



SK

DUAL CHANNEL PROXIMITY PROBE MODULE

**SHINKAWA
Electric (SEC)
of America**

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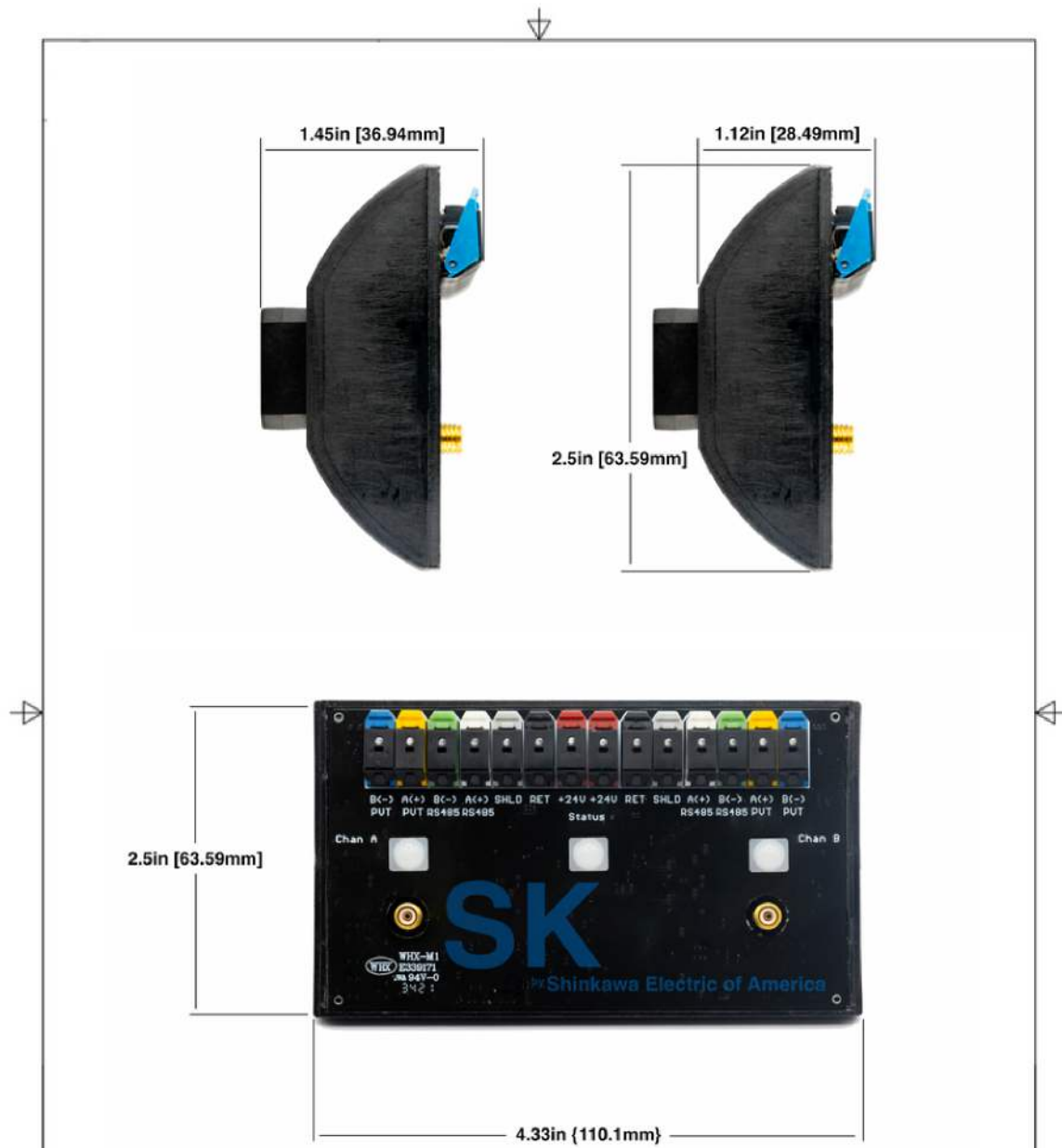
ABOUT **THE PRODUCT**

Proximity probes are used to monitor large industrial machines such as centrifugal compressors, motors, pumps, steam turbines, hydro turbines, generators, gearboxes, fans, and reciprocating compressors. Case-mounted accelerometers are not suitable for monitoring these machines due to the large difference in the ratio between the small rotor mass and the much larger stator mass. The same vibration measured by a case-mounted accelerometer would be insufficient to alert the user to the onset of a catastrophic damage.

SECA's SK delivers two probe drivers in one smart device, digital delivery of data, peer-to-peer communications and advanced customization features tuned to your applications.

Compatible with existing API670 style proximity probe systems such as 3300XL[®] and NSV[®], SK is designed for larger critical machines and balance of plant machines with oil-lubricated journal bearings and is helping many plants monitor shaft vibration relative to the sleeve bearing. The SK innovative electrical and mechanical runout compensation system makes it the idea solution for retrofits to machines where there is no pre-machines probe track.

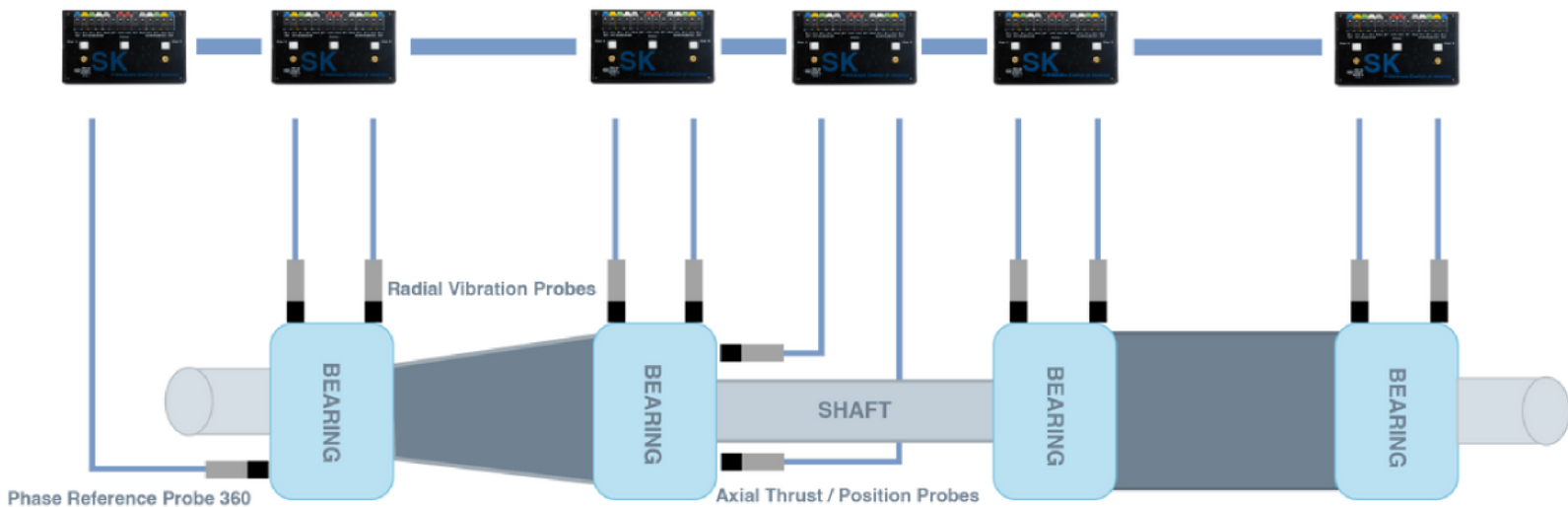
PRODUCT DIMENSIONS



PROJECT		DIGITAL_OUTPUT		TITLE		DIGITAL_OUTPUT	
APPROVED	Leo Bach	5/11/2022					
CHECKED	Bryson Carroll	5/11/2022	SIZE	SCALE	DWG NO		REV
DRAWN	Luke Benjamin	5/11/2022	A	1:2		DIGITAL_OUTPUT	1.01

PRODUCT APPLICATIONS

- Centrifugal Compressors
- Reciprocating Compressors
- Large Motors
- Large Pumps
- Large Fans
- Large Gearboxes
- Blowers
- Steam Turbines
- Hydro Turbines Gas Turbines



PRODUCT

FEATURES AND BENEFITS

- Easy to install
- Peer-to-peer communication
- 10 year life expectancy
- CSA, UL, IECEX, CE, ATEX ^(Pending)
- Engineered for hazardous location
- Made in America
- Adjustable probe gap
- Compatible with API670
- Color-coded terminals cables.
- Up to 20 modules in series
- Built-in alarm logic
- Reverse rotation detection
- Reverse mount probe housing
- Modbus RTU interface

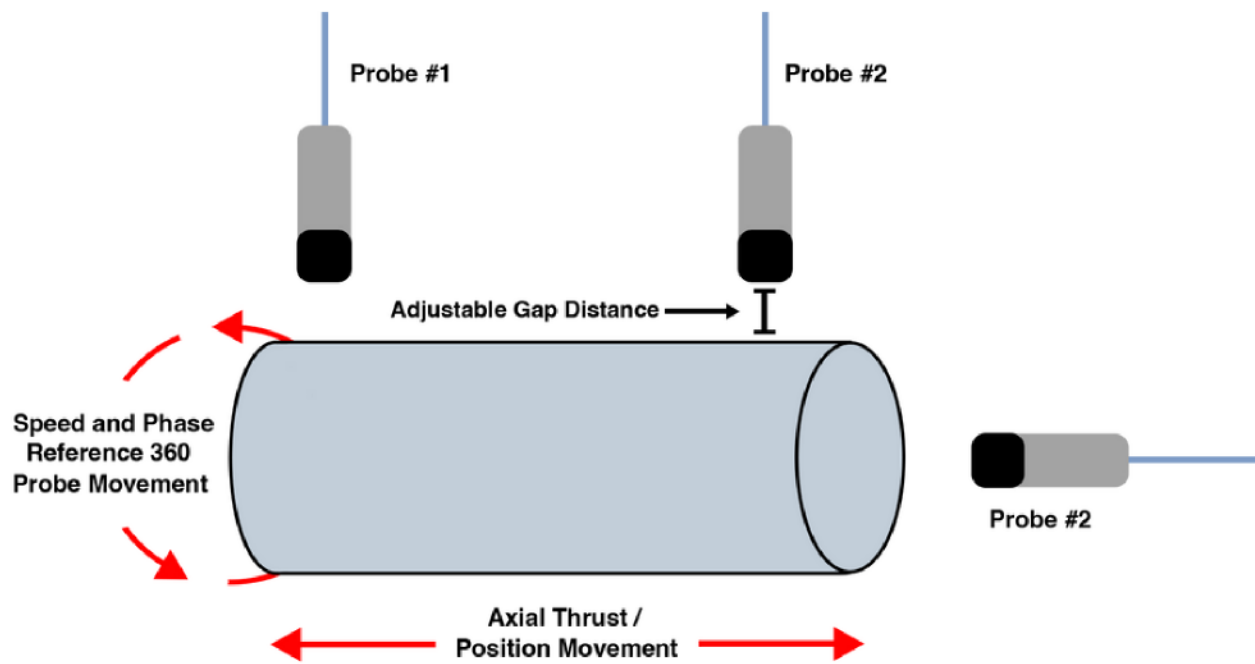


Figure 3: SK application motion reference.

ANALYSIS SOFTWARE

SECA Cloud solutions, using an edge device to get data to a secure cloud database, allow users to see trends of vibration, axial thrust position and speed in real time.

Time waveform, spectrum (FFT) and XY orbit screens are also available in the software. The system provides an internal programmable alarm for machine protection.

The system captures the dynamic, analysis data, time waveform, spectrum, FFT, and orbits simultaneously from all SK modules associated with a particular machine and a 360° phase reference probe.

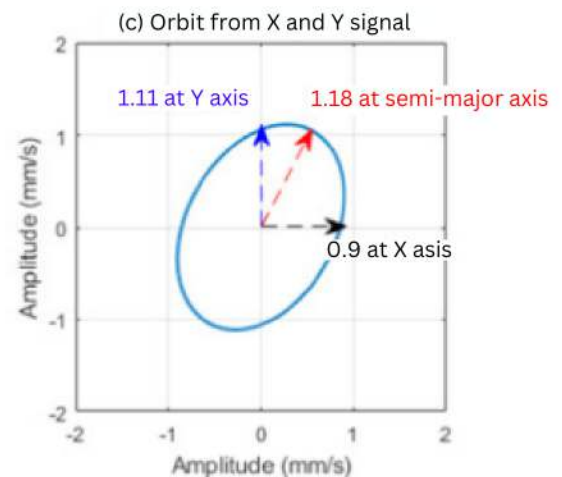
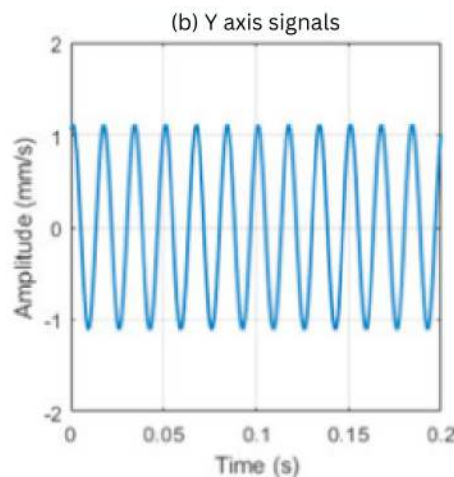
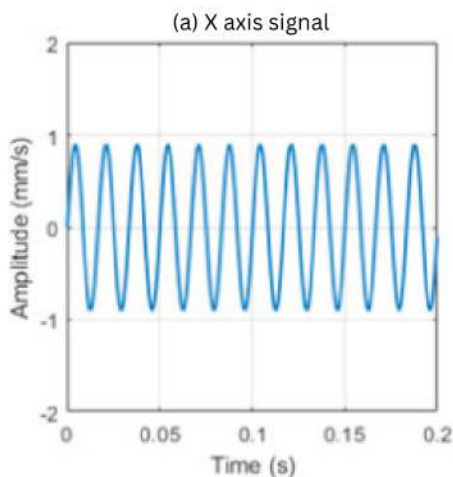
FIELD CUSTOMIZATION OPTIONS

SK configuration software is made for our customers that require advanced configurations. The simple and intuitive user interface allows:

- | | |
|--------------------------------------|----------------------|
| Connecting to SK modules | Linearization |
| Configuring SK modules | Application settings |
| Configuring each channel application | Probe gap settings |

SK is typically used with ANSI 4140 shaft material but may also be linearized in the field for other ferrous metal alloys like stainless steel, K-MONEL, INCOLOY and other. This allows technicians to react to uncommon target materials.

This technique can be performed manually, using a traditional static calibrator, or it can be done automatically, using SK's Probulator (a high precision target driving device).





TOTAL RUNOUT COMPENSATION (TRO)

SECA's unique technology eliminates electrical runout (EtRO) and mechanical runout (MRO) by digitally accounting for mechanical inconsistencies and electrical variances in the shaft. This feature insures the highest quality vibration data, free from the effects of electrical mechanical runout. This also drastically reduces the cost and time needed to prepare during installation.

Electrical and mechanical runout are recorded automatically by the SK every time the machine coasts to a stop. Last rotations are the ideal time to measure electrical and mechanical runout, as there is little to no centrifugal energy present. Changes in ERO and MRO can be caused by corrosion, rust, electrical, magnetic or physical damage to the shaft. The overall and MRO data is captured, recorded and compared to the previously stored ERO/MRO. If there is a change detected, the user is notified and may take action.

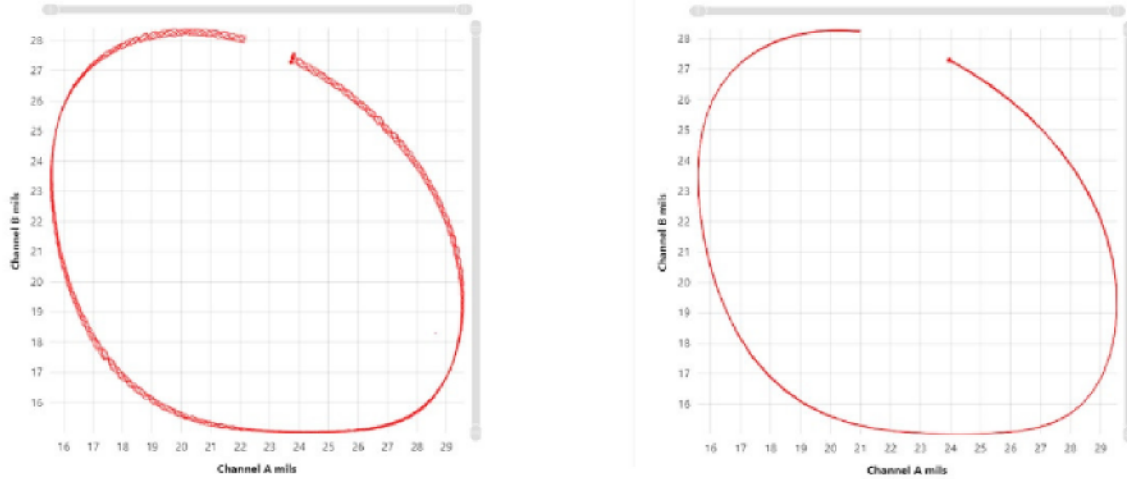


Figure 6: The SK software shows a traditional approach to proximity (Left) and the true vibration (Right) of the shaft, the output is corrected when the electrical and mechanical runout is eliminated



- **Electrical Runout(ERO):** Stresses or variations in the magnetic properties of the shaft which often are created during shaft production.
- **Mechanical Runout(MRO):** Defects in the physical properties of the shaft such as a scratches or machining imperfections.
- **Total Runout(TRO):** The measurement error that results from the combined problems of electrical runout and mechanical runout.

PROBE GAP DISTANCE

Each SK channel has an adjustable, user-defined probe gap distance. When installing the proximity probe in the bearing housing, the SK multi-color LED associated with that channel will flash to indicate that the probe is installed the correct distance from the shaft as shown on Figure 8.

LED LIGHT INDICATORS



LED solid/flashing



Probe gap is larger than the customer defined distance.



Probe gap is equal to the customer defined distance.



Probe gap is smaller than the customer defined distance.

Solution

Screw the probe so that the tip moves toward the shaft until the LED becomes solid green.

N/A

Screw the probe so that the tip moves toward the shaft until the LED becomes solid green.

FUNCTIONS

RADIAL VIBRATION

Measures the movement of a machine's shaft using AC and DC components of the transducer signal. Available outputs:

- Dynamic data for analysis
- Overall Displacement

Provides an alarm system to help prevent unplanned shutdowns and machine catastrophes. Alarm system functions:

- High alarm
- High High alarm Low alarm
- Low Low alarm

Available filters to specify the monitoring frequency range:

- High pass
- Low pass
- Band pass
- Notch filter

Configuration software can be configured with different options:

- Overall displacement vibration monitoring
- Setpoint alarm and shutdown
- Time waveform capture
- Frequency spectrum (FFT) capture
- Frequency filtering
- Start-up setpoint multiplier
- Machine ON / OFF functions

FUNCTIONS

AXIAL THRUST POSITION

Position measurements utilize the DC component of the transducer signal, the measurement unit is Mils or Microns. Alarm system functions:

- (+) High alarm
- (-) High alarm
- (+) High High alarm
- (-) High High alarm

*Default logic for alarms is "AND", if channel A AND channel B exceed value trigger an alarm. To use this logic both channels must be configured as axial thrust position.

Configuration software can be configured with multiple options:

- (+) High alarm
- (-) High alarm
- (+) High High alarm
- (-) High High alarm

FUNCTIONS

SPEED

Measures the machine speed in revolutions per minute (rpm), cycles per minute (cpm) or Hertz (Hz). Alarm system functions:

- High alarm
- High High alarm
- Low alarm
- Low Low alarm

Configuration software can be configured with four different functions:

- Speed monitoring Speed setpoint alarming
- Zero speed
- Reverse rotation

360° PHASE REFERENCE

Syncs vibration analysis data to the zero degree position. Presents live data feed of vibration data as the key or key way passes the phase reference probe.

HOW TO ORDER

Product Code	Channel A Application	Channel B Application	Probe Series and Tip Diameter	System Length	Special Application
2PRX	AA	BB	C	D	EE

CHANNEL A AND B

AA	Application for Channel A	00 = Vibration (Default) 01 = Phase Reference Probe 02 - 255 = Speed (Number of Gear Teeth or Notches) ZZ = Axial Thrust Position
BB	Application for Channel B	00 = Vibration (Default) 01 = Phase Reference Probe 02 - 255 = Speed (Number of Gear Teeth or Notches) ZZ = Axial Thrust Position

PROBE SERIES AND TIP DIAMETER

C	0 = 3300 8mm (Default) 1 = 3300 11mm 2 = 3309 5mm Focus View
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SYSTEM LENGTH

D	5 = 5 Meter (Default) 1 = 1 Meter 7 = 7 Meters 9 = 9 Meters
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SPECIAL APPLICATION

E	00 = No Special (Default)
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ACCESSORIES

- Static Calibrator (Manual Calibration Tool)
- Probulator (Automated Calibration Tool)
- ProxBox (Reverse Mount Probe Housing)
- SK Enclosure
- Proximity Probes
- Extension Cables
- Probe Brackets

SPECIFICATIONS

Power	+24VDC (7 to 36 Volts full range) @ 60mA (default)
Channels	2
Input	2 API670 style non-contact proximity probes
Output	Vibration displacement peak to peak (microns or mils) Axial thrust position distance (microns or mils) 360° phase reference (analysis) Speed (rpm or cpm or Hz)
Communication Protocol	Modbus RTU Baudrate: 115200 Parity: None Handshakes: None Data Bits: 8 Stop Bits: 1
Temperature Range	Standard: -40°F (-40°C) to +185°F (85°C) High-Temperature Option: +212°F (+105°C) *Consult Factory for High Temperature Applications
Mounting Options	35mm DINrail Baseplate + Fastener
Display / Indicators	3 high intensity, multi-color LEDs (system and probe status)
Enclosure	PBT (Thermoplastic Polymer Blend)
Hazardous Area Approvals	CSA, cUL, IECEx, Class I Division 2 Groups A-D (pending) CE and RCM (pending)
Ranges	80 mils (2032 microns) 160 mils (4064 microns) 160 mils (4064 microns)

SPECIFICATIONS

Compatible Probe Series	3300 8mm 3300 11mm (option) 3309 Focus View 5mm
System Lengths	1 meter 5 meter 7 meter (Focus View only) 9 meter * Consult factory for custom system lengths.
Target Materials	Standard: ASTM 4140 *Consult factory for other target materials
Accuracy	+/- 2% of full scale
Linearity	+/- 1 mil best straight-line fit
Resolution	0.0002" (5um)
Frequency Response	0 - 5,000Hz
A/D Sample Rate	16 bits
Speed Measurement Range	300,000 CPM
IP Rating	IP64
Humidity	99% condensing
Terminals	> 15 Newton hold force
Alarms	Low Low Low High High High
Programmable	TwinProx ship configured based on user preferences. All functions can be set using the user interface software.
Weight	4.8 ounces (136 grams)