Honeywell

Experion PKS
Gas Operations Suite User's Guide

EPDOC-X265-en-431A
February 2015

Release 431

Honeywell

Document	Release	Issue	Date
EPDOC-X265-en-431A	431	0	February 2015

Disclaimer

Contents

About this guide

This guide describes how to use the Gas Operations Suite features of Experion to monitor your gas transmission pipeline.

Revision history

Revision	Date	Description
A	February 2015	Initial release of document.

Prerequisite skills

This guide assumes that you have knowledge of other Experion software and concepts where relevant. This guide also assumes that you are familiar with the Microsoft Windows operating system and the hardware and software that you are using.

Related documents

The following documents complement this guide. They contain additional information that might be useful for reference when using Experion for gas operations.

Document	Description
Gas Operations Suite Configuration Guide	Describes how to plan and configure your Experion PKS system for gas operations.
Operator's Guide	Describes how to use Station to monitor and control your Experion PKS system.
Server and Client Configuration Guide	Contains detailed configuration procedures for an Experion server and client system.
Quick Builder User's Guide	Describes how to use Quick Builder to configure equipment.

Getting started

Gas Operations Suite is an Experion license option that allows organizations in the gas transmission pipeline industry to monitor the quality and linepack of gas flow, as well as compressor performance.

Gas Operations Suite provides the following advanced pipeline applications:

- Pipeline modelling

  The physical pipeline structure, its connections and equipment can be modelled allowing navigation through the pipeline to view the key operating parameters for pipeline equipment.
- Flow meter reconciliation

  AGA calculations and heating value calculations are used to calculate gas volume and energy flow allowing the comparison against the results from physical flow meters. The calculations supported by Gas Operations Suite are AGA 3 orifice flow meter, AGA 5 heating value, AGA 7 turbine flow meter, AGA 8 supercompressibility, AGA 9 ultrasonic, NX-19, and Wobbe Index.
- Linepack calculation

  Linepack is calculated for each segment in the pipeline and summarized for the routes and pipelines in your model. Linepack can be calculated from a combination of field values and manually entered values.
- Leak detection

  If your site is also licensed for Gas Operations Suite leak detection, leaks in the pipeline can be detected by two software based dynamic modeling algorithms. The two algorithms can be used to complement each other to provide more accurate and timely detection.
- Compressor performance monitoring

  Display compressor performance against expected performance at given operating conditions.

To use the features of Gas Operations Suite, a pipeline model must already be configured in Experion. A pipeline model consists of the equipment and associated items such as controllers and points that have been configured to reflect the components of your pipeline system. Information about the equipment in your pipeline model is displayed in Station displays, enabling the monitoring of your pipeline equipment in the same way as Alarms, Events, and so on. These displays can be system displays such as the Equipment Summary and Detail displays or custom displays. For example, your site may have a custom display configured that graphically represents the complete pipeline system and includes equipment, points, alarms, and links to other displays such as the Linepack Summary. A custom display such as this could be used to drill down into the pipeline model.

The Equipment Summary and Detail displays are different to other Station summary and detail displays in that they are automatically generated when called. The equipment types and the number of items configured for the equipment types are shown on the Equipment Summary. When clicked, the header expands or collapses the list of equipment in that group. To see detailed information about a piece of equipment, click the equipment name in the expanded list.

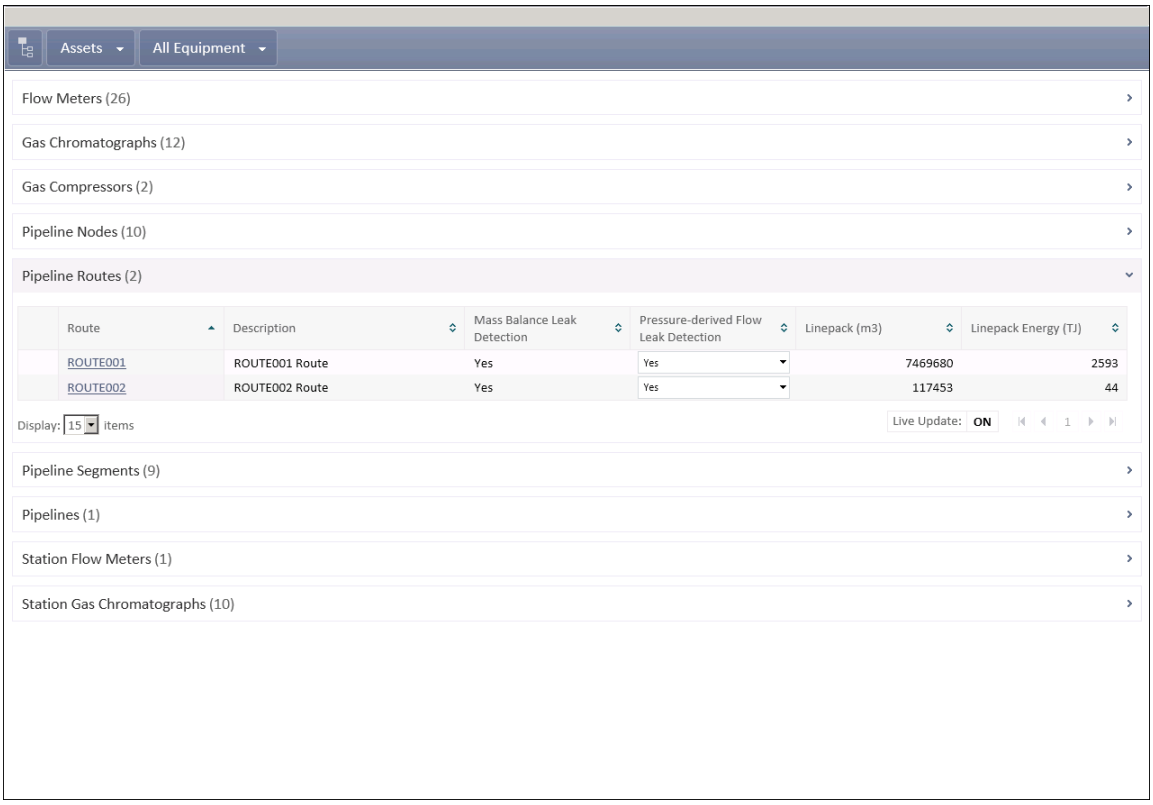

Figure 1: Example Equipment Summary display

Equipment detail layout options and custom displays can be selected from the Equipment Detail displays. If more than one layout has been configured for an Equipment Detail display, you can use the icons in the display header to switch between them.

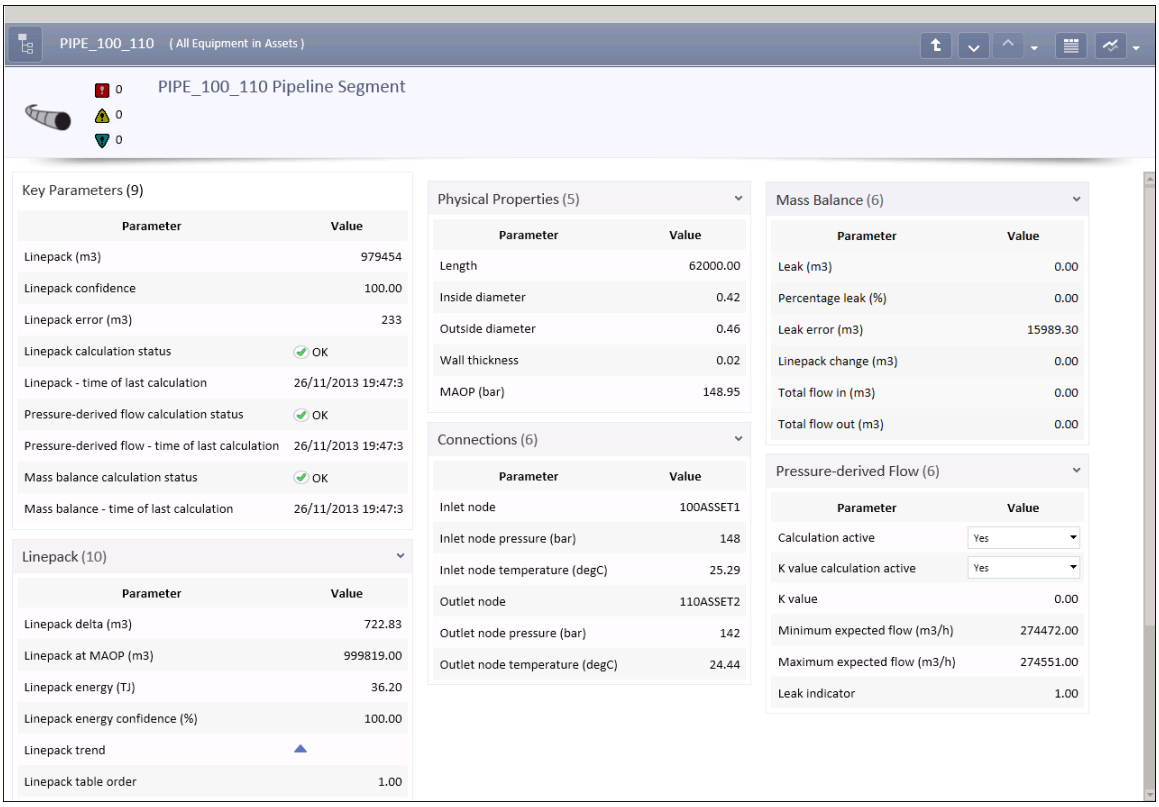

Figure 2: Example Equipment Detail display

Screen images used in this guide should be viewed as examples only as the displays at your site may be different, depending on how they have been configured.

For detailed information about how to use the Equipment Summary and equipment detail displays, see the "Viewing equipment" section in the *Operator's Guide*.

Viewing pipeline equipment

A pipeline model consists of the equipment and associated items such as controllers and points that have been configured to reflect the components of your pipeline system. In Station, you can view a list of the types of equipment in your pipeline model by clicking **Equipment** on the System Menu to see the Equipment Summary . You can view summary and detailed information for equipment in the pipeline model from the Equipment Summary.

To view summary information and list the names of the equipment in each type, click the equipment type on the Equipment Summary.

To view Equipment Detail displays, click the name of the equipment in the Equipment Summary. The default detail display will usually be the tabular layout. Other system and custom displays for the equipment can be selected from the categories in the equipment display header. If they have been configured for your equipment, there may be tabular , schematic , or trend displays available to view. If there is more than one layout in the category, you can select from a list.

For more information, see “Managing equipment” in the *Operator's Guide*.

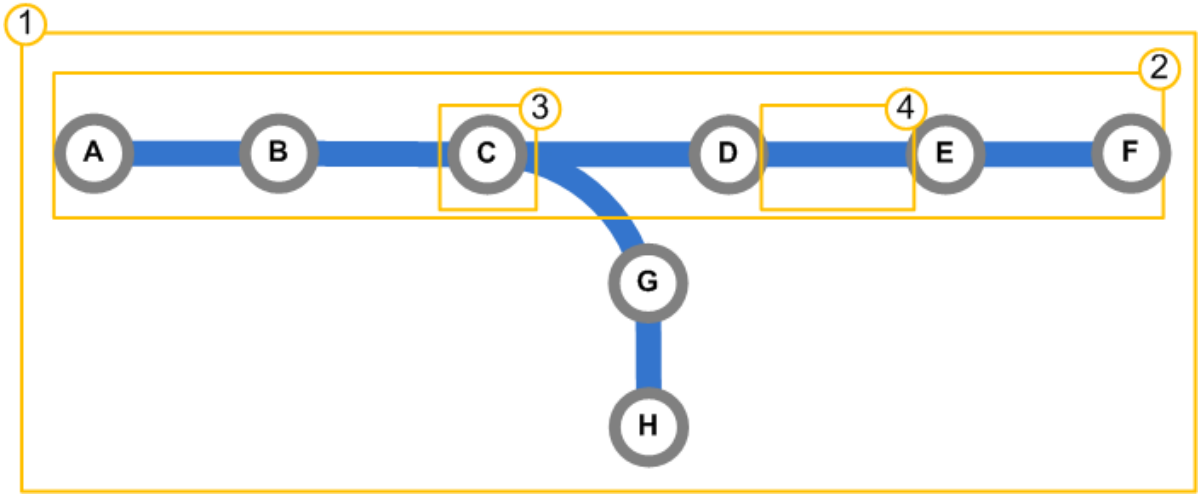

Figure 3: Pipeline components

Item	Description
1	*Pipeline* A pipeline can have one or more routes and multiple end points. A pipeline model can have more than one pipeline. This diagram shows a pipeline that consists of two routes. This pipeline has one inlet node (A) and two outlet nodes (F and H). You can view linepack summary information for a pipeline and override the field values used to calculate the linepack. If you are licensed for leak detection, you can view the status of pressure-derived flow leak detection at a specified time for any segments that have the feature enabled. You can also detect unexpected operating conditions by comparing past pressure readings to the current inlet and outlet pressure readings along each of the nodes in the pipeline.
2	*Pipeline route* A continuous non-branching length of pipe, consisting of one or more segments, that can have only two ends. Two segments are considered connected (continuous) when it is possible for gas to flow from one to the other. For small pipelines, the whole pipeline may be a single route. Longer transmission lines may have two or more routes. Each route can only belong to a single pipeline and can consist of different pipe characteristics. This diagram shows two routes. One route is identified by nodes A, B, C, D, E, and F. The second route is identified by nodes C, G, and H only. Nodes A and B are not part of the second route. You can view linepack summary information for a pipeline route and override the field values used to calculate the linepack. In the pipeline route summary information, you can select whether to enable or disable the calculation of pressure-derived flow for each route. Pressure-derived flow will not be shown on leak detection displays for the time that the calculation was not enabled.
3	*Pipeline node* A unique point on the pipeline where one or more pipeline features, such as a physical device or a change in the physical characteristics is located. A node is also the beginning or end of a segment and can contain other equipment such as flow meters, compressors, gas chromatographs, and SCADA points built on controllers. These associated items are used to collect the field data that is used in the Gas Operations Suite calculations. A node can only be associated with up to three segments (inlet, outlet, and branch). Branch nodes are included in multiple routes. In this diagram, node C belongs to both routes. Meter station, meter station branch, compressor station, main line valve, main line valve branch, reducer, and branch are all types of nodes. In this diagram, node A is the inlet node, nodes H and F are the outlet nodes, and node C is a branch node that has one inlet and two outlets. You can perform the following tasks with the equipment contained in a node: • Monitor compressor performance • Monitor gas flow and composition
4	*Pipeline segment* The smallest building block of a pipeline. A length of transmission pipeline of constant diameter, bounded by two nodes. Each segment can only belong to a single route. When you configure a segment, you can view information about the segment such as linepack. You can view linepack summary information for a pipeline and override the field values used to calculate the linepack. If you are licensed for leak detection, you can view the status of pressure-derived flow leak detection for a segment over a time period. You can also detect unexpected operating conditions by reviewing the results of the pipeline mass balance.

Related topics

“Viewing linepack information” on page 15

“Leak detection information” on page 28
“Viewing compressor information” on page 19
“Alternating or combining flow meters” on page 25
“Gas chromatograph information” on page 24
“Flow meter information” on page 22

Viewing linepack information

You can view linepack volume and linepack energy for each pipeline, route, or segment in the Equipment Summary, by clicking the equipment type. Other linepack information can also be viewed on the pipeline, route, and segment Equipment Detail tabular views. For more information, see “Accessing Equipment Detail displays” in the *Operator's Guide*.

To view the linepack subtotals by pipeline, route, and segment, and the temperature and pressure values used for the linepack calculations, call up the Equipment Detail display for a pipeline or route and select the appropriate view. The linepack views that are supplied with Gas Operations Suite for pipelines and routes are described in this topic. These views also show the status of linepack calculations and whether the current linepack volume and energy has increased, decreased, or is unchanged since the previous calculation. The time of the last linepack calculation can be seen in the tabular Equipment Detail display for a pipeline, route, and segment.

Linepack Summary

This is the default detail display shown for pipelines and routes. It includes the upstream and downstream pressure and temperature, linepack volume, and linepack energy. This display also indicates whether the **Manual PV** option has been enabled for the pressure and temperature points associated with a segment by showing MAN in the **Manual Override Active** column. The column to the right of the **Linepack Energy** column indicates whether linepack has increased, decreased, or is stable.

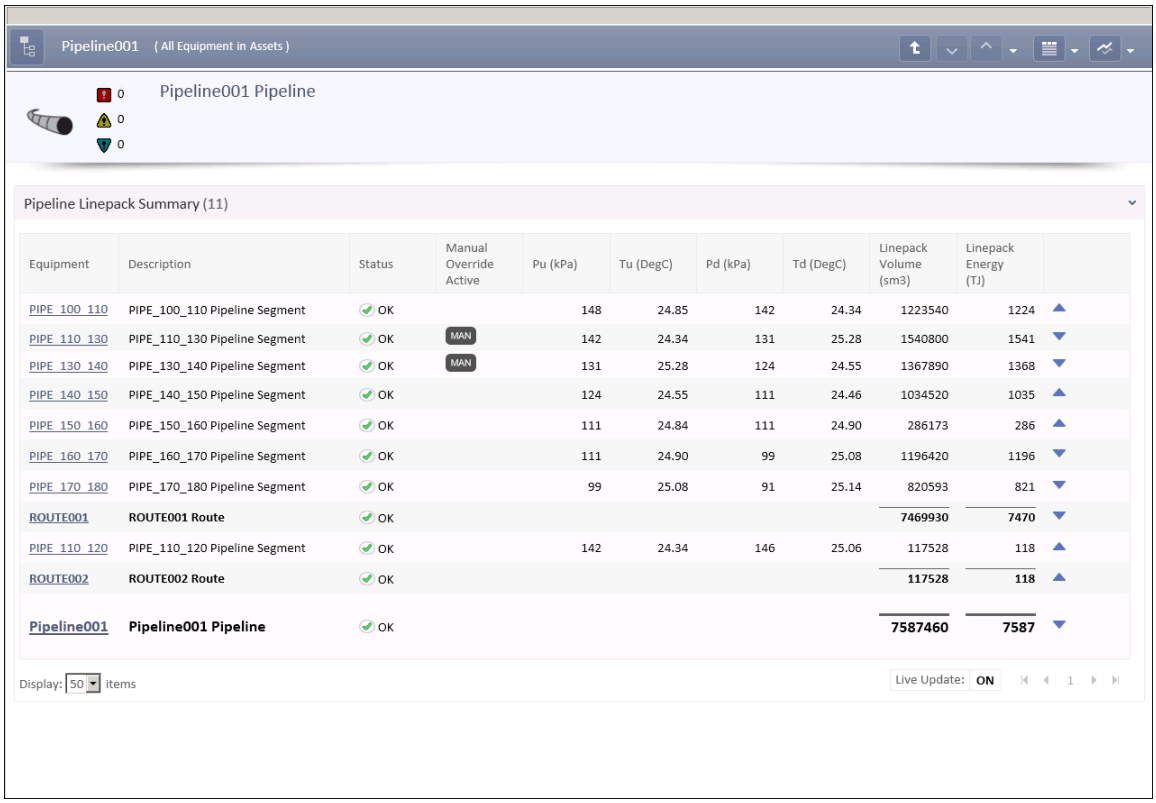

Figure 4: Example Linepack Summary

Linepack Override

This display allows you to enable and disable the **Manual PV** option for the pressure and temperature points that are used when calculating linepack for the associated segment. This allows the calculation of linepack to continue if there is some interruption to field values without the linepack values becoming stale. If a manual pressure or temperature value is entered, it can be compared to the corresponding field value to determine when it is appropriate to return to using the field value. For more information, see “Analog point process variable (PV)” in the *Server and Client Configuration Guide*.

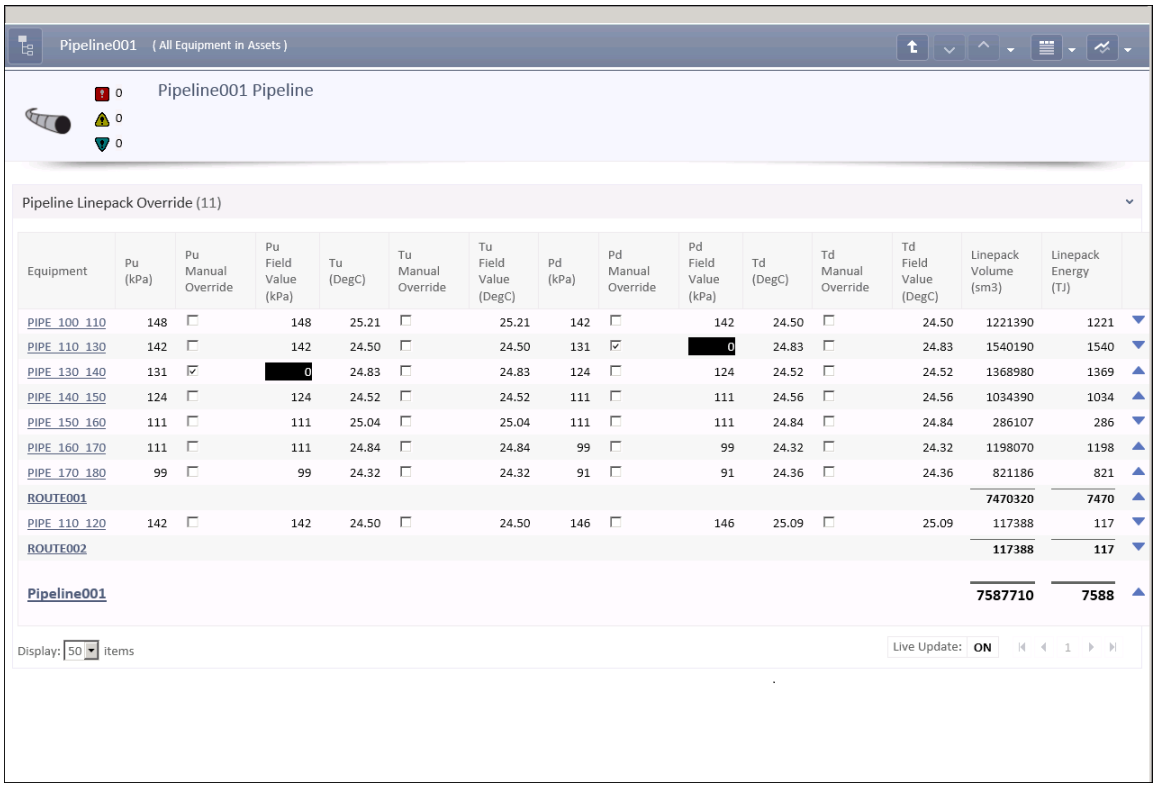

Figure 5: Example Linepack Override

Related topics

“Viewing pipeline equipment” on page 11
“Calculation status reference” on page 33

Viewing compressor information

You can view summary and detailed information, and compressor maps for the compressors in your pipeline model. Compressor maps are a graphical representation of a compressor's performance. They consist of the compressor's performance plotted over performance curves or indicators provided by the compressor manufacturer that show expected performance at given operating conditions. Compressor maps can be used to view historical operating data.

To view a list of compressors in your equipment model, click **Gas Compressors** in the Equipment Summary.

To view detailed information for a compressor, click the compressor name in the list of compressors. The first compressor map that was configured will be shown as the default detail display. To see other detailed information for the compressor, select another view or custom display from the views that have been configured.

The Equipment Detail display for a compressor shows a tabular view of the compressor map properties that have been configured for the compressor.

The trend displays supplied with Gas Operations Suite for a pipeline are the compressor maps that have been configured for the compressor. For more information, see "Configuring a compressor map" in the *Gas Operations Suite Configuration Guide*.

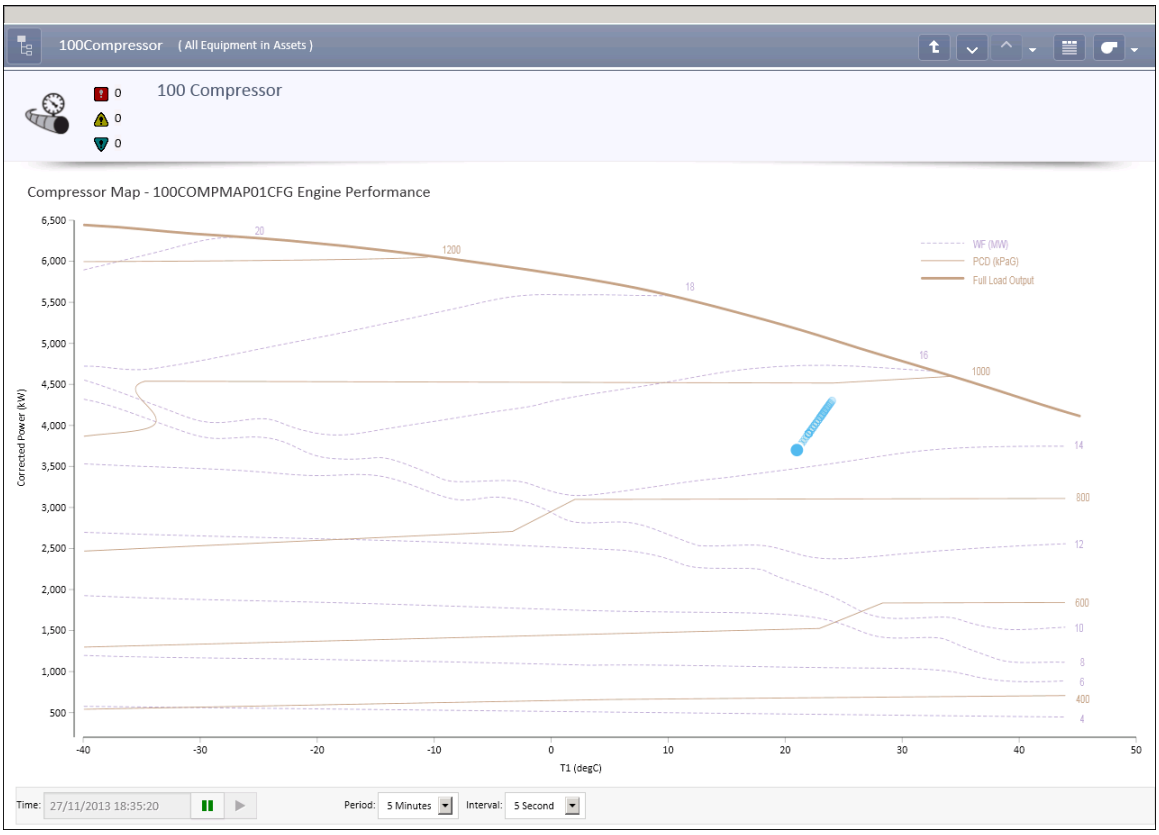

Figure 6: Example compressor map

Related topics

“Viewing pipeline equipment” on page 11

Monitoring gas flow and composition

The gas chromatographs, flow meters, and the associated items configured in your pipeline equipment model can be used to monitor gas composition values and flow measurements. By default, the pipeline model supports the viewing of gas flow and quality configured from physical flow computers in the field. However, Gas Operations Suite also supports gas volume and energy flow to be calculated on the server using a range of gas calculation standards, including American Gas Association (AGA), Gas Processor Association (GPA), and International Organization for Standardization (ISO). Displays allow comparison of the gas flow and quality from physical flow computers against the server calculated values.

The calculations supported by Gas Operations Suite and the standards that the calculations are based on are listed below.

Calculation	Standard details
AGA 3	• AGA Report No. 3, Part 1 (1990) – "Orifice Metering of Natural Gas Part 1: General Equations and Uncertainty Guidelines" • AGA Report No. 3, Part 3 (1992) – "Orifice Metering of Natural Gas Part 3: Natural Gas Applications" • AGA Report No. 3, Part 4 (1992) – "Orifice Metering of Natural Gas Part 4: Background, Development, Implementation Procedure, and Subroutine Documentation for Empirical Flange-Tapped Discharge Coefficient Equation"
AGA 5	AGA Report No. 5 (1996) – "Fuel Gas Energy Metering"
AGA 7	AGA Report No. 7 (1996, 2nd revision) – "Measurement of Gas by Turbine Meters"
AGA 8	AGA Report No. 8 (1992, 2nd edition – 1994, 2nd printing) – "Compressibility Factors of Natural Gas and Other Related Hydrocarbon Gases"
AGA 9	AGA Report No. 9 (1998) – "Measurement of Gas by Multipath Ultrasonic Meters"
Gross heating value	GPA Standard 2172-09 (2009, 3rd edition) – "Calculation of Gross Heating Value, Relative Density, Compressibility and Theoretical Hydrocarbon Liquid Content for Natural Gas Mixtures for Custody Transfer"
NX-19	AGA PAR Research Project NX-19 (1962) – "AGA Manual for the Determination of Supercompressibility Factors for Natural Gas"
Wobbe Index	ISO-6976:1995(E) (1995, 2nd edition) – "Natural gas – Calculation of calorific values, density, relative density and Wobbe index from composition"

Flow meter information

To view summary information for the flow meters in your equipment model, click **Flow Meters** or **Station Flow Meters** in the Equipment Summary.

To view detailed information for a flow meter, click the flow meter name in the summary. To see other information for the flow meter, select another view or custom display from the views that have been configured for the flow meter. For more information, see "Viewing pipeline equipment information."

Generic flow meters

In Gas Operations Suite, a generic flow meter represents a physical flow meter in the field, using any mechanism to calculate the flow. The results are not reconciled with a server-calculated flow.

The system display supplied with Gas Operations Suite for a generic flow meter is:

- Equipment Detail

  This display shows a tabular view of the key parameters, the flow parameters, and the instrumentation parameters.

Orifice flow meters

In Gas Operations Suite, an orifice flow meter represents a physical flow meter that measures flow using an orifice plate. Experion uses the input measurements from the orifice flow meter instrumentation to calculate the AGA 3 orifice flow. This result can be reconciled against the calculated result from the flow computer in the field.

The system displays supplied with Gas Operations Suite for an orifice flow meter are:

- Equipment Detail (default)

  This display shows a tabular view of the key parameters, the status of AGA calculations, compressibility properties, server calculation results, field parameters, and related equipment.
- AGA 3 Detail

  This display shows the flow meter conditions, gauge parameters, transport properties, AGA 3 input properties, and AGA 3 output properties.
- AGA 5 Detail

  This display shows the flow meter conditions, AGA 5 input properties, and AGA 5 output properties.
- AGA 8/NX-19 Detail

  This display shows the flow meter conditions, AGA 8 setup properties, NX-19 setup properties, Manual supercompressibility values, AGA 8 results, and NX-19 results.

Turbine flow meters

In Gas Operations Suite, a turbine flow meter represents a physical flow meter that measures flow using a turbine. Experion uses the input measurements from the turbine flow meter instrumentation to calculate the AGA 7 turbine flow. This result can be reconciled against the calculated result from the flow computer in the field.

The system displays supplied with Gas Operations Suite for a turbine flow meter are:

- Equipment Detail (default)

  This display shows a tabular view of the key parameters, the status of AGA calculations, compressibility properties, server calculation results, field parameters, and related equipment.
- Turbine Detail

  This display shows the flow meter conditions, gauge parameters, AGA 7 input properties, and AGA 7 output properties.

- AGA 5 Detail

  This display shows the flow meter conditions, AGA 5 input properties, and AGA 5 output properties.
- AGA 8/NX-19 Detail

  This display shows the flow meter conditions, AGA 8 setup properties, NX-19 setup properties, Manual supercompressibility values, AGA 8 results, and NX-19 results.

Ultrasonic flow meters

In Gas Operations Suite, an ultrasonic flow meter represents a physical flow meter that measures flow using ultrasonic pulses. Experion uses the input measurements from the ultrasonic flow meter instrumentation to calculate the AGA 9 ultrasonic flow. This result can be reconciled against the calculated result from the flow computer in the field.

The system displays supplied with Gas Operations Suite for an ultrasonic flow meter are:

- Equipment Detail (default)

  This display shows a tabular view of the key parameters, the status of AGA calculations, compressibility properties, server calculation results, field parameters, and related equipment.
- Ultrasonic Detail

  This display shows the flow meter conditions, gauge properties, AGA 9 input properties, and AGA 9 output properties.
- AGA 5 Detail

  This display shows the flow meter conditions, AGA 5 input properties, and AGA 5 output properties.
- AGA 8/NX-19 Detail

  This display shows the flow meter conditions, AGA 8 setup properties, NX-19 setup properties, Manual supercompressibility values, AGA 8 results, and NX-19 results.

Station flow meters

In Gas Operations Suite, a station flow meter represents a pair of flow meters that can be configured in serial or parallel. The station flow can be configured by the operator as either flow A, flow B, or flow A + flow B.

The system display supplied with Gas Operations Suite for a station flow meter is:

- Equipment Detail

  This display shows a tabular view of the key parameters, calculation status, and flow parameters for the station flow meter and the associated flow meters.

For information about how to use a station flow meter to alternate or combine flow meters, see “Alternating or combining flow meters.”

Virtual flow meters

In Gas Operations Suite, a virtual flow meter does not have a corresponding physical flow meter in the field. Instead, the flow is calculated on the server by adding or subtracting the measured flows from other physical meters.

Virtual flow meters can be used to estimate segment flow rates for leak detection purposes.

The system display supplied with Gas Operations Suite for a virtual flow meter is:

- Equipment Detail

  This display shows a tabular view of the key parameters for the virtual flow meter.

Related topics

“Alternating or combining flow meters” on page 25
“Viewing pipeline equipment” on page 11
“Calculation status reference” on page 33

Gas chromatograph information

To view summary information for the gas chromatographs in your equipment model, click **Gas Chromatographs** or **Station Gas Chromatographs** in the Equipment Summary.

To view detailed information for a gas chromatograph, click the gas chromatograph name in the summary. To see other information for the gas chromatograph, select another view or custom display from the views that have been configured for the gas chromatograph. For more information, see "Viewing pipeline equipment information."

Manual gas chromatographs

In Gas Operations Suite, a manual gas chromatograph represents a virtual instrument where the values of the various gas components are manually entered instead of using the measurements from a physical gas chromatograph.

The system display supplied with Gas Operations Suite for a manual gas chromatograph is:

- Equipment Detail

  This display shows a tabular view of the key parameters, calculation parameters, and gas component values.

Physical gas chromatographs

In Gas Operations Suite, a physical gas chromatograph represents a physical analytical instrument that measures the content of various components in a gas sample.

The system display supplied with Gas Operations Suite for a physical gas chromatograph is:

- Equipment Detail

  This display shows a tabular view of the key parameters, calculation parameters, and gas component values.

Station gas chromatographs

In Gas Operations Suite, a station gas chromatograph represents a virtual gas chromatograph that allows two physical and one manual gas chromatographs to be configured. The operator can then select which set of gas chromatograph component values should be used for calculations.

The system display supplied with Gas Operations Suite for a station gas chromatograph is:

- Equipment Detail

  This display shows a tabular view of the key parameters, calculation status, and gas components for the station gas chromatograph and the associated gas chromatographs.

For information about how to use a station gas chromatograph to select the source of gas composition values, see "Selecting the source of gas composition values."

Related topics

"Viewing pipeline equipment" on page 11
"Selecting the source of gas composition values" on page 26
"Calculation status reference" on page 33

Alternating or combining flow meters

A station flow meter is used to select or combine flow measurements when gas is directed through more than one flow meter in either a serial or parallel arrangement. If serial, the Station flow meter can select the duty flow meter, if parallel the station flow meter will use the sum of flow measurements. The source that is selected is known as the duty flow meter.

Prerequisites

- You are viewing the Equipment Summary in Station.
- Your pipeline equipment model has been configured to include a station flow meter.
- The flow meters associated with the station flow meter have been configured.

To alternate or combine flow meters for a station flow meter

1 Click **Station Flow meters**.
A list of station flow meters appears.

2 Click the station flow meter for which you will select the source.
The tabular view detail display for the station flow meter appears.

3 Under **Key Parameters**, in the **Duty flow meter** list, click the source of flow measurements that reflects your flow meter arrangement.

Results

The properties of the duty flow meter provide flow measurements for the station flow meter.

Related topics

“Viewing pipeline equipment” on page 11
“Flow meter information” on page 22

Selecting the source of gas composition values

A station gas chromatograph is used to provide redundancy in gas chromatograph readings that will be used as inputs to flow calculations. For example, in the event of gas chromatograph failure or outage, you can switch between the measurements from a physical gas chromatograph or values manually entered for a manual gas chromatograph. The source that is selected is known as the duty gas chromatograph.

Prerequisites

- You are viewing the Equipment Ssummary in Station.
- Your pipeline equipment model has been configured to include a station gas chromatograph.
- The physical gas chromatographs associated with the station gas chromatograph have been configured.

To select the source of gas composition values for a station gas chromatograph

1 Click **Station Gas Chromatographs**.
A list of station gas chromatographs appears.

2 Click the station gas chromatograph for which you will select the source.
The tabular view detail display for the station gas chromatograph appears.

3 Under **Key Parameters**, in the **Duty Gas Chromatograph** list, click the source of gas composition values.

Results

The properties of the duty gas chromatograph provide the gas composition values for the station gas chromatograph.

Related topics

“Gas chromatograph information” on page 24

Detecting a leak

If your site is licensed for leak detection, Gas Operations Suite provides two different computer-based algorithms that can assist in identifying gas leaks on a pipeline. The probability of a leak can be determined in two ways:

- Both Mass Balance and Pressure Derived Leak Detection will raise alarms when the calculated leak exceeds a configured limit. Each segment has an associated analog point for each leak detection type, upon which alarms are raised. These points are created when the segment is created, for example, segment PIPE001 will create PIPE001-MBLK and PIPE001-PDFLK. The PV Source Address of these analog points will be configured with the segment parameters, MBLeakPercent and PdFLeak respectively. The sensitivity of Mass Balance leak detection alarming can be adjusted by changing the alarm limits on PIPE001-MBLK. The alarming logic of PdF Leak Detection is implemented inside server calculations, so its sensitivity cannot be changed.
- Select the leak detection displays to view the expected flows or linepack against the observed flow or linepack.

The leak detection displays can be selected from the trend view category on the pipeline or segment detail display and show the results of two leak detection algorithms:

- The Pressure-derived Flow algorithm calculates the pressure-derived flow rate through a pipeline section (any section of pipe between two pressure transmitters) based on the pressure change in the section. If the measured flow rate differs sufficiently (beyond the extent of measurement and modeling uncertainty) from the expected flow rate, a leak is reported. The Pipeline Flow Snapshot and the Segment Flow Trend displays will show the measured flow rate against the pressure derived flow rate.
- The Mass Balance algorithm relies on the principle of conservation of mass. That is, in a leak-free pipeline, the gas mass flow into the pipeline is equal to the gas flow out of the pipeline while taking into account any change in the pipeline's linepack. If the percentage of the unbalanced flow over the total flow into the pipeline exceed the configured limits, a leak is reported. The Segment Mass Balance leak detection display shows the reconciled gas accounted for versus the uncertainty (due to meter and transmitter accuracy).

If the properties for both algorithms have been configured, they will operate simultaneously. In some cases the results of one method can be used to validate the results of the other. If only one method detects a leak, this may indicate that the leak is false. When there is a suspected leak, the results and inputs of the leak detection algorithms should be closely scrutinized to confirm that sensor failure, configured sensor accuracy, data anomalies, or other problems are not generating false leak alarms.

Leak detection information

The leak detection displays supplied with Gas Operations Suite can be selected from the trend view category when you are viewing detailed information about pipelines and segments in your pipeline equipment model.

The calculation of pressure-derived flow can be enabled or disabled for an entire route or for an individual segment. Pressure-derived flow will not be shown on leak detection displays for the time that the calculation was not enabled. Pressure-derived flow calculation may not be applicable to all segments in the pipeline. For example, if accurate flow measurement is not possible.

For more information about leak detection, contact your local Honeywell Technical Assistance Center (TAC).

Instrument uncertainty

Measured flow, pressure-derived flow, and the associated ranges of uncertainty are shown in the pipeline flow snapshot and the segment flow trend leak detection displays. The uncertainty shown for measured flow is due to the accuracy and repeatability of the flow measurement device. The uncertainty shown for pressure-derived flow is a function of uncertainty in the pressure and flow readings, the accuracy of calibration of the pressure-derived flow model, plus a tolerance to allow for transient state effects and physical changes in the pipeline over time.

The uncertainty in mass balance leak detection is the combined uncertainty of all flow meter readings used in the mass balance calculation and is calculated using the rules of uncertainty propagation.

Pipeline Flow Snapshot

The Pipeline Flow Snapshot shows the measured flow versus the pressure-derived flow for each segment in the pipeline at a specified time.

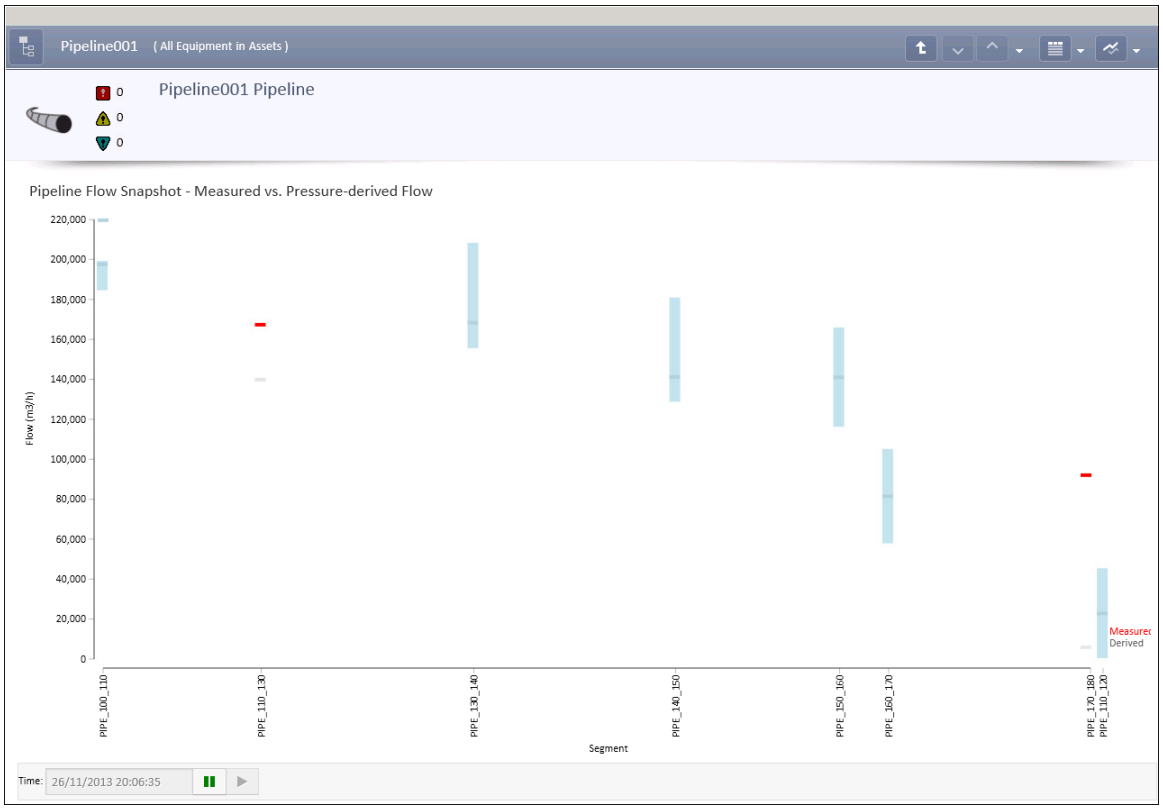

Figure 7: Example Pipeline Flow Snapshot

The measured flow and its range of uncertainty are shown as a colored bar. The pressure-derived flow and its range of uncertainty are shown as a gray bar.

Measured flow	Description
Blue	The pressure-derived flow is completely within the measured flow's uncertainty range. This indicates that there is no leak in the segment.
Yellow	The pressure-derived flow partially overlaps the measured flow's uncertainty range. This indicates that there is a possible leak in the segment.
Red	The pressure-derived flow does not overlap the measured flow's uncertainty range. This indicates that there is a probable leak in the segment.

This display shows a single pipeline with each route shown side by side with its own x-axis.

By default, the current pipeline flow snapshot information will be shown. To review previous values, specify the time period. Point to the graph bars to see the flow details (measured and calculated) of the segment.

Pipeline pressure profile

The pipeline pressure profile display shows pipeline pressure for each pressure monitoring node in the pipeline. This trend can be used to monitor pipeline pressure or as an approximate indicator of linepack.

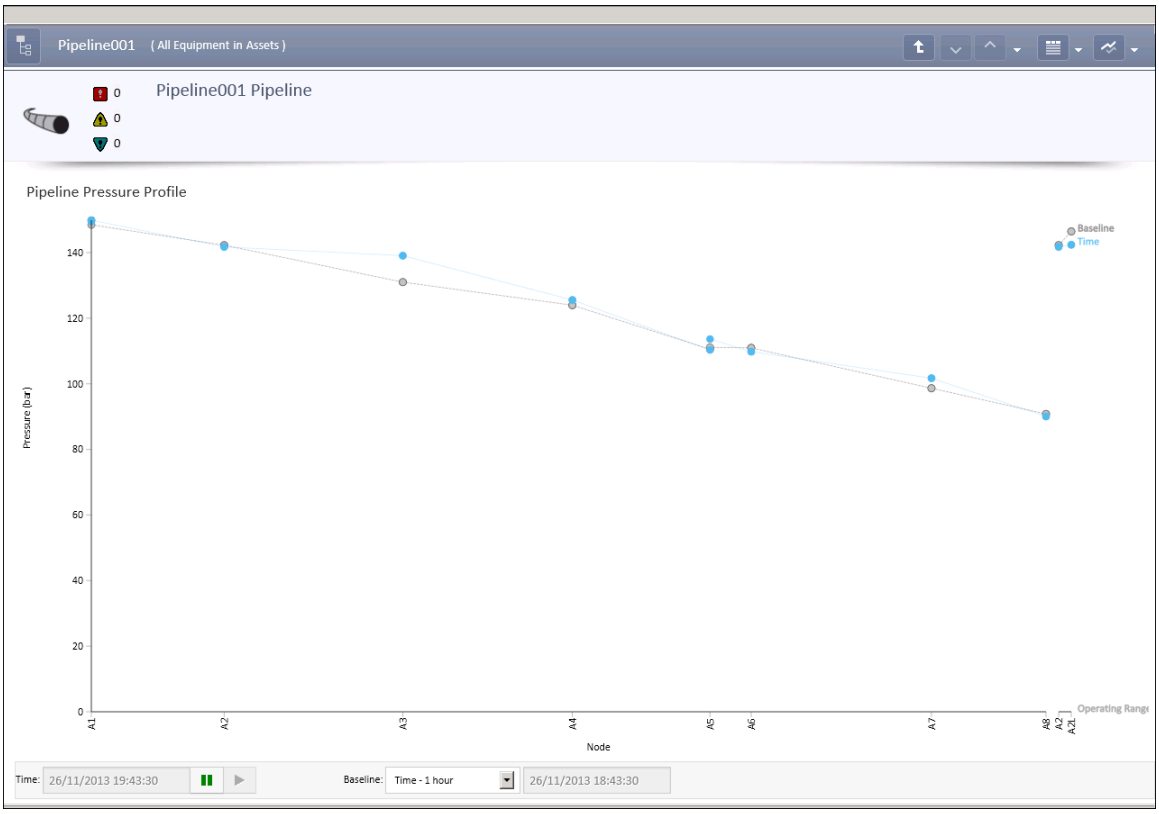

Figure 8: Example Pipeline Pressure Profile

The baseline pressure profile can be used to view the pressure profile across the pipeline at an alternate time. The shaded area represents the normal operating pressure range, which may be constant for the entire pipeline or vary by location.

This display shows a single pipeline with each route within the pipeline shown side by side with its own x-axis.

By default, the current pipeline pressure profile information will be shown and the baseline will show information from the past 24 hours. To review past pressure profiles, specify the time period and the baseline offset. The baseline offset can be configured to maintain an offset from the selected time or to be fixed to a certain date and time. Point to the graph points to see the pressure details of the node. Click on the bars of a segment to be taken to that segtment's flow trend display.

Segment flow trend

This trend shows the measured flow versus the pressure-derived flow for one segment over time.

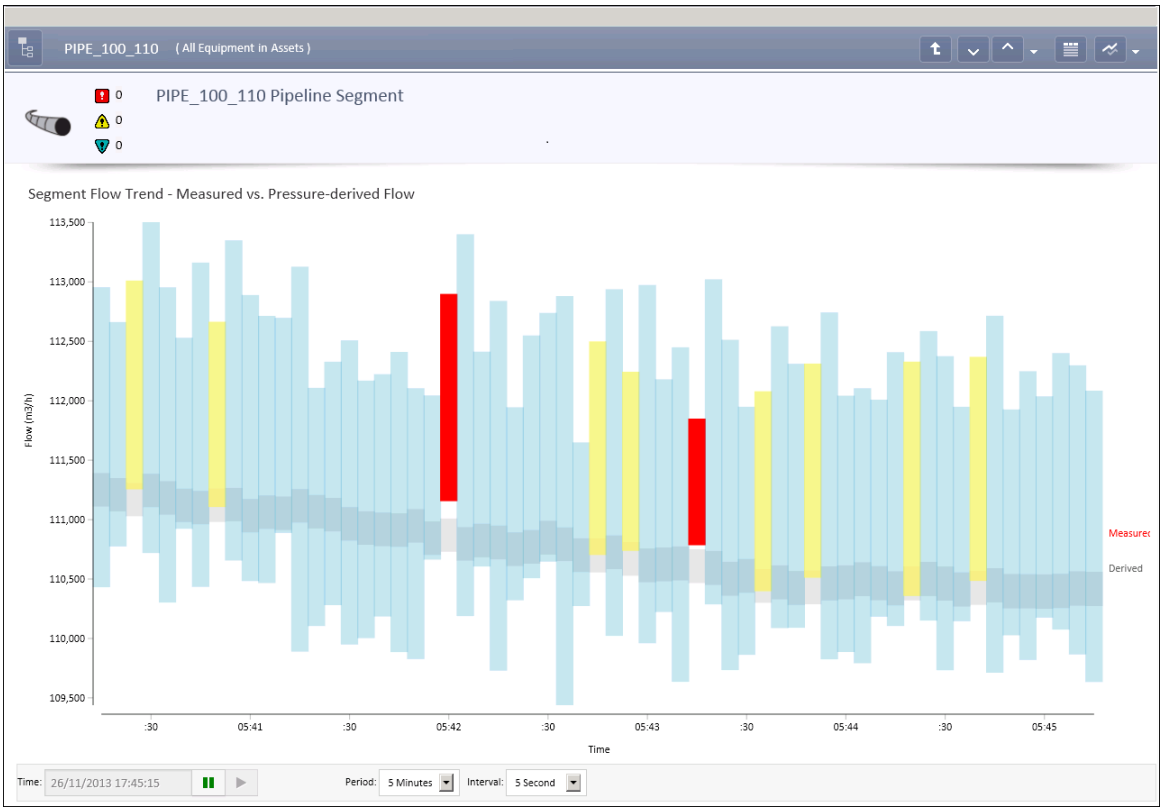

Figure 9: Example Segment Flow Trend

The measured flow and its range of uncertainty are shown as a colored bar. The pressure derived flow and its range of uncertainty are shown as a gray bar.

Measured flow	Description
Blue	The pressure-derived flow is completely within the measured flow's uncertainty range. This indicates that there is no leak in the segment.
Yellow	The pressure-derived flow partially overlaps the measured flow's uncertainty range. This indicates that there is a possible leak in the segment.
Red	The pressure-derived flow does not overlap the measured flow's uncertainty range. This indicates that there is a probable leak in the segment.

By default, segment flow trend information will be shown for the past hour in intervals of one minute. To review flows for other times, specify the time period and interval. Point to the graph to see the pressure details of the segment.

Segment Mass Balance

When segments are configured, they are grouped by zone. The segments added to a zone are determined by how much in-line metering is contained in the pipeline for those segments. Mass balance is calculated by zone and reported for segments but each segment in a zone has the same values. The Segment Mass Balance trend shows a time series of the amount of gas unaccounted for plotted over the total uncertainty in the mass balance calculation. A likely leak is indicated when the suspected leak is larger than the total uncertainty.

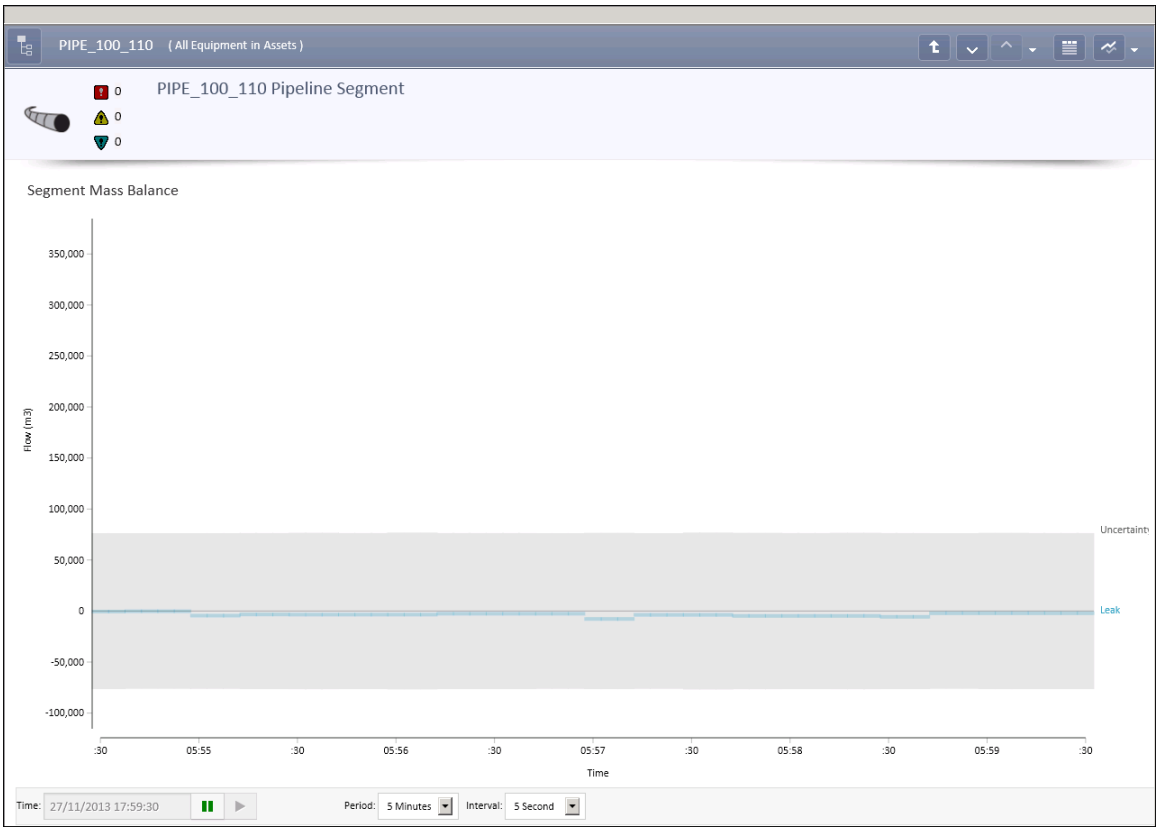

Figure 10: Example Segment Mass Balance

By default, segment flow trend information will be shown for the past hour in intervals of one minute. To review past leak events, specify the time period and interval. Point to the graph to see the leak data for the segment.

Related topics

“Viewing pipeline equipment” on page 11

Calculation status reference

This topic lists the statuses that can be displayed for calculations in Gas Operations Suite.

Status	Description
	The calculation is disabled.
	The calculation was completed successfully.
	The calculation was performed with input values that were bad, stale, not a number (NaN), in error, or in warning.
	The calculation was not performed due to an error that occurred during calculation. For example, a unit conversion error.
	The calculation was not successful.

Related topics

“Flow meter information” on page 22
“Gas chromatograph information” on page 24
“Viewing linepack information” on page 15

Troubleshooting and Maintenance

Related topics

“Calculations are not working” on page 36
“Pipeline equipment is missing in Station” on page 37

Calculations are not working

There are bad values shown in the Equipment Summary or Equipment Detail displays, the calculation status shows as **`Disabled`**, or the calculation status shows an error.

Diagnostic check

Check whether the associated points have been created.

Cause

The associated points have not been created.

Solution

In Quick Builder, create the associated points, configure them and download the project to the server. For more information, see “Downloading a project” in the *Quick Builder User’s Guide*.

Diagnostic check

Check whether the equipment has been downloaded to the server.

Cause

The equipment has not been downloaded to the server.

Solution

In Quick Builder, download the equipment to the server. For more information, see “Downloading a project” in the *Quick Builder User’s Guide*.

Diagnostic check

Check whether the relationships for the equipment have been configured correctly.

Cause

The relationships for the equipment have not been configured correctly.

Solution

In Quick Builder, configure the required relationships for the equipment and download the equipment to the server. For more information, see “Configuring equipment relationships” and “Downloading a project” in the *Quick Builder User’s Guide*.

Diagnostic check

Check whether the calculation has been enabled for the equipment.

Cause

The relevant calculation parameter for the piece of equipment has been configured as **`Disabled`**.

Solution

In Quick Builder, enable the calculation and download the equipment point to the server. For more information, see “Downloading a project” in the *Quick Builder User’s Guide*.

Pipeline equipment is missing in Station

The equipment is not visible in Station.

Diagnostic check

Check whether you have access to the parent asset.

Cause

You do not have access to the parent asset to which the equipment is assigned.

Solution

Arrange access to the asset.

Diagnostic check

Check whether the equipment has been downloaded to the server.

Cause

The equipment has not been downloaded to the server.

Solution

In Quick Builder, download the equipment to the server. For more information, see “Downloading a project” in the *Quick Builder User’s Guide*.

Notices

Trademarks

Experion®, PlantScape®, SafeBrowse®, TotalPlant®, and TDC 3000® are registered trademarks of Honeywell International, Inc.

OneWireless™ is a trademark of Honeywell International, Inc.

Other trademarks

Microsoft and SQL Server are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Trademarks that appear in this document are used only to the benefit of the trademark owner, with no intention of trademark infringement.

Third-party licenses

This product may contain or be derived from materials, including software, of third parties. The third party materials may be subject to licenses, notices, restrictions and obligations imposed by the licensor. The licenses, notices, restrictions and obligations, if any, may be found in the materials accompanying the product, in the documents or files accompanying such third party materials, in a file named third_party_licenses on the media containing the product, or at http://www.honeywell.com/ps/thirdpartylicenses.

Documentation feedback

You can find the most up-to-date documents on the Honeywell Process Solutions support website at:

http://www.honeywellprocess.com/support

If you have comments about Honeywell Process Solutions documentation, send your feedback to:

hpsdocs@honeywell.com

Use this email address to provide feedback, or to report errors and omissions in the documentation. For immediate help with a technical problem, contact your local Honeywell Process Solutions Customer Contact Center (CCC) or Honeywell Technical Assistance Center (TAC) listed in the “Support and other contacts” section of this document.

How to report a security vulnerability

For the purpose of submission, a security vulnerability is defined as a software defect or weakness that can be exploited to reduce the operational or security capabilities of the software.

Honeywell investigates all reports of security vulnerabilities affecting Honeywell products and services.

To report a potential security vulnerability against any Honeywell product, please follow the instructions at:

https://honeywell.com/pages/vulnerabilityreporting.aspx

Submit the requested information to Honeywell using one of the following methods:

- Send an email to security@honeywell.com.

  or

- Contact your local Honeywell Process Solutions Customer Contact Center (CCC) or Honeywell Technical Assistance Center (TAC) listed in the “Support and other contacts” section of this document.

Support

For support, contact your local Honeywell Process Solutions Customer Contact Center (CCC). To find your local CCC visit the website, https://www.honeywellprocess.com/en-US/contact-us/customer-support-contacts/Pages/default.aspx.

Training classes

Honeywell holds technical training classes on Experion PKS. These classes are taught by experts in the field of process control systems. For more information about these classes, contact your Honeywell representative, or see http://www.automationcollege.com.

Index