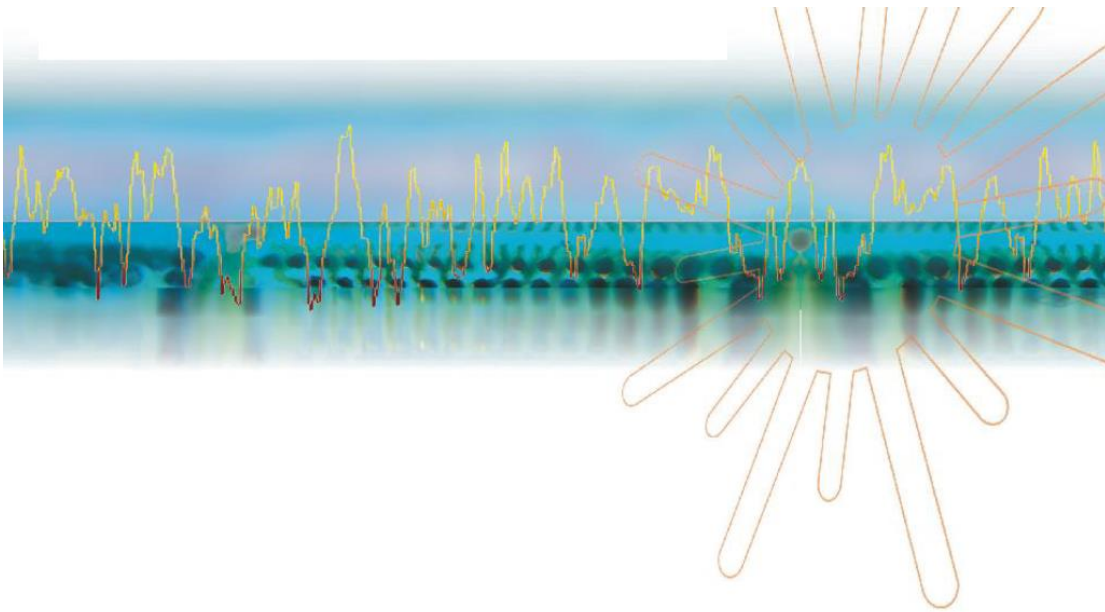




Proscan 2200

User Manual



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Documentation Version

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Components	Installed / Supplied	Notes
Sensor Type	Stil Chromatic	
Sensor Controller	Stil Prima CCS	
Sensor Display	7" Colour	
Camera	USB / Firewire CMOS	

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1.0 Introduction



1.1. Overview

The Proscan 2200 is a state-of-the-art non-contact surface measurement instrument which can be equipped with a range of chromatic and laser sensors. The Proscan is capable of rapid three-dimensional surface profiling at rates of up to 1,000 measurements per second and can achieve precise measurements even on polished or transparent surfaces with a resolution of 5nm.

A suite of available sensors with various working ranges and stand-off heights offers the capacity to optimise the measurement for a variety of surfaces, from medical and dental materials and ceramics to rough paper. The Proscan can be equipped to cater for virtually any measuring need.

1.2. Options

To accommodate clients' specific needs, this manual may include references to sensors, cameras and display interfaces that have not been supplied / installed on a particular system.

The sensors supplied with the Proscan 2200 system may incorporate one of two main types.

- S type Spectral Sensors, using Chromatic Confocal technology employing visible light.
- L type Laser Sensors, using ultra-high resolution 'blue' laser sensor technology.

Optionally, a camera may be incorporated to assist with setting up areas of interest and sample placement.

This manual includes references to the installed components as identified on Page 2.

- Chromatic Sensors
- Cameras
- Display Interfaces

1.3. Mechanical Construction and Technology

The Proscan 2200 is suitable for the most exacting of applications, and uses the experience gained from more than 25 years to create, what is probably the best of its kind.

Amongst its features are :

An all granite construction –
 Low thermal expansion
 High stability
 High rigidity
 Background noise rejection

Ultra high precision cross roller bearing table

Ultra-high resolution (20nm) invar linear scale – low thermal expansion

Contactless self –centring servo-motor technology – low mechanical noise
 Extremely high positional accuracy and repeatability
 Inaudible in operation

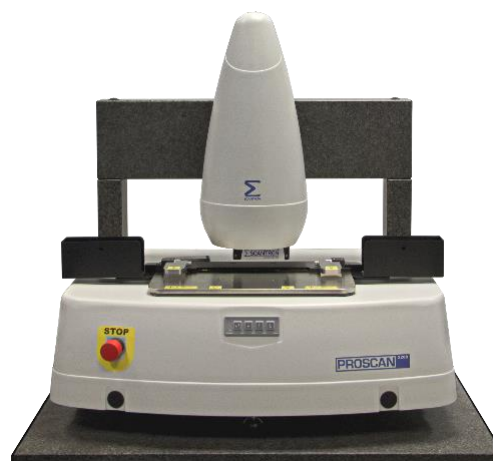
Real time electronics –
 Accurate
 Reliable
 Flexible

The Proscan 2200 Profilometer consists of a stand, containing the precision x/y/z table, motion control electronics, and a proprietary communication, control and data acquisition control board designed by Scantron. (Artemis).

A compact power supply module provides the required dc voltage to the stand, via a 3m long stainless steel sheathed umbilical cable.

1.4. The Stand

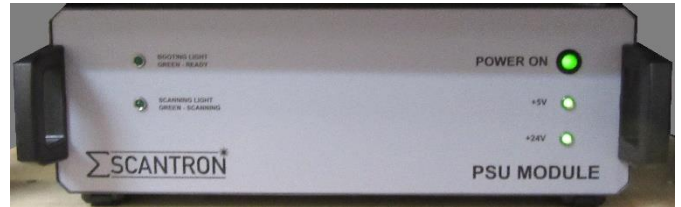
- Overall dimensions 740 mm x 542 mm x 835 mm max.
- Weight (standard version) 120 kg
- Scanning plate size 380 mm x 280 mm standard
- X and Y Travel 150 mm x 100 mm standard
- Z Travel 100 mm standard



120 kg weight: do not lift using the cover

1.5. Power Supply Module

- Overall dimensions 430 mm x 350 mm x 140 mm max
- Weight 6.1 kg
- Electrical Specification 100-110 or 220-240 VAC, 50/60 Hz
- (see product labelling)



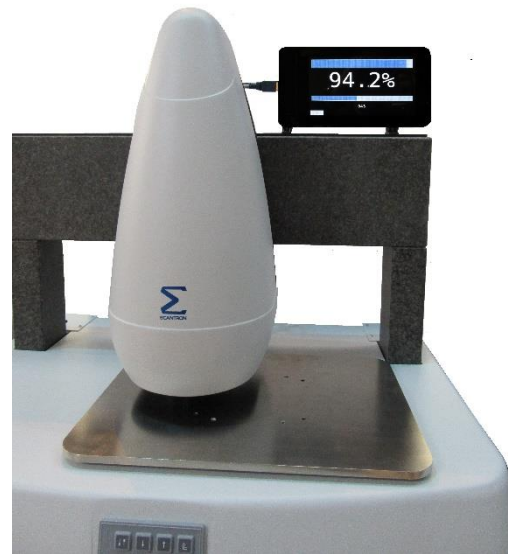
1.6. Chromatic Sensor Controller

- Technology Chromatic Confocal
- Working frequency Up to 2 KHz
- Sensitivity High
- Compatible optical pen CL-MG, OP, Everest and PROBE



1.7. Sensor Display

An optional dedicated sensor display may also be attached to indicate the current position in the sensor range.



1.8. Optical Pens

The optical pen or optical probe is the measuring head of the sensor. It is connected to the controller via an optical fibre. The sheath is generally orange in colour.

The various optical pens are defined by different measuring ranges and resolutions.

Each optical pen offers a working distance, a measurement dynamics, a spot size on the target as well as an angular opening of the light beam, making it unique.



2.0 Installation Considerations

2.1. Environment

The stand contains both mechanical and electronic components. It should be located in a sheltered, dry environment with temperatures controlled within 10 to 35 degrees C. Care should be taken to prevent excessive dust ingress, this may enter electrical and mechanical components with adverse effects including excessive mechanical wear, clogging of cooling fins etc.

If the Proscan is moved from a cold to a warm environment, allow at least 30 minutes for the temperature and dew-point to stabilise, before applying power.

Before taking measurements, it is recommended that the electronics and sensors are powered and allowed to warm up for approx 30 minutes. This allows the components to stabilise and provide optimum performance.

2.2. The Stand

The stand contains a precision X/Y table and forms the measuring bed for samples which are being analysed. Whilst taking measurements this table is in continuous motion, and, as such, it is important that consideration is given to its location and setup. In addition, the stand also houses custom communication, control, and data collection ARM PCB (Artemis board), and power electronic components. Subsequently it should not be placed near areas of extremely strong magnetic fields

The stand should be mounted on a very robust, vibration free, rigid surface. Do not place on an anti-vibration table as this likely to oscillate in reaction to the scanning motion. Vibration or motion of any sort will be translated to the measured surface and will adversely affect measurements. Purpose built steel and granite metrology tables can be supplied for use with this equipment, please contact scantron@scantronltd.co.uk for further details.

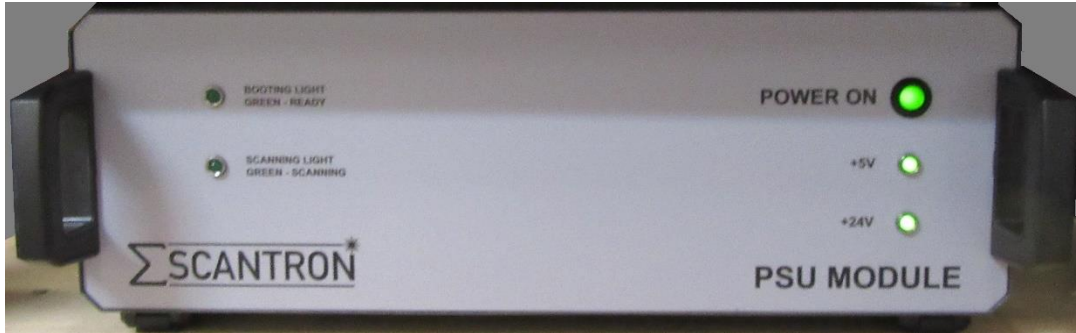
On the underside of the stand there are 3 adjustable feet, each fitted with a locknut. These feet must be set so that the stand sits firmly, and approximately level, with no trace of rocking or motion. Before attempting adjustment, the locknut should first be backed off using a 17 mm spanner, adjustment requires a 10 mm spanner. Once complete, retighten the locknut.



Exercise extreme caution when adjusting the stand feet. Use blocks to prevent the stand accidentally dropping

2.3. The Power Supply Module

The PSU Module contains power supplies and mains / DC power distribution. It needs to be installed in close proximity to the stand as the interconnecting cables are 3 m long. Generally the PSU Module is situated alongside the stand. Ensure there is adequate clearance (50 mm) around the enclosure ventilation holes.



Front panel

- BOOTING LIGHT - Unlit, Artemis board unpowered, or faulty.
Flashing, Artemis is powered and booted.
- SCANNING LIGHT - Unlit, no scans are currently being run or system is retracing a line in uni-directional scanning mode, i.e. not acquiring data.
Flashing, system is scanning a line and is acquiring data
- POWER ON indicator - Module is powered and switched on (green on 240 VAC, red on 120 VAC systems)
- +5 V LED - Indicates that the 5 VDC power supply is providing power
- +24 V LED - Indicates that the 24 VDC power supply is providing power

Back panel

- POWER ON switch - Top depressed, PSU Module is switched off.
Bottom depressed, PSU Module is switched on.

2.4. Power Requirements

The Proscan is manufactured to run on either 100-110 or 220-240 VAC, 50/60 Hz with a maximum load of 10 Amps, and a max inrush current (at cold power up) of up to 21Amps. It is not supply voltage switchable. Please see product labelling for information on the voltage applicable to your Proscan.

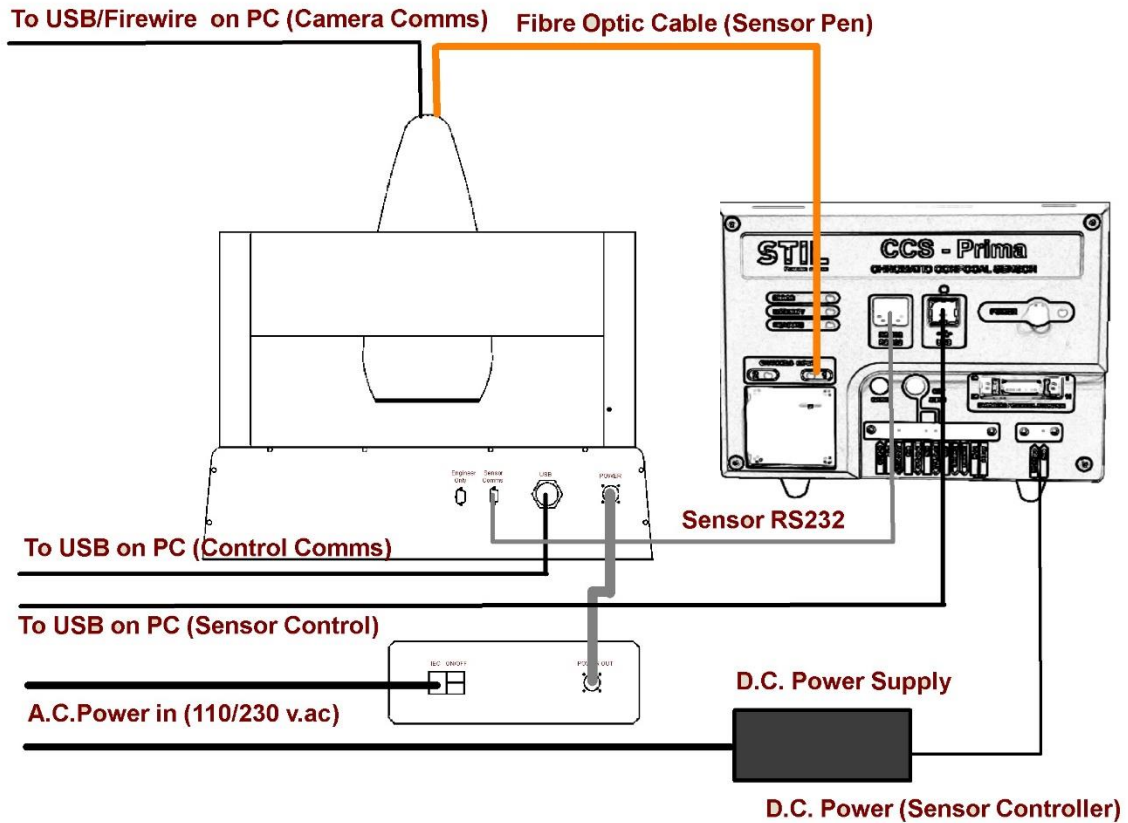
The power supply should be clean and free of high voltage transients.



Connecting an incorrectly rated power supply may cause catastrophic system damage

3.0 Connecting the System

3.1. Overview



The following section describes the connection sequence.

3.2. Communication cables

The system is supplied with all communication cables

These include:

- RS232 Sensor communication between Proscan and CCS controller
- USB (or Firewire) between Proscan and PC
- USB between CCS Controller and PC
- Fibre Optic cable between sensor pen and CCS controller



Care should be taken, when placing or routing the fibre-optic cable not to 'kink' or bend the cable in tight curves.

3.3. Connections to the rear of the PSU Module

Before connecting the main power umbilical to the PSU Module, please ensure that the system is disconnected from the electricity supply.

A basic system PSU Module, will look similar to the following illustration: -



Connect the stainless steel sheathed power cable labelled 'PSU POWER' to the 'POWER OUT' socket. The connector is keyed and can only be inserted in one orientation. Once inserted, rotate the collar clockwise until it locks on the locating pins, being mindful not to damage any of the pins by forcing the connector.

Connect an IEC power cable to the socket, and after checking that everything is safe, and that all cables are correctly connected at both ends, the PSU may be switched on using the rocker switch next to the IEC connector.

3.4. Connections to the rear of the stand

Only connect/disconnect cables with the system PSU Module fully powered down.

First connect the stainless steel sheathed power cable labelled 'STAND POWER' to the 'POWER' socket, the connector is keyed and can only be inserted in one orientation. Once inserted, rotate the collar clockwise until it locks on the locating pins, being mindful not to damage any pins by forcing the connector.

There is no connection to the female 9 way 'D' connector labelled 'ENGINEER ONLY'.



3.5. Main Power Connection

Once the cables are all firmly connected and suitably supported, power can be applied to the system, via the 10 Amp fused IEC connector on the rear panel of the PSU Module. A spare 20mm T 10A fuse is located in the connector fuse carrier, should it be required.

The system is switched on using the POWER ON rocker switch, immediately next to the IEC power inlet socket, and alongside the Serial Number label.



3.6. Switching On



Keep fingers and objects clear of the stand when powering the system for the first time !!

Once all the cables are in place and all objects are clear of the stand, it is safe to switch the system on.

On switching on the PSU module, the 5 and 24V LED indicators on the front of the Module should illuminate.

Correct booting of the Artemis board is indicated by the regular flashing of the 'BOOTING' light. This light will start flashing almost immediately upon powering up. Once flashing, the system is ready to use

Ideally, allow the sensor a few minutes to temperature stabilize.



Keep fingers and objects clear of the stand when entering software !!



Double clicking on the above icon will result in the following sequence of events:-

- The Proscan splashscreen will be displayed.
- The Z drive axis will move vertically upwards until it finds its home position. It will then move a short distance back down (only if Z drive homing is enabled in software).
- The X axis of the stage will make a small move in a positive direction (away from home in the bottom right hand corner). It will then move in a negative direction (towards home) until it finds its home position, when it will stop.
- Simultaneously, the Y axis of the stage will make a small move in a positive direction (away from home in the bottom right hand corner). It will then move in a negative direction (towards home) until it finds its home position, when it will stop.
- The full software screen will be displayed.

Please see the Software Manual for full information on operation of the software.

3.7. Switching Off

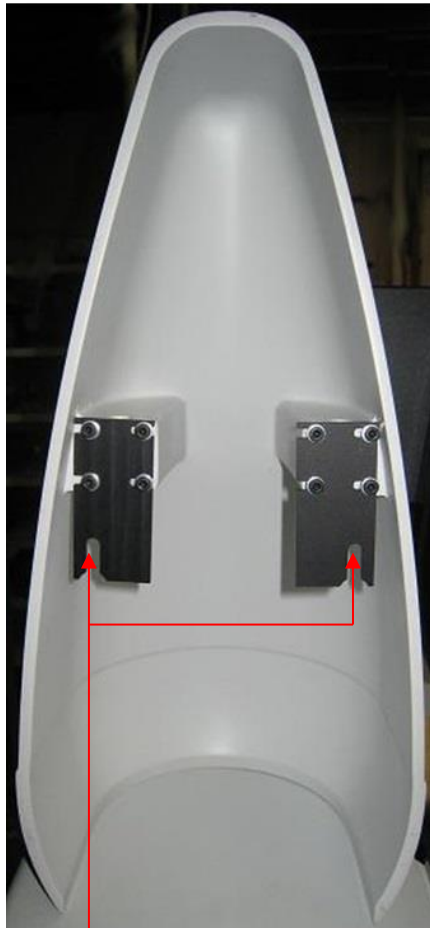
When powering down the system it is extremely important to follow the following procedure:-

- Save and close any scans that may currently be open in the Proscan software.
- Close Proscan software and confirm your choice to exit.
- Power down the PSU Module.
- Power down the sensor controller.
- Shutdown the PC and power down the monitor.

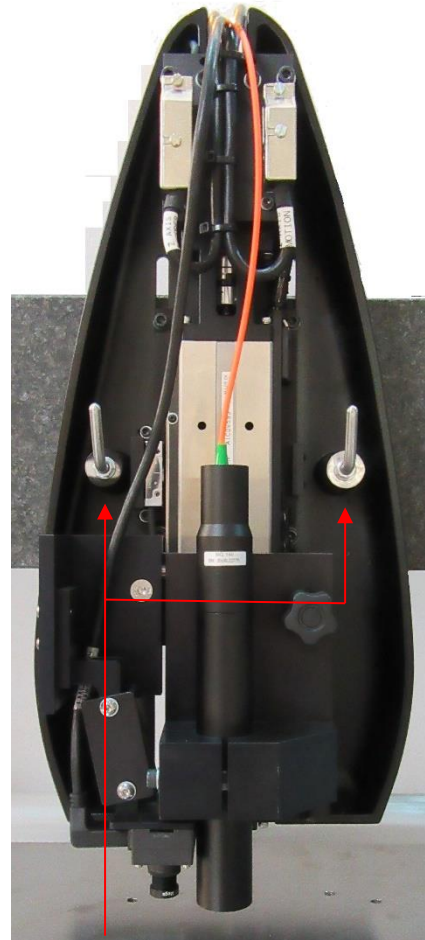
4.0 Changing the sensor

4.1. Removing the Nose Cone

To change sensor on the Proscan 2200, the nose cone must first be removed. Grip the nose cone on each side and lift towards you and upwards, off the machine. The nose cone rests on two rods which protrude from the z drive, these locate in the slots on the rear of the nose cone.



Slots
Nose cone



Locating rods
Z Drive

Replacement of the nose cone is the reverse of removal.

Please note the camera illustrated may differ from that installed.



Keep fingers and objects clear of moving parts !!

4.1.1. Changing 'S' Type Sensors

The orange optical fibre for required sensor needs to be plugged into the sensor controller. This is done using the green quick-change connectors. Push the connector firmly into the controller until a click is heard.

The optical fibre is delicate, take care when handling and route the fibre away from potential snag or crush areas.

If there is no sensor plugged into the controller; insert the blanking plug into the sensor input to prevent dust ingress.

After fitting an 'S' type sensor to the Proscan, ensure that the correct sensor is selected on the 'S' type control unit.

Select the correct sensor in the Proscan 2200 software.

Before taking measurements, allow the sensor to :-

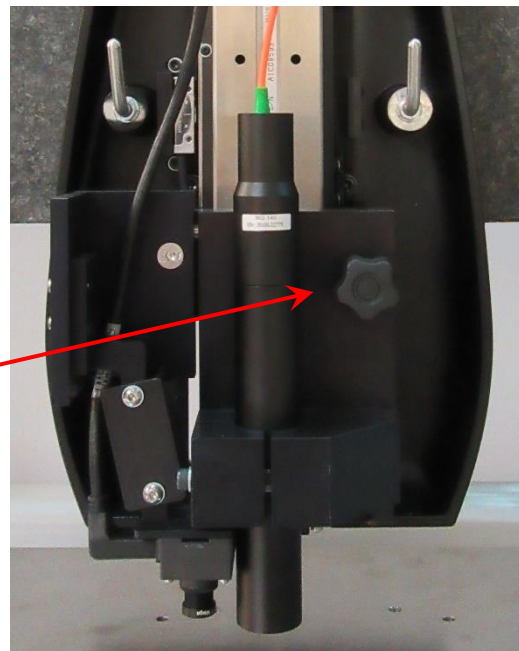
- Warm up fully (approx 15 minutes)
- Dark reference the sensor

Ensure unused sensors are stored where they not going to get damaged.

4.1.2. Sensor Mounting

The sensors are fitted onto a mounting plate which locates onto the front of the Z drive assembly via a 'V' groove and rod arrangement. They are held in place by a thumb screw.

Thumb screw



Select the sensor you wish to use, and place on the front of the Z drive, towards the right hand side, locate with the groove/rod arrangement. Tighten the thumbscrew until the sensor is held firmly in place.



Use of excessive force may lead to damage of the thumbscrew!!

Once the sensor has been changed, replace the nose cone. Select the appropriate sensor via the Tools/Sensor Selection menu in the Proscan 2200 software.

5.0 Dark Referencing

5.1. Acquiring the dark signal

The dark signal of the sensor is generated by undesirable back-reflections on the optical surfaces inside the sensor. This signal must be measured and saved to the non-volatile memory so that it can be subtracted from the measured signal. The level of the dark signal depends on the sampling rate and on the LED brightness.

A dark signal acquisition is performed during adjustment by the manufacturer, but must be repeated at regular intervals.

5.2. Recommendation

The dark signal acquisition procedure should preferably be performed at least a quarter of an hour after switching the sensor on, in order to ensure that sensor has reached thermal equilibrium.

Dark signal measurement may be launched by pressing the “Dark” button on the sensor front panel. This operation may take a few dozens of seconds, as the sensor measures and saves the dark signal at all pre-set frequencies successively.

In order to perform a dark signal acquisition, it is essential to have no object within the measurement field, or even better, to blank off the light beam by applying a piece of paper over the tip of the optical pen.

- Press the “Dark” button on the front panel of the sensor.
- The “Intensity” and “Measure” Led indicators
- on the front panel blink on and off in green alternatively, to indicate that the operation is in progress.
- Keep the optical pen tip blanked off. When measurement is done, the 3 LED indicators blink on and off simultaneously, and their colour indicates the result of the operation.



Green if the level of the acquired dark signal is satisfactory at all rates

Orange if the dark signal level is too high at low rates, but it is still possible to measure at higher rates

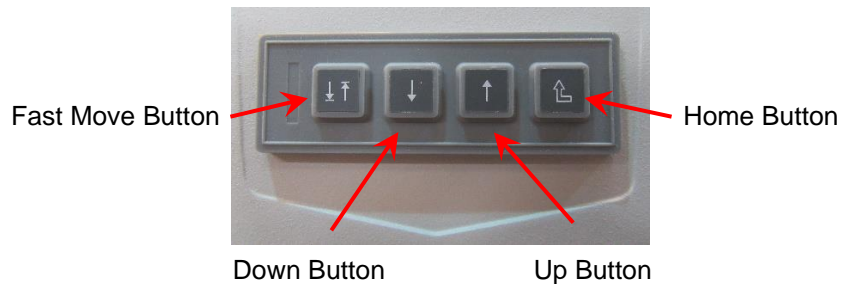
Red if the dark signal level is too high at all rates.

The piece of paper can now be removed and the sensor can be used in the normal way.

6.0 Manual Z Height Control Buttons

On the front of the Proscan Base there are four buttons to manually set the 'Z' axis height of the sensor. This assists the placement of the sample to be scanned and then setting the initial height of the sensor relative to the sample for optimum scan range. (Generally, 50% of the sensor range reading).

Setting the Z height control in the Proscan Software (Please refer to the software manual) enables the button functions.




It is essential that the 'Z' Axis is homed (fully up position) before attempting any height adjustment.

Holding the Fast Move Button simultaneously with the Up / Down button will set a higher move speed for initial placement. The final position can be 'fine-tuned' at the lower speed.

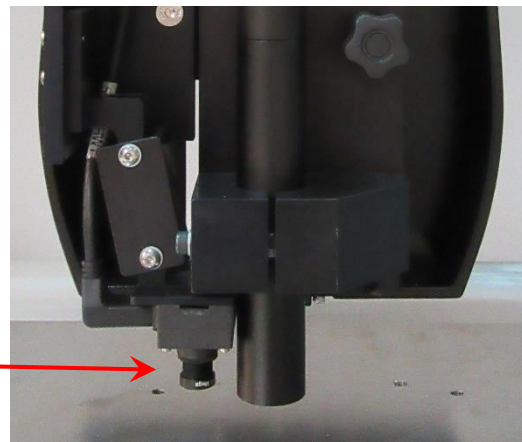
The sensor display is configured to show the percentage of the range, rather than height reading as the mid-range point would differ for a particular sensor pen.

7.0 Camera

The Proscan 2200 system may have, optionally, a camera installed to aid correct placement of test sample .

This is mounted in close proximity and height as the sensor pen. 

(Nose cone cover shown removed)



7.1. Camera Application

The display from the camera is supported by a utility named "ScantronCameraViewer"

As there is a physical offset from the camera's focal point, there is a facility built into the Key Move Stage control screen in the "Proscan" application that enables the user to move between the sensor / camera focus position. Please refer to the software manual.

8.0 Routine Maintenance

Scantron recommend an annual system Verification and routine maintenance regime be adopted.

Part	Description	Period
Z axis lead-screw	Apply THK multipurpose lithium EP grease to lead-screw	Every 12 months
X and Y rails	Apply ISO68 Slide-way oil to rails	Every 12 months
Sensor measuring head optics	Make sure laser optics are clean and free from dust. Clean using a lint free wipe and a small amount of methanol	Every 3 months \after handling \if data quality falls
X and Y axis linear encoder strip and readhead	Use a clean dry lint free cloth. Use only the following solvents sparingly with a wetted lint free cloth <ul style="list-style-type: none"> - Propan 2 ol (iso propyl alcohol) CH₃CHOHCH₃ - N Heptane CH₃(CH₂)₅CH₃ DO NOT use the following aggressive solvents to clean the scale <ul style="list-style-type: none"> - Acetone CH₃COCH₃ - Chlorinated solvents - Benzene - Methylated spirits 	Every 12 months \if readhead shows red
Cables	Check for wear\breakages	Every 12 months\as necessary

9.0 Troubleshooting

Fault	Possible reason	Action
On double clicking software icon, splash screen showing 'Scantron Proscan 2000' remains on screen and stage does not move	Electronics enclosure not plugged in/switched on	Plug in and switch on
	Stand stop pushed in	Pull stop firmly to out position, press 'Esc' key to enter software, close down and restart
	PSU module booting indicator is not lit	Wait for embedded PC to finish booting (< 10 secs) <i>Next</i> Turn off the PSU module, wait for 10 secs and then turn on again, waiting until the booting light is green <i>Next</i> Contact Scantron
	Cable connection problem	Check the power cable running from PSU module to stand
Power to the stand does not appear to be active	Power lead not plugged in	Ensure all leads are plugged in and switched on
	Fuse blown	Check fuse on back panel, and in power lead
	Internal PSU fault	Check all indicators on front of PSU module. If any of the indicators are not lit, contact Scantron
Software displays message: "The scan only contains invalid data and cannot be displayed"	Wrong sensor selected (i.e. sensor on system is not selected in software)	Go to Tools/Sensor Selection and chose the correct sensor. Also ensure sensor is selected on the S-type controller (if applicable)
	Sensor controller not switched on (S-type)	Turn sensor controller on
	Sensor out of range.	Go to Key Move Stage screen, ensure sensor is in range. Also ensure the sensor being used has enough range for the required task
	Scan was aborted	If a scan is aborted early there may be no data displayed. Allow scan to complete
System does not complete a scan	PC Energy saving settings. If the Dell PC is allowed to hibernate or enter standby mode whilst the system is scanning then the scan will not complete	As a factory default setting at Scantron, the PC energy saving settings are all turned off. Please check these settings in Windows to see if they have been changed. To do this right click on the desktop and go to properties. Screen savers do not affect operation
	Stop activated	Check and pull stop button

		out. Close Proscan software, power cycle the embedded PC, and re-start Proscan software
Z drive does not go home when software is started	Inhibit z drive set in software	In Tools/Configure there is a setting 'inhibit Z homing'. With this checked Z will not go home on start-up. This is sometimes useful to save time
Stage 'clunks' near the beginning or the end of a scan line	If a scan is being done near the limits of the table, stage could possibly hit the limit of travel if travelling at speed	Try to set scans up near the centre of the table
Software seems to freeze when doing analysis	The mathematics involved in such analysis can be very involved and may take a long time to complete	Avoid scans with over 8,000,000 data points. Try using a matrix scan if a large area scan is required
Error message "setup does not lie within stage area (100.00mm, 100.00mm). Please check your settings" in new scan mode	Stage has a fixed size so cannot scan areas larger than 100mm by 100mm	Check that your scan parameters are not going to take you outside of the stage range from your start position
No picture in camera software	Camera not in focus	Rotate focusing ring on camera to adjust focus
	Lens cover is still on the camera	Remove the Nose Cone lens cover and replace Nose Cone again
	Camera not plugged in.	Check camera connector on top of camera. If camera is still not working, contact Scantron
Poor measurements from S-type sensor.	Sensor head is dirty	To remove dust, use a pressurised can of pure dry gas To remove grease, carefully use a soft lint free cloth, with either methanol or trichloroethylene The sensors have a special coating with can be damaged by aggressive chemicals. Do not use solvents
	Sensor needs a dark reference	See appendix on dark referencing
	Sample rate too high	Lower sample rate

10.0 Appendix A

10.1. Declaration of Conformity

EC – DECLARATION OF CONFORMITY

We, as the manufacturer, declare under our sole responsibility, that the product listed below to which this declaration relates, is in conformity with the following standard(s) or standardisation documents

- **DIN EN 60825-1:2014 Laser classification.** According to DIN EN 60825-1:2014 or IEC 60825-1:2014, LS23/4 sensor is rated as laser class 2M. If a safety distance of 280 mm or more is maintained, there is no risk to the eyes from this device
- **BS EN 61010-1:2010.** Safety requirements for electrical equipment for measurement, control, and laboratory use General requirements
- is no risk to the eyes from this device, see *Safety distance NOHD*,
- **BS EN 61326-1:2013.** Electrical equipment for measurement, control and laboratory use. EMC requirements General requirements
- **BS EN 61326-2-1:2013.** Electrical equipment for measurement, control and laboratory use. EMC requirements Particular requirements. Test configurations, operational conditions and performance criteria for sensitive test and measurement equipment for EMC unprotected applications
- **BS EN ISO 12100:2010.** Safety of machinery. General principles for design. Risk assessment and risk reduction
- **BS EN ISO 13849-1:2008.** Safety of machinery. Safety-related parts of control systems General principles for design
- **BS EN 349:1992+A1:2008.** Safety of machinery. Minimum gaps to avoid crushing of parts of the human body

Following the provisions of the following directives

- **2006/95/EC** Low Voltage Directive
- **2004/108/EC** EMC Directive
- **2006/42/EC** Machinery Directive

Manufacturer : Scantron Industrial Products Ltd,
Monarch Centre,
Venture Way,
Taunton,
Somerset TA2 8DE
United Kingdom

Product : Proscan 2100



Mr Lars Lindstrand
Managing Director – Scantron Industrial Products Ltd

10.2. Contacting Scantron

Postal Address: SCANTRON INDUSTRIAL PRODUCTS LTD
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TA2 8DE
England

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Fax: +44 (0)1823 333684

e-mail: scantron@scantronltd.co.uk

Internet: www.scantronltd.co.uk

10.3. Warranty

The equipment is covered by a 12-month warranty period. The warranty period starts from the commissioning date. During the warranty period Scantron will replace or repair, free of charge any defective parts or components. These operations will be carried out at our works at Taunton, England. Shipping and packing charges are to be paid by the buyer. Whenever the size or type of the equipment are such that it cannot be easily shipped, Scantron will despatch spare parts and service personnel to the buyers facility to carry out the repair at its own expense. The buyer will cover the shipping costs of the parts and the travelling and accommodation costs of the personnel. The buyer will leave the defective equipment at our disposal for a period no longer than 1 month to complete the repair. The warranty does not cover damages caused by carelessness or improper use. The warranty is invalidated if the equipment is altered or repaired by the buyer or third parties without prior authorisation from Scantron.

Important Note:

Any changes made to the system whether hardware or software without written agreement from Scantron will invalidate the warranty.

11.0 Appendix B

11.1. Basic System Components

1	PSU Module	1
2	Stand	1
3	Dell PC	1
4	Dell keyboard, USB connector	1
5	Dell mouse, USB connector	1
6	Dell 22" Widescreen LCD monitor	1
7	IEC Power leads.	3
8	Monitor cable, 1.5 m, with 15 way high density M/M 'D' connectors	1
9	Power umbilical, 3 m cable, stainless steel sheathed. Stand end connector 19 way QM female' Labelled 'POWER IN'. Stack end connector	1
10	Ethernet cable, 5 m, with RJ45 connectors. Labelled 'ETHERNET' and 'DELL PC'	1

11.2. S type Spectral Sensors

11	'S' Type Sensor Controller. Standalone sensor control unit	1
12	'S' type sensor/sensors fitted to a thumbscrew mounting bracket (mounts onto stand z drive) and complete with quick change fibre optic cable. Labelled according to sensor type	Varies
13	IEC Power lead	1
14	3 m, serial cable with 15 way M and 9 way M 'D' connectors. 15 way end labelled 'SENSOR' (connects to the stand). 9 way end labelled 'SENSOR' (connects to the sensor controller)	1

11.3. L type Laser Sensors

15	'L' Type Laser Sensor Controller. Contained within the PSU Module. Not visible from outside	Varies
16	'L' type sensor/sensors fitted to a thumbscrew mounting bracket (mounts onto stand z drive) and complete with 2 m flying lead and with female, 14 pin, in line, round connector. Labelled according to sensor type	Varies
17	2m flying lead coming from the rear of the PSU Module with male 14 pin, in line, round connector. Labelled according to the sensor type	Varies

11.4. Camera Option

18	Camera fitted to mounting bracket (mounts onto stand z drive)	1
19	3 m Firewire cable. Labelled 'DELL PC' and 'CAMERA'	1