

Operating instructions

Mechanical Clamp VCMC K1/K2 QUICK

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.

Published by

© J. Schmalz GmbH, 08/22

This document is protected by copyright. J. Schmalz GmbH retains the rights established thereby. Reproduction of the contents, in full or in part, is only permitted within the limits of the legal provisions of copyright law. Any modifications to or abridgments of the document are prohibited without explicit written agreement from J. Schmalz GmbH.

J. Schmalz GmbH · Johannes-Schmalz-Str. 1 · 72293 Glatten, Germany · T: +49 7443 2403-0
schmalz@schmalz.de

Contents

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

12 Declarations of Conformity	17
12.1 EU Declaration of Conformity	17
12.2 UKCA Declaration of Conformity	17

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 injuries!
- ⇒ Schmalz is not liable for damage or malfunctions that result from failure to heed these instructions.

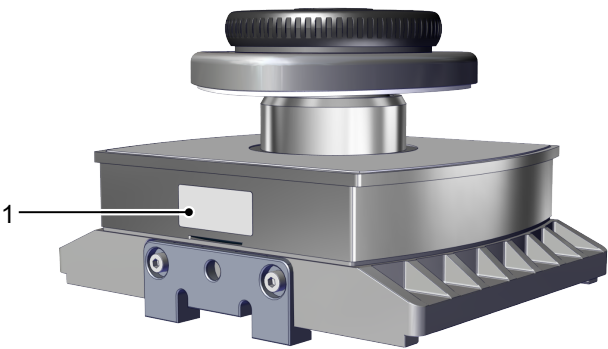
If you still have questions after reading the technical documentation, contact Schmalz Service at: www.schmalz.com/services

1.3 Type Plate

The type plate (1) is permanently attached to the product at the location shown and must always be clearly legible.

It contains important information about the product:

- Part sales designation/type
- Part number
- Serial number
- Coded date of manufacture
- Permitted pressure range



Please specify all the information above when ordering replacement parts, making warranty claims or for any other inquiries.

1.4 Warnings in This Document

Warnings warn against hazards that may occur when handling the product. The signal word indicates the level of danger.

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.

1.5 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 Safety



⚠ CAUTION

Noise pollution from leakage

Hearing damage

- ▶ Correct position.
- ▶ Wear ear protectors.



⚠ CAUTION

Falling product

Risk of injury

- ▶ Securely attach the product at the site of operation.
- ▶ Wear safety shoes (S1) and safety glasses when handling and mounting/dismounting the product.

2.2 Intended Use

The mechanical clamp VCMC K1/K2 is used for clamping dry, rigid workpieces onto vacuum clamping consoles. It may be used only in combination with suitable vacuum clamping consoles. The VCMC is to be installed by the customer.

The VCMC K1 is pre-fixed to the console with fixing flaps in order to prevent it from falling (available as an option with the K2). Switching on the operating vacuum fixes the VCMC K1 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 on the workpiece is released and the VCMC-K1 is released from the table. With the VCMC-K2, the workpiece and the VCMC are released in two separate steps.

The product is built in accordance with the latest standards of technology and is delivered in a safe operating condition; however, hazards may arise during use.

The product is intended for industrial use.

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

2.3 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

2.4 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.

2.5 Workplace Requirements

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

- The Mechanical clamp must not be used outdoors.
- The type plate and warning signs must be legible.
- The surroundings of the Mechanical clamp 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.

2.6 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 vacuum 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 optional clamping unit serves to mechanically pre-fix the VCMC to the vacuum clamping 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.

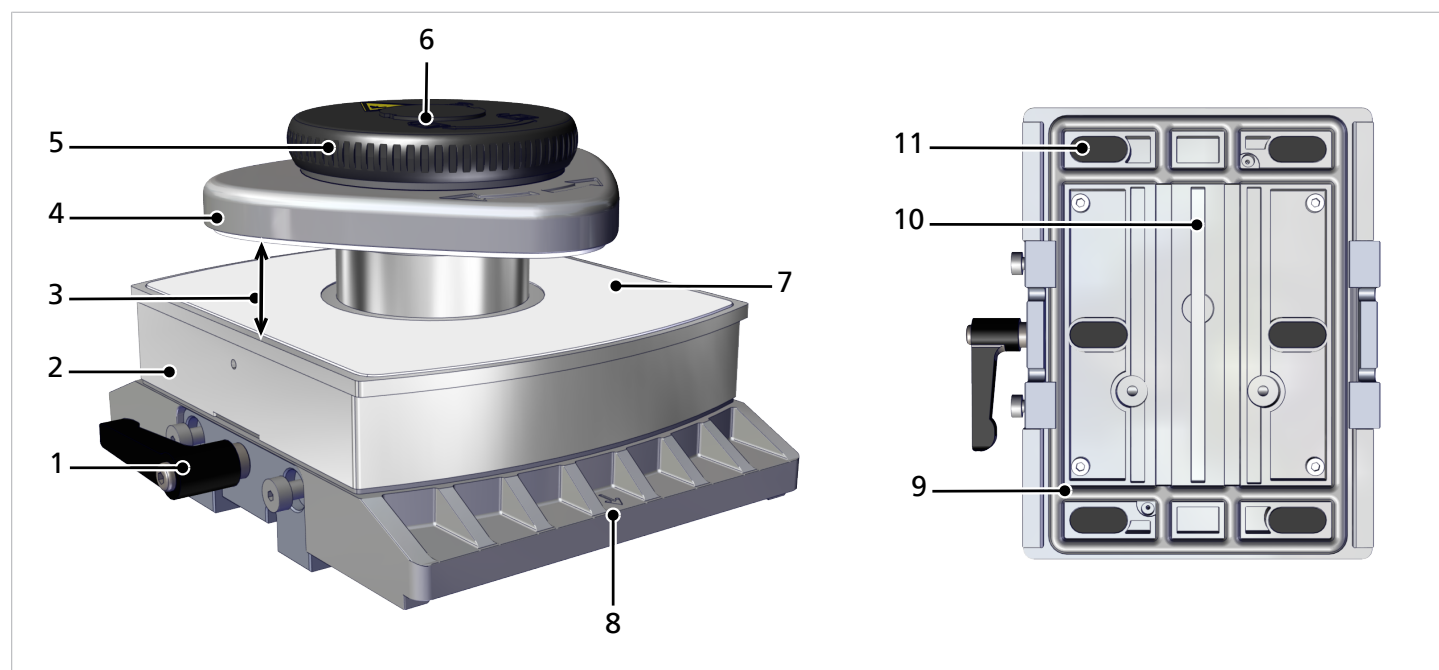
For the K1 version, the vacuum is activated by the superordinate machine (by evacuating the vacuum circuit on the vacuum clamping console).

- This clamps the VCMC to the vacuum 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 vacuum 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 | Clamp (optional) |
| 3 | Clamping range |
| 5 | Locking disk |
| 7 | Clamping surface |
| 9 | Sealing frame |
| 11 | Friction disc (6x) |

- | | |
|----|----------------|
| 2 | Main body |
| 4 | Clamping disc |
| 6 | NFC interface |
| 8 | System marking |
| 10 | Metal insert |

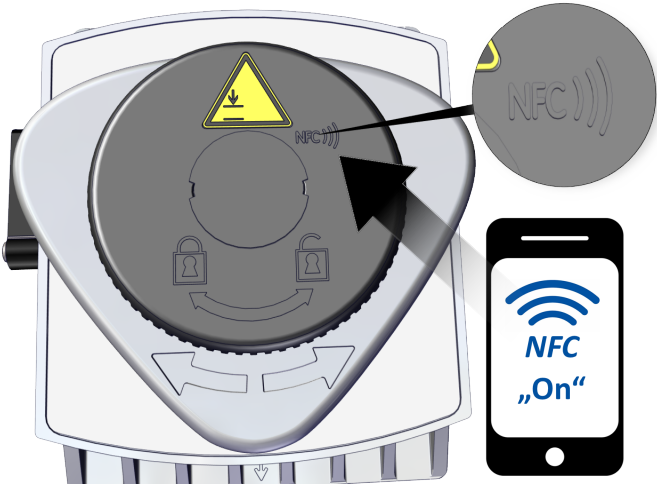
3.3 Near Field Communication (NFC)

NFC (Near Field Communication) refers to a standard for wireless data transfer between different devices over short distances.

An NFC chip is integrated in the locking disc, which functions as a passive NFC tag that can be read or written by a read or write device with NFC enabled, such as a smartphone or tablet.

Read access only can be obtained via a website viewed in a browser. This does not require an additional app. It requires only that NFC and the internet connection are enabled.

For the best data connection, center the reading device on the NFC symbol.



The reading distance is very short for NFC applications. If necessary, find the position of the NFC antenna in the reading device used.

The following parameters can be queried via NFC:

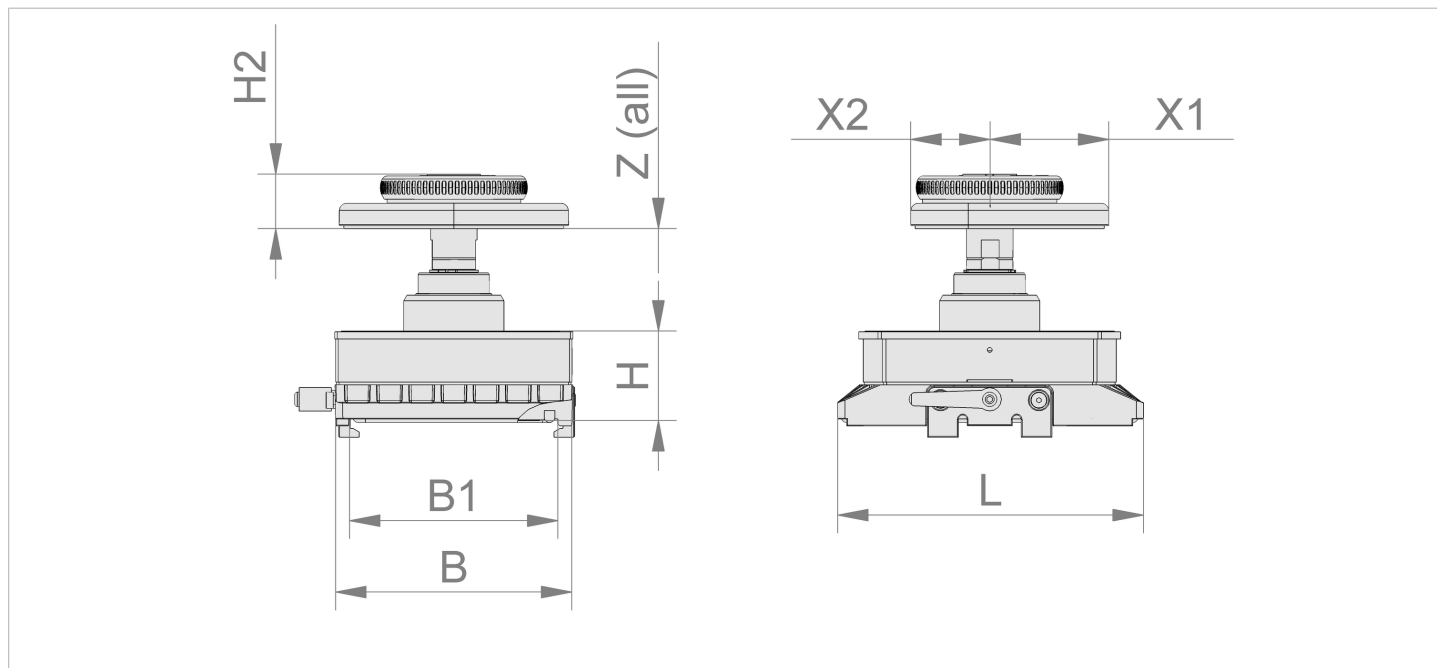
- Product group
- Type
- Part number
- Index
- Serial number
- Year of manufacture (encoded)

4 Technical Data

4.1 General parameters

Stroke length Z (all)	9 mm
Detent spacing	5 mm
Clamping range Z	15 to 50 mm & 50 to 85 mm
Minimum operating vacuum	0.6 bar
Clamping force at 0.6 bar operating vacuum	600 N
Mass of 10.01.12.04692	5.6 kg
Mass of 10.01.12.04693	5.5 kg
Mass of 10.01.12.04745	6.4 kg
Mass of 10.01.12.04746	7.2 kg

4.2 Dimensions



Part no.	H	H2	B	B1	Z (all)	L	X1	X2
10.01.12.04692	50	30.5	133	116.5	9	171	66.5	44
10.01.12.04693	50							
10.01.12.04745	75							
10.01.12.04746	85							

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 vacuum 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



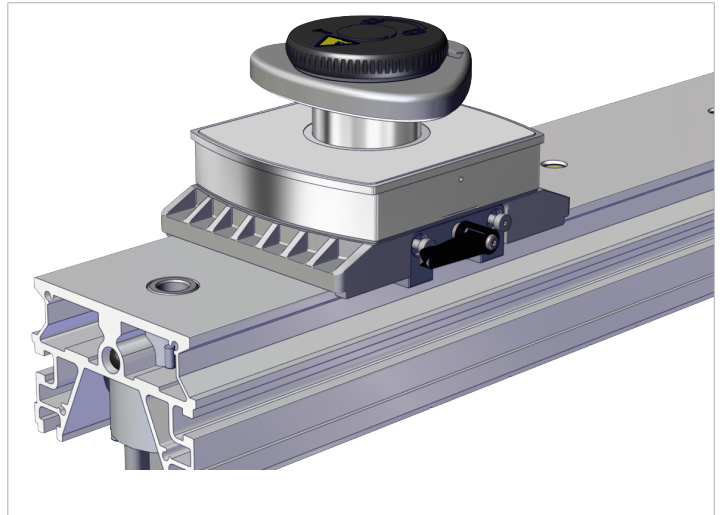
WARNING

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



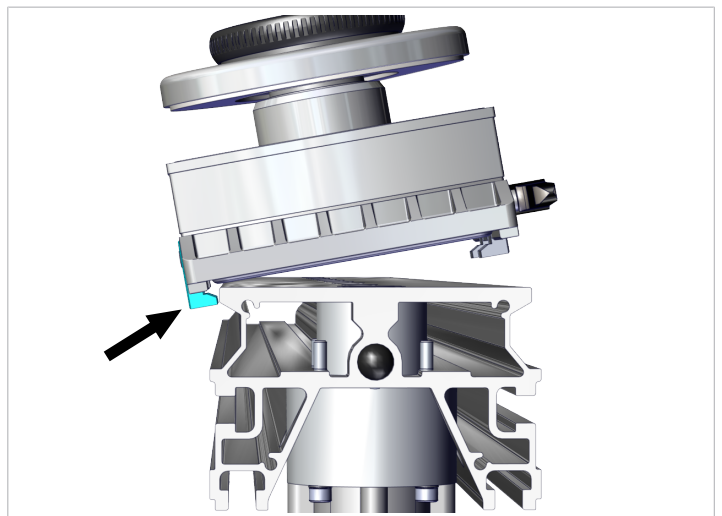
- ▶ Position the VCMC on the vacuum clamping console over a vacuum opening.

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

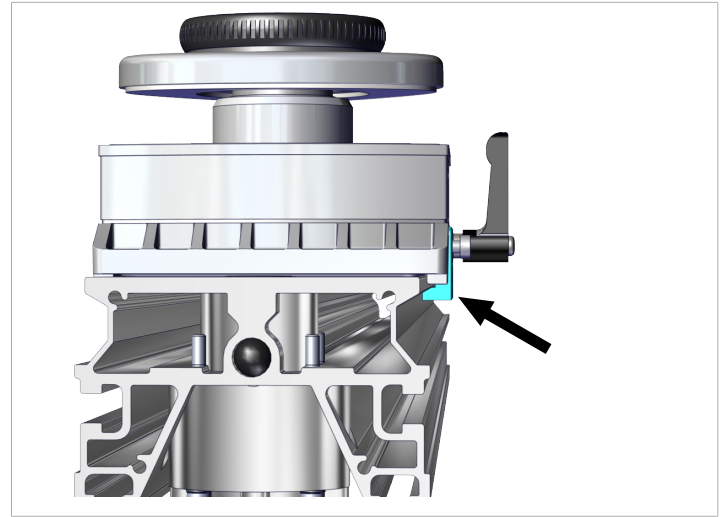
The VCMC is not fixed in place. Evacuating the vacuum channel of the console and thus the area between the VCMC and the vacuum clamping console produces a clamping force to clamp the VCMC in place.

6.2.2 Design with Additional Clamping Unit

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

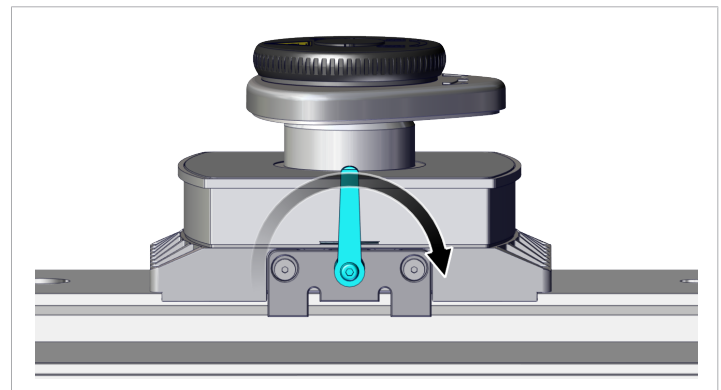


2. Swivel the VCMC onto the vacuum clamping console and position it over a vacuum opening. If necessary, use the clamping lever to open the clamping unit so that the fixing flap fits over the edge of the vacuum clamping console.



⇒ The solenoid valve integrated into the vacuum clamping 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 clamping 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

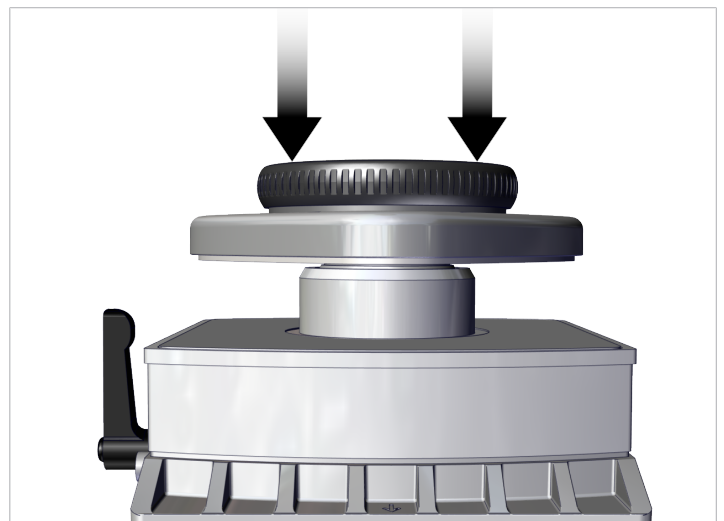
- ▶ Ensure that the clamping height is set so that the distance between the clamping disc and the workpiece is less than or equal to 6 mm.
- ▶ Do not reach into the clamping range while the clamping disc is being vacuum-lowered.

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.



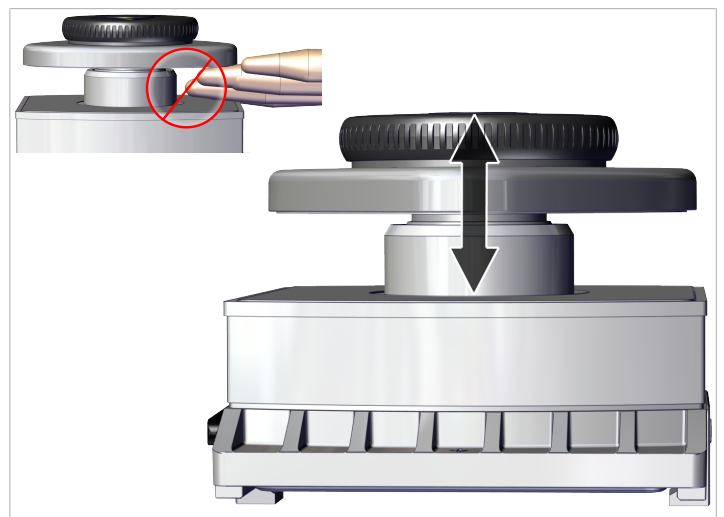
2. **Releasing the catch of the quick adjustment mechanism:** Clasp the clamping disc with both hands and press and hold the locking disc down by about 4 mm.



⇒ 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 Changing the Clamping Range

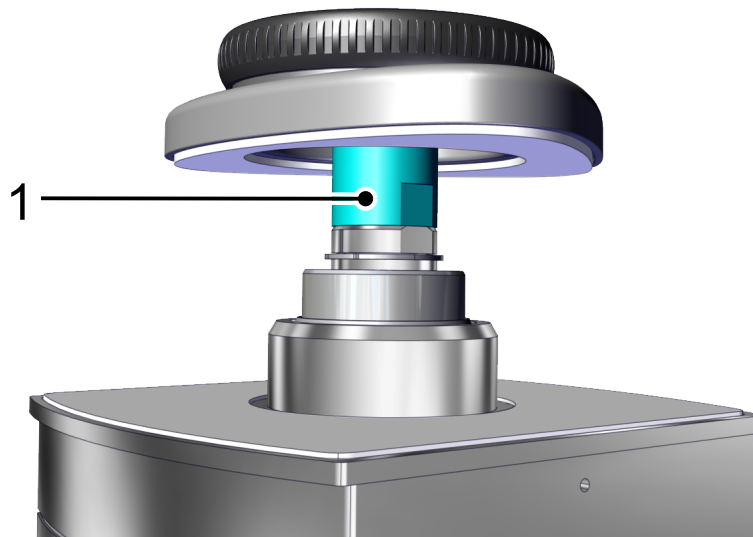


⚠ CAUTION

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.



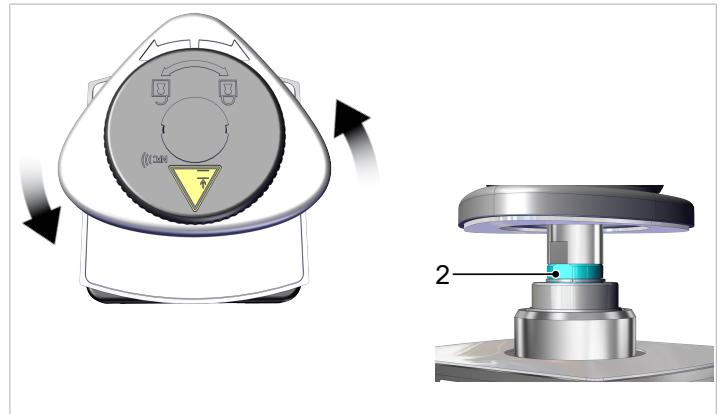
The VCMC QUICK is delivered as standard with the extension (1) mounted.

The clamping range:

- With the extension is 50 to 85 mm
- Is reduced to 15 to 50 mm when the extension is removed

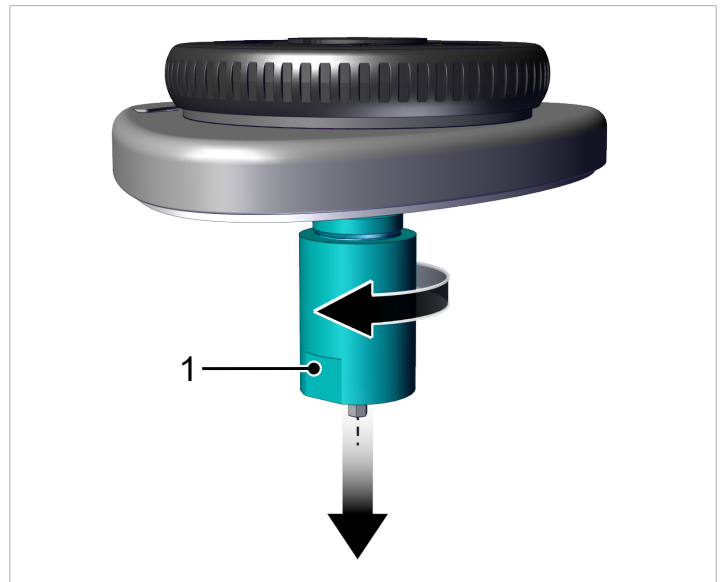
The following steps are required to remove the extension (1):

1. **Important:** Close the quick adjustment mechanism up to the stop (see section "Setting the Clamping Height, step 4").
2. Turn the complete clamping disc counterclockwise. While doing so, fix the piston rod (2) to the hexagonal mid section using a size 24 open-ended wrench (SW24).



⇒ The clamping disc with the screwed-on extension (1) is released.

3. Use a size 24 open-ended wrench to turn the extension (1) counterclockwise and remove it from the clamping disc.



4. Screw the clamping disc clockwise onto the clamp.
5. Open the quick adjustment mechanism (see step 1 above).
6. For the next steps, see section "Setting the Clamping Height, steps 2–4".

7 Start of Operations

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

When used with a vacuum clamping 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.



WARNING

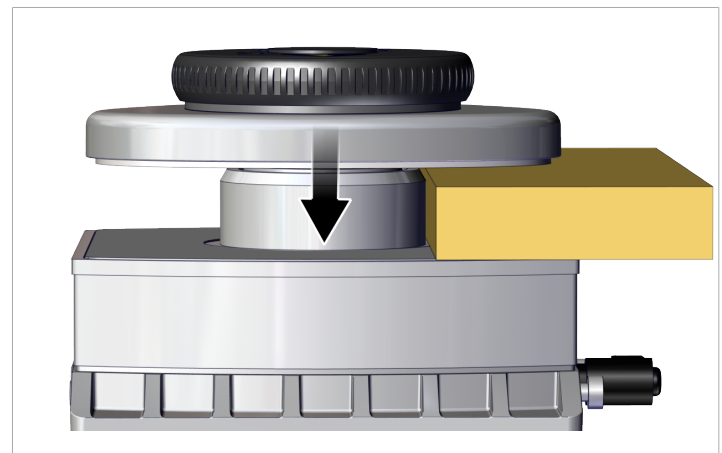
Flying workpiece due to insufficient clamping force during processing resulting from incorrect setting of the clamping height.

Risk of injury due to flying workpiece

- ▶ Adjust the clamping height such that the VCMC uses its maximum clamping force. While doing so, ensure that the lifting force of the VCMC is less than or equal to 6 mm.
- ▶ Personal protective clothing must be worn.

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

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



- ⇒ For vacuum clamping 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 (≤ 6 mm).
 - ⇒ For vacuum clamping consoles with two vacuum circuits (K2), the workpiece is clamped by lowering the clamping disc (≤ 6 mm).
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. Check the clamping height and adjust it if necessary.
 - ⇒ 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 the level of the atmospheric pressure, results in the workpiece being unclamped and the VCMC being released from the vacuum clamping console (with the K2 design, unclamping the workpiece and releasing the VCMC from the vacuum clamping 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
10.01.12.04740	SPAN-TELL 128x30 EXZ VCMC	Clamping disc	Spare part
10.01.12.04374	VRL-S M20x1x40.3	Extension with hex head	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 Accessories

Part no.	Type	Designation	Note
10.01.12.04255	KLEM-EINH 70x24.5x4.5 VCMC-K2	Clamping unit	Contains: Clamping lever, fixing element and flap
10.01.12.04008	BEF-PL 70x64.5x12.5 VCMC	Mounting plate	For positioning aid
10.01.12.04835	KLEM-EINH 69.5x28.5x12.5 VCMC-K1	Clamping unit	Contains: Clamping lever, fixing element and flap

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).

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
------------	---------------------

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
------	------------------------------------------

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.