



Assembly instructions

Valve Set with Energy Chain

WWW.SCHMALZ.COM

 $EN\text{-}US \cdot 30.30.01.02876 \cdot 01 \cdot 03/23$

Note

The Assembly 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, 03/23

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.

Contact

J. Schmalz GmbH Johannes-Schmalz-Str. 1 72293 Glatten, Germany T: +49 (0) 7443 2403-0 schmalz@schmalz.de www.schmalz.com Contact information for Schmalz companies and trade partners worldwide can be found at: www.schmalz.com/salesnetwork

Contents

1	Impor	rtant 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	5	
	1.5	Symbols	5	
2	Funda	amental Safety Instructions	6	
	2.1	Intended Use	6	
	2.2	Non-Intended Use	6	
	2.3	Personnel Qualifications	6	
	2.4	Modifications to the Product	6	
3	Produ	act description	7	
	3.1	Product Variants	7	
	3.2	Product Design of the Valve Set with Energy Chain	7	
	3.3	Description of Functions	7	
	3.4	Interfaces	8	
4	Techn	د دودhnical Data		
	4.1	Technical Data	9	
	4.2	Dimensions	9	
	4.3	PIN Assignment 1	10	
5	Trans	portation and Storage	11	
	5.1	Checking the Delivery	11	
	5.2	Unpacking the Device	11	
	5.3	Transport / Storage / Preservation 1	11	
6	Instal	lation	12	
	6.1	Mounting the Base Plate 1	12	
	6.2	Mounting the Energy Chain 1	12	
	6.3	Mounting the Energy Supply 1	14	
7 Maintenance and Cleaning		tenance and Cleaning	15	
	7.1	Safety Instructions for Maintenance 1	15	
	7.2	Maintenance 1	15	
8	Takin	g the Product Out of Operation and Disposal	16	
9	Decla	rations of Conformity	17	
	9.1	EC Conformity 1	17	
	9.2	UKCA Conformity 1	17	

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 Assembly 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 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
	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 Symbols



This symbol indicates useful and important information.

- \checkmark This symbol represents a prerequisite that must be met prior to an operational step.
- This symbol represents an action to be performed.
- \Rightarrow 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 valve set with energy chain is used to control an end effector by supplying compressed air and electronic signals.

The product may only be used with cooperative/collaborative robot systems.

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 Assembly instructions.
- 2. The product must be operated only by persons who have undergone appropriate training.

These Assembly 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.	Length of the energy chain (L)	Application example
10.01.45.00032	1,760 mm	UR5
10.01.45.00033	2,170 mm	UR10

3.2 Product Design of the Valve Set with Energy Chain



3.3 Description of Functions

The product is used to control pneumatic grippers on collaborative robots.

Four different compressed air lines can be controlled using two 5/3 multiway valves (2 x 4 mm hoses, 1 x 6 mm hose, 1 x 8 mm hose). If three hoses with a diameter of 4 mm are needed, then the included reducing fitting (from 6 mm to 4 mm hose) can be used.

The energy chain contains the compressed air lines and a sensor cable. It is attached to the robot arm of a collaborative robot using Velcro straps. An end effector is pneumatically connected to the ends of the compressed air lines, and a sensor is connected with the sensor cable.

The valve cables and the sensor cable are connected to the robot controller. Using the robot controller, the end effector can be connected pneumatically and the signals of the sensor can be further processed.

For example, the following Schmalz grippers can be used: SBPG, SCG-HSS, SLG.



Not all grippers/end effectors require all pneumatic lines and valves. Unnecessary lines can be removed from the energy chain.

3.4 Interfaces

Pneumatic connection (compressed air supply)	Hose with 8 mm diameter		
Valve cable	 4 cables with 3 wires Blue wire (ground) Brown wire (24 V control signal) Green-yellow wire (protective conductor, which may be optionally connected) 		
Sensor cable	 M8 plug, 4-pole, 4 wires on other side Brown wire (24 V) White wire (signal output 1) Blue wire (ground) Black wire (signal output 2) 		
Pneumatic connection (toward end effector)	 2 x 4 mm hoses 1 x 6 mm hoses 1 x 8 mm hoses 		

4 Technical Data

4.1 Technical Data

Length of the energy chain (L)	1,760 mm	2,170 mm	
Weight	2.5 kg	2.7 kg	
Temperature range	–10° C to +50° C		
Operating pressure	3 to 10 bar		
Cable length	5 m		
Voltage (signals)	24 VDC ±10%		
Maximum particle size, com- pressed air	5 μm		

4.2 Dimensions



Schmalz part no.	Length of the energy chain (L)	Overhang on the end of the chain (L1)
10.01.45.00032	1,760	600
10.01.45.00033	2,170	750

All dimensions given in millimeters [mm].

4.3 PIN Assignment



Signal cable	Pneumatic hose
WG1 (connection cable)	WN0 (compressed air connection)
WG2	WN1
WG3	WN2
WG4	WN3
WG5 (sensor cable)	WN4

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.

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 Mounting the Base Plate

- ✓ Choose a suitable mounting area near the base of the robot.
- ✓ Ensure that the robot does not clamp the chain while moving to the positions stored in the program.



Mount the base plate crosswise with at least 3 screws.

6.2 Mounting the Energy Chain



Risk of getting caught by the energy chain when the robot moves.

Injury due to limbs or hair getting caught.

- Route the energy chain as close to the robot arm as possible.
- Avoid the danger zone.

Completely attach the elbow joint of the robot for mounting.

Ensure that the energy chain is not taut around the elbow joint, but has some play.



6.3 Mounting the Energy Supply



Risk of injury due to overpressure

Hose/connection can burst.

• Ensure that the operating pressure does not exceed 10 bar.



Risk of injury due to pneumatic hose connected to one side only

A pneumatic hose under pressure is not connected on one side and can fling around.

• Only apply operating pressure when both ends of the hoses are connected.



Danger of electric shock due to live parts

- Only connect 24 V.
- Shorten the cables to the required length before connecting. The hose ends on the gripper can be shortened to the required length. However, ensure that the hose is long enough so that the robot can move unimpeded.
- 1. Connect the valve cables to the digital outputs of the robot controller.
- 2. Connect the sensor cables to the digital inputs of the robot controller.
- 3. Connect the voltage supply to the robot controller.

7 Maintenance and Cleaning

7.1 Safety Instructions for Maintenance



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

The operation of the product is maintenance-free.

In spite of the fact that it is maintenance-free, the product must be checked regularly for possible corrosion, damage and contamination by means of a visual inspection.

It is advisable to replace the hoses and valves every 5 years.

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 start- ing work	As required	Quarterly	Every six months
Visually inspecting the product and its surroundings	Х			
Visually inspecting the energy chain			Х	
Cleaning the product		Х		
The operating instructions are avail- able, 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 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.

9 Declarations of Conformity

9.1 EC Conformity

EU Declaration of Conformity

The manufacturer Schmalz confirms that the product described in this Assembly instructions with the designation "Valve Set with Energy Chain" fulfills the following applicable EC directives:

2011/65/EU RoHS Directive

The following harmonized standards were applied:

EN ISO 12100 Safety of machinery — General principles for design — Risk assessment and risk reduction

Additional technical standards and specifications were applied:

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.

9.2 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

The following designated standards were applied:

EN ISO 12100	Safety of machinery — General principles for design — Risk assessment and risk reduction
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