



## Quick-Change Module RMQC | End-of-Arm Ecosystem MATCH

# Operating instructions

### 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

<b>1</b>	<b>Important Information .....</b>	<b>4</b>
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
<b>2</b>	<b>Fundamental Safety Instructions .....</b>	<b>5</b>
2.1	Intended Use.....	5
2.2	Non-Intended Use .....	5
2.3	Personnel Qualifications .....	5
2.4	Modifications to the Product.....	5
<b>3</b>	<b>Product description .....</b>	<b>6</b>
3.1	Product Variants .....	6
3.2	Product Design .....	6
3.3	Description of Functions .....	7
3.4	LED Display .....	7
3.5	Connect LED.....	8
3.6	Manual Robot Soft-Switch (Option).....	8
<b>4</b>	<b>Technical Data .....</b>	<b>8</b>
4.1	Tool-Changer-Specific Data .....	8
4.2	Technical Data .....	9
4.3	Maximum Forces and Torques.....	10
4.4	Dimensions.....	10
<b>5</b>	<b>Transport and Storage.....</b>	<b>12</b>
5.1	Checking the Delivery .....	12
5.2	Unpacking the Device .....	12
5.3	Transport / Storage / Preservation .....	12
<b>6</b>	<b>Installation.....</b>	<b>13</b>
6.1	General Mounting Information.....	13
6.2	Mounting .....	14
6.3	Mounting of the Variant with an Intermediate Flange.....	14
6.4	Mounting the Energy Supply.....	15
6.4.1	"IO-Link" RMQC part no. 10.08.09.00006 and 10.08.09.00007 .....	16
6.4.2	"IO-Link" RMQC Part No. 10.08.09.00010 .....	16
6.4.3	RMCQ part no. 10.08.09.00001 and part no. 10.08.09.00002 .....	17
6.4.4	RMQC part no. 10.08.09.00003 .....	17
6.4.5	RMQC part no. 10.08.09.00004 .....	18
6.4.6	RMQC part no. 10.08.09.00005 .....	18
6.5	Connecting an External SCM (Optional) .....	18
6.6	Static Electricity .....	19
<b>7</b>	<b>Maintenance and Cleaning .....</b>	<b>19</b>
7.1	Safety Instructions for Maintenance .....	19
7.2	Maintenance.....	20

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<b>8 Accessories .....</b>	<b>20</b>
<b>9 Taking the Product Out of Operation and Disposal.....</b>	<b>20</b>
<b>10 EC Conformity .....</b>	<b>21</b>

# 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:

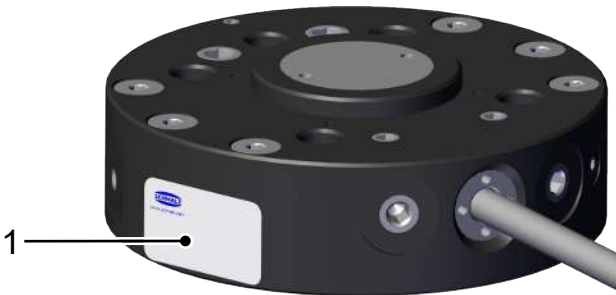
[www.schmalz.com/services](http://www.schmalz.com/services)

## 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
- CE label
- QR code



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 Intended Use

The quick-change module RMQC | end-of-arm ecosystem MATCH is mounted on a handling system (robot). It is used to hold a loose member with an appropriate gripper.

The product was specially developed for (cooperative/collaborative) use on robot systems in combination with the quick-change system MATCH.

The intended use of the product is for time-limited gripping, handling and holding in enclosed spaces. It must always be mounted on heat-dissipating materials.

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 does not accept any liability for any direct or indirect losses or damages that result from using the product. This applies, in particular, to any use of the product that is not in accordance with the intended purpose and to any use that is not described or mentioned in this documentation.

The use of the product under extreme conditions (for example, with abrasive fluids or dusts) requires the prior approval of Schmalz.

In particular, the following are considered non-intended use:

1. Use in potentially explosive atmospheres
2. Direct contact with perishable goods/food products

### 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 Modifications to the Product

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

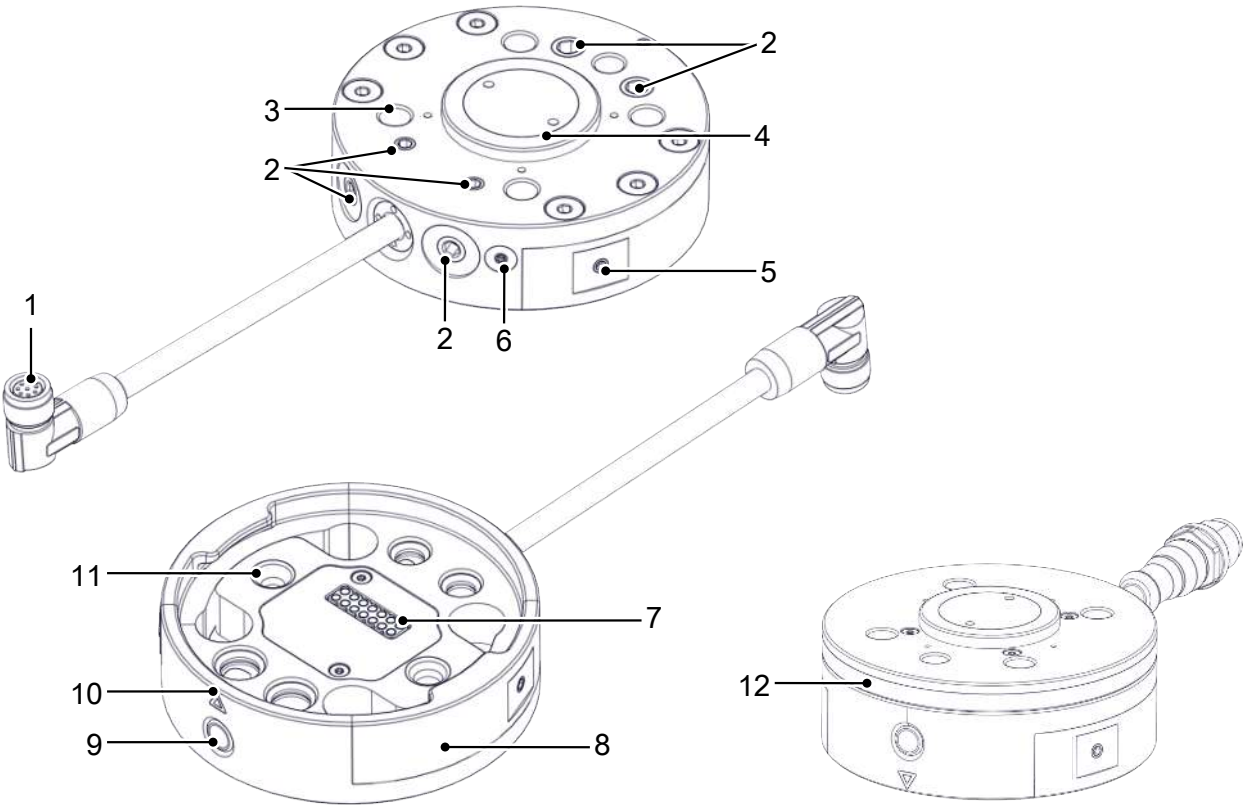
1. The product must be operated only in its original condition as delivered.
2. Use only original spare parts from Schmalz.
3. The product must be operated only in perfect condition.

### 3 Product description

#### 3.1 Product Variants

Schmalz part no.	Zimmer Group part no.	Model
10.08.09.00001	LWR50F-01-02-A	Digital I/O UR3E,UR5E,UR10E,UR16E
10.08.09.00002	LWR50F-07-01-A	Digital I/O HANWHA HCR3/5/12
10.08.09.00003	LWR50F-10-01-A	Digital I/O DOOSAN M, A and H series
10.08.09.00004	LWR50F-04-01-A	Digital I/O Techman TM5
10.08.09.00005	LWR50F-09-01-A	Digital I/O Fanuc CRX
10.08.09.00006	LWR50F-00-04-A	IO-Link, ISO TK 50
10.08.09.00007	LWR50F-00-05-A	IO-Link, with LED ring ISO TK 50
10.08.09.00010	LWR50F-01-03-A	RS485 + LED UR3E,UR5E,UR10E,UR16E

#### 3.2 Product Design



1	Robot/fixed component energy supply (connection may differ from the illustration)	2	Optional: pneumatic connection
3	4x mounting hole for M6 DIN912 (robot-side)	4	Positioning on the robot
5	Mounting option for cable strain relief device/ cable holder, 2x	6	Mounting option for grounding
7	Contact surface/contact pad spring pin	8	Locking device
9	Connect LED/optional: robot soft-switch (freedrive)	10	Marking to aid alignment
11	RMQC positioning bracket for loose member, 2x	12	Optional: LED ring

### 3.3 Description of Functions

The product is mounted on a handling system (robot). It is used to hold a loose member with an appropriate gripper.

The loose member interlocks itself with the product as it automatically extends from the drop-off station; alternatively, the loose member can be attached to the product manually. There is a connect signal between the fixed component and the loose member.

When the fixed component and loose member move together, the internal spring pin contacts make contact to transmit a signal. The connect LED then changes color from red to green and (depending on the variant) a connect signal is transmitted to the higher-level controller.

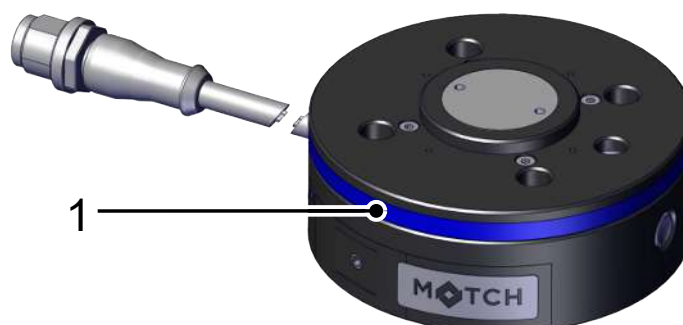
The product can be operated with a multitude of different loose members and their grippers. One requirement for doing so is that the loose member is compatible with the relevant connection options.

Since the centering bolts and markings on the loose members come in different sizes, the fixed component cannot be mounted the other way around.

The product has a hot-plug function that allows a loose member to be changed even when an electrical voltage is present.

The loose member is designed to prevent incorrect insertion into the drop-off station.






### 3.4 LED Display



The version with IO-Link with part no. 10.08.09.00007 includes an LED ring (1).

The version with IO-Link with part no. 10.08.09.00018 includes an LED ring (1).

The colors of the LED ring (1) provide information about the status of the IO-Link devices in the loose member. The LED ring (1) provides a 360° status display.

LED color		Behavior	SCHMALZ IO-Link product status	Zimmer IO-Link product status
—	None	—	No power supply	
	Red	Flashing	No connection to the IO-Link device	
		Continuous light	Fault	
	White	Flashing	Unknown IO-Link device	
	Orange	Continuous light	Condition Monitoring Warning	—
	Green	Continuous light	Workpiece picked up (vacuum > H2)	Taught-in workpiece gripped
	Blue	Continuous light	Default status: gripper has voltage and is "ready for operation" (vacuum < H2)	Gripper is in end position or no taught-in part gripped

3.5 Connect LED

The colors of the Connect LED (1) provide information about the status of the power supply and coupling.



LED color		Behavior	Status
—	None	—	No power supply
<div></div>	Red	Continuous light	Loose member not coupled
<div></div>	Green	Continuous light	Loose member coupled

3.6 Manual Robot Soft-Switch (Option)

The manual soft-switch is available only in DIO mode if the relevant robot supports this function (apart from during execution with IO-Link).

The product is equipped with a “freedrive” button (1) for manual robot soft-switches.

You must follow the steps below to manually teach in the robot position:

1. Press the “freedrive” button (1) to soft-switch the robot.  
⇒ The robot can be moved manually.
2. Move the robot to the desired position with the product.
3. Release the “freedrive” button (1) again when the desired position is reached.  
⇒ The robot and product remain in position.  
⇒ To “teach” or activate the robot and product position in the control, refer to the information from the robot manufacturer.  
⇒ Detailed technical specifications for activation are provided in the information from the robot manufacturer.



4 Technical Data

4.1 Tool-Changer-Specific Data

Electrical energy transmission	Integrated
Interlocking hub	1 mm
Repeatability in X, Y	0.05 mm
Repeatability in Z	0.05 mm
Tightening force	50 N
Releasing force	0 N
Max. axis offset during coupling in X, Y	1.0 mm



## 4.2 Technical Data

	10.08.09.00006	10.08.09.00007	10.08.09.00001	10.08.09.00010
Suitable for robot type	ISO TK 50 <sup>1)</sup>		Universal robots	
Electrical connection	Standard IO-Link M12-5 socket		—	
Interface configuration	—			Ethernet RJ45
Control	IO-Link		Digital I/O	RS485
Connection flange in accordance with EN ISO 9409-1	TK 50			
Status display	—	Yes	—	Yes
Maximum handling weight	25 kg			
Connection thread	M12		M8	
Number of contacts	5		8	
Connection type	Plug		Socket	
Pneumatic energy transmission	Integrated			
Operating temperature	5 to 60° C			
Service life in cycles	100,000			
Degree of protection in accordance with IEC 60529	IP40			
Mass	0.26 kg	0.3 kg	0.26 kg	0.4 kg

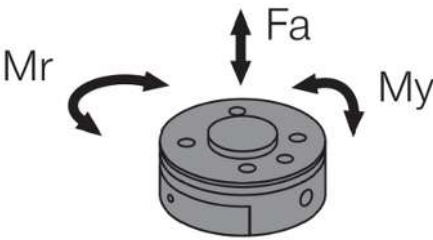
Part no.	10.08.09.00002	10.08.09.00005	10.08.09.00003	10.08.09.00004
Suitable for robot type	HANWHA HCR-3/-5/-12 <sup>2)</sup>	FANUC CRX	DOOSAN M, A and H-series	Techman TM5
Control	Digital I/O			
Connection flange in accordance with EN ISO 9409-1	TK 50			
Maximum handling weight	25 kg			
Connection thread	M8			
Number of contacts	8			
Connection type	Socket		Plug	
Pneumatic energy transmission	Integrated			
Operating temperature	5 to 60° C			
Service life in cycles	100,000			
Degree of protection in accordance with IEC 60529	IP40			
Mass	0.26 kg	0.26 kg	0.29 kg	0.6 kg
Maximum permissible current				2 A continuous, 3 A peak
Permissible voltage range 24 V ±				24 V ±10%
Switching output				NPN

<sup>1)</sup> Mechanical connection compatible with all robots with ISO TK 50 mm flange.

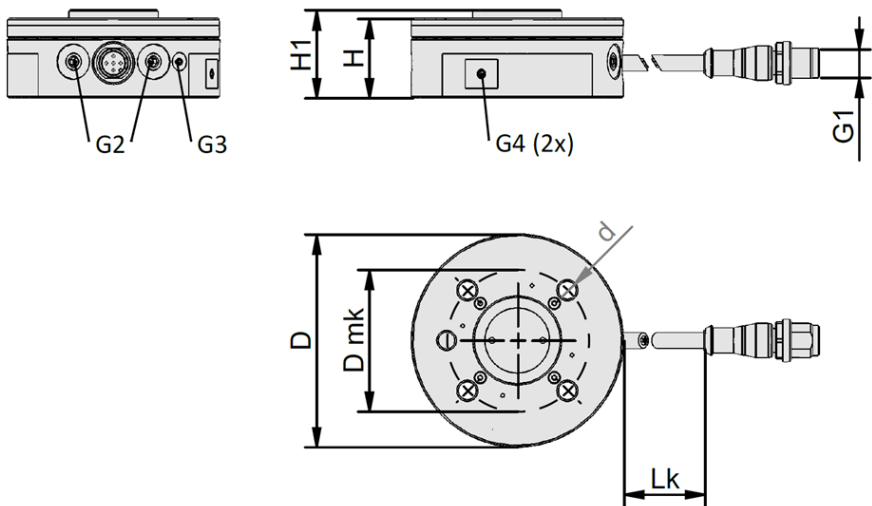
<sup>2)</sup> Suitable for all HCR-3, HCR-5 and HCR-12 devices with hardware revision Q1/2020 or higher

4.3 Maximum Forces and Torques

Mr	20 Nm
My	40 Nm
Fa	500 N

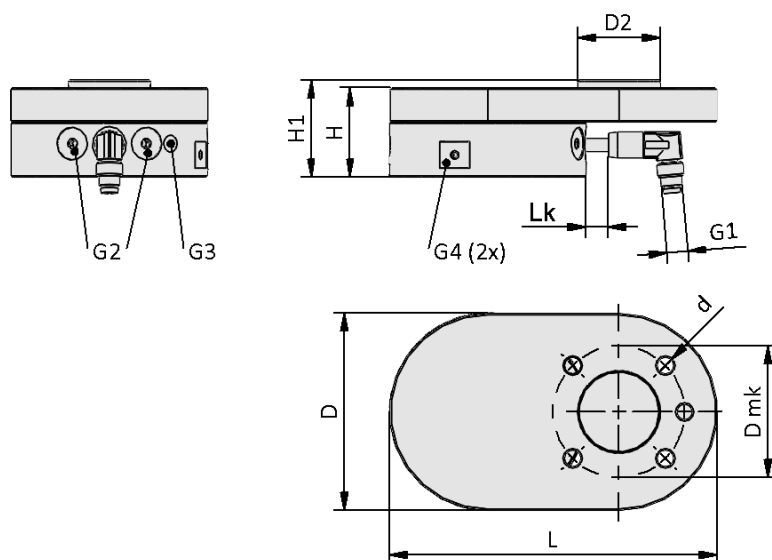


4.4 Dimensions



G2	G3	G4	D	d	Dmk
M7 internal thread	M3 internal thread	M4 internal thread	75	6.4	50
Part no.	G1	H	H1	Lk	m
10.08.09.00001	M8 internal thread	21	24	200	260 g
10.08.09.00002					
10.08.09.00003					250 g
10.08.09.00005					260 g
10.08.09.00006	M12 external thread	28	31	190	
10.08.09.00007					300 g

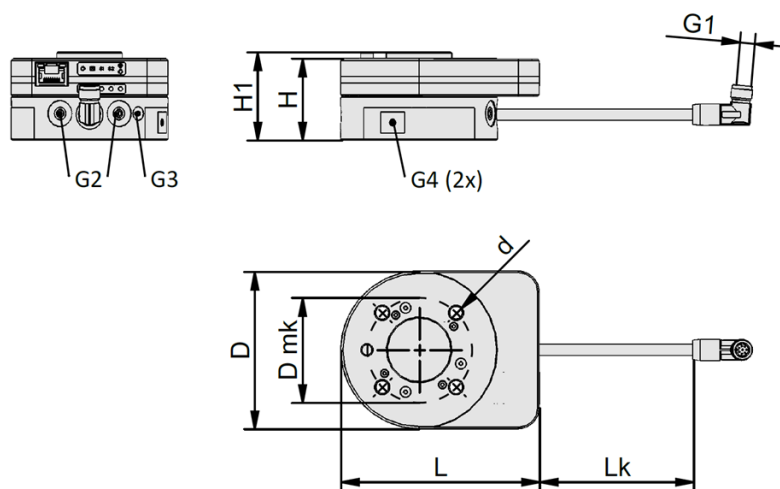
# Fixed component, part no. 10.08.09.00004



G1	G2	G3	D	d	Dmk
M8-AG	M7-internal thread	M3 internal thread	75	6.4	50

G4	D2	H	H1	L	Lk	m
M4 internal thread	31.5	34	37	125	200	600 g

## SCM fixed component, part no. 10.08.09.00010



G1	G2	G3	G4	D	d
M8 internal thread	M7 internal thread	M3 internal thread	M4 internal thread	75	6.4

H	H1	Dmk	L	Lk	m
39	42	50	95	200	390 g

All dimensions given in millimeters [mm].

## 5 Transport and Storage

### 5.1 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.

### 5.2 Unpacking the Device

Remove product packaging only to the extent required for further internal transport.



#### NOTE

##### **Improper unpacking**

Improper handling results in product failure.

- ▶ Avoid dirt on and damage to the pin contacts.
- ▶ Do not touch the pin contacts without suitable ESD protection.

### 5.3 Transport / Storage / Preservation



#### NOTE

##### **Dropping the product or subjecting it to impacts**

Damage to the product and/or malfunctions

- ▶ Do not drop the product or subject it to impacts.

- The product must always be transported and stored in its original packaging.
- Make sure that no undesired movements can take place during transport if the product is already mounted on the higher-level machine unit.
- Before starting operations and after transport, check all energy, communication and mechanical connections.
- Follow the steps below when the product is stored over a longer period of time:
  - Keep the storage location dry and free from dust to the greatest extent possible.
  - Maintain the temperature range of 5° to 50° C and avoid temperature fluctuations.
  - Avoid wind, drafts and condensation.
  - Seal off the product from dust with a weather and tear-resistant film.
  - Avoid direct sunlight.
- Clean all components. All dirt must be removed from the components.
- Visually inspect all components.
- Remove foreign bodies.
- Close electrical connections using suitable covers.

## 6 Installation

### 6.1 General Mounting Information



#### **⚠ WARNING**

**Risk of injury due to the unexpected movement of the plant or machine in which the product is to be installed.**

Risk of injury

- ▶ Switch off the machine's power supply before performing any work.
- ▶ Secure the machine against unintentional activation.
- ▶ Check the machine for possible residual energy.



#### **⚠ CAUTION**

**Risk of injury due to the unexpected movement of the product while connecting the power supply.**

Risk of injury

- ▶ Switch off the product's power supply before performing any work.
- ▶ Secure the power supply against unintentional activation.
- ▶ Check the product for possible residual energy.



#### **⚠ CAUTION**

**Risk of getting caught by the connection cable when the robot moves.**

Injury due to limbs or hair getting caught.

- ▶ Route the connection cable as close to the robot arm as possible.
- ▶ Avoid the danger zone.

The product must be mounted on a suitable screw-on surface that meets the requirements for evenness. The permissible unevenness is: 0.03 mm

- The mounting bolts are not included in the scope of delivery.
- Strength class for the mounting bolts:  $\geq 8.8$  (DIN EN ISO 4762)
- You must switch off the power supply before mounting, installation and maintenance work.
- Refer to the specifications provided by the relevant robot manufacturer for the tightening torque of the mounting bolts.

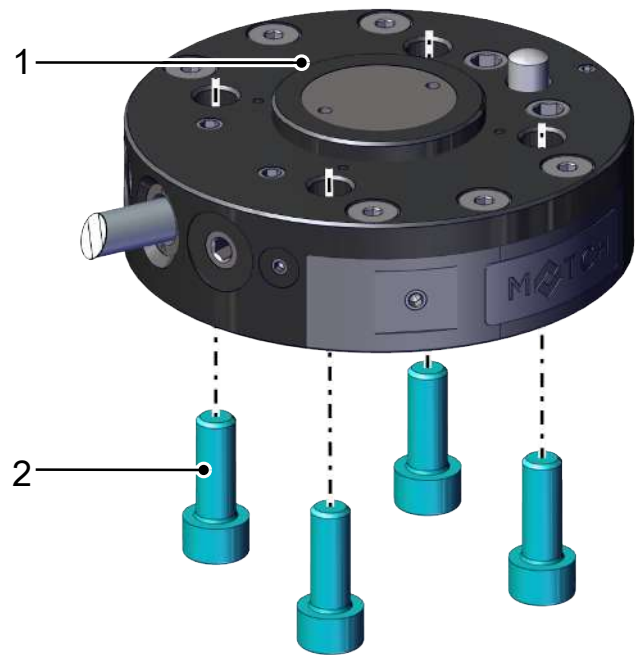
Schmalz also recommends verifying the permissible load capacity of the required screw connections in accordance with VDI 2230.

In high ambient temperatures, the product must be mounted on heat-dissipating materials. The service life of the product may be reduced if it is continuously operated under very high ambient temperatures and with rapid clock cycles.

## 6.2 Mounting

Follow the work steps below during mounting:

- ✓ The customer supplies the required number and type of mounting bolts.
- 1. Insert the product into the robot arm with the connection (1).
- 2. Loosely attach the mounting bolts (2).
- 3. Fasten the mounting bolts (2) cross-wise with the tightening torque specified by the robot manufacturer or in accordance with VDI 2230.



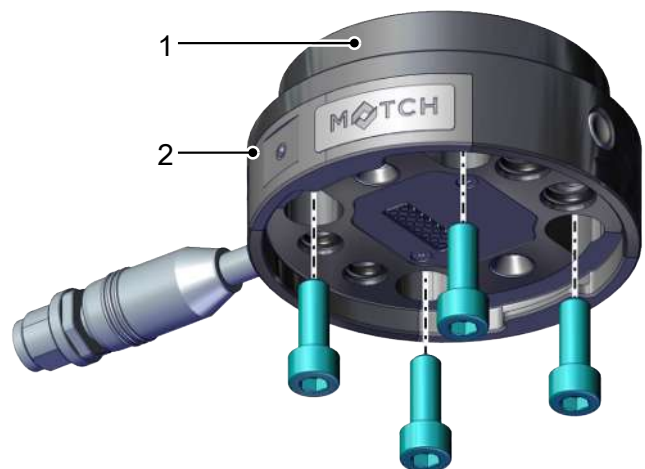
## 6.3 Mounting of the Variant with an Intermediate Flange

The displayed figures are only examples. Depending on the particular design, they can differ from the product.

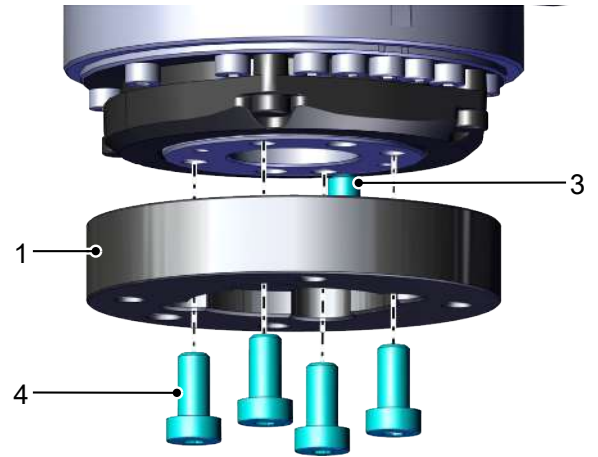
Follow the work steps below during mounting:

- ✓ The customer supplies the required number and type of mounting bolts.

1. Dismantle the intermediate flange (1) from the flange (2).



2. Attach the intermediate flange (1) to the robot arm.  
Make sure that the positioning pin (3) provided by the customer is installed. Position the intermediate flange (1) in the correct position and loosely attach the mounting bolts (4) (DIN 7984, M5x10) provided by the customer.

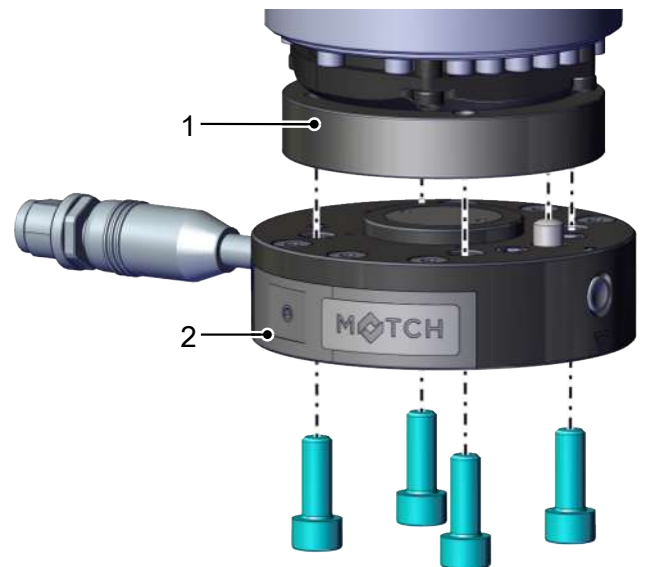


3. Fasten the mounting bolts (4) cross-wise with the tightening torque specified by the robot manufacturer or in accordance with VDI 2230.

4. Insert the positioning pin (5) into the bottle (2) at the position shown.



5. Position the flange (2) in the correct position on the intermediate flange (1) and loosely attach the mounting bolts that were removed in the first step.



6. Fasten the mounting bolts cross-wise with the tightening torque specified in VDI 2230.

## 6.4 Mounting the Energy Supply

The product is designed only for electrical operation with a 24 V DC supply voltage.

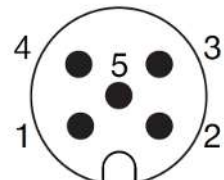
Follow the work steps below during mounting:

- ▶ Connect the product to the robot. Use a plug/ socket connection, for example.



6.4.1 “IO-Link” RMQC part no. 10.08.09.00006 and 10.08.09.00007

Controlled via SCM or conventional IO-Link master with port class B.

5-pin M12 connector	Pin	Litz wire color	Function
	1	Brown	+ 24 V DC, supply voltage for sensor
	2	White	+ 24 V DC, supply voltage for actuator
	3	Blue	GND, ground for sensor
	4	Black	C/Q, IO-Link communication
	5	Gray	GND, ground for actuator

To mount the product and start operations, you must perform the following steps:

1. Connect the product to the IO-Link master.
2. Secure the voltage supply.

For port class A, an additional supply via a Y-cable is required.

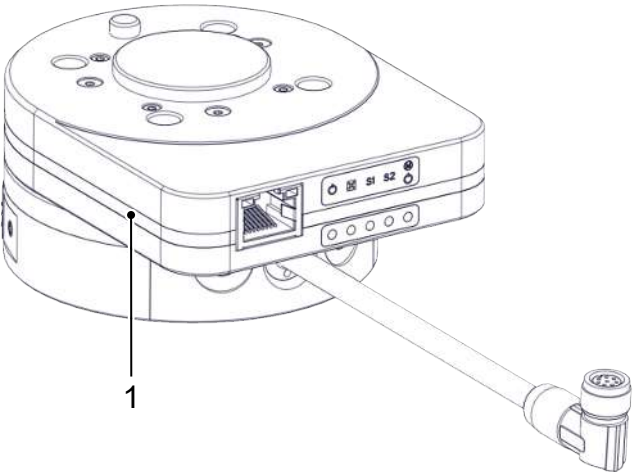
6.4.2 “IO-Link” RMQC Part No. 10.08.09.00010

For robots with an RS485 interface, the fixed component is available with the part number 10.08.09.00010.

The integrated Smart Communication Module (SCM) converts RS485 signals into IO-Link data and can therefore be used only for UR robot applications (RS485 interface).

There is an integrated LED display at position (1). The function of the LED display is identical to the IO-Link LED ring (> See *ch. LED Display, Page 7*).

You can use the PC to access the SCM via the Ethernet connection and use the Schmalz or GuideZ software.





8-pin M8 socket	PIN	Litz wire color	Function
	1	White	Communication line RS485+
	2	Brown	Communication line RS485-
	3	Green	OUT2, "part present"/IO-Link signal output
	4	Yellow	OUT3, freedrive
	5	Gray	U, +24 V supply voltage
	6	Pink	Digital IN1
	7	Blue	Digital IN2
	8	Red	GND, ground

► Secure the voltage supply.

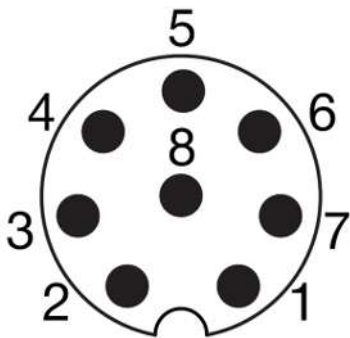
#### 6.4.3 RMCQ part no. 10.08.09.00001 and part no. 10.08.09.00002

The fixed part with part no. 10.08.09.00001 is only to be used for UR robots from the e-series.

8-pin Socket	PIN	Litz wire color	Function
	1	White	0 to 10 V analog output
	2	Brown	OUT3, connect
	3	Green	OUT2, "part present" signal output
	4	Yellow	OUT1, freedrive
	5	Gray	U, +24V DC
	6	Pink	IN1, suction
	7	Blue	IN2, blow off
	8	Red	GND, ground

The product inputs are designed for NPN controller outputs.

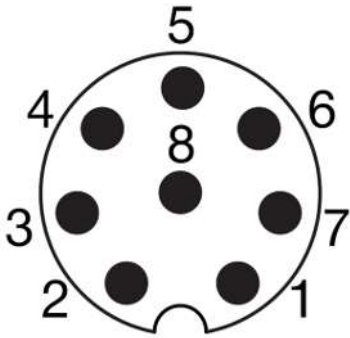
#### 6.4.4 RMQC part no. 10.08.09.00003

8-pin M8 plug	PIN	Litz wire color	Function
	1	White	OUT1, freedrive
	2	Brown	IN1, suction
	3	Green	IN2, blow off
	4	Yellow	—
	5	Gray	U, supply voltage + 24V DC
	6	Pink	—
	7	Blue	OUT2, "part present" signal output
	8	Red	GND, ground

The product inputs are designed for PNP controller outputs.

6.4.5 RMQC part no. 10.08.09.00004

The product inputs are designed for PNP controller outputs.

8-pin M8 plug	PIN	Litz wire color	Function
	1	White	U, supply voltage + 24V DC
	2	Brown	OUT2
	3	Green	OUT1/Freedrive
	4	Yellow	Connect
	5	Gray	IN1, suction
	6	Pink	IN2, blow off
	7	Blue	—
	8	Red	GND, ground

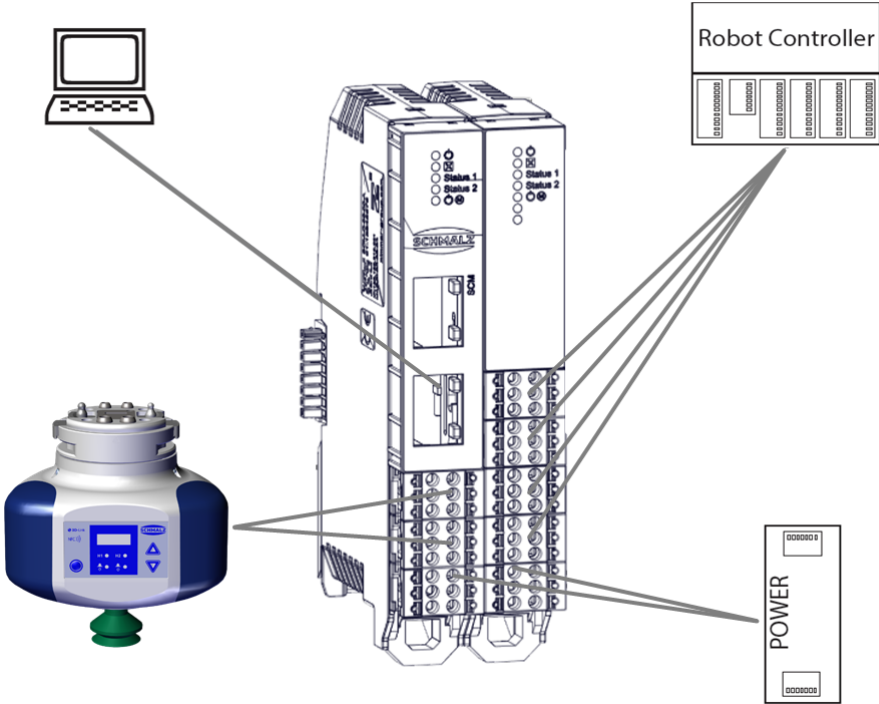
6.4.6 RMQC part no. 10.08.09.00005

8-pin Socket	PIN	Litz wire color	Function
	1	White	0 to 10 V analog output
	2	Brown	OUT3, connect
	3	Green	OUT2, "part present" signal output
	4	Yellow	OUT1, freedrive
	5	Gray	U, +24V DC
	6	Pink	IN1, suction
	7	Blue	IN2, blow off
	8	Red	GND, ground

The product inputs are designed for PNP controller outputs.

6.5 Connecting an External SCM (Optional)

As an alternative to the RMQC with integrated SCM (10.08.09.00010), you can also use the external SCM with part number 10.08.09.00014 together with the IO-Link quick-change module (fixed) (part numbers 10.08.09.00006 and 10.08.09.00007).



Can alternatively be used with a conventional IO-Link master.

## 6.6 Static Electricity

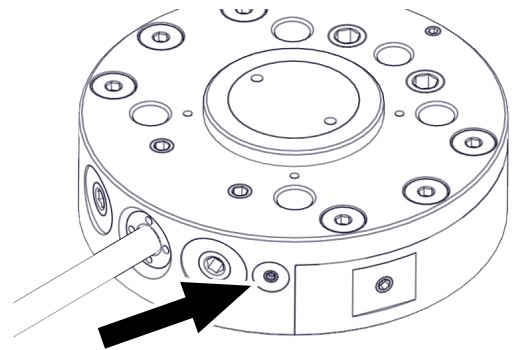


### NOTE

#### Static Electricity

Failure to comply may result in damage to property

- ▶ If ESD-sensitive parts come into contact with the product, you must ensure that the product is grounded.



- ▶ Connect the product via the mounting option for ESD dissipation (grounding).

## 7 Maintenance and Cleaning

### 7.1 Safety Instructions for Maintenance



#### ⚠ WARNING

##### Risk of injury due to incorrect maintenance or troubleshooting

- ▶ Check the proper functioning of the product, especially the safety features, after every maintenance or troubleshooting operation.



#### ⚠ CAUTION

##### Blowing off or cleaning the product with compressed air

Risk of injury and damage to the product

- ▶ Never blow off the product with compressed air.



#### ⚠ CAUTION

##### Use of Cleaners Containing Solvents

Damage to the product (seals, insulation, coatings and other surfaces may be damaged by cleaners that contain solvents) and potentially damage to health

- ▶ Use a chemically and biologically neutral cleaning agent.
- ▶ Use cleaning agent that is rated as non-harmful to health.
- ▶ The use of the following cleaning agents is strictly prohibited:
  - Acetone
  - white spirit
  - cellulose thinner/turpentine oil (solvents)

## 7.2 Maintenance

Product operation is maintenance-free.

Despite this, you must regularly inspect the product for any corrosion, damage and dirt.

We recommend commissioning Schmalz customer service to perform maintenance.

Disassembling and assembling the product yourself may lead to complications because special mounting equipment is sometimes required.



Schmalz stipulates the following checks and check intervals. The operator must comply with the legal regulations and safety regulations applicable at the location of use. These intervals apply to single-shift operation. For heavier use, such as multi-shift operation, the intervals must be shortened accordingly.

Maintenance task	When starting work	Weekly	As required	Every six months
Visually inspecting the product and its surroundings	X			
Checking the pin assignment/electrical connections		X		
Checking the locking device		X		
Cleaning the product			X	
Maintaining the locking device for and positioning of the loose member				X
The operating instructions are available, legible, and can be accessed by personnel.				X

The visual inspection covers only the components and their function. If you identify irregularities or damage during the visual inspection, you must carry out a more detailed check of the components.

## 8 Accessories

The function of the product cannot be guaranteed if you use accessories that are not sold or authorized by **Schmalz or the Zimmer Group**.

Schmalz accessories are tailored especially to the individual products. You can find optional accessories and the accessories included in delivery at [www.schmalz.com](http://www.schmalz.com).

Designation	Part no.
ECBPi MATCH	10.03.01.00626
ECBPMi MATCH	10.03.01.00661
SCM MATCH 24V-DC for RMQC-IOL	10.08.09.00014
Connection cable for SCM MATCH	21.04.05.00080

## 9 Taking the Product Out of Operation and Disposal

If the product reaches the end of the utilization phase, it may be fully disassembled and disposed of. Only qualified specialist staff may prepare the product for disposal.

1. Fully disconnect the product from the power supply.
2. Dispose of the components properly based on their material groups.

For proper disposal, contact a company specializing in the disposal of technical goods and instruct the company to observe the applicable disposal and environmental regulations.

## 10 EC Conformity

### *EU Declaration of Conformity*

The manufacturer Schmalz confirms that the product with the name "RMQC MATCH fixed component" that is described in these operating instructions fulfills the following applicable EC directives:

2011/65/EU	RoHS Directive
2014/30/EU	Electromagnetic Compatibility

The following harmonized standards were applied:

EN ISO 12100	Safety of machinery — General principles for design — Risk assessment and risk reduction
EN 61000-6-3+A1+AC	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments
EN 61000-6-2+AC	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-4+A1	Electromagnetic compatibility - Part 6-4: Generic standards - Emission standard for industrial environments

Additional technical standards and specifications were applied:

DIN EN 62061:2016-05	Functional safety of safety-related electrical, electronic and programmable electronic control systems
EN ISO 10218-2	Industrial Robots – Safety Requirements – Part 2: Robot Systems and Integration
EN ISO 13849-1:2015	Safety of machinery - Safety-related parts of control systems - Part 1 General principles for design
ISO TS 15066	Human-robot collaboration
EN IEC 63000	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances



The Declaration of Incorporation 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.