

Energy Charting and Metrics Tool (ECAM)

Part I: Introduction

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ECAM Credits and History

- ▶ Development by William Koran, P.E.
- ▶ Contracting Organizations
 - PECl, Portland Energy Conservation Inc.)
 - QuEST (Quantum Energy Services & Technologies Inc.)
 - NorthWrite Inc.
- ▶ Funding provided by the following organizations:
 - The Northwest Energy Efficiency Alliance
 - The California Energy Commission, Public Interest Energy Research (through the California Commissioning Collaborative)
 - Pacific Northwest National Laboratory (PNNL)
 - New Buildings Institute (NBI)



Federal Energy Management Program (FEMP) Mission

- ▶ The U.S. Department of Energy (DOE) Federal Energy Management Program (FEMP) provides services, tools, and expertise to Federal agencies to help them achieve their legislated and executive-ordered energy, greenhouse gas, and water goals. These are delivered through project, technical, and program services.
- ▶ ECAM helps address FEMP's mission by helping Federal building managers and operators understand their energy consumption patterns and trends, interpret raw data from energy meters, identify underlying causes of inefficiencies, and pinpoint potential solutions.
- ▶ Universal Translator (UT2) addresses any data formatting issues that ECAM cannot handle, and pre-processes the data into ECAM format.



Source: http://www1.eere.energy.gov/femp/program/om_requirements.html

Objectives of this Webinar Series

- ▶ To build off the Energy Policy Act (EPAAct) requirement to install meters by October 1, 2012, to ensure efficient energy use and reduce the cost of electricity in Federal facilities. Advanced meters or metering devices must provide data at least daily and measure the consumption of electricity at least hourly.
- ▶ To show the capabilities of ECAM in analyzing the metering data (it is assumed that the meters are already in place and data is being collected).
- ▶ To show how the data from interval meters or from the building automation system (BAS) can be used with ECAM and Universal Translator (UT2), and help users install and begin processing collected data.

Part I: Outline of this Webinar

- ▶ What is an interval meter?
- ▶ What is a building automation system (BAS)?
- ▶ What is ECAM? Who developed it? What are its features and tools?
- ▶ What is the Universal Translator (UT2)?
- ▶ ECAM Installation guide (Microsoft Excel 2007/2010)
- ▶ Pre-process (clean up) raw data extracted from interval meters and the BAS
 - Practice file to be made available to participants of the webinar

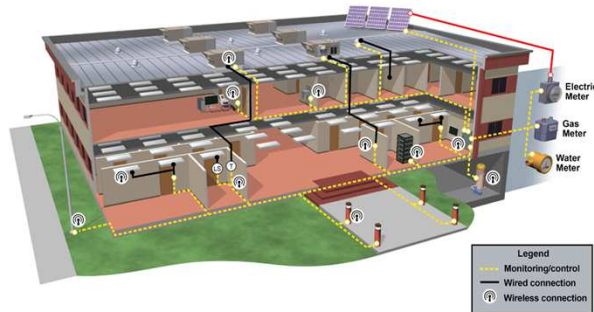
What is an Interval Meter?

- ▶ Interval meters cover two categories
 - Electrical – can track whole-building energy use, sub-panel energy use, or a specific end use (i.e., motors, chillers, etc.)
 - Flow-related – water, steam, natural gas, and other flow-related meters installed in-line using positive displacement, insertion turbine, or pressure-related techniques.
- ▶ Output related to resource use (i.e., energy, water, natural gas, etc.)
- ▶ Data collection and automated meter reading (AMR) systems collect and report resource data usage through the central system (or BAS), depending on the facilities' ability to communicate with the meter.



Source: http://www1.eere.energy.gov/femp/program/om_meteringsystems.html

What is a Building Automation System (BAS)



► Centralized, interlinked networks of hardware and software

- The purpose of the building automation system is to ensure control and operational performance of the facility as well as the comfort and safety of the building occupants.
- The building automation system also serves as a tool to alert building operators of problems with equipment that could impact comfort and safety, and can store trended data that can be used to analyze how well the different building systems are actually performing.

Pacific Northwest
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Understanding Building Automation and Control Systems

Building automation systems (BAS) are centralized, interlinked, networks of hardware and software, which monitor and control the environment in commercial, industrial, and institutional facilities. While managing various building systems, the automation system ensures the operational performance of the facility as well as the comfort and safety of building occupants. Typically, such control systems are installed in new buildings or as part of a renovation where they replace an outdated control system.

What is Controlled?

Generally, building automation begins with control of mechanical, electrical, and plumbing (MEP) systems. For instance, the heating, ventilation, and air-conditioning (HVAC) system is almost always controlled, including control of its various pieces of equipment such as:

Air-handling units (AHUs)

Roof-top units (RTUs)

Fan coil units (FCUs)

Heat pump units (HPUs)

Variable-air-volume boxes (VAVs)

Chillers (BAS communicates with, but usually these have their own controllers)

Boilers (BAS communicates with, but usually these have their own controllers)

Other systems that are often controlled or integrated for remote monitoring include:

Lighting control is the low-hanging fruit for optimizing building performance

Security

Close circuit video (CCTV)

Card and keypad access

Fire alarm system

Elevators/escalators

What is ECAM?



► ECAM-Energy Charting and Metrics Tool

- ECAM is an excel-based tool that is intended to help building owners and operators look at trended data (recommended 5 to 30 minute time interval data measurement) in a series of charts to analyze HVAC component data or utility meter data gathered from the interval meters or a BAS.

Key Features of ECAM

- ▶ Pre-processing of data to input occupancy scheduling (e.g., 8:00AM to 5:00PM Mon. through Fri.) and day-type (e.g., weekdays, Saturdays, Sundays, Holidays) information to charts. Thus, the user can look at comparisons between days and hours within days.
 - Filtering data (analyze the data in greater depth) by:
 - Day-type
 - Occupancy schedule
 - Month/year/day
 - Pre/post (energy projects)
- ▶ Creation of load profile charts to analyze whole building energy consumption.
- ▶ Creation of standard-building PNNL re-tuning charts using trend data from the BAS.

What is the Universal Translator (UT2)?

- ▶ The Universal Translator (UT2) is a tool that is used to merge data that has inconsistent timestamps or that is located in different workbooks.
 - This tool is frequently used because the output from a BAS varies based on the type of system, and how the trend logs were set up.
 - Example to follow
- ▶ Register, download, and install from:
<http://utonline.org/cms>
- ▶ UT2 user guide (as it pertains to use with ECAM) available at:
http://www.pnnl.gov/buildingretuning/documents/pnnl_20948.pdf



Universal Translator is used to merge data from different excel sheets and different timestamps. This is needed because BASs may be providing the data for one component (e.g., AHU) in multiple sheets (e.g., 2).

Also, if the user wants to merge data from more than one component, then he/she will use Universal Translator (UT) again to merge the data from AHU-1, AHU-2, etc.

Source: <http://utonline.org/cms/node/103>

How do I get a copy of the UT?

Registered users can download the latest version of the Universal Translator.

To register:

Create a new account from at the link above. Click on the "Create new account" link, fill out the account information form, and press the "Create new account" button. An email will be sent to you containing your user name, a temporary password and additional information.

To download the Universal Translator Installer:

From the Home page log in with your new account. After you log in, click on the Downloads link in the "Primary links" menu. On the Downloads page, click the link of the Installer you wish to download. You will be redirected to an article with information regarding the UT version you have chosen. Scroll to the bottom of the page. The installer file is an executable program; just click on it and begin the installation.

UT2 Example

		Start Time of data	End Time of data
Excel file 1 (.csv format)	AHU* Supply Air Temperature	1/12/2012 12:00:00AM	1/28/2012 6:30:00 PM
Excel file 2 (.csv format)	AHU Mixed Air Temperature	1/5/2012 1:00:00 AM	1/26/2012 6:00:00 PM
Excel file 3 (.csv format)	AHU Return Air Temperature	1/1/2012 3:00:00 AM	1/31/2012 12:00:00PM
Excel file 4 (.csv format)	AHU Outside Air Temperature	1/24/2012 12:00:00AM	1/26/2012 9:00:00 PM

- ▶ Scenario: Each AHU file is in a separate excel workbook.
- ▶ Goal: To merge all files into one excel workbook.
- ▶ Approach: Use UT2.
- ▶ How UT2 works: It matches concurrent timestamps across files, and linearly interpolates to match specified data frequency



Note: UT2 requires that files be imported as comma-separated values (CSV) files.

How do the BAS, ECAM, and UT2 work together?

Building Automation System
(BAS)

- ❑ Controls, manages, and collects data from HVAC components.

Universal Translator
(UT2)

- ❑ Universal Translator is used to merge data from different excel sheets and data with different timestamps.

Energy Charting and Metrics Tool
(ECAM)

- ❑ Graphs data from the BAS so the building operator can look at the trend data of HVAC components.

Result:

- 1) Building operators and building commissioners can translate data from different BASs into a common energy charting and metrics tool.
- 2) Charting HVAC data can identify improved control opportunities in buildings.

User Interaction: Installing ECAM

Installation guide of ECAM

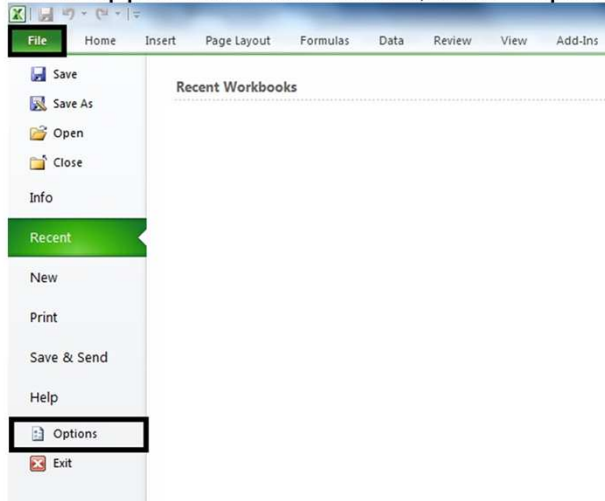
- ▶ Step 1: Download ECAM from:
http://www.pnnl.gov/buildingretuning/documents/ecam_v2pt0dev62.xls

The screenshot shows the Pacific Northwest National Laboratory website. The main heading is "Re-tuning Commercial Buildings". Under "Focus Areas", there is a link to "Re-tuning Home". Under "Downloads", there is a link to "Download ECAM v2.0 Excel (xls)". A red arrow points to this link. Below the website, a "File Download" dialog box is open, asking "Do you want to open or save this file?". The file name is "ecam_v2pt0dev62.xls", the type is "Microsoft Excel 97-2003 Worksheet, 1.66MB", and the source is "www.pnnl.gov". The dialog box has "Open", "Save", and "Cancel" buttons. A warning message at the bottom of the dialog box states: "While files from the Internet can be useful, some files can potentially harm your computer. If you do not trust the source, do not open or save this file. [What's the risk?](#)"

***Click on save, and change the file type from a .xls to a .xla.

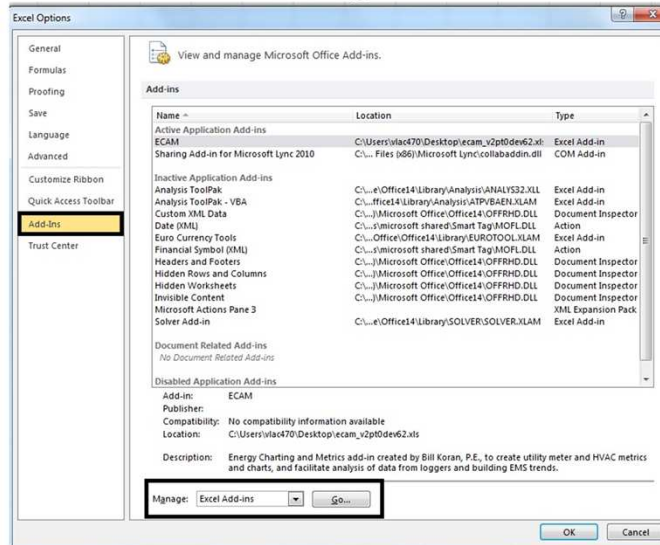
Installation guide of ECAM (cont.)

- ▶ Step 2: Open Microsoft Excel 2007/2010 and click on “File” in the upper left hand corner, then “Options.”



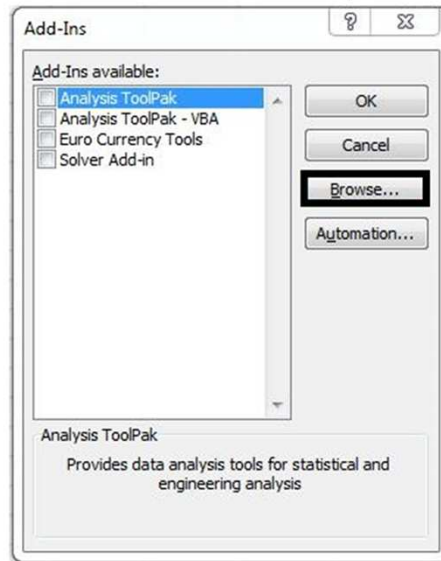
Installation guide of ECAM (cont.)

- Step 3: On the pop up options window click on “Add-Ins,” and make sure that “Excel Add-Ins” is visible in the drop down menu next to “Manage.” Click on “Go.”



Installation guide of ECAM (cont.)

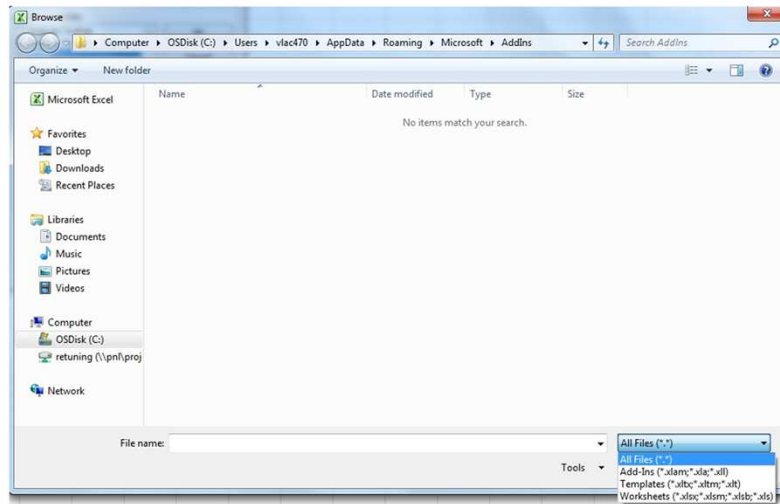
- Step 4: Click “Browse” and find the path where ECAM is saved.



It is easiest to save the version of ECAM to your desktop so you don't have to search for it in the future if/when you have to reinstall ECAM.

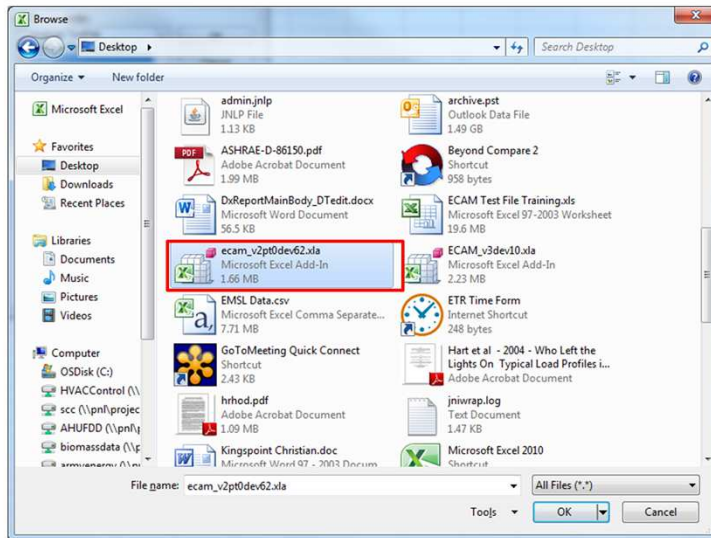
Installation guide of ECAM (cont.)

- Step 5: Select "All Files" from the drop down menu.



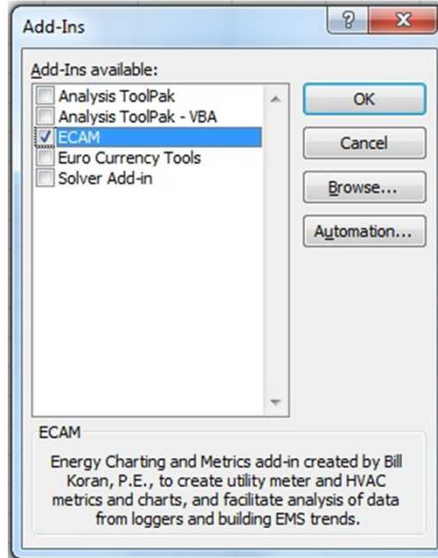
Installation guide of ECAM (cont.)

- ▶ Step 6: Find the ECAM .xla file and click "OK."



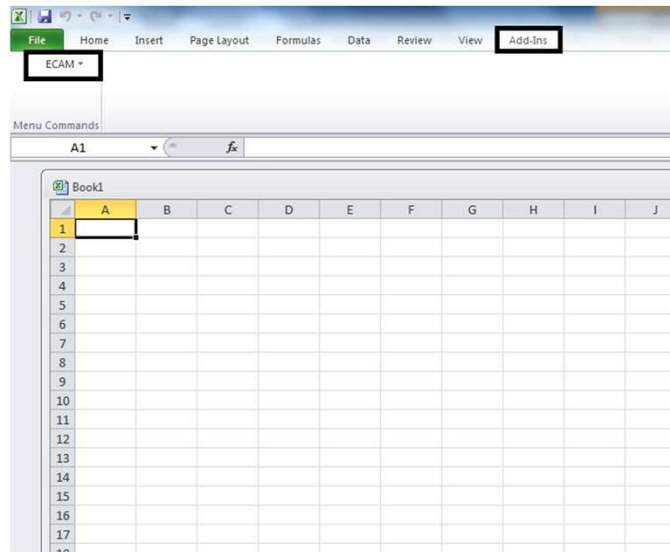
Installation guide of ECAM (cont.)

- Step 7: After selecting the ECAM add-in, make sure the check box is checked and click "OK."



Installation guide of ECAM (cont.)

- ▶ ECAM will be added in the excel home screen under the "Add-Ins" tab





Pre-processing (cleaning up) raw data extracted from the BAS



ECAM only accepts a specific form of raw data for processing. The following steps will demonstrate the process for getting a file into the proper ECAM format.

Pre-Processing Example

1 Key Trend Definitions Used

2 Point_1 MT0401A - AC2.OA 10 minutes

3 Point_2 AHU-5 MT0402A - AC 10 minutes

4 Point_3 AHU-5 MT0402A - AC COV 10 minutes

5 Point_4 AHU-5 MT0402A - AC COV

6 Point_5 AHU-5 MT0402A - AC 10 minutes

7 Point_6 AHU-5 MT0402A - AC 10 minutes

8 Point_7 AHU-5 MT0402A - AC COV

9 Point_8 AHU-5 MT0402A - AC COV

10 Point_9 AHU-5 MT0402A - AC COV

11 Point_10 AHU-5 MT0402A - AC COV

12 Point_11 AHU-5 MT0401A - AC COV

13 Point_12 AHU-5 MT0402A - AC COV

14 Point_13 AHU-5 MT0402A - AC COV

15 Point_14 AHU-5 MT0402A - AC COV

16 Point_15 AHU-1 MT0401A - AC COV

17 Point_16 AHU-1 MT0401A - AC 10 minutes

18 Point_17 AHU-1 MT0401A - AC COV 10 minutes

19 Point_18 AHU-1 MT0401A - AC COV

20 Point_19 AHU-1 MT0401A - AC COV

21 Point_20 AHU-1 MT0401A - AC COV

22 Point_21 AHU-1 MT0401A - AC COV

23 Point_22 AHU-1 MT0401A - AC COV

24 Point_23 AHU-1 MT0401A - AC COV

25 Point_24 AHU-1 MT0401A - AC COV

26 Point_25 AHU-1 MT0401A - AC COV

27 Point_26 AHU-1 MT0401A - AC COV

28 Point_27 AHU-1 MT0401A - AC 10 minutes

29 Time Interval: 10 Minutes

30 Date Range: 03/24/2011 00:00:00 - 05/06/2011 09:40:00

31 Report Timing All Hours

32

33 <Date Time Point_1 Point_2 Point_3 Point_4 Point_5 Point_6 Point_7 Point_8 Point_9 Point_10 Point_11 Point_12 Point_13 Point_14 Point_15 Point_16 Point_17 Point_18 Point_19 Point_20 Pi

34 3/24/2011 0:00 52.3417 72.1855 0 0 60.0633 68.0811 68.3023 58.1684 0 No Data 0 OFF -0.02761 1.4 74.3043 0 0 60.0633 69.4055 70.7866

35 3/24/2011 0:10 52.2188 72.1855 0 0 60.1125 68.0811 68.2614 58.0047 0 No Data 0 OFF -0.02783 1.4 74.3043 0 0 60.1125 69.4055 70.6638

36 3/24/2011 0:20 52.096 72.1855 0 0 60.1616 67.9992 68.2614 57.8818 0 No Data 0 OFF -0.02761 1.4 74.3043 0 0 60.1616 69.3236 70.541

37 3/24/2011 0:30 51.8503 72.1855 0 0 60.2599 67.9582 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 60.2599 69.2827 70.4591

38 3/24/2011 0:40 51.7334 72.1855 0 0 60.3090 67.9283 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 60.3090 69.2827 70.4591

39 3/24/2011 0:50 51.6165 72.1855 0 0 60.3581 67.8984 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 60.3581 69.2827 70.4591

40 3/24/2011 1:00 51.5000 72.1855 0 0 60.4072 67.8685 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 60.4072 69.2827 70.4591

41 3/24/2011 1:10 51.3835 72.1855 0 0 60.4563 67.8386 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 60.4563 69.2827 70.4591

42 3/24/2011 1:20 51.2670 72.1855 0 0 60.5054 67.8087 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 60.5054 69.2827 70.4591

43 3/24/2011 1:30 51.1505 72.1855 0 0 60.5545 67.7788 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 60.5545 69.2827 70.4591

44 3/24/2011 1:40 51.0340 72.1855 0 0 60.6036 67.7489 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 60.6036 69.2827 70.4591

45 3/24/2011 1:50 50.9175 72.1855 0 0 60.6527 67.7190 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 60.6527 69.2827 70.4591

46 3/24/2011 2:00 50.8010 72.1855 0 0 60.7018 67.6891 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 60.7018 69.2827 70.4591

47 3/24/2011 2:10 50.6845 72.1855 0 0 60.7509 67.6592 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 60.7509 69.2827 70.4591

48 3/24/2011 2:20 50.5680 72.1855 0 0 60.8000 67.6293 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 60.8000 69.2827 70.4591

49 3/24/2011 2:30 50.4515 72.1855 0 0 60.8491 67.5994 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 60.8491 69.2827 70.4591

50 3/24/2011 2:40 50.3350 72.1855 0 0 60.8982 67.5695 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 60.8982 69.2827 70.4591

51 3/24/2011 2:50 50.2185 72.1855 0 0 60.9473 67.5396 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 60.9473 69.2827 70.4591

52 3/24/2011 3:00 50.1020 72.1855 0 0 60.9964 67.5097 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 60.9964 69.2827 70.4591

53 3/24/2011 3:10 50.0000 72.1855 0 0 61.0455 67.4798 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 61.0455 69.2827 70.4591

54 3/24/2011 3:20 49.8835 72.1855 0 0 61.0946 67.4499 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 61.0946 69.2827 70.4591

55 3/24/2011 3:30 49.7670 72.1855 0 0 61.1437 67.4200 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 61.1437 69.2827 70.4591

56 3/24/2011 3:40 49.6505 72.1855 0 0 61.1928 67.3901 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 61.1928 69.2827 70.4591

57 3/24/2011 3:50 49.5340 72.1855 0 0 61.2419 67.3602 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 61.2419 69.2827 70.4591

58 3/24/2011 4:00 49.4175 72.1855 0 0 61.2910 67.3303 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 61.2910 69.2827 70.4591

59 3/24/2011 4:10 49.3010 72.1855 0 0 61.3401 67.3004 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 61.3401 69.2827 70.4591

60 3/24/2011 4:20 49.1845 72.1855 0 0 61.3892 67.2705 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 61.3892 69.2827 70.4591

61 3/24/2011 4:30 49.0680 72.1855 0 0 61.4383 67.2406 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 61.4383 69.2827 70.4591

62 3/24/2011 4:40 48.9515 72.1855 0 0 61.4874 67.2107 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 61.4874 69.2827 70.4591

63 3/24/2011 4:50 48.8350 72.1855 0 0 61.5365 67.1808 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 61.5365 69.2827 70.4591

64 3/24/2011 5:00 48.7185 72.1855 0 0 61.5856 67.1509 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 61.5856 69.2827 70.4591

65 3/24/2011 5:10 48.6020 72.1855 0 0 61.6347 67.1210 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 61.6347 69.2827 70.4591

66 3/24/2011 5:20 48.4855 72.1855 0 0 61.6838 67.0911 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 61.6838 69.2827 70.4591

67 3/24/2011 5:30 48.3690 72.1855 0 0 61.7329 67.0612 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 61.7329 69.2827 70.4591

68 3/24/2011 5:40 48.2525 72.1855 0 0 61.7820 67.0313 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 61.7820 69.2827 70.4591

69 3/24/2011 5:50 48.1360 72.1855 0 0 61.8311 67.0014 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 61.8311 69.2827 70.4591

70 3/24/2011 6:00 48.0195 72.1855 0 0 61.8802 66.9715 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 61.8802 69.2827 70.4591

71 3/24/2011 6:10 47.9030 72.1855 0 0 61.9293 66.9416 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 61.9293 69.2827 70.4591

72 3/24/2011 6:20 47.7865 72.1855 0 0 61.9784 66.9117 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 61.9784 69.2827 70.4591

73 3/24/2011 6:30 47.6700 72.1855 0 0 62.0275 66.8818 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 62.0275 69.2827 70.4591

74 3/24/2011 6:40 47.5535 72.1855 0 0 62.0766 66.8519 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 62.0766 69.2827 70.4591

75 3/24/2011 6:50 47.4370 72.1855 0 0 62.1257 66.8220 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 62.1257 69.2827 70.4591

76 3/24/2011 7:00 47.3205 72.1855 0 0 62.1748 66.7921 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 62.1748 69.2827 70.4591

77 3/24/2011 7:10 47.2040 72.1855 0 0 62.2239 66.7622 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 62.2239 69.2827 70.4591

78 3/24/2011 7:20 47.0875 72.1855 0 0 62.2730 66.7323 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 62.2730 69.2827 70.4591

79 3/24/2011 7:30 46.9710 72.1855 0 0 62.3221 66.7024 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 62.3221 69.2827 70.4591

80 3/24/2011 7:40 46.8545 72.1855 0 0 62.3712 66.6725 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 62.3712 69.2827 70.4591

81 3/24/2011 7:50 46.7380 72.1855 0 0 62.4203 66.6426 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 62.4203 69.2827 70.4591

82 3/24/2011 8:00 46.6215 72.1855 0 0 62.4694 66.6127 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 62.4694 69.2827 70.4591

83 3/24/2011 8:10 46.5050 72.1855 0 0 62.5185 66.5828 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 62.5185 69.2827 70.4591

84 3/24/2011 8:20 46.3885 72.1855 0 0 62.5676 66.5529 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 62.5676 69.2827 70.4591

85 3/24/2011 8:30 46.2720 72.1855 0 0 62.6167 66.5230 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 62.6167 69.2827 70.4591

86 3/24/2011 8:40 46.1555 72.1855 0 0 62.6658 66.4931 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 62.6658 69.2827 70.4591

87 3/24/2011 8:50 46.0390 72.1855 0 0 62.7149 66.4632 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 62.7149 69.2827 70.4591

88 3/24/2011 9:00 45.9225 72.1855 0 0 62.7640 66.4333 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 62.7640 69.2827 70.4591

89 3/24/2011 9:10 45.8060 72.1855 0 0 62.8131 66.4034 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 62.8131 69.2827 70.4591

90 3/24/2011 9:20 45.6895 72.1855 0 0 62.8622 66.3735 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 62.8622 69.2827 70.4591

91 3/24/2011 9:30 45.5730 72.1855 0 0 62.9113 66.3436 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 62.9113 69.2827 70.4591

92 3/24/2011 9:40 45.4565 72.1855 0 0 62.9604 66.3137 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 62.9604 69.2827 70.4591

93 3/24/2011 9:50 45.3400 72.1855 0 0 63.0095 66.2838 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 63.0095 69.2827 70.4591

94 3/24/2011 10:00 45.2235 72.1855 0 0 63.0586 66.2539 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 63.0586 69.2827 70.4591

95 3/24/2011 10:10 45.1070 72.1855 0 0 63.1077 66.2240 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 63.1077 69.2827 70.4591

96 3/24/2011 10:20 44.9905 72.1855 0 0 63.1568 66.1941 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 63.1568 69.2827 70.4591

97 3/24/2011 10:30 44.8740 72.1855 0 0 63.2059 66.1642 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 63.2059 69.2827 70.4591

98 3/24/2011 10:40 44.7575 72.1855 0 0 63.2550 66.1343 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 63.2550 69.2827 70.4591

99 3/24/2011 10:50 44.6410 72.1855 0 0 63.3041 66.1044 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 63.3041 69.2827 70.4591

100 3/24/2011 11:00 44.5245 72.1855 0 0 63.3532 66.0745 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 63.3532 69.2827 70.4591

101 3/24/2011 11:10 44.4080 72.1855 0 0 63.4023 66.0446 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 63.4023 69.2827 70.4591

102 3/24/2011 11:20 44.2915 72.1855 0 0 63.4514 66.0147 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 63.4514 69.2827 70.4591

103 3/24/2011 11:30 44.1750 72.1855 0 0 63.5005 65.9848 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 63.5005 69.2827 70.4591

104 3/24/2011 11:40 44.0585 72.1855 0 0 63.5496 65.9549 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 63.5496 69.2827 70.4591

105 3/24/2011 11:50 43.9420 72.1855 0 0 63.5987 65.9250 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 63.5987 69.2827 70.4591

106 3/24/2011 12:00 43.8255 72.1855 0 0 63.6478 65.8951 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 63.6478 69.2827 70.4591

107 3/24/2011 12:10 43.7090 72.1855 0 0 63.6969 65.8652 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 63.6969 69.2827 70.4591

108 3/24/2011 12:20 43.5925 72.1855 0 0 63.7460 65.8353 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 63.7460 69.2827 70.4591

109 3/24/2011 12:30 43.4760 72.1855 0 0 63.7951 65.8054 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 63.7951 69.2827 70.4591

110 3/24/2011 12:40 43.3595 72.1855 0 0 63.8442 65.7755 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 63.8442 69.2827 70.4591

111 3/24/2011 12:50 43.2430 72.1855 0 0 63.8933 65.7456 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 63.8933 69.2827 70.4591

112 3/24/2011 1:00 43.1265 72.1855 0 0 63.9424 65.7157 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 63.9424 69.2827 70.4591

113 3/24/2011 1:10 43.0100 72.1855 0 0 63.9915 65.6858 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 63.9915 69.2827 70.4591

114 3/24/2011 1:20 42.8935 72.1855 0 0 64.0406 65.6559 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 64.0406 69.2827 70.4591

115 3/24/2011 1:30 42.7770 72.1855 0 0 64.0897 65.6260 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 64.0897 69.2827 70.4591

116 3/24/2011 1:40 42.6605 72.1855 0 0 64.1388 65.5961 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 64.1388 69.2827 70.4591

117 3/24/2011 1:50 42.5440 72.1855 0 0 64.1879 65.5662 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 64.1879 69.2827 70.4591

118 3/24/2011 2:00 42.4275 72.1855 0 0 64.2370 65.5363 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 64.2370 69.2827 70.4591

119 3/24/2011 2:10 42.3110 72.1855 0 0 64.2861 65.5064 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 64.2861 69.2827 70.4591

120 3/24/2011 2:20 42.1945 72.1855 0 0 64.3352 65.4765 68.1794 57.6771 0 No Data 0 OFF -0.02805 1.4 74.3043 0 0 64.335

Pre-Processing Example (Cont.)

- ▶ Close up view (1) at the points list extracted from the BAS.

Key	Name:Suffix	Trend Definitions Used
Point_1	MT0401A - AC2.OA-T	10 minutes
Point_2	AHU-5 MT0402A - AC3.AVGZN-T	10 minutes
Point_3	AHU-5 MT0402A - AC3.CLG-C	COV 10 minutes
Point_4	AHU-5 MT0402A - AC3.DMPR-C	COV
Point_5	AHU-5 MT0402A - AC3.DATSP	10 minutes
Point_6	AHU-5 MT0402A - AC3.DA-T	10 minutes
Point_7	AHU-5 MT0402A - AC3.MA-T	COV
Point_8	AHU-5 MT0402A - AC3.RA-T	COV
Point_9	AHU-5 MT0402A - AC3.RF-VFD-C	COV
Point_10	AHU-5 MT0402A - AC3.RPRES	COV
Point_11	AHU-5 MT0402A - AC3.SF-VFD-C	COV
Point_12	AHU-5 MT0402A - AC3.SF-Command	COV
Point_13	AHU-5 MT0402A - AC3.SPRES2	COV
Point_14	AHU-5 MT0402A - AC3.SPSP	COV
Point_15	AHU-1 MT0401A - AC2.AVGZN-T.AVGZN-T	COV
Point_16	AHU-1 MT0401A - AC2.CLG-C	10 minutes
Point_17	AHU-1 MT0401A - AC2.DMPR-C	COV 10 minutes
Point_18	AHU-1 MT0401A - AC2.DATSP	COV
Point_19	AHU-1 MT0401A - AC2.DA-T	COV
Point_20	AHU-1 MT0401A - AC2.MA-T	COV
Point_21	AHU-1 MT0401A - AC2.RA-T	COV
Point_22	AHU-1 MT0401A - AC2.RF-VFD-C	COV
Point_23	AHU-1 MT0401A - AC2.SF-VFD-C	COV
Point_24	AHU-1 MT0401A - AC2.SF-Command	COV
Point_25	AHU-1 MT0401A - AC2.SPRES1	COV
Point_26	AHU-1 MT0401A - AC2.RPRES-SP	COV
Point_27	AHU-1 MT0401A - AC2.SPSP	10 minutes



Point list numbering and abbreviations provided by BAS.

Pre-Processing Example (Cont.)

- Close up view (2) at the raw data.

Copy and Paste the point list to the header row of the data.

2

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
16	Point_15	AHU-1 MT0401A - AC:COV																				
17	Point_16	AHU-1 MT0401A - AC:COV																				
18	Point_17	AHU-1 MT0401A - AC:COV	10 minutes																			
19	Point_18	AHU-1 MT0401A - AC:COV																				
20	Point_19	AHU-1 MT0401A - AC:COV																				
21	Point_20	AHU-1 MT0401A - AC:COV																				
22	Point_21	AHU-1 MT0401A - AC:COV																				
23	Point_22	AHU-1 MT0401A - AC:COV																				
24	Point_23	AHU-1 MT0401A - AC:COV																				
25	Point_24	AHU-1 MT0401A - AC:COV																				
26	Point_25	AHU-1 MT0401A - AC:COV																				
27	Point_26	AHU-1 MT0401A - AC:COV																				
28	Point_27	AHU-1 MT0401A - AC:COV																				
29	Time Interval	10 Minutes																				
30	Date Range	03/24/2011 00:00:00 - 05/06/2011 09:40:00																				
31	Report Timing	All Hours																				
32																						
33	<<Date	Time	Point_1	Point_2	Point_3	Point_4	Point_5	Point_6	Point_7	Point_8	Point_9	Point_10	Point_11	Point_12	Point_13	Point_14	Point_15	Point_16	Point_17	Point_18	Point_19	Point_20
34	3/24/2011	0:00	52.21875	72.1855	0	0	60.0533	68.0811	68.2614	58.0047	0 No Data	0 OFF	-0.02761	1.4	74.3043	0	0	60.1125	69.4055	70.7836		
35	3/24/2011	0:10	52.21875	72.1855	0	0	60.1125	68.0811	68.2614	58.0047	0 No Data	0 OFF	-0.02783	1.4	74.3043	0	0	60.1125	69.4055	70.7836		
36	3/24/2011	0:20	52.09595	72.1855	0	0	60.1616	67.9992	68.2614	57.8818	0 No Data	0 OFF	-0.02761	1.4	74.3043	0	0	60.1616	69.3236	70.541		
37	3/24/2011	0:30	51.85038	72.1855	0	0	60.2599	67.9582	68.1794	57.6771	0 No Data	0 OFF	-0.02805	1.4	74.3043	0	0	60.2599	69.2827	70.4591		
38	3/24/2011	0:40	51.72742	72.1855	0	0	60.309	67.9582	68.1794	57.5543	0 No Data	0 OFF	-0.02805	1.4	74.3043	0	0	60.309	69.2417	70.3771		
39	3/24/2011	0:50	51.60461	72.1855	0	0	60.3582	67.9582	68.1386	57.3495	0 No Data	0 OFF	-0.02871	1.4	74.3043	0	0	60.3582	69.1599	70.0496		
40	3/24/2011	1:00	51.48557	72.0343	0	0	60.3418	67.9582	68.1386	57.3905	0 No Data	0 OFF	-0.02805	1.4	74.3043	0	0	60.3418	68.033	69.8859		
41	3/24/2011	1:10	51.46557	72.0343	0	0	60.3418	67.8354	68.0566	57.2676	0 No Data	0 OFF	-0.02827	1.4	74.3799	0	0	60.3418	68.9551	69.8039		
42	3/24/2011	1:20	52.42352	72.0343	0	0	60.0306	67.7126	68.0158	57.4723	0 No Data	0 OFF	-0.02783	1.4	74.3799	0	0	60.0306	68.8732	69.5582		
43	3/24/2011	1:30	52.30066	72.0343	0	0	60.0797	67.7126	68.0158	57.4723	0 No Data	0 OFF	-0.02849	1.4	74.3043	0	0	60.0797	68.7094	69.2716		
44	3/24/2011	1:40	52.42352	71.9966	0	0	60.0306	67.7535	68.0158	57.5133	0 No Data	0 OFF	-0.02827	1.4	74.3043	0	0	60.0306	68.6275	69.1488		
45	3/24/2011	1:50	53.4881	71.9966	0	0	59.6048	67.7944	67.9748	57.7999	0 No Data	0 OFF	-0.02827	1.4	74.3043	0	0	59.6048	68.5047	68.8622		
46	3/24/2011	2:00	53.07867	71.9966	0	0	59.7685	67.7944	67.9338	57.4723	0 No Data	0 OFF	-0.02805	1.4	74.3043	0	0	59.7685	68.3818	68.3709		
47	3/24/2011	2:10	52.71014	71.9966	0	0	59.9159	67.7944	67.8929	57.2676	0 No Data	0 OFF	-0.02849	1.4	74.3043	0	0	59.9159	68.3409	68.3709		
48	3/24/2011	2:20	52.38257	71.9966	0	0	60.047	67.7944	67.8519	57.2267	0 No Data	0 OFF	-0.02827	1.4	74.3043	0	0	60.047	68.259	68.1661		
49	3/24/2011	2:30	52.66919	71.9966	0	0	59.9323	67.7535	67.811	57.1858	0 No Data	0 OFF	-0.02827	1.4	74.3043	0	0	59.9323	68.1771	68.0842		
50	3/24/2011	2:40	52.8739	71.9966	0	0	59.8504	67.6716	67.7291	57.0629	0 No Data	0 OFF	-0.02827	1.4	74.3043	0	0	59.8504	68.1771	67.8386		
51	3/24/2011	2:50	52.25977	71.9966	0	0	60.0961	67.6307	67.6881	56.981	0 No Data	0 OFF	-0.02849	1.4	74.3043	0	0	60.0961	68.1362	67.8386		
52	3/24/2011	3:00	51.76837	71.8454	0	0	60.2927	67.5488	67.6472	56.7763	0 No Data	0 OFF	-0.02805	1.4	74.3043	0	0	60.2927	68.0543	67.7567		

Pre-Processing Example (Cont.)

- ▶ Step 1: Highlight all of the sensor names (Column B from close up view (1)). Right-click and select “copy.”
- ▶ Step 2: Right-click on the data header “Point 1,” and select “paste transpose” under the “Paste Options:”

29	Time Interval: 10 Minutes				
30	Date Range: 03/24/2011 00:00:00 - 05/06/2011 09:40:00				
31	Report Timing All Hours				
32					
33	<Date	Time	Point_1	Point_2	Point_3
34	3/24/2011	0:00	52.71014	71.9966	0
35	3/24/2011	0:10	52.38257	71.9966	0
36	3/24/2011	0:20	52.66919	71.9966	0
37	3/24/2011	0:30	51.71014	71.9966	0
38	3/24/2011	0:40	51.38257	71.9966	0
39	3/24/2011	0:50	51.66919	71.9966	0
40	3/24/2011	1:00	51.71014	71.9966	0
41	3/24/2011	1:10	51.38257	71.9966	0
42	3/24/2011	1:20	52.66919	71.9966	0
43	3/24/2011	1:30	52.71014	71.9966	0
44	3/24/2011	1:40	52.38257	71.9966	0
45	3/24/2011	1:50	52.66919	71.9966	0
46	3/24/2011	2:00	53.71014	71.9966	0
47	3/24/2011	2:10	52.71014	71.9966	0
48	3/24/2011	2:20	52.38257	71.9966	0
49	3/24/2011	2:30	52.66919	71.9966	0

Note: Make sure the number of point names matches from view (1) to view (2) before copying and pasting the header list to the point names

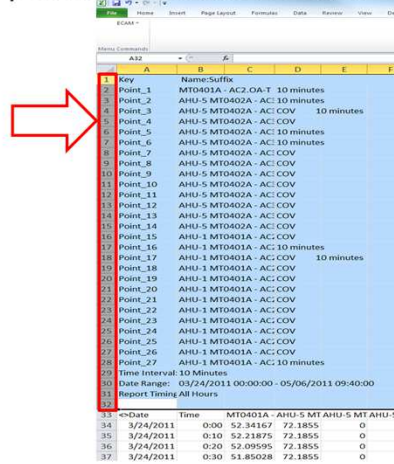
- Result: The point list names are copied and pasted to the header list of the data.



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Pre-Processing Example (Cont.)

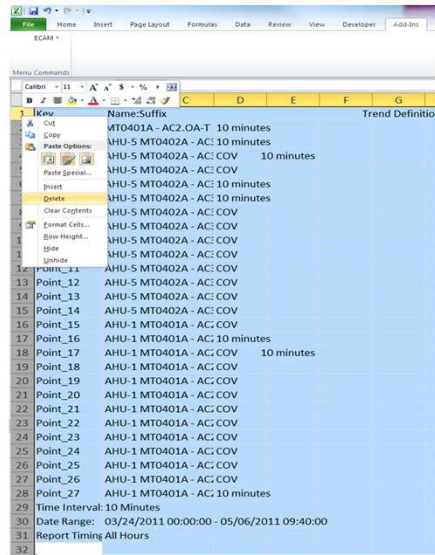
- Step 3: After copying and pasting the point list names, all information above the data header row must be deleted for ECAM to recognize it. Select all rows above this by clicking on the 1st row and drag down until the row where the point list definitions end.



Key	Name/Suffix				
Point_1	MT0401A - AC2.OA-T	10 minutes			
Point_2	AHU-5 MT0402A - AC	10 minutes			
Point_3	AHU-5 MT0402A - AC	COV 10 minutes			
Point_4	AHU-5 MT0402A - AC	COV			
Point_5	AHU-5 MT0402A - AC	10 minutes			
Point_6	AHU-5 MT0402A - AC	10 minutes			
Point_7	AHU-5 MT0402A - AC	COV			
Point_8	AHU-5 MT0402A - AC	COV			
Point_9	AHU-5 MT0402A - AC	COV			
Point_10	AHU-5 MT0402A - AC	COV			
Point_11	AHU-5 MT0402A - AC	COV			
Point_12	AHU-5 MT0402A - AC	COV			
Point_13	AHU-5 MT0402A - AC	COV			
Point_14	AHU-5 MT0402A - AC	COV			
Point_15	AHU-1 MT0401A - AC	COV			
Point_16	AHU-1 MT0401A - AC	10 minutes			
Point_17	AHU-1 MT0401A - AC	COV 10 minutes			
Point_18	AHU-1 MT0401A - AC	COV			
Point_19	AHU-1 MT0401A - AC	COV			
Point_20	AHU-1 MT0401A - AC	COV			
Point_21	AHU-1 MT0401A - AC	COV			
Point_22	AHU-1 MT0401A - AC	COV			
Point_23	AHU-1 MT0401A - AC	COV			
Point_24	AHU-1 MT0401A - AC	COV			
Point_25	AHU-1 MT0401A - AC	COV			
Point_26	AHU-1 MT0401A - AC	COV			
Point_27	AHU-1 MT0401A - AC	10 minutes			
Time Interval	10 Minutes				
Date Range	03/24/2011 00:00:00 - 05/06/2011 09:40:00				
Report Timing	All Hours				
4>Date	Time	MT0401A - AHU-5 MT	AHU-5 MT	AHU-5	AHU-5
34	3/24/2011	0:00	52.34167	72.1855	0
35	3/24/2011	0:10	52.21875	72.1855	0
36	3/24/2011	0:20	52.09595	72.1855	0
37	3/24/2011	0:30	51.85028	72.1855	0

Pre-Processing Example (Cont.)

- Step 4: Right-click after the rows have been selected and select “delete.”



► **Intermediate Result:** Point descriptions are now deleted, and the data appears at the top of the sheet. Now, all columns with “No Data” and text format (e.g., ON and OFF) must be handled.

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Pre-Processing Example (Cont.)

- ▶ Step 5: Select all columns that have “No Data” and delete them. Click on each column header (e.g., column C), then right-click and select delete.

Ar Medeiros & Machado Srd																						
	File	Home	Insert	Page Layout	Formulas	Data	Review	View	Developer	Alt	Window	Help										
Ar Medeiros & Machado Srd																						
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1	Time	MT0014	MT014	MT015	MT016	MT017	MT018	MT019	MT020	MT021	MT022	MT023	MT024	MT025	MT026	MT027	MT028	MT029	MT030	MT031	MT032	MT033
2	3/24/2011	0.00	52.34167	72.1855	0	0	60.0603	68.0811	68.3023	58.1884	0	No Data	0	OFF	-0.07161	1.4	74.3043	0	0	60.0603	69.4055	70.7869
3	3/24/2011	0.10	52.21875	72.1855	0	0	60.1125	68.0811	68.2614	58.0047	0	No Data	0	OFF	-0.07161	1.4	74.3043	0	0	60.1125	69.4055	70.6638
4	3/24/2011	0.20	52.09595	72.1855	0	0	60.1616	67.9992	68.2614	57.8818	0	No Data	0	OFF	-0.07161	1.4	74.3043	0	0	60.1616	69.3236	70.541
5	3/24/2011	0.30	51.85028	72.1855	0	0	60.2599	67.9582	68.1794	57.6771	0	No Data	0	OFF	-0.07161	1.4	74.3043	0	0	60.2599	69.2827	70.4591
6	3/24/2011	0.40	51.72742	72.1855	0	0	60.309	67.9582	68.1794	57.5543	0	No Data	0	OFF	-0.07161	1.4	74.3043	0	0	60.309	69.2417	70.3771
7	3/24/2011	0.50	51.60461	72.1855	0	0	60.3582	67.9581	68.1386	57.3495	0	No Data	0	OFF	-0.07161	1.4	74.3043	0	0	60.3582	69.1599	70.2496
8	3/24/2011	1.00	51.48557	72.0343	0	0	60.3418	67.9582	68.1386	57.3905	0	No Data	0	OFF	-0.07161	1.4	74.3043	0	0	60.3418	69.0301	69.8859
9	3/24/2011	1.10	51.48557	72.0343	0	0	60.3418	67.9582	68.1386	57.3905	0	No Data	0	OFF	-0.07161	1.4	74.3043	0	0	60.3418	69.0301	69.8859
10	3/24/2011	1.20	52.42352	72.0343	0	0	60.0306	67.7126	68.0158	57.4723	0	No Data	0	OFF	-0.07161	1.4	74.3043	0	0	60.0306	68.8732	69.5582
11	3/24/2011	1.30	52.30066	72.0343	0	0	60.0797	67.7126	68.0158	57.4723	0	No Data	0	OFF	-0.07161	1.4	74.3043	0	0	60.0797	68.7094	69.2716
12	3/24/2011	1.40	52.42352	71.9966	0	0	60.0306	67.7535	68.0158	57.5133	0	No Data	0	OFF	-0.07161	1.4	74.3043	0	0	60.0306	68.6275	69.1488
13	3/24/2011	1.50	53.4881	71.9966	0	0	59.6048	67.7944	67.9748	57.7999	0	No Data	0	OFF	-0.07161	1.4	74.3043	0	0	59.6048	68.5047	68.8622
14	3/24/2011	2.00	53.07867	71.9966	0	0	59.7685	67.7944	67.9748	57.4723	0	No Data	0	OFF	-0.07161	1.4	74.3043	0	0	59.7685	68.3818	68.3709
15	3/24/2011	2.10	52.73104	71.9966	0	0	59.8159	67.7944	67.8929	57.2676	0	No Data	0	OFF	-0.07161	1.4	74.3043	0	0	59.8159	68.3409	68.3709
16	3/24/2011	2.20	52.38257	71.9966	0	0	60.047	67.7944	67.8519	57.2267	0	No Data	0	OFF	-0.07161	1.4	74.3043	0	0	60.047	68.259	68.1661
17	3/24/2011	2.30	52.68919	71.9966	0	0	59.9321	67.7535	67.811	57.1858	0	No Data	0	OFF	-0.07161	1.4	74.3043	0	0	59.9321	68.1771	68.0842
18	3/24/2011	2.40	52.8739	71.9966	0	0	59.8504	67.6716	67.7291	57.0629	0	No Data	0	OFF	-0.07161	1.4	74.3043	0	0	59.8504	68.1771	67.8386
19	3/24/2011	2.50	52.25977	71.9966	0	0	60.0961	67.6307	67.6881	56.981	0	No Data	0	OFF	-0.07161	1.4	74.3043	0	0	60.0961	68.1362	67.8386
20	3/24/2011	3.00	51.76837	71.8454	0	0	60.2927	67.5488	67.6472	56.7763	0	No Data	0	OFF	-0.07161	1.4	74.3043	0	0	60.2927	68.0543	67.7567
21	3/24/2011	3.10	51.80599	71.8454	0	0	60.2763	67.4669	67.5653	56.7354	0	No Data	0	OFF	-0.07161	1.4	74.3043	0	0	60.2763	67.9714	67.511
22	3/24/2011	3.20	51.44086	71.6943	0	0	60.4237	67.3031	67.5044	56.6125	0	No Data	0	OFF	-0.07161	1.4	74.2287	0	0	60.4237	67.8905	67.2653
23	3/24/2011	3.30	51.56366	71.5809	0	0	60.3745	67.2622	67.4425	56.4487	0	No Data	0	OFF	-0.07161	1.4	74.2287	0	0	60.3745	67.8087	67.1834
24	3/24/2011	3.40	51.68652	71.5809	0	0	60.3254	67.1393	67.4425	56.4038	0	No Data	0	OFF	-0.07161	1.4	74.2287	0	0	60.3254	67.7677	67.0606
25	3/24/2011	3.50	51.31799	71.5809	0	0	60.4728	67.0165	67.3196	56.285	0	No Data	0	OFF	-0.07161	1.4	74.2287	0	0	60.4728	67.6448	67.0606
26	3/24/2011	4.00	50.6629	71.5809	0	0	60.7348	66.9756	67.2787	56.0393	0	No Data	0	OFF	-0.07161	1.4	74.2287	0	0	60.7348	67.6039	66.8968
27	3/24/2011	4.10	50.17157	71.4298	0	0	60.9314	66.8527	67.2317	55.7527	0	No Data	0	OFF	-0.07161	1.4	74.0776	0	0	60.9314	67.522	66.733
28	3/24/2011	4.20	50.29437	71.4298	0	0	60.8823	66.7299	67.1149	55.4661	0	No Data	0	OFF	-0.07161	1.4	74.2287	0	0	60.8823	67.4811	66.5283
29	3/24/2011	4.30	50.29437	71.4298	0	0	60.8823	66.6071	67.074	55.4251	0	No Data	0	OFF	-0.07161	1.4	74.1531	0	0	60.8823	67.3582	66.5283
30	3/24/2011	4.40	50.78571	71.2786	0	0	60.6857	66.5252	66.9931	55.4251	0	No Data	0	OFF	-0.07161	1.4	74.1531	0	0	60.6857	67.2964	66.5283
31	3/24/2011	4.50	50.29437	71.1274	0	0	60.8823	66.4021	66.9602	55.548	0	No Data	0	OFF	-0.07161	1.4	74.1531	0	0	60.8823	67.2564	66.2826
32	3/24/2011	5.00	49.76208	71.1274	0	0	61.0952	66.4021	66.8283	55.2613	0	No Data	0	OFF	-0.07161	1.4	74.0776	0	0	61.0952	67.1944	66.2826
33	3/24/2011	5.10	49.59833	71.1274	0	0	61.1607	66.2795	66.7464	55.2204	0	No Data	0	OFF	-0.07161	1.4	74.1531	0	0	61.1607	67.0716	65.996
34	3/24/2011	5.20	49.72113	70.9763	0	0	61.1151	66.2386	66.6646	55.0975	0	No Data	0	OFF	-0.07161	1.4	74.0002	0	0	61.1151	66.9078	65.7913
35	3/24/2011	5.30	49.84399	70.9763	0	0	61.0624	66.1567	66.5826	55.2204	0	No Data	0	OFF	-0.07161	1.4	74.0002	0	0	61.0624	66.826	65.5456
36	3/24/2011	5.40	49.96686	70.9763	0	0	61.0132	66.0748	66.5007	55.2204	0	No Data	0	OFF	-0.07161	1.4	74.1531	0	0	61.0132	66.6212	65.4228
37	3/24/2011	5.50	52.21875	70.9763	0	0	60.1125	65.3377	66.5007	62.6724	0	No Data	0	OFF	-0.07161	1.4	74.0002	0	0	60.1125	66.4535	65.2529

Make sure the entire column has “No Data.” Sometimes, the trends will start on a delay from one another so there may be data further down the sheet. The goal is to keep as much useful data as possible, but if the majority of the column displays “No Data,” then it should be removed completely.

Pre-Processing Example (Cont.)

- Intermediate Result: All columns displaying "No Data" have been removed.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1	Date	Time	MTD001A-AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-5
2	3/24/2011	0:00	52.34167	72.1855	0	0	60.0633	68.0811	68.3023	58.1684	0	0	OFF	-0.02761	1.4	74.3043	0	0	60.0633	69.4055	70.7866	64.3102
3	3/24/2011	0:10	52.21875	72.1855	0	0	60.1125	68.0811	68.2614	58.0047	0	0	OFF	-0.02783	1.4	74.3043	0	0	60.1125	69.4055	70.6638	63.1637
4	3/24/2011	0:20	52.09595	72.1855	0	0	60.1616	67.9992	68.2614	57.8818	0	0	OFF	-0.02761	1.4	74.3043	0	0	60.1616	69.3236	70.541	62.7543
5	3/24/2011	0:30	51.85028	72.1855	0	0	60.2099	67.9482	68.1794	57.6771	0	0	OFF	-0.02805	1.4	74.3043	0	0	60.2099	69.2827	70.4591	61.9354
6	3/24/2011	0:40	51.72742	72.1855	0	0	60.309	67.9582	68.1794	57.5543	0	0	OFF	-0.02805	1.4	74.3043	0	0	60.309	69.2417	70.3771	61.1984
7	3/24/2011	0:50	51.60461	72.1855	0	0	60.3582	67.9582	68.1386	57.3495	0	0	OFF	-0.02871	1.4	74.3043	0	0	60.3582	69.1599	70.0496	61.2803
8	3/24/2011	1:00	51.64557	72.0343	0	0	60.3418	67.9582	68.1386	57.3005	0	0	OFF	-0.02805	1.4	74.3043	0	0	60.3418	69.037	69.8859	60.8299
9	3/24/2011	1:10	51.64557	72.0343	0	0	60.3418	67.8354	68.0566	57.2676	0	0	OFF	-0.02827	1.4	74.3799	0	0	60.3418	68.9551	69.8039	60.9536
10	3/24/2011	1:20	52.42352	72.0343	0	0	60.0306	67.7126	68.0158	57.4723	0	0	OFF	-0.02783	1.4	74.3799	0	0	60.0306	68.8732	69.5582	60.748
11	3/24/2011	1:30	52.30066	72.0343	0	0	60.0797	67.7126	68.0158	57.4723	0	0	OFF	-0.02849	1.4	74.3043	0	0	60.0797	68.7094	69.2716	60.0519
12	3/24/2011	1:40	52.42352	71.9966	0	0	60.0306	67.7535	68.0158	57.5333	0	0	OFF	-0.02827	1.4	74.3043	0	0	60.0306	68.8275	69.1488	59.8881
13	3/24/2011	1:50	53.4881	71.9966	0	0	59.6048	67.7944	67.9748	57.7999	0	0	OFF	-0.02827	1.4	74.3043	0	0	59.6048	68.5047	68.8622	61.1574
14	3/24/2011	2:00	53.07867	71.9966	0	0	59.7685	67.7944	67.9338	57.4723	0	0	OFF	-0.02805	1.4	74.3043	0	0	59.7685	68.3818	68.3709	60.4614
15	3/24/2011	2:10	52.71014	71.9966	0	0	59.9159	67.7944	67.8929	57.2676	0	0	OFF	-0.02849	1.4	74.3043	0	0	59.9159	68.3409	68.1709	61.1164
16	3/24/2011	2:20	52.38257	71.9966	0	0	60.0147	67.7944	67.8939	57.2167	0	0	OFF	-0.02827	1.4	74.3043	0	0	60.0147	68.259	68.1661	60.9527
17	3/24/2011	2:30	52.66919	71.9966	0	0	59.9323	67.7535	67.8111	57.1858	0	0	OFF	-0.02827	1.4	74.3043	0	0	59.9323	68.1771	68.0842	61.3212
18	3/24/2011	2:40	52.8739	71.9966	0	0	59.8504	67.6716	67.7291	57.0629	0	0	OFF	-0.02827	1.4	74.3043	0	0	59.8504	68.1771	67.8386	61.4031
19	3/24/2011	2:50	52.25977	71.9966	0	0	60.0961	67.6307	67.6881	56.981	0	0	OFF	-0.02849	1.4	74.3043	0	0	60.0961	68.1362	67.8386	60.2566
20	3/24/2011	3:00	51.76837	71.8454	0	0	60.2927	67.5488	67.6472	56.7763	0	0	OFF	-0.02805	1.4	74.3043	0	0	60.2927	68.0543	67.7507	59.9291
21	3/24/2011	3:10	51.80939	71.8454	0	0	60.2763	67.4660	67.5653	56.7354	0	0	OFF	-0.02827	1.4	74.3043	0	0	60.2763	67.9724	67.511	59.8062
22	3/24/2011	3:20	51.44086	71.6943	0	0	60.4237	67.3031	67.5244	56.6125	0	0	OFF	-0.02827	1.4	74.2287	0	0	60.4237	67.8905	67.2653	59.8881
23	3/24/2011	3:30	51.56366	71.5809	0	0	60.3745	67.2622	67.4425	56.4487	0	0	OFF	-0.02827	1.4	74.2287	0	0	60.3745	67.8087	67.1834	59.5606
24	3/24/2011	3:40	51.68652	71.5809	0	0	60.3254	67.1993	67.4425	56.4078	0	0	OFF	-0.02892	1.4	74.2287	0	0	60.3254	67.7677	67.0606	59.4377
25	3/24/2011	3:50	51.31799	71.5809	0	0	60.4728	67.0165	67.3196	56.285	0	0	OFF	-0.02849	1.4	74.2287	0	0	60.4728	67.6448	67.0606	59.4377
26	3/24/2011	4:00	50.6629	71.5809	0	0	60.7348	66.9156	67.2787	56.0393	0	0	OFF	-0.02892	1.4	74.2287	0	0	60.7348	67.6039	66.8968	59.3149
27	3/24/2011	4:10	50.17157	71.4298	0	0	60.9314	66.8527	67.2377	55.7527	0	0	OFF	-0.02871	1.4	74.0776	0	0	60.9314	67.522	66.733	58.9055
28	3/24/2011	4:20	50.29437	71.4298	0	0	60.8823	66.7299	67.1149	55.4661	0	0	OFF	-0.02892	1.4	74.2287	0	0	60.8823	67.4811	66.5283	59.1921
29	3/24/2011	4:30	50.29437	71.4298	0	0	60.8823	66.6071	67.074	55.4251	0	0	OFF	-0.02892	1.4	74.1531	0	0	60.8823	67.3582	66.5283	58.2094
30	3/24/2011	4:40	50.78571	71.2786	0	0	60.6857	66.5252	66.9921	55.4251	0	0	OFF	-0.02871	1.4	74.1531	0	0	60.6857	67.2764	66.5283	59.8881
31	3/24/2011	4:50	50.29437	71.1274	0	0	60.8823	66.4023	66.9102	55.548	0	0	OFF	-0.02871	1.4	74.1531	0	0	60.8823	67.2354	66.3825	59.6834
32	3/24/2011	5:00	49.76208	71.1274	0	0	61.0952	66.4023	66.8283	55.2613	0	0	OFF	-0.02871	1.4	74.0776	0	0	61.0952	67.1844	66.2826	58.8645
33	3/24/2011	5:10	49.59833	71.1274	0	0	61.1607	66.2799	66.7464	55.2204	0	0	OFF	-0.02827	1.4	74.1531	0	0	61.1607	67.0716	66.0996	58.9464
34	3/24/2011	5:20	49.72113	70.9763	0	0	61.1115	66.386	66.6646	55.0975	0	0	OFF	-0.02849	1.4	74.002	0	0	61.1115	66.9078	65.7913	59.0283
35	3/24/2011	5:30	49.84399	70.9763	0	0	61.0624	66.1567	66.5826	55.2204	0	0	OFF	-0.02805	1.4	74.002	0	0	61.0624	66.826	65.5456	60.5842
36	3/24/2011	5:40	49.96686	70.9763	0	0	61.0132	66.0748	66.5007	55.2204	0	0	OFF	-0.02936	1.4	74.1531	0	0	61.0132	66.6212	65.4228	59.9291
37	3/24/2011	5:50	52.21875	70.9763	0	0	60.1125	65.3377	66.5007	62.6724	0	0	OFF	-0.02892	1.4	74.002	0	0	60.1125	66.4575	65.259	68.0771

Pre-Processing Example (Cont.)

- ▶ Step 6: Click on any cell within a status column (i.e., ON or OFF). Then hold down the Ctrl key and hit "F" (i.e., Ctrl+F)

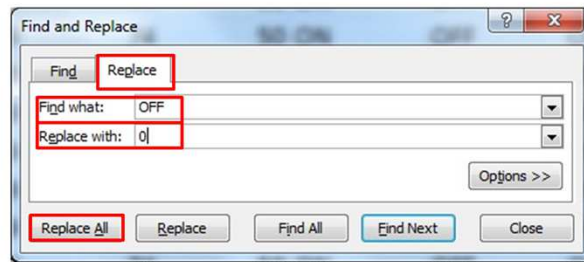
The screenshot shows a Microsoft Excel spreadsheet with a table of data. The table has columns for Date, Time, and various status columns labeled MT0401A through MT AHU-1 MT AHU-2. A Find and Replace dialog box is open, showing the search for 'OFF' and replacement with 'ON'. The dialog box is set to 'Find what: OFF' and 'Replace with: ON'. The 'Find all' button is highlighted.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
	Date	Time	MT0401A	AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-5	MT AHU-1	MT AHU-2
1	3/24/2011	0:00	52.34167	72.1855	0	0	60.0633	68.0811	68.3023	58.1684	0	0	OFF	-0.02761	1.4	74.3043	0
2	3/24/2011	0:10	52.21875	72.1855	0	0	60.1125	68.0811	68.2614	58.0047	0	0	OFF	-0.02783	1.4	74.3043	0
3	3/24/2011	0:20	52.09595	72.1855	0	0	60.1616	67.9992	68.2614	57.8818	0	0	OFF	-0.02761	1.4	74.3043	0
4	3/24/2011	0:30	51.85028	72.1855	0	0	60.2599	67.9582	68.1794	57.6771	0	0	OFF	-0.02805	1.4	74.3043	0
5	3/24/2011	0:40	51.72742	72.1855	0	0	60.309	67.9582	68.1794	57.5543	0	0	OFF	-0.02805	1.4	74.3043	0
6	3/24/2011	0:50	51.60461	72.1855	0	0	60.3582	67.9582	68.1386	57.3495	0	0	OFF	-0.02871	1.4	74.3043	0
7	3/24/2011	1:00	51.64557	72.0343	0	0	60.3418	67.9582	68.1386	57.3905	0	0	OFF	-0.02805	1.4	74.3043	0
8	3/24/2011	1:10	51.64557	72.0343	0	0	60.3418	67.8354	68.0566	57.2676	0	0	OFF	-0.02827	1.4	74.3799	0
9	3/24/2011	1:20	52.42352	72.0343	0	0	60.0306	67.7126	68.0158	57.4723	0	0	OFF	-0.02783	1.4	74.3799	0
10	3/24/2011	1:30	52.30066	72.0343	0	0	60.0797	67.7126	68.0158	57.4723	0	0	OFF	-0.02849	1.4	74.3043	0
11	3/24/2011	1:40	52.42352	71.9966	0	0	60.0306	67.7535	68.0158	57.5133	0	0	OFF	-0.02827	1.4	74.3043	0
12	3/24/2011	1:50	53.4881	71.9966	0	0	59.6048	67.7535	68.0158	57.5133	0	0	OFF	-0.02827	1.4	74.3043	0
13	3/24/2011	2:00	53.07867	71.9966	0	0	59.7685	67.7535	68.0158	57.5133	0	0	OFF	-0.02805	1.4	74.3043	0
14	3/24/2011	2:10	52.71014	71.9966	0	0	59.9159	67.7535	68.0158	57.5133	0	0	OFF	-0.02849	1.4	74.3043	0
15	3/24/2011	2:20	52.38257	71.9966	0	0	60.047	67.7535	68.0158	57.5133	0	0	OFF	-0.02827	1.4	74.3043	0
16	3/24/2011	2:30	52.66919	71.9966	0	0	59.9323	67.7535	68.0158	57.5133	0	0	OFF	-0.02827	1.4	74.3043	0
17	3/24/2011	2:40	52.8739	71.9966	0	0	59.8504	67.7535	68.0158	57.5133	0	0	OFF	-0.02827	1.4	74.3043	0
18	3/24/2011	2:50	52.25977	71.9966	0	0	60.0961	67.7535	68.0158	57.5133	0	0	OFF	-0.02849	1.4	74.3043	0
19	3/24/2011	3:00	51.76837	71.8454	0	0	60.2927	67.7535	68.0158	57.5133	0	0	OFF	-0.02805	1.4	74.3043	0
20	3/24/2011	3:10	51.80939	71.8454	0	0	60.2763	67.4669	67.5653	56.7354	0	0	OFF	-0.02827	1.4	74.3043	0
21	3/24/2011	3:20	51.44086	71.6943	0	0	60.4237	67.3031	67.5244	56.6125	0	0	OFF	-0.02827	1.4	74.2287	0
22	3/24/2011	3:30	51.56366	71.5809	0	0	60.3745	67.2622	67.4425	56.4487	0	0	OFF	-0.02827	1.4	74.2287	0
23	3/24/2011	3:40	51.68652	71.5809	0	0	60.3254	67.1393	67.4425	56.4078	0	0	OFF	-0.02892	1.4	74.2287	0
24	3/24/2011	3:50	51.31799	71.5809	0	0	60.4728	67.0165	67.3196	56.285	0	0	OFF	-0.02849	1.4	74.2287	0
25	3/24/2011	4:00	50.6629	71.5809	0	0	60.7348	66.9756	67.2787	56.0393	0	0	OFF	-0.02892	1.4	74.2287	0
26	3/24/2011	4:10	50.17157	71.4298	0	0	60.9314	66.8527	67.2377	55.7527	0	0	OFF	-0.02871	1.4	74.0776	0
27	3/24/2011	4:20	50.29437	71.4298	0	0	60.8823	66.7299	67.1149	55.4661	0	0	OFF	-0.02892	1.4	74.2287	0
28	3/24/2011	4:30	50.29437	71.4298	0	0	60.8823	66.6071	67.074	55.4251	0	0	OFF	-0.02892	1.4	74.1531	0

Pre-Processing Example (Cont.)

► Close up view:

- Step 1: Select the “Replace” tab
- Step 2: Type “OFF” in the “Find What:” box
- Step 3: Type “0” in the “Replace with:” box
- Step 4: Select “Replace All”
- Repeat steps 1-4 for “ON,” but in step 3 replace “0” with “1.”



Note: We are replacing “OFF” and “ON” with “0” and “1” respectively because ECAM charting functions only accept numerical values and not text.

Pre-Processing Result

- The headers of row 1 contain the names of the sensors. These sensor names will be used later in ECAM, so make sure they are understood by the user. If not, modify them.

Pre-Processing Results																										
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	
	Time	MIT0001A-AHU-1	MIT0001B-AHU-1	MIT0001C-AHU-1	MIT0001D-AHU-1	MIT0001E-AHU-1	MIT0001F-AHU-1	MIT0001G-AHU-1	MIT0001H-AHU-1	MIT0001I-AHU-1	MIT0001J-AHU-1	MIT0001K-AHU-1	MIT0001L-AHU-1	MIT0001M-AHU-1	MIT0001N-AHU-1	MIT0001O-AHU-1	MIT0001P-AHU-1	MIT0001Q-AHU-1	MIT0001R-AHU-1	MIT0001S-AHU-1	MIT0001T-AHU-1	MIT0001U-AHU-1	MIT0001V-AHU-1	MIT0001W-AHU-1	MIT0001X-AHU-1	MIT0001Y-AHU-1
1	3/24/2011	0.00	52.34167	72.1855	0	0	60.0633	68.0811	68.3023	58.1484	0	0	0	-0.02761	1.4	74.3043	0	0	60.0633	69.4055	70.7866	64.3102				
2	3/24/2011	0.10	52.21875	72.1855	0	0	60.1125	68.0811	68.2614	58.0047	0	0	0	-0.02783	1.4	74.3043	0	0	60.1125	69.4055	70.6628	63.1537				
3	3/24/2011	0.20	52.09595	72.1855	0	0	60.1616	67.9992	68.2614	57.8818	0	0	0	-0.02761	1.4	74.3043	0	0	60.1616	69.3296	70.341	62.7543				
4	3/24/2011	0.30	51.85028	72.1855	0	0	60.2599	67.9582	68.1794	57.6771	0	0	0	-0.02805	1.4	74.3043	0	0	60.2599	69.2827	70.4591	61.9354				
5	3/24/2011	0.40	51.72142	72.1855	0	0	60.309	67.9582	68.1794	57.5543	0	0	0	-0.02805	1.4	74.3043	0	0	60.309	69.2417	70.3771	61.1944				
6	3/24/2011	0.50	51.60461	72.1855	0	0	60.3582	67.9582	68.1386	57.3495	0	0	0	-0.02871	1.4	74.3043	0	0	60.3582	69.1599	70.0496	61.2803				
7	3/24/2011	1.00	51.64557	72.0343	0	0	60.3418	67.9582	68.1386	57.3905	0	0	0	-0.02805	1.4	74.3043	0	0	60.3418	69.0317	69.8859	60.8299				
8	3/24/2011	1.10	51.64557	72.0343	0	0	60.3418	67.8314	68.0564	57.2676	0	0	0	-0.02827	1.4	74.3799	0	0	60.3418	68.9551	69.8039	60.9036				
9	3/24/2011	1.20	52.42352	72.0343	0	0	60.0306	67.7126	68.0158	57.4723	0	0	0	-0.02783	1.4	74.3799	0	0	60.0306	68.8732	69.5582	60.748				
10	3/24/2011	1.30	52.30066	72.0343	0	0	60.0797	67.7126	68.0158	57.4723	0	0	0	-0.02849	1.4	74.3043	0	0	60.0797	68.7094	69.2716	60.0519				
11	3/24/2011	1.40	52.42352	71.9966	0	0	60.0306	67.7526	68.0158	57.5133	0	0	0	-0.02827	1.4	74.3043	0	0	60.0306	68.4775	69.1488	59.8841				
12	3/24/2011	1.50	53.4881	71.9966	0	0	59.6048	67.7944	67.9748	57.7999	0	0	0	-0.02827	1.4	74.3043	0	0	59.6048	68.5047	68.8622	61.1574				
13	3/24/2011	2.00	53.07867	71.9966	0	0	59.7485	67.7944	67.9138	57.4723	0	0	0	-0.02805	1.4	74.3043	0	0	59.7485	68.3818	68.1709	60.4614				
14	3/24/2011	2.10	52.71014	71.9966	0	0	59.9159	67.7944	67.8929	57.2676	0	0	0	-0.02849	1.4	74.3043	0	0	59.9159	68.3409	68.1709	61.1164				
15	3/24/2011	2.20	52.38217	71.9966	0	0	60.047	67.7944	67.8519	57.2167	0	0	0	-0.02827	1.4	74.3043	0	0	60.047	68.259	68.1641	60.9527				
16	3/24/2011	2.30	52.66039	71.9966	0	0	59.9329	67.7526	67.811	57.1868	0	0	0	-0.02827	1.4	74.3043	0	0	59.9329	68.1771	68.0842	61.3132				
17	3/24/2011	2.40	52.8739	71.9966	0	0	59.8504	67.6716	67.7291	57.0629	0	0	0	-0.02827	1.4	74.3043	0	0	59.8504	68.1771	67.8386	61.4031				
18	3/24/2011	2.50	52.25977	71.9966	0	0	60.0961	67.6307	67.6881	56.981	0	0	0	-0.02849	1.4	74.3043	0	0	60.0961	68.1362	67.8386	60.7566				
19	3/24/2011	3.00	51.76837	71.8454	0	0	60.2927	67.5488	67.6472	56.7763	0	0	0	-0.02805	1.4	74.3043	0	0	60.2927	68.0543	67.7567	59.9291				
20	3/24/2011	3.10	51.80939	71.8454	0	0	60.2763	67.4669	67.5853	56.7354	0	0	0	-0.02827	1.4	74.3043	0	0	60.2763	67.9724	67.511	59.8062				
21	3/24/2011	3.20	51.44046	71.6943	0	0	60.4237	67.3031	67.5244	56.6125	0	0	0	-0.02827	1.4	74.2287	0	0	60.4237	67.8905	67.2653	59.8841				
22	3/24/2011	3.30	51.56366	71.5809	0	0	60.3745	67.2622	67.4425	56.4487	0	0	0	-0.02827	1.4	74.2287	0	0	60.3745	67.8087	67.1834	59.5606				
23	3/24/2011	3.40	51.68652	71.5809	0	0	60.3254	67.1393	67.4425	56.4078	0	0	0	-0.02892	1.4	74.2287	0	0	60.3254	67.7677	67.0606	59.4377				
24	3/24/2011	3.50	51.31799	71.5809	0	0	60.4728	67.0165	67.3396	56.245	0	0	0	-0.02849	1.4	74.2287	0	0	60.4728	67.6448	67.0606	59.4377				
25	3/24/2011	4.00	50.6629	71.5809	0	0	60.7348	66.9756	67.2787	56.0393	0	0	0	-0.02892	1.4	74.2287	0	0	60.7348	67.6039	66.8968	59.3149				
26	3/24/2011	4.10	50.17157	71.4298	0	0	60.9314	66.8527	67.2337	55.7527	0	0	0	-0.02871	1.4	74.0776	0	0	60.9314	67.5122	66.713	58.9055				
27	3/24/2011	4.20	50.29437	71.4298	0	0	60.8823	66.7299	67.1149	55.4661	0	0	0	-0.02892	1.4	74.2287	0	0	60.8823	67.4811	66.5281	59.1921				
28	3/24/2011	4.30	50.29437	71.4298	0	0	60.8823	66.6071	67.074	55.4251	0	0	0	-0.02892	1.4	74.1531	0	0	60.8823	67.3582	66.5283	58.2094				
29	3/24/2011	4.40	50.29437	71.2796	0	0	60.6857	66.5252	66.9921	55.4251	0	0	0	-0.02871	1.4	74.1531	0	0	60.6857	67.2164	66.5283	59.8841				
30	3/24/2011	4.50	50.29437	71.1274	0	0	60.8823	66.4023	66.9102	55.548	0	0	0	-0.02871	1.4	74.1531	0	0	60.8823	67.1354	66.2826	59.6834				
31	3/24/2011	5.00	49.76208	71.1274	0	0	61.0952	66.4023	66.8283	55.2613	0	0	0	-0.02871	1.4	74.0776	0	0	61.0952	67.1944	66.2826	58.8645				
32	3/24/2011	5.10	49.58833	71.1274	0	0	61.1407	66.2795	66.7641	55.2204	0	0	0	-0.02827	1.4	74.1531	0	0	61.1407	67.0716	65.996	58.9464				
33	3/24/2011	5.20	49.72113	70.9763	0	0	61.1115	66.2386	66.664	55.0955	0	0	0	-0.02849	1.4	74.0002	0	0	61.1115	66.9078	65.7913	59.0283				
34	3/24/2011	5.30	49.84399	70.9763	0	0	61.0624	66.1567	66.5826	55.2204	0	0	0	-0.02805	1.4	74.0002	0	0	61.0624	66.826	65.5546	58.9642				
35	3/24/2011	5.40	49.86646	70.9763	0	0	61.0132	66.0748	66.5007	55.2204	0	0	0	-0.02796	1.4	74.1531	0	0	61.0132	66.6212	65.4128	59.9791				
36	3/24/2011	5.50	52.21875	70.9763	0	0	60.1125	65.3377	66.5007	62.6724	0	0	0	-0.02892	1.4	74.0002	0	0	60.1125	66.4575	65.259	68.0771				

Final Result

- 1.) Save the file as extension type xlsx or csv. Recommend saving as extension csv, because it will also work with the Universal Translator if required.
- 2.) The data extracted from the BAS was pre-processed in an excel sheet.
- 3.) The pre-processing consisted of removing rows or columns of "No Data," and substituting equipment status (ON or OFF) with "0" and "1," respectively.
- 4.) Be sure that there are no empty cells within the final excel sheet. If there are, then delete that row. This will help processing in UT2 and ECAM.

All Resources Available at:
www.pnnl.gov/buildingretuning/resources.stm



Thank You

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