FREEDOM® THE SMART MANUFACTURING PLATFORM

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Manufacturing Growth Expectations and Challenges

The Future of Manufacturing

Over the next 5 years, manufacturers expect to grow 5% to 10% annually amidst the threats of global competition, market volatility, pricing pressures, and rising material and labor costs. Internal manufacturing deficiencies can increase the challenges facing manufacturers even further.



- To combat both internal and external challenges, manufacturers will invest in improving production processes, strengthening customer relationships, and finding the right people with the right skills and experience.
- For a manufacturing company of any size to survive and thrive in this era, its operations have to be both lean (cost competitive and efficient) and agile (responsive to market demands).
- Lean/agile manufacturing requires the systematic elimination of unplanned downtime that erodes product margins and EBIT.
- To combat unplanned downtime, lean manufacturers are turning to lloT data-driven manufacturing metrics to monitor and improve manufacturing efficiency.

86% of executives believe digital transformation is critical for growth and competitiveness

1 in 4 have already implemented smart manufacturing solutions, while many others have begun the process

72% of companies plan to increase their IIoT spending over the next 3 years

Improve your Productivity with Freedom

Better Information for Superior Plant Management

Freedom eLOG brings manufacturers an intuitive, concise picture of their assets' performance – up-time, down-time, OEE, and contributing factors – that allows quick and relevant improvements in system productivity.

eLOG is at the heart of the Freedom IIoT platform. eLOG is a cloud-based software suite that seamlessly "Connects and Collects[™]" production asset data to dramatically improve efficiency by providing our customers full transparency of manufacturing information, with reports and analytics for optimization of machine health, process health, and OEE from the shop floor to the top floor.

Shift Reports – Easily break down and filter data to group production results by shift and categorize data for comparisons between shifts for continuous improvement programs and promoting best practices.

Triggers & Action – Expanded condition-based functionality that follows IFTTT logic. Triggers allows users to send notifications or run scripts based on specific events that occur on the shop floor.

Notifications – Receive scheduled reports to your inbox and get real time push text alerts to your mobile devices for various production activities and machine performance such as maintenance issues, unscheduled downtime, or any other performance metric that is of interest to you.

Machine Adapters – We know that manufacturers have a variety of machine types and makes of all ages. Our goal is to make it easier to connect these assets. We've developed unique software interfaces and devices for obtaining analyzing, and displaying machine performance data without the need for changes to the controllers or machine itself.

Real-Time Dashboards – Easily customized and configured screens that allow each user to create versatile and dynamic visual metrics relevant to their needs.

e\$CORE – Factory income statement monetizing the availability and performance by asset.

Custom Data Module – Extract and store available data variables from the manufacturing asset's control system for analysis.

Tablet-Based Operator Application – Allows Operators to easily interact with Freedom for classifying downtime events, entering part production information and displaying any Real-Time Dashboard created in Freedom.

Barcode Scanning Module – Users can integrate a Bluetooth bar code scanner that promotes easy scanning of downtime events, part production details, part travelers, and part numbers from a 2D bar code that communicates with the Freedom Tablet Application.

Andon Module – Creates a visual and electronic notification system for process abnormalities, maintenance requests, or material replenishment needs by asset.

Features:

- Quick and Easy to Deploy Out of the Box Functionality
- Asset Agnostic Machine interfaces for any Industrial Asset
- Automatic Gathering of Production Data, Alarms, and Events
- Web Based Connect from Anywhere with any Browser
- Real-Time Analytics, Reports, and Configurable Dashboards
- Condition Based IM and Email Notifications
- Share Data across the Manufacturing Software Ecosystem
- Conforms to AMT and VDI-3423 Standards

Benefits:

- Increased Production Output on Existing Assets
- 50%+ Documented Productivity Improvements
- Reduction of Finished Goods and WIP Inventories
- Dramatically Increased Production Margins and Profits
- Increased Return on Assets (ROA)
- Reduced Total Cost of Ownership of Manufacturing Assets
- Immediate Real Time Results
- ROI in Months not Years. 3% OEE Improvement = 6 Month ROI

Large or Small -Freedom has a Solution for your Operation

The Plans

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Freedom is available in three plan tiers: Light, Pro, Premium. These tiers allow organizations to select the plan that includes features that will provide the most impact to their manufacturing operations.

Entry-level plan allowing users to set flexible production schedules and monitor basic machine performance.

Features Include:

Freedom eLOG[®] Module

- Machine or Machine Group Filtering
- Configurable Date/Time Ranges
- Flexible Shift Scheduling
- Machine Strip Chart
- Metrics Reports
- Machine Alert Pareto Charts

Machine Interfaces • Standard Data Items Notification Module • Email Reports

Understand more about your manufacturing operation including downtime tracking, part production, and Overall Equipment Effectiveness (OEE).

Includes everything in LIGHT, plus:

Freedom eLOG® Module

- OEE Metrics
- Downtime Event Analytics
- Part Production Reports
- Program Analytics
- Production Category Reports
- Tool Reports

Machine Interfaces • Auto Part Counting Notification Module • Text Message Alerts e\$CORE® Financial Module

Factory Income Statement

Visualize your manufacturing operation's metrics on any device in the plant. Track machine and process health using Al and condition-based tools to monitor sensor and other IoT data.

Includes everything in PRO, plus:

Machine Interfaces

- Sensor Data Items
- **Shift Reports Module**
- Shift Comparison Reports
- Real-Time Dashboard Module
 - User-Defined Dashboards

Slideshow Module

Dashboard Visualization

Extended Data Module

Sensor Analytics

Notification Module

Condition-Based Triggers

System Overview and Deployment

System Architecture

A typical Freedom system installation consists of one Freedom Server, which communicates via Ethernet with industrial assets on the factory floor, each of which is equipped with a Freedom MTConnect Interface.

The Freedom system illustrated below depicts all of the components used to collect data from industrial assets (Freedom MTConnect Interface for each industrial asset), store the collected data (Freedom Server), and view reports (view Freedom web-page reports from any networked device with a browser).

Access to Freedom is available on Operator Stations or tablets providing access for the specific classification of delays, repairs, or processes, and to add comments for further clarification.

As a means of driving true enterprise transparency, Freedom can also be interfaced to existing ERP, MES, and CMMS systems. This facilitates improved operational intelligence based on real time data exchange.

Remote system support via VPN is also available for real-time support by the Freedom support team.

Deployment Options

The Freedom Server is a Linux-based system that hosts the Freedom software. In an effort to leverage the latest technologies and create unique value for our customers, the Freedom team offers multiple ways to deploy the Freedom Application. It is available in three options:

- Public Industrial Cloud Managed by Freedom
- Private Industrial Cloud Managed by the Customer
- On-premise Virtual Server Managed by the Customer

The Benefits of Freedom in the Industrial Cloud Are:

- Eliminates the Need for Dedicated or Virtual Servers and the IT Staff to Maintain them
- Lowers the Cost of Entry
- Multi-Tenant All Plants on the Same Upgrade Path and on the Same Release of Software



Detailed Reports and Real-Time Dashboards

Easy to Navigate Drill Down Reporting

Web based reports are available to the entire enterprise. This information can be used to optimize equipment, programs, and schedules for around-the-clock operation. Easy-to-read charts and graphs are supported by detailed information. Users can set up automated reports and instant notification of critical events via e-mail or text messages. Clicking on any element of a chart reveals the events that produced that element; clicking on any event reveals yet more detail. The intuitive user interface makes it easy to drill down to whatever level of detail is needed.



The **OEE Quad Chart** report provides an easy to view all-in-one representation of OEE contributing factors in the effiency of the plant.



The **Event List** report enables you to analyze the uptime and downtime reasons within each of the AMT groupings and quickly identify causes of non-productive time.



The **Top 25 Alerts** report makes it easy to analyze and understand the alert messages issued most frequently by the CNC control.

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The **Stacked Bar** report provides a view (by percentage) of how a machine's time is distributed between the various categories defined by the AMT standard.

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The **e\$CORE**[®] report generates a monetized version of asset performance. It provides full transparency into manufacturing gains or losses in terms of currency, allowing management teams to determine the amount of money being saved or wasted in a manufacturing plant.



Real-Time Dashboards allow users to create customizable and personalized dashboard designs. Establish size and layout, define machine scope, determine data criteria, and set refresh rates to generate powerful, versatile, and dynamic reports.

Machine Interfaces

Freedom Sensor Adapter

We offer a Freedom Sensor Adapter for deploying additional sensors to any type of industrial asset and also for connecting to legacy assets whose only option for communication is through discrete I/O. This off-the-shelf, self-contained, DIN-rail mounted electronic appliance mounts in the industrial asset's power panel and is connected to I/O signals from the asset as well as from external sensors. The Freedom Sensor Adapter has MTConnect on-board and connects directly to the Freedom Server. It does not require PLC programming, asset configuration, or NC programming. This adapter is expandable offering a variety of signal monitoring capabilities such as:

- Digital (proximity, pressure, power, etc.)
- Analog (temperature, current, coolant, fluids, etc.)
- Vibration (velocity RMS, bearing SPM)
- Power (3-phase Watts)



Freedom Software Adapter

Freedom Software Adapters exist for many of the current standard CNC, PLC and Robot controls that are used on the majority of industrial assets. This interface is installed directly on the asset's industrial controller. Freedom Software Adapters communicate directly with the industrial controller via open architecture tools supplied by the control vendors. No PLC programming, asset configuration, or NC programming is required. The Freedom Software Adapter is extremely simple to install taking only a few minutes to configure and when connected to a Freedom Server, communicates the real-time status of the industrial asset via MTConnect. Freedom Software Adapters are available for all types of controllers on all types of machines. Examples include but not limited to:

- CNC's (Fanuc, Siemens, Heidenhain, Bosch, Mazak, Okuma, etc.)
- PLC's (A-B, Siemens, Modicon, etc.)
- Robots (FANUC, KUKA, ABB, etc.)
- Any Controllers with OPC-UA



Rexroth

Get More From Your Shop Floor





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