1. SETTING UP THE STATISTICAL OUTPUT

When SW11/1 and SW11/2 on the applications board (see Appendix A Fig 1) are set according to the following table statistical information is available when the Batch/Stats key is pressed.

SW11/1	SW11/2	AVAILABLE STATISTICAL OUTPUT
Off	Off	None
Off	On	Average followed by Range
On	Off	Average followed by Standard Deviation
On	On	Average followed by 3 x Standard Deviation

The statistical information is available after the reading from any can within the batch has been saved.

When the statistical information has been examined, 3 choices are available:

i. Press the END key to add further cans to the batch.
ii. Press the SAVE key to download the batch data to a printer (assuming the printer and SI9000+ are correctly configured, see Section 6).
iii. Press the CLEAR key to erase the batch information from the SI9000+'s memory.

2. THE LEVEL INTERLOCK

When SW11/5 on the applications board (see Appendix A Fig 1) is set off the operation of the SI9000+ changes as follows:

i The SI9000+ can no longer detect when a can change has occurred and will not auto start after the change. Note that the level check indicator continues to operate normally.

ii Enamel rating with the level check indicator on is allowed and commences when START is pressed.

3. THE CONTACT INTERLOCK

When SW11/6 on the applications board (see Appendix A Fig 1) is set off the operation of the SI9000+ changes as follows:

i The SI9000+ can no longer detect when a can change has occurred and will not autostart after the change. Note that the contact check indicator continues to operate normally.

ii Enamel rating with the contact check indicator on is allowed and commences when START is pressed.

4. CHANGING THE RATING VOLTAGE

When SW11/7 on the applications board (see Appendix A Fig 1) is set on the operation of the SI9000+ changes as follows:

i On completion of the power up self test the default voltage setting of 6.3V is displayed on the mA display. This can be changed to 4,10,12 or 15V using the ↑ and ↓ keys. When the required rating voltage is displayed, press END to "drop back" to normal rating operation.

ii The rating voltage may then be changed at the start or end of a rating cycle, by pressing SET and using the ↑ and ↓ keys. When the required rating voltage is displayed, press END to "drop back" to normal rating operation.

5. CHANGING THE RATING DURATION

When SW11/8 on the applications board (see Appendix A Fig 1) is set on the operation of the SI9000+ changes as follows:

i. On completion of the power up self test the default rating duration of 4 seconds is displayed on the timer display. This can be altered over the range 2 to 99 seconds using the ↑ and ↓ keys. When the required rating voltage is displayed, press END to "drop back" to normal rating operation.

ii. The rating duration may then be changed at the start or end of a rating cycle, by pressing SET and using the ↑ and ↓ keys. When the required rating duration is displayed, press END to "drop back" to normal rating operation.

6. AUTORANGING OPERATION

When SW1/1 on the micro board (see Appendix A Fig 1) is set on the operation of the SI9000+ changes as follows:

1. All enamel rating currents up to 45mA are displayed and saved to two decimal places (10μA). Note that 5mA of hysteresis is incorporated in the design, so that with a decreasing current the SI9000+ does not operate to two decimal places until the current drops below 40mA. Currents above the thresholds continue to be displayed to one decimal place (100μA).

7. LINE NUMBER ENABLE

When SW1/2 on the micro board (see Appendix A Fig 1) is set on the operation of the SI9000+ changes as follows:

1. On power up the SI9000+ prompts for a line number. This can be set to any value between 0 and 99 using the ↑ and ↓ keys. One or more cans can then be enamel rated as a batch. When the data is sent to a printer or host computer the line number is also sent.

2. When a batch of measurements have been taken and statistical information, a printout or data transfer completed, pressing END will cause the SI9000+ to prompt for a new line number. Note that once a new line number is entered, all data from a previous line is erased.
The line number facility is provided primarily so that a complete set of data can be sent to a printer or host computer.

8. AUTOSTART

When SW1/3 on the micro board (see Appendix A Fig 1) is set off the operation of the SI9000+ changes as follows:

1. The semi-automatic operation described in Para 1.2.2. does not operate. After placing a can in the can stand the operator must press start and ensure that the level and contact check indicators are off before enamel rating will commence.

   Note that if either SW11/5 or SW11/6 is off then the autostart function is disabled, and rating will commence only when START is pressed.

9. AUTOSAVE

When SW1/4 on the micro board (see Appendix A Fig 1) is set on the operation of the SI9000+ changes as follows:

1. The SI9000+ operates in a "fully automatic" mode. After each can has been rated the displayed reading is automatically saved as the can is removed from the can stand and the contact check and level check indicators are illuminated. The combination of autosave and autostart results in a "fully automatic" operation.

10. USING THE SI9000+ WITH A COMPUTER

10.1 GENERAL

The SI9000+ incorporates a second serial port intended for connection to a host computer. This enables readings taken by the SI9000+ to be transferred to the computer for statistical analysis and archiving.

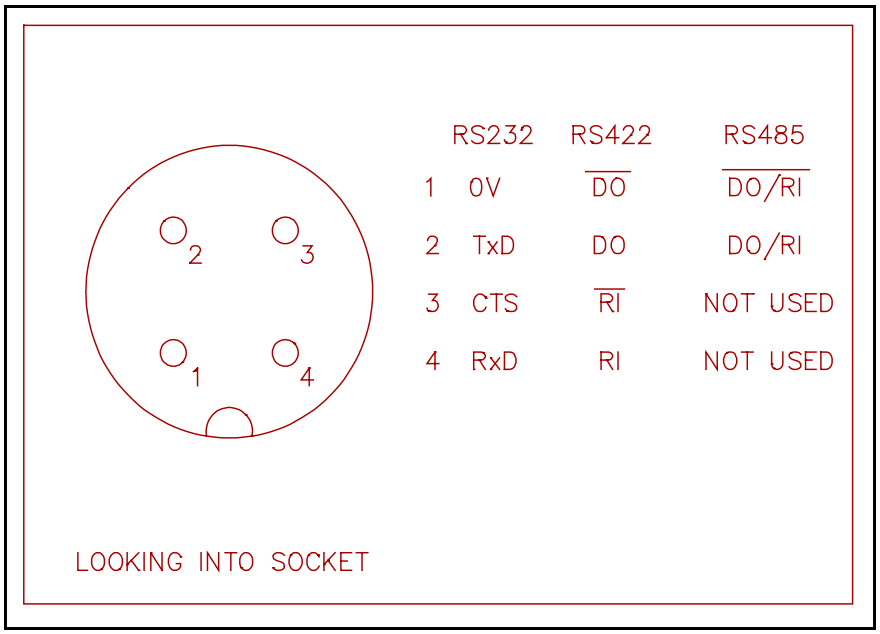
The data format and communications protocol are selectable and it will require a suitably experienced person to organise and set up such a connection. It will also be necessary to have software produced for the computer that is capable of receiving and understanding the data from the SI9000+.

The SI9000+ supports bi-directional or uni-directional communication. Internal jumpers are used to select between RS232C, RS422 and RS485 communication standards.

10.2 COMPUTER PORT CONNECTIONS

Serial Port 2 is the 4-way connector on the side of the SI9000+. The pinout of this connector is shown below.

FIG 6: COMPUTER PORT CONNECTOR



A suitable 4 way plug is supplied with each SI9000+.

10.3 SETTING DATA FORMAT AND SPEED

The computer port is set up using SW2, J1, J2 and J3 on the micro board and SW11/3 and SW11/4 on the applications board (Refer to Appendix A Fig 1. All switches must be set to match the data transmission set up of the serial port on the host computer. SW2/1 on the micro board must be on to enable the computer port output. The switch functions are as follows:

SWITCH BANK 2

SWITCH POSITION	OPEN	CLOSED
S2/1	Computer Output Off	Computer Output On
S2/2	Software Handshake Off	Software handshake On

Computer Transmission Data Format as below:-

S2/3	S2/4	S2/5	FORMAT
OPEN	OPEN	OPEN	7 data bits-Even Parity-2 Stop Bits
OPEN	OPEN	CLOSED	7 data bits-Odd Parity-2 Stop Bits
OPEN	CLOSED	OPEN	7 data bits-Even Parity-1 Stop Bits
OPEN	CLOSED	CLOSED	7 data bits-Odd Parity-1 Stop Bits
CLOSED	OPEN	OPEN	8 data bits-No Parity-2 Stop Bits
CLOSED	OPEN	CLOSED	8 data bits-No Parity-1 Stop Bits
CLOSED	CLOSED	OPEN	8 data bits-Even Parity-1 Stop Bits
CLOSED	CLOSED	CLOSED	8 data bits-Odd Parity-1 Stop Bits
S2/6}			

Computer Transmission Baud Rate as defined below:

S2/8	S2/7	S2/6	Baud Rate
OPEN	OPEN	OPEN	76800 *
OPEN	OPEN	CLOSED	38400
OPEN	CLOSED	OPEN	19200
OPEN	CLOSED	CLOSED	9600
CLOSED	OPEN	OPEN	4800
CLOSED	OPEN	CLOSED	2400
CLOSED	CLOSED	OPEN	1200
CLOSED	CLOSED	CLOSED	300

***** **NOTE: Sencon do not guarantee operation at this speed.**

The jumpers on the micro board must be changed according to the communications standard used:

	RS232	RS422	RS485
J1	C	A	B
J2	B	A	A
J3	B	A	A

SW11/4 on the applications board selects between RS422 and RS485. When SW11/4 is off RS422 is selected. If RS422 or RS485 is to be used the plug connecting the socket on the rear panel to the microboard should be moved from P2 to P3. These connectors are marked on the circuit board.