



TriScan 2 +

Dairy system performance analyzer

Instruction Manual / Parts List

08/2018

Cecomp Electronics

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1 Preface

1.1 About this manual

The manufacturer reserves the right to make changes due to technical developments in the data and images given in this manual.

Reproductions, translations and copies of any kind, even of extracts, require written authorization from the manufacturer.

Any special terms, names or jargon used in this manual will be explained in more detail in the section titled "Glossary/Abbreviations".

These instructions are part of the equipment.

- It should be kept close at hand and remain with the equipment even if the equipment is sold.
- This manual is not subject to an amendment service. The most recent version at any time can be obtained directly from the manufacturer.

Pictograms used



This pictogram indicates information that will help towards better understanding of a procedure or operation.



A correction bar in the margin indicates changes to the previous edition.



This pictogram refers to another document or another section of this manual.

1.2 Manufacturer's Address

Cecomp Electronics

a division of Absolute Process Instruments, Inc.

**1220 American Way
Libertyville, IL 60048**



800 942-0315



800 949-7502



triscan@cecomp.com



www.cecomp.com

1.3 Customer services

Authorized Technical Dealer

If necessary, please contact your nearest authorized technical dealer.

Factory Technical Contact Information

Cecomp Electronics
1220 American Way
Libertyville, IL 60048



800 942-0315



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1.4 Historical -- Compatibility

Cecomp Electronics is a diverse designer and manufacturer of a wide variety of electronic products using highly skilled engineers and innovative ideas. Due to Cecomp's specialized work in pressure/vacuum test, measurement and process control instrumentation, GEA¹ selected Cecomp to design and manufacture the original TriScan dairy analyzer.

The TriScan was designed for use in dairy equipment systems performance analysis and was in production for approximately 20 years. When GEA needed an improved and upgraded TriScan, Cecomp Electronics with its extensive manufacturing experience in both thru-hole and fully automated SMT (Surface Mount Technology) production equipment was selected to design and manufacture the TriScan II.

The TriScan II had improved operational specifications and has been in production for approximately 10 years. The Cecomp Electronics TriScan 2+ is an enhanced version of the GEA TriScan II and all GEA or Bou-Matic authorized accessory kits for the TriScan II are fully compatible with the Cecomp Electronics TriScan 2+.

¹ *The original TriScan was designed for the Babson Brothers Company. Babson Brothers Company was purchased by Westfalia Landtechnik GmbH, Germany and the new company formed was called Westfalia•Surge, Inc. Westfalia•Surge, Inc. is a member of the GEA global technology group and is now called GEA.*

2 Safety

2.1 Owner's Obligation of Care

The owner must ensure the following:

- The manual must always be available, in a legible and complete condition at the place where the product is used.
- Everyone who has to perform activities on the product must be able to view the manual at any time.
- The instructions given in the section on "Basic Safety Instructions" must be followed.
- All legal requirements must be observed.
- The product should only be used for its intended purpose.
- The product should only be used if it is in perfect working condition.
- The work to be carried out may only be performed by a suitably qualified person.
- All personnel should be regularly instructed in all relevant matters of safety at work and protection of the environment and be familiar with the manual, particularly the safety instructions it contains.
- Operating personnel who require training may only operate the equipment under the supervision of an experienced person. Their successful completion of training should be confirmed in writing.
- Safety signs, plates and stickers which are attached to the product must be replaced immediately if they become illegible or are lost.

2.2 Explanation of safety symbols

The safety symbols draw attention to the importance of the adjacent text. They are based on ISO 3864-2 and ANSI535.6.

Safety symbols and key words

**Warning:**

The indication "Warning" signals danger to life or health of personnel. Death or serious injury may result if the danger is not avoided.

**Caution**

The indication "Caution" signals important information on risks for the product or the environment.

2.3 Basic safety instructions

- The operation and maintenance of equipment in large cattle farms has inherent risks. Read and follow all applicable instructions carefully (especially the section on “Safety”) to ensure your own safety.
- Do not open or dismantle devices (risk of injury).
- Do not remove any protective devices (risk of injury).
- Regarding products from other manufacturers, always heed the warnings given in the safety data sheets and the operating instructions from the product manufacturer.

2.4 Personnel qualifications

All personnel who perform work on or with the product must carefully read and understand all applicable instructions and act in accordance with them.

- All work on electrical equipment and electrical connection work should only be performed by trained electricians.

In addition, special qualifications are required for the following activities:

- Operation
- Troubleshooting

3 Description

3.1 Correct applications

The TriScan 2+ has been designed for use in agricultural (mainly milk producing) operations.

The TriScan 2+ is exclusively designed for dairy equipment systems performance analysis.

Correct use includes reading the instructions and observing the inspection and maintenance conditions.

Any applications that are not listed here are not part of the intended purpose and are therefore considered as improper use.

- Vacuum systems
- Pulsation systems
 - Vacuum
 - Electrical
- DC power supplies
- Identification of AC Transient (Stray) voltages

The following in particular are prohibited:

- Testing vacuum or pressures outside the operating range of the TriScan 2+
- Testing voltages outside the operating range of the TriScan 2+.



Caution

The TriScan 2+ is not designed to measure electrical power to motors, lights, controls, etc.

The manufacturer/supplier is not liable for any damage resulting from improper use or application. The user alone bears the risk.

- The manufacturer expressly points out that only original parts and accessories have been adapted, tested and authorized are to be used with the product.
- The installation or use of products from other manufacturers may affect the specified properties of the original parts and lead to injury to people and animals.
- The manufacturer does not accept any liability for injury to people or animals, or damage to the product, caused by the use of products from other manufacturers.



Note!

The TriScan 2+ is compatible with all GEA TriScan II accessory kits (i.e. GEA Part No 7750-0124-984, GEA Part No. 7750-0124-082, etc.)

3.2 Changes to the product

For safety reasons, do not carry out any unauthorized changes.

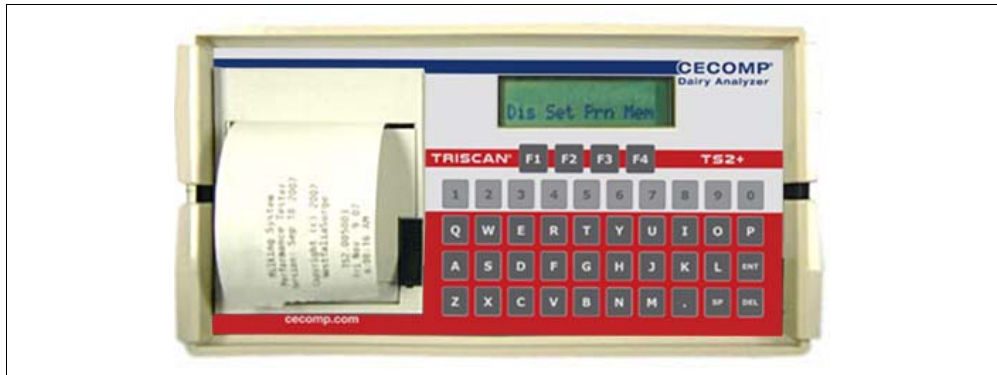
Any planned changes must be approved by the manufacturer in writing.

Do not open the case of the TriScan 2+. Any damage caused by this will be the responsibility of the owner.

Do not use any unauthorized power supply to run the unit as this may cause damage to the TriScan 2+ internal circuitry.

3.3 Design of the equipment

➤ Front panel configuration



- Thermal printer/plotter, self loading
- 16 Character x 2 line LCD display
- 4 Function keys for menu navigation
- 40 Character alpha/numeric keypad with audible feedback

➤ Back panel configuration



- Main power on/off rocker switch
- Input jack for table top charging pack
- Battery charging LED indicator
- 3 vacuum channel input ports (spring loaded quick connect fittings)
- DC/AC volts input (banana jack type)
- RS-232C serial port
- USB port (passive)
- Serial & model numbers

3.4 Functional description

The TriScan2+ is a self contained, battery operated, menu driven instrument, intended for diagnostics use in a dairy farm environment.

The TriScan 2+ can be used in the set up, maintenance and troubleshooting of;

- Vacuum systems
- Pulsation systems
 - Vacuum
 - Electrical
- DC power supplies
- Identification of AC Transient (Stray) voltages

There is a soft case with a neck strap allowing the operator to carry the unit around his neck during use.

There are also ringlets on the side of the TriScan 2+ enclosure for attaching neck straps without a case.

Connections are made between the TriScan 2+ and the various equipment or system being tested using vacuum hoses and electrical leads.

Accessories for the ends of the vacuum hoses are available for the TriScan 2+ from authorized merchant/dealers. The available accessories include tees, milk valve nipples, connectors, hoses and hypodermic needles. A vial with a rubber stopper should be connected in line with the hose as a liquid trap for milk contact applications.

Tests can be performed with real time print outs of the recording and/or recordings can be stored in memory and played back later.

**Note!**

The TriScan 2+ is compatible with all GEA TriScan II accessory kits (i.e. GEA Part No 7750-0124-984, GEA Part No. 7750-0124-082,etc.)

3.5 Product Features

The TriScan 2+ features;

- 3 Channel Vacuum/Pulsation Input
- AC/DC/PDC Voltage Input
- 4 Channel thermal plotter
- 3 Channel data summary
- Event marker capability (4th channel)
- 255 (4 Channel) recording memory
- 1000Hz sampling rate available on channel 1
- USB download capability
- Timed or continuous record capability
- Individual header and note fields
- Self-diagnostic tests and warning messages
- Real time meter / plotting capabilities

External supply voltage

- Fully operable with table top charging pack. Use the 12VDC 5A (center positive) power supply for proper battery charging and TriScan 2+ operation. This charger is NOT compatible with any the earlier models of the the TriScan in power rating and physical connection size.

Battery operation

- 12 Volt 2.2 ampere hour rechargeable sealed lead-acid
- 4 hours use per charge @ 50% printer duty cycle
- 6 hours of battery power when the printer is not used.
- Low battery indicator on LCD display (Blinking pixels in upper left character position)



Caution

Chargers compatible with the earlier models of the TriScan should not be used with the TriScan 2+

3.6 Technical Data**TriScan 2+**

| | |
|--------|------------------|
| Length | 9.25" (235mm) |
| Width | 8.5" (215.9mm) |
| Height | 4.625" (117.5mm) |
| Weight | 7lb (3.2kg) |

Thermal data

| | |
|-----------------------------------|--------------|
| Maximum operating temperature | 122°F [50°C] |
| Minimum operating temperature | 32°F [0°C] |
| Maximum humidity (non condensing) | 85% R.H. |

Power supply

| | |
|-------------------------|----------------------------|
| Table top charging pack | 12VDC 5A (center positive) |
|-------------------------|----------------------------|

Printer data

| | |
|--|-----------|
| Fast plotting speed (pulsation, pulsed DC, vacuum) | 20 mm/sec |
| Medium plotting speed (vacuum) | 5 mm/sec |
| Slow plotting speed (voltage, vacuum) | .5 mm/sec |

Electrical data input

| | |
|-----------------------|---------|
| Maximum AC voltage | 2.5 RMS |
| Maximum DC voltage | 48 VDC |
| AC voltage resolution | .01 RMS |
| DC voltage resolution | .2 |

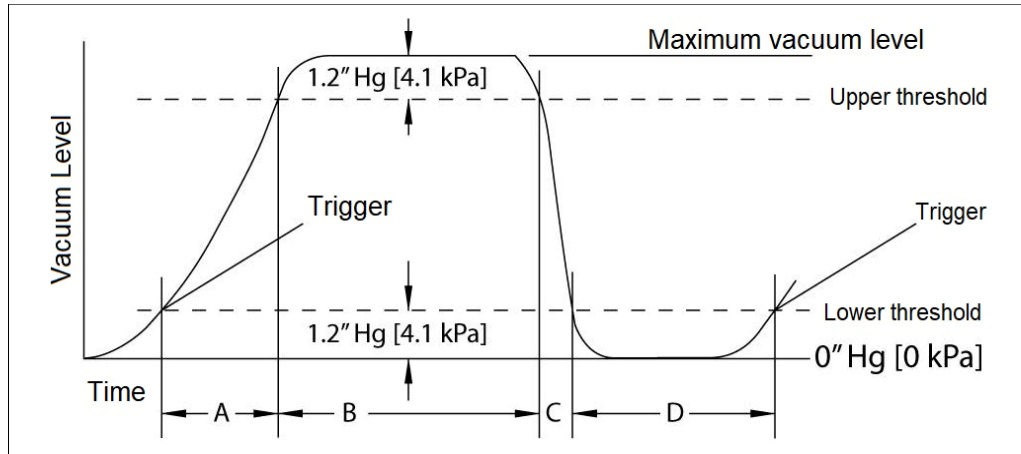
Vacuum data input

| | |
|------------------------|-------------------------|
| Operating vacuum range | 24.4" inHg [82.6 kPa] |
| Vacuum resolution | 0.1 Hg [0.3 or 0.4 kPa] |

Pulsation mode data algorithm

Pulsation trigger

The pulsation "trigger" is the point where the vacuum level crosses above the lower vacuum threshold.

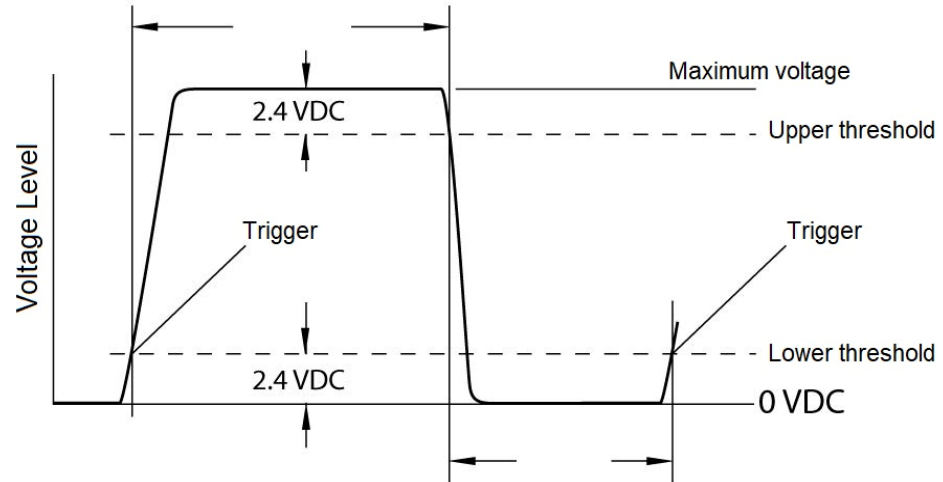


| | |
|---------------------------------|--|
| Timed recording | Trigger is used to start the recording |
| Continuous recording | Trigger is used to end the recording |
| Cycle | Trigger to trigger (A+B+C+D) |
| Algorithm | 5 cycles ((A+B+C+D)x5) |
| Minimum pulsation rate | 42 PPM |
| Accuracy range (pulsation rate) | 42-120 PPM |

Pulsed DC (PDC) mode data algorithm

Pulsed DC trigger

The pulsed DC "trigger" is the point where the voltage level crosses above the lower voltage threshold.



| | |
|---------------------------------|--|
| Timed recording | Trigger is used to start the recording |
| Continuous recording | Trigger is used to end the recording |
| Cycle | Trigger to trigger (On / Off) |
| Algorithm | 5 cycles ((On / Off)x5) |
| Minimum pulsation rate | 42 PPM |
| Accuracy range (pulsation rate) | 42-120 PPM |

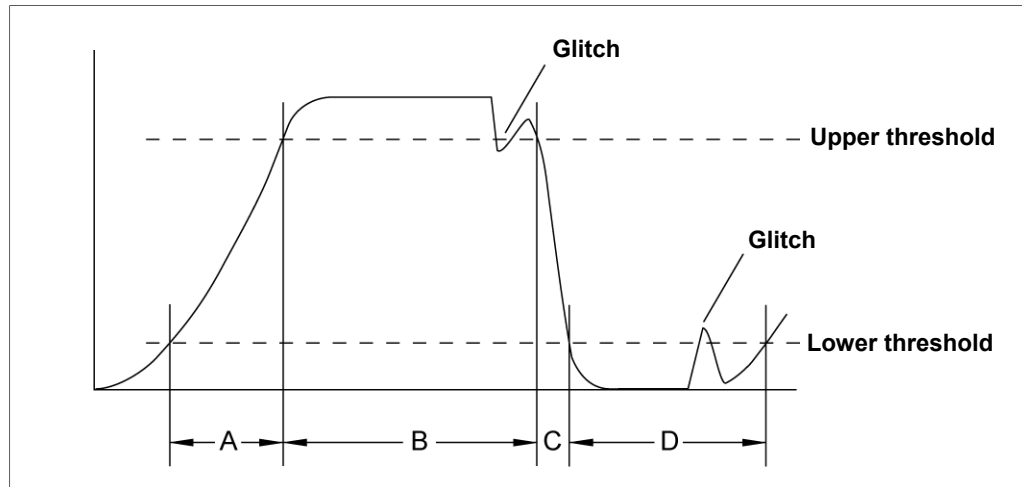
Bailout mode

The recording is terminated if it takes longer than 3 seconds to detect the starting trigger or if there is more than 5 seconds between triggers.

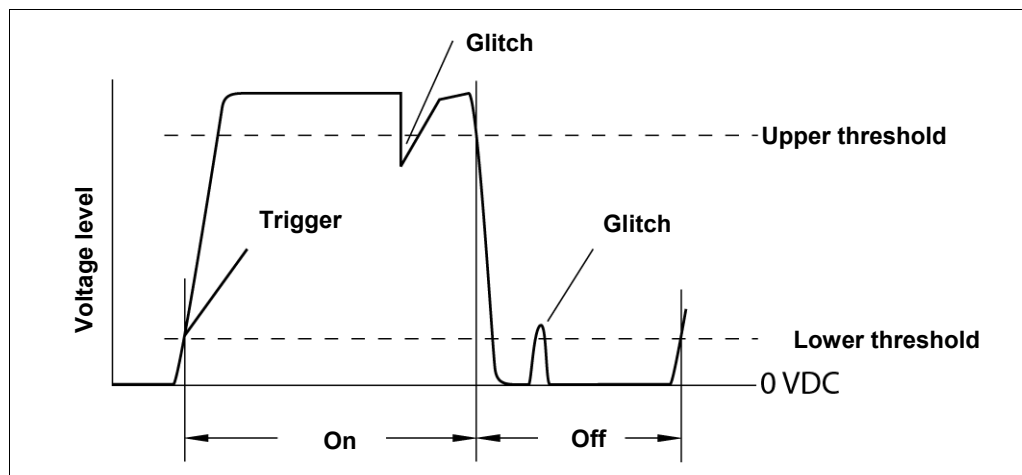
Software glitch filter

The TriScan 2+ has a filter to compensate for the “glitches” that occur above the upper threshold and below the lower threshold of a recording.

Pulsation



Pulsed DC



4 Transport

4.1 Includes

Check the goods supplied against the packing list enclosed for completeness and damage.

TriScan 2+ Dairy Analyzer Kit



| Qty | Description | |
|-----|--|------------|
| 1 | TriScan 2+ | |
| 1 | Soft carrying case with neck strap | |
| 1 | Power supply | 12V DC 5 A |
| 1 | Printer paper (**installed in printer) | 50mm |

4.2 Storage conditions

- Storage temperature **4°-140°F [-20°-60°C]**
- Max. storage time is 8 years for clock battery.

When storing the goods supplied, the location must provide protection against:

- Moisture
- Frost
- External damage (jolts, knocks, rodents, insects, . . .)
- Direct sunlight

4.3 Information on disposing of packing material

After unpacking, the packing material is to be handled properly and disposed of carefully in accordance with the valid local regulations on waste disposal and utilization.

5 Operation

5.1 Special personnel qualification required for operation

Operation may only be performed by trained and qualified personnel in accordance with the safety instructions.

The operator may only carry out work on the TriScan 2+ if he has been trained, instructed and authorized to do so by the owner.

5.2 Safety instructions for operation

To prevent damage to property and/or life-threatening injury to personnel always observe the following:

- Only use the product for its intended purpose.

Special dangers involved in operation and normal operation:

- Danger from animals.



Warning: Large animal!

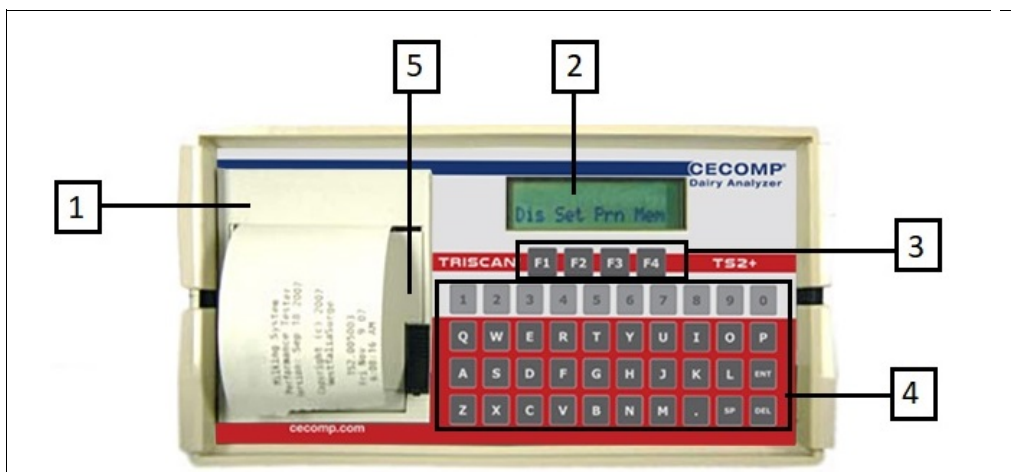
There is a risk of being stepped on or crushed, resulting in serious injury or death. Use caution when working around large animals. Always approach animals slowly. Do not make sudden movements which may startle the animal. Always leave yourself an unobstructed path of exit away from the animal.

Before operating, make sure you are adequately familiar with the following:

- The operating and control elements
- The equipment
- The method of operation
- The immediate environment
- The safety devices

5.3 Description of the operating elements

Front Panel



Legend:

| | | | |
|---|---------------|---|----------------------|
| 1 | Printer | 4 | Alpha/numeric keypad |
| 2 | LCD display | 5 | Printer paper door |
| 3 | Function keys | | |

Special purpose keys

- The function keys are used to select items displayed on the screen directly above each of the function keys.
- The "DEL" key will delete/ backspace to remove or correct type.
- The enter (ENT) key is used to confirm and save after typing. The "ENT" key is also used to exit most error message screens.
- The "SP" key is the space bar.

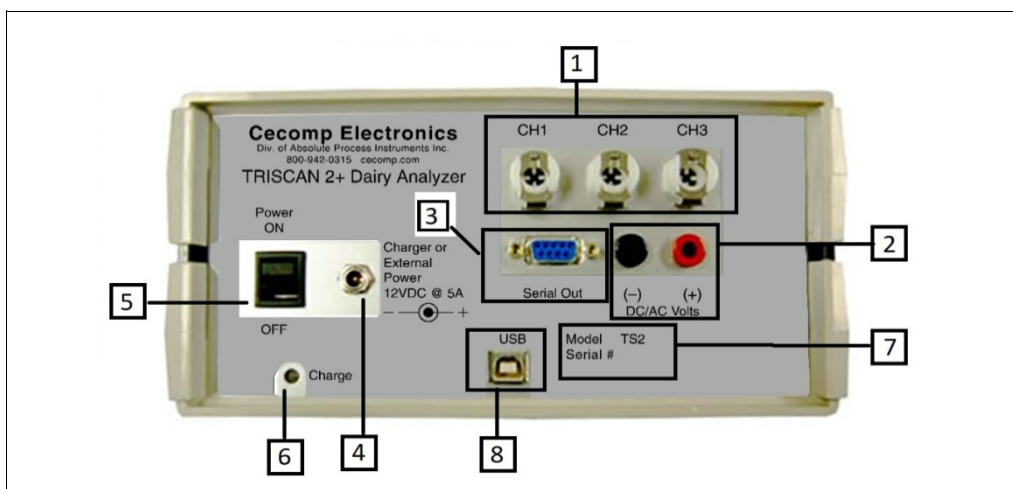
Special purpose keys in the MEMORY menu

- The "A" key is used to select all recordings stored in memory to clear them or dump to a computer.
- The "S" and "D" keys are used to step up or down through the recordings stored in the memory when asked to enter a recording number.

Special purpose keys in the SETUP menu

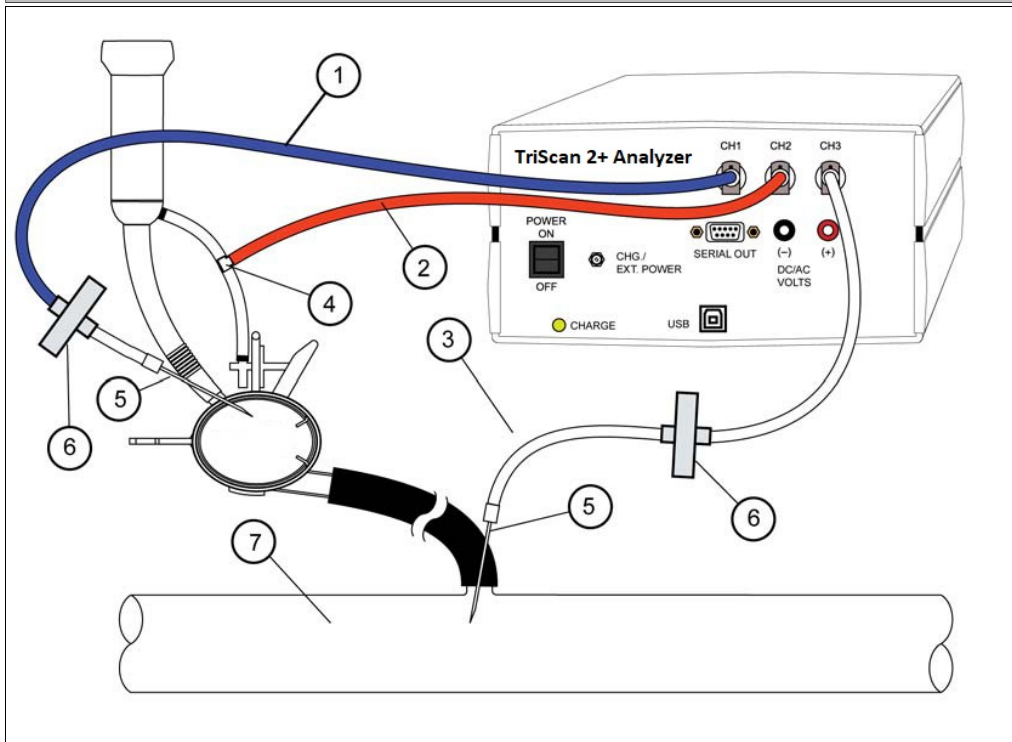
- The "C" key is used to access the internal time and date functions from the SET UP menu.
- The "P" key is used to access the PASSCODE function in the SETUP menu. Here the PASSCODE can be changed from the factory PASSCODE of 1234.
- The "H" key can be used in the SETUP menu to enter an additional line in the start up printout. This can be used to identify the customer/dealer, technician operating the unit, or any other note up to 32 characters desired. This menu item is not directly displayed and requires the use of the PASSCODE to access.
- The "U" key is used to access the measuring unit function in the SETUP menu. The factory setting is "inHg" while the alternate unit is "kPa". The PASSCODE is required to use this function.

Back Panel



| Legend: | | | |
|---------|--------------------------------|---|-------------------------------|
| 1 | 3 Vacuum input ports | 5 | Main power On/Off switch |
| 2 | DC/AC input (banana jack type) | 6 | Battery charger LED indicator |
| 3 | DB 9F RS-232 Serial port | 7 | Serial and model numbers |
| 4 | Input jack for AC/DC power | 8 | USB port |

5.4 Connecting to equipment (use of accessories)



| No | Description | |
|----|------------------------|--|
| 1 | Channel 1-milking unit | See chart below for input options for each channel |
| 2 | Channel 2-pulsation | |
| 3 | Channel 3-milk line | |
| 4 | Tee | |
| 5 | Needle | Keep out of milk flow |
| 6 | Filter | Creates a trap for fluid |
| 7 | Milk line | |



Note!

The illustration above is only an example. There are multiple ways to connect the TriScan 2+ to equipment.

| Input options | Channel 1 | Channel 2 | Channel 3 |
|-------------------|-----------|-----------|-----------|
| Off | X | X | X |
| Vacuum | X | X | X |
| Pulsation | X | X | X |
| DC voltage | X | | |
| Pulsed DC voltage | X | | |
| AC voltage | X | | |



Note!

The TriScan 2+ is compatible with all GEA TriScan II accessory kits (i.e. GEA Part No 7750-0124-984, GEA Part No. 7750-0124-082, etc.)

5.5 Power up the TriScan 2+

Turning the power on

Remove any input hoses or electrical test leads from the back of the unit.

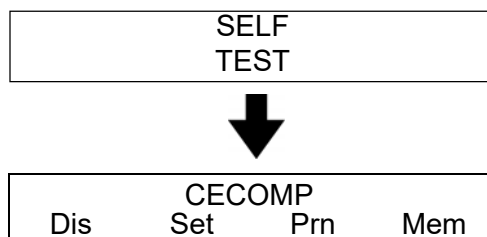
Turn the main power switch on.

The log on sequence is initiated automatically.

The log on sequence is a series of self-diagnostic tests with screen displays followed by a print out.

Start Up display (all tests passed)

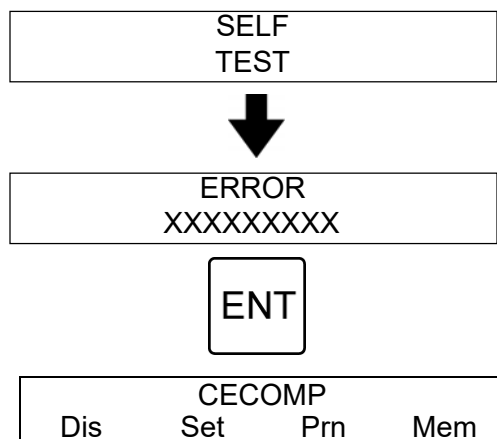
At the conclusion of the start up sequence the main menu will be displayed.



Start Up display (any tests failed)

If any tests fail during the start up sequence the error will be displayed and the sequence will be halted.

Press the ENT key to continue.



Start Up print out

**Caution**

Never pull the paper out of the printer with the door closed! Serious damage to the printer will occur if the paper is pulled in reverse.

At the conclusion of the self tests a Start Up print out is made.

CECOMP Electronics TS2+
Milking System
Performance Tester
Version X.XXX
Copyright (c) XXXX
CECOMP Electronics
(Dealer Defined Text) ...
Fri Apr 9 18
10:13:45 AM

Any of the failed tests will print out after the start up print out.

CECOMP Electronics TS2+
Milking System
Performance Tester
Version X.XXX
Copyright (c) XXXX
CECOMP Electronics
(Dealer Defined Text) ...
Fri Apr 9 18
10:13:45 AM
Failed Test (s) will print separately after the Start Up
CH1 OFFSET
CH2 OFFSET
CH3 OFFSET
DC OFFSET
AC OFFSET

Start Up tests

Self Test 1: Battery Level

Should the battery level fall below 11.0 VDC this test will fail and the LCD will read.

ERROR
LOW BATTERY

Failure of this test will disable the TriScan 2+. No further operation will be allowed until the power level has been restored.

Self Test 2: Keyboard Test

The keyboard will be tested for stuck (closed) keys. If any are found, display will read;

ERROR
KEYBOARD

Failure of this test will disable the TriScan 2+.

**Note:**

The Self Test 3, 4 and 5 are passable; i.e., depression of the ENT key will allow the TriScan 2+ to proceed, however, internal flags will be set for failed tests. These flags lock out the defective functions, and create warning messages for later operations in which attempts are made to access defective functions.

Self Test 3: Input Offset Tests (Vacuum/pulsation Channels)

CH1, CH2, CH3 vacuum inputs will be checked sequentially for input offsets.

Should any offset be detected in a channel, pressing ENT will allow you to continue past that channel.

Any attempts to enable that channel as an input will be met with an error message as follows,

ERROR
CH1 OFFSET

Self Test 4: Input Offset Tests (Voltage Channels)

Check DC input volts for offset errors. This error is passable.

Any attempt to enable DC volts as an input will be met with an error message,

ERROR
DC OFFSET

Check AC input volts for offset errors. This error is passable.

Any attempt to enable AC volts as an input will be met with an error message,

ERROR
AC OFFSET

**Note:**

While performing the vacuum and voltage offset tests, any offset within the acceptable range will be saved and used for auto calibration of the meter functions.

Self Test 5: Internal Clock Calendar

The Internal Clock/Calendar will be polled to verify that it is functioning. If it does not return a recognizable pattern the display will read

ERROR
CLOCK/CALENDAR

Audible feedback

The TriScan 2+ has an internal beeper which provides audible feedback.

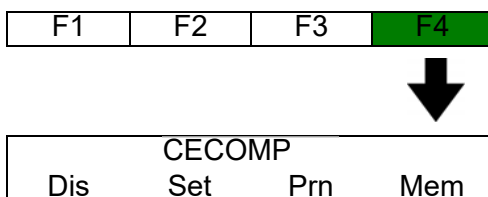
- A short beep is heard each time a keyboard or function key is pressed.
- A long beep (1 sec) is heard each time an error or warning message is displayed.
- A long beep (1 sec) is heard when a memory dump is completed.

Main menu and function keys

From the main menu, four different branches of sub-menus may be selected.

The four function keys F1, F2, F3, F4 found below the LCD correspond to the abbreviations shown on the LCD above each key and when pressed will select that menu branch.

Pressing the F4 key (EXIT) from any of the sub menus will return to the main menu.



Low battery warnings

The TriScan 2+ will periodically check the battery voltage.

If the battery voltage drops below 11.5 VDC a solid box will flash in the upper left corner of the display to indicate impending loss of battery power. All menus have the upper left display element reserved for this function.



If the battery voltage drops below 10.5 VDC (30%) the low battery error will appear, the printer will be disabled and all functions will be locked up to avoid potential damage to the internal power supply.



Note:

If external power is connected to the TriScan 2+, it will still be necessary to turn the power switch off and then back on to unlock the error message.

5.6 Loading Paper

Full rolls of thermal paper may be loaded by freeing and unrolling about 3 inches from the outer end of the paper roll.

Drop the roll into the open printer chamber with the free end coming from the bottom and front side of the chamber.

With a portion of the paper extending beyond the door close it allowing it to latch.



Installing a partial roll may require the installer to locate the roll onto the roll holders manually.



Caution

Never pull the paper out of the printer with the door closed! Serious damage to the printer will occur if the paper is pulled out without disengaging the printer drive.

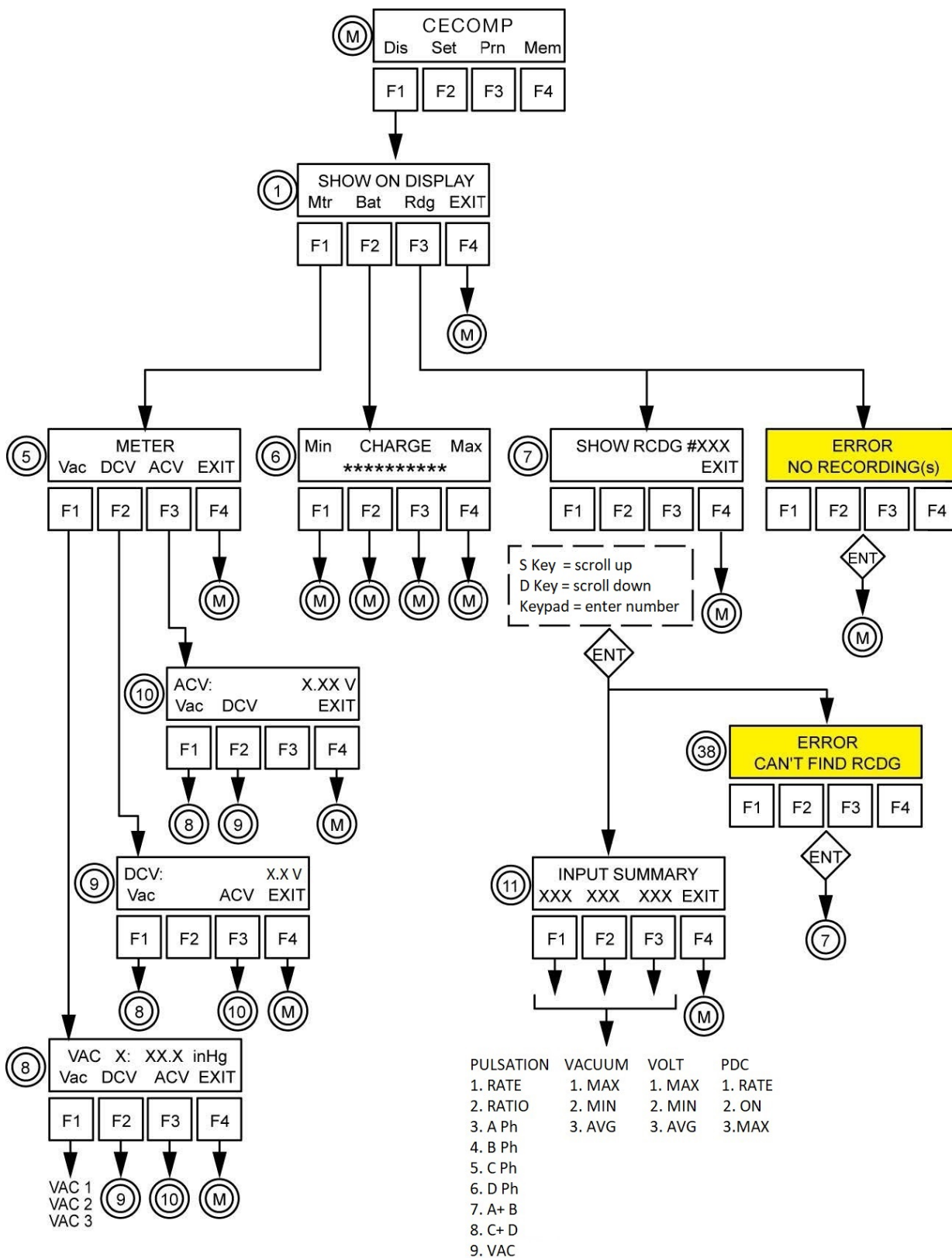
5.7 System menu flowcharts

The following tables give an overview of the system menu.

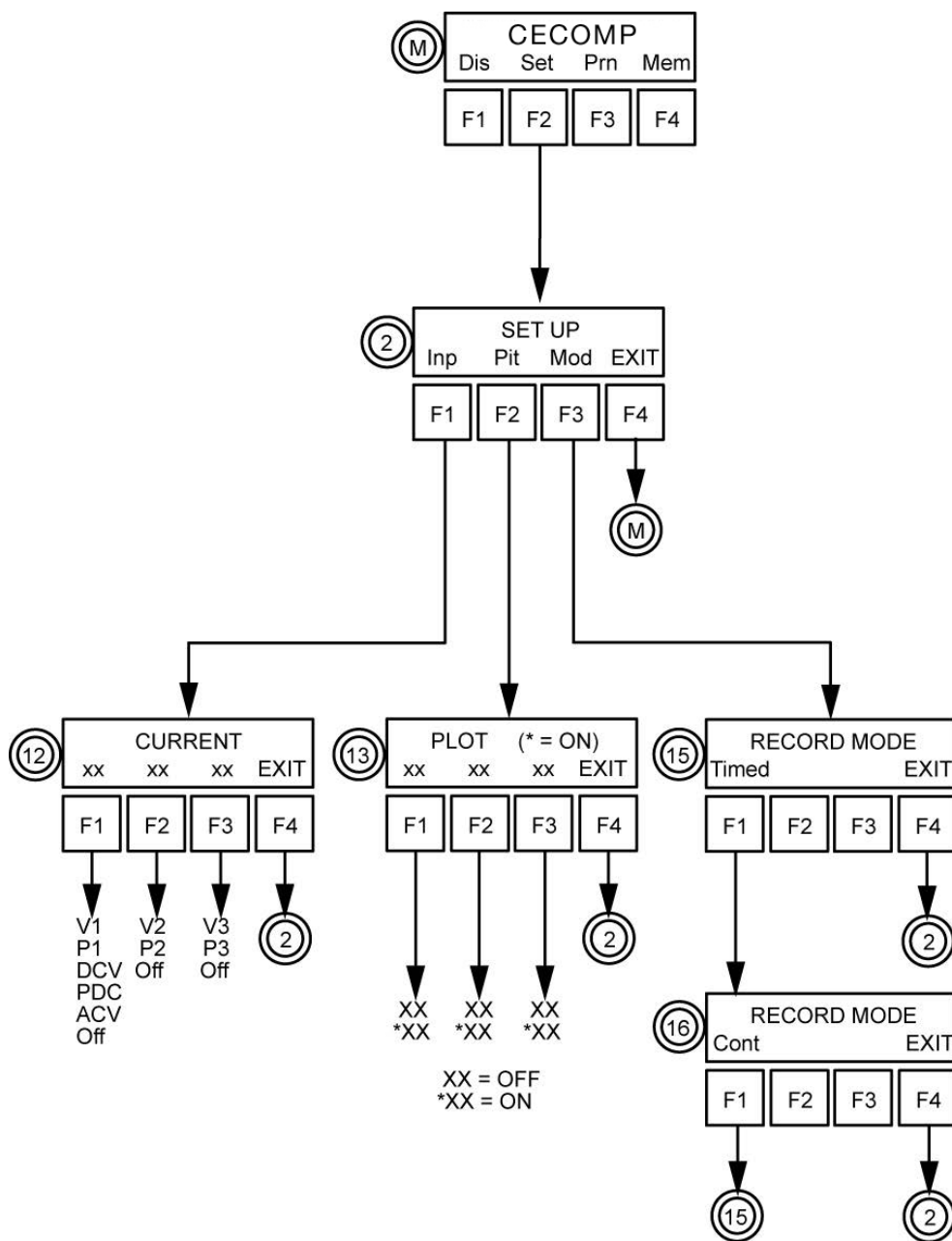
Codes in menu tree

| | |
|-----|---|
| M | Main level menu |
| X | X level menu |
| D | Steps down through consecutive recordings |
| S | Steps up through consecutive recordings |
| A | Returns all recordings |
| ENT | Enter key |
| DEL | Delete key |
| SP | Space key |
| C | Clock/Calendar menu under Set function (hidden) |
| P | Passcode Menu under Set function (hidden) |
| H | Header Text Menu under Set function (hidden, password required) |
| U | Unit Menu under Set function (hidden, password required) |

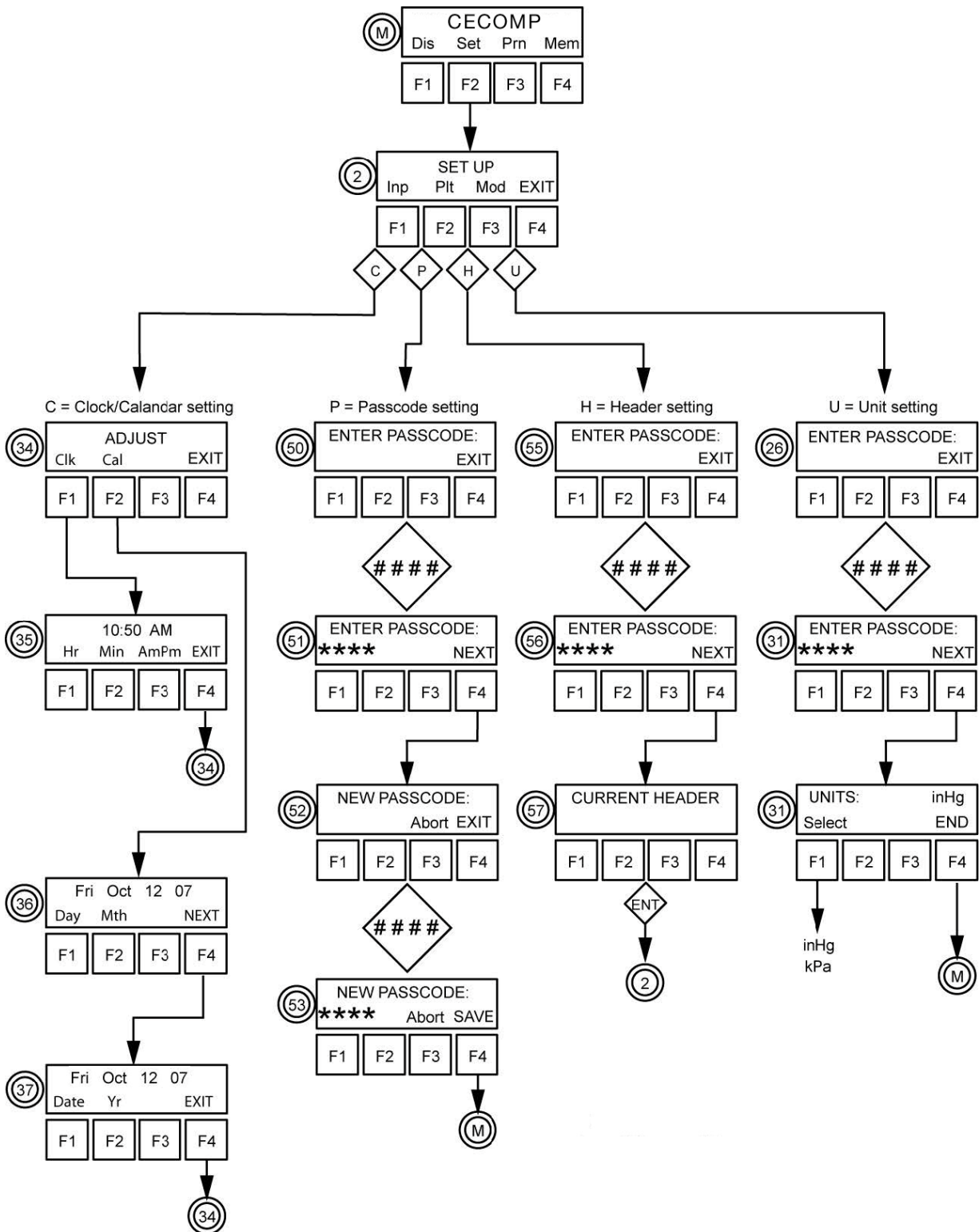
F1 SHOW ON DISPLAY



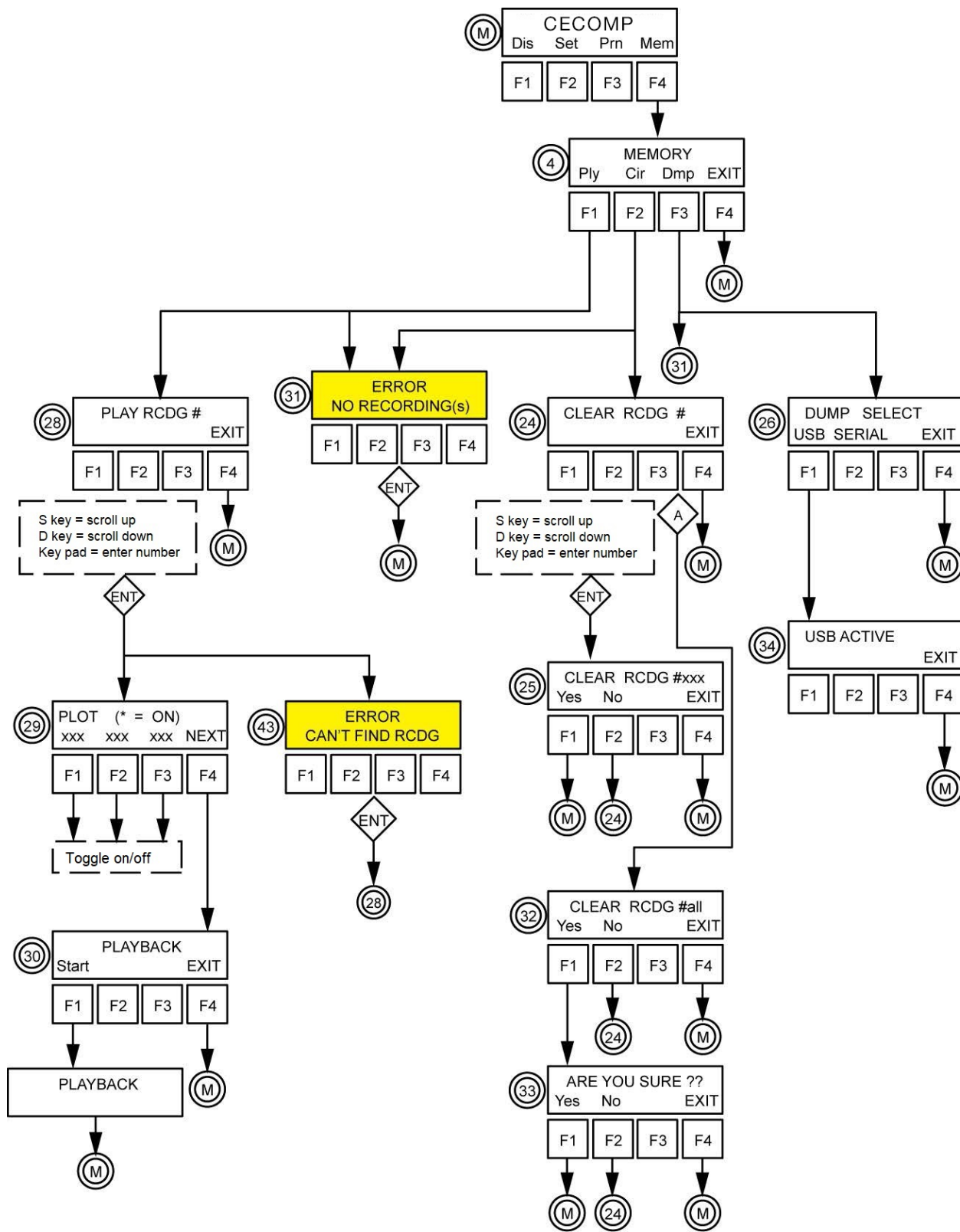
F2 SET UP



F2 SET UP (HIDDEN COMMANDS)



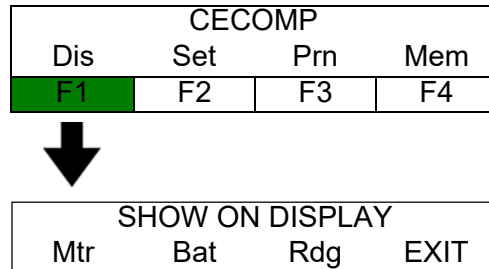
F4 MEMORY



5.8 Navigating the system menu

5.8.1 F1 (Dis) SHOW ON DISPLAY

Pressing the F1 key from the main menu switches to the SHOW ON DISPLAY menu.

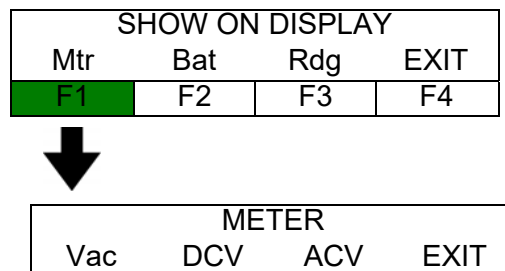


The SHOW ON DISPLAY menu allows the user to utilize the real-time meter capabilities of the TriScan 2+, view the battery charge level, display previously stored recordings by single stepping through memory or by entering discrete recording numbers or return via EXIT to the main menu.

Meter mode (Mtr)

Pressing the F1 key from the SHOW ON DISPLAY screen will enable the real time meter capabilities of the TriScan 2+.

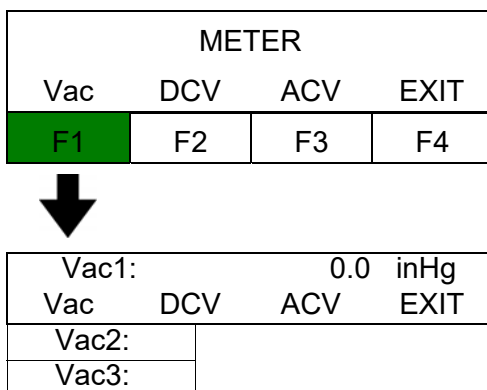
Selecting a function will allow the user to monitor the real time fluctuations of that function and display it on the LCD.



Vacuum (Vac)

Pressing the F1 key from the METER screen allows the user to monitor vacuum levels.

Repeatedly pressing the F1 key will toggle between the three vacuum channels.

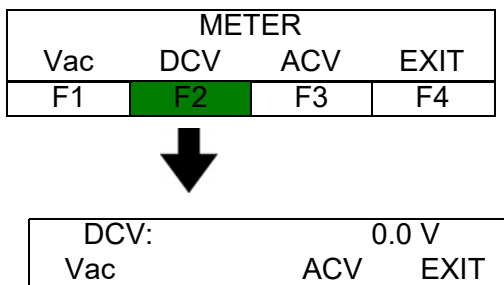


DC voltage

Pressing the F2 key from the METER screen allows the user to read DC voltages from 0-48 volts.

The leads must be attached to the AC/DC volt input jacks in the rear of the TriScan 2+.

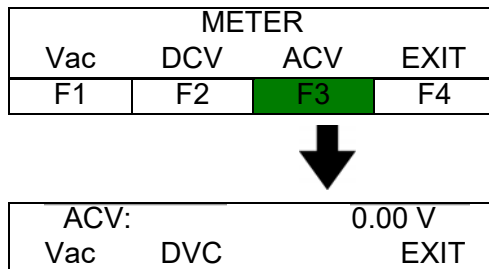
Polarity of the jacks must be observed in the DC mode.



AC voltage

Pressing the F3 key from the METER screen allows the use to read AC volts from 0-2.5 volts RMS.

The leads must be attached to the AC/DC volt input jack in the rear of the TriScan 2+.



Error messages

The following error messages may occur during testing due to overload/under-load conditions or operator error.

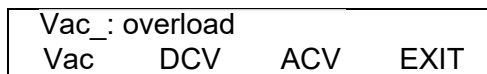


Note:

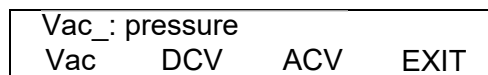
Error messages caused by an overload or under load conditions will be displayed for as long as the condition is present. The error message will clear itself once the condition has been removed.

Vacuum inputs

If the vacuum level exceeds 24.4"Hg [82.6kPa] an overload condition is present and the following message is displayed.



If positive pressure is applied to a vacuum input an under-load condition is present and the following message is displayed.



DC volts input

If the voltage level exceeds 48 VDC an overload condition is present and the following message is displayed.

| | | | |
|---------------|-----|-----|------|
| DCV: overload | | | |
| Vac | DCV | ACV | EXIT |

If the voltage level drops below 0 VDC indicating the polarity is reversed, the following message is displayed.

| | | | |
|--------------|-----|-----|------|
| DCV: reverse | | | |
| Vac | DCV | ACV | EXIT |

AC volts input

If the voltage level exceeds 2.5VAC(RMS) an overload condition is present and the following message is displayed.

| | | | |
|---------------|-----|-----|------|
| ACV: overload | | | |
| Vac | DCV | ACV | EXIT |

Check battery charge (Bat)

Pressing the F2 key from the SHOW ON DISPLAY screen allows the user to view the charge level of the battery.

- Each asterisk (*) on the second line represents a voltage level of the rechargeable battery.
- These levels range from 10 * representing 13 volts to 0 * representing 11.1 volts or less.
 - The minimum charge required to operate the printer is 5 *.
 - The minimum charge required to operate the TriScan 2+ is 3 *.
- The thresholds for alarm conditions are 10.5 volts for self test pass/fail and 11.5 volts for battery warning flash.
- The battery warning flasher is located in the upper left corner of the LCD.

| | | | |
|-----------------|-----|-----|------|
| SHOW ON DISPLAY | | | |
| Mtr | Bat | Rdg | EXIT |
| F1 | F2 | F3 | F4 |



| |
|-------------------------|
| Min CHARGE Max ***** |
|-------------------------|

Pressing any function will return the TriScan 2+ to the MAIN menu.

Battery charge level

| Number of * | Battery voltage | Indication |
|-------------|-----------------|------------------------|
| 10 | 13.0 VDC | Full charge |
| 9 | 12.8 VDC | |
| 8 | 12.6 VDC | |
| 7 | 12.4 VDC | |
| 6 | 12.2 VDC | |
| 5 | 12.0 VDC | Do not use the printer |
| 4 | 11.8 VDC | |
| 3 | 11.6 VDC | Do not use TriScan 2+ |
| 2 | 11.4 VDC | |
| 1 | 11.2 VDC | |

Battery charge LED indicator

When the charger is connected to the TriScan 2+ the LED on the rear of the TriScan 2+ changes color to indicate the charging status.

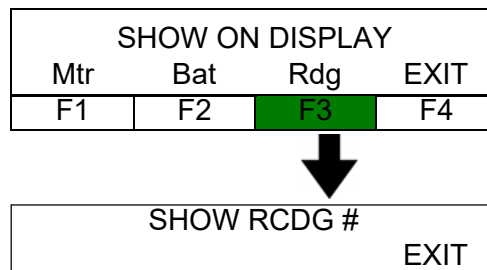
| | |
|-------|------------------------|
| Red | TriScan 2+ is charging |
| Green | Full Charge |

Note

If the TriScan 2+ power switch is on with the charger connected to the TriScan 2+ when the TriScan 2+ power switch is turned off the battery charge LED will not come on until the unit has been off for approximately 5 minutes.

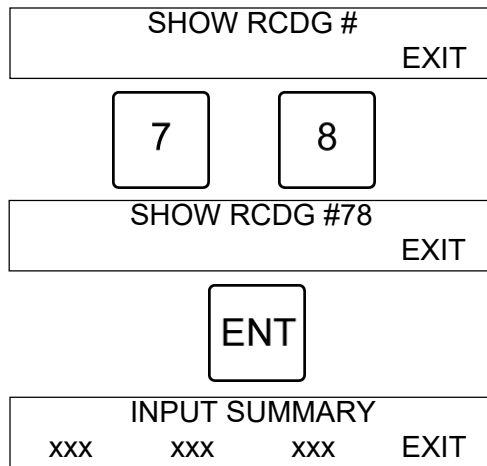
Display recordings (Rdg)

Pressing the F3 key from the SHOW ON DISPLAY screen allows the user to view recordings previously saved in memory.

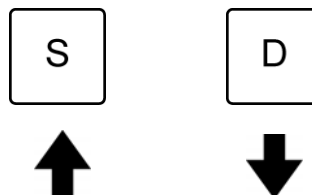


There are 2 methods to recall a recording from memory.

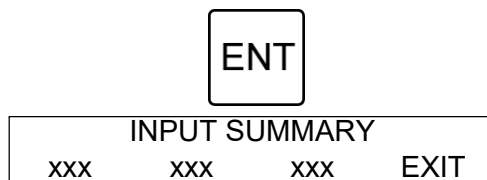
- Use the numeric keys to enter a recording number from 1 to 255. View the number displayed on the screen. Press the ENT key to show the input summary.



- Search the recordings in the memory by using the "S" and "D" keys.
 - Pressing the "S" key repeatedly will step up through the recordings currently stored in memory.
 - Pressing the "D" key repeatedly will step down through the recordings currently stored in memory.



- To choose the recording displayed, press the ENT key.



The INPUT SUMMARY screen displays what type of recording is stored on the three channels.

- To view the details of a channel, press the function key corresponding to that channel.
 - Pressing the function key repeatedly will toggle through all of the available information for that channel.

The following table shows what information is shown for each type of recording.

| Pulsation | Vacuum | AC/DC Voltage | Pulsed DC Voltage |
|-----------|----------------|---------------|-------------------|
| Rate | Maximum vacuum | Maximum volts | Rate |
| Ratio | Minimum vacuum | Minimum volts | ON time |
| A phase | Average vacuum | Average volts | Maximum volts |
| B phase | | | |
| C phase | | | |
| D phase | | | |
| A+B phase | | | |
| C+D phase | | | |
| Vacuum | | | |

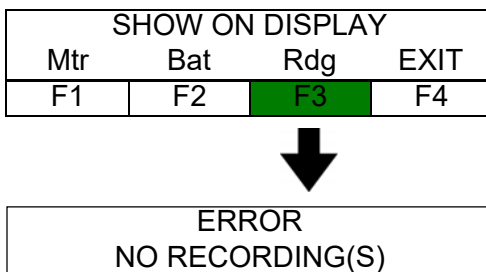
Errors and error messages

If you enter an invalid recording number, you will get this error message and activate the beeper for one second.

| |
|--------------------------------|
| ERROR ## CAN'T FIND RCDG |
|--------------------------------|

Press the ENT key to exit this screen and return to the SHOW RECORDING screen.

If there are no recordings in memory you will get this error message.



Press the ENT key to exit this screen and return to the main menu.



Note:

The DEL key may be used to correct mistakes before the ENT is pressed.



Note:

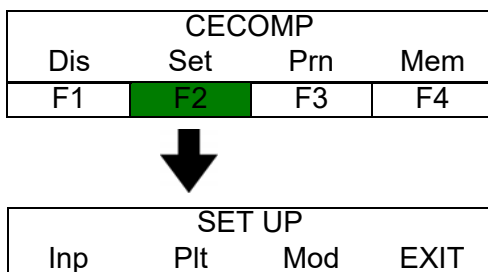
If the ENT is pressed before a number is entered you will return to the main menu.

5.8.2 F2 (Set) SET UP

Pressing the F2 key from the main menu switches to the SET UP menu.

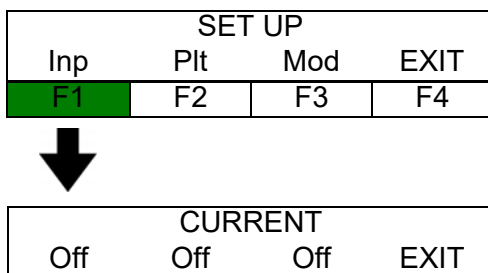
The SET UP menu is where you select the type of test you wish to run, which channels will print and whether the recording will be timed or continuous.

The SET UP menu is also where you access the internal time and date settings, user password, dealer header text, and vacuum unit of measure (inHg) or (kPa).

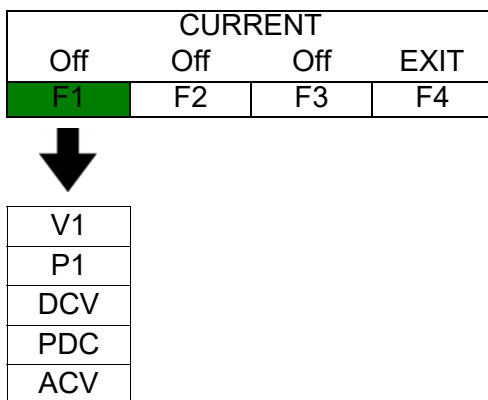


Current inputs (Inp)

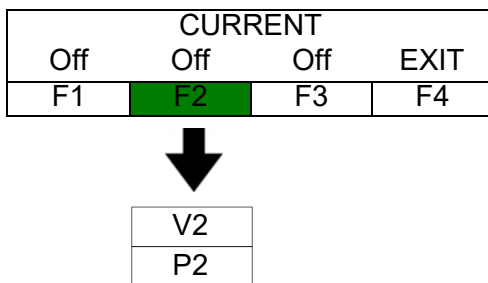
Pressing the F1 key from the SET UP screen allows the user to define the current type of input for each of the 3 channels.



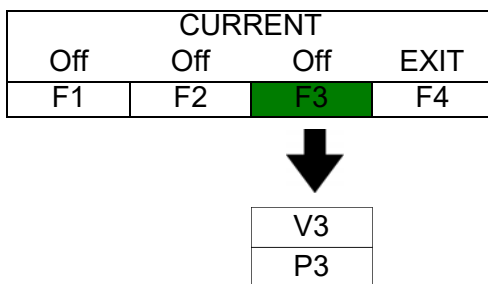
Pressing the F1 key from the CURRENT screen toggles between the 5 available inputs for channel 1.



Pressing the F2 key from the CURRENT screen toggles between the 2 available inputs for channel 2.



Pressing the F3 key from the CURRENT screen toggles between the 2 available input for channel 3.



| Definition of settings | |
|------------------------|-------------------|
| V | Vacuum |
| P | Pulsation vacuum |
| DCV | DC voltage |
| PDC | Pulsed DC voltage |
| ACV | AC voltage |

Recording speeds

Vacuum can be recorded at all 3 speeds depending on the setup.



Note:

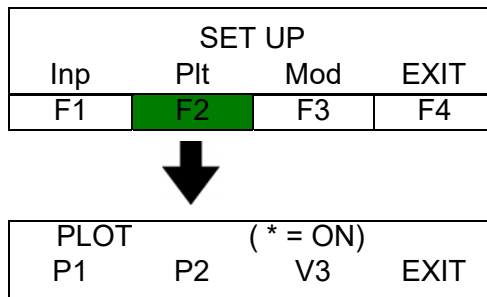
This note applies specifically to recording vacuum at fast speed. One channel will need to be set for pulsation recording. All other inputs have fixed recording speeds.

| Channel 1 | Channel 2 | Channel 3 | Recording speed | Recording time (sec.) (Timed) |
|-----------|-----------|-----------|-----------------|-------------------------------|
| Vacuum | Any | Any | Medium | 17.6 |
| Off | Vacuum | Vacuum | Slow | 176 |
| Off | Off | Vacuum | Slow | 176 |
| Pulsation | Any | Any | Fast | 5 pulsation cycles * |
| Any | Pulsation | Any | Fast | 5 pulsation cycles * |
| Any | Any | Pulsation | Fast | 5 pulsation cycles * |
| DCV | OFF | OFF | Slow | 176 |
| ACV | OFF | OFF | Slow | 176 |
| PDC | OFF | OFF | Fast | 5 pulsation cycles * |

* The TriScan 2+ will time out after 5 seconds if pulsation vacuum is not sensed while recording.

Plotting (Plt)

Pressing the F2 key from the SETUP screen allows the user to define which of the 3 channels will be plotted on the printer.



Pressing a function key from the PLOT screen toggles the plotting on and off for that channel.

- An asterisk (*) will appear next to the inputs which are set to plot.
- Any or all 3 channels may be plotted simultaneously.

| | | | |
|------|----|----|----------|
| PLOT | | | (* = ON) |
| P1 | P2 | V3 | EXIT |
| F1 | F2 | F3 | F4 |



| | | | |
|------|-----|----|----------|
| PLOT | | | (* = ON) |
| P1 | *P2 | V3 | EXIT |

| | | | |
|------|-----|----|----------|
| PLOT | | | (* = ON) |
| P1 | *P2 | V3 | EXIT |
| F1 | F2 | F3 | F4 |



| | | | |
|------|-----|-----|----------|
| PLOT | | | (* = ON) |
| P1 | *P2 | *V3 | EXIT |



Note:

A channel must have an input selected before it can be set to plot.

| | | | |
|------|-----|-----|----------|
| PLOT | | | (* = ON) |
| Off | Off | Off | EXIT |

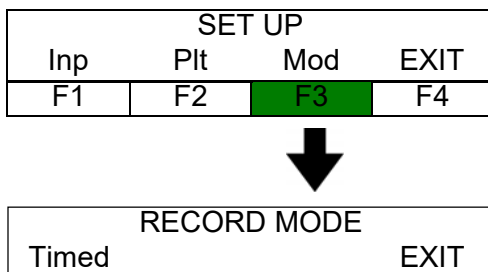


Note:

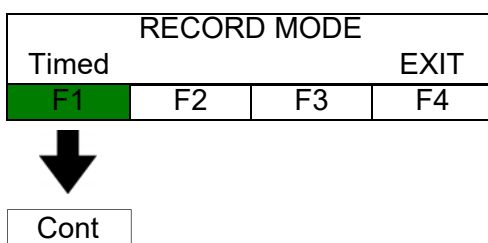
If any of the input settings are changed after the plotting setup is made, all plot settings are reset to off.

Recording mode (Mod)

Pressing the F3 key from the SET UP screen allows the user to select between a timed or continuous recording.



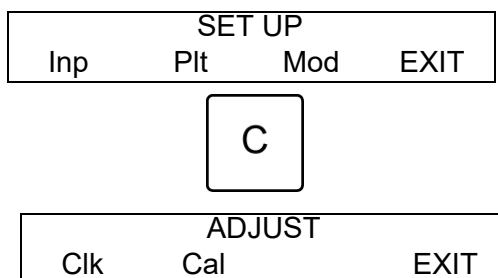
Pressing the F1 key from the RECORD MODE screen toggles between the timed and continuous mode.



Hidden commands

Clock and calendar

Pressing the C key from the SET UP screen allows the user to access the internal time and date settings.



Pressing the F1 key from the ADJUST screen allows the user to change the time setting on the internal clock.

- Pressing the F1 key will advance the hour.
- Pressing the F2 key will advance the minutes.
- Pressing the F3 key will toggle between AM and PM.

| ADJUST | | | |
|--------|-----|------|----|
| Clk | Cal | EXIT | |
| F1 | F2 | F3 | F4 |



| 2:20 PM | | | |
|---------|-----|------|------|
| Hr | Min | AmPm | EXIT |
| F1 | F2 | F3 | F4 |

Pressing the F2 key from the ADJUST screen allows the use to change the date setting on the internal calendar.

- Pressing the F1 key will advance the day of the week.
- Pressing the F2 key will advance the month.

| ADJUST | | | |
|--------|-----|------|----|
| Clk | Cal | EXIT | |
| F1 | F2 | F3 | F4 |



| Wed Apr 6 11 | | | |
|--------------|-----|------|----|
| Day | Mth | NEXT | |
| F1 | F2 | F3 | F4 |

Pressing the F4 key will go to the next screen.

- Pressing the F1 key will advance the date.
- Pressing the F2 key will advance the year.

| Wed Apr 6 11 | | | |
|--------------|-----|------|----|
| Day | Mth | NEXT | |
| F1 | F2 | F3 | F4 |



| Wed Apr 6 11 | | | |
|--------------|----|------|----|
| Date | Yr | EXIT | |
| F1 | F2 | F3 | F4 |

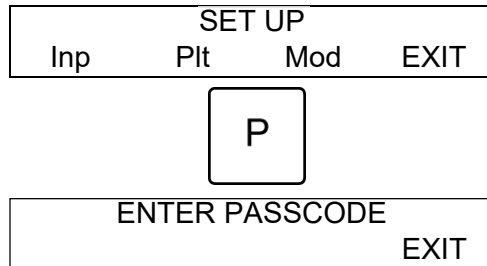


Note:

The TriScan 2+ will not prevent the entry of invalid dates such as Feb 30.

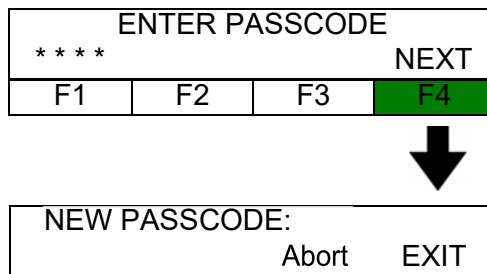
Passcode setting

Pressing the P key from the SET UP screen allows the user to change the passcode.



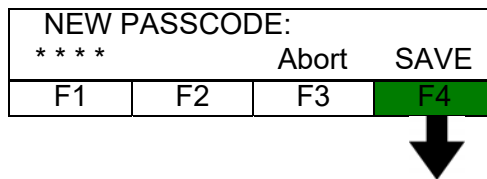
Enter the current four digit passcode.

Press the F4 key to continue.



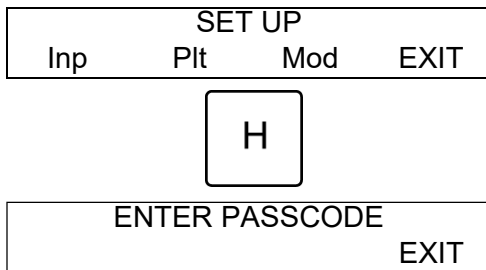
Enter a new four digit passcode using the numbers 0-9.

Press the F4 key to save the new passcode.



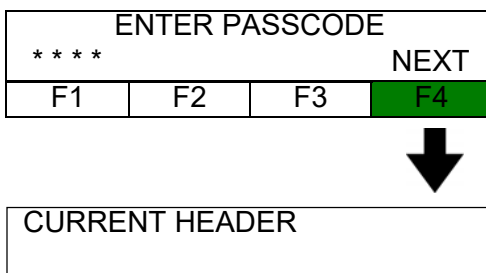
Header Setting

Pressing the H key from the SET UP screen allows the user to change the header.



Enter the current four digit passcode.

Press the F4 key to display the current header.

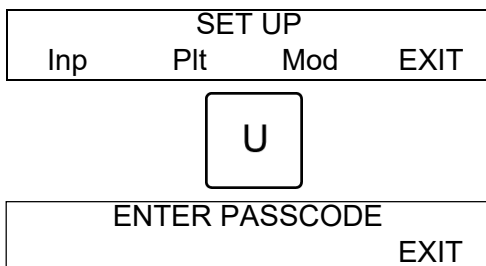


Press the DEL key to erase the current header.

Use the keypad to type a new header. Once the header you choose is displayed, press the ENT key.

Unit setting

Pressing the U key from the SET UP screen allows the user to change the type of pressure setting.



Enter the current four digit passcode.

Press the F4 key to display the current UNIT setting.

| | | | |
|----------------|----|----|------|
| ENTER PASSCODE | | | |
| * * * * | | | NEXT |
| F1 | F2 | F3 | F4 |



| | |
|--------|------|
| UNITS: | inHg |
| Select | END |

Pressing the F1 key toggles between the two types of pressure settings.

| | | | |
|--------|------|----|----|
| UNITS: | inHg | | |
| Select | END | | |
| F1 | F2 | F3 | F4 |



| |
|------|
| inHg |
| kPa |

Press the F4 key to END once type of pressure setting is chosen.

5.8.3 F3 (Prn) PRINT

Pressing the F3 key from the main menu switches to the PRINT menu.

The PRINT menu allows the user to start a recording, enter a header on the printout, check the recording capacity or return via EXIT to the main menu.

| | | | |
|--------|-----|-----|-----|
| CECOMP | | | |
| Dis | Set | Prn | Mem |
| F1 | F2 | F3 | F4 |



| | | | |
|-------|-----|-----|------|
| PRINT | | | |
| Str | Hdr | Cap | EXIT |

Start recording (Str)



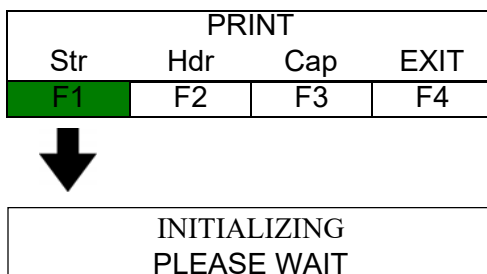
Note:

The process will be determined by which recording mode is chosen in the SET UP menu. The two recording modes are "Timed" and "Continuous".

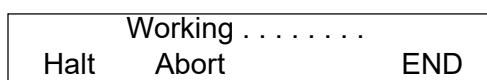
Timed recording mode

Pressing the F1 key from the PRINT screen starts the recording process.

As the recording process continues, a series of screens will appear.



The WORKING screen will display while the recording is in progress.



The printing will start.

If a channel is set to plot the printer will begin plotting a graph.

A series of dots will appear after the word WORKING (.....) giving a graphical indication of how far the recording has progressed.

- 8 dots represent a full recording.
- The dots are only displayed when in the timed recording mode.

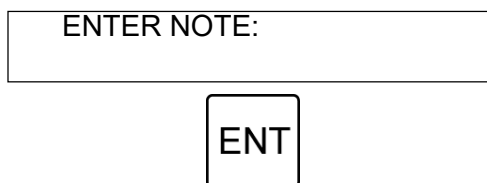
The recording will automatically end when the preset time is finished.



A summary of the recording will print out after the recording is completed.

The ENTER NOTE screen will display after the summary is completed.

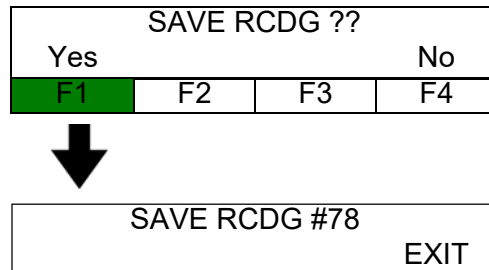
- Use the keypad to type 2 lines up to 15 characters each line.
- Press the ENT key when you have completed typing.



The SAVE RCDG screen will display after the note is entered.

Press the F1 key to save the recording in memory.

- There is a maximum of 255 recordings which can be stored in memory.
- The SAVE RCDG# screen will display the next available consecutive number to assign to this recording.



- Press the ENT key to save the recording under displayed number.
- There is also an option to assign any available recording number.
 - Press the DEL key to remove the displayed number.
 - Enter the desired available number.
 - Press the ENT key.
- Press the F4 key to not save the recording in memory and return to the PRINT screen.

Continuous recording mode

The recording will run the same as in the timed mode with the following exceptions.

- The WORKING display will show a timer rather than a series of dots showing the length of the recording.
- The recording will continue until a function key is pressed.

Pressing the F1 key from the Working screen stops the recording.

| | | | |
|---------|-------|---------|----|
| Working | | 0:00:10 | |
| Halt | Abort | END | |
| F1 | F2 | F3 | F4 |



| | | | |
|--------|-------|-----|--|
| HALTED | | | |
| Start | Abort | END | |

Choose an option from the HALTED screen.

- Press F1 to start the recording over.
- Press F2 to abort and return to the PRINT menu.
- Press F3 to stop and save the recording.

Pressing the F2 key from the Working screen stops the recording and returns to the PRINT menu.

| | | | |
|---------|-------|---------|----|
| Working | | 0:00:10 | |
| Halt | Abort | END | |
| F1 | F2 | F3 | F4 |



| | | | |
|-------|-----|-----|------|
| PRINT | | | |
| Str | Hdr | Cap | EXIT |

Pressing the F4 key from the Working screen stops the recording and proceeds to saving the recording.

| | | | |
|---------|-------|---------|----|
| Working | | 0:00:10 | |
| Halt | Abort | END | |
| F1 | F2 | F3 | F4 |

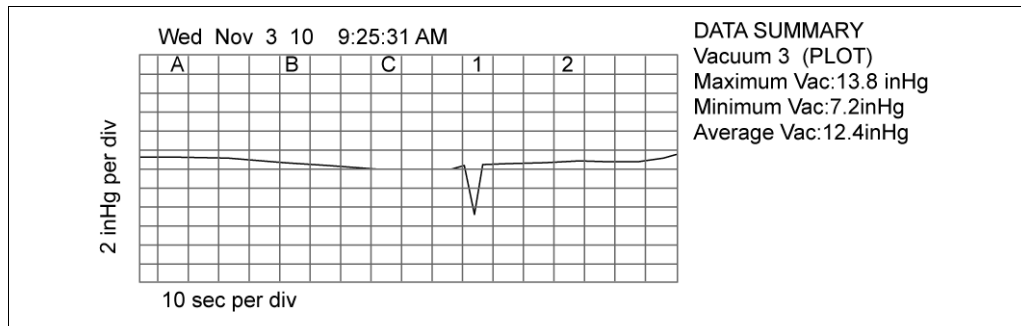


| | | | |
|-------------------------------|--|--|--|
| ANALYZING DATA PLEASE WAIT | | | |
|-------------------------------|--|--|--|

Event marker (4th channel)

To mark an event during a recording, press any number or letter key on the keypad. The moment the key is pressed, the corresponding number or letter is displayed at the top of the graph marking a moment of time.

The following example shows the letters and numbers displayed at the top of the graph marking a moment in time in relation to the recorded event.



Recording without printing

It is not necessary to print while recording. Records can be saved to memory and printed out later. This method can be used to;

- Allow the operator to freely move about while recording without having to deal with the paper.
- Continue to record if you run out of paper.
- Continue to record if the battery is running low. To record without printing;

Remove the paper from the printer

Turning the power on when there is no paper will result in an error message.

Press the ENT key to clear the message.

ERROR
PAPER OUT

ENT

Removing the paper while power is on will result in an error message.

Press the ENT key to clear the message.

ERROR
PRINTER DOOR

ENT

To remove the paper while recording.

Press the F1 key to halt recording.

| | | | |
|---------|-------|---------|----|
| Working | | 0:00:05 | |
| Halt | Abort | END | |
| F1 | F2 | F3 | F4 |



Remove paper.

The PRINTER DOOR error will appear.

Press the ENT key to clear the message.

| |
|-----------------------|
| ERROR PRINTER DOOR |
|-----------------------|



Press the F1 key if you choose to proceed without printing.

| | | | |
|-----------------|----|----|----|
| PROCEED NO PLOT | | | |
| Yes | | | No |
| F1 | F2 | F3 | F4 |

**Note:**

Setting all channels to off in the plotting setup will only stop the graphical portion of the printout. The report will still print a header and summary of the recording.

Error messages

If the memory is full when you enter the print screen.

- The message will display for 3 seconds and then go to the PRINT screen.
- You may continue to print recordings without saving them to memory.
- Clear some recordings from memory to make room for new recordings.

Warning
CAN'T SAVE RCDG

When entering a note, if you type beyond the maximum number of characters you will receive this error message.

ERROR
NOTE FULL

Press the ENT key to return to the previous screen.

If the printer runs out of paper during a recording you will receive this error message.

ERROR
PAPER OUT

Press the ENT key to return to the main menu.

When trying to save a recording, if the memory is full you will receive this error message.

ERROR
CAN'T SAVE RCDG

Press the ENT key to return to the PRINT screen.

Enter a header (Hdr)

Pressing the F2 key from the PRINT screen allows the user to enter a header which will print at the beginning of each recording allowing the printout to be easily identified by farm name, type of system, etc.

| PRINT | | | |
|-------|-----|-----|------|
| Str | Hdr | Cap | EXIT |
| F1 | F2 | F3 | F4 |



ENTER HEADER:

ENT

- Use the keypad to type 4 lines up to 16 characters each line.
- Press the ENT key when you have completed typing.

**Note:**

If you type beyond the maximum number of characters before pressing ENT, you will receive this error message.

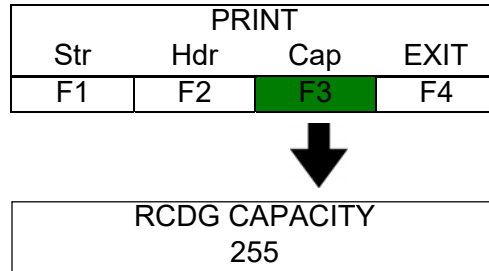
ERROR
HEADER FULL

ENT

- Press the ENT key to return to the previous screen.

Check memory capacity (Cap)

Pressing the F3 key from the PRINT screen allows the user to view the recording capacity that is remaining for the internal memory.

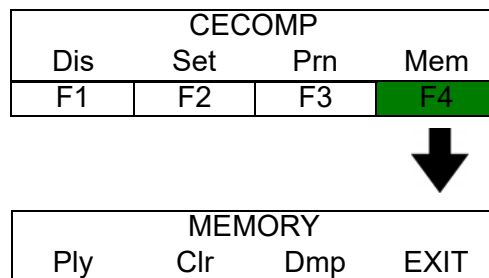


- The RCDG CAPACITY screen will be displayed for 3 seconds and return to the PRINT screen.
- There is a maximum of 255 recordings which can be stored in memory.
- Recordings are numbered sequentially from 1 to 255.
 - The numbers will continue to increase up to 255 and then start over again at 1.
 - As each recording is saved the capacity is decreased by 1.

5.8.4 F4 (Mem) MEMORY

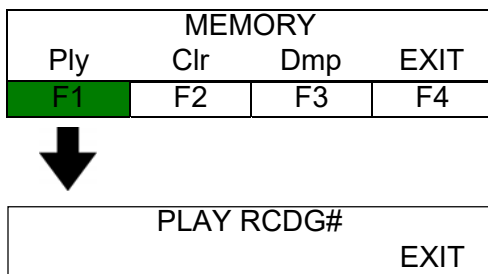
Pressing the F4 key from the main menu switches to the MEMORY menu.

The MEMORY menu allows the user to play a recording from memory, clear recordings, download recordings to a computer or return via EXIT to the main menu.



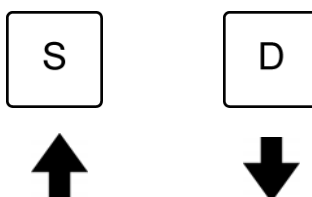
Play recordings (Ply)

Press the F1 key in the MEMORY screen to play a recording from memory.

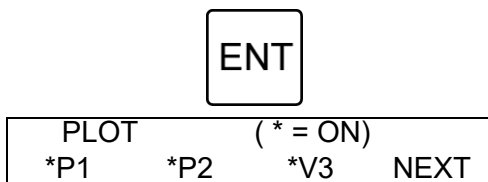


Choose a recording to view by using one of the following procedures.

- Use the numeric keys to enter a recording number from 1 to 255.
- Press the "S" key repeatedly to step up through the recordings currently stored in memory.
- Press the "D" key repeatedly to step down through the recordings currently stored in memory.



- When the correct entry is displayed, press the ENT key.



The PLOT menu allows the user to choose which channels will plot.

- Pressing a function key (F1, F2, or F3) from the PLOT screen toggles between ON and OFF for that channel.
 - An asterisk (*) will appear next to the inputs which were set to plot when recorded.
 - You may plot any channel from memory.
 - Up to 3 channels may be plotted simultaneously.

| | | | |
|------|-----|----------|------|
| PLOT | | (* = ON) | |
| *P1 | *P2 | *V3 | NEXT |
| F1 | F2 | F3 | F4 |



| | | | |
|------|----|----------|------|
| PLOT | | (* = ON) | |
| *P1 | P2 | *V3 | NEXT |

| | | | |
|------|----|----------|------|
| PLOT | | (* = ON) | |
| *P1 | P2 | *V3 | NEXT |
| F1 | F2 | F3 | F4 |



| | | | |
|------|----|----------|------|
| PLOT | | (* = ON) | |
| *P1 | P2 | V3 | NEXT |

Only P1 will print

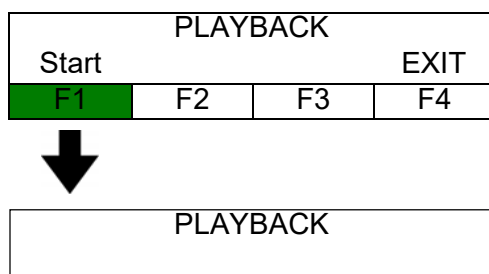
- Press the F4 key to go to the PLAYBACK screen.

| | | | |
|------|----|----------|------|
| PLOT | | (* = ON) | |
| *P1 | P2 | V3 | NEXT |
| F1 | F2 | F3 | F4 |



| | | |
|----------|--|------|
| PLAYBACK | | |
| Start | | EXIT |

- Press the F1 key to start the playback.
 - The PLAYBACK screen will be displayed during playback.
 - After the playback is complete you will go to the main menu.

**Note:**

Any or all of the 3 recording input channels may be set to plot. The fourth channel used for marking events will always be plotted.

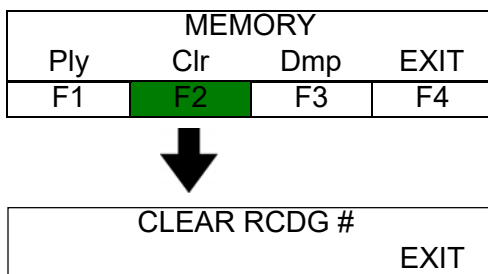
**Note:**

All recordings played back from memory will be plotted at the fast speed.

Clear recordings (Clr)

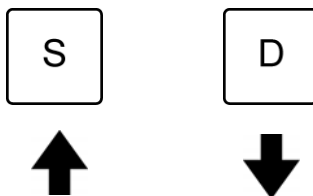
Clearing individual recordings

Press the F2 key in the MEMORY screen to clear a recording from memory.

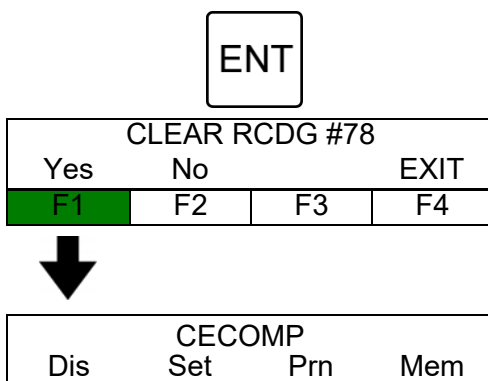


Choose a recording to clear by using one of the following procedures.

- Use the numeric keys to enter a recording number from 1 to 255.
- Press the "S" key repeatedly to step up through the recordings currently stored in memory.
- Press the "D" key repeatedly to step down through the recordings currently stored in memory.



When the correct entry is displayed, press the ENT key.



Press the F1 key to clear the recording and return to the main menu.

Clearing all recordings

Press the F2 key in the MEMORY screen to enter the CLEAR RCDG screen.

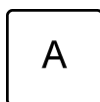
| MEMORY | | | |
|--------|-----|-----|------|
| Ply | Clr | Dmp | EXIT |
| F1 | F2 | F3 | F4 |



| | |
|--------------|------|
| CLEAR RCDG # | EXIT |
|--------------|------|

Press the A key to clear all recordings currently stored in memory.

| | |
|--------------|------|
| CLEAR RCDG # | EXIT |
|--------------|------|



Press the F1 key to clear all recordings.

| CLEAR RCDG #all | | | |
|-----------------|----|------|----|
| Yes | No | EXIT | |
| F1 | F2 | F3 | F4 |



| Are you sure ?? | | | |
|-----------------|----|------|----|
| Yes | No | EXIT | |
| F1 | F2 | F3 | F4 |

Press the F1 key to confirm clearing all recordings and return to the main menu.

5.9 Downloading recordings to a computer

Step by step procedure to make a proper connection and disconnection between the TriScan 2+ and the PC for a USB data dump



Caution

To prevent errors it is important to follow the steps in the exact order listed.

- Power up both the TriScan 2+ and the PC.
- Connect the USB cable to the TriScan 2+.
- Connect the USB cable to the computer
- Press the F4 key in the main menu.

| CECOMP | | | |
|--------|-----|-----|-----|
| Dis | Set | Prn | Mem |
| F1 | F2 | F3 | F4 |



| MEMORY | | | |
|--------|-----|-----|------|
| Ply | Clr | Dmp | EXIT |

Press the F3 key in the MEMORY screen to dump a recording from memory.

| MEMORY | | | |
|--------|-----|-----|------|
| Ply | Clr | Dmp | EXIT |
| F1 | F2 | F3 | F4 |



| DUMP SELECT | | | |
|-------------|--------|--|------|
| USB | SERIAL | | EXIT |

Press the F1 key in the DUMP SELECT screen to activate the USB port.

| DUMP SELECT | | | |
|-------------|--------|----|------|
| USB | SERIAL | | EXIT |
| F1 | F2 | F3 | F4 |



| USB ACTIVE | | | |
|------------|--|--|------|
| | | | EXIT |

Note:

The SERIAL dump is available via the RS232C serial port on the TriScan 2+ back panel. Contact the factory technical representative for information.

The TriScan 2+ will appear on the PC as a removable disk.



Files are in a text format and may be moved, copied, or deleted as desired.



Note:

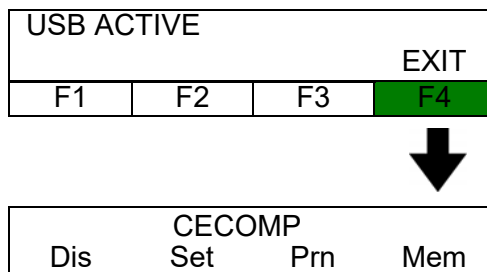
Each recording is made up of two files. The DEF file is a definition file containing channel configurations and data summaries. The TXT file contains the recorded data points and events.



Caution

In the TriScan 2+ folder there is a file labeled “TRI2.INI” that must not be modified or deleted.

Pressing the F4 (EXIT) key will deactivate the USB port and return to the main menu.



Caution

Improper procedure when connecting or disconnecting the TriScan 2+ and the PC may cause an error message on the PC. Reconnect the TriScan 2 + and the PC using the proper procedure.

5.10 Plotter formats and data summaries

Vacuum

Vacuum can be plotted at three different speeds.

- The speed is altered according to the other channel settings.

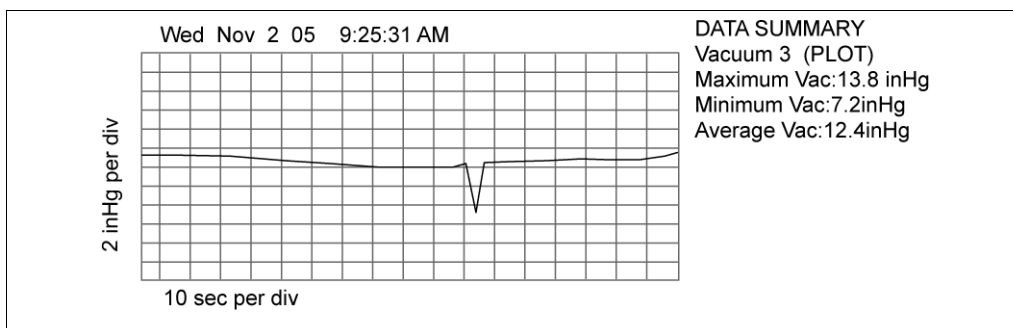
The data summary includes;

- The channel which was recorded and indicates if plotted.
- The maximum vacuum level recorded.
- The minimum vacuum level recorded.
- The average vacuum level recorded.

There are no minimum data collection requirements for the algorithm.

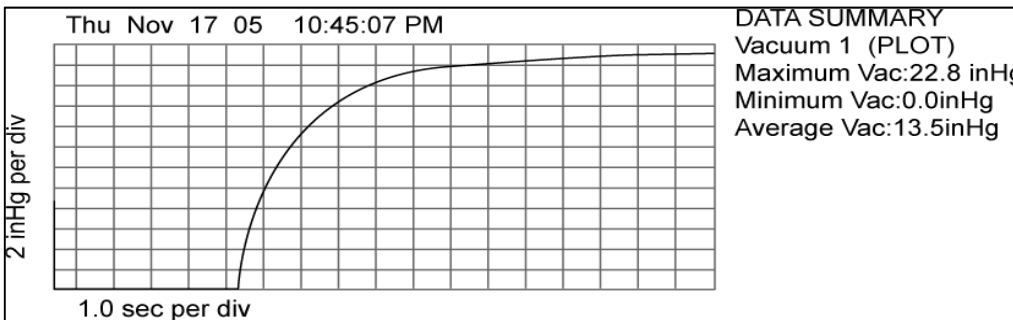
Vacuum slow speed

Sampling rate is 8 readings / second.



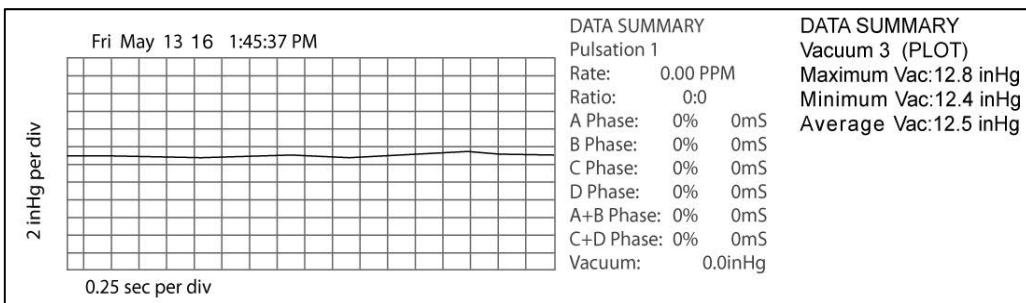
Vacuum medium speed

Sampling rate is 80 readings / second.



Vacuum fast speed

Sampling rate is 500 readings / second.



Voltage

Voltage can only be plotted at the slow speed.

The data summary includes;

- Which voltage was recorded and indicates if plotted.
- The maximum voltage level recorded.
- The minimum voltage level recorded.
- The average voltage level recorded.
- Sampling rate is 8 readings / second.

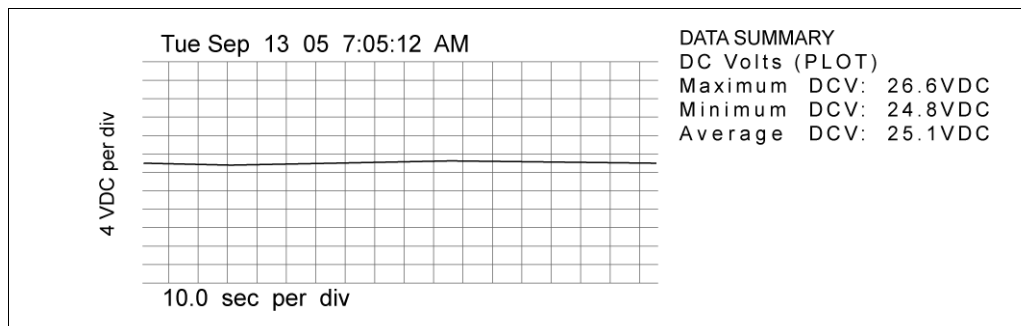
There are no minimum data collection requirements for the algorithm.

DC voltage



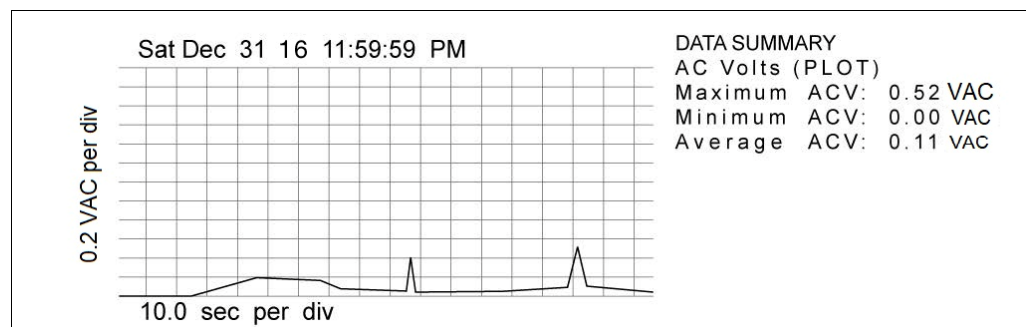
Caution

Check polarity before recording voltage inputs. Reversed polarity will give false results and peculiar recordings.



AC voltage

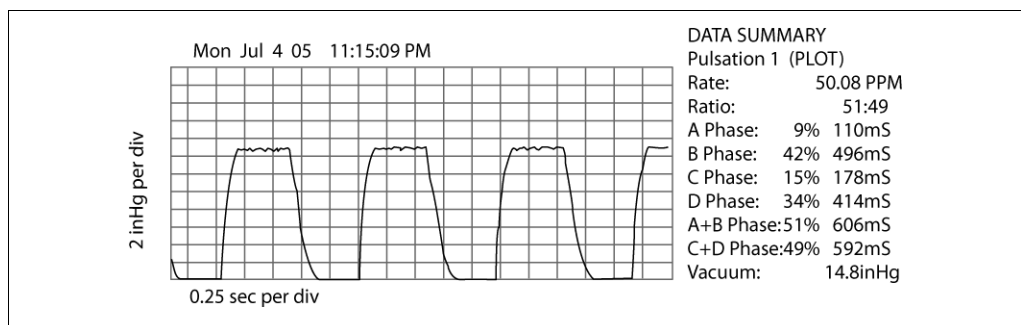
The AC voltage displayed is the RMS voltage.



Pulsation

Pulsation can only be plotted at the fast speed. The data summary includes;

- The channel which was recorded and indicates if plotted.
- The pulsation rate in pulsations per minute (PPM).
- The pulsation ratio (milk/ rest).
- The A, B, C, D, A+B and C+D phases in;
 - Percent of total (%)
 - Milliseconds (ms)
- The maximum vacuum level recorded.
- Pulsation limp on channel 2 (if two or more channels were recorded).
- Sampling rate is 1000 readings / second.



Note:

If the summary for a pulsation recording displays all zeros, there was insufficient data recorded for the pulsation algorithm.

Pulsation limp

Pulsation limp is displayed at the bottom of the summary whenever two or more pulsation channels are recorded.

- The pulsation trigger will operate on the first consecutive channel set to record pulsation.
- The computed value will always be expressed as a positive value.



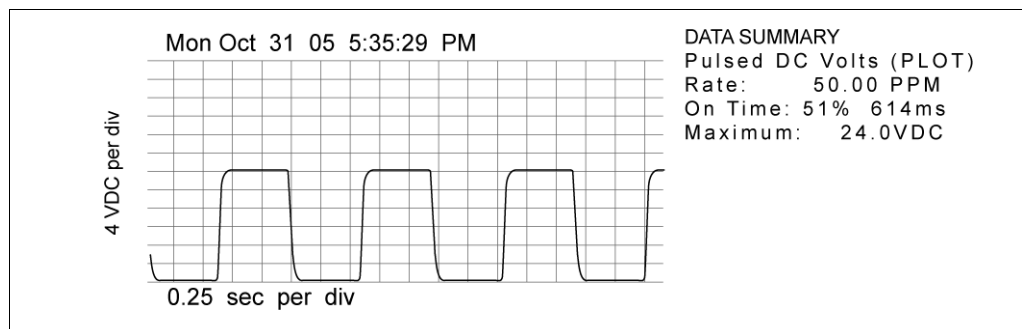
Note:

The trigger may give a brief delay at the beginning of a "timed" recording, or at the end of a "continuous" recording, but otherwise will have no effect.

Pulsed DC

Pulsed DC can only be plotted at the fast speed. The data summary includes;

- Indicates if plotted.
- The pulsation rate in pulsations per minute (PPM).
- The pulsation On time in
 - Percent of total (%)
 - Milliseconds(ms)
- The maximum voltage level recorded in voltage DC (VDC).
- Sampling rate is 1000 readings / second.

**Note:**

If the summary for a pulsed DC recording displays all zeros, there was insufficient data recorded for the pulsed DC algorithm.

6 Maintenance

The primary goal of the owner's maintenance program for the TriScan 2+ should be to avoid or mitigate the consequences of catastrophic failure of the unit. Planning, scheduling, coordination and communication throughout the operational team will help prevent equipment failure before it actually occurs and will help preserve equipment reliability. Operator maintenance should include cleaning the unit after use, battery charging and keeping records of any equipment anomalies. The ideal maintenance program should prevent any unexpected equipment failures

6.1 What is recertification of the TriScan 2+

Cecomp Electronics recommends recertification of the TriScan 2+ every 18 to 24 months to ensure that the unit meets original factory specifications and accuracy. Don't consider recertification as an action that merely fine-tunes your TriScan 2+. Recertification ensures that you can use your equipment safely and reliably. You should thus consider recertification as a form of quality assurance.

The recertification of the TriScan 2+ consists of the following:

As received test

- This is an initial "Start Up" test to ensure the unit satisfactorily completes all self tests and an initial technical evaluation of any customer/dealer listed issues.

Complete Visual Inspection of the unit

- This inspection is to verify that the external case and internal components/assemblies are not cracked, chipped or damaged.

Complete Diagnostic Testing/Failure Analysis of any customer/dealer listed issues

Battery Test

- This tests the overall function of the battery. The procedure for this test is as follows: TS2+ is configured so that all PCB (printed circuit boards) are operating under full load and printer prints continuously. To pass this test the unit must operate for at least two hours. If the unit is received with a "zero" charge on the battery, the unit is charged for at least 8 hours and this test is performed prior to diagnostic testing. If the battery does not pass the test it is considered "defective" and is replaced. After replacement the battery test is performed again.

Functional Test and cleaning of unit

- This is a test of all functional operations i.e. vacuum level , vacuum fluctuations, pulsations and printer and cleaning of interior and exterior

NOTE:

If during Inspection, Diagnostic testing/failure analysis, Battery test, or Functional test any defective components/assemblies are discovered the customer/dealer is provided an estimate for repair/replacement approval. After approval the defective components/assemblies are replaced and tests are repeated to ensure the unit operates properly to meet original factory specifications.

Calibration

- The calibration procedure is performed using equipment and procedures specifically designed to ensure that all TriScan 2+ functions are operating properly.

After completion of the above tests:

- The battery is fully charged using the Ccomp recommended charger
- A new roll of paper is inserted in the printer
- TS2+ certification certificate along with a TS2+ Repair/Service report is printed and included with the unit.

The unit is shipped back to the customer-dealer and they are invoiced for all applicable charges.

6.2 Returning a TriScan 2+ for Recertification

Before returning any TriScan 2+ for repair or recertification please obtain a Return Materials Authorization number (RMA#) by calling Ccomp Customer Service at 800-942-0315, or following instructions for service at api-usa.com.



Caution

Prior to sending the TS 2+ in for re-certification the customer-dealer should copy/remove all “customer” files stored in the TS 2+ memory. During re-certification/calibration all of the memory sectors will be re-formatted to ensure proper operation.

NOTE:

To ensure proper testing of the battery and the charging system during the battery test the charger that is used in the field must be returned with the unit. If no charger is returned with the unit Ccomp will assume that the charger is defective.

All returned items must be carefully packed to prevent damage in shipment and should be insured against possible damage or loss.

Include the RMA# and information regarding the reason for the return with the returned unit.

Shipping costs must be prepaid by the customer.

7 Operating faults

If necessary, please contact your nearest authorized technical dealer.

7.1 Fault messages and troubleshooting help

| Fault reported | Possible cause | Remedy |
|----------------------------|---|--|
| ERROR PRINTER DOOR | Door Open or Unlatched | Close printer door and press ENT to clear |
| ERROR PAPER OUT | No Paper | Load New Roll of Paper, press ENT to clear |
| ERROR CHANNEL OFFSET | Sensors not zeroed out | Remove Input source, turn unit OFF and ON |
| ERROR KEYBOARD | Defective Keyboard | Return for Repair |
| ERROR LOW BATTERY | Low Battery Charge | Recharge Battery Before further usage |
| ERROR CLOCK/CALENDAR | Low Clock Battery | Return for Service |
| ERROR NO INPUT(s) | Incorrect Set Up | Select Input(s) in SET UP |
| ERROR CAN'T FIND RCDG | Incorrect Set Up | Select/Enter different recording number |
| ERROR INVALID NUMBER | Incorrect Set Up | Select/Enter different recording number |
| ERROR NO RECORDING(s) | Incorrect Set Up | Take new recordings |
| ERROR CAN'T SAVE RCDG | Memory is Full | Clear Adequate Memory to proceed |
| ERROR HEADER FULL | User has attempted to enter more than 60 characters for the Header. | Press ENT Key to return to Editing menu. |
| ERROR NOTE FULL | User has attempted to enter more than 60 characters for the Note. | Press ENT Key to return to Editing menu. |
| Warning CAN'T SAVE RCDG | Memory is Full | Clear Adequate Memory to proceed |

8 Decommissioning

8.1 Temporary decommissioning

Disconnect all inputs and the power supply from the back of the TriScan 2+.
Remove the paper from the printer.



Caution

Never pull the paper out of the printer in the reverse direction of the paper feed! Serious damage to the printer will occur if the paper is pulled in reverse.

Store the TriScan 2+ in a location that provides protection against;

- Storage temperature 4°- 140°F [-20°- 60°C]
- Maximum storage time
- Moisture
- Frost
- External damage (jolts, knocks, rodents, insects, . . .)
- Direct sunlight



Caution

If the TriScan 2+ will be stored for more than a year remove the battery to prevent corrosion.

Recommissioning

Contact Cecom Electronics to determine if new software updates are available.

Charge the battery completely before the first use.

8.2 Final decommissioning/disposal

After final decommissioning, handle all components properly and dispose of them in accordance with all applicable local regulations on waste disposal and utilization.

Specifically;



Caution

Dispose of the battery in accordance with local laws on the disposal and recycling of sealed lead acid batteries.



Caution

Dispose of circuit boards in accordance with local laws on the disposal and recycling of circuit boards.

9 Accessory Kits

The recommended dealer for the TS2+ authorized accessory kits listed in this manual is:

Premier Dairy Services

Contact: Laurie J. Hughes

☎ 940 736-5844

✉ ljhughes@premierdairyservices.com

9.1 Accessory Kit #100

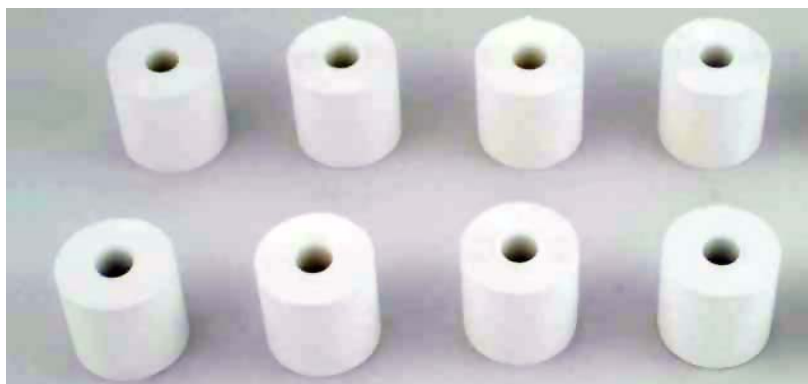
The TriScan 2+ Accessory Kit 100 can be used for testing peak milk flow claw vacuum, pulsation performance, and system vacuum.



| Part # | Description | Quantity |
|------------|--|----------|
| 100 | Kit #100 contains the following: | |
| 100-1 | Quick connect fittings for TS2+ rear connections | 4 |
| 100-2 | 14 gauge needles for inserting into the claw through the short milk tube | 2 |
| 100-3 | 12 gauge needles for wash slug monitoring | 2 |
| 100-4 | Filters (.45 micron, 30mm) | 4 |
| 100-5 | Hoses for testing vacuum - Length 3.5 foot each | 3 |
| 100-6 | Hoses for testing pulsation – Length 5 foot each, colored coded | 2 |
| 100-7 | 5/8" nipples | 2 |
| 100-8 | 3/4 " nipples | 2 |
| 100-9 | 1/4" nipples | 2 |
| 100-10 | Rubber hose sections for connecting needles, test hoses, filters and connections to the TriScan attachment fitting | 5 |
| 100-11 | Teat cup plugs | 4 |
| 100-12 | Thermal paper for TS2+ printer/plotter | 5 |

9.2 Accessory Kit #200

The TriScan 2+ Accessory Kit 200 is used to purchase replacement rolls of thermal paper for the TriScan 2+ thermal printer/plotter.



| Part # | Description | Quantity |
|------------|--|----------|
| 200 | Kit #200 contains the following: | |
| | Thermal paper for TS2+ printer/plotter | 8 |

9.3 Accessory Kit #300

The TriScan 2+ Accessory Kit 300 is used to purchase a NEMA 4X (IP 66) hard carrying case



| Part # | Description | Quantity |
|------------|-----------------------------------|----------|
| 300 | Kit #300 contains the following: | |
| | NEMA 4X hard carrying case, black | 1 |

10 Appendix**10.1 Specialist terms**

| Term | Explanation |
|-------------------|---|
| algorithm | A mathematical formula or set of steps for solving a particular problem. To be an algorithm, a set of rules must be unambiguous and have a clear stopping point. |
| ASCII | A standard set of codes used for representing alphanumeric information in a computer. |
| baud | Variable unit of data transmission speed. |
| dump | Down load to a computer. |
| limp | The difference between 2 recorded channels of pulsation displayed as a percentage. |
| millisecond | One thousandth of a second. |
| parity | The even or odd quality of the number of 1's or 0's in a binary code, often used to determine the integrity of data especially after transmission. |
| pulsed DC | Output voltage signal from an electric pulsation control. |
| pulsation trigger | The point at the beginning and end of a pulsation cycle when the vacuum crosses the lower vacuum threshold at the start of the A phase or the end of the D phase. This signal is used to begin a pulsation recording to insure 3 full cycles are achieved for data summary. |
| pulsed DC trigger | The point at the beginning and end of a pulsation cycle when the voltage crosses the lower voltage threshold at the start of the On time or the end of the Off time. This signal is used to begin a pulsed DC recording to insure 3 full On/ Off cycles are achieved for data summary. |
| RS-232 | A standard form of serial communication through a personal computer. |
| Transient voltage | Uncontrolled electric current injected into the earth, commonly called "stray voltage", neutral-to-earth voltage (NEV), neutral-to-ground voltage (N-G), or tingle voltage. |
| TriScan 2+ | Cecomp Electronics trademark for a dairy systems performance testing device. |

10.2 Abbreviations

| Term | Explanation |
|-------------|--|
| A | All |
| ACV | Alternating current voltage |
| AMPM | Midnight to noon or Noon to midnight |
| A Ph | A Phase |
| ASCII | American Standard Code for Information Interchange |
| AVG | Average |
| Bat | Battery charge |
| B Ph | B Phase |
| C | Adjust (clock and calendar) |
| Cal | Calendar |
| Cap | Recording capacity |
| CH1 | Channel 1 |
| CH2 | Channel 2 |
| CH3 | Channel 3 |
| CHG | Charge |
| Clr | Clear recording |
| Clk | Clock |
| Cont | Continuous |
| C Ph | C Phase |
| Dmp | Dump memory |
| D Ph | D Phase |
| DCV | Direct current voltage |
| Dis | Display |
| Div | Division |
| ENT | Enter |
| EXT | External |
| F1 | Function key 1 |
| F2 | Function key 2 |
| F3 | Function key 3 |

| Term | Explanation |
|-------------|-------------------------------|
| F4 | Function key 4 |
| GND | Ground |
| Hdr | Header |
| Hr | Hour |
| ID | Inner diameter |
| Inp | Input |
| LCD | Liquid crystal display |
| M | Main menu |
| Mtr | Meter |
| Max | Maximum |
| Mem | Memory |
| Min | Minimum or Minute |
| Mod | Record mode |
| Mth | Month |
| OD | Outer diameter |
| PDC | Pulsed direct current voltage |
| Plt | Plotter |
| Ply | Play recording |
| PPM | Pulsations per minute |
| Prn | Print |
| Puls | Pulsation |
| RCDG | Show recording |
| Rdg | Show recording |
| RMS | Root mean square |
| S | Step/Search |
| Set | Set up |
| Str | Start |
| Vac | Vacuum |
| Yr | Year |

| Units | |
|--------|-----------------------------|
| " (in) | Inches |
| °C | Degrees Celsius/ Centigrade |
| °F | Degrees Fahrenheit |
| inHg | Inches of mercury |
| kg | Kilograms |
| kPa | Kilopascal |
| lb | Pounds |
| m | Meter |
| mm | Millimeters |
| ms | Millisecond |
| s/ sec | Second |

10.3 Warranty

The TriScan 2+ is warranted to be free from deviations in material and workmanship for 1 year from date of purchase. During this time, and within the boundaries set forth in this warranty statement, Cecom Electronics, a division of Absolute Process Instruments Inc., will, at its sole discretion, correct the product problem or replace the product. This warranty shall not apply to product problems resulting from a) Improper application, improper installation, incorrect wiring, or operation outside of the approved specifications of the product; b) Accidents, power surges, power disruptions, power outages, static electricity, or improper voltages or currents; c) Inadequate site maintenance or preparation; d) Abuse, misuse, or unauthorized modification; e) Unexpected impediments to perform, unforeseeable or external events, acts of God, force majeure, weather and its effects, natural or man-made disasters, hazardous substances, condensation, fire, floods, earth movement, riots, military action, strikes, etc. The TriScan 2+ is not for use for, with, or in any medical devices or applications including, but not limited to, patient care, life support systems or medical research. Cecom Electronics assumes no responsibility or liability for any loss or damages resulting from use of this product in a medical or life support application. The TriScan 2+ is not for use for, with, or in any hazardous environments unless designated on the product. Customer will indemnify and hold Cecom Electronics harmless from any loss, cost or damage resulting from customer's breach of the provisions of this provision. This warranty is in lieu of all other warranties, expressed or implied, including but not limited to any implied warranty of merchantability, fitness, or adequacy for any particular purpose or use. Cecom Electronics shall not be liable for any special, incidental, or consequential damages, whether in contract, tort, or otherwise. In no event shall Cecom Electronics be liable for direct, indirect, special, incidental or consequential damages (including loss of profits or loss of time) resulting from the performance of this product. In all cases, Cecom's liability will be limited to the original cost of the product in question. Cecom Electronics reserves the right to make changes in the design, specifications, construction, and appearance of products without notice. Cecom Electronics may at its sole discretion discontinue support, warranty, or repair of products which it deems are obsolete or for which repair parts are no longer available. No employee or agent of Cecom Electronics has the authority to modify the terms of this warranty in any manner whatsoever without the express written permission of Cecom Electronics.

CECOMP®

OUR MISSION

- **Proactively provide our customers with cost-effective solutions to their industrial process measurement challenges.**
- **Be a leading manufacturer and global supplier of the highest quality industrial process measurement and custom engineered products.**
- **Offer value-added services and engineered solutions to meet the ongoing needs and requirements of our customers.**
- **Design our products to provide our customers with excellent performance and many years of reliable service in industrial environments.**
- **Continuously maintain the highest standards of quality and reliability for all products we manufacture.**
- **Maintain a long-term harmonious and mutually beneficial relationship with our merchant-dealers, customers, suppliers, employees, and shareholders**