

sylvac

SYLVAC-Scan 25
SYLVAC-Scan 50
SYLVAC-Scan 50 CE Plus
SYLVAC-Scan 50 Plus

User's manual

Contents

| | | |
|-----------|--------------------------------------------|----|
| 1. | Introduction | |
| 1.1 | Introduction | 4 |
| 1.2 | Safety Notice | 3 |
| 1.2.1 | Follow the indications in the instruction | 4 |
| 1.2.2 | User obligations | 4 |
| 1.2.3 | Personnel obligations | 4 |
| 1.2.4 | Danger in using the system | 4 |
| 1.2.5 | Use in accordance with intended usage | 5 |
| 1.2.6 | Guarantee and responsibility | 5 |
| 1.2.7 | Organisational equipment | 5 |
| 1.2.8 | Protective equipment | 5 |
| 1.2.9 | Informal safety measures | 5 |
| 1.2.10 | Personnel training | 5 |
| 1.2.11 | Control of the system | 6 |
| 1.2.12 | Safety measures in normal operation | 6 |
| 1.2.13 | Electrical hazards | 6 |
| 1.2.14 | Maintenance and repair, fault finding | 6 |
| 1.2.15 | Constructional modifications to the system | 6 |
| 1.2.16 | Cleaning the machine and waste disposal | 7 |
| 1.2.17 | System noise | 7 |
| 1.3 | System Description | 8 |
| 1.4 | Specification SYLVAC-Scan 25 | 10 |
| 1.5 | Specification SYLVAC-Scan 50 | 11 |
| 1.6 | Specification SYLVAC-Scan 50 Plus | 12 |
| 1.7 | Specification SYLVAC-Scan 50C plus | 13 |
| 2. | Installation | |
| 2.1 | Visual Inspection | 14 |
| 2.2 | Lifting SYLVAC-Scan 25 | 14 |
| 2.3 | Lifting SYLVAC-Scan 50 and 50 Plus | 15 |
| 2.4 | Installing The System | 15 |
| 2.5 | Electrical Connections | 15 |
| 3. | Workholding | |
| 3.1 | General | 17 |
| 3.2 | Headstock | 17 |
| 3.3 | Tailstock | 17 |
| 3.4 | Tooling | 17 |
| 4. | Operation - Quick Guide | |
| 4.1 | Measurement Principle | 18 |
| 4.2 | Start-Up | 19 |
| 4.3 | Calibration Mode | 19 |
| 4.4 | Calibrate a Profile Gauge | 20 |
| 4.5 | Calibration Faults | 20 |
| 4.6 | Measurement Mode | 20 |
| 4.7 | Start a Measurement Program | 21 |
| 4.8 | Shut-Down | 21 |
| 5. | Maintenance | |
| 5.1 | Schedule maintenance | 22 |
| 5.2 | Cleaning and Lubrication | 22 |
| 5.3 | Mechanical SYLVAC-Scan 50 and 50 Plus | 23 |
| 5.4 | LED | 24 |

| | | |
|-----------|------------------------------------------------------------|-----------|
| 5.5 | Limit Switches and Linear Scale Reader | 24 |
| 5.6 | Calibration values of 'daily setting piece | 24 |
| 6. | Trouble Shooting | |
| 6.1 | Troubleshooting | 25 |
| 6.2 | Start-Up Problems | 25 |
| 6.3 | Error Messages | 26 |
| 6.3.1 | Pro-Measure Error Messages | 26 |
| 6.3.2 | Pro-Composer General Error Messages | 30 |
| 6.3.3 | Pro-Composer Defining Measurements Error Messages | 31 |
| 6.3.4 | Pro-Composer Import DXF Error Messages | 32 |
| 7. | EC Conformity declaration ISO/CEI guide 22 + EN4504 | 33 |
| 8. | Guarantee | 33 |
| 9. | Notes | 34 |

1 Introduction

1.1 Introduction

The SYLVAC Scan range of non-contact measuring systems from SYLVAC SA is based on proven technology used in many standard and special purpose measuring systems. The machine is controlled using Pro-Measure and Pro-Composer Software running under the Windows 7 Professional.

The SYLVAC Scan Gauge Manual contains hardware information and a comprehensive On-line Help system contains full software and machine operation instructions.

Warning: The printed SYLVAC Scan Gauge manual, Pro-Measure Software and Pro-Composer Software On-line Help, should be read carefully before operation to ensure operator safety and accurate measurement results.

1.2 Safety Notice

Precautions

The SYLVAC-Scans have been designed with safety in mind. However, improper actions during installation or use can lead to damage to the machine. The following precautions must be taken to ensure safe and effective use of the machine.

1.2.1 Follow the indications in the instructions

- The original and reference instructions are the French version. All other versions are only translations. In all cases an original version must be in your possession.
- These instructions, in particular the safety instructions, must be observed by all persons working on the machine.
- In addition the accident prevention rules and instructions in force in the place of use must be respected.

1.2.2 User obligations

The user agrees to allow work on the machine only by persons:

- Who are familiar with the basic instructions for workplace safety and accident prevention and who have been trained in the use of the machine and:
- Who have read and understood the chapter devoted to safety and the safety warnings in these instructions.

1.2.3 Personnel obligations

All persons required to work on the machine agree before starting their work to

- Observe the basic workplace safety and accident prevention instructions
- Read the chapter devoted to safety and the safety warnings in these instructions

1.2.4 Dangers in using the machine

The SYLVAC-Scan (25; 50 series) machine has been constructed according to the state of the art and recognised safety rules. Its use does however present dangers for bodily integrity or damage to the machine or other objects. The machine must only be used

- For uses in accordance with the intended usage
- In an impeccably safe condition.

Malfunctions that could compromise safety must be eliminated immediately.

1.2.5 Use in accordance with intended usage

The SYLVAC-Scan machine is intended solely for contactless measurement. Any other use or a use outside the intended use is considered as non-conforming. The SYLVAC SA Company does not accept any responsibility for damage that could result from this. Use in accordance with intended usage also includes

- Compliance with all the instructions in the operating procedure
- Compliance with inspection and maintenance work

1.2.6 Guarantee and responsibility

Our “General conditions of sale and delivery” are generally valid. These conditions are available to the user at the latest during the conclusion of the contract. Claims for guarantee and responsibility for bodily injury and material damage are excluded if they can be attributed to one or more of the following causes:

- Use of the machine not in accordance with the intended use
- Inappropriate assembly, commissioning, use or maintenance
- Use of the machine despite defective, incorrectly fitted or inoperable safety devices
- Failure to observation indications in the operating instructions concerning the transport, storage, assembly, commissioning, use, maintenance and preparation of the machine
- Unauthorised modifications to the machine
- Inadequate monitoring of the parts of the machine subject to wear
- Inappropriately executed repairs
- Cases of catastrophes caused by the action of foreign bodies or cases of force majeure.

1.2.7 Organisational measures

- The user must make available the necessary individual protective equipment.
- All the safety equipment present must be regularly checked.

1.2.8 Protective equipment

- Before any commissioning of the machine, the protective equipment must be correctly mounted and operational
- The protective equipment must only be removed
 - After stopping and:
 - After securing the machine against involuntary starting.
- In the case of delivery of partial components, the safety equipment must be put in place by the user, in accordance with the instructions.

1.2.9 Informal safety measures

- The operating instructions must be permanently kept in the location where the machine is used.
- In addition to the operating instructions, the general and local accident prevention and environmental protection rules must be made available and observed.
- All safety and danger indications placed on the machine must be maintained legible.

1.2.10 Personnel training

- Only trained and instructed personnel are authorised to work on the machine.
- The assignment of personnel for the assembly, commissioning, use, preparation, maintenance and repair of the machine must be perfectly fixed.
- Personnel undergoing training can only perform work on the machine under the surveillance of an experienced person.

1.2.11 Control of the machine

- Do not in any circumstances perform software modifications on the machine!
- The electrical power supply to the system is isolated by the Start/Stop switch located on the rear of the control unit housing.
- Only trained personnel are authorised to operate the controls.
- The emergency stop must always be within reach of the operator.

1.2.12 Safety measures in normal operation

- Only use the machine if all the protective equipment is operational.
- Ensure before starting the machine that nobody is placed in danger by starting the machine.
- Check the operability of the safety equipment and the absence of visible damage at least once per shift.
- The cables linking the machine to its electronic controls must not be connected/disconnected when the computer/controller is switched on.
- Movements are made by motors. The machine has an emergency stop button that allows the power supply to be cut off.
- On starting and when the measurement process has started, it is prohibited to approach and touch the moving part of the machine until the end of the measurement process.
- Do not restart the machine before it stops completely.

1.2.13 Electrical hazards

- Work on the electrical power supply must only be undertaken by qualified personnel.
- Check the electrical equipment of the machine regularly. Eliminate loose connections and damaged cables immediately.
- If work connected to the power supply is necessary, a second person must be called, who can activate the general circuit breaker if necessary.

1.2.14 Maintenance and repair, fault finding

- Execute the required adjustment, maintenance and inspection work without delay.
- Maintenance of the transmission systems can only be performed by persons qualified and accredited by the SYLVAC SA company.
- Ensure that unplanned starting of the parts of the installation upstream and downstream of the machine is prevented.
- Put the slide in the low position and switch off the machine and ensure that the main circuit breaker cannot be accidentally switched on before any maintenance, inspection or repair work.
- In replacing large parts or items, ensure that they are carefully fixed to lifting equipment.
- Check the correct seating of bolted components that have been removed.
- After the end of maintenance work, check the operation of the safety equipment..

1.2.15 Constructional modifications to the machine

- Do not undertake any conversion or apply any addition of modification to the machine without the authorisation of the SYLVAC SA company.
- All conversion measures require written confirmation from the SYLVAC SA company
- Immediately replace parts of the machine that are not in impeccable condition.
- Use only original spare parts and consumable items.
- For second hand parts, it is not possible to be certain that these parts are designed and manufactured to comply with the required loads and level of safety.

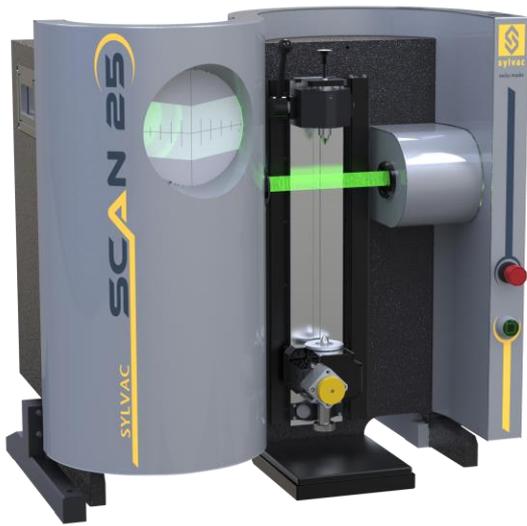
1.2.16 Cleaning the machine and waste disposal

- Handle and dispose of the materials and substances used properly, in particular
- During work on lubrication systems and equipment.
- During cleaning with solvents

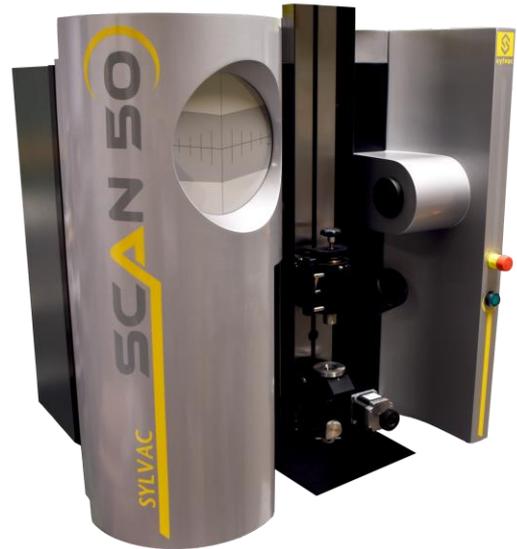
1.2.17 Machine noise

- The noise level LpA emitted by the machine is less than 70 dB(A).

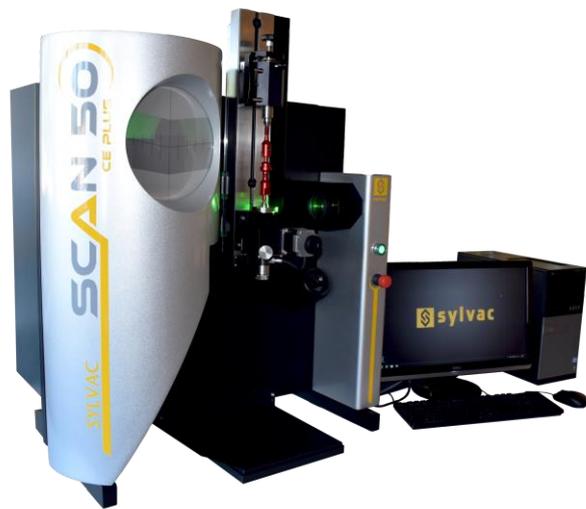
1.3 System Description



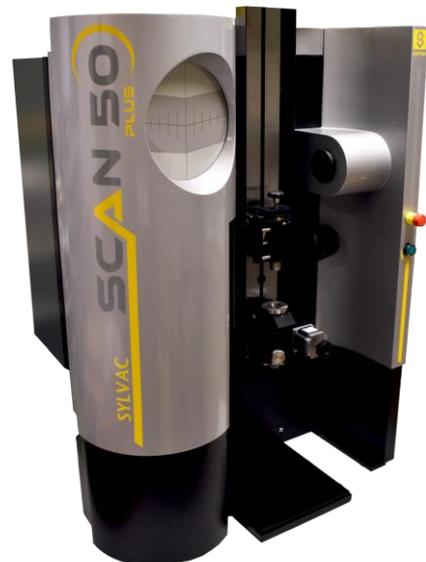
SYLVAC-Scan 25



SYLVAC-Scan 50



SYLVAC-Scan 50 C Plus



SYLVAC-Scan 50 Plus

The gauging system will measure lengths, diameters, angles, radii and other features on round, (i.e. cylindrically symmetric) components.

A stepper motor allows automatic component rotation for dynamic measurements (run-out, for example). SYLVAC-Scan 50 Plus offers in addition a motorized axis used to incline the workpiece to the helix angle of the thread (Slew).

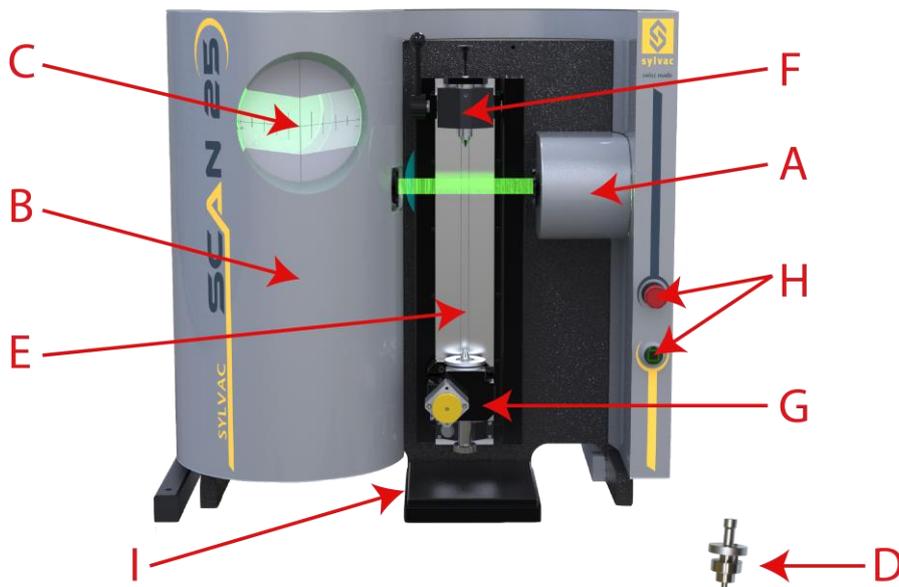
Measurements can be made directly by positioning the feature(s) to be measured at the measuring point in the fixture. Alternatively, for production components, a programmed measurement sequence can be created.

For measurement, the component is held in work-holding on the carriage and the area of the component around the measuring point is illuminated by collimated green light. An image of the component is focused onto the linear arrays of light detectors (CCD Arrays), the signals from which are analyzed by the computer and converted into measurements.

In order to measure lengths, angles and radii, the component must be scanned through the measurement point, and a number of measurements taken. The carriage is driven by a computer controlled motor and its movement is monitored by a linear scale reading transducer.

A special feature of this system is the projector screen which provides a five times magnified (nominal) image of the component for SYLVAC-Scan 25 (x4 nominal for SYLVAC-Scan 50 and 50 Plus) and an exact indication of the measurement point. The screen is used for component positioning during direct measurement and can be used in programming as well as providing a visual check on component alignment, focus and cleanliness.

The main elements of the gauging system are the measurement device and the computer/controller.



- A** Illumination Cover. Protects the illumination system.
- B** Optics Cover. Protects the optical measurement system.
- C** Projector Screen. Mounted on the optics cover.
- D** Setting Master. Located in a holder on the top of the illumination cover.
- E** Carriage. Supports the workholding
- F** Tailstock. Adjustable to suit component length.
- G** Headstock. Fixed position on the carriage.
- H** Stop and Reset Switches. Stop switch cuts power to the traverse mechanisms. Reset switch re-activates traverse mechanisms after E-Stop.
- I** Emergency Stop Baseplate.

Note: If the emergency stop button is pressed during the measurement cycle, the power to the motor control system will be removed. To reset the gauge ready for use after this condition has been used; the emergency stop button should be un-latched before pressing the green “Reset button”. This will return power to the control mechanisms.

1.4 SYLVAC-Scan 25 specifications

| DIMENSIONS | Metric | Imperial |
|---------------------------------------------------------|--------------------------------|----------------------------------|
| Measuring center (HxWxD) | 840x640x460 mm | 33x25x18 in |
| Computer mini tower | - | - |
| WEIGHT | | |
| Measuring center | 55Kg | 121 lbs |
| Complete System including PC | 85Kg | 187 lbs |
| OPERATIONAL REQUIREMENTS | | |
| Storage Temp. Range | -30 to 60°C | -22 to 140°F |
| Storage Humidity | 75% rh max. | 75% rh max. |
| Operating Temp. Range | 10 to 35°C | 50 to 95°F |
| Operating Humidity | 10 to 80% rh | 10 to 80% rh |
| Power Requirement | 100/110/220/240V 50/60Hz | |
| Power Consumption | 450W max. (excl. printer) | |
| PERFORMANCE (AT 20°C) | | |
| RESOLUTION | | |
| Lengths | 0.001 mm | 0.00004 in |
| Diameters | 0.0002 mm | 0.00001 in |
| REPEATABILITY ($\pm 2 \sigma = 95\%$) | | |
| Lengths | ± 0.0020 mm | ± 0.00008 in |
| Diameters | ± 0.0005 mm | ± 0.00002 in |
| ACCURACY (Error of mean measured value) | | |
| Lengths | (4+0.01 L) μ m | (0.16+0.01 L)/1000 in |
| Diameter | (1.0+0.01 D) μ m | (0.04+0.01 D)/1000 in |
| CAPACITY | | |
| Component Capacity | \varnothing 59 mm x L 270 mm | \varnothing 2.3 in x L 10.6 in |
| Measurement Capacity | \varnothing 25 mm x L 200 mm | \varnothing 1.2 in x L 8 in |
| Component Weight | 2.0 Kg | 4.4 lbs |
| SPEED (static measurement) | | |
| Diameter | 0.2s | |
| Edge | 0.2s | |
| Typical Cycle Time (10 features) | 15 - 25s | |
| Noise level | LpA <70 dB (A) | |

Performance data is based on results from clean ground components at 20°C and may be affected by component shape and surface.

1.5 SYLVAC-Scan 50 specifications

| DIMENSIONS | Metric | Imperial |
|---------------------------------------------------------|---------------------------------|-----------------------------------|
| Measuring center (HxWxD) | 1050 x 800 x 580 mm | 41 x 32 x 23 in |
| Computer mini tower | - | - |
| WEIGHT | | |
| Measuring center | 115 Kg | 250 lbs |
| Complete System including PC | 130 Kg | 283 lbs |
| OPERATIONAL REQUIREMENTS | | |
| Storage Temp. Range | -30 to 60°C | -22 to 140°F |
| Storage Humidity | 75% rh max. | 75% rh max. |
| Operating Temp. Range | 10 to 35°C | 50 to 95°F |
| Operating Humidity | 10 to 80% rh | 10 to 80% rh |
| Power Requirement | 100/110/220/240V 50/60Hz | |
| Power Consumption | 450W max. (excl. printer) | |
| PERFORMANCE (AT 20°C) | | |
| RESOLUTION | | |
| Lengths | 0.001 mm | 0.00004 in |
| Diameters | 0.0003 mm | 0.00001 in |
| REPEATABILITY ($\pm 2 \sigma = 95\%$) | | |
| Lengths | ± 0.0020 mm | ± 0.00008 in |
| Diameters | ± 0.0005 mm | ± 0.00002 in |
| ACCURACY | | |
| (Error of mean measured value) | | |
| Lengths | (4+0.01 L) μ m | (0.16+0.01 L)/1000 in |
| Diameter | (1.0+0.01 D) μ m | (0.04+0.01 D)/1000 in |
| CAPACITY | | |
| Component Capacity | \varnothing 100 mm x L 290 mm | \varnothing 3.9 in x L 11.4 in |
| Measurement Capacity | \varnothing 50 mm x L 275 mm | \varnothing 1.96 in x L 10.8 in |
| Component Weight | 4.0 Kg | 8.8 lbs |
| SPEED | | |
| (static measurement) | | |
| Diameter | 0.5s | |
| Edge | 0.5s | |
| Typical Cycle Time (10 features) | 20 - 35s | |
| Noise level | LpA <70 dB (A) | |

Performance data is based on results from clean ground components at 20°C and may be affected by component shape and surface.

1.6 SYLVAC-Scan 50 Plus specifications

| DIMENSIONS | Metric | Imperial |
|---------------------------------------------------------|---------------------------------|-----------------------------------|
| Measuring center (HxWxD) | 1300 x 800 x 580 mm | 51 x 32 x 23 in |
| Computer mini tower | - | - |
| WEIGHT | | |
| Measuring center | 160 Kg | 350 lbs |
| Complete System including PC | 175 Kg | 383 lbs |
| OPERATIONAL REQUIREMENTS | | |
| Storage Temp. Range | -30 to 60°C | -22 to 140°F |
| Storage Humidity | 75% rh max. | 75% rh max. |
| Operating Temp. Range | 10 to 35°C | 50 to 95°F |
| Operating Humidity | 10 to 80% rh | 10 to 80% rh |
| Power Requirement | 100/110/220/240V 50/60Hz | |
| Power Consumption | 450W max. (excl. printer) | |
| PERFORMANCE (at 20°C) | | |
| RESOLUTION | | |
| Lengths | 0.001 mm | 0.00004 in |
| Diameters | 0.0003 mm | 0.00001 in |
| REPEATABILITY ($\pm 2 \sigma = 95\%$) | | |
| Lengths | ± 0.0020 mm | ± 0.00008 in |
| Diameters | ± 0.0005 mm | ± 0.00002 in |
| ACCURACY (Error of mean measured value) | | |
| Lengths | (4+0.01 L) μ m | (0.16+0.01 L)/1000 in |
| Diameter | (1.0+0.01 D) μ m | (0.04+0.01 D)/1000 in |
| CAPACITY | | |
| Component Capacity | \varnothing 100 mm x L 515 mm | \varnothing 3.9 in x L 20.3 in |
| Measurement Capacity | \varnothing 50 mm x L 500 mm | \varnothing 1.96 in x L 19.7 in |
| Component Weight | 6.0 Kg | 13.2 lbs |
| SPEED (static measurement) | | |
| Diameter | 0.5s | |
| Edge | 0.5s | |
| Typical Cycle Time (10 features) | 20 - 35s | |
| Noise level | LpA <70 dB (A) | |

Performance data is based on results from clean ground components at 20°C and may be affected by component shape and surface.

1.7 SYLVAC-Scan 50CE Plus specifications

| DIMENSIONS | Metric | Imperial |
|---------------------------------------------------------|---------------------------------|-----------------------------------|
| Measuring center (HxWxD) | 1050 x 800 x 580 mm | 41 x 32 x 23 in |
| Computer mini tower | - | - |
| WEIGHT | | |
| Measuring center | 125 Kg | 272 lbs |
| Complete System including PC | 140 Kg | 320 lbs |
| OPERATIONAL REQUIREMENTS | | |
| Storage Temp. Range | -30 to 60°C | -22 to 140°F |
| Storage Humidity | 75% rh max. | 75% rh max. |
| Operating Temp. Range | 10 to 35°C | 50 to 95°F |
| Operating Humidity | 10 to 80% rh | 10 to 80% rh |
| Power Requirement | 100/110/220/240V 50/60Hz | |
| Power Consumption | 450W max. (excl. printer) | |
| PERFORMANCE (at 20°C) | | |
| RESOLUTION | | |
| Lengths | 0.001 mm | 0.00004 in |
| Diameters | 0.0003 mm | 0.00001 in |
| REPEATABILITY ($\pm 2 \sigma = 95\%$) | | |
| Lengths | ± 0.0020 mm | ± 0.00008 in |
| Diameters | ± 0.0005 mm | ± 0.00002 in |
| ACCURACY (Error of mean measured value) | | |
| Lengths | (4+0.01 L) μ m | (0.16+0.01 L)/1000 in |
| Diameter | (1.0+0.01 D) μ m | (0.04+0.01 D)/1000 in |
| CAPACITY | | |
| Component Capacity | \varnothing 100 mm x L 290 mm | \varnothing 3.9 in x L 11.4 in |
| Measurement Capacity | \varnothing 50 mm x L 275 mm | \varnothing 1.96 in x L 10.8 in |
| Component Weight | 6.0 Kg | 13.2 lbs |
| SPEED (static measurement) | | |
| Diameter | 0.5s | |
| Edge | 0.5s | |
| Typical Cycle Time (10 features) | 20 - 35s | |
| Noise level | LpA <70 dB (A) | |

Performance data is based on results from clean ground components at 20°C and may be affected by component shape and surface.

2. Installation

2.1 Visual Inspection

After unpacking, check all items for any external evidence of damage. If there is evidence of damage, this should be reported immediately to the carrier.

Main System Components

| Mechanical components | SYLVAC-Scan 25 | SYLVAC-Scan 50 | SYLVAC-Scan 50C Plus | SYLVAC-Scan 50 Plus |
|------------------------|----------------|----------------|----------------------|---------------------|
| Measuring centre | 902.5250 | 902.5500 | 902.5501 | 902.5502 |
| Consisting of : | | | | |
| Cables | - | - | - | - |
| Headstock | HZ173-3004 | HZ178-3004 | HZ178-3004 | HZ178-3004 |
| Tailstock | HZ125-3003 | HZ178-3003 | HZ178-3003 | HZ178-3003 |
| Two tooling centres | 902.6201 | 902.6202 | 902.6202 | 902.6202 |

| Hard- and software | Order No. |
|---------------------------------------------------------------|-----------|
| Computer, Windows 7 Professional Multilingual software, Mouse | H04760023 |
| ProMeasure/ProComposer software package | H02460011 |
| TFT Monitor, 20" (including mains cable) | H04760003 |
| Keyboard | H04760066 |

Warning : Order number for the measuring centre will change according to the chosen keyboard-type that depends on the country where goods are delivered.

Local configuration of your system

Your system is running under Windows 7 Professional installed on a PC. since this is a Windows-based multilingual version, the latter can be configured according to local attributes. This is done under **Configuration Panel and Local Language options** in the Windows menu

Check all items against the packing list, and report any shortages immediately to SYLVAC SA. If the gauging system is to be stored for a period before installation, ensure that it is carefully repacked or otherwise protected, and store it only indoors avoiding high humidity (>75%) or extreme temperatures (below -30°C or above 60°C).

2.2 Lifting SYLVAC-Scan 25

The measurement center has two handles situated at the sides of the machine for lifting. These handles are the only safe means of lifting. **The machine should never be moved by the housing. Note that lifting requires more than one person. Observe the normal lifting precautions.**

2.3 Lifting SYLVAC-Scan 50, 50CE Plus and 50 Plus

The measurement center is fitted with a yellow bar for lifting. It should be retained after installation. **This bar is the only safe means of lifting. The machine should never be moved by the housing. Note that lifting requires more than one person. Observe the normal lifting precautions.** Moreover, the lifting bar comprises a slide-blocking mechanism. The machine must not be used or turned on when the bar and its mechanism are in place.

2.4 Installing the System

See the Specification section for the required installation environment.

The gauging system must be installed on a relatively level surface capable of supporting its weight. The slide-blocking “mechanism” system must be removed before turning on the device

Note: Do not obstruct the air-flow around the cover encasing the illumination components. As this will cause overheat the illumination system, and may damage the system.

Before fitting the work-holding, the protective grease should be cleaned from the carriage, and then the carriage surfaces should be protected with a light oil.

A single phase electrical supply is required. Normal noise levels are acceptable, but large electrical spikes caused by equipment with high current surges should be avoided.

Warning: Check the voltage setting on the computer, SCREEN and printer before connecting the mains electrical supply.

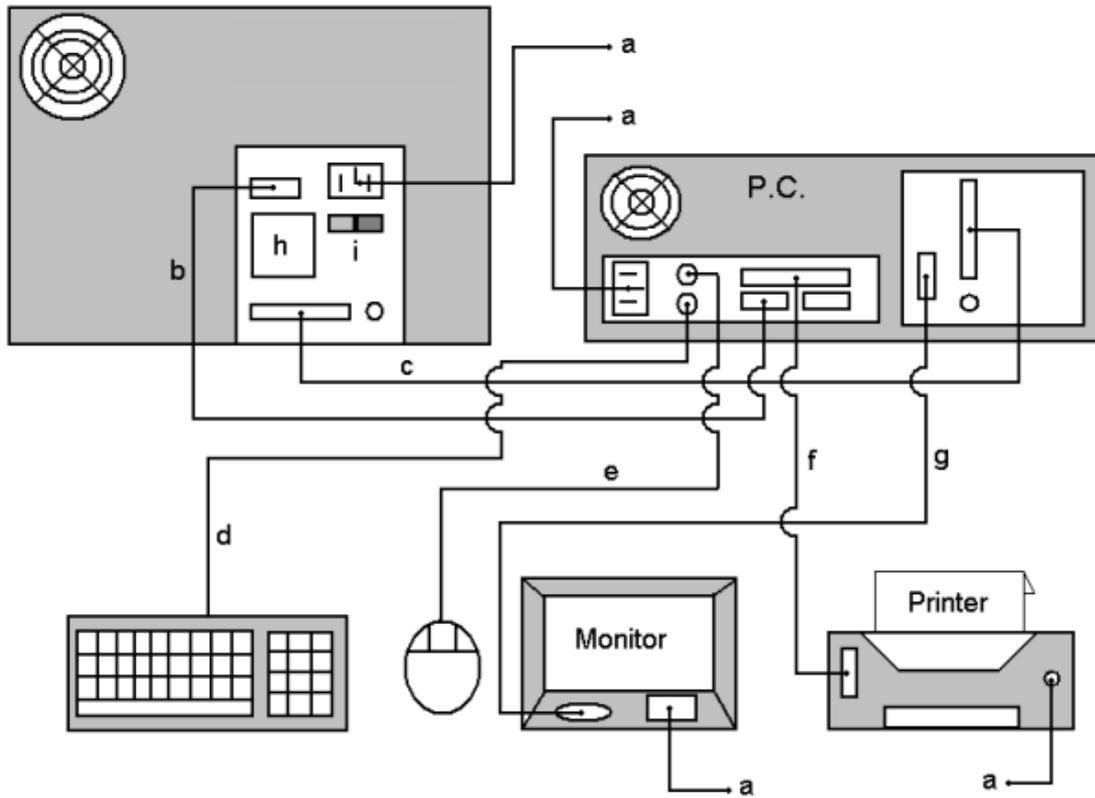
Warning: Do **NOT** attempt to alter the voltage setting on the computer. Contact SYLVAC SA if the label voltage does not match your electrical supply.

2.5 Electrical Connections

With the unit isolated from the mains, make the electrical connections. All leads are labeled. The diagram shown below is a typical lay-out and can vary depending on the type of computer used.

Actual physical position of individual connections to the PC may vary depending upon the current specification of the computer used.

System Connections, SYLVAC-Scan 25, 50 and 50 Plus



| | | | |
|----------|------------------------------|----------|-----------------------|
| a | Power Lead (to mains supply) | f | Printer Cable |
| b | RS232 (Motor Comms. cable) | g | VGA Cable (Monitor) |
| c | USB cable | h | Machine ID Plate |
| d | Keyboard Cable | i | Machine On/Off Switch |
| e | Mouse Cable | | |

3. Workholding

3.1 General

The component being measured is held in tooling which is located in the headstock and tailstock mounted on the carriage. The arrangement is as shown in the photograph below.

3.2 Headstock

The headstock is mounted in a fixed position at the lower end of the carriage. It is accurately centered by two tenon blocks which locate in the carriage tenon slot, and is retained by three M5 socket head screws.

3.3 Tailstock

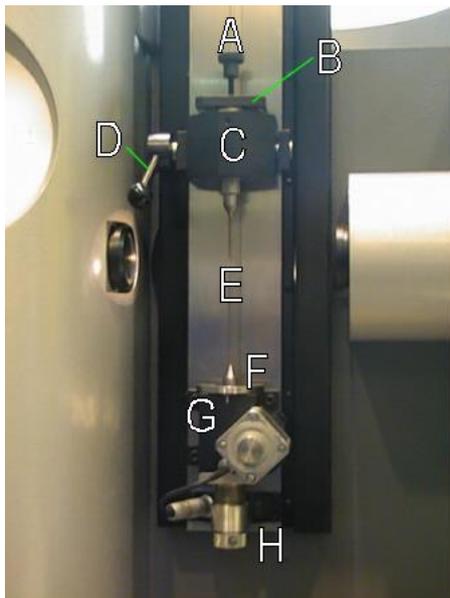
The tailstock is mounted on the carriage above the headstock, and is also accurately centered by two tenon blocks. The height of the tailstock can be altered to allow the holding of parts of different lengths. To adjust the height, the clamp is slackened, the tailstock is moved to the required position, and the clamp is re-tightened. To load or unload components, raise the tailstock component release knob, to increase the separation between the workholding centers. If the clamp is too loose to hold the component, or too tight to release it properly, then use the ratchet mechanism in the clamp lever to adjust it.

3.4 Tooling

The tooling for the gauging system, is industry standard Morse Taper 1 tooling for SYLVAC-Scan 25 (Morse 2 for SYLVAC-Scan 50 and 50 Plus) which locates in receiving tapers in the headstock and tailstock. To insert the tooling use only a gentle movement until the taper locks. If the taper will not lock, check the cleanliness of both the tool and the headstock and tailstock, ensuring that the tooling release screws are retracted. To release the tooling, use the tooling release screws to break the taper lock.

Do not use excessive force or shock loads, as damage to the slide mechanism could result.

When releasing tooling from the tailstock, ensure that it is held to prevent any risk of damage to the headstock or injury.



- A - Tooling Release Screw
- B - Spring Loaded Centre
- C - Tailstock Body
- D - Tailstock Clamp
- E - Tenon slot on Main Slide
- F - Morse 1 Taper Centre
- G - Headstock Body
- H - Tooling Release Screw

4. Operation - Quick Guide

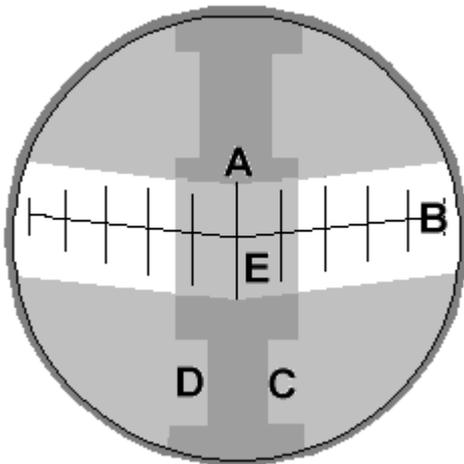
4.1 Measurement Principle

The gauging system uses solid state light sensors (CCD arrays) to analyze an image of the part being measured. The part is illuminated by parallel (collimated) green light and is moved through a measurement position on a carriage which is driven by a servo motor, rack and pinion. Movements of the carriage are monitored by an optical encoder..

A projector screen is integrated where an optical image of the region surrounding the measurement position appears at approximately x5 magnification for SYLVAC-Scan 25 (x4 for SYLVAC-Scan 50 and 50 Plus). Reference lines on the screen indicate the nominal measurement center line and also the location of the measurement position. This latter is in the form of a shallow 'V' corresponding to the alignment of the CCD arrays in the measurement system.

The SYLVAC Scan gauge will measure external diameters, lengths, angles, radii and other features on round parts. Pre-programmed sequences can be stored for re-call and automatic measurement of production parts. These programs are written in Procal, a powerful programming language designed for metrology applications on SYLVAC Scan gauges. Programs can be written automatically using Pro-Composer or manually using the Pro-Measure Procal editor.

Long term accuracy of the SYLVAC Scan is assured through the use of a setting master, provided with every system, to calibrate the system at start-up. The setting master is stored with the gauge, the location of which will vary depending on gauge type.



Projector Screen SYLVAC Scan25 / SYLVAC-Scan 50.

- A Center Line
- B Measurement Position Line
- C (-) Surface
- D (+) Surface
- E Image of Component

4.2 Start-Up

Ensure that all electrical connections are made and that there is no CD in the CD-Rom drive (if present). Switch on power to the SYLVAC-Scan with the main switch at the rear of the gauge.

Switch on power to the computer.

Press the green **RESET** button on the gauge. The system will run a series of self-checks and then start to load the Windows 7 Professional Operating System software.

Once Windows has initialized, the desktop appears. On the desktop there are icons for Pro-Measure and Pro-Composer. Double click the mouse on the icon of the application you wish to use. When loading of the application is complete, the main menu options or toolbars will be available ready for use.

Notes : In the event of an error message being displayed, note the message, switch off (observe any options for shutting down windows if available), wait at least 15 seconds and switch on again. If the error message is displayed again, contact the supplier's service organization for assistance.

4.3 Calibration Mode

Before any components can be measured, the system will require calibration. This is performed by placing a setting master into the gauging system and running the selected setting program.

Calibration performs two functions, it initializes (prepares) Pro-Measure for use and will calibrate the gauging system and devices ready for measurement. The "**Open Calibration**" command executes the Calibration program.

During Calibration, the operator should pay particular attention to prompts and messages which appear on the screen.

When the calibration sequence is complete, Pro-Measure will indicate whether calibration has been successful. Generally there are only two states :

PASS

FAIL

If calibration has failed, retry by starting the program again. Successive failures indicate possible problems with the gauging system or device.

4.4 Calibrate a Profile Gauge

1. Select the 'Open Calibration' option from the 'File' menu.
2. Select the Profile calibration file from the file selector.
3. Press the 'OK' button.
4. Your file will now be opened.
5. Once the file has finished loading, press 'F2' to begin the program.
6. There will be some on screen prompts and messages during execution of the program, respond to these as necessary.
7. When the program has completed all operations, the display window will clear.
8. Calibration is now complete.

4.5 Calibration Faults

In the event of a fault during calibration, a system error message or message specific to the gauge calibration program may be displayed. The gauge calibration program messages are :

| | |
|----------------------------------|----------------------------------------------------------------------------------------|
| Length Error | There was a problem with the measured length of the setting master. |
| Diameter Error | There was a problem with the measured diameter of the setting master. |
| Dark Ref failed | Light may have reached the arrays? i.e. tailstock may have been in the wrong position. |
| Light Ref failed | Light may have been blocked? i.e. tailstock may have been in the wrong position. |
| Illumination Dim / Uneven | Defective LED; dirty lenses; faulty array/Cvpb. |
| E-Stop Hit | There may be an object on the safety paddle switch, E-Stop may be latched down. |

The most likely causes of faults are dirt on the setting master, poor location of the setting master in the tooling or wrong setting master being used. Check that the serial number on the setting master corresponds to that displayed on the computer SCREEN, clean the setting master and re-run the calibration program. If the problem recurs, contact the SYLVAC SA Service organization.

4.6 Measurement Mode

In Measurement mode the measurement system will support the following functions :

- Measure a component placed in the gauging device
- Display the results of measurement on the SCREEN
- Update the statistics (if option available)

When accessing the 'Open Measurement' option after a successful calibration the data display window will contain a blank screen with the Text display headings. The toolbar measurement control buttons will become active. After each measurement has been completed, the data will be shown in the table below their corresponding headings. Each screen full of information is called a page and if the number of dimensions displayed exceeds the single page limit, the Page control will enable viewing of the next set of dimensions.

4.7 Start a Measurement program

9. Select the 'Open Measurement' option from the 'File' menu.
10. Select the file you wish to open from the file selector.
11. Press the 'OK' button.
12. Your file will now be opened.
13. Once the file has finished loading and the toolbar buttons become active (colored), press the 'F2' button to start the program running.
14. The program will now begin. There may be some on screen prompts or messages during execution of the program, respond to these as necessary.
15. When the program has completed all operations, the measurement results will be shown in the data display window.

Note : To make measurements on a component for which no measurement program has been written, use Pro-Composer to create a measurement program. See the on-line help within Pro-Composer for details of how to use this software.

4.8 Shut-Down

It is important when shutting down the system, that all applications and Windows itself is shut-down properly. Close all applications by selecting the **'Exit'** command from the File menu. Once all applications are closed, selected **'Shutdown'** from the **'Start'** menu on the Windows Task bar. When the **'Shutdown Windows'** box appears, select the **'Shut down the computer?'** option and press the **'YES'** button. Wait for the 'You can now safely turn off your computer' message to appear and then disconnect the power to the computer, electronics control box and gauge.

Warning : It is very important that the applications and Windows are shut-down correctly using this procedure. Failure to do so could cause hard disk corruption and consequently system failure.

5. Maintenance

5.1 Maintenance Schedule

MONTHLY

- In humid environments, oil the slide to avoid corrosion. This action must be performed regularly if you do not use the measurement system for a period of time.
- Clean the covers with a soft cloth. Do not use methylene chloride or cellulose based solvents.
- Clean the projector screen and measurement windows with a soft clean cloth only. Avoid abrasives that could scratch the glass.

YEARLY

All the annual maintenance operations that follow must be performed by persons qualified and accredited by SYLVAC SA.

- The system shall be recalibrated using a complete set of diameter and length standards. It is recommended that machines situated on shop floors are calibrated to SYLVAC specifications twice a year. Machines situated in controlled environments such as temperature controlled inspection rooms can be calibrated once a year.

During calibration, our engineer will evaluate the general state of the parts and will decide on their replacement.

Inspection interval and replacement frequency for wearing parts

- In general, inspections and maintenance must be performed at least once per year or otherwise every 4000 hours of operation:

| | |
|-----------------------------|-----------------------------|
| Motor gear belts: | 1 year or every 4000 hours |
| Belts on rack drive pinion: | 2 years or every 8000 hours |

5.2 Cleaning and Lubrication

Cleaning

The covers should be kept clean using a soft clean cloth. Normal solvents may be used to remove grease but methylene chloride or cellulose thinners **MUST NOT** be used.

The projector screen and windows should also only be cleaned with a soft clean cloth taking care to avoid abrasives which could scratch the glass.

Warning : Do **NOT** remove the covers (except as required for lamp replacement) as this could allow access of dust or other contaminants onto the optical components inside.

Lubrication

No routine lubrication of moving parts is required. The use of a light oil on the carriage to prevent corrosion, particularly in high humidity or if the gauge is not used for a period, is however recommended.

5.3 Mechanical SYLVAC-Scan 50 and 50 Plus

Tailstock

If the tailstock becomes too loose to remain in position, the clamping mechanism must be adjusted. Remove the tailstock from the machine by raising it to the top of the slide and lifting it forwards, out of the tenon slot.

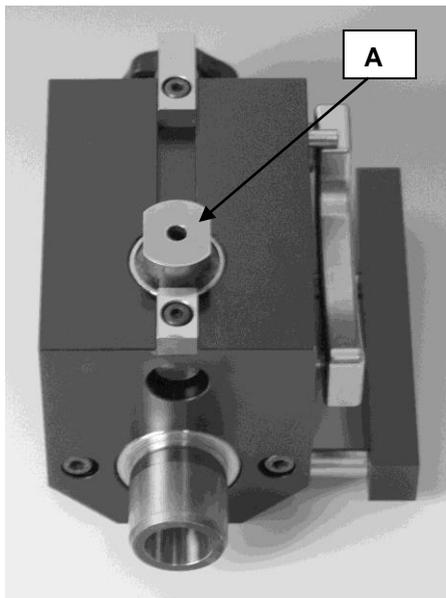
Turn it to expose the rear face.

The adjustment is of the M6 grub screw in the tenon tongue (shown as "A" in the photograph below), using a 3 mm Allen key.

Rotate it clockwise to tighten or counterclockwise to loosen the tailstock fit.

To refit, pull the clamping block to the maximum clearance from the body while squeezing the release lever.

Carefully re-engage it in the tenon slot at the top of the slide where the clearance hole is provided.



5.4 LED

The lifespan of the LED is 8x higher, which means no need to change the LED very often. The approved SYLVAC technician will replace the LED when conducting a maintenance service. It will be necessary to recalibrate the measuring system.

5.5 Limit Switches and Linear Scale Reader

Limit switches and a linear scale reader (encoder) detect the position of slide. Running the Diagnostics command from the Tools menu will indicate the state of these by using the gauge it will now be possible to locate and remedy problems with badly set or broken components.

5.6 Calibration values of 'daily setting piece'

The gauge will have one 'daily setting piece' known as a 'setting master', used for calibration before measurement. The setting piece is of precisely known physical size and is used to check the readings. The system therefore needs to know the calibrated dimensions as listed on its calibration certificate. When the setting piece is re-calibrated, which it should be once a year, you will need to type the new figures into the computer.

- 1 The setting piece dimensions are stored in the PROGRAM FILES\PRO-MEASURE\PROFILE folder, in a file called 'master.pcl'. This file may be opened using the Pro-Measure Procal Editor by selecting the Editor Open command from the Tools option off the main menu. Enter the password if required, and then select the 'master.pcl' file from the file selector.
- 2 When the file has opened and is visible on the screen, using the editor control keys, you can now update the calibration values. The 'MasterID' field should correspond to that on the master certificate to identify that you have the correct details. The remaining lines contain the setting piece dimensions. Enter the values into the appropriate fields such that the file contents match the certificate. Do not change the order of the lines in the program.
- 3 After you have typed in all the values, save the file using the Save command. When prompted, choose YES to save your changes.

The 'master.pcl' file will look similar to the following.

```
{ ----- }
{ Profile Master values }
{ V0.00 }
{ ----- }
```

```
Begin:Sub("Setup Master")
Format:Text( MasterID, "30038")
Evaluate( MasterLength := 8.000 )
Evaluate( MasterDia[1] := 5.0075 )
Evaluate( MasterDia[2] := 15.0067 )
Evaluate( MasterDia[3] := 25.0034 )
Evaluate( MasterDia[4] := 0.000 )
Evaluate( MasterDia[5] := 0.000 )
Evaluate( MasterDia[6] := 0.000 )
Evaluate( MasterDia[7] := 0.000 )
End:Sub
```

Note : Some gauges do not require all of the MasterDia fields. Those not required will have a value of 0.000. The actual value in the MasterDia fields starts with the smallest on the first line and ends with the largest, each following line being larger than the previous. This order must always be maintained.

6. Trouble Shooting

6.1 Trouble Shooting

SYLVAC Scan gauging systems have been designed for ease of use and trouble-free operation. This section details problems that might occur at start-up and also a list of error messages which can be reported by the system when running.

6.2 Start-Up Problems

1. System shows no signs of life:

- check the power source and connections, including to the computer and monitor.
- check the computer and monitor are switched on.

2. Computer starts but the illumination does not light:

- check the cable connection.
- replace the LED.

3. System starts but will not calibrate:

- clean the setting piece with a clean, dry cloth.
- check that the setting piece is located correctly in the tooling.
- check that the setting piece serial number requested matches that being used.

6.3 Error Messages

Error messages are displayed in a window in the center of the screen display. If an error message is displayed while a part program is being run, the program will usually be halted.

6.3.1 Pro-Measure Error Messages

▶ **Attempt to move beyond maximum limit.**

A motor move command has attempted to drive the motor past its maximum travel.

▶ **Attempt to move beyond minimum limit.**

A motor move command has attempted to drive the motor past its datum point.

▶ **BEGIN:SUB without END:SUB.**

A Begin:Sub keyword has been found inside a subroutine definition.

▶ **Break : Sequence aborted**

The key combination 'Alt+F9' has been pressed while a Procal program was running.

▶ **Calculation : Invalid value for ACOS**

An invalid value (> 1 or < -1) has been passed to the function Acos().

▶ **Calculation : Invalid value for ASIN**

An invalid value (> 1 or < -1) has been passed to the function Asin().

▶ **Calculation : Negative number (SQRT / ^)**

An attempt has been made to do a Sqrt of a negative number.

▶ **Calibration file damaged or invalid. Please re-calibrate.**

There is a problem with the calibration file. It could be damaged, programmed incorrectly or the wrong file.

▶ **Cannot open file.**

The specified file could not be opened.

▶ **Cannot pass *variable name* by reference.**

An attempt to pass a variable by reference to a subroutine is not possible for the specified variable.

▶ **Delimiter.**

A delimiter was expected and did not exist or a delimiter was found and was not expected. A comma must be present between all parameters passed to a Procal word.

▶ **ELSE without IF.**

An Else keyword has been executed without a preceding If.

▶ **Emergency stop hit.**

The emergency stop button has been activated.

▶ **END:IF without IF.**

An End:If keyword has been executed without a preceding If.

▶ **Invalid keyword.**

The Procal keyword has not been recognised, either the word has been incorrectly typed, or a required Plugin is not present or has not initialised correctly.

▶ **Invalid parameter.**

An incorrect parameter type has been passed. Check the syntax of the word in question.

▶ **Left hand bracket missing.**

There must be a left hand bracket '(' between a Procal keyword and the first parameter.

▶ **Limit switch hit.**

A motor move command has hit a travel limit switch.

▶ **MARK(*name*) undefined**

An attempt has been made to Recover and Goto a Mark which does not exist.

▶ **No edge found.**

The Find Edge measurement function cannot find an edge due to insufficient scanned data or incorrect data.

▶ **Numeric overflow.**

A numeric parameter is too large or too small. Check the syntax of the word in question.

▶ **Parameter magnitude error.**

The relationship of two parameters is incorrect. Check the syntax of the word in question.

▶ **Parameter values equal.**

Two parameter values are equal which is not allowed. Check the syntax of the word in question.

▶ **Plugin locked by another system**

Another program is currently using the specified plugin. Only one application can use a plugin at any one time.

▶ **This program can not be run in the selected mode.**

A program written for calibration has been selected for measurement or vice versa.

▶ **RECOVER : Invalid context**

An attempt has been made to recover to a Mark which does not exist in the current stack frame.

▶ **Register index out of range**

The index used for a variable is out of range for the variable.

▶ **REPEAT without UNTIL**

A Repeat word has been found without a following Until.

▶ **Right hand bracket missing.**

All Procal words with parameters must finish with a right hand bracket ')'

- ▶ **Segment *name* already included.**
The specified Procal segment has been included in the program more than once.
- ▶ **Segment *name* not found.**
The specified Procal segment could not be found.
- ▶ **Serial port *portnumber* is either in use or does not exist.**
An attempt has been made to open a serial port which is either in use by another application or does not exist on the computer.
- ▶ **String overflow.**
A string parameter is too long or too short. Check the syntax of the word in question. .
- ▶ **Subroutine or mark *name* re-defined.**
A Begin:Sub with the same name has been found twice in the same program.
- ▶ **Syntax : Comment.**
A comment start '{' or comment end '}' has been found without its partner.
- ▶ **System variable *name* re-defined.**
The specified variable has been defined but already exists as a system variable.
- ▶ **The *system name* system is currently in use by another application.**
Another program is currently using the specified system. Only one application can use a system at any one time.
- ▶ **Too many parameters.**
Too many parameters have been passed to the Procal Word. Check the syntax of the word in question.
- ▶ **Undefined subroutine *name*.**
The name of the subroutine has not been defined with Begin:Sub .
- ▶ **UNTIL without REPEAT**
An Until word has been found without a preceding Repeat.
- ▶ **Variable *name* re-defined**
The specified variable has been defined more than once.

6.3.2 Pro-Composer General Error Messages

▶ **System is not calibrated. A successful calibration is required before scanning.**

In order to perform a component scan, the system must be calibrated. This is done using the Open Calibration command of the Pro-Measure software.

▶ ***filename* Schematic contains non registered Feature Types.**

A schematic was loaded which contained features not active on this Pro-Composer installation.

▶ **No more than X features of this type may be defined.**

The number of measurements definable for a particular feature type is limited (normally to 9 or 99). This constraint is due to the Label size of three.

▶ **No more than X measurements may be defined.**

The maximum number of definable measurements for a schematic has been reached.

▶ **System is in use by another application.**

The system is being used by another application for scanning/measuring. Either wait for the other application to complete its task or stop the task.

▶ **Schematic has been successfully saved but the program cannot be compiled until the Component Reference Position is set.**

Although the Schematic has been saved, the Procal program cannot be generated for this schematic until the 'Set Component Position' routine has been completed.

▶ **Failed to open *filename* file.**

The selected file failed to load. This could be a general file access problem or because the file is locked. The file or disc could be damaged or corrupt.

▶ **Failed to create *filename* file.**

The selected file could not be created. This could be because you do not have the correct access rights for the folder. It may also be because the file already exists and has read only attributes.

▶ **File *filename* is corrupt or not a Pro-Composer Schematic file.**

A problem occurred trying to convert a DOS version schematic for use with this version of Pro-Composer. This could also be caused if the schematic was created in a newer version of Pro-Composer software.

6.3.3 Pro-Composer Defining Measurements Error Messages

▶ **Measurement Zone(s) not suitable for Feature Type.**

The zone doesn't contain the specified feature, or if it is a two zone intersection, the zones don't cause an intersect point.

▶ **Standards Database Error. Insufficient Data.**

A standard has been chosen, but not all the fields have been selected (turned green) on the Standards Database page or the Measurement Properties dialog box..

▶ **Standards Database Error: Parameter *name* not in FeatureType *name*.**

A Standards database table has been defined which tries to use a non-existent parameter in the specified Feature Type.

▶ **Parameter out of range.**

A specified parameter value is incorrect for the measurement.

▶ **Upper Limit must be greater then Lower Limit.**

For Min-Max parameters, the max must be bigger than the min.

▶ **Label must be either 1 letter followed by 2 digits, or 2 letters followed by a digit.**

Labels must be of the correct format.

▶ **Label already used.**

Labels must be unique. You have chosen one that is already in use. The label in question could be for a Sub Measurement Feature and so not visible on the schematic drawing.

6.3.4 Pro-Composer Import DXF Error Messages

- ▶ **Failed to find link *name* in DXF file. Correct problem in CAD application and retry.**
 Problem with the profile layer. The profile must be a fully connected outline.
- ▶ **Unrecognized DXF entity or corrupt *filename* file. Correct problem in CAD application and retry.**
 Invalid DXF file, or unsupported DXF entity was used in drawing. See DXF property specifications for a list of valid entities.
- ▶ **Either both or none of the layer names must be specified.**
 You must specify the a name for each layer or no name for both layers. You cannot specify a layer name for one of the options, it must be all or nothing.
- ▶ **Profile and Center-Line layers must have different names.**
 You cannot use the same name for both the layers. They must each have a unique name.
- ▶ **Centerline is missing or incorrect. Correct problem in CAD application and retry.**
 There is a problem with the Centerline layer. Check the details of the layer to ensure it conforms with the DXF Import specifications.
- ▶ **Profile missing or incorrect. Correct problem in CAD application and retry.**
 There is a problem with the Profile layer. Check the details of the layer to ensure it conforms with the DXF Import specifications.
- ▶ **Centerline and Profile missing or incorrect. Correct problem in CAD application and retry.**
 The system can't find a valid Centerline AND Profile layer in the DXF file.
- ▶ **Centerline is not inside the Profile. Correct problem in CAD application and retry.**
 The centerline must pass through the shape profile (Y axis).
- ▶ **Centerline does not exceed the Profile. Correct problem in CAD application and retry.**
 The centerline must exceed the extents of the shape profile (X Axis).
- ▶ **Unexpected end of file.**
 The end of file has been reach unexpectedly. This suggests a problem with DXF file.

7. EC Conformity declaration

Name of supplier: SYLVAC SA
Address of supplier: SYLVAC SA
Chemin du Cloalet 16
CH-1023 Crissier

declares under its sole responsibility that

the product Optical measuring system **SYLVAC SCAN 25 / 50 / 50 CE Plus / 50 Plus**
Type **902.5250, 902.5500, 902.5501, 902.5502**
Serial N° **See on Measuring equipment**

is in conforming with the provisions of

- the directives 98/37/ECC, 2004/108/EC and 2006/95/EC
- the standards EN 12100-2
EN 60204-1, EN 61000-6-2, EN 61000-6-4, EN 61326-1 (A+B)
- and technical data as specified in our sales documents.

SYLVAC SA

8. Guarantee

All the Sylvac SCAN machines are covered against defects in design, materials and workmanship for a period of 2 years, from the date of delivery from our factory.

During the warranty period, Sylvac SA will repair or replace the defective product free of charge.

This manufacturer's warranty does not cover:

- Aging or normal wear and tear
- Any damage resulting from incorrect or abnormal use of the product, and non-observance of the user manual provided by Sylvac SA
- Indirect or consequential damages of any kind resulting from the use, the non-functioning, the defects or the inaccuracy of the product
- Any repairs not done by an authorized qualified service partner, e.g. the disassembly of the product done by a person non-authorized by Sylvac SA
- The periodic check-ups, the adjustments or the maintenance

Sylvac SA owns all parts removed from repaired products. If Sylvac SA repairs or replaces a part of a product, its warranty term is not extended. In case of replacement the new component has a warranty of 1 year, without effect on the initial warranty period.

Any further claim against Sylvac SA, e.g. for damages additional to the above described warranty is expressed excluded.

9. Notes

9. Notes



Changes without prior notice
Sous réserve de toute modification
Änderungen vorbehalten

Edition : 2015.09 – 681.101.05-120