

ProductionManager™ Equipment Module



Product Overview

ProductionManager™ Equipment Module (PMEQ) is the foundational application of the ProductionManager EDGE® suite. It enables you to define, build, monitor, track and diagnose the equipment installed on your upstream production site. Equipment Module allows for operational analysis and diagnostics of onsite equipment, providing a standardized data model that facilitates connectivity for edge, cloud or on-premise SCADA and IIoT.

Once your equipment is configured in Equipment Module, you can expect seamless integration with all other applications across the suite. Since Equipment Module is object-oriented, it allows you to quickly locate relevant information you need to get the job done.

Features

■ Easy Configuration

Equipment Module has a simple, one-time setup. This intuitive system was designed based on feedback from customers just like you for maximum ease-of-use.

■ Flexible Equipment Definitions

Individual objects can be configured per your design standards, including:

- Wells
- Separators
- Tanks
- Aggregates
- Trains
- Compressors
- Flares
- User-defined objects.



Emerson Impact Partner



■ Message Center

This application displays notifications from all ProductionManager EDGE Suite applications in a readable, centralized location. It allows you to view the last 32 events, where results are sorted by application.

■ Tank Inventory

Supports fully API compliant tank strapping tables to calculate fluid inventory based on level for both interfaced and non-interfaced tanks.

■ Equipment Integration

You can combine common objects such as:

- Wells, separators and aggregates into a production train
- Tanks into an aggregate
- Aggregates into larger aggregates.

■ Tank Venting

Tracks pressure venting and vacuum breaking events on tanks providing device open cycles and seconds. When using Enardo™ Pressure Relief devices, will also calculate estimated vent and vacuum volumes (requires an Enardo Vent Volume Analytics license).

User Interface

Equipment Module is accessed utilizing FBxConnect™ software, a Microsoft® Windows® based program created to configure, monitor and service Emerson's FB3000 RTU and applications. Equipment Module's graphical user interface allows you to easily define, build, monitor, track and diagnose upstream production site equipment. Configurations are represented visually within the application. You can easily view data and reports, making changes and adjustments as required.

Connectivity/Requirements

- FBxConnect™ access
- FB3000 RTU
- PMEQ licensing
- Local connectivity via USB, serial or Ethernet**

**If you already have a method to connect to the FB3000 RTU remotely for SCADA access, you can use FBxConnect™ and that same remote link to connect to PMEQ and all other apps in the ProductionManager EDGE suite. Once connected, you can access all features, including editing objects, selecting auto adjustment parameters, setting alerts, reporting, diagnostics and more.

Configuration

Global Settings

These settings are applied in Equipment Module as well as the rest of the ProductionManager EDGE Suite.

ProductionManager EDGE Global Settings

ProductionManager EDGE Global Settings | System Diagnostics | Application Data

Object Instances

Number of Wells :	7
Number of Separators:	16
Number of Tank Strapping Tables:	21
Number of Tanks:	21
Number of Oil Aggregates:	8
Number of Water Aggregates:	8
Number of Production Trains:	7
Number of Compressors:	1
Number of Flares:	1
Number of User Defined Objects:	36

Contract Hour

Contract hour for gas : 9

Contract hour for liquids : 0

Rollover

Rollover for PM EDGE Running Accumulators:
1000000000000

Ambient Temperature

Temperature Ref: System_1.CPU_TEMP

Temperature: 111.65 deg F

Global Shutdown Option

Global Shutdown Status: 0

Effect: PMscEffect_1

Application Watchdogs

PM Equipment Manager:	31172	PM Chemical Manager:	0
PM Fluid Logistics:	4643	PM Surface Controls:	4644
PM Well Optimization:	4640	PM Well Test:	19833

Units

Time General: sec

Short Linear Distance: in

Long Linear Distance: ft

Meter Differential Pressure: in wc

Pressure: psi

Temperature: deg F

Tank Pressure: ounces/sq-in

Tank Relief Setpoint: ounces/sq-in

Gas: Mcf day Mcf/day

Liquid: bbl day bbl/day

Mass: lb hr lb/hr

Oil Density: API grav

Water Density: lb/ft³

Velocity: ft/min

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Message Center

Centralized repository of events and alarms from other ProductionManager EDGE suite applications as they interact with Equipment Module objects. Allows you to see current state as well as previous events and alarms.

Message Center

Shutdown Status

32 Bit Shutdown Status: [Field] Clear

Shutdown Effect Message Center

Time Stamp: [Field] Operational Message: [Field]

PM Well Testing Message Center

Time Stamp: 13-Jan-2021 16:04:04 Operational Message: Pre-Purge

Alarm Message: No Alarms Current Alarm: 0 Alarms Available: 0

PM Well Optimization Message Center

Time Stamp: 13-Jan-2021 16:05:02 Operational Message: Assisted Lift

Alarm Message: No Alarms Current Alarm: 0 Alarms Available: 0

PM Fluids Logistics Message Center

Time Stamp: [Field] Operational Message: [Field]

Alarm Message: [Field] Current Alarm: 0 Alarms Available: 0

PM Chemical Manager Message Center

Time Stamp: [Field] Operational Message: [Field]

Alarm Message: [Field] Current Alarm: 0 Alarms Available: 0

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Well Operate

Displays current pressures, valve statuses, flow rates and volumes. *Hyperlinks* will open detailed pop-ups.

Well Operate

Tag: Isabella Well Enabled
Description: Well 5

Surface Tubing: 710.0 psi
Surface Casing: 750.0 psi
Intermediate Casing: 965.0 psi
Bumper Spring Depth: 14000.0 ft
True Vertical Depth: 14000.0 ft
Bottomhole Pressure: (Live) 1280.0 psi

SSD OPEN
Flow Line: 682.0 psi

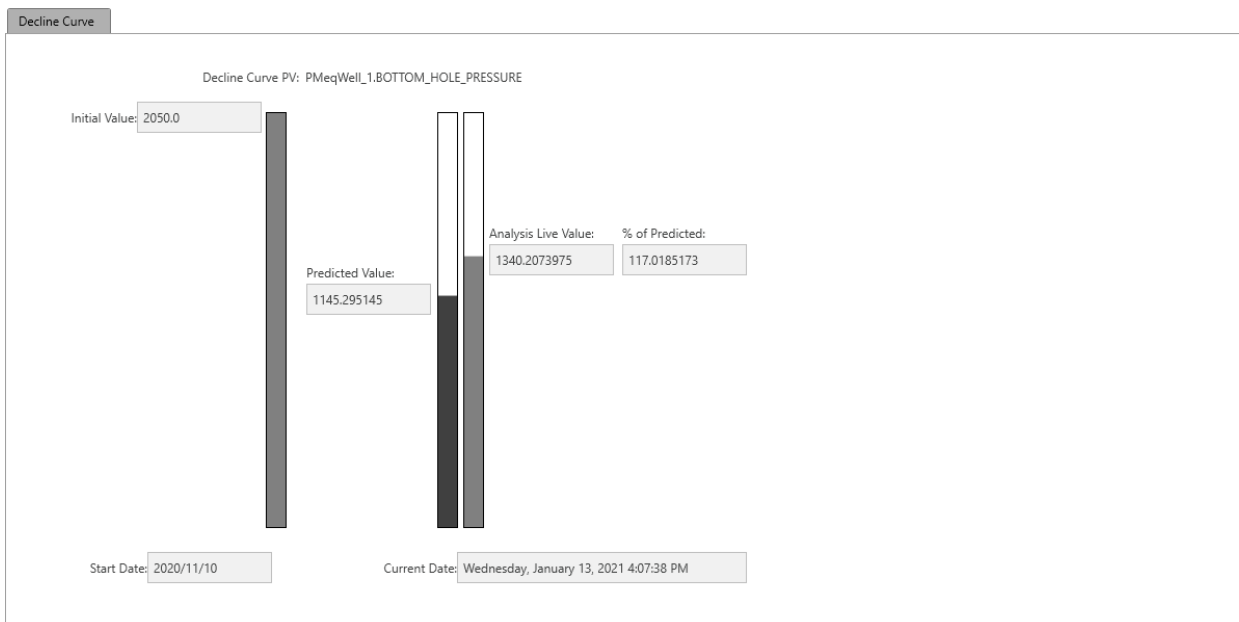
Production Valve
Open Pos: 88.0 %
Setpoint: 1800.0
PID Mode: Auto
Control: Local

Gas(Isabella 3-Phase)		Units			
Diff Pressure	88.0		in wc		
Static Pressure	410.0		psi		
Temperature	82.0		deg F	HydroCarbon	Units
Rate	1640.94	Mcf/day		90.52	bbl/day
Today	1100.57	Mcf		60.71	bbl
Yesterday	1640.94	Mcf		90.52	bbl
This Month	20750.26	Mcf		1144.91	bbl
Previous Month	46922.98	Mcf		2591.42	bbl
Running Accum	68761.16	Mcf		3796.42	bbl

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Decline Curve Analysis

Displays the calculated predicted value, the current live value and the percent of live versus predicted.



Separator Operate

Allows viewing current pressures, temperatures, flow rates and volumes. Supports advanced diagnostics of flow rates based on configurable flow validation.

Separator Operate

Tag:

Description:

Pressure: psi

Temperature: deg F

Gas: Mcf/day

Liquid Hc: bbl/day

Water: bbl/day

Separator Enabled

Gas: Mcf/day

Liquid Hc: bbl/day

Water: bbl/day

Accumulators

	Gas Meter		Liquid Hc Meter		Water Meter (Water Leg)				
Units:	Mcf/day	Secs	Invalid Volume Included in Total	bbl/day	Secs	Invalid Volume Included in Total	bbl/day	Secs	Invalid Volume Included in Total
Rate:	2135.9262811			32.058208			34.56		
Today:	775.1352761	970	12.9284117	37.5522808	970	0.6260209	20.2098	970	0.337
Yesterday:	1128.0605202	1440	18.8168364	56.008987	1440	0.9339875	29.9698	1440	0.49948
Month:	13246.9787023			678.6949898			384.8738		
Previous Month:	28853.6672536			1579.8948955			862.7715		
Running Accum:	42780.2345269			2293.0734345			68846.1625959		

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Train Operate

Allows viewing all assigned equipment configured for the train in a combined view. All associated flow rates and volumes are totaled in this view, including aggregate tank fill percent and stock.

Train Operate

Tag:

Description:

Train Enabled

Isabella Oil Agg

Oil Stock: bbl

Fill Percent: %

Isabella Water Agg

Water Stock: bbl

Fill Percent: %

Flow Rates and Accumulators

	Gas		Oil		Water	
Rate	1640.936082	Mcf/day	90.5156361	bbl/day	34.56	bbl/day
Today:	1106.0744855	Mcf/day	61.013196	bbl/day	23.296	bbl/day
Yesterday:	1640.936082	Mcf/day	90.5156361	bbl/day	34.56	bbl/day
Month:	20755.7667366	Mcf/day	1145.2103235	bbl/day	437.1404	bbl/day
Previous Month:	46922.9839904	Mcf/day	2591.4218043	bbl/day	988.5388	bbl/day
Running Accum	68766.6721178	Mcf/day	3796.7213102	bbl/day	1967.465	bbl/day

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Tank Operate

Allows viewing of current inventory of interfaced or non-interfaced oil or water tanks, including quick open/close status and daily totals of venting devices.

Tank Operate

Tag:

Description:

Account Code:

Thief	Today
Cycles:	17
Secs Open:	112
Closed:	0.7 Mcf

PVRV	Today
Cycles:	18
Secs Open:	213
Open:	0.2 Mcf

EPRV	Today
Cycles:	17
Secs Open:	161
Closed:	18.8 Mcf

Tank Fluid Statistics

Surface Level: ft Ft In /4

Tank Capacity: bbl

Liquid Volume: bbl %

Tank Pressure: oz/in2

Liquid Temperature: deg F

Tank Oil Statistics

Oil Level: ft Ft In /4

Oil Volume: bbl

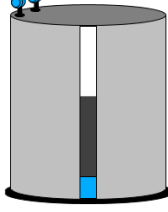
Oil Aggregate Assignment: [Tester 1 Oil Agg](#)

Tank Water Statistics

Water Level: ft Ft In /4

Water Volume: bbl

Water Aggregate Assignment: [Tester 1 Water Agg](#)



Interfaced Oil Tank

Train Assignment: [Tester 1](#)

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Tank Pressure Relief Statistics

Reports daily, monthly, and accumulated cycles, open seconds and vent and vacuum volumes.

Pressure Relief Statistics										
Featuring Enardo™ Estimated Vent and Vacuum Flow Volume Calculations										
Thief Hatch										
Enardo ES-660-HF	Flow Rate		Today	Yesterday	Month	Prev-Month	Accum	Units	Set Pressure	Units
Cycles			18	48	621	21589	24124	Cycles		
Seconds Open			118	312	4026	141765	157271	Seconds		
Estimated Vent Volume	0.0	Mcf/day	0.74	1.98	16.36	183.66	212.12	Mcf	12.0	oz/in2
Est Vacuum Volume	0.0	Mcf/day	0.53	1.38	15.75	464.04	520.84	Mcf	- 3	oz/in2
Pressure/Vacuum Relief										
Enardo ES-900-SO	Flow Rate		Today	Yesterday	Month	Prev-Month	Accum	Units	Set Pressure	Units
Cycles			18	48	621	21593	24130	Cycles		
Seconds Open			226	600	7749	273049	303786	Seconds		
Estimated Vent Volume	0.0	Mcf/day	0.21	0.56	7.16	253.53	280.5	Mcf	8.0	oz/in2
Est Vacuum Volume	0.0	Mcf/day	0.18	0.48	6.17	215.86	241.13	Mcf	- 1	oz/in2
Emergency Pressure/Vacuum Relief										
Enardo 2500	Flow Rate		Today	Yesterday	Month	Prev-Month	Accum	Units	Set Pressure	Units
Cycles			18	48	621	21590	24126	Cycles		
Seconds Open			172	456	5887	206532	229654	Seconds		
Estimated Vent Volume	0.0	Mcf/day	21.14	56.36	725.41	25638.52	28375.79	Mcf	10.0	oz/in2
Est Vacuum Volume	0.0	Mcf/day	1.48	3.89	50.02	1749.63	1954.42	Mcf	- 2	oz/in2

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Strapping Table

API-compliant strapping table that can be assigned to single tanks or re-used on multiple tanks. Supports multiple zones, multiple measurement increments and multiple volume measurement types.

Strapping Table

Tag: Oil Tanks
Description: 15' - 301 Bbls

Strapping Table

Enable Lease Tank ID Number: 0 Strap Date: (YYYYMMDD) 20201110 Strap Ref. Temperature: 60.0 deg F

Tank Shell Material: Mild Carbon Tank is Insulated Ambient Temperature: 111.6500015 deg F

Height Increment: 1/4 Inch Volume Unit: Barrel Valid Zones: 6

Table Zones:	Feet	Inches	1/4 Inches	# Increment	End Increment #	I-Factor	Accum Volume
Zone 0							0.0
Zone 1	1	0	0	48	48	0.4196	20.1408
Zone 2	1	4	0	16	64	0.4205999	26.8704
Zone 3	3	0	2	82	146	0.4196	61.2776
Zone 4	5	0	2	96	242	0.4179	101.396
Zone 5	10	1	0	242	484	0.4179	202.5278
Zone 6	15	0	0	236	720	0.4182	301.223

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Aggregate

Combine tanks into a single group object to provide total stock inventory of a fluid type. Aggregates can also be combined to provide totalized inventory.

Oil Aggregate Operate

Tag: Tester 1 Oil Agg Account Code:

Description: Oil Aggregate 1 Assigned Tanks: Tank_1

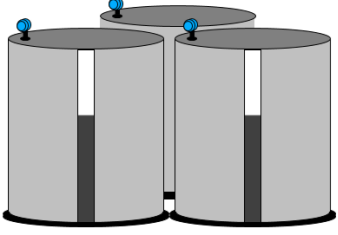
Assigned Aggs: None

Aggregate Statistics

Aggregate Capacity: 236.4287 bbl

Current Stock: 146.8372345 bbl 62.11 %

Assigned Train: [Tester 1](#)



Oil Aggregate Enabled

Water Aggregate Operate

Tag: Tester 1 Water Agg Account Code:

Description: Water Aggregate 1 Assigned Tanks: Tank_1

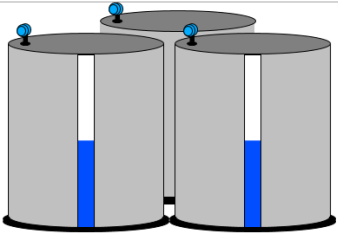
Assigned Aggs: None

Aggregate Statistics

Aggregate Capacity: 876.5466 bbl

Current Stock: 440.8840218 bbl 50.3 %

Assigned Train: [Tester 1](#)



Water Aggregate Enabled

Compressor Operate

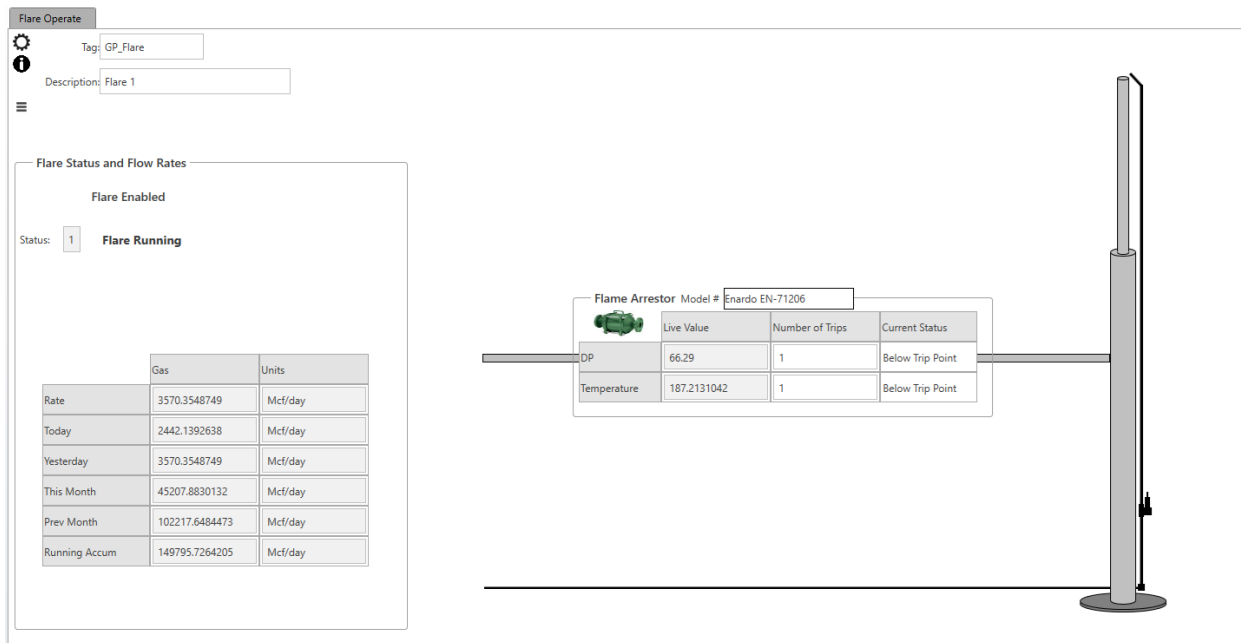
Displays compressor Run/Stop status.



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Flares

Displays flare status, flow rates and volumes and includes diagnostics for Flame Arrestors.



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User-Defined Object

Allows you to create a custom object for monitoring other equipment not included in objects above.

Note: More object types to be added in future releases.

User Def Operate

Tag: GP_VRU

Description: User Defined 1

Values

User Defined Object Enabled

Status-1	VRU Run Status	1
Status-2	VRU Filter Status	0
Value-1	Vent PSI	6.75
Value-2	VRU Flow Rate	0.0

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How Will Equipment Module Benefit Your Operation?

If optimizing well production in the field or behind a desk is important to you, Equipment Module can be of great benefit.

- **Field Operations**
Ease-of-use and configuration, measurement, current operating status, production optimization
- **Facility Engineers**
Standardized deployment of equipment and facilities
- **Production/Reservoir Engineers**
Better reservoir management through captured data and well analytics
- **Management/HSE/Accounting**
Safety controls, standardization, custody transfer measurement and log retrieval
- **SCADA/IT Administration**
Standardized data model provides consistent access to optimization, analytics and operational parameters

Support

- Help desk support is available 24/7.
- Training classes are offered year-round.
- Onsite configuration assistance is available upon request via your local Emerson Impact Partner.

ProductionManager EDGE® Suite

The ProductionManager EDGE® suite of applications is designed to provide standardized yet flexible solutions to common processes in the Oil & Gas production field. The suite is designed to assist with managing the lifecycle of the well (from flowback to abandonment), managing well testing for allocation purposes, and complete fluids management from well-to-sell. This comprehensive suite of applications has been enhanced by input from Major and Independent E&P companies alike, and utilized in North America for over 20 years with tremendous success.

ProductionManager™ Equipment Module (PMEQ)

The ProductionManager Equipment Module (PMEQ) gives you the ability to define, build, monitor, track and diagnose the equipment installed on your upstream production site. PMEQ allows for operational analysis and diagnostics of onsite equipment.

ProductionManager™ Well Optimization (PMWO)

ProductionManager™ Well Optimization (PMWO) allows you to optimize production based on industry standard methods. This application provides your operation with continuous, real-time optimization of production, as well as surface and downhole analytics. PMWO records optimization statistics needed to identify key trends, allowing you to better manage your decline curves.

ProductionManager™ Well Test (PMWT)

ProductionManager™ Well Test (PMWT) allows you to maintain accurate allocation measurement while achieving facility cost reduction goals. Now you can rest easy knowing that potential issues with allocation, scheduling, multiple testers and optimal test results are a thing of the past.

ProductionManager™ Surface Controls (PMSC)

ProductionManager™ Surface Controls allows the user to perform control, logic, and mathematical functions using easy to configure pre-designed menus. Surface Controls facilitates configuration of your complete cause and effect narrative, handling temporary or permanent shutdowns, permissives, bypasses, alarming and other utility functions.

Coming Soon

- **ProductionManager EDGE™ Fluid Logistics (PMFL)**
- **ProductionManager EDGE™ Interface (PMEI)**
- **ProductionManager EDGE™ Chemical Manager (PMCM)**

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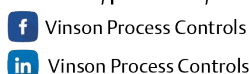
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