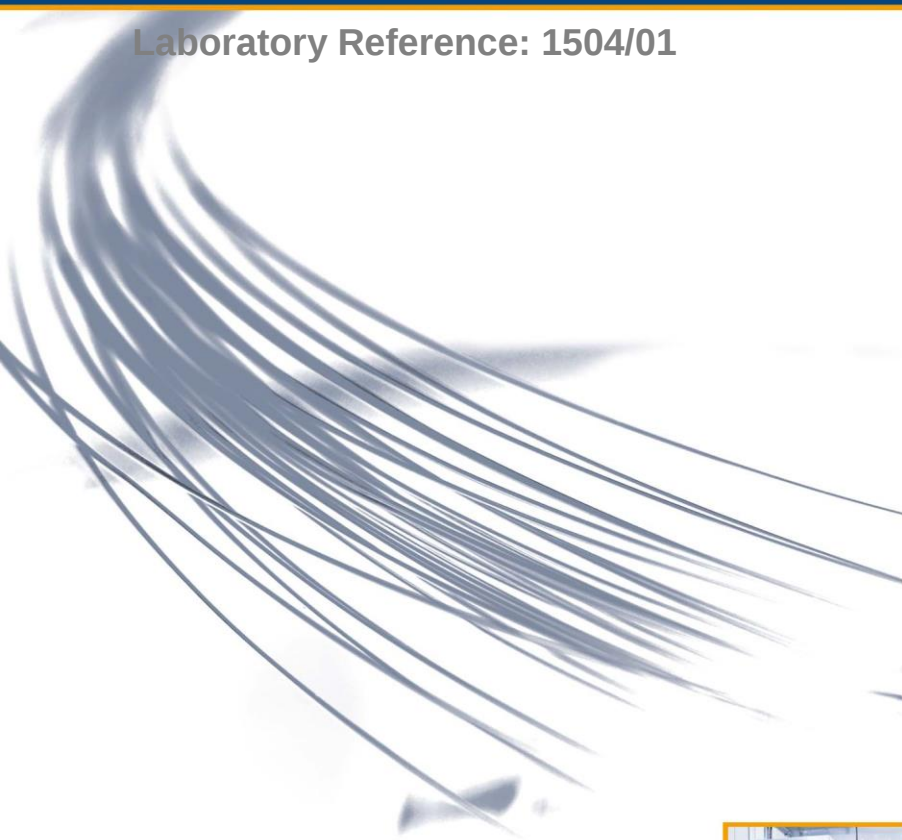
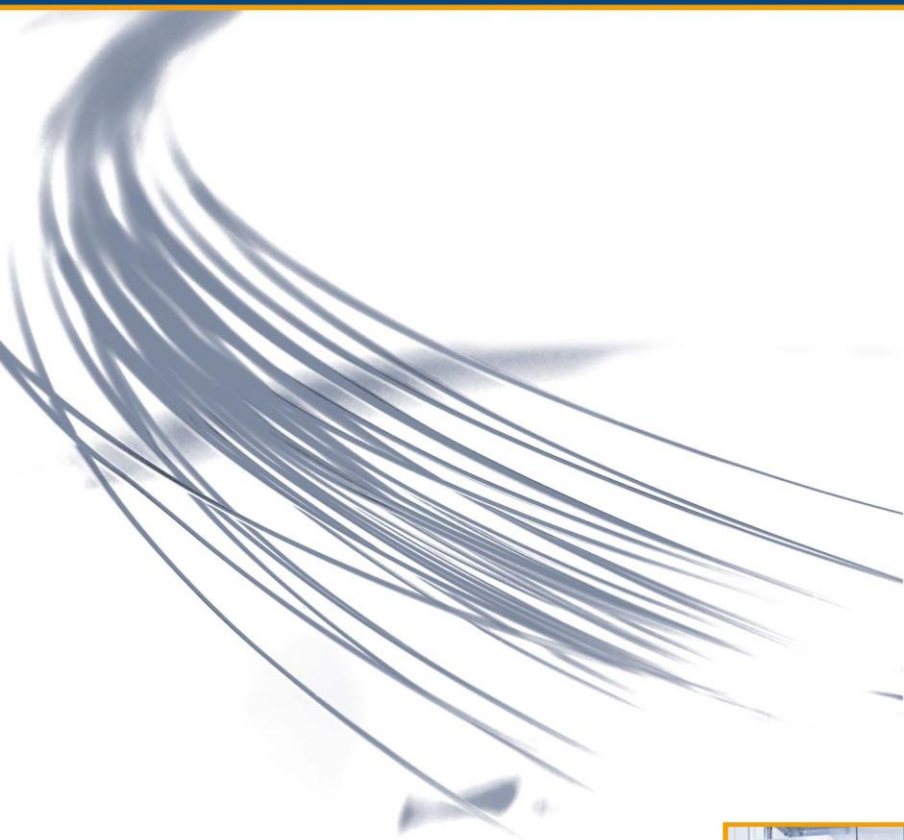


HO 8NP 0000 ; HO 6P
VALIDATION OF ASIC NEW REVISION CBA TEST
REPORT
LEM GROUP TEST REPORT
1505PU009 rev: 0

Laboratory Reference: 1504/01





LEM Test Center:

LEM Bulgaria EOOD

Iliensko Shose 8
BG-1220 Sofia
BULGARIA

Laboratory reference:

1504/01

Project reference:

xxxxxx

Customer:

/

Device:

HO 8NP 0000 ; HO 6P

Manufacturing Center:

LEM Bulgaria

Application domain:

Industrial

CLEM number:

64.50.11.000.0, 64.54.09.000.0

Number of devices:

120

Datasheet reference:

ho-np-0000_series : 17March2014/Version 4

ho-p_series : 18March2014/Version 2

Date code / Serial number:

See Identification vs. Date code:

Standards:

INDUSTRIAL STANDARDS [EN 50178 (1997)]

Precise Class according to §6.1 EN 50178 Table 7

Precise Class according to §4.1 EN 50155 Table 1

TOTAL NUMBER OF PAGES:

22

• GOAL OF THE TESTS:

Validation of ASIC new revision CBA

• COMMENTS:

/

• REVISION HISTORY:

Rev.	Date	Who	Page(s)	Changes and updates
0	14.05.2015	SKR	/	Creation

This document supersedes all earlier versions which should no longer be used.

Workflow		
Function	Name	Title/Position
Writer:	Simeon Krasimirov Rafailov	Laboratory Quality Engineer
Checker:	Grigor Boykov Mihalkov	Quality Engineer
Requested by:	Lyubomira Krasimirova Miloshevska	Process Engineer
Quality approval:	Kalin Petrov Cheshmedzhiev	Site Quality Manager

This document has been approved thanks to an IT process; therefore it contains no handwritten signature.

- Laboratory general test conditions:**

- Ambient temperature:	23 ± 5 °C
- Relative humidity:	45 ± 25 %
- Barometric air pressure:	86 to 106 kPa

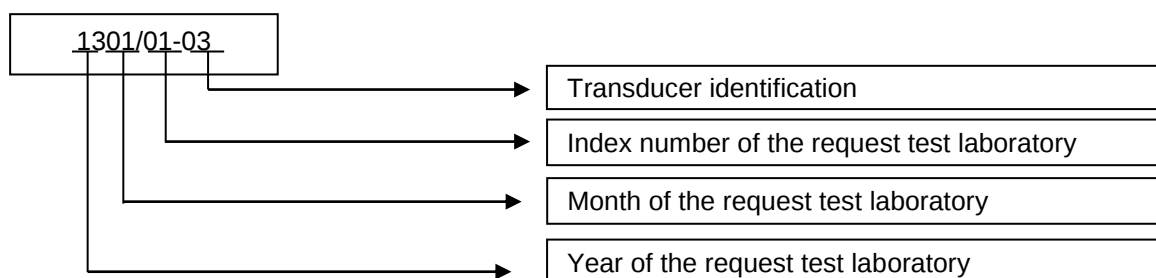
- Comments:**

- Without specific comment, the test acceptance criteria are given by the datasheets.
- LEM certifies that the measuring instruments, listed in this report, are used in accordance with the manufacturer specifications. Tests are carried out at 23 °C ±5 °C (ambient temperature) in stand-alone mode of operation.

- Related documents:**

- LEM GROUP DATASHEET SYMBOLS AND TERMINOLOGY	CO.60.11.002.0
- LEM GENEVA MANAGEMENT LABORATORY MANUAL	00.08.00.000.0
- LEM GROUP TESTS MASTERY	CO.11.10.051.0

- Laboratory number codification:**



Examples of use in the report of test:

Identification of samples in test:

1301/01-03	Sample 03 of 1301/01 test request
1301/01-#03	Sample 03 of 1301/01 test request (*)
1301/01-03 to 05	Sample 03; 04 and 05 of 1301/01 test request
1301/01-03; 06; 08	Sample 03; 06 and 08 of 1301/01 test request

(*) # sharp is the symbol to indicate “number” (optional).

- Specific symbols and terminologies:**

ID:	Transducer identification
O.O.O:	Out of order
DUT:	Device under test
DV:	Design Validation
PV:	Process Validation

Test	Test standards	Devices	Result	Page
INITIAL CHARACTERIZATION	---	---	---	7
Characterization in temperature 25°C :HO 6-P	98.20.00.580.0	ID:1504/01#001 - 1504/01#060	Pass	8
Characterization in temperature 25°C :HO 6-P	98.20.00.580.0		Pass	12
Characterization in temperature 25°C :HO 6-P	----	ID:1504/01#061 - 1504/01#120	----	16
Characterization in temperature 25°C :HO 6-P		----		
Characterization in temperature 25°C :HO 8NP				
Characterization in temperature 25°C :HO 8NP				
Characterization in temperature 25°C :HO 8NP				
Characterization in temperature 25°C :HO 8NP				
ANNEX				
END OF REPORT				

Annex:

I-	General equipment.....	17
II-	Identification vs. Date code:	18

Title



(Picture of the facilities used during the tests)

INITIAL CHARACTERIZATION

1505-000-000
1505-000-000
1505-000-000
1505-000-000

CHARACTERIZATION IN TEMPERATURE 25°C :HO 6-P

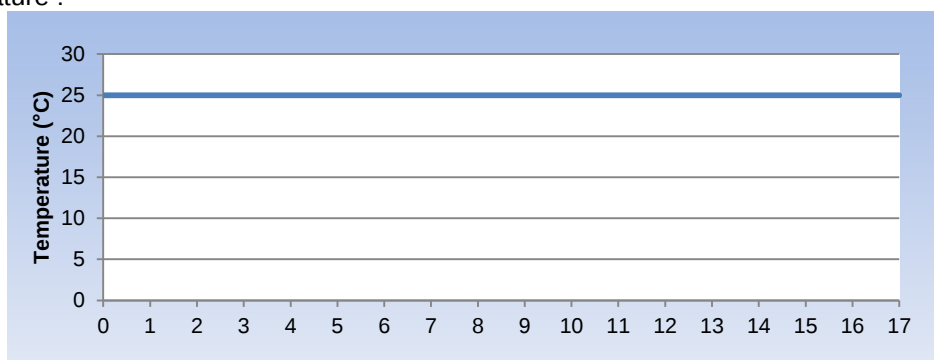
Test reference: 98.20.00.580.0
 Device: ID:1504/01#001 -1504/01#060
 Start date of test: 16.04.2015
 Operator: KRE, SKR

- Result:**

Pass

- Conditions:**

Temperature: Refer to general condition
 Relative humidity: $< T < ^\circ\text{C}$
 Duration of temperature step: Uncontrolled
 Graph of temperature : /



Primary current: 6A
 Supply voltage: 5V
 Load resistance: 10k Ω

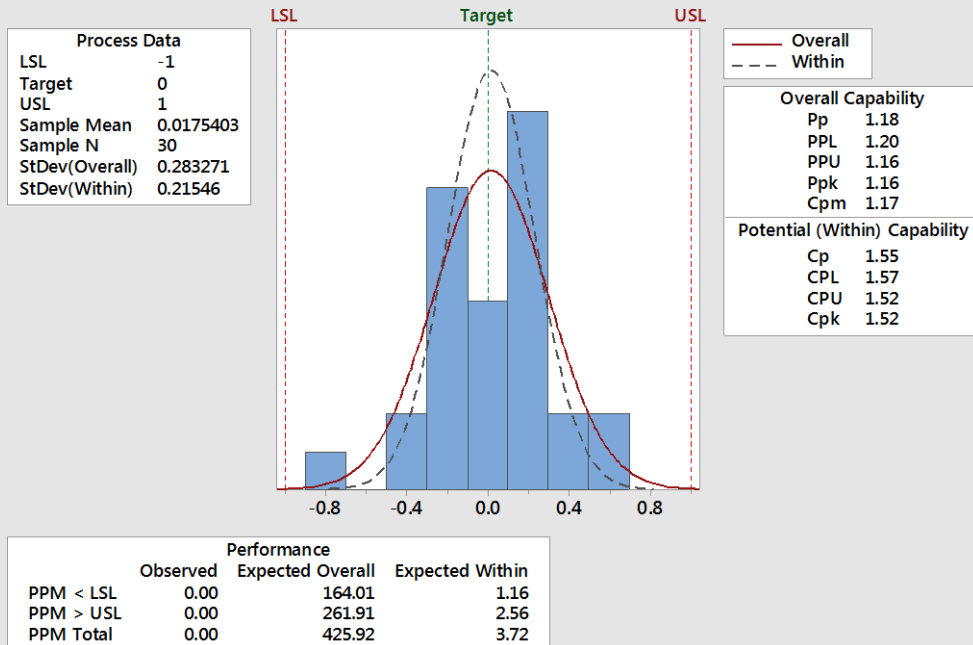
- Measurements:**

See next page

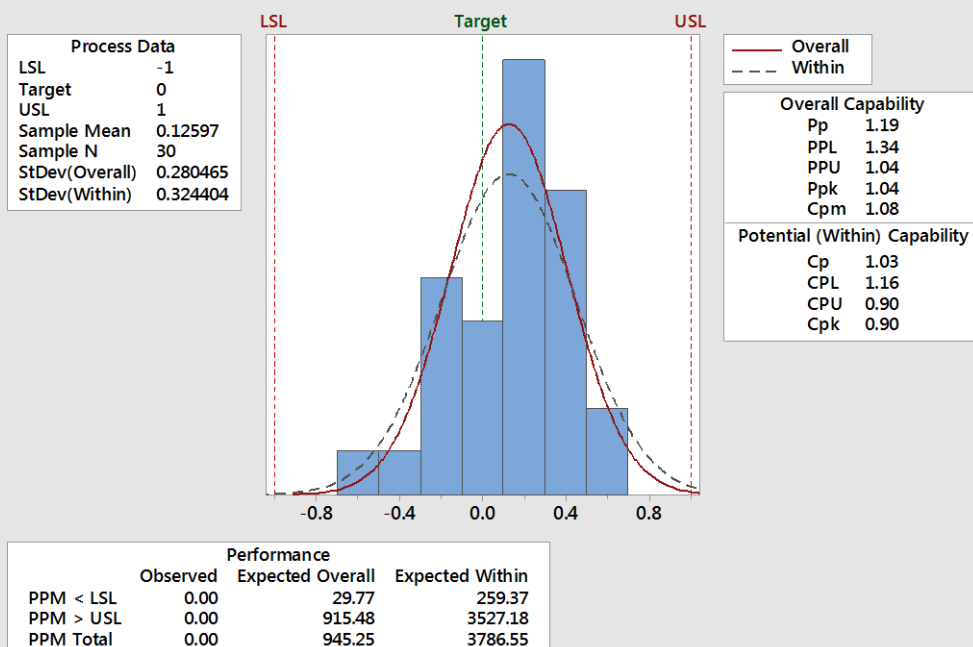
- Test program: transducers.vi**

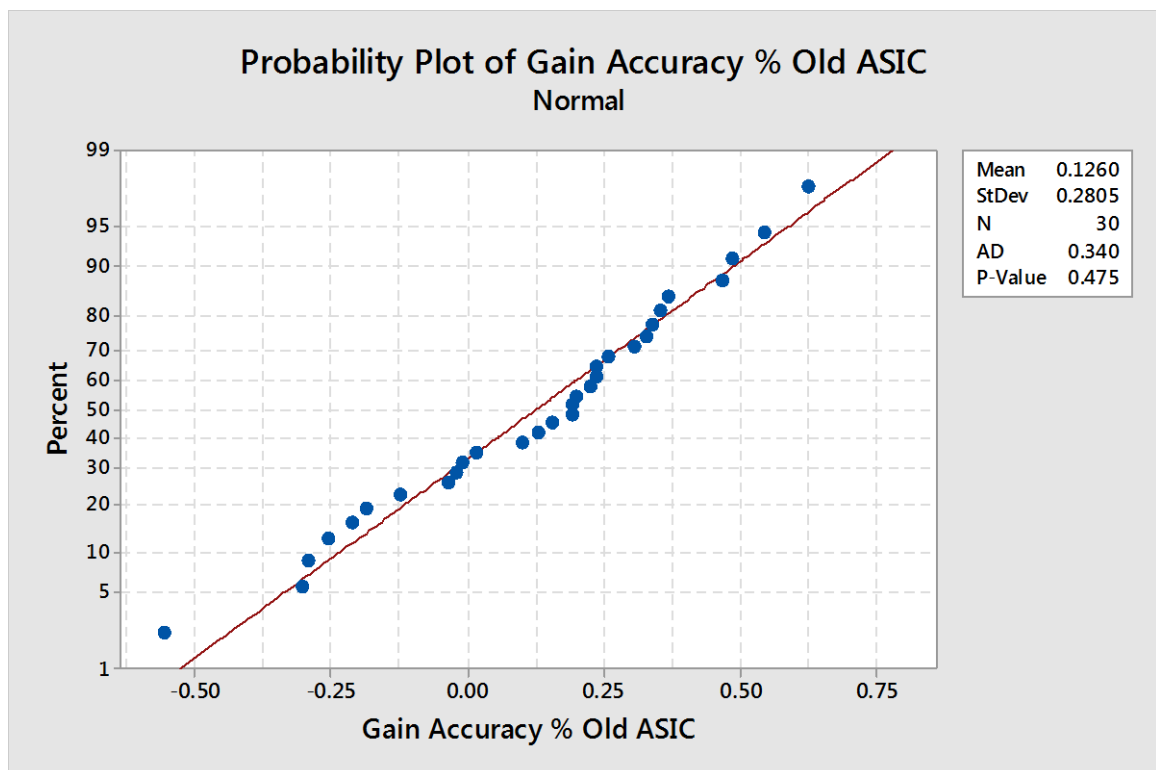
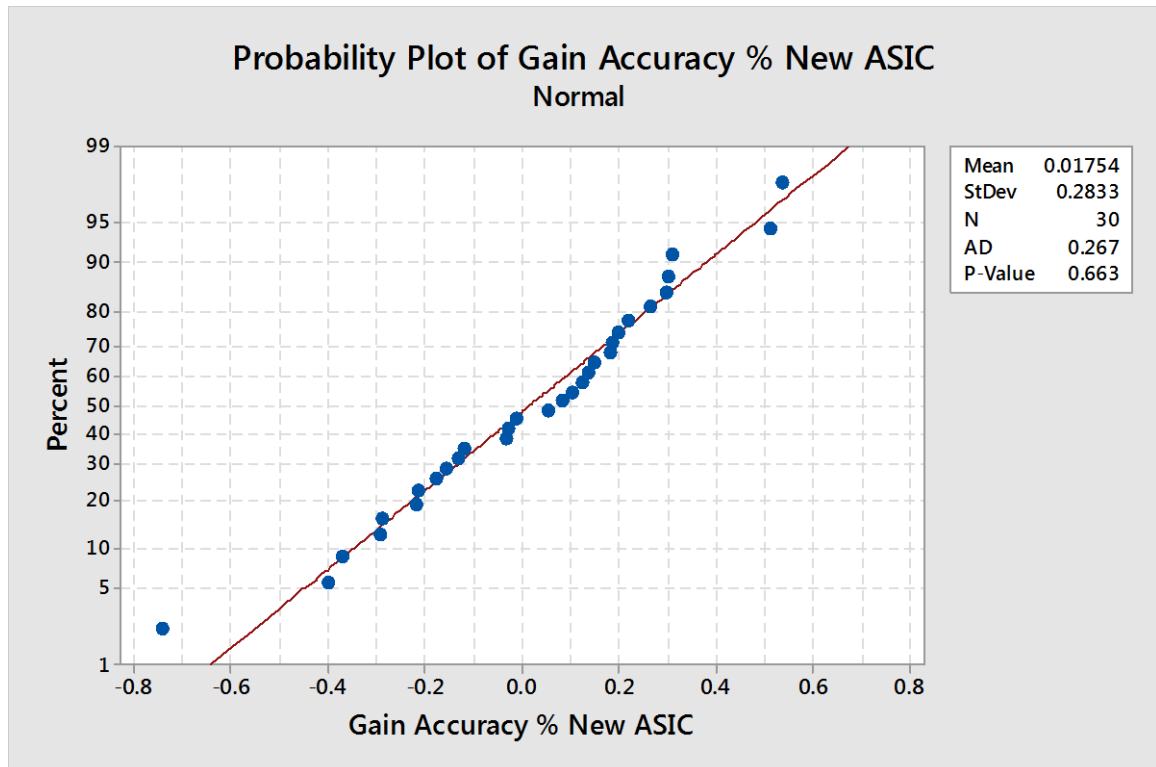
- Equipment:** See Annex I- General equipment: § PXI/DAS, & Climatic chamber N°

Process Capability Report for Gain Accuracy % New ASIC



Process Capability Report for Gain Accuracy % Old ASIC





- Measurements:

Device	Gain Accuracy % New ASIC	Device	Gain Accuracy % Old ASIC
1504/01#001	0.30	1504/01#031	0.10
1504/01#002	0.30	1504/01#032	-0.18
1504/01#003	-0.03	1504/01#033	0.49
1504/01#004	0.08	1504/01#034	0.24
1504/01#005	0.31	1504/01#035	-0.03
1504/01#006	0.14	1504/01#036	0.24
1504/01#007	0.13	1504/01#037	0.19
1504/01#008	-0.13	1504/01#038	-0.21
1504/01#009	0.51	1504/01#039	0.26
1504/01#010	-0.01	1504/01#040	0.34
1504/01#011	0.06	1504/01#041	0.16
1504/01#012	-0.15	1504/01#042	-0.30
1504/01#013	-0.18	1504/01#043	0.54
1504/01#014	-0.29	1504/01#044	-0.29
1504/01#015	-0.74	1504/01#045	-0.25
1504/01#016	-0.21	1504/01#046	-0.01
1504/01#017	0.19	1504/01#047	0.30
1504/01#018	0.11	1504/01#048	0.19
1504/01#019	0.18	1504/01#049	0.02
1504/01#020	-0.22	1504/01#050	0.47
1504/01#021	-0.29	1504/01#051	0.23
1504/01#022	0.20	1504/01#052	-0.56
1504/01#023	-0.03	1504/01#053	0.13
1504/01#024	0.54	1504/01#054	0.37
1504/01#025	0.22	1504/01#055	0.33
1504/01#026	0.27	1504/01#056	-0.02
1504/01#027	0.15	1504/01#057	0.20
1504/01#028	-0.12	1504/01#058	0.63
1504/01#029	-0.40	1504/01#059	-0.12
1504/01#030	-0.37	1504/01#060	0.36

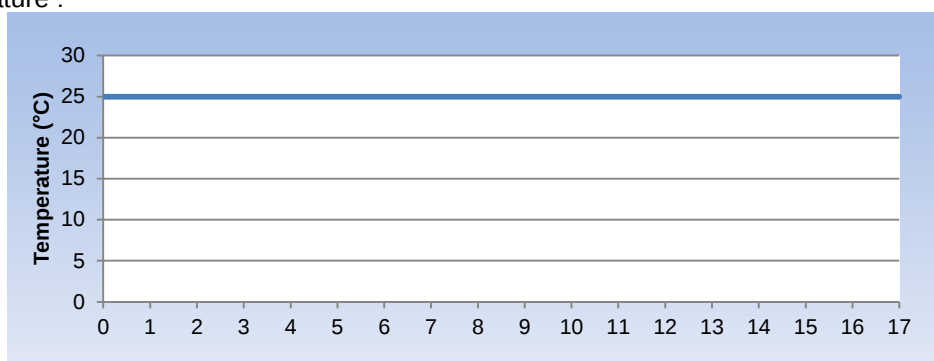
Test reference: 98.20.00.580.0
 Device: ID:1504/01#061 -1504/01#120
 Start date of test: 16.04.2015
 Operator: KRE, SKR

- Result:**

Pass

- Conditions:**

Temperature: Refer to general condition
 Relative humidity: $< T < ^\circ\text{C}$
 Duration of temperature step: Uncontrolled
 Graph of temperature : /



Primary current: 6A
 Supply voltage: 5V
 Load resistance: 10k Ω

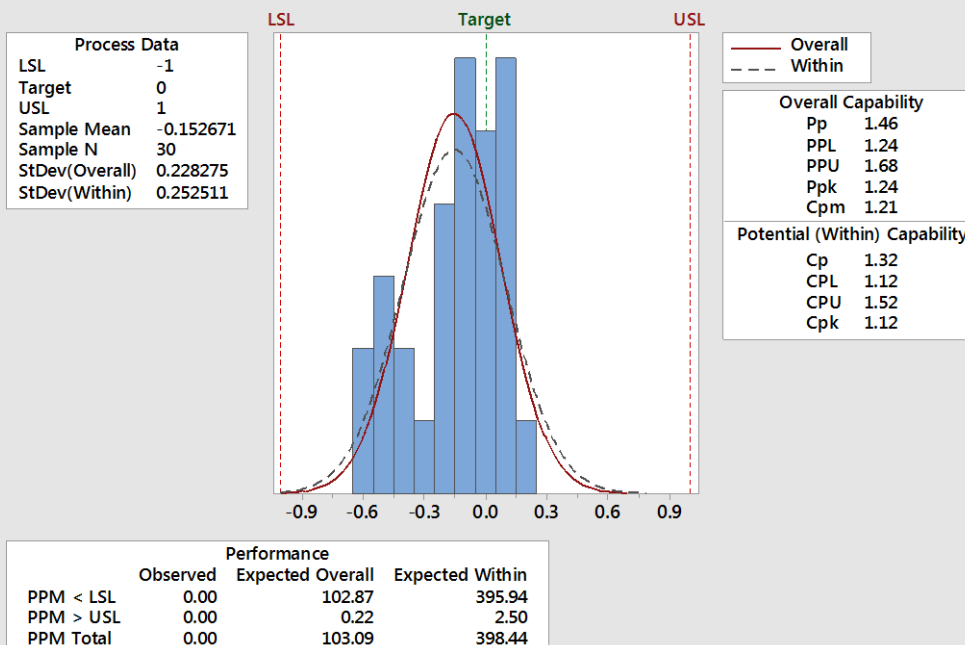
- Measurements:**

See next page

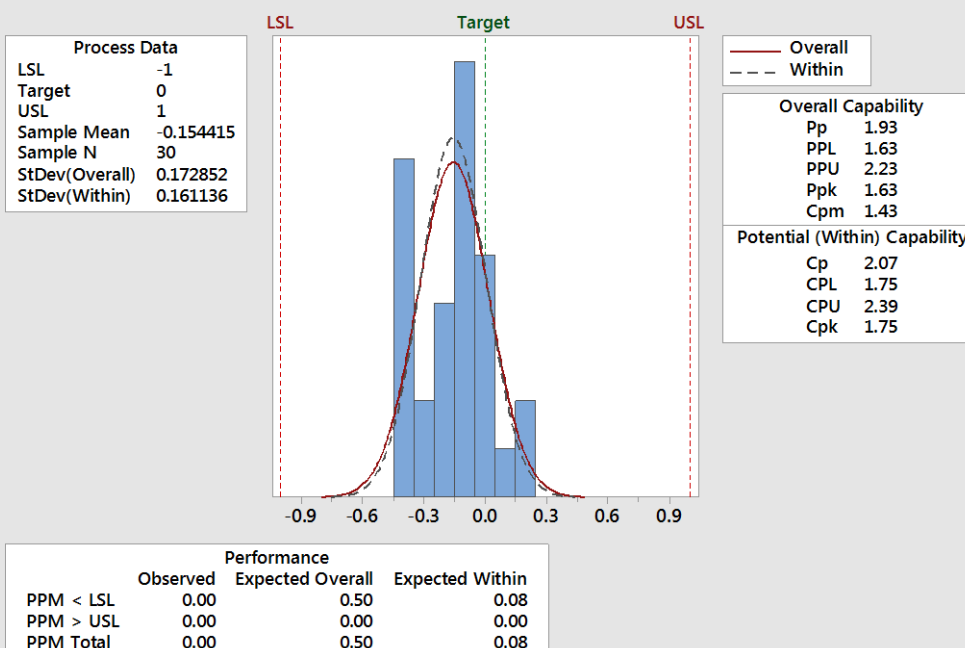
- Test program:** transducers.vi

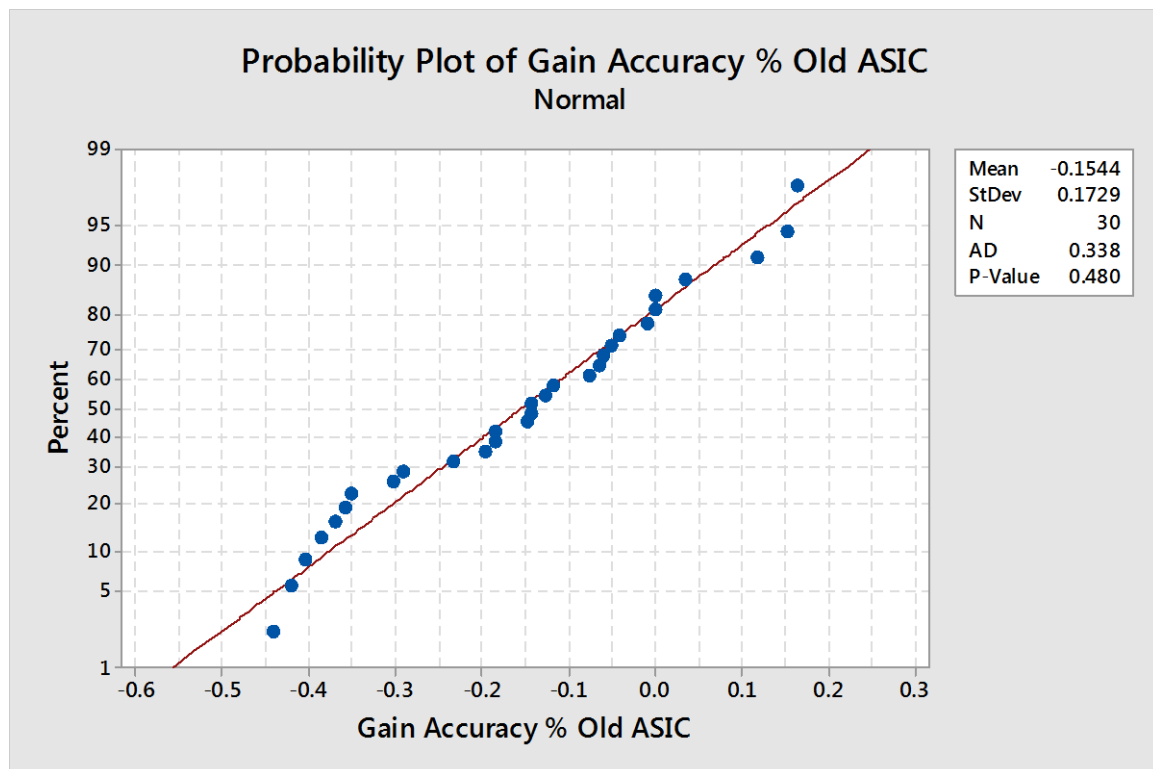
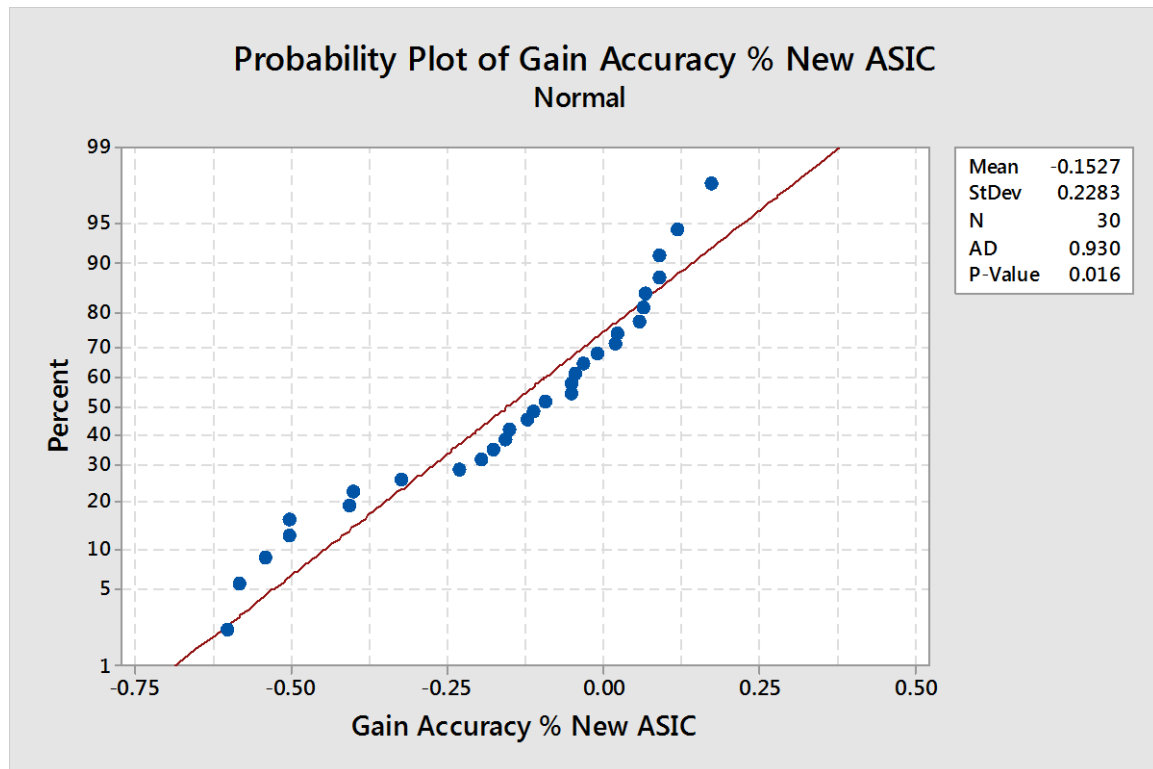
- Equipment:** See Annex I- General equipment: § PXI/DAS, & Climatic chamber N°

Process Capability Report for Gain Accuracy % New ASIC



Process Capability Report for Gain Accuracy % Old ASIC





CHARACTERIZATION IN TEMPERATURE 25°C :HO 8NP

- Measurements:

Device	Gain Accuracy % New ASIC	Device	Gain Accuracy % Old ASIC
1504/01#061	-0.09	1504/01#091	-0.05
1504/01#062	-0.04	1504/01#092	-0.14
1504/01#063	-0.40	1504/01#093	-0.39
1504/01#064	0.02	1504/01#094	0.00
1504/01#065	-0.41	1504/01#095	-0.08
1504/01#066	-0.01	1504/01#096	0.00
1504/01#067	0.07	1504/01#097	0.15
1504/01#068	-0.32	1504/01#098	-0.40
1504/01#069	-0.16	1504/01#099	0.16
1504/01#070	-0.05	1504/01#100	0.12
1504/01#071	-0.60	1504/01#101	-0.06
1504/01#072	-0.05	1504/01#102	-0.18
1504/01#073	-0.18	1504/01#103	-0.36
1504/01#074	-0.19	1504/01#104	-0.20
1504/01#075	-0.50	1504/01#105	-0.30
1504/01#076	0.02	1504/01#106	-0.35
1504/01#077	-0.54	1504/01#107	0.04
1504/01#078	-0.23	1504/01#108	-0.06
1504/01#079	-0.03	1504/01#109	-0.13
1504/01#080	0.09	1504/01#110	-0.15
1504/01#081	-0.15	1504/01#111	-0.23
1504/01#082	0.09	1504/01#112	-0.12
1504/01#083	0.06	1504/01#113	-0.44
1504/01#084	0.17	1504/01#114	-0.18
1504/01#085	-0.12	1504/01#115	-0.14
1504/01#086	-0.50	1504/01#116	-0.04
1504/01#087	-0.11	1504/01#117	-0.37
1504/01#088	0.06	1504/01#118	-0.42
1504/01#089	0.12	1504/01#119	-0.29
1504/01#090	-0.58	1504/01#120	-0.01

ANNEX

1505-000-000-000
1505-000-000-000
1505-000-000-000
1505-000-000-000

I- GENERAL EQUIPMENT

DAS / PXI					
LEM Identification	Description	Manufacturer	Model	Calibration date	Calibration due
0082	Multimeter Card	NI	NI PXI 4071	01.2014	01.2016
0088	Multimeter Card	NI	NI PXI 4071	01.2014	01.2016
0089	Multimeter Card	NI	NI PXI 4071	01.2014	01.2016
0084	DAQ Card	NI	NI PXI 6229	/	/
0083	Relay Card	NI	NI 2570	/	/
0081	Power supply	Agilent	E3649A	03.2014	03.2015
0087	Current supply	TDK lambda	Gen10-1000	/	/
0086	Current Switch	LEM	/	/	/
0161	Reference Transducer	LEM	ITZ-2000S	10.2014	10.2015
-	Resistor 10kOhm	-	-	-	-

Climatic chamber					
LEM Identification	Description	Manufacturer	Model	Calibration date	Calibration due
0185	Climatic Chamber	Climats	EXCAL 4025-HE	22.04.2014	22.04.2016

II- IDENTIFICATION VS. DATE CODE:

Device identification	Transducer	Version	Date code	Jig number
1504/01#001	HO	6-P	815099	P00211.MD01
1504/01#002	HO	6-P	815099	P00211.MD01
1504/01#003	HO	6-P	815099	P00211.MD01
1504/01#004	HO	6-P	815099	P00211.MD01
1504/01#005	HO	6-P	815099	P00211.MD01
1504/01#006	HO	6-P	815099	P00211.MD01
1504/01#007	HO	6-P	815099	P00211.MD01
1504/01#008	HO	6-P	815099	P00211.MD01
1504/01#009	HO	6-P	815099	P00211.MD01
1504/01#010	HO	6-P	815099	P00211.MD01
1504/01#011	HO	6-P	815099	P00211.MD01
1504/01#012	HO	6-P	815099	P00211.MD01
1504/01#013	HO	6-P	815099	P00211.MD01
1504/01#014	HO	6-P	815099	P00211.MD01
1504/01#015	HO	6-P	815099	P00211.MD01
1504/01#016	HO	6-P	815099	P00211.MD01
1504/01#017	HO	6-P	815099	P00211.MD01
1504/01#018	HO	6-P	815099	P00211.MD01
1504/01#019	HO	6-P	815099	P00211.MD01
1504/01#020	HO	6-P	815099	P00211.MD01
1504/01#021	HO	6-P	815099	P00211.MD01
1504/01#022	HO	6-P	815099	P00211.MD01
1504/01#023	HO	6-P	815099	P00211.MD01
1504/01#024	HO	6-P	815099	P00211.MD01
1504/01#025	HO	6-P	815099	P00211.MD01
1504/01#026	HO	6-P	815099	P00211.MD01
1504/01#027	HO	6-P	815099	P00211.MD01
1504/01#028	HO	6-P	815099	P00211.MD01
1504/01#029	HO	6-P	815099	P00211.MD01
1504/01#030	HO	6-P	815099	P00211.MD01

III- IDENTIFICATION VS. DATE CODE:

Device identification	Transducer	Version	Date code	Jig number
1504/01#031	HO	6-P	815099	P00211.MD01
1504/01#032	HO	6-P	815099	P00211.MD01
1504/01#033	HO	6-P	815099	P00211.MD01
1504/01#034	HO	6-P	815099	P00211.MD01
1504/01#035	HO	6-P	815099	P00211.MD01
1504/01#036	HO	6-P	815099	P00211.MD01
1504/01#037	HO	6-P	815099	P00211.MD01
1504/01#038	HO	6-P	815099	P00211.MD01
1504/01#039	HO	6-P	815099	P00211.MD01
1504/01#040	HO	6-P	815099	P00211.MD01
1504/01#041	HO	6-P	815099	P00211.MD01
1504/01#042	HO	6-P	815099	P00211.MD01
1504/01#043	HO	6-P	815099	P00211.MD01
1504/01#044	HO	6-P	815099	P00211.MD01
1504/01#045	HO	6-P	815099	P00211.MD01
1504/01#046	HO	6-P	815099	P00211.MD01
1504/01#047	HO	6-P	815099	P00211.MD01
1504/01#048	HO	6-P	815099	P00211.MD01
1504/01#049	HO	6-P	815099	P00211.MD01
1504/01#050	HO	6-P	815099	P00211.MD01
1504/01#051	HO	6-P	815099	P00211.MD01
1504/01#052	HO	6-P	815099	P00211.MD01
1504/01#053	HO	6-P	815099	P00211.MD01
1504/01#054	HO	6-P	815099	P00211.MD01
1504/01#055	HO	6-P	815099	P00211.MD01
1504/01#056	HO	6-P	815099	P00211.MD01
1504/01#057	HO	6-P	815099	P00211.MD01
1504/01#058	HO	6-P	815099	P00211.MD01
1504/01#059	HO	6-P	815099	P00211.MD01
1504/01#060	HO	6-P	815099	P00211.MD01

Device identification	Transducer	Version	Date code	Jig number
1504/01#061	HO	8-NP-0000	815099	P00209.MD01
1504/01#062	HO	8-NP-0000	815099	P00209.MD01
1504/01#063	HO	8-NP-0000	815099	P00209.MD01
1504/01#064	HO	8-NP-0000	815099	P00209.MD01
1504/01#065	HO	8-NP-0000	815099	P00209.MD01
1504/01#066	HO	8-NP-0000	815099	P00209.MD01
1504/01#067	HO	8-NP-0000	815099	P00209.MD01
1504/01#068	HO	8-NP-0000	815099	P00209.MD01
1504/01#069	HO	8-NP-0000	815099	P00209.MD01
1504/01#070	HO	8-NP-0000	815099	P00209.MD01
1504/01#071	HO	8-NP-0000	815099	P00209.MD01
1504/01#072	HO	8-NP-0000	815099	P00209.MD01
1504/01#073	HO	8-NP-0000	815099	P00209.MD01
1504/01#074	HO	8-NP-0000	815099	P00209.MD01
1504/01#075	HO	8-NP-0000	815099	P00209.MD01
1504/01#076	HO	8-NP-0000	815099	P00209.MD01
1504/01#077	HO	8-NP-0000	815099	P00209.MD01
1504/01#078	HO	8-NP-0000	815099	P00209.MD01
1504/01#079	HO	8-NP-0000	815099	P00209.MD01
1504/01#080	HO	8-NP-0000	815099	P00209.MD01
1504/01#081	HO	8-NP-0000	815099	P00209.MD01
1504/01#082	HO	8-NP-0000	815099	P00209.MD01
1504/01#083	HO	8-NP-0000	815099	P00209.MD01
1504/01#084	HO	8-NP-0000	815099	P00209.MD01
1504/01#085	HO	8-NP-0000	815099	P00209.MD01
1504/01#086	HO	8-NP-0000	815099	P00209.MD01
1504/01#087	HO	8-NP-0000	815099	P00209.MD01
1504/01#088	HO	8-NP-0000	815099	P00209.MD01
1504/01#089	HO	8-NP-0000	815099	P00209.MD01
1504/01#090	HO	8-NP-0000	815099	P00209.MD01

Device identification	Transducer	Version	Date code	Jig number
1504/01#091	HO	8-NP-0000	815099	P00209.MD01
1504/01#092	HO	8-NP-0000	815099	P00209.MD01
1504/01#093	HO	8-NP-0000	815099	P00209.MD01
1504/01#094	HO	8-NP-0000	815099	P00209.MD01
1504/01#095	HO	8-NP-0000	815099	P00209.MD01
1504/01#096	HO	8-NP-0000	815099	P00209.MD01
1504/01#097	HO	8-NP-0000	815099	P00209.MD01
1504/01#098	HO	8-NP-0000	815099	P00209.MD01
1504/01#099	HO	8-NP-0000	815099	P00209.MD01
1504/01#100	HO	8-NP-0000	815099	P00209.MD01
1504/01#101	HO	8-NP-0000	815099	P00209.MD01
1504/01#102	HO	8-NP-0000	815099	P00209.MD01
1504/01#103	HO	8-NP-0000	815099	P00209.MD01
1504/01#104	HO	8-NP-0000	815099	P00209.MD01
1504/01#105	HO	8-NP-0000	815099	P00209.MD01
1504/01#106	HO	8-NP-0000	815099	P00209.MD01
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1504/01#108	HO	8-NP-0000	815099	P00209.MD01
1504/01#109	HO	8-NP-0000	815099	P00209.MD01
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1504/01#111	HO	8-NP-0000	815099	P00209.MD01
1504/01#112	HO	8-NP-0000	815099	P00209.MD01
1504/01#113	HO	8-NP-0000	815099	P00209.MD01
1504/01#114	HO	8-NP-0000	815099	P00209.MD01
1504/01#115	HO	8-NP-0000	815099	P00209.MD01
1504/01#116	HO	8-NP-0000	815099	P00209.MD01
1504/01#117	HO	8-NP-0000	815099	P00209.MD01
1504/01#118	HO	8-NP-0000	815099	P00209.MD01
1504/01#119	HO	8-NP-0000	815099	P00209.MD01
1504/01#120	HO	8-NP-0000	815099	P00209.MD01

END OF REPORT

According to ISO/IEC 17025

Date :

Number Laboratory concerned: 1504/01

Please fill out and send back this form to LEM Switzerland SA Laboratory after you received test report.
It will be useful to improve our work relationship.

- 0 = GOOD
- 1 = ACCEPTABLE
- 2 = TO BE IMPROVED

ITEM	MARKS			NOTES
	0	1	2	
DELIVERY TIME				
TEST REPORT PRESENTATION				
RESULTS ACCURACY				

General remarks:

LEM Intellectual Property S.A.
Avenue Beauregard 1
CH-1700 Fribourg Switzerland

mailto: dgo@lem.com