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Preamble

The purpose of this manual is to provide to the buyer and the user of the machine all the required information which will allow them to ensure a correct use, installation, operation and maintenance of the machine.

The present manual is a useful auxiliary tool for the reader which enables him to use the system in the appropriate fashion and to guarantee its permanent availability.

In order to take full advantage of its functional possibilities, it is absolutely indispensable that the instructions given in this manual be strictly complied with.

Should you have any questions, please contact your sales agency.

Please keep this manual handy at an easily accessible place, in order to make sure that the relevant information is always available.

We wish you a lot of success with your new machine.

Grüning Interscreen AG
Description of the equipment

1 Description of the equipment

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1 Description of the equipment

1.1 Introduction

The G405 installation is used for automatic coating of screen frames. The screen frames are inserted from the front (front panel side). The carriages are guided by means of special profiles made of synthetic material, with inserted slideways, and parallely motorized by two toothed belts. The drive unit is fastened on top in the control tower. The coating procedure is carried out from the bottom upward.

The coating carriage is equipped on both sides with pneumatic cylinders whose task consists in moving and tipping the trough against the mesh; this system not only guarantees an even build-up of the layer but also an absolute reproducibility of the coating results. The drive unit of the coating carriage is equipped with a fully digitalized frequency converter. The coating emulsion is applied by means of special coating troughs, either from one or from both sides of the inserted screen - according to the customer’s requirements. The variables controlling the coating procedure can be memorized within 10 different programs.

1.1.1 Overall view

The overall view of the product is shown in the appendix of chapter 4 of the present operating instructions. Furthermore, the most important individual elements have been numbered and are specified in the legend (see appendix).

1.1.2 Reference with regard to additional manuals

Availability upon agreement with the manufacturer.

1.1.3 Usage

Important: The G-405 installation may only be used for the specified application and purpose. More detailed information is given in chapter 2.3 which also describes the specifications to be complied with, as well as the risks involved in faulty applications and any possible damages resulting from such a misuse.

1.1.4 Designation of the product

The designation of the product is the following:

G-405 Automatic coating machine

Index of options:

A1 = Manual tie-bar
A2 = Motorized tie-bar
E3 = Electric voltage 1x230V (L+N+PE)
E4 = Electric voltage 2x220V (2L+PE)
H = Manual screen frame holder
S = Pneumatic screen frame holder
X = Set of spare parts G405
Z = Additional equipment for double coating (only in conjunction with option S)
1.2 Construction and function

1.2.1 Introduction

1.2.1.1 Principles of the procedure

- The screen frame is inserted into a screen frame reception unit where it is fastened.
- The coating emulsion is manually filled into the coating troughs and fed to the machine.
- The layer is automatically applied onto the stretched screen, either on one or on both sides, according to the program definition, from the bottom upward.
- As soon as the coating process is completed, an acoustic signal is heard and the coated screen frame can be removed from the machine.

1.2.2 Configuration

1.2.2.1 Mechanical configuration

The supporting frame of the G405 is a welded construction made of pickled steel sheet ST 12.03. The bottom console and tie-bar are also steel constructions that are treated with a two-component primer coat and a two-component structured finish paint.

1.2.2.2 Elektrical configuration

The automatic coating machine G-405 is equipped with two different devices, each of them containing a software (PLC and MMI Touch Screen Terminal). For the operator, the software of the PLC and of the MMI are of no importance. They only have to be specified in the event of a possible malfunction.

PLC with Flash EEPROM 405E____
MMI with Flash EEPROM 405E____
1.2.3 Default factory setting

Program 1  1-1 coating:

• Soaking time of the emulsion = 4s
• Trough contact pressure = 3bar
• Number of coating moves squeegee side = 1
• Number of coating moves print side = 1
• Coating speed = 50

Program 2  2-1 coating:

• Soaking time of the emulsion = 4s
• Trough contact pressure = 3bar
• Number of coating moves squeegee side = 2
• Number of coating moves print side = 1
• Coating speed = 50
1.2.4 **Functional description**

See chapter 4.4

1.3 **Additional equipment**

See chapter 8.2

1.4 **Description of the options**

With this version, the adjustable tie-bar used for fastening the various frame sizes is manually operated. Upon actuating the latch-type button on the handle, the tie-bar can be adapted to the respective frame size (for SH 1250 mm standard).

With this version, the adjustable tie-bar used for fastening the various frame sizes is automatically moved (for SH 1600 mm standard or bigger).

The manual screen frame holder is equipped with a cone-shaped knurled screw used for fastening the screen frame. Screwing this knurled screw in or out allows to fasten screen frames of varying thicknesses.

The pneumatic screen frame holder fastens the frame by means of pneumatic cylinders that are controlled via a foot-operated pedal.

The extended set of spare parts TG-000-114-00 contains more than the spare parts included in the set of accessories. Other than small consumables, it also contains larger components (such as cylinders, chokes, valves and switches).

In order to ensure a safe and reliable function at all times, we advise you to order this set of spare parts.

A summary of the parts included in the list of spares is shown in chapter 8.2.1.

Double coating of two screen frames positioned next to each other. The pneumatic stretchers can be separately controlled by means of a foot-operated pedal.

1.4.1 **Special version**

no available
### 1.5 Technical data

<table>
<thead>
<tr>
<th>Design</th>
<th>Unit</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage (depending on the local mains supply)</td>
<td>U V</td>
<td>1x230 + N + PE 3x220 + PE</td>
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<tr>
<td>Current</td>
<td>I A</td>
<td>10</td>
</tr>
<tr>
<td>Power</td>
<td>P kW</td>
<td>1</td>
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<tr>
<td>Mains frequency</td>
<td>F HZ</td>
<td>50 / 60</td>
</tr>
<tr>
<td>Mains fuse external</td>
<td>I AT</td>
<td>15</td>
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<tr>
<td>Cross section for connection</td>
<td>A mm²</td>
<td>2.5</td>
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<tr>
<td>Compressed air supply (oil free)</td>
<td></td>
<td>bar 7</td>
</tr>
<tr>
<td>Air consumption</td>
<td>ltr/min</td>
<td>10</td>
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<tr>
<td>Permanent sound pressure level</td>
<td>dB (A)</td>
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<tr>
<td>Height of machine (variable)</td>
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<tr>
<td>Weight of machine</td>
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<td>Screen frame height</td>
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<td>Screen frame thickness</td>
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<td>Minimum distance betw. rear wall</td>
<td>mm</td>
<td>200</td>
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<td>Material / supporting structure</td>
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<td>pickled steel sheet</td>
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<tr>
<td>Surface treatment</td>
<td></td>
<td>2K-RAL 6016 / 6018</td>
</tr>
<tr>
<td>Temperature</td>
<td>°C</td>
<td>18 - 25</td>
</tr>
<tr>
<td>Humidity of air</td>
<td>%</td>
<td>40 - 70</td>
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</tbody>
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Safety regulations

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2 Safety regulations

This chapter describes the safety-relevant requirements which must absolutely be fulfilled when using the automatic coating machine G-405 (hereinafter called the „Installation“).

For all the persons who will be working on and with the installation, it is of the utmost importance that they have previously read and fully understood the chapters referring to their respective activities. This particularly applies to the present chapter which is compulsory for all the involved persons and activities, even for staff members who are working with the machine on a temporary basis only, e.g. for setting-up and maintenance procedures.

2.1 Introduction

2.1.1 Definition of terms

Manufacturer

Is deemed to be the manufacturer: the company Grünig-Interscreen AG as well as any other person appearing as the manufacturer by affixing his name, brand name or any other distinctive label on the installation.

Is furthermore considered as the manufacturer: his representative, the import agent of the installation or any other trade persons within the distribution chain, in as far as their activities may influence the safety characteristics of the installation.

Operator

The operator is the owner of the installation as well as all the persons who - upon his request and order - carry out work on and with the installation.

Life cycles of the installation

This term refers to all the status and application phases of the installation, from the moment when it leaves the manufacturing site up to its disposal.

In the present operating instructions, the various design life cycle phases of the installation are described in the following chapters: Commissioning (setting-up, assembly), operation, maintenance, repair, shut-down/storage, wrapping/transport and disposal.
2.1.2 **Staff qualification (target group)**

Various staff qualifications are prescribed for the different lifetime phases of the installation. These specifications are lined out at the beginning of the respective chapters of the present operating instructions. For example: the requirements to be fulfilled by the operating staff are specified at the beginning of chapter 4 „Operation“, the ones destined for the service and maintenance staff in chapter 6 „Malfunction and repair“, etc.

STOP

The staff qualification describes the minimum requirements which have to be fulfilled in order to guarantee a safe operation and handling of the machine. It is incumbent on the operator to make sure that these requirements are met.

2.1.3 **Significance of the safety regulations**

The purpose of the present safety regulations is to be able to recognize the existing residual dangers and, by means of a strict compliance with the respective notes, to ensure a safe and cost-effective operation of the installation.

2.2 **Danger notes and symbols**

Certain dangers are involved when using technical products. Risks which could be eliminated neither by construction measures nor by the installation of protection devices are called residual dangers.

Various danger notes and symbols are included in the present operating instructions and posted on the installation itself, in order to point out the residual dangers existing during the appropriate use of the machine and to draw your attention to important technical requirements, and in order to avoid incorrect manipulations.
2.2.1 Notes and symbols in the operating instruction

a) Danger symbols

STOP
Information regarding risks which may cause
- fatal or serious irreversible injuries
- personal material damages exceeding an amount of Fr. 1'000'000.-

WARNING
Informationen regarding risks which may cause
- minor, average or permanent damages to health/injuries
- personal material damages up to an amount of Fr. 1'000'000.-

b) Note symbol

Information pointing out technical requirements.
A non-compliance is liable to cause malfunctions, reduction of the cost-effectiveness or maybe even production losses.

2.2.2 Danger signs on and within the area of the installation

The following danger symbols draw the attention to the unavoidable residual dangers and therefore always require an careful and attentive operation of the machine, in compliance with the present manual.

Danger sign (service door of the electrotechnical compartment) «Warning: dangerous electric voltage»
The door may only be opened by qualified staff.

Danger sign (on the coating carriage) «Warning: risk of crushing».
In the automatic mode, the coating head moves independently and unexpectedly.

Sign on frequency converter „Loaded capacitors“. A dangerous voltage will persist even within 2 to 3 minutes after the device has been switched off.

Danger ribbon
On the coating carriage «Moving element».
The coating carriage is automatically lifted and lowered by means of the chain drive unit, and the troughs are horizontally moved towards the fabric and back by means of pneumatic cylinders.
On the outer edge of the floor console «Danger zone». Nobody is allowed to enter this area.
2.3 Use of the product

2.3.1 Appropriate use

The G-405 installation has been exclusively designed for coating purposes in the screen printing industry.

Are also an integral part of an appropriate use:

- Compliance with the technical data specified in chapter 1.5
- Compliance with the present operating instructions with all the instructions and prescriptions it contains

2.3.2 Inappropriate use (faulty applications)

Any other application or use beyond these specifications is deemed inappropriate. The manufacturer declines all responsibility for any resulting damages; the risks of such a misuse are solely borne by the operator.

2.4 Safety principles

2.4.1 Repercussion on other safety concepts

The safety concept of the installation is autonomous, i.e. any other equipment installed either up-line or down-line are not influenced. If the machine is integrated into a production line, it is incumbent on the operator to draw up an overall safety concept for the complete particular installation.

2.4.2 Danger zone

WARNING

The danger zone of the machine is the area within the markings (danger ribbon) on the floor console and in vertical direction extends up to the entire height of the machine.

It is absolutely forbidden to stay within the danger zone.
2.4.3 Basic risks

2.4.3.1 Commissioning, operation, maintenance and repair

WARNING

When mounting the tower, make sure that the mounting prescriptions of chapter 3 are complied with. Nobody must be able to enter the danger zone while the machine is operated in the manual or in the automatic mode.

WARNING

After switching the main installation switch (20) off, wait approx. 5 seconds before extending your limbs into the installation.

2.4.4.2 Further safety-relevant notes in the following chapters

These notes are included in the introduction of the respective chapters. The operator can for example find them in the chapter „Operation“, the ones destined for the maintenance specialist are included in the chapter „Malfunction and repair“, etc.

2.4.5 Organizational safety measures

Other than a strict compliance with the requirements to be fulfilled by the staff which are indispensable in order to guarantee a safe operation with and handling of the installation (see chapter 2.1.2), no further measures have to be taken.

2.4.6 Safety elements

The standard version is equipped with the following safety elements:

- Sliding clutch for the upward and downward movement of the coating carriage
- Free-wheel for the downward movement of the motorized tie-bar
- Emergency disconnector hit button on the control panel
- Anchor strap (for SH 3500 or bigger) protecting the machine against tipping over

2.4.7 Removal of safety elements

All manipulation and tampering with the protection devices and safety elements is strictly forbidden and - depending on the legislation of the country of application - may have legal consequences (lawsuits).
2.5 General safety rules

2.5.1 Legal prescriptions

In addition to the operating instructions, the generally valid legal prescription and other compulsory regulations regarding accident prevention and environmental protection have to be complied with.

2.5.2 General duty of inspection

This obligation must particularly be fulfilled after every repair or maintenance intervention. During this inspection, the function of all the protection devices has to be checked.
2.5.3 Energy connections

The installation must only be connected to the energy supply sources mentioned in chapter 1.5. It must be possible to disconnect all the supply lines (to be provided by customers). Clear specifications regarding the various connections are shown in chapter 3 of the present operating instructions.

2.5.4 Spare parts

For repairing the installation, only the original spare parts described in chapter 10 of the present operating instructions may be used.

2.5.5 Modifications

Modifications of the installation are only admissible upon prior discussion with and approval by Grünig-Interscreen AG. This also applies to the installation of checking, feed and transfer systems manufactured by foreign suppliers. Should this instruction be disregarded, the manufacturer declines all responsibility for any resulting damages.

2.6 Responsibilities

2.6.1 Obligations of the manufacturer

The manufacturer is responsible for the safety of his product; in this context, he transfers some important obligations to the operator (see chapter 2.6.2).

The manufacturer observes his product beyond the delivery to the operator. He is entitled to request information from the latter, particularly with regard to safety-relevant matters.

2.6.2 Obligations of the operator

2.6.2.1 Training courses, competences

It is incumbent on the operator to make sure that the installation is only operated by duly authorized personnel. Even for temporary or auxiliary staff, he shall organize a detailed initiation and training on the basis of the present operating instructions and determine the respective competences.

2.6.2.2 Instruction regarding risks

It is incumbent on the operator to make sure that all the work carried out on and with the installation by his staff is exclusively based on the present operating instructions. He shall provide all the resources and devices necessary to guarantee the safety of the users.
2.6.2.3 **Obligation regarding maintenance and necessary care**

The installation must at all times be maintained and operated in perfect condition, and the maintenance intervals have to be complied with.

2.6.2.4 **Duty of observation and information**

Should any (residual) dangers and risks become apparent during the operation of the installation which have not been described in the present operating instructions, then the operator is under the obligation to inform Grünig-Interscreen AG of this fact without delay.

2.6.2.5 **Location of the operating instructions**

The present operating instructions must be at all times available on the machine (tool compartment, container, etc.). Should the copy be lost or in bad condition, new originals can be ordered from Grünig-Interscreen AG.

2.6.2.6 **Staff speaking a foreign language**

In addition to the specifications of chapter 2.6.2.5 some trade unions require that for all the personnel having insufficient knowledge of the local language, the operator shall provide an operating manual for the involved tasks and activities in the respective language. In this case, the present safety regulations as well as the safety-relevant notes in the various chapters must also be translated.

2.7 **EU conformity**

2.7.1 **Determination / analysis of the residual dangers**

The safety-relevant notes included in the present operating instructions have been determined by a residual risk analysis; they draw your attention to the residual dangers.

2.7.2 **Declaration of conformity for EC identification**

See following page
Commissioning

3  Commissioning

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3.1.1  Staff qualification
3.1.2  Safety regulations
3.1.3  Energy sources to be provided by customers

3.2  Setting-up and installation
3.2.1  Preliminary requirements
3.2.2  Required space
3.2.3  Unwrapping and cleaning
3.2.4  Location plan
3.2.5  Assembly instructions
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3.4.1.7  Checking the limit stop switches of the carriage and tie-bar
3.4.2  First commissioning

3.6  Acceptance protocol
3 Commissioning

3.1 Introduction

3.1.1 Staff qualification

The installation must only be set up, assembled and taken into operation by specialized professionals with adequate technical training or by staff having comparable knowledge in the field of mechanic, pneumatic and electric technology. A training course or introduction by Grünig-Interscreen AG is absolutely required for this purpose.

3.1.2 Safety regulations

STOP - Attention to residual dangers
First read chapter 2 „Safety regulations“ and follow all the danger notices it contains.

STOP - Attention to the general safety prescriptions
In addition to the safety regulations mentioned in chapter 2, the safety prescriptions regarding the particular technical fields (pneumatic, electric technology, etc.) as well as the locally applicable regulations of the respective country have to be taken into account.

STOP
Before taking the installation into operation, make sure that nobody remains within the danger area.

3.1.3 Energy sources to be provided by customers

The energy sources which are required for operating the installation have to be provided according to the specifications by the operator of the installation. The various connections which are required for this purpose are listed in chapter 1.5. Please take into account the technical data and the information specified on the rating plate.
3.2 Setting-up and installation

3.2.1 Preliminary requirements

It is recommended to use a crane or a fork lift truck in order to unwrap and set up the heavy individual elements.

3.2.2 Required space

Sufficient space has to be provided in order to ensure an efficient and comfortable use of the installation.

- Distance between the installation and the rear wall: at least 200 mm
- Distance between the installation and the left-hand side (control tower): at least 500 mm
- Distance between the installation and the right-hand side: at least 200 mm
- Distance in front of the installation (on the side of the control panel): at least 1000 mm

The available floor must be hard and even, with only a minimum of vibrations, designed for a minimum load capacity of 250 kg/m².

The room should be free of UV radiation and as far as possible dustfree and offer a constant room temperature between 18°C and 25°C, as well as a relative humidity of air ranging between 40 - 70%.

3.2.3 Unwrapping and cleaning

The wrapping of the installation must be removed as described in chapter 10. Any dirty parts have to be cleaned with a rag.

After unwrapping the machine elements, the installation must be assembled as described in chapter 3.2.5 „Assembly instructions“.
### 3.2.4 Location plan

(All measurements in mm)

Legend:

1) Mains power supply (240 mm from floor level)
   U=1x230V+N+PE/50-60Hz/I=10A or U=3x220V+PE/50-60Hz/I=10A
   (for the exact connection values, please refer to the rating plate of the installation)
2) Compressed air supply (240 mm from floor level) 7bar
3) Max. weight of the machine 560 kg
3.2.5 Assembly instructions

The enclosed Set of accessories TG-000-113-00 is required for assembling the installation. The assembly must be carried out in the order specified hereafter.

1. Control tower: as shown in the illustration, attach the lifting straps to the eye screws and set the tower up by means of a crane or a fork lift truck. Place the control tower at the planned site and adjust it vertically by means of the levelling feet. For SH 3000 or bigger: mount anchor straps.
3. For option S: Insert the pneumatic tube from the floor console through the hole provided in the control tower and connect it according to the numbers.

4. Position the floor console (stopping pins being positioned at the back) above the two centering holes ø6 and fix by means of the two dowel pins ø 6x20 (Caution: make sure that the tube is not crushed).

5. Check if the floor console has been correctly centered with the two pins. Fasten the floor console using the hexagon head cap screws M8x20 and washers M8.

6. Lift the top plate up to the required height, using a crane or a fork lift truck, and fasten it onto the control tower by means of the hexagon head cap screws M8x20 and the washers M8.

Push the connection tube onto the drive shaft and tighten the screw by hand.
7. Set the side part up by means of a crane or a fork lift truck, stick the hexagon crown of the side part into the connection tube. (Should it not be possible to insert the hexagon shaft into the connection tube, the fixing screw of the carriage guide must be removed.)

8. Position the side part above the two centering holes ø6 of the floor console and fix it by means of the two heavy-type dowel pins ø6x20, and fasten it to the top plate and to the floor console using the hexagon head cap screws M8x20 and washers M8.

9. Adjust the connection tube and screw it down to the hexagon shafts. Remove the fixing screws of the carriage guide on the control tower and on the side part.

10. Adjust the machine vertically by means of the levelling feet. Position the foot-operated switch panel and connect the plug (5-pole plug).
11. Connect the electric power supply to the mains socket (in accordance with the rating plate). Switch the main installation switch on (4.4.1).

12. Screw the coating carriage against the carriage guides, the side with the red trough carrier end piece being positioned in front (squeegee side).

13. Connect the reinforced tube to the tower.
14. Replace the sealing bung on the drive motor by a bleed screw.

15. Connect the pneumatic tubes according to the numbering of the valves.

If all the assembly steps have been carried out up to this point, the coating carriage can be positioned at a convenient work height, in the manual menu (4.3.3).
16. The upper tie-bar is inserted into the guide on the side of the side part. Then it is inserted into the guide on the other side in an inclined angle from above, as shown by the illustration. Now the tie-bar lies loosely on the coating carriage. Should this procedure be hindered by the magnetic rod on the tie-bar, this rod can be removed.

17. If the upper tie-bar is motorized, the guide piece with the two concave ball-bearings must be carefully moved to the respective height. Now the tie-bar can be screwed into this guide piece. Make sure that the upper tie-bar is always parallel with regard to the lower one. The upper tie-bar must have no play. If the magnetic rod has been removed, it must now be re-mounted (the magnet pointing towards the front).

18. For options S and Z: Connect the spiral tube on top of the control tower and and on the tie-bar, at the provided connection.

19. On the control tower and on the side part, mount one black rubber buffer at the provided threaded hole at the lower end of the toothed rack.

20. Connect the compressed air supply (a matching speed air coupler is included in the set of accessories.) If option S is provided: position the foot-operated pedal and connect the plug (5-pole plug)
3.2.6  **Fixing and securing**

For screen frame heights of 3000 mm or more, the coating machine must be fastened onto the wall by means of the anchor straps and the fixing material included in the delivery; otherwise there is a risk that the installation might topple over.

3.3.1  **Electric power supply**

The installation must be connected to a mains supply system, various voltages being possible. (Please refer to the rating plate)

The electric current supply is connected to the mains outlet in the installation by means of a feed cable.

3.3.2  **Compressed air connection**

Connect the compressed air supply on the rear side of the control tower. Connection values according to the technical data (see chapter 1.5).

An input pressure regulator with manometer and water trap has already been included in the installation (the water trap has to be emptied and cleaned according to the maintenance plan or to the actual requirements).
Commissioning

3.4 **First commissioning**

3.4.1 **Setting and preparation**

3.4.1.1 **Visual checking prior to starting the machine**

The visual checking prior to starting the installation only serves to avoid gross mistakes.

- Has the installation been levelled? (chapter 3.2.5)
- Have all the components been mounted, screwed down and connected at the correct place? (chapter 3.2.5)
- Have the electric and pneumatic connections been made?
- Have the anchor straps been mounted? (chapter 3.2.6)

3.4.1.2 **Switching the installation on**

See chapter 4.4.1

3.4.1.3 **Mechanically adjusting the trough pivot**

These settings are pre-adjusted at the factory and should only be corrected if necessary.

- Mount the coating troughs onto the machine (4.4.3.2)
- Insert a screen frame (of faultless quality) into the machine and fasten it as described in chapter 4.4.3)
- Manually move the coating carriage upward, approximately to the beginning of the coating height (4.3.3.7)

Proceed to the adjustments of the trough contact pressure between the print side and the squeegee side one after the other.

**Important:** Parallelity is of prime importance - all the settings must be checked on the left- and right-hand sides!

Loosen the screws (1) of the two tipping levers

The trough pivot is adjusted by means of the setting screws on the rotating lever (1).
### 3.4.1.4 Mechanically adjusting the trough contact pressure

**Preliminary condition:**
In order to be able to adjust the trough contact pressure, the trough pivot must previously have been correctly adjusted (3.4.1.3).

In the menu of the manual functions, move the trough onto the mesh (4.3.3.7)

The contact pressure is adjusted by means of the piston rod (2) of the contact pressure cylinders (3). The contact pressure is increased by screwing the piston rod (2) in. Screwing the piston rod (2) out causes the contact pressure to be reduced. The setting must be secured by means of the hexagon nut.

**Important:** Parallelity is of prime importance - all the settings must be checked on the left- and right-hand sides!

The trough contact pressure must be adjusted after the basic setting, depending on the width of the screen frames (see calculation formula).

**Chart for adjusting the contact pressure:**

<table>
<thead>
<tr>
<th>SB (mm)</th>
<th>Mass A (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>4</td>
</tr>
<tr>
<td>1250</td>
<td>4</td>
</tr>
<tr>
<td>1500</td>
<td>4.5</td>
</tr>
<tr>
<td>1750</td>
<td>4.5</td>
</tr>
<tr>
<td>2000</td>
<td>5</td>
</tr>
</tbody>
</table>

A perfect coating can only be guaranteed if the contact pressure of the coating trough has been correctly adjusted.
**Commissioning**

### 3.4.1.5 Mechanically adjusting the trough tipping movement

Preliminary condition:
In order to be able to adjust the trough tipping movement, the trough pivot must previously have been correctly adjusted (3.4.1.3).

In the menu of the manual functions, tip the trough forward (4.3.3.7)

The tipping movement is adjusted by means of the piston rod (4) of the tipping cylinders (5). The tipping angle is increased by screwing the piston rod in. Screwing the piston rod out causes the tipping angle to be reduced. The setting must be secured by means of the hexagon nut.

**Important:** Parallelity is of prime importance - all the settings must be checked on the left- and right-hand sides!

**Setting the tipping angle:**

In the position where the coating trough is tipped forward, the trough end piece (6) must be adjusted with a draft angle of at least 5° towards the mesh.

A faultless coating result can only be achieved if the tipping position of the coating trough has been correctly adjusted. Make sure that for the tipping movement the draft angle has been adjusted for the trough on the print side and the one on the squeegee side.
3.4.1.6  **Adjusting the frame profile height**

The frame profile height can be adapted to the actual height of the frame profiles by means of the two knurled screws (1) and (2).

The scale graduation is specified in centimeters (cm) (adjusting range: 3 to 8 cm).

Knurled screw (1) is for limit stop switch carriage on top

Knurled screw (2) is for limit stop switch carriage below

3.4.1.7  **Adjusting the contact pressure**

Pressure regulator (3): for adjusting the trough contact pressure to the mesh on the print side (black trough end piede)

Pressure regulator (4): for adjusting the trough contact pressure to the mesh on the squeegee side (red trough end piede)

The programmed pressure is displayed on the respective manometer (5).

The contact pressure of the trough must be adapted to the respective situation (type of mesh, mesh tension, etc.)

We advise to adjust a contact pressure of 3 - 4 Bar on both sides. In the event of large machines, the contact pressure must be increased according to the requirements (to 4-5 Bar).
3.4.1.8 **Checking the limit stop switches of the carriage and tie-bar**

In order to check the function of the magnetic switches of the coating carriage, select the manual mode (4.3.3) and move the coating carriage to the end positions (top position at the magnetic rod of the tie-bar, bottom position at the magnet on the C-shaped rail.

If the magnetic rod has been removed in order to facilitate the installation of the tie-bar, do not forget that when inserting the magnetic rod the magnet (X) is turned towards the front.

As soon as the magnetic limit stop switch has been reached, the carriage must be stopped.

For checking the function of the magnetic switches of the tie-bar, select the manual mode (4.3.3) and move the tie-bar to the upper end position.

As soon as the magnetic limit stop switch has been reached, the tie-bar must be stopped.

Should the carriage fail to stop and overtravel the magnetic switch, please contact the specialist of Grünig-Interscreen AG.

3.4.2 **First commissioning**

If all the items of chapter 3 have been carried out up to this point, follow the further instructions provided in chapter 4.4. Then a first mesh can be coated. This initial coating process serves at the same time as a functional checking of the machine.
3.6 Acceptance protocol

The undersigned herewith confirm that the installation has been correctly set up, connected and taken into operation according to the specifications contained in chapter 3. The operator of the installation has been instructed on the basis of the present operating manual and ensures the correct use and handling of the installation. In particular, chapter 2 - Safety - will be given top priority and attention.

Machine type: ___________________ Serial no.: ___________________

The operator: ___________________ Place: ___________________
              Date: ________________

The manufacturer: ______________ Place: ___________________
                      Date: ______________
Acceptance protocol

The undersigned herewith confirm that the installation has been correctly set up, connected and taken into operation according to the specifications contained in chapter 3. The operator of the installation has been instructed on the basis of the present operating manual and ensures the correct use and handling of the installation. In particular, chapter 2 - Safety - will be given top priority and attention.

Machine type: ___________________  Serial no.: ___________________

The operator: ___________________  Place: ___________________
                   Date: ___________________

The manufacturer: ___________________  Place: ___________________
                      Date: ___________________
4 ........................................................................................................ Operation

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4 Operation

4.1 Introduction

4.1.1 Qualification of staff

The installation can be operated by staff members who are at least semi-qualified, after being sufficiently instructed by the operator on the basis of the present operating manual, and whose attention has been drawn to the existing residual dangers. Apprentices require particular instruction and supervision.

4.1.2 Danger notices

STOP - Pay attention to the residual dangers:

First of all, read chapter 2 “Safety regulations” and follow all the danger notices it contains.

STOP

As soon as the machine is being operated, nobody is allowed to enter the danger area.
4.2 Control and display elements

4.2.1 Arrangement and designation

4.2.1.1 Control tower

Legend:
20) Main installation switch
21) Emergency stop button
22) MMI Terminal
23) Pressure regulator (print side)
24) Manometer pressure display (print side)
25) Pressure regulator (squeegee side)
26) Manometer pressure display (squeegee side)
27) Start key
   (is lit = ready to start)
   (is flashed = coating carriage moves automatically

4.2.1.2 Foot-operated pedal

Legend:
23) Tie-bar UPWARD (from SH 1600 or bigger)
24) Tie-bar DOWNWARD (fr.SH 1600 or bigger)
25) Open / close stretcher (Option S)
4.3 **Terminal operation**

4.3.1 **Key functions**

- This key takes you back to the previous menu.
- This key takes you to the menu of the manual mode or chooses the function indicated on the display above the key.
- This key takes you to the programming menu or chooses the function indicated on the display above the key.
- This key takes you to the menu of the settings or chooses the function indicated on the display above the key.
- This key takes you back to the operating menu.
- This key deletes already defined input values.
- This key switches over to the sub-menu or stores defined input values.
- The arrow keys control the cursor positions on the text display.
- The numerical keys are used for defining the program variables and for selecting the programs.

4.3.2 **Automatic mode**

The automatic mode is the normal operating mode that is shown on the display whenever the machine is switched on by means of the main installation switch (20).

The coating program to be carried out is selected by means of the numerical keys and started with the start key (27).

At the end of the coating process an acoustic signal is heard.
4.3.3 Manual mode

If the automatic mode is shown on the display, actuating the F1 key will take you to the menu of the manual mode.

Use the vertical arrow keys (↑↓) in order to choose the desired manual function, and then actuate the Enter key.

The functional commands will appear on the display.

The functional commands displayed above the keys F1 - F3 will be carried out as long as the respective key remains actuated.

The MAIN key will take you back to the automatic mode.

Coating carriage up/down:

The F1 key will move the coating carriage to the top. The F2 key will move the coating carriage to the bottom.

Tie-bar up / down:

The F1 key will move the tie-bar to the top. The F2 key will move the tie-bar to the bottom. The F3 key opens/closes the screen clamp device.

Approaching the trough:

The F1 key approaches the trough on the print side. The F2 key approaches the trough on the squeegee side. The F3 simultaneously approaches the troughs on the print and on the squeegee side. If this same key is actuated once again, the troughs will move back.
Tipping the trough forward

<table>
<thead>
<tr>
<th>Tip trough forward</th>
<th>PS</th>
<th>SS</th>
<th>PS /SS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F1</td>
<td>F2</td>
<td>F3</td>
</tr>
</tbody>
</table>

The F1 key tips the trough up on the print side. The F2 key tips the trough up on the squeegee side. The F3 key simultaneously tips the troughs forward on the print and on the squeegee side. If this same key is actuated once again, the troughs will be tipped backward.
### 4.3.4 Programming

While the automatic mode is shown on the display, select a storage location between 1 and 10 by means of the numerical keys.

Actuating the F2 key will take you to the programming menu.

With version F (mounting the film), the type of coating can be selected by striking the Enter key.

Use the keys (F1 and F2) to alternate between the coating types.

The PREV key will take you to the program parameters.

Use the vertical arrow keys (↑↓) in order to change the cursor position to the parameter to be defined.

By means of the numerical keys, you can now define the respective variables of the parameter, confirm the entry by actuating the Enter key.

The parameters *....* only exist if in the settings (F3) the extended program functions have been activated.

The MAIN key will take you back to the automatic mode.

#### 4.3.4.1 Coating print side

Enter the number of coating moves (trough approached) on the print side.

- Minimum value: 0
- Maximum value: 10

#### 4.3.4.2 Tipping the trough forward DS

Enter the number of Tipping trough forward (trough tipped forward) on the print side.

- Minimum value: 0
- Maximum value: number of defined coating moves print side

#### 4.3.4.3 Coating RS

- Minimum value: 0
- Maximum value: 10

#### 4.3.4.4 Tipping the trough forward RS

Enter the number of Tipping trough forward (trough tipped forward) on the squeegee side.

- Minimum value: 0
- Maximum value: Anzahl definierter Beschichtungshübe RS

#### 4.3.4.5 Speed

The speed of the coating moves can be changed by entering a value.

- Minimum value: 1%
- Maximum value: 99%
4.3.4.6 **Soaking time**

Define the soaking time for the coating emulsion

Minimum value: 1s

Maximum value: 60s

4.3.5 **Settings**

While the automatic mode is shown on the display, the F3 key will take you to the menu of settings.

Use the vertical arrow keys (↑↓) to choose the desired setting, then actuate the Enter key.

4.3.5.1 **Counter**

The installation offers a total counter as well as a daily counter that can be reset to „0“.

The coating motor counter records the number of operating hours of the coating carriage’s motor.

The duty cycle time records the operating time between the moments when the installation is switched on and switched off.

4.3.5.2 **Language**

Language selection:

The system offers 6 different languages:

1st language: German
2nd language: English
3rd language: French
4rd language: Italian
5rd language: Spanish
6rd language: upon agreement

Use the vertical arrow keys (↑↓) for selecting the desired language, then actuate the main key.
4.3.3.3 **Software version**

This display shows the presently valid software version of the machine. In the event of problems with the machine, please always specify the complete number, e.g. ST-405-010-00 01000

4.3.5.4 **Program**

Upon activating the extended program settings, you can specify for the coating moves how often the trough shall be tipped forward. With the standard program settings, the trough is always tipped forward.

Use the keys F1 and F2 to select the desired program setting, then press the Main key.

---

4.4 **Operating sequence**

4.4.1 **Switching the machine on and off**

Switching on:
Switch the machine on by means of the main installation switch (20). The following text will appear on the display:

```
Automatic mode
Program       Nr. 01
```

Switching off:
Switch the machine off by means of the main installation switch (20). The machine must never be switched off while a program is being processed.

After the machine has been switched off, wait approximately 5 s before switching it back on.

4.4.2 **Programming the machine**

Before starting to program the machine, select a storage location between 1 and 10 on the terminal (22) and then actuate the F2 key.
You are now in the programming menu where the parameters have to be defined as described in chapter 4.3.4.
4.4.3  Getting the machine ready

4.4.3.1  Mounting the troughs

Preliminary condition:
The coating carriage is in the bottom position defined by the magnetic limit stop switch.

Please make sure that the appropriate trough width is being used for the screen frame to be treated. The following reference values should be observed:

Up to a screen frame inside dimension of 2060mm
Screen inside dimension -60mm = red trough (squeegee side RS)
Screen inside dimension -85mm = black trough (print side DS)

Up to a screen frame inside dimension of 5100mm
Screen inside dimension -100mm = red trough (squeegee side RS)
Screen inside dimension -150mm = black trough (print side DS)

Push the trough (1) with the red end piece onto the supporting profile (2) whose end piece has the same color, until the trough centering cam latches into the slot of the coating trough.

Fasten the trough (1) on both sides by means of the trough clamping pieces (3).

For double-coating process: the special trough centering devices (4) are pushed into the groove of the supporting profile (5) and positioned in the drilled holes ø 6.2.
Then the troughs are mounted as described above.
4.4.3.2 Positioning the tie-bar

Preliminary condition:
The coating carriage is in the initial position.

Place the screen frame (the print side pointing towards the rear) from the front side into the frame reception unit at the bottom and push it into the stop piece of the lateral screen frame position (4.4.3.4-4.4.3.5).

Manual tie-bar (screen height 1250 mm):
By keeping the button on the handle depressed, move the manual tie-bar downward until the upper screen frame supports lie flat on the frame. As soon as the button is released, the tie-bar is latched in in the desired position.

Warning:
When moving the manual tie-bar (i.e. the button is maintained depressed), please take into account that the dead weight of the tie-bar must be taken up by the operator, otherwise the tie-bar will fall down.

Motorized tie-bar (for screen frame heights of 1600 mm or bigger):
Actuate the foot-operated pedal and move the tie-bar downward until the upper screen frame supports lie flat on the frame.

4.4.3.3 Lateral screen frame position for single coating

Center the screen frames (1) with regard to the coating troughs or the machine center

Position the screen frame support (2) according to the size of the screen frame

In order to have a reference position for further coating processes with the same screen width, secure the lateral stop piece (3) of the screen frame support.

4.4.3.4 Lateral screen frame position for double coating

Center the screen frame (1) with regard to the coating troughs

Position the screen frame support (2) according to the size of the screen frame

In order to have a reference position for further coating processes with the same screen width, secure the lateral stop piece (3) of the left-hand and right-hand screen frame support (3).
4.4.3.5 **Stretching the screen frame**

Preliminary condition:
The screen frame is inserted and the tie-bar positioned.
The coating carriage is positioned below on the magnetic limit stop switch.

![Image of stretching the screen frame](image)

To guarantee an optimal fastening of the screen frame, the clamping rod (1) can be adjusted by unscrewing the knurled screw (2) and the stopping pint (3) can be adjusted by unscrewing the knurled screw (4) according to the size of the screen frames.

Then actuate the foot-operated pedal (pneumatic stretcher).

For the double coating process: the pneumatic stretchers are divided by the machine center into left-hand and right-hand stretchers; for closing the stretchers on the left side the foot-operated pedal (stretcher) must be actuated repeatedly.
The same applies for opening the stretchers.

Actuating 1x: stretchers on the right side
Actuating 2x: stretchers on the left side

![Image of adjusting the frame profile height](image)

To guarantee an optimal fastening of the screen frames, the cone-shaped knurled screw (5) must be screwed in respectively out to adapt it to the size of the screen profile.

The screen frame must lie flat on the stretcher block and the cone-shaped surface of the knurled screw (5) must be screwed in until the screen frame touches the stopping pin (6).

The stopping pin (6) can be adjusted by unscrewing the knurled screw (7).

4.4.3.6 **Adjusting the frame profile height**

In order to ensure a faultless execution of the automatic coating process, a correct setting of the parameter Frame profile height (among others) is indispensable (3.4.1.6).

In the automatic mode, any incorrect settings which do not match the screen frame size will damage the coating troughs and the machine itself.
4.4.3.7 **Checking the program parameters**

Before starting the dry run, check if the program entries (4.3.4) of the activated program are correct and adapted to your requirements.

4.4.3.8 **Dry run**

The dry run is used for testing 1:1, the work sequences of the defined program, but without the troughs being filled.

This allows to optimize the program before any waste screens have been produced.

If all the conditions detailed under paragraphs 4.4.3.1 - 4.4.3.8 are fulfilled, the machine is ready for the dry run.

The active coating program is started by actuating the Start key on the front panel.

4.4.3.9 **Filling the troughs**

For filling the troughs, they must be taken out of the machine and filled with the coating emulsion appropriate for the respective application.

The filling quantity depends on the number of coating moves.

Then remount the troughs (4.4.3.2).

4.4.4 **Initial position**

The coating carriage will move in the bottom position and the stretchers will be closed actuating the the Start key on the front panel

- In the initial position the coating carriage is in the bottom position defined by the magnetic limit stop switch. --> the Start key is lit
- The tie-bar is adjusted to the height of the inserted screen frame.
- The screen frame is inserted and the stretchers are closed (print side at the back).
- The Start key is lit
- The display shows the automatic mode (chapter 4.3.2).

4.4.5 **Start of program**

The program can only be started if the machine is in the initial position (4.4.4).

The selected coating program is started by actuating the Start key on the front panel.

The following causes may be responsible if a program cannot be started:

- Machine is not in the initial position (4.4.4)
- Screen frame is not stretched (4.4.3.6)
- Emergency stop has been actuated (4.5.1)

4.4.6 **Program sequence**

Once the program has been started, the respective work functions will be processed according to the defined program.

4.4.7 **End of program**

At the end of the program an acoustic signal is heard.
4.5 Error messages

When working with the G405 machine, the following errors can occur which are visualized on the display.

4.5.1 Emergency disconnector function

4.5.1.1 Emergency stop hit button

If problems of any type occur, the program or the manual function can be stopped any time by actuating the hit button (21).

The following text appears on the display:

```
Automatic mode
Program Nr. 01
```

The machine is stopped. Except if a coating program is being processed, the troughs are tipped backward and after a short delay time move away from the mesh.

After the cause of the problem has been eliminated, the hit button must be unlocked by turning it to the right; then the emergency stop message is cleared from the display.

The message on the display must then be cleared by actuating the F1, F2 or F3 key.

4.5.2 Error number

see error list in chapter 6

4.6 Malfunctions

The elimination of malfunctions is described in chapter 6.
4.7 Appendix

4.7.1 Overall view

Legend:
1 Control tower with front plate
2 Electric and pneumatic equipment
3 Floor console
4 Coating carriage
5 Tie-bar
6 Ceiling
7 Screen frame stretchers (pneumatic)
8 Foot-operated pedal
9 Levelling foot
5.1 Introduction
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5.1.2 Safety regulations
5.1.3 Consequences in the event of a non-compliance

5.2 Resources and operating materials
5.2.1 Lubrication chart

5.3 Maintenance plan

5.4 Maintenance work
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5.4.1.5 Checking the oil level in the carriage drive gear unit
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5.4.2 Exchange work
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5.5 Proof of maintenance

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5 Maintenance

5.1 Introduction

5.1.1 Qualification of the staff

Persons with mechanical know-how are qualified for the maintenance work required by the machine. The persons responsible for maintenance must be appropriately instructed by Grünig-Interscreen AG during the commissioning procedure (see chapter 3).

5.1.2 Safety regulations

STOP - Pay attention to the residual dangers:

First of all, read chapter 2 „Safety regulations“ and follow all the danger notices it contains.

STOP - Pay attention to the general safety regulations:

In addition to the safety regulations lined out in chapter 2, the relevant technical safety prescriptions (regarding electricity, etc.) as well as the local laws and the regulations valid in the country of application must be complied with.

WARNING

Never touch any elements of the installation, as these might move unexpectedly and cause injuries.

Switch the installation off.
5.1.3 **Consequences in the event of a non-compliance**

If the maintenance work is not carried out according to the specifications, the manufacturer declines all responsibility and guarantee claims.

5.2 **Resources and operating materials**

5.2.1 **Lubrication chart**

<table>
<thead>
<tr>
<th>Material</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gear oil</td>
<td>SAE 20W-50</td>
</tr>
<tr>
<td>Anti-corrosion products</td>
<td>Oil-based product with high viscosity, good adhesion and rust-preventing properties</td>
</tr>
<tr>
<td>Lubrication grease</td>
<td>Free-flowing gear grease</td>
</tr>
<tr>
<td>Oil spray</td>
<td>Oil-based spray product with good sliding characteristics</td>
</tr>
</tbody>
</table>

5.3 **Maintenance plan**

We draw your attention to the fact that a faultless operation of the automatic coating machine G-405 can only be guaranteed if its maintenance is carried out according to the regulations!

The following maintenance plan has only been established for single-shift operation. **Should the machine be operated in various shifts, the intervals between the maintenance interventions are shortened in accordance.**

**Weekly maintenance or according to the requirements:**

- General cleaning of the machine (remove coarse dirt, chapter 5.4.1.1)
- Empty the inspection glass of the water trap (chapter 5.4.1.2)
- Functional checking of the safety elements (chapter 2.4.6)
- Check the coating trough for signs of mechanical wear or damage (chapter 5.4.1.3)
Monthly maintenance or according to the requirements:

- Check the chain tension of the carriage drive unit (chapter 5.4.1.4)
- Check the chain tension of the motorized tie-bar (SH 1250 or bigger) (chapter 5.4.1.4)
- Check the oil level in the gear unit of the motor (chapter 5.4.1.6)

Every six months or according to the requirements:

- Check and clean the carriage guides (chapter 5.4.1.6)
- Check and clean the tie-bar guides (chapter 5.4.8)
- Clean the inspection glass of the water trap (chapter 5.4.1.2)
- Check the tight fitting of the fixing screws of carriage and tie-bar

5.4 Maintenance work

For carrying out the maintenance work, the coating carriages have to be moved to the bottom limit stop switch and the tie-bar and the heating to the bottom position (below head level). Make sure that while you are carrying out maintenance work, nobody else is in a position to take the machine into operation.
5.4.1 Cleaning, care, greasing, checking and adjusting work

5.4.1.1 Installation in general

For cleaning the varnished parts of the installation, use nothing but non-abrasive and ecologically acceptable household cleaners which are applied with a slightly moistened rag. Do not use solvents, gasoline or any other aggressive chemicals. Blank metal surfaces may be cleaned with solvents or gasoline. Avoid using running water for cleaning the installation. In order to ensure a correct functioning of the individual elements, especially of the stretchers, it is important that all traces of emulsion are thoroughly removed from the machine.

Control panel:

Before opening the service door (3) of the control elements, make sure that the main installation switch (20) is switched off.

Particular care is required when cleaning the control panel. For this purpose, use nothing but a dry rag or weak compressed air in order to remove the coarse dirt. Electrotechnical modules may carry a residual current which could cause electrocution.

5.4.1.2 Inspection glass water trap

Open the service door of the control tower

The water which has accumulated in the water trap (1) is blown out into an appropriate collector trough by unscrewing the bleeding screw (2). Before removing the inspection glasses, the main pneumatic conduit must be separated from the machine. Then let off the residual pressure in the pneumatic system by means of the screw (2) on the water trap. The trough protection device (3) must be removed.

The acrylic inspection glass of the water trap (1) may only be cleaned with a water-moistened rag. Never use solvents for cleaning the acrylic inspection glass, or else it will get brittle and could explode as a result of the high pressure, which may cause injuries.
5.4.1.3  **Checking the coating trough**

Check in the first place the coating edge to see if it has been damaged (dents as well as mechanical wear).

We draw your attention to the fact that faultless coating results can only be achieved with faultless coating troughs.

5.4.1.4  **Checking the chain tension of the drive units**

For checking the correct chain tension: press your thumb against the chain, which should then slightly bounce back.

**Carriage:**

The tension of the drive chains for the carriage and the motorized tie-bar has to be adjusted according to the requirements.

The chain tension of the carriage drive unit must be checked from the side of the control tower and from the lateral side.

Loosen the hexagon nut (1) by 2 to 3 turns.
The chain tension is increased by turning the hexagon screw to the right.
Re-tighten the hexagon nut (1).

For checking the correct chain tension: press your thumb against the chain, which should then slightly bounce back.

**Tie-bar (SH 1600 mm or bigger):**

The tie-bar is equipped with a chain drive unit on the side of the control tower. The chain tension is adjusted by means of the eccentric bolt of the guide pinion.

Loosen the hexagon nut (3) by 2 to 3 turns.
The chain tension is increased by turning the hexagon socket insert of the eccentric bolt to the right.
The torque on the hexagon socket key influences the strength of the chain tension.
For securing the setting: re-tighten the hexagon nut (3).
5.4.1.5 **Checking the oil level in the carriage drive gear unit**

Open the service door of the control tower

The oil level in the inspection glass (2) of the carriage drive unit should reach up to the center of the inspection glass. If the oil level has dropped below this mark, top up with gear oil HD SAE-20-50, using the bleed screw (3), until the oil level reaches up to 3 mm above the center of the inspection glass.

The gear oil must be replaced every 2500 operating hours.

5.4.1.6 **Adjusting and cleaning the carriage guides**

The guide profile (8) - especially the part being engaged in the slideway (6) - must be kept in a clean condition and, if required, greased with an anti-corrosion spray.

Adjusting the carriage guides:
In the event of an excessive play, the carriage guides on the left-hand and right-hand sides are submitted to wear and need to be readjusted.

Loosen the cheese-head screws (4) by 2 to 3 turns.

Slightly loosen the counter-nut (5) and adjust the play between the slideway (6) and the guide profile by means of the set screw (7).

Then re-tighten the counter-nut (5) and the cheese-head screws (4).
**5.4.1.7 Checking and cleaning the tie-bar guides**

Check the toothed rack (1) for signs of pollution. If necessary clean with a rag and grease with a free-flowing chain grease.

In the event of an excessive play, the tie-bar guides can be re-adjusted. Check the settings on the left-hand and right-hand sides.

Loosen the cheese-head screws (2) and the counter-nut (3) by 2 to 3 turns.

Adjust the play by means of the set screw (4) and then re-tighten the cheese-head screws (2) and the counter-nut (3).

---

**5.4.2 Exchange work**

Any defects detected during the maintenance procedure must be immediately repaired. Chapter 6 „Repair“ of the present operating instructions contains more detailed information in this respect.

---

**5.4.3 Checklist installation**

After the maintenance intervention is completed, check all the handled elements with regard to their function. Close all the covers, doors etc. and make sure that you have not left any maintenance material in/on the installation.

Reconnect the power supply. Unlock the main installation switch and switch the installation back on.

---

**5.5 Proof of maintenance**

The maintenance protocol which is kept within the machine serves as a proof of maintenance. Every maintenance intervention must be entered.
5.6 After-sales informationen

Should you have any technical questions or problems, please contact the representative responsible for your country.

Any questions and problems which cannot be solved by the respective representative, can be directly submitted to the manufacturer, either by phone or by fax/e-mail.

Grünig-Interscreen AG
Ringgenmatt 14
CH-3150 Schwarzenburg
Switzerland

Phone +41-31-734 26 00
Telefax +41-31-734 26 01
E-Mail: mail@grunig.ch
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Troubleshooting, repair

6 ................................................................. Troubleshooting, repair

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6 Troubleshooting, repair

6.1 Introduction

6.1.1 Staff qualification

The installation may only be overhauled and repaired by professionals with adequate technical training or having comparable knowledge in the fields of mechanic and pneumatic technologies. The person responsible for corrective maintenance and repair must have been instructed by Grünig-Interscreen AG during the commissioning procedure with regard to the special requirements (see chapter 3).

6.1.2 Safety regulations

STOP - Attention to the residual dangers

First read chapter 2 „Safety regulations“ and follow all the danger notices it contains.

STOP - Attention to the general safety prescriptions

In addition to the safety regulations mentioned in chapter 2, the safety prescriptions regarding the particular field (pneumatic and electric technology) as well as the locally applicable regulations of the respective country have to be complied with.

WARNING

Do not touch any parts of the installation, as they might move unexpectedly and cause injuries. Always disconnect the installation’s pneumatic /electric supply before carrying out any corrective maintenance/repair work.
6.1.3 **Safety measures**

The compressed air supply must be disconnected from the installation, and the remaining pressure must be let off as described in chapter 5.4.1.5. When carrying out repair work within the electric system, make sure to wait at least five minutes after the main installation switch (20) has been switched off, as the frequency converter contains a residual current.

6.2 **General information**

6.2.1 **Tools**

- Set of hexagon socket screw keys
- Set of ring fork spanners
- Set of screw drivers

6.2.2 **Work material, consumables**

Only the original spare parts described in chapter 10 may be used. The most important spares can also be ordered as a spare part kit TG-000-066-00. The dismantled parts have to be disposed off according to the rules for environmental protection.
6.3 Fault localizing and elimination

6.3.1 Error messages

When working with the G405 machine, various error messages can appear on the display.

- **ERROR** - Error 1

  number of the error Decoding according to list of errors (see appendix of chapter 6)

  Use this keys F1-F3 to acknowledge the display

The error number shown on the display is listed in the appendix of chapter 6 which also specifies the causes which may have triggered the error, together with the corrective measures in order to eliminate the problem.

After the cause of the malfunction has been eliminated, the display must first be acknowledged.

Should the error still persist, the message cannot be acknowledged, which means that the machine is not ready for operation.

6.3.1.1 Failure frequency converter

In the event of a failure of the frequency converter, the following text appears on the display:

Error FUF

Open the service door to the electrotechnical compartment.
Do not touch any parts of the machine.

The red LED (1) is lit:
Malfunction, the frequency converter is not ready.
Switch the machine off, wait 5 seconds then switch it back on.

No LED is lit:
Switch off the main installation switch (21) and check the automatic circuit breaker Q1.

Check if all the emergency stop buttons are unlocked and if the Reset key has been actuated.

The green LED (2) is lit:
The frequency converter is ready for operation.
6.3.2 Mechanical errors

6.3.2.1 Coating troughs do not simultaneously approach the mesh

The approaching and withdrawal movements of the coating troughs from the squeegee and the print side can be synchronized.
The settings must be made on the left- and right-hand sides of the carriage plate, in order to guarantee that the movements remain parallel.

The approaching movement can be slowed down on the throttle (1), by turning it to the right, and accelerated by turning it to the left.
The withdrawal movement can be slowed down on the throttle (2), by turning it to the right, and accelerated by turning it to the left.

6.3.2.2 Coating troughs are not simultaneously tipped forward

The approaching and withdrawal movements of the coating troughs from the squeegee and the print side can be synchronized.
The settings must be made on the left- and right-hand sides of the carriage plate, in order to guarantee that the movements remain parallel.

The forward tipping movement can be slowed down on the throttle (3), by turning it to the right, and accelerated by turning it to the left.
The backward tipping movement can be slowed down on the throttle (4), by turning it to the right, and accelerated by turning it to the left.

6.3.2.3 Coating troughs do not approach the mesh in parallel

- The geometry of the carriages is not correct and the carriage needs to be readjusted (see chapter 3.4.1.4).
- **Important**: Parallelism must always be ensured! Check all the settings on the left- and right-hand sides.

6.3.2.6 Coating troughs are not tipped forward in parallel

- The geometry of the carriages is not correct and needs to be readjusted (see chapter 3.4.1.5).
- **Important**: Parallelism must always be ensured! Check all the settings on the left- and right-hand sides.
6.3.2.5 **Screen frame stretchers fail to close / to open**
- no compressed air
- Valves Y5 and Y6 on the valve battery fail to switch
- Check the cable of the foot-operated pedal for damages and replace it if necessary
- Stretchers are soiled with coating emulsion

6.3.3 **Operating errors**

6.3.3.1 **Coating troughs butt into the frame**
- The programmed frame profile height does not match the inserted screen frames and must be correctly adjusted (3.4.1.6).

6.3.3.2 **Incorrect mounting of the troughs**
- Mount the troughs as described in chapter 4.4.3.2

6.3.3.3 **Screen frame inserted the wrong way**
- The print side of the screen frame must lie on the side of the carrier profile with the black end pieces.

6.3.3.4 **The mesh tears**
- Damaged trough edge or damaged end pieces
- Excessive contact pressure of the coating trough onto the mesh
- Mechanical contact pressure is not correctly adjusted (3.4.1.4)
- The used troughs are not appropriate for this screen frame(4.4.3.2)

6.3.3.5 **Striation during coating**
- **Narrow striation:**
  caused by damaged troughs, soiled troughs, coating emulsion residues on the trough end pieces, inclusions in the coating emulsion, mesh threads in the emulsion.
- **Wide striation:**
  caused by crooked and distorted screen frames; the troughs fail to approach the fabric in parallel, the geometry of the carriage must be readjusted (3.4.1.4).

6.3.3.6 **Generally unsatisfactory coating results**
- Please contact the manufacturer of your emulsion product in order to make sure that this product answers your requirements and is appropriate for the planned application.
6.4 Appendix

6.4.1 List of errors

6.4.2 Diagrams
DATENBLATT / DATA SHEET
PAGE DES DONNEES

SPANNUNG / VOLTAGE / VOLTAGE 1 x 230 V VOLT
STROM / COURANT / MAIN CURRENT 4 AMPERE
LEISTUNG / PERFORMANCE / POWER 0.8 KILOWATT
FREQUENZ / FRÉQUENCE / FREQUENCY 50/60 HERTZ

SICHERUNGEN / FUSIBLES / FUSES

F1 6.3 AT
F2 1.6 AT

MOTORSCHUTZSCHALTER / DISJ. DE LA PROTECTION / MOTOR PROTECTION SWITCH

Q1 0.55 AT

Druckluft
Aire comprimé
Air pressure

6 bar / 87 psi
OPTION / VARIANTE / OPTION

Pédale TRAVERSE EN HAUT
Foot-pedal HOLDER UP
Fussschalter TRAVERSE AUF

13
14
S6

Foot-pedal HOLDER DOWN
Pédale TRAVERSE EN BAS
Fussschalter TRAVERSE AB

13
14
S7

Fusschalter SPANNER
Pédale FIXATION
Foot-pedal CLAMP

13
14
S8

Magnetschalter TRAVERSE OBEN
Cont. magn. TRAVERSE EN HAUT
Magn. switch HOLDER TOP

13
14
B4

OPTION / VARIANTE / OPTION
SPANNER / FIXATION / CLAMP
AUSFÜHRUNG / VERSION / TYPE A2

ws
2x0,5
W8

ws
4x0,5 f
W9

ws
4x0,5 f
W10

br
4x0,5 f
W8

br
4x0,5 f
W9

gn
ge

Digital inputs

0V

I_0.0.1.0 - I_0.0.1.7

DIT701

COATING MACHINE

Grunic

ES-405-010-03-E3C-DEF

Datum 02.07.2007
Bearb. sp
Gepf. 

Zustand Änderung Datum Name Norm

Blatt 6 von 8 Bl.
Digital outputs

DOT701  O_0.0.3.0 - O_0.0.3.7

Valve CUT OFF THE FILM RIGHT
Vanne COUPER LE FILM À DROITE
Ventil FILM SCHNEIDEN RECHTS

Valve CUT OFF THE FILM LEFT
Vanne COUPER LE FILM À GAUCHE
Ventil FILM SCHNEIDEN LINKS

Valve MODULE OF FILM UP/DOWN
Vanne ÉLÉMENT DU FILM EN HAUT/EN BAS
Ventil FILM MODUL AUF/AB

Digital outputs

Digital outputs

Digital outputs

Digital outputs

Digital outputs

Digital outputs

Digital outputs

Digital outputs

Digital outputs

Digital outputs

Digital outputs

Digital outputs

Digital outputs

Digital outputs
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<td>Indicateur lumineux START</td>
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<td>23</td>
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<td>Motorschutzzuschalter TRAVERSE</td>
<td>Disjoncteur de la protection TRAVERSE</td>
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<td>36</td>
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<td>Vanne COUPER LE FILM À DROITE</td>
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<td>Vanne ÉLÉMENT DU FILM EN HAUT/EN BAS</td>
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Datum: 02.07.2007
Bearbeiter: SF
Blatt 2 von 2
### EP-405-010-01-E

**Frequency controller parameters G405: SA-405-010-01.58c**

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<td>CLI</td>
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### I/O Assignments

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<td>NO :Not assigned</td>
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</table>

### Fault management

| ATR  | Automatic Restart | No | No | 150 |
| OPL  | Output Phase Loss | Yes | Yes | 151 |
| THT  | Type of Protection | ACL:Vent. Motor | ACL:Vent. Motor | 153 |
| LFL  | Loss of Follower | No | No | 154 |
| FLR  | Catch on fly | No | No | 155 |
| STP  | Controlled Stop on power loss | NO | NO | 156 |

### Drive Identification

- **Drive catalog number**: ATV58*U09M2
- **Motor rating**: 0.37kW 0.5HP
- **Input Voltage**: 200/240V
- **50/60 Hz Switch position**: 50 Hz
- **Continuous output current**: 2.3 A
- **Rated continuous current**: 3.1 A
- **Option card**: No option card

### PLC-Settings

- **Microswitch S1**: 00000110
- **Microswitch S2**: 10100010
- **Microswitch S3**: 0000
- **Microswitch S4**: 0101
Legende zu
Pneumatikdiagramm G405

Legende

Druckquelle
pressure source

Leitungsverbindung
tube connection

Schlauchnummer
tube number

Schnellkupplung
speed-air-coupler

Drosselrückschlagventil
chocker return valve

Schalldämpfer
silencer

Rückschlagventil
return valve

Elektrische Betätigung
electrical operated

Wasserabscheider
water trap

Luftfeder
pneumatic spring

Druckregler mit Manometer
pressure regulator with manometer

5/2 Wegesventil
5/2 way valve

Pneumatikzylinder mit Feder hinten
pneumatic cylinder with spring behind

Pneumatikzylinder
pneumatic cylinder

Z6.1 Spanner oben rechts
clamp on top right

Z6.2 Spanner unten rechts
clamp below right

Z5.1 Spanner oben (links)
clamp on top (left)

Z5.2 Spanner unten (links)
clamp below (left)

Y5 Spanner links
clamp left

Y6 Spanner rechts
clamp right

Y3/Y3 Druckseite Rinne anfahren
print side trough approach

Y4/Y4 Druckseite Rinne aufstellen
print side trough set up

Y1/Y1 Rakelseite Rinne anfahren
squeegee side trough approach

Y2/Y2 Rakelseite Rinne aufstellen
squeegee side trough set up

P3 Druck Druckseite
pressure print side

P1 Hauptdruck
main pressure

P2 Druck Rakelseite
pressure squeegee side

Masstab 1:1

Gezeichnet: BM 12.09.2001
Geprüft:
Auftrag Nr:
Kunde:

PD-405E001-001

Diese Zeichnung ist unser geistiges Eigentum und darf ohne unsere Genehmigung weder kopiert, vervielfältigt noch Drittpersonen zugänglich gemacht werden.
<table>
<thead>
<tr>
<th>Error No.</th>
<th>Error messages</th>
<th>Cause</th>
<th>Repair</th>
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<tbody>
<tr>
<td>Emergency Stop</td>
<td>EMERGENCY STOP</td>
<td>Kiling of a function or a program</td>
<td>see chapter 4.5.1</td>
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<tr>
<td>Error 1</td>
<td>Motor protection switch</td>
<td>The tie-bar got jammed and the motor protection switch has responded</td>
<td>check the free running movement of the tie-bar and switch on the motor protection switch Q1</td>
</tr>
<tr>
<td></td>
<td>tie-bar motor</td>
<td></td>
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</tr>
<tr>
<td>Error 2</td>
<td>Reference switch coating carriage</td>
<td>Switch B1or B2 mounted on the coating carriage fails to respond</td>
<td>Replace the switch on the coating carriage</td>
</tr>
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<td>coating carriage</td>
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<tr>
<td>Error 3</td>
<td>frequency converter</td>
<td>Error / frequency converter is not ready for operation</td>
<td>see chapter 6.3.1.1</td>
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Decommissioning, storage

7 ........................................................................................................ Decommissioning, storage

7.1 ............................................................................................................... Introduction
7.1.1 .......................................................................................................... Staff qualification
7.1.2 .......................................................................................................... Safety regulations

7.2 ........................................................................................................ Taking the installation out of operation
7.2.1 .......................................................................................................... Shut-down
7.2.2 .......................................................................................................... Cleaning
7.2.3 .......................................................................................................... Safety devices for transportation
7.2.4 .......................................................................................................... Conservation
7.2.5 .......................................................................................................... Packaging
7.2.6 .......................................................................................................... Identification

7.3 ........................................................................................................ Storage conditions
7.3.1 .......................................................................................................... Storage place
7.3.2 .......................................................................................................... Duration of storage
7.3.3 .......................................................................................................... Space requirement
7.3.4 .......................................................................................................... Environmental compatibility

7.4 ........................................................................................................ Maintenance during storage

7.5 ........................................................................................................ Taking the installation back into operation
7 Decommissioning, storage

7.1 Introduction

7.1.1 Staff qualification

Simple knowledge in the field of mechanic technology are sufficient for taking the installation out of operation and in order to ensure correct storage. Also see chapter 8.

7.1.2 Safety regulations

STOP - Attention to the residual dangers:

First read chapter 2 „Safety regulations“ and follow all the danger notices it contains.

7.2 Taking the installation out of operation

7.2.1 Shut-down

The tie-bar as well as the coating carriage have to be moved completely to their bottom position. Then the machine must be disconnected from the power and compressed air supply.

7.2.2 Cleaning

See chapter 5 (5.4.1)

7.2.3 Safety devices for transportation

For storage purposes, it is not required to mount the transport safety devices.

7.2.4 Conservation

All the untreated metal parts have to be well protected by means of an appropriate anti-corrosive agent. The control componentry must be protected against dust.

7.2.5 Packaging

Select an adequate wrapping for the installation which ensures sufficient protection against dust. Furthermore, make sure that no condensation water can form beneath the wrapping.

7.2.6 Identification

At an easily visible place, stick a label on the wrapping which contains the information supplied on the rating plate.
7.3 Storage conditions

7.3.1 Storage place

The storage site must be dry and protected against atmospheric influences. The storage temperature must be kept between -10 and +50°C.

7.3.2 Duration of storage

Provided that adequate maintenance is ensured, the duration of the storage is not limited.

7.3.3 Space requirement

The space required for storage corresponds to the size of the machine.

7.3.4 Environmental compatibility

The storage of the installation does not represent a potential hazard for the environment.

7.4 Maintenance during storage

The conservation of the installation (according to 7.2.4) must be checked at regular intervals and - if required - be renewed.

7.5 Taking the installation back into operation

The installation is taken back into operation as described in chapter 3.
Packaging, transportation

8 .............................................. Packaging, transportation

8.1 ........................................................................................................... Introduction
8.1.1 ........................................................................................................... Staff qualification
8.1.2 ........................................................................................................... Safety regulations

8.2 ........................................................................................................... Delivery condition
8.2.1 ........................................................................................................... Accessories

8.3 ........................................................................................................... Packaging
8.3.1 ........................................................................................................... Preparatory measures
8.3.2 ........................................................................................................... Selecting the wrapping
8.3.3 ........................................................................................................... Stow-away plan
8.3.4 ........................................................................................................... Measures and weights

8.4 ........................................................................................................... Transportation
8.4.1 ........................................................................................................... Loading
8  **Packaging, transportation**

8.1  **Introduction**

8.1.1  **Staff qualification**

For the transportation, relevant specialized knowledge and experience in this particular field are required.

8.1.2  **Safety regulations**

**STOP** - Attention to the residual dangers

First read chapter 2 „Safety regulations“ and follow all the danger notices it contains.

8.2  **Delivery condition**

In the assembled condition, the automatic coating machine G405 consists of the following elements:

- 1 Control tower
- 1 Side part
- 1 Floor console
- 1 Ceiling console
- 1 Connection tube
- 1 Coating carriage
- 2 Coating troughs (squeegee and print sides)
- 1 Foot-operated switch-panel
- 1 Tie-bar
- 2 Anchor strap (for SH 3000 or bigger)
- 1 Box with accessories and small material (TG-000-113-00)

- 1 Box containing the spare parts set (option X (TG-000-114-00)
- 1 Foot-operated switch-panel (option Z)
### 8.2.1 Accessories

According to list of accessories **TG-000-113-01**:

<table>
<thead>
<tr>
<th>#</th>
<th>Item</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Slide rail with groove</td>
<td>FT-000-811-00</td>
</tr>
<tr>
<td>3</td>
<td>Slide rail</td>
<td>FT-000-812-00</td>
</tr>
<tr>
<td>1</td>
<td>Ratchet wheel (Option H)</td>
<td>FT-000-832-00</td>
</tr>
<tr>
<td>1</td>
<td>Anchor strap (for SH 3000 or bigger)</td>
<td>FT-000-789-00</td>
</tr>
<tr>
<td>1</td>
<td>Trough clamping piece</td>
<td>FT-000-431-00</td>
</tr>
<tr>
<td>2</td>
<td>Square key 6mm</td>
<td>ET-001-024-00</td>
</tr>
<tr>
<td>10</td>
<td>Fuse FST 5x20 6.3A</td>
<td>ET-001-336-00</td>
</tr>
<tr>
<td>10</td>
<td>Fuse SPT 5x20 3.15A</td>
<td>ET-001-560-00</td>
</tr>
<tr>
<td>10</td>
<td>Fuse SPT 5x20 2A</td>
<td>ET-001-338-00</td>
</tr>
<tr>
<td>10</td>
<td>Fuse SPT 5x20 1A</td>
<td>ET-001-339-00</td>
</tr>
<tr>
<td>10</td>
<td>Fuse SPT 5x20 0.5A</td>
<td>ET-001-341-00</td>
</tr>
<tr>
<td>5</td>
<td>Fuse15A, quick-acting</td>
<td>ET-001-557-00</td>
</tr>
<tr>
<td>1</td>
<td>Quick couplling with female thread G 1/4&quot;</td>
<td>ET-000-111-00</td>
</tr>
<tr>
<td>4</td>
<td>Sliding nut M8 20/8x30 (SH 3000 or bigger)</td>
<td>ET-000-375-00</td>
</tr>
<tr>
<td>4</td>
<td>Hexagon head cap screw M8x16 (SH 3000 or bigger)</td>
<td>ET-000-445-00</td>
</tr>
<tr>
<td>4</td>
<td>Hex. head cap wood screw ø6x50 (SH 3000 or bigger)</td>
<td>ET-000-320-00</td>
</tr>
<tr>
<td>8</td>
<td>Washer M8 ø8.4/16x1.6 (SH 3000 or bigger)</td>
<td>ET-000-193-00</td>
</tr>
<tr>
<td>4</td>
<td>Dowel ø8 (SH 3000 or bigger)</td>
<td>ET-000-319-00</td>
</tr>
<tr>
<td>1</td>
<td>Spatula for coating trough</td>
<td>ET-001-509-00</td>
</tr>
</tbody>
</table>

**Spare parts set (option X):**

According to list of spare parts **TG-000-114-00**:

<table>
<thead>
<tr>
<th>#</th>
<th>Item</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5/2 two way valve 1/8&quot; without choke</td>
<td>ET-000-130-00</td>
</tr>
<tr>
<td>1</td>
<td>Magnetic coil 22mm 24VDC</td>
<td>ET-000-940-00</td>
</tr>
<tr>
<td>1</td>
<td>Throttle check valve ø6x1/8&quot; (air inlet)  (Option S)</td>
<td>ET-000-790-00</td>
</tr>
<tr>
<td>1</td>
<td>Throttle check valve ø6x1/8&quot; (air outlet)</td>
<td>ET-000-104-00</td>
</tr>
<tr>
<td>1</td>
<td>Spare filter element 8my</td>
<td>ET-000-145-00</td>
</tr>
<tr>
<td>1</td>
<td>Flange bearing UFL 004</td>
<td>ET-000-325-00</td>
</tr>
<tr>
<td>1</td>
<td>Deep groove ball bearing 16004-2Z</td>
<td>ET-000-669-00</td>
</tr>
<tr>
<td>2</td>
<td>Deep groove ball bearing 6004-2Z</td>
<td>ET-000-088-00</td>
</tr>
<tr>
<td>2</td>
<td>Deep groove ball bearing 608Z</td>
<td>ET-000-667-00</td>
</tr>
<tr>
<td>2</td>
<td>Deep groove ball bearing 626-2Z</td>
<td>ET-000-666-00</td>
</tr>
<tr>
<td>1</td>
<td>Pneumatic cylinder ø20 stroke 50</td>
<td>ET-000-956-00</td>
</tr>
<tr>
<td>1</td>
<td>Pneumatic cylinder ø20 stroke 30</td>
<td>ET-000-955-00</td>
</tr>
<tr>
<td>1</td>
<td>Pneumatic cylinder ø20 stroke 30 (with front spring)</td>
<td>ET-000-952-00</td>
</tr>
<tr>
<td>10</td>
<td>DU sleeves ø 8 / 10 / 10</td>
<td>ET-000-690-00</td>
</tr>
<tr>
<td>1</td>
<td>Free wheel ZZ 6204 M</td>
<td>ET-000-715-00</td>
</tr>
<tr>
<td>2</td>
<td>Concave bearing SKG-21975</td>
<td>ET-000-153-00</td>
</tr>
<tr>
<td>1</td>
<td>Cylinder sleeve ø8/14x8</td>
<td>ET-001-478-00</td>
</tr>
<tr>
<td>4</td>
<td>Cap ø8 PVC (Option S)</td>
<td>ET-001-022-00</td>
</tr>
</tbody>
</table>
8.3 **Packaging**

8.3.1 **Preparatory measures**

When packaging the G405 coating machine, the following preparatory measures have to be taken:

**For machine height SH = 1250**

- The machine is packaged and forwarded in assembled condition.
- The set of spare parts TG-000-113-00 is added in a separate box.

**For machine heights SH = 1600 or bigger**

- The machine must be disassembled into its individual componentry modules. For the dismantling, proceed in the reverse order of the process described in chapter 3 „Commissioning“. The componentry modules are wrapped and sealed into shrink-down plastic foil (PE).

At the height of the screw connection, the carriage guide plates are secured by means of a fixing screw and thus protected against accidental shifting (free wheel direction).

- The set of accessories TG-000-113-00 is added in a separate box.

8.3.2 **Selecting the wrapping**

For the purpose of transportation, the machine (except the one with minimum height) is dismounted and disassembled into its individual componentry modules and then packed onto a pallet or into a wooden crate.

The following packaging types are possible:

- **Wooden crate**
  
  Cover on the side wall, square timber 10x10cm at the bottom

- **Wooden pallet**
  
  Sealed into shrink-down foil, square timber 10x10cm at the bottom

Depending on the type of transport which is foreseen, the wooden crates are equipped as follows:

- **Transport by ship**
  
  The crate and the cover are fitted with waterproof paper for seaworthy packing

- **Air freight**
  
  Only the cover is fitted with waterproof paper for seaworthy packing

- **Transport by truck**
  
  Only the cover is fitted with waterproof paper for seaworthy packing

- **Special protection**
  
  Upon request, the crate can be treated with a special protection product
8.3.3  **Stow-away plan**

not available

8.3.4  **Measures and weights**

- Size of wooden crates and pallets (machine assembled) : (L=SB+870 mmxB870mmxH2170mm)
- Size of wooden crates and pallets (machine disassembled) : (L=SH+920 mmxB1270 mmxH920 mm)
- max machine weight: 560.00kg
- max. gross weight (wooden crate) 810.00kg
- max. gross weight: (pallet) 750.00kg

8.4  **Transportation**

8.4.1  **Loading**

The wooden crate or the pallet must only be fastened at the places marked for this purpose.
Disposal

9.1 ........................................................................................................... Introduction
9.1.1 ............................................................................................................. Staff qualification
9.1.2 .............................................................................................................. Safety regulations

9.2 ...................................................................................................... Disposal
9.2.1 ....................................................................................................................... Wrapping
9.2.2 ................................................................................................................... Operating material
9.2.3 ........................................................................................................... Installation or parts thereof
9.2.3.1 ........................................................................................................ Electronic equipment and elements

9.3 ........................................................................... Disposal sites and authorities
9.3.1 ............................................................................. Legal regulations (valid in the respective country)
Disposal

9.1 Introduction

9.1.1 Staff qualification
Knowledge in the field of mechanics is sufficient for the disposal of the installation. In order to dismount the installation, proceed in the reverse order as for the assembly of the componentry modules as described in chapter 3 „Commissioning“.

9.1.2 Safety regulations

STOP - Attention to the residual dangers:
First read chapter 2 „Safety regulations“ and follow all the danger notices it contains.

9.2 Disposal

It is incumbent on the operator of the installation to make sure that the legal waste removal regulations and prescriptions valid at the place of disposal are strictly complied with.

9.2.1 Wrapping
The utilized packing material contains adhesives which may, according to regional environmental regulations, be liable to disposal in an official specialized facility, such as a waste disposal furnace.

9.2.2 Operating material
The coating emulsion must be disposed off in compliance with the specifications of the emulsion’s manufacturer.

9.2.3 Installation or parts thereof
The installation has to be dismantled and the different materials separated in order to be taken to the respective recycling collector bins.

9.2.3.1 Electronic equipment and elements
Particular disposal prescriptions have to be observed for these elements.

9.3 Disposal sites and authorities

Informationen regarding disposal sites and the responsible authorities can be obtained from the Office for environmental protection or from specialized disposal companies.

9.3.1 Legal regulations (valid in the respective country)
The laws of the legislature, local authorities regulations or those of other official agencies regarding waste disposal must be strictly complied with.
Spare parts catalog

10 ..................................................... Spare parts catalog

10.1 ................................................................................... Introduction

10.2 ..................................................................................... Warranty

10.3 ..................................................................................... Disposal

10.4 ..................................................................................... Appendix

10.4.1 ........................................................................... List established according to part numbers
10  **Spare parts catalog**

10.1  **Introduction**

Only the spare parts supplied by the manufacturer may be used. Should any parts other than these original parts be installed, the manufacturer declines all responsibility!

The spare parts must be ordered from the local representative responsible for your country. Should there be no representative in your country, the parts can be ordered directly from Grünig-Interscreen AG.

10.2  **Warranty**

In the event of installation elements which have to be replaced during the warranty period, the customer is only entitled to receiving the replacement parts free of charge if the defective originals are returned to the manufacturer for inspection.

10.3  **Disposal**

The replaced parts must be disposed off according to the local regulations.

10.4  **Appendix**

10.4.1  **List established according to part numbers**

The following list of spare parts lists all the elements of the respective system which would be required in the event of a possible replacement.
Spare parts catalog

ET-000-377-00
ET-000-927-00
ET-000-239-00
ET-002-105-00
ET-001-377-00
ET-001-387-00
ET-000-275-00
ET-001-388-00
ET-001-378-00

TG-000-116-00
TG-000-137-00
TG-000-073-00
TG-000-074-00

ET-001-378-00
ET-000-206-00
TG-000-074-00

ET-000-306-00
TG-000-137-00

ET-002-058-00
ET-000-088-00
ET-002-058-00
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TG-000-073-00</td>
<td>Trough centering device double coating</td>
</tr>
<tr>
<td>TG-000-079-00</td>
<td>Valve connector</td>
</tr>
<tr>
<td>TG-000-115-00</td>
<td>Positioning limit switch for carriage G4</td>
</tr>
<tr>
<td>TG-000-116-00</td>
<td>Front plate structure G405</td>
</tr>
<tr>
<td>TG-000-130-00</td>
<td>Pneumatic stretcher below G405</td>
</tr>
<tr>
<td>TG-000-131-00</td>
<td>Manual stretcher below G405</td>
</tr>
<tr>
<td>TG-000-134-01</td>
<td>Overload clutch</td>
</tr>
<tr>
<td>TG-000-136-00</td>
<td>Manual stretcher above G405</td>
</tr>
<tr>
<td>TG-000-137-00</td>
<td>Pneumatic stretcher above G405</td>
</tr>
<tr>
<td>FT-000-431-00</td>
<td>Trough clamping piece</td>
</tr>
<tr>
<td>FT-000-781-00</td>
<td>Stopper pin</td>
</tr>
<tr>
<td>FT-000-792-00</td>
<td>Tension screw</td>
</tr>
<tr>
<td>FT-000-793-00</td>
<td>Lateral stop piece</td>
</tr>
<tr>
<td>FT-000-796-00</td>
<td>Guide pinion galvanized 3/8&quot;x7/32&quot; Z=25</td>
</tr>
<tr>
<td>FT-000-797-00</td>
<td>Drive pinion galvanized 3/8&quot;x7/32&quot; Z=25</td>
</tr>
<tr>
<td>FT-000-798-00</td>
<td>Drive pinion galvanized 3/8&quot;x7/32&quot; Z=25</td>
</tr>
<tr>
<td>FT-000-799-00</td>
<td>Free-wheel pinion galvanized 3/8&quot;x7/32&quot; Z=25</td>
</tr>
<tr>
<td>FT-000-800-00</td>
<td>Guide pinion galvanized 3/8&quot;x7/32&quot; Z=25</td>
</tr>
<tr>
<td>FT-000-801-01</td>
<td>Chain pulley disk galvanized 3/8x7/32&quot; Z=25</td>
</tr>
<tr>
<td>FT-000-804-00</td>
<td>Chain guide profile</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>---------------------------------------------------</td>
</tr>
<tr>
<td>FT-000-806-00</td>
<td>Clamping bar</td>
</tr>
<tr>
<td>FT-000-811-00</td>
<td>Slideway with groove</td>
</tr>
<tr>
<td>FT-000-812-00</td>
<td>Slideway</td>
</tr>
<tr>
<td>FT-001-509-00</td>
<td>Spatula to coating trough, PU 90° Shore A</td>
</tr>
<tr>
<td>EG-000-003-01</td>
<td>Gear motor, 1400 min⁻¹, i=75:1</td>
</tr>
<tr>
<td>EG-000-004-01</td>
<td>Zürrer gear motor, 1400 min⁻¹, i=72:1</td>
</tr>
<tr>
<td>ET-000-088-00</td>
<td>Deep groove ball-bearing 6002-2Z</td>
</tr>
<tr>
<td>ET-000-098-00</td>
<td>Screwed angle connection ø6-1/8&quot;, plug-type</td>
</tr>
<tr>
<td>ET-000-104-00</td>
<td>Throttle check valve screw fitting ø6x1/8&quot;</td>
</tr>
<tr>
<td>ET-000-111-00</td>
<td>Exhaust air throttle</td>
</tr>
<tr>
<td>ET-000-115-00</td>
<td>Quick coupling with female thread G 1/4&quot;</td>
</tr>
<tr>
<td>ET-000-115-00</td>
<td>Filter regulator Multi-Fix G 1/4&quot; Type C.11-10</td>
</tr>
<tr>
<td>ET-000-125-00</td>
<td>PA sealing washer 3/8&quot;</td>
</tr>
<tr>
<td>ET-000-126-00</td>
<td>Manometer G 1/8&quot; / 1-10 Bar</td>
</tr>
<tr>
<td>ET-000-129-01</td>
<td>Sound absorber 3/8&quot;</td>
</tr>
<tr>
<td>ET-000-130-00</td>
<td>5/2-way valve 1/8&quot; without throttle effect</td>
</tr>
<tr>
<td>ET-000-131-00</td>
<td>Collective valve plate SX-Series</td>
</tr>
<tr>
<td>ET-000-142-00</td>
<td>Screw-fitting w.screwed nipple ø6-1/8&quot;, PA</td>
</tr>
<tr>
<td>ET-000-153-00</td>
<td>Concave bearing SKG-21975</td>
</tr>
<tr>
<td>ET-000-197-01</td>
<td>Door buffer ø19/3x9.5 black Natural rubber</td>
</tr>
<tr>
<td>ET-000-202-00</td>
<td>Rotating latch 13 / 6mm 4kt / H=19.5</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>ET-000-206-00</td>
<td>Levelling foot M10x50 FE.ZN</td>
</tr>
<tr>
<td>ET-000-237-00</td>
<td>Manometer sealing ring G1/8” PA</td>
</tr>
<tr>
<td>ET-000-239-00</td>
<td>Pressure regulator valve G1/8” MRS-06 PA</td>
</tr>
<tr>
<td>ET-000-240-00</td>
<td>Screwed angle ø 6-1/8” PA</td>
</tr>
<tr>
<td>ET-000-275-00</td>
<td>Luminous push-button key green 1 make contact, 1 break contact</td>
</tr>
<tr>
<td>ET-000-306-00</td>
<td>Rilsan spiral ø6x4 black PA</td>
</tr>
<tr>
<td>ET-000-325-00</td>
<td>Flange bearing UFL 004</td>
</tr>
<tr>
<td>ET-000-325-00</td>
<td>Pressure regulator valve G1/8” MRS-06 PA</td>
</tr>
<tr>
<td>ET-000-544-00</td>
<td>Precision centering screw ø8f9 / M6x12 black</td>
</tr>
<tr>
<td>ET-000-666-00</td>
<td>Deep groove ball-bearing 626-2Z</td>
</tr>
<tr>
<td>ET-000-667-00</td>
<td>Deep groove ball-bearing 608-2Z</td>
</tr>
<tr>
<td>ET-000-669-00</td>
<td>Deep groove ball-bearing 6004-2Z</td>
</tr>
<tr>
<td>ET-000-689-00</td>
<td>DU- bushing ø6/8/6</td>
</tr>
<tr>
<td>ET-000-690-00</td>
<td>DU- bushing ø6/10/10</td>
</tr>
<tr>
<td>ET-000-700-00</td>
<td>DU- bushing ø16/18/10</td>
</tr>
<tr>
<td>ET-000-715-00</td>
<td>Free-wheel ZZ 6204 M</td>
</tr>
<tr>
<td>ET-000-720-00</td>
<td>Screwed angle connection ø6-1/4” plug-type</td>
</tr>
<tr>
<td>ET-000-728-00</td>
<td>Screwed T-shaped connection ø6-1/8” plug-type</td>
</tr>
<tr>
<td>ET-000-790-00</td>
<td>Throttle check valve screw fitting ø6x1/8” inlet air throttle</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ET-000-804-00</td>
<td>Plastic hose KUW 36 grey</td>
</tr>
<tr>
<td>ET-000-920-00</td>
<td>Protection container 1/4&quot; Type B.11</td>
</tr>
<tr>
<td>ET-000-927-00</td>
<td>Manometer ø50 1/8&quot; w. front ring 1-10 Bar</td>
</tr>
<tr>
<td>ET-000-940-00</td>
<td>Magnet coil 22mm 24VDC 5X-Series</td>
</tr>
<tr>
<td>ET-000-952-00</td>
<td>Pneumatic cylinder ø20 stroke 30 single-acting with front spring</td>
</tr>
<tr>
<td>ET-000-955-00</td>
<td>Pneumatic cylinder ø20 stroke 30</td>
</tr>
<tr>
<td>ET-000-956-00</td>
<td>Pneumatic cylinder ø20 stroke 50</td>
</tr>
<tr>
<td>ET-001-022-00</td>
<td>Hooded buffer ø8 PVC</td>
</tr>
<tr>
<td>ET-001-024-00</td>
<td>Square key 6mm</td>
</tr>
<tr>
<td>ET-001-044-00</td>
<td>Pressure spring 0.8x10x30 Spring steel brand C</td>
</tr>
<tr>
<td>ET-001-046-00</td>
<td>Magnet ø 8 x 5</td>
</tr>
<tr>
<td>ET-001-074-00</td>
<td>Chain 06B-1 S</td>
</tr>
<tr>
<td>ET-001-076-00</td>
<td>Chain joint 06B-1 S</td>
</tr>
<tr>
<td>ET-001-128-01</td>
<td>AC motor Groschopp DM / WKM90-60 400/230V/50Hz, 1400 min-1, 83/82a</td>
</tr>
<tr>
<td>ET-001-129-01</td>
<td>Simple worm gear 82a i = 75:1, 500 Ncm</td>
</tr>
<tr>
<td>ET-001-138-01</td>
<td>Motor IEC 71C4 230 400V 3Ph 50Hz 1.55 KW, 1400U, IP55 F</td>
</tr>
<tr>
<td>ET-001-141-00</td>
<td>Gear 2/1KW i=72:1 without clutch</td>
</tr>
<tr>
<td>ET-001-268-00</td>
<td>Flange angle size 36 black</td>
</tr>
<tr>
<td>ET-001-280-00</td>
<td>Digital output terminal DOT 701</td>
</tr>
<tr>
<td>ET-001-336-00</td>
<td>Fuse SPT 5x20 6.3A</td>
</tr>
</tbody>
</table>
ET-001-369-00
Electronic buzzer ESD 24V

ET-001-377-00
Emergency disconnector ø40
1 break contact

ET-001-378-00
Main installation switch 32A 3P+N+PE
Front installat. 4 holes fastening

ET-001-387-00
Auxiliary switch w. screw fitting
1 break contact

ET-001-388-00
Incandescent lamp 24V / 2W

ET-001-440-00
Auxiliary switch block lateral D+1S

ET-001-478-00
Cylinder sleeve ø8/14x8
Bronze

ET-001-489-00
Motor protection switch GV2-M04 0.4-0.63A

ET-001-518-00
5/2-way valve 1/8" with throttle effect
SX-Series

ET-001-550-00
Terminal block TBA 704

ET-001-592-00
Foot-operated switch 1OS XPE-A110

ET-001-605-00
Contactor 3-pole 24VDC 9A

ET-001-811-00
SPS CPU 726

ET-001-812-00
Digital input terminal DIT 701

ET-001-939-01
Power pack 1606-XLP30E 24...28V / 30W

ET-002-058-00
Deep groove ball-bearing 16004-2Z

ET-002-090-00
Needle switch
Typ 59025-010

ET-002-094-00
Tubular screw-fitting LK-I 36
synthetic material

ET-002-098-00
Power requirement to Cimrex 10 Operator Terminal

ET-002-105-00
Cimrex 10 Operator Terminal
ET-002-110-00
Fuse SPT 5x20 1.6A

ET-002-571-00
Frequency converter ATV31 0.37kW