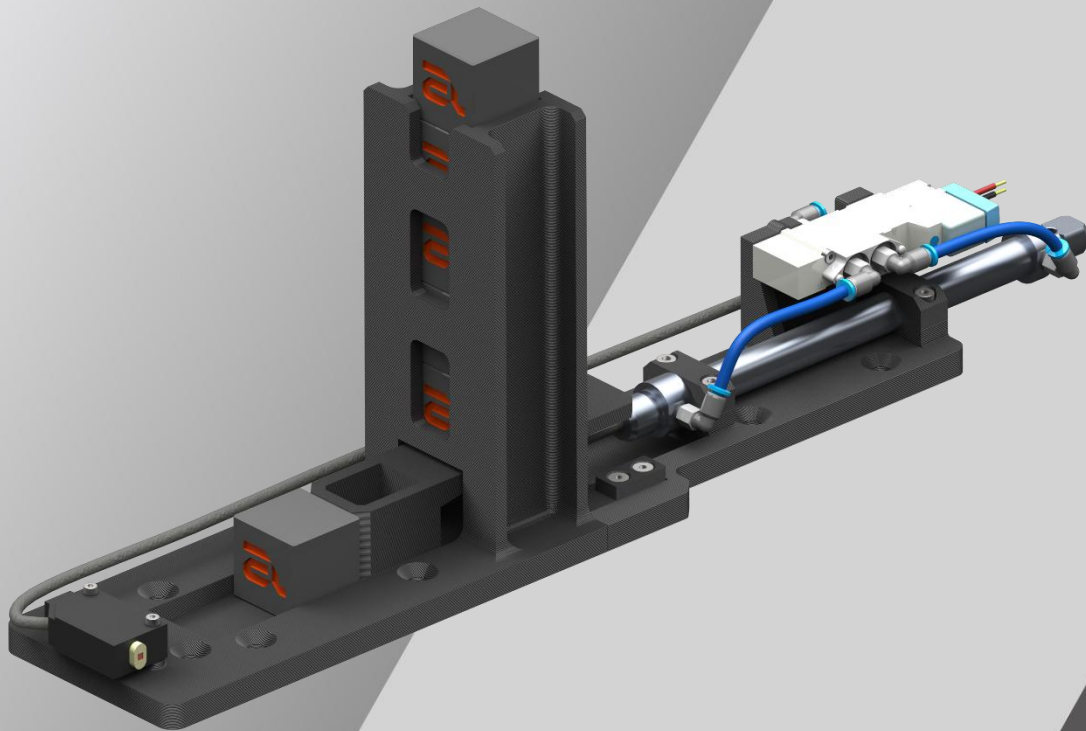


Astorino

Cubes Feeder Operation Manual



Preface

This manual describes the handling of the 6-axis robot "astorino" cubes feeder option.

The ASTORINO is a learning robot specially developed for educational institutions. Pupils and students can use the ASTORINO to learn robot-assisted automation of industrial processes in practice.

ASTORINO Cubes Feeder Manual

1. The "astorino" software included with the ASTORINO is licensed for use with this robot only and may not be used, copied or distributed in any other environment.
2. Kawasaki shall not be liable for any accidents, damages, and/or problems caused by improper use of the ASTORINO robot.
3. Kawasaki reserves the right to change, revise, or update this manual without prior notice.
4. This manual may not be reprinted or copied in whole or in part without prior written permission from Kawasaki.
5. Keep this manual in a safe place and within easy reach so that it can be used at any time. If the manual is lost or seriously damaged, contact Kawasaki.

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Symbols

Items that require special attention in this manual are marked with the following symbols.

Ensure proper operation of the robot and prevent injury or property damage by following the safety instructions in the boxes with these symbols.



WARNING

Failure to observe the specified contents could possibly result in injury or, in the worst case, death.

[ATTENTION]

Identifies precautions regarding robot specifications, handling, teaching, operation, and maintenance.



WARNING

- 1. The accuracy and effectiveness of the diagrams, procedures and explanations in this manual cannot be confirmed with absolute certainty. Should any unexplained problems occur, contact Kawasaki Robotics GmbH at the above address.**
- 2. To ensure that all work is performed safely, read and understand this manual. In addition, refer to all applicable laws, regulations, and related materials, as well as the safety statements described in each chapter. Prepare appropriate safety measures and procedures for actual work.**

Paraphrases

The following formatting rules are used in this manual:

- For a particular keystroke, the respective key is enclosed in angle brackets, e.g. <F1> or <Enter>.
- For the button of a dialog box or the toolbar, the button name is enclosed in square brackets, e.g. [Ok] or [Reset].
- Selectable fields are marked with a square box ☐.
If selected a check mark is shown inside the symbol ☒.

ASTORINO Cubes Feeder Manual

List of contents

Preface	I
Symbols	1
Paraphrases	2
List of contents	3
1 Nomenclature in this manual	4
2 Overview of ASTORINO	4
3 Technical specifications	5
4 Cube feeder package contents	5
5 Dimensions	6
6 Unboxing and starting-up	7
6.1 Connection	8
6.2 Controlling conveyor via OUTPUTS	9
6.3 Reading photoelectric sensor	10
6.4 Adjusting the photoelectric sensor	10
7 Pneumatic schematic	11
8 Manufacturer information	12
Appendix A – Controlling a valve without 24V IO Module	13

1 Nomenclature in this manual

The author of the manual tries to use generally valid terminology while achieving the greatest possible logical sense. Unfortunately, it must be noted that the terminology is reversed depending on the point of view when considering one and the same topic. Also it is to be stated that in the course of the computer and software history terminologies developed in different way. One will find therefore in a modern manual no terminologies, which always satisfy 100% each expert opinion.

2 Overview of ASTORINO

The ASTORINO is a 6-axis learning robot developed specifically for educational institutions such as schools and universities. The robot design is based to be 3D printed with PET-G filament. Damaged parts can be reproduced by the user using a compatible 3D printer.

Programming and control of the robot is done by the "astorino" software.

The latest software version and 3D files can be downloaded from the KAWASAKI ROBOTICS FTP server:

<https://ftp.kawasakirobot.de/Software/Astorino/>

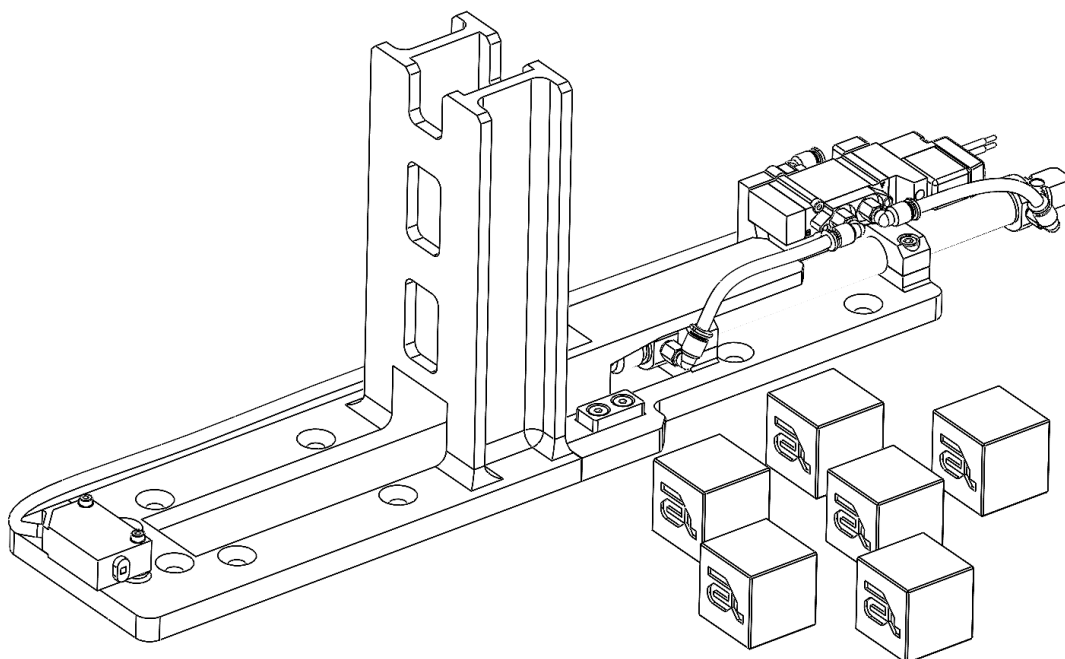
Just like Kawasaki's industrial Robots the ASTORINO is programmed using AS language. Providing transferable programming skills from the classroom to real industrial applications.

3 Technical specifications

Characteristics		Astorino Cubes feeder
Working environment	Temperature	15–35°C
	Humidity	35–60%
Cunes size		25 mm
Max. cubes capacity		6
Max. current consumption		100 mA
Size		372x70x133mm
Power supply		24V
Piston stroke		100 mm
Recommend pressure		4 Bar
Max. air pressure		8 Bar
Photo sensor	Type	PNP
	Working Voltage	24 V
Weight		350 g
Material		Aluminium, PET-G
Colour		Silver/Black
Other options required		24V IO Module*

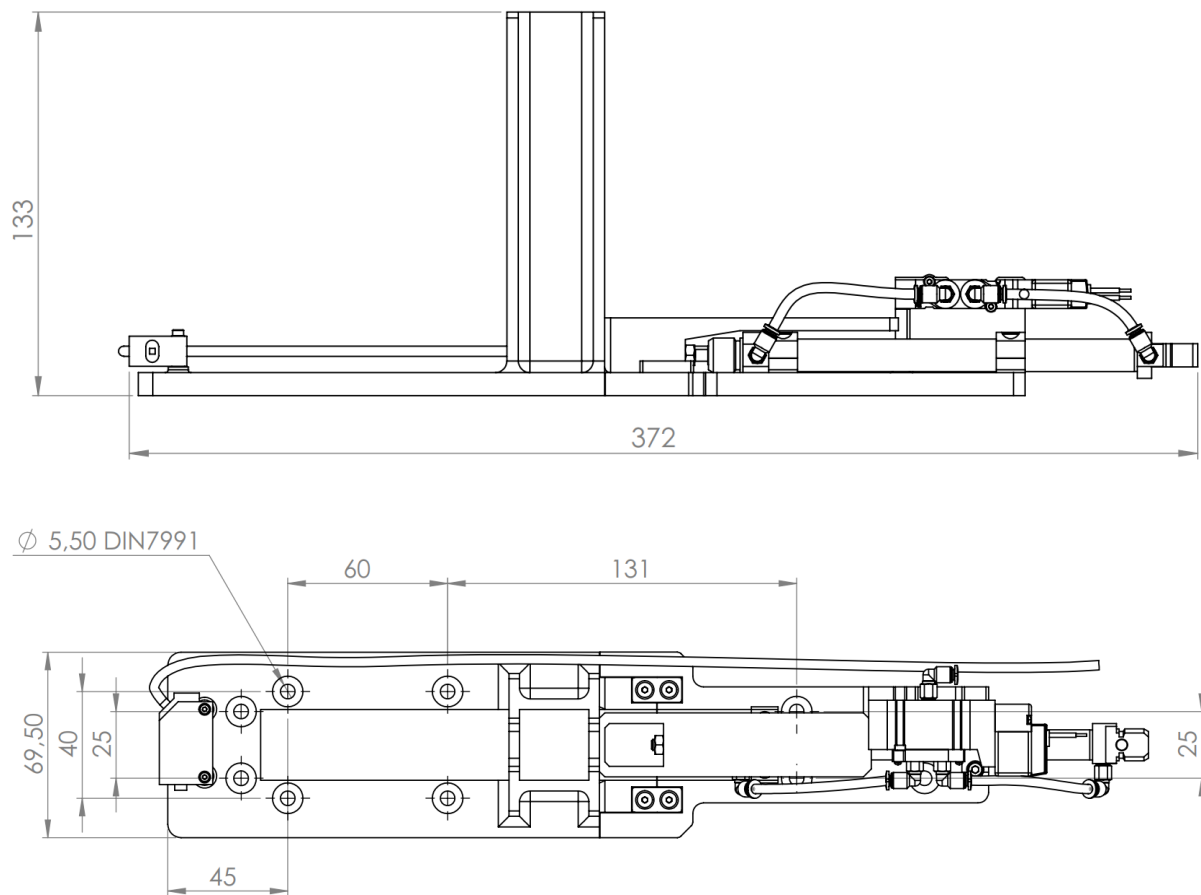
* Can be replaced by a relay/mosfet board

4 Cube feeder package contents



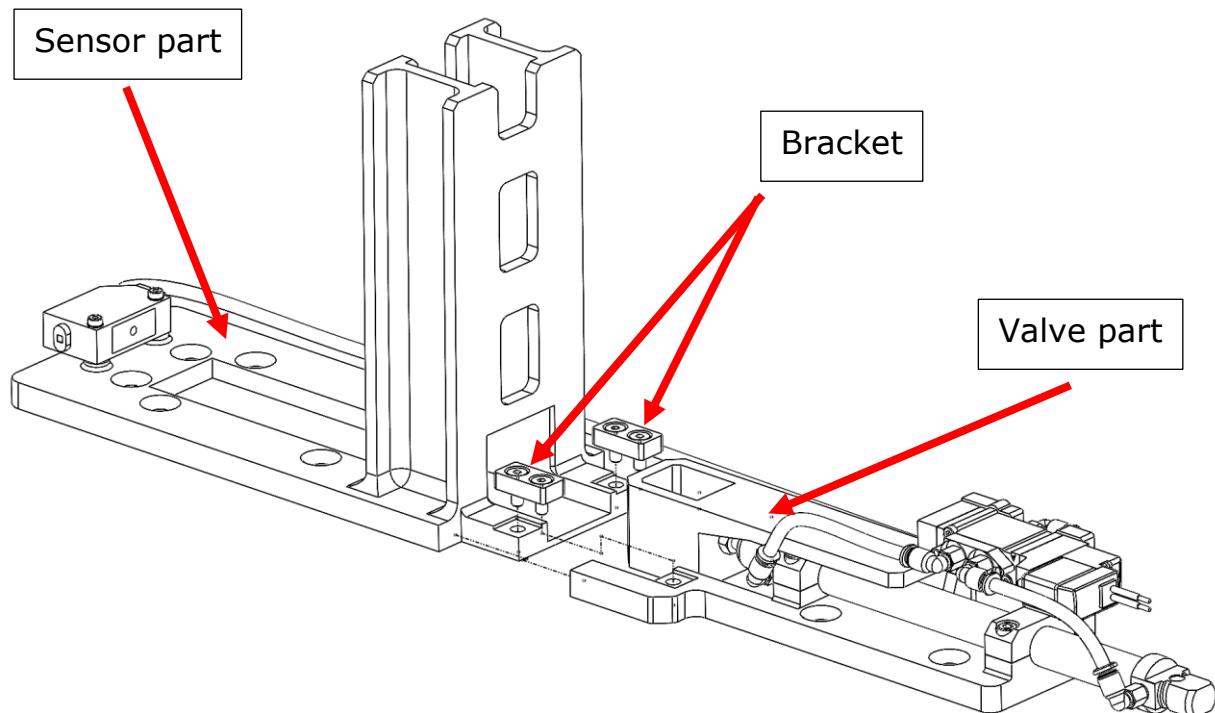
Quantity	Name
1	3D printed sensor part
1	3D printed valve part
2	Bracket
4	DIN7991 M3x10
1	Pneumatic piston
1	Photo sensor
6	25 mm cube
1	Valve

5 Dimensions



6 Unboxing and starting-up

Once the cubes feeder is removed from the packaging, assemble it and place on a solid surface.



Connect two sides with a rectangular brackets and four DIN7991 M3 screws.

6.1 Connection

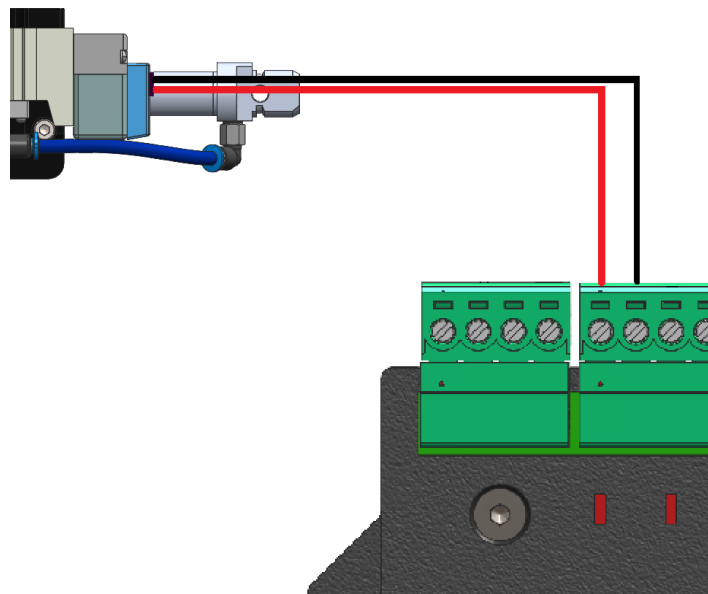
! WARNING

Before installation make sure that the robot is TURNED OFF and is installed on the firm surface to avoid any injury!

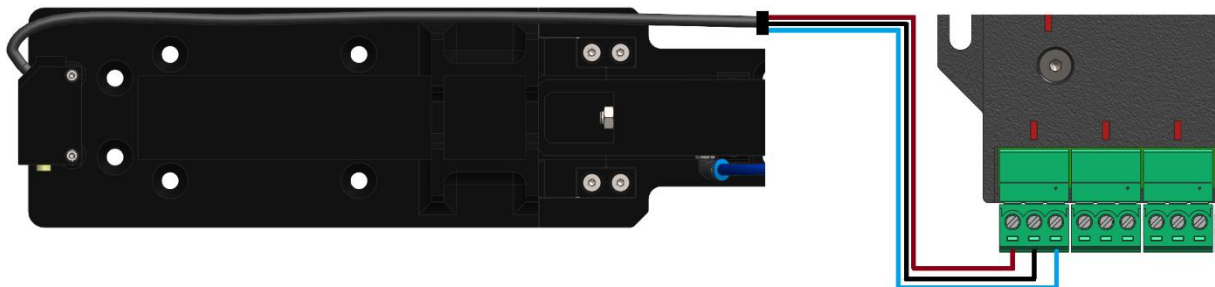
! WARNING

Before installation make sure that the pressure source is turned off and residual pressure contained in pressure banks is released!

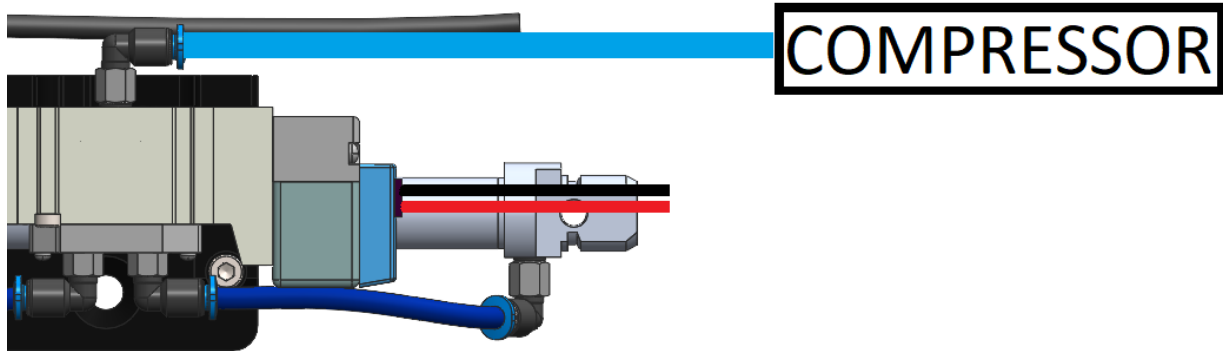
- Connect VALVE to astorino 24V IO module OUTPUT



- Connect SENSOR to astorino 24V IO MODULE INPUT

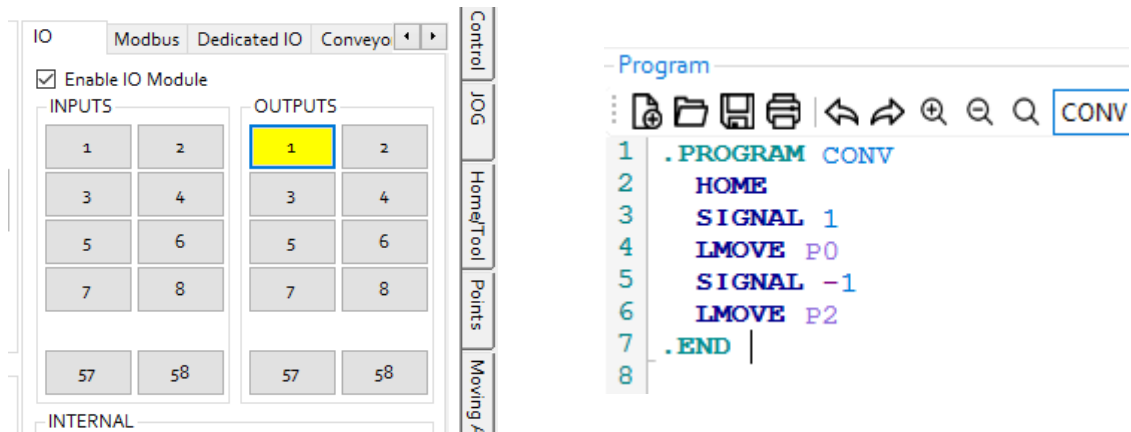


- Connect compressed air with a $\varnothing 4$ pipe.



6.2 Controlling conveyor via OUTPUTS

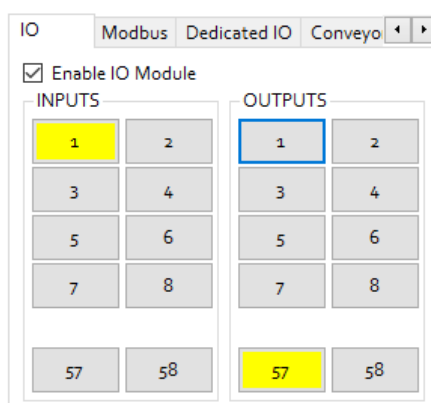
To control cubes feeder operation please use astorino software or Teach Pendant to turn ON or OFF OUTPUTS that are connected to the cubes feeder, or use SIGNAL command in your program



ASTORINO Cubes Feeder Manual

6.3 Reading photoelectric sensor

To read photoelectric sensor use astorino software or Teach Pendant to view INPUT that is connected to the sensor, or use SIG/SWAIT command in your program.



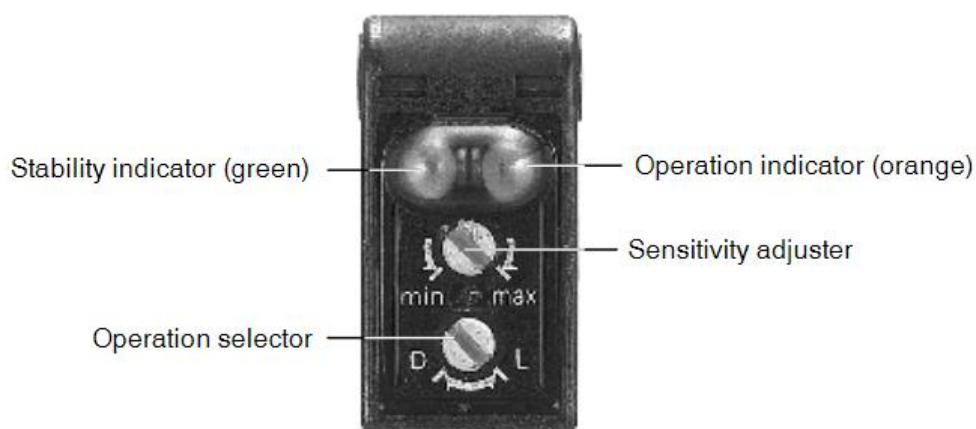
```

Program
1 .PROGRAM CUBES
2 HOME
3 PULSE 1,2
4 SWAIT 1001
5 LAPPRO P0,50
6 SPEED 20 MM/S
7 LMOVE P0
8 LDEPART 100
9 PULSE 1,2
10 IF SIG(1001) == TRUE THEN
11   PRINT "THERE IS A CUBE"
12 ELSE
13   PRINT "CUBE NOT FOUND"
14 END
15 .END
16

```

6.4 Adjusting the photoelectric sensor

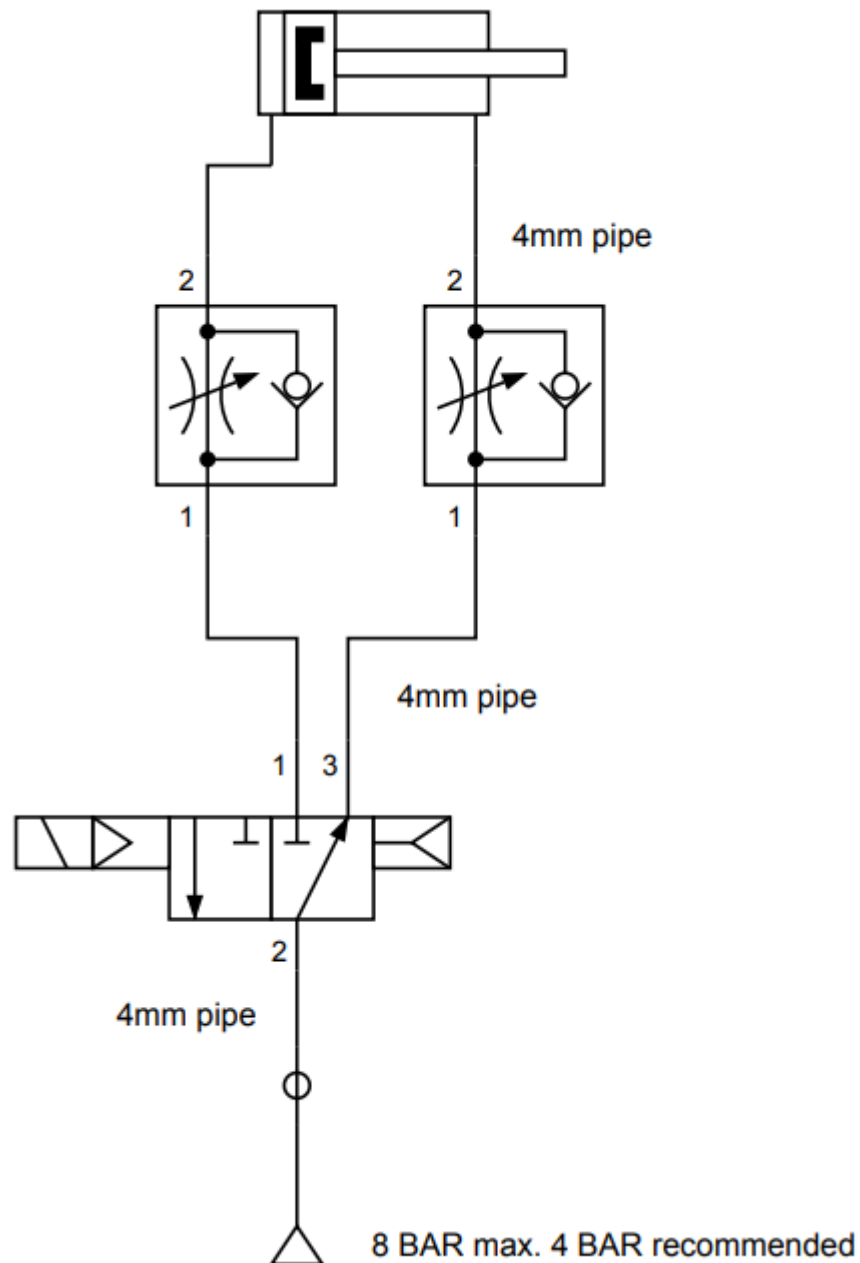
To adjust the sensesitivity and switch operation mode of the photoelectric sensor use two knobs that are located on top of the sensor.



Available operations are LIGHT ON and DARK ON

LIGHT ON		DARK ON	
Object found		Object found	
Operation indicator (LED)		Operation indicator (LED)	
Output transistor		Output transistor	

7 Pneumatic schematic



8 Manufacturer information

For further questions, contact Kawasaki Robotics support.

Contact:

Kawasaki Robotics GmbH

tech-support@kawasakirobot.de

+49 (0) 2131 – 3426 – 1310

Kawasaki Robot
Cubes Feeder Operation Manual

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Appendix A – Controlling a valve without 24V IO Module

