ENGINEERING
TOMORROW

Operator's Manual

ET5070 Crimping Machine

Imprint

Manufacturer:

UNIFLEX-Hydraulik GmbH
Robert-Bosch-Strasse 50-52
D-61184 Karben
Germany

Phone: +49 (0) 60 39 / 91 71 - 0
Fax: +49 (0) 60 39 / 91 71 - 181

This Operating Manual of the machine is a translation; the original is in German.

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EC / UK - Declaration of Conformity

In accordance with EC Machinery Directive 2006/42/EC and UK-Supply of Machinery (Safety) Regulations 2008.

The following machine

ET5070

was developed, designed and manufactured in compliance with EC Directive 2006/42/EC and UK-Supply of Machinery (Safety) Regulations 2008, in the sole responsibility of

UNIFLEX-Hydraulik GmbH
Robert-Bosch-Strasse 50 - 52
D-61184 Karben

The following standards, codes and specifications have been applied:

- EC Directive 2006/42/EC
- EMC Directive 2014/30/EC
- EN ISO 12100: 2010
- EN 60204-1: 2018
- UK-Supply of Machinery (Safety) Regulations 2008
- UK-Electromagnetic Compatibility Regulations 2016

This declaration are invalid when the machine is modified or if unauthorized and unapproved third-party components are used without our prior approval.

Entity authorised for documentation: Uniflex-Hydraulik GmbH, Technical Documentation Dept.

Karben, 04.10.2022

Managing Director Harald von Waitz

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1 About this document

In this Operation Manual, the “forming machine ET5070” is consistently referred to as machine.

This Operation Manual includes important notes on how you operate your machine/unit safely, properly and economically.

Use not in compliance with the intended purpose may result in hazard to the operator's health and life and/or in the risk of damage to/the machine/unit. Consequently, please only use the machine/unit

- in good order and condition,
- in accordance with its intended purpose,
- in a safety-conscious manner, with awareness of risks and hazards,
- in compliance with all notes included in this Operation Manual.

The machine/unit may only be operated by staff who

- has read the Operation Manual,
- has understood it,
- has been instructed in the operation of the machine/unit, and
- has signed in the Annex.

Figures may include accessories/options. Customer-specific equipment may vary.
The product images shown are for reference only and may differ from the product delivered.

1.1 Target groups

The target groups of this Operation Manual are:

Owner

An owner is a natural person or entity using the device himself/herself/itself, or on whose behalf the device is used. An owner may appoint a representative to exercise the owner's rights and obligations.

The owner has to make sure that

- national provisions, occupational safety regulations and applicable environmental protection regulations are fully complied with;
- persons working on the machine/unit are adequately qualified;
- persons working on the machine/unit are suitable for operating the machine/unit;
- the Operation Manual has been read and understood. One hardcopy of the Operation Manual must always be kept at a designated place where the machine/unit is used.
- persons working on the machine/unit are aware of potential risks;
- the operating staff is familiar with the location as well as with operating the fire alarm and fighting means. Free access to this equipment must be ensured.
- personal protection equipment is worn (safety footwear, protection gloves and safety glasses).

Machine/unit fitters

Machine/unit fitters must be at least 18 years old and have completed training for the task, i.e. they must have attended a specialist vocational training.

A fitter

- must observe the instructions in the Operation Manual;
- must inform the owner on failures and damage.

Operator

An operator is a person charged with and instructed in the proper operation of the machine/unit by the owner or the otherwise contractually obliged person.

The operator

- must observe the instructions in the Operation Manual;
- must inform the owner on failures and damage.
- must not perform and maintenance or repair work on the machine/unit.

1.2 Storage

The Operation Manual is part of the machine/unit and must be kept near the machine/unit at all times. Upon disposal of the machine/unit, the Operation Manual must also be handed over.

1.3 Name plate

The name plate is fixed near the power cable.

1.4 Abbreviations

CFM	Crimp Force Monitoring
FD	Manual Flow Divider
PB	Crimping dies
PBK	Calibration crimping dies
PFC	Pressure Force Control
PFM	Pressure Force Monitoring
QDC	Quick crimping die change system
ZWB	Intermediate dies

2 Safety instructions

2.1 Presentation of warnings

Warning notes in the Operation Manual warn against risks involved with the handling of the machine/unit. Risk levels are identified as follows:

HAZARD! The signal word HAZARD identifies an imminent hazard resulting in serious injuries or death. This warning is supplemented by a triangular hazard symbol.

WARNING! The signal word WARNING identifies a potentially hazardous situation, which might result in serious injuries or death. This warning is supplemented by a triangular hazard symbol.

CAUTION! The signal word CAUTION identifies a potentially hazardous situation, which might result in light injuries. This warning is supplemented by a triangular hazard symbol.

ATTENTION! The signal word ATTENTION identifies a potentially hazardous situation, in which the product or property in the environment may be damages. This warning is supplemented by a hazard symbol or a exclamation mark.

2.2 Intended use

This machine is a forming machine for industrial use, only suitable for the manufacture of hose connections with a permissible diameter depending on the fitting and the hose thickness, see “Technical Data” in Section 3.

Intended purposes include:

- single workplace for one person only,
- single stroke with manual feed and withdrawal,
- for maximum hydraulic operating pressure, see “Technical Data” in Section 3.
- operating temperature between 10 °C and 35 °C,
- operation in a closed room,
- use of eight identical original UNIFLEX dies with the same label or seven dies and one associated marking crimping die.

- The machine must not be operated by persons not capable of operating the machine without any risk. These may include:
  - persons with physical or mental disabilities;
  - children and persons under age;
  - persons with a restricted capability for the operation of machines (e.g. under the influence of drugs, alcohol or narcotics)

Use of the control in compliance with the intended purpose also includes compliance with the instructions in this Operation Manual.

Use for other than the intended purpose

Any other use is considered as being not in compliance with the intended purpose, in particular:

- design modification of the machine;
- use in explosive environments;
- forming of non-metal workpieces without specific safeguards approved by UNIFLEX;
- misuse of consumables and waste materials.

In particular non-metal workpieces may by overstressed by the forming process so that this may result in a sudden failure. Chips or seriously accelerated workpiece parts impose a high risk potential for operators, individuals and objects, even outside the working area.

WARNING!	
	**Risk for life and health!** Use not in compliance with the intended purpose imposes risks for life and health. Consequences resulting from use for other than the intended purpose shall be under the sole responsibility of the owner. • Always use the machine in compliance with its intended purpose.

2.3 Product-specific risks

The machine/unit is designed in accordance with the latest state of technology. Nevertheless, the machine/unit may impose risks:

2.3.1 Risks imposed by mechanical equipment

Risk of squeezing

When the die system closes, there is a risk of getting squeezed between the die and the workpiece.

- Keep the feed opening for the workpiece as small as possible.
- Keep sufficient distance to the die system.

Tilting hazard

The risk of tilting mainly exists while the machine is being transported.

- Observe the machine's centre of gravity during transport.

2.3.2 Risks imposed by electricity

There is a risk of electrocution near the live parts!

- Work on electric systems may only be performed by qualified electricians or instructed and trained persons under the supervision of a qualified electrician.
- Deactivate the machine/unit and secure it against unintentional restart before maintenance.

2.3.3 Risks imposed by hydraulic equipment

Risks are imposed by all hydraulic lines and connections. Hydraulic systems are subject to special safety provisions. Work on hydraulic equipment may only be performed by persons with expert knowledge of and experience with hydraulic equipment.

- After the machine/unit is deactivated, the given and potentially hazardous residual energy has to be considered.
- Relieve the residual pressure in the system before performing repair or maintenance work on hydraulic systems.

- Regularly check lines and bolted connections for leaks and visible damage. Immediately remedy any damage detected.

Repair work on the hydraulic system of the machine/unit or on its components may only be performed by UNIFLEX specialist staff.

2.3.4 Risks imposed by noise

The noise level meter acc. to IEC 804, Class 2, was calibrated before measuring.
The operation of the machine/unit causes noise emissions of < 70 dB(A) at the workplace. Noise protection is not required.

Higher noise emissions may occur when other machine/unitry is simultaneously used at the workplace. The machine/unit owner must provide for appropriate protection, e.g.

- instruct staff to wear ear protection,
- provide information/instructions on risks,
- identify hazardous areas,
- provide health monitoring.

2.3.5 Risks imposed by substances

Oils, greases and emulsions may penetrate the skin. When handling hazardous substances, oils and greases, the manufacturers' safety instructions have to be observed. Apply skin protection appropriate for the hazardous substances used.

2.3.6 Risk by hot surfaces

There is a risk of burning when the electric motor and/or the workpiece are touched after forming.

- Keep sufficient distance to the electric motor.
- Wear protection gloves.

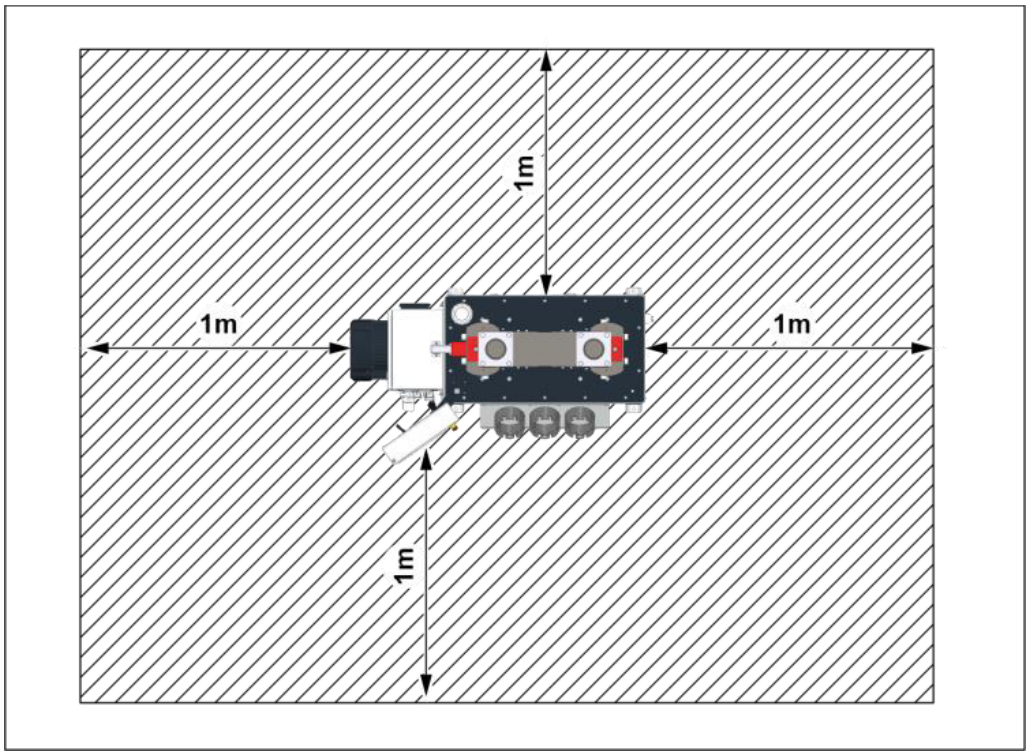
2.3.7 Risks in case of fire

The operating staff has to be familiar with the location as well as with operating the fire alarm and fighting means. Free access to this equipment must be ensured.

Never use water to extinguish a fire. For appropriate fire extinguishing action, please read the safety data sheet of the hydraulic oil supplier.

2.4 Safety

2.4.1 Working area

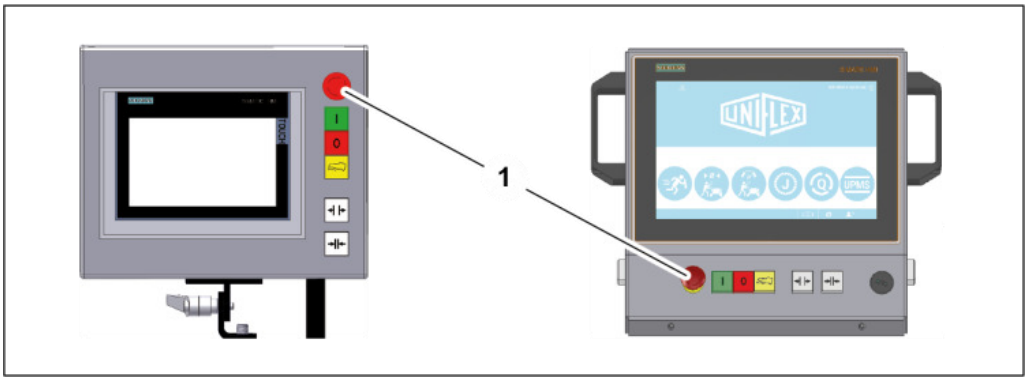


The working area is designed as the area 3 ft all around the machine (shaded).

- Keep the working are free from trip hazards.
- Use ducts for lines and cables.
- Provide good illumination.
- Keep access to hydraulic supply free.

2.4.2 Emergency-stop button

The machine is fitted with an emergency-stop button on the control panel.



Immediately activate the emergency-stop button (1) in cases of emergency.

Remedy the cause of the emergency stop first before unlocking the emergency-stop button.

Do not pull the emergency-stop button for unlocking it, but release it by rotating it.

2.4.3 Protection equipment

Due to the variety of customer-specific workpieces, UNIFLEX is not capable of supplying additional standard protection equipment together with the machine for the prevention of potential residual risks imposed by the machine.

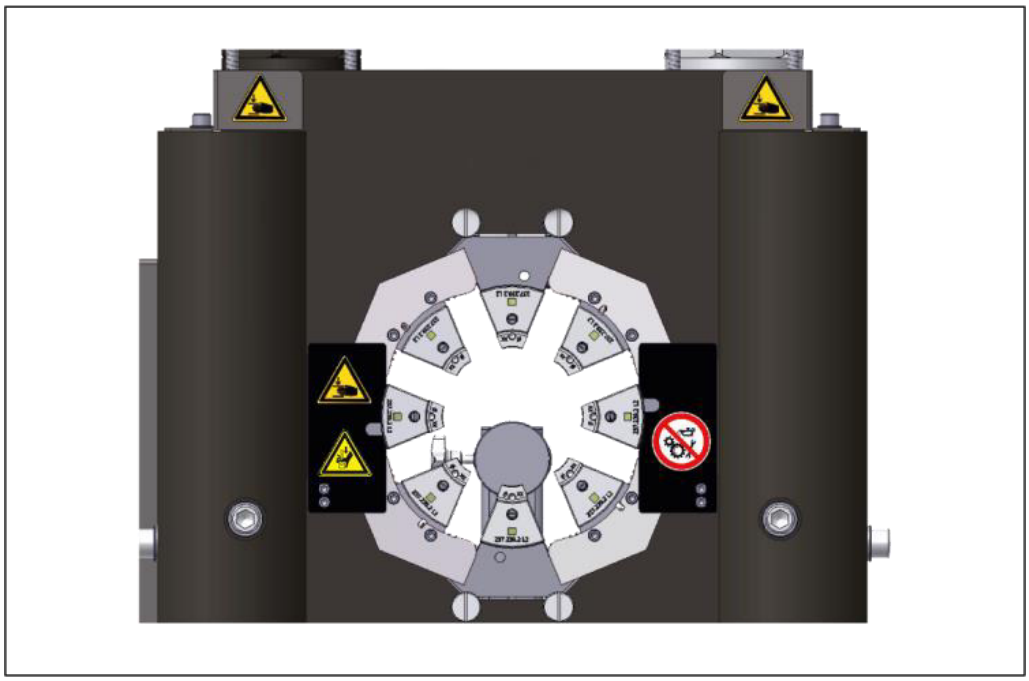
The necessity of additional, workpiece-specific protection equipment may for instance arise for angled workpiece geometries needing a large opening for being inserted into the forming machine. The pressure joining of insulators, structural steel and steel ropes, too, may require special safeguards.

The owner has to consider the need for adapted protection equipment before commissioning. If such need exists, the relevant protection equipment has to be mounted before commissioning of the machine.

UNIFLEX will provide you with customized solutions for protection equipment upon request. Please do not hesitate to address your personal contact for consultation.

Mounted safety equipment must not be removed, bypassed or avoided.

2.4.4 Warning signs on the machine



	**Hand injury** on the die system
	**Risk of squeezing** on the die system
	**Hot surface** on the electric motor

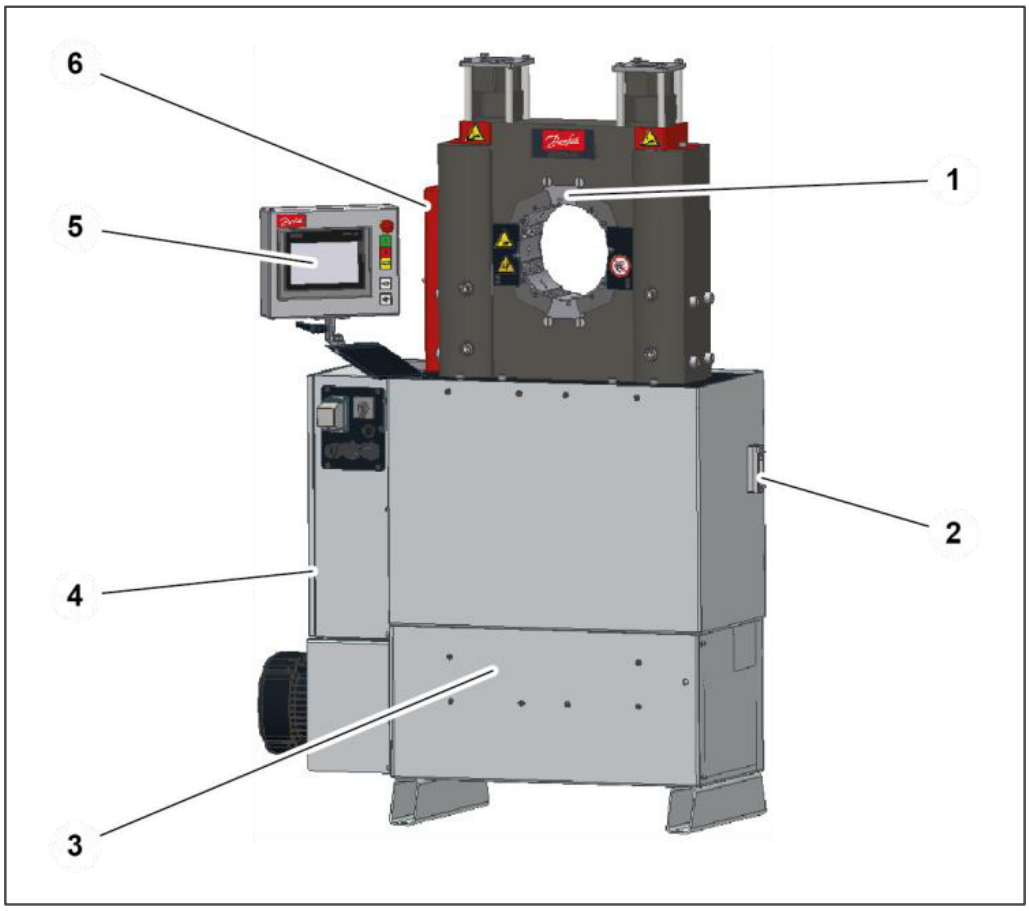
	**Oiling / greasing prohibited** on the die system

Illegible or missing warning signs must immediately be replaced by the owner.

3 Machine description

3.1 Design and function

Base machine



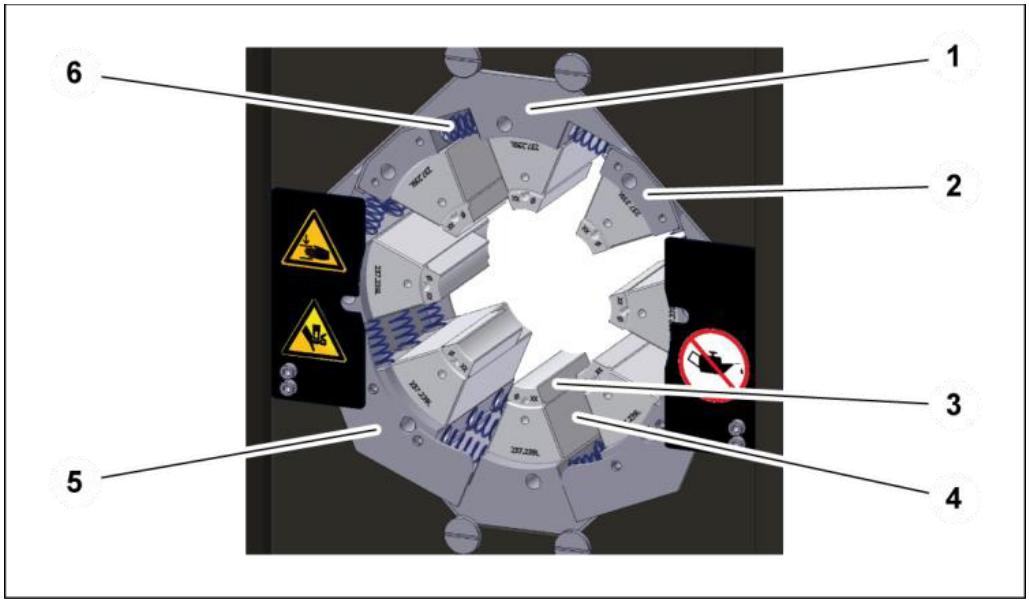
(1) Crimping tool
(2) Oil sight glass
(3) Power unit (comprising electric motor, pump, control block)
(4) Control cabinet
(5) Control panel with buttons and control system CONTROL C.2 / IPC
(6) Position encoder system

The crimping tool (1) is closed hydraulically, whereby the work piece is formed. The pressure needed for this purpose is built up by the electrically driven pump (5) in the cylinders.

The position encoder system (6) records the current position of the die system and transfers the value to the control system.

Data records may be saved in the item memory and recalled at any time in the control system. Depending on the operation mode, the actual forming process is controlled via the buttons on the control panel (5).

Crimping tool



The die system comprises base dies, intermediate dies (depending on the application) and crimping dies.

There are two different types of base dies; the master dies (1) are located on the positions 3 o'clock, 6 o'clock, 9 o'clock and 12 o'clock. The secondary dies (2) are located in between. All base dies are mounted on slide plates. The crimping dies (3) and the intermediate dies (4), if any, are plugged onto the basic crimping dies. The intermediate dies (4) are needed if small work pieces are to be formed on a large machine.

After the forming process, the base dies are pressed apart by the pressure springs (6) when the machine opens. The guiding plates (5) guide the base dies axially in the machine.

3.2 Accessories

The machine may be fitted with accessories. A list of the available accessories is included in the Annex, Section "Accessories".

3.3 Options

The machine can be fitted with Options. A list of the available options is included in the Annex, Section "Options".

3.4 Forming process

There are two types of forming process with different target parameters:

- Forming to a defined diameter
- Forming to a defined pressure

Forming to a defined diameter

This is the standard process for forming to produce hydraulic hoses. The crimping tool closes until it reaches a pre-set diameter, regardless of the required forming force. The required forming force may be up to the machine's maximum capacity.

Optionally, it is possible to monitor the required forming pressure (= forming force) at the time when the pre-set diameter is reached, in order to detect workpiece deviations (PFM option: Pressure Force Monitoring).

Forming to a defined pressure

This process is used for special applications, e.g. insulators with a fibreglass rod, which are pressure-sensitive. Due to the workpiece tolerances, forming to a specific diameter could result in the destruction of the workpiece. The crimping tool closes until the pre-set pressure value is reached; there is no pressure control.

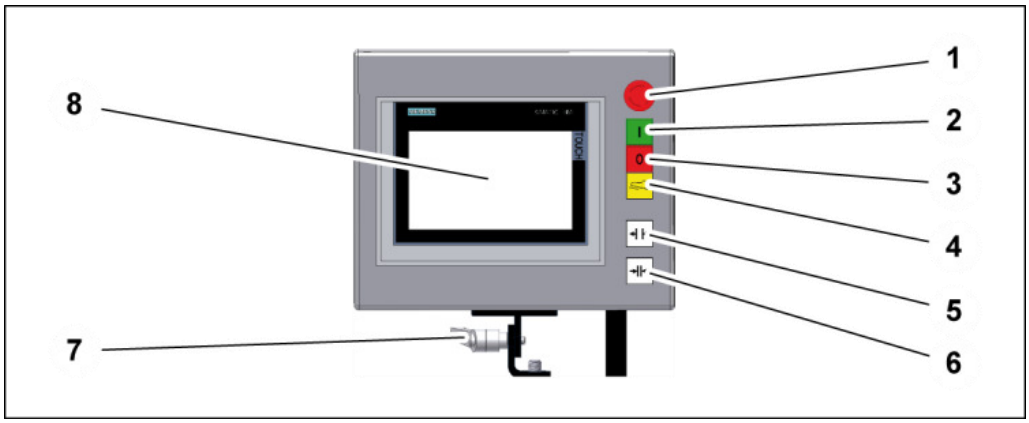
Optionally, it is possible to monitor the obtained forming diameter at the time when the pre-set pressure is reached, in order to detect workpiece deviations (PFM option: Pressure Force Monitoring).

Optional pressure control to the requested pre-set pressure, including the possibility to vary the pressure built-up speed and soft approach of the pre-set pressure (PFC function: Pressure Force Control).

WARNING!	
	**Risk of injuries!** In particular non-metal workpieces may by overstressed by the forming process so that this may result in a sudden failure. Chips or seriously accelerated workpiece parts impose a high risk potential for operators, individuals and objects, even outside the working area! • Relevant workpieces should only be formed using specific safeguards.

ATTENTION!	
	**Risk of damage to machinery!** The machine lifetime is reduced with a high permanent load, while wear increases disproportionately. • When using the machine in series production, it must not permanently be loaded with over 2/3 of the maximum operating pressure. • The especially high load during pressure joining of isolators, structural steel as well as steel ropes (PFC applications) necessitates machine overhauls after 150,000 forming processes, each. Please contact our Service department in due time: +49 (0)6039 9171-0.

3.5 Operation and display elements C.2

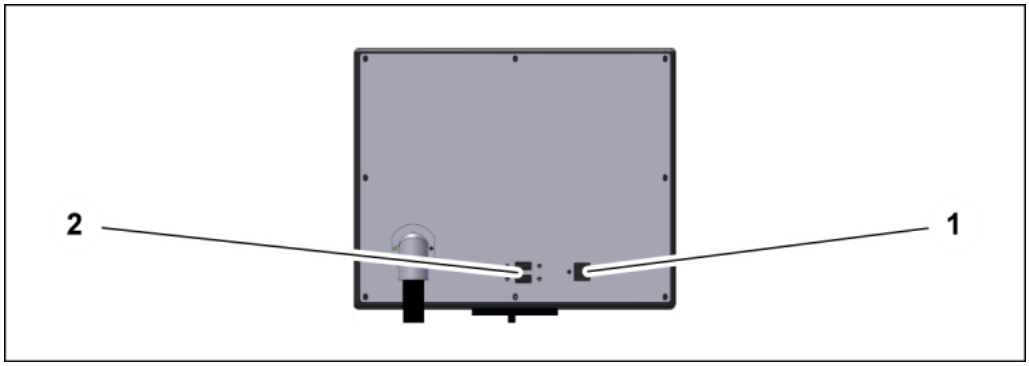


(1) Emergency-stop button

(2) Illuminated Motor on button [I]
(3) Motor off button [0]
(4) Illuminated foot switch [⌓]
(5) Illuminated Open tool button [⇤ ⇥]
(6) Illuminated Close tool button [⇥⇤]
(7) Locking lever / angle setting
(8) control panel of CONTROL C.2

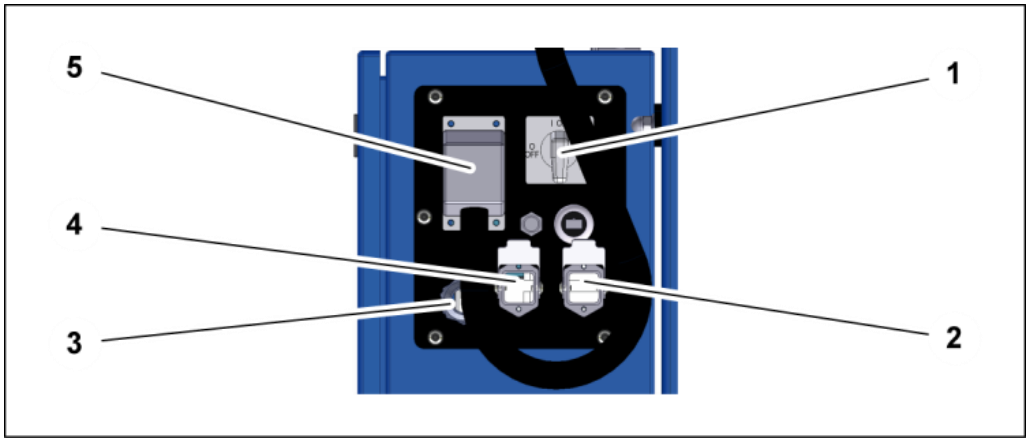
The illuminated buttons [I] and [0] may be arranged the other way round, depending on the control version.

The operation of the control system CONTROL C.2 is described in a separate Operation Manual. This description is supplied with the machine.



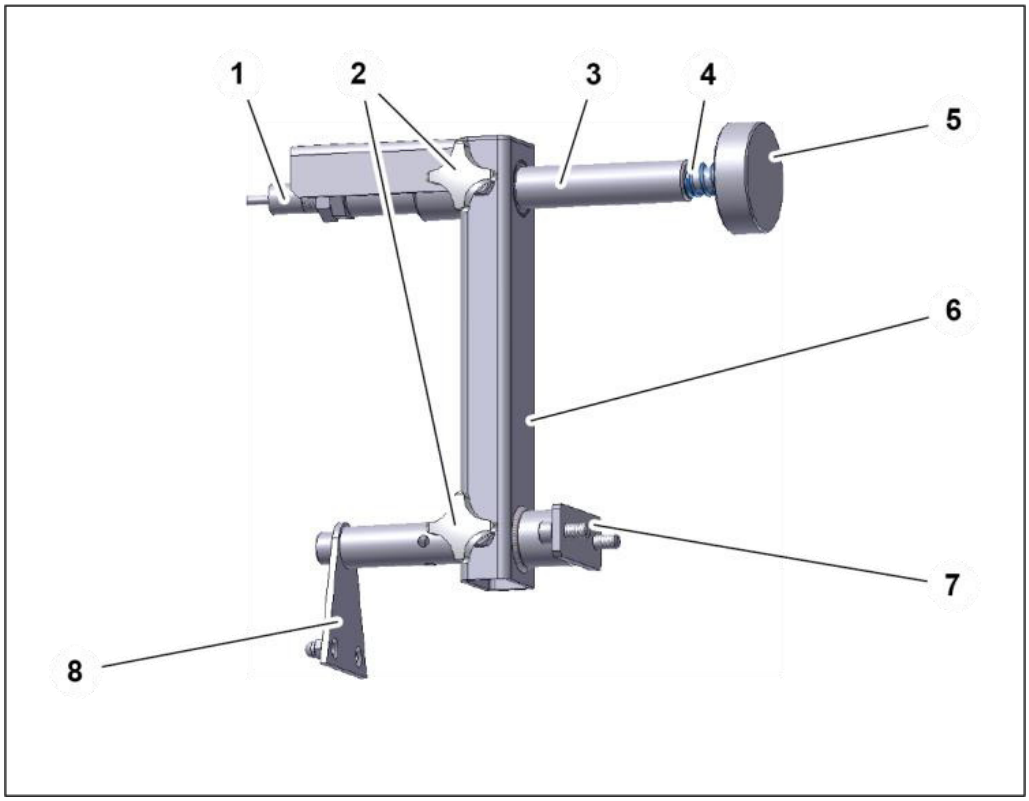
(1) LAN socket for connection with a network. Network connection options are set out in the description of the relevant optional packages.
(2) 2 x USB sockets (for the use of memory media, callipers or barcode scanners certified by UNIFLEX, only)

3.6 Electric sockets



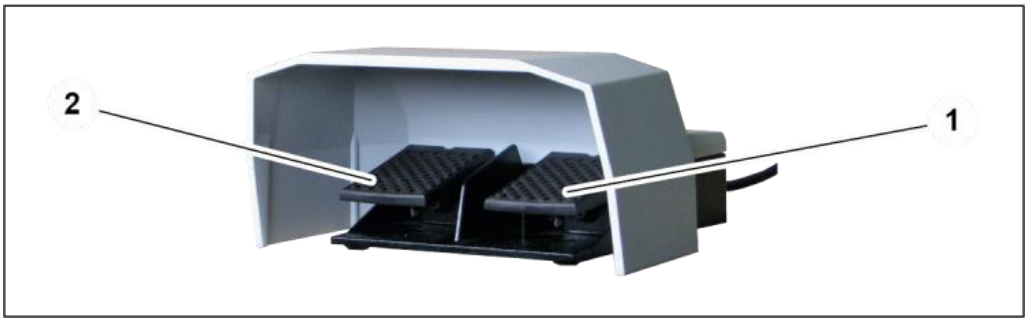
(1) Main power switch
(2) Socket for single foot switch
(3) Power cable screw connection
(4) Socket for depth stop / dual foot switch
(5) Control panel connection

3.7 Depth stop (accessory)



(1) Connection cable with plunger switch
(2) Star handle screw
(3) Sleeve
(4) Compression spring
(5) Stop disc
(6) Clamping yoke
(7) Locking shaft
(8) Gusset plate

3.8 Foot pedal (accessory)



(1) Close machine pedal [→||←]

(2) Open machine pedal [|← |→]

WARNING!	
	**Risk by fatiguing posture!** A static posture may result in work-related musculosceletal disorders and reduce productivity. • Make sure that operators have sufficient periods of relief and recreation.

3.9 Operation modes

The control unit provides for the following operation modes for operating the forming tool:

- Manual operation

  C.2 / IPC is activated in the control. The forming process is controlled manually via the buttons on the control panel or external buttons (depth stop or dual foot switch):

  – Activate the [→||←] button for closing and forming. The [|← |→] button is used for opening.

  – Dual foot switch
  The right foot switch is used for closing and forming. The left foot switch is used for opening.

  – Depth stop
  The tool is closed automatically when the workpiece activates the depth stop by pressure. Press the [|← |→] button to open the tool.

As soon as the pre-set forming diameter or forming pressure is reached in the control, the tool stops and opens automatically.

- Semi-automatic operation

  C.2 / IPC A is activated in the control. The forming process is started manually via the buttons on the control panel or external buttons, e.g. the dual foot switch:

  – Activate the [⇥⇤] button for closing and forming.
  – Dual foot switch
    The right foot switch is used for closing.
  – Depth stop
    The tool is closed automatically when the workpiece activates the depth stop by pressure.

  As soon as the forming diameter or forming pressure as defined in the control is reached, the tool stops and opens automatically after the preset holding time.

Production is possible in any operation mode.

The operation mode selected before deactivating the machine will be active upon a restart. The operation modes are set on the control panel.

When the Foot switch button [] is activated, the Close tool button [⇥⇤] is inoperative, even if the button is illuminated. The Open tool button [⇤ ⇥] is always active independently.

The operation of the control system is described in a separate Operation Manual. This description is supplied with the machine.

3.10 Technical data

Machine	
Dimensions L x W x H	1200 x 600 x 1700 mm
Weight	approx. 750 kg
Control	CONTROL C.2
Operation mode	S6-70 %
Noise level	< 70 dB(A)*
Protection class	IP 40
Function	
Forming force	3150 kN / 315 t
Max. forming range	Ø dies + 20 mm (max. outer diameter of the fittings before forming)
Maximum Ø dies	145 mm
Opening size without dies	215 mm
Opening distance	+70 mm
Closing speed	23 mm/s
Forming speed	1.4 mm/s
Opening speed	33 mm/s

Workpiece capacity

SAE R13	max. 2″, depending on fitting
SAE R 15	2½”, depending on fitting
Industry	max. 4" (6"), without flange, depending on fitting
Die type	237 L / 239

Electric connection

Connection power	4 kW
Supply voltage adjustable	230 V 50/60 Hz, 3 phases+PE 380 V 50/60 Hz, 3 phases+PE 400 V 50/60 Hz, 3 phases+PE 420 V 50 Hz, 3 phases+PE 440 V 60 Hz, 3 phases+PE 460 V 60 Hz, 3 phases+PE 480 V 60 Hz, 3 phases+PE
Voltage selection by plug position	Δ 230 V 50/60 Hz, 3 Phases Y 380 - 480 V 50/60 Hz, 3 Phases
Motor protection setting (red marking at adjustment scale)	230 V, 15 A 380 - 480 V; 8.5 A
Back-up fuse	230 V: 20 A delayed, 400 V: 16 A delayed, preferably thermal fuses, if circuit breakers are used these should be of the class C type

Hydraulic system

Oil volume	approx. 100 l
Oil type	HLP 46, DIN 51524, 10µ filtered
System pressure	max. 330 bar

Building prerequisites

Permanent floor loading	Approx. 0.07 kg/mm^2
Floor carrying capacity	Min. 2500 kg/m^2
Floor quality	B25
Evenness	Max. unevenness 5 mm/m
Inclination	max. 5 mm/m

Ambient conditions

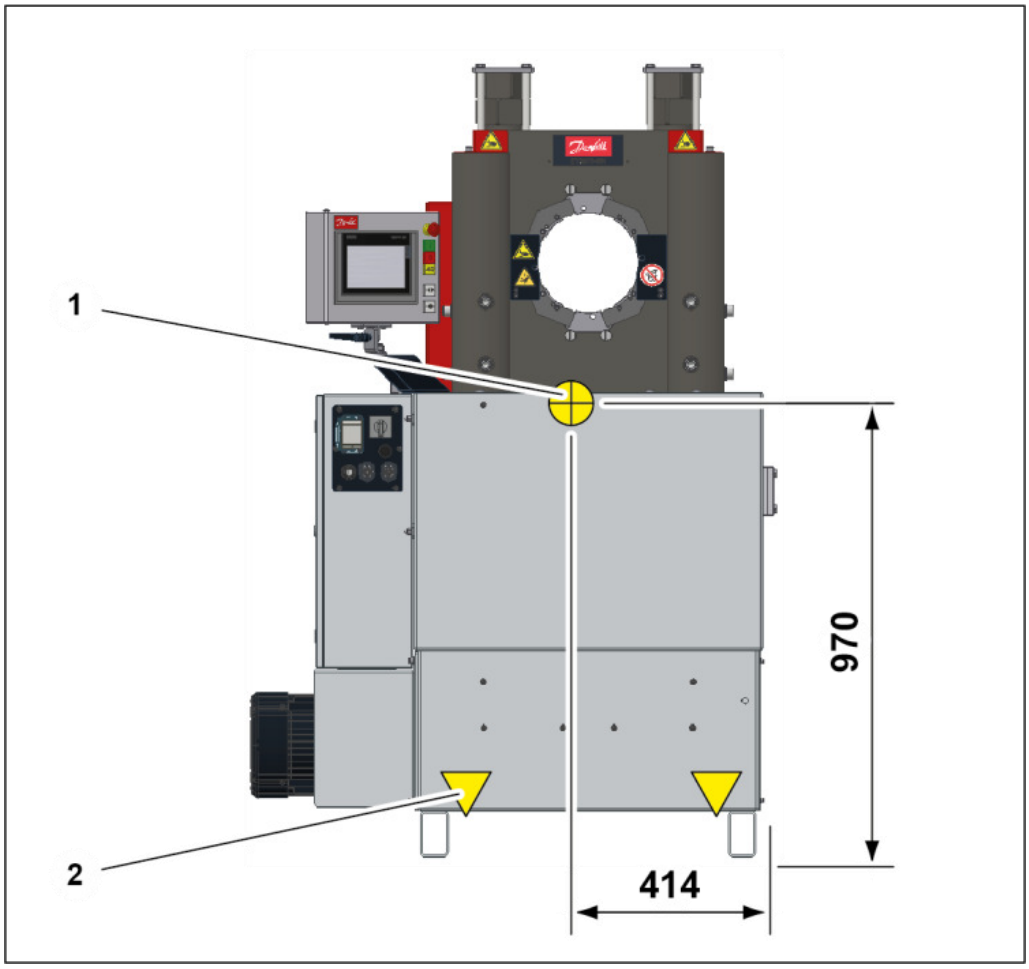
Ambient temperature	10 °C – 35 °C
Air humidity	45 % – 65 %

The *data are theoretical/computed values, or values measured on a prototype. Actual values may vary slightly, depending on the machine.

4 Transport and commissioning

4.1 Transport

The goods should be transported in the original packaging. During transport, the goods must be secured safely within the packaging. All applicable laws and regulations relating to securing loads shall be observed during transport.



The machine/unit may only be unloaded and transported by means of a forklift, a lift truck or a crane. When a crane is used for transport, lifting gear with a sufficient length and lifting capacity has to be used. For machine/unit weight, please refer to "Technical data" in Section 3.

WARNING!	
	**Danger from falling loads!** Risk of injury from falling loads. • Do not stand under suspended loads.

WARNING!	
	**Danger from tilting machine/unit!** The machine/unit may tilt if it is transported improperly. There is a risk of being injured. • Consider the machine/unit's centre of gravity (1). • Only lift the machine/unit at the designated points.

1. Lift the machine/unit with a forklift, lift truck or crane at the designated points (2) and transfer it to the location of installation.

4.2 Intermediate storage of machine/unit

If the machine/unit cannot be mounted immediately upon delivery, it must be protected against:

- Contamination,
- Weather influences,
- Mechanical damage.

The machine/unit components may only be stored in closed rooms and under the following conditions:

- temperature between 10°C and 35°C,
- maximum air humidity 80% (non-condensating).

4.3 Commissioning

The machine is commissioned by the customer's fitter.

1. Place the machine on an even ground at the place of installation.

WARNING!	
	**Risk by tilting machine!** If not bolted to the floor, the machine may tilt. There is a risk of being injured. • Fix the machine on the floor.

2. Use suitable bolts to fix the machine legs on the floor.

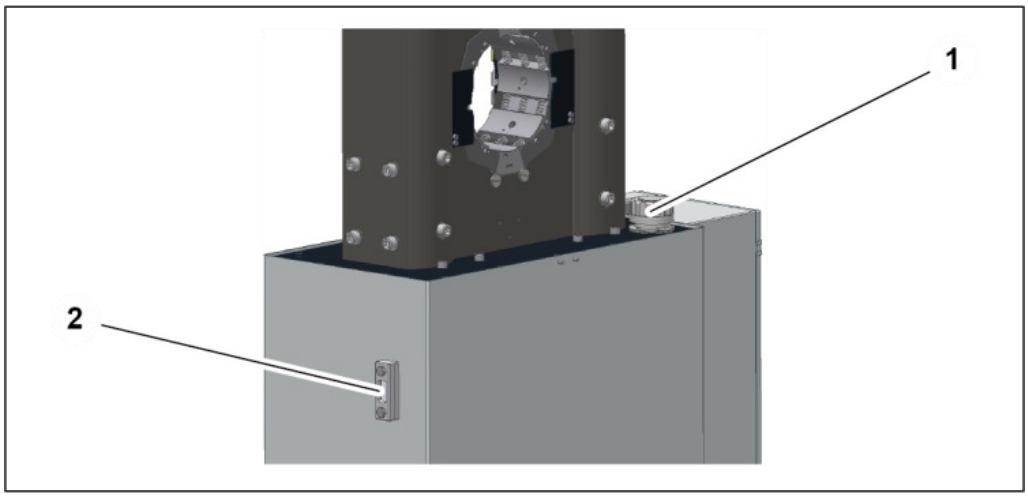
Place the machine in a way so that it is easily accessible for maintenance work from all sides.

3. Check the machine for damage.
4. Check the electric cables for damage.
5. Train the operating staff and record training sessions in “Declaration of trained staff”, Section 9.

WARNING!	
	**Risk of injuries!** Machine components might loosen during transport. Such components might be flung out during to the forming process. There is a risk of being injured. • Open and close the machine several times without any workpiece. • Check the machine for atypical noise.

4.3.1 Filling hydraulic oil

If the UNIFLEX forming machine was purchased without hydraulic oil filling, the appropriate new, clean and pre-filtered hydraulic oil has to be filled before commissioning (for oil type, please refer to "Technical data" in Section 3).



CAUTION!

Risk of injuries!

Contact with hydraulic oil and other consumables imposes a risk of injuries for the skin, eyes, respiratory and intestinal tracts! Hydraulic liquid spills impose danger of slipping and falling!

- Observe supplier's protection and safety instructions (see data sheet).
- Wear personal protection equipment.
- Do not eat, drink or smoke in the working area and when handling consumables.
- Ensure good ventilation.
- Avoid floor contamination.

ATTENTION!

Risk of fire!

Hydraulic liquid spray or spills imposes a risk of fire.

- Avoid ignition sources (welding, cutting and soldering work) near the hydraulic oil filling.

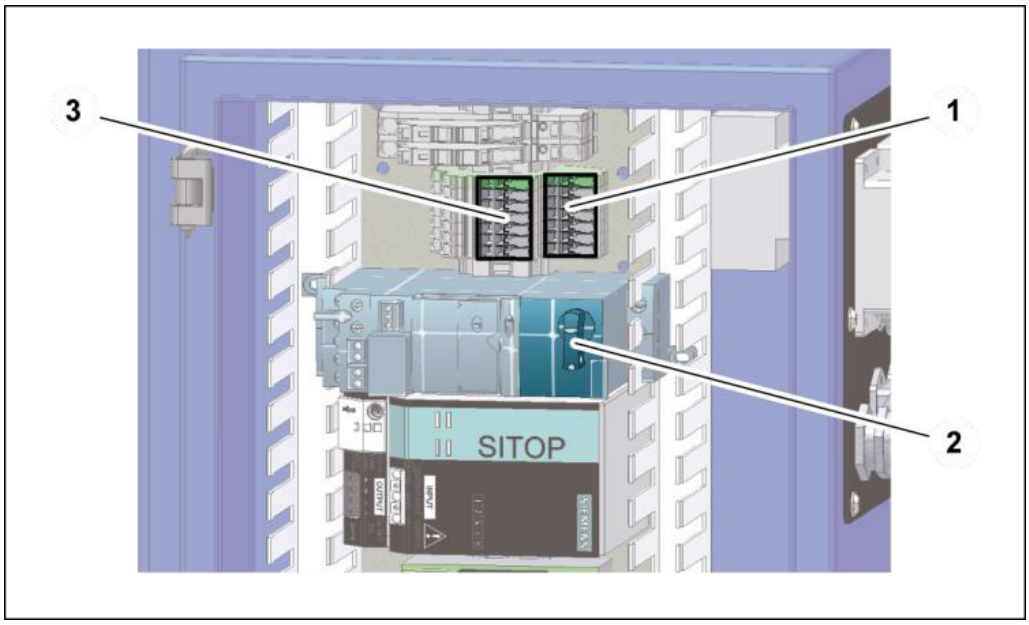
1. Open the cover (1).
2. Fill in hydraulic oil; for quantity and type, please refer to "Technical data" in Section 3.
   The oil level can be read on the fill level indicator (2). The oil level should be at the centre of the fill level indicator.
3. Close the cover (1).

4. Do not operate the machine for a minimum of four hours so that the dirt particles in the system may settle.

4.3.2 Electrical connection

ATTENTION!	
	**Risk of damage to machinery** The voltage range described in this Section is only permissible for multi-voltage machines (MVA). Reconnecting the machine with a fixed input voltage will result in the destruction of the machine. • Do not reconnect machines with fixed input voltage.

WARNING!	
	**Risk by electrical voltage!** There is a risk of electrocution near the live parts! • Work on electric systems may only be performed by qualified electricians or instructed and trained persons under the supervision of a qualified electrician. • Do not operate the machine without a sufficiently rated ground wire. • Deactivate the machine and secure it against unintentional restart before maintenance.



1. Connect the voltage selection plug to the correct slot in the control cabinet - Δ 230 V on connection (3), Y 400 V on connection (1).
2. Set the motor protection switch (2) as specified in the Technical data.

The permissible voltage frequency ranges and the relevant motor protection setting are also indicated on the sticker in the control cabinet door.

3. Have the power cable of the machine connected to the local mains by a qualified electrician according to the regulations of the Electricity Board.
4. Check the electric motor rotational direction according to the arrow. Exchange outer cable (phases) of the connection, if required.

ATTENTION!	
	**Risk of damage to machinery!** Extended operation of the motor with an incorrect rotational direction or operating the machine without oil will destroy the hydraulic pump. • Make sure that the hydraulic oil filling in the machine is sufficient before starting the machine. • Ensure that the rotational direction of the motor is correct. Observe the red arrow on the motor cover.

4.3.3 Bleeding the hydraulic system

1. Switch on the machine.
2. Operate the machine in the idle mode for two minutes in order to fill the pump with oil.
3. Open and close the tool several times.
4. Check oil level, add hydraulic oil if required.

5 Operation

5.1 What you have to observe

The operator has received the Operation Manual from the owner, has read and understood it and will observe it.

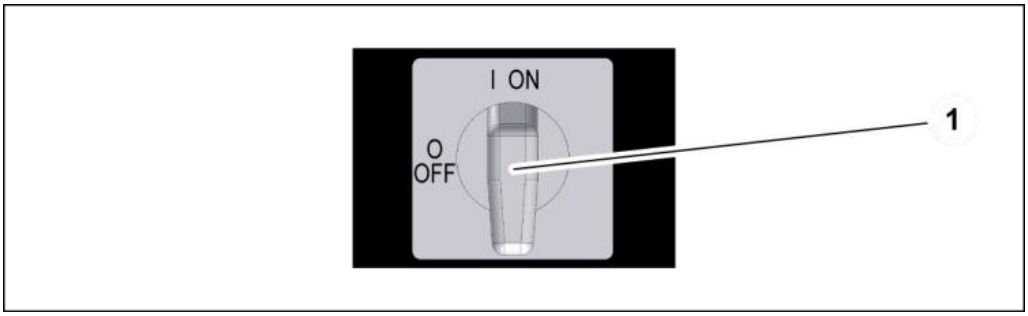
Before starting and/or re-starting

- Ensure sufficient illumination of the working area of the machine/unit.

During operation

- Observe the safety instructions on the machine/unit.
- Make sure that no other persons stay in the working area.
- Use appropriate aids to handle heavy workpiece.
- Each movement of the hand must be observed.
- The control cabinet must be closed securely.
- Eating, drinking and smoking at the workplace is prohibited.
- Wear close-fitting clothes.
- Do not wear watches or jewellery.

5.2 Activation



1. Check that there is no emergency-stop situation.
2. Activate the power switch (1). The control starts the operating system; the starting screen showing the UNIFLEX logo will appear after a few seconds.

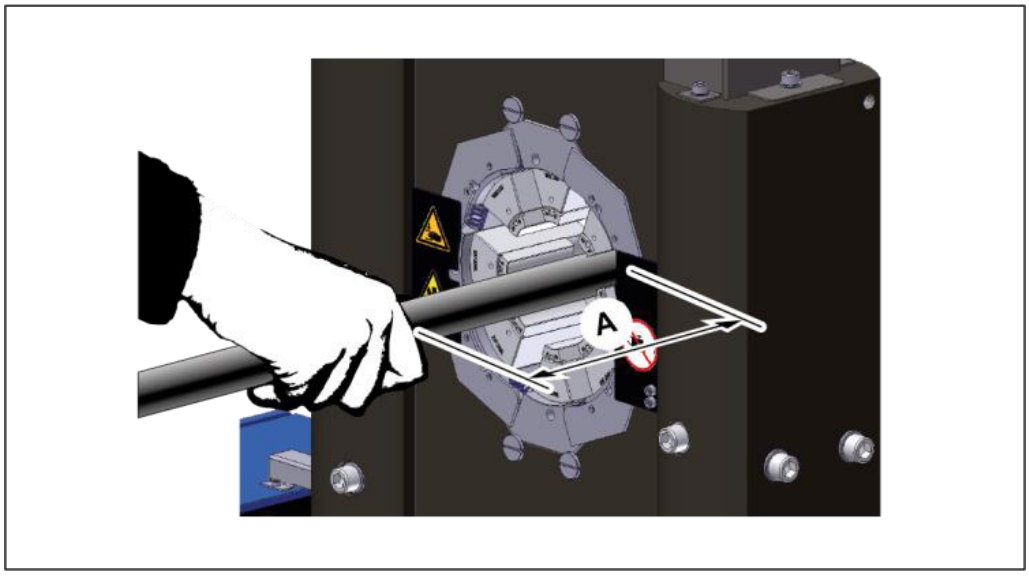
5.3 Forming the workpiece

5.3.1 Prerequisites

Prerequisites for a correct forming process:

- The die system and the workpiece match each other.
- The proper jaw system is correctly mounted in the tool.
- The forming dimension and the dies have been entered in the control system, please also refer to "Setting the forming dimension" in Section 5.
- Preferably form the workpiece in the centre of the crimping die length. Eccentric forming leads to a conical forming result and an increased one-sided wear of the die system and the bearing plates.

5.3.2 Operation mode buttons control panel

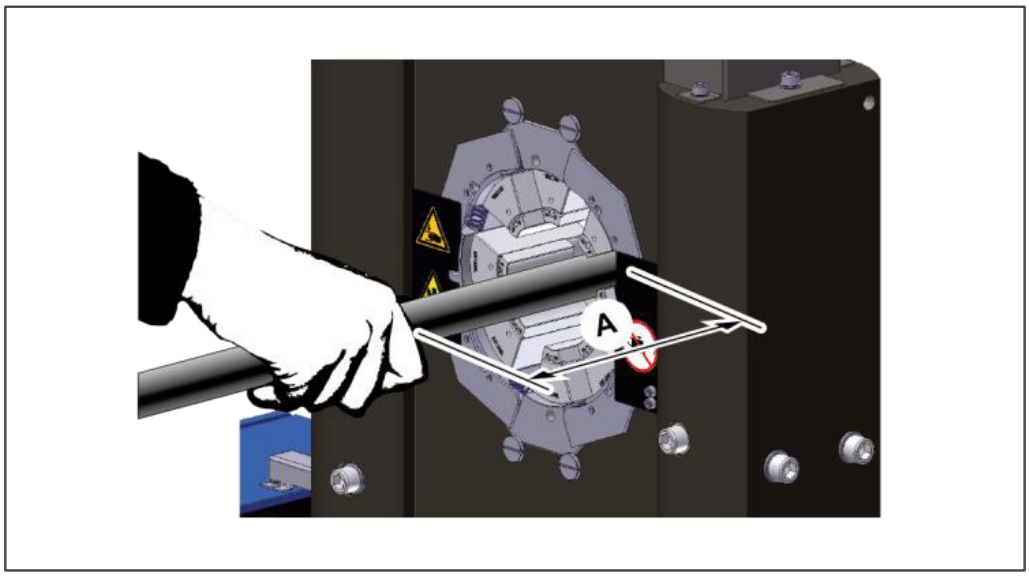


WARNING!	
	**Risk of squeezing!** When the die system closes, there is a risk of getting squeezed between the die and the workpiece. • Keep the feed opening for the workpiece as small as possible. • Keep a minimum distance of 120 mm (A) to the die system.

1. Manually position the pre-mounted workpiece in the tool.
2. Hold the workpiece with one hand during the forming process.
3. Press and hold the button [⇥⇤] to close the tool; the forming process starts and ends when the pre-set diameter/pressure is reached.
4. **Manual operation mode:** Press the [⇤ ⇥] button upon completion of the forming process to open the tool.
5. **Semiautomatical operation mode:** Wait until the hold time defined in the control has expired; the tool will then open automatically.
6. Remove the workpiece from the tool.
7. Check the forming dimension after the first forming process. Correct the forming dimension in case of deviations between the actual dimension and the specified dimension (see “Setting the forming dimension” in Section 5).

Open the crimping tool only so much that the hose may be placed and/or removed easily. Excessive opening means risk of squeezing and time loss.

5.3.3 Remote automatic mode, via dual foot switch

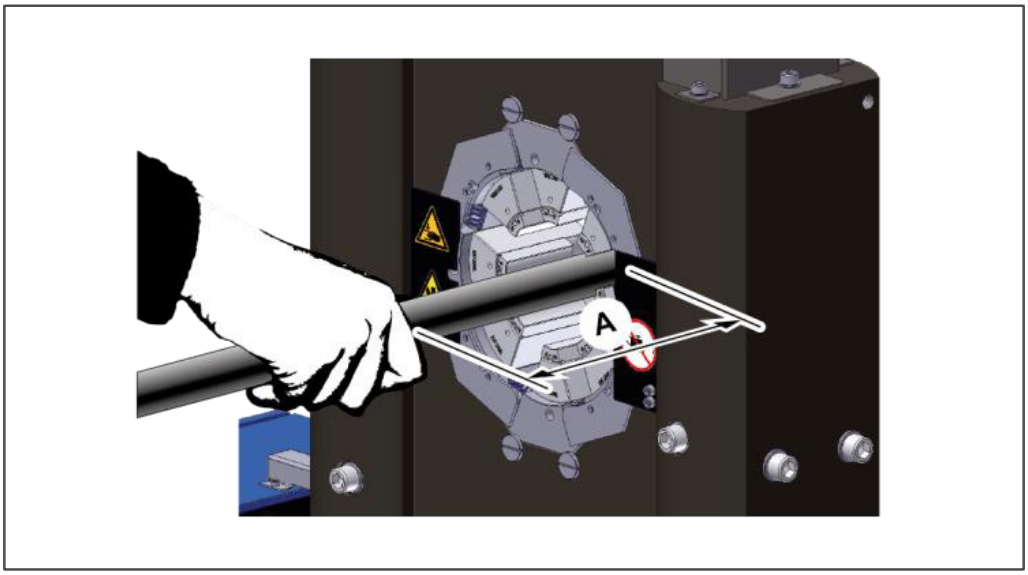


WARNING!	
	**Risk of squeezing!** When the die system closes, there is a risk of getting squeezed between the die and the workpiece. • Keep the feed opening for the workpiece as small as possible. • Keep a minimum distance of 120 mm (A) to the die system.

1. Press [⇦]the button to activate the dual foot switch.
2. Manually position the pre-mounted workpiece in the tool.
3. Hold the workpiece with one hand during the forming process.
4. Activate and hold the dual foot switch.
5. **Manual operation mode:** When the forming process is completed, release the foot switch >Close< and activate the foot switch >Open< to open the tool.
6. **Semi-automatic operation mode:** Wait until the hold time defined in the control has expired; the tool will then open automatically.
7. Remove the workpiece from the tool.
8. Check the forming dimension after the first forming process. Correct the forming dimension in case of deviations between the actual dimension and the specified dimension (see "Setting the forming dimension" in Section 5).

The operation mode Remote automatic via the dual foot switch is only functional if the plug of the dual foot switch is connected to the control cabinet.

5.3.4 Remote automatic mode, via depth stop



WARNING!

Risk of squeezing!

When the die system closes, there is a risk of getting squeezed between the die and the workpiece.

- Keep the feed opening for the workpiece as small as possible.
- Keep a minimum distance of 120 mm (A) to the die system.

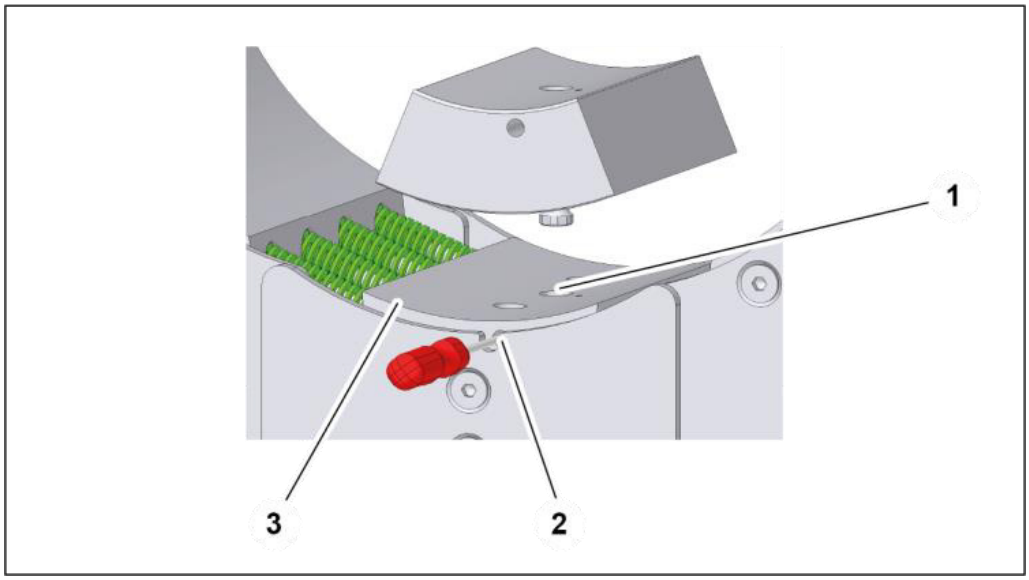
1. Switch on the [⇦] button to activate the depth stop.
2. Insert the pre-assembled workpiece into the machine manually and press it against the depth stop.
3. Hold the workpiece with one hand during forming; the workpiece must continuously activate the depth stop during forming.
4. **Manual operation mode:** Press the [|◂ ▸|] button to open the machine when the forming process is completed.

5. **Semi-automatic operation mode:** Wait until the hold time defined in the control has expired; the tool will then open automatically.
6. Remove the workpiece from the tool.
7. Check the forming dimension after the first forming process. Correct the forming dimension in case of deviations between the actual dimension and the specified dimension (see "Setting the forming dimension" in Section 5).

The Automatic External mode with the depth stop is only functional if the connection of the depth stop is established in the control cabinet.

5.4 Changing the crimping dies

5.4.1 Changing the crimping dies/intermediate dies with a die key



Positioning the dies

1. Open the crimping tool fully.
2. Deactivate the machine at the power switch.

WARNING!

Risk of squeezing!

When the die system closes, there is a risk of getting squeezed between the dies.

- Only replace the dies when the motor is deactivated.

3. Use the die key to press and hold the locking pin (2) in the basic die (3) backward.
4. Use the holding pin to place the crimping dies in the locating hole (1).
5. Remove the die key and release the pressure on the locking pin (2) - the crimping die is now fixed.

Always mount a complete set of identical crimping dies with the same label and diameter. One set comprises eight crimping dies or seven crimping dies and one associated marking die.

Removing the crimping dies

1. Open the crimping tool fully.
2. Deactivate the machine at the power switch.

WARNING!

Risk of squeezing!

When the die system closes, there is a risk of getting squeezed between the dies.

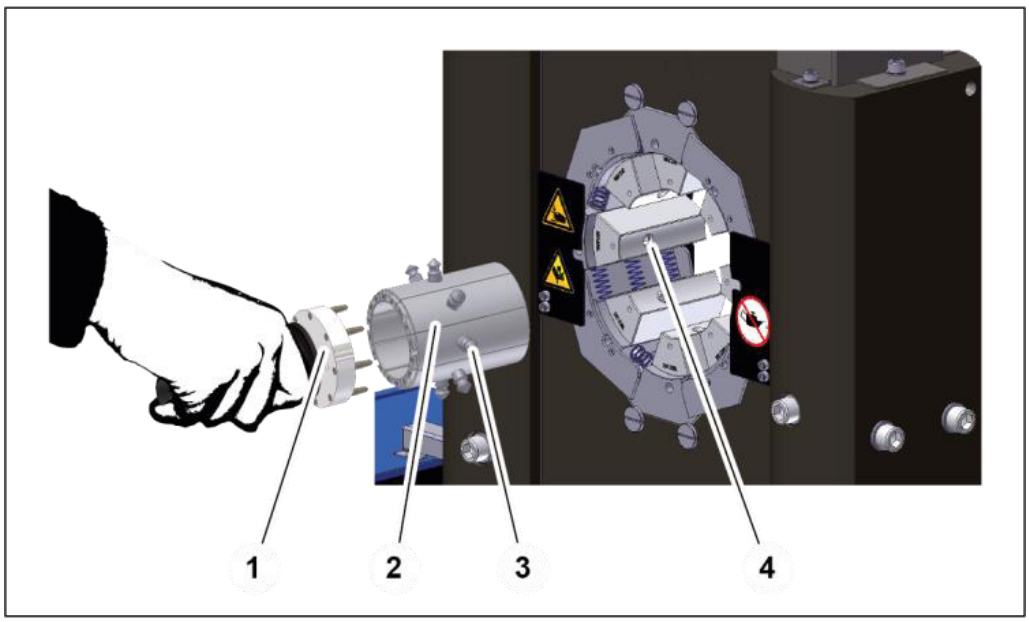
- Only replace the dies when the machine is deactivated.

3. Hold the crimping die to be removed with one hand.
4. Use the die key to press and hold the locking pin (2) in the basic die (3) backward with the other hand.
5. Remove the crimping die concerned.
6. Remove the die key and release the pressure on the holding pin (2).

Intermediate dies are positioned and removed in the same manner when needed.

After forming heavy fittings, the locking pin (2) may be a little sluggish. In this case, use a rubber mallet to loosen the locking pin (2) by carefully knocking on the die key.

5.4.2 Changing the crimping dies with the quick die change system (only profile 239)



1. Select the change position for crimping dies in the control by activating the button [QDC].
2. Press the [◂| |▸] button to open the crimping tool so that the dies type PB239 can just be inserted.
3. Push the eight pins of the quick die change system (1) into the front holes of the crimping dies (2).
4. Rotate anti-clockwise and remove the crimping dies (2) from the deposit.
5. Check the retaining bolts (3) of the crimping dies for damage.
6. Hold the quick die change system with crimping dies in the centre of the crimping tool.

WARNING!

Risk of squeezing!

When the die system closes, there is a risk of getting squeezed between the dies.

- Take care that no parts of your body are inside the forming area when the crimping dies close.

ATTENTION!

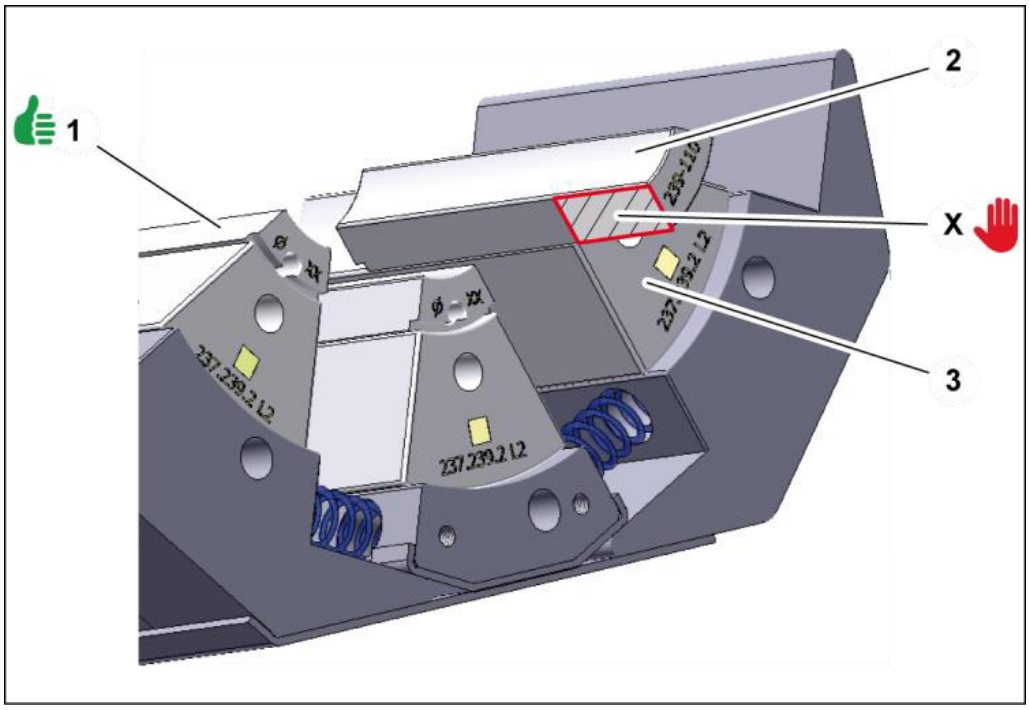
Risk of damage to machinery!

The retaining bolts and the crimping dies will be destroyed if the retaining bolts do not fit in the mounting hole of the base dies or intermediate dies.

- Pay attention to the correct position of the quick die change system with crimping dies.

7. Press the [→||←] button to close the tool.
   All retaining bolts (3) must slide into the relevant mounting hole (4) of the basic or intermediate dies, and the spring-mounted pressure pieces must engage into the retaining bolts.
8. Remove the quick die change system (1) and check that the crimping dies fit tightly.
9. Proceed in reverse order to remove the crimping dies.

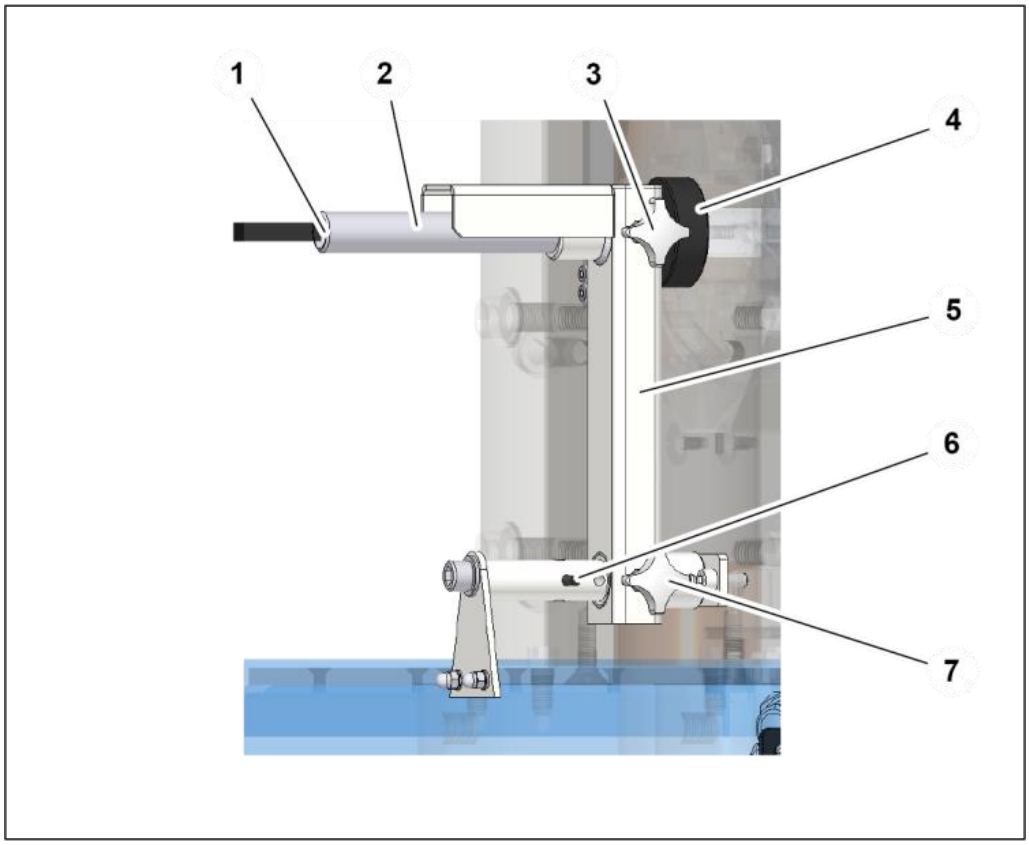
Always use a complete set of equal crimping dies with the same identification and diameter. One set comprises eight crimping dies or seven crimping dies and one matching marking die.



ATTENTION!	
!	**Risk of damage to machinery!** If the crimping dies protrude beyond the basic and intermediate dies, the crimping dies, the intermediate dies and the machine will be damaged (see (X) in the figure). In the figure, the crimping die (2) is placed incorrectly. • Place the crimping die (2) in the base and/or intermediate die (3) so that it does not protrude. In the figure, the crimping die (1) is placed correctly.

5.5 Adjusting the depth stop

The depth stop must be adjusted specifically for the work piece. When inserting the hose, the crimping process is triggered by contact with the stop disc. When the pre-defined forming diameter or forming pressure is reached, the tool will stop automatically. Remove depth stop for special applications, e.g. pipe bends.



1. Dismantle the linchpin (6).
2. Loosen the star handle screw (7).
3. Move the clamping yoke (5) into the desired position.
4. Mount the linchpin (6).

WARNING!	
	**Risk of squeezing!** There is risk of getting squeezed between the depth stop and the machine chassis when positioning the depth stop. • Mount the linchpin. • Tighten the star handle screw.

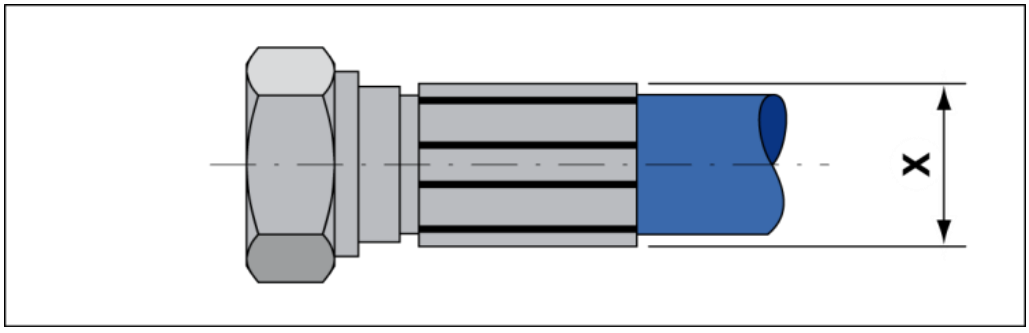
5. Tighten the star handle screw (7).
6. Loosen the star handle screw (3).
7. Adjust the sleeve (2) with stop disc (4) in the axial direction.
8. Tighten the star handle screw (3).
9. Connect the cable (1) into the socket for the depth stop.

Adjusting the control unit:

1. Activate the illuminated [☜] foot pedal. The machine is closed automatically when the workpiece is pressed against the depth stop.
2. Form the workpiece.
3. Press the [|◂ ▸|] button to open the tool.
4. Check the workpiece.
5. If the workpiece meets the requirements: produce other identical workpieces.
6. If the dimension is not reached: Adjust difference on the control unit, form again and check the workpiece.

Activate automatic opening in the control for series production.

5.6 Setting the forming dimension



The forming dimension (X) must be set specifically for the workpiece.

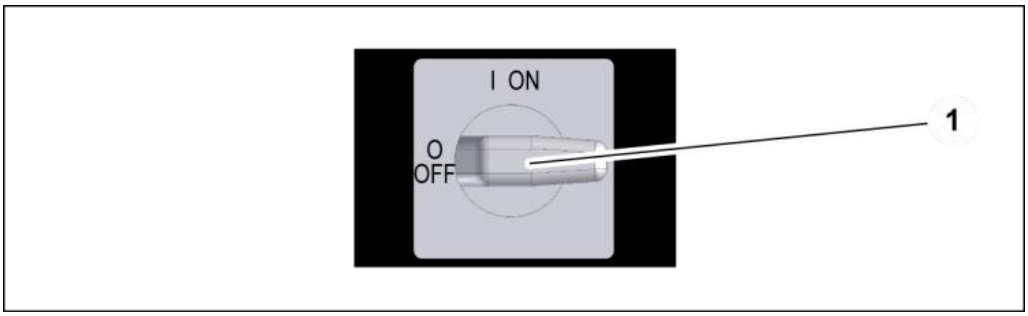
1. Read the forming dimension in the forming dimension table of the system supplier, e.g. Ø 17.4 mm.
2. Select crimping dies with a smaller or the same diameter, e.g. Ø 17 mm,
3. Place the crimping dies in the tool.
4. Set the control and/or micrometer to the requested dimension:

   Control system: Forming dimension diameter

   Micrometer: Workpiece forming dimension less crimping die diameter

5. Form the workpiece.
6. Check the workpiece.
7. If the dimension is reached: manufacture other identical workpieces.
8. If the dimension is not reached: Adjust difference on control and/or in the micrometer, repeat the forming process and check the workpiece.

5.7 Stop



1. Complete the forming process.
2. Deposit the work piece outside the machine.
3. Deactivate the main switch (1).
4. Check the machine for contamination, leaks and external damage.
5. Check the crimping tool and retaining bolts for contamination, damage and secure fitting.
6. Check the oil level.
7. Remove contamination, dust and chips using a vacuum.

Inform the fitter in case of damage or other irregularities.

5.8 Emergency stop

In case of an emergency

Immediately press the emergency-stop button (1) in cases of emergency. The crimping tool movement will be stopped. The drive unit is shut down.

Restart after and emergency

WARNING!	
	**Risk of injuries!** The emergency-stop button was probably activated due to the occurrence of a hazardous situation. A restart of the machine may cause injuries if the hazardous situation has not yet been remedied! • Remedy the hazardous situation before a restart.

1. Remedy the cause of the emergency stop.
2. Unlock the emergency-stop button.
3. Reset the error messages on the control.

5.9 Cleaning

ATTENTION!	
	**Risk of damage to machinery!** If the machine is cleaned with a steam jet or compressed air, dirt and water may ingress in the machine and cause serious damage. • Do not use a steam jet to clean the machine. • Do not use compressed air to clean the machine.

1. Vacuum the machine from metal abrasion (crimping scale) in the opened crimping tool, or use a soft cloth to clean it. For this purpose, remove the crimping dies and the intermediate dies.

6 Maintenance

Regular maintenance will ensure the continuous operation reliability of the device.

6.1 What you have to observe

This Section describes action to be taken by you as the fitter regularly to ensure the troublefree use of the machine/unit.

- Maintenance work may only be performed by qualified maintenance staff (machine/unit fitters).
- Repair work on the machine/unit or components may only be performed by appropriately qualified expert staff or UNIFLEX experts!
- The machine/unit must always be deactivated during maintenance work (see "Deactivation" in Section 5). Use the lock to prevent the main switch from being switched on and also attach a sign. Example text:

  Machine/unit out of service for maintenance work!
  Do not switch on!

- Welding, flame-cutting and grinding work on and in the machine/unit and its environment must be approved in advance. There is a risk of fire. The machine/unit must be cleaned from dust and inflammable substances. Adequate ventilation must be ensured.

6.2 Maintenance schedule

If not specified otherwise, inspections listed in the maintenance schedule are visual inspection. Replace defective parts.

If you work in 2 shifts, the check frequency has to be doubled. If you work in 3 shifts, you proceed as with 2-shift operation.

Record maintenance work performed in the maintenance log.

Maintenance item	Weekly	Monthly	Every 6 months	Number of years
Hydraulic system				
Hydraulic energy lines – hoses: Check for porosity and leaks.		X		
Hydraulic energy lines - bolted connections of hoses and pipes: Check for leaks.		X		
Hydraulic oil: Check oil level, add oil if required (see “Replacing hydraulic oil” in Section 6).		X		
Hydraulic oil filter: Change according to control display.				
Hydraulic oil: Replace				1
Hydraulic hoses: Have replaced (DIN 20066) no later than six years after manufacture (see label). Make sure that replacement hoses are of equivalent quality (high-pressure hoses).				6
Crimping tool				
Crimping tool: Check for damage and wear.		X		
Retaining bolt: Check for damage.		X		
Slide bearing plates: Check for wear (see “Checking and replacing slide bearing plates” in Section 6).			X	
Pressure springs between base dies: Check for damage.			X	
Guiding plates: Check for wear (visible grooves, unevenness).			X	
Hexagon socket screws in the base dies: retighten initially after 1000 crimping cycles , subsequently after 50,000 crimping cycles, each (HM 3xx M8, torque MA = 25 Nm; HM400 / HM 450 / HM 480 M8, torque MA = 40 Nm, HM 660 / HM 665.3 M12, torque MA =145 Nm).				
Check all bolted connections for secure fitting and retighten if necessary.				1

Maintenance item	Weekly	Monthly	Every 6 months	Number of years
Complete crimping tool: overhaul after 150,000 crimping cycles. Only in case of extreme loads when insulators, structural steel as well as steel ropes (PFC applications) are pressure–joined.				1.5
Safety equipment				
Emergency-stop button: Check function	X			
Check permanently installed partitioning protection equipment and covers for completeness and correct installation		X		
Check case foot switch for completeness. The case protects the pedals against unintentional activation.		X		
Warning signs on the machine: Check legibility (see "Warning signs on the machine" in Section 2)			X	

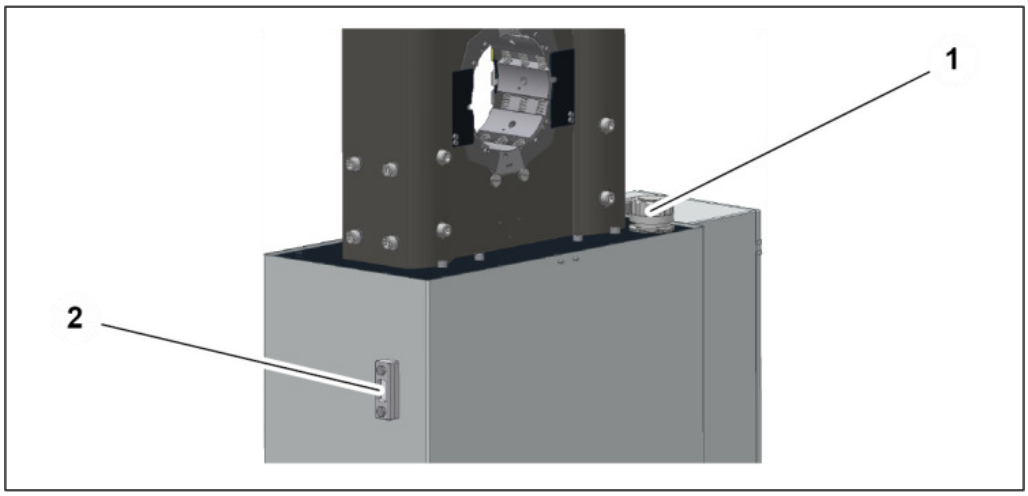
Hydraulic oil changes and wear part replacements must be recorded in the maintenance log!

6.3 Hydraulic oil and hydraulic oil filter replacement

CAUTION!	
	**Risk of injuries!** Contact with hydraulic oil and other consumables imposes a risk of injuries for the skin, eyes, respiratory and intestinal tracts! Hydraulic liquid spills impose danger of slipping and falling! • Observe supplier's protection and safety instructions (see data sheet). • Wear personal protection equipment. • Do not eat, drink or smoke in the working area and when handling consumables. • Ensure good ventilation. • Avoid floor contamination.

ATTENTION!	
	**Risk of fire!** Hydraulic liquid spray or spills imposes a risk of fire. • Avoid ignition sources (welding, cutting and soldering work) near the hydraulic oil filling.

Hydraulic oil



1. Deactivate the machine on the power switch and secure it against unintentional restart.

2. Let the hydraulic oil cool down until the tank enclosure is warm to the touch.
3. Open the cover (1) and unscrew the screen.
4. Pump out hydraulic oil by using an external pump.
5. Fill in new hydraulic oil (see “Technical Data” in chapter 3).
6. Close the cover (1).
7. Do not operate the machine for a minimum of four hours so that the dirt particles in the system may settle.
8. Start the machine.
9. Operate the machine in the idle mode for two minutes.
10. Run the tool several times to bleed the hydraulic oil system.
11. Check oil level. The oil level should be at the centre of the fill level indicator (2); refill hydraulic oil, if required.

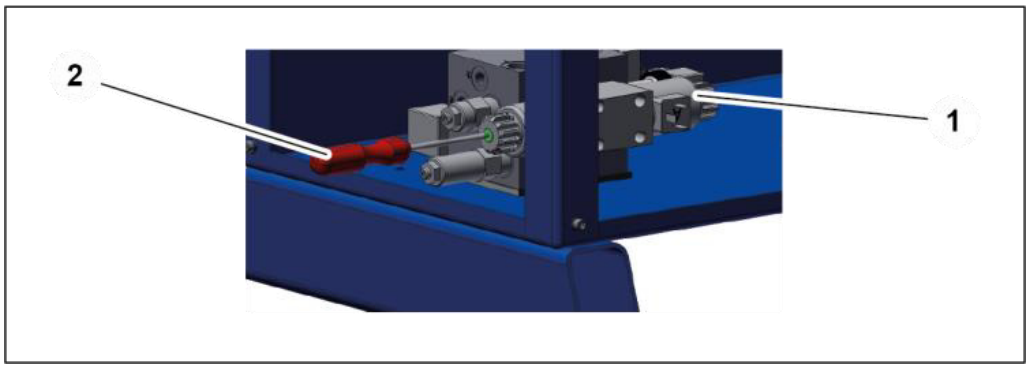
Hydraulic oil filter

The hydraulic oil filter is located in the machine enclosure and is accessible when the plate on the back is dismantled. The replacement filter number is indicated on the sticker near the pressure filter.

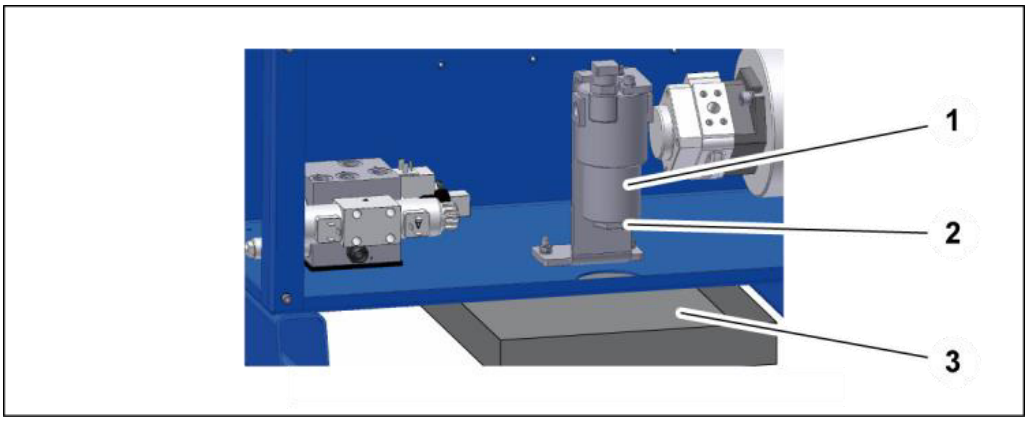
1. Open the crimping tool fully.

If it is not possible to open the crimping tool completely, contact service department.

2. Deactivate the machine on the power switch and secure it against unintentional restart.
3. Unscrew the plate on the machine back.



4. Operate the valve (1) manually in both directions, once each, using the wrench (2) to discharge residual pressure, if any.

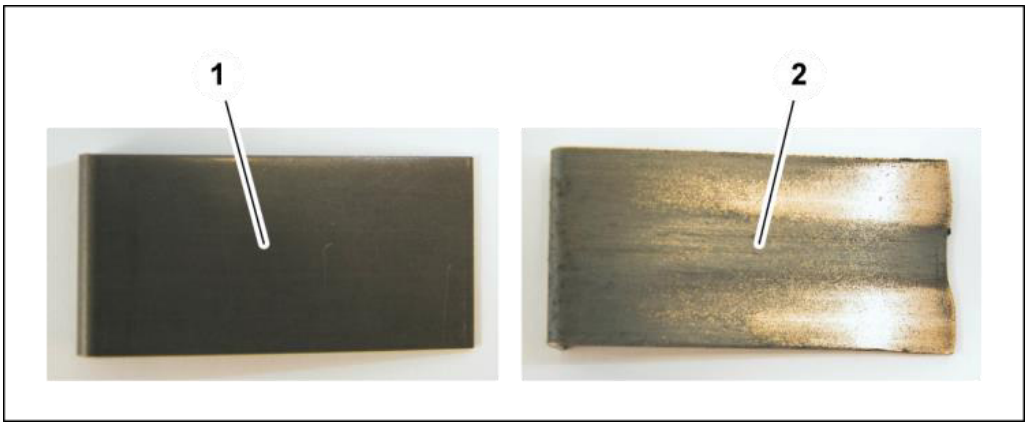


5. Place an oil sump (3) beneath the machine.
6. Loosen the screws on the filter (2) and remove it.
7. Remove the filter housing (1).
8. Replace the filter element.
9. Reassemble everything in the reverse order.
10. Check oil level, refill hydraulic oil, if required.
11. Operate the machine in the idle mode for two minutes.

Dispose of the oil and filter in compliance with the applicable local environmental protection regulations.

6.4 Checking and replacing slide bearing plates

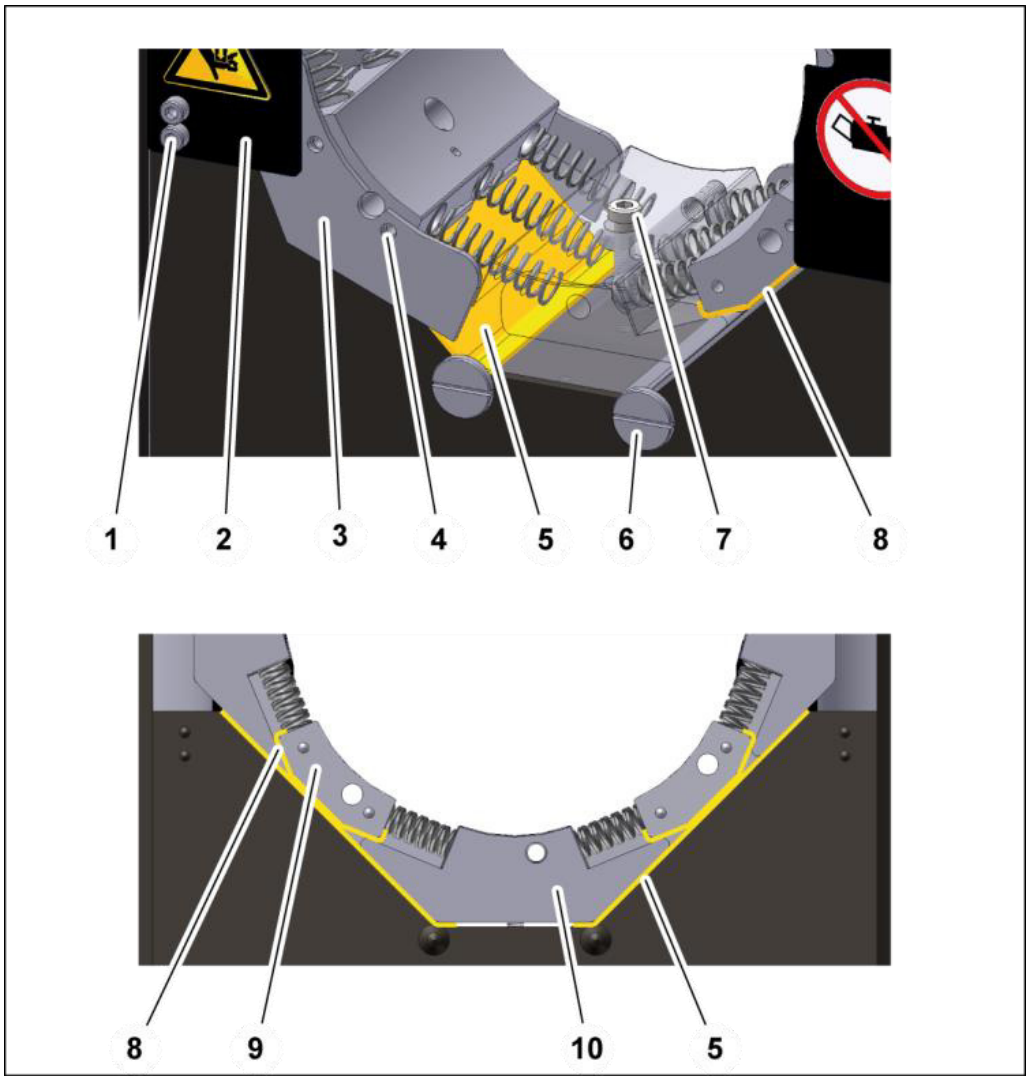
Checking slide bearing plates



Check slide bearing plates for wear, replace defective parts. The slide bearing plate (1) is new, the slide bearing plate (2) is worn.

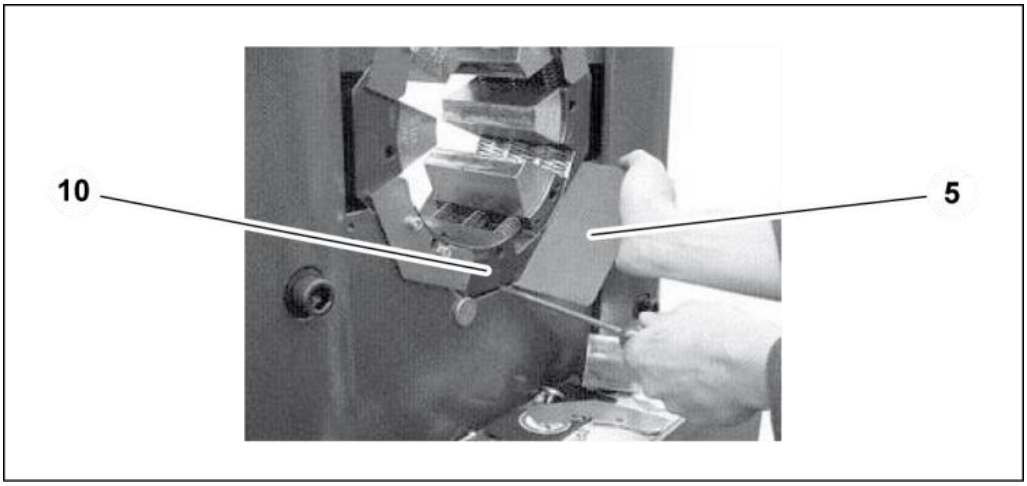
	ATTENTION!
!	**Risk of damage to machinery!** Worn slide bearing plates may cause damage to the machine and lead to inaccuracies of the forming dimension. • Replace worn slide bearing plates in good time.

Replacing slide bearing plates



1. Open the crimping tool fully.
2. Deactivate the machine on the main switch and secure it against unintentional restart.
3. Unscrew the hexagon socket screws (1) (four each in the front and back) and remove the plates (2).

4. Loosen the hexagon socket screws (4) (eight at the front and the back, each) with adjusting washers and remove the guiding plates (3).
5. Use die wrench to press secondary dies (9) towards the centre of the tool.
6. Replace the four secondary bearing plates (8) by new ones. In doing so, use the new secondary bearing plates to push out the old secondary bearing sheets, each.
7. Slightly loosen the hexagon socket screw (7) in the 6 o'clock master dies and the 12 o'clock master dies (10).
8. Unscrew the flat headed screws with slot (6) (four each in the front and back).

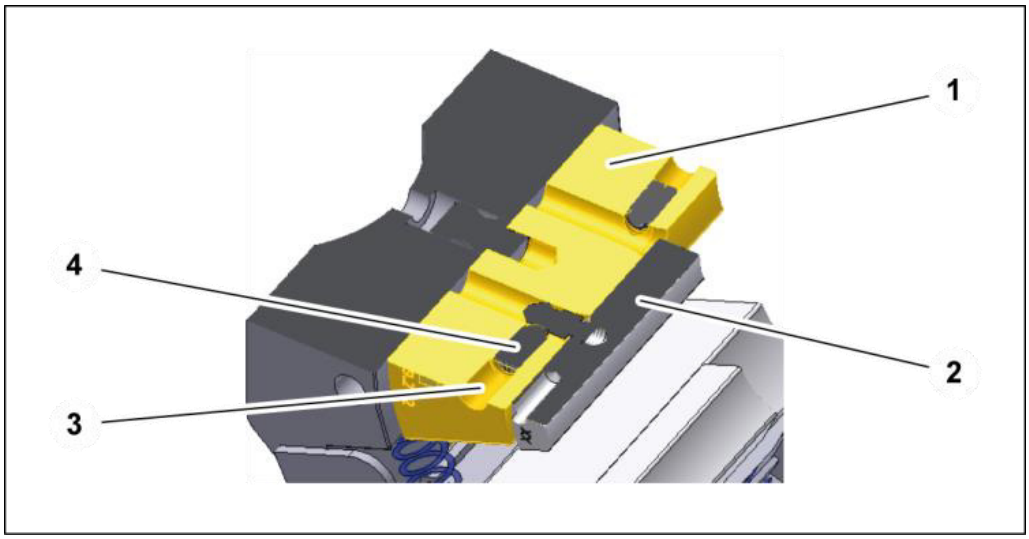


9. Slightly lift off the master dies (10) by using a screw driver and replace the four main bearing plates (5) by new ones. In doing so, use the new main bearing plates to push out the old main bearing sheets, each. Pull out screw driver again.
10. Replace hexagon socket screw (7) and tighten it to the torque for M8 MA = 25 Nm.
11. Reassemble guiding plates and protective plates in the reverse order.
12. For this purpose, fix one shim ring per screw on the secondary dies with grease before the guiding plates (3) are screwed on.
13. Perform a forming test run and check the formed sleeve.

Shims, if present, have to be inserted at the same position as before.

After replacement of the slide bearing plates, the machine has to be recalibrated (see CONTROL C.2 / IPC Operation Manual).

6.5 Installation of spring-mounted pressure piece in intermediate dies



The intermediate die 237.239.2L2 (1) has to pin holes. For using the second pin hole, an additional spring-mounted pressure piece (4) has to be mounted in the intermediate dies:

1. Remove the intermediate die from the machine.
2. Insert a pressure piece (4) in the hole (3) and screw it in by twelve revolutions.
3. Press the crimping dies (2) into the locating hole with the newly mounted pressure piece.

Only screw in the pressure piece until the crimping dies cannot be moved manually any longer. If the pressure pieces are tightened excessively, the pins will be subject to excessive wear.

6.6 Replacement of relay/opto-coupler

1. Deactivate the machine on the power switch and secure it against unintentional restart.
2. Open the control cabinet.
3. Open the flap 90° and press down on the hinge with the opened flap (1).
   The relay/opto-coupler (2) will spring up.
4. Remove the relay/opto-coupler and replace it by a new one.
5. Close flap.

7 Troubleshooting

Error	Cause	Remedy
Machine does not close/open	Main switch is OFF	Activate the main switch
	Voltage incorrect	Check voltage supply
	Power plug defective	Check power plug and replace if necessary
	Rotational direction of electric motor incorrect	Check rotation direction, correct electrical connection
	Insufficient amount of hydraulic oil	Refill oil
	Power unit defective	Check power unit
	Operation buttons defective	Check operation buttons and replace, if required
	Dial on flow divider has completely been turned to the right.	Turn dial on flow divider completely to the left.
Machine forms unevenly/conically	Bearing plates worn	Check bearing plates for wear and replace if necessary
	Base dies damaged	Check base dies for damage and replace if necessary
	Crimping dies damaged	Check crimping dies for damage and replace if necessary
	Crimping area is not centred	Preferably form the work piece in the centre of the crimping die length
Crimping dimension not achieved	Bearing plates worn	Check bearing plates for wear and replace if necessary
	Oil pressure too low	Check oil pressure at the MP measuring point, pump or pipe may be leaking or defective, repair or replace
	Incorrect crimping dies used	Check crimping die diameter and crimping die section and replace, if required (for crimping die section, please refer to “Technical data” in Section 3)

Error messages displayed on the control panel are described in the separate operating instructions of the control system.

8 Decommissioning, disposal

WARNING!

Risk by electrical voltage!

There is a risk of electrocution near the live parts!

- Shut down the machine/unit.
- Disconnect the machine/unit from the power supply.

CAUTION!

Risk of injuries!

Contact with hydraulic oil and other consumables imposes a risk of injuries for the skin, eyes, respiratory and intestinal tracts! Hydraulic liquid spills impose danger of slipping and falling!

- Observe supplier's protection and safety instructions (see data sheet).
- Wear personal protection equipment.
- Do not eat, drink or smoke in the working area and when handling consumables.
- Ensure good ventilation.
- Avoid floor contamination.

ATTENTION!

Risk of fire!

Hydraulic liquid spray or spills imposes a risk of fire.

- Avoid ignition sources (welding, cutting and soldering work) near the hydraulic oil filling.

CAUTION!

Risk of injuries!

Parts of the machine/unit may be under pressure and/or tension. Loosening components may impose a risk of injuries!

- De-pressurize the machine/unit before performing any work and check for potential sources of hazard.

8.1 Dismantling

This section describes activities to be performed by you as the operator to ensure the safe dismantling of the machine/unit.

- The machine/unit may only be dismantled by entrusted and qualified staff.
- Open the machine/unit completely.
- Depressurise the machine/unit before dismantling it (deactivate the hydraulic pump and secure it against restart; operate valve manually, if any; open bolted hydraulic connections slowly and carefully).
- Check the machine/unit for mechanical tension and consider it during dismantling.
- Empty the machine/unit of all consumables, see “Maintenance”, Section 6.

8.2 Recycling

The machine/unit contains metal, hydraulic hoses, electric cables and electronic components, depending on the type.

As regards disposal, the applicable national environmental protection and waste disposal regulations have to be complied with.

8.3 Consumables and waste

Observe applicable national environmental protection and waste disposal regulations.

Return consumables, e.g. oils, greases, test media, to supplier - they are hazardous waste. Also observe the information given on the safety data sheet.

9 Annex

Individual machine/unit components may deviate in their features. Please indicate the serial number of the machine for spare part orders.

9.1 Accessories (upgradable)

Accessories	Article code
Quick die change system	QDC 239.5
Die deposit	QDS 239 B QDS 239 C QDS 239 R
TU-QDS system	QDS-S.2 double row TU-QDS F Shelf TU-QDS F 239 I
Depth stop	TA HM 3xx C A
Mirror	SHS 375-380
Camera set	OCS 10.3 retro
Lamp with magnetic base	LUS
Die key	239.017.4
Oil cooler (HM3xx PFC Standard)	OC HM3xx/HM245 MVA
Crimping die system	237L/239+PTS System
Intermediate die set	237.239.2L2

Please contact our Sales department for ordering accessories.

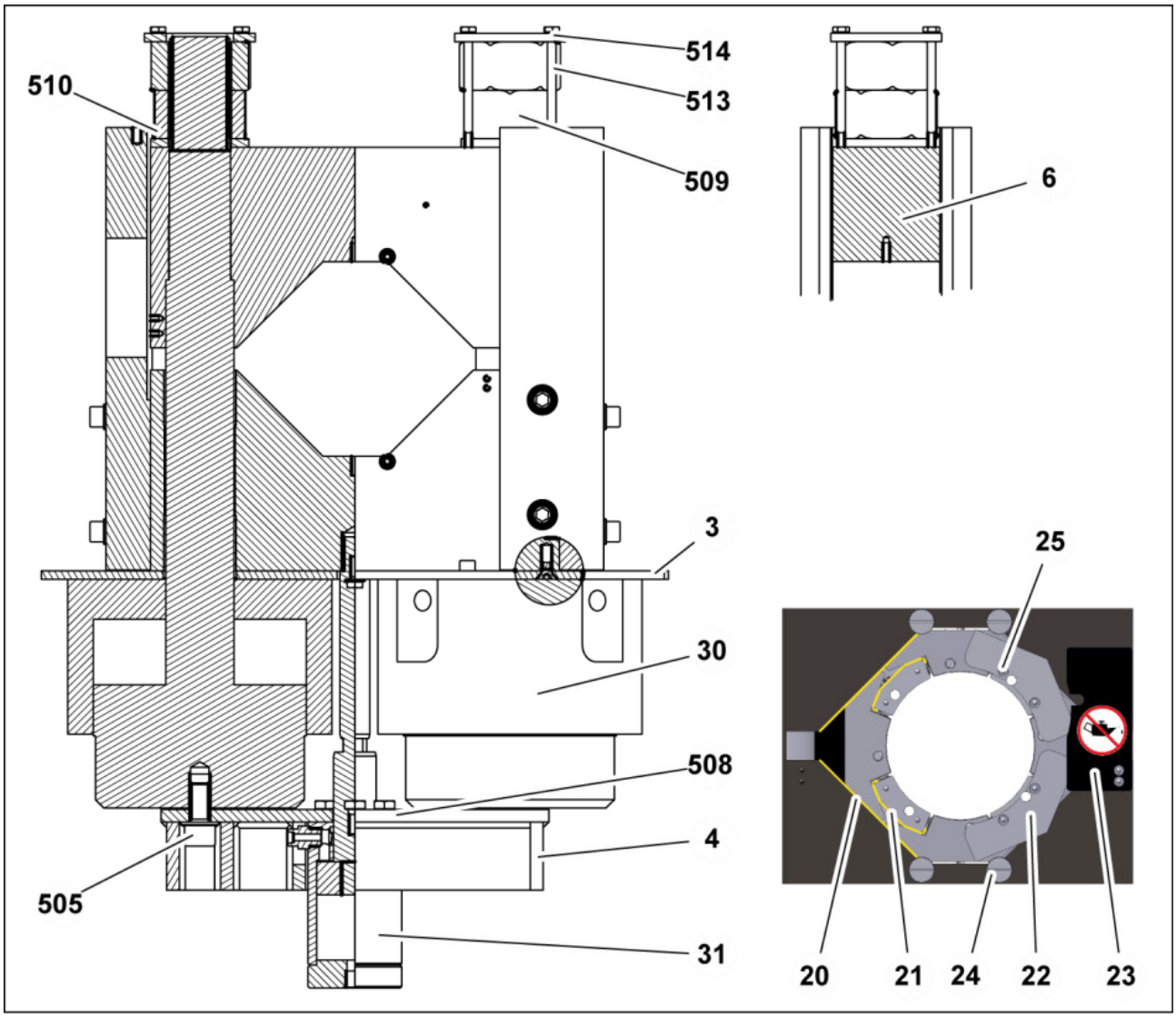
For more control accessories, please refer to the Control C.2 / IPC Operation Manual.

9.2 Options (only available ex works)

Options	Item number
Manual current regulator	241.930 (not for PFC machines)

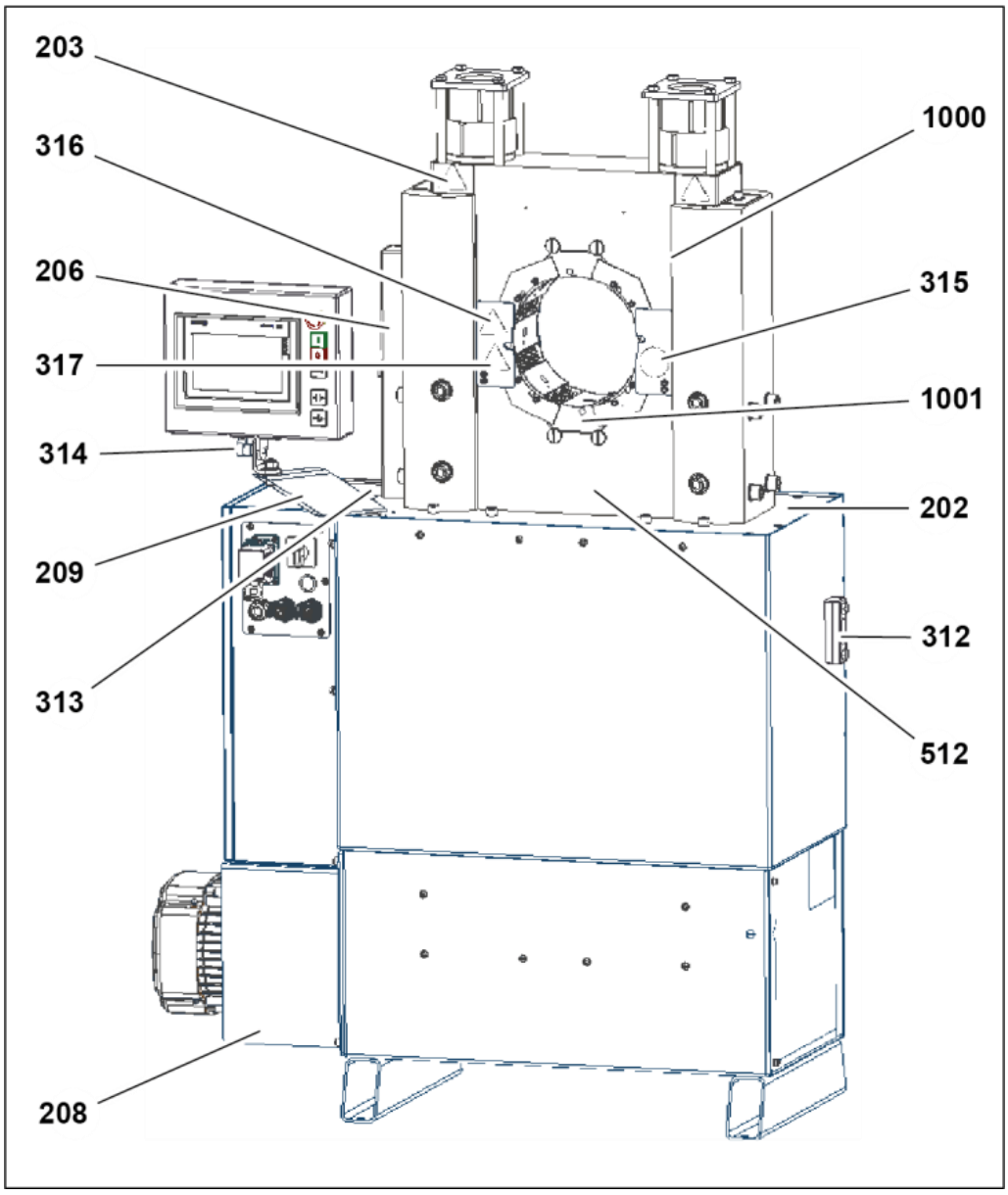
9.3 Spare parts list

9.3.1 Mechanics



Item	Quantity	Article code	Description
4	1	232.104.3	U-profile
6	1 set	SK 1130.3	Lateral guidance
20	4	232.113.4	Main counter-plate
21	4	232.114.3	Side counter-plate
22	8	237.103.4	Counter-plate

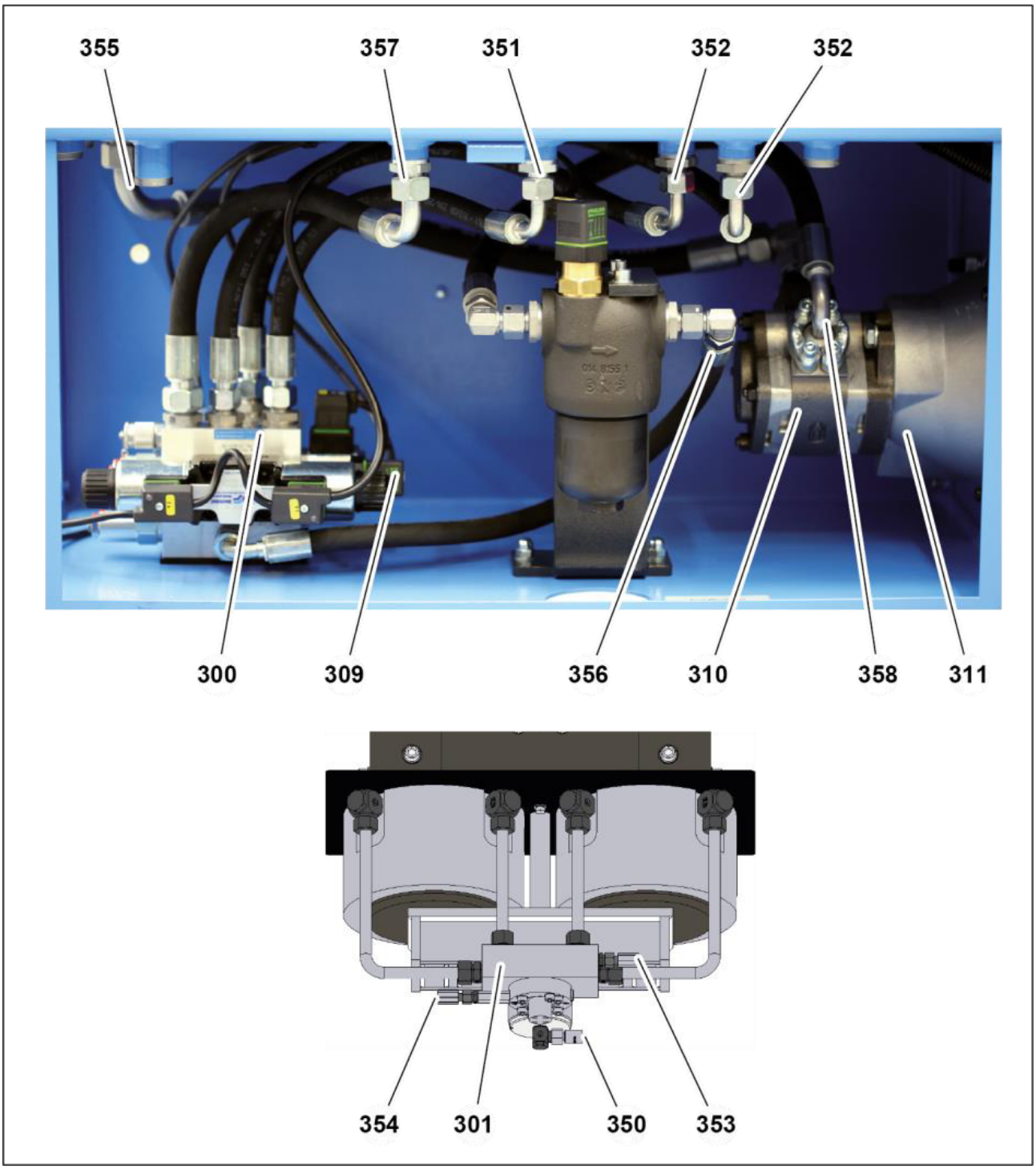
Item	Quantity	Article code	Description
23	2 sets	232.128.3	protection plate
24	8	798.110142	Flathead screw DIN 921 M8x12
25	32	798.220016	Shim ring DIN 988 6.0x12.0x0.1
30	2	238.300.3	Hydraulic cylinder
31	1	238.311.3	Hydraulic cylinder
505	2	798.120012	Hexagon socket head screw DIN EN ISO 4762 M24x2x50
508	6	798.120123	Hexagon screw DIN EN ISO 4017 M16x30
509	4	798.320008	Hexagon nut DIN EN ISO 4032 M72x3
510	2	232.105.4	Washer
513	8	798.110154	Hexagon socket head screw with shaft DIN EN ISO 4014 M10x150
514	8	777.501	Schnorr lock washer S10



Position	Quantity	Article number	Description
202	1	232.132.2 / 232.133.2	Protection pad
203	2	232.168.3	Protection plate, lateral Guidance
206	1	241.018.3 + colour code	Protection hood position sensor
208	1	241.021.3 + colour code	protection plate
209	1	235.015.3	Holder operator panel
312	1	266.353	Oil sight glass
313	1	UC-AB-1163-40	Oil filler plug
314	1	777.022	Clamp lever

Position	Quantity	Article number	Description
315	2	578.4	Oil prohibition sign
316	2	715.4	Warning sign crushing risk
317	6	716.4	Warning sign Warning of hand injuries
1000	1	238.1100	Pressing tool complete HM 325 / HM 375
1001	1 Set	237.1003	Base jaws set PB 237

9.3.2 Hydraulic system

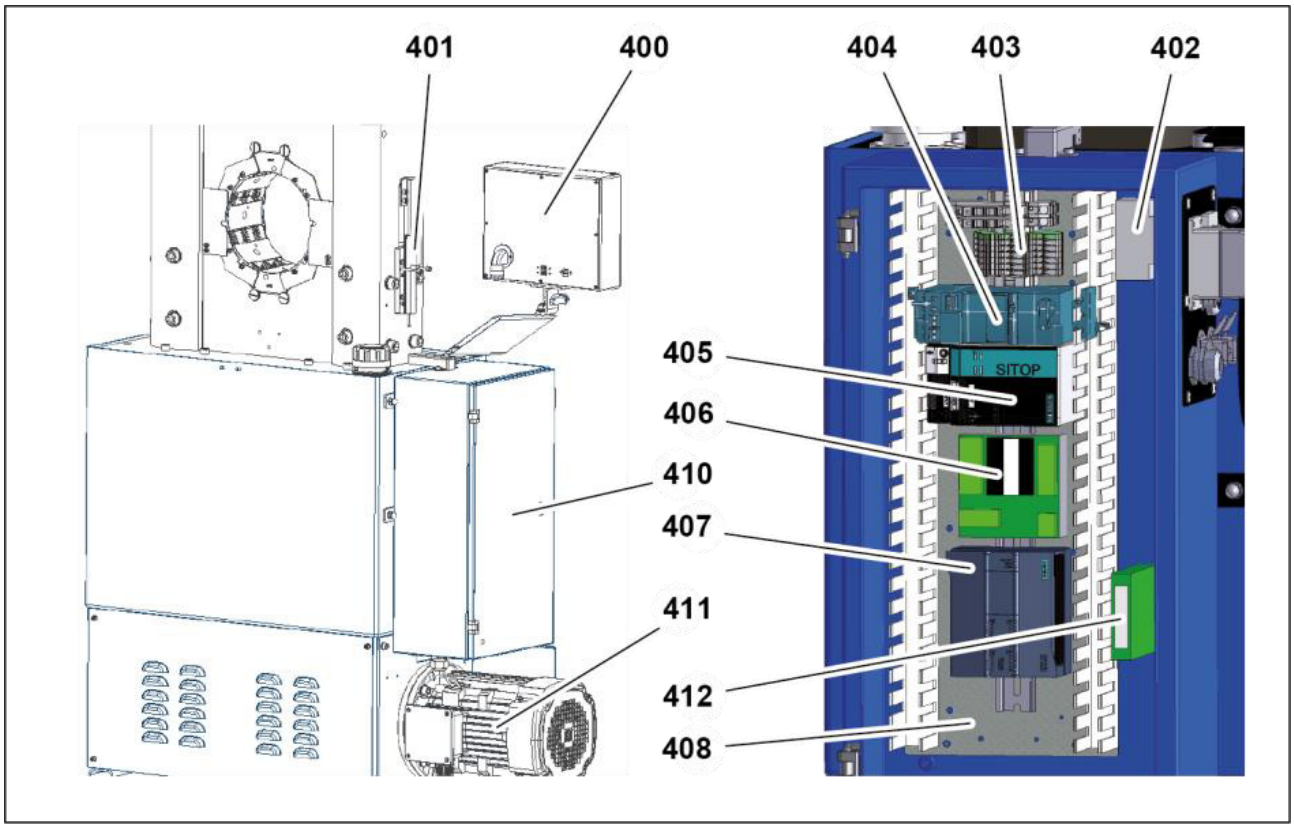


Item	Quantity	Part code	Designation
300	1	232.059_XYZ	Hydraulic manifold complete XYZ = supplier ID letter
301	1	232.057	Suction valve, complete
309	1	220.916	Pressure sensor

Item	Quantity	Part code	Designation
310	1	 239.350 239.351 232.013 232.010	Hydraulic pump HM 325 HM 325 H HM 375 / HM 380 / HM 3xxPFC HM375 H / HM380 H
311	1	 777.303 PR250-122-433-1	Bell housing HM 325 HM 375 / HM 380 / HM 3xxPFC
No pic-ture	1 1	M28 238.251	Coupling HM 325 Coupling HM 375 / HM 380 / HM 3xx PFC
350	2	232.031	Hose assembly
351	1	238.603	Hose assembly
352	2	238.604	Hose assembly
353	1	238.607	Hose assembly
354	1	238.608	Hose assembly
355	1	238.615	Hose assembly
356	2	238.619	Hose assembly
357	1	241.352	Hose assembly
358	1 1	238.604 241.351	Hose assembly HM 325 Hose assembly HM 375 / HM 380

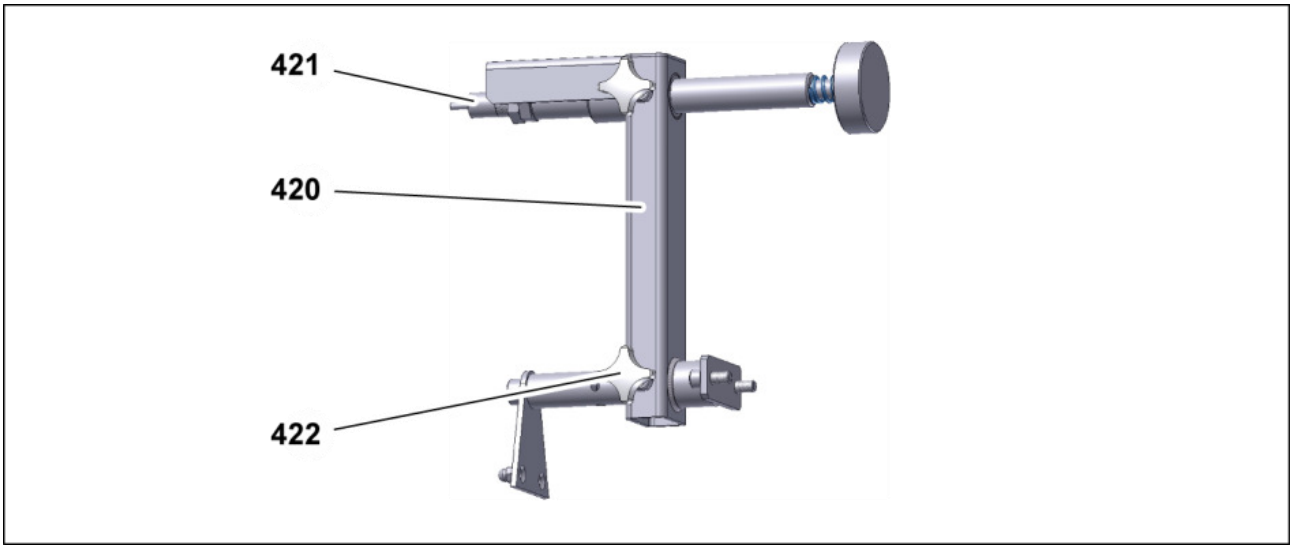
The number of the replacement filter (1) can be found on the sticker (2) next to the pressure filter.

9.3.3 Electric equipment



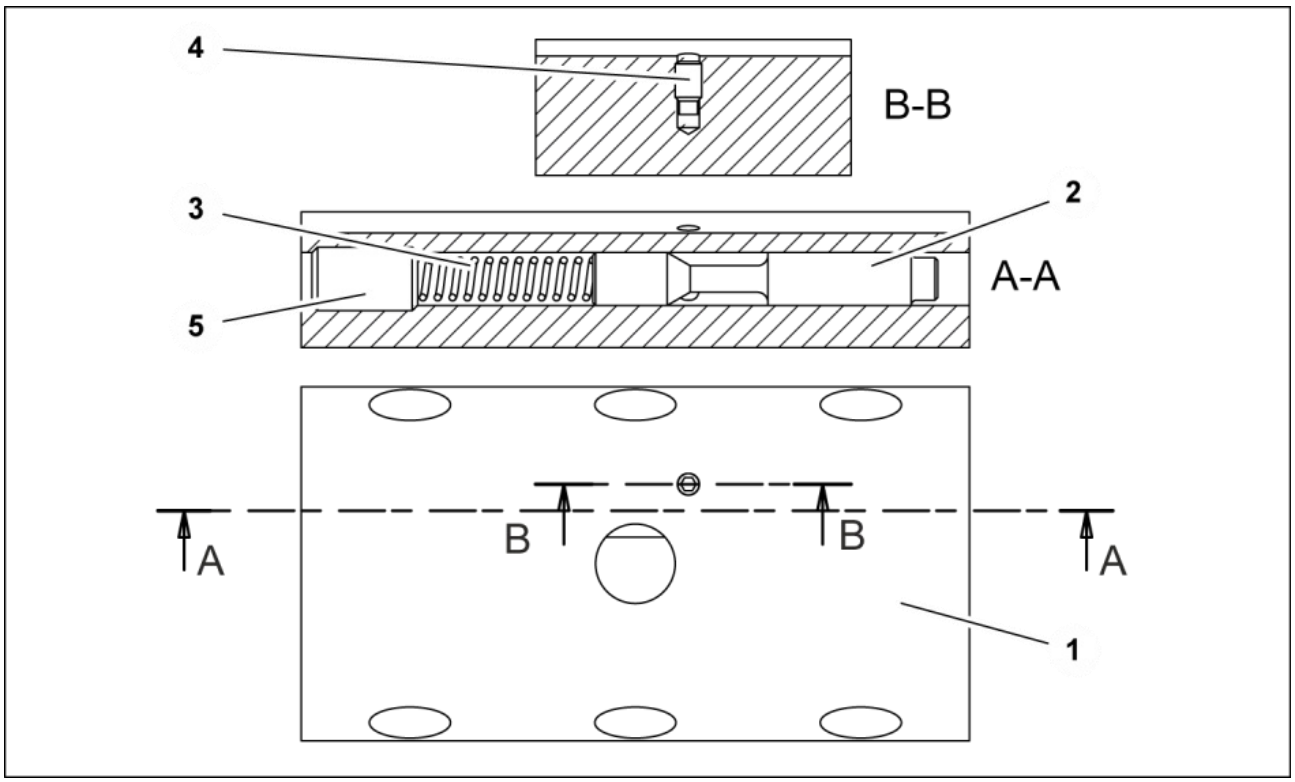
Item	Quantity	Article code	Designation
400	1 1 1	807.710 807.711 807.860	CONTROL C.2 800 mm CONTROL C.2 1800 mm CONTROL IPC 800 mm
401	1	807.415	Position encoder
402	1	8.06.100	Main power switch
403	1	888.621	Voltage selection unit
404	1	880.014	Motor protection combination
405	1	807.318	Switching power supply
406	1	888.406 888.411 888.410	Passive interface Relay Opto-coupler
407	1	807.375	CPU
408	1	807.601	Electrical sheet, complete
No picture	1	807.610	Outside cable kit
410	1	800.244.2 + colour code	Control cabinet

Item	Quantity	Article code	Designation
411	1	232.011 238.011	Electrical motor 4 kW Electrical motor 5.5 kW
412	1	888.701	Selec amplifier (for PFC machines only)



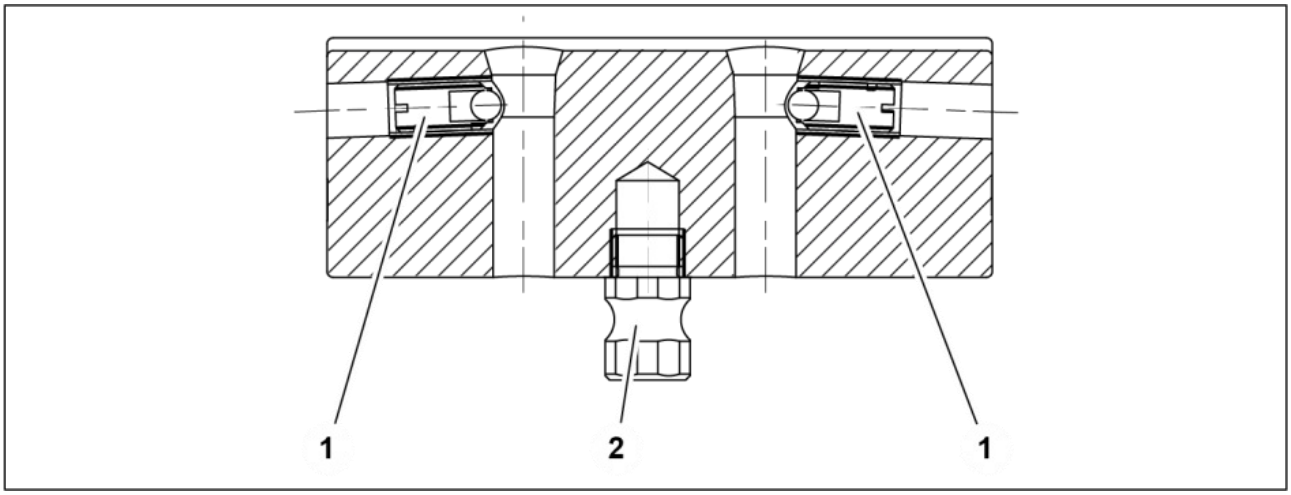
Position	Number	Article number	Designation
420	1	TA HM 3xx C A	Depth stop, complete
421	1	807.430	Plunger switch, complete
422	1	232.036	Star knob screw M8

9.4 Base dies



Item	Quantity	Part code	Designation
1	4 4	237.101.2 237.102.2	Master dies Secondary dies
2	8	232.153.4	Locking bolt
3	8	D-195A-21	Pressure spring
4	8	798.420027	Threaded pin DIN EN ISO 4028 M5x10
5	8	798.420026	Threaded pin DIN EN ISO 4026 M12x20

9.5 Intermediate dies 237.239.2L2



Item	Quantity	Article code	Designation
1	8	239,151	Spring-mounted pressure piece
2	8	232.504.4	Holding pin

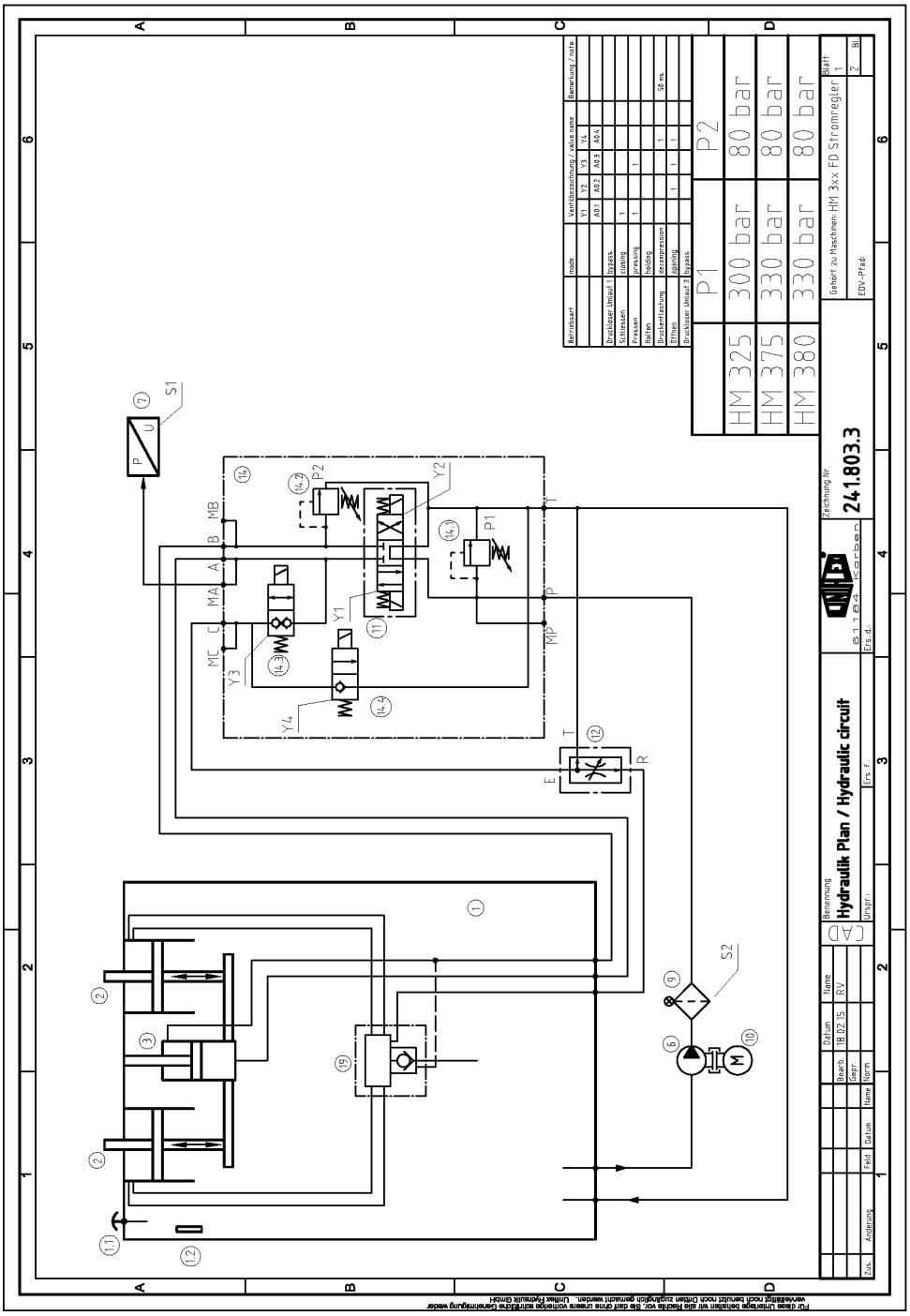
9.6 Spare parts kit

Number per machine	Part code	Designation
1	238.1100	Replacement tool HM 325 / HM 375
1	238.1102	Replacement tool HM 380 / HM 3xx PFC
24	D-106340	Pressure spring
8	232.504.4	Retaining bolt (profile: 232 / 237 / 237L / 554)
8	239.041.4 sw	Retaining bolt, plastic (profile: 239 / 239L)
8	239.041	Retaining bolt, steel (profile: 239 / 239L)
1	239.151	Pressure spring screw(profile: 239)
1	232.1	Slide bearing set
1	238.4	Guiding plate set
1	VK 302	Standard packaging (single machines)
1	800.605	Interface calliper cable
1	800.609	Calliper
1	800.610	Single foot switch

9.7 Retaining bolt for standard crimping dies (depending on crimping die)

Retaining bolt	Crimping die profile									
	262	263	239	266	232	237	554	245	246	247
 262.104.4	x									
 262.129.3		x								
 239.041.4			x							
 239.041.4 (sw)			x							
 232.504.4				x	x	x				
 232.505.4					Ø96 / Ø103					
 220.502.4							x			
 245.114.4								x	x	x

9.8 Hydraulic diagram



Pos.	Benennung	Designation	Teile-Nr. / Article-No.
1	Hydrauliktank	hydrauliktank	241.001.0
1.1	Öleinfüllstutzen		UC-AB-1163-40
1.2	Ölschauglas	oil level gauge	266.353
2	Presszylinder	press cylinder	238.300.3 (HM 380 238.315.3)
3	Rückhubzylinder	return cylinder	238.311.3
4	Steuerblock	control block	232.059
6	Hydraulikpumpe 9 L	hydraulik pump 9 L	239.350 (HM 325)
	Hydraulikpumpe 9 L	hydraulik pump 9 L	232.013 (HM 375 / HM 380)
	Hydraulikpumpe 12 L	hydraulik pump 12 L	232.010
7	Drucksensor	pressure sensor	220.916
9	Druckfilter	pressure filter	-
10	E-Motor 4 kW	electro-motor 4 kW	232.011
	E-Motor 5,5 kW	elektro-motor 5,5 kW	238.011
11	4/3 Wegeventil (NG 6)	4/3 directional valve	227.001
12	Stromregler	regulator	238.057
14.1	Druckbegrenzungsventil P1	pressure relief valve	-
14.2	Druckbegrenzungsventil P2	pressure relief valve	-
14.3	2/2 Wege Sitzventil	pressure sequence valve	-
14.4	2/2 Wege Sitzventil	pressure sequence valve	-
19	Nachsaugventil	anti-cavitation check valve	232.057

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And. Index	Änderung	Feld	Datum	Name

CAD — Projektionsmethode 1 DIN 6

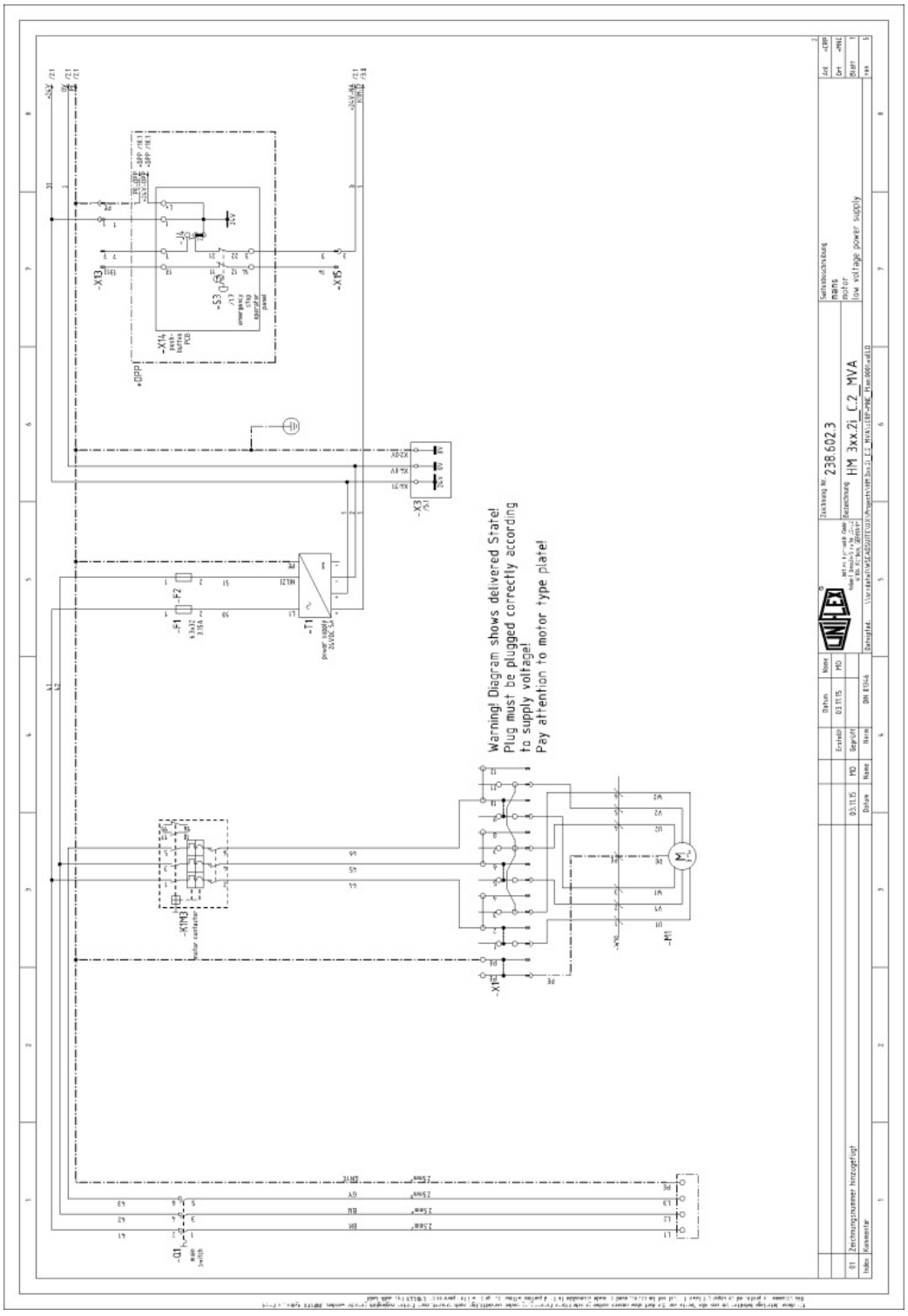
Allgemeintoleranzen ISO 2768-mK DIN EN ISO 13920	Oberfläche DIN ISO 1302 DIN 4768	
	Datum	Name
Bearb.	18.02.15	RV
Gepr.		

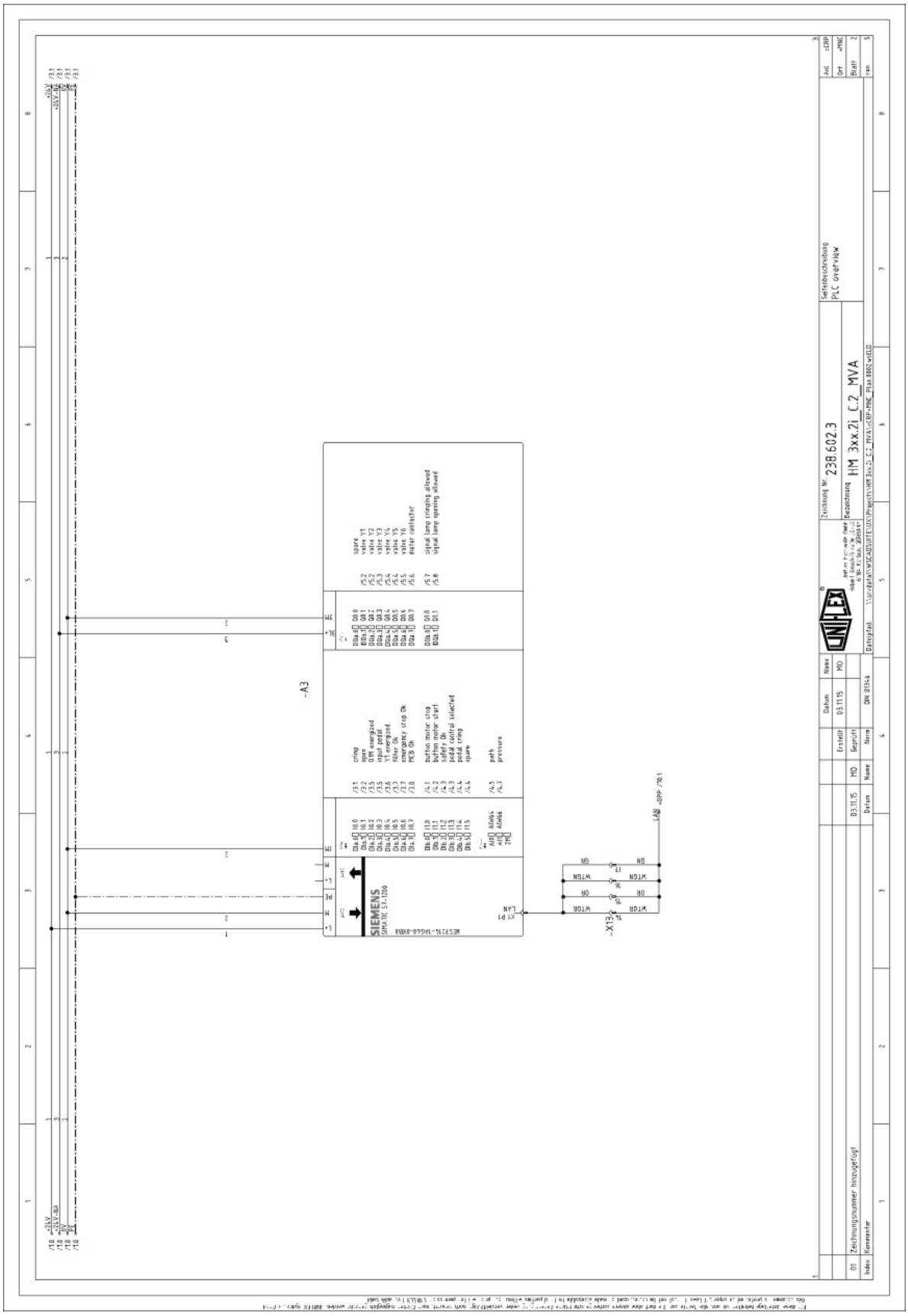
UNIFLEX 61184 Karben

Ursprung:

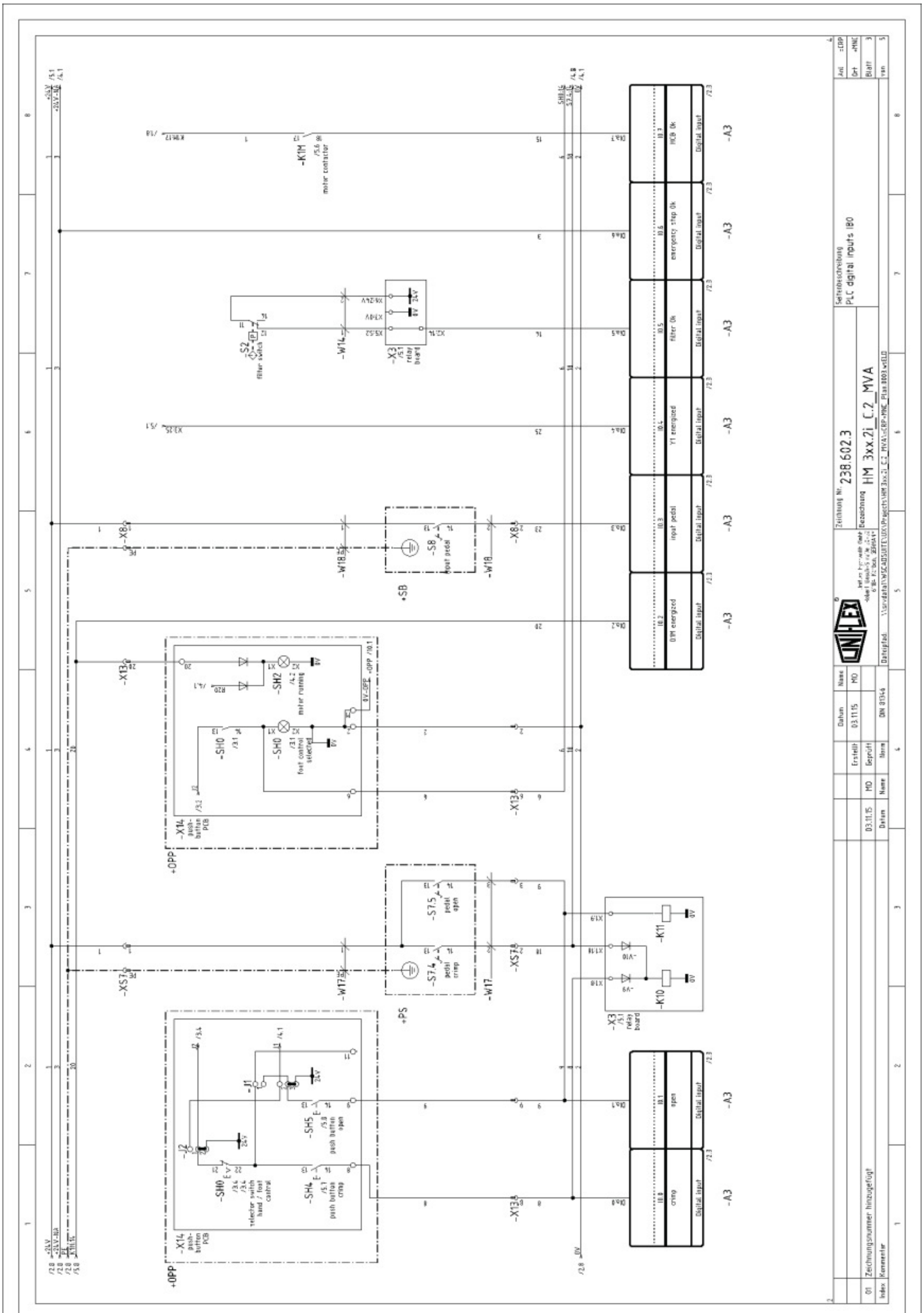
Werkstoff / Halbz.	Teil von Maschinentyp: HM 3xx FD Stromregler
Maßstab	Gewicht
Gehört zu Zeichnung	EDV-Pfad: ..\\
Benennung: **Stückliste zu 241.803.3**	
Zeichnung Nr.: 241.803.4	Blatt: 2 / 2 Bl.
Ers. für:	Ers. durch:

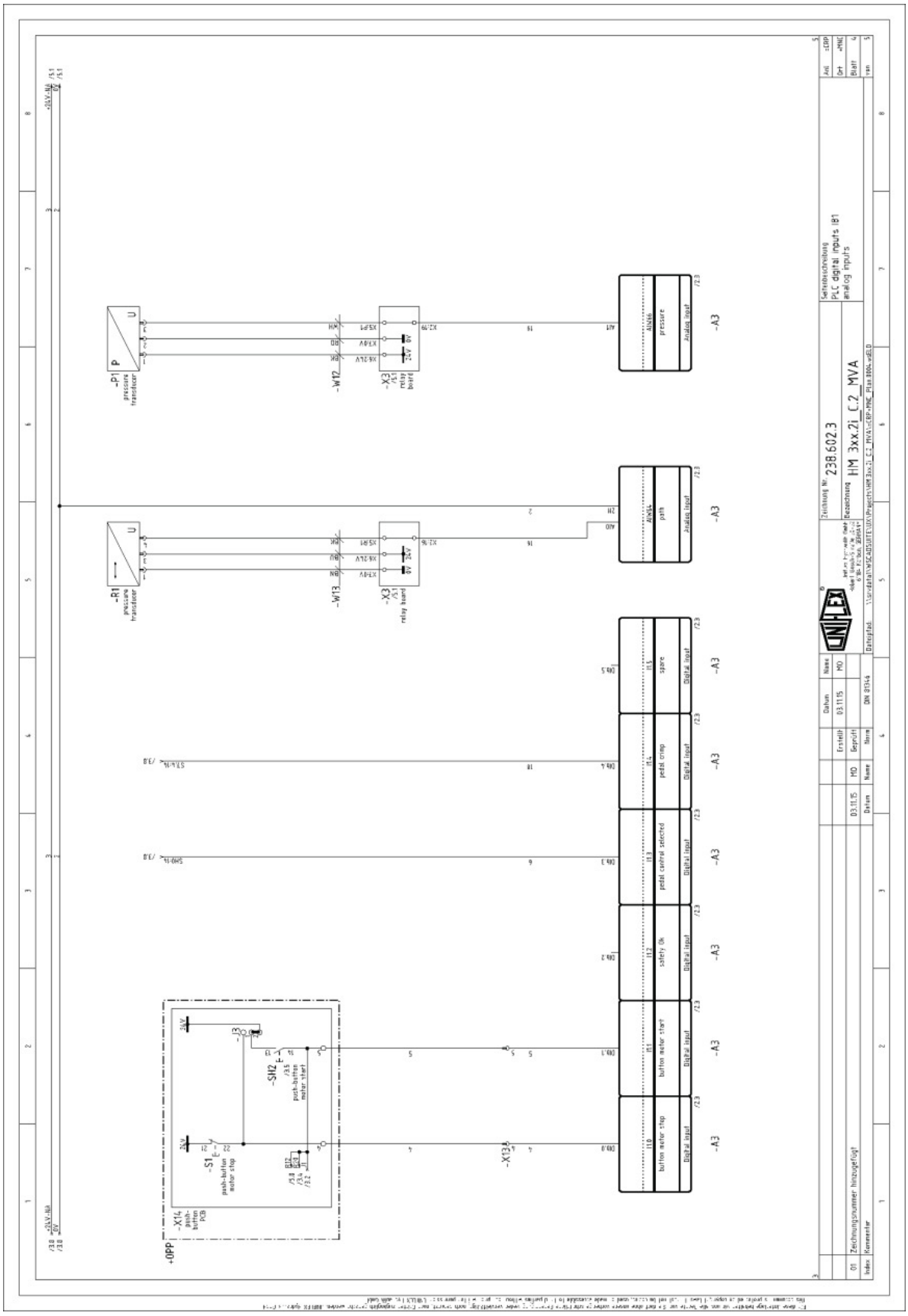
9.9 Electric diagram

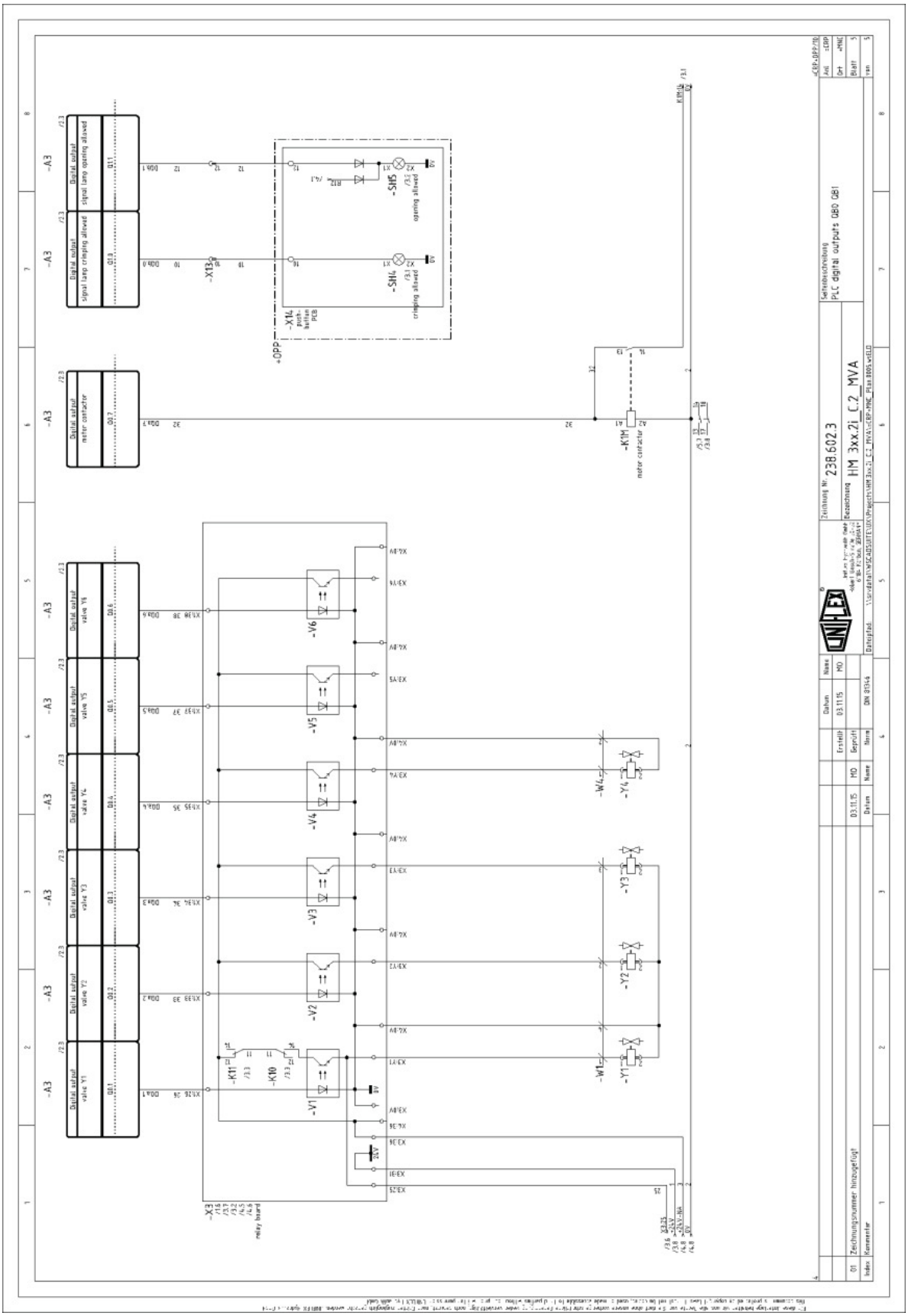


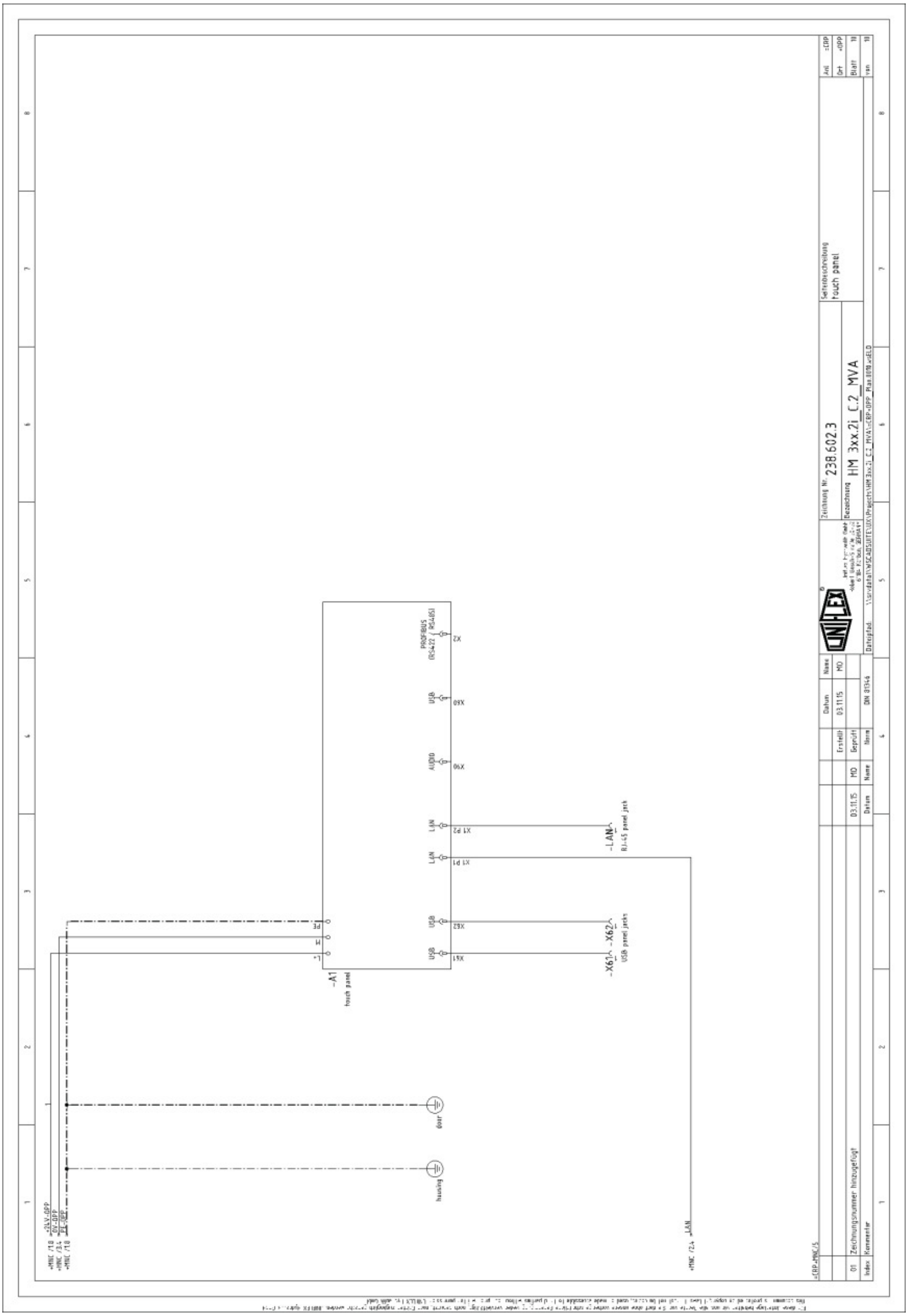


9 Annex
9.9 Electric diagram









touch panel
238.602.3
HM 3xx.2i_C.2_MVA
-A1
-LAN
RJ-45 panel jack
-X61 -X62
USB panel jacks
PROFIBUS
USB
AUDIO
LAN
housing
door
Zeichnungsnummer hinzugefügt

9.10 Maintenance log

Hydraulic oil	Hose assembly	Retaining bolt	Slide bearing plate	Pressure springs	Guiding plate	Relay	Remark	Date	Signature
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9.11 Declaration of qualified staff

I herewith declare that I have attended an internal training for the operation of the UNIFLEX machine and have been informed on all safety-related details. In addition I declare that I have read and understood this Operation Manual completely.

City	Date	Name	Signature
City	Date	Name	Signature
City	Date	Name	Signature
City	Date	Name	Signature
City	Date	Name	Signature
City	Date	Name	Signature

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Danfoss Power Solutions
14615 Lone Oak Road
Eden Prairie, MN 55344, USA
Phone: 952-937-9800

Danfoss Power Solutions II GmbH
Fluid Conveyance
Dr. -Reckeweg-Str. 1
DE-76532 Baden-Baden
Tel.: +49 7221 6820
Machine and tooling selection hotline: FcMachineSupportEMEA@danfoss.com
Service and repair Hotline: FcMachineRepairsEMEA@danfoss.com

Danfoss Power Solutions (US) Company
2800 East 13th Street
Ames, IA 50010, USA
Phone: +1 515-239-6000

Danfoss Power Solutions GmbH & Co.OHG
Krokamp 35
D-2439 Neumünster, Germany
Phone: +49 4321 871 0

Danfoss Power Solutions ApS
Nordborgveg 81
DK-6430 Nordborg, Denmark
Phone: +45 7488 2222

Danfoss Power Solutions Trade (Shanghai) Co. Ltd.
Building #22, No 1000 Jin Hai Rd
Jin Qiao, Pudong New District
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