



SCM 1120
Single Channel
Slow-Vibration Monitor

Product Manual

TABLE OF CONTENTS

<u>Section</u>		<u>Page</u>
1.0	System Description	4
2.0	Operation	4
	2.1 Power-Up Sequence	4
	2.2 Normal Display	4
	2.3 Operating Properly Indicator	5
	2.4 Sensor Wiring Break Detection	5
	2.5 Set-Point Adjustments	6
	2.6 Set-Points Lock	6
	2.7 Alarm and Trip Operation	7
	2.8 Higher Set-Point Operation	7
	2.9 Analog Output	7
	2.10 Contrast Adjustment	7
	2.11 Operation of the Keys	8
3.0	Configuration	9
4.0	Detailed System Description	10
	4.1 The Monitor	10
	4.2 The Sensor	10
	4.3 The Interconnect Cable	10
5.0	Installation	11
	5.1 Initial Inspection	11
	5.2 Monitor Installation	11
	5.2.1 Mounting	11
	5.2.2 Environment	11
	5.2.3 Rear Panel Connections	11
	5.2.4 16-Position Terminal Block	11
	5.2.5 10-Position Terminal Block	12
	5.3 Driver Installation	13

6.0	Installation Check List	14
	6.1 Interconnection Wiring	14
	6.2 Probe Installation	15
	6.3 Monitor Installation	15
	6.4 Applications	15
7.0	Maintenance	15
	7.1 General	15
	7.2 Calibration	15
	7.2.1 Monitor Adjustments	15
	7.2.2 Periodic Calibration	14
	7.2.3 Monitor Calibration	14
	7.2.4 Sensor Calibration	16
	7.3 Troubleshooting	16
	7.4 Replacement Parts	16
	7.5 Record Keeping	16
8.0	Specifications	15
	Appendix A – Panel Cutout	19
	Appendix B – Rear Panel Connections	20
	Appendix C – Front Panel Representation	21
9.0	Warranty Statement	22

1 System Description

This SCM 1120 is a Single Channel Slow-Vibration Monitor utilizing an Indikon proximity probe and probe driver. It is a replacement for the old V/P-LDC(E) product.

The monitor supplies power to the driver. The driver excites the probe and develops an output signal which is the instantaneous gap. The monitor measures the gap signal and processes it to determine the vibration for shaft speeds around 60RPM of one revolution per second. The vibration is displayed as a peak-to-peak amplitude value on the graphical LCD. **The SCM 1120 does not include a keyphasor input and does not include a panel mounted BNC connector for the instantaneous gap output. Such features and/or additional features can be added upon customer request.**

2 Operation

2.1 Power-Up Sequence

When power is applied, the monitor will display the start-up messages.

The first message is:

RIVERHAWK COMPANY
INDIKON PRODUCTS
315-624-7171

The second message is:

SCM 1120
S/N XXXXX-XX
SOFTWARE REV 1.0

The third message is configurable and can be used to specify any information desired.

The serial number will vary by job number and unit number. The software revision will change as software updates or enhancements are included.

2.2 Normal Display

Under normal operating conditions, the OK indicator will be lit and the output relays will be energized, closing the Normally Opened contacts. Excessive vibration will actuate the ALARM and/or TRIP capability of the monitor. In such cases, the OK indicator will go off and the ALARM and/or TRIP indicators will be lit and the corresponding relays will be de-energized. Both Normally Opened and Normally Closed contacts are provided on each relay.

The display is a graphical white-on-blue LCD that provides a variety of information. For new users of this monitor, the unit has a demonstration mode that helps with initial familiarization. Install a jumper wire between terminals 14 and 15 on the 16-terminal block (TB1) and apply power to terminals 1 and 2. The monitor will ramp the displayed value between two levels. With the alarm set-point and trip set-point between these two values, the indicators and relays will react accordingly.

The LCD will display the following:

Vibration level in large numerals at the upper left

The engineering units at the upper right – MILS PK-PK

The STATUS at the middle right – OK, ALARM, or TRIP

A bar graph towards the bottom with:

0 and span values displayed – typically 0 and 5

An “A” and “D” at the alarm and trip points

A vertical bar at the alarm and trip points

A thin horizontal bar across the display

A thick horizontal bar indicating the magnitude of the displayed value

The ALARM and TRIP set-point values displayed at the bottom

The monitor has four keys on the front panel; an up arrow, a down arrow, a SET PT, and a RESET key. These will be referred to in this manual as UP, DOWN, SP, and RESET.

2.3 Operating Properly Indicator

With the monitor is functioning properly, a small square indicator (special character), located in the upper right corner of the display will alternate on and off each second.

2.4 Sensor Wiring Break Detection

The monitor can detect faults in the sensor wiring. When a break is detected, it will display an appropriate message.

Possible wiring error messages:

```

SIGNAL RETURN
NOT CONNECTED
TO DRIVER OR COMMON

SIGNAL RETURN xx.xxxV
-----
SIGNAL MAGNITUDE
TOO LOW
SHOULD BE > -2V

SIGNAL = xx.xxxV

```

SIGNAL MAGNITUDE
TOO HIGH
SHOULD BE < -22V

SIGNAL = xx.xxxV

As these are static messages and the keypad has no function at this point, the “operating properly” indicator will flash to signify that the monitor is functioning properly. Once the wiring problem is resolved, the display of normal information will resume.

When a wiring break is detected, the monitor will take one of three actions, depending on how it has been configured:

1. Set the vibration value to zero, which will cause no alarm or trip,
2. Set the vibration value to just above the alarm set-point, which will cause an alarm, or
3. Set the vibration value to just above the trip set-point, which will cause an alarm and trip condition.

2.5 Set-Point Adjustments

With the normal display shown, pressing SP will hide the bargraph and set-point values and display only the alarm set-point. Pressing SP again display the trip set-point. Pressing SP again will return the monitor top the normal display.

With the alarm or trip set-point value displayed, pressing UP or DOWN will increment or decrement the value. Pressing RESET will move the cursor under the digits to the left. Pressing UP or DOWN will increment or decrement the value above and to the left of the cursor, not changing any digits to the right. After the value has been adjusted, press SP to advance to the next display.

2.6 Set-Points Lock

The monitor can be configured with a lock on set-point changes. The “lock code” can be any 1 to 7 digit number. If the set-points lock feature is configured (configuration value not equal to zero), when the SP key is pressed, the following will be displayed on the bottom three lines:

SET-POINTS ARE LOCKED
LOCK # = 0

Pressing UP or DOWN will increment or decrement the digit, and only the digit selected. After the correct digit is displayed, pressing RESET will move the cursor to the right. Repeat this process until the lock number has been entered. When the entire lock number is correctly displayed, press SP to continue. If the correct lock number has been entered, the alarm setpoint will be displayed and can be changed.

If the wrong lock number has been entered, the following will be displayed:

INCORRECT LOCK #

Press SP to return to the normal display and press SP again to correct the lock number.

When entering the lock number, the RESET key moves the cursor to the right and provides zero extension of the lock number. If the cursor is on the seventh digit, pressing RESET will move it all the way to the left and any trailing zeros will be eliminated.

Once set-point changes have been unlocked, they will remain unlocked until no key has been pressed for 60 seconds.

2.7 Alarm and Trip Operation

The alarm and trip capability is not latching, but rather automatically resets when the vibration reduces below the set-point. The monitor has a delay before actuation and a delay before reset for the alarm and trip. These are initially set to one second.

If observing the demonstration mode, it can be observed that the states change one second after the value passes each set-point.

2.8 Bypass Operation

The bypass capability disregards the vibration. This capability is activated by an external contact closure (relay or switch), typically from a supervisory system or start-up control system.

If observing the demonstration mode, the bypass feature can be actuated by placing a jumper between terminals 13 and 15 on the 16-terminal block (TB1).

When Bypass is active, "BYPASS" will be shown on the display just above "STATUS".

2.9 Analog Output

An analog output is available for transmission of the vibration signal to a PLC or DCS supervisory system. It is essentially a standard 4-20mA output, but can easily be configured to provide a 0-20mA, 1-5VDC, or 0-5VDC. The span of the output corresponding to 20mA is variable.

2.10 Contrast Adjustment

As with most LCD displays, the contrast may need to be adjusted occasionally for an optimal display. With the normal display shown, repeated depression of the UP or DOWN key will adjust the contrast.

2.11 Operation of the Keys

A summary of the functions of the keys is as follows:

Normal Display

SET PT	Displays the individual set-points and allows changes
UP	Increases the contrast
DOWN	Decreases the contrast
RESET	No function on this monitor (automatic reset of alarm and trip are used)

Set-Point Display (applies to the bottom 3/5ths of the display)

SET PT	Displays the individual set-points and allows changes
UP	Increases the value displayed
DOWN	Decreases the value displayed
RESET	Moves the cursor to another digit

3 Configuration

While the operation of the SCM 1120 described above has been simplified, the unit has many parameters that can be modified to vary the operation of the unit. These parameters are configured at the factory to meet the specific needs of the customer. Should parameters need to be varied in the field to better suit the characteristics of the operating environment, such as the level of vibration being monitored, the amount of instantaneous variation in the vibration, or more appropriate actuation or reset delays, changes can easily be made in the field by using a laptop computer and a simple PC application.

On the front panel of the monitor there is a jack (connector) for a Configuration Cable. The cable is a standard 4-wire audio cable with 1/8" diameter plugs on each end. A Configuration Adapter provides the connectivity between the standard DB-9 serial port connector on a PC/laptop and the Configuration Cable. The Configuration Adapter and the Configuration Cable are available from Indikon as a "KIT". Also available is a USB port to DB-9 serial port adapter, should that type of connection be required or more convenient.

The installation and operation of the PC/laptop application is covered in a separate manual. The Configuration Parameters and Values are discussed in DOC1046.

4 Detailed System Description

4.1 The Monitor

The SCM 1120 is a sophisticated product utilizing a single board computer and capable graphical display. Besides the configurability through software and many parameters, it has a lot of hardware capability as well. The vibration measuring circuitry has two differential amplifiers that configure the “negative” voltage input coming from the probe driver(s). Different software filters can be utilized and configured to best measure and display the desired value. Data presentation could be changed to match customer preferences.

The monitor also includes checks on the functionality of the sensing circuit and the sensor.

Since the monitor can detect a wiring break, it can provide only an alarm indication if this happens, advising of the situation, rather than ignoring or failing to recognize it or providing a trip indication. This insures safe operation with minimal down time.

An alarm bypass feature could easily be provided, if desired, as a second digital input is available, currently used for the Demonstration Mode.

4.2 The Sensor

The SCM 1120 will connect to a probe driver that will be setup to work with a proximity probe and generate a gap signal. The probe will connect to the driver by a coaxial cable with our standard SMA connector.

4.3 The Interconnecting Cable

The driver will connect to the monitor with a cable to carry power to the driver and signal from the driver. The cable contains two twisted pair within a shield.

5 Installation

5.1 Initial Inspection

Check the monitor for external damage such as dents or scratches on the surfaces. If the shipping carton is not damaged, check the cushioning material and note any sign of severe stress as an indication of rough handling in transit. It's a good idea to check the operation of the monitor on the bench prior to installation.

5.2 Monitor Installation

5.2.1 Mounting

The monitor is designed for panel mounting and requires an opening as shown in Appendix A. This is the same opening and screw hole arrangement that was used on many older products, including the V/P-LDC(E) product. Secure the instrument to the panel with four #8 lock washers and nuts behind the panel. Screws are not needed as the monitor has threaded studs on the back of its front panel. The monitor can be mounted in any standard filler panel.

5.2.2 Environment

The monitor should be mounted in a control room environment, free from contamination and excessive ambient temperatures.

5.2.3 Rear Panel Connections

All external connections are made to the monitor at the two terminal blocks on the rear panel as shown in Appendix B. These are high quality pluggable blocks with captive wire clamps. These blocks have a high retention force and the 16-position plug is not easy to remove. It is easiest to use a pair of slip jaw type pliers to grab the raised edges of the plug.

One inch diameter holes are located below terminal blocks for cable entrance. Rubber grommets or strain relief cable clamps, with or without reducers, can be used to protect external wiring as needed.

5.2.4 16-Position Terminal Block

Power Connections – Terminal 1 is the hot/line connection and Terminal 2 is neutral. The power required is 85 to 265 VAC, 50/60 Hz.

IMPORTANT NOTE

Safety ground must be connected to terminal 3 (cabinet ground).

Relay Contacts – If the vibration level exceeds the set-point the relay de-energizes and the Common-NC contacts will close (terminals 5-4 and 8-7) and the Common-NO contacts will open (terminals 5-6 and 8-9).

Analog Output – Terminal 11(+) and 10(-) are provided as inputs to external equipment, such as a recorder or computer. The output is typically a 4-20mA output, but it can be configured as a 0-20mA output. The output can be configured as a 1-5VDC or 0-5VDC

output by moving an internal jumper or addition of a 250 ohm resistor at the connector or at the instrument it is connected to. The current output is a source, so no external power supply is needed. Terminal 12 is connected to safety ground/cabinet ground and should be used for the shield of the connecting wires.

IMPORTANT NOTE

The Analog Output is fully isolated from the input power and the (-) terminal is not an internal circuit common. There is no internal resistive path to cabinet ground. The Analog Output does have a common return line with the two Digital Inputs, which are likewise isolated from the input power and cabinet ground.

Digital Inputs – DI1 is used for the Bypass feature and a relay or switch contact closure should be connected to terminals 13 and 15. Terminal 16 is connected to safety ground/cabinet ground and should be used for the shield of the connecting wires.

DI2 initiates the Demo Mode when a connection is made between terminals 14 and 15.

IMPORTANT NOTE

The Digital Inputs are contact closure sensing inputs. They do not require power and should not be connected to any outputs that supply power.

5.2.5 10-Position Terminal Block

Driver Connections – Terminals 1 and 2 connect to the Black and Green wires, respectively, and supply power to the driver. Terminals 4 and 5 connect to the White and Red wires, respectively, which is the signal from the sensor. Terminal 3 is connected to safety ground/cabinet ground and should be used for the shield of the connecting cable.

		Driver-to-Monitor Connection	
SB-5 Cable		Monitor end (tinned leads)	Driver end (lugs)
Wire Color	BLK	Terminal 1 / -24VDC	-24VDC
	GRN	Terminal 2 / COM	COM
	CLEAR	Terminal 3 / SHIELD	-----
	WHT	Terminal 4 / SIG	SIG
	RED	Terminal 5 / RTN	COM

5.3 Driver Installation

For details on identification, outline and installation, refer to driver manual.

IMPORTANT NOTE

The cable internal shield (bare drain wire) should not to be connected to ground at the driver. The shield is to be connected to its designated terminal at the monitor. Therefore at the driver, the cable shield (aluminum foil and drain wire) should be cut off and insulated to prevent accidental contact with conduit or any other possible ground.

6 Installation Checklist

Review the installation of the system. The following is a list of common errors of instrument users in the past. This list has been compiled solely as an aid to the user in avoiding installation pitfalls.

6.1 Interconnection Wiring

Incorrect Connections - The most dangerous is connecting power to the wrong terminals. The most subtle is running signal wiring too close to high power wiring. This may result in noisy and intermittent system performance. Wires that normally conduct AC voltage, such as those going to relay contacts, should not be allowed to run close or rest against the non-shielded part of cable inner conductors.

Loose Connections – Insure that all screw terminal connections have been sufficiently tightened. Do not use too large a screwdriver when tightening screw-on connections, since it could break off portions of the barrier type of terminal strip. Be sure plugs and connectors are completely inserted and tightened.

Ground Loops – Exposed shields on cables must not be allowed to touch any ground potential surface, especially at the pickup. The ground for the system is at the monitor. Such exposed shields must be taped to avoid accidental grounding.

Damaged Cables – All cables should have proper strain relief, as needed, and be routed away from sharp edges and moveable mechanical parts.

6.2 Probe Installation

- Probe should be radially mounted at right angles to the shaft being monitored.
- Keyways, oil slingers or increase/decreases in shaft diameters should be kept to a minimum of one probe tip diameter away from the near edge of the probe.
- The gap between probe tip and shaft should be between 40 and 60 mils for optimum results.
- Metals other than that being monitored by probe should be no closer than .25" from the sides of the probe and .50" to the rear of the front surface of probe tip.
- If bracket-mounted, attention must be given to bracket stiffness so as to not amplify the vibration.
- Cable connections must be tight (approximate applied torque of 8 in-lbs). Cable and connectors should be protected as the application dictates, i.e flexible conduit, rigid conduit, etc.

6.3 Monitor Installation

Poor Environment – Monitors are designed for a control room environment. Temperatures must not exceed 135°F. Weatherproof doors, air purging, or other means of protection, must be provided where the environment is poor.

No Instrument Ground – The monitor chassis must be grounded. Refer to rear terminal drawings for the ground connection.

6.4 Applications

Other conditions and/or exceptions to any of the above should be discussed thoroughly with Indikon. Most applications can be handled with minor modifications to standard systems. Should trouble occur in an existing system, our service engineers are available to lend assistance. Most troubles can be pinpointed in the course of a telephone conversation.

7 Maintenance

7.1 General

Maintenance requirements have been minimized as a result of the design of the system. However, the monitor, driver, and probe should be handled as precision instruments. Reasonable care should be taken making connections to the rear panel. Maintenance, if required, is in general limited to replacement of defective components, isolated by standard trouble-shooting techniques.

7.2 Calibration

7.2.1 Monitor Adjustments

No internal adjustments to the monitor should be needed and the system should maintain calibration for an extended period of time.

7.2.2 Periodic Calibration

The system, which consists of the monitor, driver and probe, should be checked for calibration annually.

7.2.3 Monitor Calibration

If a sensor simulator is available, the monitor can be checked by connecting it to the simulator to verify the monitor displays correct values.

If no such equipment is available, monitors should be returned to the factory for calibration.

7.2.4 Sensor Calibration

If a matched probe target is available, the probes can be checked by connecting to a known good monitor and vibrating the probes at applicable levels to verify that the monitor displays the correct value.

If no such equipment is available, the probes should be returned to the factory for calibration.

7.3 Troubleshooting

- 7.3.1 Preliminary** - To locate trouble in the system, start with a thorough visual inspection and then proceed with an electrical check as necessary. Remove power from the equipment and inspect the system for a loose pickup, loose or improper connections, a blown fuse, burned insulation, etc. Repair any defect discovered and system performance before troubleshooting further.
- 7.3.2 Self-Check** – Damaged connecting cables may be causing noise or intermittent connections. Proceed with pickup “substitution” or “electrical tests”. If the monitor fails a self-check the cause is internal and will require checking at the factory.
- 7.3.3** If the malfunction still exists, the cause may be internal to the monitor, sensor, or cable.

7.4 Replacement Parts

It has been our experience that the probes are most often the source of problems, not because they fail, since they rarely do, but because they are often accidentally damaged during the course of mechanical maintenance on the machine itself.

7.5 Record Keeping

Many users of vibration monitoring equipment find that daily or at least weekly logging of vibration readings is valuable in noting trends in machine behavior, enabling them to schedule a shutdown for necessary repairs.

8 Specifications

Input Sensor

Probe driver and proximity probe

Vibration Measurement

Normal Range: 0-50 mils peak-to-peak

Measuring Capability of the Monitor: 0-80 mils peak-to-peak

Measuring Accuracy: +/- 1% of span

Frequency Range

Normal shaft rotation 60 RPM (1Hz)

Sensor Wiring Break Detection

Black/Green wires for power to the driver

Red/White wires for driver output to the monitor

Set-Point Range

0.1 to 99.9 mils peak-to-peak

Alarm and Trip Actuation Time Delay

0 to 60 seconds

Alarm and Trip Reset

Automatic with variable delay, 0 to 60 seconds

Relay Contacts

SPDT, rated 5A resistive

Suitable for signal level switch until they actuate a high current load

Analog Output

4-20 mA, for load resistance less than 500 ohms

Actual range: 0-22mA

Accuracy of output: 0.5% of full scale value

Can be configured as a 0 to 20mA output via software

Can be configured as a 1 to 5VDC or a 0 to 5VDC output via a hardware jumper

Rear Panel Connectors

Pluggable Phoenix connectors with captive wire clamps, 10 and 16 terminals

Sensor Cable (may change)

Indikon Type SB-5, 800 feet maximum

2 twisted pair, red/black and green/white

22 AWG, 7/30 tinned copper, polyethylene insulation

Mylar laminated aluminum shield with a drain wire, gray PVC jacket

Conductor to conductor capacitance: 22pf/foot

Conductor to shield capacitance: 37pf/foot

Operating Power

Voltage	115 VAC nominal
Power Consumption	8 watts, typical
Fuse Rating	2 Amp (Type 3AG, Slow Blow)

Isolation

Digital Inputs	Isolated from case/earth ground and power
Analog Output	Isolated from case/earth ground and power
Isolation	350 Vac, 500 Vdc

Mechanical

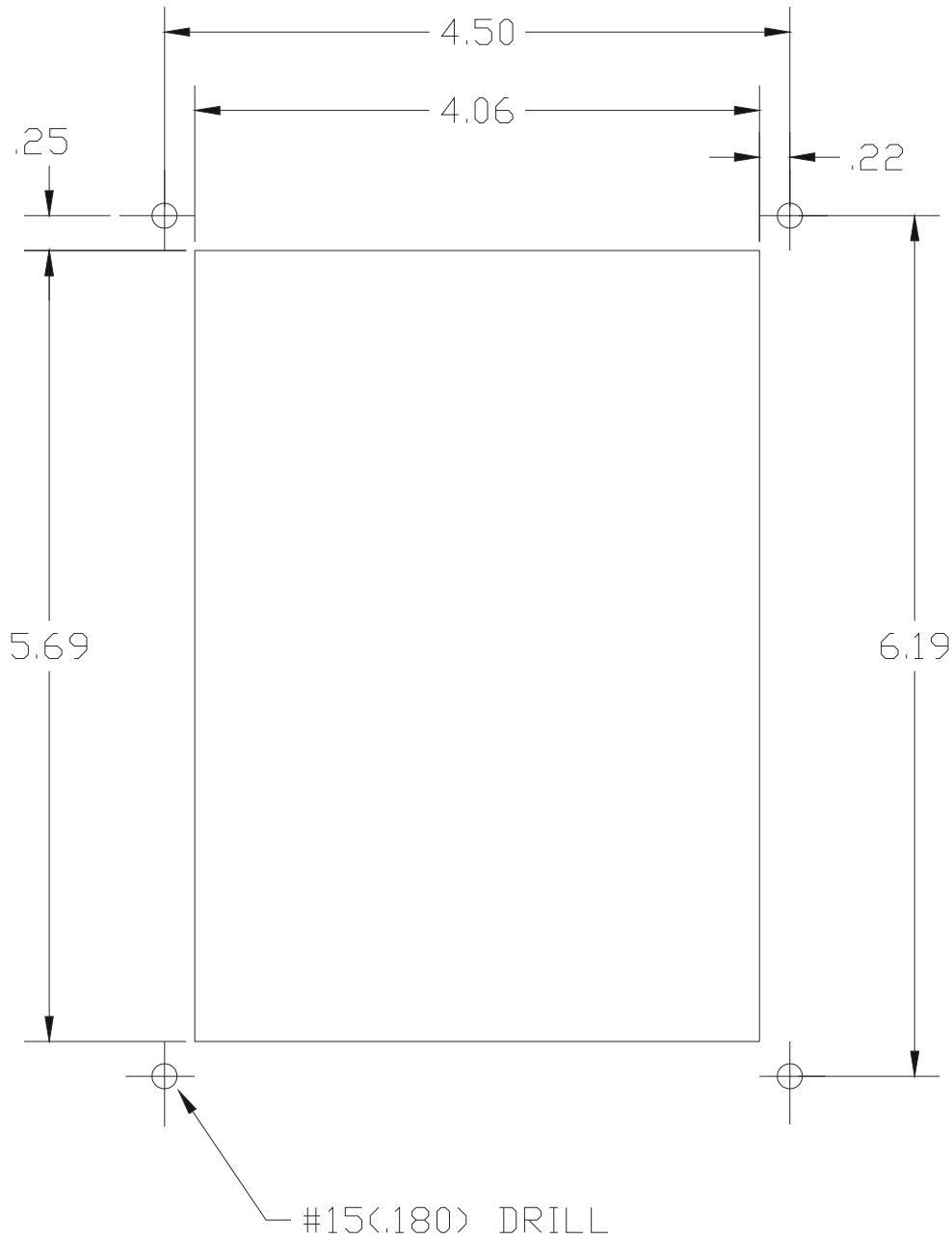
Aluminum anodized enclosure	
Dimensions – Face Plate	5.38" W x 6.8" H (137mm x 173mm)
Dimensions – Enclosure	14.0" L x 3.8" W x 5.44" H (356mm x 97mm x 138mm)
Mounting Studs	#8
Mounting Cutout/Holes	See diagram

Environmental

Ambient Operation Temperature	32°F to 131°F (0°C to 55°C)
Humidity	0 to 100% RH, non-condensing
Transportation Vibration	IAW Commercial Handling/Shipping

Warranty

Standard	1 year
----------	--------



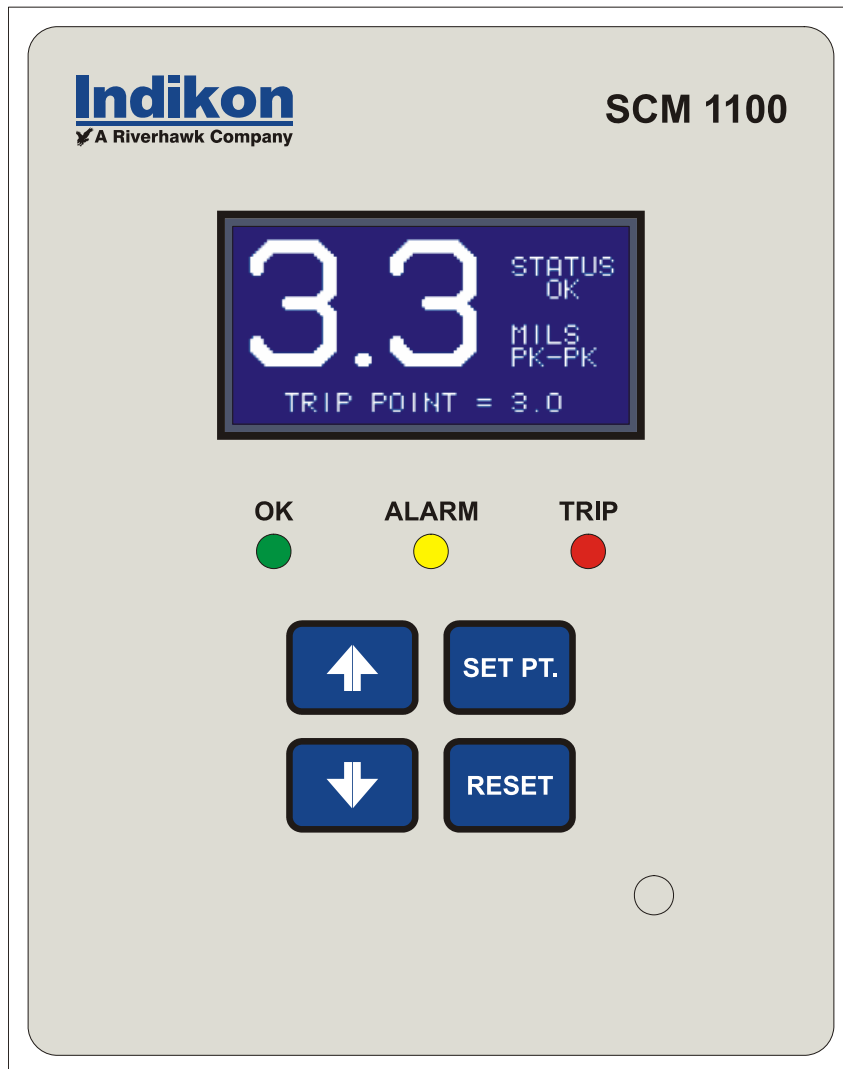
Same as V/P-T3, VT-11A, and Series 2000 TriLight

Appendix A – Panel Cutout

SHIELD	16
RETURN	15
DIG IN 2	14
DIG IN 1	13
SHIELD	12
OUT+	11
OUT -	10
N.O.	9
ALARM	8
N.C.	7
N.O.	6
TRIP	5
N.C.	4
GROUND	3
NEU	2
120 VAC	1
	TB1

10	NA
9	NA
8	NA
7	NA
6	NA
5	RTN
4	SIG
3	SHIELD
2	COM
1	-24 VDC
TB2	

Appendix B – Rear Panel Wiring



The Model designation will be SCM 1100 as the SCM 1120 is part of that family of products

Appendix C – Front Panel Representation

9 Warranty Statement

Limited Warranty: Vibration monitoring equipment and accessories are warranted by the Seller for one year to be free from defects in both materials and workmanship under normal use and service. This warranty is in lieu of and excludes any other warranty, express or implied, including, but not limited to, any implied warranty derived from quote or fitness of purpose. (Manufacturer's liability and Buyer's limited remedies under Manufacturer's warranty shall be limited solely to repair, replacement, credit or refund, at the manufacturer's option, with respect to products supported by a Return Material Authorization number obtained from the Manufacturer and returned to the Manufacturer. The Manufacturer shall not be liable, under any circumstances, for consequential or incidental damages, including, but not limited to, labor costs or loss of profits arising in connection with the use of or inability to use products purchased from the Seller)

Product Application: The Buyer is solely responsible in determining the suitability of the Manufacturer's products in its application regardless of circumstances.

Manufacturer reserves the right to make future design changes to any of its products without thereby incurring any obligations to make changes to or replacements of this product.

Manufacturer neither makes nor authorizes any person to make on its behalf any other guarantee or warranty concerning its products.

Service

To obtain service under this Limited Warranty call Riverhawk Customer Service Department in **New Hartford** to obtain an RMA (Return Material Authorization) number.

- Pack the item(s) in its original shipping container (or equivalent)

- Put the RMA number on the address label

- Put the RMA number on the shipping carton

- Insure it (or assume the risk of loss / damage during shipment)

- Ship the product freight pre-paid to New Hartford

Manufacturer is not responsible for damage to inbound product.

Riverhawk (Headquarters)

215 Clinton Road

New Hartford, NY 13413

Voice: 315-624-7171

Fax: 315-624-7173