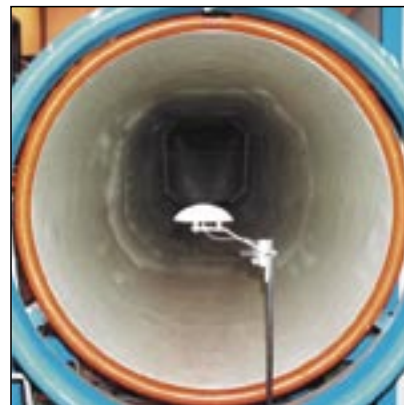
HD9408PS 50K Kit composed by static port, pole mounting bracket and HV55 tube

HD9408PS 50 Static port for barometric measurements equipped with the HV55 tube

HD9408PS 56 Mounting bracket for static port, barometer fastening, pole anchor
HV55 HV55 UV- and temperature-resistant silicone tube, inside \varnothing : 3mm, outside \varnothing : 6mm, L=400mm



TESTS MADE IN THE WIND TUNNEL

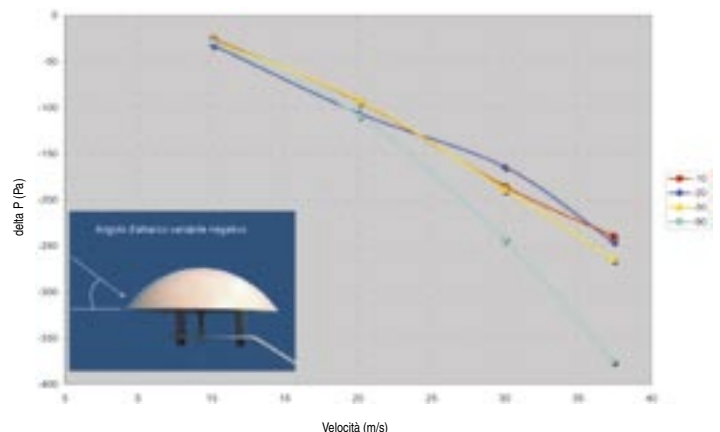


Static port put in front of the wind tunnel

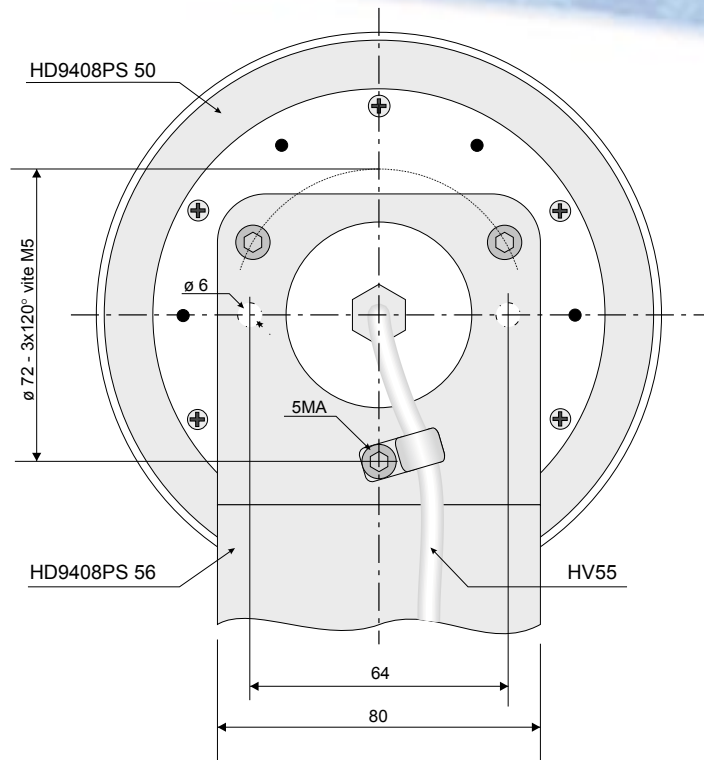
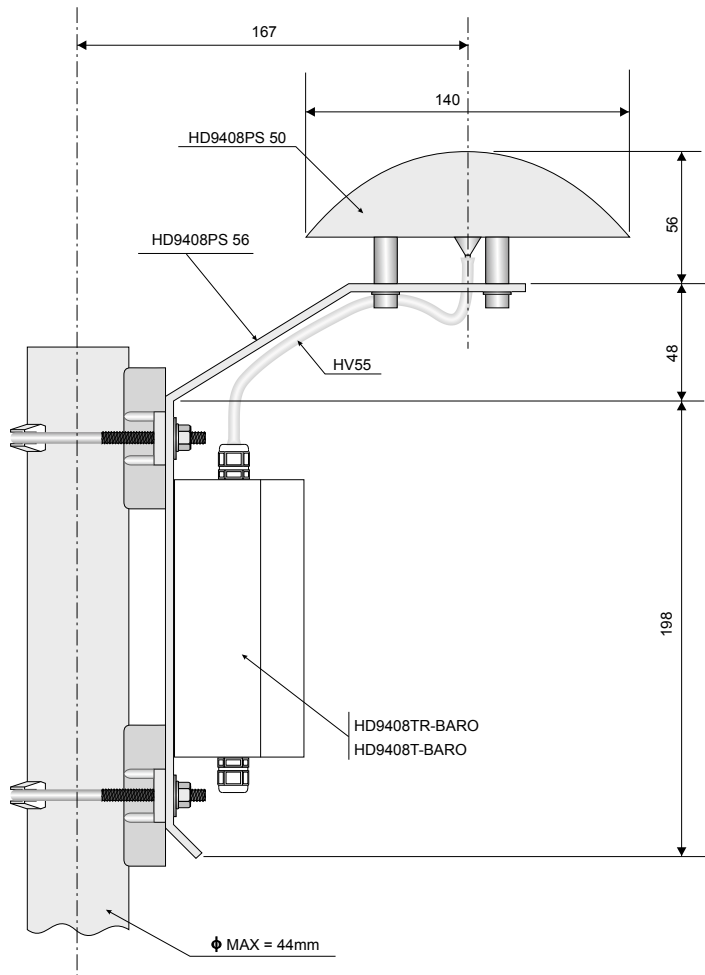
HD9408PS 50 STATIC PORT FOR BAROMETRIC MEASUREMENTS

DESCRIPTION

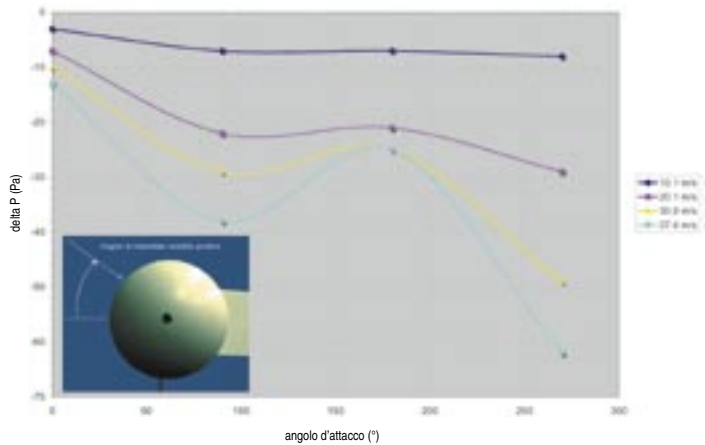
The measurement of the barometric pressure in free field can register values, which differ of hundreds of pascal from the effective ones, because of wind fluctuation and direction. The HD9408PS 50 static port for barometric measurements minimizes such errors, because, besides working as a filter (brake) against the wind dynamic pressures, it allows to the barometer to work properly, even in presence of snow or ice, as well as to conform to the WMO directions (World Meteorology Organization). The materials applied in manufacturing the static port are UV-resistant and can operate in the temperature range between -40°C and $+80^{\circ}\text{C}$.



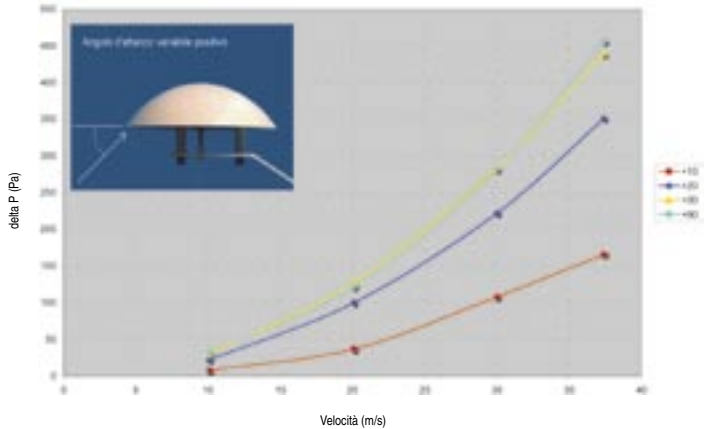
ΔP according to the yaw angle β (join angle $\alpha = 0^{\circ}$)



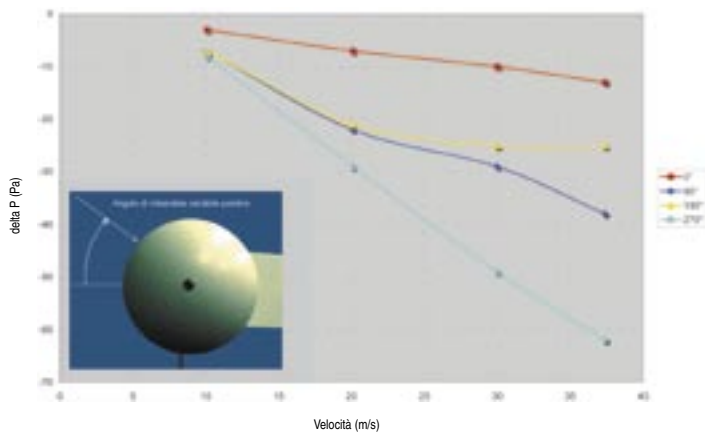
Error due to the dynamic pressure	Lower than 0.3mbar @20°C
Working temperature	-40°C... +80°C
Connection pipe (for a tube with inside ϕ : 3mm, outside ϕ : 6mm)	ϕ 3.4 mm
Weight of the static port. - Weight of the static port equipped with the bracket	200 gr, 570 gr



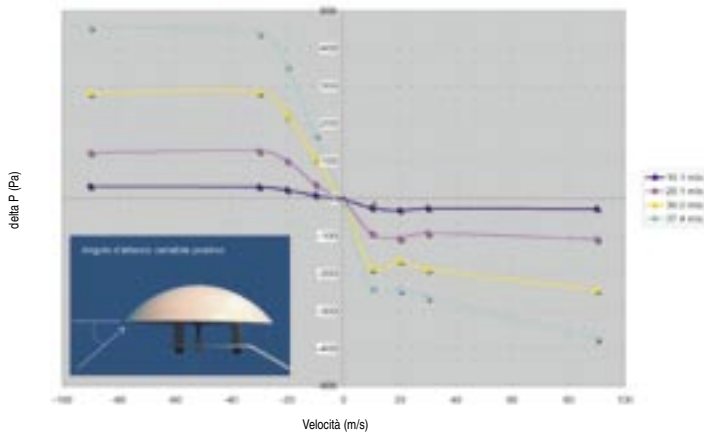
ΔP according to the join angle α (yaw angle $\beta = 0^\circ$)



ΔP according to the β yaw angle



ΔP according to the α join angle (yaw angle $\beta = 0^\circ$)



ΔP according to the α join angle