SCANCENTER LX

BEARING & BELT

MONITORING SYSTEM

MANUAL AND INSTALLATION GUIDE

READ THIS ENTIRE GUIDE BEFORE

PROCEEDING WITH THE INSTALLATION

The Rolfes Company
P.O. Box 188 - 108 North Main Street
Danville, IA 52623
800-824-7274 ♦ 319-392-4194 ♦ 319-392-4192 (Fax)
www.rolfes.com ♦ Revision II, Winter 2002

Table of Contents

1.0 Introduction:

Thank you for purchasing the Rolfes Company's ***SCANCENTER LX*** *Series* - Bearing & Belt Monitoring System. The ***SCANCENTER LX*** *Series* utilizes electronic switching which makes it the fastest and most repetitive system on the market for monitoring bearing temperatures and belt alignment.

The Rolfes Company offers a comprehensive line of monitoring equipment. Our complete product range and extensive systems experience allows us to offer effective solutions to a wide spectrum of your practical requirements. Our extensive background in systems monitoring along with a constant program of innovation and technological development, allows us to offer cost-effective and user-orientated solutions.

This manual is presented as a reference for the installation and operation of this system. Please read **all** instructions for this and any other system prior to installation to better understand its operation.

NOTE: The Rolfes Company will not be responsible for damages caused by any hardware or equipment, which has not been supplied by The Rolfes Company.

If you need assistance with any item in this manual, please write, FAX or call :

800-824-7274	***Toll Free***	***Customer Service***	***Ext. 120***
319-392-4194	***International***	***Service Department***	***Ext. 121***
319-392-4192	***FAX***	***Sales Department***	***Ext. 141***

2.0 Overview:

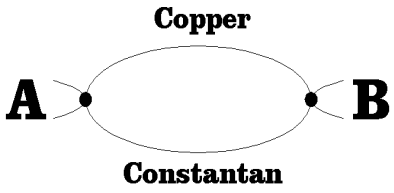
The Rolfes Company offers the next generation in hazard monitoring systems with the ***SCANCENTER LX*** *Series* - Bearing & Belt Monitoring System. It has the capability to continuously monitor your facility and notify any person when a problem arises via an audible alarm, display, printer and/or computer screen.

The ***SCANCENTER LX*** *Series* uses Type "T" Thermocouples and is designed as a preventive maintenance system to monitor the bearings and belt alignment in your facility. It can save costly equipment repairs by detecting a problem at the earliest stages. It can also help save downtime, by allowing you to schedule a repair before a large amount of damage occurs. Catastrophic damage from spark/heat-ignited explosions can be prevented.

2.1 SCANCENTER LX Series Features:

- Version 2.0 Scans At A Rate Of Just Under 3 Seconds / Sensor.
- Immediate Temperature Retrieval.
- User Programmable.
- Centigrade / Fahrenheit Capability.
- Continually Scans For Open Sensors (Self Diagnostic).
- 32 Sensor Positions Standard.
- Up to 160 Points with the Optional Expander Boards for Future Equipment.
- Warnings and Alarms That are Audible Via the Built in Buzzer.
- Plus a Dry Contact Relay for Remote Alarm.
- Streaming Data Output via RS-232 Serial Communications Port.
- Print a Log to a Printer or Computer.
- Used to Trigger a PLC via an ASCII Stream (@ 19200 BPS).
- Climate Operating Conditions (Instrument only): 40° F to 120° F.

2.2 Thermocouple Theory:



Many different metals are used for a thermocouple in various applications: however, copper and constantan are the most practical for temperatures below 600 F°. A constantan is an alloy, approximately 57% copper and 43% nickel. The junction of copper and constantan is called a Type "T" Thermocouple. When a circuit is formed consisting of two dissimilar conductors and one of the formed junctions of these two conductors (A) is a temperature higher than the temperature of the other junction (B), a minute voltage is generated and a current will flow in the circuit.

The current will flow in one direction if the temperature at (A) is higher then (B). The current will flow in the opposite direction if the temperature at (B) is higher then (A). No voltage will exist and no current will flow when the temperature of junctions' (A) and (B) are the same. A single junction, such as (A) or (B) is commonly called a thermocouple. The common abbreviation for thermocouple is T/C'S. Any mix of type "T" thermocouple sensors, (probe, surface mount or rub block style) can be used with the *Scancenter LX Series Instrument.*

3.0 SCANCENTER LX Components:

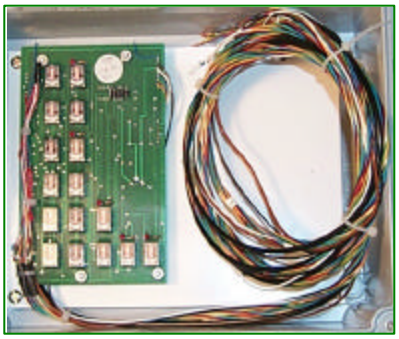
The ***SCANCENTER LX*** Series instrument is user programmable with a large LCD display for Immediate Temperature Retrieval of bearing temperatures and belt alignment information. 32 Sensor points come standard. The unit is capable of up to 160 points using the optional expansion boards.

The unit will send the any warning / alarm commands simultaneously to its internal buzzer, dry contact relay (for a remote siren) and to the RS-232 port if a PLC requires input. It also has Centigrade / Fahrenheit Capability.

3.1 Optional Equipment:

32-Point Expansion Board: *Optional*

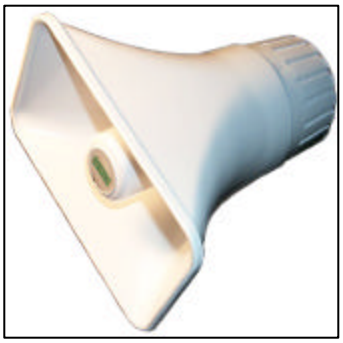
The ***SCANCENTER LX*** was designed with the "building block approach" in mind. With this expander board, it will allow for expansion beyond the standard 32-point configuration within the Scancenter LX, up to 160 points maximum. Utilize this option for future expansion of your facility.



ALRM-100: *Optional*
Receives the alarm command from the SYS-1 to alert operators of a slowdown condition, this unit powers the siren.

Siren: *Optional*

Weatherproof case with dual tones capabilities for multiple systems.



3.2 Recommend Equipment:

Electro or EMP style crimpers are recommended when using the supplied SPL-10 crimps to aid in making all splices or connections.

3.3 Using Type "B" - SPL-10 Crimps:

The Rolfes Company *HIGHLY* recommends using the Electro or GMP style crimpers with type "B" crimps when making leadwire or thermocouple splices.

By using this style of crimper, the installer can accomplish proper splices without having to strip each individual wire. Each crimp can accommodate 3 - 24 AWG un-stripped wires. Only in certain circumstances (when more than 3 wires or larger gauge wires are used) will it be necessary to strip back wires. This type of splicing tool allows the installer a more efficient way to make all splices in the system.

Each crimp has several "teeth" on the inside of it. These "teeth" grip each wire through its insulation. Since these crimps are designed for 3 - 24 AWG un-stripped wires, if more than the designed amount of wire is inserted into the crimp the "teeth" will not be able to penetrate the insulation of each wire.

When the crimper is used it will save the installer time and any headaches from stripping each wire.

☞ *NOTE:* This tool is adjustable; please call for proper size shims for the style of crimp you are using.

4.0 Instrument Installation:

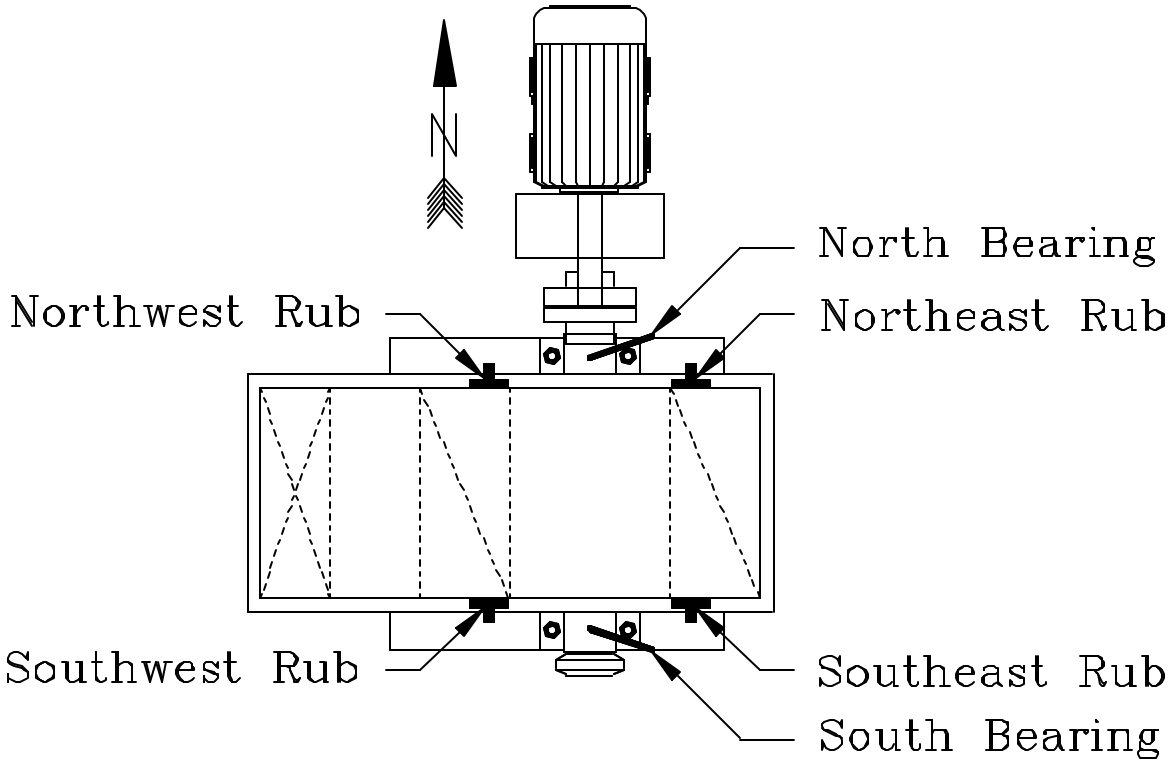
The ***SCANCENTER LX*** instrument is vital piece of equipment for the safety and smooth operation of your facility. Please use good judgment when choosing an installer.

4.1 Sensor Layout:

Prior to wiring the sensors, the installer should make an overview drawing of the facility with its equipment. This will serve a means of keeping track of sensors installed and to ensure nothing is over looked.

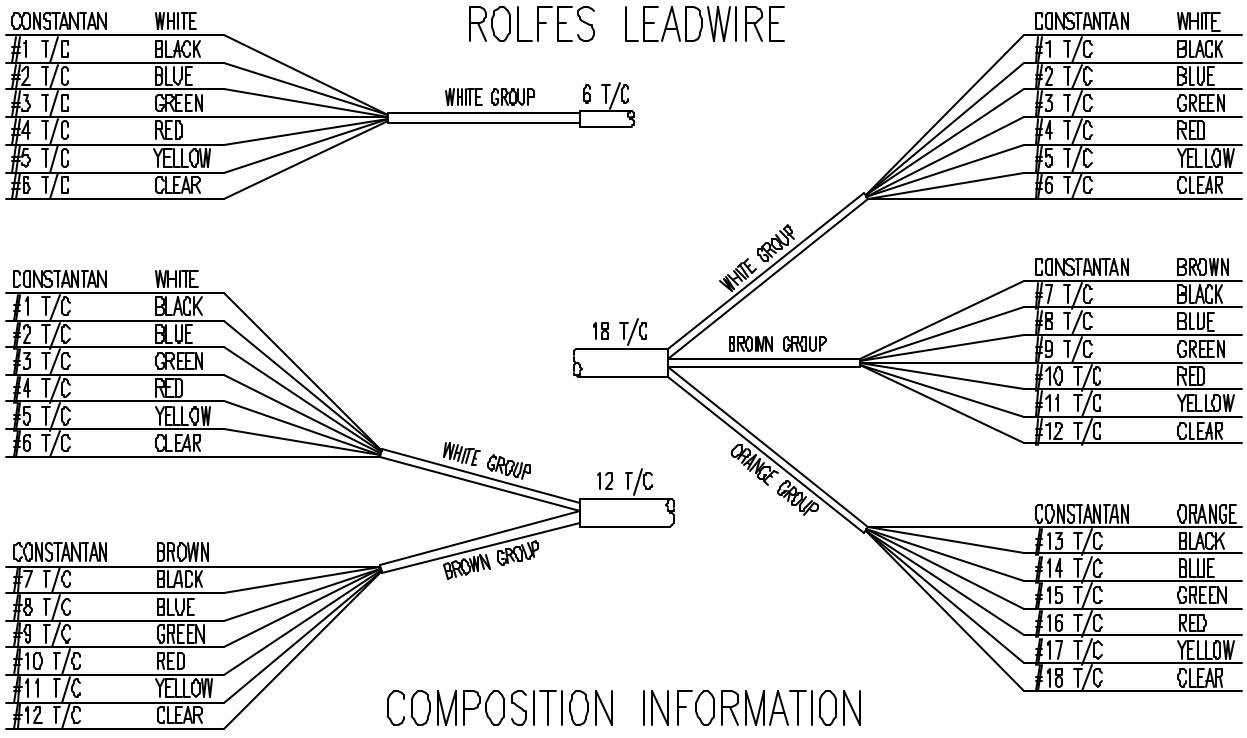
> 🗣 *HINT:* If the installer works on one piece of equipment at a time (e.g. head section of a leg) and installs the sensors in a logical manner, wiring and any troubleshooting will be that much easier.

For example: If you were to start on the head section of "leg #1" use the north or the motor side main bearing as the first sensor in the system. Followed in a clockwise manner by the northeast belt rub, southeast rub, etc. (see diagram) for every leg and belt in the system. Continue this at the tail (or boot) of the leg. Use the wire color code (see leadwire diagram) to keep everything consistent between each leg and / or belt. By doing this it's much easier to wire and if need be, to troubleshoot.



5.0 Leadwire:

Instead of having many individual wires throughout the system, leadwire is used in various sizes to make this more manageable. Available in sizes from 6, 12, 18 and 21 T/C, each of these are capable of producing the number of T/C's labeled on them. Each of these different sized leadwires have constantan group(s) of wires ranging from white, brown and/or orange. Each group has 6 wires to it: black, blue, green, red, yellow and clear (21 T/C leadwire has 7 wires to a group which has an added violet after the clear, not shown).



5.1 Leadwire Installation:

To help prevent leadwire problems, we recommend that all leadwire exposed to the outside environment be installed in an IMC or rigid threaded conduit. Do not use aluminum conduit. See the chart (next page) for proper sizing of conduit for leadwires.

On installations without conduit, the leadwire should be attached to an existing conduit or messenger wire with tie bands. Avoid attaching to conduit where the voltage of the wires exceeds 500 volts. Attach the wire so it is protected from physical damage.

NOTE: Label both ends of every leadwire run to avoid any confusion.

5.2 Maximum Fill Of Various Conduit Sizes:

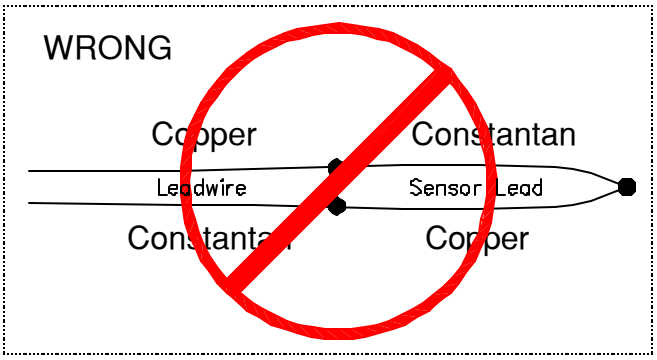
CONDUIT SIZE	Area in Square Inches	6 T/C	12 T/C	18 & 21 T/C
.50”	.12	7	3	3
.75”	.21	12	5	5
1.00”	.34	20	8	8
1.25”	.60	36	15	14
1.50”	.82	49	20	19
2.00”	1.34	81	33	31

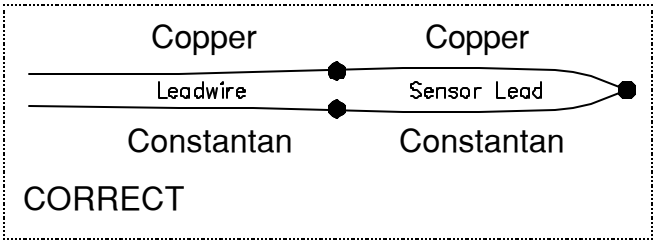
5.3 Proper Wiring:

Wiring type “T” thermocouples is a relatively easy task, provided you understand how it works. As explained earlier in this manual there are two different metals in a junction, one being a copper and another being an alloy called a constantan. With this in mind each sensor must have 1 wire (copper) and 1 wire that is common (constantan) to all sensors.

Another factor here is to keep in mind that the wire types must stay consistent throughout the system. From the sensor back to the instrument will be two wires, a nickel-plated constantan and a copper. If either of these wires are crossed, you will have problems (see diagram). Or, if you use anything but the supplied wire you may also have problems.

Connecting the nickel-plated constantan to a copper creates a thermocouple. If you made a wrong connection as in the example, you are actually making three T/C’s. This will cause the temperatures read backwards, that is, if a bearing you are monitoring gets hot the instrument will see the temperature go cold **or** when you do a freeze mist test the temps will go hot.





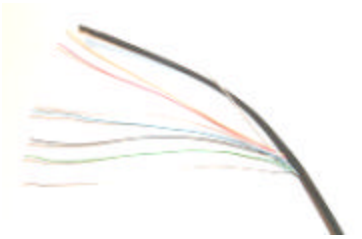
5.4 Tying in Equipment:

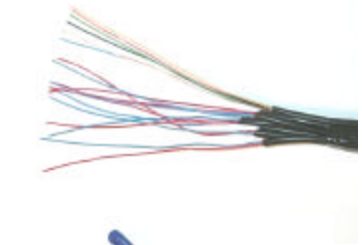
The piece of equipment that you want monitored has a HEAD section with 6 sensors (2 bearings, and 4 rub points) and the Tail section which is similar (2 bearings, and 4 rub points). After installing all necessary hardware and sensors, leadwire runs are next. Keep in mind the shortest run to the instrument will have the larger of the leadwire: Meaning if there are 12 points to be monitored and the tail section is closest to the instrument, a 12 T/C leadwire from that point back will be installed. To join both of the sections together, run a 6 T/C from the tail to the head.

5.5 Leadwire Preparation:

Prepping the leadwire for splicing is done by, stripping back about 6 inches of its black insulation. Follow the example:

- Locate the strip string on the side that appears to have a ridge.
- Using a utility knife, make a small cut toward the end of the lead on this ridge to locate the string.
- Using a pair of pliers' grab the string and pull it back about 6 inches and pull out the group(s) wires inside, cut off the outer insulation.
- Untwist the wires to see a constantan wire (white, brown or orange) with a group of color (copper) wires; black, blue, green, red, yellow, clear and depending on the leadwire sometimes a violet.
- Do the same to the extension lead you will be connecting to.
- Using black vinyl tape, tape the leadwire and sensor leads together.
- Trim all of the wires to the same length.
- Using the color code splice together the copper sensor wires first using the Type "B" crimps. (Blue crimps used in this example, most crimp today are white in color.)
- Next strip back about an inch of insulation from each constantan, twist together and crimp. (Stripping back the wires is necessary since there are more than 3 wires per crimp; see "Using Type "B" connectors".)
- Finally twist or group the crimps together and place in the junction box or equivalent protected area.





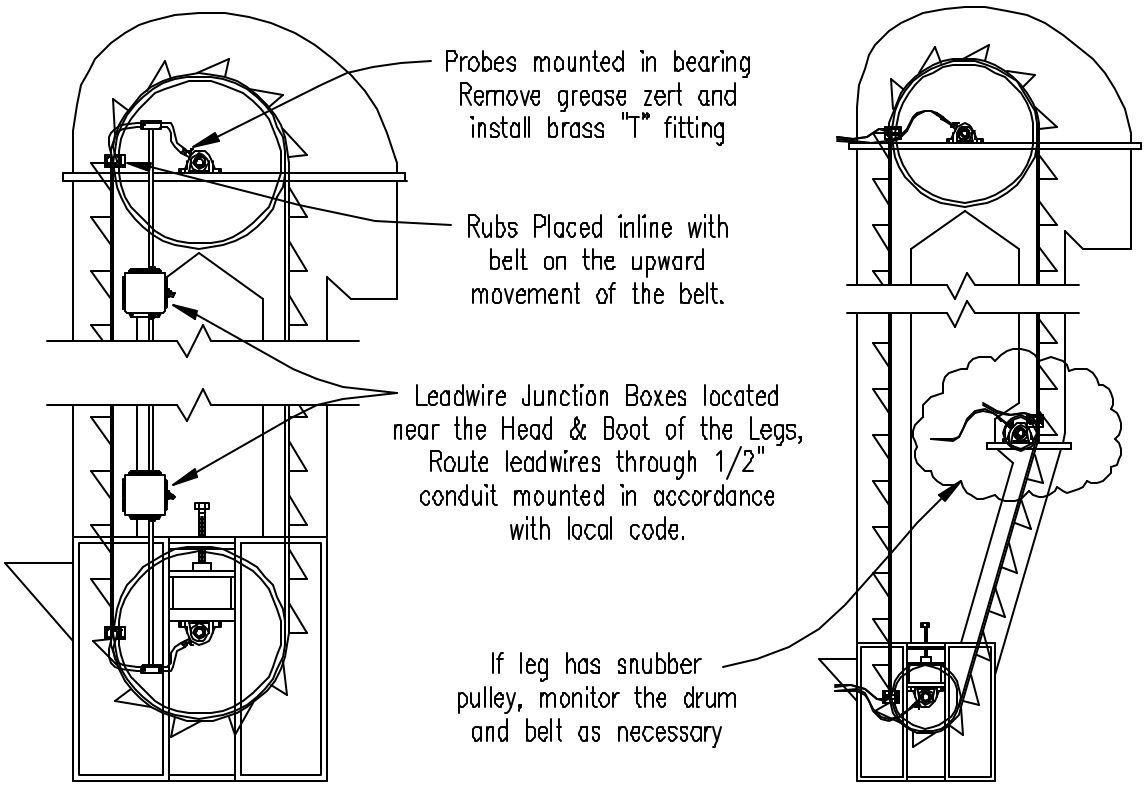
6.0 Mounting Sensors:

Installing the sensors requires a knowledgeable & skillful contractor. It's recommended that Rolfes personnel be contracted to do this work, since it may save the customer any headaches associated with an installer who is not resourced with the knowledge and/or skill to install this hazard monitoring system.

6.1 Installation – Leg Rub Points:

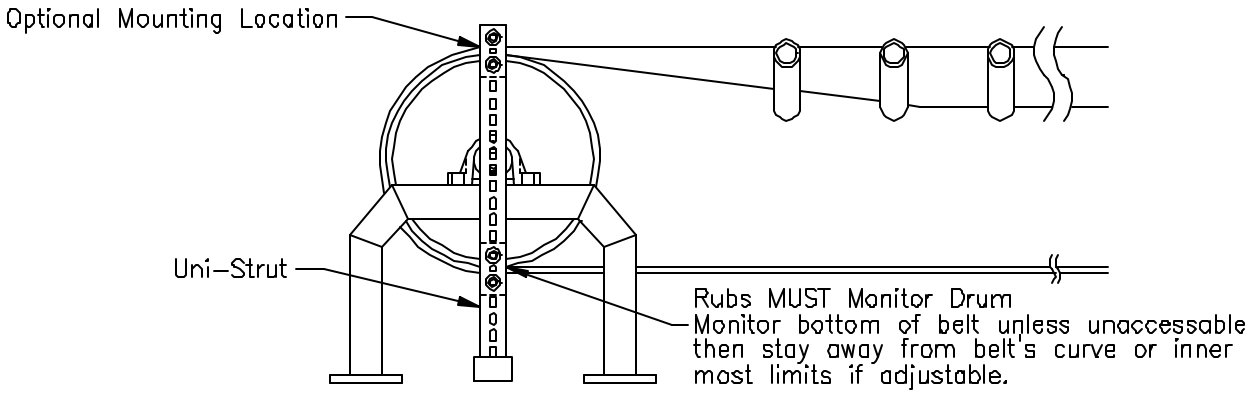
The rub point sensor is used to monitor pulley and belt alignment in product (e.g. grain) moving equipment. With these rubs in the proper location they will save the owner / operator from excessive down time due to any mishaps from alignment problems. With this in mind, mount each rub point as close as possible to the pulley, normally ½" to an 1" from the head, knee, or tail in a secure manner. At the tail section, the rub sensor is to be mounted with adequate room for pulley adjustment. The rub should **NOT** touch or interfere with the pulley.

For rub point sensors mounted on grain legs, a minimum of four rubs should monitor the upward moving portion of the belt (e.g. two rubs at the tail along with two rubs at the head on both sides of the upward moving belt of the leg). If the leg being monitored has a "Knee" or "Snubber" pulley, two more rubs should be installed so that it monitors this location as well (see below).

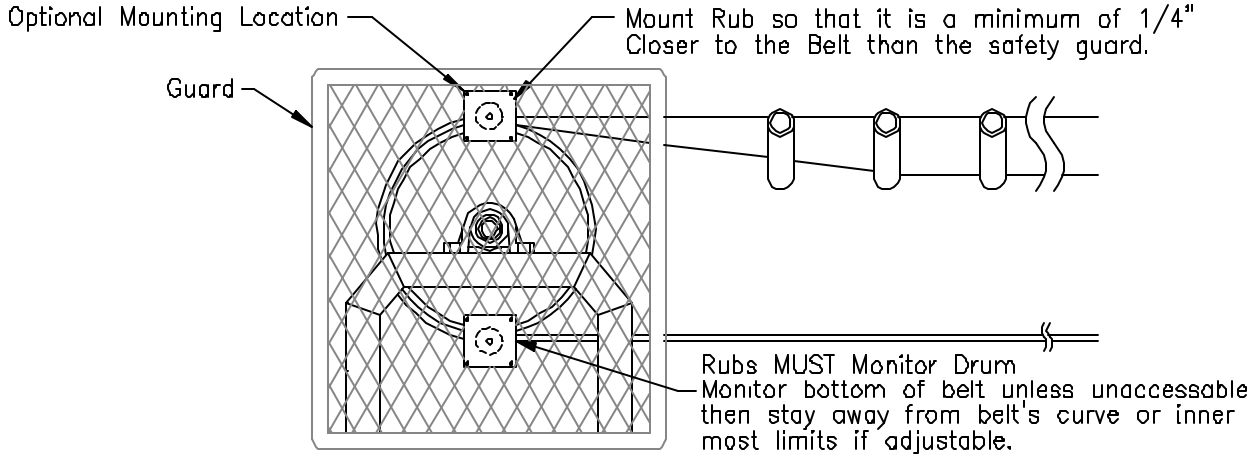


6.2 Installation – Belt Rub Points:

Rub point sensors that monitor open or enclosed belts; these should be mounted in a manner to monitor the bottom side of that belt. Mount each rub point as close as possible to the pulley, normally ½" to an 1" from the head, idler, or tail in a secure manner. At the tail section, the rub sensor should be mounted with adequate room for pulley adjustment. The rub should **NOT** touch or interfere with the pulley (see below).



Open Conveyor Belt



Enclosed Conveyor Belt

7.0 Cutting & Drilling for Rubs:

Warning: Follow ALL safety precautions and LOCK-OUT / TAG-OUT the equipment that is being worked on.

Prior to mounting the rub sensors, determine the pulley diameter. This will help to locate the belt with little effort if there are no access doors, etc. The accuracy of locating correct sensor position is crucial to this system.

Once the belt is located mark and drill a pilot hole to ensure the sensor's center will monitor the belt and pulley if required. Check the position by placing a heavy gauge wire through hole and "feeling" for belt. If the belt is located directly beneath this hole, then you're ready to start cutting the sensor hole. This requires a good quality hole-saw, cutting fluid and a heavy-duty low speed drill. The hole must be drilled slowly with adequate cutting fluid applied by dribbling down the metal onto the hole-saw as the hole is cut.

NOTE: If the drill runs to fast, the teeth will not bite in and will wear quickly. Cutting fluid will eliminate excessive heating of the tool and any sparks produced.

Use an appropriate size hole saw, drill into the pilot hole that located the belt. Once the hole is made the sensor should be checked for proper fit. If the hole is too small it may be reamed to size. Place the rub assembly in the drilled hole and mark the 4 retaining holes. Drill through the equipment's wall using a slightly larger bit than the mounting holes.

RECOMMENDED: After all drilling and cutting is completed, the use of a rust inhibitor or good quality paint is recommended to prevent any corrosion to the equipment.

*7.1 **RPS-2** / 2" Rub Blocks:*

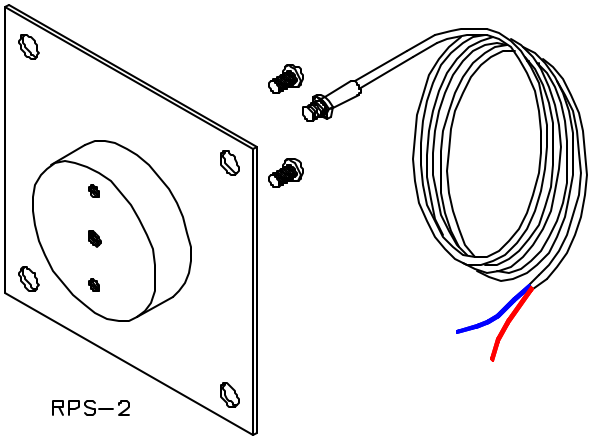
Determine location of the sensor. See ***CUTTING & DRILLING*** for use as a guide**.**

- Use a 2-1/8" hole saw and cut into the leg casing, in line with the belt and/or pulley. Verify your measurement prior to drilling.
- Insert the rub block into the hole and mark the four corner holes of the plate, then remove the rub block.
- Use appropriate drill bit, drill out the four mounting holes.
- Re-insert the rub block and attach it with appropriate hardware.
- Screw the drill and tap sensor into the rub block.

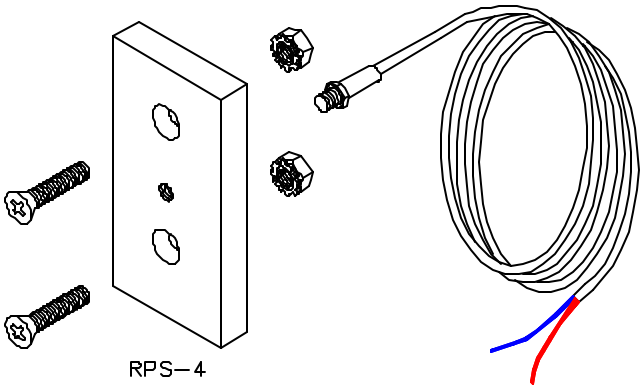
*7.2 **RPS-4** / 2" X 4" Rub Block:*

On an open conveyor, a 2" X 4" rub block is commonly used. These can be installed several different ways.

- The most common is to attach the rub block to a floor mounted or otherwise secured section of Uni-Strut.
- Screw the DTS sensor into the back of the rub block and mount it to the Uni-Strut in a secured fashion.



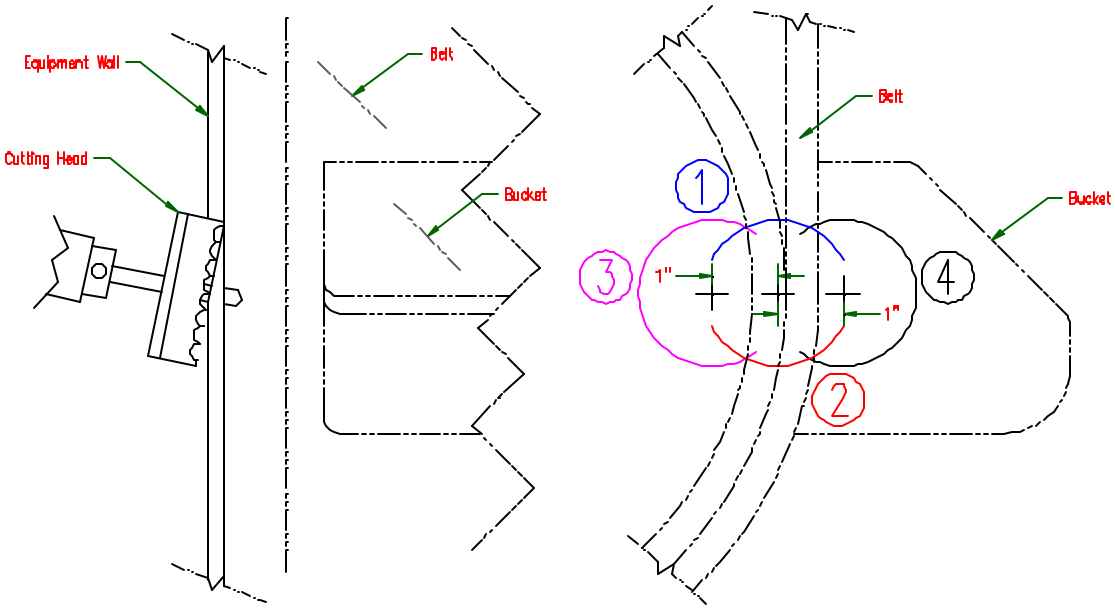
RPS-2



RPS-4

*7.3 **RPS-8** / 2" X 4" Rub Block With Conduit Fitting:*

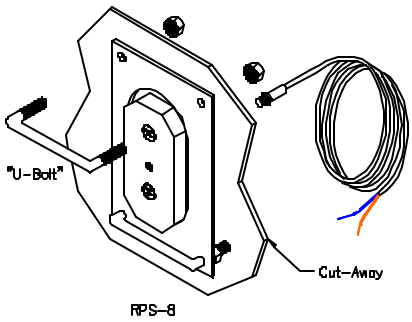
Determine location of sensor. See *Cutting & Drilling.*



RPS-8 Cutting Procedure

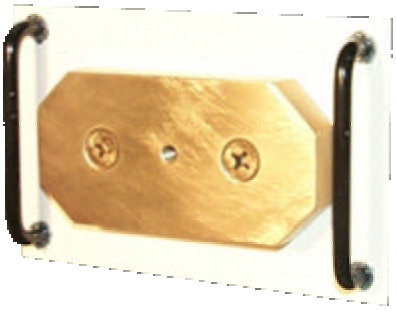
For the RPS-8 rub, use the example above.

- Start by drilling into the casing at an angle and cut along line 1, but not the circumference of the cutting blade.
- Next cut along line 2, again not the circumference of the blade.
- Measure 1" perpendicular to the belt from first hole an drill into line 3 with more cutting area.
- Next, place a piece of wire into the hole of the 3rd cut (this will help to retain the piece of metal so it doesn't fall into the equipment).
- Finally drill the last line (#4) and remove the remaining material.



The bolts are inserted from the inside out through the sensor's hole. **Be very careful not to drop any bolts inside the equipment.** Mount the rub sensor on the bolts and secure in place. It may be necessary to shim the sensor out from the equipment wall, this can be done by placing shaped UHMW or washers on the outside portion of the bolts and then mounting the rub sensor.

If required, install "Seal-Tight" from RPS-8 sensor to a junction box and wire according to the examples in this guide.



RPS-8

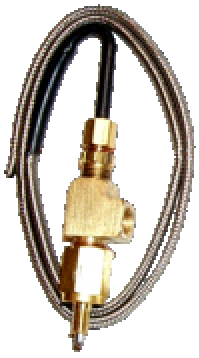
7.4 Bearing Probes:

Depending on the type of bearing that will be monitored, no modifications should be necessary. Only in certain circumstances will this be necessary and recommended that the manufacturer of the bearing be contacted prior to any modifications or drilling.

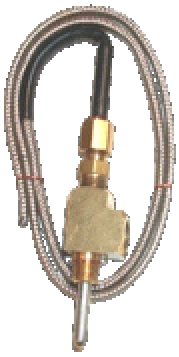
> *NOTE: The Rolfes Company is not responsible for any damage incurred from the installation. Use good judgment to prevent any damage in the installation process.*

- Clean the area around the grease zerk to avoid foreign matter from entering the bearing during the probe installation.
- Remove the grease zerk & install the brass "T" in its place.
- Insert the probe through the compression fitting so it touches the race of the bearing and then pull back 1/8" so it is not in contact with the race.
- Tighten the compression fitting to hold the probe in place.
- Reinstall the grease zerk into the brass "T" fitting and grease bearing to check for leaks.

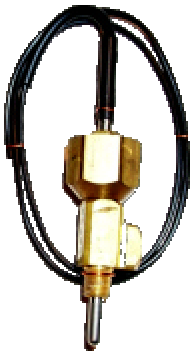
> *IMPORTANT: If a grease leak occurs, tighten the necessary fitting. Make sure the bearing is getting ample amounts of grease or lubrication.*



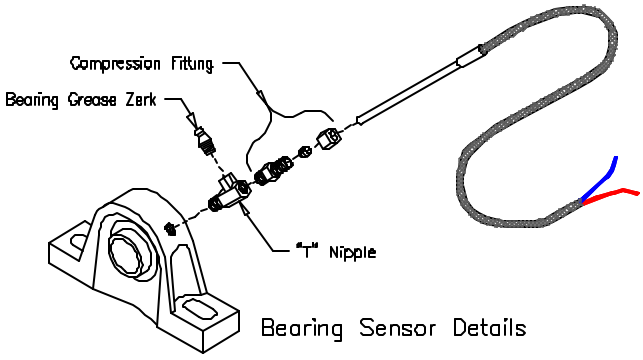
BPS-8



BPS-10



BPS-CON



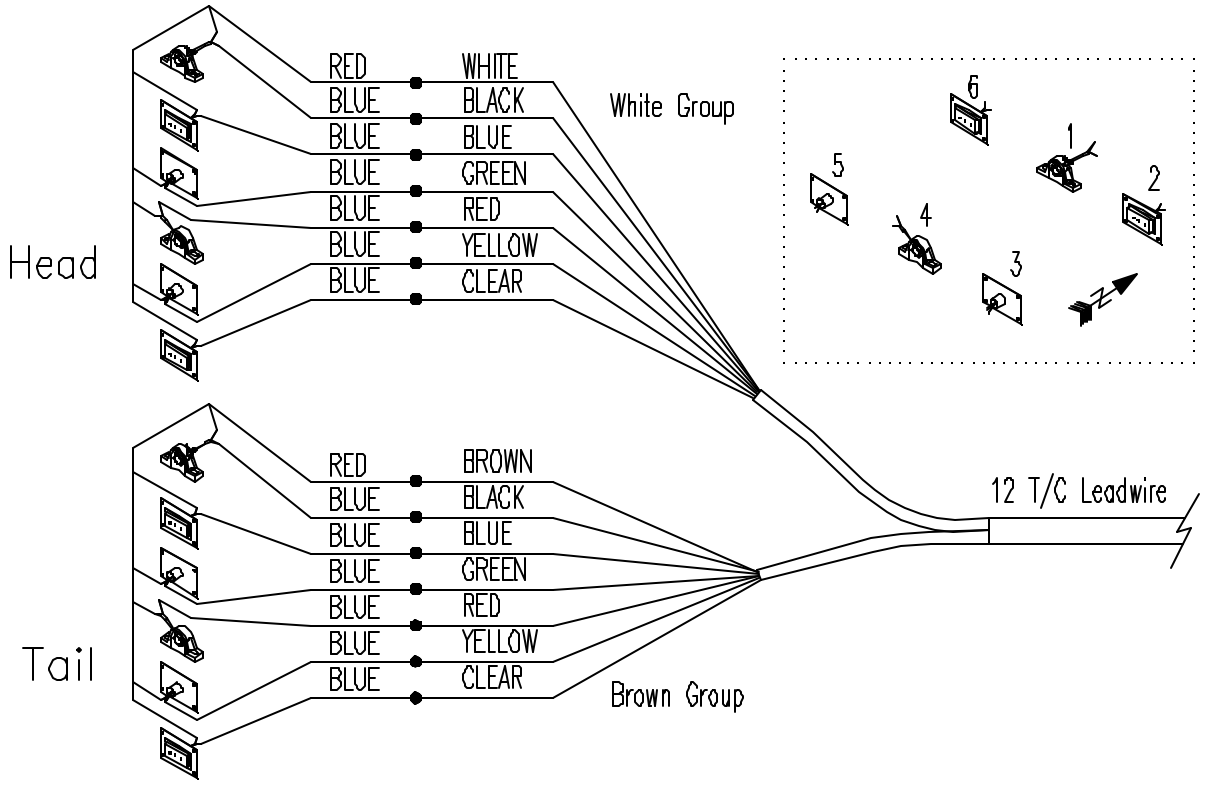
Bearing Sensor Details

8.0 Splicing in the Sensors:

Using the color code and the sensor layout, start by splicing the sensors in as seen below. Starting at the head section, make all splices to the leadwire running to that section. From there the leadwire will most likely continue to the tail section. There it will be spliced into a larger size leadwire going to the instrument.

For this example, you'll splice in a 6 T/C leadwire from head section into a 12 T/C leadwire. The 6 T/C leadwire has a WHITE group only and the 12 T/C leadwire will have a WHITE group along with a BROWN group. Since you wired in all 6 sensors at the head section, splice that 6 T/C leadwire into the WHITE group of the 12 T/C leadwire, with everything being color to color (less confusion and/or color transposing). Next, splice in the tail section's 6 T/C leadwire into the BROWN section of the 12 T/C leadwire. Try to stay consistent, as an example if the black wire of the head section is the north bearing, do the same for the tail section.

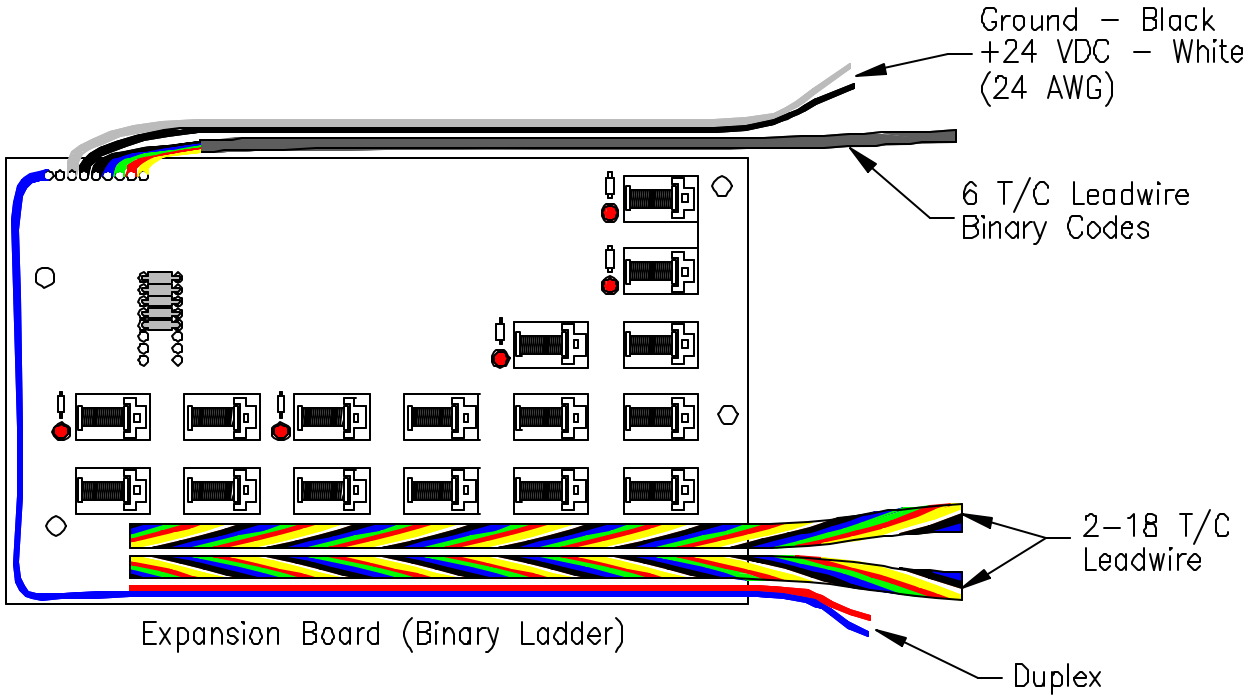
If you have multiple sensors in one location, you can make all common connections (constantans) in one splice. For instance, you might have 2 probe sensors and 4 rub sensors at the tail of a leg. Connect all of the sensor constantan wires to the leadwire constantan.



☞ NOTE: When making a splice with more than 3 wires in a type "B" connector, strip back the ends and twist the wires together prior to crimping.

9.0 Wiring in the Expansion Board:

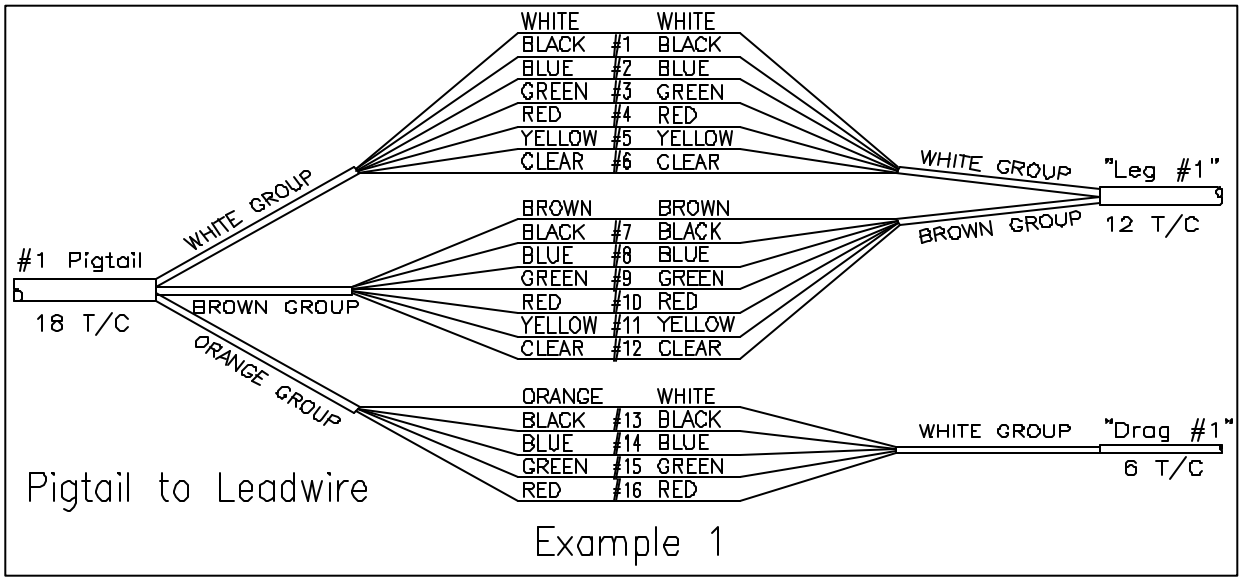
After every sensor has been spliced in, next is connecting the leadwire run to the expansion board or binary ladder. The leadwire coming in from the equipment should be marked to avoid any confusion to what is being monitored. Once identified, splice in the leadwire groups to the expansion boards' 18 T/C pigtail.

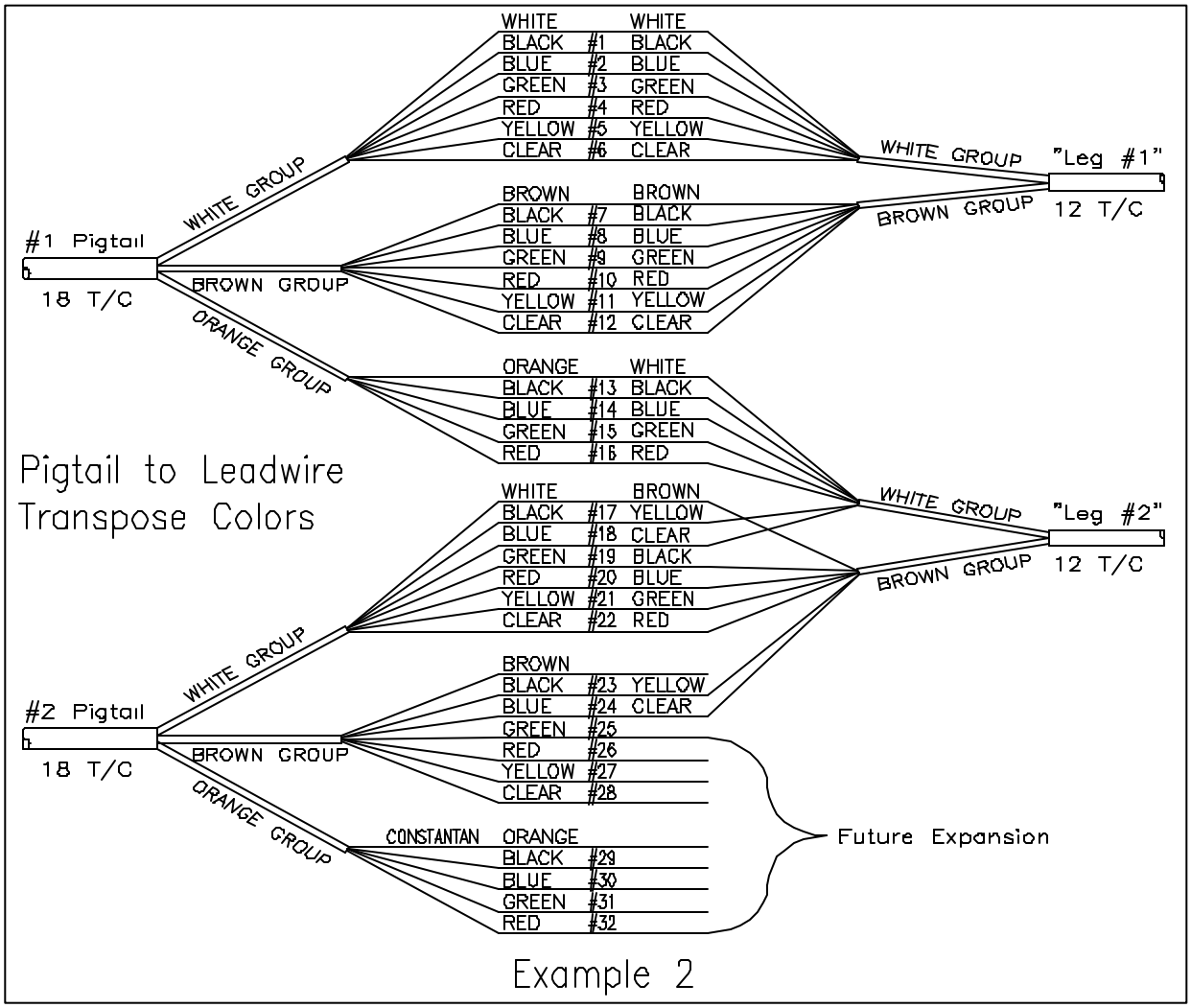


Connect each of the sensor wires in a logical order to the appropriate wire on the expansion board. For instance, points 1 through 12 might be Leg #1; points 13 through 16 might be a drag, etc. The first group will be the HEAD section of the leg, which is the WHITE group of the 12 T/C leadwire. This group will be spliced color to color onto the WHITE group of the first 18 T/C pigtail. Next will be the TAIL section, which is the BROWN group of the 12 T/C to the BROWN group of the 18 T/C pigtail, all color to color. (See example 1 on next page).

When all connections are made, carefully place the wires in the junction box and continue to the binary connections.

9.1 Wiring in Expansion Board Pigtails:





9.2 Splicing the Expansion Board to the SCANCENTER LX:

Use the following chart to connect the 18 T/C leadwire from the ***SCANCENTER LX*** to the Expansion Board (Binary Ladder).

Scancenter LX	Duty	Remote Binary Ladder
White Constantan	Constantan	Red Duplex
Black - (18 T/C Leadwire)	Binary Code	Black - (6 T/C Leadwire)
Blue	Binary Code	Blue
Green	Binary Code	Green
Red	Binary Code	Red
Yellow	Binary Code	Yellow
Clear	NOT USED	NOT USED
Brown Constantan	Constantan	Red Duplex
Black - (18 T/C Leadwire)	+24 VDC	Board #1- White (24 AWG)
Blue	Copper	Board #1- Blue Duplex
Green	+24 VDC	Board #2- White (24 AWG)
Red	Copper	Board #2- Blue Duplex
Yellow	+24 VDC	Board #3- White (24 AWG)
Clear	Copper	Board #3- Blue Duplex
Orange Constantan	Constantan	Red Duplex
Black - (18 T/C Leadwire)	+24 VDC	Board #4- White (24 AWG)
Blue	Copper	Board #4- Blue Duplex
Green	+24 VDC	Board #5- White (24 AWG)
Red	Copper	Board #5- Blue Duplex
Yellow	NOT USED	NOT USED
Clear	NOT USED	NOT USED
Black wire (24 AWG) is Ground.		
***NOTE*-**THE YELLOW & CLEAR of the ORANGE GROUP is NOT USED on any pigtail.		

After everything is connected turn on the ***SCANCENTER LX*** and observe the temperatures, looking for opens indicated by ---. Note the temperatures. Make sure your temperatures are believable. Temperatures in the boot area of a leg will generally be very consistent if the leg hasn't been running for a while. Likewise, head temperatures will be warmer if the heads are exposed to the sun.

10.0 Additional Equipment:

So far we have talked about only one piece of equipment that is monitored. If you are installing more sensors to additional equipment you will do everything the same up to this point. When splicing in additional equipment it may be necessary to transpose wire colors. BUT, do this ONLY on the PIGTAIL to the expansion board.

With the addition of another "leg" (for example) the wiring process up to the expansion board should be wired the same as "leg #1". If done correctly, you know that the BLACK wire of the WHITE group (12 T/C leadwire) is the north bearing of the head section. This will help you to keep things in logical order of which items are what and the order they are scanned.

Using the next available T/C switch at the expansion board, in this case, would be the BLACK wire of the ORANGE group on the 1st 18 T/C pigtail. Splice in the BLACK wire of the WHITE group (new leg) to this point. Continue through the color code until every wire is connected.

NOTE: DO NOT USE THE YELLOW or the CLEAR of the ORANGE GROUP on any pigtail at the expansion boards.

When the last wire on the pigtail is used, jump to the next (2nd) pigtail and start with the BLACK wire of the WHITE group. The constantans (WHITE, BROWN & ORANGE) will be spliced color to color OR together.

HINT: If your site has a drag with only 4 sensors (bearings only) use it as a "filler" and connect it to the orange group, this allows for most everything to be color to color without transposing the additional leg.

10.1 Additional Expansion Boards:

As your facility grows, so does the need for your ***SCANCENTER LX***. The ***LX*** series has this ability with the use of expansion boards. These expansion boards will allow you to add equipment without the added cost of another monitoring system. Just purchase an expansion board(s) along with the sensors for the new equipment.

To add, "piggy-back" the new expansion board to the existing board and connect everything together except for the +24 VDC in and the blue duplex, follow the chart on page 18.

11.0 Instrumentation & Controls:

The ***SCANCENTER LX*** *Series* uses a bold face Liquid Crystal Display (LCD). The controls for the ***SCANCENTER LX*** are located just below the display. Once the ***SCANCENTER LX*** is setup for operation, no other adjustment should be needed. Set it once and let the system alert the operators of any problems and where to take the appropriate action.

11.1 Mounting the Instrument.:

Mount the ***SCANCENTER LX*** instrument securely and in accordance with any local or regional electrical codes.

The ***SCANCENTER LX*** instrument should be installed in a dust free and climate controlled environment for optimal operating conditions (temperature range: 40°F TO 120°F). Mount the unit so that the display is in the most readable position. For optimum viewing, the unit should be so the display is at or slightly above eye level.

NOTE: Use of conduit is highly recommended, but not required for proper function of the instrument. HOWEVER, with that in mind, make all leadwire runs well clear of power lines to prevent any interference. DO NOT run leadwire in power trays or in conduit with any other lines either power or signal. With the use of dedicated conduit, all cabling is protected against damage and improper equipment shutdown.

Conduit and leadwire runs should be made from the sensors to the ***SCANCENTER LX***. Follow any local or regional electrical codes.

Use (3) #8 or #10 Flathead screws to mount the ***SCANCENTER LX***.

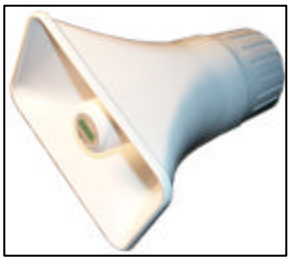
- Place the first screw at the location of the center-mounting hole (back of instrument), leave about 1/8” gap between the screw head and the wall.
- Remove, ONLY, the wiring duct cover at the bottom of the unit. Leave the faceplate of the unit in place.
- Hang the unit on the center screw and level; mark in the lower corner locations for the other 2 mounting screws (see below).
- Remove the unit and pre-drill for the other 2 mounting screws.
- Determine where conduit will be run to the Scancenter.
- Lay the unit with the conduit knockout facing up and use a small screwdriver to make several punctures around the perimeter of the knockout.
- Do not use excessive force to remove knockouts.
- Hang the unit and install the remaining 2 mounting screws.
- Attach appropriate conduit to the unit.

11.2 Electrical Connections:

The ***SCANCENTER LX*** has been set to your voltage specification at the factory, either 120 VAC or 240 VAC. Please contact your representative if this incorrect. Rolfes is not responsible for installing the wrong voltage to the ***SCANCENTER LX***.

12.0 Alarm & Siren:

The recommended alarm for the ***SCANCENTER LX*** system is the ALRM-100. This ALRM-100 is easily installed and should be mounted near the ***SCANCENTER LX*** with the SIREN mounted where it will be noticed or heard clearly by any operators.

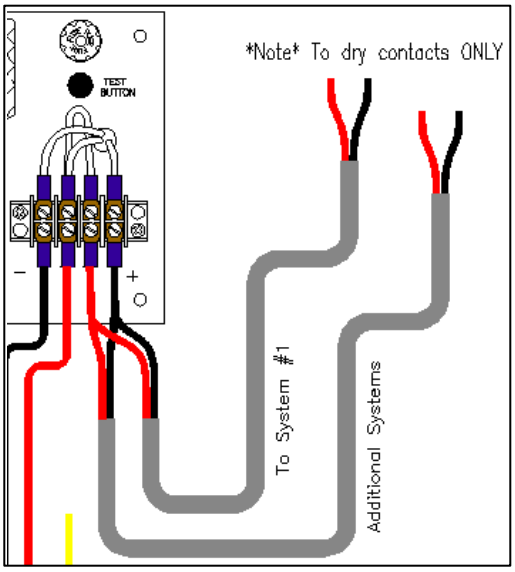


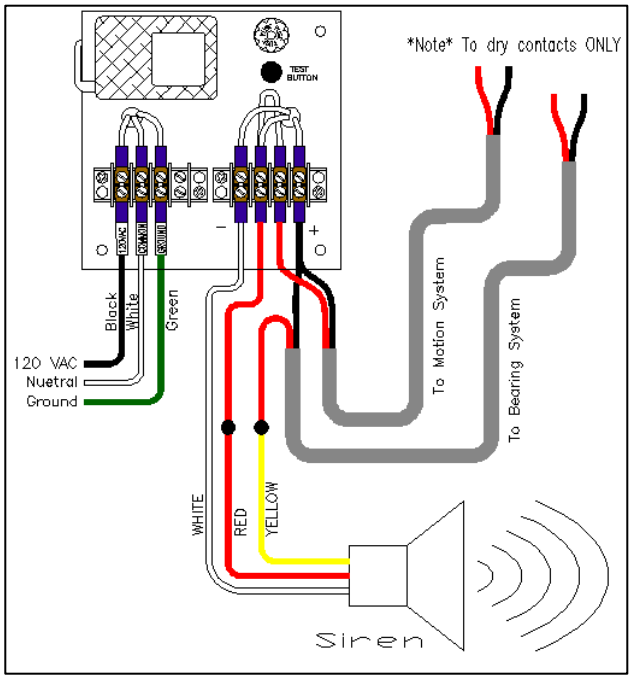
Dual-Tone Siren

Use good judgment when locating an area for the SIREN; you don't want it to be too close to your operators, OR too far away from your operators to hear it over the noise of the equipment.

This diagram (right) shows two different monitoring systems and one ALRM-100 controller using the dual tone capability of the siren. (i.e. Motion system & Bearing system.)

The diagram below shows two identical systems using the same ALRM-100.





Dual-Tone Svstems w/ one

Siren Tones	
Yellow	**Solid**
Red	**Wave**
White	**Common**

🏷 *NOTE:* If your facility has only one monitoring system, OMIT the "additional- systems" lead in the diagram below.

🏷 *NOTE:* USE DRY CONTACTS ONLY (no voltage on lines going to or from these systems).

🏷 *NOTE:* All electrical connections are to be made by a licensed electrician and in accordance with any local or regional electrical codes.

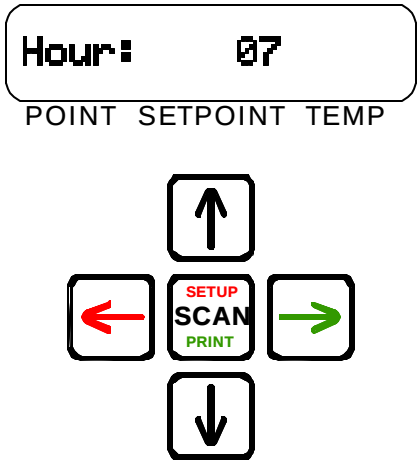
WARNING: The ALRM-100 is rated at 120VAC ONLY. If your facility requires 240VAC, install a 240VAC to 120VAC transformer / converter. Contact your sales representative if you require a transformer / converter.

13.0 SCANCENTER LX Setup:

To enter the Setup mode, press and hold the ← key and then press the **SCAN** key. Once in the setup mode use the ← and → keys to move to different setup parameters and the ↑ **and** ↓ keys to increase or decrease values.

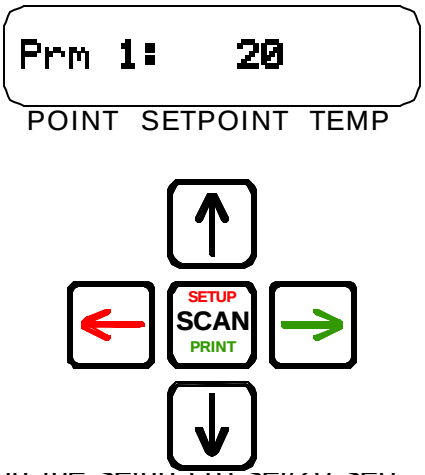
13.1 Setup Parameters:

Point:	Description	Default
Hour	Set Hour (0 – 23)	Varies
Minute	Set Minute (0 – 59)	Varies
Month	Set Month (1 – 12)	Varies
Day	Set Day (1 – 31)	Varies
Year	Set Year (0 – 99)	Varies
Delay	Display scan rate (1 – 15)	2
➤	Adjustable Sensor Display Rate.	
Output	(0 – 1)	0
➤	0 – Normal printer operation.	
➤	1 – Continuous data output (PLC).	



WARNING: Prm 1 – 12: Do not change these values unless instructed to by Rolfes support personnel; these items are calibrated at the factory.

Point:	Description	Default
Prm 1	Warning Offset	20
Prm 2	Ambient Offset	30
Prm 3	Digital Sensor retry	15-20
Prm 4	N/A	0
Prm 5	Temperature Calibration MSB	2
Prm 6	Temperature Calibration LSB	36
Prm 7	Ohms Calibration MSB	0
Prm 8	Ohms Calibration LSB	100
Prm 9	Temperature Offset	Varies
Prm 10	Ohms Offset	8
Prm 11	N/A	0
Prm 12	N/A	0

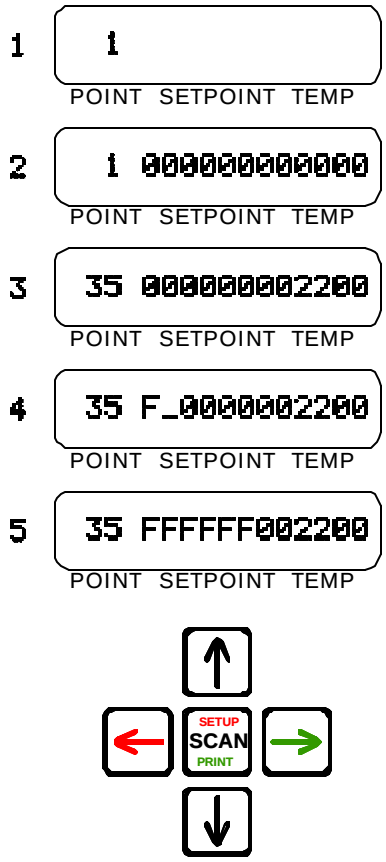


Warning offset is adjustable. Changed by altering PRM 1 in the setup (10 set/20 set). If this value was 5, for example, when a sensor is within 5 degrees of an alarm, a warning chirp sounds.

13.2 Configuration of Sensors:

To get your ***SCANCENTER LX*** system to scan every sensor from the first to the last, you need to program the last sensor to be scanned. For this example let's say there are 34 sensors in your system, use the following procedure below as a sample:

1. With the power is on, press and hold the ↓ arrow and then press the **SCAN** button, screen will display a "1".
2. Next press the ↑, the screen will display a point number and an address.
3. Use the ↑ arrow to scroll up to the first NON-USED sensor address.
4. Enter one sensor more than in your system (e.g. 34 sensors in the system, you would enter 35 in the point location).
5. Next, use the → arrow to move the cursor into the digital address area.
6. Enter at least SIX (6) "F's" (see example) using the ↑ & ↓ arrows. When the correct value is in place, cursor over to the next position and repeat. The values run from 0-9 and A through F.
7. The series of "F's" tell the ***SCANCENTER LX*** to return to the first sensor in the system.
8. When you have entered the "return" address, press the **SCAN** button to go into Auto Mode.



13.3 PLC Output:

When using a PLC to control equipment, the ***SCANCENTER LX*** can be interfaced via an RS-232 serial data stream. The Output type parameter should be set to 1 for continuous output. (See Setup Parameters.)

The ***SCANCENTER LX*** serial output is American Standard Code for Information Interchange (ASCII) data. The communication parameters are 19200 baud, 8 data bits, 1 stop bit, and no parity. Each line is terminated by a carriage return - line feed combination. The data string will consist of either temperature data or error / retry information.

Temperature data example:

05/12/06 21:52 30 130 150 --- 0

Retry example:

Retry 3 on Point 1

The temperature data will always be at the same character position within the output string and is as follows:

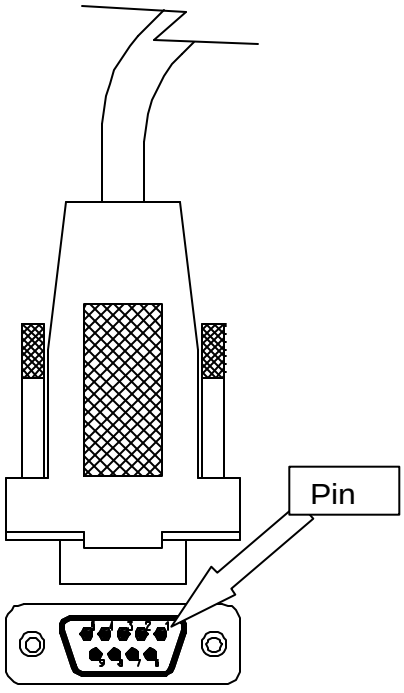
Data	Start	Length
Date:	1	8
Time:	12	5
Point:	20	3
Warning setpoint:	31	3
Alarm setpoint:	42	3
Temperature:	52	4
Status:	64	1

The status value will be:

Normal:	0
Warning:	1
Alarming:	2

The serial connector is a 9 pin female.

Wire:	Pin:
TXD	2
RXD	3
Common	5



14.0 Navigating Through the Scancenter:

When the ***SCANCENTER LX*** is first turned on, several things are accomplished in rapid succession.

The alarm relay is closed momentarily to check its operation.

Date and Time is shown.

Software version number appears.

And the program goes to Auto Scan mode.

The ***SCANCENTER LX*** continuously scans for temperatures that are above the setpoint. The **ALARM** set point is displayed in the center of the display. The **WARNING** is 20 degrees (Fahrenheit) below this value.

14.1 Manual Mode:

The Manual Mode allows the user to view any point with in the system. For example if you have a warning alarm on the east bearing of the tail section on the basement belt, you can use the ***SCANCENTER LX*** to view its temperature, prior to visually looking at the bearing. To do this use the ← or → keys to move the cursor ("<") in the display, to the point position and enter in the point location of the sensor you want to view (via the ↑ and ↓ keys). You can jump to any specific point in the system and it will lock on to that sensor and continuously read its temperature. After 20 seconds on the sensor, it will resume to the automatic scan mode or you may press the **SCAN** button to resume auto mode at anytime.

14.2 Setpoint:

To change the set point, use the **← or → arrows** to move the "<" to the right of the set point value. Use the **↑ and ↓ arrows** to increase or decrease the set point value.

14.3 All Set:

This feature allows the user to set every setpoint to a common value without having to do them individually.

First, use the cursors to move the "<" to the right of any sensor's setpoint. Next enter in the desired value. Hold the **→ arrow** and shut **OFF** the SCANCENTER. When you turn it back on, you will see all of the sensors set to the new setpoint value. Please **NOTE;** this will also set the motion setpoint to that same value and needs to be reset to its correct setting.

14.4 Selection of Fahrenheit, Celsius or OHMs W:

Use the ← or → keys to move the "<" to the far right of the display to change to **F°** or **C°** (via the ↑ and ↓ keys).

ⓘ IMPORTANT: If you change from F° to C° or vise-versa, reset all of the setpoints to its equivalent temperature.

16.5 Detection of Bad Sensor:

If the ***SCANCENTER LX*** detects a bad sensor it will sound a brief chirp. Manually move through the points to determine the location of the bad sensor.

If the ***SCANCENTER LX*** detects a sensor that has reached the **WARNING** set point, it will sound a short beep and print the warning on the printer, if attached.

If the ***SCANCENTER LX*** detects a sensor that has reached the **ALARM** set point, it will sound the alarm until cleared by the operator by pressing the **SCAN** button. The alarm will sound again in 2 minutes if the point has not cooled down. The unit continues to scan for alarms on other points.

14.6 Sensor Lockout:

If a sensor has gone bad, you can lock it out until repair can be made. To do this, follow the Setpoint Configuration and use the arrows to lower the setpoint value to "0", this will lock out the bad sensor.

🏷 *NOTE:* This should ONLY be used as a TEMPORARY MEASURE!

Warning; Fix the sensor problem as soon as possible.

14.7 Freeze Mist Test:

The Freeze Mist test was developed to verify the function and location of each sensor after the installation is completed. Items inspected during the visit include; proper sensor location, hardware used, slices in junction boxes and at the instrument, test of audible alarms / horns, freeze mist, and custom printout of sensor locations along with verification of items checked. Call the service department to schedule this test.

Limited Warranty

THE ROLFES COMPANY warrants that the products furnished to the PURCHASER will, at the time of shipment, be free from all defects in material and workmanship under normal use and service for a period of twelve (12) months from date of original shipment or, if installed by THE ROLFES COMPANY personnel, twelve (12) months from date of placing product into service. THE ROLFES COMPANY'S sole obligation hereunder shall be limited to, at THE ROLFES COMPANY'S option, either replacing or repairing any product for which (i) prompt notice has been given to THE ROLFES COMPANY within the warranty period of the product under question; and (ii) after THE ROLFES COMPANY'S authorization, is returned to THE ROLFES COMPANY'S factory of origin, freight prepaid; and (iii) after examination it is disclosed, to THE ROLFES COMPANY'S satisfaction, the product is defective.

If the product was originally installed by THE ROLFES COMPANY personnel within the continental United States, an on-site examination by THE ROLFES COMPANY can be performed in lieu of parts (ii) and (iii) above and if the product is found defective, it will be repaired or replaced under warranty if all other conditions of this warranty are met. If on-site examination is requested and no defects are found within the scope of this warranty, PURCHASER will be subject to payment to THE ROLFES COMPANY for the on-site examination at THE ROLFES COMPANY'S standard hourly and travel rates.

Any repair or replacement shall not extend the period with which this warranty can be asserted. All replaced equipment or parts will become the property of THE ROLFES COMPANY. This warranty shall not apply to products which THE ROLFES COMPANY has determined have, by PURCHASER or another, been altered or modified by anyone other than THE ROLFES COMPANY; or has been subjected to misuse, neglect, accident, damage in transit, abuse or unusual or natural hazard; or has been installed improperly or used in violation of THE ROLFES COMPANY'S standards and specifications.

THIS WARRANTY MAY BE ASSERTED BY PURCHASER ONLY AND NOT BY PURCHASER'S CUSTOMER AND IS EXPRESSED IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY, AND ALL OTHER OBLIGATIONS OR LIABILITIES ON THE ROLFES COMPANY'S PART. THE ROLFES COMPANY NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON TO ASSUME FOR THE ROLFES COMPANY ANY OTHER LIABILITIES IN CONNECTION WITH THE SALE OF SAID PRODUCTS. IN NO EVENT SHALL THE ROLFES COMPANY BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES; LOSSES OR EXPENSES INCLUDING, BUT NOT LIMITED TO, LOSS OF USE, LOSS OF PROFITS OR LOSS OF DATA; OR FOR LOSS, DAMAGE, OR EXPENSE DIRECTLY OR INDIRECTLY ARISING FROM THE FAILURE OF THE PRODUCT TO OPERATE PROPERLY OR THE INABILITY OF THE PURCHASER, PURCHASER'S CUSTOMER, OR ANY END USER TO USE THE PRODUCT EITHER SEPARATELY OR IN COMBINATION WITH ANY OTHER EQUIPMENT. In no event shall THE ROLFES COMPANY'S liability for failure to deliver or breach of any provision of this warranty, including, without limitation, THE ROLFES COMPANY'S obligation with respect to non-conforming items, exceed, with respect to the product, the purchase price of the relevant product.

THE ROLFES COMPANY reserves the right to incorporate improvements without notice and is not obligated to incorporate the same improvements in products previously manufactured.

Appendix 1

Sensor layout: