Collamat® 9100

Technical handbook

5999.557-01A

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1 Safety advices

1.1 Important warnings

Before installing and operating the Collamat® 9100 read the following safety instructions.

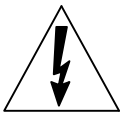
- **The Collamat® 9100 labeller is exclusively intended for labelling goods. It must exclusively be controlled and driven by a C9100 monitor.**
- **Install the Collamat® 9100 only by a trained specialist considering the national specific regulations of**
  - **prevention of accidents**
  - **mechanical stability**
  - **construction of electrical and mechanical systems**
  - **noise suppression**
- **Take notice of the technical data of the Collamat® 9100. Especially the environment conditions must be observed.**
- **Operate the Collamat® 9100 only by trained personnel.**
- **In case of non-authorized modifications the guarantee will become void.**
- **Before connecting non-standard products, ask your competent technical supporter.**

1.2 Danger advices

- **The safety symbols and danger advices on the Collamat® 9100 and in this manual must strictly be observed.**
- **Switch the monitor C9100 off before connecting or disconnecting the labeller to or from the monitor C9100.**
- **Only authorized personnel may open the monitor and the connector box.**
- **Disconnect the monitor from the mains before opening the connector box.**
- **Danger of pinching hair, jewelry, ties, clothes etc. into the traction unit !**
- **Danger of injury by cutting fingers in the paper zone !**
- **Danger of injury in the dancer roller zone of the Collamat® 9100 rewinder and unwinder !**
- **Danger of injury in the case of non-expert use of the Collamat® 9100 paper stock control !**
- **When operating the labeller, the operating personnel must keep to a safe location to prevent injury by the products being labeled.**

1.3 Symbol descriptions

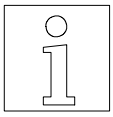
ATTENTION
Danger to damage the Collamat® 9100 or other system components, with a potential consequential danger of injuries.
DANGER
Imminent hazard for persons.



DANGER
Shock hazard due to high voltage at component.

DANGER
Hazard of contact injury due to high component temperature.

ATTENTION
ESD (ElectroStatic Discharge) warning. The p.c.boards or other components may only be touched in an electrostatically protected environment.



NOTE
Important or additional information to Collamat® 9100 or its documentation.

2 Introduction

2.1 General information

This Technical Manual describes design and function of the Collamat® 9100. In addition to the Operating Instructions, it contains the settings and notes necessary to get optimum use of the Collamat® 9100. The descriptions of each electrical or mechanical assembly also help for quick error analysis and trouble-shooting.

We recommend to replace p.c.boards always as complete units returning them to Collamat Stralfors or its representative for repair to be sure that the high quality standard of the Collamat® 9100 can also be guaranteed after any repair.

Special characteristics of the Collamat® 9100:

- resistant to wear, no clutch/brake-system
- rugged
- easy installation and operation due to modular design
- easy to operate due to up-to-date menu operated software
- quick change-over to other labelling tasks
- high performance
- high reliability and accuracy
- latest SMD-technology
- high precision 3-phase steppermotor

2.2 The Monitor

The power supply and the electronic control are built into a stable metal casing. All peripherals are connected to a connector box connected to the monitor back panel by one single D-sub-connector. A large heatsink allows to operate the monitor without additional fan. The control (monitor) can be mounted in various positions.

The monitor contains the following assemblies:

- Noise filter with voltage selector
  The noise filter keeps EMI outside to prevent any interference with the electronic control and also prevents EMI to be transmitted to the mains supply. The voltage selector allows versatile adaptation of the power supply to different mains voltages.
- Transformer
  Supplies the power for all components of the Collamat® 9100.
- Interface p.c.board
  The interface p.c.board connects the motor driver to the power supply and to the controller. The electronic part of the power supply is also installed on the interface p.c.board which shapes all input and output signals to and from the controller.

- Motor Driver
  The 3-phase motor driver is a standard assembly of a leading stepper motor. It energizes the stepper motor. The step rate is adjustable from 200 up to 1000 steps per revolution. Standard setting is 500 steps per revolution.
- Controller p.c.board
  The controller p.c.board comprises a Hitachi H8/532 microcontroller, EPROM with software, LC-display and short-stroke keyboard. The controller p.c.board controls all labelling sequences, the LC-display, the keyboard and the nonvolatile memory.
  The LC-display has four lines with 20 characters each and a background illumination.
  The controller p.c.board combines front panel and controller in one component.

2.3 The software

The controlling software of the Collamat® 9100 is stored in the EPROM (firmware) and has the following features:

- Modern user interface
- 6 digits preset and batch counter
- Adjustable label length dependent suppression of label scanner signal to detect transparent or preprinted labels
- Adjustable goods speed and length dependent scanner signal suppression after labelling
- Programmable adjustment of labelling position on the goods
- Programmable adjustment of predispensing
- Multiple labelling with electronic setting of gap between labels
- Automatic adaptation of dispensing speed by measuring the goods speed by light barrier or incremental encoder
- Storage of 32 labelling programs
- Memory protection by access password
- Two user levels
- Monitoring of label stock and out-of-label, end of paper web, open roller in traction unit, motor driver OK-signal
- Nonstop mode with two Collamat® 9100 systems
- Multilingual user display
- Automatic label scanner adjustment
- Full operability during labelling
- All peripherals program-controlled - no potentiometers and switches necessary

2.4 The Dispenser

The traction unit as well as the other peripherals are mounted on a module rail. All parts are surface treated to protect from corrosion. The special coating of the traction unit roller affords permanent torque transmission to the paper web without slip. The force of the paper web brake is adjustable. The traction roller can be easily turned by hand during Power OFF for easy threading and installing the paper web.

3 The Collamat® 9100 Labeller

The Collamat® 9100 must be installed by trained personnel considering the following national specific regulations:

- Prevention of accidents
- Noise suppression
- Mechanical stability
- Construction of electrical and mechanical systems

3.1 Prevention of accidents

When installing and connecting the C9100 monitor and labeller pay attention that the signal and power cables cannot become stumble obstacles. Lay the cables according to the national safety regulations. Signal cables must not be placed in close proximity to power cables.

3.2 Noise suppression

For radio interference suppression the C9100 labeller and monitor are shielded according to the CE directives. Only cables approved by Collamat Stralfors are allowed to be used to connect the monitor to labeller and mains. Additional peripherals have to be connected only to the mains socket of the monitor. These devices must be approved by Collamat Stralfors.

3.3 Mechanical stability

If the Collamat® 9100 is used on a movable stand, this stand must be capable to be tilted by 10° in each direction. See Figure 1:

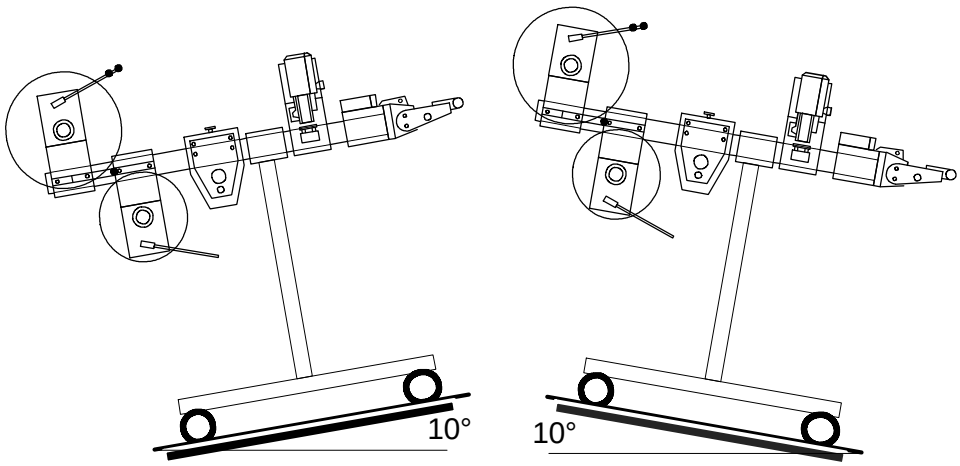


Figure 1: Mechanical stability of C9100 labeller stand

4 Assemblies

In the following the various assemblies, their adjustment and maintenance are described. First an overall view of the labeller.

The assemblies are mounted on a module rail. Figure 2 shows these assemblies with their designations on the module rail:

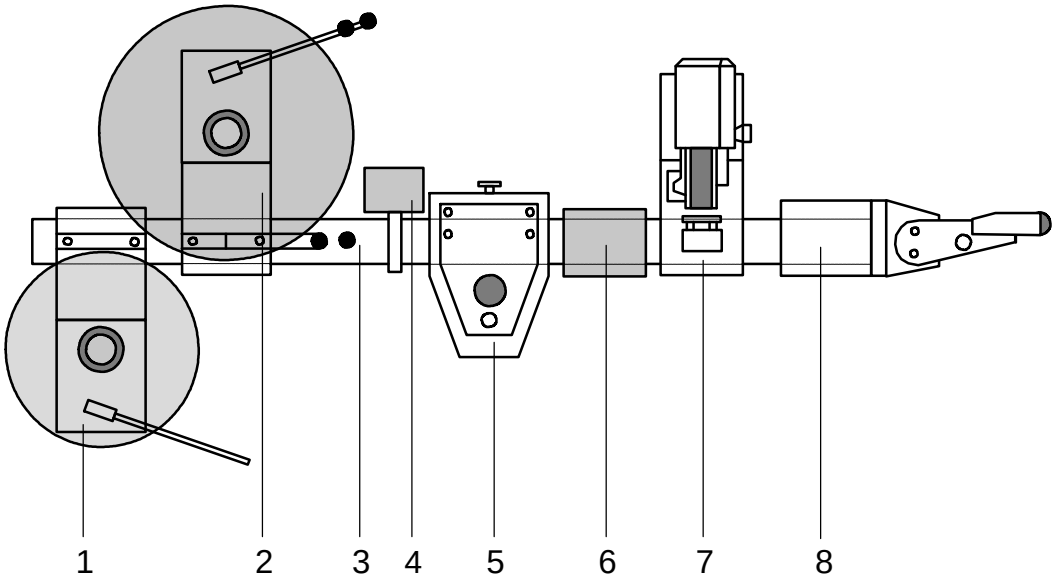


Figure 2: Assemblies

Legend for assemblies

1. Rewinder
2. Unwinder
3. Modular rail
4. Connector box
5. Traction unit
6. Support
7. Flat printing unit (optional)
8. Adapter

4.1 Installation examples

Due to the modular design of the Collamat® 9100 there is nearly no limit in variations of the installation. But for best results in labelling, the following figures show installation examples of constructions which do their work successfully:

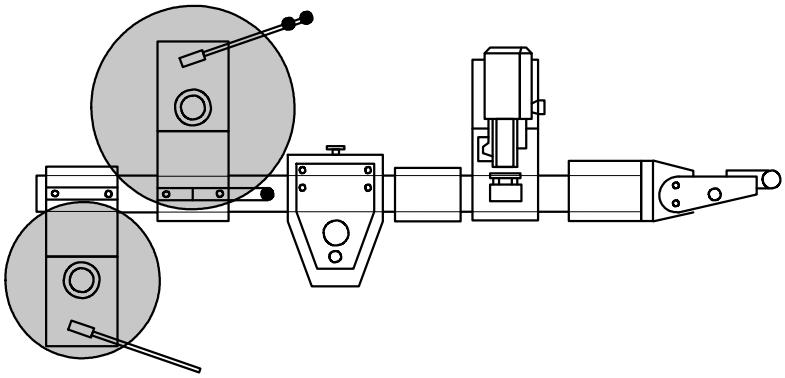


Figure 3: 1st example

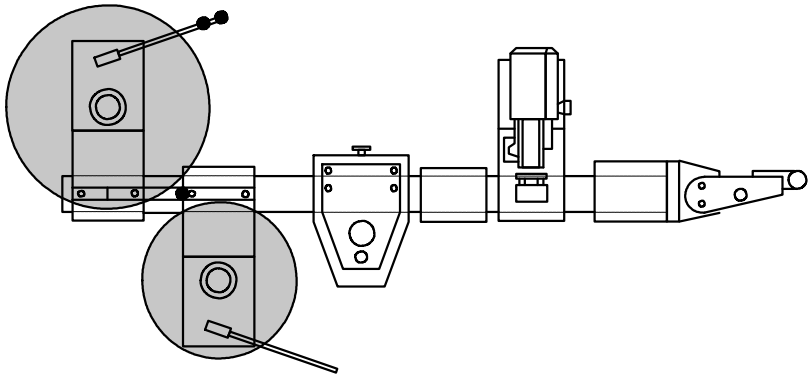


Figure 4: 2nd example

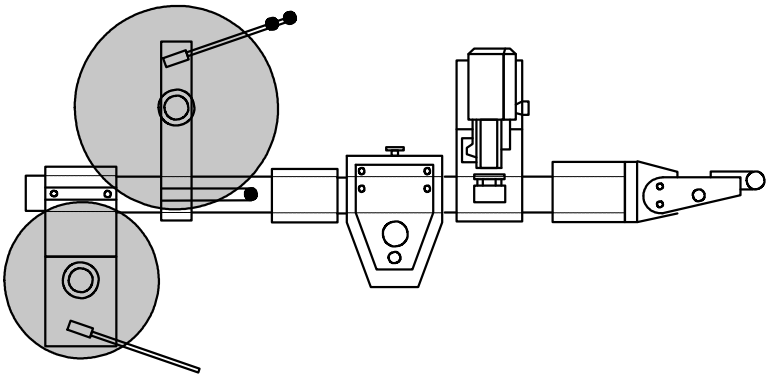


Figure 5: 3rd example

The threading of the paper web, the adjustment of the paper brake and adapter are described in the Operating Instructions of the Collamat® 9100 labeller.

5 Traction unit

5.1 General information

The traction unit can be used both for right- and left-hand versions of the labeller.

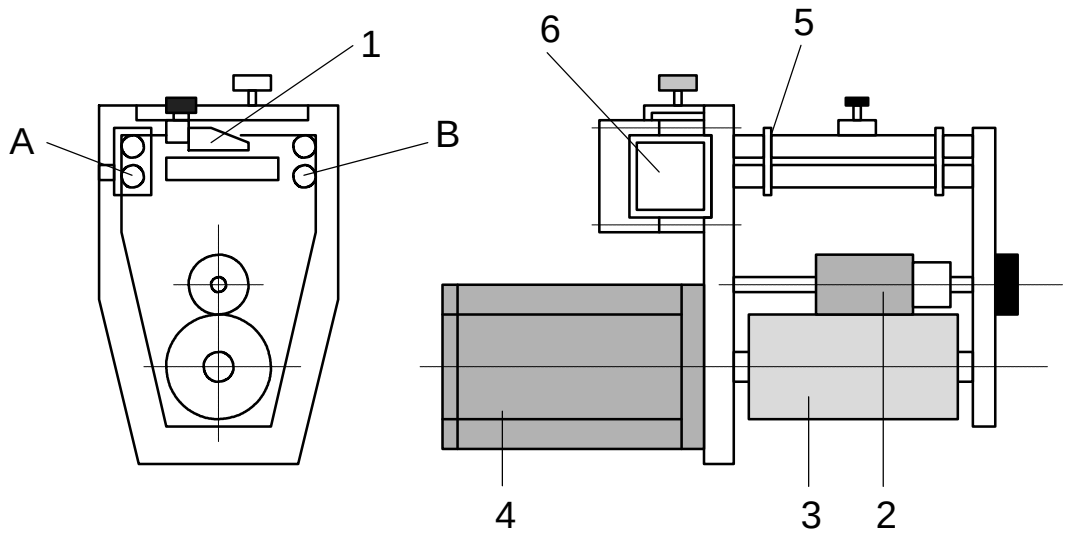


Figure 6: Traction unit

Legend for traction unit

1. Paper break
2. Pinch roller
3. Traction roller
4. Stepper motor
5. Paper web guide
6. Module rail

The direction of rotation of the traction roller is set by programming the monitor.

More information see Operating Instructions MONITOR C8600/C9100, chapter CONFIGURATION, menu DIRECTION OF ROTATION.

Install the **paper web guides** in position **A** for **right-hand** version, in position **B** for **left-hand** version.

5.2 Pinchroller

5.2.1 Direction of tension force

The direction of the tension force of the left- and right-hand version are opposite to each other. If the direction of the tension force is not correct, hits of the rewinder to the paper web may open the traction unit.

Procedure

Slacken locking screw **2**, remove, turn, reengage and screw down knurled washer **1**. Letter 'L' or 'R' defines left- or right-hand version, respectively. Standard version is **'R'**.

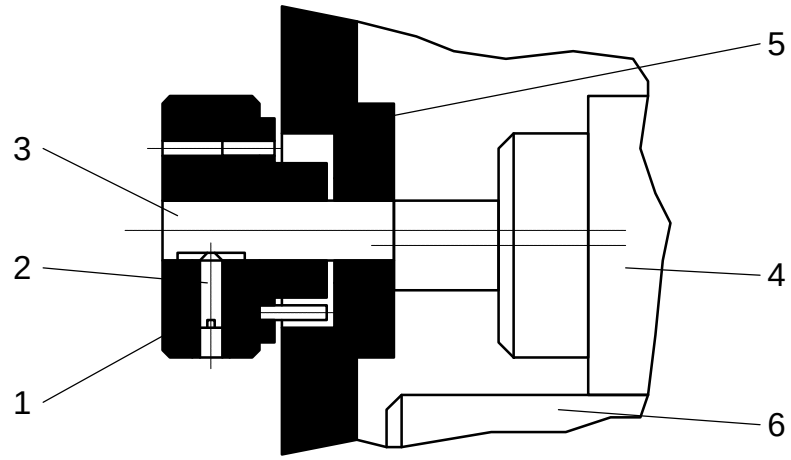


Figure 7: Direction of the tension force

Legend

1. Knurled disk
2. Locking screw
3. Eccentric pinch roller shaft
4. Pinch roller
5. Adjustment flange
6. Traction roller

5.2.2 Exchange of pinch roller

The pinch roller is a part subject to wear. Its wearing time is stress-dependent. It is good practice to select a paper web wider than the pinch roller to avoid wear when the pinch roller runs directly on the traction roller.

Procedure

Disassemble and remove front panel **1** together with eccentric pinch roller shaft **2**. Do not slacken fixing screw **3**. Slacken locking screw **4** and pull off pinch roller **5**. Attach new pinch roller **5**, tighten locking screw **4,** slide in and reassemble front panel **1**. Then check parallelism with pinch roller.

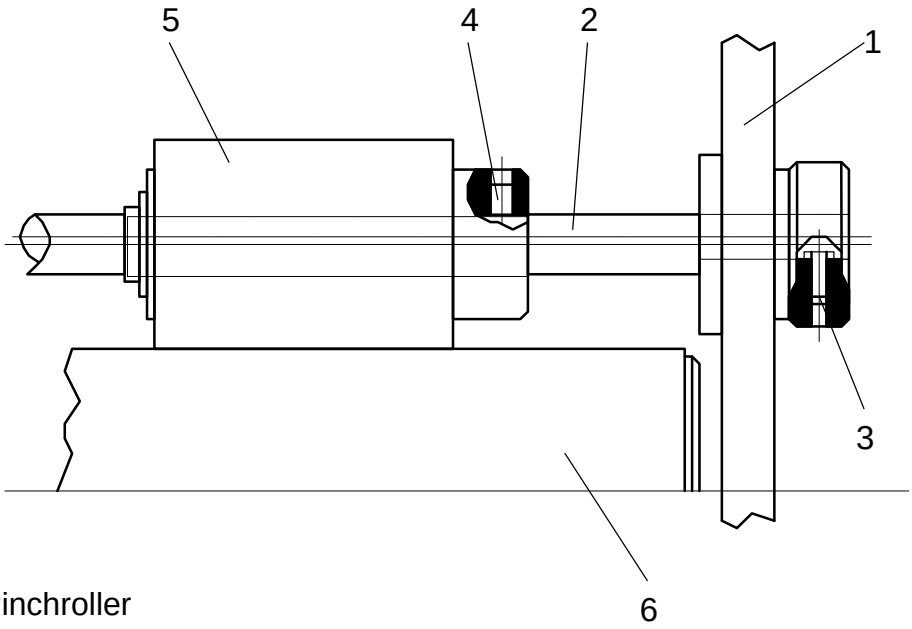


Figure 8: Pinchroller

Legend

1. Front panel
2. Eccentric pinch roller shaft
3. Fixing screw of knurled knob
4. Locking screw with hexagon socket
5. Pinch roller
6. Traction roller

The parallelism adjustment of the pinch roller is described in the following chapter.

5.2.3 Parallel adjustment of pinch roller

The parallelism of the pinch roller with the traction roller is decisive for the stability of the paper transport. If the rollers are not in parallel the paper web will be transported obliquely through the traction unit resulting in a lateral force on the paper web which forces the web to shift on the dispensing edge and the labels to be dispensed obliquely.

Procedure

Release and shift pinch roller **2** to the left, slacken screw **7** on right adjusting flange **6,** turn adjustment flange **6** by means of 3 mm mandrel **9** appropriately.
Retighten screw **7** and shift pinch roller **2** to the right. Slacken clamping screw **7** on left adjusting flange **5** and adjust it with the same pressure as the right adjusting flange **6**. Tighten screw **7,** reposition and lock pinch roller **2** in center position of traction roller **8**.

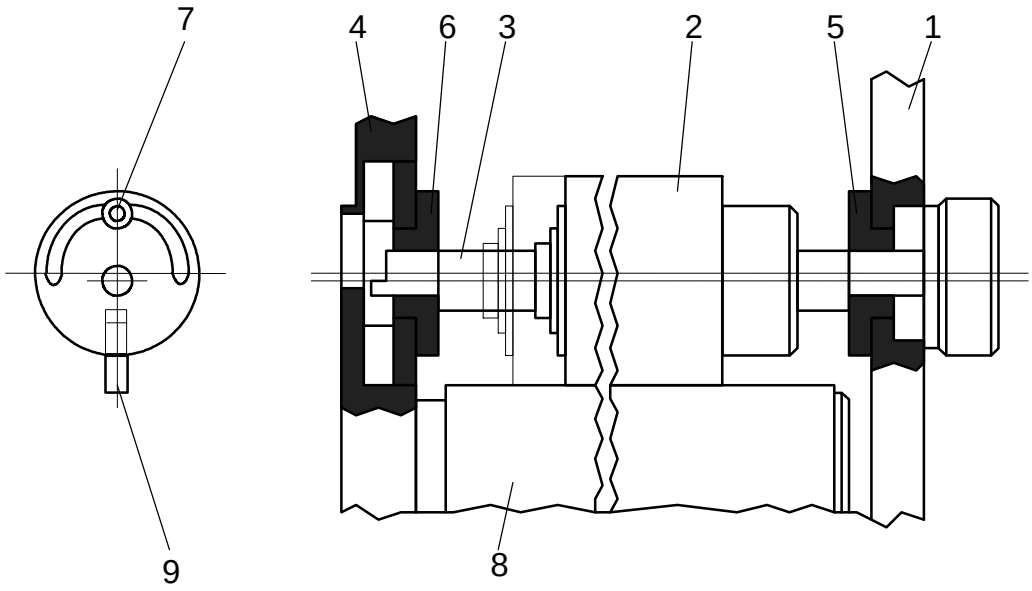


Figure 9: Parallelism of pinch roller with traction roller

Legend

1. Front panel
2. Pinch roller
3. Eccentric pinch roller shaft
4. Support plate
5. Adjusting flange, left
6. Adjusting flange, right
7. Clamping screw
8. Traction roller
9. Mandrel

In new traction units the parallelism of the pinch roller to the traction roller is already correctly adjusted by Collamat Stralfors.

5.3 Traction roller

5.3.1 Replacement of traction roller and damping disk

Procedure

Remove front panel **1** together with pinch roller **9**. Unscrew stud bolt **7** and remove traction roller **3** from stepper motor-shaft **5**. Remove securing ring **8**. Remove traction roller **3** from roller shaft **4** and replace the damping disk **6**.
Reassemble the traction unit in reverse order. Tighten stud bolt only after assembly of front panel.

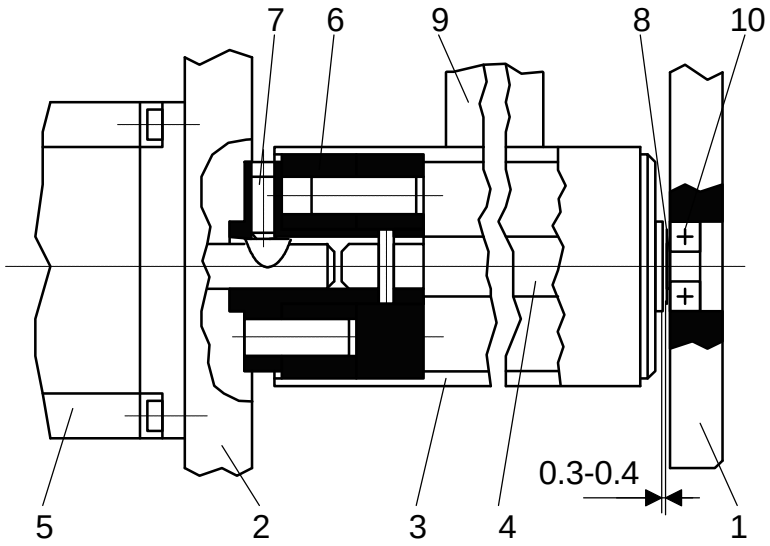


Figure 10: Replacement of traction roller

Legend

1. Front panel
2. Suport plate
3. Traction roller
4. Roller shaft
5. Stepper motor
6. Damping disk
7. Stud bolt
8. Securing ring
9. Pinch roller
10. Ball bearing

It is important that the traction roller is adjusted with an axial play of 0.3 - 0.4 mm between ball bearing 10 and collar of roller shaft 4.

5.4 Rewinder and unwinder

5.4.1 General information

Rewinder and unwinder (= winder) with motor drive are intended to automatically wind or unwind the paper web of the COLLAMAT 9100 labellers. The winder is powered with 24 VDC. A deviation of the dancer roller starts automatically the winder motor. The winding speed is electronically controlled as a function of the dancer roller position. At the end of the paper web or upon paper web break, the motor is stopped automatically after some revolutions to prevent an uncontrolled run-up of the winder. Thickness of the wound roll and direction of action of the dancer roller can be adapted by plug-in jumpers on the electronic winder system. The direction of rotation can be switched over from outside. Rewinder and unwinder distinguish themselves only by dancer roller and winder mandrel.

Design

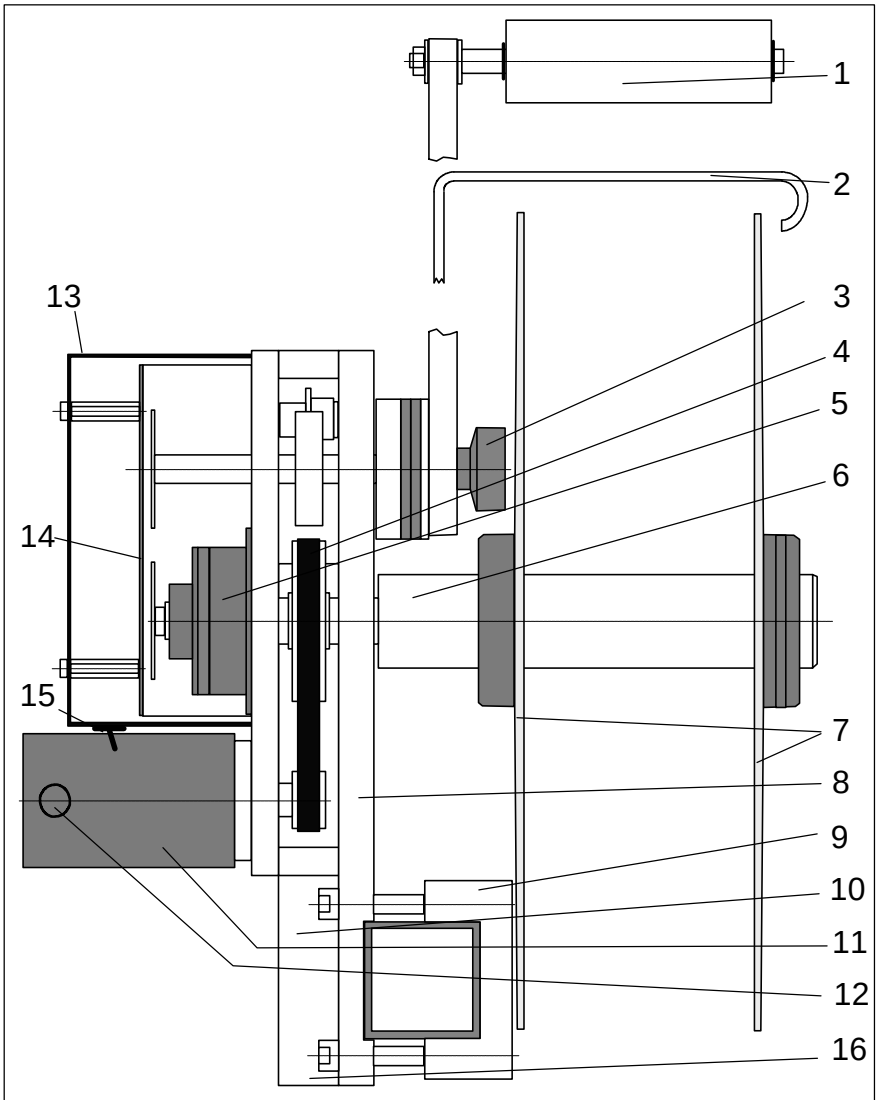


Figure 11: Winder

Legend

1. Unwinder dancer roller
2. Rewinder dancer
3. Knurled knob for dancer position
4. Toothed belt
5. Brake
6. Winder mandrel
7. Lateral disk
8. Support plate
9. Clamp
10. Dancer spring
11. DC motor
12. Motor brush
13. Cover
14. Winder control
15. Direction of rotation toggle switch
16 Spring adjust

5.4.2 Support plate

The assembly is mounted on a rigid support plate **8** fixing the winder on the module rail in a stable way. A cover **13** with rubber sealing protects the winder control **14** from dirt and humidity.

5.4.3 Drive

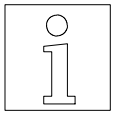
The winder mandrel **6** is driven by a current-controlled DC motor **11** via a toothed belt **4**. To prevent the winding from after-running the winder mandrel is braked with free dancer roller by brake **5**. The DC motor is equipped with exchangeable brushes **12**.

5.4.4 Dancer

The dancer roller arm has two tasks. On the one hand it represents a paper web stock for rapid supply or take-up of the paper web, on the other hand it signalizes its position to the winder control by optical sensors. With adjustable spring force, it stabilizes the tension applied to the paper web. The cooperation of the dancer roller with the winder control and the winder motor provides a controlled paper supply or take-up. Two different dancer roller types **1** or **2** are available for rewinders and unwinders, respectively.

5.4.5 Winder mandrel

The winder mandrels **6** of rewinder and unwinder are also different. The mandrel of the rewinder is designed to take up a clamping bow which provides a sure but well detachable connection of the empty paper web with the mandrel.
The winder mandrel can be provided additionally with a clamping core for paper rolls with 3" core diameter (76.2 mm). The clamping core is intended to correctly transmit the torque to the paper roll.



On request, also clamping cores with other diameters are available.

5.4.6 Brake

The winder mandrel **6** is braked by a electromagnetic brake. This brake is activated by the winder control **14** at the moment when the dancer runs free, after detection of a broken paperweb or when the motor stands still. The breaking force and breaking time can be adjusted.

5.4.7 Winder control

The winder control **14** controls the whole winding process controlling the DC motor **11** as a function of the dancer position which is optically measured and electrically weighted. The winder control also controls the electromagnetic brake **5**.

5.5 Final assembly of the winder

If the winder is delivered in parts (Dancer and winder mandrel not assembled) all parts must be finally assembled. Refer to the figure 11.

5.5.1 Assembly of the dancer

- Remove the knurled knob **3** of its shaft
- Put the dancer **1**, **2** on the dancer shaft and fix it to the desired position using the knurled knob **3**.

5.5.2 Assembly of the unwinder/rewinder mandrel

- Plug the unwinder/rewinder mandrel **6** to the winder shaft and fix it with its fixing screw.

5.5.3 Exchange of the dancer spring

The Collamat 9100 winders use three different springs types. To figure out the spring types the springs are coded with three different colours.

Colour	Springwirediameter [mm]	Winder
yellow	1,7	Rewinder C9110...C9130
blue	2,25	Unwinder C9110
red	2,5	Unwinder C9120, C9130

Normally the blue springs are used in the unwinder C9110. If you received another kind of winder the appropriate springs are delivered in the package. It must be exchanged.

- Remove the spring adjusting screw **16**
- Remove the springguide tubeholder at the bottom from the support plate **8**
- Remove the square springguide tube **10**
- Remove all three springs together with the spring guides from the pulling bar
- Reassemble the attached springs and spring guides in the same manner to the pulling bar
- Slightly retighten the fixing screw to fix the system
- Lubricate the springs, the spring guides and the quare springguide tube with grease
- Reassemble the square springguide tube **10** and fix it with the springguide tubeholder to the support plate **8**
- Adjust the spring adjusting screw **16** until the necessary spring force of the dancer is OK

5.6 Adjustments

In the following chapter the various adjustments are described considering the items:

Dancer:	**Motor:**	**Brake:**
○ Spring force	○ Direction of rotation	○ Braking time
○ Tension direction	○ Tension force	○ Delay time
○ Direction of action		○ Braking force

5.6.1 Spring force of the dancer

Adjust the spring force of the dancer roller so that the retraction force of the dancer roller is not higher than required by the dancer roller to reset itself with threaded-in paper web.

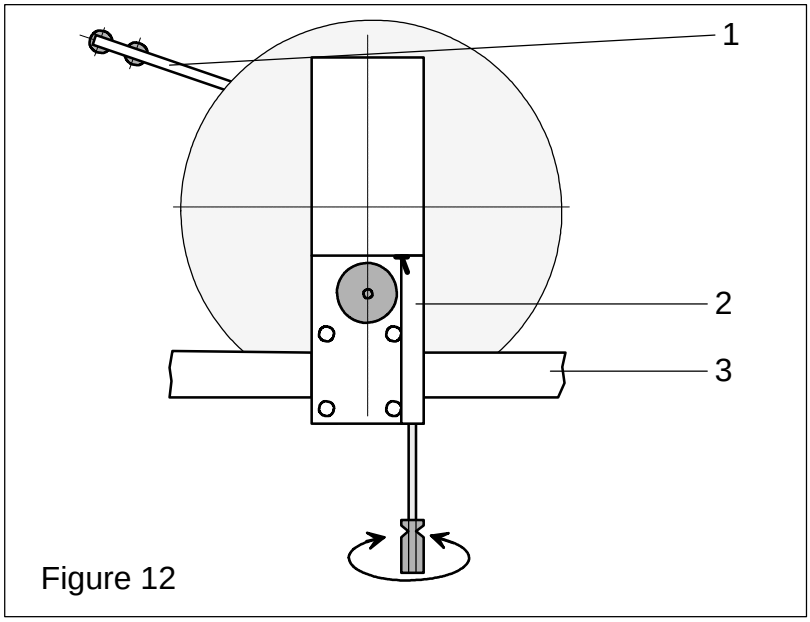


Figure 12

1. Dancer
2. Dancer spring
3. Modulel rail

Winder rear view

For adjustment of the spring force, use a 5mm hex screw driver. The dancer spring **2** can be accessed from the bottom of the winder.

- To increase the dancer force tighten the dancer spring clockwise
- To decrease the dancer force loosen the dancer spring anti clockwise

5.6.2 Tension direction of the dancer

Rewinder and unwinder tension direction are different:

- The rewinder provides permanent traction force on the paper web
- The unwinder provides permanently a full paper loop

Depending on space, mounting of the winders may differ. In principle the dancer roller has to be mounted so that the paper web never can be stretched. This applies both for full and empty paper rolls.
At the rewinder, the direction of rotation of the motor must act against the spring force of the dancer roller allowing thus a finer adaptation of the dancer roller position with empty winder mandrel.
At the unwinder the direction of rotation of the motor has to be adjusted according to the label roll design: whether it is **inside** or **outside** wound.

5.6.3 Direction of action of the dancer

The direction of action of the dancer roller is set on the C9100 winder control **14** with the **DANCER** jumper. As a rule the jumper is already set in factory in the correct direction of action. It must be distinguished between rewinder and unwinder:

- The rewinder motor must start with free dancer
- The unwinder motor must stop with free dancer

ATTENTION:
On the rewinder a free released dancer starts the free-wheel limitation which stops the winder mandrel after eight revolutions. Therefore either stop the winder or do not let swing out the dancer completely.

5.6.4 Motor rotation direction

The toggle switch **15**, placed on the cover **13** of the winder allows to select the direction of rotation of the winder mandrel **6**.

5.6.5 Tension force of the motor

The tension force of the motor depends of:

- The rewinder must not produce high accelerations but provide a constant force on the paper web.
- The unwinder must be capable to rapidly produce high accelerations but after unwinding it must stop immediately.

The TORQUE and WIND jumper blocks on the C9100 winder control **14** are intended to set the tension force.

5.6.6 Breaking force and time

The force and breaking time of the electromagnetic break **5** can be adjusted with the jumper blocks **ATTN**, **BREAK**, **TIME** and **DELAY** on the C9100 winder control **14**.

5.7 Arrangement and mechanical adjustment of the rewinder

The rewinder is placed behind the traction unit on the module rail.

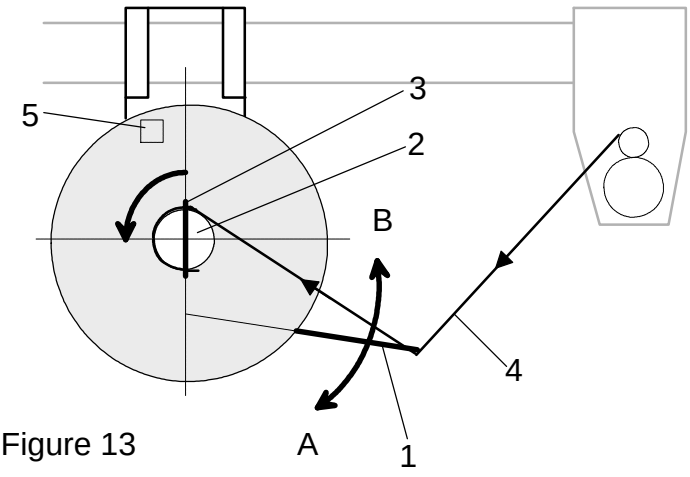


Figure 13

Legend

1. Dancer
2. Rewinder mandrel
3. Clamping bow
4. Paper web
5. Direction of rotation toggle switch

The rewinder is fastened under the module rail**.** The dancer **1** pulls the paper web **4** from the traction unit downwards. The winder mandrel **2** turns counterclockwise. The sprinf force of the dancer is set with the dancer spring so that the force in the upper stop does not become too high. With high labelling speed, the dancer roller must not impact the paper web. The direction of action of the dancer **1** is the same as that of the spring force, i.e. if the dancer roller moves downward, the motor must start to rotate. The direction of rotation of the motor is set with the change-over switch **5** on the rear side of the rewinder cover.

For LEFTHAND MACHINES, the above information applies reversely!

ATTENTION:
The upper position of the dancer roller must be so that the paper web is never fully stretched. Otherwise impacts on the traction unit may occur which open the closure.
The angle of paper web around the dancer between winder mandrel and traction unit must be an obtuse angle. See figure 13. In most cases a stretched paper web will cause faults !

Figure 14 shows the second mode to mount a rewinder. Here the rewinder is mounted **above** the module rail. But this mounting type should be used only when a mounting according to figure 13 is not possible for space reasons.

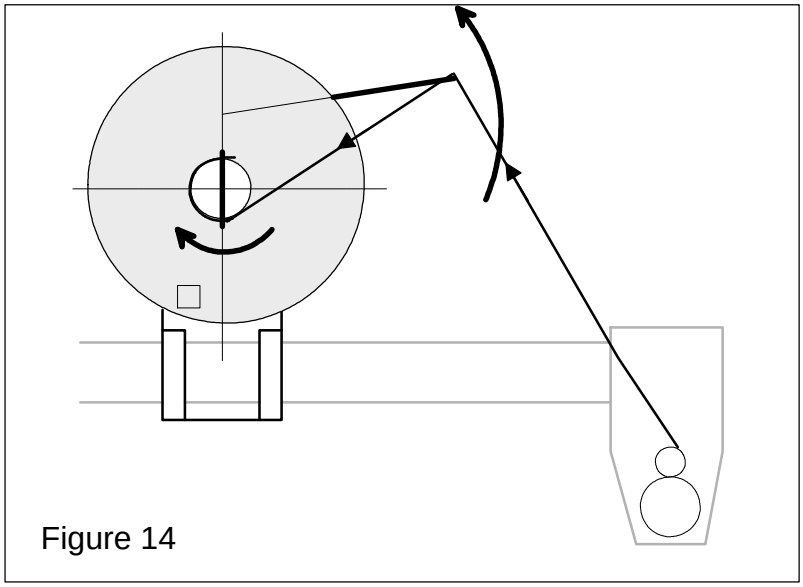


Figure 14

Set the spring force of the dancer roller so that the dancer roller can bear the paper web to the upper stop. The dancer roller must move independently fully upwards (lefthand stop) if there is no paper web to be wound. The winder mandrel must turn clockwise. Be carefully that the paper web is never stretched.

For LEFTHAND MACHINES the above information applies reversely !
Righthand stop = clockwise

5.8 Arrangement and mechanical adjustment of the unwinder

The unwinder is placed, as shown in figure 15, on the top of the module rail.

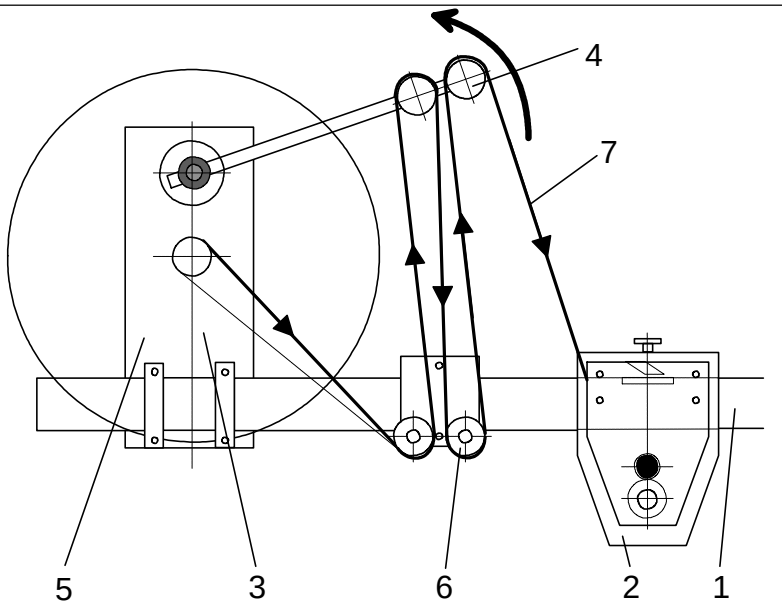


Figure 15

Legend

1. Module rail
2. Traction unit
3. Unwinder
4. Dancer
5. Direction of rotation toggle switch
6. Deflection rollers
7. Paper web

The unwinder is fastened above the module rail **1**. The dancer roller **4** pulls the paper web upwards. If the dancer is moved downwards the motor starts to rotate. The direction of rotation of the unwinder is set by the toggle switch **5**. The resetting force of the dancer should be set as low as possible. But in operation the dancer roller must never touch the lower stop avoiding thus impacts to the label web and an inaccurate labelling.

NOTE:
In the case of horizontal mounting position and lateral labelling special paper web guides are available which prevent that the paper web can slip down.

5.8.1 Maintenance

The winder does not need maintenance to a large extent. Remove dirt with a cleaning agent free of solvents. No cleaning agent or humidity must penetrate into the winder. Otherwise there is the danger of damages to electrical components or bearings.
The brake of the winder mandrel and the motor brushes are liable to wear depending of use. They must be exchanged or readjusted depending of use and wear.

5.9 Brake

The brake **7** must brake the winder mandrel **10** when the dancer **1** is released to its rest position. It must not more be active when the motor **12** is powered. The brake force is controlled by the winder control **4**.
The optimum airgap of the break is 0.2mm when it is released. If the gap is wider (> 0.5mm) the break must be readjusted. This readjustment is also necessary when the breaking force is not sufficient.

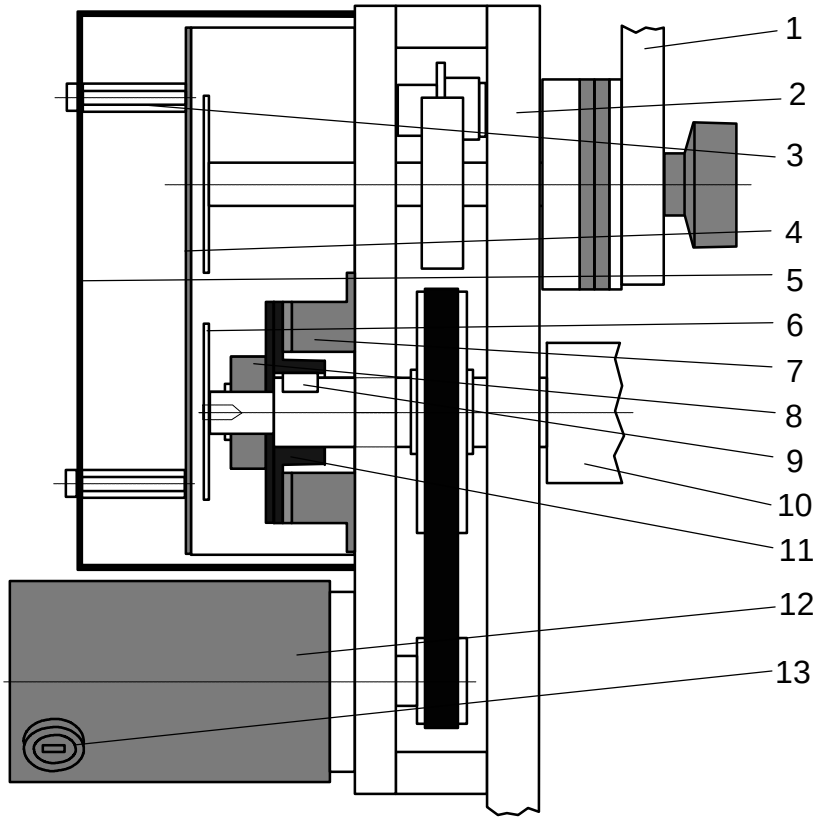


Figure 16

Legend

1. Dancer
2. Support plate
3. Fixing bolt
4. Winder control
5. Cover
6. Sensor flag
7. Electromagnetic break
8. Securing nut
9. Wedge
10. Winder mandrel
11. Anchor
12. DC Motor
13. Motor Brush

5.9.1 Adjustment of brake

Remove the cover **5**. Open the fixing bolts **3** and remove the winder control **4**. Remove the sensor flag **6** on the winder mandrel **10**. Lock the mandrel. Adjust the break while turning the securing nut **8** in or out until the gap is 0.2mm again. Fix the nut with Loctite. Reassemble all parts in reverse mode.

ATTENTION:

- **Do not forget to retighten the powertransistors of the winder control to the heatsink (2 screws).**
- **While unpowered, the anchor must not touch the break magnet ! (Minimum 0.2mm airgap)**

5.10 Motor brushes

In normal operation the brush life is approx. 2500 hours. During occasional maintenance works, check for abrasion. They should be exchanged only when the motor does not more rotate.
To exchange the motor brush, carefully loosen the brush holder since the brush is under spring pressure. With removed screw the brush can be removed. After check or exchange the brush can be reassembled in the holder and fixed with the screw.

ATTENTION:
Only use genuine type brushes. Otherwise there will be the danger of permanent motor damage.

5.11 Electrical settings

The winder control C9100 controls the winders motorcurrent and breakcurrent depending on the dancers position. This position is sensed without contact in five steps with optical sensors placed at the rear side of the winder control p.c.board. Six connectors are used to connect the 24 volt supply voltage, the motor and break wires respectively. Figure 17 shows the component side of the p.c.board:

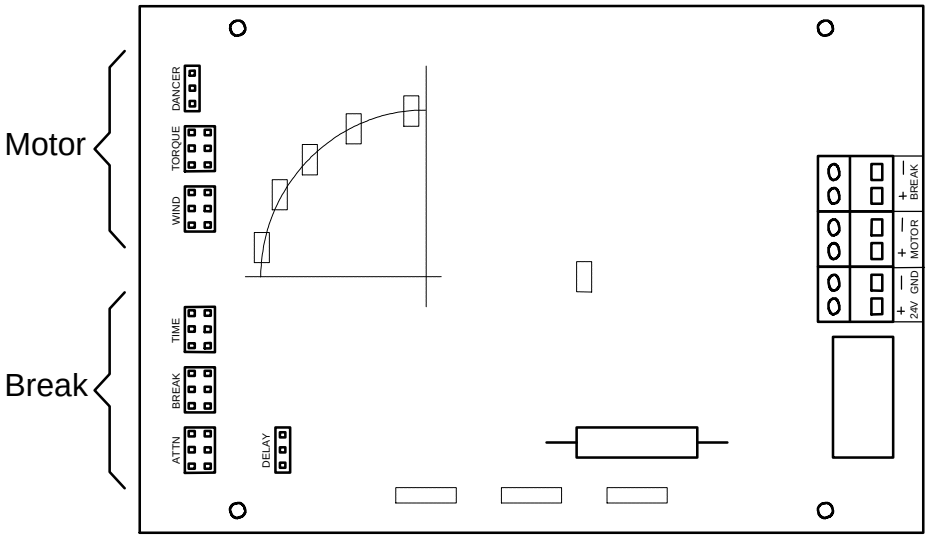


Figure 17: Winder control

The winder control board carries seven jumper blocks for the motor and break current adjustment. Three jumpers (**WIND**, **TORQUE** and **DANCER**) are used for the motor current, four jumper (**ATTN**, **BREAK**, **TIME** and **DELAY**)) are used for the break current adjustment. The following table shows the jumpers and their function.

Motor-jumpers	**Function**
DANCER	Direction of action of dancer roller
TORQUE	Torque
WIND	Rewinder/Unwinder

Break-jumpers	**Function**
ATTN	Attenuation of break current
BREAK	Break current
TIME	Attack time of break current
DELAY	Delay for attenuation of break current

5.11.1 Direction of action of dancer (DANCER)

The position of the dancer roller is sensed without contact by five optical sensors which are mounted mechanically in line so that depending to the dancer position the light beam of one or more sensors is detected.
The output signals of these light sensors are added and represent the signal to control the winder motor current. Since the same dancer is used for righthand and lefthand type winders, it must be only possible to switch over the characteristics of the deflection. This is set by means of the **DANCER** jumper**.**

If with **righthand stop** of the dancer roller the motor should rotate, the **DANCER** jumper must be plugged in the **left** (1) position, for **lefthand stop** in the **right** (3). See next figure 18.

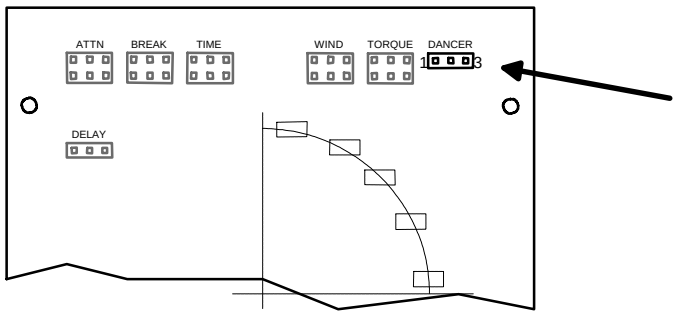
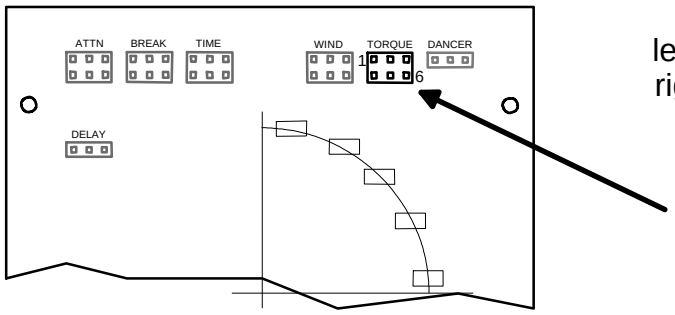


Figure 18

5.11.2 Motor force (TORQUE)

The motor force in function of the dancer position is set with the **TORQUE** jumper. If the jumper is plugged in on the **right** side (6) the force is **lower**, if it is plugged in on the **left** side (1) the force is **higher**. Figure 19 shows the position of the **TORQUE** jumper.

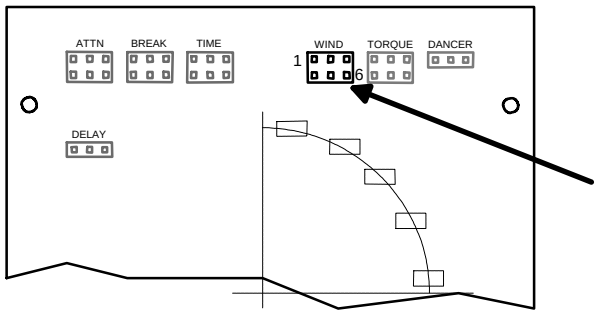


left: higher current
right: lower current

Figure 19

5.11.3 Winder (WIND)

The winder provides a constant tension on the paper web. The motor is always under current. The tension force must not be too high to avoid impacts on the paper web.
The unwinder must unwind the paper roll as a function of the dancer position. When unwinding the unwinder needs a high force to accelerate the paper roll.
The **WIND** jumper is used to set the start force of rewinder or unwinder. When the jumper is plugged in on the **left** side (1), the force becomes **lower**, if it is plugged in on the **right** side (6), the force becomes **higher**. Figure 20 shows the position of the **WIND** jumper**.**



left: lower current
right: higher current

Figure 20

5.11.4 Adjustment of the break current

For adjusting the breaking force and to minimize the power loss of the break the winder control has four extra jumper blocks. The break current is a current with a timed envelope. The following figure 21 shows the envelope and its parameters.

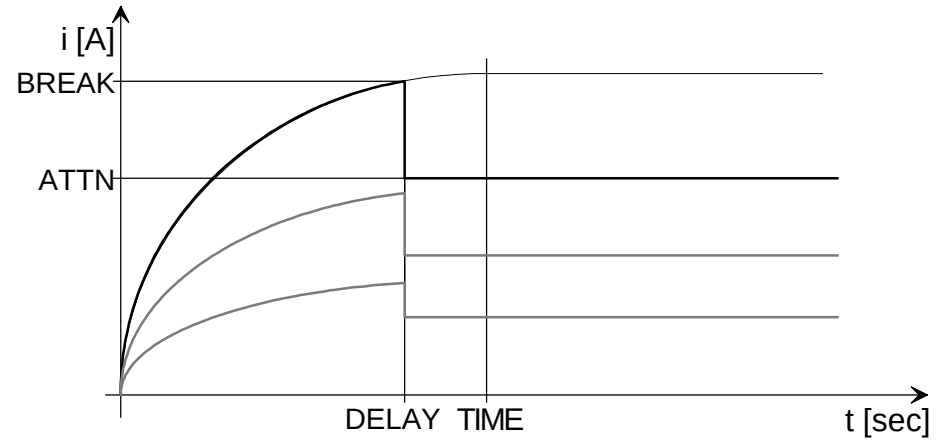
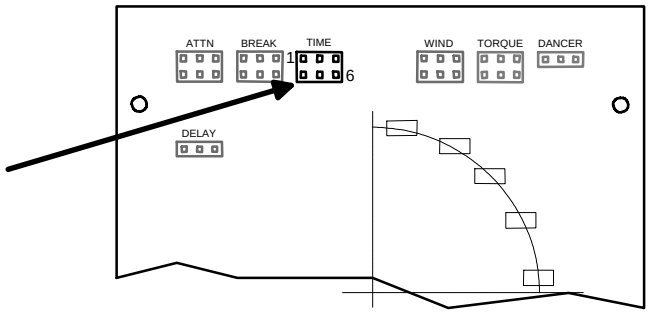


Figure 21

TIME	Sets the time how fast the current rises to its maximum
BREAK	Sets the maximum break current
DELAY	Sets the time when the current will be attenuated
ATTN	Sets the attenuation of the break curent

5.11.5 TIME

The **TIME** jumper is used to select the attack time of the break current. Depending to the mass of the paper rolls three different attack times can be selected.

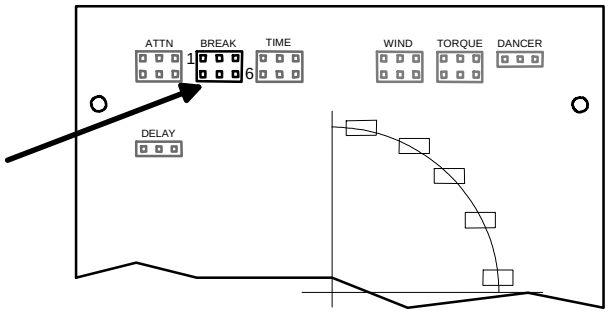


left: slow attack
right: fast attack

Figure 22

5.11.6 BREAK

The **BREAK** jumper is used to set the maximum break current. Depending to the mass of the paper rolls three different break currents can be selected.

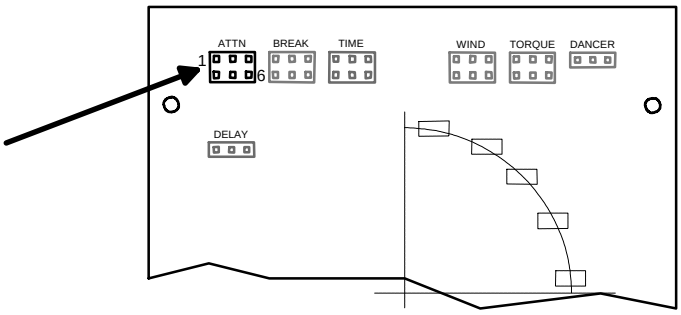


left: lower current
right: higher current

Figure 23

5.11.7 ATTN

The **ATTN** jumper is used to set the attenuation of the break current after the DELAY time.

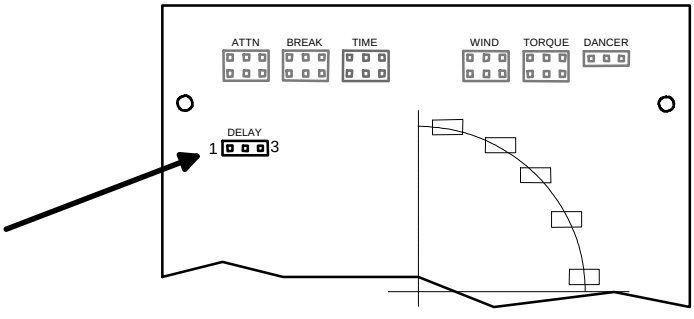


left: higher current
right: lower current

Figure 24

5.11.8 DELAY

After the DELAY time, the break current is attenuated to reduce electrical power loss. The jumper DELAY is used to select a delay time which insures a propper break of the paper roll.



left: long delay
right: short delay

Figure 25

5.12 Midi-unwinder

5.12.1 General information

If the Collamat® 9100 is not pushed to its maximum capacity the unpowered midi-unwinder may be used. As a simple rule the maximum labelling speed should not exceed 1/2 of the maximum labelling speed as defined in the data sheet.

5.12.2 Installation position and mechanical adjustment

Install the midi-unwinder as shown in Figure 26:

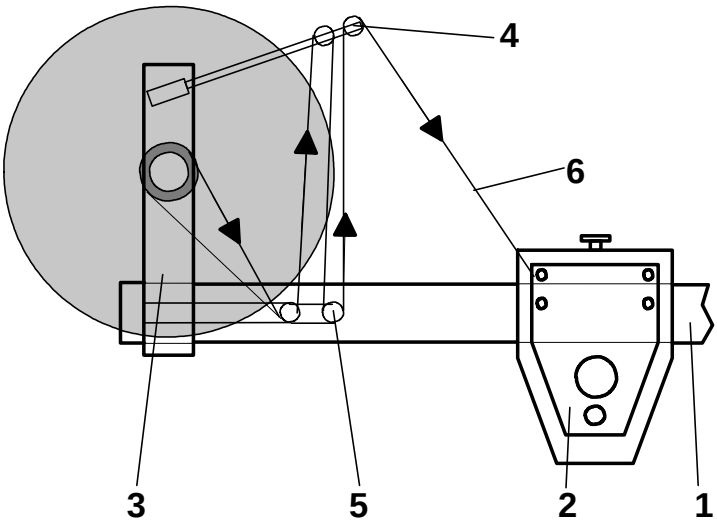


Figure 26: Midi-unwinder

Legend

1. Module rail
2. Traction unit
3. Midi-Unwinder
4. Dancer roller
5. Deflection roller
6. Paper web

The midi-winder is mounted 'above' the module rail. The dancer roller pulls the paper web 'upwards' and its force is adjusted with the spring so that it becomes not too high at the lower stop (see Collamat® 9100 Operating Instructions). When the dancer roller is moved downwards, the brake must release itself so that the traction force of the paper web can turn the mandrel together with the label roll. When the dancer roller moves upwards the label roll stops.

The lower stop must not be touched by the dancer roller in its lower position. When the dancer roller spring force is not correctly adjusted, the traction motor may block because of hits on the paper web.

5.13 Flap adapter

The flap adapter is used to dispense the labels. It peels the labels from the paperweb when the paperweb is pulled around the peeling edge. Figure 27 shows an overall view of the flap adapter:

The flap adapter comprises several assemblies: support **1** to mount the adapter to the module rail, flap **2** for label dispensing and rotary element **3** for lifting.

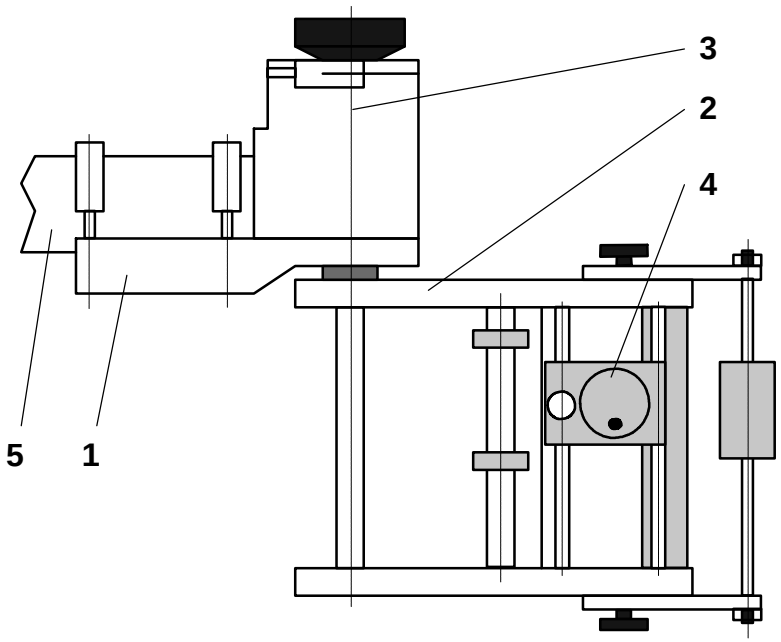


Figure 27: Flap adapter

Legend

1. Support
2. Flap
3. Rotary element
4. Label scanner
5. Module rail

There are two different flap adapters:

- Springloaded flap adapter
- Fixed flap adapter

5.14 Support

The flap adapter is mounted on a sturdy aluminum plate. This plate provides for a stable fixing of the adapter on the module rail and protects the mechanical parts from dirt and humidity.

5.15 Flap

The whole flap is made of corrosion resistant material. The label scanner is placed on two guiding shafts. The optical label scanner operates with reflecting IR-light. Reliable operation of the label scanner is only guaranteed if the mirror is not scratched or dirty.

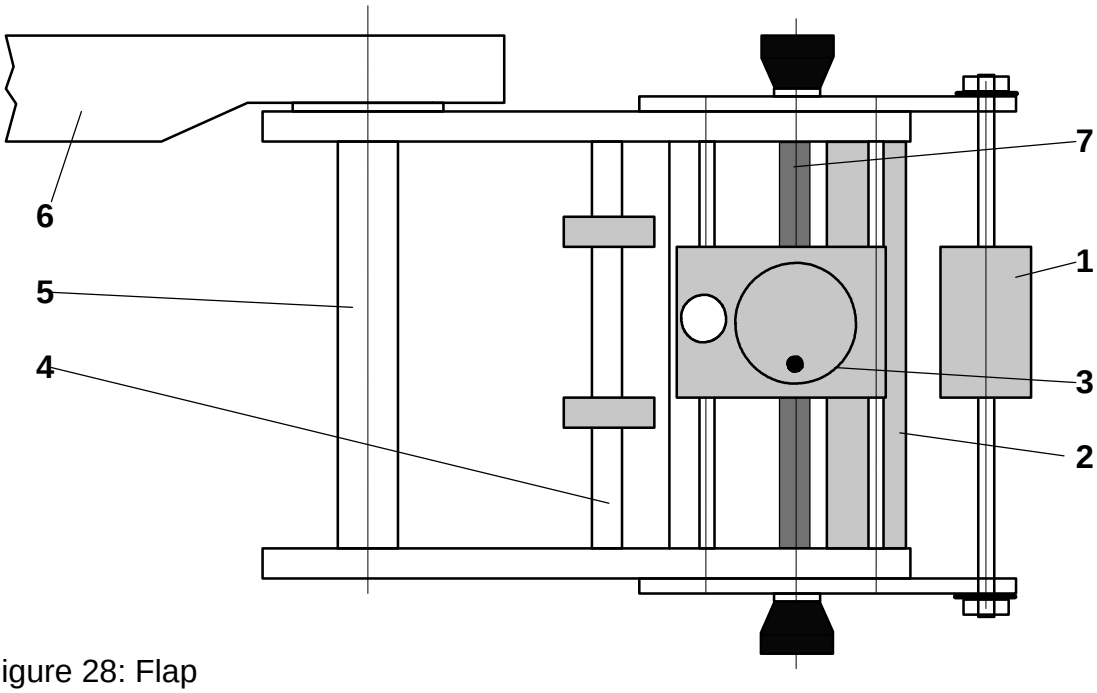


Figure 28: Flap

Legend

1. Pressing roll
2. Peeling edge
3. Label scanner (mechanical or optical)
4. Guiding shaft
5. Deflection roller
6. Support plate
7. Mirror

5.15.1 Exchange of the mirror

Remove the seven screws **7** on the outer lever plate **1**. Now remove and exchange mirror **3**. Reassemble all components in reverse order.

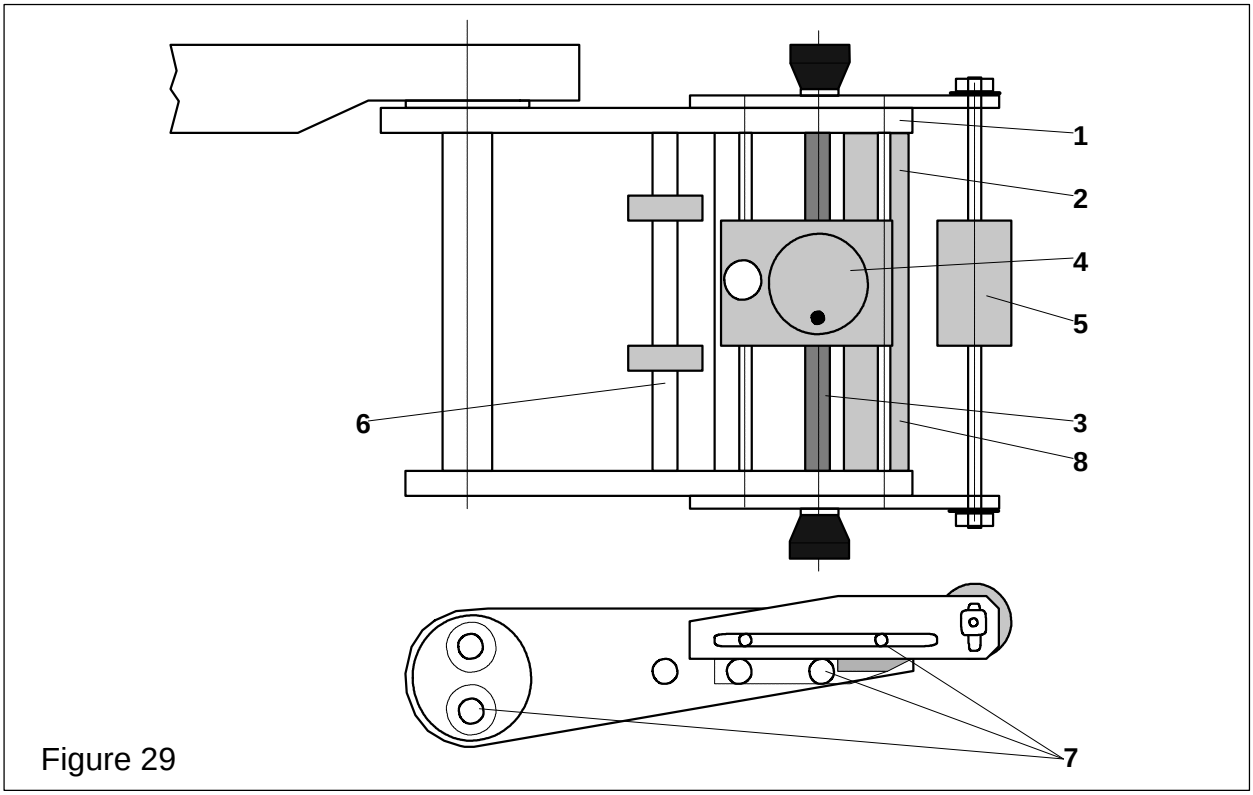


Figure 29

Legend

1. Adapter lever plate
2. Dispensing plate
3. Mirror
4. Optical label scanner
5. Pressing roll
6. Guiding shaft
7. Adapter sink head screws
8. Peeling edge

5.15.2 Exchange of peeling edge

Remove the seven screws **7** on the outer lever plate **1**. Now remove the two fixing screws of the dispensing plate **8** and exchange it. Reassemble all components in reverse order.

When fixing the peeling edge 8 on the dispensing plate 2, the peeling edge must fit exactly into the stage of the dispensing plate.

5.15.3 Roller dispenser edge (option)

For wide paper webs and high labelling speed we recommend to mount a roller dispenser edge to reduce the torque of the traction unit motor.

To fix the roller dispenser edge, first remove the outer lever plate **1** as described in figure 29. Now exchange the dispenser edge and mount the peeling roller into the drilled hole of the outer lever plate. Reassemble all components in reverse order. Keep care that the peeling roller turns smoothly.

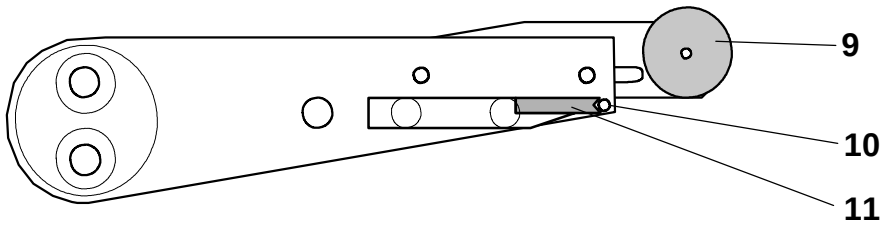


Figure 30: Roller peeling edge

Legend

9. Pressing roll

10. Peeling roller

11. Dispenser edge

5.16 Optical label scanner

The optical label scanner is made of corrosion resistant material. It can be shifted laterally or removed by releasing the knurled screw **6**.

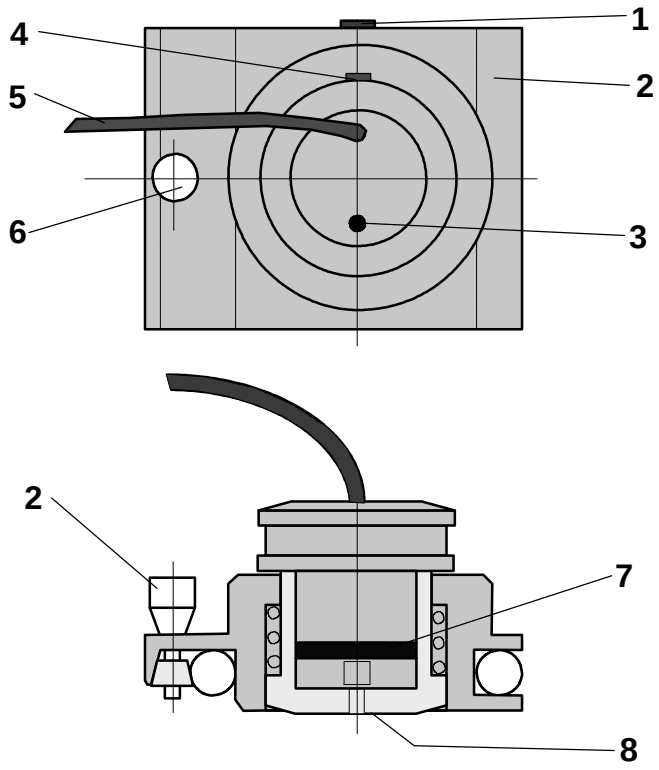


Figure 31: Optical label scanner

Legend

1. Fixing screw
2. Case
3. LED
4. Cable fixer
5. Cable
6. Knurling screw
7. Sensor p.c.board
8. Bottom screw

5.16.1 Replacement of the sensor p.c.board

Open the scanner after removing it from the adapter by opening the screws **1** and **8**. Release the cable fixer **4** and plug out the sensor board carefully. Replace it and reassemble all parts in reverse mode.

6 THE C9100 MONITOR

Before opening the monitor unplug the mains plug. Charged capacitors inside the monitor may lead to shock hazard. After unplugging wait at least 10 seconds before opening the monitor.

6.1 Construction

The electronics control of the C9100 labeller is built in a stable, elegant steel cabinet containing no adjustable controls. All settings are done via keyboard. By removing the two screws from the back panel the cover can be separated from the housing bottom.

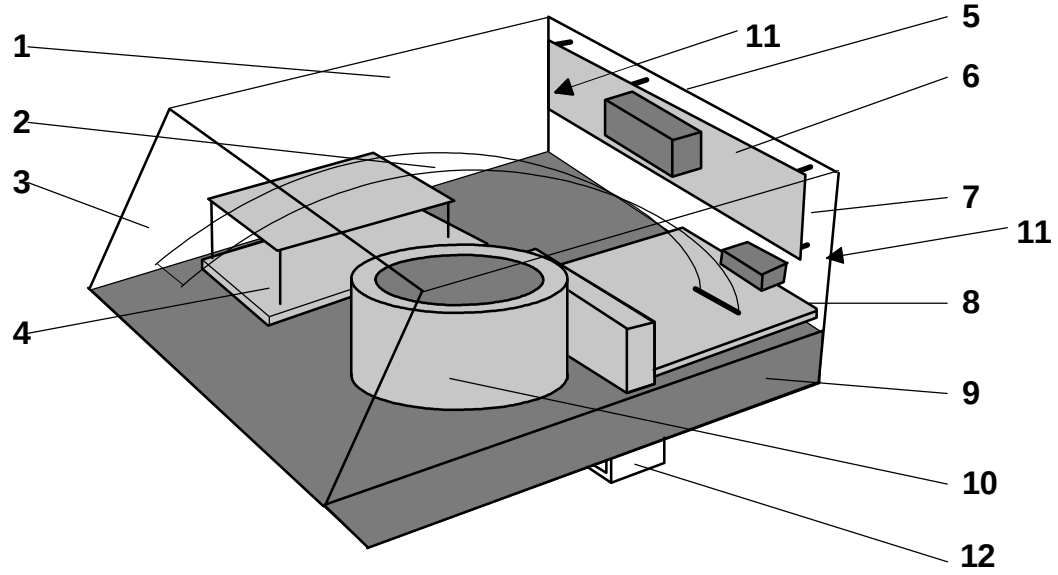


Figure 32: Monitor

Legend

1. Cover
2. Flat Cable
3. Control panel / controller p.c.board
4. Motor driver
5. Back panel
6. Mains filter p.c.board
7. Mains switch
8. Interface p.c.board
9. Heatsink
10. Transformer
11. Locking screws
12. Mounting clamp

Cover **1** carries control panel **3** and protects the assemblies inside the monitor. It can be removed from heatsink **9** by unscrewing the screws **11** and slightly shifting the cover frontwards.

ATTENTION:
Remove cover carefully. Otherwise the flat cable 2 will be torn out so that the flat cable or its connectors may be damaged.

ATTENTION:
The electronic components of the control panel must not be touched without ESD safety precautions. The controller is sensitive to electrostatic discharge.

6.2 The control panel

The control panel of the C9100 monitor is a stand-alone unit containing a microprocessor. It has the function of both a front panel and a control and management processor. All settings of the Collamat® 9100 are programmed and handled in this unit and stored in the control panel even if the power is turned off.
The monitor and control panel can be mounted in two different positions (see figure 33). Therefore the panel is fastened with six fixing bolts to the cover. It can be removed or assembled by clicking it out or in from or onto the cover. Take care to the flat cable position. It must not be twisted or squeezed.

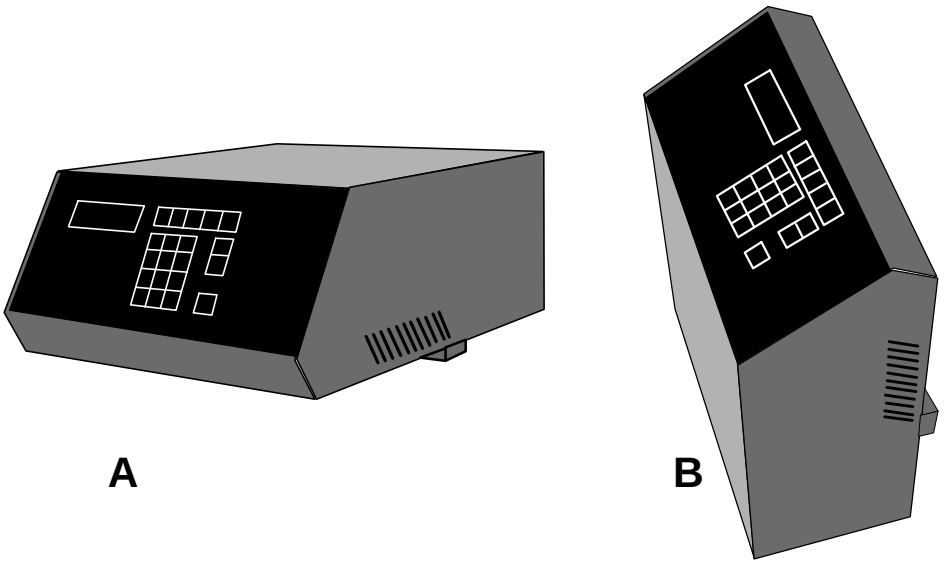


Figure 33: Installation modes

When removing the front panel from the cover, keep care that the fixing bolts are not damaged. After reassembling the front panel with the cover spread the fixing bolts a bit with a little screwdriver or a tool that fits the small slots of the bolts by hand without applying too much force. The front panel must fit tight to the cover.

ATTENTION:
When assembling or disassembling the front panel, the conductor side or the front panel may be damaged. Do not use sharp tools like knives or screwdrivers. Pay attention to the ESD safety precautions !

6.3 Construction

The control panel contains ESD sensitive components. When opening the control panel observe the ESD safety precautions.

If a control panel component is defective it must be exchanged. For any repair not made by Collamat Stralforsthe guarantee will become void.

Control panel and front panel are a constructive unit connected with a 50 conductor flat cable to the interface p.c.board. The power supply of the flat cable and the signals to the controller are supplied via this flat cable. All electronic components are soldered in SMD technology onto the p.c.board.
The front panel contains the keyboard equipped with short stroke contacts under the front foil. The keys have a clicking function helping to clearly feel their functioning. So it is easier to operate in a noisy environment.
The LCD display is, like the LEDs for the operation mode display, covered behind the front panel foil. Figure 34 is a rear view of the control panel. All SMD components, the LCD-display and the flat cable connector are placed here.

6.4 Hardware

The circuit is controlled by a H8/532 microcontroller serving the LC display, the keyboard and the control lines to the motor driver and to the labeller. All inputs and outputs of the p.c.board are protected from electromagnetic interferences (RMI) with filters assuring a safe operation and preventing the p.c.board from perturbing radiation to the outside. Figure 34 shows the component side of the control panel.

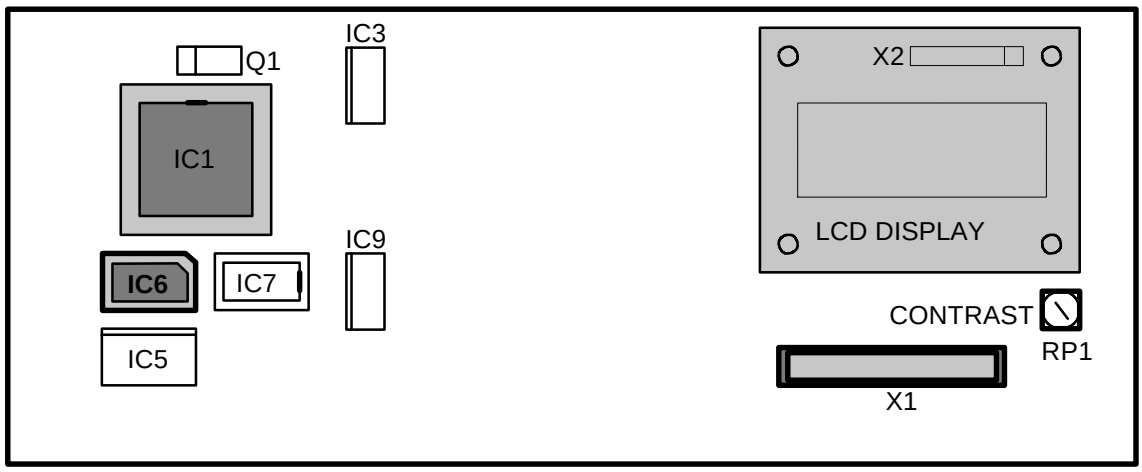


Figure 34: Rear view of control panel

6.4.1 IC6 program memory, EPROM 128 Kbytes

The software is programmed as firmware into a 27C010 type EPROM housed in a PLCC-package. To exchange the EPROM a special **PLCC extracting tool** is necessary. The position of the EPROM is shown in Figure 34.
When inserting the EPROM, note that the beveled edge of the package fits the oblique side of the socket. Press the EPROM slightly with the finger into the socket until it snaps in.
The **IC6** program memory is programmed with the firmware of the two Collamat® types **8600 and 9100**. The firmware detects automatically the monitor by a specific code of the interface p.c.board.

ATTENTION:
If the EPROM is extracted with an incorrect tool, the socket may be destroyed.

6.4.2 The LCD display

The LCD display has four lines with 20 characters each and shows all the user information and the labeller states. The background illumination affords a good legibility also in dark environment. It can be turned on and off by the microcontroller.

6.4.3 Adjusting the contrast

Trimmer **RP1** placed on the component side allows to adjust the contrast (see also Figure 34). It has to be adjusted with a special screwdriver for SMD components. Any other kind of tool may damage the trimmer. Never apply force to the trimmer !

6.4.4 Exchanging a defective LCD

First remove all four fixing screws of the LCD. Then unsolder carefully all 16 soldering points of connector X2 from the LCD. Now plug in the new LCD in connector X2 and fasten it with the fastening screws. Before resoldering the pins be carefully that seat and parallelism of the LCD are exact.

Before exchanging the LCD be carefully to observe the guarantee provisions. For broken LCDs the guarantee will become void ! The same applies for unauthorized soldering on assemblies.

6.5 The back panel

The back panel comprises the mains connections and the labeller connection socket. The mains is connected to the mains filter p.c.board which contains the mains plug and the mains switch, the fuses, the mains filter and socket and an additional noise filter for the motor driver.

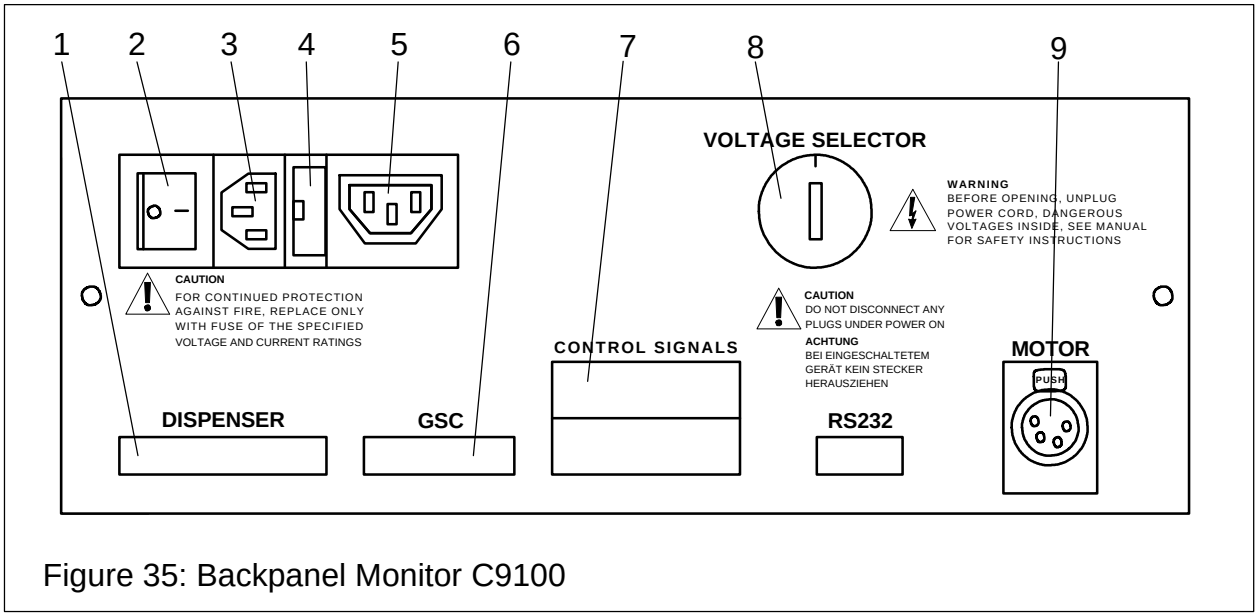


Figure 35: Backpanel Monitor C9100

Legend

1. Labeler connector
2. Mains switch
3. Mains plug
4. Fuse holder
5. Mains socket
6. Goods scanner connector
7. Signal relais connector
8. Voltage selector
9. Motor connector

Only units approved by Collamat Stralforsare allowed to be connected to the mains socket **5**. The following table shows the fuse current ratings and the maximum permissible current for the mains socket:

Mains-voltage (VAC)	Mains-fuse	Peak-current	Monitor-fuse	Max. load current
110/120 VAC	20 AT	30 Â, 20 ms	**10 AT**	2 A
220/230/240 VAC	10 AT	30 Â, 20 ms	**5 AT**	1 A

The **monitor** must be the **first** unit which is **switched on** in a heavy loaded mains. Otherwise the inrush current may blow the mains fuse.

The signal relay contacts 7 only may be used to signalize operation conditions of the Collamat®. These contacts must not be used to switch self-powered or dangerous units.

The connector diagrams of the labeller connection **1**, the goods scanners **6** and the signal relay **7** are shown in the chapter 'C9100 monitor pin assignment'.

6.6 The mains filter p.c.board

The mains filter p.c. board is used to supply a filtered mains voltage to the transformer. The p.c.board is mounted on the back panel and contains components on both sides. The mains filter p.c. board comprises a high-performance mains filter, the voltage selector, the mains plug and socket for the transformer and the mains fuses. The mains filter p.c.board also comprises the RMI-noise suppression filters for the motor driver. Figure 36 shows the mains filter p.c. board.

CAUTION: Do not disconnect any plug with power on ! Mains voltage is applied to the mains filter p.c.board ! Danger of shock hazard due to high voltage at components !

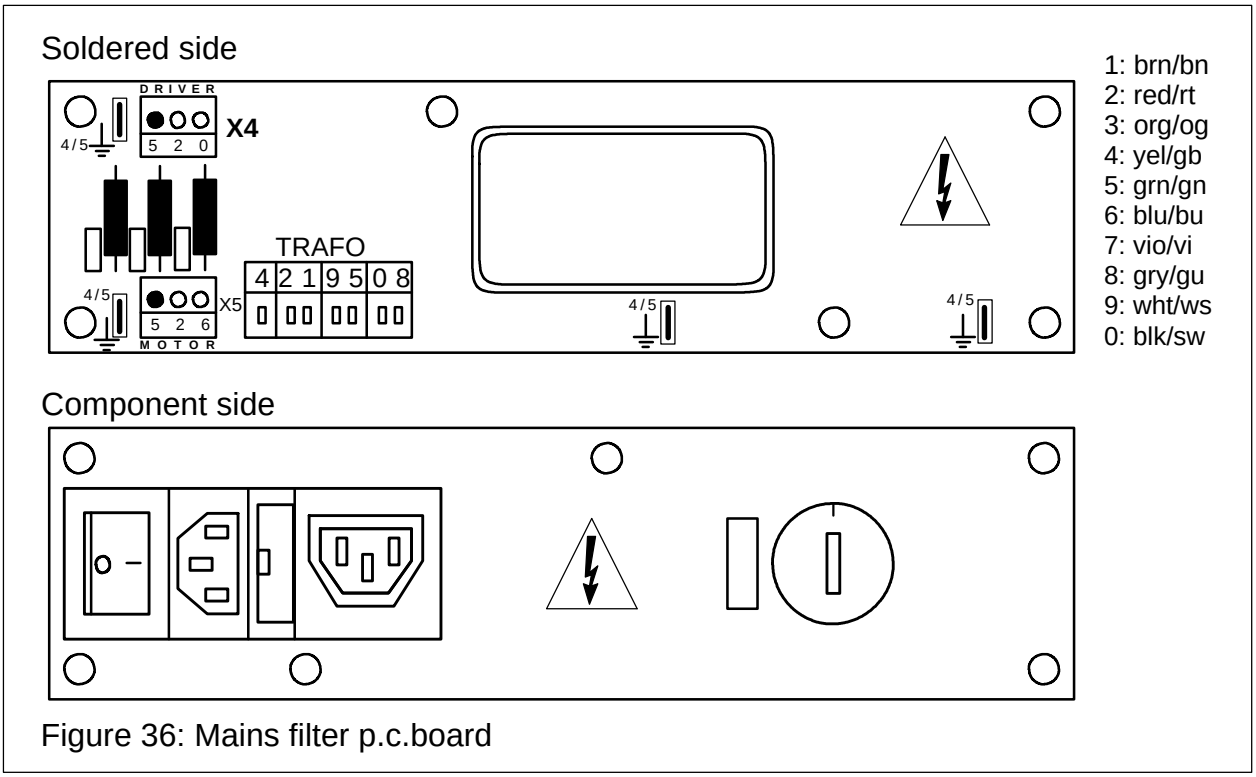


Figure 36: Mains filter p.c.board

6.6.1 Exchange of mains filter p.c.board

To exchange the mains filter p.c.board first disconnect all cables on the p.c.board. Then the board can be removed after unscrewing the six screws. Fasten the new p.c.board with the six screws on the spacer bolts. Reconnect first the motor cables and then all other cables. Figure 37 shows the wiring of the mains filter p.c.board.

ATTENTION:
After exchange of the mains filter p.c.board all four grounding cables must be reconnected. Otherwise shock hazard or malfunction of the monitor may result.

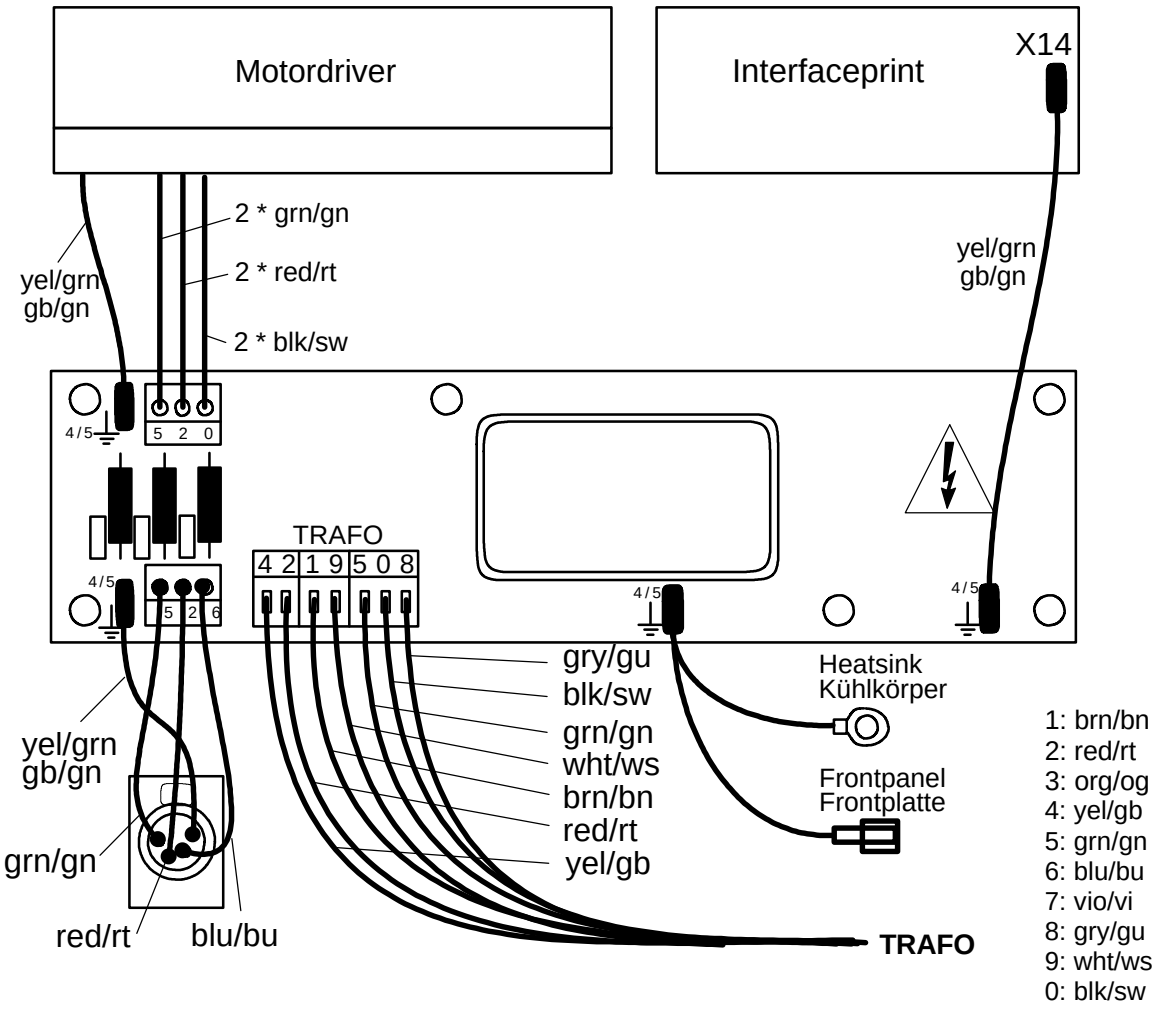


Figure 37: Wiring of the mains filter board

ATTENTION:
After exchange of the mains filter p.c.board, the voltage selector must be set to the correct mains voltage to which the Collamat® has to be connected.

6.7 The interface p.c.board

The interface p.c.board is used to connect the labeller and its peripherals to the monitor. It filters and converts the signals of labeller and installation control to the logic level of the controller. The interface p.c.board also contains the electronic parts of the power supply unit and feeds the motor control signals to the motor driver. Figure 38 shows the position of the interface p.c.board.

6.7.1 The power supply

The mains transformer is connected to the terminals X11 and X12. The motor driver voltage is connected to terminal X11. Fuse F1 protects this voltage from overload. LED **LD1** indicates the **120V** for the motor driver.

The supply voltage for the logic, the sensors and the winders is connected to terminal X12. Fuse F2 protects this voltage from overload. LED **LD2** indicates the presence of **24V**. The voltages 12V and 5V are generated from the 24V using switching controllers. LED **LD3** indicates the **12V**, LED **LD4** indicates the **5V**.
The 5V and 12V supplies are short-circuit proof and protected from overload.

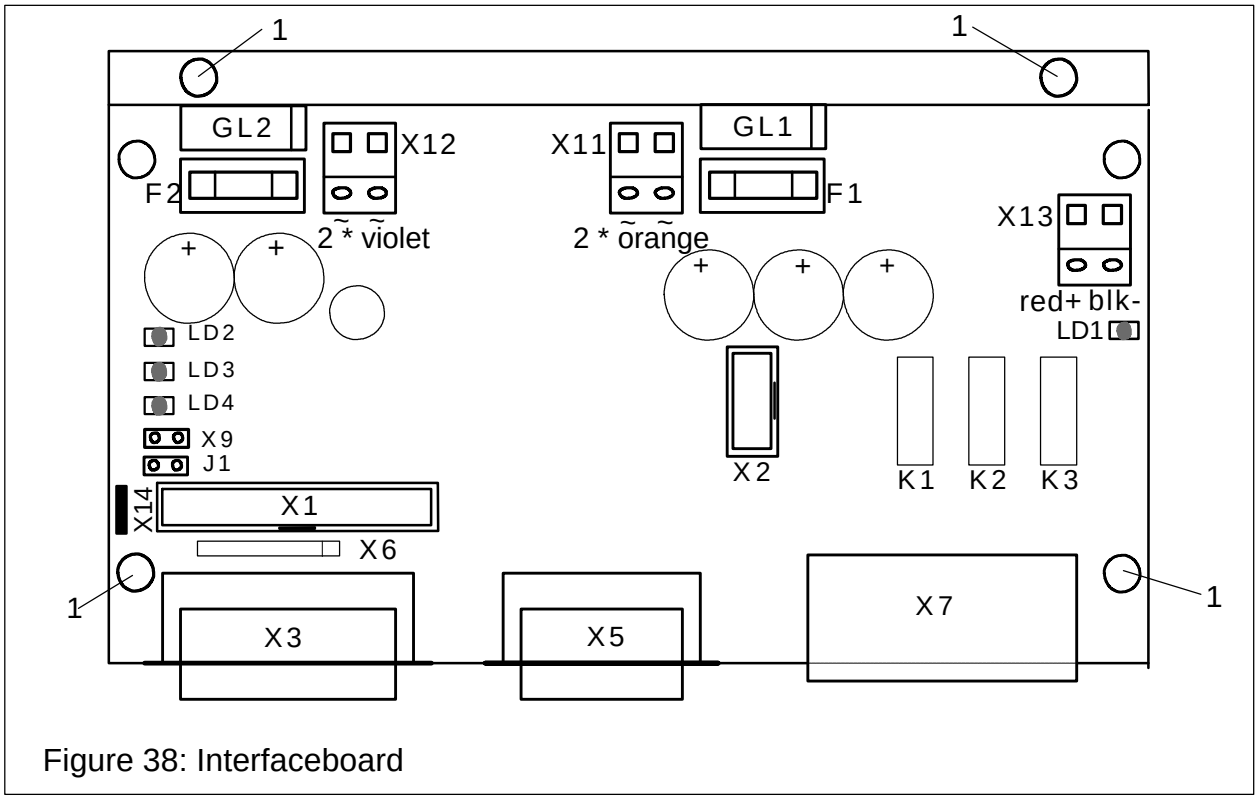


Figure 38: Interfaceboard

The following table shows the voltage and fuse values of the interface p.c.board:

Voltage	Current	Fuse	Terminal ~	Terminal =	LED
120 V	2,2 A	F1 : 4 AT	X11	X13	LD1
24 V	6 A	F2 : 10 AT	X12	-	LD2
12 V	500 mA	-	-	-	LD3
5 V	1 A	-	-	-	LD4

6.7.2 Fuses

If there is no voltage 120V or 24V the associated LED is not lit. If there are no 24V there are also no 12V and 5V. Each voltage has its own LED. (See also above table.) If a voltage is missed, its fuse must be checked. The fuses are placed under the heatsink on the interface p.c.board. If the fuse is blown first check the cause. The fault must be eliminated before the fuse is replaced.

6.7.3 Exchanging the interface p.c.board

To exchange the interface p.c.board first disconnect all cables. Then slacken the four fastening screws **1** and remove the p.c.board. Carefully insert the new p.c.board and fix it with the four fastening screws **1**. Finally reconnect all cables.

6.7.4 Terminals and connectors

The following table lists up the terminals and connectors of the interface p.c.board:

Terminal Connector	Description
X1	Flatcable connector to the frontpanel
X2	Motor clock and monitoring signals of the motor driver
X3	Labeller connector
X5	GSC-connector for the goods scanners
X6	Serial port for factory testing
X7	Signal relay contacts
X9	Key operated switch
X11	Voltage supply from transformer, 85 VAC
X12	Voltage supply from transformer, 19 VAC
X13	Voltage supply to motor driver p.c.board, 120 VDC
X14	Ground connector to the power filter p.c.board

6.7.5 Particularities

Attention:
When unplugging the flat cable carefully pull it out from X1 to avoid any damage. When reinserting pay attention to plug it in over the whole width.

Connector X6 is used to test the monitor using a serial connection to a PC. Also a n additional RS232 Communication set is available which must be plugged in X6.
Connector X7 makes floating potential relay contacts available allowing to control external units such as signal lamps or PLCs. Also an external signal input, to Start or Stop the Collamat® is provided.
Connector X9 is used to indicate the firmware there is a keyswitch attached. The keyswitch is then connected to J1. If the Key makes contact to J1 the user level is set to **PROGRAMMER**, otherwise it is **OPERATOR**.
This connector X9 together with Jumper J1 also is useful when the password is lost. The password can then be cleared by entering **'0000'** in the password setting menue. See also chapter **Password**.
The ground connection X14 is used to connect the grounding wire to the mains p.c. board. If this grounding is not plugged in, malfunctions of the labeller may occur.

6.8 The motor driver

The motor p.c.board is an assembly developed and produced by a well-known manufacturer of stepper motor controls.

The motor driver p.c. board is adjusted, tested and built into the monitor by Collamat Stralfors. Do not change any setting ! Do not change the motor phase current !
ATTENTION: Do not change any switch or jumper position under voltage !

DANGER:
Disconnect all voltage supplies before working on the motor driver !

6.8.1 Settings

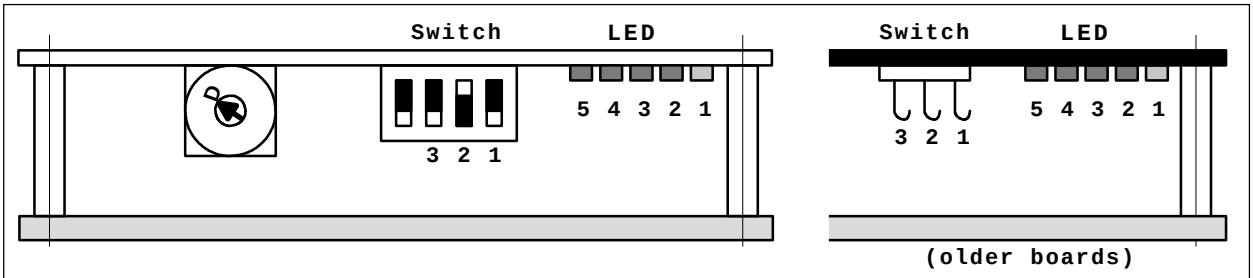


Figure 39: Motor driver settings

Set the hook switches S1, S2, S3 and the selector switch to the following positions:

S1 : open	**S2 : closed**	**S3 : open**	**Selectorswitch : D**

6.8.2 Status indicators

The five LEDs on the motor driver indicate operating states and faults:

LED 1	lights up when the motor driver operates properly. The supply voltage exceeds 80 VDC.
LED 2	lights up in case of a short-circuit between two motor phases.
LED 3	lights up in case of excess temperature (> 75°) of the heatsink.
LED 4	lights up in case of overvoltage (>140 V) during operation with brake.
LED 5	lights up in case of undervoltage (< 80 V).

NOTE:
If a fault occurs (LED2 to LED5), the motor is deenergized and LED1 goes out. The fault condition is displayed on the monitor and can only be cleared by switching the monitor off and on.

6.8.3 Exchanging the motor driver

First remove the two connector clamps. Then unplug the connector and screw off the motor driver from the heatsink. Screw down the new motor driver, connect it to its cables and secure it by the connector clamps.
When assembling pay attention that no dirt is between cooling plate and heatsink.

6.9 The connector box 9100

The signals of the C9100 monitor are fed in one cable to the connector box on the labeller. There all electrical modules of the labeller with the exception of the stepper motor are connected. The following Figure 40 shows the position of the connector terminals in the connector box. On the connector p.c.board the wire colors are marked with the numbers of the resistor color code. These colors are valid for Collamat Stralfor-speripherals. The connection cables of the modules are fed through the lateral conduit glands.

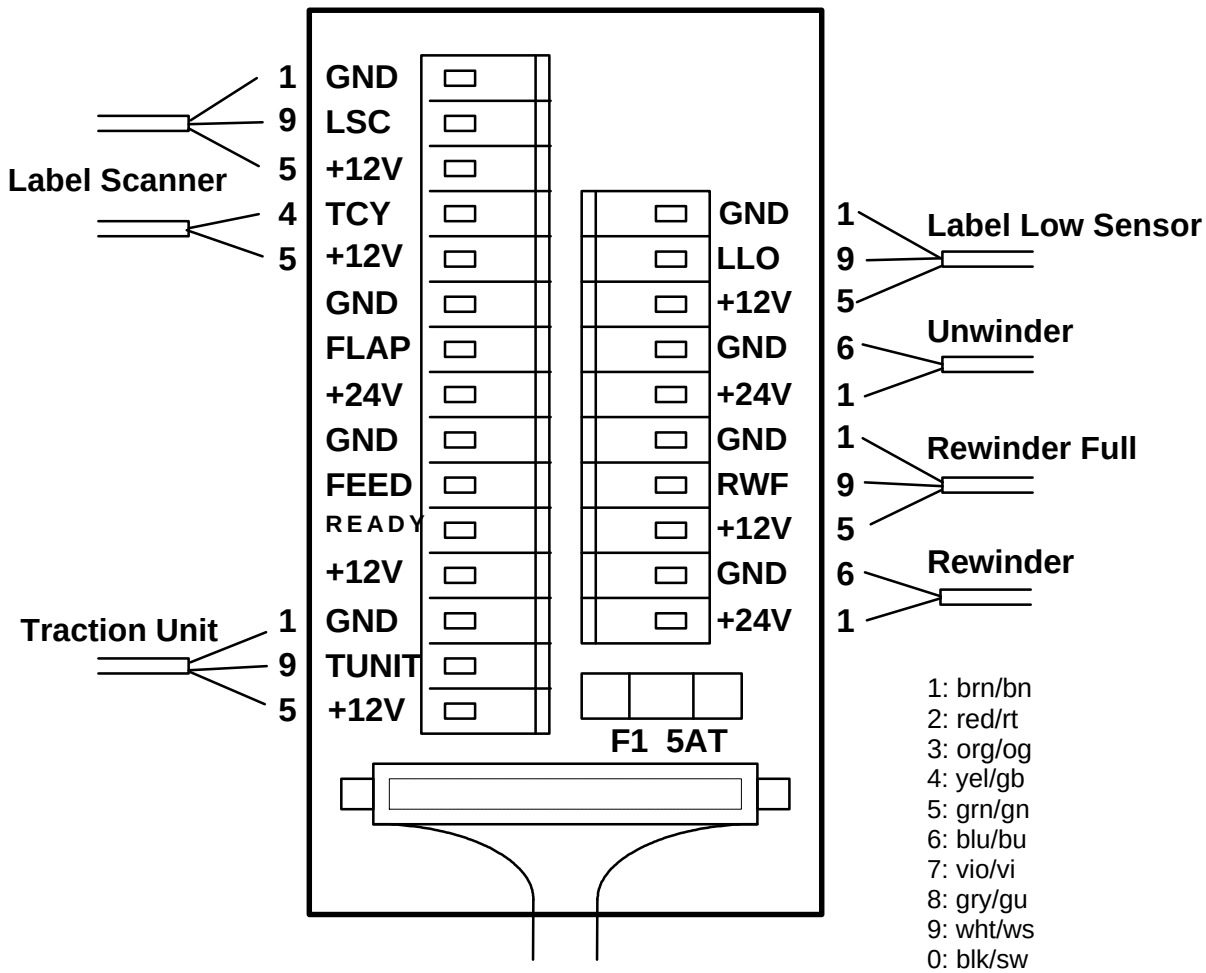


Figure 40: Connector print

6.9.1 Fuse F1, 5A slow blowing

Fuse F1 protects the 24V power supply of the winders from short-circuit and overload. If one or both winders are dead, first check this fuse.

6.10 Control signals for external units

The **FEED, FLAP** and **READY** signals are used to control external units.

6.10.1 FEED

The **FEED** signal indicates that the labeller is dispensing, i.e. that the stepper motor turns. With this signal e.g. an external flat printing unit can be controlled. See also Figure 41.

6.10.2 FLAP

The **FLAP** signal is used to control an external flap adapter control. The end of the signal can be delayed via the monitor. It starts together with the FEED signal. See also the following Figure 41:

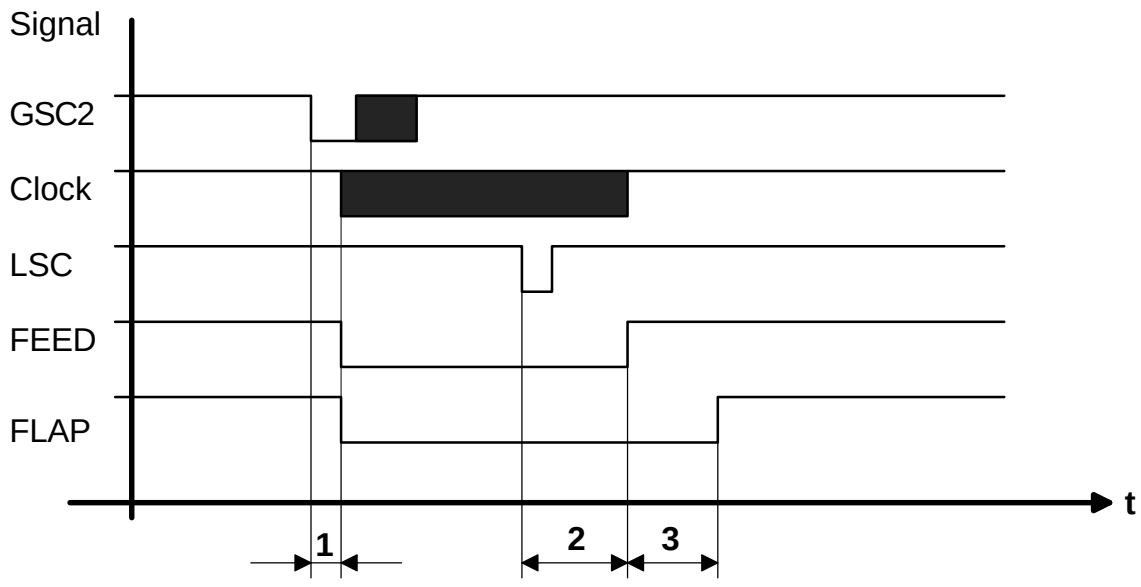


Figure 41: Signal FEED and FLAP vs. time

1. Speed dependent position delay
2. Length of predispensing
3. Time delay of FLAP signal

All signals are open collector towards ground signals and capable to drive a maximum load of 100 mA. See Figure 46.

7 Signals and connector pin assignments

This chapter describes the signals of the Collamat® 9100. All inputs and outputs are described functionally and electrically. Also the pin assignments of the monitor connector are described.
All inputs and outputs are equipped with filter elements to protect from electromagnetic interferences. These components also prevent interferences caused by electrostatic discharges. The interference may cause a malfunction of the Collamat® 9100. Anyway, when installing the labeller observe the rules concerning RMI and ESD to prevent such interferences. These rules are listed later in this manual.

7.1 Inputs

There are two different kind of inputs:

- **Photocoupler inputs :** isolated by photocouplers
- **Comparator inputs :** with ground referenced comparator

7.1.1 Photocoupler inputs

The photocoupler inputs are used to connect external equipment which may have a different grounding or another ground reference. Thus circulating ground compensation currents through the inputs and consequently faults are avoided. All photocoupler inputs are protected from wrong polarity and overvoltage. Figure 42 shows the diagram of the photocoupler inputs:

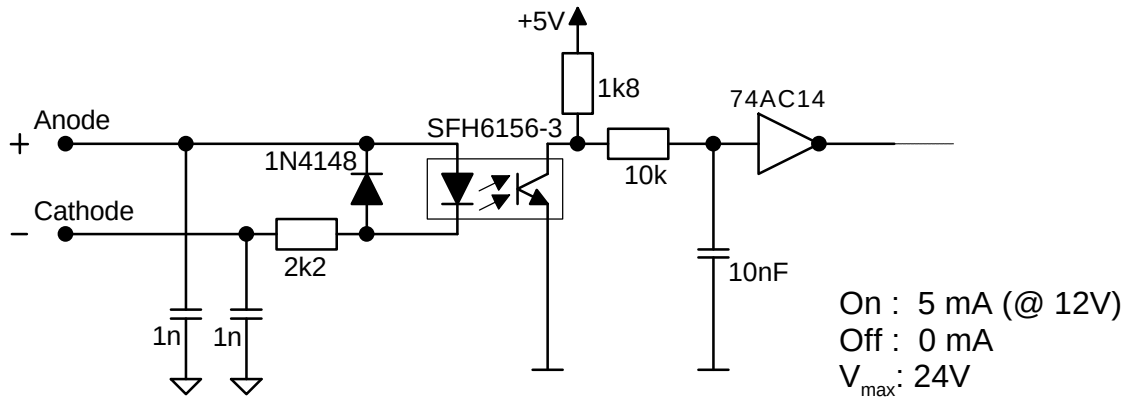


Figure 42: Photocoupler input diagram

The input is active when a current higher than 5 mA (at 12V) flows through the photocoupler LED. The maximum input voltage is 24V.

The following input signals are equipped with photocouplers:

- **GSC1** Incremental encoder or measuring goods scanner
- **GSC2** Goods scanner
- **GSC3** Goods scanner for nonstop labelling or external counter
- **NSTPI** Control signal for nonstop labelling
- **STOP** Control input for external control

7.1.2 Comparator inputs

The comparator inputs are used to connect the peripheral unit signals generated by the labeller. They are fed via the **DISPENSER** plug through a cable to the monitor. The peripherals are connected to the connector box.
The inputs are protected against wrong polarity and they are active when GND (0V, ground) potential is applied. (The peripheral units of Collamat Stralfors have NPN-outputs towards 0V.) Figure 43 shows the input diagram of the comparator inputs:

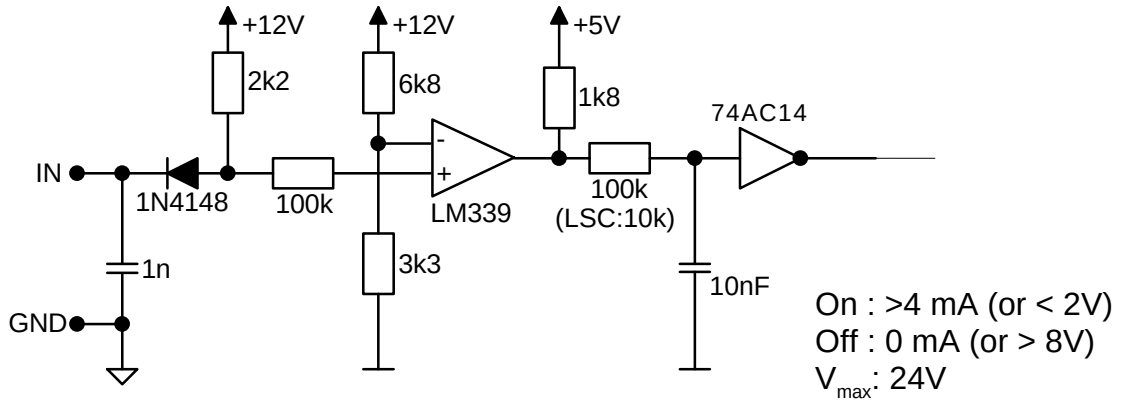


Figure 43: Comparator input diagram

The inputs are active when a current of minimum 4 mA flows towards GND.

The following input signals are equipped with comparators:

- **LSC** Label scanner
- **TUNIT** Traction unit, paper end sensor
- **READY** READY-signal from flat printer
- **LLO** Paper stock control, unwinder empty
- **RWF** Rewinder full

7.2 Functional description of inputs

7.2.1 Goods scanners GSC1 and GSC2 (Good SCanner)

The inputs **GSC1** and **GSC2** are used to detect the goods. For all three modes (fixed speed, measuring and incremental) GSC2 is used to detect the goods. GSC1 is used for speed measurement.

- For a fixed speed GSC1 has no function
- For the detection with measuring scanner GSC1 is the first activated scanner seen in transportation direction. (GSC1 must first be interrupted.) The mechanical distance to the second scanner GSC2 can be programmed between 10 mm and 100 mm).
- For the speed measuring with an incremental encoder, GSC1 is connected to the clock output of the encoder.

Both inputs are lead to the **GSC** connector on the backpanel of the monitor. The inputs can be connected either to NPN- or PNP-sensors. Figure 44 shows how to connect the GSC inputs.

7.2.2 Goods scanner GSC3

The input **GSC3** is used to count the goods in the Nonstop labelling mode. The input also can be used to count goods or events. Therefore the counter must be programmed to EXTERNAL. The input GSC3 will be connected to the GSC connector. The wiring is the same like the other two GSC inputs. Figure 44 shows how to connect the GSC inputs.

7.2.3 Control input NSTPI (NonSToP In)

The **NSTPI** input is used for the connection of two Collamat® in the Nonstop labelling mode. The wiring of the nonstop mode is described in the chapter Nonstop labelling. This input will be connected to the GSC connector.

7.2.4 Control input STOP

The **STOP** input is used to stop or start the Collamat®. It has the same function like the RUN/STOP key on the control panel. If the signal is activated while the Collamat® is stopped the Collamat® will be started (RUN) and vice versa.
The relais contacts are activated according to the momentary mode. The counting of the goods will be continued anyway. Error messages will not be cleared. The connection of this signal is done the same way like the GCS signals. It must be connected to the CONTROL SIGNALS connector. Figure 44 shows how to connect the STOP input:

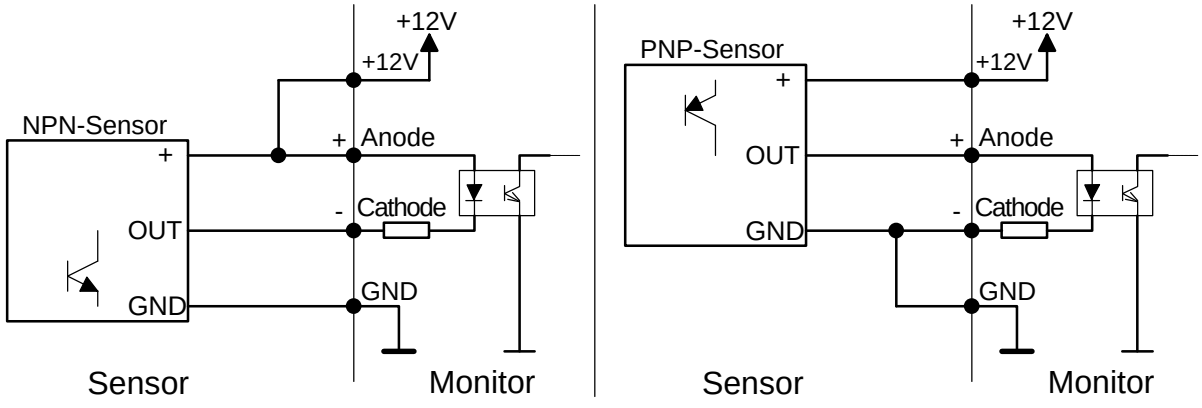


Figure 44: Connection of photocoupler

All comparator inputs are taken to the DISPENSER connector. From there the signals go to the connector box on the modular rail. The peripheral units are all connected to the connector box.

7.2.5 LSC (Label SCanner)

The LSC input is connected to the label scanner. This input has a fast response time for accurate scanning of the label position while transportation. As labels scanners all NPN-sensors can be connected to the connector box.

7.2.6 TUNIT (Traction UNIT)

The signal **TUNIT** is used for the supervision of the traction unit. In the traction unit two signals are observed. The first sensor observes the locking sensor of the tractionroller. The second sensor observes the paperend. For the paperend sensor an alternative sensor may be used.

7.2.7 READY

The signal **READY** is used to signal the Collamat® that a connected peripheral device like hotstamp or flatprinter is ready. When the signal is active, it means the NPN-output of the device is pulled to GND, labelling is not possible. An error message is then displayed.

7.2.8 LLO (Label LOw)
7.2.9 RWF (ReWinder Full)

The two signals **LLO** and **RWF** are used to observe the diameter of the winders. The standard sensors of Collamat Stralfors are equipped with NPN-outputs and are connected to the connector box.

7.3 Outputs

Also for the outputs we have two different kind of outputs:

- **Isolated outputs**
- **Open-Collector outputs**

7.3.1 Isolated outputs

These outputs are completely isolated to the monitor. There are three relais outputs and one photocoupler output. The relais outputs are capable to drive signaling lamps or an external PLC. Figure 45 shows the electrical diagram of the isolated outputs.

ATTENTION:
The relais outputs must not be used to switch dangerous self-driven units.

If the relais outputs are active the contacts **A and C** are connected together. If not active **R and C** are connected together. See also figure 45.

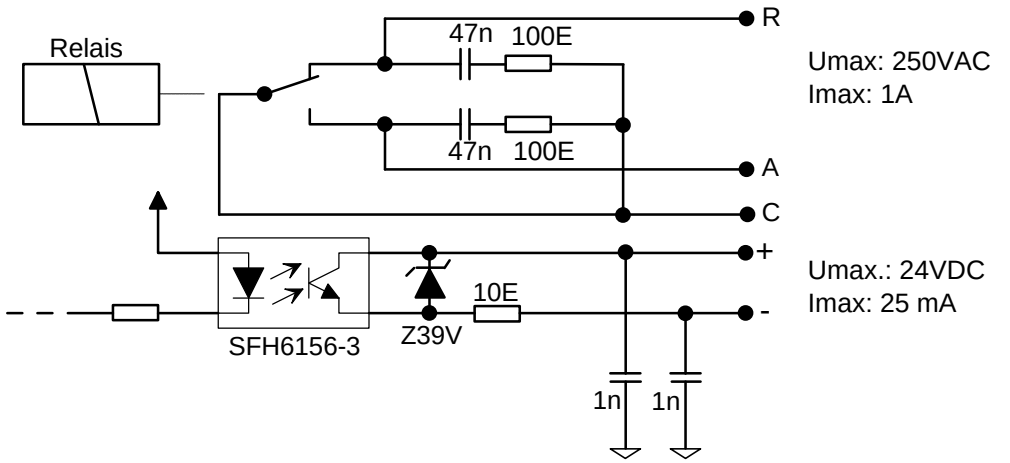


Figure 45: Floating outputs

The following outputs are floating:

- **RUN** Relais output indicates RUN mode
- **NOK** Relais output indicates a WARNING message
- **ERROR** Relais output indicates an ERROR message
- **IFEED** Photocoupler, isolated FEED-signal

7.3.2 Open-Collector outputs

The Open-Collector signals are used to switch and control external units. Figure 46 shows the electrical diagram of these outputs. The outputs are equipped with an internal free wheeling diode. If an inductive load is switched an additional external diode is necessary.

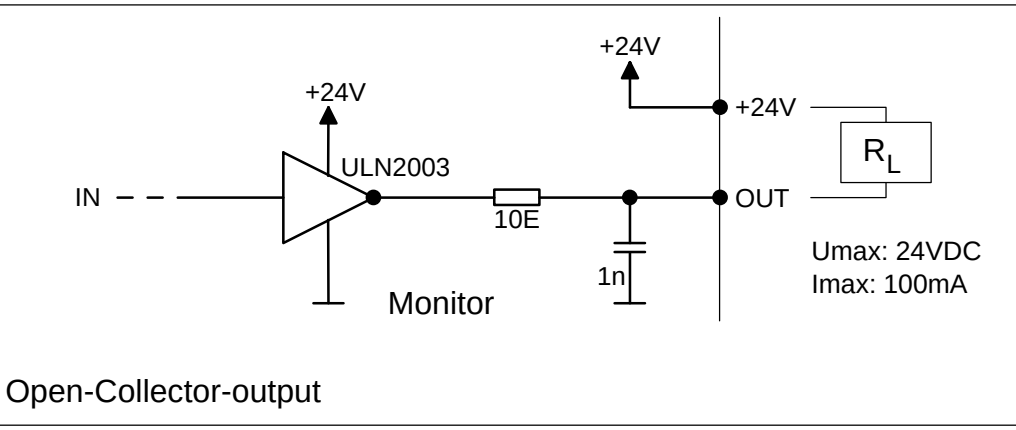


Figure 46: Open-Collector-output

The following Open-Collector-outputs are available:

- **FEED** Indicates that the traction motor is turning
- **FLAP** Signal to control an external flap adapter magnet
- **CLOCK** Steppermotor clock for synchronizing external units
- **NSTPO** Nonstop control signal

7.4 Functional description of the outputs

7.4.1 Mode indicator RUN

The **RUN** relais output indicates the RUN or Stop mode of the labeler. The output is activated while the Collamat® is in the labelling mode. If the Collamat® is stopped the relais output is not activated.
The output RUN can be used to activate a green lamp.

7.4.2 Warning signal NOK (Not OK)

The **NOK** relais output indicates a warning condition. There are many reasons which cause a warning. The cause is displayed on the control panel. To confirm and clear the NOK signal first the cause of the warning must be eliminated. Then the ENTER key must be pressed on the control panel.
The output NOK can be used to activate a yellow lamp.

7.4.3 Error signal ERROR

The **ERROR** relais output indicates an error condition. There are many reasons which cause an error. The cause is displayed on the control panel. To confirm and clear the ERROR signal first the cause of the warning must be eliminated. Then the ENTER key must be pressed on the control panel.
The output ERROR can be used to activate a red lamp.

7.4.4 Connection of a signalisation to the monitor

To connect the signal lamps like described above it can be wired like shown in figure 47. The connection is made to the CONTROL SIGNALS connector.

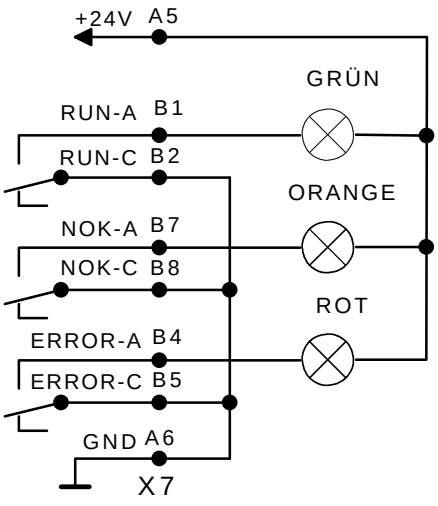


Figure 47: Connection of a signalisation lamp

7.4.5 Signal FEED, IFEED

The signal **FEED** is always active when the steppermotor is turning. This signal indicates an external printing unit that the paper is moving or stopped. The flatprinter analyses the rising edge of this signal for the printing action. The time diagram of the FEED signal is shown in figure 41.
The signal IFEED is a copy of the FEED signal. It is completely isolated by a photocoupler from the electronic parts. This signal can control a strange printing unit completely floating. Thanks to the photocoupler the signal can be used for NPN- or PNP-inputs. The polarity of the IFEED signal can be adjusted on the control panel. NORMAL means that the signal is with the same polarity of the FEED signal. INVERSE means that it is inverted to the FEED signal.

7.4.6 Flap adapter signal FLAP

The signal **FLAP** is used to control the flap adapter. The setting ADAPTERMAGNET is used to turn on or off this signal while labelling. If it is turned on the signal, FLAP is activated simultaneously with the FEED signal. The turning off of the FLAP signal can be delayed by an adjustable time. If a newer labelling process is activated while FLAP is delayed, it remains active.
The control of the flap adapter with an electromagnet or pneumatic valve is to be done by the customer. If a solution with an electromagnet is distinguished the duty cycle of the magnet must be considered for labelling. Generally the electromagnet solution is not as strong, fast and electrically easy to realize as the pneumatic actor with pneumatic valve and cylinder.

7.4.7 Steppermotor clock CLOCK

The signal **CLOCK** can be used to synchronize an external device (e.g.. Ink-Jet or Thermal Transfer printer) with the steppermotor.

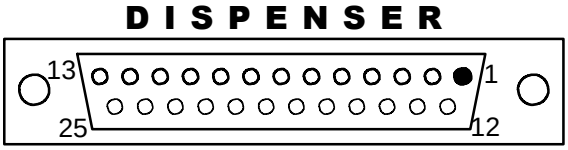
7.4.8 Control output NSTPO (NonSToP Out)

The signal **NSTPO** is used to link two Collamat® 9100 for the Nonstop mode. The wiring diagram is shown in the chapter Nonstop.

7.5 Monitor C9100 Connector layouts

7.5.1 Connector X3, DISPENSER

To this connector the control cable to the connector box is attached. The signals of this connector are used especially to control the dispenser and its units.



Type: 25 pole, D-Sub, female

Pin	Name	In/Out
1	GND	
2	LSC	I
3	GND	
4	TUNIT	I
5	GND	
6	READY	I
7	GND	
8	LLO	I
9	RWF	I
10	GND	
11	GND	
12	GND	
13	GND	

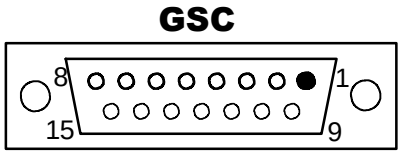
Pin	Name	In/Out
14	+12V	
15	TCY	O
16	+12V	
17	+12V	
18	FLAP	O
19	FEED	O
20	+12V	
21	+12V	
22	+24V	
23	+24V	
24	+24V	
25	+24V	

Pin assignment of the connector DISPENSER

ATTENTION:
For the connection of the dispenser signals a shielded cable must be used. Keep care that the cable is capable to lead the maximum current of the two connected winders. The cable must not be placed near power electronic devices. See also in chapter RMI protection.

7.5.2 Connector X5, GSC

To this connector the signals of the goods scanners and the nonstop wiring is connected. For the prevention of electromagnetic interferences (RMI) shielded cables should be used.



Type: 15 pole, D-Sub, female

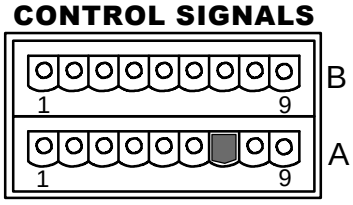
Pin	Name	In/Out
1	GSC1-	I
2	GSC2-	I
3	GND	
4	GSC3-	I
5	NSTPI-	I
6	GND	
7	NSTPO	O
8	+24V	

Pin	Name	In/Out
9	GSC1+	I
10	GSC2+	I
11	+12V	
12	GSC3	I
13	NSTPI+	I
14	+12V	
15	CLOCK	O

Pin assignment of the connector GSC

7.5.3 Connector X7, CONTROL SIGNALS

On the CONTROL SIGNALS connector the upper row is used to access three relais contacts for signalisation purpose. The lower row supplies a 24V voltage for external signal lamps. The maximum current for the 24V is 200 mA.



Type: PHOENIX CONTACT MDSTB 2,5/9-G1-5,08

Pin	Name	In/Out
1	RUN A	O
2	RUN C	O
3	RUN R	O

Pin	Name	In/Out
4	ERROR A	O
5	ERROR C	O
6	ERROR R	O

Pin	Name	In/Out
7	NOK A	O
8	NOK C	O
9	NOK R	O

Pin assignment of the upper connector row CONTROL SIGNAL

Pin	Name	In/Out
1	STOP+	I
2	STOP-	I

Pin	Name	In/Out
3	IFEED+	O
4	IFEED-	O

Pin	Name	In/Out
5	+24V/200mA	
6	GND	

Pin assignment of the lower connector row CONTROL SIGNAL

7.6 How to connect a goods scanner

The goods scanners and incremental encoders are connected to the GSC connector. As described in the chapter **Inputs** NPN- or PNP-sensors may be connected. Figure 48 shows the connection of the standard Collamat Stralfors goods scanner:

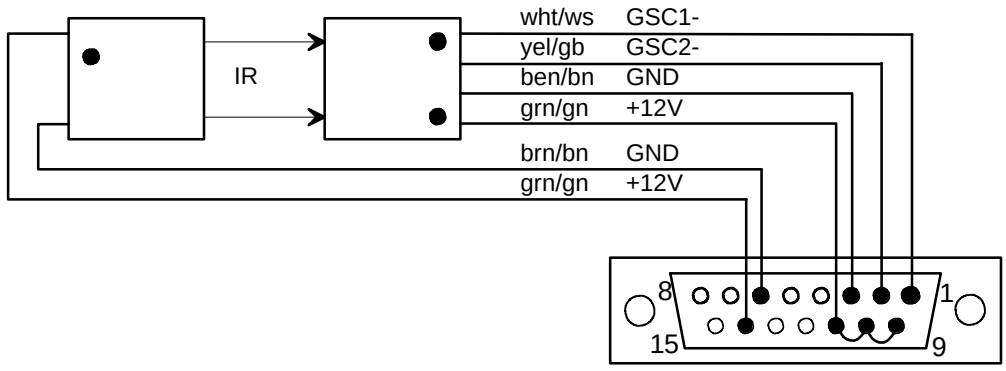


Figure 48: Connection of the CS IR goods scanner

Figure 49 shows the connection of NPN- and a PNP-scanners respective:

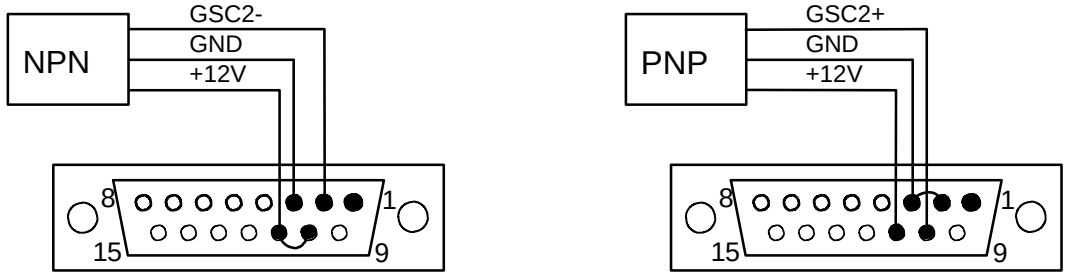


Figure 49: Connection of NPN- and PNP-scanners

Figure 50 shows the connection of NPN- and PNP-incremental encoders respective:

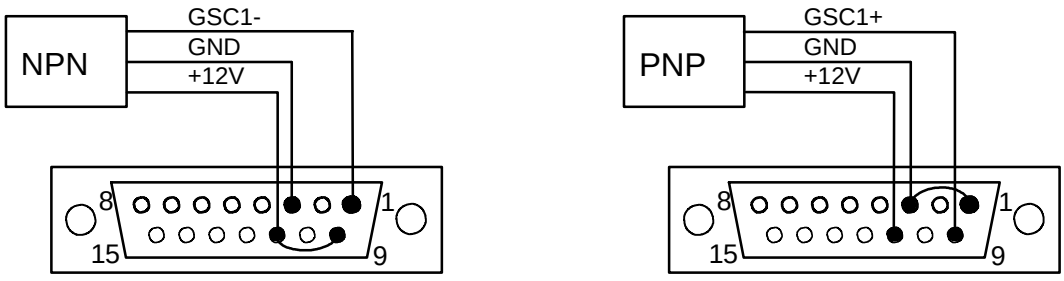


Figure 50: Connection of NPN- and PNP-incremental encoders

8 Nonstop labelling

When using two Collamat® 9100 it is possible to label goods with no down time. For this purpose the two monitors must be connected together by an electrical link. The necessary links are shown in figure 51. The placement of the two Collamat® to each other is shown in figure 52.

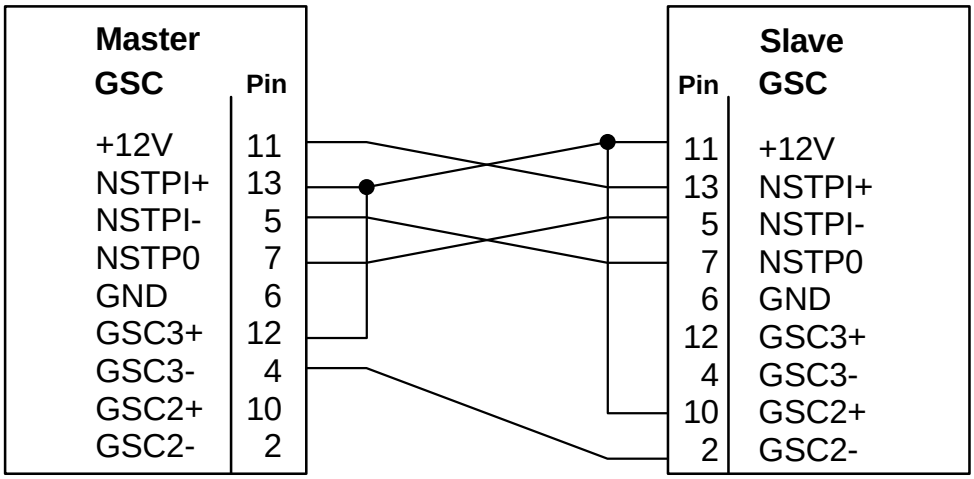


Figure 51: Connections for Nonstop labelling

Not shown is the connection of a possibly connected speed measuring equipment using an incremental encoder and the goods scanner of both Collamat® . For the speed measuring one incremental encoder could be used for both Collamat® together. Notice also that the goods scanner GSC2 of the slave is connected in parallel to the GSC3 input of the master.

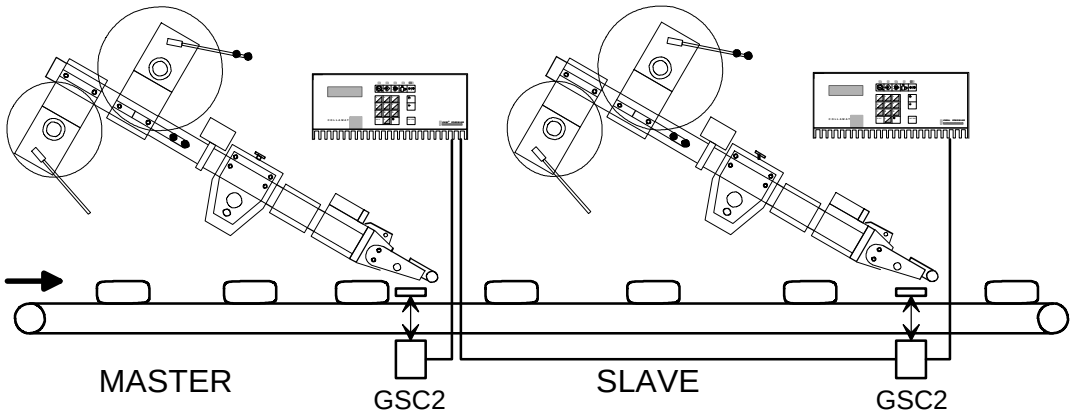


Figure 52: Placement of the two Collamat®

Proceeding

The Nonstop labelling is supervised and controlled by the master. Goods passing GSC2 of the master are counted up. Passing GSC2 of the slave the goods are counted down. If the master is unable to label the goods, it gives the grant to the slave at the moment when the first not labeled good reaches the GSC2 scanner of the slave.

At this moment the slave starts the labelling. Now the cause of the stop of the master can be serviced. The slave labels the goods until it is unable to label because of any reason. Now the slave signals the master to start labelling. The master starts immediately to label the goods. At this moment both Collamat® are labelling for a while. When the first labeled good arrives at the GSC2 of the slave, the slave stops labelling. Now the cause of the stop of the slave can be serviced.
The master always has the control over the goods which are labeled on which Collamat® . In the display of the control panel it is possible to display the goods count of the goods between the two GSC2 scanners of the two Collamat®. If an error occurs which causes both Collamat® to stop all goods in between of the both GSC2 scanners must be removed. Then the NONSTOP COUNTER must be cleared on the control panel of the master.

8.1 Setting up of the Nonstop mode

After the wiring of the Nonstop mode is made the installation must be set up as follows:

- Stop the conveyor or the goods transportation
- Remove all the goods in between of the two GSC2
- Set both monitors to STOP
- Set up the two labelers
- Choose Nonstop mode MASTER on the master
- Choose Nonstop mode SLAVE on the slave
- Set monitor master to RUN
- Set monitor slave to RUN
- Start the conveyor or the goods transportation

The goods are now labeled in the Nonstop mode. If an error occurs which causes a stop of a Collamat® the following procedure is necessary:

- Service the erroneous condition on the stopped Collamat® Confirm the errormessage on the monitor with the ENTER key

If an error occurs which stops both Collamat®, first the error condition must be serviced. Then all the goods in between the two GSC2 sensors must be removed. The nonstop counter must be cleared on the master.
For the supervision and setting up the Nonstop mode in the free selectable display, the counter of the goods in between the two GSC2 scanners can be displayed.

If a position value or a goods suppression is set, it will be considered by the monitor while labelling. The distance of the GSC2 to the peeling edge in this case must be the same on both labelers.

9 Speed measuring

9.1 Incremental encoder

The electrical connection of an incremental encoder is described in the chapter **Connection of the goods scanners**. If the speedmeasuring is done by an incremental encoder, on the control panel the step width must be programmed so that the speed measuring is made correctly. The step width is the traveling way of a good in between two encoder steps. Figure 53 shows an example how to calculate the step width:

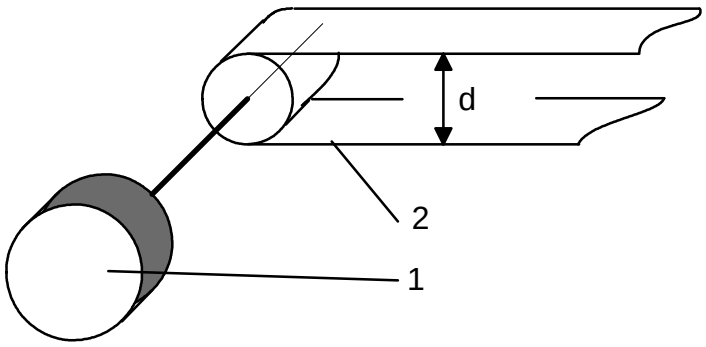


Figure 53: Incremental encoder

Example:
The incremental encoder **1** gives 200 pulses per revolution. It is attached directly to the shaft of the conveyor **2**. The diameter **d** is 100 mm. Calculation:

$$\text{Step} = \frac{d * Pi}{\text{Pulse}} = \frac{314\ \text{mm}}{200} = \mathbf{1.57\ mm}$$

9.2 Measuring goods scanner

The electrical connection of the measuring goods scanner is described in the chapter **Connection of the goods scanners**. If the speedmeasuring is done by a measuring goods scanner, on the control panel the distance **L** must be programmed so that the speed measuring is made correctly. Figure 54 shows the placement of the scanners:

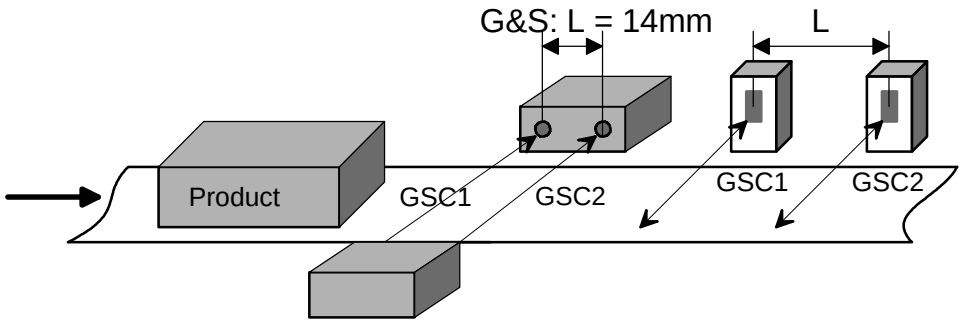


Figure 54: Measuring goods scanner

10 Motor and motorcable

Attention:

- **The motor never must be dismantled !**
- **For safety reasons and in order to guarantee interference suppression, the** motor has to be connected to a ground conductor !
- Steppermotors heat up during operation !
- When connecting or disconnecting the motor, the monitor must be switched off !
- When working on the motor the monitor must be disconnected from mains !

10.1 Motorcable

The motorcable is connected to the connector **MOTOR** on the backpanel of the monitor. Figure 55 shows the motorconnector and its pin assignment:

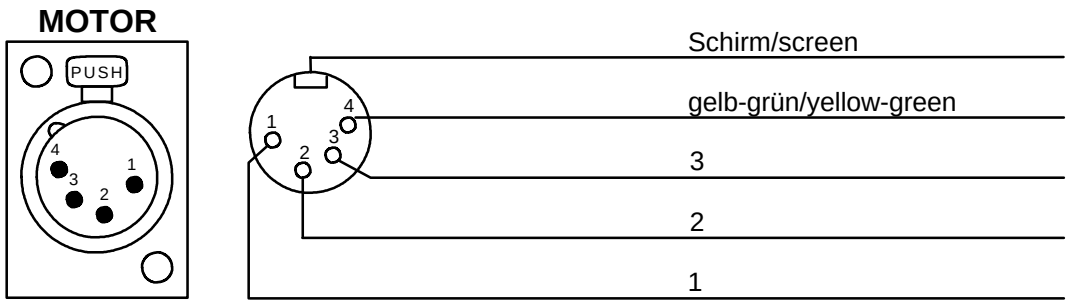


Figure 55: Motorcable

10.2 Motor wiring

The connection of the motor usually is done in the terminal box of the motor. The numerated wires of the cable are connected to the terminals inside of the terminal box. The earth connection is made via the motor grounding terminal. See also figure 56:

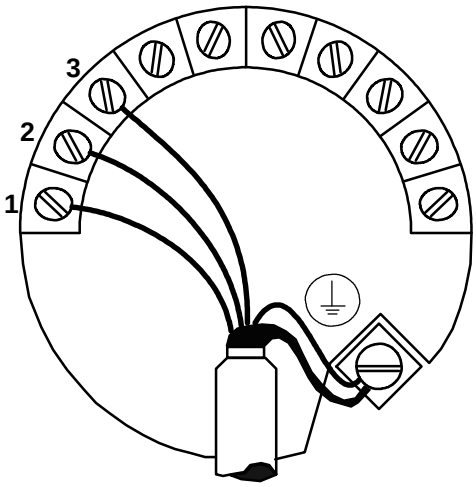


Figure 56: Connection inside the terminal box

11 Control signals for external devices

11.1 Control of a Hotstamp with the IFEED signal

The connection of a hotstamp printer to the IFEED signal is described below. On the CONTROL SIGNALS connector the IFEED signal can be attached. It can be connected with two different types (NPN or PNP) of hotstamp inputs. Figure 57 shows the connection of different hotstamps. Figure 58 shows the timing diagram.

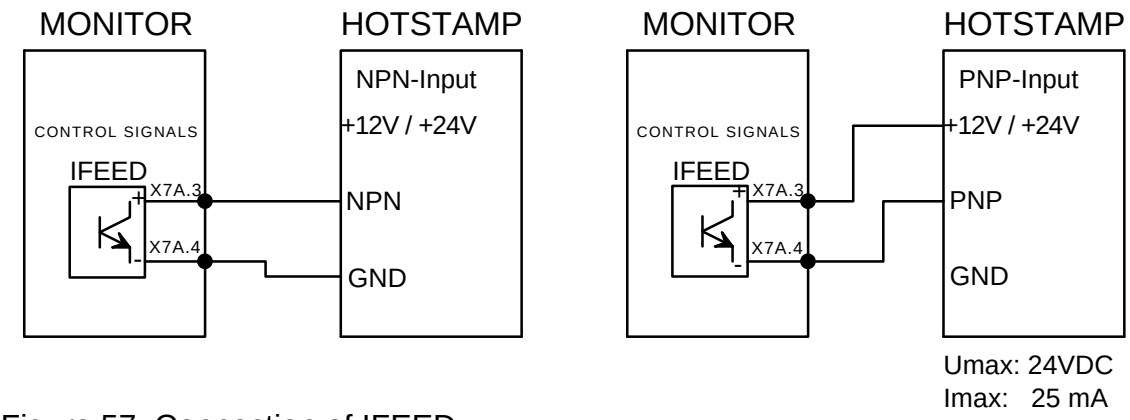


Figure 57: Connection of IFEED

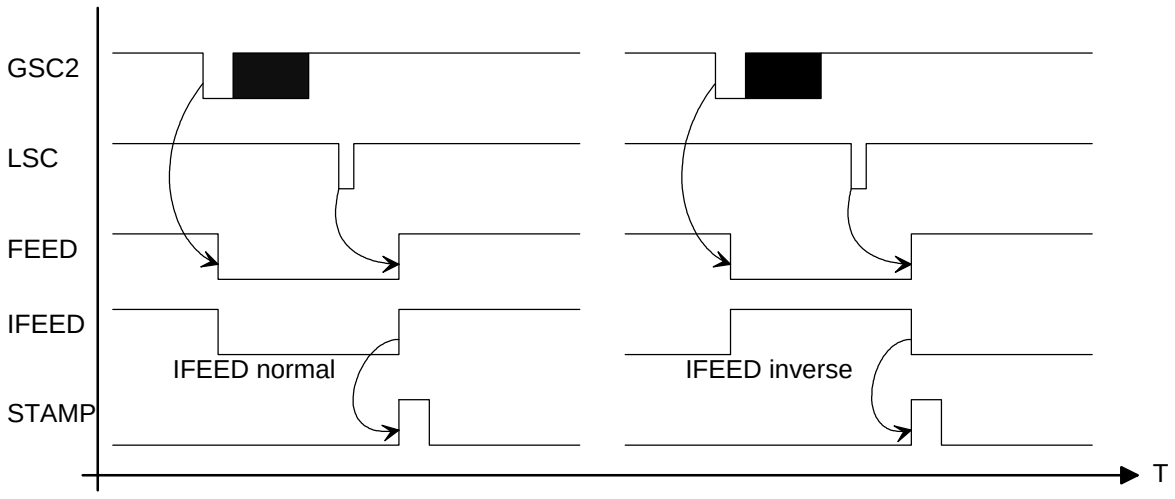


Figure 58: Timing diagram

Dependent on the manufacturer, the polarity of the triggering signal of the hotstamp must be changed. This adjustment is to be set in the configuration menu **IFEED POLARITY** to **normal** or **inverse**. See also figure 58.

11.2 Control of the flap adapter

The signal FLAP which is accessible inside of the connector box is used to control the flap adapter. The NPN-signal is active during the labelling simultaneously to the FEED signal. See also figure 41. Figure 59 shows how to connect a pneumatic valve to the FLAP signal. The pneumatic valve controls the compressed air for the adapter movement. The mechanical adapting of the pneumatic cylinder to the adapter must be made by the customer. The pneumatic valve also can be used to control a pressing station for the labels.

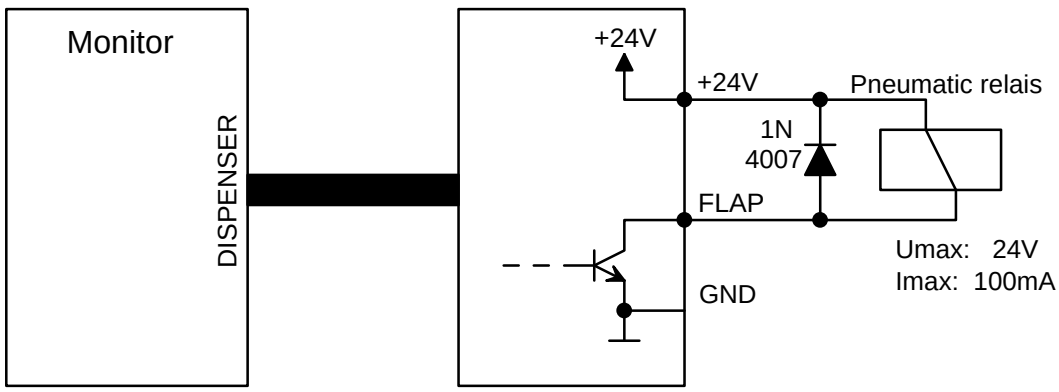


Figure 59: Connection of a pneumatic relais

ATTENTION:
Connecting a relais, a free wheeling diode must be provided. If this is not made electromagnetic interferences can cause malfunction to the Collamat® . Keep care to the polarity of the diode !

The FLAP signal can be adjusted in the configuration menu of the monitor. The signal can be switched on or off. If it is turned off no FLAP signal is generated. If it is turned on FLAP is simultaneously generated to the FEED signal. The FLAP signal additionally can be extended. This adjustment also is made in the configuration menu when the adapter magnet is turned on. The time can be adjusted in 0.1s steps.

12 Testing the monitor with the diagnostic connector

In the firmware of the monitor C9100 there is a self-test function for the monitor electronics. This test only may be successful with a diagnostic connector attached to the three connectors on the back plane of the monitor. Figure 60 shows the diagram of the wiring of this connectors:

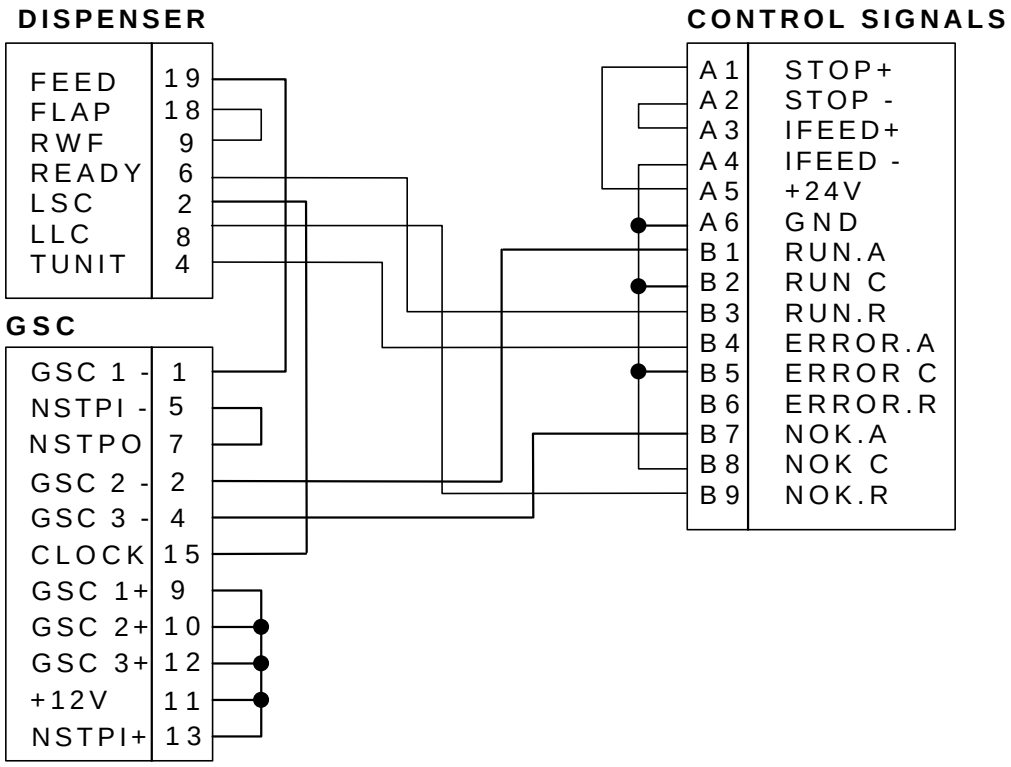


Figure 60: Diagnostic connector

13 Cabling and setting up

For a troublefree operation of the Collamat® 9100 following items must be observed:

- Trained personnel
- Ambient temperature
- Dirt and dust
- Splashing water
- Installation and setting up of the installation
- Installation and setting up of the Collamat® 9100
- Electromagnetic interferences
- Safety regulations and safety requirements

13.1 Cabling

Electromagnetic interferences can lead to non repeatable and not obvious errors while labelling. Often misplaced layout of the cabling, RMI and ESD interferences disturb the labelling. Because of this the following rules must be observed for the cabling:

- Separated mains and signal cables
- Use shielded cables
- All units must be grounded
- Connect only devices which meet the RMI standards
- Use power filtering units in interfered environments and interfered mains supplies

13.2 Setting up

The setting up must be done carefully by trained personnel. The following items must be observed:

- Visual control of the control unit
  Are all electrical and mechanical units correctly attached ?
  Are all connectors accessible ?
- Connect the monitor to mains and switch it on
  Is the display illuminated ?
  Does the startup message appear ?
- Turn off the monitor and unplug it from mains
- Set up the winder and unwinder and connect it to the connector box
  Are the jumpers inside of the winders set correctly ?
- Attach the goods scanner signals to the DISPENSER connector
- Connect the monitor to the mains voltage an turn it on
  Do the winder turn the right way ?
- Turn off the monitor and unplug it from mains
- Connect the remaining units to the connector box of the Collamat®
- Connect the monitor to the mains voltage and turn it on
  Do the peripheral units work OK ?
- Turn off the monitor and unplug it from mains
- Attach the motorcable
- Connect the monitor to the mains voltage and turn it on
  Does the motor work in the MOTORTEST-menu ?
  Is the turning direction OK ?
- Thread the paperweb and adjust the label scanner
- Dispense a label by the control panel
  Is it dispensed correctly ?
- Connect the goods scanners (and possible incremental encoder)
- Dispense a label by the goods scanner
  Watch to the error messages on the display

14 Password

In case of a lost password the firmware gives two procedures for recovery. One procedure uses the keyboard on the front panel. This procedure causes data loss. The other procedure uses a keyswitch but the monitor must be opened.

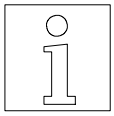
14.1 By keyboard

First switch power off. Then hold the **ENTER**-key while turning power on. The following message is displayed:

```
Clear memory !

Password       ####
Discontinue: [ESC]
```

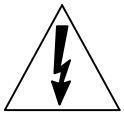
Now type in **4148**. The Collamat will clear now the password to **0000.** The data of program number **32** will be set to default values and it will start up with program **32**.



Note:
This function is available since firmware 1.20.
Version 1.10....1.13 clears program 1.

If you type **4147** instead **ALL** programs are set to default values the password is also cleared and program **1** is selected.
This procedure is also helpfull to restart a complettely misprogrammed Monitor which hangs after power on.

14.2 By keyswitch



Danger:
Before opening the monitor unplug the mains plug. Charged capacitors inside the monitor may lead to shock hazard. After unplugging wait at least 10 seconds before opening the monitor.

For this procedure the monitor must be opened. On the interfaceprint (see figure 38) two jumpers J1 and X9 must be set. Now after power on in the **Configuration** menu **User level** the password can be changed.

15 Fuses

Fuse	Rating	Part Number
Monitor	110/120V: 10 AT 220/230/240V: 5 AT	7403.0833 7403.0822
Interface F1	4 AT	7403.0800
Interface F2	10 AT	7403.0333
Connector box F1	5 AT	7403.1224

16 Glossary

16.1 Short cuts

ESD **E**lectro**S**tatic **D**ischarge
RMI **R**adio **M**agnetic **I**nterference
GND **G**rou**ND**
IR **I**nfra **R**ed
LCD **L**iquid **C**rystal **D**isplay
LED **L**ight **E**mitting **D**iode
nc **n**ot **c**onnected
RS232 Standard serial data exchange protocol

16.2 Signals

ERROR Errorsignal caused by any error of the Collamat®
FEED Signal indicating the labelling process
GND **G**rou**ND**
GSC **G**oods **SC**anner
IFEED **I**solated **FEED** signal
LLO **L**abel **LO**w signal indicating the end of the label stock
LSC **L**abel **SC**anner
nc not connected
NOK **N**ot **OK**, something not OK
NSTPI **N**on**ST**o**P IN**-put
NSTPO **N**on**ST**op **OUT**-put
READY READY signal from peripheral units
RWF **R**e**W**inder **F**ull
TCY **T**ransparen**CY**, Control current for the label scanner IR-diodes
TUNIT **T**raction **UNIT**, signal that supervises the traction unit

16.3 Terms

Stopping accuracy: Accuracy of the papertransportation
Unwinder: Device that carries the full paperweb rolls and unwinds it
Adapter: Part of the labeler. Here the label is peeled of the paperweb by pulling it over a sharp edge
Rewinder: Device that takes the empty paperweb from the traction unit and rewinds it
CE-Mark: Certification for the European market, means: **C**onformité **E**uropéenne
Collamat®: Brand name for a labeler built by Collamat Stralfors.
C9100: Labeler type C9100
GSC: Goods **SC**anner
Flap adapter: Adapter which moves to the product during the labelling
LSC: Label **SC**anner
LC-Display, LCD: Liquid crystal display
Machinestatus: Working mode of the Collamat®. E.g..: Stop, OK, ERROR
Monitor: Controlbox containing all electronic boards of the Collamat®
Position: Sticking position of a label on the good
Predispensing: Predispensing of a label on the peeling plate
Motorstep: Travelling way of the label for one motorstep
Dispensing speed: The speed of the goods to which the labels are sticked
Speed: See also dispensing speed
Startfrequency: Highest possible frequency for a steppermotor to start moving without loss of steps
Traction unit: Part of the dispenser in which the paperweb is pulled

17 Technical data

Dispenser general data (standard values)

System	Units	C9110	C9120	C9130
Version		right/left		
Dispensing speed	m/min	0.5-80	0.5-60	0.5-40
Min. label width	mm	20		
Max. width of the paperweb	mm	95	160	250
Min. label length	mm	10	15	20
Min. label length @ max. dispensing speed	mm	28	13	10
Stop accuracy	mm	@ 40 m/min ± 0.5		
Minimal gap between labels for optical scanner	mm	3		
Minimal gap between labels for mechanical scanner	mm	2		
Max. diameter of paperroll	mm	350		
Max. weight of paperroll	kg	20		
Noise figure max.	dB(A)	< 70		

Traction unit

System	C9100
Driver	3-phase steppermotor 500 steps
Motor voltage	120V
Max. phase current	5.0 A
Type of protection	IP40
Ambient temperature	+5-40 °C
Ambient humidity	15-90%, non condensing
Noise figure max.	70 dB(A) @ 1 m distance

System	C9110	C9120	C9130
Weight	8.2 kg	9.0 kg	10 kg

Midi-unwinder

Diameter of the roll core	42 mm
Max. outside diameter of roll	350 mm
Max. weight of roll	20 kg
Empty weight	4.2 kg
Spring dancer with automatic brake	

Motor driven rewinder and unwinder

System	Rewinder	Unwinder
Diameter of roll core	42 mm	
Max. diameter of roll	350 mm	
Drive	current controlled DC-motor, electromagnetic brake	
Electric power	24 V DC, 3A max.	24 V DC, 3A max.
Type of protection	IP42	
Ambient temperature	+5-40 °C	
Ambient humidity	15-90% non condensing	
Noise figure max.	70 dB(A) @ 1 m distance	
Weight	5 kg	

Flap adapter

System	C9110	C9120	C9130
Max. width of paperweb	95 mm	160 mm	250 mm
Weight	4.5 kg	5.0 kg	5.6 kg

Version	right/left
Adapter angle	±90°, with adjustable snap-in locking
Recuperating spring force	adjustable
Additional press time of adapter	adjustable
Max. cadence on max. turning angle	10'000 cycles/h
Max. turning angle	15°
Ambient temperature	+5-40°C
Ambient humidity	15-90% non condensing

Label scanner

Optical label scanner
Mechanical label scanner
Black mark reader (optional)

Monitor

System	C9100
Mains voltage	110/120V AC, 220/230/240V AC, ±10%
Power consumption	480 VA
Main fuse	110V : 10 AT, 230V : 5 AT
Display	LCD, 4 lines, 20 characters each
Dimensions (LWH in mm)	375 * 305 * 155 mm
Ambient temperature	+5-40°C
Max. ambient humidity	15-90% non condensing
Type of protection	IP40
Weight	approx. 15.5 kg

The information in this handbook reflects the state of the publication date.
We reserve the right to make design modifications.

18 Trouble shooting checklist

Machine-Type:		Ser.No. Monitor:	Ser.No. Labeler:
Ser.No Control panel:	Software-Version:	Ser.No. Motordriver:	Ser.No. Interfaceboard:
Environment	Mains voltage:	Frequency Hz:	Temperature °C:
	Humidity %:	Interference level (Burst):	Interference level ESD (Static):
Labels	Width:	Length:	Gap:
	Thickness:	Transparency:	Material:
Paperweb	Width:	Thickness:	Transparency:
Goods	Kind:	Material:	Shape:
	Length:	Width:	High:
	Speed m/min	Length in transportation:	Distance:
Labeler	Speed m/min:	Pieces / min.:	Measuring:
Settings	Predispensing:	Position mm:	Suppression:
	TCY value:	Label length:	Suppression:
Special:			
Machine-environment	Goodstransport:	Feeder:	Taker:
	Other machines around:		
Peripheral units	1	2	3
Screening	Mains cable:	Sensorcables:	
ESD-Phenomena	Description:		
Description of the malfunctions:	Accumulation	frequent: repeated:..... spontaneous:	sec
Date / ev. date and time of the last disturbances:			
Comments:			
Disturbance registered by Name: Date:			

Please make a copy of this list before using it.