

ITINERARIO INTERNAZIONALE E78

S.G.C. GROSSETO - FANO

Adeguamento a 4 Corsie nel Tratto Grosseto - Siena
(S.S. 223 "DI PAGANICO") dal Km 27+200 al Km 30+038 - Lotto 4

MONITORAGGIO AMBIENTALE

COD. **FI13**

IL SOGGETTO ESECUTORE DELLE ATTIVITÀ DI MONITORAGGIO AMBIENTALE ANTE OPERA



IL RESPONSABILE U.O. AMBIENTE, TERRITORIO, ARCHITETTURA E ARCHEOLOGIA :

Arch. Giovanni MAGARÒ

VISTO: IL RESPONSABILE DEL PROCEDIMENTO:

Ing. Achille Devitofranceschi

PIANO DI MONITORAGGIO AMBIENTALE

SOTTOSUOLO

Certificati di calibrazione della strumentazione n° 1

CODICE PROGETTO			NOME FILE			REVISIONE	SCALA:
PROGETTO	LIV. PROG.	N. PROG.	T01-M006-MOA-RE02_A				
L0702B	E	1701	CODICE ELAB. T01M006MOARE02			A	-
C							
B							
A	Emissione		Giu 2019	-	-	-	
REV.	DESCRIZIONE		DATA	REDATTO	VERIFICATO	APPROVATO	



CALIBRATION REPORT

N. 1902169

Serial Number: S173653

Product Code: 0S242DV3000

Model: DIGITAL INCLINOMETER PROBE $\pm 30^\circ$

Type: Digitized MEMS

Calibration Date: 28/02/2019 09:36

Customer: SOCOTEC ITALIA S.r.l.

Job Number: 19-00030

Project Code:

FW/HW Ver. 3.10/-

Test Conditions

Temperature: $21 \pm 0.5^\circ\text{C}$

Humidity: $33 \pm 10\%$

Barometric Pressure: $1007 \pm 5\text{ hPa}$

Calibration Method

Calibration is made by direct comparison method using a calibration bench.

Calibration is made at SISGEO laboratory. SISGEO S.r.l. is a Certified UNI EN ISO 9001 Company.

Calibration procedures: IST 10/01*; IST 10/04*; IST 10/06*; IST 10/13*; IST 10/28* (*: in accordance to the instruments model)

Calibration is made according to inclinometric, displacement, load and pressure conventions in reference to calibration equipment.

Traceability is through first line standards, validated by certificates of calibration

Electronic level 210: Microplan, LE602, RT180016-A

Multimeter 171: Keysight Technologies, 3458A, LAT 046 358517

- The measurement results reported in this Calibration Report were obtained following the calibration procedures and the reference samples of instruments written above. They relate only to the calibrated item and they are valid only for the time and conditions of calibration, unless otherwise specified.

- The measurements uncertainties (U) stated in this document have been determined according to the ISO/IEC Guide 98 and to EA-4/02. Usually they have been estimated as expanded uncertainty obtained multiplying the standard uncertainty by the coverage k factor corresponding to a confidence level of about 95%. Usually the k factor is 2.

- MPE: Maximum Permitted Error

RESULTS

Linear Sensitivity Factors: (1)	Ch. A	A= 9,9857E-01 [Digit/Digit]	B= 2,4110E+01 [Digit]
	Ch. B	9,9878E-01 [Digit/Digit]	-8,7279E+00 [Digit]

Maximum Linear Error + U: (2)	Ch. A	0,0572 [%FS]
	Ch. B	0,0475 [%FS]

MPE Lin. = 0,15 [%FS]

Final Linear Reading: (3) $R_{cl} = A \cdot R_{meas} + B$ [Digit]

Polynomial Sensitivity Factors: (4)	Ch. A	A= -4,0638E-11 [Digit/Digit ³]	B= -4,3518E-08 [Digit/Digit ²]	C= 1,0017E+00 [Digit/Digit]	D= 2,6040E+01 [Digit]
	Ch. B	-3,4856E-11 [Digit/Digit ³]	2,7581E-08 [Digit/Digit ²]	1,0015E+00 [Digit/Digit]	-9,9691E+00 [Digit]

Maximum Polynomial Error + U: (2)	Ch. A	0,0007 [%FS]
	Ch. B	0,0021 [%FS]

MPE Pol. = 0,05 [%FS]

Final Polynomial Readings: (5) $R_{cp} = A \cdot R_{meas}^3 + B \cdot R_{meas}^2 + C \cdot R_{meas} + D$ [Digit]

CRITERIA |Max Lin. Err.| + U < |MPE Lin.|
|Max Pol. Err.| + U < |MPE Pol.|

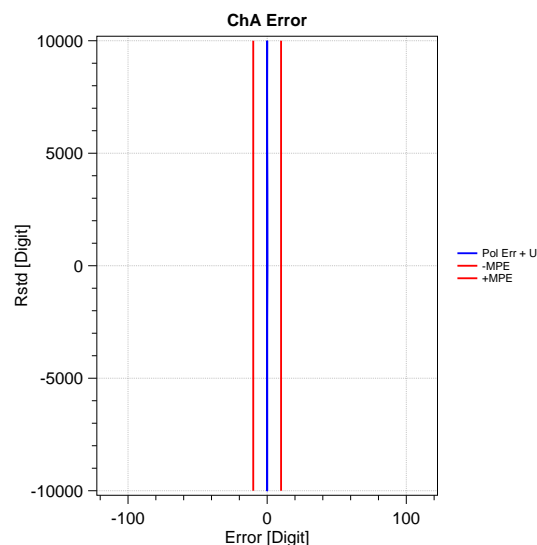
COMPLIANT

To the Datasheet

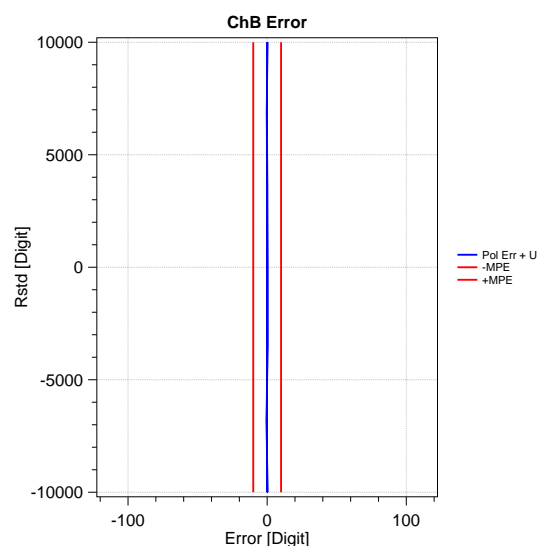
Issue Date: 01.03.2019

CQE: *Renzo Bruni*

Ch. A				
Rstd ⁽⁶⁾ [Digit]	Rmeas ⁽⁷⁾ [Digit]	U [Digit]	Rcl ⁽³⁾	Rcp ⁽⁵⁾
10000	10001,57	0,0461877	10011,4	10000,01
6840,4	6817,39	0,0461877	6831,764	6840,399
3472,96	3443,06	0,0461877	3462,253	3472,919
0	-26,04	0,0461877	-1,893007	-0,04486395
-3472,96	-3494,02	0,0461877	-3464,92	-3472,86
-6840,4	-6865,57	0,0461877	-6831,656	-6840,381
-10000	-10045,34	0,0461877	-10006,88	-9999,984
-10000	-10045,37	0,0461877	-10006,92	-10000,01
-6840,4	-6865,62	0,0461877	-6831,706	-6840,431
-3472,96	-3494,13	0,0461877	-3465,03	-3472,97
0	-26,04	0,0461877	-1,893007	-0,04486395
3472,96	3443,1	0,0461877	3462,293	3472,959
6840,4	6817,49	0,0461877	6831,864	6840,499
10000	10001,51	0,0461877	10011,34	9999,951



Ch. B				
Rstd ⁽⁶⁾ [Digit]	Rmeas ⁽⁷⁾ [Digit]	U [Digit]	Rcl ⁽³⁾	Rcp ⁽⁵⁾
10000	10027,29	0,0461877	10006,33	9999,964
6840,4	6850,21	0,0461877	6833,124	6840,586
3472,96	3478,93	0,0461877	3465,957	3473,035
0	9,88	0,0461877	1,140036	-0,07428193
-3472,96	-3459,74	0,0461877	-3464,246	-3473,115
-6840,4	-6832,36	0,0461877	-6832,751	-6840,153
-10000	-10012,89	0,0461877	-10009,4	-10000,09
-10000	-10012,94	0,0461877	-10009,45	-10000,14
-6840,4	-6832,24	0,0461877	-6832,631	-6840,034
-3472,96	-3459,72	0,0461877	-3464,226	-3473,095
0	9,78	0,0461877	1,040158	-0,1744317
3472,96	3478,73	0,0461877	3465,757	3472,835
6840,4	6850,25	0,0461877	6833,163	6840,626
10000	10027,18	0,0461877	10006,22	9999,854



- LEGEND**
- (1): Linear factors obtained by means of linear formula according to the least squares method.
 - (2): The errors shows related to residual error on the calibration step applying linear/polynomial correction + Uncertainty.
 - (3): Values calculated using linear correction.
 - (4): Polynomial factors obtained by means of linear multiply regression formula.
 - (5): Values calculated using polynomial correction.
 - (6): Reference readings.
 - (7): Instruments readings.

- NOTES:**
- a) % F.S. error is calculated on whole range.
 - b) Resulting error depends on the effects of linearity and hysteresis.
 - c) The errors reported into the charts are the results of the sum of each step error and the related measure uncertainty.

Digit = 20000*sina