

Operating manual

Turret Rewinder ATW

with automatic

Reel change system TAC



Somatec



Customer	:	Sample customer
Order - No.	:	000000
Issued	:	March 2010

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Important directions for the user of the operating manual

For technical reasons, the delivered machine, type **Turret Rewinder ATW**, will be called “line” in the following documentation.

Some of the applied pictures and drawings in the description or instruction serve as an explanation of the line, because a picture or a drawing tells you more than any words.

Because of many build in standard components in the line, the translated details in the coloured performance of the build-in components could be varying.

Some pictures show the line with disassembled safety devices, like barriers, panelling, safety-closings, or safety-doors, therewith the details of the line can be performed better.

Technical alterations and adding of the explanation./explanation are reserved.

No responsibility will be taken for the contents, especially for damages through existent, not existent, or incorrect declarations.

It is not allowed to pass on this description./operating manual to third parties in printed or electronically format or to amend something to this description./operating instruction, unless this is specially authorized by SOMATEC.

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March 2010

Within this sample manual only some selected chapters are presented in order to keep this sample manual within a reasonable size.

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1. General

1.1 General Data of the Project

1. Designation of the Project:

Type of Line / Machine-type :	Turret Rewinder ATW with automatic reel change system TAC
Place of Erection :	
Supplier or/and Seller :	SOMATEC Sondermaschinen GmbH
Customer/Buyer:	Sample customer
Order - No. :	000000
Electrical No. :	000000

3. The following faults have been confirmed at the acceptance of the documentation.
(Debatable faults have to be noted.):

Faults:	Notes:

4. The documentation of the line is accepted by the following signatures, because of the
above-mentioned arrangements.

5.	Place:	Date:
	Sample customer	
	Customer (Orderer)	(Authorized Person)
	SOMATEC Sondermaschinen GmbH	
	Supplier (Manufacturer)	(Authorized Person)

Line Manager (Customer)	(Authorized Person)
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1.2 Initiation for the Operator manual

The manager of the line is obliged to produce **operating instructions** for the operating personnel, to protect their health or other safety technical danger.

Besides the manager is obliged to instruct the operating personnel about the safe and orderly operating, up keeping, maintenance, and operating the line relevant.

This operator's manual book can be used as a constant part of a service instruction, but in no way it is a service instruction.

The manager takes care, that the operating personnel take notice of this service instruction.

This operator's manual book is a constant part of the line and an essential help for a successful and danger less operating of the line from SOMATEC

The operator's manual book will help keeping the line on a high efficiency capacity during a long duration of life, and to take the necessary moderations to avoid accidents.

At the end of maintenance and before commissioning the line, the manager has to start a trial run with checking all safety devices at the machine, to convince himself that the line is safe to operate as well as the personnel operating the line is capable to operate orderly and safe.

The machine has been built to the regular standard of technique and the acknowledged safety technical rules.

The manager is obliged always to keep up the newest valid safety-modifications.

Should you need any further information, you can reach at the following telephone- and fax-numbers a competent partner to speak to:

Customer Service & Spare parts:

Phone: +49 5151 10652 0

Fax: +49 5151 10652 10

1.3 Instruction- and Educational Help

As a contractor/manager you are obliged to inform and instruct the operating personnel about the existing legal- and prevention of accidents order, as well as the safety devices at the line.





The operating personnel have to understand the instructions, and it has to be made sure, that the instructions have to be taken notice of.

Only through this way you will reach that your personnel is working consciously for safety and danger

On the following pages you will find examples with educational themes, as well as a formula, which confirms the course of instruction.

1.4 Symbols in the Operator's Manual

Used symbols within the documentation

Symbol	Explanation
	Information Additional information besides the manual operator's book.
	Danger Danger of suffering death and injuries.
	Attention Danger of destroying or damaging the line or line parts.
	Pointing to Points to an additional text passage within the documentation.

1.5 Example for Educational Themes

1.	For Safety
<p>Accident prevention instructions.</p> <p>General legal instructions.</p> <p>General safety advises.</p> <p>Mode of acting during an emergency.</p> <p>The personal safety equipment.</p> <p>Safety advises for operating the line.</p> <p>Proceeding with safety devices at the line.</p> <p>Safety devices at the surrounding of the line.</p> <p>Meaning of symbols and signs.</p>	
2.	Operating the Line
<p>Proceeding with the operating elements of the line.</p> <p>Explanation of the operating instruction for the operating personnel.</p> <p>Special experience of the manager with proceeding the line.</p> <p>The use of material deposit, expedients and helping devices.</p> <p>Experience with regard to the production.</p>	
3.	Up keeping- and Maintenance instructions
<p>Proceeding according to instructions with the cleaning material, lubrications.</p> <p>Special experiences of the manager for maintenance, up keeping and taking care of the line.</p>	

4. Confirming the Instruction		
Date:		Educational instructor:
		Signature of the educational instructor:
No.	Surname, Christian name	Signature:
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2. Safety

2.1 General

Even the line has been manufactured operating safely, according to technical standard, some danger could proceed from it, if:

- non-trained or non-instructed personnel is operating.
- not operated according to the specifications,
- the upkeep or maintenance is improperly

2.2 Application as Specified

The line serves for winding a flat web made of PVC.



See „Technical Data“

Any use beyond this application does not correspond to the specification and the operator/ user of the line will be solely responsible for any resulting damage.

Application as specified also includes compliance with the instructions for:

- Safety,
- Operation,
- Upkeep/maintenance,

as described in this manual.

2.3 Attention and Warning Signs

Attention and Warnings within this operator's manual:

Sign	Signification
	Attention! Electrical fitting room. For electrical experts only.
	Danger: Danger of getting cut.
	Danger: Danger of getting pulled in and squashed.
	Danger: Danger of turning rolls.
	Danger: Danger through the rotating winding reel.
	Danger: Danger of getting squashed.
	Forbidden: It is forbidden to touch or put your hands in!
	Forbidden: It is forbidden to walk in this area!
	Information: Additional Information.
	Danger! Danger of suffering death and injuries.
	Attention! Danger of destroying or damaging the line or line parts.
	Pointing to: Points to an additional text within this documentation.

2.4 Signs at the Machine

Safety stickers have been applied in the danger areas of the line, which either explains themselves as described symbolic or short words



Attention!

Special care has to be taken in the noted danger area.
Imperatively observe these safety signs.

Examples for **possible** safety stickers:



Automatically
start



Danger of getting
pulled in



Rotating rollers



Danger of hand-
injuries



Danger of getting
squashed

Take care, that these signs are not covered and that they are always readable.

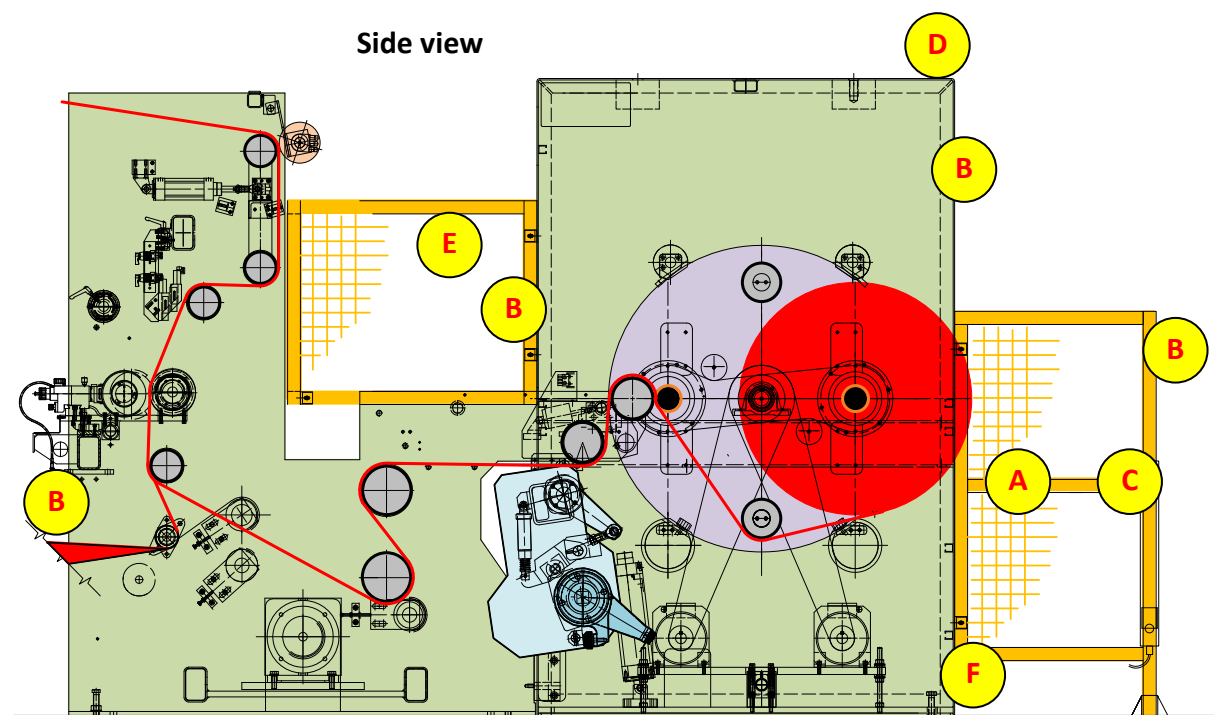


Attention!

The following safety devices must not be damaged or removed. Their function must be checked regularly “once a week”, or after repairs by the competent technical staff!

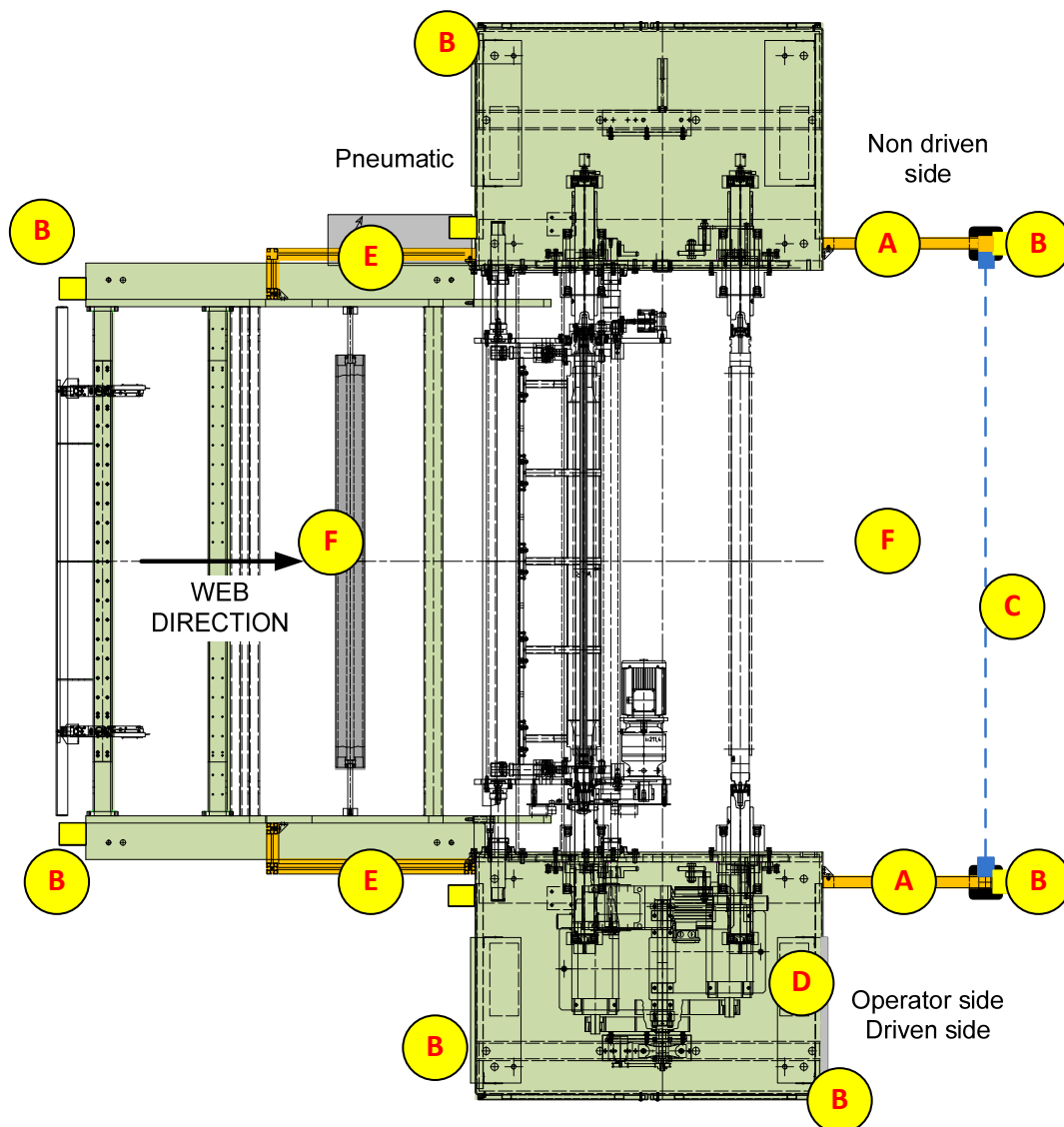
2.5 Safety Devices

2.5.1 Safety devices – Side View



- A** Fix mounted safety guard
- B** Emergency Stop Push Button
- C** Safety light barrier with approximation reaction
- D** Flash light or Alarm message system
- E** Safety doors with electromechanically interlock
- F** Safety Area

2.5.2 Safety devices – Top View



2.5.3 Stationary Protective Gratings at the Rear of the Line

(A) They prevent an access to the line from the side and protect persons from crushing and shearing strain at the winding stations.

2.5.4 Emergency-Stop - push buttons

(B) The following safety devices may not be damaged or removed. Their function must be checked regularly "once a week" or after repairs by the competent technical staff!

In the surroundings of the machine Emergency-Stop strikers are positioned which will stop the machine immediately when they have been actuated.

2.5.5 Safety Light Barrier

(C) Stationary protective gratings, made of stable square frames with corrugated wire grating, are positioned on the left and right of the entrance area of the line. The protective gratings are fixed to the machine frame and to the floor. The light barrier is mounted on the left and right of the frame. The distance to the point of danger amounts to approx. 900 mm. Functions, which are protected by the light barrier:

- cutting and lay-on system
- opening and closing of chucks
- turret system



If the invisible monitoring beam is interrupted (through persons or objects), all movements within the machine – with the exception of the rewinding process- will be interrupted. Only after having acknowledged the safety area (Safety Area Reset) the movements will be enabled again. When entering the safety area, the alarm horn sounds with a steady tone.

2.5.6 Alarm Message System

(D) The alarm message system consists of an optical and an acoustical part. The optical part consists of three lights showing the following alarm status:

GREEN	All systems of the winder are working properly.
ORANGE	Roll change process in operation. Together with this signal an acoustic signal starts. As the acoustic signal can be acknowledged on the operator screen, the optical signal continues until the roll change cycle has been finished and will be reset then automatically.
RED	A fault has been occurred at one part of the winder. Depending on the fault production has been finished and the fault has to be acknowledged and eliminated.

The acoustic signal is an intermittent tone. At dangerous situations at the winder this signal sounds. With this signal the operators shall be called to the winder when

- an automatic roll change is initiated, or
- a fault within the control system of the winder has been occurred.

The acoustic signal can be acknowledged by operation of the sensor button „fault reset” at the visualisation system (see chapter 6).

2.5.7 Safety doors

(E) They prevent an access to the line from the side and protect persons from crushing and shearing strain at the pull rollers, the contact roller, and the cut system. At both sides of the machine safety doors are between the main roll stand and the longitudinal slitting device attached. These safety doors can be opened only in the operating mode ‘Thread Up’. The releasing of the lock occurs after the Contact roller with the sledge went first into the rearmost position.



After the thread up of the web the safety doors are to be closed properly. The closed state is asked through safety switches. To activate the interlock the operating mode ‘Thread Up’ must be switched off and the push button ‘Safety Area Reset’ (41) has to be pressed. The safety doors are bolted electromechanically and can be opened only again to the above description.

2.5.8 Safety Areas

(F) The complete machine contains danger areas, which must be protected against the wanted or unintentional intervention by persons. These protective devices consist of isolating devices, which stand firm or consist of equipments with approximation reaction. The scope of delivery of the Co. SOMATEC refers only to a part of the complete machine, the safety devices are only carried out for this part too.

The operating company of the plant is obliged, to furnish the complete machine with the safety devices after a risk analysis to the national safety regulations.

2.5.9 Mechanical maintenance areas

The access is only for special trained personnel. The access is secured by screwed connections or square sash fastener.



Attention!

Behind the doors mechanical movements could take place. The doors should only be opened for maintenance work. After maintenance the doors have to be completely locked safely.

2.5.10 Electrical maintenance areas

The access is only for special electrical personnel. The electrical maintenance areas are symbolised outside with an E-flash. The access is possible only with a special key. The doors are secured by sash fastener with a double beard key.



Attention!

Directly behind the doors are connections to parts, which lead to dangerous voltages. There is a danger of electrical shocks.

After maintenance the doors have to be completely locked again with the double beard key.

2.6 Protection of Labour

To avoid accidents, primary energies like current-, pneumatic- and hydraulic supplies of the machine have to be switched off and be reenergized or depressurised.

This is also valid for adjusting jobs, if appropriate. Eventually removed guards have to be applied again before start-up.

Irregularities in operation have to be reported immediately to the responsible supervisor by the personnel working on the machine.

In case a machine trouble impairs the safety of the employees, the machine must be shut down immediately. The machine may only be started again, after the elimination of the trouble.

The opening and closing of the chucks may only take place under visual check.



Danger of getting squashed!

Do not touch the rotating parts inside the machine, like rollers, wheels, belts and chains while operating.

Special care is necessary during handling at the cutting device.



Danger of injuring your hands.

If there is a danger of personal injury due to the machine, one of the Emergency Stop strikers has to be actuated.

Do not avoid any security devices or safety instructions (stickers) on the machine.



Danger of Life

Danger of life is in case of avoiding any safety devices, like safety mats, safety light barriers, safety grades and safety doors!

2.7 Safety Instructions for the Operating Personnel

- Keep your working place clean and tidy.
Any disorder will increase the danger of accidents.
Use the protection equipment available such as earmuffs, protective gloves, protective clothing and goggles.
- Only carry out work, which you have been asked for.
- Do not allow any access to the machine by unauthorized persons.
- During **cleaning works** on the line, the voltage- and air pressure supply has to be switched off and be secured against unintentional switching on.



To reduce the risk of accidents

- Wear tightly fitting clothing!
 - Danger of getting caught
- Do not wear any jewellery!
 - Danger of getting caught, trapped
- Protect long hair by a hair net!
 - Danger of getting pulled in, caught
- When dealing with operating agents (lubricants, grease and other chemical substances) observe the manufacturer's information and safety instructions for the product involved.
- Use suitable hoists for the transport of heavy or bulky parts.

2.8 Safety Instructions for Operating the Line

- Principally the following safety devices may not be disassembled or set out of function.
(for example removing or disconnecting the „Emergency Stop Push Button“).
- In case it is necessary to disassemble safety equipment for maintenance or repairs, the safety equipment has to be refitted instantly upon termination of the work.
- During repairs on the line, the current and compressed air supply must be switched off and secured against any unintentional restarting.
- During repair works on the pneumatic system, the system must be pressure-less.
- When the line shows changes or any irregularities of its operating behaviour, Stop operation of the line and inform the supervisor of the trouble. Only after elimination of trouble, the line is allowed to be restarted.
- Perform any work at the electrical equipment of the line by qualified electrical technicians and indoctrinated personnel of your plant
- Carry out manual functions, for example: opening and closing of chucks only by visual inspection.
- Do not touch any rotating parts during production (for example rollers, wheels, chains and belts).

2.9 Upkeep and Operating Instructions

- In order not to endanger the operating personnel and further individuals, the dangerous areas of the line shall be protected and secured through build on precautions.
- The specified dimensions for barrier screens and walkways have to be kept clear and shall be observed in accordance with the European and national applicable accident prevention regulations.
- Prior to start up the line all present applicable safety regulations as well as all other generally accepted regulations respecting industrial medicine must be fulfilled and observed.
- Any person, which is authorized to install, start up, maintain and upkeep the line, must have read and understood this operator's manual and the chapter "**safety**" in particular.
- If necessary, internal instructions should be given by taking into consideration the technical qualification of the personnel employed respectively.
- Only use those working material recommended by SOMATEC:
- Take care that inspection and maintenance intervals will be adhered to
- Document all upkeep and maintenance jobs by recording the same in the machine-specific maintenance manual (see next page for examples).
- For the maintenance and upkeep intervals, refer to the maintenance instructions in chapter 7.



When the maintenance intervals are not adhered to or when performing arbitrary changes on the line, which are not covered by the scope of delivery of SOMATEC, the manufacturer's liability for any resulting damage will be excluded. The warrantee/guarantee of the manufacturer will thus expire.

[illegible]

4. Structure and Mode of Operation

4.1 Terminology

To clarify the individual terms, the following terminology list shall apply to the Terminology.

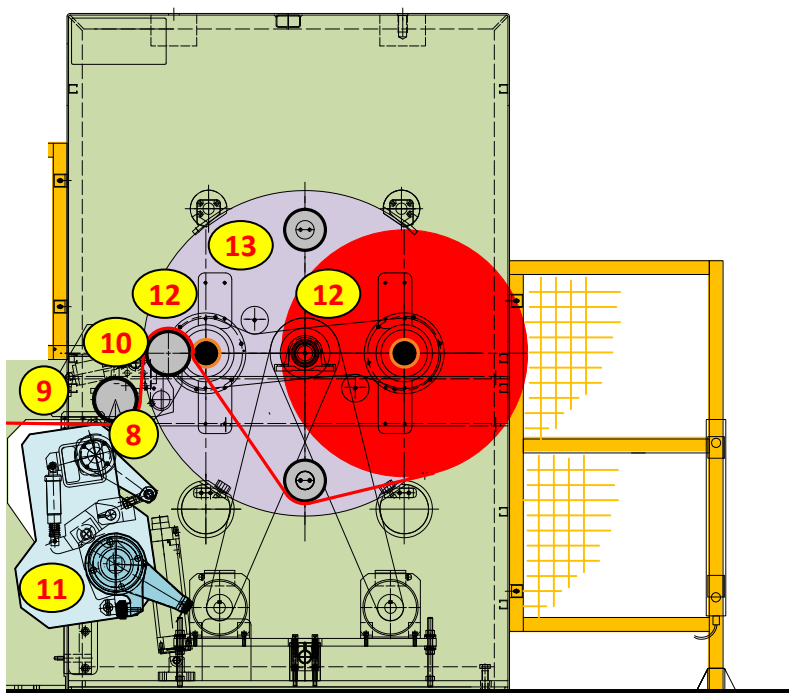
Definition	Explanation
Alarm horn	Acoustic device at the winder to point out dangerous situations to the operator. Such situations are: start of roll change, errors at a monitored component or a trouble in the winder.
Characteristics	Definition of a wind technique. Under that, the depending of the tension to the winding diameter will be set. The input takes place directly in the Visualisation System in Newton.
Chucks	Unit for chucking of winding shafts or cores for the winding process. The chucks will be closed pneumatically or hydraulically and locked by means of safety units. At the same time the required torque for central winding will be transmitted.
Cross cutter	A device that terminates the winding cycle by cutting off the flat web throughout its width. It is a pneumatically driven cutter which cuts off the material web on the cutting roll transverse to the web.
Flash lights	An optical device at the winder, which shows a dangerous status, like roll changes, cross cuttings or entering the security area.
Length-measurement unit	Unit for measuring the material length (for instance a measuring wheel)
Machine / Line	An overall structure of parts or devices connected with each other, at least one of them being movable; also of machine drive, control and energy circuits, etc. which have been combined for a special application, in particular for the process, treatment, movement and preparation of a material.
Nameplate electrical	Plate at the switch cabinet, holding manufacturer's information and the electrical connecting and operating data.
Nameplate mechanical	Plate at the machine with manufacturer's information for machine type, year of construction and reference number.
Operating area	This area comprises any location where the operator stands and walks to carry out his jobs. It comprises walkways, pits as well as stationary devices at the machine, like staircases, platforms, pedestals, etc.
Operating part	Part of the actuation system to which a force is applied from the outside. The operating element may be a handle, a button, a key, a roll or a tappet.

Definition	Explanation
Operator	An authorised person, which can use the machine and the according equipment.
Pendulum roller system	Device for measuring the tension in flat material.
PLC	Programmable logic control. Freely programmable control by a central processing unit (CPU) with analogue and digital inputs and outputs. The complete functions of the machine will be stored in a program, which will be worked off cyclically. The cycle is started with the reading-in of all inputs and outputs and terminated after the process of the program linkages with the editing of the outputs. The control is self-regulating, i.e. in a case of error all outputs will be immediately set to logic zero.
Protecting Arrangements	Protective arrangements using special technical means, called guards (separating guards, safety devices) to protect persons from danger, which cannot prevented adequately or restricted sufficiently by a corresponding design.
Pull roller system	<p>A roller set, which determines the material speed in the winder. This may be realized by:</p> <p>The friction between material web and surfaces of the pull rollers or</p> <p>The pressure of a nip roller against one of the pull rollers.</p>
Recipe	Means of filing winding data. The recipes can be stored, modified or called in.
Regulation	Closed regulation circuit for the precise control of revolutions and torque in the winder. For the regulation swivelling arms or tension measuring devices will be used as actuators.
Roll	A rewound flat web with or without winding core.
Roll	A flat web during winding condition.
Safety light barrier	A double beam safety light barrier for the protection of persons, which, when interrupted, locks and switches off functions.
Safety measuring device	A device that removes danger or decreases it.
Security area	Internal area of the line, which is secured by special devices against unauthorized staying during executing dangerous functions.
Spreader roller	Roller for spreading the material and to avoid length wrinkles.
Surrounding temperature	The temperature of the air, where the operating material will be used.

Definition	Explanation
Tension	General term for the generation of tension in flat material. The tensile forces in the material will be detected by a pendulum, dancers or tension measuring rollers and displayed in the measuring unit N (Newton).
Transport tension	Compared to the winding tension, the transport tension is not depending on the winding diameter and takes care of the material transport to the machine.
Winding core	An element where a flat web will be wound.
Winding shaft	A unit for taking up cores and for fixing by expanding bars in radial and axial directions.
Winding tension	A definition out of the winding technique. The winding tension acts during the winding process and it is possible to be set at the starting value and the characteristics.
WLR	Abbreviation for Waren Lauf Richtung (web run direction).
Wrapping roller	Rollers, which will be driven by the material without drive with low web resistant. Wrapping rollers serve for the leading and support of the web material.

4.2 General

Following only some selected chapters are presented in order to keep this sample manual within a reasonable size.



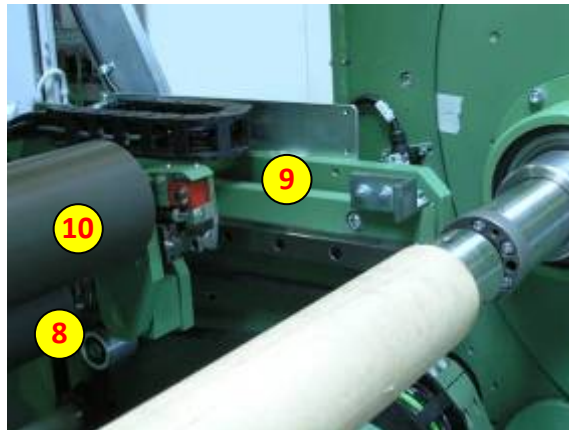
	Designation	Chapter
8	Tension measuring roller (winding tension)	4.3.7
9	Contact roller system	4.3.8
10	Contact roller	4.3.8
11	Reel change system TAC	4.3.9
12	Winding system	4.3.11
13	Indexing system	4.3.12

4.3 Description of the Sub-Assemblies

4.3.1 Contact roller System

The contact roller system (9) is equipped with the following units:

- Tension measuring roller (8)
- Contact roller (10)



The slide is shifted on linear guides by means of a servo motor.

The contact roller is made of aluminium and used to guide the material web to the winder. It is guided linear to web running direction and moved and/or positioned by means of an electric motor.

The travelling path of this roller starts at the smallest core diameter and ends at the maximum diameter to be rewound. At roll change, the contact roller is automatically positioned according to the preselected core diameter.

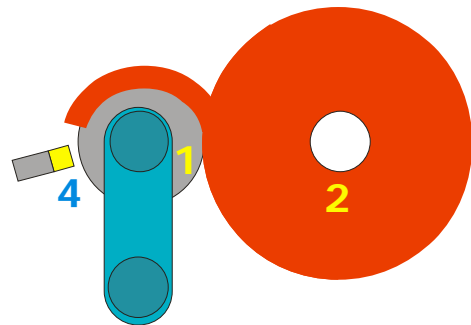
To fulfil highest requirements when winding different material qualities, the contact roller is used for two winding programs.

- **Contact winding**
- **Gap winding**

4.3.1.1 Contact Winding

Contact winding means:

The reel (2) is at any time in contact with the contact roller (1). On each side pneumatic cylinders presses the contact roller (1) against the reel (2). On both ends, the contact roller is mounted in arms and each side can be shifted separately towards the reel. Thus the contact roller can adapt itself to any winding profile and take care of an optimal fixation of the individual layers in the reel.



The pressure is set by the control in dependence of the current winding diameter. The pressure will be delivered by the PLC and converted in an EP-transducer (Electro-Pneumatic transducer). The actual pressure can be read off in "bar" at a manometer of the pneumatic operation unit and in "N" (Newton) on the screen of the main operation panel.

At contact winding the contact roller is in vertical position behind the nip point of the material onto the reel. Thus the contact roller wrap amounts to 180° and the tensile force in the material has no influence upon the contact roller pressure against the reel. Also the dead weight of the roller will be supported by the bearing and no force, resulting from the weight, acts upon the pressure.

The increasing reel (2) shades a sensor, which is arranged behind the contact roller to monitor the vertical position of the contact roller. From the signal quantity of the sensor an electrical signal will be generated which is fed to the travelling drive through an amplifier. The contact roller (1) will be moved away from the reel (2) by means of an electric positioning motor, thus making the sensor free.

The evaluation of the signal quantity of the sensor on the one hand yields the travelling direction of the contact roller and, on the other hand, a measure for the travelling speeds. If the contact roller will be heavily pressed out of its vertical position by the reel, the sensor will be shaded and the signal quantity reduced. If the contact roller is pressed out of its ideal vertical position towards the reel (contact roller pressure), the sensor become free and the signal quantity will be increased.

If the sensor is heavily shaded (contact roller pressed away from the reel), the travelling drive quickly moves away from the reel. If the sensor is completely free, the travelling drive moves toward the reel and the contact roller is pressed toward the reel.

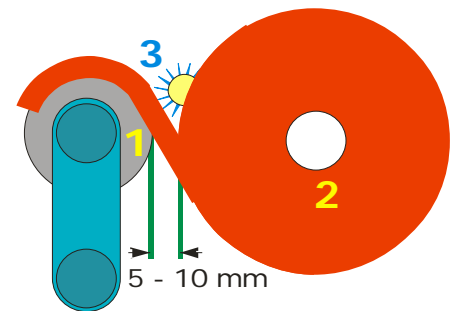
Thus the signal quantity of the sensor is a measure for the travelling speed of the contact roller.

4.3.1.2 Gap Winding

Gap winding means:

The reel (2) will be kept to a distance of approx. 5 – 10 mm to the contact roller (1).

On each side pneumatic cylinders press the contact roller (1) against fixed limit stops with a very high pressure, thus guiding the contact roller in parallel to the reel. In this way the material web will be optimally guided to the reel over a constant gap.



The pressure will be delivered by the PLC and converted in an EP-transducer (**E**lectro-**P**neumatic transducer).

The actual pressure can be read off in "bar" at a manometer of the pneumatic operation.

The increasing reel (2) darkens a photocell, which is arranged in between reel and contact roller. An electrical signal will be generated which is fed to the travelling drive through an amplifier. The contact roller (1) will be moved away from the reel (2) by means of an electric motor, thus making the photocell free. The photocell is operating with a transmitter on one side and with a receiver on the other side. The photocells are equipped with optical devices that ensure a maximum focussing of the light beams. As any **optical equipment** this one, too, is **susceptible to dust**.



Attention!

You have to take care that the photocells will always have to be clean.

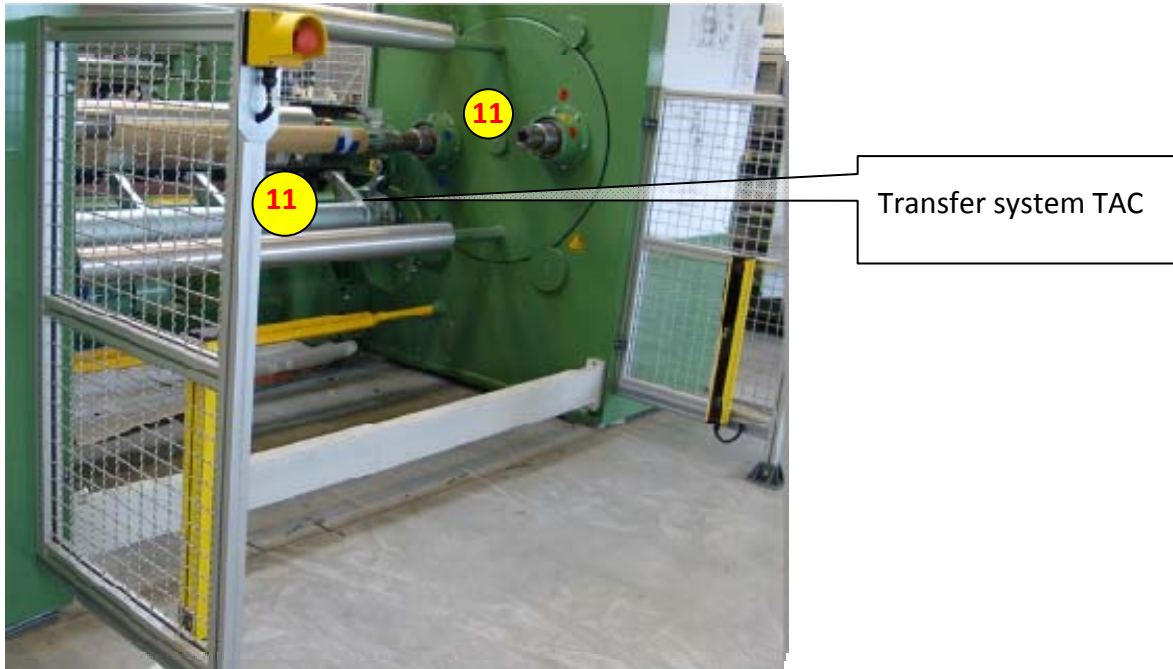
The evaluation of the light quantity of the photocells on the one hand yields the travelling direction of the contact roller and, on the other hand, this is a measure for the travelling speed. If the gap between contact roller and reel decreases, the photocell will be darkened and the light quantity reduced. If the gap between contact roller and reel increases, the photocells become free and the light quantity will be increased.

If the photocell is heavily darkened (contact roller near to the reel), the travelling drive quickly moves away from the reel. If the photocell is completely free, the travelling drive moves toward the reel and the contact roller forms the desired gap toward the reel.

Thus the gap between contact roller and reel is a measure for the travelling speed of the contact roller.

4.3.2 Reel Change System TAC

For automatic reel change (with winding direction “face of film wound inside of finished reel”) the transfer system TAC (11) is mounted within the winder.



The automatic transfer system TAC is used for cross cutting the film and for lay-on of the film onto the new adhesive prepared winding core at full production speed.

For the reel change process the TAC system swivels in the cutting position after the indexing process of the winder has finished.

Just before cross cutting the web is guided in a short distance to the adhesive prepared new core. Then a serrated knife cuts the web at right angles and a brush will press the new leading edge onto the adhesive prepared core. The cross cutting knife is mounted on a swivelling knife arm. The knife bar is driven by a torsion spring that is loaded by a motor.

Description of reel change process:

The reel change process starts with indexing of the actual winding station to the cut position.

After indexing the contact roller is moved forward until a distance of approx. 10 mm between running web and prepared core is reached. Then the TAC-system swivels in working position. The knife arm is prepared for the cross cut by loading a torsion spring by a motor.

When the pre-selected web length is reached, the knife arm is actuated and the serrated knife cuts web, which is simultaneously brushed onto the core by the brush mounted on the knife arm.

After winding the first layers of the new reel, all systems will be swivelled back in their home position.

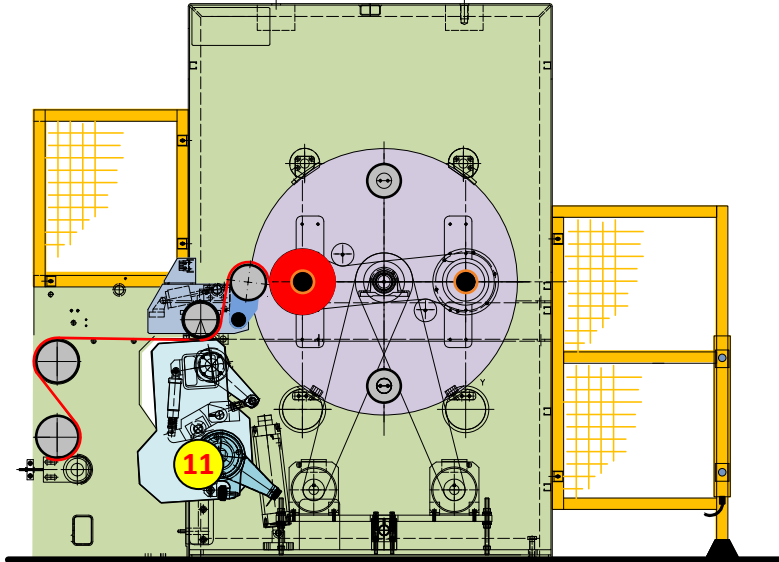
The end of the wound reel will not come in contact with the adhesive prepared core, only the leading edge of the new reel is fixed by the adhesive tape onto the core. Therefore there is no influence of the adhesive tape to the finished product. Although the whole reel change process is controlled carefully, the winding quality during indexing and reel change might be different from winding quality during stationary winding.

**Attention!**

Do any maintenance work at the reel change system TAC only at relaxed torsion spring!

4.3.3 Reel change cycle

4.3.3.1 Normal Winding Process

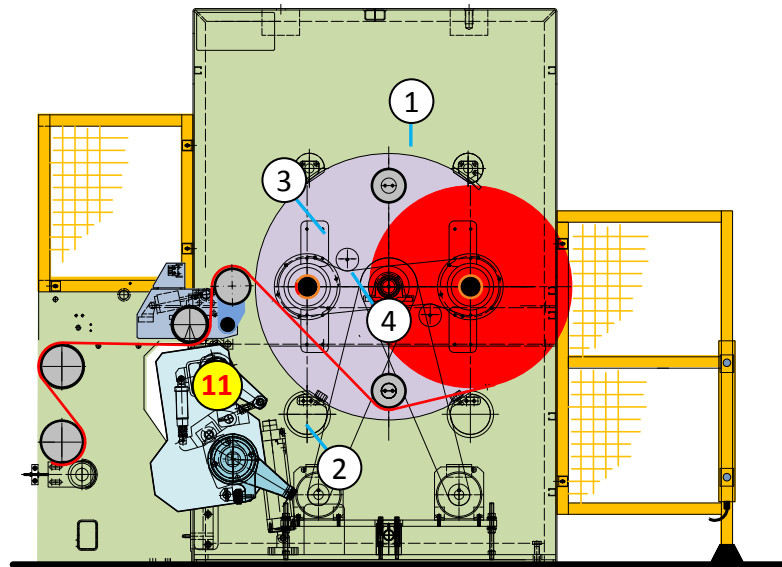


- Turret system is switched off in the cutting position
- **Winder 1** is switched on and is connected to the winding system and **Winder 2** is switched off

or

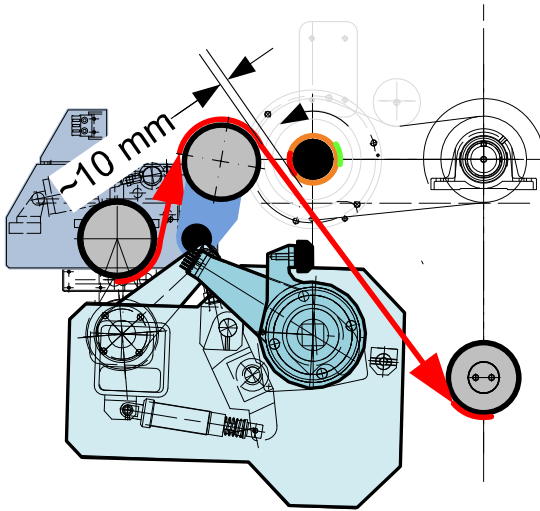
- **Winder 2** is switched on and is connected to the winding system and **Winder 1** is switched off
- Contact roller is positioned at the reel
- Cutting system is in home position
- Torsion spring is in zero (0) position
- The serrated knife is secured by the knife guard

4.3.3.2 Indexing process



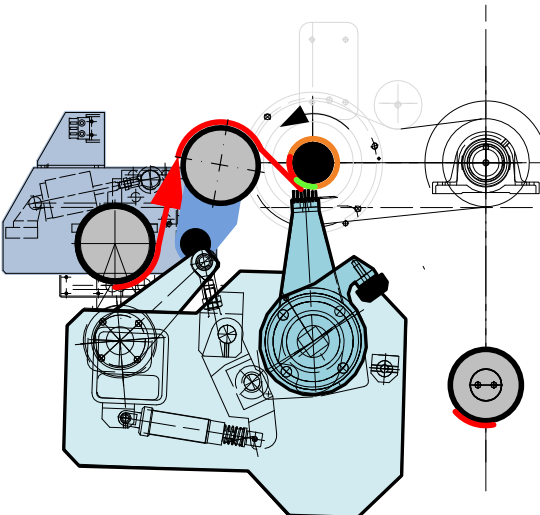
Step	Explanation
1	<p>Indexing system is switched on; maximum turret speed is achieved. The destination is the cut position according to the selected core diameter, 3" or 6".</p> <p>Winder 1 is switched on and is connected to the winding system</p> <p>Winder 2 will be switched on (synchronous surface speed) or</p> <p>Winder 2 is switched on and is connected to the winding system</p> <p>Winder 1 will be switched on (synchronous surface speed)</p> <p>Contact roller stops in the last winding position</p>
2	<p>The indexing system is in cut position.</p> <p>After indexing the contact roller is moved forward until a distance of approx. 10 mm between running web and prepared core is reached.</p> <p>The serrated knife moves in cut position and the knife arm is prepared for the cross cut by loading the torsion spring motor-driven.</p> <p>The cut system (11) swivels in cut position.</p> <p>Ready winder is for cut!</p>
3	<p>The prepared join is detected by sensors.</p>
4	<p>When the pre-selected web length is reached and the timing for the cut procedure is calculated, the knife arm is actuated and the serrated knife cuts web, which is simultaneously brushed onto the core by the brush mounted on the knife arm.</p> <p>After winding the first layers of the new reel, the knife arm will be swivelled back in his home position.</p> <p>The winder in winding position is switched over to the winding system.</p>

4.3.3.3 Indexing process completed – Cutting



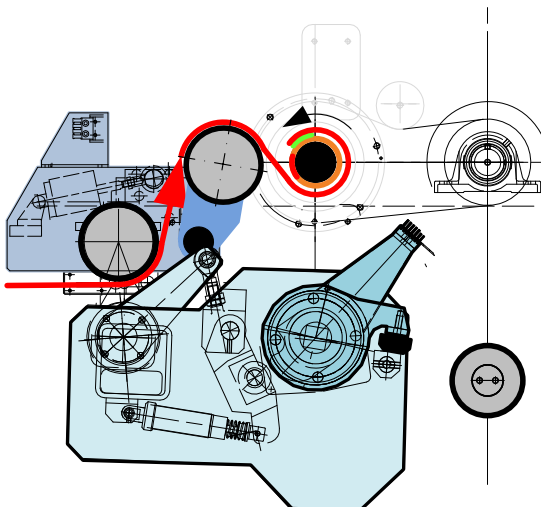
Cutting system ready for the cut

- Lock system in lock position
- Cutting spring is loaded
- The join is synchronized with the cutting system
- Unlock the spring loaded knife system



The knife is fired

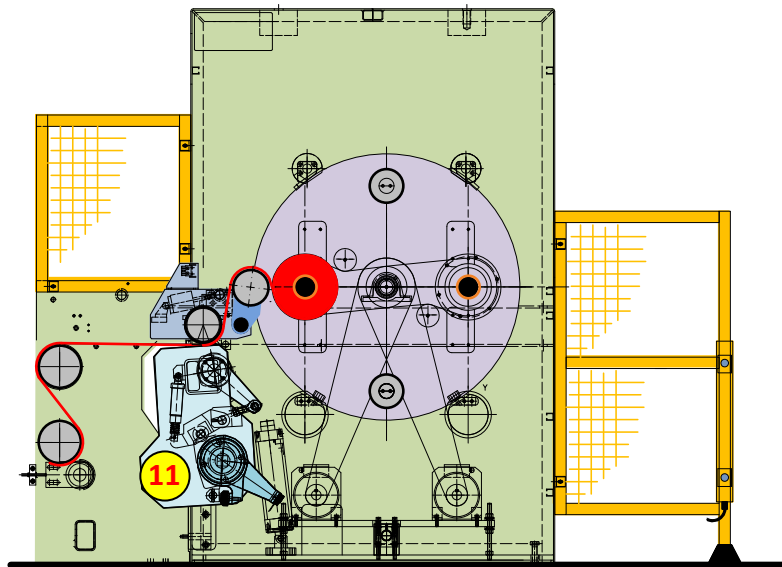
- After approx. 45° swivel angle the serrated knife cuts the web.
- The cut triggering is so carried out that the brush pushes the beginning of the web on the prepared join.



Cutting system into basic position

- Lock system brought in release position
- Cutting spring is relaxed in home position
- Lock system in release position
- The shock-absorber has destroyed the rest energy.

4.3.3.4 *Return to Normal Winding Operation*



After Cutting and lay-on process

- Contact roller is positioned at the reel
- Cutting spring is in zero (0) position
- Serrated knife is secured by knife guard
- Reel transfer system **(11)** swings to home position
- The indexing system indexes the winding station from cutting into winding position and the finished reel in unloading position.
- The turret system is switched off

A complete reel change has been carried out.

The finished reel can now be unloaded.

The winding station in basic position then can be equipped with an empty core.

4.3.4 Winding System (Winding Drive)

The winder contains two independent winding stations, winder 1 and winder 2. The winding stations are marked with colour on the turret-discs left and right in web run direction (WLR).

- Winder 1: **1**
- Winder 2: **2**

Each winding station will be driven by an electric motor, which is speed- or torque-controlled through an electronic actuator.

The driving power is transmitted by timing belts over a gear reducer unit to the chuck in the machine frame.



Right hand side



Left hand side

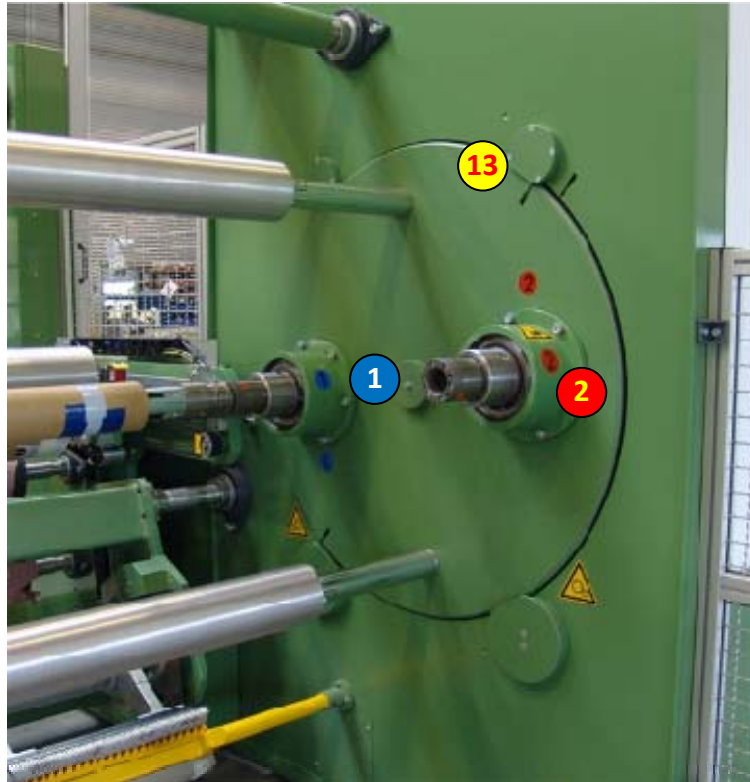
Winding system **(12)**. The winding characteristic can be set from constant tension to a hyperbolic taper tension through the winding diameter, i.e. from a linear increasing torque to a constant torque.

For the preset of the winding parameters see item "Operation", Chapter 6.

4.3.5 Indexing System

The Indexing system **(13)** consists of two turret disks.

The holding positions (cutting and winding position) will be determined by the preselection of the core diameters and fixed directly by means of the motor brake. Marks for orientation and control of the turret positions are at the side of the machine frame. On the turret disks the winding drives with the chucks are mounted.



Turret disk right in web run direction (WLR) with the winding stations for winder **1** and winder **2**.

The chucks are actuated pneumatically and take up the winding shafts.

Two turret discs are guided in big steel cabinets by means of big roll bearings with integrated tooth rings. The rings of both sides are connected via synchronic shaft, which is equipped with toothed wheels on both sides. On one side the synchrony shaft is equipped with the indexing drive.

The cabinets are covered with big doors, so that it is easy to reach each point for maintenance work.

The AC-winding motors type SIEMENS 1PH7 are mounted in the left side cabinet and is connected to the chucks by means of timing belts.

The supports for the winding shafts are pneumatically actuated and designed for winding on expansion winding shafts.

5. Transport and Installation

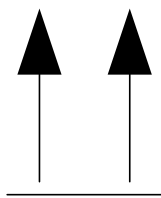
5.1 Transport

The machine shall be unpacked immediately upon receipt and checked for any potential transport damages, with the loosely delivered accessories to be checked for completeness.

Any damage or missing parts shall be complained about within eight days by stating our commission number.

When transporting the machine, utmost care must be taken that it will not be exposed to heavy shocks and impacts.

Mind the potential signs. For instance:



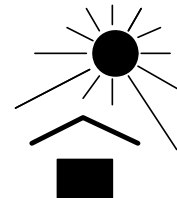
Top



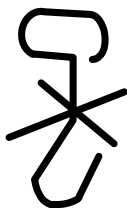
Handle with
Care!



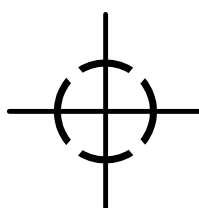
Keep dry!



Keep cool!



Do not use any hand hooks

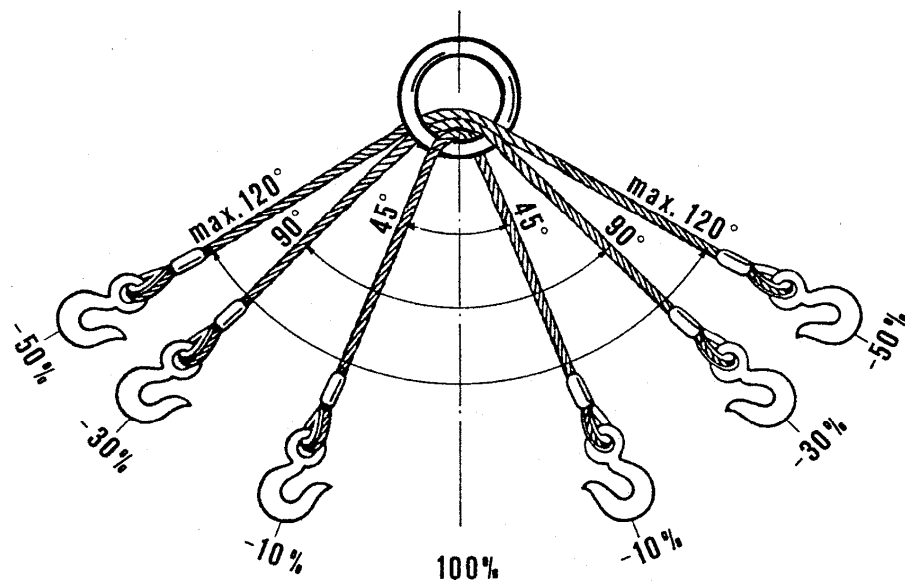


Centre of gravity



Limit stop here

For lifting purposes use lifting eyes or bores for hooking up the shackles.



For hooking up purposes the spreading angle of chains and ropes must not exceed 120 degrees.

When a width of 1.500 mm is going to be exceeded, unloading and transporting should principally be performed with the aid of a transportation crossbar.



Red lacquered transport units for movable parts at the machine may only be removed after installation and anchoring of the line.

Supports and struts with the inscription:

FOR TRANSPORT ONLY

are only allowed to be removed at the site of installation.

If the machine is packed in transport cases, the centre of gravity of the cases is identified by respective signs and marks.

5.2 Installation

5.2.1 Localisation

At the localisation of the line, the intended escapes have to be kept free (see installation plan, if necessary).

There must be sufficient place for maintenance and upkeep of the line.

The location and/or the foundation of the line must have enough carrying capacity.

When setting up the switch cabinet, mind not to obstruct or cover the entrance and exit ports for the ventilation (cooling).

5.2.2 Alignment

To adjust the line, all winding shafts and rollers must be perfectly horizontal.

Please make the following checks:

Weighing by means of a water level (0.1 mm/m)

Winding shaft or roll

All not driven rolls must be checked

Parallelism of machine parts

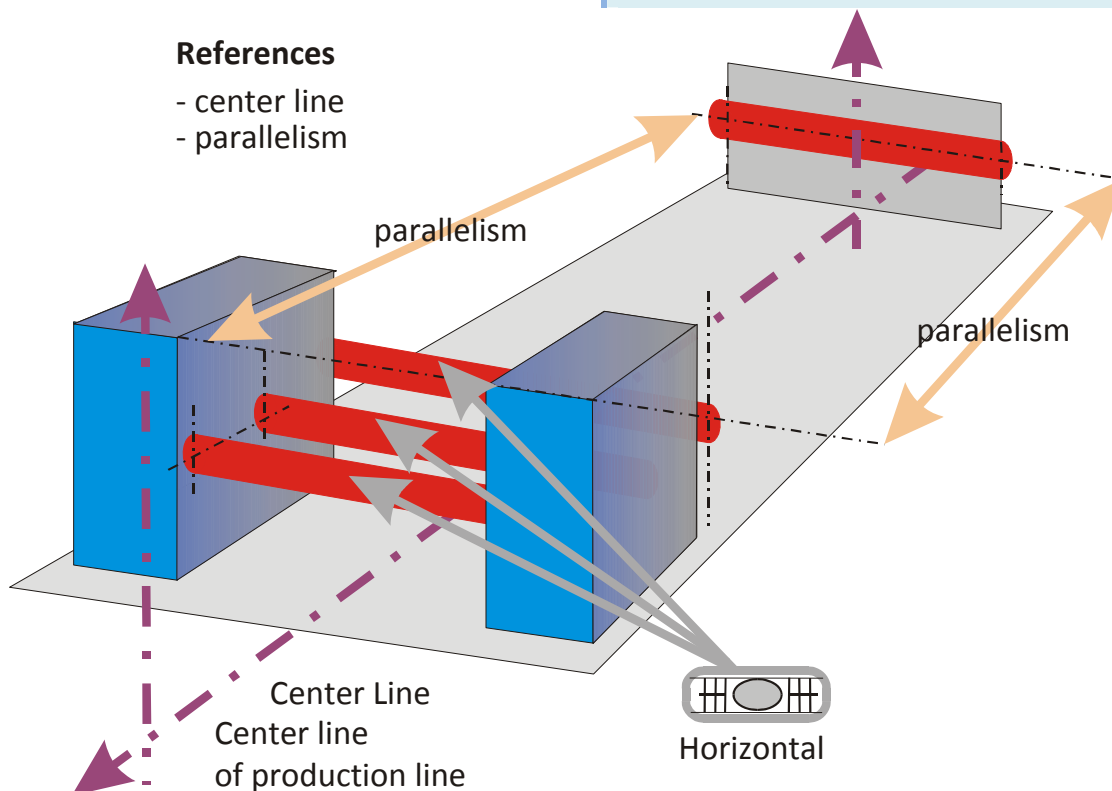
- in the winding shaft or
- roll's centre.

Admissible tolerance up to ± 0.2 mm/m.

Admissible tolerance ± 0.2 mm.

That they are running well.

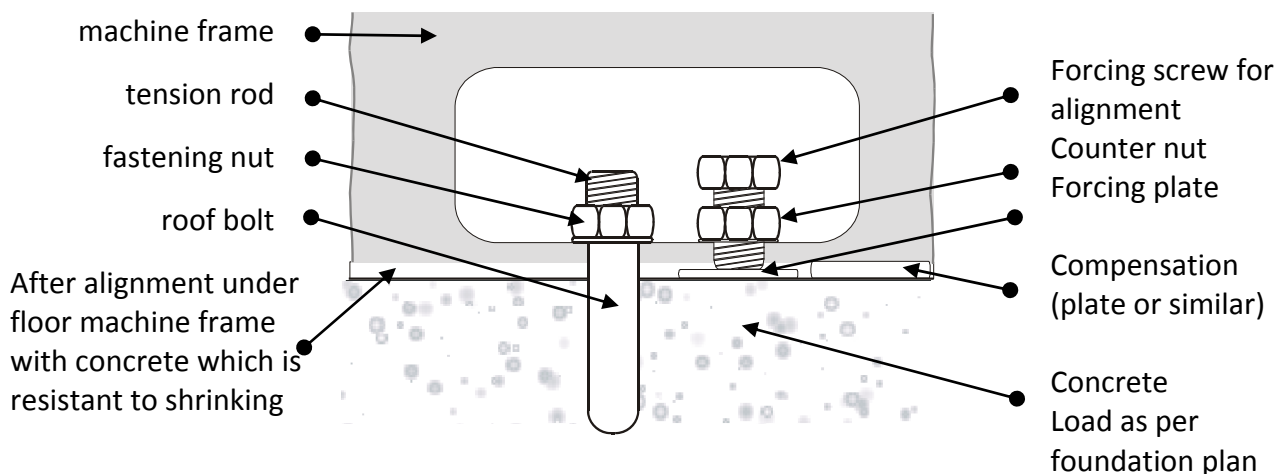
- to the upstream machine ± 0.2 mm
- to individual rolls ± 0.1 mm



5.2.3 Fastening

During installation, the line must be aligned in a torsion free way and fastened firmly and free from vibrations. Tighten all anchor bolts.

Example for machine fastening:



Check the movable parts for smooth running, if necessary loosen them from their drives and check them individually.

According to the transport regulations, all oil-containing gears and tanks have to be emptied prior the shipment.



Attention!

Therefore check all filling levels and lubrication points of the line and fill or refill them according to the regulations.

****** IMPORTANT ******
CLEAR THE VENTS!

5.2.4 Disassembly / Shutdown

When shutting down the Line for a longer period:

- Clean the machine!
- Preserve machine with grease so as to avoid corrosion damages!

Please ask for one of our service technicians for the disassembly of the line.

5.3 Electrical Connection

5.3.1 Check-up of the Electrical Equipment

Check the electrical operating agents of their proper condition:



Attention!

All jobs at the electrical equipment of the line may only be carried out by electrical experts or instructed persons under the supervision of electrical experts and according to the electrical-technical rules.

1. Prior the first start-up and after changes or repairs prior to the new start-up.
2. Prior to start-up check if all connection terminals are tight, retighten if necessary.
3. At certain intervals.
These intervals shall be laid down such that any deficiencies potentially to be expected will be recognized in time.

The electrical connections which have been disconnected between the switch cabinet and the machine for transportation purposes shall be reconnected according to **VDE 0113** and/or to the **national standard** for electrical technique at the place of erection.

All connecting terminals are marked in accordance with the mating connections and must be connected correspondingly.

See the plan for the circuit diagram for cross section and number of wires of electrical lines.

Plug connectors shall be connected according to their identical marks.

5.3.2 Mains Connection

Mains connection and frequency must correspond to the data given in the wiring diagram and in the chapter "Technical Data". They must not deviate more than $\pm 10\%$ frequencies from the specified value.

The electric supply has to be secured with a bias fuse for the line connection according to the information on the nameplate.

Please refer to the „**Technical Data**“ for the nominal value.

To obtain the right sense of rotation when connecting the machine, check the sense of rotation of the electrical field prior to the machine's connection and connect it clockwise.

5.3.3 Protective Measures

The electrical equipment of the line has been designed in such a way that the user may choose the locally applicable protective measures.

⚡ Protective conductor PE and neutral conductor (N) are routed to connecting terminals. The low-voltage network must be directly ground at one point for the function of the over-current guards (fuses, cut-outs, etc.).

Depending on the protective measure chosen, ⚡ remove or apply a wire jumper between ⚡ PE and N.

5.4 First Start-up



The first commissioning of the line should be done by SOMATEC.

Ask for one of our commissioning engineers to instruct your operating personnel for the first indoctrination.

Convince yourself about the following points before commissioning:

- Have all safety equipment been installed and do they function properly?
- Have the operating personnel been trained on the basis of the operating instructions for the line?
- Have internal operating instructions been given and have they been understood?
- Has the line been installed properly?
- Has the wiring between the line and the switch cabinet been carried out properly?
- Have all filling levels and lubricants been filled up properly?

6. Operating the line

6.1 General

On the following pages you find a tabulated survey of the operating sequences.

The first column shows numbers, which correspond with the position numbers of the operating elements in performance of the operating panel. Without a position number, the object is not appearing.

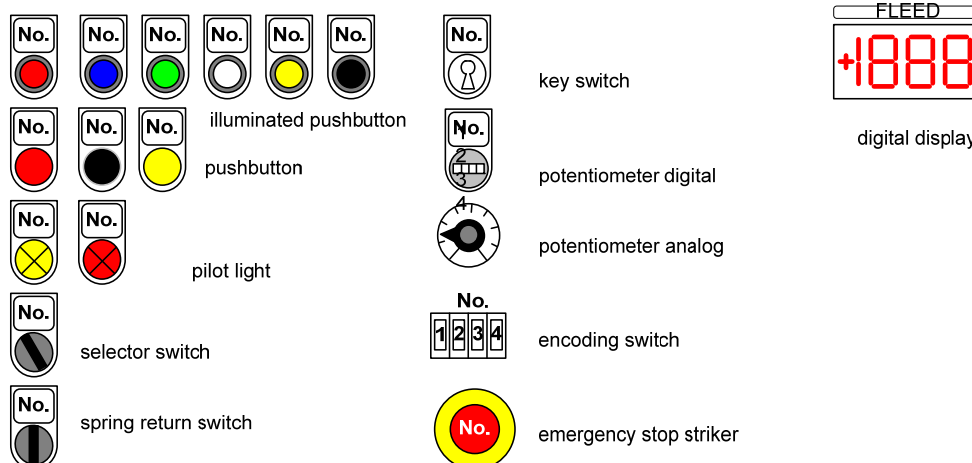
In the second column the names of the operating signs are shown, e.g. "Control"; or an object has been named, where the work has to be carried out.

The third column contains - if necessary - explanatory hints regarding the function or a short description of the jobs to be carried out.

This chapter comprises the following subjects:

Description of operating elements	Operating +P
	Visualization system
Establishing the readiness for operation	Electric
	Pneumatic
	Pull in
Operating the line	Reel change
Setting of the winding quality	Winding parameter


Significance of Symbols



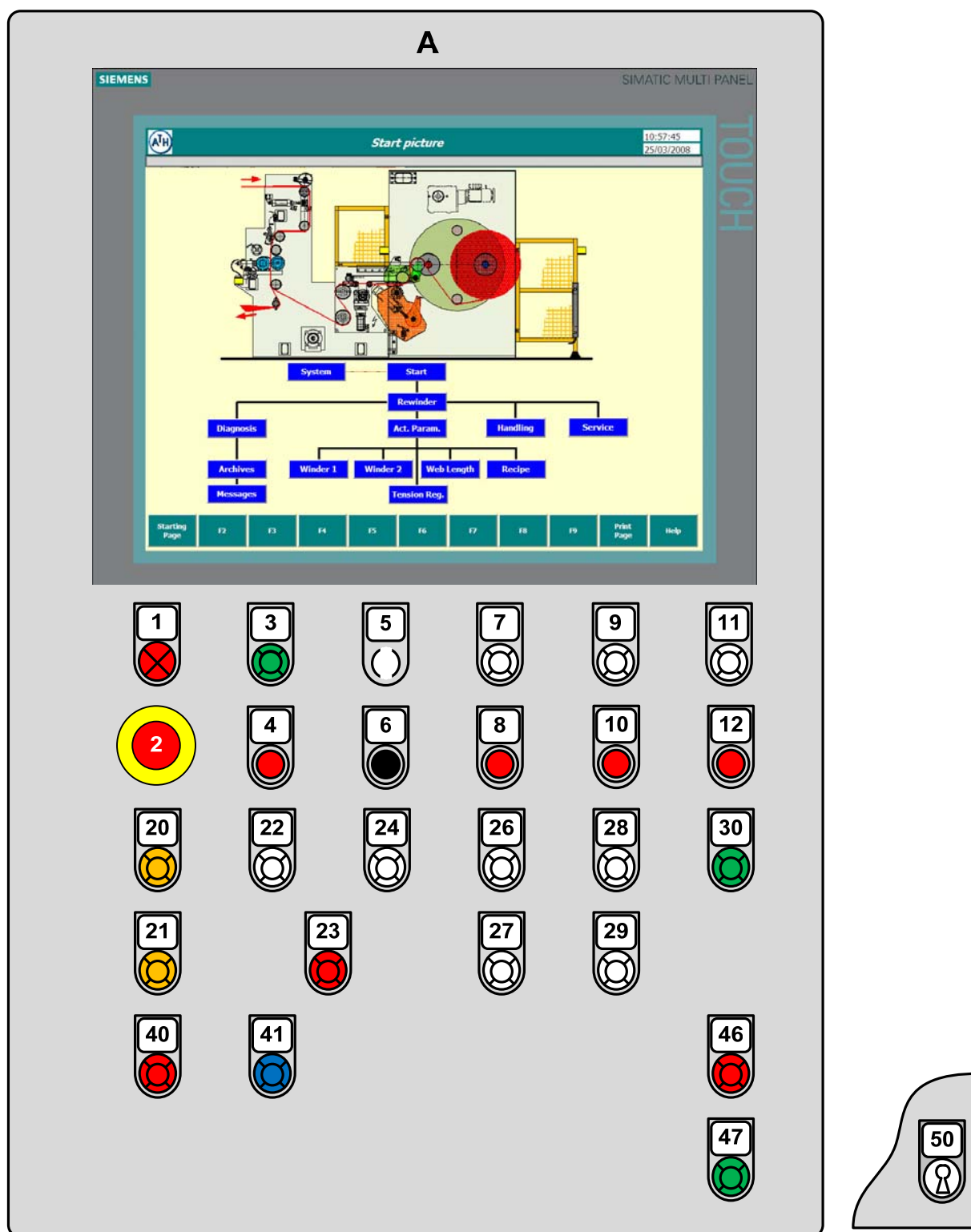
6.2 Description of Operating Elements

6.2.1 Operating the switch cabinet




No.	Inscription	Signification
A	Ready for Operation	The indicator is illuminated, when the main switch has been switched on.
B		Electrical type plate with declarations for the mains connection and the drawing-papers.
C		<p>Main Switch is provided for switching on and off the main power for the winding machine.</p> <p>1 ON</p> <p>0 OFF</p> <p>In position 0 the Main Switch can be secured through a padlock against unexpected switching on.</p>



6.2.2 Main Operating Panel (+P)





No.	Inscription	Signification
A	Touch Panel	Visualization SIEMENS TOUCH SCREEN
1	Emergency Stop Actuated	<p>Control-light is indicating an error of the Emergency Stop Circle. Emergency switches are situated in the complete surrounding of the machine, when actuated it will bring the complete line to a still stand, and releases an alarm.</p> <p>Actuating the Emergency shut-off will be indicated through the illuminated indicator "Safety Off Actuated" in the main operating.</p> <p>If an Emergency shut-off has been actuated at the winding machine, the place of actuating will be shown in clear words in the visualization system.</p> <p>The release of the winding machine takes place by actuating the button "Emergency Stop / Reset". If the release of the Emergency Stop Circle has taken place, the illuminated button goes off. In case the illuminated button does not go off after actuating the button, another Emergency shut-off Device in the Emergency Stop Circle is still actuated. After all Emergency Stop Devices have been brought into the not actuated position (unlocked), the Emergency Stop Circle can be released again!</p>
2	Emergency Stop	<p>Emergency shut-off Shock Button</p> <p>A switch, which is actuating by push buttons with self-acting mechanical locking. The operating part is RED, the frame is Yellow. When actuated the whole line comes to a standstill, which means, drives will slow down to standstill and switch off. The performance of functions will be stopped and /or disconnected. The electrical supply of the line will be switched off.</p> <p>Attention: For keeping safe conditions, some primary energy might be present in the line in form of pneumatic.</p>
3	Control ON	<p>After having unlocked all E-STOP strikers, the E-STOP pull chord and after having actuated the E-STOP Reset, the machine control can be switched on.</p> <p>The telltale lamp (green) lights up.</p>
4	Control OFF	<p>When actuating the pushbutton or one of the E-STOP devices, the machine control will be switched off.</p> <p>The telltale lamp (green) is extinguished.</p>

No.	Inscription	Signification
5	Thread Up Off - On	<p>The key switch has to be switched with the responding key into position ON (I). Therewith the winding machine will be switched into Thread Up Mode.</p> <p>That causes the following consequences:</p> <p>The drives can only be operated with a limited speed.</p> <p>The contact roller drives with the sledge back into the thread up position.</p> <p>If the contact roller achieved the rearmost position and if the knife arm turned off to basic position the safety doors can be opened.</p> <p>All movements in the safety area are locked (Contact roller, Knife arm and Turret system)</p> <p>The safe area is accessible for the thread up of the web.</p> <p>After the safety doors are closed properly again and the mode Thread Up is switched off with the key-operated switch, the safety area can be receipted. The key Safety Area Reset has to be actuated to activate the lock at the safety doors and the safety barrier.</p> <p>The safety doors are locked.</p> <p>After thread up, the key switch has to be switched into position zero and the key has to be pulled out. The safety doors has to be closed properly and</p> <p>The winding machine is in operating mode (Normal Operation), when the key switch is in zero position and the safety doors are locked. The machine can be operated in the operating modes <i>Manual</i> or <i>Automatic</i>.</p>
6	Pull Roll Accelerate 	<p>When actuating this key, the speed of the winder - with a fixed value - is faster than the line speed. Thus the winder is able to pick up the loose material between winder and downstream machine.</p> <p>This function may only be carried out at visual contact to the web and may not be actuated when the dancer is in centre position.</p>
7	Pull Roll On	The drive for the pull roll unit will be switched on and rotates with a surface speed, which is dependent on the master signal and the position of the dancer roller.
8	Pull Roll Off	The drive of the pull roll unit will be decelerated to standstill and switched off.
9	Winder 1 ON	The drive of winder 1 will be switched on and rotates with a surface speed, which is dependent on the master signal.
10	Winder 1 Off	The drive of winder 1 will be decelerated to standstill and switched off.

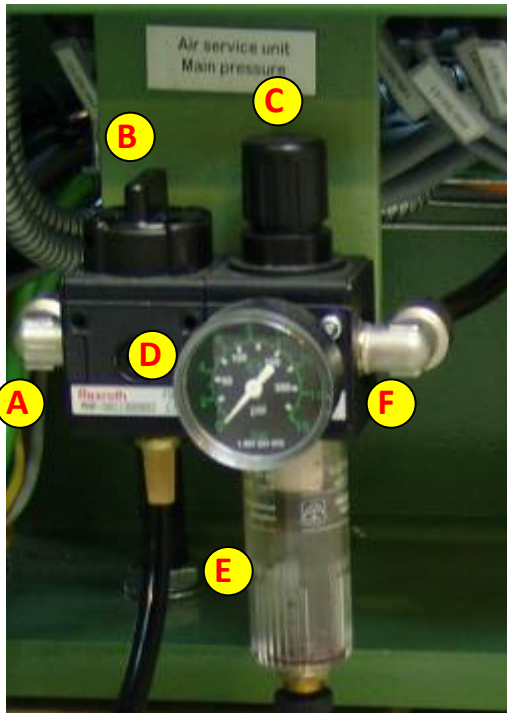
No.	Inscription	Signification
11	Winder 2 On	The drive of winder 2 will be switched on and rotates with a surface speed, which is dependent on the master signal.
12	Winder 2 Off	The drive of winder 2 will be decelerated to standstill and switched off.
20	Automatic Mode	Operating automatically The functions in the machine are working automatically through a step-chain from the start of the roller change until the unload of the finished rolls. The length controls the start of the roller change or an overriding system, the input of the change start.
21	Manual Mode	Operating manual The functions of the machine will be started manual one after the other. This operating mode is not suitable for continual production, because it is not possible to put in the time sequences for starting the functions manual.
22	Indexing Forward	The turret system is switched on and indexes the empty winding shaft from unloading to lay-on position (forward). The direction of rotation for the indexing system changes with the selection for the upper or lower cutting system!
23	Indexing Stop	The indexing motion is stopped directly.
24	Indexing Backward	The turret system is switched on and indexes the empty winding shaft from slitting to winding position (backward). The direction of rotation for the indexing system changes with the selection for the lower or upper cutting system.
26	Slide Forward	The positioning drive moves the contact roller toward the reel. The travelling speed is a fixed value of the line, the movement is stopped in front position or according to the selected operating mode of the contact roller.
27	Slide Backward	The positioning drive moves the contact roller away from the reel. The travelling speed is a fixed value of the line; the movement is stopped in rear position.
28	Knife Arm Up	The knife arm of the cut system swivel from rest position to cut position for roll change.
29	Knife Arm Down	The knife arm swivels to rest position:

No.	Inscription	Signification
30	Ready for Cut	<p>The indicator illuminates with permanent light, when the TAC reelchange system is ready for cutting and putting on.</p> <p>Indicates the indicator with permanent light, the illuminated push button can be actuated. The cutting- and putting on procedure will be released immediately therewith.</p> <p>The pre-stressed knife is initiated and the web cut off.</p>
40	Chuck Open 	<p>The chucks will be opened.</p> <p>For safety reasons, a two-hand operating element is provided so as to prevent an opening of chucks by mistake. I.e. the chucks will only be opened if key 40 and 46 will be actuated at the same time.</p> <p>The winding shaft is deflated.</p> <p>It has to be taken care, that the reel or the winding shaft has to be supported before the chucks are opened. This has to take place by a lift platform truck or through the unloading fork!</p> <p>Danger through loads falling down!</p>
41	Safety Area Reset 	<p>Giving a receipt for safety area and the electromechanically lock system at the safety doors!</p> <p>The indicator illuminates with permanent light, when the safety area of the winding machine has been disturbed or one of the safety doors are open.</p> <p>A light barrier will secure the interior of the line.</p> <p>When entering the safety area, dangerous functions will be interrupted or blocked.</p> <p>Only after the safety area is clear again and the key <i>Safety Area Reset</i> has been actuated, these functions may be carried out again.</p> <p>After the operator mode 'Thread Up' the safety doors are locked when the key <i>Safety Area Reset</i> has been actuated.</p>

No.	Inscription	Signification
46	Chuck Open	<p>The chucks will be opened.</p> <p>For safety reasons, a two-hand operating element is provided so as to prevent an opening of chucks by mistake. I.e. the chucks will only be opened if key 40 and 46 will be actuated at the same time.</p> <p>Caution!</p> <p> It has to be taken care, that the reel or the winding shaft has to be supported before the chucks are opened. This has to take place by a lift platform truck or through the unloading fork!</p> <p>Danger through loads falling down!</p>
47	Chuck Close	The chucks will be closed.
No.	Inscription	Signification
50	<p>Maintenance Mode</p> <p>L = Off</p> <p>H = On</p>	<p>The key switch for switching on the arrange mode for the machine is positioned in the terminal box in the main operating.</p> <p>Supposition: The door at the main operating has to be opened by an expert with a special key (double beard key) for electrical mounting rooms. The key switch has to be switched on with setting a key into position 1.</p> <p>The maintenance mode is a self working kind of operating.</p> <p>This kind of operating is only allowed to be operated by special trained experts.</p> <p>Switching on the operating kind of maintenance mode will take place through actuating a key switch. This key switch may only be actuated by special trained experts for removing disturbances or during maintenance work.</p> <p>Danger!</p> <p> After finishing maintenance work or removing disturbances, the key switch has to be absolutely put back into the off position (0) and the key has to be pulled off.</p> <p>This key may not be reachable for any other operating personnel.</p> <p>Before starting this kind of operating, the line has to be separated against unauthorized entering of personnel that are not involved in the maintenance work.</p> <p>After finishing the Service Mode or maintenance work, the door at the main operating panel has to be locked up orderly again with the special key.</p>

6.2.3

6.2.4 Pneumatic Operating



- A Main Supply > 5,5 bar
- B Main Valve. Actuating manual for de-aerate the winding machine during maintenance work or releasing for normal operating.
- C Pressure reducer for setting the operating pressure to 5 bars.
- D Manometer, for reading the set operating pressure.
- E Water refiner. Collecting storage for condensed water from the supplied air.
- F Operating voltage into the control of the winding machine.

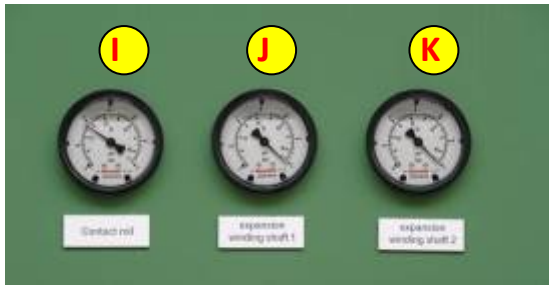
Caution!

The maintenance unit for the compressed air is positioned in the left side frame of the line and is freely accessible. The compressed-air feeder must have a cross-section of $\frac{1}{2}$ ". The feeder must always have the same cross-section and may not be pinched off or guided through reducing valves.

The mains for the compressed air normally must supply an air consumption of approximately 7 m³/h at a minimum pressure of 6 bars.

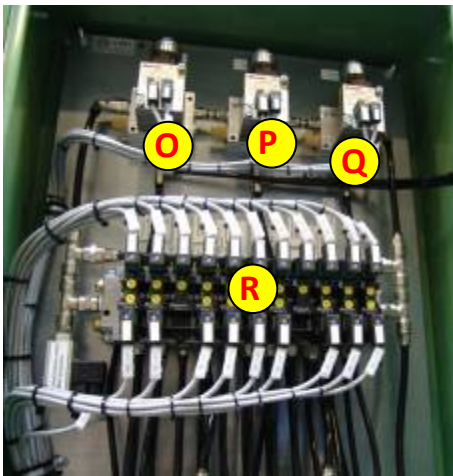


Electro - Pneumatic Converter for the load of the dancer (pendulum).



Pneumatic operating from outside

- I Contact roller: Indicator for the actual pressure of the contact roller.
- J Winding Shaft 1. Indicator for the actual pressure in the winding shaft of winder 1.
- K Winding Shaft 2. Indicator for the actual pressure in the winding shaft of winder 2.



Pneumatic operating from the inside

- O EP-Converter for Winder 1
- P EP-Converter for Winder 2
- Q EP-Converter for contact roller
- R diverse pneumatic valves
(see pneumatic plan and wiring scheme.)



Attention!

Access only with a special key (square) for special trained personnel. After maintenance work the door of the pneumatic operating has to be locked orderly and the key has to be removed.!

For maintenance work the delivered key (foursquare key) has to be used to open the door lock of the mechanical mounted rooms.

Description of the pneumatically mounted parts is placed inside of the door.

6.2.5 Panel Operating by Siemens SIMATIC MP370

6.2.5.1 General Description

The visualization system exists of a **touch-screen**, **touch mask** or a **sensor-screen mask**. It is a computer-screen mask and by touching some fields on the screen mask, it will guide you through the program.

Instead of using a cursor by a mouse-click or anything like that, you can use a finger or a pencil. The indicating of a cursor is abundant on a common picture and will only show by putting in some data.

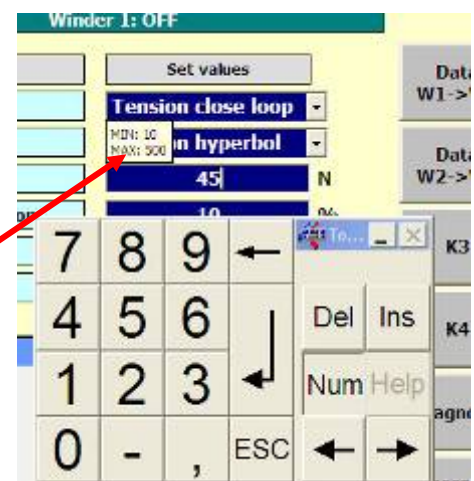
The analogy to the mouse-click is a short touch.

If some data have to be put in to the input fields, it appears after touching such an input field depending on the input:

- a numerical sub window with numbers (numeric pad). By touching any single number, the numbers will be transmitted one after the other in to the input field. After finishing the input, the transmitting key (ENTER) has to be actuated and the numerical sub window will be deleted.
- an alphanumerical sub window with letters and numbers (alphanumeric pad). By touching any single letters or numbers the data will be transmitted one after the other in to the input field. After finishing the input, the transmitting key (ENTER) has to be actuated and the alphanumerical sub window will be deleted.

After touching one of the input fields, automatically the calling up of the numerical or alphanumerical sub windows take place, that means the under windows cannot be called up without the reason of alterations of the data.

The input will be proofed for valuation, that means each input value has a higher and a lower limit. It shows a display window with limited values for high and low values. Only input values within the limited value of the control will be taken over. If the input value is not within the limited value, the previous value stays and the new value will not be transmitted.



The input field shows the following background colour:

BLUE

The input value is within the predefined limits.

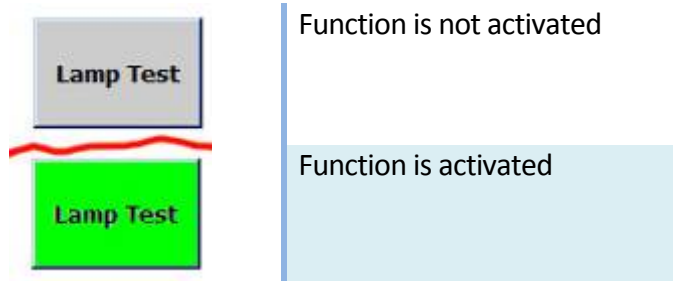
YELLOW:

The current input value is outside the predefined limits.

With the key ESC you can leave the input without changing the actual value. With the cursor keys $\leftarrow \rightarrow$ can be jumped to higher or lower valuation within an input field.

Sensor fields show the actual state by changing their colour.

The switched off function shows a gray coloured display field, the actuated function shows a green coloured display field.



Mind you can only select fields, allowing an input. Fields which are not editable will be skipped.

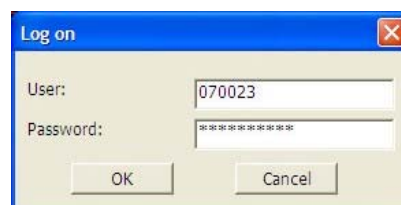
Each screen mask has an associated help page, which can be called up with Help. Important information can be read here.

With return you call up the previous screen mask.

6.2.5.2 Password Protection

Some screen masks are restricted for special users, like maintenance or service technicians. For getting access, the user has to put in a password. If user and password do agree with each other, it is possible to get access for settings in to the screen masks.

After calling up a protected screen mask, a following under window appears with putting in fields for the user and the belonging password. At the same time an alphanumerical keyboard is appearing for the input of user data and password. The complete input has to be closed with the field OK. If the input is wrong or not right, the procedure will be interrupted. An interruption also takes place with the field interrupt.



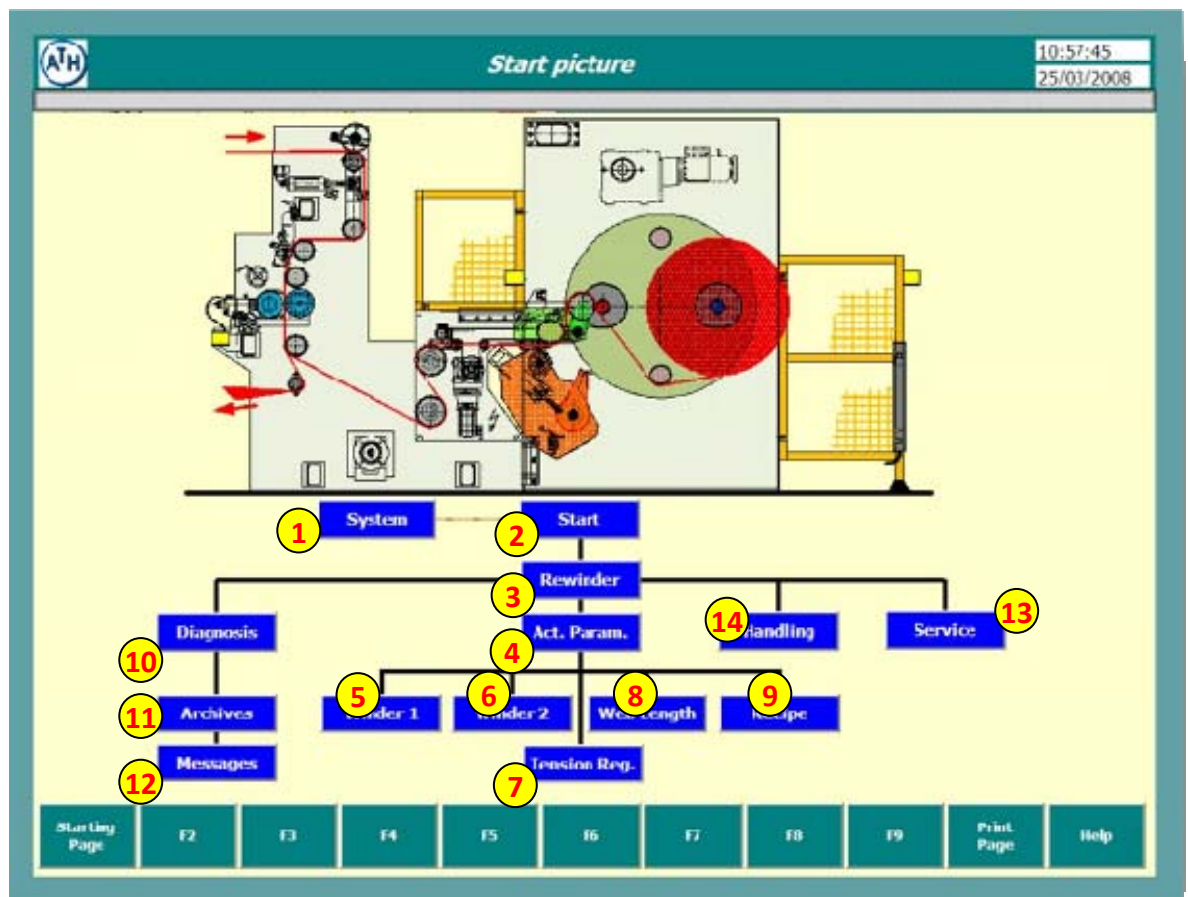
6.2.5.3 Description of the Screen Masks

In chapter 6.2 each screen mask is associated with a chapter of its own. Here is the survey of the single chapter numbers. That means i.e.:

③ Chapter 6.3.3

or

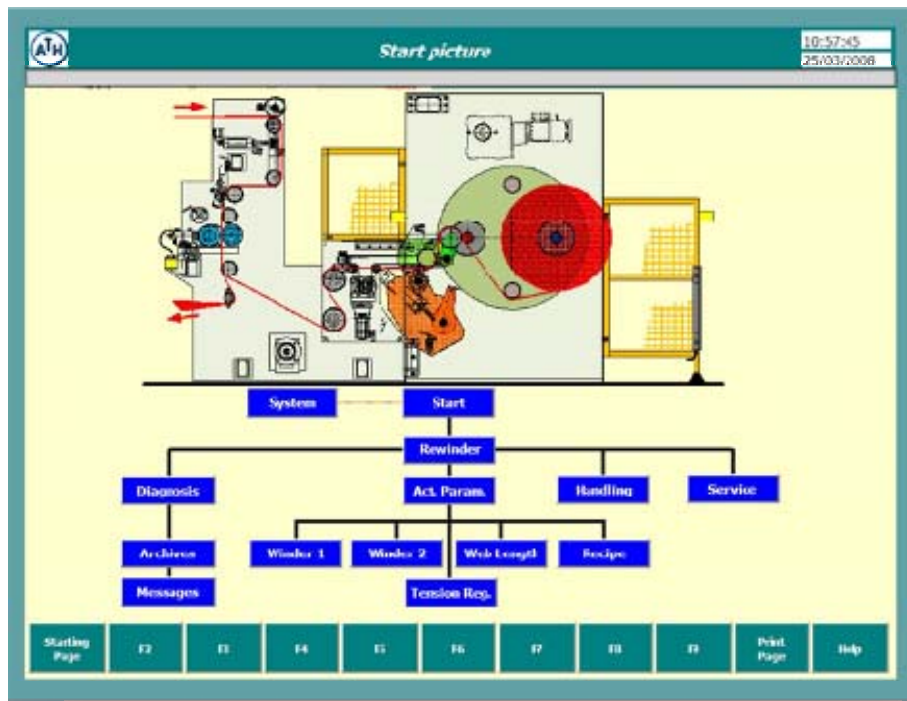
⑩ Chapter 6.3.10



- ⑭ The command button **Handling** is not used at this time.
If the command button is controlled, no reaction occurs.

6.3 Screen Masks

6.3.1 Start picture



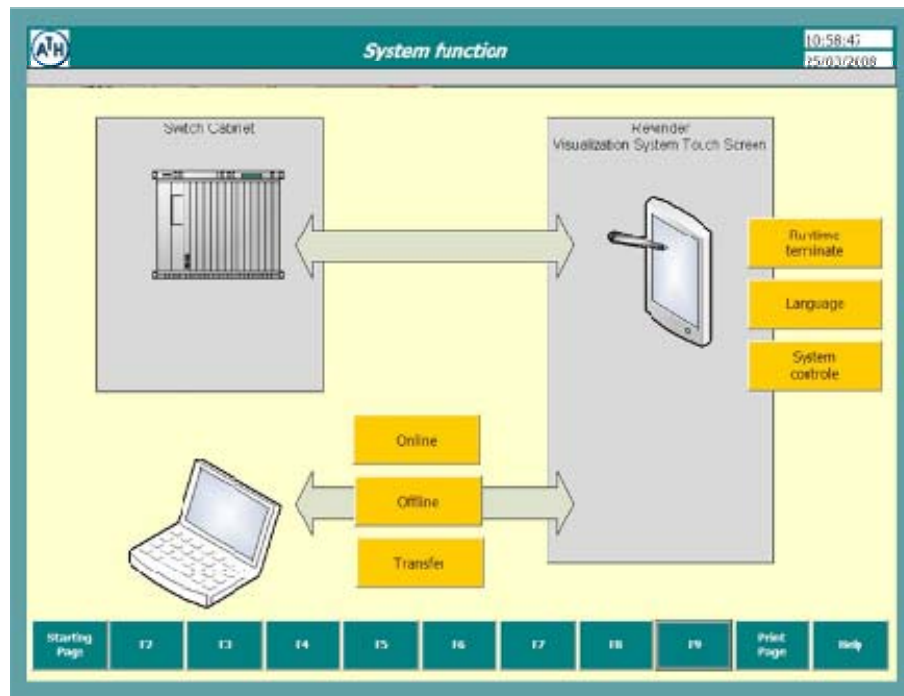
This screen mask Start picture appears straight after switching on the control.

All further screen masks of the visualization system can be called up from this starting page by a sensor touch. Any coloured pointed field is a sensor touch and leads to the inscribed *screen mask*.

14

The command button **Handling** is not used at this time.
If the command button is controlled, no reaction occurs.

6.3.2 System function



The access is protected by a password!

Function	Signification
<i>Run time terminate</i>	When actuated, the user program will be finished.
<i>Language</i>	Changeover of the language on the user surface. GERMAN < > ENGLISH < > CHINESE
<i>System Control</i>	When actuated, the Touch Panels will be called up by the system control. Modifications are possible for lightness, contrast etc..
<i>Online</i>	The Touch Panel (TP) is connected with the control.
<i>Offline</i>	The connection between Touch Panel (TP) and control will be interrupted.
<i>Transfer</i>	Data transfer between the programmable computer (PC) and the Touch Panel.

6.3.3 Rewinder / Overview



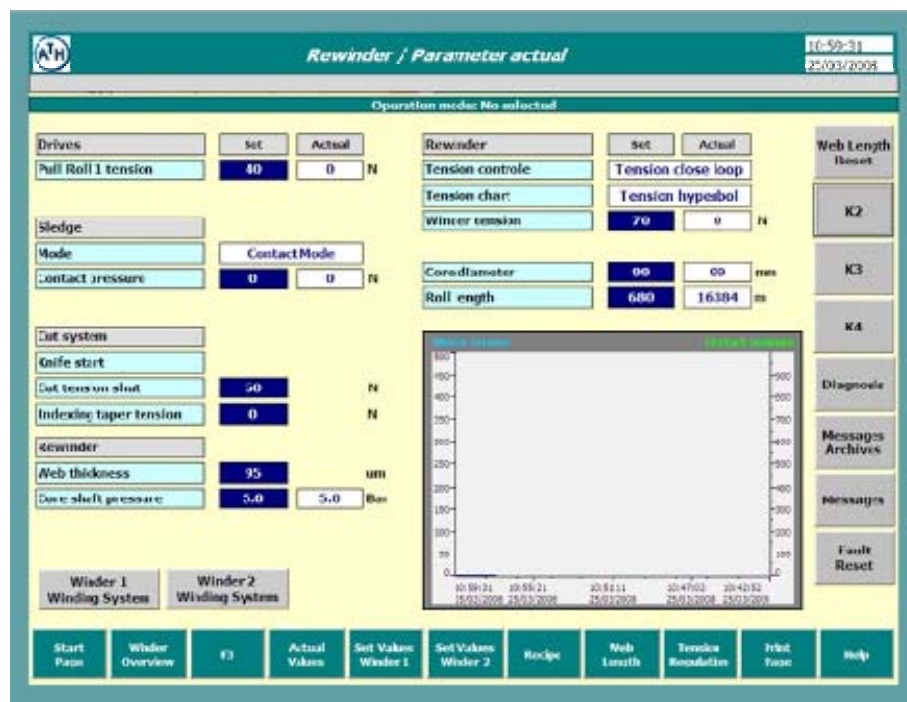
Statement of the whole machine with all drives as motor symbols. Through the change of colour, the state of each single drive is indicating.

- GREY** The drive is switched off.
- GREEN** The drive is switched on.
- RED** The drive is switched off through a disturbance.

Besides the actual circumstances will be indicated for:

- the actual operating statements
- Display for the actual Line speed and selection of intern or extern setting of Line speed.
- Pull Roll 1: Actual Tension, Torque and circumference speed
- Contact roller: Mode and Contact force
- ReelChange will appear in the displayed length (meter) and time (minutes)
- For each Winder is displayed the actual
 - torque,
 - speed,
 - diameter and
 - length

6.3.4 Rewinder / Parameter actual



The screen mask shows the actual data, how the winding machine winds the material web.

Drives	Set	Actual
Pull Roll 1 tension	Display of the set tension.	Display of the tension in the web before the pull roll 1 (load of dancer roller).
Sledge (Contact roller)	Set	Actual
Mode	Display of the selected operating mode for the contact roller: <ul style="list-style-type: none"> • Contact Mode or • Gap Mode 	
Contact pressure	Display of the set pressure of the contact roller.	Display of the pressure of the contact roller against the roll.

Cut System	Set	Actual
Knife start	Display of the set value for the distance between the web edge and the beginning of the adhesive tape at the join.	
Cut Tension shot	Display of the set increase of the tension after cut and reelchange.	
Indexing taper tension	During the indexing systems turns the tension is reduced around the set value.	

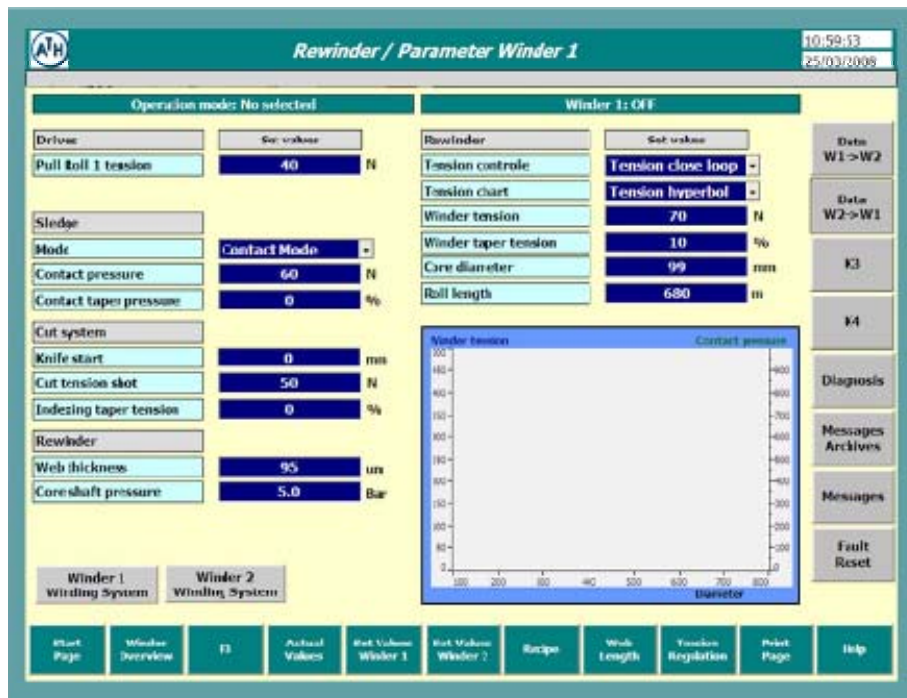
Rewinder	Set	Actual
Web thickness	Display of the set value for the web gauge.	
Core shaft pressure	Display of the set air pressure for expanding the winding shaft.	Display of the air pressure in the winding shaft.

Rewinder	Set	Actual
Tension control	Display of the selected winding mode for the winder.	
	Tension open loop	No feedback of the tension in the web material run. The tension results out of the torque of the drive machine.
	Tension closed loop	Feedback of the tension in the web material run and therewith the control of the tension.
Tension chart	Speed control	Feedback of the tension in the web material run and controlling the circumference speed of the roll.
	Display of the set dependence of the tension to the winding diameter.	
	Tension hyperbol	The tension is changing, depending to the presetting characteristic from the constant up to the hyperbolical decreasing progress with increasing winding diameter.
	Tension linear	The tension is changing linear from a starting value at the winding core up to the final value linear with increasing winding diameter.

Rewinder	Set	Actual
Winder tension	Display of the desired value of tension in the material web run.	Display of the actual measured tension in material web run.
Core diameter	Display of the selected outer diameter of the winding core.	Display of the actual core diameter
Reel length	Display of the preset material length of a finished roll.	Display of the actual wound material length.

Display of a graphic with actual parts out of the winding process. From the graphic direct deviations between the set- and the actual tension progress can be read by the winding diameter.

6.3.5 Rewinder / Parameter Winder 1



In the **Set Values Winder 1** the necessary values have to be set for winding with winder 1. The winding data can be put in separately for each winder, marked by the blue frame for winder 1. With the reel change the data will be transmitted at any given time into the machine data.

Independence to the winding data preset for winder 1 or 2, the winding data can be changed again or accommodate straight into the machine data. If winding data for both winders are equal, only the data for one winder has to be set and can be transmitted then by actuating the data W1>W2 or the data W2>W1 on to the other winder.



The data fields always have to be filled completely!

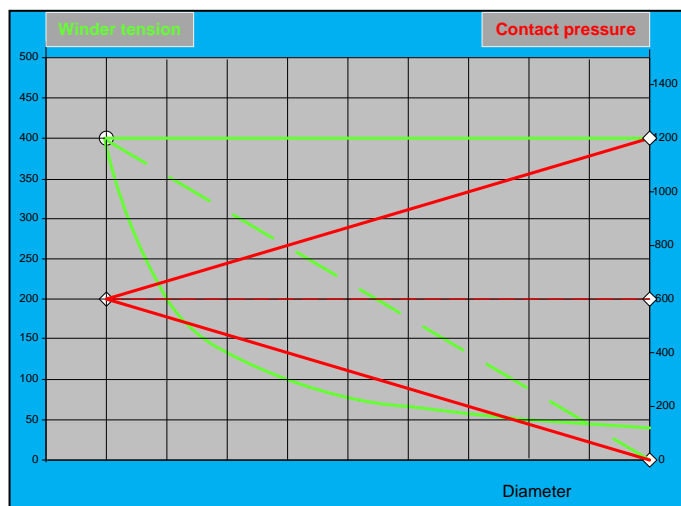
Drives

Signification

Pull roll 1 tension

Set value of tension in the material web before the pull roll 1.
(load of dancer roll)

Sledge (Contact roller)	Signification
Mode	Input for operating mode for the contact roller with a menu selection.
	<div> <div>Contact Mode</div> <div>The contact roller presses permanent the material web run on to the roll, with the set contact tension.</div> </div> <div> <div>Gap Mode</div> <div>The contact roller will be held permanent with a gap to the reel with the help of a photo-cell.</div> </div>
Contact pressure	Input for the contact power for the operating mode "contact".
Contact taper pressure	Input for the progress of the contact in dependence to the winding diameter. Preset for pressure increase or decrease over the winding diameter: The preset has to be between -100 and +100%. The trend is set by a linear equation between the start value and the end value. <div>-100%</div> The end value is zero at max. diameter of 800 mm <div>0 %</div> the start value is constant over the entire diameter <div>+100%</div> The end value is two times of the start value at max. diameter of 800 mm.



Graphic scheme of the actual selected tension and contact pressure.

The diagram shows the graphs for the tension and for the contact pressure directly after input of the data. The operator immediately recognises a correct or incorrect input.

The scheme shows per example in green colour the tension flow at 100 % with hyperbolic and linear trend. At 0% the tension is constant of the winding range. Start value for the winder tension is 400 N.

In red colour the contact pressure is shown.

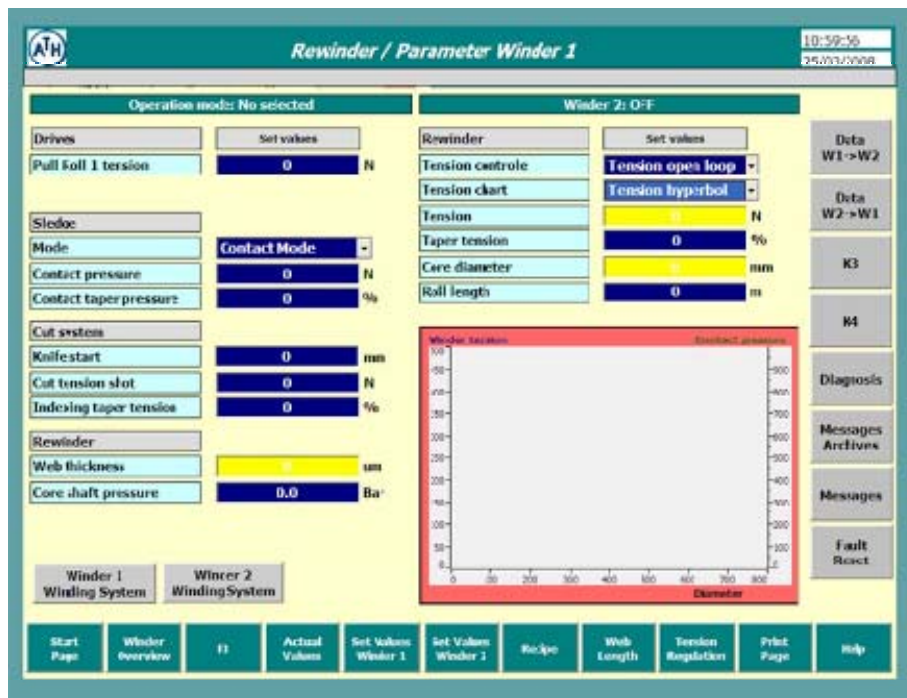
- +100%: Start value for the contact force is 600 N and the end value is two (2) times of the start value that means 1,200 N!
- 0 % : The contact force is constant with the value of the start force with 600 N.
- -100% : The contact force falls from the initial value with the wound diameter to zero. Between the shown limit values any trend can be selected.

Cut System	Signification
Knife start	Input for the distance of the web edge and the beginning of the adhesive tape at the join.
Cut Tension shut	Input for the increase of the tension after cut and reel change.
Indexing taper tension	During the indexing systems turns the tension is reduced around the set value.

Rewinder	Signification
Web thickness	Input of the web gauge. This input is important for the sequence during reel change.
Core shaft pressure	<p>Input for the air pressure for expanding the winding shaft.</p> <p>This input should not be higher than it is really necessary, for too high pressure can deform the cores at the winding shaft. In case the pressure is too low, eventually the necessary torque will not be transmitted during winding procedure and the core could slide axial on the winding shaft.</p>

Rewinder	Signification
Tension control	<p>Input for the winding mode of the winder with a selected menu.</p> <p>Tension open loop No feedback of the tension in the material web run. The tension results out of the torque of the drive machine.</p> <p>Tension closed loop Feedback of the tension in the material web run and therewith controlled tension.</p> <p>Speed control Feedback of the tension in the material web run and control of the circumference speed of the roll.</p>
Tension chart	<p>Input for the progress of the tension in dependence to the winding diameter.</p> <p>Tension hyperbolical The tension changes depending on to the preset of the characteristics from constant up to hyperbolical decreasing progress with increasing winding diameter.</p> <p>Tension linear The tension changes linear from a starter value at the winding core up to a final value linear with increasing winding diameter.</p>
Winder tension	<p>Input for the tension at the beginning of the roll.</p> <p>Depending on the selection of the progress of the tension over the winding diameter, this value stays constant or the value drops with increasing winding diameter.</p>
Core diameter	Input for the outer diameter of the winding core.
Roll length	Input for the material length of the finished rolls.

6.3.6 Rewinder / Parameter Winder 2



In the **Set Values Winder 2** the necessary value has to be set for winding with winder 2. The winding data can be put in separately for each winder, marked by the blue frame for winder 2. With the reel change the data will be transmitted at any given time into the machine data.

Independent to the winding data preset for winder 1 or 2, the winding data can be changed again or accommodate straight into the machine data. If winding data for both winders are equal, only the data for one winder has to be set and can be transmitted then by actuating the data W1>W2 or the data W2>W1 on to the other winder.



The data fields always have to be filled completely!

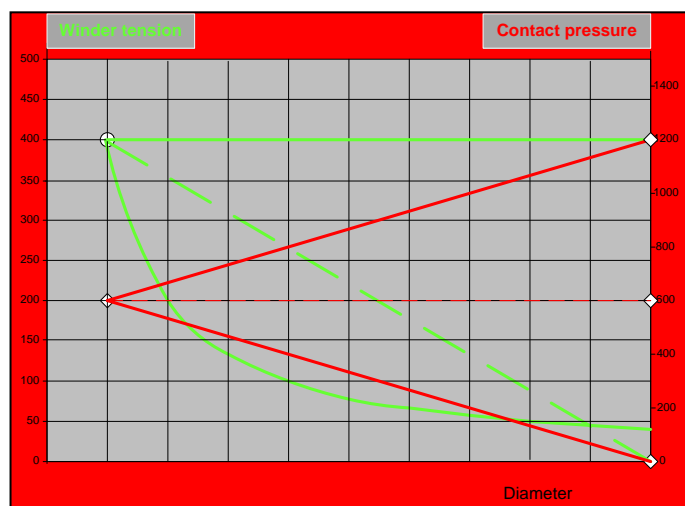
Drives

Signification

Pull Roll 1 tension

Set value of the tension in the material web run before pull roll 1.

Sledge (Contact roller)	Signification
Mode	<p>Input for operating mode for the contact roller with a menu selection.</p> <p>Contact Mode The contact roller presses permanent the material web run on to the roll, with the set contact tension.</p> <p>Gap Mode The contact roller will be held permanent with a gap to the reel with the help of a photo-cell.</p>
Contact pressure	Input for the contact power for the operating mode "contact".
Contact taper pressure	<p>Input for the progress of the contact in dependence to the winding diameter.</p> <p>Preset for pressure increase or decrease over the winding diameter:</p> <p>The preset has to be between -100 and +100%. The trend is set by a linear equation between the start value and the end value.</p> <p>-100% The end value is zero at max. diameter of 800 mm</p> <p>0 % the start value is constant over the entire diameter</p> <p>+100% The end value is two times of the start value at max. diameter of 800 mm.</p>



Graphic scheme of the actual selected tension and contact pressure.

The diagram shows the graphs for the tension and for the contact pressure directly after input of the data. The operator immediately recognises a correct or incorrect input.

The scheme shows per example in green colour the tension flow at 100 % with hyperbolic and linear trend. At 0% the tension is constant of the winding range. Start value for the winder tension is 400 N.

In red colour the contact pressure is shown.

- +100%: Start value for the contact force is 600 N and the end value is two (2) times of the start value that means 1,200 N!
- 0 % : The contact force is constant with the value of the start force with 600 N.
- -100% : The contact force falls from the initial value with the wound diameter to zero. Between the shown limit values any trend can be selected.

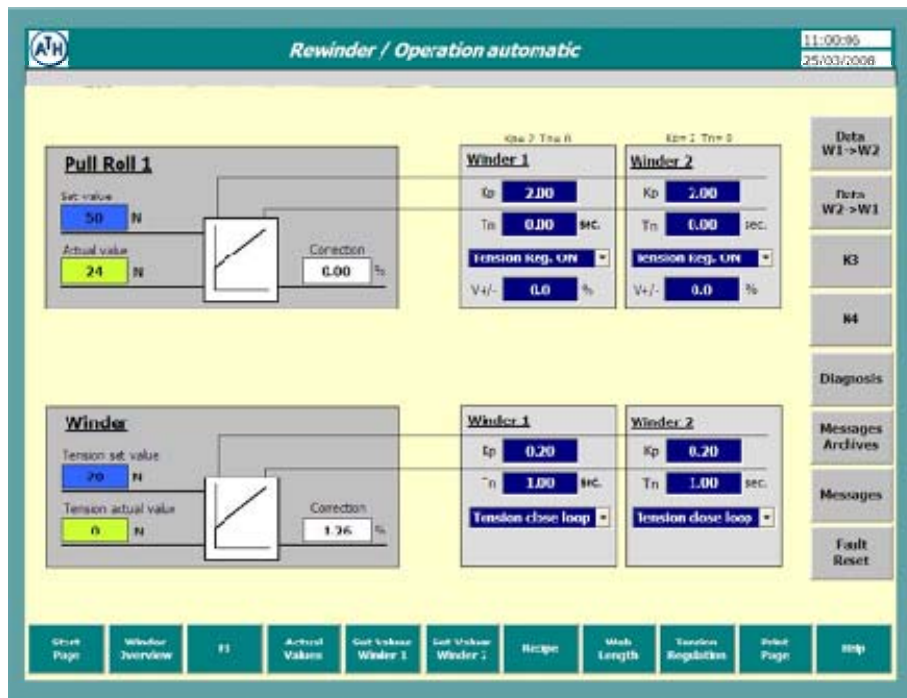
Cut System	Signification
Knife start	Input for the distance of the web edge and the beginning of the adhesive tape at the join.
Cut Tension shut	Input for the increase of the tension after cut and reel change.
Indexing taper tension	During the indexing systems turns the tension is reduced around the set value.

Rewinder	Signification
Web thickness	Input of the web gauge. This input is important for the sequence during reel change.
Core shaft pressure	<p>Input for the air pressure for expanding the winding shaft.</p> <p>This input should not be higher than it is really necessary, for too high pressure can deform the cores at the winding shaft. In case the pressure is too low, eventually the necessary torque will not be transmitted during winding procedure and the core could slide axial on the winding shaft.</p>

Rewinder	Signification
Tension control	<p>Input for operating mode of the winder with a selecting menu:</p> <p>Tension open loop: No feedback of the tension in the material web run. The tension results from the torque of the drive machine.</p> <p>Tension closed loop: Feedback of the tension in the material web run and therewith controlling of the tension.</p> <p>Speed control: Feedback of the tension in the material web run and controlling the circumference speed of the roll.</p>
Tension chart	<p>Input of the progress of the tension in dependence to the reel diameter.</p> <p>Tension hyperbol: The tension changes depending to the pre select of the characteristic from constant up to hyperbolical decreasing progress with increasing reel diameter.</p> <p>Tension linear: The tension changes linear from the starting value at winding core up to the final value linear with increasing reel diameter.</p>
Winder tension	<p>Input for the tension at the beginning of the roll.</p> <p>Depending on the selection of the progress of the tension over the winding diameter, this value stays constant or the value drops with increasing winding diameter.</p>
Core diameter	Input for the outer diameter of the winding core.
Roll length	Input for the material length of the finished roll.

Display of a graphic with actual presetting for the tension and the contact force.

6.3.7 Rewinder / Operation automatic



The parameter for the technological control of the drives for the transport and winding of the material web has to be put into the **Tension Regulator**. The size of the parameter depends of the fixed mechanical constituent parts and to the characteristics of the web material. A general validity setting of the parameters can take place for a big range of material. At an extreme deflection, like material strength, the E-module, and the material width, it can cause insufficient conditions of the control. Only then it is necessary, to suite the parameter to the given conditions.

For the adaptation of the parameter, a voluminous knowledge of the control-technique is necessary. Wrong settings could lead to tremendous faulty functions during transport and winding the material web!

The PI-Controller decides the set-value $u(t)$ out of the control deviation $e(t)$ as followed:

$$u(t) = K_p(e(t) + \frac{1}{T_N} \int_0^t e(\tau) d\tau).$$

General the valid in the control line of the PI-Controller is:

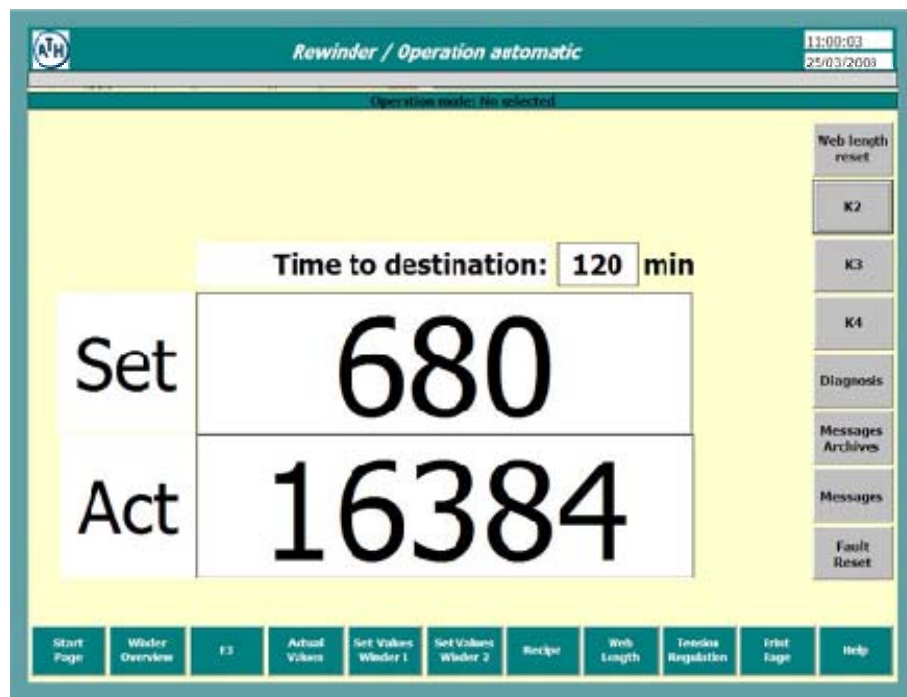
- The P-control part (K_p) is trying quickly to catch up the appearing control differences.
- Afterwards the I-control component (T_N) removes the control differences which has been left.

The PI-Controller works, at responding tract and setting, many times faster and accurate and therefore it will be used very often.

Pull Roll 1	Signification
	The circumferential speed of the pull roller is determined to the line speed signal and the correction signal of the technology regulator.
Proportional amplification $\{K_p\}$	Between the alterations for the controller of coming in and going out sizes, the proportional-additional value k_p is valid. P-amplification bigger strong reaction when changing the set value. P-amplification too little unstable positioning, strong over-swinging.
Integral component $\{T_n\}$	After a jump alteration at the entrance, the integral time T_n disappears till the finish is altering with the value K_p *entrance value. I-Component too big soft control behaviour, strong over-swinging.
Tension Regulator	Scroll down menu: Tension Regulator ON The circumference speed of the pull roller rolls will be controlled. If the circumference speed is higher than the line speed, the measured tension will be higher than the set value and the speed will be controlled decreasing till the set tension has been reached again. If the speed is too low, the control will take place the opposite principle. Tension OFF The circumference speed of the pull roller rolls will not be controlled. The material web will be pulled off with a constant speed and the tension is not defined, that means; it can be changed when the tension is too high or too low.
Correction	Display of the current adjustment value in percent.

Winder	Signification						
	The torque for the winder drive is controlled or regulated with the technology regulator (automatic controller).						
Proportional amplification $\{K_p\}$	<p>Between the alterations for the controller of coming in and going out sizes, the proportional-additional value k_p is valid.</p> <p>P-amplification bigger strong reaction when changing the set value.</p> <p>P-amplification too little unstable positioning, strong over-swinging.</p>						
Integral component $\{T_n\}$	<p>After a jump alteration at the entrance, the integral time T_n disappears till the finish is altering with the value $K_p \cdot \text{entrance value}$.</p> <p>I-component too big soft control behaviour, strong over-swinging.</p>						
Tension Regulator	<p>Scroll down menu:</p> <table> <tr> <td>Tension open loop</td><td>No feedback of the tension in the material web run. The tension results out of the torque of the drive machine.</td></tr> <tr> <td>Tension closed loop</td><td>Feedback of the tension in the material web run and therewith controlled tension.</td></tr> <tr> <td>Speed control</td><td>Feedback of the tension in the material web run and control of the circumference speed of the roll.</td></tr> </table>	Tension open loop	No feedback of the tension in the material web run. The tension results out of the torque of the drive machine.	Tension closed loop	Feedback of the tension in the material web run and therewith controlled tension.	Speed control	Feedback of the tension in the material web run and control of the circumference speed of the roll.
Tension open loop	No feedback of the tension in the material web run. The tension results out of the torque of the drive machine.						
Tension closed loop	Feedback of the tension in the material web run and therewith controlled tension.						
Speed control	Feedback of the tension in the material web run and control of the circumference speed of the roll.						
Correction	Display of the current adjustment value in percent.						

6.3.8 Rewinder / Web Length



The displays have been carried out with special big figures; therewith the values can also be read from a big distance.

Inscription	Signification
Time to destination	Display of the remaining time until the next reel change in minutes.
Set	Display of the actual preset of the material length for the finished rolls.
Act	Display of the actual wound material length.

6.3.9 Rewinder / Parameter Recipe

Call of this mask with **Recipe** from all other screen masks.

An existing recipe can be called up in two ways:

1. The line below DATA record, name has to be touched. After this, a table of all existing recipes is approaching in a Scroll down menu. The wanted one can be selected by touching.
2. An alpha-numerical keyboard is appearing for the input of the recipe name.

Inscription	Signification
Data record new	After touching the sensor field, a new recipe will be put in. An alpha-numerical keyboard is appearing for the input of the recipe name. All fields within this recipe have to be filled.
Data record store	The displayed recipe will be stored by the name shown in the field DATA RECORD NAME.
Data record erase	The displayed recipe will be deleted. Before the final and not reparable deletion, a security question turns up. Are you sure to delete the recipe with the name ,....'? If this question will confirm, the recipe will be deleted.

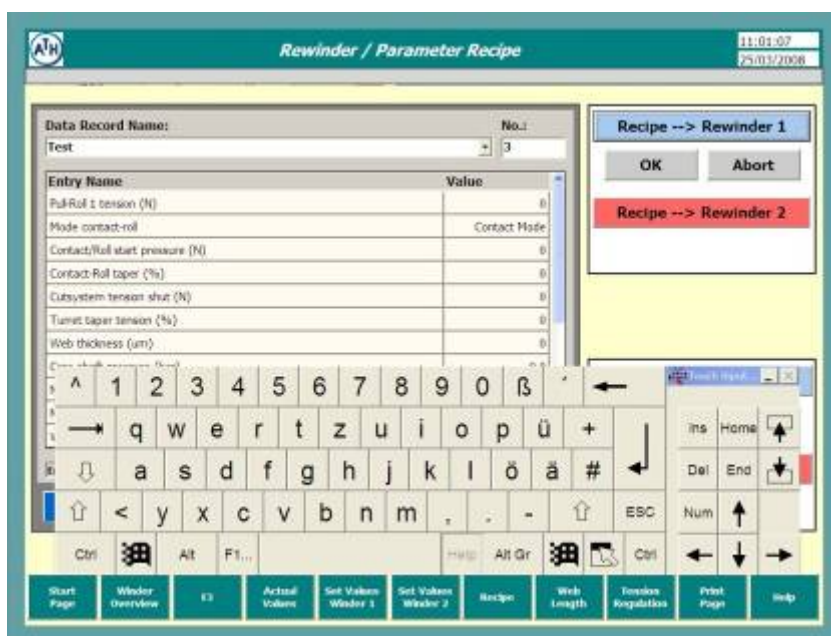
Inscription	Signification
Recipe → Rewinder 1	The selected recipe is transferred to the control of the winder 1 immediately.
Recipe → Rewinder 2	The selected recipe is transferred to the control of the winder 1 immediately.
Rewinder 1 → Recipe	The data of the actual winding procedure of winder 1 will be transmitted into the displayed recipe.
Rewinder 2 → Recipe	The data of the actual winding procedure of winder 2 will be transmitted into the displayed recipe.



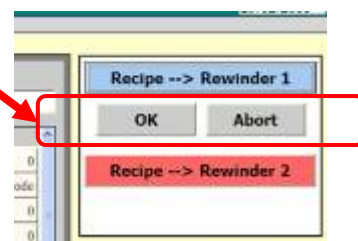
Attention!

The input of the data will not be watched for their value. Therewith too high or too low data can be put in.

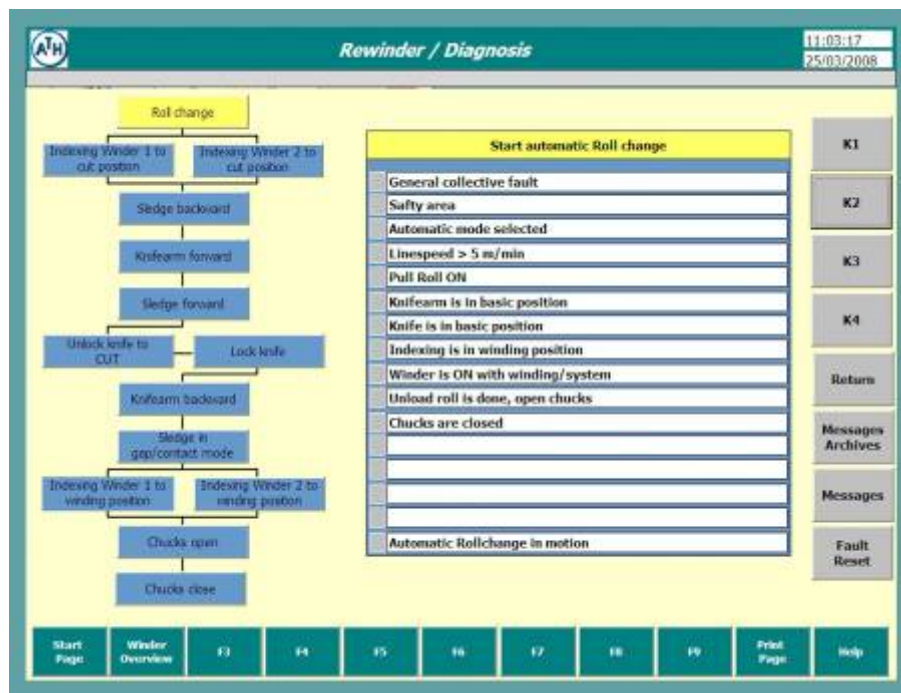
A keyboard turns up for the input of alphanumeric data.



This sub window turns up if changes were carried out in the recipe and the recipe are not stored before closing the window of the recipe.



6.3.10 Rewinder / Diagnosis

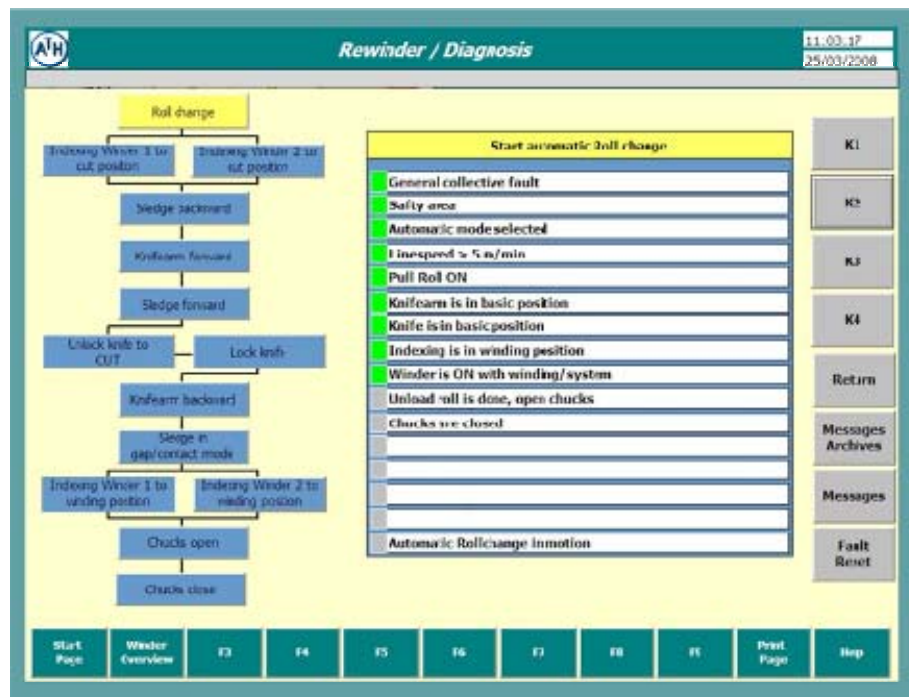


The complete step chain is displayed in the mask 'diagnosis' for automatic progress during reel change.

Step	Execution
Reel Change	The reel change will be started either manual or automatically by the preset of the web run length.
Indexing Winder 1 to cut position	Winder 1 will be indexed from load- and unload position into cutting position, or alternatively W 2.
Indexing Winder 2 to cut position	Winder 2 will be indexed from load- and unload position into cutting position, or alternatively W1.
Sledge backward	The contact roller will be driven away from the roll.
Knife arm forward	The knife-arm will be lifted into cutting position.
Sledge forward	The contact roller will be driven on to the empty core for reel change.
Unlock knife to CUT	The cutting will start. The torsion spring will be relaxed and the material web disconnected and put on to the empty core.
Lock knife	The torsion spring will turned into basic position and the toggle lever system will be pressed into the safe position.
Knife arm backward	The knife-arm will be swivelled into basic position.
Sledge in Gap/Contact mode	Depending on the preset, the contact roller will be positioned into operating mode contact or gap winding.

Step	Execution
Indexing Winder 1 in Winding position	Winder 1 will be turned from cutting position into winding position, or alternatively Winder 2.
Indexing Winder 2 in Winding position	Winder 2 will be turned from cutting position into winding position, or alternatively Winder 1.
Chucks open	The chucks will be opened for taking off the finished rolls.
Chucks close	The chucks will be closed for picking up the winding shaft with the empty core.

6.3.10.1 Rewinder / Diagnosis



In the single screen masks, the conditions for the separate steps of the step-chain are displayed. Each single step can be called up by touching the sensor field. Through the information, which signals each line in the fields shown before, it says, if the operating is

- right = **GREEN** or
- wrong = **GREY**.

To proceed an operation, all existing fields has to indicate green.

In this screen mask-diagnosis, the condition will be shown for *Indexing Winder 2 to Winding position*. All conditions are understood as an AND connection, that means: all conditions have to be present and shown green.

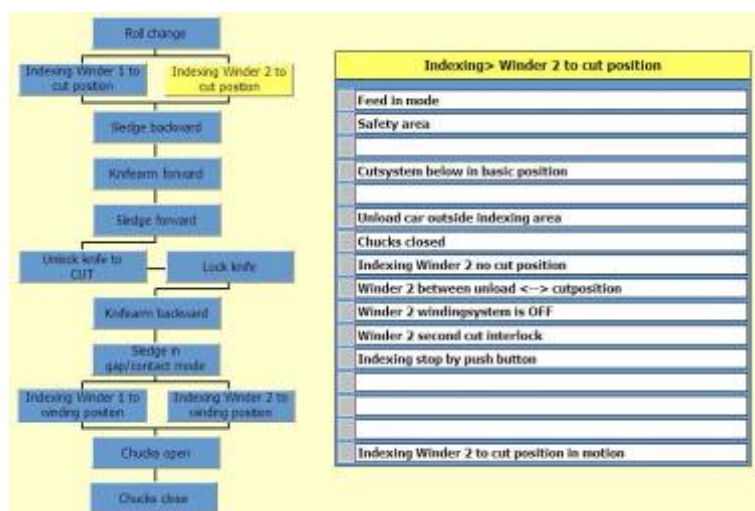
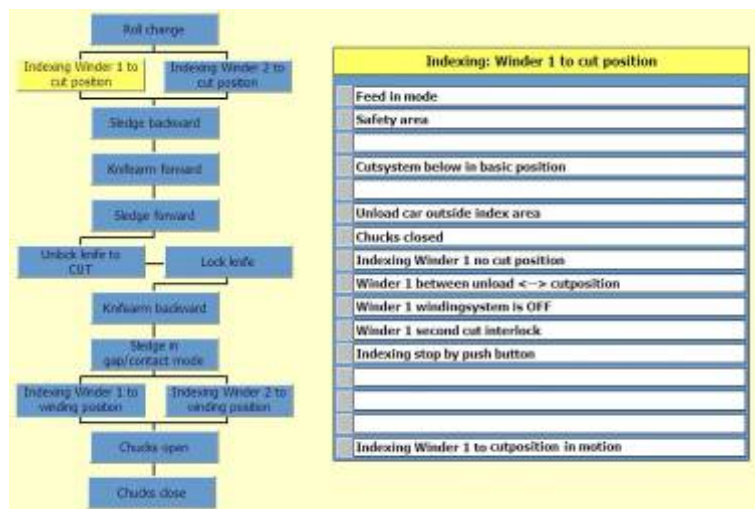
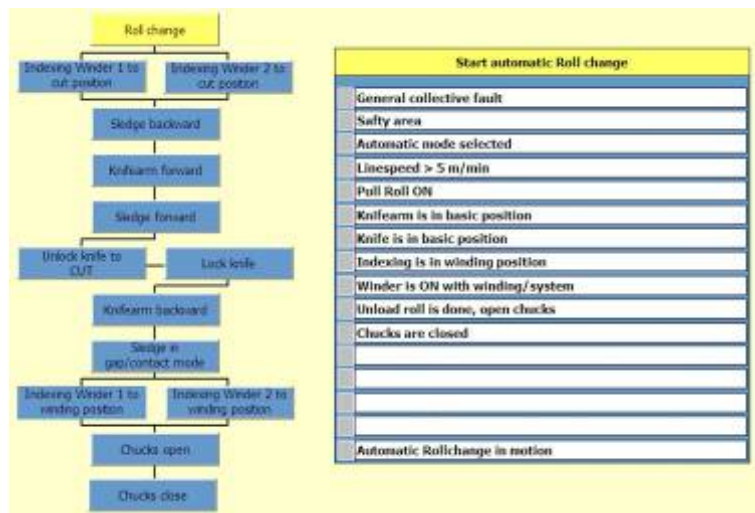
As to be recognized in this example, a condition will be signed red, which means; the condition has not been accomplished or is wrong:

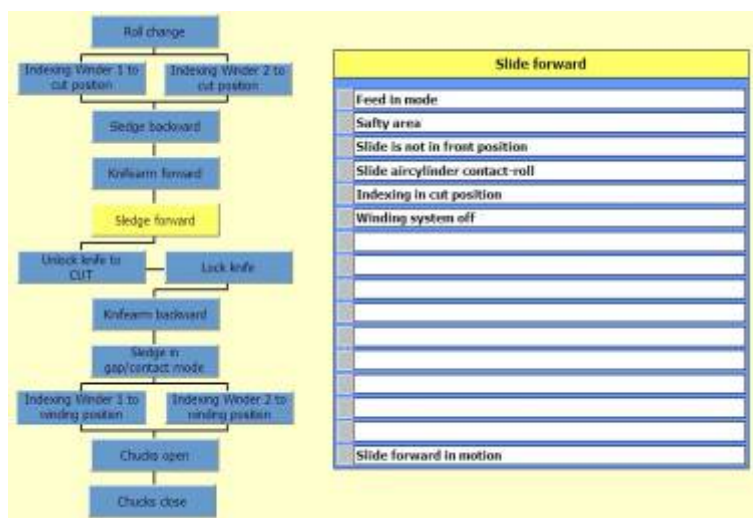
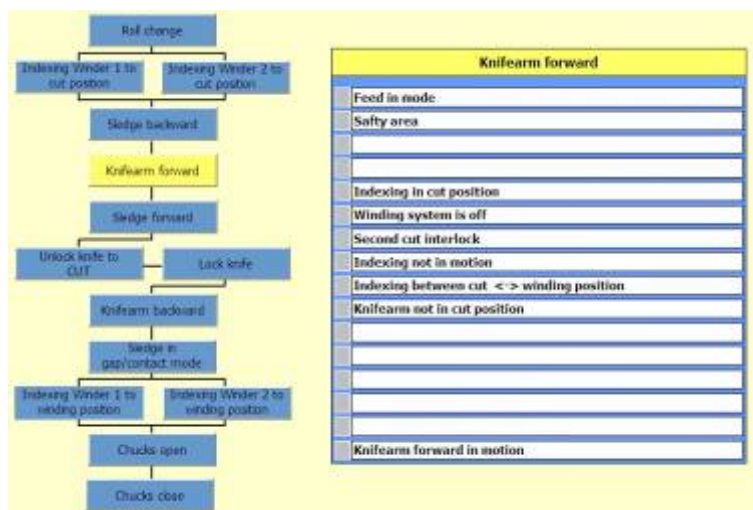
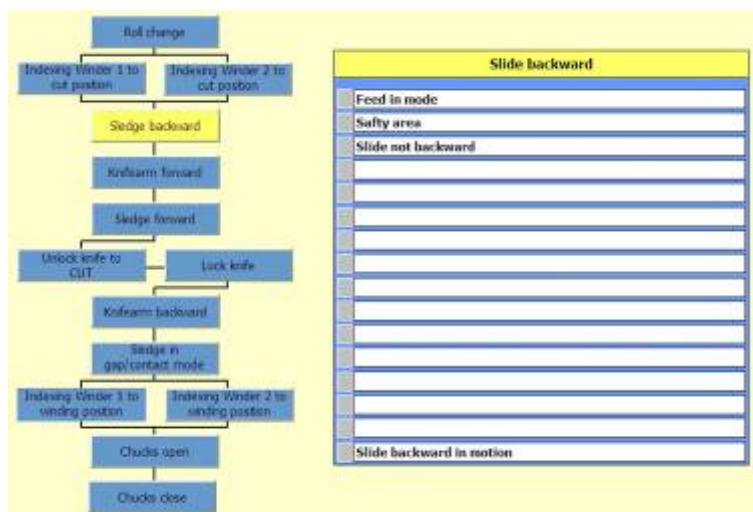
- Chuck closed

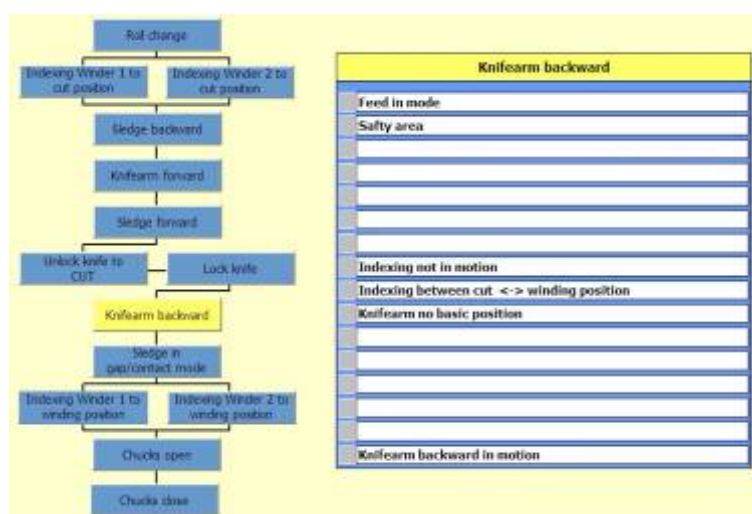
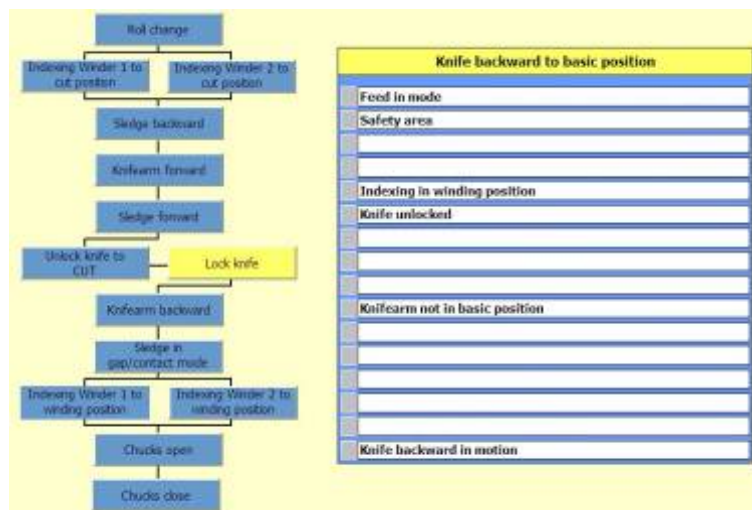
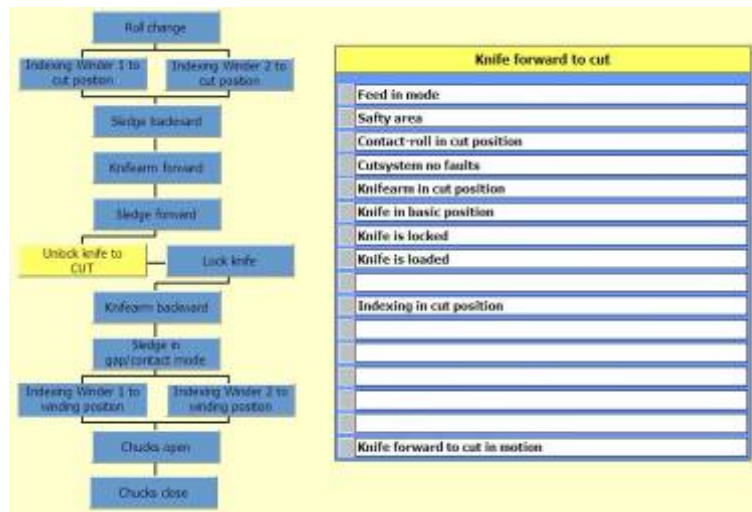
It can also be gone directly to the Chuck system and the Chuck can be examined. Why the Chuck is not closed? Possible mechanical reasons, faults in the pneumatic, the cylinder or the proximity switch.

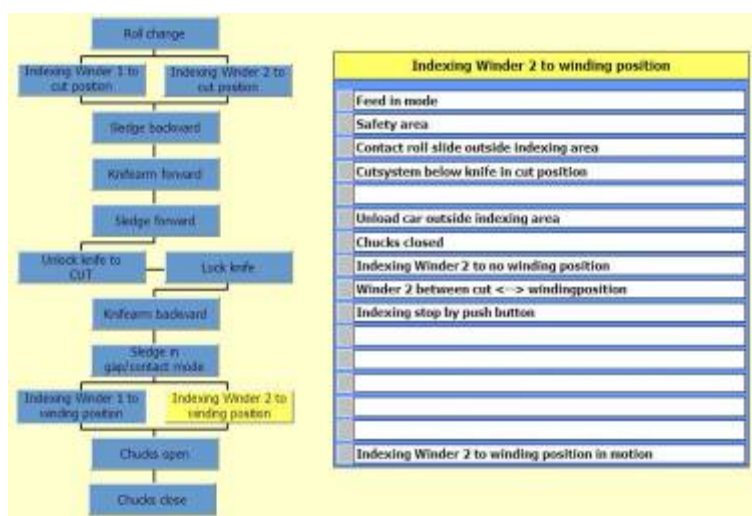
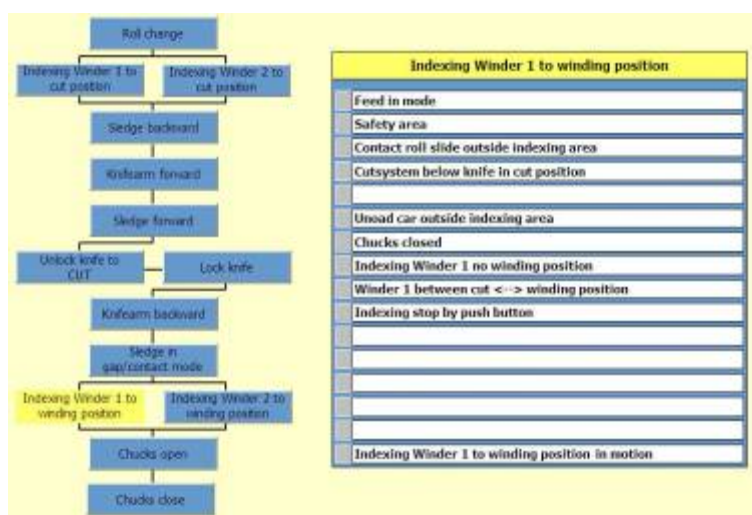
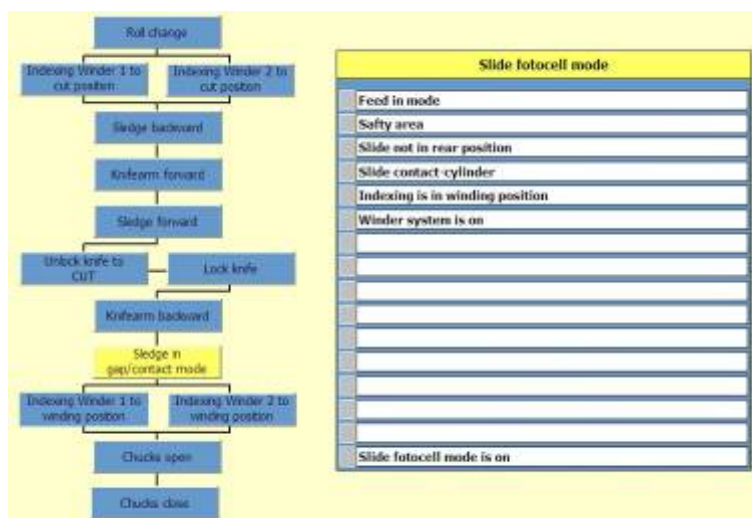
Possible electrical reason: defect sensor or the cable is interrupted.

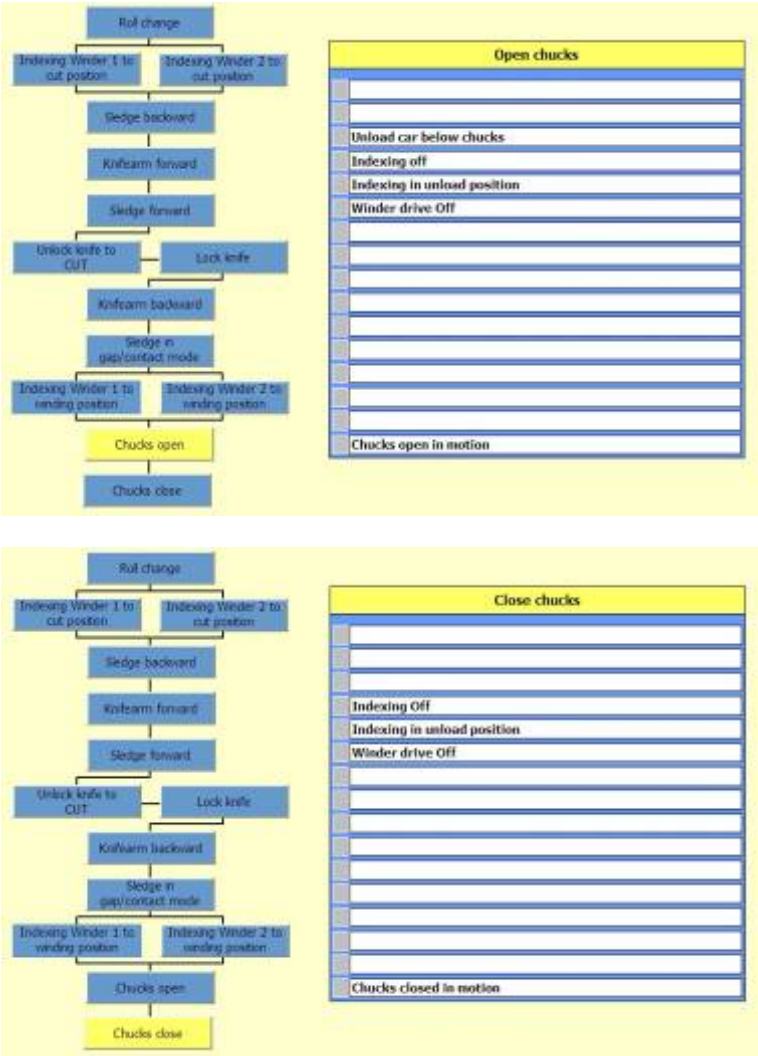
The following screen mask can be displayed.



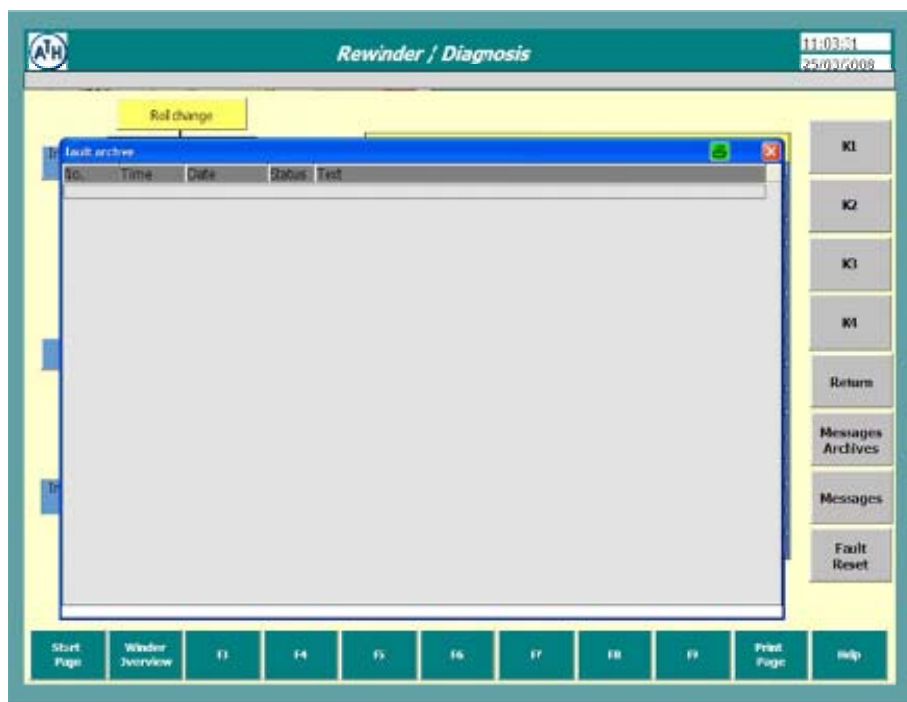








6.3.11 Screen Mask Messages Archives




Call up sub window **Messages Archives** with Report Archives out of **Starting Page**.

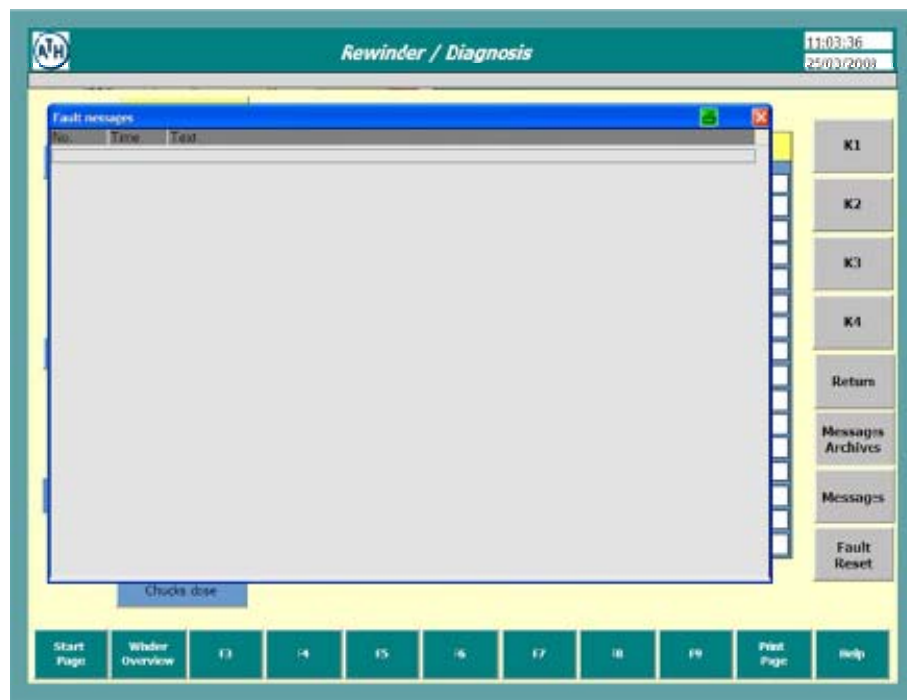
In the archives all reports and errors from **Messages** will be stored

The archives can only take up a limited amount of reports and errors. In case the maximal amount of storing has been reached, the oldest reports and errors will be deleted, line after line, and so new storing place has been made free.

Designation	Functions
No.	Each report and each error has a fixed number in the control.
Time	Display of the time, when the incident has happened.
Date	Display of the date, when the incident has happened.
Condition	Each report or error will be indicated in their actual condition, through a arrived. The incident has taken place. r removed. The incident has been removed or settled. q quitted. The incident has been quitted through Error Reset..
Text	Description of the incidents in clear text.

The sub-window **Messages** will be deleted by touching the field .


6.3.12 Screen Mask Messages



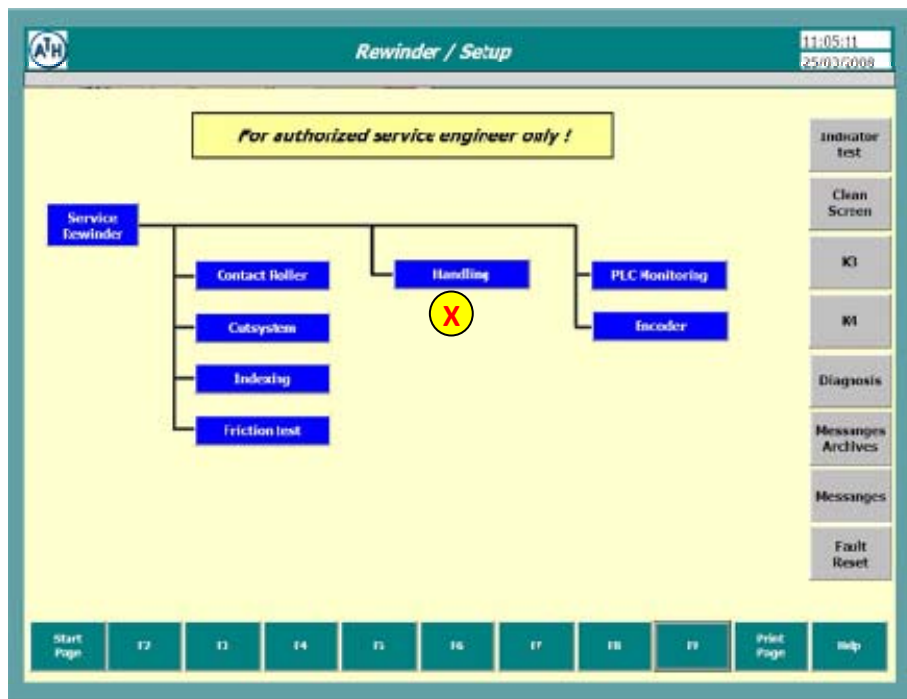
Activate Reports out of any other screen mask, the actual screen mask will indicate the sub-window **Messages**.

Reports and error will be indicated. Thereby each line comprises the following data:

Designation	Signification
No.	Each report or error has a fixed number in the control.
Time	Display of the time, where the incident has happened.
Date	Display of the date, when the incident has happened.
Condition	Each report or error will be indicated in their actual condition, through a arrived. The incident has taken place. r removed. The incident has been removed or settled. q quitted. The incident has been quitted through Error Reset.
Text	Description of the incidents in a clear text.

The sub-window **Messages** will be deleted by touching the field .

6.3.13 Rewinder / Setup



Call up Service Menu only from Starting Page. The single sub windows of the Service Menu can also be called up from Starting Page.

The red coloured sensor fields are accessible only after the input of a password.

The blue coloured sensor fields are specially reserved for the maintenance personnel.

The screens can be called up at any time, but the single functions can be released only in Operating Mode Service. The functions will be prosecuted in jog operating. Speed control and speed are reduced as far as possible.



The command button **Handling** is not used at this time.
If the command button is controlled, no reaction occurs.



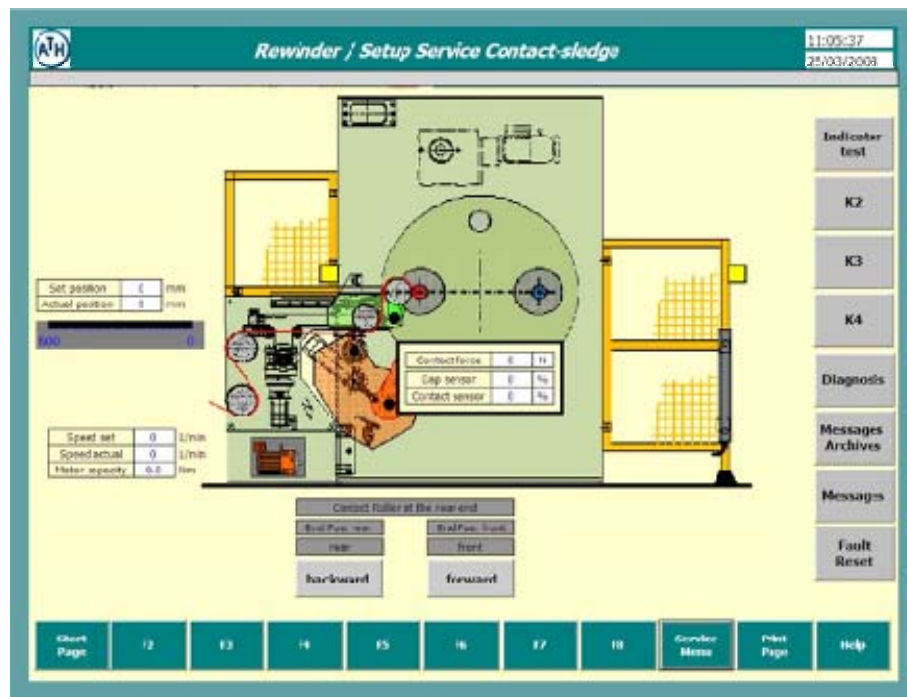
Danger!

The operating mode **Service Menu** has to be switched on with a key-switch. The key switch has been built into the electrical box behind the main operator panel +P. The entrance to the electrical mounted room is only possible with a special key (double beard) and can be used only by trained specialists.

In the operating mode **Service**, the functions will proceed without reverse locking, that means: illogical functions can be started, which can eventually lead to destruction of the machine.

The safety devices are out of order. The maintenance personnel take care, that no authorized persons have admittance around the area of the machine.

6.3.13.1 Rewinder / Setup Contact-sledge (Contact roller)



Function	Signification
Contact roller - Positioning System	
Speed set	Display of the set driving speed for the contact roller.
Speed actual	Display of the actual driving speed of the contact roller.
Motor capacity	Display of the motor capacity in Nm
Set position	Display of the set position for the positioning system of the contact roller.
Actual position	Display of the actual position of the contact roller.
Display	Bar graph for the current diameter.
Contact roller	
Contact force	Display of the actual force, the contact roller is pressing against the reel with.
Gap sensor	Display for the actual light sensor of the photo cell for gap winding controller.
Contact sensor	Display of the actual positioning of the contact roller for operating mode contact.

Function	Signification
<i>backward</i>	When actuating the sensor field, the contact roller will be driven away from the roll into direction of the backward end position.
<i>forward</i>	When actuating the sensor fields, the contact roller will be driven in direction to the roll.

Information about the position of the Contact roller and the sledge

Contact Roller at the rear end



This line appears when the limit switch at the end of the positional tract for the contact roller is actuated.

This position is not achieved under normal circumstances because the sledge is always immediately done to behind. There is a fault at the drive of the sledge unit. Take the machine from the production and remove the fault!

End pos. rear

Display illuminates, when the contact roller at the back end of the positional tract has been driven to.

rear

Display of the direction drive of the contact roller.

Backward → tract from the reel into direction rear end-stud.

End pos. front

Display illuminates, when the contact roller is driven to the front end of the positional tract.

rear

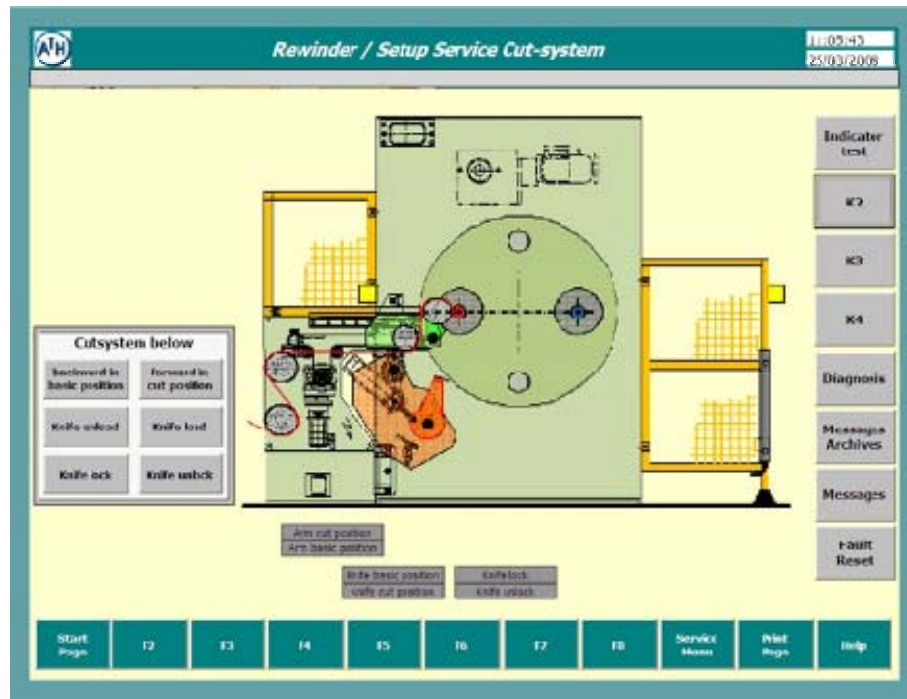
Display of the driving direction of the contact roller.

forward → in direction reel

front

Display of the drive direction of the contact roller.

6.3.13.2 Rewinder / Setup Service Cut-system (TAC)



Function	Signification
Cutsystem below	
<i>backward in basic position</i>	At activity the sensor field the cutting system is swung into the basic position.
<i>forward in cut position</i>	At activity the sensor field the cutting system is swung into the cutting position.
<i>Knife unload</i>	At activity the sensor field the pneumatic cylinder for the knife drive is disengaged.
<i>Knife load</i>	At activity the sensor field the pneumatic cylinder for the knife drive is engaged.
<i>Knife lock</i>	At activity the sensor field the knife is locked by the lock system.
<i>Knife unlock</i>	At activity the sensor field the knife is fired by unlocking the lock system.



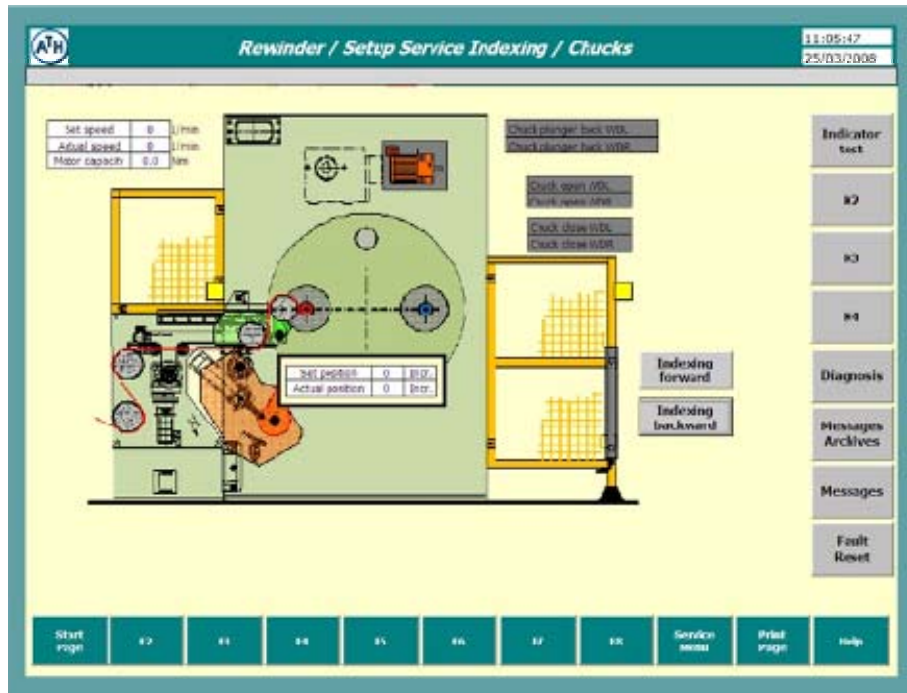
Attention!

Before the execution of work on the cutting system you convince yourself of the pressure less condition.

Display fields for the actual setting position of

- Arm cut position
- Knife basic position
- Knife lock
- Arm basic position
- Knife cut position
- Knife unlock.

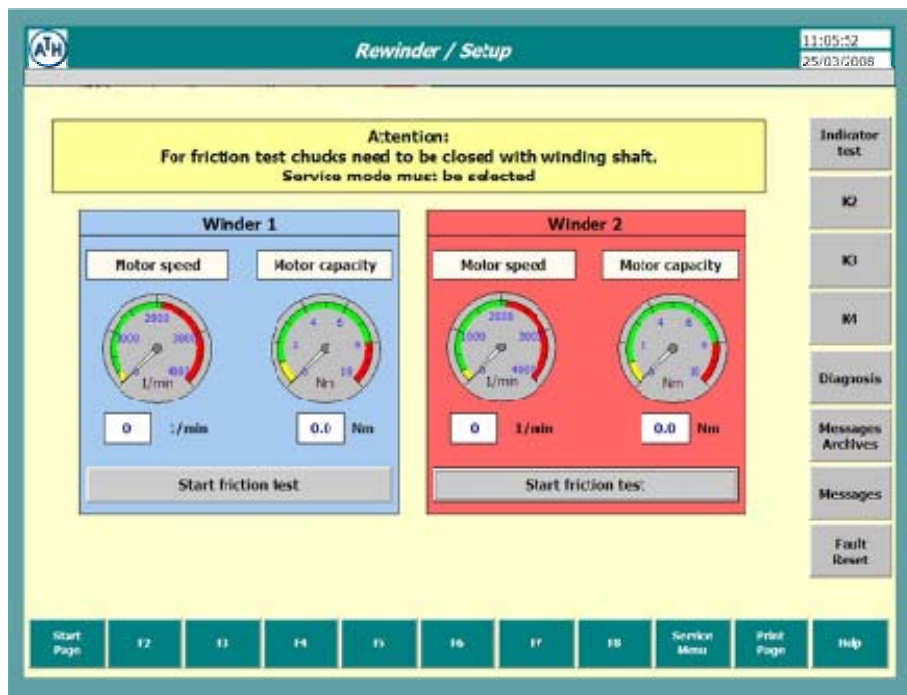
6.3.13.3 Rewinder / Setup Service Indexing / Chucks



Turret system	Signification
Set speed	Display of the set speed for indexing.
Actual speed	Display of the actual speed during indexing.
Motor capacity	Display of the motor load in Nm
Set position	Display of the set estimated position for the indexing system in increments.
Actual position	Display of the actual position of the indexing system in increments.
<i>Indexing forward</i>	When actuating the sensor field indexing forward, the indexing system will be turned into forward direction, that means, the winding place will be turned from the unload position into cutting position.
<i>Indexing backward</i>	When actuating the sensor field indexing backwards, the indexing system will turn into backwards direction, that means, the winding place will be turned from cutting position into winding position.

Chuck system	Signification
Chuck open plunger back WDL	Display illuminates, when the plunger valve in WDL is in basic position, that means, the plunger is pulled in.
Chuck open plunger back WDR	Display illuminates, when the plunger valve in WDR is in basic position, that means, the plunger is pulled in.
Chuck open WDL	Display illuminates, when the chuck in WDL is in open position.
Chuck open WDR	Display is illuminating when the chuck in WDR is in open position.
Chuck close WDL	Display is illuminating when the chuck in WDL is in close position.
Chuck close WDR	Display is illuminating when the chuck in WDR is in close position.

6.3.13.4 Rewinder / Setup friction-test Winder 1 & 2







Each rotating drive has friction losses through the bearings, which are highly dependent on the number of revolutions. At the friction test, the revolutions are changed between a very low number of revolutions (almost zero) and the maximum number of revolutions in about ten steps. At this, the current consumption will be measured. The measured data will be stored in a table in the PLC and the individual measuring points connected in a linear way. In this way, you can calculate the torque - required for the loss friction - in form of the current consumption for almost any number of revolutions. The calculated value will be set for the drive.

At each winding action a relatively large range of revolutions will be passed at constant line speed. If the drive gets a value for winding at a controlled torque, this value is always split into three parts:

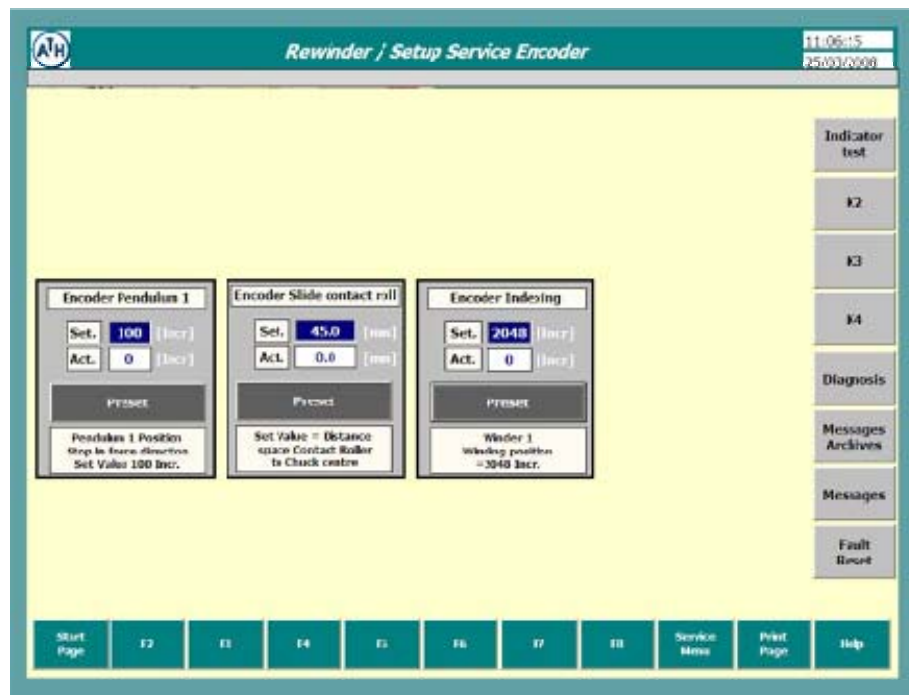
- Working torque, generating the tension at the winding diameter.
- Dynamic loss through the bearings and the drive connections.
- Static loss in the bearings and drive connections.

The larger the ratio from the working torque to the torques from static and dynamic friction, the more reproducible are the production data. If the ratio is almost the same, there will be problems for the working torque because the friction will change with the life of the machine on the long term and with the temperature of the bearing on the short term. Hence the short-term changes at the friction test cannot be considered, but only the long-term ones.

Therefore the friction test should be done at intervals of about 3 months. The better you know the losses from the frictions, the better the conversion from torque to tension. In the closed regulation circuit, the dynamics can then be increased.

Friction test Winder 1	Signification
 	<p>The friction test cannot be carried out during the running production!</p> <p>Attention:</p> <p>For the friction test the winders must be equipped with a winding shaft.</p>
<p><i>Start friction test</i></p> <p><i>Winder 1</i></p>	<p>When actuating the sensor fields, the friction test for winder 1 will start.</p>
Friction test Winder 2	Signification
 	<p>The friction test cannot be carried out during the running production!</p> <p>Attention:</p> <p>For the friction test the winders must be equipped with a winding shaft.</p>
<p><i>Start friction test</i></p> <p><i>Winder 2</i></p>	<p>When actuating the sensor fields, the friction test for winder 2 will start.</p>

6.3.13.5 Rewinder / Setup Service Encoder



The access to this screen mask 'Absolute Encoder' is protected by a password!



The Preset functions should only be used after the exchange of one transmitter, because when the preset function is released, the position values will be written new.

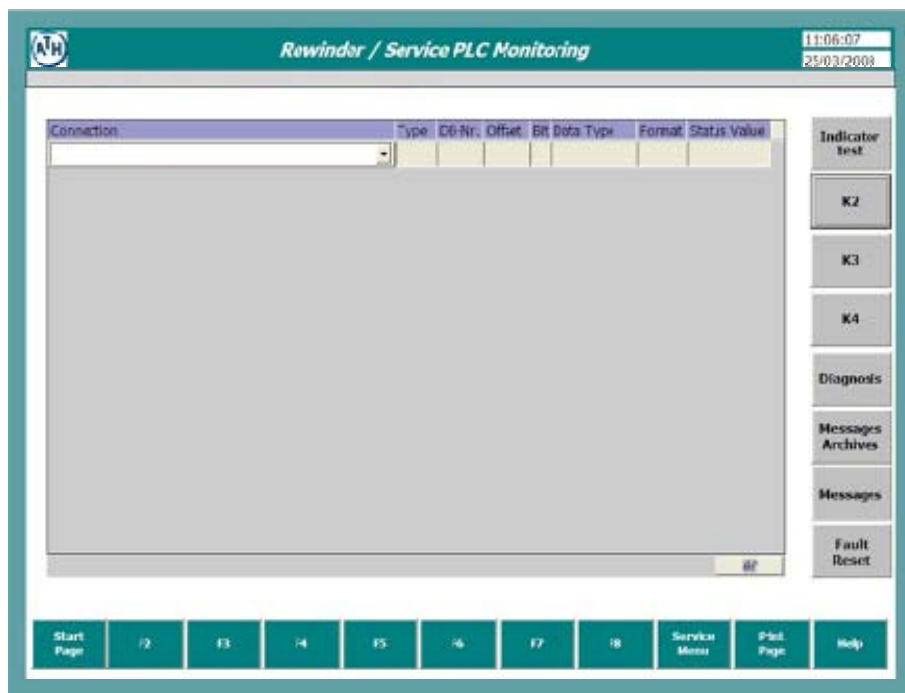
This procedure cannot be cancelled.

The Encoder serves for the transformation of a mechanical position into an electrical value. For the exact control of functions, the connection of the mechanical and electrical position is absolutely necessary.

The exact mechanical position for each single encoder has been described in the above line. Attached to this mechanical position, the value of the encoder has been described in the bottom line.

Function	Signification
Desired Value (Set.)	Input of the desired value, if the mechanical position has been started firmly.
Actual Value (Act.)	Display of the actual values.
Preset	When actuated, the preset (desired) value in the input field will be taken over for the encoder position.

6.3.13.6 Rewinder / Service PLC Monitoring



The access is protected through a password.

Access to this screen mask may be only for specialists with knowledge of the programming in STEP7 (SIEMENS).




Function	Signification
Connection	Submenu with the selection to the PLC
Type	Submenu with the selection to DB, I, O, F, T, C
DB-No.	Input of the desired data block
Offset	Start address of I, O, F and data DBW, DBD, DBB
Bit	Bit of start address I, O, F and data DBW, DBD, DBB
Data Type	Selection of the desired types of the dates: BIN, HEX, DEC
Format	Selection of the : CHAR; WORD; INT; DWORD; DINT; REAL
Status Value	Actual value



There is the possibility of the observation of the control words up to the individual bit.

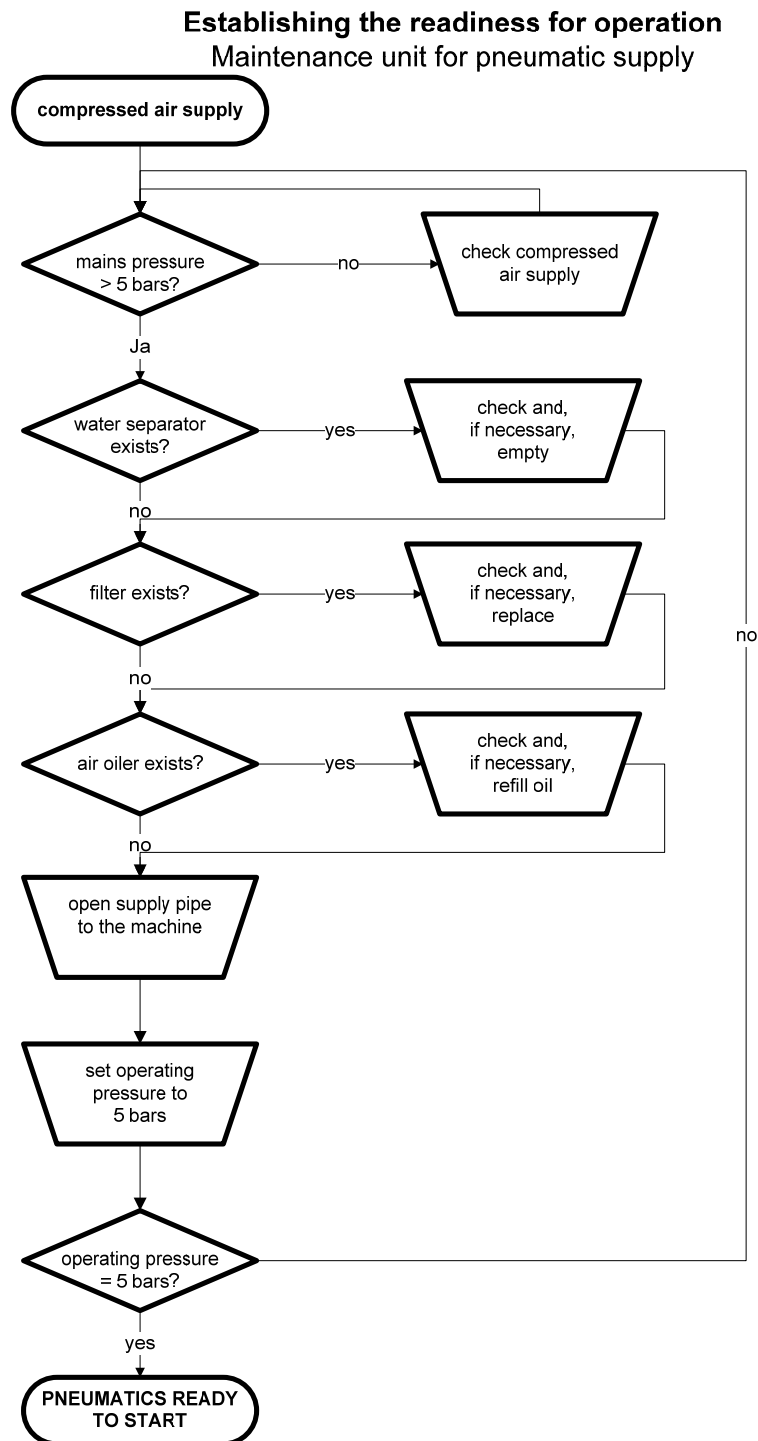
6.4 Operating the Line

6.4.1 Electrical Supply




	<p><i>Take notice that the air has to be of good quality that means: containing low rest density and no impurity.</i></p> <p><i>The incoming supply pressure has to be always higher than 6 bars, the operating pressure of the line.</i></p>
Maintenance Unit	<p>At the left machine pedestal, seen in web run direction WLR.</p> <p>Open the compressed air supply for the line and set the air pressure to 5 bars at the maintenance unit.</p>
Control of the water refiner	<p>Eventually removing</p>
	<p><i>Before switching on the line, make sure, no personnel is staying at the danger area of the line.</i></p>
Main Switch	<p>At switch cabinet Switch on.</p>
Emergency Stop key	<p>At the whole line (pre-machine) the Emergency Stop devices have to be unlocked and the whole Emergency Stop Chain has to be released.</p>
Emergency Stop Reset	<p>actuate. Only after releasing the whole Emergency Stop Circle, which is placed in the Emergency Stop devices at the production line, the winding machine can be switched on.</p>
Screen Mask System	<p>Automatic start of industrial PC with the Visualisation system.</p>
	<p>Attention:</p> <p>Never just switch off the system WinCC, but always drive down as aimed.</p>
Screen Mask System	<p>The Start picture is indicated. The operating mode of the machine will be switched automatically into manual operating.</p>

6.4.2 Pneumatic Supply

Maintenance Unit for pneumatic supply



6.4.3 Preparation of Winding

What has to be done?	Where to be done?	Signification
		<p><i>At the pneumatic connections, always take care that the air is of good quality, i.e. low amount of residual moisture and no contamination.</i></p> <p><i>The supply pressure must always be higher than 5 bars, which is the operating pressure of the line.</i></p>
Air service unit	at left hand side of machine frame, as seen in web run direction	Open pneumatic supply of line and set the compressed air at the maintenance unit to 5 bars .
Check water separator		Empty, if necessary
Check of air oiler.		Refill with acid-free oil, if necessary.
		<i>Prior to switching on the line, make sure that there is no one in the danger area of the line.</i>
Main switch	at switch cabinet	Switch on
EMERGENCY-STOP devices	Round the machine	At the complete line (downstream machine) the E-STOP devices have to be unlocked and the complete E-STOP chain must be released.
E-STOP Reset	Main operator panel	Actuate. Only after having enabled all E-STOP devices at the production line within the E-STOP circuit, the winder can be switched on.
Screen system		Automatic start of the industrial PC with the visualisation system.
		<p>Attention:</p> <p>Never simply switch off the system WinCC, but always shut it down systematically.</p>
Screen system		The ‚Start picture’ is displayed. The operation mode of the machine is automatically switched to manual mode.

6.4.3.1 Equipment with Winding Shafts



*At this time, a winding shaft may **not** be inserted*

- The turret system must be in unloading position
and
- The winding drives must be switched off.

The machine is designed for a continuous operation at the AUTOMATIC MODE. The complex functions of the machine at reel change, the transport of the winding shafts and the individual functions at reel disposal cannot be controlled manually within a certain time. Therefore the individual units should always be set to the operation mode AUTOMATIC.




Only switch over to manual operation (Manual mode) if you have enough time, if the production has been stopped or if there is a trouble at the line.

Check operation mode and switch over, if necessary:

Manual mode (21) actuate

The winder now only operates in the functions as required by the actuation of function keys.

The functions for establishing the readiness of operation have been carried out according to the previous chapters.

Operation	Signification
	Danger! No winding shaft may have been loaded at this time
	Attention! Set the desired chucking pressure at the pressure reducing valve on the turret star to max. 3 bars .
	The turret system must be in unloading position and the winding drives must be switched off.

Operation	Signification
Chucks Open	<p>Actuate luminous key 40 and 46 at the same time.</p> <p>Note:</p> <p>For opening the chucks, the winding drive (Winder 1 or 2 ON/OFF) must be switched off.</p> <p><i>Set the desired chucking pressure at the pressure reducing valve on the turret disk in the side frame to max. 3 bars.</i></p> <p>Attention! May only be done by the maintenance personnel.</p>



Enter the safety area and load a new winding shaft into the chucks with a suitable hoist system.



Attention!

Mind the correct position of the winding shaft in the chucks. The driven side is provided with a multipoint cone which can only be taken up from the drive side, the non-driven side is provided with a smooth cones.

If the winding shaft will be inserted incorrectly, this may cause damages at the shaft and at the machine.



For the execution of further functions leave the safety area and press *Safety Area Reset (41)*.



Attention when clearing the safety area!

The operator of the key 'Safety Area Reset' (+P (41)) has to convince himself that no one stays within the safety area at this moment.

If he clears the safety area although there are still people within it, he acts with gross negligence.

Operation	Signification
Chucks Close	actuate (47) . The chucks close pneumatically. The driven side moves out first with max. operating pressure, the non-driven side is following with delay and adapts to the length of the winding shaft.
 Attention!	<i>Prior to the next operating step, the chucks must be closed!</i>
Indexing Forward	actuate (22) . The winding station, equipped with the shaft, indexes from unloading to cutting position (independently of the set core diameter).
Index Backward	actuate (24) . The winding station, not yet equipped with a shaft, indexes to unloading position, the winding station with the new shaft indexes from slitting to winding position.
	Load now the second winding station with a core, as described above.

Following the same functional sequence, the second winding shaft will be loaded to the winder. The machine is ready to operate when two winding shafts have been fastened in the chucks.

6.4.3.2 Manual Setting


For the input of new set values for winding, you can switch to the menu 'Parameter Winder 1' / 'Parameter Winder 2' from all masks of normal operation.

The entered values are only valid for either winder 1 or winder 2, i.e. the line can wind material with completely different parameters for the winding stations Winder 1 and / or Winder 2.

The individual data fields are controlled by arrow keys, the approached field will be provided with a dark background. The individual fields are restricted by limit values which cannot be exceeded.

Operation	Signification
Roll length	set. Set the desired running meters for the rolls to be wound. At the operation mode 'Automatic', a reel change will be carried out when reaching the set running length.
Core diameter	set. Set the outer diameter of the cores, not the inner one. According to this input, the slitting position will be calculated, the surface speed of the core at reel change controlled and the characteristics for the tension calculated during winding.
Contact pressure	Enter the initial pressure of the nip roller in Newton (N).
Contact pressure curve	Input for the curve of the nip roller pressure in dependence of the winding diameter. The input is in percentage and means: 100 % constant initial pressure, the pressure is independent of the actual winding diameter during winding. 0 % linear drop of pressure from initial pressure at the empty core to Zero at maximum winding diameter.
Initial tension	Set the initial tension for the central winding drive. This setting corresponds to the initial tension. For further settings see CHARACTERISTIC.
Characteristic	set. The input is done in percentage and means: 100 % constant tension, the tension at winding is independent of the actual winding diameter. 0 % hyperbolic drop of tension from initial tension at an empty core to a finite value at maximum winding diameter (see figure of winding quality).



Operation	Signification				
Pull Roll 1  Attention!	<p>The transport tension will be set with the dancer roller 1 load. It is required for the correct tension in the longitudinal slitting unit and for the transport of the material between series machine and the line (winder).</p> <p>The maximum winding tension may only be 2.5 times of the transport tension. Therefore the transport tension must be set in correspondence to the winding tension. If the transport tension is too low, the two-roller pull system cannot hold the material and cannot determine the speed; this will cause malfunctions during the winding process.</p>				
Core chucking pressure	<p>The winding shafts will be vented automatically through the closed chucks. Depending on the operation mode of the shaft, the pressures in the chucks will be adapted:</p> <table> <tr> <td>Rigid shaft</td><td>Chucking pressure 5 bar (80 psi)</td></tr> <tr> <td>Friction shaft</td><td>variable chucking pressure, depending on the tension and diameter in a range of 0.2 to 5 bar.</td></tr> </table>	Rigid shaft	Chucking pressure 5 bar (80 psi)	Friction shaft	variable chucking pressure, depending on the tension and diameter in a range of 0.2 to 5 bar.
Rigid shaft	Chucking pressure 5 bar (80 psi)				
Friction shaft	variable chucking pressure, depending on the tension and diameter in a range of 0.2 to 5 bar.				

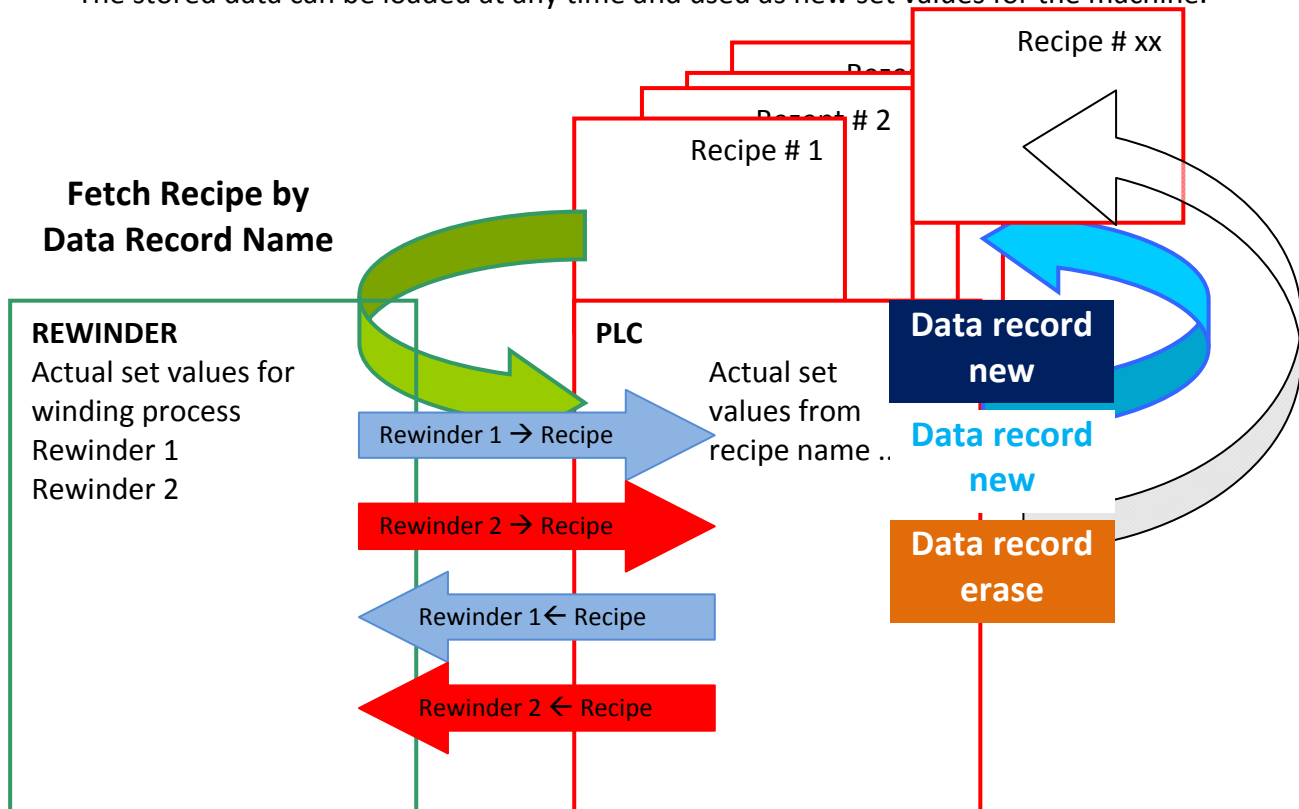
6.4.3.3 Settings – Recipes

For the input of new set values for winding, you can switch to the menu 'Parameter Winder 1' or 'Parameter Winder 2' from all mask of normal operation (not Arrange Mode!).

The entered values are always valid for all two winding stations W 1 to W 2.

Proved production data may be stored in recipes under alphanumeric names. In the PLC is every recipe assigned with a number, which cannot be called. So the operator must call the recipe with his alphanumeric name.

The stored data can be loaded at any time and used as new set values for the machine.



With key 'Data record store' data will be saved under the given recipe name. Data which have been stored under this name before are lost irreversibly.

6.4.4 In Line Production

6.4.4.1 Production Line

The winder is connected with the series machine by means of a control signal. This signal is set from 0 to 10 volts in correspondence to the line speed of 0 m/min. to maximal production speed. These values are fixed parameters of the production line.


The surface speed of the empty core is controlled in accordance to this setting, i.e. the outer diameter of the core also is a fixed part of the machine parameters and cannot be changed without changing the calculating program. These changes can only be carried out by the experts. If cores are used which have different diameters as given in the technical data, serious troubles during winding and/or web transfer have to be expected.

The control signal **must** correspond to the speed of the material, i.e. the material has to be supplied from a fixed point from where it is permanently delivered with the actual transport tension and without any slipping or sliding. If the control signal does not correspond to the material speed, serious troubles during winding have to be expected.

The actual winding diameter will be calculated indirectly from the ratio of line speed to the speed of the winding shaft. So if any errors occur following the above mentioned items, the calculations and affects are incorrect.

6.4.4.2 Settings prior to Operation

Set Value	Signification
Tension Pull Roll 1	Set the tension between downstream machine and pull roll 1 system. This setting corresponds to the transport tension and the tension in the web for longitudinal slitting.
Rewind tension	Set the tension for the Rewinder. Depending on the selected characteristic and form factor, this setting corresponds to the initial tension. Further settings in the screen mask Characteristic.
Contact pressure	Set the pressure for the contact roller. Depending on the selected start and end value and form, this setting corresponds to the initial pressure of the contact roller. Further settings in the screen mask Characteristic Pressure.
Running length	set. Set the desired running meters for the finished rolls. At the operation mode 'Automatic' a reel change will be carried out when the entered length has been reached.

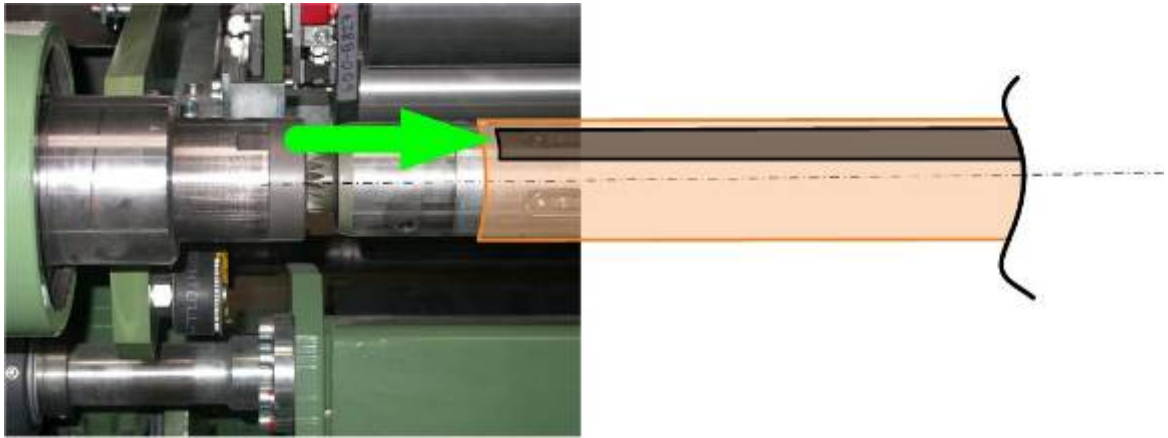
Set Value	Signification
Core chucking pressure	After closing the chucks the winding shafts in the machine will be inflated automatically. Due to the resulting expansion, the cores are radial and axial fixed on the shaft. The core chucking pressure has to be set in dependence of the design and wall thickness of the cores. The cores shall not be destroyed by an excessive chucking pressure. On the other hand, the pressure must be high enough to transmit the required torques from the shaft to the reel without any friction.
Core diameter 	set. The input of the actual outer core diameter is absolutely necessary. By means of this outer core diameter, the exact cutting position for the turret system will be approached and the synchronous speed calculated.
Operating mode of the contact roller	Select the operating mode for the contact roller <i>Start picture → operating mode 'Slide'</i> <ul style="list-style-type: none"> • Contact • Gap
Tension increase after cutting	After cutting, the tension will be increased for the set value for a limited time.
Winding mode	Select the winding mode: <ul style="list-style-type: none"> • torque regulated • torque controlled • speed regulated
Manual-Automatic Machine	Select the operating mode of the machine: <ul style="list-style-type: none"> • Manual Mode (21) • Automatic Mode (20)

The basic position of the winder is given through the following conditions:

- Knife arm of Cutting system in home position
- Cut cylinder relieved
- Turret system in winding or unloading position
- Chucks closed

The line now is in basic position.

6.4.4.3 *Join Preparation*



The cutting system TAC needs for laying on the web to the empty core a stripe of double-sided adhesive tape. This stripe must exactly be stuck on a certain position crossways about the core.

The exact position is marked by an indentation at the chuck (seen on the right hand side in Web Direction). The marking has to be turned manually to the work area of the operator. The adhesive tape is stick on in the prolongation of the marking.

At a prolongation of the chuck axis the position of the marking is detected within the machine frame by sensors and with that is calculated and controlled the triggering for the cut release.

One Prerequisite for the exact cutting und lay on is the exact position to the adhesive tape on the core surface. The stripe must strongly be pressed by hand to the core surface. Only then the adhesive tape cannot be torn off if it comes into touch by the web after cut.

The adhesive strength and the breadth of the adhesive tape must be adjusted after the speed and the tensil in the web immediately after cutting und laying on.

The position of the web edge opposite the adhesive tape can be influenced by the set value of 'Knife start' in the screen masks 'Parameter Winder 1' and/or 'Parameter Winder 2'.

6.4.4.4 Thread up

When you have carried out all steps as described above, the machine now is in basic position and thus ready to operate.







For the following jobs to be carried out on the line utmost care must be taken. Before going on, you must have read and understood the chapter „Safety, Labour Protection, and Safety Units“!

Key switch +P (5) in position ON (I), thus calling the operating mode 'Thread Up'.

The following functions are introduced automatically or carried out:

1. The contact roller is driven into the rearmost position.
2. The Knife arm is turned off to the basic position.
3. The safety light barrier is switched off and the safety area can be entered.
4. The locks at the safety doors are deactivated and the safety doors can be opened at both sides.

Prepare the winding core with an adhesive tape stripe according to the regulation!

Operation	Signification
	<p><i>Pay attention to possible dangers when Thread Up the material web. Dangerous situations may occur through</i></p> <ul style="list-style-type: none"> - <i>catching and rewinding</i> - <i>Thread Up and getting trapped</i> - <i>squeezing and cutting</i> <ul style="list-style-type: none"> • Enter the outer core diameter of winder 1. • Enter the outer core diameter of winder 2. • Actuate 'Indexing forward'. The empty winding shaft indexes from winding to 'Thread up position'.
	<p>Condition:</p> <p>Operating mode 'Thread up' switched on and speed less than 10 m/min.</p>
	<p>Thread up the web according to the "Web Run Scheme" (Chapter 3). Risk of getting caught and squeezed at the driven rollers!</p>
Switch on drives	<p>Thread up the web into the machine and apply it to the winder in 'Thread up position'.</p> <p>Switch on the drives for pull roll 1 and winder in splicing position (Winder 1 or Winder 2). The rollers and winding core on the winding shaft run with surface speeds of less than 10 m/min.</p>
	<p>Make sure that no one is working on the rollers or shafts when switching on the drives!</p> <p>Close the safety doors on both sides properly.</p>



Put web upon the core and close the first layers. Splice material to core.

Attention when clearing the safety area!

The operator of the key 'Safety Area Reset' (+P (41)) has to convince himself that no one stays within the safety area at this moment.

If he clears the safety area although there are still people within it, he acts with gross negligence.

Index to cutting position and actuate knife arm toward cutting position.

Initiate the cut, if the web is smoothly running upon the reel.

After cutting, the 'Thread up process' is complete. The web will be rewound in the selected winding mode. When switching off the operating mode 'Thread up', the machine is enabled for the production.

Set the key switch (+P (5)) to OFF (0) position.

Clearing the safety area (+P (41)) and lock the safety doors



Attention when clearing the safety area!

The operator of the key 'Safety Area Reset' (+P (41)) has to convince himself that no one stays within the safety area at this moment.

If he clears the safety area although there are still people within it, he acts with gross negligence.

The danger zone of the line is secured through a safety light barrier.

6.4.5 Reel Change at the Operating Mode MANUAL



Before the start for a reel change the attachment of the preparation on the core has to be absolutely checked!

The cutting system TAC cannot lay on the web without adhesive tape in the specified place.

Operation	Signification	
Manual Automatic <i>Machine</i>	Operating mode of machine	actuate +P (21) . "Manual" appears in the display field of the operation mode.
Call screen mask	<i>Winder Overview</i>	
Indexing forward	22	actuate. A reel change will be initiated independently of the actual running length. <ul style="list-style-type: none"> • The turret system indexes the empty core to cutting position. The PLC calculates the correct cutting position according to the set core diameter. • The empty winder starts up automatically and synchronises its speed to the production speed. • End of functions when reaching cutting position.
Slide forward	26	actuate. The contact roller travels to the empty core in cutting position. The cutting position will be calculated and positioned in such a way that the web does not touch the empty core and a gap of approx. 3 mm is generated between core and web.
Knife arm Up	28	actuate The following functions are carried out automatically: <ul style="list-style-type: none"> • the knife arm is unlocked and swung to cutting position • the torsion spring will be tensed • if the knife arm is in top position, the contact roller in cutting position, the Counter bar in working position and the knife stressed, cutting will be enabled. • The indicator lamp in push button 30 changes to green.

Operation	Signification	
Ready for Cut	30	<p>actuate</p> <p>The following functions are carried out automatically:</p> <ul style="list-style-type: none">• The lock system for the cut cylinder is initiated and the serrated knife cuts off the material web.• The brush brushes the material to the core.• The empty core (winding drive) is switched over synchronously and thus enabled for winding with torque.• The contact roller travels against the core, pressing the web against it.• The knife arm is swung to home position.• The cut cylinder is relieved.• The winder with the full reel will be switched off.• The turret system indexes to winding and/or to unloading position.

6.4.6 Reel Change at the Operation Mode 'AUTOMATIC' with Manual Initiation



Before the start for a reel change the attachment of the preparation on the core has to be absolutely checked!

The cutting system TAC cannot lay on the web without adhesive tape in the specified place.

Operation	Signification	
Main operator Panel	Operating mode of machine	actuate +P (20) . <i>'Automatic'</i> appears in the display field of the operation mode.
Indexing forward	22 (+P)	actuate. <ul style="list-style-type: none"> The turret system indexes the empty core to cutting position. The PLC calculates the correct cutting position according to the set core diameter. The cut cylinder will be tensed and the serrated swung to work position The winder starts up automatically and synchronises its speed to the production speed. The knife arm will be swung to cutting position. If the knife arm is in cut position, the contact roller in cutting position and the knife stressed, cutting will be enabled. Ready for cut (30) 'TAC Cut' is burning steadily.
Ready for Cut	30	actuate The following functions are carried out automatically: <ul style="list-style-type: none"> The lock system for the stressed cut cylinder is initiated and the serrated knife cuts off the web. The brush brushes the material to the core. The empty core (winding drive) is switched over synchronously and thus enabled for winding with torque. The contact roller travels against the core, pressing the web against it. The cut cylinder and the serrated knife is in cut position. The knife arm swings to home position. The winder with the full reel will be switched off. The turret system indexes to winding and/or to unloading position.

6.4.7 AUTOMATIC with Automatic Initiation



Before the start for a reel change the attachment of the preparation on the core has to be absolutely checked!

The cutting system TAC cannot lay on the web without adhesive tape in the specified place.

The functional sequence will be automatically initiated by the PLC when reaching the rewind length through 'TAC Reel Change Start'. The functional sequence corresponds to that as for the manual initiation of automatic reel change. Cutting is also carried out automatically when the set 'Running Length' has been reached.

At the start of the automatic reel change an acoustic signal sounds and a flashlight indicates the initiation of automatic movements at the winder.



Make sure that no one stays within the danger zone of the line at this time!

The operator of the key 'Safety Area Reset' (+P (41)) has to convince himself that no one stays within the safety area at this moment. If he clears the safety area although there are still people within it, he acts with gross negligence.

6.4.8 Reel Unloading

Prior conditions for unloading of the finished rolls:

1. The turret system stands in the unloading position.
2. The drive of the winder in the unloading position is switched off.



The operator of the key , Safety Area Reset' (+P (41)) has to convince himself that no one stays within the safety area at this moment. If he clears the safety area although there are still people within it, he acts with gross negligence.

- Enter safety area and unload the finished reel with a suitable hoist system.
- Load a new winding shaft into the chucks with a suitable hoist system.



A suitable hoist system has to be used for the transportation of the winding shafts and the finished rolls. The winding shafts and the finished rolls has to be so surely incorporated with the transport system that nothing can not fall down.

Nobody must stay under the floating burdens!

For the execution of further functions leave the safety area and press *Safety Area Reset (41)*.



Attention when clearing the safety area!

The operator of the key 'Safety Area Reset' (+P (41)) has to convince himself that no one stays within the safety area at this moment. If he clears the safety area although there are still people within it, he acts with gross negligence.

7. Up keep and Maintenance

7.1 Explaining

The mechanical and electrical operating elements shall be checked for their proper condition at regular intervals. These intervals are to be specified such that any deficiencies expected to arise will be recognized in time.

Carefully treat and clean the surfaces of the rollers. Careful treatment is defined as follows:

- Do not use cutting tools (knives, scrapers, industrial blades) on guide rolls and rubber-covered rollers.
- Rollers with special coatings may not be treated with cleansers (petrol, acetone, etc.) because the special coating may dissolve.
- Mind the safety signs when cleaning the rollers!

Troubles should not arise at an appropriate care, not even at in case of continuous operation.

Because the machine is produced out of traditional and established elements, any unexpected faults should be easily recognized and repaired.

The following table "Maintenance Instructions" provides a recommendation for summary intervals at which the work shall be carried out on the basis of normal operation conditions. All data therein refer to a one-shift operation at Mid-European climate.

The maintenance intervals shall be shortened (see section 1) for a multi-shift operation and/or increased climatic loads (temperature, air humidity, aggressive vapours).

- Temperature,
- Air Humidity,
- Aggressive Vapours



**The stipulated intervals refer to the
TOTAL RUNNING PERIOD OF THE LINE,
not to the running period of the individual components.**

**Oil changes and lubrication jobs have to be carried out at least
once a year.**

The maintenance works are divided into two steps:

Maintenance step I

Maintenance work to be carried out, daily, weekly, and monthly:

External function control of the components as well as the lubrication and oiling as instructed. Noted faults have to be repaired.

Maintenance step II



Only special trained personal has to carry out a control.

It refers to work being carried out during a main check-up. Worn parts have to be exchanged.

A new start-up of the machine has to take place through a following test run.

While lubricating and refilling of oil the surrounding of the named parts have to be cleaned, therewith to avoid the entering of foreign substances.

Description of the single building elements and building parts and special maintenance instructions are noted in the index.



All bearings equipped with lubricators and not referred to in the maintenance instructions shall be lubricated every six months.

Use lubricants with low temperature coefficients and low viscosity for easy-running rollers and drives.

Advisement: KLÜBER ALTEMP QNB 50



The most usual lubricants of well-known manufacturers are listed in the lubricant table. The lubrication point plan is based on lubricants according to DIN 51502.



Hydraulic oil can cause health damages. Therefore avoid direct skin contact. Wash after contact thoroughly! Refrain from any meal and smoking at works with hydraulic oil.

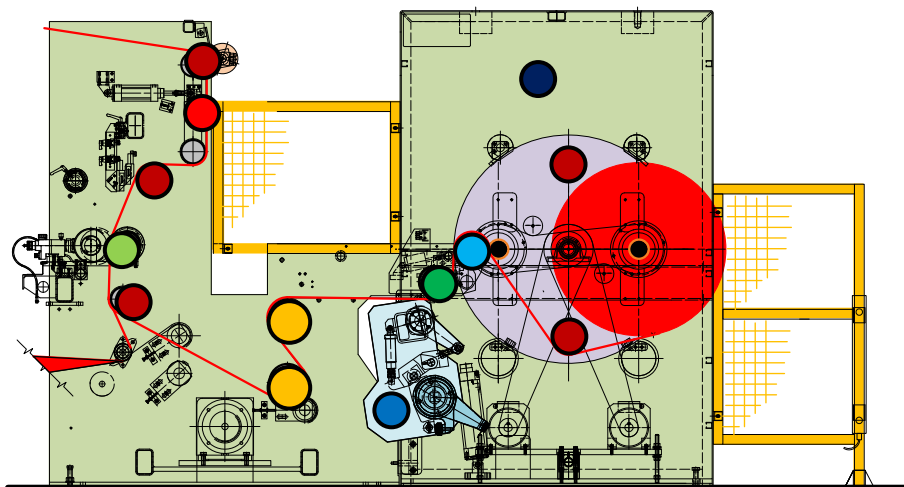


The handling and disposal of mineral oils is subject to legal regulations. Hand in waste oils at an authorized reception. Take care that no mineral oil reaches the soil, the public channel system or other freely environment.

7.2 Lubricant Table

Designation DIN 51 502	Kinet. viscosity mm ² /s at 40°	KLÜBER	BP	ESSO	MOBIL	SHELL
Lubricating oils with additives to increase the protection against corrosion as well as to increase the stress						
CLP 46	41-51	LAMORA 46	ENERGOL HLP 46 ENERGOL GR-XP 46	NUTO H 46	MOBIL DTE 25	TELLUS 46
CLP 68	39-47	LAMORA 68	ENERGOL 68 ENERGOL GR-XP68	SPARTAN EP 68	MOBILGEAR 626 Mobil DTE 26	OMALA 68
CLP 100	55-67	LAMORA 100	ENERGOL 100 ENERGOL GR-XP 100	SPARTAN EP 100	MOBILGEAR 627	OMALA 100
CLP 150	80-97	LAMORA 150	ENERGOL 100E ENERGOL GR-XP 150	SPARTAN EP 150	MOBILGEAR 629	OMALA 150
CLP 220	115-138	LAMORA 220	ENERGOL GR-XP 220	SPARTAN EP 220	MOBILGEAR 630	OMALA 220
CLP 320	163-196	LAMORA 320	ENERGOL GR-XP 320	SPARTAN EP 320	MOBILGEAR 632	OMALA 320
Hydraulic oils with additives to increase the protection against corrosion as well as to increase the stress						
HLP 46HLP 68	41-51	LAMORA HLP 46 LAMORA HLP 68	ENERGOL HLP 46 ENERGOL HLP 68 ENERGOL HLP D46 ENERGOL HLP D68	NUTO H 46 NUTO H 68	MOBIL DTE 25 MOBIL DTE 26	TELLUS 46 TELLUS 68 HYDROL DO 46 HYDROL DO 68
Gear- and rolling bearing fat, chain lubricants						
Designation DIN 51 502	application purpose	application temperature range				
GP 00 G	gear toothing	-20 to +100	NATOSBIN 1600 EP STRUCTOVIS P 00	ENERGREASE HT-EP 00 FIBRAX EP 370	MOBILPLEX 44	TIVELA COMPOUND A
K 2 K	rolling bearing	-35 to +130	CENTOPLEX 2	BEACON 2	MOBILUX 2	ALVANIA FAT R 2
K 3 K	rolling bearing	-20 to +130	CENTOPLEX 3	ENERGREASE LS 3 BEACON 3	MOBILUX 3	ALVANIA FAT R 3
BCV	chain and ropes	15 to +90 0 to +90	STRUCTOVIS BHD GRAFLOSCON A-G1	SURETTFLUID 4K	MOBILTAC D MOBILTAC E	CARDIUM FLUID C CARDIUM FLUID D

7.3 Lubrication instruction



See the significations in the following table:

Mode G = Grease O = Oil
Intervals ½ = half a year i.n. = if necessary

Assembly	Description	work	mode	Int.
Idler Roller		Flange bearing; check smooth run, lubricate bearings (lubricating nipple, see material)	G	½
Dancer roller	Pneumatic cylinder	Pneumatic cylinder; visual control; check tightness		½
	Pendulum roller	lubricate bearing (lubricating nipple, see material)		½
Longitudinal Cut	slide / guidance slide unit	Lubricate guiding slide (lubricating nipple, see material), visual control	G	½
Pull roll 1	Drive gear	Gear; check smooth run, check oil level (refill if necessary, see material), check tightness	O	½
	Belt drive	Belt; visual control		
Tension Measuring Roller		Flange bearing; check smooth run, lubricate bearings (lubricating nipple, see material)	G	½

Assembly	Description	work	mode	Int.
Contact roller Slide unit	Drive gear	Gear; controlled web still-stand, controlled oil level (refill if necessary, see material), check tightness	O	½
	Belt drive	belt; visual control		½
	slide / guidance slide unit	Lubricate guiding slide (lubricating nipple, see material), visual control	G	½
Cut System TAC	Knife Arm	Pneumatic cylinder; visual control; check tightness		½
	Spring load drive Drive gear	Gear; check smooth run, check oil level (refill if necessary, see material), check tightness	O	½
	Lock cylinder	Pneumatic cylinder; visual control; check tightness		½



Attention!

Before the execution of work on the Cutting system TAC you convince yourself of the pressure less condition.

Indexing drive	Drive gear	Gear; check smooth run, check oil level (refill if necessary, see material), check tightness	O	½
	Belt drive	belt; visual control		½
	Belt drive shaft encoder	belt; visual control		½
Winding drive with chucks	Belt drive	belt; visual control		½
	Drive gear	Gear; check smooth run, check oil level (refill if necessary, see material), check tightness	O	½
	Clamping heads	Visual control; check tightness, check min-maximal clamping diameter		½

7.4 Maintenance Plan

In addition to the given lubricating instructions the following maintenance jobs or checks should be carried out once a week.

Assembly	work
Dancer roller unit S-pull roller system	Check smooth movement and clean pneumatic cylinders and bearings, if necessary. Check angular transmitter, at synchronous line speed the dancer must be in centre position.
Linear and round guide ways	Check for cleanness and clean, if necessary
Roll chain drives	Check and retighten
Toothed belt drives	Check and retighten
Pneumatics	
Air connections	check
Maintenance unit	
• air oiler	check and refill with CLP46, if necessary
• water separator	empty
Blower	Check for cleanness and clean, if necessary
Fans at motors	
Air filters at switch cabinets	