

Part 21 (PAR)

Event # 48863

Rep Org: INTEGRATED RESOURCES, INC.		Notification Date / Time: 03/28/2013 15:53 (EDT)	
Supplier: INVENSYS (FOXBORO METER CO.)		Event Date / Time: 03/27/2013 15:30 (CDT)	
Last Modification: 08/21/2013			
Region: 4	Docket #:		
City: NEBRASKA CITY	Agreement State:	Yes	
County:	License #:		
State: NE			
NRC Notified by: JOHN F. BROSEMER	Notifications:	GREG PICK	R4DO
HQ Ops Officer: HOWIE CROUCH		PAUL KROHN	R1DO
Emergency Class: NON EMERGENCY		PART 21 GROUP	EMAIL
10 CFR Section:		DEBORAH SEYMOUR	R2DO
21.21(d)(3)(i) DEFECTS AND NONCOMPLIANCE		JULIO LARA	R3DO

PART 21 REPORT - FOXBORO POWER SUPPLY POTENTIAL FAILURES DUE TO DEFECTIVE TIE WRAPS AND HOLDERS

Mr. John F. Brosemer, President of Integrated Resources, Inc., reported discovery of repeated defects in Foxboro Meter Company's N-2ARPS-A6, Style D power supplies. When manufactured, the power supplies utilized Thomas and Betts TC105A aluminum wire tie holders in random numbers and placements. As the power supplies age, the tie wrap holder adhesive degrades and the tie wraps embrittle resulting in the separation of the tie wraps and loss of holder adhesion to the power supply enclosure. This causes the wraps and holders to fall to the bottom of the enclosure which could result in shorts when the aluminum comes in contact with electronic components. In one particular power supply, all tie wrap holders in use failed and separated from the enclosure.

The power supplies are used in Foxboro SPEC-200 cabinetry that are used throughout the industry. At the time of this notification, Integrated Resources has one power supply from Three Mile Island and two power supplies from Ft. Calhoun undergoing refurbishment. Integrated Resources will be following up this telephonic notification with a written report once their internal investigation is done.

Recommended corrective actions are for affected facilities to open and inspect all power supplies and remove the aluminum tie wrap holders and replace the tie wraps and holders with Teflon types.

*** UPDATE FROM BROSEMER TO SNYDER AT 1530 EDT ON 4/1/13 ***

"Suspecting this to be a common mode failure IRI [Integrated Resources, Inc.] opened and inspected two Foxboro N-2ARPS-A6 power supplies which were sent to IRI for refurbishment by Fort Calhoun Nuclear Station. Examination revealed that both of the power supplies have the same failures of the tie wrap aluminum mounting plates adhesive with the majority of the plates being held on the wire bundles by age embrittled nylon wire ties.

IE19
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Part 21 (PAR)

Event # 48863

"Confirmation of the common mode failure by inspection of the Fort Calhoun Nuclear Stations was on or about 1530 CDT on March 27, 2013.

"IRI is not the OEM or Original supplier for this power supply and cannot provide the number nor locations of these components. However, by searching the RAPID database IRI has found the power supplies at the following:

"Arizona Public Service - Palo Verde Nuclear Generating Station; Constellation Energy - Nine Mile Point Nuclear Power Plant; Detroit Edison - Fermi 2 Nuclear Power Plant; Dominion Nuclear - Millstone Nuclear Power Plant; Dominion Nuclear - Kewaunee Nuclear Power Plant; Eletronuclear - Angra Nuclear Power Plant; Entergy Nuclear - Arkansas Nuclear One; Entergy Nuclear - Indian Point Energy Center; Entergy Nuclear - Pilgrim Nuclear Power Plant; Entergy Nuclear - J. A. Fitzpatrick Nuclear Power Plant; Exelon Corporation - Three Mile Island Nuclear Plant; Exelon Corporation - Peach Bottom Atomic Power Station; NextEra Energy - Point Beach Nuclear Power Plant; Progress Energy Florida - Crystal River Nuclear Power Plant; Southern California Edison - San Onofre Nuclear Generating Station.

"IRI suspects several other utilities and units are affected by this report.

Corrective action taken: "IRI's preliminary suggestion is inspection and removal of failed tie wrap mounting plates which are being held on to wire bundles by aging nylon tie wraps. IRI also suggests replacement of age embrittled nylon tie wraps with Tefzel tie wraps."

Contact Information:
John F. Brosemer; President
Integrated Resources, Inc.
113 South 9th Street
Nebraska City, NE 68410

Notified R1DO (Dwyer), R2DO (Seymour), R3DO (Daley), R4DO (Kellar) and Part 21 Reactors (Email).

*** UPDATE FROM JOHN BROSEMER (VIA EMAIL) ON 8/21/13 AT 1628 EDT ***

"IRI's final recommendations are to remove all Thomas and Betts Co. model TC105A wire tie holders and to replace any embrittled wire ties with TEFZEL wire ties in all of the affected Foxboro Co. power supplies.

"IRI also discovered during the course of the investigation that Thomas and Betts Co. supplied these wire tie holders through normal distribution to all of the manufacturers. IRI recommends that the industry, during normal inspections, inspect for the these types of wire tie holders in all other installed equipment and to remove the failed wire tie holders."

Notified R1DO (Schmidt), R2DO (Haag), R3DO (Kozak), R4DO (Werner) and Part 21 Reactors (via email).



July 5, 2013

Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, D.C., 20555-0001

Subject: 10 CFR Part 21 Report Notification, Foxboro, Co. N-2ARPS-A6 Power Supplies
Common Mode Failure of Thomas and Betts Model TC105A Ty-Rap Mounting Plates Adhesive
Final Report.

Dear Sir or Madam:

Integrated Resources, Inc., (IRI) submits this letter and the attached report to provide the final report and recommendations on IRI 10 CFR 21 notification event 48863.

IRI's final recommendations are to remove all Thomas and Betts, Co., model TC105A wire tie holders and to replace any embrittled wire ties with TEFZEL wire ties in all of the affected Foxboro, Co., Power Supplies.

IRI also discovered during the course of the investigation that Thomas and Betts, Co., supplied these wire tie holders through normal distribution to all of the manufacturers. IRI recommends that the industry, during normal inspections, inspect for these types of wire tie holders in all other installed equipment and to remove the failed wire tie holders.

Sincerely,

John F. Brosemer
President
Integrated Resources, Inc.
(402) 873-5859

INTEGRATED RESOURCES, INC.
DOCUMENT TITLE AND REVISION STATUS SHEET

Title: FINAL REPORT ON IRI FOXBORO METER CO., POWER SUPPLY MODEL N-2ARPS-A6 SERIAL NUMBER 4935949 TIE WRAP HOLDERS.		Document Number: TMI-1201-100
Document Type: Technical Evaluation		Project No: TMI-1201
Client: Three Mile Island Nuclear Station	Purchase Order No: 80 046008	Page 1 of 5

SAFETY RELATED - THIS DOCUMENT CONTAINS A SAFETY RELATED ITEM - YES X NO

REVISIONS		
NO	DESCRIPTION	DATE
0	Initial Release	7/5/13

ORIGINATOR/DATE	CHECKED BY/DATE	APPROVED/DATE
<div style="text-align: center;"><i>John F. Brosemer</i></div> John F. Brosemer 7/5/13	<div style="text-align: center;"><i>Marvin F. Shimmel</i></div> Marvin F. Shimmel 7/5/13	<div style="text-align: center;"><i>John F. Brosemer</i></div> John F. Brosemer 7/5/13

TECHNICAL EVALUATION

GENERAL INFORMATION

DESCRIPTION OF TECHNICAL EVALUATION:

This report provides the final results of IRI's investigation pertaining to IRI's 10 CFR Part 21 report number 48863.

GENERAL TECHNICAL EVALUATION

GENERAL INFORMATION TECHNICAL EVALUATION:

During the refurbishment of a safety related Foxboro Model N-2ARPS-A6 STYLE D power supply Serial Number 4935949 from Three Mile Island Nuclear Plant Integrated Resources, Inc. (IRI) found a one inch by ½ inch Ty-Rap aluminum mounting plate lying loose in the bottom of the power supply. (Attachment 1)

Further examination of the power supply found that the adhesive had failed on 14 of the 15 remaining aluminum mounting plates leaving the plates attached to the wire harnesses by age embrittled nylon wire ties. The only mounting plate that had not failed was not used (no tie wrap was installed).

Suspecting this to be a common mode failure IRI opened and inspected two Foxboro N-2ARPS-A6 STYLE D power supplies Serial Numbers 4484237 and 4484239 which were sent to IRI for refurbishment by Fort Calhoun Nuclear Station. Examination revealed that both of the power supplies have the same failures of the Ty-Rap aluminum mounting plates adhesive with the majority of the plates being held on the wire bundles by age embrittled nylon wire ties.

Confirmation of the common mode failure by inspection of the Fort Calhoun Nuclear Station power supplies and engineering analysis that the failure could pose a threat of the failure causing the power supplies not being capable of fulfilling their safety function was completed on or about 1530 CDT on 27 March 2013.

Based on this inspection and analysis Integrated Resources, Inc., (IRI) initiated a 10 CFR 21 verbal report dated 28 March 2013, at 1553 EDT, to Mr. H. Crouch (U.S. NRC) of a potential common mode failure of the Ty-Rap mounting plates adhesive used in Foxboro, Co. Power Supplies Model N-2ARPS-A6.

GENERAL INFORMATION TECHNICAL EVALUATION: (CONTINUED):

With the initial suggested resolution to remove the wire tie holders and replace affected wire ties with TEFZEL tie wraps.

IRI provided a full written report via email on 1 April 2013.

On 2 April 2013 contacted Ms. Sandy Brenneman at Invensys, Inc., (Previously Foxboro, Co.) and provided IRI's written 10 CFR part 21 report via email.

On 17 April 2013, IRI contacted the tie wrap holder manufacturer Thomas and Betts, Co., Product Manager, Mr. Steve McIlwain. Mr. McIlwain informed IRI that the TC105A product was withdrawn from the market after customer complaints of failing adhesive with the last production run occurring on 17 February 1998. The TC105A was replaced by the TC105 and a two part epoxy adhesive, which is the currently offered product. (Attachment 2).

Mr. McIlwain also provided product drawings of the TC105A, TC105 and the old adhesive specification (Attachment 3).

On June 7, 2013 Invensys, Inc., published a Customer Advisory 2013027abi, titled Invensys Response to US NRC 10CFR21 Event Number 48863 as Reported by Integrated Resources, Inc., and Instruction SI 0-00616 titled SPEC200 Hardware Nuclear (N-2ARPS Series) and commercial (2ARPS Series) Power Supply Cable Tie Replacement for Heat Sink Mounted Cable Harness. (Attachment 4)

These documents conclude that "The cable tie holders serve no safety related function and those that are loose or detached should be removed."

During a review of the Invensys, Inc., Documents IRI noted that the documents speak only of those wire tie holders used in the main compartment of the power supplies and those attached to the Heatsink. On June 10, 2013, IRI emailed Invensys, Inc., to inquire if the tie wrap holders contained in the "false bottom" area were covered by the same recommendation.

On June 25, 2013, IRI received an email from Mr. Norm Provost of Invensys, Inc., which states "All cable ties and holders within the affected products have been considered in the evaluation. Note that only those wire tie holders that are (or were) attached to the vertical interior walls of the power supply are the ones of concern. This is reflected in the customer notice and Special Instruction." (Attachment 5)

SPECIFIC INFORMATION (CONTINUED):

IRI disagrees with the final statement, in that any loose metallic objects within the affected power supplies could affect the safety function of the power supply during or subsequent to a seismic event.

Since Invensys, Inc., has concluded that the wire tie holders "serve no safety related function" and the adhesive will continue to fail, IRI suggests removal of ALL wire tie holders and replacement of the aging wire ties with TEFZEL tie wraps.

CONCLUSION/SUGGESTED DISPOSITION

IRI concludes that removal of all wire tie holders and any aging wire ties, replacing the wire ties with TEFZEL wire ties.

This concludes IRI's information and recommendation on the Foxboro, Co., power supply problem. However, as a result of research for this report it was found that Thomas and Betts, Co., sold the TC105A through distributors and would not have any records concerning end user information. The fact that this product was used extensively during the years that the current generation of nuclear plants were being built would indicate to IRI that it is very likely that these wire tie holders may have been used by different vendors and other equipment. IRI recommends that other equipment be visually examined as part of the normal maintenance program and that if loose wire tie holders are found to be present they be removed and the wire ties replaced with TEFZEL wire ties.

REFERENCES AND ATTACHMENTS

REFERENCES:

1. The Foxboro, Co., MI 2AR-102, MAINTENANCE INSTRUCTION MULTINEST POWER SUPPLY +15 AND -15 VDC, MODEL 2ARPS STYLE D, dated June 1980.
2. The Foxboro, Co., TI 2AR-102, TECHNICAL INFORMATION SPEC 200 MULTINEST POWER SUPPLY 2ARPS SERIES (STYLE D), dated May 1977.

ATTACHMENTS:

1. ATTACHMENT 1 - PHOTOGRAPH OF FAILED TIE WRAP HOLDER TC105A (1 PAGE).
2. ATTACHMENT 2 - RECORD OF CONVERSATION DATED 17 APRIL 2013 (1 Page).
3. ATTACHMENT 3 - THOMAS AND BETTS, CO., ENGINEERING INFORMATION (3 PAGES).
4. ATTACHMENT 4 - INVENSYS, INC., CUSTOMER ADVISORY AND SPECIAL INSTRUCTION (13 PAGES).
5. ATTACHMENT 5 - INVENSYS, INC., EMAIL DATED 25 JUNE 2013 (2 PAGES).

ATTACHMENT 1 - PHOTOGRAPH OF FAILED TIE WRAP HOLDER TC105A
Page 1 of 1

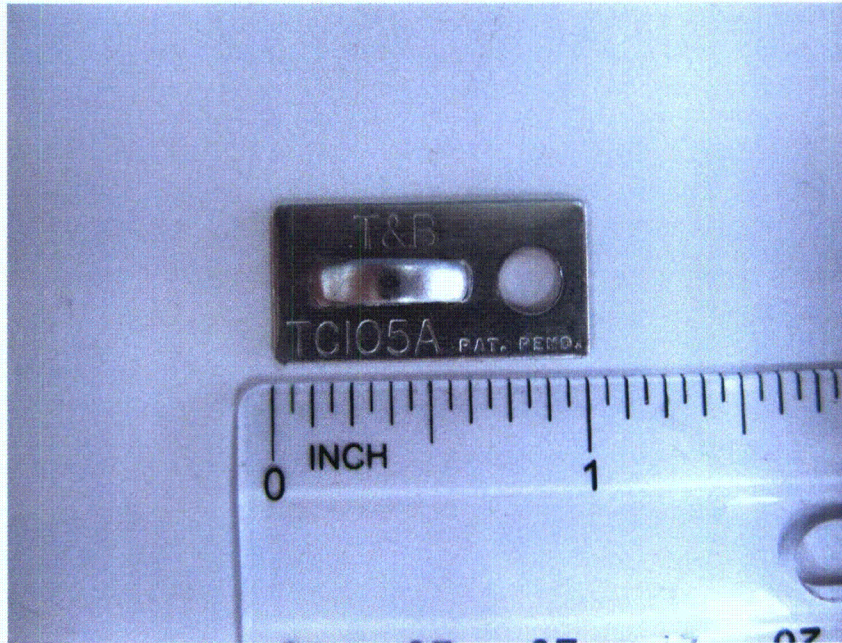


Figure 1 - TC105A with failed adhesive

Date: 4/17/2013
Page 1 Of 1

RECORD OF CONVERSATION

NAME: Steve McIlwain

TITLE: Product Manager

COMPANY: Thomas & Betts

TIME: 1430 CDT

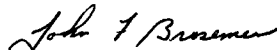
SUBJECT: Thomas & Betts TC105A Tie Wrap Holders

SUBJECT OF CONVERSATION

Discussed the ongoing investigation of the failed Tie Wrap Holders. Mr. McIlwain indicated that the Tie Wrap Holders were removed from the market after several reports from customers that the adhesive had prematurely failed typically 10 to 15 years after application. The last production run of the TC-105A Tie Wrap Holders was on February 17, 1989. After that date the standard TC105 product was supplied with a two part epoxy adhesive. This product is still offered by Thomas and Betts today.

The tie wrap holders were provided to various distributors over the life of the manufacture of the wire ties and that Thomas and Betts would have no way of tracking which manufacturers had used the Tie Wrap Holders.

Mr. McIlwain offered to email me the product specifications for the TC105A, TC105 and adhesive that was used.

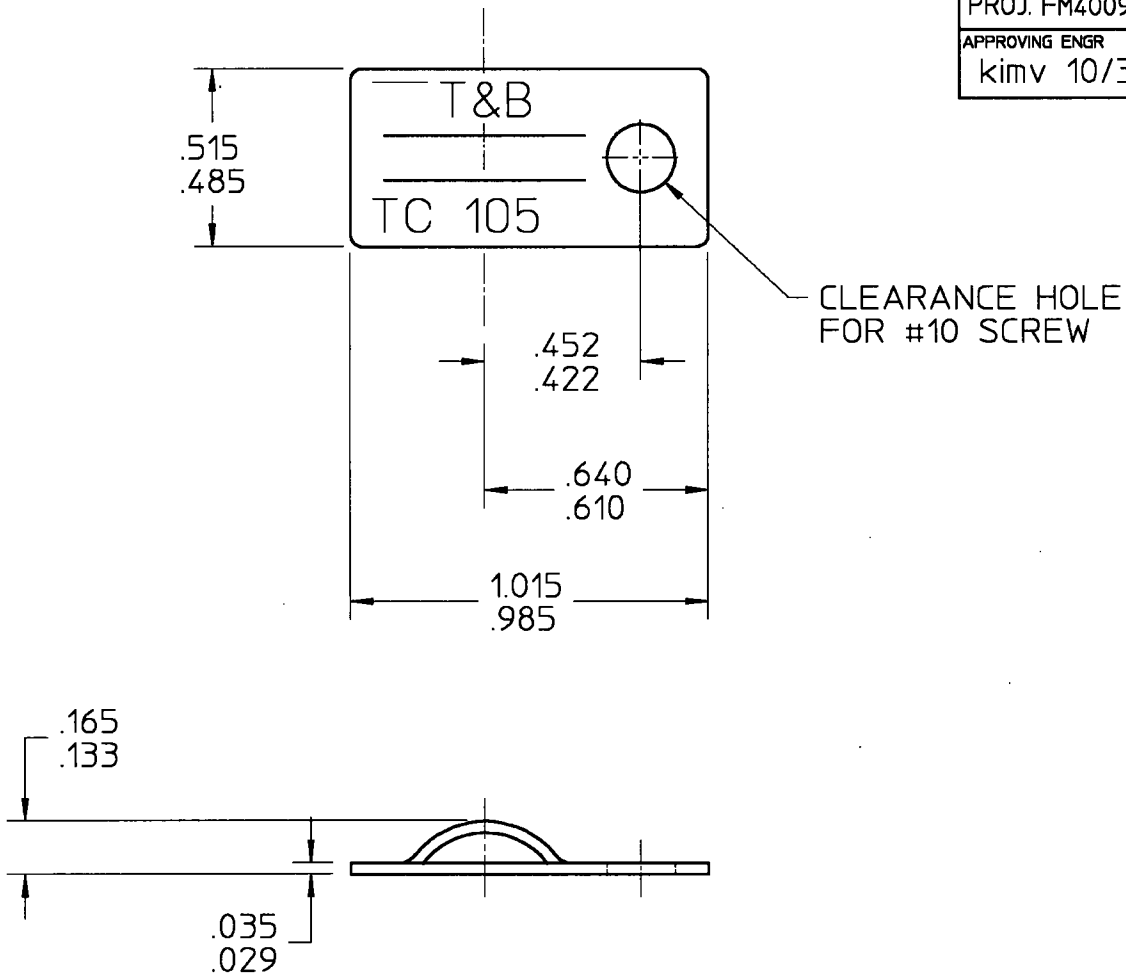


SIGNATURE: _____

I:\R1 Special Projects\2013\TMI Foboro Power Supply Wire Tie Brackets\Part 21 Final Report\Record of Conversation 130417 Thomas & Betts.wpd

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3	SEE ENGRG RLSE 1003480
PROJ. FM400945	
APPROVING ENGR kimv 10/3/00	



MATERIAL:
ALUMINUM 3003H14
PER SPEC. Q Q-A-250/2B

FINISH:
CLEAN & FINISH PER
MIL-C-5541D
CLASS III CLEAR

THIS DRAWING AND THE INFORMATION CONTAINED
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Ty-Rap

Thomas & Betts

APPROVING ENGR	PRODUCT MANAGER	DESCRIPTION TY-RAP® MOUNTING PLATE, FOR USE WITH STRAPS .190 WIDE MAX			
Thomas & Betts Corporation Memphis, Tennessee		SIZE A	REV. NO. 3	REV. DATE 10/3/00	SALES DWG. NO. AS40321-22
THIRD ANGLE PROJECTION	IF DUAL DIMENSIONED, DIMENSIONS ARE SHOWN IN mm INCH				SHEET OF

COMPUTER GENERATED HP-CAD ME-HYBRID

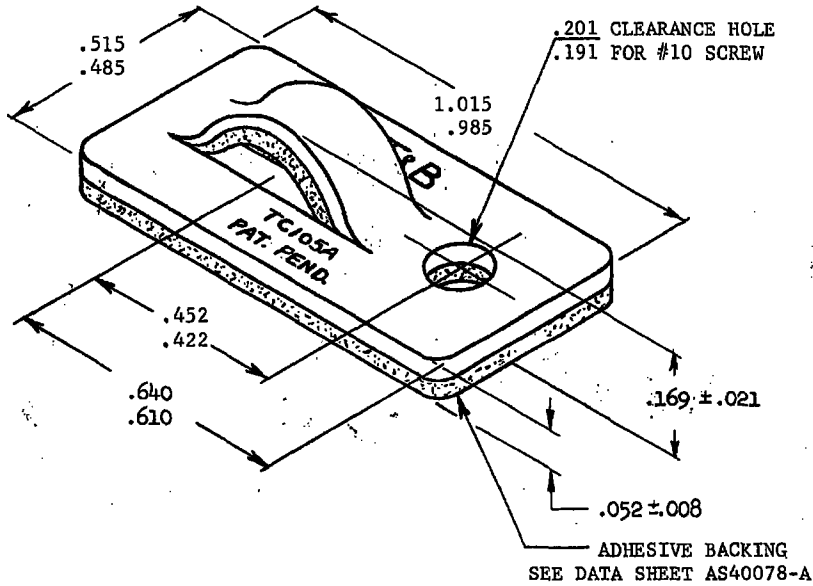
REVISIONS
 1 CHANGED DIM.
 .159 ±.021 WAS
 .172/141. ADDED
 DIM. .052 ±.008
 (MD-9283-3) 6-20-68 C.F. 8

REFERENCE NOTES

PROJ. NO. CS-4174-469
 DRAWN [Signature]
 CHECKED [Signature]

AS 40321-31

T & B THOMAS & BETTS ENGINEERED
ADHESIVE BACKED TY-RAP® MOUNTING PLATE
 FOR USE WITH TY-RAP® STRAPS .190 WIDE MAX.
 CAT. NO. TC-105A



MATERIAL: ALUMINUM PER SPEC QQ-A-250/2B (3003H14)

TYPICAL TEST RESULTS, APPLIED TO BAKED ENAMEL SURFACE

CURE TIME	STATIC LOAD, LBS.	PULL OFF FORCE, LBS.
15 MINUTES	2	15
1 HOUR	4	20
24 HOURS	15	29
48 HOURS	20	42

RECOMMENDED STATIC LOAD AFTER A MINIMUM CURE OF 15 MINUTES 2 LBS. MAX.

THIS DRAWING IS INTENDED ONLY FOR DESCRIPTIVE PURPOSES AND MUST BE REFERRED TO ANY OF THE DETAILS SHOWN HEREON.

THE THOMAS & BETTS CO. DIV. OF THOMAS & BETTS CORPORATION ELIZABETH NEW JERSEY IN CANADA: THOMAS & BETTS LTD., ISERVILLE, P.Q.	REV.	APPROVED BY	DATE	SIZE	DWG. NO.
	1	[Signature]	4-15-69	A	AS40321-31

THE THOMAS & BETTS CO.

ATTACHMENT 3, THOMAS AND BETTS, CO. ENGINEERING INFORMATION PAGE 3 OF 3

ELIZABETH NEW JERSEY
IN CANADA, THOMAS & BETTS, LTD., MONTREAL



THE T & B DISTRIBUTOR
SERVES AND SAVES

TECHNICAL DATA SHEET

PRODUCT: ADHESIVE BACKED TY-RAP[®] MOUNTING PLATES

DESCRIPTION: Adhesive Backing is a general purpose, quick-setting, high bond strength film. The Solvent Activation is designed to suit application needs.

SHELF LIFE: Over one year in normal, industrial storage conditions. Laboratory retained samples (filed at 70°F) have reacted normally to solvent after as long as three years. All adhesive films should be stored in a cool, dry place away from daylight.

BONDING: Surfaces to be adhered must be clean, dry, and free from grease, oil, or other contaminants. T&B Solvent TC-110 may be used to clean surfaces. Do not use dauber as a wiper.

Apply Solvent TC-110 to entire surface of adhesive backing with dauber supplied, taking care not to puddle. The proper bonding character of the film appears when strong cobwebs or legs develop after solvent activation. Time cycle is from 5-20 seconds, depending upon atmospheric conditions and the amount of solvent applied. The bond should be closed at once under firm, even pressure.

Excessive solvent will delay the reset of bond. Insufficient solvent fails to produce proper tack. Allow as much time as possible for curing. The bond continues to develop for as long as 30 days.

BONDS: Adhesive backed mounting plates may be mounted to many types of surfaces, including most plastics and metals. It is not recommended for the following: zinc, nickel, tin and some synthetic finishes such as melamine type, polyethylene, vinyl and other special type plastics such as teflon and mylar (DuPont).

FILM SPEC.: Bonds are resistant to water, oil, moisture, weak acids, alkalis; semi-flexible. Material complies with MIL P-6906, MIL D-8634, MIL-N-25076, excellent electrical characteristics (@ 500 V-D-C. : 25 x 10¹¹ megohms). Temperature performance range: -30°F+140°F, with short duration exposures up to 200°F. (Some performance at higher temperatures depending on duration, mounting load and bond area.) Not recommended for use where temperature will continue at or above 140°F.

STATEMENT OF LIMITATION:

Because of the conditions under which these devices may be applied and the surfaces to which they may be bonded are beyond our control, we cannot accept responsibility for the results obtained. No warranty, expressed or implied, is made by us with respect to performance.

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DESIGNED	G4-3-19-64	CHECKED	3-23-64 G4G-	REVISION NUMBER				AS 40078-A
DRAWN	R.BACH. 3/19/64	APPROVED	77					

FOXBORO

Customer Advisory # 2013027abi

Invensys Response to US NRC 10CFR21 Event Number 48863 as Reported by Integrated Resources, Inc.

June 7, 2013

FOXBORO NUCLEAR SPEC200 POWER SUPPLY POTENTIAL FAILURES DUE TO DEFECTIVE CABLE TIES AND CABLE TIE HOLDERS

Invensys has completed an investigation of the reported condition and has made the following determination: It has been determined that two models of FOXBORO SPEC 200 Power Supplies could have age-related failure of wire harness cable ties and cable tie holders. The cable tie holders which are aluminum, if fully detached, could fall onto live electrical connections within the power supply and could result in electrical failure of the supply.

The affected model codes are as follows:

- Model N-2ARPS, all styles and option codes, manufactured in 1995 or earlier
- Model N-2ARPS05, all styles and option codes, manufactured in 1995 or earlier

Extent of condition:

The cable tie holders in the above mentioned models are secured to the interior wall of the power supplies with an integral adhesive. Inspecting a sample of three older power supplies in the age group revealed 100% adhesive failure. In all cases the cable ties themselves were intact and so no holders had fallen into the power supply, although several cable ties did however indicate some discoloring from age. Two such power supplies were subsequently tested on a shake table up to 20 Hz at 13 g's of acceleration in order to simulate a seismic event. Under this test condition one cable tie became detached resulting in its' holder falling into the supply. There are approximately ten such holders in each supply.

Analysis indicates that the consequence of the holder bridging live parts can cause the output of the supply to fail, i.e. the output voltage of the supply can fall to zero volts. Typically two supplies in a SPEC 200 rack in a primary and backup configuration would need to fail in this manner in order for the SPEC 200 card nests to lose power.

The nuclear SPEC 200 product line has been reviewed for other instances where this cable tie holder is used and could pose a similar risk. It was determined that there are none.

Invensys repair history has no record of the metal cable tie holder identified as a root cause for failure in any N-2ARPS or N-2ARPS05 power supplies independent of age, style or option codes.

Power Supply Identification:

The model codes involved are as follows:

- (1) Model N-2ARPS, all styles and option codes, manufactured in 1995 or earlier
- (2) Model N-2ARPS05, all styles and option codes, manufactured in 1995 or earlier

To determine if the instrument is affected by this issue, examine the origin number on the data plate (e.g. 2A9501).

Invensys Operations Management, 33 Commercial Street, Foxborough, MA 02035 USA

The origin code of affected units is between 2A9501 (January 1995) and prior. The manufacturing date format is PPYYWW where:

- PP = Plant of manufacture code (in this example, 2A, 2B)
- YY = Year of production
- WW = Week of production

If the date code is beyond the manufacturing year of 1995, then no action is necessary.

Actions or Resolutions

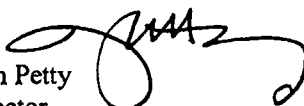
It is recommended that the affected model codes within the manufacturing date range be cycled out of service for inspection as soon as practical. The cable tie holders serve no safety related purpose and those that are loose or detached should be removed. The cable ties themselves are recommended for seismic integrity and should be replaced. Instructions for performing these actions are detailed in Special Instruction SI 0-00616.

For information

If you have any questions regarding this notification, please contact your local Invensys/Foxboro Representative or an Invensys Operations Management support center at:

GCS Center	America's GCS	Asia Pacific GCS	EMEA GCS
Location	Foxboro MA USA	Singapore	Baarn NL
Phone	+1-866-746-6477	+65-66829-8899	+31-3554-84125
Internationally	+1-508-549-2424		
Fax	+1508-549-4999	+65-6829-8898	+31-3554-84230
Email	support@ips.invensys.com	csc.ap@ips.invensys.com	emeatac@ips.invensys.com

Regards,


John Petty
Director
Global Client Support

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Advisory # 2013027abi

ATTACHMENT: SI 0-00616

Instruction

SI 0-00616

May 2013

SPEC200[®] Hardware
Nuclear (N-2ARPS Series) and Commercial (2ARPS Series)
Power Supply Cable Tie Replacement for
Heatsink Mounted Cable Harness

AG101CX Kit

Quantity	Part No.	Description
12	N0139FR	Cable Ties
1	P0928HV	Label, Revision Marking
1	SI0-00616	Special Instructions

Overview**— NOTE**

This is not a product recall. This repair is specific to cable ties and cable tie hold-downs only.

Industry Notification

There is a potential that in the Foxboro Model N-2ARPS Series (including N-2ARPS05 Series) and the Model 2ARPS Series (including 2ARPS05 Series) power supplies, the wire harness cable ties and cable tie holders could fail in units that were manufactured in 1995 or earlier. As soon as practical, these SPEC200 power supplies should be temporarily removed from service and inspected. Customer site maintenance should determine whether there is an issue that needs rework.

The cable tie holders serve no safety-related purpose; however, those that are loose or detached should be removed. The cable ties themselves are necessary and should be replaced as needed. Instructions for performing these actions are detailed in this SI.

Customer List

A letter will be sent to all affected customers and an advisory will be published on our Invensys Global Customer Support website.

Affected Modules

The affected model codes are:

- ◆ Nuclear
 - ◆ Model N-2ARPS Series SPEC200 Power Supplies containing all styles and option codes manufactured in 1995 or earlier.
 - ◆ Model N-2ARPS05 Series SPEC200 Power Supplies containing all styles and option codes manufactured in 1995 or earlier.
- ◆ Commercial
 - ◆ Model 2ARPS Series SPEC200 Power Supplies containing all styles and option codes manufactured in 1995 or earlier.
 - ◆ Model 2ARPS05 Series SPEC200 Power Supplies containing all styles and option codes manufactured in 1995 or earlier.

Affected Date Codes

Recommendation is for inspection of power supplies with year date codes 1995 and earlier. The probability of occurrence of adhesive failure would appear to be high for this age group of equipment. (See Figure 3 and Figure 4.)

Issue Resolved

Potential common mode aging failure of metal cable tie holders used in Foxboro Model Power Supplies. For the age group involved, the qualified life of 14 years as stated in PSS 9-7A1A has been exceeded.

Work to be Performed

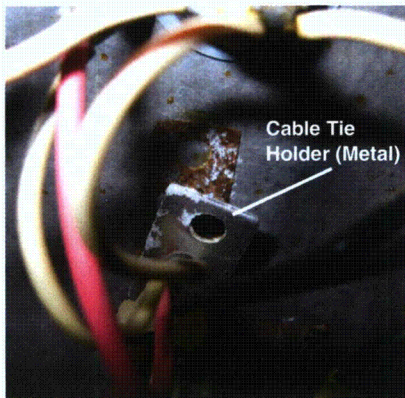
The cable tie holders are out of the warranty period, and as such are no longer warranted. These tie holders are not a safety-related or required item. The recommendation is to contact your authorized repair center for inspection and repair. In the event that you wish Invensys to make these repairs, contact Invensys and Invensys will provide a quote and a time period of its availability to perform these repairs. For further information, you can consult your Invensys field service representative.

Recommended Timing of Required Action

It is recommended that all potentially affected power supplies be cycled out of service for inspection and corrective action as soon as practical. Instructions for inspection and corrective action will be detailed or else referenced in a letter sent to customers.

Basic Concern

Aging Adhesive on Cable Tie Holder and Aging Cable Ties



The adhesive that was integral to the aluminum cable tie holder was utilized in production from initial sales release until the year 1995. It has determined that this age group is at risk of adhesive failure based on the field reports and our own observations. (See the example of adhesive embrittlement in the photo to the left.)

Background

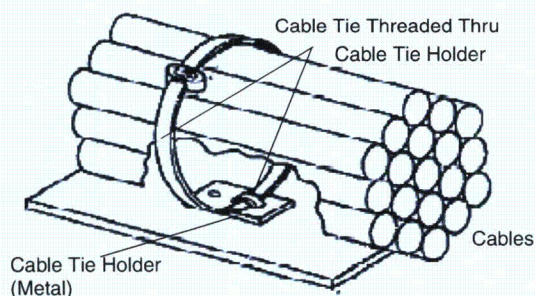
Cable harnesses mounted on the Power Supply Rear Heatsink Assembly are secured to the interior wall of the power supply using the aluminum cable tie holders with an integral adhesive (reference Foxboro p/n A3300AK). Typically, ten cable tie holders are utilized in a single Power Supply. The associated cable ties are a common variety made from nylon (reference Foxboro p/n N0139FR).

In some cases, these cable tie and holder systems are located above live un-insulated electrical parts within the power supply. Field reports indicate that during one particular inspection all cable tie holders were found to be detached from the interior walls of a power supply and in one instance, an embrittled cable tie had fractured causing the (metal) cable tie holder itself to fall into the bottom of the supply. It is surmised that if the cable tie holder had bridged live electrical parts that this condition, while in service, could result in potential failure of the power supply. A population of similarly aged power supplies in service and having this condition could then possibly result in a common mode failure situation.

Basic Analysis and Related Information

Cable Tie Holder

The adhesive that was integral to the aluminum cable tie holder was utilized in production from the initial sales release until the year 1995. It has been determined that this age group is at risk of adhesive failure based on the field reports and our own observations.



Cable Tie

It has been determined that embrittlement and eventual fracture of nylon tie wraps is a credible failure mode that can be caused by the combination of aging and service conditions. The probability of occurrence is considered to be low to moderate for the affected age group.

Consequence of Electrical Shorts within the Power Supply

It has been determined that an electrical short caused by a falling cable tie holder could result in loss of function of the power supply. The consequence would, however, in effect be no more severe than a random electrical failure. When considering single failures caused by a cable tie holder-related electrical short, the only significant impact would be a reduced MTBF compared to normal operation.

History of the Reported Failure Condition

Invensys repair history has no records of the cable tie holder identified as a root cause for failure in any SPEC200 product.

Overall Analysis, Conclusions and Additional Considerations

Potential Issue

Information obtained to date supports the possibility that a number of cable tie holders and cable ties are in various stages of deterioration within power supplies performing a safety-related function. During normal operation, it is possible that multiple cable tie holders in the power supplies could simultaneously fail and possibly bridge live parts which could cause electrical short circuits. Multiple power supply failures may occur.

Hardware Upgrade Process

The cable tie holders serve no safety-related purpose and those that are loose or detached should be removed. Only the new cable ties supplied in this kit will be used for the cable bundle tie-down.

Figure 1 illustrates a Heatsink Assembly TA hardware assembly overview with nine cable bundle tie-down locations and Figure 2 is a photo of the rear heatsink assembly with the tenth cable bundle tie-down location in the chassis.

For each of the ten locations, **inspect the cable bundle condition one cable tie holder/cable tie at a time** and perform the following for each:

- ◆ Remove the individual cable tie holder and discard. If the cable tie holder is still in place, gently pry to remove.

— **NOTE** —

If a cable tie holder is very solid and will not come loose, it is recommended that you leave the holder in place and install a new cable tie.

- ◆ Remove the associated cable tie and replace it with a new cable tie from this kit.

The label included in the kit is placed on the front of the power supply to indicate that the cable ties have been replaced.

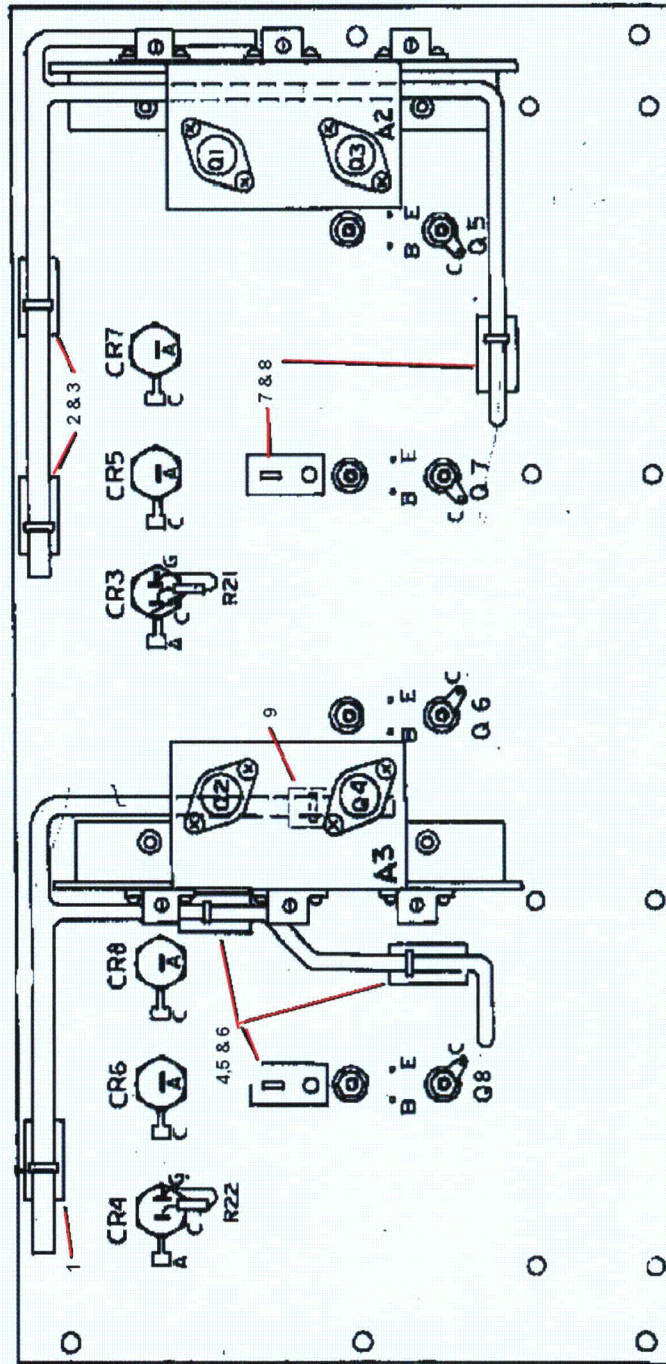


Figure 1. N-2ARPS-05 Heatsink Assembly TA
(with Cable Bundle Tie-down Locations 1 - 9)

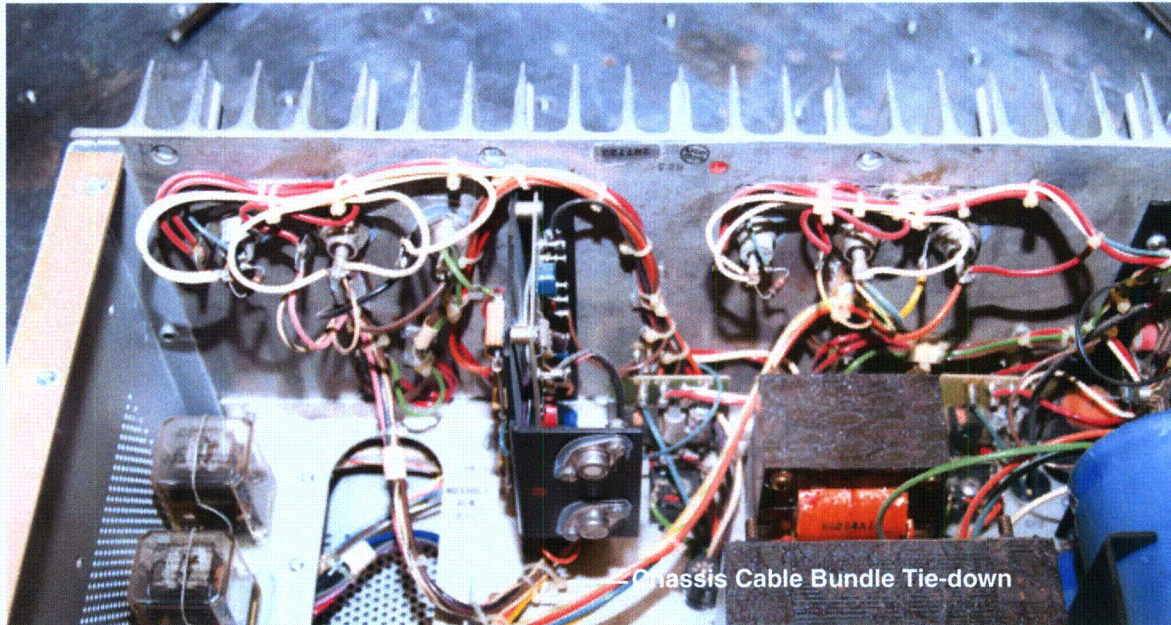


Figure 2. Rear Heatsink (with Cable Bundle Tie-down Locations)

Recommended Rework Procedures

— NOTE —

Prior to inspection of the power supply, make sure that all power to the unit has been removed and the unit is then removed from the rack. Take proper maintenance precautions when servicing this equipment.

Perform the following tasks:

1. Verify the product type and model on the front of the Power Supply as shown in Figure 3. Verify the product date codes as shown in Figure 3 and/or Figure 4.

To determine if the instrument is affected by this issue, examine the origin number on the data plate (e.g. 2A9501).

- a. The origin code of affected units is between 2A9501 (January 1995) and prior. The manufacturing date format is PPYYWW where:
 - ◆ PP = Plant of manufacture code (in this example, 2A, 2B)
 - ◆ YY = Year of production
 - ◆ WW = Week of production
- b. If the date code is beyond the manufacturing year of 1995, then no action is necessary.

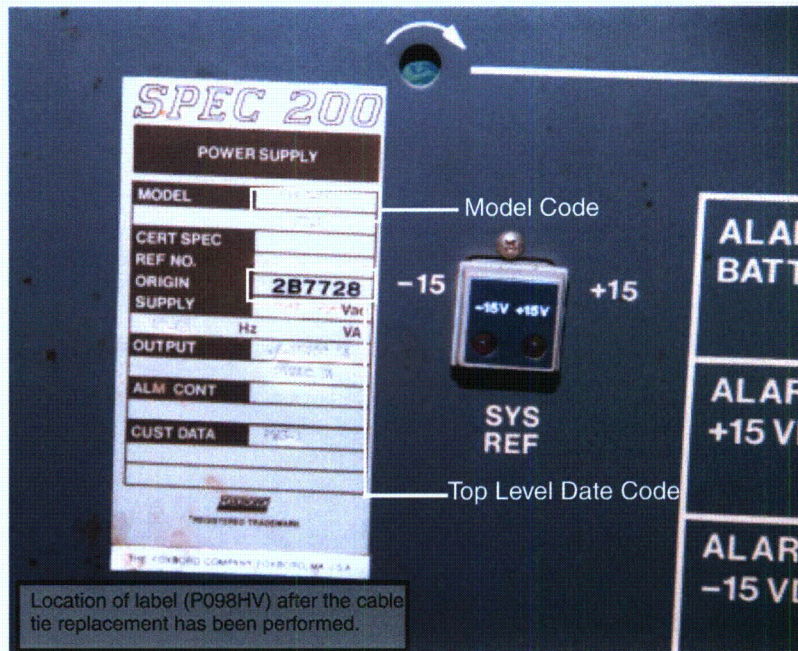


Figure 3. Product Type and Model and Top Level Date Code

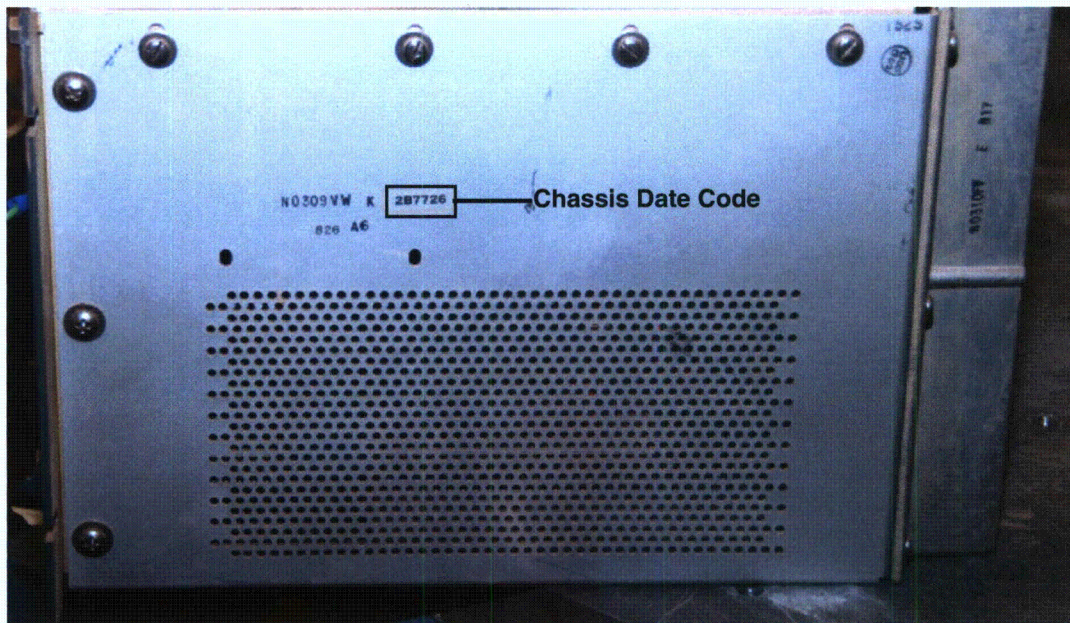


Figure 4. Chassis Date Code

2. Remove the screws and screws/washers in the power supply top cover as shown in Figure 5 and lift the cover.

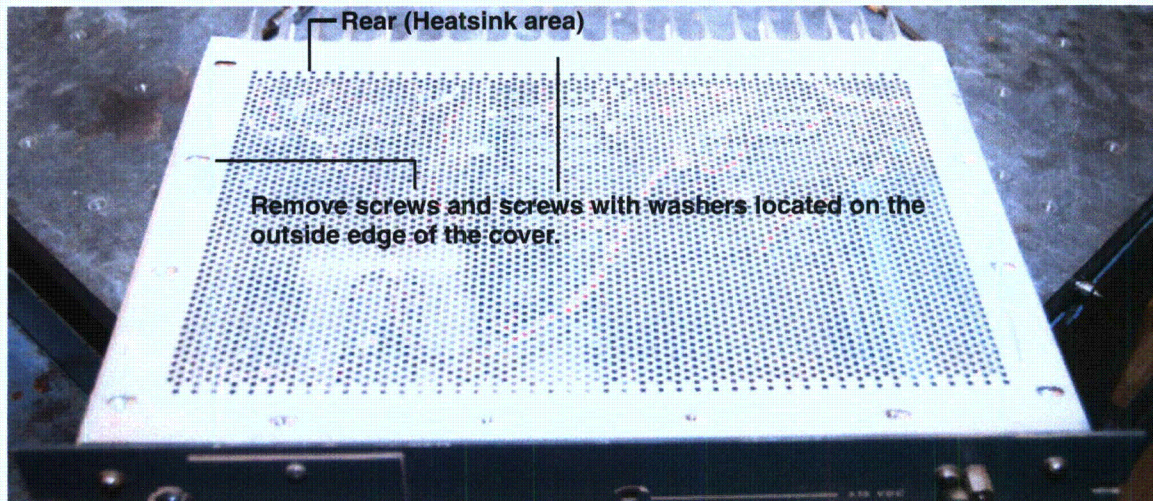


Figure 5. Power Supply Top Cover

3. The following examples indicate a close-up of an aging cable tie holder in the rear heat-sink location and the chassis location.

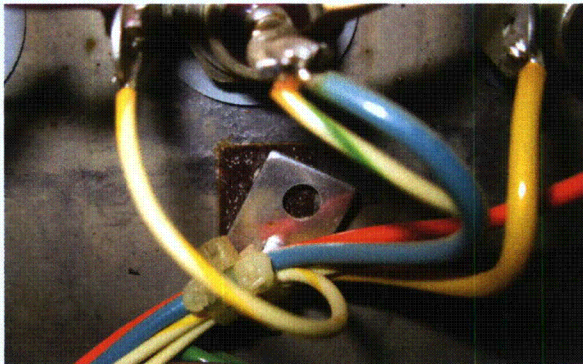


Figure 6. Rear Heatsink Location

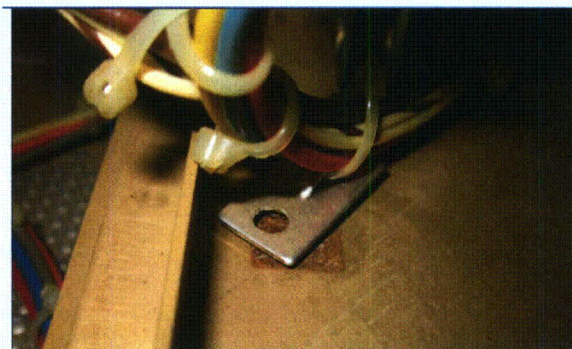


Figure 7. Chassis Location

4. See Figure 1 for the location of the nine cable tie holders in the rear heatsink and Figure 2 for the location of the tenth cable tie holder in the chassis.
5. Individually, snip out the loose cable tie holder/cable tie and discard. Gently pry the cable tie holder to remove or if it cannot be removed, leave the holder in place.
6. Individually, install a new cable tie provided in this kit.
7. Repeat this process for each of the identified cable bundle tie-down locations.
8. Replace the power supply top cover securing it with the appropriate screws and screws with washers.
9. Place the label (p/n P0928HV) on the front of the power supply in the lower left corner of the power supply (Figure 3).
10. Complete the attached AG101CX Retrofit Configuration Control Record (one sheet per kit) and return to Invensys Systems, Inc. by FAX or mail as stated on the form.

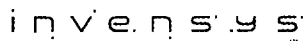
Invensys Operations Management
10900 Equity Drive
Houston, TX 77041 United States of
America
<http://iom.invensys.com>

Global Customer Support
Inside U.S.: 1-866-746-6477
Outside U.S.: 1-508-549-2424 or contact
your local Invensys representative.
Website: <http://support.ips.invensys.com>

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Retrofit Configuration Control Record

AG101CX Kit

This form is used to update the Invensys Foxboro Configuration Control Records. It must be filled out and faxed to 1-508-549-4999 or mailed to: Invensys Systems, Inc., Mail Code: B52-AB, 33 Commercial Street, Foxboro, MA 02035. Please complete only one sheet per kit. List all Invensys Foxboro Sales Order Numbers involved.

CUSTOMER NAME: _____ CUST ID: _____

LOCATION: _____

PRODUCT TYPE: _____

FOXBORO SALES ORDER NO: _____

KIT PART NUMBER: _____

EXCLUDING SPARES ____ HOW MANY TOTAL UNITS ARE AT THE CUSTOMER'S SITE? _____

HOW MANY OF THESE UNITS ARE AFFECTED BY THIS CHANGE? _____

HAS KIT BEEN INSTALLED? YES ____ NO ____ IF YES, QTY. INSTALLED THIS TRIP: _____

FOXBORO SERIAL/IDENTIFICATION/ORIGIN DATE CODE: _____

ON-SITE SPARES: _____

HAS THE CUSTOMER ANY SITE-SPARES THAT REQUIRE THIS CHANGE? YES ____ NO ____

IF YES, HOW MANY TOTAL SITE-SPARES: _____

HAS KIT BEEN INSTALLED? YES ____ NO ____ IF YES, QTY. INSTALLED THIS TRIP: _____

COMMENTS:

** HOME OFFICE USE ONLY

** REQD _____

** INF _____

** YRWK _____

** SITE _____

KIT INSTALLER _____

CLOCK NUMBER _____

DATE _____

John Brosemer

From: Provost, Norm [Norm.Provost@invensys.com]
Sent: Tuesday, June 25, 2013 8:16 AM
To: John Brosemer
Cc: Francis, Karen
Subject: RE: Foxboro Part 21 report
Attachments: Customer Advisory #2013027abi.pdf; SI_0-00616_a.pdf; "AVG certification".txt
Mr. Brosemer,

Here is the status and Invensys final conclusion.

Attached are copies of the customer notification and the inspection/rework procedure for the subject issue, for reference. These have been sent by certified mail to all users. Users are invited to contact Invensys for support as required. No further action by Invensys related to this issue beyond user support is anticipated at this time.

All cable ties and holders within the affected products have been considered in the evaluation. Note that only those tie holders that are (or were) attached to the vertical interior walls of the power supply are the ones of concern. This is reflected in the customer notice and Special Instruction.

Regards,
Norm Provost, Chairman (Invensys) Nuclear Product Safety Committee

Invensys Systems Inc.
33 Commercial Street
Foxboro, MA 02035
USA

From: Francis, Karen
Sent: Tuesday, June 25, 2013 7:08 AM
To: Provost, Norm
Cc: Dale Overbeck; Marvin Shimmel; John Brosemer
Subject: RE: Foxboro Part 21 report

Good Morning Norm,
Can you please address John's email?

Thank You
Karen

From: John Brosemer [mailto:john_brosemer@iri-ne.com]
Sent: Tuesday, June 25, 2013 2:39 AM
To: Francis, Karen
Cc: Dale Overbeck; Marvin Shimmel
Subject: Foxboro Part 21 report

Ms Francis,

7/3/2013

Is there any "status" concerning the T&B TC105A's installed in the false bottom of the power supplies? IRI is approaching our estimated final report date to the NRC. Will it be necessary for me to initiate an "interim" report? Or does Foxboro anticipate being able to put this issue to rest in the next week or two?

I am currently out of the office and can be reached via email or via cell phone at (402) 209-0510.

John F. Brosemer
President
Integrated Resources, Inc.
(402) 873-5859

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