

Data Loaders



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Chapter

1

Overview

Topics:

- About the APM Connect Data Loaders
- Access the Data Loaders Page
- Data Loader Workflow

About the APM Connect Data Loaders

The APM Connect Data Loaders allow you to import records from external sources into GE Digital APM.

Foundation Data Loaders

- Foundation Equipment and Functional Location Data Loader: This loader builds out the Asset Hierarchy based on the asset parents structure defined in the workbook.
- Foundation Taxonomy Data Loader: This loader creates, or updates Taxonomy Categories, Classes, and Types based on the data in the Excel source.
- Foundation Work History Data Loader: This loader creates the necessary work history and work
 history detail records and links them to the corresponding equipment or functional location as defined
 in the Excel workbook.

GE Digital APM Rules and the Data Loaders

When loading data into GE Digital APM, it is important to understand how GE Digital APM treats data, and the subsequent impact on data loads.

GE Digital APM creates records based on the rules for that family. Therefore, the data that is loaded into GE Digital APM via the Data Loaders are also subject to the same rules. This could result in blank Equipment records with no data if the rules for the family do not require data. Similarly, there is no restriction on key fields having to contain a value other than what is required by the rules.

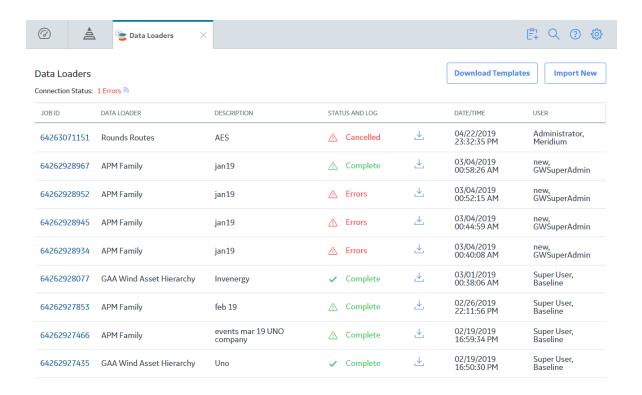
For example, the baseline Equipment family does not have any fields that are marked as required in the rules, so when using the data loaders, equipment records are created even with only one field populated in the worksheet. If you only populated Maintenance Plant on the APM data loader spreadsheet, then an equipment records would be created with only maintenance plant and no other identifying information.

Access the Data Loaders Page

Procedure

In the module navigation menu, select **Tools** > **Data Loaders**.

The **Data Loaders** page appears, displaying the list of the Data Load jobs that are running or complete. You can use this page to download the Data Loader Templates and import data through the Data Loader user Interface. For more information on the columns available in this page, refer to the Field Descriptions of the Data Loaders Page topic.



Data Loader Workflow

This workflow provides the basic, high-level steps for using this module. The steps and links in this workflow do not necessarily reference every possible procedure.

Procedure

- 1. Identify the data you want to transfer from external sources to GE Digital APM.
- 2. Download the Data Loader Workbooks, and then populate the data loader workbooks.

Tip: Alternatively, you can use a zip file of .csv files that conform to the data loader workbook format.

- 3. **Optional:** Test the connections required to complete a data load.
- 4. In GE Digital APM, select the appropriate file, and then run a data import job.
- 5. Review the Data Import Log for warnings, messages, or errors.
- 6. If there are transfer errors, resolve the errors.

Chapter

2

Workflow

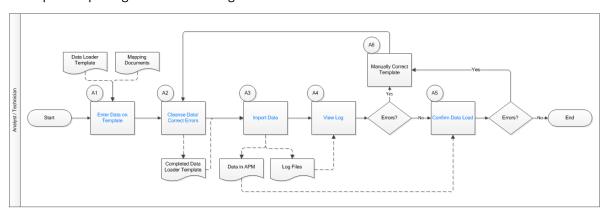
Topics:

- General Data Import Workflow
- Enter Data on Template
- Cleanse Data / Correct Errors
- Import Data
- View Log
- Confirm Data Load
- Manually Correct Template

General Data Import Workflow

The APM Connect Data Loaders provide users with the ability to import data from external sources into the various GE Digital APM modules. All data loaders share common capabilities and architecture. Each one uses an Excel worksheet as the source of data to be loaded into GE Digital APM, and each contains the intelligence to load the specific data model for which it was intended.

Tip: Select a shape with blue text for details about the step in the workflow. For more information, refer to the topic Interpreting the Workflow Diagrams.



Enter Data on Template

Persona: Analyst/Technician

Identify the type of data to load, navigate to **Tools** > **Data Loader**, download the spreadsheet template, and make it available for editing. There are several standard data loads that can be processed to load data to GE Digital APM. Options include loaders from Foundation, MI, Strategy, Rounds, and FE.

Use the correct template and mapping document to layout the data import, and then populate the spreadsheet with records that you want to load based on the rules detailed in the mapping document.

Cleanse Data / Correct Errors

Persona: Analyst / Technician

After populating the spreadsheet, use Excel tools to detect and correct (or remove) incomplete, corrupt, or inaccurate records from the worksheet.

Import Data

Persona: Analyst / Technician

Using the Data Import feature, accessed via the **Tools** menu in GE Digital APM, import the data into GE Digital APM.

View Log

Persona: Analyst / Technician

Review the log file that is available through the record explorer, or, if the user has access, in the APM Connect Administration Center.

Confirm Data Load

Persona: Analyst / Technician

By searching record manager or creating a query of families loaded, validate that data is loaded successfully. Ideally, run the test validation query as indicated in the mapping document.

Manually Correct Template

Persona: Analyst / Technician

After running the data load, if the status shows errors, review the error log to identify the root cause, and then make any needed changes to the spreadsheet and retry.

Chapter

3

Data Loaders

Topics:

- Download the Data Loader Workbooks
- Import Data Loader Workbooks
- Test Data Loader Connection
- Run a Data Import Job
- Access the Details of an Import
 Job
- About Populating Site Reference Data
- Considerations for Loading with .CSV Files

Download the Data Loader Workbooks

Procedure

- Access the Data Loaders page, and then select Download Templates.
 The Download Templates window appears, displaying a list of the data loader categories.
- 2. Select the category whose template you want to download.

Data Loader Category	Workbooks in the Category
APM Connect	 APM Family Equipment and Functional Location Tag to Asset Relationship Taxonomy Work History
APM Failure Elimination	 Production Loss Analysis (PLA) 1-Admin Production Loss Analysis (PLA) 2-Event Production Loss Analysis (PLA) 3-Plan Root Cause Analysis (RCA) System Reliablity
APM Foundation	 Asset Criticality Analysis (ACA Checklist) Asset Criticality Analysis (ACA) Custom Asset Hierarchy Geographic Information System (GIS) Policy Instance Data Loader Risk Matrix Role
APM Health	 Rounds Allowable Values Rounds Readings Rounds Routes Rounds Templates
APM Mechanical Integrity	 Inspection Management (IM) Assets Inspection Management (IM) Functional Location RBI Components To TML Groups Relationship Risk Based Inspection (RBI) 580 Risk Based Inspection (RBI) 581 Risk Based Inspection (RBI) Corrosion Loop Thickness Monitoring (TM) Equipment Thickness Monitoring (TM) Functional Location Thickness Monitoring (TM) Piping Equipment Thickness Monitoring (TM) Piping Functional Location
APM Power Generation	 Generation Availability Analysis (GAA) Events Generation Availability Analysis (GAA) GADS Amplification Codes Generation Availability Analysis (GAA) GADS Cause Code
APM Safety	Calibration Hazards

Data Loader Category	Workbooks in the Category
APM Strategy	 Asset Strategy Management (ASM) Asset Strategy Management (ASM) Templates Failure Modes and Effects Analysis (FMEA) FMEA Analysis Template FMEA Asset Template RCM Analysis Template Reliability Centered Maintainence (RCM)
APM Wind Generation	GAA Wind Asset HierarchyGAA Wind EventsGAA Wind Sub Group Capacity

3. In the **Templates** column, in the row for the data loader whose template you want to download, select

The template is downloaded, and can be populated with data to load into GE Digital APM.

Import Data Loader Workbooks

About This Task

You can import custom Data Loader workbooks or localized workbooks into GE Digital APM, so that they can be accessed on the **Data Loaders** page.

Procedure

- 1. Access the **Export** page.
- 2. In the **Available Items** section, in the **Select metadata type** drop-down, select **DataLoader Templates**.

The **Available Items** section is populated with the Data Loader catalog entries.

- 3. Select the box of Data Loader whose workbook you want to modify, and then select The Data Loader appears in the **Selected Items** section.
- 4. In the **File Name** box, enter a name for the file that will be exported, and then select the **File Type** XML(.xml).
- 5. Select **Start Export**.

The Data Loader files are exported, and a zip file is downloaded containing three files:

<Data Loader Name> Files:

A folder containing the excel source workbook for that data loader.

<DataLoaderName>.xml:

An xml containing the metadata for the data loader catalog item.

ExportLog:

A log file detailing the export from GE Digital APM.

- 6. Open the <DataLoder Name> Files folder, and place a copy of the workbook to be imported into the folder.
- 7. If you want to replace the default workbook with the workbook to be imported, rename the workbook to be imported to match the exact naming structure of the default template, and then delete the default template.

Important: The name of the file to be imported must match the original file name exactly. Otherwise, the workbook will be not be available to download in GE Digital APM

- 8. If you want to add an additional workbook, and keep the default workbook:
 - a) Ensure the workbook to be imported has a unique name, different from the naming structure of the default workbook, and then delete the default workbook.
 - b) Open the <DataLoaderName>.xml file.
 - c) In the DATALOADERTEMPLATE_ID, DATALOADERTEMPLATE_DESC, and the DATALOADERTEMPLATE_FILE_NM parameters, replace the existing value with the name of the new workbook to be imported.
 - d) Save the file.
- 9. Create a zip file with the <Data Loader Name> Files folder containing the new workbook to be imported, the <DataLoaderName>.xml file, and the ExportLog file.
- 10. Access the **Import** page.
- 11. In the **Import File** box, select **Choose File**, and then navigate to the zip file you created in the previous step.
- 12. Select the box of Data Loader whose workbook you want to import, and then select
- 13. Select **Start Import**.

The new workbook is imported into GE Digital APM.

Results

The workbook that you imported can be download on the Data Loaders page.

- In the File Name box, enter Equipment and Functional Location Export, and then select the File Type XML(.xml).
- Select Start Export.
 The Data Loader workbook file

The Data Loader workbook files are exported, and a zip file is downloaded containing three files:

- **Equipment and Functional Location Export Files**: A folder containing the default Equipment and Functional Location Data Loader workbook.
- **Equipment and Functional Location Export.xml**: An .xml containing the metadata for the catalog item.
- ExportLog: A log file detailing the export from GE Digital APM.
- 6. Open the Equipment and Functional Location Export Files folder, and place a copy of the workbook to be imported into the folder. In this example the workbook name is Equipment and Functional Location_DE.
- 7. Ensure the template to be imported has a unique name different from the naming structure of the default template, and then delete the default template.
- 8. Open the Equipment and Functional Location Export.xml file.
- 9. In the **DATALOADERTEMPLATE_ID** and **DATALOADERTEMPLATE_DESC** parameters, replace Equipment and Functional Location with Equipment and Functional Location_DE.
- 10. In the parameter **DATALOADERTEMPLATE_FILE_NM**, replace the value with Equipment and Functional Location_DE.xml.
- 11. Save the file.
- 12. Create a zip file with the Equipment and Functional Location Export files.
- 13. Access the **Import** page.
- 14. In the **Import File** box, select **Choose File**, and then navigate to the zip file Equipment and Functional Location Export.
 - In the **Available Items** section **The Equipment and Functional Location** entry appears.
- 15. Select the **The Equipment and Functional Location**box, and then select



16. Select **Start Import** Button.

The new template is imported into GE Digital APM, and is available to download on the Data Loaders page.

Test Data Loader Connection

Procedure

- 1. Access the **Data Loaders** page.
- 2. If, on the upper-left corner of the page, the **<number> Error** link appears beside the , then select the link.

Note: If the number of errors link does not appear, then the connections needed to use the data loaders are configured properly.

The **Connection Errors** dialog box appears displaying the connections status for each connection point needed to use the data loaders.

3. Select **OK**.

The connection status is tested.

Results

The following table describes the connection status for data import jobs.

Connection Test	Description	If you get an Error
APM Connect Web API Test	Test the connection between the GE Digital APM web API and the APM Connect server.	Ensure the ports are open between the GE Digital APM Server and the APM Connect server.
APM Connect Configuration Test	Test the configuration of the APM Connect connection parameters configured in GE Digital APM.	Ensure the parameters configured in GE Digital APM are correct to establish connection from GE Digital APM and APM Connect.
APM Fileshare Access Test	Tests the file share system is connected to the GE Digital APM Server, so that the server can read and write to the configured file shares.	Ensure the parameters configured in GE Digital APM are correct to establish connection from GE Digital APM, and the user has the necessary permissions to access the file share.
APM Staging Database Test	Tests the GE Digital APM Server is connected tot the APM Connect IR database.	Ensure that PostgresSQL is accepting the connection from GE Digital APM . These connections are managed in the file pg_hba.conf.
APM Connect Fileshare Access Test	Tests the file share system is connected to the APM Connect server, so that the server can read and write to the configured file shares.	Ensure the parameters configured in GE Digital APM are correct to establish connection from GE Digital APM, and the user has the necessary permissions to access the file share.
APM Connect Staging Database Test	Tests the connection between the APM Connect server and the IR database to ensure that files can read and written to the IR.	Ensure the RunDataLoaderRoute.cfg is configured correctly.

Run a Data Import Job

Before You Begin

This topic assumes that you have migrated your data to the required format for the modules into which you want to import data. The format should match either:

- The format matching the Excel workbook templates.
- A conforming zip file containing .csv files.

Procedure

- 1. Access the **Data Loaders** page.
- 2. Select **Import New**.
 - The **Import Data** window appears.
- 3. In navigation tree, select the data loader category, and then select the data loader that you want to use to import data according the following table.

Data Loader Category	Workbooks in the Category
APM Connect	 APM Family Equipment and Functional Location Tag to Asset Relationship Taxonomy Work History
APM Failure Elimination	 Production Loss Analysis (PLA) 1-Admin Production Loss Analysis (PLA) 2-Event Production Loss Analysis (PLA) 3-Plan Root Cause Analysis (RCA) System Reliablity
APM Foundation	 Asset Criticality Analysis (ACA Checklist) Asset Criticality Analysis (ACA) Custom Asset Hierarchy Geographic Information System (GIS) Policy Instance Data Loader Risk Matrix Role
APM Health	 Rounds Allowable Values Rounds Readings Rounds Routes Rounds Templates
APM Mechanical Integrity	 Inspection Management (IM) Assets Inspection Management (IM) Functional Location RBI Components To TML Groups Relationship Risk Based Inspection (RBI) 580 Risk Based Inspection (RBI) 581 Risk Based Inspection (RBI) Corrosion Loop Thickness Monitoring (TM) Equipment Thickness Monitoring (TM) Functional Location Thickness Monitoring (TM) Piping Equipment Thickness Monitoring (TM) Piping Functional Location
APM Power Generation	 Generation Availability Analysis (GAA) Events Generation Availability Analysis (GAA) GADS Amplification Codes Generation Availability Analysis (GAA) GADS Cause Code
APM Safety	CalibrationHazards
APM Strategy	 Asset Strategy Management (ASM) Asset Strategy Management (ASM) Templates Failure Modes and Effects Analysis (FMEA) FMEA Analysis Template FMEA Asset Template RCM Analysis Template Reliability Centered Maintainence (RCM)
APM Wind Generation	 GAA Wind Asset Hierarchy GAA Wind Events GAA Wind Sub Group Capacity

- 4. In the **Select a File for importing** box, select **Choose File**, and then navigate to and select the file that you want to import.
- 5. In the **Job Description** box, enter a short description of the job.
- 6. Select **Import**.

The job is run, and the status of the job appears in the **Status and Log** column.

Tip: If necessary, you can cancel an import job by selecting the button that appears in the **Status and Log** column. If you cancel a job, any changes that have already occurred are not removed, therefore, you may need to manually modify records to update or remove unwanted data.

Status	Description	
Waiting	nitial state when job is created. The data import job is queued for pre-processing on the APM Connect Server.	
Staging In Progress	The data import job is being prepared on the APM Connect Server.	
Staging Failure	The data import job failed during preparation.	
Staging Complete	The data import job was prepared successfully.	
Dataloader Enqueued	The maximum number of data load jobs has been exceeded, as determined in the APM Connect Connection Records, or there is a job of the same type running. The data import will begin once the other jobs are complete.	
Configuring Dataloader	The data import job is configuring the proper user roles and arranging data processing for most efficient execution flow.	
In Progress	The data import job is loading data into the GE Digital APM Data Source.	
Data Synchronization in Progress	The data import job is synchronizing the loaded data and relationships across the APM Data Source.	
Job Cancelling	The data import job is in the process of being cancelled. This occurs after you select $ imes$.	
Cancelled by User	The data import job was cancelled successfully.	
	Note: When a job is cancelled, the data imported prior to cancelling is not removed.	
Errors	The data import is complete, but encountered one or more errors. You can download the log file to view detailed error messages.	
Complete	Data has been imported into GE Digital APM.	
	Note: If the icon appears, the data was imported with warnings. You can download the log file to view detailed warning messages.	

Access the Details of an Import Job

Before You Begin

This topic assumes that you have successfully run a data import job.

Procedure

- 1. Access the **Data Loaders** page.
- 2. In the **Job ID** column, select the job that you want to open. On a new page, the datasheet for the selected job appears.



3. To view the information contained in the **Log Text**, select .

The **Text Editor** window appears, displaying details about the job, such as error messages, warnings concerning the data load and general information regarding the data records that were loaded.

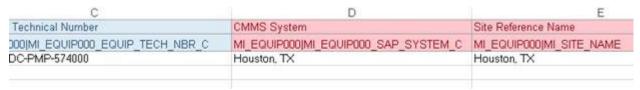
About Populating Site Reference Data

The APM Family Data Loader can be used to populate the Site Reference on Equipment and Functional Location records in GE Digital APM.

About This Task

The APM Family Data Loader populates the **ENTY_KEY** system field and the **MI_SITE_KEY** system field associated with the Site Reference value to be populated. On asset records, the Site Reference is stored in the **MI_SITE_KEY** field, a system field in GE Digital APM. The APM Data Loader uses the Site Name (**MI_SITE_NAME**) to translate the value to the corresponding Site Key and populate the **MI_SITE_KEY** field; therefore, you do not need to know the key to be able to populate the site reference. This functionality is important because this value can change from one database to another.

Procedure



- 2. Enter the site name to designate the site by which the asset record, once loaded into GE Digital APM, will be filtered.
- 3. Continue populating the source workbook, and then run the data loader.

Considerations for Loading with .csv Files

Typically when you load data into GE Digital APM you will use the provided Data Loader workbooks, however, if you have a program that creates reports that generates .csv files, GE Digital APM can load that data as long as you follow these guidelines.

The Data Import job can accept a .zip file that contains .csv files as input. The format of the .zip file is specific to each Data Loader and must contain .csv files that conform match these specific rules.

- There must be a .csv file for each worksheet defined in the workbook template for the Data Loader.
- The filename must match the worksheet name with the file extension .csv. For example, the .csv for the Equipment worksheet must be named Equipment .csv.
- The .zip must contain all the .csv files that match the worksheets expected by the data loader.

A . zip that meets all of these requirements can be used as input to the Data Import job.

Chapter

4

Reference

Topics:

- About the Data Loader Worksheets and Fields
- About the Configuration Worksheet
- System Code Tables Used by Data Loaders

About the Data Loader Worksheets and Fields

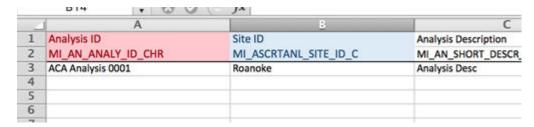
Field formats for the data loader workbooks carry specific value and cell requirements. This topic contains guidelines for data/time format, units of measure (UOM), and cell color coding.

Important: When using an Excel data loader workbook, to delete rows from the workbook, you must right-click the row number and then select **Delete**.

Cell Color Coding

In order to differentiate between required and recommended field values in the Excel workbook, cells adhere to the following color coding scheme:

- **Red**: a required field.
- Blue: a recommended field.



Note: The Column ID and Associated Field ID will both be colored the same.

Cells that Require Logical Values

When a cell corresponds to a field in GE Digital APM that requires a Logical value, you should enter True or False.

Character Limits in Character Fields

In GE Digital APM, family fields that have the Character data type (Character fields) restrict values to a maximum length. In the Excel workbooks, when entering data in a cell that represents a Character field, the values must not exceed the character limit of the corresponding field.

Date and Time Format

Dates should be entered as text in the following format: YYYY-MM-DD hh:mm:ss, where:

- YYYY is the four-digit year.
- MM is the two-digit month.
- DD is the two-digit day.
- **hh** is hours in 24-hour notation.
- **mm** is minutes.
- ss is seconds.

Note: It is recommended to enter the dates as text in the date fields stored in the data loader workbooks.

For example, a complete entry would be the following: 2015-05-01 17:53:00. This corresponds to 5:53 PM on May 1, 2015.

Note: Hours must be entered in 24-hour notation (e.g., 17:53:00, not 5:53:00). AM and PM should never be included. Unless otherwise noted in the applicable Mappings Document, times entered should be based on the time zone of the user who will be performing the data load."

Language

Data loader Excel workbooks are available with field captions in all baseline languages supported by GE Digital APM.

Reference Sheets

You can insert additional worksheets into your data loader workbook that will not be loaded into GE Digital APM by encasing the worksheet name in parentheses. For example, if you wanted to add a sheet to record notes on the data loaded into the workbook, you could add a worksheet named (Notes). Because the name of the worksheet is in parentheses, the worksheet will not be loaded into GE Digital APM.

Units of Measure

In the workbooks, values that correspond to a Unit of Measure (UOM) should be entered based on the current UOM Conversion Set setting for the user performing the data load.

For example, if the UOM Conversion Set for the user is Metric, metric values should be entered in the Excel workbook.

In cells that correspond to a field that uses a UOM, you should not enter the actual UOM. For example, you should enter 10. not 10 Inches.

About the Configuration Worksheet

The **Configuration** Worksheet is a common worksheet, which can be implemented by each of the data loaders. It allows you to control aspects of how your data is loaded such as batching and which other worksheets should be processed.

Note: The **Configuration** Worksheet cannot be used by the Failure Modes and Effects Analysis (FMEA) Data Loader, the Reliability Centered Maintenance (RCM) Data Loader, Thickness Monitoring (TM) Equipment Data Loader, or the Thickness Monitoring (TM) Functional Location Data Loader.

The Configuration worksheet is needed to describe the type of data that you will be loading and how that data should be handled during the data load.

Worksheet	Description
Configuration	The Configuration worksheet is needed to describe the type of data that you will be loading and how that data should be
	handled during the data load.

Configuration Worksheet

Field Caption	Field ID	Data Type (Length)	Comments
Load Data From Worksheet	LOAD_DATA_WORKSHEET	Boolean	Identifies if data from the corresponding worksheet identified in the Data Worksheet ID column will be loaded or not. True: the corresponding worksheet will be processed. False: The corresponding worksheet will not be loaded into the Meridium database.
Data Worksheet ID	DATA_WORKSHEET_ID	Character	This column contains the name of the <data> worksheet where the actual data is located. It needs to have the same name as the <data> worksheet in the data loader workbook.</data></data>
Batch Size	BATCH_SIZE	Character	Modifying this field is required to determine the number of records processed in each batch. Enter the batch size you want, and the Data Loader will process that many records per batch.
			For example, if you want to use a batch size of 100, enter 100, and the data loader will process 100 records per batch.
			Note: The recommended batch size is 100. If the Batch Size column is removed from the source workbook, the data loader will default to a batch size of 100.
			In addition to processing the data in batches, the log file reports progress by batch.

System Code Tables Used by Data Loaders

The following table lists the System Code Tables that are used by the APM Connect Data Loaders.

Table ID	Table Description	Function
MI_WORK_PROCESS_ADAPTERS	Data Loader Jobs	Contains a list of all of the loaders and is used to link the corresponding Job Label in the APM Connect Administration Center.
MI_INTERFACE_LOG_CATEGORIES	Interface log categories	Contains a list of the log categories for APM Connect, and is used to categorize the log files by APM Connect component.