



6400 Portable Analyzer Reference Manual

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Why an Analysis Program?

The purpose of any Analysis Program is to assemble quality systems and personnel to perform regular assessments of the condition and performance of the operation's equipment assets.

Testing and analysis, when performed with consistency and regularity, can be a valuable tool for helping predict and pinpoint mechanical or other problems that may be occurring within a process system to help reduce costly down or offline time as well the repair or replacement of mechanical parts or components.

Goals

The analyzer is used to take measurements relating to vibration, ultrasonic, pressure, ignition, and temperature for comparing the findings with predicted results to determine where problems may be, or about to be, occurring on a machine. Things we are looking for might include:

Engine Assessments:

Condition Measurements and Items of Concern:

- Detonation
- Misfires
- Firing Pressure Imbalance
- Leaking Valves and Rings
- Worn or Scored Liners
- Primary and Secondary Ignition
- Turbo Charger Issues

Performance Measurements and Items of Concern:

- Combustion
- Fuel Consumption
- Horsepower
- Efficiency

Compressor Assessments:

Condition Measurements and Items of Concern:

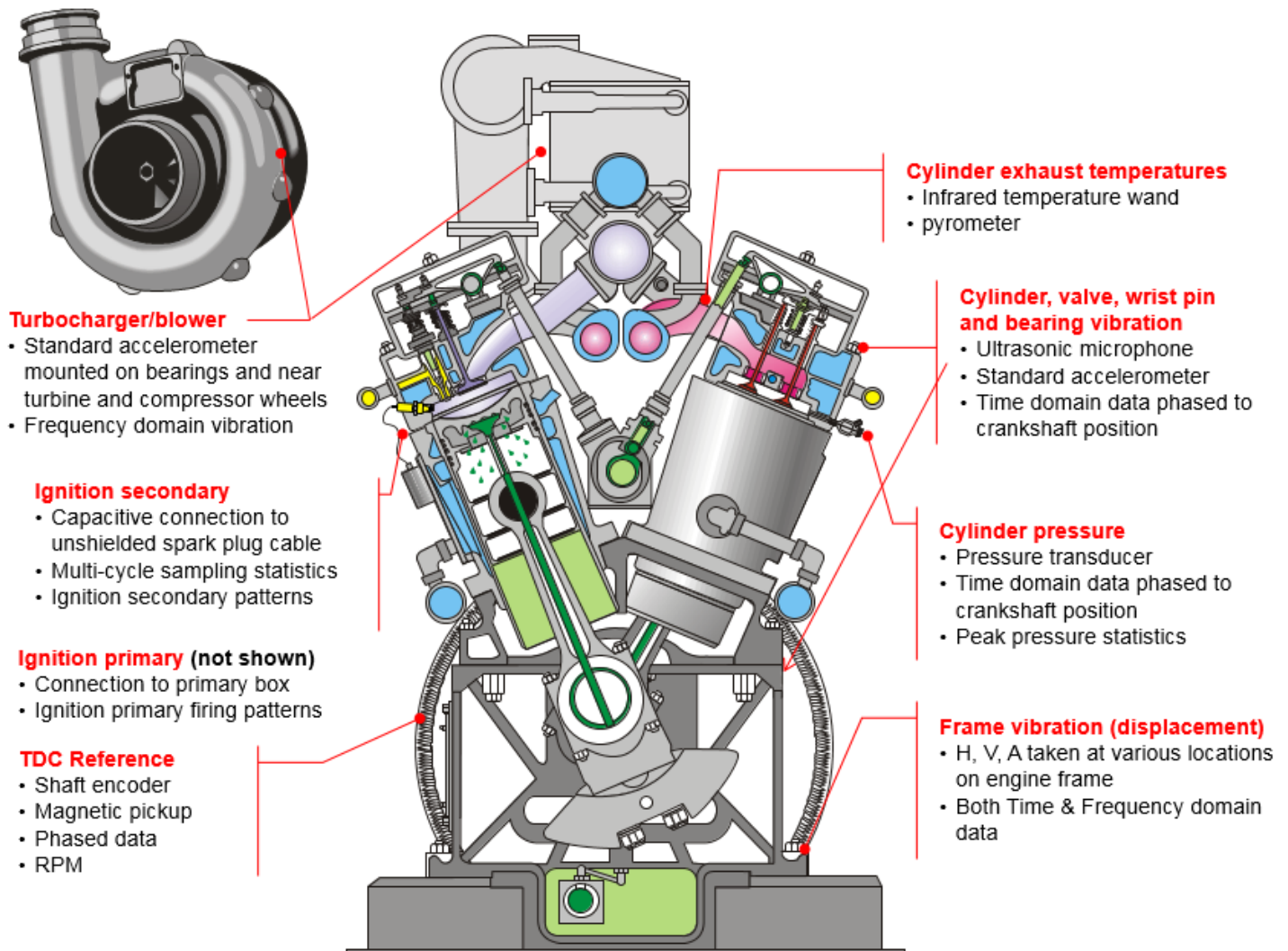
- Leaking Valves and Rings and Packing
- Rider Band Wear
- Crosshead Wear
- Liner Damage
- Excessive Frame Vibration
- Lack of Rod Reversal
- Foundation or Grout Damage
- Looseness

Performance Measurements and Items of Concern:

- Horsepower
- Capacity
- Efficiency
- Valve Dynamics
- Gas Pulsations

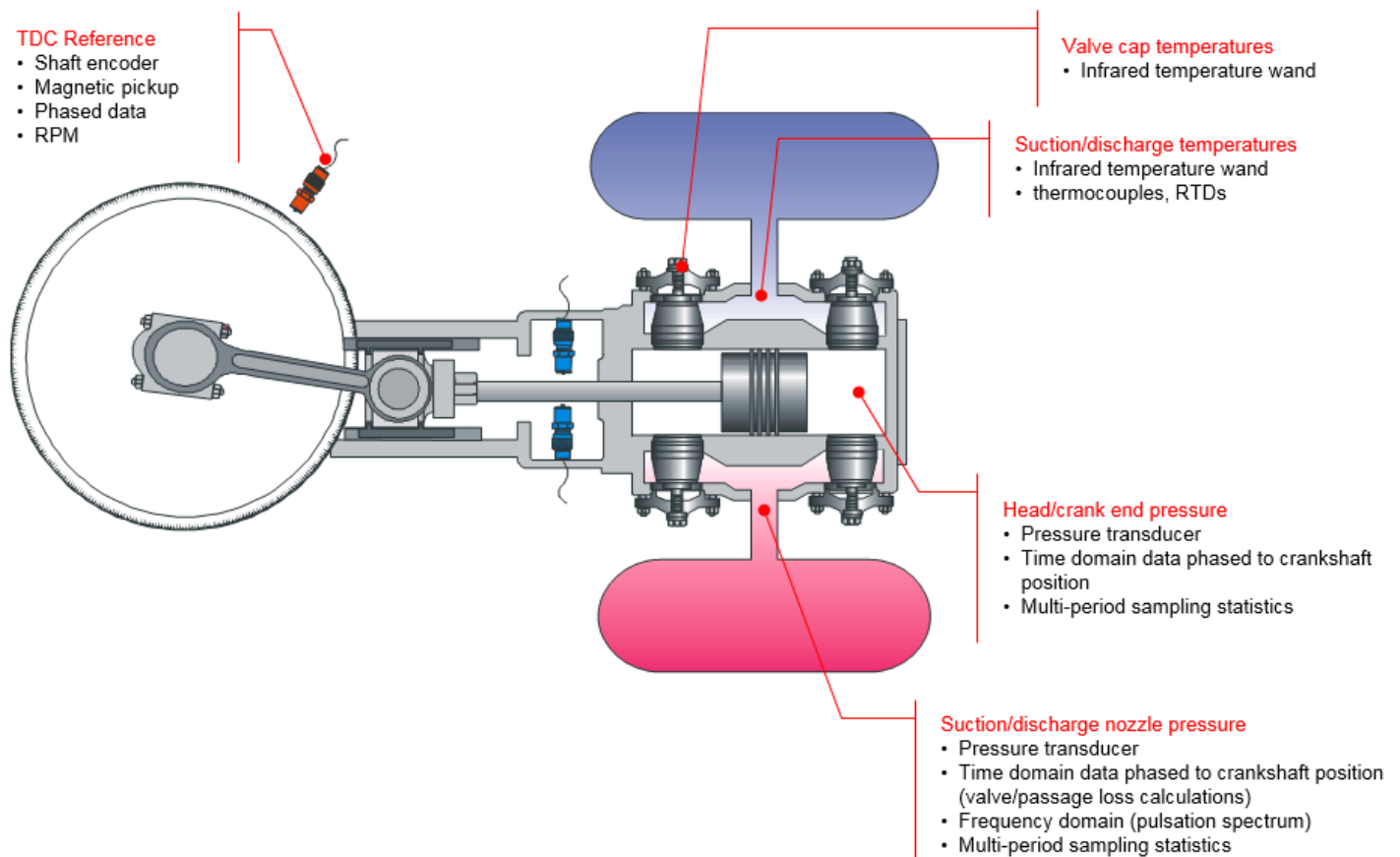
Engine Data Collection Locations

Engine Data Collection Point Examples

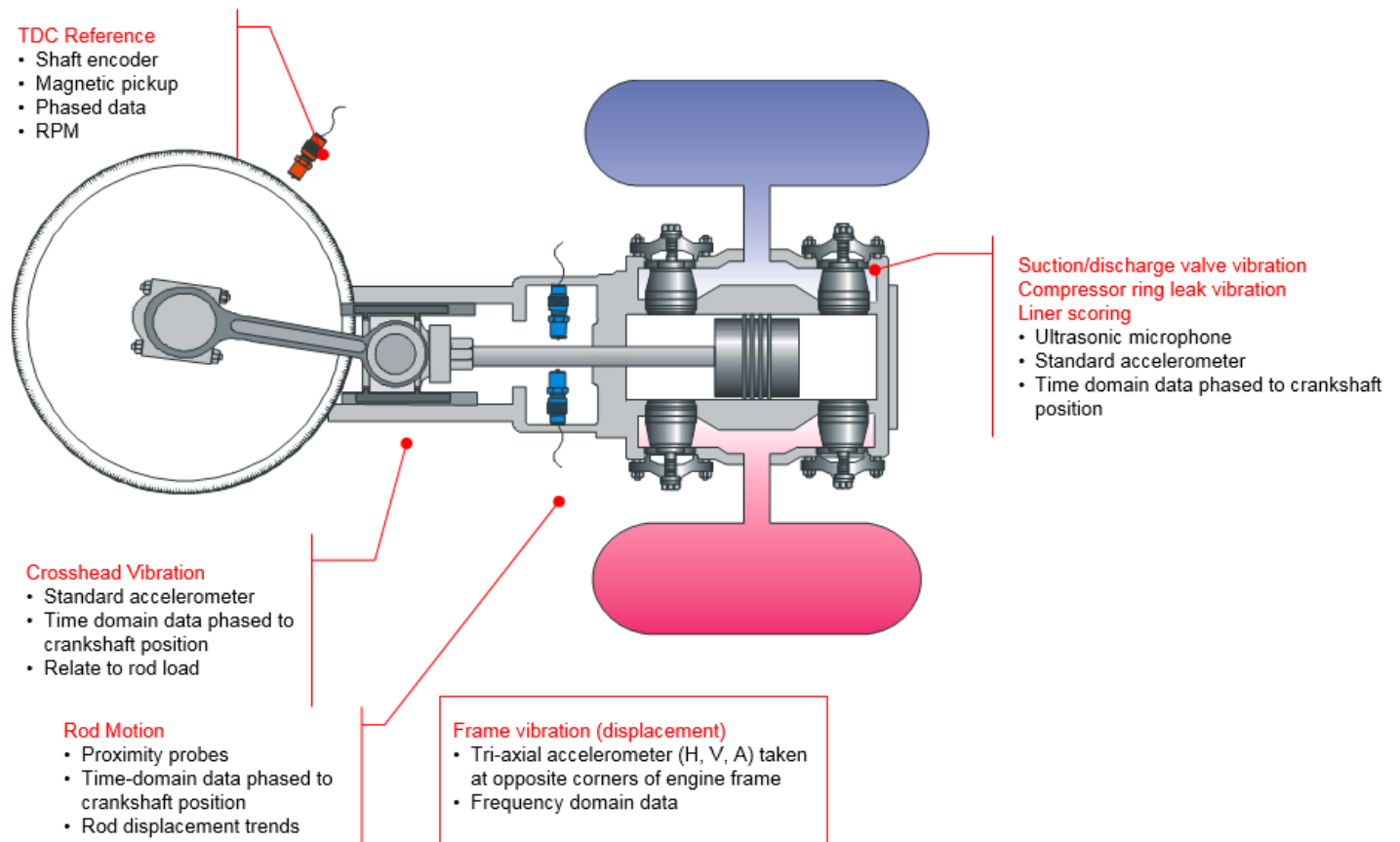


Compressor Data Collection Locations

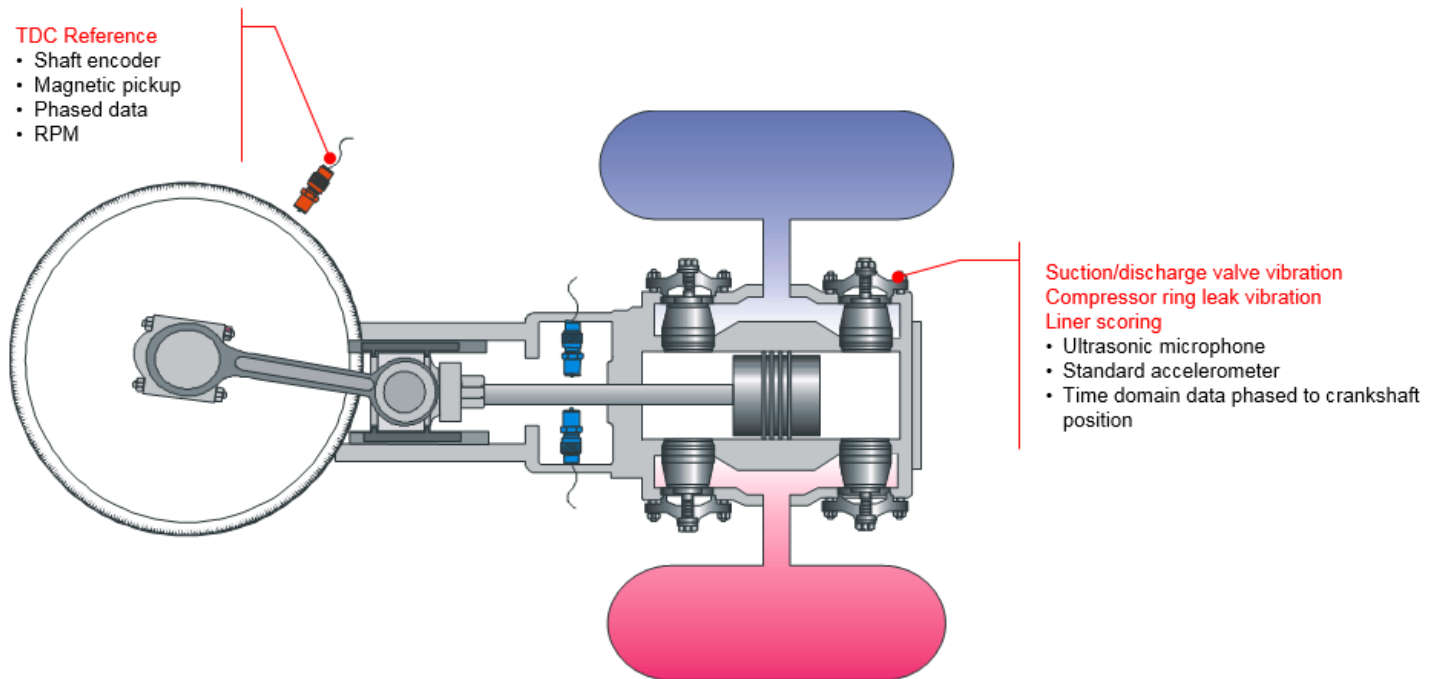
Compressor Pressure and Infrared Data



Compressor Vibration Data



Compressor Ultrasonic Data



Batteries and Charging

The 6400 analyzer kit comes standard with two different sized batteries. The analyzer uses the large battery, while the encoder / wireless transmitter & strobe (timing) light use the smaller battery.

Note: Both batteries utilize the same battery charger that is provided with the 6400 analyzer kit.

6400 Analyzer Battery Removal and Installation:

- On the back of the analyzer use a coin to turn the locking mechanism counterclockwise to unlock the battery door.
- Replace the battery with a charged battery.
- Close the door and relock.

Note: Using the lowest analyzer screen brightness level without making the screen hard to see for the user will extend battery life.



Encoder / Wireless Transmitter Battery Removal and Installation:

- Slide the door open on the side of the encoder.
- Pull the tag on the battery to remove it.
- Replace with a charged battery.
- Close the door.
- Once a new battery is installed the encoder will automatically turn on.

Note: To save battery life remove this battery while the encoder is not in use.



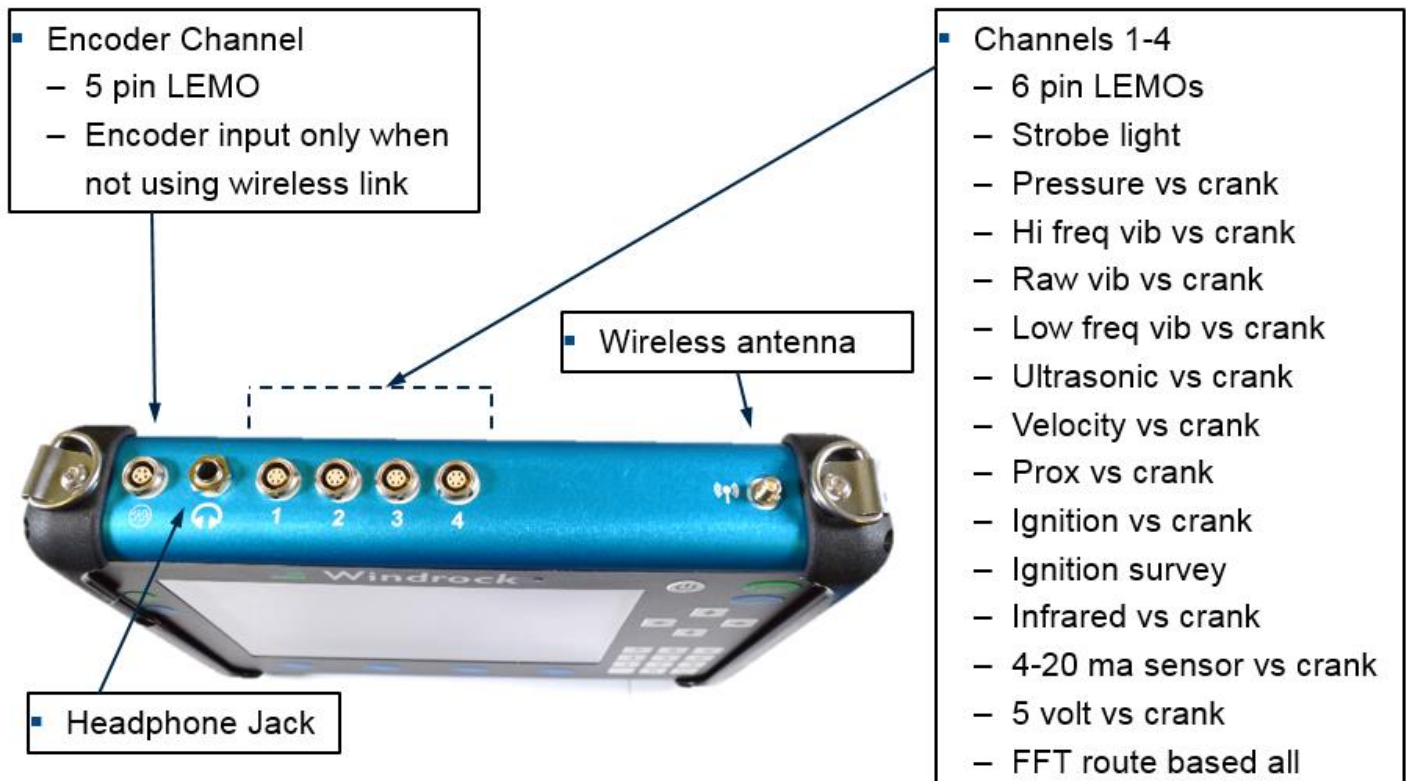
Strobe (timing) light Battery Removal and Installation:

- Unthread the back cover and pull the connector straight out of the timing light.
- Pull tag to remove the battery from the housing.
- Install a new battery.
- Replace plug and connector.
- Rethread on back cover. The cover does not need to be extremely tight.



6400 Analyzer

6400 Analyzer Top View



The analyzer is used to measure voltage or mA signals coming from a sensor or transducer and translating it into useful data by converting it into calculated values for determining the health and performance of the machine being measured.

Windrock analyzers come in several configurations ranging in complexity depending upon the types of machinery to be tested and data to be collected:

- | | |
|-------------|--|
| - 6400 / CA | 1-channel engine power cylinder balancer and ignition analyzer |
| - 6400 / MA | 2-channel reciprocating machinery maintenance analyzer |
| - 6400 / DA | 2-channel diesel engine analyzer |
| - 6400 / PA | 4-channel performance analyzer |
| - 6400 / VA | 4-channel vibration analyzer |

Note: The MA, DA, and PA have the capability to add the VA (vibration) option to their current configuration which provides additional vibration (FFT) data collection capabilities.

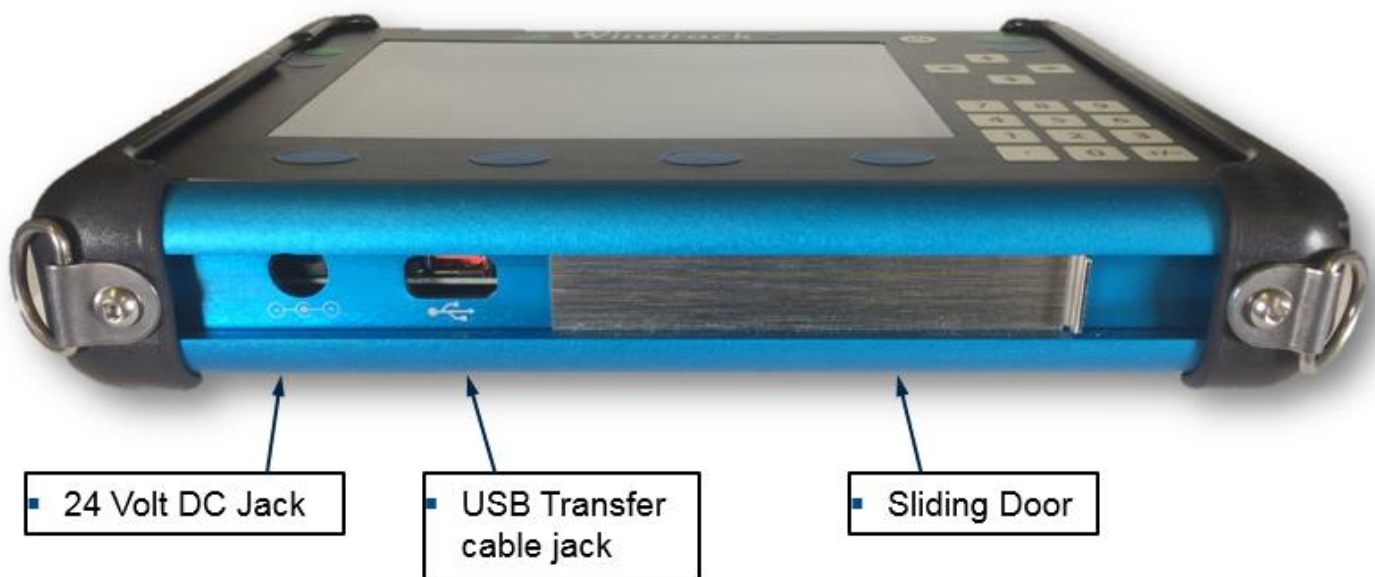
Note: The number of channels and options your analyzer has available will vary based on the specific model of analyzer that you have.

6400 Front View

- The four keys on the bottom are defined by the button directly above the key.
- The BLUE and GREEN buttons on the left are duplicates of the BACK and ENTER keys.
- The ENTER key usually selects the particular menu item or “traps” data.
- The BACK key takes you back one menu level, or when in data collection, immediately stops data collection.



6400 Bottom View

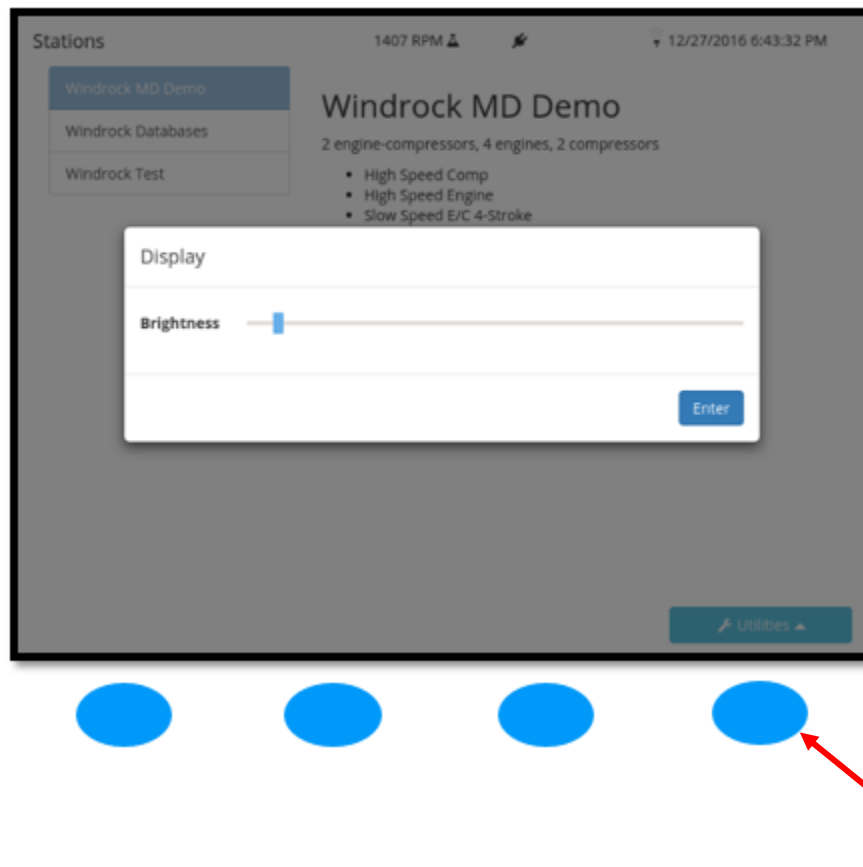


Adjusting Analyzer Screen Brightness

The ability to adjust the brightness of the analyzer is available via the Utilities menu on the 6400-analyzer screen. Once Utilities is selected, a menu list will be displayed on the analyzer. Select option 2 (System setup) from the main utilities menu and then option 2 (Display) from the sub menu. Once selected the adjustment box below will display on the analyzer screen. Use the arrows on the analyzer to adjust the screen brightness to the desired setting and then select the ENTER (Blue) button on the analyzer to save the setting.

Once saved the analyzer will remember the setting the next time the analyzer is turned on.

Note: Using a brighter setting will consume more battery power and shorten the overall charge life of the battery.

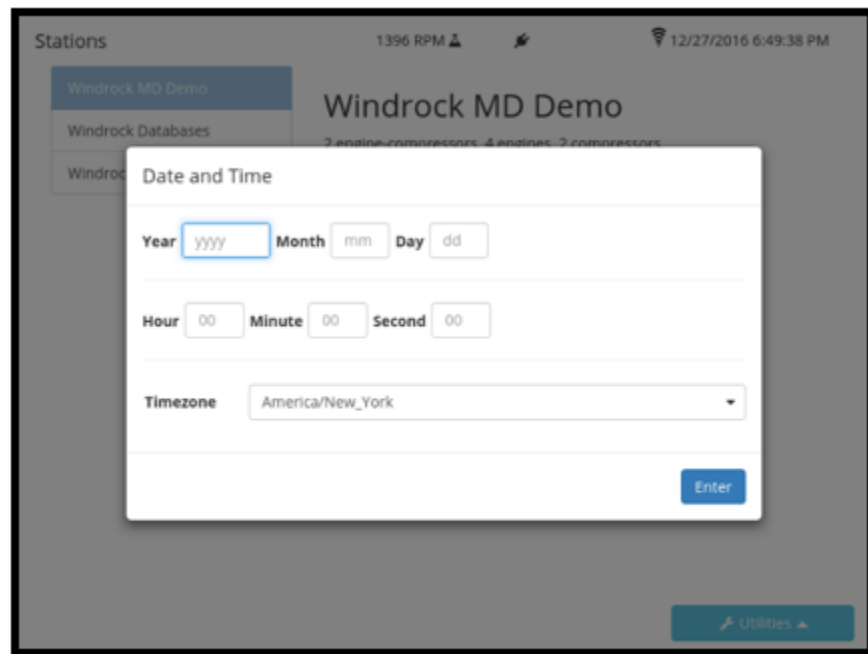


Press analyzer function key to open “Utilities” menu on the analyzer.

Adjusting Analyzer Date/Time

The ability to adjust the date/time that displays on the analyzer is available via the Utilities menu on the 6400 analyzer screen. Once Utilities is selected, a menu list will be displayed on the analyzer. Select option 2 (System setup) from the main utilities menu and then option 3 (Date/time) from the sub menu. Once selected the adjustment box below will display on the analyzer screen. Use the keypad on the analyzer to adjust the date/time to the desired setting and then select the ENTER (blue) button on the analyzer to save the setting.

Note: The date/time can be automatically adjusted via connection of the analyzer to the Windrock MD software on your PC. For this function to work properly the time zone on the analyzer must match the time zone on your PC.



Press analyzer function key to open “Utilities” menu on the analyzer.

Encoder / Wireless Transmitter

Encoder / Wireless Transmitter



The encoder converts the rotational motion of the crankshaft into electrical signals. The encoder generates a pulse per degree (PPD) signal and a pulse per revolution (PPR) signal for tracking crankshaft motion. The half inch shaft is for connecting to a rotating element at running speed.

The analyzer takes the information from the encoder and preprocesses it to match the setup for the unit (2 or 4 stroke, A/B phase shift). This makes the encoder easier to use and the data easier to collect as you don't need to go to the encoder to make any changes after the initial setup.

The encoder also incorporates Mag Pickup, Prox. Probe or Optical input connectors for once per turn inputs (TDC).

The DEG input is an optional input to track the angular velocity between TDC triggers.

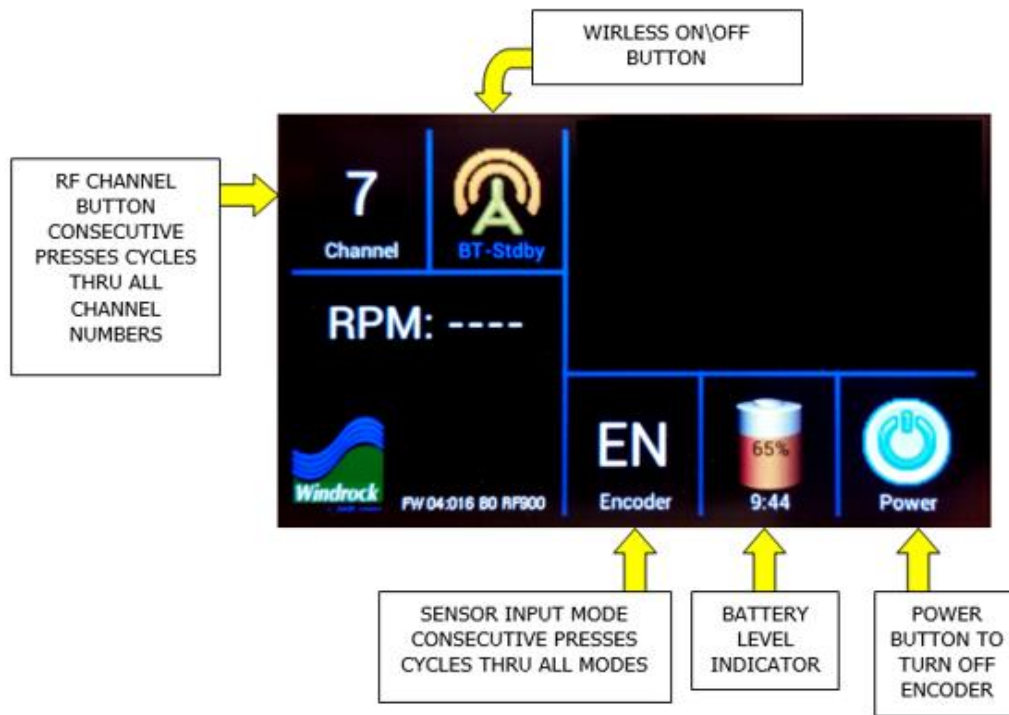
The third connector is a 5 pin LEMO for a direct connection to the analyzer with an encoder cable. Cable sold separately.

Note: The 6320 encoder cable is not compatible with the 6400.

The short antenna is for blue tooth connection that is currently used for firmware updates and is not required for normal operation.

The long antenna is for sending speed information to the 6400 and is required when using the wireless function.

Encoder / Wireless Transmitter Screen



The encoder has a touch screen with icon buttons.

The 6400 encoder has the ability of choosing from 8 different wireless frequencies by selecting the channel the encoder is to use.

Wireless Channels and Frequencies:

- Channel 0 = 903.37 MHz
- Channel 1 = 906.37 MHz
- Channel 2 = 907.87 MHz
- Channel 3 = 909.37 MHz
- Channel 4 = 912.37 MHz
- Channel 5 = 915.37 MHz
- Channel 6 = 919.87 MHz
- Channel 7 = 921.37 MHz

Note: If a 6320 analyzer is running in the general vicinity of a 6400 analyzer interference will occur with the 6400 encoder / wireless transmitter signal if it is set to Channel 7. The 6320 transmitter signal is not compatible with the 6400 hardware.

Note: When powered off the screen will turn back on by touching the screen. Be sure to remove encoder / wireless transmitter battery when storing in equipment case to prevent encoder / wireless transmitter from turning on and lowering battery charge.

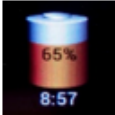
Encoder / Wireless Transmitter Functions

Encoder Functions

Encoder Modes – touch the two letter symbol to cycle modes.



- Once a battery is installed it will automatically turn on. To turn the encoder off simply press the power button in the top left corner of the screen.



- Battery Meter**
 - This is simply a gauge that indicates the remaining battery power and estimated usage.



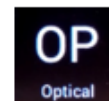
- Wireless Transmitter**
 - This radio symbol is a button on the touch screen allowing the user to turn the wireless transmitter on and off.
 - Once enabled there is a channel box that will appear on the top right. You can touch this to cycle through channels 0-7.



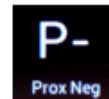
- EN**
 - This mode uses the input shaft to detect speed.



- MP**
 - This mode uses a magnetic pickup to detect a once per revolution signal (TDC) and an optional second magnetic pickup to detect a degree signal.



- OP**
 - Uses an optical pickup and reflective tape to detect a once per revolution signal (TDC) and an optional second magnetic pickup to detect a degree.

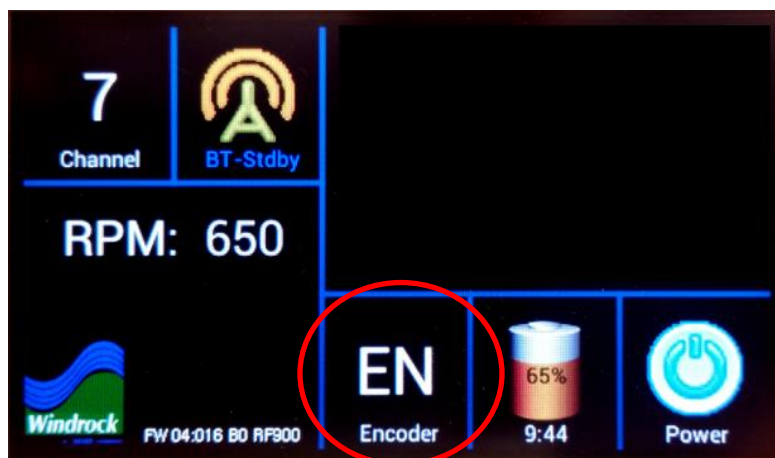


- P-**
 - This mode uses a negative proximity pickup to detect a once per revolution signal (TDC)



- SM**
 - Simulates a speed and transmits it to the analyzer via RF or wired connection.

Encoder (EN) – Requires access and connection to the crank or a shaft running at the same speed.



Magnetic Pickup (MP) - Uses a magnetic pickup plugged into an accelerometer cable to see a target on the flywheel. The encoder can automatically determine whether a pin or hole is being detected and polarity of the sensor wires is not critical so long as both wires have no reference to ground.

Setting TDC (top dead center / once-per-turn)



The threshold adjustment controls the sensitivity or level detection of the signal. It defaults to 20 (least sensitivity) and can be adjusted up or down by slowly rotating the shaft.

If the signal does not exceed the threshold level, the device will not show an RPM number and the threshold number on the gauge is red as shown.



Once the signal level exceeds the threshold level, the device will calculate an RPM and display it if the RPM is within measuring range as shown.

TIPS FOR SETTING THRESHOLD LEVEL

One characteristic of magnetic pickups is that their signal amplitude changes with the speed of the flywheel, ie, as the speed increases, the signal gets larger, and as the speed decreases, the signal gets smaller. If the threshold level is lowered from 20 until the tip of the signal is just detected while running at a higher speed, the threshold setting may not work if the signal gets smaller at a lower speed. Therefore, it is recommended that the threshold level is swept over the range of the gauge noting the upper and lower bound numbers where the colors change between green and red and then setting the level halfway between them.

Noise or other artifact considerations

If noise is present or other artifacts such as a previously used pin on the flywheel which has not been completely ground down, and the threshold number is set to a level that detects them, the RPM number can become erratic or indicate a multiple of the correct rpm. For example, if a ground down pin was detected while the engine/compressor was running at 300 rpm, the encoder would see a stable 600 rpm and the gauge number would be green, therefore, the lower bound gauge number to reference would not be a red/green color change but change to an incorrect rpm.

Setting DEG (degree)



The MP mode can also be configured to add a second magnetic pickup for detecting degree signals by pressing the **TDC ONLY** / **TDC & DEG** button which toggles between TDC only mode and TDC & DEG mode.

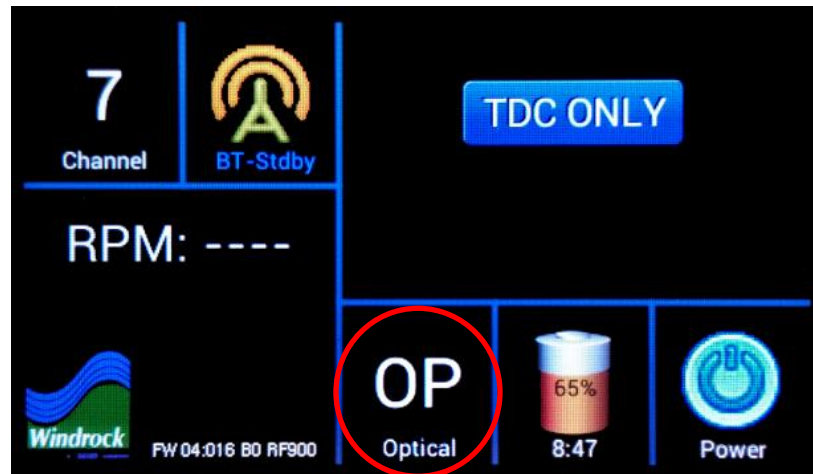
Note: Before changing to this mode, the user must have already set TDC having a stable RPM.

The TDC & DEG mode adds a **DEGREE • EVENTS •** indicator and a degree pickup mode icon   that configures the sensor for detection of either gear teeth or an arrangement of holes or pins on a flywheel. Consecutive presses of the icon toggles between the two modes.



The threshold gage for the DEG pickup is identical to the TDC gauge and should be adjusted in the same way TDC ONLY mode is except that the degree events value is referenced during adjustment rather than RPM.

Optical Pickup (OP) - This function uses an optical pickup that is plugged into the TDC port and it is triggered from a piece of reflective tape that is mounted on the flywheel.

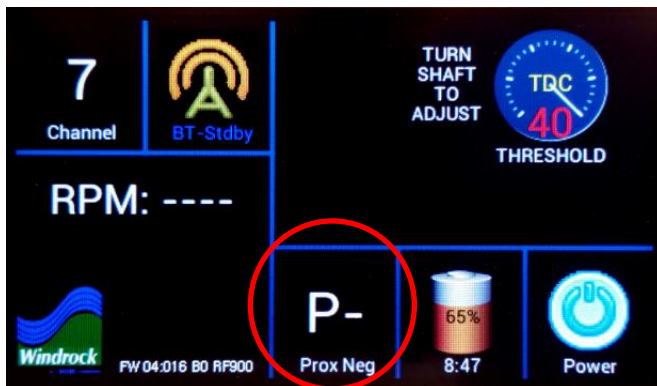


Like the MP mode, this mode also has a **TDC ONLY** / **TDC & DEG** button which toggles between TDC only mode and TDC & DEG mode.

Note: Before changing to this mode, the user must have already set TDC having a stable RPM.

The TDC & DEG mode also adds the **DEGREE - EVENTS -** indicator.

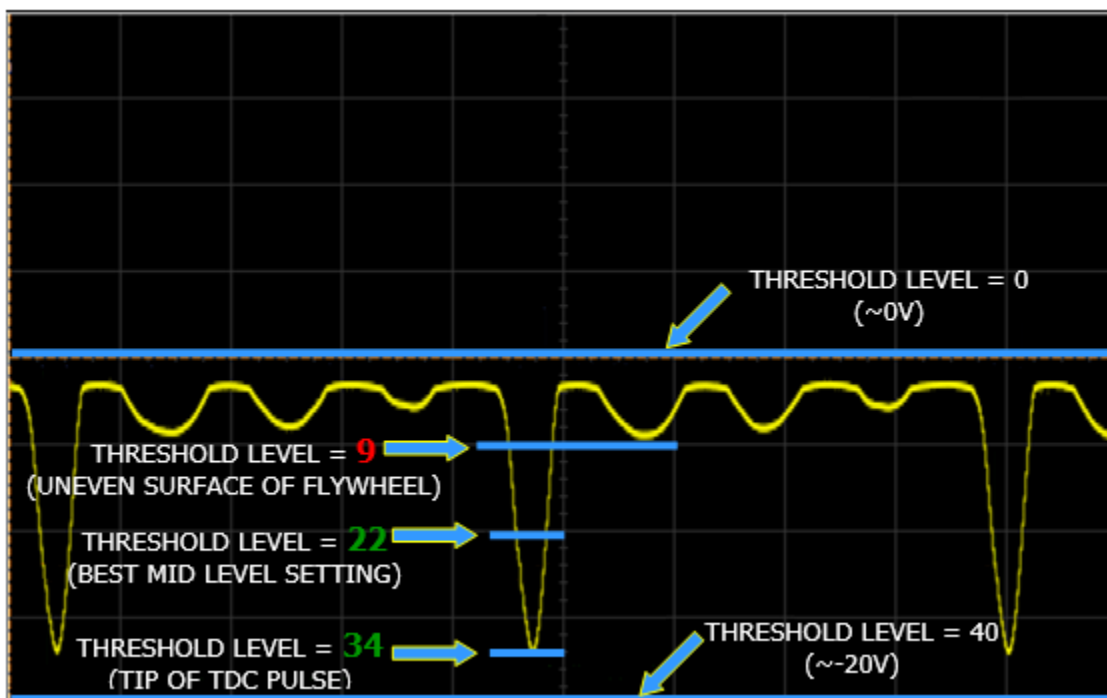
Prox Negative (P-) - This mode accommodates a negative supply proximity probe that is looking at a hole or pin target to obtain a TDC (Common with Bentley panels).



The threshold adjustment operates the same as the MP mode except that it has a wider range (0-40). Unlike magnetic pickups, prox probe signal levels do not change with speed. However, unlike magnetic pickups, which have no DC component, prox probes can have the AC signal appear over a wide DC component range, making it necessary to identify the upper and lower bounds for best threshold selection.

The Prox waveform below provides an example for setting the best threshold level. It is essentially the same approach as described for the MP mode.

- Start with the max gauge value (40) which will usually result in no RPM reading and a gauge value in RED.
- Lower the value until a stable RPM reading shows and stable GREEN color for the gauge value which for this example is 34 and an RPM of 250.
- Continue lowering the level until the RPM changes and/or the gauge value turns RED. For this example, a value of 9 detects another pulse from the uneven flywheel surface resulting in erratic RPM and the gauge value color turns RED so 10 would be the last GREEN value.
- Adjust the gauge level to the midpoint of 22 ($(34+10 / 2)$) which yields maximum separation from both the uneven flywheel surfaces and the peak of the TDC signal.



Simulator (SM) – This is a way to be able to test the analyzer without being on a unit.



It is possible to use the timing light in this mode to estimate speed on pumps/fans and collect crank angle data where a speed reference is not available. The range of this feature is 150-1300 RPM. The **COURSE / FINE** toggle button allows for course / fine adjustment in the RPM value.

NOTE: NEVER USE THIS MODE WHEN YOU CAN USE THE ENCODER OR A ONCE PER TURN MODE!

FCC Exposure Notice:

To maintain compliance with the RF exposure guidelines, place the unit at least 20cm from nearby persons.

Pour assurer la conformité aux directives relatives à l'exposition aux fréquences radio, le jouet doit être placé à au moins 20_cm des personnes à proximité.

This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

- (1) This device may not cause interference; and
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

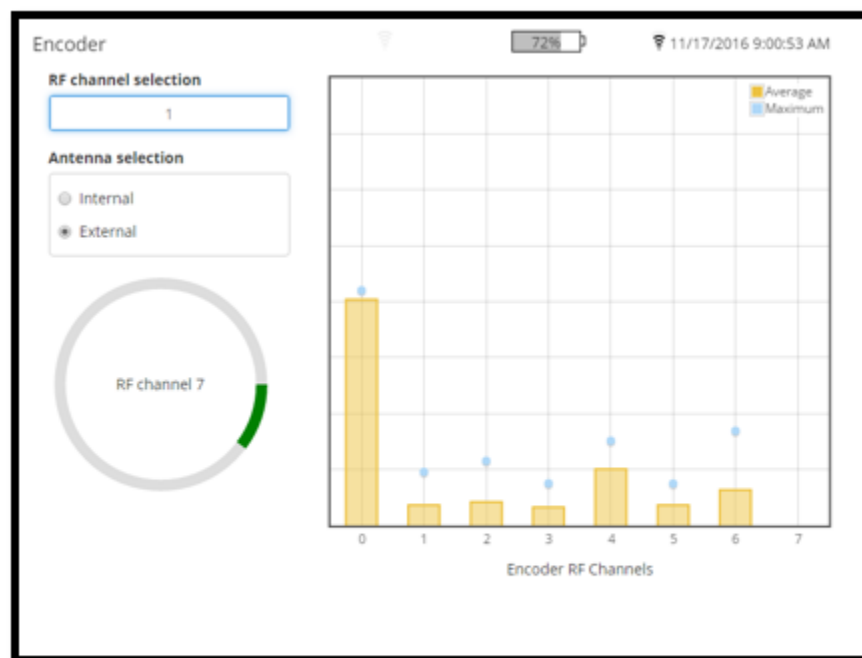
This device has been designed to operate with the antennas supplied by Windrock. Antennas not supplied by Windrock are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

Selecting a Wireless Transmitter Channel

The 6400 encoder / wireless transmitter has the ability of choosing from 8 different wireless frequencies by selecting the channel the transmitter is to use.

When picking a channel, the one with the least amount of RF traffic is most desirable. To determine this, perform the following steps...

- 1) With the wireless encoder / wireless transmitter off, on the 6400 analyzer open the Utilities menu and select option 5 (Encoder).
- 2) The analyzer will begin scanning all 8 available RF channels. Let the analyzer perform a complete scan of all available channels.
- 3) Upon performing the scan select the channel with the lowest bar. In the example below, based on the performed scan we would want to select channels 1, 2, 3, or 5.
- 4) Once you have made your choice enter the RF channel number in the RF channel selection box by using the keypad on the analyzer.
- 5) After entering the channel number on the analyzer push the down arrow to enter the antenna selection field. Use the left and right arrows to toggle between the internal and external antenna choices. This is in reference to the antenna on the analyzer. For achieving a stronger signal utilize the external antenna option with the antenna attached to the analyzer.
- 6) Turn on the wireless encoder / wireless transmitter and select the channel that was chosen in the previous step.
- 7) Press the BACK (green) button on the analyzer to exit out of the screen and retain the channel selected.



Magnetic Pickup / Optical Sensor



Both of these methods works well to provide a once-per-turn synchronization reference by tracking the revolution of a reflective reference such as a hole, pin or reflective tape.

Magnetic Pick-up

- The magnetic pick-up will cause the sync light to flash at the center of the hole or pin target.
- Typically, a pin works better than a hole.
- A $\frac{1}{4}$ inch target with a $\frac{1}{4}$ inch gap to the pickup is a good starting point for gapping the magnetic pickup.
- The magnetic pickup uses a standard accelerometer cable that plugs into the TDC plug on the encoder on the LEMO end and the magnetic pickup on the other end.

Optical Sensor

- The sync light will flash at the leading edge of the reflective tape.
- Do not place the reflective tape near TDC as the sync light will flash at the same time the optical sensor will be looking for the signal. This can make it more difficult to sync than it should be.
- Cutting the width of the tape in half can help with getting a reliable speed reference.
- This sensor has trouble if there is bright sunlight.
- A normal starting gap for the optical pickup is about 1-3 inches.
- The optical pickup has an integrated LEMO connector that plugs into the TDC plug on the encoder.

Cables

The 6400 analyzer kit comes standard with two cable types. Optional cables are available for purchase separately.

Multipurpose (A6460-CBL-0-06) (White End)
Used for connection of the following end devices:

- Pressure Sensors
- Ultrasonic/IR Sensor
- Timing Light
- Proximity Kit



Vibration (A6468-CBL-0-06) (Red End) Used for connection of the following end devices:

- Accelerometer
- Velocity Sensor
- Mag P/U for encoder
- Proximity Kit



Optional Cables

- Secondary Ignition Clip (A6470-00-06) (Blue End) – Used for collecting spark data.

Note: 6320 Secondary Ignition clip is not compatible with the Windrock 6400 analyzer.

- Primary Ignition Cable – Not Pictured
- Low Voltage Cable – Not Pictured
- Accel w/ BNC – Not Pictured
- Encoder Cable (A6464-CBL-0-50) – Not Pictured.



Strobe (Timing) Light

Strobe Light



- The strobe light is a smart sensor and can be plugged into any channel.
- To sync the encoder with the TDC mark on the flywheel press one of the two black adjustment buttons on the side of the housing.
 - Each button press is 0.125 degrees.
- The longer you hold the button down the faster the degrees will change.
- There is a degree readout on the bottom right on the analyzer screen.
- The sync light uses the same small battery as the encoder.

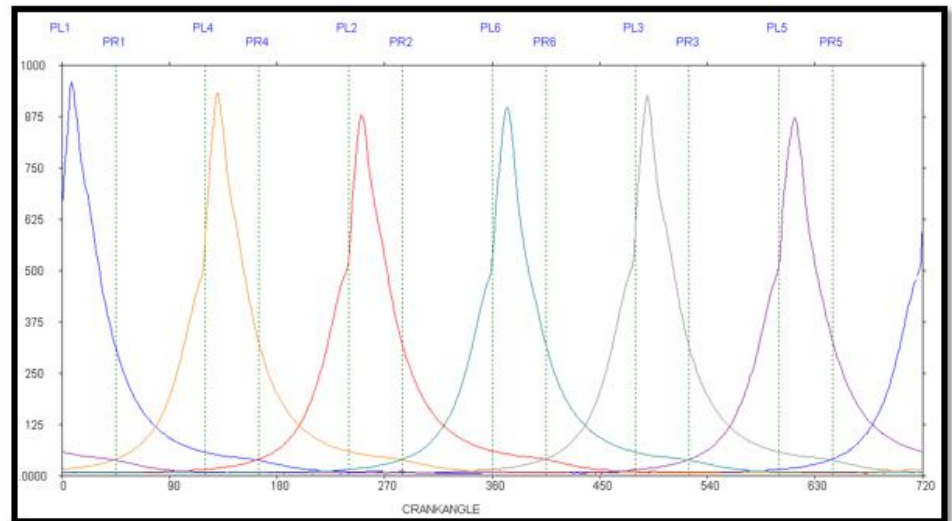
When using a permanently mounted magnetic pickup you can make a note of the degree offset from the bottom right of the screen and enter this offset into the machine geometry setup.

Note: The analyzer currently retains the last degree offset that was set using the timing light. If using a permanently mounted magnetic pickup located at TDC be sure to set the strobe light offset to 0.00 degrees prior to taking data.

Note: The strobe light begins flashing as soon as it is plugged into the analyzer. Be sure to deactivate any fire eyes, etc. that could be tripped in the immediate area of the machine prior to usage.

Engine Pressure Transducer

Engine Pressure Transducer



The engine 4-20 mA strain gauge pressure sensor comes as an air-cooled sensor and can be used for high temperature applications such as diesel. The range of this sensor is 0 – 5000 PSIG.

Note: Always zero the engine pressure sensor prior to taking data, and periodically during data collection, to compensate for thermal shift.

The power pinning function in the software configuration will also help reduce any effect of thermal shift.

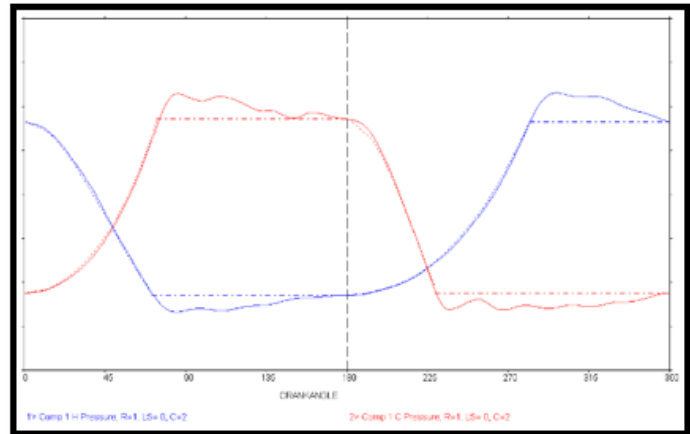
Note: Any sensor can be used with any other analyzer without factory recalibration.

Compressor Pressure Transducer

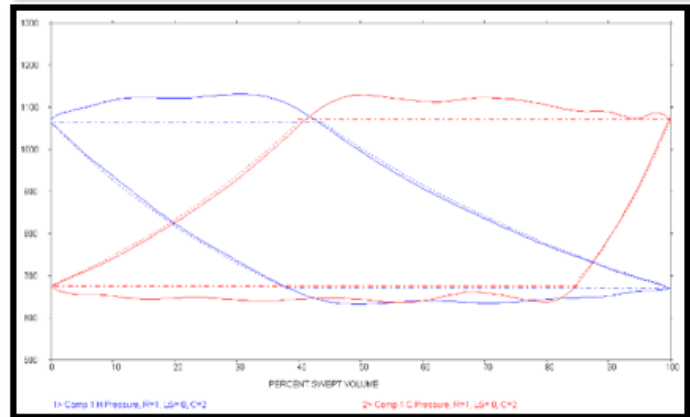
Compressor Pressure Transducer



Pressure Trace



PV Card



The compressor 4-20 mA sensor is the standard sensor for collecting compressor pressure measurements with the Windrock 6400 analyzer.

The pressure transducer is typically connected to a Kiene valve or other indicator valve type on the compressor cylinders.

Typical full scale ranges are 300, 500, 1,000, 2,000, 3,000, 5,000 psig.

The quick-connector should be cleaned periodically or whenever contamination of the pressure passage or diaphragm may have occurred (such as during testing on units within a refinery). Brake cleaner works well for this.

Note: Always zero the compressor pressure sensor prior to taking data, and periodically during data collection, to compensate for thermal shift.

Note: Do not remove the main sensor body from the right-angle adapter due to specific torque limits are required for re-installation.

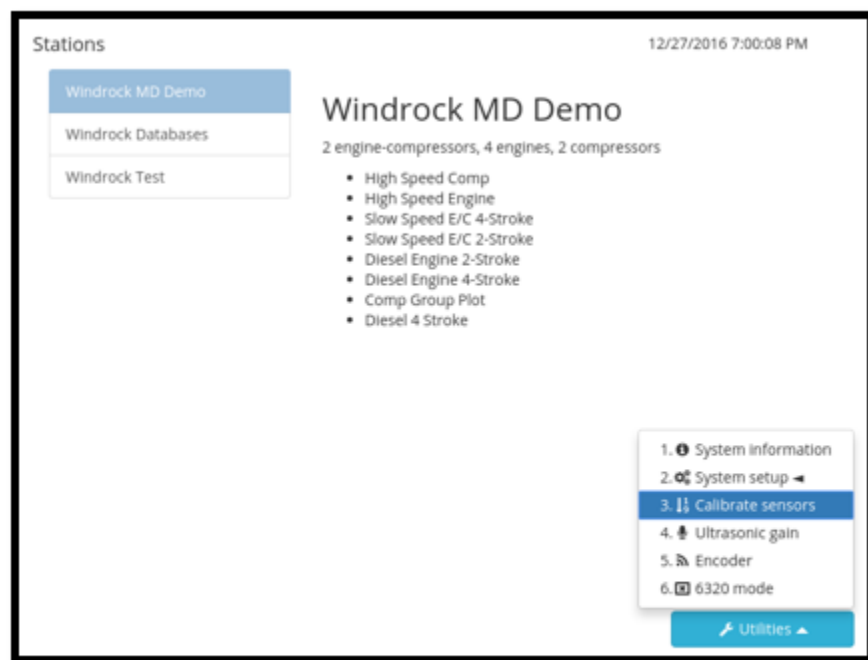
Pressure Transducer Calibration (Zeroing the Sensor)

Pressure transducers should be calibrated prior to connection to a machine when taking data.

To calibrate a pressure transducer simply plug the sensor into the analyzer and press the Utilities function key, then select option 3 (Calibrate sensors) from the menu.

Alternatively, zero points may also be added directly to the data collection route to allow zeroing of the sensor from the main data collection route menu. By using this option reduces button clicks and prevents the user from possibly forgetting to zero a sensor if more than one sensor is being used on a machine.

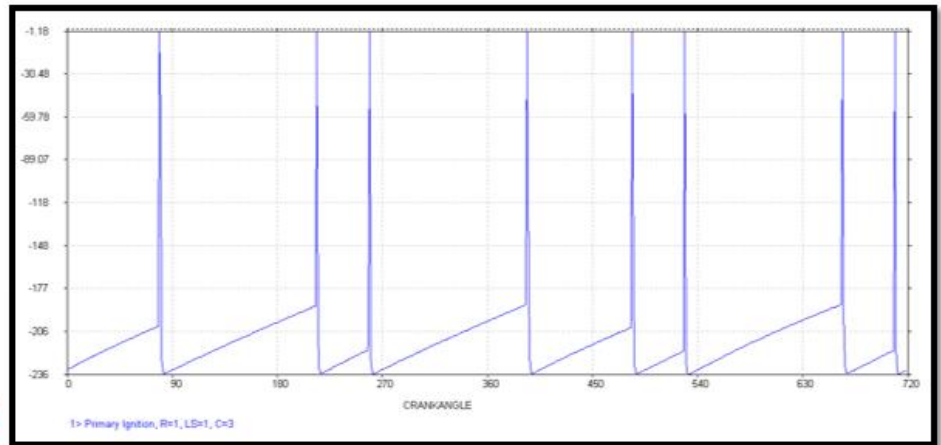
Note: We recommend zeroing the pressure transducer periodically during data collection to compensate for thermal shift.



Press analyzer function key to open "Utilities" menu on the analyzer.

Primary Ignition

Primary Ignition



- You can measure up to 500 volts with the built in 100 : 1 attenuator.

The primary ignition pick-up is used to capture and accurately measure primary ignition voltage when access is readily available.

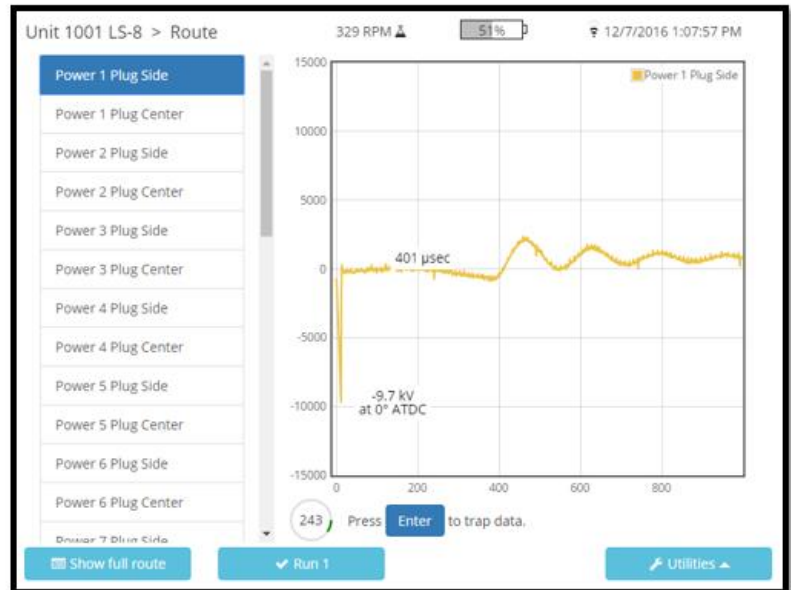
You can measure up to 500 volts with the built in 100 :1 attenuator.

The primary ignition pick-up is clipped to the N, G, P, V or other lead in the junction box depending on the ignition system using the red alligator clip. The black lead is connected to engine ground for zero voltage reference and to complete the measurement circuit.

Note: Due to the design of most newer engine packages the ability to take primary ignition data is not always accessible.

Secondary Ignition

Secondary Ignition



- You can measure up to 50,000 volts with the built in 10,000 : 1 attenuator.
- Best results in channel 1.
- The capacitive clip is clipped around the spark plug wire.

The calibrated secondary ignition capacitive clip is used to measure the secondary ignition voltages. The attenuation is 10,000:1 and with a 50-kilovolt measurement range. The capacitive clip is clipped around the spark plug wire.

A difference in the 6320 and 6400 is spark collection. Now, you will see only the detailed spark trace in real time and be able to view the ionization voltage, arc duration and timing of the ignition spark.

***** DO NOT CONNECT SPARK CLIP TO ANALYZER WHILE CLIP IS ENERGIZED ON A SECONDARY IGNITION WIRE *****

The alligator clip may be connected to engine ground, but is not usually necessary.

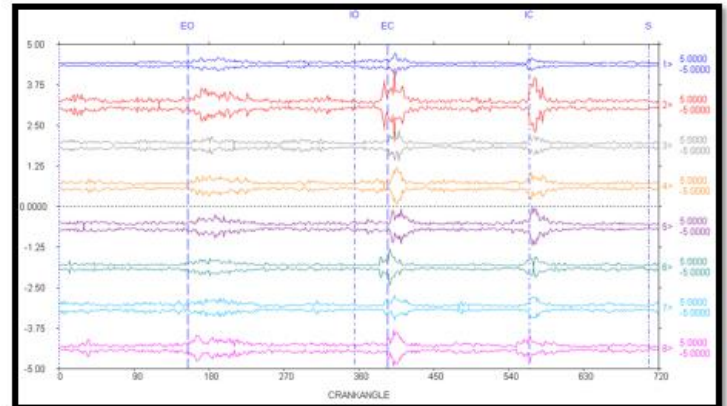
If the analyzer is operating erratically during ignition testing, try connecting, or disconnecting the ground clip to see if this will improve the analyzer stability.

Accelerometer

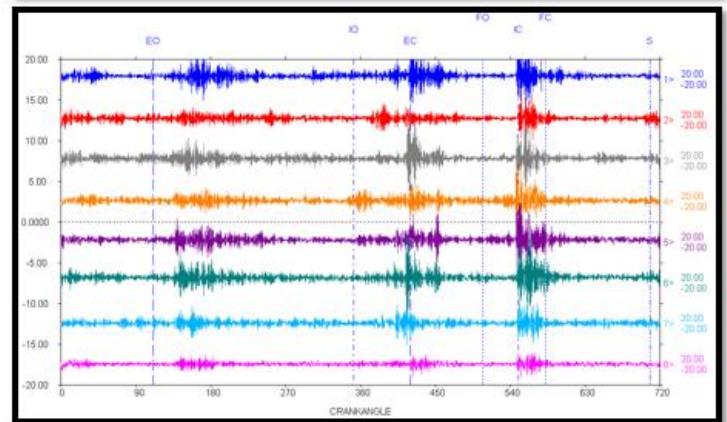
Accelerometer



High
Frequency



Raw



The Accelerometer converts mechanical or physical movement of the sensor itself into an electrical signal which is proportional to the actual movement or vibration of the component being measured. It is typically placed on several test points on both engines and compressors and is usually held in place using a flat magnet. A two-pole magnet may also be used on this sensor, however generally this is only recommended for rounded surfaces due to with the two-pole magnet the amplitude of the reading will be slightly diminished.

The accelerometer sensor provided with the Windrock 6400 analyzer has a sensitivity of 100 mV / g and is the small sensor in the kit when compared to the velocity sensor.

Typical sensitivity is 100 mV / g. 50 mV / g accelerometers can also be found in the field.

Note: Do not drop the accelerometer or slap it on the test point.

Note: Avoid overheating the sensor (general rule of thumb is if it is too hot to the touch, it should be cooled down before taking data).

Velocity Probe

Velocity Probe



Time
Waveform

Spectrum

The velocity probe converts mechanical or physical movement to an electronic signal which is converted by the analyzer to reflect actual movement or vibration. The output is in inches per second (ips) velocity. Its output can be accurately integrated to displacement for measurement of components vibrating at relatively low frequencies (frames, cylinders, skids).

The velocity probe provided with the Windrock 6400 analyzer has a sensitivity of 100 mV /g and is the large sensor in the kit when compared to the accelerometer.

The velocity probe is typically used with FFT data collection.

Common data collection would have the velocity probe being used with a 2-pole magnet mounting as we are typically taking readings on rounded surfaces associated with piping and vessels.

Note: Do not drop the velocity probe or slap it on the test point.

Note: Avoid overheating the sensor (general rule of thumb is if it is too hot to the touch, it should be cooled down before taking data).

Ultrasonic / Infrared Temperature

Ultrasonic / Infrared



- The 6400 Ultrasonic and IR temperature sensors are combined into one sensor.
- The button on the sensor is the same as the ENTER button on the keypad when the sensor is plugged into any channel.
- The ultrasonic gain is adjusted via the Utilities menu on the 6400 screen.
- While using the IR part of this end device you must use the button on the ultrasonic to save the reading as opposed to the ENTER key on the key pad.
 - When manual temperature readings are recorded using the keypad the ENTER key will save the data.

Note: When setting the gain in the analyzer for the ultrasonic the setting is stored globally in the analyzer. This means that when you set the gain using the ultrasonic, when you go to take data on another machine the gain will still be set to where it was when last used.

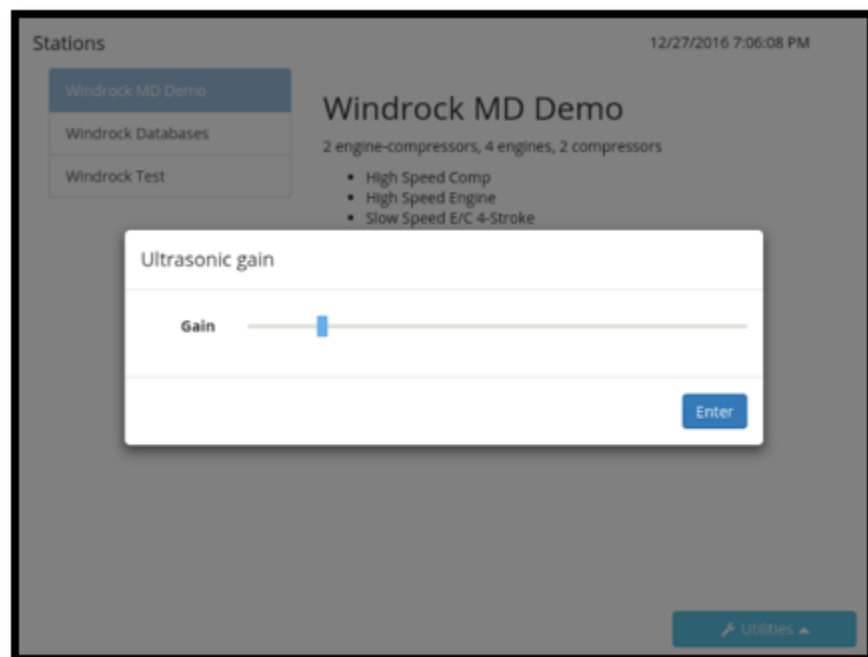
For further information regarding setting the gain using the analyzer please reference the *Ultrasonic Gain Adjustment* section of this manual.

Ultrasonic Gain Adjustment

The ultrasonic sensor gain is adjusted via the Utilities menu on the 6400-analyzer screen. Once Utilities is selected, a menu list will be displayed on the analyzer. Select option 4 (Ultrasonic gain) from the Utilities menu and the adjustment box below will display on the analyzer screen. Use the arrows on the analyzer to adjust the gain to the desired setting and then select the ENTER (blue) button on the analyzer to save the setting.

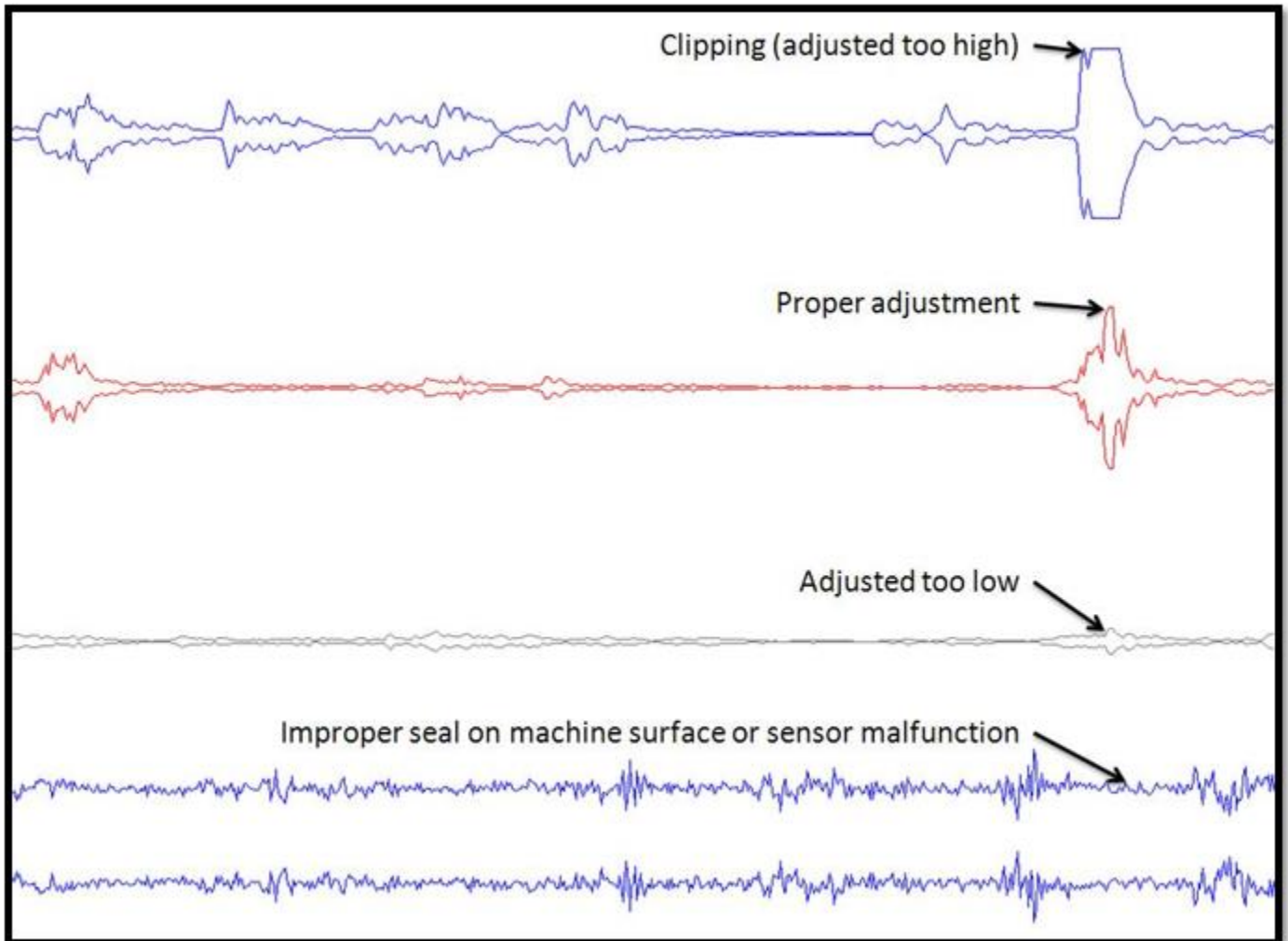
Note: When adjusting the gain, it is best to do so with an ultrasonic trace on the screen. By doing this will allow visual adjustment.

Note: When setting the gain in the analyzer for the ultrasonic the setting is stored globally in the analyzer. This means that when you set the gain using the ultrasonic, when you go to take data on another machine the gain will still be set to where it was when last used.



Press analyzer function key to open “Utilities” menu on the analyzer.

The following example illustrates the various data trace representations that may be observed while adjusting the ultrasonic gain and should be used for comparison when setting the ultrasonic gain to an acceptable level.

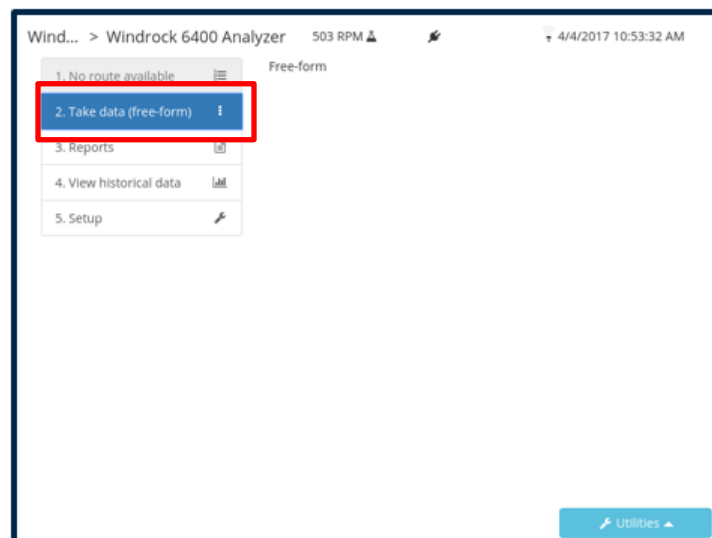


Headphones

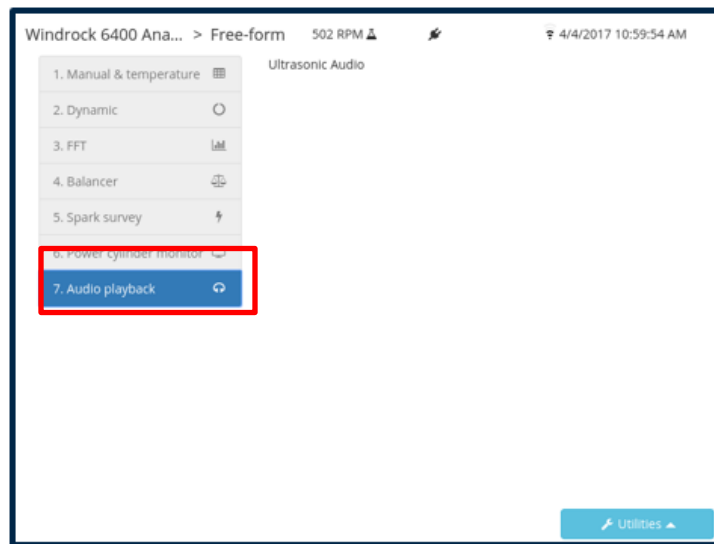
The 6400 analyzer is available with optional accessory headphones. When used in conjunction with the ultrasonic sensor the headphones allow the user to listen and detect internal and external gas leakage during the walk-around assessment.



- 1) Plug the headphones into the headphone jack port on the 6400 analyzer.
- 2) Plug the ultrasonic sensor into any of the analyzer channels.
- 3) On the analyzer select a Station and Machine, then select option 2 “Take data (free-form)”.



- 4) Select option 7 “Audio playback”.

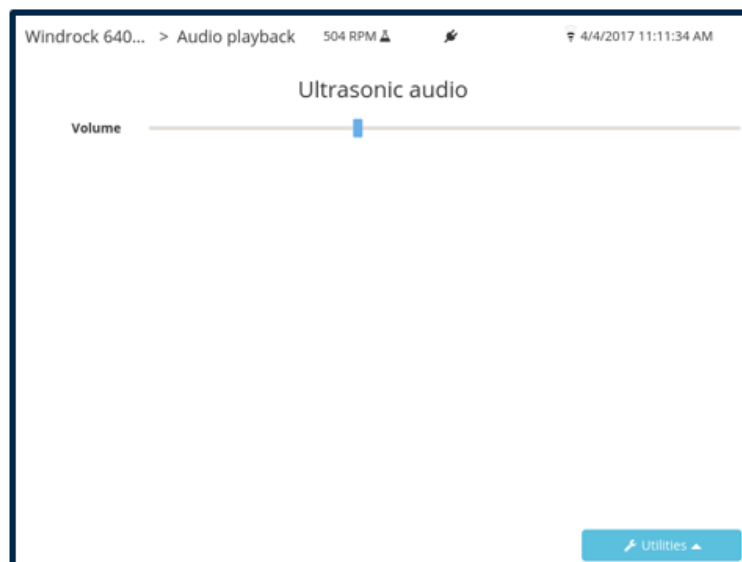


- 5) Adjust the volume knob on the headphones to the desired sound level if available. On the analyzer adjust the volume bar to the desired setting using the arrows on the analyzer keypad.

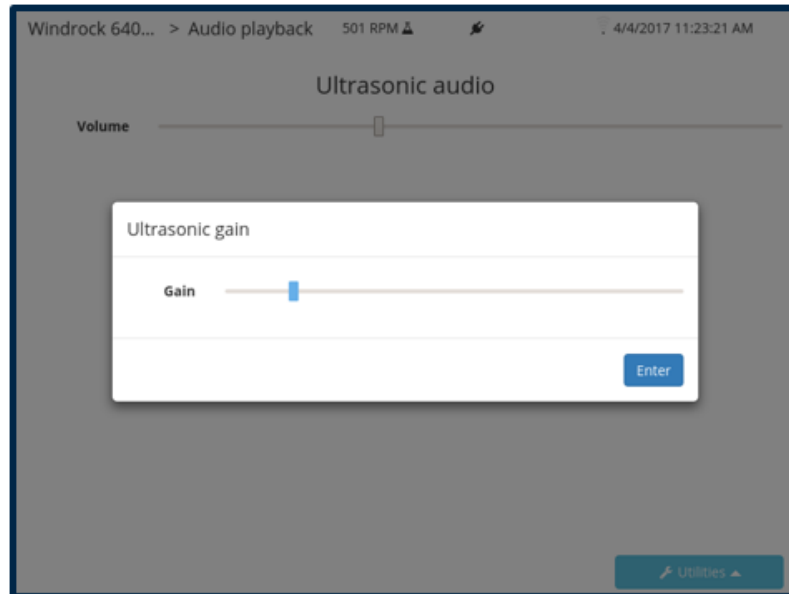
Note: The ultrasonic audio playback is only functional when the screen below is displayed.

Note: The ultrasonic sensor must be plugged into a channel prior to entering the below screen for the audio playback feature to work properly.

Note: The ultrasonic gain will also need to be adjusted appropriately for playback of sound.



- 6) Adjust the ultrasonic gain by accessing the Utilities function key and then selecting option 4 (Ultrasonic gain).
- 7) Use the arrows on the analyzer to adjust the gain to the desired setting and then select the ENTER (blue) button on the analyzer to save the setting.



/VA Kit Additional Items

/VA Kit Additional Items



The VA option provides the ability to collect additional vibration types of data used in FFT / Spectrum analysis such as orbit plots. Furthermore, it allows for easy data collection off Bently style panels.

Components include:

- Additional Windrock MD software functionality
- Four (4) accelerometer input cables, 10-ft. (LEMO to 2-pin MS)
- Five (5) proximity probe input cables, 10-ft. (LEMO to BNC-M)
- Three (3) additional accelerometers
- Three (3) additional magnetic bases