ENGINEERING
TOMORROW

Operator's Manual

ET4250 Crimping Machine

Imprint

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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

ET4250

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, 01.03.2021

Managing Director Harald von Waitz

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1 About this document

In this Operation Manual, the “forming machine ET4250” 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.

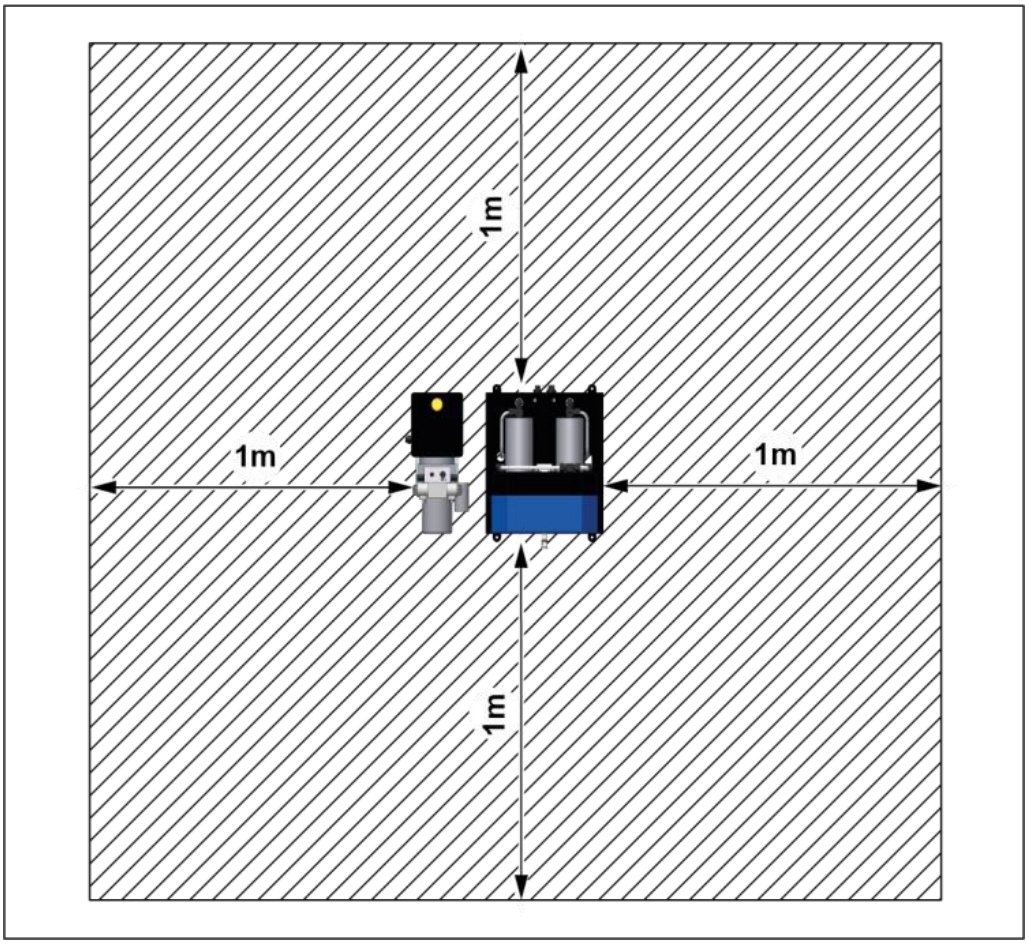
2.3.7 Risks in case of fire

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 defined as the area 1 metre all around the machine (shaded).

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

2.4.2 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.

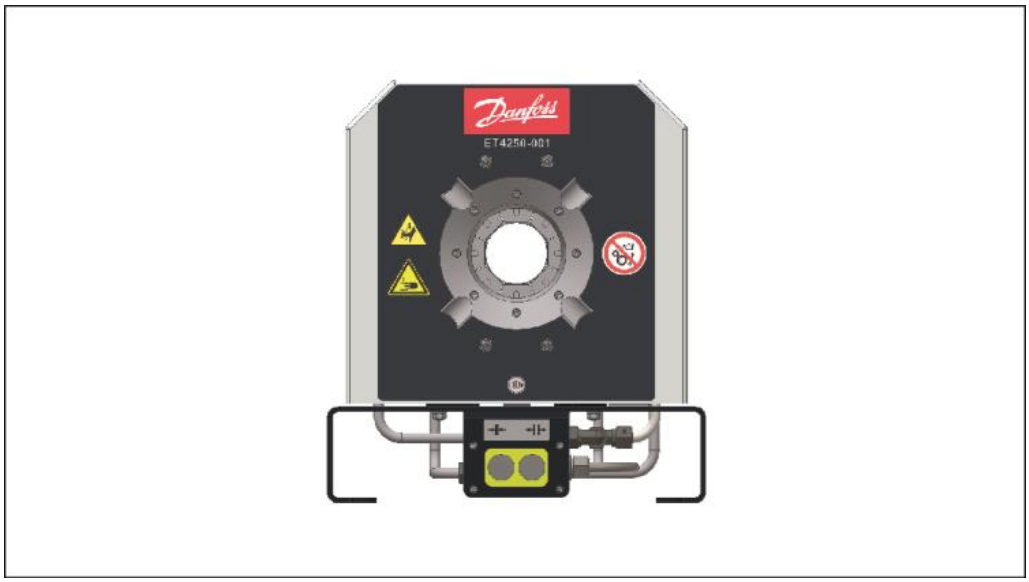
The necessity of additional, workpiece-specific protection equipment may for instance arise for angled workpiece geometries needing a large opening for being inserted into the forming machine. The pressure joining of insulators, structural steel and steel ropes, too, may require special safeguards.

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.

2.4.3 Warning signs on the machine



	**Hand injury** on the die system

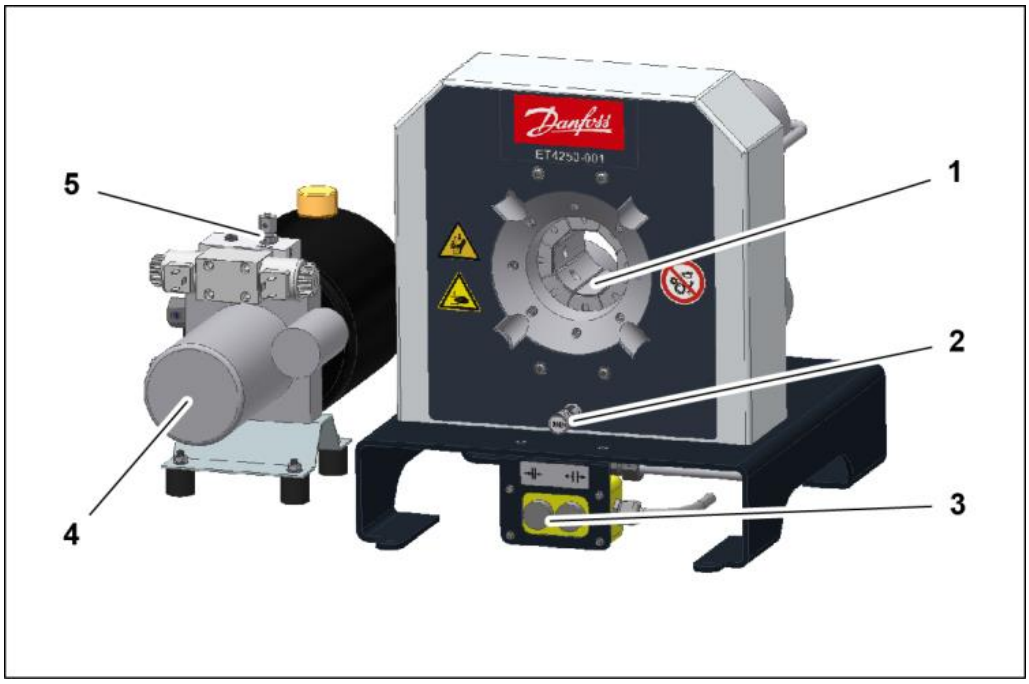
	**Risk of squeezing** on the die system
	**Oiling / greasing prohibited** on the die system

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

3 Machine description

3.1 Design and function

Base machine



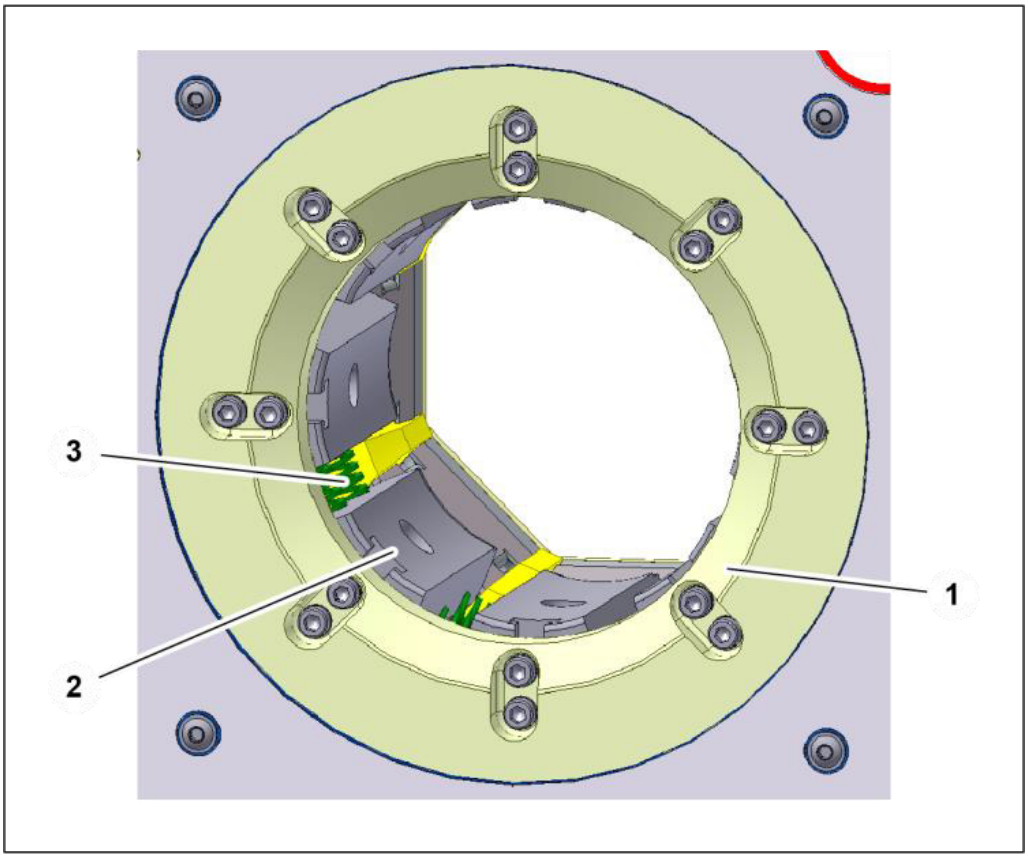
(1) Crimping tool
(2) Micrometer
(3) Control console
(4) Power unit
(5) Manometer connection for pressure test (manometer measuring range: 0 – 400 bar)

The crimping tool (1) is closed hydraulically, whereby the work piece is formed. The pressure needed for this purpose is generated in the cylinders by the pump (4) driven by the power unit.

The actual forming process is controlled via the buttons on the control console (3).

The micrometer (2) is used to change the final diameter of the die system.

Crimping tool



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

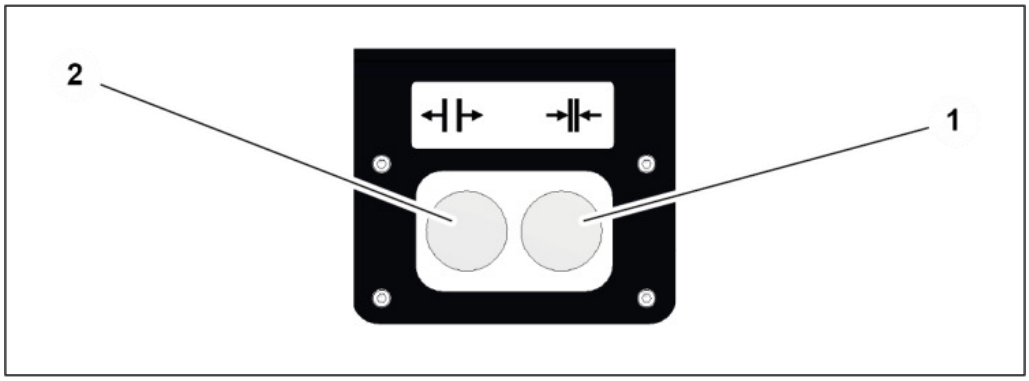
All base dies are mounted on slide plates. The crimping dies and the intermediate dies, if present, are attached to the base dies (2). The intermediate dies are required if small work pieces are to be formed on a large machine.

After the forming process, the base dies are pressed apart by the pressure springs (3) when the tool opens. The bearing segments (1) on the front guide the base dies axially in the tool.

Accessories

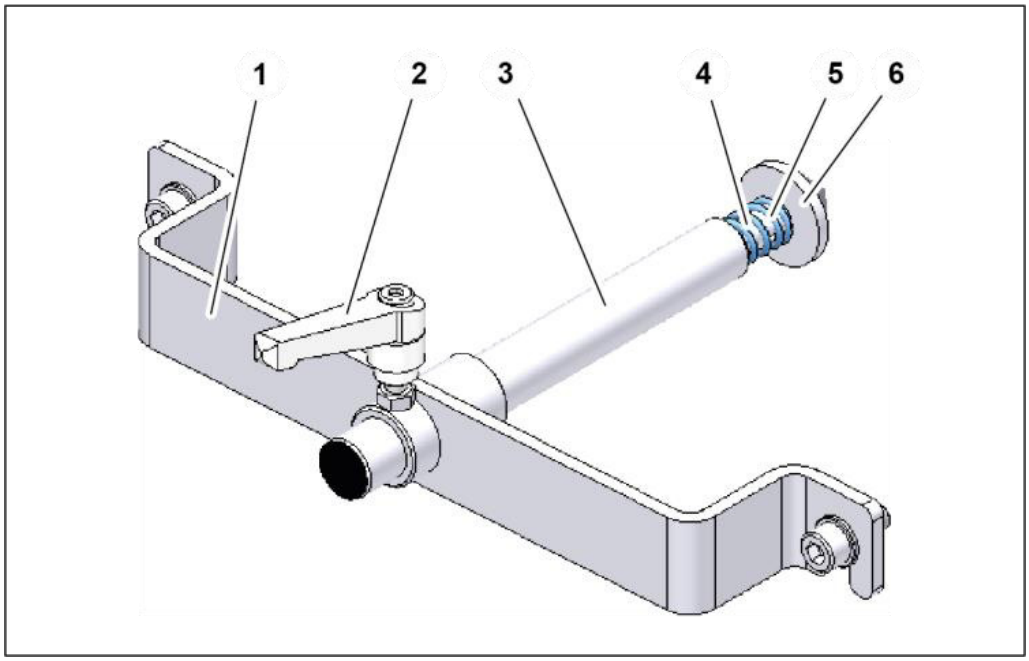
The machine can be fitted with accessories. A list of the available accessories is included in the Annex, Section "Accessories".

3.2 Operating elements



(1) Close tool button [→||←]
(2) Open tool button [←| |→]

3.3 Depth stop (accessory)



(1) Clamp
(2) Clamp lever
(3) Sleeve
(4) Plunger
(5) Pressure spring
(6) Stop pin

3.4 Forming process

There is one type of forming:

- Forming to a defined diameter

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.

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. Forming machines for servicing are not intended for permanent operation and are not suitable for series production. • Do not perform more than 200 **crimping actions** per day.

3.5 Technical data

Machine

Dimensions of machine L x W x H	425 x 370 x 435 mm
Dimensions of power unit L x W x H	450 x 231 x 296 mm
Machine weight	approx. 110 kg
Power unit weight	approx. 17 kg
Control	CONTROL A
Noise level	< 70 dB(A)*
Operation mode	S3-10%
Protection class	IP 40

Function

Forming force	1200 kN / 120 t
Max. forming range	Ø crimping dies + 12 mm (max. outside diameter of the fittings before the forming process)
Maximum Ø crimping dies	62 mm
Opening size without dies	97 mm
Opening distance	+27 mm
Closing speed	2.10 mm/s*
Forming speed	0.64 mm/s*
Opening speed	2.18 mm/s*

Work piece capacity

SAE R12 / 4SP 1-part fittings	1 1/2" depending on the fitting
SAE R15 / 4SH 2-part fittings	1 1/4", depending on the fitting
SAE R12 / 4SP 2-part fittings	1 1/2" depending on the fitting
Industry	2"
90° bend	1 1/4", depending on the fitting
Die type	239

Electrical connection

Power rating	2 kW
Voltage rating	12 V

Hydraulic system

Oil volume	approx. 4 l
Oil type	HLP 46, DIN 51524, 10µ filtered
System pressure	max. 330 bar

Workbench

Stable, level workbench with a carrying capacity of	approx. 500 kg

We recommend industrial flooring which meets the following structural requirements

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

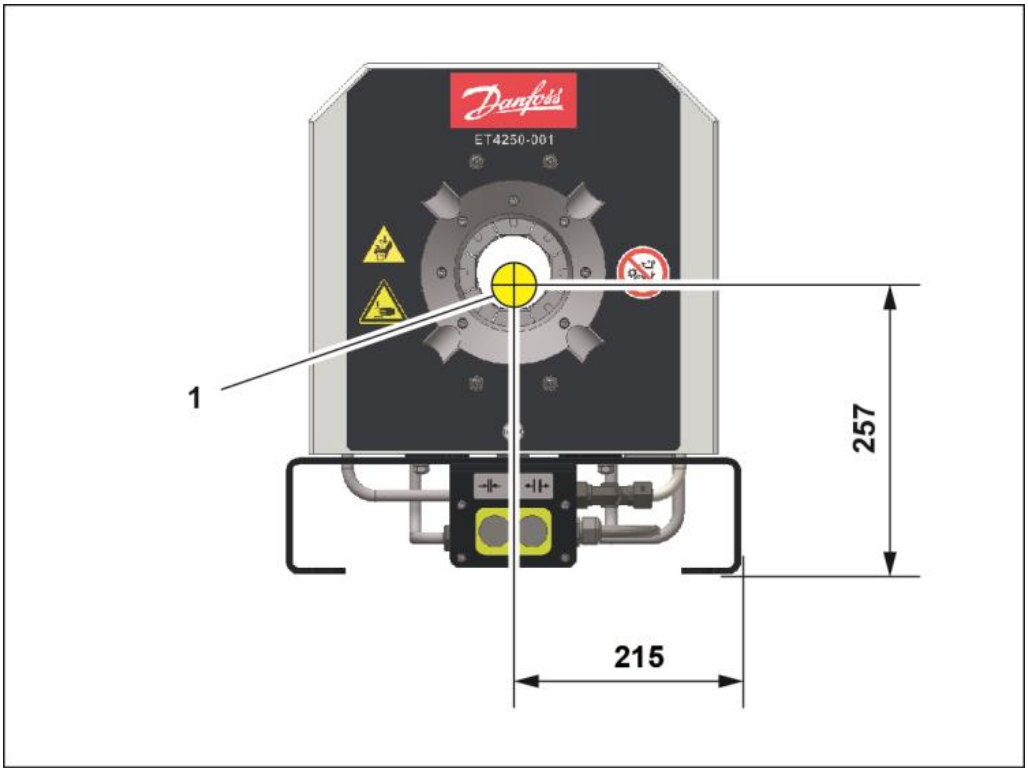
Ambient temperature	10 °C – 35 °C
Air humidity	45 % – 65 %

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 must only be unloaded and transported with a crane. Lifting gear with a sufficient length, width and lifting capacity must be used. For machine 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!** The machine may tilt if it is transported improperly. There is a risk of being injured. • Consider the machine's centre of gravity (1). • Lift the machine by the crimping tool.

7. Thread the lifting belt with protective hose or fixed coating pursuant to DIN EN 1492-1 with a width of 120 mm through the crimping tool.

The lifting belt must be placed around the crimping tool in such a manner that it supports with its full width.

8. Use the crane to lift the machine with the lifting gear and transport it to the installation site.

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 a stable and level workbench.
2. Bolt the machine onto the workbench.

The workbench must be sufficiently solid and stable.

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

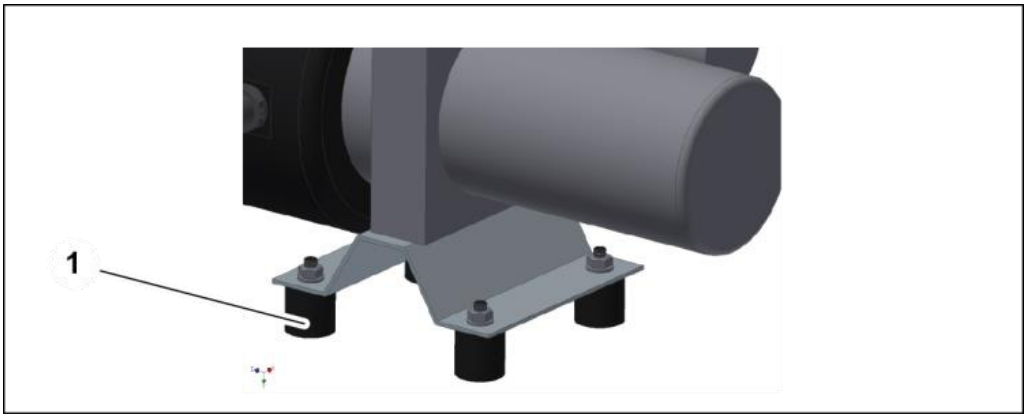
3. Check the machine for damage.
4. Check the electric cables for damage.
5. Train the operating staff and record training sessions in “Declaration of trained staff”, Section 9.

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.

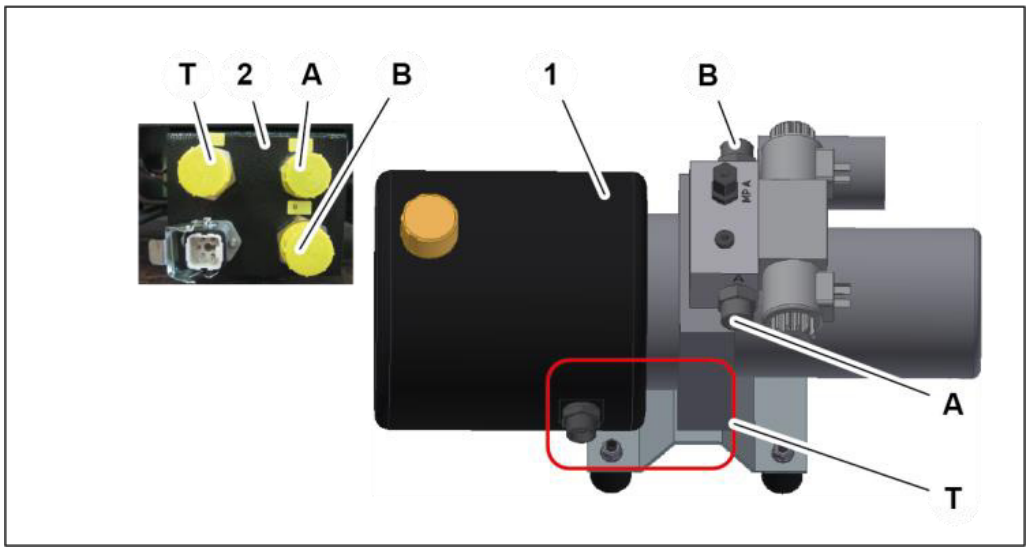
- Open and close the machine several times without any workpiece.
- Check the machine for atypical noise.



The rubber-metal buffers will reduce vibration.

1. Mount the rubber-metal buffers (1) on the hydraulic unit legs.
2. Place the hydraulic unit on a solid and level workbench.
3. Bolt the hydraulic unit to the workbench on the rubber-metal buffers.

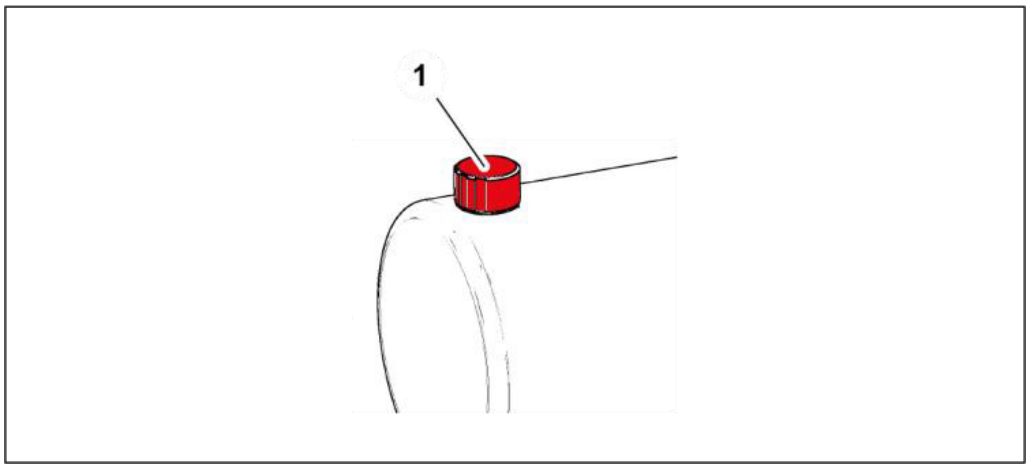
4.3.1 Connecting the hydraulic unit



4. Remove the protective caps on the hydraulic unit (1).
5. Remove the protective caps on the machine (2).
6. Connect the connections A, B and T with hose assemblies.

4.3.2 Filling hydraulic oil

If the UNIFLEX forming machine was purchased without filled hydraulic oil, the suitable, 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 a 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!

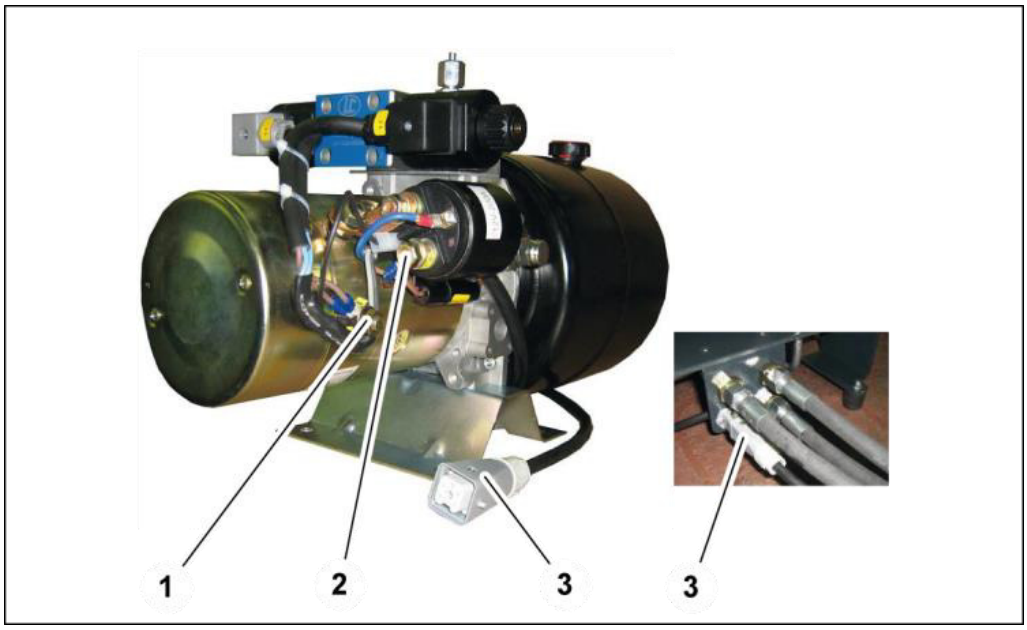
Hydraulic liquid spray or spills impose a risk of fire.

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

1. Open the air ventilation cap (1).
2. Add hydraulic oil; for quantity and type, please refer to "Technical data" in Section 3. The oil level can be read on the dipstick of the air ventilation cap. The oil level should be at the centre of the marking.
3. Close the air ventilation cap (1).
4. Do not operate the machine for a minimum of four hours so that the dirt particles in the system can settle.

4.3.3 Electrical connection

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. • Deactivate the machine and secure it against unintentional restart before maintenance.



The cable cross-section of the power cable must be at least 25 mm^2.

1. Fit the power cable on the unit and the grid with cable lugs.
2. Fit the supply line of the power cable with a battery disconnection switch.
3. Connect the power cable to the + positive terminal (2) and the - negative terminal (1).
4. Connect the plug (3) of the hydraulic unit to the socket of the machine back.

For interrupting the battery power supply, a main power switch is to be installed in the working area of the machine in accordance with accident prevention regulations.

Make sure that the power cable has been installed correctly and properly. Improper installation may result in excessive heating of the connection terminals and the power cable.

A minimum of 88 Ah battery power of the vehicle is required. Do not use any gel batteries.

In order to prevent the battery from being discharged, the hydraulic unit should only be started when the vehicle engine is running.

ATTENTION!

Risk of damage to machinery!

The hydraulic power unit is not rated for permanent operation.

- The maximum of 30 crimping cycles per hour must not be exceeded.

4.4 Bleeding the hydraulic system

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.

CAUTION!

Risk of injuries!

Risk of injuries in case of contact of hydraulic oil with skin and eyes!

- Observe supplier's protection and safety instructions (see data sheet).
- Wear personal protection equipment.
- Do not eat, drink or smoke when handling hydraulic oil.
- Ensure good ventilation.

ATTENTION!

Risk of damage to property!

Work pieces, base dies and crimping dies can be destroyed!

- There must be no work pieces in the machine.

1. Remove the intermediate dies and crimping dies.
2. Open and close the machine several times.
3. Switch off the machine using the main switch and secure it against switching on unintentionally.

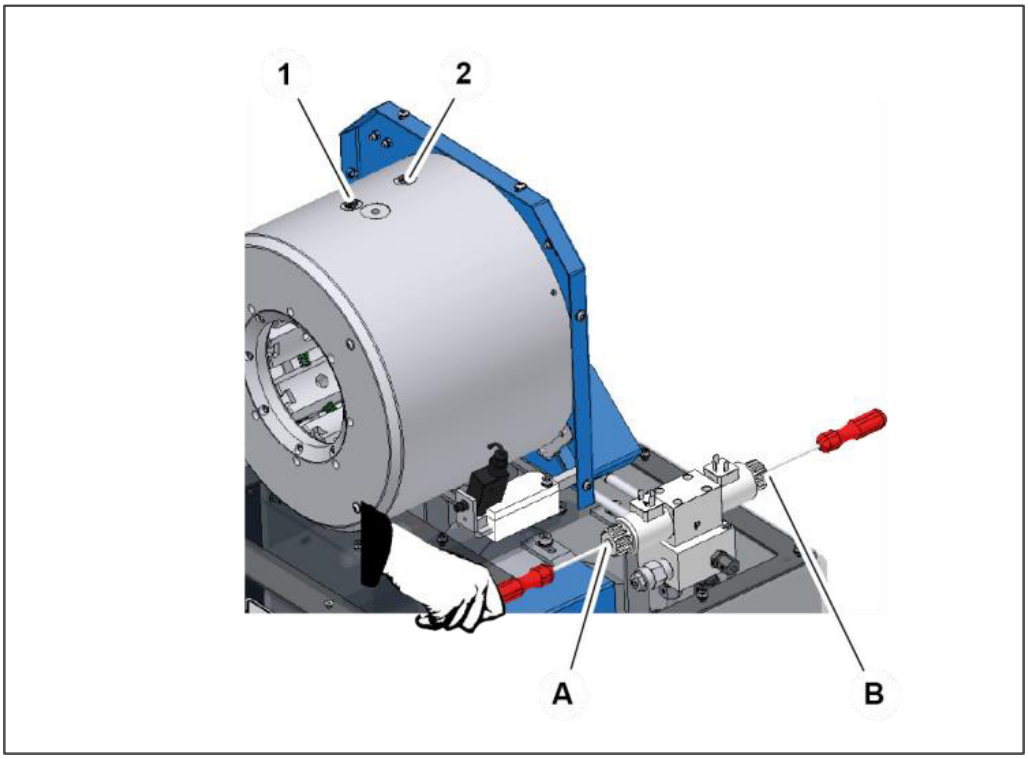
ATTENTION!

Risk of damage to property!

The connection cables of the control are located directly beneath the cover any might be damaged when the cover is lifted off.

- Keep the cover straight while carefully pulling it forward until the micrometer is completely immersed in the cover, and then lift it up vertically.

4. Loosen the fixing screws of the front cover, remove the front cover.



5. The machine may only be pressurised slightly.
   Release pressure by activating the plungers A and/or B on the solenoid valve.

WARNING!	
	**Risk of injuries!** If the air ventilation cap is unscrewed excessively, it may be ejected by the hydraulic system pressure and cause injuries, e.g. to the eyes. • Only unscrew the air ventilation cap by a half turn. • Avoid a high pressure build-up when opening the machine by activating the [⇤ ⇥] Open Machine button.

6. Unscrew the air ventilation cap (1) and (2) by a half turn.
7. Switch on the machine.
8. Open and close the machine using the [⇤ ⇥] Open Machine and [⇥ ⇤] Close Machine buttons, until the oil running out of the air ventilation cap (1) is free of bubbles.
   Collect the hydraulic oil running out.
9. Tighten the air ventilation caps (1) and (2) with the appropriate torque (45 Nm).

10. Switch off the machine using the main switch and secure it against switching on unintentionally.
11. Mount the cover.

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 Start

1. Connect the power cable to the power grid (see “Electrical connection” in Section 4).

5.3 Forming the workpiece

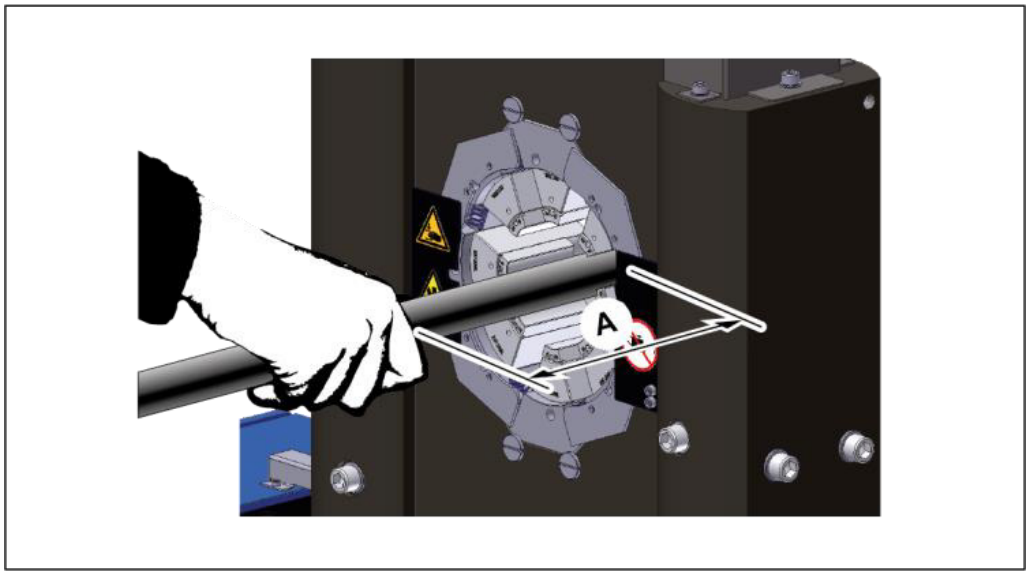
5.3.1 Prerequisites

Prerequisites for a correct forming process:

- The die system and the workpiece are compatible.
- The proper jaw system is correctly mounted in the tool.
- The forming dimension is set correctly, please also refer to “Setting the forming dimension”, Section 5.

- Preferably form the workpiece in the centre of the crimping die length. Eccentric forming will result in a conical forming result and increased lopsided wear on 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.

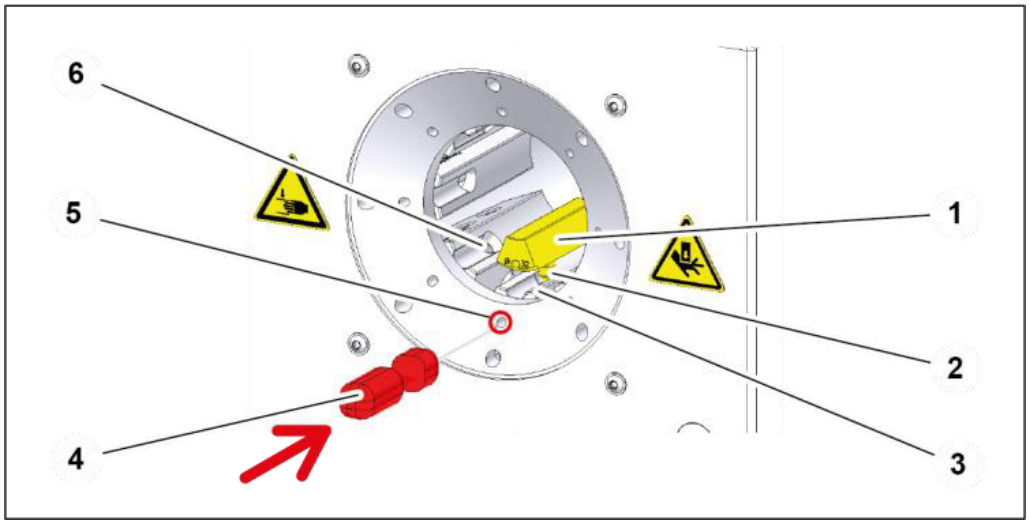
1. Manually position the pre-mounted workpiece in the tool.
2. Hold the workpiece with one hand during the forming process.
3. Press and hold the button [⇥⇤] to close the tool; the forming process starts and ends when the pre-set diameter/pressure is reached.
4. Press the [⇤ ⇥] button upon completion of the forming process to open the tool.
5. Remove the workpiece from the tool.
6. 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).

WARNING!	
	**Risk of squeezing!** When the die system closes, there is a risk of getting squeezed between the die and the workpiece. • Open the crimping tool only so much that the hose may be placed and/or removed easily.

5.4 Changing the crimping dies

5.4.1 Changing the crimping dies using a die wrench



Positioning the crimping dies

1. Completely open the crimping tool.
2. Switch off the machine using the main switch and secure it against switching on unintentionally.

WARNING!

Risk of squeezing!

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

- Only replace the crimping dies when the machine is switched off.

3. Use the supplied die wrench (4) to push and hold the locking bolt backward in the basic die (3).
4. Use the retaining bolt (2) to place the crimping dies (1) in the mounting hole (6).
5. Remove the die wrench (4) to release the pressure on the locking bolt - the crimping die is now fixed.

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.

Removing the crimping dies

1. Completely open the crimping tool.
2. Switch off the machine at the main switch.

WARNING!

Risk of squeezing!

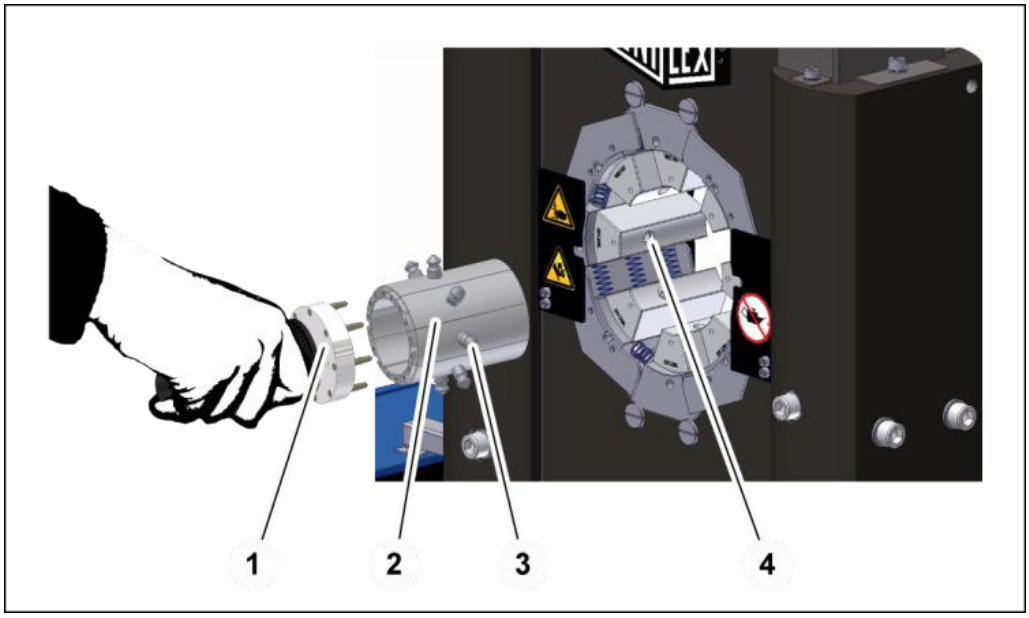
When the die system closes, there is a risk of getting squeezed between the dies.

- Only replace the crimping dies when the machine is switched off.

3. Hold the crimping die to be removed with one hand.
4. Use the other hand to push and hold the locking bolt backward in the basic die (3) by means of the die wrench (4).
5. Remove the crimping die concerned.
6. Remove the die wrench (4) and release the pressure on the locking bolt.

After forming heavy fittings, the locking bolt may be slightly sluggish. In this case, use a mallet to release the locking bolt by slightly hitting on the die wrench.

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



1. Set micrometer to 0.0 mm position.
2. Open the crimping tool fully by activating the [⊣ ⊢] button.
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.

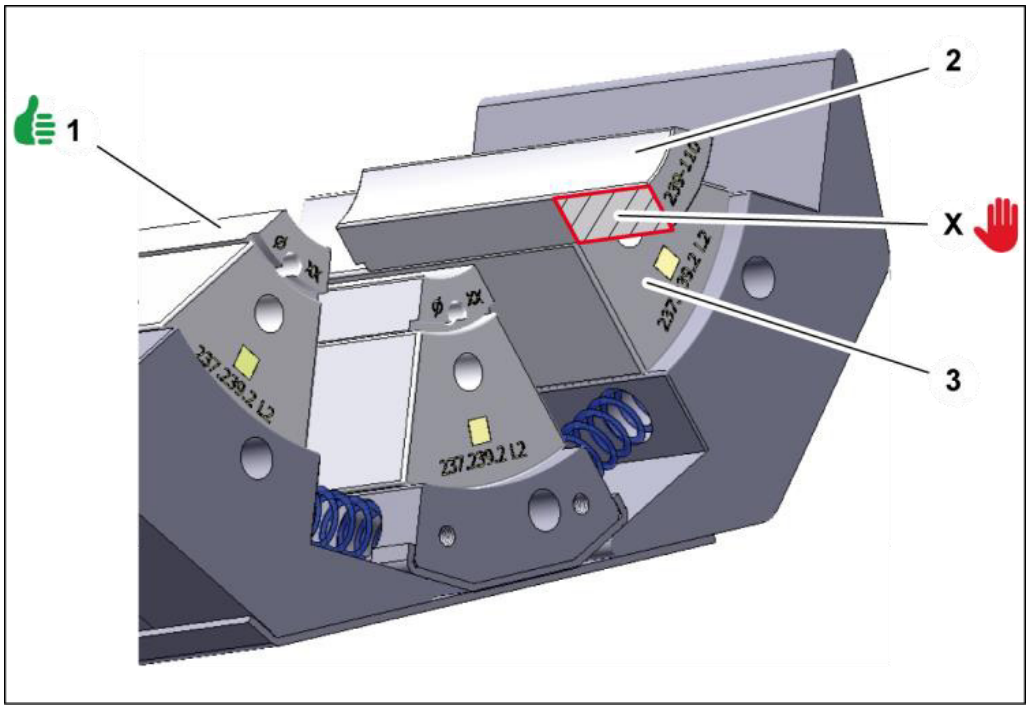
- Pay attention to the correct position of the quick die change system with crimping dies.

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.

For machines with a basic die system different from PB 239, the intermediate dies must be inserted as instructed.

The QDC 239.5 may only be used to insert or remove the crimping dies of type PB 239.

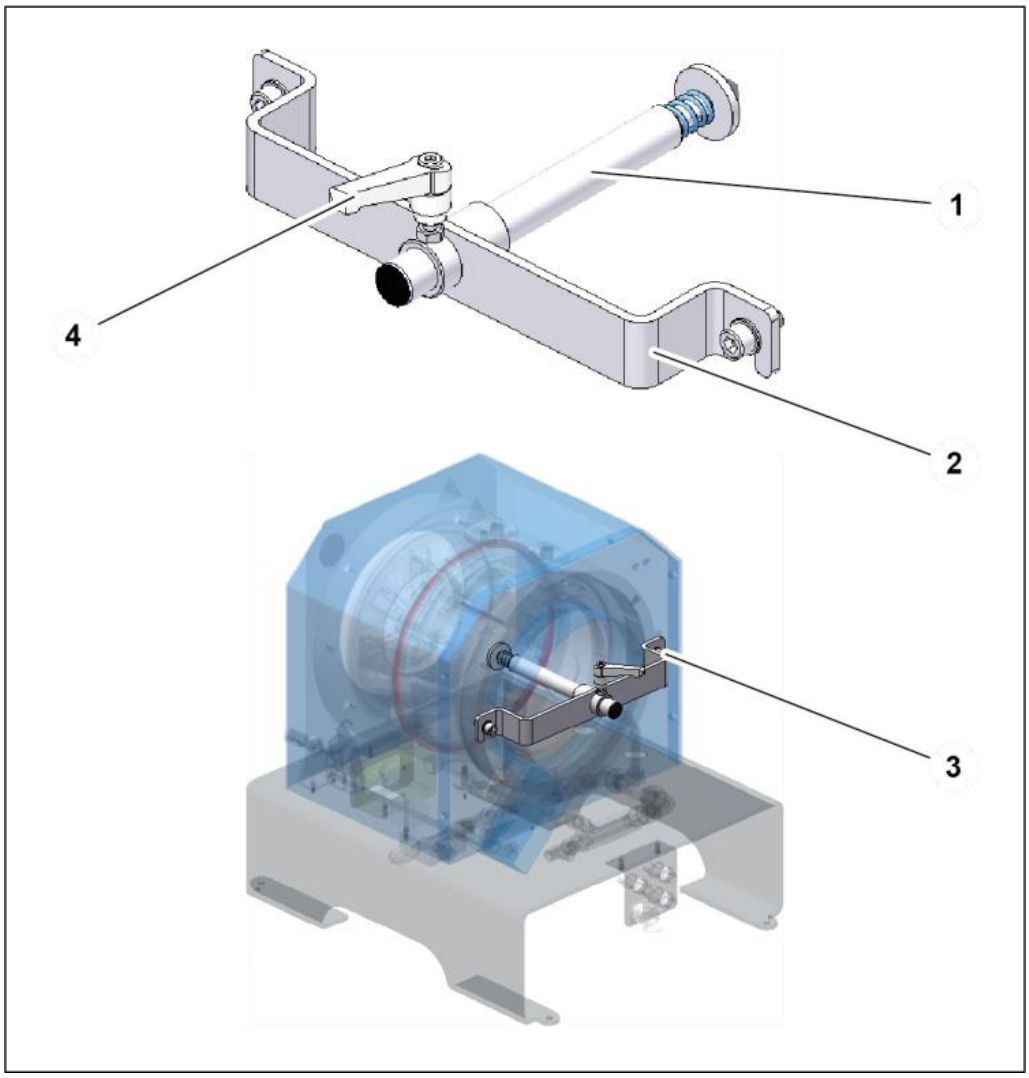
Always use a complete set of equal crimping dies with the same identification and diameter. One set comprises eight crimping dies or seven crimping dies and one matching marking die.



ATTENTION!	
!	**Risk of damage to machinery!** If the crimping dies protrude beyond the base and intermediate dies during forming, 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 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 workpiece. For special applications such as pipe elbows, for example, the depth stop is to be removed.



1. Mount the depth stop clamp (2) on the machine back using cylinder bolts (3).

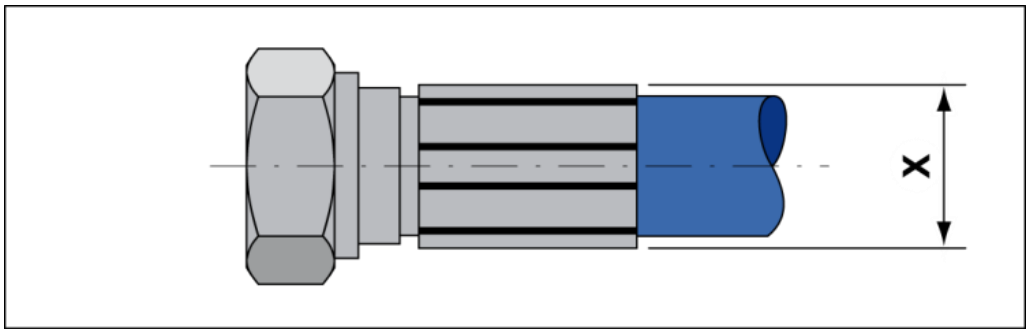
WARNING!	
	**Risk of squeezing!** There is risk of getting squeezed between the depth stop and the machine chassis when positioning the depth stop. • Do not touch the stop pin. • Do not reach into the open crimping tool.

Adjusting the control unit:

1. Insert the fitting in the correct position. Position the fitting within the crimping surfaces and at least 2 - 4 mm away from the end of the crimping die.

2. Press the [→||←] button to close the crimping tool until the crimping dies are tight to the crimped sleeve.
3. Disconnect machine from power supply and secure it against switching on unintentionally.
4. Loosen the clamp lever (4).
5. Push the sleeve with stop pin (1) towards the fitting.
6. Tighten the clamping lever (4).
7. Switch on the machine.
8. Form the workpiece.
9. Press the [|← →|] button to open the tool.
10. Check the workpiece.
11. If the workpiece meets the requirements: produce other identical workpieces.
12. If the dimension is not reached: Adjust difference on the micrometer, form again and check the workpiece.

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 Forming travel limitation

If the forming process is started outside the maximum forming range, see “Technical data” in Section 3, the forming distance limitation is activated and the machine stops, depending on the equipment. With machines without any forming distance limitation, tools components may be damaged if the forming range is exceeded.

5.8 Stop

1. Complete the forming process.
2. Deposit the work piece outside the machine.
3. Disconnect the power unit from the power supply.
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.

5.9 Emergency stop

In case of an emergency

Actuate the battery disconnection switch immediately in the event of an emergency. The crimping tool movement will be stopped. The drive unit is shut down.

Restart after and emergency

WARNING!	
	**Risk of injuries!** The battery disconnection switch 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. Actuate the battery disconnection switch.

5.10 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.

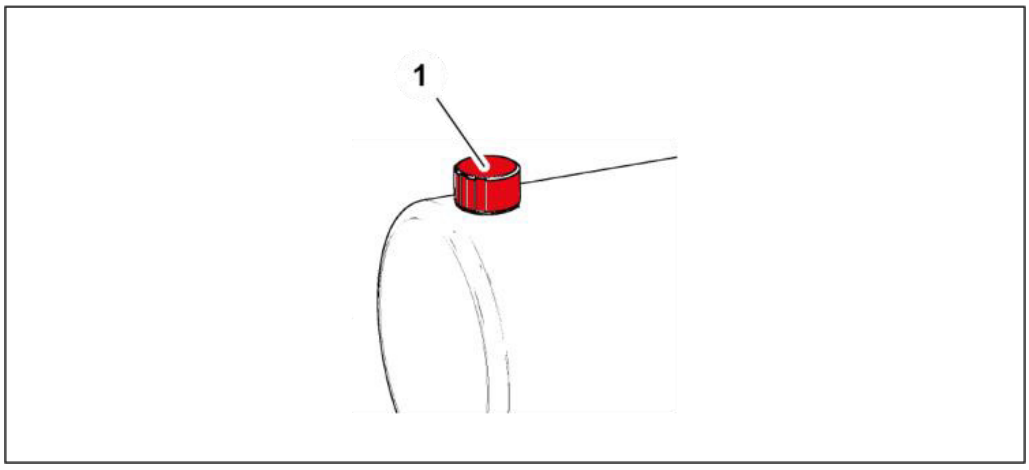
Maintenance item	Weekly	Monthly	Every 6 months	Number of years
Hydraulic system				
Hydraulic energy lines – hoses: Check for porosity and leaks.		X		
Hydraulic energy lines - bolted connections of hoses and pipes: Check for leaks.		X		
Hydraulic oil: Check oil level, add oil if required (see “Replacing hydraulic oil” in Section 6).		X		
Hydraulic oil: 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	
Check all bolted connections for secure fitting and retighten if necessary.				1
Safety equipment				
Emergency-stop button/Emergency stop device: Check function	X			
Fixed guards and covers: Check for completeness and correct installation.		X		
For machines with foot switch, only 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 change

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.

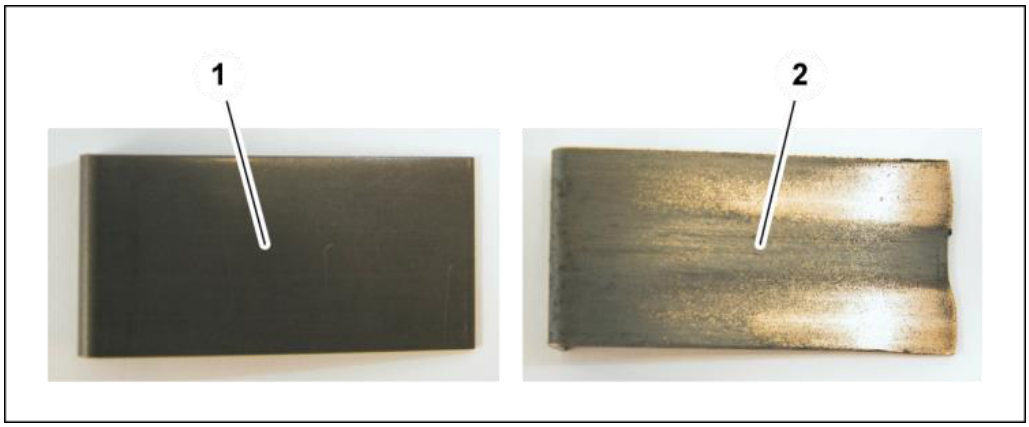


1. Disconnect machine from power supply and secure it against switching on unintentionally.
2. Let the hydraulic oil cool down until the tank enclosure is warm to the touch.
3. Open the air ventilation cap (1).
4. Pump out hydraulic oil using an external pump.
5. Add new hydraulic oil (see “Technical Data” in Section 3).
6. Close the air ventilation cap (1).
7. Do not operate the machine for a minimum of four hours so that the dirt particles in the system can settle.
8. Switch on 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 can be read on the dipstick of the air ventilation cap. The oil level should be in the middle of the marking. Add hydraulic oil if necessary.

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

6.4 Checking and replacing slide bearing plates

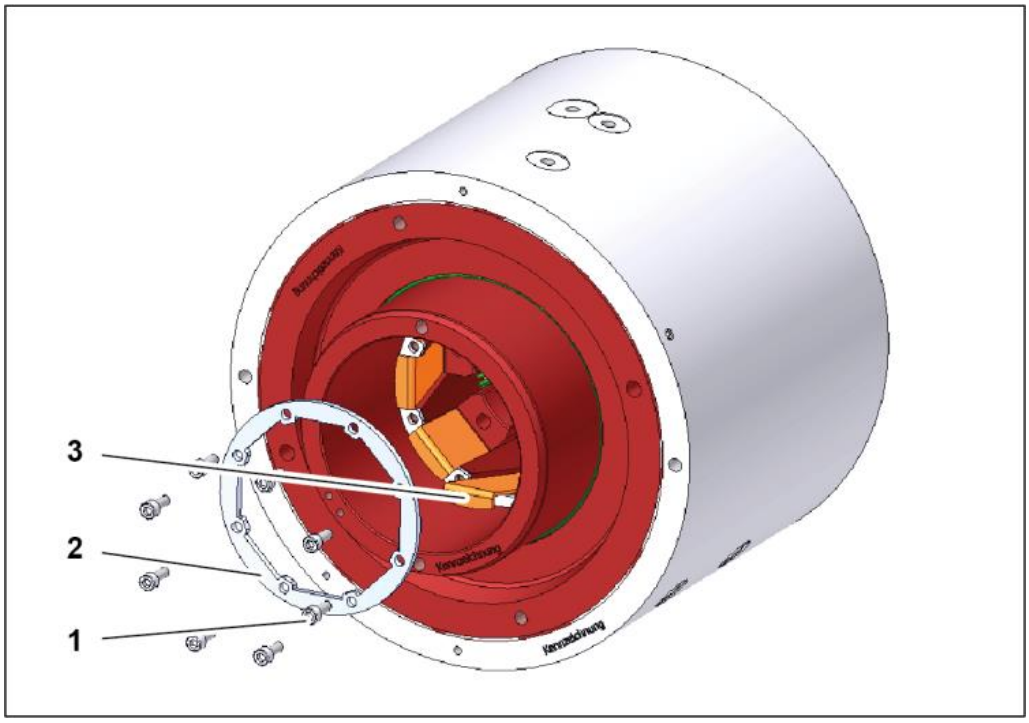
Checking slide bearing plates



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



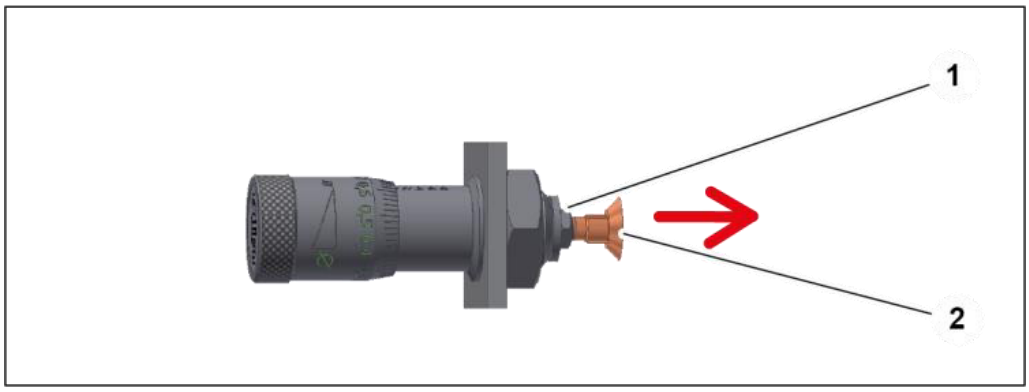
1. Open the crimping tool fully.
2. Deactivate the machine on the main switch and secure it against unintentional restart.
3. Loosen bolts (1) on clamping ring (2).
4. Remove clamping ring (2).
5. Pull out old slide bearing plate (3).
6. Insert the new slide bearing plate (3).
7. Perform steps five and six for all eight slide bearing plates.
8. Remount clamping ring (2).
9. Tighten screws (1).

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

Check the machine zero point after each bearing plate replacement and readjust the micrometre if necessary.

6.5 Micrometer adjustment

If the measured forming dimensions of the workpiece deviate from the forming dimensions of the crimping die when the micrometer is set to zero, the micrometer must be readjusted.



1. Release the screws on the cover.
2. Remove the cover (see “Annex” in Section 9).
3. Loosen the counter-nut (1) of the contact screw (2).
4. Adjust the contact screw (2).

2.5 revolutions of the contact screw correspond to 1 mm change in the forming dimension.

5. Remount the enclosure/front panel.
6. Test the crimping process and readjust if necessary.

7 Troubleshooting

Error	Cause	Remedy
Machine does not close/open	Battery disconnection switch set to OFF	Actuate the battery disconnection switch
	Voltage incorrect	Check voltage supply
	Insufficient amount of hydraulic oil	Refill oil
	Power unit defective	Check power unit
	Operation buttons defective	Check operation buttons and replace, if required
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 not centred	Preferably form the workpiece 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 profile and exchange, if required (see “Technical data”, Section 3, for crimping die profile)

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.

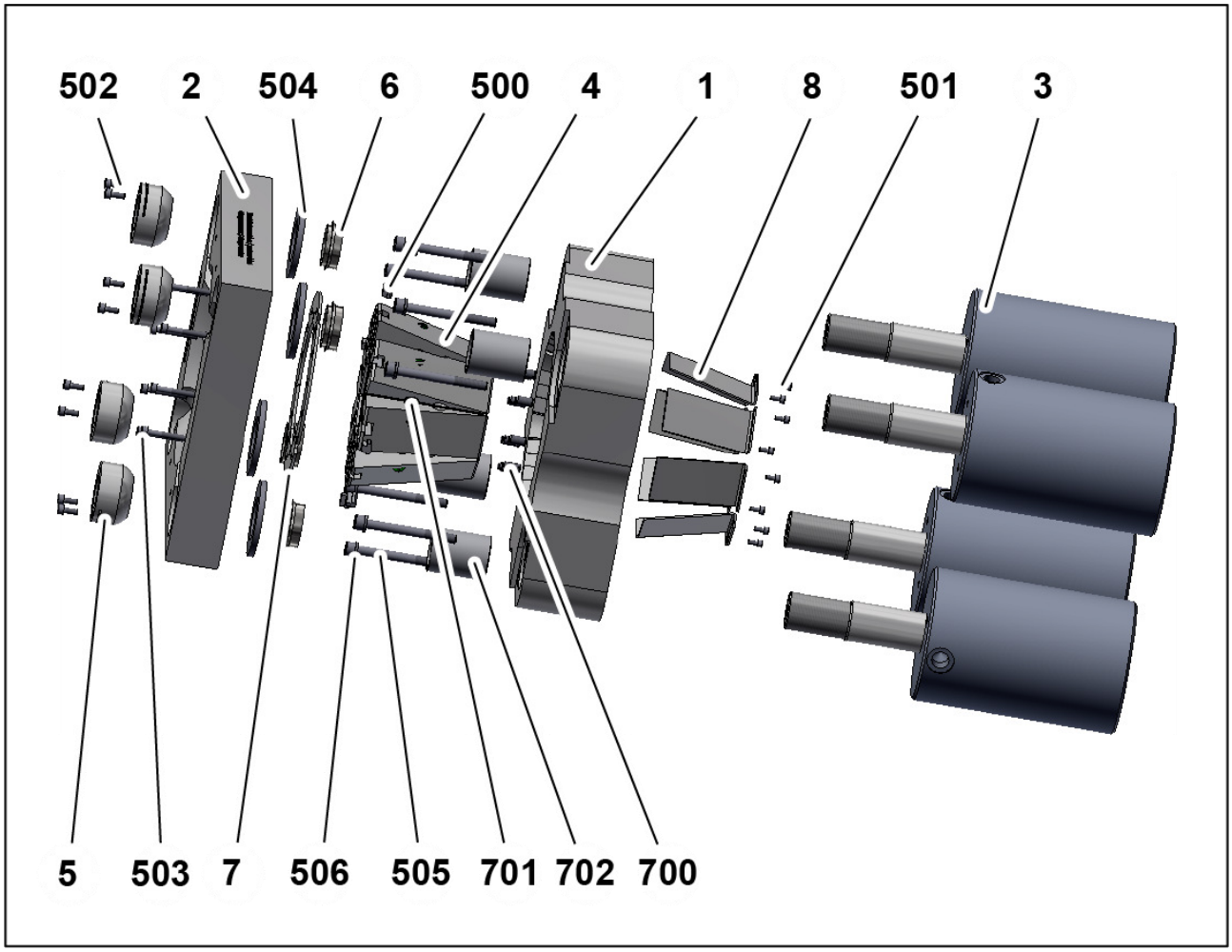
9.1 Accessories (retrofittable)

Accessories	Part code	Unit of delivery quantity
Simple and quick die change system	QDC 239.5	1 item
Die deposit	QDS 239 B QDS 239 C QDS 239 R	1 item 1 item 1 item
TU-QDS crimping die deposit system	TU-QDS F Basic TU-QDS F Shelf TU-QDS F 239 I	1 item 1 item 1 item
End stop	TA S3_L	1 item
Mirror	SHS S3_L	1 item
Camera set	OCS 10.3 retro	1 item
Lamp with magnetic base	LUS	1 item
Die wrench	239.017.4	1 item
Adapter for base die groove	295.005.3 (8x)	1 item
Universal table	TU	1 item
Crimping dies system	PB 239	1 set

Please contact our Sales department for ordering accessories.

9.2 Spare parts list

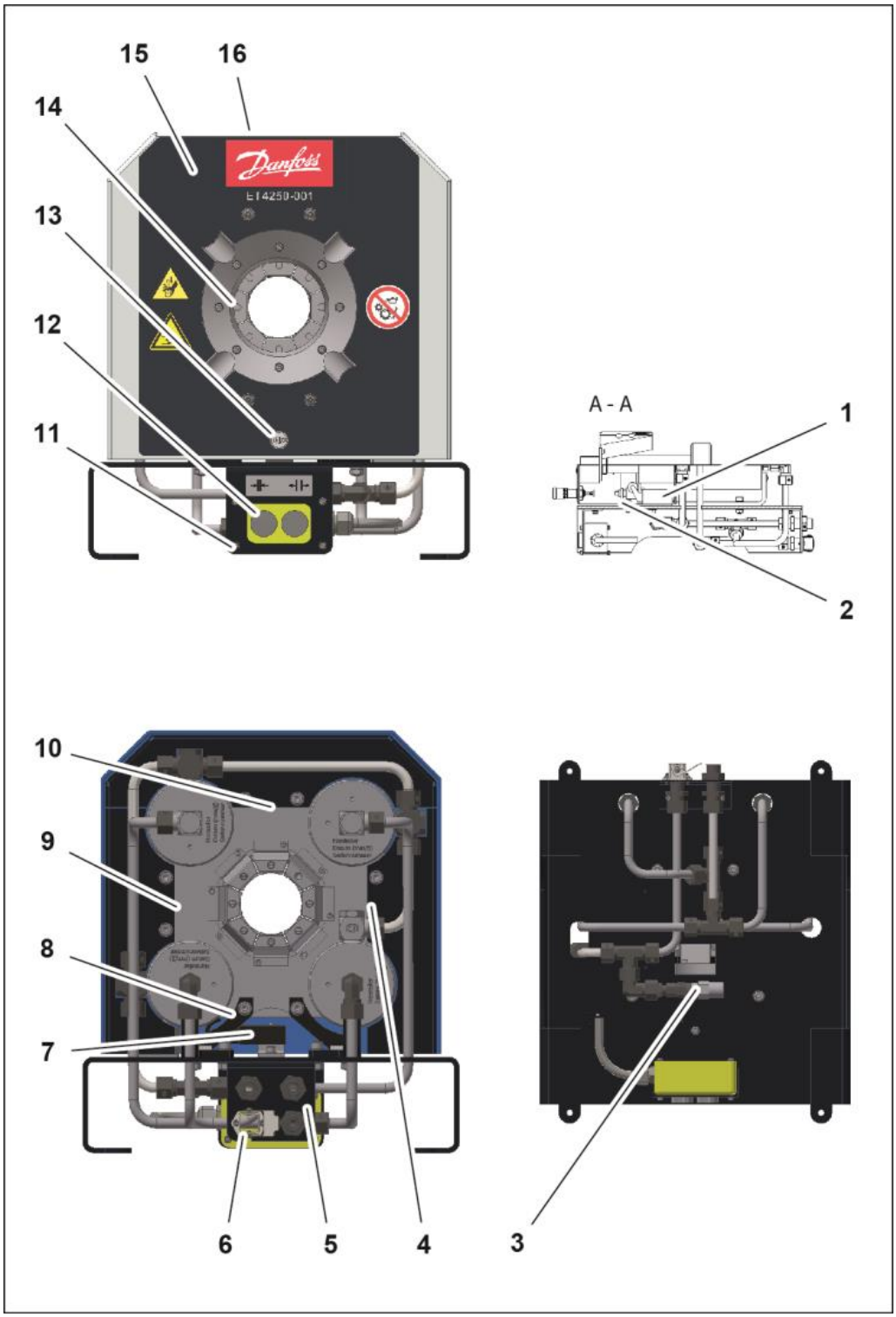
9.2.1 Tool



Item	Quantity	Part code	Designation
1	1	264.191.0	Pressure plate, back
2	1	264.171.0	Pressure plate, front
3	4	263.390.3	Hydraulic cylinder
4	1	264.2	Base dies set
5	4	264.194.3	Ball nut
6	4	264.186.4	Sleeve
7	2	264.185.3	Bearing segment
8	8	264.196.4	Bearing plate, rear pressure plate
500	8	798.320003	T-groove nut

Item	Quantity	Part code	Designation
501	8	798.110088	Cylinder screw with hexagon socket ISO 4762 – M4x8 - galvanised
502	8	798.120068	Cylinder screw with hexagon socket DIN 4762 – M5x10 - 12.9
503	8	798.110103	Cylinder screw with hexagon socket ISO 4762 – M5x35 - galvanised
504	4	798.210035	Washer DIN EN ISO 7089 – 36 galvanised
505	8	798.110127	Cylinder screw with hexagon socket ISO 4762 – M8x80 - galvanised
506	8	798.750004	Spring washer DIN127 – A 8 – galvanised
700	8	239.151	Pressure spring screw
701	16	268.150	Pressure spring
702	4	3550DU	Bearing bush

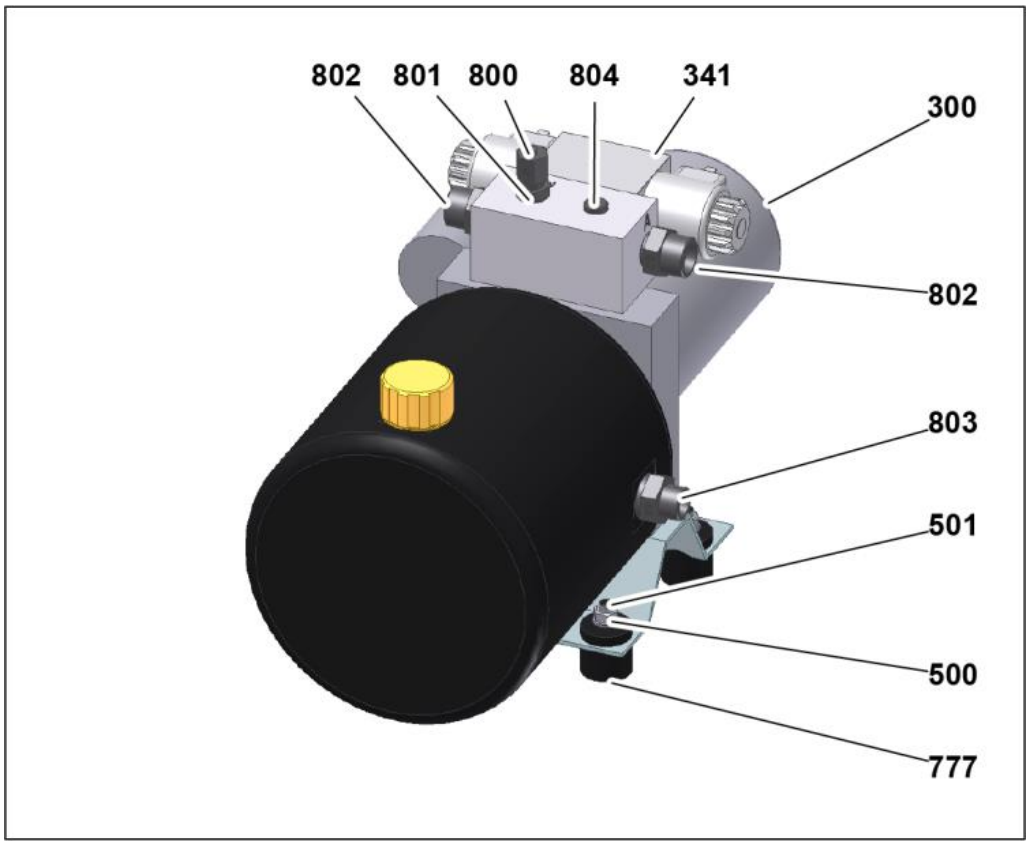
9.2.2 Mechanical equipment



Item	Quantity	Part code	Designation
1	1	8.12.041	Position switch
2	1	264.248.4	Mounting plate, roller switch

Item	Quantity	Part code	Designation
3	1	245.515	Piston-type pressure switch
4	1	263.257.3	Protective plate, left side
5	1	263.241.3	Angle for switch
6	1	8.12.037	Mounted housing
7	1	Z-15-GQ3	Limit switch
8	2	263.214.3	Tool holder
9	1	263.258.3	Protective plate, right side
10	1	263.255.3	Protective plate, top
11	1	263.241.3	Angle for switch
12	1	264.406	Switch
13	1	219.400.3	Crimping micrometer
14	1	269.1194	Tool S3.4
16	1	263.250.2	Cover S3.x/ S4.x

9.2.3 Hydraulic unit DC



Item	Quantity	Article code	Designation
300	1	263.350 263.354	Hydraulic unit 12 V DC Hydraulic unit 24 V DC
341	1	263.353 227.001	Way-valve 12 V DC Way-valve 24 V DC
500	4	DIN 125-1 - B 8.4	Washer
501	4	DIN 934 - M8	Hexagon nut
777	4	300.001	Rubber buffer
800	1	VKAM06S	Sealing plug
801	1	GE06SOMD	Straight screw-in nozzle
802	1	GE12LRED	Straight screw-in nozzle
803	2	GE12LR1/2ED	Straight screw-in nozzle
804	1	VSTI1/8ED	Sealing plug
	1	276.3500	Hydraulic unit 12 V DC, complete
	1	276.3501	Hydraulic unit 24V DC, complete

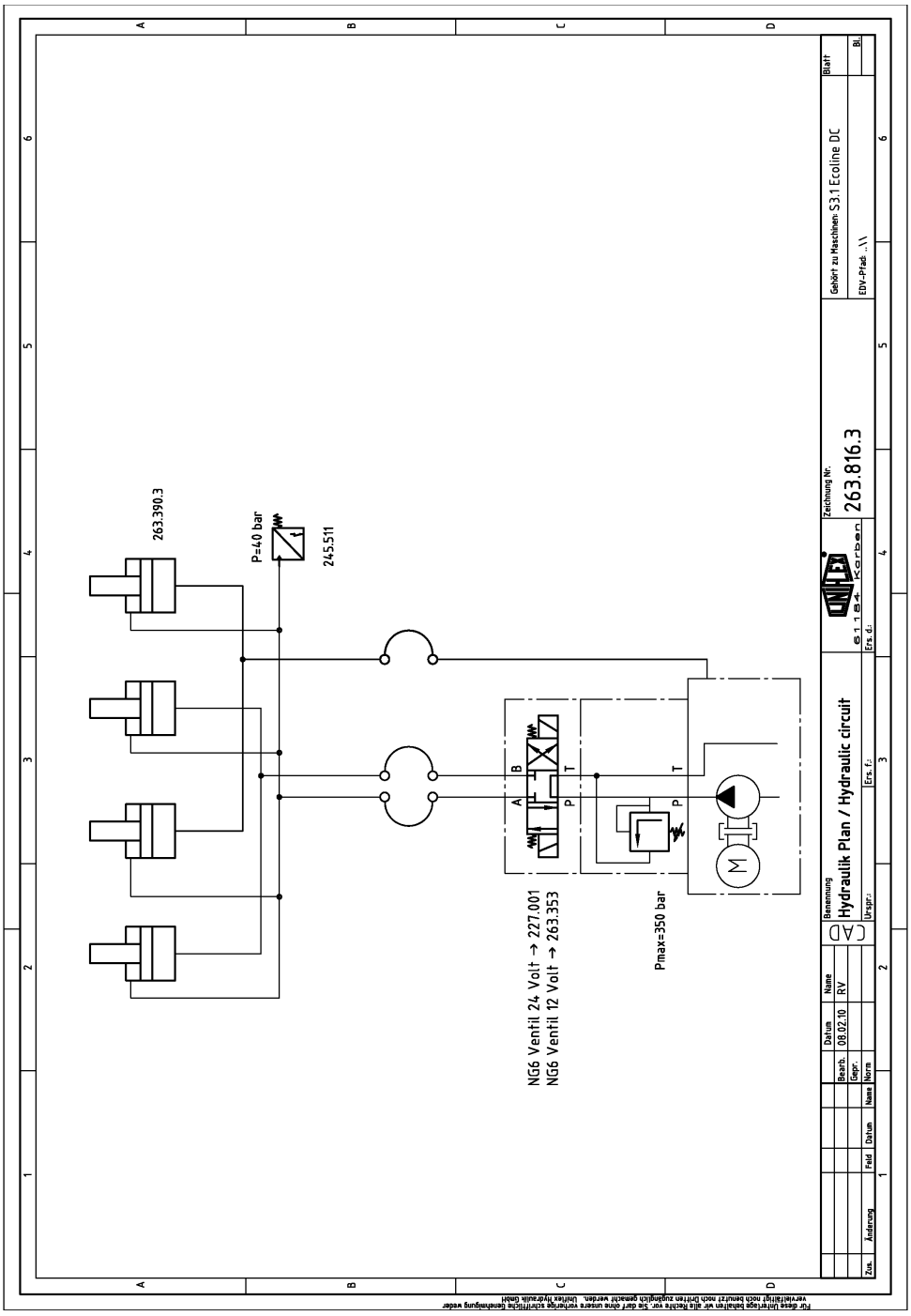
9.3 Spare parts kit

Quantity	Part code	Designation
1 set	263.1	Spare parts set S3.1/4.1 bearing plates for base dies
1 set	263.2	Spare parts set S3.1/4.1 front bearing segments
8 per set	239.041.4 sw	Retaining bolt, plastic (profile: 239 / 239L)
8 per set	239.041.4	Retaining bolt, steel (profile: 239 / 239L)
8 per set	239.151	Pressure piece
1	263.11	Repair tool set
1	263.4	Spare parts set, set of base dies S3/S4
1	263.5	Spare parts set, cover S3

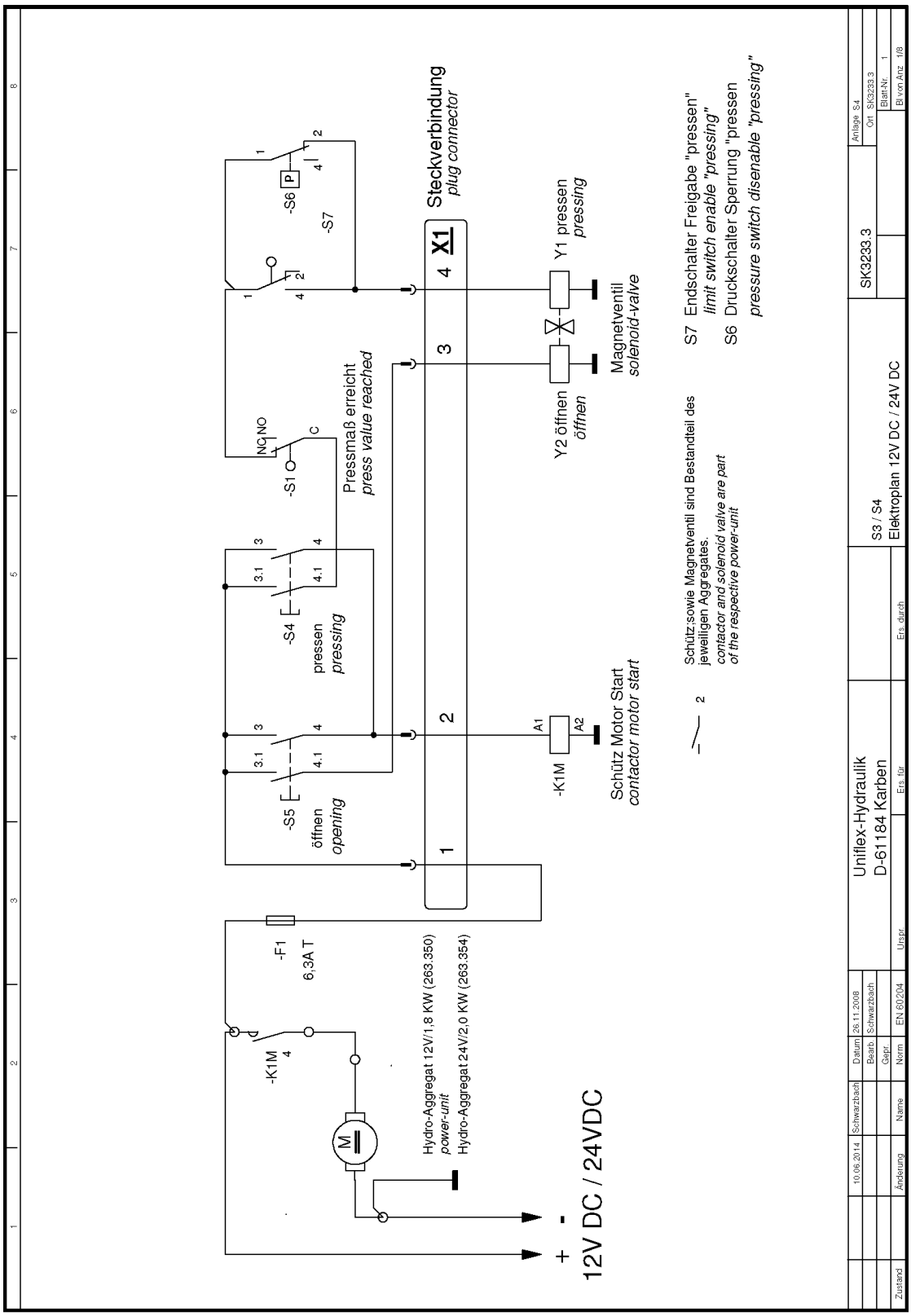
9.4 Retaining bolt for standard crimping dies (depending on crimping die)

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

9.5 Hydraulic diagram



9.6 Electric diagram


12V DC / 24VDC
+ -
-K1M
-F1
6,3A T
Hydro-Aggregat 12V/1,8 KW (263.350)
power-unit
Hydro-Aggregat 24V/2,0 KW (263.354)
-S5
öffnen
opening
-S4
pressen
pressing
-S1
Pressmaß erreicht
press value reached
-S6
-S7
Steckverbindung
plug connector
X1
-K1M
Schütz Motor Start
contactor motor start
Y2 öffnen
öffnen
Y1 pressen
pressing
Magnetventil
solenoid-valve
S7 Endschalter Freigabe "pressen"
limit switch enable "pressing"
S6 Druckschalter Sperrung "pressen
pressure switch disenable "pressing"
Schütz sowie Magnetventil sind Bestandteil des jeweiligen Aggregates.
contactor and solenoid valve are part of the respective power-unit
Uniflex-Hydraulik
D-61184 Karben
S3 / S4
Elektroplan 12V DC / 24V DC
SK3233.3

9.7 Maintenance log

Hydraulic oil	Hose assembly	Retaining bolt	Slide bearing plate	Pressure springs	Guiding plate	Relay	Remark	Date	Signature
☐	☐	☐	☐	☐	☐	☐			
☐	☐	☐	☐	☐	☐	☐			
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9.8 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.

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About Danfoss Power Solutions FC

We sincerely appreciate your choice in selecting this product as part of the range of tooling products distributed by Danfoss.

Danfoss hoses, fittings, and tooling provide the ultimate fluid conveyance solutions for a variety of equipment and applications around the world. We proudly engineer to support a sustainable future for tomorrow.

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