



## EMC TEST REPORT

**Report Number:** 101561028ATL-001

**Project Number:** G101561028

**Report Issue Date:** March 31, 2014

**Report Revised Date:** April 2, 2014

**Product Designation:** TJ6100-401 & TD6100-401 Current to Pressure Transducers

**Standards:** IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-6, IEC 61000-4-8  
per IEC 61326-1, 2012/07/10 Ed: 2

Tested by:  
Intertek Testing Services NA, Inc.  
1950 Evergreen Blvd, Suite 100  
Duluth, GA 30096 USA

Client:  
Fairchild Industrial Products Company  
3920 West Point Blvd.  
Winston-Salem, NC 27102 USA

Report prepared by:

Jeffrey D. Hiday / EMC Team Leader

Report reviewed by

Troy J. Ihle / Project Engineer

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## 1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

## 2 Test Summary

Section	Test full name	Result
3	Client Information	
4	Description of Equipment Under Test	
5	System Setup and Method	
6	Radiated Emissions (EN55011: 2008) <b>Not tested</b>	Not Tested
7	AC Mains Conducted Emissions (EN55011: 2008) <b>This test is not applicable for DC powered devices</b>	N/A
8	Harmonics <b>This test is not applicable for DC powered devices</b>	N/A
9	Flicker <b>This test is not applicable for DC powered devices</b>	N/A
10	Electro-Static Discharge Immunity Test (IEC 61000-4-2: 2 <sup>nd</sup> Edition: 2008)	Pass
11	Radiated, Radio-Frequency, Electromagnetic Immunity (IEC61000-4-3 2 <sup>nd</sup> Edition: 2010)	Pass
12	Electrical Fast Transient/Burst Immunity Test (IEC61000-4-4 3 <sup>rd</sup> Edition: 2012)	Pass
13	Immunity to Surges (IEC61000-4-5 2 <sup>nd</sup> Edition: 2009)	Pass
14	Conducted, Radio-Frequency, Electromagnetic Immunity Test (IEC61000-4-6 4 <sup>th</sup> Edition: 2013)	Pass
15	Power Frequency Magnetic Field Immunity Test (IEC61000-4-8 2 <sup>nd</sup> Edition: 2009)	Pass
16	Voltage Dips/Interruptions Immunity Test <b>This test is not applicable for DC powered devices</b>	N/A
17	Revision History	

### 3 Client Information

This EUT was tested at the request of:

**Client:** Fairchild Industrial Products Company  
3920 West Point Blvd.  
Winston-Salem, NC 27102, USA

**Contact:** Mr. Stan Przybylowicz

**Telephone:** (336) 659-3456

**Email:** stanp@fairchildproducts.com

### 4 Description of Equipment Under Test

**Manufacturer:** Fairchild Industrial Products Company  
3920 West Point Blvd.  
Winston-Salem, NC 27102, USA

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Electro-Pneumatic Transducers	Fairchild Industrial Products Company	TD6100-401	0214836
Electro-Pneumatic Transducers	Fairchild Industrial Products Company	TJ6100-401	0214838

Receive Date:	03/06/2014
Received Condition:	Good
Type:	Production

#### Description of Equipment Under Test (provided by client)

The Model T6100 series Lock in place Electro-Pneumatic I/P Transducer uniquely lock in last place feature provides flexibility, reliability, and safety applications requiring protection from signal failures to critical control systems instruments. The design of the T6100 relies on a proprietary integrated solenoid valve module interposed between the flapper- nozzle pilot and the booster section. Upon signal failure and electrical charge stored within the active electronic module maintains the to the voice coil at the last set-point. Simultaneously, a high energy pulse closes the solenoid valve, trapping the signal pressure within the signal chamber at the last set-point. The booster continues to provide its normal forward and exhaust flow, with the constant signal pressure now captured and maintained within the signal chamber.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
Not Listed	12 mA	DC	DC

#### Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	The primary operation of the EUT is to output a pressure signal proportional to the input current signal, 4 to 20mA.
2	The secondary operation of the device is to recognize a loss of power and to lock the output pressure at the last known good point.

#### Software used by the EUT:

No.	Descriptions of EUT Exercising
1	None

## 5 System Setup and Method

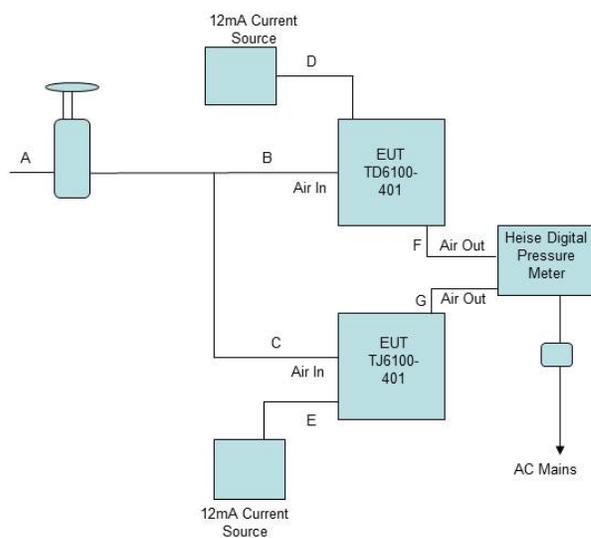
Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
A	Air Supply	7.6m	No	No	Air Pressure Valve
B	Air In	5.5m	No	No	TD61000-401
C	Air In	4.7m	No	No	TJ6100-401
D	+12mA Current Source	14.6m	Yes	No	TD61000-401
E	+12mA Current Source	14.6m	Yes	No	TJ6100-401
F	Air Out	5m	No	No	Heise
G	Air Out	5m	No	No	Heise

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
Current Source	Altek Industries Corp.	334A	1604065
Current Source	Fairchild	ET-500	I/P031
Digital Pressure Meter	Heise	PM	41636
Pneumatic Regulator	Fairchild	M10262	0214
Pressure Gauge	Fairchild	G-2062	ATL1403061056-001

### 5.1 Method:

Configuration as required by Standard taking Precedence.

### 5.2 EUT Block Diagram:



### 5.3 EUT Performance Criteria and Monitoring:

Performance as required by Standard taking Precedence.

#### Product Specific Performance:

No.	Description
1	Test Procedures supplied by the client were followed in Table's 1, 2a ,2b, 2c were followed for each test. To summarized these procedures for verifying the lock in last place: a) adjust
2	a) adjust the current source output to 100%, then return to 50% setting (output pressure must follow the input change)
3	b) disconnect the positive current signal lead (output pressure must remain within 5% of original pressure value)
4	c) reconnect the positive current signal line and adjust the current source to 50% (output pressure must follow the input change)

#### Description of how performance was observed during testing:

No.	Description
1	Pressure gauge readings were observed on the Heise, 2 channel, Digital Pressure Meter throughout testing to validate the functionality of the EUT(s).

General notes:

## 6 Radiated Emissions

### 6.1 Method

Tests are performed in accordance with IEC 61326-1, 2012/07/10 Ed: 2.

**TEST SITE:** 10m Semi-Anechoic Chamber

**10 Meter Semi-Anechoic Chamber** The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096. It is a 10 meter semi-anechoic chamber manufactured by Panashield. Embedded in the floor is a 3 meter diameter turntable.

#### Measurement Uncertainty

For radiated emissions,  $U_{lab}$  (3.9 dB at 3m and 3.6 dB at 10m below 1 GHz, and 4.2 dB at 3m above 1 GHz)  $< U_{CISPR}$  (5.2 dB), which is the reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

#### **Sample Calculation**

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength in dB $\mu$ V/m
- RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dB $\mu$ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

RA = 52.0 dB $\mu$ V  
 AF = 7.4 dB/m  
 CF = 1.6 dB  
 AG = 29.0 dB  
 FS = 32 dB $\mu$ V/m

To convert from dB $\mu$ V to  $\mu$ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where } UF = \text{Net Reading in } \mu\text{V}$$

$$NF = \text{Net Reading in dB}\mu\text{V}$$

#### **Example:**

$$FS = RA + AF + CF - AG = 52.0 + 7.4 + 1.6 - 29.0 = 32.0$$

$$UF = 10^{(32 \text{ dB}\mu\text{V} / 20)} = 39.8 \mu\text{V/m}$$

## 6.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
N/A						

## Software Utilized:

Name	Manufacturer	Version
N/A		

## 6.3 Results:

The sample was not tested for radiated emissions at the client's request.

## 7 AC Mains Conducted Emissions

### 7.1 Method

Tests are performed in accordance with IEC 61326-1, 2012/07/10 Ed: 2.

#### TEST SITE:

**The EMC Lab** has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

**10 Meter Semi-Anechoic Chamber** The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096. It is a 10 meter semi-anechoic chamber manufactured by Panashield. Embedded in the floor is a 3 meter diameter turntable.

#### Measurement Uncertainty

For conducted emissions,  $U_{lab}$  (2.8 dB in worst case)  $< U_{CISPR}$  (3.6 dB), which is the reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

#### Sample Calculations

The following is how net line-conducted readings were determined:

$$NF = RF + LF + CF + AF$$

Where NF = Net Reading in dB $\mu$ V

RF = Reading from receiver in dB $\mu$ V

LF = LISN or ISN Correction Factor in dB

CF = Cable Correction Factor in dB

AF = Attenuator Loss Factor in dB

To convert from dB $\mu$ V to  $\mu$ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where } UF = \text{Net Reading in } \mu\text{V}$$

$$NF = \text{Net Reading in dB}\mu\text{V}$$

#### Example:

$$NF = RF + LF + CF + AF = 28.5 + 0.2 + 0.4 + 20.0 = 49.1 \text{ dB}\mu\text{V}$$

$$UF = 10^{(49.1 \text{ dB}\mu\text{V} / 20)} = 285.1 \mu\text{V/m}$$

### 7.2 Results:

The sample was not tested because the EUT is DC powered and does not connect to the AC mains.

## 8 Electrostatic Discharge Immunity Test

### 8.1 Method

Tests are performed in accordance with IEC 61326-1, 2012/07/10 Ed: 2.

**TEST SITE:** Duluth, GA

**The EMC Lab** has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

### 8.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
014450	Electrostatic Discharge Simulator (ESD)	Noiseken	ESS-200AX	5079C00055	04/08/2013	04/08/2014
211511	Electrostatic Discharge Gun (ESD)	NoiseKen	TC-815P	ESS0361872	04/08/2013	04/08/2014
213119	Vertical Coupling Plane	Intertek	ESD-VCP	none	VBU	Verified
211897	Digital Pocket Thermometer and Hydrometer	Mannix	SAM700BAR	none	12/27/2013	12/27/2014
213047	Multimeter	Fluke	87	65290209	01/09/2014	01/09/2015

#### Software Utilized:

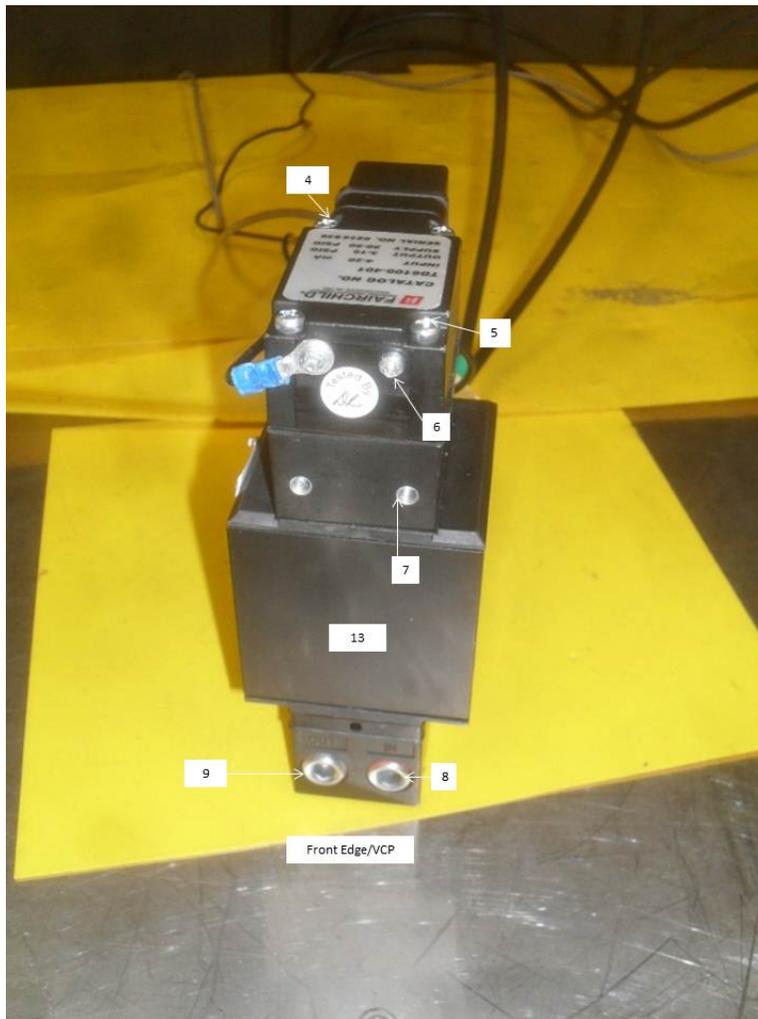
Name	Manufacturer	Version
Not Applicable	Not Applicable	Not Applicable

### 8.3 Results:

The sample tested was found to Comply.

8.4 Setup Photographs:

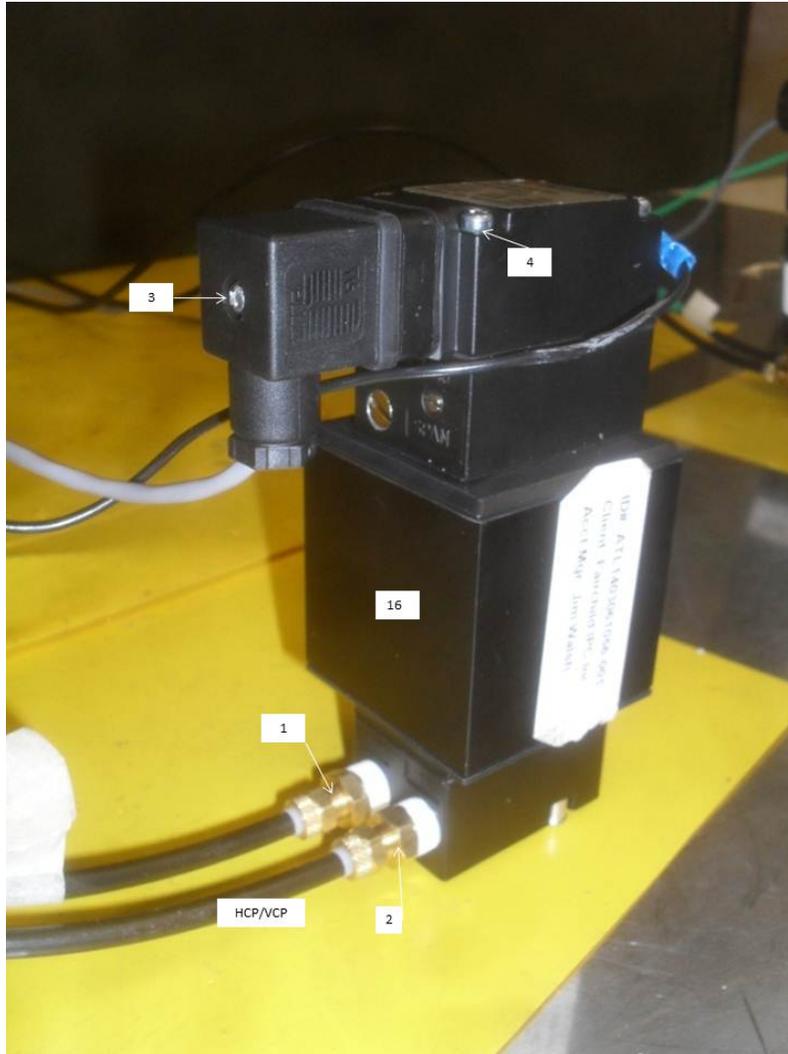
ESD Locations - Photo #1



ESD Locations - Photo #2



ESD Locations - Photo #3



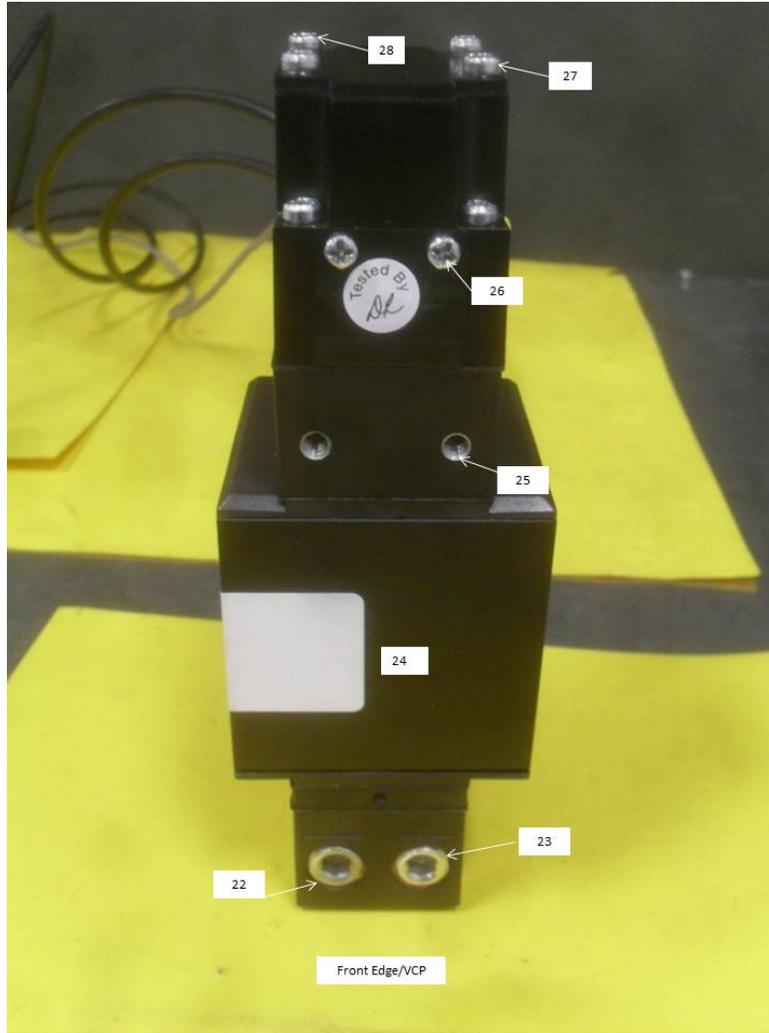
ESD Locations - Photo #4



ESD Locations - Photo #5



ESD Locations - Photo #6



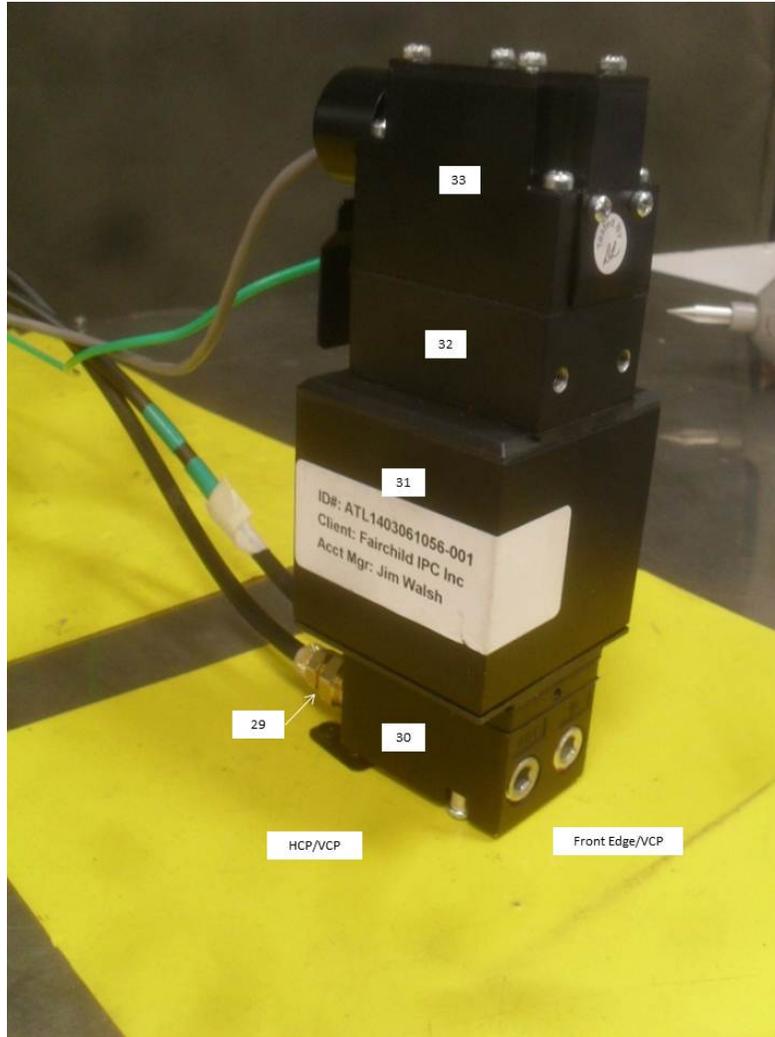
ESD Locations - Photo #7



ESD Locations - Photo #8



ESD Locations - Photo #9



ESD Locations - Photo #10



**8.5 Data:**

Test Point	Discharge Voltage Type	Test Voltages, Polarities and Result Classification												
		2 kV		4 kV		6 kV		8 kV		Air Discharges only above 8 kV	15 kV		__ kV	
		Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg		Pos	Neg	Pos	Neg
HCP	Contact	A(1)	A(1)	A(1)	A(1)	A(1)	A(1)			Air Discharges only above 8 kV				
Front Edge	Contact	A(2)	A(2)	A(2)	A(2)	A(2)	A(2)							
VCP	Contact	A(3)	A(3)	A(3)	A(3)	A(3)	A(3)							
1 - 6	Contact	A	A	A	A	A	A							
7- 14	Contact	A	A	A	A	A	A							
15-21	Contact	A	A	A	A	A	A							
22-28	Contact	A	A	A	A	A	A							
28-38	Contact	A	A	A	A	A	A							

Test Personnel: MJA

Test Date: 03/17/2014

Supervising/Reviewing Engineer:  
 (Where Applicable) TJI  
 Product Standard: IEC 61326-1  
 Input Current: 12mA (DC)

Required Performance: B  
 Test Levels: 6kV Contact and 8kV Air

Waveform Verified on Oscilloscope: Yes  
 470k x 2 Strap(s) Verified: 955k Ohms

Ambient Temperature: 22.3 °C  
 Relative Humidity: 41.5 %  
 Atmospheric Pressure: 973.5 mbars

Notes: Applied 3 second delay between ESD discharges. No Air discharge points.

- (1) Discharge to Horizontal Coupling Plane, 4 locations
  - (2) Discharge to front edge of Horizontal Coupling Plane
  - (3) Discharge to Vertical Coupling Plane, 4 locations
- The EUT met the requirements without any degradation of performance.

Deviations, Additions, or Exclusions: None

## 9 Radiated, radio-frequency, electromagnetic field immunity test

### 9.1 Method

Tests are performed in accordance with IEC6100-4-3.

**TEST SITE: Duluth, GA**

**The EMC Lab** has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

### 9.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
200063	Power Meter	Boonton	4232A	120802	02/27/2014	02/27/2015
015681	Signal Generator, 5kHz-3.3GHz	Rohde & Schwarz	SMT 03	844933/040	12/02/2013	12/02/2014
200001	Attenuator, 20 dB, <18GHz	Weinschel Corp	2	BK1848	12/04/2013	12/04/2014
200160	Power Sensor	Boonton	51011-EMC	35991	02/27/2014	02/27/2015
213008	Antenna, Biconlog, 80-1000MHz	EMCO	3143	9404-1031	VBU	Verified
200142	Isotropic Field Probe (10MHz-40GHz)	ETS-Lindgren	HI-6053	00133447	02/13/2014	02/13/2015
BBA100	Broadband Amplifier	Rohde & Schwarz	R&S BBA100	101172-1	VBU	Verified

#### Software Utilized:

Name	Manufacturer	Version
Tile	Quantum Change	3.4.K.22

### 9.3 Results:

The sample tested was found to Comply.

**9.4 Setup Photographs:**



**9.5 Data:**

Field Level (V/m)	Frequency Range MHz	Antenna Polarity, Azimuths and Result Classification							
		Vertical				Horizontal			
		0	90	180	270	0	90	180	270
10	80 to 1000 200, 400, 600, 800, 1000	A	A	A	A	A	A	A	A
3	1400 to 2000 1600, 1800, 2000	A	A	A	A	A	A	A	A
1	2000 to 2700 2200, 2400, 2700	A	A	A	A	A	A	A	A

Test Personnel: JDH  
 Supervising/Reviewing Engineer: \_\_\_\_\_  
 (Where Applicable) TJI  
 Product Standard: IEC 61326-1, 2012/07/10 Ed: 2  
 Input Current: 12.0mA (DC)

Field Level Monitored: Yes

Test Date: 03/12/2014 & 3/15/2014  
 Modulation: 80 % AM  
 Required Performance: A  
 Test Levels: See Table Above  
 Ambient Temperature: 24 °C  
 Relative Humidity: 33 %  
 Atmospheric Pressure: 967xx mbars

**Notes:**

(1) The EUT met the requirements without any degradation of performance.

Deviations, Additions, or Exclusions: None

## 10 Electrical Fast Transient/Burst Immunity Test

### 10.1 Method

Tests are performed in accordance with IEC 61326-1, 2012/07/10 Ed: 2.

**TEST SITE:** Duluth, GA

**The EMC Lab** has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

### 10.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
012906	EMC Immunity Test System	KeyTek	EMC Pro Plus	0601240	10/15/2013	10/15/2014
213195	Coupling Clamp	Compliance Design	801-4-CC	none	VBU	Verified
T006217	THDX	Oregon Scientific	BA888	NSN	12/11/2013	12/11/2014
211678	Power Supply	Tektronix	PS2510G	TW50295	VBU	Verified

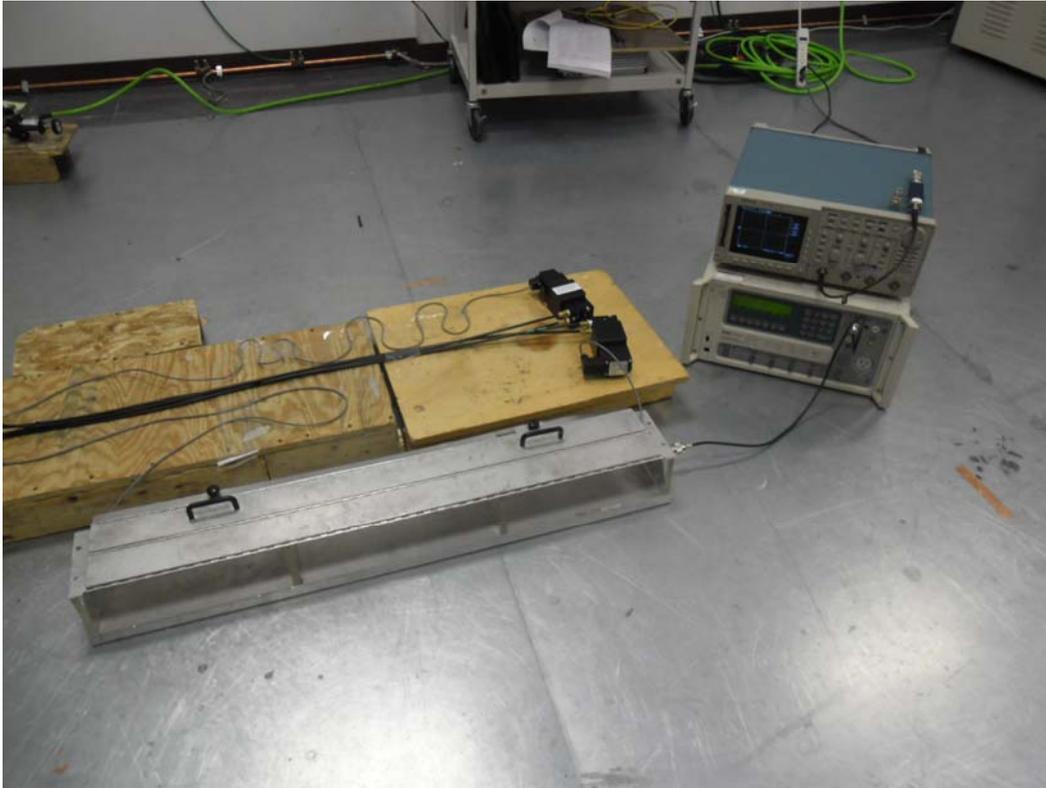
#### Software Utilized:

Name	Manufacturer	Version
CEWARE	KeyTek	CEW32

### 10.3 Results:

The sample tested was found to Comply.

**10.4 Setup Photographs:**



**10.5 Test Data:**

Test Point	Coupling Method	Test Voltages, Polarities, and Result Classification										
		0.25kV		0.5kV		1 kV		2 kV		4 kV		
		pos	neg	pos	neg	pos	neg	pos	neg	pos	neg	
12mA (DC) on TD6100-401	Clamp	A	A	A	A	A	A	A	A	A		
12mA (DC) on TJ6100-401	Clamp	A	A	A	A	A	A	A	A	A		

Test Personnel: <u>JDH</u> Supervising/Reviewing Engineer: <u>TJI</u> (Where Applicable) <u>TJI</u> Product Standard: <u>IEC 61326-1, 2012/07/10 Ed: 2</u> Input Current: <u>12.0mA (DC)</u> Waveform Verified on Oscilloscope: <u>Yes</u>	Test Date: <u>03/15/2014</u> Pulse Repetition Frequency: <u>5kHz</u> Required Performance: <u>B</u> Test Levels: <u>See Table Above</u> Ambient Temperature: <u>23 °C</u> Relative Humidity: <u>24 %</u> Atmospheric Pressure: <u>984 mbars</u>
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**Notes:**

(1) The EUT met the requirements without any degradation of performance.

Deviations, Additions, or Exclusions: None

## 11 Immunity to Surge

### 11.1 Method

Tests are performed in accordance with IEC 61326-1, 2012/07/10 Ed: 2.

**TEST SITE:** Duluth, GA

**The EMC Lab** has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

### 11.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
012906	EMC Immunity Test System	KeyTek	EMC Pro Plus	0601240	10/15/2013	10/15/2014
213288	Oscilloscope, Digital Real-Time	Tektronix	TDS680C	B020153	11/05/2013	11/05/2014
T006217	THDX	Oregon Scientific	BA888	NSN	12/11/2013	12/11/2014

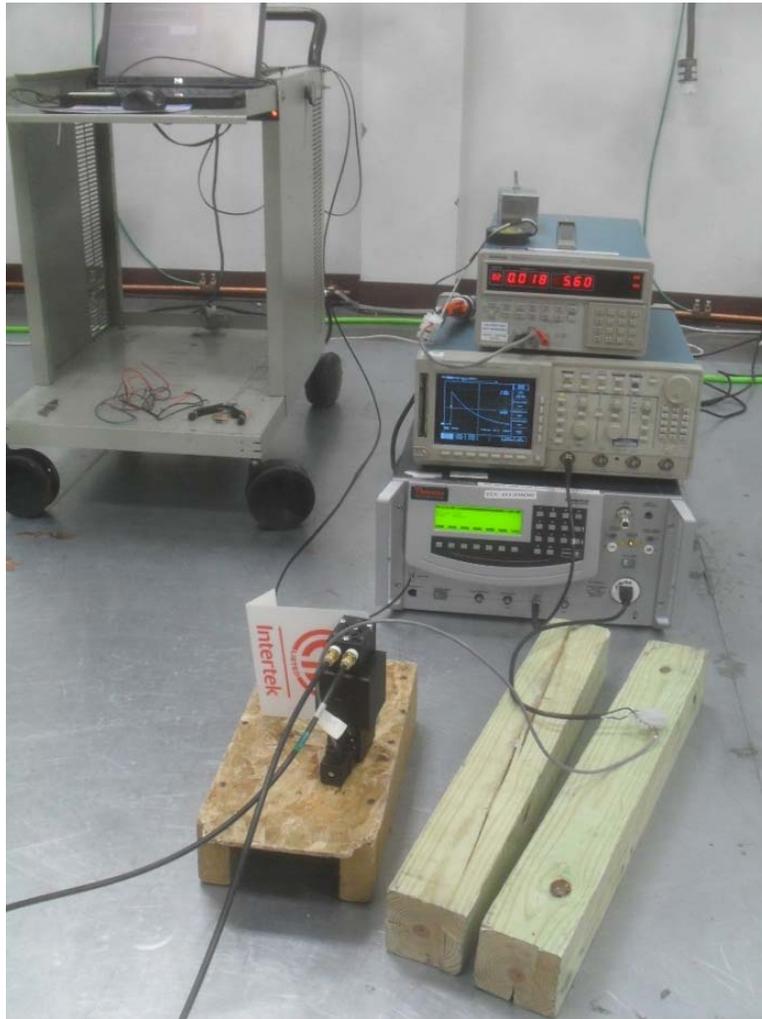
### Software Utilized:

Name	Manufacturer	Version
CEWare	Keytek	3.2

### 11.3 Results:

The sample tested was found to Comply.

**11.1 Setup Photographs:**



**11.2 Test Data:**

Test	Test Voltages, Polarities, and Result Classification							
	0.5kV		1kV		2kV		4kV	
	pos	neg	pos	neg	pos	neg	pos	neg
12mA (DC) on TD6100-401, L-PE	A	A	A	A				
12mA (DC) on TJ6100-401, L-PE	A	A	A	A				

Test Personnel: JDH, MJA  
 Supervising/Reviewing Engineer: \_\_\_\_\_  
 (Where Applicable) TJI  
 Product Standard: IEC 61326-1, 2012/07/10 Ed: 2  
 Input Current: 12.0mA (DC)  
 Waveform Verified on Oscilloscope: YES

Test Date: 03/19/2014  
 Test Levels: See Table Above  
 Performance Criteria: See Report Section 5.3  
 Ambient Temperature: 23 °C  
 Relative Humidity: 27 %  
 Atmospheric Pressure: 984 mbars

**Notes:**

(1) The EUT met the requirements without any degradation of performance.

Deviations, Additions, or Exclusions: None

## 12 Conducted, radio-frequency, electromagnetic field immunity test

### 12.1 Method

Tests are performed in accordance with IEC 61326-1, 2012/07/10 Ed: 2.

**TEST SITE:** Duluth, GA

**The EMC Lab** has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

### 12.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
003178*	Power Meter	Boonton	4321A	36701	04/03/2013	04/03/2014
011405	Signal Generator, 10kHz-990MHz	Hewlett Packard	8656B	3050U09746	07/17/2013	07/17/2014
18703	75 Watt Amplifier, 10kHz-220MHz	Amplifier Research	75A220	15964	CNR	CNR
200147*	EM Injection Clamp (10kHz-1GHz)	Fischer Custom Commu	F-2031-23mm	120442	04/03/2013	04/03/2014
200125*	Power Sensor, Dual Diode, 10kHz to 8GHz	Boonton	51011-EMC	34915	03/06/2014	03/06/2015
T006217	THDX	Oregon Scientific	BA888	NSN	12/11/2013	12/11/2014

### Software Utilized:

Name	Manufacturer	Version
Tile	Quantum Change	3.4.K.22

### 12.3 Results:

The sample tested was found to Comply.

**12.4 Setup Photographs:**



**12.5 Test Data:**

Injection Device Type	Port Description	Test Level (Vrms)	Result Classification
Clamp	12mA (DC) on TD6100-401	3	A
Clamp	12mA (DC) on TJ6100-401	3	A

Test Personnel: JDH  
 Supervising/Reviewing Engineer: \_\_\_\_\_  
 (Where Applicable) TJI  
 Product Standard: IEC 61326-1, 2012/07/10 Ed:2  
 Input Current: 12mA (DC)  
 Test Level Verification Performed: **Yes - calibrated**

Test Date: 03/15/2014  
 Modulation: 80%  
 Required Performance: A  
 Test Levels: See Table Above  
 Ambient Temperature: 23.5 °C  
 Relative Humidity: 25 %  
 Atmospheric Pressure: 985 mbars

**Notes:**

(1) The EUT met the requirements without any degradation of performance.

Deviations, Additions, or Exclusions: None

### 13 Power Frequency Magnetic Field Immunity Test

#### 13.1 Method

Tests are performed in accordance with IEC 61326-1, 2012/07/10 Ed: 2.

**TEST SITE:** Duluth, GA

**The EMC Lab** has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

#### 13.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
211297	Double Voltage & Frequency Tester AC Source 304/308	Combinova	6408-1	6408-1000172	VBU	Verified
213197	ELF Field Monitor	Walker Scientific In	ELF-60D	K71959-13	01/29/2014	01/29/2015
200024	Loop, Radiating, 30 A/m	Intertek	1000-4-8-1	575	VBU	Verified
211897	Digital Pocket Thermometer and Hydrometer	Mannix	SAM700BAR	none	12/27/2013	12/27/2014
213047	Multimeter	Fluke	87	65290209	01/09/2014	01/09/2015

#### Software Utilized:

Name	Manufacturer	Version
Not Applicable	Not Applicable	Not Applicable

#### 13.3 Results:

The sample tested was found to Comply.

13.4 Setup Photographs:

At 50 Hertz



At 50 Hertz



At 50 Hertz



At 60Hertz



At 60 Hertz



At 60 Hertz



**13.5 Test Data:**

Test Location/ Mode/ EUT Input	Test Level (A/m)	Frequency (Hz)	Result Classification		
			X – Axis	Y – Axis	Z – Axis
Enclosure/ Operating/ 12mA (DC)	30	50	A	A	A
Enclosure/ Operating/ 12mA (DC)	30	60	A	A	A

Test Personnel: <u>MJA</u>	Test Date: <u>03/17/2014</u>
Supervising/Reviewing Engineer: _____	Required Performance: <u>A</u>
(Where Applicable) Product Standard: <u>TJI</u>	Test Levels: <u>See Table Above</u>
Input Current: <u>IEC 61326-1</u>	Ambient Temperature: <u>22.3 °C</u>
Ambient Field Level: <u>12mA (DC)</u>	Relative Humidity: <u>42.8 %</u>
Test Field Level Verified: <u>0.6 milliGauss</u>	Atmospheric Pressure: <u>974.5 mbars</u>
Verified: <u>Yes</u>	

Notes: Both models, TD6100-401 and TJ6100-401 tested.

(1) The EUT met the requirements without any degradation of performance.

Deviations, Additions, or Exclusions: None

## 14 Voltage Dips / Interruptions Immunity Tests

### 14.1 Method

Tests are performed in accordance with IEC 61326-1, 2012/07/10 Ed: 2.

**TEST SITE:** Duluth, GA

**The EMC Lab** has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

### 14.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due

### Software Utilized:

Name	Manufacturer	Version
N/A		

### 14.3 Results:

The sample was not tested for immunity to voltage dips because the EUT does not connect to the AC mains.

**15 Revision History**

<b>Revision Level</b>	<b>Date</b>	<b>Report Number</b>	<b>Prepared By</b>	<b>Reviewed By</b>	<b>Notes</b>
0	03/31/2014	101561028ATL-001	JDH	TJI	Original Issue
1	04/01/2014	101561028ATL-001	MJA	TJI	On all Test Data pages, Input Voltage changed to Input Current: 12mA (DC), Surge testing performed at +/-1kV.