

ILVC9003 Valve Controller

Installation, Operation and Maintenance manual



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Innovation never stops.

Introduction

This manual concerns the controller: ILVC9003

Introduction year: 2021

This user manual contains important information for installing, operating and maintenance of the controller. Read the manual closely and follow the instructions contained in it. For reference, you may keep a copy of the manual.

The Pneumatic Valve Controller ILVC9003 is not a standalone device. It is meant to be integrated in a larger installation.

When installed/connected differently than described in this manual, Sitomatic will not be responsible for any damage or harm created by or to the controller.

The data in this manual is based on the latest information and may be subject to changes.

We can modify our products and any related item such as documentation at any time, without notification.

Sitomatic Process Technology B.V.'s General Conditions also apply.

All the information present in this manual is to be used for installing and operating the controller. All technical and technological information as well as any drawings and technical specifications remain our property and may not be copied or reproduced to any other third party.

Sitomatic Process Technology B.V. Netherlands

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Functions:

The ILVC9003 is a universal valve controller for automatic control of pneumatic process valves. This means that it can be placed on almost any pneumatic based actuator. Different mounting kits are available to connect the valve controller and actuator.

The ILVC9003 is equipped with an internal solenoid which can be controlled through the electronics. This way no external solenoids are required for most applications.

The controller can be calibrated by pressing the calibration button on the valve controller. When the controller calibrates it will adjust its values to the valve it is mounted on.

The controller has the following features:

- Automatic calibration.
- I/O-Link connection.
- Linear and rotary measurement available.
- Internal solenoid for air control.
- Contact free position measurement.
- Visual feedback on controller through bright LED.
- Mounting kits available to fit on different actuator brands and sizes.
- Easy replacement of the electronics.

General data:

Mechanical data		
Body material	:	POM
Colour body	:	Black
Cover material	:	Polycarbonate
Colour cover	:	Smoked
Stroke range	[mm]	: Linear 5-70
Relative humidity	[%]	: ≤ 80
Ambient temperature	[°C]	: -10 ... +50 (non-freezing)
Dimensions	[mm]	: 115 x 70 [HxD]
Airflow solenoid	[L/min]	: 98
Maximum air pressure	[Bar]	: 7
Operating air pressure	[Bar]	: 5 - 6
IP rating	:	IP 67

Symbols/safety regulations:

	<p>Sign that warns for a possible electric shock.</p>
	<p>General warning sign.</p>
	<p>Refers to additional manuals/datasheets.</p>
	<p>Additional information.</p>
	<p>Advice: We advise you to wear suitable protection clothing, (such as gloves and goggles) when you use cleaning products.</p>

Safety regulations:

- Installation, maintenance and repairs must only be carried out by qualified personnel.
- After maintenance or repair, the unit must be tested before it is put back into service.
- Cleaning should be done in such a way that no water or other fluids can enter any electrical parts of the controller.

The user must ensure that:

- Working conditions are safe.
- The instruction manual is available.

Installing the controller:

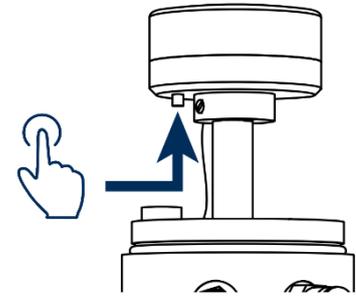
This instruction is specifically for the installation of the unit on a pneumatic actuator and not for the integration into the system.

Installation:

1. Place the mounting kit on the actuator and make sure it is securely screwed to the actuator.
2. Place the ILVC9003 on the mounting kit and securely screw it to the mounting kit.
3. Secure the controller by tightening the set screws located in the base plate.
4. Check gently if it is fixed motion-free on the actuator. No force should be used for this checking.
5. Connect the air supply to Port 1 (standard 6mm tube).
6. Connect the ILVC9003 to the actuator using Port 2.
7. Plug in the electrical connector to the ILVC9003.
8. Open the air supply.

Calibration with bright LEDs:

1. Remove the screw cover.
2. Press and hold the calibration button for approximately 4 seconds, until the electronics start flashing green, then release the button. The button is located under the electronic module.
3. Wait until the controller stops the calibrating and shows the current position of the actuator (Green or Amber).
4. Put the screw cover back on to the controller.
5. The controller is now calibrated and ready to be used.



Normally push-in fittings are installed for 6mm air tubing. Modifications for other air- fittings are available upon request.

When installing the tubes make sure that:

- The tubing and connections are free of dust and dirt.***
- The appropriate tube diameter is used.***
- The tubes are long enough.***
- The tubes are cut with a 'tube cutter'.***



Pneumatic Connection

Port	Description	Code
1	Supply	P
2	Actuator	A
3	Release	R



Ensure that the ILVC9003 and the mounting kit are mounted securely in place to prevent any malfunctions caused by movement of the controller.



Air connectors should have parallel thread and O-ring.
DO NOT use PTFE tape, as this can cause air leakage and puts tension on the base of the controller.



Avoid magnetic fields around the ILVC9003 valve controller.
Magnetic fields may affect the functionality of the controller.



Be careful while connecting and disconnecting electronic connectors.
There is a risk of an electric shock when not handled properly.



While calibrating, the controller will fully open and close the actuator for proper calibration.
Make sure that this cannot cause any harm or damage.



The bright LED can be blinding or harmful when looked straight into.
Do not remove the dome cover.

Open/Close:

Functionality of the controller:

This chapter described the way the controller operates. Next to this there is an explanation of the different states and feedbacks the controller gives back.

Air flow:

When the solenoid on the controller is de-activated the airflow towards the controller is blocked. The actuator output is connected to the release of the controller. This state causes air to flow out of the actuator. The ILVC9003 will also go to this state when the power is disconnected.

Upon activation of the internal solenoid the air inlet will be connected to the actuator thus allowing the actuator to switch position.

The internal solenoid of the ILVC9003 is activated and de-activated through IO-Link.

Electrical feedback(s):

The ILVC9003 standard mode of operation uses the following rule: The actuator is closed when it is on its lowest position. It is possible to change the position of open and closed. This is done through the IO-Link interface.

When the automatic calibration of the controller is activated, this will be sent back to the master.

All feedback signals are sent through IO-Link.

Visual Feedbacks:

Bright LED feedback:

Close	In between	Open
 GREEN	 BLANK	 AMBER

IODD

When using a product that communicates through IO-Link, you require an IODD file. IODD is an abbreviation for IO-Link Device Description. The IODD is a combination of data and image files that are used to identify and control the ILVC9003.

With the use of IO-Link in combination with the ILVC9003 the controller gets equipped with additional features. Compared to its Direct I/o and AS-I equivalents the controller is easily adjusted to customer changes. Features that are controlled through the IODD are:

- Swap feedback colors;
- Swap position of feedback signals;
- Select solenoid state upon communication loss;

Swap feedback colors:

This feature swaps the colors of the closed and open position of the controller. This feature is equivalent as the feature described in chapter "Swap visual feedback bright LED". However, through IO-Link the colors can be adjusted remotely. This gives easy control and custom possibilities without complicated sequences.

Swap position of feedback signals:

This feature makes it possible to swap the position on which the closed and open signals are sent out. This way you can modify the controller without having to adjust the physical wiring compared to traditional Direct I/O valve controllers.

Select solenoid state upon communication loss:

When the communication with the master is lost the ILVC9003 has to option for to control the solenoid. These options are:

- Turn off solenoid;
- Maintain solenoid state.

By default, the solenoid is turned off to make sure the connected actuator is sent to its safe position (whether this be Normally Open (NO) or Normally Closed (NC). When the option to maintain solenoid state is selected the internal solenoid will maintain its current state whether this is ON or OFF.

Additional features:

We keep developing the IODD file and extend it with additional features to give even more control and custom specifications to the ILVC9003.

Check our website for the latest IODD file: <https://sitomatic.nl/io-link/>

Error description:

Malfunctioning of the ILVC9003 will be indicated by flashing of the amber LED.

Before trying the solutions mentioned below, please ensure that the unit is mounted securely onto the actuator (this includes the mounting kit). The unit needs to complete its calibration on the actuator it is placed on for proper operation.

LED blinking:	Description:	Possible cause:	Solution:
1 time	No calibration in the controller.	The controller has not been calibrated before.	Calibrate the controller.
2 times	Controller lost position.	No air flow.	Check air connections. Check for pressure on the air inlet.
		Long magnetic interference.	Remove nearby magnets when possible. Re-calibrate if the magnets cannot be removed.
		Controller moved on the actuator.	Reposition the controller and secure its position with the screws.
3 times	Controller did not reach its designated position.	Controller has been placed on a different actuator and has not been calibrated.	Calibrate the controller.
		The actuator cannot fully open or close.	 Refer to the manual of the valve-manufacturer on how to safely solve this problem.
4 times	Controller did not move after activation of solenoid.	No air flow.	Check air connections. Check for pressure on the air inlet.
		Actuator is leaking.	Solve leakage.
		Valve is blocked.	Check valve clearance.
5 times	An error occurred during calibration	Magnetic spindle incorrect or not assembled	Assemble the spindle according to the required mounting kit
		No air flow.	Check air connections. Check for pressure on the air inlet.



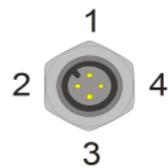
While calibrating, the controller will fully open and close the actuator for proper calibration. Make sure that this cannot cause any harm or damage.



Air connectors should have parallel thread and O-ring. DO NOT use PTFE tape, as this can cause air leakage and puts tension on the base of the controller.

Wiring diagram:

Electrical data	
Power supply [V]	: 24 DC
Power Consumption	: <1,5W or <50mA
Open feedback colour [dome led]	: Amber *
Close feedback colour [dome led]	: Green *
Connector	: M12x1 male
No. of pins	: 4
Position feedbacks	: Through IO-Link
Solenoid control	: Through IO-Link
Pin lay-out	Front view male connector
1. 24V DC	: Brown
2. N.C.	:
3. Ground	: Blue
4. C/Q	: Black
Connection type	: Class A M12-4



* Colours can be inverted to switch visual feedback.

Maintenance:

We point out that you should take care of the equipment according to common technical rules. In case of inappropriate operation or handling by unqualified personnel the guarantee of the manufacturer will not be valid.

Some parts of the controller should be checked on a regular basis. The interval between the checks depends on the surroundings of the controller but should not exceed a year time. The check includes, but is not limited to, the following parts:

- Screw cover.
- Air connection(s).
- Electrical connector.
- O-ring seal of the screw cover.
- Base plate.

Maintenance should be performed by trained and qualified personnel

Cleaning the exterior:



Before applying cleaning liquids make sure that they do not damage the equipment.



In case the equipment is contaminated with acids or alkaline cleaner, we recommend rinsing with clean water within 30 minutes. Particular attention must be given to any opening(s) in order to prevent crack formation.



Be careful using liquids on the controller.

If liquid gets inside the connector and/or controller it may cause a short circuit or an electric shock.

Repair:

The valve controller will function without maintenance and trouble if it is appropriately used. In the event of failure, you have the possibility of exchanging parts by your own personnel or to exchange the entire valve controller. The malfunctioning valve controller can be sent to the following address for repair or inspection:

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