



***RST INSTRUMENTS* LTD.**

IR420
4 to 20 mA Readout
Instruction Manual

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IR420 4 to 20 mA Readout

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Table of Contents

1	OVERVIEW	1
1.1	Connections of Strain Gauges	2
2	QUICK START INSTRUCTIONS	3
3	POWERING ON/OFF	4
4	IR420 FRONT PANEL CONTROLS	6
4.1	Startup.....	6
4.2	Setting the Date & Time	7
5	MONITOR SETTINGS.....	8
6	MANUAL READINGS	9
7	STORING READINGS IN MEMORY	9
7.1	Creating Memory Locations in the Field	9
7.2	Zero Readout	11
7.3	Store Readings	13
8	REVIEWING DATA	14
9	DATALOGGING	14
10	DELETING.....	15
11	IR420 INTERNAL BATTERY	16
12	SOFTWARE & FIRMWARE UPDATES.....	17
13	WARRANTY	17
14	CONTACT US.....	18
15	APPENDIX A – IR420 MENU FLOW CHART	19
16	APPENDIX C – SPECIFICATIONS	20

Table of Figures

Figure 1 – IR420 Readout.....	1
Figure 2 – Wiring Connections.....	2
Figure 3 – IR420 Meter Electrical Diagram.....	3
Figure 4 – Manual Power Off.....	4
Figure 5 – Auto Off Screen.....	4
Figure 6 – Auto Power Off Time.....	4
Figure 7 – Auto Backlight Off.....	5
Figure 8 – IR420 Readout Details.....	6
Figure 9 – Default Readings Screen.....	6
Figure 10 – Readings Screen.....	6
Figure 11 – Set Time.....	7
Figure 12 – Date/Time Set.....	7
Figure 13 – Monitor Settings.....	8
Figure 14 – Monitor Settings Options.....	8
Figure 15 – Memory Screen.....	9
Figure 16 – Create Location.....	10
Figure 17 – New Location.....	10
Figure 18 – Zero Readout.....	11
Figure 19 – Zero Readout – select location.....	11
Figure 20 – Zero Readout – Apply or Remove Zero.....	11
Figure 21 – Zero Readout – accept reading.....	12
Figure 22 – Select Location.....	13
Figure 23 – Storing a Reading.....	13
Figure 24 – Select a Location.....	14
Figure 25 – Reviewing Data.....	14
Figure 26 – Delete.....	15
Figure 27 – Delete Options.....	15
Figure 28 – Battery Door.....	16
Figure 29 – Battery Voltage.....	16
Figure 30 – IR420 Menu Flow-Chart.....	19

1 OVERVIEW

The RST IR420 Readout Instrument is a dedicated intelligent measuring system specially designed for reading the output of resistive strain gauges and transducers. It's lightweight, yet extremely rugged design is perfectly suited for harsh environmental conditions often encountered in the field. Furthermore the IR420 is extremely easy to use with a USB interface for downloading data. The readout uses 3 standard AA alkaline batteries which are field replaceable, negating the need to return the readout to the factory for battery replacement. The use of standard AA batteries eliminates the need for a charger.

The IR420 is a precision instrument and should be treated as such. It should be protected against shock and heavy vibration. Its case is water resistant; however care should be taken to avoid getting the open unit wet, as damage to internal components could occur.

For any repair, the unit should be returned to the manufacturer as there are no user serviceable parts. In the event that the unit is disassembled by the user the warranty will be void.



Figure 1 – IR420 Readout

- | | |
|--------------------------------|--|
| 1. USB Connector | 6. Scroll Down |
| 2. Large Character LCD display | 7. Enter |
| 3. Backlight | 8. Terminal Posts
(for sensor connection) |
| 4. ESC (navigates back a menu) | |
| 5. Scroll Up | |

9. Terminal Posts

(for sensor connection)

1.1 Connections of Strain Gauges

All connections are made by simply connecting all wires to the matching color binding post.. The readout automatically detects the instrument and wiring, and displays according to instrument.



Figure 2 – Wiring Connections

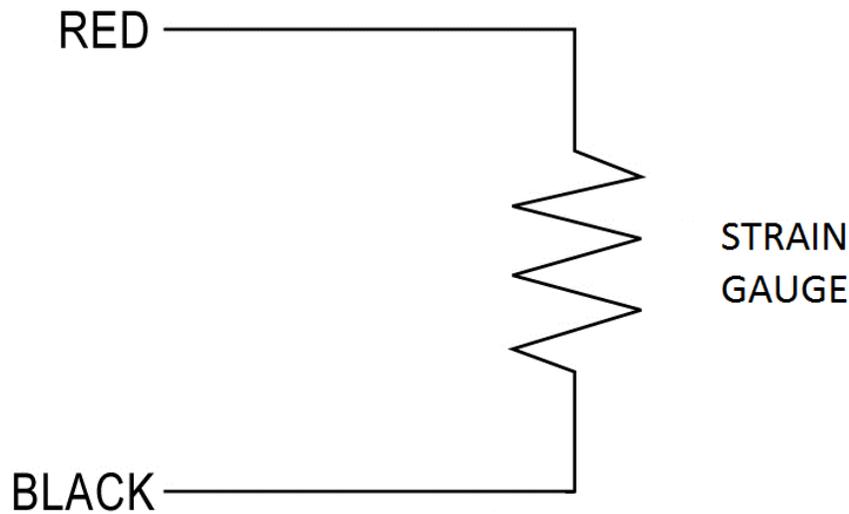


Figure 3 – IR420 Meter Electrical Diagram

2 QUICK START INSTRUCTIONS

The instructions for performing a manual reading on a strain gauge or transducer (i.e. not storing to memory) are simple and straightforward:

1. Connect the strain gauge or transducer to the binding posts (Figure 1)
2. Turn display on (press any key)
3. Wait a few moments for unit to startup
4. Record the displayed reading (mA).

Note

Step 4 (above) is assuming the Monitor Settings are set to *default*. The IR420 has the ability to custom configure the readout settings so that engineering units can be displayed. Please refer to the Multireadout Host Software Instruction Manual for more information.

3 POWERING ON/OFF

The IR420 readout can be powered on anytime by pressing any key. The unit can be powered off manually or automatically. To power off manually, use the up/down arrows to scroll to the following screen:



Figure 4 – Manual Power Off

- Press *Enter* and the unit will turn off.
- To adjust the automatic power off settings, navigate to the *Auto Off* screen as shown below:



Figure 5 – Auto Off Screen

- Press *Enter* and the following screen will appear:

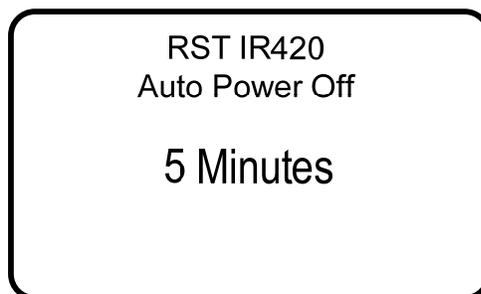


Figure 6 – Auto Power Off Time

Use the arrow keys to scroll to the desired auto power off time. Please note that the auto power off feature is always active and cannot be disabled. This is to conserve battery life. The default is 5 minutes. The next screen prompts to set the Auto Backlight Off:

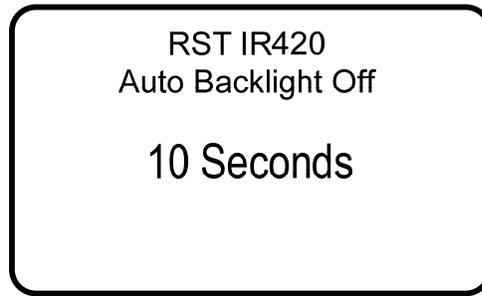


Figure 7 – Auto Backlight Off

Use the up/down scroll buttons to adjust.

4 IR420 FRONT PANEL CONTROLS

4.1 Startup

Upon powering on the unit (by pressing any key), an opening screen will appear showing the RST Instruments logo. If the user wishes to view the details of the readout *press any key* immediately and the following will appear:

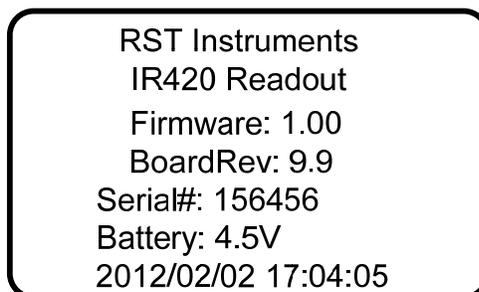


Figure 8 – IR420 Readout Details

This displays the model, version number, serial number and the current date/time settings. It is always a good idea to ensure that the date and time are correct, as this may affect any readings being stored in memory on the unit. Refer to section 4.2 for setting the date and time.

If no keys are pressed after power on, the unit will default to readings screen as shown below.

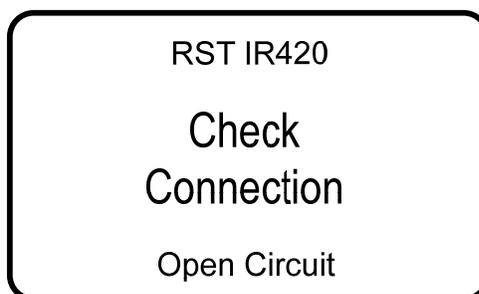


Figure 9 – Default Readings Screen

The instrument will display *Check Connection* in absence of any strain gauge. Additional information is provided at the bottom of the screen, indicating either *Open Circuit* or *Short Circuit*. Upon connecting of the strain gauge, readings will display as shown below.

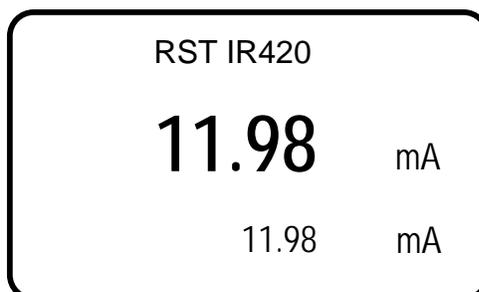


Figure 10 – Readings Screen

The readings screen displays the current strain reading and converted value (assuming an instrument is connected).

4.2 Setting the Date & Time

Keeping the date and time current ensures that you have accurate historical records of your data. Whenever a reading is taken and stored in the units' memory, an associated date/time stamp is always included.

- Turn on the readout by pressing any key.
- Using the arrow keys, scroll down to the *Set Time* screen and press *Enter*:



Figure 11 – Set Time

- The current editable data field will have an underline, use the arrow keys to modify the field and press enter when complete (pressing enter cycles through each field).



Figure 12 – Date/Time Set

- When complete the program will exit to the main menu screen.

5 MONITOR SETTINGS

Various parameters of the IR420 readout can be adjusted by selecting the *Monitor Settings* menu as shown below:

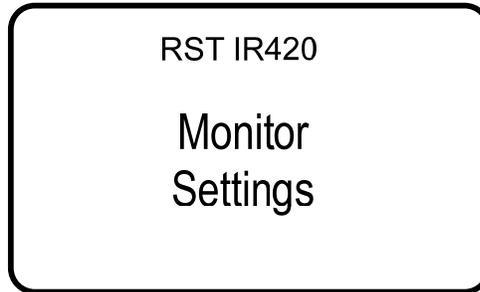


Figure 13 – Monitor Settings

Press *Enter* to choose whether a custom or predefined setting is required.

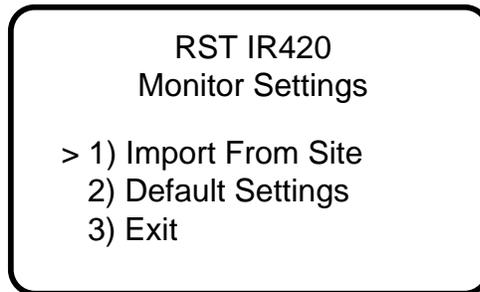


Figure 14 – Monitor Settings Options

- Select *Import From Site* to copy settings from existing location.
- To reset settings to default, select *Default Settings*. Monitor readings will have no zero reading and mA units.
- Select *Exit* to go back to previous menu.

Note

Engineering units calibration can only be set using the Multireadout Host Software, please refer to the Host Software manual for further information.

6 MANUAL READINGS

The following instructions outline the basic steps needed to take a manual reading with the IR420 readout:

- Connect the instrument leads to the quick-connect terminals. Match the wires color for color.
- Turn on the readout by pressing any key.
- The readout will go through its startup procedure, and automatically default to the reading screen.
- The mV/V reading will appear along with the engineering units converted value.
- Record the reading and move onto the next instrument.

For memory functions, please refer to section 7.

7 STORING READINGS IN MEMORY

The IR420 has 128k of internal memory allowing it to store over 11 000 time-stamped, readings. The current memory usage is displayed on *Memory* screen, as shown in Figure 15. Data can be reviewed either on-board or downloaded to a host computer via the USB connector. Individual locations can be preconfigured in the office via the Multireadout Host Software or by creating locations on the unit itself (section 7.1).

7.1 Creating Memory Locations in the Field

The IR420 Readout has the ability to be either pre-configured in the office (through Host Software), or taken directly to the field. If taken directly to the field, each location will be assigned a generic name which is editable once back in the office and connected to a host computer. In most cases it is recommended that the IR420 be pre-configured in the office prior to taking readings in the field. In this manner, site location names can be setup ahead of time allowing the field personnel to be able to arrive at instrument locations, and store readings without needing to create a location in the units' memory.

If the IR420 has not been pre-configured in the office, the following instructions explain how to create new locations. Please refer to Figure 30 (flow chart) for a graphical representation of the steps outlined below:

- Turn on the readout by pressing any key.
- Using the arrow keys, scroll to *Memory* and press *Enter*.

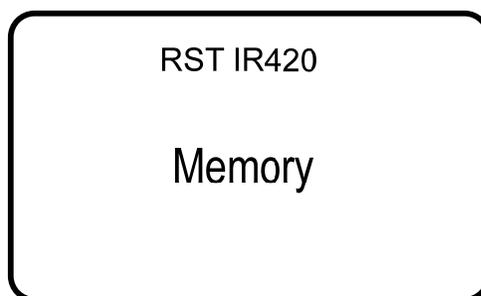


Figure 15 – Memory Screen

- Press *Enter* to advance to the next screen.

- Using the arrow keys, scroll to *Create Location* and press *Enter*.

Note
The maximum number of predefined locations is 254.



Figure 16 – Create Location

- The readout unit will automatically create a site called *Location X* where 'X' is the next storage location available in the units' memory. Please note that when creating new sites in the field, you can only name them *Location X*. Make note of the real location name in your field notebook and its relation to the *Location* number. When connecting to the Host Software back in the office, a custom name can be entered at that time. This replaces the site name assigned by the readout.

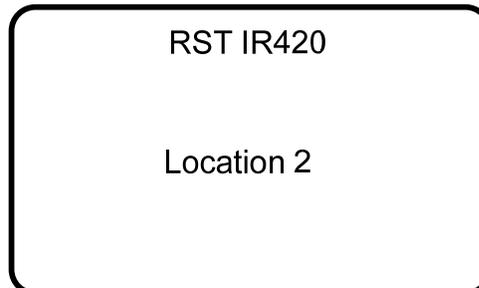


Figure 17 – New Location

- The IR420 automatically increments the new location to the next number available.
- Press *Enter* and the unit will return to the previous menu.

7.2 Zero Readout

For each created location, zero reading needs to be recorded. Connect to appropriate sensor, and then use the arrow keys to scroll to *Zero Readout* and press *Enter*. The following screen will appear:

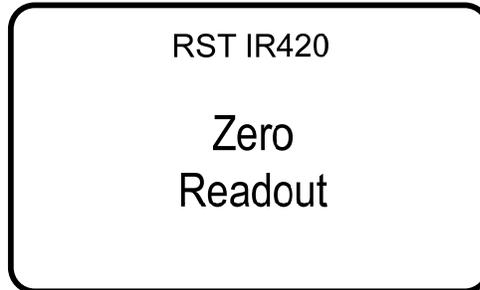


Figure 18 – Zero Readout

- Use the arrow keys to select location. When the desired location is found, press *Enter* to select it.

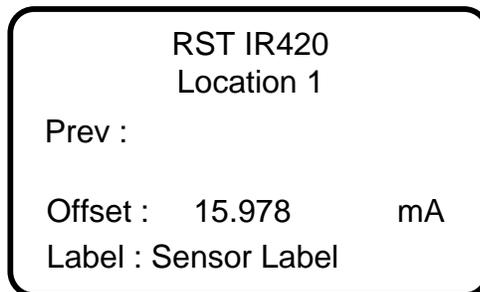


Figure 19 – Zero Readout – select location

- . The following will appear:

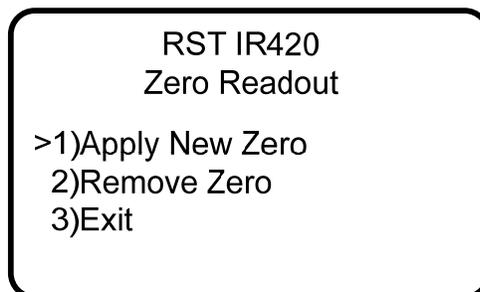


Figure 20 – Zero Readout – Apply or Remove Zero

- At this point, options are given to apply new zero or remove zero reading completely from selected location.
- When applying new zero, the IR420 will prompt you with the question: *Accept?*, press *Enter* to store the reading.

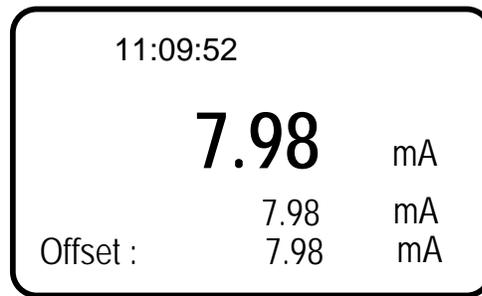


Figure 21 – Zero Readout – accept reading

- After storing the reading, the IR420 will return the user to the previous screen.

7.3 Store Readings

- Use the arrow keys to scroll to *Store Data* and press *Enter*. The following screen will appear:

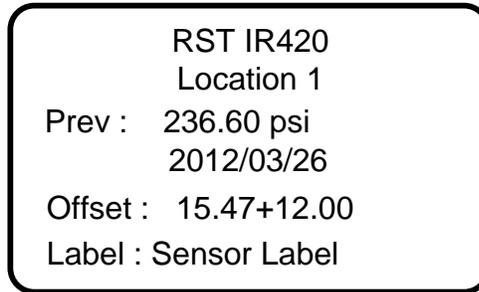


Figure 22 – Select Location

- Use the arrow keys to select location. When the desired location is found, press *Enter* to select it. The following will appear:

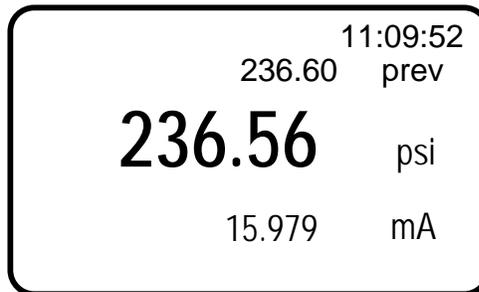


Figure 23 – Storing a Reading

- Reading time and zero value are displayed for a reference.
- The IR420 will prompt you with the question: *Accept?*, press *Enter* to store the reading.
- After storing the reading, the IR420 will return the user to the previous screen.

8 REVIEWING DATA

To review any reading on the IR420 unit itself, please follow these instructions:

- Power on the readout by pressing any key.
- Using the arrow keys, scroll down to *Memory*, press *Enter*.
- Scroll to *Review Data* and press *Enter*.
- Scroll to the desired location (using arrow keys). If the previous reading session was downloaded using Host Software, the *Prev* value shows last reading in previous session. Refer to Multireadout Host Software manual for instructions. If present, zero reading for currently selected location is displayed along with recording date.
- Press *Enter* to display recorded data.

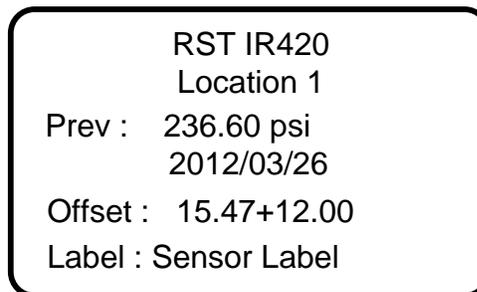


Figure 24 – Select a Location

- If the location contains more than one reading, these readings can be scrolled through using the arrow keys. The date and time of each reading will appear to differentiate each reading.

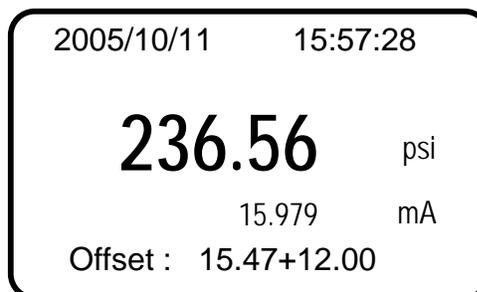


Figure 25 – Reviewing Data

9 DATALOGGING

The IR420 will have basic datalogging function in next readout revision. The user will be able to set the datalogging interval and the number of iterations.

Note

Datalogging will be available in next firmware version..

10 DELETING

All location information can be deleted from the IR420 readout or via the Host Software. This is done by the following:

- Power on the display by pressing any key.
- Using the arrow keys, scroll down to *Memory*, press *Enter*.
- Using the arrow keys, scroll to *Delete* and press *Enter*.

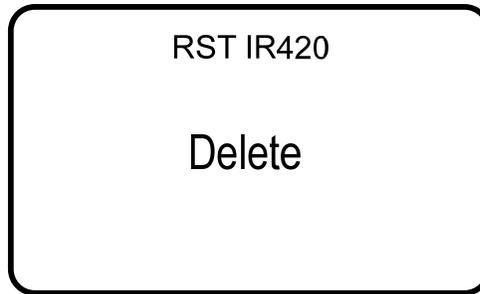


Figure 26 – Delete

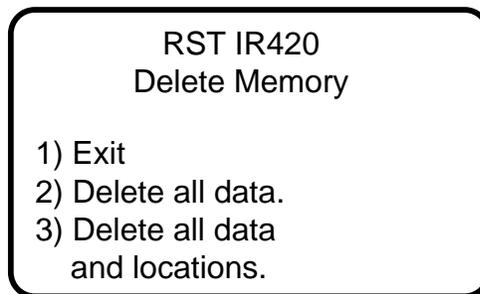


Figure 27 – Delete Options

- Using the *arrow keys*, scroll to the desired delete option and press the *Enter* key to select. Press *Enter* to confirm, press *ESC* to exit back to the main menu.

11 IR420 INTERNAL BATTERY

The RST IR420 operates on 3 alkaline AA batteries. Access to the batteries is done through a port on the side of the unit. Use a flathead screwdriver or a coin to access the batteries (see Figure 28). The unit ships standard with regular AA batteries. If the unit is being used consistently in cold environments, the user may replace the alkaline batteries with lithium batteries which are also readily available.



Figure 28 – Battery Door

The status of the battery can be checked by:

- Turning on the readout by pressing any key.
- Using the arrow keys, scroll to the battery voltage screen.
- The readout will display the *battery voltage* as shown below:



Figure 29 – Battery Voltage

Note

If the battery voltage drops below 3.5 volts a low battery warning will be displayed in the form of “BATT” in the upper right of each screen. Change the batteries at this time.

12 SOFTWARE & FIRMWARE UPDATES

The IR420 readout is designed such that the unit's software and firmware can be easily updated by the customer through the USB port. Please regularly visit: <http://www.rstinstruments.com> for product updates.

13 WARRANTY

RST Instruments Ltd. reserves the right to change the price or modify the specifications of its equipment without notice.

RST Instruments Ltd. agrees, for a period of 12 (twelve) months from the date of purchase, as evidenced by the date of the invoice, to replace any equipment which fails or malfunctions as a result of defects in materials or workmanship when that equipment has been serviced or installed by the servants or agents of RST Instruments Ltd. The agreement to replace herein contained does not apply to the compensation or any portion of installation or site preparation

There is no warranty, representation, or condition of any kind, expressed or implied with respect to the equipment or the accuracy or longevity thereof, except that of replacement as stated above. RST Instruments and its servants or agents will not be liable for any special, indirect or consequential damages arising from the servicing or installation of the equipment, nor shall recovery of any kind against the said company be greater in amount than the purchase price of the specific equipment purchased which allegedly caused the damage. The purchasers assumes all risks and liabilities for any loss, damage or injury to persons or property of the purchasers or others, however caused, arising out of the use or possession of any equipment supplied by RST Instruments Ltd. save and except the agreement to replace contained herein.

14 CONTACT US

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15 APPENDIX A – IR420 MENU FLOW CHART

The following flow chart outlines all functions of the IR420 front panel controls:

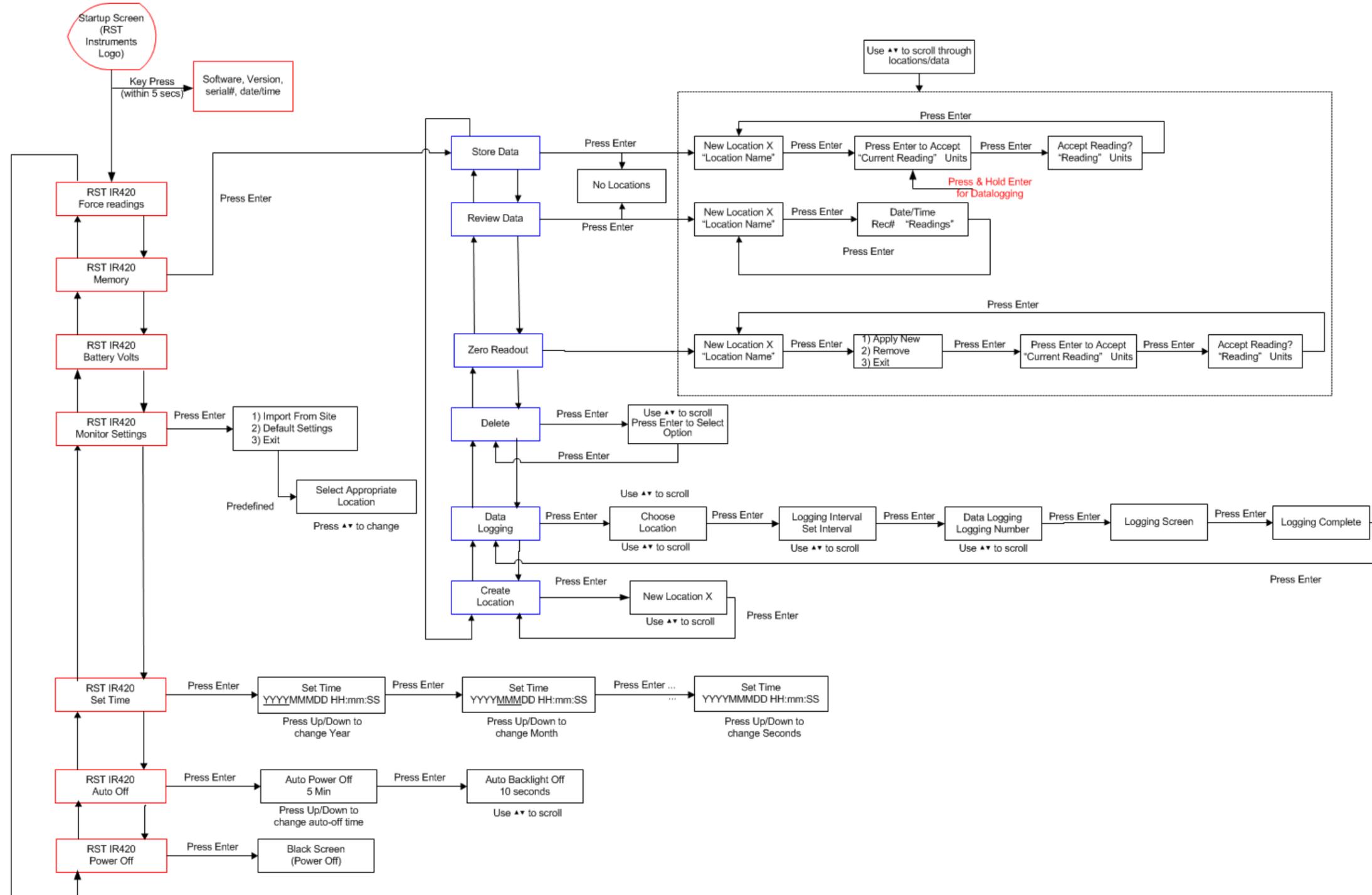


Figure 30 – IR420 Menu Flow-Chart

16 APPENDIX C – SPECIFICATIONS

<i>Description</i>	<i>Specification</i>
Display	Graphic 128 x 64 pixels large character display
Display Backlight	High efficiency LCD with auto off
Memory	128 kB
Max Instrument Locations	254
Memory Capacity	10800 custom labeled points
Location Identification String	Up to 20 characters
Download Speed	15 seconds (full memory)
Battery	3 "AA" alkaline
Battery Indicator	On-screen low battery indicator
Operating Temperature	-20 °C to 60 °C
Dimensions	W 22cm x D 19cm x H9.5cm (8.75 x 7.5 x 3.75in.)
Weight	1.1 kg (2.4 lbs)