

# Bring the power of Machine Learning to the Industrial Edge

EcoStruxure™ Autonomous Production Advisor –  
Rod Pump Analytics Application

## Unique features

### Fast return on investment

50 barrels per day @ \$55/barrel

### Production optimization

+3% yields \$27k per well  
Operators can identify "optimal" pump speeds from models

### Pump failure prediction

+4-5 days yields \$100k savings  
Advanced notification means improved scheduling

### Improving downtime

+2% yields \$19k per well  
Abnormal pump pattern recognition raises events status prior to automatic shutdown

The EcoStruxure Autonomous Production Advisor with the Rod Pump Analytics Application gives field operators and production engineers the ability to monitor the behavior of their pumps in real-time, where an ensemble of Machine Learning models recognize and identify the downhole Dynacard shape directly at the Edge device.

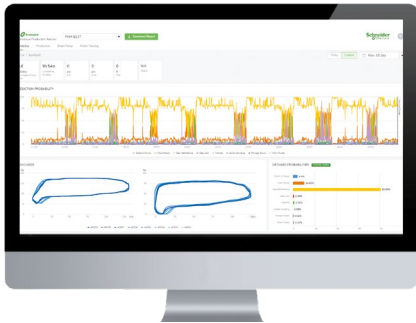
The cloud-based user interface allows operators to monitor the results of Dynacards recognition in real-time along with other Rod Pump parameters that are required to assess the overall performance of the Artificial Lift system.

- A dynamic user interface for monitoring results of the Dynacard recognition Machine Learning model
- Ability to re-train Dynacard clusters with low prediction probability
- Aggregates, helps secure, analyzes, and relays data from any Rod Pump controller and/or VSD at the Edge of the network
- Uses a small Hardware platform to run applications and machine learning models locally at the Edge

## Benefits

- Maximize the value of legacy automation investments
- Reduce unplanned downtime and operating costs through machine learning based Dynacard recognition
- Maximize throughput/production by identifying optimal pump speed
- Manage environmental impact (energy consumption / emissions)
- Extend asset lifetime through predictive maintenance
- Capture expertise and domain knowledge through augmented intelligence model training

# Autonomous Production Advisor – Rod Pump Analytics Application user interface



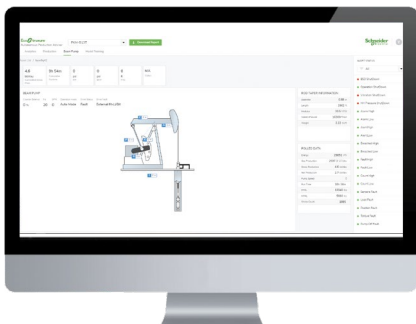
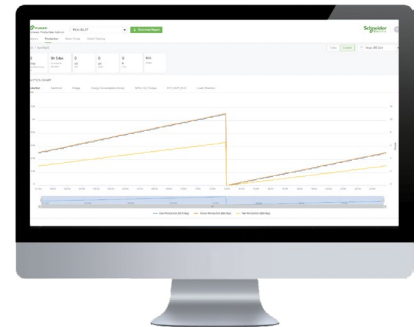
## Analytics tab

The Rod Pump Analytics Tab allows operators and production engineers to track the Dynacard recognition in real-time. For every downhole Dynacard that is generated by the Rod Pump Controller, the Machine Learning models analyze the shape and provide a weighted probability of the Dynacard recognition.

Dependent on the speed of the pump, the Analytics Tab also displays a forecasted Dynacard shape based on the last 10 downhole Dynacards. This feature is enabled with the purchase of the Dynacard Forecast Module and runs locally on the Edge device.

## Production tab

The Production Tab displays streaming data which includes instrumentation, production, electrical, and down-hole information. The data availability is dependent on the Rod Pump Controller with which the Edge device interfaces at site. Users can also browse through historical time-series data.



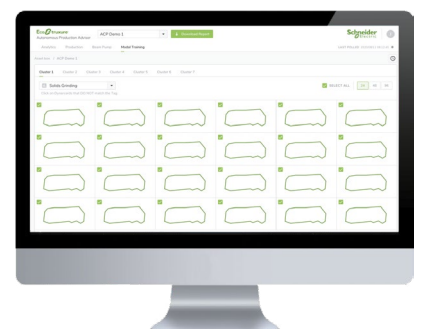
## Beam Pump tab

The Beam Pump Tab provides the following snapshot information:

- Pump physical dimensions
- Run and cumulative production status
- Rod taper information
- Alarms and Events

## Model training tab

Under the Model Training Tab, operators and production engineers can re-train the Dynacard Recognition model by labelling the cards which have a low card recognition probability. Based on a pre-set probability threshold, Dynacards that are below the threshold are pooled into similar clusters, where the user labels the clusters, which in turn re-trains the Dynacard Recognition model. The model re-training is done automatically, and the updated model is pushed to the Edge device.



# Autonomous Production Advisor – Gateway 101

The Gateway 101 is an Edge Compute device that enables Edge Analytics and Machine Learning Model deployment close to industrial assets.

The Gateway is fully managed by the EcoStruxure Autonomous Production Advisor (APA) platform, where users can control application deployment and hardware provisioning tasks to manage a fleet of Edge Gateways.

The Gateways are delivered with the Ubuntu 18.04 LTS operating system and a preconfigured software environment that allows for the deployment of applications through the APA platform.

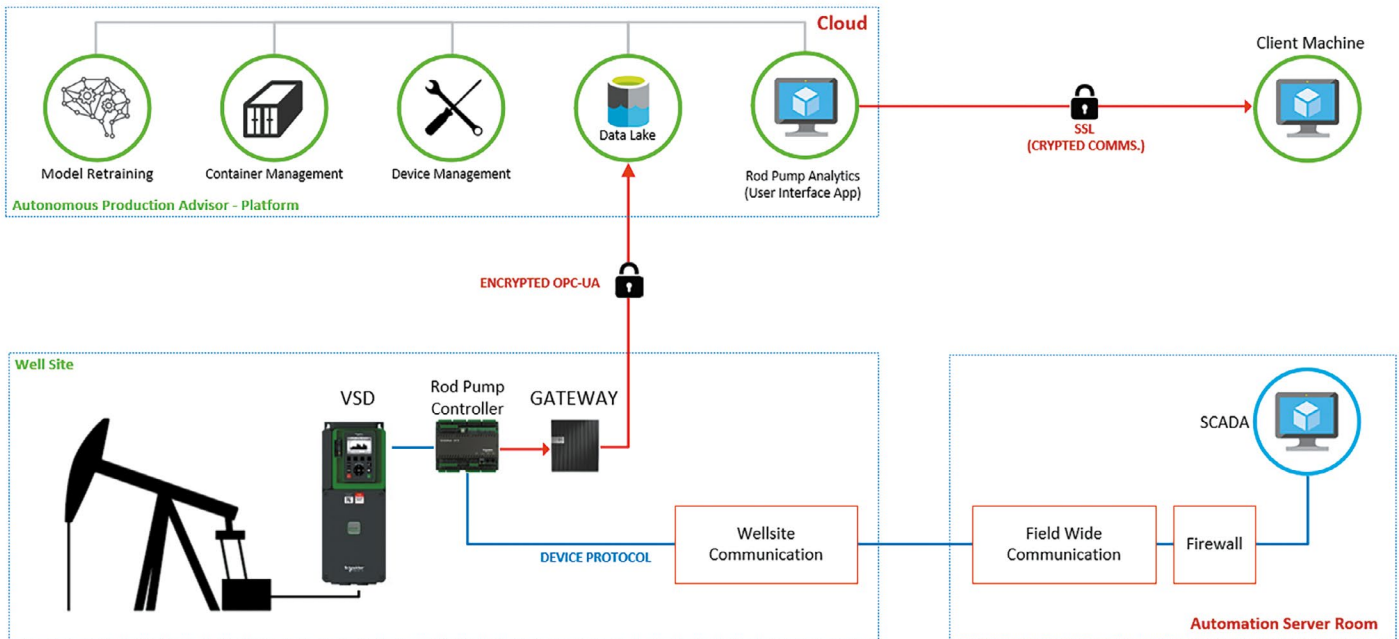
\*For more information, download the EcoStruxure Autonomous Production Advisor – Gateway 101 data sheet and ordering guide.



## Typical architecture

Once the Gateway 101 and the appropriate Rod Pump Analytics license is purchased, the hardware is shipped with the necessary Rod Pump Controller driver, along with the embedded Machine Learning models. The Gateway 101 will work out-of-the-box and will require interface with an existing Rod Pump Controller either over TCP or Serial link.

\*For more information on how to power-up, install, and connect the Gateway download the Autonomous Production Advisor Gateway User's Guide.



## How to order

The Rod Pump Analytics Application runs on the Gateway 101. The appropriate Gateway model can be selected from the datasheet referenced above. When ordering the hardware, specify the Rod Pump Controller or Variable Speed Drive with which the Gateway 101 will interface, and Schneider Electric will provide the relevant protocol driver.

Gateway 101 models with built-in Cellular Modem do not come with data SIM cards. Discuss with your Schneider Electric sales representative if you want the SIM Card to be included with the Gateway 101.

## Rod Pump Analytics Application – subscription license

The Application subscription is available through an “as-a-service” model. Contact your Schneider Electric sales representative to discuss the subscription license options.

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**Schneider**  
Electric

Schneider Electric  
70 Mechanic Street  
Foxboro, MA 02035  
Toll free: + 1 877 342 5173  
[se.com/processautomation](https://se.com/processautomation)