

Reporting provides the quick answers you need

Today's industrial plants can't afford crippling unplanned downtime, high maintenance costs, and wasted energy. Seeing early warnings of impending machine failure empowers maintenance staff to schedule repairs but how to get answers from all of the reams of data coming in? All too often the information is locked away in high resolution images, complex plots, vague reports or siloed away between the teams. The key to success is understanding how to properly use the information in the most efficient manner.



Reporting basics

The needs for reporting can be different based on the person requesting it, the industry, the technologies, the applications, and the company culture. Does the report need to be forwarded on to generate a work order, or consolidated in an enterprise program, or reviewed by the supervisor, or put in a folder for later? (Or never seen again). Here are the basics:



Enterprise report

Commonly referred to as Computerized Maintenance Management Systems (CMMS), are used company-wide and at the highest level. Like Fluke's eMaint software, which is used by companies that want to get the most from the data by connecting all databases together.



Connected report

Fluke Connect® Measurements collaborates by sharing data wirelessly between multiple Fluke tools to the cloud for reference and sharing with supervisors and experts. Fluke Connect® Assets helps you build and sustain a predictive maintenance program.

010 Vibration Tester Diagnostic Report			
Device Serial Number	1506017		
Machine Serial Name	S 0100000		
Measurement Date/Time	02/2/2013 14:47:58		
Check Type	Maximum Peak	0.82 mm/s ² r/f 1.425 cm 2T in Low Range	
	1X RMS	0.20 mm/s ²	
	Overall Vibration	0.76 mm/s ² (RMS) @ 20	
Diagnosis			
Ball Bearing	Red	Severe	Severe
Motor Fan End Bearing	Yellow	Severe	Severe
Motor Fan End Coupling	Yellow	Severe	Severe
Motor Fan End Coupling	Yellow	Severe	Severe
Motor Fan End Coupling	Yellow	Severe	Severe
Motor Fan End Coupling	Yellow	Severe	Severe
Recommendations			
Replace Motor Fan End Bearing	4	Severe	Severe
Replace Motor Fan End Bearing	4	Severe	Severe

Individual tool report

Each Fluke tool has its own specific report that was designed to provide the results for the tool.

There are four commonalities in most reports but quite often presented a little different depending on the tool and the technology:

- 1. Setup**—ensures the tool is set up correctly
- 2. Measure**—simple readings or complex data
- 3. Diagnose**—the data might need some analysis in order to get useful answers.
- 4. Action**—recommended next steps

805 FC Vibration Meter

The 805 FC is easily added to the operator rounds to screen machine health. After a quick measurement, it provides three readings and two severity scores—is the machine ok or is further testing needed?



Measure—3 readings:

1. Bearing impacting
2. Overall vibration
3. Bearing temperature

High frequency
4,000 Hz to
20,000 Hz

01/12/2011 09:10 AM
Bearing
3 CF+
GOOD

Bearing
vibration
(CF+)

Diagnose—2 severity scores:

1. Bearing health
2. Overall machine health

Overall vibration
Frequency range
10 Hz to 1,000 Hz

Overall Vibration
0.06 g (pk)
GOOD

Overall
vibration

Temperature
-20 °C to 200 °C

Temperature
68.7°F
ID :
TYPE : Recip Chiller
RPM : >600

IR
temperature

Setup

Check to see if
the test was setup
correctly?

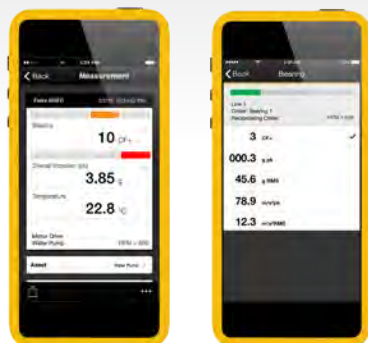
The measurements can be saved both on the 805 FC and sent wirelessly to a Fluke Connect enabled device.

There are two reporting methods available:

1) **Fluke Connect**—share information (3 readings and 2 severity scores) with everyone on your team. Trend the overall vibration over time. Store and track the severity scores and measurements.

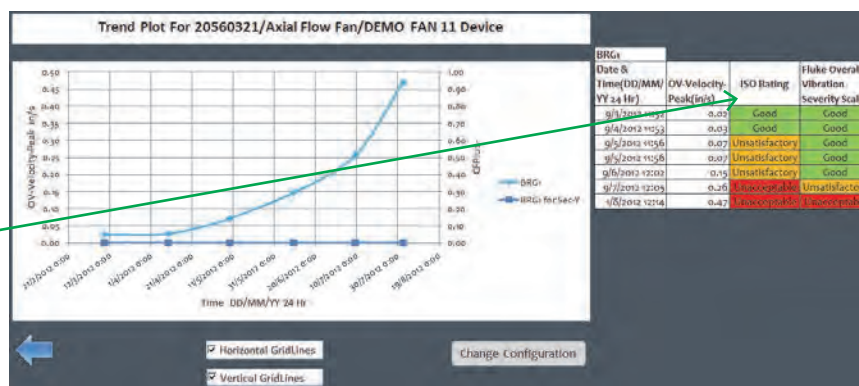
2) **Excel template**—trend all three measurements simple data (a number) can be trended over time.

Or, copy and paste data into your own custom spreadsheet



Diagnose

Machine health auto compared to 37 machine categories (built-in database) and ISO 10816



Action

The recommended next step: No action, check more frequently, or further testing needed

Machine Name: DEMO FAN 11/BRG2																
Date & Time (DD/MM/YY 24 Hr)		OV-Velocity					HF Acceleration					Temperature		CFPlus		
Record No	Time (DD/MM/YY 24 Hr)	Peak (in/s)	Rms (in/s)	Peak (mm/s)	Rms (mm/s)	Peak (g)	Peak (m/s ²)	Rms (g)	Rms (m/s ²)	Peak (g)	Peak (m/s ²)	Centigrade	Fahrenheit			
1	9/3/2012 11:52	0.03	0.75	0.02	0.53	0.06	1.50	0.11	1.07	0.02	0.22	2.14	25.1	77.2	0	
2	9/4/2012 11:54	0.02	0.58	0.02	0.41	0.05	1.16	0.11	1.11	0.02	0.20	2.23	25.1	77.5	0	
3	9/5/2012 12:00	0.05	1.29	0.04	0.91	0.10	2.58	0.11	1.11	0.02	0.23	2.23	25.0	77.0	0	
4	9/7/2012 12:07	0.28	7.21	0.20	5.10	0.57	14.42	0.12	1.14	0.02	0.24	2.23	24.8	75.6	0	
5	1/8/2012 12:14	0.58	14.81	0.41	10.47	1.17	29.62	0.11	1.07	0.02	0.21	2.22	24.1	75.4	0	

810 Vibration Tester

Most rotating machine failures come from four common faults: imbalance, misalignment, bearings, and looseness. The 810 has an auto diagnostic program—based on 30 years of machine baselines analyzed by vibration experts from real machines—that helps your team return to work even faster. Extensive setup, trending, analysis and onsite experts are not needed.

There are three reporting methods available:

- 1) **Tester screen**—review data and results in the field.
- 2) **Viewer software**—review data and results on your PC.
- 3) **PDF report**—One button push from Viewer software. Review setup and data to validate results.

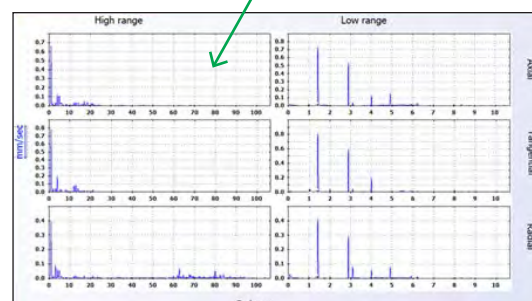
Machine Setup Details	
Device Serial Number :	PC desktop
Machine Setup Name :	5 SPINDLE
Setup Field	Input
Motor type	AC
AC motor with VFD	Yes
Speed in RPM	1775
Nominal kw	50
Motor mounted	Vertical
Motor has	Roller bearing
Motor detached from drive train	No
Motor close-coupled	No
Coupling between motor and next component	Yes
Next component	Gearbox
Gearbox bearing type	Roller bearing
Number of internal speed changers in gearbox	1
What is known?	Shaft speeds
RPM entry method	Manual
RPM of input	1775
RPM of output	275
Is there a flexible coupling between gearbox and next component ?	Yes
Next component that gearbox is attached to	Spindle

Setup

Check to see if the test was setup correctly.

Measure

Complex data: high resolution vibration spectrum in 2 ranges and 3 axis from each bearing—review to validate data.



810 Vibration Tester Diagnostic Report			
Device Serial Number :	1926017		
Machine Setup Name :	5 SPINDLE		
Measurement Date/Time :	02/22/2013 14:47:59		
		Maximum Peak: 0.82 mm/sec at 1.42X on 2T in Low Range 1X RPM: 1830 RPM Overall Vibration: 0.76 mm/s (RMS) @ 2R	
Diagnosis			
Fault description	Fault severity	Severity Score	Severity Scale
Motor Free End Bearing Wear	Extreme	90/100	
Spindle Input End Looseness	Extreme	76/100	
Gearbox Ball Bearing Wear	Moderate	38/100	
Recommendations			
Recommendation	Priority	Priority Descriptor	
Replace Motor Free End Bearing	4	Mandatory	
Replace Gearbox Ball Bearing	2	Disirable	

Diagnose

Automated analysis (database, baseline and rule base from experts). If Setup and data is valid, then Diagnosis is valid.

Action

Follow the recommended next step: No action, further testing needed, schedule next downtime, or repair immediately.

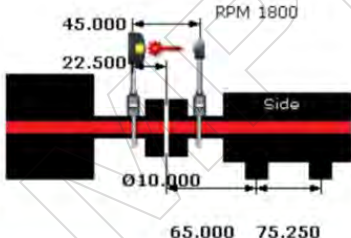
830 Laser Shaft Alignment Tool

The 830 employs an intuitive guided user interface that walks the technician through the steps and performs complicated alignment calculations for your team. This means you'll have the answers you need to quickly align most of your machines (not just a few) and get your plant up and running fast.

All-in-one screen provides misalignment values at the coupling center, severity scores based on tolerances, and correction values: shims and jacking bolts to align motor shaft to stationary shaft.

Document your work with PDF report before and after.



Fluke 830 LASER ALIGNMENT TOOL Report			
File info			
Filename:	sample		
Created:	20-March-2014, 12:38:51		
Measured:	20-March-2014, 19:02:42		
Comment:			
Machine dimensions			
Static		Value:	Unit:
Coupling	Coupling diameter:	10.000 [inch]	
	Distance from sensor to prism	45.000 [inch]	
	Distance from sensor to coupling centre:	22.500 [inch]	
	Distance to right machine:	65.000 [inch]	
	RPM:	1800 RPM	
Movable	Distance from 1 to 2 Feet:	75.250 [inch]	
Dimensions [inch]			
			
Machine coupling diagnose			
Actual:	Results of Sweep Measurement	Value:	Unit:
Vertical:	Gap	-0.7 [mils]	
	Offset	-2.2 [mils]	
	Vertical tolerance:		
Horizontal:	Gap	-0.4 [mils]	
	Offset	+1.2 [mils]	
	Horizontal tolerance:		
Machine foot corrections			
Static			
Movable	Vertical:	Horizontal:	Unit:
Foot 1	-2.4	-3.7	[mils]
Foot 2	-7.7	-6.5	[mils]
Printed: 28-March-2014, 13:29:58 Ver.: 1.00 S/N: 65431612			

Check to see
setup correct

Measure

Simple data:
misalignment
the coupling
Gap and Offset

Diagnose

Automated alignment
vertical and
based on tolerance

Action

Follow the recommended
corrections of
feet based on
condition: existing
out of tolerance
misaligned.

Setup

Check to see if the test was setup correctly?

Measure

Simple data: coupling misalignment values at the coupling center for Gap and Offset.

Diagnose

Automated analysis of alignment condition in vertical and horizontal based on tolerance tables.

Action

Follow the recommended corrections of motor feet based on alignment condition: excellent, good, out of tolerance, grossly misaligned.



Ti450 Infrared Camera

Technicians can use the thermal imaging capabilities of the handheld Ti450 Infrared Camera in order to discover and diagnose various issues, including cooling problems and impeded airflow, bearing issues on motors, and many mechanical problems. The Ti450 produces sharp, clear images with advanced focus systems. Technicians can also highlight equipment areas that are outside your pre-set 'normal' temperature ranges quickly with color alarms.



Powerful SmartView® software for your Windows desktop computer makes it easy to optimize images, perform advanced analytics, generate quick, customizable reports, and export images to the format of your choice. Easily adjust visible and infrared image blending and locate potential problems with IR Fusion® technology. Get a closer look at problem areas by adjusting the level and span, changing the color palette or enabling color alarms.

There are three reporting methods available:

- 1) **On the camera screen**—images can be viewed locally.
- 2) **SmartView desktop software**—makes it easy to optimize images, perform advanced diagnostics, generate quick, customizable reports, and export images to the format of your choice.
- 3) **Fluke Connect mobile app**—share information with everyone on your team.

Measure and Diagnose

View image and send it to Fluke Connect mobile app or download to PC to include in report.

Easily adjust visible and infrared image blending and locate potential problems with IR Fusion technology.

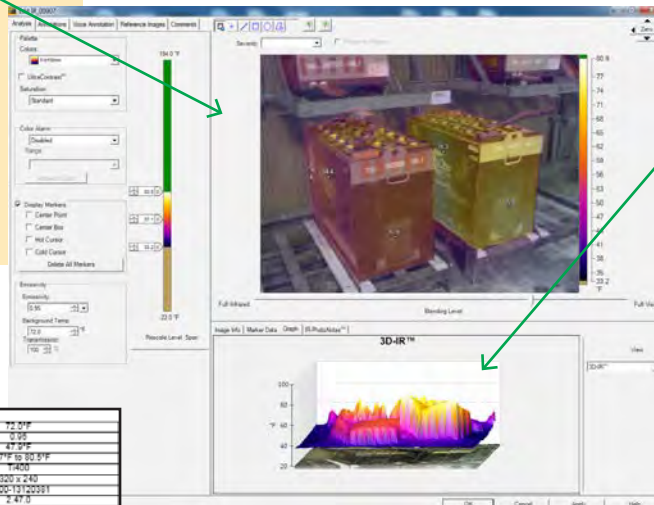


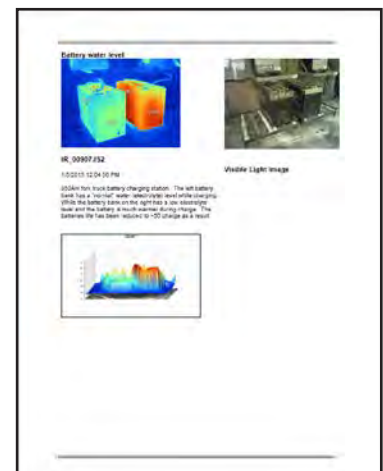
Image Info			
Background Temperature	72.0°F		
Emissivity	0.95		
Average Temperature	47.9°F		
Image Range	33.7°F to 80.9°F		
Camera Model	1450		
IR Sensor Size	320 x 240		
Camera Serial Number	1450213100001		
DSP Version	2.47.0		
Camera Manufacturer	Fluke Thermography		
Lens description	FLUKE LENS W/IR		
Image Time	1/5/2015 12:04:56 PM		
Calibration Range	-4.0°F to 176.0°F		
Distance to Target	2.95m		

Main Image Markers			
Name	Temperature	Emissivity	Background
P0	57.5°F	0.95	50.0°F
P1	75.3°F	0.95	50.0°F
P2	78.3°F	0.95	50.0°F
P3	84.4°F	0.95	50.0°F

Diagnose and Action

Get a closer look at problem area by adjusting the level and span, changing palette or enabling color alarms and 3D-IR.

Review notes and recommendations.



438-II Power Quality and Motor Analyzer

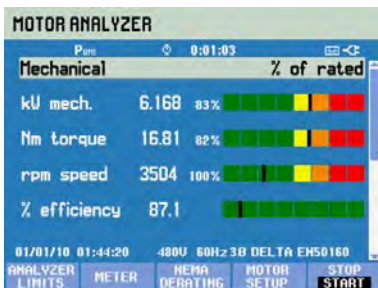
The 438-II provides a streamlined and cost effective method for testing motor efficiency, while eliminating the need for external mechanical sensors and costly downtime. It provides electrical and power quality measurements including voltage, current, and harmonics. It also provides vital mechanical measurements such as torque and motor efficiency.



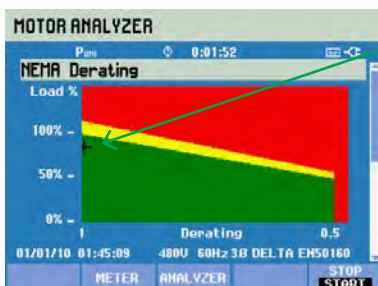
- 1) Enter the motor rating plate information into the 438-II, so that the instrument may provide a benchmark for NEMA derating and motor performance measurements.
- 2) The data collected can be viewed real time locally on the instrument. Screenshots may be sent to the Fluke Connect mobile app or loaded into the PowerLog 430-II desktop software.
- 3) Additional logged data such as electrical and power quality measurements may be viewed via PowerLog 430-II desktop software. A professional PDF report may be generated, which includes all the electrical measurements important to making energy savings and troubleshooting decisions.



Setup
Enter motor rating nameplate information.



Measure and Diagnose
View live motor data and send screenshots to Fluke Connect mobile app or download to PC to include in report.



NEMA derating chart provides a quick way to determine if motor is being overworked or underworked.



Diagnose and Action
View trend data such as voltage, amps, and power to determine optimal energy savings and troubleshoot power quality issues.

Fluke. Keeping your world up and running.®