

MATCH

Operating instructions

Quick-Change Module RMQC | End-of-Arm Ecosystem MATCH ABB IRB 1100

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, 12/22

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 Symbols	5
2 Fundamental Safety Instructions	6
2.1 Intended Use	6
2.2 Non-Intended Use	6
2.3 Personnel Qualifications	6
2.4 Warnings in This Document	6
2.5 Modifications to the Product	6
3 Product description	7
3.1 Product Variants	7
3.2 Product Design	7
3.3 Description of Functions	8
3.4 LED Display	8
3.5 Connect LED	9
4 Technical Data	10
4.1 Tool-Changer-Specific Data	10
4.2 Technical Data	10
4.3 Maximum Forces and Torques	10
4.4 Dimensions	11
5 Transportation and Storage	12
5.1 Checking the Delivery	12
5.2 Unpacking the Device	12
5.3 Transport / Storage / Preservation	12
6 Installation	13
6.1 General Mounting Information	13
6.2 Mounting of the Variant with an Intermediate Flange	14
6.3 Installing the Energy Supply	15
6.4 Static Electricity	16
7 Manual Robot Soft-Switch (Option)	17
8 Maintenance and Cleaning	18
8.1 Safety Instructions for Maintenance	18
8.2 Maintenance	19
9 Accessories	20
10 Taking the Product Out of Operation and Disposal	21
11 Declarations of Conformity	22
11.1 EC Conformity	22
11.2 UKCA Conformity	23

1 Important Information

1.1 Note on Using this Document

J. Schmalz GmbH is generally referred to as Schmalz in this document.

The document contains 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 document describes the product at the time of delivery by Schmalz and is aimed at:

- Installers who are trained in handling the product and can operate and install it
- Technically trained service personnel performing the maintenance work
- Technically trained persons who work on electrical equipment

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
- CE label
- QR code



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

1.4 Symbols



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.

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 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.

2.5 Modifications to the Product

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

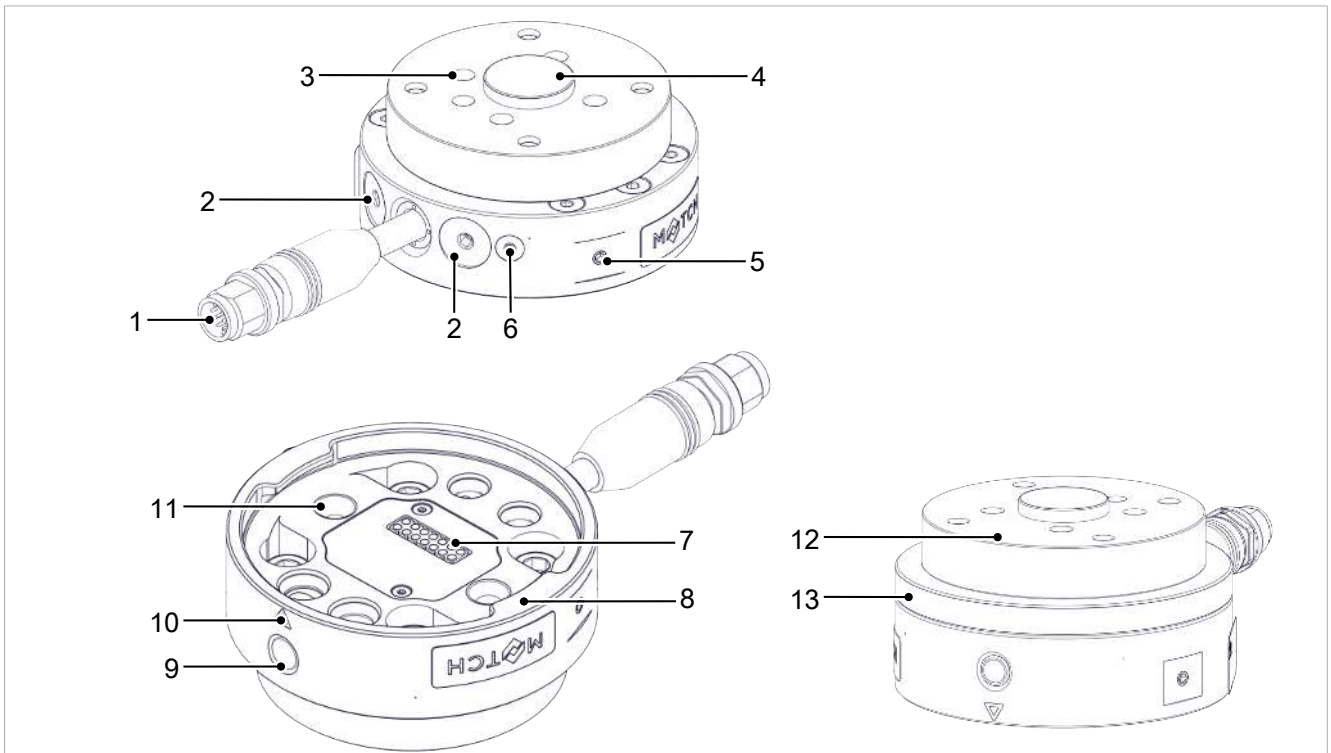
1. The product must be operated only in its original condition as delivered.
2. Use only original spare parts from Schmalz.
3. The product must be operated only in perfect condition.

3 Product description

3.1 Product Variants

Schmalz part no.	Zimmer Group part no.	Model
10.08.09.00021	LWR50F-15-01-A	Digital I/O IRB 1100
10.08.09.00022	LWR50F-15-04-A	IO-Link IRB 1100
10.08.09.00023	LWR50F-15-05-A	IO-Link LED-B IRB 1100

3.2 Product Design



1	Energy supply of robot/fixed member	2	Pneumatics connector (optional)
3	4x mounting hole for M6 DIN912 (robot-side)	4	Positioning on the robot
5	2x attachment for cable strain relief device	6	Attachment for grounding
7	Contact surface/contact pad spring pin	8	Locking device
9	Connect LED	10	Marking to aid alignment
11	2x RMQC positioning bracket for loose member	12	Intermediate flange
13	LED ring (optional)	—	—

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.

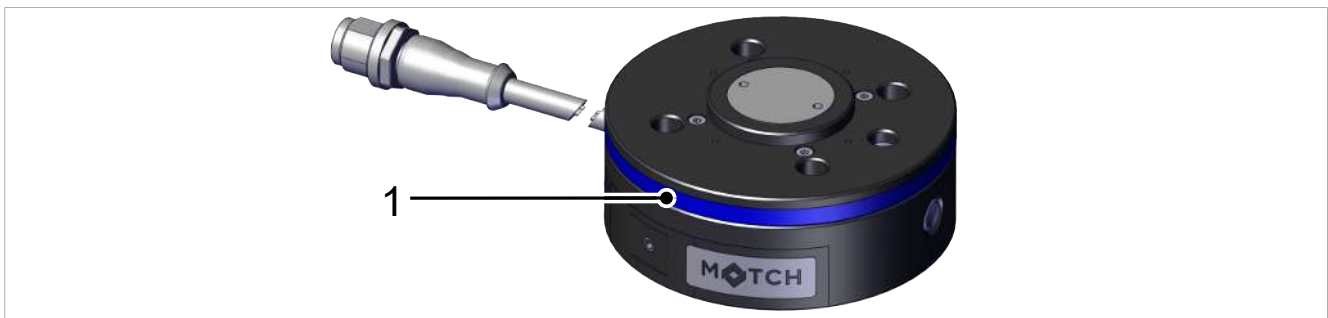
The product can be operated with a multitude of different loose members and their grippers. One requirement for doing so is that the loose member is compatible with the relevant connection options.

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 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
	Red	Continuous light	Loose member not coupled
	Green	Continuous light	Loose member coupled

4 Technical Data

4.1 Tool-Changer-Specific Data

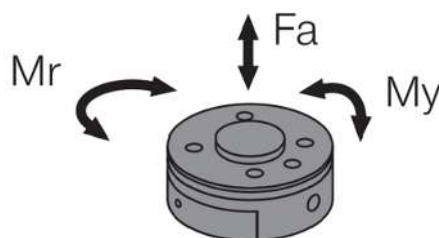
Electrical energy transmission	Integrated
Interlocking hub	1 mm
Repeatability in X, Y	0.05 mm
Repeatability in Z	0.05 mm
Tightening force	50 N
Releasing force	0 N
Max. axis offset during coupling in X, Y	1.0 mm

4.2 Technical Data

	10.08.09.00021	10.08.09.00022	10.08.09.00023
Suitable for robot type	ABB IRB 1100		
Electrical connection	M12-12 plug		
Control	Digital I/O	IO-Link	IO-Link LED B
Connection flange in accordance with EN ISO 9409-1	ISO TK 50		
Status display (Connect LED)	Yes		
Maximum handling weight	25 kg		
Connection thread	M12		
Number of contacts	12		
Connection type	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		
Control type NPN/PNP	PNP	—	
Permissible pressure range [bar]	-0.6 to 10		
Sealing material	NBR		
Mass moment of inertia [kgm ²]	0.00044	0.00049	
Maximum permissible current [A]	2 A permanent, 3 A peak		
Permissible voltage range [V]	24 V ±10%		
Mass	0.39 kg	0.39 kg	0.44 kg

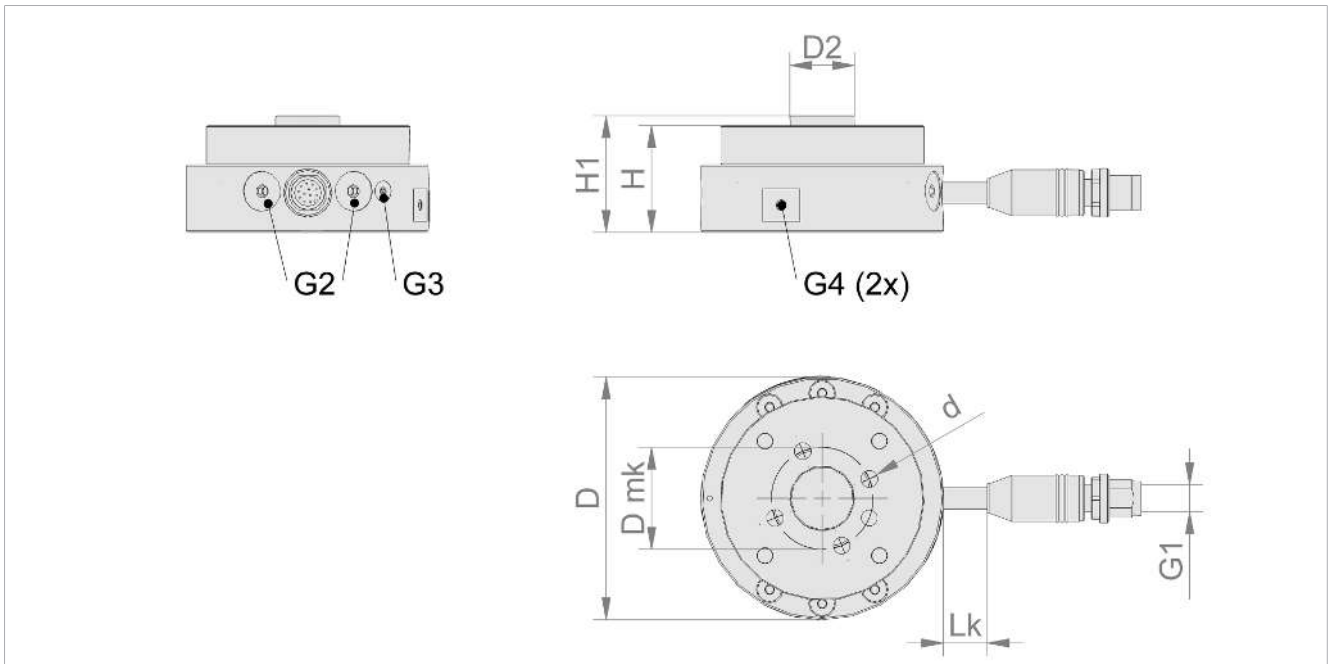
4.3 Maximum Forces and Torques

Mr	20 Nm
My	40 Nm
Fa	500 N

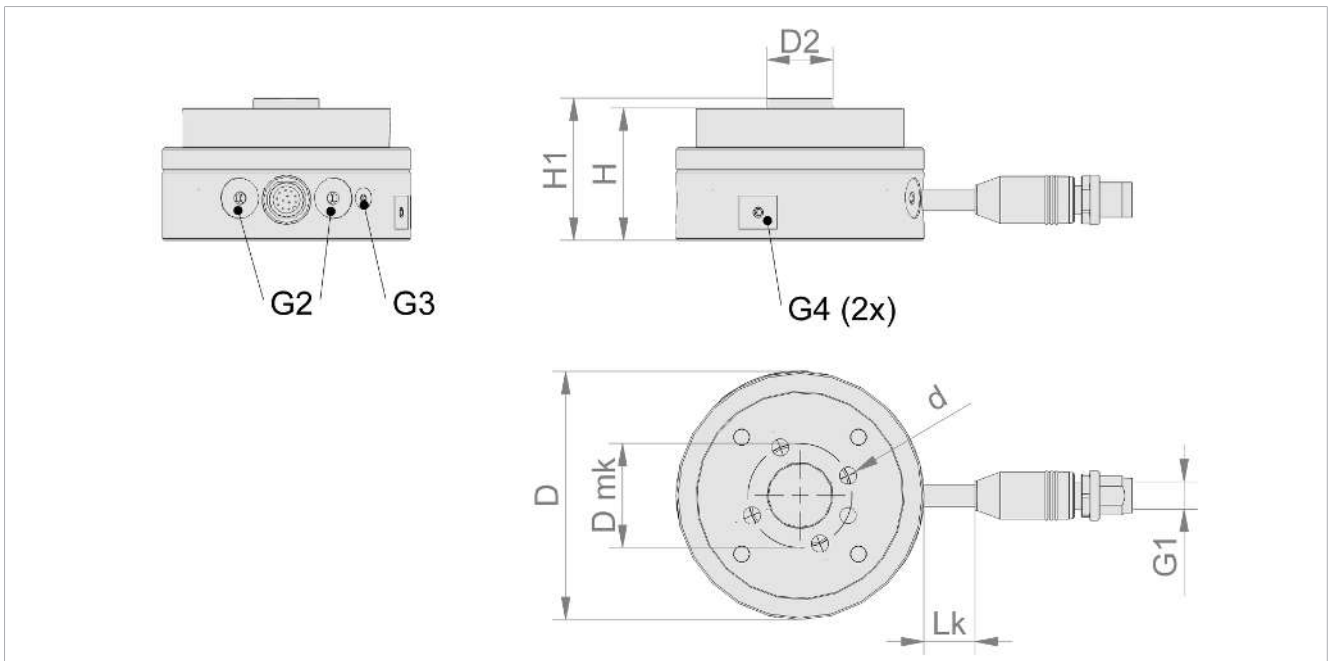


4.4 Dimensions

Parameter mapping valid for 10.08.09.00021 and 10.08.09.00022



Parameter mapping valid for 10.08.09.00023



G2	G3	G4	D	D2	d	Dmk
M7 internal thread	M3 internal thread	M4 internal thread	75	20	5.3	31.5
Part no.	G1	H	H1	Lk		
10.08.09.00021	M12-AG	33	36	450		
10.08.09.00022		40	43			
10.08.09.00023						

All dimensions given in millimeters [mm].

5 Transportation 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: ≥ 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.

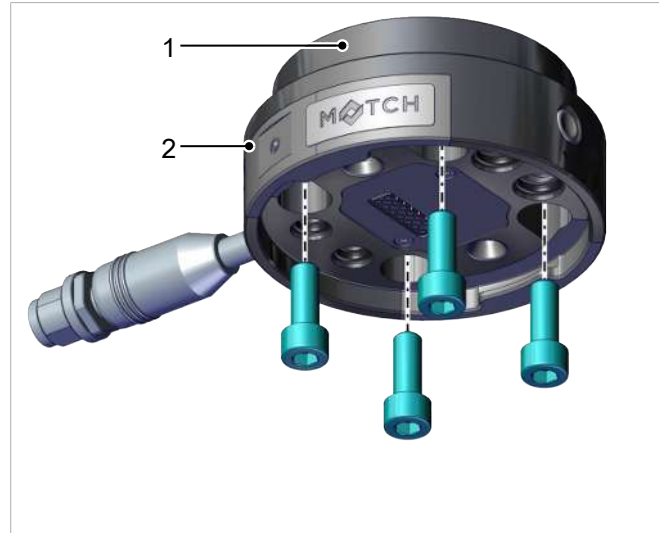
6.2 Mounting of the Variant with an Intermediate Flange

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

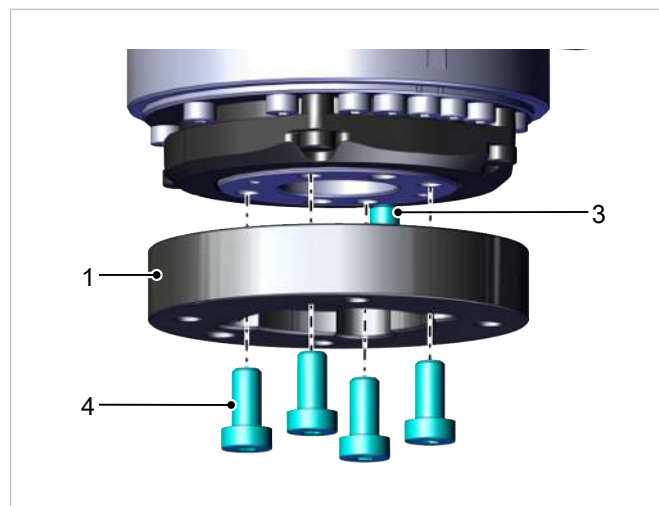
Follow the work steps below during mounting:

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

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

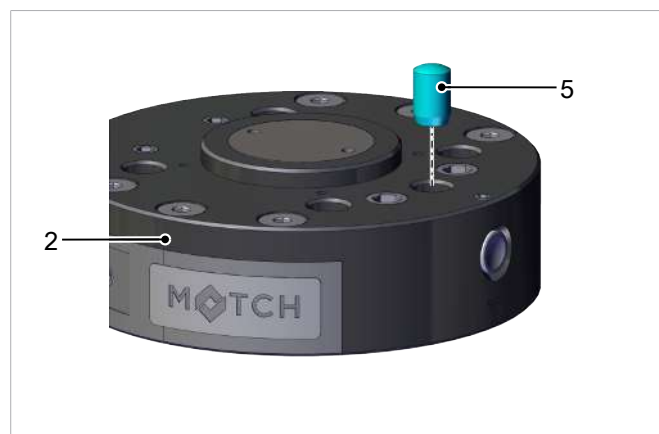


2. Attach the intermediate flange (1) to the robot arm. Make sure that the positioning pin (3) provided by the customer is installed. Position the intermediate flange (1) in the correct position and loosely attach the mounting bolts (4) (DIN 7984, M5x10) provided by the customer.

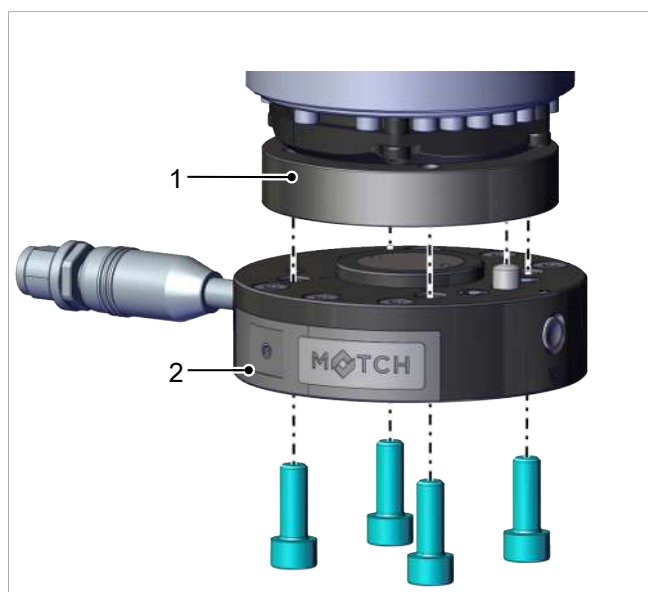


3. Fasten the mounting bolts (4) cross-wise with the tightening torque specified by the robot manufacturer or in accordance with VDI 2230.

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.

6.3 Installing the Energy Supply

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

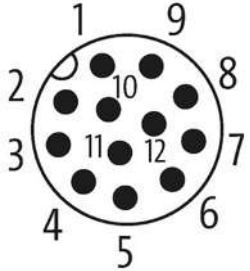
Follow the work steps below during mounting:

- ▶ Connect the product to the robot. Use a plug/socket connection, for example.
- ▶ Or run the connection cable along the robot to the IO-Link master.

6.3.1 RMQC part no. 10.08.09.00021

PIN assignment 12-pin plug	Name	Cable pin	Cable color
	24 V	1	Brown
	GND	3	White
	IN1 suck	4	Green
	IN2 blow off	2	Blue
	OUT3/Freedrive	7	Black
	OUT2	8	Gray
	Analog output	5	Pink
	Connect	6	Yellow

6.3.2 RMQC part no. 10.08.09.00022 and 10.08.09.00023

PIN assignment 12-pin plug	Name	Cable pin	Cable color
	S24V	1	Brown
	P24V	2	Blue
	SGND	3	White
	PGND	8	Gray
	IO-Link	4	Green

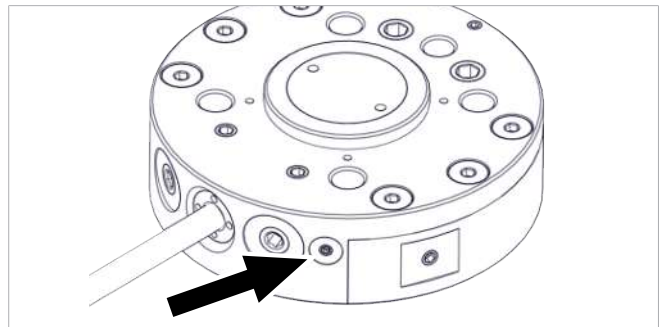
6.4 Static Electricity

**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 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.



8 Maintenance and Cleaning

8.1 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)
-

8.2 Maintenance

The product must be checked regularly for possible corrosion, damage and contamination by means of a visual inspection.

We recommend commissioning Schmalz customer service to perform maintenance.

Unauthorized disassembly and assembly of the product can lead to complications, as special assembly devices are 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			
Check electrical contacts/electrical connections/connection cables for damage and function		X		
Check the locking device		X		
Clean the product			X	
Maintain 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.

9 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.

Designation	Part no.
ECBPi MATCH	10.03.01.00626
ECBPMi MATCH	10.03.01.00661

10 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.

11 Declarations of Conformity

11.1 EC Conformity

EU Declaration of Conformity

The manufacturer Schmalz confirms that the product with the name "ejector module RECB MATCH" that is described in these operating instructions complies with the following applicable EC directives:

2011/65/EU	RoHS Directive
2014/53/EU	Harmonization of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC

The following harmonized standards were applied:

EN ISO 12100	Safety of machinery — General principles for design — Risk assessment and risk reduction
EN ISO 4414	Pneumatic fluid power – General rules and safety requirements for systems and their components
EN 61000-6-2+AC	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-3+A1+AC	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments
EN 300 330	Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz
EN IEC 63000	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances
EN 301 489-1	Electromagnetic compatibility for radio equipment and services; Part 1: Common technical requirements

Additional technical standards and specifications were applied:

EN ISO 9409-1	Manipulating industrial robots – Mechanical interfaces – Part 1: Plates
ISO TS 15066	Human-robot collaboration



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.

11.2 UKCA Conformity

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

2012	The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations
2016	Electromagnetic Compatibility Regulations

The following designated 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	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 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.

At Your Service Worldwide



Vacuum automation

WWW.SCHMALZ.COM/AUTOMATION

Handling systems

WWW.SCHMALZ.COM/EN-US/VACUUM-LIFTERS-AND-CRANE-SYSTEMS

J. Schmalz GmbH
Johannes-Schmalz-Str. 1
72293 Glatten, Germany
T: +49 (0) 7443 2403-0
schmalz@schmalz.de
WWW.SCHMALZ.COM