

Operating Instructions

Mechanical Clamp VCMC K1/K2

Note

The Operating instructions were originally written in German. Store in a safe place for future reference. Subject to technical changes without notice. No responsibility is taken for printing or other types of errors.

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Contents

1 Important Information	5
1.1 Note on Using this Document	5
1.2 The technical documentation is part of the product	5
1.3 Warnings in This Document.....	5
1.4 Symbol.....	6
2 Fundamental Safety Instructions	7
2.1 Intended Use.....	7
2.2 Non-Intended Use	7
2.3 Personnel Qualifications	7
2.4 Workplace Requirements.....	7
2.5 Emissions	8
2.6 Modifications to the Product.....	8
3 Product Description	9
3.1 Description of Mechanical Clamp VCMC	9
3.1.1 Use	9
3.1.2 The Clamping Unit.....	9
3.1.3 The Adjustment Mechanism	9
3.1.4 Clamping the Workpiece	9
3.2 Design of Mechanical Clamp (VCMC).....	10
4 Technical Data	11
4.1 General parameters.....	11
4.2 Dimensions.....	11
5 Checking the Delivery	12
6 Installation	13
6.1 Installation Instructions.....	13
6.2 Attaching the Mechanical Clamp to the Console.....	13
6.2.1 Series Design	13
6.2.2 Design with Additional Clamping Unit	14
6.3 Setting the Clamping Height.....	15
6.4 Using the Edge of the System.....	16
7 Start of Operations	17
7.1 Pre-fixing the Mechanical Clamp on a Dual-circuit Vacuum Console	17
7.2 Clamping the Workpiece	17
7.3 Machining Limitations	18
7.4 Releasing the Workpiece	18
8 Warranty	19
9 Spare and wearing parts	20
10 Accessories	21
11 Disposing of the Product	22
12 Declarations of Conformity	23

12.1	EU Declaration of Conformity	23
12.2	UKCA Declaration of Conformity	23

1 Important Information

1.1 Note on Using this Document

J. Schmalz GmbH is generally referred to as Schmalz in these Operating instructions.

These Operating instructions contain important notes and information about the different operating phases of the product:

- Transport, storage, start of operations and decommissioning
- Safe operation, required maintenance, rectification of any faults

The Operating instructions describe the product at the time of delivery by Schmalz.

1.2 The technical documentation is part of the product

1. For problem-free and safe operation, follow the instructions in the documents.
2. Keep the technical documentation in close proximity to the product. The documentation must be accessible to personnel at all times.
3. Pass on the technical documentation to subsequent users.
 - ⇒ Failure to follow the instructions in these Operating instructions may result in life-threatening injuries!
 - ⇒ Schmalz is not liable for damage or malfunctions that result from failure to heed these instructions.

If you still have questions after reading the technical documentation, contact Schmalz service at:
www.schmalz.com/services

1.3 Warnings in This Document

Warnings warn against hazards that may occur when handling the product. This document contains three levels of danger that you can recognize by the signal word.

Signal word	Meaning
WARNING	Indicates a medium-risk hazard that could result in death or serious injury if not avoided.
CAUTION	Indicates a low-risk hazard that could result in minor or moderate injury if not avoided.
NOTE	Indicates a danger that leads to property damage.

1.4 Symbol



This symbol indicates useful and important information.

- ✓ This symbol represents a prerequisite that must be met prior to an operational step.
- ▶ This symbol represents an action to be performed.
- ⇒ This symbol represents the result of an action.

Actions that consist of more than one step are numbered:

1. First action to be performed.
2. Second action to be performed.

2 Fundamental Safety Instructions

2.1 Intended Use

The Mechanical clamp (VCMC) is built in accordance with the latest standards of technology and is shipped in safe condition. However, hazards can arise during use.

The VCMC is used for clamping dry, rigid workpieces. It may be used only in combination with suitable clamping consoles. The VCMC is to be installed by the customer.

As an option, the VCMC can be pre-fixed to the console by fixing flaps (included with the clamping unit) in order to prevent it from falling down. Switching on the operating vacuum fixes the VCMC to the console. The workpiece is then clamped by means of a vertical stroke of the clamping disc. The version K2 is equipped with two separate vacuum circuits: one for pre-fixing the VCMC to the console, and another for clamping the workpiece.

To guarantee safe operation of the VCMC, ensure the following:

- During installation, the clearance between the workpiece surface and the clamping disc must be no more than 6 mm. Caution: crushing hazard!
- Do not allow anyone to reach between the workpiece and the clamping disc during the lowering process.

When the operating vacuum is switched off and the vacuum circuit is vented, the clamping pressure of the clamping disc on the workpiece and of the VCMC on the table is released (with the K2, the workpiece and the VCMC are released in two separate steps).

The product is intended for industrial use.

Intended use includes observing the technical data and the installation and operating instructions in this manual.

2.2 Non-Intended Use

Schmalz accepts no liability for damages resulting from use other than as intended. In particular, the following are considered non-intended use:

- Use in potentially explosive atmospheres
- Use in medical applications

2.3 Personnel Qualifications

Unqualified personnel cannot recognize dangers and are therefore exposed to higher risks!

1. Task only qualified personnel to perform the tasks described in these Operating instructions.
2. The product must be operated only by persons who have undergone appropriate training.

These Operating instructions are intended for fitters who are trained in handling the product and who can operate and install it.

2.4 Workplace Requirements

The following requirements must be fulfilled to ensure a safe workplace:

- The VCMC may not be used outdoors.
- The type plate and warning signs must be legible.
- The surroundings of the VCMC must be dry.
- The operator must have a clear view of the whole working area, the workplace must be adequately lit and free of glare, and the area around the workplace must be clean and clear.

2.5 Emissions

The Mechanical clamp emits noise as a result of operating with vacuum.



CAUTION

Noise pollution from leakage

Hearing damage

- ▶ Correct position.
 - ▶ Wear ear protectors.
-

2.6 Modifications to the Product

Schmalz assumes no liability for consequences of modifications over which it has no control:

1. The product must be operated only in its original condition as delivered.
2. Use only original spare parts from Schmalz.
3. The product must be operated only in perfect condition.

3 Product Description

3.1 Description of Mechanical Clamp VCMC

3.1.1 Use

The VCMC is used for clamping dry, rigid workpieces. It may be used only in combination with suitable clamping consoles. The clamping force and stroke are powered by evacuation of the VCMC. Since the contact surface of the VCMC and the vacuum block are at the same height, you can clamp a workpiece in mixed operation as well.

3.1.2 The Clamping Unit

The optionally available clamping unit serves to mechanically pre-fix the VCMC to the vacuum console.

3.1.3 The Adjustment Mechanism

The VCMC is equipped with a quick-adjustment mechanism. It allows adjusting the clamping range in steps of 5 mm to conform to the workpiece.

3.1.4 Clamping the Workpiece

The clamping process differs for the VCMC versions K1 and K2.

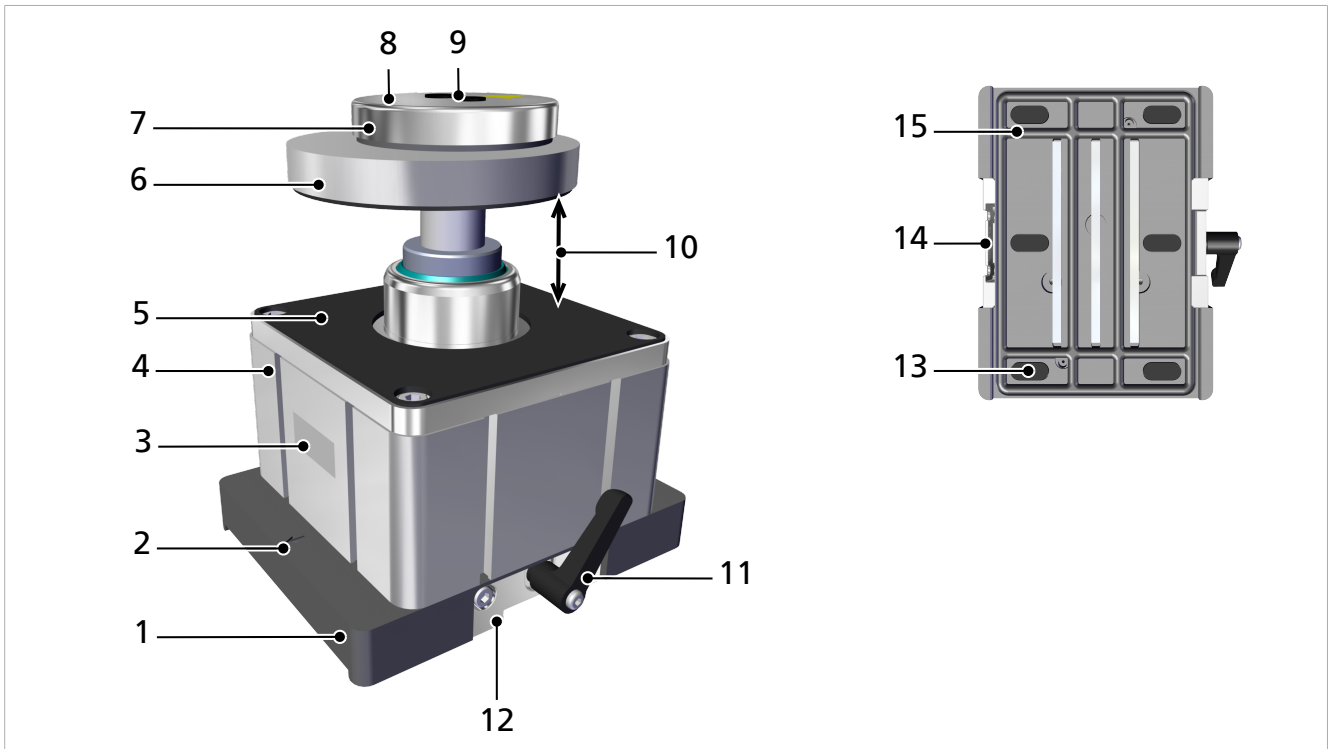
For the K1 version, the vacuum is activated by the superordinate machine (by evacuating the vacuum circuit on the clamping console).

- This clamps the VCMC to the clamping console and
- activates the lifting cylinder to clamp the workpiece.

For the K2 version, clamping is accomplished using two separate vacuum circuits. Evacuation proceeds as follows:

- The first vacuum circuit (offset from the center) is evacuated by the superordinate machine to clamp the VCMC to the clamping console.
- The second vacuum circuit (centered) is evacuated by the superordinate machine to activate the lifting cylinder and clamp the workpiece.

3.2 Design of Mechanical Clamp (VCMC)



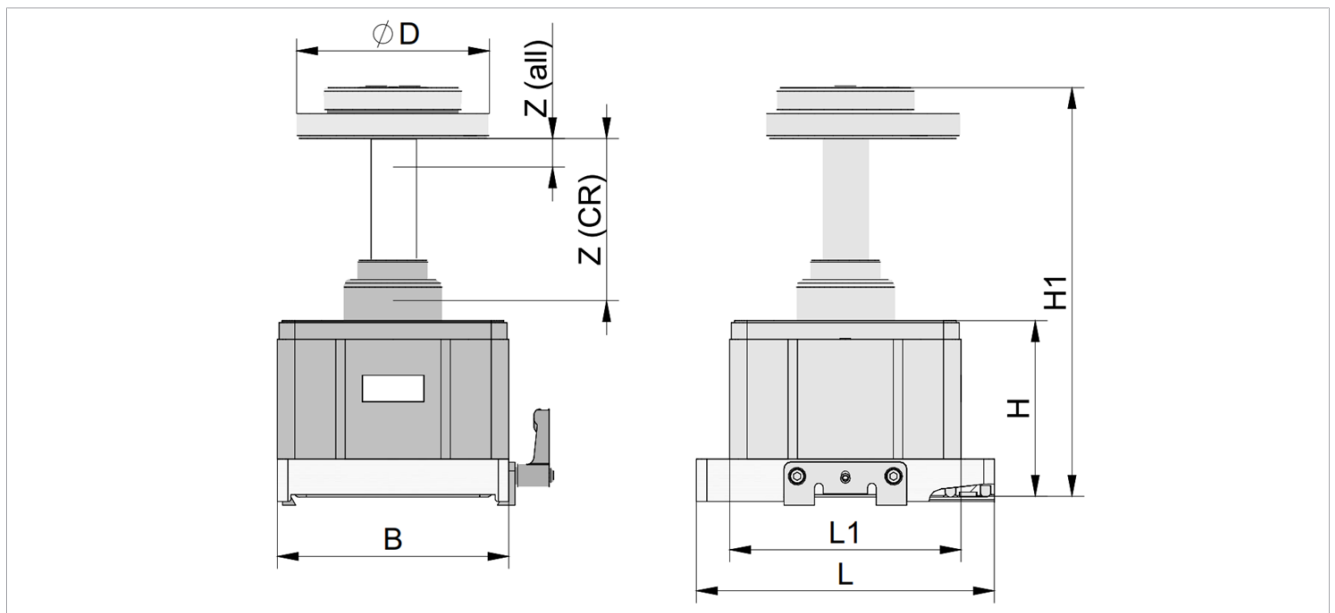
1	Supporting plate	2	System marking
3	Type plate	4	Housing
5	Clamping surface	6	Clamping disc
7	Locking disk	8	Turning direction label
9	Plugs (2x)	10	Clamping range
11	Optional: Clamping lever	12	Optional: Fixing flap
13	Friction disc (6x)	14	Optional: Fixing element
15	Sealing frame	—	—

4 Technical Data

4.1 General parameters

	Unit	Part no. 10.01.12.04104 (K1)	Part no. 10.01.12.04105 (K2)
Mass	kg	5.05	4.86
Stroke length Z (all)	mm	10	
Detent spacing	mm	5	
Clamping range Z	mm	10–100	
Minimum operating vacuum	bar	0.6	
Clamping force at 0.6 bar operating vacuum	N	600	

4.2 Dimensions



ØD	H	Z (CR)	B	Z (all)	L	L1	H1
110	100	90	128	10	170	132	232

All dimensions given in millimeters [mm].

5 Checking the Delivery

The scope of delivery can be found in the order confirmation. The weights and dimensions are listed in the delivery notes.

1. Compare the entire delivery with the supplied delivery notes to make sure nothing is missing.
2. Damage caused by defective packaging or occurring in transit must be reported immediately to the carrier and J. Schmalz GmbH.

6 Installation

6.1 Installation Instructions

The VCMC is designed for use on special vacuum clamping consoles with solenoid valves and an installation area of at least 115 x 170 mm. Accordingly, the clamping console must be at least 170 mm long.

A clamping unit is available as an option for use with clamping consoles with a special profile with a lateral contour. For detailed information, please contact J. Schmalz.

For safe installation, the following instructions must be observed:

1. Use only the connections, mounting holes and attachment materials that have been provided.
2. Carry out mounting and removal only when the device is in an idle, depressurized state.

6.2 Attaching the Mechanical Clamp to the Console



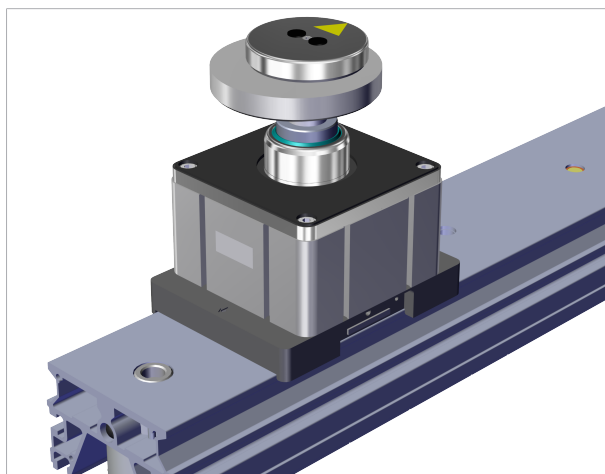
WARNING

The holding force is reduced by the presence of dirt or moisture, resulting in the workpiece being released.

Risk of injury from flying parts.

- ▶ Remove all dirt and moisture from the mechanical clamp and the clamping surface before attaching the clamp.
- ▶ Use suction equipment during the work process.

6.2.1 Series Design



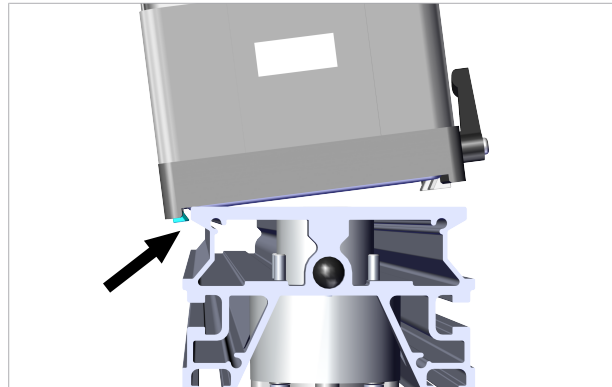
- ▶ Position the VCMC on the vacuum console over a vacuum opening.

- ⇒ The VCMC should be in full contact with the vacuum console and fitted over the side edges.
- ⇒ The solenoid valve integrated into the vacuum console (for the vacuum supply) is opened by the VCMC.

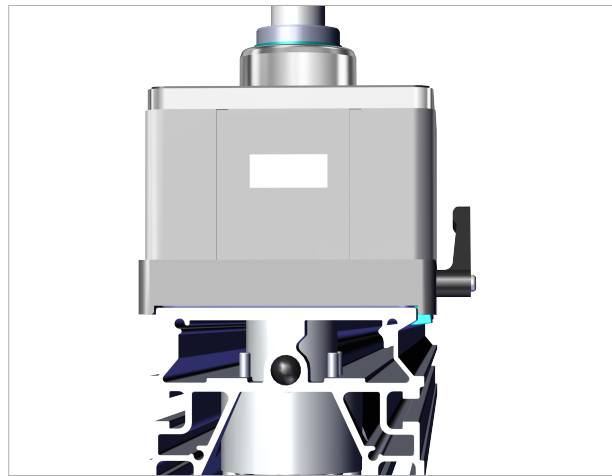
The VCMC is not fixed in place. Evacuating the vacuum channel of the console and thus the area between the VCMC and the vacuum console produces clamping force to clamp the VCMC in place.

6.2.2 Design with Additional Clamping Unit

1. Place the VCMC on the vacuum console aslant as shown in the picture. Ensure that the fixing element reaches underneath the bevel of the vacuum console.

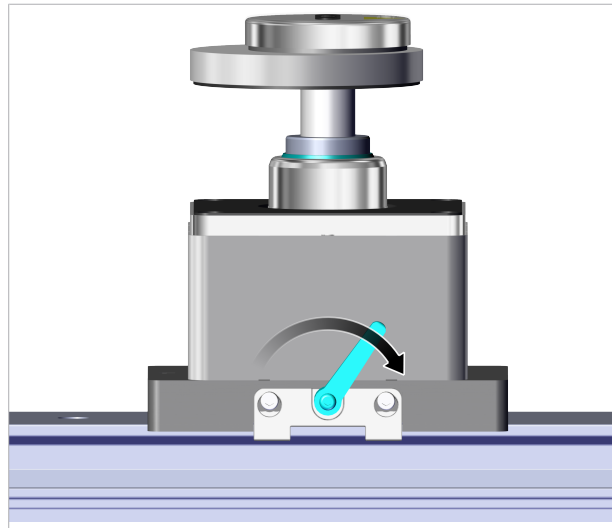


2. Swivel the VCMC onto the vacuum console and position it over a vacuum opening. If necessary, use the clamping lever to open the clamping unit so that the fixing flap fits over the edge of the vacuum console.



⇒ The solenoid valve integrated into the vacuum console (for the vacuum supply) is opened by the VCMC.

3. Tighten the clamping lever (hand-tight) to pre-fix the VCMC to the vacuum console.



6.3 Setting the Clamping Height



⚠ CAUTION

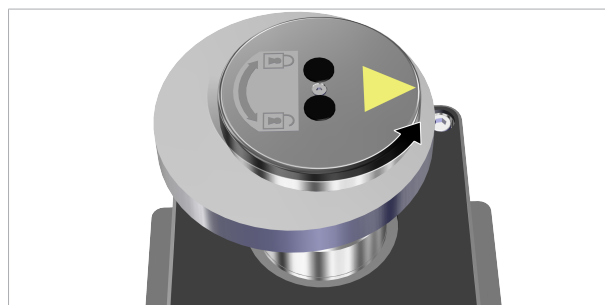
When the clamping disc is lowered, body parts may be present in the clamping range

Crushing of body parts

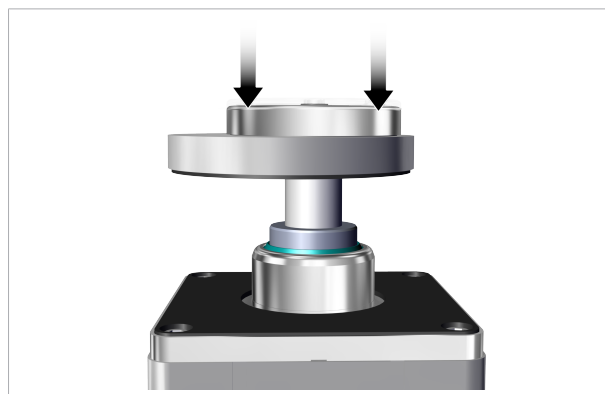
- ▶ Ensure that the clamping height is set so that the distance between the clamping disc and the workpiece is less than or equal to 6 mm.
- ▶ Do not reach into the clamping range while the clamping disc is being vacuum-lowered.

Adjust the VCMC to obtain the necessary clamping height:

1. **Opening the quick adjustment mechanism:** Turn the locking disc counterclockwise until the quick adjustment mechanism is completely opened.

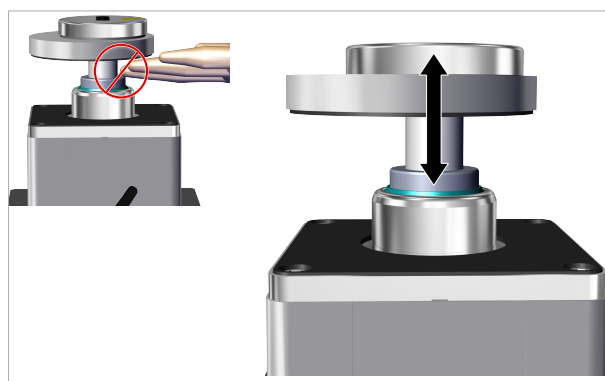


2. **Releasing the catch of the quick adjustment mechanism:** Clasp the clamping disc with both hands and press and hold the locking disc down by about 4 mm.



⇒ This releases the quick-locking mechanism.

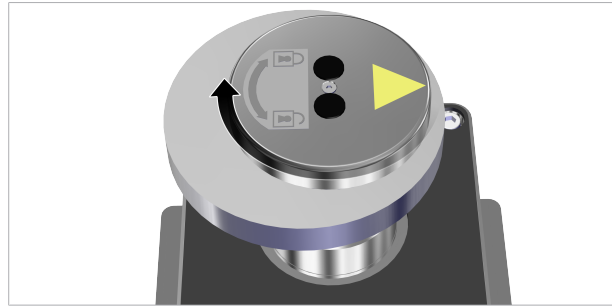
3. **CAUTION! When the clamping disc is adjusted downward, there is the risk of crushing fingertips in the area shown.** Adjust the clamping height as necessary and then release the locking disc. Ensure that the distance between the clamping disc and the workpiece is less than or equal to 6 mm. The adjustments can be made in steps of 5 mm.



⇒ The clamping disc is adjusted to the necessary clamping height.

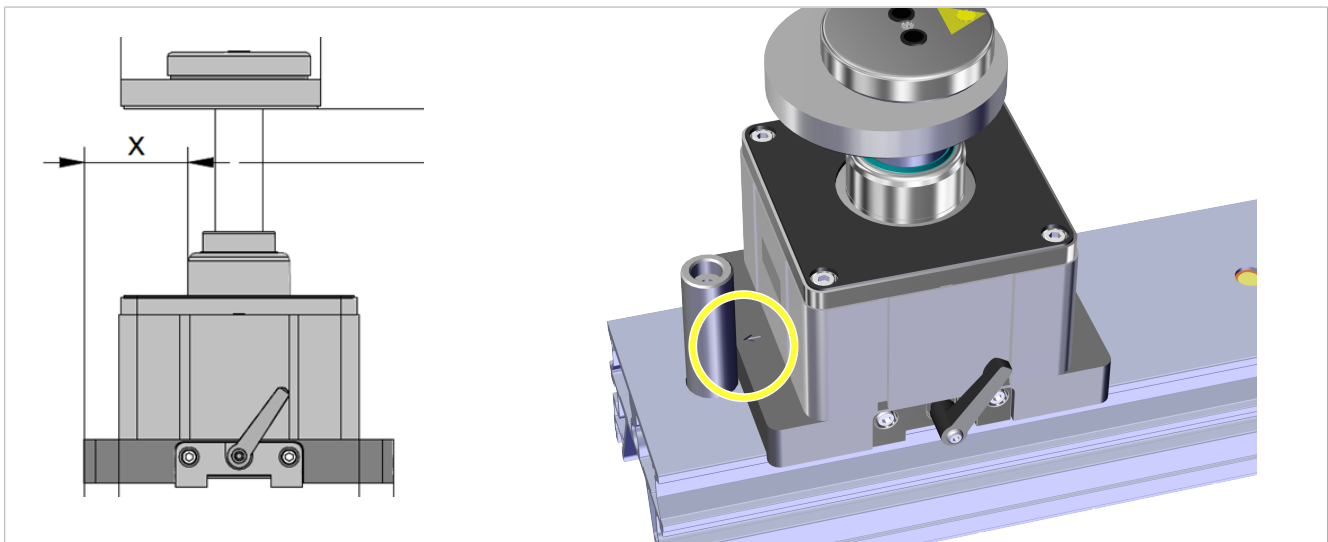
⇒ The quick adjustment mechanism is locked.

4. **Closing the quick adjustment mechanism:**
Turn the locking disc clockwise as far as possible and tighten (hand-tight) to close the quick adjustment mechanism.



- ⇒ The system is free of play.
- ⇒ The clamping height is set.
- ⇒ The VCMC is ready for use.

6.4 Using the Edge of the System



The VCMC is marked on one side of the supporting plate.

The positioning of this edge can be used to establish a set clearance distance to the workpiece (for example, aligning it with the stop cylinder ensures a set distance of 57.0 ± 0.1 mm).

7 Start of Operations

7.1 Pre-fixing the Mechanical Clamp on a Dual-circuit Vacuum Console

When used with a vacuum console with two vacuum circuits, the VCMC is pre-fixed to the console by evacuating the first vacuum circuit. During this process, initially only a part of the clamping surface is evacuated.

7.2 Clamping the Workpiece



⚠ CAUTION

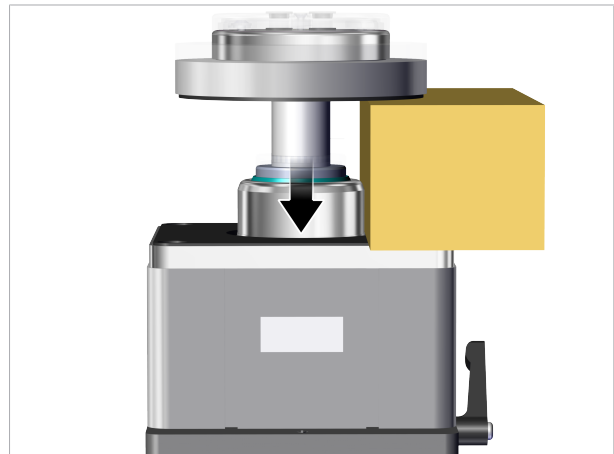
When the clamping disc is lowered, body parts may be present in the clamping range

Crushing of body parts

- ▶ Ensure that the clamping height is set so that the distance between the clamping disc and the workpiece is less than or equal to 6 mm.
- ▶ Do not reach into the clamping range while the clamping disc is being vacuum-lowered.

- ✓ The locking disc must be entirely closed.
- ✓ The workpiece is set.

1. Evacuate the appropriate vacuum circuit of the clamping console via the higher-level machine.



- ⇒ For vacuum consoles with a single vacuum circuit (K1), the VCMC is clamped to the console at the same time that the workpiece is clamped by lowering the clamping disc.
- ⇒ For vacuum consoles with two vacuum circuits (K2), the workpiece is clamped to by lowering the clamping disc.

2. Carry out both a visual and manual check to make sure that the workpiece is securely clamped by pulling on the workpiece.

- ⇒ If the workpiece can be moved, then it is not sufficiently tightly clamped. Readjust the clamping height.
- ⇒ If the clamping is sufficient, then machining of the workpiece may commence.

7.3 Machining Limitations



WARNING

The workpiece comes loose during machining and is flung away by the machine.

Risk of injury from flying parts.

- ▶ Ascertain the maximum machining parameters and observe them.
-

The clamping force is limited, meaning that it can withstand machining forces only up to a certain point. Accordingly, the operator of the mechanical clamp is obligated to establish for themselves (by experiment, slowly and carefully increasing the machining forces) the optimal settings and number of mechanical clamps necessary to ensure that the workpiece does not slip or even come loose during the machining process.

Schmalz assumes no liability for damages resulting from slippage or release of workpieces due to faulty adjustment of machining parameters.

7.4 Releasing the Workpiece



CAUTION

Falling objects resulting from the workpiece being released (deactivation of the vacuum)

Risk of injury

- ▶ Personal protective clothing must be worn.
-

Deactivating the vacuum, i.e. reducing it to atmospheric pressure, results in the workpiece being unclamped and the VCMC being released from the vacuum console (with the K2 design, unclamping the workpiece and releasing the VCMC from the vacuum console are two separate steps). The clamping disc is raised by spring force.

8 Warranty

Schmalz guarantees this system pursuant to our General Terms and Conditions of Sale and Delivery. The same applies to spare parts, provided that these are original parts supplied by us.

Wearing parts are not covered by the warranty.

9 Spare and wearing parts

Part no.	Type	Designation	Part type
10.01.12.04262	SPAN-TELL 110x31 EXZ VCMC	Clamping disc	Spare part
10.01.12.02191	VCDR 166x113x6.6 VCSP	K2 foam sealing frame	Wearing part
10.01.12.03629	VCDR 166x113x6.6 VCBL-K1	K1 foam sealing frame	Wearing part
10.01.12.04010	SCHE 12-7x3.25 POM	Disc with collar	Spare part

10 Accessories

Part no.	Type	Designation	Note
10.01.12.04255	KLEM-EINH 70x24.5x4.5 VCMC	Clamping unit	Contains: Clamping lever, fixing element and flap
10.01.12.04008	BEF-PL 70x64.5x12.5 VCMC	Mounting plate	For positioning aid

11 Disposing of the Product



⚠ CAUTION

Flying parts resulting from opening the mechanical clamp and releasing the spring
Serious injury!

- ▶ Open the mechanical clamp and carefully allow the integrated spring to slacken slowly.
-

Recover the disassembled parts for recycling or reuse (provided no agreement on return or disposal has been made).

1. Dispose of the product properly after replacement or decommissioning.
2. Observe the country-specific guidelines and legal obligations for waste prevention and disposal.

12 Declarations of Conformity

12.1 EU Declaration of Conformity

The manufacturer Schmalz confirms that the product described in these instructions fulfills the following applicable EU directives:

2006/42/EC	Machinery Directive
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The following harmonized standards were applied:

EN ISO 12100	Safety of machinery — General principles for design — Risk assessment and risk reduction
EN ISO 19085-1	Woodworking machines -- Safety requirements -- Part 1: Common requirements
EN ISO 19085-3	Woodworking machines -- Safety requirements -- Part 3: Numerically controlled (NC) boring and routing machines



The EU Declaration of Conformity valid at the time of product delivery is delivered with product or made available online. The standards and directives cited here reflect the status at the time of publication of the operating and assembly instructions.

12.2 UKCA Declaration of Conformity

The manufacturer Schmalz confirms that the product described in these operating instructions fulfills the following applicable UK regulations:

2008	Supply of Machinery (Safety) Regulations
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The following designated standards were applied:

EN ISO 12100	Safety of machinery — General principles for design — Risk assessment and risk reduction
EN ISO 19085-1	Woodworking machines -- Safety requirements -- Part 1: Common requirements
EN ISO 19085-3	Woodworking machines -- Safety requirements -- Part 3: Numerically controlled (NC) boring and routing machines



The Declaration of Conformity (UKCA) valid at the time of product delivery is delivered with the product or made available online. The standards and directives cited here reflect the status at the time of publication of the operating and assembly instructions.

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