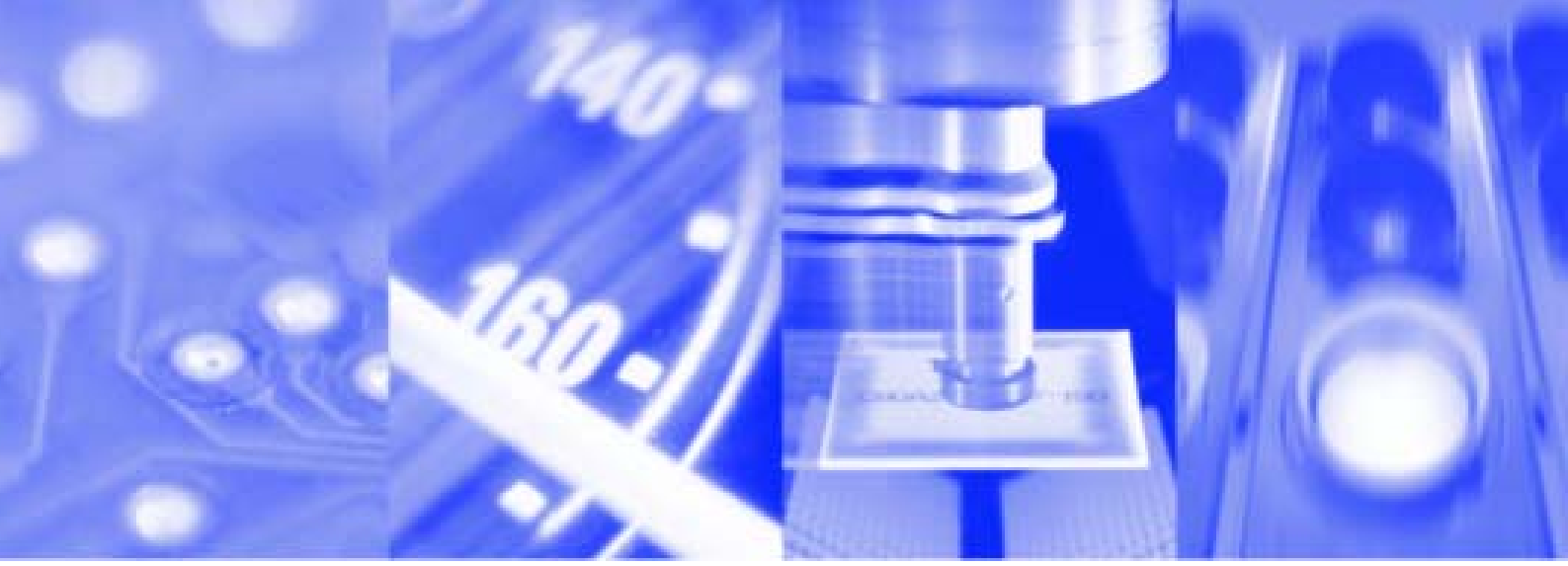


MY9 – MY12 – MY15 – MY19

Service Manual

TPSys™ 2.6

English

P-040-0070-EN

For a fast changing world MYDATA®

MY9 – MY12 – MY15 – MY19

Component Placement Machines

Service Manual

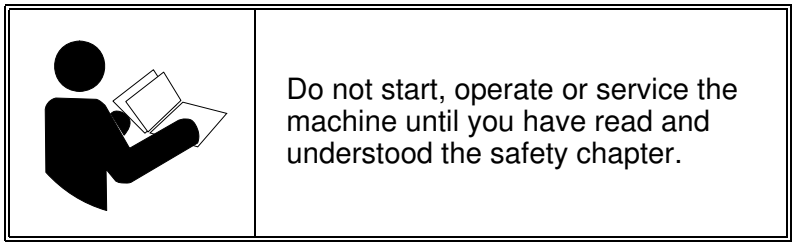
English

This document is intended for the MY9 – MY12 – MY15 – MY19 running the TPSys software version 2.6.

A standard system and available options are covered by this document. Depending on your system configuration you may lack some of the features mentioned in the document.

Disclaimer
Hardware and software mentioned in this document are subjected to continuous development and improvement. Consequently, there may be minor discrepancies between the information in the document and the performance or design of the product. Specifications, dimensions and other statements mentioned in this document are subject to changes without prior notice.

Federal Communications Commission (FCC)
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



MYDATA automation AB, Box 20155, S-161 02 Bromma, Sweden.
Phone +46 8 475 55 00 – Fax +46 8 475 55 01 – Internet www.mydata.com

Table of Contents

Text Conventions

This document uses text conventions to present information in various situations. This is explained below.

Danger, Warning, Caution, and Note

In this document a particular text layout is used to make danger, warning, and caution information evident. A triangular icon identifies the type of risk and the text describes the risk.

Danger, warning, and caution information **must** be followed.

Assisting information, notes, have the same layout but never triangular icons.

Danger

DANGER! Danger means a potentially dangerous situation that can cause death or severe bodily injury. The icon identifies the type of risk.

Warning

WARNING! Warning means a potentially dangerous situation that can cause bodily injury or considerable damage to the system or equipment. The icon identifies the type of risk.

Caution

CAUTION! Caution means that the system or equipment can be damaged or data be lost. To distinguish caution information from warning and danger information, this icon is always an empty triangle.

Note, example 1

A note contains any type of assisting information.

Note, example 2

One type of assisting information is tips, which normally have this icon.

Italic Font

Italic font is used for software screen text (for example *Parameter 1*), names (for example *Spare Parts Catalog*), and for warning text (described in the previous section).

Bold Font

Bold font is used for particular important words (for example This **must not** be done in reverse order).

Menu Selections

When describing software handling, menu selections are described in the following format:

File > *Page Setup* > *Paper Size* > *Portrait* > *OK*

This example describes to open the *File* menu and select the *Page Setup*, *Paper Size*, and *Portrait* options, and finally click the *OK* button.

Lists

Lists of items, points to consider, or procedures that have no relative order appear in bulleted or hyphenated format like this:

- Item 1.
- Item 2.

or

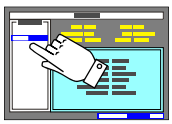
  – Item 1.
  – Item 2.

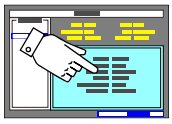
Procedures that must be performed in a specific order appear in numbered lists like this:

1. Perform this step first.
2. Perform this step second.

Icons

Throughout the manual the icons are used to draw your attention to, or complement, the information.





Navigation

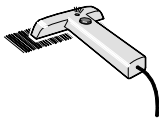
These icons will help you navigate on the screen when TPSys windows are described. They point to the area in the window that the information is referring to.

Camera view

This icon show that you are working in a camera view.

TPSys web interface

This icon indicates that you can also use is the TPSys web interface.



Barcode scan

This indicates that you can use a barcode scanner.

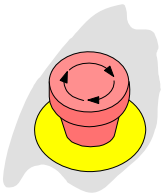
1. Safety

Before starting the machine, it is necessary that the operator, foreman and any other personnel involved in machine operation, maintenance or service understand and follow these points:

- This machine is designed to pick components from their packaging and place them onto printed circuit boards, and to apply glue. The machine must be used exclusively for these two purposes and nothing else.
- The machine must be operated by qualified personnel only. Qualified personnel should meet the following qualifications:
  - Be above 18 years of age.
  - Have normal depth perception, field of vision, reaction time, manual dexterity, coordination, and no tendency to dizziness.
  - Completed operators training.
- All personnel involved in machine operation must understand the use of the emergency stop buttons and how to manually move machine elements in case of emergency. See the *Emergency Stop Buttons* and *Emergency Movement of Machine Elements* sections in this chapter.
- Anyone operating this machine must obey all warning signs. See the *Warning Signs* section in this chapter.
- At least one manual that describes the warning signs of the particular machine type must always be kept, for instance if the machine is upgraded with a later TPSys version.
- Apart from the daily maintenance described in the operator's manual, the machine is to be serviced by authorized maintenance engineers only.
- Excess component tape from tape magazines shall be cut from the front of the machine when it is not in operation.
- When inserting or removing tools to or from the tool bank, the emergency stop button shall be pressed down.
- The emergency stop button shall be pressed down when a tool or component is manually inserted or removed from the X wagon of the machine.
- If there is a risk that any unauthorized personnel might alter the system settings and thus the behavior of the machine, then the logon facility for individual access rights has to be used.
- Ensure that all covers and shields are intact, mounted and closed while the machine is in operation.
- Do not disable or disengage any safety switch or sensor.
- Do not configure or modify MYDATA machines or devices without consulting MYDATA. The machines, devices or the interfaces between them might become unsafe.
- Do not use chemicals or other substances that may have any influence on the operator or other personnel involved in the machine operation.

Emergency Stop Buttons

All MYDATA placement machines have emergency stop buttons that are red and stop all machine movements immediately when pressed down.



All MY9 – MY19 have two emergency stop buttons located at the front of the machine frame. There is also a stop button located by the trackball. These emergency stop buttons are released by being turned clockwise.

WARNING! An emergency stop button must always be pressed down when hands, fingers, tools or other objects are within a shielded area or in the risk area of movable machine elements such as Y wagon or Tray Wagon Magazine.

Emergency stop buttons on all MYDATA optional devices, such as TEX Tray Exchanger and conveyor systems, have the same function, that is to switch all motors off and release movable machine elements.

Activating a stop system in an optional device, for instance opening a TEX Tray Exchanger door, stops only the optional device. The placement machine is not stopped by such an action.

Restart

To restart a machine after an emergency stop button has been released, enter a command on the keyboard.

Emergency Movement of Machine Elements

On the MY machines, the X wagon, Y wagon, and Tray Wagon can be moved manually after pressing both the emergency stop buttons down, provided that the power is on.

If an accident has occurred and an emergency movement of a machine element is required, use the following procedure:

Learn this by heart!

1. Press down *both* emergency stop buttons.
2. Leave the power on.
3. Move the machine element away by hand.

Warning Signs

The warning signs on the machine must be observed as this machine contains fast moving parts and high voltage.

The machine has warning signs placed as shown on the following pages. The figure numerals refer to the following descriptions.

Note that at least one manual that describes the warning signs of the particular machine type must always be kept, for instance if the machine is upgraded with a later TPSys version.

Optional devices have the warning signs shown in their manuals except for the TEX unit which has the warning signs detailed in this chapter.

All signs must be kept clean and readable.

MY9 and MY12 Warning Signs

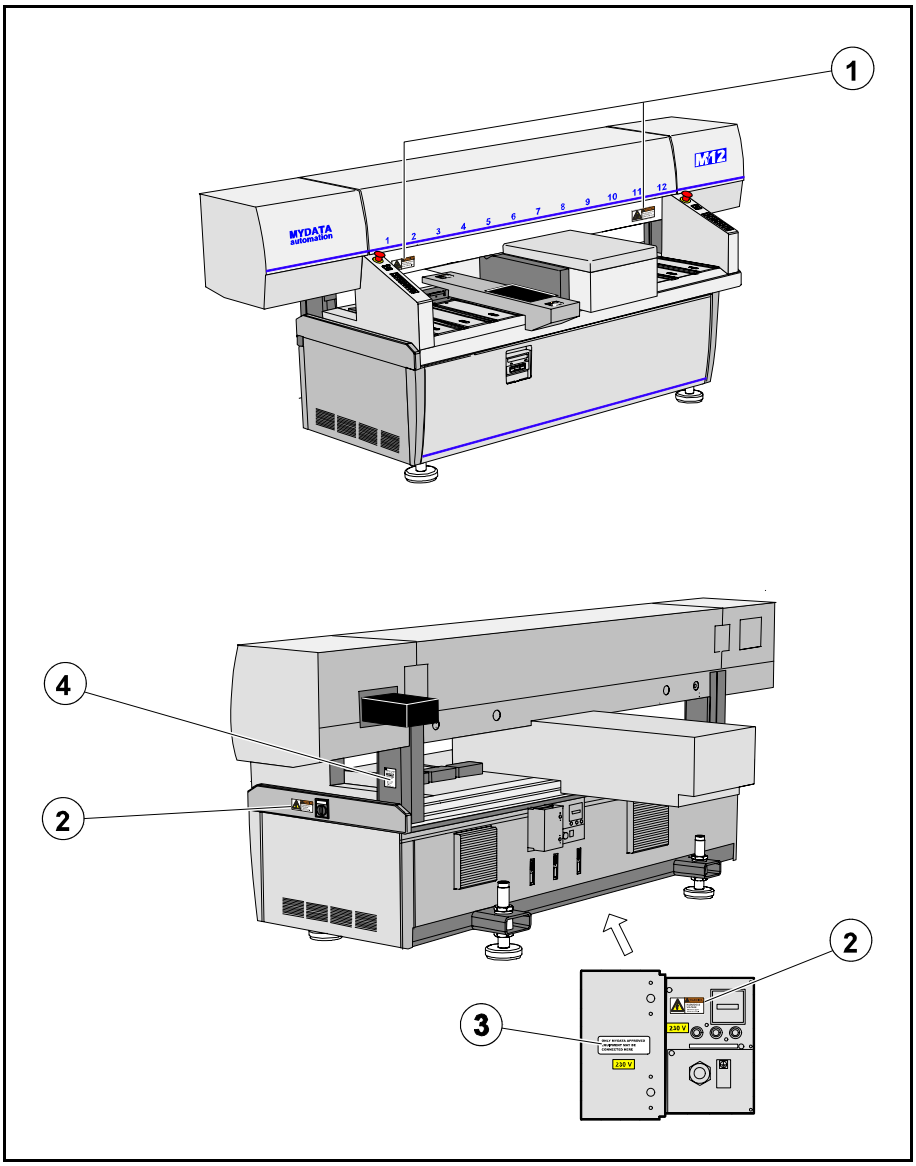


Figure 1-1. MY9 and MY12 warning signs.

MY9 and MY12 have the same set of warning signs. Figure 1-1 shows the MY12 machine.

Number and position of each sign type is described in the following text. If a sign is missing, it must be replaced immediately.

MY15 and MY19 Warning Signs

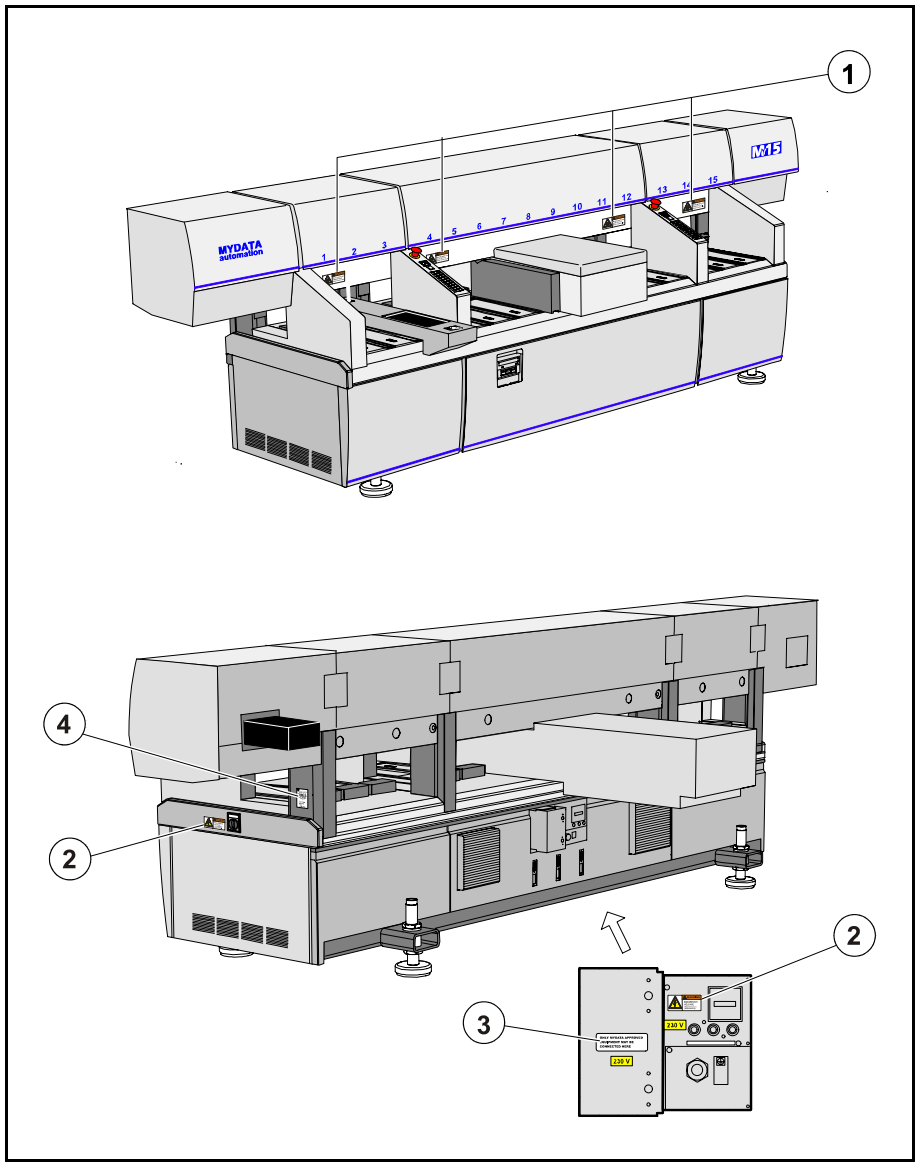


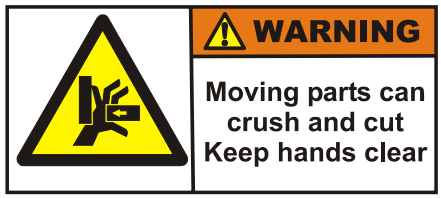
Figure 1-2. MY15 and MY19 warning signs.

MY15 and MY19 have the same set of warning signs. Figure 1-2 shows the MY15 machine.

Number and position of each sign type is described in the following text. If a sign is missing, it must be replaced immediately.

(1) (1)

(2)



Sign 1 warns of fast machine movements. Ensure that all covers and shields are intact, mounted and closed while the machine is in operation. Do not disable or disengage any safety switch or sensor.

The figures show signs according to:

- European and Canadian standards (1).
- US standards (2).

This sign is applied as follows:

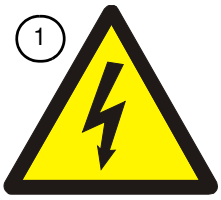
MY9, MY12

- 2 signs on the glass shield.

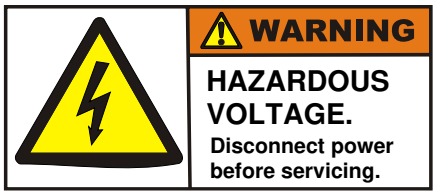
MY15, MY19

- 4 signs on the glass shield.

2 (1)



(2)



Sign 2 warns of electric shock. Units, on which this sign is placed, contain dangerous voltage levels. Power must be switched off before opening the unit. Only authorized service personnel are allowed to operate the machine when such a unit is open. Hazardous voltage is present with machine power off.

The figures show signs according to:

– European and Canadian standards (1).

– US standards (2).

This sign is applied as follows:

– 1 sign at the mains switch.

– 1 sign on the power supply unit at the rear of the machine.

DANGER! Always lock out and tag the main switch before opening the hoods and commencing any servicing within the machine.

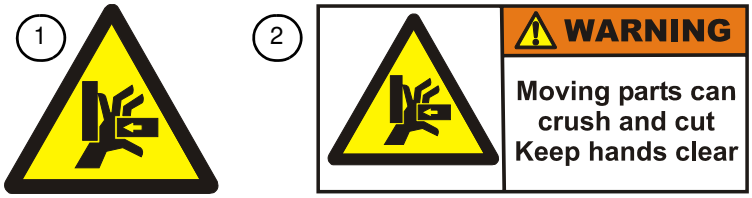
3

Sign 3 alerts that only MYDATA approved equipment is allowed to be connected to the power supply unit outlet.

This sign is applied as follows:

– 1 sign on the power supply unit at the rear of the machine.

Fast Horizontal Movements



This sign warns of fast horizontal movements. The sign is located on optional Tray Wagon Magazines (TWM) and it is applied as follows.

– Two signs on the TWM.

The figures show signs according to:

– European and Canadian standards (1).

– US standards (2).

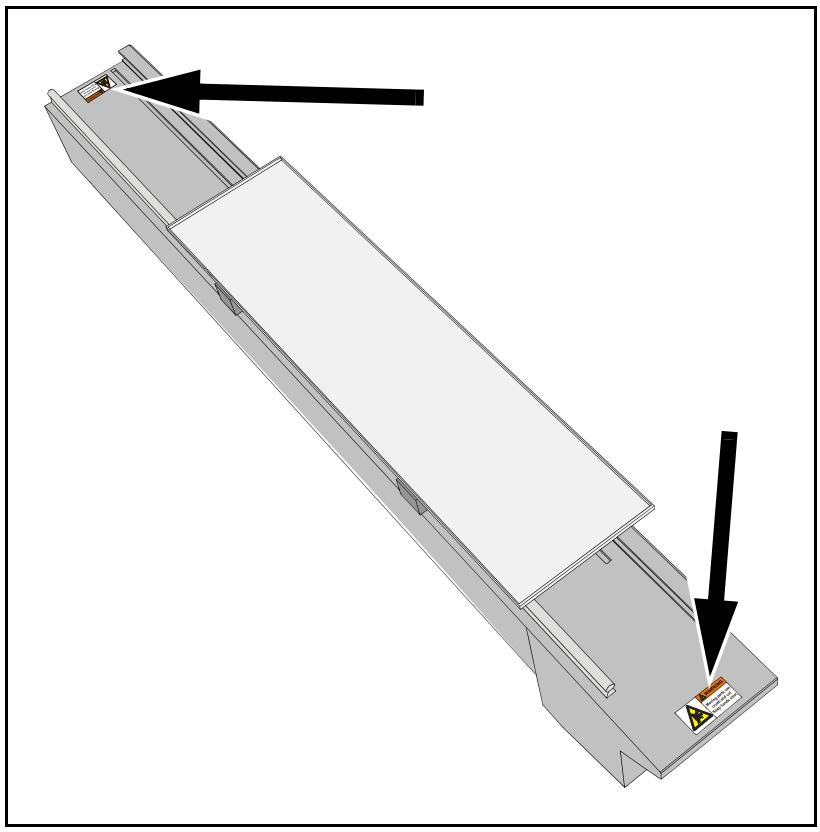


Figure 1-3. Signs on the TWM.

Type Plate

The type plate shows the name and address of the manufacturer, the machine type and serial number, and manufacturing year and country. An example of a type plate is shown below.

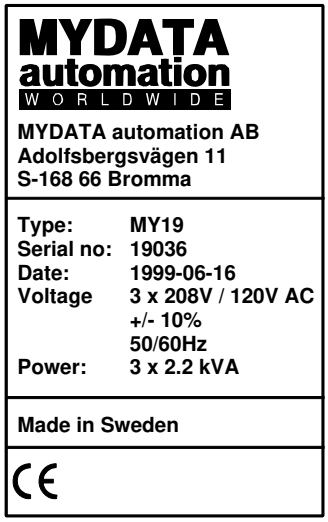


Figure 1-4. Machine type plate.

On the MY machines, the type plate is found on the rightmost machine stand (see '4' in Figure 1-1).

TEX Tray Exchanger

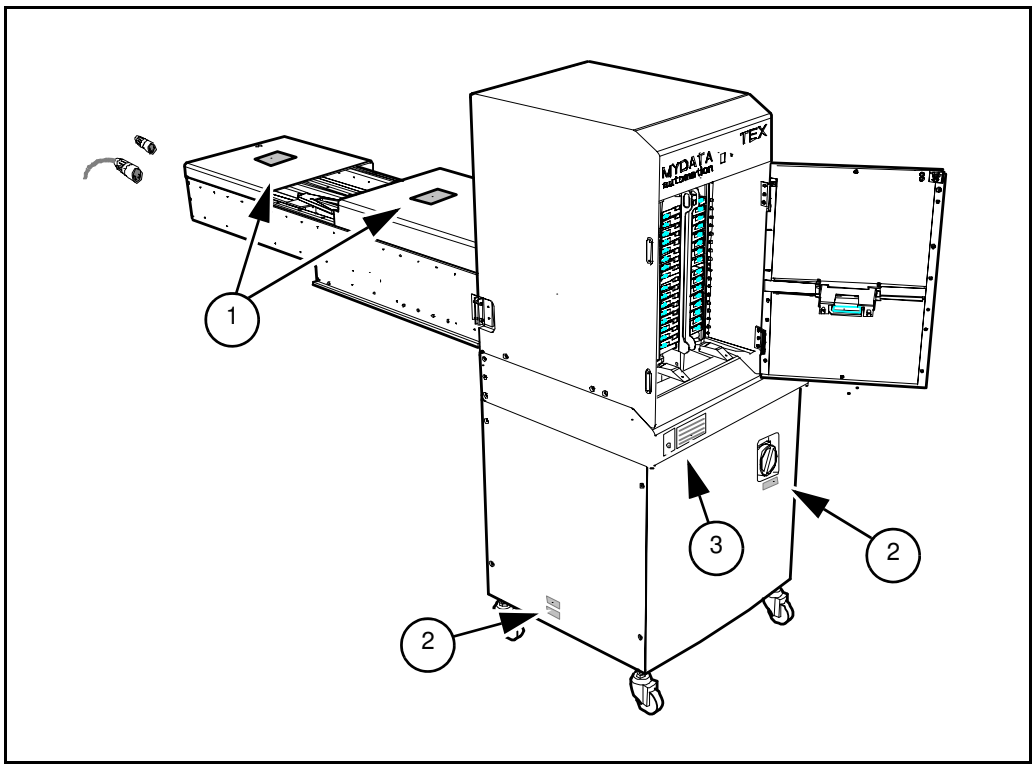


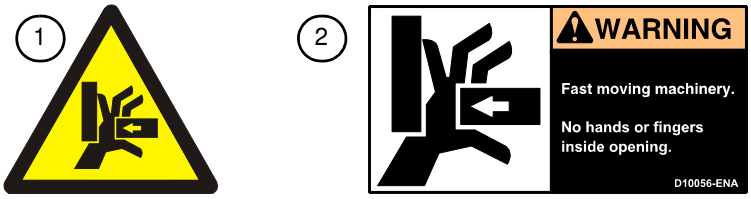
Figure 1-5. TEX Tray Exchanger.

Number and position of each sign type is described in the following text. If a sign is missing, it must be replaced immediately. Part numbers are printed on the signs, but can also be read from the following description.

TEX Warning Signs

The warning signs are located as shown in Figure 1-5.

1



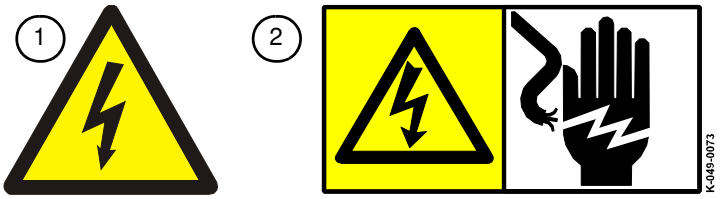
Sign 1 warns of fast machine movements. Ensure that all covers and shields are intact, mounted and closed while the machine is in operation. Do not disable or disengage any safety switch or sensor.

The figures show signs according to:

- European standards (1).
- US and Canadian standards (2).

Two warning signs are applied on the safety hoods as shown in Figure 1-5.

2



Sign 2 warns of electric shock. Units, on which this sign is placed, contain dangerous voltage levels. Power must be switched off before opening the unit. Only authorized service personnel are allowed to operate the machine when such a unit is open. Hazardous voltage is present with machine power off.

The figures show signs according to:

- European and Canadian standards (1).
- US standards (2).

Two warning signs are applied as shown in Figure 1-5.

3

Sign 3 (D-024-0345) states the laser classification for TEX units equipped with laser barcode scanner. One certification sign is applied as shown in Figure 1-5.

TEX Emergency Stop

There are safety switches at the two hoods and at the door. When a switch is activated all movements in TEX are stopped immediately. The placement machine is not affected by these switches.

When an emergency stop button on the placement machine is pressed down, the TEX is also stopped.

TEX can thus be stopped in four different ways:

- The door is opened.
- The front cover is opened.
- The rear cover is opened.
- An emergency stop button on the placement machine is pressed down.

Warnings in the Manual

Throughout the manual this symbol is used to call your attention to commands that starts machine movements. The symbol refers to the warning signs, which must be obeyed to eliminate the risk of injury. If there are instructions accompanying this symbol, they must be followed.

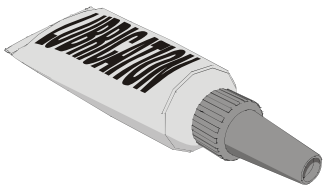
Also, to avoid damage, this symbol means that the operator must be observant of the following:

Ensure that there are no foreign objects on the assembly table, near the tool bank, or within the X wagon, Y wagon, or Tray Wagon Magazine moving areas, and that the standard tool head and the HYDRA tools are in their upper positions.

Noise

For all MY machines, the equivalent continuous sound pressure level is measured in accordance with EU directive 98/37/EC to be less than 70 dB(A).

Material Safety Data Sheets



The machine is shipped with various types of grease and oil. Below are references to descriptions of chemical composition and toxicity (Material Safety Data Sheets, shortened to MSDS) of these products.

If you have problems accessing the web sites referenced below, contact MYDATA support.

Oils

HYDRAULIC OIL, part number L-012-0122 (Shell Tellus Oil 46)

MSDS is found at http://www.epc.shell.com, search for Shell Tellus 46.

Greases

GREASE PASTE OKS 270, part number K-013-0014

MSDS is found at http://www.mydata.com, document number P-040-0137-EN. A logon user name and password may be required.

GREASE TUBE RETINAX EP2, part number K-015-0091

MSDS is found at http://www.epc.shell.com, search for Retinax.

MULTEMP LRL No. 3, U-015-0014

MSDS is found at http://www.mydata.com, document number P-040-0139-EN. A logon user name and password may be required.

This grease can also be called 'NSK No.1', on some grease tubes.

GLEITMO 585 K

Request MSDS at http://www.fuchs-lubritech.com/cms, search for Gleitmo 585 K and select "Product information".

GREASE PARALIQ GA 351, 25G, K-012-0122B

MSDS is found at http://www.klueber.com, search for Paraliq GA 351.

LITHIUM GREASE RUBENS 00, K-023-0009

MSDS is found at http://www.mydata.com, document number P-040-0138-EN. A logon user name and password may be required.

LUBRICATING GREASE FOR YM, part number K-045-0028

MSDS is found at http://www.mydata.com, document number P-045-0028-EN. A logon user name and password may be required.

OMEGA 28 GREASE , MYDATA part number L-012-0860

MSDS is found at http://www.mydata.com, document number P-040-0140-EN. A logon user name and password may be required.

Lead Acid Batteries

Batteries that may be included in the machine:

BATTERY LEAD 6V 12AH, MYDATA part number E-053-0001.
BATTERY 12V 7AH, UPS 151X65X94, MYDATA part number E-053-0002.
BATTERY 6V 4.5AH 101X47X70, MYDATA part number E-053-0003, used for instance in UPS EBK-350.

The manufacturer for the batteries above may vary over time. The batteries shipped with machines or data servers may have different manufacturers than after-sales batteries. For correct MSDS, locate the battery and read the manufacturer information, and refer to the table below for MSDS location.

Leader
http://www.celltech.internetbutik.se/produkter/upload_pdf/leader/msdsleader.pdf

Panasonic
http://www.panasonic.com/industrial/battery/oem/

Yuasa
http://www.yuasabatteries.com/pdfs/MSDS_LeadAcidBattery.pdf

In Case of Fire

Only use carbon dioxide (CO_2) extinguishers or dry chemical extinguishers in case of fire. Under no circumstances use water, as the machine contains electronic equipment.

ESD

ESD, ElectroStatic Discharge, is one of the few things an individual can unwittingly do to damage or destroy components. Much like the shock you receive when rubbing your feet on a carpet and then touching some metal. ESD can occur when working and will cause components you touch to no longer work properly.

How To Help Prevent ESD

The following steps help reducing the chances of ESD:

- Do not touch components unless you are constantly earthed by an ESD wrist strap or you are wearing ESD shoes or ESD shoe earthing strips on an ESD floor.
- Always ensure that people, the workplace and packaging are safely earthed when handling electrostatic sensitive components.
- If the packaging is not conductive, place the modules in a conductive envelope before packaging. Use ESD bags, domestic aluminum foil or paper, for example. **Never** use plastic bags or film.
- Make sure not to wear any clothing that conducts a lot of electrical charge, such as a wool sweater or synthetic fibers.
- Most plastics can easily become charged and must therefore be kept away from components.
- Do not touch electronic modules unless it is absolutely necessary to do so in order to carry out other work. If it is necessary, make sure that you do not touch pins or printed conductors.

All MYDATA pick-and-place machines have jacks for wrist straps. They are marked with an ESD sign.

2. Installation

In this chapter you will find the following information:

– *Site Preparation* on page 2-2.

  Describes what is required of the site for a successful installation.

– *Installation* on page 2-5.

  Describes how to install the machine at the site.

Site Preparation

In this section you will find prerequisites of what is required of the site for a successful installation of a MYDATA Placement Machine. Details about the working area, environmental and electrical requirements, and regulatory compliance are given. Follow these directions to ensure a safe and proper installation, as well as ongoing operating efficiency.

Site Preparation Check List

1. Identify the desired location for the machine. Verify that enough space is available.
2. Verify that all environmental requirements are met.
   - Temperature
   - Humidity
   - Cleanliness/airborne contaminants.
3. Verify that the floor is level and can take the weight.
4. Plan the transportation route to the installation site.
5. Verify that means for transportation and lifting are available (fork lift, crane etc.).
6. Obtain required, stable input power.
7. Arrange for electrostatic avoidance equipment.
8. Table (and chair) for terminal/printer.
9. Network connection.

Required Working Area

Prepare a suitable working area according to the dimensions shown in Figure 2-1 and Figure 2-2. The dimensions shown are the minimum space required for the machine with no extra options. To achieve a more efficient working area, add space for operating personnel and storage area for magazines, components etc.

Note that space around the machine is necessary for maintenance of the machine and optional equipment, if any.

Machine weight

The floor, on which the machine is transported and finally positioned, must support the machine weight, which is:

for MY9 1 800 kg net weight.

for MY12 2 000 kg net weight.

for MY15 2 500 kg net weight.

for MY19 2 800 kg net weight.

Shipping gross weight

The shipping gross weight depends on the quantity of delivered options. A usual gross weight is the machine weight plus approximately 1 000 kg.

The site

The floor at the machine site must be level.

It is recommended that the area at the machine site is ESD (Electrostatic Discharge) protected.

Cables for mains and computer network are connected to the machine at the rear (see Figure 2-2).

Maximum cable length from the machine to the terminal or printer is 5 m.

The machine noise is maximum 62 dB(A).

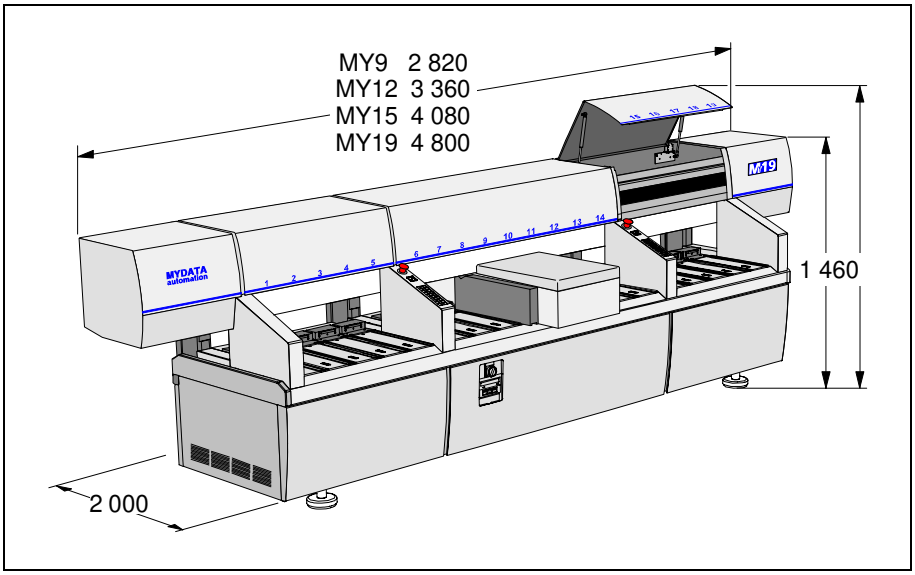


Figure 2-1. Main dimensions.

Figure 2-1 shows the main dimensions (in mm). Note that the height, 1 460 mm, does not include the monitors.

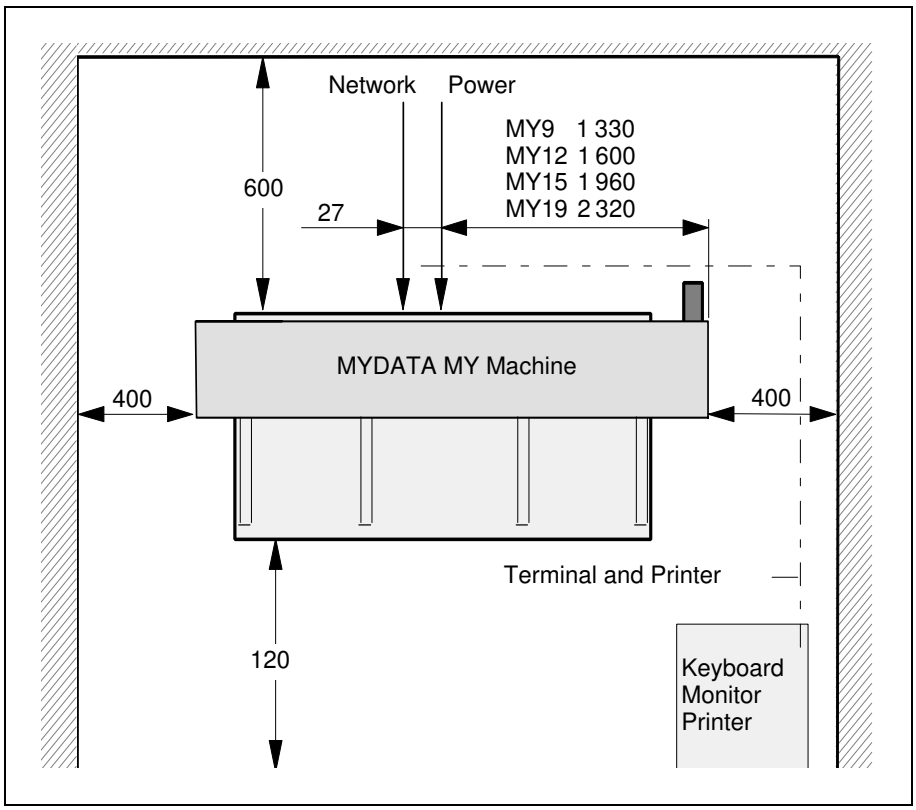


Figure 2-2. Clear space around the machine.

Figure 2-2 shows a top view over the required service area around the machine (measurements in mm), the position of the keyboard, monitor and printer and the terminal and printer cables. Also the position of the network and power inlets are shown in the figure.

Environmental Requirements

Temperature

Operating: +18 to +35 °C with full performance.

+10 to +18 °C and +35 to +40 °C with no guarantee of accuracy.

Storage: –30 to +65 °C.

Relative humidity

Operating: <95 %, non-condensing.

Storage: 100 %

Dust and dirt

The machine does not require a clean-room environment but dust and dirt must be kept as low as possible. The maintenance intervals are shortened by high temperature and a dusty or dirty environment.

Electrical Requirements

Three phase 50/60 Hz AC, 6.6 kVA (3 x 2.2 kVA), 5-wire connection, slow blow fuse (T). Acceptable voltages (±10 %): 435/250, 415/240, 410/235, 400/230, 390/225, 380/220, 370/215, 365/210, 220/127, 210/121, 200/115, 190/110.

Installation

Upon arrival the machine must be unpacked, lifted, moved to the machine site and leveled.

This section describes how to perform the installation tasks and is divided into the following main parts:

Equipment

– Standard Tools.
– Set of Allen Keys(mm).
– Spirit level and 70mm wrench.
– Lifting equipment.

Unpacking

The machine is shipped in a wooden crate (outside Europe) and must be handled with care. It is strongly recommended that a MYDATA representative is present when the machine is unpacked.

1. Inspect the "Shock-Watch" and "Tilt-Watch" gages for activation and the crate for damages. These must be annotated on the Bill of Lading and goods received note.
2. Remove the top lid.
3. Remove the rear and front sides of the box.
4. Remove the plastic protection.
5. Remove the additional packages fastened to the machine (monitor, printer, magazines, etc.).
6. Release the machine from the bottom of the box.
7. Inventory all packages to ensure that the correct items are delivered according to the packing list. If not, contact your local MYDATA representative.

Items that are always included:

- Power cable.
- Keyboard and trackball.
- Monitor (with cables).
- Calibration board and calibration components.
- Operator’s Manual.
- Programming Manual.
- Software Manual.
- Machine Manual.

Lifting the Machine

To avoid tilting or damaging the machine, always lift the machine as described below. The description includes fork lift as well as crane lift.

WARNING! Lift the machine as described below. Otherwise, the machine may become damaged and the lifting may become dangerous.

Fork Lift

Normally, the machine can be lifted with the forks placed at the center of the machine, see Figure 2-3.

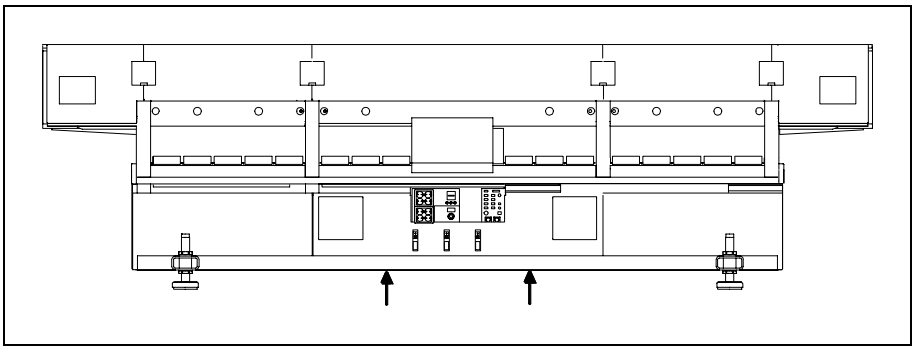


Figure 2-3. Fork lift.

Figure 2-3 shows a MY19 machine, but the forks are to be placed in the center for all machines in the MY series.

If the Y wagon is fitted other than in the center of the machine, it may be necessary to compensate for this unbalance by placing the forks slightly more to the side where the Y wagon is positioned.

Crane Lift

A lifting equipment, available from MYDATA Sweden, should be used when lifting the machine with a crane.

The machine´s center of gravity is located near the front of the machine. Therefore the hoisting cable should be slightly shorter at the front.

Figure 2-4 shows a MY19 machine, but the procedure is the same for all the machines in the MY series. The numerals in Figure 2-4 refer to the description.

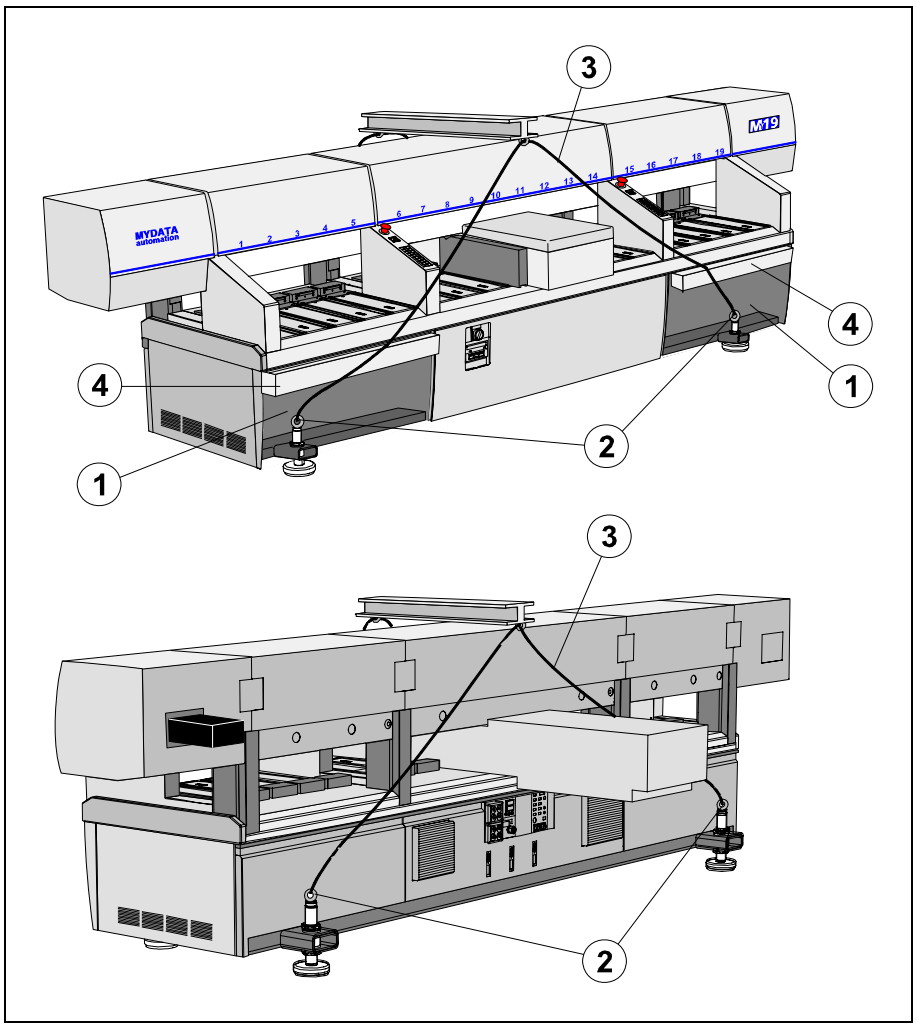


Figure 2-4. Crane lift.

1. Remove the front cover(s) at the leveling feet.
2. *For MY9*: Fit lifting eye bolts (M30 thread) in the two leveling feet at the rear of the machine.
   For MY12, MY15, MY19: Fit four lifting eye bolts (M30 thread) in the leveling feet.

3. *For MY9*: Fit the hoisting cable as in Figure 2-4 for the two eye bolts on the rear of the machine. Fit the front hoisting cable *around* the two front leveling feet.
   For MY12, MY15, MY19: Fit the hoisting cable between the eye bolts and the beam. This beam has a length of 1 500 mm.
4. Place a piece of cardboard, or a blanket, between the machine frame and the hoisting cable. This will protect the magazine table when the hoisting cable is stretched.

Moving and Placing the Machine

Move the machine to the final position and put it on the leveling feet. You can use either a fork lift or a crane. An alternative is to do as follows:

1. Place the machine on fixed supports, for instance 280 mm or higher solid wooden blocks. These supports *must* be placed under the *frame* of the machine.
2. Mount a wheel on each leveling foot using four screws (8 mm Allen key) for each wheel.
3. Resting the machine on the wheels, move it to its final location.
4. With a jack under the cross bar at a short end of the machine, lift one side of the machine.

WARNING! Block up the machine while working under it.

5. Remove two wheels and place the machine on the leveling feet.
6. Repeat the procedure on the other side of the machine.

Leveling

When the machine has been placed in the final location, check the leveling as described below.

1. Place a spirit level on the Y wagon or on the magazine tracks and adjust the leveling feet until the machine is level in both directions.
2. Make sure that each leveling foot is screwed firmly against the floor so that the weight of the machine is divided equally on the four feet.
3. Check if the machine is steady by manually trying to rock the machine. If not, adjust the leveling feet.
4. Tighten the locking nut on each leveling foot.

Powering

MYDATA machines are set up for adequate mains supply before delivery. It is set according to the customer order, normally only the mains power needs to be connected, and nothing needs to be altered inside the machine.

Knowing your mains power supply, you can verify that the machine is properly set up by comparing the configuration plugs numbers in the machine to the table below.

If the mains voltage or the type of mains supply is to be changed, internal power connections in the machine must also be changed accordingly, see the next section.

DANGER! The power configuration plugs should only be installed by an authorized MYDATA service engineer.

Electrical Configuration

WARNING! Disconnect the mains before opening, or doing any work inside the machine.
Always ensure that the voltage labeled on the machine (close to the mains power inlet) corresponds to the mains.

The machine is equipped with three mains transformers (TR1, TR2 and TR3), which all have to be configured in the same way and according to the supply voltage. A configuration plug (’A’) is provided for selecting how the three mains supply phases are connected to the machine (Delta or Y connection). The voltage configuration is set by moving a jumper cable in the EPT units

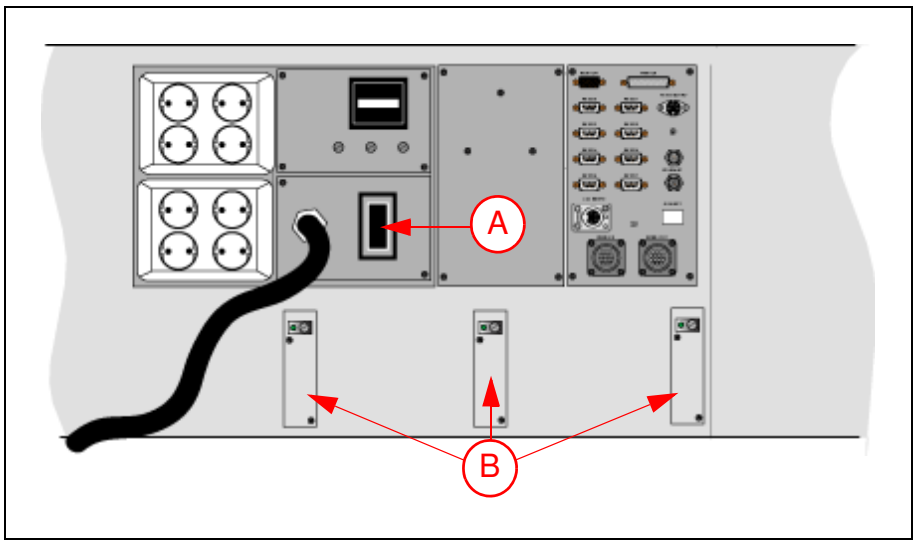


Figure 2-5. Rear panel.

Figure 2-5 shows the rear panel with the type configuration plug (’A’) and the three EPT units (’B’).

Electrical Configuration Plug Table

Select the configuration plugs for the mains according to the table below.

D/Y	Type plug part #	Remark
Delta	L-029-0297	Japan
	L-029-0296	USA 220 V w. no neutral Norway. USA 3-phase w. long leg
Y (Wye)	L-029-0295	USA EU standard The U.K. and Japan.

WARNING! Never connect the mains before ensuring that the correct configuration plugs are installed.

Setting the Voltage Configuration

The voltage configuration is set by moving a jumper cable in the EPT units. Follow the procedure below to set the voltage in the EPT units.

Procedure

1. Remove the two screws holding the cover of the EPT unit.

   On the back of the cover there is a sticker (’A’) that describes how to configure the unit for different voltages.

2. Locate the jumper cable (’B’) on the right side of the terminal block.

   One end of the jumper cable should always be connected to terminal ’0’ on the terminal block.

3. Move the other end of the jumper cable to the terminal (1-5) that represents the desired voltage configuration.

4. Re-assemble the EPT cover.

5. Repeat the procedure above on the other two EPT units.

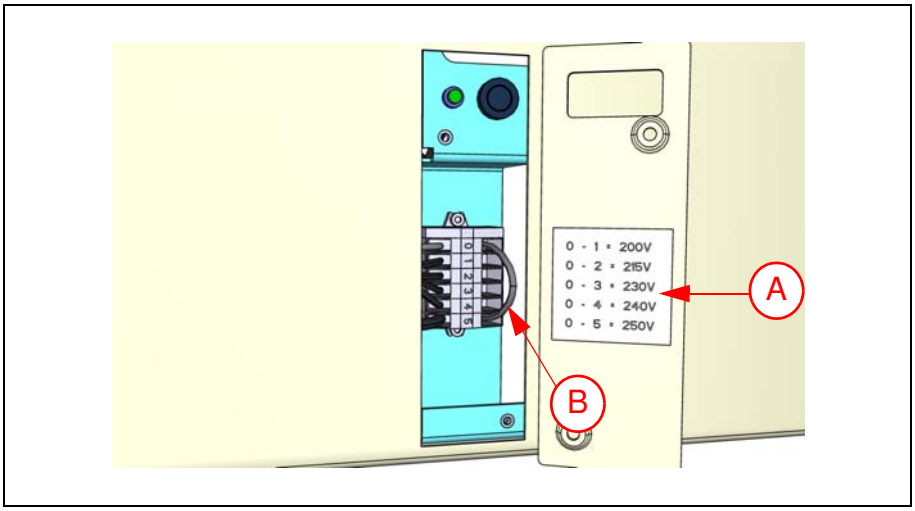


Figure 2-6. Configuration plugs.

Electrical Connection

This placement machine is intended to be stationary and movable to accommodate the changing production needs of the end use factory (this is in compliance with the NEC Article 400-7 and -8).

The machine is delivered with a 5 x 2.5 mm^2 power cable and, depending on the destination, a US 5 pole, three-phase power plug (Figure 2-7), or a European standard 5 pole, three-phase power plug (Figure 2-8).

US power plug specification (Figure 2-7): NEMA L21-20P, 20A 3Y, 120/ 208 V AC, UL/CSA, 2HP, IP20.

Power Plug Connection

Connect the mains power plug according to Figure 2-7 or 2-8 and table shown below.

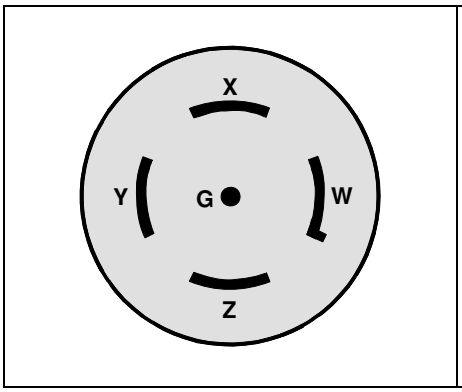


Figure 2-7. Power plug, US

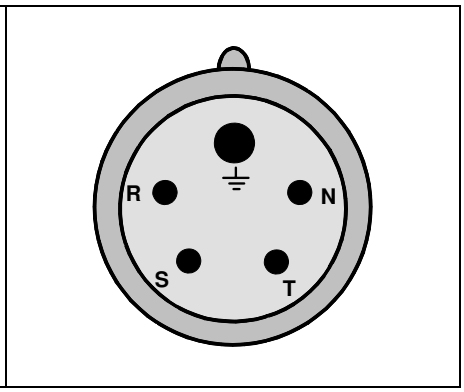


Figure 2-8. Power plug, Europe

Part	Power plug markings US	Power Cord Colors, US	Power plug markings EU	Power Cord Colors, EU
Live 1	X	Orange	T	Black
Live 2	Y	Red	S	Brown
Live 3	Z	Black	R	Black
Neutral	W	White	N	Blue
Protective Earth	PE	Green	W	Yellow/Green

Power Cord Connection

The machine power terminal block is to be connected to the mains power cord as shown in Figure 2-9 and table shown below.

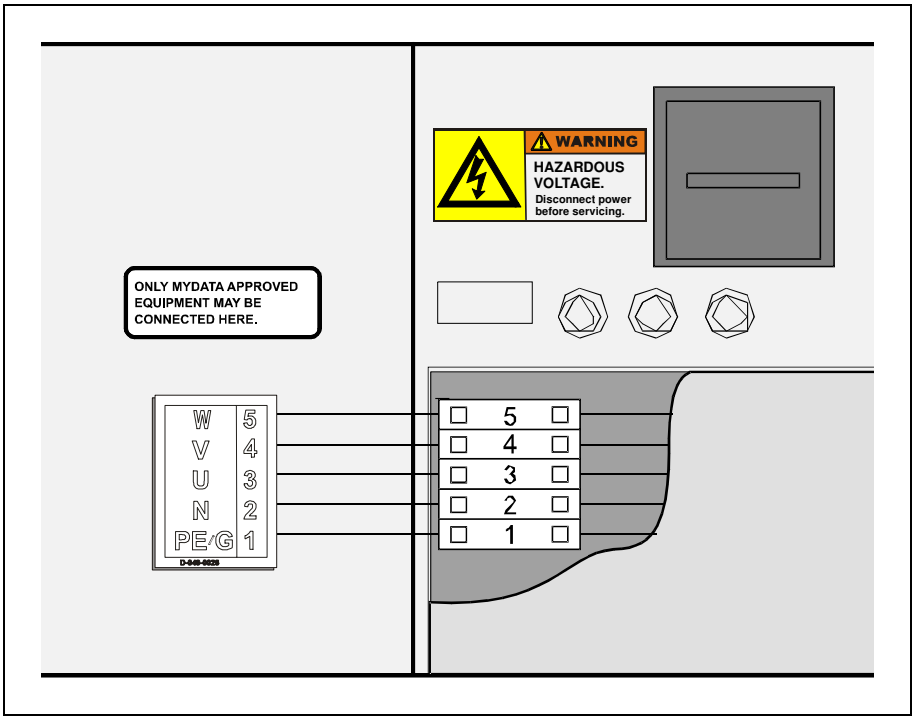


Figure 2-9. Power terminal block

Part	Power terminal block marking	Power cord marking, US	Power cord marking, EU
Live 1	W	Orange	Black
Live 2	V	Red	Brown
Live 3	U	Black	Black
Neutral	N	White	Blue
Protective Earth	PE/G	Yellow/Green	Yellow/Green

WARNING! Never connect the mains power before ensuring that the correct configuration plugs are installed.

Network Connection

The computer network is connected with a RJ45 connector.

Machine Installation And Calibration

There are a number of installation and calibration tasks in TPSys for a complete machine installation. The system will lead you through these tasks in the correct order – all you have to do is follow the instructions on the screen. Chapter 3 details how the various subsytems are registered in *hwconf*. Chapter 4 give information as to the tools and other hardware that is needed, as well as details on how to use calibration compmnents and boards.

ECR

ECR is a choice you make when installing the machine. On this type of machine, the mechanical centering unit is no longer required. A new type of X-wagon camera with a bigger FOV than standard is installed. In auto install above some new measurements have been added, and the order is slightly different.

3. Hardware Configuration

TPSys has a hardware configuration program called *hwconf*. This is where the machine configuration is specified.

There are two main tasks for the program:

- Identification of the servo controllers present in the machine, and thus select the appropriate servo software for them.
- Configuration of machine parameters, given the installed hardware.

Hwconf must be run every time the hardware is changed, or TPSys is upgraded. When you run hwconf for the first time, you must perform the operations described below manually. This is also the case if you add, or remove, hardware on the machine. When upgrading TPSys on the other hand, the program will perform these steps automatically.

TPSys View Of the Machine

TPSys sees the machine as a set of units, or subsystems. Each subsystem is configured by selecting the appropriate module type, which is an actual physical implementation of the subsystem. If there are more than one module type available, the operator must point to the correct one.

TPSys can communicate with some of these subsystems. To communicate, the system uses a number of controllers, or servo boards. The hwconf program automatically detects the various controller types on the machine.

Starting hwconf

1. Exit TPSys if it is running.
2. Start the configuration program `hwconf` at the Linux prompt on a machine. This opens up a TPSys-like interface with only two menus, *Main* and *Exit*.

   The *Main* menu in the hwconf program has two options, *Controllers* and *HW Configuration*. These options are described below.

* Controller Viewer * Window

Select *Main* > *Controllers* in the hwconf menu to open the * *Controller Viewer* * window.

This window is primarily used for troubleshooting of servos and for installing special servos.

Command Keys

All available commands for the * *Controller Viewer* * window are found in the upper-right area of the window.

Commands that are common in the TPSys interface are described in the TPSys, Operator's Manual.

Commands that are specific to the * *Controller Viewer* * window are listed below.

Enter– Autodetect Controller

Highlighting a controller in the list and pressing <Enter> starts a search for that specific controller.

F1 – Auto-detect all Controllers

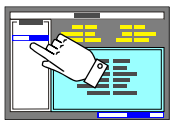
Pressing <F1> starts a search for all controllers in the list.

F2 – Select special servo

It is possible to bypass the automatic selection of servo for a controller and selecting a special servo. Press <F2>, and a list of available servos for the controller will appear.

There is no check that the servo selected is valid for the machine or configuration

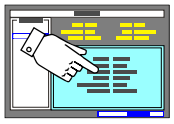
Controllers



The *Controllers* list shows the possible controllers for the current machine, and the status of detection. A status symbol at the left of each entry shows the current status. When the window is first opened, no symbols are shown.

Symbol	Status
	No symbol means no search has been made for that controller type.
–	Searched for but not found.
*	Searched and found.

Data



This box contains detailed information about the highlighted controller, for instance servo software name, version and date.

* Subsystem Viewer * Window

Select *Main* > *HW Configuration* in the hwconf menu to open the * *Subsystem Viewer* * window.

This will bring up a list of possible subsystems in the machine. When configuring a new machine, mandatory subsystems and the centering unit are preselected. You may need to manually add some subsystems, depending on the configuration. If an old machine configuration exists, for instance when TPSys is being upgraded, this existing configuration is read.

If the system has not auto detected the controllers before you configure a subsystem, it will perform an automatic detection. This may take a few seconds.

Command Keys

All available commands for the * *Subsystem Viewer* * window are found in the upper-right area of the window.

Commands that are common in the TPSys interface are described in the TPSys, Operator's Manual.

Commands that are specific to the * *Subsystem Viewer* * window are listed below.

Space – Select subsystem

By pressing <Space> when a subsystem is highlighted, you toggle whether the subsystem should be present or not. The *Present* field in the *Data* box indicates the status for the highlighted subsystem. Note that you cannot toggle the presence of mandatory subsystems.

Enter – Configure subsystem

By pressing <Enter> when a subsystem is highlighted, you start a configuration wizard for that subsystem and for any subsystems related to that subsystem.

F1 – Configure selected subsystems

By pressing <F1> the program will configure all selected subsystems, in other words the subsystems marked with * or ** in the list (see page 3-4).

F2 – Save machine configuration

By pressing <F2> the configuration is saved. This performs all the required setup for the machine, setting the appropriate parameters and such. If you exit the window without saving with <F2>, the system will prompt if you wish to save the configuration.

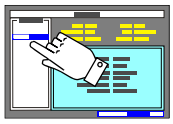
F3 – Select all subsystems

By pressing <F3>, all subsystems are selected.

F4 – Mark subsystem replaced

By pressing <F4>, the highlighted subsystem is marked as uncalibrated in the *Utility* > *Installation and Calibration* > *Calibration* function in TPSys.

Subsystems



This list contains the possible subsystems for the machine.

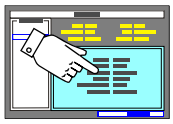
The configuration status is shown in the left margin of the *Subsystems* list. A status symbol at the left of each entry shows the current status.

Symbol	Status
	Not present.
*	Present but not configured.
**	Present and configured.

To configure a system, highlight it in the *Subsystems* list and press <Enter>. A message box will inform that auto detection is ongoing, this may take some time. Depending on the subsystem, you may get further configuration questions. For further information, see page 3-5.

If the configuration is successful, the subsystem will be marked as present and configured in the list.

Data



The data box at the bottom right shows the status and, if configured, the selected module type.

Configuration Questions

When you are configuring the subsystems, the system will ask a number of questions. The actual questions will depend on which subsystems are marked as present, and what machine type it is.

If the machine has previously been configured with hwconf, the program will point out the choices previously made. Not all of the following questions and choices will appear for each machine.

Y Wagon

The program will ask for the type of Y wagon installed.

Conveyor

The program will ask what type of conveyor is installed on the machine.

Z Unit

You will be asked what type of Z unit is installed on the machine. It will be either a Midas unit or the older Z-Fi type, see Figure 3-1 below.

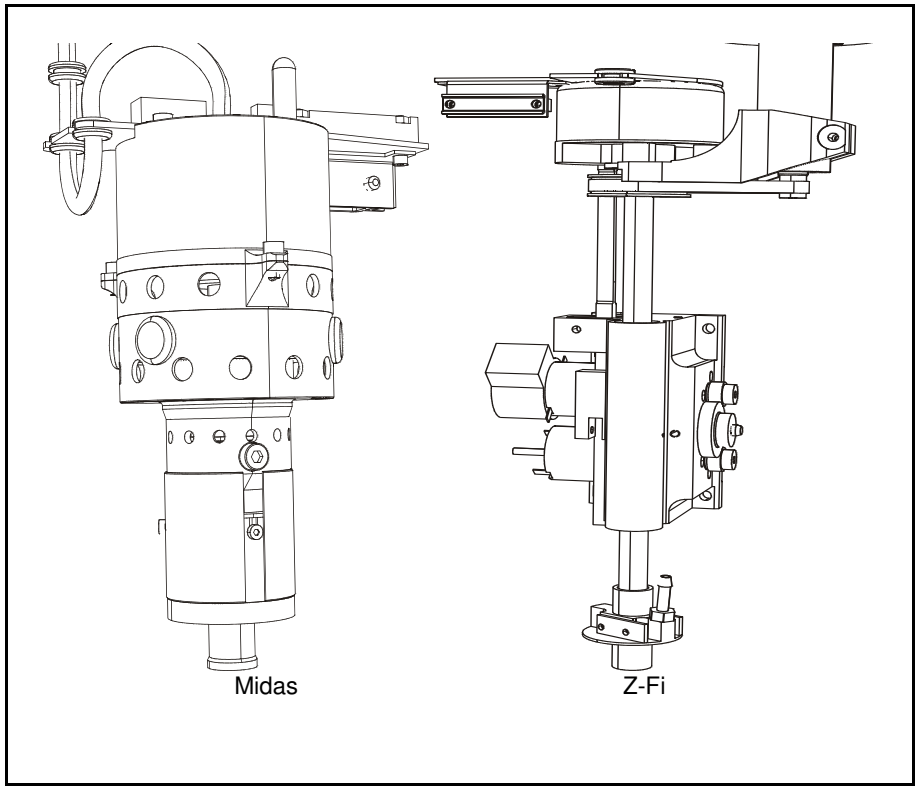


Figure 3-1. Z units.

Magazine

The program will ask if the magazine bus is CAN-based or MOT-based. If the machine is upgraded to handle Agilis LM8 or LM1216 magazines, or manufactured after February 2004, the machine magazine bus is CAN-based.

X wagon Camera

You will be asked for the kind of X wagon camera (PVC) installed. The list below shows the different types. Some of the options are only available on some machine models.

PVC 2

Big shiny lighting unit with 4 halogen bulbs. SONY-camera XC-77CE. Field of view (FOV) 14x11mm.

PVC 3

Small black lighting unit with 2 halogen bulbs. SONY-camera XC-73CE. FOV 8x6 mm.

PVC 4, CP5

Small black lighting unit with 2 halogen bulbs. SONY-camera XC-73CE. FOV 14x11 mm. For machine with CP5 electronics.

PVC 4, CP5, 21.5x17

Small black lighting unit with 2 halogen bulbs. SONY-camera XC-73CE. FOV 21.5x17 mm. For MY-series ECR machines.

PVC 4, CP5, 16x12.5

Small black lighting unit with 2 halogen bulbs. SONY-camera XC-73CE. FOV 16x12.5 mm. For MY-series machines with a T3, T4, T5 or T6 conveyor that is mounted in its lower position to allow mounting of higher components.

PVC 4, CP4

Small black lighting unit with 2 halogen bulbs. SONY-camera XC-73CE. FOV 14x11 mm. For machine with CP4 electronics.

Optical centering cameras

You must indicate which type each selected optical centering camera is. The list below shows the different types.

For each camera subsystem, there is a corresponding illumination subsystem. The illumination subsystem is automatically configured when the camera subsystem is configured.

SVC

Rectangular field of view, approximately 53x41 mm. Lighting unit with surface mounted diodes. Manufactured in steel. Previously known as L-011-0034 or L-11-034B.

HRC

High-resolution camera. Always part of a DVC together with an SVC.

OVC1

TP9-2U specific with FOV 41x41mm. Lighting unit with through hole mounted diodes. Manufactured in aluminum. Previously known as L-011-0110B.

OVC2, 3, 4, 5

Rectangular field of view (FOV), approximately 53x41 mm. Lighting unit with through hole mounted diodes. Manufactured in aluminum. Previously known as L-011-0025.

EVC1, 2, 3, 4

Standard cameras with extended field of view.

HYDRA camera

The program will ask whether the installed HYDRA camera is for HYDRA 14,400 cph or for HYDRA 21,000 cph.

HYDRA tools

The program will ask whether the HYDRA unit has 11.5mm exchangeable tools or shorter exchangeable tools. Select the 11.5mm option.

HYDRA reference background

The program will ask what type of HYDRA reference background the machine has. The options will vary depending on if the machine has a Linescan camera present or not.

The HYDRA unit can be fitted with three different reference backgrounds (HRB): type 14, type 14LSC and type 23LSC.

- Type 14 can only be used with the HYDRA camera.
- Type 14LSC can be used with both the HYDRA camera and the Linescan camera. Type 14LSC has an inner diameter of 14 mm.
- Type 23LSC can only be used with the Linescan camera. Type 23LSC has an inner diameter of 23 mm.

HYDRA vacuum

The program will ask if the HYDRA vacuum unit is black or white.

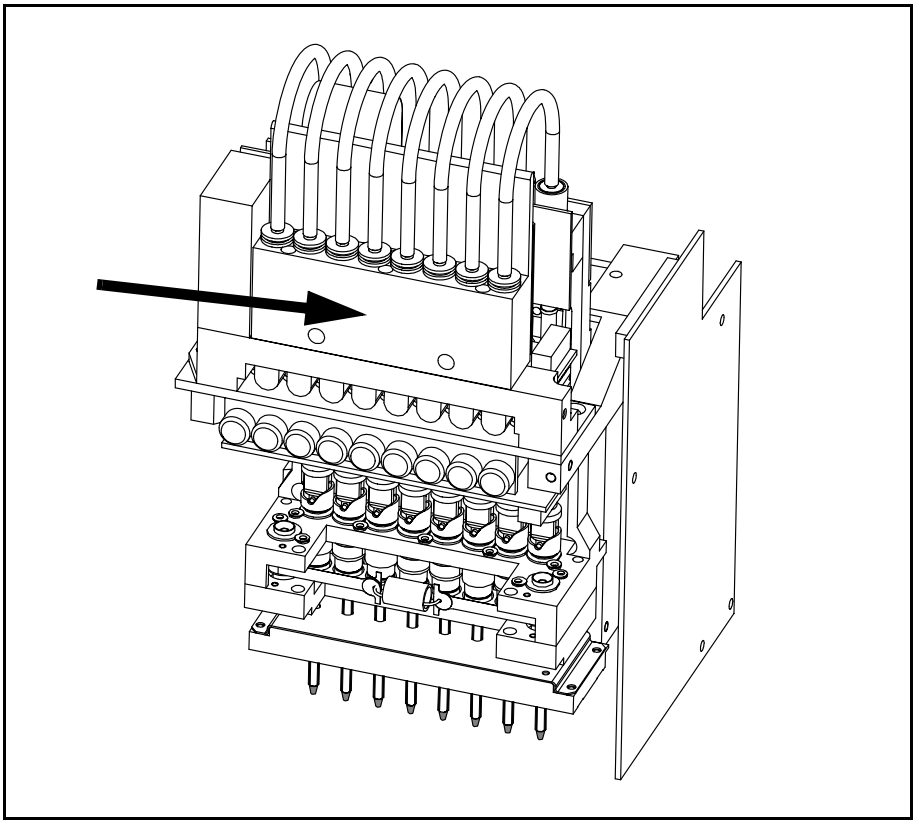


Figure 3-2. HYDRA with vacuum unit (see arrow).

Calibration and updating questions

Depending on the machine type and hardware configuration, the program may indicate that you have to calibrate the X servo.

Calibration may be done at this time, or skipped for the time being. If you skip the calibration, a warning will be displayed, saying that the calibration should be performed before running the machine the next time.

You may be asked if any TEX units are installed. If there are, the program will check whether their firmware needs updating, and if necessary, update it. This may take a couple of minutes.

The program will automatically search for other controllers with firmware that needs updating, and if it finds any, it will update them also.

Messages will be displayed to inform you of what is happening during this time.

When saving a configuration, the program will show a list of calibrations that will be marked as uncalibrated in the *Utility* > *Installation and Calibration* > *Calibration* function in TPSys. It is possible to abort at this point by typing <Esc>.

4. Installation And Calibration

The machine configuration is specified in the hardware configuration program *hwconf*, see Chapter 3. Hwconf must be run every time the hardware is changed, or TPSys is upgraded.

Running hwconf is just the first step in the installation process. The next step is to let TPSys install and calibrate the various resources. Thereafter the machine is ready to use.

The TPSys *Installation Guid*e (P-010-0905-EN) describes how to perform a complete installation of Linux and TPSys.

This chapter is divided into the following sections:

Installation

When performing a new software installation there are a couple of measurements and configurations that have to be done before the machine is ready for operation.

The following steps have to be performed before the machine can be used. Each step is described in the following section.

1. Install the TPSys software.
2. Run the *Postinstall* program.
3. Run the *hwconf* program (hardware configuration program).
4. Run the *Autoinstall* procedure.
5. Perform the machine calibration procedures.

Installing the TPSys Software

The TPSys software is installed by inserting the TPSys software CD in the machines DVD player and powering up or rebooting the machine. Follow the instructions on the screen.

For a more detailed description of the TPSys software installation, refer to the TPSys *Installation Guide*

Postinstall Program

Postinstall is an option configuration program that is used to set different software options, for example magic word, use time lock, tools used in the machine, colors used, network parameters. The *postinstall* program is automatically started after the TPSys software installation. It is also possible to start the program by typing *postinstall* at the Linux prompt.

Note, if you start *postinstall* on an already installed and calibrated machine all settings will be reset and all calibrations have to be re-done.

For a detailed description of the *postinstall* procedure, refer to the TPSys *Installation Guide.*

Hardware Configuration Program

The machine configuration is specified in the hardware configuration program *hwconf*. The *hwconf* program must be run every time the hardware is changed, or TPSys is upgraded.

For a detailed description of the *hwconf* program, refer to Chapter 3 in this manual.

Autoinstall Procedure

Before actual use of the machine, some machine parameters must be measured in every individual machine. The measurement procedure is assisted by a program called *autoInstall*. Some of the steps will require manual intervention. Follow the instructions given on the screen.

WARNING! Not all of the normal safety systems of the machine are in operation during this procedure, so make sure that nothing is in the way of the machine's moving parts before pressing <Enter>, <PgDn> or <PgUp>.

For a detailed description of the *autoInstall* procedure, refer to the TPSys *Installation Guide.*

Machine Calibration

The final step is to perform a number of calibration procedures on the machine, thereafter the machine is ready to be used.

The machine calibration procedures are described in the following section.

Calibration

If you are to perform a new installation of a machine. Start by following the first six steps as described in the TPSys *Installation Guide*. When done, return to this section for detailed descriptions of each calibration that needs to be performed.

If you are not performing a new installation of a machine but new hardware has been added or replaced in the machine, then TPSys must first be informed about which calibration steps that need to be performed. Before starting any calibrations, inform TPSys about the new hardware by running the *hwconf* program and select the new hardware in *hwconf*, see Chapter 3.

TPSys use calibration components and plates in some of the operations. You will be asked to locate and verify, for instance, fiducial marks on these components. In some cases you may have to do mechanical calibrations, like for instance the HYDRA camera's alignment in Y direction.

Backup and Restore

When performing a backup, the calibration status of the machine as well as the calibration data created by the calibration operations are saved. Restoring will restore the calibration status of the machine.

Requirements

In order to be able to perform the calibrations, there are some hardware and tools that are needed. Before starting any calibration steps, ensure that you have the required parts at hand.

- Calibration components and plates.
- Empty board (PCB).
- Slide caliper.
- Allen keys.
- Screwdrivers
- Spanners
- Metal ruler.

Starting the Calibration

Knowing the dependencies between various installation operations, and in which order to perform them, can be difficult. TPSys will help you with these tasks. Simply put – follow the instructions on the screen.

To start the machine calibration, select *Utility* > *Installation and Calibration.* This opens a *CALIBRATION* window listing all calibration steps.

The following calibration procedures are described later in this Chapter.

1. *X-wagon camera calibration* on page 4-6.
2. *Place area calibration* on page 4-8.
3. *Centering Base Level Measurement* on page 4-9.
4. *Mechanical centering unit alignment* on page 4-10.
5. *Coarse measurement of Z-unit offset* on page 4-11.
6. *Cable resistance measurement* on page 4-12.
7. *Optical Centering Calibration (SVC & HRC)* on page 4-13.
8. *Optical Centering Camera Offsets (SVC & HRC)* on page 4-13.
9. *Optical Centering Calibration (Linescan Camera)* on page 4-16.
10. *Linescan Camera Fine Tune* on page 4-18.
11. *Calibrate HYDRA Camera Optics* on page 4-19.

- Press <F1> to run through the required calibrations.

Command Keys

F1 – Finish calibration

By pressing <F1> all non-performed calibration steps will be executed in the required order. For each operation TPSys will display a pop-up window declaring which operation will be started. If an operation is aborted, or fails, TPSys will return to the main window without performing the remaining steps. After an operation is completed the *Date* column is updated.

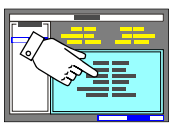
F2 – Clear calibration status

Pressing <F2> will clear all timestamps, marking all operations as not performed.

Enter – Perform specific calibration

To perform a specific calibration, place the cursor on the desired line and press <Enter>. If you select not to perform dependent steps, the operation will be executed but not marked as performed. The system will warn you if the specified operation invalidates any already performed calibrations. It you proceed with the operation, the timestamp for all invalidated calibration operations will be cleared.

Data



Date

Timestamp showing when a calibration step was performed. If no calibration has been performed the column is blank.

Operation

All required calibration steps in the preferred order.

X-wagon camera calibration

Purpose

The purpose of this calibration is (with the aid of a calibration board) to stabilize the X,Y offset values and the theta value for the X-wagon camera.

When to perform this procedure?

- Installing a new machine.
- If the offset values for the X-wagon camera, are not within ±3µm approximately.

Requirements

– Calibration Plate, see Figure 4-1.

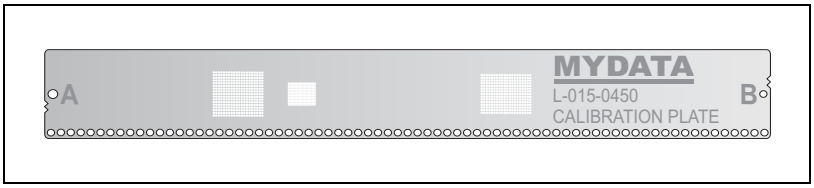


Figure 4-1. Calibration plate.

– Calibration Background Plate

The table below show which background to use for different load tables.

Load table	Plate
288 or 358mm Y-wagon with covers	L-015-1681
ML3	L-015-1682
ML4	L-015-1686
ML5	L-015-1687
ML6	L-015-1689
Special ML7 Proline	L-015-1690
400PT or 420PT with covers	L-015-1683
450PT without covers	L-015-1684
468 or 478mm Y-wagon with/without covers	L-015-1684
538mm Y-wagon without covers	L-015-1684
T3	L-015-1685
T4	L-015-1686
T5	L-015-1687
T6	L-015-1688
500T without covers	L-015-1685
500T extended 1 module	L-015-1686
500T2 with covers	L-015-1685
500T2 ML adapter	L-015-1684
500T2 special extension 24"	L-015-1686
500T2 extended 1 magazine module	L-015-1686
500T2 special extension 28"	L-015-1686

Procedure

1. Start the calibration by selecting the camera to calibrate in the *Calibration* window.
2. Follow the instructions presented on the screen.
   - When prompted, insert the appropriate calibration background plate. Set the conveyor width and grab the plate.
   - When prompted, place the area calibration plate (L-015-0450) on the calibration background plate, see Figure 4-2. Set it approximately aligned to the X axis.

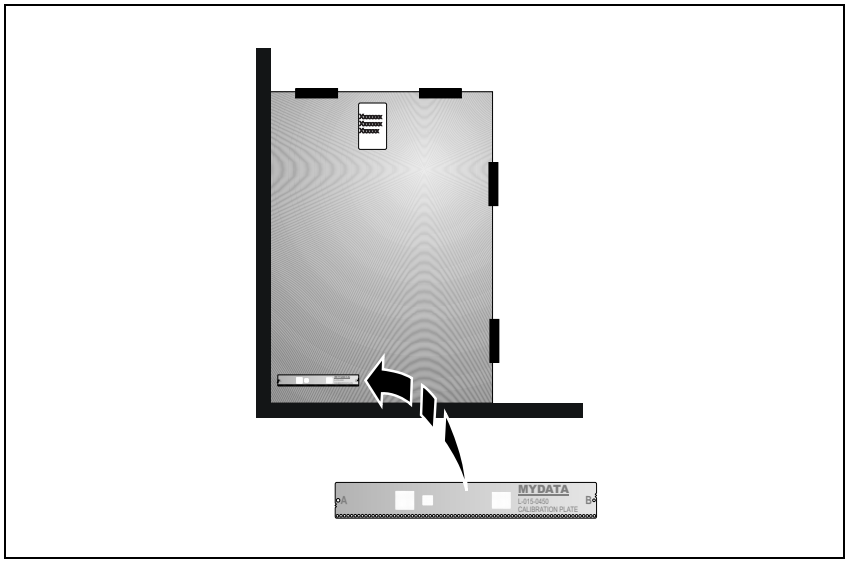


Figure 4-2. Calibration board (L-015-0450).

TPSys will repeat the calibration a number of times, and present the final results in a dialog box.

Place area calibration

Purpose

This procedure is used to calibrate the assembly table place area, where the objective is to obtain the standard deviation values for the X axis and the Y axis.

When to perform this procedure?

- Installing a new machine.
- If the Y wagon has been removed/replaced.

Requirements

– See *X-wagon camera calibration* requirements on page 4-6.

Procedure

1. Start the calibration by selecting *Place area calibration* in the *Calibration* window.
2. Follow the instructions presented on the screen.
   – When prompted, insert the appropriate calibration background plate in the conveyor. Set the conveyor width and grab the plate.
   – When prompted, place the area calibration plate (L-015-0450) on the calibration background plate, see Figure 4-3. Set it approximately aligned to the X axis.

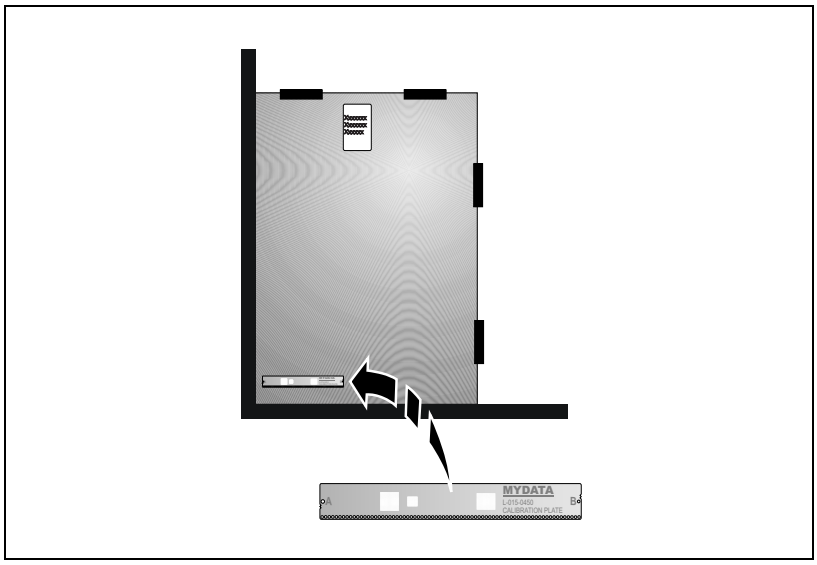


Figure 4-3. Calibration board (L-015-0450).

A coarse measurement of the Z unit offset is made.

The place area calibration will now run and a progress bar will be displayed showing information as to elapsed time and remaining time.

The calibration is performed in one pass, including both the X axis and the Y axis. When the calibration is completed, the result is displayed as standard deviations for the X axis and the Y axis. A high standard deviation indicates that the area calibration plate has moved during calibration or that there are some mechanical problems in the machine.

Centering Base Level Measurement

Purpose

This procedure measures the vertical position of the centering jaws, which equals the base centering level.

When to perform this procedure?

- Installing a new machine.
- The mechanical centering level must be measured if the centering jaws have been loosened.
- If a centering or electrical verifying problem occurs.

Procedure

1. Start the calibration by selecting *Place area calibration* in the *Calibration* window.
2. Follow the instructions presented on the screen.

   The vertical position of the centering jaws is measured and the new value is stored as parameter *21.0221 Centering; Centering base level* which normally equals centering level Number 1.

Mechanical centering unit alignment

Purpose

The purpose of this calibration step is to mechanically align the mechanical centering unit to the rotational center of the Z unit mount tool.

When to perform this procedure?

- Installing a new machine.

Requirements

– Empty board (PCB).

– Calibration component (L-010-0166-1 HCOB ED-1), see Figure 4-4.

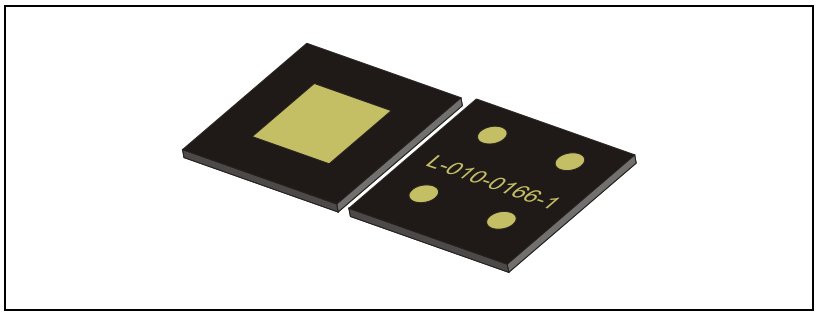


Figure 4-4. Calibration component (L-010-0166-1 HCOB ED-1)

Procedure

1. Start the calibration by selecting *Mechanical centering unit alignment* in the *Calibration* window.
2. Follow the instructions presented on the screen.

   – When prompted, insert an empty board to place the calibration component on, and put the calibration component on the board. The component shall be placed as in Figure 4-5, that is with the text and four dots upwards.

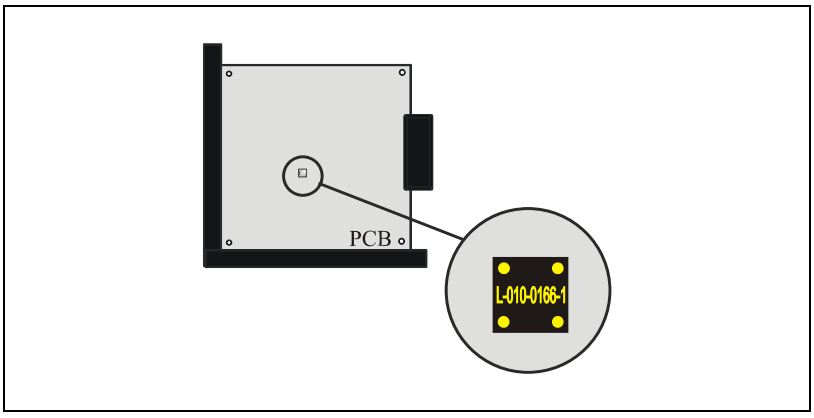
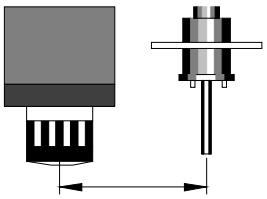


Figure 4-5. Placing calibration component.

TPSys does the required measurements and displays the *C misalignment*. If the misalignment is too big, then the mechanical centering unit must be mechanically adjusted.

Coarse measurement of Z-unit offset



Purpose

To set a coarse offset between the optical axis of the X-wagon camera and the mount tool center line.

When to perform this procedure?

- Installing a new machine.
- If the camera or parts of the Z axis have been loosened.

Requirements

– See *Mechanical centering unit alignment* requirements on page 4-6.

Procedure

1. Start the calibration by selecting *Coarse measurement of Z-unit offset* in the *Calibration* window.
2. Follow the instructions presented on the screen.
   – When prompted, manually insert the component on the mount head nozzle.

   TPSys centers the component mechanically, places the component on the board and locates the component using the X-wagon camera.

Cable resistance measurement

Purpose

This procedure is used to measure the cable resistance in wires included in the electrical verification circuit, and to update this value in the system.

The cable resistance has effect when verifying low ohm resistors only, see below.

When to perform this procedure?

- Installing a new machine.
- If the centering jaws have been replaced.
- If the resistance test fails in verifying low resistance.

Requirements

– Zero ohm resistors are required to perform this measuring.

Procedure

1. Start the calibration by selecting *Cable resistance measurement* in the *Calibration* window.
2. Follow the instructions presented on the screen.

   – When prompted, apply manually a zero ohm resistor with the selected package to the tool tip in 0 degrees.

   This procedure updates the *111.0002 Right X wagon; Cable resistance* or *111.0012 Left X wagon; Cable resistance* parameter. The default value for this parameter is 0.6 ohm, which, if incorrect, has affect only on resistors with a resistance of less than 50 ohm approximately.

   If you have no zero ohm resistor, you can use a low ohm resistor and subtract the real resistor value from the measured value and enter the difference to the *111.0002 Right X wagon; Cable resistance* or *111.0012 Left X wagon; Cable resistance* parameter.

Optical Centering Calibration (SVC & HRC)

Purpose

This procedure describes how to calibrate the SVC and HRC camera.

When to perform this procedure?

- Installing a new machine.
- If parts of the optical or mechanical system is modified or replaced.

Requirements

– C23S mount tool.

– Slide caliper.

– Calibration board (L-029-0506-3 Plate 506 ED-3), see Figure 4-6.

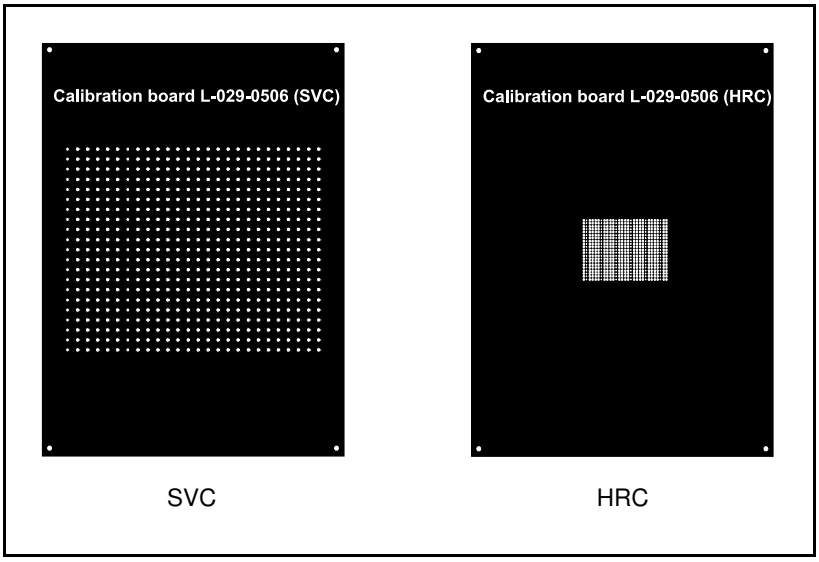


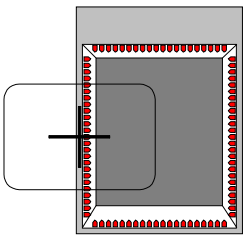
Figure 4-6. Calibration board (L-029-0506-3 Plate 506 ED-3).

The calibration plate is the cameras absolute reference and should therefore always be handled with care. When not used the calibration plate should be stored in its accompanying casing in order to keep it clear from dust and in good shape.

The calibration plate in Figure 4-6 is used for the calibration of the Standard vision camera (SVC) and the High resolution camera (HRC) in a dual vision system. A rubber cloth is provided with the plate. This cloth will keep the plate from slipping when placed on a board.

Procedure

1. Start the calibration by selecting the camera to calibrate in the *Calibration* window.
2. Follow the instructions presented on the screen.



- When prompted, Move the crosshairs to the camera´s left side when the *Center cross hairs on the left side of the camera frame* dialog box is shown.
- When prompted, Measure the calibration plate thickness with a slide caliper when the *Verify calibration plate thickness* dialog box is shown. Insert the correct value in the dialog box on the screen.
- When prompted, put a board on the assembly table. Put the rubber cloth provided with the calibration plate on the board. Place the calibration plate on top of the rubber cloth. The rubber cloth will keep the calibration plate from slipping around on the board.
- When prompted, use the trackball, adjust the crosshairs to the center of the calibration pattern.

  The camera is positioned in 90 degrees. Consequently, the dot area should be centered vertically on the monitor.

  To pan the image, use the key combinations in the table below.

Key combination	Move image
Ctrl + W	Up
Ctrl + X	Down
Ctrl + A	Left
Ctrl + D	Right
Ctrl + PgUp	Zoom Out
Ctrl + PgDn	Zoom In
Ctrl + S	Back to normal view

3. If the calibration pattern is not aligned in the Y direction, it might be necessary to adjust the Y position of the camera unit mechanically, see page 9-7.

Do not adjust a DVC unit mechanically if the SVC is calibrated.

---

4. The camera calibration is now completed. Proceed with the procedure.

– *Optical Centering Camera Offsets (SVC & HRC)* on page 4-15.

Optical Centering Camera Offsets (SVC & HRC)

Purpose

This calibration step needs to be performed for all centering cameras in the machine in order to increase the accuracy of the computed centering offsets.

When to perform this procedure?

- This calibration step needs to be performed for all centering cameras in the machine.

Requirements

– See *Mechanical centering unit alignment* requirements on page 4-6.

Procedure

1. Start the calibration by selecting the camera to calibrate in the *Calibration* window.
2. Follow the instructions presented on the screen.

   TPSys picks up the component and acquires the necessary number of images and calculates the centering offsets.

   When the measurement is done, the result is presented on the screen.
3. If this procedure was performed on the Linescan camera then continue with the following procedure.

– *Linescan Camera Fine Tune* on page 4-18.

Optical Centering Calibration (Linescan Camera)

Purpose

This procedure describes how to calibrate the Linescan camera.

When to perform this procedure?

- Installing a new Linescan camera
- If parts of the optical or mechanical system is modified or replaced.

Requirements

– C23S mount tool.

– Calibration plate Linescan camera (L-010-0452B).

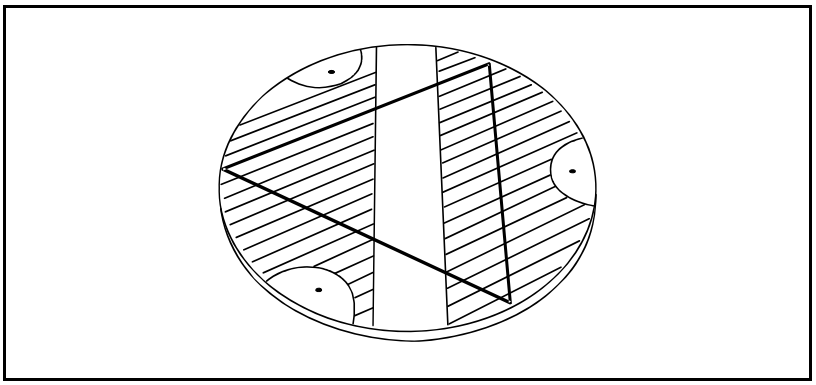
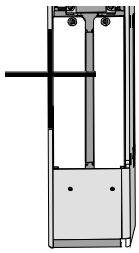


Figure 4-7. Calibration plate Linescan camera (L-010-0452B).

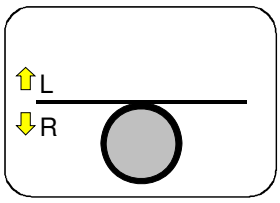
The calibration plate is the cameras absolute reference and should therefore always be handled with care. When not used the calibration plate should be stored in its accompanying casing in order to keep it clear from dust and in good shape.

Procedure

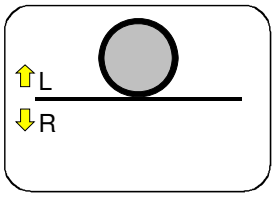
1. Start the calibration by selecting the camera to calibrate in the *Calibration* window.
2. Follow the instructions presented on the screen.



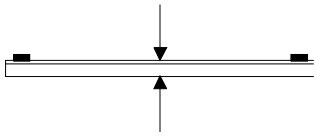
– When prompted, use the trackball to center crosshairs on the camera frame (see figure).



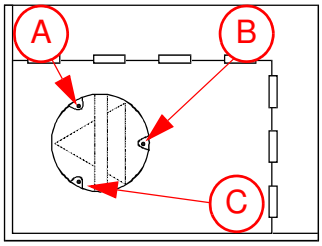
– When prompted, align the left side of the Midas mount head tool holder top to the horizontal line in the center of the screen. Use the trackball to move the tool position up or down.



– When prompted, align the right side of the Z tool in the same way as above.



– When the *Verify calibration plate thickness* dialog box is shown, measure the calibration plate thickness with a slide caliper. Insert the correct value. The plate thickness does not include the supports.



– When prompted, put a board on the assembly table and then put the calibration plate on top of that board with the supports downwards. Note the orientation of the plate.

A = *upper left fiducial mark of calibration plate.*

B = *lower right fiducial mark of calibration plate.*

C = *lower left fiducial mark of calibration plate.*

When ready, the calibration starts and the *Running Linescan camera calibration* dialog box is presented on screen. The calibration procedure will last for approximately 2 minutes and if successful the *Calibration successful* dialog box is presented on the screen.

3. When the calibration is completed, continue with the following procedure.

– *Linescan Camera Fine Tune* on page 4-18.

Linescan Camera Fine Tune

Purpose

After a camera calibration it is always necessary to perform a fine tuning to achieve the highest possible placement accuracy. This procedure measures the angle between the Midas LSC reference line and the X axis of the table coordinate system.

When to perform this procedure?

- After performing Optical Centering Calibration (SVC & HRC) (Linescan Camera).

Requirements

– C23S mount tool.

– Calibration component (L-040-1084).

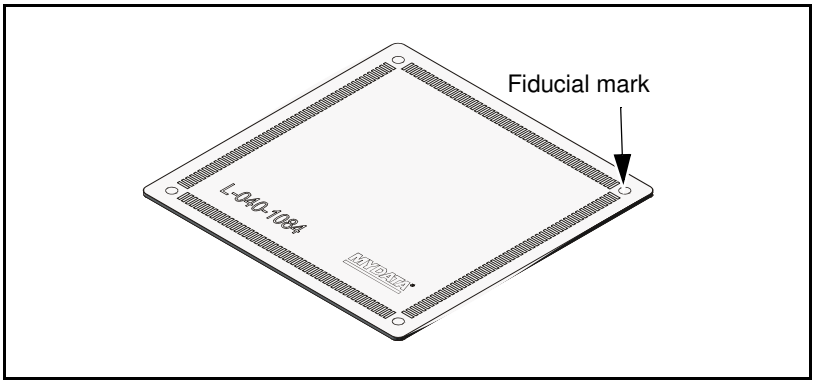


Figure 4-8. Calibration component (L-040-1084).

1. Start the calibration by selecting the camera to calibrate in the *Calibration* window.
2. Follow the instructions presented on the screen.
3. When prompted, use the trackball to move the camera crosshair to indicated component fiducial marks, and verify each fiducial mark.

   Centering camera angle offset value in the parameter file is now adjusted automatically.

Calibrate HYDRA Camera Optics

Purpose

To calibrate the optical system of the HYDRA camera. This enables TPSys to compensate for non-linearities and distortions in the optical system.

When to perform this procedure?

- Installing new HYDRA system.
- After replacing or moving the HYDRA system.

Requirements

– C23S mount tool.

– Calibration plate HYDRA camera (L-019-0633-2).

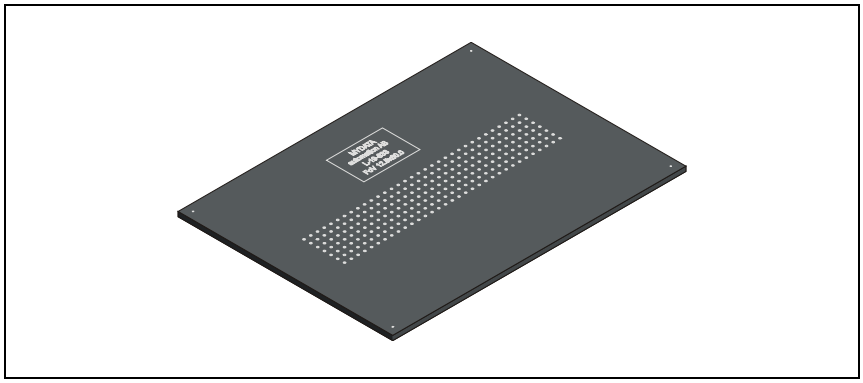


Figure 4-9. L-019-0633-2 Calibration plate.

Procedure

1. Measure the thickness of the calibration plate, using a slide caliper and enter the value when prompted.
2. When prompted, insert a clean PCB on the lower left end of the Y wagon. Place your calibration plate (L-019-0633-2) upside down on the PCB according to figure 4-10. Verify when ready.

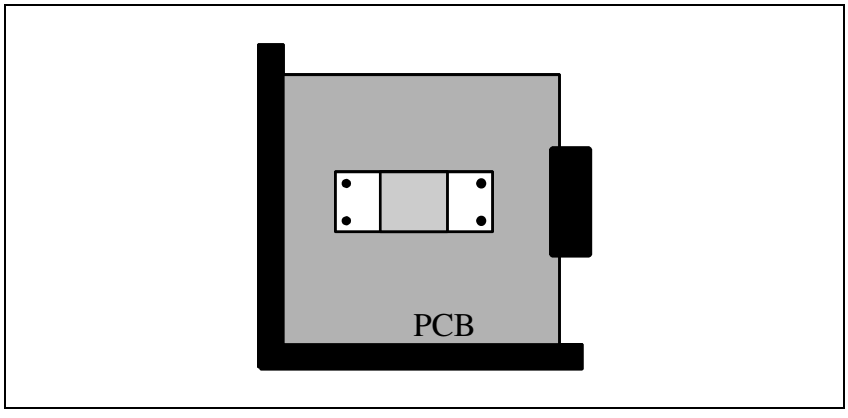


Figure 4-10. Calibration plate L-019-0633-2 on the PCB.

3. Use the trackball to *Center cross hairs on lower left fiducial mark of calibration plate* as accurately as possible, and verify.

   The X-wagon moves to the lower right fiducial mark.

4. Use the trackball to *Center cross hairs on lower right fiducial mark of calibration plate* as accurately as possible, and verify.

5. Find a place to measure the board level on. Use the trackball to move the X-wagon camera somewhere on the PCB near the calibration plate. Verify when ready.

   The Midas mount head will now pick up the calibration plate and move to a position above the HYDRA camera.

   The camera view with a graphical support pattern is shown on the screen See Figure 4-11.

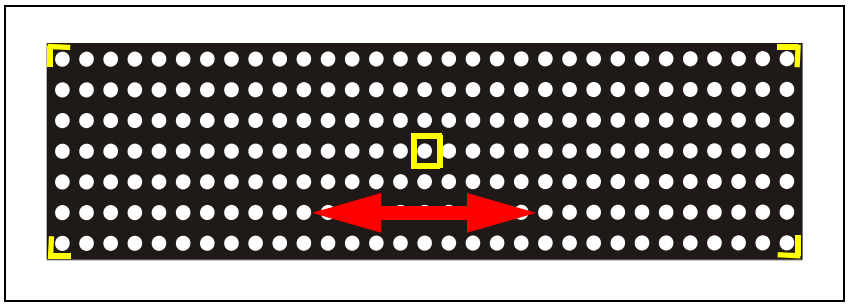


Figure 4-11. Locate X position of calibration plate

6. Use the graphical support pattern to locate the X position of the calibration plate. See Figure 4-11.
7. When you are satisfied with the X position, select *Ready* in the *Locate X position of calibration plate* dialog box and press <Enter>.
8. You may have to adjust the cameras Y position. Please see page 9-8 for information.

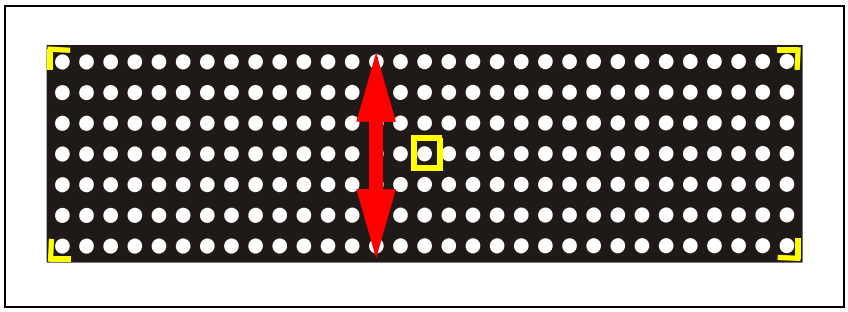
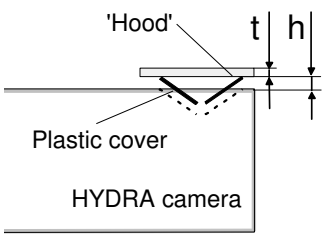


Figure 4-12. Adjust Y position of camera

9. When you are satisfied with the Y position, select *Ready* in the *Adjust Y position of camera* dialog box and press <Enter>.
10. When the calibration of the camera optics is done, verify the calibration by pressing <Shift> + <F1> and study the view with the small crosses.
11. Ensure that all crosses are in the center of the dots. Move the image with the shortcut keys, see table on page 4-14.

Measuring HYDRA Camera Height



When you measure the HYDRA camera Z level, a protection hood with known thickness (‘t’ in the figure) must be placed over the camera opening.

We suggest you use a metal ruler as hood. If the camera openings plastic cover is sticking up above the camera housing, this height (‘h’ in the figure) must also be measured and added to the thickness of the hood. Use a slide calliper to measure the height.

5. X Movement System

This chapter contains adjustment and calibration instructions for the X movement function.

Also, it contains some procedures to measure particular values for evaluating purposes during calibrations.

The machine contains the following four different movement systems:

1. X movement moves the X wagon in the X direction.
2. Y movement moves the Y wagon with the assembly table in the Y direction.
3. Z movement moves the mount tool vertically.
4. Theta movement rotates the mount head.

WARNING! In this chapter, some of the procedures cause the machine to make movements. The below warning must be followed for such procedures. Procedures that cause the machine to make movements are marked with this sign next to the text. Before entering such commands, check the following: Ensure that there are no foreign objects on the assembly table, near the tool bank, or within the X wagon, Y wagon, or Tray Wagon Magazine moving areas, and that the standard tool head and the HYDRA tools are in their upper positions

Show Transducer Positions

This program shows the C, Theta, X, Y, and Z positions, and the Theta and Z positions for the HYDRA unit, if used. Use this procedure to detect transducer faults or faults in the transducer wiring.

Procedure

1. If you currently run TPSys, select *Restart TPSys* from the *Exit* menu and press the space bar on the keyboard to get to the startup menu.
2. Select *Show Transducers*.
3. When prompted OK to initiate hardware? press <Enter>. The *Show Transducers* window is shown.
   - Transducers named 'Fi' show the Theta values (in mDeg).
   - The YM transducer is shown only if the machine has a tray wagon magazine, and the HFi and HZ transducers are shown only if the machine has a HYDRA unit.
   - All axes, except for the X axis, are released. Use the joystick to make X movements.

CAUTION! Watch the tool head during movements because the locks can be released, which means that the Z mechanism may go entirely down by its own weight.

4. When ready with *Show Transducers*, exit by pressing any other key than <F1> on the keyboard or *Camera* on the machine keypad.
5. Confirm by replying *Yes* in the shown *Exit* dialog box.

WARNING! Make sure there are no fingers in the machine moving areas and press <Enter> to resume the previous positions:

6. If you want to return to the startup menu, press <Space> before TPSys is started.

Check X-wagon Grease Pump

Use the procedure below to test the function of the X-wagon grease pump.

Procedure

1. Select *Exit* > *Exit To Service*.
2. Select *Utility* > *Test PAIB board.*

   The *Load board* dialog box is shown with the servo file that will be loaded to the MOT-X board.
3. When ready, select *Yes* in the *Load board* dialog box to start the measurement. The *PAIB Board Test* information box is shown.
4. Control the Grease pump status by moving the cursor to the *Grease pump on* field and press <Space> to toggle the grease pump on or off.
5. Press <Enter> to save the chosen setting.

Adjustment and Calibration

Adjustments and calibrations included in the X movement section are:

Measuring the X Belt Tension

This section describes how to measure the tension of the X belt, located under the upper covers of the machine.

Tools

- Frequency counter.
- Two prisms.

Procedure

1. Open the upper left cover using a pointed object, for example a thin screwdriver, see Figure 5-1.

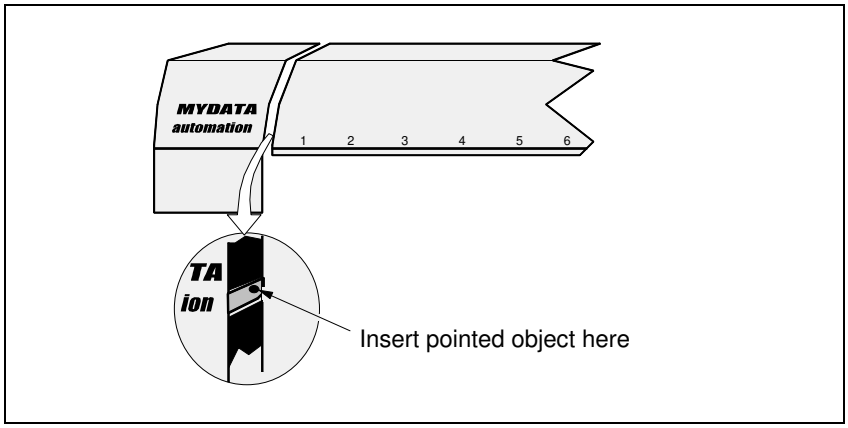


Figure 5-1. Opening the upper machine cover.

2. Move the X wagon to its leftmost position.
3. Put the two prisms on the X rail with the flat edge upwards as shown in Figure 5-2, under the X belt upper part. They should be placed with a spacing of 900 mm ±2 mm.

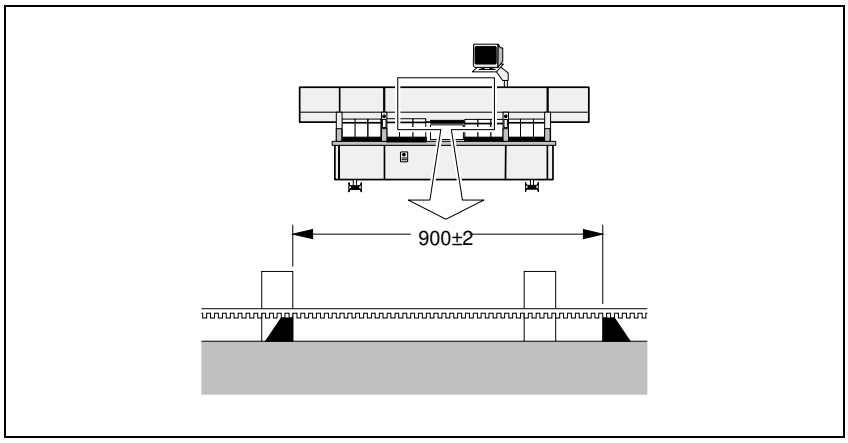


Figure 5-2. Measuring the X belt tension.

4. Measure the resonant frequency on the length between the prisms. The belt tension is correct when the frequency is 57 Hz.
5. If the belt tension is not correct, then adjust as described in the next section *Adjusting the X Belt Tension*.

Adjusting the X Belt Tension

This section shows how to adjust the X belt tension if the measured frequency is not measured to be 57 Hz (see above).

A measured value below 57 Hz indicates that the belt is slack and must be tightened. A value above 57 Hz indicates a belt too taut and therefore needs to be untightened.

Procedure

1. Loosen the A and B fixing screws, see Figure 5-3.

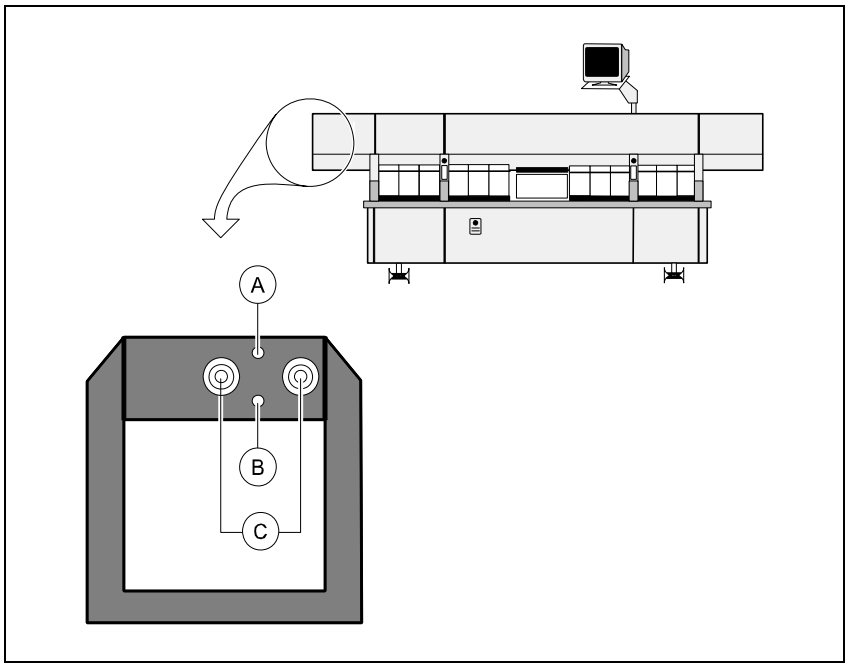


Figure 5-3. Adjusting X belt tension.

2. Adjust the belt by turning the screws marked 'C' in Figure 5-3 as follows:
   - To stretch the belt – turn screws 'C' clockwise.When stretching the belt, loosen the 'A' and 'B' fixing screws successively.
   - Loosen the belt – turn the 'C' screws counter-clockwise.
3. Make sure that the belt is parallel to the X-rail end by adjusting the 'C' screws equally.
4. When satisfied with the adjustment, tighten the 'A' and 'B' fixing screws.
5. Continue by performing the *Adjusting the X-Belt Pulley* procedure as described on page 5-6.

Adjusting the X-Belt Pulley

This procedure is used to adjust the X belt dynamic position on the pulley after adjusting the X belt tension.

The X-belt utility option in TPSys is used to run the X wagon back and forth, while adjusting the X-belt pulley.

Adjust the pulley using the X-belt utility as follows:

Procedure

1. Select *Exit* > *Exit To Service* in TPSys to start the service program.
2. Start the *X-belt utility program* by selecting *Utility* > *Adjust X belt*.

WARNING! To simplify the adjustment the machine will move the X wagon continuously.

3. Loosen the 'A' and 'B' fixing screws somewhat, see Figure 5-3.
4. Adjust the dynamic position of the X belt to the center of the stretching pulley.
   - To move the belt to the left, loosen the right C screw somewhat and tighten the left 'C' screw somewhat.
   - To move the belt to the right, loosen the right 'C' screw somewhat and tighten the right 'C' screw somewhat.
5. When the X belt is centered on the pulley and does not touch the driving pulley flanges on the opposite side of the machine, tighten the 'A' and 'B' fixing screws.
6. Terminate the X-belt program by pressing any key.
7. Finally, run the *X Axis Calibration* on page 5-7.

X Axis Calibration

This calibration creates correlation data for the X-wagon motor transducer and the X-belt motor transducer. The correlation data is inserted in a new X servo file.

This procedure is performed automatically on machines with MOT3D boards and HYDRA 21K during initialization.

On machines with previous servo software it must be performed manually:

- After the X belt has been stretched (see section *Adjusting the X-Belt Pulley*).
- Prior to initiating the hardware if a new servo is installed.
- If mechanical parts of the X axis mechanism have been replaced or adjusted.

1. If you are currently running TPSys, then select *Exit TPSys* from the *Exit* menu.
2. Start the *xCalibrate program* by entering the command xCalibrate at the Linux prompt.

WARNING! This will create machine movements.

3. Wait until the program is finished.

Measuring the Cog Play

This procedure is used to adjust the X-wagon motor cog play.

It is an adjustment that shall be performed if the X-wagon motor has been removed for repair, or after yearly maintenance.

The procedure should be repeated for each magazine (slot) position along the X rail.

Procedure

1. If you are currently running TPSys, then select *Exit TPSys* from the *Exit* menu.
2. Press both the emergency stop buttons down, move the X wagon by hand to a magazine position, and release the emergency stop buttons.
3. Select *X motor > Motor > Measure cog play*

   The *Load board* dialog box is shown with the servo file that will be loaded to the MOT-X board.
4. When ready, select *Yes* in the *Load board* dialog box to start the measurement.

WARNING! This cause machine movements.

An alternating forward/reverse force of 127 mNm is applied to the X-wagon motor, which increases in 1 mNm steps until the X-belt motor transducer indicates a movement.

The system measures the cog play and presents the result in a window.

The cog play should be between 48 µm and 108 µm in all the magazine positions along the X rail.

5. Repeat the above procedure, on each magazine position along the X rail.
   – If the received value is outside the accepted range (between 48 µm and 108 µm) in any of the magazine positions, adjust the cog play as described in the next step.

Adjusting the Cog Play

Adjust the cog play as follows:

1. On machines with a Midas unit, remove the Midas Z motor (the Midas unit is described in Chapter 6 *Mount Heads*.
2. Loosen the three motor fixing screws ('A' in Figure 5-4) somewhat.

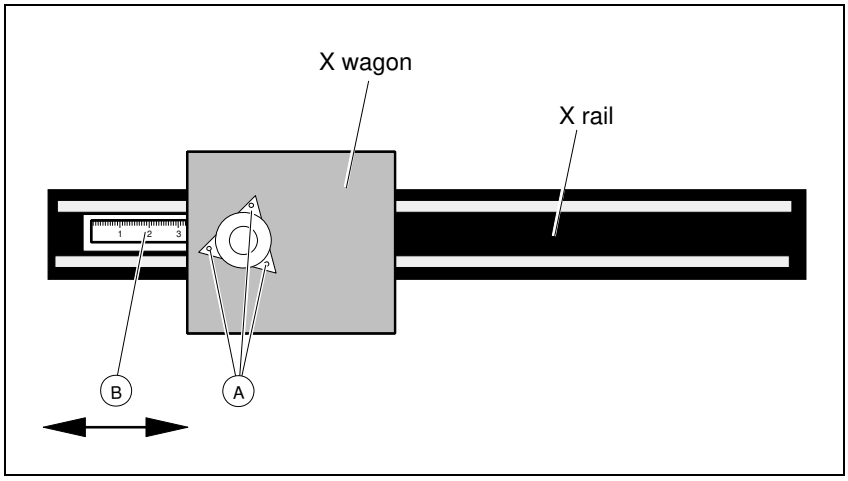
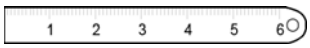


Figure 5-4. Adjusting X cog play



3. Use a metal ruler with a hole in the end. Insert this ruler behind the X wagon and place the hole of the ruler over a pin used to adjust the cog play (B).
   - To increase the cog play, push the ruler to the right.
   - To decrease the cog play, pull the ruler to the left.
4. Tighten the three motor fixing screws (A).
5. On machines with a Midas unit, reinstall the Midas Z-motor.
6. Run the *X Axis Calibration* as described on page 5-7.

   (Not necessary if MOT3D and HYDRA 21K are installed).

6. Mount Heads

The MY series of machines can have two different types of placement heads:

Midas unit

This is the fine pitch single mount head on MY machines (See Figure 6-1).

HYDRA unit

The HYDRA unit is a multiple mount head with eight mount tools (See Figure 6-2).

Both units are described in this section.

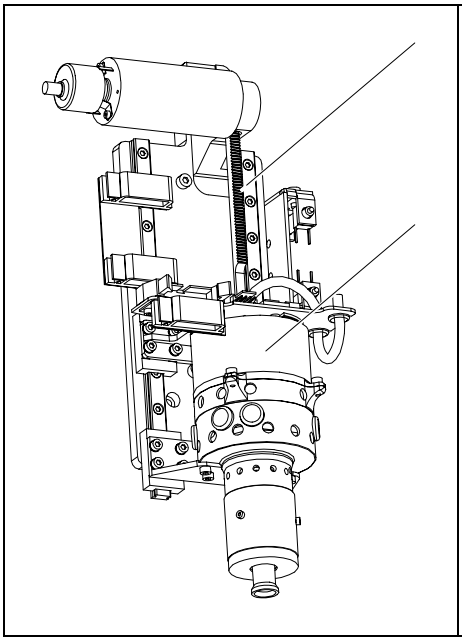


Figure 6-1. The Midas Unit.

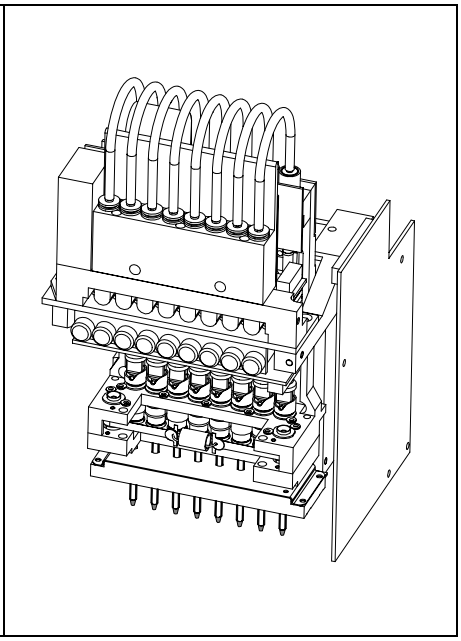


Figure 6-2. The HYDRA Unit.

WARNING! In this chapter, some of the procedures cause the machine to make movements. The below warning must be followed for such procedures. Procedures that cause the machine to make movements are marked with this sign next to the text. Before entering such commands, check the following: Ensure that there are no foreign objects on the assembly table, near the tool bank, or within the X wagon, Y wagon, or Tray Wagon Magazine moving areas. Ensure that the single mount head and the HYDRA tools are in their upper positions.

Midas Unit

The Midas unit is a highly accurate single mount head for the MY series of machines.

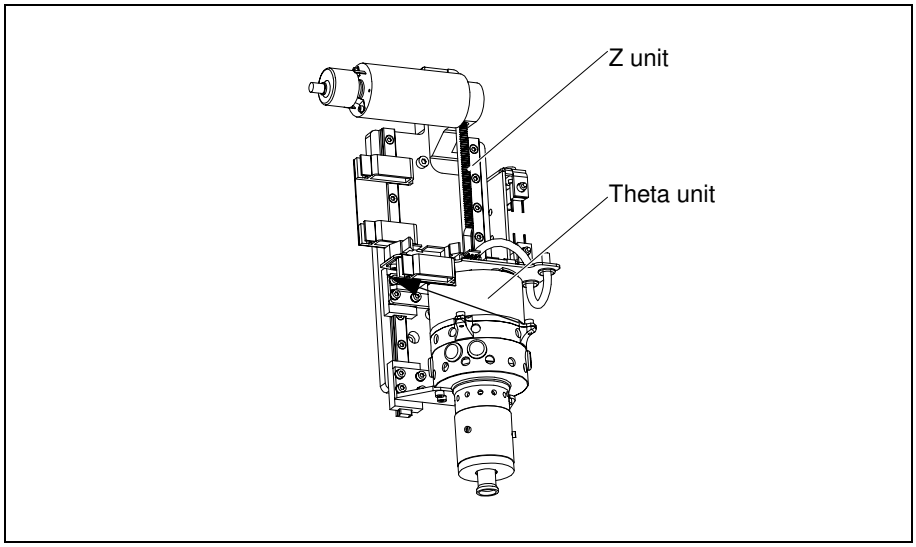


Figure 6-3. Z and Theta units of the Midas.

A Midas consists of two main units, the Z unit and the Theta unit (See Figure 6-3), which are assembled together. These two units include all devices needed for the Z movement and the Theta movement respectively.

In the Midas the motor and encoders are integrated with the Z shaft guided by stiff play-free bearings.

Electrical Parts

There are two PCBs included in the Midas Unit:

ZFIB located on top of the Theta unit. ZFIB is a connector board with a line driver for the Theta encoder.

FFX, which is a flexible board with Z sensors. FFX is located in between the ZFIB board and the tool head to allow the Theta movement.

Adjustment and Calibration

This section comprises the following adjustment and calibration procedures:

Measuring Midas Cog Play

This section describes how to measure the cog play for the Midas Z movement.

1. If you are in TPSys you must exit to the Linux prompt. Select *Exit* > *Exit TPSys*.
2. Enter `service -x` at the Linux prompt to start the extended service program.
3. Select *Utility* > *Test tools* > *Test of Midas* > *Friction test Z axis.* Allow the test to perform.
4. Select *View results on screen*. You may have to press <q> repeatedly to see the results.
5. Exit. If the cog play needs adjustment, please see the following section.

Adjusting the Cog Play

This section describes how to adjust the cog play for the Midas Z movement.

The Midas Unit require adjustment of the cog play after replacing the Z motor.

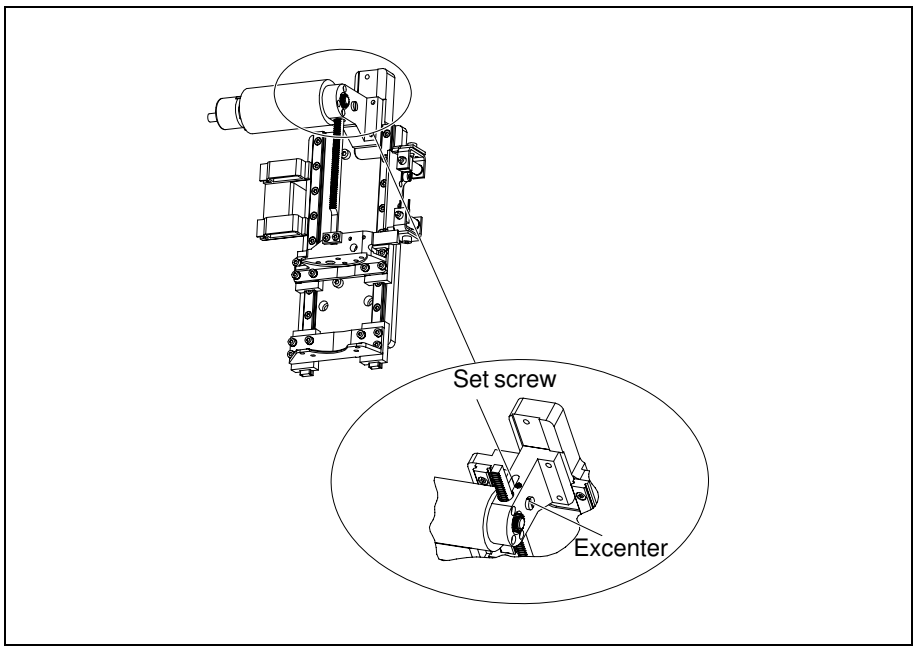


Figure 6-4. Adjusting the cog play.

Procedure

1. Carefully loosen the locking screw (see Figure 6-4).
2. Adjust the cog play. To check, press the rack gently towards and from the cog wheel by hand. Cog play must be as small as possible without increasing friction.
3. Adjust the cog play by turning the excenter screw (see Figure 6-4).
4. Tighten the set screw.
5. Run the friction program for Z motor. If the measured friction is too high, readjust the cog play and remeasure the friction again.

Troubleshooting

The following table shows some of the symptoms that may turn up when installing and running the Midas Unit.

Symptom	Possible reason	Suggested action
CMB in the way of Midas.	Wrong CMB.	Change to CMB2, part # L-029-0371-1E.
Scraping sound when rotating Theta.	FFX worn.	Exchange the FFX board.
	Theta stop in contact with housing.	Adjust the Theta stop.
	Theta encoder broken	Exchange Midas unit
	Theta brushes worn out.	Exchange the brushes.
High Z friction.	Rack too tight.	Adjust the rack.
	Rack worn due to poor lubrication.	Exchange the rack and the Z motor.
	Cable holder touches the linear guides.	Bend the cable holder back.
Z sensor does not work.	FFX board worn or sensors broken.	Exchange the FFX board. See separate Repair Guide.
	FFX board connector not inserted properly.	Reinsert FFX board connector.
Midas does not work.	MOT2 motor board instead of MOT3.	Change to MOT3 board in the MOT-Z computer slot.
Z locks do not work.	Solenoids worn out.	Replace the solenoids.
	Z lock bracket bent.	Order new bracket or bend it back.
Theta upper/lower end point not repetitive.	The FFX board is too tight.	Adjust the FFX board. See separate Repair Guide.
Theta encoder not stable.	Theta stop loose.	Tighten the M4 screw at the rear of the Midas unit.

HYDRA Mount Head

The HYDRA system is a multiple mount head designed to pick and place up to eight components during the same X movement. This considerably increases the placement speed.

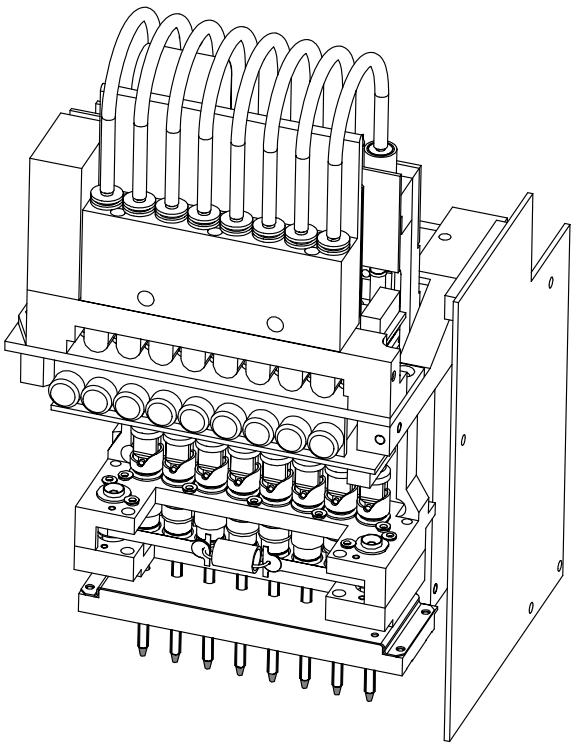


Figure 6-5. HYDRA Unit.

Aligning HYDRA Camera Background Reference

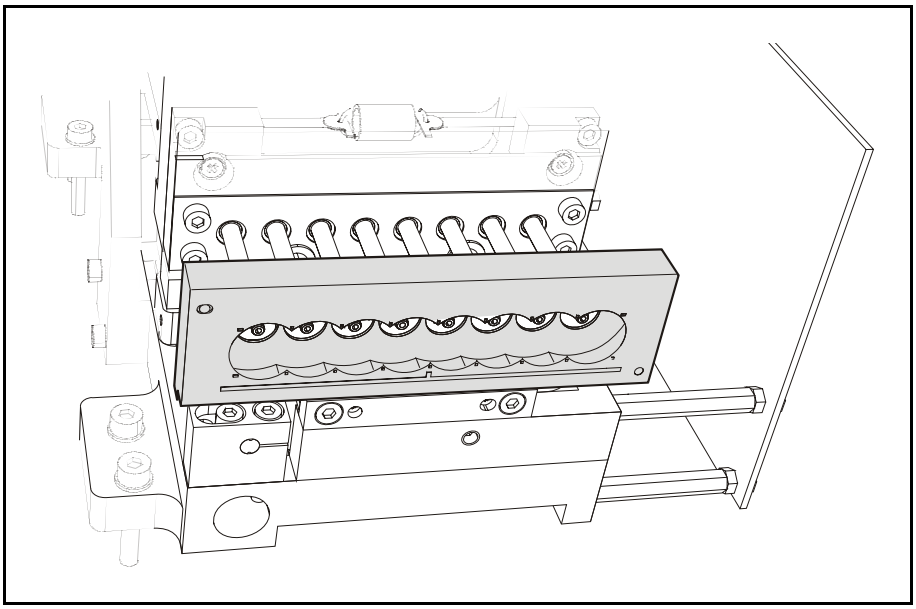


Figure 6-6. HYDRA reference background.

There are three types of reference backgrounds available:

Type 14
The standard HYDRA camera reference background.

Type 14 LSC
A reference background optimized for the Linescan Vision Camera.

Type 23 LSC
A reference background intended for bigger type of components.

Perform this procedure when a new HYDRA system is installed. In this procedure only a mechanical alignment is made, no parameters are modified.

This procedure can be carried out either with the HVC or the LSC.

WARNING! This procedure will cause machine movements. Keep hands, tools and foreign objects clear of moving machinery.

Procedure

1. Select *Utility* > *Installation and Calibration*.
2. Select *Adjust HYDRA reference background* and the camera to use when performing this procedure.

   The X wagon moves to the selected camera. Depending on the selected camera, the system shows different camera views.

   Figure 6-7 shows the camera view when the HYDRA Vision Camera (HVC) is used. Figure 6-8 shows the camera view when the LineScan Camera (LSC) is used.

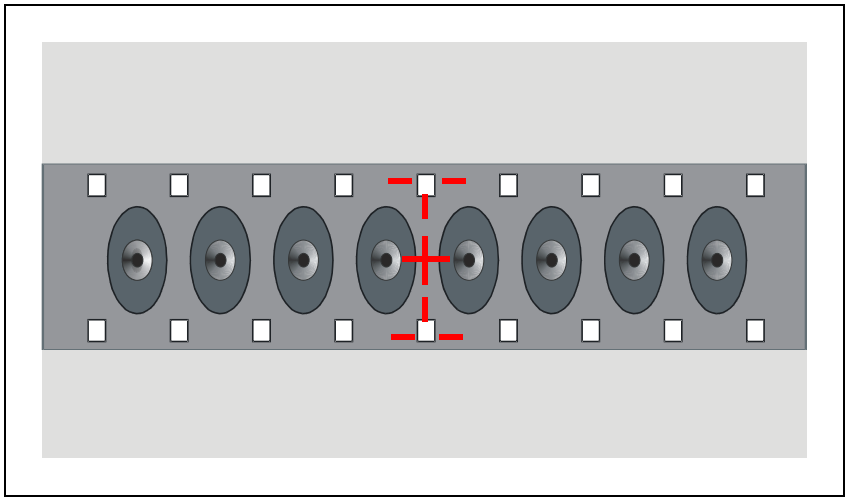


Figure 6-7. HVC view

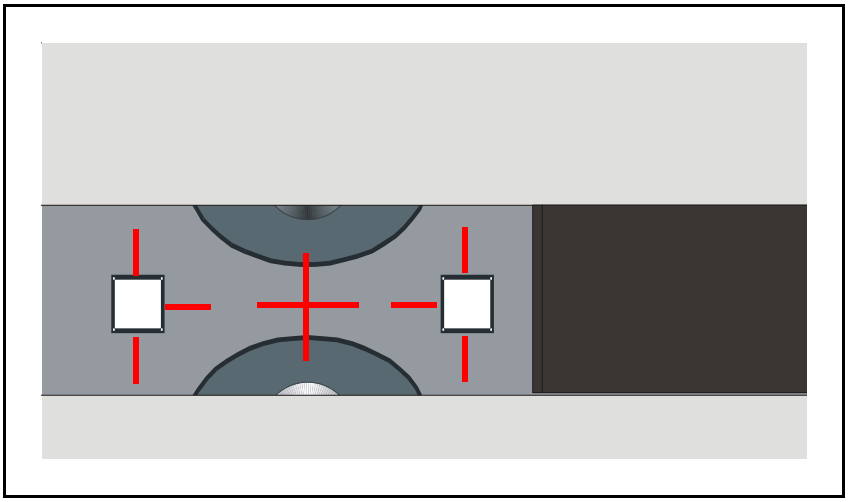


Figure 6-8. LSC view

3. Check the alignment of the reference background by verifying that, the two small red crosses are positioned in the middle of the white reference points on both ends of the reference background. If necessary, the reference point background can be adjusted mechanically in horizontal (Y) and/or theta direction as described in points 4 - 7 below.

4. Loosen the two 2.5 mm screws under the reference background with an allen key.
5. Adjust the reference point background in horizontal (Y) and/or theta direction with the two (0.9 mm) set screws, situated against the HYDRA chassis, perpendicular against the tools.
6. Adjust the reference background until the two small red crosses are positioned in the middle of the white reference points (See Figure 6-7 and 6-8) at both ends of the reference background.
7. When satisfied, fasten the (2.5 mm) screws.
8. If you are satisfied with the result, select *Ready* in the shown dialog box and press <Enter> to exit the procedure.

Adjustment and Calibration

This section comprises the following adjustment procedures:

Adjusting Z-indicator Levellers (HYDRA 2D)

Below the swivel there is a cylinder acting as the z-indicator leveller. If the z-levels need adjustment the cylinder can be adjusted up and down.

The cylinder is connected to the vacuum pipe with an M2 screw. Be sure to use thread lock Loctite on the screw after adjustment.

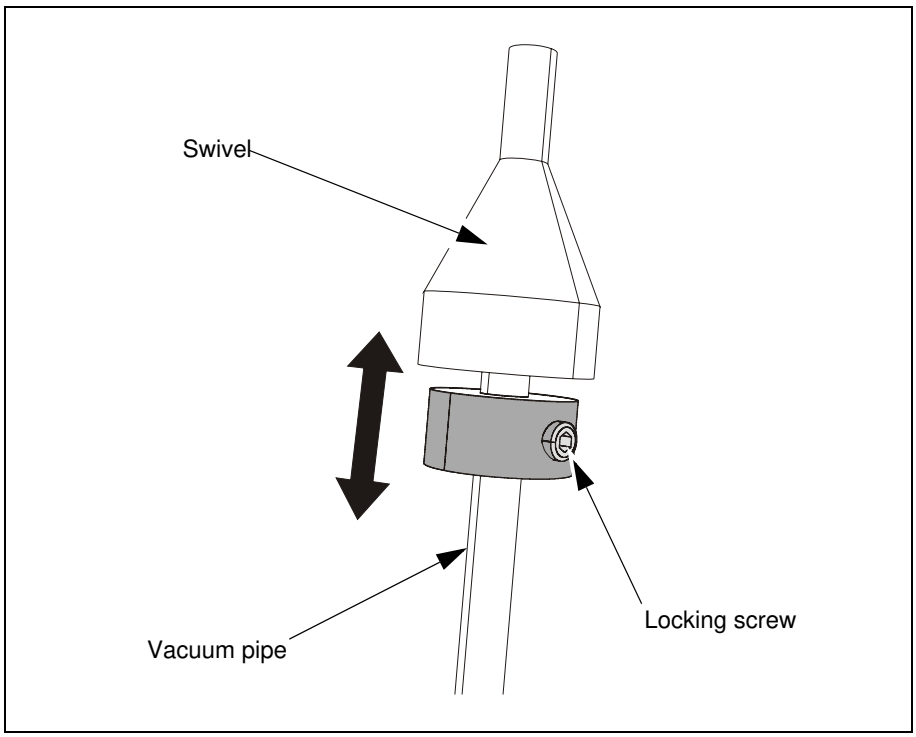


Figure 6-9. Adjusting z-indicato.r

Cog Play Adjustment

1. Run the *HYDRA Service program*, *HZ Cog Play*. Follow the instructions given by the program.

   Depending on the result from the extended service program, reduce or increase the cog play as follows:

2. Loosen the locking screw (’1’) in Figure 6-10).
3. Turn the eccentric adjustment screw (2) slightly to reduce (too little cog play) or increase (too much cog play) the pressure of the bearing against the gear rack.
   - From the mid position, the pressure is increased in both clockwise and counter-clockwise direction.
   - If it is difficult to reach the correct adjustment in both upper and lower position, chose a loose setting rather than adjusting the cog play too tight.
4. Tighten the locking screw.
5. Run the HZ Cog play test again and repeat the adjustment if necessary.

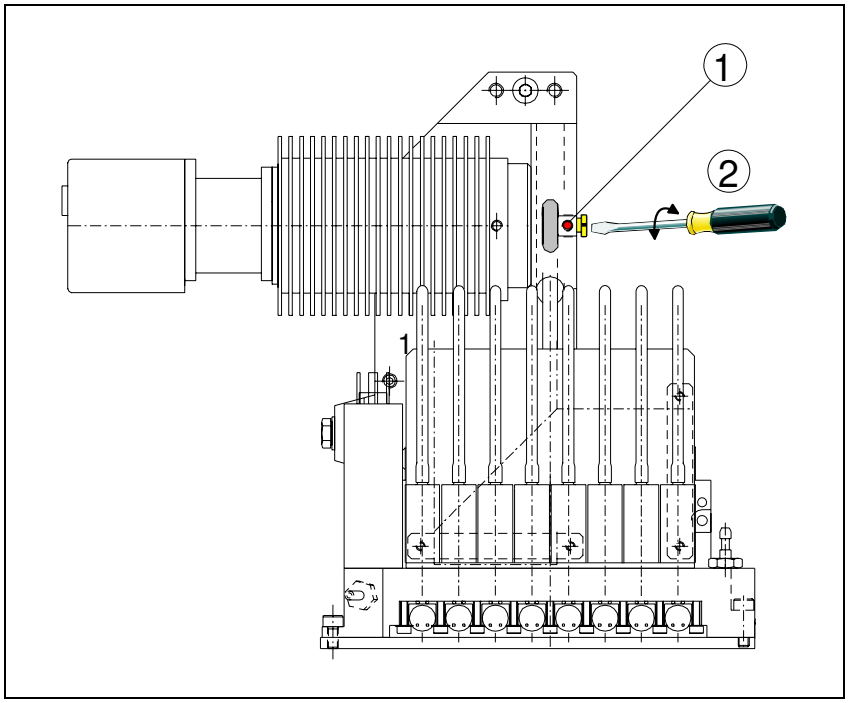


Figure 6-10. HZ Cog play adjustment.

Troubleshooting

The following section covers some of the symptoms that may turn up when installing and running the HYDRA Unit. To perform some of the following tests, run the HYDRA Service program. Follow the instructions given by the program.

Check List

Before commencing any troubleshooting on the HYDRA unit, verify that measured values are in accordance with the values mentioned below.

Mechanics/movement

- Check the HZ and H-Theta operating ranges and the transducer deviations, if any.
  - The HZ operating range shall be 2 056 - 19 500 ±500 units (tics).
  - The H-Theta operating range shall be 2 056 - 19 500 ±500 units.
- The transducer deviation during operation should be less than 10 units for the HZ with no time limitation, and less than 100 units for the H-Theta during 100 cycles.
- Measure the HZ static friction.
  - The minimum force required to move the HZ wagon from a static position, above the tool latches, should be 0 - 6 force units approximately.
- Measure the HZ dynamic friction.
  - The minimum force required to move the HZ wagon across the operating range with some or all latches activated should be 4 - 12 force units approximately.
- Check the HZ cog play.
  - The play between the HZ motor and the rack should be 5 - 12 tics. A low value means high friction. A high value could result in wear and bad servo regulation. The results from three consecutive readings (in the same Z position) must differ less than 3 tics.
- Measure the H-Theta dynamic friction.
  - The minimum force required to move the H-Theta across the operating range should be 18 - 40 force units approximately.
- Each HYDRA tool must have an eccentricity (wobble) less than 0.08 mm.
- In lowered position, the difference in height between the lowest and highest tool must be less than 0.3 mm.
- Tool tips must not be worn or damaged. Clean with alcohol.
- The spring load on each HYDRA tool should be within 1.10 - 1.25 N.
- While turning the HYDRA theta belt, the belt must wander <1 mm Z wise across the belt wheels. If not, replace the belt.
- Ensure that all tool clamps are properly seated into the Theta couplings.

Vacuum

- Measure the vacuum levels at open, partly open and closed vacuum system, see Chapter 10.
  - For an open system, the level should be 60 - 80 units (vacuum) approximately.
  - A closed system should show 200 - 230 units approximately.
  - When one valve is open, the vacuum system should show 160 - 200 units approximately
- The vacuum sensor must indicate the atmospheric pressure within 0.01 bar, and a negative pressure of at least 0.4 bar.

Impact sensors

- Use the Check leds, current 0-15 feature in the Motqom menu.
  - Make sure that the light levels for the indicators are at 180 - 190 at current level 7 in the table. If not, adjust the position of the HYDUBB Ed-2 board.
- Check the correlation between indicator level and the angle of the H-Theta.
  - Verify that the variations do not exceed 15 units. Otherwise, the electronics make an incorrect decision as to weather or not an impact on a surface has been made, due to the angle of the H-Theta.

Tool latches

- Check the function of all the tool latches. In case of malfunction, measure the electrical resistance in each solenoid (85 ±5 W).
- Measure the individual HZ tool latch positions.
  - The latch height levels shall be 4 200 - 4 900 units (tics).
  - The deviation from the lowest to the highest level must be less than 150 units. The variation between three consecutive measurements should be <50 tics.
- Check the indicator gain.
  - The correct value should be in an interval of 200 - 600 units.
  - A unit is defined as 1/1000 indicator unit per tic i.e. if HZ moves 100 tics downwards and the gain is 600 units, the indicator should change 100x600/1000=60 units.

Electronics

- Check the HYDB board function, the board supply voltage level, and the motor temperature.
  - To indicate a proper function, the green LED on the board shall blink with the light on 75 % of the time.
  - A fault in the communication is indicated with a blinking light which is on 25% of the time.
  - The board supply voltage shall be approximately 25 Volt (18 - 26 V).
  - The HZ motor temperature should not exceed 75 °C.

Vision

- Check and clean the Linescan and HYDRA camera optics, mirrors and protective glass.
- Clean the camera reference background and check for even the smallest scratch or damage. Align the camera if a HVC is installed.

TPSys

- Ensure that the setting of the HYDRA angle in the Package List is 90°.
- Ensure that the Small chip lead type is not used in the package data (unless otherwise is clearly stated).
- Ensure that the TPSys package data corresponds to the real components.

Troubleshooting Actions

To perform some of the following tests, run the HYDRA Service program in the extended service program. Follow the instructions given by the program.

For each test in *Test specific system* there are defined limits. These limits are stored in a separate text file.

When the control of limits is performed the system generates a number of error messages. Refer to the table below for information about a specific error message.

Symptom (Error Message)	Suggested action
HZ- or HTheta working range assumes unreasonable figures and limits	Reload MOT-Z and re initiate.
	If the error repeats itself it may be caused by problems with the MOT-Z or a bad transducer coupling.
HZ and HTheta within limits, but too big transducer drift	Check that the transducer is properly connected and that no outside currents interfere.
HZ start friction or movement friction very high:	Check that the shaft or guide bearings are not damaged or dirty.
	Make sure the rack is not too tight.
	Check if there is current to the HZ- motor.
HZ cog play too big or too small	Adjust the rack.
HTheta friction very high	Make sure all tool holders are properly in position. Try manually, with zero motor current, to move the belt back and forth.
	If the friction feels uneven the belt is probably deformed. Run burnin on HTheta or change belt.
	Also check each bushing.
Vacuum levels out of bounds	Make sure the vacuum pump is working properly. Apply vacuum for each tool and feel with the finger tip. Check filters and look for possible leakage.
Bad current levels for the indicators, or no indication of hit	Use ‘Check leds, current 0-15’ in the single command menu. Make sure that the light level for the indicators is at correct values at current level 5 in the table. If not, then the indicators are not adjusted properly, and may have to be readjusted.
	Repeated problems may be caused by poorly adjusted sensors, bad LEDs or the light path may be obstructed. Also worn out tool springs may generate disturbances or even indications of a hit.
Indicator variation is too big when turning HTheta	Check if the upper part of the tool mechanism wobbles too much.
	Check if the lower edge of the housing, which obstructs the light beam from the LED, is uneven.
Tool latches don’t work	Check if the latches can be activated in a position were the HZ-wagon is out of the way. A burnt solenoid can be detected by its distinct smell.
	Check that there is no mechanical obstacle for the latch itself by moving it by hand.
Uneven levels between the tool latches	If one or more latches operates at a different height or out of bounds, it may be caused by a poorly adjusted solenoid pack. Make sure the latch does not move too much z-wise.
	The problem may also be caused by a bad HZ-indicator.
Tool spring length too small	Adjust the latch fingers upwards. You need to remove the vacuum module (white or translucent) to see the three screws holding the latch fingers in place. Loosen the screws and move the shaft upward.

Symptom (Error Message)	Suggested action
Tool spring length too big	The latch finger misses the rim of the tool mechanism. This causes failure when e.g. measuring board height. Adjust solenoids outwards, by adjusting the position of the brackets attached to the HZ-frame. Make sure that the latch finger does not hit (noticeable as a metallic sound) the tool mechanism when the latch is actuated. A perfectly adjusted latch should make more of a 'thud'-sound.
Problems of malfunctions	Reload MOT-Z and initiate HZ and HTheta.
	Make sure the motor is not too hot.
	Check if the fan works properly.
	Investigate if the motor windings smell burned.
	Check the position of the brackets attached to the HZ-frame.

7. Tools & Tool Banks

This chapter contains a description of the different tools and tool banks used on MYDATA placement machines.

WARNING! In this chapter, some of the procedures cause the machine to make movements.The below warning must be followed for such procedures. Procedures that cause the machine to make movements are marked with this sign next to the text. Before entering such commands, check the following: Ensure that there are no foreign objects on the assembly table, near the tool bank, or within the X wagon, Y wagon, or Tray Wagon Magazine moving areas, and that the standard tool head and the HYDRA tools are in their upper positions.

Single Mount head Tools

The following two types of single mount head tools are available for the Midas unit on MYDATA placement machines:

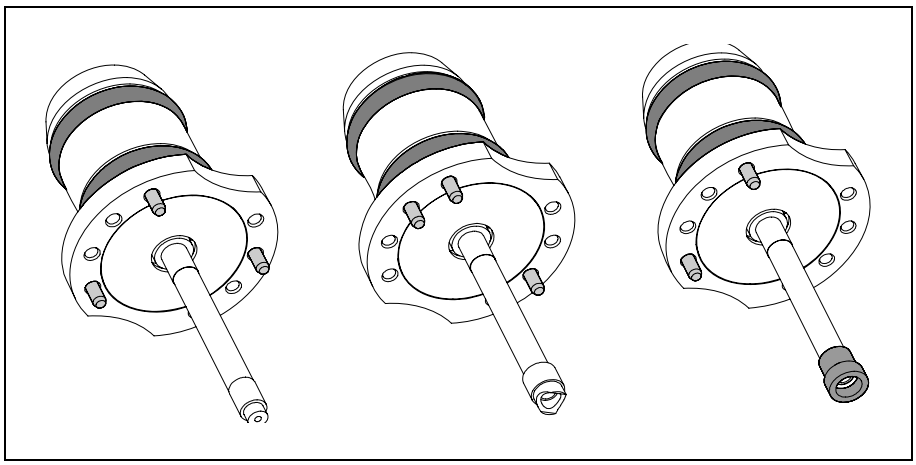


Figure 7-1. Stiff tools.

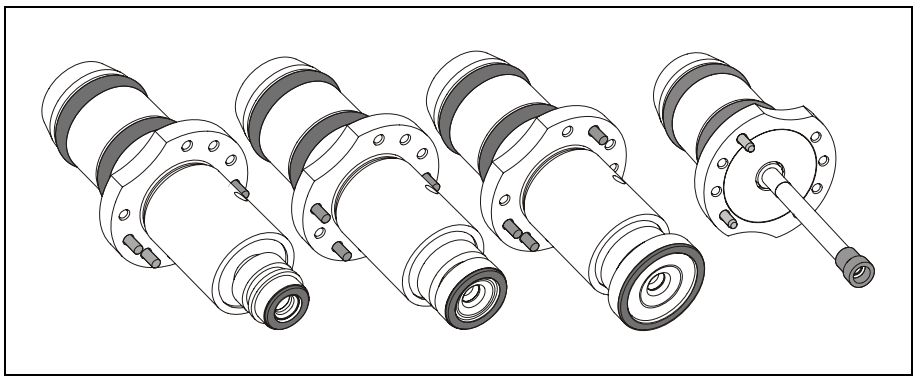


Figure 7-2. Spring-loaded tools.

The main difference between these two types of tools is that the spring-loaded tools provide a faster mounting speed by utilizing the Intelligent Surface Impact Control (ISIC) function.

Both types are intended for the same component ranges. The A14S, A23S, A24S and C23S tools are spring-loaded versions of the A14, A23, A24 and C23 stiff tools.

To get full Linescan Vision System performance, it is necessary to use spring-loaded tools.

Single Mount head Tool Installation

This procedure is used to install the single mount head tools, spring-loaded or stiff, before they can be used for placement or adhesive application.

WARNING! This procedure cause the machine to make movements. Ensure that there are no foreign objects on the assembly table, near the tool bank, or within the X wagon, Y wagon, or Tray Wagon Magazine moving areas, and that the standard tool head and the HYDRA tools are in their upper positions.

Procedure

1. Select *Utility* > *Installation and Calibration* > *Tool Installation* > *Install tools.*
2. The *Select tools to install* dialog box is shown and a submenu with the following three options is opened.
   - *All tools*

     Including tools that have been previously installed.
   - *All uninstalled tools*

     Only the tools that are not installed.
   - *Specific tool*

     Only one specific tool. You have to choose which specific tool you want to install. Press <Space> to show a list of available tools.
3. When prompted, trim the tool positions by centering the cross hairs on the selected tools and confirm the positions with *Ready*.

This window is also used to edit installed tools.

CAUTION! The Spring parameter must be set to No when a stiff tool is used otherwise there is a risk to get uncontrolled placement forces or impact forces which may damage the component and the board or the mount head. Always check that the parameters are correctly set when a tool is exchanged.

CAUTION! Because of the wide tool body compared to the tool tip on A23S and A24S, there is a small but not negligible risk for collision between the tool body and tall components already placed, or between the tool body and the rails of the conveyors. This risk does not apply to the C23S tool. To limit this risk it is advisable to mount low components before mounting high components.

Installing a Tool Bank

1. Select *Utility* > *Installation and Calibration* > *Tool Installation* > *Install tool bank* in TPSys. The *Select tool bank type* dialog box is shown.
2. Press <Space> to show a list of available tool banks (See page 7-5 for various tool bank layouts).

The standard tool bank has the following layout:

Tool numbering and usage are further detailed in the *Programming Manual*.

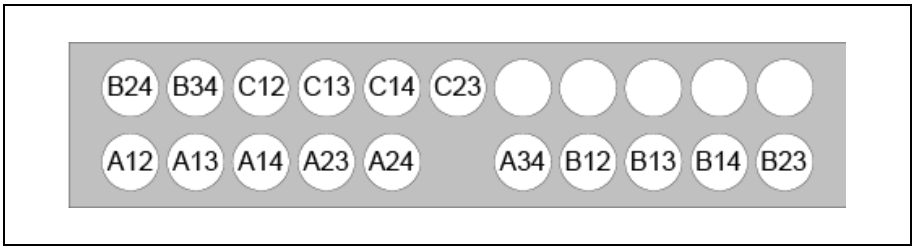


Figure 7-3. Example of tool bank layout.

The tool body on the A23S, A24S and C23S tools are wide (Ø9.5mm) therefore the A23S and A24S tools will not fit in some tool banks. Check that the tool bank is compatible with the tools you are planning to use. If the tool bank is not compatible with the tools, you may require an upgrade kit (see the table below).

Tool bank related to mount table	Compatible with tools	Requires upgrade kit
ML tables (ML3, 4, 5, 6)	A23S, A24S, C23S	
500T2 Conveyors (pre. 2001-08-20)	C23S	L-015-1616
500T2 Conveyors (post. 2001-08-20)	A23S, A24S, C23S	
400PT Conveyors	A23S, A24S, C23S	
420PT Conveyors (pre. 2001-08-20)	C23S	L-015-1615

An A23S tool has the same code pin configuration as the corresponding stiff tool A23. The same applies for A24S and C23S. It is therefore not possible to use a spring-loaded tool and the corresponding stiff tool simultaneously.

Removing a Tool Bank

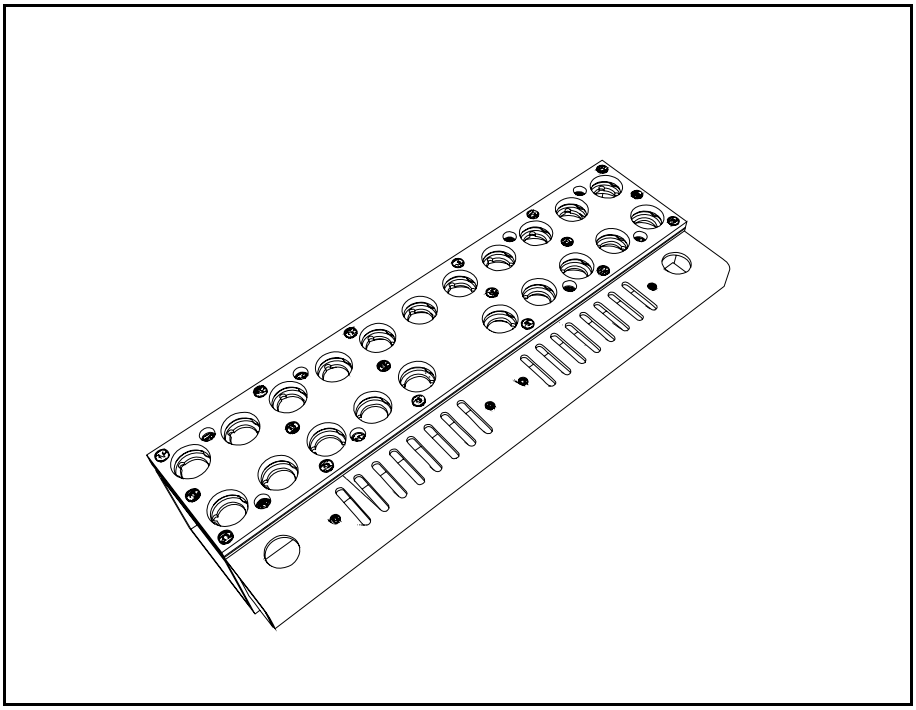
1. Select *Utility* > *Installation and Calibration* > *Tool Installation* > *Remove tool bank.*

   The *Remove tool bank* dialog box is shown.
2. Select which tool bank to remove from the list of installed tool banks.
3. Press <Enter> to remove the selected tool bank.

Tool banks

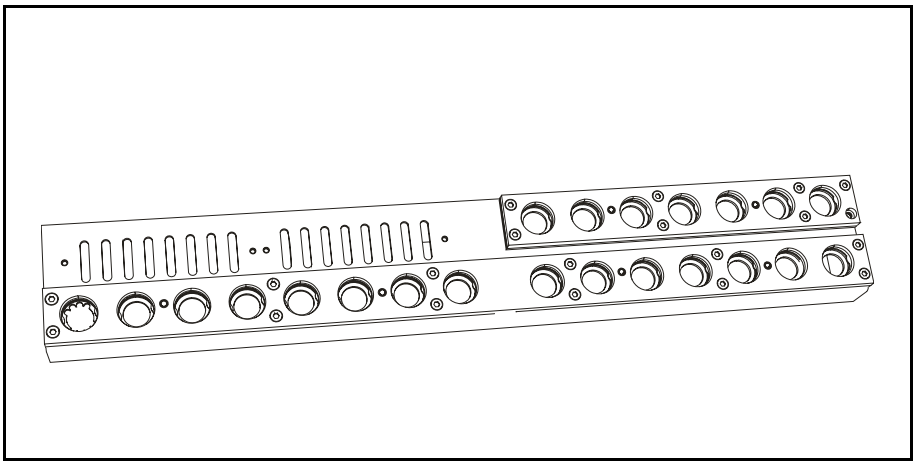
These tables can be used to identify the bank in the machine when asked to *Select tool bank type* at installation above. "**TP**" in these tables indicates the test position, that is the tool check position.

Y wagon 288



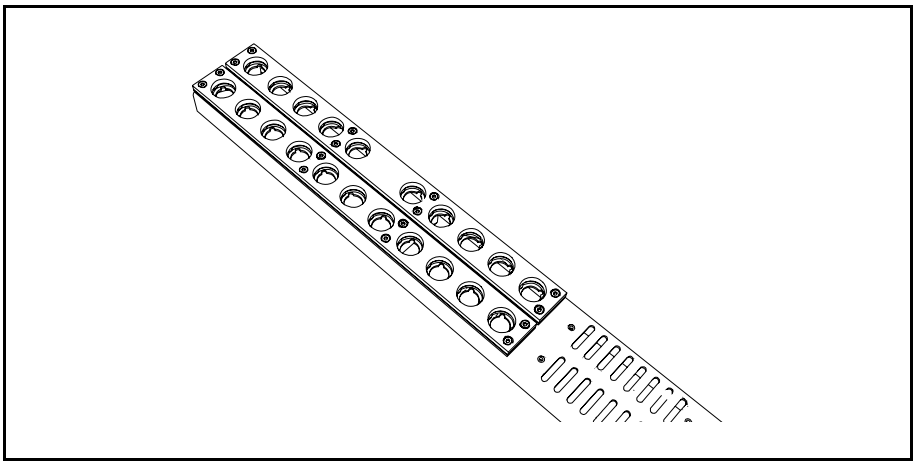
B24	B34	C12	C13	C14	C23	C24	C34	D12	D13	D14
A12	A13	A14	A23	A24	**TP**	A34	B12	B13	B14	B23

ML 3/4/5



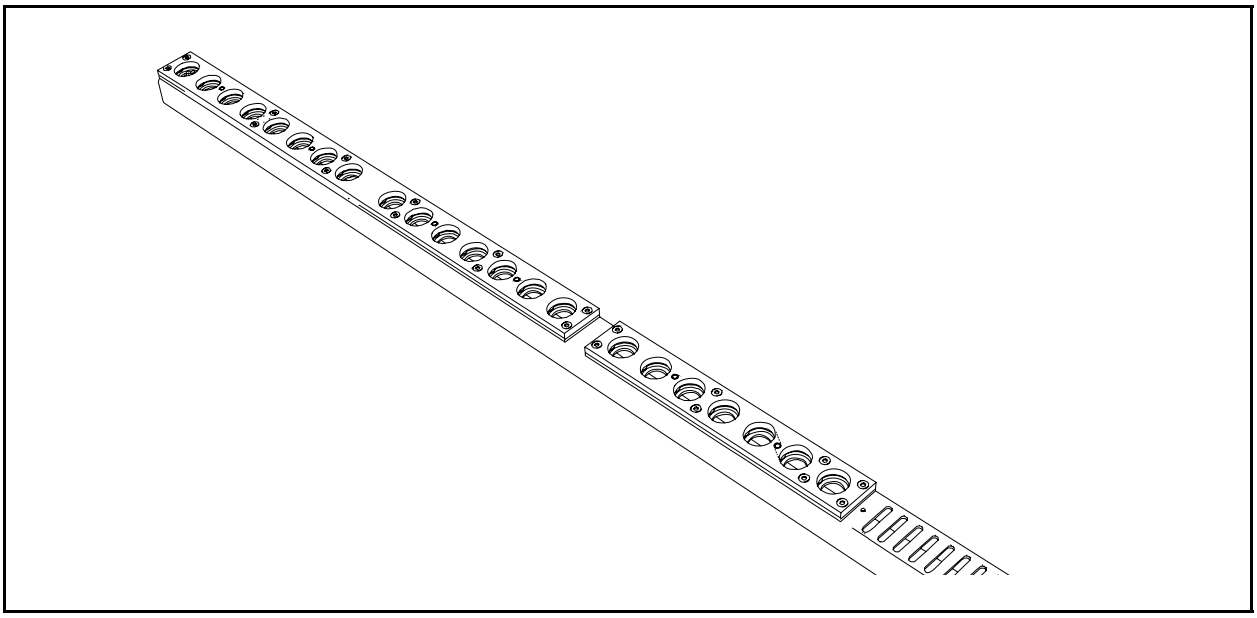
									C23	C24	C34	D12	D13	D14	D23
A12	A13	A14	A23	A24	A34	B12	B13	**TP**	B14	B23	B24	B34	C12	C13	C14

ML 3/4/5 ATE



B34	C12	C13	C14	C23	**TP**	C24	C34	D12	D13	D14
A12	A13	A14	A23	A24	A34	B12	B13	B14	B23	B24

ML 6



A12	A13	A14	A23	A24	A34	B12	B13	**TP**	B14	B23	B24	B34	C12	C13	C14	C23	C24	C34	D12	D13	D14	D23

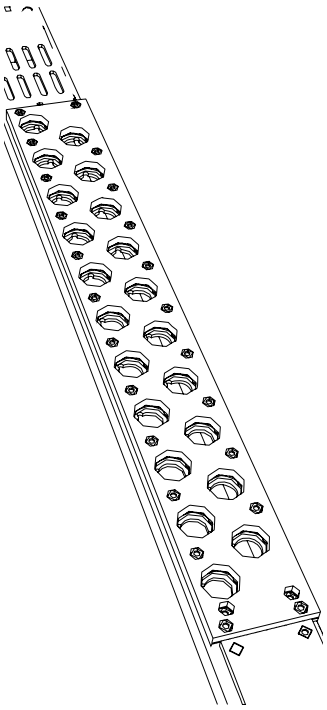
ML 6 ATE

A12	A13	A14	A23	A24	A34	B12	B13	B14	B23	B24	B34	C12	C13	C14	C23	**TP**	C24	C34	D12	D13	D14

T conveyor 500T and 500T2

A12	A13	A14	A23	A24	A34	B12	B13	B14	**TP**	B23	B24	B34	C12	C13	C14	C23	C24

PT conveyors



PT Conveyor 400PT.

400PT	420PT	450PT
TP	D23	C24
D14	D14	C23
D13	D13	C14
D12	D12	C13
C34	C34	C12
C24	C24	B34
C23	C23	B24
C14	C14	B23
C13	C13	B14
C12	C12	B13
B34	B34	B12
B24	B24	A34
B23	B23	A24
B14	B14	A23
B13	B13	A14
B12	B12	A13
A34	**TP**	A12
A24	A34	**TP**
A23	A24	
A14	A23	
A13	A14	
A12	A13	

If the tool bank on the machine does not match any of the above layouts, the installation can proceed anyway. These layouts are used by TPSys to provide good initial guesses as to tool positions and tool check positions. The positions can be manually located in case of an unknown tool bank.

If the tool bank is not of a known type, choose the “custom” type. Then locate the tool bank on the Y-wagon. TPSys will guide you through this procedure.

The tool and glue tool check positions must also be located. The machine will offer a default position for these, but the position must be located manually. In this case, the default positions of the mount tools will also be incorrect, and they will need to be located with the joystick when they are installed.

Custom Tools

In some cases, custom tools may be bigger than 10 mm in diameter – the size of the biggest standard tools C23 and C23S.

The three following parameters in the *Edit tool* dialog box must be set if this is the case:

- *Lower edge of code pins*

  Measure with auto install with the biggest tool installed.

- *Tool case diameter*

  Measure with auto install with the biggest tool installed.

- *End of fast margin for C*

  Measure the dimension of the biggest part of the tool. Use the diameter on round tools, or the diagonal on other tools. Add 1mm. If, for example, the tool has a diameter of 21 mm, set the parameter to 22 mm.

Follow the procedure below to set the parameters for a specific tool.

1. *Utility* > *Tool Installation* > *Edit tool*

   The *Select tool to edit* dialog box is shown.

2. Press <Space> and select the tool to edit from the list.

   The *Edit tool* dialog box is shown (see Figure 7-4).

3. In the shown dialog box, set the parameters as desired.

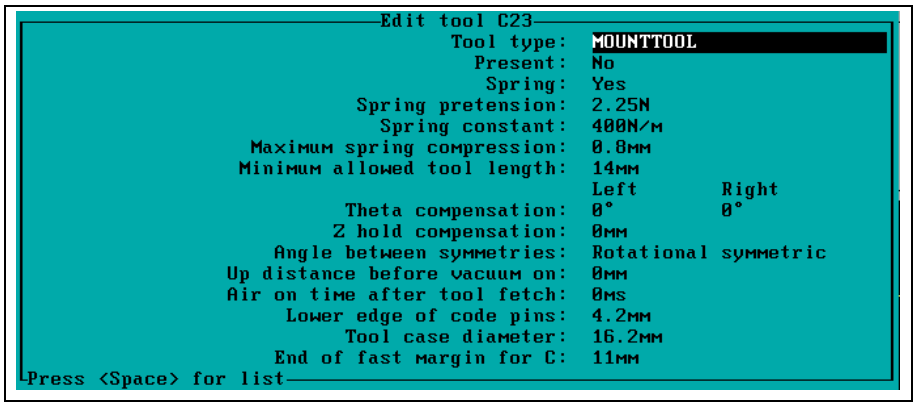


Figure 7-4. Edit tool dialog box.

HYDRA Mount Tools

The HYDRA mount tools consist of a tube with a changeable nozzle (H03 – H06), see the figure 7-5.

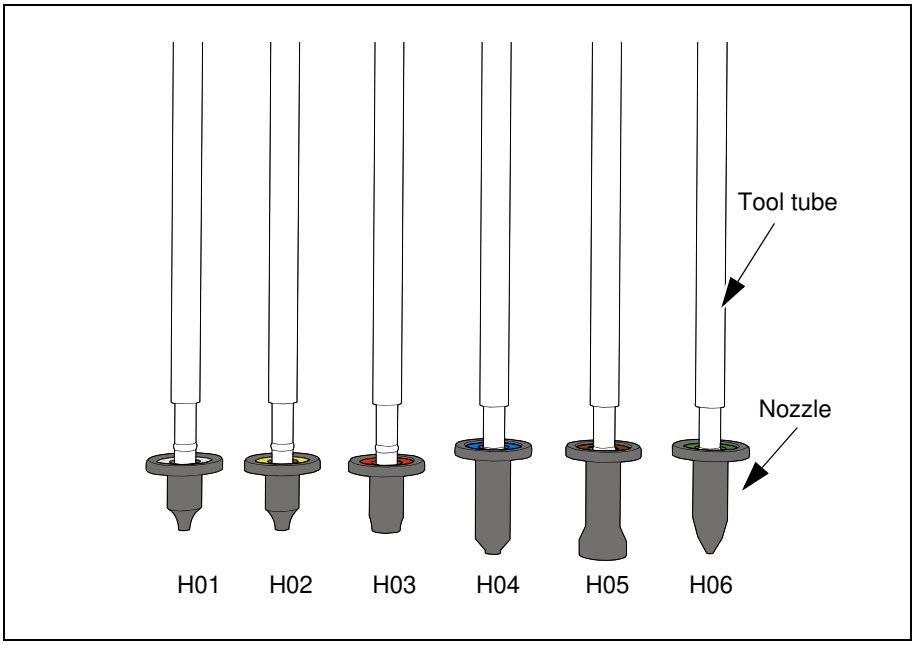


Figure 7-5. HYDRA mount tools.

There are, for the time being, six types of HYDRA tools intended for different sizes of component packages. Each tool type has its own identification color on the top of the nozzle. Mount tools must be kept free from dirt and foreign particles to prevent the tubes from being clogged up.

The HYDRA mount tools can be changed manually or by using the HYDRA Speedmount ATE, Automatic Tool Exchanger system mentioned below.

HYDRA Tool Tubes

The HYDRA tool tubes are attached to the HYDRA unit.

The HYDRA unit moves to the HYDRA tool bank where the tool tubes leave the current tools before picking up new ones.

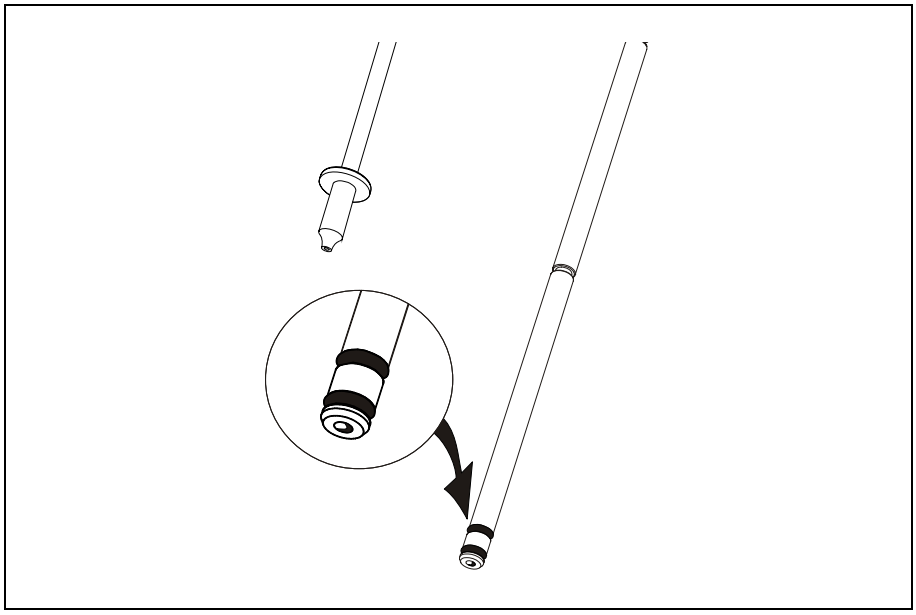


Figure 7-6. HYDRA 2B Tool tube.

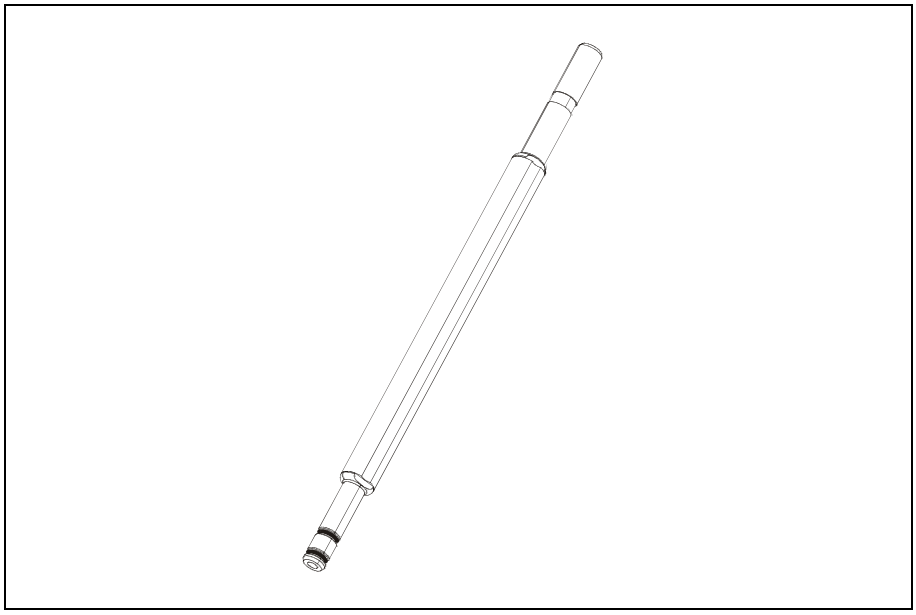


Figure 7-7. HYDRA 2D Tool tube.

Each tool is held in place on the tool tube by two O-rings. This ensures that the tool is always properly aligned and can be replaced without re-calibrating the HYDRA unit.

HYDRA Automatic Tool Exchanger

HYDRA Speedmount ATE, Automatic Tool Exchanger, is a system for changing HYDRA tools automatically.

Instructions regarding how to operate the ATE system can be found in the *Operators Manual*.

The ATE system comprises the following parts:

- *HYDRA Mount Tools* on page 7-9.
- *HYDRA Tool Tubes* on page 7-10.
- *HYDRA Tool Bank* on page 7-12.

In the following text, the HYDRA ATE tool bank is called HYDRA tool bank or just tool bank.

HYDRA Tool Bank

The HYDRA tools are stored in the HYDRA tool bank when not in use. When the tools are to be exchanged, the HYDRA unit moves to the bank and the tools are exchanged.

Each tool resides in an own position in the tool bank. When a tool is automatically fetched by the HYDRA unit, it is considered that the HYDRA unit has borrowed the tool from the tool bank. So, all the tools reside in their own tool bank positions but are temporarily attached to the tool tubes on the HYDRA unit.

The first tool tube (position 1 in the HYDRA unit) fetches a tool from one of the two tool slots with index No. 1 in the tool bank, see Figure 7-8. The second tool tube (position 2 in the HYDRA unit) fetches from one of the slots marked 2, and so on.

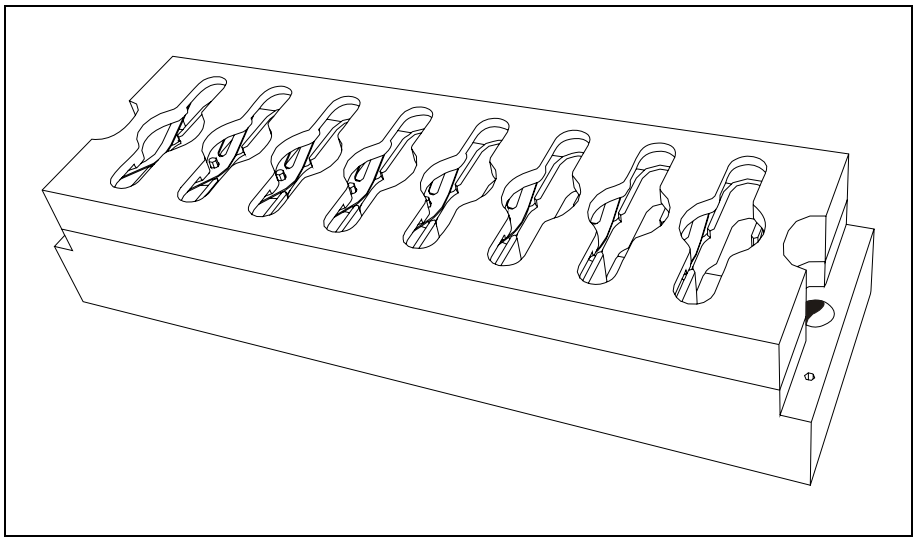


Figure 7-8. HYDRA ATE tool bank.

Bank types

There are two types of HYDRA tool banks:

Standard type

For T-type conveyors and 288, 468 and ML 3-6 tables, see Figure 7-9.

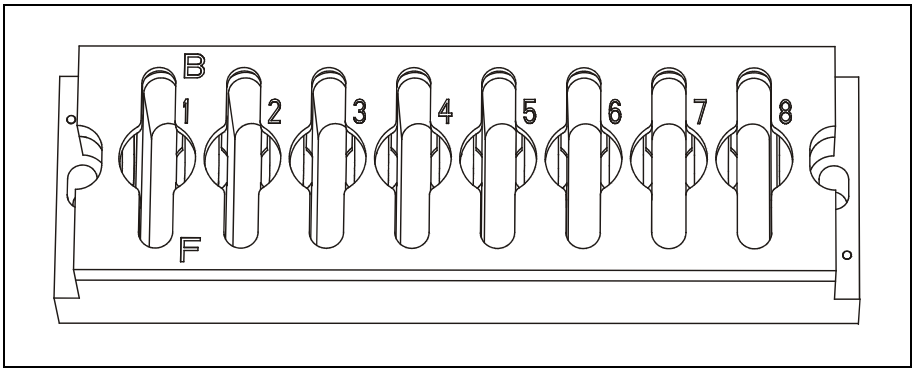


Figure 7-9. Standard tool bank.

PT type (Pass-through)

For 400 PT and 420 PT conveyors, see Figure 7-10.

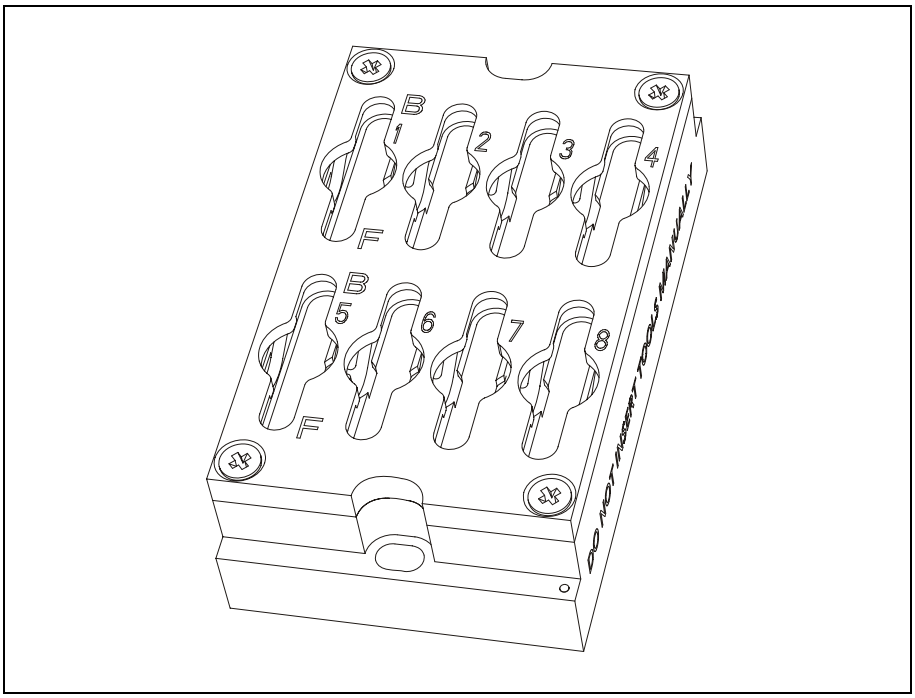


Figure 7-10. PT Tool bank.

Bank Parts

A HYDRA tool bank consists of the following parts (see Figure 7-11 and Figure 7-12):

- A housing.
- A lid with recessions underneath to ensure the positioning of each tool.
- A spring that presses the tools against the lid.
- Four mounting screws for the lid.

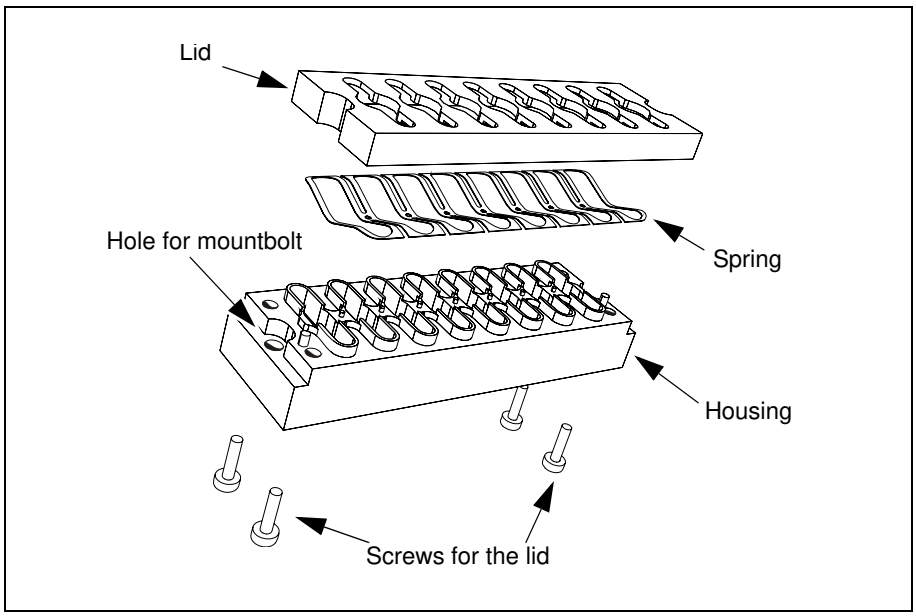


Figure 7-11. HYDRA tool bank parts – new type.

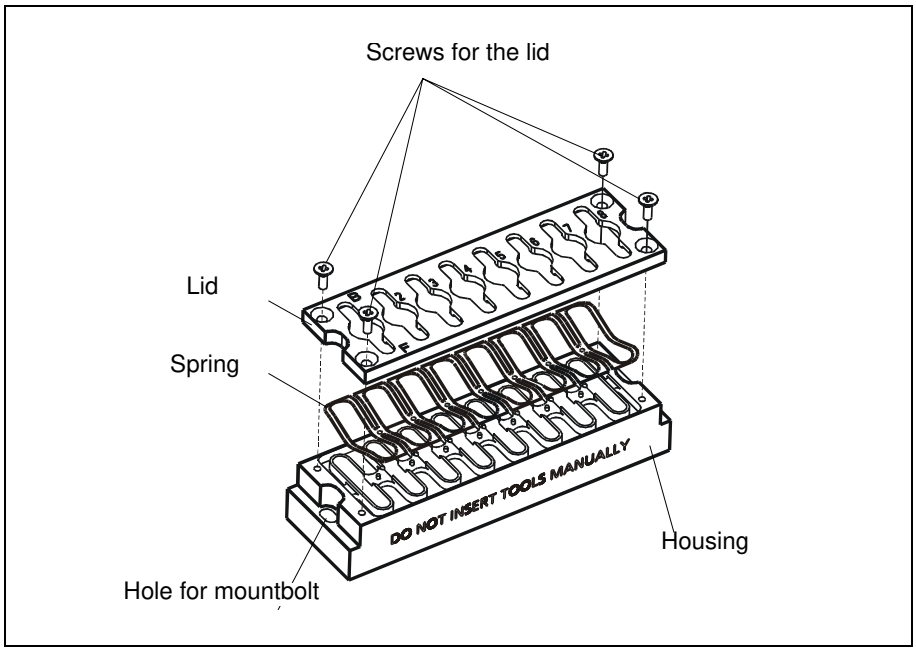


Figure 7-12. HYDRA tool bank parts – old type.

Bank Positions, Slots and Rows

A HYDRA tool bank can hold up to 16 tools in two rows by eight tool positions, see Figure 7-13.

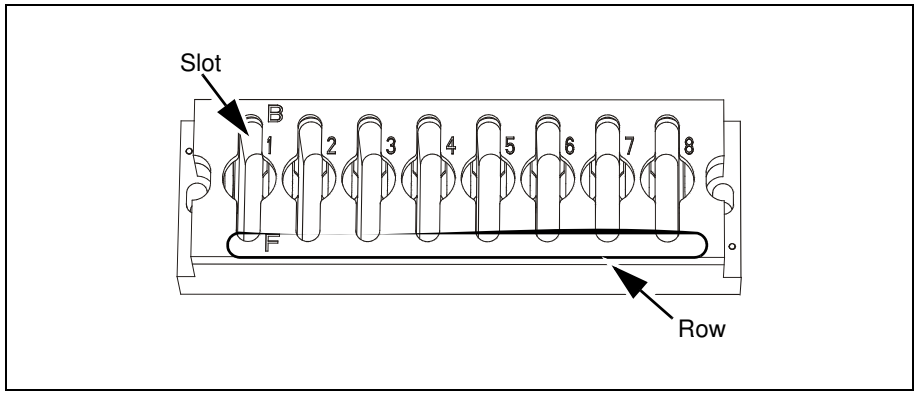


Figure 7-13. Tool bank positions, slots and rows.

– A slot has two positions, a front position and a back position.

– A tool position can hold one tool.

– The rows are called Front (marked ‘F’) and Back (marked ‘B’) corresponding to their Y positions in the tool bank. Front is the row facing the operator.

Installing HYDRA Tool Bank

This procedure is used to install the HYDRA Tool bank. Perform this procedure after installing a new HYDRA Tool bank or after replacing, or moving the HYDRA Tool bank. If the spring has been replaced, perform this procedure.

Create New Fiducial Mark

TPSys need fiducial marks to be able to locate the bank positions on the Automatic Tool Exchanger (ATE) tool bank. Therefore first create a new fiducial mark in TPSys, and make TPSys recognize this mark type.

Each tool bank has two fiducial marks of the same type. This mark type is to be recognized by TPSys.

1. Select *Edit > Fiducial Marks.* The *Fiducial Marks* window is shown.
2. Press <Ins> in the *Fiducial Marks* window, this will open the *Create New Fiducial Mark* box.
3. Type the name and user comment for the new fiducial mark called: `hydrabank` (in one word). Note that only this name can be used for this purpose.
4. Enter the following data:
   - *Type: Circle*
   - *Diameter:* 1 mm
   - *Color: Dark* or *Bright* depending on type of toolbank. For the new type of toolbank use – *Dark*.
   - *Search area width:* 1.5 mm
   - *Search area length:* 1.5 mm
5. Press <Enter> to save the new fiducial mark.
6. Activate the teach function by pressing <F5>.
7. Use the joystick or trackball to move the x-wagon camera until the fiducial mark is centered in the x-wagon camera field of view. Confirm the position by pressing <Enter>. A graphical overlay in the form of a yellow rectangle is shown on the screen.
8. The teach area can be adjusted with the joystick or trackball. When ready, press <Enter> to confirm the size of the teach area. The detected fiducial mark is outlined on the screen with a graphical overlay in green.
9. Press <Enter> to confirm the size of the search area.Locate and center one of the fiducial marks on the tool bank by using the joystick or trackball. Press <Enter> when ready.
10. The yellow rectangle, shown on the screen represents the teach area.

11. Use the joystick or trackball to adjust the size of the teach area until the yellow rectangle completely covers the fiducial mark. Press <Enter> when ready.
12. The fiducial mark is taught and the result is shown on the screen.
13. Proceed with the next section.

Install HYDRA tool bank

1. Select *Utility* > *Installation and Calibration* > *.HYDRA Tool Utility* > *Install HYDRA tool bank.*
2. Select a tool bank to install from the shown list.
3. Select type of tool bank to install.
   - Choose *PT type* for Pass-Through Conveyors.
   - Choose *Standard* for all other Y wagon solutions.
4. Make sure the tool bank is empty.

CAUTION! If a tool is left in a tool position, then the tool tube for that position will most certainly be bent.

When prompted, confirm in the shown dialog box that the tool bank is empty.

5. Center the first fiducial mark, located to the left of the tool bank, by using the trackball or joystick and confirm.
6. Center the second fiducial mark, located to the right of the tool bank, in the same way as the first one.

   TPSys will now measure the scale, angle and level for the tool bank, and if the tool bank seems to overlap an already installed tool bank.

   If the measured values are inside the defined limits, the system will ask if you accept the scale and angle deviations.

   If the values are outside the limits you must adjust the tool banks as described in section *Adjusting HYDRA Tool Bank Position* on page 7-19.

   If you accept, then the installation is complete.
7. You can now insert tools in the tool bank as described in the *Operator's Manual.*

Uninstalling HYDRA Tool Bank

This procedure is used to uninstall a HYDRA tool bank from the system. Perform this procedure when you want to replace or remove a HYDRA tool bank.

Make sure the HYDRA tool bank is empty from tools, before uninstalling the tool bank. Refer to the *Operator's manual* for instructions regarding the removing of tools.Uninstalling a non-empty tool bank means that the information about the inserted tools is lost and the tools must be removed manually.

Procedure

1. Select *Utility* > *Installation and Calibration* > *HYDRA Tool Utility* > *Uninstall HYDRA tool bank*.
2. Select the tool bank to be uninstalled from the shown list in *Select HYDRA tool bank to uninstall* dialog box.
3. If the tool bank is not empty you have to confirm that you want to uninstall a non-empty tool bank. The tool bank is now uninstalled from TPSys.

Adjusting HYDRA Tool Bank Position

If the tool bank scale, angle or level measurement values are outside the defined limits in the installation, you must adjust the tool banks as described below.

The adjustment description comprises:

- Adjust Tool Bank Angle.
- Adjust Tool Bank Level (288 and 468 ATE Base Tool Bank only).
- Overlapping Tool Banks.

Adjust Tool Bank Angle

If the angle deviation was outside the defined limit during the tool bank installation.

1. Loosen the two tool bank mounting screws and tap it carefully to a correct position.
2. Tighten the two mounting screws.
3. Run Install HYDRA tool bank, see page 7-16.

Adjust Tool Bank Level

This description is applicable for 288 and 468 board handling systems only.

CAUTION! If you have altered the tool bank height – you must reinstall the tool bank. The machine can be damaged due to new tool bank height.

If the level was too low during the tool bank installation, you can place shims (see Figure 7-14) under it. Use a single or a combination of shims. An ATE Base Tool Bank Upgrade Kit contains 1mm, 2mm and 3mm shims (2 pieces of each).

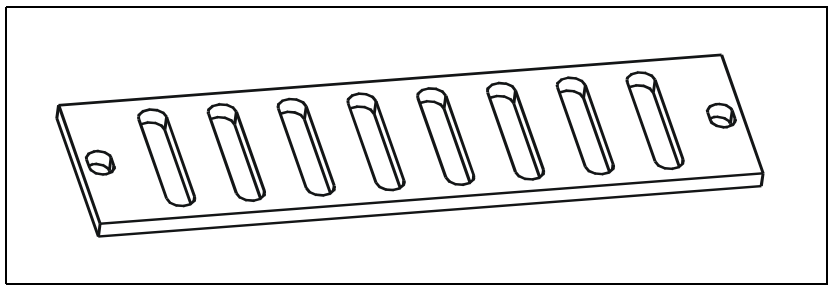


Figure 7-14. Shim.

Overlapping Tool Banks

If the system senses that a tool bank seems to overlap another tool bank during the installation, the installation will fail. This will occur if you try to install a tool bank that is already installed.

8. Mechanical Centering and Verification

This chapter describes the mechanical centering system. It contains a description of the system, adjustment and calibration information.

WARNING! In this chapter, some of the procedures cause the machine to make movements. The below warning must be followed for such procedures. Procedures that cause the machine to make movements are marked with this sign next to the text. Before entering such commands, check the following: Ensure that there are no foreign objects on the assembly table, near the tool bank, or within the X wagon, Y wagon, or Tray Wagon Magazine moving areas. Ensure that the single mount head and the HYDRA tools are in their upper positions.

The mechanical centering system centers and aligns the components mechanically when held by the single mount head tool.

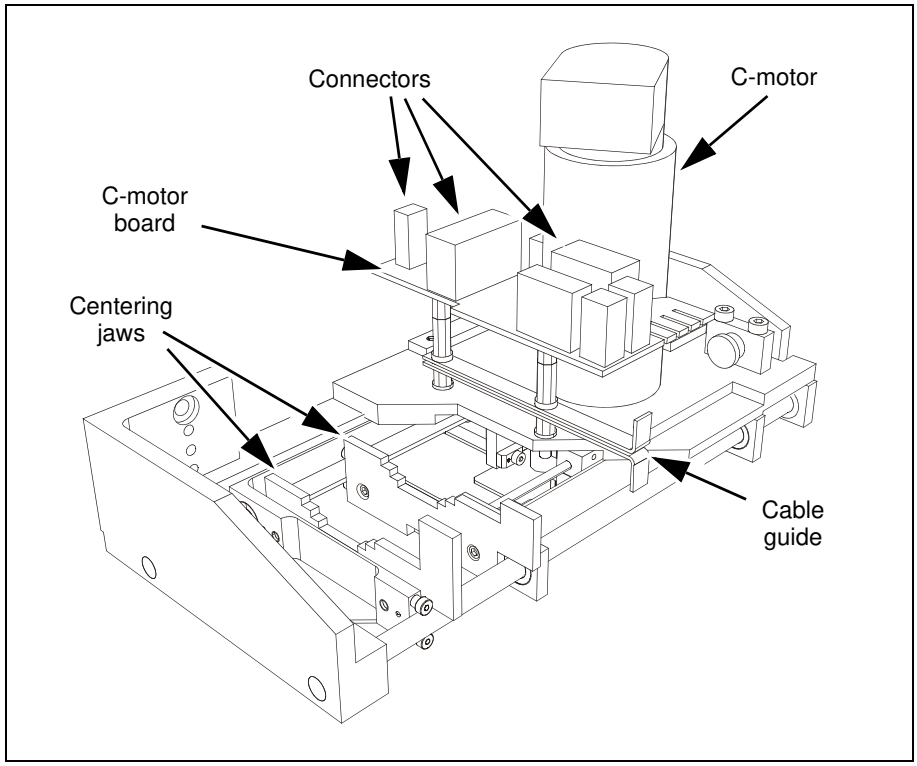


Figure 8-1. C60 Mechanical centering system.

The mechanical centering system is also a mechanical and electrical verifier system that verifies the component dimensions and electrical values prior to placing the components.

Mechanical Centering

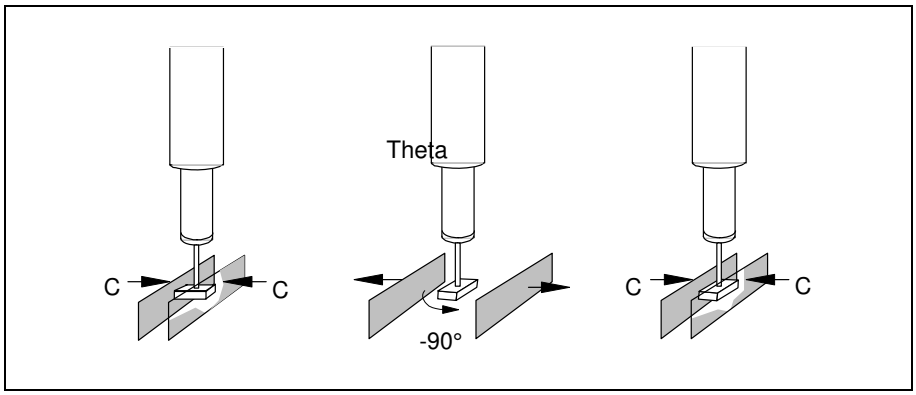


Figure 8-2. Centering and verifying.

Two centering jaws move symmetrically in a C movement towards each other, see Figure 8-2. They move until they both touch the component. The component is moved to the rotational center of the tool (centering and aligning). In this position the external dimensions and electrical data are verified. The centering jaws then retract.

The assembly process continues if the component was not rejected at the verification above. A rejected component is put into a reject bin, put back, or manually removed.

For most common, packages the tool with the component is rotated 90° by the Theta movement to be centered and verified a second time. Packages can be programmed to use up to twelve mechanical centering phases. See the *Programming Manual* for more information.

Mechanical Verification

Mechanical verification means that the centering jaws measure the external dimensions of the component during mechanical centering. The component dimensions specified in the package list are used at this verification. Components that do not meet the mechanical specifications are rejected, see the next section.

Electrical Verification

Electrical verification means that electrodes on the centering jaws measure electrical parameters of the component during the mechanical centering. Component values and tolerances defined for each component, and are used during this verification.

Components that do not meet the electrical specifications are rejected.

Adjustment and Calibration

This section contains adjustment and calibration instructions for the mechanical centering system.

The following procedures are covered by this section:

Measuring the Centering Base Level

This procedure measures the vertical position of the centering jaws, which equals the base centering level (see the figure 8-3).

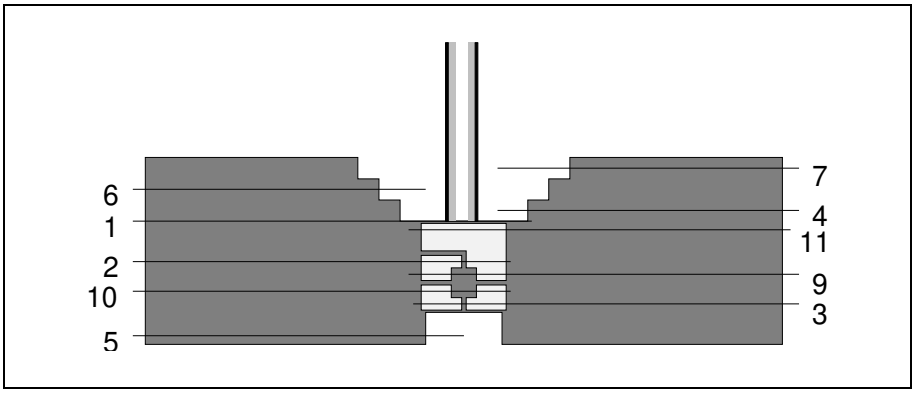


Figure 8-3. Mechanical centering levels.

The mechanical centering level must be measured if the centering jaws have been loosened or replaced.

It should also be performed as the first step if a mechanical centering or electrical verification problem occurs.

1. Select *Utility* > *Installation and Calibration* > *CALIBRATION* > *Centering Base Level measurement* or *Centering 2 Base Level measurement.*
2. Press <Space> when the *Measure centering base level* dialog box is shown. The installed tools submenu is shown.
3. Select the smallest tool available (that is used for mechanical centering) from the submenu.
4. When ready, press <Enter>. The vertical position of the centering jaws is measured.

   If the value in the following dialog box is confirmed, then the new value is stored as parameter *21.0221 Centering; Centering base level* which normally equals centering level Number 1.

Adjusting the Centering Unit

In this procedure the adjustment will compensate for any C misalignment in the centering device. This must be measured if the centering jaws have been loosened or replaced.

1. Prior to this adjustment you will have to perform the *Centering Base Level measurement*.
2. Read off the field *C misalignment* when the procedure is completed.
3. If the C misalignment exceeds 5µm, then the centering device should be adjusted as follows.
4. Loosen locking screws (’1’ in Figure 8-4).

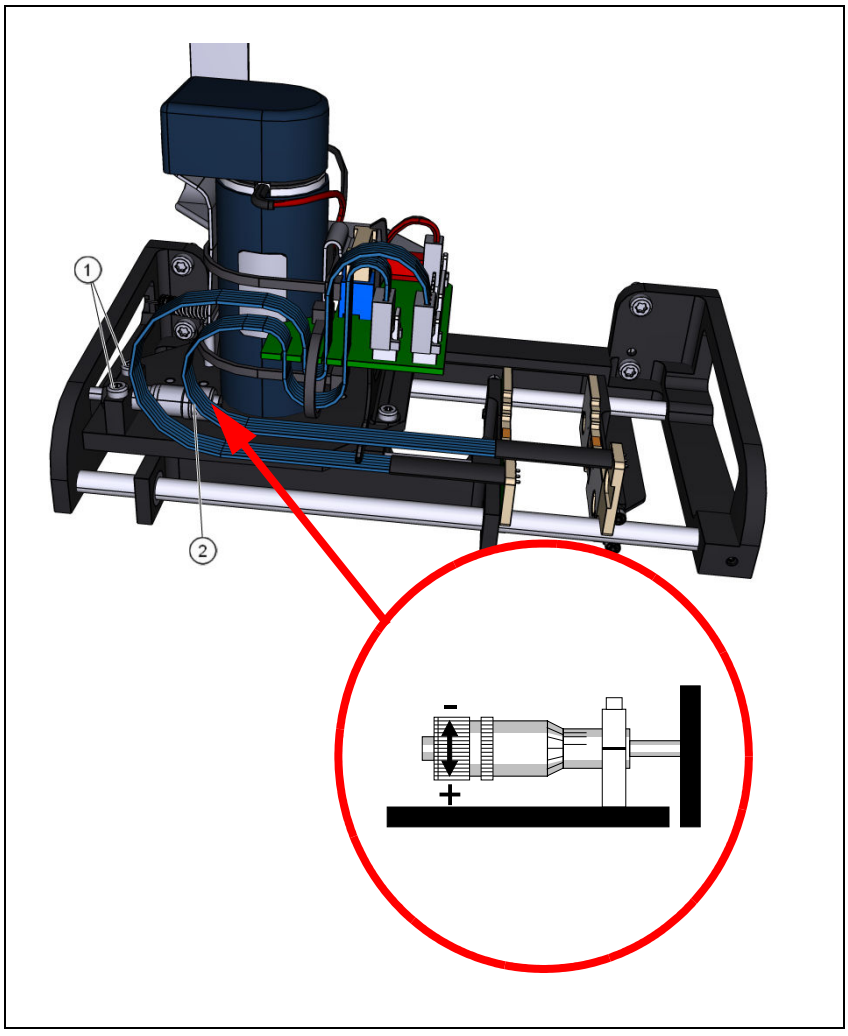


Figure 8-4. Adjusting the centering unit.

5. Adjust the micrometer (’2’) on the centering unit to counteract the indicated C misalignment.
6. Tighten the locking screws.
7. Repeat the procedure until the misalignment value is within accepted range.

Cable Resistance Measurement

This procedure is used to measure the cable resistance in wires included in the electrical verification circuit, and to update this value in the system.

The cable resistance has effect when verifying low ohm resistors only, see below.

This must be measured if the centering jaws have been replaced.

Requirements

– Zero ohm resistors are required to perform this measurement.

Procedure

1. Select *Utility* > *Installation and Calibration* > *Cable resistance measurement.*
2. Select package. By default, package 1206-09 is highlighted.
3. When prompted, select the *Measuring angle*, which is 90° for 2-pole components.
4. Select *Manual* or *Magazine* pick method. The latter requires a magazine loaded with zero ohm resistors.

If you have selected manual pick, apply manually a zero ohm resistor with the selected package to the tool tip in 0 degrees. Press <Enter> when ready.

This procedure updates the *111.0002 Right X wagon; Cable resistance* or *111.0012 Left X wagon; Cable resistance* parameter. The default value for this parameter is 0.6 ohm. If incorrect it only has effect on resistors with a resistance of less than 50 ohm approximately.

Measure friction on the Centering Device

1. Select *Exit* > *Exit To Service*.
2. Select *Motor* > *C motor* > *Measure friction.*
3. Measure the friction with the default speed value suggested in the shown dialog box.

   The *Measure* command starts the friction measuring.

   After completed measuring, the friction is shown in a pop-up window.

Measured friction values for the C-axis should be maximum 1 112 mN.

Replace Centering Jaws

1. Check the wiring before disconnecting the cables to the XTC board so that you can reconnect properly.
2. Remove the old jaws (see figure 8-5) and replace with new ones.

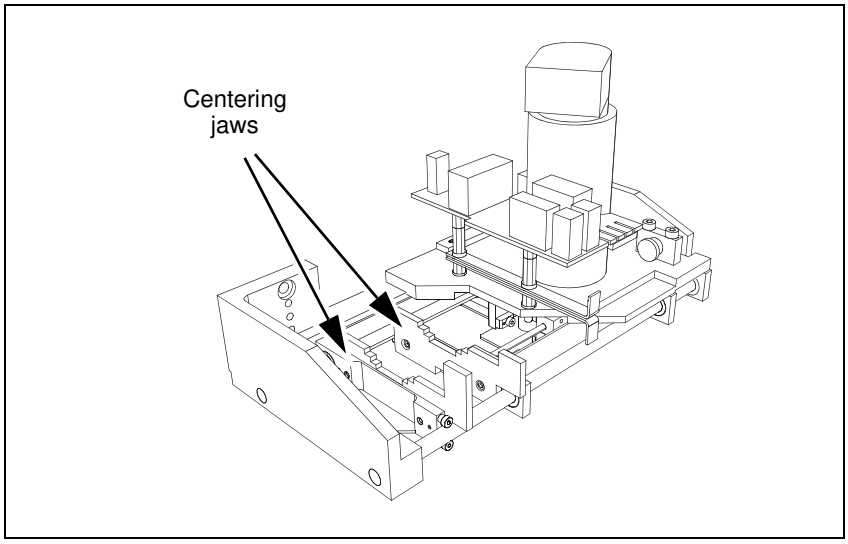


Figure 8-5. Centering Jaws.

Make sure the cables can run smoothly by pressing the centering jaws gently together by hand.

3. Perform the procedure *Measuring the Centering Base Level* on page 8-3.
4. Measure Z-unit offset.
5. Measure Z-unit offset if the received *C misalignment* value is outside the accepted range, see page 8-4.
6. Perform the *Cable Resistance Measurement* on page 8-5.
7. Make a test assembling.

9. Vision Systems

This chapter contains a description of the different cameras and vision systems used on MYDATA placement machines.

This chapter is divided into the following two parts.

X-wagon Camera

This section describes the positioning vision system. It contains a description of the system, adjustment and calibration information.

The positioning vision hardware consists of a camera located on the X wagon, therefore called the X-wagon camera. This camera faces downwards and is used for acquiring images of boards, magazines and trays. The operator uses it to locate various objects in the machine.

TPSys is able to automatically analyses the images taken by the X-wagon camera. It can use these images to:

- Set the PCB coordinate system by finding the PCB reference fiducial marks.
- Locate magazine positions.
- Locate TEX tray pallets.
- Locate components on trays before picking them.
- Locate local fiducials to a component mount position.

WARNING! In this section, some of the procedures cause the machine to make movements. The below warning must be followed for such procedures. Procedures that cause the machine to make movements are marked with this sign next to the text. Before entering such commands, check the following: Ensure that there are no foreign objects on the assembly table, near the tool bank, or within the X wagon, Y wagon, or Tray Wagon Magazine moving areas, and that the standard tool head and the Hydra tools are in their upper positions.

CAUTION! Camera units contain components that can be damaged by improper handling. Do not put fingerprints on any optical parts. Avoid exposing the camera to a dusty environment. Mirrors and CCD cameras are factory adjusted and must not be readjusted.

Adjusting the X-wagon Camera Focus

At delivery the camera's focus is preset to a nominal 23.7 mm. This is the distance between the lowest part of the camera's illumination unit, and the upper surface of the PCB on the Y wagon. Sometimes the camera focus may need adjustments.

Note that the camera has to be calibrated after this adjustment, and that the assembly table place area must be calibrated as well.

Procedure

1. Insert the calibration board (L-029-0220F or later) on the Y wagon.

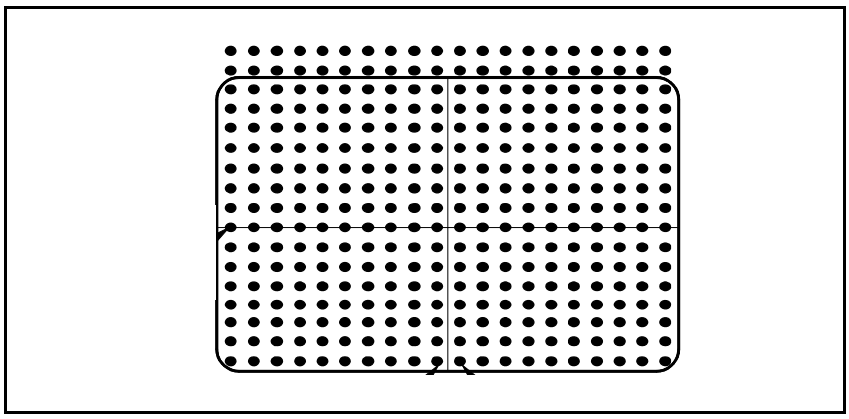


Figure 9-1. L-029-0220F.

2. Start the calibration by selecting: *Utility* > *Installation and Calibration* > *X-wagon camera calibration*
3. Center the camera on the calibration board pattern.
4. Make sure the emergency stop buttons are pressed down.
5. Remove the cover on the machine to gain access to the camera unit.

   On the front of the camera unit, about 15 mm below the Sony camera, there are three holes. Two of which are threaded, see Figure 9-2.

   In each of the threaded holes there is a locking screw for the lens system. The unthreaded hole is used for focus adjustment.

6. Loosen one of the locking screws that locks the lens system.

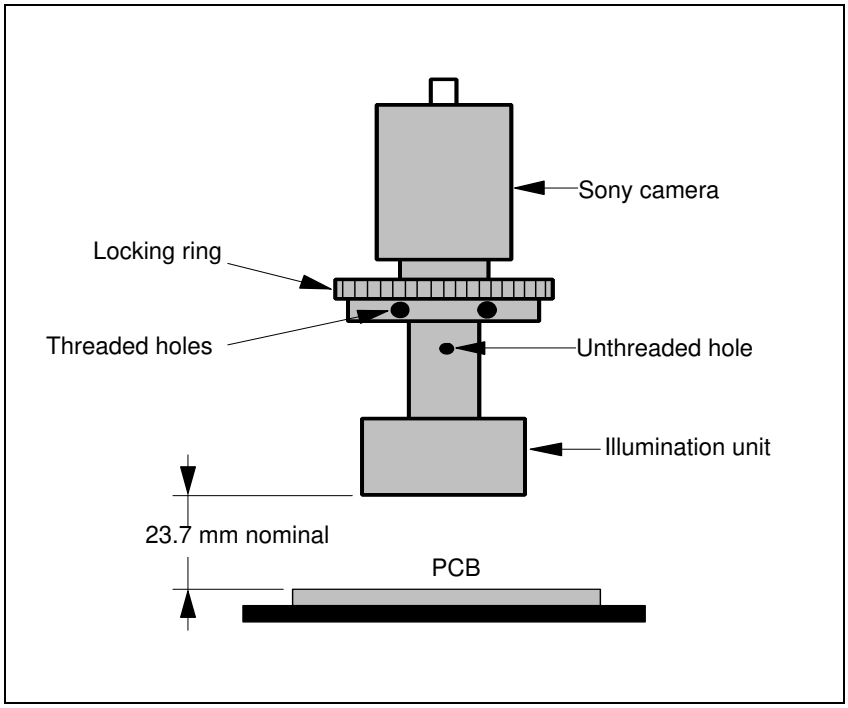


Figure 9-2. Camera unit, front view.

7. Insert a screw driver in the unthreaded hole and apply a gentle force.

8. Unscrew the other locking screw that holds the lens system. The lens system can now be moved up and down with the screw driver.

9. View the image on the monitor and adjust the focus.

10. When ready, tighten the locking screws before removing the screw driver.

11. Put back the cover.

12. Release the emergency stop buttons.

13. Calibrate the camera in TPSys.

Optical Centering Systems

An optical centering system consists of a camera which acquire an image of a component held by a mount tool, and software which can identify, inspect and calculate the exact position and angle of the component relative the mount tool. The system then calculates the position and angle for the mount tool to place the component correctly on the PCB.

WARNING! In this section, some of the procedures cause the machine to make movements. The below warning must be followed for such procedures. Procedures that cause the machine to make movements are marked with this sign next to the text. Before entering such commands, check the following: Ensure that there are no foreign objects on the assembly table, near the tool bank, or within the X wagon, Y wagon, or Tray Wagon Magazine moving areas, and that the standard tool head and the Hydra tools are in their upper positions.

CAUTION! Camera units contain components that can be damaged by improper handling. Do not put fingerprints on any optical parts. Avoid exposing the camera to a dusty environment. Mirrors and CCD cameras are factory adjusted and must not be readjusted.

Standard and Dual Vision Systems

SVS, Standard Vision System

The SVS, Standard Vision System, is a single camera system with a field of view (FOV) of 55.4 mm x 41.5 mm. This system is intended for optical centering and inspection of a wide range of parts, from SO packages with only a few leads to large fine pitch QFP packages and BGA packages with generic bump patterns.

The camera unit is called SVC, Standard Vision Camera. The SVC camera unit is shown in Figure 9-3.

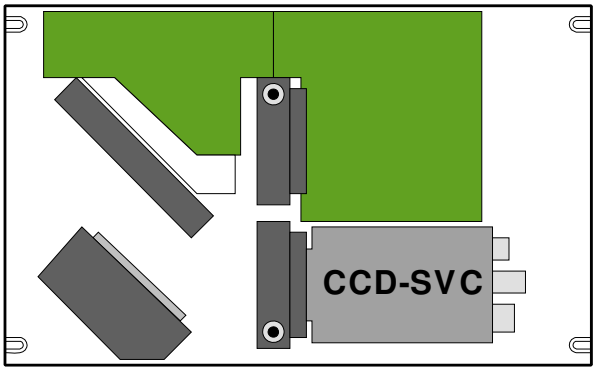


Figure 9-3. SVC camera unit.

DVS, Dual Vision System

The DVS, Dual Vision System, is a camera system with two different fields of view (FOV's), 55.4 mm x 41.5 mm for the standard camera and 17.3 mm x 12.9 mm for the high resolution camera (HRC).

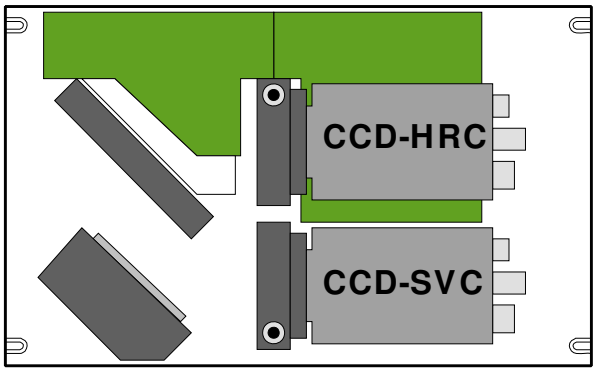
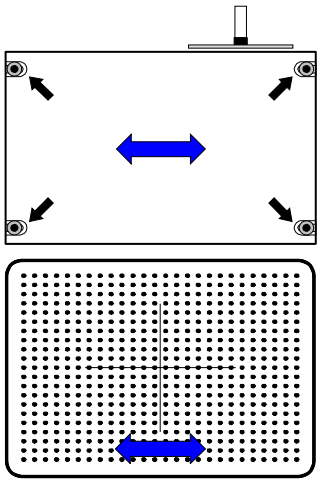


Figure 9-4. DVC camera unit.

Standard and Dual Vision Systems Mechanical Calibration

Sometimes it may be necessary to adjust the Y position of the camera unit mechanically.

Do not adjust a DVC unit mechanically if the SVC is calibrated.



1. To adjust the camera Y position, remove the component bin and camera cover. Loosen the four screws as depicted in the figure.
2. Adjust the camera unit, in the Y-wise direction, until the cross hairs are centered to the calibration pattern (Calibration plate L-029-0506-3).
3. Tighten the four screws and check that the calibration pattern is still centered. If not, loosen the screws again and repeat the adjustment described above.
4. Confirm in TPSys that the Y adjustment is completed.

HYDRA Camera

The HYDRA camera takes images of components picked by the HYDRA unit. It takes an image of four components in one shot. When inspecting components, two consecutive images are taken while the HYDRA unit passes over the camera.

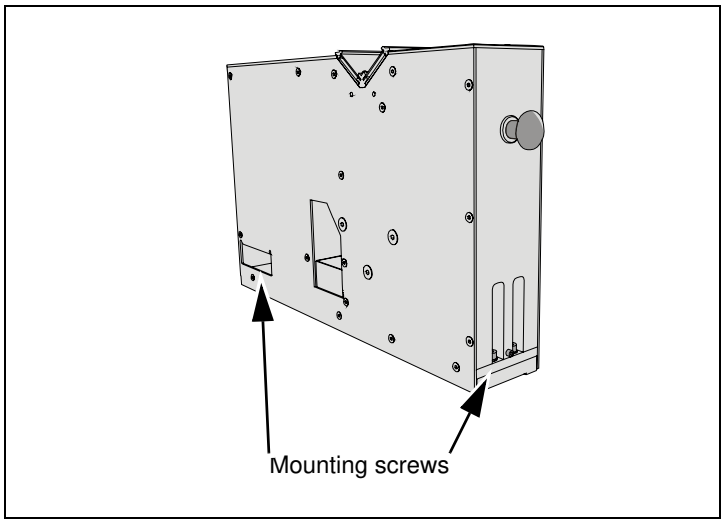


Figure 9-5. HYDRA camera.

The camera box is mounted on the machine using three screws at the bottom of the camera box, extending through a steel plate (See Figure 9-5).

To protect the lenses from dust and components there is a transparent gate in the camera box that is controlled from the front.

When removing any components from the glass on the gate they fall down to the back of the camera into a dump bin and can easily be reached.

Adjusting HYDRA Camera Y Position

Sometimes you must physically adjust the HYDRA camera Y-wise, so that the center of its CCD coincides with the center of the single mount head.

Adjusting HYDRA Camera 2 Y position

1. loosen the rear bolt, see Figure 9-6.

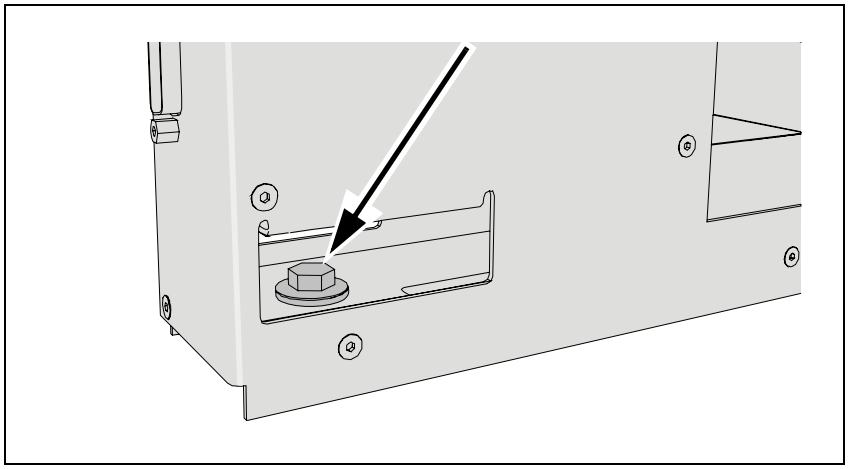


Figure 9-6. Loosen bolt.

2. Loosen the two screws located at the front of the camera box ('A' in Figure 9-7).
3. Adjust the Y position of the camera with screw (B). By turning the screw clock-wise the camera will move towards the front of the machine (on the monitor it looks as if the camera is moving downwards). If you want to move the camera towards the rear, turn screw (B) counter-clock wise while pushing gently on the camera.

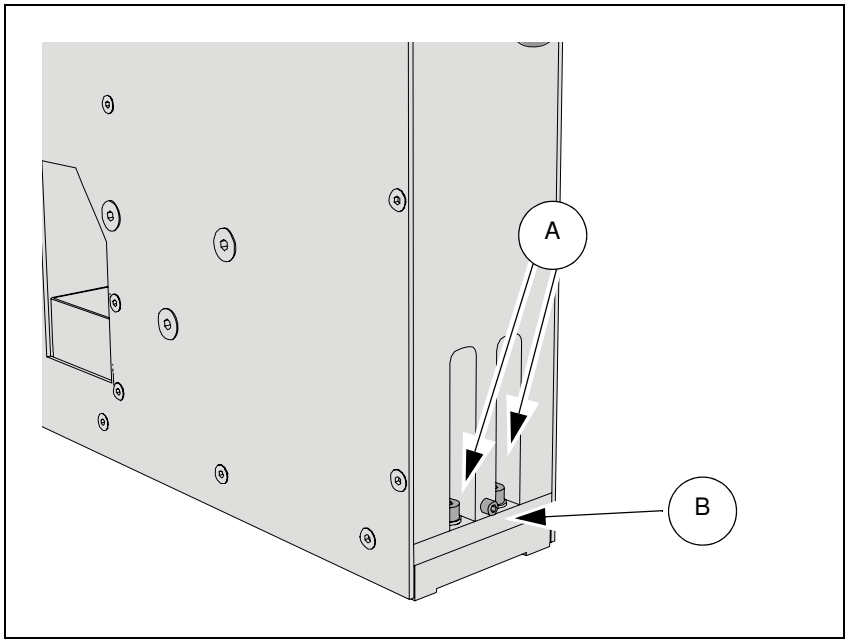


Figure 9-7. Adjust camera Y-position.

4. When satisfied with the Y position, fasten screws (A) and the rear bolt (see Figure 9-6).

Adjusting HYDRA Camera 1 Y position

1. Loosen the lid of the camera box and remove it (e.g. with a magnet). See Figure 9-8.

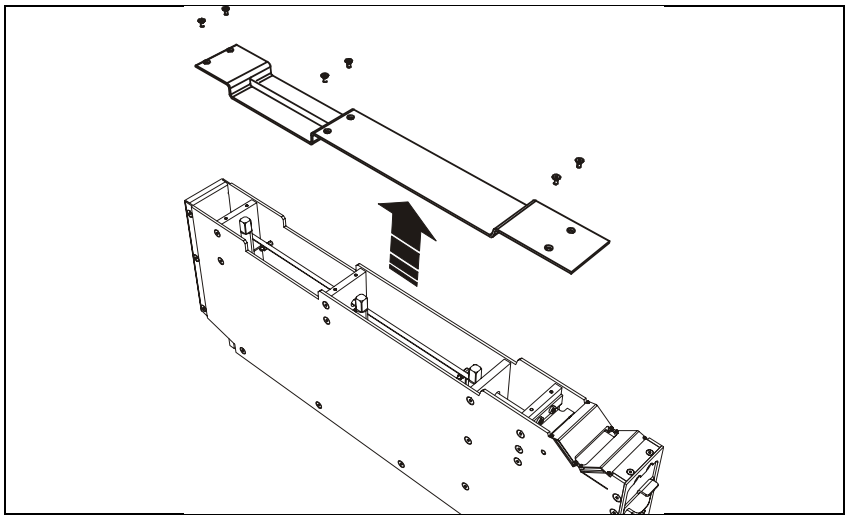


Figure 9-8. Remove camera lid.

2. Loosen the three bars in the camera box with a 9 mm universal screw spanner. See Figure 9-9.

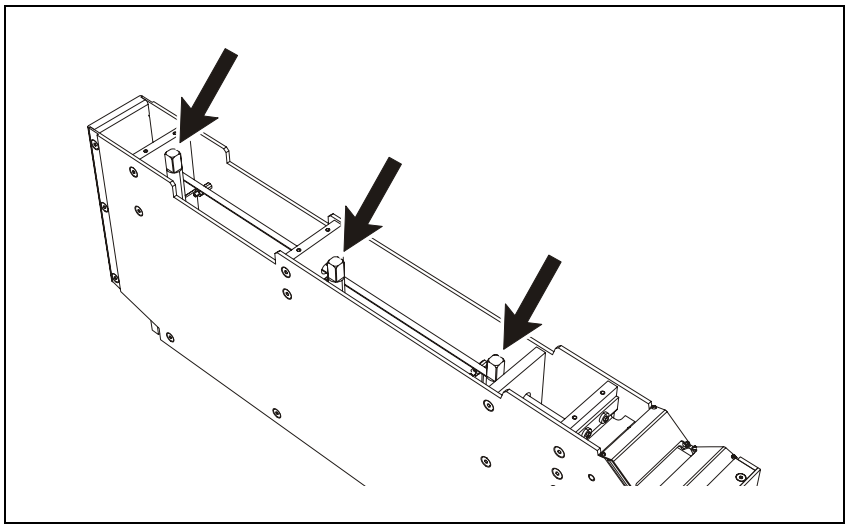


Figure 9-9. Loosen bars.

3. Loosen screw located in the front of the camera box (’A’ in Figure 9-10).
4. Adjust the Y position of the camera with screw (B). By turning the screw clock-wise the camera can be moved towards the front of the machine (on the monitor it looks as if the camera is moving downwards).

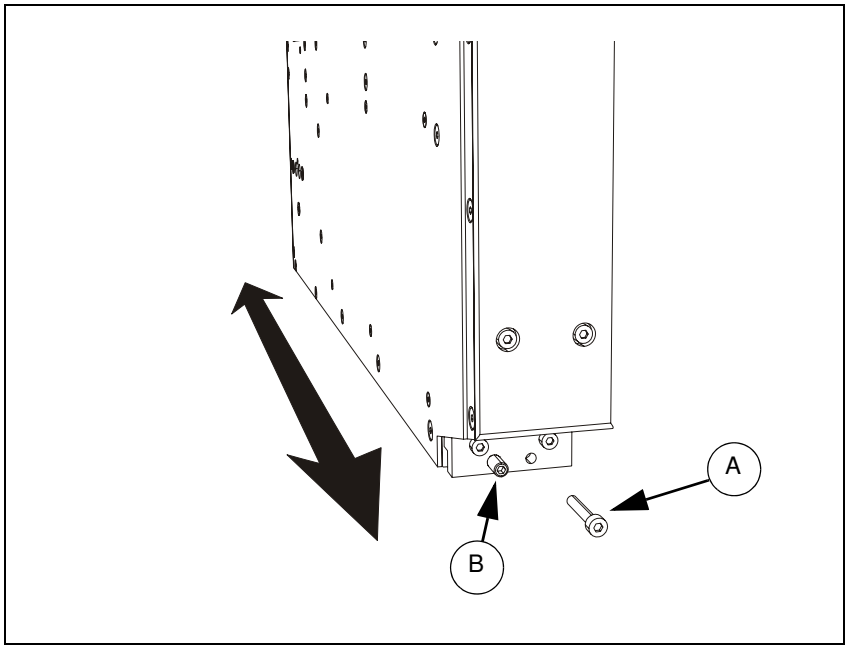


Figure 9-10. Adjust camera Y-position.

5. When satisfied with the Y position, fasten screw (A) and the three bars in the camera box.

6. Reattach the lid.

Linescan Vision System

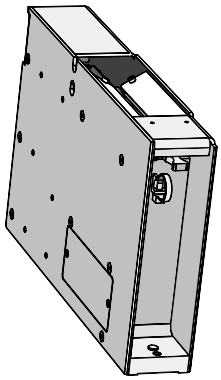
The LinescanVision System generates a picture by taking a series of line images synchronized with the position of the mount head as it pass over the camera. The final image is made up of thousands of such lines. The illumination of the component is done with ambient lighting.

The LinescanVision System consists of the following hardware:

- Camera box.
- LSAD board.
- Power unit.

WARNING! In this section, some of the procedures cause the machine to make movements. The below warning must be followed for such procedures. Procedures that cause the machine to make movements are marked with this sign next to the text. Before entering such commands, check the following: Ensure that there are no foreign objects on the assembly table, near the tool bank, or within the X wagon, Y wagon, or Tray Wagon Magazine moving areas, and that the standard tool head and the Hydra tools are in their upper positions.

Camera box



The most important part of the LVS is the Linescan camera (LSC). Inside the camera box there is a 2048 x 96 pixel CCD. There are also electronic boards needed to drive the CCD image sensor, and send the analog video signal to the LSAD board.

The camera can be used as a 2048 x 96 pixels area camera, which is useful for calibration and troubleshooting. This mode is for example used in the service program.

The focal plane is factory-set at 14 mm above the camera frame. This is not possible to adjust. There are no serviceable parts inside the camera box, except for the glass window and the LED boards. To avoid vibrations or relative movements between the CCD and the lens, all optical elements are glued to a steel frame. This frame is made from a single solid block of metal.

The illumination unit has two separate light segments. The LED current is constant (50 mA per diode). The light intensity is varied by changing the duty cycle.

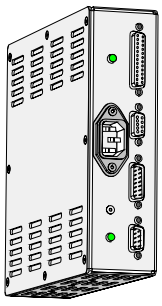
LSAD Board

An LSAD board is mounted inside the AT-CPU2 and performs several functions:

- It provides the camera box with line synchronization based on HFLASH.
- Switches the LED boards on and off.
- AD converts the 8 channel analog video and feeds the data to the 4 MB video memory on VVG2.
- It compensates for gain and offset variations between the 8 channels of the cameras CCD-sensor, using Look Up Tables (LUT).
- Controls the camera electronics via a serial link.

The LSAD board is accessed via the VVG2. Only +5 V and GND are connected to the ISA-bus.

Power Unit



The Power unit is mounted behind the Linescan camera and supplies it with six different voltages: +15 V, +13.5 V, +12 V, +5 V, –2 V and -5 V.

The Power unit also supplies the drive current for the LED boards. If the LED boards are kept on for too long, a watch-dog will automatically switch them off, preventing the diodes from over-heating due to a faulty cable or LSAD board.

Two green LED indicate camera power OK and LED power OK.

Troubleshooting

Refer to the table below if you have problems with the Linescan Camera.

Symptom	Possible reason
Calibration fails.	Calibration plate touches centering jaws when rotated. Try setting parameter 73.0003 to –13.5 mm.
	Ensure that you have installed the reference background correctly.
Cannot find the reference background.	Camera or reference background incorrectly mounted in Y direction. The entire reference background (7x56 mm) should be visible in the leftmost channel (pixels 0-255).
	Reference background dirty, bent, damaged or not installed.
LED boards not illuminating.	Light intensity in package data set to 0 %.
	Power unit or LED cable damaged.
Blurred image in both vertical and horizontal direction.	Incorrect component height in package data.
	Camera level incorrectly measured.
	Centering unit mounted in upper position.
	Magnification incorrectly measured during calibration.
Blurred image only in vertical direction.	X wagon traveling too fast over camera. Try lowering parameter for max X speed 57.0211 (also 58.0211 if you have two LSCs).
Vertical stripes in image.	Look-up-table calibration failed.
	LED cable shield damaged.
	Power unit or power cable damaged.
	Video cable damaged.
Dark image.	Calibration failed.
	LED boards or power unit damaged.
Dark spots in image.	Dirt on camera window.
	Components on the camera glass.
Bad placement accuracy.	Dirt on reference background.
Slow mounting.	Max-safe-pos incorrect.
	View mode or debug mode on.
	Incorrect tool parameters.
Level of camera box not repeatable.	Midas touches LED board Plexiglas cover when measuring camera box height. Loosen screws holding Plexiglas over LED boards, push down, and re-tighten screws.

10. Pneumatic System

This chapter briefly describes the pneumatic system. The chapter is divided into the following parts:

- *Standard Pneumatic System* on page 10-2. For the single mount head.
- *HYDRA Pneumatic System* on page 10-4. For the HYDRA unit.

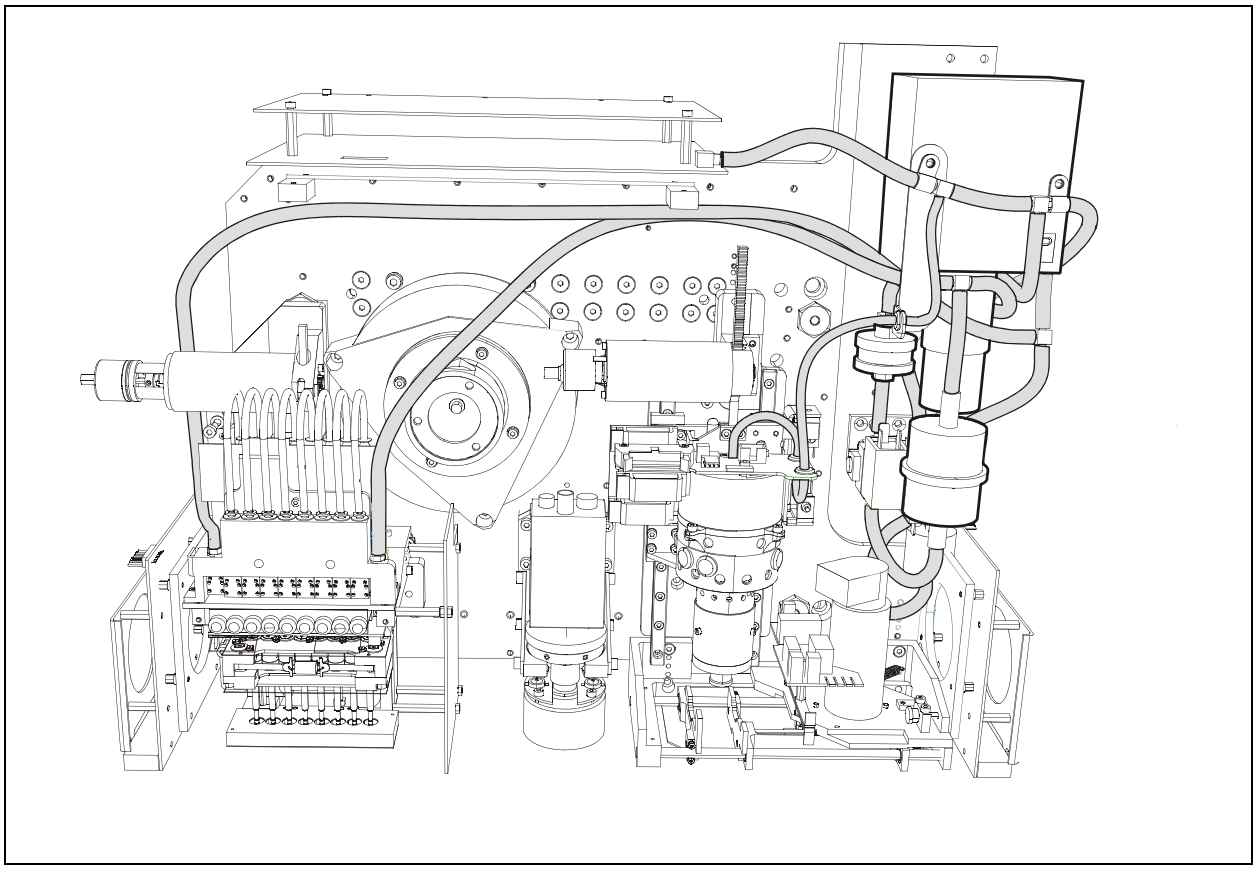


Figure 10-1. Pneumatic system.

Standard Pneumatic System

The pneumatic system is located on the X wagon and is used to obtain a negative pressure in the single mount head tool when picking and moving parts. It also produces an air pressure used to quickly release parts when placing the components.

A schematic of the standard tool pneumatic system is shown in Figure 10-2.

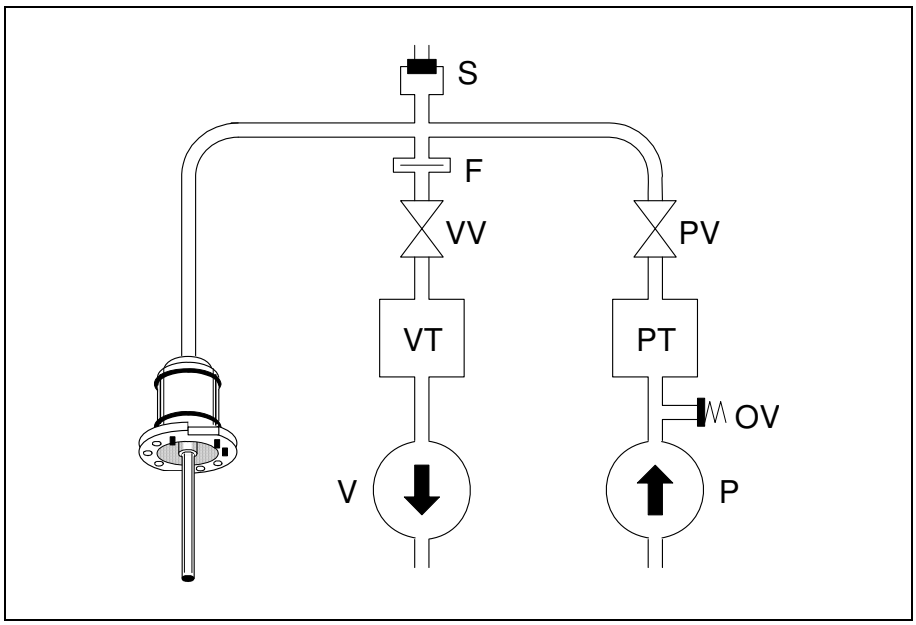


Figure 10-2. Standard pneumatic system.

Vacuum

A vacuum pump (V) maintains a negative air pressure in a vacuum tank (VT). When the vacuum valve (VV) opens, air will be taken from the mount tool via a filter (F). A sensor (S) measures and indicates the negative pressure to the system.

Pressure

An air pump (P) maintains an air pressure in a pressure tank (PT). When a pressure valve (PV) opens, air from the tank will increase the pressure in the mount tool. The sensor (S) indicates the pressure to the system.

An overload valve (OV) secures the air pressure not to exceed a certain maximum level.

The vacuum system is controlled by the MOT-Z board.

Standard Vacuum control

You can individually control pump, vacuum valve, pressure valve, and also supervise the sensor pressure from the *Vacuum* control dialog box.

Procedure

1. Select *Exit* > *Exit To Service*.
2. To see the vacuum level in the standard mount tool, select *Vacuum* > *Show/Hide vacuum/force sensors*

   In the *Vacuum and force* information box for the standard mount tool:

   – The field *Vacuum* in the standard mount tool, shows as a value between 0 and 255.

   – A value between 0 and 30 should be shown for no vacuum, that is when the vacuum/pressure pump is off.

   – A value above 170 should be shown for full vacuum, that is when the pump is on, the vacuum valve is open, and the pressure valve is closed.
3. You can individually control pump, vacuum valve, pressure valve by selecting *Vacuum* > *Z Vacuum*.
4. You can control the vacuum pump, the vacuum valve and the pressure valve by moving the cursor to the desired option and pressing <Enter>.

HYDRA Pneumatic System

The HYDRA pneumatic system uses the same vacuum and pressure pump as the standard tool pneumatic system. For more details see section in the *Standard Pneumatic System* section.

The HYDRA pneumatic system consists of eight vacuum valves and one pressure valve. The vacuum valves switch between vacuum and pressure. Pressure can either be over pressure or atmospheric pressure. The pressure valve is only open (over pressure) for a few milliseconds, enough to clear the vacuum in the tool tip.

A schematic of the HYDRA pneumatic system is shown in Figure 10-3.

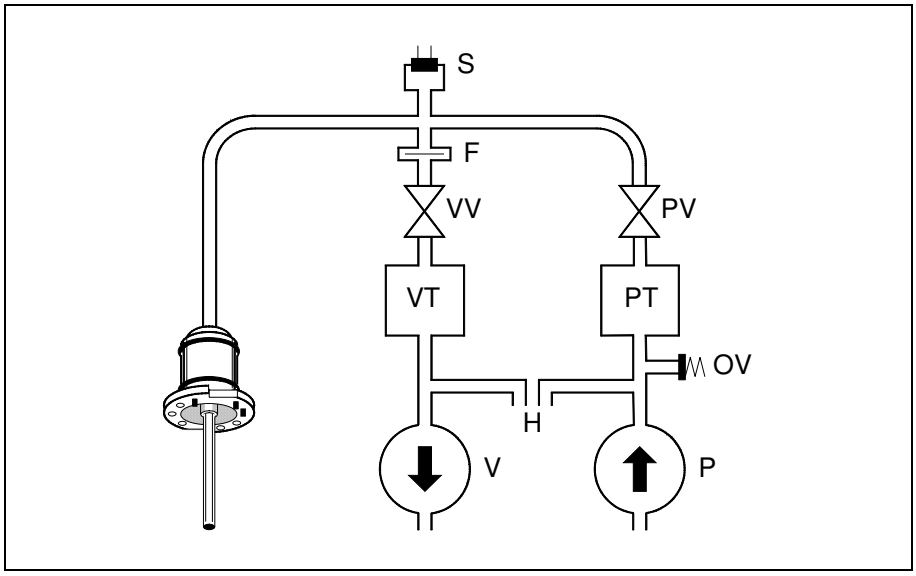


Figure 10-3. HYDRA pneumatic system.

Vacuum

The HYDRA pneumatic system is connected to the common vacuum pump at 'H.'

Pressure

The HYDRA pneumatic system is connected to the common pressure pump at 'H.'

The vacuum system is controlled by the MOT-Z board.

HYDRA Vacuum Control

You can individually control pump, vacuum valve, pressure valve, and also supervise the sensor pressure from the *HYDRA Vacuum* control dialog box.

Procedure

1. Start the *Service Program* by selecting *Exit* > *Exit To Service* in the TPSys menu.
2. To be able to see the vacuum levels in the HYDRA mount tools, open the vacuum sensor information box by selecting:

   Vacuum > *Show/Hide vacuum/force sensors*

   In the *Vacuum and force* information box for the HYDRA mount tools:

   – The vacuum in the HYDRA unit is shown as a value between 0 and 255 (H in the figure above). The field Z in the information box shows the vacuum in the standard mount tool.

   – A value between 30 and 75 should be shown for no vacuum, that is when the vacuum/pressure pump is off. For best repeatability perform this test without HYDRA tools.

   – A value between 190 and 220 should be shown for full vacuum, i.e. when the pump is on, the vacuum valve for the particular nozzle is open, and the pressure valve for the same nozzle is closed.
3. You can individually control pump, vacuum valve, and pressure valve by selecting *Vacuum* > *HYDRA Vacuum*.

You can control the vacuum pump, the vacuum valve and the pressure valve by moving the cursor to the desired option and pressing <Enter>.

The vacuum valves are controlled by moving the cursor to the desired tool number, pressing <Space> for an *Open* or *Close* action, moving the cursor to the *Set* option, and pressing <Enter>.

11. Power Supply System

This chapter contains information about the power system and fuses that are accessible from the outside of the electrical units in the machine.

The following units are included in the power supply system. All the units are located on the electric shelf (’1’ in Figure 11-1):

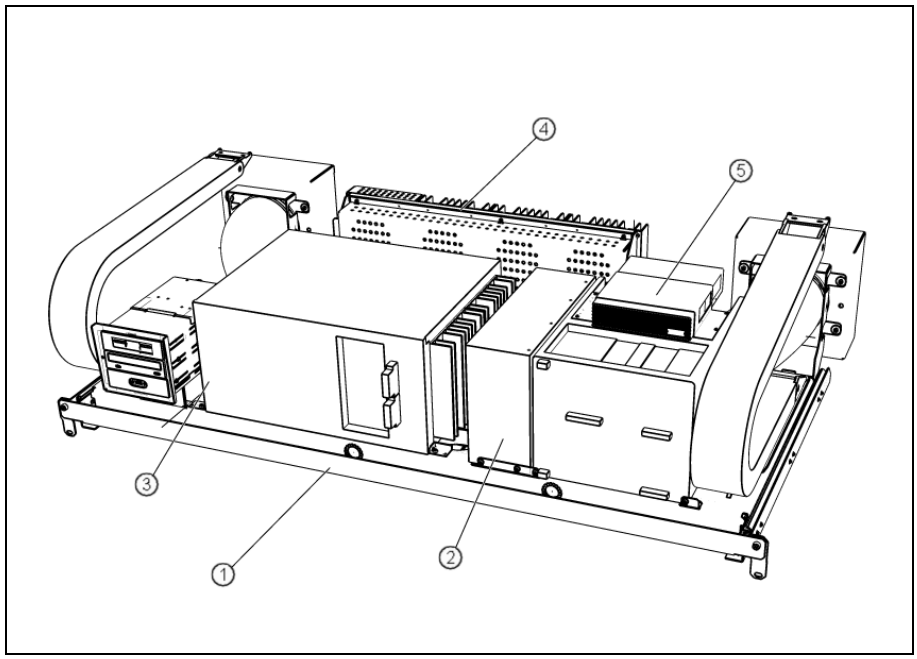


Figure 11-1. Power Supply System.

WARNING! These units contain dangerous voltage levels. Follow the safety instructions in the operator´s manual. Power must be switched off before opening a unit.

Fuses

The electrical systems are protected by fuses located in the following units:

– Mains Input Unit
– PS4
– BM4CB
– UPS Unit

Mains Input Unit

The Mains Input Unit is located at the rear of the machine. The unit supplies the various machine systems with power converted to different voltages from the mains voltage.

The machine can be either Y or D connected to the mains.

It is important to know what kind of connection the machine is connected to, because the fuses are different depending on the connection type.

The fuses included in the Mains Input Unit are accessible from the mains input panel (see '1' in Figure 11-2).

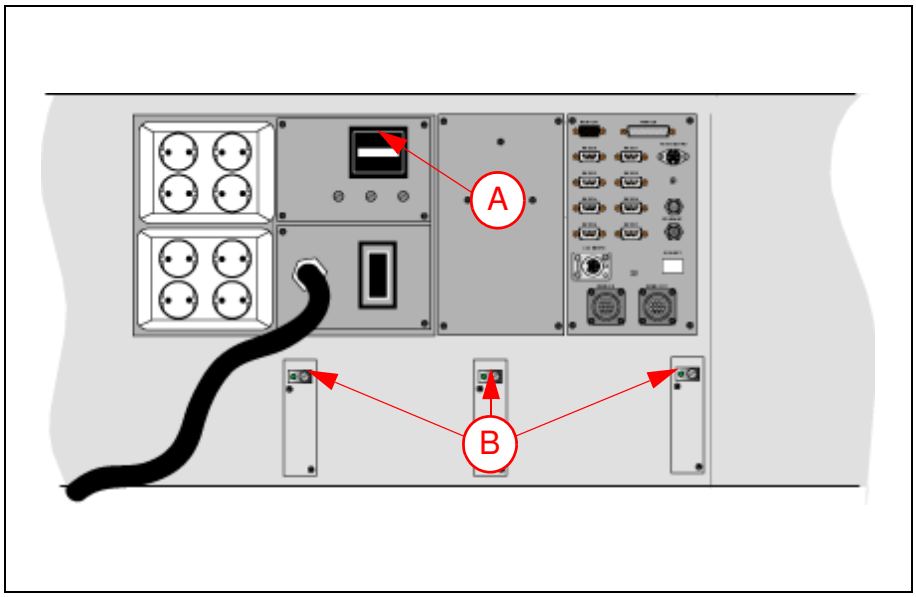


Figure 11-2. Mains input panel.

The F1, F2 and F3 fuse data are indicated in the following table for Y and D connection. The fuses are located at 'A' in Figure 11-2.

Fuse	Type	Rate Y Connection	Rate D Connection
F1	6.3 x 32 mm	8 A Slow	15 A Slow
F2	6.3 x 32 mm	8 A Slow	15 A Slow
F3	6.3 x 32 mm	8 A Slow	15 A Slow

EPT Units

Three EPT units are located in the Mains Input Unit accessible from the input panel (see 'B' in Figure 11-2).

The EPT units have voltage plugs and fuses and are used for one phase each.

The fuses in the three EPT units are called F1 and have the following data:

Fuse	Voltage	Type	Rate
F1	140 V AC	6.3 x 32 mm	10 A Slow

PS4

The PS4 power supply unit contains the main fuses ('2' in Figure 11-3).

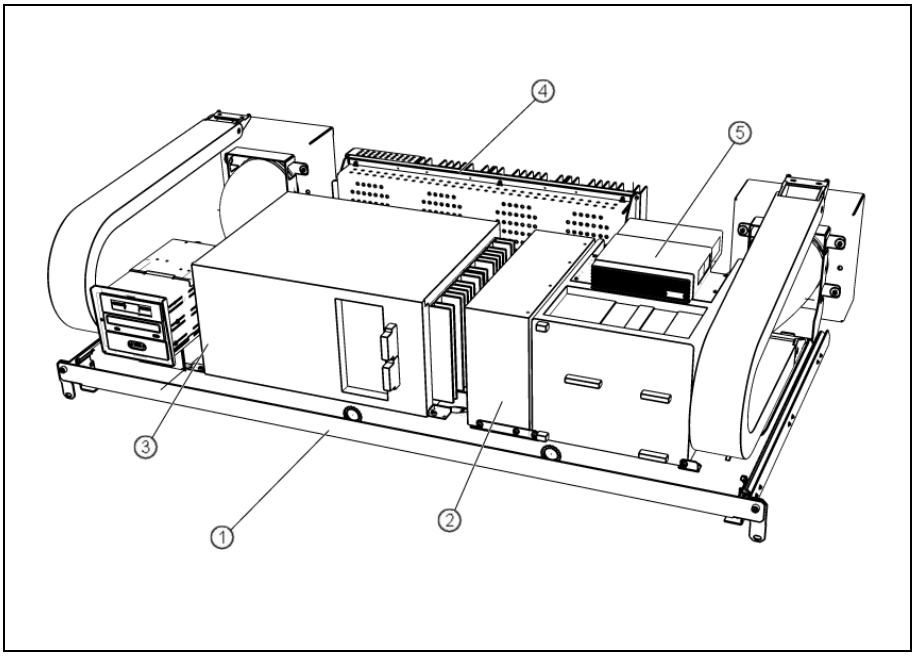


Figure 11-3. PS4.

The fuses in PS4 are accessible from the front of the machine, in the middle section, under the magazines.

The following table shows the fuses and circuit breakers included in the PS4 unit.

Fuse	Circuit	Type	Rate
F1	Mains	Circuit breaker	8 A
F2	Mains	Circuit breaker	8 A
F13	55 V AC	6.3 x 32 mm	0.1 A FAST
F14	55 V AC	6.3 x 32 mm	0.1 A FAST
F11	+75 V	6.3 x 32 mm	6.3 A SLOW
F12	–75 V	6.3 x 32 mm	6.3 A SLOW
F9	+38 V	6.3 x 32 mm	15 A SLOW
F10	–38 V	6.3 x 32 mm	15 A SLOW
F3	110 V AC	6.3 x 32 mm	15 A SLOW
F8	110 V AC	6.3 x 32 mm	15 A SLOW

BM4CB

There is a BM4CB unit ('3' in Figure 11-4) located to the left in the computer box. The computer box is located on the electric shelf ('1') inside the machine.

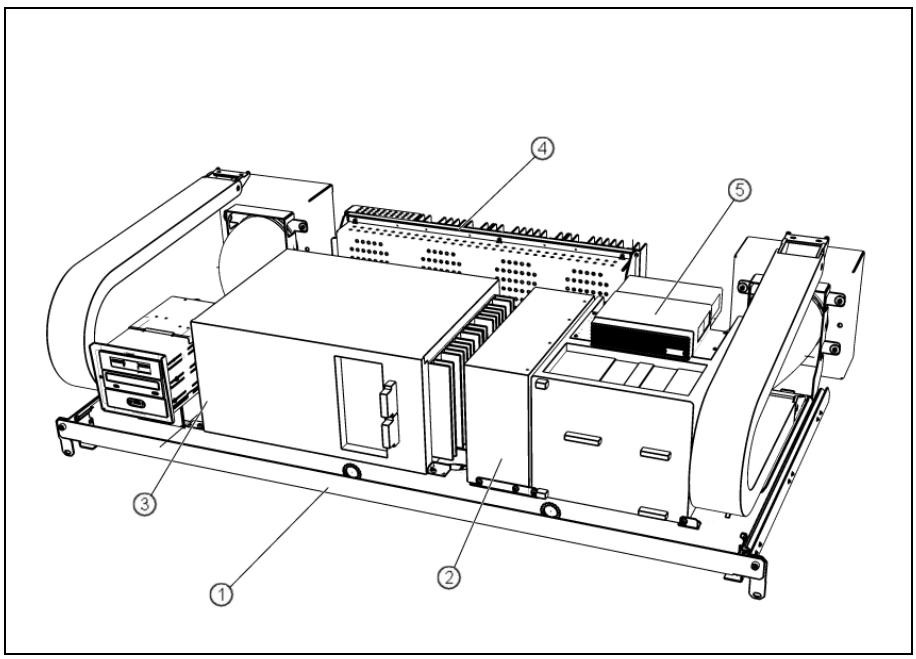


Figure 11-4. BM4CB.

The fuses included in the BM4CB are shown in the following table.

Fuse	Type	Rate
M25 V-	5 x 20 mm Quick	2 A
Theta (Fi)	5 x 20 mm Quick	1.6 A
C	5 x 20 mm Quick	1.6 A
H Theta (Fi)	5 x 20 mm Quick	1.6 A
M25 V+	5 x 20 mm Quick	2 A
X	nc	nc
Z	5 x 20 mm Quick	2 A
Y	5 x 20 mm Quick	4 A
YM	5 x 20 mm Quick	1.6 A

UPS

The UPS (Uninterrupted Power Supply) unit provides battery support to the computer box in case of power failure. The UPS unit (’5’ in Figure 11-5) is located on the right side of the electrical shelf, on top of the ELMO unit.

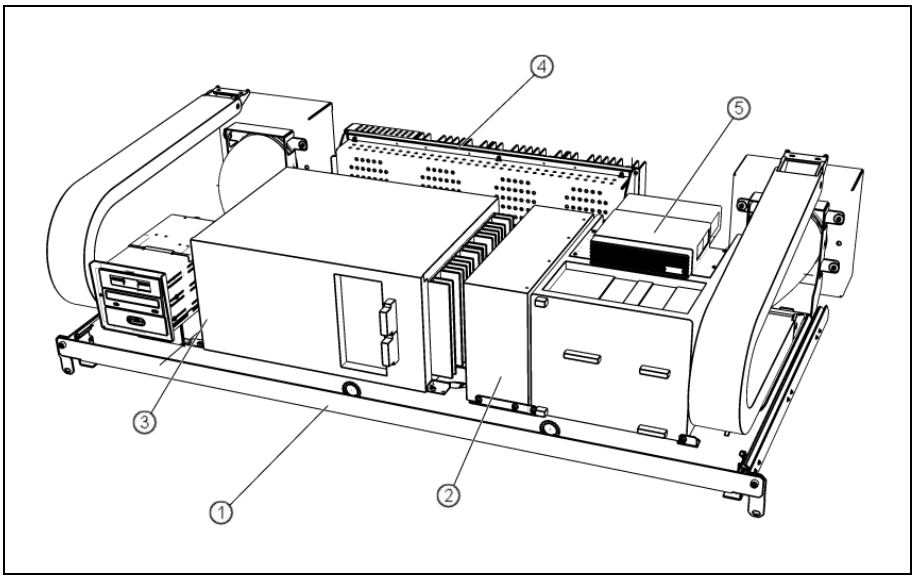


Figure 11-5. UPS Unit.

If the machine of any reason is turned off from power for more than 6 months the batteries in the UPS should be charged for 24 hours to prevent backup failure. The batteries should be changed after 5 years to new batteries.

UPS fuse

There is one fuse in the UPS unit. The fuse (rated 8 Amp) is located in the back of the unit (’1’ in Figure 11-6).

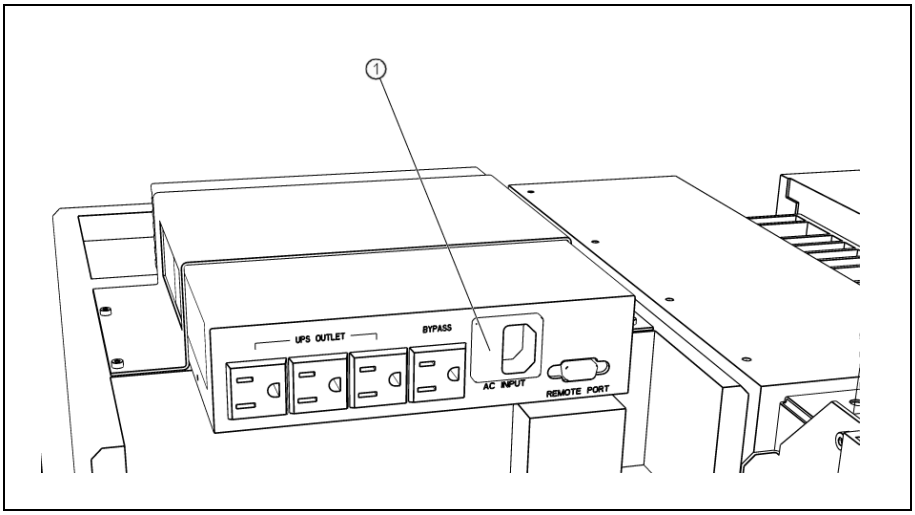


Figure 11-6. UPS Unit rear view.

UPS Repair Guide

For instructions regarding the UPS installation see Repair Guide (UPS REPLACEMENT, P-049-0678). Available from Mydata.

12V/5V Box

The 12 V/5 V Box is located on the electric shelf on the left side of the booster (’4’ in Figure 11-7).

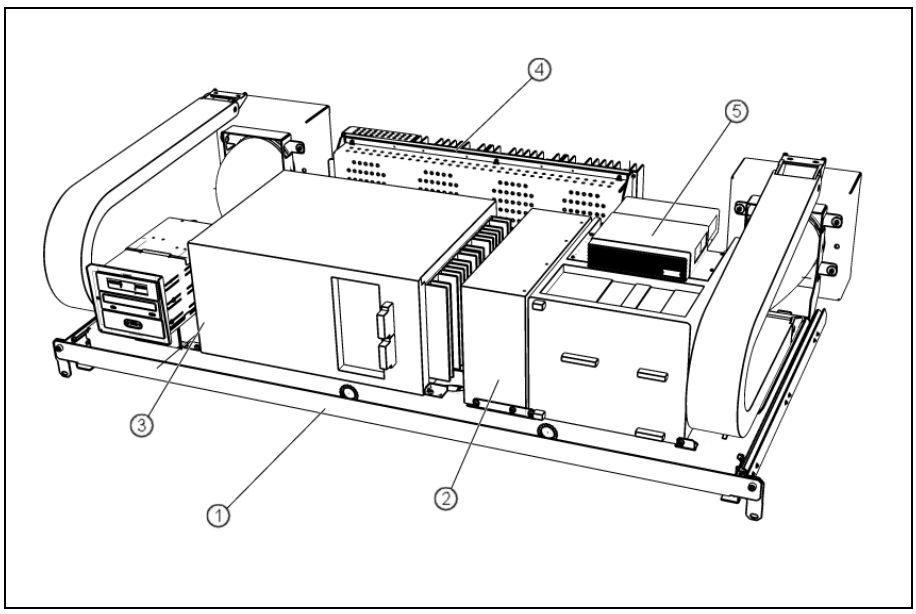


Figure 11-7. Box 12 V / 5 V.

Inside the box there are two switch mode power supplies, generating the 5 V and 12 V DISC voltages.

The 5 V and 12 V are distributed with the XP5/12 V cable to the BM4CB in the computer box.

The input power is supplied by the UPS unit.

Functional Test

The following procedure describes how to display the internal system voltages.

Procedure

1. Start the Service Program by selecting the *Exit To Service* in the TPSys *Exit* menu.
2. Select *Utility* > *Show line voltages*

   The internal system voltages is displayed in the following box:

```
Line voltages
   50 V AC (rms): 53.91
20 V DC/DC input: 18.4
    18 V battery: 19.9
        12 V CRT: 11.9
       12 V disk: 11.8
           5.6 V: 5.68
             5 V: 4.98
           -25 V: -24.6
           -35 V: -35.9
           -75 V: -74.4
            75 V: 76.7
            35 V: 35.4
            25 V: 25.4
```

The voltage ‘5.6 V’ is no longer used and the ‘18 V battery’ voltage is generated by the UPS system.

Line voltages description

Field	Description
50 V AC (rms).	This voltage is sensed for power failure. When it decreases to a certain level, files are saved and the system is shut down using battery backup power.
20 V DC/DC input.	This voltage is generated by the PSU and is applied the DC/DC converter for 5 V DC supply voltage.
18 V battery.	Battery power fed to the booster for generating required backup voltages.
12 V CRT.	12 V DC for monitor.
12 V disk.	12 V DC for disk drives.

Remaining lines display internal supply voltages generated by the PSU and the following booster.

This function is controlled by the MOT-M board.

Troubleshooting

A LED indicator is located on the front panel of the UPS Unit. The LED indicator is used to show the current status of the UPS Unit. The following table shows the status levels that the UPS Unit can assume.

LED indicator status	Function
Steady green light.	Normal line.
Slow blinking.	Battery in use.
Fast blinking (pending shutdown).	Low battery.
Black out.	Overload, short.

The following table shows some of the symptoms that may turn up in case of failure in the UPS Unit.

Symptom	Suggested action
LED is not on.	1. Check for power fail.
	2. Check if input cable is loose.
	3. Check if power switch is "off".
	4. Check if the fuse is blown.
Back up failure.	Check if the battery voltage is to low (Recharge the batteries for 24 hours).

12. Board Handling Systems

This chapter describes the Board Handling System. It contains brief descriptions about internal and external conveyors, Y wagons and Y module types and different Conveyor configuration systems.

This chapter also contains instructions concerning functional tests and adjustment and calibration procedures that can be performed on the different Board Handling System configurations.

The Board Handling System comprises the following main parts:

Y wagon

The Y wagon or Y module unit provides the Y movement of the Manual load table or Internal Conveyor in the machine.

Conveyor system

To transport the mounted PCB, the Y module is equipped with an Internal and/ or External Conveyor.

Cover hoods

The Y wagon and Conveyor system are covered by hoods to protect operators from moving parts of the machine.

Y Wagon

The Y Wagon provides the Y movement of the Manual load table or Internal Conveyor in the machine.

There are two different methods, used by the Y wagon to hold the PCBs in the MY series of machines. The Y wagon can be equipped with either a Manual load table or an Internal conveyor system.

Manual load (ML)

The PCBs are fixed into position using magnetic supports. Any number of PCBs, of different sizes or shapes that fits on the table can be mounted simultaneously.
Examples of manual load Y modules are:

288 ML2 – The two module Y wagon using two magazine positions.

468 ML3 – The three module Y wagon using three magazine positions.

Figure 12-1. MY 12 with manual load.

Internal conveyor (IC)

The PCBs are automatically placed and locked in the right position before the components are mounted. After the components are mounted the conveyor transports the board to the next stop, usually an external conveyor.
Examples of Y module Internal conveyors are:

- Conveyor 420PT.
- Conveyor 500T2.
- Conveyor 500T.

Figure 12-2. MY 15 with 500T Internal conveyor.

Y Wagon or YM unit types

The table below shows the different Y Wagon or YM unit types.

Y wagon name	Description
Y-cogbelt	Y wagon with cog belt.
Y1/Y2a	Y wagon with short screw.
Y1/Y2b	Y wagon with long screw.
Y1/Y2c	Y1, Y2 with YWB and optional TWM.
Y1/Y2d	Y1, Y2 with YWB2 (with board jam indicators) and optional TWM.
Y1/Y2e	Y1, Y2 with YWB and Y-type TWM.
YWU3a	YWU3 with stand alone 288.
YWU3b	YWU3, 4, 5 with stand alone 468, ML3, 4, 5 or conveyor.
YWU3c	YWU3, 4, 5 with special conveyor.
YWU3d	YWU3, 4, 5 with huge table.
YWU4a	YWU4, 5 with ML6, 7 and low friction.
YWU4b	YWU4, 5 with ML6, 7 and high friction.
YM0	Empty Y-unit for CAN network (Intended for Conveyor).
YM1	Y-unit for ML3 for CAN.

Conveyor Systems

The main function of the Conveyor System is to transport the mounted PCB to the next stop, usually an external conveyor.

There are mainly two types of conveyor systems:

Internal Conveyor System

Uses an internal conveyor on the Y module to transport the PCB.

External Conveyor System

This system consists of external conveyors, board loaders and unloaders that are used to transport the mounted PCB to other stages in the production chain.

Examples of External conveyors are:

- Buffer conveyor BC2 1200.
- Buffer conveyor BC2 1500.
- Transport conveyor TC2 1200.
- Transport conveyor TC2 1500.
- Transport conveyor TC2 2000.

There are also loaders, unloaders and workstations available.

The External Conveyor System is not covered by this chapter.

Conveyor types

The table below shows some of the different Conveyor types.

Conveyor	Description
Conveyor 400PT	Internal Y module conveyor for the Pass Through configuration.
Conveyor 500T2	Internal Y module conveyor for the Transversal configuration.
Conveyor T3 through T6	Internal Y module conveyor for the Transversal configuration (controlled by CAN network).

Conveyor System Configurations

There are two different configuration styles for Conveyor systems:

(T) Transversal style

In this configuration the entire line passes along the back of the machine. This allows the front side to be fully accessible to the operator.

Figure 12-3. Transversal style configuration.

(PT) Pass through

The pass through system has the advantage of using shorter conveyors, which keeps the overall length down. There is a choice of having the line passing through the center or at either end of the machine.

Figure 12-4. MY 9 with 400PT conveyor.

Hoods

To protect operators from moving parts of the machine, the Y wagon and Conveyor system are covered by hoods.The hoods are equipped with safety switches that stop the machine, when opened during operation.

To prevent failures in the board handling the hood kit is also equipped with Board Jam Sensors.

Measure Friction Of Y Wagon

This procedure describes how to measure friction on the CAN-System controlled YM Y wagon. The maximum and minimum position values for the Y wagon will be needed to be able to perform this measurement.

Procedure

1. Start the *Service Program* by selecting *Exit* > *Exit To Service* in the TPSys menu.
2. Select *Motor* > *Y motor* > *Read range.*
3. Make a note of the position values that are shown in the information box.
4. Select *Motor* > *Y motor* > *Measure friction.*
5. Enter the speed value 100 mm/s in the dialog box.
6. Select the field *Measure friction* and press <Enter> to start the measurement.
7. When the measurement is done, select the field *View result* and press <Enter>.
8. Repeat the procedure above, using the following speed values 200, 400 and 600 mm/s.

Measure Friction On T3 – T6 Board Handling Systems

This procedure describes how to measure friction on a CAN-System controlled conveyor.

Procedure

1. Start the *Service Program* by selecting *Exit* > *Exit To Service* in the TPSys menu.
2. Select *Conveyor* > *Width motor* > *Measure friction.*
3. Enter the speed value 10 mm/s in the dialog box.
4. Select the field *Measure friction* in the dialog box and press <Enter> to start the measurement.
5. When the measurement is done, select the field *View result* and press <Enter>.
6. Repeat the procedure above, for the *Transport motor* and the *Hold motor* using the following speed values:
   - *Transport motor*: 40 mNm.
   - *Hold motor*: 1 N.

Adjusting Y wagon Reject Bins

It is possible to have up to eight reject bins. Usually they are placed in the frames of the machine. If the frames host cameras or a glue station there is no room left for reject bins. It is therefore possible to have reject bins on the Y wagon.

Procedure

1. Select *Utility* > *Installation and Calibration* > *Locate Reject Bins.*
2. When prompted select the bin you want to adjust.
   - Bins 1-4, which are of frame type, are installed in autoInstall.
   - Bins 5-8 are by default set to 'Not used'. This can be changed in parameter group *32 Reject positions*.
3. When prompted use the joystick to point the Z-head at the desired bin location.

Adjust Board Jam Sensor

Note that this section only applies to some versions of the T3-T6 Board Handing System. Other versions (the ones with Prima Y amplifier) have the control of the Board Jam Sensors integrated into the YMB electronic board.

Board Jam Sensors are used in the T configurations of the machine. The Board Jam Sensors are placed on the Side Covers below the feeder conveyors. Two of the Board Jam Sensors are positioned at the front end of the support beams and two at rear end.

Perform this adjustment once a month.

Procedure

1. Before adjusting the Board Jam Sensor verify the following Main Unit settings: (Depending on version, the Main Unit is either located inside the Y module's electronics cabinet, or panel mounted in the Y module's electronics cabinet).
   - Output Selector switch set to D.ON (dark on).
   - Power Mode set to "SUPER".
   - Output Timer mode set to "OFF".
2. Make sure there is nothing blocking the Board Jam Sensor light beam.
3. On the Main Unit display, check that the value is above 500.
4. Adjust the Board Jam Sensors by loosening the two screws (‘A’ in Figure 12-5) holding the Board Jam Sensor to the sensor bracket.
5. Slightly turn the Board Jam Sensor (See Figure 12-5) and monitor the display on the Main Unit. The value on the display should be as high as possible.

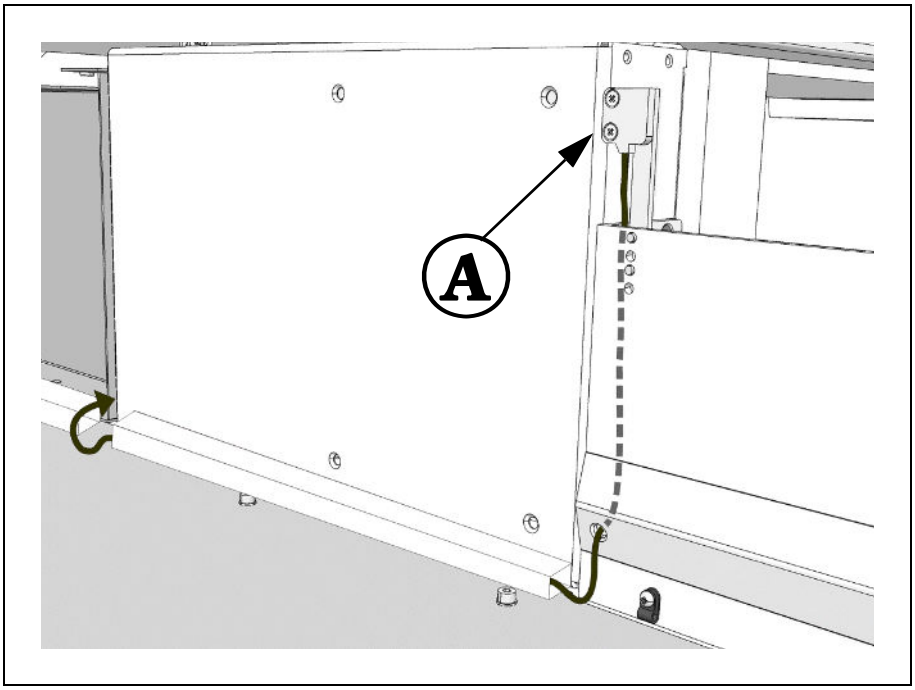


Figure 12-5. Adjust Board Jam Sensor.

6. When satisfied with the received value, refasten the Board Jam Sensor screws.

CAUTION! Be careful, not to use too much force when tightening the screws or the Board Jam Sensor may be damaged.

7. With no PCB in place, press the button marked "SET" on the Main Unit.

   The orange LED on the Main Unit lights up.

8. Place a 0.6 mm PCB on the Conveyor to cut out the light beam, and press the "SET" button again and release it.

9. Repeat the procedure above, on the other Main Unit.

13. Component Feeding Systems

This chapter contains descriptions, calibration and adjustment information for the various component handling systems. The chapter is divided into the following sections:

TEX Tray Exchanger is described in a separate manual entitled *TEX Tray Exchanger, Service Manual*. This manual shall be inserted in this chapter, if a TEX is used.

WARNING! In this chapter, some of the procedures cause the machine to make movements. The below warning must be followed for such procedures. Procedures that cause the machine to make movements are marked with this sign next to the text. Before entering such commands, check the following: Ensure that there are no foreign objects on the assembly table, near the tool bank, or within the X wagon, Y wagon, or Tray Wagon Magazine moving areas, and that the standard tool head and the HYDRA tools are in their upper positions.

Tape Magazines

To get the full flexibility of the tape magazine system, the machine must be calibrated accurately using a reference magazine.

When the machine is calibrated, all the tape magazines (except Agilis LM8 and LM1216) need a pick line adjustment. For more information about a specific tape magazine refer to the following sections and pages.

- *Agilis Magazine (AM8)* on page 13-9.
- *TM – Tape Magazines* on page 13-18.

Adjusting Magazine Slots

The magazine slot´s Y direction is adjusted mechanically. This adjustment must be performed if the magazine slot´s adjustment screw has been loosened.

Prerequisites

- Shims in different thicknesses.
- A set of Allen keys (mm).
- A reference magazine is required to adjust and calibrate the magazine slots properly.

Procedure

1. Insert, until stop, the reference magazine in position 1.
2. Select *Utility* > *Installation and Calibration* > *Locate Slot Position.*
3. Select a magazine position from the shown selection box.
4. Check the slot's Y direction on the monitor against the reference magazine's center mark in both X and Y.

   Use the trackball or joystick to move the camera along the pick position line. The cross hairs should be centered on the line.
5. If the centermark is off in the Y direction, adjust the slot position. Start by unscrewing the stop screw, see Figure 13-1.

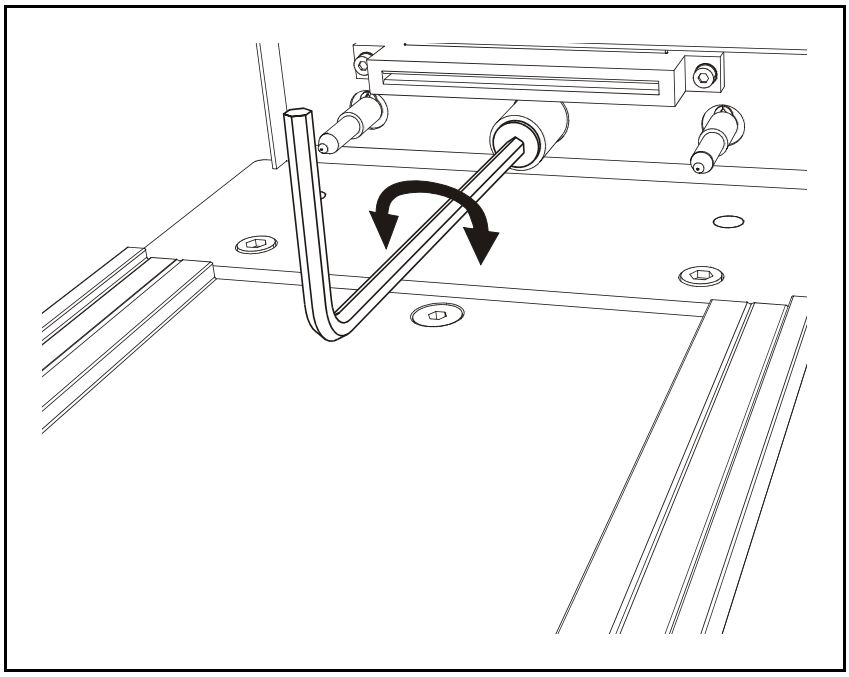


Figure 13-1. Unscrew the Stop Screw.

6. Add or remove shims as necessary, see Figure 13-2. Shims are available in different thicknesses. Use the cross hair scaling to determine how much off-center the mark is in the Y direction.

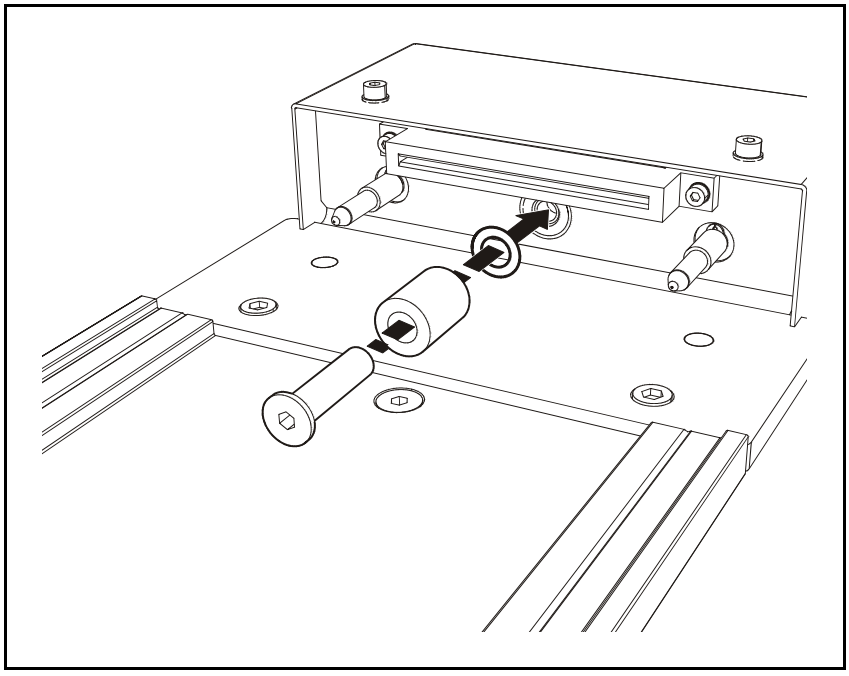


Figure 13-2. Add or remove shims for correct alignment.

7. Check that the Y position of the centermark aligns with the cross-hair.

8. Center the cross-hairs on the Magazine center mark in the X direction. Confirm by selecting *Ready* in the *Locate position* dialog box.

9. Repeat the procedure for all the magazine positions.

Test Magazine

This option tests major functions of the selected magazine.

Procedure

1. Select *Exit* > *Exit To Service.*
2. Select *Magazine* > *Test.*
3. Select the desired magazine by entering the magazine position in the *Select slot* dialog box:

   A continuously updated test result for the selected magazine is shown.

Function	Setting	Description
Test result	Passed	A communication test completed successfully.
	Off	The test was not successfully completed.
Button	No	The release button on the magazine is released.
	Yes	The release button on the magazine is pressed in.
Lamps	Off	Both of the LEDs are temporarily off, or the LED test was not successfully completed.
	Yellow	The Yellow LED only is temporarily lit.
	Green flash	The Green flash LED only is temporarily lit.
	Yellow flash	Yellow flash of the LEDs are temporarily lit.

The *Button* and *Lamps* status shall reflect the visible states of these functions on the magazine.

Polling Magazines

Polls those magazines which are inserted in the machine.

Procedure

1. Select *Exit* > *Exit To Service.*
2. Select *Magazine* > *Poll.*
3. The polling result is displayed on the monitor.

If the text in the Buttoned out column is *No* the magazine is in operation (the green LED on the magazine is lit with a steady light). If the text is *Yes* the system does not pick from the magazine (the green LED is either flashing or off). If it is neither of these but '---' the magazine type has no release button.

Agilis Linear Magazine (ALM8 and ALM1216)

From version 2.6 TPSys supports Agilis Linear Magazine 8 (for 8 mm tape) and Agilis Linear Magazine 1216 (for 12 and 16 mm tape).

The main features of these magazines are feeding speed, feeding accuracy and flexible feeding stroke. The magazine can feed tape in variable length. This makes it possible for the software to adjust the pick position for a feeder not only in the X direction but also in the Y direction.

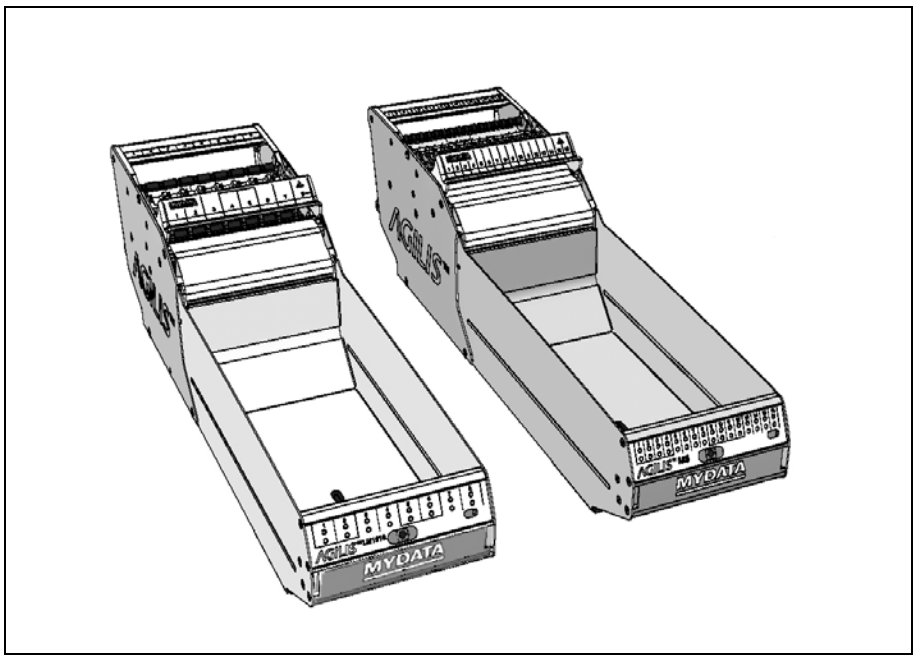


Figure 13-3. Agilis Linear Magazine ALM1216 and ALM8.

The Agilis Linear Magazines 8mm, ALM8, use the same feeders as Agilis Magazine M8, see *Agilis Magazine (AM8)* on page 13-9.

The Agilis Linear Magazines 1216mm, ALM1216, use 12 and 16 mm feeders. They are similar to the 8 mm feeders but can handle larger components.

Instead of the cogwheels that feed the tape in the AM8 magazine, the ALM magazines have a linear slide that moves back and forth (see Figure 13-4). The slide is equipped with pins that move up and down. This construction makes it possible to feed tape with steps of arbitrary length.

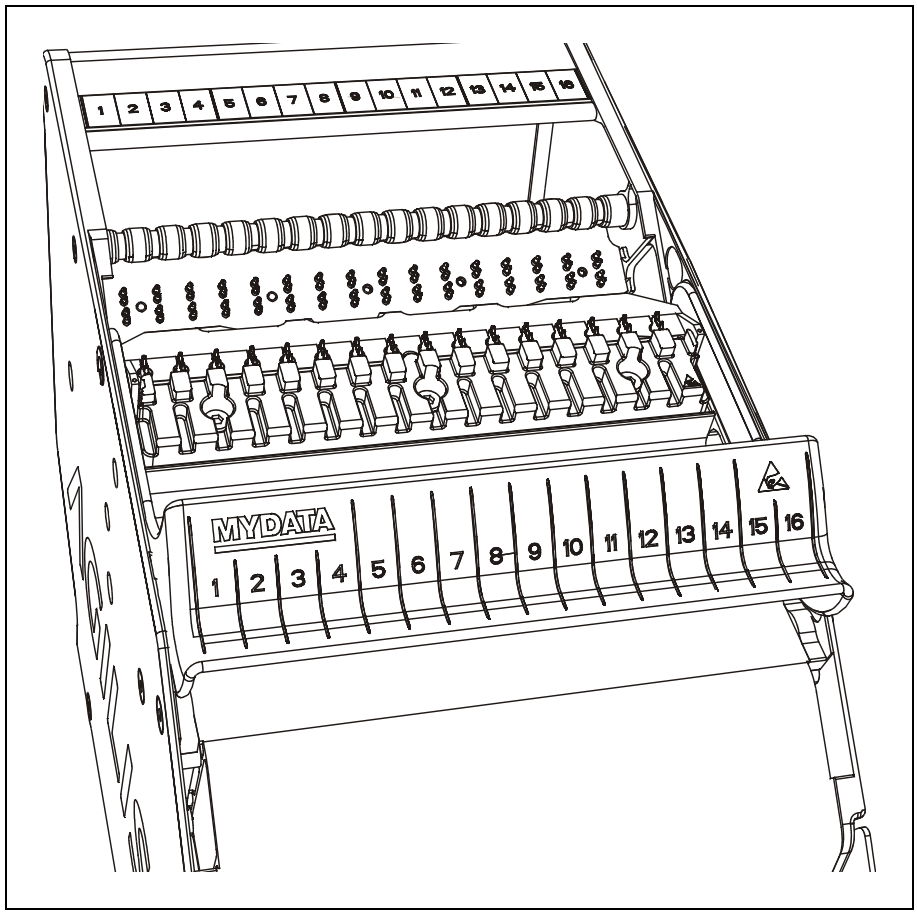


Figure 13-4. Agilis Linear Magazine – ALM8.

The ALMs have two fiducial marks, one on each side of the wagon. They are circular, 1 mm diameter, black on white. Both fiducial marks are searched when the magazine is located. All previous types of magazines only have one fiducial mark (1 mm wide, 10 mm long) on the left side.

Pick Line Adjustment

As mentioned above, Agilis Linear Magazines have the ability to step feeders with an arbitrary step length. This makes it possible for the software to adjust the pick position in both in X and Y direction. Mechanical adjustments to the magazine are no longer required.

See the *Operator´s Manual* for instructions on how to adjust the pick line.

Information Panel

The Agilis Linear Magazine has the same information panel as Agilis M8.

Polling Removable Feeders

Agilis Linear Magazines use the same feeders as Agilis M8. Therefore polling of the feeders are done in the same way. Please see *Polling Removable Feeders* on page 13-11

Agilis Magazine (AM8)

The Agilis M8 Magazine is a tape magazine for 8 mm tape. Removable feeders are used to bring the components to the placement head. These feeders make reloading of components fast and easy. You can run any combination of normal and fine pitch component tapes in an Agilis M8 Magazine.

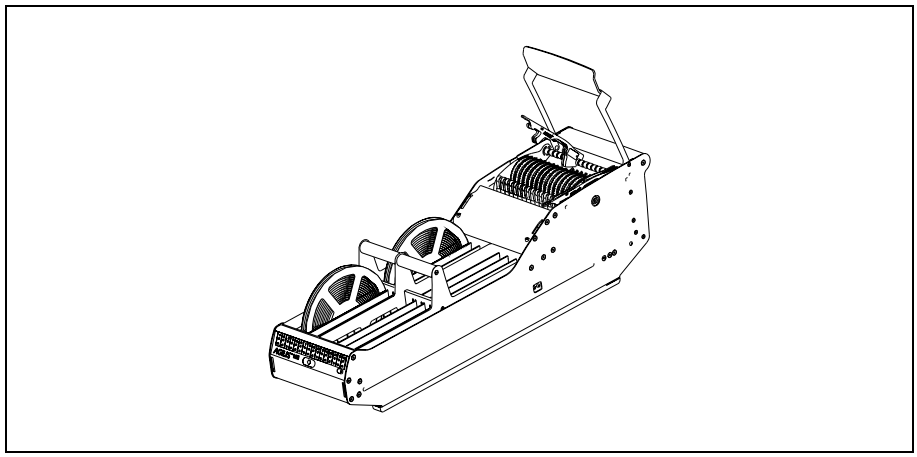


Figure 13-5. Agilis M8 magazine.

The removable feeder is an intelligent unit in which you load the component tape before inserting it into the magazine. Feeders can easily be moved from one feeder position to another.

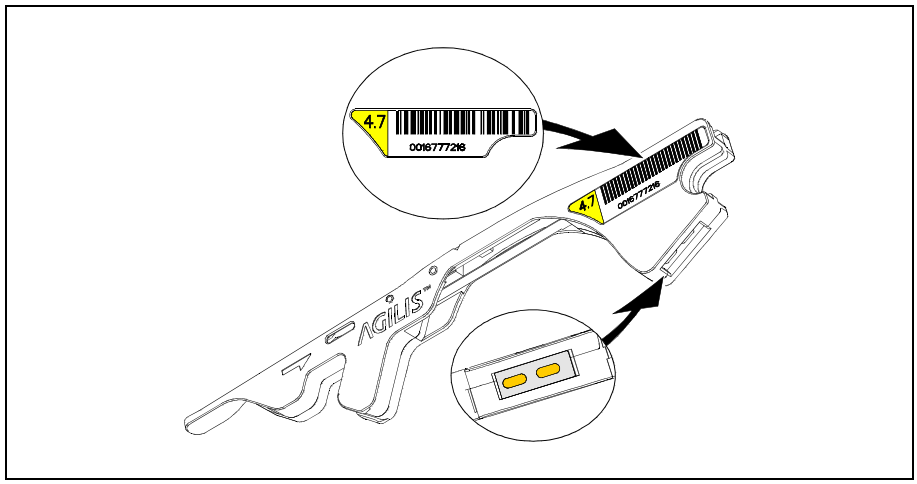


Figure 13-6. Removable Feeder.

The feeder has a barcode and a unique ID number, which is also stored in its electronic part.

Release button and status LEDs

The Agilis magazine has an info panel with green and yellow LEDs showing the status for each feeder. The panel also has a release button from which you can order the machine not to pick components from the magazine. Finally there is a LED indicating the magazine status.

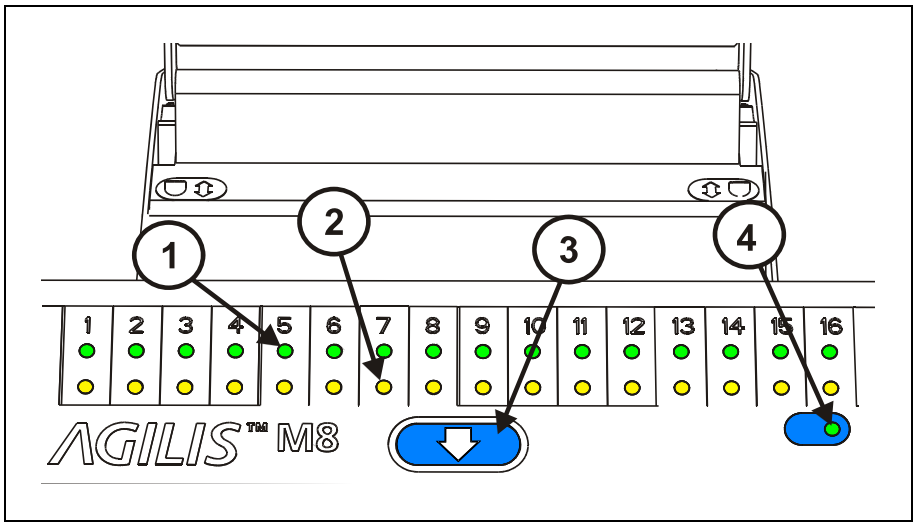


Figure 13-7. Information panel.

Green and Yellow LEDs (1, 2)

The LEDs on the information panel indicate that the magazine has contact with the machine. There is one green and one yellow LED for each feeder position. If a feeder is loaded, the green LED is on at this position. If there is no feeder in a feeder position no LED is on.

If the component reel is running out of components, the green LED for that feeder position will blink. If the machine is unable to use the feeder, the yellow LED comes on.

Release button and Indication LED (3, 4)

Press the release button (’3’ in Figure 13-7) on the panel. This tells the machine not to pick components from the magazine.

This button resets magazine errors for the magazine, i.e. equivalent to removing or inserting the magazine.

The green indication LED in the bottom right corner (’4’ in Figure 13-7) is on when the magazine is inserted in the machine. It starts blinking when you press the release button and is off when the magazine is ready to be pulled out.

Make sure the green LED in the bottom right corner and the green LEDs for loaded feeder positions are on before starting assembly.

Always wait until the green indication LED in the bottom right corner is off. Removing the magazine from the machine while the green LED is on can damage the placement head.

Polling Removable Feeders

Polls magazines that are equipped with removable feeders.

Procedure

1. Start the *Service Program* by selecting *Exit* > *Exit To Service.*
2. Select *Magazine* > *Poll removable feeders.*
3. Select the desired magazine by entering the magazine position in the *Select slot* dialog box. The polling result is displayed on the monitor as follows:

Poll removable feeders

Feeder	Serial number ((dec))	((hex))
1	16779431	0x10008a
2	16779833	0x1000a3
3	3	0x3
4	16780099	0x1000b4
5	3	0x3
6	3	0x3
7	3	0x3
8	3	0x3
9	3	0x3
10	3	0x3
11	3	0x3
12	3	0x3
13	3	0x3
14	3	0x3
15	3	0x3
16	3	0x3

The serial numbers are presented both by decimal and by hexadecimal notation in the information box.

If the decimal serial number is ’3’, it means that the system has found no Agilis feeders in that position. Apart from the obvious reason of no feeder installed, it can be caused by:

– Poor contact between the Agilis feeder and the Magazine.

– Faulty Agilis feeder ID circuit board.

Agilis M8 Pick Line Adjustment

The pick line in Agilis M8 is adjustable in Y direction mechanically and in X direction through TPSys, see *Operator's Manual.*

To adjust the pick line Y direction, use the two Allen screws positioned on top of the magazine near the feeders, see Figure 13-8. You can do the adjustment with the magazine inserted in the machine and instantly see the result on the screen.

We recommend you to adjust feeder position 1 first and then position 16. Use a 3 mm Allen key.

Use the step feeder function, key <F4>, to assure that the component is in pick position before you make the adjustment.

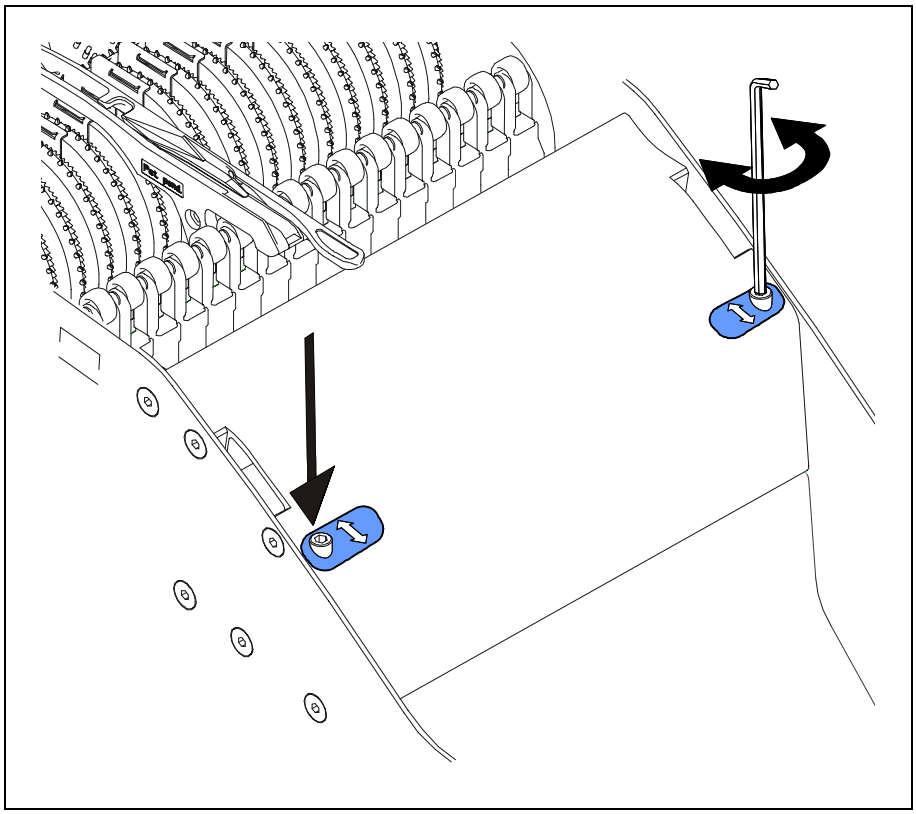


Figure 13-8. Adjusting Pick line Y direction.

Troubleshooting

This section describes how to locate errors that may occur and suggestions on how to solve the problems.

The troubleshooting chapter is divided as follows:

Start in the first localization section. You will then be guided to the appropriate part of the other sections.

Locating Errors

The following table helps you to find out if an error is located in the Agilis magazine or in the base machine.

An error has occurred	
Is the Magazine correctly inserted?	**No** – Insert properly. **Yes** – Do the test below.
Does the magazine work in other magazine positions?	**Yes** – Most likely the magazine position does not work properly. Go to the *Machine Errors* section. **No** – Do the test below.
Do other Magazines work in the magazine position?	**No** – Most likely the magazine position does not work properly. Go to the *Machine Errors* section. **Yes** – Most likely the error is located in the Agilis M8 Magazine. Go to the *Magazine Errors* section.

Magazine Errors

This section contains errors located in the Agilis magazine and suggestions on how to solve the problems.

LED Indicated Error

This table contains errors indicated by the LEDs on the rear handle and how to solve these problems.

Symptom	Action
None of the LEDSs are lit.	Check if the control board cables are connected? **If No** – Connect the Magazine board cables through the main opening underneath the Magazine. **If Yes** – Replace the control board. *If control board is replaced but LEDs not lit* – Replace the rear handle. *Note*! If it is a faulty rear handle unit, put the old control board back since it is probably intact and has the original serial number.
The LEDs are not lit according to the loaded feeders position and TPSys do not detect the magazine.	Replace the control board. *If replacing control board does not solve the problem* – Replace the handle unit. *Note*! If it is a faulty rear handle unit, put the old control board back since it is probably intact and has the original serial number.
Yellow LEDs are lit but only for a short while.	Try feeders that you know work in other Magazines. *If other feeders does not solve the problem* – Replace the control board. *If replacing control board does not solve the problem* – Replace the interconnection board. *Note*! If it is a faulty interconnection board, put the old control board back since it is probably intact and has the original serial number.
A feeder is not detected in a single feeder position.	Check if the feeder work in other magazines. – If not replace the feeder. *If the feeder work in other magazines* – Check the condition of the interconnection board connectors (there are double connectors for each of the two contact areas). *If no fault with interconnection connectors* – Change the interconnection board.

Pick Error

This section contains component pick errors and how to solve the problems.

Check		Action
Out of components?	Yes	Load a new component reel.
	No	See below.
Is the pick line adjusted?	No	Adjust the pick line according to the *Operator´s Manual*.
	Yes	See below.
Is the tape transport free from interference?	No	Make sure the tape can run smoothly from the reel to the feeder.
	Yes	See below.
Is the feeder properly inserted in the Magazine?	No	Make sure the feeder wheel spikes are positioned in the component tape feeding holes.
	Yes	See below.
Is the feeder properly loaded?	No	Reload the feeder according to the Operator´s Manual.
	Yes	See below.
Are the feeder wheels running?	No	See the *Feed Error* section.
	Yes	See below.
Are the feeder wheels running evenly and smoothly?	No	Assure the free movement of the wheels by adjusting the nut on the feeder wheel unit.
	Yes	See below.
Are the feeder wheels intact?	No	Replace the feeder wheel unit.
	Yes	Make sure there are no components or other things stuck between the feeder wheel cogs.

Feed Error

This section contains feed errors and how to solve the problems.

Check		Action
Do you hear the motor running for about a second?	No	Replace the motor unit. If this does not solve the problem – replace the control board.
	Yes	See below.
Do you hear clicking sound from the solenoids?	No	Make sure the connectors to the solenoids are properly connected (20-pole flat cable). Check both the connectors at the control board and at the solenoid unit. If the cable is loose, reconnect it. If this does not solve the problem – replace the control board. If this does not solve the problem – replace the solenoid unit. Note! If it is a faulty interconnection board, put the old control board back since it is probably intact and has the original serial number.
	Yes	See below.
		Make sure there are no components or other things stuck between the feeder wheel cogs.

Machine Errors

This section contains errors indicated by the LEDs on the rear handle, located in the machine and suggestions on how to solve the problems.

Symptoms	Action
The LEDs are not lit the way they are supposed to.	Check if *any* LEDs are lit. Make sure there are no components or other things stuck in the Magazine slot connectors – check all the slots. Check the M25V+ fuse on the BM3CB board in the computer box – replace if blown.
LEDs are lit but TPSys does not detect any Magazine.	Replace the 74HC/LS244 socketed circuit on the MI board in the computer box (Always use HC-circuits when replacing). If replacing this circuit does not solve the problem – Check the XMIF cable between the computer box and the Magazines.
LEDs are lit and TPSys does detect the Magazine	Make sure there are no components or other things stuck in the Magazine slot connectors – check all the slots. If the action above does not solve the problem – Change the driver circuits on the MI board (ULN2003, L603 or L702). If the action above does not solve the problem – Replace the MI board and/or the MOT-M or the MCU.

TM – Tape Magazines

The TM tape Magazines can handle all tape materials – paper, plastic and aluminium. They do not have removable feeders like the Agilis range of Magazines.

TM magazines are available for a range of tape widths – 8 mm – 56 mm. There is also a TMFlex Magazine available which have removable feeders with internal tape feeding.

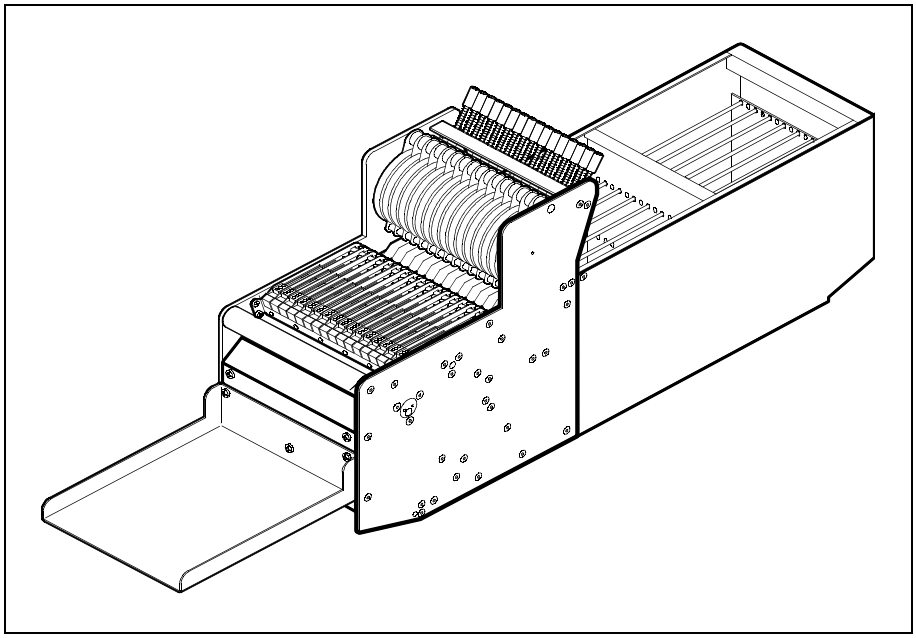


Figure 13-9. TM8 tape magazine.

Functional Test

Release Button and Status LEDs:

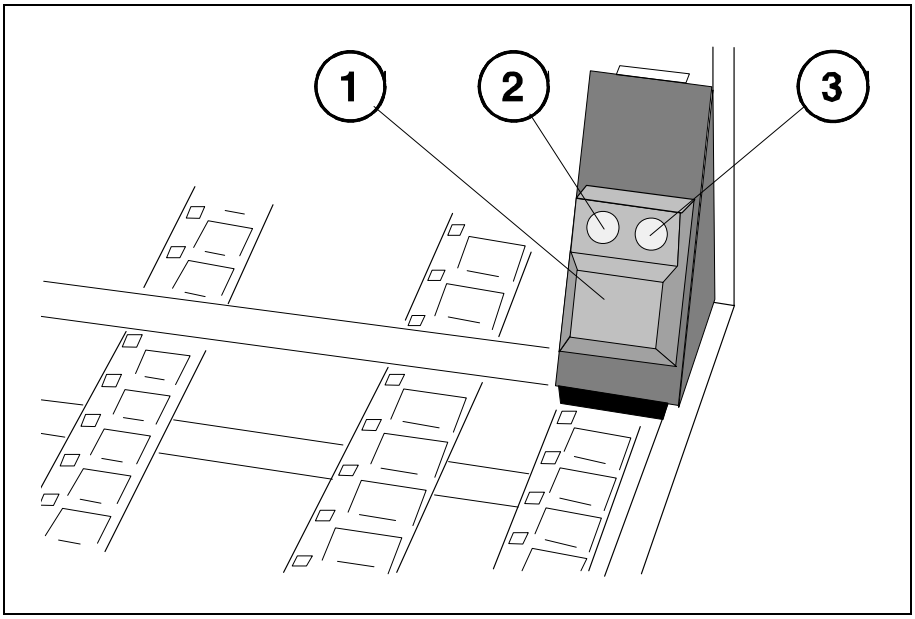


Figure 13-10. Release button and status LEDs.

All TM Magazines are equipped with a release button (’1’ in Figure 13-10) which has a green LED (2) and a yellow LED (3).

Release button (1)

Press this button and wait until the green LED is off before removing the magazine from the machine.

This button resets magazine errors for the magazine, i.e. equivalent to removing or inserting the magazine.

Green LED (2)

Steady light	The magazine is recognized by the system and will be used.
Flashing	The release button has been pressed.
Off	The system does not use the magazine.

Yellow LED (3)

Steady light	At least one feeder is empty or a pick error has occurred.
Off	In operation.

Adjusting Pick-Up Position

TM8 magazine pick positions are adjusted by turning an eccentric disk on each side of the magazine as follows:

1. Insert the magazine and, select *Magazine* > *Locate Feeder Positions*.
2. Select feeder *1* and center the cross hairs on the component.
3. Make a few component advancements by choosing the *Step feeder* option in the upper left menu and check the Y-wise deviation.
4. Adjust feeder *1* by loosening three screws, see Figure 13-11. Turn the eccentric disc with two holes as shown in the figure.
   – Remove the magazine if inserted near the machine frame. Otherwise, it can be adjusted without being moved. If the eccentric disk is turned *counter-clockwise*, the pick-up position is moved forwards, see the figure 13-11.

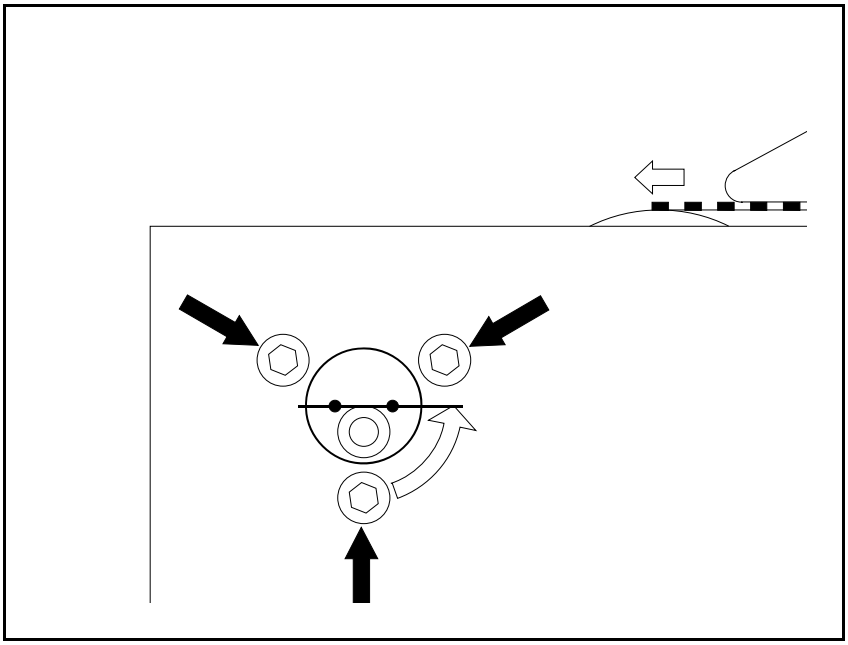


Figure 13-11. Magazine pick-up position, first feeder.

5. When the first feeder is adjusted, repeat step *2* to *4* on the last feeder in the magazine.

   If the eccentric disk is turned *clockwise*, the pick-up position is moved forwards (see Figure 13-12).

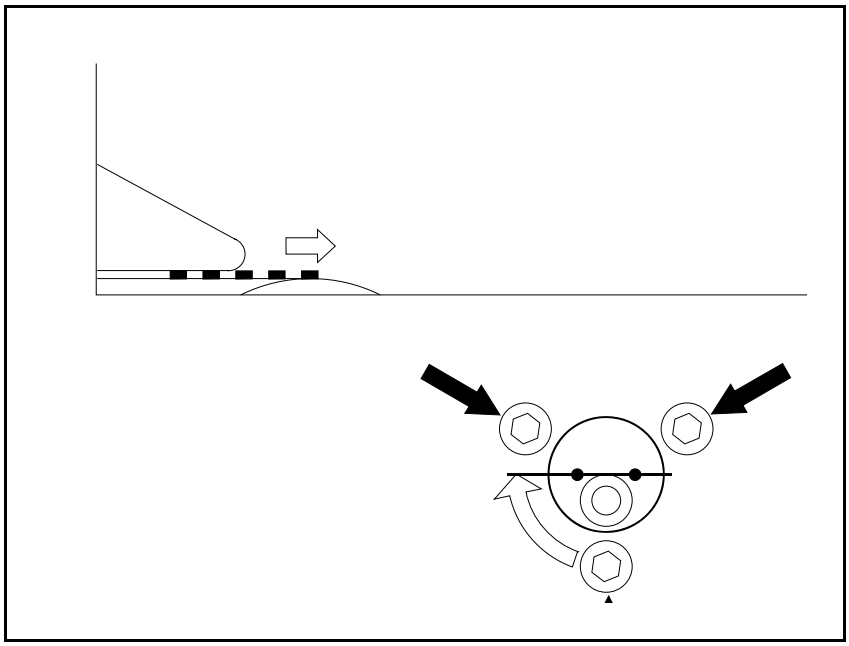


Figure 13-12. Magazine pick-up position, last feeder.

6. Return to feeder *1* and check the pick position again. Adjustments made on one side may affect the other side somewhat.
7. When both outermost feeders are properly adjusted, make sure the three screws are re-tightened properly on both sides.

The axle shaft points downwards when the magazine is set to default eccentric disk position (see Figure 13-13).

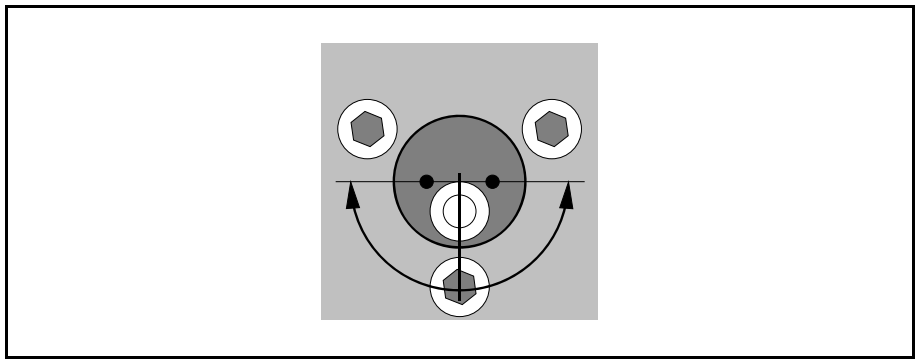


Figure 13-13. Default eccentric disk position.

From this position the adjustment range is 90 degrees forwards or reverse.

CAUTION! The belt tension is affected by this adjustment. If the eccentric discs are turned more than 10° the belt tension should be readjusted.

Adjusting Feeder Arm Gap

Procedure

1. Slightly tighten both the countersunk screws at the solenoid bar (one at each side of the magazine).

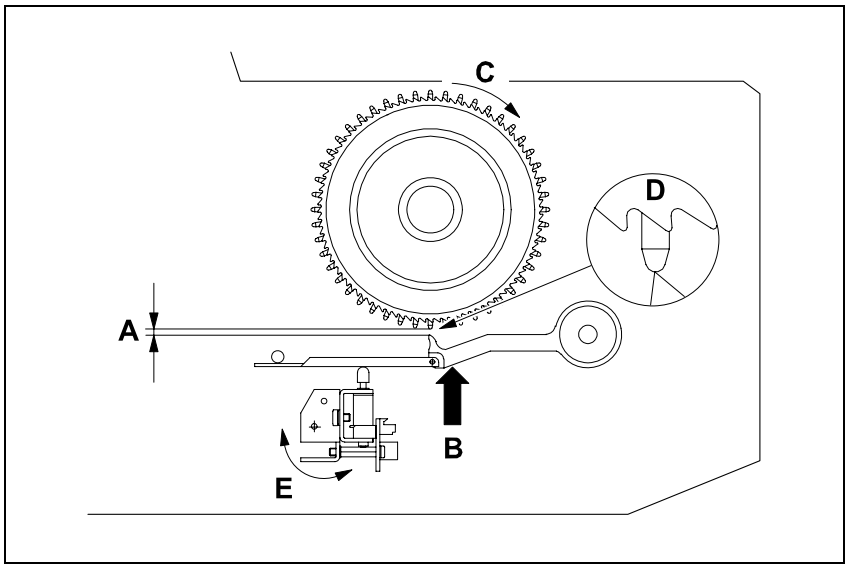


Figure 13-14. Feeder arm gap.

2. Adjust the gap between the feeder wheels and the feeder arm tips ('A' in Figure 13-14) by turning the solenoid bar.

   The gap should be 0.5 mm - 1.0 mm. Set the gap as follows:

   – Lift the outermost feeder arm (B) by hand as much as the tip touches the feeder wheel.

   – Turn the feeder wheel (C) while the feeder arm is lifted.

   – Stop turning the feeder wheel when the top point of a tooth passes (D).

   – Compare the lifted feeder arm position to the released position and estimate the gap.

   – Turn the solenoid bar (E) until the gap is 0.5 mm - 1.0 mm.

   – Slightly tighten the adjusting screw (protruding head) at the solenoid bar.

   – Repeat the procedure for the outermost feeder arm on the opposite side.

3. Turn all the feeder wheels. The feeder arm tips must not touch the wheels. Readjust if necessary.

4. Tighten the four solenoid bar screws.

5. Check the gap again. Readjust if necessary.

Setting Code Disc Synchronization

The code disc synchronization can be set either by using a pulse counter device or without using this device. The following describes setting the synchronization without a pulse counter device.

Procedure

1. Loosen the stop screw on the single hole code disc.

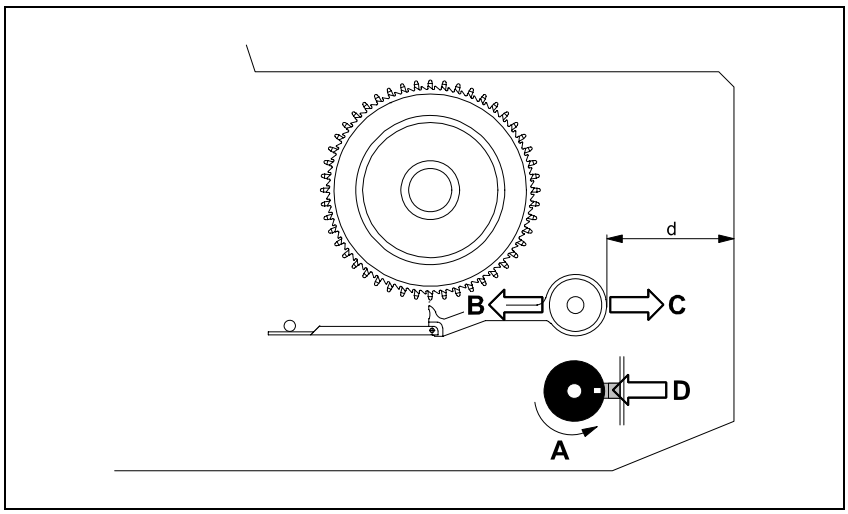


Figure 13-15. Setting the code disc.

2. Turn the multi-hole code disc by hand ('A' in Figure 13-15) until the eccentric shaft with the feeder arms are as far from the magazine front as possible (B), i.e. when the 'd' distance is maximum.
3. Measure the 'd' distance and note it down as 'd1.'
4. Continue turning the multi-hole code disc by hand until the eccentric shaft with the feeder arms are as close to the magazine front as possible (C), i.e. when the 'd' distance is minimum. 1.5
5. Measure the 'd' distance and note it down as 'd2.'
6. Calculate 'd3' as follows:

$$d3 = \frac{d1 + d2}{2} + 1.5$$

7. Again, turn the multi-hole code disc until the 'd' distance equals the calculated 'd3' distance.
8. Without turning the multi-hole code disc, turn the single hole code disc until the hole is in the optical sensor read off position (D).
9. Without turning the code discs, position the single hole code disc in the middle of the optical sensor gap, and tighten the stop screw.
10. Check the setting by turning the single hole disc until the hole is in the optical sensor read off position and measure the 'd' distance. It shall correspond to the calculated 'd3' distance. If not, readjust the setting.

Measuring Feeder Wheel Friction

This procedure is for the TM8 – TM56 Magazines, but not for the TMFlex Magazines.

Prerequisites

- Piece of component tape.
- Dynamometer

Procedure

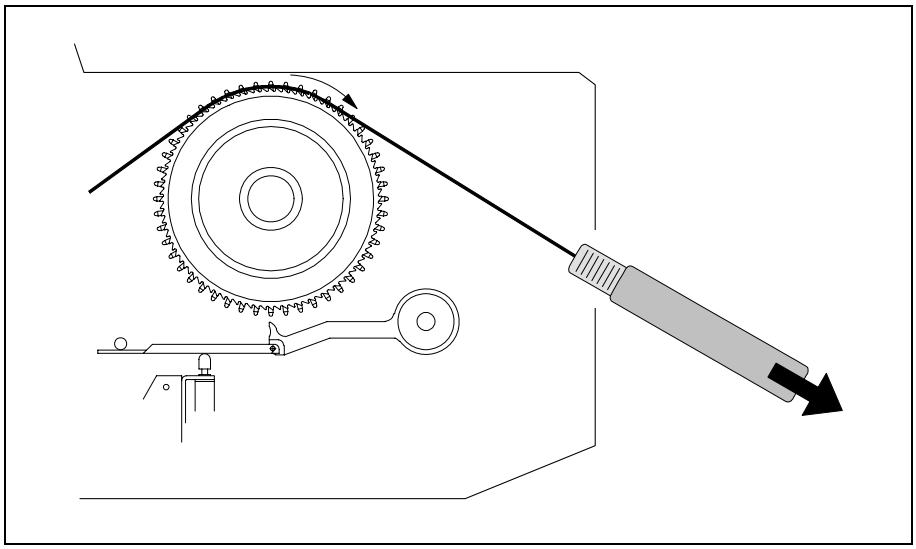


Figure 13-16. Feeder wheel friction measurement.

1. Measure the feeder wheel friction by putting a piece of component tape on the feeder wheels and pull the tape using a dynamometer (see Figure 13-16). The force required to rotate each wheel shall be 1 - 5N.
2. If necessary, adjust by turning the nut (A in Figure 13-17) clockwise to increase the friction, counter-clockwise to decrease it.

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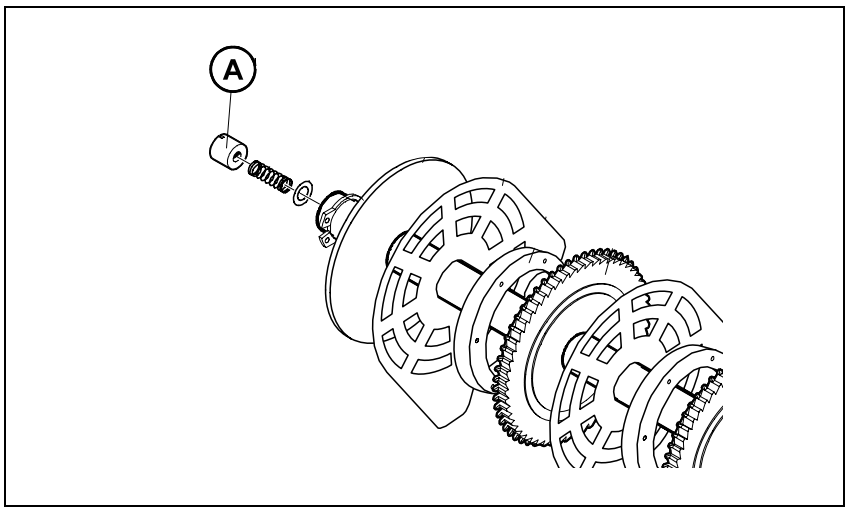


Figure 13-17. Feeder wheel pack end nut

Tray Wagon Magazine

Figure 13-18 below shows the Tray Wagon Magazine inserted in one of the magazine positions of a TP9-UFP machine.

The Tray Wagon Magazine can be used on all the MYDATA placement machines.

The Tray Wagon Magazine has a Y movement of its own.

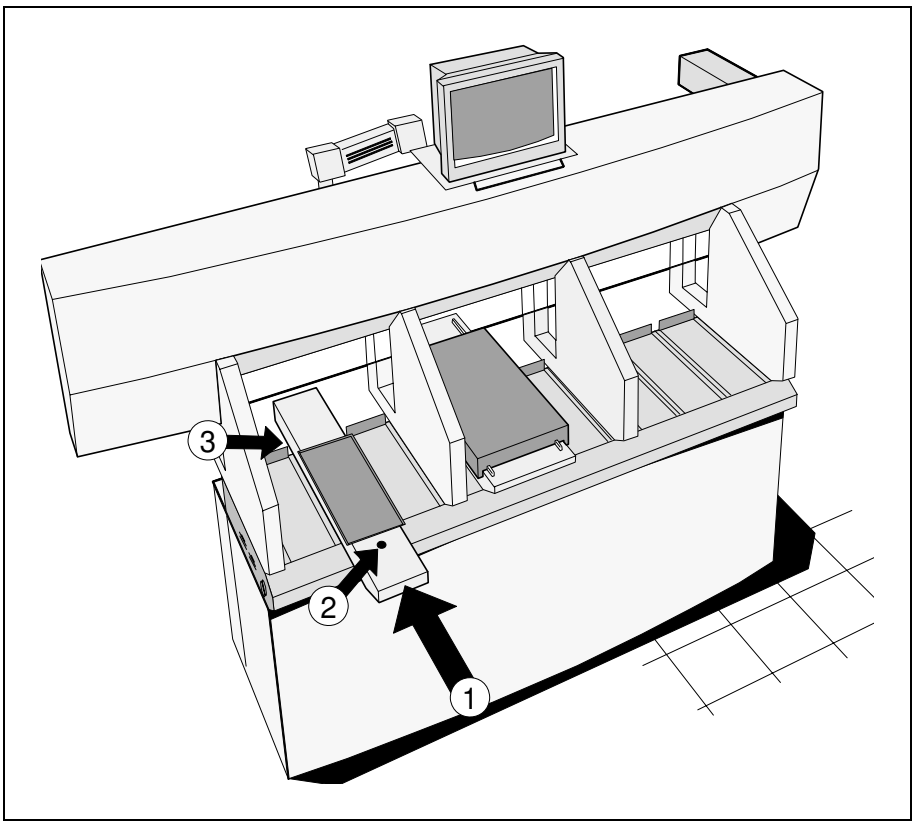


Figure 13-18. Tray Wagon Magazine.

Tray Wagon Magazine Installation

1. Insert the Tray Wagon magazine in a magazine position ('1' in Figure 13-18). Any magazine position can be used for a one-module magazine. Two- and three-module magazines can be used in all magazine positions except for the positions required for the magazine top overhang.
2. Fasten the magazine by tightening the screw (2).
3. Select *Utility* > *Installation and Calibration* > *Tray Wagon Installation/Removal.* The *Connect the tray wagon magazine* dialog box is shown.
4. Connect the magazine cable at the rear of the machine and press <Enter> when done. The TWM cable is connected to the XYM-B connector underneath the Y wagon. If the magazine has been used before, then the connection is made to the cable connector.
5. Press <Enter> to verify *OK to initiate hardware?*
6. Enter the top table width of the magazine from the *Select table width* dialog box (1 – 3 magazine positions):
7. Check and, if incorrect, modify used magazine position number in the shown *Tray wagon position calibration* dialog box.

   For two or three-module magazines, the magazine position furthest to the left should be entered.
8. Calibrate the Tray Wagon Magazine position by centering the following marks on the tray wagon:
   - Lower left mark.
   - Upper right mark.
   - Lower right mark.
9. Restart any off-line terminal.

   The installation extends some of the TPSys menu options. Any off-line terminal that has been active during the installation must be restarted to make the installation take effect in the off-line menu system.

Tray Wagon Magazine Removal

1. Select *Utility* > *Installation and Calibration* > *Tray Wagon Installation/Removal.*
2. The *Remove tray wagon?* dialog box is shown. Reply *Yes* to remove the tray wagon.
3. Press <Enter> when prompted *OK to initiate hardware?*
4. The system will indicate that the tray wagon magazine is uninstalled. Disconnect the TWM cable connector at the rear of the magazine, loosen the fixing screw and remove the magazine.

14. Peripheral Systems

This chapter describes the peripheral systems, which includes the following accessories:

Signal Tower

An optional signal tower that has red, yellow, green and white light in addition to a buzzer can be used to indicate the operational status of the machine.

The combination of light and buzzer signals for various machine states can be configured to match individual needs, which is described in the following sections.

The unit is connected as follows:

- CP4 board to an 8 pin Din connector labeled Warning lamp.
- CP5 board to a 15 pin D-sub connector behind the connector panel at the rear of the machine.

The machine can be pre-wired with a 15 pin D-sub connector in one of the cable racks. The connector carries +25V, GND and a number of control signals.

Signal connection:

Bit 0 = Red lamp

Bit 1 = Yellow lamp

Bit 2 = Green lamp

Bit 3 = Not connected

Bit 4 = White lamp (fixed at GND on most CP4 boards).

Bit 5 = Not connected

Bit 6 = Buzzer

Bit 7 = Not connected

Machine States

The machine can be in seven different states, which are defined in the below default settings table. Each state can be indicated with the signal tower with a combination of lit lamps and activated buzzer. The lamps can have steady light or be blinking and the buzzer sound can be intermittent or continuous.

The combination of lit lamps, blinking lamps and buzzer sound for the various machine states is configured in a parameter file.

Default Settings

The settings shown in the following table is the default settings for delivered machines.

The desired combinations of lamp and buzzer signals for each machine state are set in the parameters. See the Software Manual for information on how to change these parameters.

Default signal	Machine state	Description
Green steady light	Running	Normal mounting or gluing operation.
	Waiting	The machine is running but it waits for loading or unloading the board.
Green steady light + yellow blinking + intermittent buzzer	Poor performance	The machine is running but components cannot be picked from at least one magazine feeder which may be out of components. The same component type is however available in another magazine feeder.
	Stops soon	The machine is running but components cannot be picked from at least one magazine feeder which may be out of components. The layout will not be completely mounted.
Yellow steady light	Idle/stopped	The machine - has not been started yet or - has finished mounting/gluing a layout. or - is stopped by the operator.
Red steady light + buzzer	Operator needed	The machine cannot complete the assembly without help from the operator. Typically caused by lack of components.
	Error	The machine is stopped due to a fatal error or by an emergency stop button(s).

Testing the Signal Tower

Use the procedure below to test the function of the lamps in the Signal Tower.

Procedure

1. If not already running, start the Service Program by selecting *Exit* > *Exit To Service* in the TPSys menu.
2. *Select Utility* > *Warning lamps.*
3. Select which lamp to be altered in the field named *Lamp*.
4. Each lamp can be set in three different states *On*, *Off* or *Blink* by moving the cursor to the desired field and pressing <Enter>.

Printer

A printer is an option with the machine. It is used to print out several kinds of data, for example:

- Component data.
- Package data.
- Magazine and tray data.
- Layout, panel and PCB data.
- Settings and parameters.
- Production data.

This section describes how to prepare the following printer for usage in TPSys:

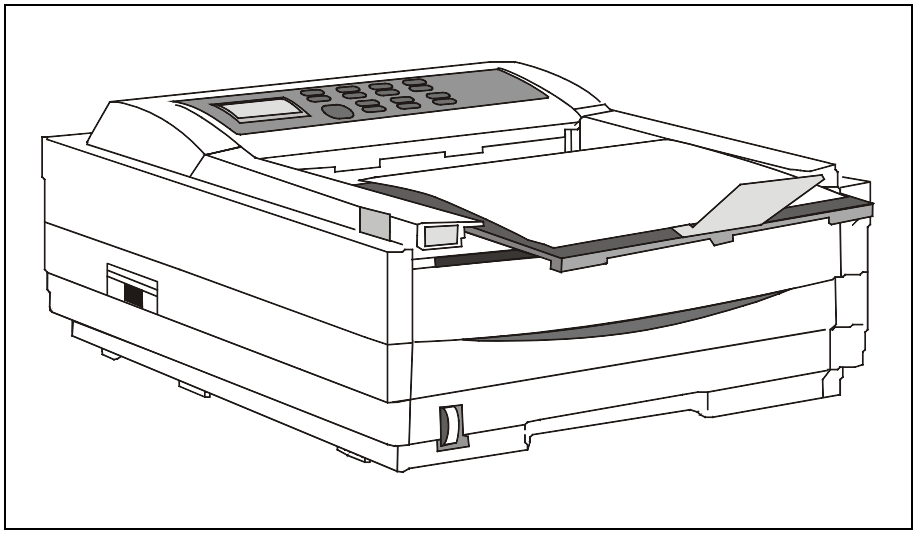


Figure 14-1. Printer.

Installation

The printer is delivered in its original box. With the printer there is a manufacturers manual detailing how some of the steps below are to be performed.

Procedure

1. Unpack the printer and check the contents according to the printer setup guide.
2. Install toner and load paper as per the printer manual.
3. Make sure the power for the MY machine is switched off.
4. Attach the power cord to the printer and the mains power. Plug the power cord into the printer first, then into a grounded outlet.
5. Insert the printer end of the cable firmly into the connector on the back of the printer. Fasten the cable to the printer securely.
6. Connect the other end of the cable to the printer connector on the MY machine backside (see Figure 14-2). Fasten the cable securely.

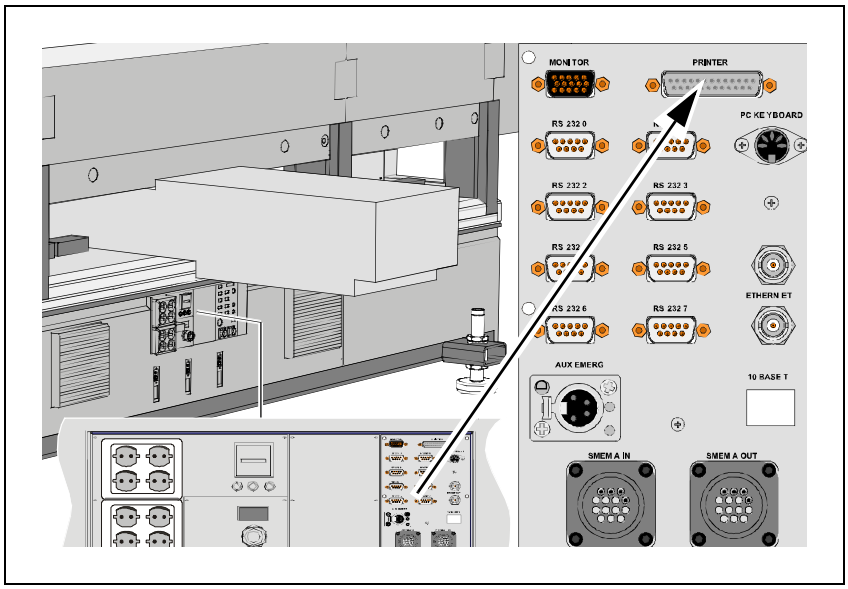


Figure 14-2. Mains input panel.

7. Switch on the MY machine and turn on the printer. It takes about 10 seconds for the printer to initialize, warm up, and display the ON-LINE message, indicating the printer is ready to receive data.
8. Do not start TPSys.
9. Follow the description in the TPSys 2.6 Installation Guide, or software manual, on how to install and configure the printer. For details on operations of the printer, please refer to the printer manual.

It is possible to set printer options using the TPSys web interface. In found in the *Service Tools* menu.

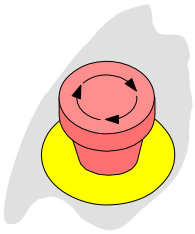
15. Safety System

The safety system comprises the following parts:

- *Emergency Stop Buttons* on page 15-1.
- *Optical Safety System* on page 15-2.
- *Cover and Door Switches* on page 15-2.

This chapter contains a description of these parts. It also contains adjustment and calibration information for the WSR2 boards in the optical safety system. There is also a description of a functional test that displays the status of the emergency stop buttons and the light beams

Emergency Stop Buttons



There are two emergency stop buttons located on the machine frame adjacent to the Y wagon.

The emergency stop buttons are red and they stop all machine movements immediately when pressed down.

The buttons are released by turning the knobs clockwise.

Emergency stop buttons on MYDATA accessories such as Tray Exchanger – TEX, conveyor system, etc. have the same function, that is to switch all motors off and release movable machine elements.

WARNING! An emergency stop button must always be pressed down when hands, fingers, tools or other objects are within a shielded area or in the danger area of movable machine elements such as the X wagon or Tray Wagon Magazine.

Restart

To restart the machine after an emergency button has been released, enter a command on the keyboard.

Optical Safety System

There is an optical safety system that transmits and receives non-visible light beams between the X wagon and the machine ends, along the glass shield. If any of these light beams is blocked, a safety relay stops the X movement immediately.

The X wagon safety relay is included in the safety system.

The optical safety system is built-up by two WSR2 boards on the X wagon and two TST2 boards in the machine ends.

The WSR2 boards have switches that must be set as detailed in the adjustment part of this chapter.

Cover and Door Switches

There are electrical switches at the X-wagon covers and at the Y-wagon cabinet.

If any of the switches at the X-wagon covers is activated, i.e. if a cover is opened, then the X-wagon safety relay stops the X movement immediately.

If the front or rear part of the Y-wagon cabinet is opened, then an Y-motor relay stops the Y movement immediately.

The Conveyor transp. are controlled by the MOT-X board.

Functional Test

This procedure displays the status of the emergency stop buttons and the light beams of the X-wagon optical safety system.

Procedure

1. Start the *Service Program* by selecting *Exit* > *Exit To Service* in the TPSys menu.
2. To be able to see the Conveyor transp. settings, open the *Show/Hide safety switches* information box by selecting: *Motor* > *Show/Hide safety switches.* The *Conveyor transp.* dialog box is shown. The following settings can be made:

Conveyor hold

- *No* – The emergency stop buttons are not pressed. The machine is operable.
- *Yes* – At least one of the emergency stop buttons are pressed down. The machine is not operable.

Light curtain

- *No* – The light beams of the X-wagon optical safety system are not blocked (green LED lit on the optical safety unit). The machine is operable.
- *Yes* – The light beams are blocked (red LED lit). The machine is not operable.

Both the emergency stop buttons have to be pressed down to release the X wagon and make it possible to move it manually.

Adjusting the WSR2 Switches

The optical safety system is built-up of two WSR2 boards on the X wagon and two TST2 boards in the machine ends. The WSR2 boards have switches that must be set as detailed below.

The WSR2 boards have two switches each, S1 and S2. The boards are located leftmost and rightmost on the lower part of the X wagon. The boards are shown in Figure 15-1 and Figure 15-2. In some cases WSR2 switches may be found in a different location as to the ones shown in the figures below. The markings though are always the same.

- The switch setting for the WSR2 board on the left-hand side of the X wagon is shown in Figure 15-1. S1 should be set to ON-OFF-OFF-ON and S2 to OFF-ON-OFF-ON.

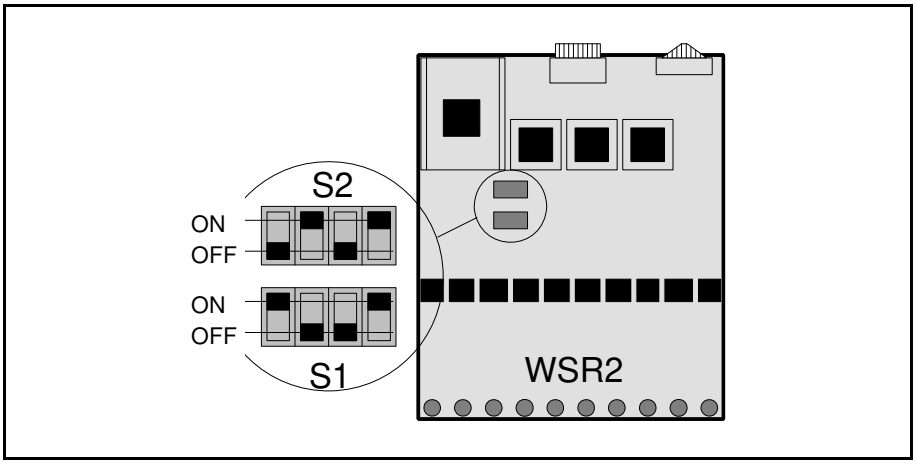


Figure 15-1. Left WSR2 board.

- The switch setting for the WSR2 board on the right-hand side of the X wagon is shown in Figure 15-2. S1 should be set to ON-OFF-OFF-ON and S2 to ON-OFF-ON-OFF.

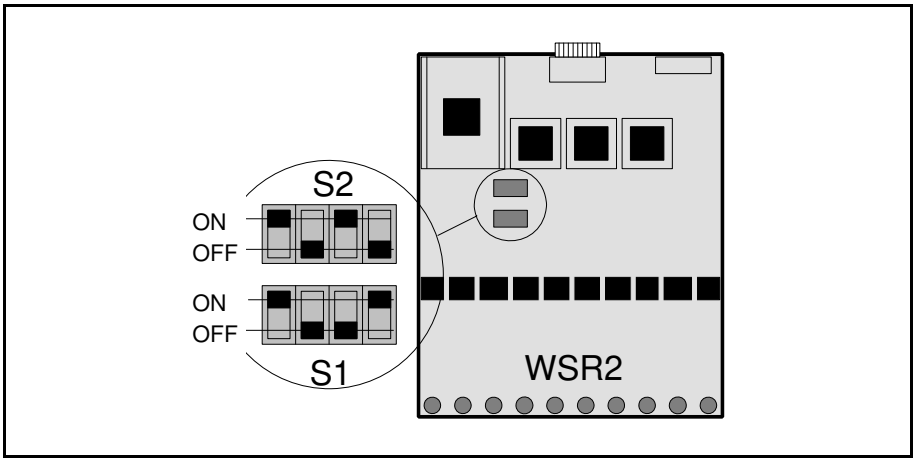


Figure 15-2. Right WSR2 board.

16. Test Protocol

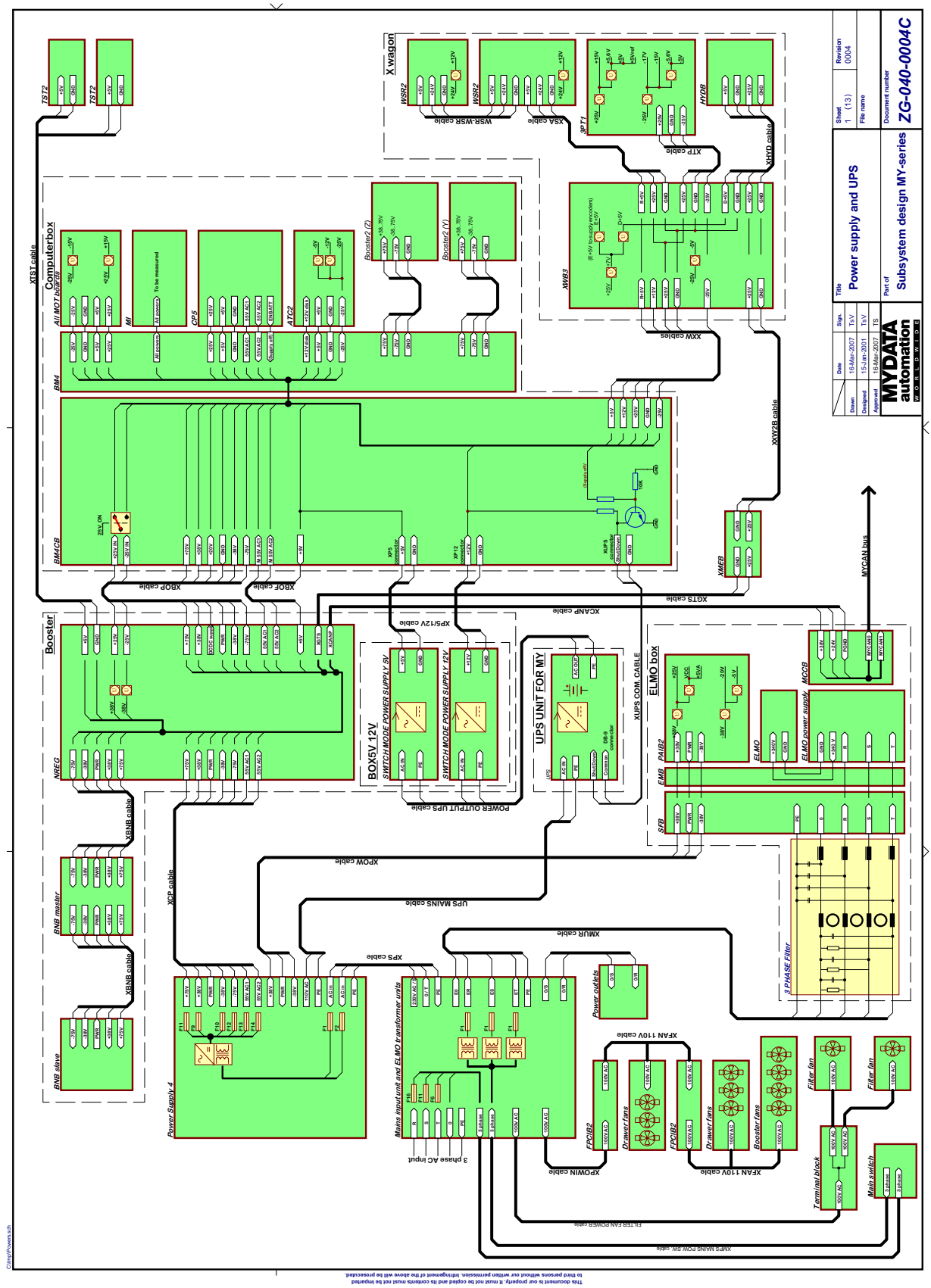
This chapter is intended for the test protocols provided with the machine.

17. Schematics

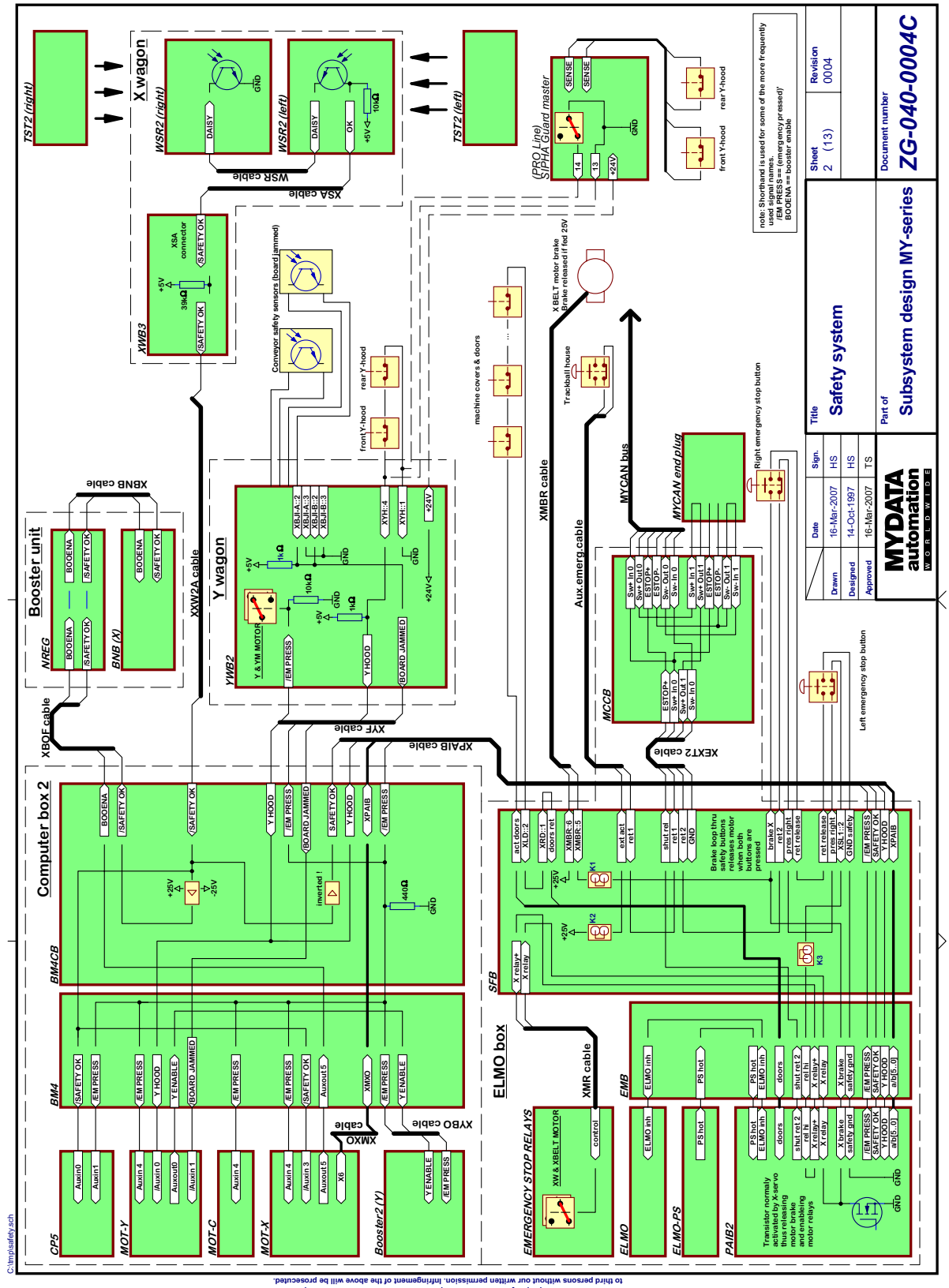
This chapter contains the block schematics – ZG-040-0004C – for MYDATA MY9 – MY12 – MY15 – MY19 machines.

Detailed schematics are available from http://www.mydata.com

Power Supply And Ups

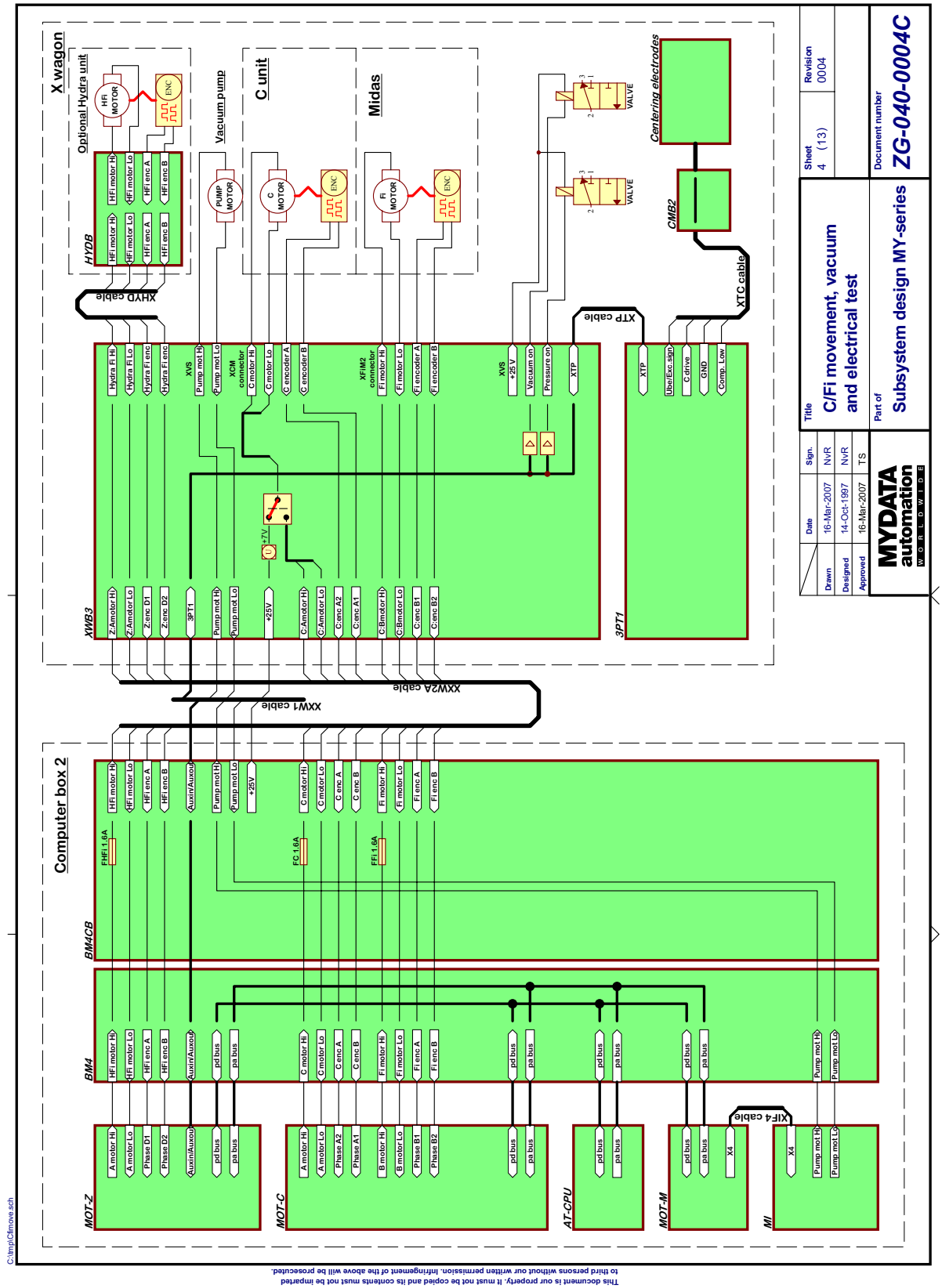


Safety System



C/fi Movement, Vacuum And Electrical Test

X Movement


X wagon
Optional Hydra unit
HYDB
HFi MOTOR
ENC
HFi motor Hi
HFi motor Lo
HFi enc A
HFi enc B
Vacuum pump
PUMP MOTOR
C unit
C MOTOR
Midas
Fi MOTOR
VALVE
Centering electrodes
CMB2
XHYD cable
XTC cable
XTP cable
XVB3
3PT1
XVS
XCM connector
XFM2 connector
Hydra Fi Hi
Hydra Fi Lo
Hydra Fi enc
Pump mot Hi
Pump mot Lo
C motor Hi
C motor Lo
C encoder A
C encoder B
Fi motor Hi
Fi motor Lo
Fi encoder A
Fi encoder B
+25 V
Vacuum on
Pressure on
XTP
Ubo/Exc.sign
C drive
GND
Comp. Low
Z:Amotor Hi
Z:Amotor Lo
Z:enc D1
Z:enc D2
3PT1
+25V
C:Amotor Hi
C:Amotor Lo
C:enc A2
C:enc A1
C:Bmotor Hi
C:Bmotor Lo
C:enc B1
C:enc B2
XXW2A cable
XXW1 cable
Computer box 2
FHFi 1.6A
FC 1.6A
FFi 1.6A
BM4CB
BM4
Auxin/Auxout
pd bus
pa bus
MOT-Z
MOT-C
AT-CPU
MOT-M
MI
A motor Hi
A motor Lo
Phase D1
Phase D2
Phase A2
Phase A1
B motor Hi
B motor Lo
Phase B1
Phase B2
XIF4 cable
X4
Title
C/Fi movement, vacuum and electrical test
Part of
Subsystem design MY-series
Sheet
4 (13)
Revision
0004
Document number
ZG-040-0004C
Date
Sign.
Drawn
16-Mar-2007
NvR
Designed
14-Oct-1997
NvR
Approved
16-Mar-2007
TS
MYDATA automation
C:\tmp\C#move.sch
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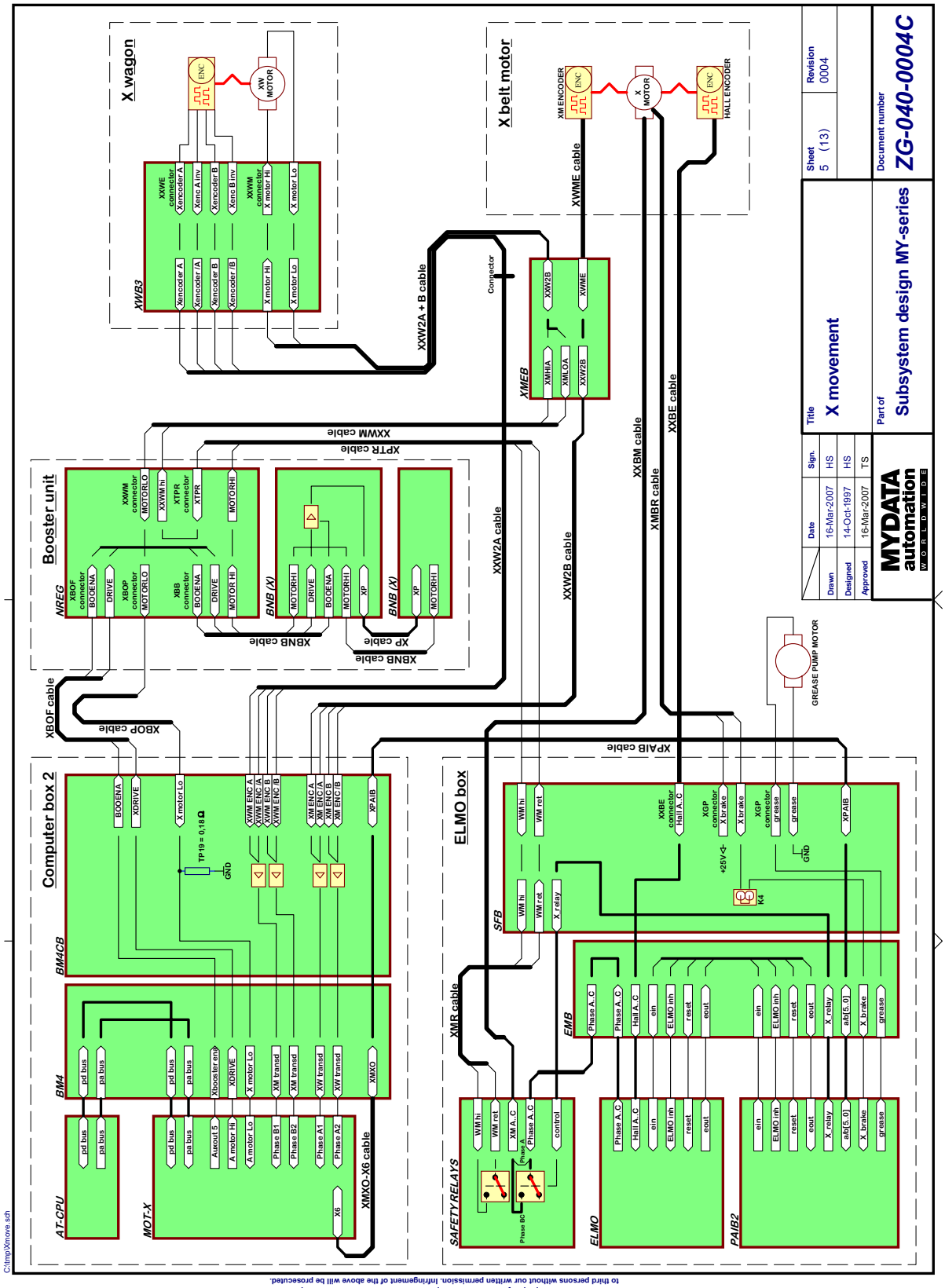
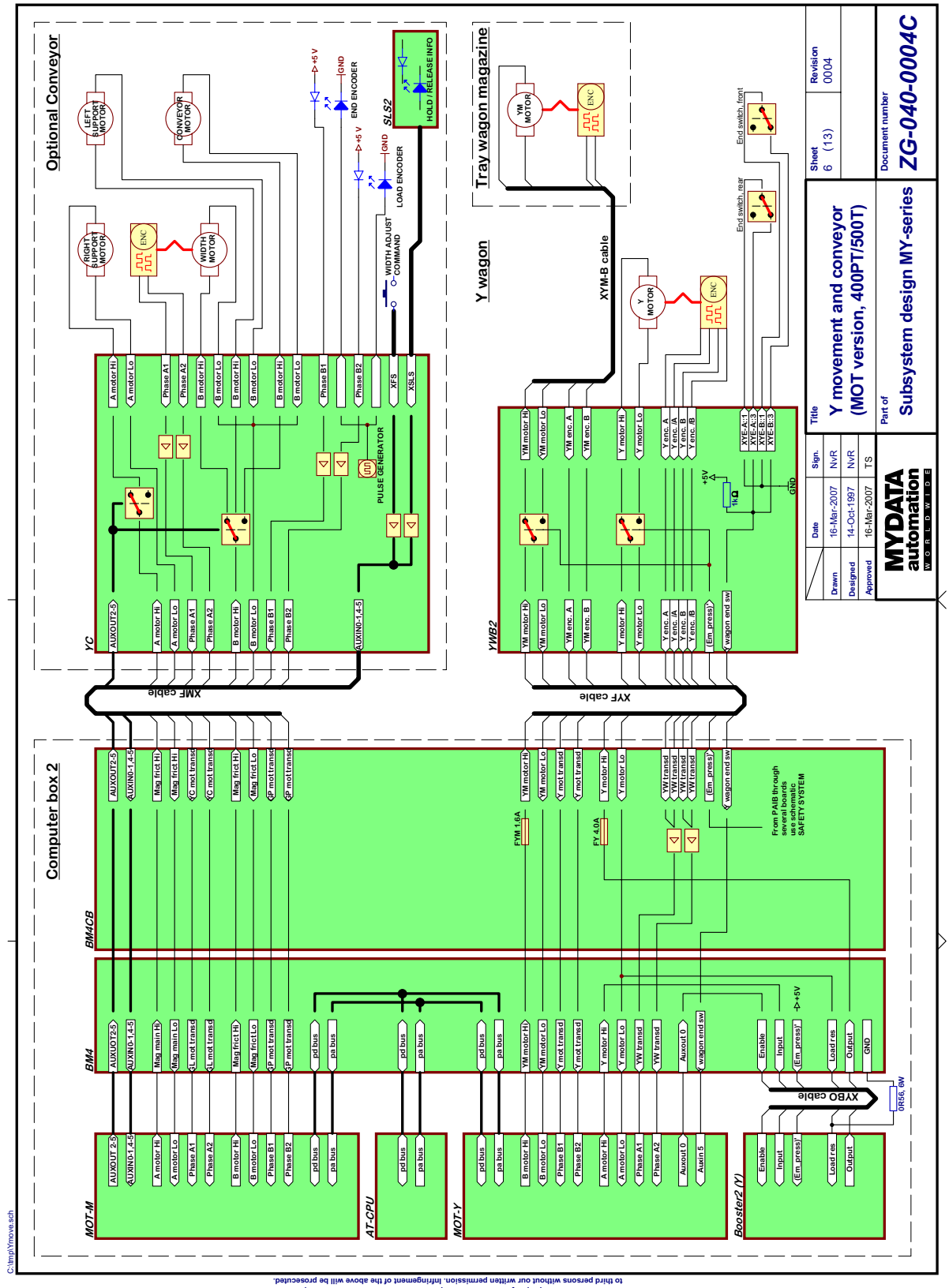
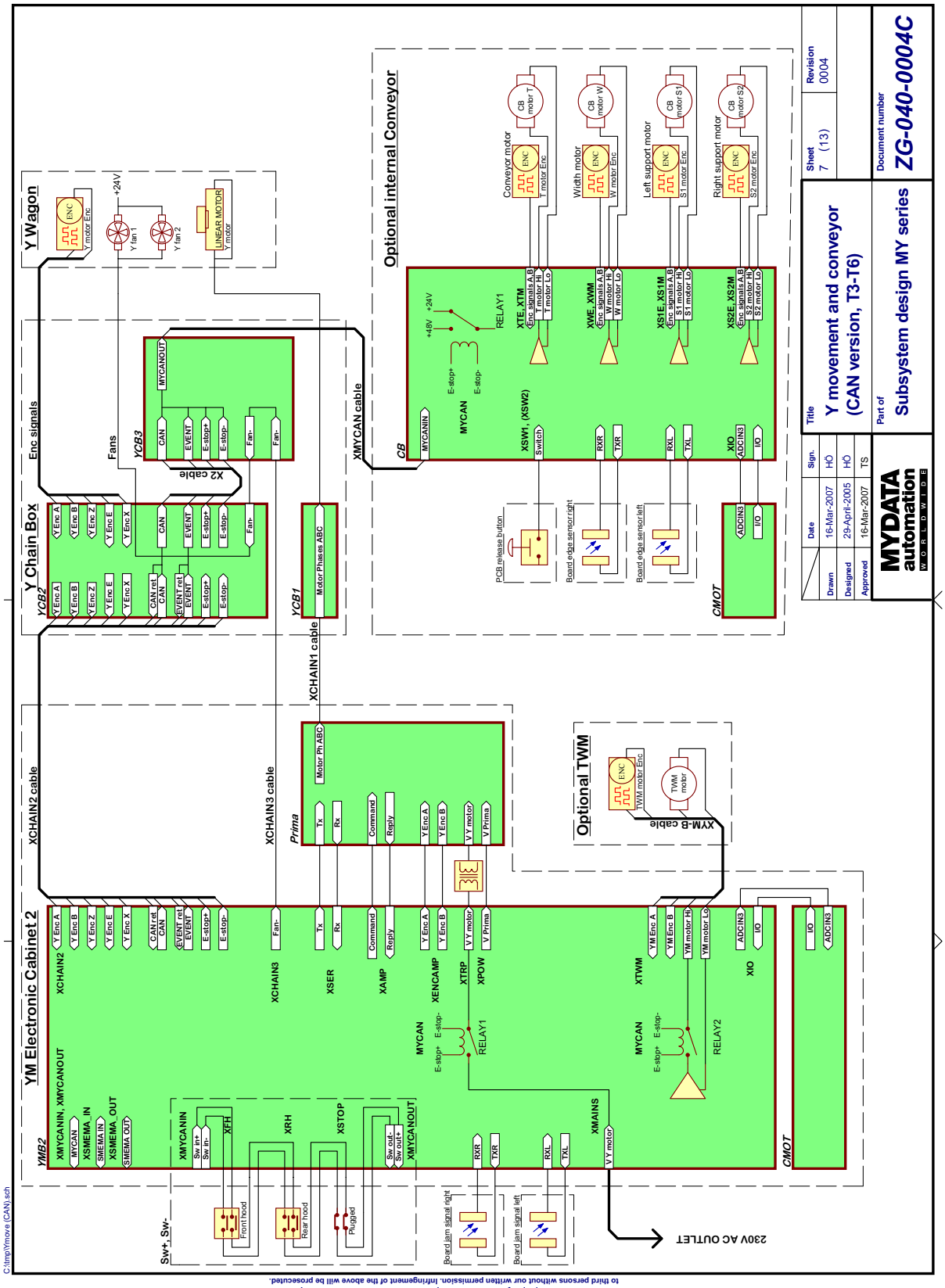
Y Movement And Conveyor (MOT Version, 400PT/500T)



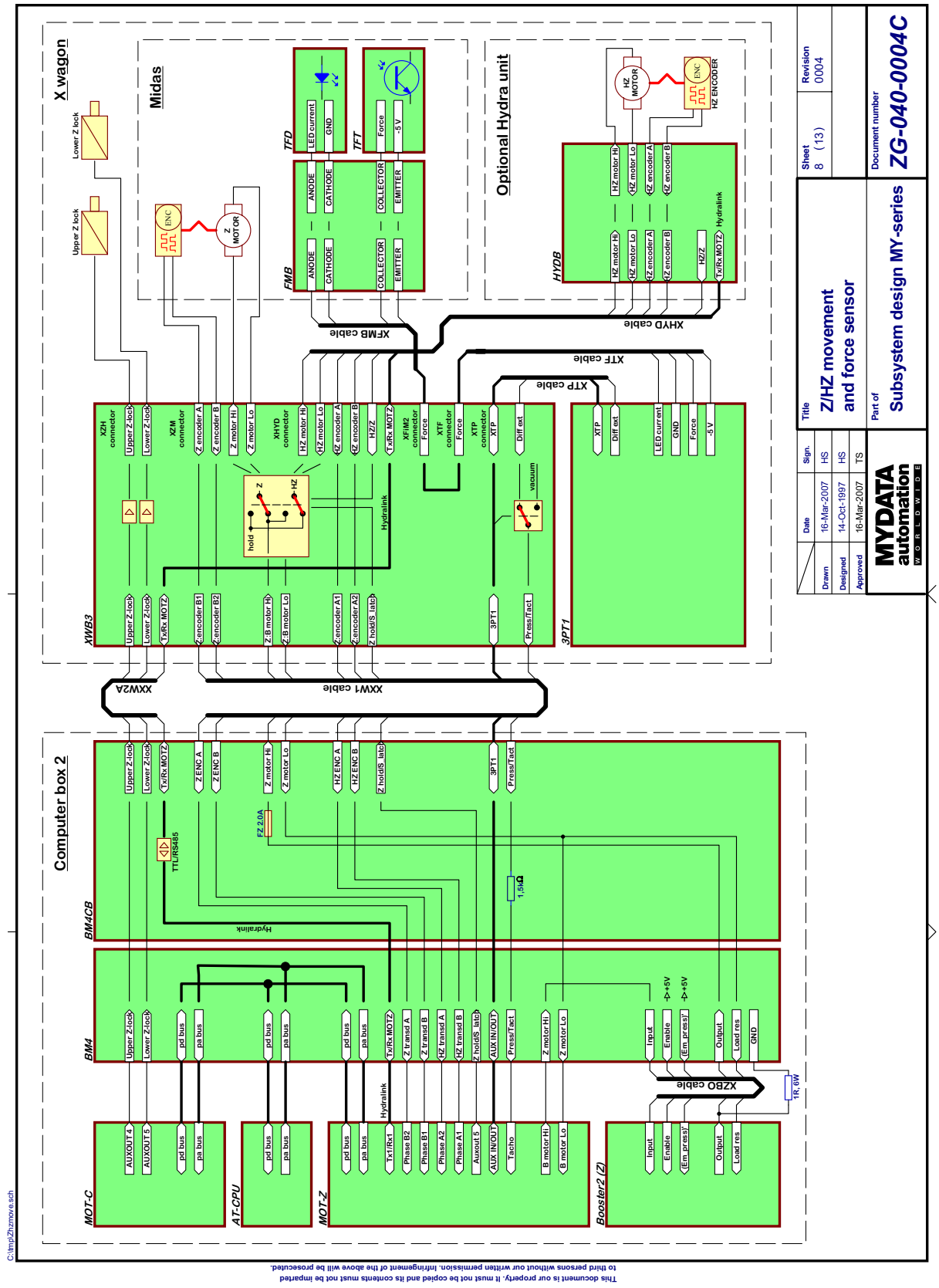
Y Movement And Conveyor (CAN Version, T3 – T6)



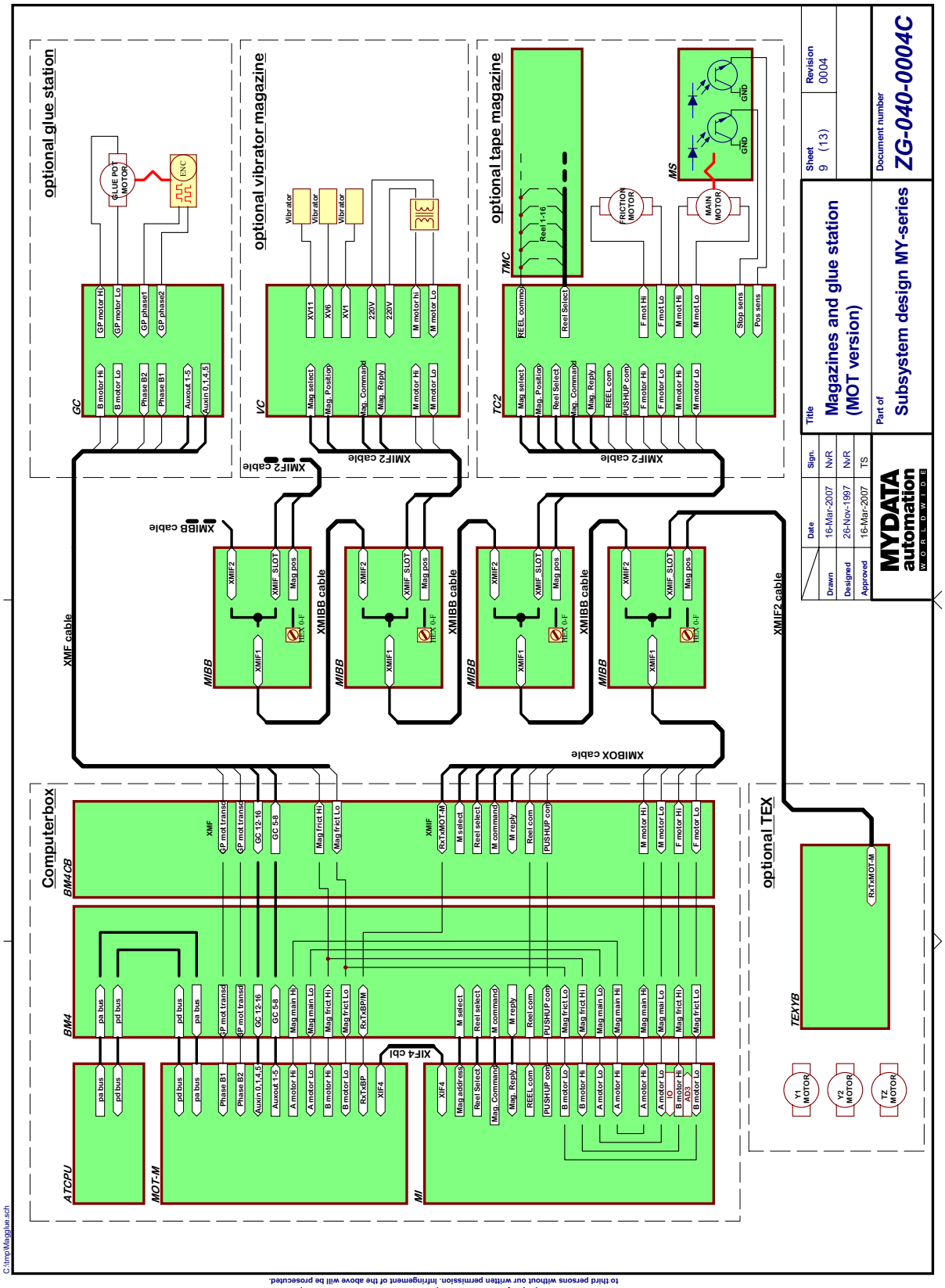
Z/HZ Movement And Force Sensor



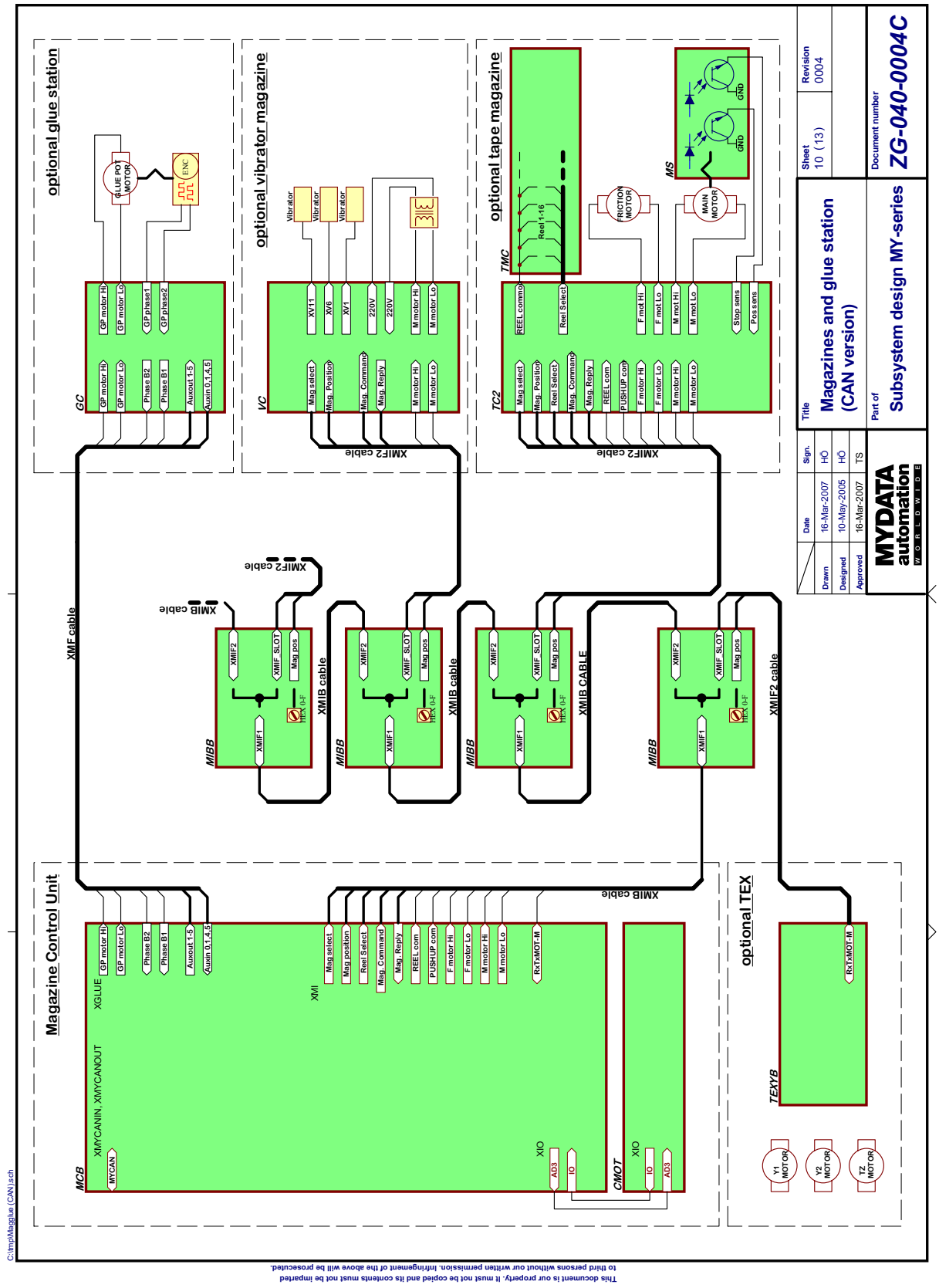
Magazines And Glue Station (MOT Version)



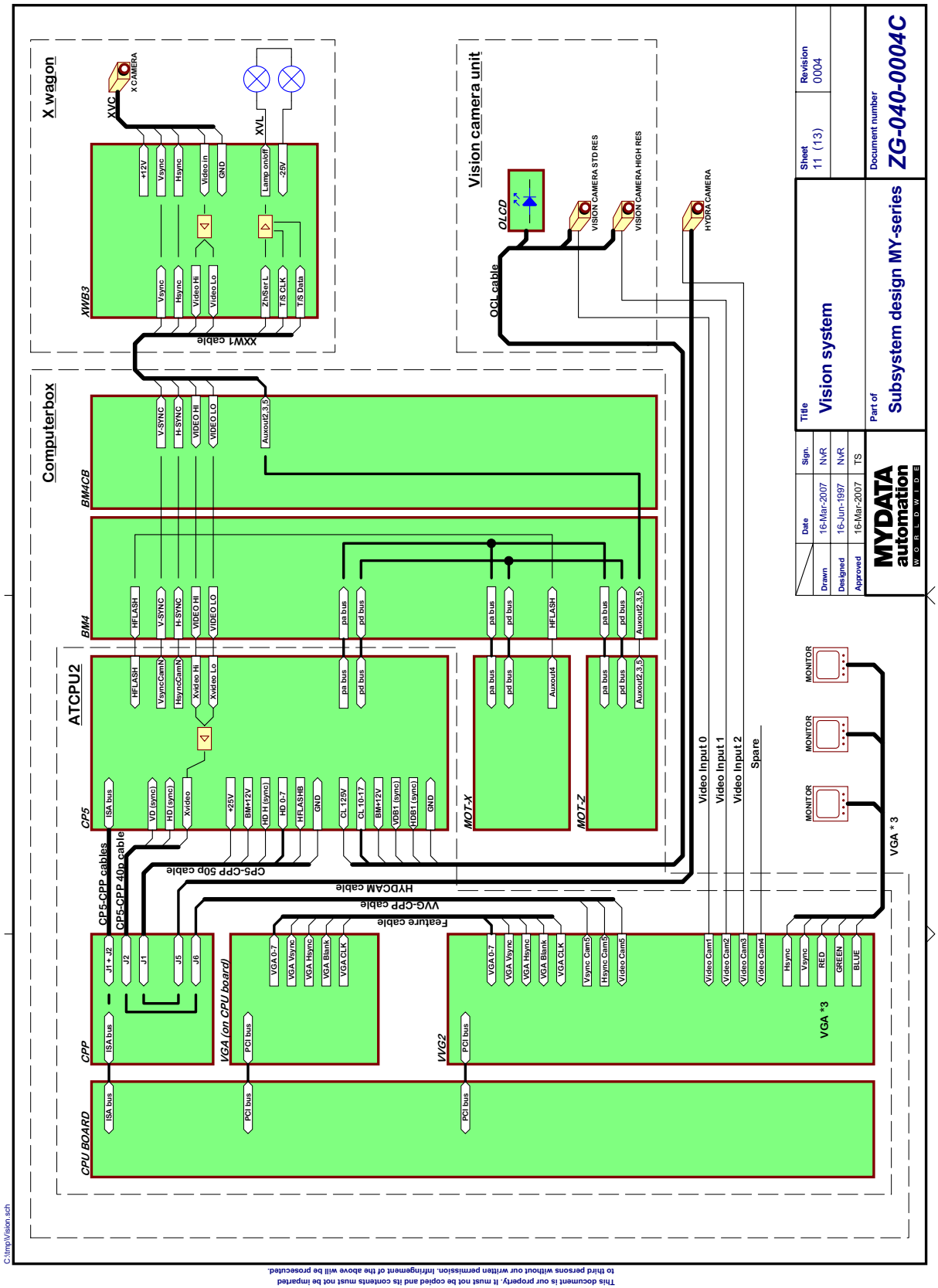
Magazines And Glue Station (CAN Version)



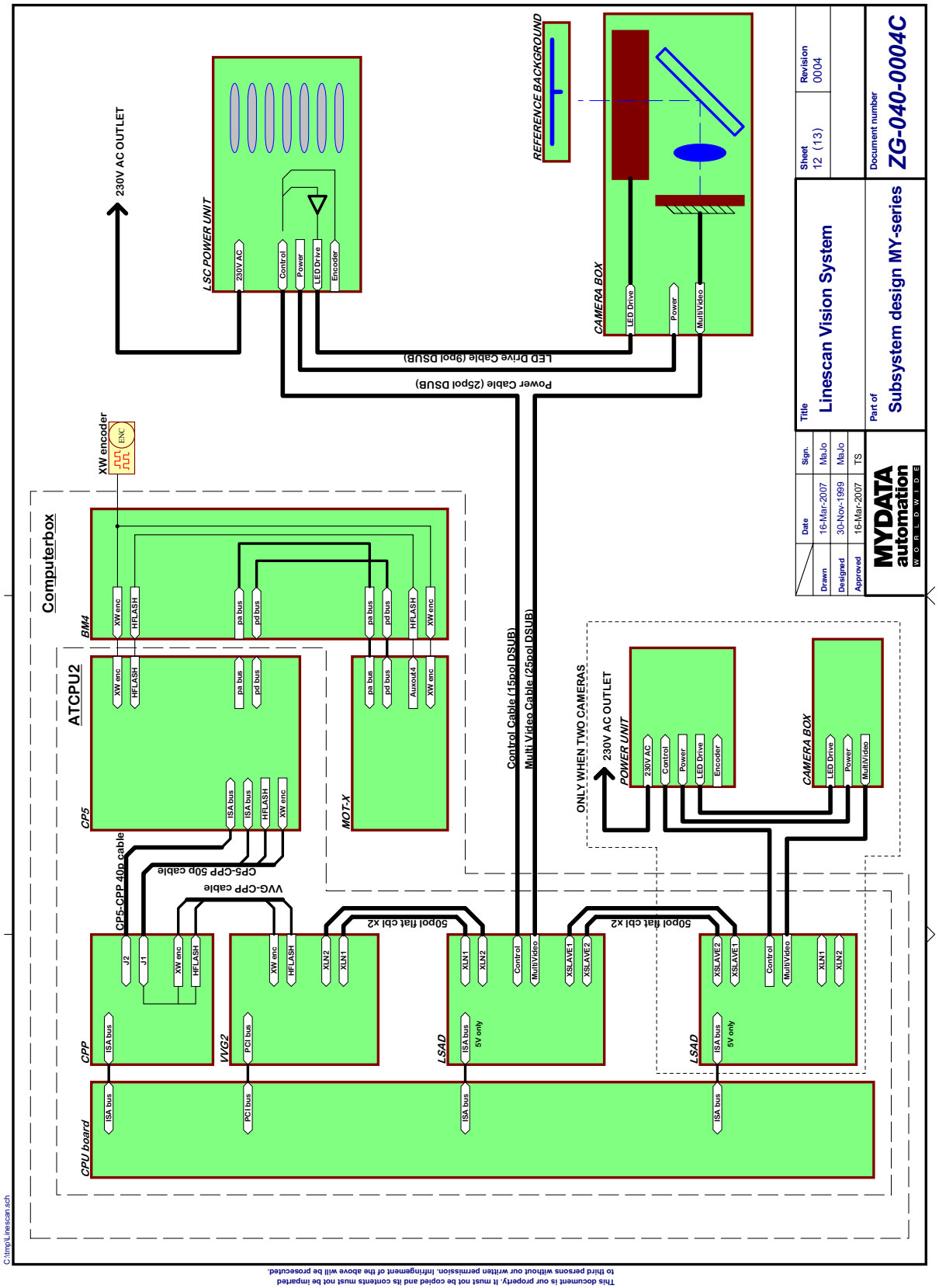
Vision System



Linescan Vision System



Peripherals



18. Maintenance

This document informs about preventive maintenance for the MY9 – MY12 – MY15 – MY19 machine types. This maintenance should be performed at stated intervals. The warranty on the machine and parts applies only if these instructions are followed.

WARNING! Before commencing any maintenance, press an emergency stop button down or turn the power off.

Maintenance intervals

- The intervals for daily maintenance are fixed and should be performed by the machine operator. The daily maintenance is also described in the Operator's manual.
- The maintenance intervals specified at 160 hours running time and 2000 hours running time are dependent on the usage of the machine. These times are based on an eight hour working day, seven days a week. This type of maintenance should **only** be performed by an authorized maintenance engineer.

CAUTION! The maintenance intervals apply to a clean environment and an indoor temperature of maximum 25 °C. If operated in a dusty environment, or higher temperature, it is strongly recommended to perform cleaning and lubrication after half the stated time intervals.

Cleaning optics

- If the optical surface is very dusty or dirty, remove the dust and dirt using a spray can with clean air **intended for optics**. Other air may contain particles and grease from air pumps and valves which may be harmful to the optics.
- Clean optics by folding a clean lint-free cloth to the width of the optics. Apply a small amount of **isopropyl** alcohol, and gently pass the cloth over the surface. Ensure there is no film left on the surface after the use of alcohol. An alternative is to use pre-moistened cleaning towlettes, especially developed for cleaning of optics.

Lubricants

Unless otherwise stated, use Shell Tellus oil, Omega 28 or OKS 270 grease. Oil and grease should be applied just to give just a thin film.

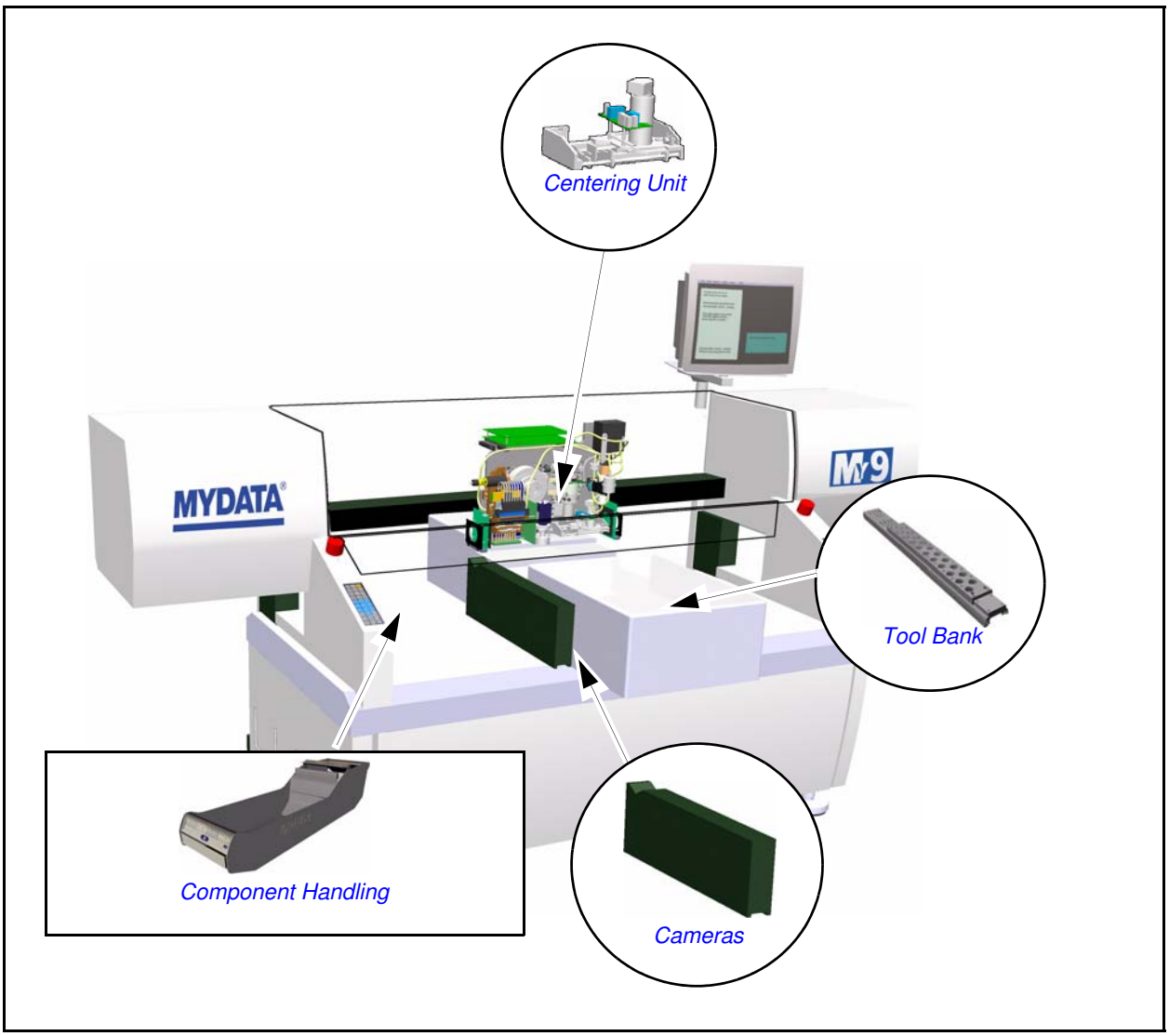
Do not lubricate Z-fi mount heads with Omega 28.

Information about Material Safety are found on http://www.mydata.com.

Spare parts

Part numbers for spare parts are found on the MYDATA web site: http://www.mydata.com. User name and password may be needed.

Daily Maintenance



Equipment

- Lint-free cotton wool buds.
- Isopropyl alcohol.
- Lint-free cloths.
- Collecting container for rejected components.
- Vacuum cleaner or short-bristled brush.

Tool Bank

Single mount head tools

- Pick up the tools from the tool bank to inspect them.
- Wipe off any solder paste and glue from the tip of the mount tools carefully with a cloth slightly wet in alcohol. Be careful not to damage the springs in spring-loaded tools.
- Inspect the tool tips. Replace damaged tools and tool tips. Part numbers are found in the *Spare Parts Catalog*.
- Wipe off the glue tools carefully with a cloth slightly wet in alcohol.

Be careful to put the tools back in their original position in the toolbank.

Single head tool bank

- Wipe off the tool bank with a cloth slightly wet in alcohol. Take extra care to wipe off the tools verification points.
- Wipe off the glue tool verification points.
- Clean under the glue tool bank where the tools are kept.

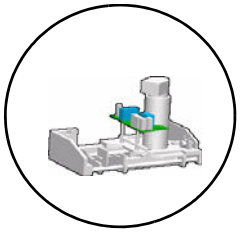
HYDRA tool bank

- Wipe off any solder paste and glue from the tool bank with a cloth slightly wet in alcohol.

Glue station (when used)

- Wipe off the Glue station´s verification points.

Centering Unit



Centering jaws

– Clean the centering jaws and Linescan reference background using a cotton wool bud slightly wet in alcohol, see Figure 18-1.

– Clean the Linscan reference background using a lint-free cloth slightly wet in alcohol, see Figure 18-1.

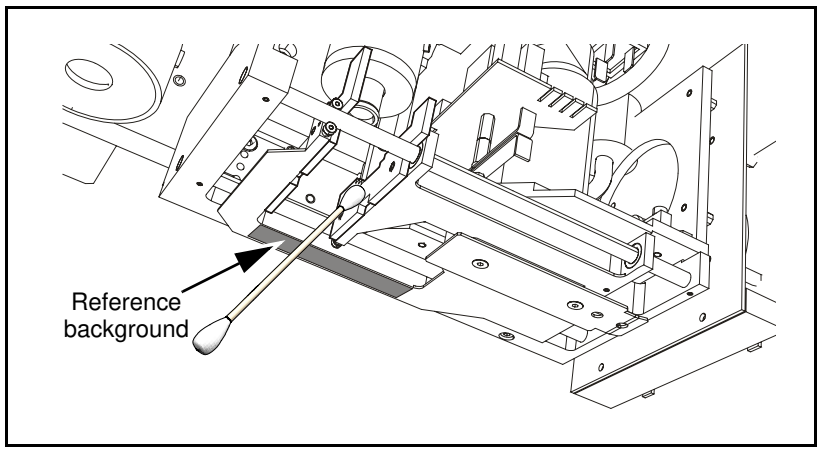


Figure 18-1. Centering jaws.

Component Handling

Machine board

– Remove loose components and pieces of component tape from the machine, internal conveyors, TEX, slot positions and the magazines with a vacuum cleaner or brush.

– Inspect the magazine connectors and remove any components and component tape with a vacuum cleaner or brush.

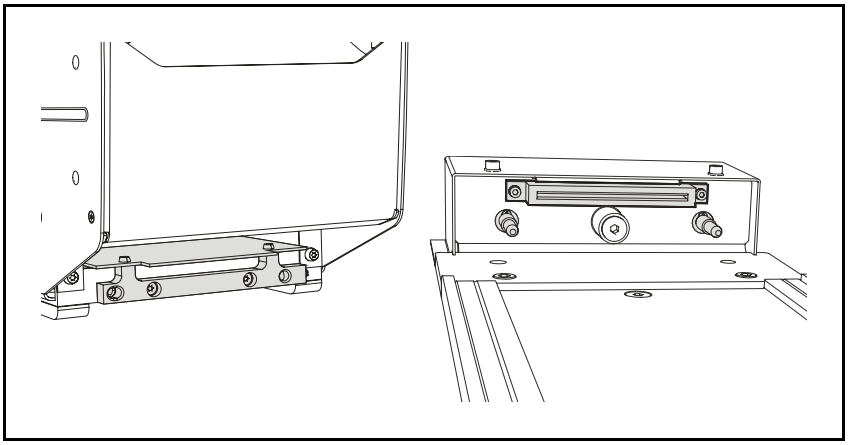


Figure 18-2. Magazine connectors.

– Make sure that the connectors are not damaged.

– Empty the reject bins.

Cameras

HYDRA camera glass

– Remove dropped components from the camera glass by pulling the knob at the front of the HYDRA camera box, see Figure 18-3.

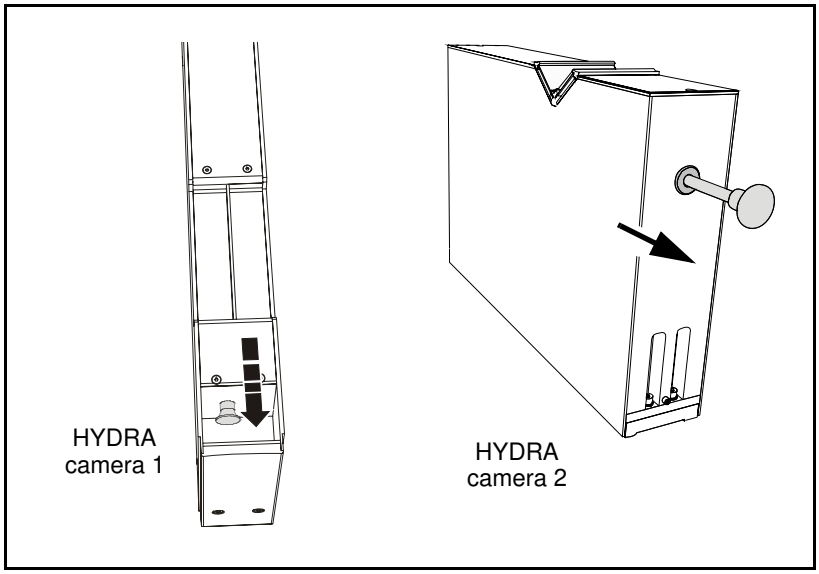


Figure 18-3. Knobs of HYDRA camera 1 and 2.

Linescan camera glass

– Remove dropped components from the Linescan camera glass by withdrawing it at the front of the camera box, see Figure 18-4.

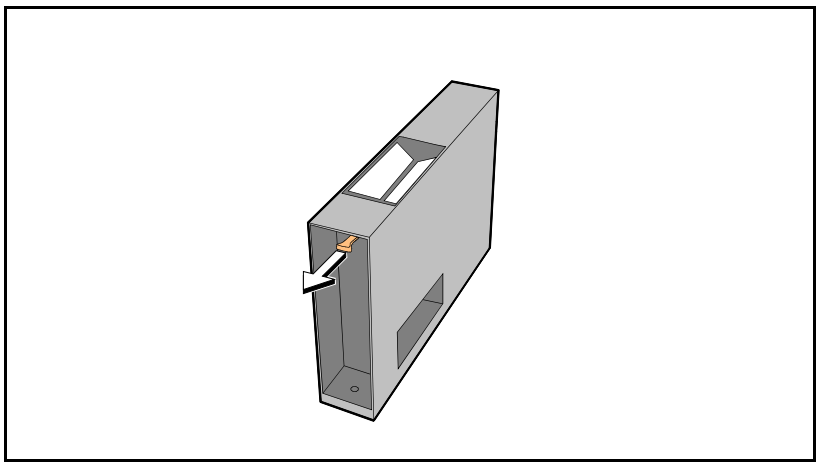
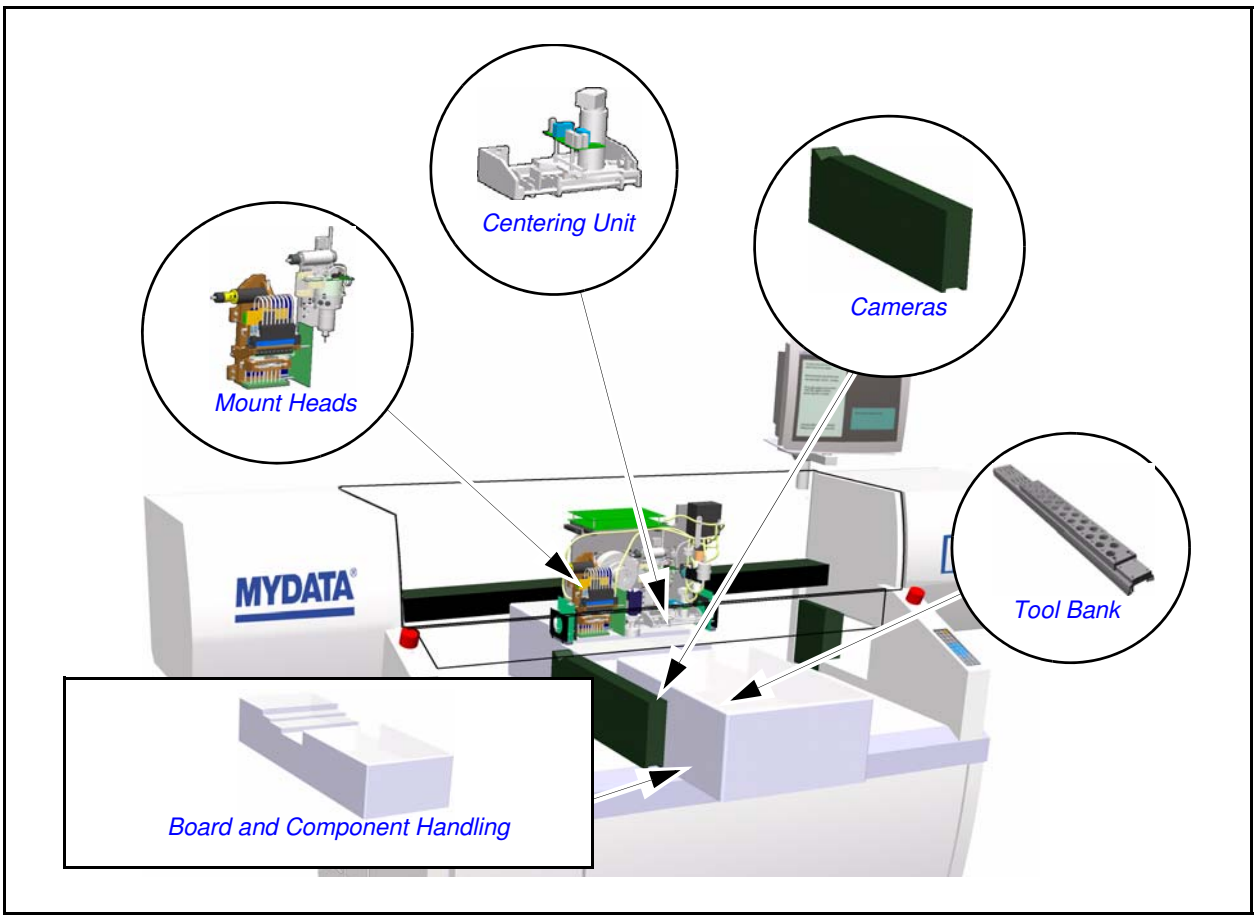


Figure 18-4. Pulling Linescan camera glass.

Be careful not push the camera glass too far back when re-inserting it in the Linescan camera.

Weekly Maintenance



Equipment

- Shell Tellus oil for lubrication.
- OKS 270 grease, optionally Omega 28 grease.
- Z-fi mountheads shall not be lubricated with Omega 28.
- Isopropyl alcohol.
- Lint-free cloths.
- Lint-free cotton wool buds.
- Collecting container for rejected components.
- Vacuum cleaner or short-bristled brush.

Preparation

Make a backup of TPSys.

Refer to the TPSys software manual about backing up data and parameters.

Tool Bank

Single mount head tools

– Check spring-loaded tools by gently pressing the tubes to the end position. When the tubes are released, make sure they return to the original positions. **Be careful not to overload the springs.**

– Lubricate metal colored spring-loaded tools with a drop of Shell Tellus oil, see Figure 18-5.

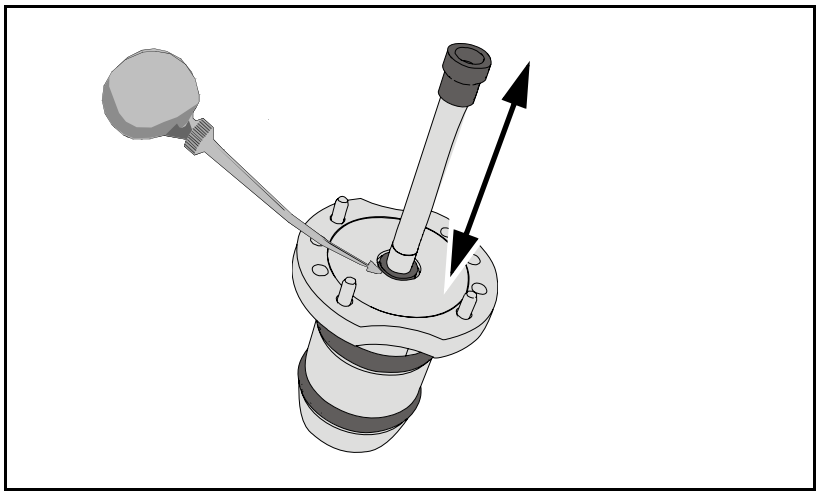


Figure 18-5. Spring loaded tools lubrication.

Do not lubricate any tools with a black housing.

– Inspect O-rings for cracks or abrasions. Replace if necessary. Part numbers are found in the *Spare Parts Catalog*.

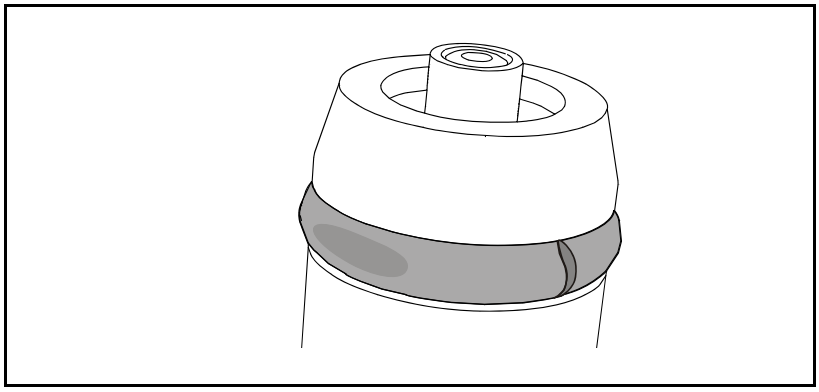
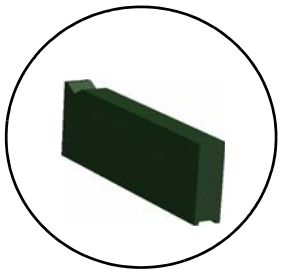


Figure 18-6. Cracks and abrasion on O-ring.

– Clean and lubricate the single mount-head tool O-rings with grease. Apply only a thin layer of grease on the O-rings. With OKS 270 grease the O-rings should be lubricated once a week. With Omega 28 grease the O-rings should be lubricated once a month or every 160 hours. **Do not use Omega 28 if you have a Z-fi mount head**.

Cameras



DVS/SVS camera

– Empty the DVS/SVS camera dump bin.

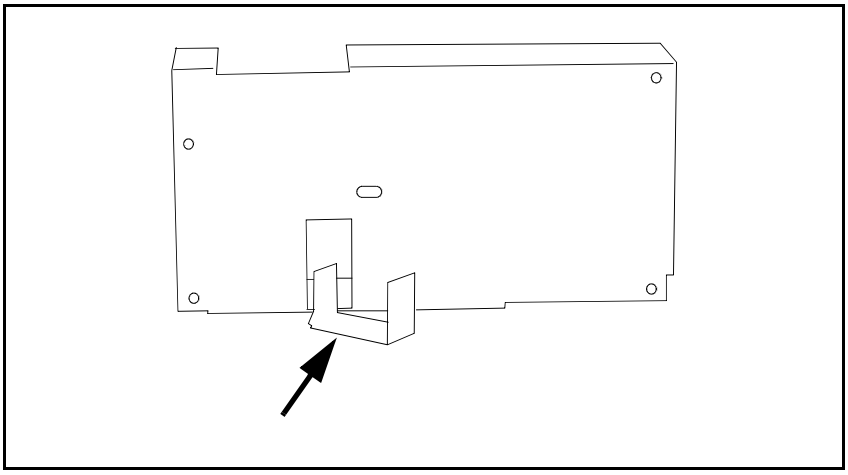


Figure 18-7. DVS/SVS camera dump bin.

Linescan camera

– Remove the Linescan camera glass by withdrawing it at the front of the camera box, see Figure 18-8.

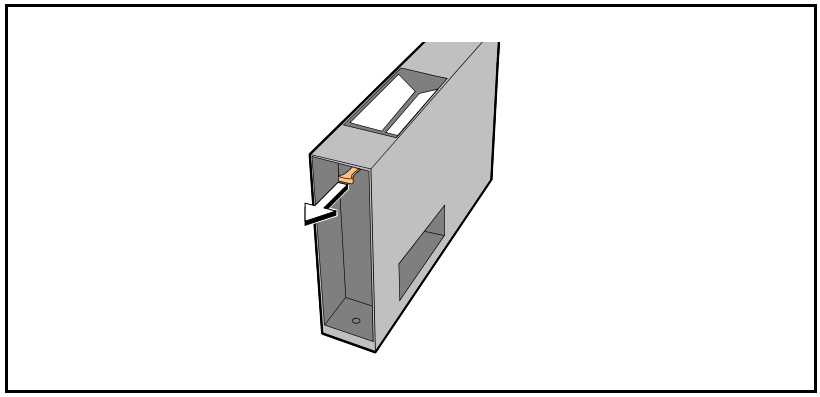


Figure 18-8. Removing Linescan camera glass.

– Clean the Linescan camera optics.

Instructions on how to clean optics are found on page 18-1.

HYDRA camera

– Open the bin lid at the rear of the HYDRA camera 1 or on the side of HYDRA camera 2 and empty the bins. Remove dropped components from the camera body, preferably with a vacuum cleaner.

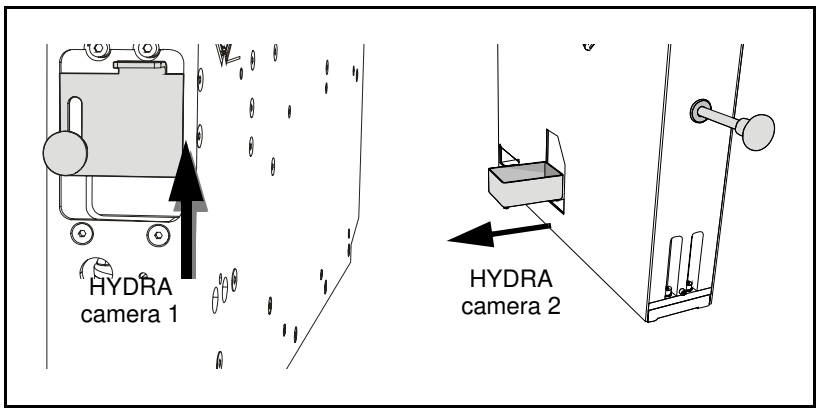
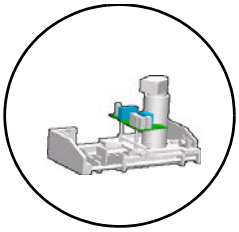


Figure 18-9. HYDRA camera dump bins.

Centering Unit



Centering unit

– Inspect the electrodes and the termination wires. Are the electrodes pitted (that is full of dents after components), worn, or the wires are damaged, the centering jaws must be replaced and calibrated. Refer to the machine manual for details. Part numbers are found in the *Spare Parts Catalog*.

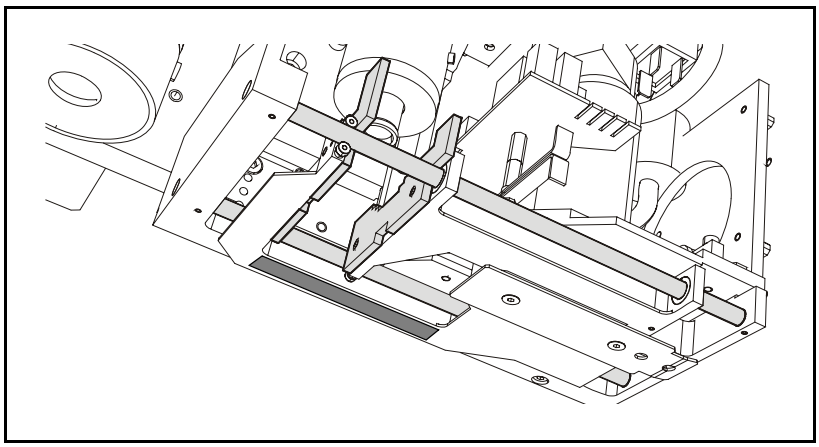
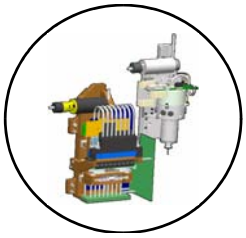


Figure 18-10. Centering unit electrodes and axles.

– Wipe the mechanical centering unit axles with a lint-free cloth and lubricate them with Shell Tellus oil. Make sure that the Linescan reference background is not contaminated with oil. If so, wipe of the Linescan background with a lint-free cloth slightly soaked with alcohol.

Mount Heads



Single mount head

– Clean dirt and dust out with a cotton wool bud from the inside of the tool head. Be careful not to damage the force sensor inside the tool head. Lubricate the inside of the tool head by inserting and removing a greased tool manually, see Figure 18-11.

– Wipe off old grease and dirt from the Z rack with a cloth and apply a new thin layer of OKS 270 grease, see Figure 18-11.

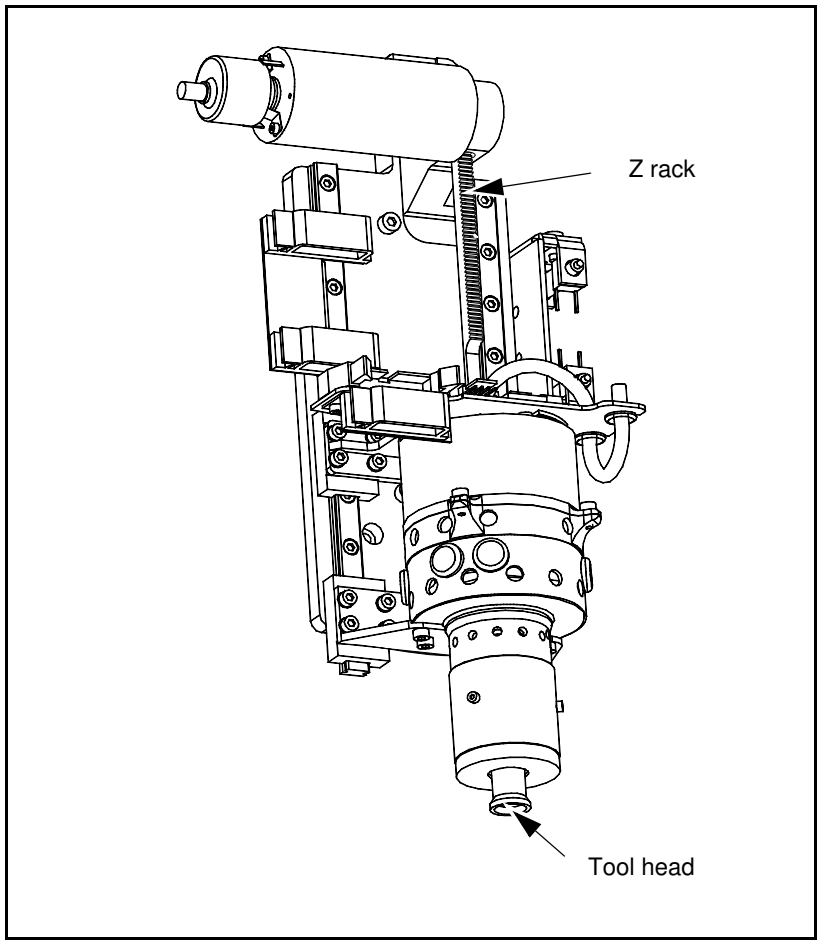


Figure 18-11. Single mount head, Z rack and tool head position.

HYDRA unit

– Wipe of the reference background on the HYDRA unit with a cloth.

– HYDRA 2B: Lubricate the HYDRA Z shaft with Shell Tellus oil. (HYDRA 2D is lubricated at the yearly service).

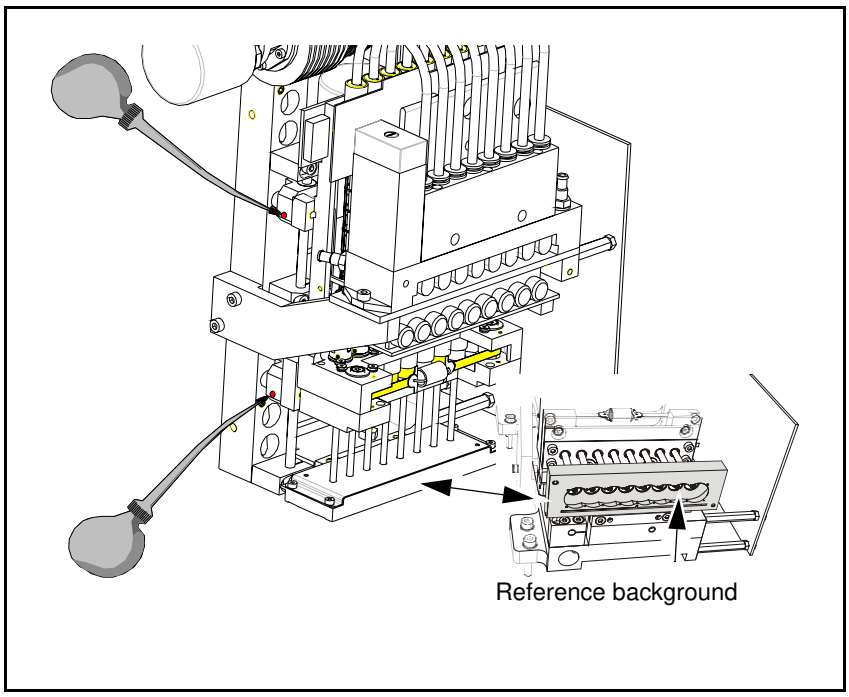


Figure 18-12. Z-shaft points of lubrication and reference background.

HYDRA tools

Remove the tools manually. Instructions on how to remove tools are found the in Operator´s Manual.

– Remove the H01 (white tools) and inspect their tips for cracks and dents under a magnifier or pocket lens. Replace damaged tools if necessary.

– Remove the H04 (blue tools) and inspect the rubber tips under a magnifier or pocket lens for cracks or abrasions. Replace tip if necessary.

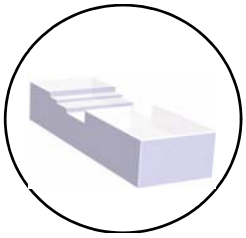
– Remove the H06 (green tools) and inspect their tips for cracks and dents under a magnifier or pocket lens. Replace tool if necessary.

– Remove the H02 (yellow tools) every other week and inspect their tips for cracks and dents under a magnifier or pocket lens. Replace if necessary.

– Part numbers are found in the *Spare Parts Catalog*.

Check the rubber tip container for expiry date. Do not use expired rubber tips.

Board and Component Handling



Y wagon

– Wipe off the Y-wagon linear bushing rods with a cloth slightly oiled with Shell Tellus oil.

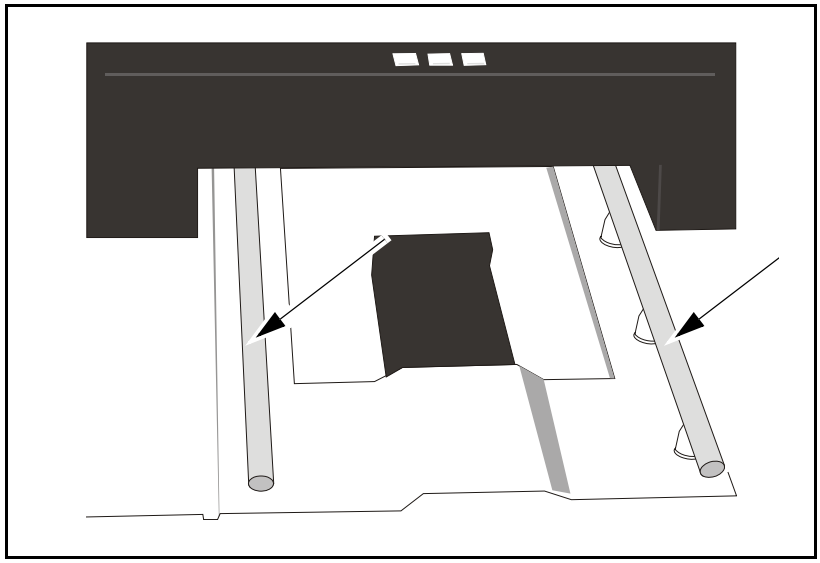


Figure 18-13. Y-wagon rods.

Note: This step only applies to models with white Y-wagon unit.

Tray Wagon Magazine (when used)

– Wipe off the Tray Magazine rod with a cloth slightly oiled with Shell Tellus oil.

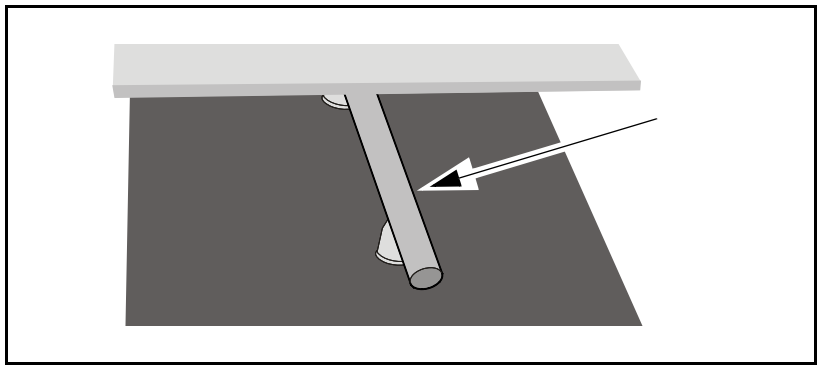


Figure 18-14. Tray Wagon Magazine rod.

Other

Warning signs

– Inspect the Warning signs. Clean or replace if necessary.

160 Hours Maintenance

These maintenance tasks shall only be performed by an authorized maintenance engineer.

1. Inspect the X-wagon ribbon XXW1 and XXW2 cables.

– Check the two blue X-wagon ribbon cables located on top of the X beam. Replace damaged or worn cables, see separate repair guide.

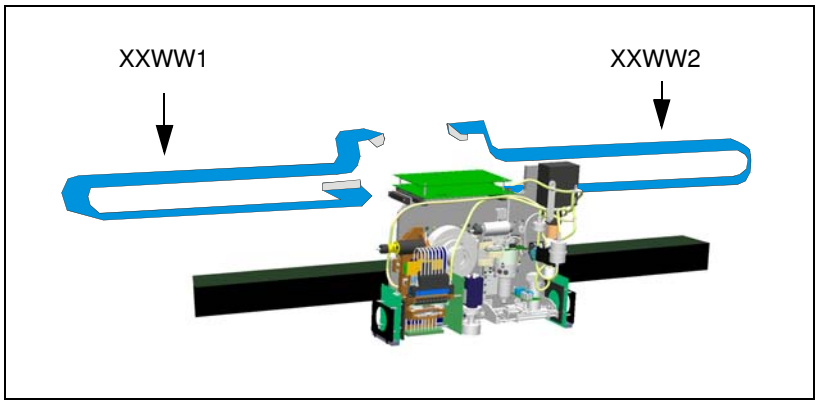


Figure 18-15. Flexible cables.

2. Dual vision camera optical outer mirror.

– If an dual vision centering camera is used, then clean the outer mirror (at the arrow in Figure 18-16) accessible without opening the camera cabinet.

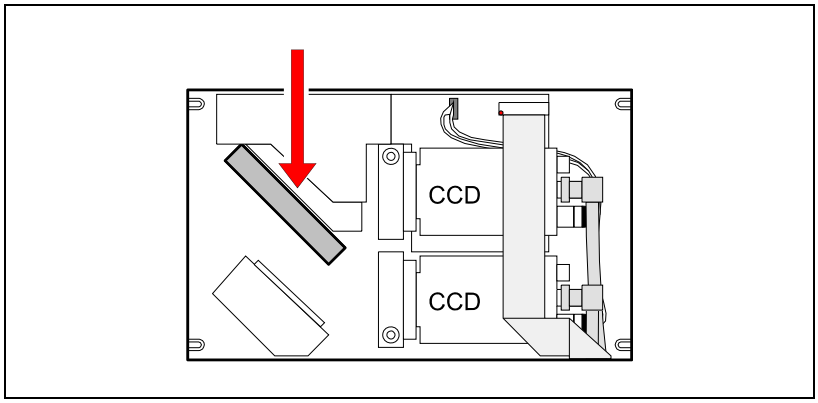


Figure 18-16. Dual vision camera outer mirror.

3. Clean the HYDRA Theta belt.

– Clean the Theta belt at the motor shaft using a cotton wool bud slightly wet in alcohol, see Figure 18-17. Move the belt by gently dragging the belt spring as shown by the arrow.

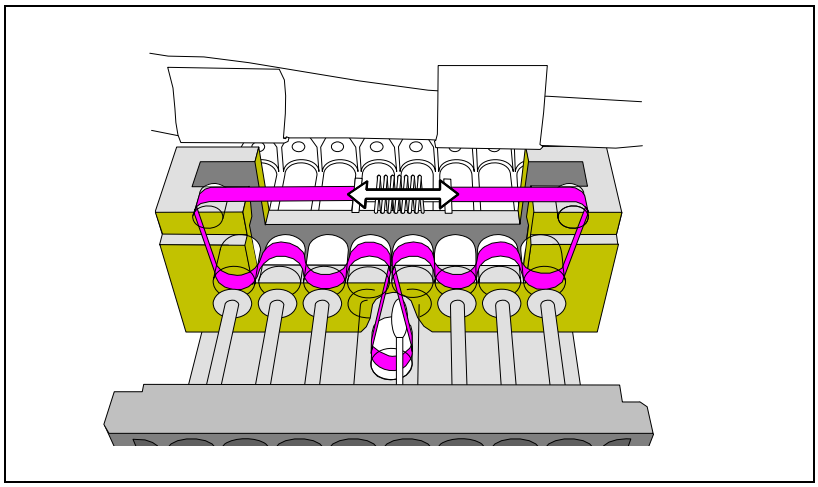


Figure 18-17. HYDRA Theta belt.

4. Clean the HYDRA camera glass.

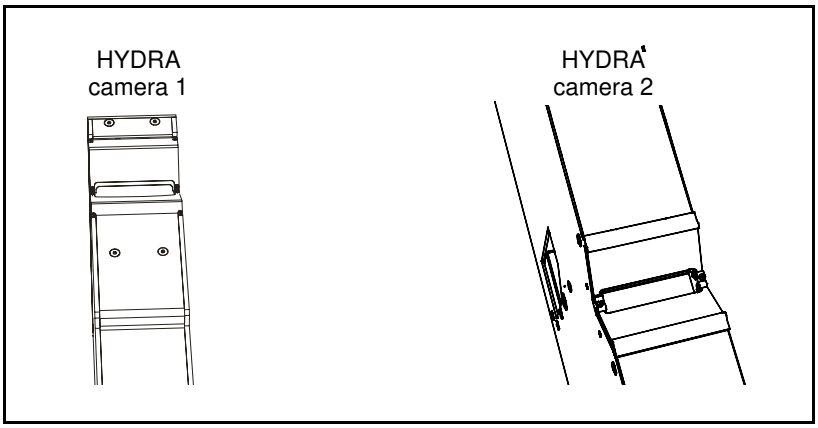


Figure 18-18. Camera glass, HYDRA camera 1 and 2.

5. Lubricate the front and rear of the HYDRA Z rack with OKS 270 grease.

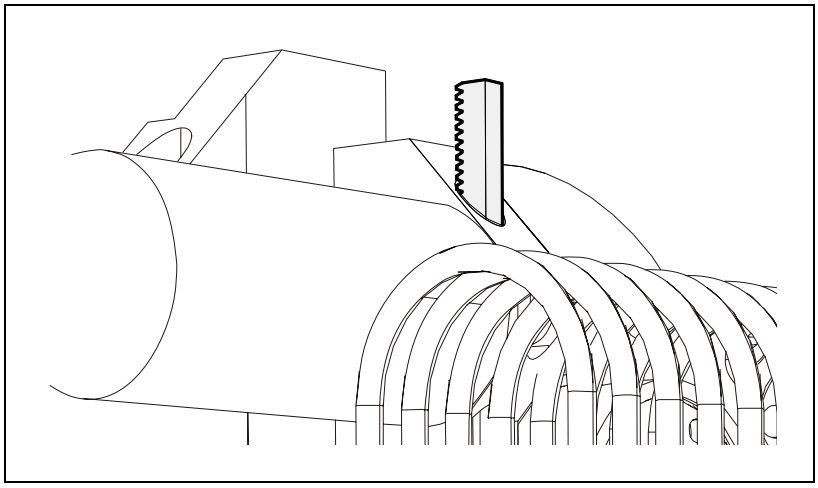


Figure 18-19. HYDRA Z rack.

6. Check the HYDRA vacuum system as described in the machine manual.

7. Check the Standard vacuum system.

- Inspect the vacuum hoses and test the vacuum system as described in the machine manual.
- Replace the vacuum filter at every other service. Part numbers are found in the *Spare Parts Catalog*.

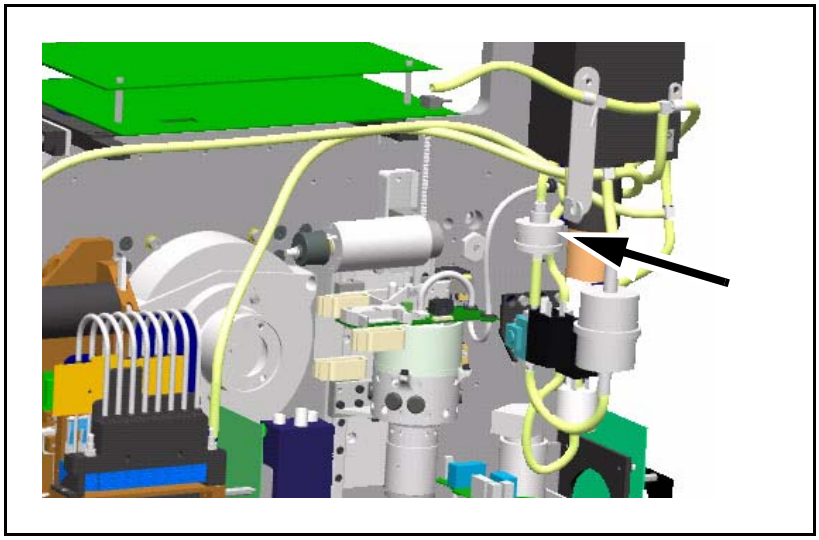


Figure 18-20. Vacuum filter.

8. Clean or replace the fan filters.

– Clean thoroughly (using a vacuum cleaner) the two fan filters at the rear of the machine. If the filters are clogged they must be replaced. Part numbers are found in the *Spare Parts Catalog*.

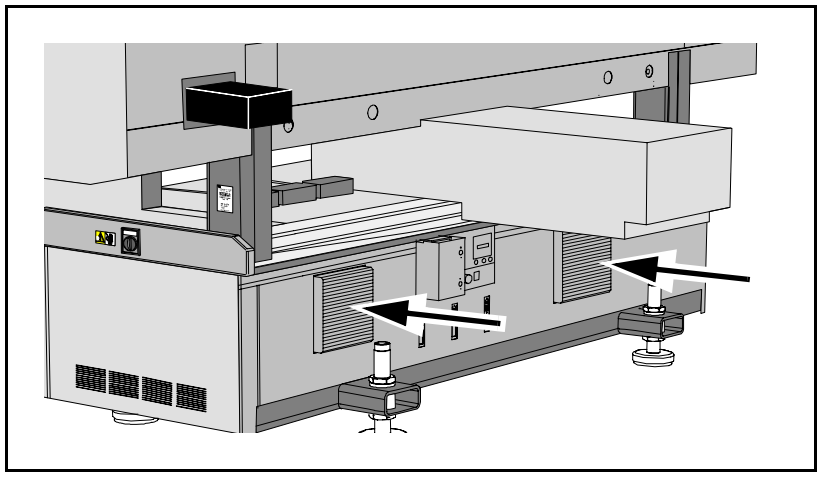


Figure 18-21. Fan filter.

9. Check the grease pump.

– Make sure the indicator lamp on the grease pump is lit by using the *Check X-Wagon Grease Pump* procedure as described in the machine manual.

Yearly or 2000 Hours Maintenance

This preventive maintenance shall only be carried out by authorized MYDATA service engineers. There is a specific instruction for the yearly maintenance that has to be followed.

Please contact your MYDATA Service Department to arrange for a visit by a MYDATA field service engineer.

This service will affect for example:

- The HYDRA ATE.
- The single and HYDRA mount heads.
- The X system.
- The internal conveyor system.

Maintenance Tables

This section shows the previous described maintenance as tables that can be copied and used as service protocols.

Daily

Place	Maintenance action	Completed
Tool Bank	*Single mount head tools* – Inspect the tools and tip. Wipe off and replace tips/tools if necessary.	
	Single head tool bank – Wipe off any solder paste and glue from the toolbank.	
	HYDRA tool bank – Wipe off any solder paste or glue from the HYDRA tool bank.	
	Glue station (when used) – Wipe off the glue tools, tool bank, and verification points. – Clean under the tool bank.	
Centering Unit	*Centering jaws* – Clean the centering jaws and Linescan reference background.	
Component Handling	*Machine board* – Remove loose components/component tape. – Inspect the magazine connectors and remove loose components/component tape. – Empty the reject bins.	
Cameras	*HYDRA camera glass* – Remove components from HYDRA camera glass. *Linescan camera glass* – Remove components from Line scan camera glass.	

Weekly

Place	Maintenance action	Completed
Preparation	Make a backup of TPSys.	
Tool Bank	*Single mount head tools* – Lubricate metal colored Single mount-head tools. – Inspect and lubricate Single mount-head tool´s O-rings.	
Cameras	*DVS/SVS camera* – Empty the camera dump bin *Linescan camera* – Clean Linescan camera optics. *HYDRA camera* – Empty the HYDRA 1 or 2 dump bin.	
Centering Unit	*Centering unit* – Inspect the mechanical centering unit electrodes. – Clean and lubricate the mechanical unit axles. – Clean the Line-scan reference background if necessary.	
Mount Heads	*Single mount head* – Clean and lubricate inside of tool mount head. – Clean and lubricate Single-mount head Z rack. *HYDRA unit* – Wipe off reference background. – HYDRA 2B ONLY: Lubricate HYDRA Z shaft. *HYDRA tools* – Remove tools manually and inspect them for wear and/ or damage.	
Board and Component Handling	*Y wagon* – Clean and lubricate the Y-wagon rods. *Tray Wagon Magazine (when used)* – Clean and lubricate the Tray Wagon Magazine rod.	
Other	*Warning signs* – Inspect the Warning signs. Replace if necessary.	

160 Hours Maintenance

This preventive maintenance shall only be carried out by authorized MYDATA service engineers. There is a specific instruction for the yearly maintenance that has to be followed.

Interval	Maintenance actions	Completed
Monthly or 160 hours.	***1.*** *Inspect the X-wagon ribbon XXW1 and XXW2 cables.*	
	2. *Dual vision camera optical outer mirror.*	
	3. *Clean the HYDRA Theta belt.*	
	4. *Clean the HYDRA camera glass.*	
	5. *Lubricate the front and rear of the HYDRA Z rack with OKS 270 grease.*	
	6. *Check the HYDRA vacuum system as described in the machine manual.*	
	7. *Check the Standard vacuum system.*	
	8. *Clean or replace the fan filters.*	
	9. *Check the grease pump.*	

Yearly or 2000 Hours Maintenance

This preventive maintenance shall only be carried out by authorized MYDATA service engineers. There is a specific instruction for the yearly maintenance that has to be followed.

Interval	Maintenance actions	Completed
Yearly or 2000 hours.	Please contact your MYDATA Service Department to arrange for a visit by a MYDATA field service engineer.	

Appendix A - Service Program Reference Guide

The Service Program is a collection of various basic service tools selectable from a main menu (see Figure A-1).

There is also an Extended Service Program that is basically the same program as the Service Program, but some of the sub menus have more options than the Service Program.

The Extended Service Program contains procedures that should only be carried out by an authorized MYDATA service engineer

Starting the Service Program

- If you are currently running TPSys, then you can select *Exit* > *Exit To Service* in the menu.
- ... or select the *Restart TPSys* option in the *Exit* menu and press <Space> to get the startup menu. In the startup menu, select the *Service* option.

The Service Program main window is shown in Figure A-1.

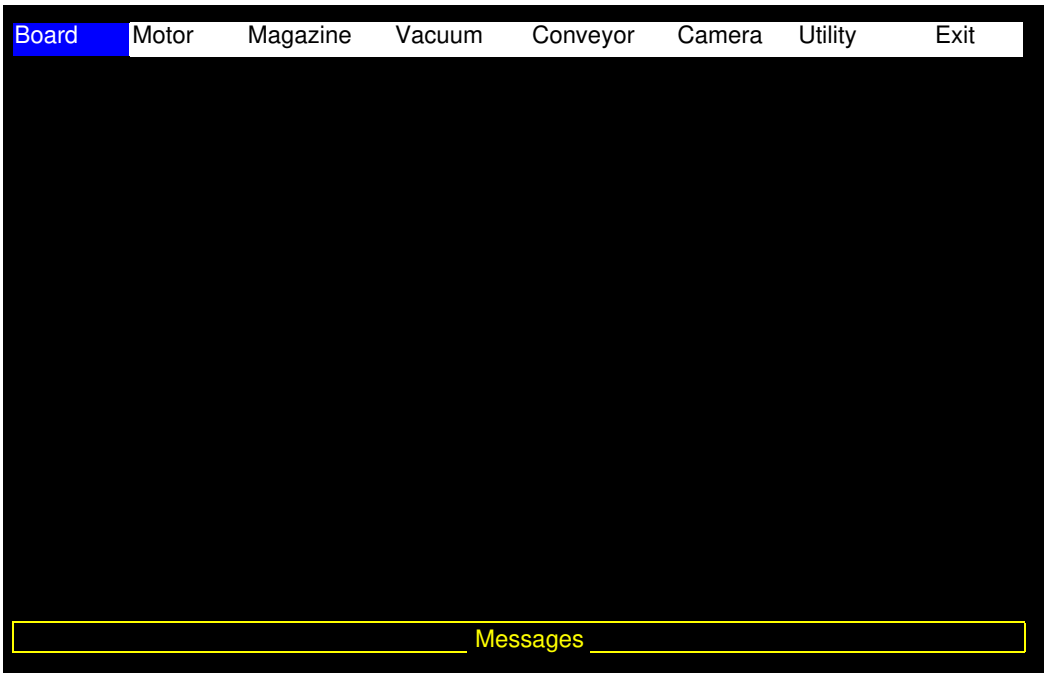


Figure A-1. Service program main menu

Main Menu Options

Described below are some of the options and commands that are available from the main menu.

Any dimmed alternatives in the shown menus are not applicable to the current machine configuration.

Board

To control the Servo computer boards of the various movements of the machine, including:

- Show status.
- Load or reset motor controller boards.

Motor

To control the various axes of the machine, including:

- Initiate motors and read position or range.
- Control locks and latches for single and HYDRA mount heads.
- Toggle the Y wagon's position.
- Measure frictions.
- Calibrate the force sensor.

Magazine

To control tape and vibrator magazines, including:

- Step, poll and test magazines or removable feeders.
- Test the MagLink used by the TEX Tray Exchanger.

Vacuum

To control the vacuum pump and the valves for vacuum and air pressure for the single mount head tool and the HYDRA mount tools. The vacuum and force sensors can also be shown from this option.

Conveyor

To control the Y-wagon conveyor features.

Camera

To control the various illumination units and cameras.

Utility

To control and indicate:

- Voltages.
- PAIB board.
- Warning lamps.
- Perform TEX installation.
- Show about information boxes.

Exit

To exit the Service Program.

Board

This menu contains options regarding the various boards (CanIC board - MotZ board) that control the movements of the machine. Selecting one of the boards opens a submenu with options that may vary, depending on selected board.

Any dimmed alternatives in the shown menus are not applicable to the current machine configuration.

The following submenu options are available:

- Show status.
- Reset.
- Load.
- Sensors.

Show status

Displays motor controller load status and servo identification. The information in this box may vary, depending on selected board.

Reset

Performs a hardware reset of the selected board.

Load

Loads the displayed servo program to the selected board.

Sensors

This option is applicable to the *CanIC board* only. Selecting this option opens the *Conveyor board edge sensors* dialog box, which displays information about the internal conveyors board edge sensors.

Show status of all boards

Displays motor controller load status and servo identification for all the boards. Unloaded boards, if any, can also be loaded by confirming this option in the dialog box. If you do not want to load unloaded boards, press the <Esc> key.

Load all boards

Loads all servo files.

Motor

This menu contains options regarding the motors (*C motor* to *Tray wagon motor*) that control the various axes of the machine. Selecting one of the motors (*C motor* to *Tray wagon motor*) opens a submenu with options that may vary, depending on selected motor.

Any dimmed alternatives in the shown menus are not applicable to the current machine configuration.

The following submenu options are available for the selected motor.

- Initiate or Initiate motor.
- Read range.
- Read position.
- Stand by.
- Locks.
- Latches.
- Measure friction.
- Calibrate force sensor.
- Measure cog play.

Initiate or Initiate motor

This option is applicable to all motor functions. This option makes a hardware initiation, i.e. moves to the mechanical stop and resets the position counter.

If Z-axis and/or Hydra Z is not initiated then the system will ask if you want to initiate Y motor anyway. Before proceeding, check that there is no risk for collision between Z-axis and/or Hydra Z and Y axis.

Read range

This option displays the selected motor's range.

Read position

This option displays the current position. To get the position value for a desired position, press <Enter> and the current position is shown.

Stand by

This option is applicable to the X-motor function only. It can be used if the X motor has been stopped in a position where the servo and X motor keep regulating continuously. This situation causes an disturbing noise from the X-wagon motor. Using this command stops the regulation and thus the noise. The stand-by mode ceases automatically at the next X wagon move command.

Locks

This option is applicable to the Z-motor function only. It controls the magnet locks for the Z axis. The locks can be individually controlled. The locks are controlled by the MOT-C board.

Latches

This option is applicable to the HYDRA Z-motor function only. The option provides a way to control the mount tool latches, one latch for each of the eight mount tools. Selecting this alternative displays the dialog shown in Figure A-2.

Dialog box HZ motor latches

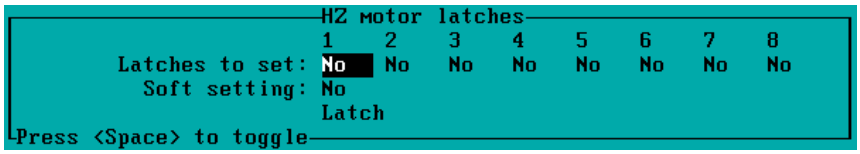


Figure A-2. HZ motor latches.

Latches to set

Each HYDRA mount tool that has its latch set will follow the vertical movement of the Z mechanism. The latches are set by selecting the *Yes* option for the desired tool numbers. Tools with the *No* option will not move.

Soft setting

Changing the state of the latches can be made softly (slowly). This setting enables/disables this feature.

Latch

Highlight this option and press <Enter> to carry out settings made. To toggle between *Yes* and *No* press <Space>.

Measure friction

This option measures the friction, and it is applicable to all the movement axes except the X axis.

Depending on the selected motors control system MOT-board or CAN-board, the available options may differ somewhat. When measuring friction on CAN- controlled motors, a dialog box is shown with the following information:

Dialog box Measure friction

Depending on the selected motor, the available options differ somewhat. When measuring friction on the *X motor*, *Y motor* or *Tray wagon motor* the dialog box shown in Figure A-3 is displayed.

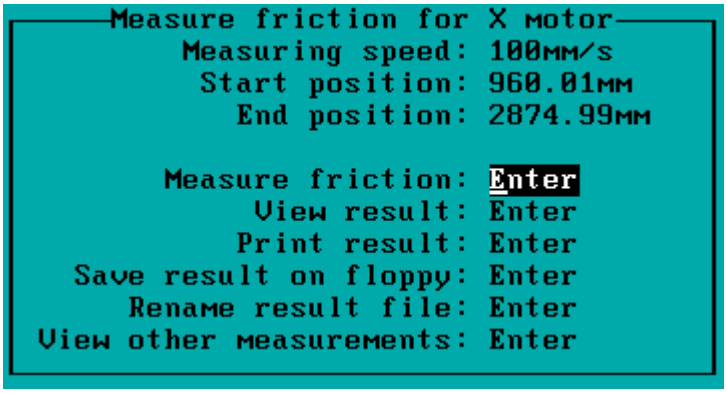


Figure A-3. Measure friction for X motor or Y motor.

Measuring speed

Speed value while measuring friction.

Start position

Value that indicates where on the unit the friction measurement area starts.

End position

Value that indicates where on the unit the friction measurement area ends.

Measure friction

Start the measuring procedure.

View result

Opens the information box that shows the friction measurement result.

Print result

Print the measurement result on a printer.

Save result on floppy

Save the measurement data on a floppy disk.

Rename result file

Rename the measurement data file.

View other measurements

View results from previous measurements. The friction result is presented as a histogram, with the position intervals to the left and the actual force required to move the unit is represented by 'X's to the right in the figure. A summary of the friction result is shown above the histogram.

Measure cog play

This procedure is used to measure the cog play for the X-wagon cogwheel.

Calibrate force sensor

This option is used to calibrate the tool indicator used for single mount head spring-loaded tools.

Gluepot motor

This option is used to start and stop the glue pot rotation motor.

Show/Hide motor positions

Selecting this option opens and closes an information box that shows the positions for the motors used in the system.

Show/Hide force/vacuum sensors

Selecting this option opens and closes an information box that shows the vacuum and the tool indicator values for standard mount tool and HYDRA mount tool. The force and vacuum indication features are controlled by the MOT-Z board.

Vacuum

The vacuum in the mount tool shown as a value between 0 and 255. See the vacuum section on page A-11.

Force

Tool indicator value. Normal value is approximately 180 for released tool and 0 - 20 when the tool nozzle is pressed in.

HYDRA mount tool information box

Vacuum

Z – Standard mount tool vacuum.

The vacuum in the mount tool shown as a value between 0 and 255. See the vacuum section on page A-11.

H – HYDRA unit vacuum.

A value between 30 and 75 is shown for no vacuum. A value between 190 and 220 is shown for full vacuum. See the vacuum section on page A-11.

Force

Z – Standard mount tool indicator value.

Normal value is approximately 180 for released tool and 0 - 20 when the tool nozzle is pressed in.

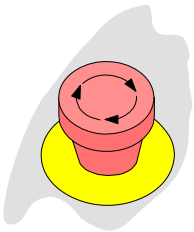
Tool 1-8 – HYDRA tools indicator value.

The Tool 1-8 lines in the figure apply, individually, to the eight HYDRA mount tools.

Hit

Indicates, individually for the eight HYDRA mount tools, if the nozzles have ‘hit’ components, i.e. are pressed in somewhat (indicated *Yes*) or not (*No*). You can test the function by gently pressing the nozzles upwards.

Show/Hide safety switches



Displays the status of the emergency stop buttons and the light beams of the X-wagon optical safety system as follows:

Emergency button

No

The emergency stop buttons are not pressed. The machine is operable.

Yes

At least one of the emergency stop buttons are pressed down.The machine is not operable.

Light curtain

No

The light beams of the X-wagon optical safety system are not blocked (green LED lit on the optical safety unit). The machine is operable.

Yes

The light beams are blocked (red LED lit). The machine is not operable.

This function is controlled by the MOT-X board.

Both the emergency stop buttons have to be pressed down to release the X wagon and make it possible to move it manually.

Magazine

Step, polling and test commands can be given to a desired magazine by selecting the *Magazine* menu.

Any dimmed alternatives in the shown menus are not applicable to the current machine configuration.

All magazine functions are controlled by the *CanM board*.

Step magazines

Sends a component advancement command to the magazine.

This command can be used to obtain component advancements without picking a component after each advancement.

Select the desired magazine by entering the magazine position in the *Select slot* dialog box.

After selecting the desired magazine, you can choose to make advancement steps on multiple feeders or on a single feeder.

If you select *Yes* a multiple feeder dialog box is shown. If you select *No* a single feeder dialog box is shown. They show the following data:

Dialog box feeder(s)

Feeders/Feeder

You can choose feeder by pressing <Space> (multiple feeders) or enter the desired feeder number (single feeder).

Feeds wanted

Enter the desired number of feeds to be performed.

Steps per feed

Enter the desired number of steps per feed to be performed on each feeder.

Step

Starts the step command.

Steps done

Counts the number of steps done.

Poll

Polls those magazines which are inserted in the machine. The polling result is displayed on the monitor. If the text in the *Buttoned out* column is *No* the magazine is in operation (the green LED on the magazine is lit with a steady light). If the text is *Yes* the system does not pick from the magazine (the green LED is either flashing or off). If it is neither of these but '---' the magazine type has no release button.

If you press the <F1> key, then the type and serial numbers are displayed as octal numbers. Another press on the <F1> key toggles back to decimal presentation.

Test

Selecting this option opens a submenu where it is possible to perform a number of tests on a magazine.

This option tests continuously major functions of the selected magazine.

Select the desired magazine by entering the magazine position in the *Select slot* dialog box. A continuously updated test result for the selected magazine is shown with the following data:

Dialog box test

Test result

Passed – A communication test completed successfully.

Off – The test was not successfully completed.

Button

No – The release button on the magazine is released.

Yes – The release button on the magazine is pressed in.

LED's

Off – Both of the LEDs are temporarily off.

Yellow – The Yellow LED only is temporarily lit.

Green flash – The Green flash LED only is temporarily lit.

Yellow flash – Yellow flash of the LEDs are temporarily lit.

Off – The LED test was not successfully completed.

The *Button* and *Lamps* status shall reflect the visible states of these functions on the magazine.

Poll removable feeders

Polls magazines that are equipped with removable feeders if any.

Select the desired magazine by entering the magazine position in the *Select slot* dialog box. The polling result is displayed on the monitor.

The serial numbers are presented both by decimal and by hexadecimal notation in the information box.

Vacuum

The vacuum pump and the valves for pressure and vacuum can be controlled with the options in the *Vacuum* menu.

Any dimmed alternatives in the shown menus are not applicable to the current machine configuration.

Show/Hide force/vacuum sensors

Opens and closes an information box that shows the vacuum and the tool indicator values.

This menu option is the same as the *Show/Hide force/vacuum sensors* option in the *Motor* menu described in *Show/Hide force/vacuum sensors* on page A-7).

Z vacuum

Opens the vacuum control dialog box for the standard mount tool.

You can control the vacuum pump, the vacuum valve and the pressure valve by moving the cursor to the desired option and pressing <Enter>.

To be able to see the vacuum level in the standard mount tool, open the vacuum sensor measuring box by selecting the *Show/Hide vacuum/force sensors* option. The vacuum in the standard mount tool is shown as a value between 0 and 255. A value between 0 and 30 should be shown for no vacuum, that is when the vacuum/pressure pump is off.

A value above 170 should be shown for full vacuum, that is when the pump is on, the vacuum valve is open, and the pressure valve is closed.

HYDRA vacuum

Opens a vacuum control dialog box for the HYDRA unit.

You can control the vacuum pump and the pressure valve by moving the cursor to the desired option and pressing <Enter>.

The vacuum valves are controlled by moving the cursor to the desired tool number, pressing <Space> for an *Open* or *Close* action, moving the cursor to the *Set* option, and pressing <Enter>.

To be able to see the vacuum levels in the HYDRA mount tools, open the vacuum sensor measuring box by selecting the *Show/Hide vacuum/force sensors* option.

The vacuum in the HYDRA unit is shown as a value between 0 and 255.

A value between 30 and 75 should be shown for no vacuum, that is when the vacuum/pressure pump is off.

A value between 190 and 220 should be shown for full vacuum, that is when the pump is on, the vacuum valve for the particular nozzle is open, and the pressure valve for the same nozzle is closed.

The vacuum system is controlled by the MOT-Z board.

Conveyor

From the *Conveyor* menu, you can control a number of conveyor features.

Any dimmed alternatives in the shown menus are not applicable to the current machine configuration.

Selecting one of the motors (*Width motor*, *Hold motor* or *Transport motor*) opens a popup menu with options that may vary, depending on selected motors.

The options *Transport motor* and *Hold motor* is only applicable for CAN-controlled conveyors.

The following submenu options are available for the (*Width motor*, *Hold motor* or *Transport motor*):

- Initiate.
- Read range.
- Read position.
- Move, Movego.
- Toggle axis.
- Measure friction.

Initiate

To initiate the different conveyor motors, ensure that the conveyor path is empty (no PCB in the path) and select the Initiate option in the popup menu.

Since the MOT-controlled conveyors only have a *Width motor*, this option initiates the whole MOT-controlled conveyor.

Select Yes in the dialog box to perform the motor initiation.

Read range

This option displays the selected motor's range.

Confirm the Read command by pressing <Enter>. The *Min* and *Max* positions of the selected range are shown in the box.

Read position

This option displays the current position. To get the position for a desired position, move to the position when the *Read Conveyor width* box is shown. Then, confirm the *Read* command by pressing <Enter>. The current position is shown.

Move, Movego

These options are advanced movement commands that can be used by service engineers to perform various test and service procedures. These commands are not covered in this manual.

CAUTION! Due to the risk of damaging the machine, do not run the Movement commands without a full understanding of their function.

Toggle axis

This option toggles the conveyor axis position, that is moves the conveyor axis between its end positions.

This command will move the selected conveyor axis to the opposite end of its travel. If the axis is not at either end, it will move to the end furthest from its current position.

Measure friction

This option measures the friction, and it is only applicable to the CAN-controlled conveyor. By selecting this option in the *Conveyor* submenu, a popup box is shown with the following data.

Dialog box Measure friction

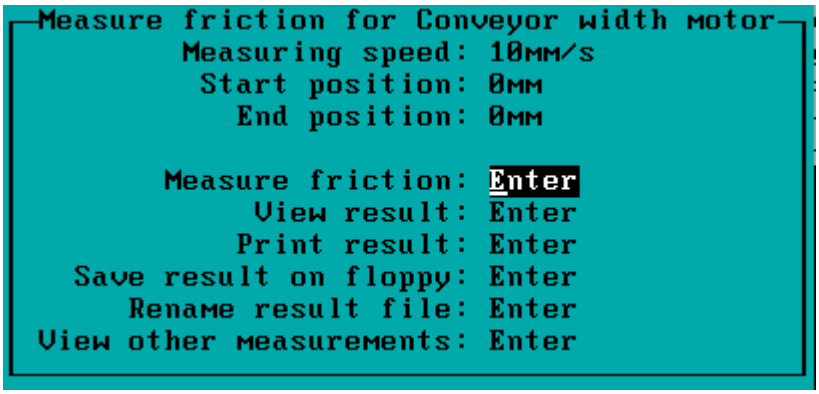


Figure A-4. Measure friction on conveyor motors.

Measuring speed

Speed value while measuring friction.

Start position

Value that indicates where on the Conveyor the friction measurement area starts.

End position

Value that indicates where on the Conveyor the friction measurement area ends.

Measure friction

Start the measuring procedure.

View result

Opens the information box *Conveyor Width Axis Friction Measurement Result*. The friction result is presented as a histogram, with the position intervals to the left and the actual force required to move the Conveyor Width Axis is represented by 'X's to the right in the figure. A summary of the friction result is shown above the histogram in the information box.

Print result

Print the measurement result on a printer.

Save result on floppy

Save the measurement data on a floppy disk.

Rename result file

Rename the measurement data file.

View other measurements

View results from previous measurements.

Load/unload board

By selecting the *Load/unload board* option in the *Conveyor* menu a load/unload menu is shown with the following data:

You can load, unload, grab, and release the board by selecting the desired option from the menu and pressing <Enter>.

The CAN-controlled conveyor only has the *Grab* and *Release* option in the load/unload menu.

Sensor status

This option is only applicable for MOT-controlled conveyors.

A number of sensors can be used in the conveyor path. The status of these sensors can be shown by selecting the *Sensor status* option in the *Conveyor* menu.

Yes

A board is currently present at the sensor position. You can test this option by putting a finger in front of the sensor.

No

There is no board at the sensor position, or the particular sensor is not used.

End

Not used.

End-of-fast

Not used.

Support up

Indicates that the board is in its upper position.

Support down

Indicates that the board is in its lower position.

Width home

Indicates the home position of the internal Y-wagon conveyor width.

Elevator home

Not used.

Front/left presence

The front or left (depending on the conveyor direction) end position of the internal conveyor path of the Y wagon.

Right button

Indicates that the right and center buttons are pressed simultaneously.

Left button

Indicates that the left and center buttons are pressed simultaneously.

Rear/right presence

The rear or right (depending on the conveyor direction) end position of the internal conveyor path of the Y wagon.

SMEMA outputs

To be able to test the conveyor system, the SMEMA output from the machine can be manipulated by the operator. This is performed by first selecting the *SMEMA outputs* option in the *Conveyor* menu.

You can set channel 1 and channel 2 to be busy or available by selecting the desired option from the menu and pressing <Enter>.

Show/Hide SMEMA inputs

The SMEMA input signal from the prior conveyor system can be shown or hidden by selecting the Show/Hide SMEMA inputs option in the Conveyor menu.

Match conveyor speed

With this option you can match the conveyor speeds in a dialog box. If the internal conveyor speed is changed a popup is displayed after pressing OK, asking if the parameters 92:0013 and/or 92:0023 should be set to the entered value.

Camera

The *Camera* menu controls the positioning camera on the X wagon, the optical centering vision camera, the HYDRA vision camera, and Linescan camera.

Any dimmed alternatives in the shown menus are not applicable to the current machine configuration.

When a camera is selected you will get a pop-up window where you can turn on or off the camera. Depending of selected camera you will also be able to select which lighting to use for a particular camera.

X-wagon camera 1

Turns on/off the X-wagon camera.

Optical centering camera 1 to *Optical centering camera 4*

Turns on/off the installed optical centering camera(s). The system can utilize up to four different optical centering cameras.

HYDRA camera

Turns on/off the HYDRA centering camera, if any.

Linescan camera 1 or *Linescan camera 2*

Turns on/off the Linescan camera(s).

All cameras off

Turns off all the cameras.

Show LSAD status

Selecting this option opens an information box that shows the current status of the Linescan cameras LSAD board in the machine.

Utility

From the *Utility* menu, you can control the following features:

Show line voltages
Displays the internal system voltages in an information box.

This function is controlled by the MOT-M board.

Test PAIB board
This option is used to show status for a number of various features in the machine.

By selecting *Yes* in the shown dialog box, the selected servo file will be loaded to the MOT-X board.

A new window is opened, showing the following information:

Emergency button
Yes
At least one of the emergency stop buttons are pressed down.

No
None of the emergency stop buttons are pressed down.

Limits exceeded
Not used.

Door open
Yes
At least one machine door is open.

No
All the machine doors are closed.

X-wagon fan fail
Yes
The X wagon fan is not working.

No
The X wagon fan is working.

ELMO disabled
Yes
The ELMO booster unit is off.

No
The ELMO booster unit is on.

Belt motor hot

Yes

The X wagon belt motor is too hot.

No

The X wagon belt motor is not too hot.

Motor relay on

Select *Yes* or *No* and press <Enter> to activate or deactivate the X wagon motor relay.

ELMO on

Select *Yes* or *No* and press <Enter> to switch the ELMO booster on or off.

Grease pump on

Select *Yes* or *No* and press <Enter> to switch the X wagon grease pump on or off.

Limit check on

Not used.

Set PAIB port

Select *Enter* and press <Enter> to set the choice made in the lower part of the box.

About machine

This option shows the machine type, the machine serial number, and the machine name:

– *Model*: MY19

– *Serial*: 190001

– *Name*: MY19-Machine

About HYDB board

This option shows the following HYDRA information in an information box.

– Version

– Type

– Supply voltage.

– Motor temperature.

Warning lamps

This option is used to test the lamps in the signal tower. Each lamp can be set to *On*, *Off* or *Blink*. This test does not affect the lamp configuration setting.

TEX installation

This option is used to initially install the TEX Tray Exchanger, which has to be carried out by MYDATA service personnel.

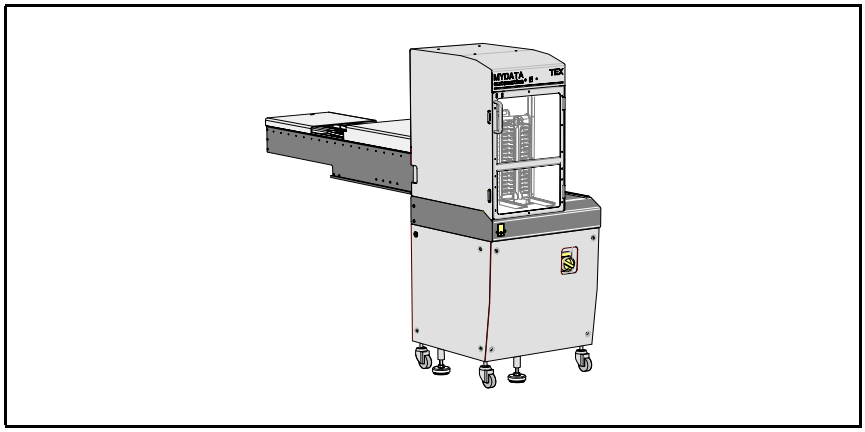


Figure A-5. TEX Tray Exchanger.

Harddisk status

Selecting this option opens an information box that shows the current status of the hard disks used in the machine (see Figure A-6).

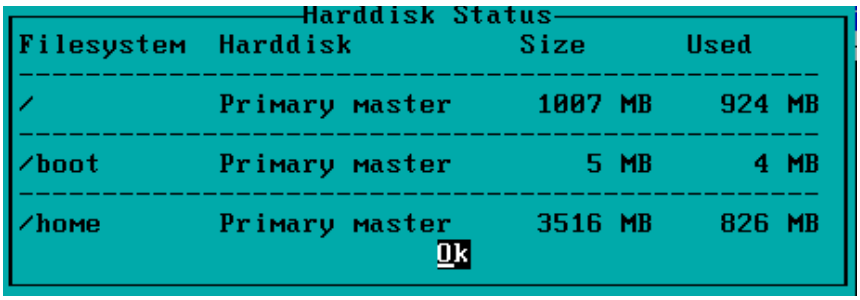


Figure A-6. Harddisk status.

Appendix B – About the Documentation

The documentation of the MYDATA component placement machines comprises the following parts:

- Operator's manual.
- Programming manual.
- Service manual.
- Software manual.
- Spare parts catalog.

The document structure in Figure B-1 shows the intended user for each document.

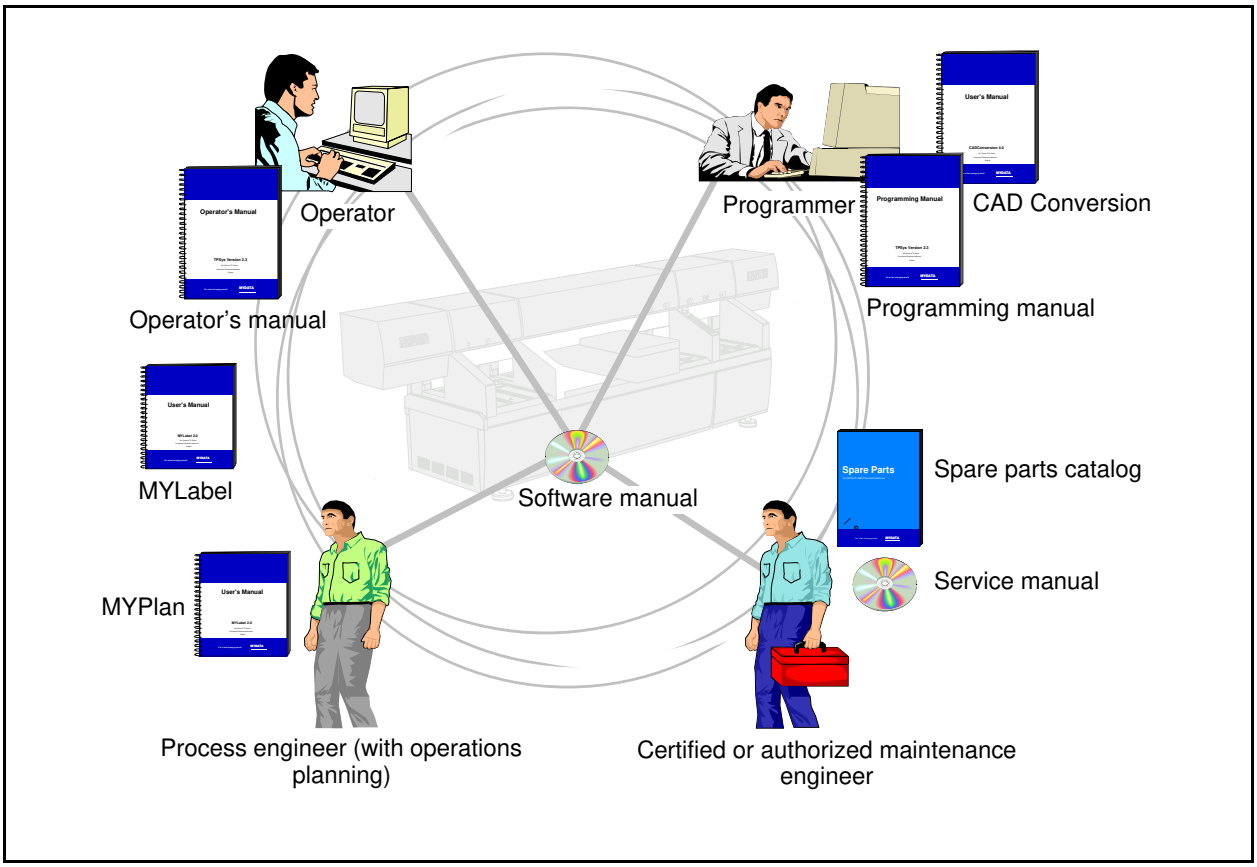
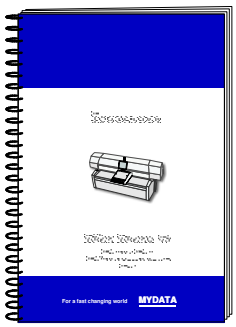


Figure B-1. Document structure.

These documents and some supplementary software products are described on the following pages.

Operator's Manual



An operator's manual is available for the MY9–MY19 type of MYDATA pick and place machines.

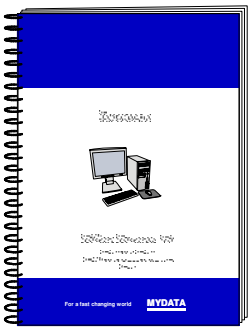
This manual is provided with each machine.

The operator's manual is available in the same languages as the TPSys software.

The operator's manual contains information to assist the operator to start and operate the system, load components and handle magazines and trays.

Information about safety, daily maintenance, HYDRA, TEX, and Tray Wagon Magazine operation is also included in the operator's manual.

Programming Manual



A programming manual is available for TPSys version 2.6 that covers all MYDATA pick and place machine types running TPSys version 2.6.

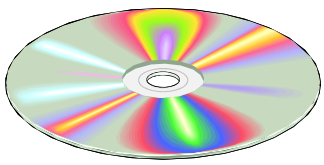
This manual is provided with each machine.

The programming manual is not available in the same languages as the TPSys software, but in the majority of these languages.

The programming manual contains basic information about the machine movements, such as coordinates, fiducial marks, angles, centering, verification, how to program boards, create mount lists, and complete component and package lists.

Information about pre-programmed packages, HYDRA, TEX, and Tray Wagon Magazine programming is also included in the programming manual.

Service Manual



A service manual is available for the MY9–MY19 type of MYDATA pick and place machines.

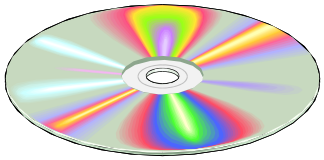
This manual is provided with each machine.

The service manual is available on a CD in English only. A hard copy can be ordered from MYDATA.

The service manual contains descriptions, service instructions, and calibration guidelines for the machine.

Information about safety, maintenance, and common optional devices and systems are also included in the service manual.

Software Manual



A software manual is available for TPSys version 2.6 that covers all MYDATA pick and place machines running TPSys version 2.6.

This manual is provided with each machine.

The software manual is available on a CD in English and Japanese. A hard copy can be ordered from MYDATA.

The software manual contains a system overview, Linux description, import/ export information, back up/restore instructions, and network communication.

The software manual contains also a message reference guide, containing TPSys messages with descriptions.

Spare Parts Catalog

A spare parts catalog, containing information, figures and part numbers on the most common spare and consumable parts, is available from MYDATA.

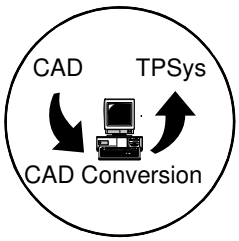
The spare parts catalog is available in English only.

Supplementary Software

MYDATA provides supplementary software that facilitates the programming work in TPSys.

This software may be mentioned somewhere in this manual but it will not be described here. Refer to the manual for the respective product.

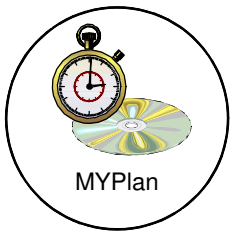
CAD Conversion



CAD Conversion is a software package used to convert CAD files containing placement data to TPSys in order to use the data for component placing.

The CAD Conversion software package includes a comprehensive *CADConversion, User's Manual*.

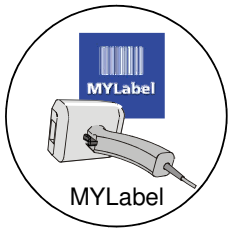
MYPlan



MYPlan is a Windows-based software developed for scheduling board assemblies in MYDATA placement machines. The purpose of the software is to provide the operator with appropriate loading instructions to increase the placement machine performance. MYPlan calculates the best possible solution to place the components under certain circumstances.

The MYPlan software package includes a comprehensive *MYPlan, User's Manual*.

MYLabel



MYLabel keeps track of component carriers (tapes, sticks) used in production by using barcodes. MYLabel uses an identification barcode linked to a database with component names, quantities, and batch information. The database also contains component information, such as stock location and owner.

The MYLabel software package includes a comprehensive *MYLabel, User's Manual*.

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MYDATA®
automation
WORLDWIDE

SWEDEN
MYDATA automation AB
Adolfsbergsvägen 11
168 66 Bromma
Sweden
Tel: +46 8 475 55 00
Fax: +46 8 475 55 01

USA
MYDATA automation, Inc.
320 Newburyport Turnpike
Rowley MA 01969-2002
USA
Tel: +1 978 948 6919
Fax: +1 978 948 6915

JAPAN
MYDATA automation K.K.
Okura bldg., No. 3, 1st floor
2-17-7, Nihonbashi Kayabacho,
Chuo-ku, Tokyo 103-0025
Japan
Tel: +81 3 3661 7714
Fax: +81 3 3661 7715

UK
MYDATA automation Ltd.
14 Wessex Trade Centre
Ringwood Road
Poole BH12 3PQ
England
Tel: +44 1202 723 585
Fax: +44 1202 723 269

CHINA
MYDATA automation Pte Ltd.
Block 4, No. 700 Gui Ping Road,
Cao He Jing Hi-Tech Park,
Shanghai 200233, China
Tel: +86 21 6485 5389

MYDATA automation Pte Ltd.
Shop 206, Dong Po House,
Yee Hong Road, Yan Tain
Industrial Area,
Fenggang town, Dongguan,
Guangdong, China
Tel: +86 769 7567 313

BENELUX
MYDATA automation B.V.
Schakelplein 10
5651 GR Eindhoven
Netherlands
Tel: +31 40 262 06 67
Fax: +31 40 262 06 68

SINGAPORE
MYDATA Asia Pte Ltd.
Asiawide Industrial Building
5 Pereira Road, #01-01
Singapore 368 025
Tel: +65 6281 7997
Fax: +65 6281 7667

FRANCE
MYDATA automation S.A.
13 Rue de Norvège BP122
91944 Courtaboeuf Cedex
France
Tel: +33 1 69 59 24 34
Fax: +33 1 69 28 71 00

www.mydata.com
info@mydata.se