MANUAL

TT-SERIES
THERMAL TRANSFER

Thermal Transfer
Printer Manual

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kortho
coding & marking

These user manuals are the: “Translation of the original user manual” of the TT-Series.

Rev. no.	Description	Date	Check
1.0	Final Manual	07/04/2020	Kortho
1.1	Update layout	19/08/2020	ATG
1.2	Changes front	04/09/2020	ATG
1.3	Layout change	09/09/2020	ATG
1.4	Content improvement	03/12/2020	ATG
1.5	Change 2	08/12/2020	ATG
1.6	Adjusting front view + Appendix 4	09/12/2020	Kortho
2.0	Adjustments for inspection purposes	28/10/2021	ATG
2.1	Appendices attached	29/10/2021	ATG
2.2	Counterpressure roller mounting attached	01/11/2021	ATG
2.3	Processing of final feedback	22/12/2021	ATG
2.4	Processing of final feedback 2	07/01/2022	ATG
2.5	Processing of final feedback 3	10/01/2022	ATG
2.6	Processing of warnings	12/01/2022	ATG
3.0	Translation from NL to EN	31/01/2022	ATG
3.1	Text edit EN	03/02/2022	ATG

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 fully in-house developed 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.

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 and 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 printer, 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 concession 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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100% MADE IN HOLLAND

Preface

This is the preface to the TT-Series User Manual.

This User Manual informs the user on how to safely use (and daily maintain) the TT-Series.

Make sure this User Manual is always available with the TT-Series.

Read this User 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.

The operation (and daily maintenance) of the TT-series must only be carried out by appropriately qualified staff.

Appendices

The following appendices have been added to this User Manual:

- Appendix 1 'Technical specifications'.
- Appendix 2 'Declaration of Conformity'.
- Appendix 3 'Technical Drawings'.
- Appendix 4 'Spare parts'.
- Appendix 5 'External Power Supply'.

Index

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1 Introduction

This chapter provides general information about the TT-Series and this accompanying User Manual.

1.1 Note

Optimal safety can only be guaranteed if you read this User Manual carefully before using the TT-Series.

1.2 Manufacturer

The TT-Series is manufactured by:

BV Korthofah

Lageweg 39

2222 AG Katwijk (NL)

The Netherlands

Phone:	+31 (0) 71 40 60 470
Fax:	+31 (0) 71 40 32 807
Web:	www.kortho.com
Email:	info@kortho.nl

1.3 Related documents

In addition to this User Manual, the following documents belong with the TT-Series:

- Technical specifications.
- Declaration of Conformity in accordance with Annex II 1.A of the Machinery Directive (2006/42/EC).
- Technical drawings.
- Spare parts.
- External power supply.

1.4 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

Machine type plate	
Article number	
Serial number	
Model	
Manufacturer	
Street address	
Zipcode, city	
Year of production	

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.

1.5 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.

Normal use is understood to mean: Use under normal conditions, i.e. within the margins indicated in this User Manual.

1.6 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 User Manual.
- Ignoring safety warnings or safety instructions as stated on the TT-Series or in this User 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.

1.7 Copyright

BV Korthofah reserves the right to improve its products at any time without informing its customers. The contents of this manual are subject to change.

Every care has been taken in the writing of this manual. BV Korthofah cannot be held liable for errors in this publication or for any consequences thereof.

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

2 Safety

This chapter contains general safety instructions. Please read this chapter carefully before using the TT-Series and before performing any maintenance work on the TT-Series.

2.1 Symbols

The following symbols are used in this user 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.

2.2 User

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

Observe the safety instructions in this user 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 7 of this user manual and the safety regulations below before using the TT-Series or performing any operation on the TT-Series.

2.3 Maintenance engineer

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

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

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

2.4 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 User Manual. Always remain alert to dangerous situations and avoid any improper or careless use.

2.4.1 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.

2.4.2 Potential hazards

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

Handling the cassette:

The cassette lever should only be used for removing or inserting the cassette into the printer. This lever 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.

2.4.3 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).

2.5 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

This chapter describes the main components, function and operation of the TT-series.

3.1 Function

The function of the TT-series is:

- Printing variable codings.

3.2 Machine overview TT-series

The TT-series consists of the following parts:

Figure 3-1: Machine overview TT-series

No.	Description
1	TT-series
2	Windows HMI with Kortho Control Center (KCC) software

The image above is a test set-up. The TT-Series and the HMI can be installed separately.

Controlling multiple printers (max. 250) from a single HMI is also possible with Kortho Control Center.

The Kortho Printerface IoT Industrial tablet shown here is optional. You can also install Kortho Control Center on another Windows 10 (or higher) system of your choice.

The TT-Series is connected via an external power supply. BV Korthofah recommends using this external power supply. See Appendix 5 for detailed information about this external power supply.

3.3 Machine overview TT-series

The TT-series consists of the following parts:

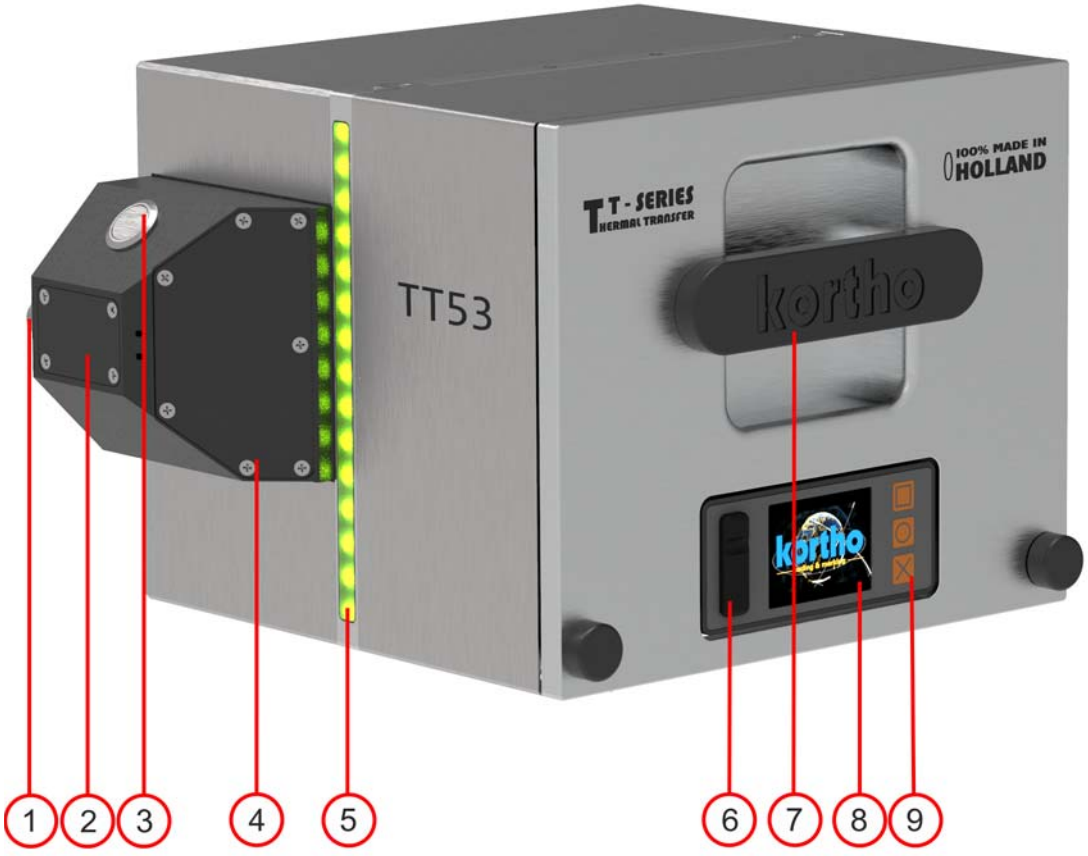


Figure 3-2: Machine overview TT-Series closed

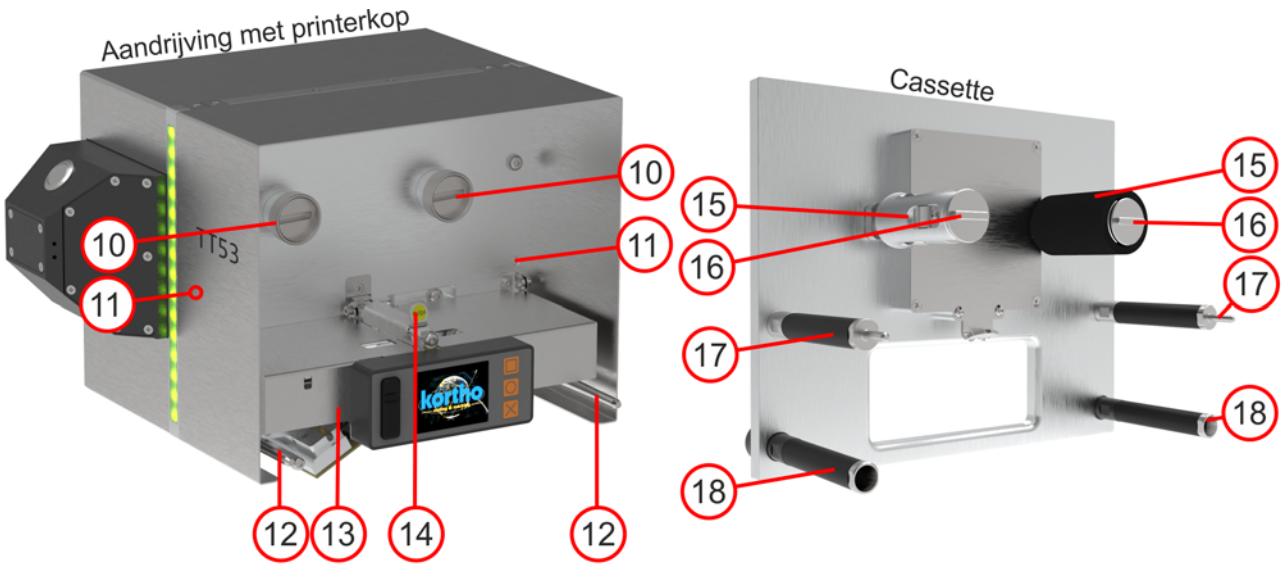


Figure 3-3: Machine overview TT-Series open

No.	Description	No.	Description
1	Connections	10	Drive clutch (2x)
2	Bluetooth antenna	11	Pin hole with safety switch (2x)
3	ON/OFF button	12	Guide Pin Cassette (2x)
4	RFID scanner	13	Printhead cover
5	Signal strip	14	Printhead cover lock
6	USB ports	15	Drive axles for print ribbon (2x)
7	Handle with lock	16	Ribbon axle coupling with lock (2x)
8	Display	17	Upper guide roller with insert pin (2x)
9	Control buttons	18	Lower guide roller (2x)

3.4 General operation of TT-Series

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

1. Schematic representation of the print ribbon progression.
2. Printing process.
3. Operating modes.

3.4.1 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.***

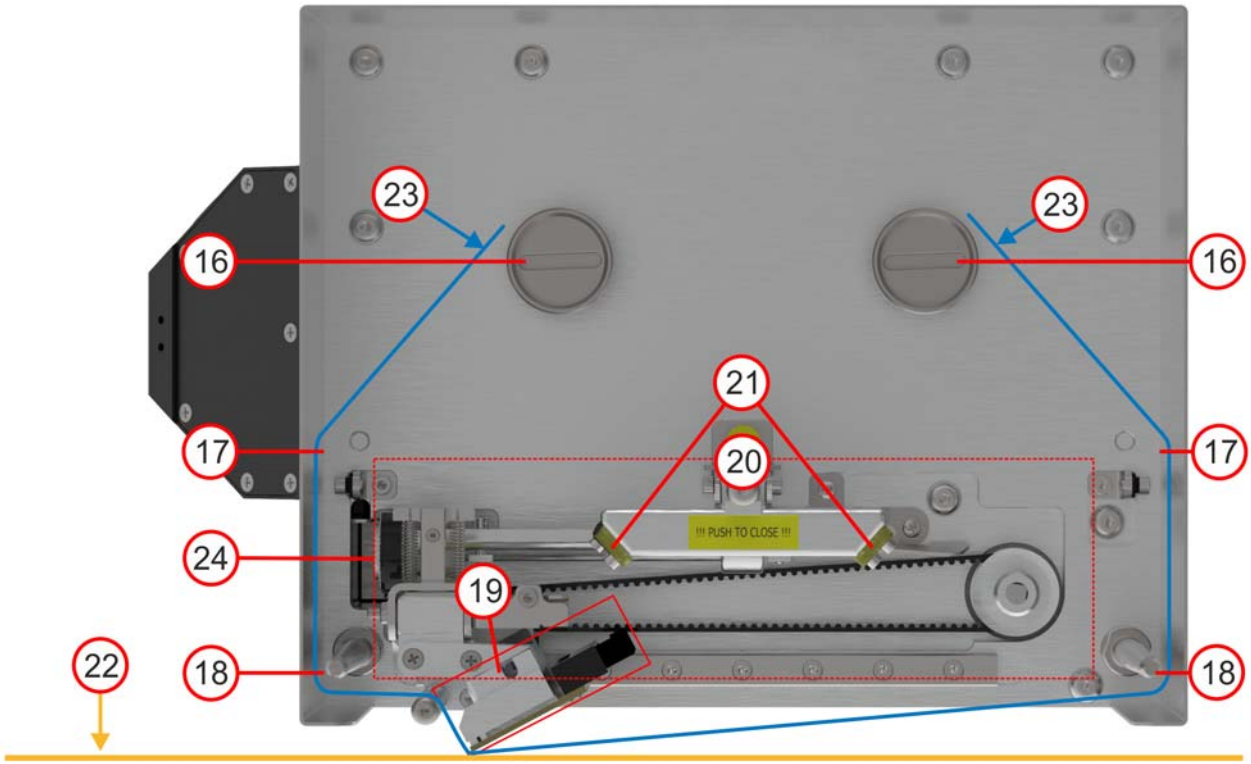


Figure 3-4: Schematic representation of ribbon progression

No.	Description	No.	Description
16	Ribbon axle coupling with lock (2x)	19	Print head
17	Upper guide roller with insert pin (2x)	20	Printhead horizontal movement drive
18	Lower guide roller (2x)	21	Ultrasonic sensor (2x)

No.	Description	No.	Description
22	Progression of substrate	24	Printhead vertical movement drive
23	Schematic progression of print ribbon		

3.4.2 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.

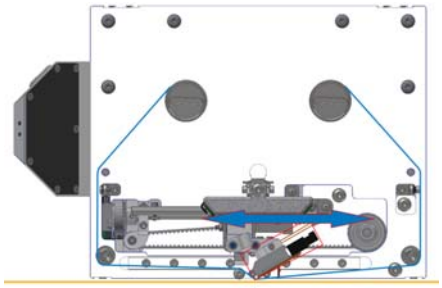
Thermal transfer printing uses a thermal printhead and a thermal transfer ribbon (print ribbon). The printer heats the appropriate heating elements on the thermal printhead at great speed, to transfer wax/resin to the flexible packaging. With this technology, a barcode or text with a very high resolution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

3.4.3 Operating modes

The TT-Series has two operating modes:

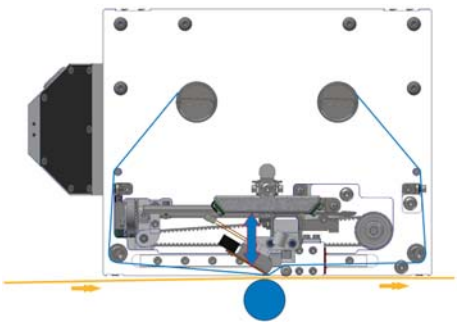
1. Intermittent.

In the intermittent mode, the substrate is stationary during the printing process. In order to print, the printhead moves downwards, pressing the print ribbon against the substrate. Next, the head performs a vertical stroke over the print ribbon and substrate. During this stroke, the heat 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.



2. 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. This means that the print ribbon is pressed against the substrate while it is already in motion. 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.

3.5 Status screen

The status screen consists of the following parts:

Figure 3-5: Status screen

No.	Description
1	USB ports
2	Display
3	Control buttons

Production data

The status screen displays several basic production data, including:

1. Time.
2. Status.
3. Printing speed.
4. Print counter.
5. Label ID/name.
6. Printer-ID/name.
7. Amount of ribbon used (in % and/or metres).
8. Notifications from KCC software.
9. Background colour changes depending on printer status.

General settings

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

1. Language.
2. Rotation/viewing orientation display.
3. Network settings: IP-adres/Subnet mask/Gateway.
4. Firmware update: When USB with new firmware is introduced.
5. Health report download: When USB is inserted without firmware.
6. Download current settings/labels: When USB is inserted without firmware.
7. Printer pause/start.
8. Load test print.
9. Print test print.
10. Bluetooth discoverable/pair.

> ***Extensive process parameters, settings and job processing can be read and set on the separate HMI KCC that is supplied with the TT-Series.***

3.6 HMI Kortho Control Center

The Interface software for all Kortho printers is called Kortho Control Center (from here on referred to as 'KCC'). This software is installed by default on the Kortho Printerface IoT controller, 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 250 Kortho 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:

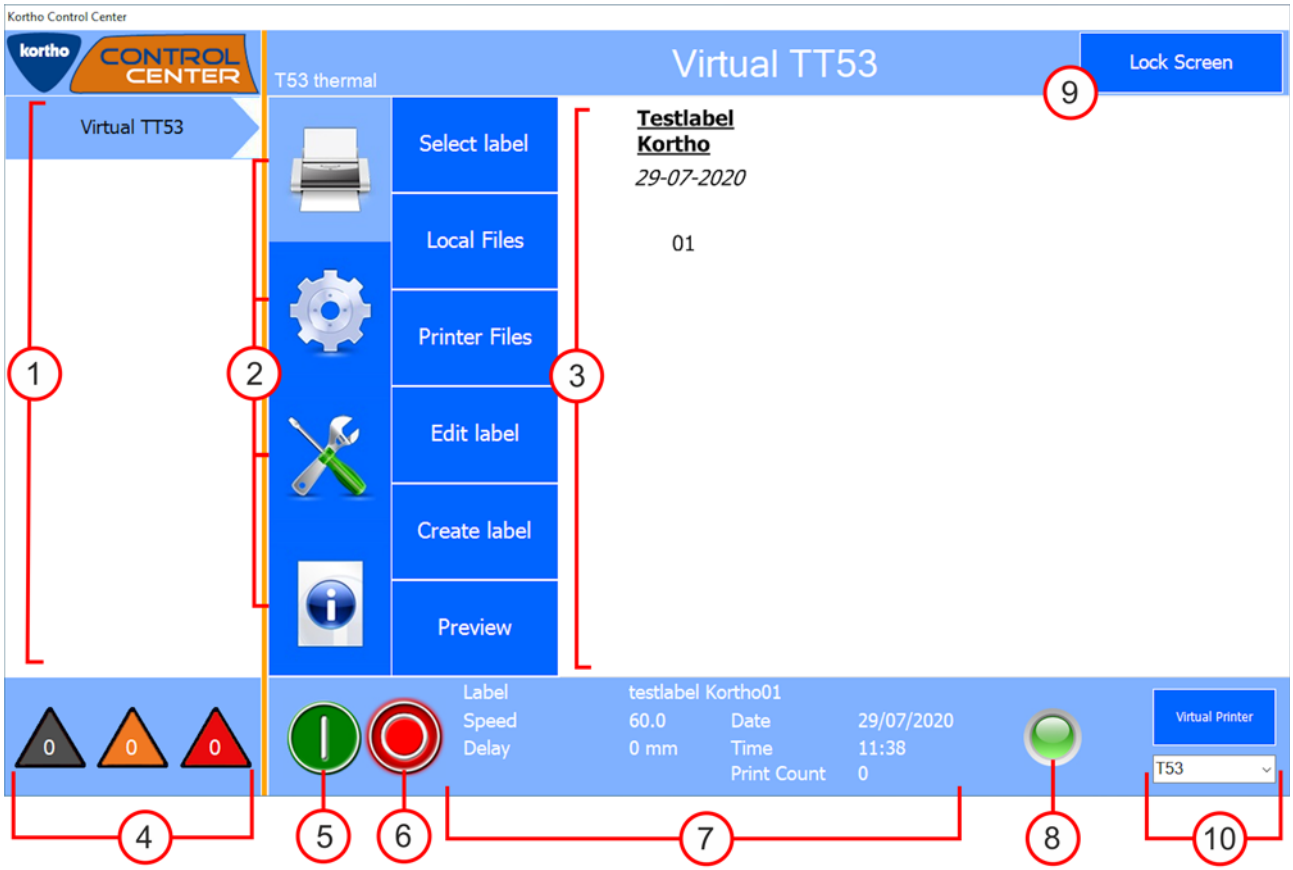


Figure 3-6: HMI

No.	Description
1	IP PRINTER-ID OVERVIEW Displays a list of all network-connected printers. - Connected printers will automatically be found and displayed in the printer ID overview. - 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. - Depending on the status of the printer, the printer ID button will change colour (Offline = Grey, Ready/OK = Blue, Warning = Orange, Error = Red).

No.	Description
2	PRINTER SELECTION MENU **Press** one of the four buttons to expand the menus. The four buttons are: - Print (label selection and label management). - Settings (printer and interface settings). - Service and diagnostics (service and diagnostics functions). - Information (system information).
3	ACTIVE MENU SCREEN - Displays the selected menu. In this example: 'Select label'.
4	PRINTER STATUS TRIANGLES Displays the status of all active printers in the IP address list. • Grey = no connection. • Orange = warning. • Red = error. - The number in the triangle indicates the number of printers with the relevant status.
5	START BUTTON **Press** this button to start the printer. - The printer will wait for a signal from the production line.
6	STOP BUTTON **Press** this button to pause the printer. - The printer will not print, regardless of what the production line is doing.
7	GENERAL PRINTER INFO Displays the name of the selected label, speed, delay, date, time and number of prints. - This data is also visible on the display of the printer itself.
8	SIGNAL STRIP Displays the status of the printer selected in the IP address list. • Blue = voltage present. • Green = ready. • Orange = warning. • Red = error. • Pink = update software.
9	LOCK SCREEN **Press** this button to lock the screen.
10	VIRTUAL PRINTER To perform tests.

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

3.7 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 = voltage present.
- 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

This chapter describes the installation procedure for the TT-Series.

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 vibration-free.

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:

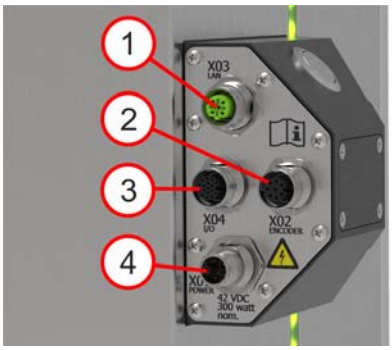
1. **Mount** the TT-Series in the facility provided to that end.

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

3. **Mount** the HMI (Kortho Printerface IoT or your own system, Windows 10 or higher) at the desired location and connect the desired number of printer(s) via Ethernet.

4. **Connect** the TT-Series.

The printer has the following connectors.



1. Ethernet.
2. Encoder.
3. I/O (freely configurable).
4. Power supply.

Securely tighten the clamping ring of the connectors.

4.6 Power supply installation

See Appendix 5 for installation instructions for the external power supply. This is recommended by BV Korthofah for use with the TT-Series.

4.7 Installation KCC-software

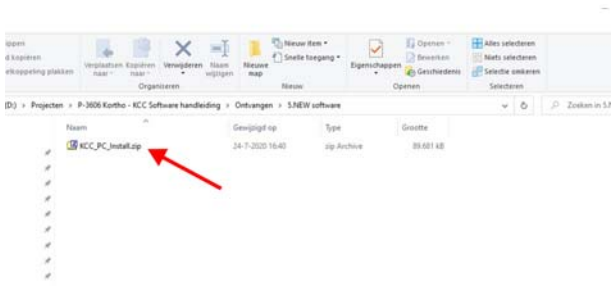
To install the KCC software, perform the following operations:

1. **Open** the website of BV Korthofah:WWW.KORTHO.COM.
2. **Click** on FAQ.

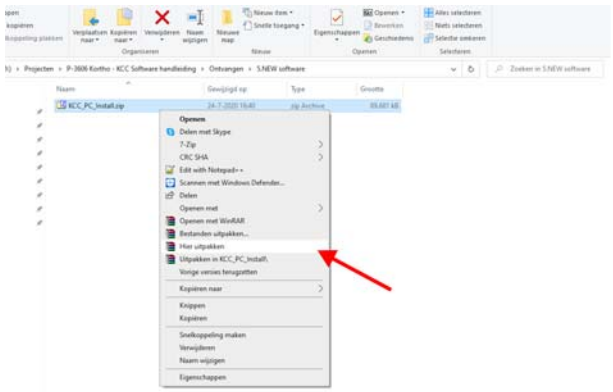
A list of different software options will open. In this case:

3. **Click** on KORTHO CONTROL CENTER (VERSION -X-).

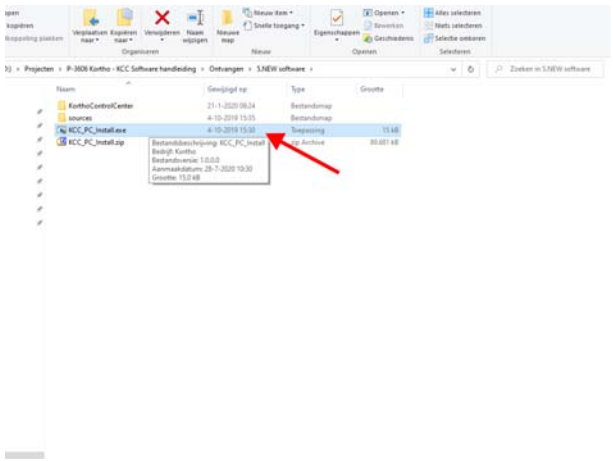
4. **Select** the desired folder where the installation folder can be downloaded.
- The installation folder is a .zip file.



5. **Extract** the zip file.

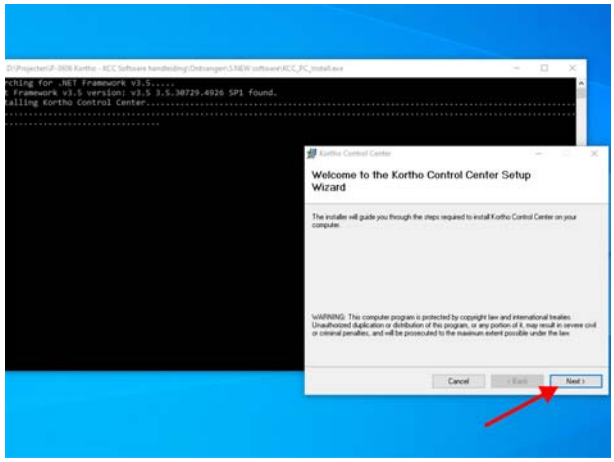


6. **Double click** the file: KCC_PC_INSTALL.EXE
- The installation program opens.

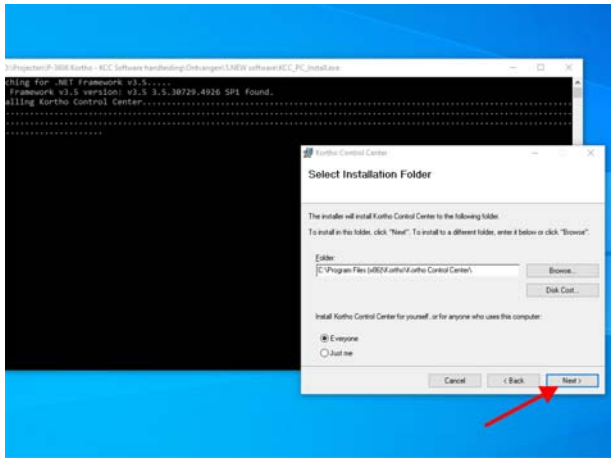


Follow the steps in the installer:

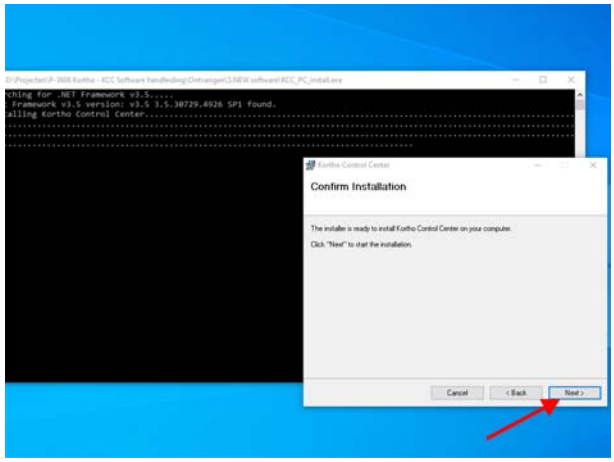
7. **Click** on NEXT.



8. **Select** the file location where the program should be installed.
9. **Select** whether the program on this computer is intended for everyone or just for yourself.
10. **Click** on NEXT.

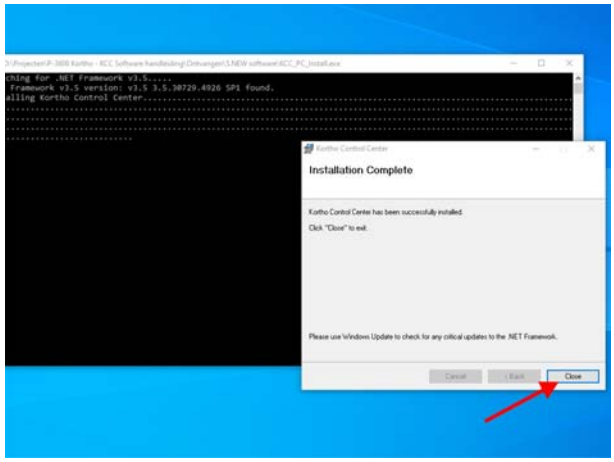


11. **Click** on NEXT to start the installation.

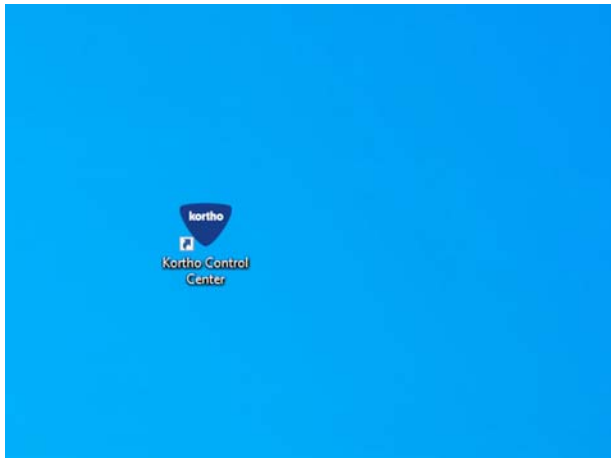


Upon successful installation:

12. Click on CLOSE to close the installer.
- If necessary, run a manual Windows update to check the computer for critical updates to the .NET Framework.



A shortcut to open the Kortho Control Center will appear on the desktop.



4.8 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: Label 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 configuration

This chapter contains information on how to perform the adjustment for the TT-Series.

5.1 Safety regulations

The configuration must be done by qualified personnel.

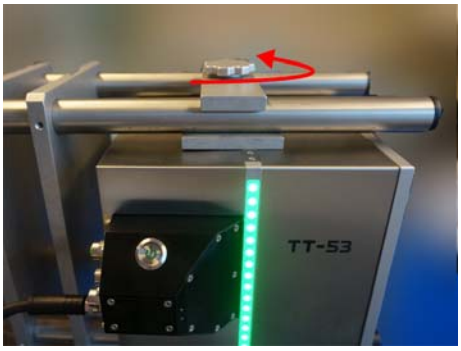
Correct configuration before commissioning is very important for the TT-Series. It improves print quality, reduces wear on parts and extends machine life.

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:

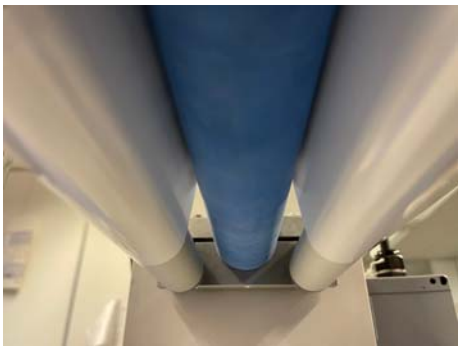
1. **Slightly** loosen the set screw.
- The printer does not need to be removed from the frame.

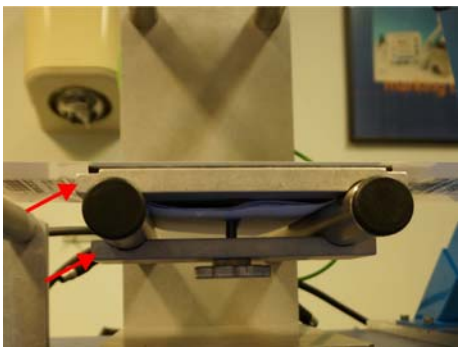


2. **Move** the printer to the desired location along the tubular frame.

3. **Retighten** the adjusting screw to secure the printer.

Depending on the operating modes, counterpressure material may need to be mounted on the underside of the printer. For intermittent printing, this is a counterpressure plate. For continuous printing, a counterpressure roller.





5.3 Adjusting the counterpressure material under the printer

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 printhead. 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.

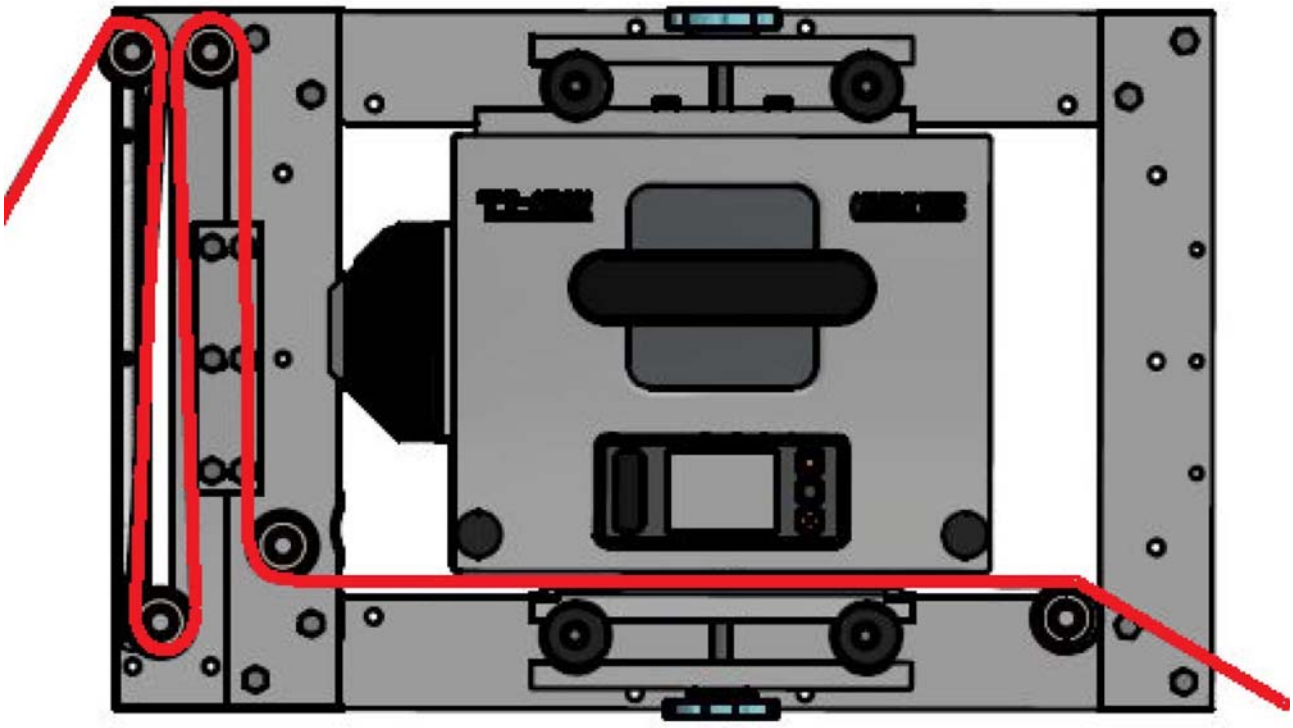


Figure 5-2: Intermittent set-up

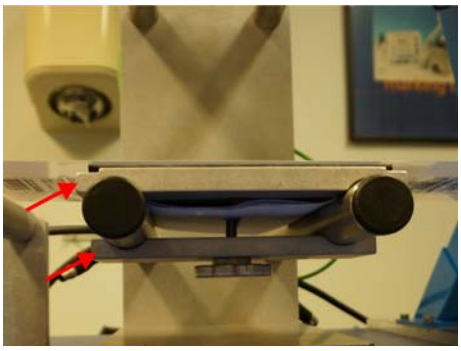
The substrate buffer on the left in the example is optional and only required if it is necessary to manually adjust the print position on the substrate.

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

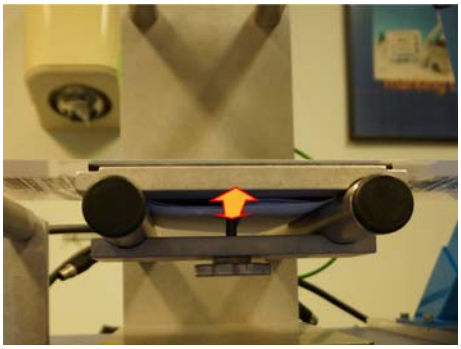
The counterpressure plate must be mounted parallel to the bottom of the printer with the maximum print stroke falling within the dimensions of the plate. This is necessary to prevent the head from protruding over the edge during printing.

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

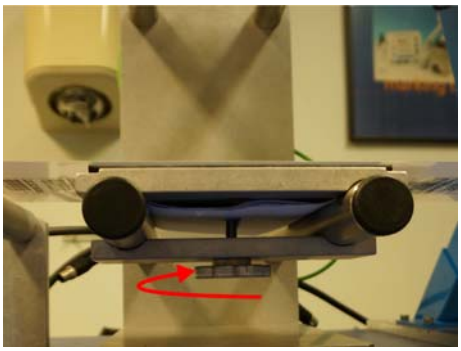
1. **Mount** the module with the counterpressure plate in the tubular frame under the printer.



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



3. **Retighten** the adjusting screw 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 wheel must be placed on the substrate. 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.

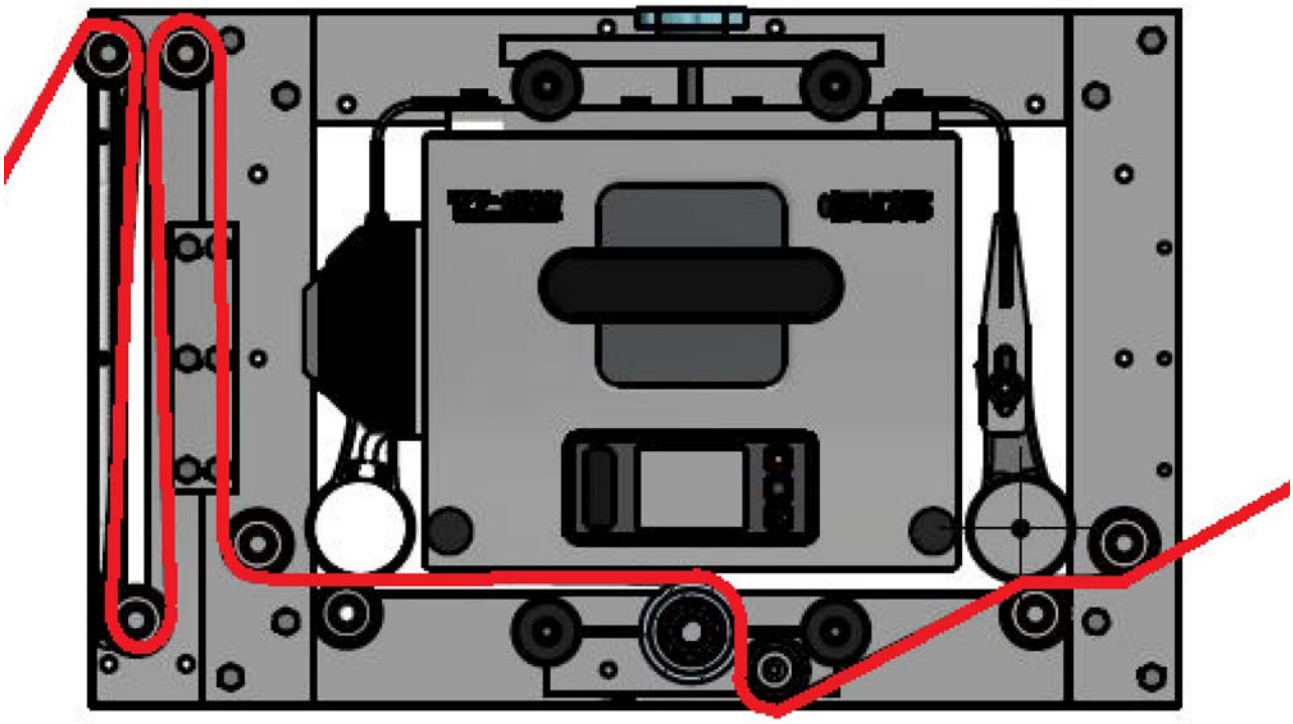


Figure 5-3: Continuous set-up

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 cm from the underside of the printer. Within this distance, the head will automatically position itself on the roller.

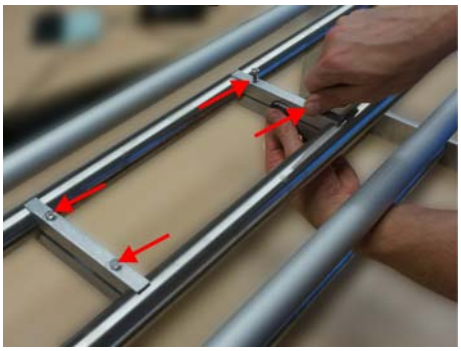
⚠ ***The encoder can be mounted on the long side of the suspension block. If you turn the block the, the encoder will be on one side or the other of the printer. Ideally, this is before the print position, so that the wheel cannot run over the print. Also make sure that the substrate is properly clamped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

⚠ ***In the example, only 1 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.***

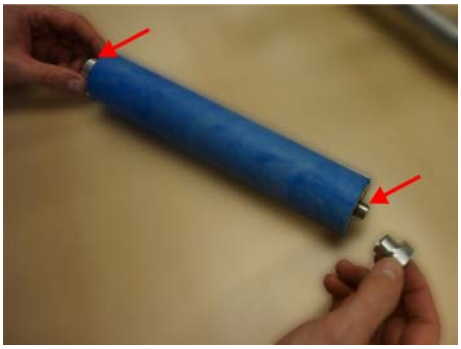
To mount the counterpressure roller under the printer, perform the following operations:

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 four rods 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.

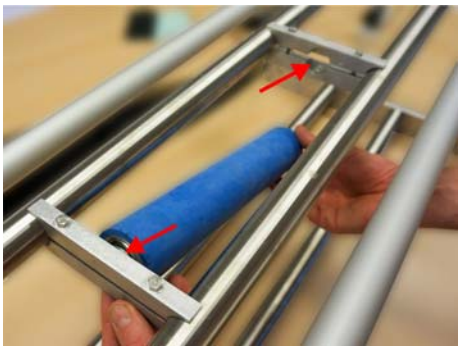
1. **Mount** two end plates onto the two fixed rods of the frame.
- Hand-tighten the bolts.



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

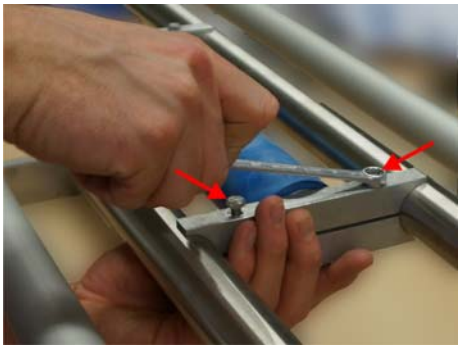


3. **Place** the counterpressure roller and the substrate guide roller(s) between the two end plates.
- If necessary, slide the end plates so that they clamp the spacers entirely.

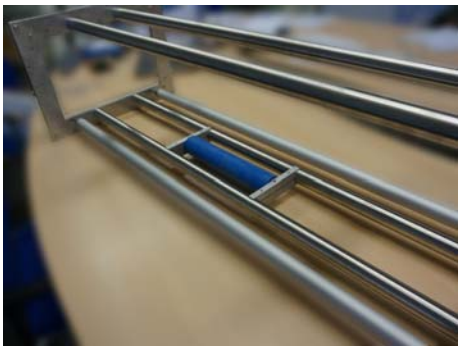


⚠ ***When clamping the counterpressure roller and guide rollers, make sure they can rotate freely. To guarantee this is possible, the rollers should not be clamped at the ends. Leaving some space will allow them to rotate freely and without resistance.***

4. **Tighten** the four bolts of the end plates.
- Use key 8 to do this.



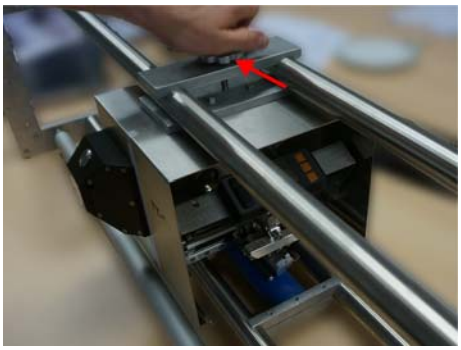
The test set-up is now rotated with the counterpressure roller down. Above the counterpressure roller, the printer will be mounted on the two tubes at the top.



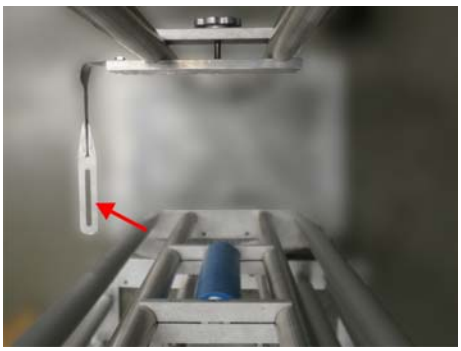
5. **Mount** the two mounting plate bolts to the printer.
- Use key 8 to do this.

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

7. **Position** the printer over the counterpressure 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 star knob to secure the printer.

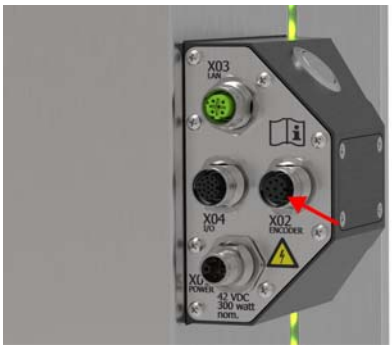


10. **Mount** the encoder in the designated position on the long side of the suspension block (to the left or right of the printer).

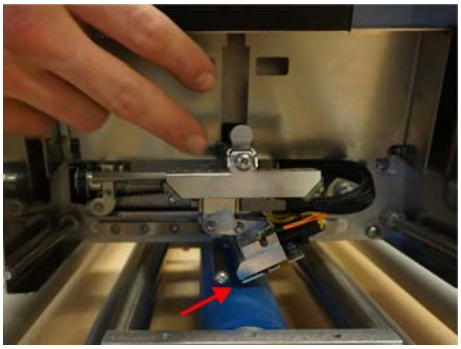


! ***The counterpressure roller will not always rotate synchronously with the substrate, in other words, measuring the roller alone will be unreliable. Therefore, make sure that the encoder wheel is always positioned on the substrate itself.***

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 counterpressure roller.



The TT-Series will go through a start-up procedure after each cassette closure. Among other things, the printhead will verify the distance at which the counterpressure material is located by moving towards it until it touches it. The maximum range here is 6 mm. After contact, the printhead will move back 2mm 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 counterpressure 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 counterpressure material. The substrate must not sag or bulge up at the print position and must be passed horizontally under the printhead across the entire width. The Kortho TT-Series bracket comes with 4 additional rollers that can be used for this purpose.

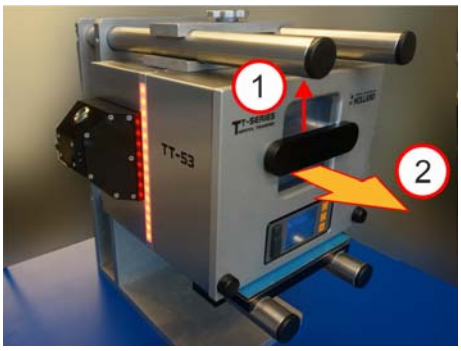
5.4 Printhead adjustment

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

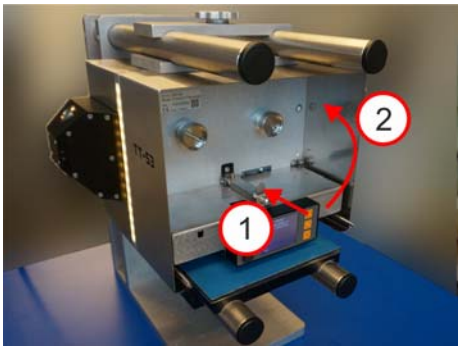
1. **Press** the STOP button to stop the TT-series.
- The printhead moves to its 0-position.

The back side of the cassette handle has a latch.

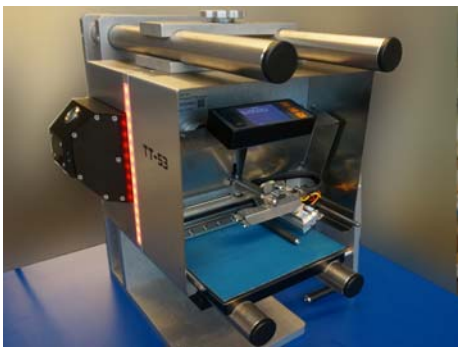
2. **Push** the lock up and **pull** the cassette towards you.
- Check that the print ribbon does not get cought behind components.



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°.***

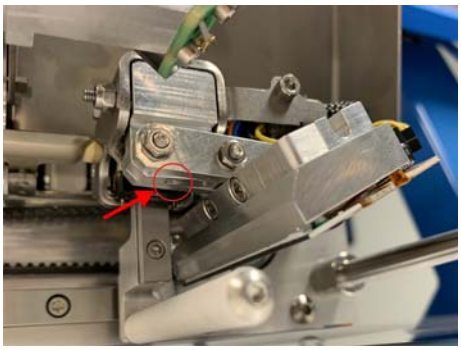
5.4.1 The tilting resistance of the printhead

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.

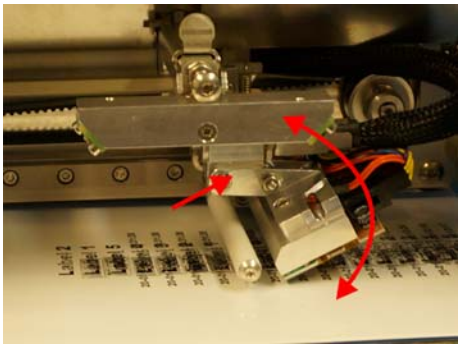


5.4.2 The printing angle of the printhead

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

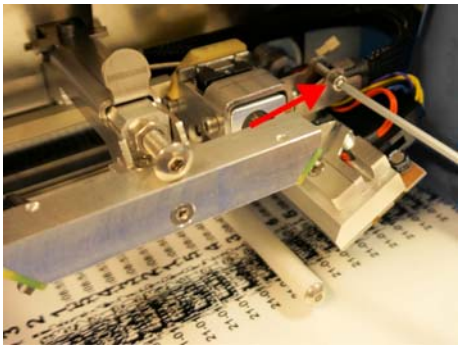
Seen from the front, the substrate can be transported under the printhead from left to right (from now on right-handed) and from right to left (from now on left-handed) during the printing process. In Intermittent mode, the printhead for both left and right-handed use should be mounted with the cables 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.

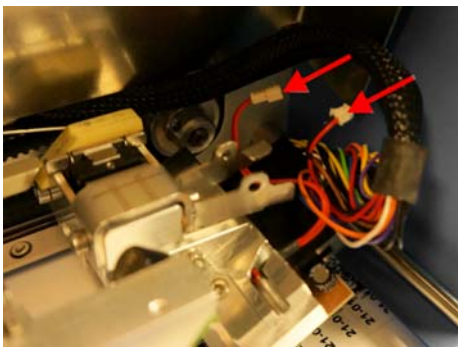
The intermittent or continuous left or right mode can be selected in KCC. See the separate KCC software manual for details.

Perform the following operations to reverse the printhead:

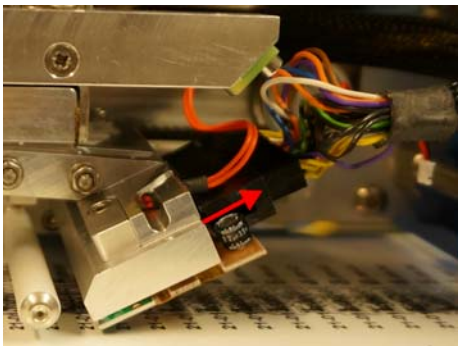
1. **Open** the printhead cable clamp.
- This may be bent open slightly.



2. **Disconnect** the connector from the pre-heating cable (red-black).

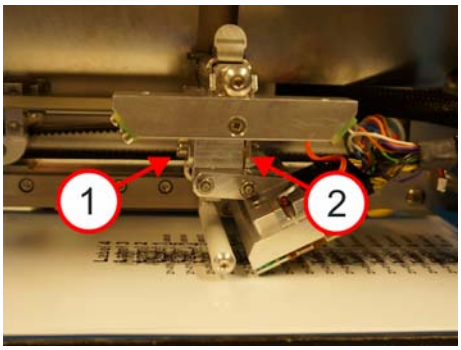


3. **Disconnect** the connector from the printhead wiring harness.

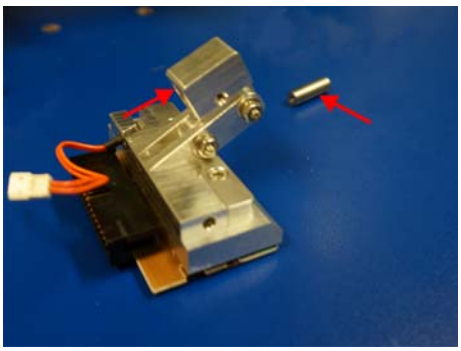


4. **Remove** the socket bolt (1) and screw (2) out of the tilting block.

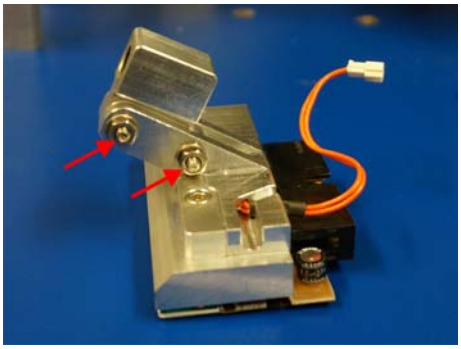
- The printhead can now be removed from the holder.
- Please note that the tilting block is fitted with a threaded axle. This may fall out with removal.



5. **Remove** the threaded axle from the tilting block.

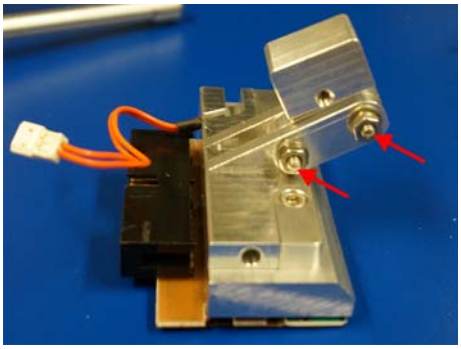


6. **Remove** the nuts on the side of the tilting block.

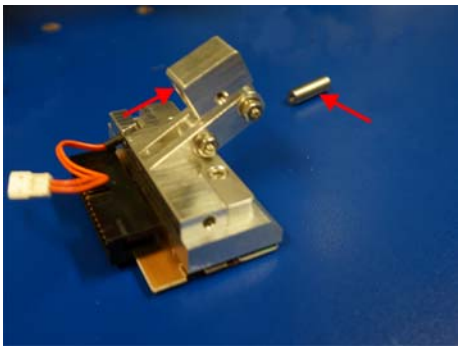


Rotate the printhead 180°!

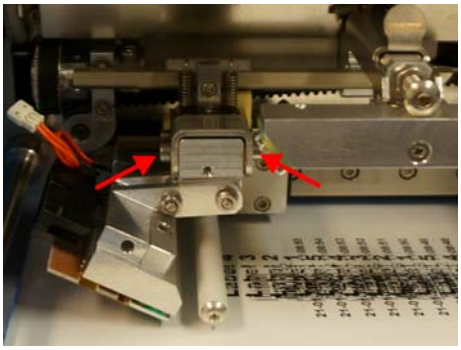
7. **Mount** the nuts back onto the printhead.
- The nuts of the tilting block must always face outwards. Towards the user (front view).



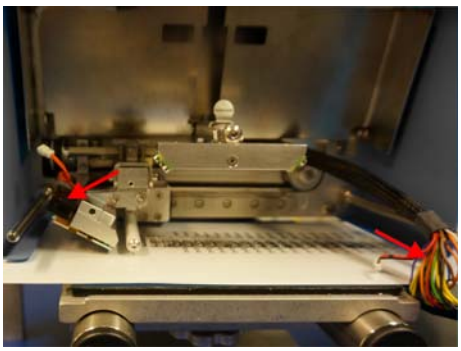
8. **Position** the threaded axle back into the tilting block.



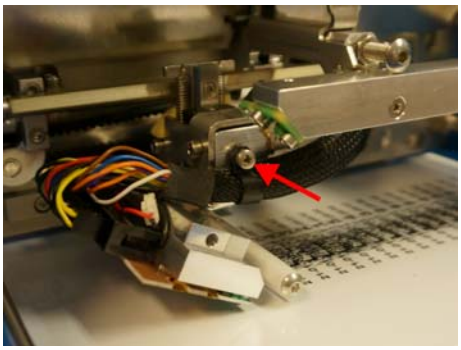
9. **Mount** the printhead back into the holder.



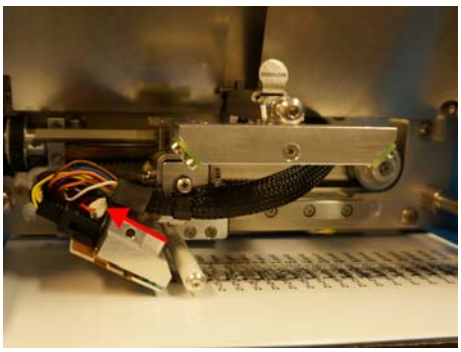
10. Reconnect the wiring harness connector.



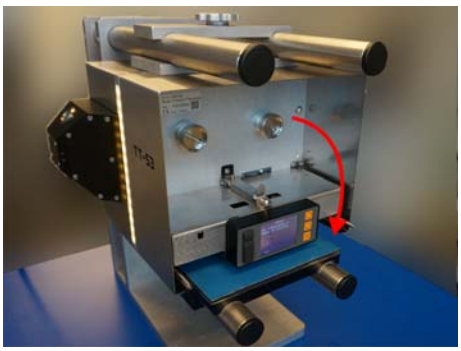
11. Mount (in this situation) a P-clamp on the tilting block through which the cable is routed.



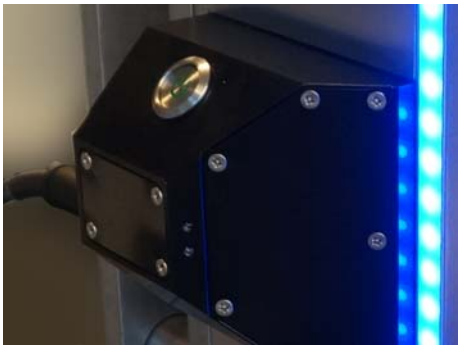
12. Connect the connector of the pre-heating cable.



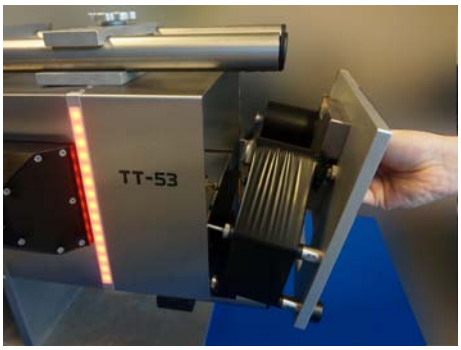
13. Close the printhead cover.



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



15. **Put** the cassette back.



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

This chapter provides information on the operation of the TT-Series.

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 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.

2. Check the following points:
- Test input and output.
- Test encoder operation.
- Test LAN connection.
- Test USB at the front.
- Test the three buttons on the display.

6.3 Start-up

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

1. **Select** the Printer ID button of the printer to be started.

2. **Select** the desired label to be printed.
- Check the printer and material settings.

3. **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.

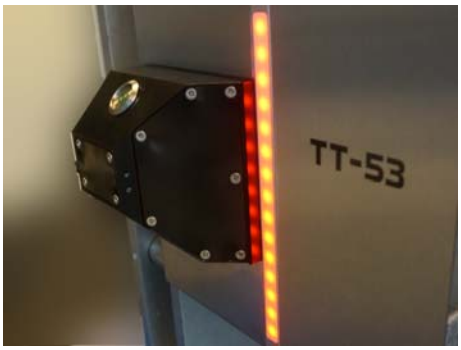
6.4 Changing the print ribbon

During production, the roll of ribbon in the printer may sometimes run out. The printer indicates this as follows:

- In KCC, you can enter at which remaining ribbon length the "low ribbon" notification is issued.

- 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 notification will appear as a pop-up in combination with a colour change of the printer ID button (orange for warning, red for error).



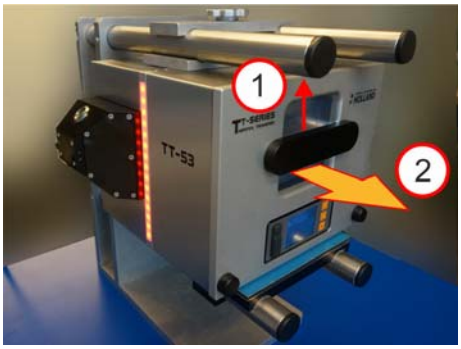
Perform the following operations to change the TT-Series print ribbon:

1. **Select** the Printer ID button of the printer for which the ribbon needs to be replaced.
- 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.

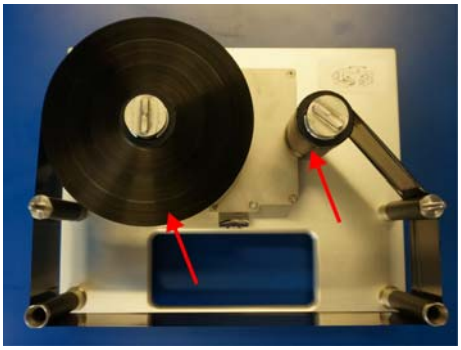
The back side of the cassette handle has a latch.

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



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

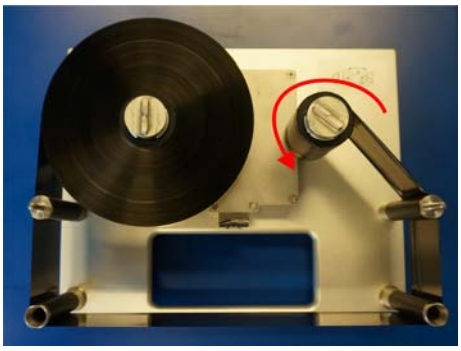
5. Remove both rollers.



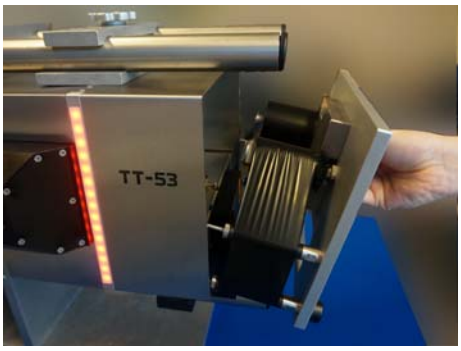
6. Position a new roller (1) and a winding roller (2) on the ribbon axle.
- Depending on the operating mode, a new roller must be placed on the left or right ribbon axle. More information can be found at the bottom of this section.

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 on 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.



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 TT-Series has been refilled and can be restarted. Below is a schematic representation for placing a full roller in relation to the operating mode:

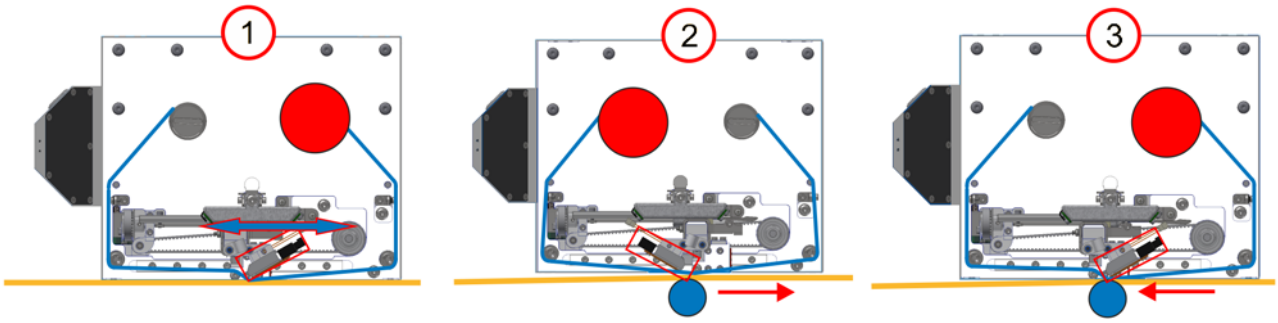


Figure 6-1: Positioning a full roller in relation to the operating mode

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 ID button of the printer to be stopped.

2. **Press** the STOP button to stop the TT-series.

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.

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Version date: Febuary 3, 2022

7 Maintenance

This chapter describes the maintenance that should be carried out.

7.1 Safety regulations

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

Maintenance 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.

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 Inspection

Periodic inspection is required to ensure optimal operation of the TT-Series. The frequency of these inspections depends on the operating conditions.

Inspections may only be performed by skilled technicians. Please read the safety instructions carefully.

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

7.3 Service sheet

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.

Below is an overview of the maintenance work:

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. These include, among others: - Peel-off roller bar (near the printhead). - The printhead on the side that touches the substrate. - Foil guides on the cassette.	Weekly
Check the mounting of the printer. It should not be moving across the frame.	Annually
Check the housing for dents, particularly at the rear near the PBC.	Annually
Check for belt wear. - Printhead carriage belt (1x). - Printhead up and down belt (1x). - Belt near foil motors (2x).	Annually
Check the printhead cable for wear. - Is it attached correctly? - Is it still able to move freely? - Is the shielding still of good quality?	Annually
Check the counterpressure plate. - Clean the counterpressure plate with alcohol if it is soiled. - Replace the counterpressure plate if scratches or dents are visible. See Appendix 4, Spare Parts.	Annually
Check the operation of the printhead. - 1. Check that the correct counterpressure plate has been applied. - 2. Set the density and pressure as low as possible. - 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

Maintenance manual	Frequency
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 in the connector block for proper assembly and any wear.	Annually
Check the printer software for updates.	Annually
Check the KCC software for updates.	Annually

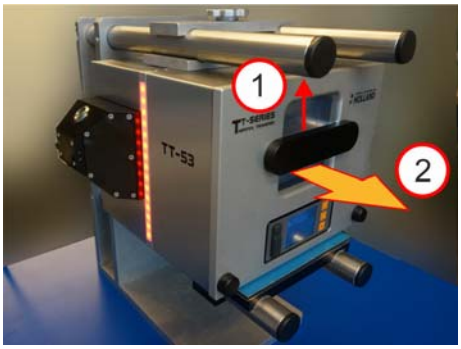
7.4 Replacing the printhead

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

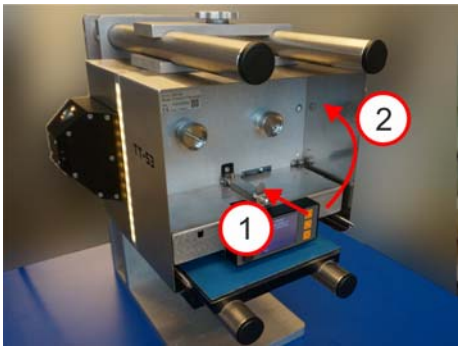
1. Press the STOP button to stop the TT-series.
- The printhead moves to its 0-position.

The back side of the cassette handle has a latch.

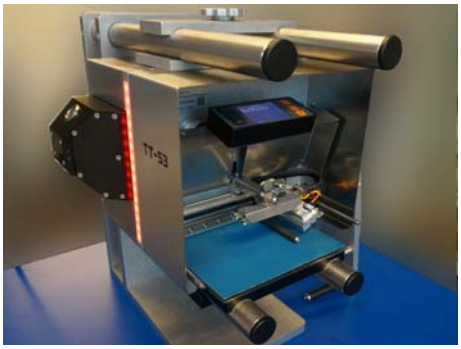
2. Push the lock up and **pull** the cassette towards you.
- Check that the print ribbon does not get cought.



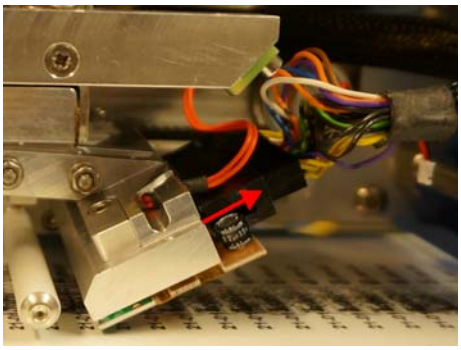
3. Press the lock (1) of the printhead cover and **lift** (2) the printhead cover.



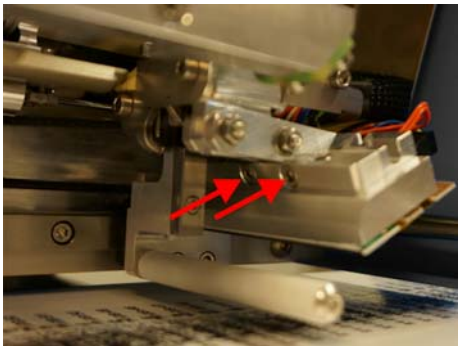
The printhead is now accessible for adjustment and maintenance work.



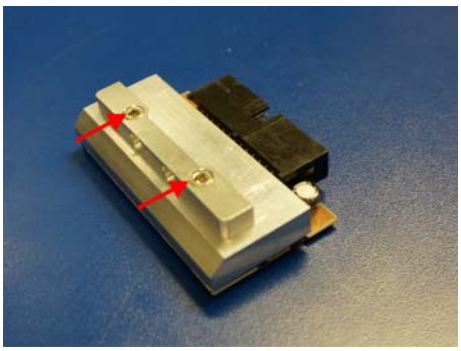
4. **Disconnect** the connector from the printhead wiring harness.



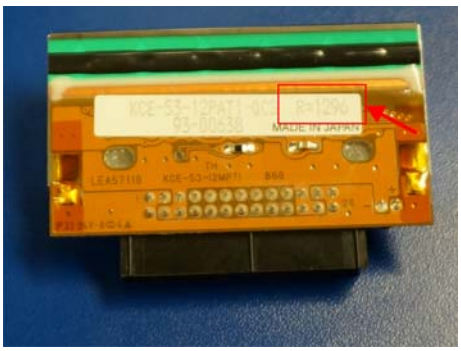
5. **Remove** the socket screws (M3x6) at the front of the printhead.



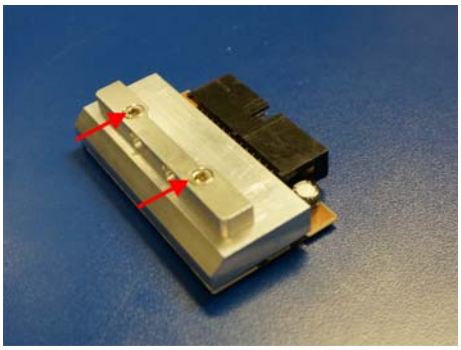
6. **Remove** the socket screws (M3x6) at the front of the mounting block at the top of the printhead..



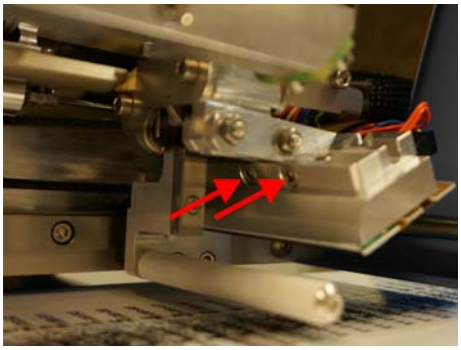
7. Take a new printhead.
- Fill in the resistance value of the printhead in KCC. Each printhead has its own resistance value. See Section 4.2.2.2. of the separate KCC software manual for details.



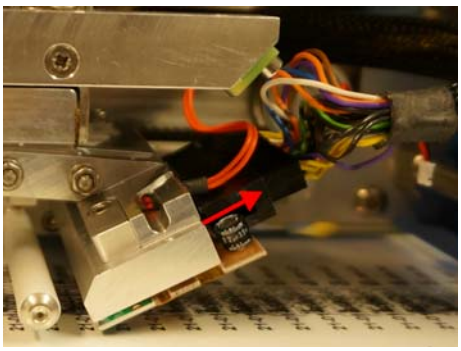
8. Mount the mounting block to the top of the printhead.



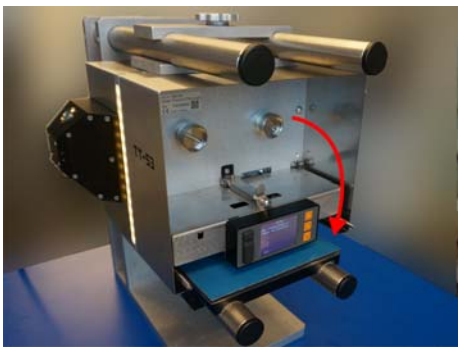
9. Mount the printhead back onto the frame.



10. Connect the connector of the printhead wiring harness.

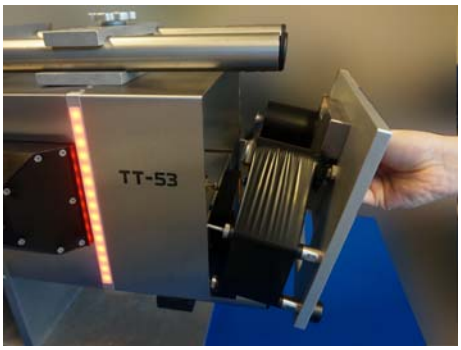


11. Close the printhead cover.



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

13. Put the cassette back.



The printhead has now been replaced.

8 Connection interface

This chapter provides information about the connection interface of the TT-Series.

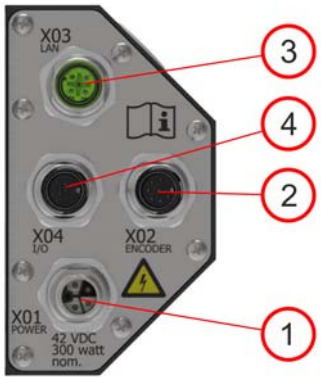
8.1 Circuit diagrams of the interfaces

On the side of your TT-series printer is a so called connector block mounted. On this block you find an connector plate with four M12 connectors. These are M12 rotary connectors. We use these to guarantee a secured and fluid proof connection.

> ***Note: because of the close connection, the screwing of the connector can be a bit stiff.***

One will find the following connection inputs in this connector block:

1. X01 - Power
2. X02 - Encoder
3. X03 - LAN
4. X04 - I/O

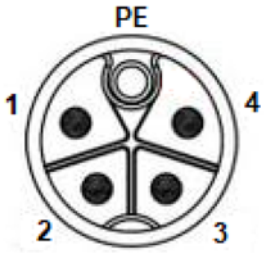


8.2 Interface X01 - Power

For mating the output voltage connector (X01) use an M12-K coded 5 pin male connector.

Pin assignment (X01):

1. Pin 1: 0VDC Out;
2. Pin 2: 42VDC Out;
3. Remote ON/OFF plus;
4. Remote ON/OFF return;
5. Pin PE: PE



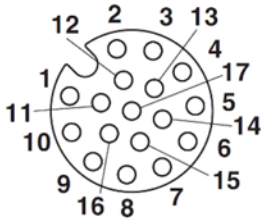
The power supply can be switched on by shorting the Remote ON/OFF interface and switched off by an open on that interface. The open circuit voltage is 15V and the short circuit current is about 15mA. The switch can be found on the connector block, which is mounted to the side of the printer.

For more information about the power supply, please see the Power Supply section.

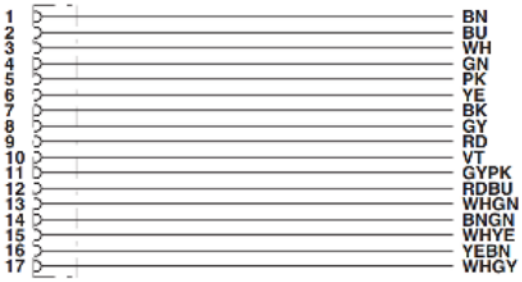
8.3 Interface X02 - I/O

Pin assignment (X02):

Pin	(default) Function	Type
1	Print A	Input (**)
2	Busy B	Output (*)
3	Print B	Input (**)
4	Trigger A	Input (*)
5	Inhibit A	Input (*)
6	Trigger B	Input (*)
7	Ribbon OUT A	Output (*)
8	Inhibit B	Input (*)
9	Busy A	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	24V	Power (**)
16	Chassis_GND	Passive(**)
17	GND	Power (**)



Circuit diagram



8.3.1 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) - When the Inhibit input is active, the system will not print. When this input becomes active during the printing process, it will finish the print first. This function can be used as a safety feature on a host machine.

General Error (output) - When General Error is activated the printer has ended up in a state that it can't print. This output tells the operator that an error has occurred which requires user attention. An error can be caused due to a ribbon out, ribbon broken, print missed or mechanical/ electrical failure.

Connect the error output on a optical device (i.e. lamp, buzzer, etc) or on the host machine. This will stop the host machine when the printer reports an error. The output signal can be set to be active high or active low.

Busy (output) - This output signal tells the host machine that the printer is busy printing and that the substrate should not move. This signal can be leading (High) or falling (Low) edge synchronised. This signal is active from the moment the thermal printhead is going down until it is going up again. So, the period that the thermal printhead is in contact with the substrate.

Foil out (output) - When the foil reaches the end of the ribbon roll, the system stops and activated the foil out output. Also the general error output will come up.

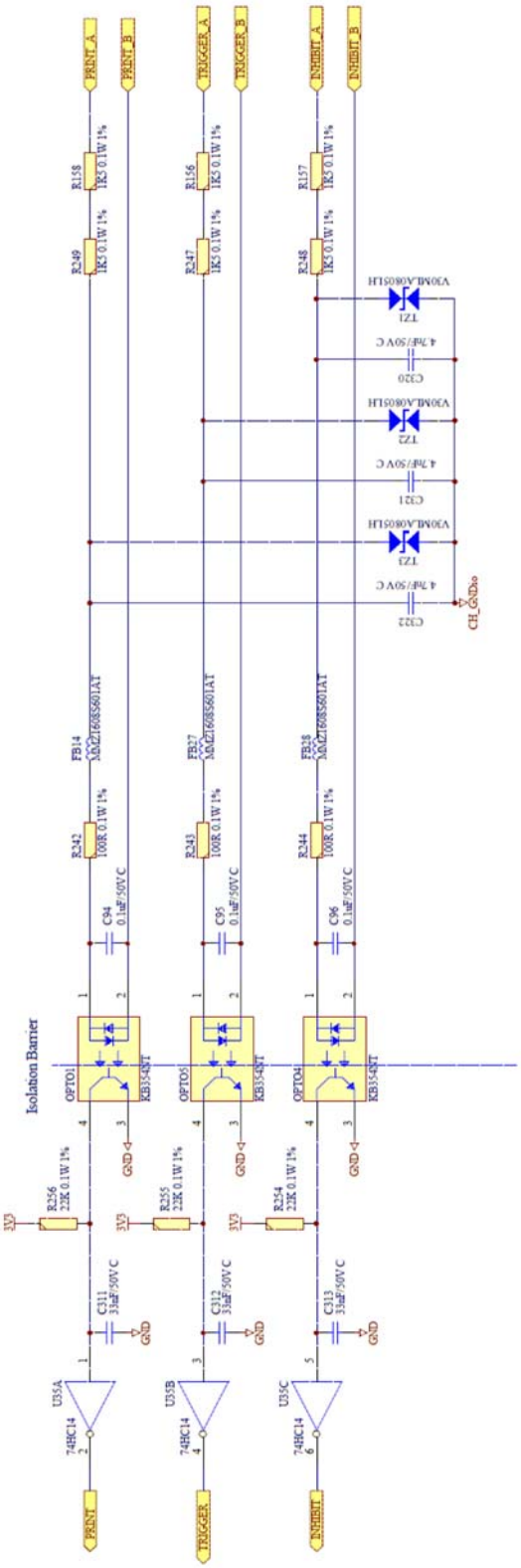
Ready (output) - The printer waits for a triggerpulse on PRINT REQUEST when this output is activated. This output becomes active when the following conditions are true:

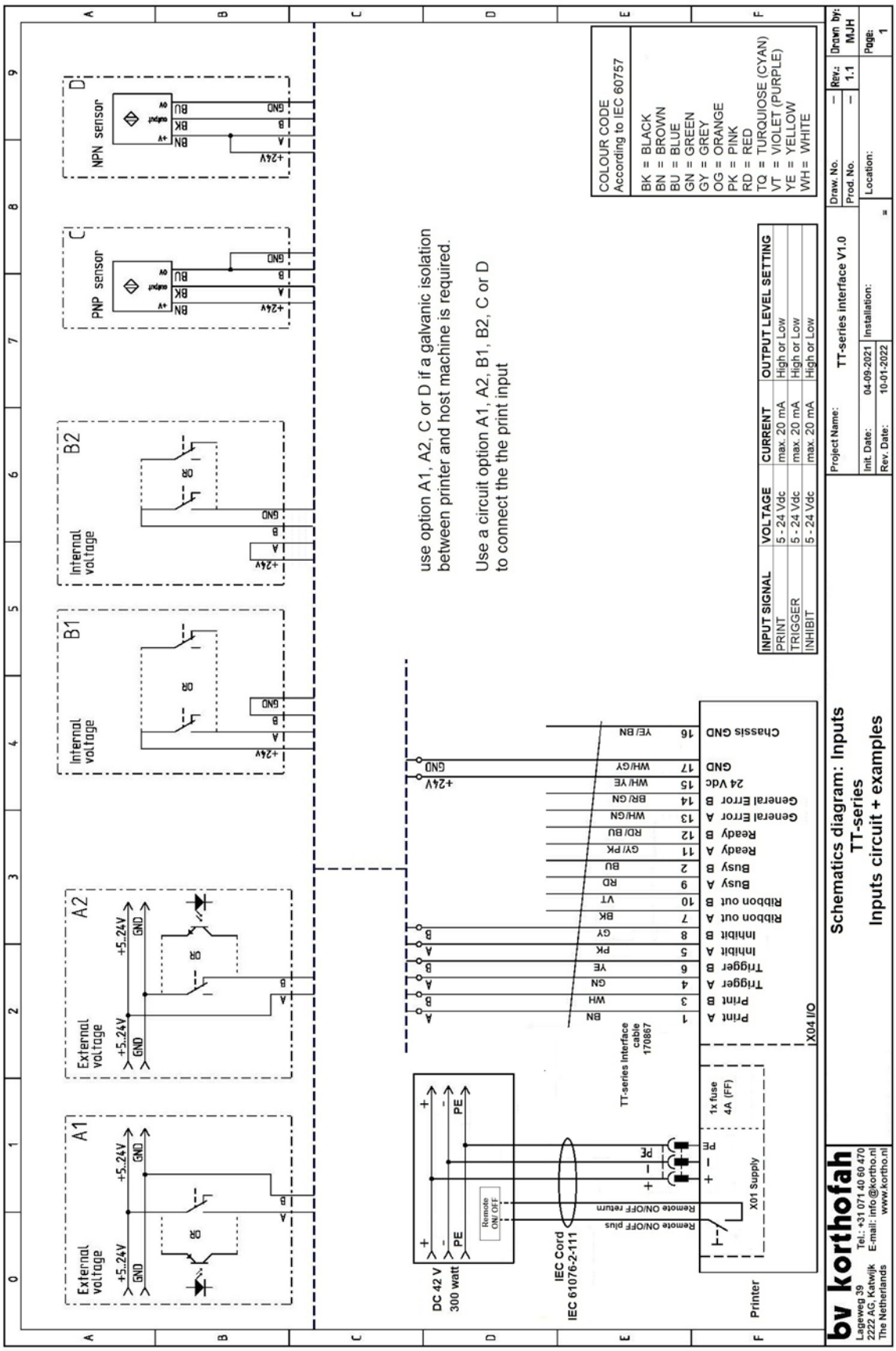
- The system must be on,
- The system must be in Standby mode,
- General alarm must be inactive.

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

8.3.2 Inputs

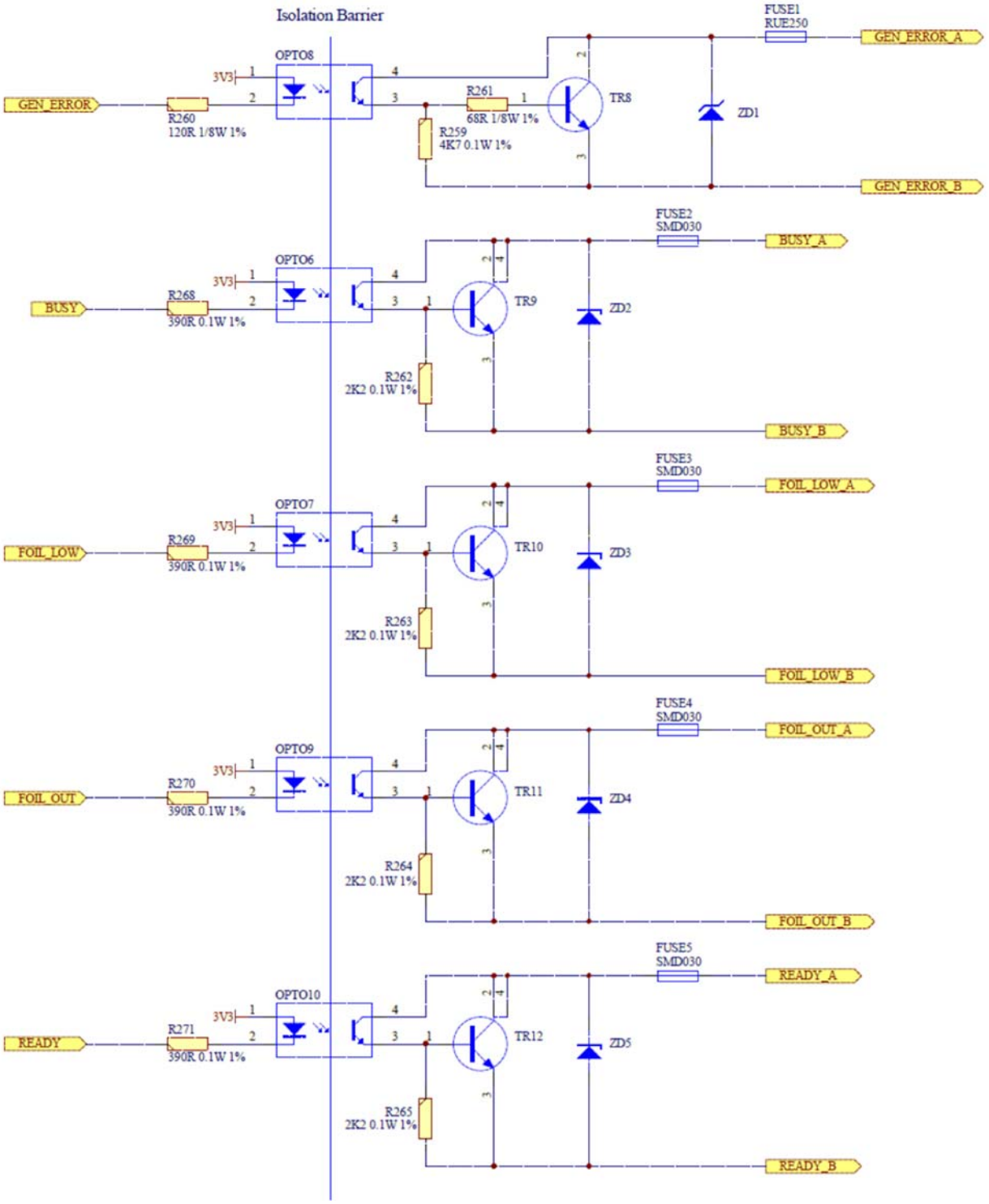
Internal:

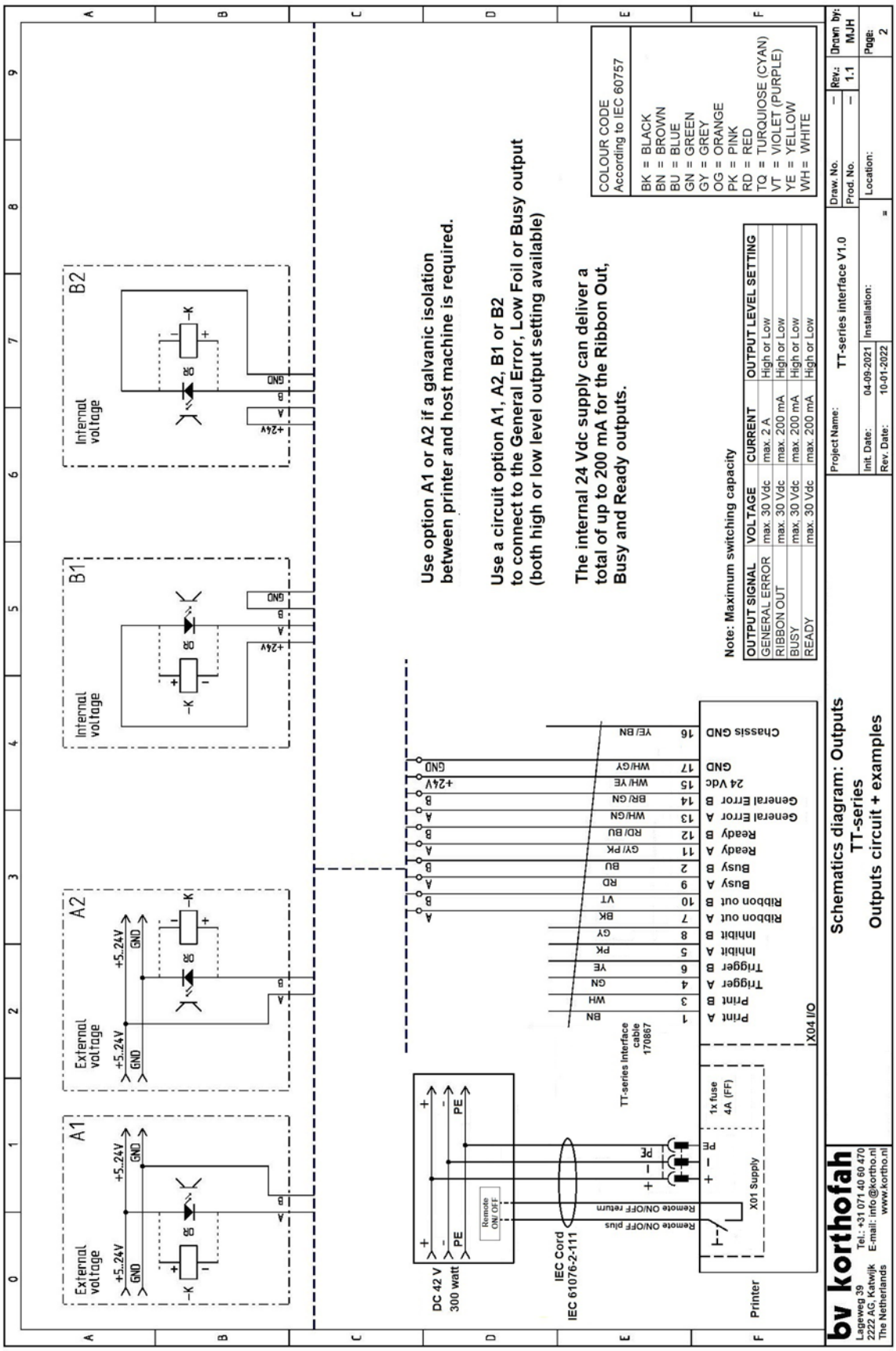



Schematics diagram: Inputs
TT-series
Inputs circuit + examples
TT-series interface V1.0
bv korthofah
Lageweg 39
2222 AG, Katwijk
The Netherlands
Tel.: +31 071 40 60 470
E-mail: info@kortho.nl
www.kortho.nl
INPUT SIGNAL | VOLTAGE | CURRENT | OUTPUT LEVEL SETTING
PRINT | 5 - 24 Vdc | max. 20 mA | High or Low
TRIGGER | 5 - 24 Vdc | max. 20 mA | High or Low
INHIBIT | 5 - 24 Vdc | max. 20 mA | High or Low
use option A1, A2, C or D if a galvanic isolation between printer and host machine is required.
Use a circuit option A1, A2, B1, B2, C or D to connect the the print input
COLOUR CODE According to IEC 60757
BK = BLACK
BN = BROWN
BU = BLUE
GN = GREEN
GY = GREY
OG = ORANGE
PK = PINK
RD = RED
TQ = TURQUIOSE (CYAN)
VT = VIOLET (PURPLE)
YE = YELLOW
WH = WHITE
NPN sensor
PNP sensor
Internal voltage
External voltage
DC 42 V 300 watt
IEC Cord IEC 61076-2-111
TT-series Interface cable 170867
X04 I/O
X01 Supply
1x fuse 4A (FF)
Printer
Remote ON/OFF
Remote ON/OFF plus
Remote ON/OFF return
Chassis GND
GND
24 Vdc
General Error B
General Error A
Ready B
Ready A
Busy B
Busy A
Ribbon out B
Ribbon out A
Inhibit B
Inhibit A
Trigger B
Trigger A
Print B
Print A

8.3.3 Outputs

Internal:



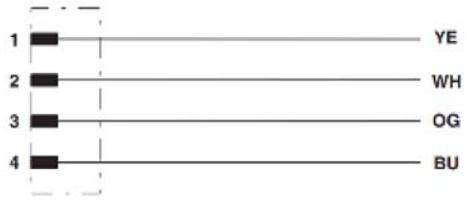

Schematics diagram: Outputs
TT-series
Outputs circuit + examples
TT-series interface V1.0
Use option A1 or A2 if a galvanic isolation between printer and host machine is required.
Use a circuit option A1, A2, B1 or B2 to connect to the General Error, Low Foil or Busy output (both high or low level output setting available)
The internal 24 Vdc supply can deliver a total of up to 200 mA for the Ribbon Out, Busy and Ready outputs.
Note: Maximum switching capacity
OUTPUT SIGNAL | VOLTAGE | CURRENT | OUTPUT LEVEL SETTING
GENERAL ERROR | max. 30 Vdc | max. 2 A | High or Low
RIBBON OUT | max. 30 Vdc | max. 200 mA | High or Low
BUSY | max. 30 Vdc | max. 200 mA | High or Low
READY | max. 30 Vdc | max. 200 mA | High or Low
COLOUR CODE According to IEC 60757
BK = BLACK
BN = BROWN
BU = BLUE
GN = GREEN
GY = GREY
OG = ORANGE
PK = PINK
RD = RED
TQ = TURQUIOSE (CYAN)
VT = VIOLET (PURPLE)
YE = YELLOW
WH = WHITE
Printer
X01 Supply
1x fuse 4A (FF)
IEC Cord IEC 61076-2-111
DC 42 V 300 watt
TT-series Interface cable 170867
X04 I/O
Chassis GND
GND
24 Vdc
General Error B
General Error A
Ready B
Ready A
Busy B
Busy A
Ribbon out B
Ribbon out A
Inhibit B
Inhibit A
Trigger B
Trigger A
Print B
Print A
Internal voltage
External voltage
+5..24V
+24V
Remote ON/OFF plus
Remote ON/OFF return
Remote ON/ OFF
bv korthofah
Lageweg 39
2222 AG, Katwijk
The Netherlands
Tel.: +31 071 40 60 470
E-mail: info@kortho.nl
www.kortho.nl
Project Name:
Init. Date: 04-09-2021
Rev. Date: 10-01-2022
Installation:
Location:
Draw. No. –
Prod. No. –
Rev.: 1.1
Drawn by: MJH
Page: 2

8.4 Interface X03 - LAN

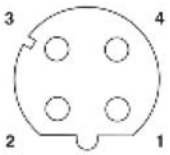
Pin assignment (X03):

1. Pin 1: ETH_TX+ (Yellow)
2. Pin 2: ETH_TX- (Orange)
3. Pin 3: ETH_RX+ (White)
4. Pin 4: ETH_RX- (Blue)

Circuit diagram



Schematic diagram



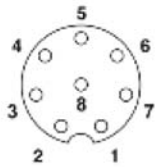
Pin assignment M12 socket, 4-pos., D-coded, female side

8.5 Interface X04 - Encoder

An encoder converts a shaft rotation to pulses. These pulses provide the control box with information about the speed of the substrate to be printed on. An encoder is used as soon as the TT-53 series is used in continuous mode. Based on the information from the encoder, the printer can bring the ribbon to the same speed (during printing) as the substrate. The print head can also adjust to the right firing speed, based on this encoder information.

PIN	FUNCTION
1	External GND
2	External 24V
3	WEB_ENCODER_A+
4	WEB_ENCODER_A-
5	WEB_ENCODER_B+
6	WEB_ENCODER_B-
7	Not used
8	Not used

Schematic diagram



Pin assignment M12 socket, 8-pos., A-coded, view female side

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

Item	Waarde
Resolution:	1800 PPR. TT-series uses it in quadrature. Which means 7200 edges per mm.
Wheel diameter:	47,75mm
Input voltage:	5 - 24Vcc
Input current:	100 mA max (65 mA typical) with no output load
Output type:	Line Driver

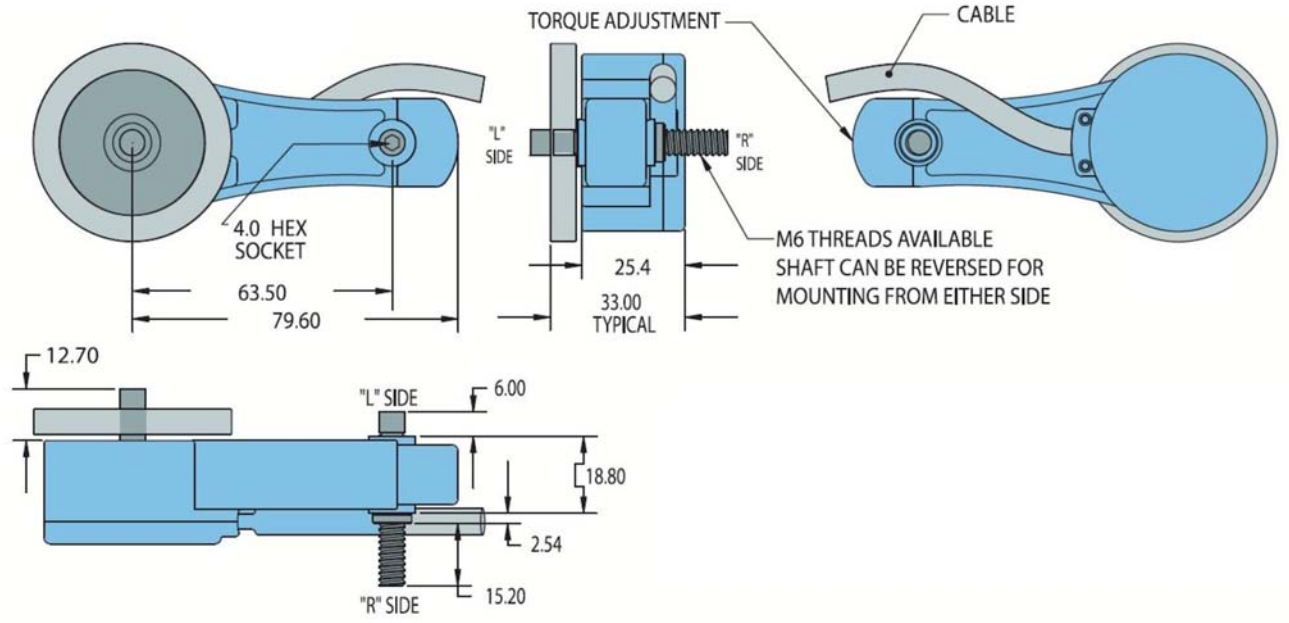


Figure 8-1: Encoder

9 Transport & storage

This chapter contains instructions for transporting, storing, and installing the TT-Series.

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 ^{o}C.
- Relative humidity: 20 - 80%.

Documentnumber: P-3859
Version date: Febuary 3, 2022

10 Disposing of the machine

This chapter contains information on how to dismantle and dispose of the TT-Series.

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.

Documentnumber: P-3859
Version date: Febuary 3, 2022

A1 Technical specifications

This appendix lists the technical specifications of the TT-Series.

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 (Depending on label size)	240 strokes per minute/4 strokes per second (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 (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.

Documentnumber: P-3859
Version date: Febuary 3, 2022

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 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 Declaration of Conformity

This Appendix contains the TT-Series Declaration of Conformity.

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 12th 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:	**Thermal Transfer printer TT-53**
Model number:	**Print unit TT-53**
Serial number:	**Printerface IoT**
(Product identification)	**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 [1] :	**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)

D. van der Vlugt
Director

Woerden, 2021 November, 11

[1] *Meeting the requirements of these standards and the requirements mentioned in the report means presumption of conformity with EMC Directive - 2014/30/EU.*

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.

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.

CE

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, 1st February 2021
Place and date of issue

2direct GmbH
Langenstück 5
D-58579 Schalksmühle
Tel.: +49-2351-66887-0
Fax: +49-2351-66887-29

Signature (Wilfried Gerhard)

Bay Area Compliance Labs Corp.

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) 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

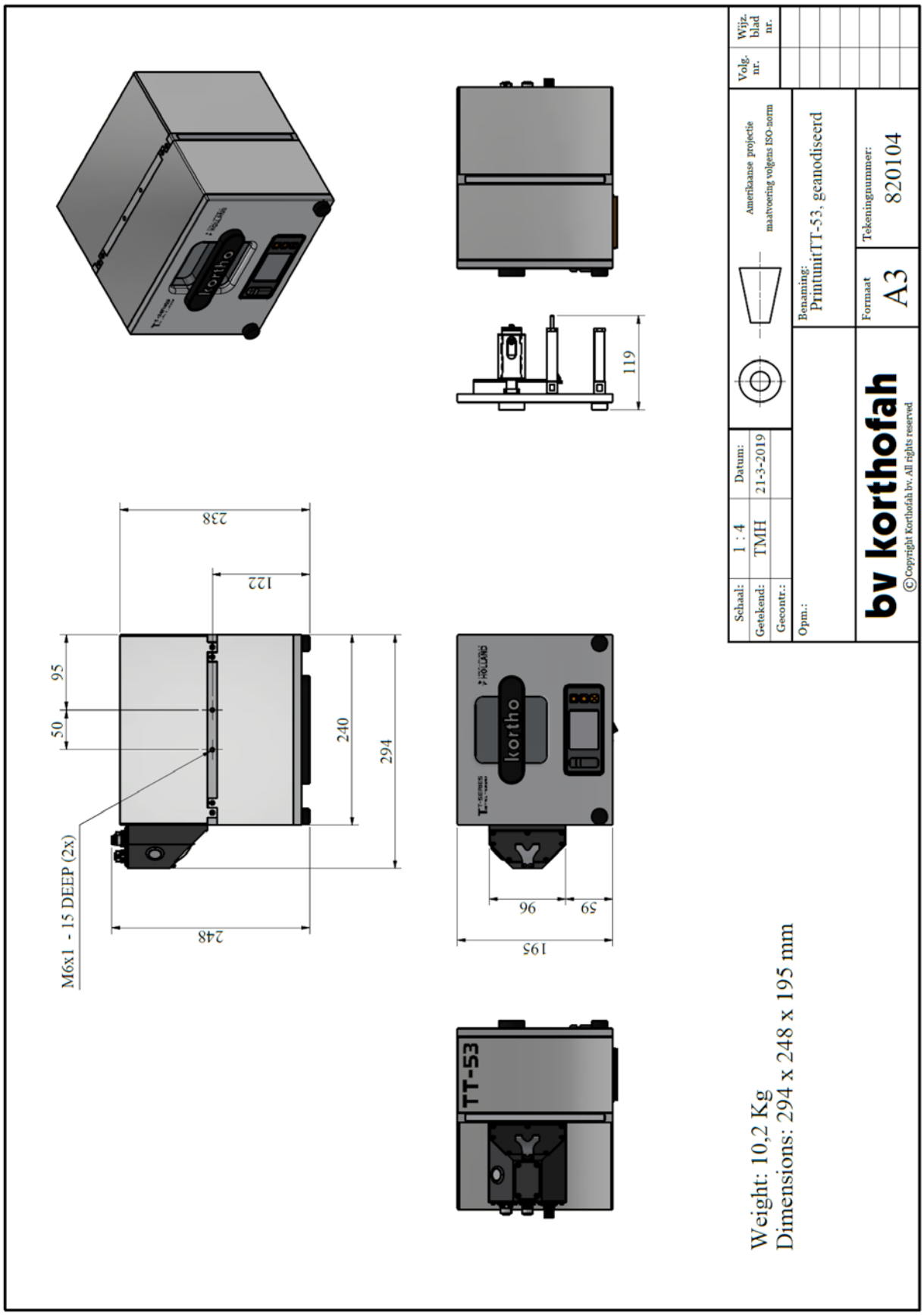
Signature

BAY AREA COMPLIANCE LABORATORIES CORP. (SHENZHEN) TESTING AND VERIFICATION BACL

Bay Area Compliance Laboratories Corp. (Shenzhen)
6/F, West Wing, Third Phase of Wanli Industrial Building, Shahe Road, Nanshan District, Free Trade Zone, Shenzhen, Guangdong, China
Phone: +86-755-33320018 Fax: +86-755-33320008
www.baclcorp.com.cn
C03-C0 (200115)

A3 Technical drawings

This Appendix contains the Technical Drawings of the TT-Series.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©Copyright Korthofah bv. All rights reserved
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TT-53
Weight: 10,2 Kg
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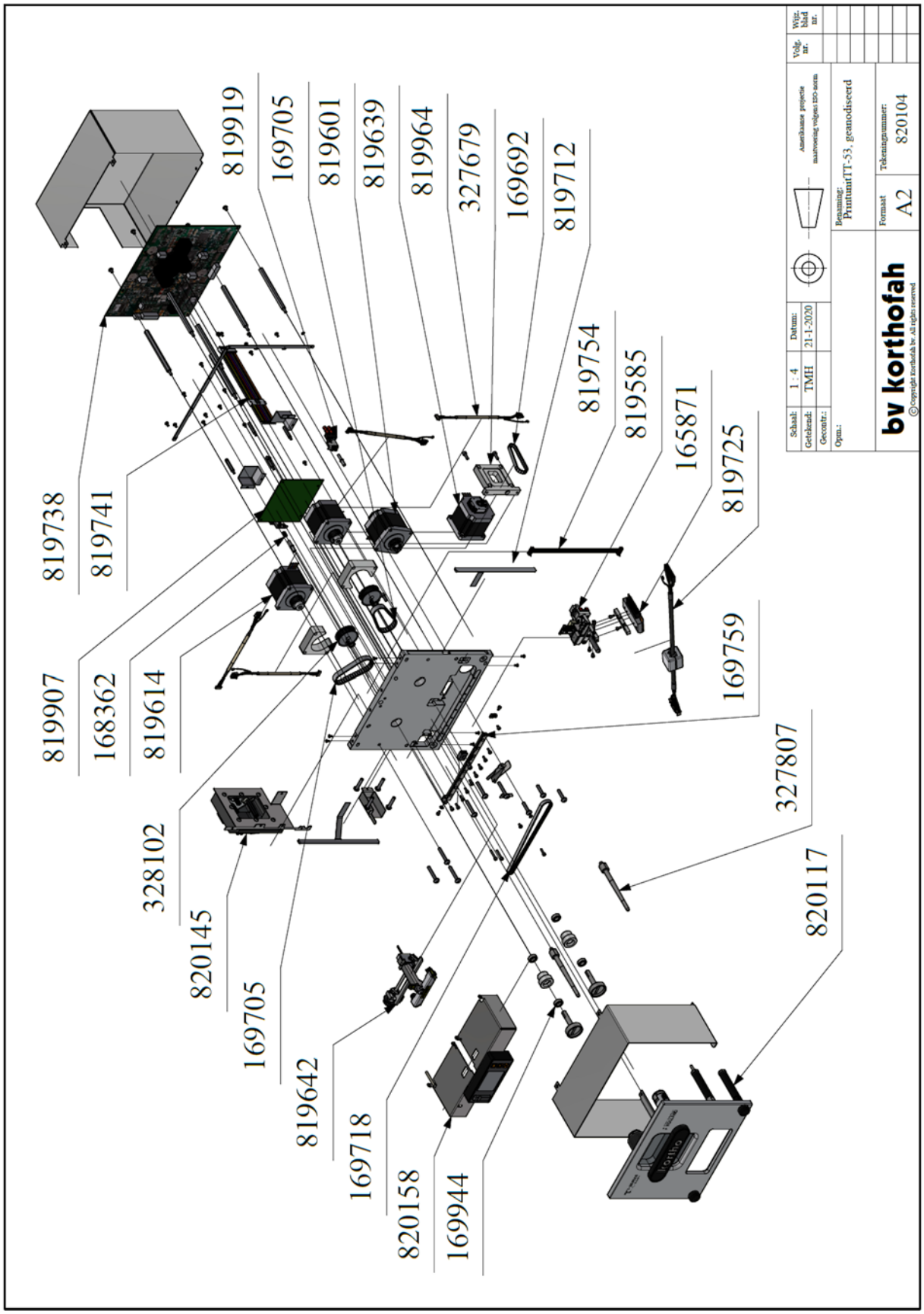
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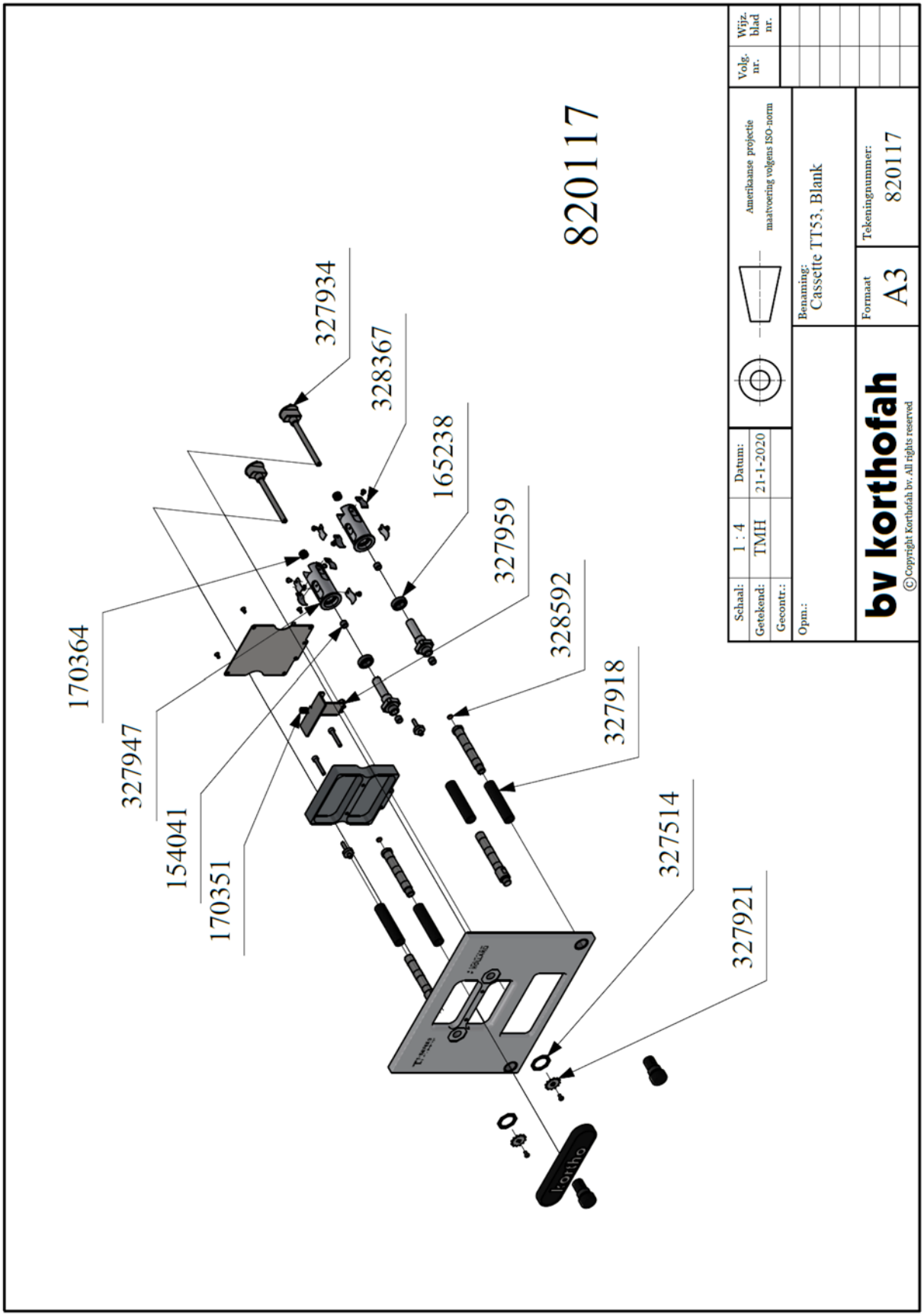
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by korthofah
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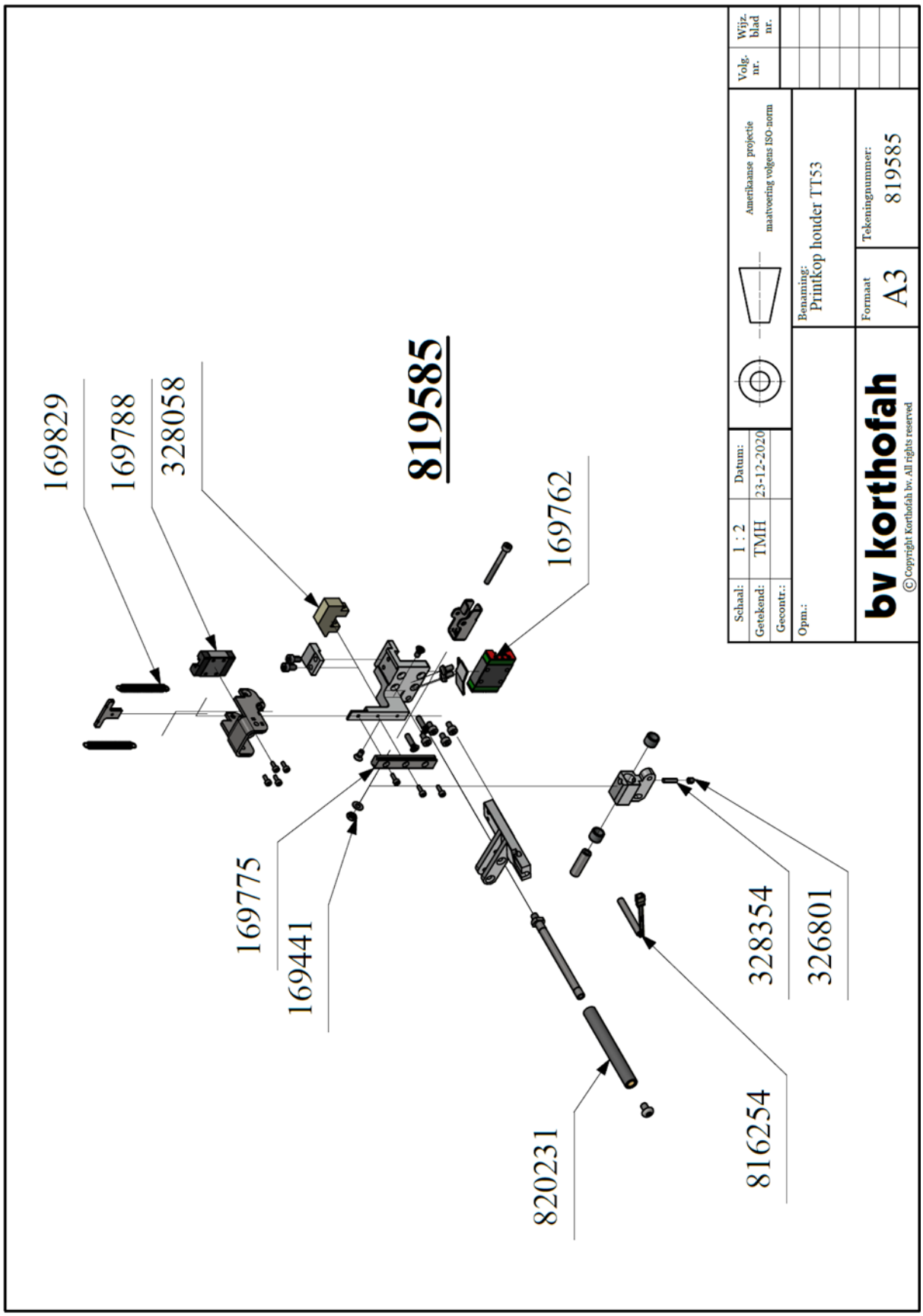
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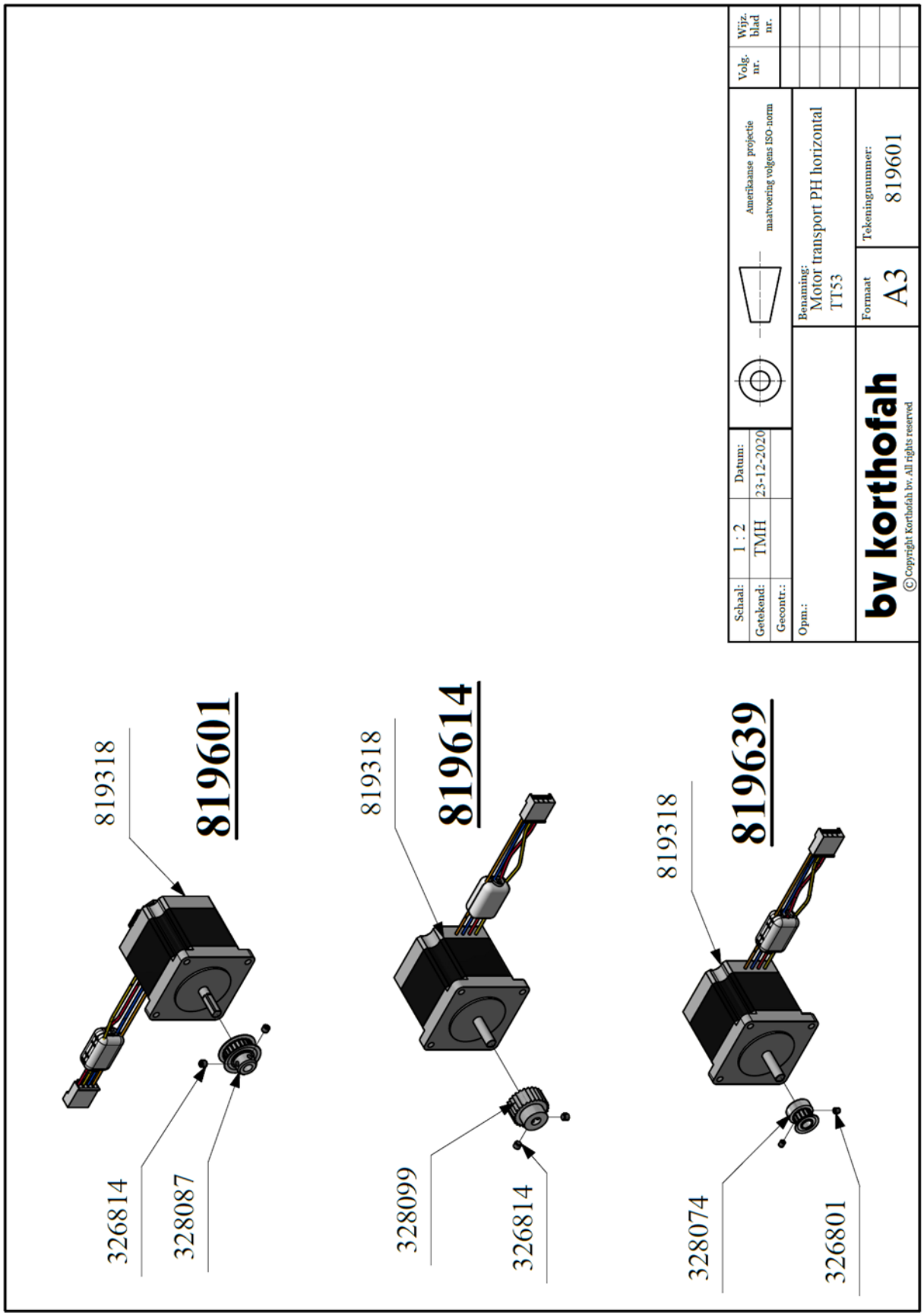
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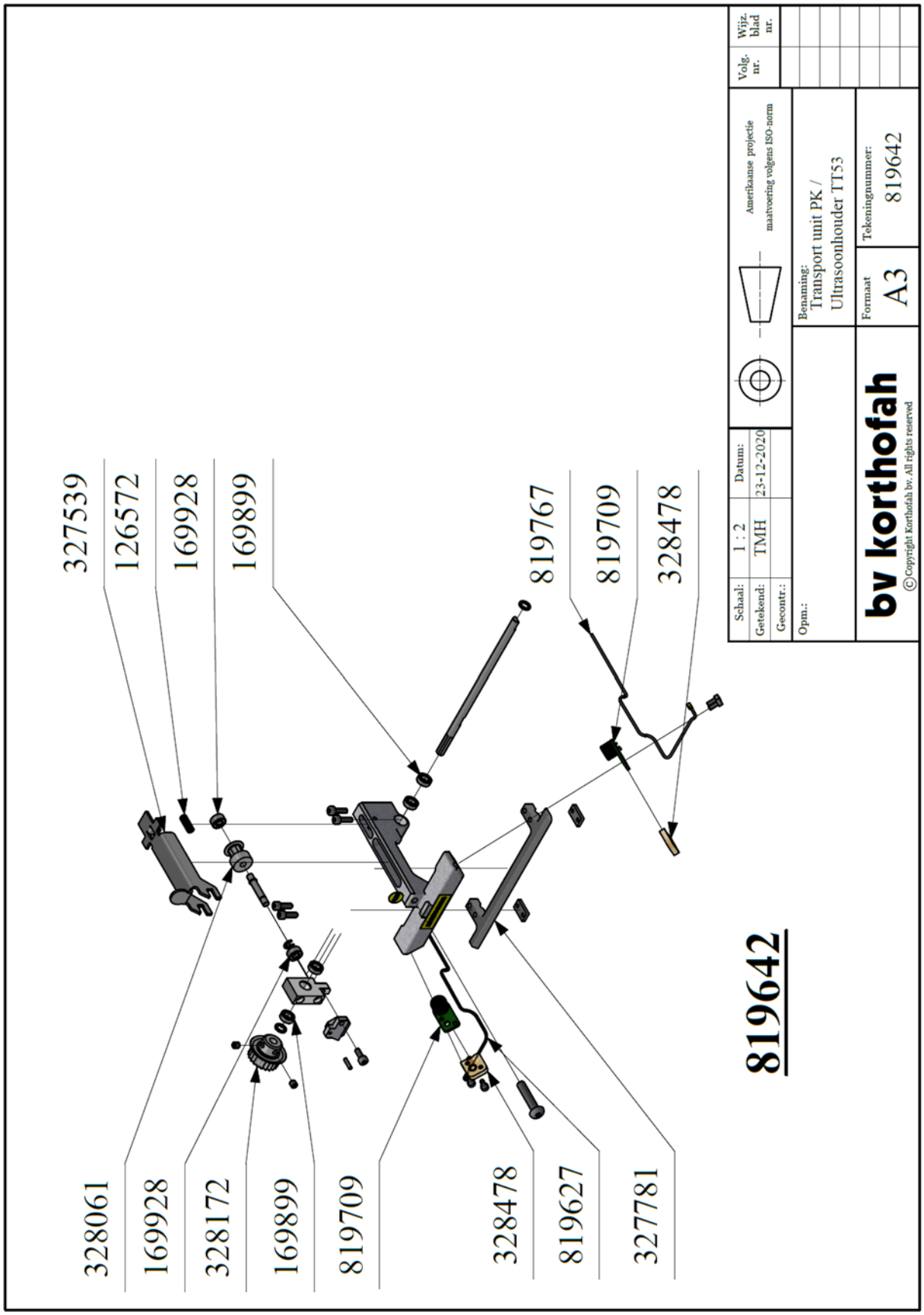
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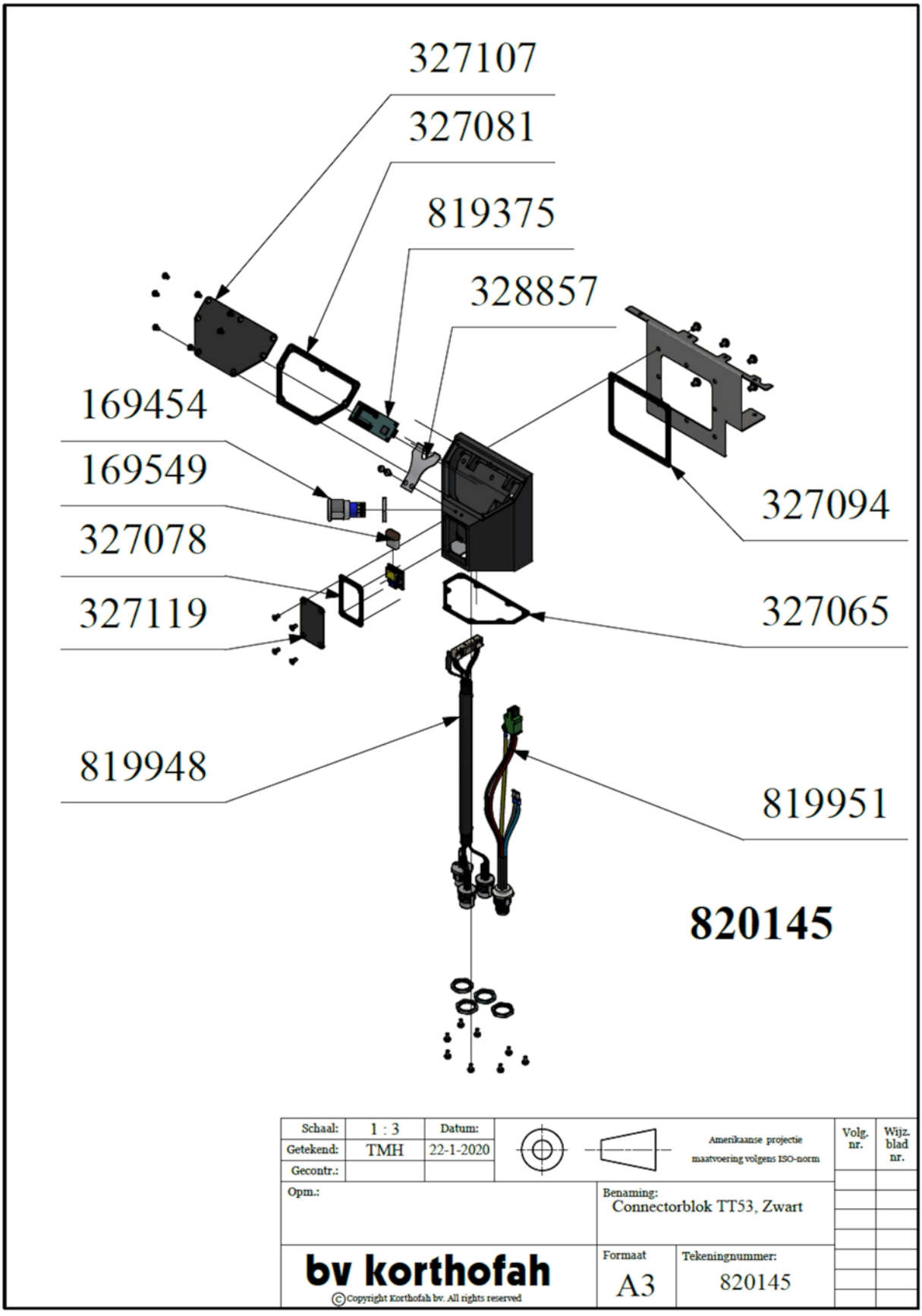

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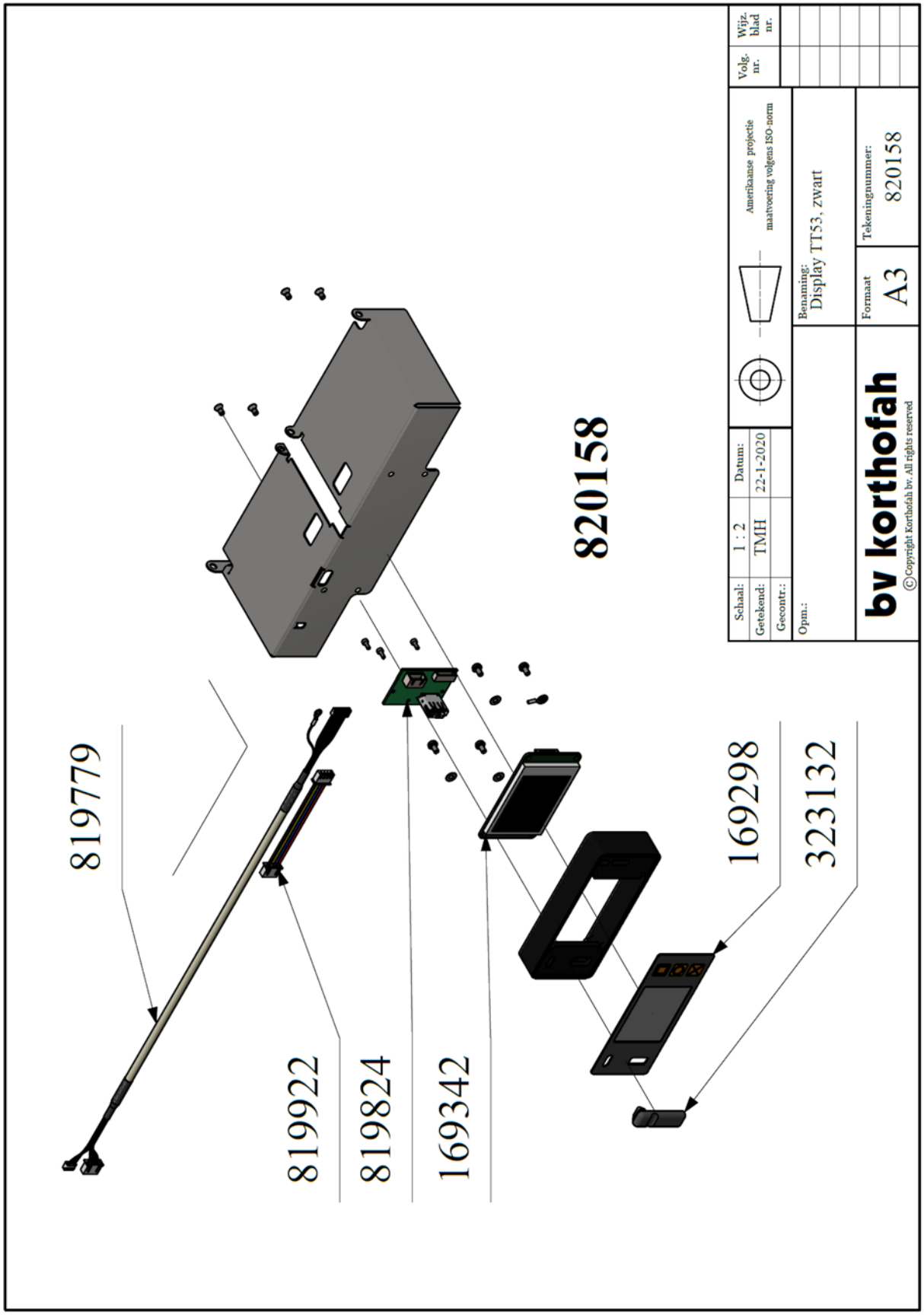
bv korthofah			Formaat A3	Tekeningnummer: 820145	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Tekeningnummer: 820158
Volg. nr.
Wijz. blad nr.
bv korthofah
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A4 Spare parts

This appendix contains the spare parts for the TT-series.

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
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 TT53
169775	Transport rail L=44mm
169788	Carriage PH transport TT53
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

Article number	Description
323132	Seal USB Bk Tsc12/Tsc20
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 TT53
327539	Print head sliding cover TT53
327679	Adjustment block stepper motor TT53
327781	Positioning arm Pk, TT53
327807	Cassette Guide axle TT53
327918	Roller, Cassette TT53
327921	Positioning wheel winding/unwinding roller TT53
327934	Carrying winding/unwinding roller TT53
327947	Winding/unwinding roller cassette TT53
327959	Locking slide cassette TT53
328058	Sliding block transport Printhead holder TT53
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 TT53
328367	Leaf spring winding/unwinding roller TTO
328478	Silicone silencer ultrasonic
328592	Buffer cassette TT-53
328857	Clip connector block

Article number	Description
816254	Heating element D=4 48V-10W
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 TT53

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 TT53