

# MANUAL

**TT-SERIES**  
THERMAL TRANSFER

Thermal Transfer  
Printer Manual

BV Korthofah  
Lageweg 39  
NL-2222 AG Katwijk  
The Netherlands

**kortho**  
— coding & marking —

“original instructions”

## Copyright

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This manual has been drawn up by BV Korthofah. Address information see cover page.



## Our History

Kortho was founded in Amsterdam in 1926 and is still a Dutch and 100% family owned company today. Because of our long history we were able to witness the evolution of Coding & Marking from the beginning. Naturally our machines also evolved along the way. From stencilling and the standalone mechanical stamping machines in the early days. To the network connected Industry 4.0 printers of today.

## Our technologies

Next to still offering our mechanical hotfoilprinters, rollcoders and touch-dry marking systems, Kortho also specializes in Thermal Print as well as Hi-res Inkjet systems. Two core technologies that stand at the base of our new generation printers: Consisting of TIJ and Piezo inkjets on one end, and Label and TTO printers on the other. This makes us the widest multi-technology oriented specialist in the market today. Furthermore as all products have been fully developed in-house our printers and software have a highly integrated and standardized design between them.

## Our values

As an independent and longtime family owned business Kortho has always been able to stay true to itself. Firstly by remaining a specialist. Hence, we will only develop a printer if we can make it best in its kind. Never shall we launch an average product just to widen our offering. And secondly by staying transparent. Basing our pricing on manufacturing cost and obvious value only. Never on marketing, strategy or artificial product differences. These principals not only guarantee technologically dominant and best valued priced printing systems, but also a loyal partner that will always choose long term relationships over short term results.

## Our mission

As early as 2007, and with our first network controlled TTO launched in 2009, Kortho saw clearly that high automation and centralized (human-free) printer control was the future in coding. Winning OEM's and dealers would not just have to offer good printers, but also be able to integrate them into any smart customized coding solution. Something that just very recently became known as Industry 4.0. As a result Kortho has focused its development in this direction ever since. First by implementing the needed functionalities. And now, through our SLIMLINE concept, by making them easy, quick and cheap to implement. Our mission: Making smart, tailored and error free coding into the new global standard. And thus turning Industry 4.0 into a turn-key available commodity.

**INDUSTRY 4.0 IS NOW A TURN-KEY  
AVAILABLE COMMODITY!**

**SLIMLINE™**

SLIMLINE printers are all about bringing Industry 4.0 within reach. To achieve this we specifically designed this new line of equipment to excel in an IoT network environment. On the software side by making any tailored printer control solution easy and quick to implement. And on the hardware side by re-using as much as possible of existing network and IT infrastructure. Allowing for significant savings on printer hardware. Something that's an absolute first in Coding & Marking.

## For this, Kortho's SLIMLINE concept is based on the following principles:

### LESS CODING ERRORS

The biggest savings in coding are not found in the cost per print, maintenance costs nor equipment price. Because although these costs are still very important, they are insignificant in comparison to the costs of a product recall or factory downtime due to coding errors. This is why SLIMLINE printer control is specifically designed to address coding errors. Be it human, mechanical or process related.

### LESS SOFTWARE LICENSE FEES

The costs of IT solutions traditionally start with license fees. In order for SLIMLINE to work Kortho took the strategic decision to offer our own Kortho Control Center software for free. This label design and network control platform can operate the entire range of SLIMLINE printers from one central GUI. And with more than a decade of IoT oriented development will cover 95% of all smart coding requirements. Straight out of the box, free of charge and with all features unlocked. Effectively turning our software into a service product without profit motive.

## SLIMLINE CONCEPT

### LESS PROGRAMMING TIME

Second cost component in IT is the need for extended scripting. Which at the same time is also the main reason for complexity. To address these issues we designed SLIMLINE printers to be open and omnicompatible to other third party software as well. The idea behind this is simple: The more software that supports our printers, the bigger our offering in turn-key software solutions. And with the world as our IT supplier there's always going to be an existing specialist for each application. Because of this with SLIMLINE printers you no longer need to script every new or exotic requirement from scratch. Nor conform to the capabilities of just the printer manufacturer's software. Instead, our printers will allow you to use to best suited and already proven software for the application. Something that, with no financial incentive to sell our own software, will always be enabled and promoted by Kortho objectively.

### LESS HARDWARE INVESTMENTS

Just like with software the key to reduce hardware costs lies in needing as little as possible. This as Kortho will never make concessions on equipment build quality in order to lower its price. Luckily in centralized control this is not needed as equipment savings can also be found by re-using existing infrastructure. This is why SLIMLINE printers are designed to operate without each needing an individual HMI. Everything you need is in the printer itself so that up to 250 different systems can be operated from one single terminal. Even across different production plants. Naturally each printer can still be equipped with its own HMI, but this is optional. Meaning that the more the control is centralized, the bigger the savings will be on controllers. On top, SLIMLINE printers can also be controlled from any previously purchased HMI. Allowing for further hardware savings by re-using already present servers, PC's, tablets or other devices to control the printers from.

Smart coding  
Less license fees  
Less coding errors  
Less programming time  
Less hardware investments

**SLIMLINE: Smart Less Is More**

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2021-09 subject to change without notice



# Preface

This manual informs the user on how to safely use (and daily maintain) the TT-series.



***Read this manual carefully before first using the TT-series or before carrying out any operating activities on it. This is the only way to ensure optimum safety.***

## Related documents

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In addition to this manual, the following documents belong with the TT-series:

- EC Declaration of Conformity of the Machinery in accordance with Annex II 1.A of the Machinery Directive (2006/42/EC).
- Manual external power supply.

## Symbols

---

The following symbols are used in this manual:



***A tip or hint.***



***Draws your attention to possible problems.***



***Draws your attention to the risk of the TT-series being damaged if the instructions are not followed carefully.***



***Draws your attention to the risk of users becoming seriously injured if the instructions are not followed carefully.***



***A reference to another chapter, section, or document.***

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# 1 Introduction

## 1.1 Manufacturer

The TT-series is manufactured by:

**BV Korthofah**

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## 1.2 Machine identification

The name of the machine is: TT-series.

A type plate example of the TT-series is shown below:



Figure 1-1: Type plate example

The TT-series is CE-marked. This means that the TT-series complies with the essential health and safety requirements in Appendix I of the Machinery Directive.



**Fill in the article number, serial number and year of production as stated on the type plate in the table below.**

| Machine identification |  |
|------------------------|--|
| Article number         |  |
| Serial number          |  |
| Year of production     |  |

## 1.3 Service life

---

With normal use and adherence to the specified maintenance periods, the service life of the TT-series is ten years. The service life can be negatively affected if original parts are not used during repairs. Using non-original parts also voids any claim to warranty or compensation.

## 1.4 Liability

---

The manufacturer of the machine is not liable for any hazardous situations, accidents and damage that are the result of:

- Improper use of the TT-series.
- Using the TT-series for applications or under conditions other than those specified in this manual.
- Ignoring safety warnings or safety instructions as stated on the TT-series or in this manual.
- Making changes of any kind to the TT-series. This includes the use of other replacement parts.
- Insufficient maintenance.
- Normal wear and tear.

The manufacturer cannot be held liable for consequential damage, such as damage to products, interrupted operations, loss of production, etc., resulting from machine malfunction.

# 2 Safety

## 2.1 User

---

The TT-series may only be operated by qualified personnel.



***Observe the safety instructions in this manual. Failure to observe the safety instructions may cause unacceptable risks.***



***The TT-series may only be operated by one person at a time.***

Users must familiarise themselves with Chapters 1 to 6 of this manual and the safety regulations below before using the TT-series or performing any operation on the TT-series.

## 2.2 Maintenance engineer

---

The TT-series may only be serviced by suitably qualified personnel.



***Observe the safety instructions in this manual. Failure to observe the safety instructions may cause unacceptable risks.***

The maintenance engineer must be familiar with the full contents of this manual and the safety instructions provided below before putting the TT-series into use and carrying out maintenance work on the TT-series.



## 2.3 Safety regulations

---

The TT-series complies with the basic health and safety requirements of the European Communities. This means that the TT-series can be operated and maintained safely if all safety instructions are carefully observed. However, improper or careless use can create dangerous situations.



***Observe the safety instructions in this manual. Always remain alert to dangerous situations and avoid any improper or careless use.***

### 2.3.1 General safety instructions

---

Observe the following general safety instructions:

- Tie back long hair.
- Do **not** wear loose clothing or jewellery.
- Check the general operation of the TT-series.
- Keep your hands away from hazardous areas of the TT-series.



***Keep bystanders at a distance. DO NOT allow unauthorised personnel to operate the TT-series***

- Never start the TT-series while people are working on the machine.
- Carry out the maintenance work in accordance with the safety instructions in chapter 6. Replace any damaged or faulty parts or components before using the TT-series again or carrying out operating activities on the machine.
- Modifications to the TT-series may only be made with the express written permission of BV Korthofah.



***The TT-series is connected via an external power supply. BV Korthofah recommends using this external power supply. See Appendix 5 for safety instructions when using this external power supply.***

## 2.3.2 Residual hazards

---

The following hazards may occur when using or servicing the machine:

### Handling the cassette:



*The cassette handle should only be used for removing or inserting the cassette into the printer. This handle is not intended for transporting or holding the printer; there is a risk that the printer could come loose and cause personal injury if dropped.*

### To replace the ribbon:



*Caution is advised when changing the ribbon, to prevent injuries to hands or fingers.*

### Heating element:



*The heating element and printhead holder may become hot during use. To prevent burns, do not touch the printhead and printhead holder.*

## 2.3.3 Warnings

---

The following warnings are issued when the machine is used or maintained:

### Damage to the Thermal printhead:



*Replacing the thermal printhead without setting the correct resistance value or without taking into account static electricity may permanently damage the thermal printhead.*

### Cable routing:



*To avoid damage to the cables or printer, the cables must be routed at a suitable distance from moving parts.*

### Mains voltage:



*To prevent damage to the printer, the connected mains voltage must be between the minimum and maximum mains voltage as specified in B1, technical specifications.*

### Power supply to the printer:



*The power supply to the printer is adapted to the operation of the printer. Using a different power supply may result in safety issues and, in extreme cases, even damage the printer. If the power supply is damaged for any reason, it must be replaced with the same model and type.*

### Printhead cleaners:



***To prevent damage to the printer, use a soft brush and lint-free cloths. Do not use high-pressure air, abrasive materials, metal objects or aggressive degreasers such as acetone or benzene.***

### Spare and consumable parts:



***To prevent damage to the printer, only use Kortho spare parts and consumables.***

### Sound pressure:



***In certain situations, this unit may reach a noise level above 70 dB(A). Max. noise level is 79 dB(A).***

## 2.4 Function of the TT-series

---

The function of the TT-series is:

- Printing variable codings.

The TT-series has been developed specifically for this function and may not be used for other purposes.



***The only way in which the TT Series may be used is described in Chapter 3. Any other use of the TT-series is NOT permitted.***

Before using the TT-series for the first time, the operator and maintenance engineer should be instructed in how to use and maintain the TT-series.

# 3 Machine description

## 3.1 Scope of supply



Figure 3-1: Machine overview TT-series

The TT-series consists of the following parts:

1. TT-series Thermal Transfer printer.
2. Kortho Printerinterface (optional).
3. External power supply (not shown in the figure).



***The Kortho Printerinterface shown here is optional. You can also install Kortho Control Center on a Windows 10 (or higher) system of your choice.***

***Controlling multiple printers (max. 100) from a single HMI is also possible with Kortho Control Center.***



***The TT-series is connected via an external power supply. Kortho recommends using this external power supply. See Appendix 4 for detailed information about this external power supply.***

### 3.2 Machine overview TT-series

The TT-series consists of the following parts:

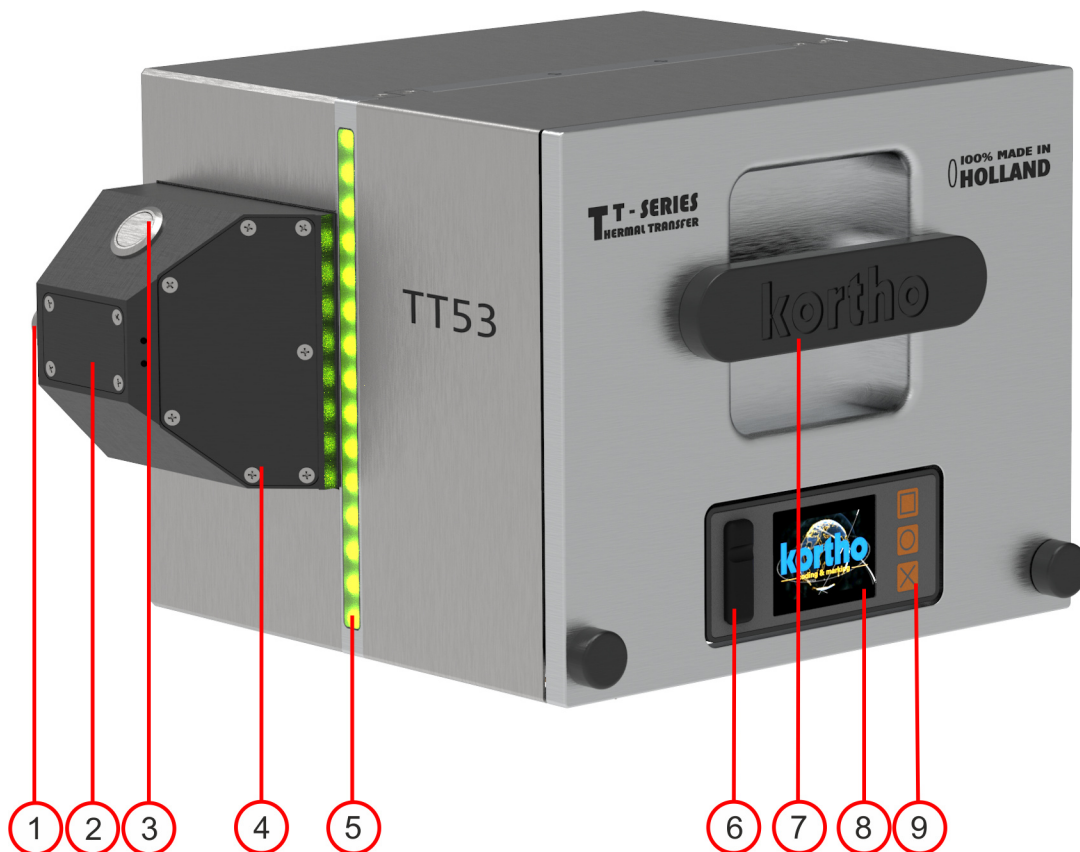


Figure 3-2: Machine overview TT-series (closed)

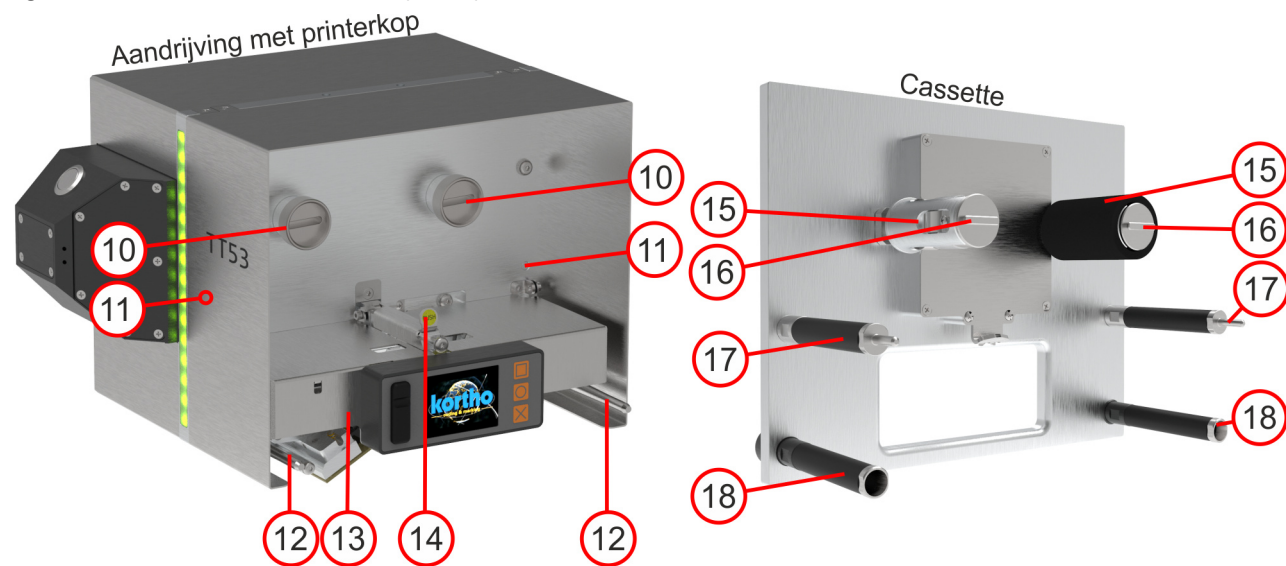


Figure 3-3: Machine overview TT-series (open)

The TT-series consists of the following parts:

1. Connections.
2. Bluetooth antenna.
3. ON/OFF button.
4. RFID scanner.
5. Signal strip.
6. USB port.
7. Handle with lock.
8. Display.
9. Control buttons.
10. Drive clutch (2x).
11. Pin hole with safety switch (2x).
12. Guide Pin Cassette (2x).
13. Printhead cover.
14. Printhead cover lock.
15. Drive axles for print ribbon (2x).
16. Ribbon axle coupling with lock (2x).
17. Upper guide roller with insert pin (2x).
18. Lower guide roller (2x).

### **3.3 General operation of TT-series**

---

The function of the TT-series is:

- Printing variable codings.

The general operation of the TT-series is described in the following paragraphs:

- Schematic representation of the print ribbon progression (§3.3.1).
- Printing process (§3.3.2).
- Operating modes (§3.3.3).

### 3.3.1 Schematic representation of ribbon progression

The image below is a schematic representation of the print ribbon progression.



*The numbering in the image is a continuation of the numbering in Section 3.2. Numbers 16, 17 & 18 have been superimposed for reference purposes.*

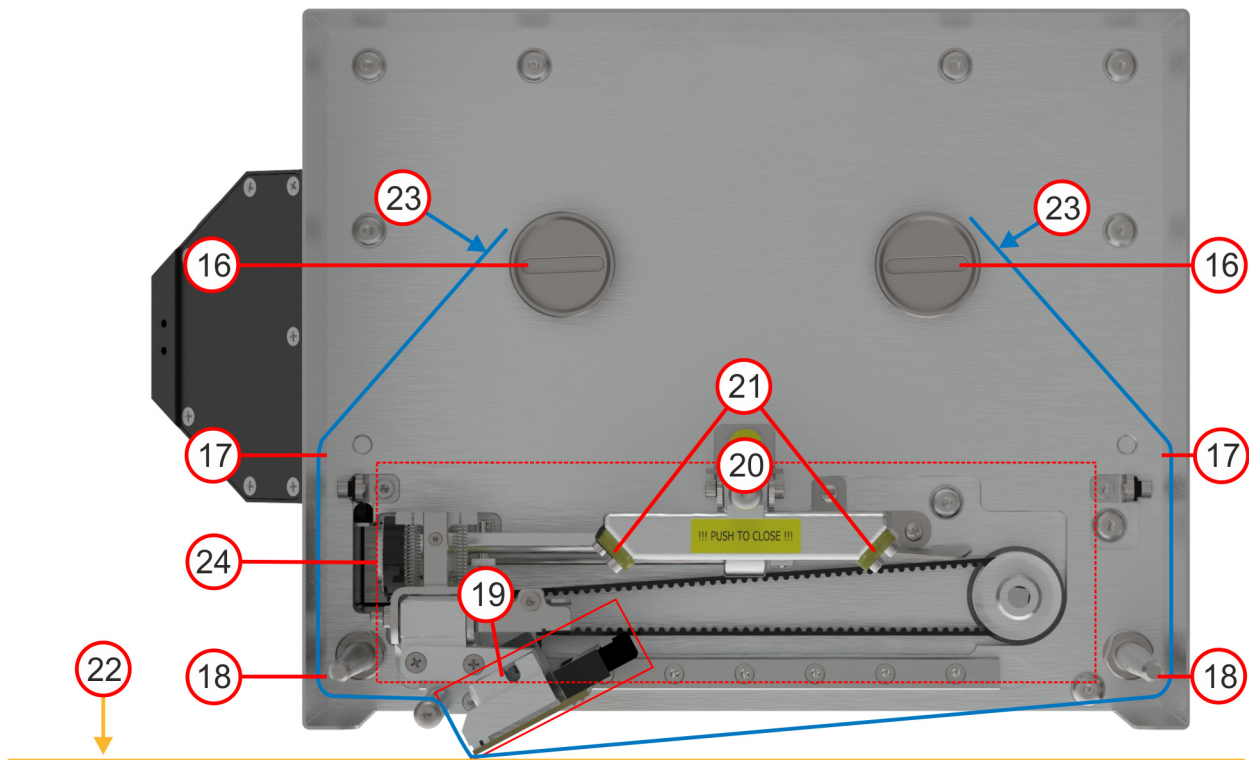


Figure 3-4: Schematic representation of ribbon progression

- |   |   |
|---|---|
| <b>19.</b> Ribbon axle coupling with lock (2x).     | <b>24.</b> Print head.                          |
| <b>20.</b> Upper guide roller with insert pin (2x). | <b>25.</b> Printhead horizontal movement drive. |
| <b>21.</b> Lower guide roller (2x).                 | <b>26.</b> Ultrasonic sensor (2x).              |
| <b>22.</b> Progression of substrate.                | <b>27.</b> Printhead vertical movement drive.   |
| <b>23.</b> Schematic progression of print ribbon.   |   |



### 3.3.2 Printing process

---

The TT-series is a thermal printer. Thermal printers (also known as TTO) are highly suitable for printing packaging applications with flexible foil. This technology is widely used in the food and packaging industry. A code, barcode, best before date, list of ingredients, etc. are printed on flexible foil or a flexible label during the printing process.

Thermal transfer printing uses a thermal printhead and a thermal transfer ribbon (print ribbon). The printer heats the appropriate heating elements on the thermal printhead at great speed, to transfer wax/resin to the flexible packaging. With this technology, a barcode or text with a very high resolution is put on the packaging. Thanks to the high resolution, the printing is very readable and easy to scan with a barcode scanner

### 3.3.3 Operating modes

---

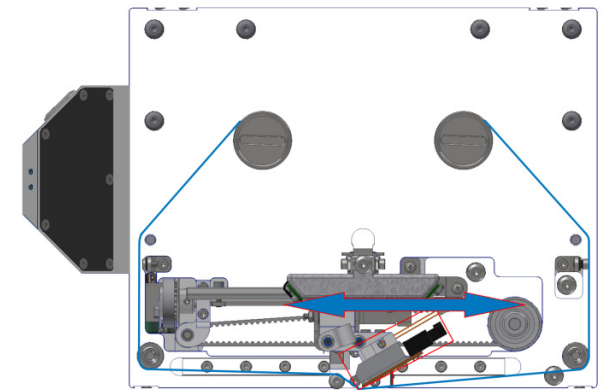
The TT-series has two operating modes:

- Intermittent.
- Continuous.

#### Intermittent.

---

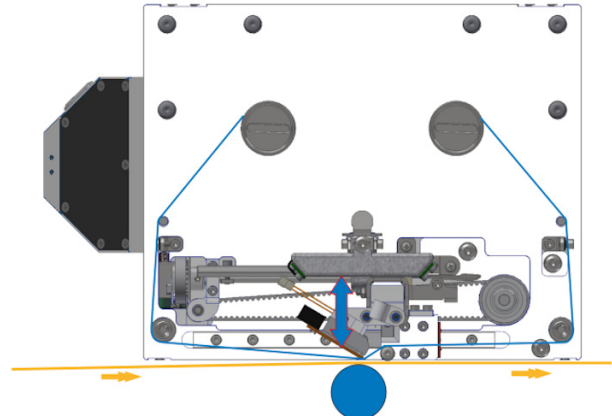
In the intermittent mode, the substrate is stationary during the printing process. In order to print, the printhead moves downwards, so the print ribbon is pressed against the substrate. Next, the head performs a horizontal stroke over the print ribbon and substrate. During this stroke, the dots of the head are actuated so that the ink from the print ribbon is melted over to the substrate. A counterpressure plate is mounted under the substrate. The substrate will continue to move in a stepwise fashion between each print stroke.



## Continuous.

---

In the continuous mode, the substrate moves during the printing process. In order to print, the printhead only moves up and down towards the substrate. The print ribbon is brought to the same speed as the substrate and then pressed against the substrate while it is moving. The print ribbon will then be transported underneath the head, synchronously with the substrate, while printing. With the use of an encoder, the substrate and foil can be transported at a variable speed without affecting the print quality.



***Depending on the print mode and/or orientation, the printhead needs to be in a certain position. See §5.3.2. for details.***



***Depending on the print mode and/or orientation, the new roll of print ribbon should be placed on the left or right axle of the cassette. See §6.4 for details.***



***The type of print ribbon depends on the substrate and print speed, but also on the desired adhesion and coverage. This is why it is important to always have test prints made first to decide on the correct print ribbon.***

## 3.4 Status panel

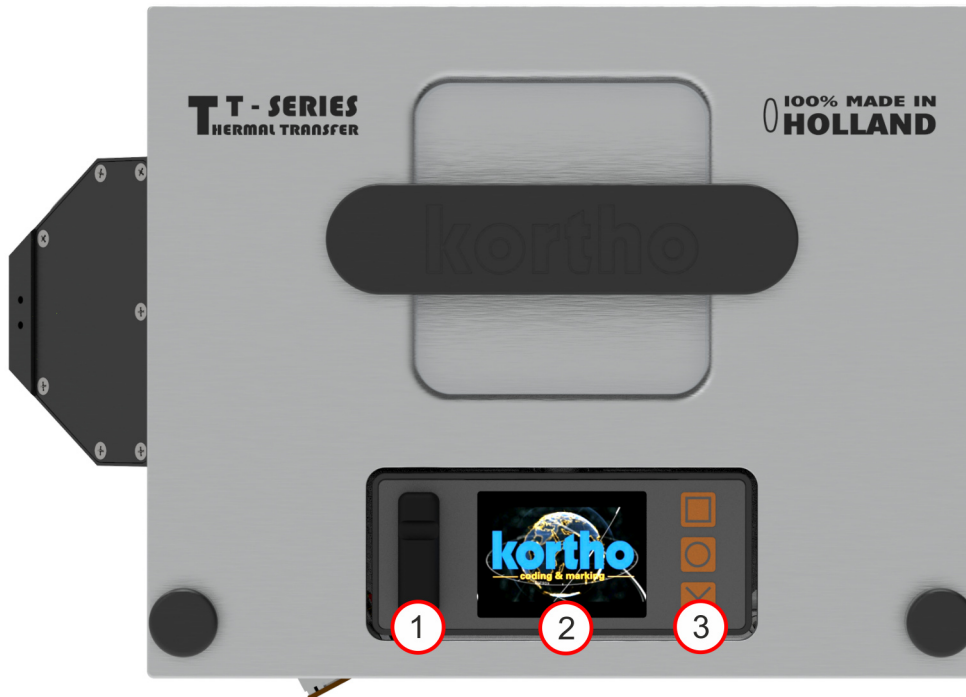


Figure 3-5: Status panel

The status panel consists of the following parts:

1. USB port.
2. Display.
3. Control buttons.

The status panel provides multiple functions:

- It offers two status screens (§3.4.1).
- A number of basic settings (§3.4.2) can be changed using the simple menu structure.
- If applicable, it displays warnings or error messages with the corresponding orange or red background color.
- The system software can be updated using a USB stick.
- The printer can be set to RUN or STOP mode.
- One can select a test label.
- You can make a test print.
- A test report from the printer can be placed on the USB stick.
- Bluetooth can be activated (for service personnel).

## 3.4.1 Status screens

---

The display can show two status screens. When one of the control buttons is pressed, the following information is displayed:

- The type of printer.
- The name or the IP address of the printer.
- The amount of ribbon which is still present.
- The number of prints since the current label was selected.
- The name of the label current being printed.
- The function of the three control buttons on the right side of the display.

If no controls buttons are pressed for approximately one minute, the following information is displayed:

- The current time.
- The print modus (ON / OFF or RUN / STOP).
- The number of prints per minute.
- The amount of ribbon available in percent.

## 3.4.2 Basic settings

---

You can also set up some basic settings on the status screen, such as:

- Language of the menu.
- Rotation/viewing orientation display.
- Network settings: IP-adres/Subnet mask/Gateway.
- Firmware update: by inserting a USB stick with new firmware.
- Bluetooth discoverable/pair.



***Extensive process parameters, settings and job processing can be read and set via Kortho Control Center (please refer to §3.5 and the separate Kortho Control Center software manual).***

### 3.5 HMI Kortho Control Center

The Interface software for all Kortho printers is called Kortho Control Center. This software is installed by default on the Kortho Printerface, but can also be downloaded free of charge to use on any other Windows system (Windows 10 or higher). Control from the HMI with KCC to the printer(s) is done via Ethernet. Up to 100 printers can be controlled from a single HMI with KCC. It is possible to use different models with different print sizes. The HMI with KCC consists of the following parts:

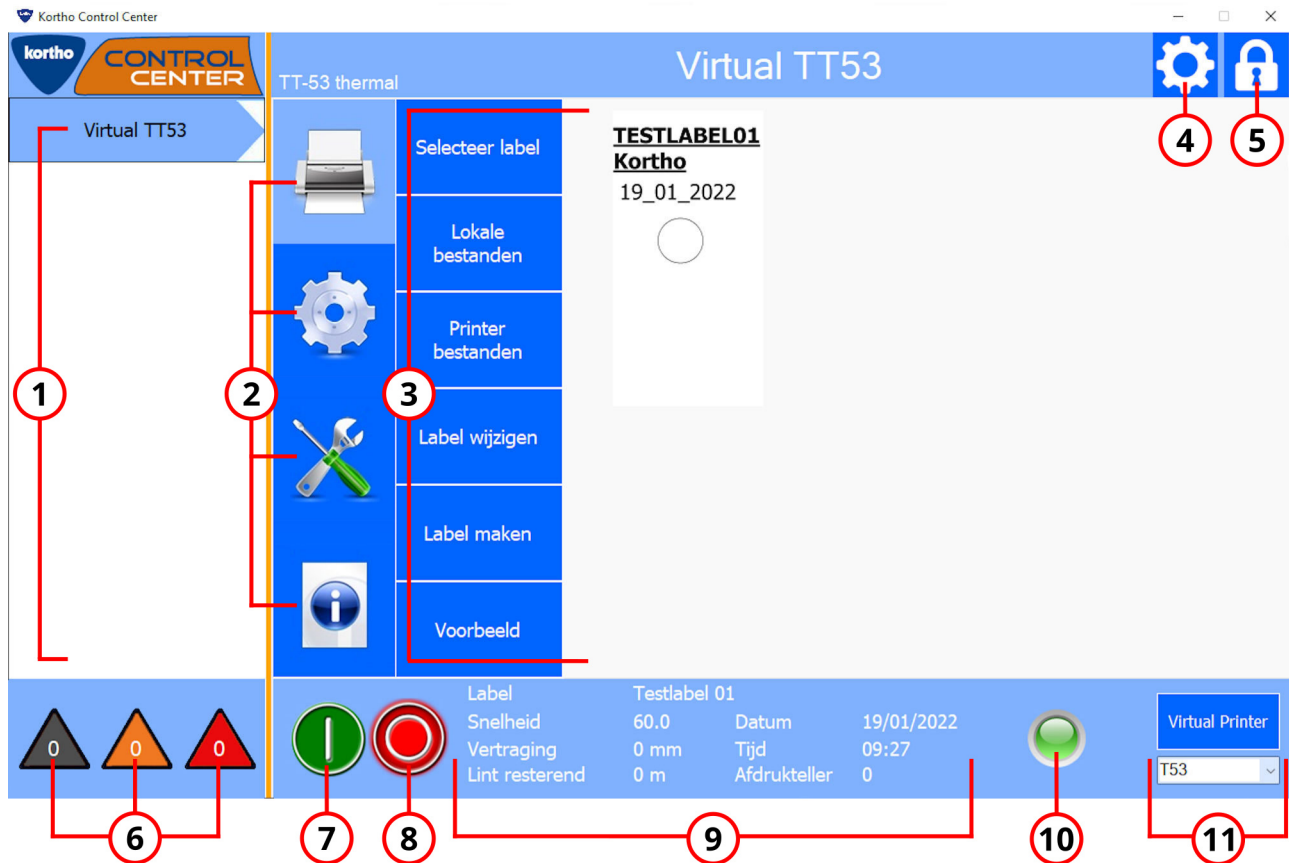


Figure 3-6: HMI

| No. | Description  |
|-----|--|
| 1.  | <p><b>Printer overview / printer selection</b></p> <p>Displays a list of all network-connected printers. Press one of the buttons to select a printer.</p> <ul style="list-style-type: none"> <li>• Connected printers will automatically be found and displayed in the printer ID overview.</li> <li>• The printer's IP address will be displayed as the printer ID by default. You can change this to a printer ID of your choice in KCC.</li> <li>• Depending on the status of the printer, the printer ID button will change colour (Offline = Grey, Ready/OK = Blue, Warning = Orange, Error = Red).</li> </ul> |

| No. | Description   |
|-----|---|
| 2.  | <p><b>Printer settings</b></p> <ul style="list-style-type: none"> <li>• Printer (label selection and label management).</li> <li>• Settings (printer and interface settings).</li> <li>• Service and diagnostics (service and diagnostics functions).</li> <li>• Information (system information).</li> </ul> <p>Press one of the buttons to display the details / settings on the details / settings screen.</p> |
| 3.  | <p><b>Detail / settings screen</b></p> <p>Shows the details / settings of the setting selected in the printer settings. (In this example the details / settings of the Printer (label selection and label management) are shown.)</p>   |
| 4.  | <p><b>Printer status triangles</b></p> <p>Displays the status of all active printers in the IP address list.</p> <ul style="list-style-type: none"> <li>• Grey = no connection.</li> <li>• Orange = warning.</li> <li>• Red = error. <ul style="list-style-type: none"> <li>- The number in the triangle indicates the number of printers with the relevant status.</li> </ul> </li> </ul>                        |
| 5.  | <p><b>Start button</b></p> <p>Press this button to start the printer selected in the printer overview.</p> <ul style="list-style-type: none"> <li>• The printer will wait for a signal from the production line.</li> </ul>   |
| 6.  | <p><b>Stop button</b></p> <p>Press this button to pause the printer selected in the printer overview.</p> <ul style="list-style-type: none"> <li>• The printer will not print, regardless of what the production line is doing.</li> </ul>  |
| 7.  | <p><b>General printer info</b></p> <p>Displays the name of the selected label, speed, delay, date, time and number of prints of the printer selected in the printer overview.</p> <ul style="list-style-type: none"> <li>• This data is also visible on the display of the printer itself.</li> </ul>   |
| 8.  | <p><b>Status LED</b></p> <p>Displays the status of the printer selected in the printer overview.</p> <ul style="list-style-type: none"> <li>• Blue = power is present and printer is starting up.</li> <li>• Green = ready.</li> <li>• Orange = warning.</li> <li>• Red = error.</li> </ul>   |

| No. | Description  |
|-----|--|
| 9.  | <b>Virtual printer</b><br>Demo mode to be able to work with the KCC without actually connecting a printer / connecting to a printer. |
| 10. | <b>Software settings</b><br>Press this button to open the software settings screen.  |
| 11. | <b>Lock screen</b><br>Press this button to lock the screen.  |



*For extensive KCC functions for the TT-series and other Kortho printers, please refer to the separate Kortho Control Center software manual.*



## 3.6 Signal strip

Both sides of the TT-series are equipped with a LED signal strip. The colour of the signal strip indicates the status of the TT-series.



Figure 3-7: Signal strip

The signal strip contains the following status colours:

- Blue = Booting.
- Green = Active / ready.
- Orange = Warning.
- Red = Error.
- Pink = Software update.



**Printer status changes and notifications will be simultaneously displayed, centrally in KCC and locally on the printer. KCC will show the notification in a pop-up in combination with a colour change of the Printer-ID button. The printer shows the notification on the display in combination with a colour change of the LED strips and background colour of the display.**

# 4 Installation

## 4.1 Safety regulations

---



*Installation must be carried out by qualified staff.*



*Personnel must take all necessary measures to prevent injury to persons and/or damage to a production line.*

## 4.2 Environment

---

The environment in which the TT-series may be installed must meet several requirements regarding humidity, temperature and vibration.

- The relative humidity should be between 0 and 85% (non-condensing).
- The ambient temperature must be between 0 and 40°C.
- The TT-series may not be used in fire or explosion hazard areas.
- The TT-series must be mounted with low vibration.

## 4.3 Positioning

---

The location of the TT-series on a production line must meet several requirements:

- There is sufficient room to carry out maintenance work on the TT-series.
- The TT-series does not interfere with production or control processes of the production line proper.
- The TT-series is placed out of reach of human operations taking place on the production line.

## 4.4 Mounting options

The TT-series can be mounted in a tubular frame on a production line. This makes it possible to rotate the printer at an angle that is parallel to the production line. The TT-series can print at any angle.

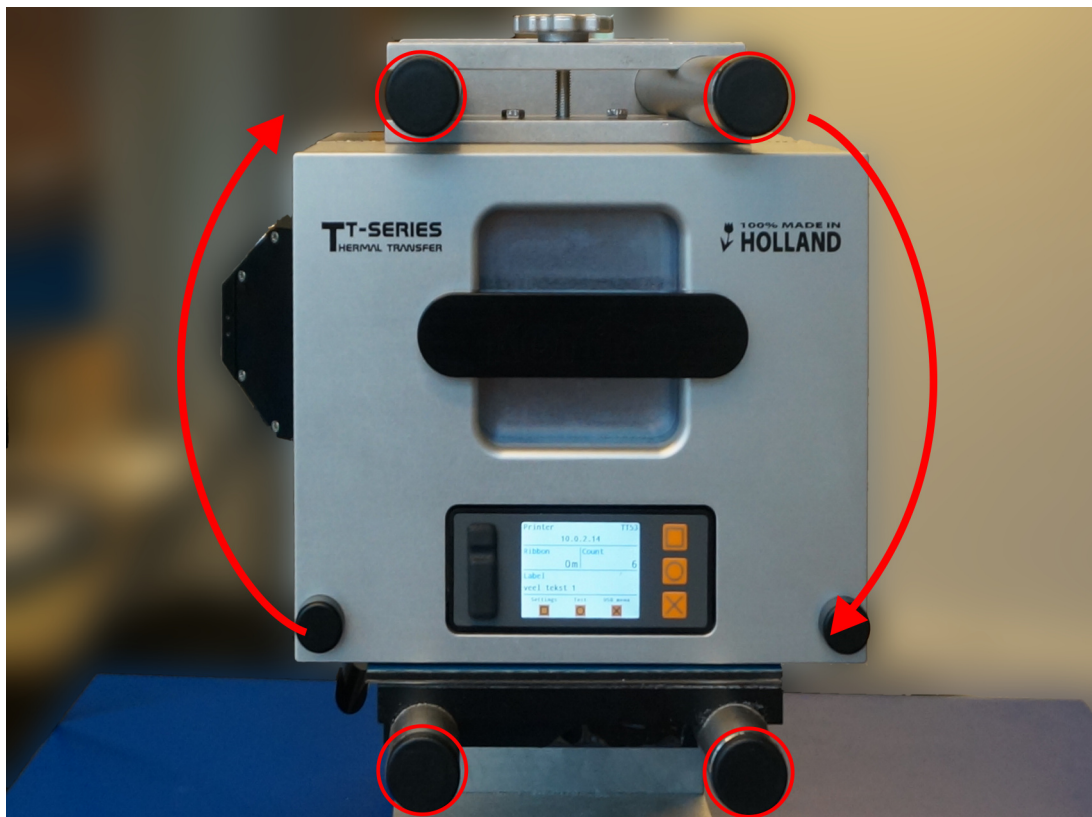


Figure 4-1: TT-series mounting options

## 4.5 Printer installation

To install the TT-series, perform the following operations:

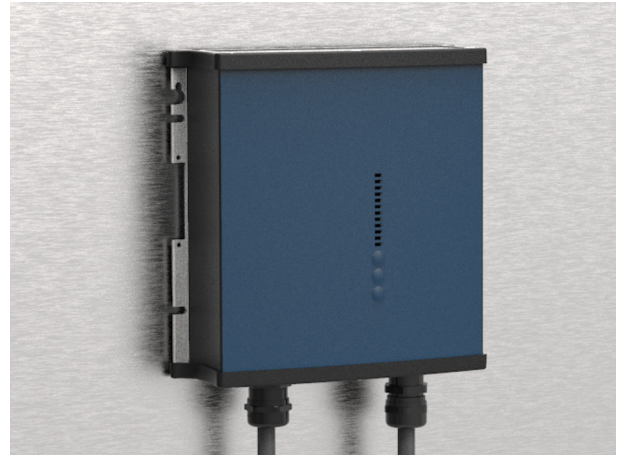
1. **Mount** the TT-series in the facility provided to that end.



**2. Mount** the printer power supply in the desired location.



*See appendix 4 for installation instructions of the external power supply.*



**3. Mount** the HMI (Kortho Printerinterface IoT or your own Wiindow based system) at the desired location.



*See the KCC software manual for installation instructions of the KCC software.*



**4. Connect** the TT-series.

The printer has the following connectors.

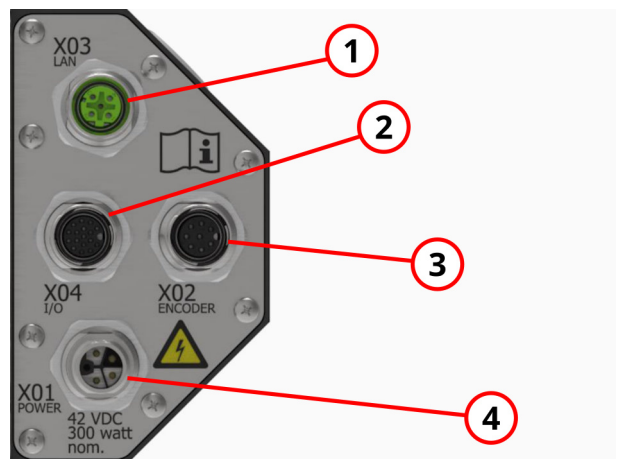
1. Ethernet.
2. Input / output interface.
3. Substrate encoder.
4. Power supply.



*Securely tighten the clamping ring of the connectors.*



*See chapter 8 for detailed information of the connectors.*



## 4.6 Commissioning

Perform the following operations before commissioning:

- Check that the TT-series is connected correctly.
  - Check that the TT-series power supply is connected correctly.
  - Check the network connection of the TT-series.
  - Check that the I/O cable is connected correctly.
  - In the case of continuous operation mode, check that the encoder is connected correctly.



**Check that the clamping rings of the connectors are properly tightened.**

- Check that the print ribbon type matches the desired operating mode, substrate, and production line.
- Check that the trajectory of the print ribbon is webbed correctly.



**The inside of the cassette has two labels that show the trajectory of the print ribbon. See the image below.**



Figure 4-2: Labels inside cassette

- Check the adjustment of the printhead. This mainly concerns the tilting resistance (see Section 5.4.1.) and the printing direction, but possibly also the angle to the substrate.



# 5 Settings and configura- tion

## 5.1 Safety regulations

---



*The configuration must be done by qualified personnel.*



*Correct configuration before commissioning is very important for correct operation of the TT-series. It improves print quality, reduces wear on parts and extends machine life.*

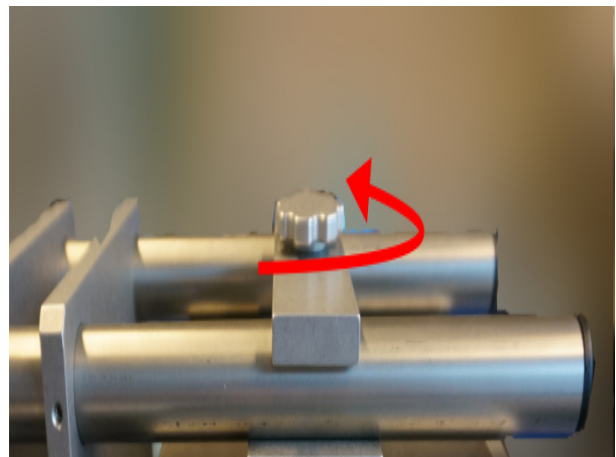
## 5.2 Setting printer above substrate

---

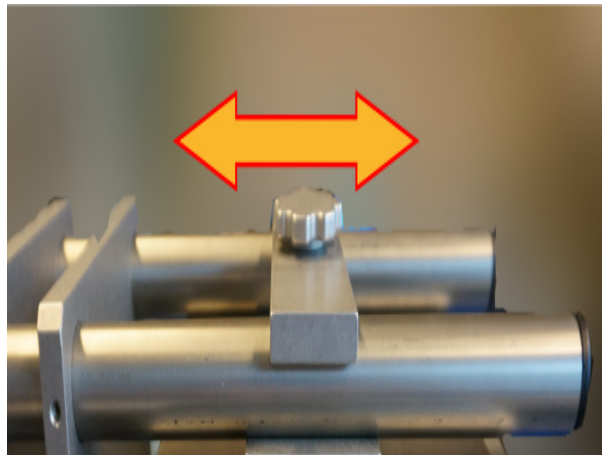
The printer is suspended in a two-tube frame above the substrate. This tubular frame can either be supplied by BV Korthofah or installed by the owner. Since the substrate may vary, with different widths, the location of the variable encoding may also differ. The TT-series can be shifted across the frame in order to adjust the location of the variable coding.

To move the TT-series across the width of the substrate, perform the following operations:

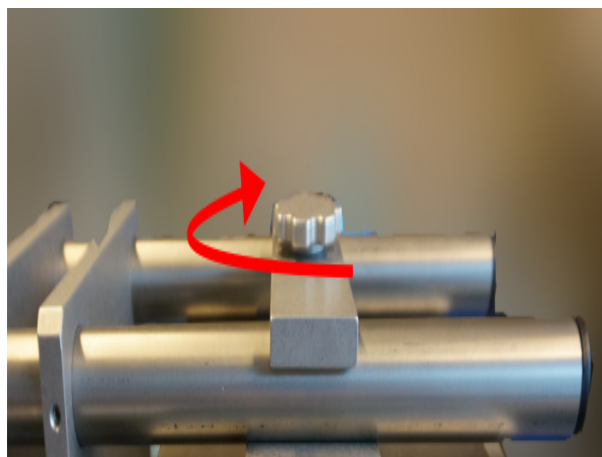
1. **Slightly** loosen the bolt with turning knob.
  - The printer does not need to be removed from the frame.



2. **Move** the printer to the desired location along the tubular frame.

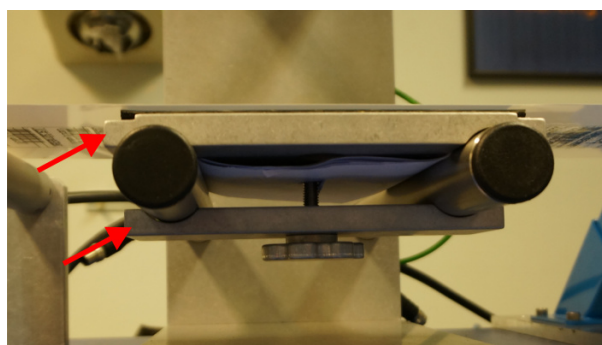
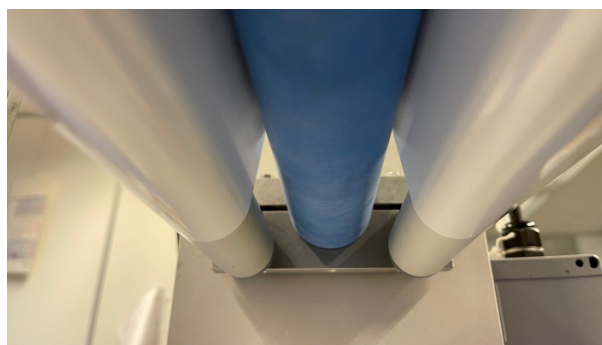


3. **Retighten** the bolt with turning knob to secure the printer.



Depending on the operating mode, counterpressure material may need to be mounted on the underside of the printer:

- For continuous printing, a counterpressure roller.
- For intermittent printing, this is a counterpressure plate.





## 5.3 Adjusting the counterpressure material under the printer

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Depending on the operating mode, a different counterpressure material must be installed underneath the printhead. For intermittent use, this module contains a flat platen, and for continuous use a round roller. If the Kortho bracket is used, both the continuous and the intermittent counterpressure module are easily interchangeable within the same bracket. The bracket itself is universal, so it is suitable for both modes. Both counterpressure modules are also available separately (see appendix 4 Spare parts) for use in a non-Kortho bracket. Printer dimensions can be downloaded as a 3D file from the Kortho website, or consult the technical drawings in the appendices to this manual.



***Printer dimensions can be downloaded as a 3D file from the Kortho website; alternatively please consult the technical drawings in the appendices to this manual.***



***The standard Kortho bracket can also be cut to size on site. This means that taking measurements beforehand is often not necessary. Scan the QR code below to access a tutorial.***

KORTHO TUTORIAL



TT-SERIES- BRACKET

Figure 5-1: QR code tutorial

## 5.3.1 Mounting counterpressure plate for intermittent operation

When printing in intermittent mode, a counterpressure plate must be mounted under the print-head. The maximum print stroke must fall within the size of the plate so that the head cannot protrude over the edge of the plate while printing. The example below shows an intermittent set-up based on the Kortho bracket.

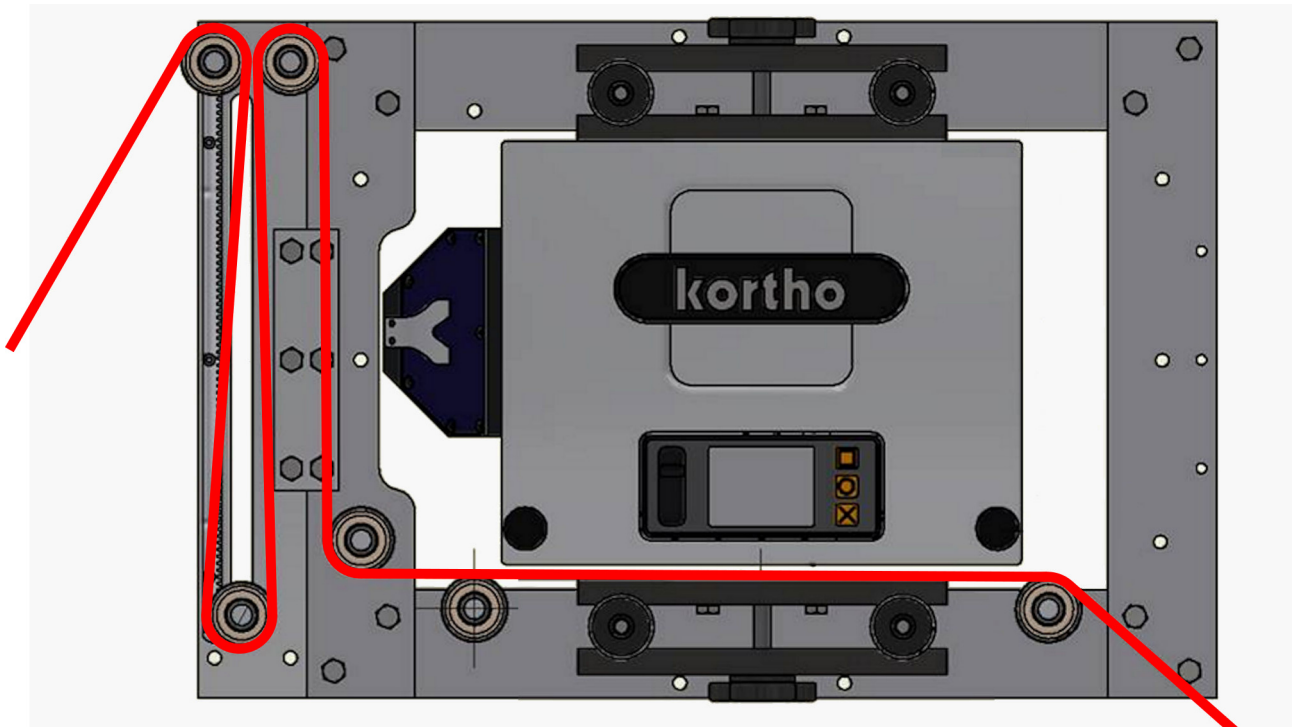


Figure 5-2: Intermittent set-up



*The substrate buffer on the left in the example is optional and only required if it is necessary to manually adjust the print position on the substrate.*



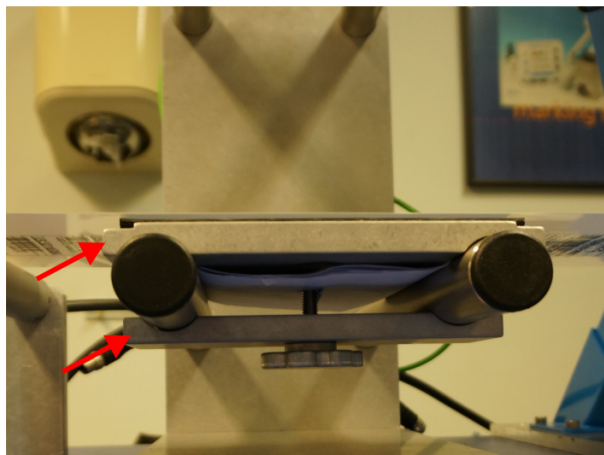
*The counterpressure plate should not be positioned lower than 6 mm from the bottom of the printer. Within this distance, the head will automatically position itself on the plate.*



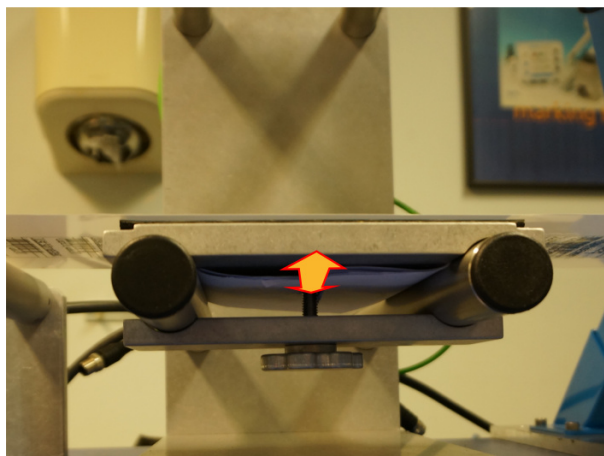
*The counterpressure plate must be mounted parallel to the bottom of the printer with the maximum print stroke falling within the dimensions of the plate. This is necessary to prevent the head from protruding over the edge during printing.*

To mount the counterpressure plate under the printer, perform the following operations:

1. **Mount** the module with the counterpressure plate in the tubular frame under the printer.



2. **Slide** the module under the printhead so that the counterpressure plate is completely under the printhead's print path.



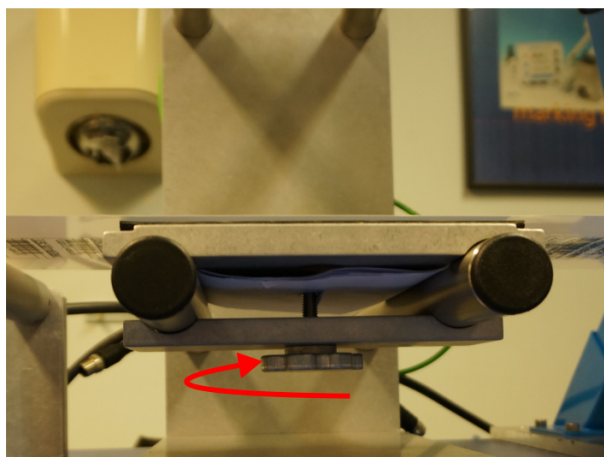
3. **Retighten** the bolt with turning knob to fix the module in the correct position.



*The Kortho TT-series counterpressure plate is attached with magnets and is therefore easy to replace if worn.*



*A substrate foil setting is also available for the Kortho TT-series bracket. This can be mounted on either side of the bracket. By buffering more or less substrate foil into this, the print position can be changed quickly.*



### 5.3.2 Mounting counterpressure roller for continuous use

When printing in continuous mode, a counterpressure roller must be mounted under the printhead. In addition, an encoder must also be used, the measuring wheel of which must be placed on the substrate above a substrate guide roller. It is important that the encoder wheel rotates exactly synchronously with the substrate. Therefore, the encoder must be positioned as close to the print position as possible and always directly on the substrate itself. Measuring on a roller alone, or further removed from the print position, will not be sufficiently reliable. Also make sure that the substrate has sufficient friction with the counterpressure roller so that it also rotates along as well as possible. The example below shows a continuous set-up based on the Kortho bracket.

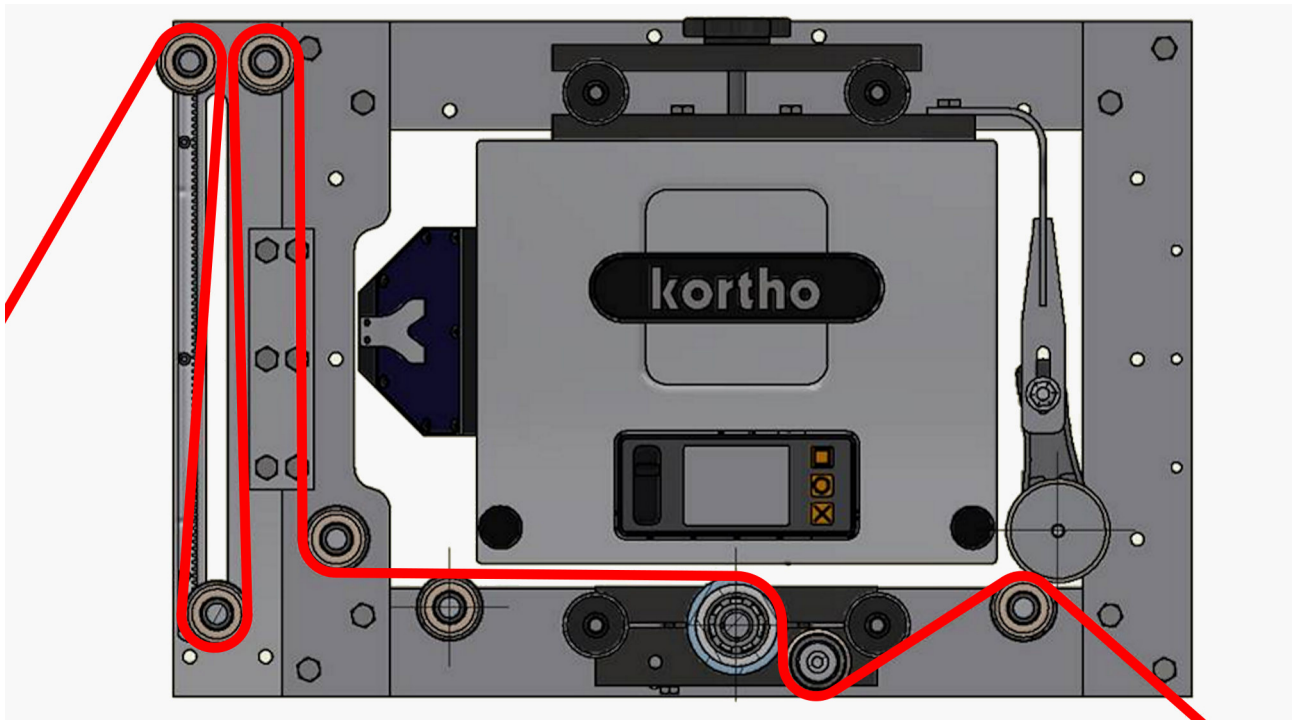


Figure 5-3: Continuous set-up



*The substrate buffer on the left in the example is optional and only required if it is necessary to manually adjust the print position on the substrate.*



*The counterpressure roller should not be positioned lower than 6 mm from the underside of the printer. Within this distance, the head will automatically position itself on the roller.*



*The encoder can be mounted on the long side of the suspension block. If you turn the block the, the encoder will be on one side or the other of the printer. Ideally, this is before the print position, so that the wheel cannot run over the print. Also make sure that the substrate is properly clamped between the wheel of the encoder and the guide roller, so that it rotates synchronously.*

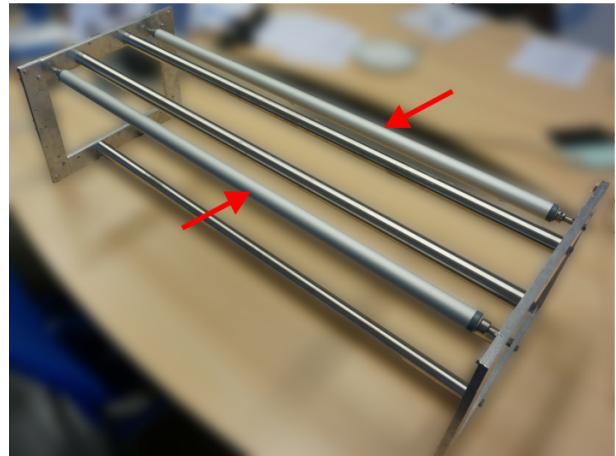


*In the example, only one guide roller has been placed after the print position. This ensures that the substrate (in red) tightens nicely around the counterpressure roller, so that it rotates along with it. If necessary, two rollers can also be used on each side for extra friction. This can result in more resistance, however, so should only be done if the counterpressure roller is not rotating along properly.*

To mount the counterpressure roller under the printer, perform the following operations:

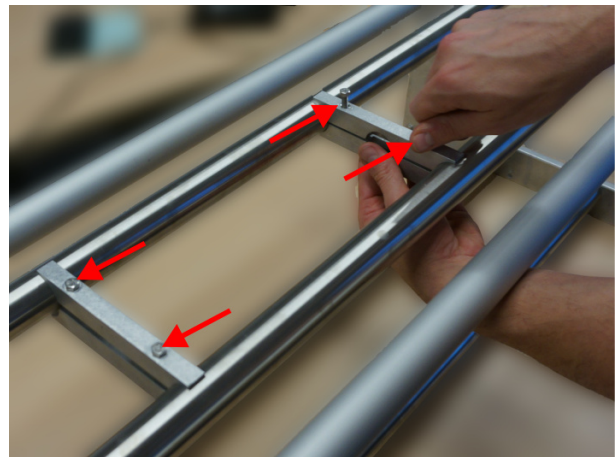
The picture on the right is a test set-up with a tubular frame into which the printer and the counterpressure roller can be mounted.

- The two rods and two shafts that are on top form the bottom of a test set-up. After step 4, the test set-up is reversed for this instruction. In practice, the placement of tubes and rollers may deviate slightly from the situation in this picture.



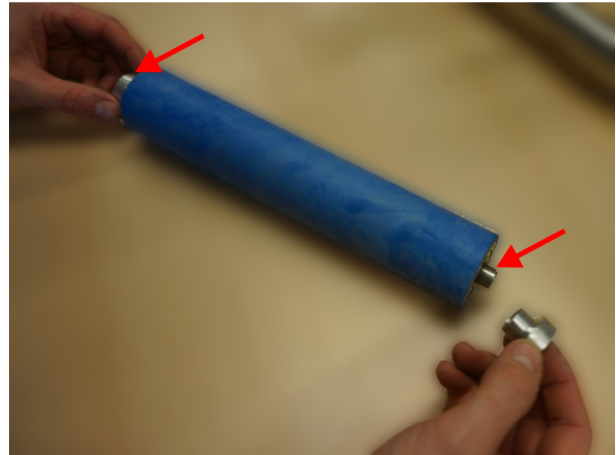
**1. Mount** two endplates onto the two fixed axes of the frame.

- Hand-tighten the bolts.





**2. Place** spacers on the ends of the counterpressure roller axle.

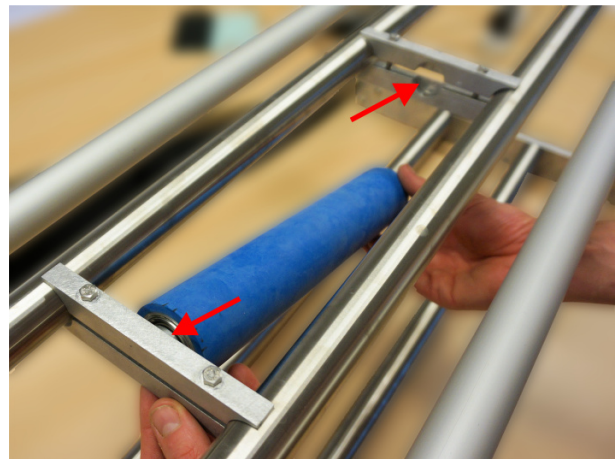


**3. Place** the counterpressure roller and the substrate guide roller(s) between the two end plates.

- If necessary, slide the end plates so that they clamp the spacers entirely.

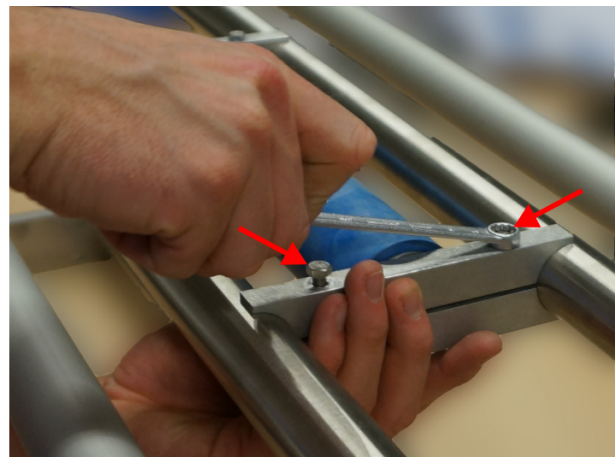


***When clamping the counterpressure roller and guide rollers, make sure they can rotate freely. To guarantee this is possible, the rollers should not be clamped at the ends. Leaving some space will allow them to rotate freely and without resistance.***

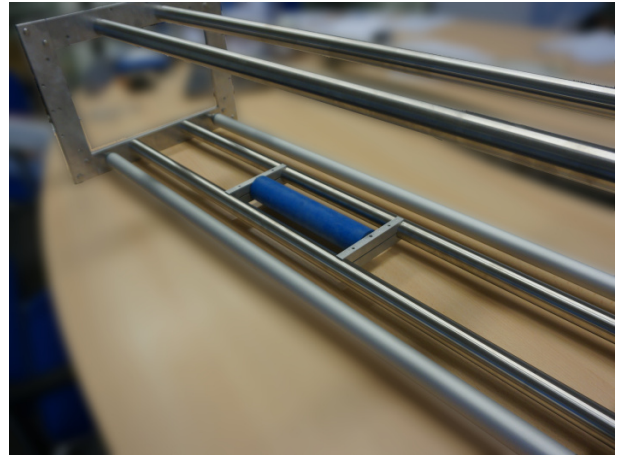


**4. Tighten** the four bolts of the end plates.

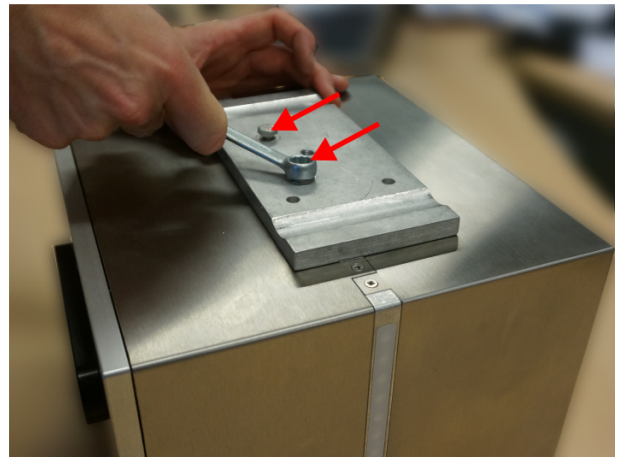
- Use key 8 to do this.



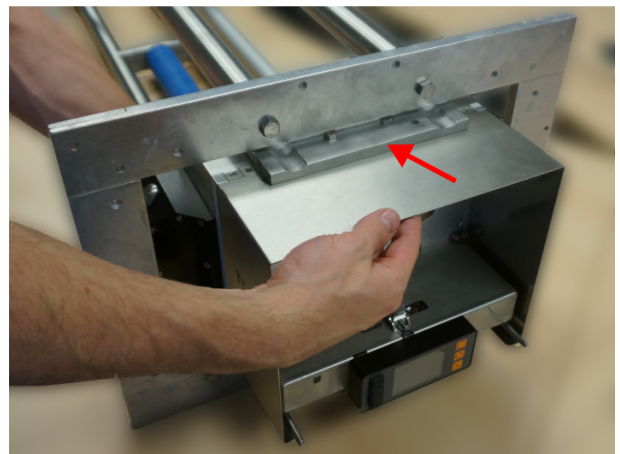
The test set-up is now rotated with the counterpressure roller down. Above the counterpressure roller, the printer will be mounted on the two tubes at the top.



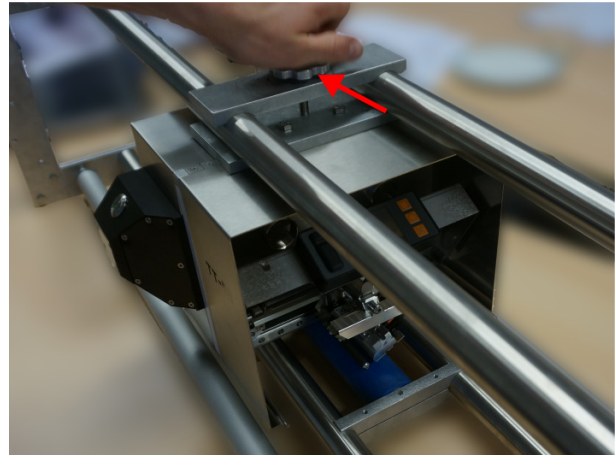
- 5. Mount** the two mounting plate bolts to the printer.
- Use key 8 to do this.



- 6. Slide** the printer through the opening from the side of the tubular frame.



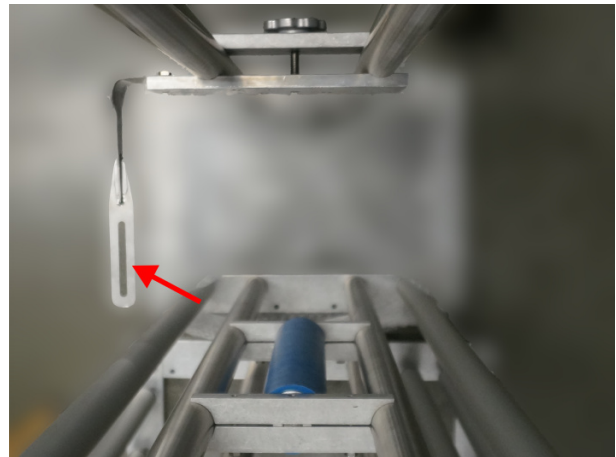
- 7. Position** the printer over the counter pressure roller.
- 8. Position** the mounting plate on the top side above the mounting plate on the printer.
- 9. Connect** the mounting plates together and tighten the bolt with turning knob to secure the printer.



- 10. Mount** the encoder in the designated position on the long side of the suspension block (to the left or right of the printer).



*It may happen that the counter pressure roller does not always run exactly synchronously with the substrate, in other words, measuring the roller alone will be unreliable. Therefore, make sure that the encoder wheel is always positioned on the substrate itself.*



- 11. Connect** the encoder cable to the connector on the connector block.





**12. Verify** that the printhead is aligned just a fraction before the middle of the top of the counter pressure roller.



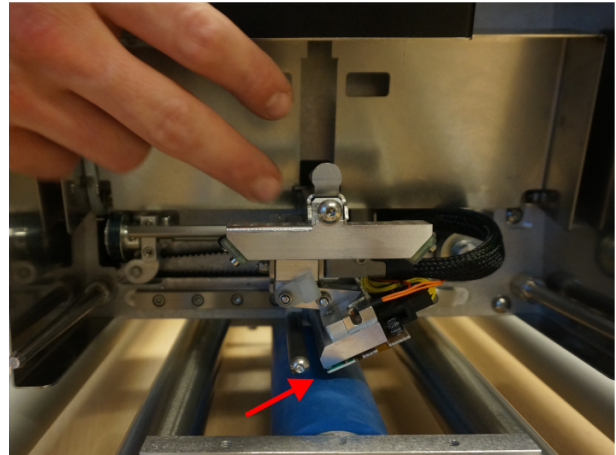
*The position of the print head can be adjusted in KCC (Settings -> Printer -> Print head position).*



*The TT-series will go through a start-up procedure after each cassette closure. Among other things, there will be checked at which distance the counter pressure roller or counter pressure plate is located by moving towards it until it touches it. The maximum range here is 6 mm. After contact, the print head will move back 2 mm to position itself at the ideal standby distance from the substrate to be printed. If the Kortho bracket is used in combination with the Kortho counter pressure modules, all parts will be positioned at the correct distance from each other.*



*Always make sure that the substrate is well supported across the entire width before and after the counter pressure material. The substrate must be passed horizontally under the printhead across the entire width. The Kortho TT-series bracket comes with four additional rollers that can be used for this purpose.*



## 5.4 Printhead adjustment

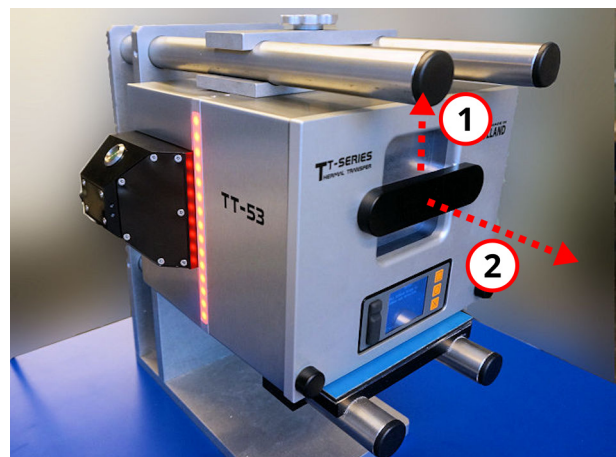
To adjust the printhead, it must first be made accessible. Perform the following operations to do so:

1. **Press** the **STOP** button to stop the TT-series.
  - The printhead moves to its 0-position.

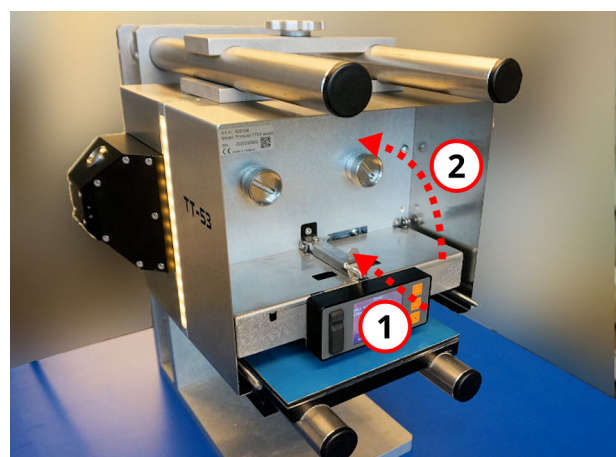


The back side of the cassette handle has a latch.

2. **Push** the lock up and **pull** the cassette towards you.
  - Check that the print ribbon does not get caught behind components.



3. **Press** the lock (1) of the printhead cover and **lift** (2) the printhead cover.

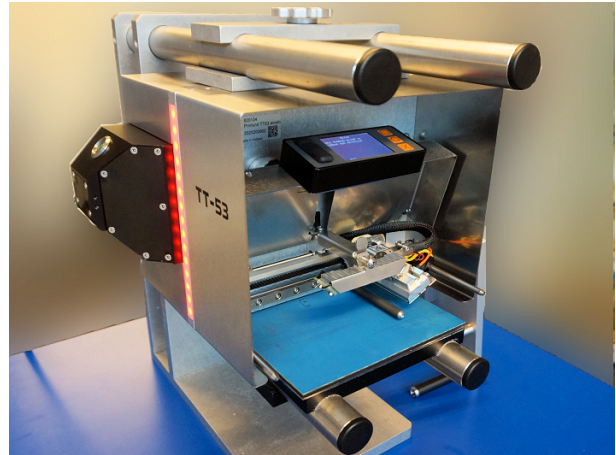


The printhead is now accessible for adjustment and maintenance work. There are four adjustment options:

1. The tilting resistance of the printhead.
2. The printing angle of the printhead.
3. Reversing the printhead.
4. Printhead software settings (KCC).



***The heating element near the printhead can reach temperatures of up to 45 °C.***



## 5.4.1 The tilting resistance of the printhead

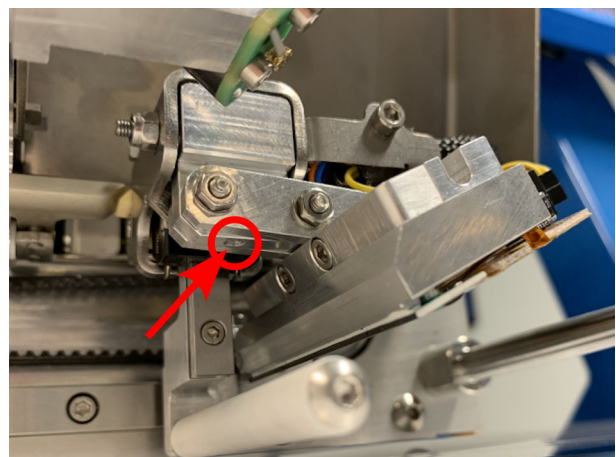
It is important that the printhead makes simultaneous contact across the entire width when it is pushed against the substrate. It may happen, however, that the substrate does not run parallel to the printhead. The printhead can tilt slightly to compensate for this. Upon first contact with the substrate the printhead will stay in position so it is parallel to the substrate. Ensuring this is a friction screw that can be turned to adjust the tilting resistance.



***It is important in this regard that the tilt resistance is set correctly. If it is too light, the printhead will not hold its position after each print stroke. If it is too heavy, the head will not be easy to move into position.***

To adjust the printhead pressure depth, perform the following operations:

- **Turn** the adjusting screw clockwise to increase the tilting resistance.
- **Turn** the adjusting screw counterclockwise to decrease the tilting resistance.

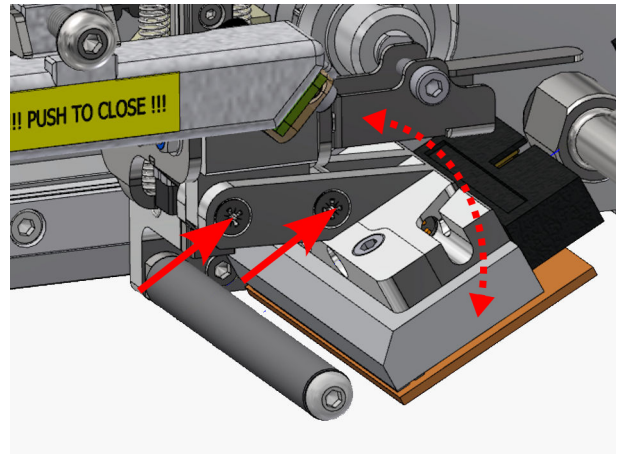


## 5.4.2 The printing angle of the printhead

The default angle at which the printhead touches the substrate is 28 degrees. The printhead is in this position by default. However, in some situations you may need to change the angle to create a better contact with the substrate across the entire width of the head.

To adjust the print angle of the printhead, perform the following operations:

1. **Loosen** the two bolts on the side of the printhead suspension.
2. **Adjust** the angle.
3. **Tighten** the two bolts again.





## 5.4.3 Reversing the printhead

Seen from the front, the substrate can be transported under the printhead from left to right (from now on right-handed) and from right to left (from now on left-handed) during the printing process. In Intermittent mode, the printhead for both left and right-handed use should be mounted with the cables to the right, seen from the front. The same position should also be used in continuous left-handed mode. This is why new printers will be delivered with the printhead in this position as standard. The printhead only needs to be reversed when printing in continuous right-handed mode.



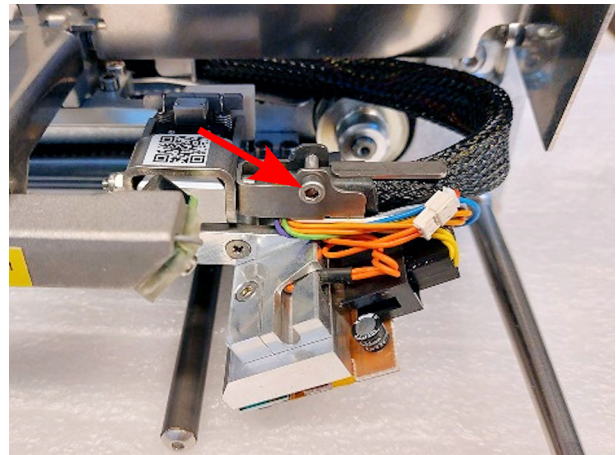
***Reversing the printhead may be necessary when the operating mode or production direction changes.***



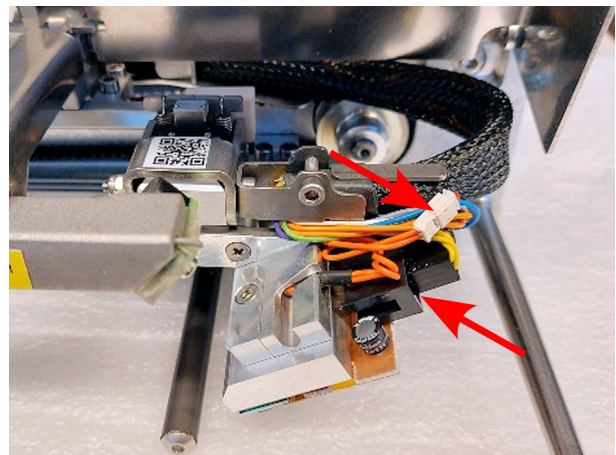
***The intermittent or continuous left or right mode can be selected in KCC. See the separate KCC software manual for details.***

Perform the following operations to reverse the printhead:

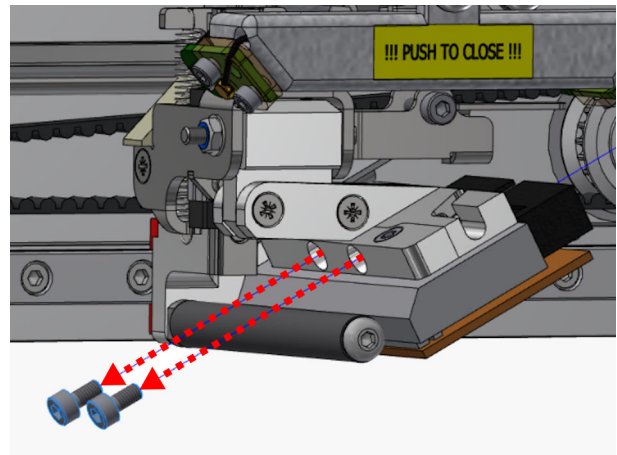
- 1. Loosen** the Allen screw a few turns.
  - The cable harness no longer needs to be clamped.



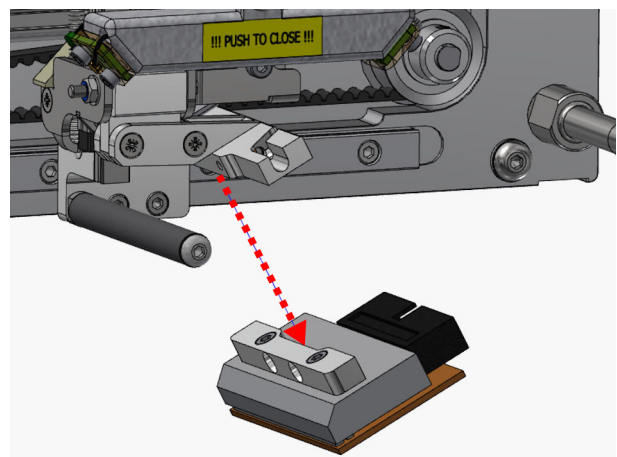
- 2. Disconnect** the cable harness from the print head.
  - Both the small white connector and the large black connector must be disconnected.



3. **Loosen** the two Allen screws that secure the print head.

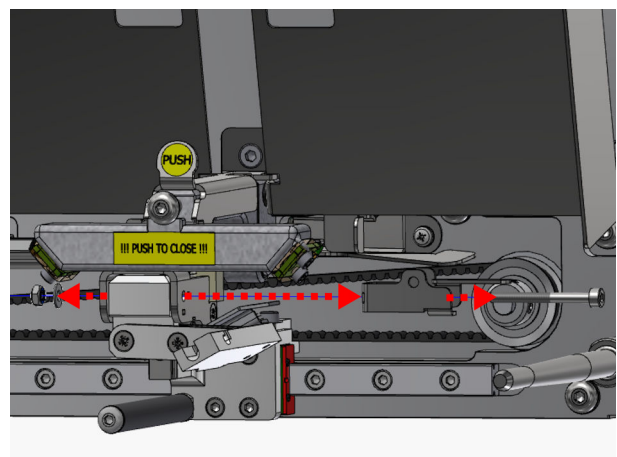


4. **Remove** the print head from the print head bracket.

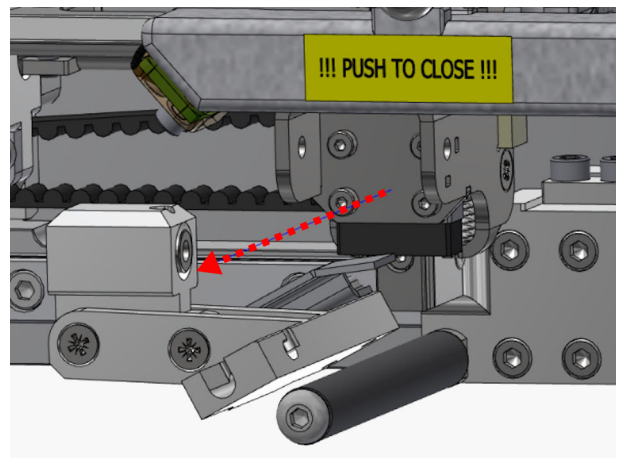


5. **Loosen** the Allen screw and nut that secures the print head bracket and cable clamp.

6. **Remove** the cable clamp.

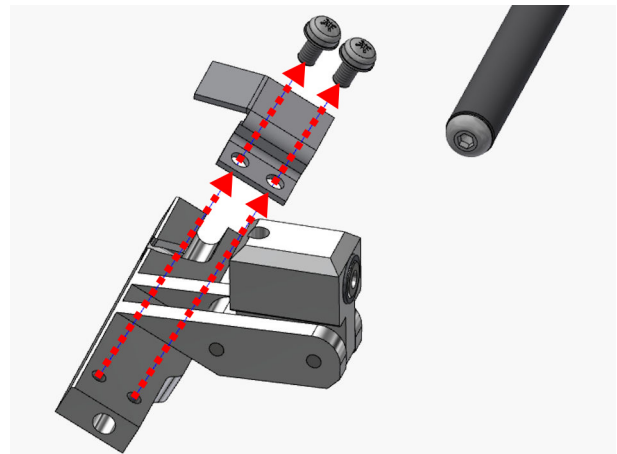


7. **Remove** the print head bracket.

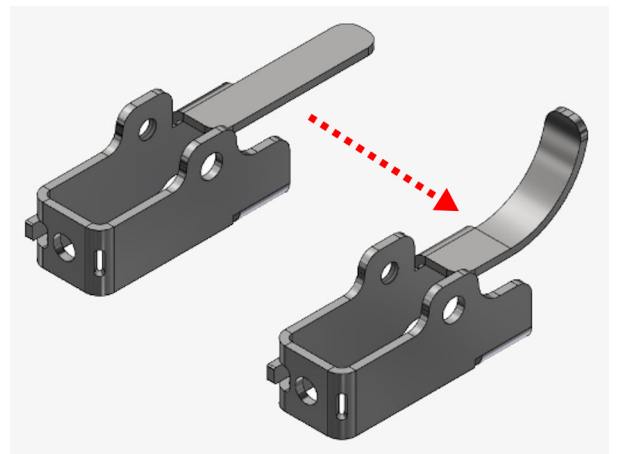


8. **Loosen** the two screws securing the cable clamp.

9. **Remove** the cable clamp.



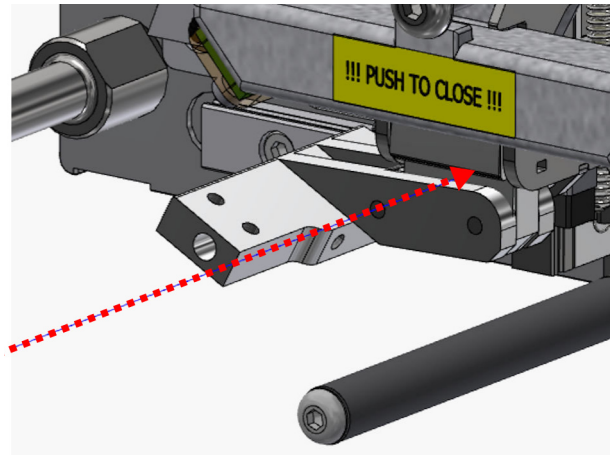
10. **Bend** the tab of the cable clamp around as shown in the figure on the right.



**11.** Place the print head bracket turned 180° back into the holder.



*Please note that the print head bracket is mounted rotated 180° (see figure on the right).*

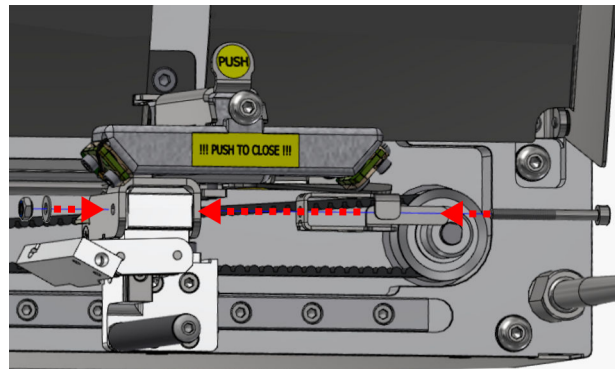


**12.** Place back the cable clamp.

**13.** Tighten the Allen screw and nut a few turns.



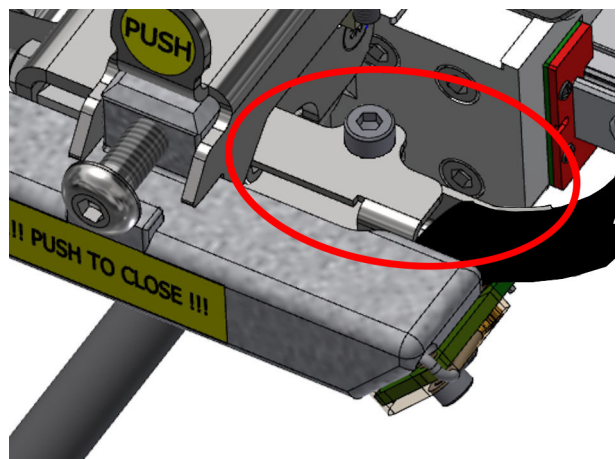
*Do not fully tighten the Allen screw. The cable clamp must still be able to rotate.*



**14.** Rotate the cable clamp to the position shown in the figure on the right.



*Do not clamp the cable harness yet!*

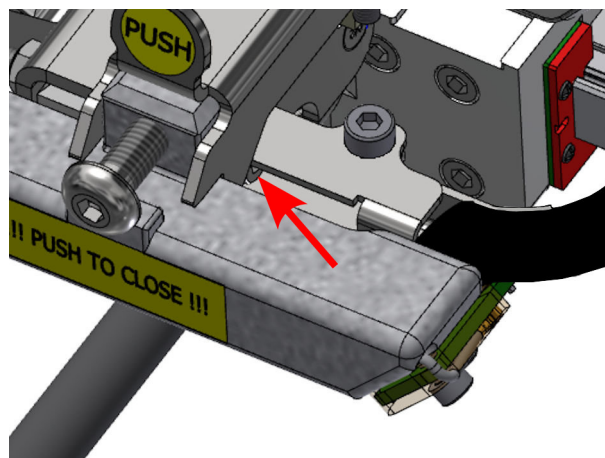




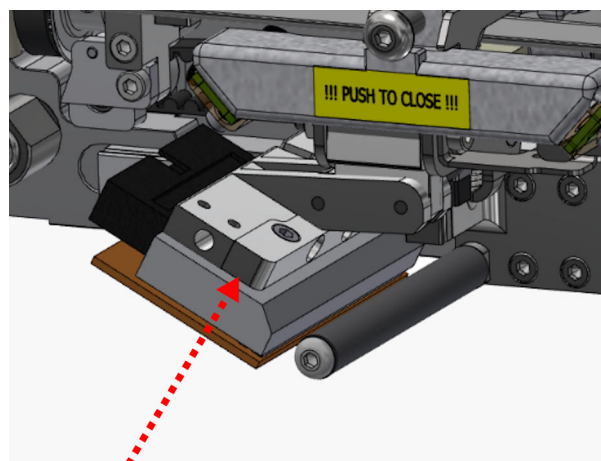
15. Tighten the Allen screw.



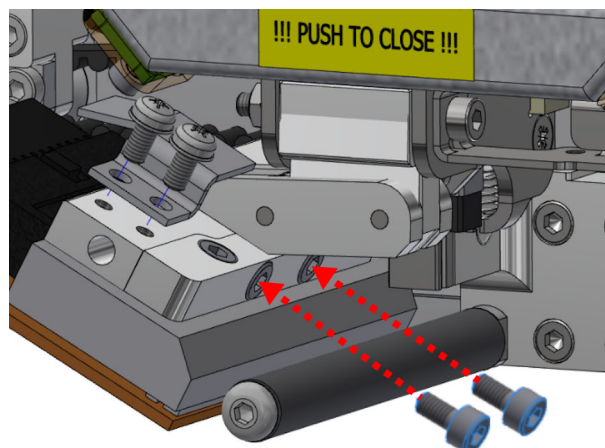
*Tighten the Allen screw such the print head bracket can still swivel when a little pressure is exerted on it. The print head bracket (with print head) needs to be able to set itself correctly on the counter pressure roller to obtain good quality prints.*



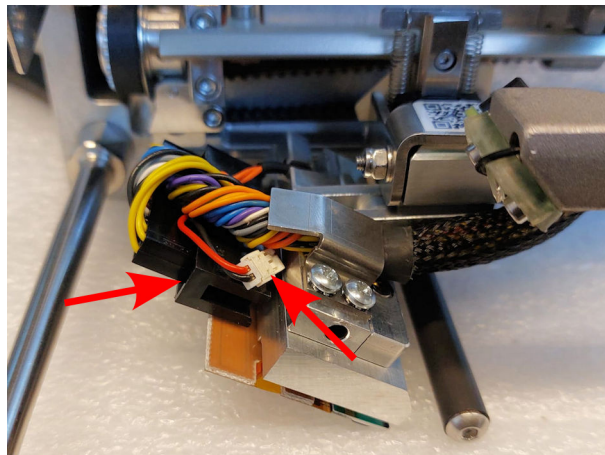
16. Place the print head on the print head bracket.



17. Tighten the two Allen screws.



- 18. Connect** the cable harness to the print head.
- Both the small white connector and the large black connector must be reconnected.

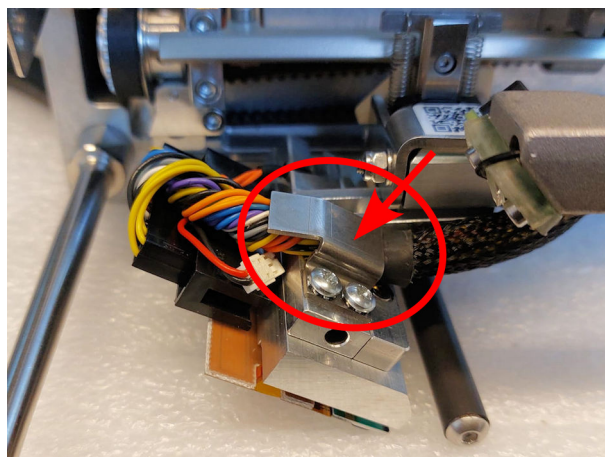


- 19. Place** the cable clamp over the cable harness.

- 20. Tighten** the two Allen screws.



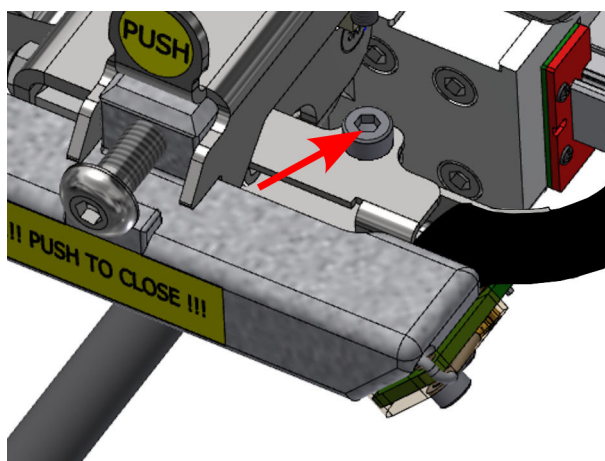
*Make sure the cable harness is positioned like shown in the figure on the right and now no wires are trapped between the printhead bracket and the holder.*



- 21. Tighten** the Allen screw.
- The cable harness must be clamped again.



*The printhead is now reversed and the TT-series is ready for production.*



## 5.4.4 Printhead software settings (KCC)

The contrast, pressure and preheating of the printhead are set in KCC.



*See Section 4.2.2.6 of the separate KCC software manual.*

## 6 Operation

### 6.1 Safety regulations

---



*The TT-series should only be operated by qualified personnel.*



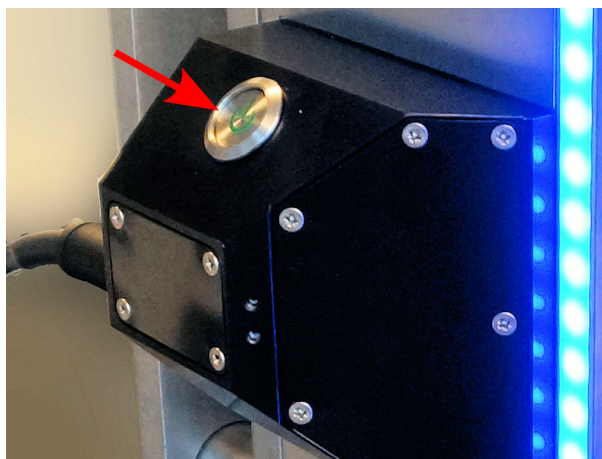
*Personnel must take all necessary measures to prevent injury to persons and/or damage to a production line.*

### 6.2 Switching on

---

To switch on the TT-series, perform the following operations:

- 1. Press** the ON/OFF button to switch on the TT-series.
  - The signal strip light up blue and the printer display starts up.
  - If it concerns the first connected printer, start the HMI with KCC.
  - Make sure the HMI is connected to the printer with KCC via Ethernet.



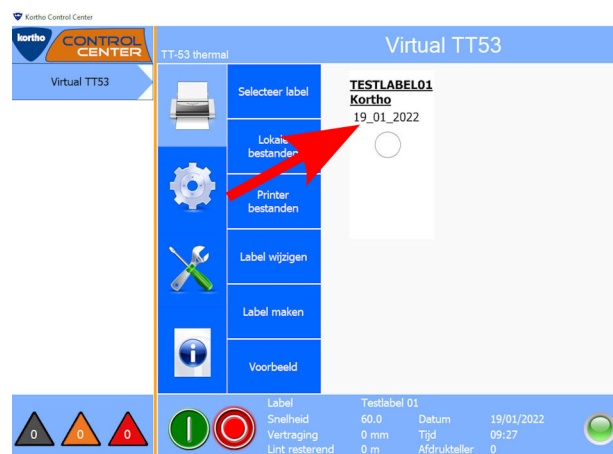
## 6.3 Start-up

To start the TT-series, perform the following actions in KCC:

1. **Select** the printer to be started/configured by pressing the corresponding Printer ID button.



2. **Select** the desired label to be printed.



3. **Set** the settings below correctly.
  - Foil type (ribbon type).
  - Motion (I printer or C printer).
  - Handed (left r right model in case of C printer).
  - Printhead position (in case of a C printer, print head on top of the counter pressure roller).
  - Substrate encoder direction (in case of a C printer, depends on on how the encoder is mounted).
4. **Set** the I/O signals (when in use) correctly.
  - Busy (output; system is printing, select high or low active).
  - Ribbon break (output; high or low active).
  - Inhibit (input; stops the printer if active; high or low active).
  - Trigger (input; not defined).
  - Print signal (input; high or low active).
  - Print missed, set as warning or error.
  - Encoder timeout, set as warning or error.
  - Speed too high, set as warning or error.
  - Speed too low, set as warning or error.
  - General error (output; high or low active).

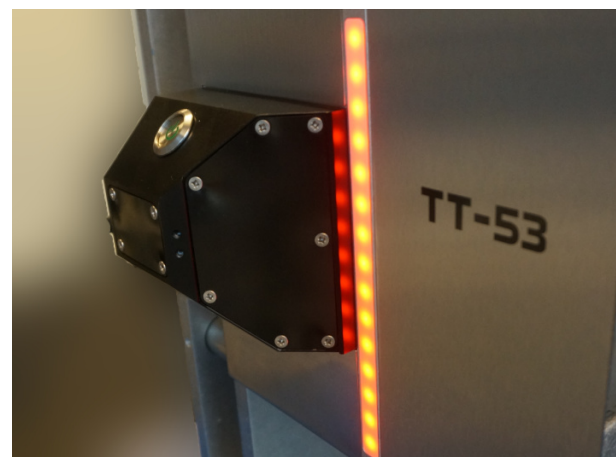
5. Press the START button to start the TT-series.
  - The printer is now activated and will wait for a signal from the production line to start printing.



## 6.4 Changing the print ribbon

During production, the roll of ribbon in the printer will run out. In KCC, you can enter at which remaining ribbon length the "low ribbon" output will become active (only when the output is enabled in the signal settings menu). When running out of ribbon the printer indicates this as follows:

- Both KCC and the printer itself will indicate that the ribbon is running low, or even finished. The "low ribbon" notification is a "warning". With these notifications, the printer requires attention, but will continue printing. The "ribbon finished" notification is an "error". With these notifications, the printer cannot continue printing and will require immediate attention.
- The printer will show the notification in the status display in combination with a colour change of the signal strip and the background colour of the display. In KCC the printer ID button on the left will change color (orange for warning, red for error). The message will also appear in the error list.



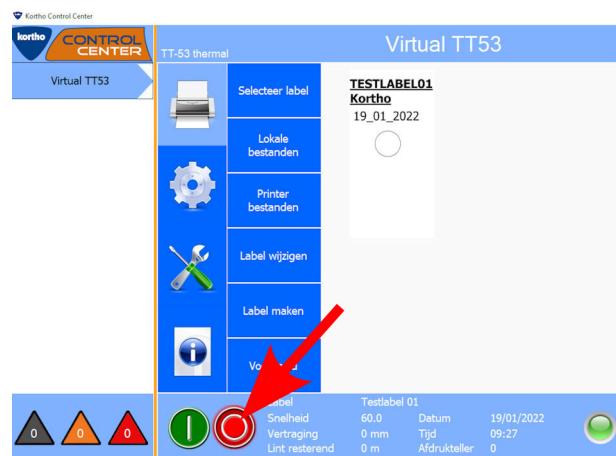


Perform the following operations to change the TT-series print ribbon:

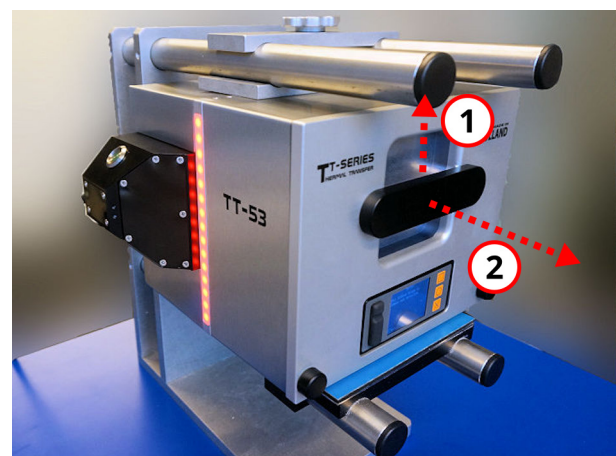
1. **Select** the printer for which the ribbon needs to be replaced by pressing the corresponding Printer ID button.
  - If the printer has not yet been given a name, the IP address of the printer will be displayed here.



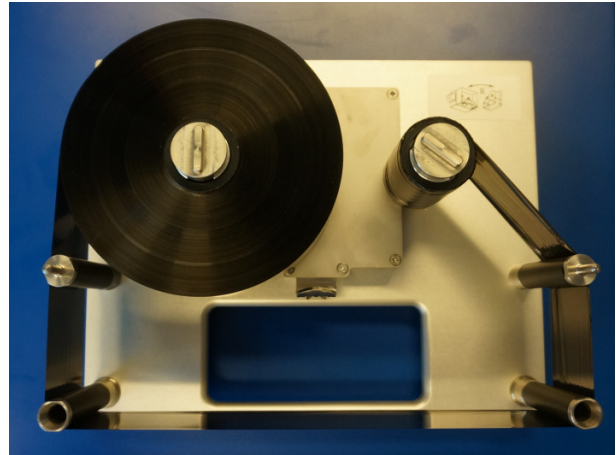
2. **Press the STOP** button to stop the TT-series.
  - The printhead moves to its 0-position.



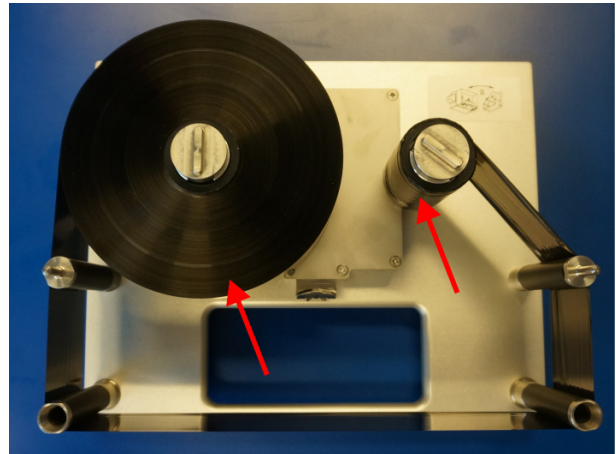
3. **Push** the lock (1) up and **pull** the cassette (2) towards you.
  - The latch is located at the back side of the cassette handle.
  - Check that the print ribbon does not get caught.



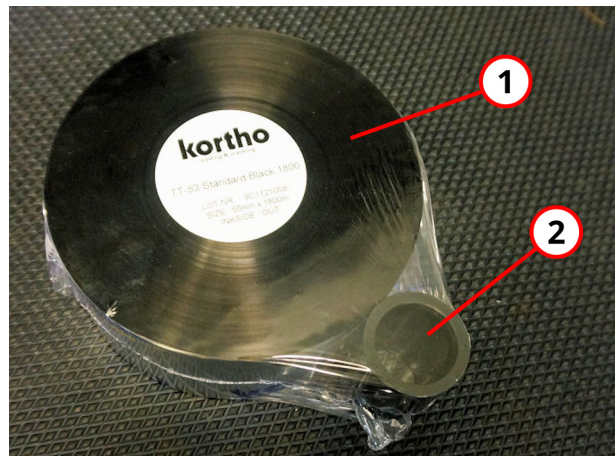
4. **Place** the cassette with its spine on a table.



5. **Remove** both rollers.

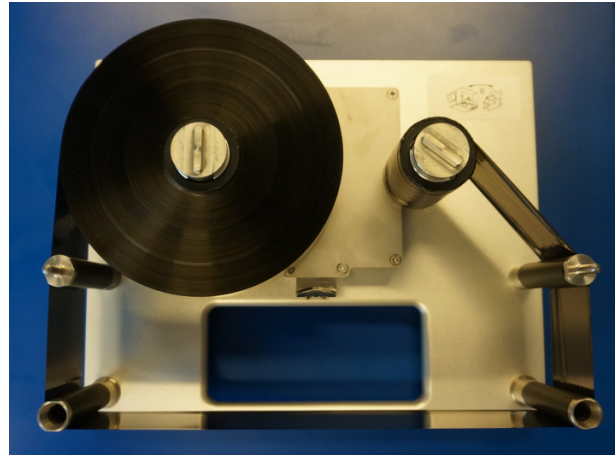


6. **Position** a new roller (1) and a winding roller (2) on the ribbon axle.  
- Depending on the operating mode, a new roller must be placed on the left or right ribbon axle. More information can be found at the bottom of this section.



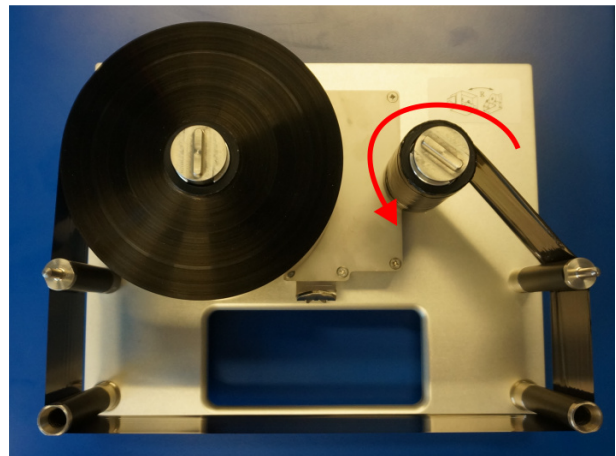
**7. Wrap** the print ribbon around the guide rollers.

- The axles are locked to prevent the ribbon from unwinding before it is inserted into the printer. Press the metal top with the elongated coupling of the axle to unlock and be able to turn it manually.



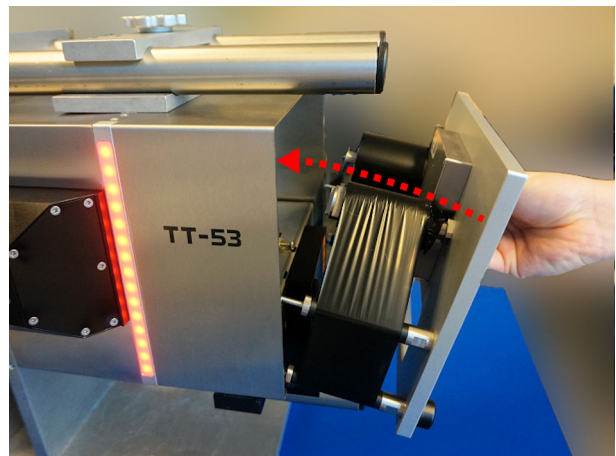
**8. Wrap** the print ribbon around the winding roller with one turn and turn the ribbon axle half a turn so that it is secured around the roller.

- Turn both rollers slightly so that the underside becomes smooth and the print ribbon is somewhat tensioned.



**9. Put** the cassette back in the TT-series.

- Use the guide pins to this end.
- Push the cassette against the printer housing so that the safety switch in the pin hole is turned off. A clear "click" is heard when the cassette is properly inserted.



*The drive clutch will rotate for approximately 20 seconds to engage the print ribbon suspension in the cassette. This also ensures that the print ribbon is tensioned mechanically. In addition, the initialisation of the ribbon rollers (diameter determination) and printhead is also performed again at the same time. The TT-series signal strip shows a red colour during this process.*



**Roller placement**

The print ribbon of the TT-series has been replaced and the TT-series can be restarted. See below for a schematic representation for placing a full roller in relation to the operating mode:

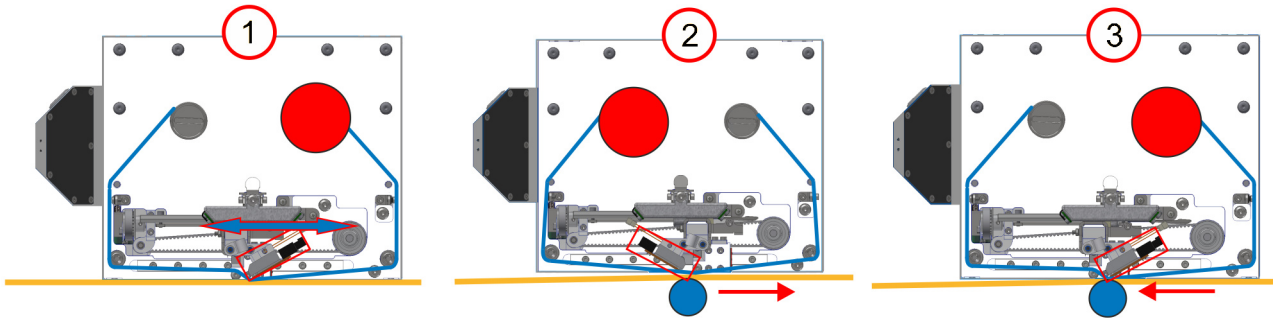


Figure 6-1: Positioning a full roller in relation to the operating mode

| No. | Operating mode                      | New roller placement        |
|-----|-------------------------------------|-----------------------------|
| 1   | Intermittent left and right handed. | Left axle of the cassette.  |
| 2   | Continuous right-handed.            | Right axle of the cassette. |
| 3   | Continuous left-handed.             | Left axle of the cassette.  |



*The illustration shows the printer seen from the front. In other words, the rollers are placed in mirror image in the cassette. The roller placement table above is based on a cassette which is placed flat on a surface with the axles upwards and with the ribbon trajectory pointing downwards.*



*Depending on the operating mode and production direction, the printhead will also have to be reversed. See §5.3.2 for how to reverse the printhead.*



*The inside of the cassette has two labels that show the course of the print ribbon. See the image below.*



Figure 6-2: Label inside cassette

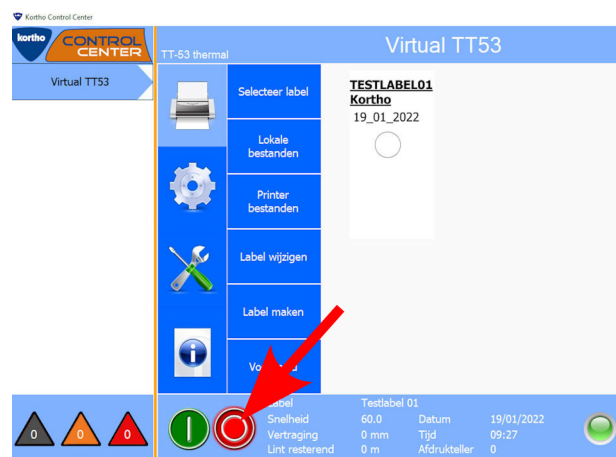
## 6.5 Stopping

Perform the following actions to stop the TT-series:

1. **Select** the printer to be stopped by pressing the corresponding Printer ID button.



2. **Press** the STOP button to stop the TT-series.
  - The printhead moves to its 0-position.



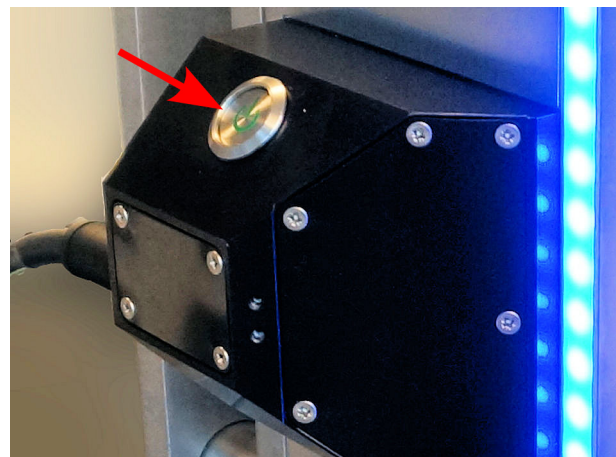
## 6.6 Switching off

To switch off the TT-series, perform the following operations:

1. **Press** the ON/OFF button to switch off the TT-series.



***Always first stop the TT-series with the STOP button so the print head is at its 0-position before switching the TT-series off.***



# 7 Maintenance

## 7.1 Safety regulations

---

Carry out the following safety steps before starting any maintenance work:



***Maintenance and inspection must be carried out by qualified staff.***



***Make sure the TT-series is completely turned off and de-energised before performing any maintenance on the machine.***



***Always replace damaged parts with original parts. See Appendix 4 for Spare parts.***



***Completely stop the production line on which the TT-series is mounted before performing any maintenance work on the TT-series.***



***Modifications to the TT-series may only be made with the express written permission of BV Korthofah.***



***The TT-series is connected via an external power supply. BV Korthofah recommends using this external power supply. See Appendix 5 for safety instructions when using this external power supply.***

## 7.2 Service sheet



**Periodic inspection is required to ensure optimal operation of the TT-series. The frequency of these inspections depends on the operating conditions. The intervals are based on normal use of the TT-series. In the case of extreme operating conditions, the interval may be adjusted at your discretion.**

An overview of the inspection and maintenance work is given in the table below:

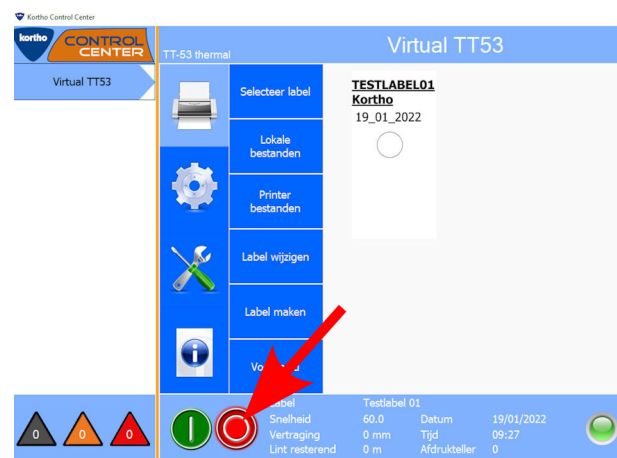
| Maintenance manual   | Frequency |
|--|-----------|
| Check the amount of print ribbon.  | Daily     |
| Check the printhead for contamination and dust.  | Daily     |
| Clean all parts that have come into contact with the print ribbon with surface cleaner or IPA. Use a clean, soft cloth or cleaning swab. Among others, the following parts must be cleaned: <ul style="list-style-type: none"> <li>• Peel-off roller bar (near the printhead).</li> <li>• The printhead on the side that touches the substrate.</li> <li>• Foil guides on the cassette.</li> </ul> | Weekly    |
| Check the mounting of the printer. It should not be moving across the frame.   | Annually  |
| Check the housing for dents. Particularly at the back where the logic board (a printed circuit board) is located.  | Annually  |
| Check the timing belts for wear. <ul style="list-style-type: none"> <li>• Printhead carriage belt (1x).</li> <li>• Printhead up and down belt (1x).</li> <li>• Timing belt near the foil motors (2x).</li> </ul>   | Annually  |
| Check the printhead cable for wear. <ul style="list-style-type: none"> <li>• Is it attached correctly?</li> <li>• Is it still able to move freely?</li> <li>• Is the shielding still of good quality?</li> </ul>   | Annually  |
| Check the counter pressure plate. <ul style="list-style-type: none"> <li>• Clean the counter pressure plate with surface cleaner or IPA if it is soiled.</li> <li>• Replace the counter pressure plate if scratches or dents are visible. See Appendix 4, Spare Parts.</li> </ul>  | Annually  |

| Maintenance manual   | Frequency |
|--|-----------|
| Check the operation of the printhead.<br>1. Check that the correct counterpressure plate has been applied.<br>2. Set the density and pressure as low as possible.<br>3. Make a test print of a completely black area and check if any areas have not been covered. | Annually  |
| Check that the foil guides on the cassette are straight.   | Annually  |
| Make sure the foil guide pins in the printer are straight.   | Annually  |
| Check the transmission from the motor axle to the cassette axle for wear.  | Annually  |
| Check the cables connected to the connector block for proper assembly and any wear.  | Annually  |

## 7.3 Replacing the printhead

The printhead will need to be replaced after -x- hours. Perform the following operations to replace the printhead:

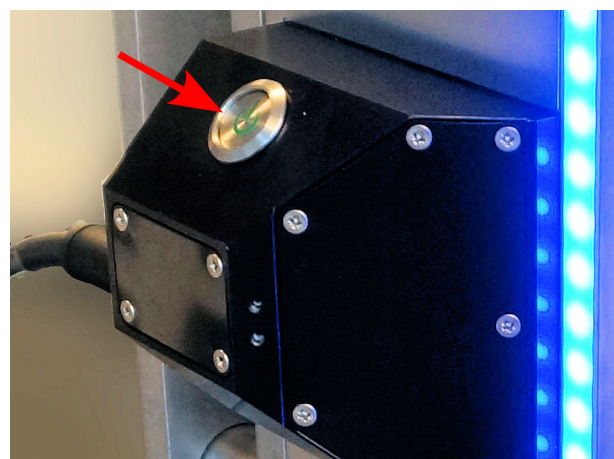
1. **Press** the **STOP** button to stop the TT-series.
  - The printhead moves to its 0-position.



2. **Press** the **ON/OFF** button to switch off the TT-series.

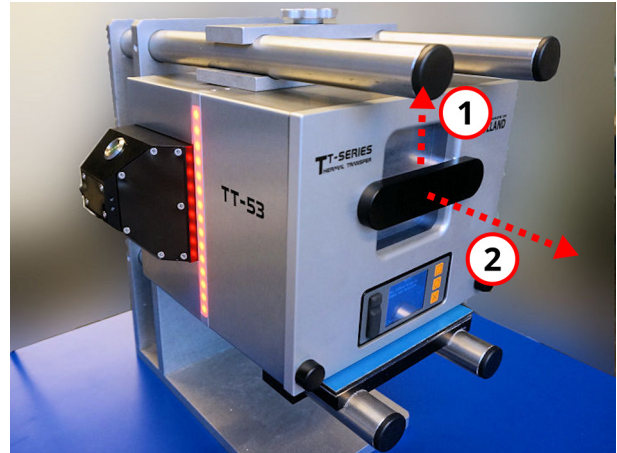


***Always first stop the TT-series with the STOP button so the print head is at its 0-position before switching the TT-series off.***

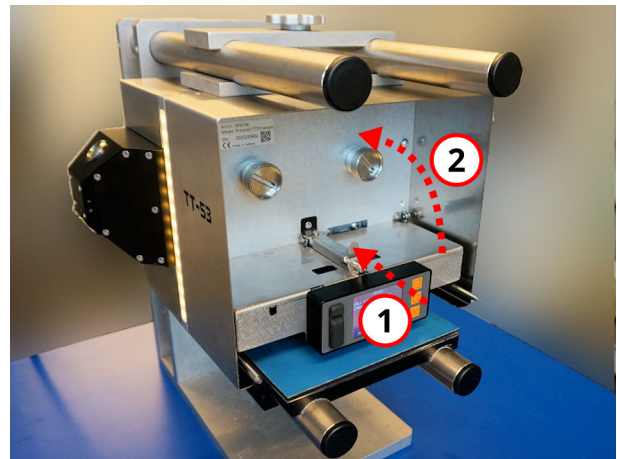




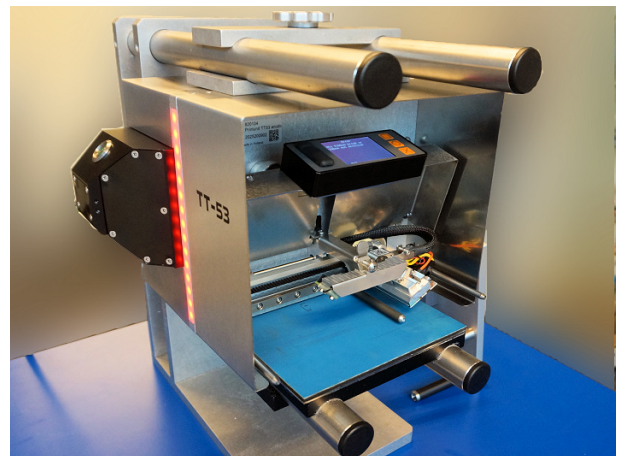
- 3. Push** the lock (1) up and **pull** the cassette (2) towards you.
- The latch is located at the back side of the cassette handle.
  - Check that the print ribbon does not get caught.



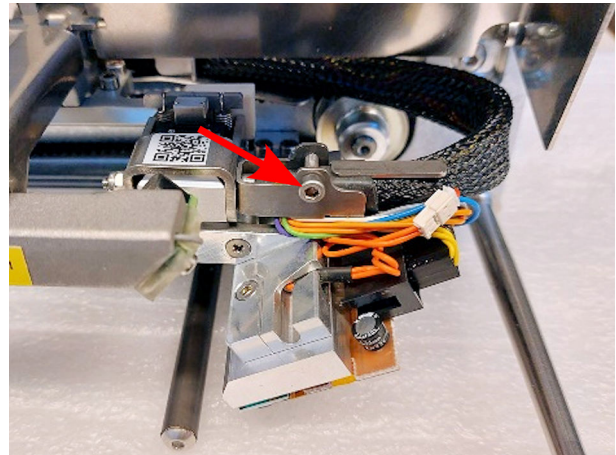
- 4. Press** the lock (1) of the printhead cover and **lift** the printhead cover (2).



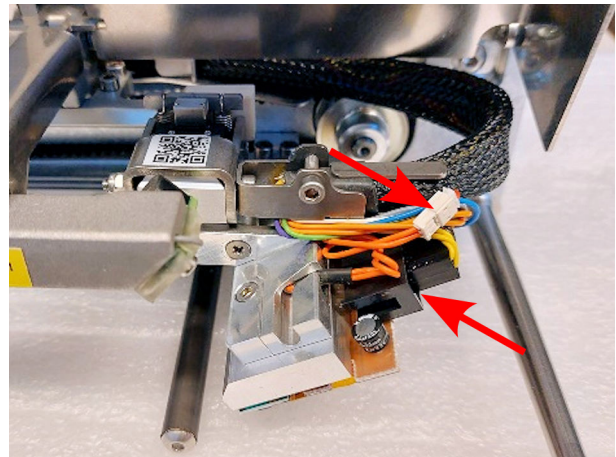
- The printhead is now accessible for adjustment and maintenance work.



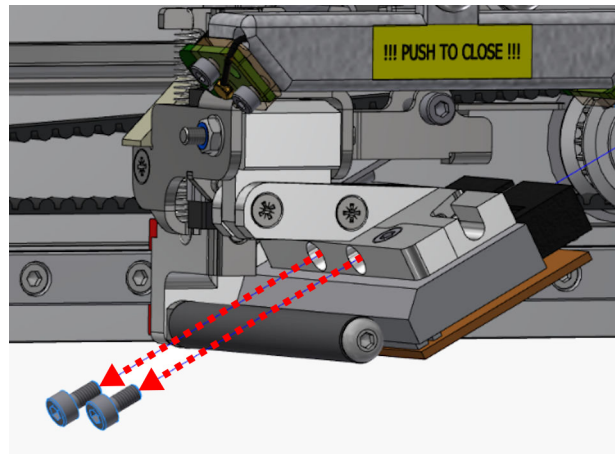
5. **Loosen** the Allen screw a few turns.
- The cable harness no longer needs to be clamped.



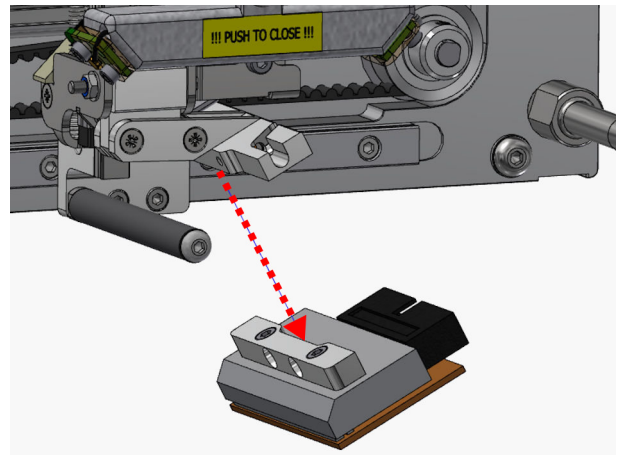
6. **Disconnect** the cable harness from the print head.
- Both the small white connector and the large black connector must be disconnected.



7. **Loosen** the two Allen screws that secure the print head.

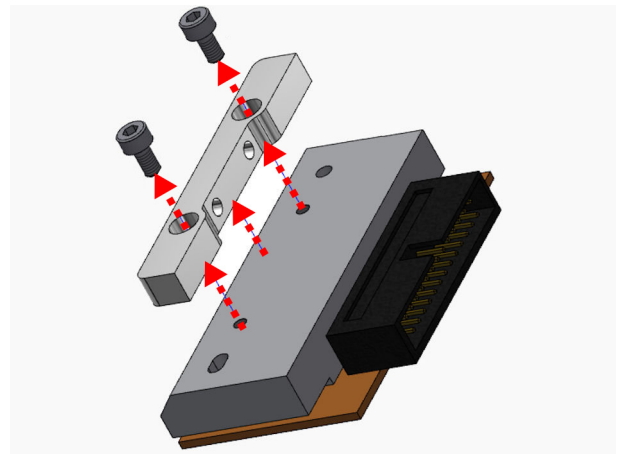


**8. Remove** the print head from the print head bracket.



**9. Loosen** the two Allen screws that secure the mounting bracket on the print head.

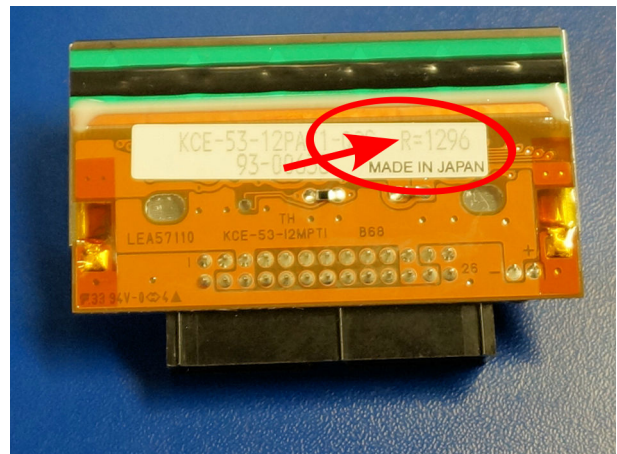
**10. Remove** the mounting bracket from the print head.



**11. Take** a new printhead and **write** down the resistance value on a piece of paper.



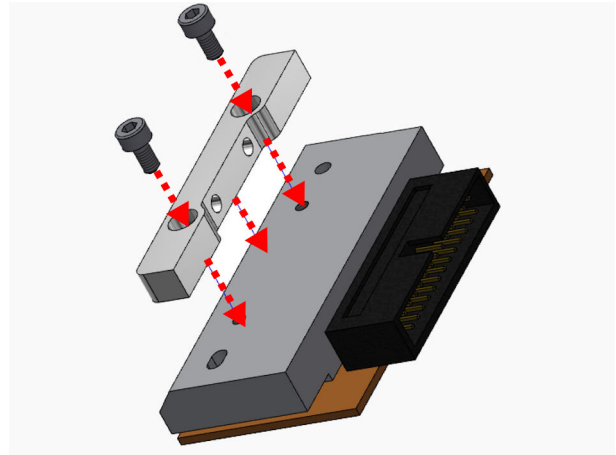
***Each print head has its own resistance value which must be entered in KCC. This is done at the end of the procedure.***



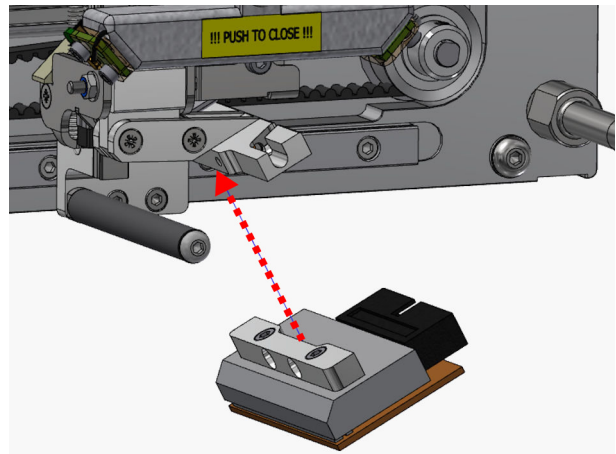


**12.**Place the mounting bracket on the print head.

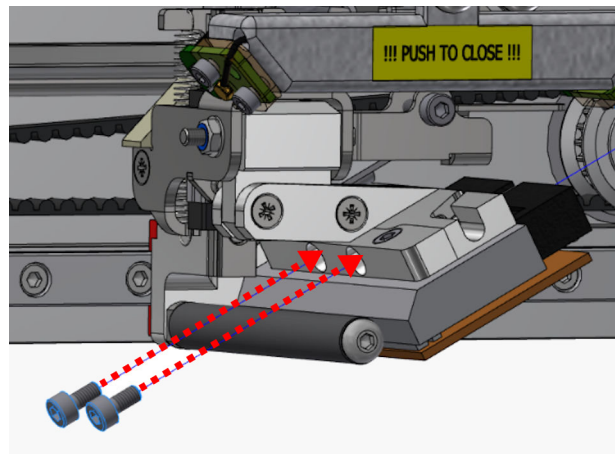
**13.**Fasten the two Allen screws.



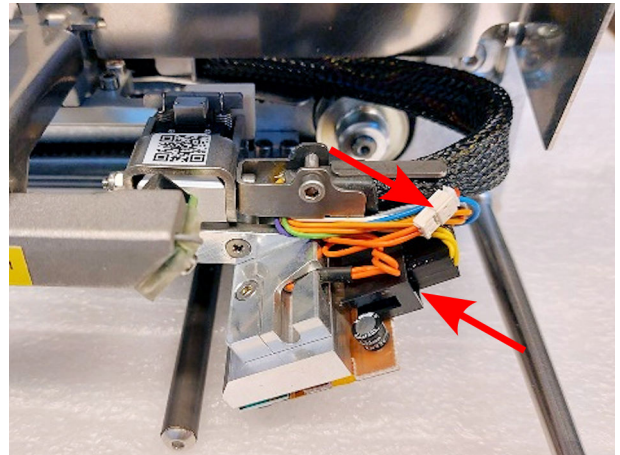
**14.**Place the print head on the print head bracket.



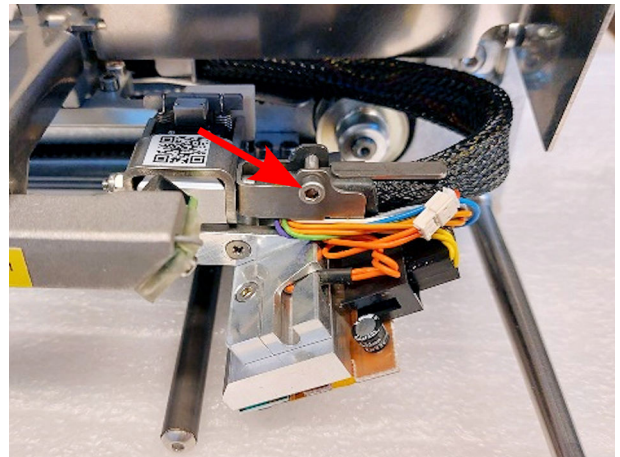
**15.**Tighten the two Allen screws.



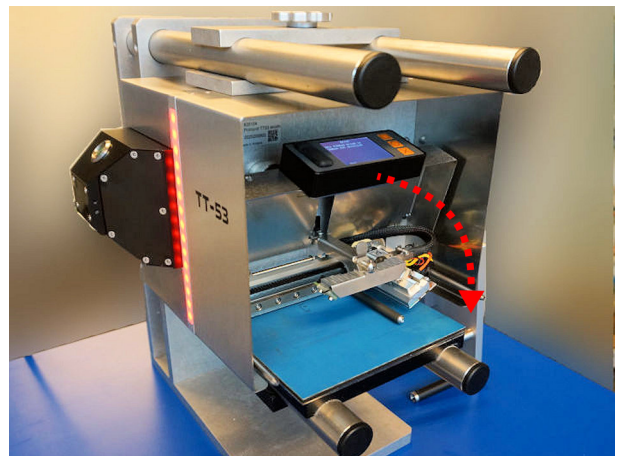
- 16. Connect** the cable harness to the print head.
- Both the small white connector and the large black connector must be reconnected.



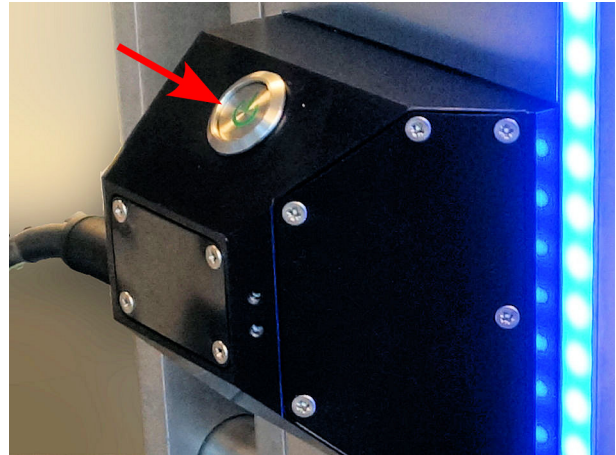
- 17. Tighten** the Allen screw.
- The cable harness must be clamped again.



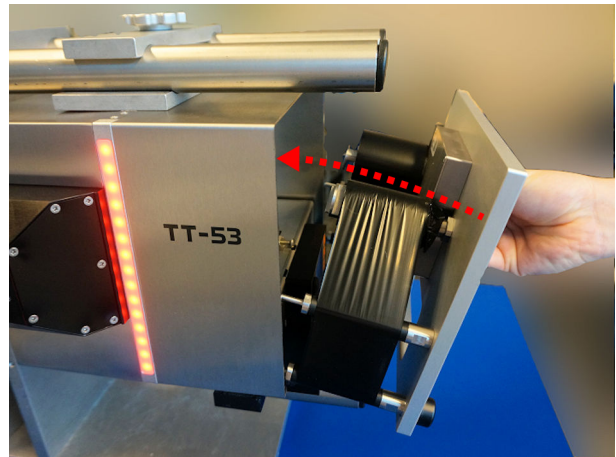
- 18. Close** the printhead cover.



**19. Turn on** the printer so that the printhead moves back to the 0-position.



**20. Put** the cassette back.



**21. Enter** the resistance value of the print head in KCC.

- KCC menu: Settings -> Printer -> P.H. Resistance.



*Each print head has its own resistance value. It is very important to enter the correct value in KCC to obtain good quality prints and to make sure the print head will last as long as possible.*



*The printhead is now replaced and the TT-series is ready for production again.*

# 8 Connection interfaces

## 8.1 Overview interfaces

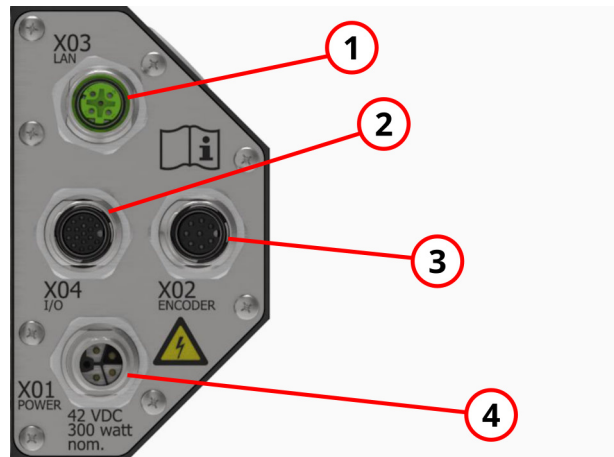
On the side of the TT-series a so called connector block mounted. On this block are four M12 connectors which are used these to guarantee a secured and fluid proof connection to any peripheral equipment and the power supply.



***Because the connectors are waterproof, they are a bit more difficult to put together and take apart. Ensure that the connectors are properly tightened for a reliable connection.***

The connector block contains the following interfaces:

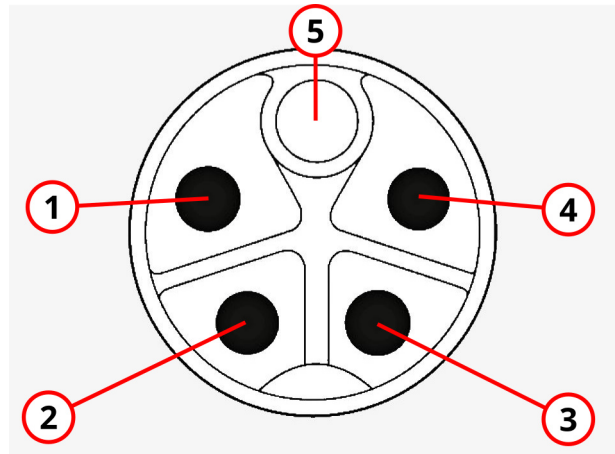
1. X03 - LAN.
2. X04 - I/O.
3. X02 - Encoder (only C printer).
4. X01 - Power.



## 8.2 Interface X01 - Power

The cable from the external power supply is connected to this connector. This is an M12 K coded 5-pin male connector with the following pin assignment:

1. 0 VDC.
2. 42 VDC.
3. Remote ON/OFF plus.
4. Remote ON/OFF return.
5. Safety PE.



The external power supply (supplied by Kortho) is switched on by pressing the ON/OFF button on the TT-series. Pins 3 and 4 are shorted (power supply on) or broken (power supply off).



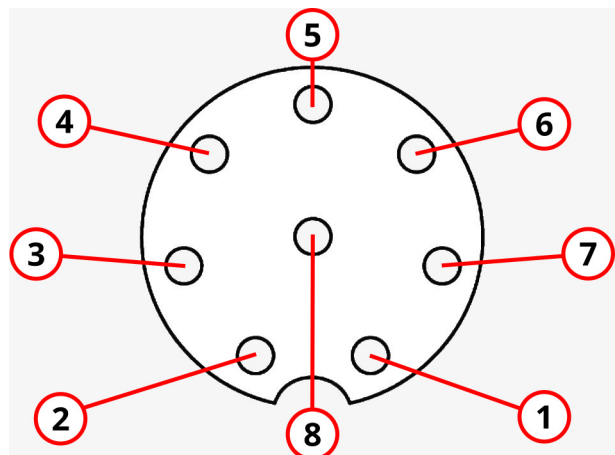
**See annex 5 for more information about the external power supply.**

## 8.3 Interface X02 - Encoder

An encoder is connected to this connector. An encoder passes speed information to the TT-series. This encoder is only necessary if the TT-series is set up as a continuous printer and is used to measure the speed of the substrate so that the print is printed in the right place and with the correct dimensions.

This is an M12 A coded 8-pin female connector with the following pin assignment:

1. GND.
2. 24 VDC.
3. Substrate encoder kanaal A+.
4. Substrate encoder kanaal A-.
5. Substrate encoder kanaal B+.
6. Substrate encoder kanaal B-.
7. Not used.
8. Not used.





The TT-series uses an encoder that has the following characteristics:

| Item                      | Waarde  |
|---------------------------|---|
| Resolution:               | 7200 PPR (The TT-series uses it in quadrature. Which means 28800 edges per rotation.) |
| Measuring wheel diameter: | 47,75mm   |
| Input voltage:            | 24 VDC  |
| Input current:            | 100 mA max (65 mA typical) with no output load  |
| Output type:              | Line Driver (RS422)   |

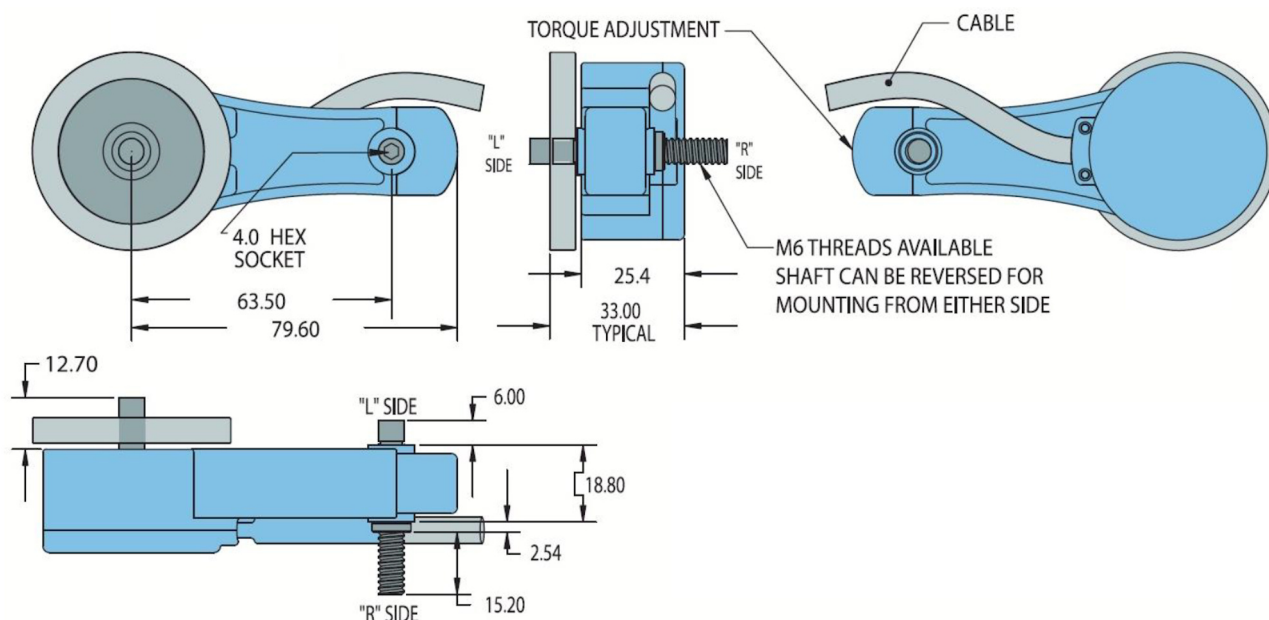


Figure 8-1: Encoder



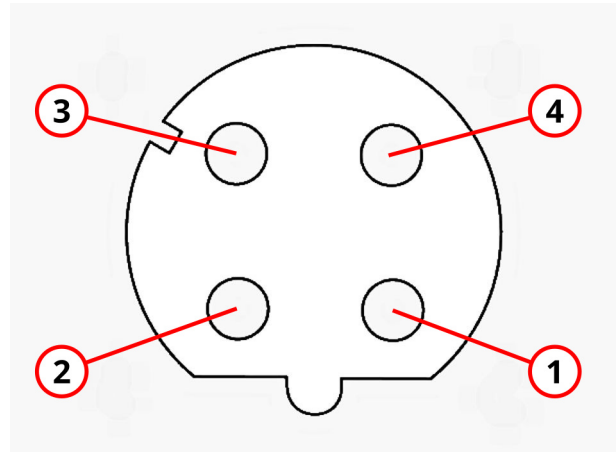
## 8.4 Interface X03 - LAN

The LAN cable is connected to this connector. This is an M12 D coded 4-pin female connector with the following pin assignment:

1. ETH\_TX+ (yellow).
2. ETH\_TX- (orange).
3. ETH\_RX+ (white).
4. ETH\_RX- (blue).



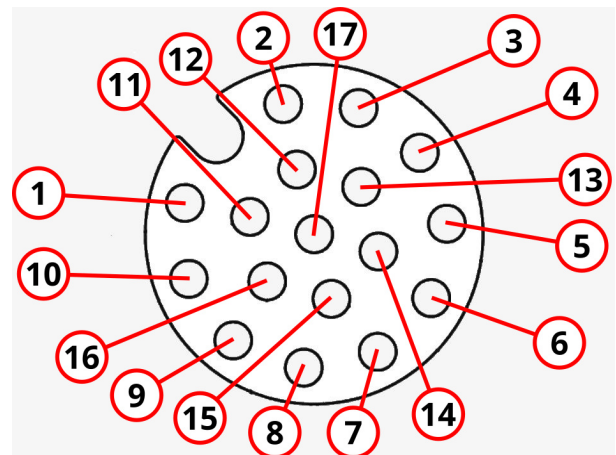
**Always use shielded LAN cables kables. Kortho can supply LAN cables (length 5 m) from stock (art. no. 170841).**



## 8.5 Interface X04 - I/O

This is a M12 A coded 17-pin female connector with the following pin assignment:

1. Print A (input).
2. Busy B (output).
3. Print B (input).
4. Trigger A (input).
5. Inhabit A (input).
6. Trigger B (input).
7. Ribbon out A (output).
8. Inhabit B (input).
9. Busy B (output).
10. Ribbon out B (output).
11. Ready A (output).
12. Ready B (output).
13. ?.General Error A (output).
14. ?.General Error B (output).
15. 24 V (power).
16. Chassis GND (passive).
17. GND (power).



### 8.5.1 Functions

---

**Print request (input)** - Select the rising edge or falling edge of the product detection sensor. This setting depends on which type of sensor is used and how it is set.

Usually, the sensor/ host is set in a way that the print will be made on the rising edge. Default setting is high (rising edge).

**Inhibit (input)** - If this input is made active, the printer will no longer print. If this input becomes active during a print cycle, the print is completed first. This function can be used to remotely stop or continue the printer.

**General Error (output)** - If this output becomes active, the printer has entered a situation where it can no longer print. The operator must resolve the problem to resume the printing process. An error could be caused by the ribbon being broken or used up or a print being skipped etc.

Connect this output to an alarm signal (lamp) or to the host machine. In the latter case, the machine can stop automatically if this is supported. The output can be set active high or low.

**Busy (output)** - This output is active when the printer is making a print and there is therefore contact with the substrate. In the case of an intermittent execution, the host machine is not allowed to transport any substrate. In the case of a continuous printer, transport can always continue and the signal can be used for other purposes. This output can be set as high or low active..

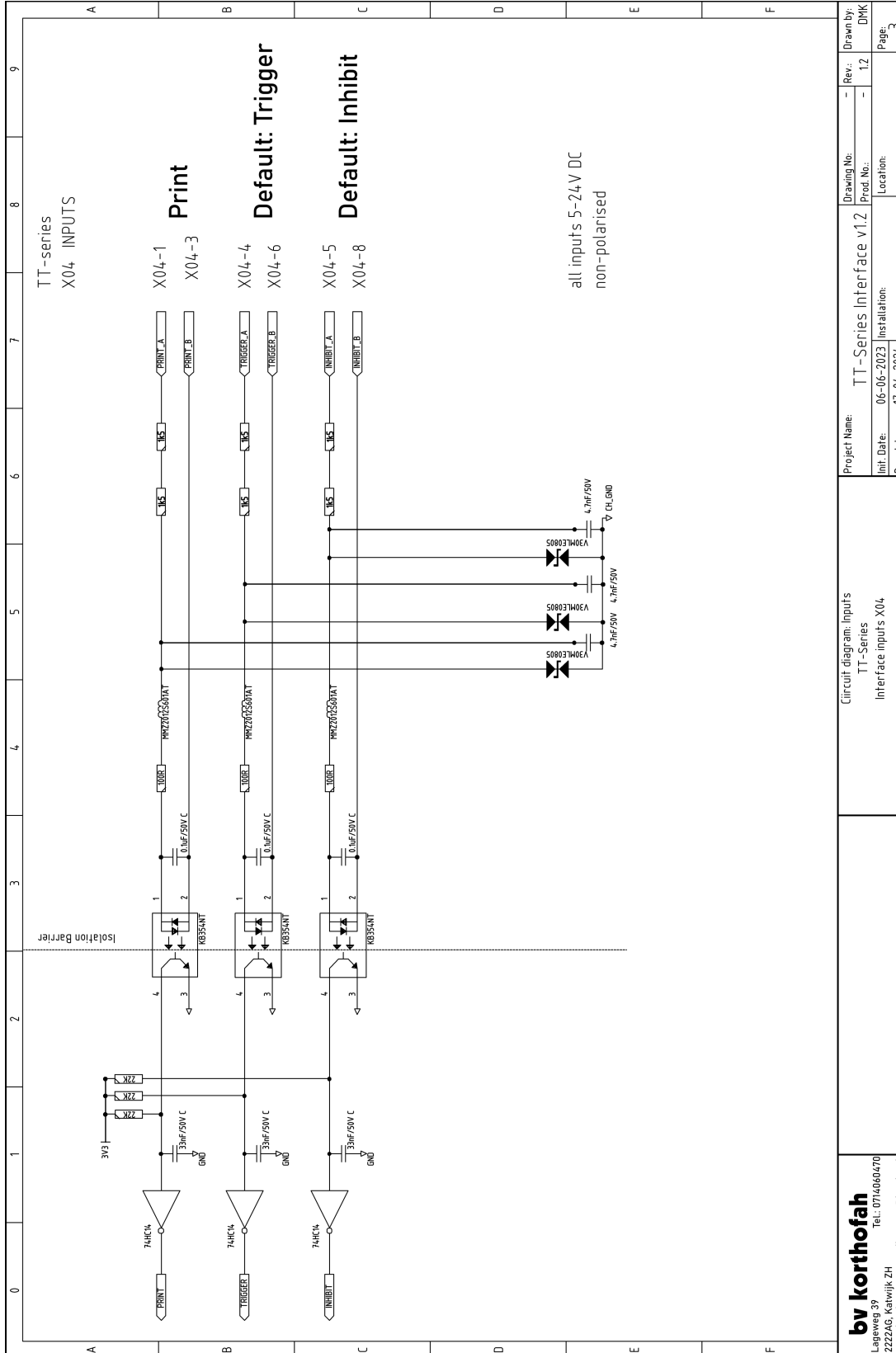
**Ribbon out / broken (output)** - This output becomes active if the printer detects that the ribbon is not being transported correctly. This could be because the ribbon has run out or is broken. If this happens, the general error output is also activated so that the system stops and it is immediately clear, by using this output, that the ribbon is empty or broken. This output can be set actively low or high.

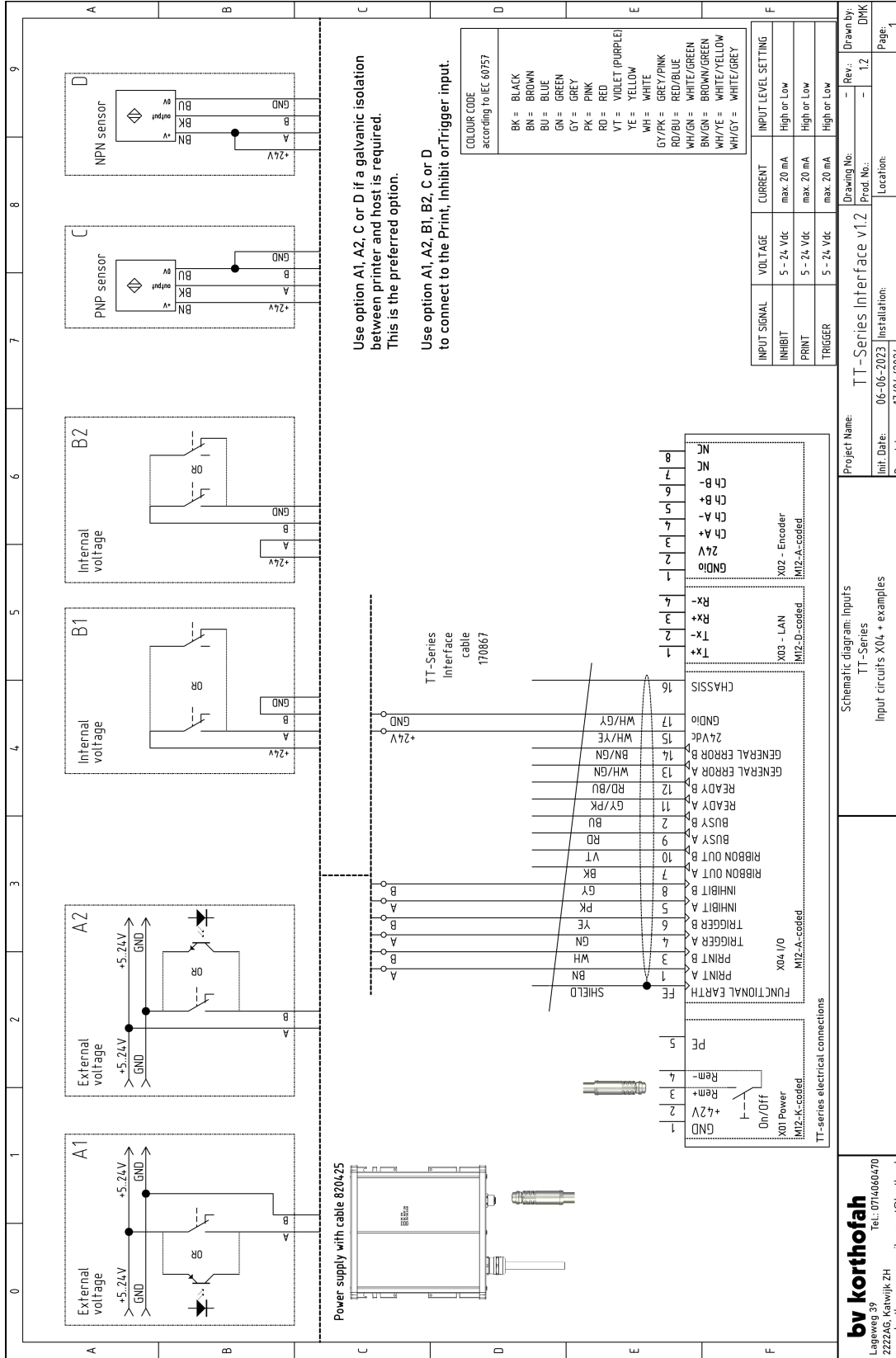
**Ready (output)** - When the printer is put into START mode, it waits for a print signal to print. The ready output indicates when the printer is ready to print. These are the conditions under which ready becomes active:

- The printer must be on.
- The printer must be in standby mode (press the START button).
- No general alarm must be inactive.

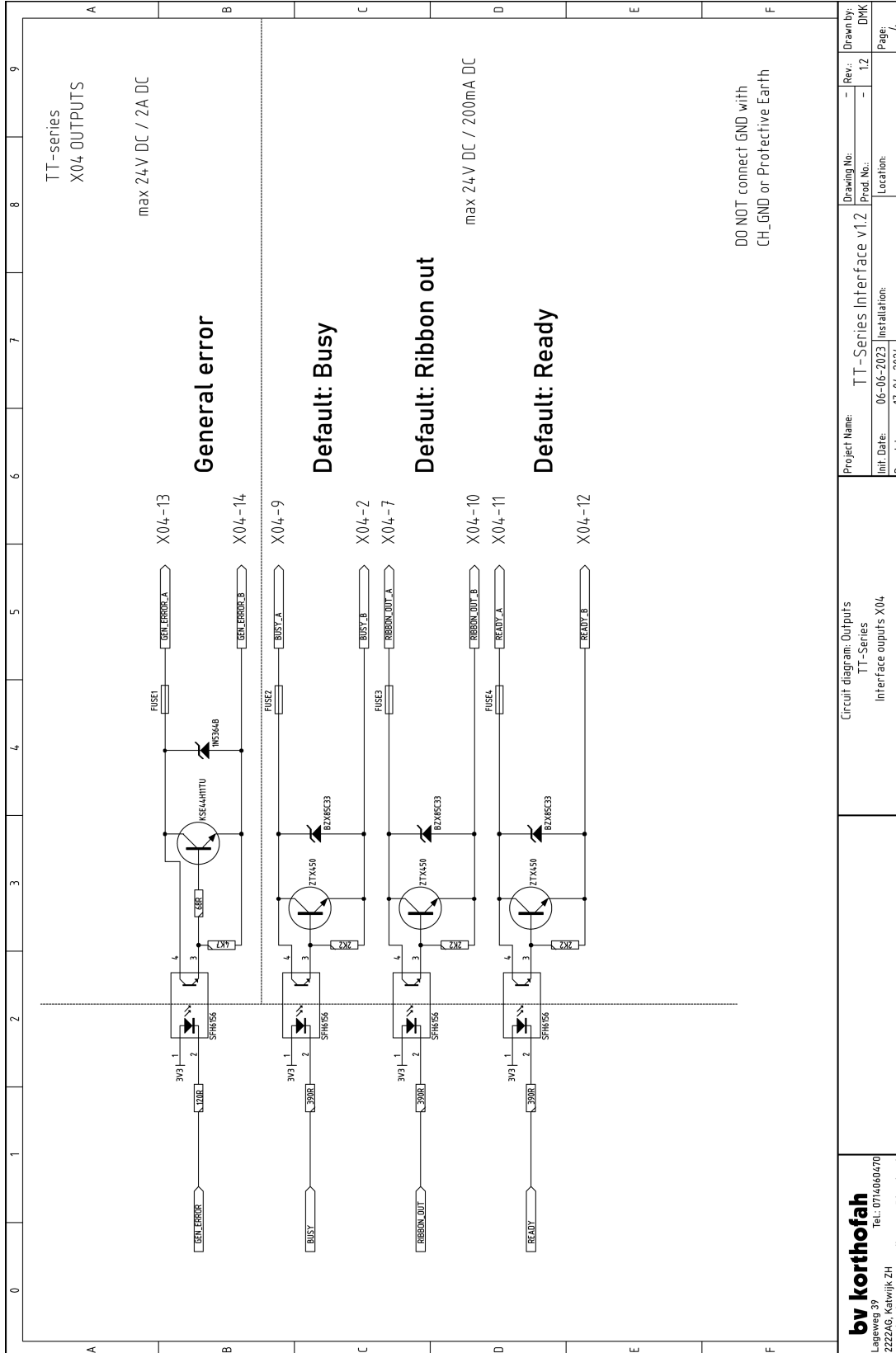
This output can be used to check if the system is on and ready to take a print.

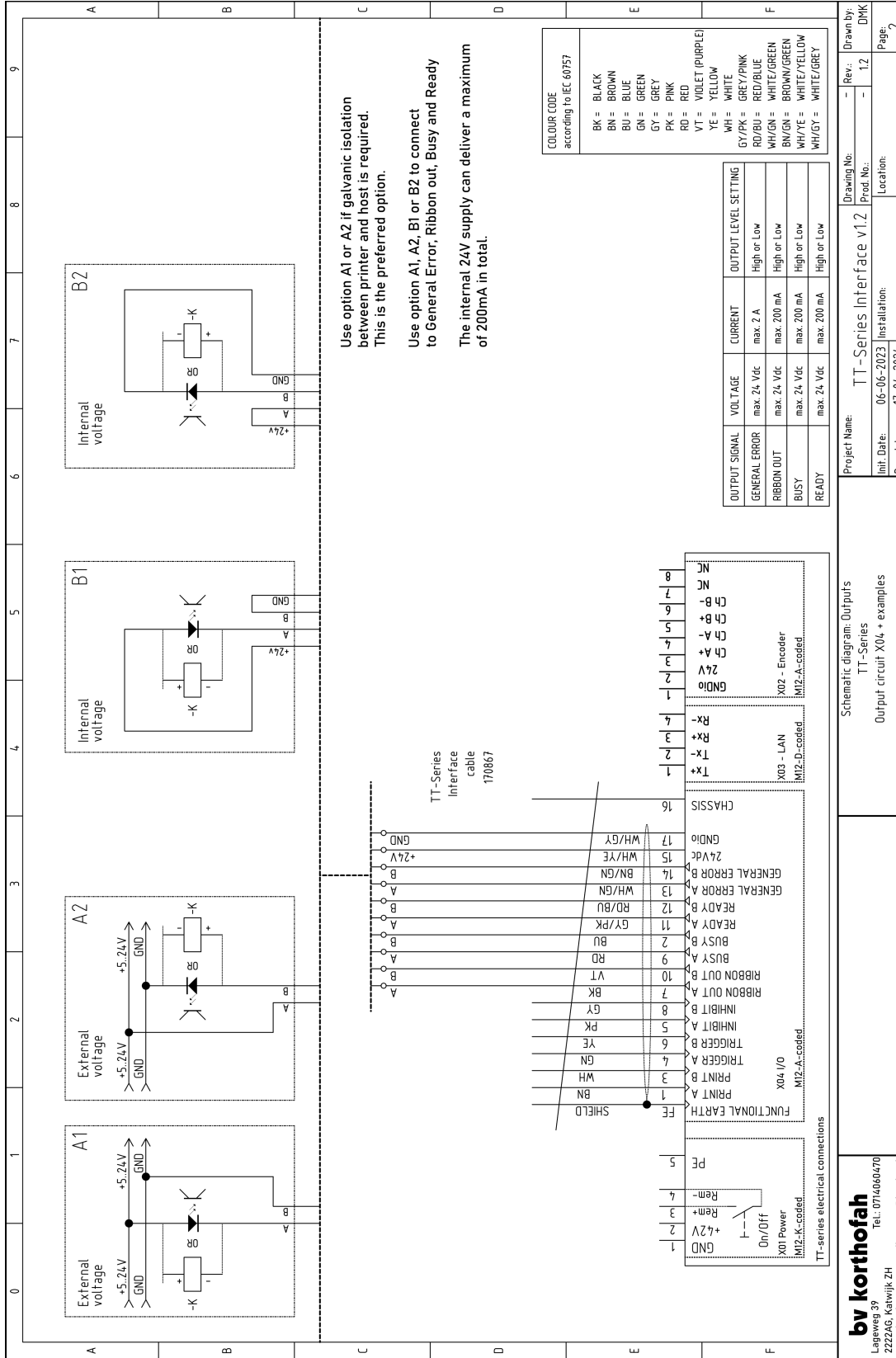
8.5.2 Circuit diagrams - inputs





8.5.3 Circuit diagrams - outputs







# 9 Transport & storage

## 9.1 Transport

---

The TT-series should be inspected for transport damage immediately upon receipt. In the event of any damage, the sender must be notified immediately.

## 9.2 Storage

---

The TT-series may only be stored indoors, under the following conditions:

- Temperature: -10 / +50 °C.
- Relative humidity: 20 - 80%.

# 10 Disposal

## 10.1 Safety regulations

---

Before dismantling and disposing of the TT-series, the following safety instructions must be observed:



***Make sure that all machine parts are turned off and disconnected from power sources before dismantling and disposing of the TT-series!***



***Ensure that the TT-series is SAFELY disassembled and disposed of according to the CURRENT LEGAL REGULATIONS of the country of use.***



***Think of the ENVIRONMENTALLY-FRIENDLY METHOD of disposing of hazardous substances and materials.***

## 10.2 Disposing of materials

---

Ensure that the separated dust is removed and/or processed in accordance with applicable environmental laws.



***The TT-series contains no harmful substances or materials and can be scrapped or recycled at the end of its service life.***



***Used printer ribbon rolls should be treated as small chemical waste.***

# A1 Technical specifications

## A1.1 Printer specifications

| Item   | Value  |
|--|--|
| Printer mode   | The TT-series can print both Continuous and Intermittent                 |
| Right-handed/left-handed                               | The TT-series can print left and right-handed                            |
| Printing resolution                                    | 12 dots / mm (304 dpi)   |
| Printing surface (Intermittent)                        | 53mm x 95mm  |
| Printing surface (Continuous)                          | 53mm x 200mm   |
| Maximum printing speed (Intermittent)                  | 60m/min or 1000mm/sec (head over product)                                |
| Minimum printing speed (Intermittent)                  | 3m/min or 50mm/sec (head over product)                                   |
| Maximum printing speed (Continuous)                    | 60m/min or 1000mm/sec  |
| Minimum printing speed (Continuous)                    | 3m/min or 50mm/sec   |
| Maximum printing capacity<br>(Depending on label size) | 240 strokes per minute/4 strokes per second<br>(Depending on label size) |
| Ribbon mechanism                                       | Cassette – with simple 2-axle ribbon trajectory                          |
| Maximum ribbon length                                  | TT- 53: 1800 m   |
| Ribbon qualities                                       | Standard, Premium and Excellence   |
| Ribbon colours   | Standard colours<br>(available immediately, specials on request)         |
| Standard ribbon width                                  | TT-53: 55 mm   |
| Printhead type   | Corner Edge  |
| Preheat printhead                                      | Yes  |
| Control  | Fully electric   |

## Printing characteristics

---

- - Date code completely customisable
- - Time
- - Entering variables
- - Shift codes
- - Generating serial numbers
- - Any desired font
- - Dynamic barcodes
- - 2D-codes
- - ERP and Database Connection
- - Can also be controlled with the Kortho Windows printer driver

## Controller/hardware interface options

---

No assigned controller required. Hardware interface options:

- Kortho Printerface (KCC app) via Ethernet cable or network.
- PC-based (KCC app) through direct connection via Ethernet cable or network.

Label layout integrated in KCC software (included). Once the Kortho print driver has been installed, you can use any label design package.

## A1.2 Power supply

| Item                     | Value  |
|--------------------------|--|
| Input                    | AC 100 - 240V (-15% / +10%), max 4 / 1.7A, 50-60Hz               |
| Output (Continuous load) | DC 42V, 300W   |
| Output                   | DC 42V, 300W   |
| Inrush current           | 2.6A / 6A peak @ 25°C 120 / 230 Vac                              |
| IP rating power supply   | IP67   |
| Efficiency               | 93.4 / 95% at 100 / 230 Vac                                      |
| Dimensions (l x w x h)   | 183mm x 182mm x 59mm<br>connected without connectors and cabling |
| Weight                   | 1200g / 2.7lb  |

## A1.3 Printer

| Item                              | Value                     |
|-----------------------------------|---------------------------|
| Dimensions (l x w x h)            | 238x294x195mm             |
| Weight                            | 10.3 KG                   |
| IP-rating printer                 | IP20                      |
| Ambient temperature (operational) | 0°C - 40°C (32°F - 104°F) |
| Ambient temperature (transport)   | 0°C - 50°C (32°F - 122°F) |
| Relative humidity between         | 10 - 90% (non-condensing) |

## A1.4 Connections

### X04 - Inputs and outputs

| Item        | Value  |
|-------------|--|
| Inputs      | 3. Print, Inhibit and Trigger                          |
| Outputs     | 5. Busy, Foil Break, Foil Low, General Error and Ready |
| I / O power | 24V, 200mA (total)                                     |

### X02 - Encoder

| Item    | Value  |
|---------|--|
| Encoder | M12, 8-pin connector for external encoder for continuous mode. |

### X01 - Power

| Item        | Value   |
|-------------|---|
| Power input | M12-K coded 5 pin male connector. 42VDC power input from dedicated supplied PSU |

### X03 - LAN

| Item         | Value                  |
|--------------|------------------------|
| LAN ethernet | M12 D-code, 10/100Mbps |

### Connectivity

| Item               | Value   |
|--------------------|---|
| USB A port (front) | Used for software updates and/or downloading reports              |
| Bluetooth          | For temporary (service) purposes – not recommended for production |
| RFID               | RFID tag reader   |



# A2 Declarations and test- certificates

## EC Declaration of conformity

---

(According to Annex II.A of the Machinery Directive 2006/42/EC)

We,           BV Korthofah  
              Lageweg 39  
              2222 AG Katwijk ZH  
              Nederland

declare under own responsibility that the product

|                    |        |
|--------------------|--------|
| Kortho TT-53       | 819528 |
| Power supply TT-53 | 820075 |

to which this declaration relates is in conformity with the following standards or other normative documents

EN 61000-6-4 (2007) + A1 (2011), class A  
EN 61000-3-2 (2014)  
EN 61000-3-3 (2013)  
EN 61000-6-2 (2005) + A1 (2005), Industrial  
EN 60204-1 (2006) + A1 (2009)  
NEN-EN-ISO 12100:2010  
FSO/TR 14121-2:2007

following the provisions of the

EMC Directive 2014/30/EU  
Machinery Directive 2006/42/EC



M.P.J.J. de Groot, Directeur  
November 12<sup>th</sup> 2020, Katwijk ZH, Nederland

**DARE!!**

## Certificate of Compliance

This certificate is issued under the conditions as described in the test report as mentioned below

Certificate number:

**20210639CRT01**

Product name:  
Model number:  
Serial number:  
(Product identification)

**Thermal Transfer printer TT-53  
Print unit TT-53  
Printerface IoT  
2025306502**

Manufacturer:

**Korthofah B.V.  
Lageweg 39  
222 AG Katwijk ZH  
The Netherlands**

Measurements carried  
out on behalf of:

**Korthofah B.V.  
Lageweg 39  
222 AG Katwijk ZH  
The Netherlands**

Applicant's representative:

**Mr. M. Hageman**

In the capacity of:

**Manufacturer**

Date of measurement:

**2021 October, 14-15-18**

The measurement results  
are laid down in report:

**20210639RPT01**

The product has been  
examined according to <sup>1</sup> :

**Emission: EN 61000-6-4 (2007) + A1 (2011)  
Immunity: EN 61000-6-2 (2005) + AC (2005) & EN 61000-6-2 (2019)  
Emission: EN 61000-3-2 (2014)  
Emission: EN 61000-3-3 (2013)**

**DARE!! Services B.V.**  
Vijzelmolenlaan 7  
NL-3447 GX Woerden  
The Netherlands

T: +31 348 200 900  
M: services@dare.nl  
W: www.dare.nl

*The Standard for EMC & Automotive, FCC and  
Product Safety.*

  
**D. van der Vlugt**  
Director

Woerden, 2021 November, 11

<sup>1</sup> Meeting the requirements of these standards and the requirements mentioned in the report means presumption of conformity with EMC Directive - 2014/30/EU.

De volgende tabel geeft een samenvatting van de resultaten van de tests die zijn uitgevoerd op de Thermal Transfer-printer TT-53.

| Test sequence | Test description   | Basic standard   | EUT modified during test (yes/no) | Result (Pass/Fail) |
|---------------|--|--|-----------------------------------|--------------------|
| 1             | Conducted emission, test with an AMN   | EN 55032 (2015) + A11 (2020)   | No                                | Pass               |
| 13            | Conducted emission at telecommunication ports, test with an AAN                                      | EN 55032 (2015) + A11 (2020)   | No                                | Pass               |
|               | Conducted emission at telecommunication ports, test with a current probe                             | EN 55032 (2015) + A11 (2020)   |                                   | Not applicable     |
|               | Conducted emission at telecommunication ports, test with a capacitive voltage probe* & current probe | EN 55032 (2015) + A11 (2020)   |                                   | Not applicable     |
| 9             | Radiated emission up to 1 GHz (SAC)  | EN 55032 (2015) + A11 (2020)   | No                                | Pass               |
| 11            | Radiated emission above 1 GHz (FAC) **   | EN 55032 (2015) + A11 (2020)   | No                                | Pass               |
| 2             | Harmonics (I ≤16 A per phase)  | EN-IEC 61000-3-2 (2014) & EN-IEC 61000-3-2 (2019)* not yet harmonized) | No                                | Pass               |
| 3             | Flicker (I ≤16 A per phase)  | EN-IEC 61000-3-3 (2013)  | No                                | Pass               |
| 7             | ESD  | EN-IEC 61000-4-2 (2009)  | No                                | Pass               |
| 10            | Radiated immunity  | EN-IEC 61000-4-3 (2006) + A1 (2008) + A2 (2010)                        | No                                | Pass               |
| 5             | EFT  | EN-IEC 61000-4-4 (2012)  | No                                | Pass               |
| 6             | Surge  | EN-IEC 61000-4-5 (2014) + A1 (2017)                                    | No                                | Pass               |
| 4             | Conducted immunity   | EN-IEC 61000-4-6 (2014)  | No                                | Pass               |
| 8             | Voltage dips and interruptions 230 V – 50 Hz (I ≤16 A per phase)                                     | EN-IEC 61000-4-11 (2004) + A1 (2017)                                   | No                                | Pass               |
| 12            | Voltage dips and interruptions* all other voltages and frequencies. (I ≤16 A per phase)              | EN-IEC 61000-4-11 (2004) + A1 (2017)                                   | No                                | Pass               |
|               | Transients and surges in the vehicular environment (12/24 V)   | ISO 7637-2 (2004)  |                                   | Not applicable     |

\* Testen zijn uitgesloten van accreditatie.

De onderstaande tabel toont details over tests die niet van toepassing zijn.

| Phenomenon   | Comment   |
|--|---|
| Conducted emission, telecommunication/network ports (CVP/CP)   | Tested according AAN method   |
| Transients and surges in the vehicular environment (12/24 VDC) | The EUT is not connected to the 12/24 VDC power mains of a vehicle. |



**EC-Declaration of Conformity**

According to the regulations  
2014/53/EU (RED) & 2015/863/EU (RoHS3)

**We, Importer / Distributor**

2direct GmbH  
Langenstück 5  
58579 Schalksmühle  
Germany

**Declare that the product**

Brand Name: **LogiLink**  
Model Number: BT0037  
Bluetooth Dongle

**Is in Conformity with the following European Standards:**

EN 62479:2010  
EN 50663:2017  
EN 62368-1:2014+A11:2017  
EN 301 489-1: V2.2.3  
EN 301 489-17: V3.2.4  
EN 300 328: V2.2.2  
EN 50581:2012

**Report No: AGC00126210101EH02, AGC00126210101ES01, AGC00126210101EE01,  
AGC00126210101EE04**

**Identification of signatory empowered to bind the manufacturer or his authorized  
representative.**

Schalksmühle, 1<sup>st</sup> February 2021

Place and date of issue



2direct GmbH  
Langenstück 5

D-58579 Schalksmühle  
Signature (Wilfried Gohmert)  
Fax: +49-2351-66887-29





**ATTESTATION OF CONFORMITY**

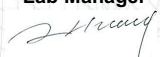
**Attestation Number :** AOCRSZ200328011A2-03  
**Date of Issue:** 2020-06-24  
**Product:** USB NFC Reader Module  
**Model(s):** **ACM1252U-Z2, ACM1252U-Z6**  
**Brand:** NA  
**Manufacturer & Address:** Advanced Card Systems Ltd.  
 Units 4108 - 4110, 41st Floor, Manhattan Place, 23 Wang Tai Road, Kowloon Bay, Hong Kong

**Bay Area Compliance Laboratories Corp. (Shenzhen) hereby declares that the submitted sample(s) of the above equipment has been tested for CE-marking and in accordance with the following European Directives and Standards:**  
**Radio Equipment Directive 2014/53/EU**

| Essential Requirement | Harmonized Standards   | Test Report Number |
|-----------------------|--|--------------------|
| Radio Spectrum        | ETSI EN 300 330 V2.1.1 (2017-02)   | RSZ200328011-22A1  |
| EMC                   | ETSI EN 301 489-1 V2.2.3 (2019-11)<br>ETSI EN 301 489-3 V2.1.1 (2019-03) | RSZ200328011-02A1  |
| Safety                | EN 62368-1: 2014+A11: 2017   | RSZ200328011-SF    |
| Health/SAR            | EN 50364:2018  | RSZ200328011A1     |

\* Note: Harmonized Standards not yet cited in OJ

**CE** Mark is permitted only after all applicable requirements are met in accordance with the European Union Rules, including the manufacturer's issuance of a "Declaration of Conformity. The Declaration of Conformity is issued under sole responsibility of manufacturer. This attestation is specific to the standard(s) stated above and compliance with additional standards and/or European directives are applicable.

**Attestation by:** Alvin Huang  
**Lab Manager**  
  
 \_\_\_\_\_  
**Signature**



Bay Area Compliance Laboratories Corp. (Shenzhen)  
 6/F, West Wing, Third Phase of World Postnet Building, Shenzhen Free Trade Zone, Shenzhen, Guangdong, China.  
 Phone: +86-755-33320018 Fax: +86-755-33320009  
 www.bactorm.com.cn  
 C03-C0 (200115)

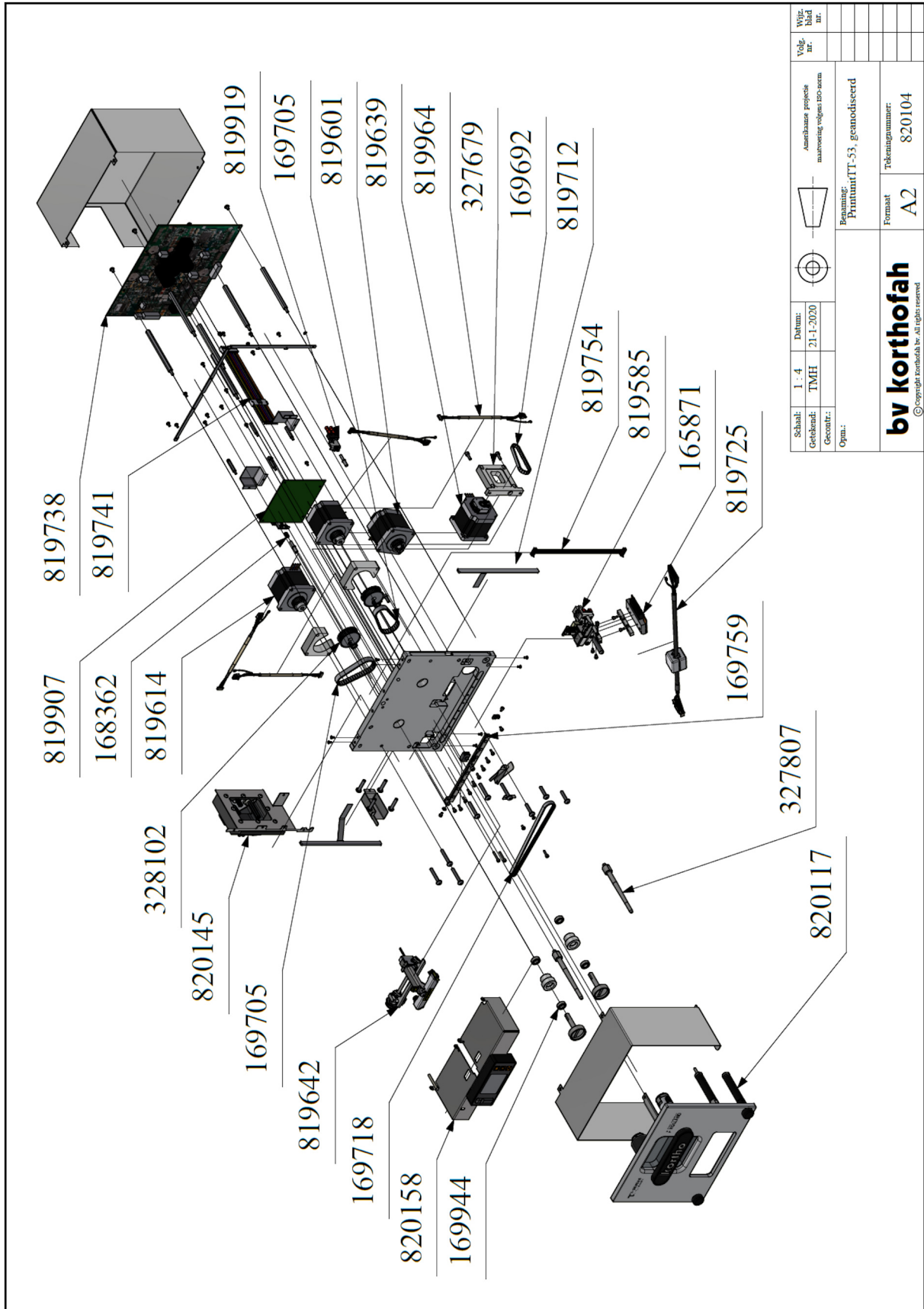


# A3 Technical drawings

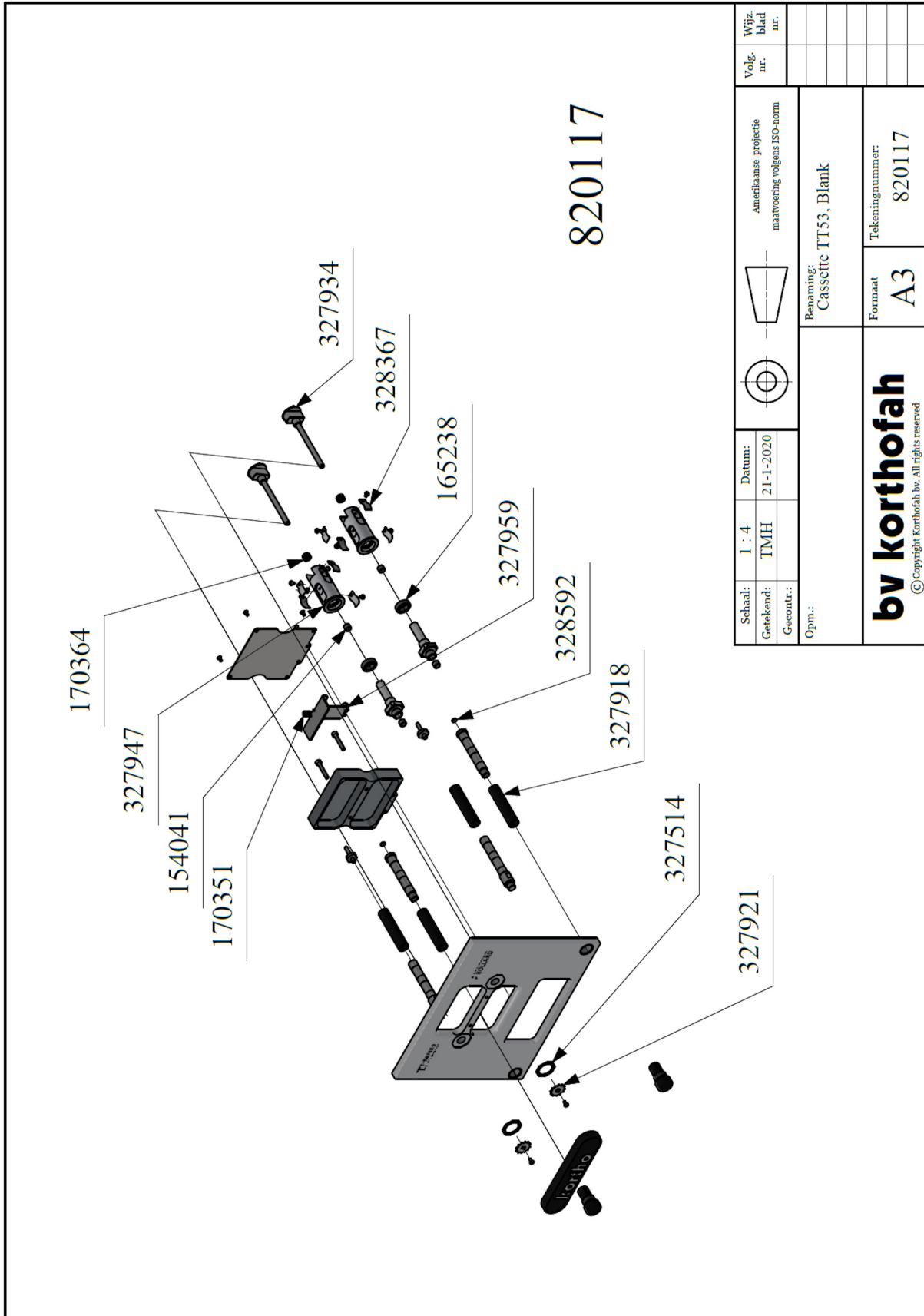
M6x1 - 15 DEEP (2x)

Weight: 10,2 Kg  
Dimensions: 294 x 248 x 195 mm

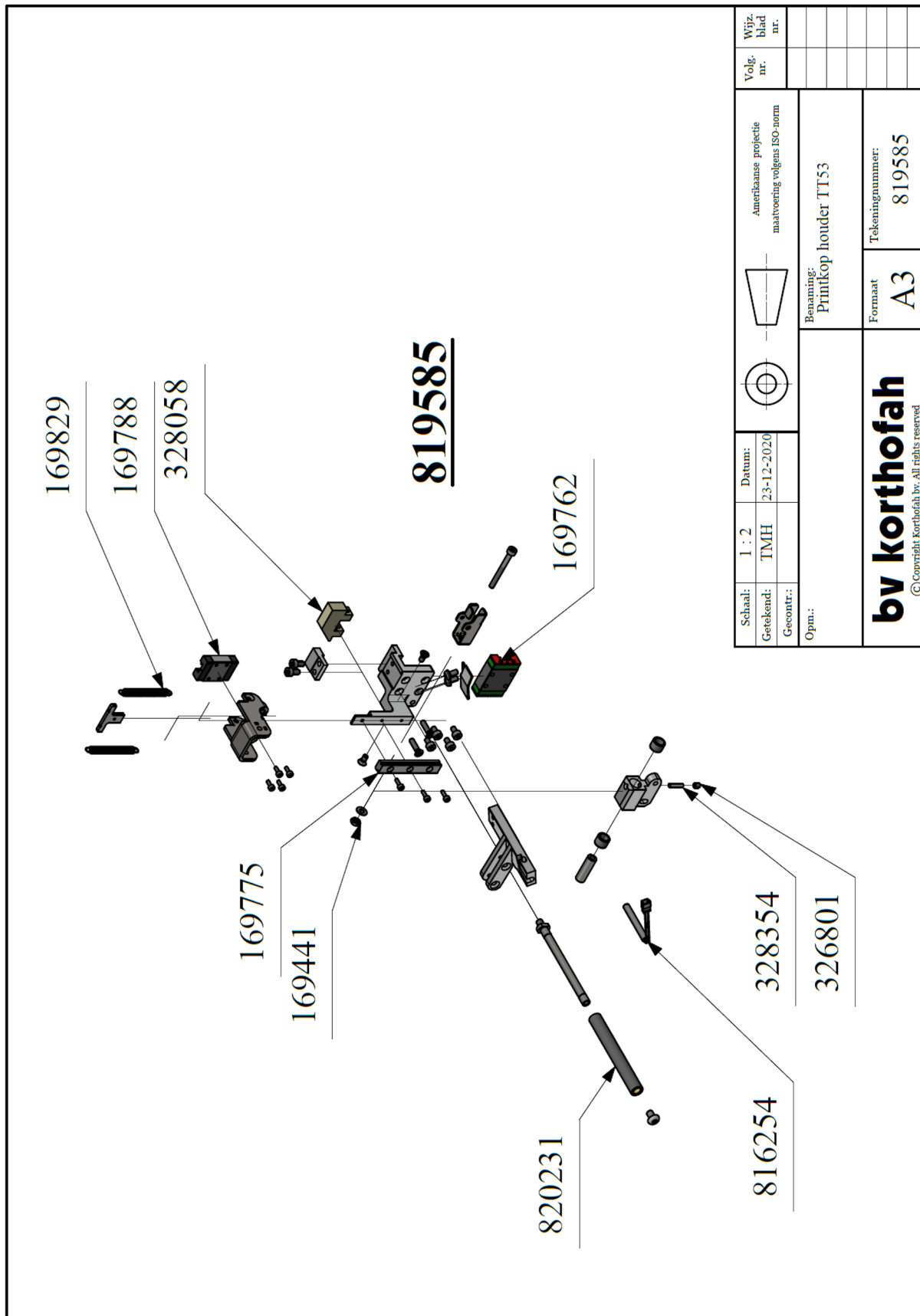
|                     |                  |   |   |                      |
|---------------------|------------------|---|---|----------------------|
| Schaal: 1 : 4       | Datum: 21-3-2019 |   | Amerikaanse projectie<br>maatvoering volgens ISO-norm | Wijz-<br>blad<br>nr. |
| Getekend: TMH       |                  |   |   | Volg-<br>nr.         |
| Gecontr.:           |                  |   |   |                      |
| Opm.:               |                  | Benaming: Printunit TT-53, geanoniseerd       |   |                      |
|                     |                  | Formaat Tekeningsnummer: A3 820104            |   |                      |
| <b>bv korthofah</b> |                  | © Copyright Korthofah bv. All rights reserved |   |                      |



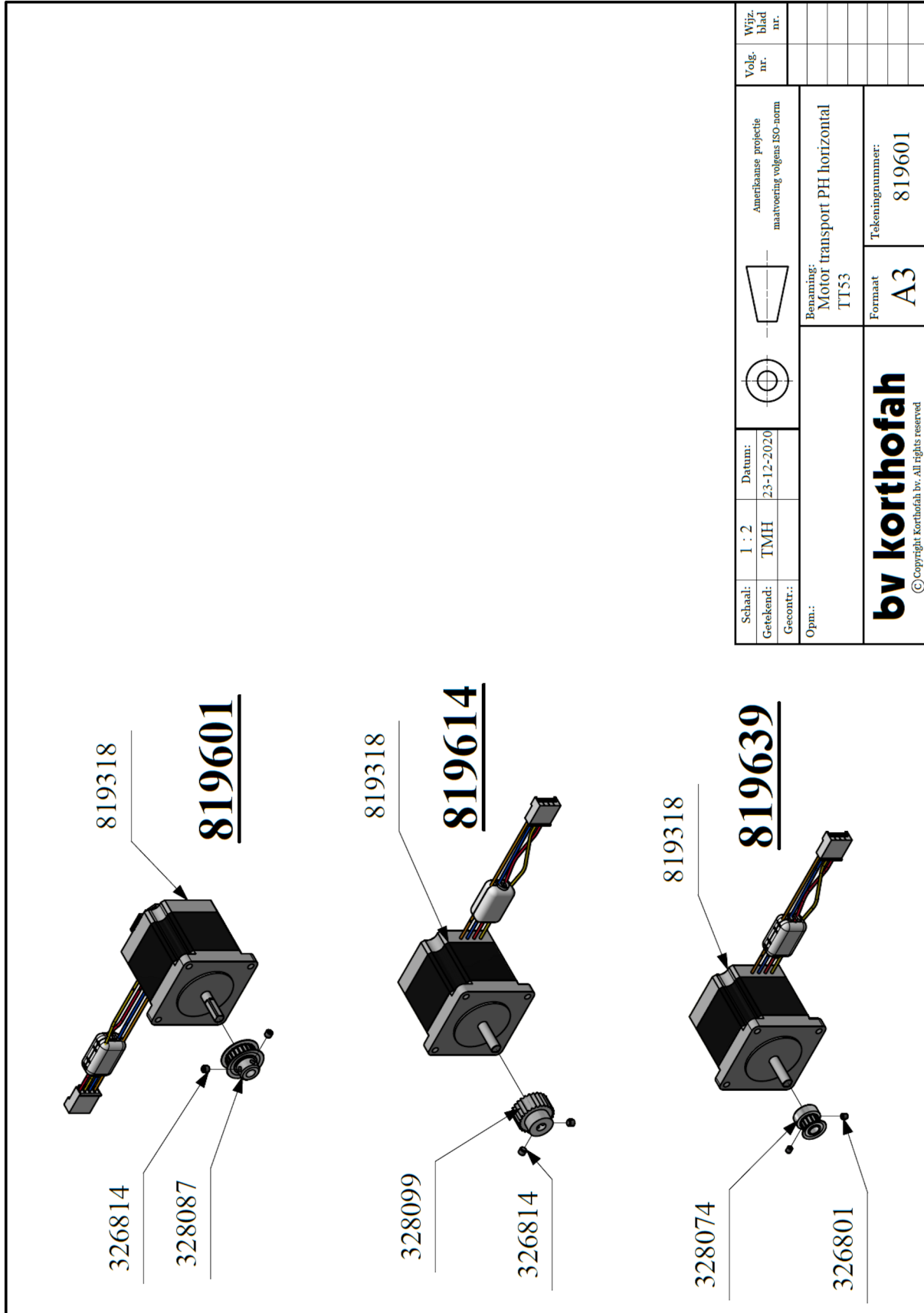
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|--|------------------|---|
| Schaal: 1:4  | Datum: 21-1-2020 | Wijz. blad nr.  |
| Gebruik: TMH   |                  | Volg. nr.   |
| Gevoert:   |                  |   |
| Optm.:   |                  |   |
|  |                  | Aankomende projectie:<br>maatvoering volgens ISO norm |
| Benaming: Printunit TT-53, geïntegreerd                              |                  |   |
| <b>bv korthofah</b><br>© copyright korthofah bv, all rights reserved |                  | Tekentagnummer:<br>820104                             |
| Formaat: A2  |                  |   |



|   |       |        |           |   |                           |              |
|---|-------|--------|-----------|---|---------------------------|--------------|
| Schaal:   | 1 : 4 | Datum: | 21-1-2020 | Amerikaanse projectie<br>maatvoering volgens ISO-norm | Wijz.<br>blad<br>nr.      |              |
| Getekend:   | TMH   |        |           |   |                           | Volg.<br>nr. |
| Gecontr.:   |       |        |           |   |                           |              |
| Opm.:   |       |        |           | Benaming:<br>Cassette TT53, Blank                     | Tekeningnummer:<br>820117 |              |
| <b>bv korthofah</b><br>© Copyright Korthofah bv. All rights reserved. |       |        |           | Formaat   | A3                        |              |
|   |       |        |           |   |                           |              |

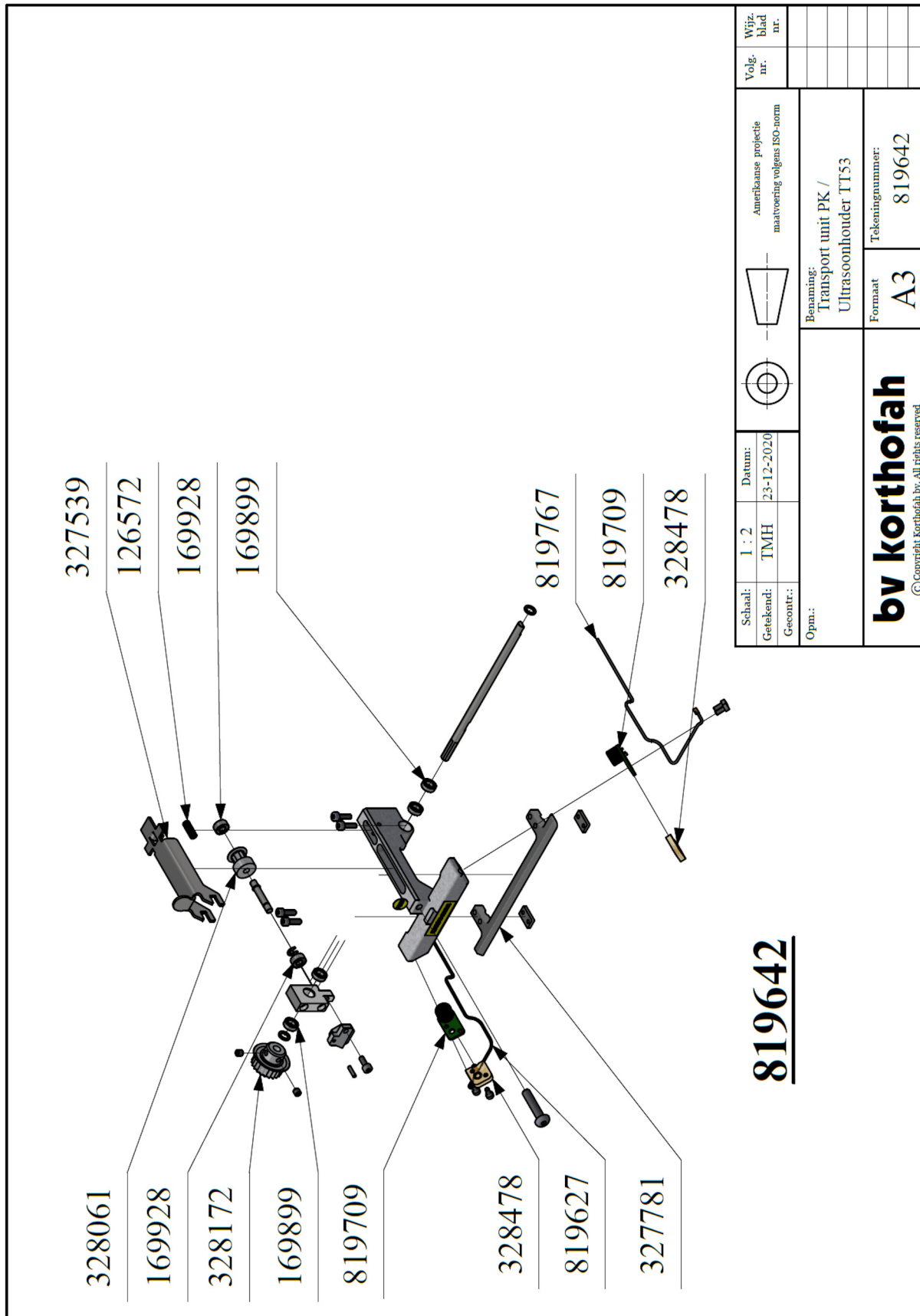


|  |                   |  |   |                |
|--|-------------------|--|---|----------------|
| Schaal: 1 : 2  | Datum: 23-12-2020 |  | Amerikaanse projectie<br>maatvoering volgens ISO-norm | Wijz. blad nr. |
| Getekend: TMH  | Gecont.:          |  |   | Volg. nr.      |
| Opm.:  |                   |  |   |                |
| <b>bv korthofah</b><br>© Copyright Korthofah bv. All rights reserved |                   | Benaming: <b>Printkop houder TT53</b><br>Formaat: <b>A3</b><br>Tekeningnummer: <b>819585</b> |   |                |



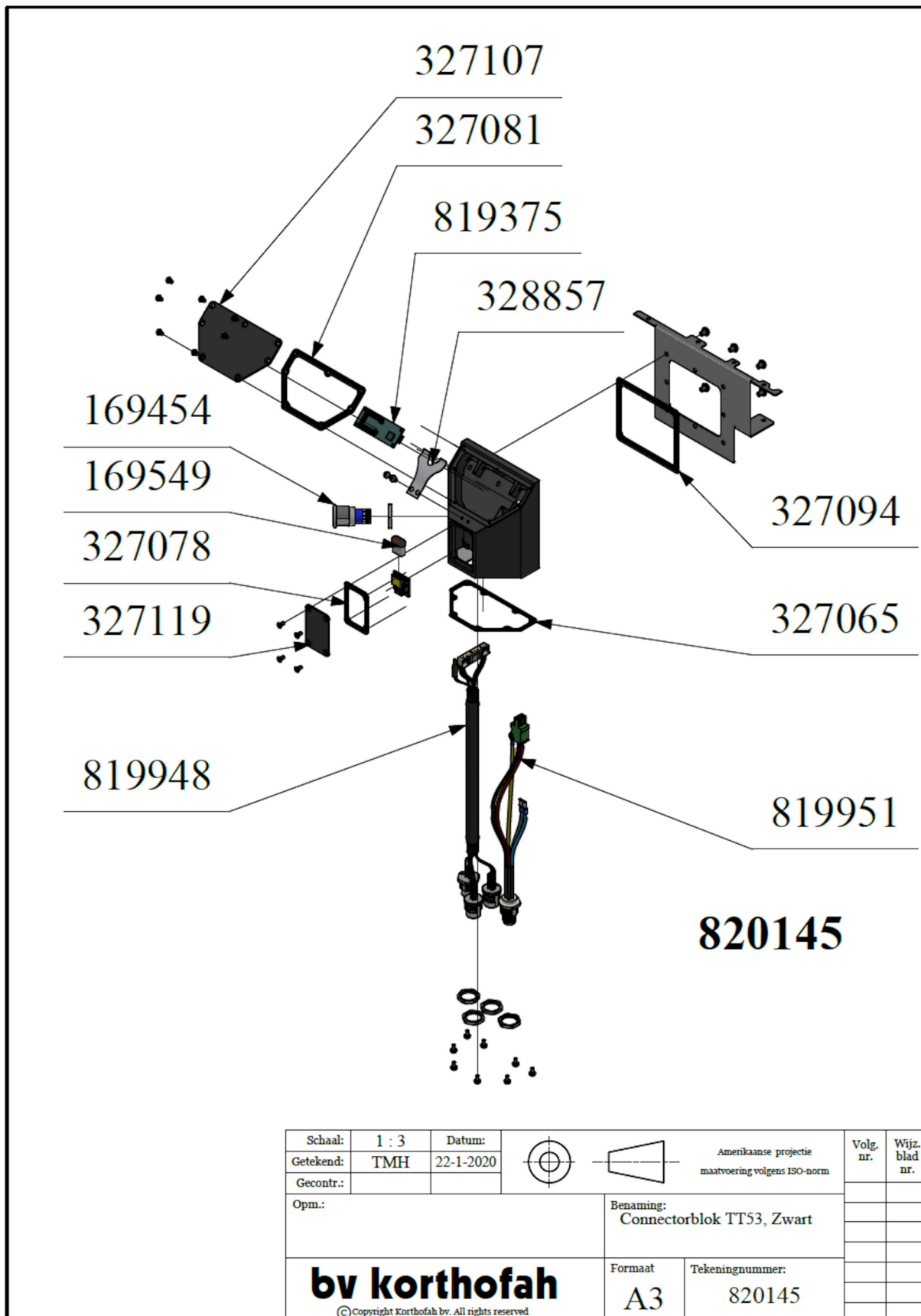
|                     |       |          |            |   |   |                           |
|---------------------|-------|----------|------------|---|---|---------------------------|
| Schaal:             | 1 : 2 | Datum:   | 23-12-2020 |   | Amerikaanse projectie<br>maatvoering volgens ISO-norm | Wijz.<br>blad<br>nr.      |
| Getekend:           | TMH   | Gecont.: |            |   | Benaming:<br>Motor transport PH horizontaal<br>TT53   | Volg.<br>nr.              |
| Opm.:               |       |          |            |   | Formaat<br>A3   | Tekeningnummer:<br>819601 |
| <b>bv korthofah</b> |       |          |            | © Copyright Korthofah bv. All rights reserved |   |                           |

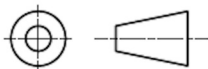


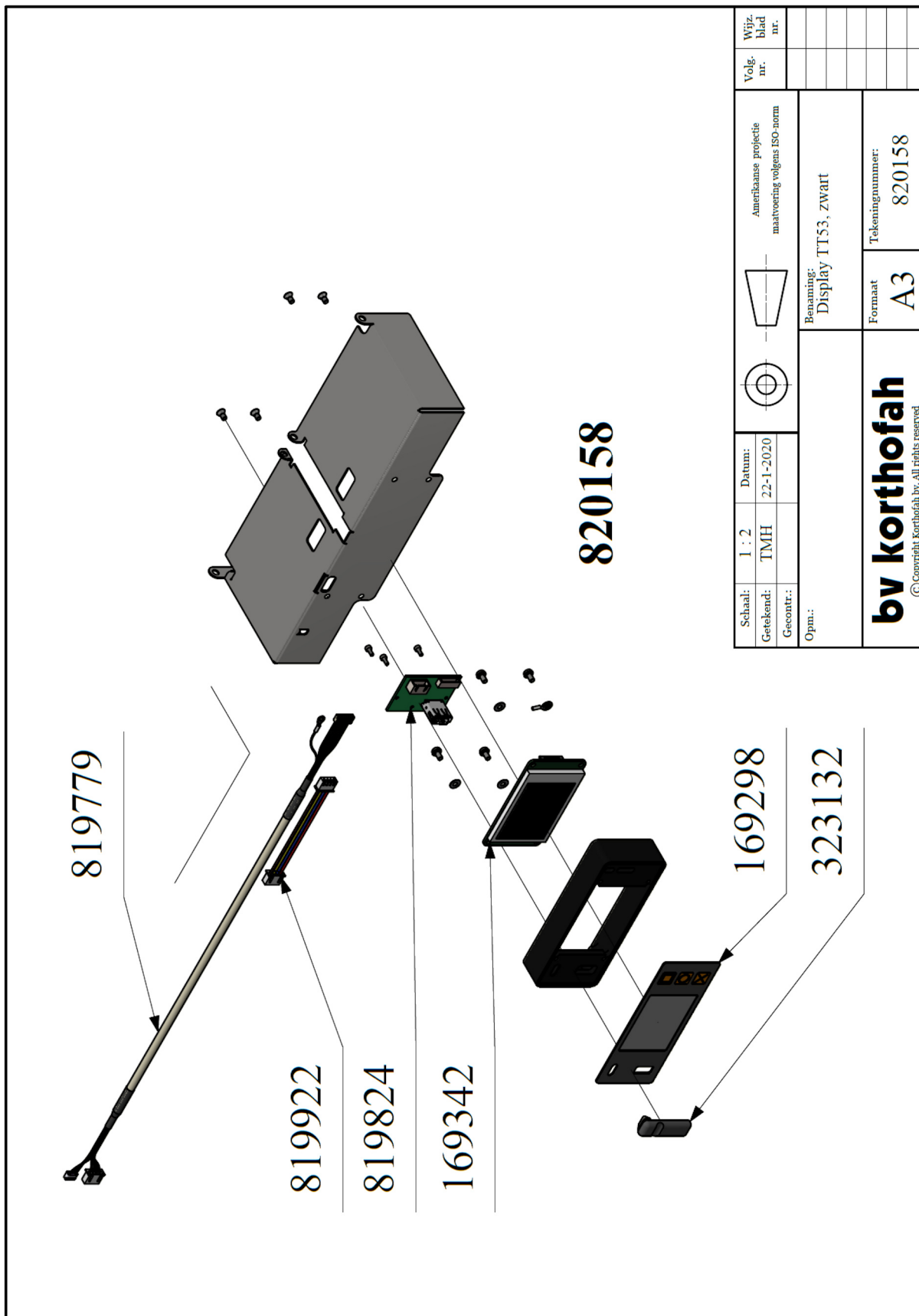


**819642**

|           |       |        |  |   |   |                      |              |
|-----------|-------|--------|--|---|---|----------------------|--------------|
| Schaal:   | 1 : 2 | Datum: | 23-12-2020   |   | Amerikaanse projectie<br>maatvoering volgens ISO-norm | Wijz.<br>blad<br>nr. |              |
| Getekend: | TMH   |        | Benaming:<br>Transport unit PK /<br>Ultrasoonhouder TT53 |   |   |                      | Volg.<br>nr. |
| Gescont.: |       |        |  |   |   |                      |              |
| Opm.:     |       |        |  | <b>bv korthofah</b><br>© Copyright Korthofah bv. All rights reserved. |   |                      |              |



|   |       |           |  |  |                           |                |
|---|-------|-----------|--|--|---------------------------|----------------|
| Schaal:   | 1 : 3 | Datum:    |  |  Amerikaanse projectie<br>maatvoering volgens ISO-norm | Volg. nr.                 | Wijz. blad nr. |
| Getekend:   | TMH   | 22-1-2020 |  |  |                           |                |
| Gecontr.:   |       |           |  |  |                           |                |
| Opm.:   |       |           |  | Benaming:  | Connectorblok TT53, Zwart |                |
| <b>bv korthofah</b><br><small>© Copyright Korthofah bv. All rights reserved</small> |       |           |  | Formaat  | Tekeningnummer:           |                |
|   |       |           |  | A3   | 820145                    |                |



|                     |                  |   |   |                |
|---------------------|------------------|---|---|----------------|
| Schaal: 1 : 2       | Datum: 22-1-2020 |   | Amerikaanse projectie<br>maatvoering volgens ISO-norm | Wijz. blad nr. |
| Getekend: TMH       |                  |   |   | Volg. nr.      |
| Gecont.: :          |                  |   |   |                |
| Opm.:               |                  | Benaming: Display TT53, zwart                 |   |                |
|                     |                  | Formaat A3                                    | Tekeningnummer: 820158                                |                |
| <b>bv korthofah</b> |                  | © Copyright Korthofah bv. All rights reserved |   |                |

# A4 Spare parts

## A4.1 Spare parts for repairs

| Article number | Description                                 |
|----------------|---|
| 126572         | Pressure spring,Lo=16.5 Dm=4.0 D=0.4        |
| 154041         | Glycodur Bus 08/06X06                       |
| 165238         | Ball bearing 19/10X5                        |
| 165871         | Thermal Printhead Qic 30/53 TT-53           |
| 168362         | Pressure spring D=0.3 Dm=4.5 L=31.0         |
| 169298         | Front Foil Display TTO                      |
| 169342         | Front Display TTO                           |
| 169441         | Self-locking Hexagon Nut M3 Stainless Steel |
| 169454         | Push button with lighting                   |
| 169549         | WIFI USB                                    |
| 169692         | HTD Serrated drive belt 159                 |
| 169705         | HTD Serrated drive belt 186                 |
| 169718         | HTD Serrated drive belt 384                 |
| 169759         | Transport rail L=165mm                      |
| 169762         | Carriage transport rail TT-53               |
| 169775         | Transport rail L=44mm                       |
| 169788         | Carriage PH transport TT-53                 |
| 169829         | Tension spring, L=34.5, Printhead holder    |
| 169899         | Ball bearing 9/5X3                          |
| 169928         | Ball bearing 9/4x4                          |
| 169944         | Ball bearing 16/8x5                         |
| 170351         | Pressure spring D=0.8 Dm=6.3 L=15.5         |
| 170364         | Pressure spring D=0.7 Dm=9.0 L=18.0         |
| 323132         | Seal USB Bk Tsc12/Tsc20                     |

| Article number | Description                                      |
|----------------|--|
| 326801         | Adjusting screw M3X4 with locking device         |
| 326814         | Adjusting screw M4X4 with locking device         |
| 327065         | Connector block gasket TTO                       |
| 327078         | WIFI plate gasket                                |
| 327081         | Reader plate gasket                              |
| 327094         | Conn. gasket Printer TTO                         |
| 327107         | Plastic Plate READER, connector block            |
| 327119         | Plastic Plate WIFI, connector block              |
| 327514         | Locking Gear TT-53                               |
| 327539         | Print head sliding cover TT-53                   |
| 327679         | Adjustment block stepper motor TT-53             |
| 327781         | Positioning arm Pk, TT-53                        |
| 327807         | Cassette Guide axle TT-53                        |
| 327918         | Roller, Cassette TT-53                           |
| 327921         | Positioning wheel winding/unwinding roller TT-53 |
| 327934         | Carrying winding/unwinding roller TT-53          |
| 327947         | Winding/unwinding roller cassette TT-53          |
| 327959         | Locking slide cassette TT-53                     |
| 328058         | Sliding block transport Printhead holder TT-53   |
| 328061         | HTD Toothed Belt Wheel Z10                       |
| 328074         | HTD Toothed belt wheel Z14 – stepper motor       |
| 328087         | HTD Toothed belt wheel Z22, d=6.35               |
| 328099         | HTD Toothed Belt Wheel Z26                       |
| 328102         | HTD Toothed Belt Wheel Z36                       |
| 328172         | HTD Gear Z22, d=5.0                              |
| 328354         | Pin, Printhead holder TT-53                      |
| 328367         | Leaf spring winding/unwinding roller TTO         |
| 328478         | Silicone silencer ultrasonic                     |
| 328592         | Buffer cassette TT-53                            |
| 328857         | Clip connector block                             |
| 816254         | Heating element D=4 48V-10W                      |

| Article number | Description                                 |
|----------------|---|
| 819318         | Stepper motor incl. AMT112Q-V & JST Plug    |
| 819375         | RFD Reader, Connector block                 |
| 819585         | Printhead holder TT-53                      |
| 819601         | Motor transport PK horizontal TT-53         |
| 819614         | Stepper motor Foil holder TT-53             |
| 819627         | Cable Ultrasonic sensor TT-53 black         |
| 819639         | Stepper motor Printhead holder TT-53        |
| 819642         | Transport unit PK/Ultrasonic holder TT-53   |
| 819709         | Ultrasonic sensor                           |
| 819712         | LED Strip 175*9mm, TT-53                    |
| 819725         | Thermal Printhead Cable TT-53               |
| 819738         | CPU circuit board, TT-53                    |
| 819741         | Power Supply Board cable - CPU Board TT-53  |
| 819754         | LED Power Cable TT-53                       |
| 819767         | Cable Ultrasonic sensor TT-53, grey         |
| 819779         | Cable LCD Display - CPU circuit board TT-53 |
| 819824         | Circuit board PCB USB                       |
| 819907         | Circuit board power supply CPU, TTO         |
| 819919         | Cassette switch incl. cable, TT-53          |
| 819922         | Cable Display internal, TT-53               |
| 819948         | Cable connector block, TT-53                |
| 819951         | Cable Connector Block Power Supply, TT-53   |
| 819964         | Encoder cable - Stepper motor TT-53         |
| 820117         | Cassette TT-53, Blank                       |
| 820145         | Connector block TT-53, black                |
| 820158         | Display TT-53, black                        |
| 820231         | Foil guide roller PK TT-53                  |



## A4.2 Spare parts for maintenance

| Article number | Description                                |
|----------------|--|
| 165871         | Thermal Printhead 53mm                     |
| 169718         | HTD Serrated drive belt 384                |
| 169692         | HTD Serrated drive belt 159                |
| 169705         | HTD Serrated drive belt 186                |
| 169718         | HTD Serrated drive belt 384                |
| 328061         | HTD Toothed Belt Wheel Z10                 |
| 328074         | HTD Toothed belt wheel Z14 – stepper motor |
| 328087         | HTD Toothed belt wheel Z22, d=6.35         |
| 328099         | HTD Toothed Belt Wheel Z26                 |
| 328102         | HTD Toothed Belt Wheel Z36                 |
| 328172         | HTD Gear Z22, d=5.0                        |
| 328367         | Leaf spring winding/unwinding roller TTO   |
| 819499         | Cassette TT-53                             |
| 819601         | Motor transport PK horizontal TT-53        |
| 819614         | Stepper motor Foil holder TT-53            |
| 819639         | Stepper motor Printhead holder TT-53       |
| 819725         | Thermal Printhead Cable TT-53              |
| 819738         | CPU circuit board, TT-53                   |
| 819907         | Circuit board power supply CPU, TTO        |
| 819919         | Cassette switch incl. cable, TT-53         |
| 820231         | Foil guide roller PK TT-53                 |

# A5 External power supply

## A5.1 Safety regulations

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Always observe the following safety instructions for the external power supply:



***Do not open, modify or repair the power supply.***



***Do not use in wet locations or areas where moisture or condensation can be expected.***



***Do not touch people or animals while switching on the power supply.***



***Do not touch people or animals immediately after switching off the power supply.***



***If touched for a long time, warm surfaces of the power supply may cause burns.***



***Sharp edges at the back of the power supply may cause injury.***



***If damage or malfunction should occur during installation or operation of the power supply, immediately disconnect the power from the power supply. Rather than taking action yourself, please get in touch with technically qualified or Kortho-trained personnel.***



***As with the TT-series printer, the power supply is not intended for outdoor use.***



***Do not use the power supply without a proper PE (Protective Earth) connection.***



***Do not connect the negative potential of the output to a PE outside the power supply.***



***The rated voltage between the input terminals and the PE potential must not exceed 240 Vac.***



***Do not switch outputs or power supplies in parallel in order to provide a higher output current.***



***Do not connect the outputs of multiple power supplies in series in order to generate higher output voltages.***



***Do not block the airflow around the power supply. Do not cover the ventilation slats.***



*Only clean the power supply with a damp cloth.*



*The input of the power supply must be equipped with a disconnection device. This allows maintenance personnel to make sure that the power supply and the connected TT-series are disconnected from the mains.*



*The power supply is designed to operate at altitudes of up to 5,000m (16,400ft). Above 2,000m (6,560ft) a reduction of the output current and overvoltage category is necessary.*



*It is strongly advised to use an external fuse. The fuse protects your installation by cutting the current in case of overload, short circuit or overcurrent. Preventing damage and downtime of the TT-series's power supply. For this use an automatic fuse that can turn off up to 16A (B or C characteristic). Do not use automatic fuses smaller than 6A (B or C characteristic) in order to prevent shutdown of the fuse.*



*The breaking capacity is the maximum (error)current that can safely be cut off by the internal fuse of the power supply itself. In the case of the TT-series's power supply the breaking capacity is 1500A.*

## A5.2 Intended use

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The power supply was designed and conceived for Kortho's TT series. This is why Kortho recommends only using this power supply in combination with a TT-series printer. Should you decide otherwise, the warranty in the event of electrical damage to your TT-series printer will lapse.

Should you use the power supply for other purposes (other than powering the TT-series), please do not connect the power supply to equipment where a malfunction could cause serious personal injury or threaten life.



*If the power supply is used in a way that is not covered in the product specifications, the protection provided by the power supply cannot be guaranteed.*

### A5.3 Product Description

When using the TT-series printer, Kortho recommends using the power supply developed for this purpose. The FPS300.422-056-101 is a stand-alone power supply for single-phase grid systems. The power supply provides a stabilised and galvanically isolated (from the mains) PELV output voltage of 42VDC for the TT-series printer.

The power is turned on with an ON/OFF button that is located on the printer. To this end, the supplied five-wire M12 power cable must be connected between the power supply and the output connector (X3) on the printer.

The output of the power supply is electronically protected against no-load, overload and short circuit and can handle any kind of load, including unlimited inductive and capacitive loads.



Figure 5-1: External Power LED Indication

| No. | Colour | Notation  | Indication   |
|-----|--------|-----------|--|
| 1   | Green  | DC-OK     | There is an output voltage above 37.8V of a working power supply.<br>- This LED will flash if the output is turned off via the external ON/OFF signal (the switch on the printer). |
| 2   | Red    | DC-Not OK | There is an output voltage lower than 37.8V at the output of the power supply.   |
| 3   | Orange | Overload  | The output current is higher than 8.5A.  |

The power supply is equipped with an overheating protection. This means that if the internal temperature becomes too high, the output of the power supply will be switched off. Once the power supply has cooled down to a normal operating temperature, the output will automatically turn back on.

## A5.4 Features of the external power supply

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- The negative potential of the outputs is permanently connected to PE inside the unit.
- The power supply is built into an IP67 housing, offering protection against electrical, mechanical and fire hazards.
- The power supply is designed to be mounted in a controlled environment up to and including pollution degree 3, as specified in the IEC 60664-1 and IEC 61010-1 standards
- If properly installed and mounted, the housing of the power supply offers a degree of protection of IP65 and IP67. You must, however, firmly tighten the corresponding cable onto the M12 connector.
- The insulation of the power supply is designed to withstand overvoltages, up to and including overvoltage category III, according to IEC 60664-1.
- The power supply is designed as Protection Class I equipment according to IEC 61140.
- The power supply has been designed for convection cooling and does not require an external fan.
- The power supply has been designed, tested and approved for branch circuits up to 20A (UL) and 32A (IEC) without additional protection.
- The maximum ambient temperature is +70°C (+158°F). The operating temperature is equal to the ambient or ambient air temperature and is defined 2 cm below the power supply.
- The power supply is designed to operate in spaces with relative humidity between 5% and 95%.
- The power supply is suitable for being powered from TN or TT grid networks.

## A5.5 Installation and mounting instructions

- Install the power supply on a flat surface, with the connectors facing down.
- Please observe the following minimum installation distances:
  - 30 mm at the top of the power supply.
  - 150mm at the bottom (for the cables).
  - 10mm at the front.
  - 10mm left and right.
- Use 4 screws for wall mounting; 2 for the top mounting holes and 2 for the bottom mounting holes. The recommended screw size is M4.

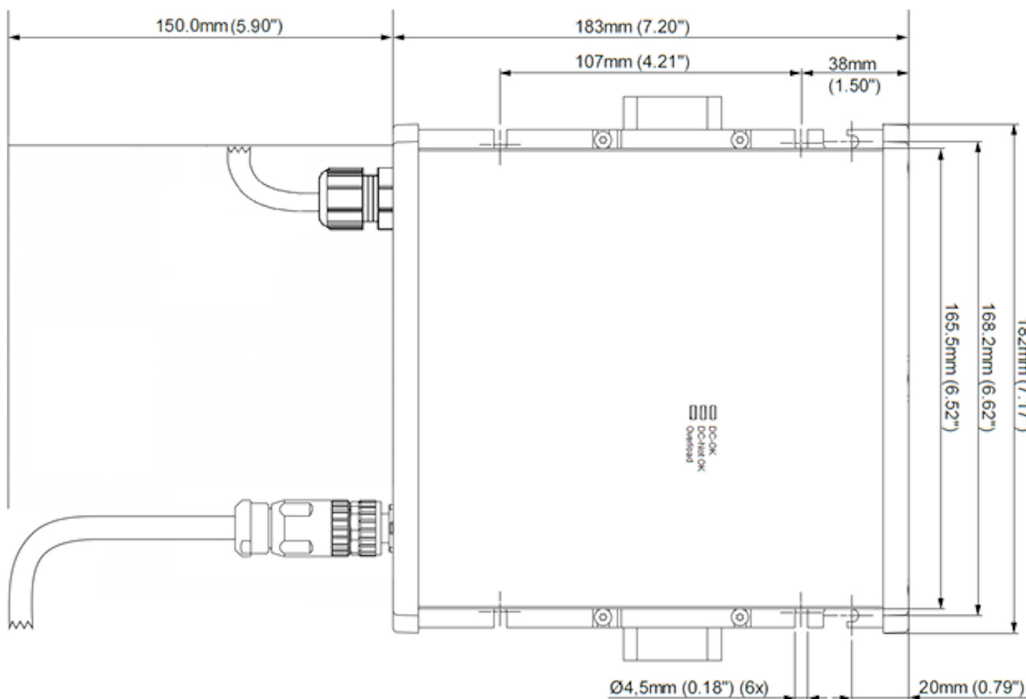


Figure 5-1: External power supply dimensions



Figure 5-2: Connector voeding



***Tighten the clamping ring of the power supply connector securely. This can prevent damage due to moisture.***



## A5.6 Connector cable installation plug

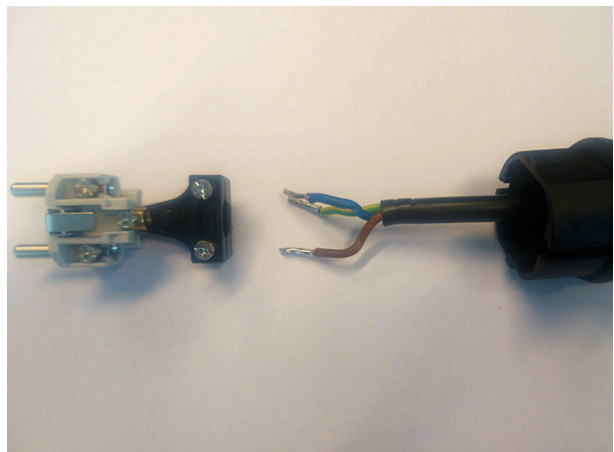
The plug of the power supply connector cable does not meet the correct requirements in every market. For some markets, the supplied plug must be replaced with an IP54 plug.

To correctly connect the IP54 plug, please perform the following operations:

1. **Remove** the supplied standard plug from the power cable.
2. **Open** the housing of the IP54 plug.



3. **Pull** the power cable through the housing of the IP54 plug.

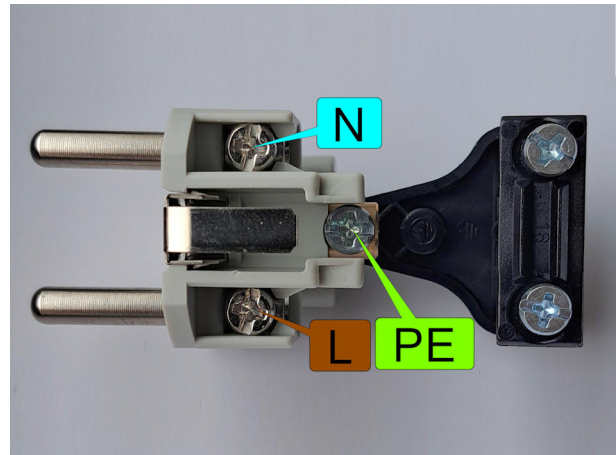


4. **Strip** the three wires of the power cable.
5. **Secure** ferrules around the exposed copper of the three wires.

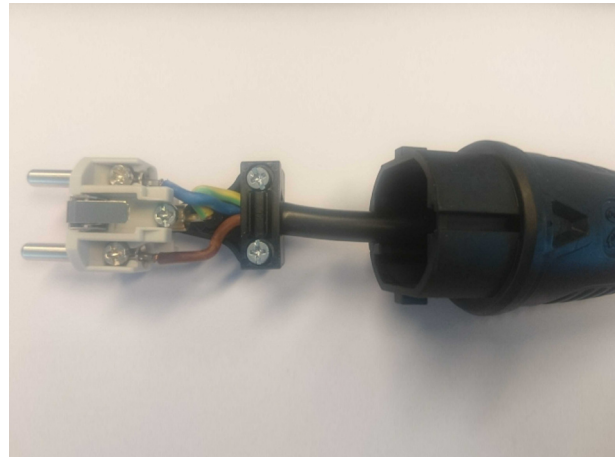


Once the ferrules have been crimped:

6. **Secure** each ferrule under the appropriate connection with a screw.



7. **Tighten** the two screws of the cable clamp.  
- This ensures the strain relief of the cable.



8. **Slide** the connector and housing of the IP54 plug back together.

9. **Screw** the housing back together.

