



Technical Specification

Screen Printing Machine ST104

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SPM ST104 with UV curing station and stacker

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1 General Description

Principle: The ST104 machine is a sheet-fed stop cylinder screen printing machine. It is capable of handling stock in the form of sheets of paper.

1.1 Feeder:

The feeder consists of the pile handling and the sheet separator system.

Pile handling system consists of a chain-driven pile lifting mechanism. Rear stackers are provided at the left and right sides for the centered alignment of the paper pile. A limit switch detects the top position of the pile after it moves up.

The sheet separator system consists of the separator head and the feed board devices. The feeder is of rear separator type with two forwarding and two pickup suckers. Air blow device for double sheet detection is also provided to ensure that multiple sheets do not enter the printing station. The feed board consisting of the vacuum suction belts and feeder board device is arranged to keep the stock stream in even pitch and aligned. Pull-in-roller is provided to pick up the paper before it is transferred to the suction belt.

1.2 Printing unit:

Rollers feed the paper to the printing unit the paper from feeder is fed into the printing unit by means of rollers. The paper is registered by manually adjusting the front lay and side lays. This is done to maintain a consistent position of the image on every sheet. The paper then passes over the printing cylinder and is held tightly in place by means of cylinder gripper, which closes after the paper reaches the front lay. The paper moves below the screen containing the image, mounted on the frame. The printing cylinder rotates as the frame moves forward. The squeegee comes down, squeegee pressure is applied, and ink from the squeegee passes through the screen and gets applied on the paper, at the point where the paper is held in close contact with the printing cylinder and the screen.

1.3 In-feed unit and Dump gate:

The infeed unit is located next to the printing unit. A dump gate is provided to separate unprinted stock when there is a register error. A sensor present in the cylinder sends a signal to the dump gate and to the squeegee if the paper is not gripped properly. The squeegee does not move down to the printing position, preventing paper wastage and faulty printing. The dump gate lifts up thus preventing the unprinted stock from moving to the next section in the line for drying. The dump gate then comes back to the normal position ready to accept the next printed stock. The papers rejected by the dump gate are collected in a bin at the bottom, which can be re-fed for printing, thus minimizing paper wastage and improving productivity.

1.4 Hot Air Drying system: This unit is used to dry the ink on the sheet after printing. Controls are provided on a control unit for this station. This unit consists of two blowers, which are driven by a motor. Each blower has six heaters, which heat up the circulating air. This hot air from the blowers passes over the top surfaces of the sheet. The ink coating is dried by this hot air then the air follows the same path. The blower continuously circulates the hot air. Exhaust air will go out through the moisture controller, which is provided at the middle top of the hot air station.

1.5 Infra-red Drying system: An infra-red dryer for drying of aqueous inks and coatings and solvent based varnish is provided. These are high efficiency dryers with minimum energy utilization and waste heat reduction. The design of the chassis allows cooling of the work surface and reflector without over cooling the lamp. This unit consists of infra-red with reflector assemblies and is cooled by air. Infrared dryer

consists of three lamps for drying purpose. Three fans are provided on top for cooling purpose. High quality reflectors are used to increase the heating capacity.

1.6 UV curing system: The UV curing system is ideally suited for curing UV curables over-printed clear varnish, lacquer and UV curable inks on paper, paper-boards. Variable speed AC motor and AC drives are used to drive this conveyORIZED curing machine. Teflon (PTFE) coated belts are used to carry the substrates such as papers which withstands the high heat under the UV lamps. The paper is held on the belt by vacuum, created by the suction blower. Triple cooling system is provided for cooling UV lamps.

Consisting of the UV light heads, the cooling system and the power electronics, the UV curing system is built to be highly efficient. Further, the two different UV power levels are available.

1.7 Chilling Unit: It is of the same size as the hot air conveyor, but it is used to cool the sheet. It consists of two blowers driven by one motor and each blower is connected to a heat exchanger, which is wound with copper coil pipes in which cooled water is circulated. Temperature of the air in the heat exchanger is reduced between the ranges of 15 to 20 deg Celsius, drawn through heat exchangers, then passed through the blower and is blown at the top surfaces of the sheet to cool it.

1.8 Delivery Stacker: After the completion of all processes the sheets are collected in the delivery stacker. When the sheets are collected in pile board, it moves down. The moving distance and time can be set at the operator control panel. The jogger assembly helps to stack the sheet in correct position. Depending upon the sheet size, the sheet stopper assembly is moved and set to the right position. After the sheets fall down in the delivery stacker, the paper flap presses the tail end of paper to align the paper.

1.9 Power & Control: The power and control section is built to high standards of safety and performance. It comprises the main drives, the UV system and the control PLC system. Together with the operator panel on the feeder and the various control elements around the machine, it enables easy and safe operation of the machine.

2. Scope of supply (standard machine)

2.1 Feeder

1. Steel plate for pile loading
2. Mechanical Double Sheet Detector
3. Suction Type Feeder board
4. High Speed Separator
5. Feeder pump (Rietschle / Becker / Orion)

2.2 Register

1. Front-lay Detector
2. Pull/Push Type Side-lay
3. Side-lay Detector

2.3 Printing unit

1. Double Diameter Impression Cylinder
2. Stainless Steel Covered Impression Cylinder
3. Pneumatic Screen Clamping System
4. Pneumatic Squeegee Pressure Setting
5. Tilting Delivery Board
6. Suction in Cylinder for Holding Paper

2.4 Operation & control

1. Servo Control For Frame and Cylinder
2. Sequential Start Up
3. Emergency Off at Feeder
4. Emergency Off at Delivery
5. Touch Screen Display

2.5 Others

1. Platform
2. Proteck Standard Painting
3. Standard Accessories & Spare Parts

2.6 Options

1. Electro-Static Eliminator at Feeder and Delivery
2. IR UV Conveyor (IR 3 Lamps 4kW each; UV 2 Lamps 11.4 kW each)
3. In-feed with Dump Gate (Available with any conveyor, Weight Approx 300 kg)
4. Hot Air Conveyor (12 Heaters of 1.5 kW each)
5. Chiller Conveyor
6. Sheet Stacker

3.Optional Equipment:

3.1 UV Curing Station (IR + UV)

1. Suction conveyor
2. Paper collecting table at delivery (If stacker is not required)
3. UV lamps – 2 nos. / lamp power: 11.4 KW, each
4. IR Lamps – 3 nos. / lamp power: 4 KW, each
5. Variable speed drive motor to suit UV coating equipment
6. Teflon coated belts for withstanding heat under UV lamps
7. Specially designed reflector units for maximum utility of UV rays
8. Air-cooled reflectors
9. Convenient provision for exhaust system
10. Machine mounted on castor wheels
11. Power packs designed manufactured in-house to ensure long life of UV lamps
12. Power requirement 37 kW
13. Low and High Power modes for UV
14. Weight Approx. 1200 kg

3.2 Hot Air Dryer

1. Suction conveyor
2. Paper collecting table at delivery (If stacker is not required)
3. Heater Elements – 12 nos. / power: 1.5 KW, each
4. Variable speed drive motor
5. Teflon coated belts for withstanding heated air
6. Convenient provision for exhaust system
7. Machine mounted on castor wheels
8. Twin Impeller Blower for Air Blow
9. Power Requirement 22 kW
10. Digital Readout For Set and Actual Temperatures
11. Weight Approx. 1300 kg

3.3 Refrigerated Dryer Station

1. Suction conveyor
2. Paper collecting table at delivery (If stacker is not required)
3. Variable speed drive motor
4. Teflon coated belts
5. Cooled water inlet
6. Machine mounted on castor wheels
7. Power Requirement 6 kW
8. Separate Cooled Water Supply Unit (Optional)
9. Digital Readout For Set and Actual Temperatures
10. Weight Approx. 1250 kg

3.4 Delivery Stacker

1. Suction conveyor
2. Variable speed drive motor for suction belts

3. Pile Height of 1000 mm
4. Pneumatically Operated Side Joggers
5. Paper Sensor to activate Joggers
6. Automatic Pile Lowering
7. Steel Plate for Pile Board
8. Air Blow in Delivery for Proper Stacking
9. Power requirement 2 kW
10. Weight Approx. 1000 kg

3.5 Power & control

1. Operating voltage other than standard voltage (380 – 415 VAC 50 / 60 Hz)
2. Customer specified components of different brand than standard.

3.6 General

1. Non-standard paint colors.
2. Special packing requirements (Materials, break-up of packing units)

4. Technical data

1. Maximum Sheet Size:	1,040 mm x 740 mm
2. Minimum Sheet Size:	400mm x 360mm
3. Maximum Printing Size:	1,040mm x 720 mm
4. Maximum Press Speed:	3,000 sheet/ hour (sph)

*Actual printing speed will be dependent upon size, thickness, and quality of stock being run as well as on the accuracy of register required and other operation, maintenance conditions.

5. Sheet thickness:	0.08mm to 1mm
6. Screen Frame Size: Length x Width	1,280mm x 1140mm
7. Distance between Screen Frame Edge and Front Edge of Printing Image:	150 mm
8. Paper Pile Height: Feeder	1,000 mm
9. Machine Size: (L x W x H)	4300mm x 1750mm x 1900mm
10. Machine Weight: (approx.)	3.2 Tons
11. Total Power Requirement: (Standard Specifications) ST104 with Feeder	10 kW 415V 50Hz 3 phase

5. Documentation & Safety

5.1 Documentation:

CE Documentation (to be supplied with the machine)
 (All documentation will be supplied in hard copy and electronic form)

Mechanical	1 set of layout drawings.
Electrical	1 set of electrical wiring diagram and part list.
Pneumatic	1 set of pneumatic diagram.
Parts Manual	1 parts manual in English language.
Operating Manual	1 operating manual in the English language.
Maintenance Manual	1 maintenance manual including preventive maintenance schedule in English language.
Operating Manual	1 operating manual in local language for CE compliance.
Maintenance Manual	1 maintenance manual including preventive maintenance schedule in local language for CE compliance.

5.2 Safety:

The ST104 complies with the CE standard with respect to:

EN 12100-1	Basics
EN 12100-2	Basics
EN 294	Safety distance upper body.
EN 418	Emergency stop
EN 574	Two-hand safety
EN 953	Covering
EN 954	Safe operating system
EN 1037	Unintended start
EN 1050	Risk analysis
EN 1088	Door switches/safety
EN 60204-1	E-security
EN 60642	Transformers
EN 60947-5-1	Electrical

6. Warranty

The standard warranty period expires at the end of 425 calendar days from the date of shipment from Proteck manufacturing facility or Proteck warehouse or at the end of 365 days from the date of start of installation at customer premises, whichever is earlier.

During the warranty period of 12 months, starting from the day of installation, all cost that results from the normal use of the product (except for wear-out parts) will be covered by Proteck.

This warranty includes material cost as well as labour cost of engineers.

Excluded from the warranty are travelling cost, travelling hours and travelling expenses of engineers.

In the following cases this warranty loses validity:

- In case the machine is moved to another location without involvement of Proteck.
- In case parts are replaced by parts not of equal brand and specification.
- If modifications of any sort are made to the machine without written consent of Proteck.

7. Installation, training and commissioning

The customer is responsible for unloading the machine parts from the truck or container and for all internal transportation of the machine to the installation location. Also the customer will make sure that there is adequate space available for installing the machine.

A total of 5 working days with 2 engineers are budgeted for taking care of the installation, commissioning and training. These days are approximately divided over:

Installation:	2 working days
Putting into operation and testing:	1 working day
Training:	2 working days

The customer is also responsible for connecting the machine to electricity and air supply.

For the training it is important that the person responsible for preventive maintenance and for reactive maintenance is available during the entire period of installation. This person (or these persons) will also receive the extended maintenance and service training. Training can be extended upon customers' request.

8. Acceptance procedure

The initial acceptance test of the machine will take place at the Proteck manufacturing facility or the Proteck warehouse located in The Netherlands. The customer is welcome to attend this test. If the customer wishes to use it's own acceptance criteria these have to be discussed prior to placing the PO and be made part of this specification. Also if the customer wishes to perform an acceptance test after installation this has to be specified prior to placing the PO and be made part of this specification.