SIEMENS

Insights Hub

Predict

System Manual

10/2025

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

⚠ WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

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Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Table of contents

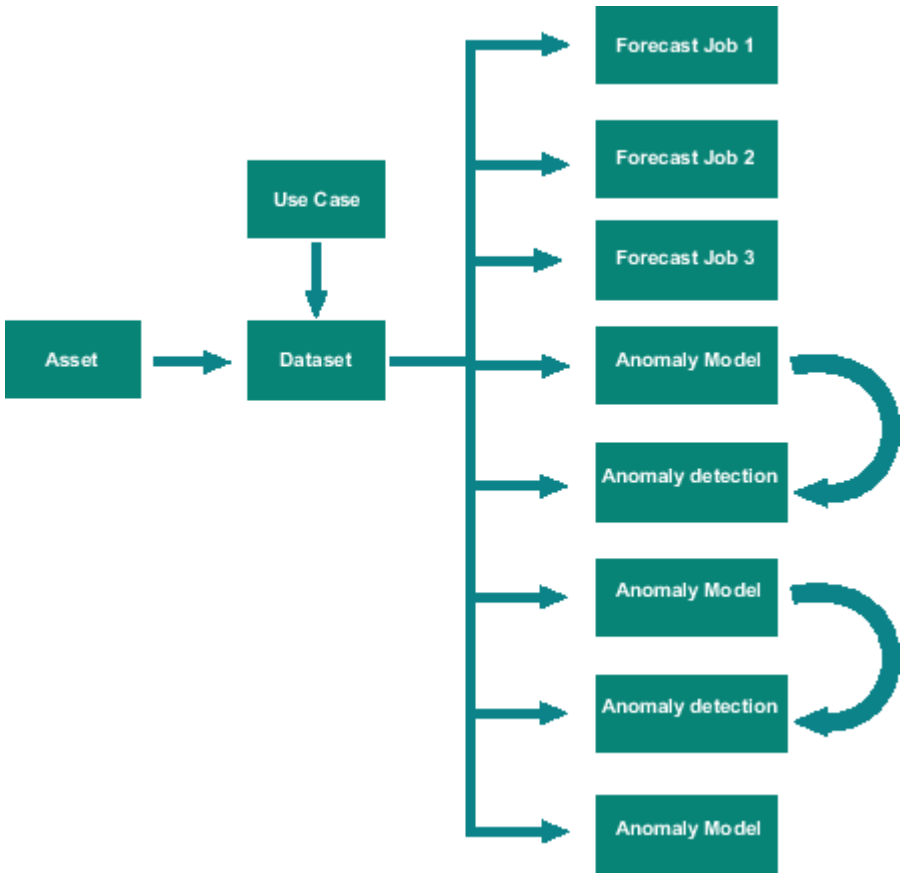
1 Predict Overview

Introduction

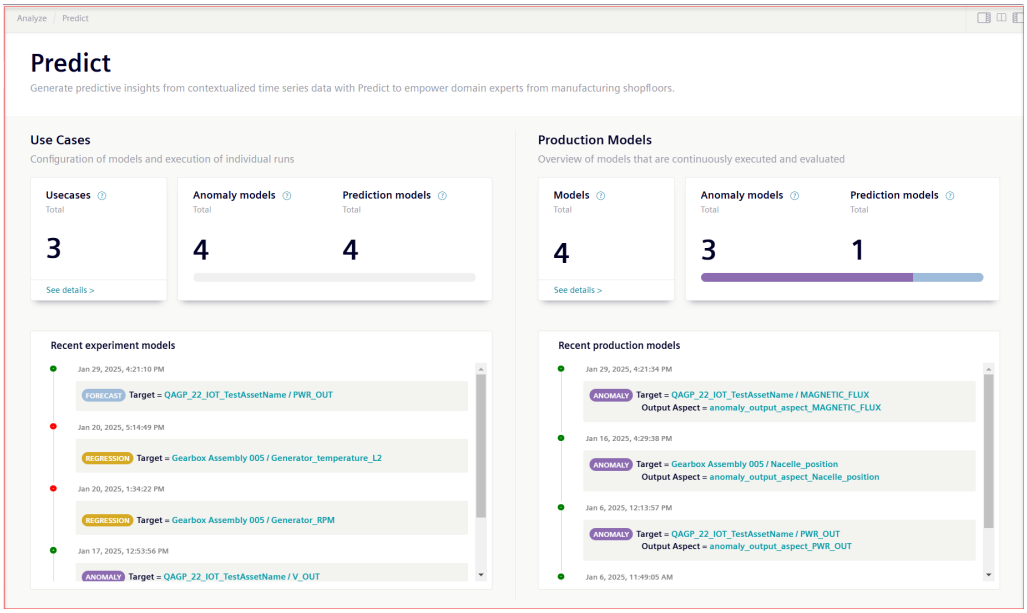
Predict offers you an out-of-the-box journey to create predictive models for faster and better forecasting and anomaly detection on your Time Series data using advanced artificial intelligence and machine learning technologies.

Predict uses time series data from asset as dataset and does easy configuration for forecast and anomaly model building, schedule, execute, achieve and visualize immediate insights.

The below graphic depicts the workflow of Predict:



The following screen displays the home screen of Predict:

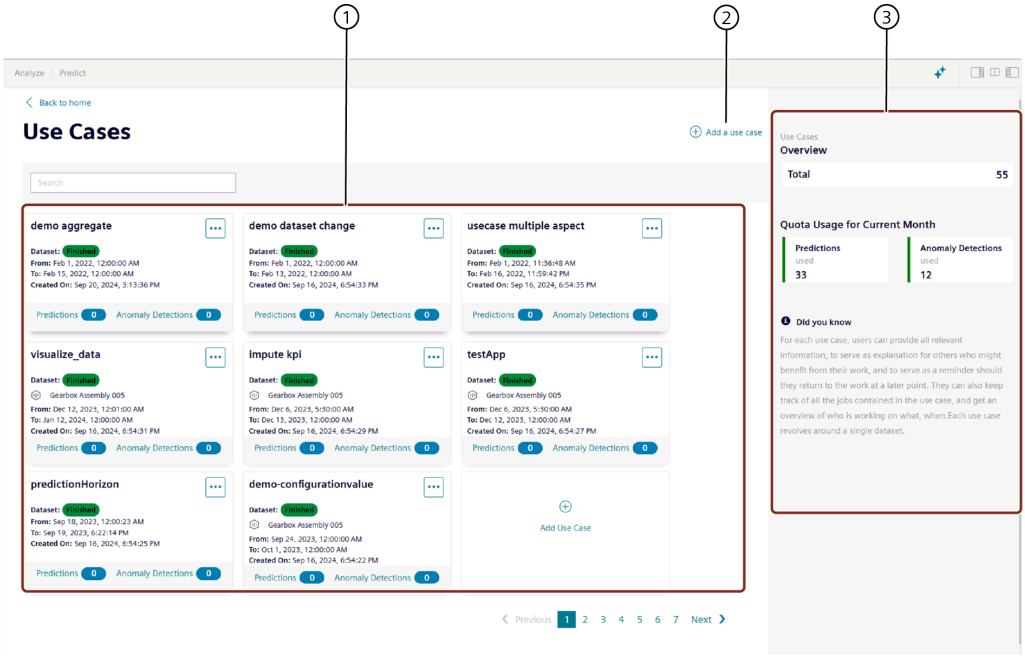

Analyze / Predict
Predict
Generate predictive insights from contextualized time series data with Predict to empower domain experts from manufacturing shopfloors.
Use Cases
Configuration of models and execution of individual runs
Usecases
Total
3
See details >
Anomaly models
Total
4
Prediction models
Total
4
Production Models
Overview of models that are continuously executed and evaluated
Models
Total
4
See details >
Anomaly models
Total
3
Prediction models
Total
1
Recent experiment models
Jan 29, 2025, 4:21:10 PM
FORECAST Target = QAGP_22_IOT_TestAssetName / PWR_OUT
Jan 20, 2025, 5:14:49 PM
REGRESSION Target = Gearbox Assembly 005 / Generator_temperature_L2
Jan 20, 2025, 1:34:22 PM
REGRESSION Target = Gearbox Assembly 005 / Generator_RPM
Jan 17, 2025, 12:53:56 PM
ANOMALY Target = QAGP_22_IOT_TestAssetName / V_OUT
Recent production models
Jan 29, 2025, 4:21:34 PM
ANOMALY Target = QAGP_22_IOT_TestAssetName / MAGNETIC_FLUX
Output Aspect = anomaly_output_aspect_MAGNETIC_FLUX
Jan 16, 2025, 4:29:38 PM
ANOMALY Target = Gearbox Assembly 005 / Nacelle_position
Output Aspect = anomaly_output_aspect_Nacelle_position
Jan 6, 2025, 12:13:57 PM
ANOMALY Target = QAGP_22_IOT_TestAssetName / PWR_OUT
Output Aspect = anomaly_output_aspect_PWR_OUT
Jan 6, 2025, 11:49:05 AM

Use Cases 2

2.1 Use Cases

Use Case

Predict allows you to create use cases, which are used to track and manage both Prediction and Anomaly detection jobs and link the dataset.



① Overview of the use cases in the tenant

② Adds a new use case

③ Displays a quick overview of the total use cases and the quota usage for the current month

Creating a Use Case

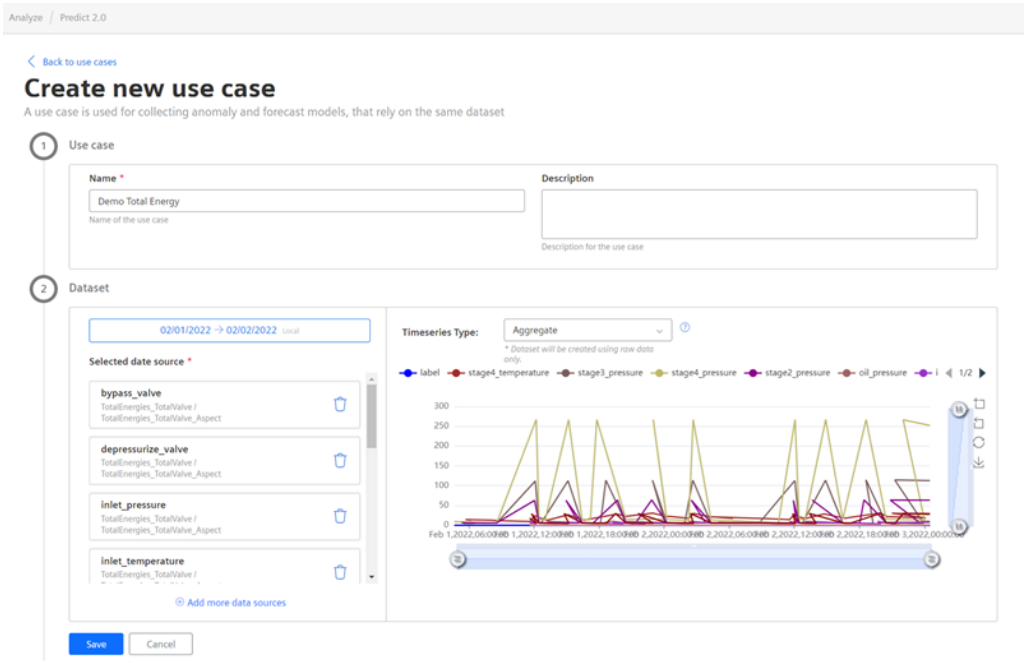
To create a use case, proceed with the following steps:

1. Open "Predict" by clicking on below icon on Insight Hub launchpad. 

2. Click "See details" in the Use cases section.

3. Click "Add a use case".

4. Enter the name and description of your choice.



5. Select the preferred date range.

6. Click "Add more data sources". The "Add data source" page is displayed. In this page,:
   - Select the Asset, Variables for the preferred dataset.
   - Click Add data source.

7. Click "Save".

A use case to manage both forecast and anomaly jobs is created.

Editing or Deleting a Use Case

To edit an existing use case, proceed as follows:

1. In the "Use Cases" screen, select the existing use case.

2. Click ··· and click Edit.

3. In the Edit Use Case screen, update the required fields.

4. Click "Save".

To delete an existing Use Case, select the use case, click ··· and click "Delete". In the confirmation Dialog, click "Delete".

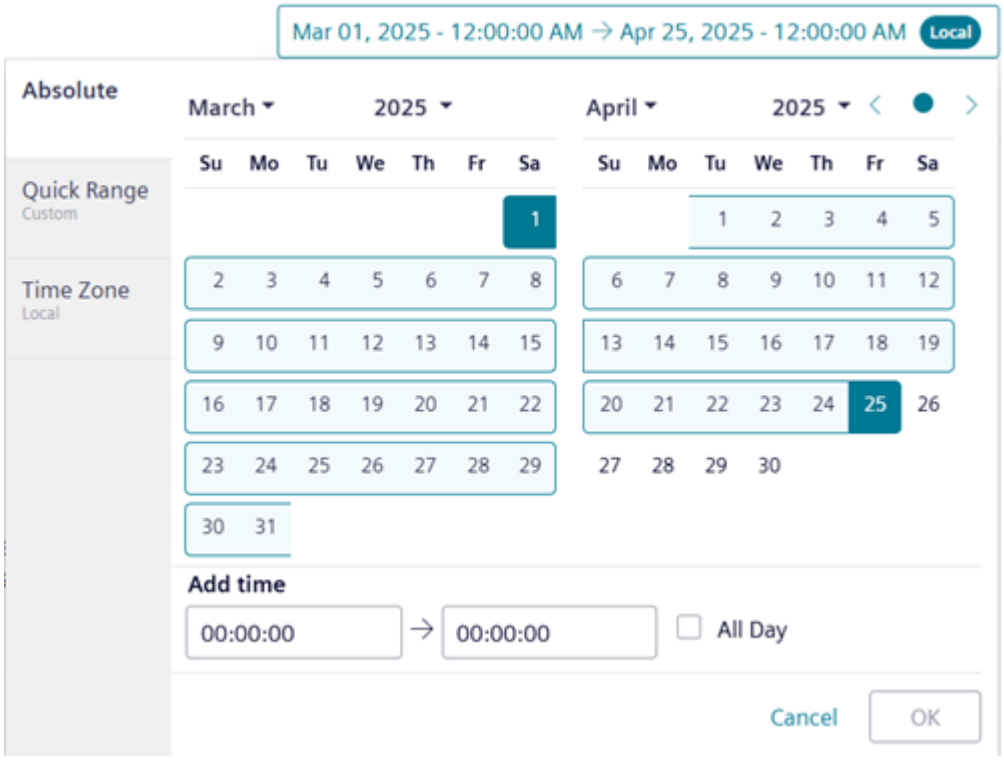
2.2 Timepicker

Timepicker

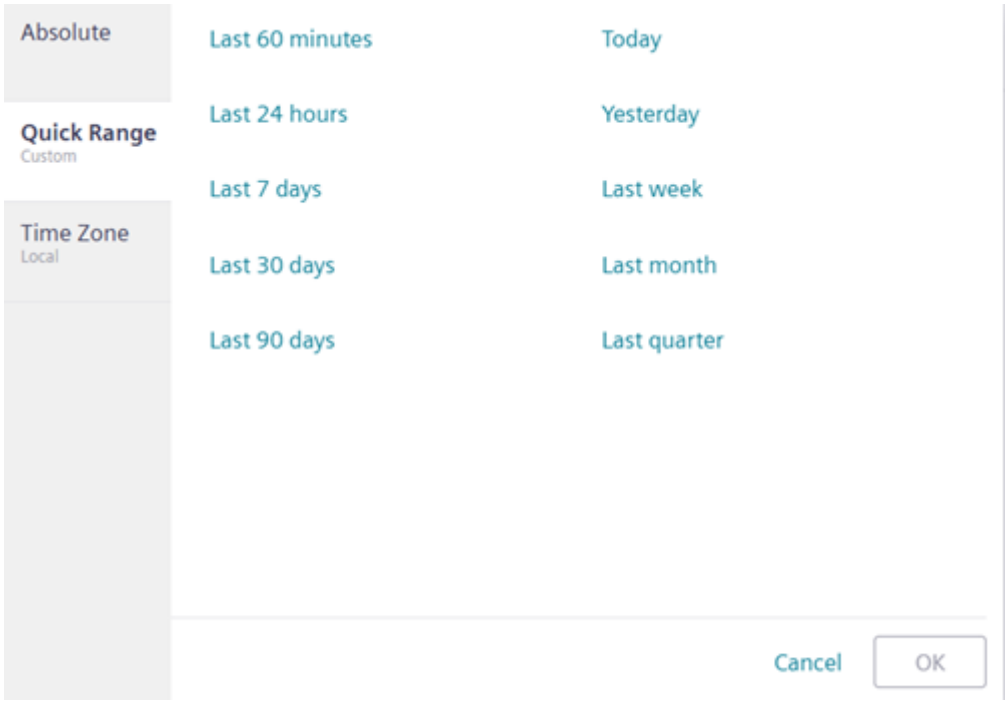
The graph shows the set time period in the Time selection panel.

The time selection panel offers you to select the required time range in the following ways:

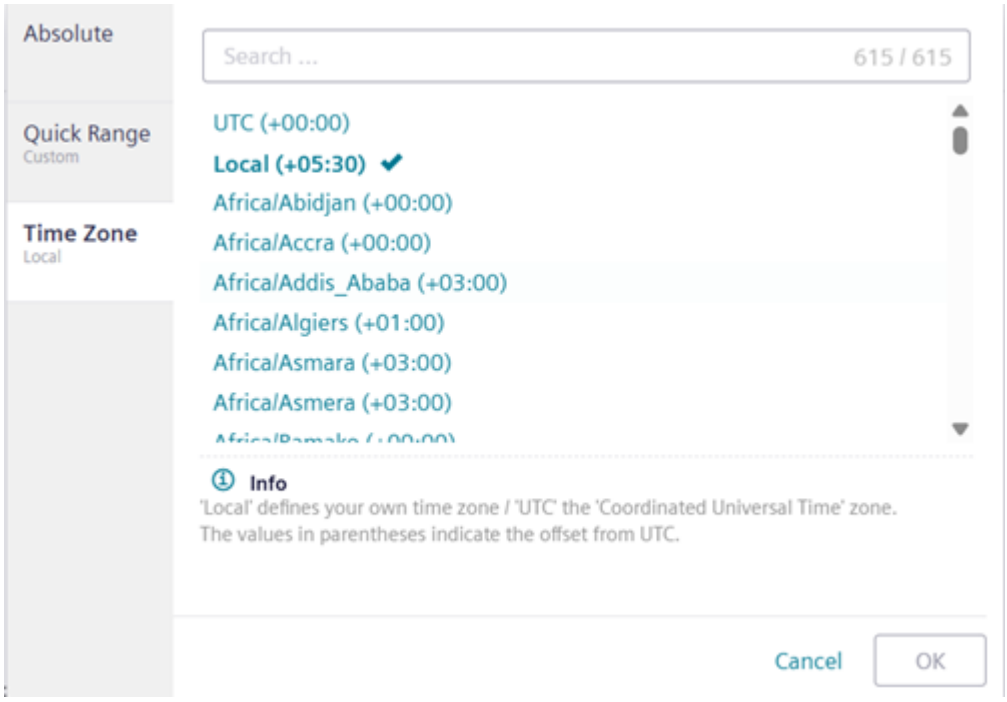
- Absolute: Allows you to select the time range between the "From" date to "To" date.



- Quick Range: Allows you to select the predefined quick time range.



- Time Zone: Allows you select the time zone.



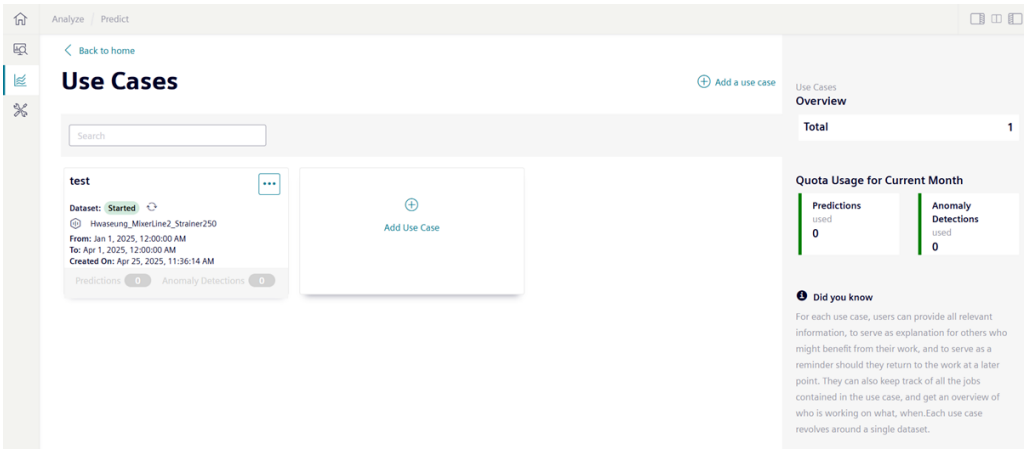
Production models

3

Production models

Predict allows you to track and manage both Forecast and Anomaly detection jobs, which are continuously executed and evaluated as per the jobs scheduled.

Using the Production models, the users track and monitor the forecast and anomaly reports for models that are frequently executed in accordance with the schedule.



Prediction 4

Prediction

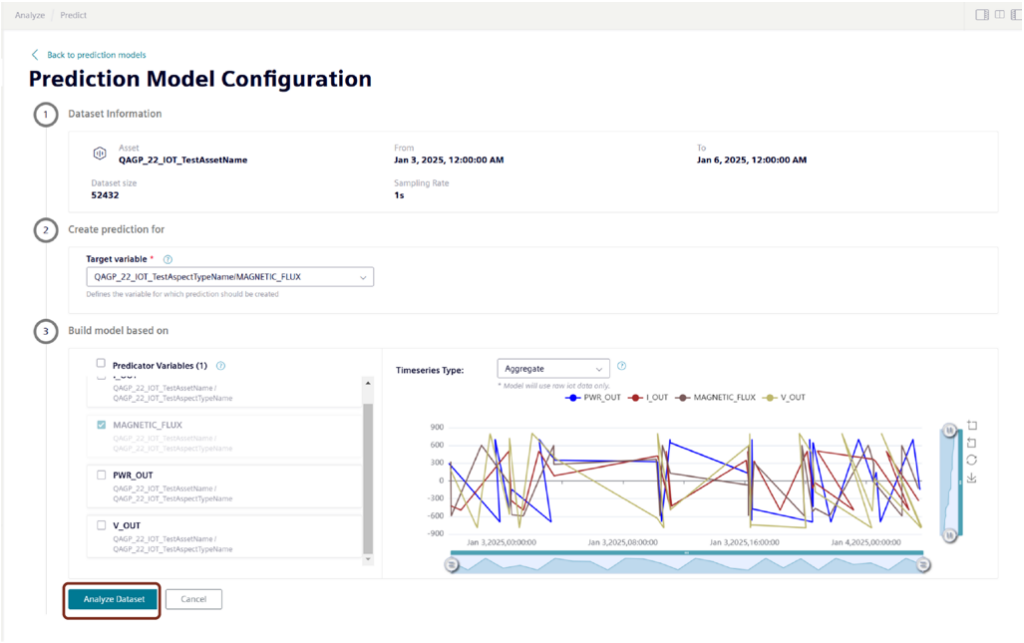
The "Prediction" category offers automated modeling capabilities for forecast and regression use cases as part of Predict offering, which offers out-of-the-box modeling using advanced machine learning technologies.

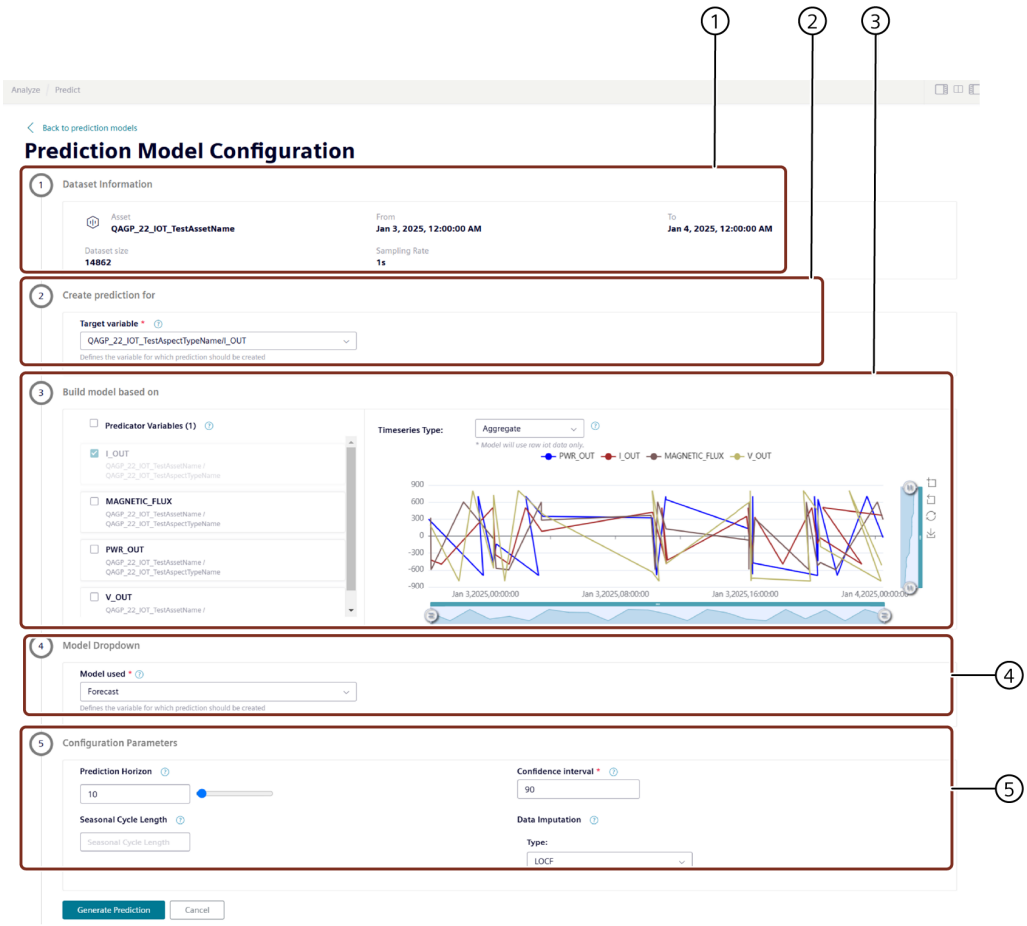
Forecast use case is to predict future multiple time series values for example pressure on every minute in next a few hours. Such use case considers the seasonality and pattern from the time series data. In industrial scenarios, it could contribute to condition monitoring continuously on some key machine datapoints collected from sensors.

Regression use case is to identify the correlations between independent predictors and dependent target and predict the target value via the values of those predictors. The predictors are mainly collected from sensors, machine configurations, production process data, etc. and target is usually like machine health measurement, remaining useful life, failures indicator, etc. Predict could leverage data from asset as dataset and does easy configuration for model building and execution. It also visualizes prediction results which could be further utilized for your targeted use cases like comparing with threshold value, reviewing historic prediction records for model selection.

User interface

The following figure shows the "Prediction" screen:





① Dataset information
② Select the target variable for creating the prediction
③ Select predictor variables and timeseries type and click "Analyze dataset"
④ Select the recommended model type or choose the model type
⑤ Select the Configuration parameters

Generating the Prediction model

To generate the prediction report, proceed with the following steps:

1. Open "Predict" in the "Analyze" section.

2. Select the required "Use case" and click "Prediction Jobs".

3. Select the targeted variable of your choice.
The forecast prediction is prepared for the selected target variable.

4. Select the input variables of your choice.

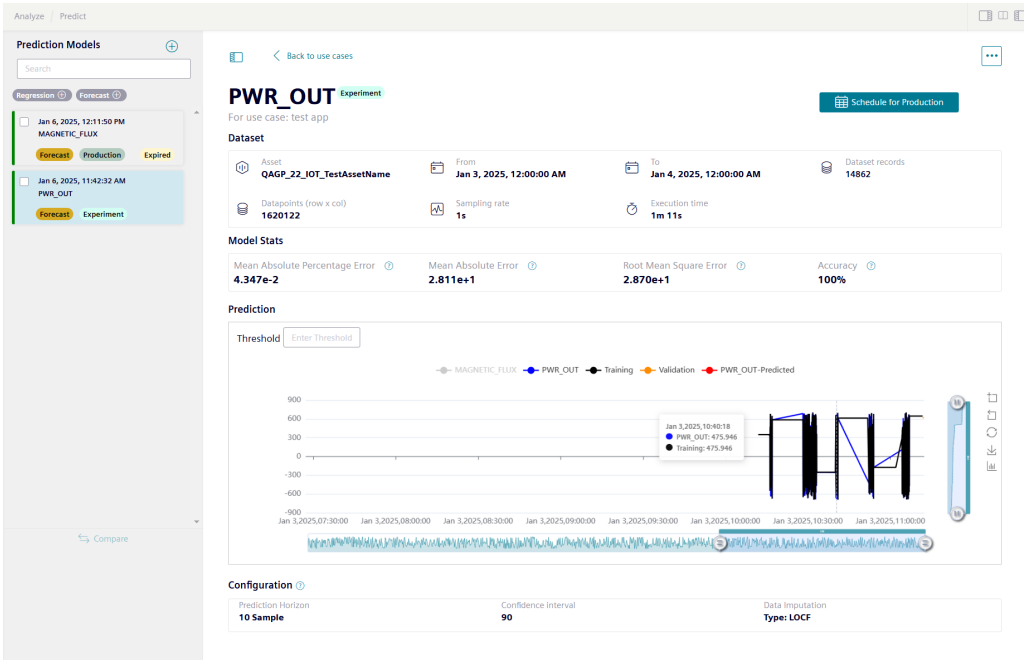
5. Click on "Analyze Dataset", to display the model used for the selected target variable. You also have the option to change the model.

6. Configure the below settings to generate the prediction report.

    - Prediction Horizon: Number of samples or time period in the future for forecasting

- Confidence Interval: A measurement of percentage to represent the confidence level
- Seasonal Cycle Length: Number of time intervals in one complete Seasonal pattern

7. Click "Generate Prediction".

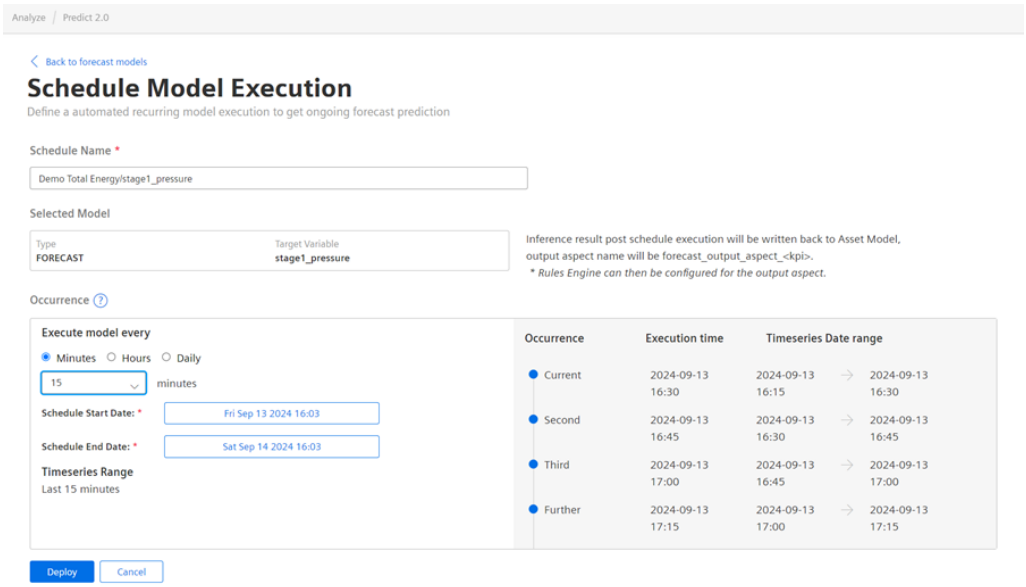


Scheduling the Prediction for production

It is possible to plan and schedule the production of the forecast or regression model which can be executed and evaluated on the frequent intervals as per the preferred time range.
To schedule the production run of the forecast or regression model, proceed with the following steps:

1. Open "Predict" in the "Analyze" tab.
2. Select the "Use Case", and click "Predictions".
3. Select the preferred model from the list of available models.
4. Click "Schedule for production".
5. Select the preferred frequency for executing the models.
6. The forecast or regression models can be executed as per the below intervals:
   - Minutes
   - Hourly
   - Daily
   - Weekly
7. Select the preferred date range.

8. Click "Save".



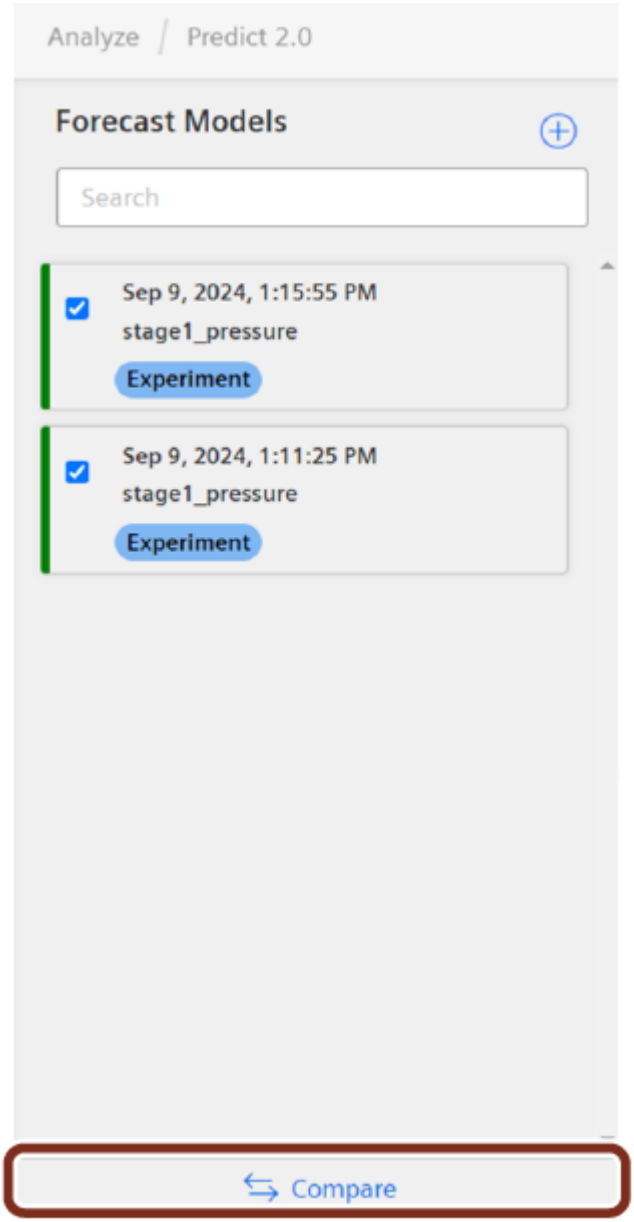
Once the prediction is scheduled for production, the prediction reports are generated as per the schedule. The generated prediction report can be used to predict the future data for the selected variables of the asset. To view the prediction report, click "Production forecasts" and select the preferred report from the "detail result for prediction execution" drop-down.

Saving the Prediction report in IoT store

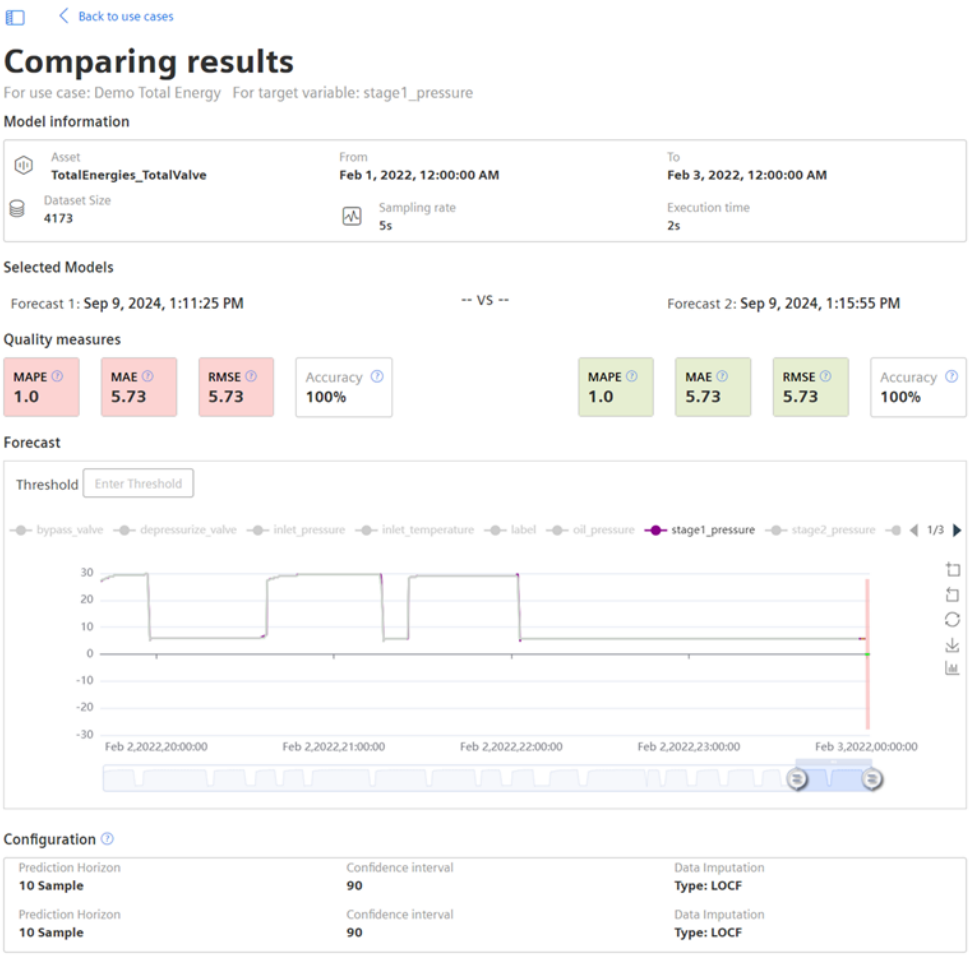
Once the prediction reports are generated as per the schedule, the aggregates (mean, min and max) are calculated based on the forecast prediction results. This report containing aggregated data is uploaded back into Insights Hub IoT store. Rules engine can be configured to generate events based on prediction results.

Comparing the Prediction report

Once the prediction report is generated, you can make the required changes in the "Prediction Configurations" and click "Regenerate Prediction" and compare the two reports.
To compare the prediction reports, select the required prediction reports and click "Compare".



The following figure shows the comparison of the two forecast reports:



Deleting the Prediction Reports

To delete the prediction reports, select the required prediction reports from the list, click ··· and select "Delete".

Anomaly Detection 5

Anomaly Detection

The "Anomaly Detection" category offers automated modeling capabilities for identifying the variations in your time series data as part of Predict offering using advanced machine learning technologies.

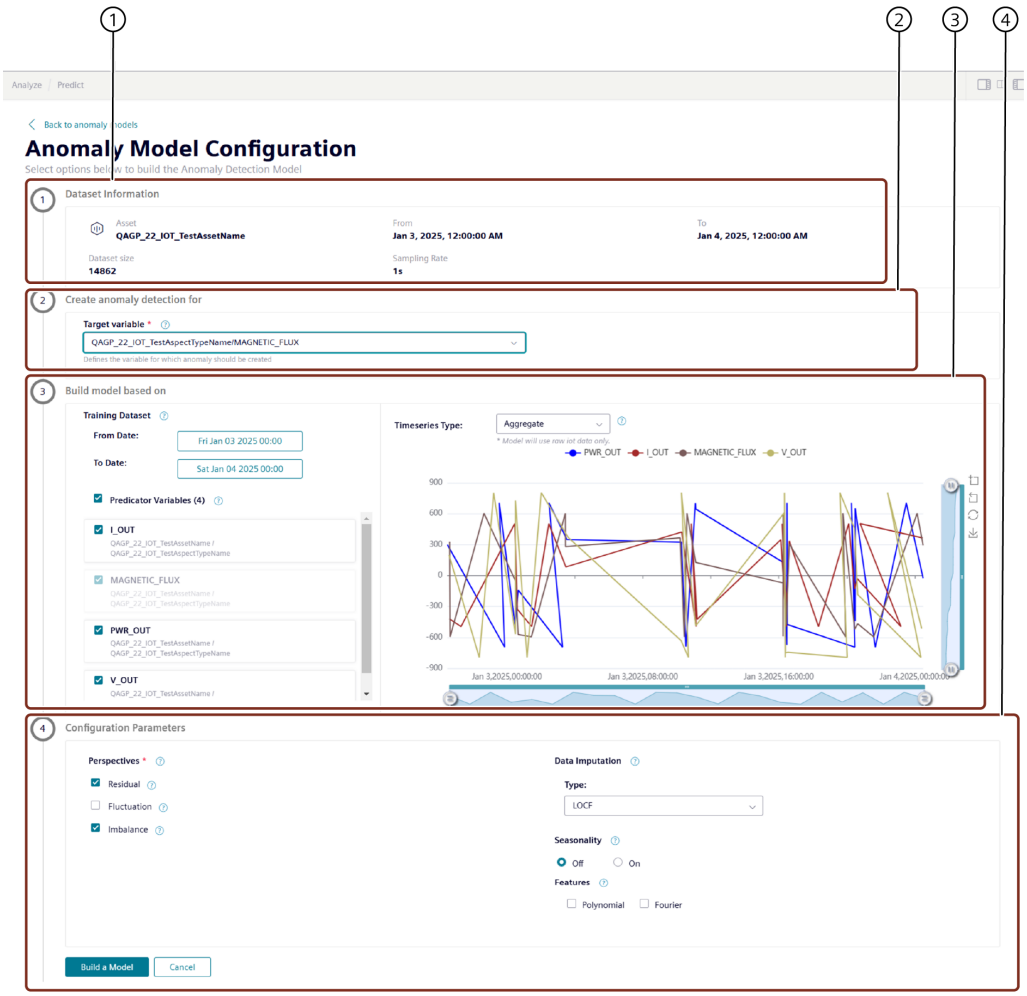
Anomaly detection use case is to learn from the normal behaviors of your data and identify the anomalous datapoints from multiple perspectives. In industrial scenarios, it could contribute to monitoring continuously the anomalous behaviors from sensors which could give early alerts to avoid more serious malfunctions in the near future.

Anomaly Detection could leverage data from asset as dataset and performs easy configuration for model building and detection of anomalies.

It could visualizes the anomaly spots, indicators, which could be further utilized for your targeted use cases like comparing with threshold value, reviewing historic records.

User Interface

The following image shows the Anomaly Detection screen:



① Displays the Dataset information

② Displays the variable for which anomaly needs to be created

③ Data visualization area

④ Displays the configuration parameters

Building the Anomaly Detection model

To build the anomaly detection model, proceed with the following steps:

1. From the "Analyze" tab, click "Predict".

2. Select "Use Case", and click "Anomaly Detections".

3. In the "Training Dataset" section, select the "From Data" and "To Date" as the time period required for the training dataset for the model building.

4. Select the "Predicator Variables" and the "Timeseries Type".

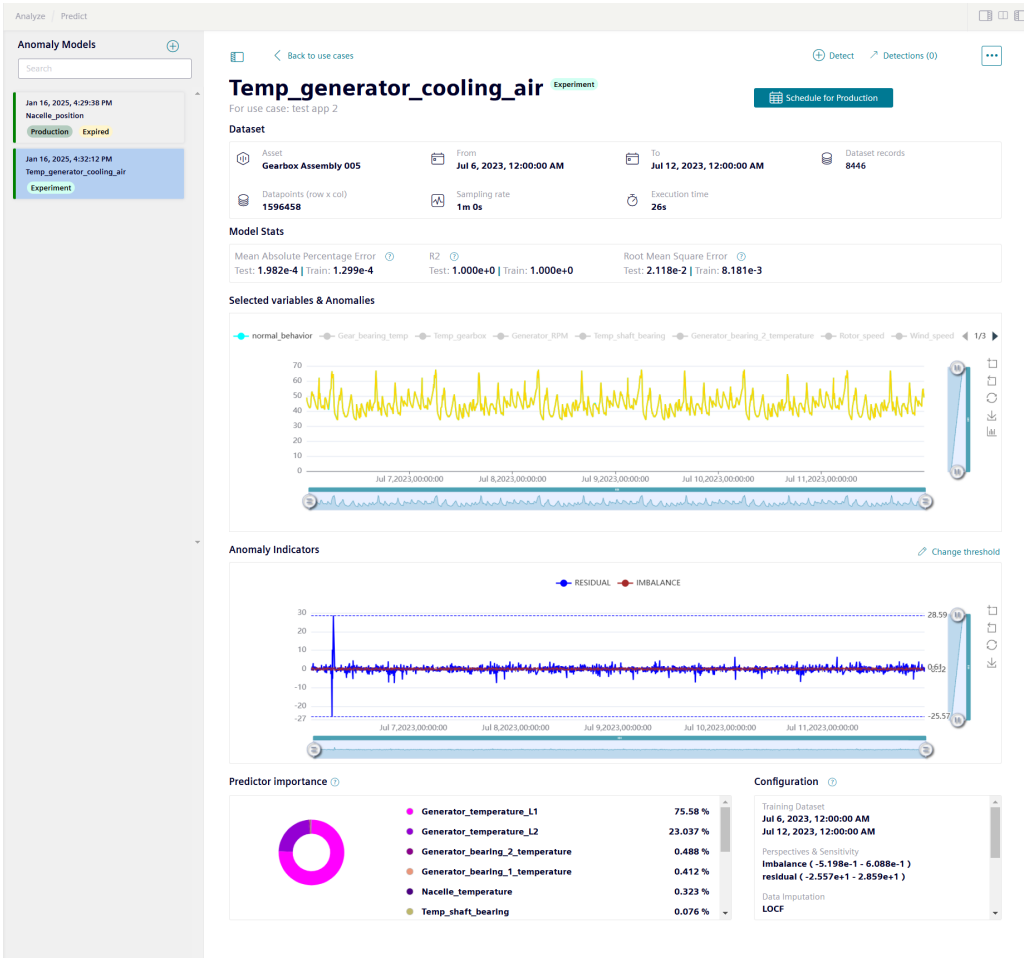
5. Configure the "Perspective" settings:

   - Residual: Detects the residuals with significantly higher magnitude than those observed on the in-sample period as anomalous.

- Fluctuation: Anomalous behavior model detects anomalies if different fluctuations are observed than those which were present during the in-sample period.
- Imbalance: The imbalance perspective helps to detect anomalies accompanied by deviation of the residuals output from zero for a longer period of time.

6. Configure the "Data Imputation" setting by selecting the type from the drop-down.
7. For "Seasonality", click "On" or "Off" to enable or disable the seasonality.
8. Select "Polynomial" or "Fourier" to configure the type of "Feature".
9. Click "Build a model".

The generated anomaly model can be used to visualizes the anomaly spots, indicators.



Change Threshold

1. Click on Change threshold to change the sensitivity. User can change the threshold for a specific perspective and preview the results.
2. Once satisfactory results are shown, aka user is happy with the anomalies based on sensitivity then click on save to persist updated model configurations.
3. Now, updated thresholds will be used for inferences.

Schedule the Anomaly model for production

It is possible to schedule the production of the anomaly model which can be executed and evaluated on the regular intervals as per the preferred time range.

To schedule the production run of the anomaly model, proceed with the following steps:

1. Open "Predict" in the "Analyze" tab.
2. Select the "Use Case", and click "Anomaly Detections".
3. Select the preferred model from the list of available models.
4. Click Schedule for production.
5. Select the preferred frequency for executing the models.

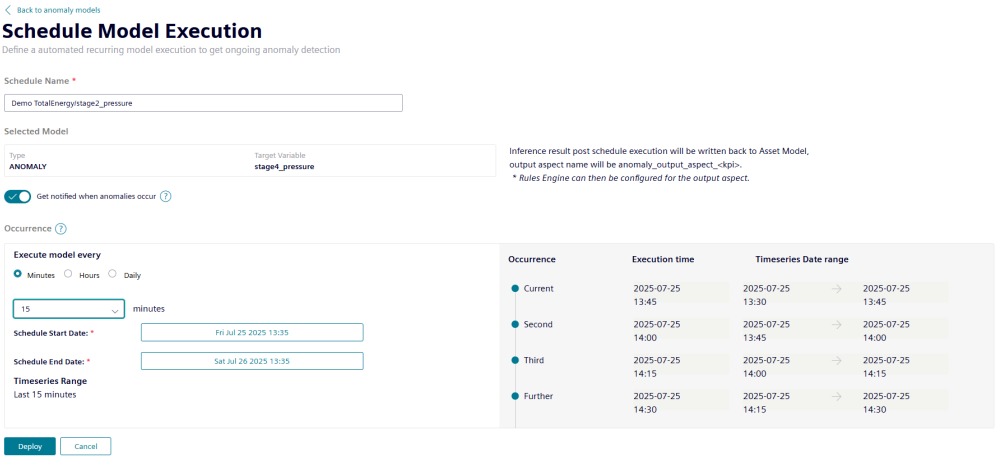
The anomaly models can be executed as per the below intervals:

- Minutes
- Hourly
- Daily
- Weekly

6. Select the date in the "Schedule Start Date" and "Schedule End Date".

7. Enable 'Get notified when anomalies occur' button for seamless rules engine integration and getting notified.

8. Click "Deploy".

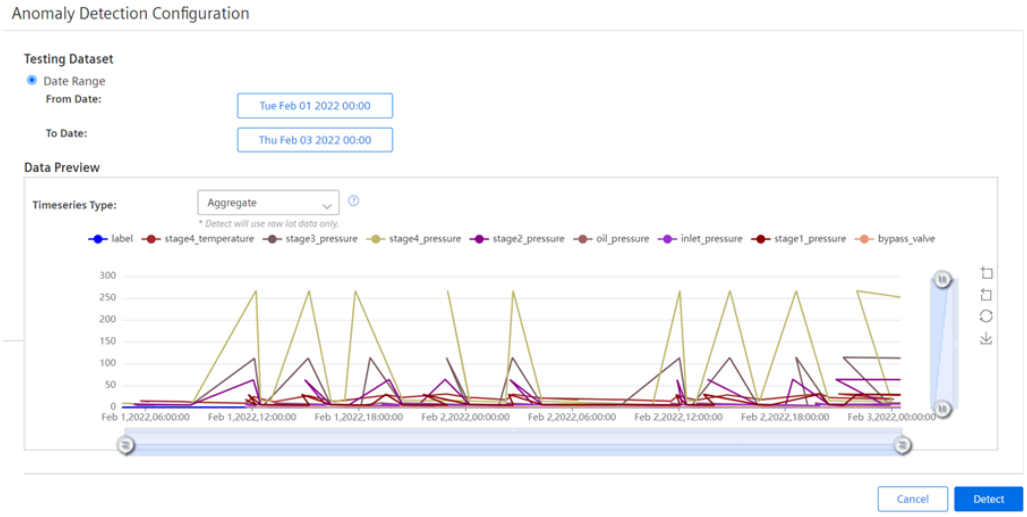


Anomaly Detection Results

Once the anomaly detection is scheduled for production, the anomalies are generated as per the schedule. The generated anomalies can be used to analyze the data for the selected variables of the asset. To view the anomaly detection, click "Production Detections" and select the preferred anomaly detections from the "Detail result for anomaly execution" drop-down.

Detecting Anomalies

Once the model for anomaly detection is built, configure the "Testing Dataset" setting, the time period to execute the anomaly detection. Click "Detect" to start detecting the anomaly spots for the selected dataset.



Once the Anomaly detection is completed, the anomaly spots are displayed as shown below:

① Displays the selected variables and anomalies

② Displays the anomaly indicators as per the perspectives

③ Displays the top predictors

④ Displays the anomaly detection configuration details

Delete anomaly detections

To delete the generated anomaly detections, select the anomaly detections from the list, click ••• and select "Delete".

Limitations 6

Predict 2.0 Plugin Limitations

This section describes the limitations of the Insights Hub Predict 2.0 Plugin:

Default

- Limited to 20 Forecasts per month. Purchase Forecasts upgrade package to add additional 200 forecasts.
- Limited to 20 anomaly detections per month. Purchase anomaly detections upgrade package to add additional 200 anomaly detections.
- Maximum 1 Million datapoints (number of rows x number of variables) are allowed per dataset.

Rules

- No special characters are allowed in use case "name" and "description".