PRO services

ProSmart®
Predictive Condition Monitoring
Installation & Operation Guide

ITT

ENGINEERED FOR LIFE

Index

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SAFETY INSTRUCTIONS

IMPORTANT SAFETY REMINDER

To: Our Valued Customers

The information in this section must be studied before attempting any work on or with the ProSmart Wireless Condition Monitoring System.

Products manufactured and furnished by ITT Monitoring and Control will provide safe, trouble-free service when properly installed, maintained and operated. We have an extensive network of experienced sales and service professionals to assist in maximizing your satisfaction with our products.

Safe installation, operation and maintenance of ITT's equipment are essential end user responsibilities. The ProSmart Installation and Operation Guide identify specific safety risks that must be considered at all times during the life of the product. Understanding and adhering to these safety warnings is mandatory to ensure personnel, property and/or the environment will not be harmed. Adherence to these warnings alone, however, is not sufficient; it is expected that the end user will also comply with industry and corporate safety standards. Identifying and eliminating unsafe installation, operation and maintenance practices is the responsibility of all individuals involved in the installation, operation and maintenance of industrial equipment.

Safety Symbol and Signal Word Explanation:

	**This is the dangerous voltage alert symbol. It warns of high voltage which can cause death or physical injury. Obey all safety messages that follow this symbol to avoid possible injury or death**
	**This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.**
⚠ DANGER	**DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.**
⚠ WARNING	**WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.**
⚠ CAUTION	**CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.**
NOTICE	**NOTICE used without the safety alert symbol addresses practices which, if not avoided, may result in property damage.**

SAFETY INSTRUCTIONS

With respect to ProSmart Wireless Condition Monitoring System installation, operation, and maintenance activities the following risks bear reinforcement above and beyond normal safety precautions:

⚠ DANGER

All electrical installation and maintenance work must be undertaken by a qualified electrician only. Failure to do so will result in serious injury or death.

⚠ DANGER

During installation all equipment must be disconnected from the power supply without any possibility of being made live (Lockout/Tagout). Failure to do so will result in serious injury or death.

⚠ DANGER

The ProSmart System is designed and certified only to be installed in a non-hazardous location or a hazardous location labeled as Class I Division 2, Group A B C D T4 only. The rating is contingent to proper installation of modules for Class I Division 2. Failure to do so could result in serious injury or death.

⚠ WARNING

The Data Monitor requires 12-24VDC and the Communication Module requires 12VDC. Connecting the module to AC or a higher voltage could result in serious injury or property damage.

⚠ WARNING

The Communication Module and Data Monitor are equipped with a radio transmitter and receiver operating in the 2.4GHz band. To satisfy FCC radio frequency exposure requirements for mobile type transmitting devices, a separation distance of 20cm or more should be maintained between the antenna of the Communication Module and Data Monitor and persons during operation, with exception of hands, wrist, feet, and ankles. To ensure compliance, operations at distance closer than 20cm are prohibited. Excessive radio frequency exposure should be avoided.

⚠ WARNING

The Data Monitor is equipped with a relay output. This relay output may be activated as soon as power is connected to the unit. This may result in unintended consequences. To ensure the relay activates only when desired, do not connect the Data Monitor relay wires until the system accepting the contact closure is ready (alarm beacon, horn, etc.).

⚠ WARNING

The DC capacitors contain electrolyte and the printed circuit boards contain lead, both of which will be classified as hazardous waste within the EU. They must be removed and handled according to local regulations.

SAFETY INSTRUCTIONS

⚠ WARNING

Due to some materials used in some electrical components, thoroughly wash hands with soap and water after handling any electrical components. Always use protective glasses, gloves, and clothing.

NOTICE

No modifications should be made to the Communication Module and Data Monitor enclosures and the cover should not be removed from the Data Monitor Electronic Board Chamber; otherwise, the warranty will be void.

Please take the time to review and understand the safety instructions, installation and operation guidelines provided in the ProSmart Installation and Operation Guide for the applied equipment.

The ProSmart System has been designed for safe and reliable operation when properly installed, applied and maintained in accordance with the instructions in the ProSmart Installation and Operation Guide. ITT Monitoring and Control shall not be liable for physical injury, damage or delays caused by failure to follow these instructions.

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INTRODUCTION

The ProSmart Wireless Condition Monitoring System provides a cost effective method to monitor all types of rotating equipment all year around - 24 hours a day; 7 days a week; 365 days a year. The ProSmart System collects machine specific information and provides warnings and alarms to users. The ProSmart System is designed around ease of installation, rapid deployment, easy system expansion, and no additional IT infrastructure required. A user needs very little training to start using the ProSmart system.

The ProSmart System consists of four core components: ProNet Server Application, Communication Module, Data Monitor, and Sensors.

ProNet Application

An internet based system providing Graphical User Interface for Analysis Tools such as FFTs and Band Alarms, Event and Alarm Management, and Historical Data Management. ProNet automatically alerts the select users to alarms via e-mail or voice phone calls so that the problem can be rectified before it results in machine failure. Data storage and maintenance is handled by ITT and requires minimal IT involvement.

Communication Module

A field mountable wireless data communication module, manages all data communication between the Data Monitor module(s) and ProNet server application. The Communication Module supports communication to the server via Local Area Networks (LAN), dedicated broadband connection such as cable and DSL, GPRS, and CDMA cell modems.

Data Monitor

A field mountable wireless data monitoring module for capturing, analyzing, and processing conditions of any rotating equipment such as pumps, compressors, blowers, fans, mixers, etc. using Sensors and analog/digital inputs. The Data Monitor should be mounted in close proximity to the machine.

Sensors

Range of ProSmart specific industrial “Plug and Play” sensors measuring Vibration, Temperature, and Speed. ProSmart also allows 3 analog process inputs in the form of 4-20mA to be analyzed. ProSmart will also analyze 2 digital inputs in the form of 0-24VDC. This moves ProSmart from being just a vibration monitoring device to a complete condition monitoring solution.

ProSmart and its related products are protected by the following patents: 6,464,464; 6,487,903 B2; 6,564,627; 6,591,697; 6,648,606; 6,681,634 B2; 6,776,584; 7,080,508 B2; 7,112,037 B2.

GETTING STARTED

Web based…

client eliminates software installation and management costs.

HOSTED PLATFORM

The ProNet user interface provides the ability to view, analyze, and store data in a secure environment anywhere in the world.

With online reports that range from supervisory overviews to detailed analysis windows, ProSmart provides benefits to each level of your organization.

Wireless architecture…

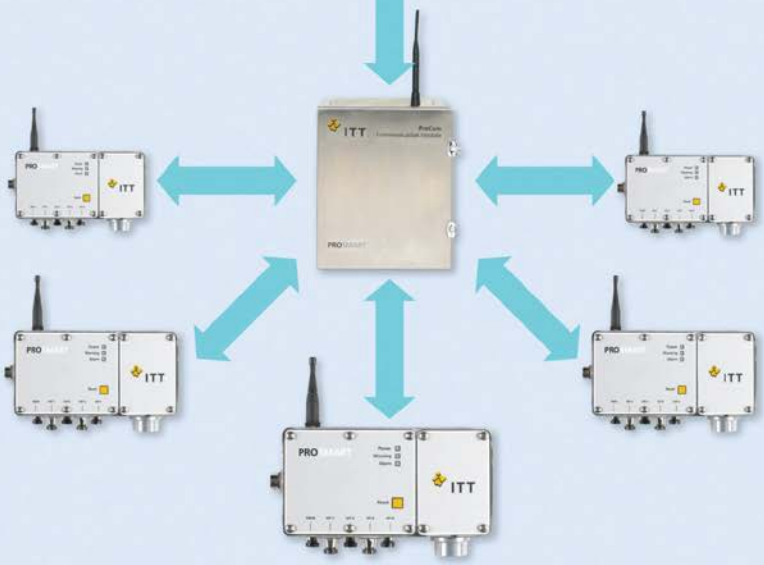
reduces installation costs and complexity.

COMMUNICATION MODULE

As the gateway to the Internet, the ProSmart CM provides a secure connection to the ProNet platform via LAN, DSL, cell, or 802.11 wireless routers.

DATA MONITOR

Integrated processing capabilities allow 22 channels of information to be collected every 5 seconds, 24/7/365.



ProSmart delivers…

key machinery health data directly to you

MACHINE LEVEL

ProSmart can be used to provide continuous machinery monitoring of all your rotating equipment. Standard process signals can be integrated for greater diagnostic capabilities.

ProSmart Wireless Condition Monitoring System Architecture

GETTING STARTED

How to use this guide

This guide has been organized to make installation of the ProSmart System easy. Installation has been divided into three main sections that include all the information needed to get up-and-running. The four sections are:

- **Communication Module Installation**
- **Data Monitor Installation**
- **Sensor Installation**
- **ProNet User Guide**

Each section has been laid out to speed you through the installation process, while providing enough background information to help understand the process.

1. Step Number - The step number helps to keep track of where you are in the configuration process when used in conjunction with the process map.
2. Process Map - The process map is a visual guide of what needs to be done in the step.
3. Background Information - This information explains what the upcoming steps are and why they are being performed. Examples are provided to assist in understanding the concept.
4. Special Notes - These highlighted sections contain comments that are important to the installation process.
5. Illustration View - The illustration view shows installation illustration for guidance.

PROSMART

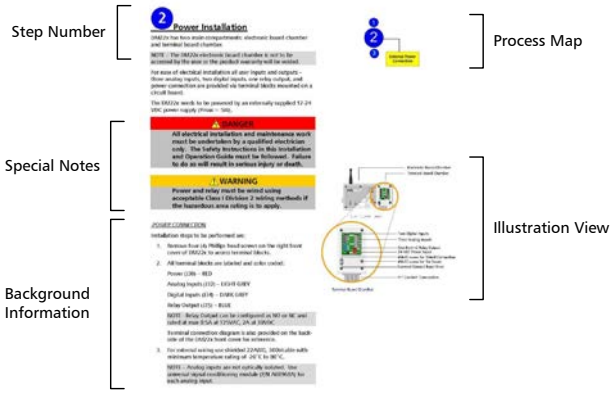


Figure A - Typical Installation Page

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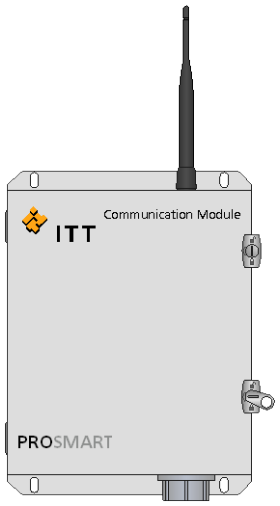
COMMUNICATION MODULE INSTALLATION

This section is devoted to install your ProSmart Communication Module.

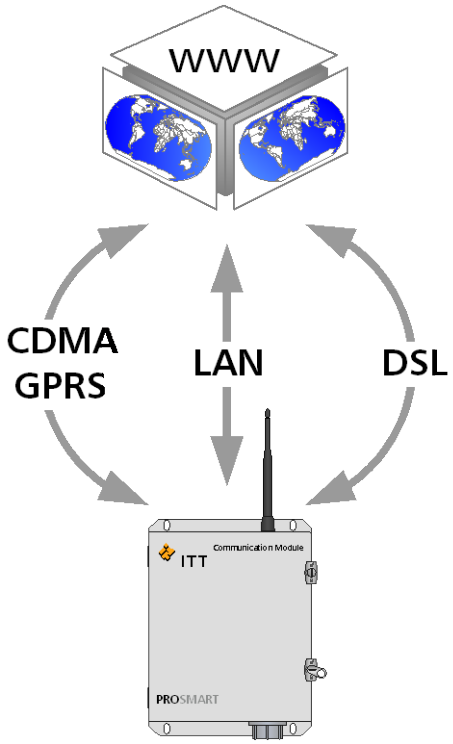
Step	Description
	Communication Module Overview
1	Communication Overview
2	Mechanical Installation
3	Power Connections



Overview - Communication

When selecting an installation site for the Communication Module two communication paths need to be evaluated:

1. **Communication signal strength between Communication Module and Data Monitor** - It is recommended to optimize the communication signal from the Communication Module to each Data Monitor by having ITT or an authorized distributor perform a site survey.
2. **Reliable Internet connection for Communication Module to communicate with the ProNet server** - the Communication Module can communicate using either Local Area Network, Broadband connection such as DSL, cable modem, or cellular modem, similar to an internet connection with a personal computer.

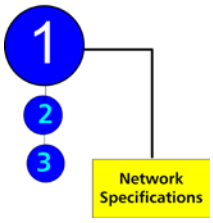


The Communication Module communicates to the ProNet Server application through a standard internet connection. The Communication Module is equipped with an Ethernet cable to connect into your network receptacle. The Ethernet cable for the Communication Module exits through the same conduit hub as the DC power.

All communication is initiated from the Communication Module. Inbound communication requests to Communication Module are ignored since it acts only as a client and not as a server. Factory default configuration for the Communication Module is DHCP (Dynamic Host Configuration Protocol). It may also be configured to use a static IP.

The Communication Module allows only specific DMs to send data. The Communication Module will set aside time in its polling routine for a listed DM to communicate.

1 Communication Configuration



NETWORK SPECIFICATIONS

If communicating through a Local Area Network (LAN), it must be configured to allow communication from the Communication Module to the following URL address and through the following ports, especially if the Communication Module must be behind a firewall:

- data.prosmart.ittmc.com for data management and software downloads.

  NOTE – Configure LAN network for URL address and not the resolved IP address since IP address can change anytime.

- Outbound communication support for:
  - HTTP Protocol (standard web browser protocol) via port 80
  - External NTP (standard Network Time Protocol) via port 123

ProNet users must have access to www.prosmart.ittmc.com to login to the GUI (Graphical User Interface) and interact with their devices.

DHCP Configuration –
Default factory configuration. This is the preferred method of network configuration (no additional information is needed).

Static IP Configuration –
To configure the Communication Module to use a static IP the following information is needed:

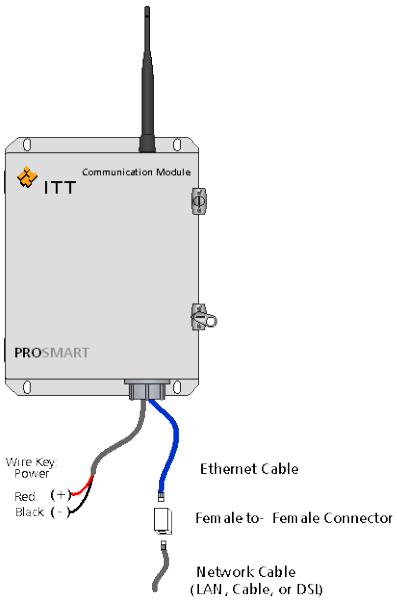
- Static IP address
- IP DNS1 and IP DNS2
- IP Gateway
- IP mask

An ITT representative can either configure the Communication Module in the field or it can be preconfigured at the factory.

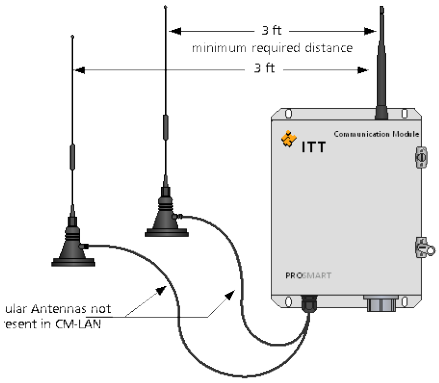
2 Mechanical Installation

Installation steps to be performed are:

1. Before installing the Communication Module, please note the Mac ID from the nameplate on the right-side of the Communication Module for future reference. This will appear similar to the following: 00:50:C2:8F:44:AA
2. When selecting a location to mount the Communication Module following items need to be considered:
    - Mount Communication Module at least 15 feet above ground
    - Communication Module antenna needs to be in vertical upright position, and
    - At least 10 inches of area around the antenna needs to be clear of any obstruction
3. Mount the Communication Module on a suitable mounting surface such as a wall or pillar using fasteners that can support the Communication Module's weight of approximately 15 lbs (6.8 Kg).
4. The Communication Module has ¾" NPT conduit hub.
5. Install the Communication Module per NEMA requirements.
6. For Communication Module using a cellular modem, the cellular antenna needs to be at least 3 ft away from the Communication Module antenna. At least 10 inches of area around the cellular antenna also needs to be clear of any obstruction.
7. For ideal communication with the DM, the CM should be in direct line of sight.



Communication Module - LAN



Communication Module – Cellular Modem

3 Power Connections

COMMUNICATION MODULE – LAN CONNECTION

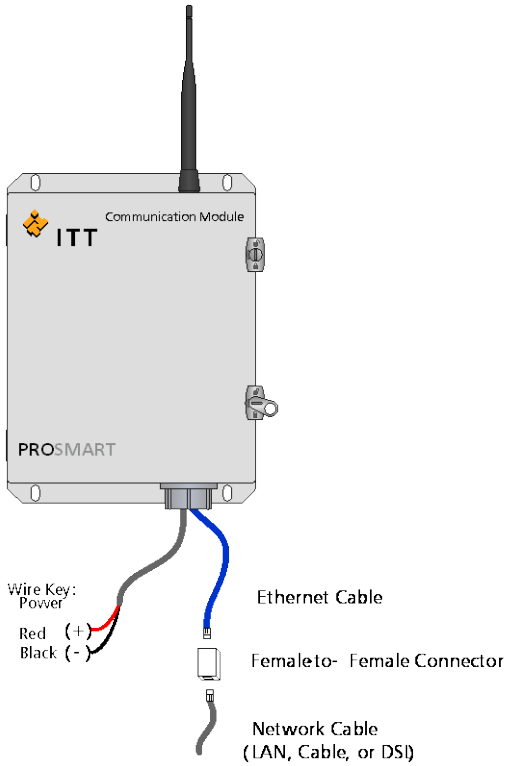
The Communication Module with LAN connection needs to be powered by an externally supplied 12 VDC power supply.

⚠ DANGER

All electrical installation and maintenance work must be undertaken by a qualified electrician only. The Safety Instructions in this Installation and Operation Guide must be followed. Failure to do so will result in serious injury or death.

⚠ DANGER

Power must be wired using acceptable Class I Division 2 wiring methods if the hazardous area rating is to apply. Failure to do so could result in serious injury or death.



Communication Module - LAN

Steps to be performed for proper power installation are:

1. Install the conduit and connection box per your local electrical and environmental codes.
2. Communication Module has ¾" NPT conduit hub.
3. Follow the wiring diagram shown to the right for proper installation.
4. Use a voltmeter to measure the supplied power at the connection box and verify that it is 12VDC.
5. Caution must be taken to observe correct polarity when connecting DC power wires. Reversing DC power polarity will damage the Communication Module and will void warranty.

⚠ WARNING

Reversing DC power polarity will damage the Communication Module and will void the warranty.

6. Customer must connect earth ground and Communication Module's ground wire (Green/Yellow wire attached to the CM enclosure sub-plate) to the ground lug provided inside the CM enclosure near the bottom hinge.
7. Communication Module's ground wire that is attached to the CM enclosure sub-plate (Green/Yellow wire), customer

supplied earth ground wire, and the power conductors should be of same gauge.

8. Ground wires should have a ring lug crimped and sized to fit over the CM enclosure grounding stud. The grounding lug nut should be securely tightened for a good connection of the ring lugs to the grounding stud.

NOTE – Before powering the Communication Module take every precaution to ground the unit.

⚠ WARNING

The Communication Module does not have an on-off switch and will start operating as soon as power is applied. This may result an unintended alarm annunciation as well as an unintended activation of relay outputs on the DM modules communicating with the Communication Module at the time.

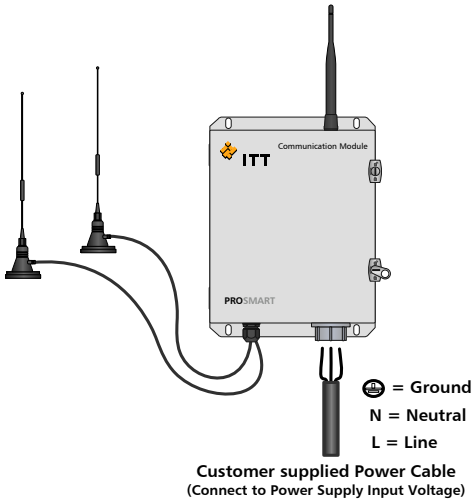
COMMUNICATIONS MODULE INSTALLATION

COMMUNICATION MODULE – CELLULAR MODEM CONNECTION

The cellular modem option of Communication Module includes a cellular modem, modem bracket, modem antennas, and 100-240 VAC to 12VDC power supply for ease of installation. This option is not Class I Division 2 rated, therefore, should not be used in CID2 applications.

⚠ DANGER

The Communication Module with cellular modem connection is not rated for CID2 application. Do not install and use the Communication Module with cellular modem in CID2 rated area. Failure to do so will result in serious injury or death.



Communication Module – Cellular Modem

The Communication Module with cellular modem connection needs to be powered by an externally supplied 100-240VAC power supply.

⚠ DANGER

All electrical installation and maintenance work must be undertaken by a qualified electrician only. The Safety Instructions in this Installation and Operation Guide and local electrical codes must be followed. Failure to do so will result in serious injury or death.

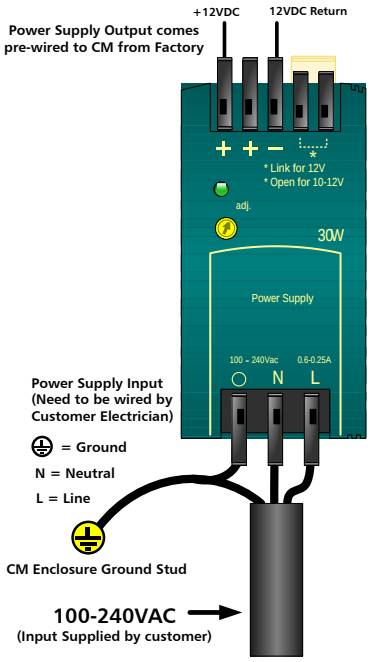
Steps to be performed for proper power installation are:

1. Power supply output comes pre-wired to Communication module from factory and should not be modified.

⚠ WARNING

Reversing DC power polarity will damage the Communication Module and will void the warranty.

2. Install the conduit and connection box per your local electrical and environmental codes.
3. Communication Module has ¾" NPT conduit hub.
4. Follow the wiring diagram shown to the right for proper installation.
5. Use a voltmeter to measure the supplied power at the connection box and verify that it is 100-240VAC.
6. Customer must connect earth ground and Communication Module's ground wire (Green/Yellow wire attached to the CM enclosure sub-plate) to the ground lug provided inside the CM enclosure near the bottom hinge.



Connect 100-240VAC Input to Power Supply Input Voltage

Note: Power supply output is preset from factory with jumper for 12VDC +/- 0.5%

COMMUNICATIONS MODULE INSTALLATION

7. Connect PULS power supply input ground to the CM enclosure ground stud.
8. Communication Module's ground wire that is attached to the CM enclosure sub-plate (Green/Yellow wire), customer supplied earth ground wire, and the power conductors should be of same gauge.
9. Ground wires should have a ring lug crimped and sized to fit over the CM enclosure grounding stud. The grounding lug nut should be securely tightened for a good connection of the ring lugs to the grounding stud.

NOTE – Before powering the Communication Module take every precaution to ground the unit.

⚠ WARNING

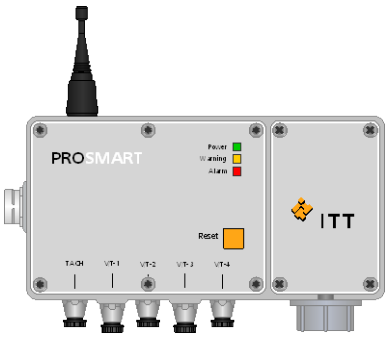
The Communication Module does not have an on-off switch and will start operating as soon as power is applied. This may result an unintended alarm annunciation as well as an unintended activation of relay outputs on the DM modules communicating with the Communication Module at the time.

COMMUNICATIONS MODULE INSTALLATION

DATA MONITOR INSTALLATION

This section is devoted to install your ProSmart Data Monitor DM22x.

Step	Description
	Data Monitor Overview
1	Mechanical Installation
2	Power Connections
3	Class I Division 2 Cap Lock Installation

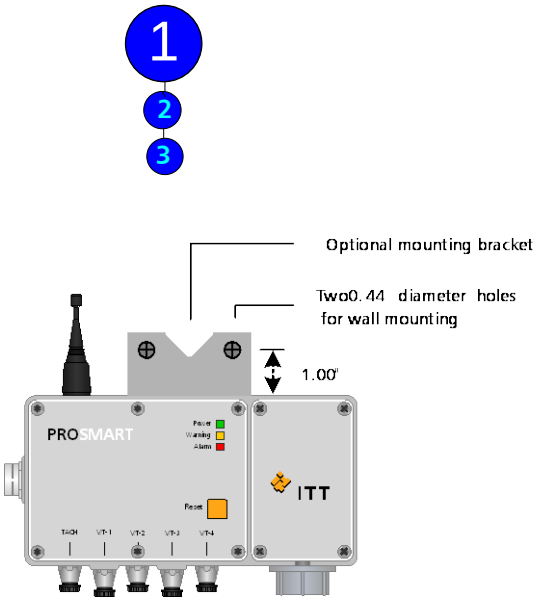


COMMUNICATIONS MODULE INSTALLATION

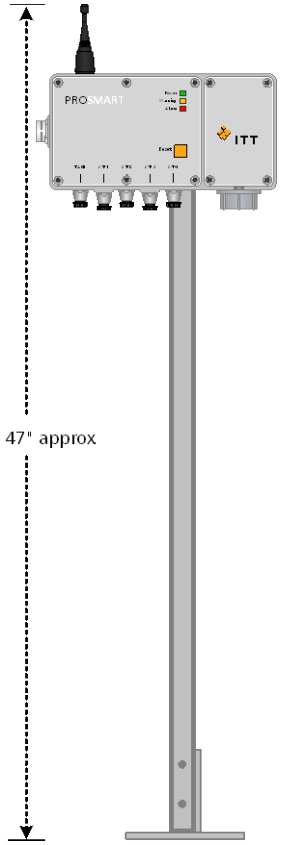
1 Mechanical Connections

Installation steps to be performed are:

1. Before installing DM22x, please note the Mac ID from the nameplate on the right-side of the enclosure for future reference. This will appear similar to the following: 00:50:C2:8F:44:AA
2. When selecting a location to mount the DM22x the following items need to be considered:
    - Mount the DM22x approximately four feet above ground
    - The DM22x antenna needs to be in vertical upright position, and
    - At least 10 inches of area around the antenna needs to be clear of any obstruction
3. Mount the DM22x on a suitable mounting stand, four (4) ¼-20 UNC mounting holes are provided on the rear of DM22x for mounting. The DM22x can be mounted on a floor mounted stand or a wall mounting bracket which ITT can provide. The DM should NOT be mounted on the equipment but should be mounted in near the rotating equipment.
4. For ideal communication with the Communication Module the DM22x should be placed in direct line of sight, if installation permitting.



Wall mounted arrangement



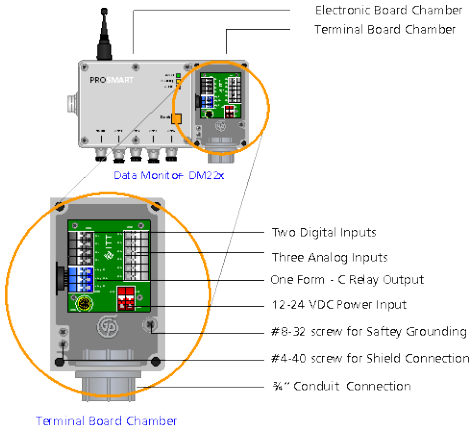
Floor mounted stand arrangement

COMMUNICATIONS MODULE INSTALLATION

2 Power Connections

For ease of electrical installation all user inputs and outputs – three analog inputs, two digital inputs, one relay output, and power connection are provided via terminal blocks mounted on a circuit board.

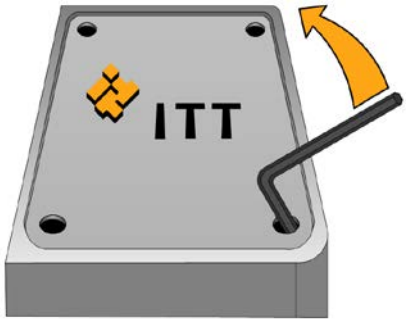
NOTE – The DM22x Process Board Section is not to be accessed by the user or the product warranty will be voided.



OPENING THE TERMINAL SIDE OF THE DM22X

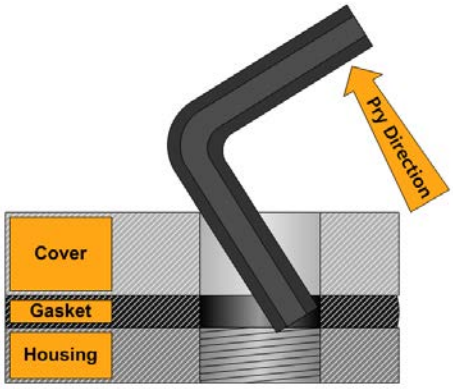
Installation steps to be performed are:

1. Using a Phillips head screw driver, remove the four screws located in each corner of the cover.
2. Using an 1/8" Allen wrench pry up on the corners of the cover to break the seal.
    a. Using the Allen wrench feel for the gasket that separates the cover from the DM22x housing.
    b. Take caution not to damage the threads in the screw connections
    c. Using the gap where the gasket is located pry up the cover.
    d. Slow constant force will aid in breaking the seal.
    e. Take a look at the other corners and slowly pry up on them to release the overall tension holding the face plate.



⚠ CAUTION

The face plate edges of the DM housing may be sharp due to the manufacturing process, and should be handled carefully. Failure to take precautions may result in minor or moderate cuts and injury.



NOTICE

Although it is preferred that an 1/8" Allen wrench be used in accessing the terminal side of the DM, other tools can be used. The Allen wrench has worked the best in field applications and resists damage more than other possible instruments.

COMMUNICATIONS MODULE INSTALLATION

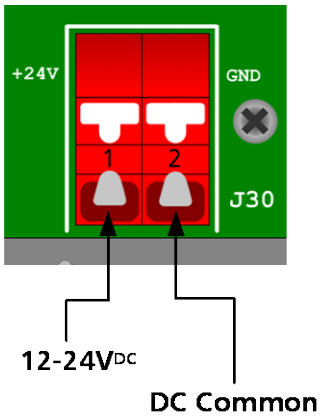
The DM22x needs to be powered by an externally supplied 12-24 VDC power supply (Pmax = 6W).

⚠ DANGER

All electrical installation and maintenance work must be undertaken by a qualified electrician only. The Safety Instructions in this Installation and Operation Guide must be followed. Failure to do so will result in serious injury or death.

⚠ DANGER

Power and Relay must be wired using acceptable Class I Division 2 wiring methods if the hazardous area rating is to apply. Failure to do so could result in serious injury or death.



Power Connections on DM Terminal

POWER CONNECTION

Installation steps to be performed are:

3. All terminal blocks are labeled and color coded:

   Power (J30) – RED

   Analog Inputs (J32) – LIGHT GREY

   Digital Inputs (J34) – DARK GREY

   Relay Output (J35) – BLUE

   NOTE - Relay Output can be configured as NO or NC and rated at max 0.5A at 125VAC, 2A at 30VDC

4. Inside the terminal side of the Data Monitor there are 3 screws provided for shielding and grounding of the unit for safety.

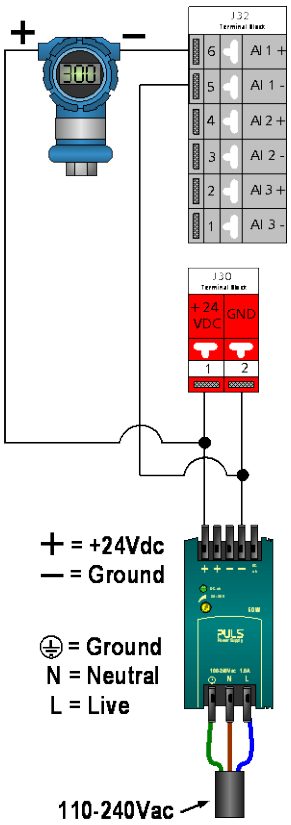
   NOTE – For ground shield two (2) #4-40 screws are provided and for Tie down one (1) #8-32 screw is provided.

5. If analog inputs are used, connect the analog input shield to the DM22x enclosure #4-40 shield screw (see diagram). For analog and digital inputs wiring use shielded 22AWG, 300V cable with minimum temperature rating of -20˚C to 80˚C.

   NOTE – Analog inputs are not optically isolated. If necessary, use universal signal conditioning module (P/N A08968A) for each analog input.

   NOTE – Digital inputs are non-powered dry contact type.

   NOTE – Terminal connection diagram is also provided on the back-side of the DM22x front cover for reference.



Single Power Supply for Process Transmitter and Data Monitor

COMMUNICATIONS MODULE INSTALLATION

6. Install the conduit and connection box per your local electrical and environmental codes.
7. DM22x has ¾" NPT conduit hub.
8. Use a voltmeter to measure the supplied power at the connection box and verify that it is within the 12-24VDC range.

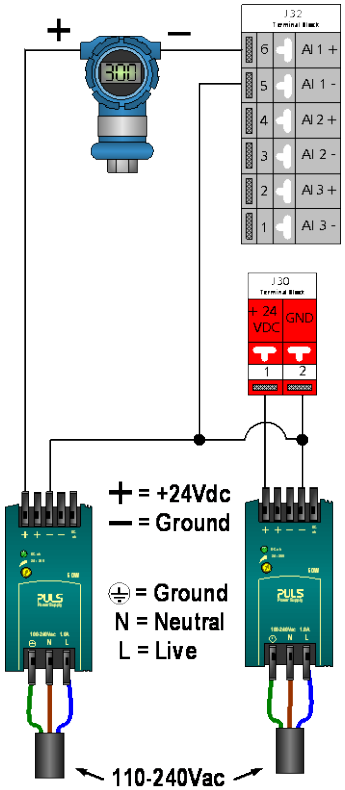
NOTE – Before powering the DM22x take every precaution to ground the unit.

⚠ WARNING

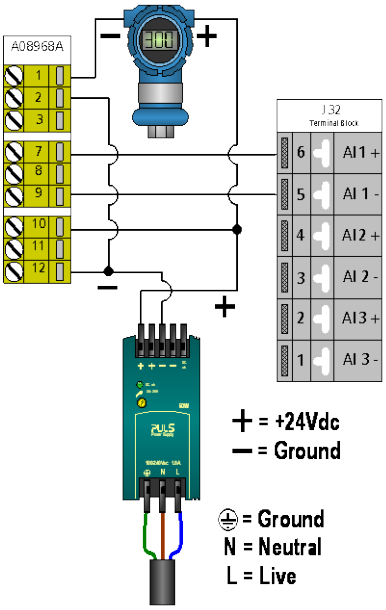
The Data Monitor does not have an on-off switch and will start operating as soon as power is applied. This may result an unintended alarm annunciation as well as an unintended activation of Relay Outputs on the Data Monitors communicating with the Communication Module at the time. To ensure the relay activates only when desired, do not connect the Data Monitor relay wires until the system accepting the contact closure is ready (alarm beacon, horn, etc.).

9. After completing the electrical connection, fasten the DM22x front cover.

NOTE – The DM22x is delivered with protective caps on all connectors. The caps shall remain in place on all connectors that do not have a sensor cable connected. Failing to follow this instruction may lead to damage of the connector and subsequent damage to the internal electronic boards.

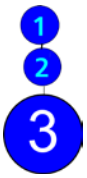


Separate Power Supply for Process Transmitter and Data Monitor



Universal Signal Conditioning Module Wiring

3 Class I Division 2 Cap Lock Installation



For hazardous areas classified as Class I Division 2 Group A B C D T4, Cap Lock (P/N A08569A) should be used on all plug and play connections of the Data Monitor, whether there is a sensor connected or only a protective screw cap, to prevent the event of an open receptacle.

⚠ DANGER

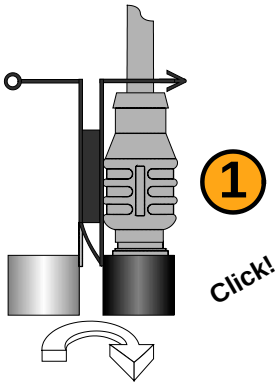
Unit must have tool removable cap-locks installed according to Installation and Operation manual or the system is not Class 1 Division 2 compliant. Failure to comply with Class 1 Division 2 instructions could result in serious injury or death.

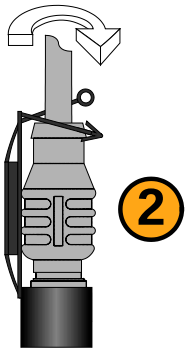
Cap Locks are to be used on the following areas for Class 1 Division 2 applications:

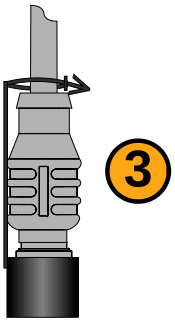
A. DM22x connections (includes unused inputs).

B. Cable to cable connection points.

C. Sensor cable to sensor housing connection.





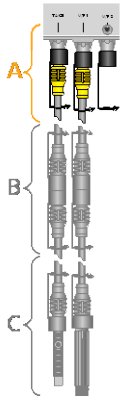


Cap Lock Install: DM22x Connections

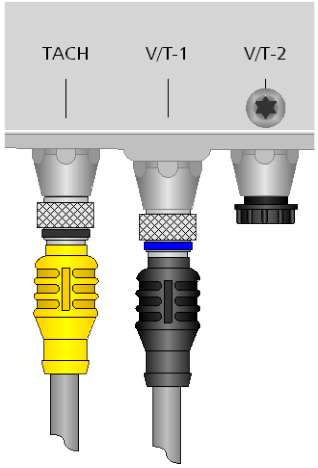
For hazardous areas classified as Class I Division 2 Group A B C D T4, Cap Lock (P/N A08569A)

Installation steps to be performed to install Class I Division 2 caps are:

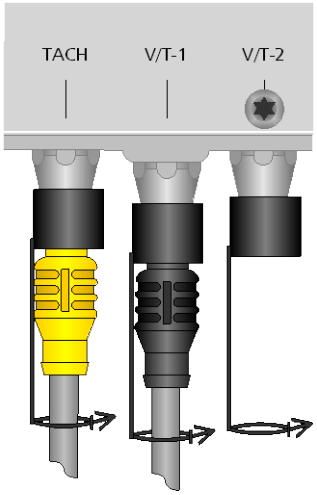
1. Unit should not be powered until all Cap Locks are installed and the installation is compliant with Class 1 Division 2 and local electrical standards.
2. Cover the installed sensor, extension cable connection, or protective screw cap with the Class I Division 2 Cap Lock.
3. Connect the 2 halves of the cap lock around the connection point. After it snaps together secure the cap lock to the cable (if applicable) by inserting the arrow through the ring.



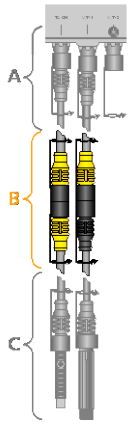
For Non-hazardous



For C1D2 Rated



Cap Lock Install: Cable to Cable Connections

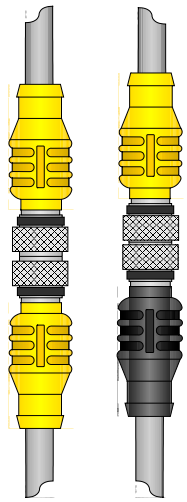


For hazardous areas classified as Class I Division 2 Group A B C D T4, Cap Lock (P/N A08569A)

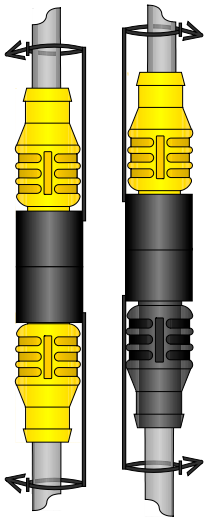
Installation steps to be performed to install Class I Division 2 caps are:

1. Unit should not be powered until all cap-locks are installed and the installation is compliant with Class 1 Division 2 standards.
2. Cover the cable connections with the Class I Division 2 Cap Lock.
3. Connect the 2 halves of the cap lock around the connection point. After it snaps together secure the cap lock to the cable (if applicable) by inserting the arrow through the ring.
4. Each connector requires a Cap Lock, therefore cable to cable connections will have 2 Cap Locks.

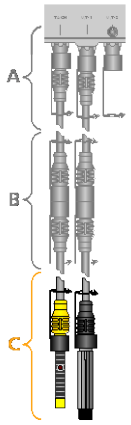
For Non-hazardous



For C1D2 Rated



Cap Lock Install: Cable to Sensor Connections

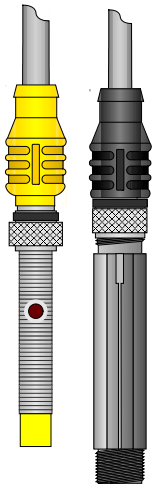


For hazardous areas classified as Class I Division 2 Group A B C D T4, Cap Lock (P/N A08569A)

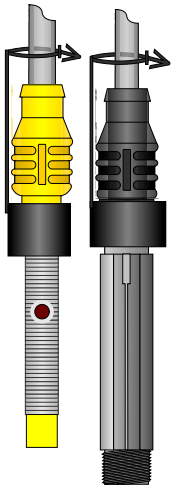
Installation steps to be performed to install Class I Division 2 caps are:

1. Unit should not be powered until all cap-locks are installed and the installation is compliant with Class 1 Division 2 standards.
2. Cover the installed sensor connection with the Class I Division 2 Cap Lock.
3. Connect the 2 halves of the cap lock around the connection point. After it snaps together secure the cap lock to the cable (if applicable) by inserting the arrow through the ring.

For Non-hazardous



For C1D2 Rated



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SENSOR INSTALLATION

This section is devoted to install your ProSmart Sensors ST-02 and SV-03.

Step	Description
	Sensor Overview
1	Tachometer Sensor ST-02 Overview and Considerations ST-02 Installation
2	Vibration & Temperature Sensor SV-03 Overview and Considerations SV-03 Installation MK-04

SENSOR INSTALLATION

1 Tachometer Sensor

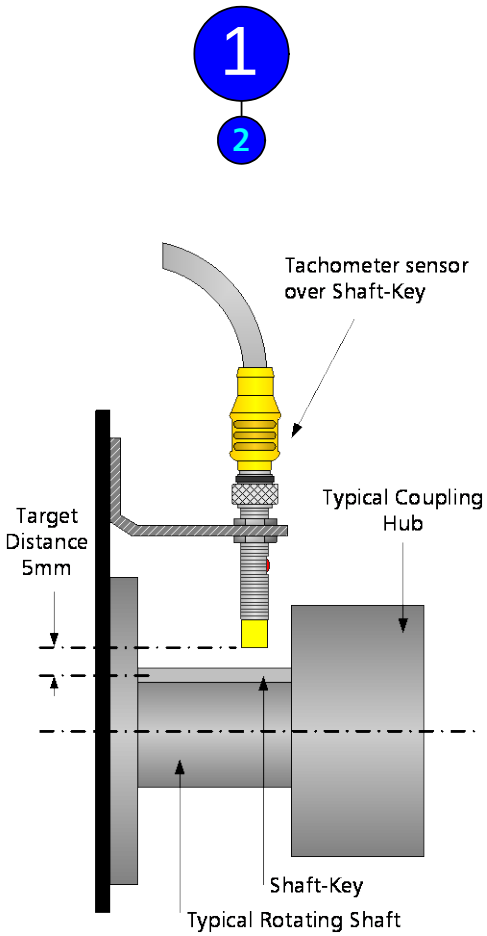
ST-02 OVERVIEW AND CONSIDERATIONS

The Tachometer ST-02 is a high quality inductive proximity sensor. An inductive proximity sensor operates by measuring the oscillator circuit losses of a projected electromagnetic field. Inductive proximity sensors use an oscillator to generate an electromagnetic field that radiates from the sensor's tip. When a metal object enters this field, surface currents, called "eddy currents", are induced in the metal object. These eddy currents drain energy from the electromagnetic field resulting in a loss of energy in the oscillator circuit. This in turn leads to a decrease in the amplitude of oscillation. A trigger circuit monitoring the oscillator mechanism detects this change and generates a signal that switches the output ON or OFF. When the object leaves the electromagnetic field area, the oscillator eddy currents subside and the oscillator regenerates. Returning the sensor returns to its OFF state.

The ST-02 tachometer provides a voltage pulse output proportional to shaft speed. During each rotation of the shaft, a raised metal component passes the sensor face and triggers a voltage pulse. The raised metal target must be ferrous. For optimal sensing range, a carbon steel target is recommended.

NOTE – The ST-02 can be used to detect a detent or shaft keyway. The depth and width of the indent and shaft material will determine if the ST-02 can sense the change.

An LED on the sensor housing will illuminate when the sensor is triggered. See the diagram shown to the right for LED location.



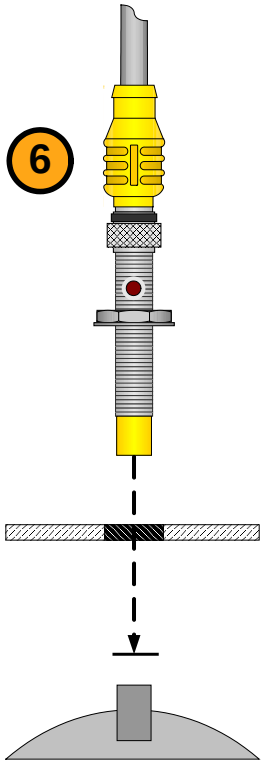
ST-02

SENSOR INSTALLATION

ST-02 INSTALLATION

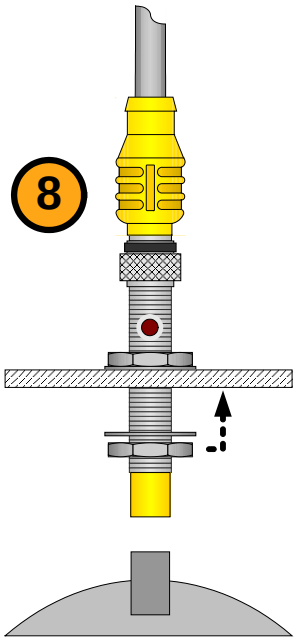
DANGER

During installation all equipment must be disconnected from the power supply without any possibility of being made live (Lockout/Tagout). The Safety Instructions in this Installation and Operation Guide must be followed. Failure to do so will result in serious injury or death.



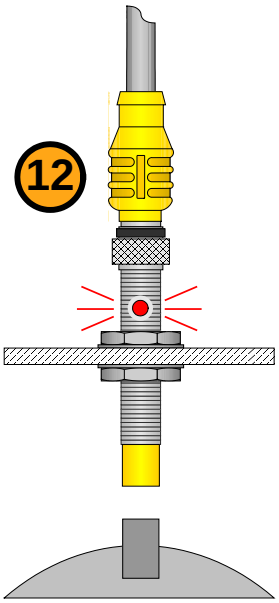
Installation steps to be performed are:

1. Inspect both the driving and driven machine around the coupling or shaft to determine an appropriate location for the tachometer mounting bracket. The bracket requires a flat surface oriented 90° from the shaft. The bracket should also be stiff enough to avoid bouncing during machinery operation.
2. A ferrous metal target is required for the sensor to detect. Either a shaft-key, shaft keyway, or a set screw is acceptable. ITT also has special order split aluminum rotary encoders for purchase which make for easier installation.
3. Once a suitable mounting location is identified, verify that the sensor cable will reach the Data Monitor and will not interfere with the operation and maintenance of the desired monitored equipment.
4. Bolt one end of the mounting bracket to the machine just above the shaft target.
5. Adjust the other end of the mounting bracket to align with the centerline of the shaft. Refer to the diagram shown below for proper installation and typical dimensions.
6. Thread the top nut and star washer onto the tachometer housing. Leave enough of the sensor housing below the top nut so that the sensor can be inserted fully through the bottom hole in the mounting bracket.
7. Using the top nut, adjust the sensor so that the gap between the sensor face and the top of the shaft key is between 0.197" (5mm) and 0.157" (4mm). Refer to the diagram shown below for proper installation and typical dimensions.
8. Secure the tachometer sensor to the bracket by threading the bottom nut and star washer.
9. Plug the tachometer sensor cable into the Data Monitor into the TACH connector. Do not force to connect any cable connection; it may lead to damage the Data Monitor and/or the sensor connection cable.
10. If system is in a Class 1 Division 2 environment install cap locks in correct locations as described in previous capture.

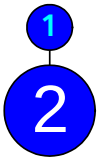


SENSOR INSTALLATION

11. Once cap locks are properly installed and all wiring and installation is compliant with the plant and local codes, power the DM22x ON.
12. Rotate the machine shaft by hand while watching the LED on top of the tachometer sensor. Ensure that LED is on when the target is under the sensor and off when the target is not. If the LED does not light, adjust the gap until the LED lights up during the appropriate times.
13. Tighten the bottom nut and ensure that the sensor does not drift from its working location. If the sensor goes out of the gap sensing area, no reading will be taken.
14. Verify the proper installation and operation of each sensor by viewing the sensor readings on the ProNet User Interface. Consider using Loctite 243 on threads to avoid loosening of nuts.



2 VIBRATION & TEMPERATURE SENSOR



SV-03 OVERVIEW AND CONSIDERATIONS

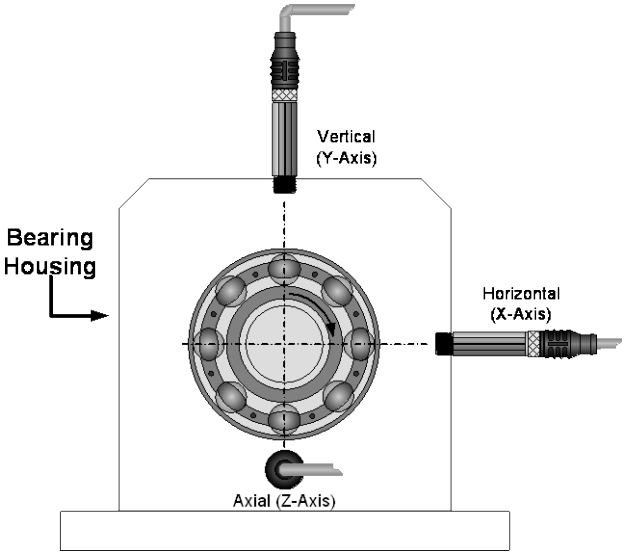
Accelerometers are the industry standard transducer for vibration analysis systems. They output electrical signals in response to mechanical accelerations. Acceleration is typically used to measure vibration levels on rolling element bearing housings. Typical accelerometers output an analog waveform scaled in mV / G. G's are the units of acceleration used in vibration analysis (1 G = 9.8m/s^2 and 32.2 ft/s^2).

The SV-03 sensor is a MEMS (Micro Electro-Mechanical) type accelerometer and as such can not be powered using standard Piezo accelerometer power supplies. The SV-03 is also a "matched system component" and can not be replaced by or substituted for standard 100 mV/G sensors. **Any attempt to do so may damage both the sensor and the ProSmart Data Monitor.**

SV-03 MOUNTING CONSIDERATIONS

Vibration Sensor

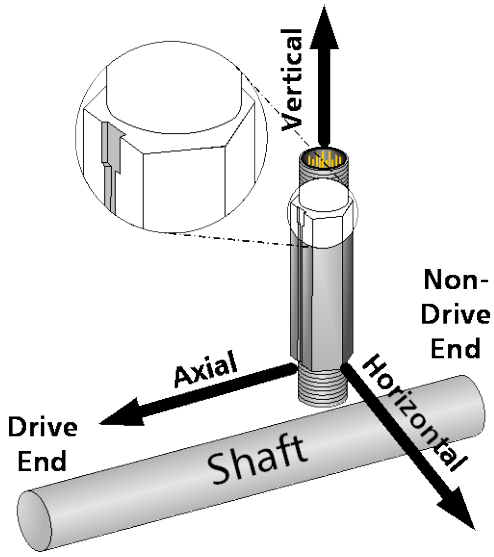
1. The key to accurate vibration measurement and condition diagnosis is transducer placement. Accelerometers should be mounted at points that are most responsive to changes in machine condition.
2. Accelerometers must be mounted as close as possible to the machine's bearings to ensure that vibrations are transmitted directly to the sensor. Any mechanical impedance between the sensor and the bearing housing will decrease the accuracy of the measured vibration. Never mount an accelerometer on heat shielding or machine guards. Acceptable locations for mounting the SV-03 are shown on the diagram to the right.
3. When mounting accelerometers in the axial direction, the sensor must be located in the "load zone" of the bearing. This zone is normally directly beneath the rolling element bearing. However, on certain belt or chain driven equipment, the load zone can shift. Consult a ProSmart applications engineer if unsure of proper mounting locations.
4. Thrust Bearings are designed to primarily handle axial forces. To best monitor thrust bearings, axial mounting of the sensor is suggested. Although the SV-03 can monitor the thrust force while mounted in any position, it gives the most accurate representation of machine vibration in the axis that is aligned with. This is because the sensor only has to contend with translational motion (straight line) in that axis. The other axis will contain a small portion of rotational motion (rocking) as well.



SV-03

SENSOR INSTALLATION

5. The orientation of the sensor must be recorded. The names of each axis on the ProNet User Interface must then be adjusted to reflect the machinery axis being measured. For example, if the Z-Axis (denoted by the groove on the body of the sensor) is typically placed in line with the machine axial plane and preferably facing the driven end of the equipment. This will ensure that the data is properly interpreted by the end user.



Preferred Sensor Orientation

Temperature Sensor

The SV-03 includes an integrated temperature sensor. The temperature sensor can provide valuable data related to rolling element bearing condition. For the most accurate temperature readings, the sensor must be mounted as close as possible to the bearing housing. There will most likely be a small differential between measured skin temperatures and the SV-03's measured value. Temperature trending will provide indications of changes in machine condition, even if the measured temperature at the sensor is different from the skin temperature of the bearing.

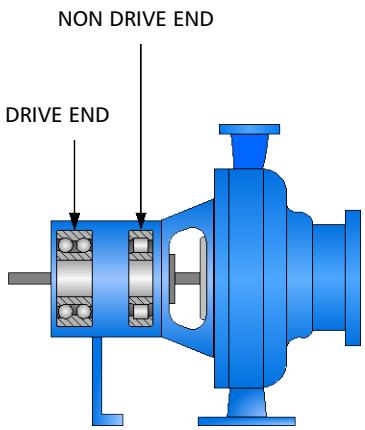
SENSOR INSTALLATION

MACHINE SPECIFIC CONSIDERATIONS

Bearing Location Terminology

ITT uses standard terminology to describe the locations of bearings on equipment. Drive End denotes the bearing that is located closest to or connected to the powered shaft. Non Drive End denotes the bearing that is farthest from the powered shaft. Refer to the diagrams shown to the right.

NOTE – Although the default terminology refers to Drive end and Non drive end the sensors can be named to the customer's preference. Inboard/outboard or thrust/radial is also acceptable bearing terminology.



Bearing Locations

Pumps

Horizontal Pumps

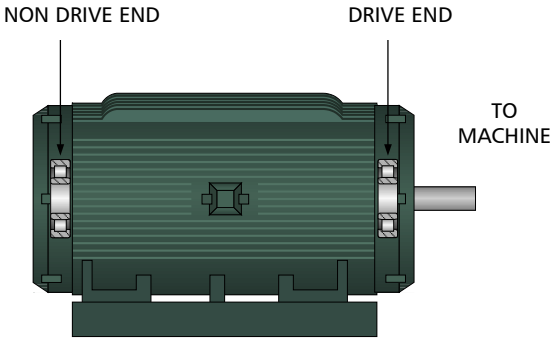
Optimal monitoring positions for Pumps are on both bearings on the power end of the pump. This includes Overhung and Centerhung (AKA "between bearings").

Goulds Pumps will have an indent above the bearings where a vibration sensor is to be located.

Always mount the sensors over the flange on the power end, never on the hollow section of the casting.

Vertical pumps

Most vertical pumps do not have easily accessible pump bearings. In this application the best location for vibration monitoring will be isolated to the motor. Some prefer to also have monitoring on the stuffing box bushing. This may pick up vibrations transmitted to the casing.



Bearing Locations

AC/DC Motors

Optimal monitoring positions for AC/DC motors are at the drive end and opposite drive end bearing locations.

If a motor's cooling fins prevent tapping a hole for sensor mounting, a Fin Mount adapter can be epoxied in between the motor fins just above the bearing. The sensor can then be threaded into an MK-04 adapter and affixed to the Fin Mount adapter.

NOTE – Never mount an accelerometer on the Fan Cover of a motor. The fan cover does not provide an adequate transmission path for the vibration and any sensor readings recorded on them will not represent actual machinery vibration.

SENSOR INSTALLATION

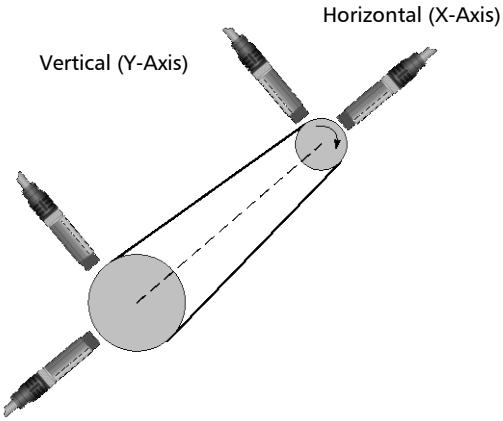
Fans

Optimal monitoring positions for Axial and Radial Flow fans are at the drive end and opposite drive end bearings.

Certain Belt driven fans may have a bearing load zone that is not directly beneath the bearing. If unsure of proper mounting location for axial sensor mounting on this type of equipment, consult a ProSmart Applications Engineer.

Belt /Chain Driven Equipment

If the 2 shafts connected by the belt are not in the same plane, the radial mounting positions are not at true vertical and horizontal positions. The mounting positions must be adjusted in order to better detect the bearing and belt defects on machines with this configuration. Refer to the diagram shown to the right for proper mounting locations. Either of the X or Y positions are appropriate for mounting the SV-03 Tri-axial sensor.



Belt/Chain Driven Equipment

MACHINE SPECIFIC CONSIDERATIONS

Blowers, Compressors

Optimal monitoring positions for Axial Flow and Radial Flow blowers are at the drive end and opposite drive end bearings.

Reciprocating Equipment

Optimal monitoring positions for standard (2 bearing) reciprocating machinery are at the drive end and opposite drive end bearing locations.

If there are more than 2 bearings on the crankshaft, each bearing location should be monitored in order to adequately protect the machine.

Rolls

Due to the lower RPM of rolls be sure to consult with a ProSmart Applications Engineer on possible limitations. ProSmart will only currently sample down to 6 Hz. With low speed applications this may miss the 1x run speed vibration but in most cases is sufficient to monitor bearing failures.

Oil/Lube Based Bearings (Babbitt, sleeve, journal etc.)

ProSmart uses an accelerometer to detect bearing faults and machine health. Since oil/lube based bearings do not contain rolling elements mechanical motion is not transferred to the machine. Larger rotating equipment tends to use oil/lube based bearings. Lube base bearings need to be monitored with an "Eddy Current Probe" or "Displacement Transducer" (aka Proximity Probe). These sensors can be brought into ProSmart as an overall value through the 4-20mA connection. This will measure the clearance between the shaft and the sensor.

SENSOR INSTALLATION

SV-03 PRE-INSTALLATION

1. Before installing the SV-03 Sensor, identify bearing locations on each machine to be monitored. Record locations on a machinery diagram for future reference.

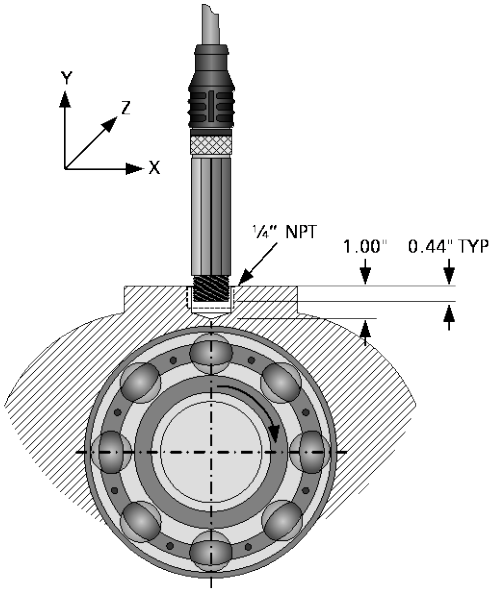
   NOTE – Sensors should not be mounted in environments exceeding 190°F.

2. If it is desired to mount the sensor using a 1/4-28 stud instead of the standard ¼ NPT threads, a Mounting Adapter is available. Reference part number A08560A.

3. For epoxy mounting using the MK-04 adapter kit, the mounting locations should first be scraped free of paint and cleaned of oil and grease. Any material such as these will attenuate the vibration readings if it is between the sensor and the machine. Grease, dirt, and loose paint will cause the epoxy to not adhere properly.

4. For temporary mounting a magnetic mount solution is available. The magnetic mount has a ¼-28 UNF stud that screws into the MK-04. The magnet mount is a rare earth flat magnet.

5. If mounting the MK-04 adapter on a curved or irregular surface, such as on the side of a motor, for best results the mounting location should be spot faced to provide a 1.25 inch diameter flat area.



Axial View

SV-03 INSTALLATION

⚠ DANGER

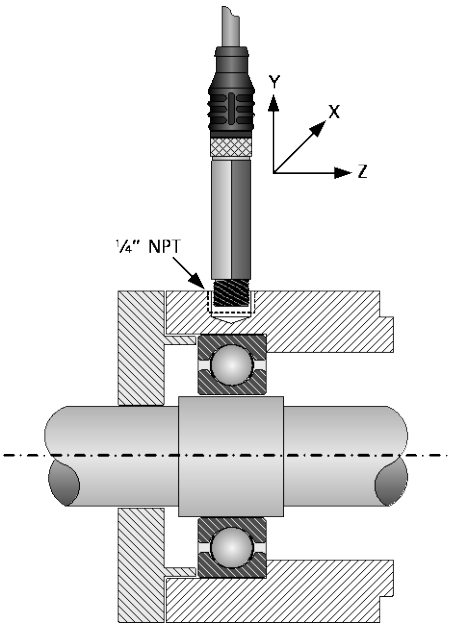
During installation all equipment must be disconnected from the power supply without any possibility of being made live (Lockout/Tagout). The Safety Instructions in this Installation and Operation Guide must be followed. Failure to do so will result in serious injury or death.

1. Locate an appropriate location such as above a rolling element bearing to install the SV-03 sensor. Before installing the sensor cable, verify that the cable will reach the Data Monitor and will not interfere with the operation and maintenance of the equipment. Extension cables are available if needed to ensure proper cable routing.

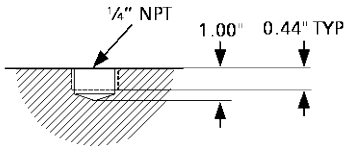
2. A ¼" NPT tapped hole is needed for installation of the SV-03 sensor. Mark the position of the hole on the desired equipment to monitor.

3. Drill and tap a ¼" NPT hole. Do not break through the casting of the bearing frame. Take extra caution not to leave any metal particles in the hole as this may affect vibration and temperature sensing.

4. Apply thermal conductive thread sealant – Loctite 243 to the threads of the SV-03 sensor.



Side View

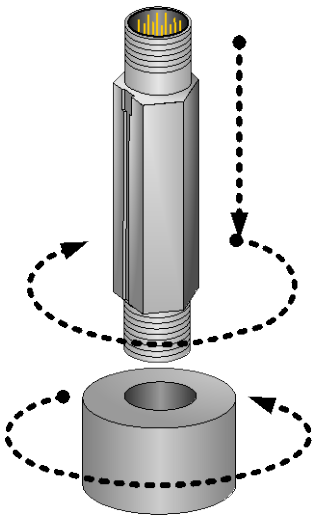


Bottom Drill

SENSOR INSTALLATION

5. Thread the SV-03 sensor into the tapped hole. The preferred orientation of the sensor slot (denoting the Z – axis) is facing either the drive end (preferred) or the non drive end (alternative). This is critical to ensure that the correct vibration readings are recorded for X, Y, and Z axis.
6. The Data Monitor should be powered down before plugging in the sensor. This will avoid false spikes of data when the sensor is connected.
7. Plug the SV-03 sensor cable onto the sensor and then into a V/T receptacle on the Data Monitor. The connectors are keyed and only connected in one orientation. Do not use force when connecting the sensor cables to the Data Monitor since this may damage the Data Monitor and/or the cable connector. The connector with more pins is connected to the sensor and the connector with fewer pins is connected to the Data Monitor.

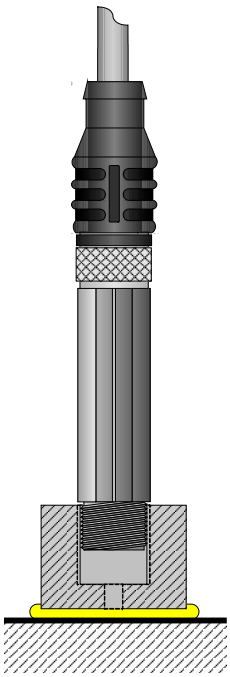
   NOTE – Do not power on the Data Monitor until all sensors are properly installed and connected to the Data Monitor. Connecting a sensor to a powered DM can cause a voltage spike that may harm the sensor.
8. Ensure that the sensor cable is secured after mounting so that it does not move or flex continuously during machinery operation.
9. Verify the proper installation and operation of each sensor by viewing the sensor readings on the ProNet User Interface.



MK-04

Epoxy Mounting –
Installation steps to be performed are:

1. A 1.25" minimum diameter is needed to install the MK-04 mounting adapter.
   a. The location of the sensor determines the way a unit can be monitored. Ideally the sensor will be mounted as close to the bearing housing as possible and oriented in the proper direction.
   b. The equipment surface needs to be cleaned and free of heavy dirt, paint, oil, and grease.
   c. A wire-brush or grinding wheel works well for removing rust and paint. Make sure area is safe for hot work.
2. Apply thermal conductive thread sealant – Loctite 243 to the threads of the SV-03 sensor. Loctite 243 is provided with your MK-04 package.
3. Thread the SV-03 sensor into the ¼" NPT tapped hole of the MK-04. Secure the MK-04 to sensor by using a 9/16" wrench on the sensor and channel locks on the MK-04. DO NOT over tighten, the Loctite 243 will ensure that the sensor does not become loose due to vibration.



Epoxy Mounting

SENSOR INSTALLATION

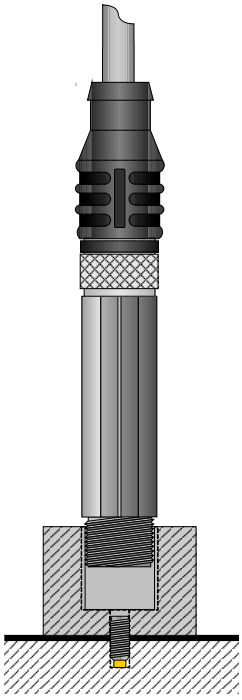
4. The mounting adapter comes with a Loctite 330 Kit (Epoxy). Crush the activator vial between your fingers. Using the cotton tip wet the surfaces that will be in contact with the Epoxy.
5. Break off the tip of the epoxy tube and apply the adhesive to the bottom of the mounting adapter. You can use the activator vial to spread the Loctite 330 on the mounting adapter. Follow instructions and recommended cure time on back of the Loctite 330 package.
6. Make sure that the notch on the sensor is pointed along the axis of the machine; either towards the back end of the motor (drive end - preferred) or towards the far side of the driven equipment (non drive end - alternate). Press and hold the mounting adapter to the equipment for approximately 4 minutes (longer if conditions require). The full cure takes 4-24hours.

SENSOR INSTALLATION

Stud Mounting –

Installation steps to be performed are:

1. A 1.25" diameter is needed to install the MK-04 mounting plate. Mark the desired area for the mounting plate and use spot face tool to level and clean the area.
    - A ¼"-28 UNF tapped hole is needed for MK-04 mounting stud. If a ¼"-28 UNF hole does not already exist, mark the position for the stud on the desired equipment to monitor and drill and tap accordingly.
    - Apply thermal conductive thread sealant – Loctite 243 to the threads of the mounting stud. Loctite 243 is provided with your MK-04 order package. Follow instructions on back of the Loctite 243 package.
2. Thread the mounting stud into the ¼"-28 UNF hole identified in step 1 above.
3. Apply Loctite 243 to the remaining threads of the mounting stud.
4. Thread the mounting plate onto the mounting stud. Gently hand tighten. Leave some slack to correct for orientation.
5. Thread the SV-03 sensor into the ¼" NPT tapped hole of the MK-04. Using a 9/16" wrench on the sensor tighten the sensor and MK-04 together. DO NOT over tighten, the Loctite 243 will ensure that the sensor does not become loose due to vibration.
    - Make sure that the notch on the sensor is pointed along the axis of the machine; either towards the back end of the motor (drive end - preferred) or towards the far side of the driven equipment (non drive end - alternate).
    - If it is not possible to get the sensor in the preferred orientations be sure to get the orientation 90 degrees from the preferred orientation.
6. Follow SV-03 installation instruction from steps 6 through step 9.



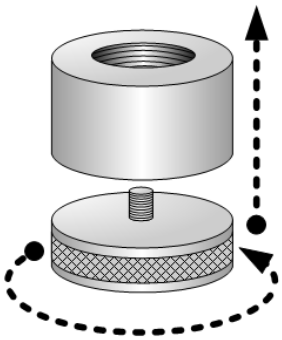
Stud Mounting

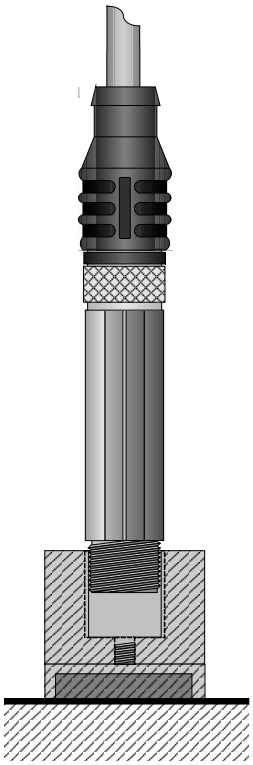
SENSOR INSTALLATION

Magnet Mount –

Installation steps to be performed are:

1. A 1.25" diameter is needed to install the MK-04 mounting plate with the magnetic adapter. Mark the desired area for the mounting plate and use spot face tool to level and clean the area.
    - Apply thermal conductive thread sealant – Loctite 243 to the threads of the magnetic adapter and threads of the sensor. Follow instructions on back of the Loctite 243 package. Loctite 243 is provided with your MK-04 order package.
2. Thread the magnetic adapter into the ¼"-28 UNF hole identified in step 1 above.
3. Thread the SV-03 sensor into the ¼" NPT tapped hole of the MK-04. Using a 9/16" wrench on the sensor and channel locks on the MK-04 tighten the sensor and MK-04 together. DO NOT over tighten, the Loctite 243 will ensure that the sensor does not become loose due to vibration.
4. Place the sensor on a ferrous surface. Make sure that the orientation is correct. The preferred orientation of the sensor slot (denoting the Z – axis) is facing either the drive end (preferred) or the non drive end (alternative). This is critical to ensure that the correct vibration readings are recorded for X, Y, and Z axis.
5. Follow SV-03 installation instruction from steps 6 through step 9.





Magnet Mount

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PRONET USER GUIDE

This section is devoted to the ProNet Graphical User Interface.

Step	Description
	ProNet User Guide
1	Logging into ProNet
2	Updating User Account Profile
3	Dashboards
4	My Machines
5	Data and Trending
6	Analytical Features
7	Reports

PRONET USER GUIDE

1 LOGGING INTO PRONET

GETTING STARTED

Browser Requirements: Internet Explorer v6+

The recommended display resolution is: 1280 x 1024 pixels

Right-click Desktop → Properties / Settings

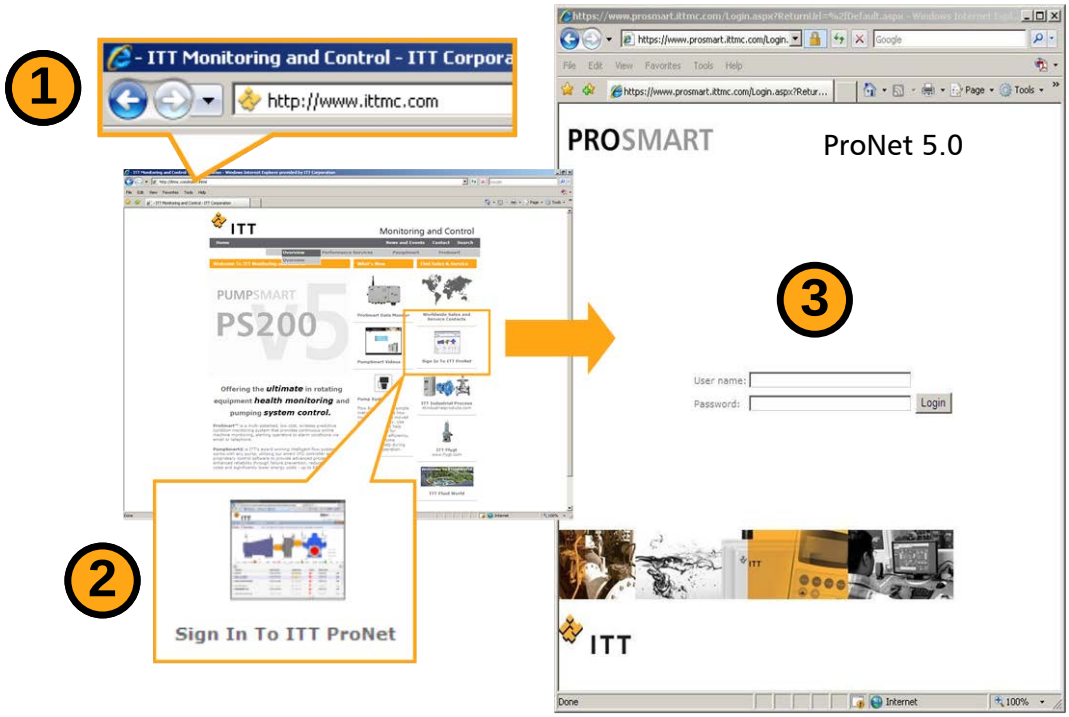
DPI Setting: Normal Size (96 DPI)

Right-click Desktop → Properties / Settings / Advanced / General

Website:

http://www.ittmc.com *OR* https://www.prosmart.ittmc.com

Login:



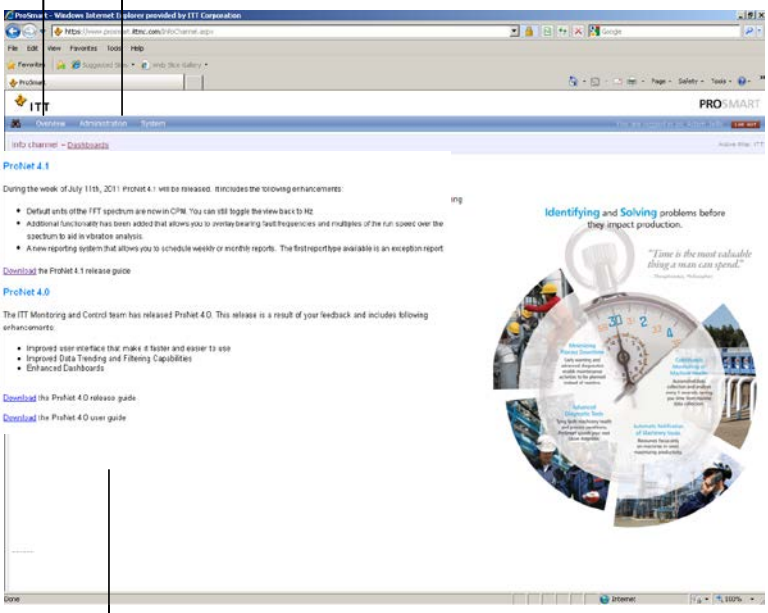
PRONET USER GUIDE

WELCOME TO PRONET

Once you have successfully logged into ProNet, you will typically be greeted by the ProNet Welcome screen. This screen serves as your gateway to online monitoring and includes some key features. You may also be greeted by a dashboard screen. Company Administrators can configure the rules for the users in that company.

Overview
Your primary selection for viewing and maintaining ProSmart devices. Choices:
- Dashboards
- My Machines
- My Reports

Administration
Administration allows you to add users, define companies and/or operating units, as well as administer different machine types.

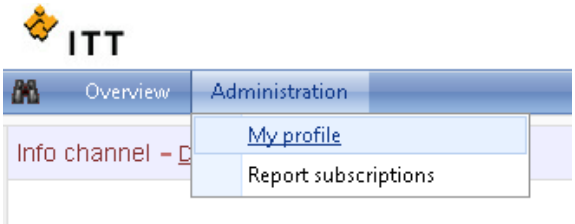


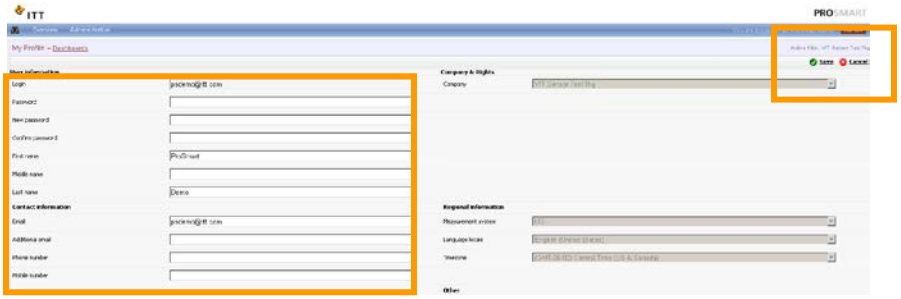
News and Notes
This area is used to inform you of new features, platform status, and other information beneficial to your use of ProNet.

2 UPDATING USER ACCOUNT PROFILE

New user account request needs to be submitted to the plant ProSmart supervising user or ProSmart administrator. You will be notified with your ProNet username and temporary password once your account is created.

You may change your account password, email address, phone number, measurement system, and timezone. To access your profile place your cursor over the main Administration menu option and select My profile.





EMAIL AND ADDITIONAL EMAIL:

You must provide a valid email address to receive email notification of your equipments' alarm conditions. ProNet allows up to two email addresses to receive alarm notifications.

PHONE NUMBER AND MOBILE NUMBER FORMAT:

ProNet will only allow plus sign and 10 digit phone number (without any space or dash) format. Example: +18662615612

MEASUREMENT SYSTEM:

You have two options to select from – US and Metric units

TIMEZONE:

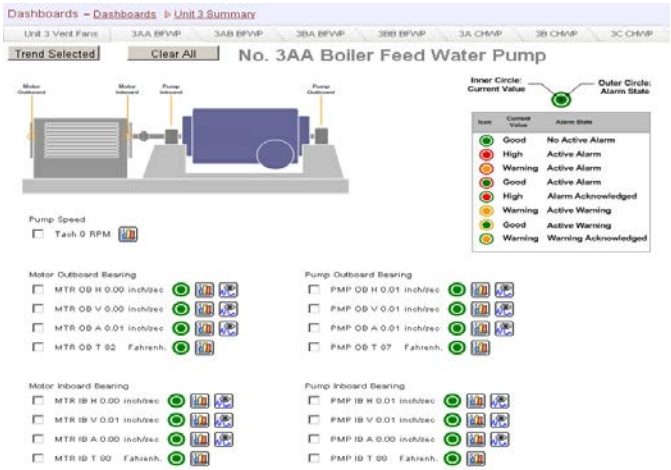
Make sure your profile timezone is correct. Data is shown in your local timezone in ProNet. If it's not correct please contact your ProSmart supervising user or ProSmart administrator.

NOTE: Make must save before exiting My profile page or view for your changes to take effect. Save icon is located on the upper right-hand corner of My profile page.

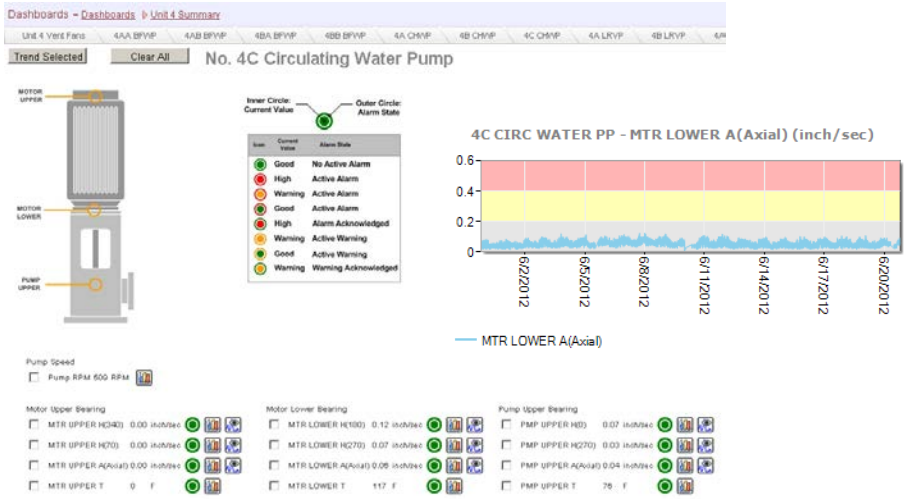
3 DASHBOARDS

ProSmart continuous machinery monitoring system is designed for multi-plant predicitive maintenance programs.

ProNet Dashboards take the abstract nature of your machine data and ties it into a visual representation of your machine. ProNet utilizes an easy to understand graphis to help quickly vizualize the condition of each machine. From 'Green-on-Green', meaning everything is okay to 'Red-on-Red' to indicating an active alarm state.



Above is a typical layout for a customized Equipment Level Dashboard. The dashboard display and breaks out the sensors. If you hover your mouse over the sensor a "Quick View" window will appear (sample shown below). The "Quick View" trends 2 weeks worth of data to give you a quick glance at how the equipment has been operating.



PRONET USER GUIDE

ALARM SUMMARY ICON

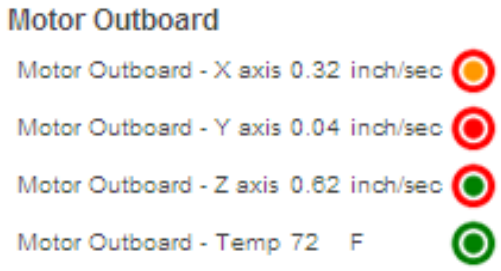
Next to each sensor name there is a colored bulls-eye (as shown at the bottom). The bulls-eye represents the machine's health for that particular sensor.

Icon	Alarm State *Outer Ring*	Current Level *Inner Ring*
	No Active Alarm	Good Below Warning Level
	Active Alarm	Good Below Warning Level
	Active Alarm	Warning Above Warning Level Below Alarm Level
	Active Alarm	Good Below Warning Level
	Active Alarm	Alarm Above Alarm Level

Current Level –
The current state of the machine acts as real time alarming. If the machine is in alarm this circle is showing red. If it is at an acceptable vibration level then it is green.

Alarm State –
The Alarm State acts as an alarm historian. If a sensor reaches an alarm threshold and will maintain the worst alarm state color until it is acknowledge by a user.

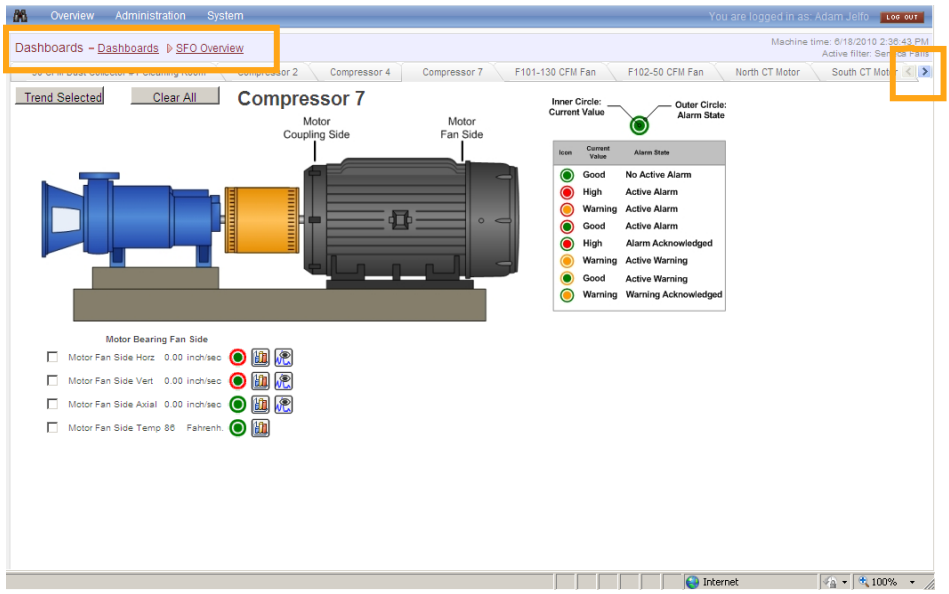
For the example shown below the equipment has warnings and alarms. The inner circle represents the current state of the machine. The outer circle represents the alarm state. In the example above the "Motor Outboard – Z axis" shows the outer circle red and the inner circle green; this means that the machine's current operation in with the set limits but was previously in an alarm condition. The key below shows the possible combinations and their meanings.



PRONET USER GUIDE

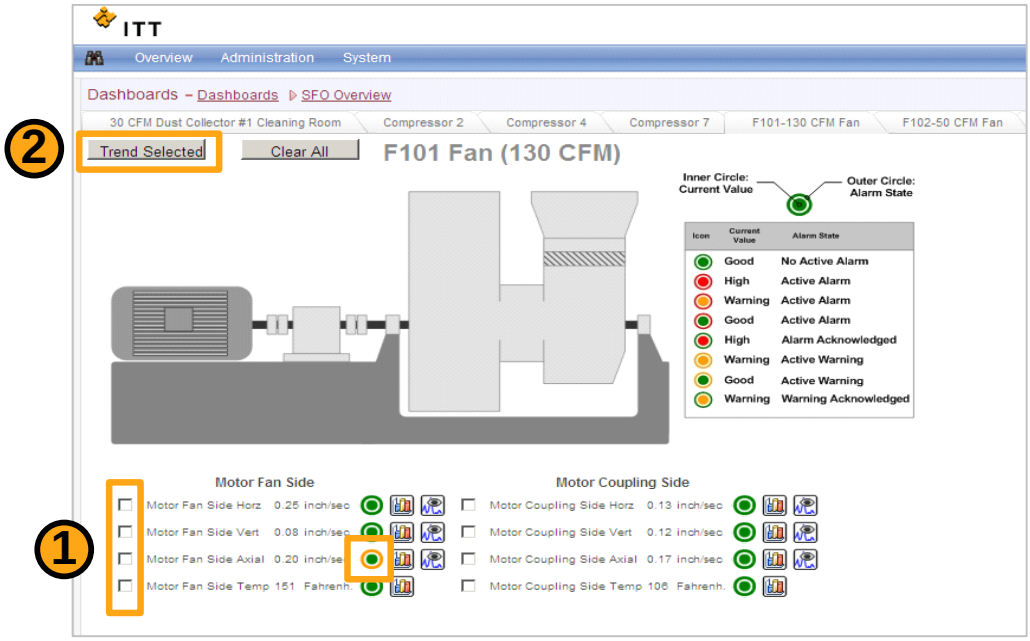
BREADCRUMBS

The Dashboard "Breadcrumbs" feature of ProNet allows the user to easily navigate back to previously viewed pages. The Dashboard link will always be available to quickly take the user to the primary dashboard. The "Scroll Link" will be active if the number of dashboard tabs exceeds the page width.



TRENDING DATA

Trending data can be easily done from the dashboard. Simply click the empty check box next to the desired sensor (multiple sensors can be selected) and then click the "Trend Selected" button. Users who want to see a vibration sensor trend with FFT event icons (when an FFT was captured) can select the trend icon to the right of the sensor; for all other sensor types this icon will pull up a trend only.

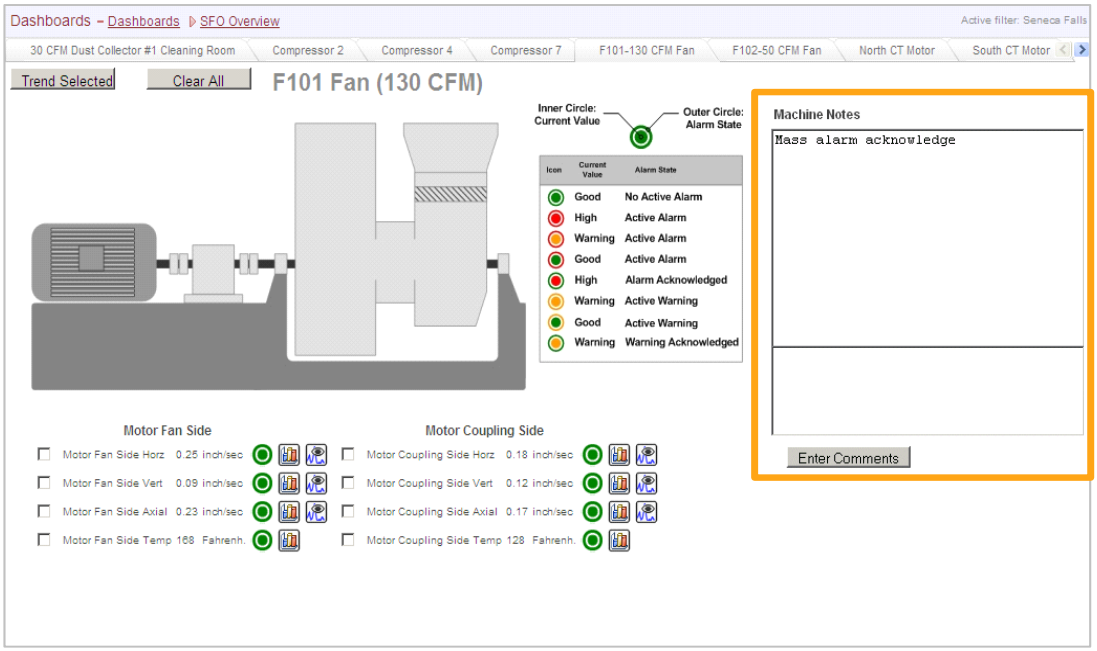


Alarms are able to be acknowledged directly from the dashboard by clicking on the sensor "bulls-eye".

PRONET USER GUIDE

MACHINE NOTES

"Machine Notes" is available to customers that purchase a customized dashboard. This feature allows users to post comments about the machine, alarm conditions, and other maintenance related activities. The user types a comment into the lower text box (see picture below) and then clicks "Enter Comments." The comment will then become displayed in the upper text box for future users to see. The Machine Notes can double as a maintenance log and can be exported into excel for record keeping.



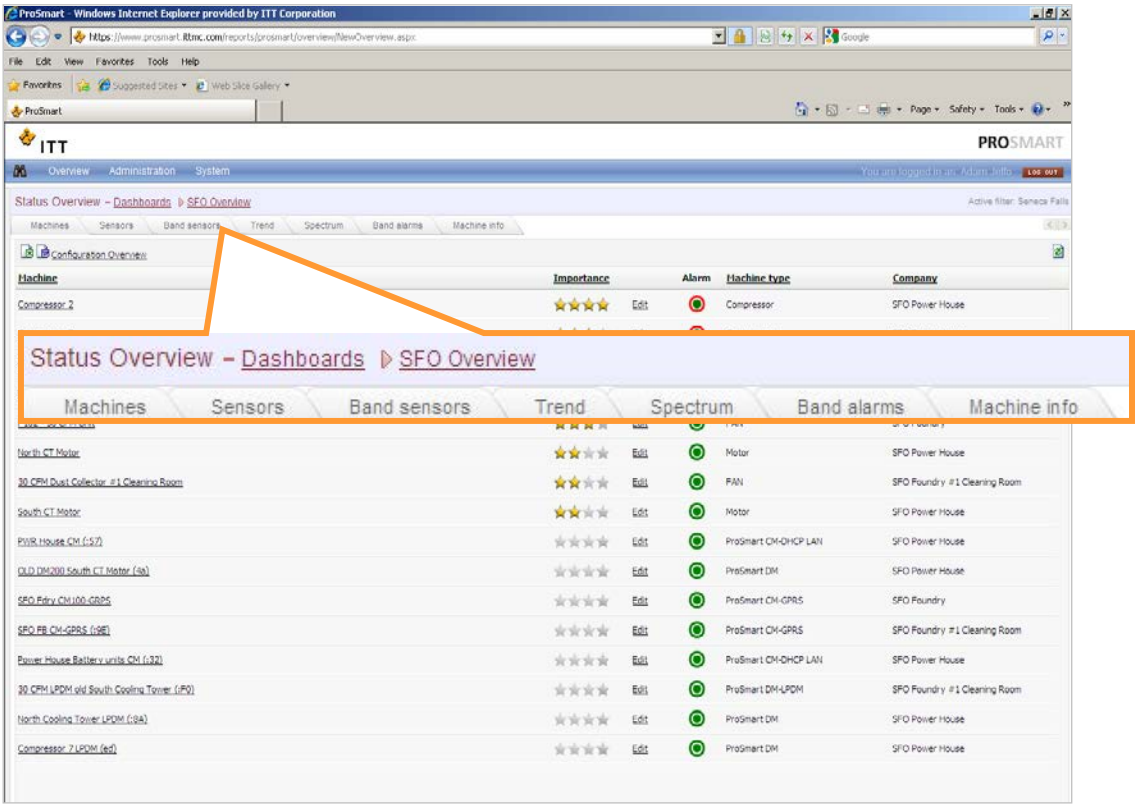
4 MY MACHINES

The My Machines page houses more information than the dashboards, which is why this page makes use of lists and tabs to organize information. When you trend sensors you are automatically navigated to the My Machines page.

TABS AND RELATED FUNCTIONS

Additional information about selected machine

- SENSORS – Provide listing of all physical sensors of selected machine
- BAND SENSORS – Provide listing of all band (aka window) sensors of selected machine
- TREND – Window for viewing selected sensor data
- SPECTRUM – Window for viewing selected FFT/Time Waveform data
- BAND ALARMS – Graphical view of a machines band sensors (aka window sensors)
- MACHINE INFO – Information regarding machine and alarm acknowledgements

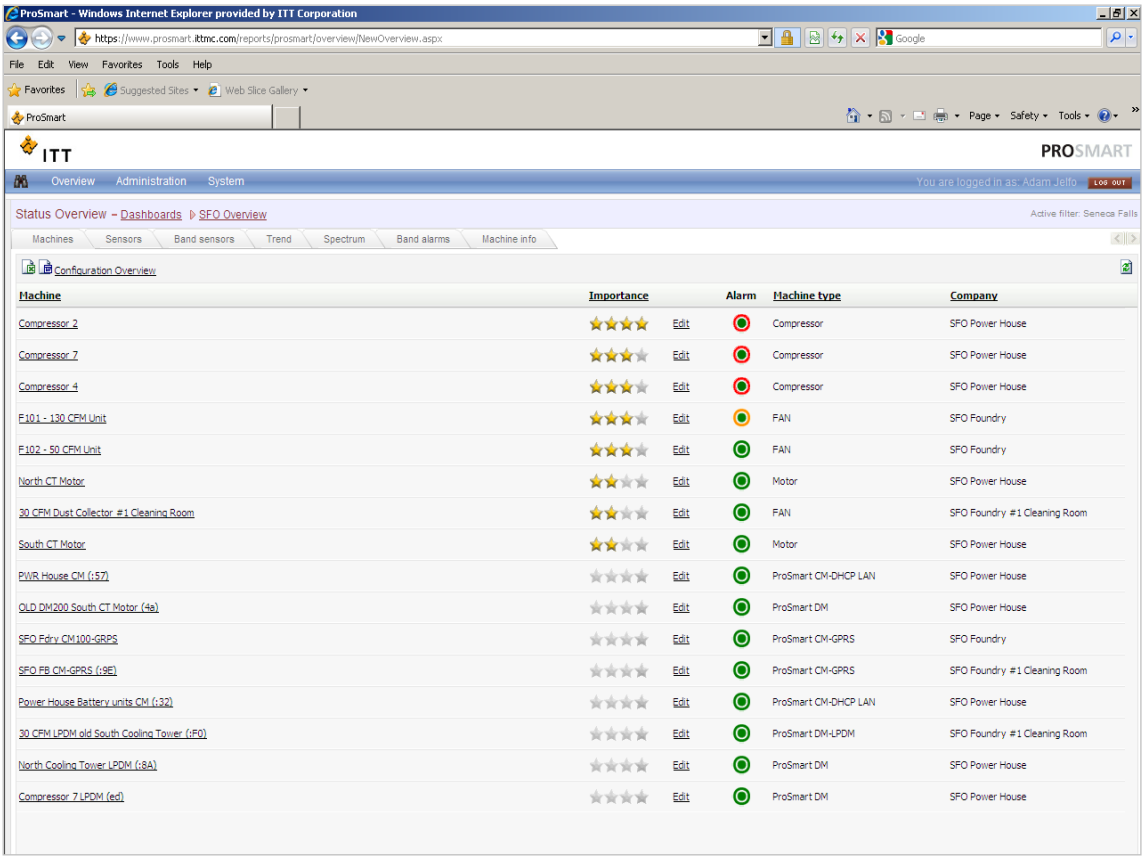


PRONET USER GUIDE

MACHINES TAB

The My Machines page is the list view of equipment. It displays the machine name, the importance level, alarm summary icon, the machine type, and the company it resides under.

The machines are automatically sorted by importance and alarm levels. Machines are first sorted by a user defined importance level, by the alarm state, and then by current operation state. This will allow you to rapidly sort through machines and sensors to find critical data.



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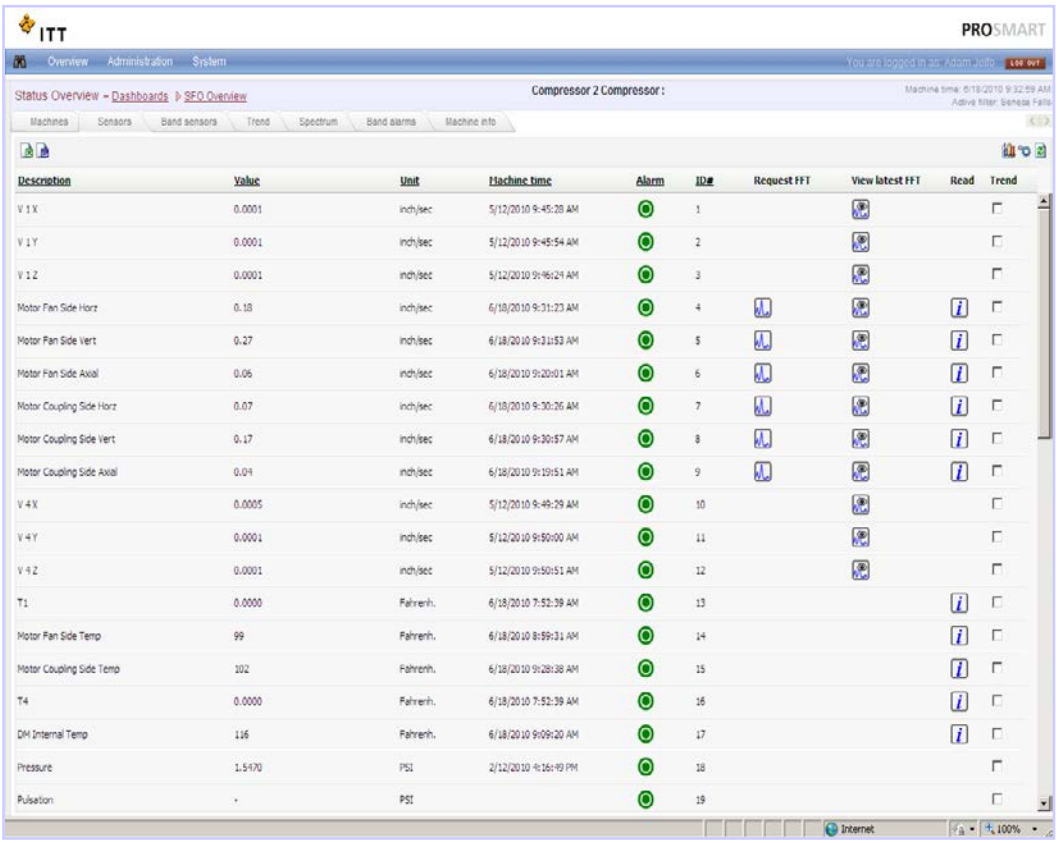
PRONET USER GUIDE

SENSOR TAB

Selecting the machine's name from the Machine tab will open the Sensors tab. This will display available sensor groups and sensor values. Sensor data can be trended, spectrum data viewed, and sensor readings requested from this single page.

This page displays:

- Sensor description
- Sensor last recorded value
- Unit associated with sensor reading
- Last time the sensor value was recorded
- Alarm Icon
- Trending and Data Request Icons



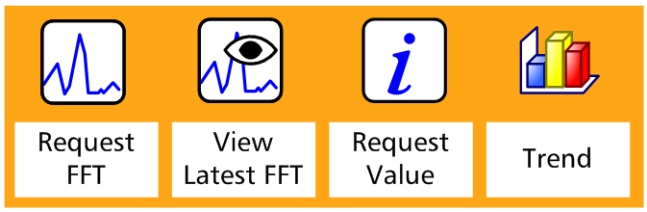
NOTE – If the machine time is greater than 8 hours old, the sensor may be disabled or the DM is not reporting. If sensor value is "---", it means the DM has stopped communicating with the platform. It is recommended to check power on CM and DM.

PRONET USER GUIDE

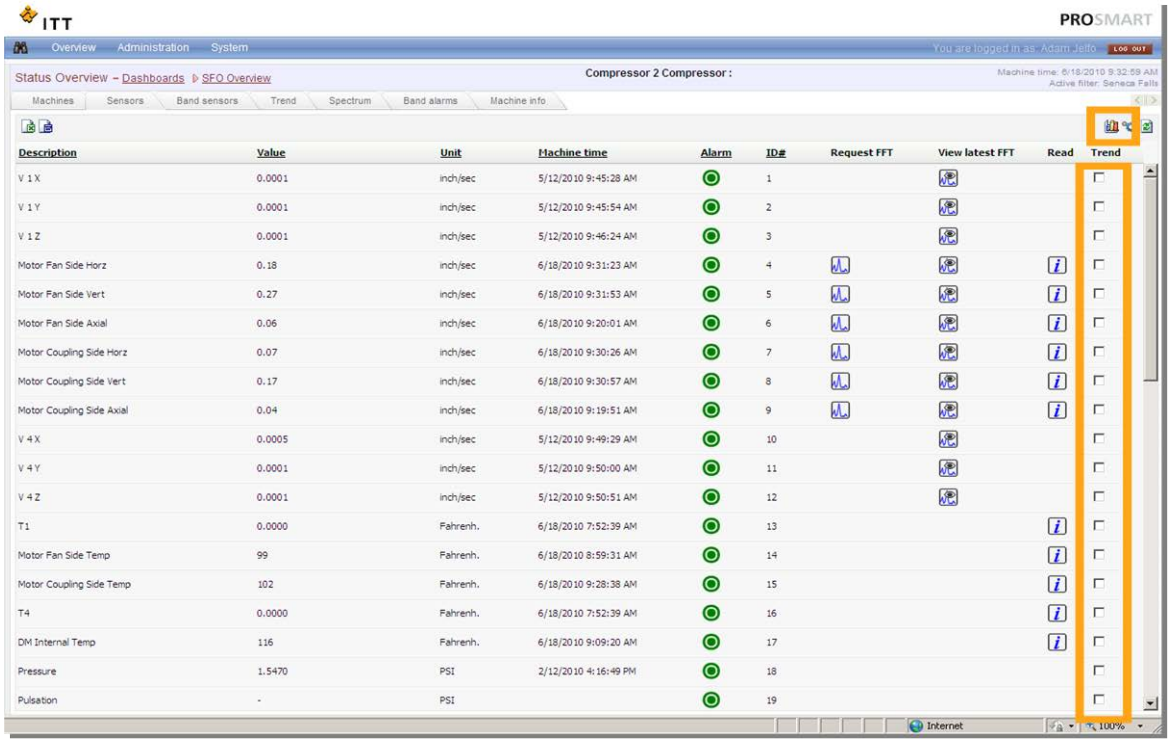
Trending & Requesting Data

Icons on the right side of the screen are used for trending and requesting data (as shown below).

REQUEST FFT/TWF – Request an FFT and/or Time Waveform to be taken
VIEW LAST FFT/TWF – Plot FFT and/or Time Waveform data
READ – Request a sensor reading to be taken
TREND – Plot sensor data against time



To trend data from the Sensors tab, select the desired sensor by clicking on the empty box at the right side of the screen. Once all the desired sensors are selected, click the icon to view the graph of the trends of the selected sensor(s).

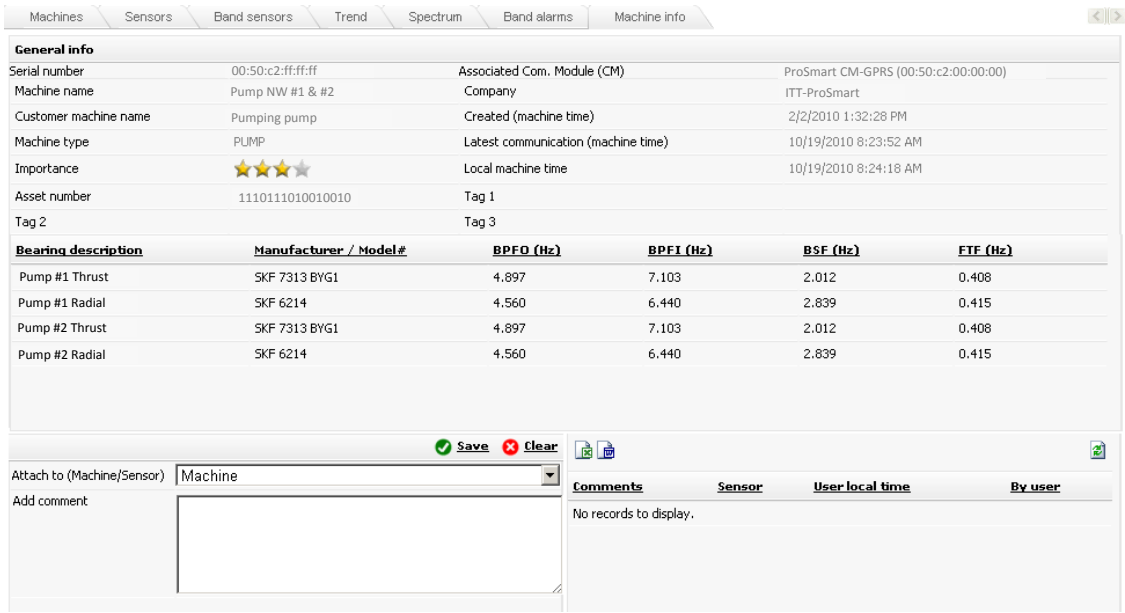


PRONET USER GUIDE

MACHINE INFO TAB

The Machine Info tab contains:

- The DM name, DM's MAC ID, & Company
- Last communication time
- Importance level
- Machine type
- Bearing information (BPFO, BPFI, BSF, FTF)
- Machine Notes (Record of cleared alarms and comments.)



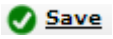
Alarm Acknowledgements

When an alarm is cleared a note will be made of what alarm was cleared, by whom, and at what time.

User Comments

A user can add comments to a machine or sensor. First a user must select the area they would like to comment on

Then type the comment into the text field.

Then click 

The comment will appear to the right of the text field

5 DATA AND TRENDING

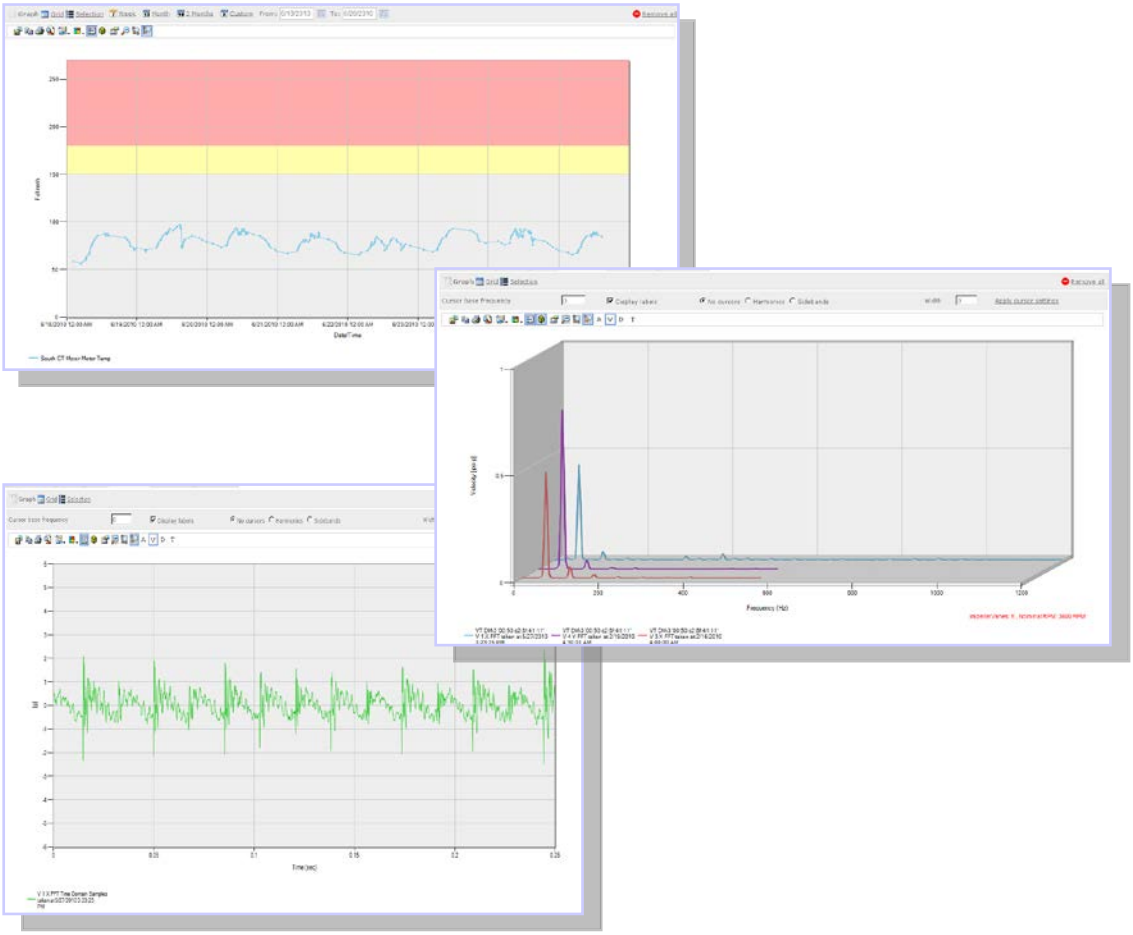
TYPES OF DATA

Overall Vibration
Overall is calculated as a Root-Mean-Squared (RMS) value.

Fast-Fourier Transform (FFT)
ProSmart has the ability to analyze the time-waveform data collected from a vibration sensor using a Fast-Fourier Transform (FFT) Analysis in RMS (ips). Users are able to view the FFT value in Velocity (ips), Acceleration (g), and Displacement (mils)

- ***On Alarm*** – When a sensor goes into an alarm condition, ProSmart can be configured to automatically capture an FFT
- ***On Schedule*** – Automatic capture of FFT on calendar schedule
- ***On Request*** – On Demand

Time Waveform (TWF)
Users are able to view the raw data associated with a specific vibration spectral measurement. This is also known as Time Domain Spectrum (TDS).
This is on Request Only



PRONET USER GUIDE

VIEW OPTIONS

The trending windows have 3 primary ways to view the data

1. 

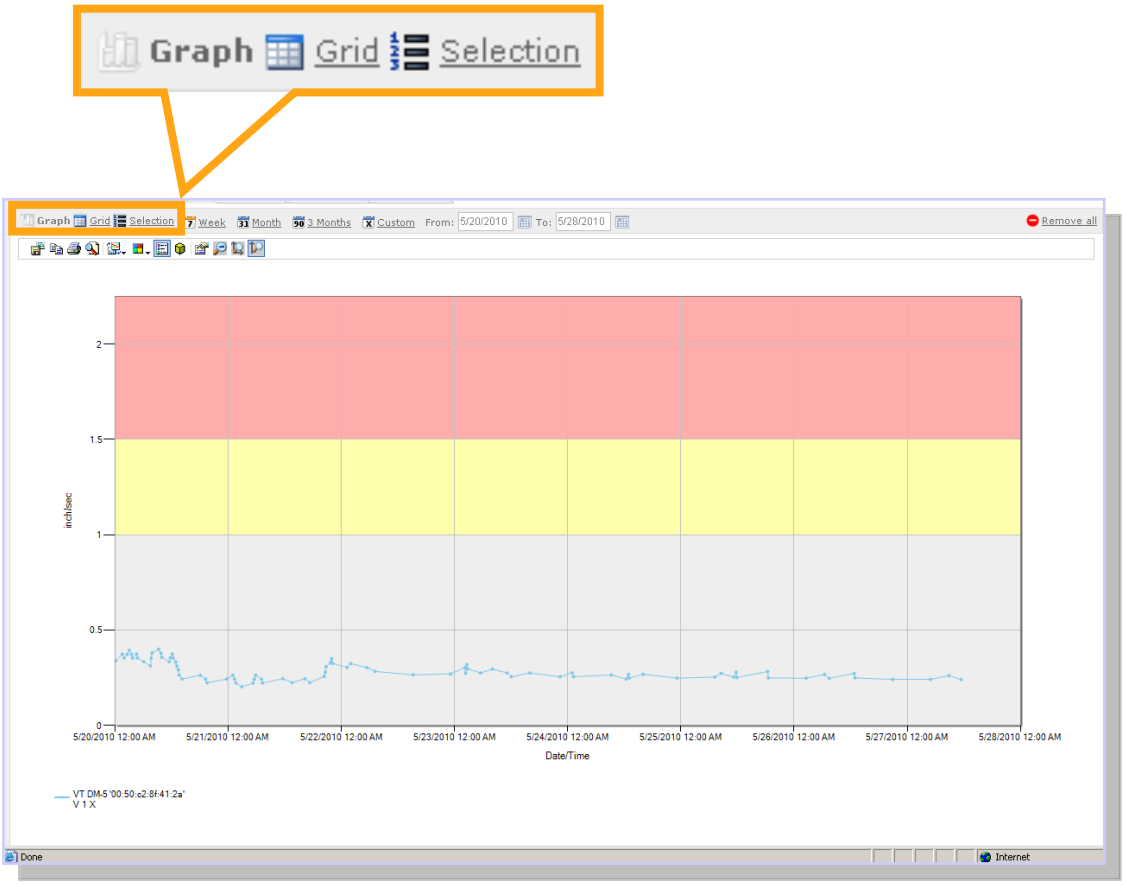
Graph is the graphical view of the data.

2. 

Grid view is a list of all the data points that make up the graph. This is where you would go to export the data points.

3. 

Selection is essentially the graph legend where you can remove a trend line or change the axis it is graphed on.



PRONET USER GUIDE

ALARM VALUES

ProSmart provides up to four alarm levels when monitoring data:

- High Alarm (Red Band)
- High Warning (Yellow Band)
- Low Warning (Yellow Band)
- Low Alarm (Red Band)

Alarm levels are set in the ProNet platform and then sent down to the Data Monitor. *(Tip: Yellow band represents warning and red band represents alarm thresholds)*

PRONET USER GUIDE

ZOOM

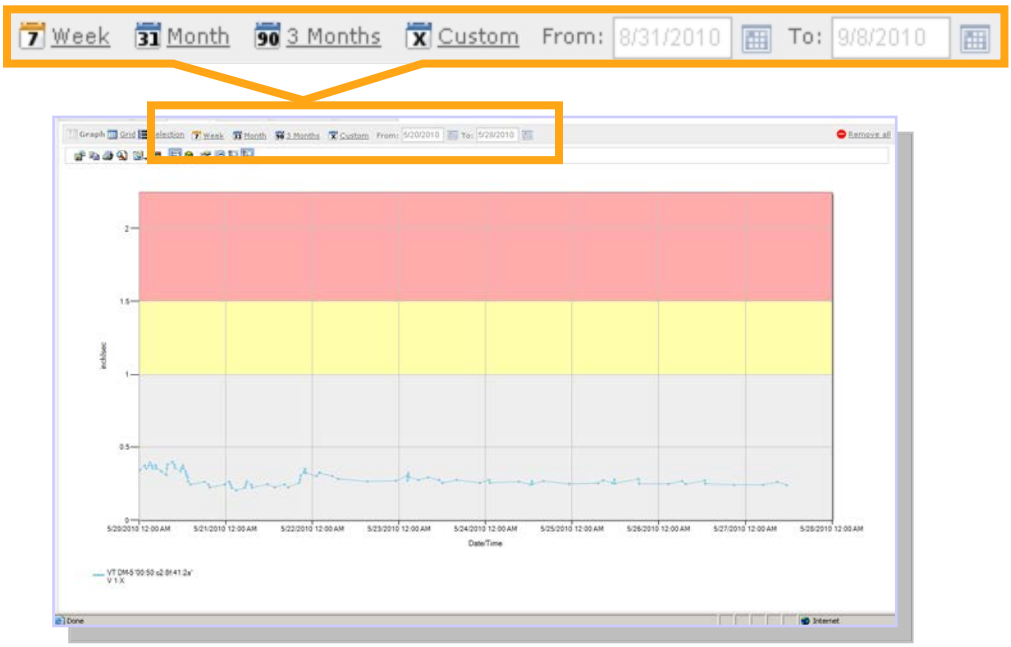
Click on the graph to initialize the starting point of the area which will be zoomed in to.
While still holding the left mouse button, drag your mouse (left or right) and let go when you have reached the end point of your desired zoomed in area.

- Select the  icon to reset the zoom level.
- Select the  icon enable zoom for x-axis only. (Default)
- Select the  icon enable zoom for x- and y- axis

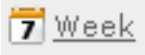
PRONET USER GUIDE

VIEWING HISTORICAL DATA

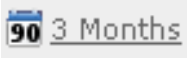
The date range selected can be changed from the top of the trend page. Orange calendar top indicates the current selection. Week (7 days) is shown below as currently selected.



Quick Select Date Filters:

- 

7 Day Trend (Default)
- 

31 Day Trend
- 

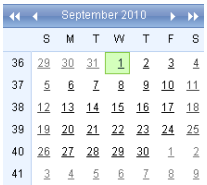
90 Day Trend

Custom Date Selection:

1. Click 

to edit date range. Once the Custom button is clicked the dates will be editable.

2. Set date range manually OR Select range from popup calendars



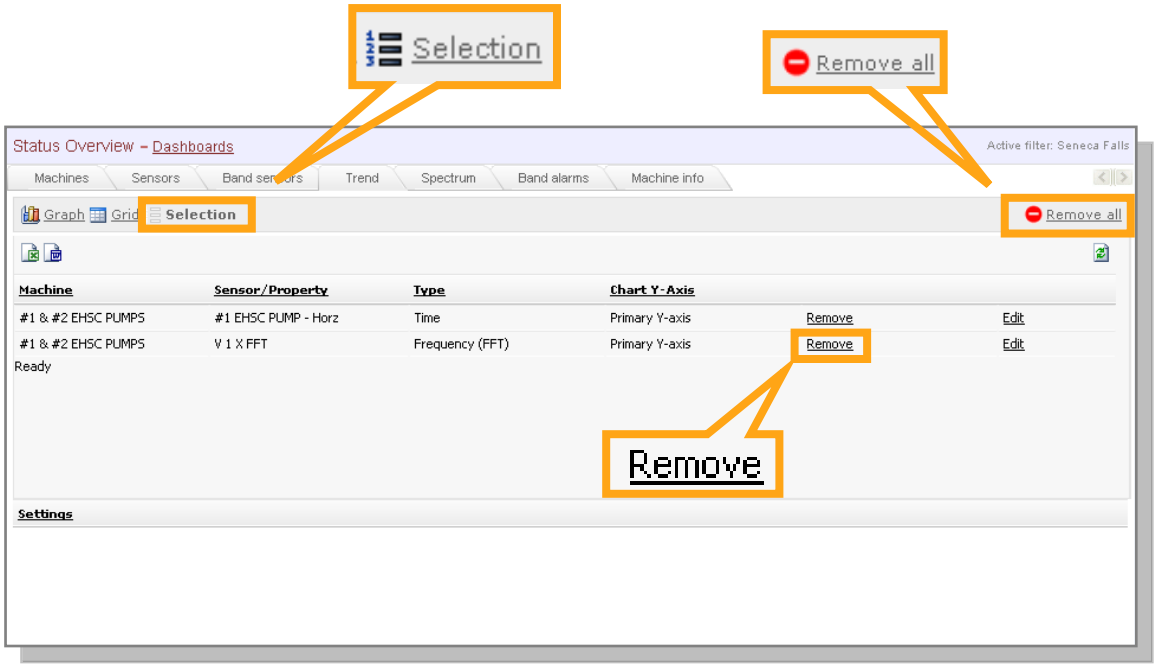
3. Once you have set both dates click 

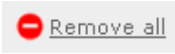
to activate the date range.

PRONET USER GUIDE

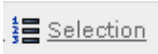
REMOVING TREND LINES

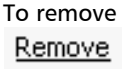
It is sometimes necessary to drop one or more trend lines from a graph while analyzing data. There are two primary ways to remove trend lines from a graph.



1. To remove all the trend lines from a graph simply click on the 

icon which is located near the upper right corner of the screen.

2. To remove only one sensor from the trend, go to the 

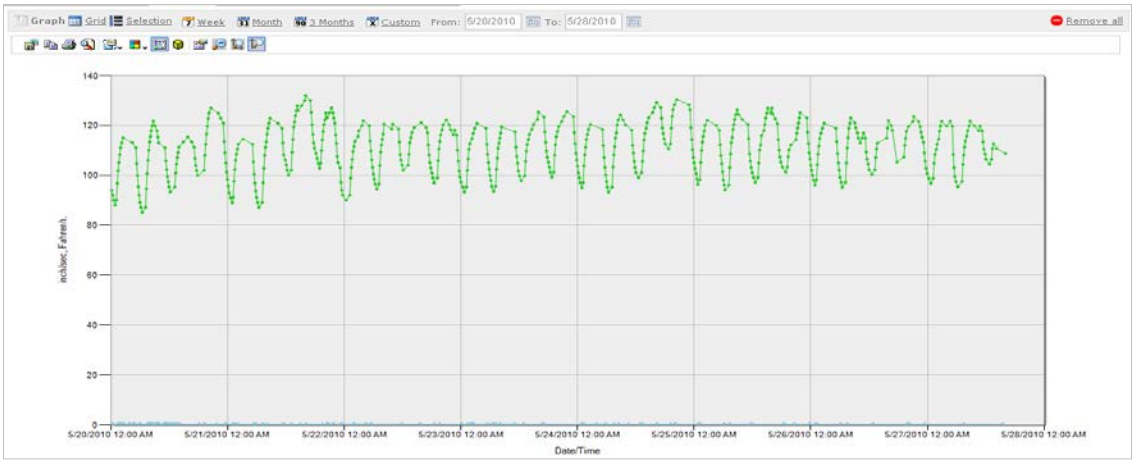
page and then click 

for the sensor you would like to remove.

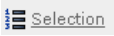
PRONET USER GUIDE

SECONDARY AXIS

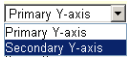
The Secondary Axis feature is used to view different data sets at the same time. As you can see from the screen shot below if temperature and vibration are graphed on the same axis, temperature will over power the vibration reading because of the difference in scales.



It is necessary to move one of these data sets to a "Secondary Y-axis" in order to establish if there is a correlation between vibration and temperature.
To set a trend to the "Secondary Y-axis" follow these steps:

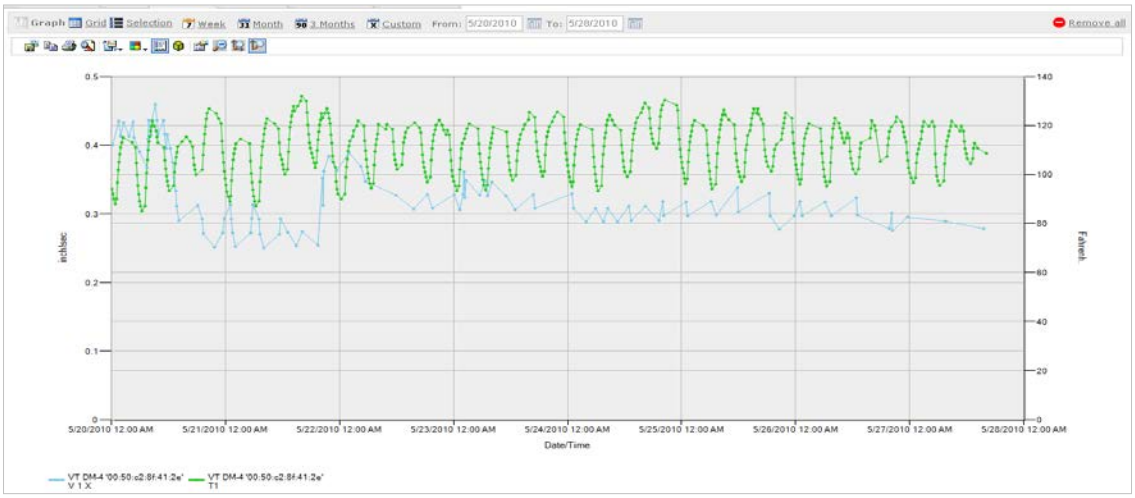
1. Click on 

2. Then click 

3. Select 

4. Click 

5. Click 

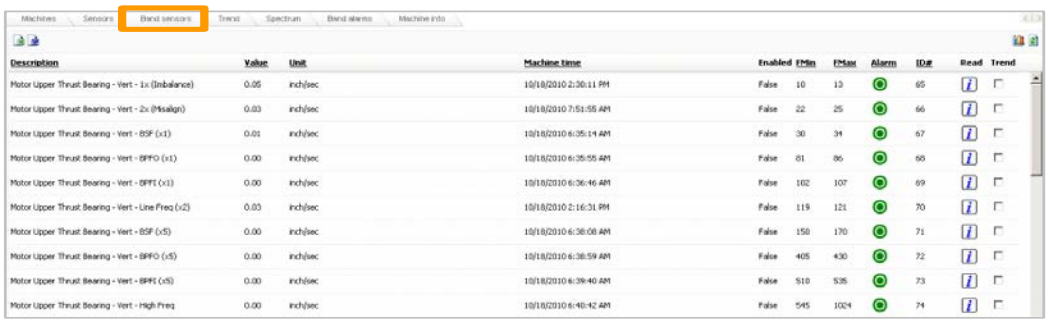


6 ANALYTICAL FEATURES

BAND SENSORS
(aka window sensors)

Band sensor (or window) is a frequency span that covers particular fault frequency. This band sensor is used to monitor the progression of a given fault.
There are 10 possible band sensors available per vibration axis. This means that there are 30 possible band alarms per physical sensor and 120 band sensors per DM.

There are 2 ways to view the settings; the first is the list view of band sensors under the Band Sensors Tab.



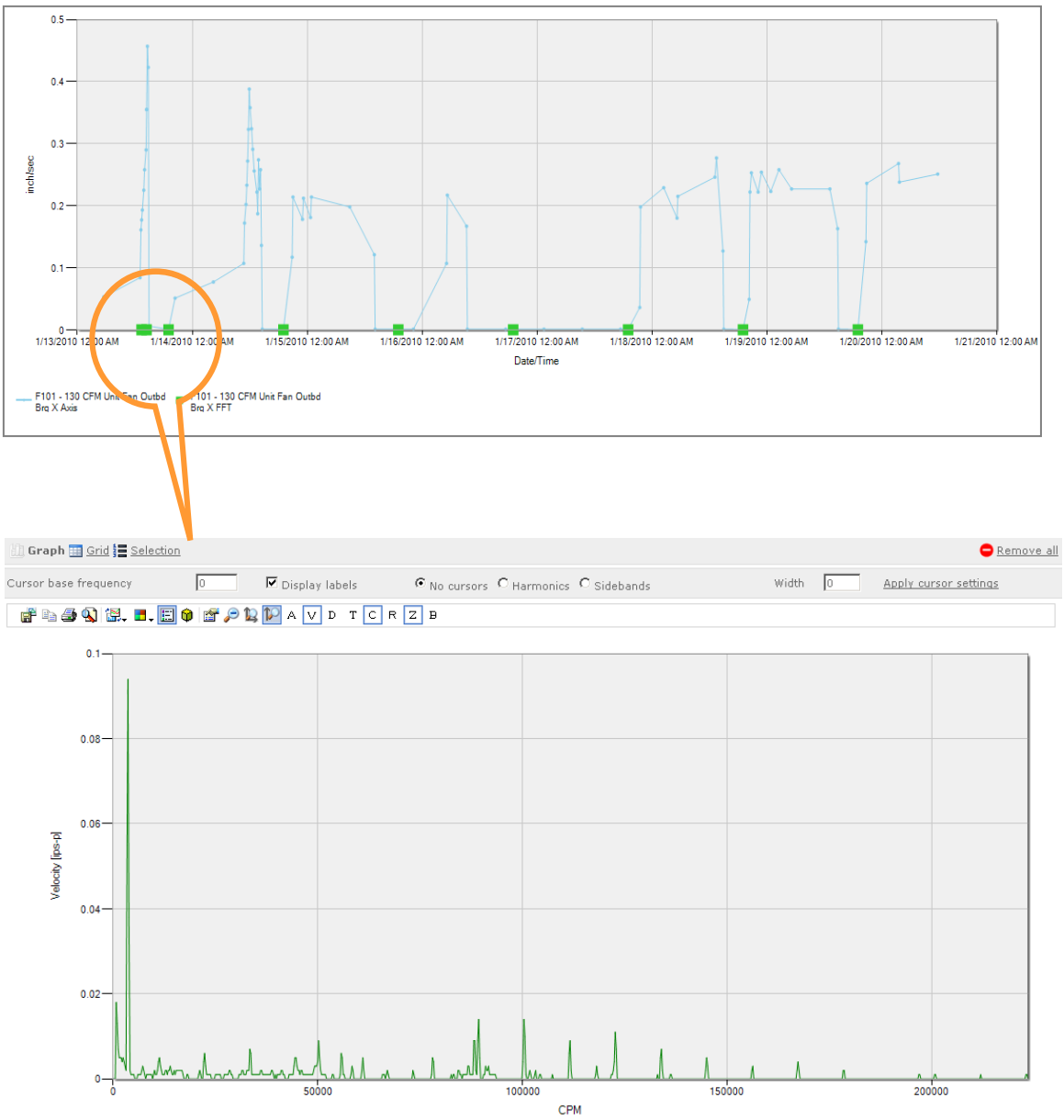
Description	Value	Unit	Machine time	Enabled	FMin	FMax	Alarm	ID#	Read	Trend
Motor Upper Thrust Bearing - Vert - 1x (Imbalance)	0.05	inch/sec	10/18/2010 2:30:11 PM	False	10	13		65		
Motor Upper Thrust Bearing - Vert - 2x (Misalign)	0.03	inch/sec	10/18/2010 7:51:55 AM	False	22	25		66		
Motor Upper Thrust Bearing - Vert - BSF (x1)	0.01	inch/sec	10/18/2010 6:35:14 AM	False	30	34		67		
Motor Upper Thrust Bearing - Vert - BPFO (x1)	0.00	inch/sec	10/18/2010 6:35:55 AM	False	81	86		68		
Motor Upper Thrust Bearing - Vert - BPFI (x1)	0.00	inch/sec	10/18/2010 6:36:46 AM	False	102	107		69		
Motor Upper Thrust Bearing - Vert - Line Freq (x2)	0.03	inch/sec	10/18/2010 2:16:31 PM	False	119	121		70		
Motor Upper Thrust Bearing - Vert - BSF (x5)	0.00	inch/sec	10/18/2010 6:38:08 AM	False	150	170		71		
Motor Upper Thrust Bearing - Vert - BPFO (x5)	0.00	inch/sec	10/18/2010 6:38:59 AM	False	405	430		72		
Motor Upper Thrust Bearing - Vert - BPFI (x5)	0.00	inch/sec	10/18/2010 6:39:40 AM	False	510	535		73		
Motor Upper Thrust Bearing - Vert - High Freq	0.00	inch/sec	10/18/2010 6:40:42 AM	False	545	1024		74		

The view shown below is a graphical view found under the Band Alarms Tab. User must select sensor they wish to view from the drop down menu. This displays the alarm and warning levels as well as the current value.

PRONET USER GUIDE

FFT EVENT ICONS

ProSmart will show when an FFT was taken for a trended sensor. This event icon will appear at the bottom of the vibration trend. The icon also doubles as a link. When the icon is clicked, the user will be navigated to the spectrum tab with the selected FFT displayed.



PRONET USER GUIDE

SPECTRUM DATA OPTIONS

Fast-Fourier Transform (Units)

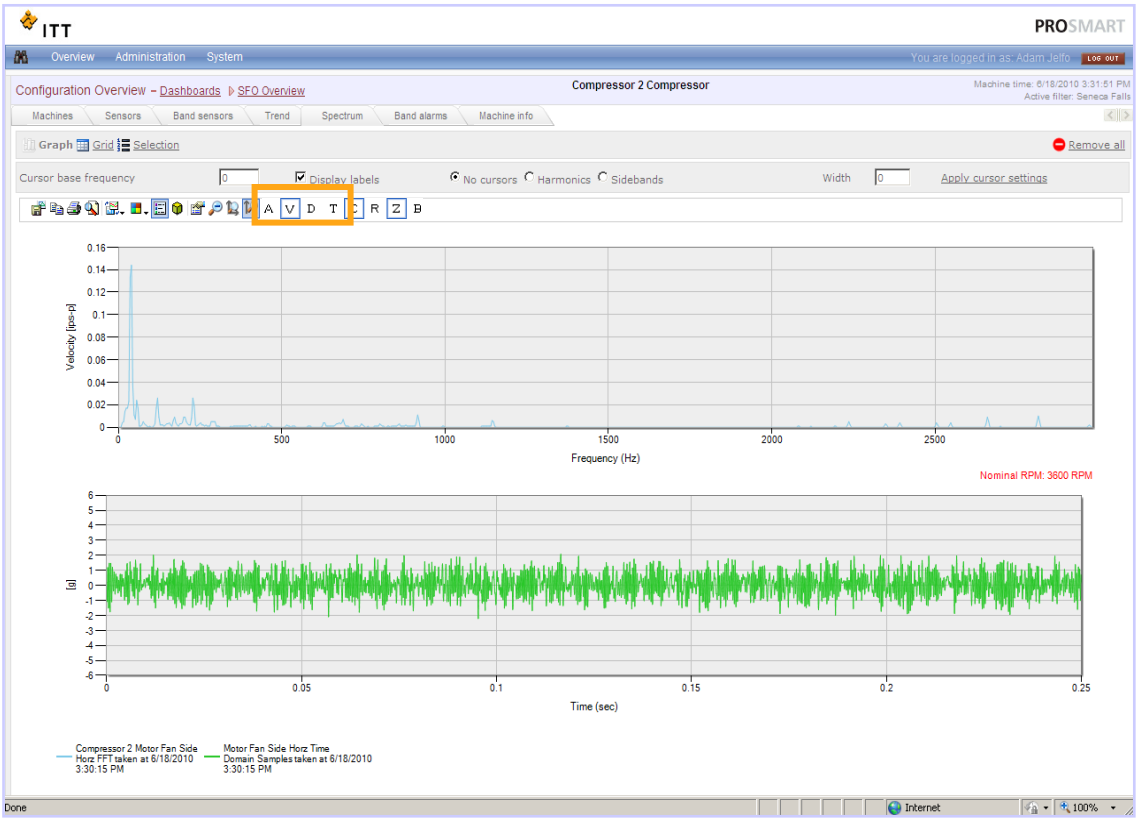
- A - Acceleration (g's)
- V - Velocity (inch/sec)
- D - Displacement (mils)

ProNet has the ability to make on-the-fly unit conversions to better meet the user's preferences.

Multiple Viewing Options

ProNet can display FFT and Time Waveform on the same screen as well as individually to aid in rapid diagnosis.

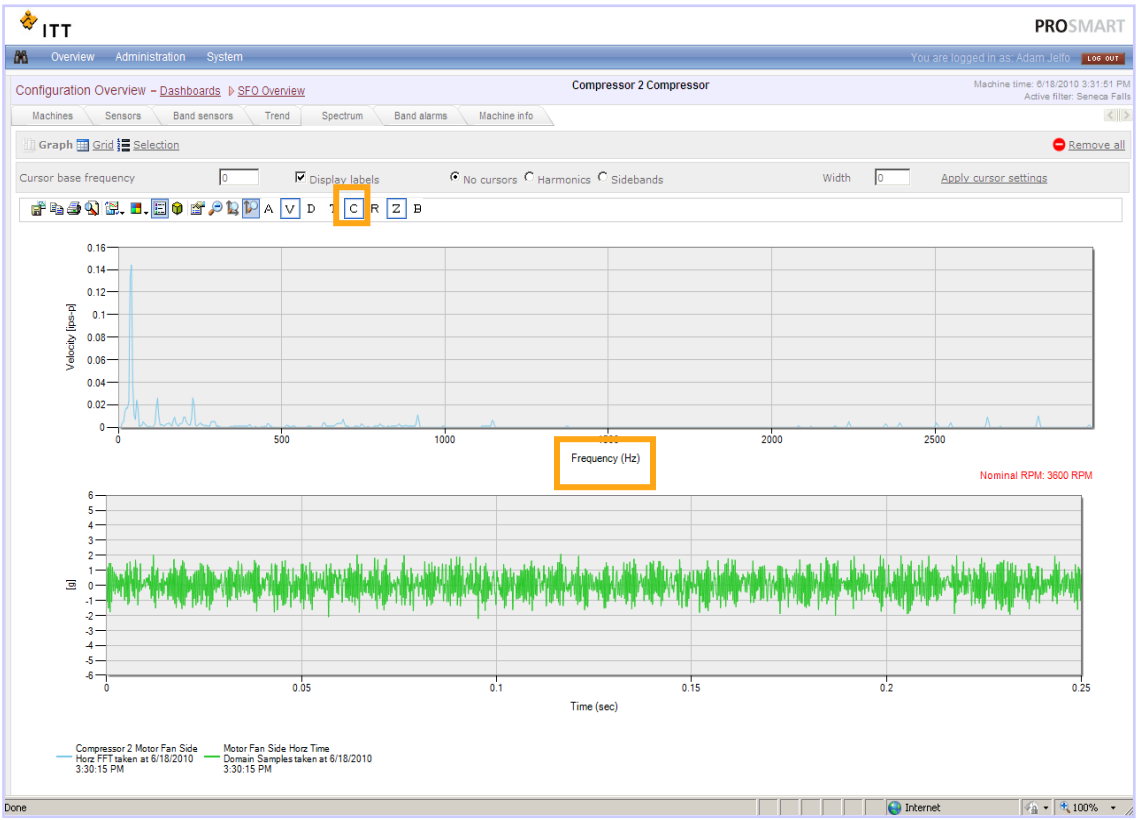
- Clicking "**T**" will toggle between three different graphing views, respectively
    1. FFT Only
    2. TWF Only
    3. FFT and TWF



TOGGLE CPM/HZ

PRONET USER GUIDE

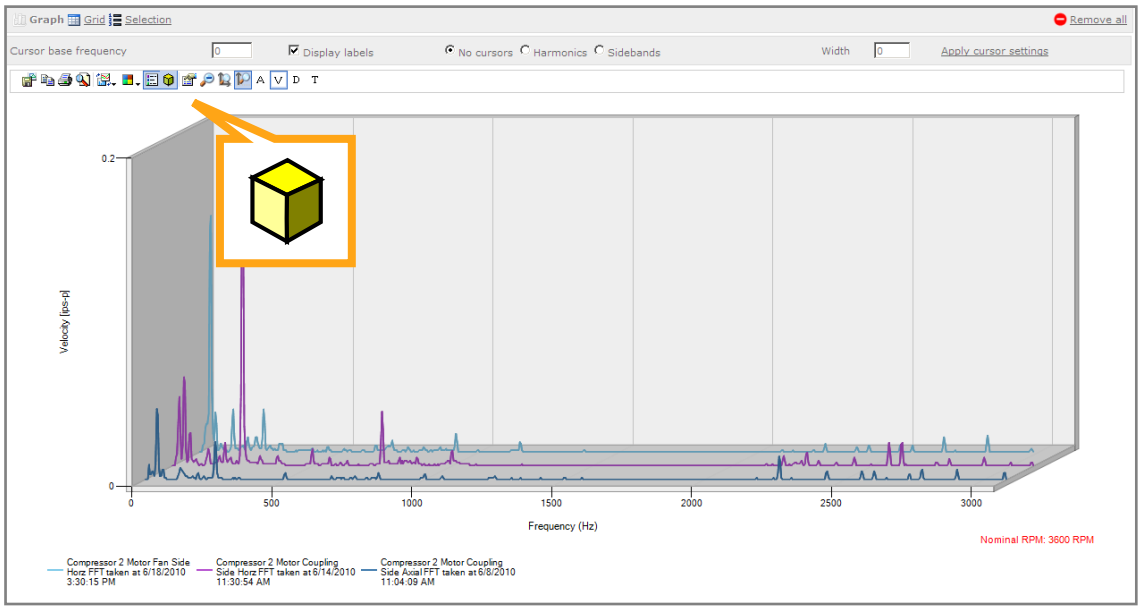
ProNet allows user the option to choose their FFT spectrum X-axis unit in either CPM or Hz. To switch between these two units, click the "**C**" at the top of every spectrum page. The default unit is Cycles per Minutes - CPM.



PRONET USER GUIDE

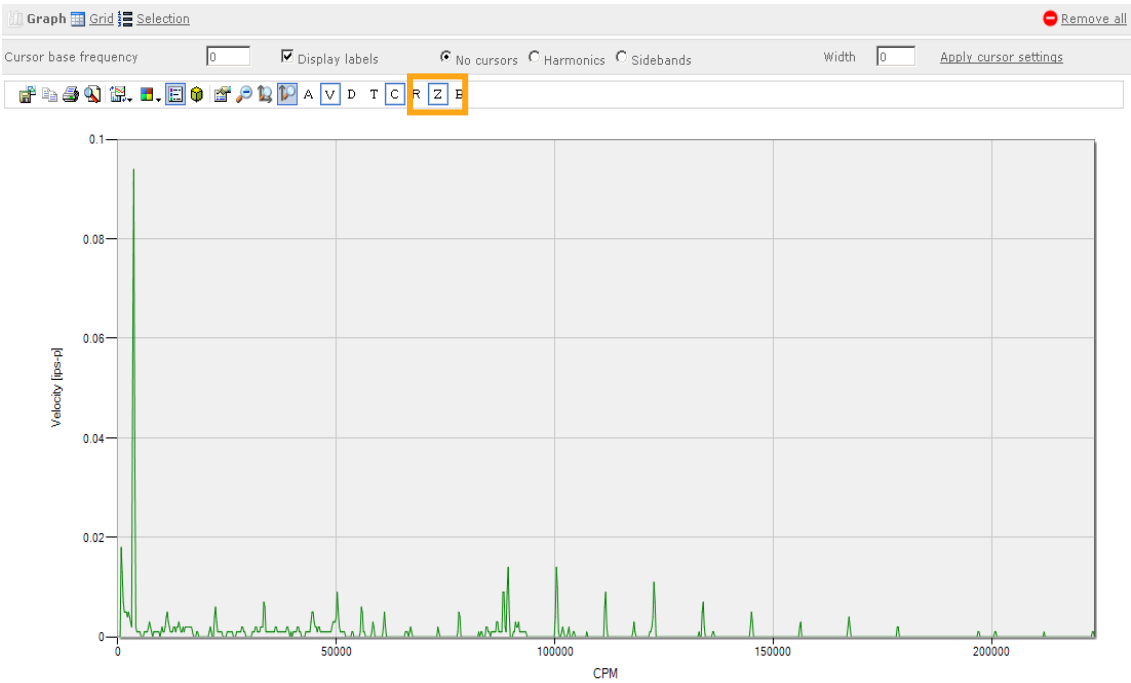
WATERFALL VIEW
(aka 3D FFT view)

After several FFTs are selected on the same graph, click the 3D view on the graphing tool bar.



ZERO ELIMINATION

The Zero Elimination feature of ProNet automatically zoom the data into the part of the spectrum that contains non zero data. This is accomplished by eliminating the view of zeros at the high end of the spectrum. To toggle Zero Elimination on and off, click the "**Z**" at the top of every spectrum page.



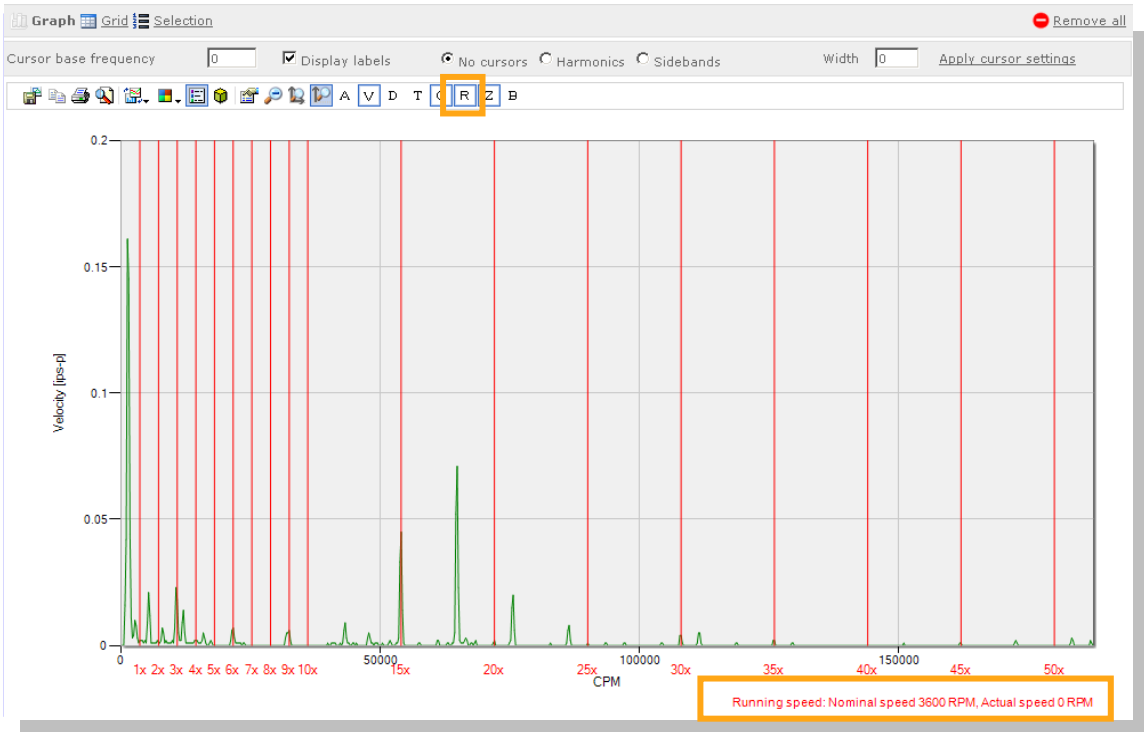
Cursors: Orders of Running Speed

PRONET USER GUIDE

Orders cursors are used to distinguish synchronous and non-synchronous FFT peaks relative to the multiples of the machine run speed. Lines are placed on the graph according to the machine's RPM value taken from the tachometer sensor.

Note: If the device does not have a tachometer sensor installed, then the order cursors will be calculated from the Nominal RPM property of the equipment. Both values can be seen in the bottom right corner of the screen.

To toggle the RPM Lines, click the "**R**" at the top of the spectrum page.



PRONET USER GUIDE

Cursors: Rolling Element Bearing Fault Frequencies

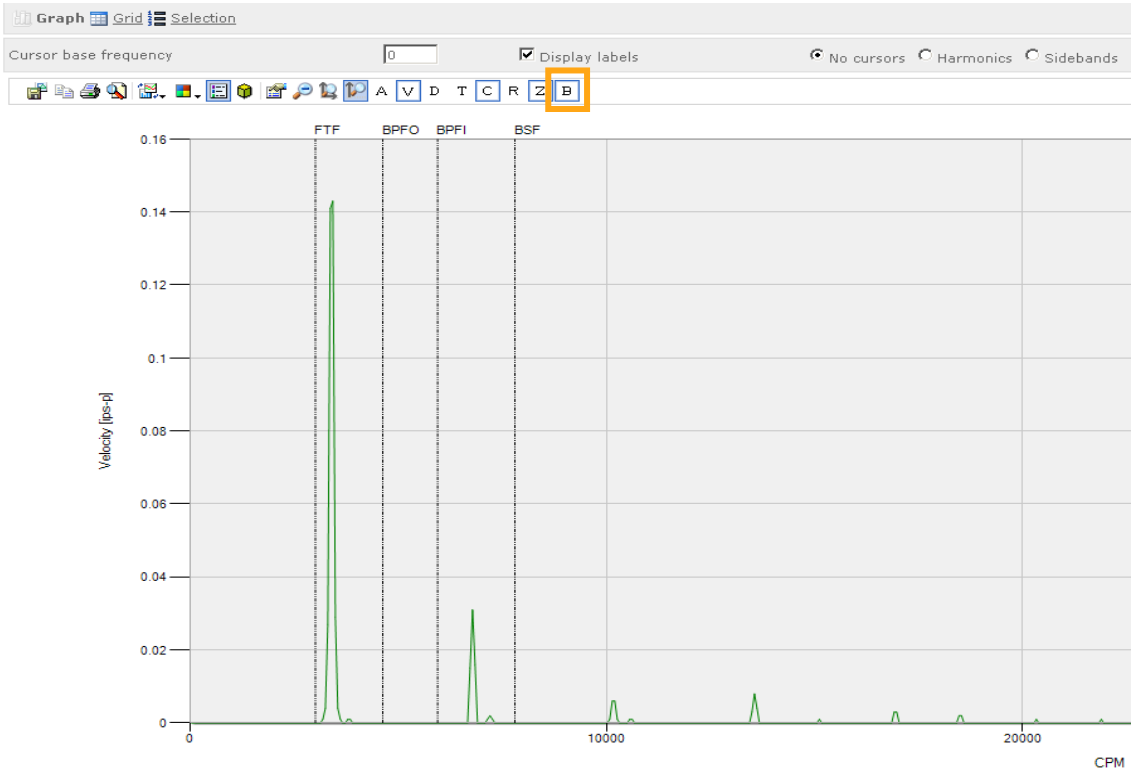
While analyzing FFT spectrum, user may choose to overlay cursors at four important fault frequencies:

- FTF – Fundamental Train or Cage,
- BPFO – Ball Pass Frequency of the Outer Race,
- BPFI – Ball Pass Frequency of the Inner Race, and
- BSF – Ball Spin Frequency

These values are the "fault frequencies" of the ball bearings of the machine being monitored.

Note: Equipment's bearing models and the fault frequencies are stored in the Machine info page of the ProNet and can be modified by a ProNet supervisor or administrator user.

To toggle the ball bearing fault frequencies, click the "**B**" at the top of the spectrum page.



PRONET USER GUIDE

HARMONIC CURSORS

Harmonic cursors are used as a tool in vibration analysis to eliminate possible fault conditions. Harmonic cursors are used to distinguish synchronous and non-synchronous peaks as well as to view harmonics of a frequency.

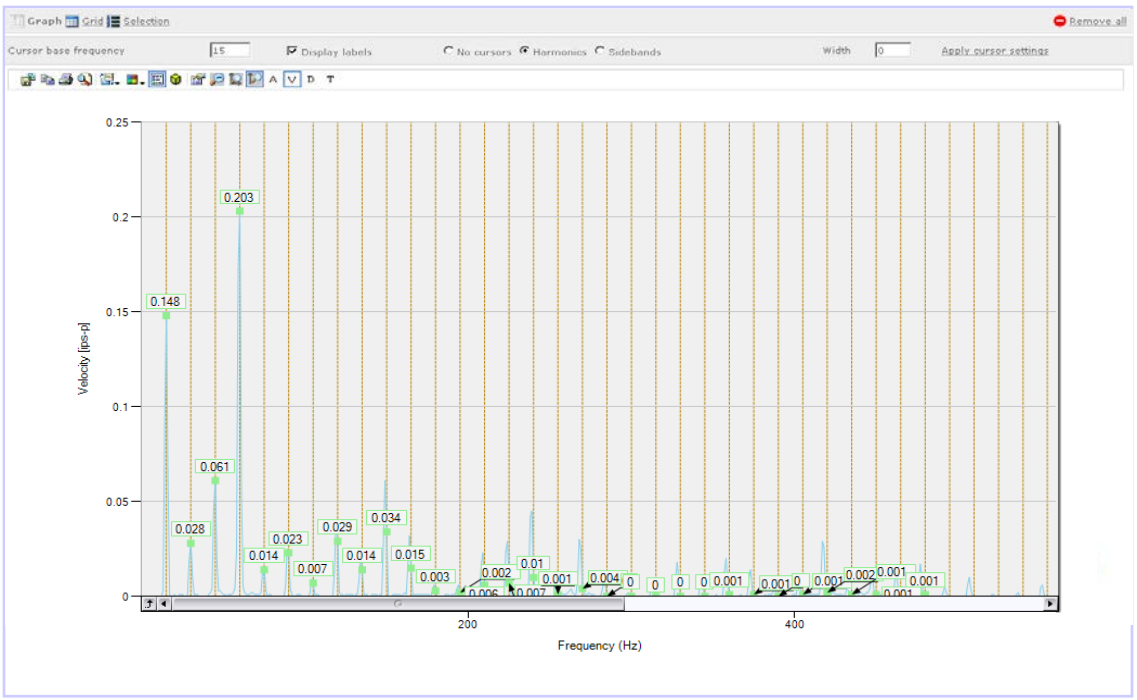
To use harmonic cursors:

1. Set the cursor base frequency. The cursors base frequency is typically the running frequency (RPM/60) or the fundamental frequency of harmonics.

   Cursor base frequency 15

2. Then click Harmonics

3. Click to Apply: Apply cursor settings



NOTE – The Width does not need to be set in order to use the harmonic cursors.

To remove cursors select No cursors and then select Apply cursor settings

NOTE – The fields for cursor base frequency and width need to have a value otherwise you will not be able to apply changes. If necessary set the fields to 0.

SIDEBAND CURSORS

Sideband cursors are used to distinguish peaks that appear next to a primary peak. This is another tool used in vibration analysis.

To use sideband cursors:

1. Set the cursor base frequency. The cursors base frequency is typically the fault you want to view for sidebands (typically bearing faults).

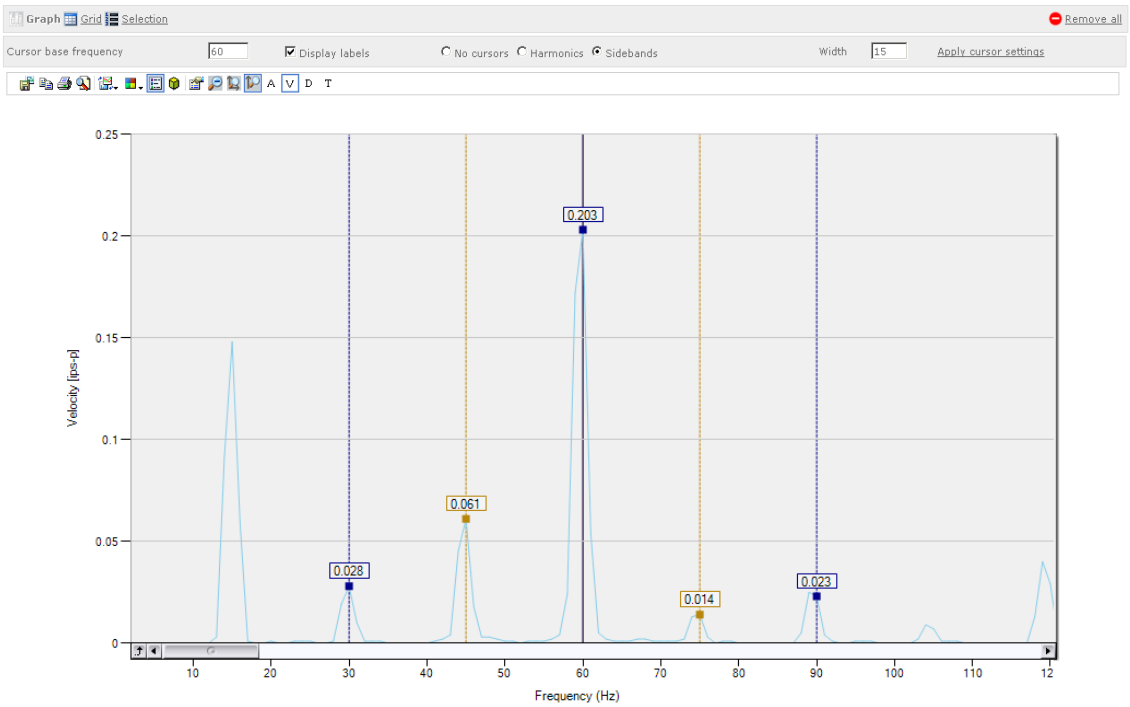
   Cursor base frequency 60

2. Then click Sidebands

3. Set the side band width. This will set how far the sideband lines are apart from each other.

   Width 15

4. Click to Apply: Apply cursor settings



NOTE – The Width should be smaller than ½ of the cursor base frequency otherwise the sideband markers will be hidden.

To remove cursors select No cursors and then select Apply cursor settings

NOTE – The fields for cursor base frequency and width need to have a value otherwise you will not be able to apply changes. If necessary set the fields to 0.

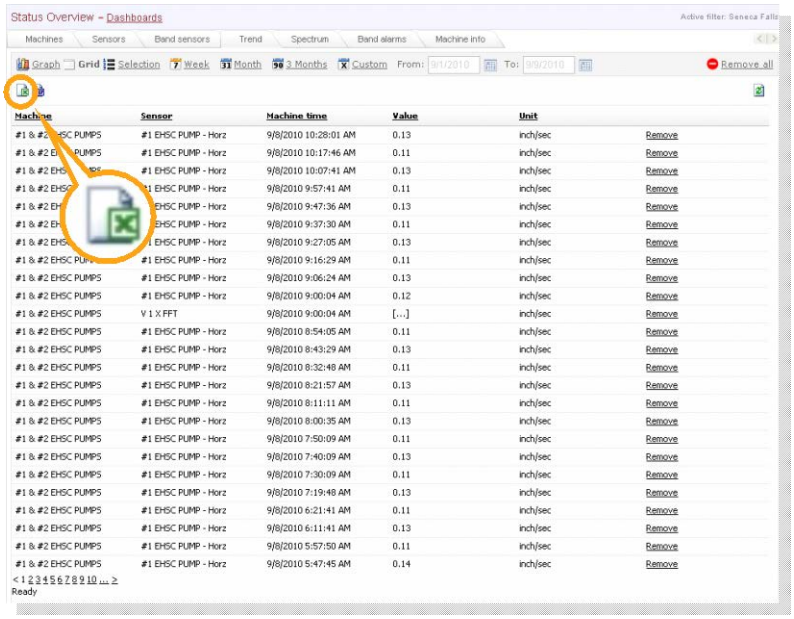
PRONET USER GUIDE

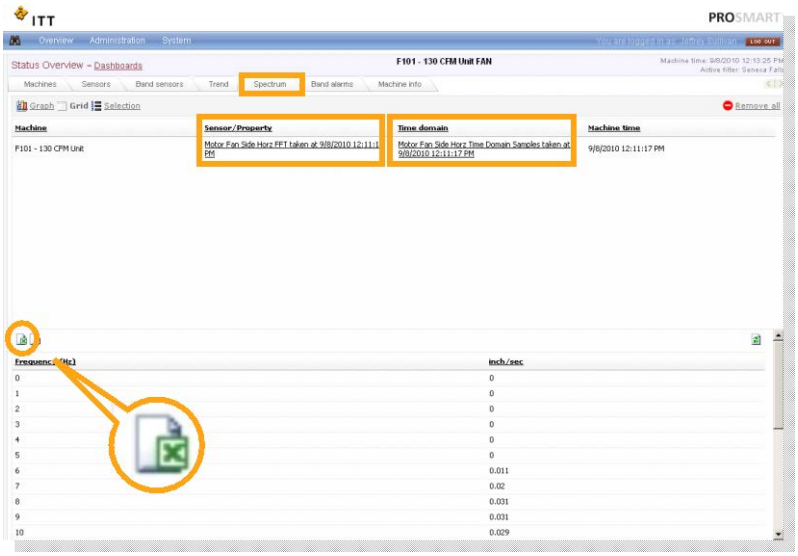
DATA EXPORT

Graphing data, spectrums, time waveform, and user comments can all be exported into excel.

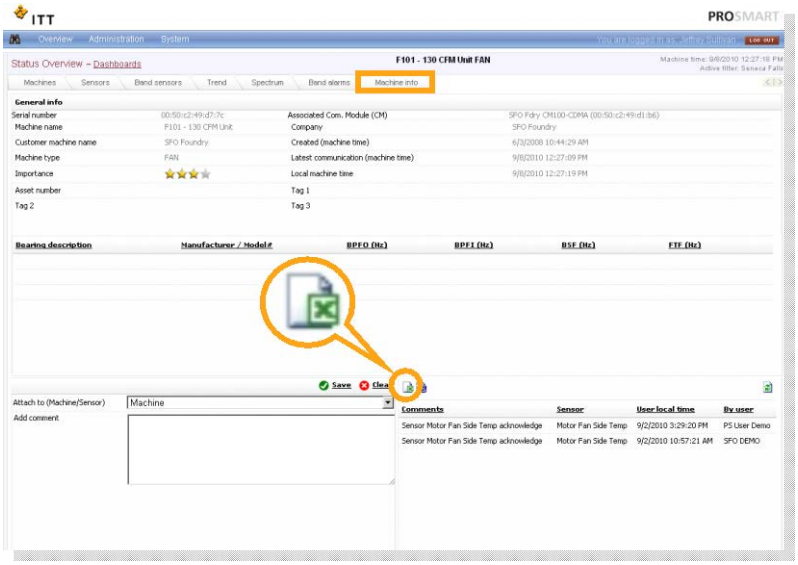
1. If exporting User Comment Log go to step 3.
   If exporting graph data or spectrum/time waveform go to step 2.

2. First select  to view the data points on a graph or the data for a spectrum/waveform.
   If applicable: Click on either the FFT or the TWF to view the data points in the lower window.

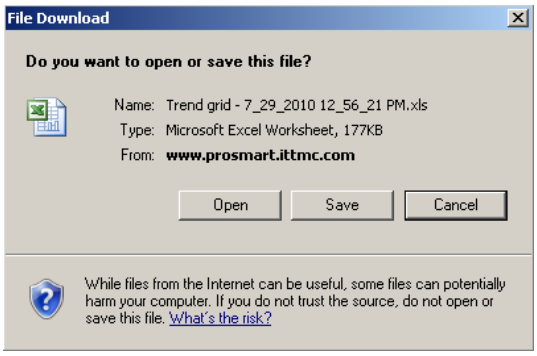




PRONET USER GUIDE



3. Then click the  icon to export to Microsoft Excel.
4. A dialog box will pop-up (if using Internet Explorer).
   Some Browsers may automatically start the download once icon is clicked.



5. Select save and save the data in a safe and accessible location.

7 REPORTS

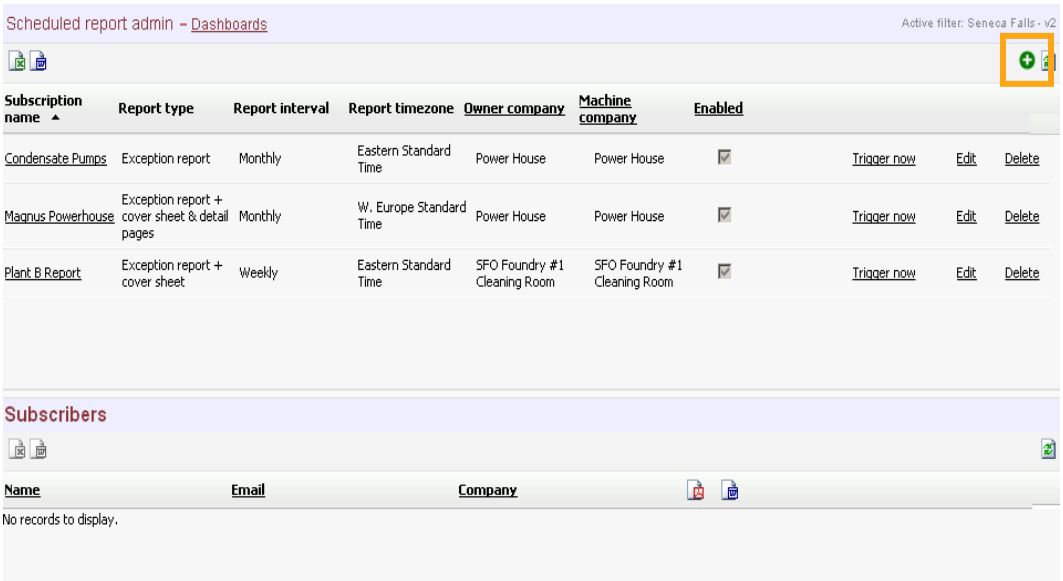
The reporting system of ProNet generates Exception Reports in the background and sends them to select users via email. These reports can be generated weekly, monthly, or on-demand. Subscribed users will receive their report on the first Monday after the weekly reporting period ends or the first business day of a new month.

All users have the ability to request reports. However, Read-only Users and Regular Users can only schedule reports for themselves and receive reports in PDF file format. ProNet Supervisors and Administrators can schedule reports for other users and send reports to email addresses outside of the ProNet system. They can also request reports in PDF or RTF format.

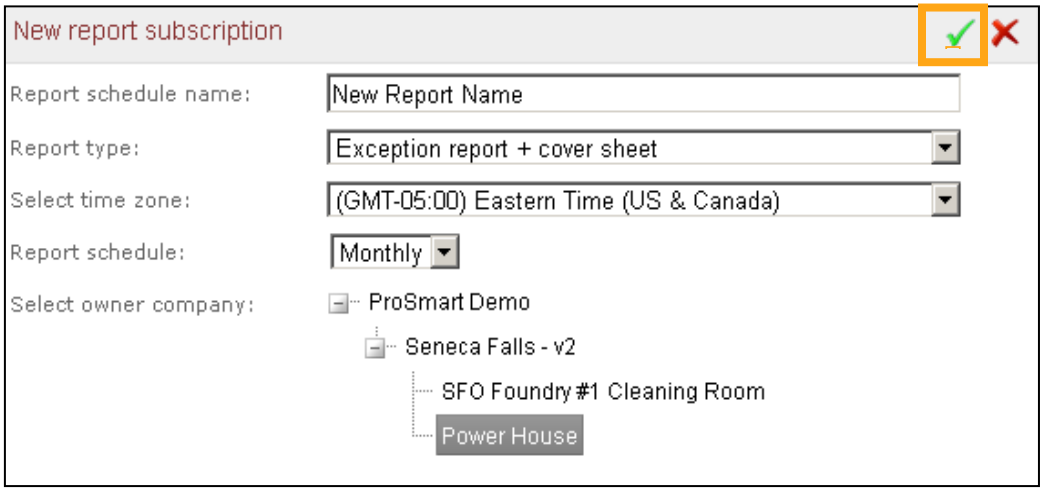
CREATING A REPORT SUBCRIPTION

1. Select Report subscriptions from the Administration drop down menu

2. Select at the top of the page to add a new report subscription.

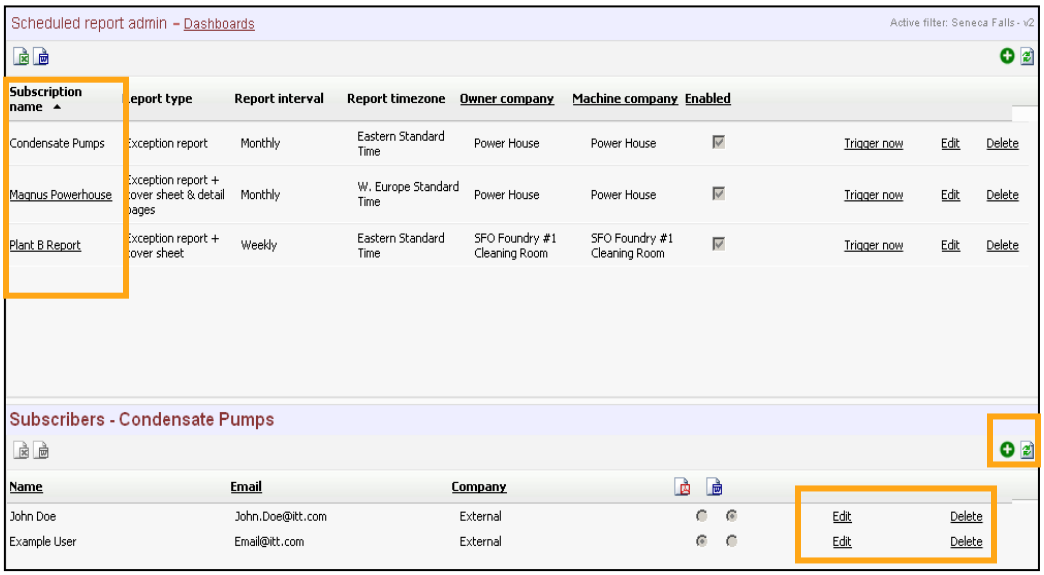


3. On the New report subscription window configure following items to schedule recurring reports
    - Report schedule name (Give report subscription your preferred name)
    - Report type
    - Select preferred time zone (ProNet system will use this time zone to automatically generate and email scheduled report.)
    - Report schedule frequency— either monthly or weekly.
    - Select the owner company of the reporting subscription.
    - Click ✓ to submit the subscription.



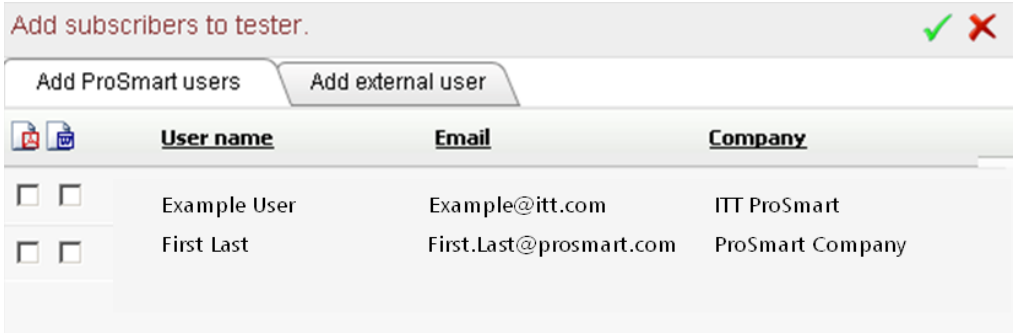
ADDING USERS TO A REPORT SUBSCRIPTION

1. Click on the report subscription name to add or modify subscribed users.
2. Select ⊕ to add a new user to the report subscription

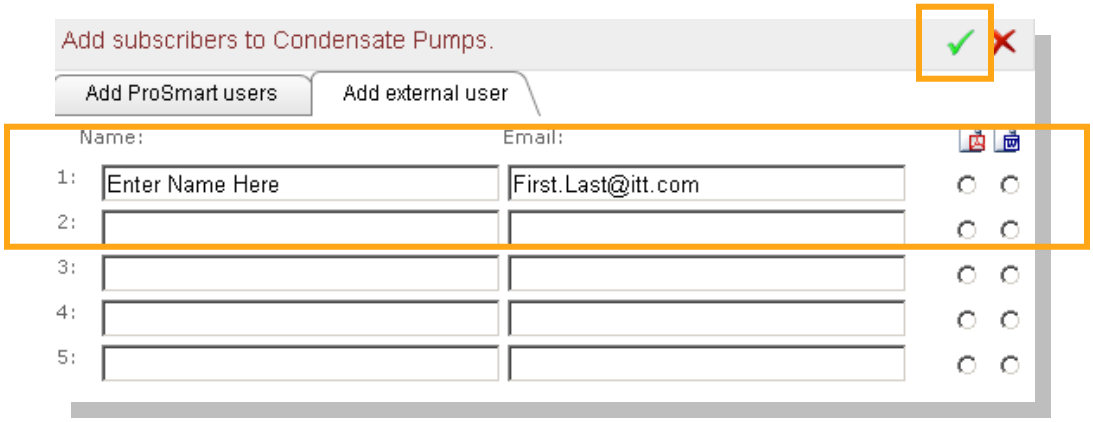


PRONET USER GUIDE

3. Click Delete to remove the user from the subscription or click Edit to edit the user's email address.
4. In the Add subscribers window, select the "ProSmart user" tab or the "External user" tab



5. For ProSmart user select the report file type (PDF or RTF)



6. For external user enter the name and email address of the user and select the report file type (PDF or RTF)
7. Click the [✓] to save the subscription.

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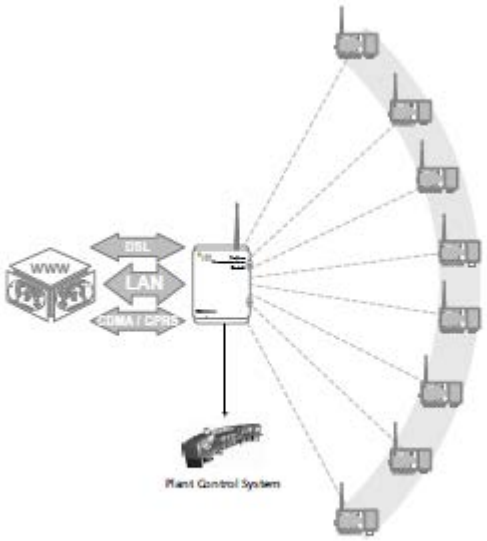
APPENDIX A-1 MODBUS INFORMATION

Modbus Specifications

The Communication Module supports the FieldTalk™ Modbus/TCPIP slave functionality, which allows the Modbus-TCP/IP master device to enquire data from the Communication Module.

The Communication Module maps physical sensors - overall vibration, temperature, tachometer, analog inputs, digital inputs, and relay output readings from DM modules into a Modbus registry space. Alarming and device management on ProSmart, using Modbus, is not possible at this time.



NOTE – Communication Module does not poll the DM module when the master requests a reading, but it uses the latest stored value.

Modbus/TCPIP master and slave devices need to be on the same LAN. Communication Module communicates via the standard Modbus port 502.

APPENDIX A-1 MODBUS INFORMATION

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APPENDIX A-2 PROSMART DATA SHEETS

ITT	Communication Module Data Sheet	PROSMART

ProSmart CM

CERTIFICATIONS

RATINGS……CSA, FCC, CE①
CM-LAN: Class I Division 2
Groups A B C D T4
CM-CDMA / GPRS: Non-Hazardous

RADIO

RADIO OUTPUT POWER……100mW

RADIO FREQUENCY……2.4GHz FHSS
(Frequency Hopping Spread Spectrum)

ENVIRONMENTAL LIMITS

ENCLOSURE RATING……NEMA 4X

ENCLOSURE MATERIAL……Painted 304 Stainless Steel

HUMIDITY……10-90% non-condensing

ENVELOPE DIMENSIONS……20.0"H x 10.0'W x 5.5"D
(includes antenna)

WEIGHT……15lbs (6.8kg)

OPERATING TEMP. MAX……158°F (70°C)

OPERATING TEMP. MIN……-40°F (-40°C)

STORAGE TEMP. MAX……185°F (85°C)

STORAGE TEMP. MIN……-40°F (-40°C)

COMMUNICATIONS

WIRELESS ARCHITECTURE……Point-to-Multipoint

WIRELESS PROTOCOL……Proprietary Frequency Hopping Spread Spectrum (FHSS) 2.4 GHz

DEVICE ENCRYPTION……Up to 256-bit

GUI ENCRYPTION……128 Bit SSL

GUI BROWSER……Internet Explorer 8.0

TRANSMITTING RANGE……2.2 miles (3.5Km) Line of Sight
1150ft (350m) Plant*

*depends on industrial environment

ProSmart CM-LAN

COMMUNICATIONS

NETWORK CONNECTION……LAN or DSL

NETWORK PROTOCOL……Standard Ethernet

NETWORK ADDRESSING……DHCP or Static IP

ELECTRICAL

SUPPLY VOLTAGE……12VDC

MAX. CURRENT DRAW……400mA

POWER CONSUMPTION……5W

ProSmart CM-CDMA/GPRS

COMMUNICATIONS

NETWORK CONNECTION……CDMA or GPRS Modems
(NA: Verizon cellular data service)
GPRS Modem
(NA: AT&T cellular data service)
(Int'l: Local cellular data service)

NETWORK PROTOCOL……Standard Ethernet

NETWORK ADDRESSING……DHCP

ELECTRICAL – CM WITH MODEM

SUPPLY VOLTAGE……12VDC

MAX. CURRENT DRAW……0.85A

POWER CONSUMPTION……10.2W

POWER SUPPLY

SUPPLY VOLTAGE……100-240VAC

P out……30W

OUTPUT VOLTAGE……12 VDC

Certified for Construction Purposes only when signed	Customer Name……
	Goulds S/N……
	Customer P.O #……
Date……	Item No……

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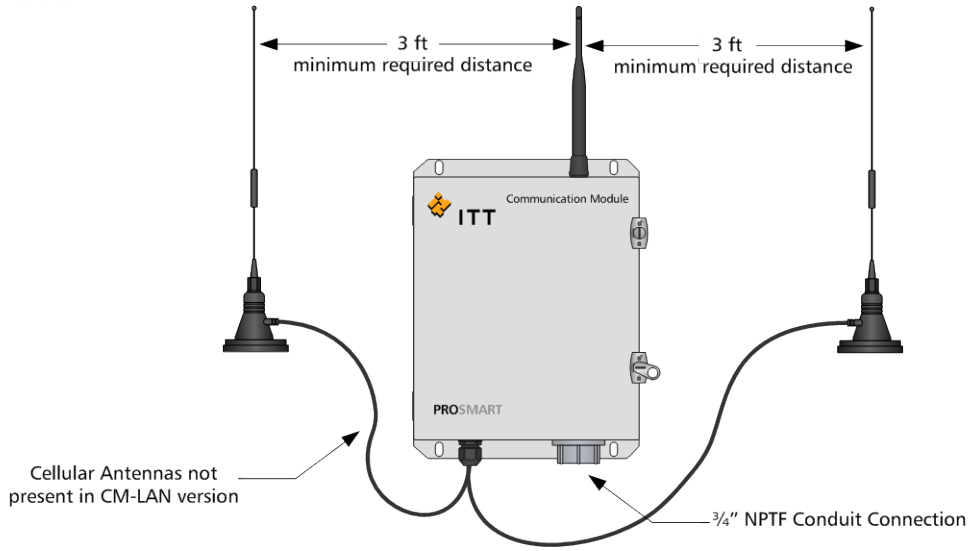
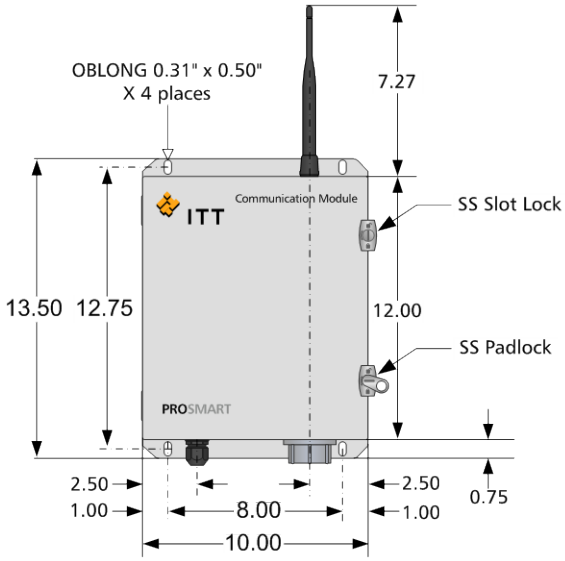
APPENDIX A-2 PROSMART DATA SHEETS

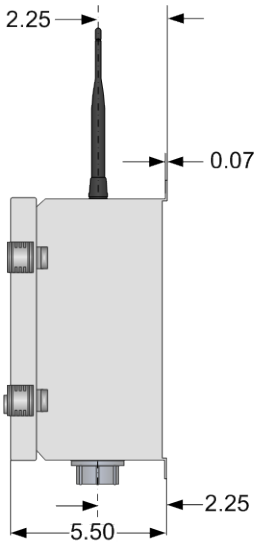
ITT	Communication Module Data Sheet	PROSMART

ProSmart CM





Front View



Side View

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APPENDIX A-2 PROSMART DATA SHEETS

ITT	Data Monitor Data Sheet	PROSMART

ProSmart DM22x

CERTIFICATIONS

RATINGS……CSA, FCC, CE
Class I Division 2 Groups A B C D T4

ELECTRICAL

POWER CONSUMPTION……5W

SUPPLY VOLTAGE……12-24VDC

MAX. CURRENT DRAW……(0.4A) 12VDC
(0.2A) 24VDC

RADIO OUTPUT POWER……100mW

RADIO FREQUENCY……2.4GHz FHSS
(Frequency Hopping Spread Spectrum)

ENVIRONMENTAL LIMITS

ENCLOSURE RATING……NEMA 4X, IP66

ENCLOSURE MATERIAL……Investment-cast 304 Stainless Steel

HUMIDITY……10-90% non-condensing

ENVELOPE DIMENSIONS……8.3"H x 9.1'W x 3.1"D
(includes antenna)

WEIGHT……11lbs (5kg)

OPERATING TEMP. MAX……158°F (70°C)

OPERATING TEMP. MIN……-40°F (-40°C)

STORAGE TEMP. MAX……185°F (85°C)

STORAGE TEMP. MIN……-40°F (-40°C)

COMMUNICATIONS

WIRELESS PROTOCOL……Proprietary Frequency Hopping Spread Spectrum (FHSS) 2.4 GHz

TRANSMITTING RANGE……2.2 miles (3.5kM) Line of Sight
1150ft (350m) Plant*

*depends on industrial environment

DATA ACQUISITION/PROCESSING

ANALOG-TO-DIGITAL CONVERTER……16 bit

ADVANCED ANALYSIS……FFT Spectrum and Time Waveform
Low Frequency FFT

SAMPLING RATE……Effective rate 16kHz

SAMPLING TIME……5 seconds Normal Mode
10 seconds Low Freq Mode

FREQUENCY BANDWIDTH RANGE……12-3500Hz (Normal Mode)
6-1000Hz (Low Frequency Mode)

DATA BLOCK LENGTHS……1024 and 4096

SPECTRAL LINES……1000 and 4000

WINDOWING……Hanning

RESOLUTION……Standard Resolution
4 Hz per bin (Normal Mode)
1 Hz per bin (Low Frequency Mode)

High Resolution
1 Hz per bin (Normal Mode)
0.25Hz per bin (Low Frequency Mode)

STANDARD INPUT/OUTPUT

Local LED Indicators……Power
Warning
Alarm

4-20mA ANALOG INPUTS……3 Channels (124 ohm input resistance)
(may require signal conditioning module)

DIGITAL INPUTS……2 Channels (Rated for 5-24 VDC)

FORM-C RELAY OUTPUT……1 Channel (Resistive Load)
125VAC/0.5A, 30Vdc/2A

VIBRATION/TEMPERATURE SENSOR……12 Channels (Vibration)
4 Channels (Temperature)

TACHOMETER INPUT……1 Channel (RPM)

Certified for Construction Purposes only when signed	Customer Name……
	Goulds S/N……
	Customer P.O #……
Date……	Item No……

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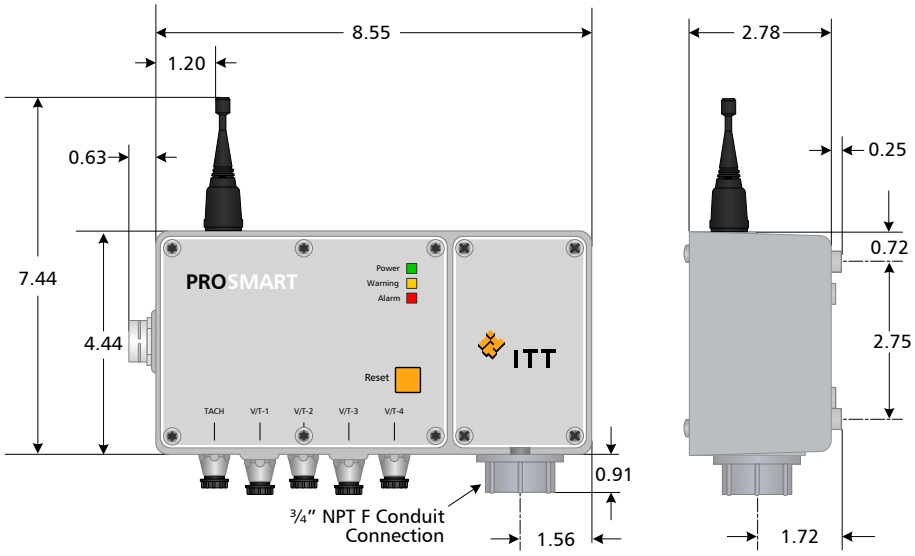
APPENDIX A-2 PROSMART DATA SHEETS

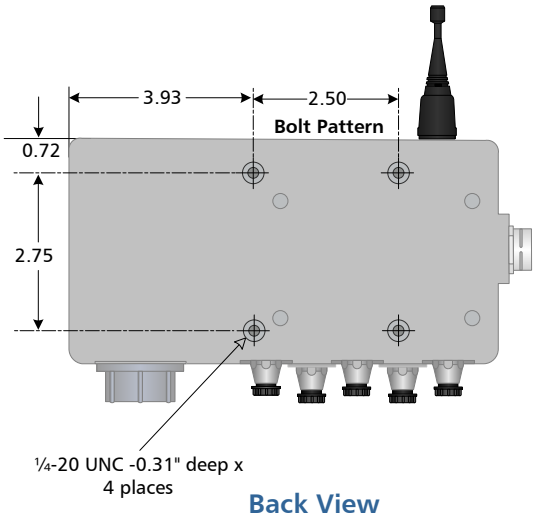
ITT	Data Monitor Data Sheet	PROSMART

ProSmart DM22x



Front View

Right Side View



Back View

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APPENDIX A-2 PROSMART DATA SHEETS

ITT	Data Monitor Terminal Connections	PROSMART

ProSmart DM22x

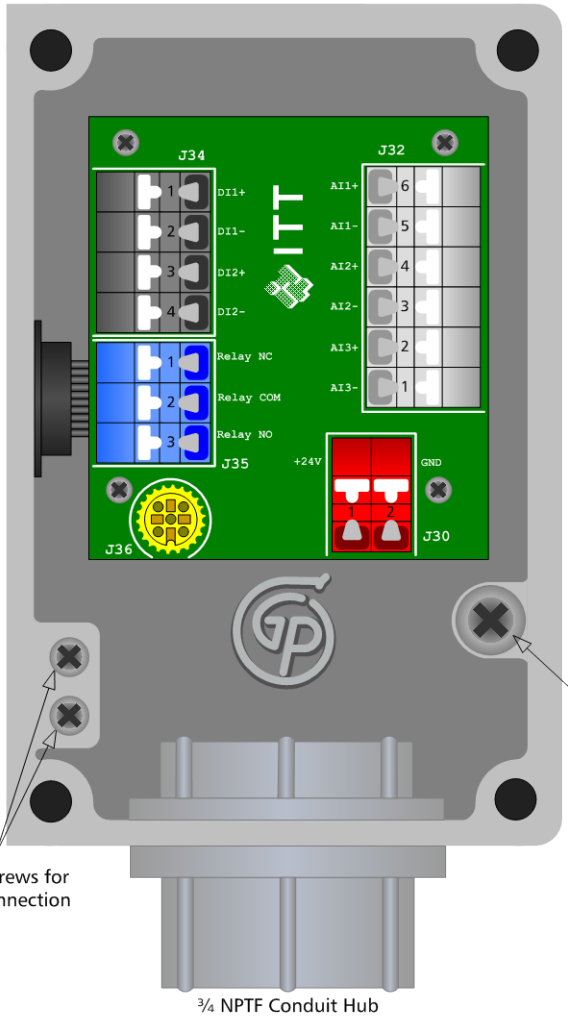

Table 1.0: Terminal Associations

color	#	Label	Description
Red (J30)	1	+24V	+12V-24Vdc Input Power
	2	GND	DC Common (-VDC)
Blue (J35)	1	RELAY NC	Relay: Normally Closed
	2	RELAY COM	Relay: Common
	3	RELAY NO	Relay: Normally Open
Dark Grey (J34)	1	DI1+	Digital Input 1 Positive Side
	2	DI1-	Digital Input 1 Negative Side
	3	DI2+	Digital Input 2 Positive Side
	4	DI2-	Digital Input 2 Negative Side
Light Grey (J32)	1	AI3-	Analog Input 3 Negative Side
	2	AI3+	Analog Input 3 Positive Side
	3	AI2-	Analog Input 2 Negative Side
	4	AI2+	Analog Input 2 Positive Side
	5	AI1-	Analog Input 1 Negative Side
	6	AI1+	Analog Input 1 Positive Side
Yellow (J36)			Reserved

WARNING

Do not use relay output for control and protection

Front View

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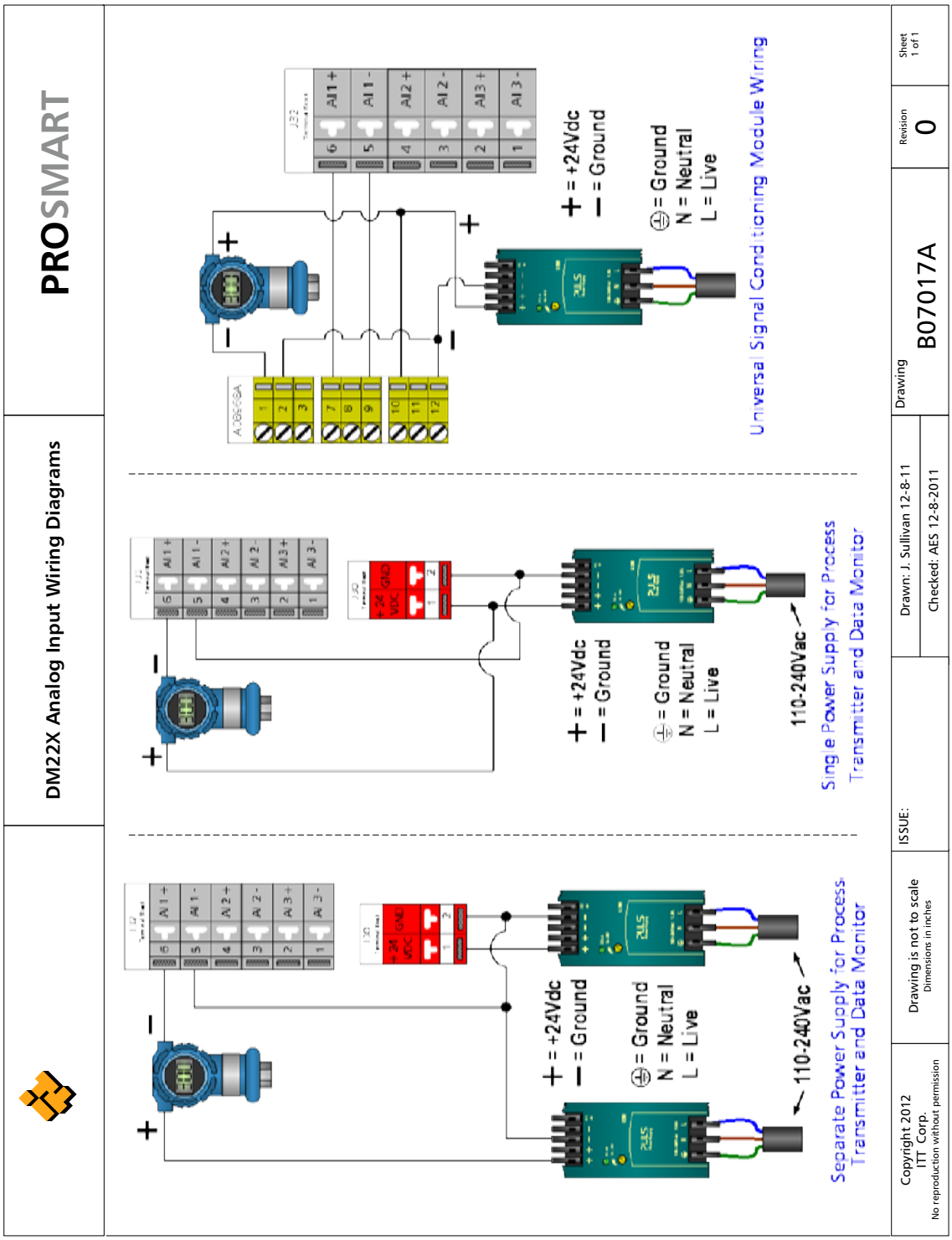
APPENDIX A-2 PROSMART DATA SHEETS



APPENDIX A-2 PROSMART DATA SHEETS

ITT	Vibration / Temperature Sensor Data Sheet	PROSMART

ProSmart SV-03

CERTIFICATIONS

RATINGS.....CSA, FCC
Class I Division 2 Groups A B C D T4 (with ProSmart System)

SPECIFICATIONS

CABLE LENGTH.....6.6ft (2m)

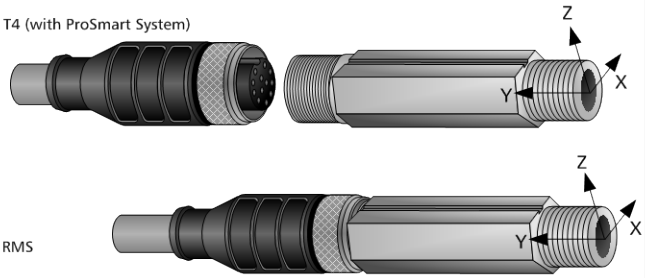
TECHNOLOGY.....MEMS Accelerometer

FREQUENCY.....6-1500Hz (X, Y, and Z axis)

TEMPERATURE ACCURACY.....+/-2.5°C to +/-5°C (max.)

VIBRATION RANGE.....+/- 6G

VIBRATION ACCURACY.....6-1500Hz: +/-10% or 0.03in/sec RMS
Whichever is greater



ENVIRONMENTAL LIMITS

ENCLOSURE RATING.....NEMA/CSA TYPE 6; IP67

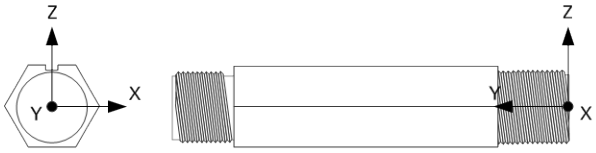
ENCLOSURE MATERIAL.....316 Stainless Steel

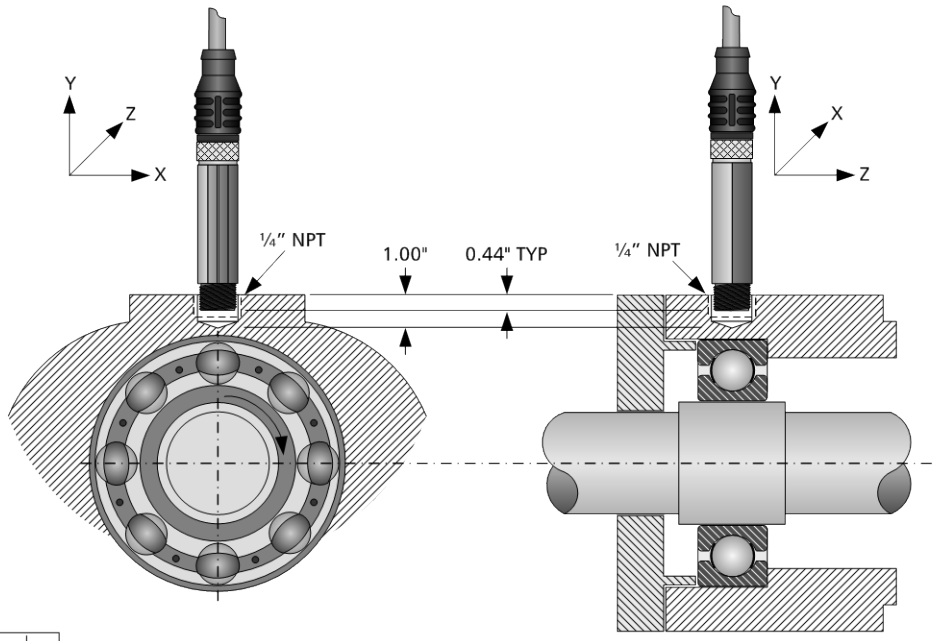
OPERATING TEMP. MAX.....185°F (85°C)

OPERATING TEMP. MIN.....-40°F (-40°C)

STORAGE TEMP. MAX.....221°F (105°C)

STORAGE TEMP. MIN.....-40°F (-40°C)





Axial View

Side View

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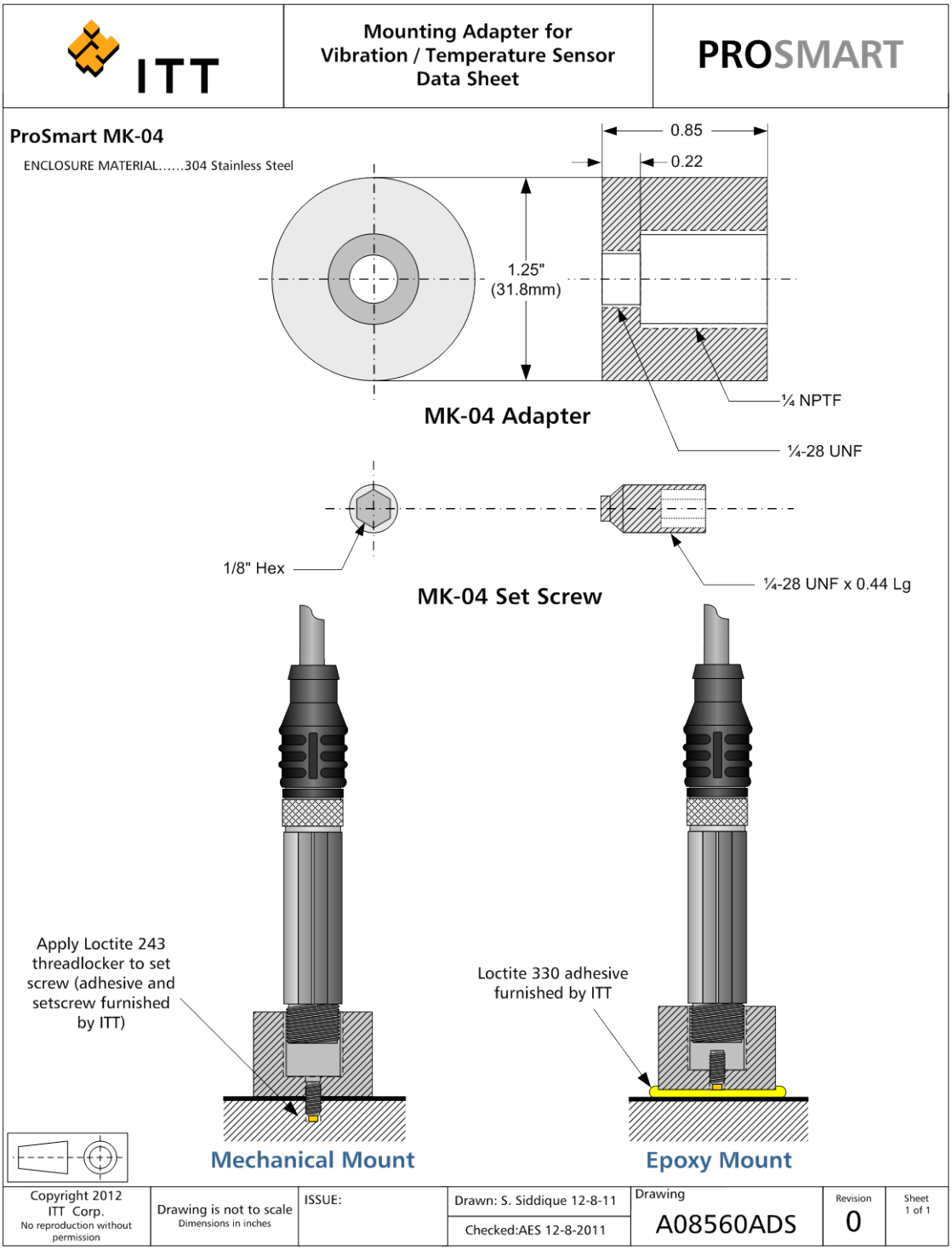
APPENDIX A-2 PROSMART DATA SHEETS



APPENDIX A-2 PROSMART DATA SHEETS

ITT	Magnetic Mounting Adapter for Vibration / Temperature Sensor Data Sheet	PROSMART

Magnetic Mounting Adapter MMK-04

ENVIRONMENTAL LIMITS

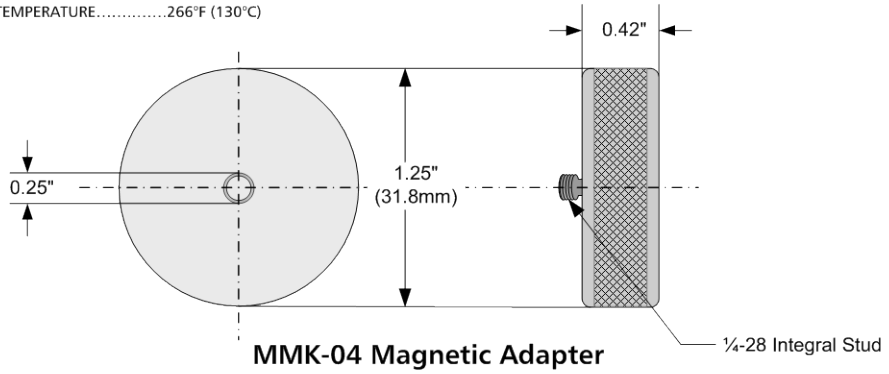
PULL STRENGTH.....60 lbs (27 kg)

MOUNTING.....¼-28 Integral Stud

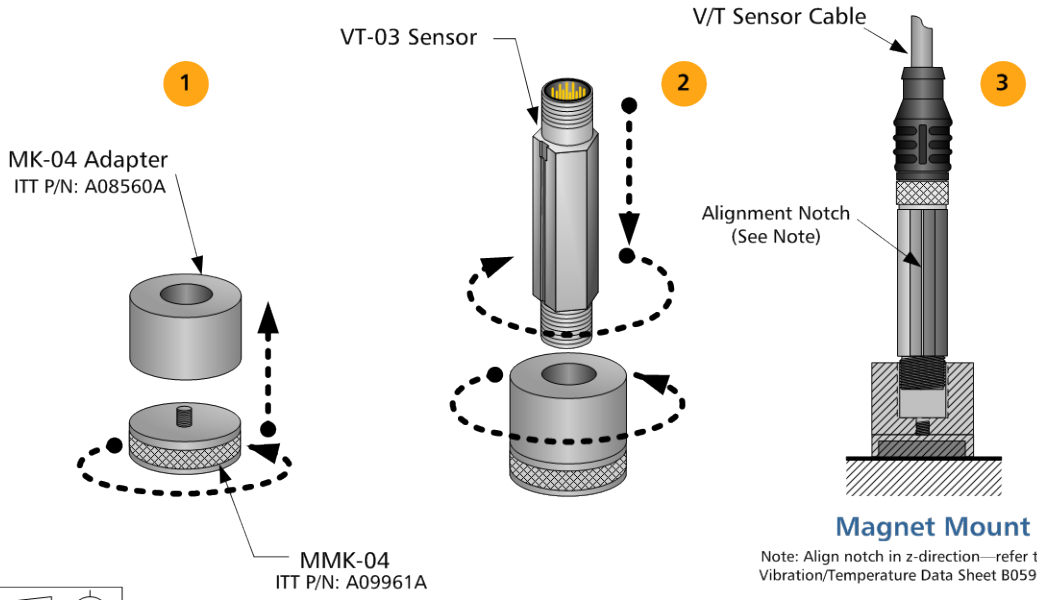
CASE MATERIAL.....304 Stainless Steel

MAGNET MATERIAL.....Neodymium

MAXIMUM TEMPERATURE.....266°F (130°C)



MMK-04 Magnetic Adapter



Magnet Mount

Note: Align notch in z-direction—refer to IOM Vibration/Temperature Data Sheet B05966ADS

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APPENDIX A-2 PROSMART DATA SHEETS

ITT	Tachometer Sensor Data Sheet	PROSMART

ProSmart ST-02

CERTIFICATIONS

RATINGS……UL, CSA, FCC, CE, IP67, Intrinsically Safe, Non-Incendive
Rated for Class I Division 2 Groups A B C D T4 (with ProSmart System)

SPECIFICATIONS

CABLE LENGTH……6.6ft (2m)

TECHNOLOGY……Inductive Proximity Sensor

MAX. SENSING RANGE……0.197in (5mm)*

OPERATING RANGE……0-7200RPM

*Dependent on sensing material and size of target

ENVIRONMENTAL LIMITS

OPERATING TEMP. MAX……158°F (70°C)

OPERATING TEMP. MIN……-13°F (-25°C)

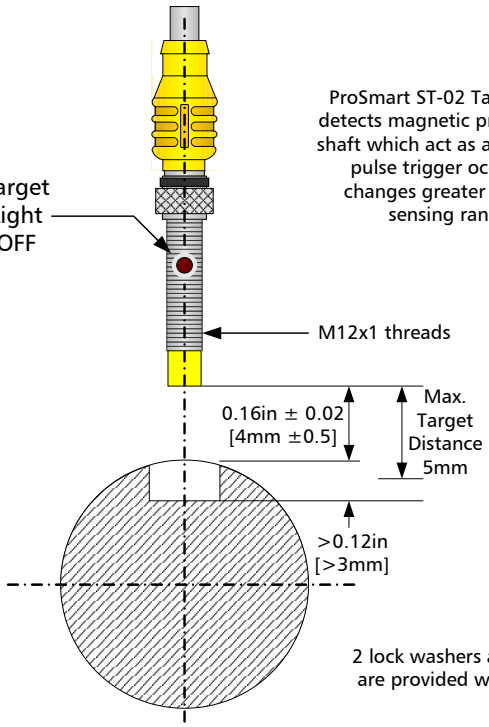
STORAGE TEMP. MAX……185°F (85°C)

STORAGE TEMP. MIN……-40°F (-40°C)

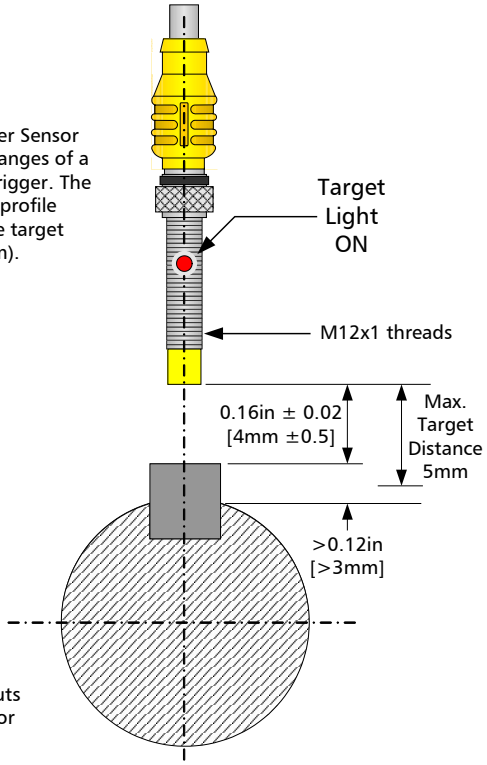
PRE-OPERATION CHECK

Procedure	With the ST-02 tachometer installed into a powered DM; rotate the shaft to observe the Target Light.
Pulse ID off Keyway	Target light should be ON through entire rotation EXCEPT through keyway.
Pulse ID off Shaft Key	Target light should be OFF through entire rotation EXCEPT over shaft-key.

ProSmart ST-02 Tachometer Sensor detects magnetic profile changes of a shaft which act as a pulse trigger. The pulse trigger occurs for profile changes greater than the target sensing range (5mm).



Pulse ID off Keyway



Pulse ID off Shaft-Key

2 lock washers and 2 nuts are provided with sensor

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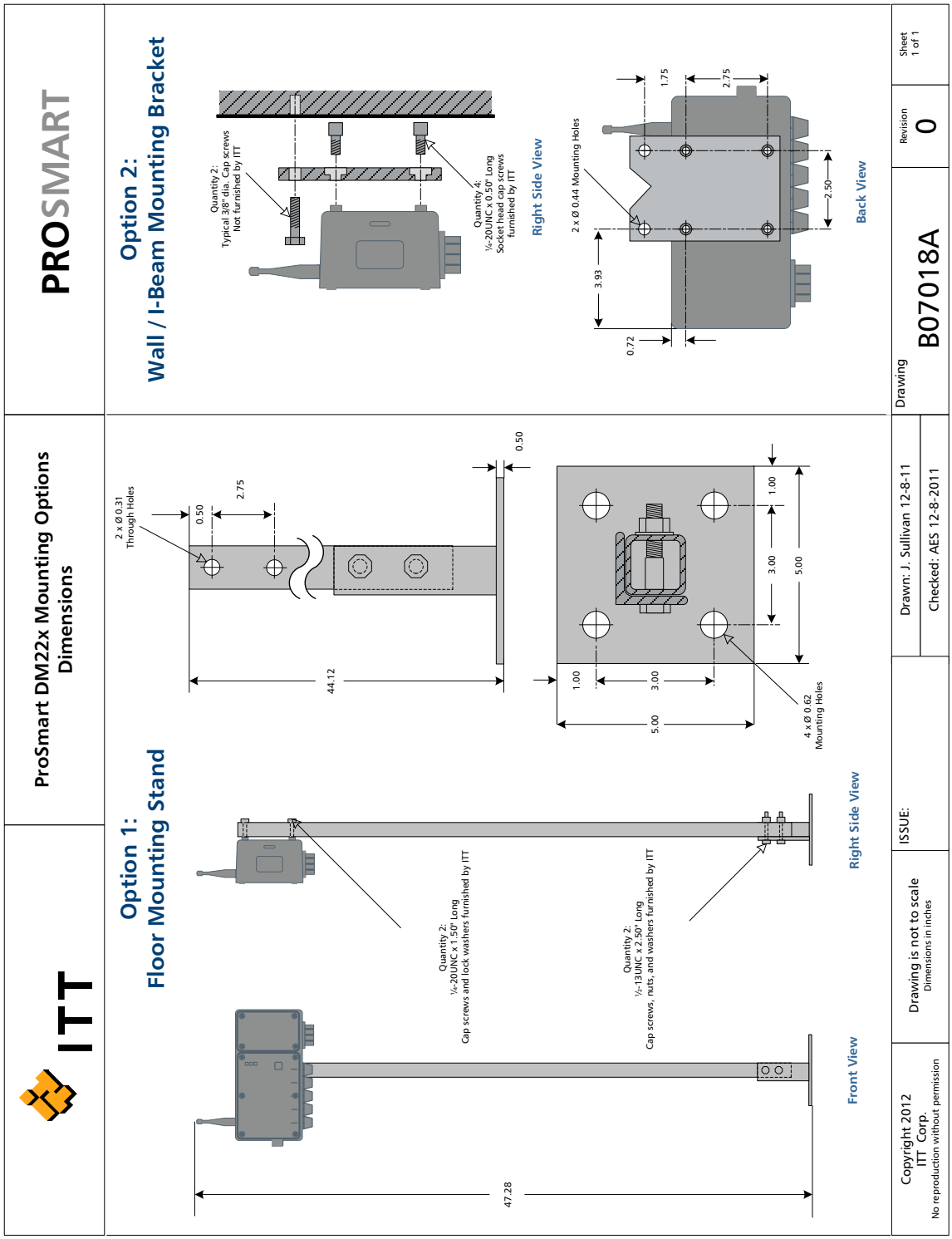
APPENDIX A-2 PROSMART DATA SHEETS



APPENDIX A-2 PROSMART DATA SHEETS

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DATA MONITOR TROUBLESHOOTING

Symptoms	Remedy
The power status light does not come on.	1. Confirm the DM is being powered by a 12-24VDC external power supply 2. Refer to the Data Monitor Power Installation guide in this manual for proper connections 3. Check for loose connections
Data Monitor does not seem to be communicating with the Communication Module.	1. Make sure the Data Monitor and Communication Module are both powered on 2. Check DM and CM for proper antenna installment 3. Check for proper mounting of both DM and CM 4. Check for line of sight between DM and CM 5. Confirm that the DM has been added to the CM's poll list on the ProNet platform

COMMUNICATION MODULE TROUBLESHOOTING

Symptoms	Remedy
Communication Module will not power on.	1. Confirm the CM is being powered by a 12 VDC external power supply 2. Refer to the Communication Module Power Installation guide in this manual for proper connections 3. Check for loose connections
Communication Module is not connecting to the internet.	1. Confirm that the CM is powered on 2. Ensure a distance of at least 3 feet between the CM antenna and the cellular antenna (for CMs using a cellular modem only) 3. Ensure the CM is configured to allow communication from the CM to the URL address: *data.prosmart.ittmc.com* 4. Confirm outbound communication support for: - HTTP / HTTPS Protocol (standard web browser protocol) via port 80 and 443 - External NTP (standard Network Time Protocol) via port 123

SENSOR TROUBLESHOOTING

Symptoms	Remedy
Tachometer target light does not come on.	1. Verify DM is powered on 2. Ensure Target Distance <5mm is being achieved through shaft revolution
Tachometer target light does not change state during Pre-Operation checks.	ST-01 Tachometer is not sensing a change in the targeting distance. 1. Target ST-01 Sensor at larger rotating object (e.g. deeper/wider keyway or higher key) 2. Consider using shaft collet in lieu of key / keyway
Tachometer target light does not change state during equipment operation.	Target light may be changing state so quickly, it appears solid or flickers lightly. Use a strobe to freeze rotation and observe Target Light.
Sensor does not appear in Status Overview.	Confirm that sensor is enabled in Configuration Overview.

PRONET TROUBLESHOOTING

Symptoms	Remedy
ProNet is not displaying correctly on the computer.	1. Ensure the use of Internet Explorer v6+ 2. Change display resolution to: 1280 x 1024 pixels 3. Change DPI Setting to: Normal Size (96 DPI)
ProNet is not reading sensor value.	1. Check CM-DM Communication 2. Make sure sensor is enabled 3. Make sure sensor is plugged into DM 4. Confirm that the sensor is properly mounted onto a running machine 5. Check for electrical continuity on each wiring leg 6. Check for inadvertent grounding of wiring leg
ProNet reading appears to have a noisy/erratic signal.	1. Check for loose connections 2. Check for moisture in connection 3. Confirm total cable run length does not exceed 30 meters
ProNet reading does not match actual value.	1. Check for loose connections. 2. Check for moisture in connection.

***If problem is not able to be resolved, then please contact your ProSmart Global Administrator**

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