

CAPE INSTRUMENT SERVICES



SALES, SERVICE, CALIBRATION & MANUFACTURE
OF INDUSTRIAL & MARINE INSTRUMENTATION

38 Section Street, Paarden Eiland, Cape Town, South Africa

Infrared Thermographic Inspection Report

for

Mr. John Doe

Allan's Place

Paarden Eiland

sales@cis-online.co.za

Cape Instrument Services

Thermal Imaging Services

Thermographer	Joe Blogs
Telephone No.:	+27 (0) 21 511 4104
Faximile No.:	021 511 9866
Mobile No.:	+27 (0)
E-Mail	sales@cis-online.co.za

Client Detail

Company	Allan's Place
Inspection date	18/02/2014
Calibration date	18/06/2015
Contact (Initials and surname)	Mr. John Doe
Contact Tel. No.:	021 852 5015
Contact Cell No.:	082 413 5834
Contact E-Mail:	sales@cis-online.co.za
Address	38 Section Street
City (Site Location):	Paarden Eiland
Nature of Business:	Processing
Observer Name	

Scanner Detail

Scanner Used:	E60
Calibration date	18/06/2015
Wave length	Long Wave
Calibration Interval	Annual

1. Inspection workscope

The scope of this inspection is limited to the equipment listed in the Equipment Inspected Inventory given later in this report. The listing is as agreed with the client or client representatives before or during the course of the inspection and was confirmed by the Technologist directly after completion of the inspection. It is the responsibility of the Client Responsible Person to ensure that all critical or scheduled equipment does appear in the listing or to ensure that equipment not inspected for whatever reason be included during the next outing.

2. Inspection of open panels

An Infra Red scanner can only detect the surface temperature of an object. It cannot penetrate any solid materials including the following - Metal, Glass or Poly Carbonate. For safety purposes, and to prevent unwanted trips or failures, it is the responsibility of the client to ensure that the panels are opened according to the client's site procedures.

3. Executive Summary

A complete list of inspected equipment is given in the Equipment Inspected Inventory, table 7. All faults found are listed individually on the exception detail pages attached. A comprehensive summary of findings are presented in the report. Each exception is classified in a risk category. Each category represents a specific recommended action as per table 6 and should be attended to accordingly. All A-category exceptions should receive attention without delay. B-category exceptions on HT equipment should be treated similarly to A-category exceptions.

4. Equipment & Personnel

A long wave (LW) imager is used. The imager has a wide temperature range of approximately -50 Degrees Celsius to 650 Degrees Celsius and a thermal sensitivity (MRTD) of at least 0.1 Degrees Celsius. Imager temperature accuracy is within 2% of reading or 2 Degrees Celsius whichever is the largest. The imagers are initially calibrated by the manufacturer, and contains a continuous on-board calibration system utilising internal black bodies. Thereafter each unit is calibrated in accordance with our Base Operating Standards. The specifications for the imager used during this inspection appears on the individual exception detail pages. The operating Technologist is a qualified ITC certified level 2 Thermographer with 20 years of experience in the field.

5. Standards and Procedures

Faults are classified according to standards based on temperature difference between the exception and the reference. This standard was derived from experience, both locally and abroad, and is recognised by all main Thermal Inspection Authorities world-wide. Different classification criteria do however exist and may be used on request. However, final classification remains the discretion of the thermographer on site.

Table 6 under recommendation details the exception categories used for Electrical Reticulation Inspection.

6. Recommendation

The recommended actions for each exception found are based on the standards and procedures referred to above and is a direct function of the exception classification.

While these standards can and are mostly strictly applied, subjective interpretation as to criticality of equipment, maintenance schedules and spares availability etc., is left to the Client Responsible Person's discretion.

*Temperature Difference Calculated:	Rating:	Recommended action:
= or >40°C	A	Repair immediately
=20°C < 40°C	B	Repair as soon as possible
=10°C < 20°C	C	Repair as scheduling permits
<10°C	D	Thermographer's discretion
Electrical/Mechanical	Inv.	Investigate cause of hot area

* Temperature Difference Calculated = Fault Temperature - Reference Temperature

7. *Equipment Inspected Inventory*

The contents of this table represents all the equipment inspected during this outing. Any equipment not listed here, was either not under load, not opened, not accessible or was not inspected for another valid reason. It is the responsibility of the Client Responsible Person to supply this listing initially and to ensure that the supplied listing is comprehensive and inclusive of all critical equipment. Furthermore it is the clients responsibility to ensure that all critical or scheduled equipment was in fact inspected. It is also the clients responsibility to ensure that all equipment not inspected due to whatever reason be included in the listing for inspection during the next outing, if at all possible. All equipment tested will be deemed to be under normal load conditions unless otherwise indicated.

(NW) - Not working/operational; (NUNL) - Not under normal load; (NA) - No Access to panel; (C/P) - Control Panel

Substation / Area

Main LT Room

New Panel

PFC

Panels 1-4

Old Panel

Panels 1-7

Scrubbing Tower

Control panels 1-3

Decanter

Control panel

Desluger

Db

Boiler House

Main Db

Feed pump C/P

500KVA Panel

Panels 1-3

500KVA transformer

Compressor Room

Db

Compressor 1 C/P

Compressor 2 C/P - N/W

Stikwater Plant

Db

Seperator 1 - C/P

Seperator 2 - C/P

Seperator 3 - C/P - N/W

Control Room

Evaporating C/P

Water Pump Room

Control panel

Fresh water pump

Fire Pump - N/W

Laundry

Db

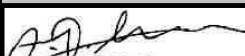
Inspection Summary

Allan's Place

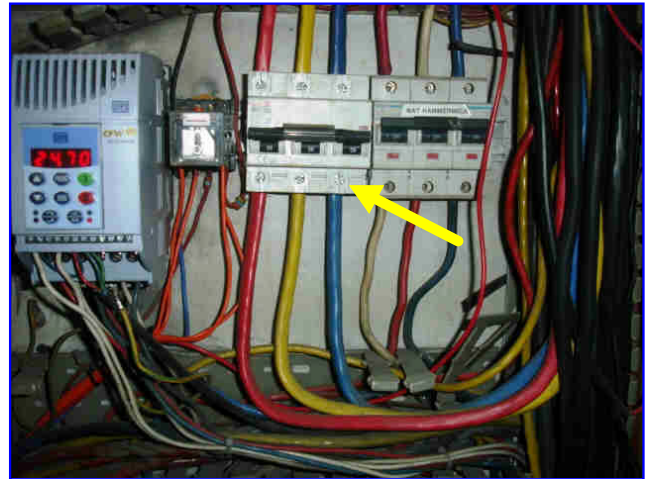
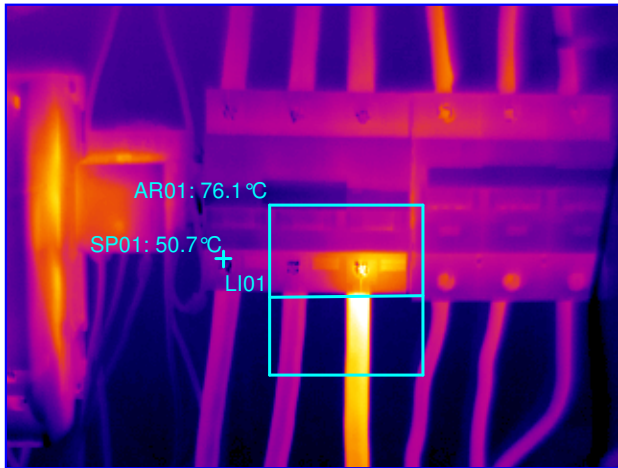
No.	Substation / Area	Feeder / Equipment	Phase	Cat.
1	Main LT Room	Panel 6-Decanter 2-Breaker	Blue	B
2	Main LT Room	Panel 5-Hammer Mill 1-Contactor	White	B
3	Boiler House-Main Db	Boiler 7-Draft Fan Breaker	White	C
4	Hostel Kitchen Db A	Bottom Row-Circuit Breaker 8	n/a	Inv.
5	Hostel Transformer Yard	Pole Transformer-Secondary Side	White,Blue	A

Summary

A	B	C	D	Inv.
0	2	1	0	0

Revision no.	Inspection date	Technologist	Signature
00	18/02/2014	Joe Blogs	

Exception number: 1

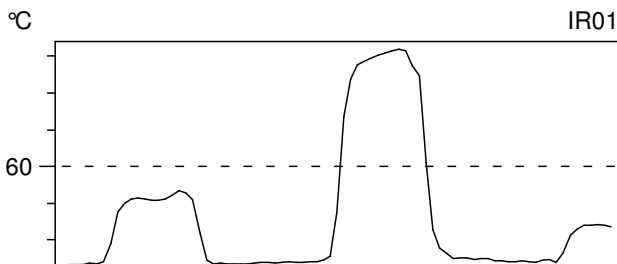


Substation / Area:	Main LT Room
Feeder /equipment:	Panel 6-Decanter 2-Breaker
Fault description:	Bottom of the breaker
Phase:	Blue

Exception temperature :	76.1 °C
Reference temperature :	50.7 °C
Temperature difference :	25.4

CATEGORY**B****Thermographer comments**

The cable needs to be cleaned and reconnected.



Delta T:	Rating:	Recommended action:
>40°C	A	Repair immediately
=20°C < 40°C	B	Repair as soon as possible
=10°C < 20°C	C	Repair as scheduling permits
<10°C	D	Thermographers discretion
Elect./Mechanical	Inv.	Investigate cause of hot area

To be completed by client responsible repairer**Details of action taken:**

Repairs undertaken by:

Print Name

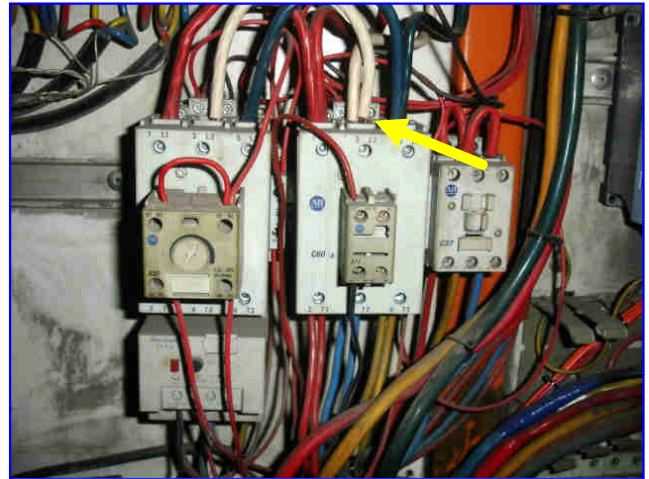
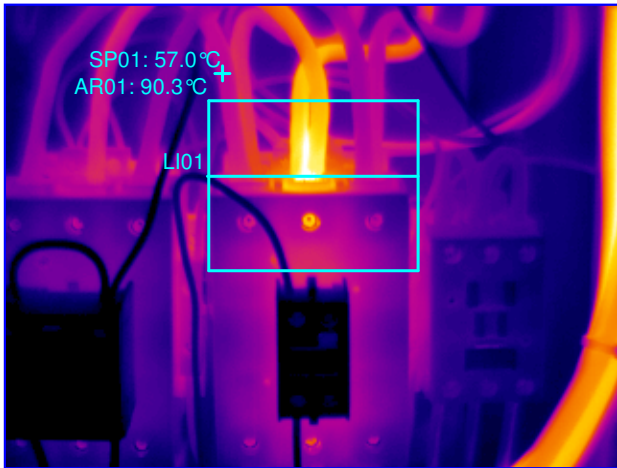
Signature

Date

Imager specifications and calibration detail

Type:	Serial No:	FOV:	W/Length:	Range:	Cal. Date:	Cal. Int.:
FLIR E60	49038826	FOL18	Long Wave	-20 - 650	18/06/2015	Annually

Exception number: 2

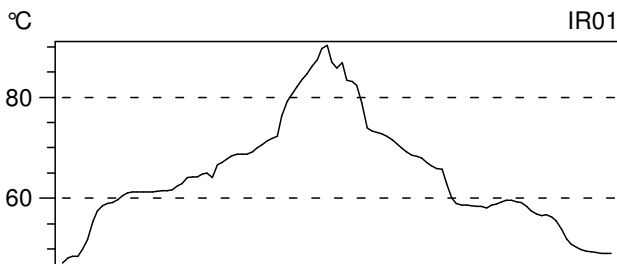


Substation / Area:	Main LT Room
Feeder /equipment:	Panel 5-Hammer Mill 1-Contactor
Fault description:	Top of the contactor
Phase:	White

Exception temperature :	90.3°C
Reference temperature :	57.0°C
Temperature difference :	33.3

CATEGORY**B****Thermographer comments**

The cables need to be cleaned and reconnected.



Delta T:	Rating:	Recommended action:
>40°C	A	Repair immediately
=20°C < 40°C	B	Repair as soon as possible
=10°C < 20°C	C	Repair as scheduling permits
<10°C	D	Thermographers discretion
Elect./Mechanical	Inv.	Investigate cause of hot area

To be completed by client responsible repairer**Details of action taken:**

Repairs undertaken by:

Print Name

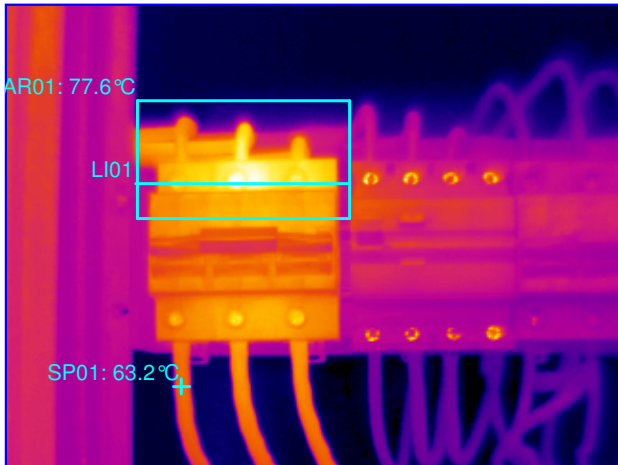
Signature

Date

Imager specifications and calibration detail

Type:	Serial No:	FOV:	W/Length:	Range:	Cal. Date:	Cal. Int.:
FLIR E60	49038826	FOL18	Long Wave	-20 - 650	18/06/2015	Annually

Exception number: 3

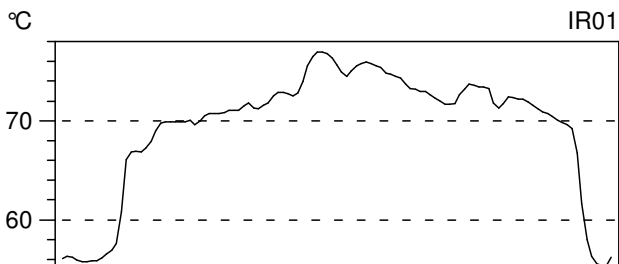


Substation / Area:	Boiler House-Main Db
Feeder /equipment:	Boiler 7-Draft Fan Breaker
Fault description:	Top of the breaker
Phase:	White

Exception temperature :	77.6°C
Reference temperature :	63.2°C
Temperature difference :	14.5

CATEGORY**C****Thermographer comments**

The cable needs to be cleaned and reconnected.



Delta T:	Rating:	Recommended action:
>40°C	A	Repair immediately
=20°C < 40°C	B	Repair as soon as possible
=10°C < 20°C	C	Repair as scheduling permits
<10°C	D	Thermographers discretion
Elect./Mechanical	Inv.	Investigate cause of hot area

To be completed by client responsible repairer**Details of action taken:**

Repairs undertaken by:

Print Name

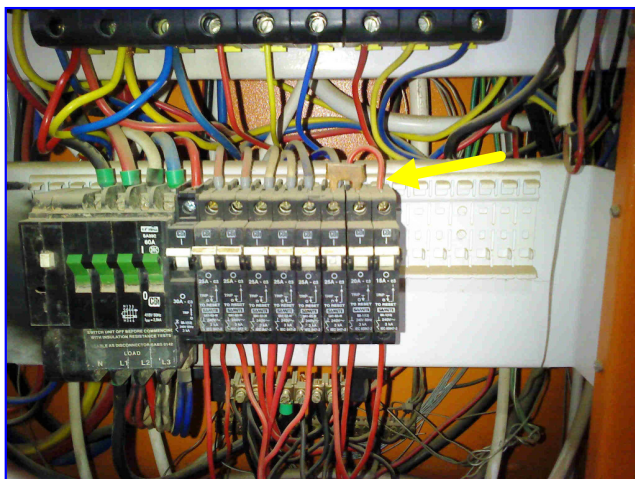
Signature

Date

Imager specifications and calibration detail

Type:	Serial No:	FOV:	W/Length:	Range:	Cal. Date:	Cal. Int.:
FLIR E60	49038826	FOL18	Long Wave	-20 - 650	18/06/2015	Annually

Exception number: 4

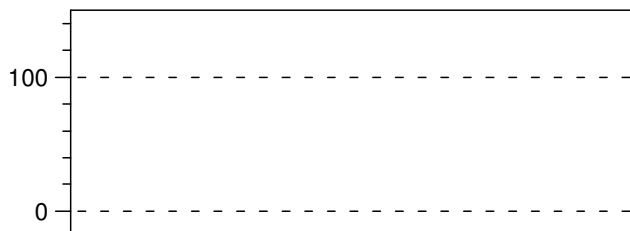


Substation / Area:	Hostel Kitchen Db A
Feeder /equipment:	Bottom Row-Circuit Breaker 8
Fault description:	Incorrect size link cable
Phase:	n/a

CATEGORY**Inv.****Thermographer comments**

The link cable needs to be the same size as the feeder cable.

IR01



Delta T:	Rating:	Recommended action:
>40°C	A	Repair immediately
=20°C < 40°C	B	Repair as soon as possible
=10°C < 20°C	C	Repair as scheduling permits
<10°C	D	Thermographers discretion
Elect./Mechanical	Inv.	Investigate cause of hot area

To be completed by client responsible repairer**Details of action taken:**

Repairs undertaken by:

Print Name

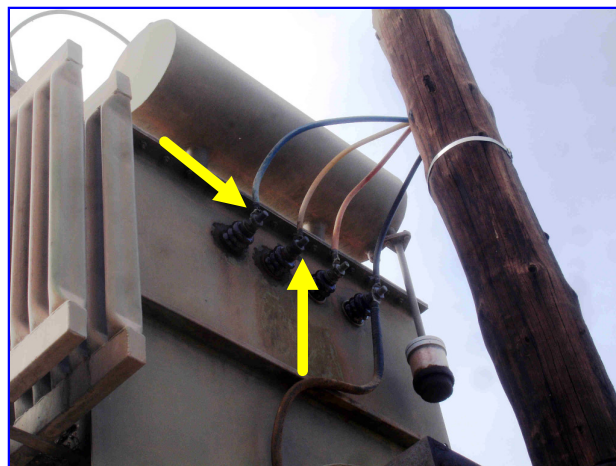
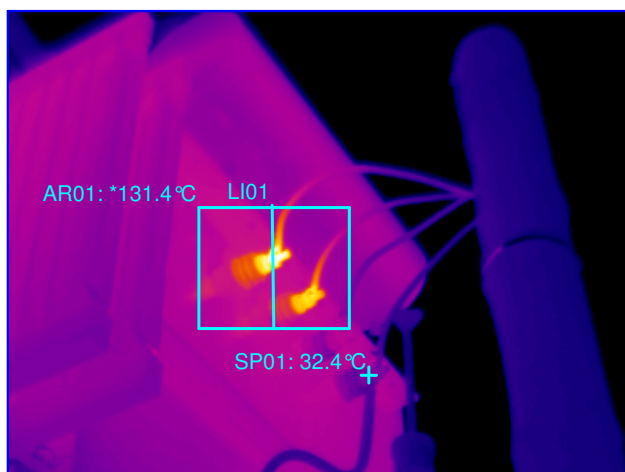
Signature

Date

Imager specifications and calibration detail

Type:	Serial No:	FOV:	W/Length:	Range:	Cal. Date:	Cal. Int.:
FLIR E60	49038826	FOL30	Long Wave	-20 - 650	18/06/2015	Annually

Exception number: 5

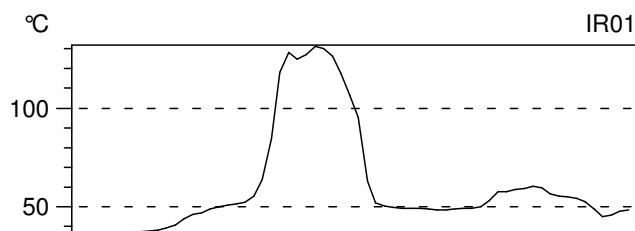


Substation / Area:	Hostel Transformer Yard
Feeder /equipment:	Pole Transformer-Secondary Side
Fault description:	Bushing connections, hot
Phase:	White,Blue

Exception temperature :	*131.4°C
Reference temperature :	32.4°C
Temperature difference :	*99.0

CATEGORY**A****Thermographer comments**

The bushings on the transformer are leaking oil and the cable lugs need to be cleaned and reconnected.



Delta T:	Rating:	Recommended action:
>40°C	A	Repair immediately
=20°C < 40°C	B	Repair as soon as possible
=10°C < 20°C	C	Repair as scheduling permits
<10°C	D	Thermographers discretion
Elect./Mechanical	Inv.	Investigate cause of hot area

To be completed by client responsible repairer**Details of action taken:**

Repairs undertaken by:

Print Name

Signature

Date

Imager specifications and calibration detail

Type:	Serial No:	FOV:	W/Length:	Range:	Cal. Date:	Cal. Int.:
FLIR E60	49038826	FOL18	Long Wave	-20 - 650	18/06/2015	Annually