

OPERATOR BASED CONDITION MONITORING

PROGNOSE 
Asset Management



OPERATOR BASED CONDITION MONITORING

PROGNOSE IS AN INNOVATIVE, OPERATOR EMPOWERED, ONLINE CONDITION MONITORING SYSTEM THAT COMBINES SEVERAL PREDICTIVE MACHINERY MEASUREMENTS. THIS EARLY WARNING SYSTEM HAS A SIMPLE INTERFACE, REVEALING THE OVERALL EQUIPMENT CONDITION IMMEDIATELY VIA THE OPERATOR DASHBOARD.

This simple early warning system can identify a wide range of impending failure modes in rotating element machines and process equipment.

The operator dashboard, is backed by a sophisticated and powerful analysis and troubleshooting suite, used to identify, analyse, and resolve equipment defects.

KEY BENEFITS

- Increase equipment availability
- Reduce spare parts usage
- Lower repair and servicing
- Identify failures
- Eliminate breakdowns
- Eliminates the need for on site expertise
- Reduces time-based maintenance

SAVES MONEY AND INCREASES OPERATING EFFICIENCY.

PROGNOSE embraces three fundamentals of equipment reliability:

ConditionNet Periodic monitoring of machinery condition (vibration and temperature) to identify mechanical and electrical failures.

LubriNet Continuous lubrication monitoring (grease, oil flow and quality).

Process parameters – Periodic acquisition of process variables to evaluate the overall operating efficiency of the equipment.



MEASURE MORE - IDENTIFY MORE - PREVENT MORE

By measuring vibration intensity, lubrication certainty and process efficiency PROGNOSE identifies a vast array of failure modes, indicates corrective actions to be applied, and prevents equipment breakdowns. In addition to vibration intensity uncovering electrical and mechanical defects, PROGNOSE provides lubrication certainty, through monitoring of lubrication quality and rate. Finally PROGNOSE provides process assurance through its process measurement capability, calculating and tracking efficiency at the equipment level. This unique combination of measurement provides a comprehensive condition monitoring system covering most monitoring requirements and anticipated failure modes. As a result, PROGNOSE increases plant availability, reduces unscheduled maintenance and increases equipment efficiency.



MEASURE MORE

PROGNOSE Measurements

- Vibration intensity. Measuring the vibration amplitude and frequency to understand mechanical smoothness and electrical continuity.

Vibration amplitude + vibration frequency = vibration intensity

- Lubrication (quantity and quality). Ensure adequate lubrication and cooling for bearings and gears.

Lubrication rate + lubrication quality = lubrication certainty

- Process efficiency. Measure process variables to track equipment performance efficiency.

Process rate – process loss = performance efficiency

Overall PROGNOSE measurement delivery

Vibration intensity + lubrication certainty + process efficiency = equipment assurance



IDENTIFY MORE

Potential failure modes

- Unbalance/misalignment/mechanical looseness/resonance
- Bearing and gear defects
- Lack of lubrication/over lubrication
- Rate decrease, power increase, waste flows (Power in/Rate out) = efficiency



PREVENT MORE

- Equipment failures (breakdown)
- Unscheduled maintenance
- Repairs and replacements



TECHNICAL BENEFITS

PROGNOSE IS REMOTE MONITORING DEVICE, DESIGNED TO OBTAIN DATA AT THE EQUIPMENT, AND TRANSMIT IT TO ANYWHERE IN WHERE WORLD. IT IS FULLY NETWORK CONNECTABLE COVERING MULTIPLE MACHINES, IN MULTIPLE AREAS AND MULTIPLE SITES. THE CONFIGURABLE DASHBOARD LINKS ALL MONITORED MACHINES TO A COMMON POINT THROUGH ITS NETWORK CONNECTIVITY AND DEFINED ALARM CONDITIONS.

With its automated data collection, PROGNOSE obtains consistent, repetitive data and removes the need for human interaction or user intervention. With the flexibility of multiple measurements, all necessary data required can be captured without plant disruption - ensuring production rates and quality standards are maintained.

DIRECT COMPARISON OF SEVERAL MACHINE CONDITIONS IS POSSIBLE AND PROVIDES PERTINENT DATA TO ENABLE MORE INFORMED DECISIONS WITH REGARD TO CORRECTIVE ACTIONS AND MAINTENANCE.

Using the operator dashboard, PROGNOSE offers a user friendly touch screen interface, displaying overall trend levels and selectable alarm functions

PROGNOSE implements automated assessment of the equipment's current condition, detecting the most common failures modes and indicating these to the user via the operator dashboard. Automated evaluation of the following conditions is made on a continuous basis.

- Unbalance
- Misalignment
- Mechanical looseness
- Worn or damaged bearings
- Worn or damaged gears
- Lubrication deficiency

PROGNOSE is also designed with experienced engineers and analysts in mind. Its comprehensive condition monitoring software database that can be accessed locally or remotely at any time, enabling in depth evaluation of potential problems.

Boasting time domain and frequency domain analysis, PROGNOSE provides a powerful analysis suite in a condition monitoring database.

PROGNOSE has a redundant data repository system so high levels of data integrity are assured even during network failures and communication interruptions.

A scalable solution, PROGNOSE is designed to be purchased in building blocks to match user needs. Users can start small and grow the system overtime, limiting any initial capital expenditure. As the need to monitor more equipment grows, so can the PROGNOSE solution. PROGNOSE is designed with criticality in mind, offering higher levels of detection for more critical equipment, whilst lowering the cost of monitoring for less critical items.

Its application is suitable for:

- Highly critical assets
- Hard to access equipment
- Equipment enclosed by fixed or interlocked guards
- Trouble shooting of problem equipment



TECHNICAL SPECIFICATIONS

MEASUREMENT (PROGNOSE STANDARD)

Measurement parameter	Detail
Velocity RMS overall (mm/s)	2-1600 Hz (ISO)
Acceleration RMS overall (G's)	2-25,000 Hz
Demodulated acceleration overall (G's)	5000 Hz - 10 KHz
Operator (vibration) dashboard	Machine condition Bearing condition Unbalance Misalignment Mechanical looseness Other Lubrication deficiency
Temperature	0-100 °C (10 mV/°C)
Grease flow	0-2500cc/min, accuracy (+/- 3%)
Oil flow	0-(tbd) L/min, accuracy (+/- n%)
Process variables	0-10 v / 4-20 mA
Oil contamination/wear particles	% (1-100)
Oil temperature	0-100 °C
Machine efficiency	User selectable calculated value*

*via onboard equation builder

PROGNOSE (OPERATOR DASHBOARD)



OVERALL LEVELS



PHYSICAL (STANDARD ENCLOSURE)

Parameter	Detail
Enclosure	
Dimensions (length/height/depth) mm	600/400/200
Mounting	Wall/frame
Rating	IP 65
Material of construction	316 Stainless steel
Weight (Inclusive of battery)	10 kg
Touch screen	
Dimensions (length/height/depth) mm	300/250/150
Grade	Industrial Grade 12VDC 15.6" diagonal
Type	Active matrix TFT LCD (LED)
Response time-total (typical)	10 msec
Contrast ratio	500:1
Operating temperature	0 °C to 40 °C
Humidity	20% to 80%
Mini PC	
Processor	Intel i7
RAM	8 GB
Hard disk	500 GB SSD
Operating system	Windows 10
Connectivity	Dual ethernet port (RJ45)
Alarms and indication	
Visual	LED multicolour with test mode
Audible	

ELECTRICAL

Parameter	Detail
Power supply (mains)	
Volts	240 V SP+N
Amps	13
Frequency	50 Hz
Power supply (internal)	
Volts	12 / 5
Amps	4.6 / 5
Connections	
Mains power	Screwed terminal (2.5 mmsq) 10A isolator
Ethernet	RJ45
Sensors	Screwed terminal (1.5 mmsq)

SENSORS

Vibration/temperature

Technical performance	
Measurement	Detail
Mounted base resonance	22 kHz (nominal)
Sensitivity	10 mV/g +/- 10% nominal 80 Hz at 22 °C
Frequency response	2 Hz to 10 kHz +/- 5%
	0.8 Hz to 15 kHz +/- 3dB
Isolation	Base isolated
Measurement range	+/- 80 g
Temperature	10 mV/°C with 500 mV offset
Transverse sensitivity	Less than 5%
Electrical	
Electrical noise	0.1 mg max
Current range	0.5–8 mA
Bias voltage	2.5 Volts Nom
Settling time	2 seconds
Output impedance	200 Ohms max
Case isolation	>10 ⁸ Ohms at 500V
Environmental	
Operating temperature range	-55 to 90 °C
Ingress protection	IP67
Maximum shock	5000 g
Emissions	EN6001-6-4:2001
Immunity	EN6001-6-2:1999
Mechanical	
Case material	Stainless steel
Sensing element/construction	PZT/Compression
Mounting torque	8 Nm
Weight	100 gms (Nom)
Maximum cable length	100 metres
Mating connector/cable assembly	M12- Straight or right angled Screened cable assembly

Grease flow sensor

Measurement	Detail
Flow	0-2500 cc/min
Max pressure	10153 psi (700 bar)
Accuracy	+/- 3%
Vibrations	20 g (10-20000 Hz)
Life time	10 ⁹ pulses
Temperature	-20 - +70 °C
Connections	1/8" NPT
Material	Aluminium
Weight	0.186 kg
Lubricant	ISO VG 32 to NL Grade 2
IP rating	IP-67



Oil condition sensor

Parameter	Detail
Ferrous wear and wear particle	Fine
Ferrous wear and wear particle	Coarse
Contamination	Water in oil
Presence	Oil presence
Temperature	Temperature indication
Humidity	95% RH + 55 °C
Oil sensor	
Size (overall)	57mm x ø24.5 mm
Immersion depth	29.1 mm
Process connection	M20 8 1.5 threaded connection
IP rating	IP 66/IP68/IP69K to EN60529
Material	Aluminium alloy, FEP, PEI
Operating temperature	-40 - +150 °C
Junction box	
Size	105.5*105.5*66 mm
Material	Aluminium alloy, St.St, polyester
Weight	0.70 kg
Operating temperature	-40 - +85 °C
IP rating	IP 65



