

HSB Thermography
S e r v i c e s

INFRARED THERMOGRAPHIC SURVEY

For



Survey Performed
02 October, 2008

By
Sandy J. Sanor
Director
HSB Thermography Services
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Dear [REDACTED]:

Thank you for allowing HSB Thermography Services to provide this service. We trust this report proves helpful and is of assistance to you.

The scope of work included the following areas:

Electrical control and distribution system, motor control centers, transformers and machine line panels.

Equipment not surveyed during this visit includes deenergized, lightly loaded, inaccessible and/or deemed by plant personnel to be non-critical.

All findings from last year have been corrected. Overall the electrical system is looking very good and it shows that you have been very diligent in correcting findings and maintaining the equipment.

As a result of this service the following are presented for your review:

- 0 CRITICAL
- 0 SEVERE
- 9 ALERT

Should you have any questions or comments concerning this report or our services, we are here to assist you. Please feel free to contact me at "sandy_sanor@hsb.com"

Sincerely,

S. J. Sanor

Director - HSB Thermography Services
Level II



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The criteria used to categorize findings in this report are based on the potential effect that a failure will have on operations and production.

CRITICAL- *Failure of this component will have a significant impact on production, require costly repairs and/or represents a potential personnel hazard.*

SEVERE- *Failure is not expected to go beyond the component listed and should have minimal impact on operations and production; repair costs could be significant.*

ALERT- *Failure is of a routine nature and repairs can be made easily and at a reasonable cost. Cost is, more often than not, limited to labor and a few minor parts.*

Infrared thermographic surveys are non-contact, non-destructive examinations used to find abnormal or unexpected thermal patterns or temperature differentials. These thermal patterns may indicate such conditions as loose connections, overloaded circuits or phases, deteriorated or damaged insulation or refractory, or excessive or unwanted friction, among others.

To perform the thermographic survey of your facility, HSB Thermography Services used the FLIR Thermacam P-65 infrared imaging system. This system utilizes the latest developments in uncooled technology to generate the most accurate data available.

The calibration is certified traceable to The National Institute of Standards and Technology, NIST, USA, and the Swedish National Testing and Research Institute, SP. This calibration is based on the International Temperature Scale (ITS-90).



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Equipment List

Three Alimentatore Rooms – All groups that were in use, of which most were.

Recycling Formation Alimentatore 7, 5 and 3

Elettrica Cabina 1 and 2 all panels on low voltage

Cabina di Trasformazione three (3) transformers

Open screen bus ways

Line 1, 2, 3, 4 and 5 control panels

One of the new air compressors, the other three were off.

Paste Department Control Panel

Mixer Control Room Panels

Molino 2, 3 and 4 all panels

Scrubbers for lines 1-5

Scrubber panel for FMWS

Acid Recirculation area panels

Rolling Mill #2 all panels

Macpal Palletizes for FMWS 1 and 2

FMWS lines 1 and 2

Utility Switchyard



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Inspection Summary

CATEGORY	Location Area	Equipment Location	Equipment ID	Page Number
Alert	Alimentatore	46 Gruppo 4	Lead to power strip	6
Alert	Alimentatore	47 Gruppo 3	Connection to phase	7
Alert	Alimentatore	10 Gruppo 3 & 4	Middle phase	8
Alert	Line #1	Thermo Welding Machine Panel	Main Disconnect	9
Alert	Line #5	C.O.S Panel	Fuse #3 - resistenz dx	10
Alert	Mulino #2	Campo 9	Circuit Breaker 11A17	11
Alert	FMWS #1	GRAMEGNA Panel	Fuse #8	12
Alert	Elettrica Cabina #1	Acqua Vascone #37	Circuit Breaker Phase	13
Alert	Line 1,2 3,4 and 5	Panel for the lighting	Circuit Breaker 14	14

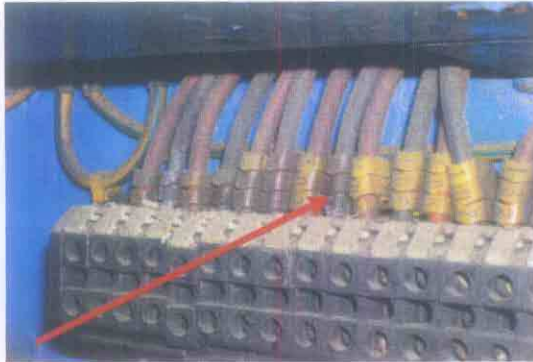
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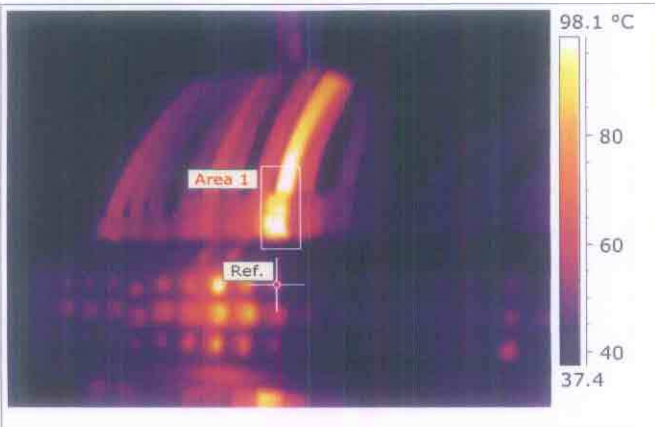
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CATEGORY Alert

Location Area	Alimentatore
Equipment Location	46 Gruppo 4
Equipment ID	Lead to power strip
Est. Repair Cost Before Failure	€ 25
Est. Repair Cost After Failure	€ 50
Est. % of Production	0 %
Est. Down Time	0

Date: 10/02/2008



Ref. Temperature	54.3 °C
Area 1 Max. Temperature	106.7 °C

Area 1: Temp. Rise 52.4 °C

Recommendation/Comments:

The 8th lead from the left is very hot.

The connections should be disassembled, cleaned, the lead should be cut back to good metal and the power strip repaired as necessary. Reassemble and properly torque fasteners.

Repair notes:

Signature: Date:

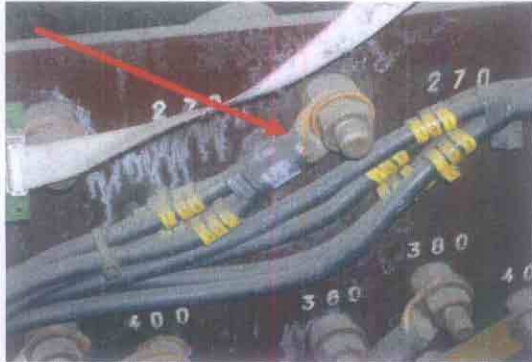
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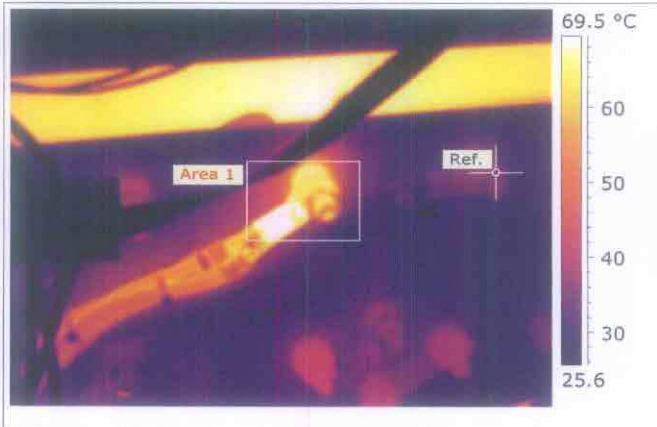


CATEGORY

Alert

Location Area	Alimentatore
Equipment Location	47 Gruppo 3
Equipment ID	Connection to phase
Est. Repair Cost Before Failure	€ 50
Est. Repair Cost After Failure	€ 100
Est. % of Production	0 %
Est. Down Time	0

Date: 10/02/2008



Ref. Temperature	35.4 °C
Area 1 Max. Temperature	71.3 °C

Area 1: Temp. Rise 35.8 °C

Recommendation/Comments:

The problem is in the leads to the lug fitting.

The connections should be disassembled, cleaned, inspected for damage and replace the lug connection as. Reassemble and properly torque fasteners.

Repair notes:

Signature:..... Date:

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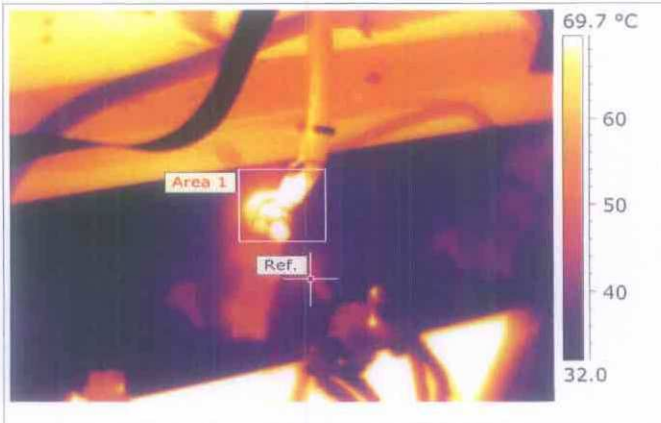
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CATEGORY Alert

Location Area	Alimentatore
Equipment Location	10 Gruppo 3 & 4
Equipment ID	Middle phase
Est. Repair Cost Before Failure	€ 50
Est. Repair Cost After Failure	€ 100
Est. % of Production	0 %
Est. Down Time	0

Date: 10/02/2008



Ref. Temperature	43.1 °C
Area 1 Max. Temperature	75.7 °C

Area 1: Temp. Rise	32.6 °C
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Recommendation/Comments:

The marked connection is very warm.

The connections should be disassembled, cleaned, inspected for damage and repaired as necessary. Reassemble and properly torque fasteners.

Repair notes:

Signature:.....Date:

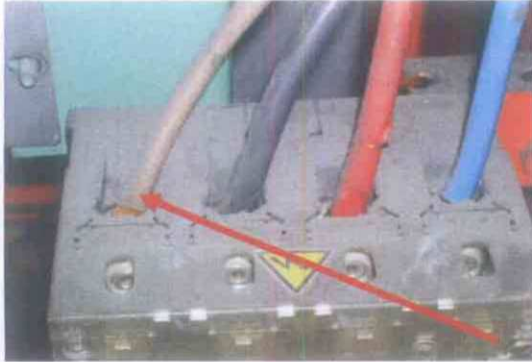
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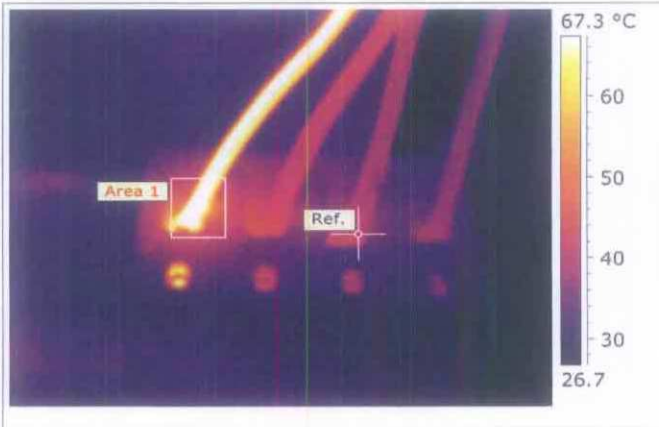


CATEGORY

Alert

Location Area	Line #1
Equipment Location	Thermo Welding Machine Panel
Equipment ID	Main Disconnect
Est. Repair Cost Before Failure	€ 25
Est. Repair Cost After Failure	€ 200
Est. % of Production	0 %
Est. Down Time	0

Date: 10/02/2008



Ref. Temperature	41.0 °C
Area 1 Max. Temperature	69.4 °C
Area 1: Temp. Rise	28.4 °C

Recommendation/Comments:

The left phase is very warm.

The connections should be disassembled, cleaned, inspected for damage and repaired as necessary. Reassemble and properly torque fasteners.

Repair notes:

Signature:..... Date:

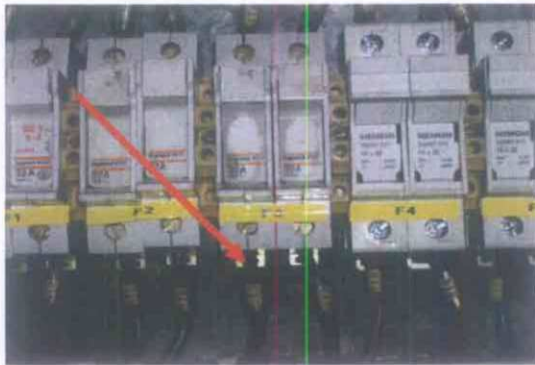
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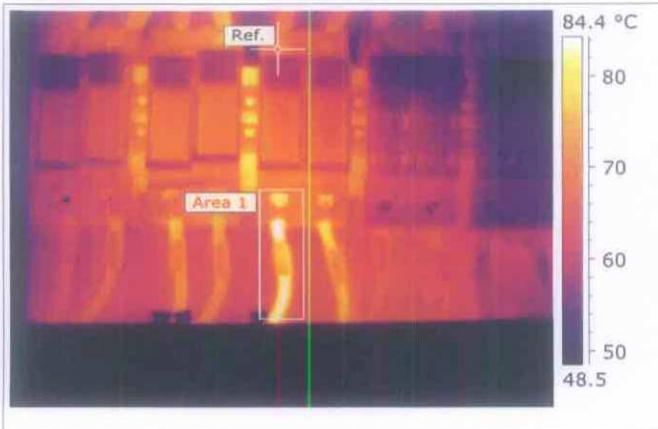
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CATEGORY Alert

Location Area	Line #5
Equipment Location	C.O.S Panel
Equipment ID	Fuse #3 - resistenz dx
Est. Repair Cost Before Failure	€ 10
Est. Repair Cost After Failure	€ 75
Est. % of Production	0 %
Est. Down Time	0

Date: 10/02/2008



Ref. Temperature	67.4 °C
Area 1 Max. Temperature	89.8 °C
Area 1: Temp. Rise	22.4 °C

Recommendation/Comments:

The marked lead of the fuse is very warm

The connections should be disassembled, cleaned, inspected for damage, and the lead cut back to good metal. Reassemble and properly torque fasteners.

Repair notes:

Signature:..... Date:

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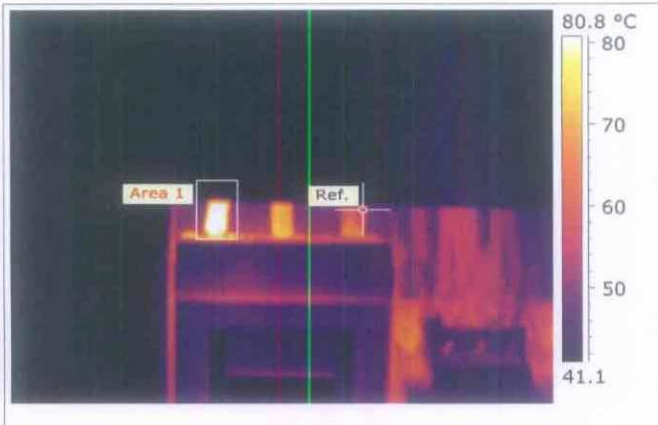
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CATEGORY Alert

Location Area	Mulino #2
Equipment Location	Campo 9
Equipment ID	Circuit Breaker 11A17
Est. Repair Cost Before Failure	€ 50
Est. Repair Cost After Failure	€ 200
Est. % of Production	0 %
Est. Down Time	0

Date: 10/02/2008



Ref. Temperature	58.1 °C
Area 1 Max. Temperature	93.5 °C
Area 1: Temp. Rise	35.4 °C

Recommendation/Comments:

The left phase is elevated in temperature.

The connections should be disassembled, cleaned, inspected for damage and repaired as necessary. Reassemble and properly lubricate and torque fasteners according to the manufacturer's specifications, using new hardware as required.

Repair notes:

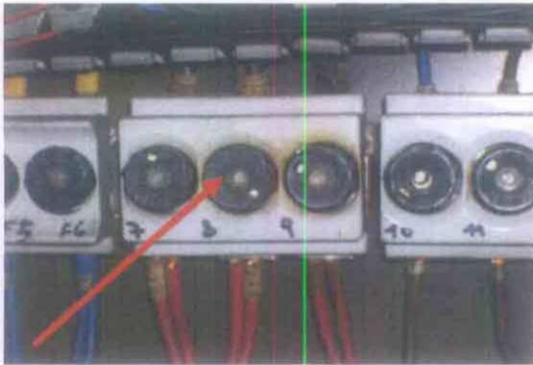
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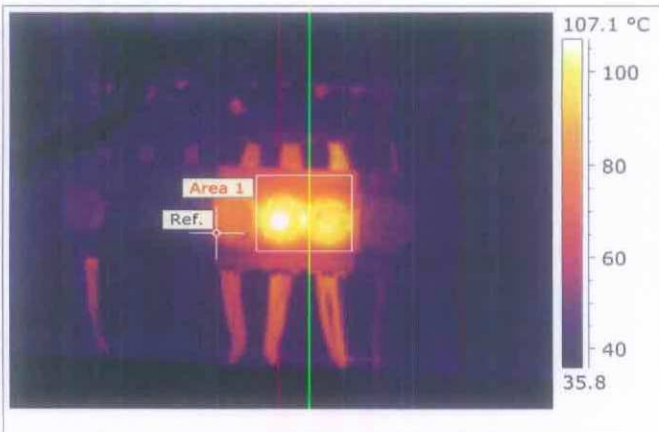
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CATEGORY Alert

Location Area	FMWS #1
Equipment Location	GRAMEGNA Panel
Equipment ID	Fuse #8
Est. Repair Cost Before Failure	€ 10
Est. Repair Cost After Failure	€ 50
Est. % of Production	0 %
Est. Down Time	0

Date: 10/02/2008



Ref. Temperature	61.8 °C
Area 1 Max. Temperature	110.9 °C
Area 1: Temp. Rise	49.1 °C

Recommendation/Comments:

The #8 fuse is very hot. This is likely to be a problem with the fuse and fuse holder.

The fuse should be removed, cleaned, inspect the fuse holder for damage and repair as necessary. Reassemble and properly tighten.

Repair notes:

Signature: Date:

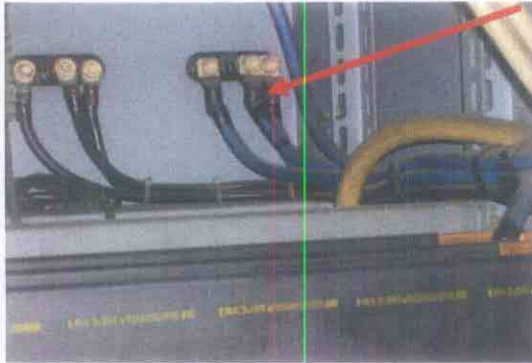
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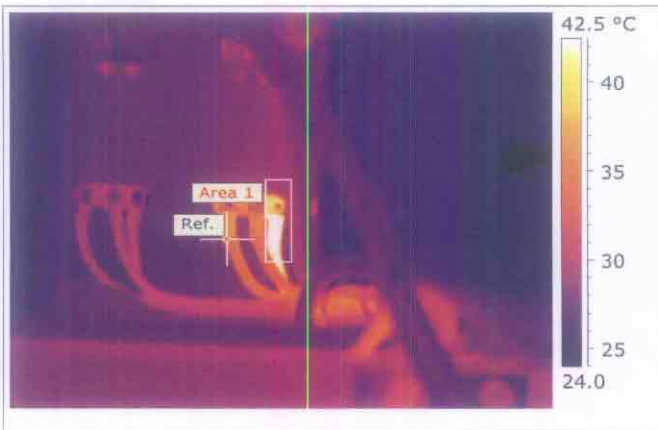


CATEGORY

Alert

Location Area	Elettrica Cabina #1
Equipment Location	Acqua Vascone #37
Equipment ID	Circuit Breaker Phase
Est. Repair Cost Before Failure	€ 50
Est. Repair Cost After Failure	€ 200
Est. % of Production	0 %
Est. Down Time	0

Date: 10/02/2008



Ref. Temperature	34.7 °C
Area 1 Max. Temperature	49.4 °C

Area 1: Temp. Rise	14.7 °C
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Recommendation/Comments:

The marked connection is elevated in temperature.

The connections should be disassembled, cleaned, inspected for damage and repaired as necessary. Reassemble and properly lubricate and torque fasteners according to the manufacturer's specifications, using new hardware as required.

Repair notes:

Signature: Date:

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CATEGORY

Alert

Location Area	Line 1,2 3,4 and 5
Equipment Location	Panel for the lighting
Equipment ID	Circuit Breaker 14
Est. Repair Cost Before Failure	€ 15
Est. Repair Cost After Failure	€ 50
Est. % of Production	0 %
Est. Down Time	0

Date: 10/02/2008



Ref. Temperature	53.8 °C
Area 1 Max. Temperature	91.5 °C
Area 2 Max. Temperature	-
Area 3 Max. Temperature	-

Area 1: Temp. Rise	37.7 °C
Area 2: Temp. Rise	0.0 °C
Area 3: Temp. Rise	0.0 °C

Recommendation/Comments:

The marked leads are very hot.

The connections should be disassembled, cleaned, inspected for damage and the leads cut back to good metal. Reassemble and properly torque fasteners.

Repair notes:

Signature:..... Date:

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