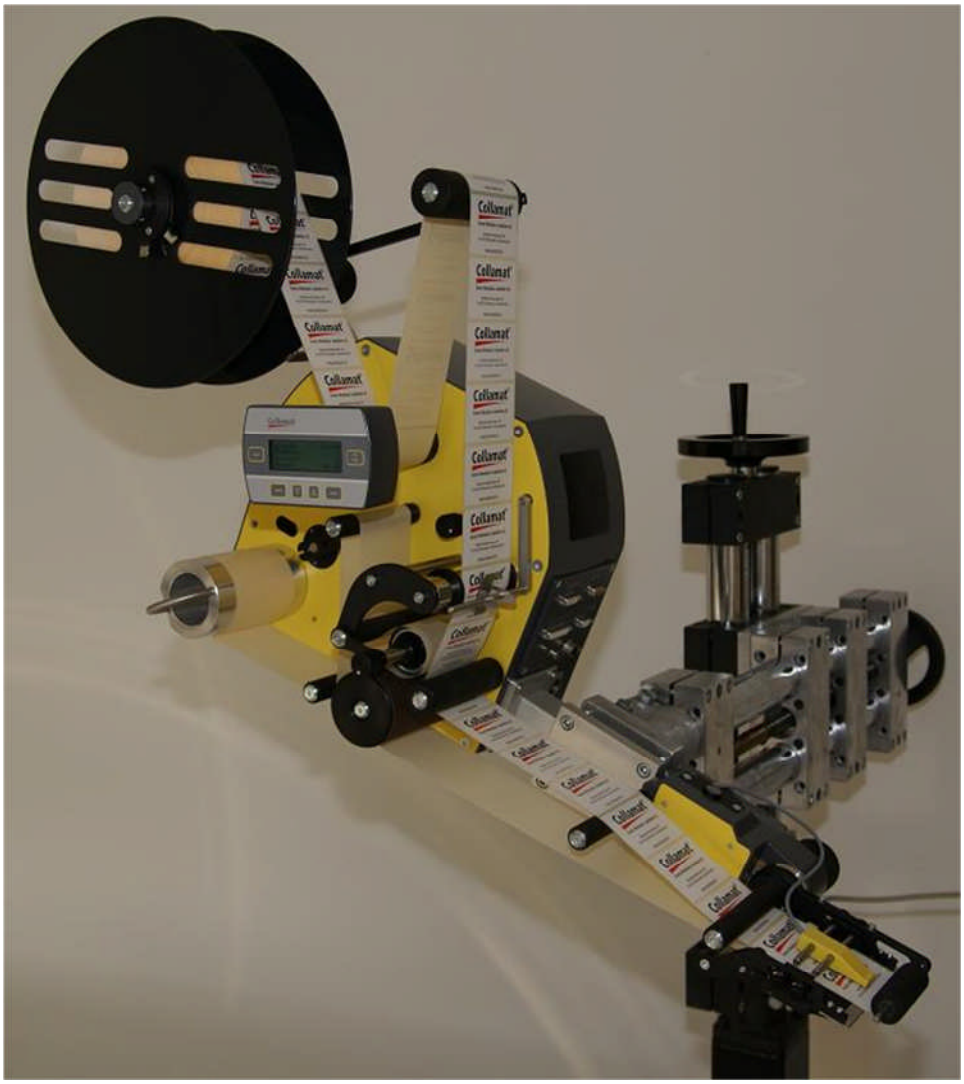
# Technical Handbook

## Collamat S Series



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The German-language version of this Technical Handbook is the only official original version. Any Technical Handbook translated into other languages (or excerpts of it) are only references to this original version.

**Read the Technical Handbook before performing any work on the machine!**

# Technical Handbook

## Translation of the Original Edition

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20-04-2010 V1.00 Draft for field testing devices - ps
10-05-2010 V1.01 Correction after translation – ps
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# 1 General

## 1.1 Information about the Technical Handbook

This Technical Handbook is a technically-detailed addendum to the operating instructions for the Collamat S. All safety, warning and caution notices in the Collamat S operating instructions are also valid in this handbook with no restrictions.
The Collamat S Technical Handbook (abbreviated as TH in this document) is considered the technical element of the operating instructions. The TH should help you to use the Collamat S to its fullest. The description of the individual mechanical and electrical components also helps for rapid troubleshooting and problem solving in case of faults. Any defective electronics modules (printed circuit boards) are to be replaced as entire units and the defective modules are to be sent to the Collamat AG company or their representatives for repair or exchange. This is the only way to ensure that the high level of quality of your Collamat S is maintained after repairs.

The special features of the Collamat S include the following:

- low-wear mechanics
- minimal abrasive wear with the rewinder version with friction clutch
- robust, reliable and precise
- simple handling with a modular structure
- easy-to-adjust label brake
- multiple options for installation (clamping pieces) in upright or horizontal position
- user-friendly thanks to modern, menu-based programming
- quickly configured to perform other labeling tasks maximum labeling power
- unwinder unit with a brake mechanism for 300 mm or 400 mm diameter label rolls – optional with double dancer
- highly modern SMD technology
- for 230 VAC / 115 VAC network current (adjustable on the outside of the machine)
- 2-phase stepper motor with micro step resolution for the greatest precision
- various adapters for up to 3 cylinders (standard and customer-specific)optional electrical rewinder (for dispensing speeds > 50 m/min or for wide labels) - DC motor with 4Q-MC and single- / double dancer control
- optional external connection box / connection module
- optional sensors for monitoring label supply / rewinder volumes, ....
- optional warning lamps (ready - error - maintenance)
- optional Ethernet connection (standard / customer-specific)
- customer-specific interface

# 2 Technology

## 2.1 Software/Firmware

The control program for the Collamat S has the following features:

- dual processor hardware allows for rapid parallel processing for communication and
- drive control
- modern user interface
- preset and print run counter
- impulse suppression for path-dependent suppression of the label scanning for applications such as printed or transparentlabels
- impulse suppression for path-dependent suppression of the goods scanning after labeling process
- programmable settings for label position
- programmable settings for pre-dispensing
- multiple labeling with electronic adjustment of label offset
- automatic adjustment of dispensing speed with measurement of goods speed using an incremental encoder
- storage of 99 labeling programs
- password protection with multiple access levels
- monitoring of almost empty label supply (LLO - optional) and of out of label situation (OOL),
- open counter-pressure roller in traction unit (TUO), rewinder full (RWF - optional),
- motordriver OK, ...
- non-stop operation with 2 Collamat S systems = interruption-free labeling
- multilingual user interface
- automatic setup of optical label sensor
- all operational steps possible during labeling
- control of all peripheral devices from the program - without potentiometers, switches, etc .....
- motorized (optional) rewinder unit for labeling speeds > 40 - 50 m/min
- infinitely adjustable paper brake
- error / warning management - every exception status (input) that could influence labeling can be configured from the operator panel as an error, warning, or as a situation to be ignored.

## 2.2 The traction unit

**Description**

The traction unit system is either attached directly using a clamping piece connection or using a module rail on an adjustable unit.

The corresponding peripheral devices are installed on the module rail and / or on one of the many flanges on the housing.
All mechanical parts are surface-treated against corrosion.

The traction cylinder of the system is treated with a special coating for permanent, slip-free drive transmission to the carrier paper.

The braking force of the label strip break is infinitely adjustable.

The traction cylinder can be easily turned by hand when the dispenser is powered down (power OFF) to simplify setup of the dispenser.

The rewinder drive system can be easily turned by hand to simplify setup of the dispenser.

The pressure roller that holds the carrier paper on the traction cylinder can be easily lifted (opened) using a turning knob for easy setup of the dispenser.

When the pressure roller is open, this is displayed on the operator panel (TUO - Error - corresponding warning message).

Uninterruptible labeling can be setup by installing the so called Nonstop-Cabling-Set (two Collamat S are used – only **one** incremental encoder will be used in speed mode: TACHO).

Several helpful options are available to increase the performance and comfort of a Collamat S. These are the most important options:

- Electrical rewinder unit (ERW)
- Indicator light column (red-green-orange) (SIG)
- Label volume (empty) observation (LLO)
- Rewinder volume (full) observation (RWF)
- Connection-Box (CBO)
- Connection-Module (CMO)
- Incremental-Encoder (TACHO)
- Magnet Flap Adapter (MFA)
- External Operator Panel (EOP)
- Double Dancer Rewinder
- Double Dancer Unwinder
- Lying Down Set
- Ø400mm Unwinder Disks
- div. clamps, modular rails adjusting units
- div. stands
- etc.

## 2.3 Components

**Description**

The individual components with their setup options and maintenance are described here. This section begins with a general overview of the dispenser.

The components are mounted on a module rail. Figure x shows these components and their names mounted on the module rail:

### 2.3.1 Front view

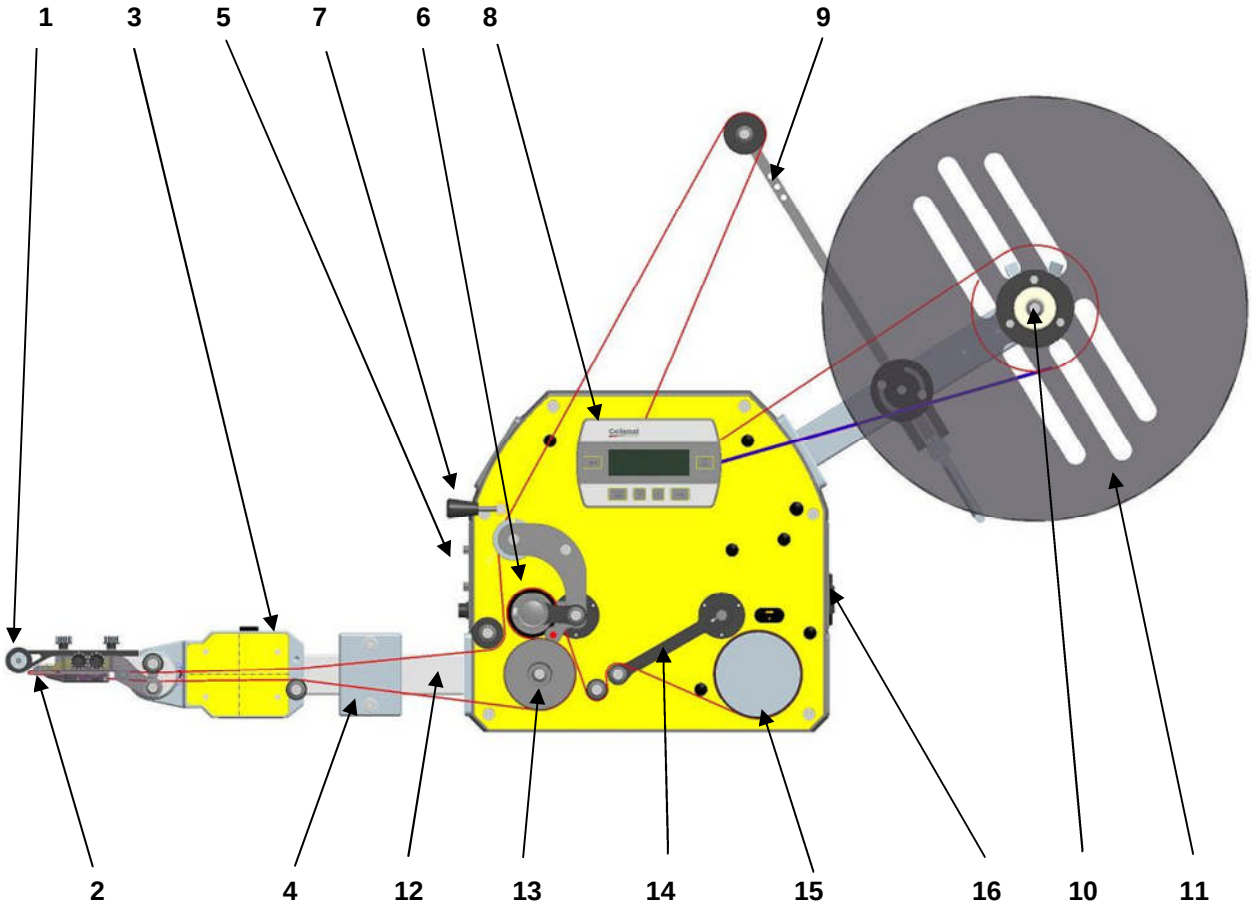



Fig. 2-1

| | | | |
|---|---|---|---|
| 1 | Pressure roller adapter | 9 | Pendulum, feed roller unit |
| 2 | Dispensing edge adapter | 10 | Unwinder unit |
| 3 | Housing adapter | 11 | Unwinder front plate (adjustable) |
| 4 | Clamping piece, 40 x 40 module rail | 12 | Module rail |
| 5 | Side connection plate, "SIGNALS" | 13 | Traction cylinder |
| 6 | Pressure roller for traction cylinder | 14 | Rewinder pendulum |
| 7 | Paper brake opener | 15 | Rewinder cylinder |
| 8 | Operator Panel (keyboard and LCD) | 16 | Side connection plate, "power" |

## 2.3.2 Rear view

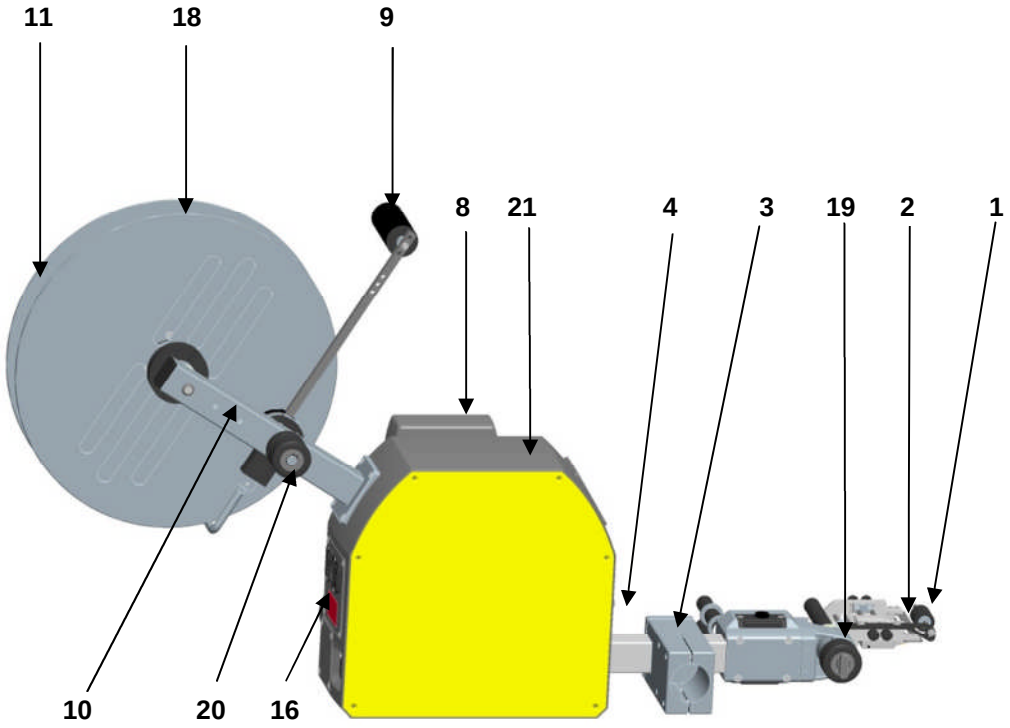


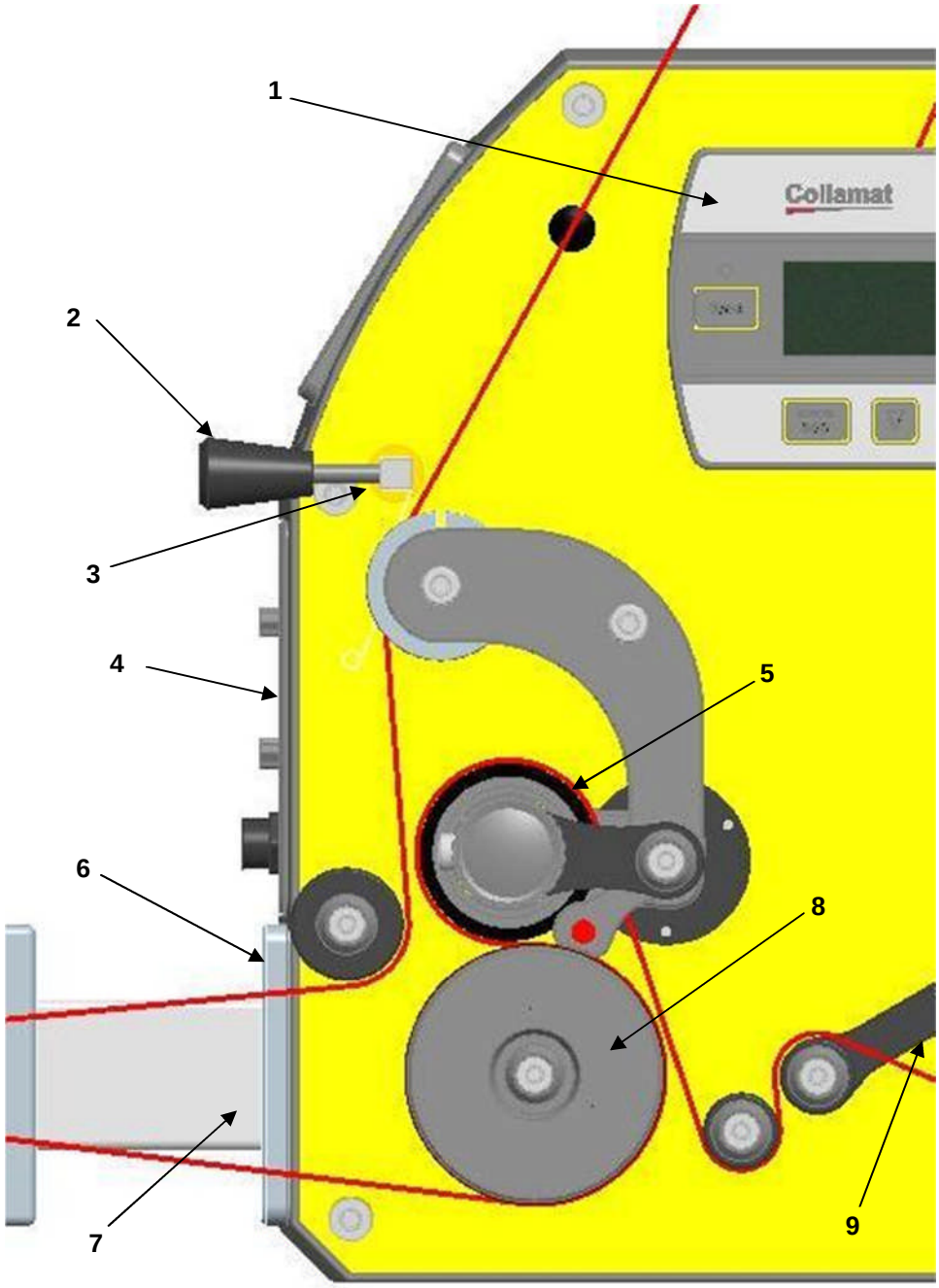

Fig. 2-2

1 Pressure roller adapter
2 Dispensing edge adapter
3 Clamping piece module rail 40/40 x 50
4 Side connection plate, "SIGNALS"
8 Operator panel (keyboard and LCD)
9 Pendulum, feed roller unit
10 Unwinder unit
11 Unwinder front plate
16 Side connection plate, "power"
17 Adjustment wheel, dispenser applicator
18 Unwinder rear plate (fixed)
19 Dispenser edge angle adjustment (+ opt. spring tension)
20 Unwinder pendulum spring tension adjustment
21 Traction unit housing

## 2.3.3 Front view traction unit

**Traction unit in detail**

**Drive**

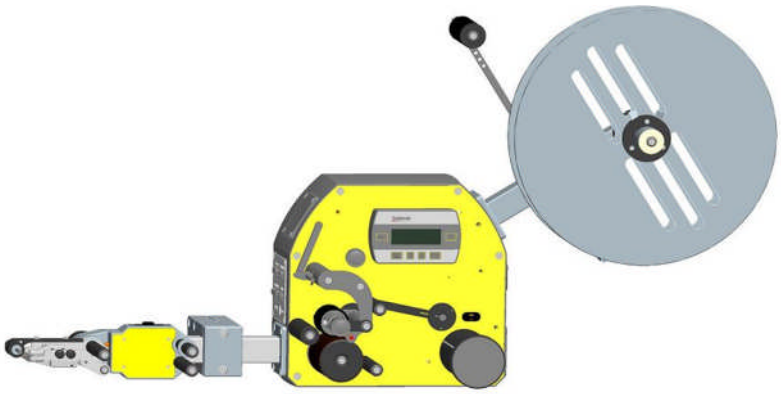



| | | | |
|---|---|---|---|
| 1 | Operator panel (keypad + LCD) | 6 | Module rail flange |
| 2 | Paper brake opener | 7 | Module rail |
| 3 | Paper brake | 8 | Traction cylinder |
| 4 | Side connection plate, "SIGNALS" | 9 | Rewinder pendulum |
| 5 | Pressure roller for traction cylinder | | |

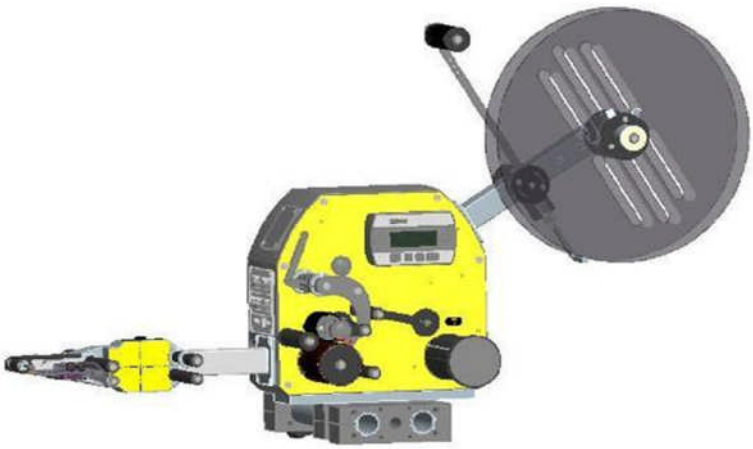
## 2.4 Assembly examples

**Description**

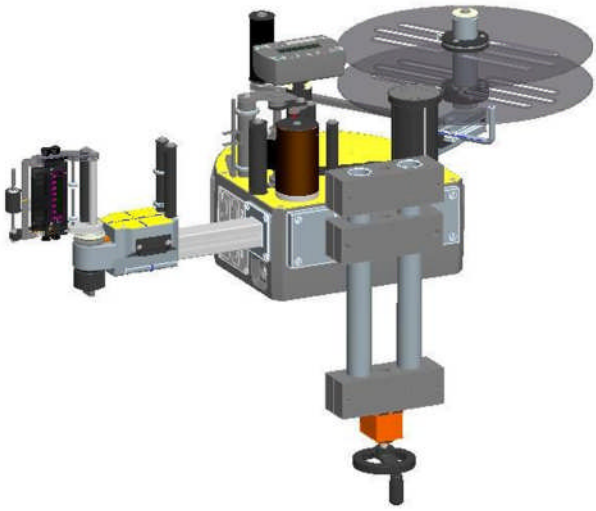
The modular structure of the Collamat S gives you nearly limitless assembly options. The following assembly examples have produced good labeling results.



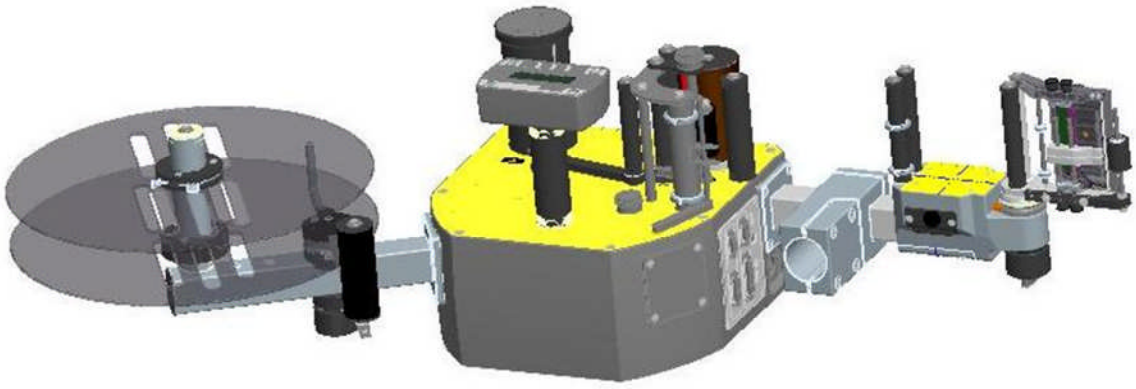
Example 1 - Clamping piece on module rail



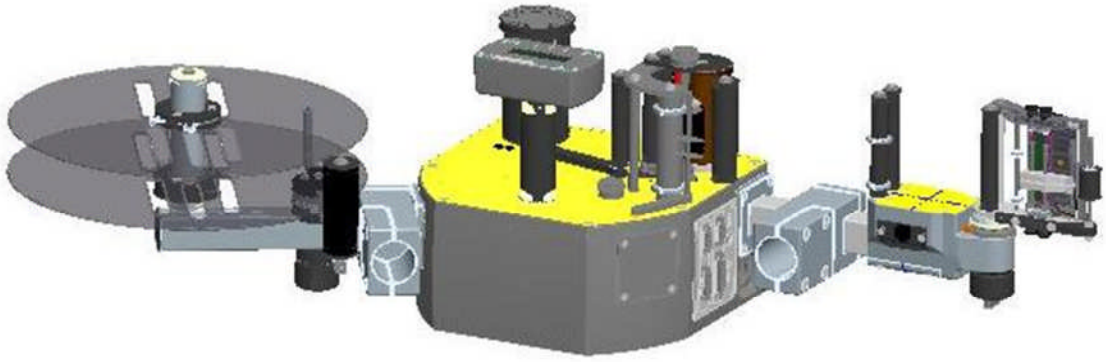
Example 2 - Clamping piece on housing floor



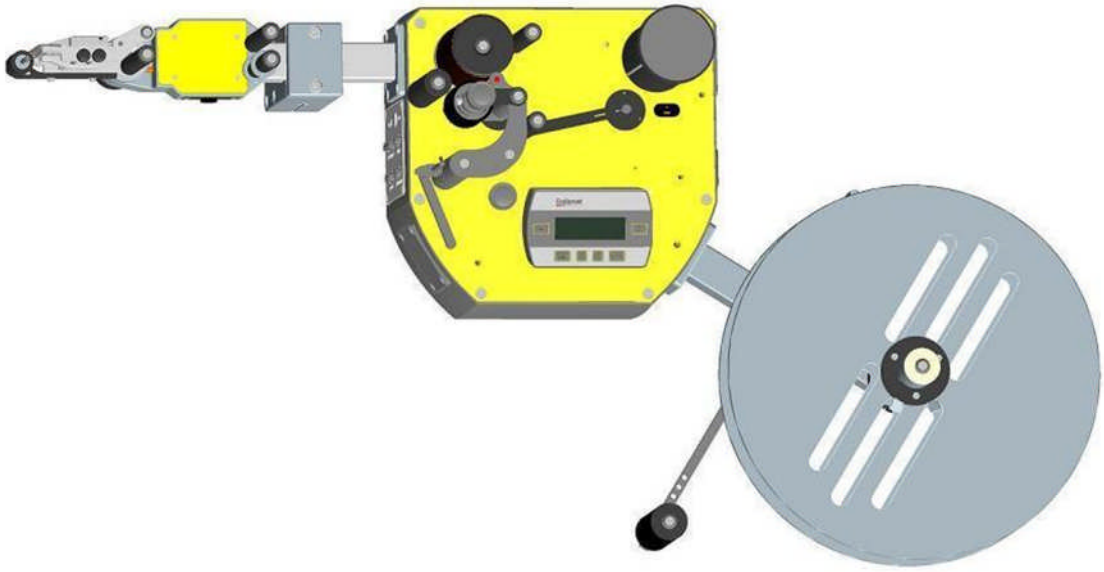
Example 3 Horizontal position of Collamat S - Clamping piece on housing floor



Example 4 Horizontal position of Collamat S - Clamping piece on module rail



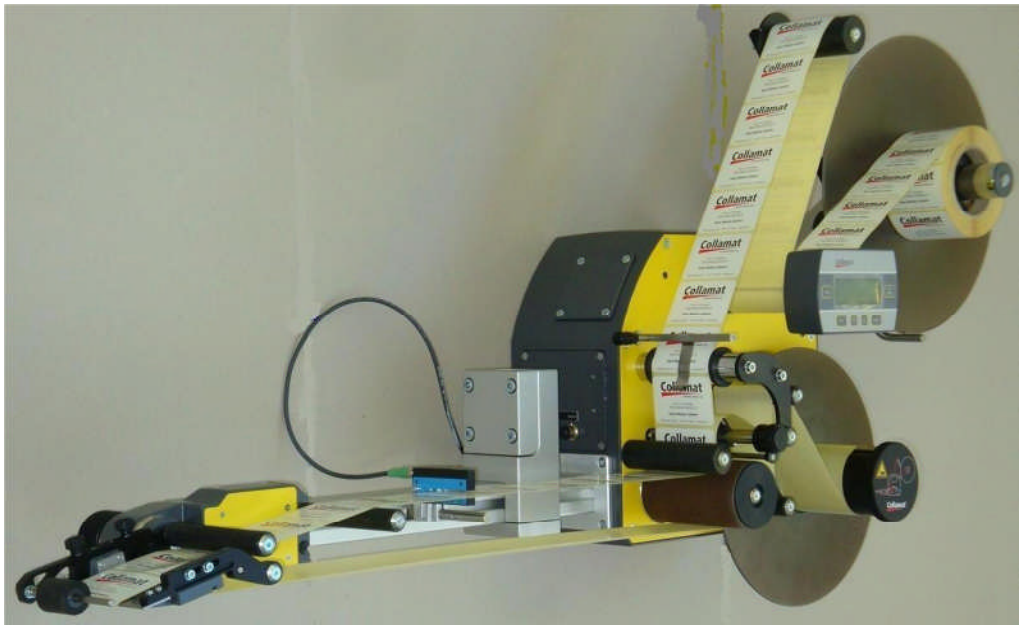
Example 5 Horizontal position of Collamat S - 2 clamping pieces on module rail



Example 6 – Collamat S "overhead" - clamping piece on housing floor or module rail

## 2.4.1 General information's to IP54 version

**IP 54 variation option**



Example of a IP54 Installation with side labeling set, IP65 fork sensor (LSC) and fix modular rail clamp piece (FXA)

Collamat S **xx – 10 L – IP54**

**The side connection plate "SIGNALS" is available with or without D-SUB connectors/plugs.**

***INFORMATION!***

*Pay attention to the different IP54 directions in the Collamat S Series Operator Manual.*

*IP54 units have to be intensely maintained every 12 month (see also chapter Maintenance in the Collamat S Series operator manual).*

# 3 Components

**Electric shock**

**DANGER!**

Before opening the traction unit (cover at rear), pull the power cord from the device socket. Stored capacitance inside the traction unit can lead to electric shock. Because of this, wait at least 10 seconds prior to opening the system.

## 3.1 Construction

**Description**

The **main control unit** (HMC0601 Main board) and the traction and rewinder mechanical systems of the Collamat® NG are contained in a stable, attractive metal housing. Setup of software parameters and monitoring of the spender are performed at the operator panel. The Collamat S housing may only be opened for a "one-time" setup and for service work.

Unscrew the four screws on the rear wall to open the housing from the rear. The goods sensor type is configured using a jumper on the connection board at the "SIGNALS" side connection plate (see Configuring the Collamat S). The goods sensor connection is set to PNP type by default.

After removing both side connection plates ("Power" and "SIGNALS" connection plates - remove 4 screws from each and unplug cables), the front plate can also be removed (remove the front x assembly screws and pull the front plate out forwards). All components of the Collamat S are attached to the front plate. Service work is easiest to perform with the front plate removed.

The peripheral components are located outside the traction unit housing:

The **label unwinder unit** is connected to the dispenser housing using a special clamping piece (4 screws).

The **label rewinder unit** is located in the traction unit. The capacity of the Collamat S rewinder is sized to fit carrier paper from a 400 mm diameter label roll.

For rapid labeling (dispensing speed greater than 50 m/min) or for very wide labels, an optional motorized rewinder is available.

This module consists of a 4-quadrant motor controller, a high-torque DC motor, a sensor module (speed monitoring using compensator control) and a special toroidal transformer with additional winding for the motor controller.

**Description (continued)**

To simplify feeding the carrier paper into the rewinder core, a special combination module consisting of a friction clutch and one-way bearing was developed. This ensures that the rewinder coil is held at a perfect position despite reverse slippage.

Order text: Collamat S xx - WW D

(**xx**=max speed, **WW**=Width, **D**=Direction).

The pendulum of the rewinder damps the carrier paper movement. With the optional motorized rewinder, the rewinder pendulum assumes control of the rewinder speed.

The various **adapter types** (spring adapter, magnet flap adapter (MFA), air vacuum adapter (AVA), etc.) are attached to the 40 x 40 module rail. The module rail itself is connected to the dispenser housing using a special clamping piece. The control and operator signals are connected to the adapter electronics in the adapter housing using ribbon cable fed through the module rail. The adapter electronics (depending on the adapter type, various adapter boards are available) condition the label sensor and the FEED button as well as, depending on the adapter type, the sensor and actor signals.

The **operator panel** consists of a keypad, indicator LEDs and an LCD display and is mounted to the upper guide roller of the feed roller (turnable) by default.

Six keys, three LEDs and a 4-row x 20 character display (with background lighting) allow for simple programming and monitoring of the dispenser.

The operator panel can also be connected to the "SIGNALS" connection plate. For this, the connection cable that normally leads from the main control board to the operator panel is attached to the free 5-pole plug of the connection board at the "SIGNALS" connection plate.

For connecting the operator panel to the "SIGNALS" connection plate (ext. operator), an additional connection cable is needed (HMC06CA31A).

For **installing the complete dispenser unit** onto an adjustable unit or an assembly unit, various clamping piece types are available (module rail, housing floor, side bottom and side top). See assembly examples at 3.1.

## 3.2 Electronics - Control unit

**ESD**

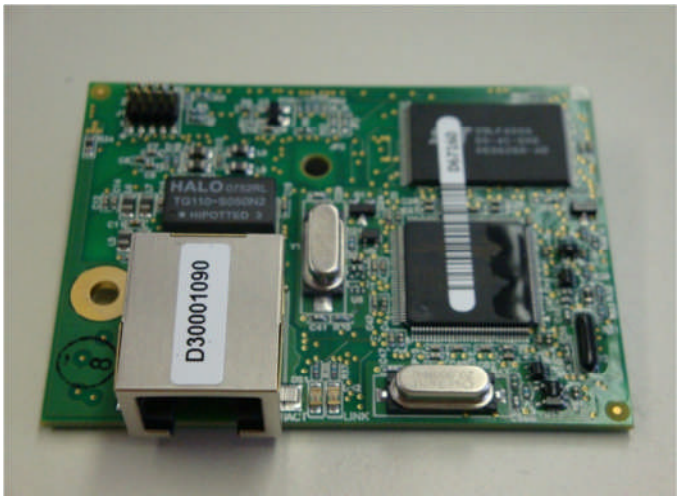
**DANGER!**
The electronics of the control unit may not be touched without taking precautions against ESD. The electronics are sensitive to direct electrostatic discharge.

**Master controller**

The heart of the **main control unit** is a dual-processor system consisting of a master controller and a slave controller.

The complete **master controller** unit is contained in a module that is inserted into the main control unit (MHC0601-Mainboard). The master controller communicates with the operator panel, the slave controller and the peripheral components (SIGNALS connection plate and adapter). The modern, powerful master controller leaves nothing to be desired. Even with updated user and dispenser firmware, the controller's computing power will remain sufficient for the coming years. All components including Flash storage, RAM (battery-buffered), interface controllers, real-time clock, RJ45 slot, battery, etc. are located on this card module.

**RCM 4010**




**Slave controller**

The **slave controller** executes the rapid dispenser functions assigned by the master controller. The incremental encoder (speed sensor), goods sensor, label sensor and motor controller communicate directly with the slave controller.

The slave controller, power supply, interface controller and signal conditioner are located on the main control unit. This is attached to the front plate with four screws.

# Components

**Motor controller**

The **motor controller** is a component developed and built by a renowned step motor controller producer. Standard parameters for using the Collamat S are 80V DC / 5.1/6A – 2000 steps / revolution – automatic current reduction.

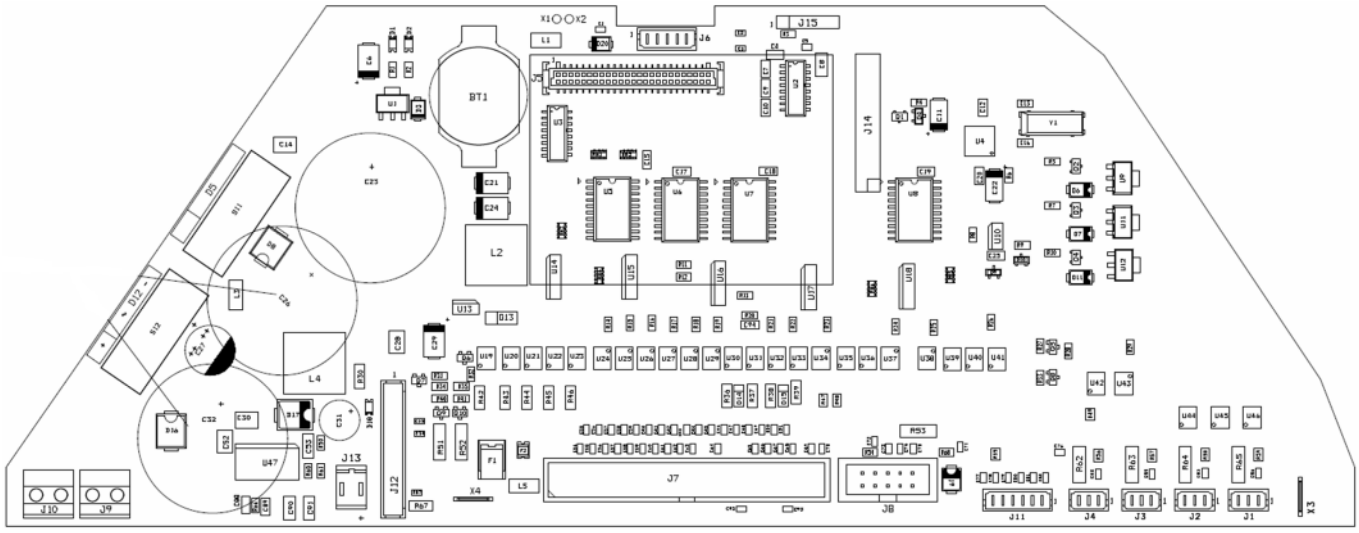
**Power**

The **power** for the electronics is delivered by a high-powered toroidal transformer. The rectification and regulation of the various voltages (DC voltage production) is executed at the main control unit and, optionally, at the rewinder module.

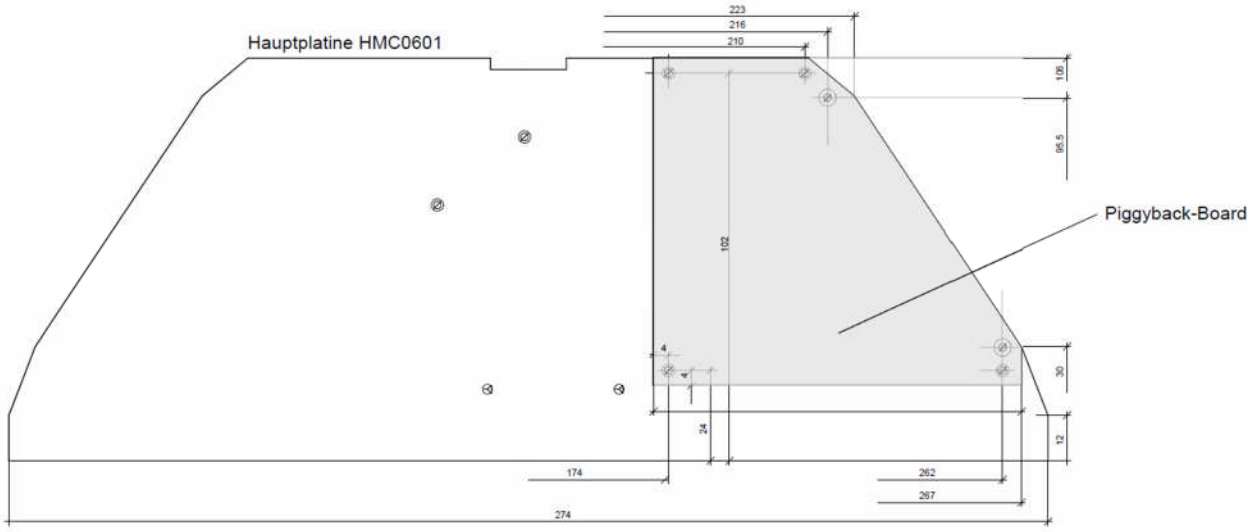
**Slots**

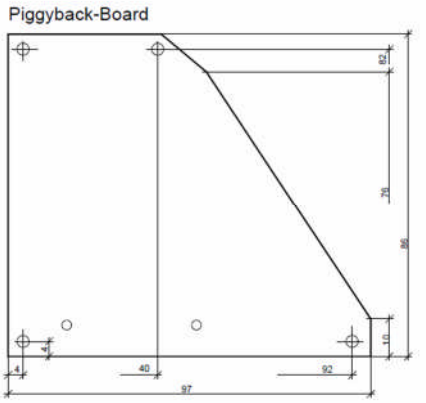
An **additional slot** on the main control unit is for customer-specific applications. Currently, the following add-on boards (piggyback boards) are available:

- **X-WEB piggyback board**: Controls a transverse belt system
- **AVA piggyback board**: Controls the various air vacuum adapters
- More add-on boards are planned.



Master controller - Main control unit




Measurements of the master controller and piggyback board

## Print Modifications

HMC0601V3-5 – 17.11.2011:

- R63, R64 = 560E
- C29 = 22uF/35V
- R14-19, R23-25, R29 = 560E
- J9, J10 = MSTBVA 2,5/ 2-G-5,08 (1755736)
- Heathsink – new drillings:
- Drawing 152188572
- New partlist:
  Stückliste HMC0601-V3-5 - 52180260 vom 17112011.pdf
- New schematics:
  HM-COLLAMAT RAB4010-V-3-5-Schema.pdf

### 3.2.1 Details for the main control unit

**Connection terminals and plugs**

| No. | Description | Cable |
|---|---|---|
| J10 | 58V toroidal transformer, motor voltage, screw terminals | 2 red wires |
| J9 | 27V toroidal transformer, logic voltage, screw terminals | 2 blue wires |
| J13 | Step motor, motor controller, power plug | Cable with 2 cores |
| J12 | Step motor, motor controller, control signal plug | Cable with 8 cores |
| J7 | Control signal plug, SIGNALS connection plate | Cable with 40 cores |
| J4 | OOL – plug – Out Of Label sensor | Cable with 1 cores |
| J1 | TUO – plug - traction unit open sensor | Cable with 3 cores |
| J3 | RWF – plug - ReWinder Full sensor | Cable with 3 cores |
| J2 | LLO – plug - paper supply low sensor | Cable with 3 cores |
| J11 | REW - plug - optional rewinder, control signals | Cable with 6 cores |
| J6 | Operator panel - plug - operator panel | Cable with 5 cores |
| J8 | Adapter plug - ribbon cable to adapter | Cable with 10 cores |
| J5 | Master controller - socket (microcontroller card) | Cable with 40 cores |
| J14 | Add-on board - plug - customer-specific boards | Cable with xx cores |
| | | |
| X3 | PE Protective earth | green - yellow |
| X4 | PE Protective earth | green - yellow |

**Fuses**

| No. | Description | Value |
|---|---|---|
| SI1 | Microfuse 20 x 5 mm - (logic voltage - 24V DC, 5V DC and 3.3V DC) | 2.5AT |
| SI2 | Microfuse 20x5 mm - (step motor voltage - 80V DC) | 5.0AT |
| F1 | Electronic fuse (+24V F1 - ICH = 0.75A / IT = 1.5A)<br>F1 monitors the +24V that run on plugs J6, J7 and J8. | 0.75 / 1.5A |
| F2 | Electronic fuse (+24V F2 - ICH = 0.20A / IT = 0.4A)<br>F2 - This fuse is only used for the internal board test. | 0.2 / 0.4A |

**Fuses**

If the electronic fuses F1 or F2 have triggered, this indicates that an overload or short-circuit is present on one of the loads connected to plugs J6, J7, J8 and ... .

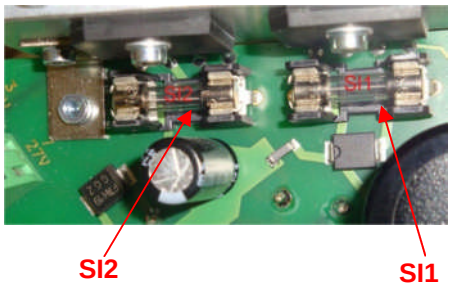
After the short-circuit or overload has been corrected, the corresponding fuse is reactivated after briefly turning it on and off.

The connections at the optional connection box (MHC0604-1-x or HMC0605-2-x) are also protected with the 1AT microfuse.

Another microfuse (3.15AT) is located at the optional magnet flap adapter (MFA), which protects the AC circuit at the corresponding MFA interface (magnet or CP21 connection).

The microfuses SI1 and SI2 are located at the left side of the main control printed board (near the

cooling element). The fuse SI1 is located at the top edge of the board.




Fuses FI1 and FI2

**Voltage control LEDs**

On the step motor end stage (NCD06):
Green LED: indicates 80V DC voltage.
Position: middle LED

On the main control unit (HMC0601):
LED D18: indicates 24V DC voltage.
Position: by the motor controller plugs J12 + J13
LED D2: indicates 5V DC voltage.
Position: left next to battery BT1
LED D1: indicates 3.3V DC voltage.
Position: left next to LED D2

If the 80V DC motor voltage or the 24V DC, 5V DC or 3.3V DC voltages are not active, the corresponding LED will **not** be lit. If the 5V DC voltage is not active, the 3.3V DC will not be active either. If one of the voltages is not active, the corresponding fuses must be checked. The fuses are located near the cooling element on the left side of the main control unit. If the fuse is defective, the cause of the defect must be determined. The defect must be corrected before the fuse is replaced.

**PE - connections (blade terminals)**

The PE – connections (earthing terminals) are located at the bottom right and left of the main control unit are labeled X3 and X4.

PE (left): X4

PE (right): X3

*Earthing terminals* (PE terminals) create a connection to the housing frame, the "Power" side plate and to the adapter. They are for connecting an earthing system.

**Definition of earthing conductor:** Earthing conductors must be colored green/yellow. This color combination may only be used for conductors with a protective earthing function. To avoid mix-ups, no green or yellow wires may be used in supply voltage installations (switch cabinets, cables). At plug connections, the earthing conductors are connected to special protective contacts, which are set up so that they connect prior to the other contacts and separate after the other contacts are separated. Connector cables must be set up so that the earthing conductor is the last to disconnect if the cable is pulled out.

PE connections at the dispenser housing:

PE connections (M4) are located above the opening for the RJ45 socket (Ethernet connection) - one each on the left and right. The PE connection near the "Power" connection plate is the central connection for the entire system (see also PE1 in the assembly diagram in the Appendix).

**PE - connections are:**

| No. | Description |
|---|---|
| 1 | "Power" connection plate - PE supply input socket to PE supply output socket |
| 2 | "Power" connection plate - PE supply input socket to PE control board MHC0601 |
| 3 | "Power" connection plate - PE supply output socket to PE dispenser housing (PE1) |
| 4 | PE dispenser housing (PE1) to PE adapter housing |
| 5 | PE dispenser housing (PE2) to PE connector board ("SIGNALS" connection plate) |
| 6 | PE adapter housing to PE adapter board (HMC0605 or HMC0606) |
| 7 | PE adapter housing to inside side holder of the dispenser edge |

**PE cable**

| No. | Description | Cable |
|---|---|---|
| HMC06CA14 | PE power cable | Connections 1, 2 + 3 |
| HMC06CA15 | PE cable, adapter housing to traction unit | Connection 4 |
| HMC06CA28 | PE connector board cable | Connection 5 |
| HMC06CA27 | PE cable, adapter housing to board | Connection 6 |
| HMC06CA26 | PE cable, adapter housing to board | Connection 7 |

See also block diagram in Appendix (Register G)

**Shielding**

The label sensor is very sensitive to disturbances from external influences. Because of this, the transmitter and receiver cables are shielded. These shieldings are at the PE level in the adapter housing. **Service note:** Shielding connections must be kept as short as possible!

## 3.2.2 Changing the main control unit

**Changing the main control unit**

To replace the main control unit, all cables must be unplugged and the screw terminals for the transformer cables must be loosened. The four mounting screws are then removed and the board is removed.

The master controller card module can then be removed. Loosen the mounting screws and unplug the module. If a customer-specific card module is used, this module can now also be unplugged (J14).

The new board is carefully inserted and fixed with the four mounting screws. After this, all cables and wires are re-connected. Re-insert the (tested or new) card modules and fix them with screws.

Check the firmware version of the master controller (card module in the middle of the main control unit - J5) and the slave controller (see also Programming the controller).

**Version number**

***INFORMATION!***

*The main control unit and add-on modules (electronics) contain ESD-sensitive components. When handling these electronics, measures against ESD must be taken.*

**Warranty**

***INFORMATION!***

*All defective electronic modules must be replaced. If repairs are attempted or if attempted repairs lead to further malfunctions, the warranty will be void.*

## 3.2.3 FIRMWARE versions

**Version number**

***INFORMATION!***

*The firmware versions of the master controller, slave controller, optional rewinder controller and operator panel controller must be compatible. The current firmware version numbers are listed on the back wall of the interior of the Collamat S.*

**Version number**

Firmware versions

| | |
|---|---|
| Master | 1.00 |
| Slave: | 1.41 |
| Operator: | 3.004 |
| Rewinder: | 3.20 |
| Date: | 2011-07-19 |

**Firmware Update**

Every microcontroller contains its "task-specific" software - the firmware - in so-called Flash memory.

If the firmware is updated (expansion of task-specific functions = firmware update), the microcontroller that was changed must be reprogrammed in the Collamat S spender.

The manufacturer of the Collamat S or its local representatives have special programming devices for this purpose.

Normally, the end user does not have these programming devices available, so Collamat AG offers a special update service by chip or board.

The following firmware update services are available:

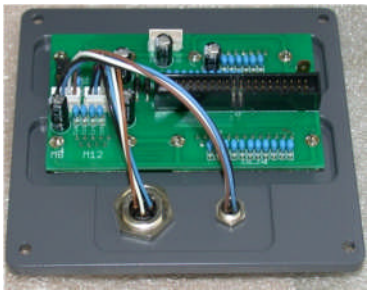
- Master controller: Replacement board RCM4010
  No. 52180402
- Slave controller: Replacement board HMC0601
  No. 52180266
- Operator panel: Replacement microcontroller PIC16F84A
  No. 52180379
- Rewinder: Replacement microcontroller dsPIC 30F2010
  No. 52180408

Please find more information to Firmware update procedures in chapter 6.4.19. and 6.4.20.

## 3.4 The side connection plate “SIGNALS”


**view from the outside**

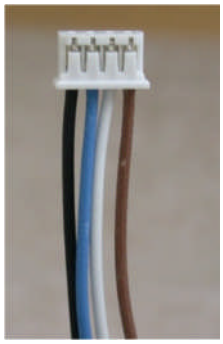
**from version Y to …**



**up to version V …**

| Connections | Function | Plug - Connector |
|---|---|---|
| Nonstop | Nonstop labeling with two labelers | 15-pin D-Sub plug |
| Opt. RS232 | Optional serial port (RS232) | 9-pin D-Sub plug |
| Opt. Operator | Optional operator panel | 9-pin D-Sub connector |
| Connection-Box | Connection box / connection module | 25-pin D-Sub plug |
| GSC | Good scanner | 4-pin M8 plug |
| TACHO | Incremental encoder | 4-pin M12 plug |

### GOOD SENSOR (GSC)



**Version Y and later:**

After removing the main housing back cover you are able to adjust the goodsensor (GSC) configuration jumpers on the board.

Default setting for the good scanner is:

- Sensor type: PNP-good scanner
- Control-input: not connected (NC)
- Control-pins: Pin4=output and Pin2=control-input
- Sensor power: Pin3=GND and Pin1=24V

Jumper settings (PCB **version Y** and later): Jumper:

- Sensor type: PNP- or NPN good-sensor - **JP4**
- Control-input: set to +24V, GND or open (NC) - **JP3**
- Control-pins: Pin2=output and Pin4=Control-input or vice versa - **JP2**
- Sensor power: Pin3=GND and Pin1=24V or vice versa - **JP1**

### Jumper-Sensortype JP4 [JP1]

Configuration NPN / PNP (**JP4-TYPE**):

- PNP-good scanner: 2 x jumper top (vertical)
- NPN-good scanner: 2 x jumper bottom (vertical)

**Jumper-Control-input JP3 [JP2]**

**e.g. bright- / dark-switching (JP3-CNTR.):**
The control line has to be connected to GND, to +24V or left open - depending on the brand of the good scanner. The most common function for the control line is:
Setting the sensor to bright - or to dark - switching (see data sheet of the device):

- JP2 – Control line to GND: jumper top (horizontal)
- JP2 – Control line to 24V: jumper bottom (horizontal)
- JP2 – Control line - open - : jumper center (horizontal)

For those good sensors using the control line as a teach input, JP2 has to be set to position:open (center=NC=not connected).

**Jumper-Control-Pins JP2**

**(JP2-I/O)**: The pin number and the function of the control pin and the sensor output pin depends on the sensor brand / type :

- Normal: Pin4=output and Pin2=Control input
  2x jumpers vertiacal / bottom
- Inverse: Pin2=output and Pin4=Control input
  2x jumpers vertiacal / top

**Jumper-Sensor-Power JP1**

**(JP1-POWER)**: The power pins on a good sensor may differ depending on the sensor brand / type:

- Normal: Pin3=GND and Pin1=24V
  2 x jumper horizontal right
- Inverted: Pin3=24V and Pin1=GND
  2 x jumper horizontal left

**Details to version Y ….**

See appendix – register H

**Details to version V ….**

**Version V and older:**
Jumper settings (up to PCB version V): Jumper:

- Sensor type: PNP- or NPN good-sensor - **[JP1]**
- Control-input: set to +24V, GND or open (NC) - **[JP2]**

**M8- / M12- plug**

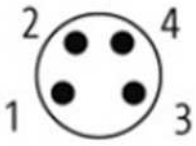
Self mountings plugs e.g. from MURR Elektronik::
M8-plug – male – 4-pin: Part.Nr. 7000-08351-0000000
M12-plug – male – 4-pin: Part.Nr. 7000-12491-0000000

**M8- / M12- cable (1:1)**

M8- resp. M12-Extension cable (male – female)
e.g. from Phoenix Contact:
M8-Kabel – 3m: Part.Nr. SAC-4P-M8MS/3,0-PUR/M8FS
M12-Kabel – 3m: Part.Nr. SAC-4P-M12MS/3,0-PUR/M12FS

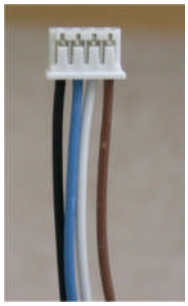
### 3.4.1 The „GSC“ M8-plug

**Pin assignment**




View on plug from behind

View on connector from front (Pin)



The plug type for the good scanner cable is a 4-pin M8-plug.

The pin assignment of this plug is according to the international standard:

- Pin 1: +24V
- Pin 2: Control line (bright- dark-switching or teach)
- Pin 3: GND
- Pin 4: Input GSC (X7-27/29)

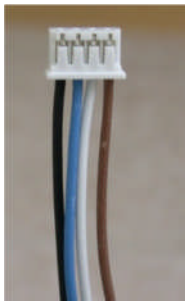
Connect white molex plug to M8-Sensor connector.

### 3.4.2 The „PLC“ M8-plug

**Pin assignment**


View on plug from behind

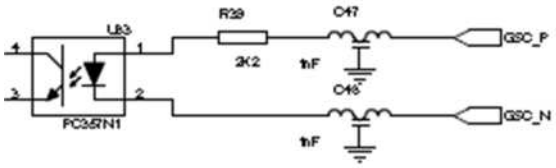
View on connector from front (Pin)



The plug type for the PLC is a 4-pin M8-plug.

The pin assignment of this plug is according to the international standard:

- Pin 1: +24V (Collamat)
- Pin 2: GSC_P
- Pin 3: GND (Collamat)
- Pin 4: GSC_N (X7-27/29)

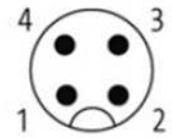



Collamat input

Connect white molex plug to M8-PLC connector.

### 3.4.3 The „TACHO“ M12-plug

**Pin assignmen**




View on plug from behind

View on connector from front (Pin)

The plug type for the incremental encoder cable is a 4-pin M12 plug. The pin assignment of this plug is according to the Collamat S standard:

- Pin 1: +24V
- Pin 2: TACA_P (Signal A – PNP) (X7-26)
- Pin 3: GND
- Pin 4: TACB_P (Signal B – PNP) (X7-25)

Connect white molex plug to M12 Tacho connector.

## 3.5 Operator panel

**Operator Panel**

The operator panel is mounted at the upper guide roller of the unwinder.

The position of the operator panel can be turned to the optimum operator position, depending on the position of the dispenser. The operator panel electronics can be removed from the housing by unscrewing the mounting screws at the rear.

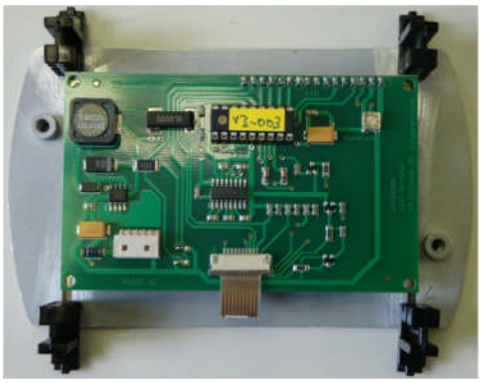

The operator panel

**Replacing a defective LCD or interface board**

Unscrew the two mounting screws at the back of the operator panel housing. Carefully remove the complete operator panel unit from the housing. Unplug the five-pole connection cable from the board interface. Carefully slide out the four assembly supports (they may stick slightly to the keyboard foil). Unplug the keyboard connection from the interface board. For this, the locking mechanism for the plug must be disengaged (pull the brown plastic piece to the board edge). Remove the interface board from the LCD module (from the 16-pin post plug). If the LCD module is defective: Carefully remove the LCD module from the keyboard foil (this may require a large screwdriver).

Installation of the new parts is performed in the reverse sequence.

Warning: Remove the protective foil from the glass surface of the LCD module!

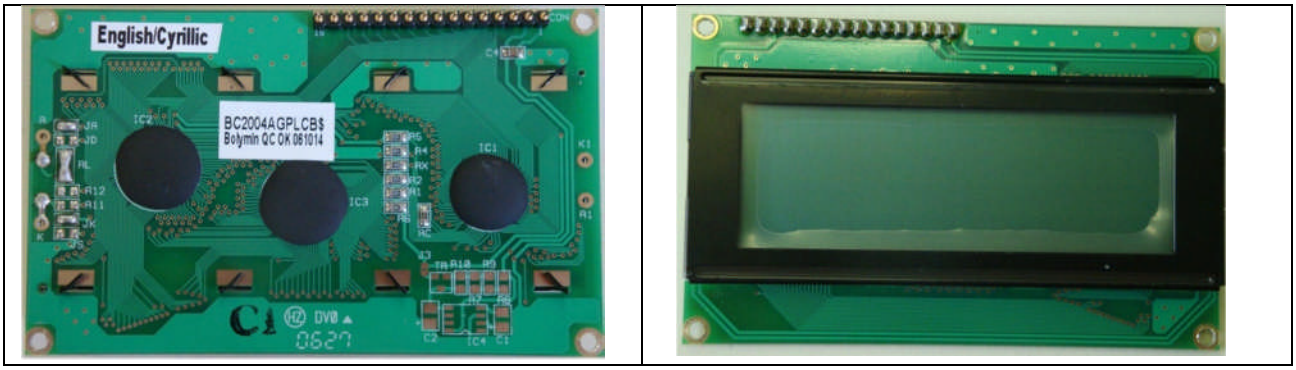


Interface board

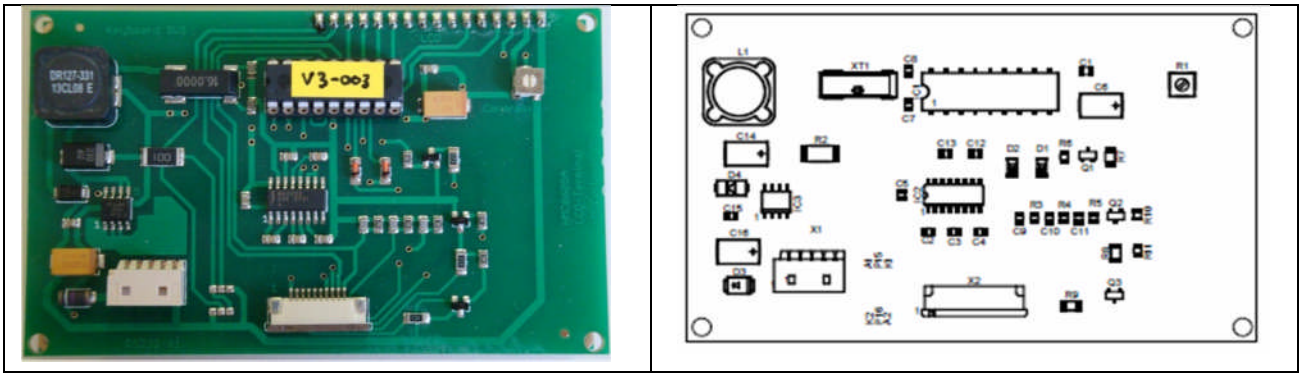
**Replacing the LCD**

**DANGER!**

When replacing the LCD module, note the warranty limitations. There is no warranty for broken LCDs. Unauthorized manipulation of the components will annul the warranty.




LCD display - rear and front




LCD terminal interface board HMC0609-x - Contrast settings with R1

**Version number**

***INFORMATION!***

*On the IC1 microcontroller (small label) of the LCD interface board, the firmware version number is listed.*

**Contrast settings**

The small trimmer **R1** on the interface board (HMC0609 board – component side) can be used to set the LCD contrast. The trimmer must be set using a special screwdriver for SMD trimmers. Using another screwdriver can damage the trimmer. No force may be used!

## 3.6 The NDC06 motor controller (MC)

**Note**

The motor end stage is a component developed and built by a renowned step motor controller producer. The end stage is also known as the motor controller (MC).

**MC NDC06**

***INFORMATION!***

*The motor end stage is set up, tested and installed into the Collamat® by Collamat AG. The motor end stage settings may not be altered. The set phase current may not be adjusted!*

**WARNING:** *Do not set the switches/jumpers under active voltage!*

**MC NDC06**

**DANGER!**

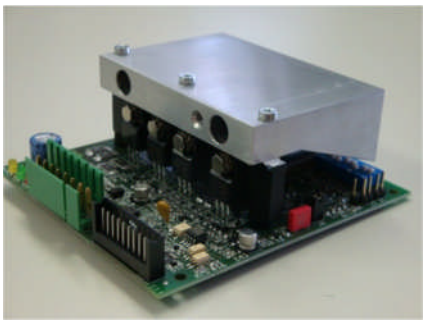
No voltage may be active during any work on the motor end stage!

### 3.6.1 Changing the MC

**Replacing the MC**

To replace the "step motor" motor end stage, start by unplugging the three cables (plug sockets AM1, AM2 and AM3). After that, both assembly screws for the end stage on the cooling element can be removed. The complete motor end stage (with cooling element) can now be removed from the front plate. The end stage can now be unscrewed from the cooling element (three screws).

The new motor end stage is now screwed onto the cooling element. Clean the contact surfaces between the cooling element and the end stage profile and use heat-conductive past at the contact point. Now check the switch and jumper settings on the board.



Motor end stage NDC06

### 3.6.2 Settings for the MC

**DIP - switches and jumpers**

**Dip switch DP1; 3, 6 and 7 – ON** 1, 2, 4, 5 and 8 - OFF
(Standard Motor: SM2862-5155) Rated current: 5.1 A:

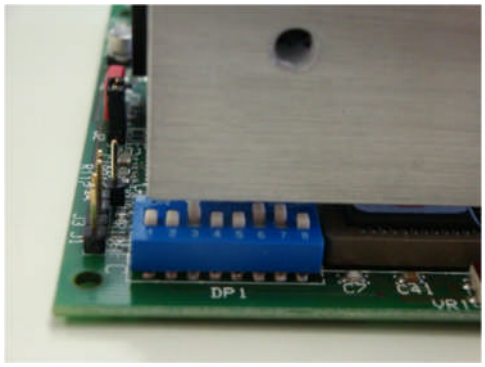
**Dip switch DP1; 6 and 7 – ON** 1, 2, 3, 4, 5 and 8 - OFF
(Optional Motor: SM2862-5255) Rated current: 6.0 A:
Steps/rotation: 2000 Damping: off

Note:
The OFF position of the DIP switch is at the edge of the board.

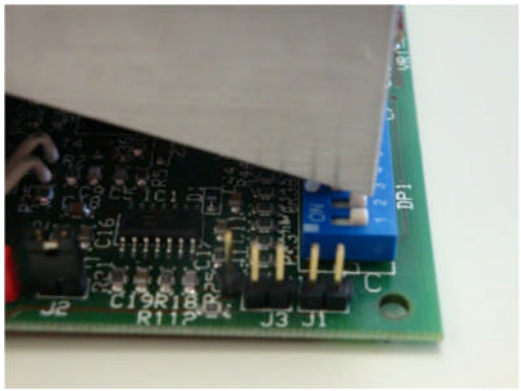
| | | |
|---|---|---|
| **Jumper J1:** | (FC) automatic current reduction active (jumper not plugged in) | - OFF |
| **Jumper J2:** | (CO) control input, "power off" not active (jumper plugged in) | - ON |
| **Jumper J3:** | (OS) step and direction mode active (jumper not plugged in) | - OFF |

The complete motor end stage can now be screwed back onto the front plate (clean the contact surfaces here as well and coat them with head-conductive paste).

The corresponding cables can now be plugged back in (AM1, AM2 and AM3).



DIP switch settings

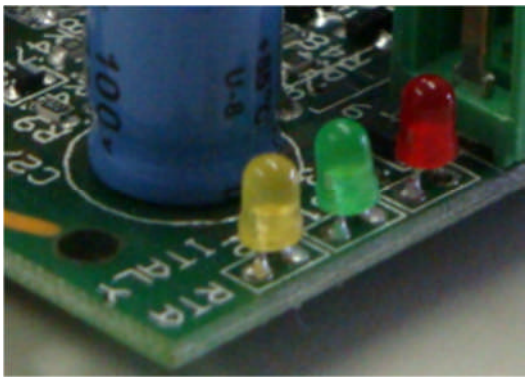


Jumper settings J1, J2, J3

### 3.6.3 Status LED for the MC

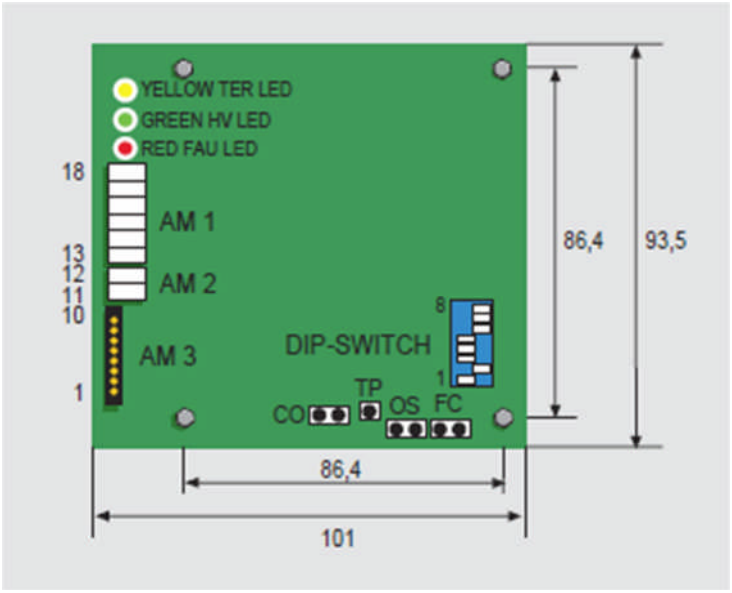
**MC status LED**

| LED | Status | Explanation |
|---|---|---|
| Green HV | ON | Operating voltage in acceptable range |
| Red FAU | ON<br><br>OFF | a – over temperature, if TER LED is <on><br>b – overvoltage or under voltage, if HV LED is <off><br>c – short-circuit / motor incorrectly connected if HV LED is <on><br>Motor end stage OK - if HV LED is <off> |
| Yellow TER | ON<br>OFF | Motor end stage not OK – over temperature<br>Motor end stage not OK – if HV LED is <on> |

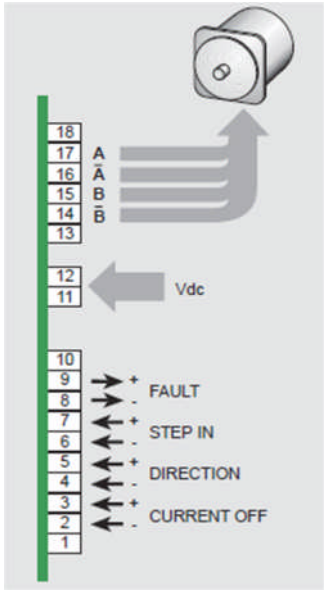


MC status LED

### 3.6.4 Jumpers, LED, DIP and plugs of the MC




MC pin designations




Plug arrangement

## 3.7 FEED

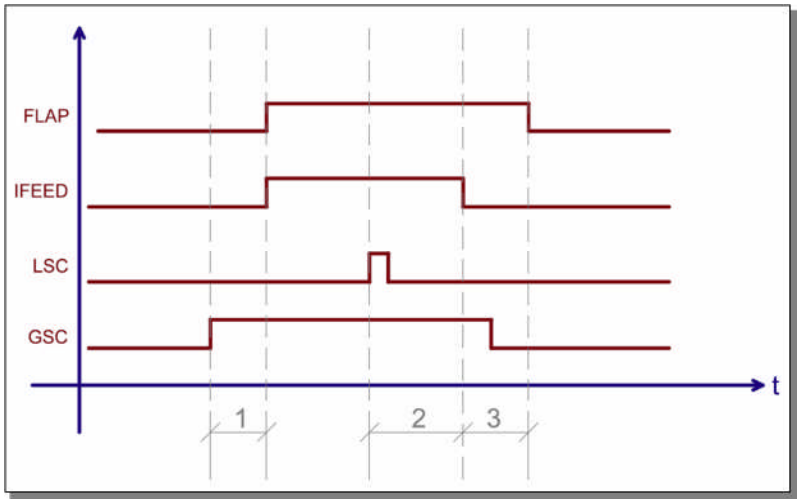
**Signal status**

The **IFEED** signal is always active while the step motor is turning. This signal can communicate to an external printer unit that paper is moving or not. The printer system analyzes the curves of this signal for printing to determine that the paper is not moving. The time sequence of the IFEED signal is shown in Figure 3-15..

The **IFEED** signal is separated from the rest of the electronics with an optical coupler. The signal can be used to start an external printer in a potential-free manner.

Using the optical coupler, the signal can be switched for NPN or PNP inputs. The polarity of IFEED can be programmed using the operator panel. NORMAL means that the signal is active when the dispenser is dispensing. INVERS means that the signal is active when the dispenser is not dispensing.

The IFEED signal (as with many other control signals) is available at the connection port ("SIGNALS" side connection plate or on the connection box / module).




Time sequence of the IFEED and FLAP signals

a. Speed-dependent positioning delay
b. Length of pre-dispensing
c. Delay of MFA flap signal

(MFA = magnet flap adapter)

**FLAP**

The **FLAP** signal course shows the control of a magnet flap adapter (MFA) - the curve clearly shows the delay time (3) that ensures that the adapter touches the product after dispensing a label and is not retracted until after the product has passed.

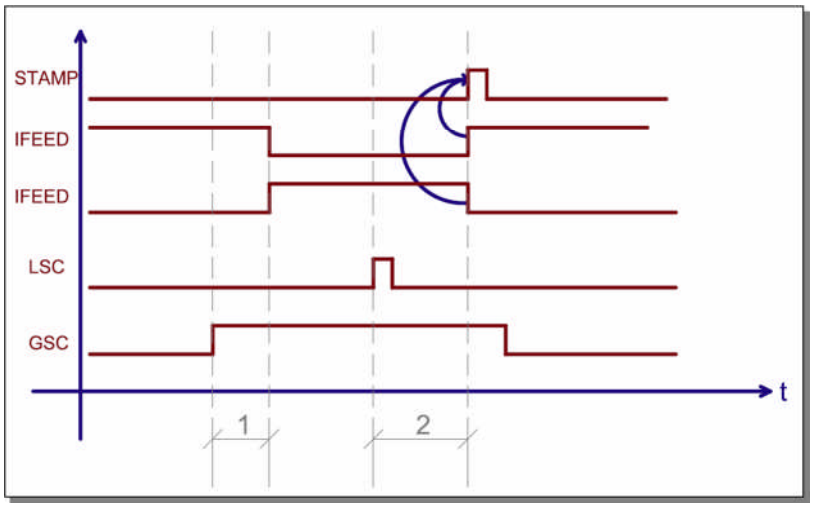
## 3.8 Controlling external devices

**Controlling a hot stamp with IFEED**

Hot stamps are connected to the IFEED signal as follows:

The IFEED signal is available at the "SIGNALS" connection plate at plug X4 of the connection box - or, optionally, at the connection box / on the connection module.

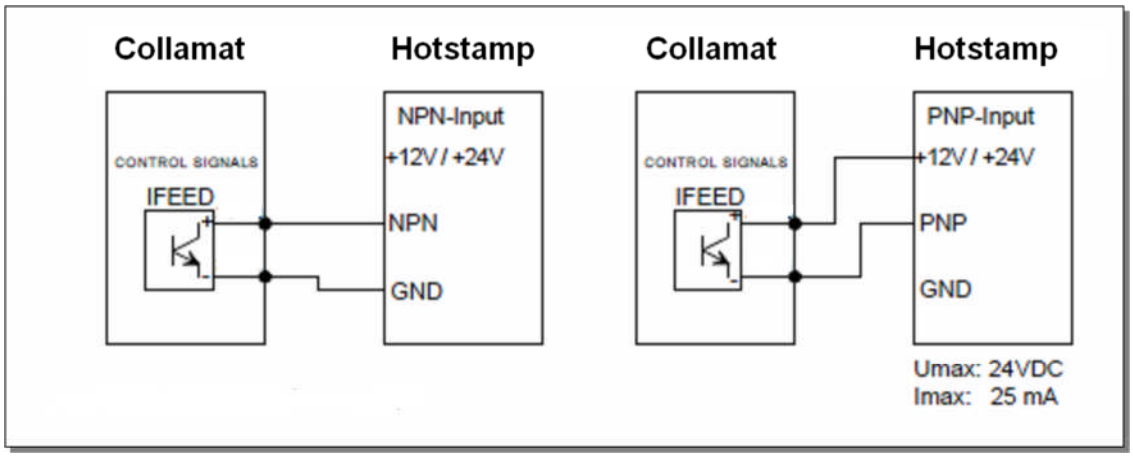
Depending on the manufacturer and type of hot stamp, the polarity of the hot stamp trigger signal may need to be changed. This is done in the **IFEED POLARITY** configuration menu to **normal** or **inverted**. See also Figure xx.




Time sequence of the IFEED- and STAMP- signals

1 - Speed-dependent position delay

2 - Length of pre-dispensing



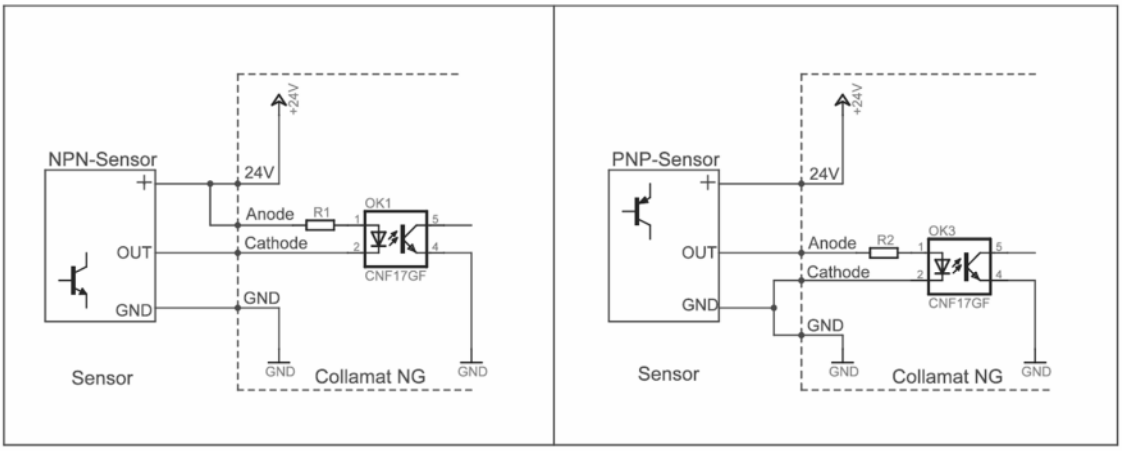

Connection diagram – NPN or PNP hot stamp optical coupler inputs

**NPN / PNP inputs**

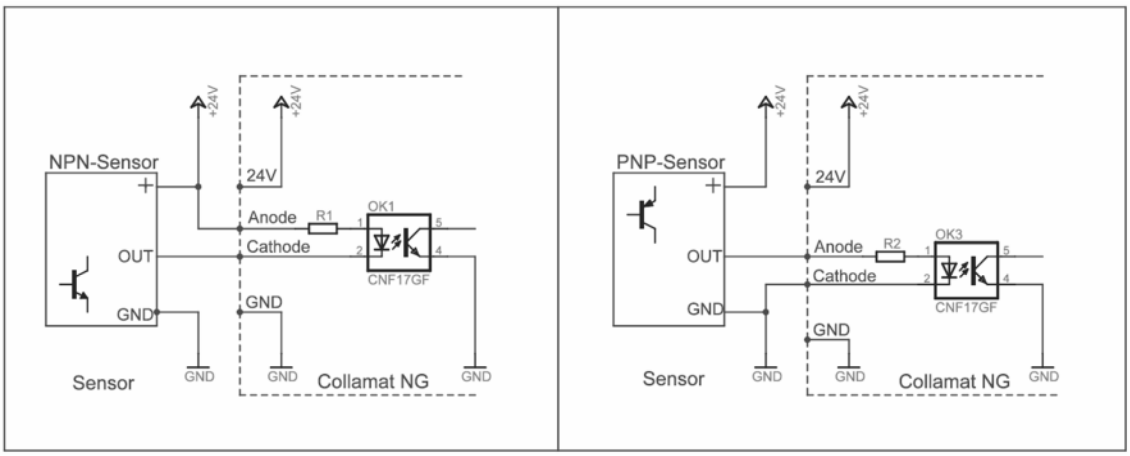
Optical coupler inputs with included anode and cathode connections can be connected individually. Pre-resistance in the anode cable is already installed. The following inputs of the Collamat S follow this input principle:

- GSC_P / GSC_N
- COUNTER_INP / COUNTER_INN
- NSTP_INP / NSTP_INN
- RWE_ERROR_INP / RWE_ERROR_INN
- PRODUCT_INP / PRODUCT_INN
- TACA_P
- TACB_P

for this: XXXXXX_XXP = anode connection
XXXXXX_XXN = cathode connection




Connection diagram for NPN or PNP sensors at the optical coupler input
Sensor supply voltage from **internal**

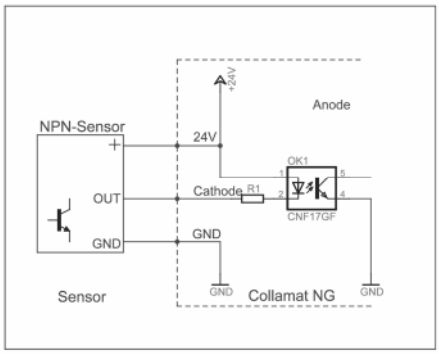



Connection diagram for NPN or PNP sensors at the optical coupler input
Sensor supply voltage from **external**

**Connecting internal sensors (NPN)**

Collamat S **"internal"** sensors are NPN sensors, meaning that the optical coupler inputs are set for 24V at the anode side. A 2K2 resistor in the cathode cable ensures proper current limiting. These inputs can be switched very easily by establish a short-circuit against GND. The following inputs of the Collamat S follow this input principle:

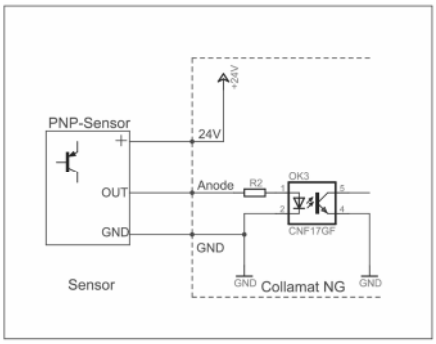
- RTA_ERR
- TUNIT
- LLO
- RWF
- OOL




**Connecting external sensors (PNP)**

Collamat S **"external"** sensors are PNP sensors, meaning that the optical coupler inputs are set to GND at the cathode side. A 3K3 resistor in the anode cable ensures proper current limiting. When positive voltage (24V) is activated at the inputs, these inputs can be switched very easily. The following inputs of the Collamat S follow this input principle:

- DISP
- START
- STOP
- READY
- LOCK_INV
- LOCK



## 3.9 Incremental encoder (optional)

### 3.9.1 Speed measurement

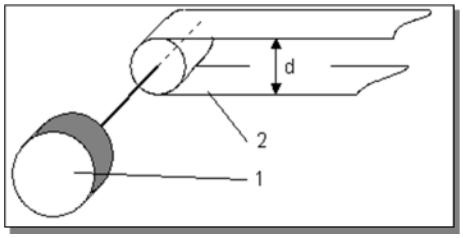
**Variable speed**

For the labels to be placed onto the goods at exactly the speed of the goods, the goods speed must be measured. This is performed using an incremental encoder, which transmits pulses to the slave controller in accordance with the measured path distance (inputs TACA_P and TACB_P at the M12 TACHO socket).

Electrical connection of the incremental encoder:
see **Incremental encoder (TACHO)** under "SIGNALS" side connection plate and the next page.

When using an incremental encoder for speed measurement, the step distance must be entered at the operator panel for correct measurement. The step distance is the distance traveled by the goods between two encoder pulses (waves).

The step distance is calculated as follows:




Example 1:
The Collamat S (black wheel) incremental encoder **1** sends 2000 pulses per rotation. The incremental encoder wheel is driven by conveyor belt **2**. The wheel diameter **d** measures 70 mm. Both rising and falling waves at outputs A and B are counted.

$$\text{Step} = \frac{d * pi}{\text{pulses}} = \frac{219.91\ \text{mm}}{4 * 2000\ \text{pulses}} = 0.027489\ \text{mm / pulse}$$

Example 2:
The Collamat S (blue wheel) incremental encoder 1 sends one pulse per 0.1 mm. The incremental encoder wheel is driven by conveyor belt 2. Both rising and falling waves at outputs A and B are counted.

$$\text{Step} = \frac{0.1\text{mm:}}{\text{pulses} * 4} = 0.025\ \text{mm / pulse}$$

Example 3:

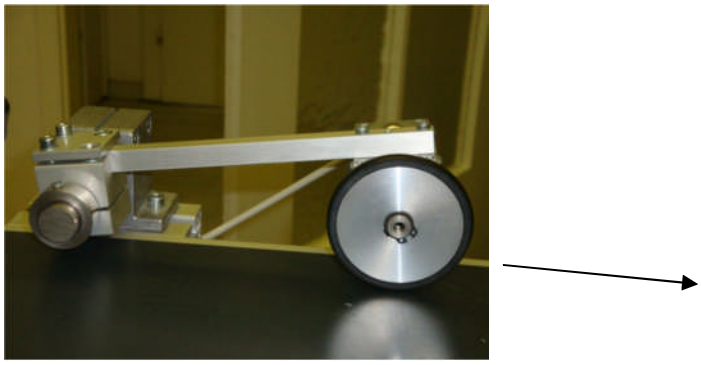
The incremental encoder is mechanically connected to the conveyor belt drive (axle to axle):
- the conveyor belt is moving forward L mm during one full incremental encoder turn (e.g. 240mm)
- the incremental encoder has a resolution of P pulses per revolution – e.g. 5000 pulses/rev.

$$\text{Step} = \frac{L}{P * 4} = \frac{240\text{mm}}{5000\ \text{pulses} * 4} = 0.012\ \text{mm / puls}$$

## 3.9.2 Hardware data for the incremental encoder

**70mm wheel-Ø incremental encoder**

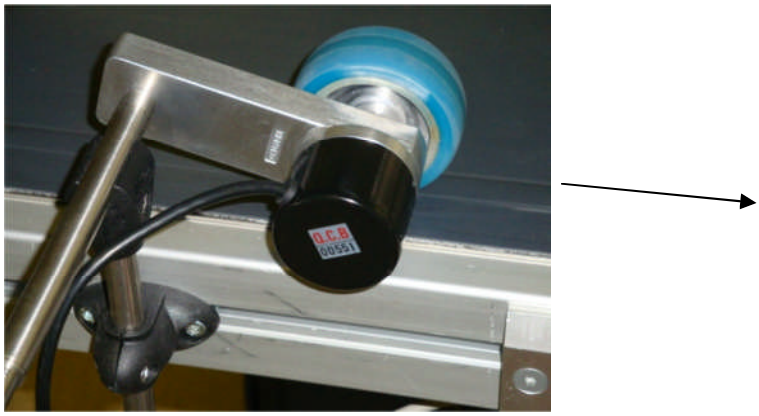
| What | Data |
|---|---|
| Operating voltage + Vs | 10 ….30V DC – typical: 24V DC |
| Current input | 60Ma |
| Resolution | 2000 pulses / rotation |
| Impulse tolerance | +/- 15% |
| Moment of inertia | typically 3 X $10^{-7}$ $kgm^2$ |
| Operating torque | typically 0.21cNm (3000 U/min 20°C) |
| Protection type | IP64 |
| Outputs A, B and N | Push-pull, short-circuit-proof |
| Mech. connection | Hollow shaft, 6 mm diameter |
| Cable length | 4m |
| Friction wheel: | 70.0 mm diameter |
| Cable colors + pins | +Vs brown M12 – pin 1<br>Channel A green M12 – pin 4<br>Channel B yellow M12 – pin 2<br>GND white M12 - pin 3<br>Channel N pink n.u. *<br>Shielding connected to housing<br>n.u. * Index signal is not used |
| M12 plug: | MURR Elektronik – Part.Nbr. 7000-12491-0000000 |
| Caution: | The turning direction of the incremental encoder will be automatically detected by the Collamat S. See mounting direction (arrow) of the encoder on the picture below. The encoder should be pulled (and not pushed) by the conveyor belt. |



70 mm wheel-Ø incremental encoder

### 63.66mm wheel-Ø incremental encoder

| What | Data |
|---|---|
| Operating voltage + Vs | 8 ….26V DC – typical: 24V DC |
| Current input | <=60mA |
| Resolution | 0.1mm / pulse |
| Rise / fall time | < 2us |
| Max. speed | 480m/min (8m/s) |
| Shock | 20g/11ms |
| Protection type | IP50 |
| Outputs A, B and N | Push-Pull |
| Friction wheel | PU silicon rubber – 63.66mm |
| Cable length | 4m (diam. 4.5mm) |
| Cable colors + pins | +Vs red M12 – pin 1<br>Channel A white M12 – pin 2<br>Channel B green M12 – pin 4<br>GND black M12 - pin 3<br>Shielding connected to housing<br>No Index channel not available |
| M12 plug: | MURR Elektronik – Part.Nbr. 7000-12491-0000000 |
| Caution: | The turning direction of the incremental encoder will be automatically detected by the Collamat S. See mounting direction (arrow) of the encoder on the picture below. The encoder should be pulled (and not pushed) by the conveyor belt. |



63.66mm wheel-Ø incremental encoder

## 3.10 Etikettierung - Theorie

### Standard Mode

**First check before starting:**

Before starting a dispensing sequence (dispensing a label), a few important parameters have to be checked first by the Collamat S firmware:

- **Position:** Check of the Position value / Position delay (see drawing). ). A too short Position value connotes: the stepper motor is not able to speed up (ramp up) to reach the actual product speed (good speed) within the defined position -distance/ -time! A too low Position value can also result in an error- or warning-message on the display (depending on the setting of the „Configuration – Error handling - Position to short“ parameter.
- **Predispensing:** Check of the Predispensing value (see drawing). The distance from the physical position of the label sensor to the desired stop position of the label on the dispensing edge is called “Predispensing” („Labeling parameter - Predispensing“). A too short value connotes: the stepper motor is not able to speed down (ramp down to the desired stop position) within the defined predispensing distance! A too low Predispensing value can also result in an error- or warning-message on the display (depending on the setting of the „Configuration – Error handling - Predispensing to short“ parameter).

**Starting a single labeling sequence:**

**1-Start:** The start point for a single labeling sequence (dispensing one label on the product) is always the triggering of the good scanner (GSC) by the front edge of the product (in product flow direction).

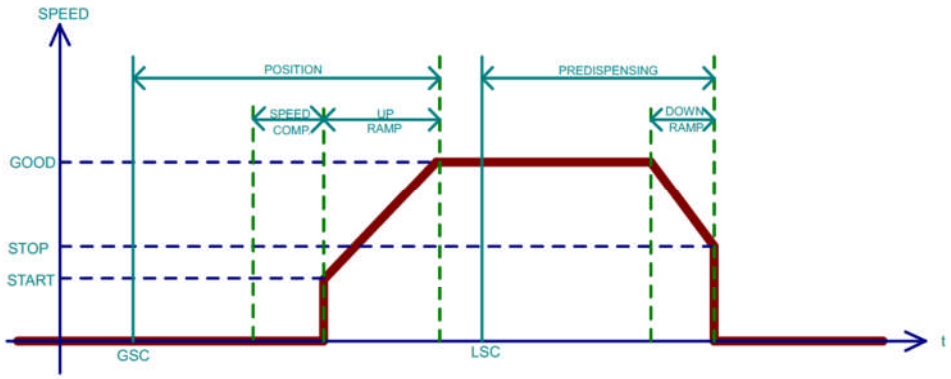
**2-Position-Delay:** First action is the start of the position delay [“Labeling Parameter - Position“ minus calculated speed compensation].

**Position delay = POSITION minus SPEED COMPENSATION**

**3-Motor start:** After the expiration of the position delay, the stepper motor starts moving – beginning with the start speed („Service - Stepper motor - Start-speed“) - speeding up with the defined acceleration **(**„Service - Stepper-Motor - Acceleration“ = **UP RAMP**). After the motor speed has reached the product speed („Labeling parameter - Speed selection - Fixed speed“ = **GOOD SPEED**), the motor keeps holding this speed.

**4-Wait for LSC input:** the stepper motor is still moving (speed = product speed) until the label sensor (LSC) detects a new label (end of actual label). The stepper motor is still moving the paper (label) with the product speed until the remaining distance to the calculated stop position of the label (following the actual label) in the front (on the dispensing edge) is equal to the length of the break sequence = equal to the length of the down ramp distance („Service - Stepper motor - Deceleration“ = DOWN RAMP). This is the start of the down ramp.

**5-Motor stop:** Now the last section of the label movement will get started (deceleration). The correct stop position of the label (following the dispensed label) is defined by the predispensing value and the length of the down ramp (see above) – whereas the length of the down ramp always depends on the value of the product speed .



**…continue with Standard Mode**

**Speed - Compensation** (SPEED COMP): Compensation value = distance resulting from the speed difference between product speed and ramping up motor speed – while in the RAMP UP section of the label movement. Remember: the higher the product speed the higher the compensation value! This explains the pre starting of a labeling sequence :

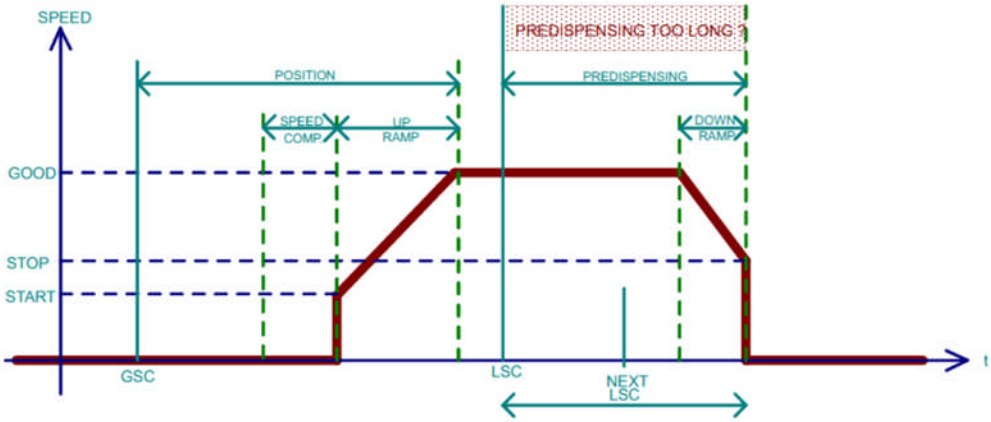
**Position delay = POSITION value minus SPEED COMP. value**

**Continue in the labeling sequence:**

The perfect time where the label has to be placed onto the product is where the motor speed is equal to the product speed (after the ramp up sequence and before the ramp down sequence get started)! Because we always like to have the same label position on the product, the start point where a new labeling sequence get started has to be determined and set according to the speed dependable calculated “SPEED COMPENSATION” value.

**Special case:** a new detected gap (between two labels) within the defined predispensing distance will result in a corresponding error-/warning message: „Predispensing too long“ (depending on the setting of the „Configuration – Error handling – Predispensing too long“ parameter).

Counteraction: reduce the predispensing value or the product speed!



## „Fast Speed“ Mode

**„Fast Speed Mode”** = fast labeling with short labels!

The course of action in the „Fast Speed Mode” is similar to the above described “Standard Mode”. However – a few parameters are treated different, to make the unit running faster (especially for short labels).

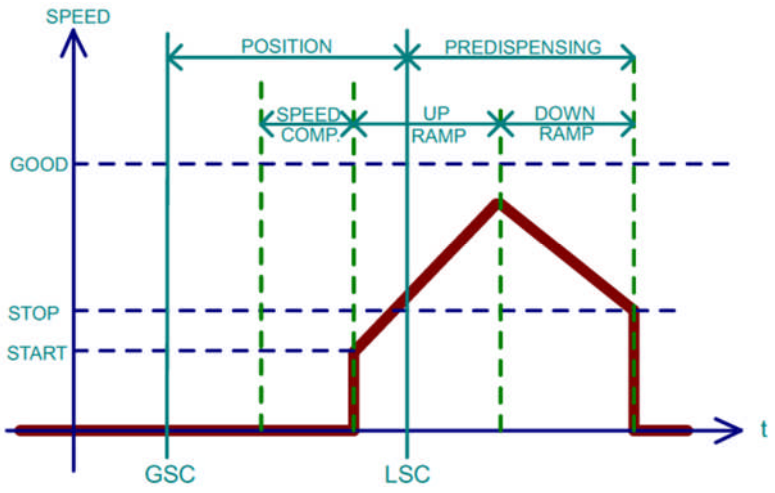
In this mode the detection of the gap between two labels (by the label sensor - marked as LSC) will normally fall into the up ramp section of the labeling sequence (see drawing below). This denotes that after the label gap has been detected, the remaining part of the label has to be checked/calculated constantly and the process has to be continued as following:

**Case 1:**

The labeling sequence can proceed as usual (ramp up to product speed – keep running with product speed – ramp down to stop). This is about the “Standard Mode” (see above). The critical point in this labeling process will get reached where the labeling speed is not able anymore to speed up to the (increased) product speed (“Labeling parameter – Speed selection – Tacho”). This is the point where the unit switches to case 2 = “Fast Speed Mode”.

**Case 2:**

The motor will have not enough time to completely ramp up to the level of the actual product speed. While in the acceleration phase up (ramp), the firmware is continually checking/calculating the remaining distance/time needed to correctly decelerated (ramp down) and stop at the defined predispensing position (on the dispensing edge). The point where the stepper motor will be switched from acceleration to deceleration is called the **“**point of return**”**. The predispensing and the position values are speed dependable parameters!




As soon as the labeling speed can NOT reach the product speed anymore (see drawing above), the **“Fast Speed Mode”** will be activated.

This mode enables the unit to run a high product/ label cadence – however the label speed will not reach the product speed (the product speed will always be faster than the labeling speed) – what - of course - can complicate the “glue down” process (label to product).

**… continue with**

**„Fast Speed Mode”**

**Observation / Adjustment:**

Before starting and/or while running a label dispensing sequence, a few important parameters have to be checked by the Collamat S firmware / by the operator:

- **Position:** Check of the Position value / Position delay (see above). A too short value connotes: the motor is not able to speed up and reach the calculated “point of return” – this is the point where the acceleration phase has to be changed to the deceleration phase (see drawing above)! A too short value can result in an error- or warning-message on the display (depending on the setting of the „Configuration – Error handling - Position to short“ parameter).
- **Predispensing:** Check of the Predispensing value (see above). The distance from the physical position of the label sensor (LSC) to the desired stop position of the label on the dispensing edge is called “Predispensing” („Labeling parameter - Predispensing“). A too short value connotes: the motor is not able to speed down from the “point of return” to the desired stop position. A too short value can result in an error- or warning-message on the display (depending on the setting of the „Configuration – Error handling - Predispensing to short“ parameter).
- **Error handling:** The behavior of the corresponding „Fast Speed“ message (on the display) can be adjusted in the menu „Configuration - Error handling“ ( setting a specific error-/warning condition to be ignored, to warn or to stop).

**Advantage of the “Fast Speed Mode” vs. “Standard Mode”:**

Because the stepper motor is not able to completely speed up to the product speed, the speed up distance/time can be shorter.

Because the stepper motor does not need to speed down from the product speed – but rather from the “point of return” - which is always lower – the ramp down distance/time can be shorter.

Because of shorter position- and predispensing-values and therefor shorter rump up and ramp down distances/times, the amount of products per time (product cadence) can be increased dramatically!

## 3.11 Electrical rewinder

### 3.11.1 Short description

The rewinder unit (also called rewinder) is to rewind the carrier paper (carrier foil) after labeling. The carrier paper is a waste product, which can be recycled in most cases.

For dispensing speeds greater than 40-60 m/min or for very wide labels, an (optional) electrical rewinder is needed. The rewinder pendulum serves to control the speed (power) of the rewinder motor (DC), which drives the rewinder core. The control unit - consisting of the pendulum mechanics and the pendulum sensor board - sends a control signal corresponding to the pendulum position to the 4-quadrant motor controller (called 4Q-MC in the following) via control input J1. This input controls the rewinder motor and rewinder core - onto which the carrier paper is rewound - based on the status of the control cable signals.

The Collamat S is capable of accommodating carrier paper sizes for label rolls up to 400 mm in diameter (carrier paper diameter on the rewinder: approx. 280 mm).

Optional: A ratchet disk is located on the back of the rewinder gear wheel with 25 black and white marks on it (the so-called incremental encoder). Using special reflective sensors on the sensor board, the speed and rotational direction of the rewinder is monitored and controlled.

The hardware-based coding of the dispensing direction is performed when the sensor board is installed. For a dispenser that runs from "left to right" (called a "right-sided dispenser" by Collamat AG), the internal assembly screw in the sensor board is coded to "right".

The monitoring cable transmits the following parameters (main computer to/from 4Q-MC) via J3 control inputs/outputs:

- Paper width — narrow / wide - adjustable at operator panel
- On / Off: — enable / disable

  If the dispenser is in error mode, the following occurs: The rewinder is turned off (disabled) adjustable at operator panel
- Run / Error: — The rewinder motor controller sends a RUN or ERROR signal to the main computer depending on the system status (if the dispenser is in error mode, the rewinder is turned off (disabled)

### 3.11.2 Status LEDs on the MC

**Status LED** Status of the 4Q rewinder motor controller

| LED | Description |
|---|---|
| GREEN | Operating voltage active |
| RED | The motor controller is in error mode or disabled. |

### 3.11.3 Electrical connections

**Socket J3 - CONTROL**

| Pin | Description | | |
|---|---|---|---|
| 1 | RW_WIDTH | - narrow / wide | - paper width |
| 2 | GND | | |
| 3 | RW_ENABLE | - on / off | - enable / disable motor |
| 4 | GND | | |
| 5 | RW_ERROR | - Run / Error | - 4Q-MC error ? |
| 6 | GND | | |

**Socket J1 – CONTROL (Version X1 and X2)**

| Pin | Signal | Description |
|---|---|---|
| 1 | GND | Ground |
| 2 | TURNA | Rotation direction phase A |
| 3 | TURNB | Rotation direction phase B |
| 4 | U4(S1) | Sensor position 1 - pendulum position |
| 5 | U3(S2) | Sensor position 2 - pendulum position |
| 6 | U2(S3) | Sensor position 3 - pendulum position |
| 7 | U1(S4) | Sensor position 4 - pendulum position |
| 8 | LR | left / right (coded during installation |
| 9 | NC | not used |
| 10 | VCC | +5VDC |

### Socket J1 – CONTROL (Version A)

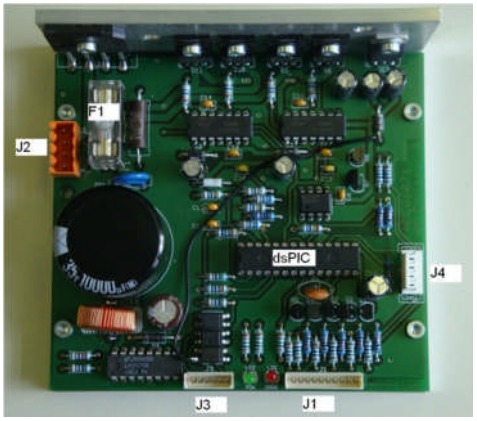
| Pin | Signal | Description |
|---|---|---|
| 1 | GND | Ground |
| 2 | NC | not used |
| 3 | U4(S1) | Sensor position 1 - pendulum position |
| 4 | U3(S2) | Sensor position 2 - pendulum position |
| 5 | U2(S3) | Sensor position 3 - pendulum position |
| 6 | U1(S4) | Sensor position 4 - pendulum position |
| 7 | LR | left / right (coded during installation |
| 8 | VCC | +5VDC |

### Socket J4 – PROGRAMMER

| Pin | Signal | Description |
|---|---|---|
| 1 - 5 | ⋯ | Programming device connection (e.g. MPLAB ICD2) |

### Socket J2 – POWER / MOTOR

| Pin | Signal | Description |
|---|---|---|
| 1 | ~ | Transformer connection (black cable) |
| 2 | ~ | Transformer connection (black cable) |
| 3 | M+ | Motor connection (red cable) |
| 4 | M- | Motor connection (black cable) |




4Q-MC (HMC0607-X1/X2) or 4Q-MC (HMC0607-A)

mounted on cooling bracket

## 3.11.4 Voltage supply

**Transformer**

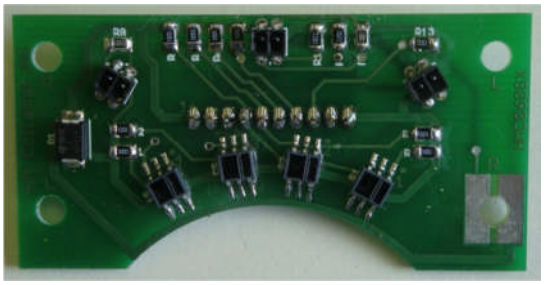
To operate the electrical rewinder unit, a special transformer (460VA) is needed that supplies the necessary energy to the 4Q-MC (24V AC).

## 3.11.5 Mechanics

**Drive / Control**

The following points must be checked before first using the electrical rewinder:

- belt tension (belt tensioner)
- pendulum tension of the control pendulum (spring)
- pendulum position (position of the control tab over the sensor board)
- Status - LED (on the motor controller board)



Rewinder sensor board (HMC0608X1)

**Here are the controls in detail:**

- Belt tension .....
- Pendulum tension .....
- Setting up the control tab using the example of a "right-sided" dispenser:
- Waiting position: The pendulum is at the lowest position; the carrier paper is taut. Check the control tab over the sensor board the right outside sensor on the board is covered by the tab - the three other sensors (inside) are visible:
- Speed level 1: only the two right-most sensors are covered by the control tab = slow rewinding speed.
- Speed level 2: only the three right-most sensors are covered by the control tab = medium rewinding speed.
- Speed level 3: All sensors are covered by the control tabs = fast rewinding speed.
- Paper tear: The right sensor is NOT covered by the control tab.

- Status LED:
  Green LED = Power supply OK
  Green LED + red LED = Error or machine not cleared for use

## 3.1 Non-stop labeling

### 3.1.1 Short description

It is possible to label goods without interruptions – by using two Collamat S.. For this purpose, both Collamat S units must be connected to one another electrically. The necessary connections are shown in Fig.3.9.5. Both Collamat S units are aligned as shown in Figure 3.9.2.

For speed mode “TACHO”, using an optional incremental encoder (called encoder); the encoder is supplied with 24V DC from both dispensers. The encoder signals and the supply voltage for the encoder are routed over the non-stop cable. The encoder is normal plugged into the M12 socket of the MASTER Collamat S.

The Master supervises the labeling process in Nonstop-Mode. Products passing the good scanner GSC of the Master are counting up the MA-SL--Counter. Products passing the good scanner GSC of the Slave are counting down the MA-SL-Counter (see MA-SL-Counter = Nonstop Counter). If the Master is not able to start the next label (error, warning,…), the Master will hand over the job to the slave by setting the NSTP-OUT signal – as soon as the first product without label passes he good scanner of the Slave. Now the Slave starts with the labeling process.
The corresponding error-/warning- cause at the Master unit can now be removed and then the state of the Master has to be set from pause/error to standby. The Slave is now doing the labeling job until he gets an error/warning or the „Changeover-key“ (🡅) on the Slave has been pressed (1). The Slave now hands over the nonstop control to the Master. The Master will be set immediately to online. There could be a situation where Master and Slave is labeling at the same time (if MS-SL-Counter > 0). At the moment where the first product (with a label on it from the Master) reaches the good scanner of the Slave, the Slave will get a cleared NSTP-OUT signal (stop command). Now it’s time to remove the cause of the Slave stop (error/warning).

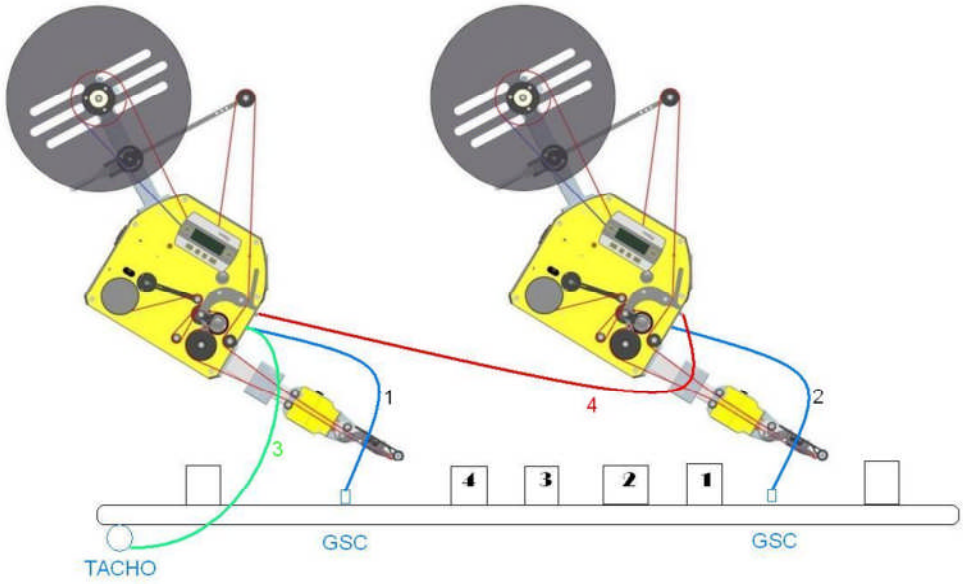
The Master is always controlling both labelers (Master + Slave) – will say - the master does know at every time the status of the two labelers and the value of the MS-SL-Counter. The Nonstop-Menu of the Master always shows the amount of products between Master and Slave = MA-SL-Counter.

There could be a situation where Master and Slave are in the error state. Remove the cause of these errors/warnings, remove all products between Master and Slave, set the Master to online and the Slave to Standby.
If the products between Master and Slave cannot be removed (formulary, foils, bowls,…) the MA-SL-Counter has to be set correspondingly (Nonstop-Menu of the master unit).

**Explanation:** MA-SL-Counter = Nonstop counter

(1) the external input line COUNTER **/ CH_OV** can also be used to start the change-over sequence (in nonstop mode only) **!**

### 3.1.2 Assembly




Setup for two Collamat S units in non-stop operation

Machine type: right-sided
Dispenser left: Master
Dispenser right: Slave

1 = goods sensor (Master GSC)
2 = goods sensor (Slave GSC)
3 = incremental encoder (Master + Slave TACHO)
4 = Non-stop cable(HMC06CA29)

### 3.1.3 Setup

When the system is wired for non-stop operation, setup is performed as follows:

- Stop the transport belt or product flow
- Remove the goods between the two GSC units
  or edit nonstop counter GOODS MA-SL) accordingly
- Set both Collamat S units with <run/stop>-key to STOP
- Set up both dispensers:
- Select the MASTER non-stop mode on the master
- Select the SLAVE non-stop mode on the slave
- Set the Collamat S Master with the <run/stop>-key to “ready”
- Set the Collamat S Slave with the <run/stop>-key to “standby”
- Start the transport belt or product flow.

The goods will now be labeled in non-stop operation. If any condition causes stoppage of one of the dispensers, proceed as follows:

- Correct the error status on the stopped dispenser
- Confirm the error message with ENTER
- press <run/stop> key = set dispenser to Standby mode
- press <up>-key  (on active unit = Slave) = change over to master (Changeover)

If an error occurs in non-stop mode that stops both dispensers, the error must first be corrected and the error message has to be confirmed (<enter>-key. Then, remove all goods between the GSC units before clearing the non-stop counter on the Collamat S Master. An erroneous slave demanding an immediate stop will inform the master by sending a short puls on the NSTP-OUT line (= NSTP-IN on the master nonstop connector) –only in the situation for nonstop counter (MA-SL-counter) > 0.

Setup or restart after a nonstop error (stop): normally the products between master and slave have to be removed and the nonstop counter has to be reset. There are situations where the products can NOT be removed (form-, foil- or mold-labeling). In these cases the nonstop counter has to be edited accordingly. To monitor and set up non-stop operation, the freely-configurable operator panel can be set to show/edit the number of goods between the two good scanner (GSC) units.

Position settings and goods suppression are applied to both goods sensors. The distance from the dispenser edge of each dispenser to the corresponding goodscanner (GSC) should be identical.

**Advise:**
The SLAVE has to be used – wherever possible – as so called „Emergency Unit“.  As soon as the MASTER is „Ready”, it is very advisable to hand over the control to the MASTER (Change-over) if the MASTER is in Standby mode.

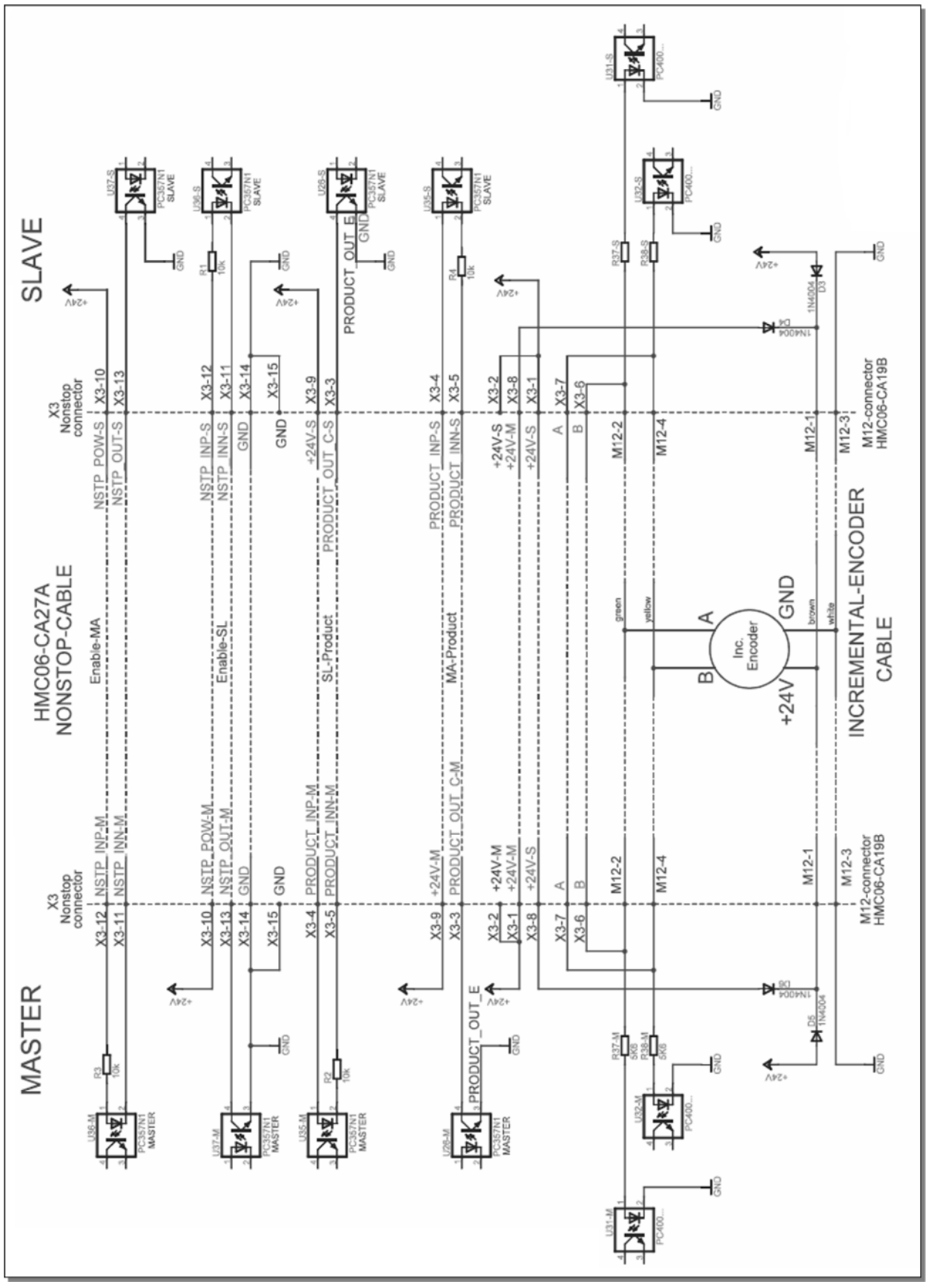
**Why:**
A faulty SLAVE (which has to be stopped immediately) is not able to label the products between MASTER and SLAVE anymore (after the error has occurred). If there are products between MASTER and SLAVE the nonstop unit (both dispenser) have to be stopped immediately (nonstop-error)! If there are no products between MASTER and SLAVE the MASTER can take over without problems.

### 3.1.4 Nonstop Control-Table

| | | Voltage* | Voltage* | Products | Products | |
|---|---|---|---|---|---|---|
| | | Pin 13 to GND | Pin 11 to GND | **btw. MS-SL** | **btw. MS-SL** | |
| **Master (MS)** | **Slave (SL)** | **MS: NSTP-OUT** | **MS: NSTP-IN** | Counter MA-SL | With label | **Comment** |
| stopped** | stopped** | 0 | 0 | 0 | 0 | |
| stopped** | ready | 0 | 24 | 0 | 0 | |
| ready | stopped** | 24 | 0 | 0 | 0 | |
| ready | standby | 24 | 24 | 0 | 0 | |
| standby | ready | 0 | 24 | 0 | 0 | |
| | | | | | | |
| stopped** | stopped** | 0 | 0 | > 0 | 0 | |
| stopped** | ready | 0 | 24 | > 0 | 0 | |
| ready | stopped** | 24 | 0 | > 0 | > 0 | |
| ready | standby | 24 | 24 | > 0 | > 0 | |
| standby | ready | 0 | 24 | > 0 | 0 | |
| | | | | | | |
| ready | standby | 24 | 24 | 0 | 0 | |
| ready | standby | 24 | 24 | 1 | 1 | |
| ready | standby | 24 | 24 | 2 | 2 | |
| ↑ | | | | | | Change over MS->SL |
| changeover | standby | 24 | 24 | 3 | 2 | NSC +1 -Etikette auf Prod. von MS |
| changeover | standby | 24 | 24 | 4 | 2 | NSC -1 -Etikette auf Prod. von MS |
| changeover | standby | 24 | 24 | 3 | 1 | NSC -1 -Etikette auf Prod. von MS |
| standby | ready | 0 | 24 | 2 | 0 | NSC -1 |
| standby | ready | 0 | 24 | 1 | 0 | NSC -1 |
| standby | ready | 0 | 24 | 0 | 0 | NSC -1 |
| standby | ready | 0 | 24 | 1 | 0 | |
| standby | ready | 0 | 24 | 2 | 0 | |
| | | | | | | |
| standby | ready | 0 | 24 | 0 | 0 | |
| standby | ready | 0 | 24 | 0 | 1 | |
| standby | ready | 0 | 24 | 0 | 2 | |
| ↑ | | | | | | changeover SL->MS |
| ready | changeover | 0 | 0 | 2 | 2 | |
| ready | changeover | 0 | 0 | 1 | 1 | |
| ready | standby | 24 | 24 | 0 | 0 | |
| ready | stopped** | 24 | 0 | 1 | 1 | |
| ready | stopped** | 24 | 0 | 2 | 2 | |

* NSTP-IN and NSTP-OUT measured on Nonstop connector of the Masters (to GND = Pin 14/15)
** Pause or Stopped
Changeover = change over from -> to (MA -> SL or SL-> MA)

### 3.1.5 Nonstop cabeling



# 4 Inputs + Outputs

## 4.1 Inputs + Outputs (Electronic)

**Explanation**

This chapter describes the signals of the Collamat S in detail. All input and output signals are described electrically and functionally. The plug positions on the "SIGNALS" connection plate and the pin positions of the input/output plug adapter have already been described in the chapter *"SIGNALS" side connection plate*.

All inputs and outputs are equipped with filter components to protect against electromagnetic interference. These components also prevent interference resulting from electrostatic discharge from interfering with the function of the Collamat S. However, rules to avoid these types of interference are to be observed when setting up a labeling system. These rules are described in a later chapter.

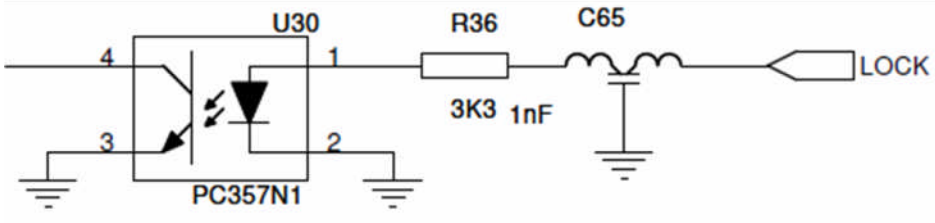
### 4.1.1 Inputs

**Optical coupler inputs**

The optical coupler inputs allow external devices to be connected that may be independently earthed or have a separate earthing potential. This prevents equalizing currents over the inputs and prevents faults. We distinguish between optical coupler inputs with common ground potential (GND), optical couplers with common +24V potential and optical couplers with separate anode and cathode cables.

Figure xx shows a diagram of the optical coupler inputs with a common GND potential.

#### Optical coupler input with common GND




On: 7.5 mA @ 24V DC
Off: 0 mA:
Vmax: 28VDC

**Explanation**

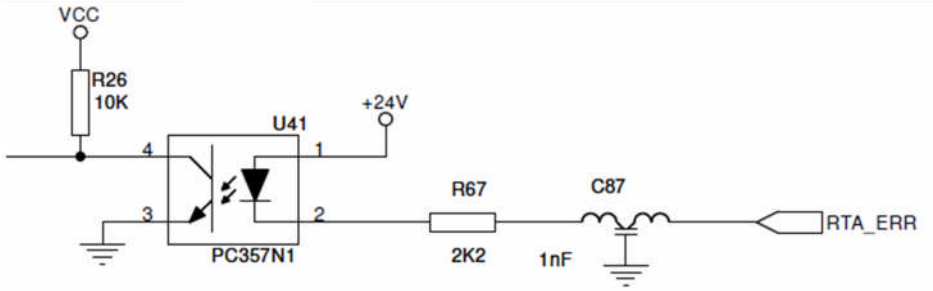
With this type of input, both PNP as well as push-pull output signals can be connected. The input is active if a current of approx. 7.5 mA (at 24V) flows through the LED of the optical coupler. The maximum input voltage is 28V.

The following input signals fall under this category:

**NPN inputs with common GND**

| Input | Description |
|---|---|
| DISP | Pushbutton on adapter – dispense one label |
| START | Change operating mode – from STOP to RUN |
| STOP | Change operating mode – from RUN to STOP |
| READY | Ready input |
| LOCK_INV | Lock inverse input |
| LOCK | Lock input (LOCK != LOCK_INV) |

## Optical coupler input with common +24V




On: 7.5 mA @ 24V DC
Off: 0 mA:
Vmax: 28V DC

**Explanation**

The figure above shows a diagram of the optical coupler inputs with a common +24V potential. This corresponds to most internal input signals.

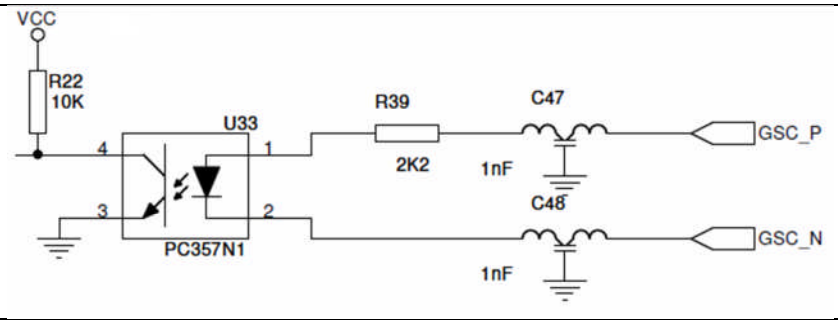
With this type of input, both NPN as well as push-pull output signals can be connected. The input is active if a current of approx. 7.5 mA (at 24V) flows through the LED of the optical coupler. The maximum input voltage is 28V.

The following input signals fall under this category:

**NPN inputs with common +24V potential**

| Input | Description |
|---|---|
| RTA_ERR | Error signal for step motor end stage |
| TUNIT | Traction unit open |
| LLO | Low label supply in unwinder |
| RWF | Rewinder full |
| OOL | Out of labels |

## Optical coupler input with separate cables




On: 7.5 mA @ 24V DC
Off: 0 mA:
Vmax: 28V DC

**Explanation**

The figure above shows a diagram of optical coupler inputs with separate anode and cathode cables.

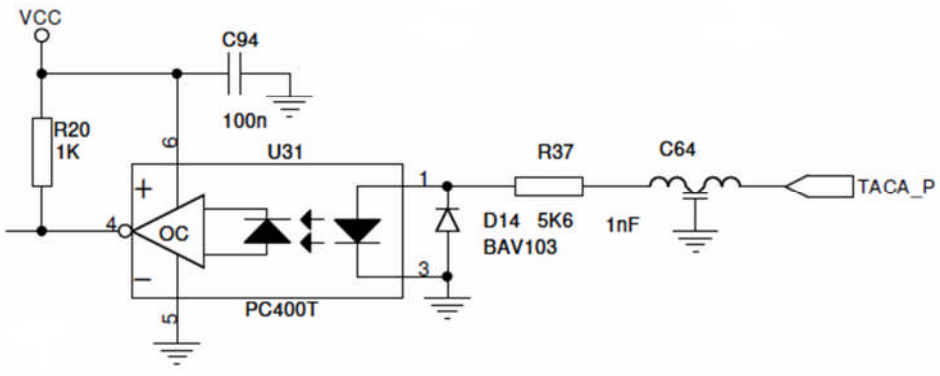
With this type of input, PNP, NPN as well as push-pull output signals can be connected. The input is active if a current of approx. 7.5 mA (at 24V) flows through the LED of the optical coupler. The maximum input voltage is 28V.

The following input signals fall under this category:

**NPN inputs with separate anode and cathode cables**

| P | N | Description |
|---|---|---|
| GSC_P | GSC_N | Goods sensor input |
| COUNTER_INP | COUNTER_INN | Counter input |
| NSTP_INP | NSTP_INN | Non-stop input |
| RWE_ERROR_INP | ERROR_RW_INN | Rewinder error input |
| PRODUCT_INP | PRODUCT_INN | Non-stop counter input |

## Rapid optical coupler input with separate cables




On: 4 mA @ 24V DC
Off: 0 mA:
Vmax: 28V DC

.

**Explanation**

The figure above shows a diagram of the rapid optical coupler inputs with separate anode and cathode cables.

With this type of input, PNP, NPN as well as push-pull output signals can be connected. The input is active if a current of approx. 4 mA (at 24V) flows through the LED of the optical coupler. The maximum input voltage is 28V.

The following input signals fall under this category:

**Rapid optical coupler inputs**

| Input | Description |
|---|---|
| TACA_P | Incremental encoder (tacho) - phase signal A |
| TACB_P | Incremental encoder (tacho) - phase signal B |

## 4.1.2 Label sensor – inputs

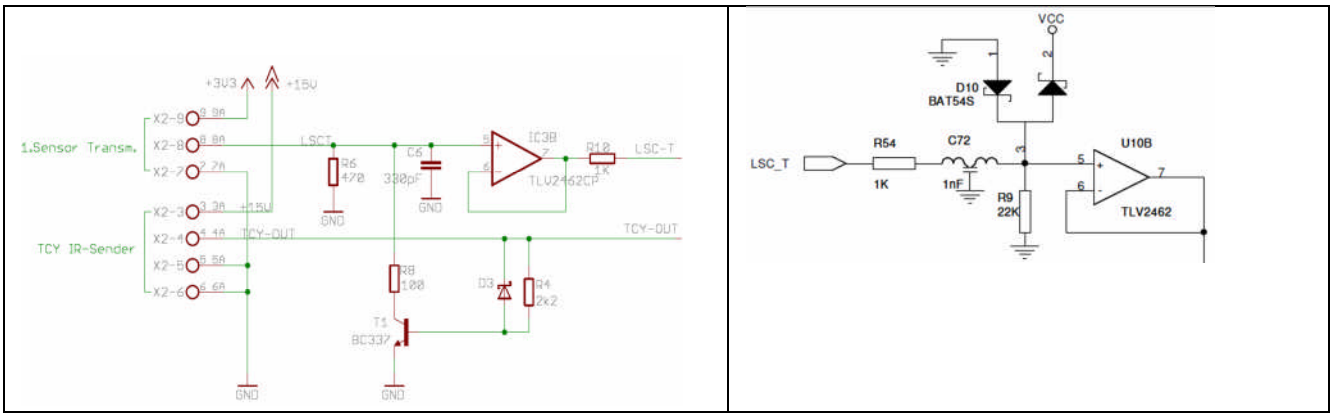
**Explanation**

The only **analog** inputs in the Collamat S are the two inputs of the label sensor.

The standard label sensor consists of an OP550A phototransistor receiver that is built into the housing of the sliding label sensor head. The active signal passes through a shielded cable to the adapter electronics in the adapter housing.

Here, the signal is converted and sent to the main control unit (in the Collamat S housing) over the adapter ribbon cable. A rapid operation amplifier switch sends the analog active signal to the slave controller.

Figure below shows a basic diagram for the analog inputs:




Basic diagram – Analog sensor(s) - Sensor 1 and optional Sensor 2 (analog sensor 2 – only for HMS-units)

**Explanation**

Analog label sensor input - shown here is the example of a "transmissive sensor" - "Sensor 1" on the adapter board HMC0605 and on the main control board HMC0601.

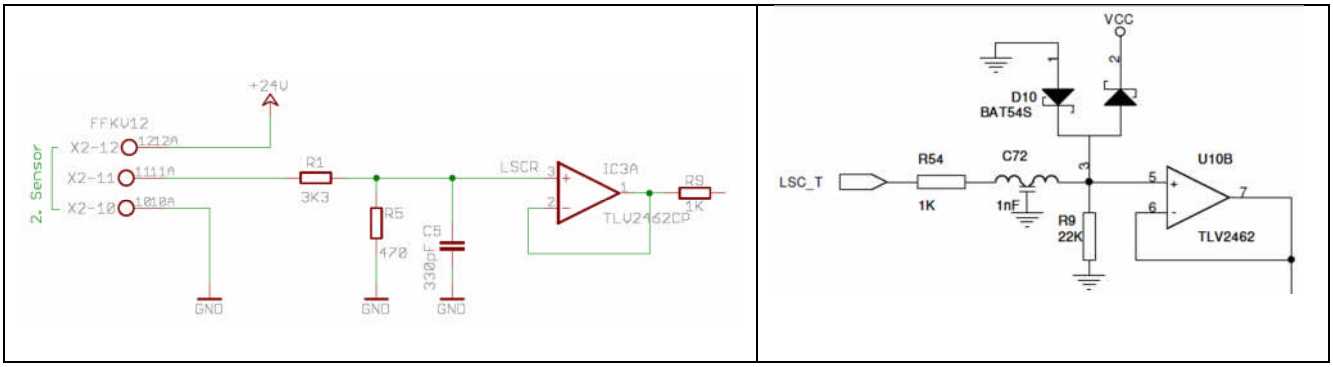
The following input signals fall under this category of analog inputs:

**Analog inputs (label sensor 1)**

| Input | Description |
|---|---|
| LSC_T | IR- label sensor "transilluminating" - Sensor 1<br>CAG "fiber optic“ version<br>The adapter boards of the CAG and HMS devices are configured for this version. |
| LSC_R | IR- label sensor "reflecting" - Sensor 2<br>HMS "black mark reader“ version<br>The adapter boards of the HMS devices are configured for this version. |

**Digital input (label sensor 2 - 24V DC - PNP)**

The figure below shows a basic diagram for the digital label sensor input:




**Explanation**

Digital label sensor input - shown here is the example of "Sensor 2" on the adapter board HMC0605 and on the main control board HMC0601.

The following input signals fall under this category of digital inputs:

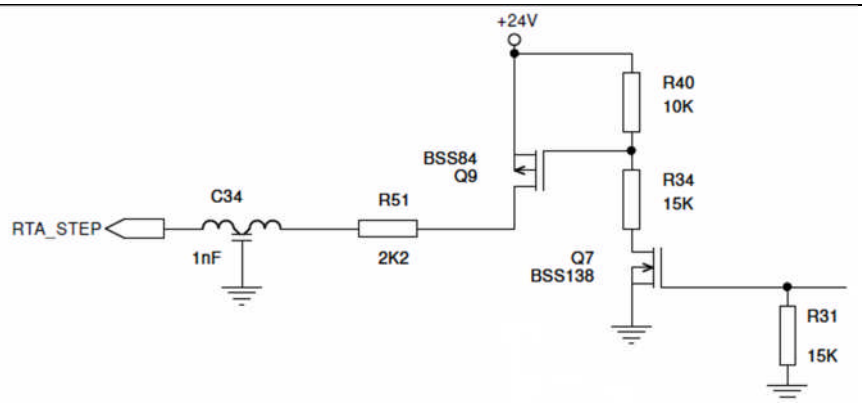
| Input | Description |
|---|---|
| LSC_R | e.g. digital forked light barriers (24V DC - PNP) - Sensor 2<br>CAG "external sensor" version<br>The adapter boards of the CAG devices are configured for this version (see also above). |

### 4.1.3 Outputs

For the outputs, there are different types of switching mechanisms:

**PNP – outputs**

The following figure shows a basic diagram for a PNP output:




U: 24V DC
Umax: 28V DC

**The following output signals fall under this category:**

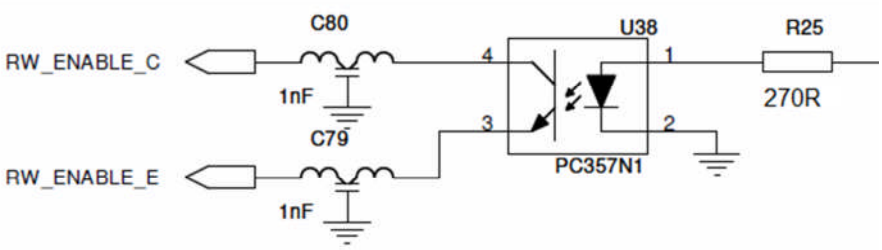
| Output | Description |
|---|---|
| RTA_STEP | Step pattern to the step motor end stage |
| RTA_DIR | Directional signal to the step motor end stage |
| FLAP | Control signal for the magnet flap adapter |

**Optical coupler – outputs**

**Open collector outputs**

This version of the optical coupler outputs uses separate collector and emitter cables.

The Figure below shows a basic diagram for these optical coupler outputs:




U: 24V DC
Umax: 28V DC

Ri: >= 2.5kOhm

Ri = load connected to the output pins

(according to EN61131-2 –typ2 or typ3)

**The following output signals fall under this category:**

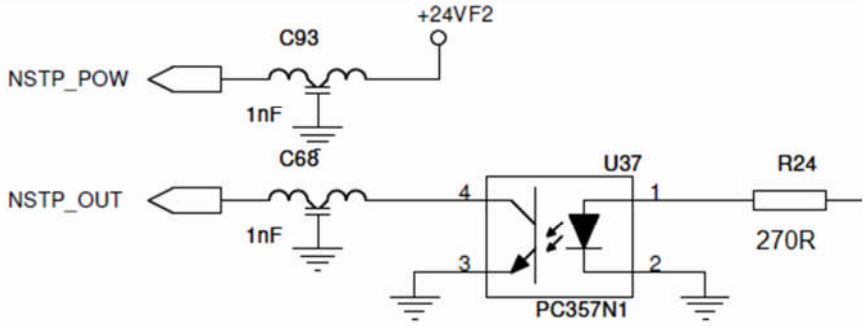
| P | N | Description |
|---|---|---|
| RW_ENABLE_C | RW_ENABLE_E | Rewinder enable input |
| RW_WIDTH_C | RW_WIDTH_E | Rewinder width input |
| ERR_OPT_C | ERR_OPT_E | Error Output |
| WAR_OPT_C | WAR_OPT_E | Warning Output |
| RUN_OPT_C | RUN_OPT_E | Run Output |
| PROD_OUT_C | PROD_OUT_E | Product-Counter Output |
| IFEED_C | IFEED_E | FEED Output (isolated input) |
| ADA_HOME_C | ADA_HOME_E | Adapter in Home Position Output |

**Open collector outputs**

**Emitter at ground**

For the next optical coupler output version, the emitter is permanently connected to GND and has a separate connection for the +24V supply.

The following figure shows a basic diagram for this optical coupler output:




U: 24V DC
Umax: 28V DC

Ri: >= 2.5kOhm

Ri = load connected to the output pins

(according to EN61131-2 –typ2 or typ3)

**The following output signals fall under this category:**

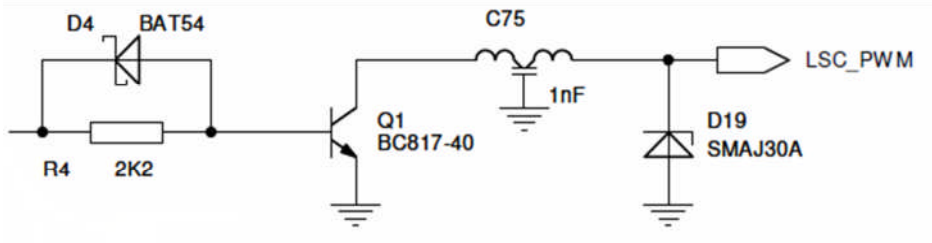
| P | N | Description |
|---|---|---|
| NSTP_POW | NSTP_OUT | Control signal, output for non-stop control |
| GSC_OUT_P | GSC_OUT | Goods sensor input forwarded to this output |

**Open collector output**

**not galvanically separated!**

This is an internal output signal on the Collamat S and may only be used for controlling the label sensor transmitter stage.

The following figure shows a basic diagram for this output:




U: 24V DC
Umax: 28VDC0
Imax: 100mA:

**The following output signal falls under this category:**

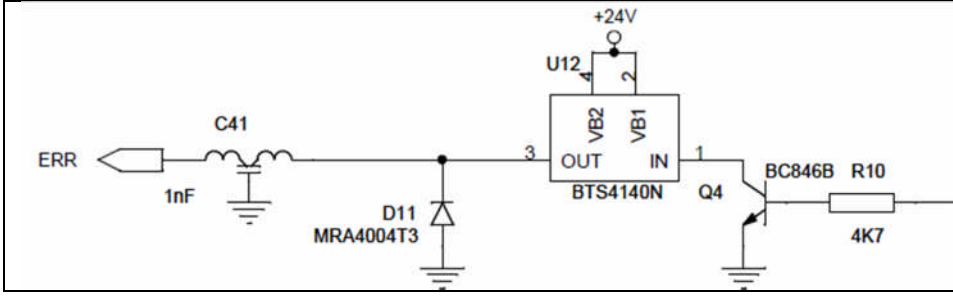
| Output | Description |
|---|---|
| LSC_PWM | Control of the label sensor transmitter stage (TCY) |

**Power Outputs**

**Not galvanic separated!**

Power outputs are special outputs designed - amongst others - for status indicators (LED's).

Max. output load: 100mA !




U: 24VDC
Umax: 28VDC0
OUTmax: 100mA

**The following output signals fall under this category:**

| Ausgang | Beschreibung |
|---|---|
| RUN | RUN output (online)<br>Used to connect a "green" indicator " LED. |
| WAR | WAR output (Warning)<br>Used to connect an "orange" indicator " LED. |
| ERR | ERR output (Error)<br>Used to connect a "red" indicator " LED. |

## 4.2 Inputs + Outputs (description)

### 4.2.1 Input details

**Inputs**

| Input | Description |
|---|---|
| **RTA_ERR** | Error signal for step motor end stage<br>(optical coupler input – 3K3 series resistor) |
| **TUNIT** | The signal **TUNIT** serves to monitor the traction unit. A forked light barrier is located there to monitor the closing mechanism of the traction cylinder.<br>(optical coupler input – 10K series resistor) |
| **LLO** | The signal LLO (Label LOw) serves to monitor the roll diameter at the unwinder. The standard monitoring sensors from Collamat AG are fitted with NPN outputs (active L).<br>(optical coupler input – 10K series resistor) |
| **RWF** | The RWF signal (ReWinder Full) serves to monitor the roll diameter of the rewinder. The standard monitoring sensors from Collamat AG are fitted with NPN outputs (active L).<br>(optical coupler input – 10K series resistor) |
| **OOL** | The OOL input (Out Of Label) serves to monitor the label strip. The paper brake of the Collamat executes this monitoring function (paper tear?). If no paper is located under the brake shoe of the paper brake, the OOL input is activated. The standard monitoring sensors from Collamat AG are fitted with NPN outputs (active L).<br>(optical coupler input – 10K series resistor) |
| **GSC** | The GSC_P / GSC_N output is the goods sensor input for the Collamat S.<br>Configuring the goods sensor input: see "SIGNALS" connection plate under xx<br>(optical coupler input – 2K2 series resistor) |
| **PRODUCT_INX** | The PRODUCT_INP / PRODUCT_INN input serves the Collamat S "MASTER" for goods counting in non-stop operation.<br>(optical coupler input – 10K series resistor) |
| **NSTP_INX** | The input NSTP_INP / NSTP_INN connects two Collamat S units for non-stop operation. The cable connections for non-stop operation is described in the chapter "Non-stop". The input is connected to the non-stop plug.<br>This is an "internal" signal transmission for the Collamat S.<br>(optical coupler input – 10K series resistor) |
| **RWE_ERROR** | The RWE_ERROR_INP / RWE_ERROR_INN input transmits errors from the rewinder.<br>(optical coupler input - 10K series resistor) |

**Inputs (continued)**

| Input | Description |
|---|---|
| **COUNTER_INX or CH-OV** | The COUNTER_INP / COUNTER_INN input serves to count goods or events (was PRTERR_X).<br>This external input (**CH-OV**) will be used in Nonstop-Mode to start the Change-over sequence (equal to the Change-over-key(↑) on the operator panel)<br>(optical coupler input – 3K3 series resistor) |
| **ERRIN** or **LOCK-INV** | ERRIN – input (external error input) or (optional)<br>Locks the dispenser with the emergency stop switch (palm button) for version with LOCK and LOCK_INV combination input = two-channel emergency stop connection (SIL)<br>(Optical coupler input - 3K3 series resistor) |
| **LOCK** | Locks the dispenser with the emergency stop switch (palm button) LOCK != LOCK_INV, meaning that the emergency stop switch in the NOC or NCC versions (secure input) causes an immediate controlled stop of the motors (traction motor and optional rewinder motor) when activated and/or in case of short-circuit or interruption of one or more connection cables. The calculated SIL of <1 does not require an emergency stop function. Collamat AG includes a two-channel emergency stop system anyway (configurable in user menu).<br>(optical coupler input - 3K3 series resistor) |
| **START** | The START input can be used to start the Collamat S. This function corresponds to the RUN/STOP button on the operator panel. If the signal is activated when the system is stopped, the Collamat will be started (RUN).<br>The RUN output is switched based on the system's current status. Goods counting is continued. Error messages are not cleared<br>(optical coupler input – 3K3 series resistor) |
| **STOP** | The STOP input is used to stop the Collamat. This function corresponds to the RUN/STOP button on the operator panel. If the signal is activated when the system is running, the Collamat will be stopped (! STOP).<br>The RUN output is switched based on the system's current status. Goods counting is continued. Error messages are not cleared.<br>(optical coupler input – 3K3 series resistor) |
| **DISP** | The pushbutton on the adapter is connected to this input.<br>The FEED button on the operator panel is connected to this input. Pushing the button activates a dispense process = dispenses one label.<br>(optical coupler input – 10K series resistor) |
| **READY** | The READY signal is used to signal the Collamat that connected peripheral devices such as a flat printing system or a hot stamp are ready or not ready. If the signal is active, meaning that the PNP output of a peripheral device is switched to +24V, the labeling may not proceed. An error message is output.<br>(optical coupler input – 3K3 series resistor) |

**Inputs (continued)**

| Input | Description |
|---|---|
| **LSC_T** | Sensor 1: (fiber optic type)<br>The LSC_T input is connected with the transmissive label sensor receiver. To allow for highly precise sensor function, this input is given a very small damping time. With this input, only the CAG fiber optic receiver can be used as a label sensor receiver. |
| **LSC_R** | **CAG** - Sensor 2:<br>CAG – variety: (digital PNP 24VDC sensor)<br>The LSC_R input can be connected with an optional standard PNP label sensor (e.g. a forked light barrier). To allow for highly precise sensor function, this input is given a very small damping time. All CAG devices have Sensor 2 configured as a digital input (CAG = **Collamat AG**).<br>**Note:** The input configuration for the label sensor inputs is found on the corresponding adapter board.<br>(HMC0605 or HMC0606) = Configuration for CAG. |
| **LSC_R** | **HMS** - Sensor 2:<br>HMS – variety: (black mark reader)<br>The LSC_R input is connected with the HMS reflective label receiver. To allow for highly precise sensor function, this input is given a very small damping time. With this input switch configuration, only the HMS black mark reader receiver can be used as a label sensor. This applies to all HMS devices (HM Systems S/A).<br>**Note:** The input configuration for the label sensor inputs is found on the corresponding adapter board.<br>(HMC0605 or HMC0606) = Configuration for HMS. |
| **TACA_P** | Incremental encoder – phase signal A.<br>(optical coupler input – 5K6 series resistor) |
| **TACB_P** | Incremental encoder – phase signal B.<br>(optical coupler input – 5K6 series resistor) |

### 4.2.2 Output details

**Outputs**

| Output | Description |
|---|---|
| **RTA_STEP** | This signal transmission controls the step motor end stage (speed control).<br>This is an "internal" signal transmission for the Collamat S. (PNP, 2K2 Shunt) |
| **RTA_DIR** | This signal transmission controls the step motor end stage (rotational direction).<br>This is an "internal" signal transmission for the Collamat S. (PNP, 2K2 Shunt) |
| **FLAP** | The FLAP signal controls the electromagnet flap adapter. The ADAPTERMAGNET setting allows this signal to be turned on or off for labeling. If turned on, FLAP is activated together with the IFEED signal.<br>FLAP can be extended by a configurable amount of time beyond the IFEED signal. If a new labeling process occurs during the extension time of FLAP, FLAP will remain active. To control the electromagnet flap adapter, a special adapter board HMC0606x (MFA-Adapter-PCB) is necessary. (PNP, 2K2 Shunt) |
| **RW_ENABLE_X** | The output RW_ENABLE_C / RW_ENABLE_E controls the (optional) electrical rewinder module (releases the motor controller stage of the rewinder module).<br>This is an "internal" signal transmission for the Collamat S. (Open collector output - no shunt) |
| **RW_WIDTH_X** | The RW_WIDTH_C / RW_WIDTH_E output controls the (optional) electrical rewinder (paper width setting narrow / wide).<br>This is an "internal" signal transmission for the Collamat S. (Open collector output - no shunt) |
| **IFEED_X**<br>**FEED** | The IFEED_C / IFEED_E signal is always active while the step motor is turning. This signal can communicate, for example, to an external printer unit that paper is moving or not. The flat printer system analyzes the curves of this signal for printing to determine that the paper is not moving. The time sequence of the IFEED signal is shown in chapter 3.5.<br>The **IFEED** output is separated from the rest of the electronics with an optical coupler. The signal can be used to start an external printer in a potential-free manner. Using the optical coupler, the signal can be switched for NPN or PNP inputs. The polarity of IFEED can be programmed using the operator panel. NORMAL = active while label is moving. INVERS = opposite to NORMAL, This adjustment is often used for tamp printer .<br>(Open collector output - no shunt). |

**Outputs (continued)**

| Output | Description |
|---|---|
| **NSTP_OUT**<br>**NSTP_POW** | The NSTP_POW / NSTP_OUTconnects two Collamat S units for non-stop operation. The cable connections for non-stop operation are described in the chapter **"Non-stop"**.<br>This is an "internal" signal transmission for the Collamat S. (Open collector output – no shunt – emitter at GND) |
| **GSC_OUT** | The signal GSC_OUT_P / GSC_OUT is a copy of the GSC input signal (GSC input = GSC output).<br>(Open collector output – no shunt – emitter at GND) |
| **LSC_PWM** | This is an "internal" output signal on the Collamat S and may only be used for controlling the Collamat S label sensor transmitter stage. |
| **PRODUCT_OUT** | This is an "internal" output signal on the Collamat S that is used for control during non-stop operation. (Open collector output - no shunt) |
| **ERR** | Error POWER output (max. 100mA)<br>Used to connect a “red” indicator LED. |
| **WAR** | Warning POWER output (max. 100mA)<br>Used to connect an “orange” indicator LED. |
| **RUN** | Run POWER output (max. 100mA)<br>Used to connect a “green” indicator LED. |
| **ERR_OPT_X** | The output ERR_OPT_C (Collector) and ERR_OPT_E (Emitter) shows the error status |
| **WAR_OPT_X** | The output WAR_OPT_C (Collector) and WAR_OPT_E (Emitter) shows the warning status |
| **RUN_OPT_X** | The output RUN_OPT_C (Collector) and RUN_E (Emitter) shows the RUN status (online mode) |

**CAG = Collamat AG - Switzerland**

**HMS = HM Systems A/S - Denmark**

# 5 Maintenance

## 5.1 Safety

### Basics

**WARNING!**
**Danger of injury due to improper maintenance work!**

Incorrect maintenance can cause serious injury or damage.

Therefore:

- Maintenance work may only be performed by qualified and owner-authorized and trained personnel.
- Inform operating personnel prior to starting maintenance and service work.
- Before starting work, ensure that adequate conditions for assembly are present.
- Ensure that the assembly location is orderly and clean! Loose or scattered components and tools can cause accidents.
- If components are replaced:
- Pay attention to correct fitting of replacement parts.
- Reinstall all mounting elements appropriately.
- Observe the correct screw-tightening torques.
- Before turning the system back on, ensure that all covers and protective equipment are installed correctly and function properly.
- After completing maintenance work, check safety equipment for functionality.

### Pneumatic system

**WARNING!**
**Danger of injury due to compressed air!**

The compressed air in the pneumatic system can escape without warning and set pneumatically driven components in motion, causing serious injuries.

Therefore, before starting any work:

- Turn off the pneumatic system and ensure that it cannot be turned on.
- Depressurize all components which are under pressure.

## Electrical equipment

**DANGER!**
**Danger of death due to electrical current!**

Contact with live components can cause danger of death.

Electrically driven components can start to move without warning and cause extremely serious injuries.

Therefore:

- Before beginning work, turn off electricity supply and ensure that it cannot be turned-back on.
- All work on the electrical systems, on individual electrical components and on connections may only be performed by trained electricians.

## Personal protective equipment

For all maintenance work, the following must be worn:

- Industrial safety clothing
- Protective gloves
- Safety footwear
- Goggles

## Securing against switching on again

**DANGER!**
**Danger of death due to unauthorized re--activation!**

During maintenance, there is a danger that the power supply will be switched on again without authorization. This causes danger of death for those in the danger area.

Therefore:

Before starting work, turn off all energy supplies and ensure that the system cannot be turned back on.

## Environmental protection

- Observe the following environmental protection instructions when performing maintenance:
- At all lubrication points which are provided with lubricant manually, remove escaping, used, or surplus grease and dispose of according to the local regulations.
- Collect drained oil in suitable containers and dispose according to the local regulations.

## 5.2 Maintenance schedule

The following sections describe the maintenance work necessary for optimum and fault-free operation. The maintenance intervals are to be observed.

If the regular checks show increased wear of individual components or functional assemblies, the operator must shorten the maintenance intervals according to the actual wear. Changes compared with normal operation (higher power consumption, temperatures, vibrations, noise etc, or the triggering of monitoring devices) are signs that system function is impaired. To avoid faults which could cause direct or indirect injuries or damage, the maintenance personnel must be informed immediately.

In case of questions regarding maintenance work and intervals: Contact the manufacturer (Service address → Page 2).

In addition to these operating instructions, the instructions in the Appendices for the installed components also apply. The information which they contain – in particular the safety information – must be observed!

| Interval | Maintenance work | To be performed by |
|---|---|---|
| Daily | Clean dirt, dust and adhesive deposits from printer and applicator (see Chap. 8.3) | Operator |
| | Check ease of movement of moving parts | |
| | Visual inspection of condition and damage to the machine | |
| Monthly | Clean dirt from entire machine | Operator |
| | Check condition and correct function of electric cables, switches and safety devices | Qualified electrician |
| Every 6 months | Check all fixing screws for tightness and tighten if necessary. Observe screw tightening torques! | Operator |

## 5.3 Cleaning

If superficial dirt is noted, proceed as follows:

**1.** Switch off the machine and secure against switching on again.

**2.** Remove dirt correctly. Note:

- Do not use aggressive cleaning agents.
- Absorb oil deposits with oil-absorbing materials (e.g. sawdust).
- Observe local regulations to dispose of cleaning cloths and processing residues in an environmentally friendly manner.
- After cleaning work, check that all opened covers and safety devices are closed and function correctly.

**BEWARE!**
**The device can be damaged by incorrect cleaning!**

Aggressive cleaning and cleaning supplies can damage or destroy the guide components, compressed air hoses, electrical cables, sensors and nearby components. Therefore:

- Do not use cleaning agents with aggressive ingredients.
- Never remove adhesive residues with sharp-edged or pointed objects, knives or similar tools.

*INFORMATION!*

*Remove adhered labels as soon as possible. The longer they adhere to the machine, the stronger the adhesion!*

# 6 Faults, repair and maintenance work

This chapter describes the possible causes of faults, and the work needed to remedy these.

If there is an increase of similar faults due to greater than average use, the maintenance intervals must be shortened according to the actual use.

Contact the manufacturer in case of faults which cannot be remedied with the aid of the following information (→ S. 2)!

## 6.1 Safety

**Basics**

**WARNING!**
**Danger of injury through incorrect remedy of faults!**

Incorrect remedy of faults can cause serious injury or damage.

- Only have work for the remedy of faults carried out by qualified and instructed personnel.
- Before starting work, ensure that adequate conditions for assembly are present.
- Ensure that the assembly location is orderly and clean! Loose or scattered components and tools can cause accidents.
- If components need to be replaced: Pay attention to correct fitting of replacement parts. Re-install all fixing elements correctly.
- Observe the correct screw-tightening torques.
- Before turning the system back on, ensure that all covers and protective equipment are installed correctly and function properly.

**Pneumatic system**

**WARNING!**
**Danger of injury due to compressed air!**

This only applies to devices with an air vacuum adapter (AVA). The compressed air in the pneumatic system can escape without warning and set pneumatically driven components in motion, causing serious injuries.

Therefore, before starting any work:

1. Switch off the pneumatic system and secure against switching on.
2. Depressurize all components which are under pressure.

**Electrical equipment**

**DANGER!**
**Danger of death due to electrical current!**

Contact with live components can cause danger of death.

Electrically driven components can start to move without warning and cause extremely serious injuries.

Therefore:

1. Before beginning work, turn off electricity supply and ensure that it cannot be turned back on.
2. All work on the electrical equipment, on individual electrical components and on the connections may only be performed by qualified electricians.

**Personnel**

- If not otherwise stated, the work to remedy faults can be carried out by the operator.
- Some work may only be carried out by specially trained personnel, or only by the manufacturer. This will be separately indicated in the particular description of the fault.
- Work on electrical equipment may only be carried out by qualified electricians.
- Replacement of parts and components may only be carried out by specialist personnel.

**Personal protective equipment**

For all work during remedy of faults, the following must be worn:

- Industrial safety clothing
- Protective gloves
- Safety footwear
- Goggles

**Securing against switching on again**

**DANGER!**
**Danger of death due to unauthorized re--activation!**

During remedy of faults, there is a danger that the power supply will be switched on again without authorization. This causes danger of death for those in the danger area.

Therefore:

– Before starting work, turn off all energy - supplies and ensure that the system cannot be turned back on.

**Environmental protection**

Observe the following environmental protection instructions when remedying faults:

- At all lubrication points which are provided with lubricant manually, remove escaping, used, or surplus grease and dispose of according to the local regulations.
- Collect drained oil in suitable containers and dispose of according to the local regulations.

**Conduct in case of faults**

Always:

1. Activate the Emergency Stop immediately in case of faults which cause a direct danger of injury or damage.
2. Switch off all energy supplies and secure against switching on.
3. Inform those responsible at the site of the emergency.
4. Depending on the type of fault, have the cause determined and remedied by authorized specialist personnel.

## 6.2 Restarting after remediation of faults

After remedy of the fault or removal of the cause of interruption:

1. Reset the emergency stop device.
2. Acknowledge the error message or fault on the control unit.
3. Ensure that no-one is in the danger area.
4. Start the machine according to the instructions in the chapter "Start-up".

## 6.3 Table of faults

| Fault | Possible cause | Remedy | To be performed by |
|---|---|---|---|
| Machine cannot be switched on | No mains power | Check power supply | Operator |
| | Defective device fuse | Replace fuse | Electrician or manufacturer |
| | Fault at electrical system | Establish and remedy fault | Electrician or manufacturer |
| Machine operates, but does not work | Owner-side protective equipment blocked or faulty | Determine the cause and remedy the error. After this, ensure that no persons are in the danger zone and confirm the interruption. | By specialist authorized by operating company |
| | Fault in the safety chain of the entire plant | | |
| Device does not label or labels incorrectly | Incorrect dispenser settings | Check settings: pre-dispensing, pressure roller, incremental encoder, label and goods suppression, READY and LOCK inputs, paper brake, label sensor | Operator |
| Error message at operator panel | Remedy the displayed error | Take action as directed by error message | Operator |
| | Label supply?<br>Carrier paper?<br>Sensors?<br>Incremental encoder?<br>Paper brake?<br>Pressure roller open? | With every label roll change, remove the carrier paper from the rewinder | |
| | | Check the loop pendulum position (turn off!) | |
| | Air / vacuum? | Check air pressure / vacuum | Specialist |
| COLLAMAT AG<br>OFFLINE | Message at operator panel | Check connection control unit to operator panel | Specialist |
| | | Master controller error<br>Firmware problem | |
| PIC offline | Status message at operator panel | Slave controller error<br>Firmware problem | Specialist |
| Poor label position | Unsuitable label paper | Insert new label roll | Operator |
| | Label guide | Check null edge, parallel - paper course? | Operator |
| Drive motor turns off (display on operator panel) | Motor overloaded | Determine the cause of the overloading and remedy it, e.g. high friction of the label strip. | Specialist |

| Fault | Possible cause | Remedy | To be performed by |
|---|---|---|---|
| Drive motor turns off (display on operator panel) | Motor overloaded | Determine the cause of the overloading and remedy it, e.g. high friction of the label strip. | Specialist |
| Motor turns in the wrong direction | Incorrect settings in operator panel - Menu: ROTATION DIRECTION | Correct settings | Operator |
| Motor blocked at high dispensing - speed | Excessive friction in paper path | Check paper brake ?<br>Check unwinder pendulum ? | Specialist operator |
| | | Check step motor settings ? | |
| | | Reduce friction, e.g. attach Teflon tape to the separation edge. | |
| Loose traction cylinder when device is turned on | Traction cylinder flange wedge broken or worn | Check mechanics:<br>Check wedge and replace if necessary. | Specialist |
| Other faults | Plug-in connections loose or faulty | Check all plug-in connections for correct seating and function. | Electrician<br>Pneumatic system specialist |

## 6.4 Performing maintenance and repair work

The following is a list of maintenance and repair work that can be performed by a specialist or an electrician (for spare parts, see attachment).

**Safety**

**DANGER!**
**Danger of death due to unauthorized re--activation!**

When working on the machine, there is a danger that the power supply will be switched on again without authorization. This causes danger of death for those in the danger area.

Therefore:

– Prior to beginning work, turn off energy supply (electrical current, compressed air) to the machine and ensure it cannot be turned on.

## 6.4.1 Replacing the pressure roller

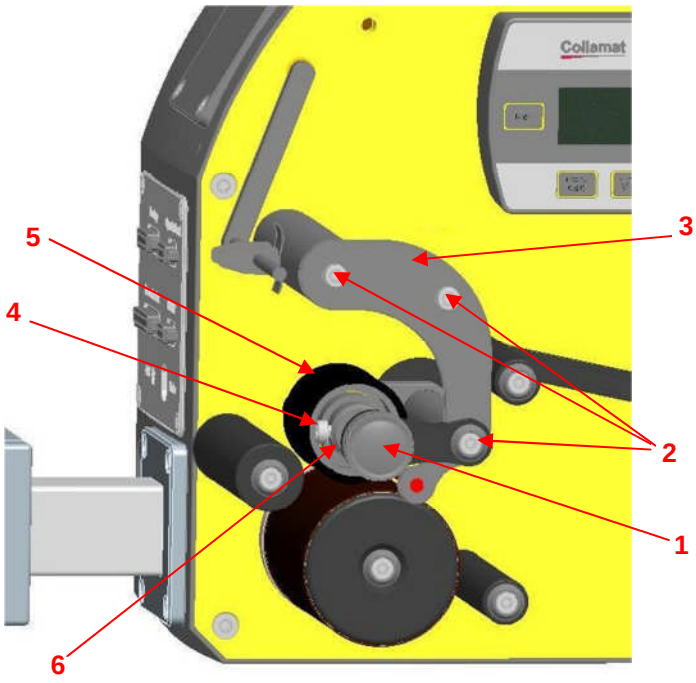
**Traction drive**

**Replace pressure roller**

The pressure roller is a wear part that can suffer wear and damage more or less quickly depending on usage and handling. When labeling, ensure that the carrier paper runs between the pressure roller and the traction cylinder. If the carrier paper is wider than the pressure roller, the roller should be centered on the carrier paper.

**Procedure:**

- Unscrew the turning knob **(1)**.
- Unscrew the 3 assembly screws **(2)** on the fixing bracket **(3)**
- Loosen the screw **(4)** on the pressure roller
- Pull the pressure roller **(5)** out towards the front.
- Slide the new pressure roller onto the pressure axis **(6)** and install.




| | | | |
|---|---|---|---|
| **1** | Turning knob | **4** | Support srew |
| **2** | Assembly srews | **5** | Pressure roller |
| **3** | Fixing bracket | **6** | Pressure axis |

## 6.4.2 Changing the traction cylinder

**Traction drive**

**Replacing the traction cylinder**

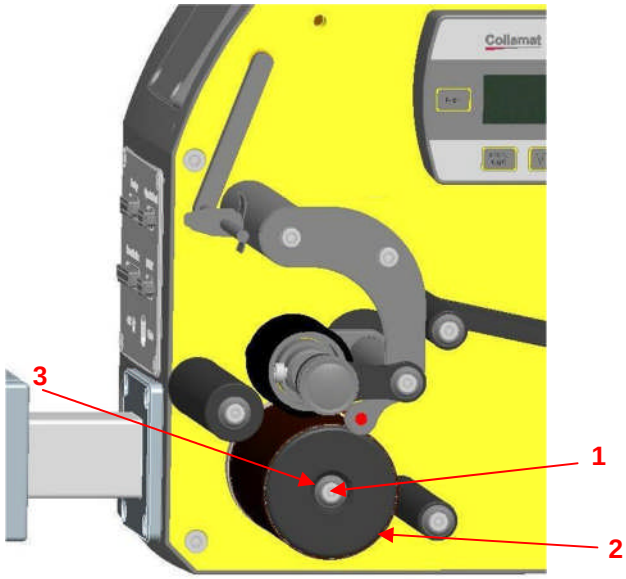
If the traction cylinder is damaged or worn, it must be replaced.

**Procedure:**

- Unscrew and remove the support screw (**1**).
- Pull off the traction cylinder (**2**) from the cylinder bearing (**3**) and the drive axle.
- Ensure that the wedge (**4**) is not damaged.
- Install the traction cylinder in the reverse sequence performed for removal.

**CAUTION**!

If possible, install a new wedge during installation. The wedge is a wear part!




**1** Support screw
**2** Traction cylinder
**3** Cylinder bearing

## 6.4.3 Setting the belt tension (traction)

**Traction drive**

**Setting the belt tension**

If the label strip is not being transported correctly, the timing belt may need to be adjusted.

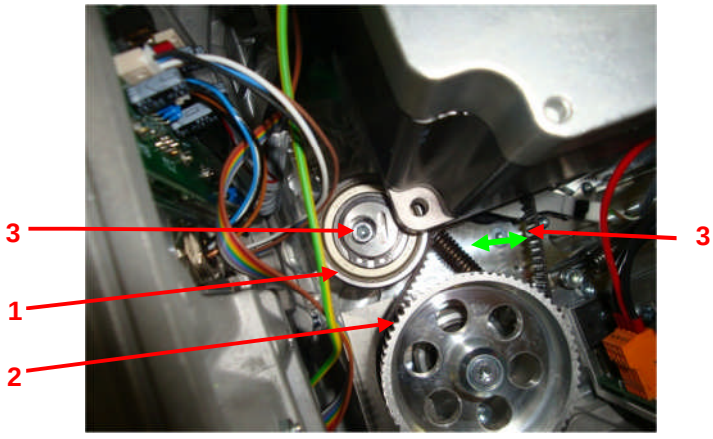
**Procedure:**

- Remove the housing cover on the back. For this, remove the six screws.
- The belt tension of the labeler is set with a belt tensioner (**1**) at the timing belt (**2**).
- Loosen the fixing screw on the belt tensioner slightly using a torsion screwdriver.
- Use a large flathead screwdriver to turn the belt tensioner until the required belt tension is reached.
- Hold the flathead screwdriver in this position. With your other hand, tighten the fixing screw with the torsion screwdriver firmly.
- If the belt tension is too low, the timing belt will not be driven correctly.
- If the belt tension is too high, the step motor will lock up.

*INFORMATION!*

*The belt tension must be set so that the timing belt does not lock up when the drive motor turns.*

*Examination: A force (F) pressed on the timing belt with approx. 10N (see green double arrow) should move down the timing belt about 8 mm (1kg ~ 9.8N).*




Setting the timing belt tension

| | | | |
|---|---|---|---|
| **1** | Belt tensioner | **3** | **Locking screw** |
| **2** | Timing belt | **4** | **Check position** |

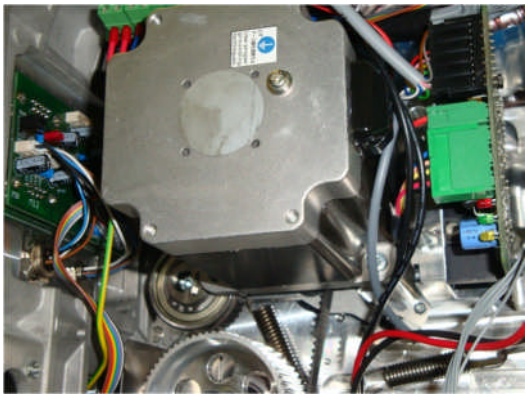
## 6.4.4 Changing the timing belt (traction)

**Feed drive**

**Replacing the timing belt**

**Procedure:**

- Remove the housing cover on the back.
- Loosen the belt tensioner (1)
- Unplug the cable (2) from the stepper motor (3) at the motor controller (4)



- Remove the three fixing screws (5) at the step motor.
- Remove the step motor and the timing belt
- Remove the thermal paste from the motor and from the assembly block, clean the parts and apply new thermal paste.
- Install the new timing belt in the reverse sequence performed for removal.
- Set the belt tension (see 6.4.3)

1 Belt tensioner
2 Motor cable
3 Stepper Motor
4 Motorcontroller SDC06
5 Motor fixing screws

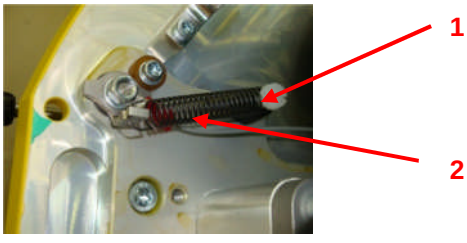
## 6.4.5 Changing the OOL spring

**Replacing the OOL spring**

**OOL = Out Of Label**

**Procedure:**

- Remove the plastic screw .
- Replace spring
- Secure the plastic screw with Loctite




**1** Plastikschraube 2 Feder

## 6.4.6 Changing the drive motor (traction)

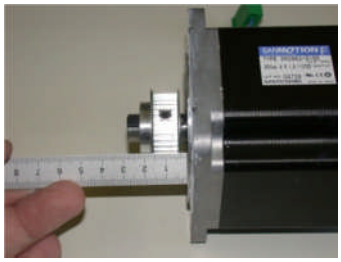
**Traction drive**

**Replacing the step motor**

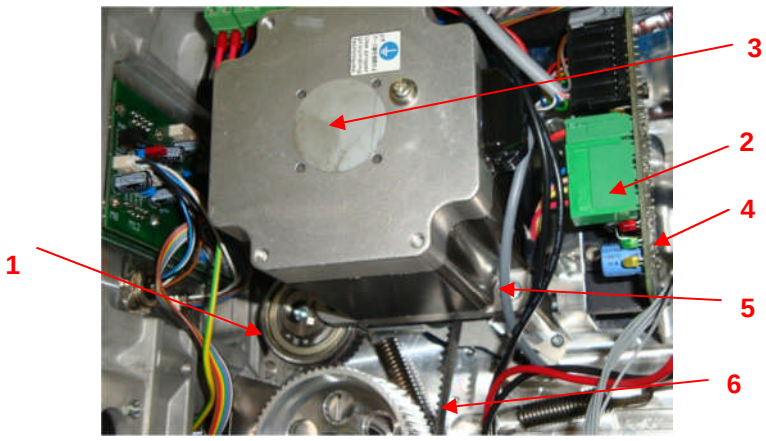
If the drive motor is damaged, it must be replaced.

**Procedure:**

- Remove the housing cover on the back. For this, remove the six screws.
- Loosen the belt tensioner (1)
- Unplug the cable (2) from the step motor (3) at the motor controller (4)
- Remove the three fixing screws (5) at the step motor.
- Remove the step motor (3) and timing belt (6)
- Pull the gear (7) off the motor axis. Remove the wedge.
- Remove the thermal paste from the assembly block (6). Clean the assembly block and apply new thermal paste.
- Screw the gear onto the new motor (use a new wedge (8))
  – distance lower disk of gear to motor: 2mm



- Apply thermal paste to the motor.
- Install the new timing belt in the reverse sequence performed for removal.
- If necessary, slide the gear on the motor axis so that the timing belt runs parallel on both gears.
- Set the belt tension (see above)




Changing the drive motor

| | | | |
|---|---|---|---|
| **1** | Belt tensioner | **5** | Fixing screws |
| **2** | Motor cable | **6** | Timing belt |
| **3** | Step motor | **7** | Gear |
| **4** | Motor controller | **8** | Wedge |

## 6.4.7 Ligth tube / Sender board replacement

**Adapter / applicator**

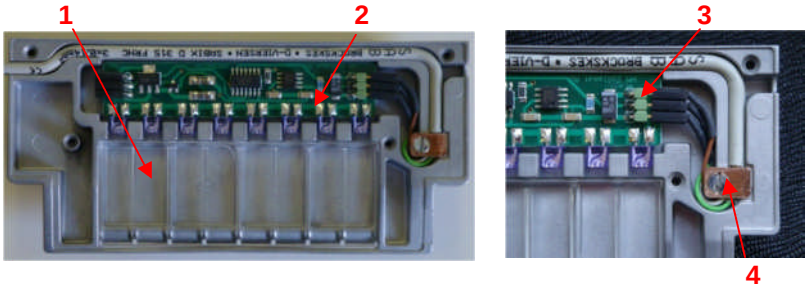
If the fiber optic cable of the label sensor can no longer be cleaned or is damaged or dull, it must be replaced

**Replacing the light tube / transmitter board**

If the sender board of the label sensor is no longer functional (check with digital camera or IR measuring device), it must be replaced.

**Procedure:**

- Unscrew the lower cover plate from the label transmitter housing.
- Replace the light tube (1) or transmitter board (2).
- When replacing the transmitter board, insure that the cable socket is inserted correctly on the board header pins. The brown (3) wire (15V DC cable) belongs to the + symbol (back); green wire close to the LEDs (front)
- Reassemble in the reverse sequence.




**1** Ligth tube (flat) #5218 . . .
**2** Transmitter board #52180206
**3** Brown wire
**4** Cable shielding

## 6.4.8 Adjusting the rewinder pendulum (RW active + passive)

**Rewinder unit**

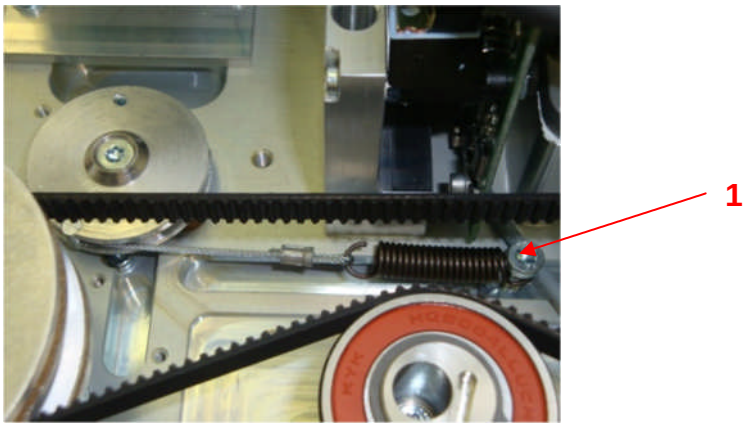
**(active and passive)**

**Adjusting the pendulum spring tension**

Set the spring tension so that the retraction force is no stronger than needed for the pendulum to return to its zero position (to the upper stop = paper tear position). To set this spring tension, the back wall of the dispenser must be removed (see warnings for working with the housing open).

Slightly loosen the spring fixing screw (**1**) and slide it in the guide rail to achieve the desired spring tension. After this, firmly tighten the fixing screw again.

The picture shows a left unit – stronger spring force = move screw (1) to the right. Fasten fixing screw.




Picture of a left unit (L)

**1** Fixing screw for setting spring tension

## 6.4.9 Setting the belt tension (RW passive)

Passive rewinder

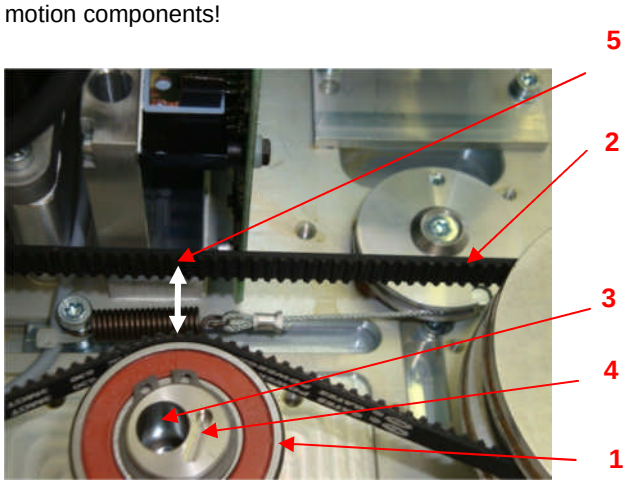
If the carrier paper is not rolled up cleanly by the rewinder, the timing belt may need to be adjusted.

Adjusting the belt tension

Procedure:

- Remove the housing cover on the back.
- The belt tension of the labeler is set with a belt tensioner (1) at the timing belt (2).
- Loosen the fixing screw (3) on the belt tensioner slightly using a torx screwdriver.
- Use a large flathead screwdriver to turn the belt tensioner until the required belt tension is reached.
- Hold the flathead screwdriver in this position. With your other hand, tighten the fixing screw with the torx screwdriver firmly.
- If the belt tension is too low/high, the timing belt will not be driven correctly – motor /clutch can be blocked!
- Examination: apply a force (F) of about 8N to the timing belt (above the belt tensioner – see white double arrow). The timing belt should move down approx. 10mm (1kg ~ 9.8N).

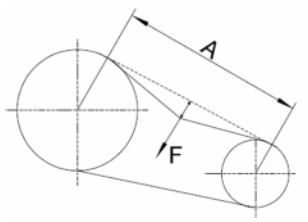
A correct adjusted belt tension results in a smooth (soft) motion sound of the motion components!




Picture of a right unit (R)

Adjusting the timimng belt

| | | | |
|---|---|---|---|
| 1 | Belt tensioner | 3 | Torx screw |
| 2 | Timing belt | 4 | Adjustment slot |
| | | 5 | Adjusting force (F) |



## 6.4.10 Changing the timing belt (RW passive)

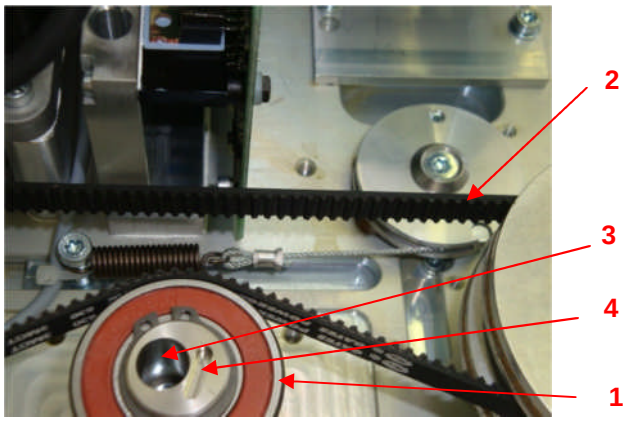
**Passive rewinder**

If the timing belt is damaged, it must be replaced.

**Procedure:**

**Replacing the timing belt**

- Remove the housing cover on the back. For this, remove the six screws.
- Loosen the belt tensioner (1)
- Remove the timing belt (2)
- Install the new timing belt in the reverse sequence performed for removal.
- Set the belt tension (see above)




Replacing the timing belt

| | | | |
|---|---|---|---|
| **1** | Belt tenioner | **3** | Friction clutch |
| **2** | Timing belt | **4** | Adjustment slot |

## 6.4.11 Adjusting the friction clutch (RW passive)

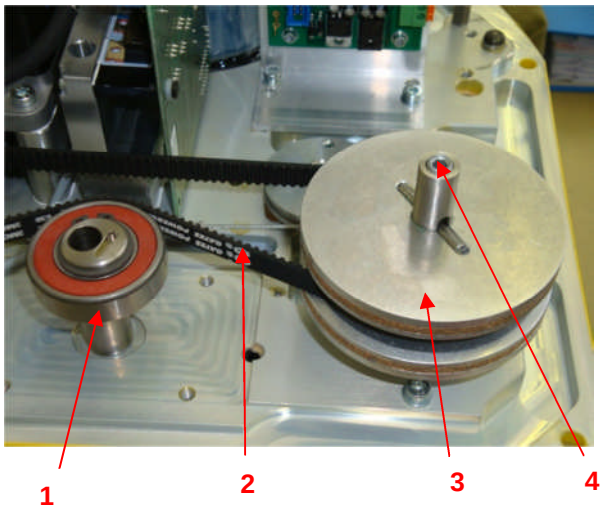
**Passive rewinder**

**Adjusting the friction clutch**

If the drive for the passive rewinder is not functioning properly, the friction clutch settings must be checked first (see corresponding chapter later in the manual). If the friction clutch can no longer be adjusted, the clutch pads must be changed.

**Procedure:**

- Remove the housing cover on the back.
- Adjust the pressure of the friction cluch with adjusting screw (4)……




Adjusting the clutch

| | | | |
|---|---|---|---|
| 1 | Timing belt tensioner | 3 | Friction clutch |
| 2 | Timing belt | 4 | Adjusting screw |

## 6.4.12 Reconditioning the clutch disks (RW passive)

**Passive rewinder**

**Replacing the clutch disks**

If the drive for the passive rewinder is not functioning properly, the friction clutch settings must be checked first (see corresponding chapter later in the manual). If the friction clutch can no longer be adjusted, the clutch pads must be changed.

**Procedure:**

- Remove the housing cover on the back.
- Loosen the belt tensioner (1)
- Remove the timing belt (2) from the friction clutch (3)
- Loosen the adjusting screw (4)
- Remove the splint (5)
- Friction clutch discs (6) - remove the alu- and cork disks and the pulley from the clutch axis.
- Clean the alu disks
- Replace the cork disks
- Assemply steps in reverse order of disassembly steps.
- Set the belt tension (see above)

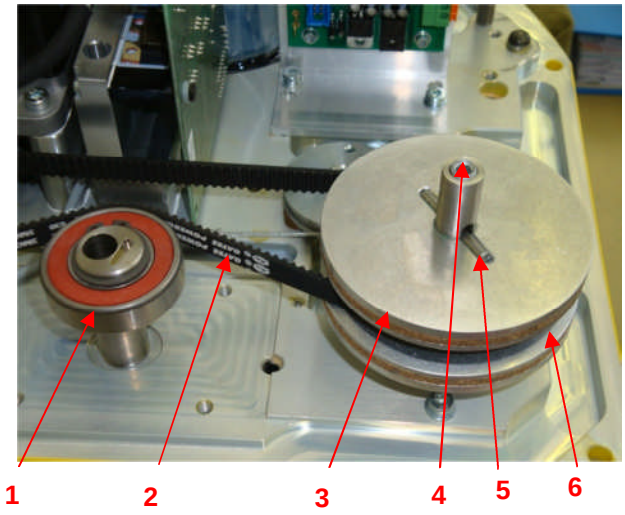



Fig. Replacing the clutch disks

| | | | |
|---|---|---|---|
| 1 | Timing belt tensioner | 4 | Adjusting screw |
| 2 | Timing belt | 5 | Splint |
| 3 | Friction clutch | 6 | Friction clutch |

## 6.4.13 Setting the belt tension (RW active)

**Optional Electric rewinder**

**Setting the belt tension**

If the carrier paper is not cleanly rolled up by the optional electrical rewinder, the belt tension must be checked and adjusted if necessary.

**Procedure:**

- See Setting the belt tension (traction)
- In the rewinder traction unit, a one-way bearing is used that prevents the paper from running backwards.

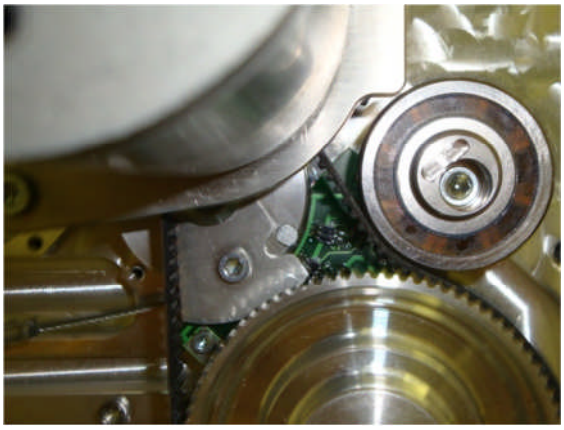


Fig. Setting the belt tension

| | | | |
|---|---|---|---|
| **1** | Belt tensioner | **3** | Tensioning screw |
| **2** | Drive belt | | |

## 6.4.14 Changing the drive belt (RW active)

**Optional electric rewinder**

**Replacing the timing belt**

If the drive belt is damaged, it must be replaced.

**Procedure:**

Procedure is identical to "Changing the rewinder motor", see below ... ...

## 6.4.15 Changing the rewinder board (RW active)

**Optional electric rewinder**

**Replacing the rewinder board**

Replace the defective rewinder board HMC0607-x:

- Remove all plugs from the board
- Remove the 2 fixing screws (front plate)
- Remove the 4 fixing screws (board)
- Remove the 6 fixing screws from the aluminum rear wall - the component to the far right has 2 washers

Assembly material:

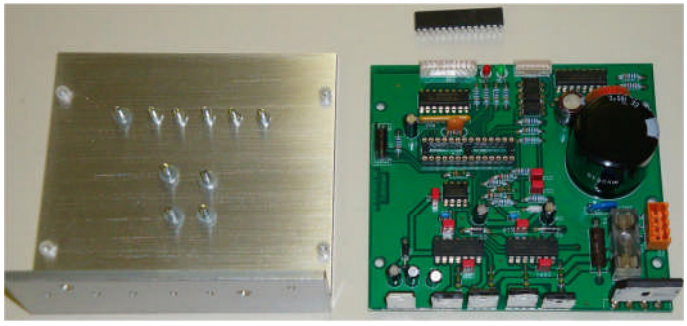
- 6 M3x8 screws (NS008 026 Z)
- 4 M3x6 screws (NS008 001 Z)
- 2 M3 washers (NS290 001 Z)
- 1 aluminum assembly bracket (74015944)

Microcontroller:

- 1 dsPIC30F2010 microcontroller

Replacement board:

- 1 rewinder board HMC0607-x (52180308)



Assembly material

Replacement board

Thermal paste

Thermal paste has to be applied to all components on this site!

HMC0607-X1(old) HMC0607-Z HMC0607-A (new)

Assembled rewinder board (HMC0607-x) on assembly bracket

Installation:

- Tightly screw the rewinder unit back onto the front plate. Use thermal paste here at the contact surface (see above).

## 6.4.16 Replacing Rewinder-Sensor-Board ersetzen (RW activ)

**Optional electrical rewinder**

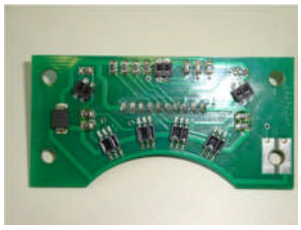
Replacing defective Rewinder-Sensor-Board HMC0608-x:

**Replace Rewinder-Sensor-Board**

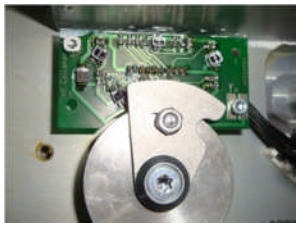
- remove rewinder dancer flag
- remove the two fixing screws (board to front plate)
- remove the sensor cable (from the board)

Replacement board:

- 1 Rewinder-Sensor-Board HMC0608-x (#52180408)
  whereas: x = version HMC0608-X (old)
  HMC0608-A (new)



replacement-board



mounting: dancer flag in position paper break

unit: „**R**“ight version

Mounting the replacement rewinder sensor board:

- Plug in the sensor cable
- Fix the board to the front plate (2 screws)

“**R**”ight version unit:

- Fix the rewinder dancer flag (1 screw)

  the three sensors on the right hand side of the board have to be covered by the rewinder sensor flag!
  (on a „**R**“ight version unit) – see picture above.

“**L**”eft version unit:

- Fix the rewinder dancer flag (1 screw)

  the three sensors on the left hand side of the board have to be covered by the rewinder sensor flag!
  (on a „**L**“eft version unit)

## 6.4.17 Changing the rewinder motor (RW active)

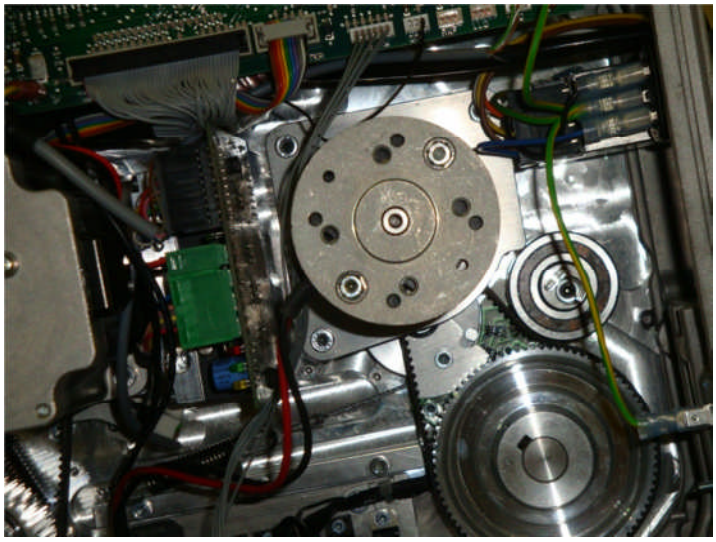
**Optional electric rewinder**

**Replacing the DC motor**

If the drive motor of the optional electric rewinder is damaged, it must be replaced.

**Procedure:**

- Remove the housing cover on the back. For this, remove the six screws.
- Loosen the belt tensioner (1)
- Detach the red and black motor cable from the power plug J4 of the motor controller.
- Remove the three fixing screws (5) at the DC motor flange.
- Remove the DC motor with the timing belt.
- Remove the two screws from the bearing support block.
- Remove the bearing support block
- Pull the gear (7) off the motor axis.
- Push the gear onto the motor axis (new motor)
- Distance from gear (upper guide disk) to motor: 17.5 mm, then insert timing belt.
- Press the bearing support block onto the motor axis (up to the stop), then fix it with two screws.
- Clean the motor support block and the motor flange plate, then re-apply thermal paste
- The remaining steps are performed in reverse order from disassembly.
- Set the belt tension (see above)



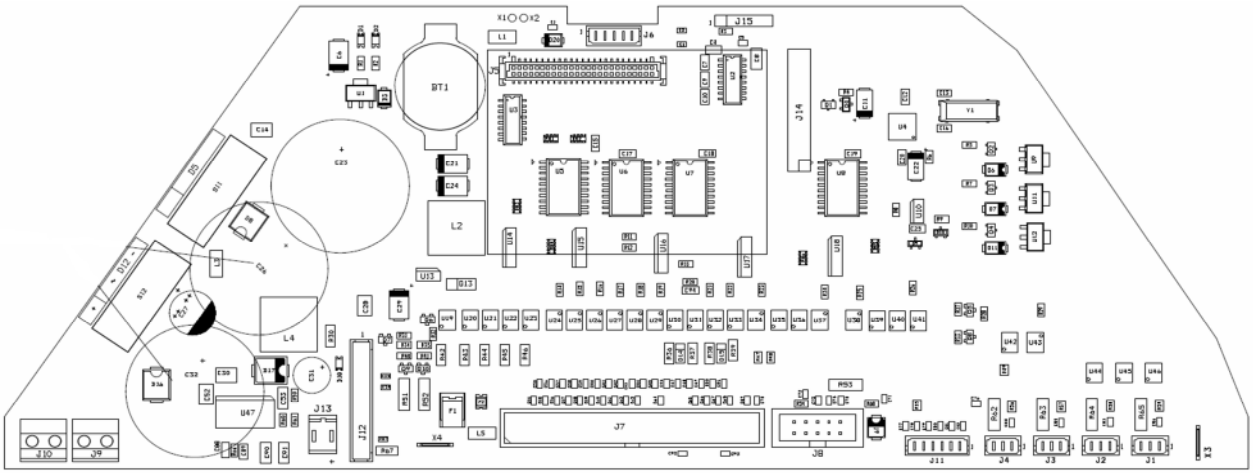
**1** Interface
**2** Connection cable
**3** Fixing screw
**4** Fixing screw
**5** Protective hood

## 6.4.18 Replacing the mainboard (HMC0601)

**Replacing the control unit (mainboard)**

Replace the defective control unit (slave controller):

- Disconnect all plug connections
- Unscrew the transformer cable (2 red cables / 2 blue cables)
- Remove the 4 fixing screws (board)
- Remove the mainboard
- Apply thermal heath sink paste (WLP 35) to the heath sink of the new mainboard

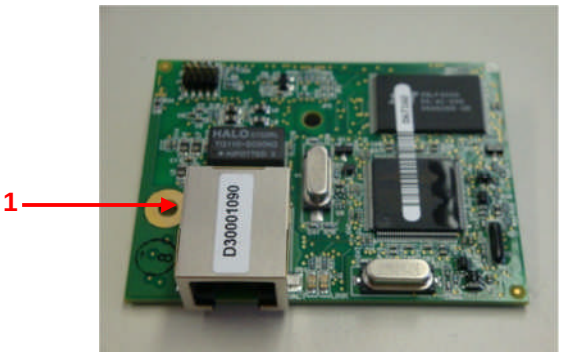


## 6.4.19 Replacing the master controller (RCM4010)

**Replacing the master controller (RCM4010)**

Replace the defective main control unit (master controller):

- Unscrew the fixing screw – Torx 10
- Remove the main control unit



## 6.4.20 Firmware Update – Master-Controller (RCM4010)

**Programming the Master-Controller of the main control unit (Mainboard)**

### Installing programming software:

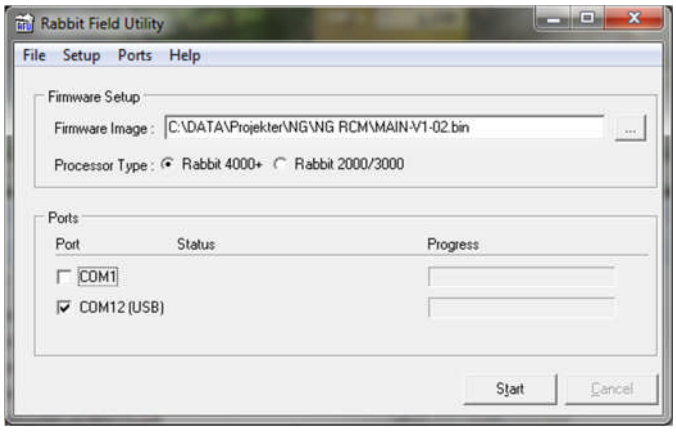
Install the programming firmware Dynamic C (V 10.66) to your PC/Laptop. Default directory: C:\Programme\DCRABBIT_10.66\
The „Flash Image“ file will be generated by Collamat AG (with the Dynamic C Software: Compile Project to .bin File = MAIN-V1-02.BIN = Version: V 1.02 (FDT3 Data File)

### Programming cable:

- Rabbit Programming cable (serial) from Reselec AG
  U.Art.Nr. 30010012 (1.27m)
  Digi International Inc. Part Number 20-01-0542 (use „PROG“ – connector)
- US232B-100-BST-cable (Blister 100cm cable) from Reselec AG U.Art.Nr. 24010001 (1.00m) incl.. EasySYNC driver software (optional use of this cable, if no serial port is available on your computer – load EasySYNC-driver first).

### Programming (RCM4010):

Use the RFU-program from Digi International Inc. (part of the Dynamic C Installation – see above) to program the Master-controller. RFU = Rabbit Field Utility Version 4.62 – or later version.




**Settings:**
- Firmware Setup: Firmware Image: LW:\.....**MAIN-V1-02.BIN**
- Processor Type: Rabbit 4000+
- Setup: Communication:- Baud Rates: Debug Baud Rates: 115200, max.Download Baud Rate: 230400, Stop Bits: 1
- Enable Processor verification, Optional: use USB to Serial Converter

Plug in programming cable: „PROG“– plug to J1 of RCM4010 (red cable -> top left)

**Load firmware image to RCM4010:**
- Start: - sending cold loader, sending Pilot BIOS, erasing flash
  - programming - observe the „Progress Bar“

- Finish! Switch off Collamat S – remove programming cable.
  Check firmware version on RCM4010 - see 6.4.21

## 6.4.21 Firmware Update – Slave-Controller (dsPIC)

**Programming the Slave-Controller of the main control unit (Main board)**

(conventional with MPLAB ICD2 or ICD3)

**Programming device:**

- MPLAB ICD2 or ICD3 (USB)

**Programming software:**

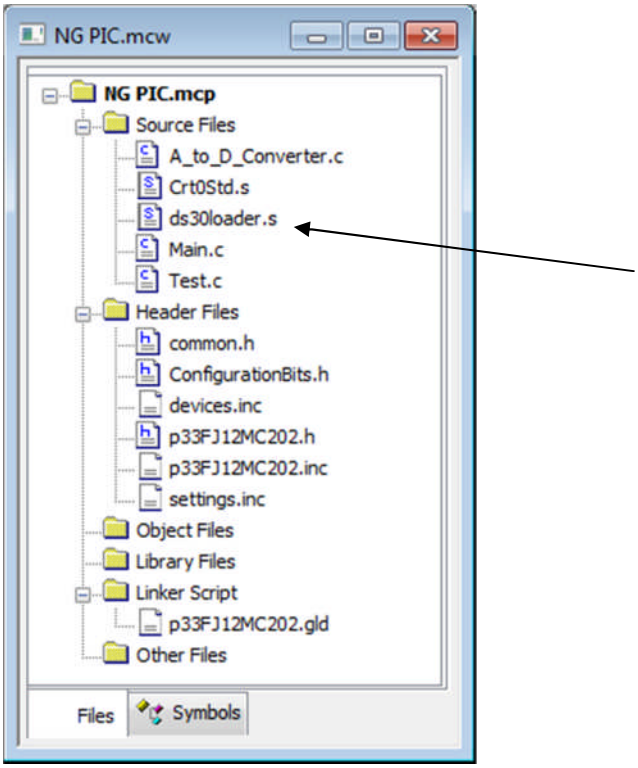
- MPLAB DIE v8.76 or newer - Installation in default path (C:\Programme\Microchip\MPLAB DIE\....)

**Check actual version:**

- Power on Collamat
- Service – Version: RCM Y.YY PIC X.XX
  (e.g. RCM 1.02 PIC 1.41)
  or observe display message after power on.

**Create HEX-file (done by Collamat AG):**

- Configure – Configuration Bits:
  - set √: Configuration Bits set in code




Project **with** Boot loader (ds30loader.s)

**Build HEX-file:**

- Project – Build All:
  …. wait for message: **BUILD SUCCEEDED**
- HEX-file has been stored as: NG PIC.HEX
- Collamat AG will provide this HEX-file for downloading.
  Name: NG PIC V-VV-BL.HEX – whereas
  V-VV indicates the corresponding version number and
  BL the boot loader version
  e.g. ." **NG PIC-1-41-mBL.HEX**"

**Prepare programming:**

- Switch OFF Collamat S unit.
- Connect MPLAB ICD2 (ICD3) to Computer (USB/COM)
- Start MPLAB IDE
- File – Import: path – open NG PIC V-VV-BL.HEX
- Connect MPLAB ICD2 (ICD3) cable to main board
  (5-pin pin header J2 on main board)
- Programmer - Select Programmer: MPLAB ICD2 (ICD3)
- Programmer - Connect:

  Connecting to MPLAB ICD 2
  ..Connected
  Setting Vdd source to MPLAB ICD 2
  Target Device dsPIC33FJ12MC202 found, revision = Rev 0x3002
  ...Reading ICD Product ID
  Running ICD Self Test
  ...Passed
  MPLAB ICD 2 ready for next operation

**Programming:**

- Programmer – Program:

  Programming Target...
  ...Validating configuration fields
  ...Erasing Part
  ...Programming Program Memory (0x0 - 0x14FF)
  Verifying...
  ...Program Memory
  ...Verify Succeeded
  ...Programming Configuration Bits
  .. Config Memory
  Verifying configuration memory...
  ...Programming succeeded
  08-Nov-2010, 10:36:29
  MPLAB ICD 2 ready for next operation

- Power OFF Collamat S
- Remove programming device

**Check version number:**

- Power ON Collamat S
- Service – Version: RCM Y.YY PIC X.XX
  (e.g. RCM 1.02 PIC 1.41)

## Programming the slave controller of the main control unit (Main board)

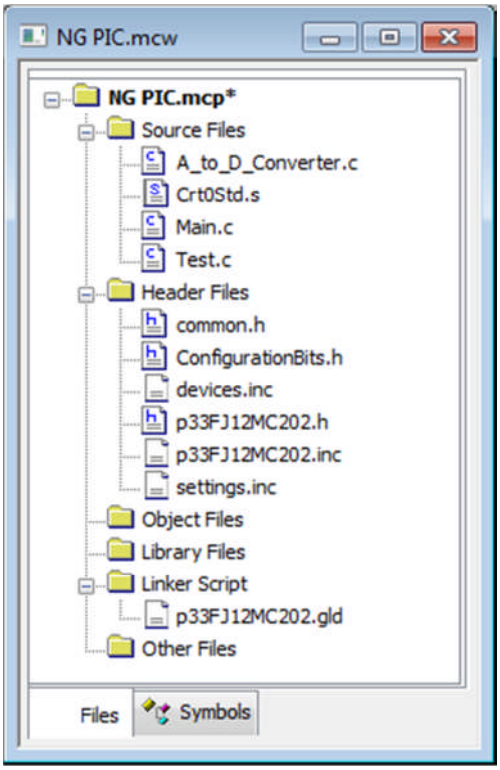
## (Boot loader version)

This programming version requires a working boot loader in the slave controller (dsPIC).

(Part of the first time programming und testing at the board supplier).

**Creating a new HEX-file (without boot loader) (by Collamat AG):**

- Configure – Configuration Bits:
  set [√]: Configuration Bits set in code




Project **without** Boot loader (ds30loader.s)

- Project – Build All:
  …. wait for message: **BUILD SUCCEEDED**
- HEX-file has been stored as: NG PIC.HEX
- Collamat AG will provide this HEX-file for downloading.
  Name: NG PIC V-VV.HEX – whereas
  V-VV indicates the corresponding version number
  e.g. ." **NG PIC-1-41-oBL.HEX**" (oBL = without BootLoader)

**Programming cable:**

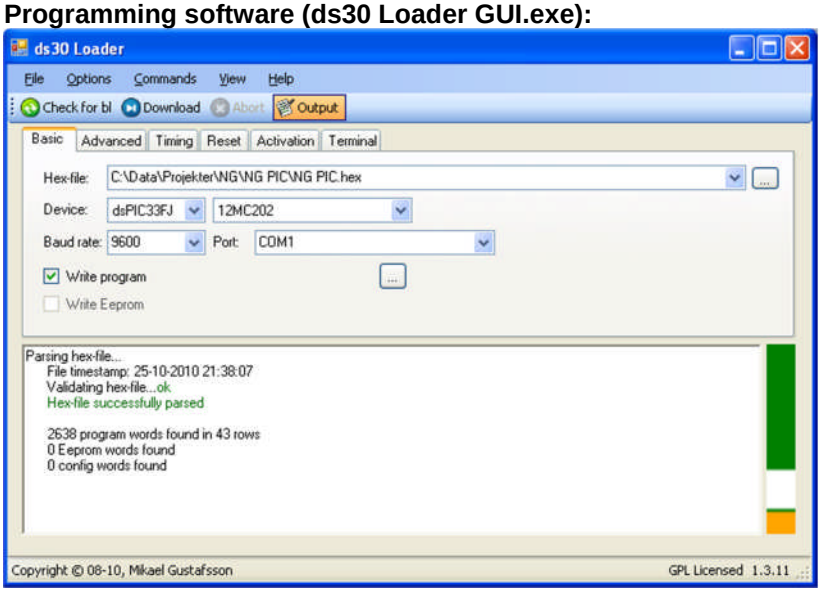
9-pin D-Sub 1:1 cable with 1x 9-pin D-sub (female) - and 1x 9-pin D-Sub (male) – connector/plug.

**Option:**

US232B-100-BST-cable (Blister 100cm cable) from Reselec AG
U.Art:Nr. 24010001 (1.00m) including EasySYNC driver software
(optional use of this cable (together with the above D-Sub cable)
if no serial port is available on your computer
– load EasySYNC-driver first).

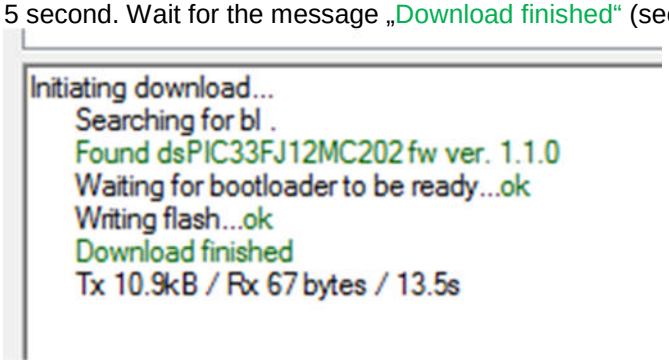
**Plug in programming cable:**
Computer with serial port (COM-Port):
Plug in D-Sub-cable to COM-port of your PC and to RS232-port of the Collamat S unit.
Computer without serial port:
Plug in US232B-100-BST-cable to USB-Port of your PC. Connect other end with D-Sub 1:1 cable. Connect other end of D-sub 1:1 cable to RS232-port of the Collamat S unit.

**Programming software (ds30 Loader GUI.exe):**




The dsLoader software is used to program the dsPIC (slave controller) of the main board (via boot loader). The boot loader itself has been loaded to the dsPIC during main board production/test (version RCM 0.88 PIC 1.29 – or newer)

**Programming:**
Power OFF Collamat S. Start prog-software ds 30 Loader GUI.exe, load HEX-file: NG PIC V-VV.HEX, device: dsPIC33FJ – 12MC202, baud rate: 9600, enable write program,
Port: serial port (for example COM1) or USB-port (COM4(USB)).
Power ON Collamat unit and – press the Download button within the next 5 second. Wait for the message „Download finished“ (see below).




The dsPIC will now restart with the new loaded firmware.
**Finish!** Switch OFF the Collamat S unit – remove programming cable.

**Firmware Versions**

See chapter 6.4.21 (bottom) or 3.2.3 firmware versions

## 6.4.22 Details to Menu - Service - Read PIC reg 0-63

**Read PIC reg 0-63**

You will find the complete menu structure in the corresponding Operator Manual of the **Collamat S Series** – from chapter 7.8. …..

**Service - Read PIC reg 0-63:** read the most important dsPIC-register (Register 0 ….. 63):

Register 01: REG_MaxStepFreq Registers[1]
Register 02: REG_Status1 Registers[2] (PIC Status Bits)
B2: MOTOR ERROR
B1: WAIT FOR COMMAND (set by PIC initialization – cleared by writing
to Control1 register – PIC function is blocked until this bit is reset)
B0: PAPER OUT
Register 03: REG_Status2 Registers[3] (Motor controller)
B8: Label gap detected – NOTE! Must be in Status2 register)
B7-B0: State
Register 04: REG_UsageCountL Registers[4]
Register 05: REG_UsageCountH Registers[5]
Register 06: REG_Control1 Registers[6]
#define REG_Pause ((REG_Control1 & 1) !=0)
B0: Pause (Disable)
#define REG_StartEdge ((REG_Control1 & 2) !=0)
B1: Startedge
#define REG_MotorDir ((REG_Control1 & 4) !=0)
B2: Motor direction
#define REG_RunContinious ((REG_Control1 & 8)
B3: Run signal, 0=active for each label, 1=active for complete cycle
#define REG_Calibrate ((REG_Control1 & 16) !=0)
B4: Skip forward with Start speed (measure label or LSC)
#define REG_MeasureLabelLen ((REG_Control1 & 32)
B5: Skip forward with Start speed until 2 gaps have been detected
#define REG_Feed ((REG_Control1 & 64) !=0)
B6: Feed label
Register 07: REG_Control2 Registers[7]
Register 08: REG_Mode Registers[8]
Register 09:
Register 10: REG_MotorStartSpeed Registers[10]
Register 11: REG_MotorReqSpeed Registers[11]
Register 12: REG_MotorStopSpeed Registers[12]
Register 13: REG_MotorAccel Registers[13]
Register 14: REG_MotorDeAccel Registers[14]
Register 15: REG_MotorFeedSpeed Registers[15] // Feed speed
Register 16:
Register 17: REG_StepLen Registers[17] // 1/65536mm
Register 18: REG_TACHOLen Registers[18] // 1/65536mm
Example: 1638 = 0.025mm
Register 19: REG_MotorMaxSpeed Registers[19] // max.Tacho
Example: 23423 = 36.00m/min // speed

**Read PIC reg 0-63**

continuation

```
Register 20: REG_StartDelay Registers[20]              // 1/16mm
                    Start (position) delay [1/16mm]
Register 21: REG_Predispense Registers[21]             // steps
                    (label stop) position after LSC edge detect
Register 22: REG_Predispense2 Registers[22]
                    Delayed predispense for corner
labelling, relative to Predispense
Register 23: REG_LabelLength Registers[23]             // steps
                    Max.label length (including gap)
Register 24: REG_GSCIgnore Registers[24]               // 1/16mm
                    GSC ignore distance
Register 25: REG_PreDispDelay Registers[25]            // 1/16mm
                    Delay [1/16mm] before predisp.2
Register 26: REG_MissLabelAccept Registers[26]
                    Number of missing labels accepted (0-2)
Register 27: REG_PreDispSpeed Registers[27]
                    Predispensing speed after GSC
falling edge, 0=follow product speed
Register 28:
Register 29:
Register 30: REG_LSCControl Registers[30]
                     #define REG_LSCAuxInput ((REG_LSCControl & 1) != 0)
                       B0: Select aux LSC input
Register 31: REG_LSCStopCriteria Registers[31]
Register 32: REG_LSCThreshold Registers[32]
Register 33: REG_LSCCurrentLevel Registers[33]
Register 34: REG_LSCMinLevel Registers[34]
Register 35: REG_LSCMaxLevelRegisters[35]
Register 36: REG_TACHOCountsPerStep Registers[36]
                    // Tacho counts per step. 10 fractional bits
Register 37: REG_TACHOFactor Registers[37]
                    // Conversion factor from encoder pulses
// to speed value. 10 fractional bits
Register 38: REG_TACHOSpeed Registers[38]
                    // example 23423 = 36.00m/min
Register 39: REG_TACHOCount Registers[39]
                    // counts up for each phase A/B edge
Register 40: REG_RunFixedDist Registers[40]
Register 41: REG_IgnoreLSC Registers[41]
Register 42: REG_Debug1 Registers[42]                  // for test only
Register 43: REG_Debug2 Registers[43]                  // for test only
Register 44: REG_Debug3 Registers[44]                  // for test only
Register 45: REG_MotorAccelSteps Registers[45]         // for test only
Register 46: REG_MotorDeAccelSteps Registers[46]       // for test only
Register 47: REG_MotorTotalSteps Registers[47]
                    // result of measurement of label length
Register 48: REG_MotorPreDispSteps Registers[48]       // for test only
Register 49: REG_TACHOInUse Registers[49]
                    // Flag for Tacho used (active) –                    //
must be 1 for encoder in use!
Register 50: REG_MultiLabels Registers[50]
                   // Multiple Mode: number of labels (1-4)
```

**Read PIC reg 0-63**

continuation

Register 51: REG_MultiReserved Registers[51]
// Multiple Mode: reserved
Register 52: REG_MultDist0 Registers[52] // 1/16mm
// Multiple Mode: distance between label edges
Register 53: REG_MultDist1 Registers[53]
// Multiple Mode:
Register 54: REG_MultiDist2 Registers[54]
// Multiple Mode:
Register 55:

Register 56:

Register 57:

Register 58:

Register 59:

Register 60: REG_Free1Registers[60]
// free
Register 61: REG_Free2 Registers[61]
// free
Register 62: REG_Free3 Registers[62]
// free
Register 63: REG_Free4 Registers[63] // test
// current start correction + tacho speed compensation
// in number of encoder pulses

## 6.4.23 Details to Menu - Service - Inputs

**Inputs**

Use this function for technical inspections or for maintenance works to **check/read** the inputs of the dsPIC – register wise:

- (ext.) Register CS0: Piggy-Board [AVA / X-WEB]
  B0: H, B1-B7: L = AVA: 1
  B0-B1: H, B2-B7: L = X-WEB: 3

- (ext.) Register CS2: internal I/O-Block
  B0: TUNIT - Traction unit open input
  B1: LLO - Label low input
  B2: RWF - Rewinder full input
  B3: OOL - Out of label input
  B4: PRODUCT_INX - Product input (AUX_INX)
  B5: NSTP_INX - Nonstop input
  B6: RWE_ERROR_INX - Rewinder error input
  B7: DISP - Feed key input

- (ext.) Register CS4: Piggy-Board [AVA or X-WEB]
  B0: DOWN1 or CW1-INPOS(P2-12)
  B1: HOME1 or CW2-INPOS(P2-13)
  B2: DOWN2 or CW3-INPOS(P1-14)
  B3: HOME2 or CW1-ERROR(P2-15)
  B4: DOWN3 or CW2-ERROR(P2-16)
  B5: HOME3 or CW3-ERROR(P2-17)
  B6: LAPR or FREF1(P2-18)
  B7: RES_IN

- (ext.) Register CS6: external / Applicator I/O-Block
  B0: START - START input
  B1: STOP - STOP input
  B2: COUNTER_INX - Printer error (PRTERR_X)
  B3: READY - READY input
  B4: ERRIN - ERROR input
  B5: LOCK - LOCK input
  B6: H - always H
  B7: H - always H

- (int.) Register PB: internal Register
  PB0: START2 - to dsPIC (RB2)
  PB1: PIC_ERR - from dsPIC (RB7)
  PB2: CS_A0 - to U3 (74VHC138)
  PB3: CS_A1 - to U3 (74VHC138)
  PB4: CS_A2 - to U3 (74VHC138)
  PB5-PB7: open - N.U.

- (int.) Register PC: internal Register
  PC0: TXD - to operator panel
  PC1: RXD - from operator panel
  PC2: TXC - to PIGGYPACK
  PC3: RXC - from PIGGYPACK
  PC4: TXB - to dsPIC (RB5)
  PC5: RXB - from dsPIC (RB6)
  PC6-PC7: open

…. continuation on next page…..

**Inputs (…)**
continuation

- (int.) Register PE: internal Register
  PE0: GSC - Goodscanner input
  PE1: RUN - from dsPIC (RB3)
  PE2: TXF - to RS232
  PE3: RXF - from RS232
  PE4: open - N.U.
  PE5: open - SMODE0 - N.U.
  PE6: open - SMODE1 - N.U.
  PE7: open - STATUS - N.U.

- for internal use only!

## 6.4.24 Details to Menu - Service – Read Outputs

Use this function for technical inspections or for maintenance works to **check/read** the outputs of the dsPIC – register wise:

- (ext.) Register CS1: N.U.

- (ext.) Register CS3: Piggy-Board [AVA or X-WEB]
  B0: BLOW (P2-3) or CW1-START(P2-3)
  B1: VALVE1 (P2-4) or CW2-START(P2-4)
  B2: VACU (P2-5) or CW3-START(P2-5)
  B3: BLTB (P2-6) or BLTB(P2-6)
  B4: A_FEED (P2-10/11) or RUN(P2-7)
  B5: VALVE2 (P2-7)
  B6: VALVE3 (P2-8)
  B7: A_FLAP (P2-9)

- (ext.) Register CS5: external / applicator I/O-Block
  B0: ERR - Error
  B1: WAR - Warning
  B2: RUN - Run
  B3: PRODUCT_OUT - Product (Nonstop) (PRINT)
  B4: FEED - forward feed
  B5: ADA_HOME - Adapter in Home-Position
  B6: N.U. – not used
  B7: FLAP - Magnet flap adapter

- (ext.) Register CS7: - el. rewinder / Nonstop I/O-Block
  B0: RW-ENABLE - el. rewinder on/off (1/0)
  B1: NSTP_OUT - Nonstop output on/off (1/0)
  B2: RW_WIDTH - el. rewinder (small=0, wide=1)

- (int.) Register PB - B0: START2 to dsPIC

- for internal use only!

## 6.4.25 Details to Menu - Service - Set Outputs

**Set outputs**

Use this function for technical inspections or for maintenance works to **set/write** the outputs of the dsPIC – register wise:

- (ext.) Register CS1: N.U.
- (ext.) Register CS3: Piggy-Board [AVA or X-WEB]
  B0: BLOW (P2-3) or CW1-START (P2-3)
  B1: VALVE1 (P2-4) or CW2-START (P2-4)
  B2: VACU (P2-5) or CW3-START (P2-5)
  B3: BLTB (P2-6) or BLTB (P2-6)
  B4: VALVE2 (P2-7) or RUN (P2-7)
  B5: VALVE3 (P2-8)
  B6: FLAP (P2-9)
  B7: RES-OUT (P2-10)
- (ext.) Register CS5: external / Applicator I/O-Block
  B0: ERR - Error
  B1: WAR - Warning
  B2: RUN - Run
  B3: PRODUCT_OUT - Product out (Nonstop) (PRINT)
  B4: FEED - forward feed
  B5: ADA_HOME - Adapter in Home-Position
  B6: N.U. - not used
  B7: FLAP - Magnet flap adapter
- (ext.) Register CS7: - el. rewinder / Nonstop I/O-Block
  B0: RW-ENABLE - el. rewinder on/off (1/0)
  B1: NSTP_OUT - nonstop output on/off (1/0)
  B2: RW_WIDTH - el. rewinder (small=0, wide=1)
- (int.) Register PB - B0: START2 to dsPIC

- for internal use only!

## 6.4.26 Directions to naming of inputs/outputs

**Naming**

Schematic version 3.4:

The schematic of the Collamat S unit has been updated.
Actual version: 3.4
The following inputs/outputs have been renamed:

Name inconsistencies:

| Old: | New: |
|---|---|
| AUX_INX | PRODUCT_INX |
| PRTERR_X | COUNTER_INX |
| PRINT_X | COUNTER_OUT |

This documentation will use the new naming ONLY!

# 7 Index

# 8 Index of documents in the Appendix

| Index | Description | Art. No. |
|---|---|---|
| A | CE - Conformity Declaration | |
| B | CE - Declaration of Incorporation | |
| C | RoHS - Conformity Declaration | |
| D | UL- / CSA - Conformity | |
| E | Lifting of loads | |
| F | Error checklist | |
| G | Wiring block diagram | |
| H. | Boards and cables | |
| I | SIL report (Page 1 of 9) | |
| J | Jumper Setting (side plate “SIGNALS” | |

# Register A

## CE Declaration of Conformity

The manufacturer: **Collamat AG**
**Bodenmattstrasse 34**
**CH-4153 Reinach – Switzerland**

declares that the product:

| | | |
|---|---|---|
| Series: | **Collamat S 50, S 100 and S 300** | (name: from 01.01.2014) |
| | Collamat NG50 und NG100: | (name up to: 31.12.2013) |
| Serial numbers: | **S 50 (NG50): from 0036 to ….** | |
| | **S 100 (NG100): from 1003 to ….** | |
| | **S 300: from 2001 to ….** | |
| Year of manufacture: | **from 2011 to ….** | |

relates to all basic requirements of the below-mentioned directives (including there changes and extensions):

**2006/42/EG - directive on machinery**
**2004/108/EG - electromagnetic compatibility (EMC)**

Authorized person to compile the complete technical documentation for this unit according to appendix VII - chapter A of the machinery directive 2006/42/EG is:

**Collamat AG, Paul Schneider, Bodenmattstrasse 34, CH-4153 Reinach, Switzerland**

Applied harmonized standards, in particular are:

| | |
|---|---|
| - EN ISO 60204-1 | **Safety of Machinery - Electrical Equipment of Machines – Part 1: General Requirements-IEC 60204-1: 1997;** |
| - EN ISO 12100-1 | Safety of machinery -- Basic concepts, general principles for design – Part 1: Basic terminology, methodology |
| - EN ISO 12100-2 | Safety of machinery -- Basic concepts, general principles for design – Part 2: Technical principles |
| - EN ISO 141121-1 | Safety of machinery, Risk assessment. Principles. |

**Remark:** **The CE-Declaration of Conformity is valid only – if the Collamat S is safely mounted on a (Collamat AG) approved rack/stand.**

Issued in Reinach: 25. Novembre 2013 by:

**Collamat AG – Bodenmattstrasse 34, CH-4153 Reinach, Switzerland**

Authorized person: CEO - Frank Ankersen

# Register B

## CE – Declaration of incorporation

The manufacturer: **HM Collamat AG**
**Bodenmattstrasse 34**
**CH-4153 Reinach - Switzerland**

declares, that the machinery / machinery component named below as:

| | | |
|---|---|---|
| Series: | **Collamat S 50, S 100 and S 300** | (name: from 01.01.2014) |
| | Collamat NG50 und NG100: | (name up to: 31.12.2013) |
| Serial numbers: | **NG 50 / S 50: from 0036 to ….** | |
| | **NG 100 / S 100: from 1003 to ….** | |
| | **NG 300: from 2001 to ….** | |
| Year of manufacture: | **from 2011 to ….** | |

is intended to be assembled with other machinery / machinery components to constitute machinery , witch shall not be put into service until the assembled machinery has been declared in conformity with the provisions of the EC Council Directive on Machinery **2006/42/EG** (including there changes and extensions):
**Appendix I: article: 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.4 and 1.5.1.**

The above mentioned machinery relates furthermore to the regulations and directives of:
**2006/95/EG** (low voltage directive) and **2004/108/EG** (electromagnetic compatibility directive - EMC).

Applied harmonized standards, in particular are:

| | |
|---|---|
| EN ISO 12100-1 | Safety of machinery -- Basic concepts, general principles for design Part 1: Basic terminology, methodology |
| EN ISO 12100-2 | Safety of machinery -- Basic concepts, general principles for design Part 2: Technical principles |
| EN ISO 60204-1 | **Safety of Machinery - Electrical Equipment of Machines Part 1: General Requirements-IEC 60204-1: 1997;** |
| EN ISO14121-1 | Safety of machinery. Risk assessment. Principles |

A technical documentation set of this piece of machinery is available on demand - in electronic form (for governmental use only). The corresponding documentation to this piece of machinery has been issued according to appendix VII part B.
Responsible person for the composition of all technical documents according to Appendix VII – chapter B of the Directive on Machinery 2006/42/EG is:

Collamat AG, Paul Schneider, Bodenmattstrasse 34, CH-4153 Reinach, Switzerland

Issued in Reinach: 25. Novembre 2013 by:

**Collamat AG – Bodenmattstrasse 34, CH-4153 Reinach, Switzerland**

Authorized person: CEO - Frank Ankersen

# Register C

# RoHS-/RoHS2-
# Conformity Declaration

The EU Directive 2002/95/EC (RoHS) and new the EU Directive 2011/65/EU (RoHS2) prohibits the use of the substances listed below (regarding limitation of use of certain dangerous substances in electric and electronic devices).

## Definition of RoHS conformity:

RoHS-/RoHS2- conformity means that the product does not contain any of the prohibited substances above the limit levels, as described by the directive and (for components) the product may be processed at higher temperatures as required for a lead-free soldering process.
The prohibited substances and the maximum allowed limit levels per homogeneous substance are:

| Substance | Limit level |
|---|---|
| Lead | 0.1% |
| Mercury | 0.1% |
| Chrome VI | 0.1% |
| Polybromated biphenyl (PBB) | 0.1% |
| Polybromated diphenylether (PBDE) | 0.1% |
| Cadmium | 0.01% |

All part suppliers for this product/device (see product details below) have confirmed that their components/component groups are **RoHS/RoHS** and **WEEE2** conform.

## Recycling

Please also consider the EU Directive 2002/96/EG **WEEE2** (Waste Electrical and Electronic Equipment) about the redemption and the disposal of electric- and electronic waste (equipment). Mission of the WEEE2 is always: Reduction of the electric / electronic waste and the environmental burden as well as the conservation of the natural resources.
Several countries (out of Switzerland) require from the manufacturer or from its abroad reseller a so called "old (waste) electric equipment registration" (e.g. for B2C-products) – e.g. for Germany - this would be the public trust **„ear"**.
Collamat AG is obligated to withdraw all used Collamat devices (B2B-products -delivery date after February 2nd. 2003), if a „local" professional waste management by the abroad reseller - according to WEEE2 – is not available.

Collamat AG has taken all necessary steps to ensure the accuracy of this statement. The declaration is only binding for Collamat products that are purchased after the production date 13.02.2003.

## Product details

| | |
|---|---|
| Order number: | … |
| Description/Manufacturer/Brand: | Label Dispenser / Collamat AG / Collamat S |
| Manufacturer description: | S 50-XX D, in which: 50=passive rewinder XX=width, D=direction or<br>S 100-XX-D, in which: 100=active rewinder XX=width, D=direction |
| Date: | Reinach, 10 April 2009 |

**Collamat AG - Bodenmattstrasse 34, CH-4153 Reinach, Switzerland**

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# Register D

## UL- CSA - Conformity

Manufacturer: **Collamat AG**
**Bodenmattstrasse 34**
**CH 4153 Reinach**
**Switzerland**

### General:

The Collamat S labeling device, created by Collamat AG, has been developed and built according to the latest EU standards / directives. This has been confirmed in the corresponding CE Declaration / Declaration of Conformity (also available as an Appendix to this document) for this device series. During the development phase of this product line, all components / component groups were checked for UL/CSA conformity. Most components conform to both CE as well as UL/CSA. For the markets demanding UL/CSA conformity, alternative parts are available (this only applies to the components having NOT combined conformity = CE and UL/CSA).

### Cables/Wires:

UL-conforming cables/wires are not easily available in Europe, particularly when a precisely defined outside diameter and corresponding cable elasticity are required (see label sensor).

The cables/wires used on the Collamat S are in CE-conforming. For the markets that demand UL/CSA conformity, alternative cable sets are available (this only applies to the components that do not have combined conformity = CE and UL/CSA).

We will compile a cable/wire set that is in conformity with both CE and UL/CSA = combined conformity – in the next revision.

### PCBs:

The board material for all Collamat S printed circuit boards (PCBs) conform with fire protection category UL 94 / V0 (category QMZS2)

The production and mounting process of the PCBs is performed in a UL accredited production process (ZPMV2)

**UL94 =** „*Tests for Flammability of Plastic Materials for Parts in Devices and Applications*“

Equal to IEC/DIN EN 60695-11-10 and -20 and equal to CSA C 22.2 are maintained.

Our PCB manufacturers and assembly suppliers have confirmed that the products delivered to Collamat AG meet the directives and regulations above.

### What/How:

The status of this analysis/testing is continuously updated in the internal document "Electronics - Parts List" for the Collamat S. For devices for UL/CSA markets, the EU Directive 2002/95/EC and RoHS conformity are also valid.

# Register E

## Lifting of loads

Heavy lifting and/or heavy labor are relative terms, as individual capabilities are very different. Work that could be performed easily by a young, strong man may be unacceptable exertion for a weaker man, an older man, or for a woman or child.

The EC Directive 90/269/EWR and the Load Handling Regulation make clear statements regarding limit levels and frequencies for load handling (LASI Publication LV 9). The German Federal Ministry recommends that acceptable loads be based on age, lifting frequency and gender. For occasional lifting and carrying, women older than fifteen years of age may move loads of 15 kg; for frequent lifting and carrying, loads of 10 kg are acceptable (occasional = less than twice hourly, max. three or four steps; frequent = more than twice or three times hourly and more than four steps).

For pregnant or nursing female employees, the Mother Protection Laws are valid. In Par. 4 Sect. 1 and Sect. 2 of the Mother Protection Law, general work prohibitions are clarified, including lifting and carrying of loads. Pregnant or nursing female employees may not lift loads of more than 5 kg frequently or 10 kg occasionally by hand.

See also EC Directive 89/391/EWR.

---

**Working with a label dispenser (Collamat S):**

The unwinder of the Collamat S can accept label rolls that have the following maximum dimensions:

- Roll diameter: 400mm
- Roll width: 250mm

Depending on the type of paper and carrier material, a label roll with these maximum diameters may weigh up to 28 kg.

**For this reason, label rolls that exceed a weight of 15 kg must be moved with a lifting system onto the unwinder unit** or .....

..... an alternative assembly of the unwinder unit must be selected, such as in which the label rolls can be loaded onto the unwinder unit near the ground with a forklift. For this, a paper guide unit is generally needed, which moves the label paper from the unwinder unit (near the ground) to the label dispenser Collamat S (generally at working height / conveyor belt height).

**If label rolls of more than 15 kg are loaded onto a standard Collamat S, the unwinder unit must be supported with a stabilization set.**

**Collamat AG - Bodenmattstrasse 34, CH-4153 Reinach, Switzerland**

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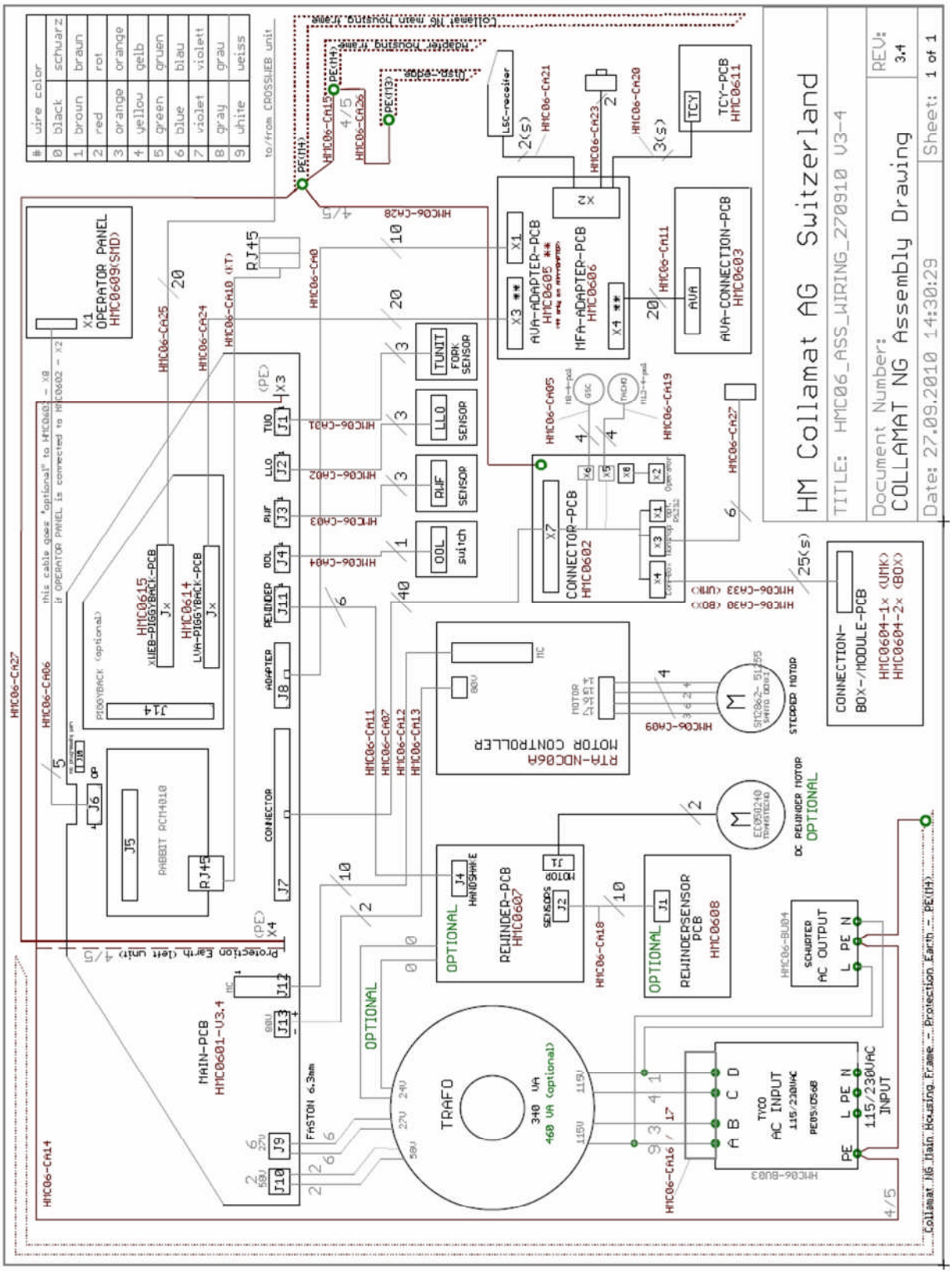
# Register F

## Error checklist

| | | | |
|---|---|---|---|
| **Device type:** | Ser.No. Dispenser:<br><br>No. …… | Collamat S xx-WW D<br>xx = max.speed: 50, 100, 300<br>WW = width: 10,20,30<br>(100/180/250mm)<br>D = direction (L/R) | <br>xx = ……<br>WW = ……<br>D = …… |
| **Environment:** | Supply voltage: | Supply frequency (Hz): | Temperature (C): |
| | Humidity %: | Degree of interference, EMC (burst): | Degree of interference, ESD (static): |
| **Labels:** | Width: | Length: | Distance: |
| | Thickness: | Transparency: | Material: |
| **Carrier paper:** | Width: | Thickness: | Transparency: |
| **Goods:** | Type: | Material: | Shape: |
| | Length: | Width: | Height: |
| | Speed m/min | Length in transport direction: | Distance: |
| **Dispenser:** | Speed m/min | Cadence pcs/min: | Measurement method: |
| **Settings:** | Pre-dispensing mm: | Position mm: | Suppression: |
| | Stop criteria: | Label length: | Suppression: |
| **Special notes:** | | | |
| **Machine environment:** | Goods transport: | Upstream machine: | Downstream machine: |
| | Other surrounding machines: | | |
| **Peripheral devices:** | 1 | 2 | 3 |
| **Shielding:** | Supply cables: | Sensor cables: | |
| **ESD phenomenons:** | Description: | | |
| **Description of interference:** | Error frequency | constant:<br>regular:<br>sporadic: | <br><br>sec |
| **Date + time of fault:** | | | |
| **Notes:** | | | |
| **Fault noted by:** | Name:<br><br>Date: | | |

# Register G

## Wiring block diagram



# Register H

## Boards (PCB) and cables

### Board numbers, Collamat S (HMC06)

| Name | Description | Version | Measures [mm] | Part-number | | Drawing-number |
|---|---|---|---|---|---|---|
| HMC0601 | Main-Board | 3.5 | 306 x 106 | 52180266 | S | 152188007 |
| HMC0602 | Connector-Board | Y | 96 x 55 | 52180401 | S | 152180401 |
| HMC0603 | AVA-Connection-Board | A2 | 70 x 64 | 52180253 | | 152180253 |
| HMC0604-1 | Connection-Box-Board (UMK-Module) | 1C | 72 x 110 | 52180404 | | 152180404 |
| HMC0604-2 | Connection-Box-Board (Bopla-Alu-Box) | 2C | 70 x 114 | 52180403 | | 152180403 |
| HMC0605 | AVA-Adapter-Board | H | 79 x 62 | 52180405 | S | 152180405 |
| HMC0606 | MFA-Adapter-Board | S | 79 x 62 | 52180406 | | 152180406 |
| HMC0607 | Rewinder-Board (old) | X1 / X2 | 110 x 100 | 52180308 | | 152188565 |
| HMC0607 | Rewinder-Board (new) | A | 110 x 100 | 52180308 | | 152188565 |
| HMC0608 | Rewinder-Sensor-Board (old) | X / Y | 60 x 30 | 52180408 | | 152180408 |
| HMC0608 | Rewinder-Sensor-Board (new) | A | 60 x 30 | 52180408 | | 152180408 |
| HMC0609 | Operatorpanel-Board (SMD) | A | 98 x 60 | 52180379 | S | 152188993 |
| HMC0610 | Forksensor-Board **N.U.** | P2 | 27 x 20 | 52180410 | | 152180410 |
| HMC0611 | LSC TCY IR-Sender-Board | I | 79 x 16 | 52180206 | S | 152180206 |
| HMC0614 | AVA Driver Piggyback **pending** | F | 97 x 86 | 52180414 | | 152180414 |
| HMC0615 | X-WEB Driver Piggyback **pending** | G | 97 x 86 | 52180415 | | 152180415 |
| RCM4010 | Maincontroller Rabbit RCM4010 | | 60 x 47 | 74016122 | S | ---------- |

**BOARDS**

**UL- / CSA- Conformity:**

PCB material according to fire protection class UL 94 / V0 (category QMZS2)

Produktion / assembly of PCB according to UL accredited production process (ZPMV2)

**UL94 =** "*Tests for Flammability of Plastic Materials for Parts in Devices and Applications*"

Identical to IEC/DIN EN 60695-11-10 and -20 and identical to CSA C 22.2

**CABLES**

**Cables according to:**

Directive 2002/95/EC OF THE EUROPEAN PARLIAMENT AND COUNCIL from January 27th. 2003

Restriction of the use of certain dangerous material in electrical and electronic equipment.

**UL- / CSA- Conformity:**

If ever possible - use UL- and CSA-approved cables and wires only ! Those parts using NOT UL- and CSA-approved cables and wires have to be declared separately.

## Cablenumbers Collamat S (HMC06)

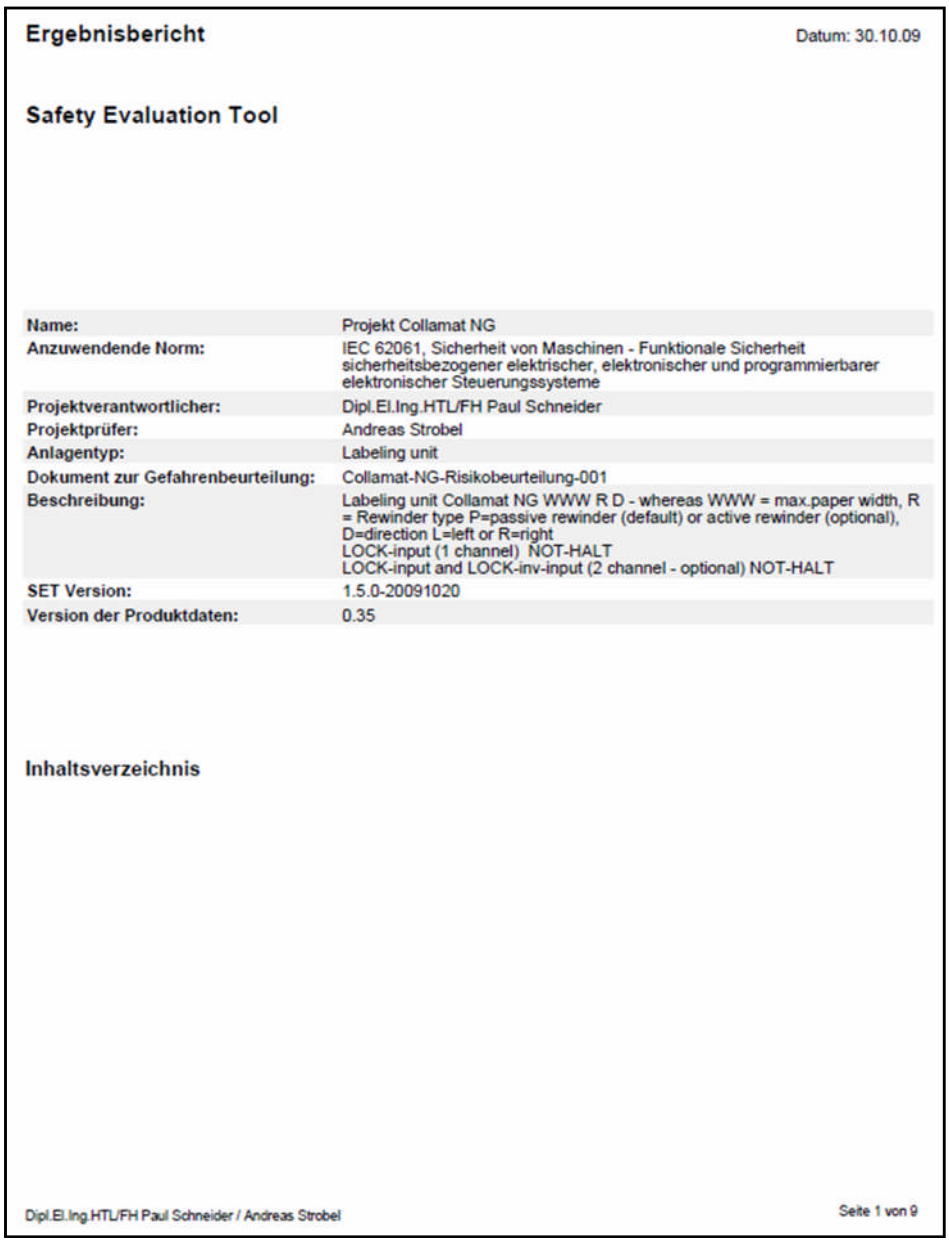
| Name | Description | | Pins | Length [mm] | Part-number | Stand. S | Drawing-number |
|---|---|---|---|---|---|---|---|
| HMC06CA01D | TUNIT sensorcable | | 3 | 370 | 52180271 | S | 152188558 |
| HMC06CA02F | LLO sensorcable | | 3 | 700 | 52180421 | | 152180421 |
| HMC06CA03A | RWF sensorcable | | 3 | 250 | 52180422 | | 152180422 |
| HMC06CA04C | OOL sensorcable | | 1 | 310 | 52180423 | S | 152180423 |
| HMC06CA05B | M8 socket (GSC) | | 4 | 115 | 52180424 | S | 152180424 |
| HMC06CA06G-s | Operatorpanel cable short | (HMC0601 to HMC0609) | 5 | 400 | 52180425-00 | S | 152180425 |
| HMC06CA06G-m | Operatorpanel cable midium | (HMC0601 to HMC0609) | 5 | 480 | 52180425-01 | (S) | 152180425 |
| HMC06CA06G-l | Operatorpanel cable long | (HMC0601 to HMC0609) | 5 | 520 | 52180425-02 | (S) | 152180425 |
| HMC06CA07E | Connectionplate cable | (HMC0601 to HMC0602) | 40 | 250 | 52180426 | S | 152180426 |
| HMC06CA08D-s | Adapter cable | (HMC0601 to HMC0605/06) | 10 | 750 | 52180427 | S | 152180427 |
| HMC06CA08D-l | Adapter cable | (HMC0601 to HMC0605/06) | 10 | 1000 | 52180428 | (S) | 152180428 |
| HMC06CA09B | Motor cable | **(KT - part of motor)** | 4 | ----- | 74071800 | | 152180429 |
| HMC06CA10A | Ethernet patch cable | **(KT)** | 5 | 300 | 52180430 | | 152180430 |
| HMC06CA11B | Electric rewinder control c. | (HMC0601 to HMC0607) | 6 | 220 | 52180431 | | 152180431 |
| HMC06CA12E | Motorcontroller controll cable | (HMC0601 to NDC06) | 7 | 120 | 52180432 | S | 152180432 |
| HMC06CA13C | Motorcontroller power cable | (HMC0601 to NDC06) | 2 | 120 | 52180433 | S | 152180433 |
| HMC06CA14H | PE - cable Power | | 1 | 130/140/165 | 52180434 | S | 152180434 |
| HMC06CA15B-s | PE - cable Adapter-Housing to VZW - (short) | | 1 | 500 | 52180435 | S | 152180435 |
| HMC06CA15B-l | PE - cable Adapter-Housing to VZW - (long) | | 1 | 750 | 52180436 | (S) | 152180436 |
| HMC06CA16F | Transformer 340VA with connectors | **(KT - part of trafo)** | - | ----- | 74080466 | | 152180437 |
| HMC06CA17F | Transformer 460VA with connectors | **(KT - part of trafo)** | - | ----- | 74080477 | | 152180438 |
| HMC06CA18C | Electric rewinder sensor c. | (HMC0607 to HMC0608) | 10 | 220 | 52180439 | | 152180439 |
| HMC06CA18D | Electric rewinder sensor c. | (HMC0607 to HMC0608) | 10-8 | 200 | 52180439 | | 152180439 |
| HMC06CA18E | Electric rewinder sensor c. | (HMC0607 to HMC0608) | 8 | 200 | 52180439 | | 152180439 |
| HMC06CA19B | M12 socket (TACHO) | | 4 | 85 | 52180440 | S | 152180440 |
| HMC06CA20E-s-R | Label sensor sender cable | (HMC0605/06 to HMC0611) | 3(s) | 680 | 52180207 | S | 152180207 |
| HMC06CA20E-l-R | Label sensor sender cable | (HMC0605/06 to HMC0611) | 3(s) | 760 | 52180454 | (S) | 152180207 |
| HMC06CA20E-L | Label sensor sender cable | (HMC0605/06 to HMC0611) | 3(s) | 550 | 52180455 | (S) | 152180207 |
| HMC06CA21D | Label sensor receiver cable | | 2(s) | 750 | 52180215 | S | 152188562 |
| HMC06CA22A | AC power line cable for MFA adapter | | 3 | 1250 | 52180443 | | 152180443 |
| HMC06CA23A | Adapter DISP cable | | 2 | 150 | 52180444 | S | 152180444 |
| HMC06CA24P1 | AVA Driver Piggyback cable | (HMC0614 to HMC0605) | 20 | 1200 | 52180445 | | 152180445 |
| HMC06CA25P1 | X-WEB Driver Piggyback c. | (HMC0615 to X-WEB-unit) | 20 | 1500 | 52180446 | | 152180446 |
| HMC06CA26C | PE -cable Adapter-housing to dispensing edge (M3-M4) | | 1 | 550 | 52180447 | S | 152180447 |
| HMC06CA27B | PE -cable Frontplate | (HMC0601 to Frontplate) | 1 | 285 | 52180448 | S | 15218xxxx |
| HMC06CA28C | PE -cable Connectorboard | (MMC0602 to Main-housing) | 1 | 125 | 52180449 | S | 152180449 |
| HMC06CA29A | Nonstop cable | (HMC0602 to HMC0602) | 13 | 3000 | 52180450 | | 152180450 |
| HMC06CA30B | Connection box cable | (HMC0602 to HMC0604-2) | 25(s) | 2000 | 52180451 | | 152180451 |

| Name | Description | Pins | Length [mm] | Part-number | Stand. S | Drawing-number |
|---|---|---|---|---|---|---|
| HMC06CA31A | Ext.Operatorpanel cable (HMC0602 to HMC0609) | 5 | 2000 | 52180006 | | 1521804 |
| HMC06CA32A | Adapter connection cable (HMC0605 to HMC0603) | 20 | 500 | 52180452 | | 152180452 |
| HMC06CA33B | Connection module cable (HMC0602 to HMC0604-1) | 25(s) | 2000 | 52180453 | | 152180453 |
| HMC06CA34B | Ext.Indicator LED-cable extension - short | 5 | 700 | 52180456 | | 152180456 |
| HMC06CA35B | Ext.Indicator LED-cable extension - long | 5 | 4000 | 52180457 | | 152180457 |
| HMC06CA36A | Indicator LED cable (KT - part of the LED) | 4 | 150 | 52180458 | | 152180458 |

# Register I

## SIL REPORT

**Calculation of the safety level SIL has been performed and documented using the Siemens safety evaluation tool. The standard used is IEC 62'601. The resulting SIL is < 1 or equal to 1. Safety measures are not requred with a SIL <= 1. However, they may be included as an option (LOCK input).**



**Ergebnisbericht** Datum: 30.10.09

**Safety Evaluation Tool**

| | |
|---|---|
| **Name:** | Projekt Collamat NG |
| **Anzuwendende Norm:** | IEC 62061, Sicherheit von Maschinen - Funktionale Sicherheit sicherheitsbezogener elektrischer, elektronischer und programmierbarer elektronischer Steuerungssysteme |
| **Projektverantwortlicher:** | Dipl.El.Ing.HTL/FH Paul Schneider |
| **Projektprüfer:** | Andreas Strobel |
| **Anlagentyp:** | Labeling unit |
| **Dokument zur Gefahrenbeurteilung:** | Collamat-NG-Risikobeurteilung-001 |
| **Beschreibung:** | Labeling unit Collamat NG WWW R D - whereas WWW = max.paper width, R = Rewinder type P=passive rewinder (default) or active rewinder (optional), D=direction L=left or R=right<br>LOCK-input (1 channel) NOT-HALT<br>LOCK-input and LOCK-inv-input (2 channel - optional) NOT-HALT |
| **SET Version:** | 1.5.0-20091020 |
| **Version der Produktdaten:** | 0.35 |

**Inhaltsverzeichnis**

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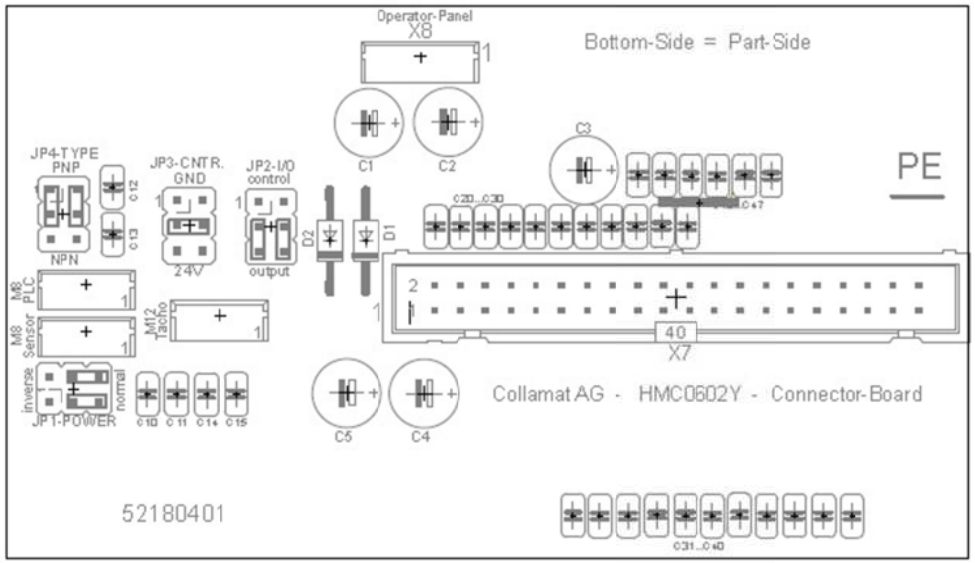
# HMC0602 (Version Y) Connector Board Configuration:




## Jumper configuration (default setting):

| | | |
|---|---|---|
| JP1-POWER: | GOOD-SENSOR (GSC) power - M8-pin-3 to GND and M8-pin-1 to 24V | use the right two jumpers - vertical (normal) |
| JP2-I/O: | GOOD-SENSOR (GSC) output - M8-pin-4 = sensor output and M8-pin-2 =sensor control input | use lower two jumpers - vertical (output) |
| JP3-CNTR: | GOOD-SENSOR (GSC) control input NOT set | use midle jumper - horizontal (N.U.) |
| JP4-TYPE: | GOOD-SENSOR (GSC) type - set to PNP (default) | use upper two jumpers - vertical (PNP) |

## Jumper configuration (other settings):

| | | |
|---|---|---|
| JP1-POWER: | GOOD-SENSOR (GSC) power - M8-pin-3 to 24V and M8-pin-1 to GND | use the left two jumpers - vertical (inverse) |
| JP2-I/O: | GOOD-SENSOR (GSC) output - M8-pin-4 = sensor control input and M8-pin-2 =sensor output | use upper two jumpers - vertical (control) |
| JP3-CNTR: | GOOD-SENSOR (GSC) control input set to GND | use upper jumper - horizontal (GND) |
| JP3-CNTR: | GOOD-SENSOR (GSC) control input set to 24V | use lower jumper - horizontal (24V) |
| JP4-TYPE: | GOOD-SENSOR (GSC) type - set to NPN | use lower two jumpers - vertical (NPN) |

## Incremental-Encoder connector (TACHO - PNP-type):

Connect 4-pin Molex plug (cable from M12 socket) to M12 Tacho connector

TACHO Molex-Connector and M12 Tacho-plug:
Pin1 = +24V
Pin2 = A-signal
Pin3 = GND
Pin4 = B-signal

## GOOD-SENSOR (GSC - PNP- or NPN-type) connectors:

Connect 4-pin Molex plug (from M8 socket) to M8 Sensor connector
Connect 4-pin Molex plug (from M8 socket) to M8 PLC connector

- connecting a standard good sensor (PNP or NPN) to the M8 socket
- connecting a PLC to the M8 socket - remove the two jumpers from JP4-TYPE !!!

GSC-Molex-Connector and M8-plug:
Pin1 = +24V
Pin2 = control-line
Pin3 = GND
Pin4 = GSC-signal

PLC-Molex-Connector and M8-plug:
Pin1 = +24V
Pin2 = GSC-P (photocoupler - Anode)
Pin3 = GND
Pin4 = GSC-N (photocoupler - Kathode)