WESAM SYSTEMS

Thermal Inspection for Electrical Equipment

Using Advanced FLIR E60bx Thermal Camera

For

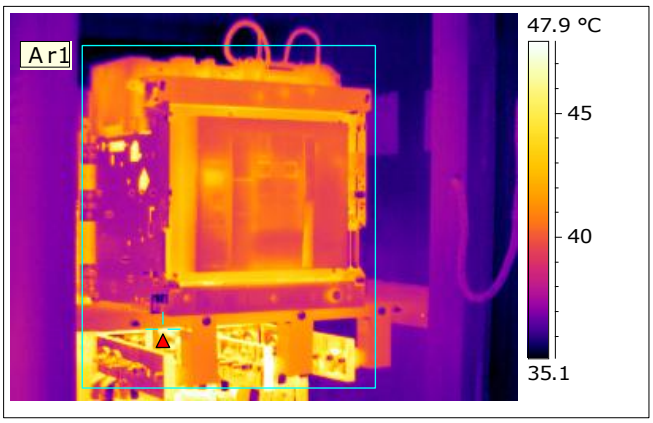
Customer:********

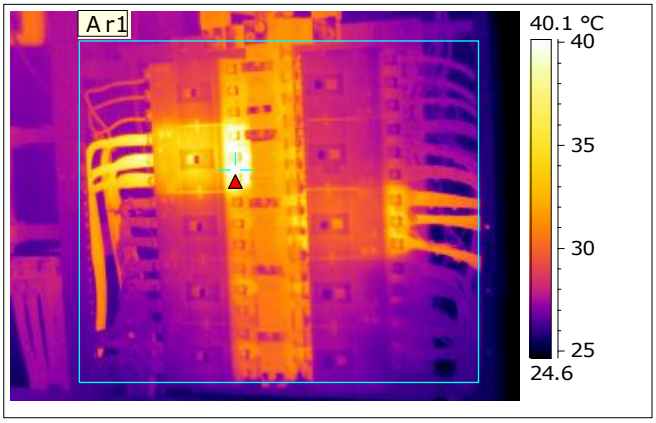
Location:********

2/3-5/2015

By

Engr. Adrian Arigo
ITC Level 1 Thermographer





Inspection Site Information	
Customer	**********
Address	**********
Contact Person	**********
Mobile	**********
Email	**********
Thermographer	Engr. Ahmed Abu Al-Khair
Phone number	+966500463798
E-mail address	abu.alkhair@wesams.com

Tool used for the service:
Using Advanced FLIR E60bx Thermal Camera

Engineer's Qualifications:
Engr. Adrian Arigo, ITC Level 1 Thermographer

Contact Details:
WESAM SYSTEMS Co. Ltd
Office # 803, Al-Jarbou Tower, Custodian of the Two Holy Mosques Rd., Al Aqrabiyah, Al-Khobar, Saudi Arabia

Phone: 0133616126

Email: info@wasamsys.com

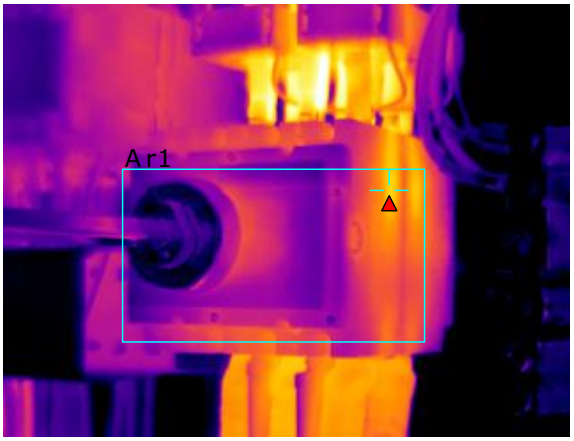
Overview of Fault Rating:

0: Normal	Temp rise 0-5 °C	No action
1: Low grade	Temp rise 5.1-10 °C	To be monitored – Plan new inspection
2: Medium grade	Temp rise 10.1-35.1 °C	Repair at scheduled shut down
3: High	Temp rise >35.1 °C	Repair immediately

Summary of Findings				
Location	**Equipment**	**Fault**	**Recommendation**	**Page Number**
Chiller Pump Room Roof – Main Building	AGH0187/EP/EMCC-2	Normal	No Action	4
Chiller Pump Room Roof – Main Building	AGH0187/EP/EMCC-2	Normal	No Action	5
Chiller Pump Room Roof – Main Building	AGH0187/EP/EMCC-2	Normal	No Action	6
Chiller Pump Room Roof – Main Building	AGH0187/EP/EMCC-2	Normal	No Action	7
Chiller Pump Room Roof – Main Building	AGH0187/EP/EMCC-2	Normal	No Action	8
Chiller Pump Room Roof – Main Building	AGH0187/EP/EMCC-2	Normal	No Action	9
Chiller Pump Room Roof – Main Building	AGH0187/EP/EMCC-2	Normal	No Action	10
Chiller Pump Room Roof – Main Building	AGH0187/EP/EMCC-2	Medium Grade	Repair at schedule shutdown	11
Chiller Pump Room Roof – Main Building	AGH0187/EP/EMCC-2	Normal	No Action	12
Chiller Pump Room Roof – Main Building	AGH0187/EP/EMCC-2	Normal	No Action	13
Chiller Pump Room Roof – Main Building	AGH0187/EP/EMCC-2	Normal	No Action	14
Chiller Pump Room Roof – Main Building	AGH0187/EP/EMCC-2	Normal	No Action	15
Chiller Pump Room Roof – Main Building	AGH0187/EP/EMCC-2	Normal	No Action	16

WESAM SYSTEMS	**Thermography Inspection for Electrical Equipment at ************	**Date: 2/3-5/2015**

Infrared Thermogram 2/04/2015

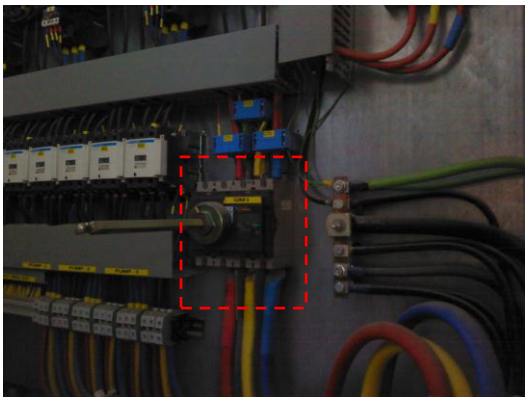


Location	Chiller Pump Room, Roof – Main Building
Equipment	AGH0187/EP/EMCC-2

Image File Name	FLIR0288.jpg
Image Date	2/04/2015
Image Time	10:35:24

Ar1 Max. Temperature	41.1 °C

Photo and Identification



Severity Rating & Recommendation			
1	Low (△= 5.1-10°C)	To be monitored	☐
2	Medium (△= 10.1-35°C)	Repair as soon as schedule permits	☐
3	High (△> 35.1°C)	Repair immediately	☐

Analysis:

Temperature analysis is normal

Corrective action:

Recommendation: Nothing to do since the temperature reading was normal

In maximum load, this main circuit breaker (Ar1 in thermal image above shown) model reference temperature should not exceed 70 º C (reference Standard for Infrared Inspection of Electrical System and Rotating Equipment).

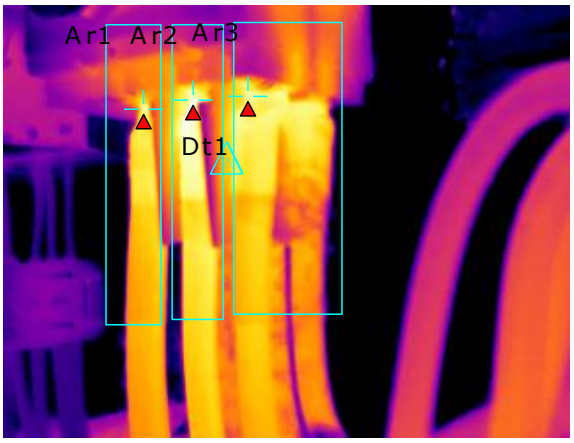
Inspected & Reported by :Engr. Ahmed Abu Al-Khair / Engr. Adrian Arigo Signature:……date:**2/3-5/2015**

Repaired by: ....…… date:

Comment:……..

WESAM SYSTEMS	**Thermography Inspection for Electrical Equipment at ************	**Date: 2/3-5/2015**

Infrared Thermogram 2/04/2015

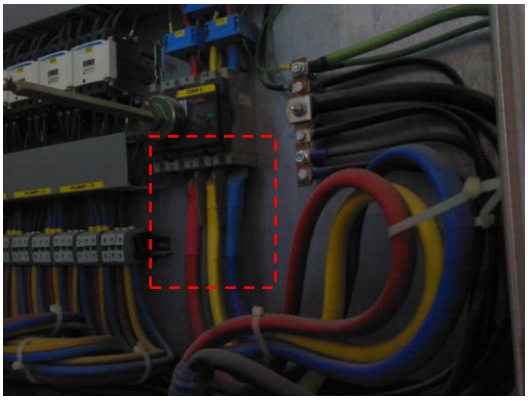


Location	Chiller Pump Room, Roof – Main Building
Equipment	AGH0187/EP/EMCC-2

Image File Name	FLIR0289.jpg
Image Date	2/04/2015
Image Time	10:36:21

Ar1 Max. Temperature	38.2 °C
Ar2 Max. Temperature	39.6 °C
Ar3 Max. Temperature	38.0 °C
Dt1 Value	1.60 °C

Photo and Identification



Severity Rating & Recommendation			
1	Low (△= 5.1-10°C)	To be monitored	☐
2	Medium (△= 10.1-35°C)	Repair as soon as schedule permits	☐
3	High (△> 35.1°C)	Repair immediately	☐

Analysis:

Temperature analysis is normal

Corrective action:

Recommendation: Nothing to do since the temperature reading was normal

In maximum load, these connections and terminations (Ar1, Ar2 and Ar3 in thermal image above shown) model reference temperature should not exceed 90 º C (reference Standard for Infrared Inspection of Electrical System and Rotating Equipment).

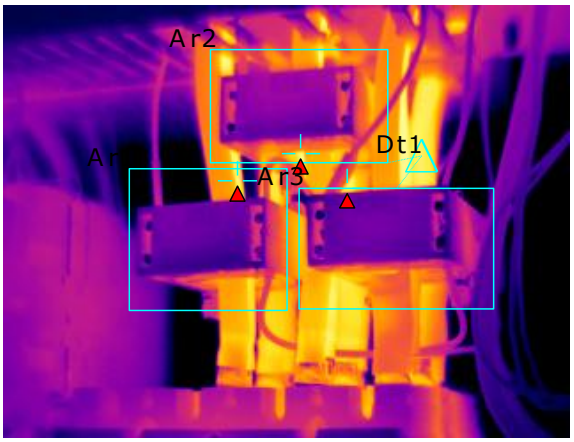
Inspected & Reported by :Engr. Ahmed Abu Al-Khair / Engr. Adrian Arigo Signature:……date:**2/3-5/2015**

Repaired by: ....…… date:

Comment:……..

WESAM SYSTEMS	**Thermography Inspection for Electrical Equipment at ************	**Date: 2/3-5/2015**

Infrared Thermogram 2/04/2015

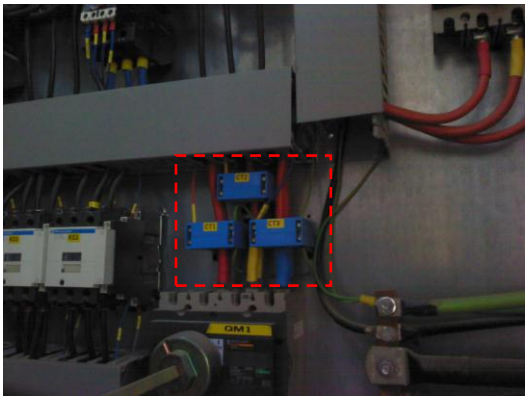


Location	Chiller Pump Room, Roof – Main Building
Equipment	AGH0187/EP/EMCC-2

Image File Name	FLIR0291.jpg
Image Date	2/04/2015
Image Time	10:37:26

Ar1 Max. Temperature	51.8 °C
Ar2 Max. Temperature	53.8 °C
Ar3 Max. Temperature	51.5 °C
Dt1 Value	2.30 °C

Photo and Identification



Severity Rating & Recommendation			
1	Low (△= 5.1-10°C)	To be monitored	☐
2	Medium (△= 10.1-35°C)	Repair as soon as schedule permits	☐
3	High (△> 35.1°C)	Repair immediately	☐

Analysis:

Temperature analysis is normal

Corrective action:

Recommendation: Nothing to do since the temperature reading was normal

In maximum load, these connections and terminations (Ar1, Ar2 and Ar3 in thermal image above shown) model reference temperature should not exceed 90 º C (reference Standard for Infrared Inspection of Electrical System and Rotating Equipment).

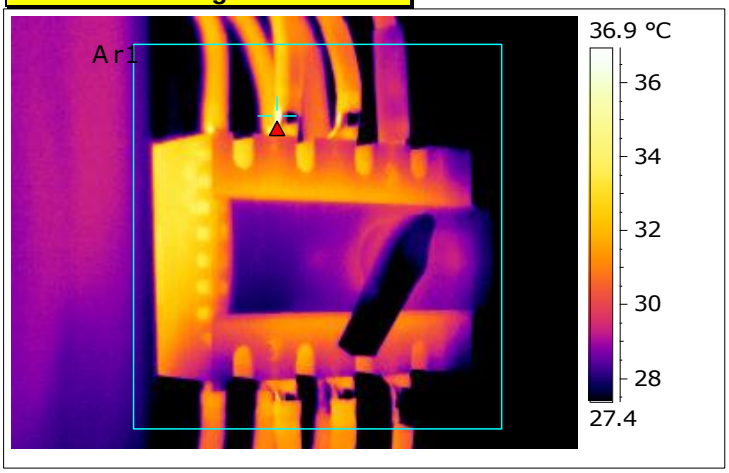
Inspected & Reported by :Engr. Ahmed Abu Al-Khair / Engr. Adrian Arigo Signature:……date:**2/3-5/2015**

Repaired by: ....…… date:

Comment:……..

WESAM SYSTEMS	**Thermography Inspection for Electrical Equipment at ************	**Date: 2/3-5/2015**

Infrared Thermogram 2/04/2015



Location	Chiller Pump Room, Roof – Main Building
Equipment	AGH0187/EP/EMCC-2

Image File Name	FLIR0294.jpg
Image Date	2/04/2015
Image Time	10:39:49

Ar1 Max. Temperature	42.3 °C

Photo and Identification

Severity Rating & Recommendation			
1	Low (△= 5.1-10°C)	To be monitored	☐
2	Medium (△= 10.1-35°C)	Repair as soon as schedule permits	☐
3	High (△> 35.1°C)	Repair immediately	☐

Analysis:

Temperature analysis is normal

Corrective action:

Recommendation: Nothing to do since the temperature reading was normal

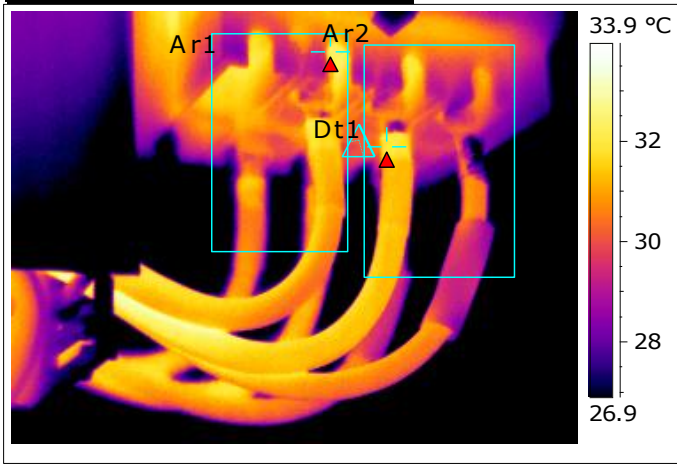
In maximum load, this main circuit breaker (Ar1 in thermal image above shown) model reference temperature should not exceed 70 º C (reference Standard for Infrared Inspection of Electrical System and Rotating Equipment).

Inspected & Reported by :Engr. Ahmed Abu Al-Khair / Engr. Adrian Arigo Signature:……date:**2/3-5/2015**

Repaired by: ....…… date:

Comment:……..

Infrared Thermogram 2/04/2015

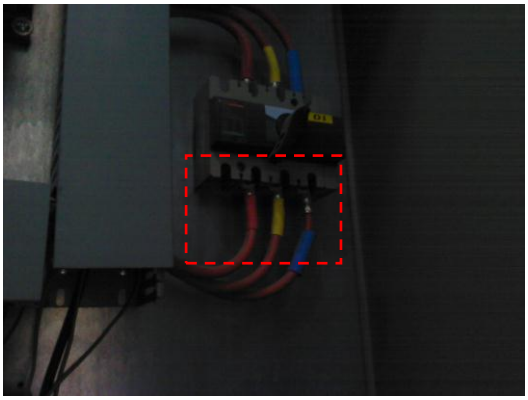


Location	Chiller Pump Room, Roof – Main Building
Equipment	AGH0187/EP/EMCC-2

Image File Name	FLIR0296.jpg
Image Date	2/04/2015
Image Time	10:41:47

Ar1 Max. Temperature	32.5 °C
Ar2 Max. Temperature	32.0 °C
Dt1 Value	0.50 °C

Photo and Identification



Severity Rating & Recommendation			
1	Low (△= 5.1-10°C)	To be monitored	☐
2	Medium (△= 10.1-35°C)	Repair as soon as schedule permits	☐
3	High (△> 35.1°C)	Repair immediately	☐

Analysis:

Temperature analysis is normal

Corrective action:

Recommendation: Nothing to do since the temperature reading was normal

In maximum load, these connections and terminations (Ar1and Ar2 in thermal image above shown) model reference temperature should not exceed 90 º C (reference Standard for Infrared Inspection of Electrical System and Rotating Equipment).

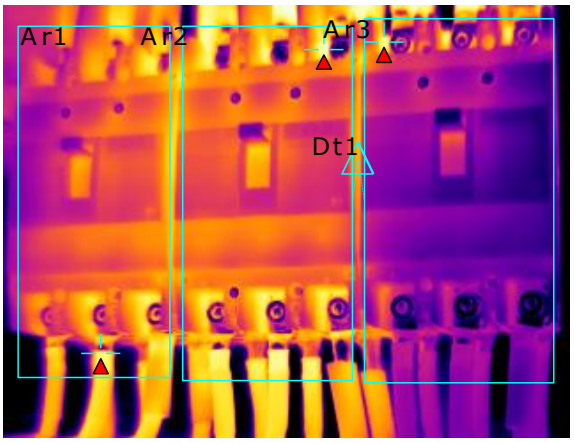
Inspected & Reported by :Engr. Ahmed Abu Al-Khair / Engr. Adrian Arigo Signature:……date:**2/3-5/2015**

Repaired by: ....…… date:

Comment:……..

WESAM SYSTEMS	**Thermography Inspection for Electrical Equipment at ************	**Date: 2/3-5/2015**

Infrared Thermogram 2/04/2015



Location	Chiller Pump Room, Roof – Main Building
Equipment	AGH0187/EP/EMCC-2

Image File Name	FLIR0298.jpg
Image Date	2/04/2015
Image Time	10:43:26

Ar1 Max. Temperature	58.2 °C
Ar2 Max. Temperature	60.4 °C
Ar3 Max. Temperature	57.9 °C
Dt1 Value	2.50 °C

Photo and Identification

Severity Rating & Recommendation			
1	Low (△= 5.1-10°C)	To be monitored	☐
2	Medium (△= 10.1-35°C)	Repair as soon as schedule permits	☐
3	High (△> 35.1°C)	Repair immediately	☐

Analysis:

Temperature analysis is normal

Corrective action:

Recommendation: Nothing to do since the temperature reading was normal

In maximum load, these connections and terminations (Ar1, Ar2 and Ar3 in thermal image above shown) model reference temperature should not exceed 90 º C (reference Standard for Infrared Inspection of Electrical System and Rotating Equipment).

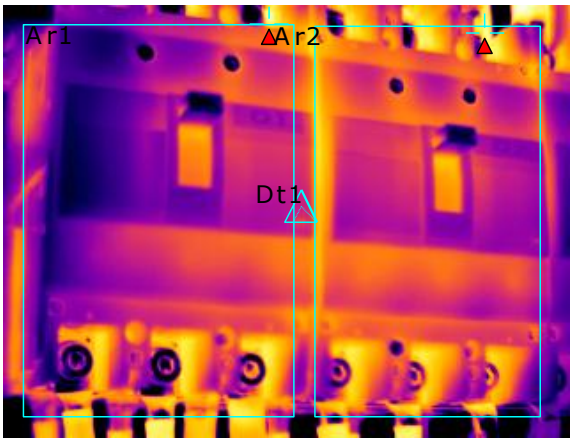
Inspected & Reported by : Engr. Ahmed Abu Al-Khair / Engr. Adrian Arigo Signature:……date:**2/3-5/2015**

Repaired by: ....…… date:

Comment:……..

WESAM SYSTEMS	**Thermography Inspection for Electrical Equipment at ************	**Date: 2/3-5/2015**

Infrared Thermogram 2/04/2015

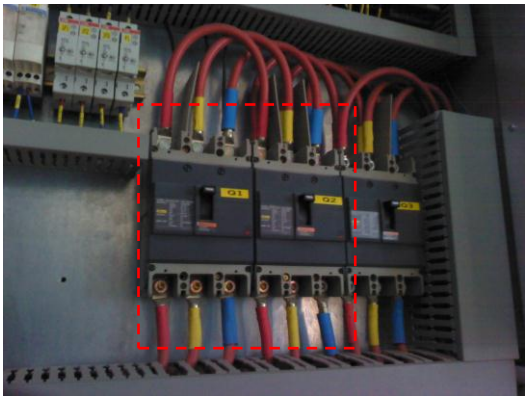


Location	Chiller Pump Room, Roof – Main Building
Equipment	AGH0187/EP/EMCC-2

Image File Name	FLIR0301.jpg
Image Date	2/04/2015
Image Time	10:45:19

Ar1 Max. Temperature	57.3 °C
Ar2 Max. Temperature	59.7 °C
Dt1 Value	2.40 °C

Photo and Identification



Severity Rating & Recommendation			
1	Low (△= 5.1-10°C)	To be monitored	☐
2	Medium (△= 10.1-35°C)	Repair as soon as schedule permits	☐
3	High (△> 35.1°C)	Repair immediately	☐

Analysis:

Temperature analysis is normal

Corrective action:

Recommendation: Nothing to do since the temperature reading was normal

In maximum load, these circuit breakers (Ar1 and Ar2 in thermal image above shown) model reference temperature should not exceed 70 º C (reference Standard for Infrared Inspection of Electrical System and Rotating Equipment).

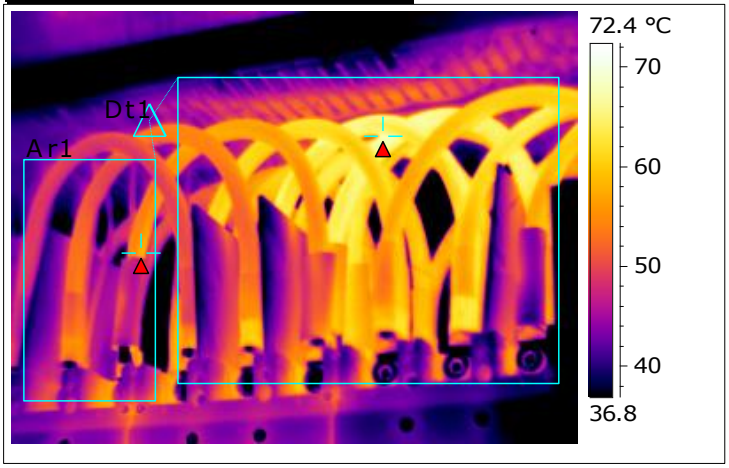
Inspected & Reported by : Engr. Ahmed Abu Al-Khair / Engr. Adrian Arigo Signature:……date:**2/3-5/2015**

Repaired by: ....…… date:

Comment:……..

WESAM SYSTEMS	**Thermography Inspection for Electrical Equipment at ************	**Date: 2/3-5/2015**

Infrared Thermogram 2/04/2015

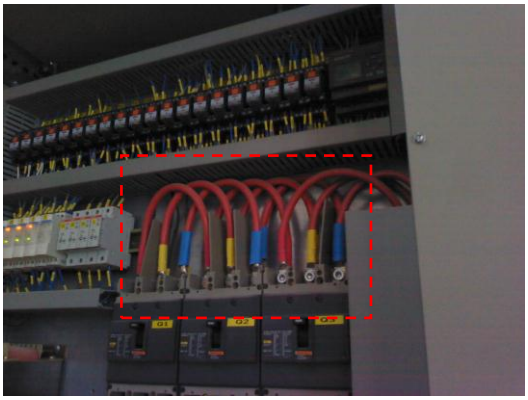


Location	Chiller Pump Room, Roof – Main Building
Equipment	AGH0187/EP/EMCC-2

Image File Name	FLIR0303.jpg
Image Date	2/04/2015
Image Time	10:46:50

Ar1 Max. Temperature	58.0 °C
Ar2 Max. Temperature	68.5 °C
Dt1 Value	10.5 °C

Photo and Identification



Severity Rating & Recommendation			
1	Low (△= 5.1-10°C)	To be monitored	☐
2	Medium (△= 10.1-35°C)	Repair as soon as schedule permits	☒
3	High (△> 35.1°C)	Repair immediately	☐

Analysis:

The 50mm² size of wire was overloaded (actual load in line 2 phase was 150 amperes) (Ar2 in thermal image above shown)

Corrective action:

Recommendation: Replace the existing cables (Ar2 in thermal image above shown) with higher ampacity rating as necessary, (Re-termination is required, then investigate -kindly double check the balancing of load / load – torque in each line side of the cables and do another thermal inspection is needed after repair)

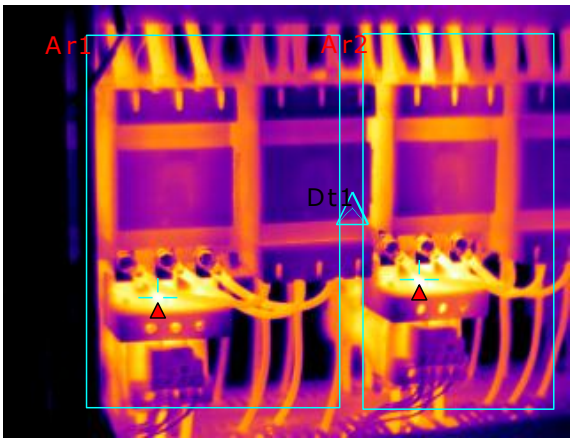
In maximum load, these connections and terminations (Ar1and Ar2 in thermal image above shown) model reference temperature should not exceed 90 º C (reference Standard for Infrared Inspection of Electrical System and Rotating Equipment).

Inspected & Reported by :Engr. Ahmed Abu Al-Khair / Engr. Adrian Arigo Signature:……date:**2/3-5/2015**

Repaired by: ....…… date:

Comment:……..

Infrared Thermogram 2/04/2015



Location	Chiller Pump Room, Roof – Main Building
Equipment	AGH0187/EP/EMCC-2

Image File Name	FLIR0313.jpg
Image Date	2/04/2015
Image Time	10:57:22

Ar1 Max. Temperature	55.0 °C
Ar2 Max. Temperature	55.7 °C
Dt1 Value	0.70 °C

Photo and Identification

Severity Rating & Recommendation			
1	Low (△= 5.1-10°C)	To be monitored	☐
2	Medium (△= 10.1-35°C)	Repair as soon as schedule permits	☐
3	High (△> 35.1°C)	Repair immediately	☐

Analysis:

Temperature analysis is normal

Corrective action:

Recommendation: Nothing to do since the temperature reading was normal

In maximum load, these connections and terminations (Ar1and Ar2 in thermal image above shown) model reference temperature should not exceed 90 º C (reference Standard for Infrared Inspection of Electrical System and Rotating Equipment).

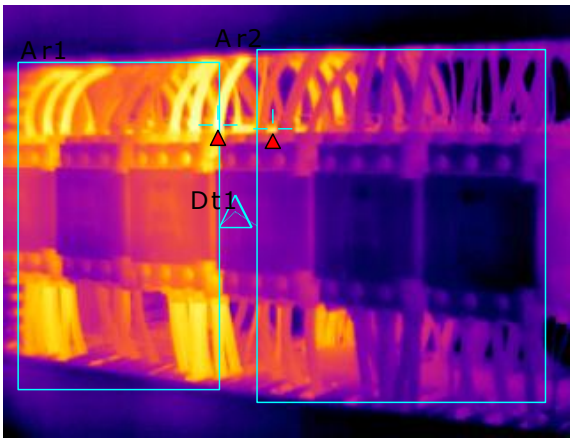
Inspected & Reported by :Engr. Ahmed Abu Al-Khair / Engr. Adrian Arigo Signature:……date:**2/3-5/2015**

Repaired by: ....…… date:

Comment:……..

WESAM SYSTEMS	**Thermography Inspection for Electrical Equipment at ************	**Date: 2/3-5/2015**

Infrared Thermogram 2/04/2015

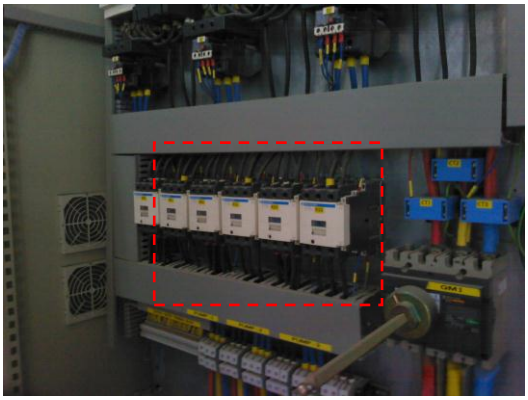


Location	Chiller Pump Room, Roof – Main Building
Equipment	AGH0187/EP/EMCC-2

Image File Name	FLIR0320.jpg
Image Date	2/04/2015
Image Time	11:01:43

Ar1 Max. Temperature	48.5 °C
Ar2 Max. Temperature	44.2 °C
Dt1 Value	4.30 °C

Photo and Identification



Severity Rating & Recommendation			
1	Low (△= 5.1-10°C)	To be monitored	☐
2	Medium (△= 10.1-35°C)	Repair as soon as schedule permits	☐
3	High (△> 35.1°C)	Repair immediately	☐

Analysis:

Temperature analysis is normal

Corrective action:

Recommendation: Nothing to do since the temperature reading was normal

In maximum load, these contactors (Ar1 and Ar2 in thermal image above shown) model reference temperature should not exceed 90 º C (reference Standard for Infrared Inspection of Electrical System and Rotating Equipment).

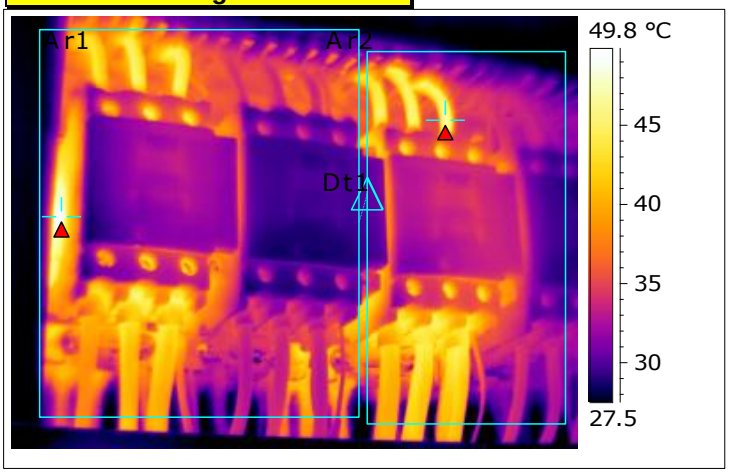
Inspected & Reported by :Engr. Ahmed Abu Al-Khair / Engr. Adrian Arigo Signature:……date:**2/3-5/2015**

Repaired by: ....…… date:

Comment:……..

WESAM SYSTEMS	**Thermography Inspection for Electrical Equipment at ************	**Date: 2/3-5/2015**

Infrared Thermogram 2/04/2015

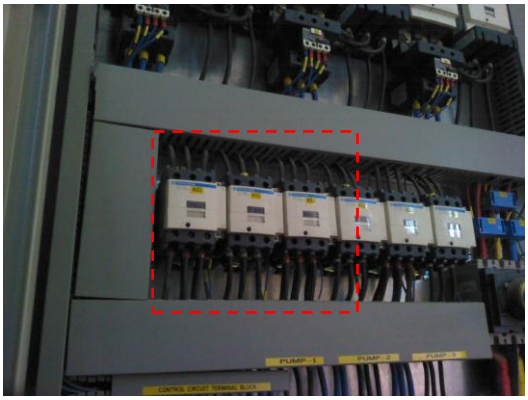


Location	Chiller Pump Room, Roof – Main Building
Equipment	AGH0187/EP/EMCC-2

Image File Name	FLIR0323.jpg
Image Date	2/04/2015
Image Time	11:02:46

Ar1 Max. Temperature	52.6 °C
Ar2 Max. Temperature	47.9 °C
Dt1 Value	4.70 °C

Photo and Identification



Severity Rating & Recommendation			
1	Low (△= 5.1-10°C)	To be monitored	☐
2	Medium (△= 10.1-35°C)	Repair as soon as schedule permits	☐
3	High (△> 35.1°C)	Repair immediately	☐

Analysis:

Temperature analysis is normal

Corrective action:

Recommendation: Nothing to do since the temperature reading was normal

In maximum load, these contactors (Ar1 and Ar2 in thermal image above shown) model reference temperature should not exceed 90 º C (reference Standard for Infrared Inspection of Electrical System and Rotating Equipment).

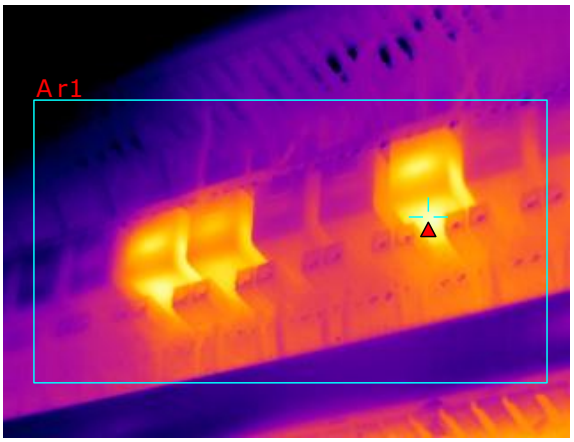
Inspected & Reported by :Engr. Ahmed Abu Al-Khair / Engr. Adrian Arigo Signature:……date:**2/3-5/2015**

Repaired by: ....…… date:

Comment:……..

WESAM SYSTEMS	**Thermography Inspection for Electrical Equipment at ************	**Date: 2/3-5/2015**

Infrared Thermogram 2/04/2015

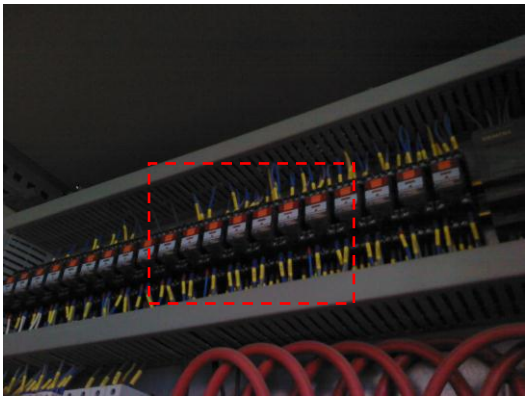


Location	Chiller Pump Room, Roof – Main Building
Equipment	AGH0187/EP/EMCC-2

Image File Name	FLIR0328.jpg
Image Date	2/04/2015
Image Time	11:06:19

Ar1 Max. Temperature	58.9 °C

Photo and Identification



Severity Rating & Recommendation			
1	Low (△= 5.1-10°C)	To be monitored	☐
2	Medium (△= 10.1-35°C)	Repair as soon as schedule permits	☐
3	High (△> 35.1°C)	Repair immediately	☐

Analysis:

Temperature analysis is normal

Corrective action:

Recommendation: Nothing to do since the temperature reading was normal

In maximum load, this relay (Ar1 in thermal image above shown) model reference temperature should not exceed 55 º C.

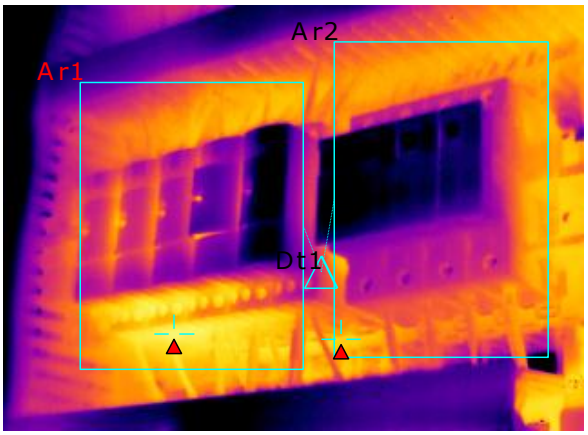
Inspected & Reported by : Engr. Ahmed Abu Al-Khair / Engr. Adrian Arigo Signature:……date:**2/3-5/2015**

Repaired by: ....…… date:

Comment:……..

WESAM SYSTEMS	**Thermography Inspection for Electrical Equipment at ************	**Date: 2/3-5/2015**

Infrared Thermogram 2/04/2015

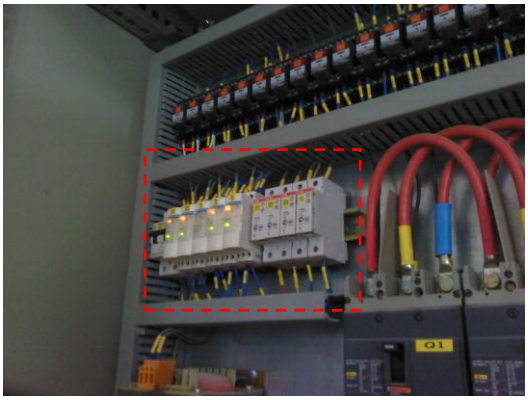


Location	Chiller Pump Room, Roof – Main Building
Equipment	AGH0187/EP/EMCC-2

Image File Name	FLIR0331.jpg
Image Date	2/04/2015
Image Time	11:07:31

Ar1 Max. Temperature	42.5 °C
Ar2 Max. Temperature	40.1 °C
Dt1 Value	2.40 °C

Photo and Identification



Severity Rating & Recommendation			
1	Low (△= 5.1-10°C)	To be monitored	☐
2	Medium (△= 10.1-35°C)	Repair as soon as schedule permits	☐
3	High (△> 35.1°C)	Repair immediately	☐

Analysis:

Temperature analysis is normal

Corrective action:

Recommendation: Nothing to do since the temperature reading was normal

In maximum load, these connections and terminations (Ar1and Ar2 in thermal image above shown) model reference temperature should not exceed 90 º C (reference Standard for Infrared Inspection of Electrical System and Rotating Equipment).

Inspected & Reported by :Engr. Ahmed Abu Al-Khair / Engr. Adrian Arigo Signature:……date:**2/3-5/2015**

Repaired by: ....…… date:

Comment:……..