Thermal Imaging Report

Inspection Ref. TI ELECTRICAL TRENDING DEMO-2 (ELECTRICAL)

TI LTD / TI ELECTRICAL TRENDING DEMO

1st Jun 2012

Client	TI LTD
Site	TI ELECTRICAL TRENDING DEMO Trident Court, 1 Oakcroft Road Chessington Surrey KT9 1BD
Contact	Richard Wallace richard@thermalimaging.co.uk 0203 0442940

Inspection Data	
Reason for Survey	PERIODIC THERMOGRAPHIC INSPECTION OF ELECTRICAL INFRASTRUCTURE AND ASSOCIATED COMPONENTS FOR THE PURPOSE OF ON-GOING RISK MANAGEMENT
Purpose of Survey	RISK MANAGEMENT INSPECTION OF ELECTRICAL INFRASTRUCTURE IN ORDER TO UNCOVER ANOMALOUS COMPONENT TEMPERATURES AND TO OFFER ROOT CAUSE AND REMEDIAL SUGGESTIONS
Inspection Commencing	N/A
Applicable Formulas	YES - LOAD CORRECTION
Camera	FLIR THERMACAM P640
Camera Calibration	CALIBRATION CHECKED
Thermographer Cert and ID	RICHARD WALLACE - LEVEL 2 THERMOGRAPHY - 49595
Software	TICOR ANDROID DATA CAPTURE AND REPORTING APPLICATION LINKED TO WEBCOR ONLINE CAMPAIGN MANAGER
Ambient Temp (C)	N/A
Humidity (%)	N/A

Summary	
Problems found during this inspection	N/A
Remedial Recommendations for problems found during this inspection	N/A

Introduction to your Ti Thermal Imaging LTD risk management thermographic inspection

This electrical and visual thermographic inspection has been carried out using a FLIR Professional thermal imaging camera with data input onto our purpose built tablet platform TICOR for instantaneous results and report generation. Our WEBCOR campaign and inspection management system houses all data that is permanently accessible over the internet allowing the user to track, monitor and adjust repair status of problems found during the inspection. Crucially it also trends component temperatures between periodic inspections offering a true predictive maintenance platform so that components, particularly with problems, can be monitored and remedial campaigns can be created around planned downtime rather than invasive unplanned shutdowns. Ultimately this approach will keep the assets running without interuptive power outages which can prevent production and cost company revenue.

Our **TICOR** and **WEBCOR** System sync's together to ensure all data is held centrally and updated upon internet connection.

This is a guide which should help you to fully understand how the inspection was performed and how the results were achieved

- The framework to this inspection can either be generated onsite during the inspection, building the list during the survey or a list exported to MS Excel can be imported into the Android tablet to provide comprehensive information such as item locations, tag numbers, work orders etc.
- Images are captured of all online items and a record is kept of temperature data to enable a trending programme to begin. Subsequent inspections will see the addition of a new image for each inspection so that temperatures can be monitored.
- Trending images and anomalous pieces of equipment have been recorded as one of two types of inspection:
    - Thermal – This covers temperature related anomalies
    - Visual – This covers all visual findings only
- All component trending images are taken under normal load conditions.
- Panels have been removed where safe and possible to do so and where covered by the Permit To Work system. In addition load readings have been captured using a clamp meter only where covered by the Permit to Work system and where safe to do so. In some cases load readings have not been taken so these are left as blank intentionally so that the normalised graph will function correctly. If a 0 value is inserted then a fictitious reading will be obtained. An explanation of the Normalization graph is listed later.
- A complete inventory will be built of the equipment giving Test Status at the time of the inspection allowing transparency to the inspection and what occurred with each piece of equipment. These Test Status include:

TBT	To Be Tested	These appear in bold on the thermographers tablet to identify which items are still to be tested
T	Tested	Marked as Tested once images and faults have been documented
NTLO	Not Tested Locked Out	Selected if the item could not be opened safely
NTNL	Not Tested No Load	Selected if the item was offline at the time of inspection and could not be started
NTNA	Not Tested Not Available	Selected if the item is no longer available
NTNS	Not Tested Not Specified	Selected if an item is found to be unspecified
NTUR	Not Tested Under Repair	Selected if an item is currently under a repair procedure
NSFI	Not Scheduled For Inspection	Selected if an item is not due or needed to be tested
NTTC	Not Tested Time Constraint	Selected if the inspection has not been allocated enough time or access problems have cause it to overrun.

Each piece of equipment has been allocated a priority to operation taken from the following non-changeable list:

Essential to Operation	Equipment is required for the site to run effectively: This may include main power, machinery and other essential items that would effect site productivity
Non-Essential To Operation	Equipment is not required for the site to run effectively: This may include items which would not effect site productivity

- Emissivity is the value in which an object emits it's infra-red radiation and is also directly proportional to it's reflectivity. For example if an item had 0.9 emissivity then it's reflectivity would be 0.1. This inspection uses an emissivity set between 0.9 and 0.96 because this is found to be suitable when assessing the temperatures of most electrical components due to them usually being housed in plastic or rubber which has a similar emissivity value. Emissivity is only changed were absolutely necessary. An example of this would be copper busbar with no electrical tape/labels attached.
- Anomalous components are assessed in one of two ways.

1. With the use of Reference components operating under similar conditions: These would include using line/load sides or different phases with similar load patterns to compare an anomalous component with another which has a more normal temperature gradient.
2. The use of load correction formulas which results in the following values:

- Estimated fault component temp at full load (°C) – This estimates the temperature that the component would be running at if it was loaded at 100%. This value has been arrived at using a formula correction using anomalous and ambient temperatures, measured and maximum load.
- The value of 75°C has been taken from the British Standard BS7671 (*.*). This value is the recommended cable temperatures of between 65-85C at full load.
- Using this value it is possible to use a fault rating system to grade the severity of the fault. The following fault ratings and colour coding have been used:

Fault Ratings	Minor	Important	Serious	Critical
100% Load corrected temp - 75°C	0-7	8-15	16-32	33+

- This value of 75°C is also used as a threshold temperature for the captured baseline images. In certain circumstances, this value has either been increased to 100°C or decreased to 50°C. The value has been increased to 100°C where the thermographer deems this a more appropriate value due to an elevated cubicle ambient or where components are tightly arranged together causing uplift in operating temperature. The value has been decreased to 50°C where the thermographer deems this a more appropriate value due to panel covers not being able to be removed and only the surface of the component can be seen and not the actual connections. In certain circumstances where SP2 Reference temperature cannot be suitably obtained, the value has been set from the BS Ref of 75°C as the SP2 reference temp.
- The normalization graph simulates temperature at 0, 50% and 100% load and is designed to assist the prediction of component operating temperature where a reference component has been used. According to Ohms law $P=I^2R$ but the graph is designed as a quick glance tool to assist in viewing the potential that a problem may become.
- Where anomalous components are found, a knowledge base library is used to house specific statements that ensure synergy between inspections for faults, root causes and recommended remedial actions.

Formulas:

Name	Formula
T load corrected	Let (Tm – Tamb) = Trise ; I meas / I full = LF (Load factor) Then: Tcorr = (((1/ LF)^1.68+(1/ LF)^1.46)/2)*Trise + Tamb

Summary

The Infrared Inspection was performed by TI Thermal Imaging, by a certified infrared Thermographer. All of the items inspected are listed in this TICOR report. Any anomalies are listed in order of priority based on the component's temperature rise, as measured from a reference component of equal type and load at the time of the inspection. TI Thermal Imaging assumes no liability directly or indirectly as a result of this inspection.

Priority	Current Inspection	Prior Inspection	Percent of Change
Thermal			
Not Specified	1 = 100%	2 = 100%	-50%
Minor	0 = 0%	0 = 0%	N/A
Important	0 = 0%	0 = 0%	N/A
Serious	0 = 0%	0 = 0%	N/A
Critical	0 = 0%	0 = 0%	N/A
Visual			
Not Specified	0	0	N/A
Minor	0	0	N/A
Important	0	0	N/A
Serious	0	0	N/A
Critical	0	0	N/A

I hereby certify the project was inspected by myself or under my direction and that the enclosed data is the result of this inspection.

TICOR
Wallace, Rich

Inventory

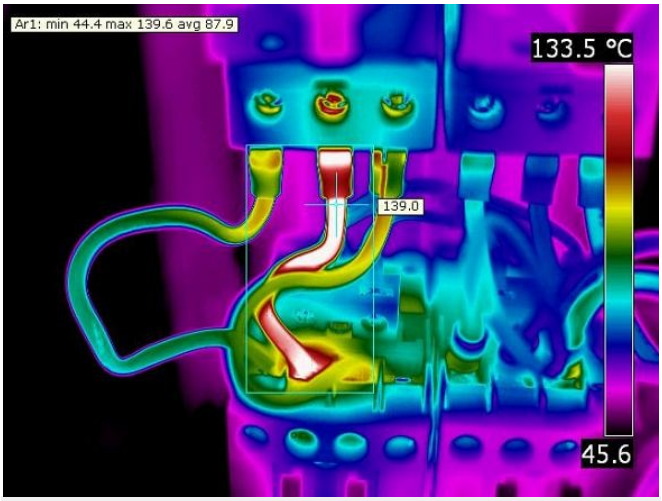
Equipment Description	PM Work Order	Item ID	Operation Priority	Problem #s	Status
BOILER ROOM					
BOILER CP2	NOT ISSUED	BOILER CP2	ESSENTIAL TO OPERATION		T
BOILER ROOM CP	NOT ISSUED	BOILER ROOM CP	ESSENTIAL TO OPERATION	1	T
PLANTROOM					
DBLB	NOT ISSUED	DBLB	ESSENTIAL TO OPERATION		T
DBLW	NOT ISSUED	DBLW	ESSENTIAL TO OPERATION		T
RISER 1A					
DB1AL	NOT ISSUED	DB1AL	ESSENTIAL TO OPERATION		T
DB1PA	NOT ISSUED	DB1PA	ESSENTIAL TO OPERATION		T
DB1ACA	NOT ISSUED	DB1ACA	ESSENTIAL TO OPERATION		T
RISER 1B					
DB1BL	NOT ISSUED	DB1BL	ESSENTIAL TO OPERATION		T
DB1PB	NOT ISSUED	DB1PB	ESSENTIAL TO OPERATION		T
DB1ACB	NOT ISSUED	DB1ACB	ESSENTIAL TO OPERATION		T
RISER A					
DBGAL	NOT ISSUED	DBGAL	ESSENTIAL TO OPERATION		T
DBGPA	NOT ISSUED	DBGPA	ESSENTIAL TO OPERATION		T
DBGACA	NOT ISSUED	DBGACA	ESSENTIAL TO OPERATION		T
RISER B					
DBGBL	NOT ISSUED	DBGBL	ESSENTIAL TO OPERATION		T
DBGPB	NOT ISSUED	DBGPA	ESSENTIAL TO OPERATION		T
DBGACB	NOT ISSUED	DBGACB	ESSENTIAL TO OPERATION		T
SWITCHROOM					
MAIN LV					
DBM	NOT ISSUED	DBM	ESSENTIAL TO OPERATION		T
DB1M	NOT ISSUED	DB1M	ESSENTIAL TO OPERATION		T
DBGA	NOT ISSUED	DBGA	ESSENTIAL TO OPERATION		T
DBLD	NOT ISSUED	DBLD	ESSENTIAL TO OPERATION		T
DBL&P	NOT ISSUED	DBL&P	ESSENTIAL TO OPERATION		T
DBLD2	NOT ISSUED	DBLD2	ESSENTIAL TO OPERATION		T
MAIN ACB INCOMER	NOT ISSUED	MAIN ACB INCOMER	ESSENTIAL TO OPERATION		T

Problems

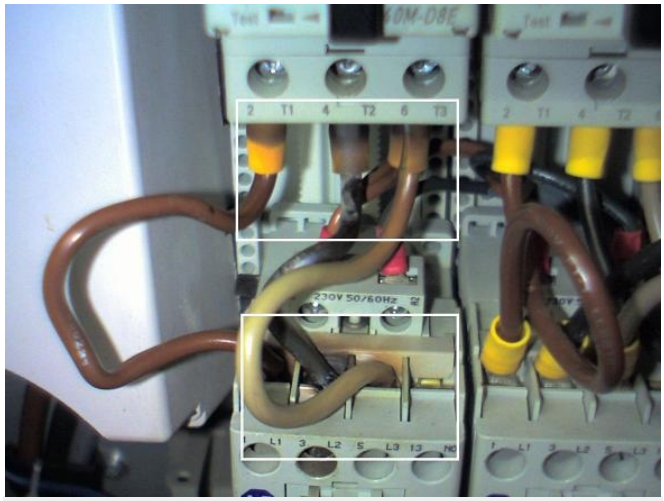
Problem #	Equipment	PM Work Order	Item ID	Temp. Rise Over Ambient	Load Factor	Type	Fault Rating	Status
1	BOILER ROOM - BOILER ROOM CP Component: CB1FD - L2	NOT ISSUED	BOILER ROOM CP	114.0 °C	0.7 %	THERMAL	NO ISSUE	OPEN
1	RISER B - DBGACB Component: NEUTRAL	NOT ISSUED	DBGACB	5.0 °C	0.1 %	THERMAL	NO ISSUE	CLOSED
2	BOILER ROOM - BOILER CP2 Component: BURNER CONTROLLER	NOT ISSUED	BOILER CP2	100.0 °C	0.6 %	THERMAL	NO ISSUE	CLOSED

Fault Pages

Client	Asset	Report Date	Problem #	Problem Type	Fault Rating	Problem Status
TI LTD	TI ELECTRICAL TRENDING DEMO	16/02/2015	1	THERMAL	NO ISSUE	OPEN



File: IR_26155A.jpg **Photo Date:** 08/03/2014

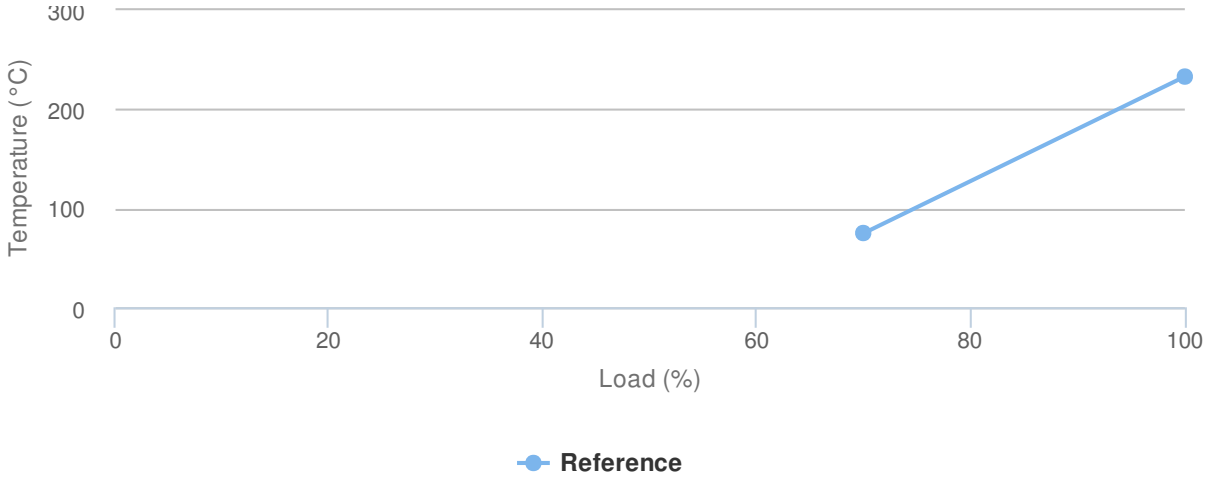


File: DC_26156.jpg **Photo Date:** 08/03/2014

Location/Equipment Information	
Location	BOILER ROOM
Component	BOILER ROOM CP
Status	T
PM Work Order	NOT ISSUED
Item ID	BOILER ROOM CP
Operation Priority	ESSENTIAL TO OPERATION
Fault Item/Description	CB1FD -L2

Problem	
Item	CONTACTORS
Type	100A
Manufacturer	MERLIN GERIN
Anomaly	INDICATED HIGHER TEMPERATURE THAN EXPECTED
Root Cause	SUSPECTED LOOSE, DETERIORATED OR INADEQUATE CONNECTION
Remedial	CHECK, CLEAN & RE-MAKE CONNECTION TO PRESCRIBED STANDARD

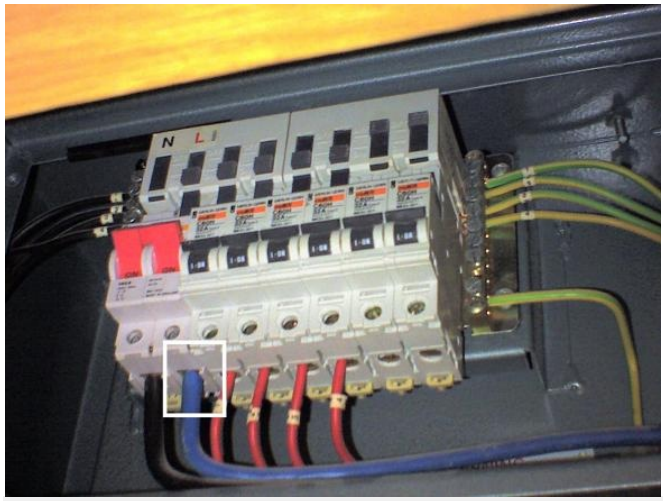
Trending Data	
Measured Temp.	138 °C
Ambient Temp.	24 °C
Nominal Maximum Current	100.0 AMPS
Measured Current	68.0 AMPS
Reference Temp. (BS7671 ref cable temp 65-85°C)	75 °C
Temp. Rise Over Ambient	114.0 °C
Load Factor	0.7 %
Temperature Load Corrected	233.1 °C
Excess of Ref Temp.	158.6 °C
Max Load To Safely Apply Remaining Beneath Ref Temp.	40.7 AMPS
Voltage	412 VOLTS
L1 Load	62 AMPS
L2 Load	68 AMPS
L3 Load	66 AMPS
Neutral Load	AMPS
Ultrasonic Reading	DBUV


300
200
100
0
Temperature (°C)
0
20
40
60
80
100
Load (%)
Reference

Fault Pages

Client	Asset	Report Date	Problem #	Problem Type	Fault Rating	Problem Status
TI LTD	TI ELECTRICAL TRENDING DEMO	16/02/2015	1	THERMAL	NO ISSUE	CLOSED

File: IR_8511A.jpg **Photo Date:** 10/03/2014

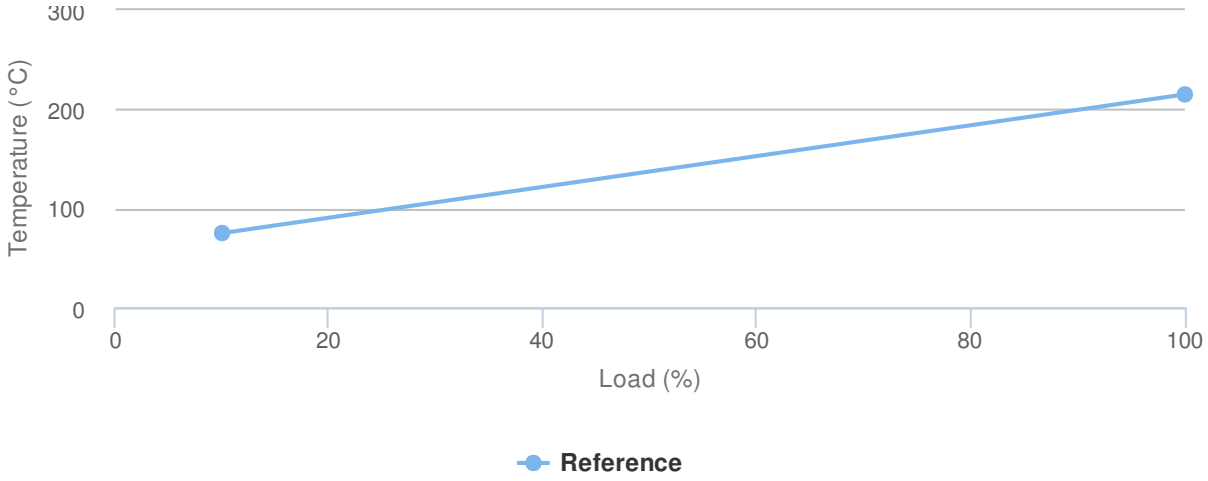


File: DC_8512.jpg **Photo Date:** 10/03/2014

Location/Equipment Information	
Location	RISER B
Component	DBGACB
Status	T
PM Work Order	NOT ISSUED
Item ID	DBGACB
Operation Priority	ESSENTIAL TO OPERATION
Fault Item/Description	NEUTRAL

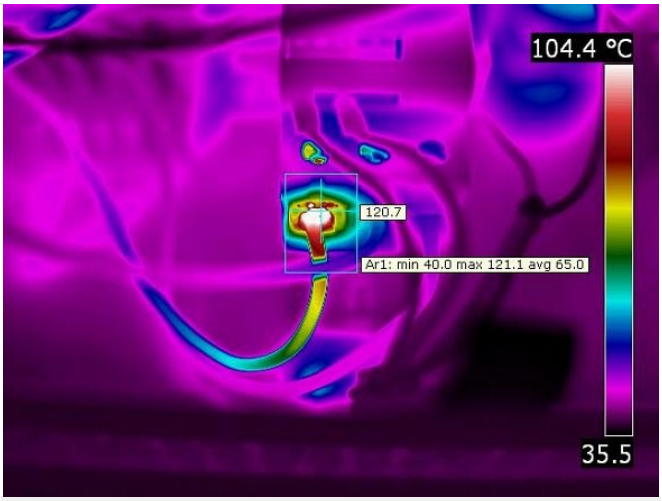
Problem	
Item	MINI CIRCUIT BREAKERS
Type	100A
Manufacturer	MERLIN GERIN
Anomaly	NEUTRAL CONDUCTOR DISPLAYING UNEXPECTED TEMPERATURE ANOMALY
Root Cause	SUSPECTED LOOSE, DETERIORATED OR INADEQUATE CONNECTION
Remedial	CHECK, CLEAN & RE-MAKE CONNECTION TO PRESCRIBED STANDARD

Trending Data	
Measured Temp.	29.0 °C
Ambient Temp.	24.0 °C
Nominal Maximum Current	100.0 AMPS
Measured Current	12.0 AMPS
Reference Temp. (BS7671 ref cable temp 65-85°C)	75.0 °C
Temp. Rise Over Ambient	5.0 °C
Load Factor	0.1 %
Temperature Load Corrected	215.8 °C
Excess of Ref Temp.	141.3 °C
Max Load To Safely Apply Remaining Beneath Ref Temp.	53.3 AMPS
Voltage	240.0 VOLTS
L1 Load	12.0 AMPS
L2 Load	0.0 AMPS
L3 Load	0.0 AMPS
Neutral Load	12.0 AMPS
Ultrasonic Reading	DBUV

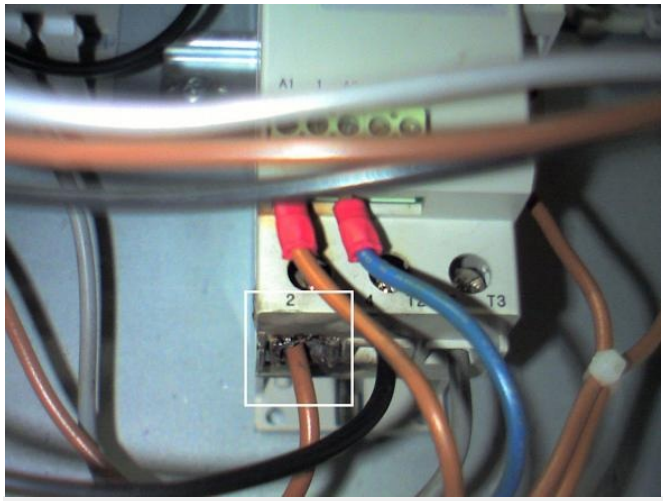

300
200
100
0
Temperature (°C)
0
20
40
60
80
100
Load (%)
Reference

Fault Pages

Client	Asset	Report Date	Problem #	Problem Type	Fault Rating	Problem Status
TI LTD	TI ELECTRICAL TRENDING DEMO	16/02/2015	2	THERMAL	NO ISSUE	CLOSED



File: IR_26157A.jpg **Photo Date:** 08/03/2014

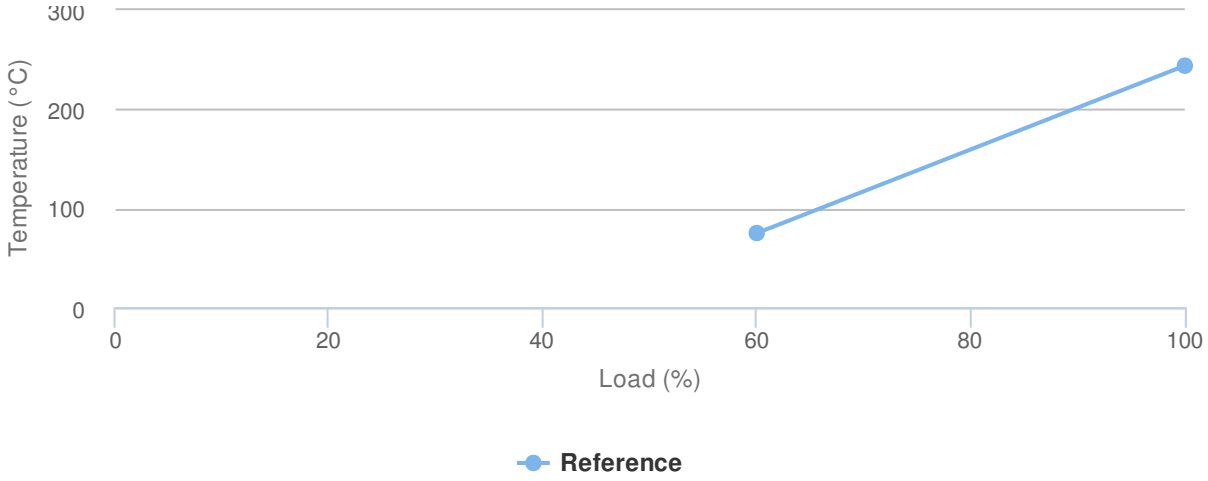


File: DC_26158.jpg **Photo Date:** 08/03/2014

Location/Equipment Information	
Location	BOILER ROOM
Component	BOILER CP2
Status	T
PM Work Order	NOT ISSUED
Item ID	BOILER CP2
Operation Priority	ESSENTIAL TO OPERATION
Fault Item/Description	BURNER CONTROLLER

Problem	
Item	CONTACTORS
Type	63A
Manufacturer	MERLIN GERIN
Anomaly	INDICATED HIGHER TEMPERATURE THAN EXPECTED
Root Cause	SUSPECTED LOOSE OR DETERIORATED CONNECTION
Remedial	CHECK, CLEAN & RE-MAKE CONNECTION TO PRESCRIBED STANDARD

Trending Data	
Measured Temp.	121.0 °C
Ambient Temp.	21.0 °C
Nominal Maximum Current	63.0 AMPS
Measured Current	36.0 AMPS
Reference Temp. (BS7671 ref cable temp 65-85°C)	75.0 °C
Temp. Rise Over Ambient	100.0 °C
Load Factor	0.6 %
Temperature Load Corrected	244.4 °C
Excess of Ref Temp.	169.9 °C
Max Load To Safely Apply Remaining Beneath Ref Temp.	24.3 AMPS
Voltage	415.0 VOLTS
L1 Load	36.0 AMPS
L2 Load	42.0 AMPS
L3 Load	41.0 AMPS
Neutral Load	0.0 AMPS
Ultrasonic Reading	DBUV


300
200
100
0
Temperature (°C)
0
20
40
60
80
100
Load (%)
Reference

Trending Data

Current Inspection No	TI ELECTRICAL TRENDING DEMO-2
Report Date	16th Feb 2015
Item No	1
Status	T
PM Work Order	NOT ISSUED
Item ID	DBGA
Operation Priority	ESSENTIAL TO OPERATION

File: DC_7006.jpg

SWITCHROOM > MAIN LV - DBGA

File: IR_2461.jpg

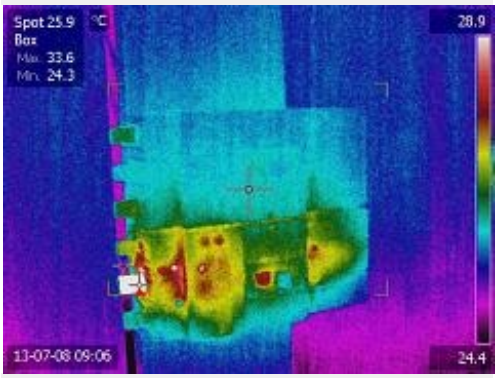


Photo Date: 10/03/2014

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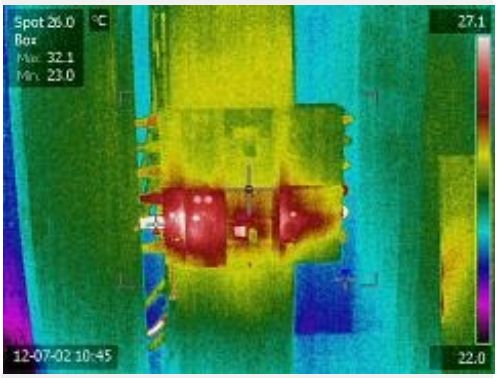

Photo Date: 10/03/2014

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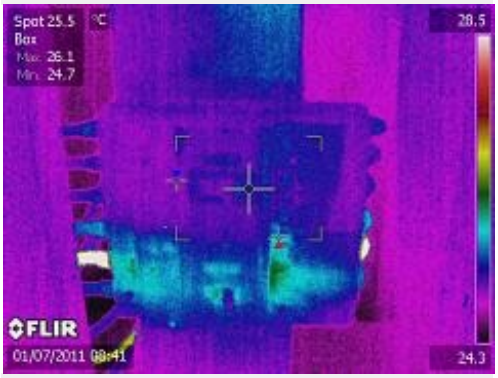
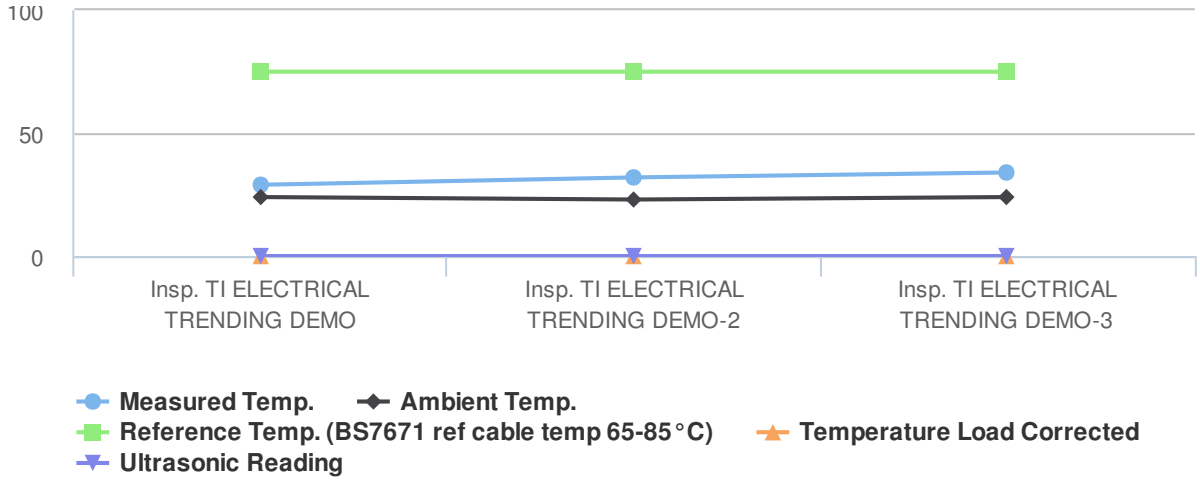


Photo Date: 08/03/2014

Trend Data Graph



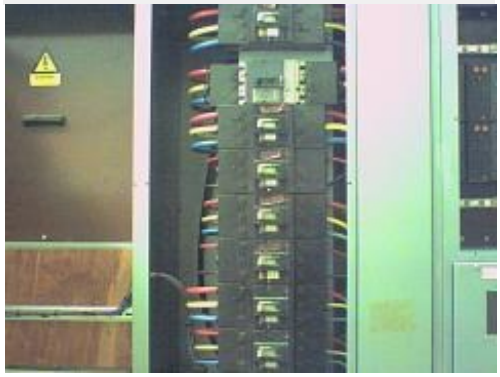
Inspection History

Inspection Reference	Date Inspected	Measured Temp.	Ambient Temp.	Reference Temp. (BS7671 ref cable temp 65-85°C)	Temperature Load Corrected	Ultrasonic Reading
TI ELECTRICAL TRENDING DEMO-3	10th Mar 2014	34 °C (+2)	24 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO-2	10th Mar 2014	32 °C (+3)	23 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO	8th Mar 2014	29 °C (0)	24 °C	75 °C	°C	DBUV

Trending Data

Current Inspection No	TI ELECTRICAL TRENDING DEMO-2
Report Date	16th Feb 2015
Item No	2
Status	T
PM Work Order	NOT ISSUED
Item ID	DBM
Operation Priority	ESSENTIAL TO OPERATION

File: DC_7010.jpg



SWITCHROOM > MAIN LV - DBM

File: IR_2465.jpg

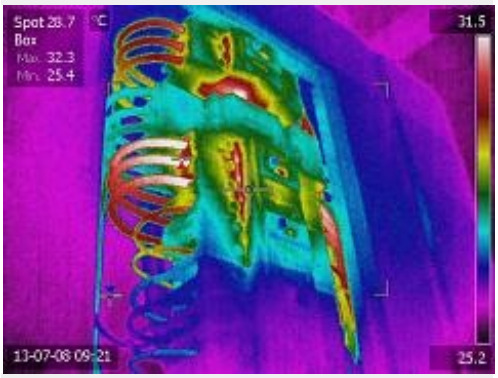


Photo Date: 10/03/2014

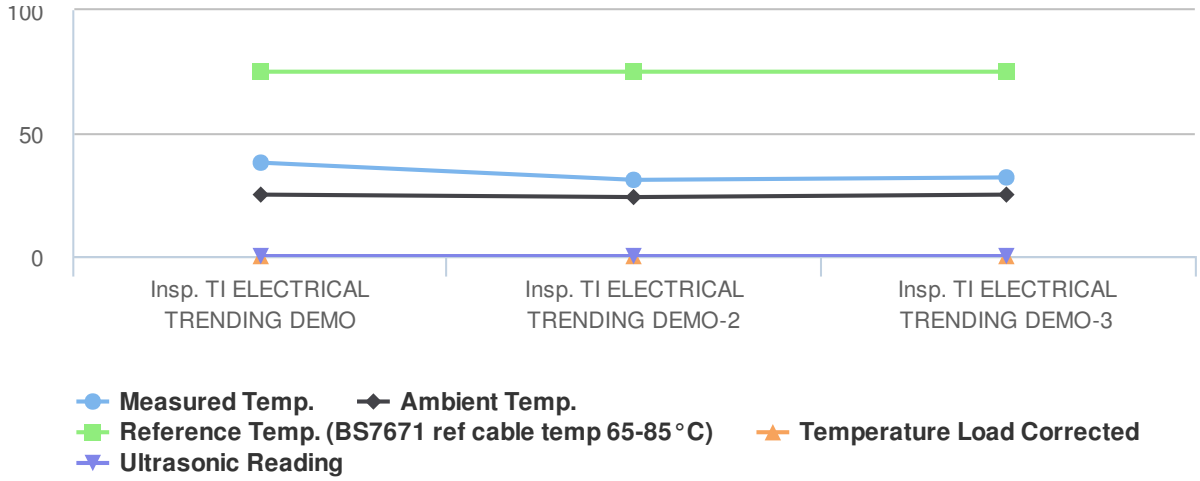
File: IR_8500.jpg

Photo Date: 10/03/2014

File: IR_7009.jpg

Photo Date: 08/03/2014

Trend Data Graph



Inspection History

Inspection Reference	Date Inspected	Measured Temp.	Ambient Temp.	Reference Temp. (BS7671 ref cable temp 65-85°C)	Temperature Load Corrected	Ultrasonic Reading
TI ELECTRICAL TRENDING DEMO-3	10th Mar 2014	32 °C (+1)	25 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO-2	10th Mar 2014	31 °C (-7)	24 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO	8th Mar 2014	38 °C (0)	25 °C	75 °C	°C	DBUV

Trending Data

Current Inspection No	TI ELECTRICAL TRENDING DEMO-2
Report Date	16th Feb 2015
Item No	3
Status	T
PM Work Order	NOT ISSUED
Item ID	DBLD
Operation Priority	ESSENTIAL TO OPERATION

File: DC_7012.jpg

SWITCHROOM > MAIN LV - DBLD

File: IR_2463.jpg

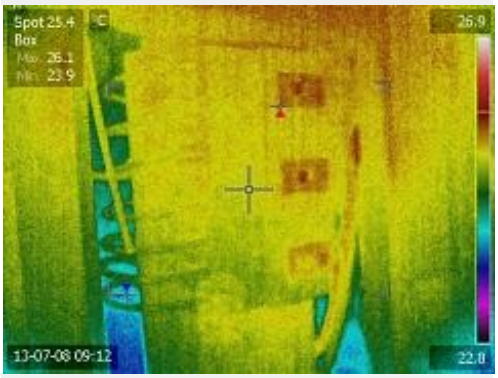


Photo Date: 10/03/2014

File: IR_8501.jpg

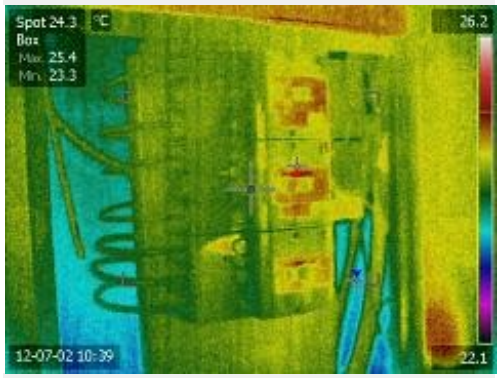


Photo Date: 10/03/2014

File: IR_7011.jpg

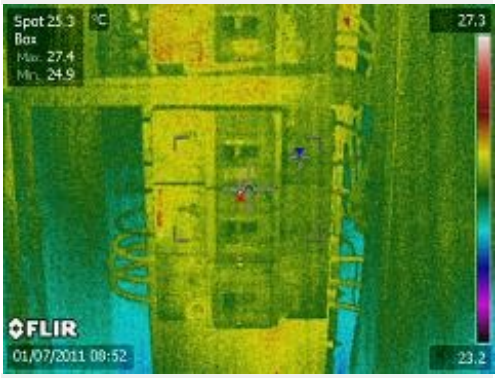
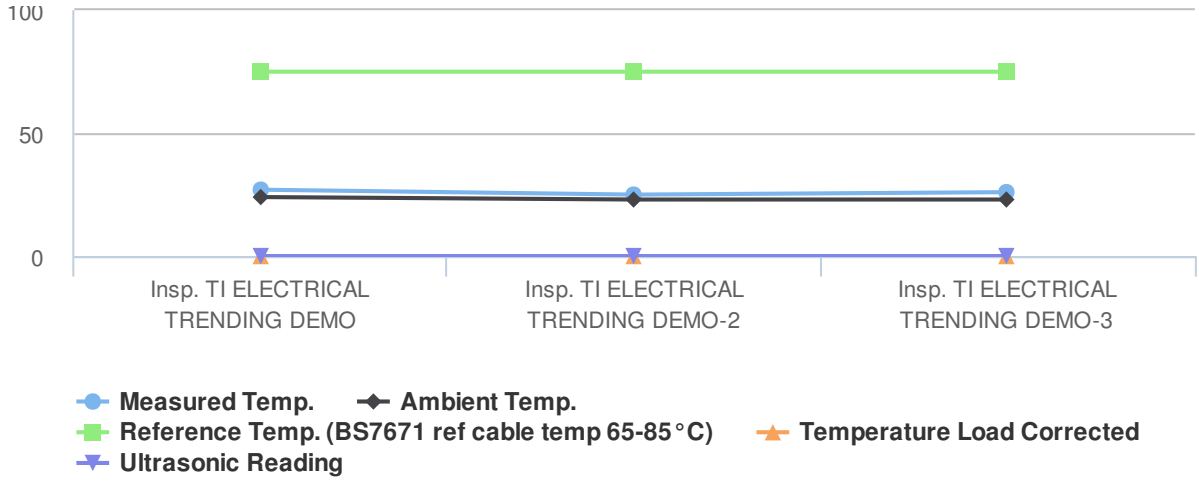


Photo Date: 08/03/2014

Trend Data Graph



Inspection History

Inspection Reference	Date Inspected	Measured Temp.	Ambient Temp.	Reference Temp. (BS7671 ref cable temp 65-85°C)	Temperature Load Corrected	Ultrasonic Reading
TI ELECTRICAL TRENDING DEMO-3	10th Mar 2014	26 °C (+1)	23 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO-2	10th Mar 2014	25 °C (-2)	23 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO	8th Mar 2014	27 °C (0)	24 °C	75 °C	°C	DBUV

Trending Data

Current Inspection No	TI ELECTRICAL TRENDING DEMO-2
Report Date	16th Feb 2015
Item No	4
Status	T
PM Work Order	NOT ISSUED
Item ID	MAIN ACB INCOMER
Operation Priority	ESSENTIAL TO OPERATION

File: DC_7014.jpg

SWITCHROOM > MAIN LV - MAIN ACB INCOMER

File: IR_2460.jpg

Photo Date: 10/03/2014

File: IR_7013.jpg

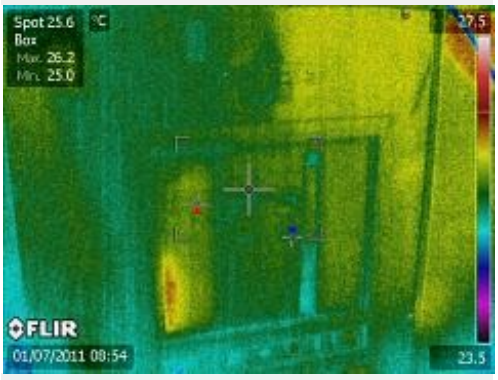
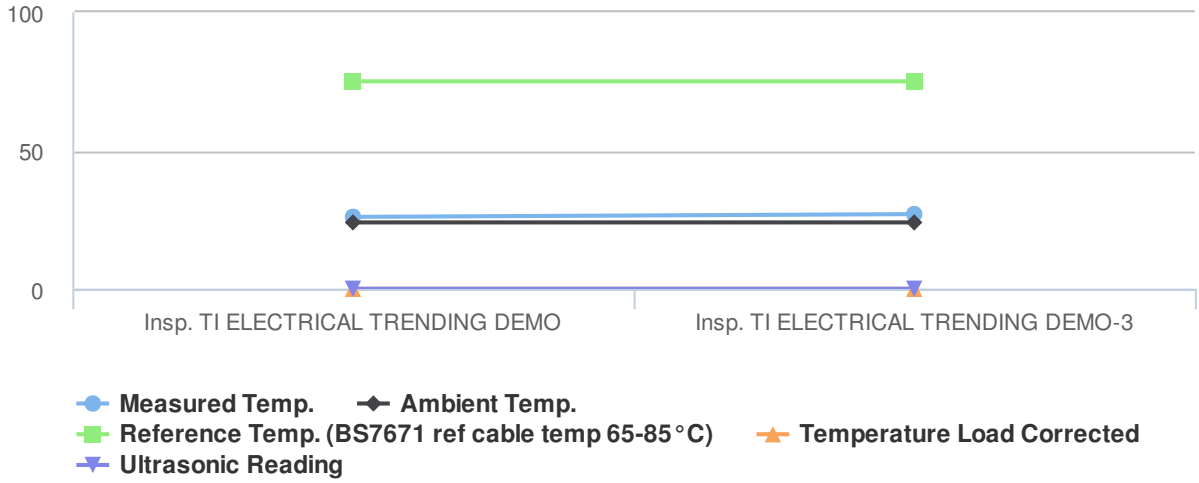


Photo Date: 08/03/2014

Trend Data Graph



Inspection History

Inspection Reference	Date Inspected	Measured Temp.	Ambient Temp.	Reference Temp. (BS7671 ref cable temp 65-85°C)	Temperature Load Corrected	Ultrasonic Reading
TI ELECTRICAL TRENDING DEMO-3	10th Mar 2014	27 °C (+1)	24 °C	75 °C	°C	DBUV

TI ELECTRICAL TRENDING DEMO	8th Mar 2014	26 °C (0)	24 °C	75 °C	°C	DBUV

Trending Data

Current Inspection No	TI ELECTRICAL TRENDING DEMO-2
Report Date	16th Feb 2015
Item No	5
Status	T
PM Work Order	NOT ISSUED
Item ID	DB1M
Operation Priority	ESSENTIAL TO OPERATION

File: DC_7016.jpg

SWITCHROOM > MAIN LV - DB1M

File: IR_2464.jpg

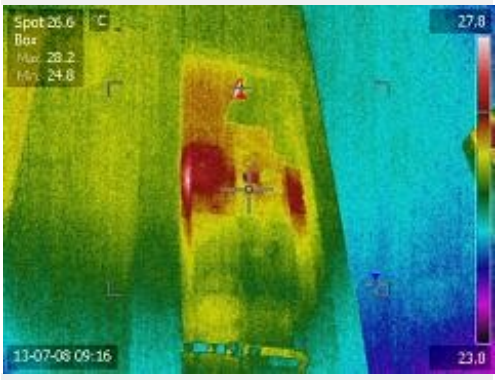


Photo Date: 10/03/2014

File: IR_8504.jpg

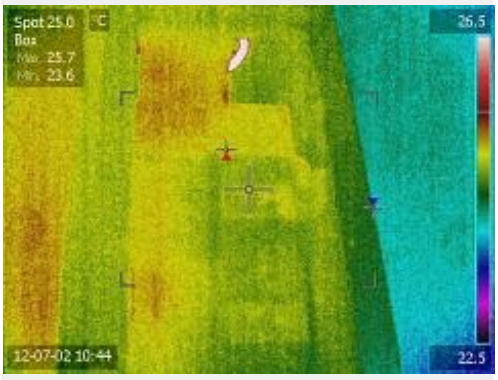


Photo Date: 10/03/2014

File: IR_7015.jpg

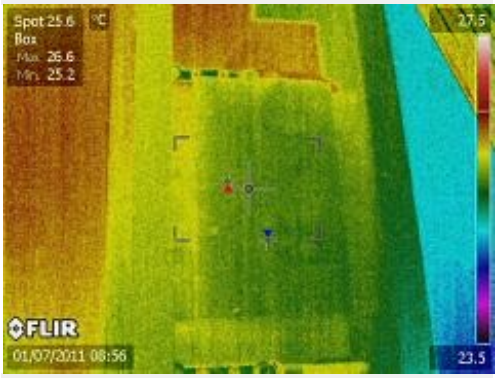
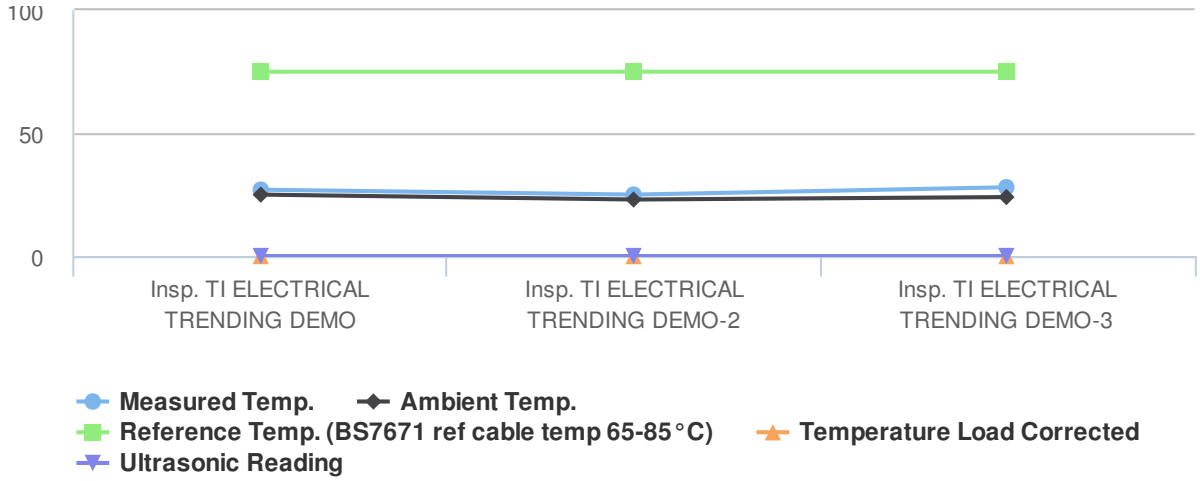


Photo Date: 08/03/2014

Trend Data Graph



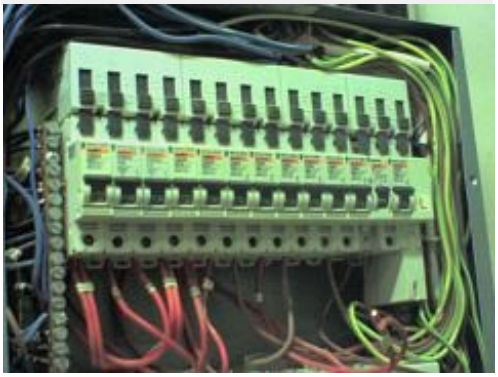
Inspection History

Inspection Reference	Date Inspected	Measured Temp.	Ambient Temp.	Reference Temp. (BS7671 ref cable temp 65-85°C)	Temperature Load Corrected	Ultrasonic Reading
TI ELECTRICAL TRENDING DEMO-3	10th Mar 2014	28 °C (+3)	24 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO-2	10th Mar 2014	25 °C (-2)	23 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO	8th Mar 2014	27 °C (0)	25 °C	75 °C	°C	DBUV

Trending Data

Current Inspection No	TI ELECTRICAL TRENDING DEMO-2
Report Date	16th Feb 2015
Item No	6
Status	T
PM Work Order	NOT ISSUED
Item ID	DBL&P
Operation Priority	ESSENTIAL TO OPERATION

File: DC_7018.jpg



SWITCHROOM > MAIN LV - DBL&P

File: IR_2459.jpg

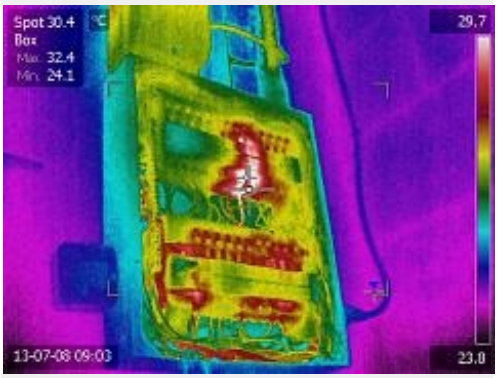


Photo Date: 10/03/2014

File: IR_8508.jpg

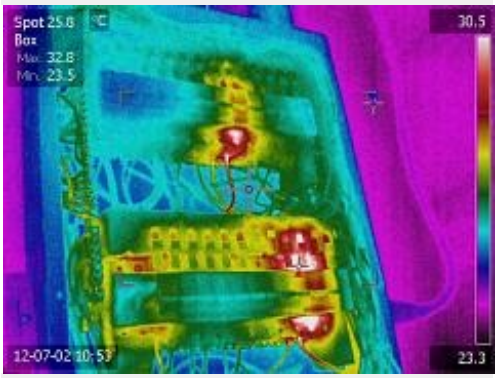


Photo Date: 10/03/2014

File: IR_7017.jpg

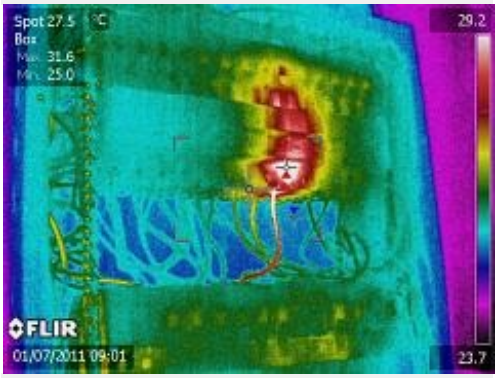
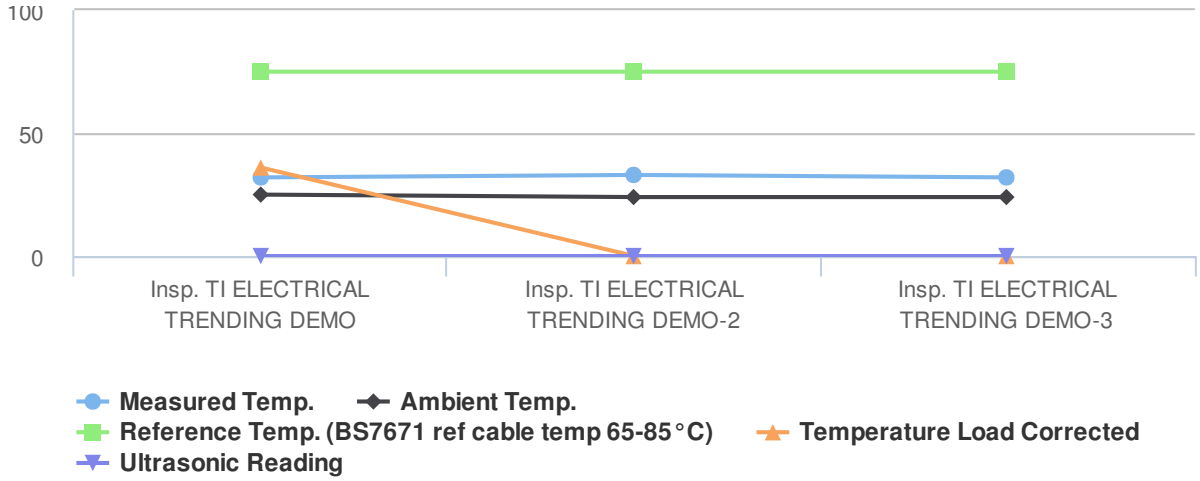


Photo Date: 08/03/2014

Trend Data Graph



Inspection History

Inspection Reference	Date Inspected	Measured Temp.	Ambient Temp.	Reference Temp. (BS7671 ref cable temp 65-85°C)	Temperature Load Corrected	Ultrasonic Reading
TI ELECTRICAL TRENDING DEMO-3	10th Mar 2014	32 °C (-1)	24 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO-2	10th Mar 2014	33 °C (+1)	24 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO	8th Mar 2014	32 °C (0)	25 °C	75 °C	36.0 °C	DBUV

Trending Data

Current Inspection No	TI ELECTRICAL TRENDING DEMO-2
Report Date	16th Feb 2015
Item No	7
Status	T
PM Work Order	NOT ISSUED
Item ID	DBLD2
Operation Priority	ESSENTIAL TO OPERATION

File: DC_7020.jpg

SWITCHROOM > MAIN LV - DBLD2

File: IR_2457.jpg

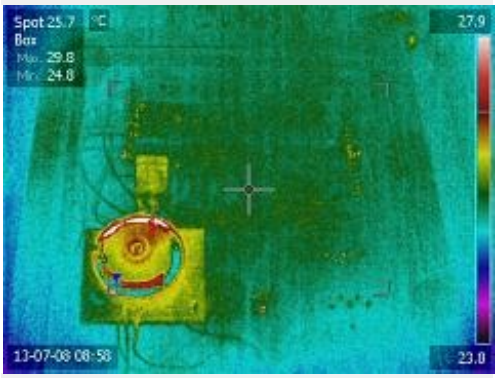


Photo Date: 10/03/2014

File: IR_8510.jpg

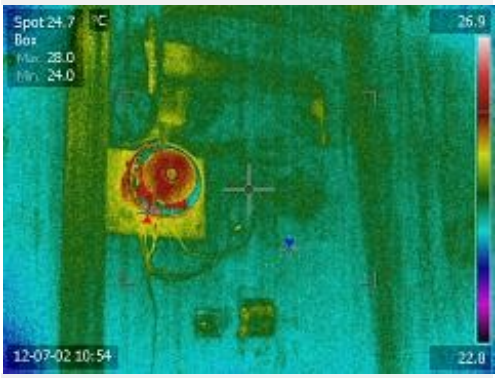
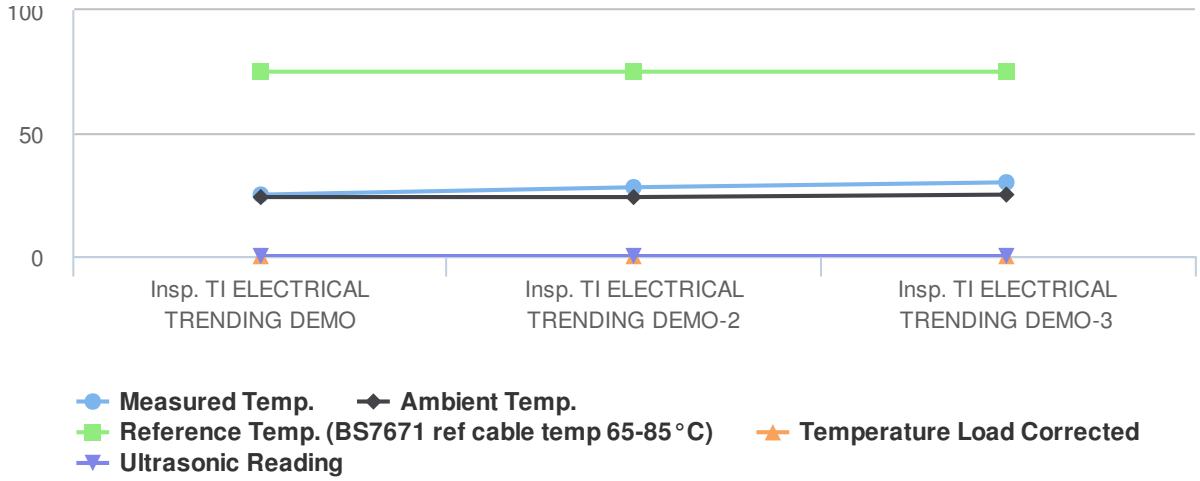


Photo Date: 10/03/2014

File: IR_7019.jpg

Photo Date: 08/03/2014

Trend Data Graph



Inspection History

Inspection Reference	Date Inspected	Measured Temp.	Ambient Temp.	Reference Temp. (BS7671 ref cable temp 65-85°C)	Temperature Load Corrected	Ultrasonic Reading
TI ELECTRICAL TRENDING DEMO-3	10th Mar 2014	30 °C (+2)	25 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO-2	10th Mar 2014	28 °C (+3)	24 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO	8th Mar 2014	25 °C (0)	24 °C	75 °C	°C	DBUV

Trending Data

Current Inspection No	TI ELECTRICAL TRENDING DEMO-2
Report Date	16th Feb 2015
Item No	8
Status	T
PM Work Order	NOT ISSUED
Item ID	BOILER ROOM CP
Operation Priority	ESSENTIAL TO OPERATION

File: DC_26154.jpg

BOILER ROOM - BOILER ROOM CP

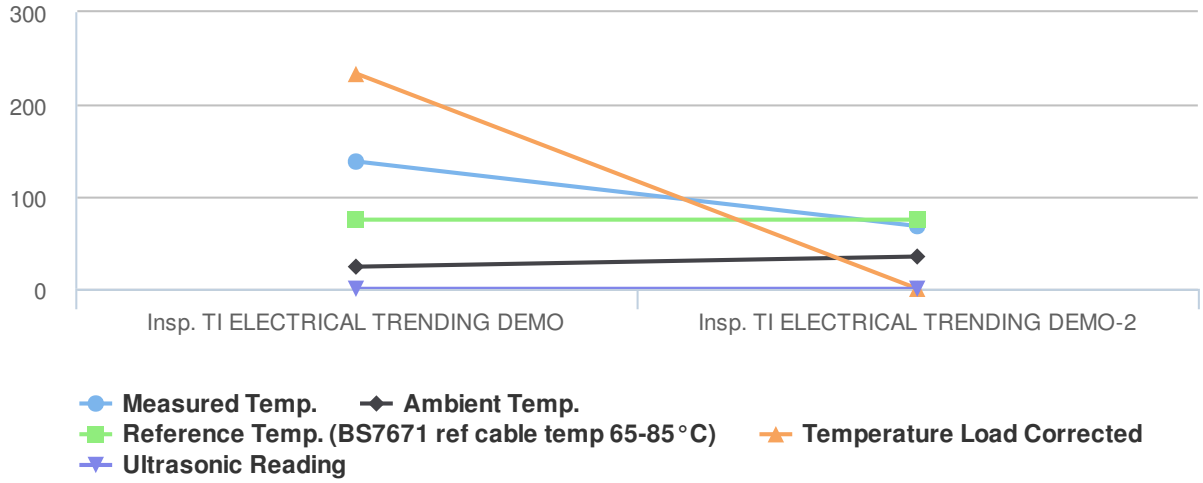
File: IR_26153.jpg

Photo Date: 10/03/2014

File: IR_26153.jpg

Photo Date: 08/03/2014

Trend Data Graph



Inspection History

Inspection Reference	Date Inspected	Measured Temp.	Ambient Temp.	Reference Temp. (BS7671 ref cable temp 65-85°C)	Temperature Load Corrected	Ultrasonic Reading
TI ELECTRICAL TRENDING DEMO-2	10th Mar 2014	68 °C (-70)	35 °C	75 °C	°C	DBUV

TI ELECTRICAL TRENDING DEMO	8th Mar 2014	138 °C (0)	24 °C	75 °C	233.1 °C	DBUV

Trending Data

Current Inspection No	TI ELECTRICAL TRENDING DEMO-2
Report Date	16th Feb 2015
Item No	9
Status	T
PM Work Order	NOT ISSUED
Item ID	BOILER CP2
Operation Priority	ESSENTIAL TO OPERATION

File: DC_26154.jpg

BOILER ROOM - BOILER CP2

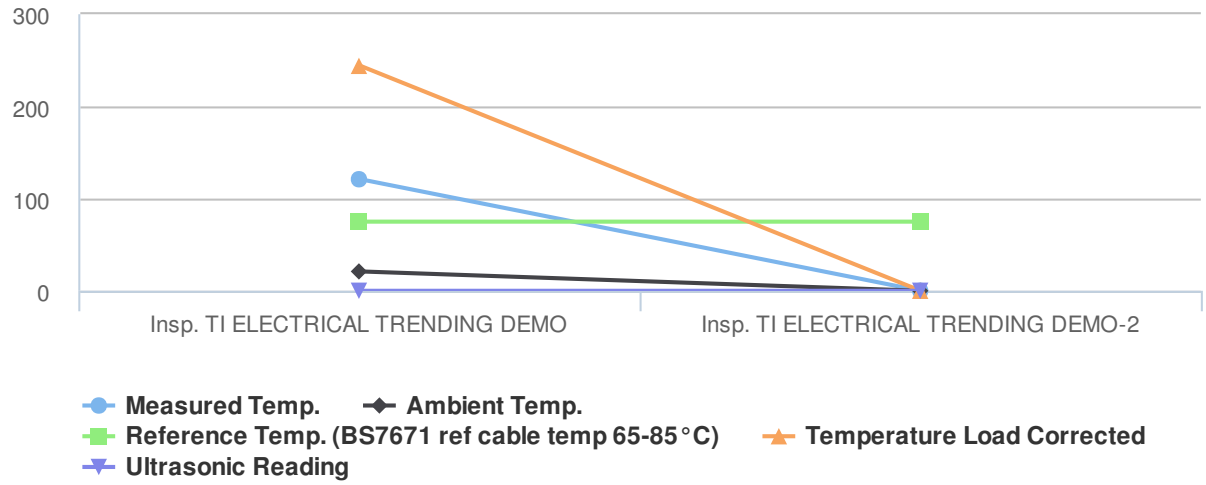
File: IR_8485.jpg

Photo Date: 10/03/2014

File: IR_26153.jpg

Photo Date: 08/03/2014

Trend Data Graph



Inspection History

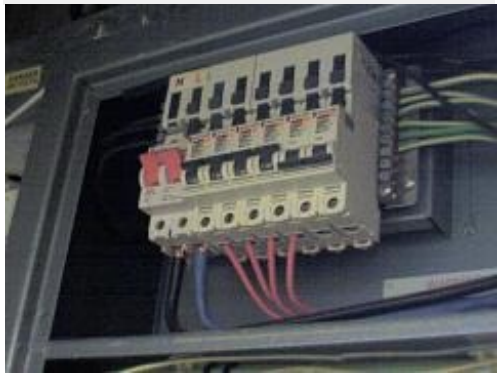
Inspection Reference	Date Inspected	Measured Temp.	Ambient Temp.	Reference Temp. (BS7671 ref cable temp 65-85°C)	Temperature Load Corrected	Ultrasonic Reading
TI ELECTRICAL TRENDING DEMO-2	10th Mar 2014	°C (-121)	°C	75 °C	°C	DBUV

TI ELECTRICAL TRENDING DEMO	8th Mar 2014	121.0 °C (0)	21.0 °C	75.0 °C	244.4 °C	DBUV

Trending Data

Current Inspection No	TI ELECTRICAL TRENDING DEMO-2
Report Date	16th Feb 2015
Item No	10
Status	T
PM Work Order	NOT ISSUED
Item ID	DBGACA
Operation Priority	ESSENTIAL TO OPERATION

File: DC_7029.jpg



RISER A - DBGACA

File: IR_2469.jpg

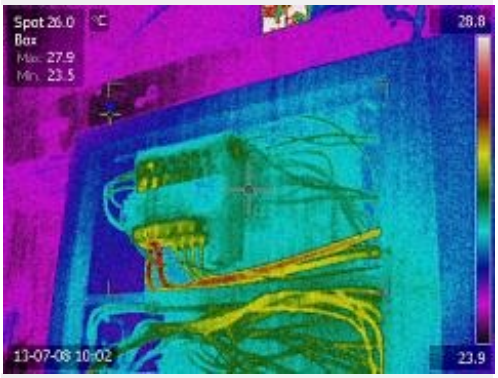
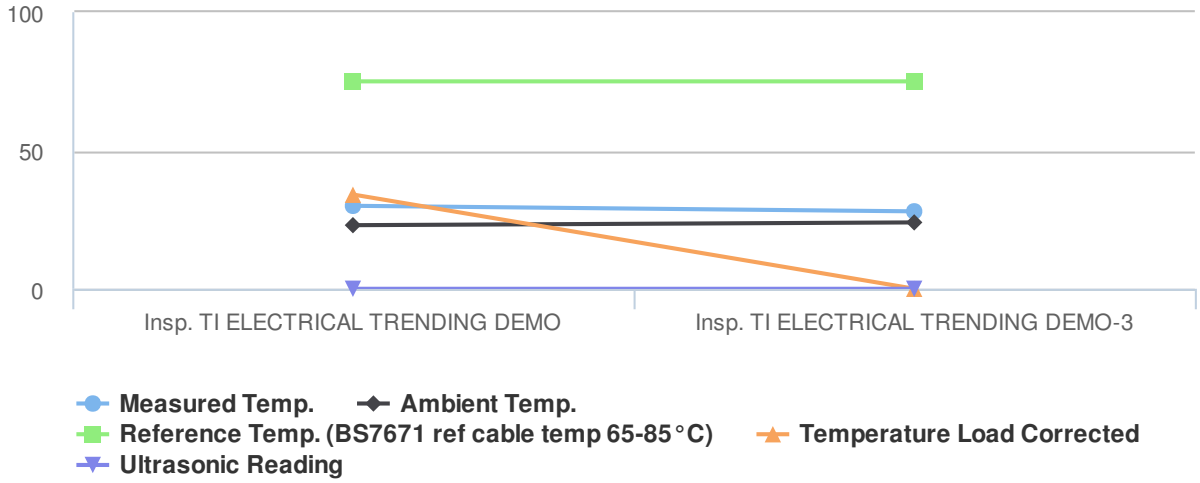


Photo Date: 10/03/2014

File: IR_7028.jpg

Photo Date: 08/03/2014

Trend Data Graph



Inspection History

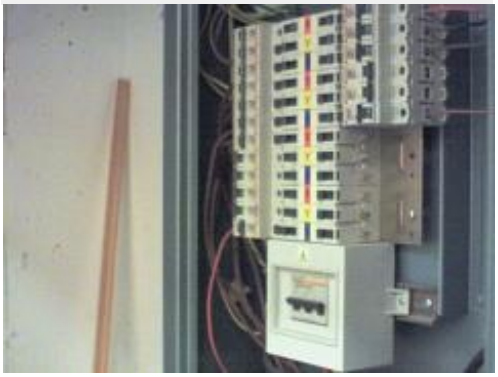
Inspection Reference	Date Inspected	Measured Temp.	Ambient Temp.	Reference Temp. (BS7671 ref cable temp 65-85°C)	Temperature Load Corrected	Ultrasonic Reading
TI ELECTRICAL TRENDING DEMO-3	10th Mar 2014	28 °C (-2)	24 °C	75 °C	°C	DBUV

TI ELECTRICAL TRENDING DEMO	8th Mar 2014	30 °C (0)	23 °C	75 °C	34.0 °C	DBUV

Trending Data

Current Inspection No	TI ELECTRICAL TRENDING DEMO-2
Report Date	16th Feb 2015
Item No	11
Status	T
PM Work Order	NOT ISSUED
Item ID	DBGPA
Operation Priority	ESSENTIAL TO OPERATION

File: DC_7031.jpg



RISER A - DBGPA

File: IR_2470.jpg

Photo Date: 10/03/2014

File: IR_8516.jpg

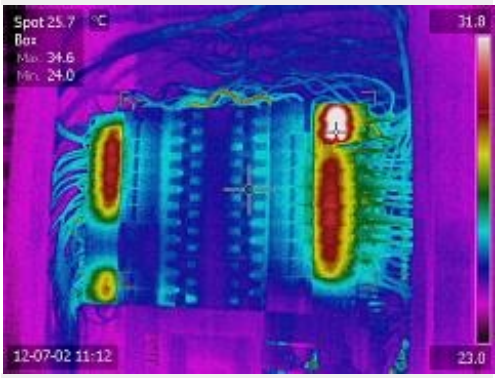


Photo Date: 10/03/2014

File: IR_7030.jpg

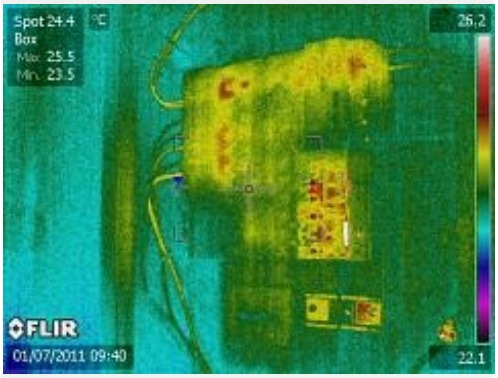
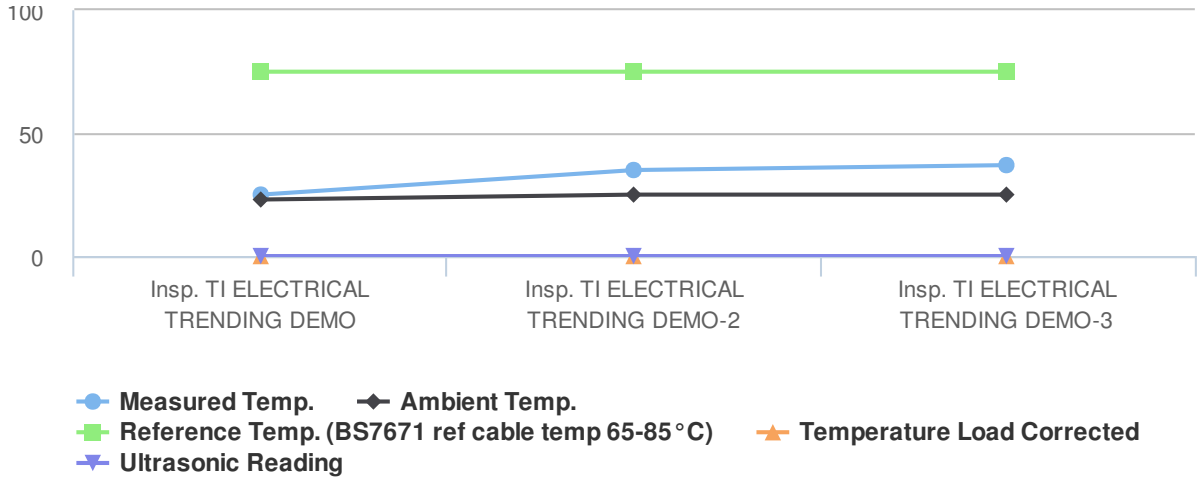


Photo Date: 08/03/2014

Trend Data Graph



Inspection History

Inspection Reference	Date Inspected	Measured Temp.	Ambient Temp.	Reference Temp. (BS7671 ref cable temp 65-85°C)	Temperature Load Corrected	Ultrasonic Reading
TI ELECTRICAL TRENDING DEMO-3	10th Mar 2014	37 °C (+2)	25 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO-2	10th Mar 2014	35 °C (+10)	25 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO	8th Mar 2014	25 °C (0)	23 °C	75 °C	°C	DBUV

Trending Data

Current Inspection No	TI ELECTRICAL TRENDING DEMO-2
Report Date	16th Feb 2015
Item No	12
Status	T
PM Work Order	NOT ISSUED
Item ID	DBGAL
Operation Priority	ESSENTIAL TO OPERATION

File: DC_7033.jpg

RISER A - DBGAL

File: IR_2471.jpg

Photo Date: 10/03/2014

File: IR_8517.jpg

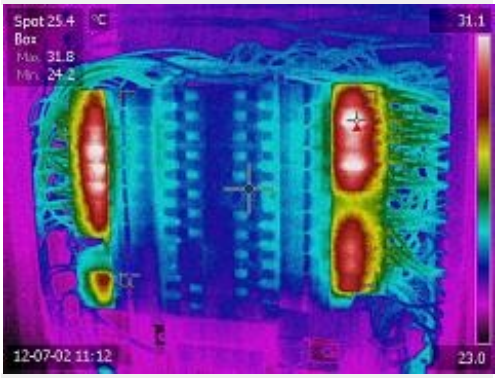
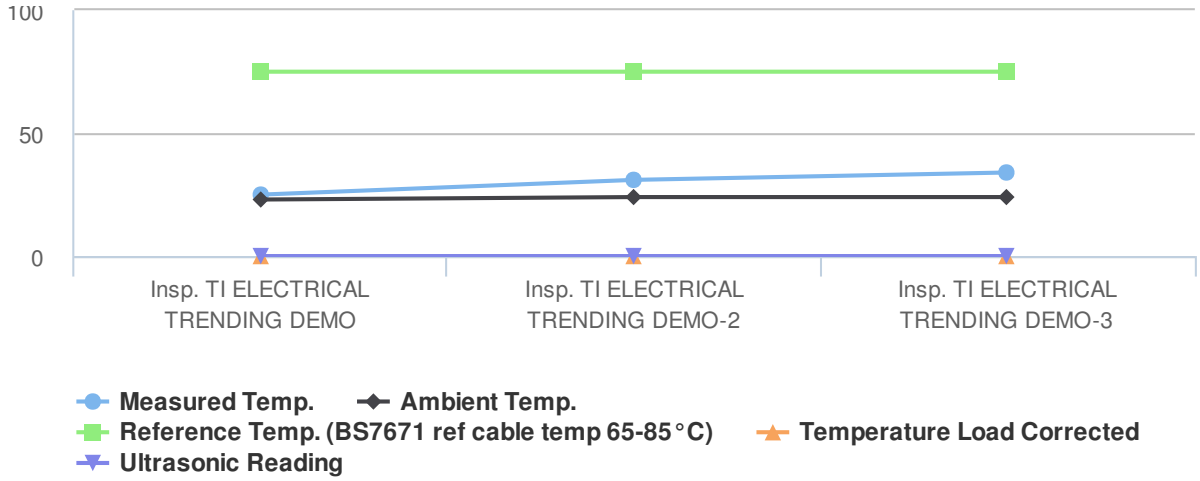


Photo Date: 10/03/2014

File: IR_7032.jpg

Photo Date: 08/03/2014

Trend Data Graph



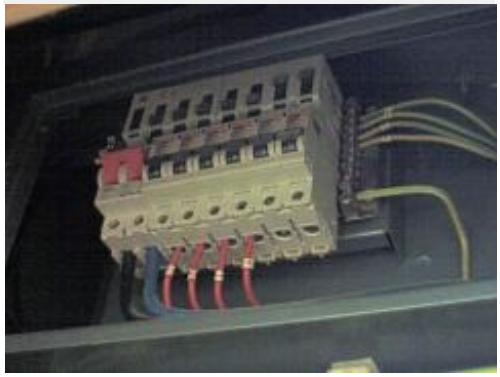
Inspection History

Inspection Reference	Date Inspected	Measured Temp.	Ambient Temp.	Reference Temp. (BS7671 ref cable temp 65-85°C)	Temperature Load Corrected	Ultrasonic Reading
TI ELECTRICAL TRENDING DEMO-3	10th Mar 2014	34 °C (+3)	24 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO-2	10th Mar 2014	31 °C (+6)	24 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO	8th Mar 2014	25 °C (0)	23 °C	75 °C	°C	DBUV

Trending Data

Current Inspection No	TI ELECTRICAL TRENDING DEMO-2
Report Date	16th Feb 2015
Item No	13
Status	T
PM Work Order	NOT ISSUED
Item ID	DBGACB
Operation Priority	ESSENTIAL TO OPERATION

File: DC_7036.jpg



RISER B - DBGACB

File: IR_2468.jpg

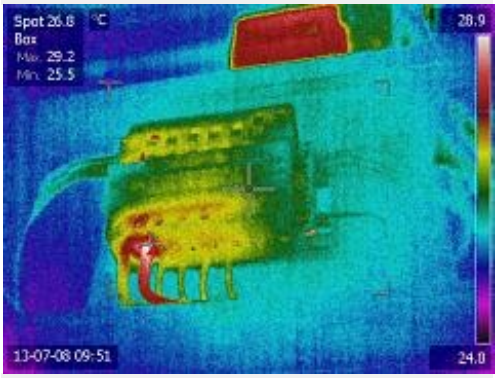


Photo Date: 10/03/2014

File: IR_8511.jpg

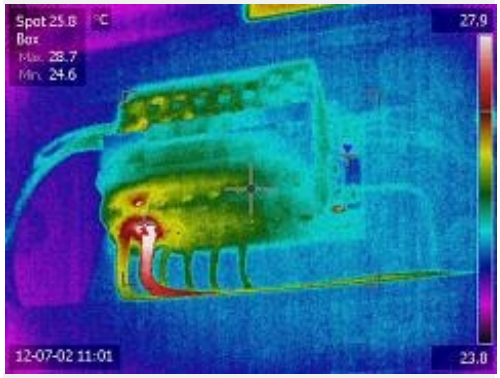


Photo Date: 10/03/2014

File: IR_7035.jpg

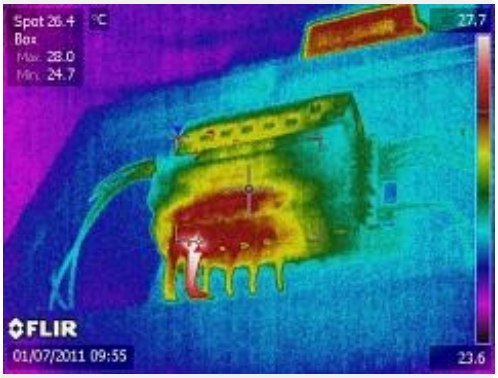
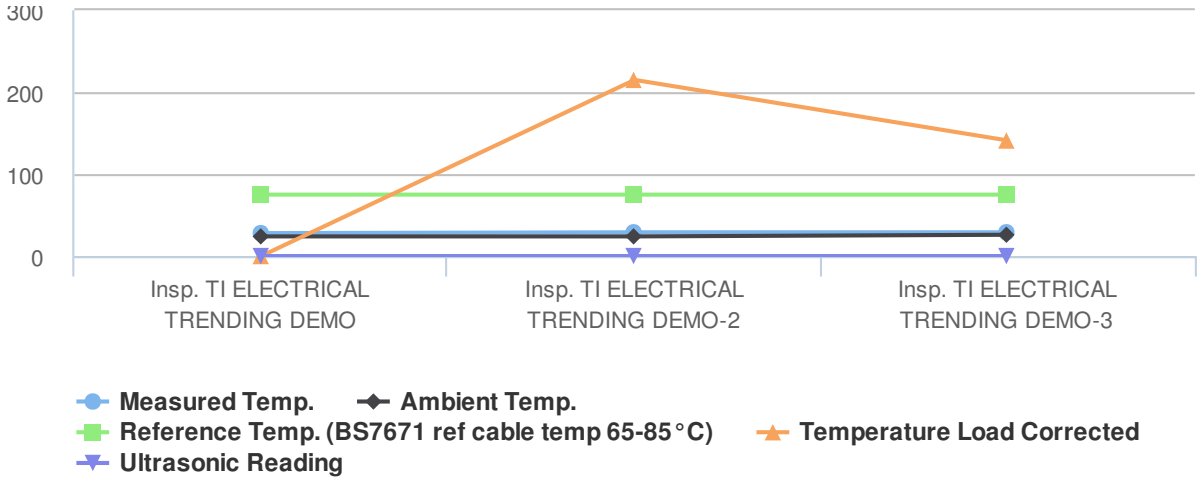


Photo Date: 08/03/2014

Trend Data Graph



Inspection History

Inspection Reference	Date Inspected	Measured Temp.	Ambient Temp.	Reference Temp. (BS7671 ref cable temp 65-85°C)	Temperature Load Corrected	Ultrasonic Reading
TI ELECTRICAL TRENDING DEMO-3	10th Mar 2014	29.0 °C (+1)	26.0 °C	75.0 °C	141.1 °C	DBUV
TI ELECTRICAL TRENDING DEMO-2	10th Mar 2014	29.0 °C (0)	24.0 °C	75.0 °C	215.8 °C	DBUV
TI ELECTRICAL TRENDING DEMO	8th Mar 2014	28 °C (0)	24 °C	75 °C	°C	DBUV

Trending Data

Current Inspection No	TI ELECTRICAL TRENDING DEMO-2
Report Date	16th Feb 2015
Item No	14
Status	T
PM Work Order	NOT ISSUED
Item ID	DBGBL
Operation Priority	ESSENTIAL TO OPERATION

File: DC_7038.jpg

RISER B - DBGBL

File: IR_2469.jpg

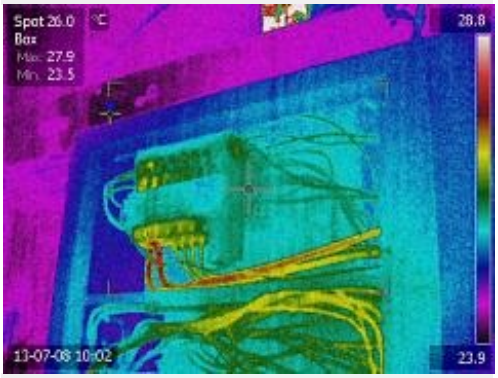


Photo Date: 10/03/2014

File: IR_8513.jpg

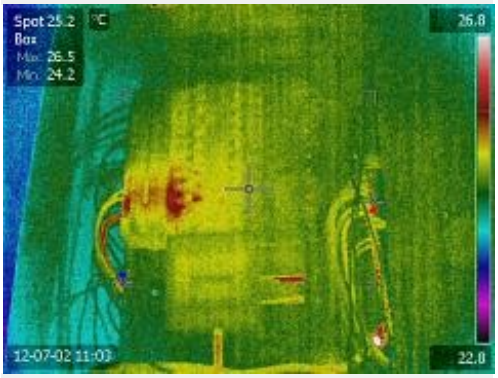
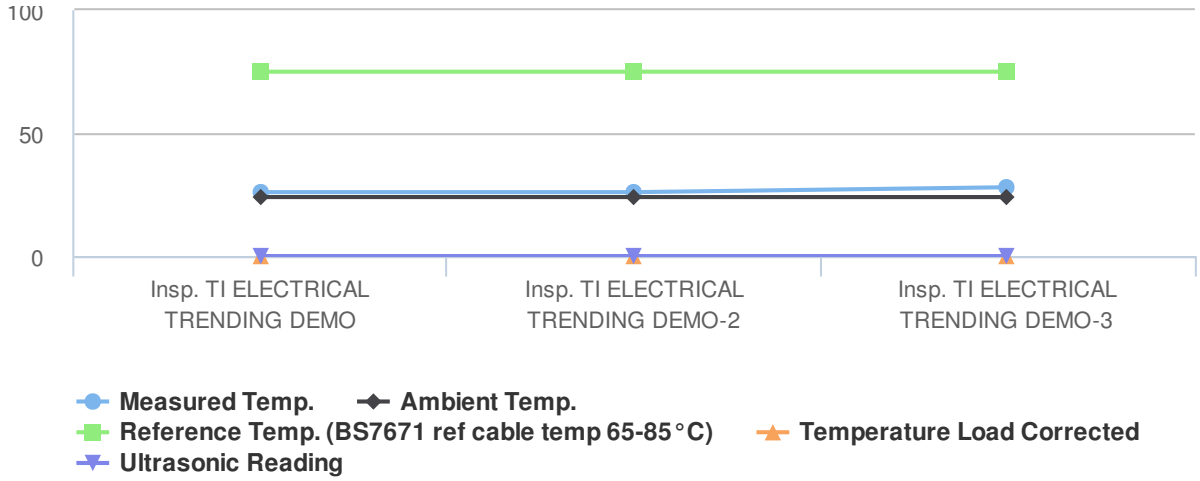


Photo Date: 10/03/2014

File: IR_7037.jpg

Photo Date: 08/03/2014

Trend Data Graph



Inspection History

Inspection Reference	Date Inspected	Measured Temp.	Ambient Temp.	Reference Temp. (BS7671 ref cable temp 65-85°C)	Temperature Load Corrected	Ultrasonic Reading
TI ELECTRICAL TRENDING DEMO-3	10th Mar 2014	28 °C (+2)	24 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO-2	10th Mar 2014	26 °C (0)	24 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO	8th Mar 2014	26 °C (0)	24 °C	75 °C	°C	DBUV

Trending Data

Current Inspection No	TI ELECTRICAL TRENDING DEMO-2
Report Date	16th Feb 2015
Item No	15
Status	T
PM Work Order	NOT ISSUED
Item ID	DBGPA
Operation Priority	ESSENTIAL TO OPERATION

File: DC_7040.jpg

RISER B - DBGPB

File: IR_2466.jpg

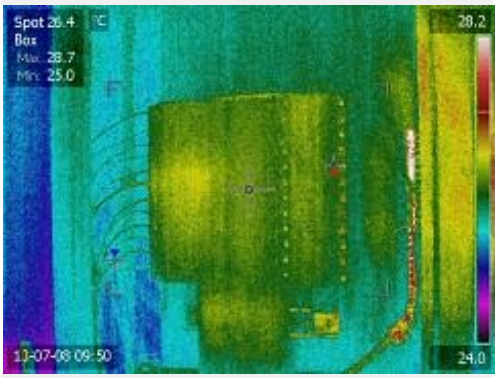


Photo Date: 10/03/2014

File: IR_8514.jpg

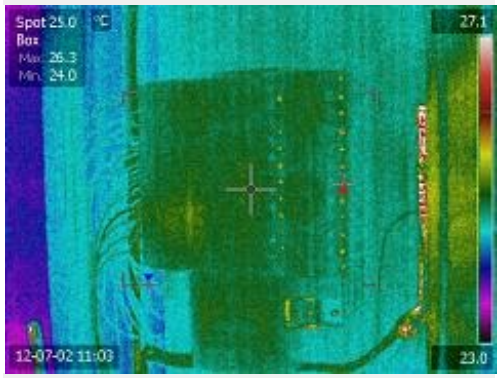


Photo Date: 10/03/2014

File: IR_7039.jpg

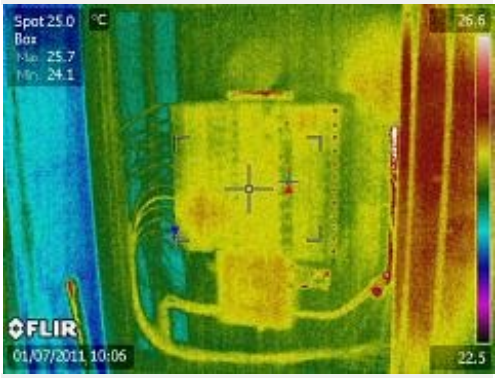
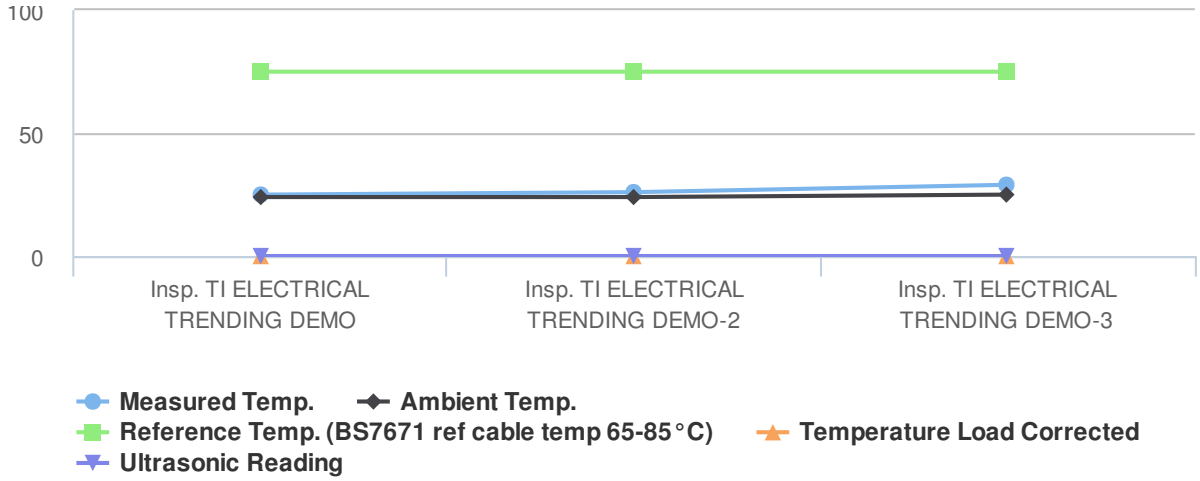


Photo Date: 08/03/2014

Trend Data Graph



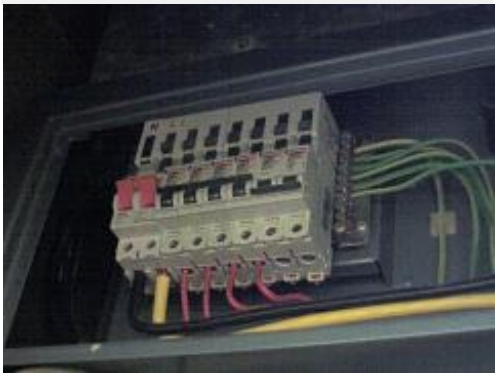
Inspection History

Inspection Reference	Date Inspected	Measured Temp.	Ambient Temp.	Reference Temp. (BS7671 ref cable temp 65-85°C)	Temperature Load Corrected	Ultrasonic Reading
TI ELECTRICAL TRENDING DEMO-3	10th Mar 2014	29 °C (+3)	25 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO-2	10th Mar 2014	26 °C (+1)	24 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO	8th Mar 2014	25 °C (0)	24 °C	75 °C	°C	DBUV

Trending Data

Current Inspection No	TI ELECTRICAL TRENDING DEMO-2
Report Date	16th Feb 2015
Item No	16
Status	T
PM Work Order	NOT ISSUED
Item ID	DB1ACB
Operation Priority	ESSENTIAL TO OPERATION

File: DC_7043.jpg



RISER 1B - DB1ACB

File: IR_2454.jpg

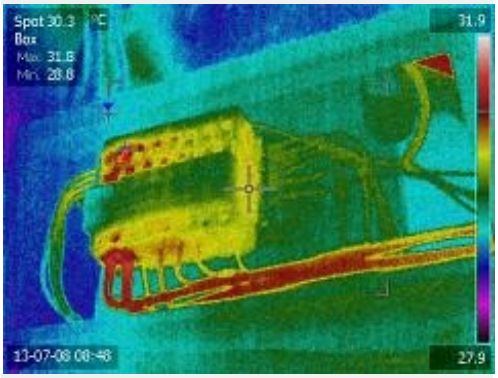


Photo Date: 10/03/2014

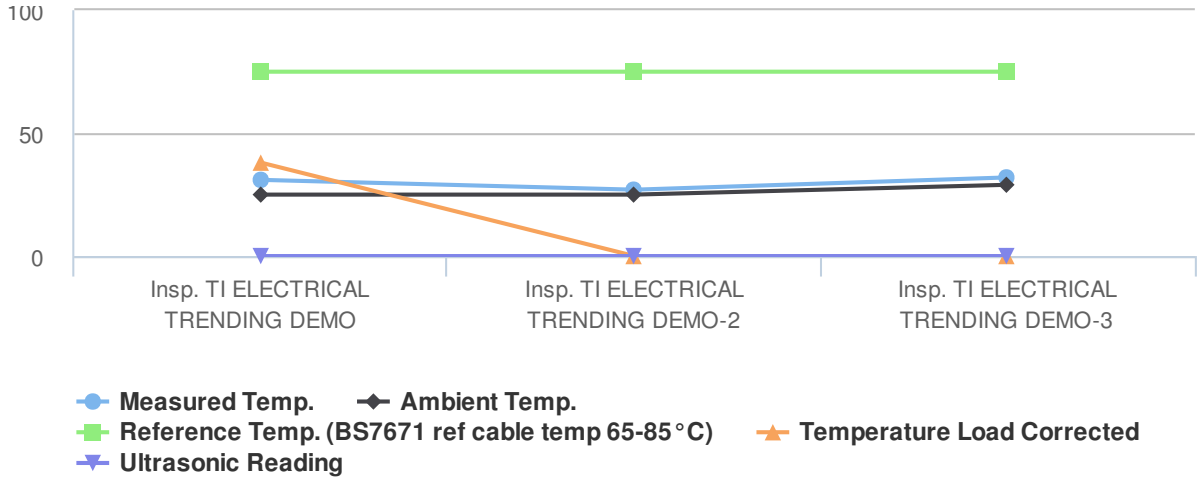
File: IR_8486.jpg

Photo Date: 10/03/2014

File: IR_7042.jpg

Photo Date: 08/03/2014

Trend Data Graph



Inspection History

Inspection Reference	Date Inspected	Measured Temp.	Ambient Temp.	Reference Temp. (BS7671 ref cable temp 65-85°C)	Temperature Load Corrected	Ultrasonic Reading
TI ELECTRICAL TRENDING DEMO-3	10th Mar 2014	32 °C (+5)	29 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO-2	10th Mar 2014	27 °C (-4)	25 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO	8th Mar 2014	31 °C (0)	25 °C	75 °C	38.4 °C	DBUV

Trending Data

Current Inspection No	TI ELECTRICAL TRENDING DEMO-2
Report Date	16th Feb 2015
Item No	17
Status	T
PM Work Order	NOT ISSUED
Item ID	DB1PB
Operation Priority	ESSENTIAL TO OPERATION

File: DC_7045.jpg

RISER 1B - DB1PB

File: IR_2455.jpg

Photo Date: 10/03/2014

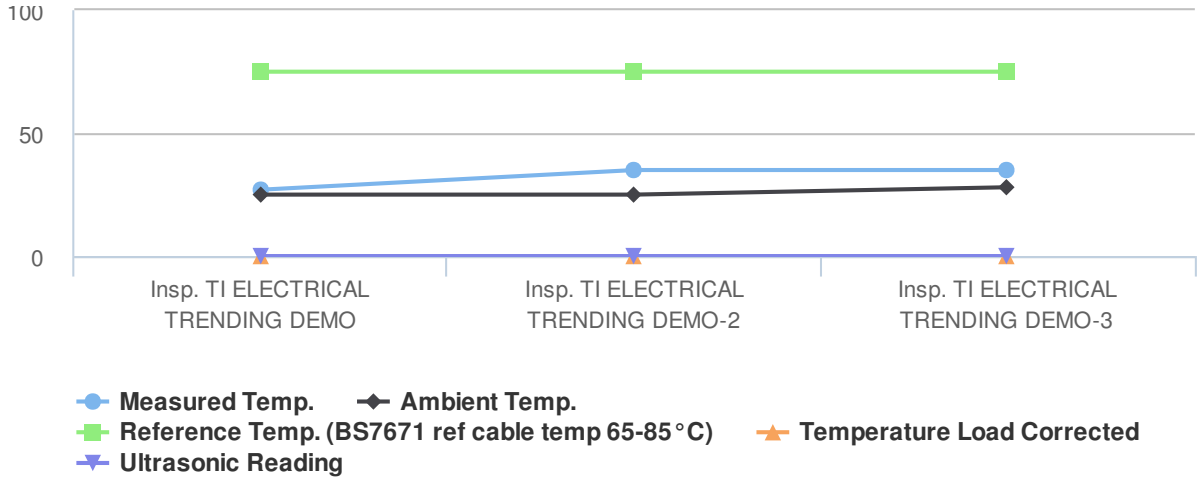
File: IR_8487.jpg

Photo Date: 10/03/2014

File: IR_7044.jpg

Photo Date: 08/03/2014

Trend Data Graph



Inspection History

Inspection Reference	Date Inspected	Measured Temp.	Ambient Temp.	Reference Temp. (BS7671 ref cable temp 65-85°C)	Temperature Load Corrected	Ultrasonic Reading
TI ELECTRICAL TRENDING DEMO-3	10th Mar 2014	35 °C (0)	28 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO-2	10th Mar 2014	35 °C (+8)	25 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO	8th Mar 2014	27 °C (0)	25 °C	75 °C	°C	DBUV

Trending Data

Current Inspection No	TI ELECTRICAL TRENDING DEMO-2
Report Date	16th Feb 2015
Item No	18
Status	T
PM Work Order	NOT ISSUED
Item ID	DB1BL
Operation Priority	ESSENTIAL TO OPERATION

File: DC_7047.jpg

RISER 1B - DB1BL

File: IR_2456.jpg

Photo Date: 10/03/2014

File: IR_8488.jpg

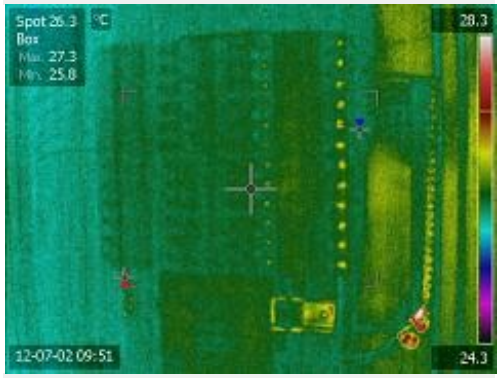


Photo Date: 10/03/2014

File: IR_7046.jpg

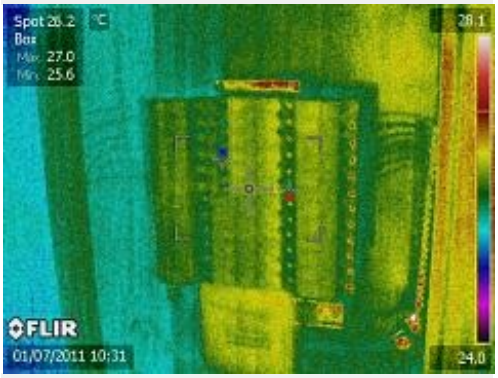
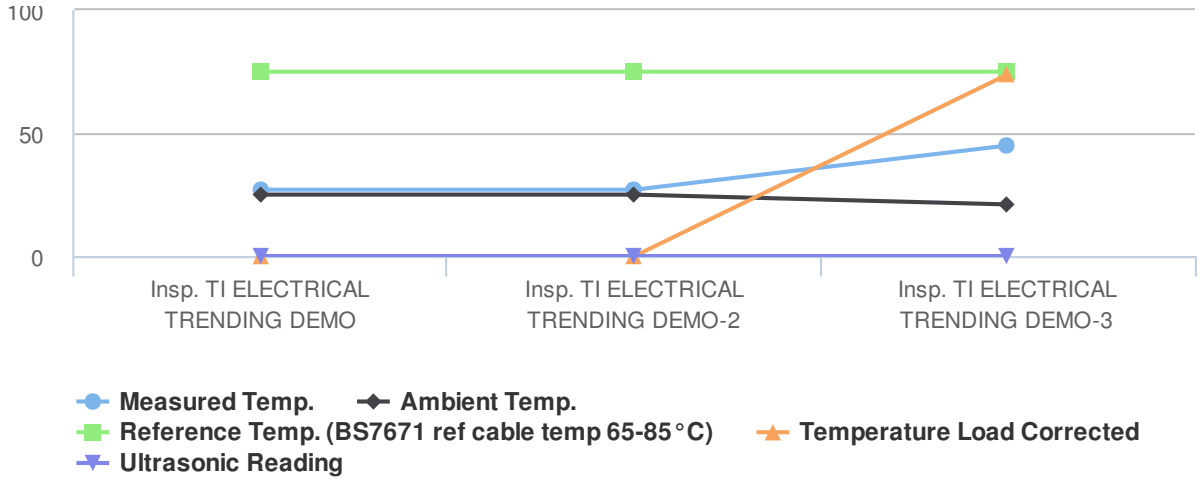


Photo Date: 08/03/2014

Trend Data Graph



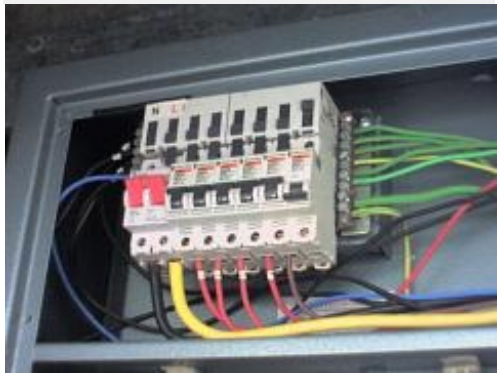
Inspection History

Inspection Reference	Date Inspected	Measured Temp.	Ambient Temp.	Reference Temp. (BS7671 ref cable temp 65-85°C)	Temperature Load Corrected	Ultrasonic Reading
TI ELECTRICAL TRENDING DEMO-3	10th Mar 2014	45 °C (+18)	21 °C	75 °C	74.6 °C	DBUV
TI ELECTRICAL TRENDING DEMO-2	10th Mar 2014	27 °C (0)	25 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO	8th Mar 2014	27 °C (0)	25 °C	75 °C	°C	DBUV

Trending Data

Current Inspection No	TI ELECTRICAL TRENDING DEMO-2
Report Date	16th Feb 2015
Item No	19
Status	T
PM Work Order	NOT ISSUED
Item ID	DB1ACA
Operation Priority	ESSENTIAL TO OPERATION

File: DC_7052.jpg



RISER 1A - DB1ACA

File: IR_2449.jpg

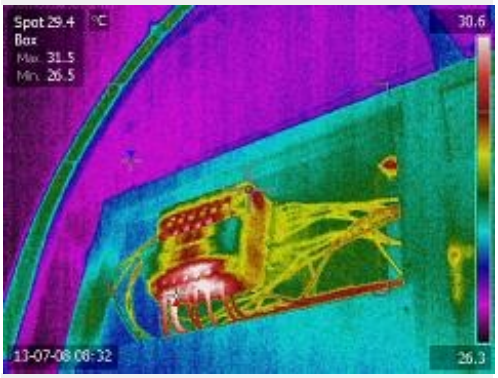


Photo Date: 10/03/2014

File: IR_8495.jpg

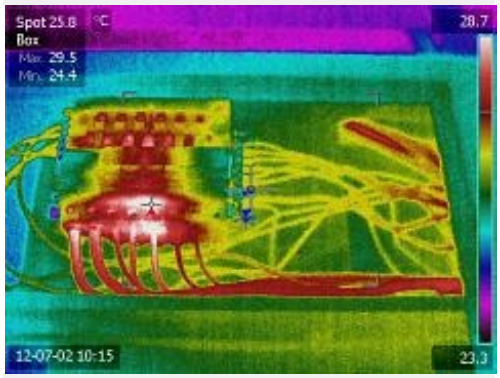


Photo Date: 10/03/2014

File: IR_7051.jpg

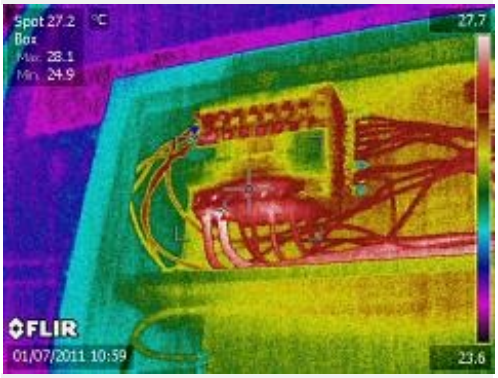
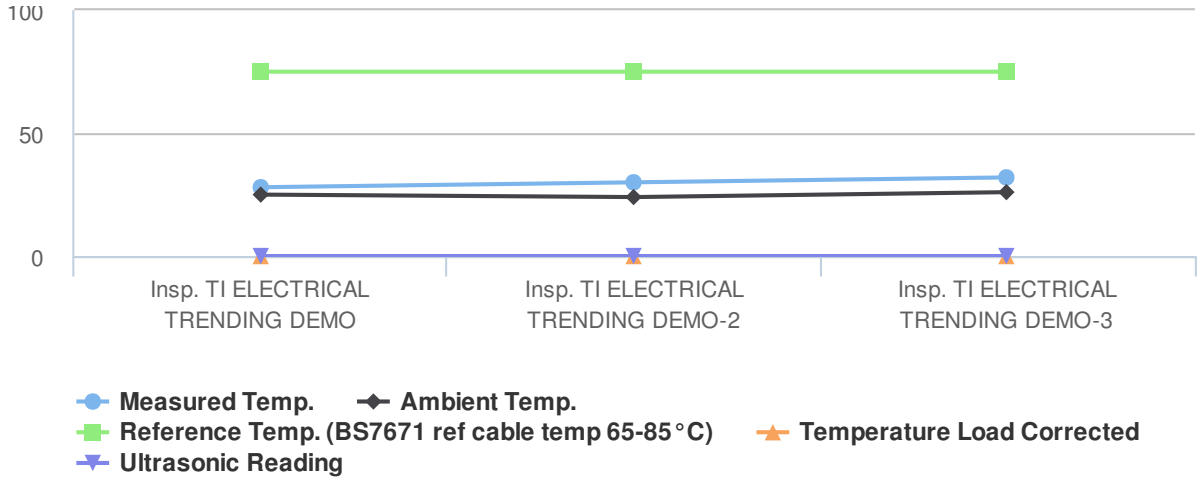


Photo Date: 08/03/2014

Trend Data Graph



Inspection History

Inspection Reference	Date Inspected	Measured Temp.	Ambient Temp.	Reference Temp. (BS7671 ref cable temp 65-85°C)	Temperature Load Corrected	Ultrasonic Reading
TI ELECTRICAL TRENDING DEMO-3	10th Mar 2014	32 °C (+2)	26 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO-2	10th Mar 2014	30 °C (+2)	24 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO	8th Mar 2014	28 °C (0)	25 °C	75 °C	°C	DBUV

Trending Data

Current Inspection No	TI ELECTRICAL TRENDING DEMO-2
Report Date	16th Feb 2015
Item No	20
Status	T
PM Work Order	NOT ISSUED
Item ID	DB1PA
Operation Priority	ESSENTIAL TO OPERATION

File: DC_7054.jpg

RISER 1A - DB1PA

File: IR_2450.jpg

Photo Date: 10/03/2014

File: IR_8496.jpg

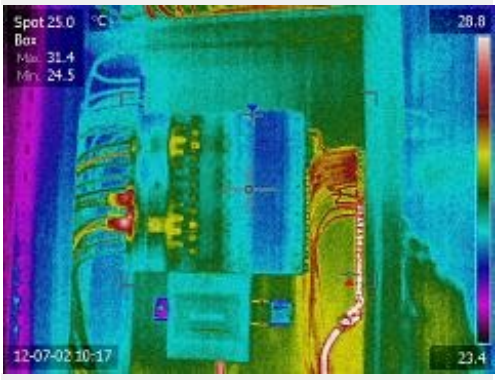
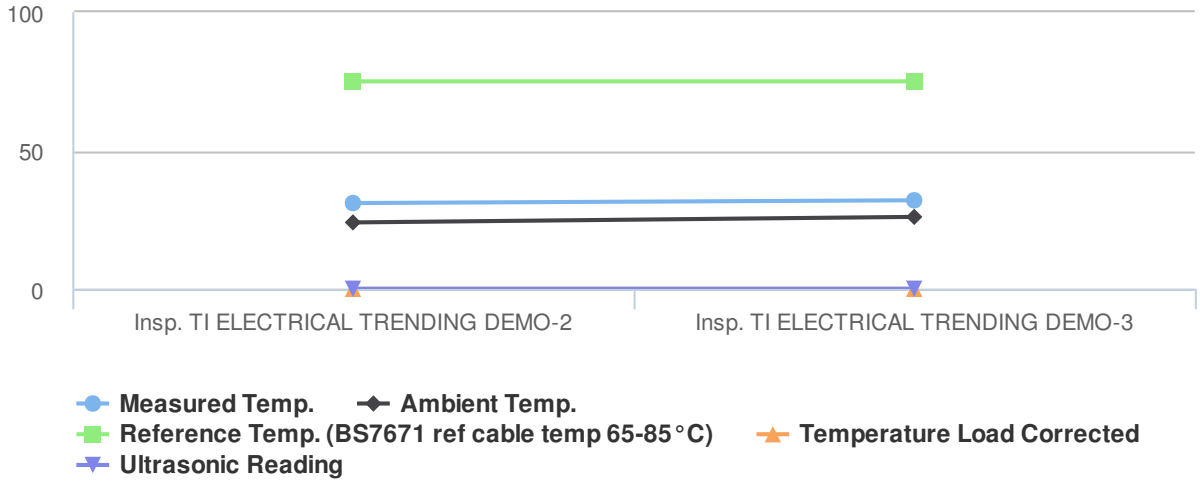


Photo Date: 10/03/2014

Trend Data Graph



Inspection History

Inspection Reference	Date Inspected	Measured Temp.	Ambient Temp.	Reference Temp. (BS7671 ref cable temp 65-85°C)	Temperature Load Corrected	Ultrasonic Reading
TI ELECTRICAL TRENDING DEMO-3	10th Mar 2014	32 °C (+1)	26 °C	75 °C	°C	DBUV

TI ELECTRICAL TRENDING DEMO-2	10th Mar 2014	31 °C (0)	24 °C	75 °C	°C	DBUV

Trending Data

Current Inspection No	TI ELECTRICAL TRENDING DEMO-2
Report Date	16th Feb 2015
Item No	21
Status	T
PM Work Order	NOT ISSUED
Item ID	DB1AL
Operation Priority	ESSENTIAL TO OPERATION

File: DC_7056.jpg

RISER 1A - DB1AL

File: IR_2451.jpg

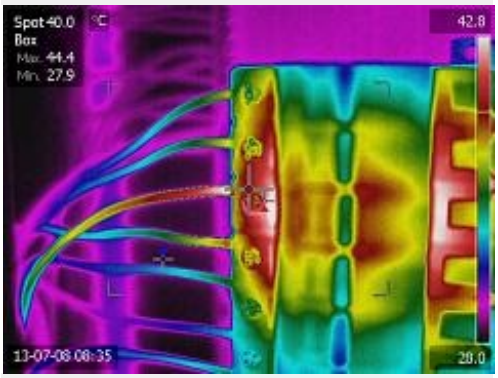


Photo Date: 10/03/2014

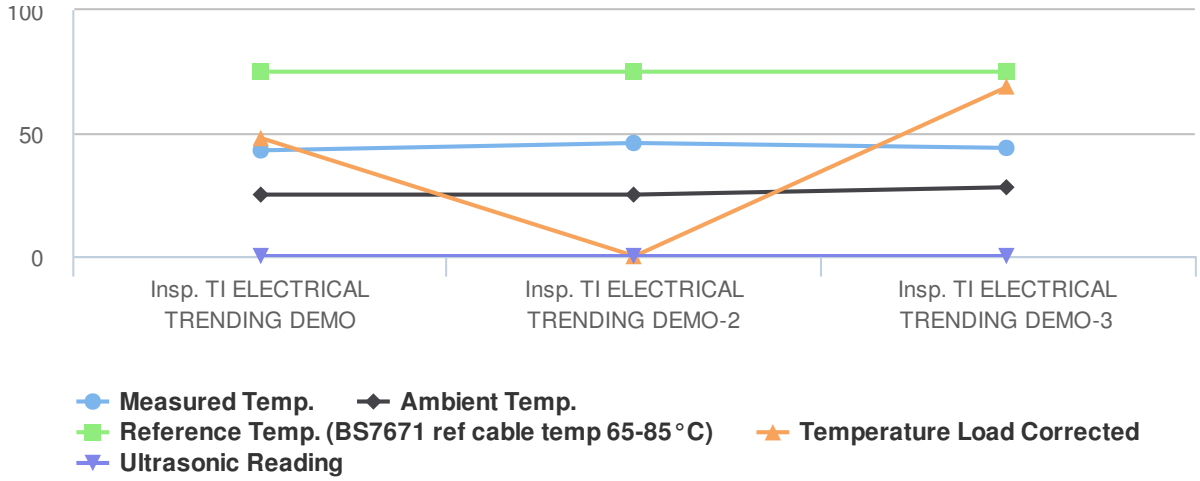
File: IR_8497.jpg

Photo Date: 10/03/2014

File: IR_7055.jpg

Photo Date: 08/03/2014

Trend Data Graph



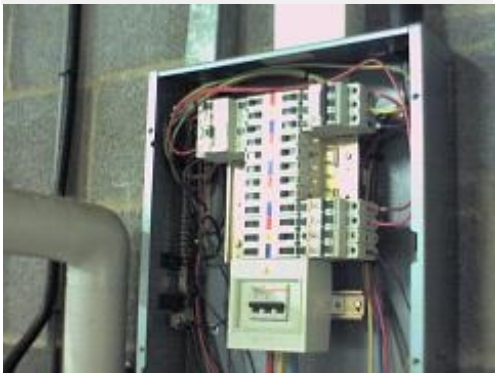
Inspection History

Inspection Reference	Date Inspected	Measured Temp.	Ambient Temp.	Reference Temp. (BS7671 ref cable temp 65-85°C)	Temperature Load Corrected	Ultrasonic Reading
TI ELECTRICAL TRENDING DEMO-3	10th Mar 2014	44 °C (-2)	28 °C	75 °C	69.0 °C	DBUV
TI ELECTRICAL TRENDING DEMO-2	10th Mar 2014	46 °C (+3)	25 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO	8th Mar 2014	43 °C (0)	25 °C	75 °C	48.2 °C	DBUV

Trending Data

Current Inspection No	TI ELECTRICAL TRENDING DEMO-2
Report Date	16th Feb 2015
Item No	22
Status	T
PM Work Order	NOT ISSUED
Item ID	DBLW
Operation Priority	ESSENTIAL TO OPERATION

File: DC_7060.jpg



PLANTROOM - DBLW

File: IR_2474.jpg

Photo Date: 10/03/2014

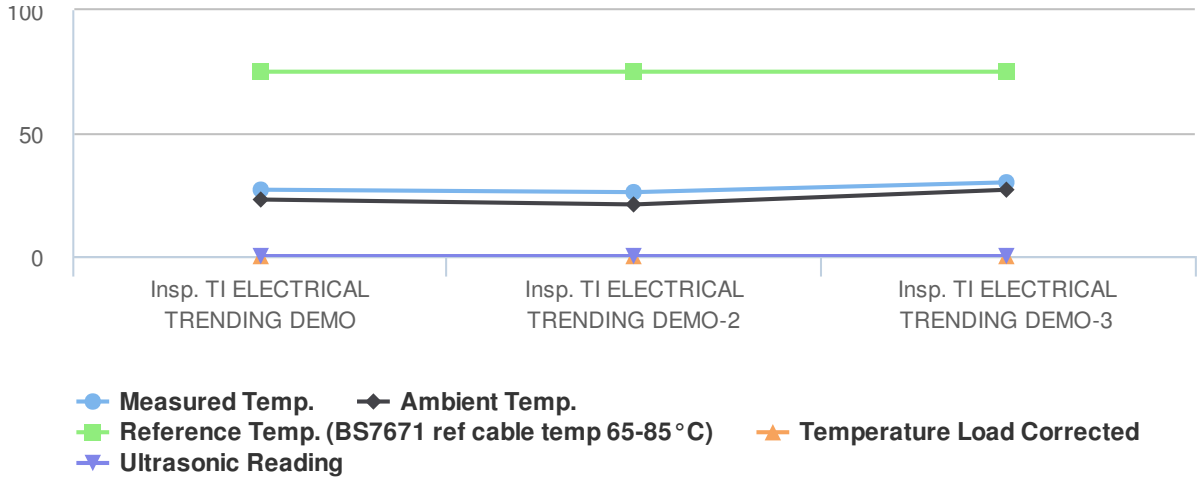
File: IR_8484.jpg

Photo Date: 10/03/2014

File: IR_7059.jpg

Photo Date: 08/03/2014

Trend Data Graph



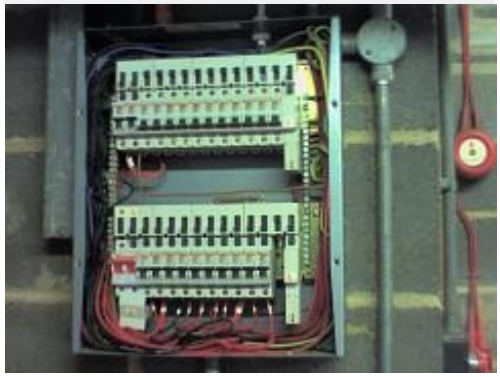
Inspection History

Inspection Reference	Date Inspected	Measured Temp.	Ambient Temp.	Reference Temp. (BS7671 ref cable temp 65-85°C)	Temperature Load Corrected	Ultrasonic Reading
TI ELECTRICAL TRENDING DEMO-3	10th Mar 2014	30 °C (+4)	27 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO-2	10th Mar 2014	26 °C (-1)	21 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO	8th Mar 2014	27 °C (0)	23 °C	75 °C	°C	DBUV

Trending Data

Current Inspection No	TI ELECTRICAL TRENDING DEMO-2
Report Date	16th Feb 2015
Item No	23
Status	T
PM Work Order	NOT ISSUED
Item ID	DBLB
Operation Priority	ESSENTIAL TO OPERATION

File: DC_7063.jpg



PLANTROOM - DBLB

File: IR_2473.jpg

Photo Date: 10/03/2014

File: IR_8482.jpg

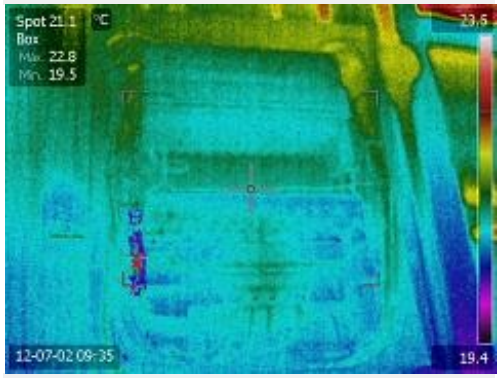
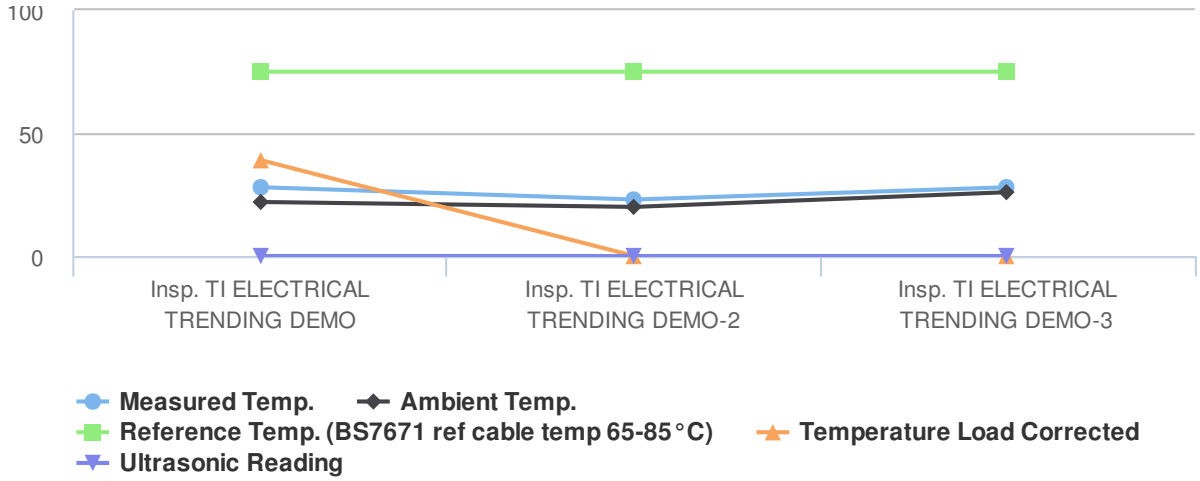


Photo Date: 10/03/2014

File: IR_7062.jpg

Photo Date: 08/03/2014

Trend Data Graph



Inspection History

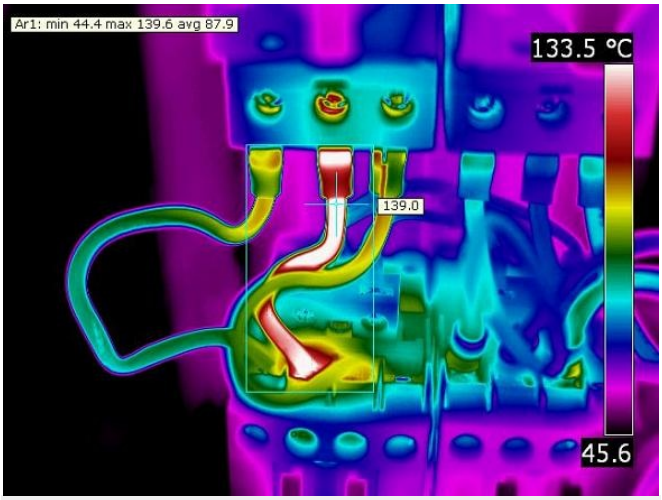
Inspection Reference	Date Inspected	Measured Temp.	Ambient Temp.	Reference Temp. (BS7671 ref cable temp 65-85°C)	Temperature Load Corrected	Ultrasonic Reading
TI ELECTRICAL TRENDING DEMO-3	10th Mar 2014	28 °C (+5)	26 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO-2	10th Mar 2014	23 °C (-5)	20 °C	75 °C	°C	DBUV
TI ELECTRICAL TRENDING DEMO	8th Mar 2014	28 °C (0)	22 °C	75 °C	39.9 °C	DBUV

Work Order Forms

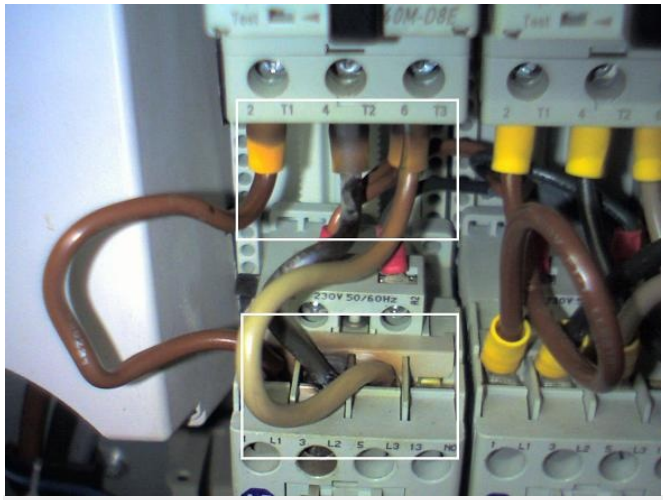
Current Inspection No	TI ELECTRICAL TRENDING DEMO-2
Report Date	16th Feb 2015
Work Order #	
Corrective Work Order #	
PLEASE ADD CORRECTIVE WORK ORDER ABOVE	

Location/Equipment Information	
Location	BOILER ROOM
Component	BOILER ROOM CP
PM Work Order	NOT ISSUED
Item ID	BOILER ROOM CP
Operation Priority	ESSENTIAL TO OPERATION
Problem	CB1FD -L2

Thermal Information	
Measured Temp.	138 °C
Ambient Temp.	24 °C
Nominal Maximum Current	100.0 AMPS
Measured Current	68.0 AMPS
Reference Temp. (BS7671 ref cable temp 65-85°C)	75 °C
Temp. Rise Over Ambient	114.0 °C
Load Factor	0.7 %
Temperature Load Corrected	233.1 °C
Excess of Ref Temp.	158.6 °C
Max Load To Safely Apply Remaining Beneath Ref Temp.	40.7 AMPS
Voltage	412 VOLTS
L1 Load	62 AMPS
L2 Load	68 AMPS
L3 Load	66 AMPS
Neutral Load	AMPS
Ultrasonic Reading	DBUV



File: IR_26155A.jpg **Photo Date:** 08/03/2014



File: DC_26156.jpg **Photo Date:** 08/03/2014

Repair Information

Loss to Production

◯ Yes ◯ No ◯ Unknown

Consequences of Failure

dewdwedewf

Repair Date

14/08/2014

Repaired By

Parts Req. Before Failure

Root Cause

Parts Req. After Failure

Repair Procedure

Repair Recommendation

Repair Action

Client Work Appraisal

We are continually trying to improve our service and ensure that our inspections are carried out to the highest standards. Please use the form below to add your comments, anonymously if you prefer, and send back to us at the address above or:

Email: richard@thermalimaging.co.uk

Service	Excellent	Good	Mediocre	Poor	Comments
Office					
Response time to enquiry					
Content of information sent on enquiry					
Telephone and email manner					
Price					
Value					
Engineer					
Time keeping					
Appearance					
Code of conduct					
Subject knowledge					
Method of work					
Engineer flexibility					
Inspection Specification					
Equipment and software					
Report content					
Report delivery time					
Report retrieval					
Other comments					

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