



Scancenter 2005 / 2010

Grain Temperature Monitoring Systems

Installation and Operations Guide

**READ THIS ENTIRE GUIDE BEFORE
PROCEEDING WITH THE INSTALLATION**

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Thank you for purchasing The Rolfes Company's Commodity Monitoring System. This manual is presented as a reference for the installation and operation of Rolfes HotSpot Grain Temperature Monitoring System.

The Rolfes Company offers a comprehensive line of temperature 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 temperature monitoring along with a constant program of innovation and technological development, allows us to offer cost-effective and user-orientated solutions.

Please read all instructions for this and any other system prior to installation.

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

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

The Rolfes Company
P.O. Box 188
108 N. Main St.
Danville, IA 52623
Phone: 800-824-7274 or 319-392-4194
Customer Service: Ext. 120
Service Department: Ext. 121
Sales Department: Ext. 141
Fax: 319-392-4192

ABOUT THIS MANUAL

This manual is a comprehensive reference for the Scancenter 2000 Series Temperature Monitoring Systems, Switches, TempSys Software and basic wiring of the system.

For easy reference this manual is divided into various sections. Although each section is a self-contained unit and may be read separately, for a complete understanding of the Temperature Monitoring System, you should read the entire manual in the order presented.

SCC2005 Specifications

Power	115 VAC +10%-15% 50/60 Hz. 50 watts maximum
	2 Amps
Weight	5.5 lbs.
Operating Temperature Range	32° to 110° F
Printer Interface	Serial Communications RS-232
	19200 Baud, 8 Data, 1 Stop, no parity
External Alarm Contact Rating	1 AMP 115 VAC – closes on alarm in Auto Mode

Computer System Requirements

If running off of a computer, here are the minimum computer requirements.

- ?? 1gig Pentium III or better
- ?? 256 Mb of RAM (512 recommended)
- ?? 20 Mb free space on hard drive
- ?? Ethernet Adaptor
- ?? Windows 2000 operating system or higher

1.0 Grain Temperature Systems

Stored grain is constantly threatened by the hazards of mold activity, insect infestation and moisture migration. When grain goes out of condition, regardless of the cause, there is almost always a rise in temperature in the critical areas.

All stored grain is infected to certain extent with various types of grain storage molds. The correct conditions of moisture and temperature will stimulate their activity. The optimum temperature is about 85 degrees Fahrenheit for most prevalent species. The growth of storage mold lowers the usefulness of grain and grain products by the development of off-odors and various types of kernel discoloration. If there is a high percentage of damaged kernels, often caused by “turning”, the grain is more likely to go out of condition.

Insect activity is also directly related to temperature and moisture content of the stored grain. Generally speaking, the dampest and warmest part of the bulk, and not the average, is the determining factor with respect to insect growth and reproduction. Infestation can be controlled by fumigants, but reduction in fumigant cost is possible if storage temperature can be maintained at a lower level. Most insects thrive in temperature above 70 degrees Fahrenheit, particularly, in high-moisture grain. Insects not only consume the grain, causing damaged kernels, but also generate heat and ultimately develop a temperature in the grain, which may cause further serious damage. Below 50 degrees Fahrenheit, most insects become dormant and may die of exposure to low temperatures after a few weeks.

When warm grain is put in storage, it is essential to reduce the temperature of the grain as soon as possible. When this cannot be done within a matter of weeks, it is wise to treat the grain with an insecticide if there is any possibility of insect infestation. If the grain is to be stored for any length of time before the temperature is reduced, further fumigation may be necessary.

The moisture in a mass of grain stored at a uniform moisture content may move within the mass because of differences in grain temperature. During the winter, the grain next to the bin wall becomes cooler than that at the center of the mass. Convection air currents pick up moisture from the warm areas and transfer it to cooler parts of the grain mass. The increase in moisture content may cause a corresponding increase in the respiration of the grain and associated microorganisms, and this oxidation of the grain carbohydrates produces added moisture and heat. Heating from one cause may trigger another, which will contribute to the total heat produced; the combined action may result in serious damage, unless the heated grain is removed, or the temperature reduced. When sufficient moisture is concentrated in the top layer of the stored grain, it may mold and cake. This often occurs, even in grain that was considered to be of safe moisture content when it was stored.

1.1 Thermocouple Theory

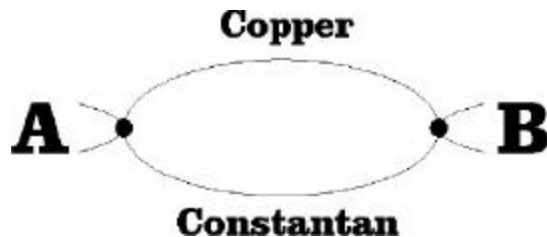
The principles, or theory, underlying thermoelectric effects were not established by one man at one time, but by several scientists working over a span of many years beginning with Alessandro Volta, who concluded in 1800 that the electricity which causes Galvani's frog to twitch was due to a contact of two dissimilar metals. This conclusion was the forerunner of the principal of the thermocouple.

When a circuit is formed consisting of two dissimilar conductors, and one of the formed junctions of these two conductors (A) is at a temperature higher than the temperature of the other junctions (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 than (B). The current will flow in the opposite direction if the temperature at (B) is higher than (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 TC.

Many metals are used for thermocouples in various applications; however, copper and constantan are the most practical for temperatures below 600 Degrees F. Constantan is an alloy approximately 57% copper and 43% nickel. The junction of copper and constantan is called a type T thermocouple.



2.0 Scancenter 2005 Introduction

The SCC2005 Scancenter console is the center of The Rolfes Company's relay based temperature monitoring system. The SCC2005 temperature monitoring system is based on the proven technology of the Scancenter 2010.

The SCC2005 Scancenter console is a stand-alone, state-of-the-art microprocessor based, operator interface device. The basic temperature monitoring system consists of a SCC2005 Scancenter, one or more remotely located Switches or switch box connected directly to several temperature-sensing cables.

The temperature cables contain several sensors that consist of copper and constantan wires. The wires are soldered together to form sensors. Each soldered area is a heat sensing point called a thermocouple (T/C). When in auto scan mode if the monitored point exceeds the absolute alarm limit and an alarm condition is present it will print, and/or alarm its present condition. This is accomplished by an auxiliary alarm relay with a set of dry contacts.

The SCC2005 controls the timing and operation of all the switches and retrieves the temperature information to be viewed. The SCC2005 converts the low-level analog temperature signals from the temperature sensors to digital form and accumulates the temperature data. The data is then available to be printed to a serial printer to provide a hard copy printout or sent an IBM compatible PC. The SCC2005 can operate in full automatic mode or Individual sensors can be manually selected and viewed from its display.

Although the SCC2005 is typically used to provide temperature monitoring of grain in grain storage facilities, it can be used to monitor coolers and other cold storage facilities along with a variety of other industrial applications.

2.1 SCC2005 System Description

The SCC2005 is housed in a modified version of The Rolfes Company's Scancenter Hazard Monitoring enclosure. It has a 2 line by 40-character display to view your information and use the Scancenter's membrane keypad to navigate through the system. It has a compact and robust circuit board with several built-in diagnostics features and has the capability of sounding an alarm when certain conditions occur. It is designed to be placed in an office environment and act as a stand-alone interface with the monitoring system. If it's connected to an IBM compatible PC (via an RS-232C serial port) it can access the temperature information through the Rolfes Company TempSys software. (See page 4 for system requirements. For software installation see page 13.)

2.2 Printer Option

The reports provided by the SCC2005 require a serial printer to connect to the RS-232 port. The SCC2005 will send the data to the printer via the RS-232 port at 19200 Baud with settings of 8 data bits, no parity and 1 stop bit. The printer type is set in the Setup screen. Enter a numeric value, 0 – 4 at the Prt field. The numbers correspond to the printer type as follows:

To change the baud rate fro the SCC2005:

Enter Setup screen by pressing #

Cursor to address

Key in 20445

Cursor to data

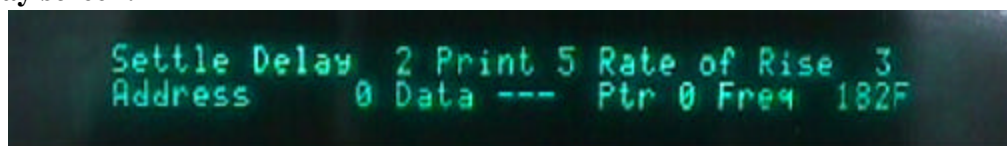
For 19200 Baud rate key 253

For 2400 Baud rate key 232

When finished you must cycle the power.

		Printer Type
	0	No control codes
	1	IBM Graphics
	2	Epson
	3	Okidata
	4	HP LaserJet

Setup display screen:



2.3 Operations Overview

The SCC2005 connects via leadwire to several switches in the system. The switches' wire bundles (also known as pigtailed from the way the twisted wire looks) are connected to the temperature sensing thermocouple cables located at various points around the facility. The thermocouples are a copper and constantan wire, which are soldered together to form a temperature sensitive dissimilar junction or T/C. The T/C's generate a voltage proportional to temperature that is converted to a digital value by the SCC2005. Each cable in the system is assigned a number and wired accordingly. The SCC2005 can retrieve the temperature of any T/C on any cable in the system.

The SCC2005 can display the temperature of an individual sensor for diagnostic purposes or it may continuously scan the temperatures of each sensor and compare it against pre-determined setpoint and print a report of the time and temperature. Each cable may be assigned an alarm limit and with the alarm contact connected to a siren or other type alert device, it can be used to inform the operator of any condition that may require attention.

2.4 Modes of Operation

The SCC2005 has two normal modes of operation: Auto Scan and Manual Scan as well as several service and diagnostic modes.

To enter Auto Scan mode press the Print button.

Auto display screen:



A blinking cursor indicates which field will be changed when data is entered from the keypad. The cursor and numeric keys may be used to edit entries shown on the screen. When data entry is not allowed, as in automatic retrieval mode, for example, the blinking cursor is not displayed.

Upon power on or from any other mode, pressing the Print key enters Auto or “*waiting for timed scan*” mode. The SCC2005 has an alarm clock feature that enables the unit to read the temperature of all cables (which are not locked out) at a pre-selected time. In this mode, the display shows the next programmed retrieval time and the current time and date.

2.4.1 Setting Time and Date

To set the time and date clock/calendar in the SCC2005, The display shows the time and date in the real time clock and allows changes to be entered. Use the cursor key(s) and the numeric keys to change the time and date settings. The time is entered in 12-hour format. The AM / PM may be toggled by positioning the flashing cursor on the displayed value and pressing the 1 or 0 key.

When the retrieval time arrives or the Print key is pressed, the SCC2005 initiates a full automatic system retrieval. Storing the temps to ram and printing as specified in The SCC2005 setup. The SCC2005 will read and print ohms but unlike temperature data, it does not store ohm readings.

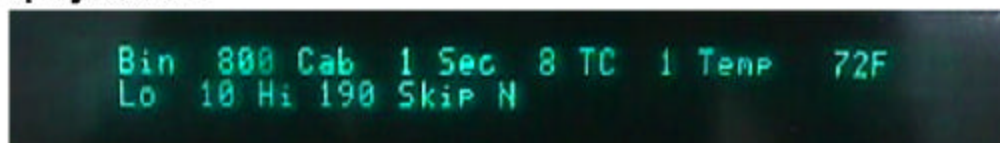
The SCC2005 stores 4 readings of temperature histories in RAM. When an individual cable is completely read, the SCC2005 updates the cable history on a first in first out basis and can print a total of 5 temperature histories (the current and 4 stored readings) for the cable. Sensors whose temperature has risen more than the Rate of Rise Limit (a global number not related to individual cable alarm setpoints) from previous reading or that has exceeded the Hi or Lo alarm setpoints will be printed in boldface on printout.

2.4.3 Manual Mode

Manual Mode allows individual sensors to be read. The desired cable and Sensor numbers can be entered from the keypad and the temperature values fetched from the appropriate sensor will be displayed. Sensors can also be stepped through sequentially using the Enter key when the cursor is flashing on T/C. In Manual Mode, the SCC2005 continuously monitors the temperature of the specified T/C. This allows rapid diagnostics and troubleshooting of the system.

To enter Manual Scan Mode press the Enter button.

Manual display screen:



Manual mode allows an individual T/C to be selected and read. It does not print or update the temperature history. In manual mode, the SCC2005 display contains: Bin, Cable, Section, T/C, Temp or Ohms, Hi and Lo alarm set points, and whether an individual cable will be included in auto scan or skipped. Selective readings may be taken by selecting the starting point in Manual mode and then returning to Auto mode to initiate a reading. Likewise, selecting a point in auto mode and then switching to Configuration mode will allow the frequency of an individual sensor to be monitored.

Pressing the # key while in Auto or Manual mode will enter Setup mode. In Setup mode, the Settle Delay, the number of temperature readings to print on the printout (1 to 5), and the Rate of Rise limit value can be set. The V/F output (Frequency) is also displayed as an aid in setting the calibration and Settle delay. This screen is also home to a “byte change” facility which may be used to make calibration and configuration changes.

2.5 Software

Using the cable read software with the SCC2005 your capabilities are:

- Starting a read

- Retrieving your temperature data

The SCC2005 instrument is still fully functional but your options through the software are limited. To read ohms you must manually switch modes in the SCC2005 as well as in the software before downloading the ohms report. If you are switching between Fahrenheit and Celsius you must also make this change in the SCC2005 as well as in the software.

For most software questions please refer to the help screens within the software.

2.6 Trouble Shooting

No Temperatures Displayed	Make sure all plugs are attached securely to instrument.
Scrambled or Blank Display	Cycle the power. Check fuse on power supply (2 amp slow blow). If this does not rectify the problem call Technical Support at 800-824-7274 ext. 120.
Will Not Print or Communicate With Computer (if using cable read software).	Check printer and/or computer connections. Check printer status (power, cleanliness, ribbon, paper). Check baud rate (see Section 2.2).

Troubleshooting Scan Center 2005

System will not communicate with printer or modem

1. Is the Printer turned on?
2. Is the serial printer cable connected to a serial printer?
3. Are all cables hooked up properly? Make sure the 9-pin connector for the serial communication port and the 9-pin connector for the remote cable data lines is not reversed? The 9-pin connector located on the left side of the 2005 is the correct connector for the serial data line.
4. Does the printer have paper?
5. Will the printer print a test page?
6. The unit's serial output may be tested if the customer has a pc with Hyper Terminal and 1 serial communications port. How? If the unit sends the report to a serial printer it can be tested using Hyper Terminal on a pc, you can determine if the printer port is bad, or if the Scan Center Port has a problem. The Scan Center Bearing, Grain, & Motion serial data settings are (2400-baud, 8-data bits, no parity bit, 1-stop bit, and the flow control should be set to XON-XOFF.) The Scan Center 2005, LXM, & LX serial data settings are (The LXM serial output is ASCII data. 19200-baud, 8-data bits, 1-stop bit, no parity bit, & the flow control is set to none.)
7. If the LX- 810 is used with the 2005 you will have to change the printer settings in the 2005 setup. Go to address 20445 then enter 232 to set the baud rate at 2400.
8. Is the serial printer setup properly? For the LX-300 hold down the tear off button while turning on the printer this will put you into the printer setup mode. Once in the setup mode follow instruction to set the printer up for the serial device you are using, get the required printer settings from the devices user manual

2005 temperatures appear inaccurate

1. If temperatures are accurate in the manual mode but not in the scan mode adjust the delay in the setup mode, to slow down the scan rate.
2. If temperatures only appear inaccurate on certain cables there may be a problem with the temperature cables they can be checked using the ohms mode on the Scan Center. If the sequences of the t/c's on the cable are correct, the next place to check is the cable splice located at the cable top. This can be verified by cutting the cable splice, as close to the cable top as possible and measuring the resistance from the lead wires to earth ground, the resistance should be infinite.
3. If the temperatures vary for certain cables in the manual mode the cables may be shorted to them selves.
4. If the temperatures vary with the outside ambient temperatures there may be moisture in a splice, or the lead wire between the Instrument and the remote muxes maybe bad. The condition of the lead wire maybe checked with an ohm meter, first disconnect the t/c common, and all control cables from the instrument, next meg the copper lead wires to the constantans, there should be no resistance. If a resistance is measured check all splice boxes, if no moisture is found, locate the bad leadwire and replace it.

The 2005 display is blank

1. Is the power supply turned on?
2. If display is garbled reset power.
3. Check fuse in the power supply?
4. Check fuses in 2005?

2005 Displays no temperatures

1. Are all cables hooked up properly? Make sure the 9-pin connector for the serial communication port and the 9-pin connector for the remote cable data lines is not reversed? The 9-pin connector located on the left side of the 2005 is the correct connector for the serial data line.
2. Check the 2005 temperature measuring circuit by connecting the red constantan connected on the blue omega plug inside the 2005 to pin #1 of integrated circuit chip, U4 (pin 1 is the pin located to the right of the notch on the integrated circuit chip, when the notch is facing you), it should now display an ambient temperature on the screen. If not send unit in for repair.

3.0 Scancenter 2010 Introduction

The SCC2010 controller is the heart of The Rolfes Company's premium relay based temperature monitoring system. The SCC2010 is based on the proven state-of-the-art microprocessor technology and controlled by Windows based - Rolfes TempSys software from your own personal computer (PC).

Along with the Rolfes Grain Temp Relay boards, this system has the capability to blend older rotary style or relay based systems into a PC based temperature retrieval system.

The SCC2010 main controller is housed in a Hoffman style enclosure, which has a versatile circuit board and power supply all within this one unit. The SCC2010 controller is designed to be in an office environment and connected to a PC via a serial cable.

The basic system consists of temperature cables, switches or field controllable switching device (relay board or rotary device), required leadwire / control lines to the SCC2010 and the Rolfes' TempSys Software.

The TempSys software controls the timing and operation of the SCC2010, which controls the switches and retrieves temperature information.

The TempSys & SCC2010 can operate in full automatic mode or Individual sensors can be manually selected and viewed from the software. It has several built-in diagnostic features and it can be used to monitor the temperature of grain in grain storage facilities, coolers and other cold storage facilities and variety of other industrial applications.

3.1 SCC2010 Specifications

Power	115 VAC +10%-15% 50/60 Hz. 50 watts maximum
	2 Amps
Weight	13 lbs.
Operating Temperature Range	32° to 110° F
Interface	Serial Communications RS-232
	9600 Baud, 8 Data, 1 Stop, no parity
External Alarm Contact Rating	1 AMP 115 VAC – closes on alarm in Auto Mode

SCC2010 Computer System Requirements are the same as for the SCC2005. (See page 4)

4.0 TempSys Software

The Rolfes Company's TempSys Software is designed to run on an IBM PC or compatible computer and interface with the SCC2005 or SCC2010. The easy to follow, menu driven operation and advanced color graphics enable you to spot trends in temperature changes and quickly identify potential trouble areas.

To accommodate various schedules and busy times, the software has a time delayed automatic retrieval option that can be used to schedule temperature retrievals at any time of the week, day or night. The software stores a history of up to 10 temperature retrievals per cable. The TempSys software runs on an IBM compatible PC and allows you to graphically view temperatures from all of the temperature cables in the system. With the PC connected to a printer, it will provide hard copy reports.

The primary difference in this software is the ability to interface with a variety of monitoring switch hardware or Switches to view the temperature sensors. Each switch unit or Switches is connected to several temperature sensing cables by means of mechanical or solid state switches.

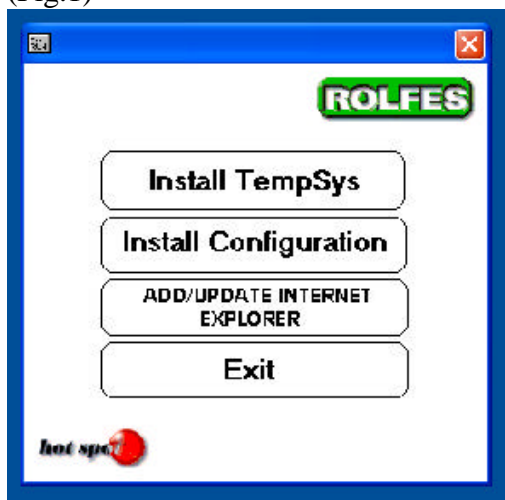
With any of these interfaces, the system will allow you to read thermocouples (T/C's) and display the data in an advanced color graphic display of the facility, in a matter of minutes. To take full advantage of the TempSys software, it was designed to interface to the Rolfes Company's Solid State Scancenter. See the help screens in the cable read software for additional information.

4.1 System Description

A basic system consists of an IBM compatible personal computer (see page 4 for requirements), the TempSys Software, an interface device (SCC2005 or 2010), remotely located switches and the leadwire required to connect to the temperature sensing cables.

4.2 Software Installation

Plug SCC2010 into the com port and turn power on before installing the tempsys software. Place your tempsys software CD in your computer's CD rom drive. The CD will start to run automatically and this image will appear on your screen. (Fig.1)



1. After this window opens click on **Install Tempsys** and follow the instructions to install this part of the program. (Fig.2)

(Fig.2)



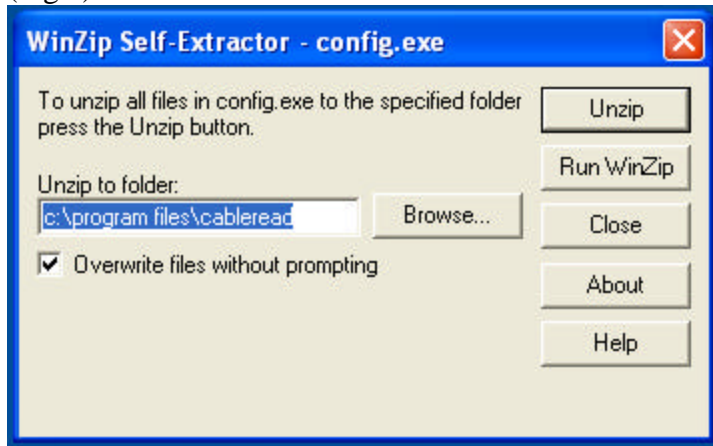
2. After you have installed the tempsys part of the program you can install the configuration. (Fig.3)

(Fig.3)



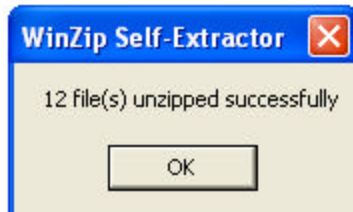
Click on **Install Configuration** and this window will appear (Fig.4). Click on the **Unzip** button and this will install the configuration of your facility. This must be done before trying to run the program or it will not work.

(Fig.4)



After you click on **UNZIP** a window will come up saying your files have unzipped successfully. Click the OK button. (Fig.5)

(Fig.5)



Your program should now be installed and ready to run. Go to the Windows **START** button (bottom left corner of your desktop), then go to **Programs**, and there should now be a **Cableread** program in your list. Click on **Cableread** and this will start your program.

If you have questions once you have started your **Cableread** program please refer to the help screens for further information.

4.3 Password Protection

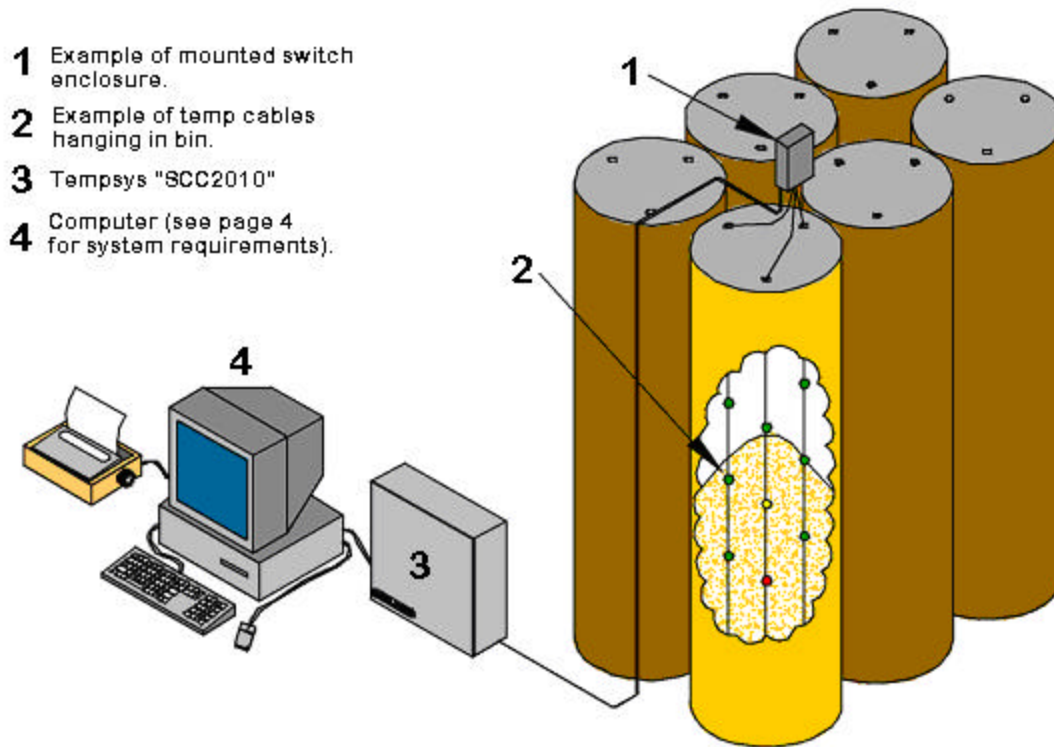
To edit cable data or to enter the setup mode requires a password. This password is always today's date revolving (MMDDYY), six digits, no slashes.

Example: Today is January 1, 2004 Password = 010104

5.0 Switches

Switches are normally placed on top of the elevator and hooked to your temperature cables.
(See Below)

Scancenter 2010 Series



5.1 Description

Switches come in two configurations:

15 T/C: Consists of eight rows of relays with eight leads labeled 1 through 8 capable of reading 15 t/c's per lead. Violets are not used. Also consists of one control labeled "C" and one "T/C" line.

21 T/C: Consists of eight rows of relays with eight leads labeled 1 through 8 capable of reading 1 t/c's per lead. Violets are used. Also consists of one control labeled "C" and one "T/C" line.

Note: Four cable boards are also available in both 15 t/c and 21 t/c configurations. They consist of four rows of relays with four leads labeled 1 through 4.

6.0 Conduit

Conduit is used to protect wires from weather or mechanical damage. Thin wall conduit is usually used for inside runs, which will not be exposed to the weather. Rigid conduit must be used for any outside work will be exposed to the weather, and may be required on some installation for inside runs as well. Follow any and all electrical code.

6.1 Selecting Size of Conduit

Conduit size is regulated by the mass of wires being housed. The maximum should be 40% filled. Proper type and size of fittings must be used in each raceway for ease in pulling wires.

The maximum number of leadwires, which must run through it, and the size of the leadwire determine the conduit size.

6.2 Maximum fill of Various Conduit Sizes

Conduit	Max Leadwire per Conduit Size				Area in Square
Size	6 T/C	12 T/C	18 T/C	21 T/C	Inches
1/2"	7	3	3	3	.12"
3/4"	12	5	5	5	.21"
1"	20	8	8	8	.34"
1 1/4"	36	15	14	14	.60"
1 1/2"	49	20	19	19	.82"
2"	81	33	31	31	1.34"

6.3 Conduit Requirements

Installing conduit runs must be kept away from high-voltage wires as much as possible to prevent inductance “pick-up”.

No more than two 90-degree bends or combination of bends totaling 180 degrees should be in the raceway between pull boxes.

Requirements regarding perpendiculars, horizontal, supports, fittings, and “expansion joints” are the same as for general electrical work.

When conduit is exposed to weather, joint compound and proper gaskets must be used; special precautions should be taken to keep moisture out of the conduit, so control wire and/or leadwire are kept dry.

7.0 Leadwire

All Rolfes Company leadwire is non-hygroscopic, UV stabilized, which will maintain signal integrity even in severe moist conditions to the sunniest, driest conditions.

The unique manufacturing process that Rolfes uses on its cables and leadwire begins by extruding color-coded polymer insulation over pure electrolytic 26 AWG solid copper and graded constantan conductors. The insulation thickness and integrity are electronically monitored throughout the process.



7.1 Rolfes Leadwire Availability

The Rolfes Company offers leadwire in cut-to-length or bulk quantities for the following varieties:

		UN-	Shielded	Constantans		
LEADWIRE	6 T/C	X		White		
	12 T/C	X		White	Brown	
	18 T/C	X		White	Brown	Orange
	21 T/C	X	X	White	Brown	Orange

7.2 Leadwire Preparation

Leadwire must be handled with care when installing. Special care should be given so the leadwire is not nicked when it is pulled through the conduit.

Leadwire should be run in accordance with print. There should be as few splices as possible. With that in mind, all major runs should be made with one continuous leadwire. If there are any splices inline, they must be made in places where they are readily accessible and in accordance with any electrical code.

Use of the “Brady” numbering tags should be used to identify each leadwire. If trimming the leadwire after a run, move or replace the numbering to where you will trim to before you actually make the cut. *This is very important as to keep the leadwire labeled correctly.*

Leave extra leadwire where splices will occur to make neat splices. A length of at least 5 feet is recommended at the instrument, switches or CRB.

7.3 Leadwire Runs

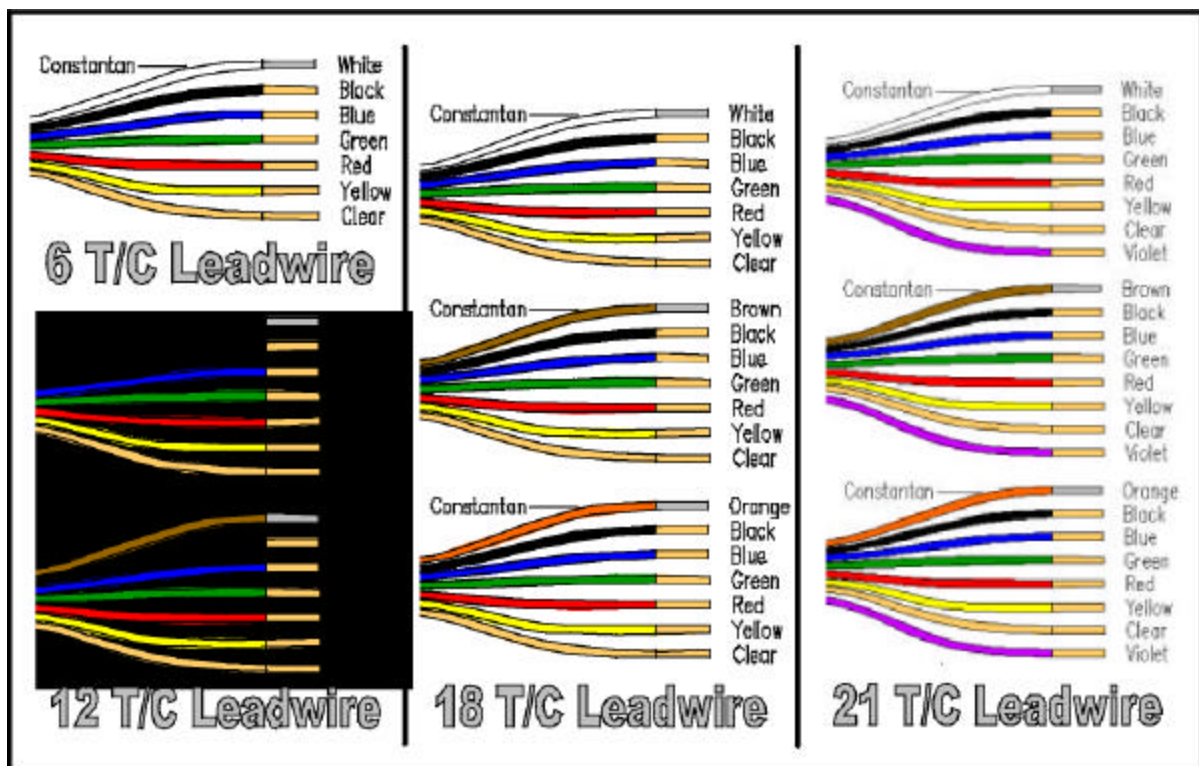
Since each facility is different, no specific instructions can be given. Normally runs are made from the new/replaced cable, which has a short or specified length of leadwire attached to it from the factory, to the control section and from there to the instrument.

One thing to keep in mind is, the more splices in line or between junction boxes can cause future problems. To remedy this make all runs as one continuous leadwire as much as possible. This will increase reliability and decrease workload.

7.4 Leadwire Color Codes

Each type of leadwire has some sort of group and color code to follow for proper wiring. With over 50 yrs experience, The Rolfes Company's color code has become the industry standard within the United States.

The basic color code for Rolfes Leadwire is as follows: Black, Blue, Green, Red, Yellow and Clear (sometimes Violet). Use the following chart as a quick guide.



7.5 Leadwire Splicing Instructions

For proper operations of this type of monitoring equipment, some sort of splicing will be a required step. Again keep in mind the less splices the better. Follow these steps for splicing leadwire together.

7.5.1 Tools required

Compression tool – Rolfes P/N SPL-HDT

Diagonal cutting pliers

Long nose pliers

Knife



7.5.2 Material required

Line “B” grease filled crimps – Rolfes P/N SPL-10 Electrical tape

NOTE: Identify the leadwires you wish to splice. Failure to do this will result in incorrect information at your instrument.

1. Locate the nylon ripcord “ridge” along the leadwire and using a sharp knife, cut along it for one inch exposing the ripcord.
2. Pull the ripcord with the long nose pliers, splitting the outer covering of the leadwire back approximately six inches. Cut off the outer covering.

Note: If the ripcord breaks, make a slit along the outer covering and open along the top of the ripcord ridge, use caution to not cut or “nick” the wires inside.

3. Untwist and/or separate the individual groups of wire and wrap the constantan wire (white, brown or orange) around that group. This will help to identify which group of wire you are working with.

Note: Depending on which leadwire you are using will determine the color groups, see page 16 for leadwire information.



4. Repeat the 3 steps above for the second leadwire that will be spliced together.
5. Tape the two pieces of leadwire together approximately 2” back from where the outer insulation has been removed.

6. Separate the groups of each leadwire and match the groups that will be spliced together.

Note: If the leadwires are not being spliced color for color (i.e. black to black), in step 7, select the groups that will be connected and in step 9 select the individual wires that will be connected.

7. Select the 1st group of each leadwire and fold the remaining groups out of the way.

8. Separate the individual wires of the two groups.

9. Select any two wires that have the same color. (See note in step 6). Without removing the insulation, twist the ends tightly at least 8 half-turns (should be twisted for a length of approx. $\frac{3}{4}$ ").

10. Repeat until all wires of the group from each leadwire are twisted, including the constantan wires.

11. Cut the twisted ends of all the wires and to approximately the same length.

12. Place the SPL-10 crimp over each pair of twisted wires. Be sure the wires are inserted into the crimp as far as possible.

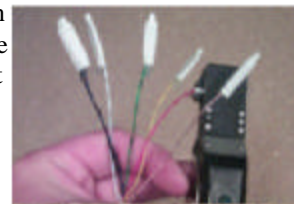
13. Using the crimp tool, compress the crimp tightly. The tool is designed so that it will not open until the crimp has been fully compressed.

Note: Each crimp has several "teeth" inside and will make a good connection through the insulation of the individual wires, so it is not necessary to strip the insulation from the individual wires prior to crimping. See crimp components at right.

Note2: Maximum of three (3) un-stripped wires per crimp. 14. Repeat step

13 for all wires in that group. 15. Repeat steps 7 through 14 for the

remaining groups.



Troubleshooting Scan Center 2010

System will not communicate with pc

1. Is the power on the 2010 on?
2. Check software COM port settings
3. Check modem settings and power.
4. Are all cables hooked up properly? Make sure the 9-pin connector for the serial communication port and the 9-pin connector for the remote cable data lines is not reversed? The 9-pin connector located on the left side of the 2010 is the correct connector for the serial data line; this line cannot be longer than 14' between the pc and the 2010. If a longer cable is required the system will require a set of line drivers.
5. The pc serial communication port may be tested using Hyper terminal, Open HyperTerminal, setup a new connection, use the following settings 9600-baud, 8-data bits, 1- stop bit, no parity bit, & the flow control is set to none. Select the communication port you are using, next place a paper clip across pins 2 & 3 of the connector at the 2010, now whatever is typed on the keyboard should be displayed on the display. If this works plug the serial cable back into the 2010, cycle the power while the hyper terminal connection is still accessed, the following should be displayed if the 2010's communications circuit is operating properly.

IICS Tempsys Controller Firmware Version 1.1 10/1995

Start Up

If not contact the Rolfes Service Dept.

6. Does the Communication port work? If the port works but the Cable Read Program runs slowly and after a short period of time, a communication error is generated, one solution may be to uninstall the port. Go to Control Panel, Add/Remove hardware, follow the wizard instruction remove the COM port. Next reboot the pc and allow the found new hardware wizard to reinstall the communications port. Prior to reinstalling the port insure the 2010 is connected to the proper port and turned on.

2010 temperatures appear inaccurate

1. If temperatures are accurate in the manual mode but not in the scan mode adjust the delay in the setup mode, to slow down the scan rate.
2. If temperatures only appear inaccurate on certain cables there may be a problem with the temperature cables, the cables can be checked using the Read Ohms Mode in the Options menu. If the sequences of the t/c's on the cable are correct, the next place to check is the cable splice located at the cable top. This can be verified by cutting the cable splice, as close to the cable top as possible and measuring the resistance from the lead wires to earth ground, the resistance should be infinite.
3. If the temperatures vary for certain cables in the manual mode the cables may be shorted to them selves.
4. If the temperatures vary with the outside ambient temperatures there may be moisture in a splice, or the lead wire between the Instrument and the remote muxes maybe bad. The condition of the lead wire maybe checked with an ohm

boxes, if no moisture is found, locate the bad leadwire and replace it.

5. If temperatures are inaccurate on all cables then the unit should be sent in for repair

2010 Displays no temperatures

1. Are all cables hooked up properly? Make sure the 9-pin connector for the serial communication port and the 9-pin connector for the remote cable data lines is not reversed? The 9-pin connector located on the left side of the 2010 is the correct connector for the serial data line.
2. Check the 2010 temperature measuring circuit by connecting the red constantan connected on the blue omega plug inside the 2010 to pin #1 of integrated circuit chip U4 (pin 1 is the pin located to the right of the notch on the integrated circuit chip, when the notch is facing you), it should now display an ambient temperature on the screen. If not send unit in for repair.

Troubleshooting Cable Read Software

Communication problems when opening Software program

1. Is program already running?
2. Is the unit turned on?
3. Are any of the units fuses blown?
4. Is the correct Serial Communication port selected in the software?
5. Are all cables hooked up properly? Make sure the 9-pin connectors for the serial communication port and the 9-pin connector for the remote cable data lines are not reversed. The 9-pin connector located on the left side of the 2005 or the 2010 is correct connector for the serial data line.
6. Does the Communication port work? If the port works but the Cable Read Program runs slowly and after a short period of time, a communication error is generated, one solution may be to uninstall the port. Go to Control Panel, Add/Remove hardware, follow the wizard instruction remove the com port. Next reboot the pc and allow the found new hardware wizard to reinstall the communications port. Prior to reinstalling the port insure the 2010 is connected to the proper port and turned on.
7. The pc serial communication port may be tested using Hyper terminal, Open HyperTerminal, setup a new connection, use the following settings 9600-baud, 8-data bits, 1- stop bit, no parity bit, & the flow control is set to none. Select the communication port you are using, next place a paper clip across pins 2 & 3 of the connector at the 2010, now whatever is typed on the keyboard should be displayed on the display. If this works plug the serial cable back into the 2010, cycle the power while the hyper terminal connection is still accessed, the following should be displayed if the 2010's communications circuit is operating properly.

IICS TempSys Controller Firmware Version 1.1 10/1995

Start Up

If not contact the Rolfes service Dept.

8. You may want to reinstall the Cable Read Software on your pc, first go to add\remove programs and remove the Cable Read program, second go into explore and delete the Cable Read folder, it is located at C:\Program Files\Cable Read.
9. If you add or delete row of data in the in the Edit Cable Data, the last row of the Cable data must be blank. If not the software will generate errors.

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.

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

