

Low Voltage (LV) SECTOR

Product description:	Linear tubular brushless motors
Tested Models:	brand name ML400300x4
Manufacturer:	Gimatic S.p.A. Via Enzo Ferrari, 2/4 - 25030 Roncadelle (BS) - Italy Tel. +39.030.2584655 Fax +39.030.2583886 url: http://www.gimatic.com

Test specification:	EN 60204-1:2006-06 +A1:2009-02
Application:	Full application
Result:	Pass <input checked="" type="checkbox"/> Fail <input type="checkbox"/>
Remarks:	None

Customer:	Gimatic S.p.A. Via Enzo Ferrari, 2/4 - 25030 Roncadelle (BS) - Italy Tel. +39.030.2584655 Fax +39.030.2583886 url: http://www.gimatic.com
Purchase Order:	ODA-U03626 dated: 2016-08-31
Order Confirmation:	CO 2016-0297-00 dated: 2016-08-31

Samples receiving date:	2016-10-12
Tests date:	from: 2016-10-20 to: 2016-12-16

Test Laboratory INTEK S.p.A. - Test and Measurement Division Via Mazzini, 75 - 25086 Rezzato (BS) - Italy Tel. +39.030.2591 857 Fax +39.030.2594 351 url: http://www.intek.it e-mail: info@intek.it	Test site INTEK S.p.A. - Test and Measurement Division Via Breve - 25086 Rezzato (BS) - Italy
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Written by

Claudio Bariselli
Test Engineer



Verified and approved by

Ivo Meroni
Test and Measurement Division Manager



00	2016-12-19	Formal issue
Rev.	Date	Description

Results of tests and controls reported in this document refer only to samples as tested and described.

It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

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1. SAMPLING

1.1 SAMPLES ORIGIN

The samples under test were supplied by the Manufacturer.

The information relating to the initial sampling are not known.

Received samples:	2
Tested samples:	2
Selection method of the laboratory:	<input type="checkbox"/> Random taking <input checked="" type="checkbox"/> N/A

1.2 ADDITIONAL INFORMATION

Manufacturing plant address:	Gimatic S.p.A. Via Enzo Ferrari, 2/4 - 25030 Roncadelle (BS) - Italy	
Type of unit:	<input type="checkbox"/> Prototype / Pre-series	<input checked="" type="checkbox"/> Series
Serial number:	Not present	
HW revision:	Not declared	
SW/FW revision:	Not declared	

2. TEST INFORMATION

Unless otherwise specified, during the tests the sample/s was/were been configured following the methods and procedure specified in the reference standard.

2.1 CONDITIONS DURING TESTING

2.1.1 PERSONNEL PRESENT TO THE TESTS

Test performed by: **Claudio Bariselli (Intek S.p.A.)**

Other people present: /

2.1.2 TESTS SEQUENCE

If reference standard prescribe a specific test sequence, the tests are performed according the sequence required, otherwise the tests are reported into this document in the order "as performed".

Selection of test per sample

Sample N	Test	Result	Notes
1	All tests except for the IP degree of protection	Compliant	/
2	IP6X – IPX7	Compliant	/

4.1.2 MODIFICATIONS TO SAMPLES

Test sample/s was/were not modified during the tests.

2.1.3 ENVIRONMENTAL CONDITIONS

The laboratory environmental conditions are recorded during the tests and for each test, the ranges that the laboratory ensures are listed in the relative paragraph. These ranges are in conformity to the limits prescribed by the reference standards.

2.1.4 ABBREVIATIONS

Test Report = TR

Equipment Under Test = EUT

Not Declared = N/D

NCR = No Calibration Required

N/Av = Not Available

N/D = Not Declared

N/R = Not Required (by the applicant, customer or manufacturer)

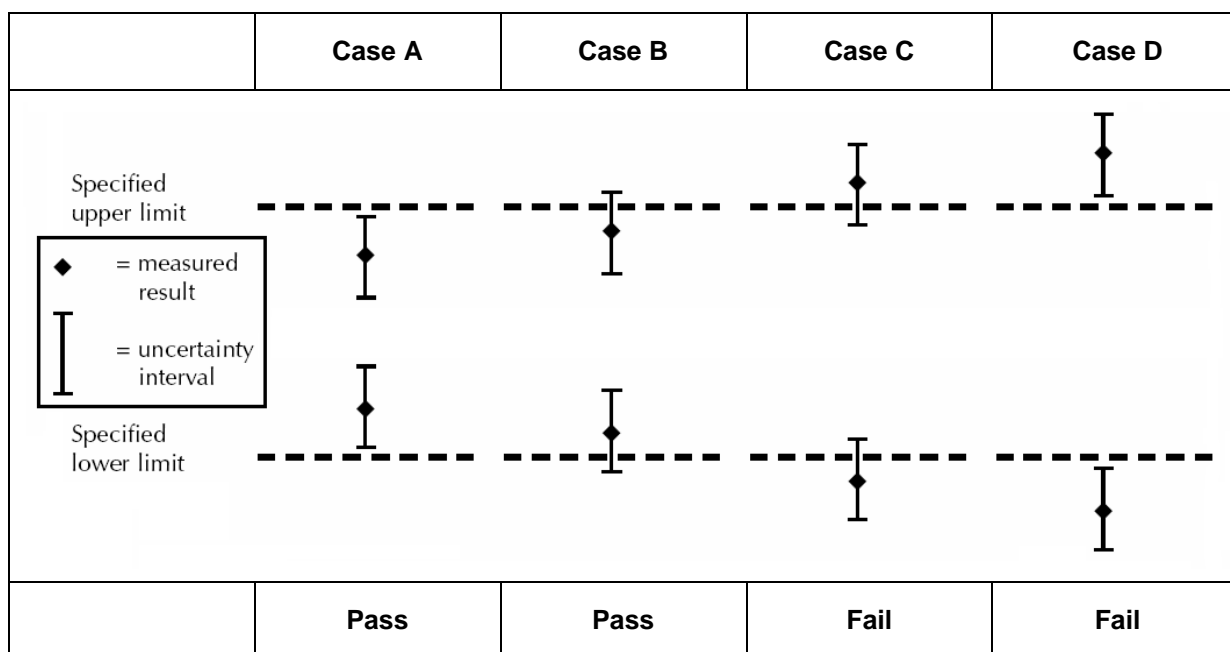
No. = Number

x ... y = from x to y

2.2 CRITERIA ADOPTED FOR COMPLIANCE EVALUATION

If applicable for compliance evaluation of test results, the Laboratory adopts the following criteria:

- Reference standard specifies uncertainty for measurements:
 - measurements uncertainty permitted;
 - instruments accuracy;
 - application of measurements uncertainty to the measured values;
 in this case the measurement complies with the requirement if the measured value is within the limits, or with the correction due to the Laboratory uncertainty.
- Reference standard doesn't specify uncertainty for measurements:
Calculate uncertainty for measurement and compare the measured result with uncertainty band to defined acceptable limit. The measurement complies with the requirement if the probability it being within the limit is at least 50%:



3. TEST INSTRUMENTATION

Description	Manufacturer	Model	Intek ID	Last Calibration	Calibration Due
Barometer	Fischer	/	0224 P	2015-01	2019-01
Thermo/hygrometer	DeltaOhm	HD35EDL1NTVI	1049 P	2016-04	2017-04
Thermo/hygrometer	DeltaOhm	HD35EDL1NTVI	1045 P	2016-04	2017-04
Thermo/hygrometer	DeltaOhm	HD35EDL1NTVI	1048 P	2016-04	2017-04
Datalogger	Hewlett Packard	34970A	0420 P	2016-04	2017-04
Multiplexer 20 ch	Hewlett Packard	34901A	0549 N	NCR	NCR
Digital multimeter	Fluke	79III	0621 P	2016-05	2017-05
Bench multimeter	Fluke	45	0116 P	2016-05	2017-05
Dielectric strength tester	ETL Pruftechnik	UX36TPT5AC-200	0899 P	2016-01	2017-01
Insulation resistance tester	Iteco	GIGALAB 9265.043	0596 P	2016-02	2017-02
Dust Chamber	ATS di Galbusera	03.01	0049 F	NCR	NCR
Test sieve for dust chamber	Endecotts	75 Mic.	0835 P	2016-05	2016-12
Manometer	F.lli Magni	-40 mbar	0956 P	2016-09	2017-09
Digital chronometer	RS	278698	0853 P	2016-03	2017-03
Immersion Tank for IPX7	Intek	/	0087 N	NCR	NCR
Tape meter	Fisher Darex	Protect Magnet 5m	0740 I	NCR	NCR

3.1 INSTRUMENTATION ACCURACY

If reference standard doesn't specify otherwise, accuracy of used instrumentation for the tests is in accordance to the limits indicated in the IEC document - CTL Decision Sheet DSH251B 2009 Developed by WG4-WG1 "Measurements accuracy".

4. EUT DOCUMENTATION

List of the documentation supplied to the laboratory:

Description	Code	Date - revision
User manual	Not available	Version 1.8
Cable data-sheet	Not available	/

A copy of this documentation is archived in Intek S.p.A.

5. ANNEXES LIST

Annex N.	Description
01	TRF for EN/IEC 60204-1
02	Photographs and temperatures recorded.

End of test report.

TEST REPORT
EN 60204-1
Safety of machinery - Electrical equipment of machines - Part 1: General requirements

Report Reference No. : **RP 2016-0420-00**

Date of issue : 2016-12-19

Testing Laboratory : **INTEK S.p.A. - Test and Measurement Division**

Address : Via Mazzini, 75 - 25086 - REZZATO (BS) - Italy

Testing location : **INTEK S.p.A. - Test and Measurement Division**

Testing location / address : Via Breve - 25086 - REZZATO (BS) - Italy

Applicant's name : **Gimatic S.p.A.**

Address : Via Enzo Ferrari, 2/4 - 25030 Roncadelle (BS) - Italy

Test specification:

Standard : EN 60204-1:2009 +A1:2009

Non-standard test method : N/A

Test Report Form No. : EN60204-1_2006+A1

Test item description : Cylindrical Linear Motor

Trade Mark :



Manufacturer : Gimatic S.p.A.

Model and/or Type reference : ML400300x4

Rating(s) : 325 Vdc – 8,8 A – 1000 W

EN 60204-1:2006 + A1			
Clause	Requirement	Remarks - Results	Verdict
1	<u>Scope</u>	/	---
2	<u>Normative references</u>	/	---
3	<u>Definitions</u>	/	---
4	<u>General requirements</u>	/	
4.1	General considerations (EN 1050; hazards, safeguarding (EN 292-2 cl. 4), inquiry form etc.)	/	P
4.2	Selection of equipment	/	P
4.2.1	General (compliance with EN or IEC standards)	The sample is compliant with all the requirements	P
4.2.2	Electrical equipment in compliance with the EN 60439 series	The sample is compliant with all the requirements	P
4.3	Electrical supply (+/-10%, +/-1Hz, harmonics, unbalance, impulses, interruption, dips etc.)	The sample is compliant with all the requirements	P
4.4	Physical environment and operating conditions	/	P
4.4.1	General (see annex B)	/	P
4.4.2	Electromagnetic Compatibility (see EMC directive)	See Intek Test Report RP 2016-0167	P
4.4.3	Ambient Air Temperature (5-40°C) (see annex B)	5 - 40 °C	P
4.4.4	Humidity (30-95%)	50 %	P
4.4.5	Altitude (1000m)	/	P
4.4.6	Contaminants (see 11.3 and annex B for details)	IP67	P
4.4.7	Ionizing and non-ionizing Radiation (see annex B)	/	N/A
4.4.8	Vibration, Shock and Bump (see annex B)	/	P
4.5	Transportation and storage (-25-55°C/70°C)	/	N/A

EN 60204-1:2006 + A1			
Clause	Requirement	Remarks - Results	Verdict
4.6	Provision for handling (see 13.4.6)	/	N/A
4.7	Installation (EN's for ergonomic design)	/	P
5	<u>Incoming Supply Conductor Terminations and Devices for Disconnecting and Switching off</u>	/	P
5.1	Incoming supply conductor terminations (EN 60445, 5.2, 5.3.1 and 5.3.2d)	No conductor terminations	N/A
5.2	Terminal for connection to the external protective earthing system (table 1, 8.2.2 and EN 60445)	/	P
5.3	Supply disconnecting (isolating) device	/	P
5.3.1	General (for each supply)	/	P
5.3.2	Type - switch-disconnector (EN 60947-3 AC- 23B or DC-23B) - disconnector with auxiliary contact (EN 60947-3) - circuit-breaker (EN 60947-2) - other switching device (EN 60947-1 for isolation, relevant product standards) - plug/socket combination	On demand, the products are provided with plug/socket combination	P
5.3.3	Requirements (IEC 60417-5007, IEC 60417-5008, red handle for E-stop, padlock, stalled motor, etc.)	/	N/A
5.3.4	Operating handle (0.6-1.7/1.9m)	Sample is only a part of the electrical equipment	N/A
5.3.5	Excepted circuits (lighting, undervoltage, UPS, etc.)	Sample is only a part of the electrical equipment	N/A
5.4	Devices for switching off for prevention of unexpected start-up (disconnect of 5.3.2, 3.17 and 5.6)	System is only a part of the electrical equipment	N/A
5.5	Devices for disconnecting electrical equipment (see 5.3, 5.3.2 and 5.6)	if requested the Samples were provided with plug/socket combination	P
5.6	Protection against unauthorized, inadvertent and/or mistaken connection (see 5.4, 5.5 and 5.3.2 d)	The plug/socket combination is directly mounted on the device.	P
6	<u>Protection against electric Shock</u>	/	P

EN 60204-1:2006 + A1			
Clause	Requirement	Remarks - Results	Verdict
6.1	General		P
6.2	Protection against direct contact		P
6.2.1	General (see 6.2, IEC 60364-4 and EN 60529 IP4X/XXB)	Protection degree IP67	P
6.2.2	Protection by enclosures (general > IP4X; a) opened by tool and without disconnect > IP2X inside; b) disconnect with interlock > IP2X inside; c) without tool and without disconnect > IP2X and interlock for barrier)	General IP67 c) IP3X	P
6.2.3	Protection by insulation of live parts (completely covered)	Completely covered by resin	P
6.2.4	Protection against residual voltage (60V/5sec or 60μC/1sec or IP2X)	No residual voltage	N/A
6.2.5	Protection by barriers (see 412.2 of IEC 60364-4-41)	No barriers	N/A
6.2.6	Protection by placing out of reach or protection by obstacles (see 412.4 and 412.3 of IEC 60364-4-41)	/	N/A
6.3	Protection against indirect contact	/	P
6.3.1	General (see 3.27, 6.3.2 to 6.3.3)	/	P
6.3.2	Prevention of the occurrence of a touch voltage	/	P
6.3.2.1	General	/	N/A
6.3.2.2	Protection by use of class II equipment or by equivalent insulation	/	P
6.3.2.3	Protection by electrical separation	/	N/A
6.3.3	Protection by automatic disconnection of supply	Sample is intended to be supplied by an electronic driver in an electrical equipment compliant to EN 60204-1	P
6.4	Protection by the use of PELV	/	N/A
6.4.1	General requirements (25/60V and 6/15 etc.)	/	N/A
6.4.2	Sources for PELV	/	N/A
7	<u>Protection of Equipment</u>	/	N/A

EN 60204-1:2006 + A1			
Clause	Requirement	Remarks - Results	Verdict
7.1	General	Sample is only a part of the electrical equipment	N/A
7.2	Overcurrent protection	/	N/A
7.2.1	General	/	N/A
7.2.2	Supply conductor (data for installation protection device)	/	N/A
7.2.3	Power circuits (7.2.10, neutral conductor, etc.)	/	N/A
7.2.4	Control circuits (connection to safety ground)	/	N/A
7.2.5	Socket outlets and their associated conductors (for each socket outlet)	/	N/A
7.2.6	Lighting circuits (unearthed conductor)	/	N/A
7.2.7	Transformers (see 7.2.10)	/	N/A
7.2.8	Location of overcurrent protective devices (conductor, reduction for less 3m and own duct)	/	N/A
7.2.9	Overcurrent protective devices (must readily available in country of use)	/	N/A
7.2.10	Rating and setting of overcurrent protective devices (as low as possible)	/	N/A
7.3	Protection of motors against overheating	/	N/A
7.3.1	General (more than 0.5kW, restart not possible)	/	N/A
7.3.2	Overload protection	/	N/A
7.3.3	Over-temperature protection (IEC 60034-11)	/	N/A
7.3.4	Current limiting protection	/	N/A
7.4	Abnormal temperature protection (heater protection)	/	N/A
7.5	Protection against supply interruption or voltage reduction and subsequent restoration (undervoltage device, restart not possible)	/	N/A
7.6	Motor overspeed protection (see 9.3.2)	/	N/A

EN 60204-1:2006 + A1			
Clause	Requirement	Remarks - Results	Verdict
7.7	Earth fault/residual current protection (see 6.3)	/	N/A
7.8	Phase sequence protection	/	N/A
7.9	Protection against overvoltage due to lightning and to switching surge	/	N/A
8	<u>Equipotential Bonding</u>	/	P
8.1	General	/	P
8.2	Protective conductors	/	P
8.2.1	General (figure 2, all stress, etc.)	Sample is connectable to the protective bonding circuit	P
8.2.2	Protective conductors (13.2.2, size in accordance with Table 1)	Protective conductors compliant with § 13.2.2 and with Table 1	P
8.2.3	Continuity of the protective bonding circuit (doors, hinges etc. need conductor, except for PELV etc.)	Sample is only a part of the electrical equipment	N/A
8.2.4	Exclusion of switching devices from the protective bonding circuit	Sample is only a part of the electrical equipment	N/A
8.2.5	Parts that need not be connected to the protective bonding circuit (insulation failure unlikely, 50x50mm ²)	Sample is connectable to the protective bonding circuit	N/A
8.2.6	Protective conductor connecting points (IEC 60417- 5019 or green-and-yellow, PE only for supply terminal)	Sample is only a part of the electrical equipment	N/A
8.2.7	Mobile machines	Sample is only a part of the electrical equipment	N/A
8.2.8	Additional protective bonding requirements for electrical equipment having earth leakage current higher than 10mA a.c. or d.c.	/	N/A
8.3	Functional bonding (insulation failure and EMI, see 4.4.2 and 9.4.3.1)	/	P
8.4	Measures to limit the effects of high leakage current	Sample is only a part of the electrical equipment	N/A
9	<u>Control Circuits and Control Functions</u>	/	N/A
9.1	Control circuits	Sample is only a part of the electrical equipment	N/A
9.1.1	Control circuit supply (transformer, except for less than two controls etc.)	/	N/A
9.1.2	Control circuit voltages	/	N/A

EN 60204-1:2006 + A1			
Clause	Requirement	Remarks - Results	Verdict
	(< = 277V)		
9.1.3	Protection (7.2.4 and 7.2.10)	/	N/A
9.2	Control functions	/	N/A
9.2.1	Start functions (9.2.5.2)	/	N/A
9.2.2	Stop functions (category 0, 1, and 2 etc.)	/	N/A
9.2.3	Operating modes (separate action for mode selector functions etc.)	/	N/A
9.2.4	Suspension of safeguards (hold-to-run, speed limiting, range of motion)	/	N/A
9.2.5	Operation	/	N/A
9.2.5.1	General (interlock see 9.3)	/	N/A
9.2.5.2	Start (safeguard in place, interlocks with sequential starting ...)	/	N/A
9.2.5.3	Stop (category depends on risk assessment based on EN 1050 ...)	/	N/A
9.2.5.4	Emergency operations (emergency stop, emergency switching off)	/	N/A
9.2.5.4.1	General	/	N/A
9.2.5.4.2	Emergency stop (see ISO 13850, category 0/1 stop, see 9.2.5.3, 9.2.2)	/	N/A
9.2.5.4.3	Emergency switching off (see IEC 60364-4-53, 536.4)	/	N/A
9.2.5.5	Monitoring of command actions (for hazardous movement)	/	N/A
9.2.6	Other control functions	/	N/A
9.2.6.1	Hold-to-run controls (continuous actuation)	/	N/A
9.2.6.2	Two-hand control (type I, II, and III...)	/	N/A
9.2.6.3	Enabling device	/	N/A

EN 60204-1:2006 + A1			
Clause	Requirement	Remarks - Results	Verdict
	(see also 10.9)		
9.2.6.4	Combined start and stop controls (for secondary function only)	/	N/A
9.2.7	Cableless control	/	N/A
9.2.7.1	General	/	N/A
9.2.7.2	Control limitation	/	N/A
9.2.7.3	Stop (see annex B)	/	N/A
9.2.7.4	Use of more than one operator control station	/	N/A
9.2.7.5	Battery-powered operator control stations	/	N/A
9.3	Protective interlocks	/	N/A
9.3.1	Reclosing or resetting of interlocked safeguards (no automatic start...)	/	N/A
9.3.2	Exceeding operating limits	/	N/A
9.3.3	Operation of auxiliary functions (sensors...)	/	N/A
9.3.4	Interlocks between different operations and for contrary motions (interlock against contrary motion)	/	N/A
9.3.5	Reverse current braking (time function is not possible...)	/	N/A
9.4	Control functions in case of failure	/	N/A
9.4.1	General requirements (protective device, proven techniques, redundancy, functional tests; refer to EN ISO 13849-1, EN ISO 13849-2 or EN IEC 62061)	/	N/A
9.4.2	Measures to minimize risk in the event of failure	/	N/A
9.4.2.1	Use of proven circuit techniques and components (one terminal, de-energizing for stop, positive open operation, design...)	/	N/A
9.4.2.2	Provisions of partial or complete redundancy (on-line, off-line...)	/	N/A
9.4.2.3	Provision of diversity (combination of open and closed contacts, different components, electrical and non-electrical systems...)	/	N/A
9.4.2.4	Provision for functional tests (automatic or manually (17.2 and 18.6)...))	/	N/A

EN 60204-1:2006 + A1			
Clause	Requirement	Remarks - Results	Verdict
9.4.3	Protection against maloperation due to earth faults, voltage interruptions and loss of circuit continuity	/	N/A
9.4.3.1	Earth faults (method a, b, c)	/	N/A
9.4.3.2	Voltage interruptions (7.5...)	/	N/A
9.4.3.3	Loss of circuit continuity	/	N/A
10	<u>Operator Interface and Machine mounted Control Devices</u>	/	P
10.1	General	/	P
10.1.1	General device requirements (IEC 61310 and IEC 60447)	Sample is only a part of the electrical equipment	N/A
10.1.2	Location and mounting ($\geq 0.6\text{m}$...)	Sample is only a part of the electrical equipment	N/A
10.1.3	Protection (IPXXD, EN 60529...)	IP67	P
10.1.4	Position sensors (no damage...)	Sensor can't be damage in event of overtravel	P
10.1.5	Portable and pendant control stations	/	N/A
10.2	Push-buttons	Sample is only a part of the electrical equipment	N/A
10.2.1	Colors (table 2, red and yellow!...)	/	N/A
10.2.2	Markings (IEC 60417, EN 50099...)	/	N/A
10.3	Indicator lights and displays	Sample is only a part of the electrical equipment	N/A
10.3.1	Modes of use (red, yellow, green!...)	/	N/A
10.3.2	Colors (EN 50099...)	/	N/A
10.3.3	Flashing lights and displays (immediate action...)	/	N/A
10.4	Illuminated push-buttons (table 2 and 4...)	Sample is only a part of the electrical equipment	N/A
10.5	Rotary control devices (rotation...)	Sample is only a part of the electrical equipment	N/A

EN 60204-1:2006 + A1			
Clause	Requirement	Remarks - Results	Verdict
10.6	Start devices (inadvertent operation...)	Sample is only a part of the electrical equipment	N/A
10.7	Emergency stop devices	Sample is only a part of the electrical equipment	N/A
10.7.1	Location of emergency stop devices (see 9.2.7.3)	/	N/A
10.7.2	Types of emergency stop device (push-button, pull-cord, and pedal-operated)	/	N/A
10.7.3	Colour of actuators (red and yellow)	/	N/A
10.7.4	Local operation of the supply disconnecting device to effect emergency stop (disconnecting device based on 5.3.2 a), b) or c); color see 10.7.3)	/	N/A
10.8	Emergency switching off devices	Sample is only a part of the electrical equipment	N/A
10.8.1	Location of emergency switching off devices	/	N/A
10.8.2	Types of emergency switching off device (push-button operated, pull-cord operated, see EN 60947-5-1)	/	N/A
10.8.3	Colour of actuators (Red and Yellow background)	/	N/A
10.8.4	Local operation of the supply disconnecting device to effect emergency switching off (see 10.8.3)	/	N/A
10.9	Enabling control device (position 1/2/3)	Sample is only a part of the electrical equipment	N/A
11	<u>Controlgear: location, mounting and enclosures</u>	/	P
11.1	General requirements	Sample is only a part of the electrical equipment	N/A
11.2	Location and mounting	Sample is only a part of the electrical equipment	N/A
11.2.1	Accessibility and maintenance (0.4-2.0m, see 13.4.5)	/	N/A
11.2.2	Physical separation or grouping (power circuits, associated control circuits, other)	/	N/A

EN 60204-1:2006 + A1			
Clause	Requirement	Remarks - Results	Verdict
11.2.3	Heating effects (limits...)	/	N/A
11.3	Degrees of protection (at least IP22 for enclosures of controlgear, see EN 60529...)	Protection degree IP67	P
11.4	Enclosures, doors and openings (doors ≤ 0.9m, no openings between liquids and electrical devices, fasteners of captive type...)	Sample is only a part of the electrical equipment	N/A
11.5	Access to controlgear (see 481.2.4 of IEC 60364-4-81, 0.7m x 2.0m...)	Sample is only a part of the electrical equipment	N/A
12	<u>Conductors and Cables</u>	/	N/A
12.1	General requirements (EN 60439-1...)	/	N/A
12.2	Conductors (table 5)	/	N/A
12.3	Insulation (PVC, 2000V test voltage, 500V for PELV, see IEC 60364-4-41, class III equipment...)	/	N/A
12.4	Current-carrying capacity in normal service (table 5, table 6, and D2...)	/	N/A
12.5	Conductor and cable voltage drop (≤ 5%...)	/	N/A
12.6	Flexible cables	/	N/A
12.6.1	General (table D.4...)	/	N/A
12.6.2	Mechanical rating (15 N/mm ² ...)	/	N/A
12.6.3	Flexible cables (table 7, see clause 44 of IEC 60621-3)	/	N/A
12.7	Conductor wires, conductor bars and slip-ring assemblies	/	N/A
12.7.1	Protection against direct contact (see 412.2.2 of IEC 60364-4-41)	/	N/A
12.7.2	Protective conductor circuit	/	N/A

EN 60204-1:2006 + A1			
Clause	Requirement	Remarks - Results	Verdict
12.7.3	Protective conductor current collectors	/	N/A
12.7.4	Removable current collectors with a disconnect function (see 8.2.4)	/	N/A
12.7.5	Clearances in air	/	N/A
12.7.6	Creepage distances	/	N/A
12.7.7	Conductor system sectioning	/	N/A
12.7.8	Construction and installation of collector wire , collector bar systems and slip-ring assemblies	/	N/A
13	Wiring Practices	/	P
13.1	Connections and routing	/	P
13.1.1	General requirements (loosening, one terminal, correspond with schematics, no solder, EN 60947-7-1, no cross overs...)	/	P
13.1.2	Conductor and cable runs (from terminal to terminal, no strain to termination, ...)	Sample is only a part of the electrical equipment	N/A
13.1.3	Conductors of different circuits (insulation for highest voltage, separation of live conductors before disconnect or marked with different color...)	Sample is only a part of the electrical equipment	N/A
13.1.4	Connection between pick-up converter of an inductive power supply system (as short as possible...)	Sample is only a part of the electrical equipment	N/A
13.2	Identification of conductors	/	P
13.2.1	General requirements	Identified by colors	P
13.2.2	Identification of the protective conductor (60417-IEC-5019 symbol or green-and-yellow...)	Identified by colors	P
13.2.3	Identification of the neutral conductor (light blue (3.2.2 of IEC 60446)...))	No neutral conductor	N/A
13.2.4	Identification of other conductors (black > power, red > control, orange > interlock...)	Identified by colors	P
13.3	Wiring inside enclosures (IEC 60332, 11.2.1, 8.2.3...)	Inside the Sample the wiring was resined	P

EN 60204-1:2006 + A1			
Clause	Requirement	Remarks - Results	Verdict
13.4	Wiring outside enclosures	/	P
13.4.1	General requirements (individual glands, bushings, ...)	Sample is only a part of the electrical equipment	N/A
13.4.2	External ducts (13.5, ...)	Sample is only a part of the electrical equipment	N/A
13.4.3	Connection to moving elements of the machine (12.2, 12.6, flexible conduit, 25mm, no metallic conduits, ...)	Sample is only a part of the electrical equipment	N/A
13.4.4	Interconnection of devices on the machine (no in series connection of devices...)	Sample is only a part of the electrical equipment	N/A
13.4.5	Plug/socket combinations (safety ground first, > 16A must be locked, identification, see 6.2.4 and IEC 60309-1...)	The Sample is provide without Plug and socket. But on demand is supplied as follows: a) IP6X; c) not intended to be connected or disconnected during load conditions; d) < 16 A; f) IP2XB;	P
13.4.6	Dismantling for shipment (protected, ...)	Sample is only a part of the electrical equipment	N/A
13.4.7	Additional conductors (spare conductors)	Sample is only a part of the electrical equipment	N/A
13.5	Ducts, connection boxes and other boxes	Sample is only a part of the electrical equipment	N/A
13.5.1	General requirements (no edges, separation from liquids...)	/	N/A
13.5.2	Percentage fill of duct	/	N/A
13.5.3	Rigid metal conduit and fittings (corrosion...)	/	N/A
13.5.4	Flexible metal conduit and fittings	/	N/A
13.5.5	Flexible non-metallic conduit and fittings	/	N/A
13.5.6	Cable trunking systems	/	N/A
13.5.7	Machine compartments and cable trunking systems	/	N/A
13.5.8	Connection boxes and other boxes (see 11.3)	/	N/A

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Clause	Requirement	Remarks - Results	Verdict
13.5.9	Motor connection boxes	/	N/A
14	<u>Electric Motors and associated Equipment</u>		N/A
14.1	General requirements (EN 60034-1, 7.3, 7.6, 7.2, 5.3, 5.4, 5.5, 7.5, 7.6, 9.4, 11...)	Sample isn't a rotating electrical machine, but a linear motor.	N/A
14.2	Motor enclosure (EN 60034-5, IP23...)	/	N/A
14.3	Motor dimensions (IEC 60072-1, IEC 60072-2...)	/	N/A
14.4	Motor mounting and compartments (EN 60034-1, guarding...)	/	N/A
14.5	Criteria for motor selection (EN 60034-1, IEC 60146, ...)	/	N/A
14.6	Protective devices for mechanical brakes	/	N/A
15	<u>Accessories and Lighting</u>		N/A
15.1	Accessories (socket-outlets based on EN 60309-1, see 6.4, 7.2, 7.3, 5.3.5...)	Sample is only a part of the electrical equipment	N/A
15.2	Local lighting of the machine and equipment	Sample is only a part of the electrical equipment	N/A
15.2.1	General (see 8.2.2, 4.4.2...)	/	N/A
15.2.2	Supply (≤ 50V, 250V, one source like transformer, separate overcurrent protection, factory lighting, 7.2.6...)	/	N/A
15.2.3	Protection (7.2.6...)	/	N/A
15.2.4	Fittings (lampholders based on IEC, ...)	/	N/A
16	<u>Marking, warning signs and reference designations</u>		P
16.1	General	/	P
16.2	Warning signs (IEC 60417-5036, no disconnect, ...)	Sample is only a part of the electrical equipment	N/A
16.3	Functional identification (IEC 60417, ISO 7000...)	Sample is only a part of the electrical equipment	N/A

EN 60204-1:2006 + A1			
Clause	Requirement	Remarks - Results	Verdict
16.4	Marking of equipment (name, mark, ratings, IEC 62023...)	Marking is impressed on the sample by lasering. see Annex 02 for drawing of marking.	P
16.5	Reference designation	Sample is only a part of the electrical equipment	N/A
17	<u>Technical Documentation</u>		
17.1	General (see annex B)	Technical documentation in accordance with this section	P
17.2	Information to be provided (description, supply requirements, environment, block diagram, schematics, sequence of operation, inspection, functional tests, maintenance, part lists...)	Technical documentation in accordance with this section	P
17.3	Requirements applicable to all documentation (IEC 61082, IEC 61346 IEC 62079, IEC 62027, cross-reference, ...)	Sample is only a part of the electrical equipment	N/A
17.4	Installation documents (supplies, drawing, location, Annex B, interconnection drawing...)	Sample is only a part of the electrical equipment	N/A
17.5	Overview diagrams and function diagrams (IEC 61082series ...)	Sample is only a part of the electrical equipment	N/A
17.6	Circuit diagram (IEC 60617, cross-reference...)	Sample is only a part of the electrical equipment	N/A
17.7	Operating manual (see also product specific standard, 1.7.4 in Annex I of Machinery Directive...)	/	P
17.8	Maintenance manual	Sample is only a part of the electrical equipment	N/A
17.9	Parts list	Sample is only a part of the electrical equipment	N/A
18	<u>Verification</u>		P
18.1	General	/	P
18.2	Verification of conditions for protection by automatic disconnection of supply	Sample is only a part of the electrical equipment	N/A
18.2.1	General	Sample is only a part of the electrical equipment	N/A
18.2.2	Test methods in TN-systems	Sample is only a part of the electrical equipment	N/A
18.2.3	Application of the test methods for TN-systems	Sample is only a part of the electrical equipment	N/A

EN 60204-1:2006 + A1			
Clause	Requirement	Remarks - Results	Verdict
18.3	Insulation resistance tests (500Vdc, > 1 MΩ...)	500 Vdc, > 100 GΩ	P
18.4	Voltage tests (1000Vac, 1 sec, 500VA...)	1000 Vac, 1 sec	P
18.5	Protection against residual voltages (6.2.4...)	No residual voltage after turning off the Sample	N/A
18.6	Functional tests (all safety related functions and components...)	Sample is only a part of the electrical equipment	N/A
18.7	Retesting (after modifications...)	Sample is only a part of the electrical equipment	N/A
Annex B	Inquiry Form (Annex B of EN 60204-1) (for information between supplier and user only) <ul style="list-style-type: none"> - Name of manufacturer: - Name of end user, if applicable: - Order number, if applicable: - Type/Model of machine: - Serial number: 	<ul style="list-style-type: none"> - Gimatic S.p.A. - Not applicable - User guide Version 1.8 - Linear motor for automation - Not applicable (sample is only a part of the electrical equipment) 	P

4.2.1	TABLE: List of critical components					P
Object/Part No.	Manufacturer / trademark	Type / model	Technical data	Standard (Edition / year)	Mark(s) of conformity ¹⁾	
Linear Motor	Gimatic S.p.A.	ML400300x4	/	EN 60204-1 / 2006	/	
/	/	/	/	/	/	
¹⁾ An asterisk indicates a mark which assures the agreed level of surveillance.						
Supplementary information: Sample is only a part of the electrical equipment						

9	TABLE: List of components for safety relevant control functions					N/A
Object/Part No.	Manufacturer / trademark	Type / model	Technical data	Standard (Edition / year)	Mark(s) of conformity ¹⁾	
/	/	/	/	/	/	
/	/	/	/	/	/	
¹⁾ An asterisk indicates a mark which assures the agreed level of surveillance.						
Supplementary information: Sample is only a part of the electrical equipment						

	TABLE: Electrical data				P
U [V]	I [A]	I _{rated} [A]	P [W]	Condition / status	
325 Vdc	8,8 A	8,8 A	1000 W	/	
/	/	/	/	/	
Supplementary information:					

	TABLE: Thermal requirements						N/A
	Supply voltage [V]						/
	Ambient T [°C]						/
Maximum measured temperature T of part / at:	T [°C]						Allowed T _{max} [°C]
Supplementary information:							

IEC/EN 60204-1 Clause 18.2.2 Test 1		Verification of the continuity of the protective bonding circuit				
Applicability of test		The test is carried out on equipment that employs protective earthing (grounding), i.e. Class 1 equipment. EXCEPTION: The test need not be made where accessible metal surfaces are not likely to become energized in a single fault condition.				
Test equipment		A current source capable of at least 0.2 A and approximately 10 A derived from a SELV having maximum no-load voltage of 24 V a.c or d.c.				
Test method		Measure the resistance of each protective bonding circuit between the PE terminal and relevant points that are part of each protective bonding circuit (i.e. relevant accessible conductive parts on the equipment) with a current between at least 0.2 A and approximately 10 A derived from a SELV having maximum no-load voltage of 24 V a.c or d.c. (to ensure safety during the test).				
Acceptable results		The resistance measured shall be in the expected range according to the length, the cross sectional area and the material of the related protective bonding conductor.				
Test locations and result of tests	Point	Test location (part of protective bonding circuit/accessible conductive part)	Test current [A]	Measurement [Ω]	Min C.S.A. of branch PE conductor [mm²]	Verdict ✓
	1	/	/	/	/	
	2	/	/	/	/	
	3	/	/	/	/	
Comments		/				
Details of test/measurement equipment used						
Type of equipment		Make	Model number	Serial number	Date of last calibration	
/		/	/	/	/	

IEC/EN 60204-1 Clause 18.2.2 Test 2		Fault loop impedance verification and suitability of the associated overcurrent protection device						
Applicability of test	The test is carried out on equipment with protection against indirect contact by automatic disconnection of an overcurrent protective device in the event of an earth-fault. A disconnecting time not exceeding 5 s is considered sufficiently short. Verification of the fault loop impedance by calculation or measurement. EXCEPTION: When measures are implemented to prevent a prospective touch voltage from exceeding 50 V a.c. or 120 V ripple-free d.c. between simultaneously accessible conductive parts.							
Test equipment	Measurement of the fault loop impedance. Fault loop impedance tester according to IEC 61557-3							
Test method	Test method is following For each overcurrent protective device, find the loop where the impedance is the largest in the event of an earth-fault. Consider an earth fault of conductors, loads, components or like. Choose the conductor to simulate the earth-fault. Connect the conductor chosen to the protective earth conductor to which an earth-fault may occur. Measure the impedance between the PE terminal and the relevant overcurrent protective device by the impedance tester. The current causing the automatic operation of the overcurrent protective device is calculated by the impedance and the nominal a.c. voltage to earth in according with Annex A.2 in IEC/EN 60204-1:2005/2006 The calculated current should be compared with the specification provided by the manufacture of the overcurrent protective device (including the characteristic curve). Note1: Application of this test method is limited to TN-System. Note2: Refer to the illustration of Figure A.1 in the Annex A in IEC/EN 60204-1							
Acceptable results	- Automatic disconnection of the supply will occur within the specified time (≤ 5 s or \leq values in according with Table A.1 in IEC/EN 60204-1) - The following condition shall be fulfilled: $Z_s(m) \leq 2/3 \times U_o/I_a$ $Z_s(m)$: the measured value of the impedance of the fault loop; I_a : the current causing the automatic operation of the disconnecting protect device within the specified time; U_o : the nominal a.c voltage to earth.							
Test locations and result of tests	Point	Test location (components)	Specified time [s]	U_0 [V]	I_a [A]	$2/3 \times U_o/I_a$ [V/A]	$Z_{s(m)}$ [Ω]	Verdict ✓
	1	/	/	/	/	/	/	
	2	/	/	/	/	/	/	
	3	/	/	/	/	/	/	
Comments		/						
Details of test/measurement equipment used								
Type of equipment	Make		Model number		Serial number		Date of last calibration	
/	/		/		/		/	

IEC/EN 60204-1 Clause 18.3		Insulation resistance tests				
Applicability of test		The test is carried out on equipment that is supplied at hazardous voltage (i.e. more than 25V r.m.s. or 60V d.c.) and which possesses a protective bonding circuit, i.e. is Class 1 equipment.				
Test equipment		An insulation resistance tester that applies a potential of 500V d.c.				
Test method		With the equipment disconnected from its supply, connect the insulation resistance tester and measure the insulation resistance between power circuit conductors and the equipment protective bonding circuit (at equipment PE terminal, cable lead or plug pin). For the test, the following conditions apply: <ul style="list-style-type: none">Switches in power circuits placed in the “ON” position; andPower circuits through contacts (relays, contactors etc.) be completed by manually engaging or bypassing the contacts. If impracticable to conduct a single test the test may be made on individual (separate) sections of the equipment and the results documented using multiple points in the table below.				
Acceptable results		Measured insulation resistance should be at least 1M ohm.				
Test locations and result of tests		Point	Test location		Measured insulation resistance [MΩ]	Verdict ✓
			From	To		
		1	Pin 1÷5	PE terminal	> 100 GΩ	✓
		2	/	/	/	/
Comments		Sample is only a part of the electrical equipment				
Details of test/measurement equipment used						
Type of equipment		Make	Model number	Serial number	Date of last calibration	
insulation resistance tester		Iteco	GIGALAB 9265.043	161231	2016-02	

IEC/EN 60204-1 Clause 18.4		Voltage tests				
Applicability of test		The test is carried out on equipment that is supplied at hazardous voltage (i.e. more than 25V r.m.s. or 60V d.c.) and which possesses a protective bonding circuit, i.e. is Class 1 equipment.				
Test equipment		An isolated power source (transformer) with a 50Hz or 60Hz output and a capacity of at least 500 VA, or of lower capacity if provided with a voltmeter that directly measures applied output potential. Alternatively a suitable dielectric withstand test instrument with a means of indicating the test potential, as well as an audible or visual indicator of electrical breakdown, or an automatic reject feature.				
Test method		<p>With the equipment disconnected from its supply, apply the test voltage gradually from zero to the greater of twice the equipment rated supply voltage or 1 000 V and hold at maximum value for at least 1 second between the conductors of all circuits, except those intended to operate at or below PELV voltages, and the equipment protective bonding circuit (at equipment PE terminal, cable lead or plug pin). Components (e.g. surge suppression devices) not rated to withstand the test voltage to be disconnected during the test.</p> <p>For the test, the following conditions need to be set:</p> <ul style="list-style-type: none">• Switches in the relevant circuits placed in the “ON” position; and• Circuits through contacts (relays, contactors etc.) be completed by manually engaging or bypassing the contacts. <p>If impracticable to conduct a single test the test may be made on individual (separate) sections of the equipment and the results documented using multiple points in the table below.</p> <p>Note: line to earth/ground filter components may be connected within the equipment. To prevent tripping of the test equipment due to excessive leakage, the DC test may be used.</p>				
Acceptable results		The equipment does not exhibit any evidence of dielectric breakdown.				
Test locations and result of tests		Point	Test location		Test voltage (AC rms / DC) [V]	Verdict ✓
			From	To		
		1	Motor pin	PE terminal and external part with metal foil	1000 Vac	✓
		2	/	/	/	/
Comments		Sample is only a part of the electrical equipment				
Details of test and measurement equipment used						
Type of equipment		Make	Model number	Serial number	Date of last calibration	
Dielectric strength tester		ETL Pruftechnik	UX36TPT5AC-200	202194 0212 2842	2016-01	

IEC/EN 60204-1 Clause 18.5		Protection against residual voltages			
Applicability of test	The test is carried out on equipment with accessible (IP2X or less) parts in operator, maintenance or service areas having a residual voltage greater than 60V after the supply has been disconnected. Residual voltages originate from capacitances within hazardous voltage circuits of the equipment. The voltage discharge test is made to demonstrate compliance with Clause 6.2.4. EXCEPTION 1: Components or circuits having a stored charge of 60 μC or less are exempted from the test. EXCEPTION 2: Where a safe discharge provision would interfere with the proper functioning of the equipment, a durable warning notice drawing attention to the hazard and stating the delay required before entry to the enclosure is allowed shall be displayed at an easily visible location on or immediately adjacent to the relevant part.				
Test equipment	Oscilloscope or high impedance voltmeter and suitable timing device.				
Test method	Monitor the relevant conductors, or equivalent circuit locations and disconnect the equipment from its electrical supply source, i.e. operate its main (or sub-) supply disconnection/isolation device(s).				
Acceptable results	Accessible live parts to be reduced to 60 V or less within 5 seconds after the disconnection of the supply voltage. The withdrawal of plugs or similar devices, which results in the exposure of conductors (pins etc.), to have a discharge time that does not exceed 1 second.				
Test locations and result of tests	Point	Test location (accessible conductive part exhibiting residual voltage)	Measured voltage after disconnection of supply		Verdict ✓
			5 seconds [V]	1 second [V]	
	1	/	/	/	
	2	/	/	/	
Comments					
Details of test and measurement equipment used					
Type of equipment	Make	Model number	Serial number	Date of last calibration	
/	/	/	/	/	

IEC/EN 60204-1 Clause 18.6		Functional Tests		
Applicability of test	The test is carried to verify the functionality of each safety circuit/device on the equipment.			
Test equipment	Depends on the safety devices being tested. Actuating devices, simulators etc. may be necessary.			
Test method	Activate each safety circuit (e.g. emergency stop, emergency off, safety interlocks, end-of-travel sensors, loss of exhaust sensors, light curtains, etc.) by actuation/resetting and confirm correct equipment response.			
Acceptable results	<p>Actuation of the respective safety device/circuits to cause the equipment, or the relevant parts of the equipment, to be automatically brought to a safe condition (safe shutdown condition).</p> <p>Resetting of any safety circuit is not to cause the equipment to resume operation where hazards are present.</p>			
Test locations and result of tests	Test no.	Name/designation of safety circuit actuator or component	Outcome of test	Verdict ✓
	1	/	/	
	2	/	/	
	3	/	/	
Comments /				
Details of test and measurement equipment used				
Type of equipment	Make	Model number	Serial number	Date of last calibration
/	/	/	/	/



Fig. 1. - Identification Sample



Fig. 2. - Reference metric Sample



Fig. 3. - Reference metric Sample



Fig. 4. - Marking

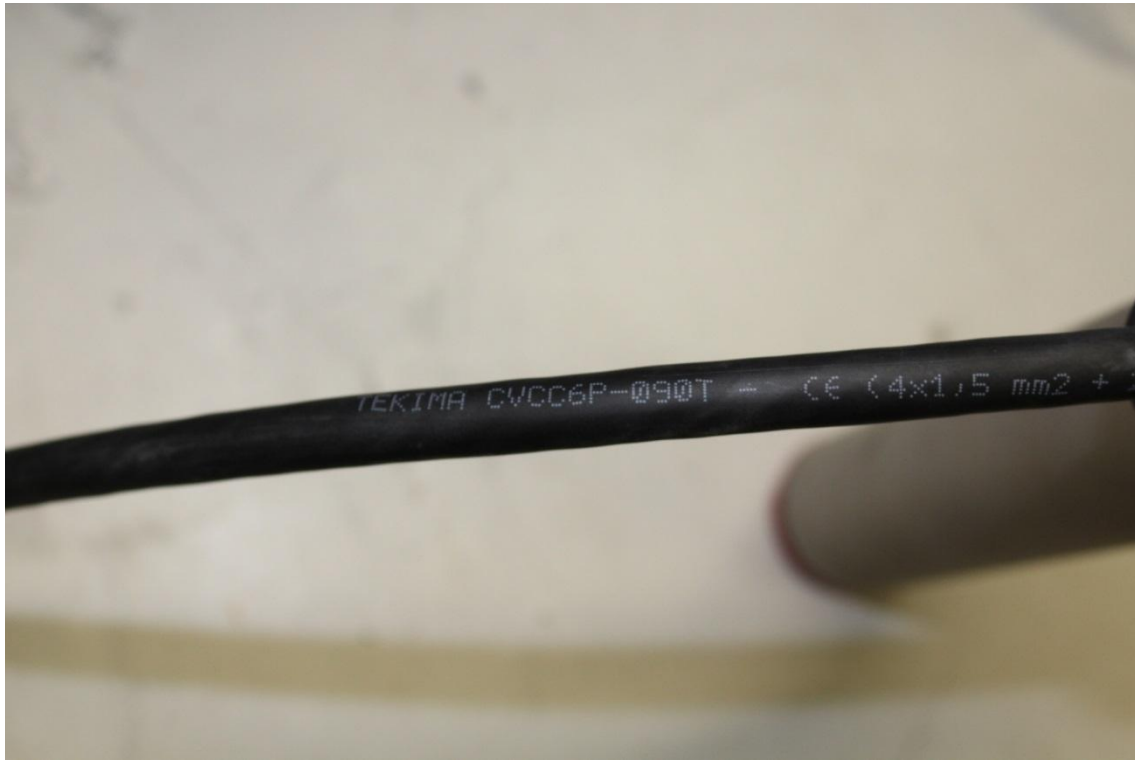


Fig. 5. - Cable marking

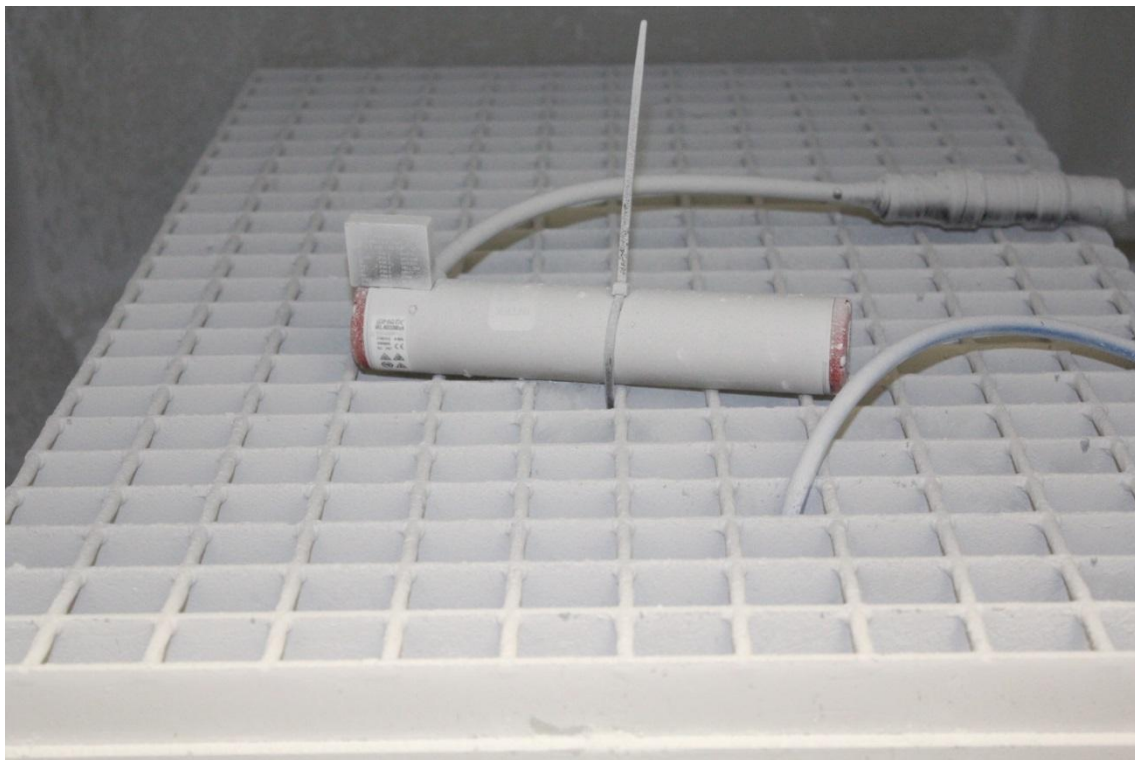


Fig. 6. - Photograph set-up for IP6X test



Fig. 7. - Photograph set-up for IPX7 test



Fig. 8. - Photograph result after IP67 Test



Fig. 9. - Photograph result after IP67 Test

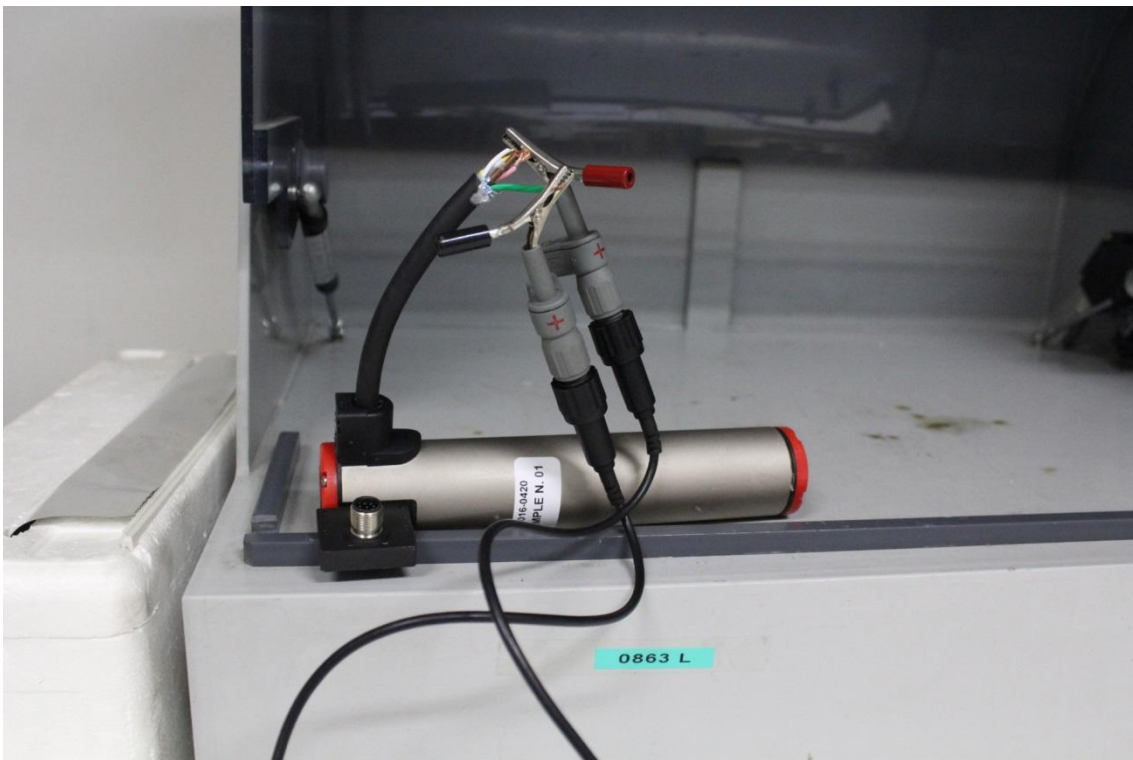


Fig. 10. - Photograph set-up for Insulation resistance test



Fig. 11. - Photograph set-up for Insulation resistance test

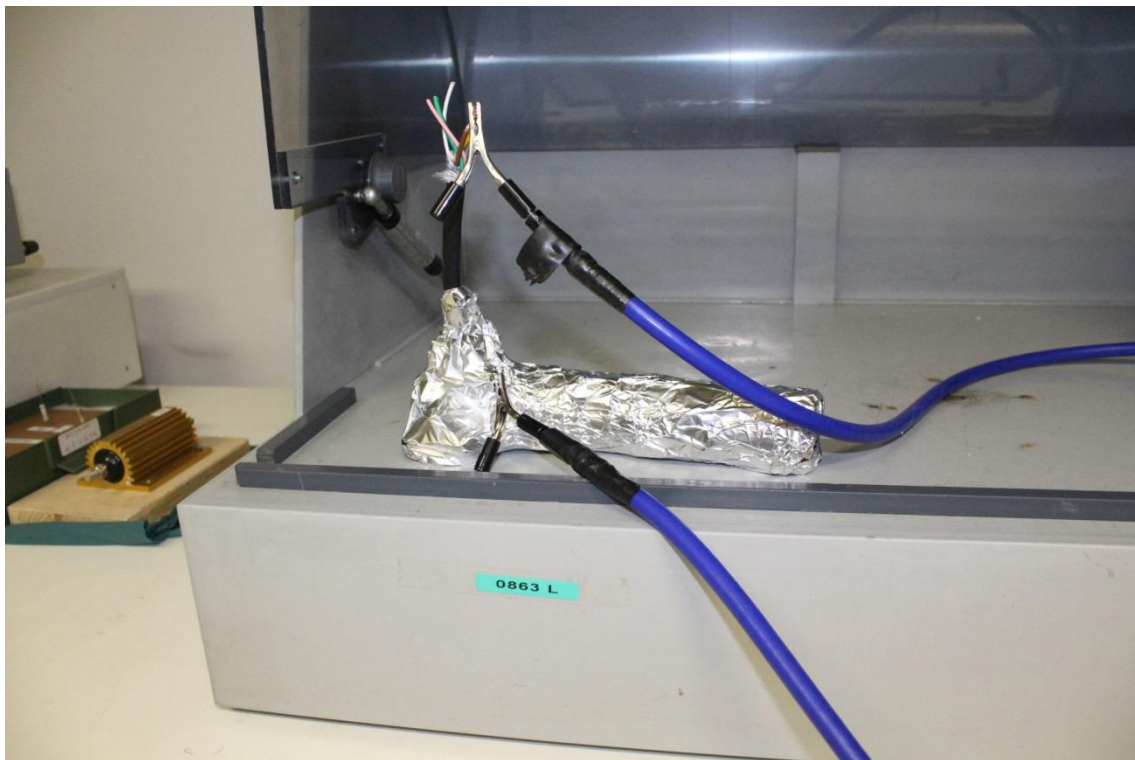


Fig. 12. - Photograph set-up for dielectric test

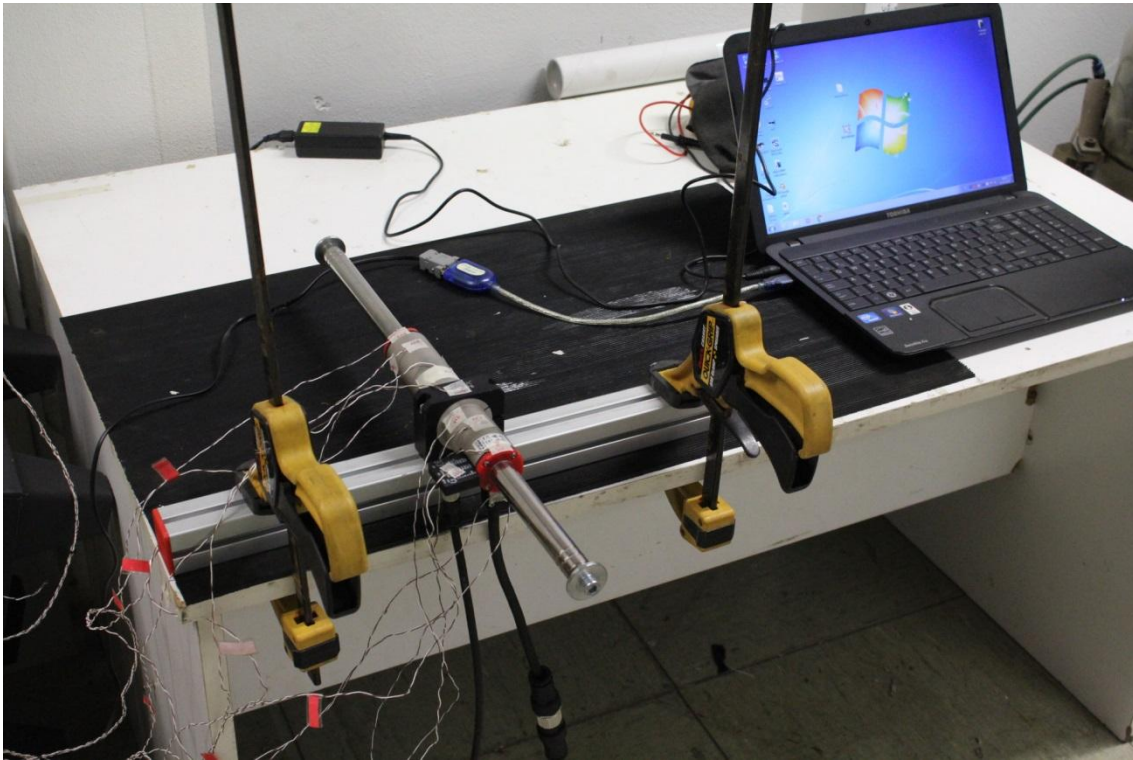


Fig. 13. - Photograph set-up for temperature rise test

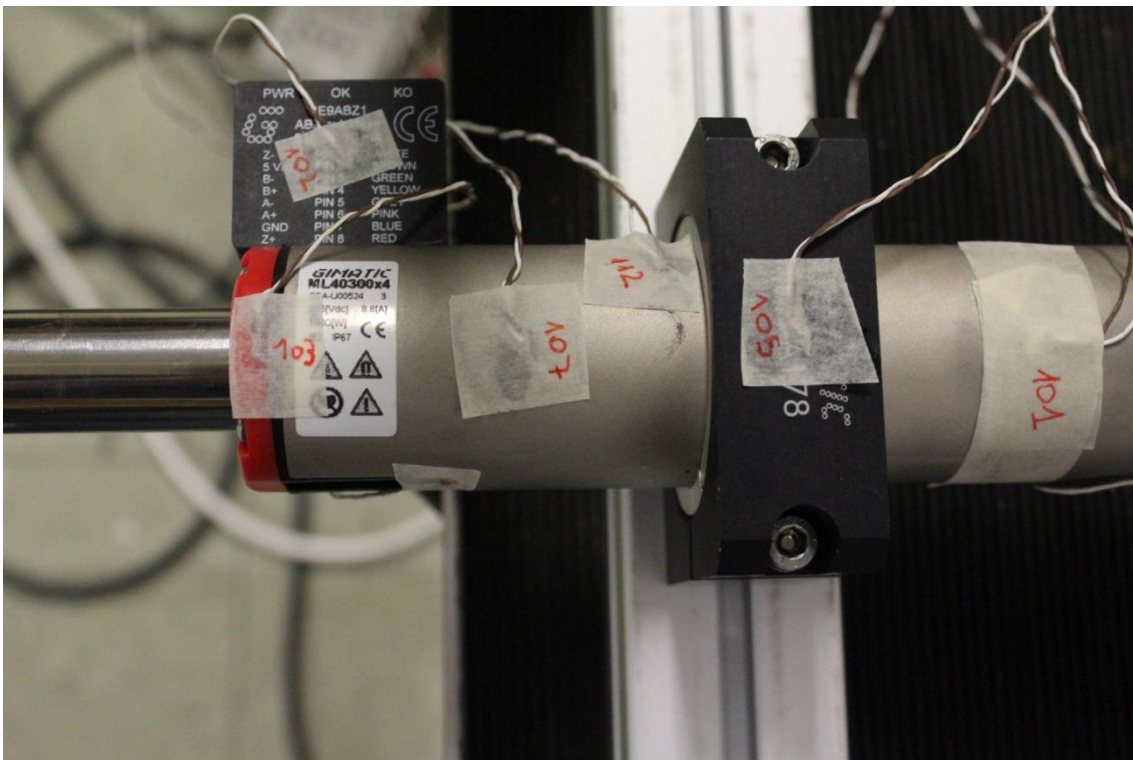


Fig. 14. - Photograph location TC

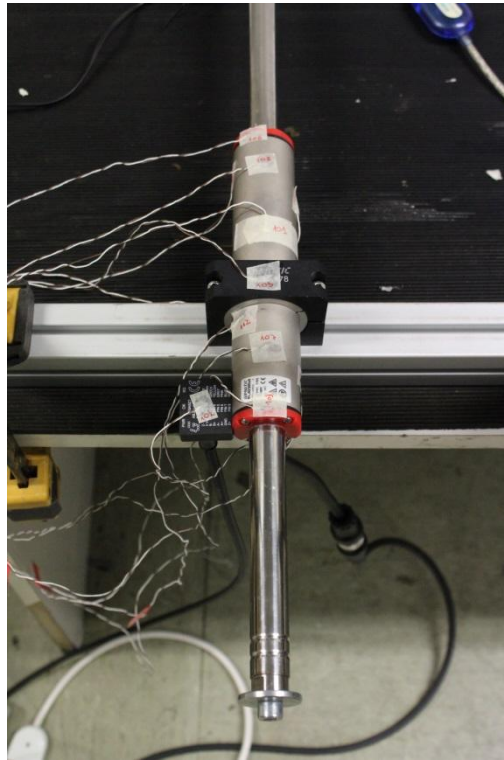


Fig. 15. - Photograph location TC

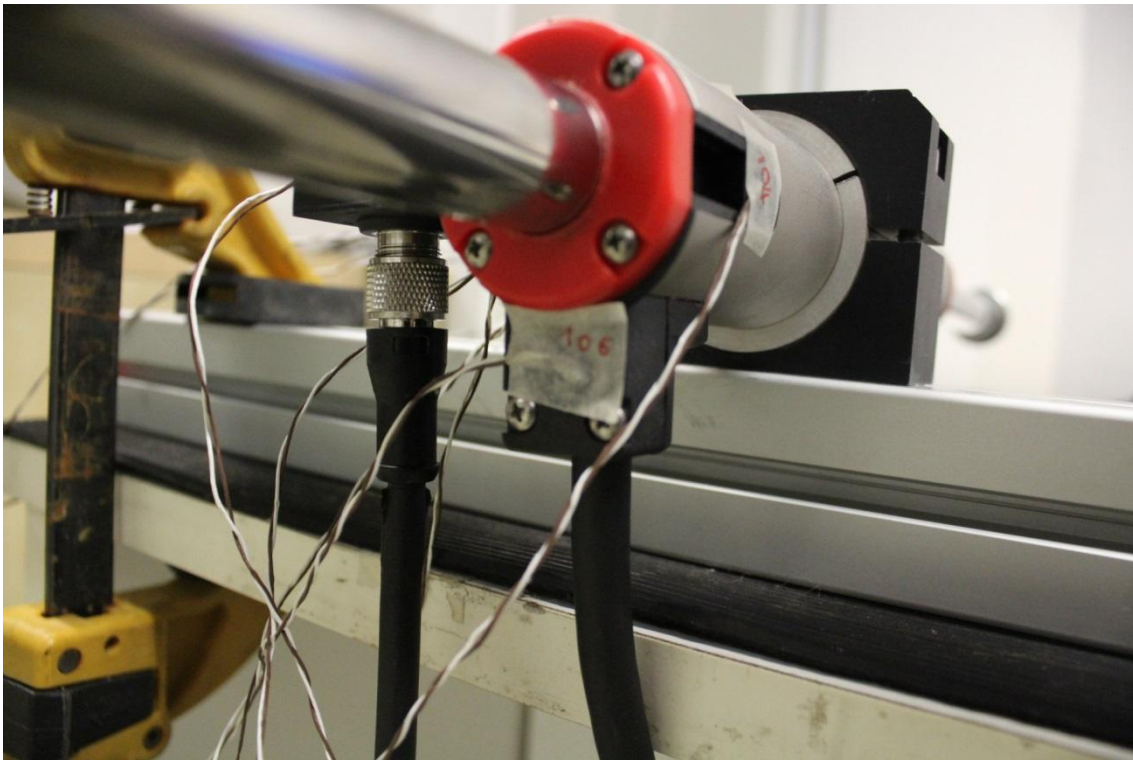


Fig. 16. - Photograph location TC

Sample N.	N. TC	TC location	Temperature	Result
1	101	Central wiring – Internal –	22,7	Pass
	102	Plastic encoder	25,0	Pass
	103	Plastic red near cable up	22,7	Pass
	104	Plastic encoder	22,6	Pass
	105	Plastic motor lock	22,5	Pass
	106	Plastic plug/socket	22,8	Pass
	107	Body external up 1	22,6	Pass
	108	Body external up 2	22,5	Pass
	109	Plastic red up	22,6	Pass
	110	Body side left external	22,5	Pass
	111	Body side right external	22,4	Pass
	112	Body side near motor lock	22,5	Pass
	113	Ambient	22,2	Pass

Fig. 17. - Table temperature detected in normal condition

Sample N.	N. TC	TC location	Temperature	Result
1	101	Central wiring – Internal –	61,0	Pass
	102	Plastic encoder	30,4	Pass
	103	Plastic red near cable up	31,7	Pass
	104	Plastic encoder	34,3	Pass
	105	Plastic motor lock	27,9	Pass
	106	Plastic plug/socket	39,7	Pass
	107	Body external up 1	40,0	Pass
	108	Body external up 2	66,9	Pass
	109	Plastic red up	60,2	Pass
	110	Body side left external	64,5	Pass
	111	Body side right external	64,6	Pass
	112	Body side near motor lock	41,8	Pass
	113	Ambient	21,8	Pass

Fig. 18. - Table temperature detected in abnormal condition