Installation manual

Micro Joystick

Micro Joystick Omni (P002-51) - Micro Joystick R-net (P002-52)

mo-vis

moving forward together

Contents

About this manual

Installation manual

This manual contains **useful and important information** about your device. **Please read it carefully before use and store safely for future reference**.

Our team will be happy to answer your questions.

mo-vis bv

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CE

Important information

⚠ CAUTION: Incorrect use or installation may lead to risk of injury to the user and damage to the wheelchair or other property. In order to reduce these risks, you should carefully read this installation manual, paying particular attention to the safety instructions and warning texts.

📄 NOTICE: Only install this product on a wheelchair where the wheelchair manufacturer allows the installation of third party parts.

Warranty

mo-vis bv warrants the product to be free from defects in material and workmanship for a period of 2 years under proper use, care and service. The dealer should never keep mo-vis products in stock for a period more than 6 months prior to delivery to the end-user. mo-vis' warranty will never exceed a period of 2 years and 6 months after shipment.

All warranties do not extend beyond the initial purchaser from an authorized mo-vis dealer or mo-vis itself.

Repair and replacement

For warranty service, contact your dealer (or us if bought directly). In the event of a defect in material or workmanship, the dealer or customer must obtain a Return Merchandise Authorization (RMA) number from us. The product must be shipped to a service centre designated by mo-vis. mo-vis will repair or, at mo-vis' option, replace any product covered by the warranty.

Amendments

No person is authorized to alter, extend or waive the warranties of mo-vis.

Disclaimer and limitations of remedies

The express warranties set forth in this agreement are in lieu of all other warranties of merchantability or fitness of purpose. In no event shall mo-vis be liable for any direct, indirect, incidental or consequential damages resulting from any defect in this product.

Warranty of parts subject to "normal wear and tear" (e.g. joystick handles, pads, …) are not covered in the warranty except as it applies to defects in material or construction.

Voiding of warranties

The foregoing warranties are contingent upon the proper installation, use, maintenance and care of the product. The warranty will be void if the product has been installed or used improperly, or if it has been repaired or any part replaced by persons other than mo-vis or an authorized dealer. This product is considered as a non-serviceable part.

The addition of equipment or features that are not manufactured or recommended by mo-vis could affect the intended function of the mo-vis product and may invalidate the warranty.

Technical support

Warning labels

Please read this manual, the safety instructions and warning texts carefully, in order to reduce the risks associated to the device. Our products are safe under normal and reasonably foreseeable operating conditions.

NOTE: This symbol indicates general notes and information.

⚠ **CAUTION:** This symbol indicates caution for a hazardous situation that, if not avoided, could result in minor or moderate injury.

⚠ **WARNING:** This symbol indicates a warning for a hazardous situation that, if not avoided, could result in death or serious injury.

Limited liability

mo-vis accepts **no liability** for personal injury or damage to property
that may arise from the failure of the user or other persons to follow the
recommendations, warnings and instructions in this manual.

⚠️ **CAUTION:** Carry out only the service and maintenance activities
specified in this manual, as long as you comply with the demands
stated in this manual for a specific action. In case of doubt, contact mo-
vis.

⚠️ **WARNING:** The device should always be tested without any person
sitting in the wheelchair after every alteration of the physical
installation or adjustment of the parameters.

Preparations

⚠️ **CAUTION:** Before you start with the installation:

- Please check the packaging and verify that all items are included.
- Make sure that you have all the necessary documentation and knowledge to install this device.
- Check the condition of the device.

Qualified service engineer

Only a qualified service engineer may install the device.

⚠️ **CAUTION:** An incorrect programming of the wheelchair electronics may cause damage to the devices, or injury to the user.

Tools

Use an Allen wrench to install the device.

⚠️ **CAUTION:** Use proper tools to install and adjust the device. The use of improper tools may cause damage to the device.

Installation plan

Set up an installation plan before beginning the installation. Based on the users' needs and capabilities, this plan should take into account:

• Where which part of the device should be placed.

• How the device will be operated.

• A robust and reliable positioning. Hard or sudden movements of the wheelchair may not disorganize the installation.

⚠ **WARNING:** Protect the device against bumps. Mind damaging the unit and wiring. Make sure that cabling is mounted in such a way that excessive wear and tear is avoided.

⚠ **WARNING:** Do not use the joystick as only support for hands or limbs. Movements and shocks may disrupt controls.

Installation

1   Define the position of the joystick.

When the arrow at the bottom of the joystick points to the front, a forward movement of the joystick will result in an according forward movement of the wheelchair.

If needed, you can change this positioning in steps of 90° with the Configurator Software.

2   Place the mounting ring around the joystick housing.

3   Secure the Q2M half clamp to the mounting ring.

Use an Allen wrench to mount the 20 mm bolt.

> 📄 **NOTE:** It is not advised, but you may mount the joystick without using the Q2M half clamp.

> ⚠️ **CAUTION:** Tighten the screws firmly, but not excessively. Excessive force may damage the unit.

4   Slide the unit over a Q2M Rod, or any other 6 mm rod, to position the Micro Joystick on the wheelchair.

A Q2M Rod D6 50 mm is included in your package, but you can use any other Q2M Rod (e.g. a C- or S-Rod from the Multi Swing).

5   Place and secure the interface unit and all cabling on the wheelchair.

> ⚠️ **WARNING:** Place the Interface unit with the connectors facing downwards. This is to prevent water from entering the Interface unit.

6 Place a power on/off (pwr) and/or mode (in) switch, secure their cabling and insert their connections. You can use the connections on the Interface unit.

> ⚠️ **CAUTION:** Before inserting a connector, remove the protective cover. If the connections are not used, always put or keep the protective covers in.

> ⚠️ **CAUTION:** This is Class I Medical Device (*MDR 2017/745*). All accessories, including switches, must also comply with the *MDR 2017/745* regulations (e.g. the mo-vis *Twister*, tested according to *EN12184* standards).

7 Connect the cabling to the wheelchair electronics.

> ⚠️ **CAUTION:** All wheelchair electronics must be switched off during installation.

Operation

The movements of the joystick are translated into according movements of the wheelchair, e.g. driving or menu navigation.

Common practice to navigate the wheelchair with the joystick is as follows:

- **Direction**: point the joystick into the direction you want the wheelchair to move. The wheelchair then moves in that direction.
- **Speed**: the further you move the joystick from the default (center) position, the faster the wheelchair moves.
- **Stop**: whenever you release the joystick, the joystick moves back to the default (center) position and the wheelchair stops.

⚠️ **CAUTION:** Avoid hitting obstacles during driving.

⚠️ **WARNING:** When the LED light flashes and/or after every incident with the wheelchair or the mo-vis device, contact your dealer immediately to perform a functional test.

Configuration

⚠ **WARNING:** Changes in parameter settings may cause damage to the device or power chair, or may cause injury to people.

⚠ **CAUTION:** Always change parameters and test the outcome without anyone sitting in the power chair.

Software download

- You can download the Configurator Software on our website http://www.mo-vis.com

- Software requirement: Windows version 10

- For all details on how to install and use the software, we refer you to the *Configurator Software manual*.

- To configure the parameters of the device, you need dealer level access. This level is password-protected. Contact mo-vis to obtain the password.

📄 **NOTE:** Never share your password with anyone and keep access to the Configurator Software strictly personal.

Defining parameter settings

1   Connect the device to a PC. Use a standard mini-USB-USB cable.

> ⚠ **CAUTION:** Before inserting a jack or USB cable, remove the
> protective cover. If the connections are not used, always put or
> keep the protective covers in.

2   Configure the parameters with the software.
3   Upload the configuration.
4   Test the configuration and adjust if necessary.

Parameter settings

SETTING	DESCRIPTION	PARAMETERS	
Mounting direction	It can be easier to mechanically mount the joystick under an angle. This function swaps the joystick axis per 90° clockwise, to compensate for the rotation of the joystick.	**0°**	Default
		0°	Min.
		270°	Max.
		90°	Step
Dead band	Neutral zone around the joystick center position. Prevents creeping of the wheelchair after releasing the joystick.	**5%**	Default
		5%	Min.
		10%	Max.
		1	Step
	📄 **NOTE:** Most wheelchair electronics have their own dead band setting. It is advised to keep the default setting of the mo-vis device.		

SETTING	DESCRIPTION	PARAMETERS	
Compensation mode	Defines activation of the compensation algorithm. For R-net: can be set individually for each profile.	**Off**	Always deactivated
		Manual	(De)activated manually by the user
		On	Always activated
Compensation factor	Lowers forward/backward (Y) driving speed on rough terrain. Wheelchair type and weight have an impact on this factor: • Heavy loaded wheelchairs may need to lower the setting to 'Weak'. • Light wheelchairs may need to increase the	Very weak	Almost no slow down
		Weak	Slows down less compared to normal
		Normal	Default setting
		Strong	Slows down more compared to normal

SETTING	DESCRIPTION	PARAMETERS	
	setting to 'Strong'. • If the joystick is mounted on a location that may multiply the value of a shock (e.g. on an arm), the setting should be lowered to 'Weak' or 'Very weak'. • Frontwheel-driven wheelchairs are less affected by this factor than rearwheel-driven	Very strong	Slows down more compared to strong
X compensation	To limit the steering reaction if the wheelchair over-reacts on steering commands. This may happen due to compensation on the X direction that prevents the wheelchair to overcome an obstacle due to the loss of torque. The value is based on the compensation in Y direction.	**None**	No compensation
		1/2 Y	X = 50% of Y level
		2/3 Y	X = 66% of Y level
		Equal Y	X = 100% of Y level

SETTING	DESCRIPTION	PARAMETERS	
(De)activation pattern	Active if compensation mode is set to 'Manual'. To activate/deactivate: nudge the joystick Forward + Backward + Forward. • Agile users may be able to execute this pattern quite quickly. • Set this parameter according to the agility of the user. 📄 **NOTE:** 'Slow' may cause the wheelchair to drive while executing the pattern.	Fast	Fast executing speed
		Normal	Normal executing speed
		Slow	Slow executing speed
Tilt	The joystick can detect the	On	

SETTING	DESCRIPTION	PARAMETERS	
	joystick tilt.	**Off**	
	The wheelchair will stop driving when the parameter is set to 'On' and the joystick is tilted more than 70° in any direction (LED will flash orange).		
	The tilt sensor inhibit becomes inactive again when the angle becomes less than 60° (green LED is on, see Omni Joystick Connection on page 30 and R-net Joystick Connection on page 37).		
	The use of this functionality certainly makes sense when a mo-vis joystick is integrated in a tray or other tilting surface/mounting aid.		
	📄 **NOTE:** The tilt sensor response time is less than or equal to 1s.		

Testing

After installation of the device, execute the following tests before the wheelchair is delivered or put into service, in according order:

Check the device for intactness

Check whether:

- The device is not bent or damaged.
- Housing, cabling and all connectors are not damaged.
- The device returns to its default position when moving and releasing the joystick forward, backward, left and right.

Operational test

> ⚠ **CAUTION:** Execute this test only on a level surface, with at least one metre of free space around the wheelchair.

⚠️ **CAUTION:** The wheelchair may start to move during the test.

1. Activate the wheelchair operating system.
2. Check for any error message.

> 🔧 **TROUBLE:** for more information on the error messages, see Omni Joystick Connection on page 30 and R-net Joystick Connection on page 37

3. Move the joystick slowly forward until you hear the parking breaks switch off.
4. Immediately release the joystick. You should hear the parking break react within a few seconds.
5. Repeat 3 and 4 three times, while slowly moving the joystick towards you, to the left and to the right.
6. Check whether the power on/off (pwr) and mode (in) switch function properly.

Test drive

Do a test drive with the wheelchair.

1. Check whether the wheelchair and all its functionalities function correctly in all positions the user may use the joystick and switches.
2. Check whether cables or parts may not get damaged or hindered in any possible position of the wheelchair.

Stop test

Drive full speed ahead and shut down the wheelchair with the power on/off switch.

The wheelchair may not suddenly stop, but must slow down to a gradual stop.

First time use

During first time use by the user, it is advised that the dealer or service engineer assists and explains the different possibilities to the user and/or his attendant. If needed, the dealer can make final adjustments.

> ⚠️ **CAUTION:** It is important that the customer is fully aware of the installation, how to use it and what can be adjusted to optimize his/her experience.

1   Explain and show the customer how you have executed the installation and explain the functionality of every (new) button.
2   Have the user test all positions of the device. If needed, adjust the (position of the) device.

    •   Are the joystick and the switches within easy reach?
    •   Can the user safely operate the power chair with the least effort?
    •   Is the placement of the device in all available positions optimal for the user?

3   Explain the possible problems and how to address them, to the user.
4   Draw the user's attention to the following:

> ⚠️ **WARNING:** A functional test is needed when the LED light flashes and/or after every incident with the wheelchair or the mo-vis device.

⚠️ **WARNING:** The device should never be covered or blocked in order to avoid uncontrollable behavior of the joystick and/or the wheelchair.

Maintenance

The device is maintenance-free. Under regular circumstances of use, the device and different parts do not require additional maintenance. Please refer to the *User Manual* of the device for cleaning instructions.

> ⚠️ **WARNING:** As dust and dirt could lead to reduced functionality, all parts of the device should be cleaned on a regular basis (monthly) or whenever needed.

Monthly inspection

Monthly, or whenever needed, check whether:

• All bolts and screws are still firmly tightened.

• There is no damage to any wiring.

• There is no excessive wear to any of the parts.

Yearly inspection

We advise to have at least yearly a full check of the wheelchair and its operating systems by a qualified service engineer.

Error codes

Omni Joystick Connection

Purpose

A mo-vis Omni Joystick has a cable with a SUB D9 connector and a 3.5 mm jack connection. They can be plugged in directly to the electronics of the wheelchair. The joystick then controls the wheelchair in all its functions (driving, electric gears, lights …).

Connectivity

The Omni Joystick allows you to connect to a wheelchair with a Curtiss-Wright Omni or Omni2 display.

Optional mo-vis adapters allow you to connect the Omni Joystick to a wheelchair with:

- **DX**: Joystick Interface Omni-DX (P002-31)
- **Easy Rider**: Joystick Adapter Omni-Easy Rider (M002-90)
- **Otto Bock Curtis electronics**: Joystick Interface Omni-Otto Bock Curtis (P002-37)

📄 **NOTE:** Third-party adapters might also be compatible with the mo-vis Omni Joysticks.

Features

The Omni Joystick Connection is an integrated part of a mo-vis Omni Joystick and consists of:

• Omni (SUB D9) connector with cable
• 3.5 mm mono jack out with cable

LED status

The illumination of the LED on the joystick interface indicates the operational status of the joystick.

JOYSTICK STATUS	TILT PARAMETER	JOYSTICK TILTED	LED STATUS
Operational	Enabled	N	LED on
Operational	Enabled	Y	LED flashes as heartbeat
Operational	Disabled	Y	LED on
Operational	Disabled	N	LED on
Error	X	X	Flash the error code

Error codes

FLASH COUNT	REASON	REQUIRED ACTION
1	-	-
2	Connection cable/driver issues	Check/replace cable to wheelchair, and / or check / replace sensor cable (if available), or replace PCB
3	Power supply	Check cable and/or replace PCB
4	Joystick/sensor fault	Check/replace joystick
5	-	-
6	ADC - internal Analog to Digital converter	Replace PCB
7	Test flag failed or Diagnostic failed	Redo tests and/or replace PCB

FLASH COUNT	REASON	REQUIRED ACTION
8	CPU fault	Replace PCB
9	Scheduler fault	Update software or replace PCB
10	Coding error	Update software or replace PCB

Fault log

🔧 **TROUBLE:**
A fault log with counters is maintained. The fault log can be accessed by the configurator (dealer level). Below is an overview of registered faults.

FAULT	REASON	REQUIRED ACTION
CPU error RAM	CPU consistency check failed	Contact mo-vis
CPU error FLASH		
CPU error EEPROM		
Run error scheduler	Firmware consistency check failed	Contact mo-vis
Code error framework		
Code error application		
MSP command corrupt	Corrupt command was received	Connection with the PC went wrong, try again

FAULT	REASON	REQUIRED ACTION
MSP command unknown	Unknown command was received	Connection with the PC went wrong. Update firmware (contact mo-vis) or update the Configurator Software. Try again.
MSP sub command unknown	Unknown sub command was received	
MSP argument invalid	Invalid argument received	
MSP device not ready	Device was not ready to receive an MSP command	Connection with the PC went wrong. Update firmware (contact mo-vis) or update the Configurator Software. Try again.
MSP device wrong state	The device is not able to receive a command in the current device	
PCB test failed	Factory test failed	Contact mo-vis
Assembly test failed		
Field test failed	Field test failed (calibration)	
Test flag check	One or more test flags not set	Redo tests and/or contact mo-vis

FAULT	REASON	REQUIRED ACTION
ADC	ADC conversion error	Check/replace Omni cable (only authorized dealers) or contact mo-vis
Output	The Omni outputs are out of spec.	
Reference	The Omni reference is out of spec.	
Communication	Communication with the sensor (joystick) failed	Check cable to sensor and/or replace sensor (only authorized dealers) or contact mo-vis
Sensor (joystick)	The sensor (joystick) is faulty	
Accelerometer	The accelerometer fails	Contact mo-vis

R-net Joystick Connection

Purpose

An R-net joystick has a communication cable with an R-net connector. The cable can be directly plugged into the R-net electronics of the wheelchair. The joystick then controls the wheelchair in all its functions (driving, electric gears …).

For more information about the R-net system, please refer to the Curtiss-Wright website http://www.cw-industrialgroup.com

Connecting the R-net communication cable

To connect the communication cables, insert the connector into its mate and push firmly.

The connector is inserted correctly if the yellow pins are completely invisible. The connectors are secured using a friction system.
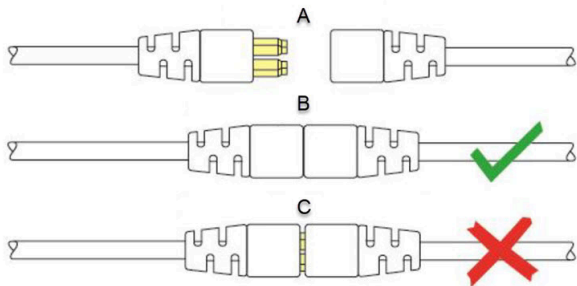
A	not connected
B	correctly connected
C	incorrectly connected

To disconnect the communication cables, firmly hold the connector housing and pull the connectors apart.

📄 **NOTE:** Pull the connector apart in a straight line to not damage the connection pins.

Micro Joystick Installation manual

R-net parameters

Some R-net parameters need to be set for correct usage of the mo-vis R-net joysticks. For this we refer to the *Curtiss-Wright manual SK77981-14 | R-net Technical Manual | Chapter 3 - Progamming*

R-net (Ch. 3 - 4.4):**Profile Management** > **Input Device Type**:

- In most cases, this parameter needs to be set to Universal for all mo-vis joysticks.

- In combination with certain other devices (e.g. Scoot Control), it is advised to set this parameter to JSM. Please refer to the *Installation manual* of the other devices for more information.

> 📄 **NOTE:** If you have several input devices of the same type, please refer to the *Curtiss-Wright manual SK77981-14 | R-net Technical Manual | Chapter 3 - Programming* to install as **Input Device Subtype**.

R-net (Ch. 3 - 7.5): **Controls** > **Global** > **Profile Button**: the default setting of this parameter is Profiles. If you want access to the modes for control of other wheelchair functionalities, such as seating positions, etc., then you have to select Profiles/Modes.

LED status

The illumination of the LED on the joystick interface indicates the operational status of the joystick.

R-NET STATUS	TILT PARAMETER	JOYSTICK TILTED	LED STATUS
Out of focus	X	X	LED flashes as heartbeat
In focus	Enabled	N	LED on
In focus	Enabled	Y	LED flashes as heartbeat
In focus	Disabled	Y	LED on
In focus	Disabled	N	LED on
Configuring	X	X	LED flashes fast
Power cycle	X	X	LED flashes as heartbeat
Error	X	X	Flash the error code

Error codes

🔧 **TROUBLE:**

When a fault occurs, the LED of the mo-vis Joystick will start to flash. A long delay is followed by a number of flashes with a short delay. The error message depends on the connection type. Count the number of flashes and look up the according error message in the table below:

FLASH COUNT	REASON	REQUIRED ACTION
1	-	-
2	Connection cable/driver issues	Check/replace cable to wheelchair, and / or check / replace sensor cable (if available), or replace PCB
3	Power supply	Check cable and/or replace PCB
4	Joystick/sensor fault	Check/replace joystick
5	-	-
6	ADC - internal Analog to Digital converter	Replace PCB
7	Test flag failed or Diagnostic failed	Redo tests and/or replace PCB
8	CPU fault	Replace PCB

FLASH COUNT	REASON	REQUIRED ACTION
9	Scheduler fault	Update software or replace PCB
10	Coding error	Update software or replace PCB

R-net trip codes

TROUBLE:
When a fault is detected by the device, an R-net trip code will be generated. The trip code will be shown on the joystick (if it is present and equipped with a graphic display). The trip code will also be logged in the R-net system and can be investigated using the R-net PC Programmer.

If you want to learn more about trip codes, see the *Curtiss-Wright manual | SK77981-14 R-net Technical Manual*.

Fault log

TROUBLE:
A fault log with counters is maintained. The fault log can be accessed by the configurator (dealer level). Below is an overview of registered faults.

FAULT	REASON	REQUIRED ACTION
CPU error RAM	CPU consistency check failed	Replace PCB
CPU error FLASH		
CPU error EEPROM		
Run error scheduler	Firmware consistency check failed	Update Software or replace PCB
Code error framework		
Code error application		
MSP command corrupt	Corrupt command was received	Connection with the PC went wrong, try again

FAULT	REASON	REQUIRED ACTION
MSP command unknown	Unknown command was received	Connection with the PC went wrong. Update firmware (contact mo-vis) or update the Configurator Software. Try again.
MSP sub command unknown	Unknown sub command was received	
MSP argument invalid	Invalid argument received	
MSP device not ready	Device was not ready to receive an MSP command	Connection with the PC went wrong. Update firmware (contact mo-vis) or update the Configurator Software. Try again.
MSP device wrong state	The device is not able to receive a command in the current device	
PCB test failed	Factory test failed	Contact mo-vis
Assembly test failed		
Field test failed	Field test failed (calibration)	
Test flag check	One or more test flags not set	Redo tests and/or contact mo-vis

FAULT	REASON	REQUIRED ACTION
ADC	ADC conversion error	Check R-net cable, replace PCB interface

FAULT	REASON	REQUIRED ACTION
R-net Uart overflow	Uart send queue is full	Replace PCB
R-net Uart Underflow	Uart receive queue is empty	
R-net Communication timeout	Maximum number of packet retransmissions is reached	Replace PCB
R-net Tx overflow	Packet transmit buffer is full	
R-net Rx overflow	Packet receive buffer is full	Replace PCB
R-net invalid seq nr	Received a packet with an invalid sequence number	
R-net data packet error	Data packet ACK mismatch	Replace PCB
R-net data descr error	Invalid packet data descriptor	

FAULT	REASON	REQUIRED ACTION
R-net Api version error	The R-net chip contains an invalid API version	Load the latest API version into the R-net chipset with the R-net dongle
R-net chip tripped error	The R-net chipset has encountered an internal error	Internal chipset error: Replace PCB R-net system error: solve R-net system error
Communication	Communication with the sensor (joystick) failed	Check cable to sensor and/or replace sensor (only authorized dealers) or contact mo-vis
Sensor (joystick)	The sensor (joystick) is faulty	
Accelerometer	The accelerometer fails	Replace PCB interface

Supported R-net parameters

The following R-net parameters of the wheelchair electronics may or may not be supported by the mo-vis joysticks.

PARAMETER	SUPPORTED	FIRMWARE VERSION
Global parameter		
Momentary screens enabled	N	
Change profile while driving	N	
Change speed while driving	N	
Actuator switches while driving	N	
Speed adjust	N	
Profile button	Y	V02.00
Actuator endstop beep	N	
Sounder volume	Y	V02.03
Start-up beep	N	
Lock function enabled	N	
Reverse driving alarm	Y	V02.00

PARAMETER	SUPPORTED	FIRMWARE VERSION
Emergency stop switch	N	
OBP keycode entry	N	
Power-up mode	N	
External profile jack function	N	
Profile / mode jack detect	N	
On / off jack detect	N	
Profiled parameter		
Joystick forward throw	Y	V02.01
Joystick reverse throw	Y	V02.01
Joystick left throw	Y	V02.01
Joystick right throw	Y	V02.01

PARAMETER	SUPPORTED	FIRMWARE VERSION
Joystick deadband	N 📄 **NOTE:** Use dead band setting in the mo-vis configurator	
Invert left/right JS axis	Y	V02.01
Invert fw/rev JS axis	Y	V02.01
Swap joystick axis	N 📄 **NOTE:** Use rotate function in the mo-vis configurator	
Change mode while driving	Y	V02.00
Sleep timer	Y	V02.00
Standby timer	Y	V02.00
Switch to standby	Y	V02.01
Mode selection in standby	Y	V02.01

PARAMETER	SUPPORTED	FIRMWARE VERSION
Standby in modes	Y	V02.01
Standby forward	Y	V02.00
Standby reverse	Y	V02.00
Standby left	Y	V02.00
Standby right	Y	V02.00
Remote selection	Y	V02.03
Background	N	

Technical data

Product description & code

- P002-51 Micro Joystick Omni
- P002-52 Micro Joystick R-net

Interface connectors

- 3.5 mm mono jack on/off
- 3.5 mm mono jack in mode
- mini USB
- connector cable, depending on the joystick version (see Omni Joystick Connection on page 30 or R-net Joystick Connection on page 37 for more information)

Dimensions

	Metric	Imperial
Joystick	50 mm x 29 mm x 29 mm (HxWxD)	1.97 in x 1.41 in x 1.41 in

Ball	16 mm x 18 mm x 18 mm (HxWxD)	0.63 in x 0.71 in x 0.71 in
Cup	15 mm x 11 mm x 11 mm (HxWxD)	0.59 in x 0.43 in x 0.43 in

Required force

Required force: ca. 8 gr (0.28 oz)

Go to our website for more information on our products or share your experience with us via email.