EWIKON

COOLSHOT

EWIKON COLD RUNNER TECHNOLOGY

COOLSHOT
cold runner systems

Operating manual

Valid for:

Complete cold halves COOLSHOT

CE

Item number: 25091
Rev: 2.0

1. General remarks

NOTE!

Improper operation of the device may result in severe personal injury and considerable material damage! You must carefully read this operating manual and familiarise yourself with the safety installations before installing, commissioning or maintaining the device. Do not operate the device without having received appropriate training.

1.1 Information on this operating manual

This operating manual has been created in accordance with the directive 2006/42/EC to enable the safe and efficient operation of COOLSHOT cold runner systems.

1.2 Manufacturer

EWIKON Heißkanalsysteme GmbH
Siegener Straße 35
35066 Frankenberg

Phone: +49 6451 501-0
Fax: +49 6451 501-202

E-mail: info@ewikon.com
Web: www.ewikon.com

1.3 Formal information on the operating manual

Person in charge of documentation: Henning Becker

Item number:	25091
Version:	2.0
Printing date:	20/03/2023
Language:	German (original operating manual)

1.4 Conventions

1.4.1 Instructions and system responses

Operating steps that have to be carried out by the operator are displayed as a numbered list. The sequence of the steps has to be adhered to.

Example:

1. Operating step 1
2. Operating step 2

1.4.2 Enumerations

Enumerations without mandatory sequence are displayed as a list with bullet points.

Example:

- Point 1
- Point 2

1.4.3 Abbreviations

The following terms and abbreviations are used in the operating manual:

Abbreviation	Meaning
PPE	Personal Protective Equipment
EU	European Union
BR	Installation space
P	Height of nozzle retainer frame plate
KH	Nozzle body height
X	Nozzle length (lower edge of nozzle body to article surface)
G	Thread
P	Fit
SW	Width across flats
T	Blueing area
m	Mass
ρ	Density
V	Volume
L x B x H	Length x width x height (e.g. mould plate, cold half)
F	Force
M	Bending moment
T_{KK}	Cold runner temperature (processing temperature)
T_{WZ}	Mould temperature
ΔT	Difference T_{KK} - T_{WZ}
LSR	Liquid Silicone Rubber
CS	COOLSHOT
NV	Valve gate

Chart 1: Terms and abbreviations

2. Safety instructions

The COOLSHOT cold runner system conforms to the machinery directive 2006/42/EG and has been designed, manufactured and checked for safety according to the applicable safety rules and legislation and the state of the art.

The COOLSHOT cold runner system is delivered in perfect working order.

The COOLSHOT cold runner system may pose risks, if it is

- not operated by professionally trained staff,
- used improperly or not used as intended,
- not in perfect order regarding safety.

2.1 Safety instructions and symbols used

Signal words introduce the safety instructions and are marked by symbols. They draw the user's attention to possible hazardous situations that may occur during installation, operation and maintenance. Safety instructions must be followed to prevent accidents, personal injury or material damage.

Warnings

- Protect against possible personal injury and material damage when followed.
- Classify the extent of hazard by the signal word.
- Indicate the risk of personal injury by hazard signs.
- Indicate the type and source of hazard.
- Indicate the risk and possible consequences.
- Show measures to prevent hazards and prohibit certain behaviours.

WARNING! = signal word

Source of hazard

Possible consequences, if ignored.

- Measures/prohibitions.

The hazard sign marks warnings which warn against personal injuries.

Source of hazard

The source of hazard indicates the cause of hazard.

Possible consequences, if ignored

If the warnings are ignored, possible consequences are e. g. crushing, burnings or other severe injuries.

Measures/Prohibitions

"Measures/Prohibitions" lists actions that are to be carried out to prevent a hazard (e. g. stop a drive unit) or that are prohibited to prevent a hazard.

2.1.1 Signal words for hazard classification

HAZARD!

indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING!

indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.

CAUTION!

indicates a potentially hazardous situation which, if not avoided, will result in minor injury or material damage.

NOTE!

indicates useful additional information and tips to promote trouble-free operation and to prevent material damage

2.1.2 Explanation of pictograms

Read
operating manual

Caution!
Risk of electrocution

Caution!
Hot surface

Caution!
Oxidising agents

Caution!
Suspended loads

Caution!
Risk of crushing

Caution!
Explosive atmosphere

Caution!
Hand injuries or cuts

Caution!
Pressurised systems

Caution!
Forklift trucks operating

2.2 Intended use

COOLSHOT cold runner systems are exclusively designed for the intended use described in this manual.

Any different and unintended use is excluded and may result in personal injuries and material damage.
Warranty expires in this case.

COOLSHOT cold runner systems are only to be used for injection moulding applications, assembled in an enclosed injection mould.

They are used to process liquid silicone rubber (LSR) according to their individual processing requirements and to pass them gently from the injection unit to the cavity by optimum temperature distribution and flow paths.

In order to use the cold runner system as intended it is essential that all tips and information given in this operating manual are read, understood and followed.

To ensure safe operation of the cold runner system, the given maintenance & inspection schedule has to be adhered to.

The system is designed for an injection pressure of 2000 bar.

The LSR used has to be processed according to the guidelines of the material manufacturer.

Use of the COOLSHOT cold runner system

Use the COOLSHOT cold runner system exclusively for its intended use and in perfect condition as regards safety! This is the only way to guarantee a reliable operation of the COOLSHOT cold runner system.

2.3 Improper use

Any use deviating from the use defined under "Intended use" or that goes beyond that use is considered improper use.

2.4 Qualification of staff

The staff has to prove that it is qualified to perform assembly, maintenance and repair. Any lack of knowledge has to be eliminated by training and briefing the staff.

2.4.1 Demands on specialised staff

Improper use of COOLSHOT cold runner systems may result in personal injuries or material damage. Only specialised staff is allowed to carry out any work.

Only specialised staff is allowed to install and operate COOLSHOT cold runner systems. Specialised staff is trained, has proven knowledge and experience in operating e. g. injection moulding units or electrical machines and devices as well as knowledge of the relevant regulations and is able to indepently identify possible hazards and prevent them by taking protective measures.

2.5 Personal Protective Equipment (PPE)

Wear the necessary protective equipment when working on or near the machine. Special information on the personal protective equipment in the work area has to be observed.

2.5.1 Symbols of the personal protective equipment

Always wear the following when carrying out any work:

Protective clothes: To protect your body wear tight-fitting clothes with low resistance to tearing, without protruding parts and with long sleeves and long trousers. Do not wear rings, chains or any other jewelry.

Safety shoes: To protect yourself against electric shocks, melt splashes, heavy, falling objects and slips and falls on slippery surfaces.

Always wear the following when carrying out special work:

Safety glasses: To protect your eyes against scattering debris, heat and silicone splashes.

Ear protection: To protect your ears against loud ambient noise.

Face mask: To protect your face against scattering debris, heat and silicone splashes.

Protective helmet: To protect your head against falling objects and sharp edges.

Protective gloves (heat resistant): To protect your hands against extreme heat, abrasions, punctures and more severe injuries.

Heat resistant apron: To protect your body against extreme heat.

2.6 General hazards and safety measures

The company operating the system must comply with the statutory obligations on occupational safety. In addition to the safety instructions of this manual the safety, accident prevention and environment protection provisions applicable for the system's range of use must be adhered to. The operating company must clearly define responsibilites and make sure that all staff operating the system has read and understood this manual. The company also has to inform about hazards at regular intervals. Personal protective equipment has to be made available to the staff. Maintenance intervals have to be respected.

Risk of physical injuries by high pressure or unexpected material leakage

- Unexpected material leakage may result in burns. There is a risk of serious injuries or death and/or damage to the cold runner.
- There is also a risk of burns, if water gets onto heated areas. If the water reaches dangerously high temperatures, the metal housing may burst and cause serious injuries due to emerging water vapour or silicone.

Safety measures

- Make sure the nozzle tips and/or the gates are not blocked by cross-linked LSR and that there is no humidity on the cold runner system, e.g. caused by a leaky temperature control circuit (please see chapter „6.3 Start-up of a COOLSHOT cold runner system“).

Risk of burns

- Hot surfaces
  Partitions of the cold runner system get very hot and may cause severe skin burns when being touched.
- Hot LSR part
  The freshly cross-linked part must not be touched immediately after the injection moulding process. It may be still very hot and may cause burns.

Safety measures

- Please make sure you wear your personal protective equipment (PPE) when working near or on a cold runner system. Pay special attention to warnings indicating hot surfaces. All components have to be cooled down to ambient temperature before you start working. Exceptions to these rules are explicitly mentioned.

Risk of electric shocks

- Danger to life by electric shock.
  Touching live surfaces may result in severe or even lethal injuries.
- Always keep water away from live components and the cold runner. There is a risk of short circuits!

Safety measures

- Electrical systems have to be disconnected from the mains and secured against being switched on again before any work is carried out. Only authorised electricians are allowed to carry out any work on electrical systems.
- All components have to be connected to a suitable power source according to the wiring diagrams and under consideration of the applicable local regulations. Injection moulding machine and cold runner systems have to be grounded.

Risk of physical injuries by suspended/heavy loads

- Only trained staff is authorised to operate lifting devices and forklift trucks. Proceed slowly and with care. Prevent the uncontrolled swinging of the loads.

Safety measures

- Lifting devices and forklift trucks have to be designed to bear the weight and the size of the cold runner system. Make sure to use the marked lifting points.

Risk of physical injuries by pressurised connecting lines (e.g. air, hydraulics, water)

- All supply lines for the medium supply of the cold half have to be long enough to prevent any stress when the mould halves part. They must not be affected by moving parts of the mould or of the machine. Prevent the hoses from rubbing over the edges of the mould as they may be damaged because this might cause a spontaneous leakage of pressurised process media.

Safety measures

- Make sure you have depressurised all supply lines before carrying out any work.
  Only skilled personnel is allowed to carry out work on the supply lines. Please wear your personal protective equipment (PPE).

Risk of physical injuries by sharp edges and corners

- Sharp edges and corners pose a risk of injury, possibly resulting in skin abrasions and cut injuries.

Safety measures

- Make sure you wear protective gloves when working near sharp edges and corners.
  Proceed with care.
- Make sure the system is clean and free of burrs.

Risk of physical injuries by crushing of extremities

- There is a risk of injury when lifting heavy loads during assembly operations, possibly resulting in crushing of hand or other parts of the body.

Safety measures

- Wear protective gloves to prevent injuries while working around heavy loads.
- Make sure all body parts are kept away from the hazardous area while setting down heavy loads.

2.7 Electrical equipment

HAZARD!

Residual voltage after activation

Risk of death by electric shock and severe injuries caused by live components.

- Check for zero potential before performing any work!

Any work on electrical equipment must be carried out by qualified electricians. Always apply the 5 safety rules when working with electrical components:

- Disconnect from the mains
- Secure against reconnection (by activating the repair switch and installing a safety lock at the same time, if necessary)
- Verify that the installation is dead
- Carry out grounding and short circuiting
- Provide protection against adjacent live parts

Maintenance work must be carried out by qualified and trained staff or maintenance staff. Never use the COOLSHOT cold runner system with faulty or inoperable electrical connections. In case of energy supply disruptions immediately switch off the COOLSHOT cold runner system. The maintenance & inspection schedules regarding electrical components given by the manufacturers have to be adhered to. Check for damaged insulation at regular intervals.

2.8 Spare and wear parts, auxiliary and operating materials

The use of non-OEM spare and wear parts as well as auxiliary material may pose risks. Only use original parts or parts approved by EWIKON Heißkanalsysteme GmbH. Only use auxiliary and operating materials which are suitable for their intended use (compare chapter „5.2 Technical devices“).

2.9 Limitation of liability

All information and instructions given in this manual have been compiled in consideration of the applicable standards and regulations, state of the art as well as our know-how and experience.

EWIKON does not assume liability for any damage caused by:

- Non-observance of this manual
- Improper use
- Use of unskilled staff
- Unauthorised retrofitting or technical modifications
- Use of non-approved spare parts as well as inappropriate auxiliary and operating materials

The technical service provided verbally, in writing or on the basis of tests represents our best knowledge but is not binding and does not release you from carrying out additional tests on the products supplied by us regarding their suitability for the intended use.

The use of the products is beyond our control. Therefore, it is your own responsibility to ensure that the products meet your specific requirements. Nevertheless, should an issue of liability arise, all damage shall be limited to the value of the products supplied by EWIKON and used by you.

We guarantee the perfect quality of our products in accordance with our general terms and conditions of sale and payment as well as the extended warranty conditions.

These are available on our homepage **www.ewikon.com**.

The statutory provisions prevailing at the time of conclusion of the contract shall apply.

We reserve the right of technical alterations to develop our products and enhance their performance properties.

2.10 Warranty terms

For warranty conditions of cold and hot runner systems and components please refer to the terms and conditions of EWIKON.

2.11 Standards and directives

EWIKON cold runner systems conform to the following European directives:

- Machinery Directive 2006/42/EC
- Low Voltage Directive 2014/35/EU
- EN ISO 12100:2010 Safety of machinery -
  General principles for design - Risk assessment and risk reduction
- EN 60204-1:2007-06 Safety of machinery -
  Electrical equipment of machines - Part 1: General requirements

3. Technical data

3.1 Mechanical specifications

3.1.1 Main dimensions of the COOLSHOT cold runner system

Description	Quantity/size (approx.)	Unit
Dimensions	See catalogue / PO-related documents	mm
Weight	See catalogue / PO-related documents	kg

Chart 2: Main dimensions of the COOLSHOT cold runner system

3.1.2 Operating parameters of the COOLSHOT cold runner system

Description	Quantity/size (approx.)	Unit
Maximum injection pressure	2000	bar
Maximum operating temperature	Depending on order	°C

Chart 3: Operating parameters of the COOLSHOT cold runner system

3.2 Electrical specifications

3.2.1 Connections/connector pin assignment/drive units

Description	Quantity/size (approx.)	Unit
Voltage	230	V
Frequency	50	Hz

Chart 4: Electrical data (only valid within the EU)

3.3 Operating conditions

Operating conditions	Size (approx.)	Unit
Ambient temperature (maximum value)	40	°C
Ambient temperature (minimum value)	10	°C
Relative humidity during operation (no condensation!)	20 to 80	%

Chart 5: Operating conditions

3.3.1 Noise emission

Determining the sound power level of noise sources based on noise pressure measurements acc. to DIN EN ISO 3741

Operating conditions	Size (approx.)	Unit
Distance to device	*	mm
Noise pressure level (operation)	*	dB (A)

Chart 6: Noise emission

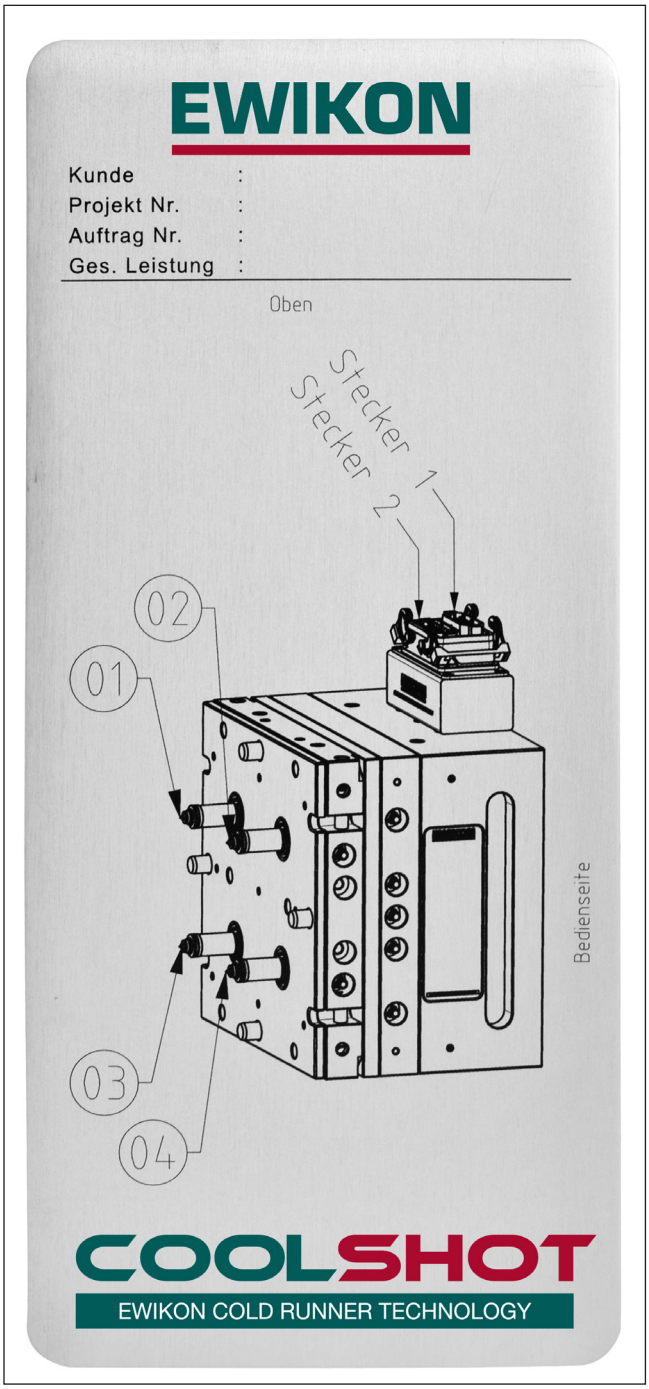
* Values can be determined only after the entire system has been started up.

3.3.2 Cooling agent

The use of unsuitable cooling agents may result in deposits and corrosion in the component to be cooled. This will negatively affect the functionality of the COOLSHOT cold runner system. Components of the cold runner system may be damaged by a reduced cooling performance in the worst case. Cooling agents (water) have to satisfy the following minimum requirements:

- Cooling by tap water is not recommended since hard water can cause deposits and corrosion.
- The water has to be clear, colourless and odourless.
- It has to be free from any floating or suspended matters.
- A warranty on the resistance of components to be cooled against corrosion attacks cannot be given. However, the use of suitable cooling agents can considerably enhance this resistance.

3.4 Type plate



Picture 1: Type plate

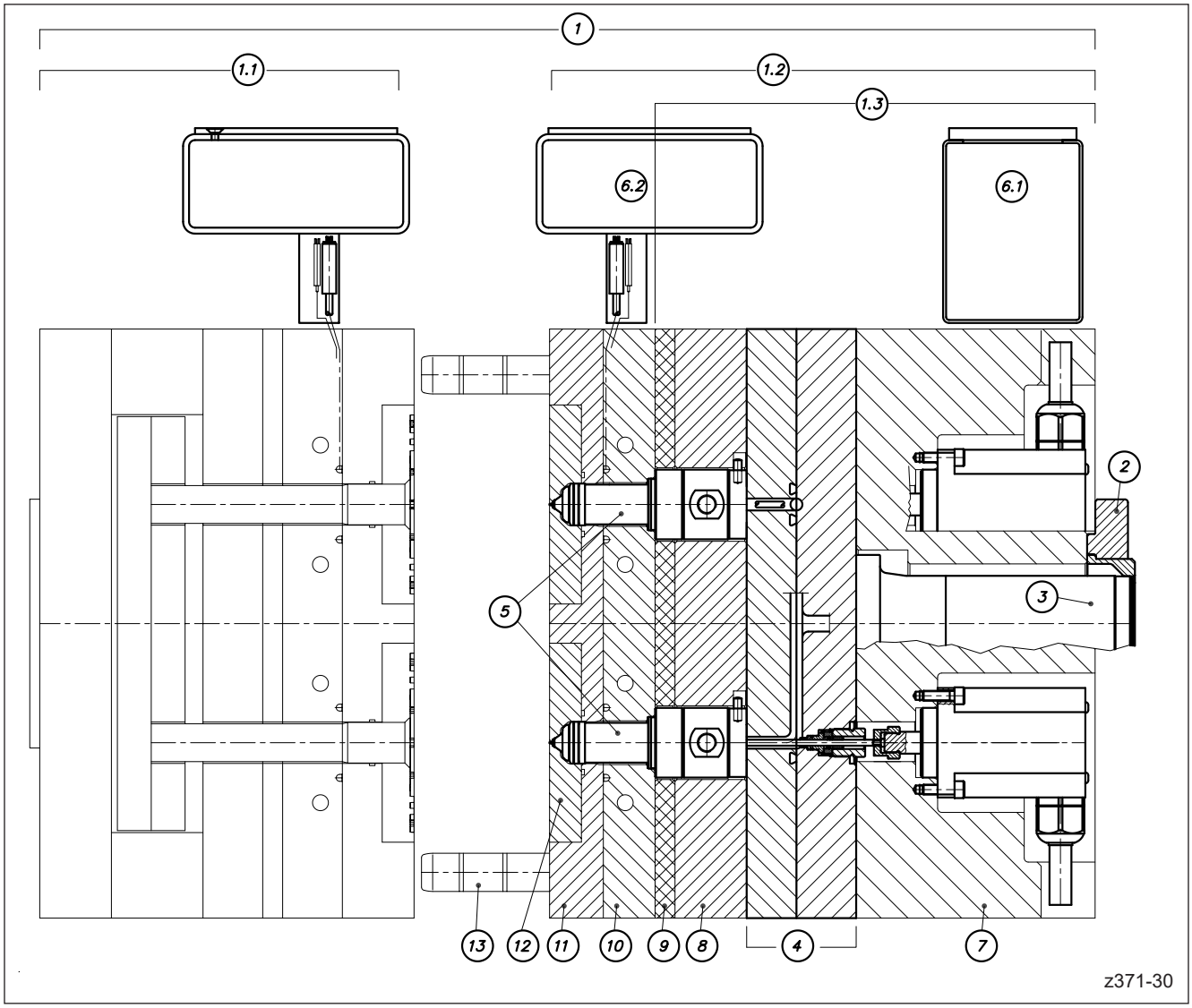
Cold halves are delivered with the type plate already mounted.

The type plate indicates project number, order number, overall performance and, if necessary, other important specifications.

For the exact allocation of heater zones and contact pins in the plugs please refer to the wiring scheme in the order specific documents.

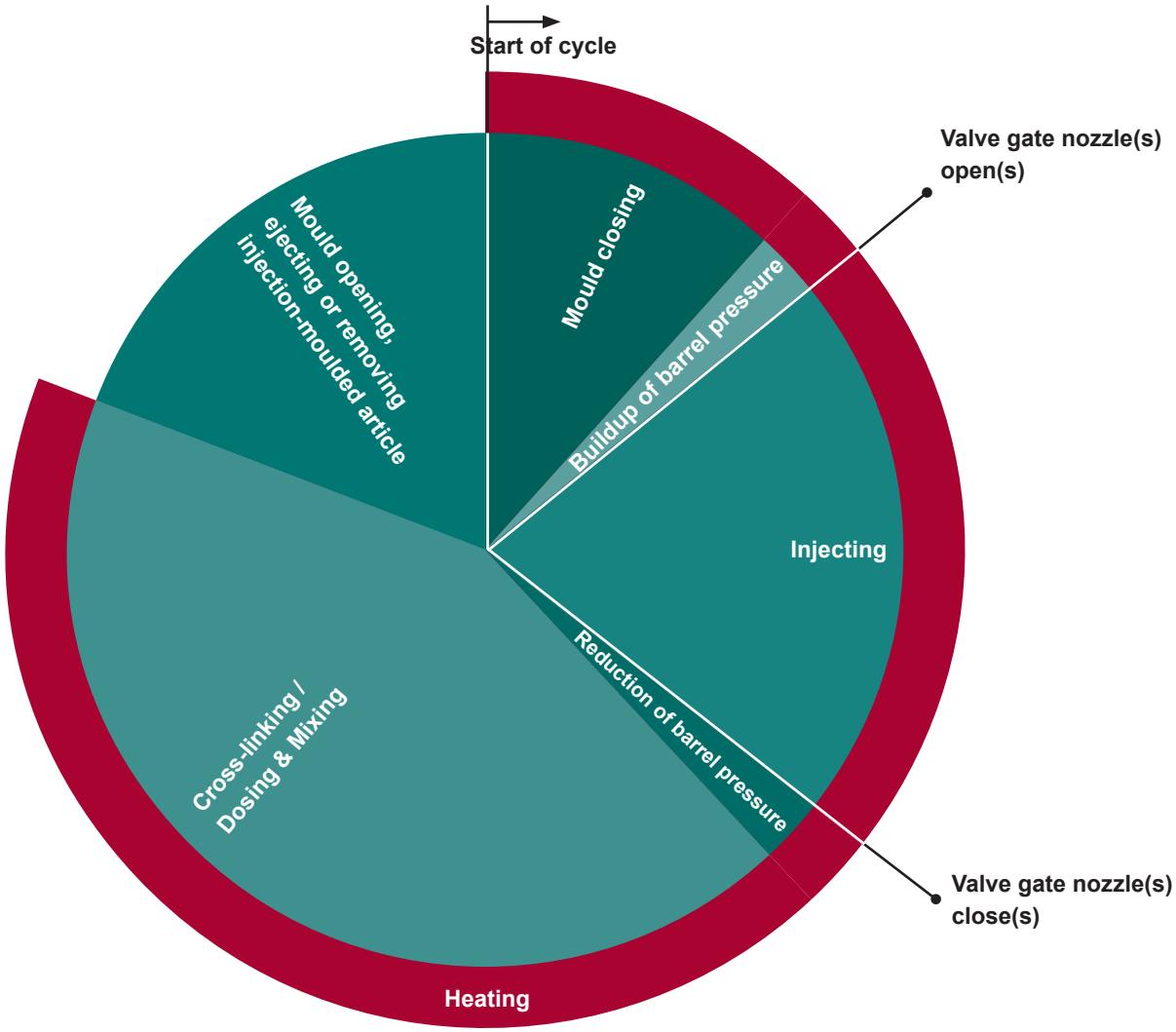
4. Functional description of the COOLSHOT cold runner system

The schematic diagrams of the components of a COOLSHOT cold runner system and the installation space shown in this document should not be regarded as the only valid general layout but only present one of many possible assembly configurations.



Picture 2: Layout of an injection mould with COOLSHOT cold runner system for the processing of liquid silicone rubber

Pos. 1 Injection mould with cold runner system
Pos. 1.1 Moving mould half (ejector side)
Pos. 1.2 Fixed mould half (nozzle side)
Pos. 1.3 Cold half (without heated separator plate)
Pos. 2 Locating ring
Pos. 3 Sprue bush
Pos. 4 Manifold package
Pos. 5 Cold runner nozzles
Pos. 6.1 Wiring box for drive units
Pos. 6.2 Wiring box for heated separator plate
Pos. 7 Clamping plate with electric drive units
Pos. 8 Nozzle retainer plate
Pos. 9 Insulation plate
Pos. 10 Heated separator plate (optional)
Pos. 11 Cavity plate
Pos. 12 Cavity insert
Pos. 13 Guide element



Picture 3: Injection moulding cycle

A cold runner system is used to distribute liquid silicone rubber (LSR) between the injection moulding unit of an injection moulding machine and the cavities of an injection mould (compare picture 2). The liquid silicone rubber (LSR) remains permanently molten until it enters the cavities.

The liquid silicone rubber (LSR) made available by the injection moulding unit is guided through the sprue bush to the manifold during the injection moulding cycle. In the manifold the liquid silicone rubber (LSR) stream for the individual cavities is split and fed to the cold runner nozzles. The cold runner nozzles guide the liquid silicone rubber (LSR) stream to the heated cavities (compare picture 3).

When using a COOLSHOT cold runner system the valve pins are opened when the injection starts. Subsequently the liquid silicone is injected into the heated cavities and the cross-linking process is activated. After filling of the cavity the gates are immediately closed by the valve pins. During cross-linking the material for the next injection cycle is prepared in the batcher. After completely finishing the cross-linking the part is demoulded.

5. Installation

The following information is intended to help you install the COOLSHOT cold runner system. The assembly staff has to have the know-how required to install an COOLSHOT cold runner system.

The described installation processes are examples. Special systems may require different procedures! Please observe the instructions in the order specific documents.

5.1 Safety instructions

DANGER!

Installation with activated voltage supply

Risk of death by electric shock and severe injuries caused by live components.

- COOLSHOT cold runner system and injection mould must be disconnected from the voltage source during installation.

WARNING!

PPE

Sharp edges and heavy components

- Cut injuries to body and extremities, mainly to the hands.
- Crushing of fingers or hand.

Hot surfaces

Body burns by hot surfaces.

Check of live components before installation

The electrical equipment of the cold runner system should be checked, especially those areas which will no longer be accessible after installation. Physical injuries such as an electric shock can be prevented that way.

Please check

- if cables are kinked or squeezed
- if cable insulations are undamaged.

Pressurized systems

All hydraulic or pneumatic supply lines must be depressurised during installation.

- Injuries caused by flying parts or "whipping" hoses.
- Injuries to eyes caused by escaping pressurised liquids.

CAUTION!

Control of the given tolerances while checking important dimensions

All given tolerances must be checked before initial installation. Failure to do so may result in leakage during operation, damage to nozzles and other components of the mould and severe injuries to persons.

Machining the tip sealing area in the heated separator plate

The tip sealing areas should be ground or milled to fit but not eroded; otherwise leakage may be possible during operation.

Cleanliness of sealing surfaces

Prevent sealing surfaces from being damaged by dirt or unsuitable cleaning tools. Failure to do so may result in leakage during operation or damage to the sealing surfaces during installation.

NOTE!

Intended use

Damage to the COOLSHOT cold runner system and/or components of the surrounding injection mould.

- The COOLSHOT cold runner system must only be installed in a matching injection mould.

Recommended auxiliary materials (tools) and operating materials for the following installation steps

The use of non-approved assembly tools may result in damage to the cold runner system (for recommended auxiliary and operating materials please see chapter „5.2 Technical devices“).

Ambient conditions during installation

Make sure that all electrical components of the COOLSHOT cold runner system are protected from direct humidity during assembly.

Dimensional check (for details please also see chapter „5.4 Checks before installation“)

Check of the given installation dimensions, fit sizes, form and location tolerances of the mould plates surrounding the cold runner system (for information please see the current catalogue in the download section on www.ewikon.com). The following dimensions have to be checked in particular:

- Mould plate dimensions.
- Height dimensions (e.g. X dimension).
- Fit sizes (e.g. in the tip sealing area).
- Surfaces for blueing

Cleaning

- Clean the installation space.
- Make sure the sealing surfaces (contour plate/tip insert, nozzle/manifold, sprue bush/manifold) are clean. If necessary clean sealing surfaces with suitable cleaning tools (brass brush or brass scraper). Prevent sealing surfaces from being damaged by dirt or unsuitable cleaning tools. Failure to do so may result in leakage during operation or damage to the sealing surfaces during installation.
- Control of the installed sealings. Replace them when damaged.
- Recommendation: Use new set of seals when disassembling the system

Pay attention to temperatures during installation

The COOLSHOT cold runner system has to be installed when it is cold (room temperature). Excessive temperatures during installation may result in damage to the elastomer sealing area and thus leakage during operation.

Mechanical stress of cable ends

The cable ends must not be subject to tensile stress.

Protect the cable ends

When wiring the system make sure that the thermo and power lines do not protrude from the outer edges of the mould and are protected against damage. The distances between heated separator plate and cables inside the mould have to be dimensioned in such a way that there is no damage to the components caused by excessive heat.

Secure the connection cables

All connecting cables have to be secured in such a way that they do not get pinched when they are installed in the mould (use cable binders and/or covering plates for the recesses).

Adhere to bending radiuses of the coil heater and the thermocouple when doing the wiring. The minimum bending radius is 15 mm. The connection can only be bent once.

Threads of screws and nozzle tips and threaded holes

Make sure all threads are clean and free moving, otherwise screws do not achieve the requested preload when tightened with the given torques. Screw connections may separate due to insufficient preload, possibly resulting in leakage during operation.

Unless otherwise indicated only use high-temperature lubricant (see chapter „5.2.1 Tools and operating materials“) to tighten threads in order to ensure the screws can be demounted any time.

Tightening torques

Wrongly chosen torques may lead to an excessive or insufficient preload of screws possibly resulting in leakage during operation due to separated screw connections (insufficient tightening torque) or damage to screws and associated components due to overload (excessive tightening torque).

Customer-specific torque specifications in assembly drawings, e.g. for special designs, always have to be given priority over differing specifications.

Only the values summarised in this operating manual and in chapter „9. Tightening torques“ must be used. Also, please consider whether the tightening torques are valid for lubricated or non-lubricated screws.

5.2 Technical devices

Specific connections and hoses are used for supply lines (cooling water).

5.2.1 Tools and operating materials

Tool	Use	Version	EWIKON item no.
Allen key	For hexagon socket head cap screw according to DIN EN ISO 4062	Depending on system and components. For wrench sizes see chapter „9. Tightening torques“.	-
Allen key, extension for allen key	Deinstallation of a screw bush	Various	
Assembly lever	Separating of mould plates	-	-
Blowtorch / small burner	Exchange of thermocouples	-	-
Cable markers (cable numbers)	Marking of electrical connections	-	-
Cable tie PA4.6	Fixation of cables, temperature sensors and shrink hoses	100 mm 150 mm	13590 13591
Chain slings (with metal tag)	Lifting and moving of cold halves	According to DIN EN 1677 (metal tag according to DIN 685)	-
Crimping tool	Attachment of cable pins to cables	-	-
Depth gauge	Control of check dimensions	-	-
Drift punch	Installation of dowel pins	-	-
Engineers hammer	Maintenance work	-	-
Fabric tube	Protection of cables	Ø 6 mm	13479
Impact wrench	Deinstallation of a screw bush	1/2 inch adapter	-
Insulation stripping pliers	Stripping of cables	-	-
Key with pilot	For hexagon socket screws according to DIN 6912	Key according to DIN 6911	-
Lifting beam	Lifting and moving of cold halves	For specifications see manufacturer	-
Mandrel	Installation of cable marker, Disassembly of tip inserts	-	-
Multimeter	Measuring of resistance	-	-
Outside micrometre	Control of check dimensions	-	-
Oxy-acetylene burner	Deinstallation of a screw bush	-	-
Pin punch	Maintenance work	Various	-
Pipe wrench	Exchange of contourplate thermocouples	-	-
Protective jaws	Protection of cold runner component surfaces which are serviced in a vice outside the injection moulding machine	Material: aluminium	
Scraper, soft	Cleaning of e.g sealing surfaces	Preferably brass wire, do not use steel wire	-
Slotted screwdriver	Maintenance work	Various	-
Side cutter	Cutting cable binders to size without any risk of injury	Preferably side cutter for electronics	
Soft face hammer	Maintenance work	-	-
Spacer bolt for swivel eye bolt	Lifting and moving of cold halves	-	19160
Spreading pliers	Installation of cable marker	-	-
Striking weight	Deinstallation of dowel pins e.g. of a screw bush	-	10578

Swivel eye bolt	Lifting and moving of cold halves	Swivel eye bolt according to Machinery directive 2006/42/EG or DIN EN 1677-1, min. grade 8 = 500 kg load capacity with inclination angle α = 0°. In case of deviations of the angle α > 0° load capacity has to be reduced according to the manufacturers' instructions.	-
Thread adaptor	Deinstallation of a screw bush	M5	280016-15
Threaded rod for assembly	Assembly of pistons for drive units, Exchange of seal kits	Various	See HPS III-NV catalogue
Torque wrench (calibrated)	For even preload	4-400 Nm (3-295 ft-lb) depending on system and components	-
Torx screwdriver	Maintenance work	Various	-
Vice	Maintenance work	-	-
Webbing slings and round slings	Lifting and moving of cold halves	For specifications see manufacturer	-
Wire brush, soft	Cleaning of e.g sealing surfaces	Preferably brass wire, do not use brass-coated wire or steel wire	-
Operating material	**Use**	**Version**	**EWIKON item no.**
Engineers blue	Blueing of all surfaces where the manifold touches the mould.	Customary	-
(Fully synthetic) high performance grease	Lubrication of components in injection moulds such as ejectors, sliders and guide pillars as well as all moving and sliding mould components. Lubrication of polymer seals.	VGS 180, Meusburger GmbH Dispenser 180 g Can 900 g Operation temperature up to 180°C	 HB00002 HB00003
Silicon heat transferring paste P12	For thermocouples	Collapsible tube (20 ml)	10023
WD 40 penetrating oil	Exchange of thermocouples	-	-
Cyanoacrylate-glue	Glueing the ends of the round cord	e.g. Sicumet 85, Henkel	-
Acetone	Cleaning the adherend surfaces of the round cord	Kluthe	-
Silicone oil	Greasing O rings and round cords before installation	Wacker silicone oil AK350	-
Thread sealing agent, liquid	Sealing of threaded connections	Loctite 542	-
PTFE Thread sealing tape	Sealing of threaded connections	according to DIN EN 751-3	-

Chart 7: Auxiliary and operating material

For all relevant instructions for safe handling of the operating and hazardous materials used please refer to the current safety data sheets of the respective manufacturers which must be observed.

5.2.2 Standard parts

NOTE!

Only use approved standard parts

Damage to the COOLSHOT cold runner system and/or components of the surrounding injection mould.

- Only standard parts which are approved for operation in COOLSHOT cold runner systems must be used.

The following standard parts with the associated standards are approved for COOLSHOT cold runner systems. Particularly for screws the associated strength classes (see chapter 5.5 Assembly of the system / the components) and tightening torques (compare chapter „9. Tightening torques“) must be adhered to.

Standard part	Valid standard	Invalid/old standard
Hexagon socket head cap screw (property class 12.9)	DIN EN ISO 4762 (ISO 4762)	DIN 912
Hexagon socket head cap screw - low head, with pilot recess (property class 12.9)	DIN 6912	-
Countersunk screw	DIN EN ISO 10642 (ISO 10642)	DIN 7991
Parallel pin	DIN EN ISO 2338 (ISO 2338)	DIN 7
Parallel pin with internal thread	DIN EN ISO 8735 (ISO 8735)	DIN 7979
Flat washer	DIN EN ISO 7089 (ISO 7089)	DIN 125-1 (DIN 125)
Flat washer	DIN EN ISO 7092 (ISO 7092)	DIN 453-1 und DIN 433-2
Feather key	DIN EN ISO 773 (ISO 773)	-
Lock ring	DIN 471	-
Split pin	DIN EN ISO 8752 (ISO 8752)	DIN 1481

Chart 8: Approved standard parts for EWIKON cold runner systems

5.3 Transport

This chapter describes how to transport a cold runner system without damaging it and how to ensure occupational safety for the staff.

5.3.1 Safety information on transport

WARNING!

PPE

Suspended loads

Death and severe crushing of body or extremities.

- Keep clear of and do not pass under suspended loads.
- Keep clear of suspended loads while they are being transported.
- Do not touch lifting devices and lifting accessories while lifting the load.
- Only lift, transport and set down loads, if you have received appropriate training.
- Only use suitable and undamaged lifting devices and lifting accessories which are checked regularly.
- Do not exceed the maximum load limit of lifting accessories.

Sharp edges and heavy components

Cut injuries to body and extremities, mainly to the hands.
Crushing of fingers or hand.

- Take care and wear your PPE.

NOTE!

Inappropriate transport

Damage to the COOLSHOT cold runner system.

- Only specially trained staff is authorised to transport the COOLSHOT cold runner system.
- Only use designated attachment points to attach lifting devices.
- Exercise greatest caution when transporting the COOLSHOT cold runner system. Handle with care.

Pendular motion while lifting the cold runner systems with a lifting device (e.g. overhead crane)

Damage to the COOLSHOT cold runner system and/or injection mould.

- Avoid pendular motions! Move COOLSHOT cold runner system slowly and with care.
- When using the lifting device to connect heavy components avoid tilting while lifting and lowering.

5.3.2 Recommended lifting accessories and slings

The lifting accessories and slings have to conform to the machinery directive 2006/42/EC (i.a. the general principles section, chapter 4.1.2.5 "Lifting accessories and their components"). Forged steel components have to be checked according to DIN EN 1677-1 "Components for slings – Safety – Part 1: Forged steel components, Grade 8".
Please also see chapter „5.2.1 Tools and operating materials“.

Slings

- Attachment swivel (min. grade 8), swivelling 360° with self-aligning rotatable eye (180°).
  Most current sizes used at EWIKON: M8, M10, M12 and M16. See Picture 4.

Lifting accessories which are required or admitted only for certain installation work:

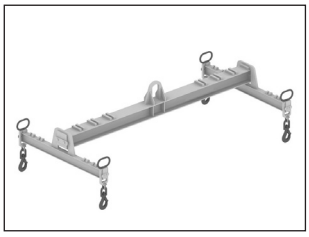
- Lifting beam (for specifications please see suppliers of lifting beams). See Picture 5.

Lifting accessories (to be used only with attachment swivels)

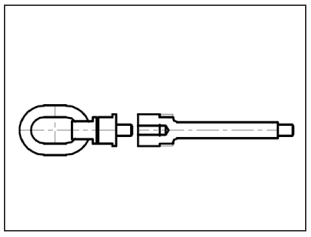
- Assembled chain slings according to DIN EN 1677 „Components for slings - Safety - Part 1: Forged steel components, Grade 8“ (with metal tag acc. to DIN 685). The octagonal red metal tags should show information about load capacities for usual modes of assembly (see Picture 7).
- Webbing slings (see Picture 8) and round slings (see Picture 9) with sewn in label indicating the working load limit for common modes of assembly (for specifications see suppliers of webbing slings and round slings).

Overview of lifting accessories and slings:

Picture 4:
Attachment swivel

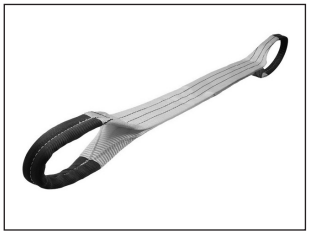


Picture 5:
Lifting beam

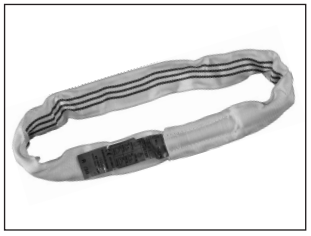


Picture 6: Spacer bolt for attachment swivel

Picture 7:
Assembled chain sling



Picture 8:
Webbing sling



Picture 9:
Round sling

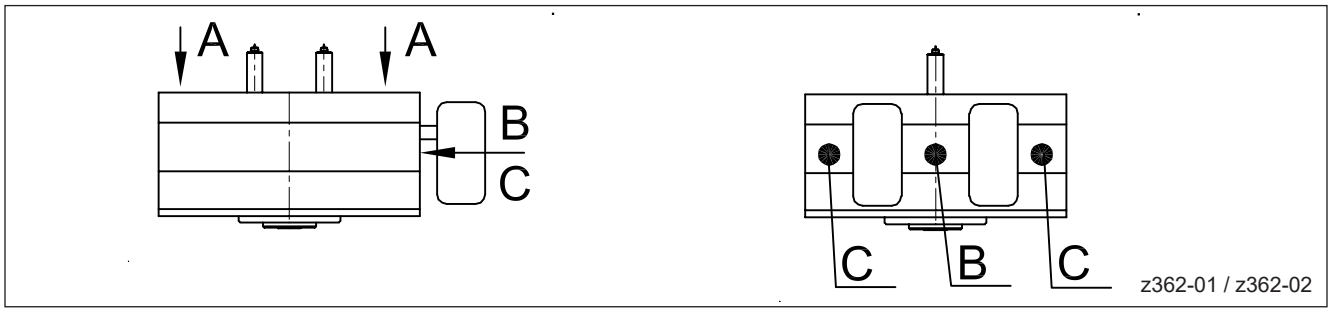
5.3.3 Check the lifting accessories and slings before use

- Lifting accessories and slings have to be checked regularly at intervals not exceeding 12 months by a qualified person. Inspection tags showing the expiration date of the current period of use should be attached directly to the lifting accessories and slings.
- A visual inspection of the lifting accessories and slings for damage has to be carried out before each use. As soon as the replacement state of wear, i.e. a defined wear characteristic, has been reached, the lifting accessories or slings must not be used any longer.
- Chains must not show any mechanical damage such as crushing, dents, deformations, expansions or cracks.
- Webbing slings must not show any yarn breaks, yarn cuts, damage to load bearing seams and deformations caused by heat or must not be subject to aggressive substances (acids, alcalis/bases, solvents).

5.3.4 Attachment points

Attachment points can be placed on the upside or on the side surfaces of the cold runner system. Other possible attachment point positions are:

- Cold half (see Picture 10):
  Upside (position A): used when removing the goods from the transport crate or on transport
  Side surface (positions B or C): used on transport and installation



Picture 10: Possible attachment points to a cold half

5.3.5 Working load limit for lifting accessories and slings

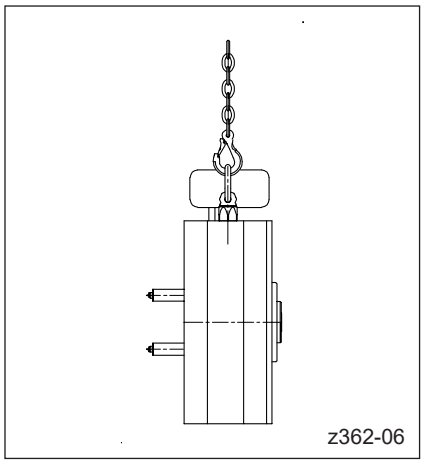
Before transport the working load limit for the used lifting accessories and slings must be checked in the following order:

1. **How heavy is the load?**
- The weight of cold halves is indicated on the EWIKON note of delivery (net weight, without packaging).

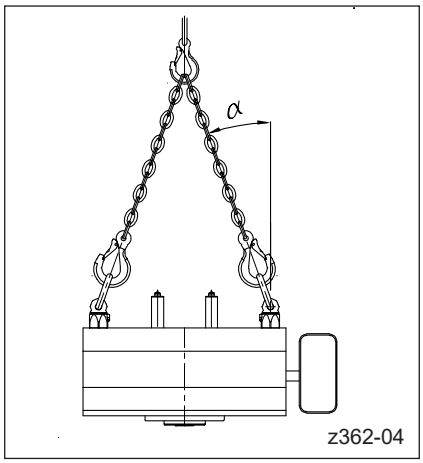
2. **Identify attachment points**
- Where are the attachment points positioned (transport threads)?
- How many attachment points are available for specific transport situations?
- What are the thread sizes of the transport threads?

3. **Is one single attachment point sufficient to lift the load vertically stretched or is more than one attachment point necessary to lift the load?**
- Only for the transport of cold halves usually one single attachment point is sufficient (see Picture 11) as the gravity centre usually coincides with the attachment point! In this case the lifting capacity is 100 %. (see Chart 9)
- When 2 attachment points are used to lift loads the following situations have to be distinguished:
  - The load is distributed between two evenly stressed but sloping legs (see Picture 12). The maximum load has to be reduced corresponding to the angle of inclination α (see Chart 9)
  - The load is distributed between two evenly stressed but vertically stretched legs (angle of inclination α = 0°) (see Picture 13). To apply force correctly the use of a lifting beam is absolutely necessary.
  - If the centre of gravity is asymmetric loads should be lifted using more than 2 attachment points. It can be helpful to use a lifting beam.
  - If more than one spacer bolts for attachment swivels are used it is absolutely necessary to use a lifting beam to enable a correct application of force via vertically stretched legs.
    If the load is lifted using sloping legs, a force F will be generated causing a side load M in the screw-in thread. Breakage risk arises.

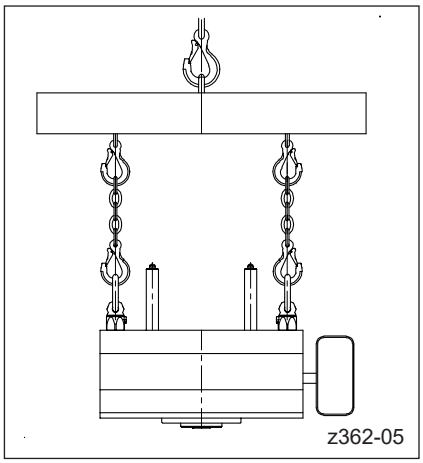
4. **Are the lifting accessories and slings approved for the respective modes of assembly?**
- Is the allowed maximum weight respected?
- Is the load capacity reduced due to the specific lifting arrangement?



Picture 11: Lifting a load using one single attachment point
(example: cold half in vertical position)



Picture 12: Lifting a load using 2 attachment points, distributed between two evenly stressed but sloping legs
(example: cold half in horizontal position)



Picture 13: Lifting a load using 2 attachment points, distributed between two evenly stressed but vertically stretched legs
(example: cold half in horizontal position)

Angle of inclination	Load capacity of each leg of a 2-leg chain sling	Load capacity of the 2-leg chain sling
0°	100 %	2 x 100 %
up to 45°	70 %	2 x 70 %
45° up to 60°	50 %	2 x 50 %
above 60°	Use not permitted	

Chart 9: Assessment of stress of slings (source: BGI 556, for detailed information see above)

5.3.6 Removal from transport crate

How to remove a cold half from a transport crate or a pallet.

- Open transport crate with suitable tools.
- Remove packaging material.
- Check cold half for damage.
- Screw in attachment swivels and affix them to a crane (most products can be lifted out of the transport crate without having to remove the walls of the crate).
- Carefully lift cold half vertically upwards and place it on a safe and non-slip surface (if system can be placed without damage) or on a safe substructure.

5.3.7 Transport and movement during installation

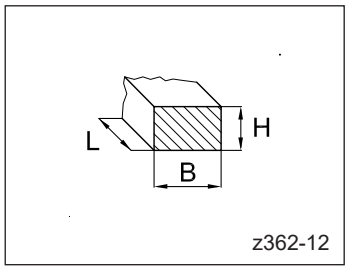
NOTE!

Consider reduced load capacity of attachment swivels!

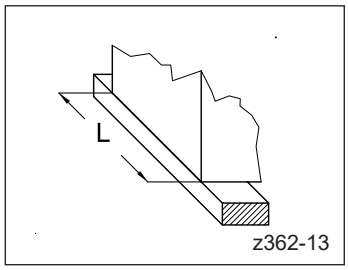
For the installation work described below the attachment swivels are loaded at changing inclination angles. Depending on the manufacturer and design of the attachment swivel the maximum possible load capacity must no longer be utilized. If the attachment swivels recommended by EWIKON are used for such installation work (see chapter „5.3.2 Recommended lifting accessories and slings“), the maximum load capacity of an attachment swivel should always be reduced by at least the half.

Using wooden laths to move cold runner assemblies

- The surface to be used must be safe and non-slip.
- Height H of the wooden lath must only be high enough to enable a tilting of the cold runner assembly. Additionally, height H must be considerably smaller than width B (H<B) to prevent the cold runner assembly from slipping (see Picture 14).
- The contact surface L x B of the wooden lath must be large enough to prevent the cold runner assembly from slipping away while it is being moved. (see Picture 14).
- If possible the wooden lath should cover the whole length L of the cold runner assembly (see Picture 15).

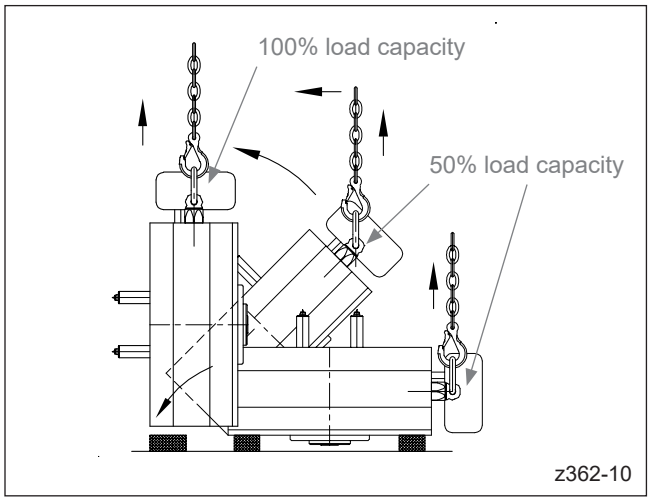


Picture 14: Dimensions of a wooden lath



Picture 15: Positioning a cold runner assembly on a wooden lath

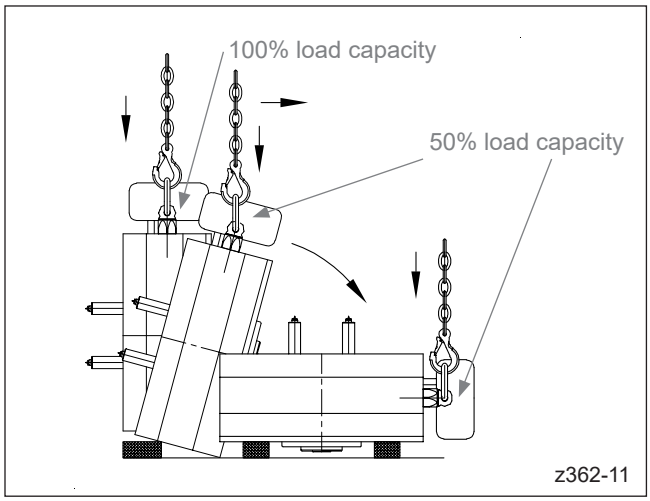
Putting cold halves from lying (horizontal) into upright (vertical) position



Picture 16: Putting cold halves from lying (horizontal) into upright (vertical) position

1. The cold half must be placed on an even, non-slip surface.
2. Screw in attachment swivels and affix them to a crane.
3. Put a wooden lath on the working surface and secure against slipping. It has to be positioned in such a way that when the external lateral surface of the cold half is erected it can be supported by the wooden lath.
4. Slowly lift the cold half until the lateral surface touches the wooden lath. Continue lifting the assembly until it reaches upright position following the movement of the cold half with the crane so that the crane hook is always perpendicular to the attachment point .
5. When the cold half hangs freely in upright position, remove the wooden lath and carefully place the cold half on a surface or move it using a crane.

Putting cold halves from upright (vertical) into lying (horizontal) position



Picture 17: Putting cold halves from upright (vertical) into lying (horizontal) position

1. Put a wooden lath on the working surface and secure against slipping. it has to be positioned in such a way that the external lateral surface of the cold half can rest on the wooden lath when it is dropped.
2. Use the crane to position the freely hanging cold half over the wooden lath
3. Slowly drop the cold half until the external lateral surface touches the wooden lath. Continue dropping the cold half carefully until it tilts and touches the working surface. Follow the tilting movement of the cold half with the crane so that the crane hook is always perpendicular to the attachment point.
4. Carefully put the cold half on the working surface following the movement of the cold half with the crane so that the crane hook is always perpendicular to the attachment point. Make sure there is a solid substructure so that protruding components are not damaged.

5.3.8 Storage of the cold half

- The cold half must not be stored outside
- The storage area should be dry, dust-free and adequately ventilated
- Avoid direct sunlight
- The storage area must not exceed a relative humidity of 50%
- The cold half must not be subject to vibration or shock
- If stored for a period of 3 weeks or more, cover must be provided

NOTE!

Pay attention to system characteristics

The work steps described just show how to move the system most commonly. Depending on the system layout further measures which have to be determined individually may be necessary to move and assemble cold runner assemblies in a safe way. The chapters „5.3.2 Recommended lifting accessories and slings“ and „5.3.5 Working load limit for lifting accessories and slings“ must be paid attention to.

- Many system versions are possible. When any transport or assembly work is carried out it has to be ensured that protruding components (e.g. nozzles, heater outlets or wiring) as well as components with reduced stability (e.g. wiring channels, connection boxes or connection blocks for supply lines) are not damaged. It may be necessary to use additional lifting accessories and slings as well as specific substructures to support the cold runner assembly.
- A second crane may be necessary to turn the cold runner system completely to avoid accidents and damage to components.

5.4 Checks before installation

The COOLSHOT cold runner system is subject to comprehensive testing by the manufacturer before delivery. For safety reaons (transport or storage damage or damage to the cold runner system when preparing installation) we recommend that you check the cold runner systems for damage just before installing it. To exclude any damage during installation all information about checks which are part of this operating instructions must be adhered to.

5.4.1 Notes on mould layout

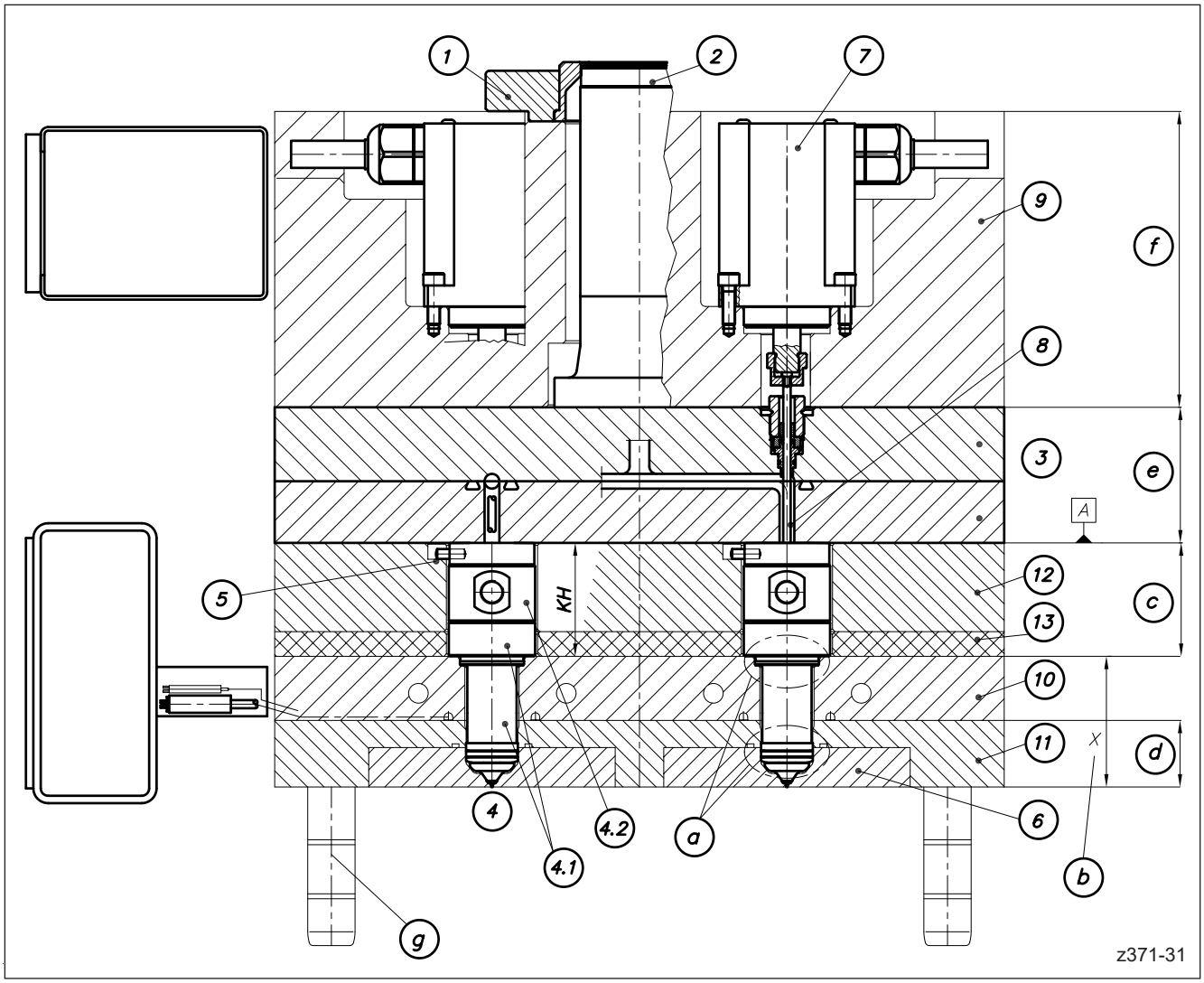
The following factors must be observed for the mould layout:

- Installation notes for the mould design
- Mould stability
- Sealing of the cold runner system
- Cooling
- Material
- Check of gate diameter

5.4.2 Standard dimensions of cold runner systems

All given installation dimensions, fit sizes, form and location tolerances of the mould plates surrounding the cold runner system have to be checked (for specifications please refer to the current catalogues on www.ewikon.com in the download section and/or the attached order-related documents). An overview of all relevant dimensions is given in Picture 18. Particularly the following dimensions have to be checked:

5.4.3 Dimensions to be checked for a COOLSHOT cold runner system



Picture 18: Example: Dimensions to be checked for a COOLSHOT cold runner system

Example: Dimensions to be checked for a COOLSHOT cold runner system

Pos. 1 Locating ring

Pos. 2 Sprue bush

Pos. 3 Manifold package

Pos. 4 COOLSHOT nozzle

Pos. 4.1 Protective sleeve

Pos. 4.2 Nozzle body

Pos. 5 Fixation of nozzle (lock against rotation)

Pos. 6 Cavity insert

Pos. 7 Electric drive unit

Pos. 8 Valve pin

Pos. 9 Clamping plate

Pos. 10 Heated separator plate (optional)

Pos. 11 Contour plate

Pos. 12 Nozzle retainer plate

Pos. 13 Insulating plate

c Height of nozzle retainer plate incl. insulating plate

KH Nozzle body height

X Nozzle length (lower edge of nozzle body to article surface)

Dimensions to be checked

a Check of the fit sizes amongst others in the area between nozzle body and contour plate / protective sleeve and cavity insert

b Dimension X of the nozzle

c Thickness of the nozzle retainer plate incl. insulating plate at at least 2 different areas of the plate

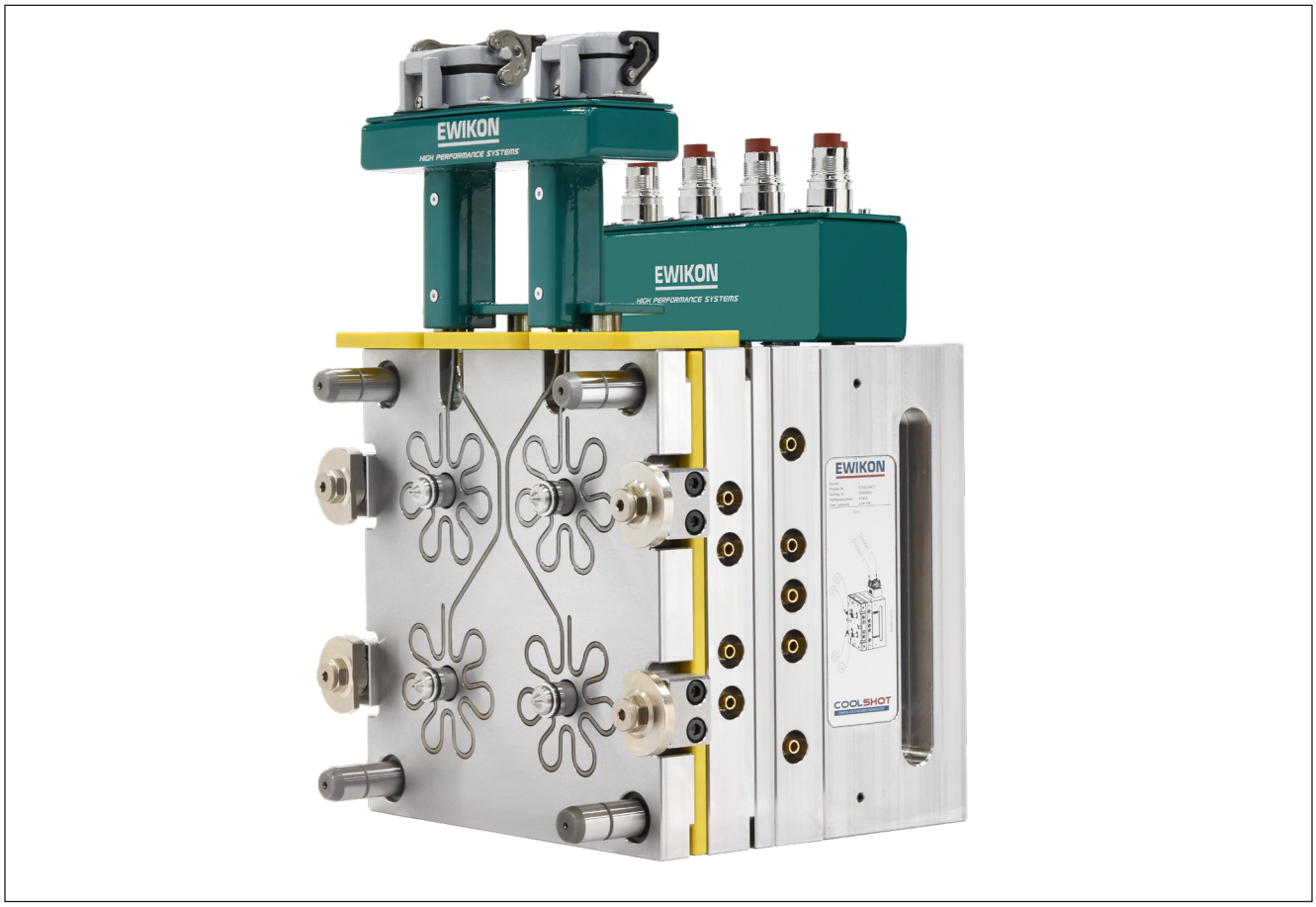
d Height of the contour plate

e Height of the manifold package

f Height of the clamping plate

g Position of the guide bolts (transition points to customer side)

5.5 Installation of a cold half COOLSHOT



Picture 19: Cold half COOLSHOT

NOTE!

Read operating manual

In the installation process described in the following hazards for the personal health are listed explicitly.

Furthermore, during installation the warning, safety and installation notes for installation of COOLSHOT cold runner systems and components as specified in chapter „5.1 Safety instructions“ must be followed!

NOTE!

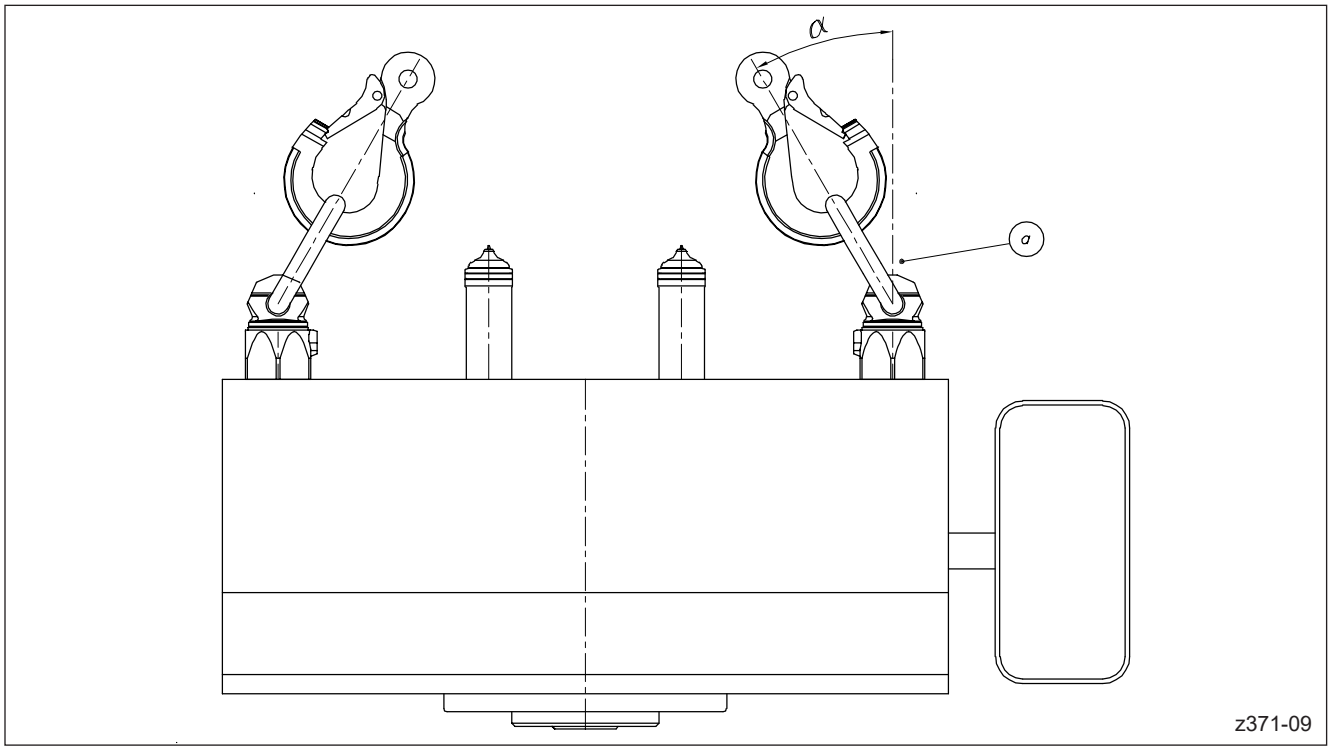
Dimensional check

Before installation the installation dimensions as listed in chapter „5.4 Checks before installation“ must be checked and compared with the values provided with the installation drawing.

Use approved standard parts only

Only standard parts which are approved for use in COOLSHOT cold runner systems must be used. See chapter „5.2 Technical devices“.

5.5.1 Introduction and preliminary measures



Picture 20: Preliminary measures

WARNING!

Suspended load

Death and severe crushing of body or extremities.

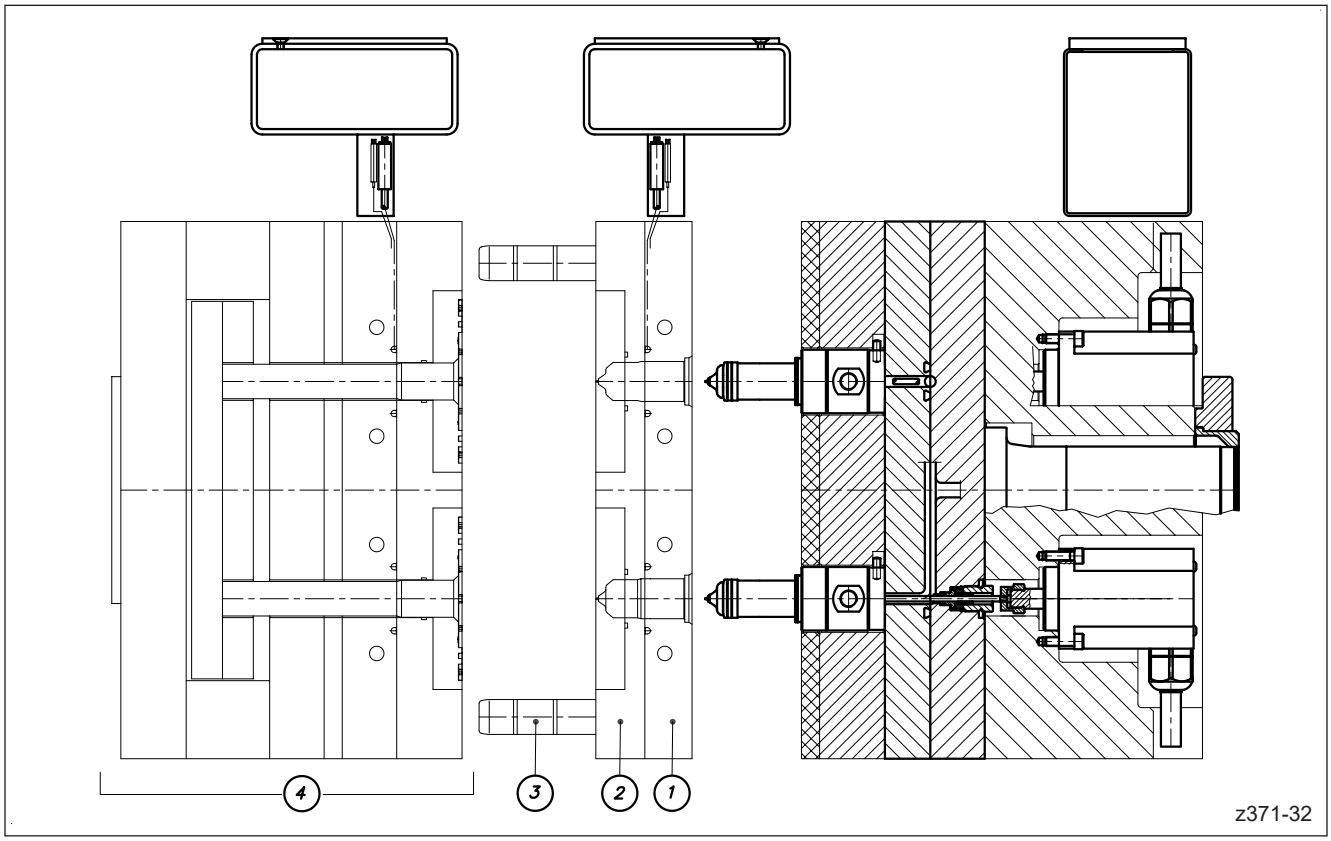
- Keep clear of and do not pass under suspended loads.
- Keep clear of suspended loads while they are being transported.
- Do not touch lifting devices and lifting accessories while lifting the load.
- Only lift, transport and set down loads, if you have received appropriate training.
- Only use suitable and undamaged lifting devices and lifting accessories which are checked regularly.
- Do not exceed the maximum load limit of lifting accessories.

Sharp edges and heavy components

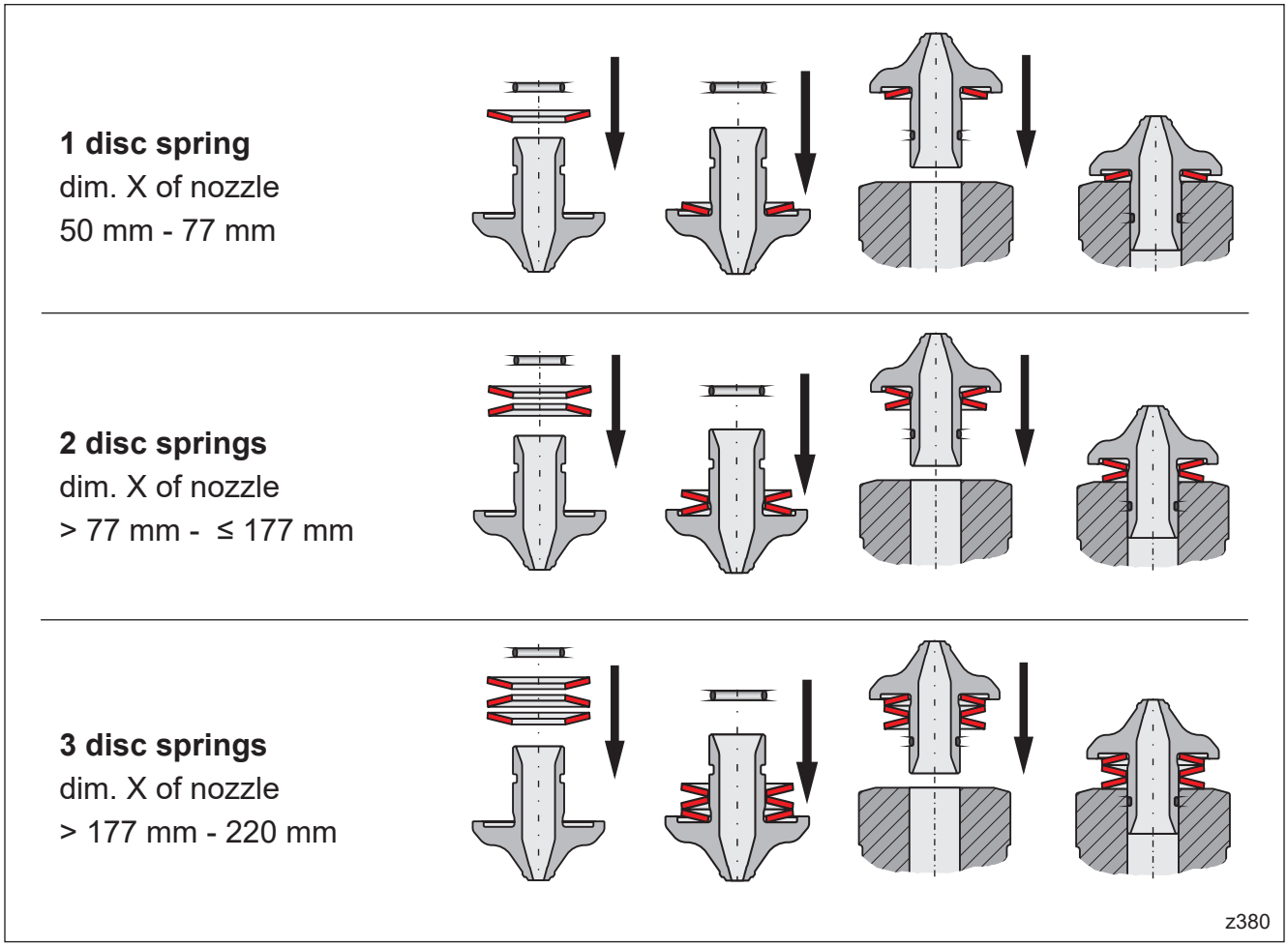
- Cut injuries to body and extremities, mainly to the hands.
- Crushing of fingers or hand.

1. Lift the COOLSHOT cold half carefully out of the transport crate. Due to the better force application point EWIKON recommends to use attachment swivels only (pos. a, see chapter „5.3 Transport“ and chapter „5.2.1 Tools and operating materials“).
2. Check the cold half for possible transport damage (visual check).

5.5.2 Installation



Picture 21: Installation



Picture 22: Installation and mounting direction of the disc springs and O-rings

Installation

HAZARD!

Connected power supply during installation

Risk of deadly electric shock or severe injuries due to live components.

- The cold half and the mould have to be disconnected from the voltage source during installation.

WARNING!

Sharp edges and heavy components

- Cut injuries to body and extremities, mainly to the hands.
- Crushing of fingers or hand.

Control of live components before installation

The electrical equipment of the cold runner system should be checked, especially those areas which will no longer be accessible after installation. Physical injuries such as an electric shock can be prevented that way.

Please check

- if cables are kinked or squeezed.
- if cable insulations are undamaged.

Pressurised systems

During installation all hydraulic or pneumatic supply lines must be depressurised.

- Injuries caused by flying parts or "whipping" hoses.
- Injuries to eyes caused by escaping pressurised liquids

Hot surfaces

Burns to the body caused by hot surfaces.

CAUTION!

Respect operating temperatures

Each cold runner system is individually designed for the material to be processed. Therefore, the specified operating temperatures must be observed. The temperature difference ΔT between cold runner temperature T_{KK} (processing temperature) and mould temperature T_{WZ}, must be strictly adhered to.

- Non-observance may cause an escape of liquid silicone inside the mould (ΔT too low) or damage to components (ΔT too large).

NOTE!

To avoid damage to the sealing collars of the tip inserts when installing the contour plate the guide elements should always be longer than the longest cold runner nozzle in the mould.

1. Check reference dimensions and tolerances of the COOLSHOT cold half as well as of the optional heated separator plate again and compare them to the values given in the installation drawing provided by EWIKON. For required reference dimensions also see chapter „5.4 Checks before installation“.
2. Slide given number of disc springs (see drawing) onto the tip insert according to the assembly sketch. **Pay special attention to the installation direction of the disc springs!** Carefully slide the O-ring onto the nozzle tip and into the notch provided. Lubricating the O-ring with a suitable silicone oil (see chapter „5.2.1 Tools and operating materials“) facilitates the insertion and is highly recommended. Slide the tip insert with the disc springs and the O-ring by hand into the tip seat of the nozzle (see „Picture 22: Installation and mounting direction of the disc springs and O-rings“).
3. Apply a thin coat of high performance grease (see chapter „5.2.1 Tools and operating materials“) to the guide elements (pos. 3). Install the optional heated separator plate (pos. 1) together with the contour plate (pos. 2) on the COOLSHOT cold half. The valve pins must be in back position (open).
4. Check if plug assignment is in accordance with the wiring plan provided by EWIKON.
5. Complete the mould with the moving mould half (pos. 4) and mount it on the machine.
6. Connect the supply lines for cooling with the corresponding connections at the COOLSHOT cold half. Check all cooling circuits for free flow.

7. **Optional**: Connect the heated separator plate to the cold runner controller and heat it up in diagnosis mode. If the controller does not feature a diagnosis function heat up each zone separately and check if the thermocouple and power connections are allocated correctly.

5.5.3 Electrical connection of an heated separator plate (optional)

HAZARD!

Connected power supply during installation

Risk of deadly electric shock or severe injuries due to live components.

- The COOLSHOT cold runner system, the cold half and the mould have to be disconnected from the voltage source during installation.

Insufficient protective conductor connection to the injection moulding machine

Risk of deadly electric shock or severe injuries due to live components.

The operator must ensure that during startup of cold runner systems all electrical system components have been wired to to the protective conductor system of the injection moulding machine or are protected by equivalent safety measures before applying electric voltage. When applying electric voltage to systems or to system components beyond specified normal operation, sufficient ground earth connection or equivalent safety measures must be ensured for each component.

WARNING!

Control of live components before installation

The electrical equipment of the cold runner system should be checked, especially those areas which will no longer be accessible after installation. Physical injuries such as an electric shock can be prevented that way

Please check

- if cables are kinked or squeezed.
- if cable insulations are undamaged.

NOTE!

Mechanical stress of cable ends

The cable ends must not be subject to tensile stress.

Protect the cable ends

When wiring the system make sure that the thermo and power lines do not protrude from the outer edges of the mould and are protected against damage. The distances between cold runner and cables inside the mould have to be dimensioned in such a way that there is no damage to the components caused by excessive heat.

Secure the connection cables

All connecting cables have to secured in such a way that they do not get pinched when they are installed in the mould (use cable binders and/or covering plates for the recesses).

Adhere to bending radiuses

The bending radiuses of the coil heater and the thermocouple have to be adhered to. The minimum bending radius is 15 mm. The connection can only be bended once.

General instructions for wiring

- Place the cables in such a way that there is no direct contact with hot surfaces and that the expected temperature is below the maximum allowable temperature for the wire insulation.
- Place the cables in such a way that they can not get pinched when the cold runner system is installed.
- When placing the cables keep clear of sharp edges.

Wiring of the heated separator plate (optional) must be performed by qualified staff according to DIN EN 60204-1 and the generally recognized codes of practice.

Heaters designed for a rated voltage of 230V AC are used. Please make sure that the voltage applied corresponds to this specification. The heaters are connected to the plug according to the arrangement given in the wiring diagram of the respective cold runner system.

5.6 Checks after installation

To be checked in cold condition

- Bores and connections for media (e.g. cooling circuits) (optical check)
- Allocation of wiring according to the wiring scheme (see order specific documents)
- Resistance of the protective earth conductor
- Optional: Insulation resistances of the heating zones of the heated separator plate
- Check of cooling (function, correct piping): Are all components that require cooling supplied with water and is the flow rate sufficient?

CAUTION!

PPE

Respect operating temperatures

Non-observance can lead to leakage of silicone inside the mould or to damages on components.

- Each cold runner system is individually designed for the silicone (LSR) to be processed. Therefore, the specified operating temperatures must be observed. The temperature difference ΔT, the difference between cold runner temperature T_{KK} (processing temperature) and mould temperature T_{WZ}, must be strictly adhered to.

Check of heaters by heating the optional heated separator plate to operating temperature

- Switch on the mould cooling.
- Check if the thermocouple and power connections are allocated correctly by heating up each zone separately (for a short time)
- When using a EWIKON controller this procedure can be automatically carried out by using the diagnosis function.

Performance test under operating conditions (mould and optional heated separator plate have reached processing temperature)

- Check function of electric drive units by repeatedly moving the valve pin to the end positions in manual mode while the mould is opened.
- Leak tightness and function of mould cooling.

6. Start-up and instructions for operation

6.1 Safety instructions

HAZARD!

PPE

Insufficient protective conductor connection to the injection moulding machine

Risk of deadly electric shock or severe injuries due to live components.

The operator must ensure that during startup of cold runner systems all electrical system components have been wired to to the protective conductor system of the injection moulding machine or are protected by equivalent safety measures before applying electric voltage. When applying electric voltage to systems or to system components beyond specified normal operation, sufficient ground earth connection or equivalent safety measures must be ensured for each component.

Raised injection pressure

The system is designed for an injection pressure of 2000 bar. When the cavity pressure is too high (e.g. by overpacking a cavity without limiting the injection pressure) components of the cold runner system may break and liquid silicone rubber (LSR) can escape.

Injection moulding processes must only be carried out with maximum pressures of 2000 bar. If the process requires higher pressures a written permission of EWIKON Heißkanalsysteme GmbH is needed.

CAUTION!

PPE

A COOLSHOT cold runner system must only be started up when used as intended within an injection mould. No security-relevant devices may be manipulated or overruled.

Improper processing of liquid silicone rubber (LSR) in the injection moulding process

Damaged moulded parts or damages on the cold runner system.

- The guidelines of the material manufacturer such as silicone and mould temperatures must be observed.

Risk of injuries during installation

Cut injuries to body and extremities, mainly to the hands. Crushing of fingers or hand.

- Be careful and wear your PPE.

Leakage during operation

Burns to body and extremities.

- An incorrect combination of the radii / immersion geometry of the sprue bush and machine nozzle, can result in unwanted material leakage during the injection process.

Observe system temperatures during installation / disassembly

Damage of the seals which are in touch with hot components directly.

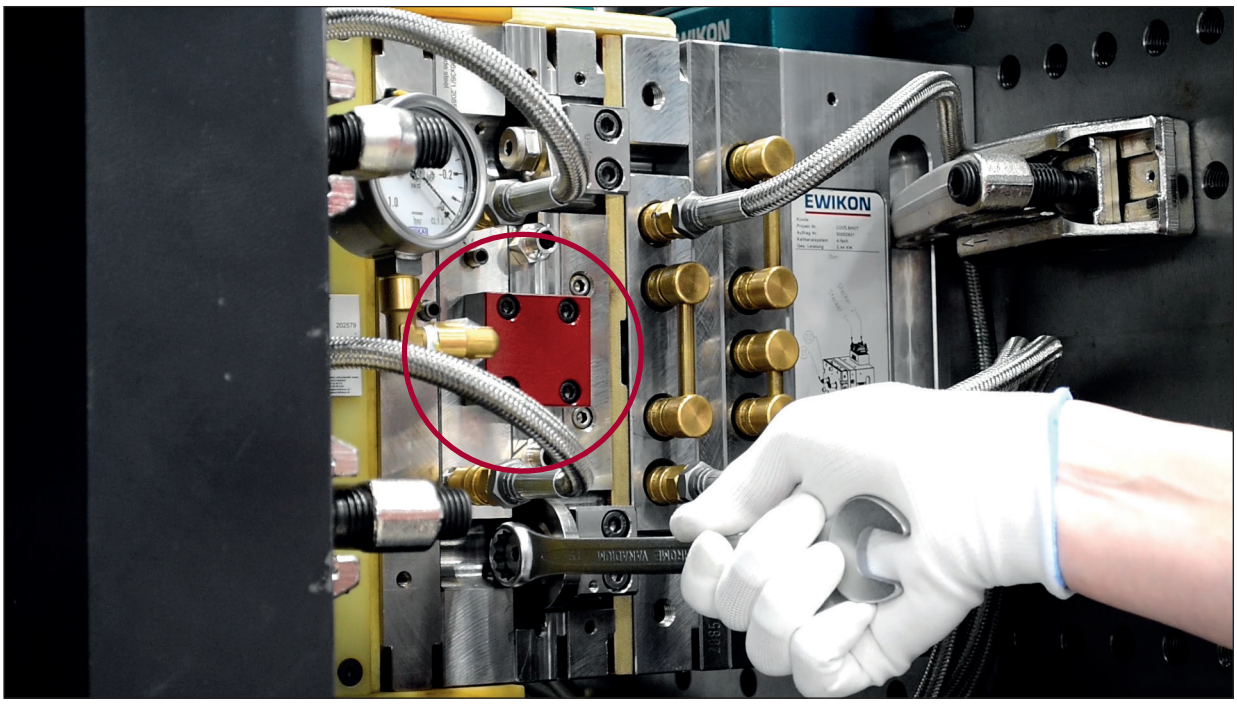
- Disassemble/assemble the heated separator plate in cold condition.

6.2 Requirements for operation

- The COOLSHOT cold runner system is aligned and clamped by means of the locating ring on the fixed side of the injection moulding machine.
- Work with pending or steeping injection unit.
- Test the system for water resistance.
- Connect power supply and thermo collective cable as well as grounding cable.
- Connect the wiring of the drive units.
- To prevent damages on the electrical installation when water leaks out, cables must not be installed below the cooling components.
- Check correct allocation of power supply, thermo and drive unit wiring by triggering each position briefly.

6.2.1 EWIKON quick clamping device for contour plate

The release of the quick clamping device may only take place when the contour plate to be lifted is connected to the movable side!



Picture 23: Connection of the mould / contour plate with the movable side

NOTE!

In order to keep the damage as small as possible in the event of an operating error (opening the mould with connected contour plate but still locked quick clamping device), we recommend inserting a predetermined breaking point between the moving and fixed contour plate. For more information on the strength of the quick clamping device please contact our service department.

6.3 Start-up of a COOLSHOT cold runner system

6.3.1 First-time start-up and filling of a COOLSHOT cold runner system

- Switch on the mould cooling.
- Switch on the heated separator plate and let the humidity from the heaters dry out at a temperature between 100 °C and 120 °C for approx. 10 minutes (sequential start /compound heating mode of the controller).
- Switch on and vent the silicone dosing unit.
- Set processing temperature and heat system long enough (sequential start /compound heating mode) until all temperatures have reached the setpoint.
- Build up barrel pressure between machine nozzle and sprue bush. Then fill up the COOLSHOT cold runner system with a specific dynamic pressure of 5 - 10 bar.
- The COOLSHOT cold runner system is filled with pre-dosed silicone until the material emerges from the opened injection points.
- Remove spilled material and clean surfaces.
- Close mould and build up operating pressure.
- Use the electric drive units to approach the reference points of the valve pin positions and set the desired opening stroke (see chapter „6.3.6 Valve pin reference“).
- Start moulding process.

6.3.2 Shutdown of a COOLSHOT cold runner system (<24 h shutdown)

- Switch off the heaters.
- Move valve pin to rear position (gating point open)
- Close the mould and fix the mould plate on the ejection side. Then release quick clamping device to lift off the mould plate.
- The mould plate remains at the ejector side when opening the mould. Disassemble nozzle tips, disc springs and O-rings. These are cleaned and reinstalled for the next injection moulding process. Check the O-rings for damage. Lubricating the O-rings with a suitable silicone oil (see chapter „5.2.1 Tools and operating materials“) makes it easier to insert them into the cold runner nozzle (see chapter „5.5.2 Installation“).
- Move back injection unit.
- Mould cooling must remain switched on permanently!

6.3.3 Shutdown of a COOLSHOT cold runner system (>24 h shutdown)

- Open mould.
- Move valve pin to rear position (gating point open – maschine function: purge).
- Purge the COOLSHOT cold runner system with one silicone component until at least 2 times the silicone volume of the cold runner system has been passed through.
- Close the mould and fix the mould plate on the ejector side. Then release quick clamping device to lift off the mould plate.
- The mould plate remains at the ejector side when opening the mould. Disassemble nozzle tips, disc springs and O-rings. These are cleaned and reinstalled for the next injection moulding process. Check the O-rings for damage. Lubricating the O-rings with a suitable silicone oil (see chapter „5.2.1 Tools and operating materials“) makes it easier to insert them into the cold runner nozzle (see chapter „5.5.2 Installation“).
- Move back injection unit.
- After the complete mould has cooled down, the mould cooling can be switched off.
- Switch off injection moulding machine and press the main switch.

6.3.4 Start-up of an already filled COOLSHOT cold runner system (after <24 h shutdown)

The COOLSHOT cold runner system is filled with the crosslinkable 2K silicone mixture.

- Install cleaned disc springs, O-rings and nozzle tips (see chapter „5.5.2 Installation“).
- Close mould. Release the contour plate from the ejector side and fix it on the heated separator plate (quick clamping device).
- Switch on the mould cooling.
- Switch on the heated separator plate and let the humidity from the heaters dry out at a temperature between 100 °C and 120 °C for approx. 10 minutes (sequential start /compound heating mode of the controller).
- Switch on and vent the silicone dosing unit.
- Set processing temperature and heat system long enough (sequential start /compound heating mode) until all temperatures have reached the setpoint.
- Build up barrel pressure between machine nozzle and sprue bush. Then fill up the COOLSHOT cold runner system with a specific dynamic pressure of 5 - 10 bar.
- The COOLSHOT cold runner system is filled with pre-dosed silicone until the material emerges from the opened injection points.
- Remove spilled material and clean surfaces.
- Close mould and build up operating pressure.
- Use the electric drive units to approach the reference points of the valve pin positions and set the desired opening stroke (see chapter „6.3.6 Valve pin reference“).
- Start moulding process.

6.3.5 Start-up of an already filled COOLSHOT cold runner system (after >24 h shutdown)

The COOLSHOT cold runner system is filled with only one silicone component.

- Install cleaned disc springs, O-rings and nozzle tips (see chapter „5.5.2 Installation“).
- Close mould. Release the contour plate from the ejector side and fix it on the heated separator plate (quick clamping device).
- Switch on the mould cooling.
- Switch on the heated separator plate and let the humidity from the heaters dry out at a temperature between 100 °C and 120 °C for approx. 10 minutes (sequential start /compound heating mode of the controller).
- Switch on and vent the silicone dosing unit.
- Set processing temperature and heat system long enough (sequential start /compound heating mode) until all temperatures have reached the setpoint.
- Build up barrel pressure between machine nozzle and sprue bush. Then fill up the COOLSHOT cold runner system with a specific dynamic pressure of 5 - 10 bar.
- The COOLSHOT cold runner system is filled with pre-dosed silicone until at least 2 times the silicone volume of the cold runner system has been passed through.
- Use the electric drive units to approach the reference points of the valve pin positions and set the desired opening stroke (see chapter „6.3.6 Valve pin reference“).
- Start moulding process.

NOTE!

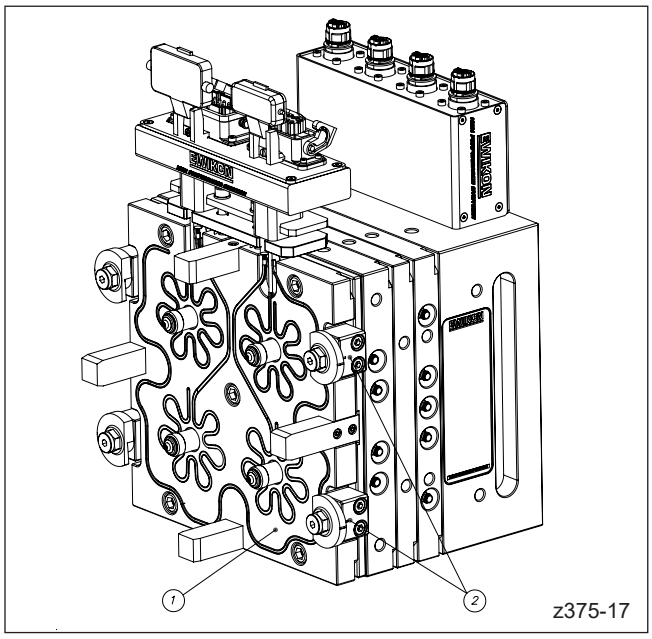
Never inject non-crosslinkable silicone compound into the mould inserts. Otherwise extensive cleaning is necessary.

6.3.6 Valve pin reference

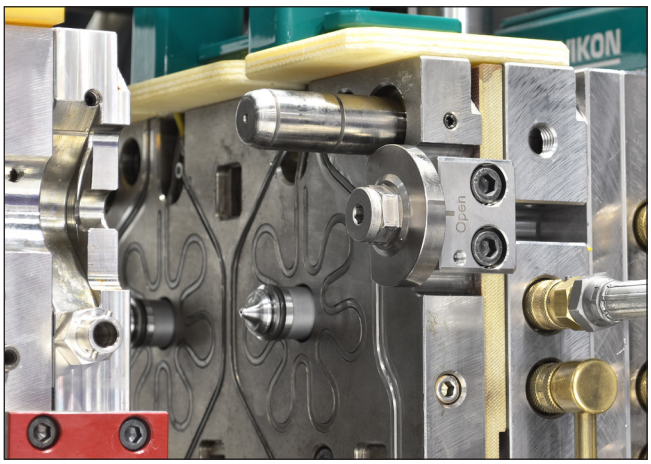
Extract of 2019_03_Betriebsanleitung_EDC-PRO-CS_EN, chapter 7.2.3, page 33:
"Due to the conical valve pin shape the determination of the best possible "CLOSED" position in silicone moulds is very timeconsuming in many cases. In order to simplify this procedure a function for the automatic determination of the "CLOSED" position is integrated. After pressing the button "Determine position CLOSE" the referencing of the system starts. After that the forward mechanical stop of the valve pin is determined in three cycles. During each cycle the valve pin is retracted until it reaches the "PURGE" position in order to clean the flow channel from potentially existing silicone residues. Finally the determined value is set as "Position CLOSE" and the valve pin is moved to this position.
Attention: The determined values must be saved as recipe file!"

6.3.7 Use of the optional quick clamping device

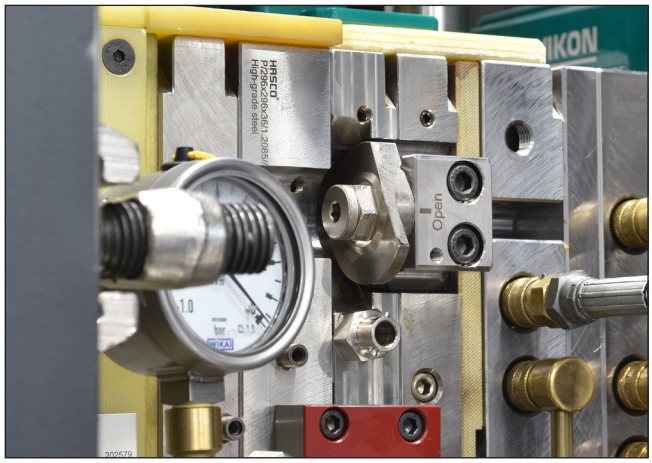
The following notes are only valid for COOLSHOT cold runner systems, which have been equipped with a quick clamping device directly on delivery.



Picture 24: Mould with quick clamping device



Picture 25: Quick clamping device opened



Picture 26: Quick clamping device closed

The quick clamping device prevents unintentional lifting of the mould plate from the optional heated separator plate. (pos. 1). By turning the clamping bolt the quick clamping device (pos. 2) can be opened and closed. The correct design of the retaining recess can be found in the 3D data of your COOLSHOT cold runner system.

Closing of the quick clamping device:

Insert the mould plate onto the optional heated separator plate until it touches contact. Subsequently the clamping bolts of the quick clamping device are twisted clockwise with the aid of a fork or ring spanner SW19. The tightening torque must not exceed 40 Nm.

Opening of the quick clamping device:

Warning! Before opening the quick clamping device the mould plate must be secured against falling.

Turn the clamping bolts of the quick clamping device counterclockwise with help of a fork or ring spanner SW19 into the "open" position to remove tension. In this position, the clamping bolt locks automatically.

6.4 Instructions for the operation of COOLSHOT cold runner systems

In general the start-up of COOLSHOT cold runner systems is carried out as described in chapter „6.3.1 First-time start-up and filling of a COOLSHOT cold runner system“ and „6.3.2 Shutdown of a COOLSHOT cold runner system (<24 h shut-down)“. When operating cold runner systems some additional instructions must be followed:

- In order to check the valve pin length mould and cold runner must have reached their operating temperature.
- Valve pin movements must be carried out at operating temperature only.
- When dismantling the mould from the machine or when disassembling the cold runner system the valve pins should always be moved into their back position (gate open) in order to prevent them from being damaged.
- Before disassembling the cold runner system all cold runner components must have reached ambient temperature. For this the mould cooling should stay switched on for a sufficient time after the heaters for the contourplate has been switched off.

Please make sure that the supply channels have a sufficient size. If possible, the diameter should be between 8 mm and 10 mm.

6.5 Possible malfunctions

6.5.1 Troubleshooting for COOLSHOT cold runner systems (without heated separator plate)

Error	Possible cause	Measure
Cold runner nozzles drool	Forward valve pin position not approached (closed gating point - controller)	Check valve pin position Re-calibrate the valve pin reference using the electric drive unit (see chapter „6.3.6 Valve pin reference“)
	Sealing surface between valve pin and nozzle tip is worn out	Check visually the condition of the valve pin Check visually the condition of the sealing surface in the nozzle tip
	Valve pin is not correctly installed	Check installation of the valve pin (see chapter „7.8 Instructions for service and repair“).
	Electric drive units not calibrated correctly	Re-calibrate the valve pin reference using the electric drive unit (see chapter „6.3.6 Valve pin reference“)
	Electric drive units do not move (signal is not processed)	Check function of electric drive units
	Gating point is worn out	Check condition / geometry of gating point
No or restricted melt delivery from the cold runner nozzles	Cross-linked silicone in the nozzle tip	Remove cross-linked silicone / clean nozzle tips (see chapter 772)
	Forward valve pin position (closed gating point - controller)	Re-calibrate the valve pin reference using the electric drive unit (see chapter „6.3.6 Valve pin reference“)
	Impurity in the flow channel	Disassemble COOLSHOT cold runner system completely and clean according to instructions (see chapter „7.8 Instructions for service and repair“)
	Electric drive units do not move (signal is not processed)	Check function of electric drive units
COOLSHOT cold runner system overmoulds	Installed O-rings are faulty or incorrectly installed	Check connections with O-ring sealing
	Sealing adjustments are not okay	Check sealing adjustments visually and dimensionally
	Disc spring is not correctly installed	Use original COOLSHOT cold runner system spare parts (e.g. disc spring)
	Assembly sealing element does not seal correctly	Check O-ring in assembly sealing element
	Used tightening torques of screw connections are not correct	Check tightening torques

Escape of cooling water	Installed O-rings are faulty or incorrectly installed	Check connections with O-ring sealing
	Sealing adjustments are not okay	Check visually and dimensionally the sealing adjustments
	Assembly of hose connections between cold runner nozzles is faulty	Check tightening torques (see chapter „9. Tightening torques“) Check length of cooling hose
	Connection fitting screwed in without thread seal	Reseal connection fitting
	Cooling bore inside the COOLSHOT cold runner system is damaged	Determine leakage and seal it
	Threat of cooling components differs to original COOLSHOT cold runner systems	Use original COOLSHOT cold runner system spare parts (e.g. connection fittings)

Chart 10: Errors/measures of COOLSHOT cold runner systems (without optional heated separator plate)

6.5.2 Troubleshooting for the heated separator plate (optional)

Error	Possible cause	Measure
Temperature of control zone exceeds set temperature	Thermocouple and power connections are not correctly allocated	Heat up each zone separately and check allocation
Controller indicates broken thermocouple	Cable of thermocouple is clamped	Check if cable of thermocouple is clamped or broken
	Malfunction of thermocouple	Change thermocouple
Thermocouple indicates wrong temperature value	Wrong type of thermocouple allocated in the controller	Change type of thermocouple
Thermocouple indicates value zero	Thermocouple is reverse-poled	Check connections of poles
	Thermocouple assignment is not correct	Heat up each zone separately and check allocation
Short decrease or increase in temperature (temperature fluctuations)	Power or thermo cables do not have proper contact	Check if cables are clamped or broken
	Humidity in the heater	Dry heat element (automatically for EWIKON controllers)

Chart 11: Errors/measures of the heated separator plate (optional)

7. Maintenance

7.1 Safety instructions

WARNING!

PPE

Hot surfaces

Body burns by hot surfaces.

- Let the COOLSHOT cold runner system (optional heated separator plate) cool down completely before starting maintenance work.

7.2 Instructions for maintenance

NOTE!

Deferred, incomplete and improper maintenance work causes increased wear on single components of the COOLSHOT cold runner system.

- Maintenance work must be carried out according to the maintenance schedule completely and within the indicated time intervals.
- Specific maintenance work must only be carried out by the qualified staff which is specified in the maintenance schedule.

In addition to the proper operation a careful maintenance is required in order to assure a long service life as well as a trouble-free function of the COOLSHOT cold runner system. Beside inspection and repair this is a preventive measure to keep the COOLSHOT cold runner system in perfect operating condition.

Please adhere to the time intervals indicated in the maintenance schedule.

It is recommended to document the maintenance work carried out in written form.

7.3 Maintenance schedule

Component / function	Measure	Staff	Interval	Remark

Chart 12: Example for a maintenance schedule

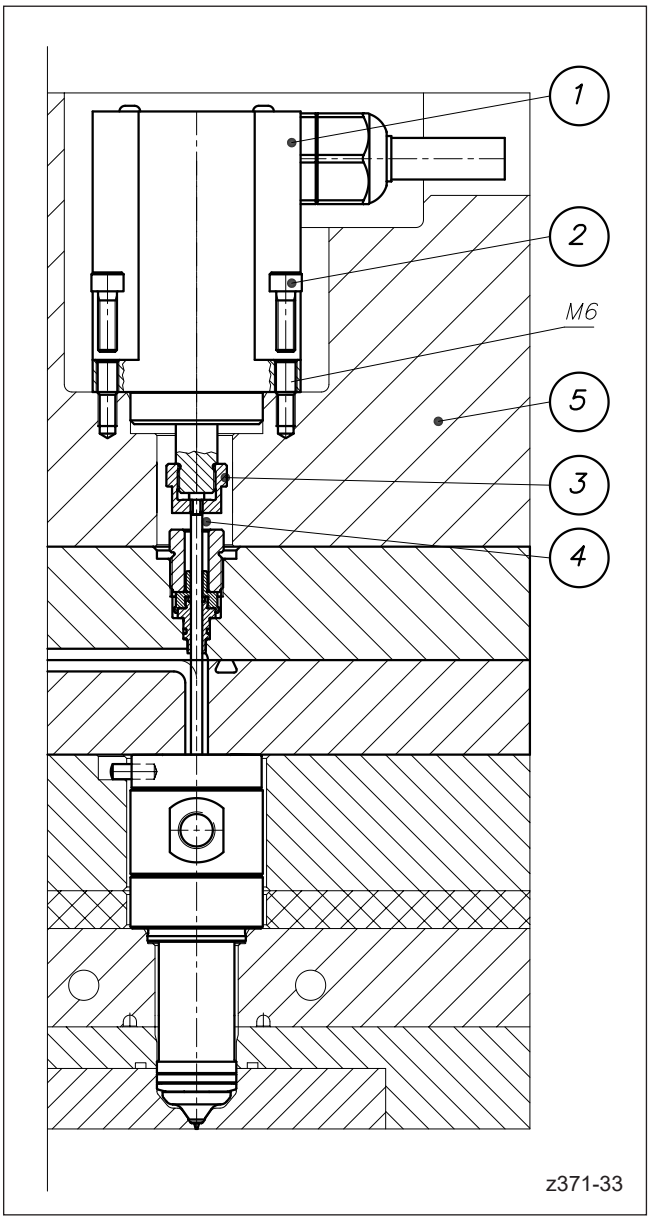
7.4 Disassembly / Assembly of electric drive units with valve pin

Preliminary measures:

Dismantle the COOLSHOT cold half from the injection moulding machine and place it on a suitable surface (metal bars or wooden bars).

1. **Disassembly of the locating ring (required when parts of the installation space for the electric drive units are covered)**
   Disassemble the locating ring if required. Loosen and remove socket head screws and remove the locating ring.

7.4.1 Disassembly of an electric drive unit with valve pin



Picture 27: Disassembly of an electric drive unit

HAZARD!

Connected power supply during installation

Risk of deadly electric shock or severe injuries due to live components.

- The cold runner system and the mould have to be disconnected from the voltage source during installation.

WARNING!

Sharp edges and heavy components

- Cut injuries to body and extremities, mainly to the hands.
- Crushing of fingers or hand.

Control of live components before installation

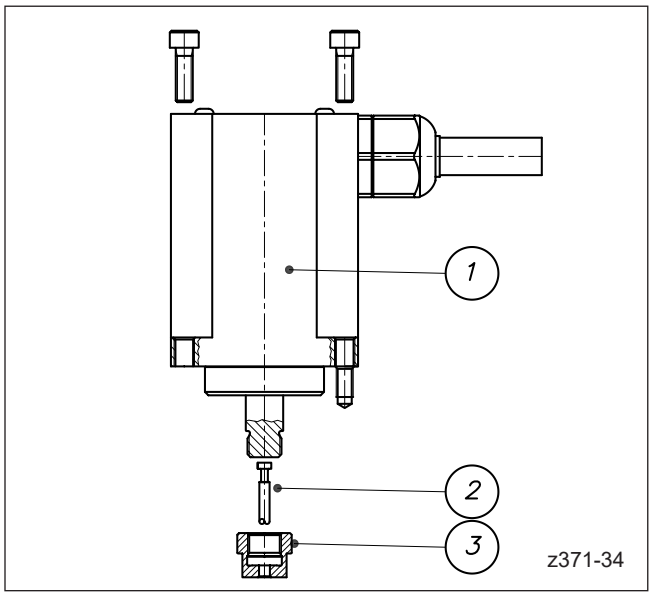
The electrical equipment of the cold runner system should be checked, especially those areas which will no longer be accessible after installation. Physical injuries such as an electric shock can be prevented that way.

Please check

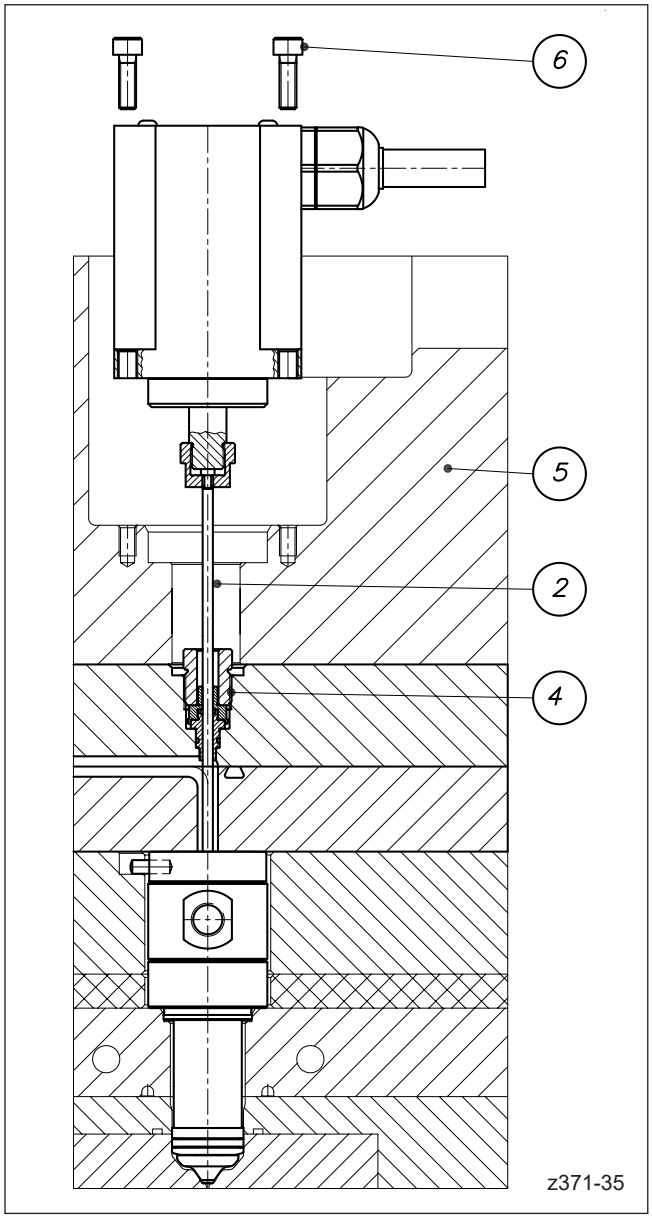
- if cables are kinked or squeezed.
- if cable insulations are undamaged.

1. Disconnect the wiring of the drive unit.
2. Unscrew the socket head screws (pos. 2) crosswise from the flange of the drive unit. Pull the drive unit (pos. 1) with valve pin retainer (pos. 3) and valve pin (pos. 4) carefully and without tilting vertically out of the mould. If required use a threaded rod (pos. b) with striking weight (pos. a) which is screwed into the thread at the backside of the drive unit to dismantle the drive unit from the clamping plate (pos. 5).
3. Unscrew the valve pin retainer (pos. 3) with valve pin (pos. 4) from the drive unit (pos. 1) by using a wrench.
4. Pull the valve pin (pos. 4) carefully out the valve pin retainer (pos. 3).

7.4.2 Installation of an electric drive unit with valve pin



Picture 28: Installation of the valve pin in a valve pin retainer



Picture 29: Installation of an electric drive unit

HAZARD!

Connected power supply during installation

Risk of deadly electric shock or severe injuries due to live components.

- The cold runner system and the mould have to be disconnected from the voltage source during installation.

WARNING!

Sharp edges and heavy components

- Cut injuries to body and extremities, mainly to the hands.
- Crushing of fingers or hand.

Control of live components before installation

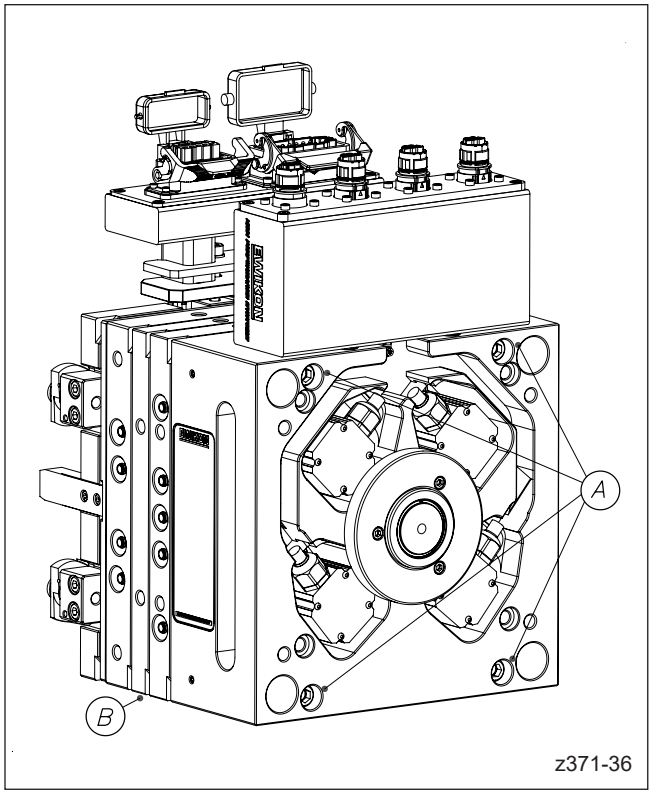
The electrical equipment of the cold runner system should be checked, especially those areas which will no longer be accessible after installation. Physical injuries such as an electric shock can be prevented that way.

Please check

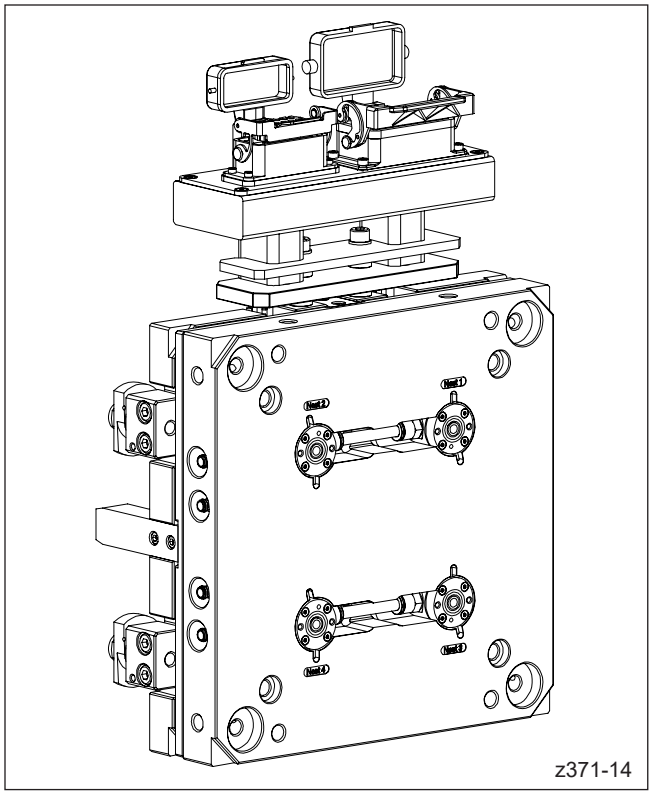
- if cables are kinked or squeezed.
- if cable insulations are undamaged.

1. Unscrew the valve pin retainer (pos. 3) from the drive unit (pos. 1) by using a wrench.
2. Insert the valve pin (pos. 2) carefully into the valve pin retainer from behind.
3. Screw the valve pin retainer with valve pin to the drive unit again and tighten it with matching torque.
   See chapter „9.3 Tightening torques for valve pin retainer for electric drive units“.
4. Install the drive unit with pre-installed valve pin (pos. 2). Coat the valve pin (pos. 2) with silicone oil (see chapter „5.2.1 Tools and operating materials“) and carefully insert it into the valve pin seal in the manifold package (pos. 4). Apply axial load only. Tilting or bending caused by lateral load must be avoided. Push the valve pin slowly through the manifold package until the drive unit sits flush in the recess in the clamping plate (pos. 5).
5. Insert the socket head screws (pos. 6) from the back through the bores in the flange of the drive unit and screw them into the clamping plate (pos. 5). Tighten with matching torque. See Chapter
   „9.1 Tightening torques for socket head screws“.
6. Wire the electric drive units according to the wiring scheme provided by EWIKON. Please also see chapter „5.5.3 Electrical connection of an heated separator plate (optional)“.

7.5 Disassembly / Assembly of clamping plate with manifold package



Picture 30: COOLSHOT cold half



Picture 31: Nozzle retainer plate

HAZARD!

Connected power supply during installation

Risk of deadly electric shock or severe injuries due to live components.

- The cold runner system and the mould have to be disconnected from the voltage source during installation.

WARNUNG!

Sharp edges and heavy components

- Cut injuries to body and extremities, mainly to the hands.
- Crushing of fingers or hand.

Control of live components before installation

The electrical equipment of the cold runner system should be checked, especially those areas which will no longer be accessible after installation. Physical injuries such as an electric shock can be prevented that way.

Please check

- if cables are kinked or squeezed.
- if cable insulations are undamaged.

Pressurised systems

During installation all hydraulic or pneumatic supply lines must be depressurised.

- Injuries caused by flying parts or "whipping" hoses.
- Injuries to eyes caused by escaping pressurised liquids.

Hot surfaces

Body burns by hot surfaces.

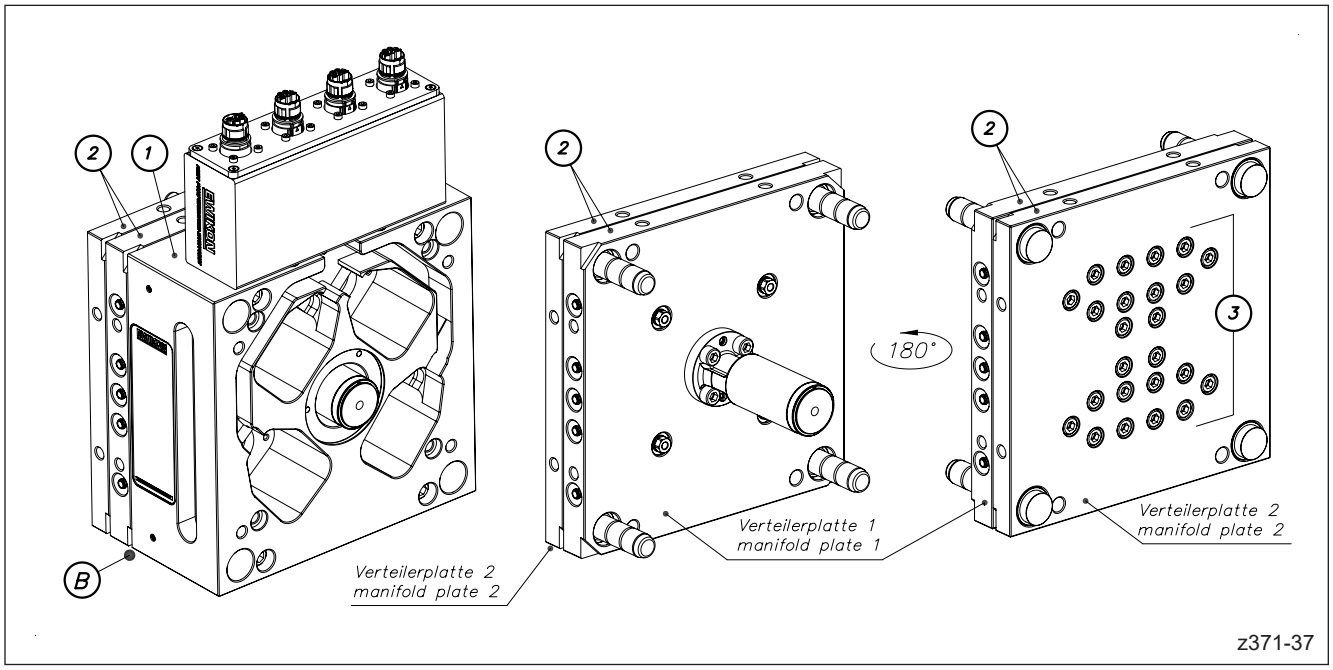
Preliminary measures:

- Dismantle the COOLSHOT cold half from the injection moulding machine.
- Disassemble the electric drive units with valve pins. (see chapter „7.4 Disassembly / Assembly of electric drive units with valve pin“).

1. Unscrew and remove socket head screws (A).
2. Insert two assembly levers (see chapter „5.2.1 Tools and operating materials“) in the provided recesses (B). Separate the clamping plate with the manifold package carefully and evenly from the nozzle retainer plate. Make sure to avoid jamming between the plates and the guide elements.

7.6 Disassembly / Maintenance / Assembly of the manifold package

7.6.1 Disassembly of the manifold package



Picture 32: Manifold package

NOTE!

Unscrew screws from the manifold package while the plates sit in upright position. Thus, twisting of the plates when applying force is avoided.

WARNING!

Sharp edges and heavy components

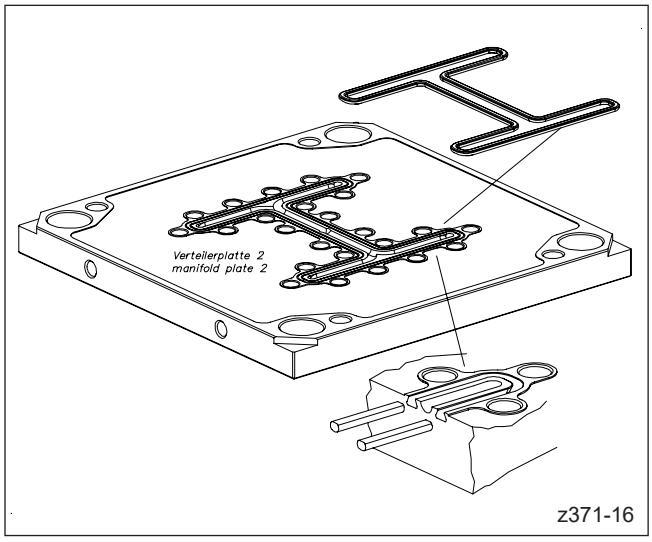
- Cut injuries to body and extremities, mainly to the hands.
- Crushing of fingers or hand.

Preliminary measures:

- Dismantle the COOLSHOT cold half from the injection moulding machine.
- Disassemble the electric drive units with valve pins. (see chapter „7.4 Disassembly / Assembly of electric drive units with valve pin“).
- Disassemble the clamping plate with the manifold package (see chapter „7.5 Disassembly / Assembly of clamping plate with manifold package“).

1. Insert two assembly levers in the provided recesses (B). Separate the clamping plate (pos. 1) carefully and evenly from the manifold package. Make sure that the clamping plate does not get jammed on the guide elements.
2. Disassemble the guide elements from the manifold package.
3. Unscrew and remove the socket head screws (pos. 3) from the manifold plate 2. Leave two screws in for fixing. Place the manifold package flat on a suitable surface (PE mat). If the sprue bush is not disassembled the manifold plate 1 needs to be supported.
4. For disassembly of the sprue bush see chapter „7.6.3 Disassembly and installation of the sprue bush“.
5. Unscrew and remove the fixing screws and take off the manifold plate 2.
6. Turn the manifold plate 2 and place it flat on a suitable surface (PE mat).

7.6.2 Cleaning the manifold package and changing the round cord seal



Picture 33: Manifold plate 2 with round cord

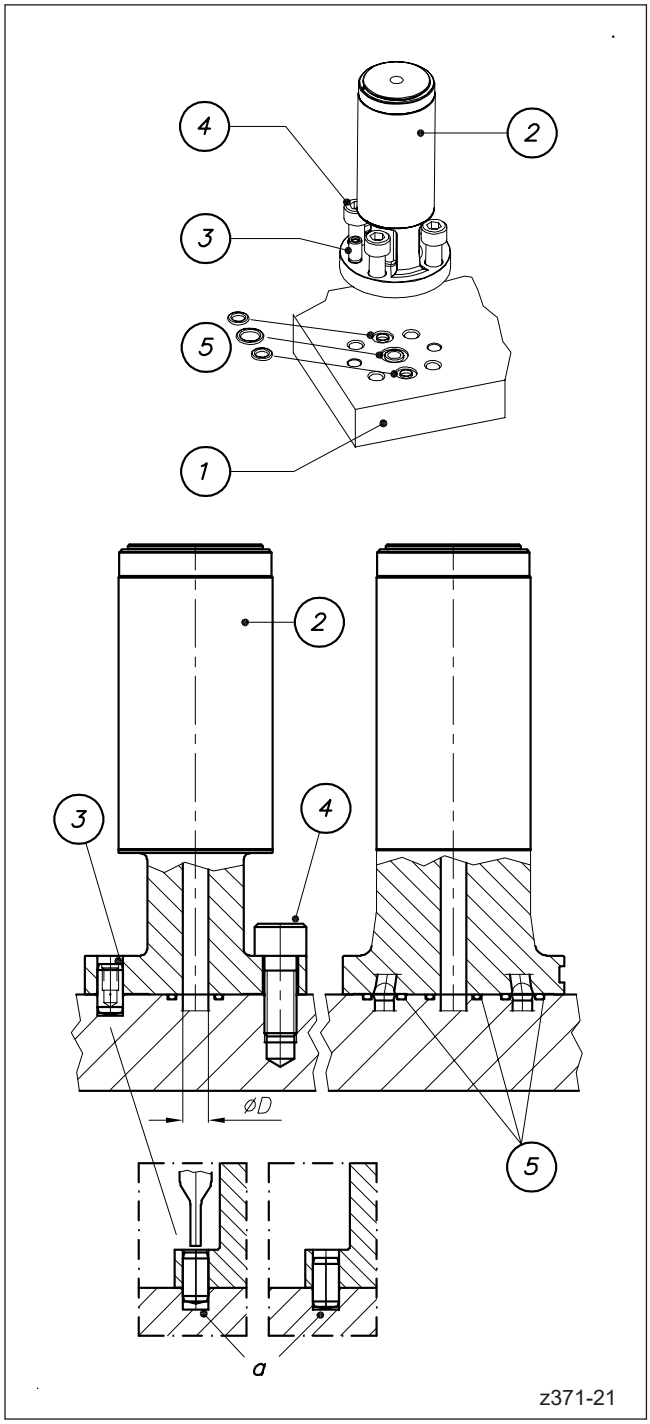
WARNING!

Sharp edges and heavy components

- Cut injuries to body and extremities, mainly to the hands.
- Crushing of fingers or hand.

1. The milled flow channel with round cord seal in the manifold plate 2 is now visible. In order to guarantee leak tightness between the manifold plates the round cord seal must be free of any damage.
2. Disassemble the damaged round cord seal. Check the seal channel and clean it by using acetone (see chapter „5.2.1 Tools and operating materials“).
3. Insert the new round cord seal into the clean seal channel to determine the required length. Cut it to size with a small excess of approx. 1 mm. It is recommended to use a cutting template to ensure a precise cutting of both joint faces (e.g. Loctite O-Ring Kit).
4. The joint faces are glued together by using a cyanoacrylate glue (e.g. Loctite 406, limitation of use 80 °C). For preparation roughen the joint faces with fine sandpaper (180 grit CAMI) and decrease them with a suitable cleaner (e.g. acetone).
5. Glue the joint faces of the round cord seal together. It is recommended to use a guide for precise positioning (e.g. prismatic guide). After the specified drying time check the adhesive joint by applying light tension.
6. Insert the slightly greased (silicone oil) round cord seal into the seal channel. Make sure that the adhesive joint is placed on a straight to avoid unnecessary tensile or torsional load.

7.6.3 Disassembly and installation of the sprue bush



Picture 34: Disassembly and assembly of the sprue bush

NOTE!

The installation process described in the folllowing will only be required if a sprue bush is delivered as spare part.

A new manifold has the sprue bush pre-installed.

WARNING!

Sharp edges and heavy components

- Cut injuries to body and extremities, mainly to the hands.
- Crushing of fingers or hand.

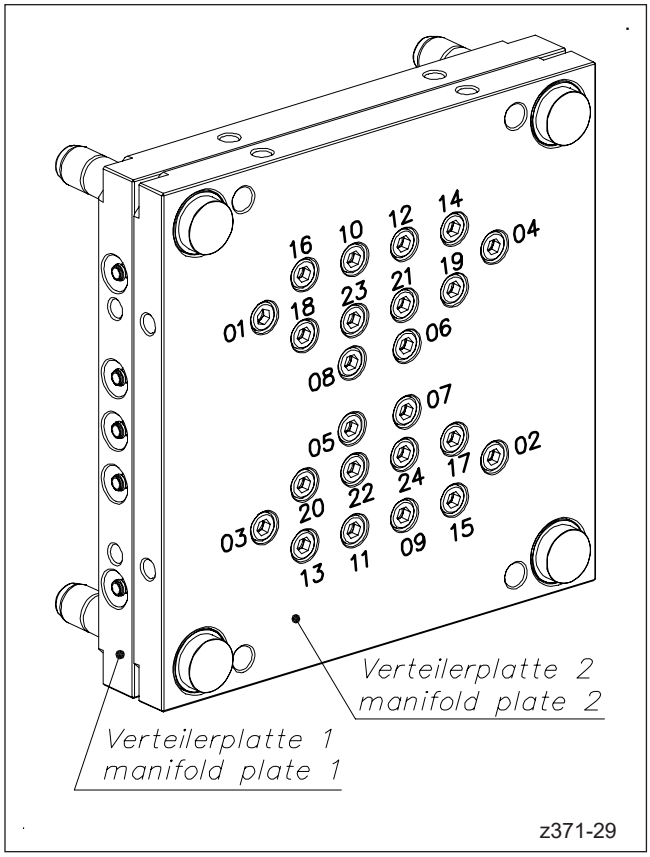
Disassembly of the sprue bush

1. Unscrew and remove socket head screws (pos. 4) of the screw bush. Disassemble the sprue bush from the manifold plate. When the o-rings (pos. 5) are not damaged they do not need to be replaced.

Installation of the sprue bush

1. The diameter D of the sprue bush (pos. 2) must be identical to the diameter of the flow channel entrance in the manifold plate (pos. 1).
2. Grease the o-rings (pos. 5) slightly with silicone oil (see chapter „5.2.1 Tools and operating materials“), insert them into the manifold plate and place the sprue bush (pos. 2) aufsetzen. Fix the position by inserting the dowel pins (pos. 3, ISO 8735) through the bores in the sprue bush into the fit bores in the manifold plate.
3. Screw in the socket head screws (pos. 4) crosswise and tighten with matching torque. See chapter „9.1 Tightening torques for socket head screws“.
4. Drive the dowel pins (pos. 3, ISO 8735) to the end of the fit bores in the manifold plate by using a punch. The front diameter of the punch should always be smaller than the tapped blind hole bore in the dowel pin in order not to damage the thread.

7.6.4 Installation of the manifold package and clamping plate



Picture 35: Installation of the manifold package

WARNING!

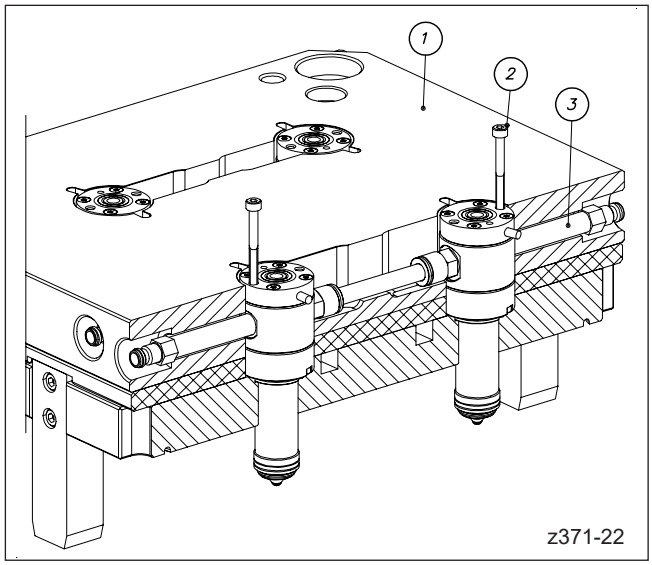
Sharp edges and heavy components

- Cut injuries to body and extremities, mainly to the hands.
- Crushing of fingers or hand.

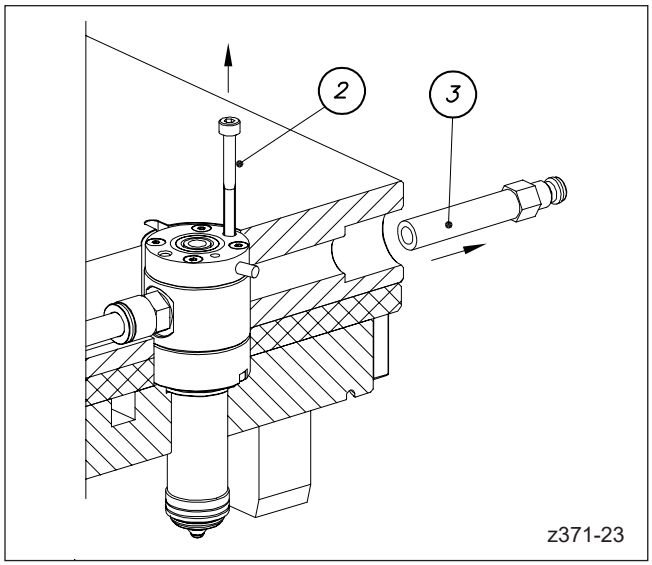
1. Assemble manifold plates 1 and 2. Make sure that flow channels and exit bores are positioned correctly.
2. Insert all socket head screw (pos. 01 - 24) into the bores and screw them in by hand one or two threads.
3. Install the guide elements.
4. Secure the manifold package against sliding and twisting.
5. Use a torque wrench to tighten the socket head screws with matching torque according to the numbering (See Chapter „9.1 Tightening torques for socket head screws“):

7.7 Disassembly / maintenance / installation of cold runner nozzles

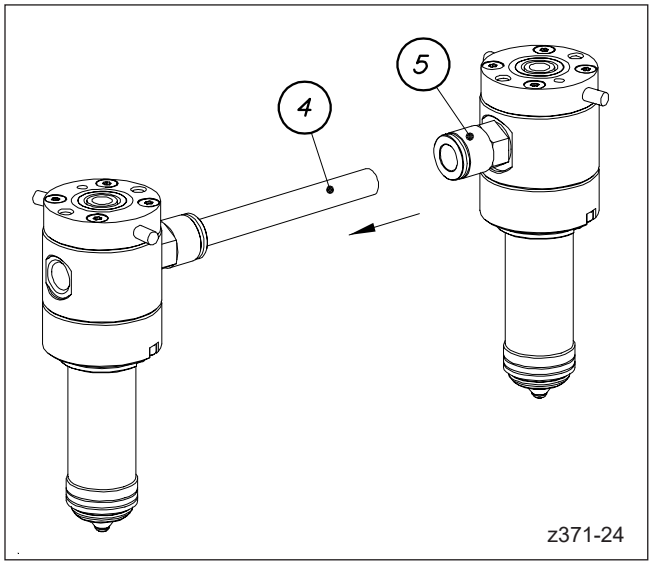
7.7.1 Disassembly of cold runner nozzles



Picture 36: Nozzle retainer plate with cold runner nozzles



Picture 37: Disassembly by using a socket head screw, disassembly of the extension nipples



Picture 38: Disassemly of the water hose

WARNING!

Sharp edges and heavy components

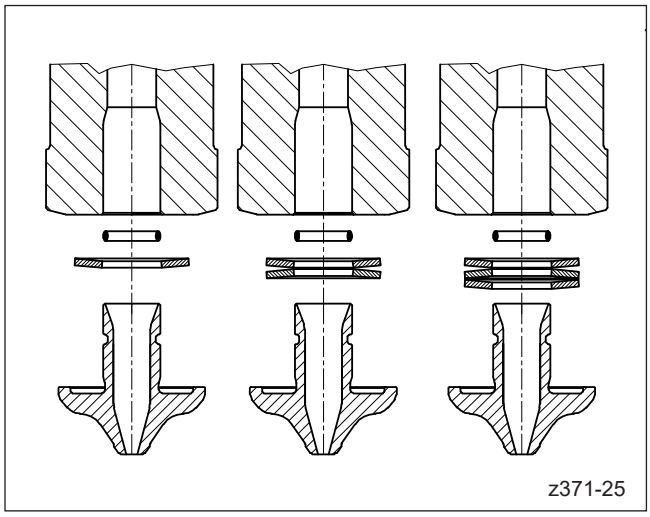
- Cut injuries to body and extremities, mainly to the hands.
- Crushing of fingers or hand.

Preliminary measures:

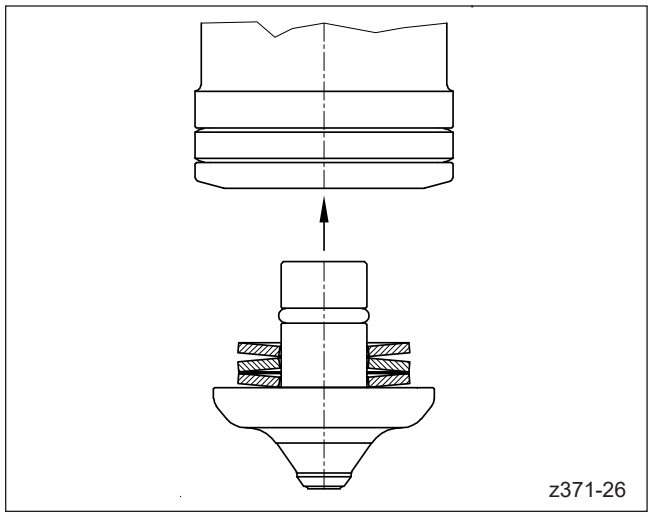
- Dismantle the COOLSHOT cold half from the injection moulding machine.
- Disassemble the electric drive units with valve pins. (see chapter „7.4 Disassembly / Assembly of electric drive units with valve pin“).
- Disassemble the clamping plate with the manifold package (see chapter „7.5 Disassembly / Assembly of clamping plate with manifold package“).

1. In order to ensure optimum access to all components to be disassembled position the nozzle retainer plate (pos. 1) with the cold runner nozzles facing downward. Depending on the guide elements used it may be necessary to support the nozzle retainer plate so that the nozzle tips cannot be damaged.
2. Unscrew and remove the extension nipples (pos. 3).
3. In order to facilitate the disassembly of the cold runner nozzle from the nozzle retainer plate (pos. 1) a socket head screw (pos. 2) can be screwed into the nozzle head.
4. Nozzles which are connected by a flexible water hose must be disassembled together. Use the screwed in socket head screws (pos. 2) to pull the nozzles carefully and without tilting out of the nozzle retainer plate. Place the nozzles on a suitable surface.
5. Disassemble the water hose (pos. 4). Push the connection (pos. 5) in the direction of the nozzle, hold it and pull out the hose.

7.7.2 Exchange of tip inserts



Picture 39: Assembly of disk springs, O-rings and tip inserts



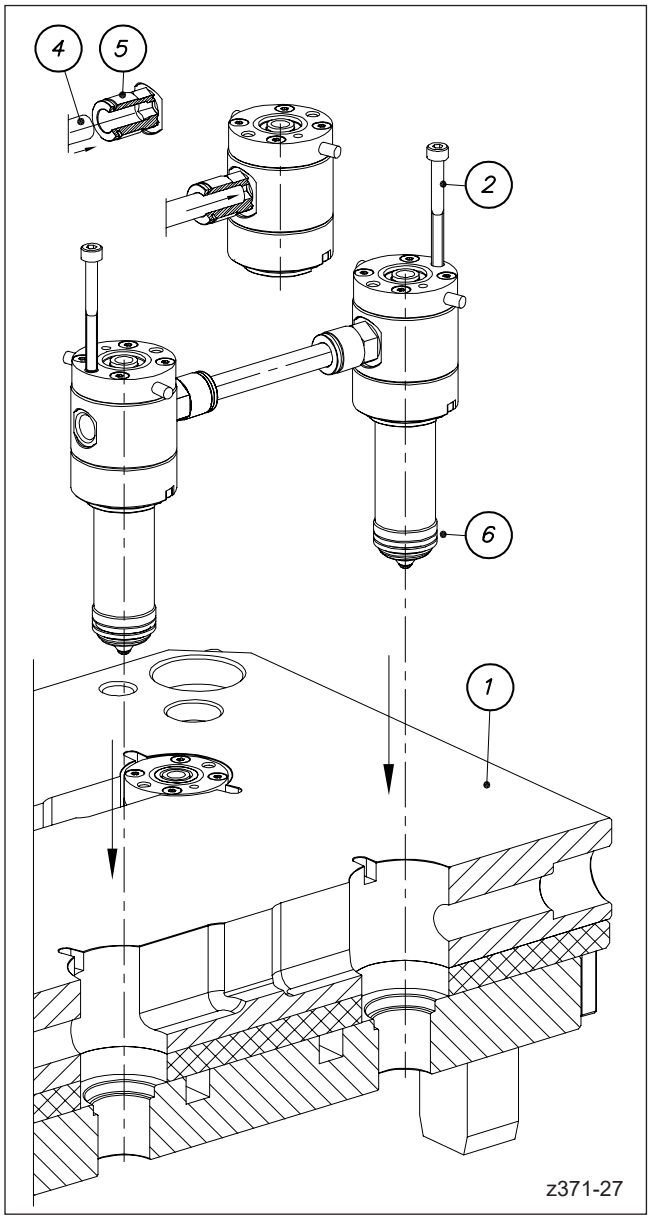
Picture 40: Installation of tip inserts with inserted disk springs (picture shows example with 3 disk springs) and O-ring

NOTE!

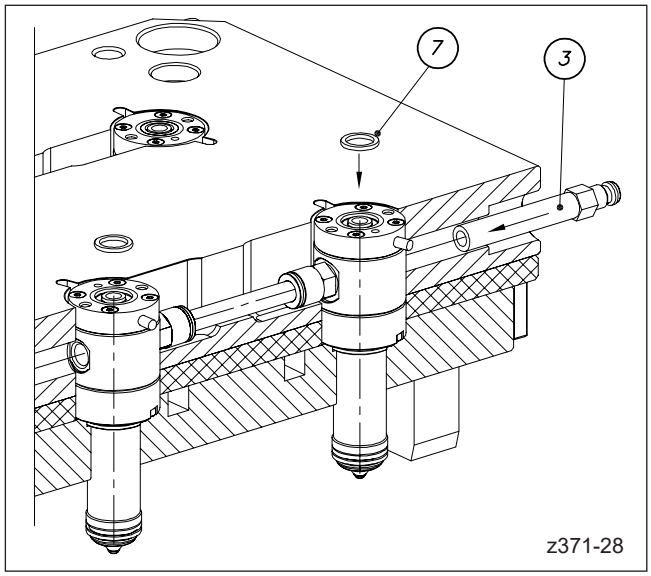
Attention! When a tip insert is exchanged the used disc springs must be exchanged as well.

1. The tip inserts are installed in the nozzle by using a sliding seat. Thus, a disassembly by hand is possible. If cross-linked LSR impedes the disassembly by hand a flattened copper mandrel (see chapter „5.2.1 Tools and operating materials“) can be used.
2. Clean the tip seat in the nozzle and check it visually for possible damage.
3. Slide the specified amount of disk springs (see drawing) on the tip insert according to the assembly sketch. **The mounting direction of the disc springs must be adhered to!** Carefully slide the O-ring onto the nozzle tip and into the notch provided. Lubricating the O-ring with a suitable silicone oil (see chapter „5.2.1 Tools and operating materials“) facilitates the insertion and is highly recommended.
4. Slide the new tip insert, disc springs and O-ring by hand into the tip seat of the nozzle (see picture Picture 39 and picturePicture 40 as well as chapter „5.5.2 Installation“ - „Picture 22: Installation and mounting direction of the disc springs and O-rings“).

7.7.3 Installation of the cold runner nozzle



Picture 41: Installation of the water pipe



Picture 42: Screwing in the extention nipples

WARNING!

Sharp edges and heavy components

- Cut injuries to body and extremities, mainly to the hands.
- Crushing of fingers or hand.

1. Slide the water hose (pos. 4) into the connection (pos. 5) of the cold runner nozzle until it sits flush.
2. In order to facilitate the installation of the nozzle screw a socket head screw (pos. 2) into the nozzle head.
3. Before installing the cold runner nozzle the O-ring (Pos. 6) in the tip area must be installed (type of O-ring see drawing). The O-ring must be replaced during each assembly process.
4. Install the nozzles which are connected by the flexible water hose carefully and without tilting in the recesses in the nozzle retainer plate (pos. 1). Use the installed socket head screws (pos. 2) as assembling aid.
5. Unscrew and remove the socket head screws (pos. 2).
6. Cut the extension nipples (pos. 3) to size and coat the threads with liquid thread sealing agent (see chapter „5.2.1 Tools and operating materials“). Screw the extension nipples (pos. 3) into the cold runner nozzle.
7. After installation of the cold runner nozzles the O-ring (Pos. 7) must be installed in the groove in the nozzle head (type of O-ring see drawing). The O-ring must be replaced during each assembly process.

7.8 Instructions for service and repair

- Only genuine spare parts must be used.
- When ordering spare parts please use the specifications given in the spare-parts lists.
- In case of service requests please always have the serial number, order number and type of the used COOLSHOT cold runner system ready.

- **Service**
  www.ewikon.com in the "Contact us" menue, submenue "Your contact at EWIKON", "Service"
  E-Mail: service@ewikon.com

8. Decommissioning

8.1 Safety instructions

HAZARD!

Connected power supply during deinstallation

Risk of deadly electric shock or severe injuries due to live components.

- The cold runner components and the mould have to be disconnected from the voltage source during deinstallation.

WARNING!

PPE

Hot surfaces

Risk of burns.

- Deinstallation work must be carried out only after components have cooled down.

Escape of hydraulic liquid and pressurised air

Risk of injuries.

- All hydraulic or pneumatic supply lines must be depressurised.

NOTE!

- All operating materials and fluids must be emptied, collected and disposed in accordance with the local regulations.
- Follow the safety instructions for transport with lifting accessories (see chapter „5.3 Transport“).
- Only specialised staff is allowed to carry out any deinstallation work.

8.2 Instructions for disposal

NOTE!

Once disposed components must not be used again. EWIKON disclaims any responsibility for personal injuries and material demage resulting from re-use.

In case that no special arrangements regarding return or disposal were agreed with EWIKON the disassembled components have to be recycled after deinstallation:

- Scrap metallic materials.
- Recycle liquid silicone rubber (LSR) components and liquid silicone rubber (LSR) waste from the production.
- Dispose the remaining components sorted by their material properties.
- Electronic scrap and electronic components are special waste and must be disposed by authorised specialised companies only.
- With regard to the environmentally sound disposal of the deinstalled COOLSHOT cold runner system the local regulations for waste disposal must be observed.

9. Tightening torques

Tighten socket head screws with the matching torques according to the following chart. All values are non-binding standard values for socket head screws with internal hexagon and standard metric thread complying with DIN EN ISO 4762.

All values were determined in accordance with the guideline VDI 2230 sheet 1:2014-12 which is based on the most frequently used torque controlled tightening method with normally 90% utilisation of the minimum yield strength $R_{p0,2}$. The values given are valid for socket head screws with property class 8.8, 10.9 and 12.9 with internal hexagon and standard metric thread complying with DIN EN ISO 4762 (replacement for DIN 912).

- The values are valid for clearance holes with tolerance "medium" complying with DIN EN 20273.
- The values are to be understood as maximum permissible tightening torques (without safety factor).
- Only calibrated tightening tools must be used.
  (When the tightening method/ the tightening tool shows a greater variation (approx. > ±5%) the required tightening torque M_A must be appropriately reduced to avoid overstressing (control test required). It must be considered that different tightening methods can show a different variation.)
- Only screws with property class 12.9 may be used.

9.1 Tightening torques for socket head screws

Thread	Lead	Width across flats AW	Property class	Maximum permissible tightening torque M_A at room temperature			
				Lubricated (High temperature installation paste, see chapter „5.2.1 Tools and operating materials“) μ_G=0.10		Screws in as-delivered condition (slightly oiled) μ_G=0.14	
				M_A [Nm]	M_A [ft·lb]	M_A [Nm]	M_A [ft·lb]
M3	0.5	2.5	8.8	1.12	0.83	1.41	1.04
			10.9	1.58	1.17	1.98	1.46
			12.9	1.90	1.40	2.37	1.75
M4	0.7	3	8.8	2.6	1.9	3.3	2.4
			10.9	3.9	2.9	4.8	3.5
			12.9	**4.5**	**3.3**	**5.6**	**4.1**
M5	0.8	4	8.8	5.2	3.8	6.5	4.8
			10.9	7.6	5.6	9.5	7.0
			12.9	**8.9**	**6.6**	11.2	8.3
M6	1.0	5	8.8	9.0	6.6	11.3	8.3
			10.9	13.2	9.7	16.5	12.2
			12.9	**15.4**	**11.4**	**19.3**	**14.2**
M7	1.0	6	8.8	14.8	10.9	18.7	13.8
			10.9	21.7	16.0	27.5	20.3
			12.9	**25.4**	**18.7**	32.2	23.7
M8	1.3	6	8.8	21.6	15.9	27.3	20.1
			10.9	31.8	23.5	40.1	29.6
			12.9	**37.2**	**27.4**	**46.9**	**34.6**
M10	1.5	8	8.8	43	32	54	40
			10.9	63	46	79	58
			12.9	**73**	**54**	93	69
M12	1.8	10	8.8	73	54	93	69
			10.9	108	80	137	101
			12.9	**126**	**93**	**160**	**118**
M14	2.0	12	8.8	117	86	148	109
			10.9	172	127	218	161
			12.9	**201**	**148**	255	188
M16	2.0	14	8.8	180	133	230	170
			10.9	264	195	338	249
			12.9	**309**	**228**	**395**	**291**
M18	2.5	14	8.8	259	191	329	243
			10.9	369	272	469	346
			12.9	**432**	**319**	549	405
M20	2.5	17	8.8	363	268	464	342
			10.9	517	381	661	488
			12.9	**605**	**446**	**773**	**570**
M22	2.5	17	8.8	495	365	634	468
			10.9	704	519	904	667
			12.9	**824**	**608**	**1057**	**780**
M24	3.0	19	8.8	625	461	798	589
			10.9	890	656	1136	838
			12.9	**1041**	**768**	**1329**	**980**

Chart 13: Tightening torques for socket head screws with standard metric thread according to DIN EN ISO 4762

9.2 Tightening torques for manifold screw connections and retaining screws

Thread	Tightening torque Lubricated (high temperature installation paste, see chapter „5.2.1 Tools and operating materials“)	
	M_A [Nm]	M_A [ft·lb]
M4	1.5	1.1
M6	5	3.7
M8	10	7.4
M10	73	54
M12	126	93
M16	309	228

Chart 14: Tightening torques for manifold screw connections (for standard installation of nozzles) and retaining screws

9.3 Tightening torques for valve pin retainer for electric drive units

Valve pin Ø [mm]	Thread (valve pin retainer)	Tightening torque	
		M_A [Nm]	M_A [ft·lb]
1.2	M10x1	10	7.4
2			
3	M14x1	15	11.0
4			

Chart 15: Tightening torques for valve pin retainer (electric drive units)

- The tightening torques given above are only valid for unlubricated screws. All parts must be clean.
- If the valve pin retainer has been tightened with the correct torque the valve pin in the valve pin has a clearance of 0.02 mm and can be rotated by hand. Jamming of the valve pin must be avoided!

9.4 Tightening torques for COOLSHOT sealing elements

9.4.1 Tightening torques for assembly group sealing element

Valve pin Ø [mm]	Thread (screw)	Tightening torque	
		M_A [Nm]	M_A [ft·lb]
3	M6x0,5	3,5	2,6

Chart 16: Tightening torques for assembly group sealing element

9.4.2 Screw connection sealing element (retaining screw)

Valve pin Ø [mm]	Thread (screw)	Tightening torque	
		M_A [Nm]	M_A [ft·lb]
3	M14x1	20	14,8

Chart 17: Tightening torques for screw connection sealing element

EWIKON

EWIKON
Heißkanalsysteme GmbH
Siegener Straße 35
35066 Frankenberg
Tel: +49 6451 / 501-0
Fax: +49 6451 / 501-202
E-Mail: info@ewikon.com
www.ewikon.com