

Installation Manual

Edition 2.1, August 2023

Multi Swing 2G Arm

P031-61 Multi Swing 2G Arm - P031-62 Multi Swing 2G Arm Bundle Q2M
- P031-63 Multi Swing 2G Arm Bundle Rail




moving forward together

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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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CH-REP: SKS Rehab AG, Im Wyden, 8762
Schwanden GL, Switzerland.



UK Responsible Person: QServe Group UK,
Ltd., 49 Greek Street, London, W1D 4EG,
UK.

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 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




TROUBLE:


In case of technical problems:

- 1 Contact mo-vis at contact@mo-vis.com or +32 9 335 28 60.
- 2 Always state the device serial number when contacting us. This ensures you are provided with the correct information.

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.

Other labels:

	Catalogue number: indicates the manufacturer's catalogue number so that the medical device can be identified.
	Batch code: indicates the manufacturer's batch code so that the batch or lot can be identified.
	Medical device: indicates that the item is a medical device.
	Date of manufacture: indicates the date when the medical device was manufactured.
	Serial number: indicates the manufacturer's serial number so that a specific medical device can be identified.
	Consult instructions for use or consult electronic instructions for use: indicates the need for the user to consult the instructions for use.
	Keep dry: indicates a medical device that needs to be protected from moisture.

	<p>Do not use if package is damaged and consult instructions for use: indicates that a medical device should not be used if the package has been damaged or opened and that the user should consult the instructions for use for additional information.</p>
	<p>CE label: indicates that the manufacturer or importer affirms the good's conformity with European health, safety, and environmental protection standards.</p>
	<p>WEEE: indicates that the product should not be discarded as unsorted waste but must be sent to separate collection facilities for recovery and recycling.</p>
	<p>Manufacturer: indicates the medical device manufacturer.</p>

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.



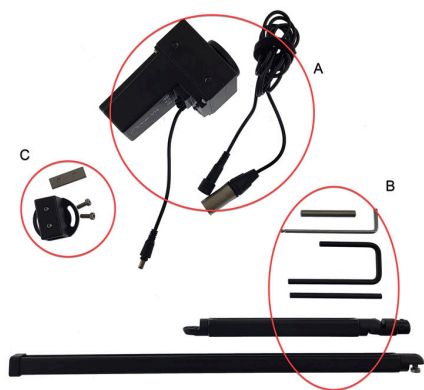
CAUTION: Carry out only the service and maintenance activities specified in this manual, as long as you comply with the demands stated in this manual for a specific action. In case of doubt, contact mo-vis.



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.

Parts and accessories

P031-61 Multi Swing 2G Arm



A	P031-50 Multi Swing 2G Motor Unit
B	M031-66 Q2M Joint Arm Assembly
C	M031-74 Q2M Joint Multi Swing 2G Adapter Set

Figure 1: P031-61



A1	P012-40 mo-vis Power Cable
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Figure 2: A = P031-50

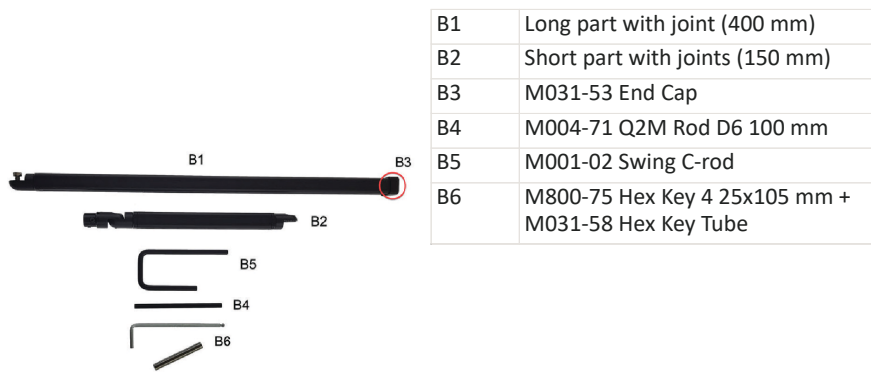


Figure 3: B = M031-66



Figure 4: C = M031-74

C1	M031-52 Q2M Joint Push Plate
C2	M031-56 Q2M Joint Multi Swing 2G Adapter
C3	2 x PMBCH-00034 M5x10 D7984 A2 SS
C4	2 x PMSCS-00023 M5x6 Flat DIN913-A2 SS

The different parts of the Multi Swing 2G can be installed in different ways, allowing a flexible placement for the user. By default, we assume that the Multi Swing 2G will be placed on the right side of the wheelchair for a horizontal movement. However, it can be mounted for vertical movement and/or on the left side of the wheelchair. You will have to

adjust the parameters in the Configurator Software then (see [Parameter settings on page 32](#)).

P031-62 Multi Swing 2G Arm Bundle Q2M

For installation on a wheelchair where a round tube is available on the backside of the wheelchair, we suggest using the P031-62 Multi Swing Arm Bundle Q2M.

In the P031-62 the P031-61 Multi Swing 2G is included, as well as the M031-99 Multi Swing 2G Mounting Set Q2M.

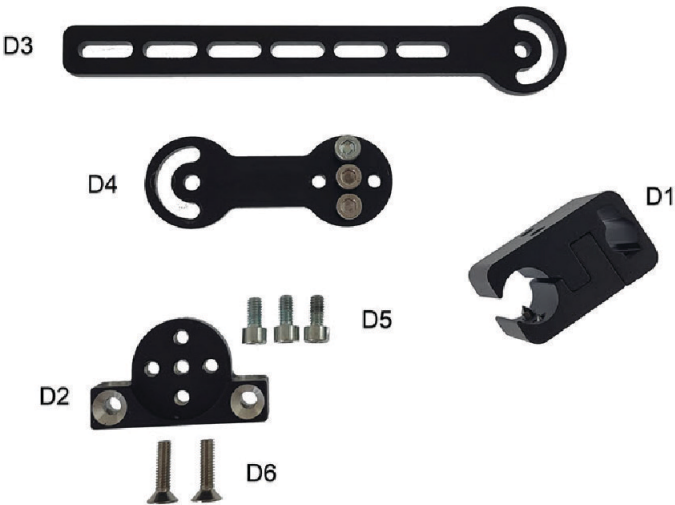


Figure 5: D = M031-99

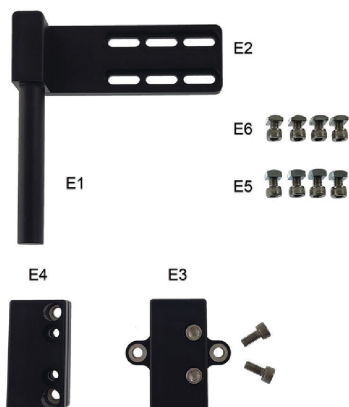
D1	M007-01 Q2M Universal Clamp
----	-----------------------------

D2	M031-23 Multi Swing 2G Dogbone Adapter
D3	M004-11 Q2M Dogbone Slide In (200 mm)
D4	M004-12 Q2M Dogbone Extension Straight (incl. mounting screws)
D5	3 x PMBCH00015 M6x12 DIN912 A2 Stainless Steel
D6	2 x PMBCS00012 M6x22

P031-63 Multi Swing 2G Arm Bundle Rail

For installation on a wheelchair where a rail system is available on the backside of the wheelchair, we suggest using the P031-63 Multi Swing Arm Bundle Rail.

In the P031-63 the P031-61 Multi Swing 2G Arm is included, as well as the M031-93 Multi Swing 2G Bracket Set Rail.



E1	M031-95 Multi Swing 2G Bracket Axle
E2	M031-96 Multi Swing 2G Bracket Base Plate
E3	M031-97 Multi Swing 2G Bracket Vertical
E4	M031-98 Multi Swing 2G Bracket Horizontal
E5	Set 1 of 4 x Mounting bolts M6x10 + nuts 10x10x5
E6	Set 2 of 4 x Mounting bolts M6x8 + nuts 10x10x4

Figure 6: E = M031-93



NOTE: Part E includes E3 and E4 for horizontal OR vertical installation. See [Multi Swing Arm Bundle Rail](#) on page 27 for more information.



NOTE: Two sets of bolts and nuts are included to be compatible with different types of rails provided by the wheelchair manufacturer.

Accessories

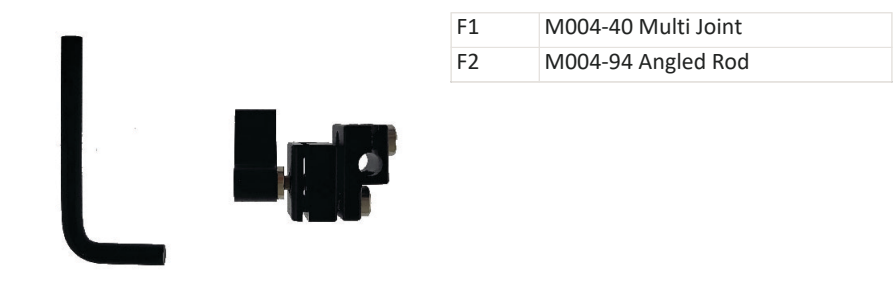
The input jack is of the stereo type, allowing dual channel use. To use both channels, a splitter cable is needed (e.g. PMCAB-00027 Stereo to Mono Splitter 3.5 mm, see picture).



There are also several accessories available to facilitate mounting of the mo-vis joystick on the Multi Swing 2G Arm.



Figure 7: F1 = M004-40 Multi Joint for Micro Joystick



F1	M004-40 Multi Joint
F2	M004-94 Angled Rod

Figure 8: M004-51 Q2M Multi Joystick Chin Control Adapter Set



F1	M004-40 Multi Joint
F2	M004-94 Angled Rod
F3	M004-45 Mounting Plate

Figure 9: M004-52 Q2M All-round Joystick Chin Control Adapter Set

Spare parts

The following parts are available as spare part:

- **A1:** P012-40 mo-vis Power Cable
- **B3:** M031-53 End Cap
- **Plastic cover:** M031-43 Q2M Joint Extrusion Cover L365
- **C:** M031-74 Q2M Joint Multi Swing 2G Adapter Set

If the arm is too short for the set-up you require, you can replace the M031-67 Q2M Extrusion 400 mm + Adapter with the M031-79 Q2M Extrusion 600 mm + Adapter.

Combination with P001-50

If you still have an 'old' Multi Swing motor unit of the first generation, it is possible to combine that with the new arm.

You can then use:

- P001-50 Multi Swing Motor Unit
- M001-70 Multi Swing Mounting Set (optional for bundle version)
- M031-73 Q2M Joint Manual Swing Adapter Set
- M031-66 Q2M Joint Arm Assembly

Preparation

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 and/or the mounting sets.



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



CAUTION: Do not tighten the screws with excessive force.

Installation plan

Before you begin

Check whether:

- The device is not bent or damaged.
- Housing, cabling and all connectors are not damaged.

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.



CAUTION: Make sure that there are no objects or people within the opening range of the arm, to avoid pinching.



NOTE: Make sure that the wheelchair is in the normal position for the user when you start the installation (so tilt and recline the chair to a normal position for the user).

Step 1: motor unit

- 1 How will you place the motor unit?
 - Left or right?

- Horizontal or vertical movement?
 - Horizontal placement:



NOTE: This is the best position to have visibility of the motor unit for the attendant or installer.

- Vertical placement:



- How far should the arm open?



NOTE: Mount the Multi Swing 2G motor unit in such a way that the jacks are protected as much as possible from water entering.


- 2 Once you have decided how you want to place the motor unit, connect it to the wheelchair via part A1. Connect a normally open button (e.g. mo-vis Twister) to the red jack of the motor unit. Also connect the motor unit to the configurator (see [Defining parameter settings on page 31](#)). Adjust the following parameters if necessary: **Open angle** and **Mounting** (see [Parameter settings on page 32](#) for more information).
- 3 Move the arm to its end stop. A first push on the button connected to the red jack will close the arm as long as you press the button or until it has reached its end stop. A second push on the button will open the arm as long as you press the button or until it has reached its maximum open angle. Before proceeding to the next step, make sure that the arm is at its end stop.




NOTE: This is a very important step, as the arm is most stable at its end stop. If you carry on with the mounting without paying attention to the end stop, the result of your installation will be less stable.

Step 2: Multi Swing Adapter Set

The Multi Swing 2G Adapter Set is used to connect the Multi Swing 2G arm to the Multi Swing 2G motor unit.

 **NOTE:** Part C1 is included. Put this piece safely aside, until you slide the arm through the Adapter. Make sure you don't lose this.

At the end-stop position: place part C onto part A and attach it into the slots that fit the optimal position for the user.

 **NOTE:** At this point in the installation, it is still a preliminary fitting. Don't over-tighten the screws as you might have to change the position later on.

Step 3: Arm Assembly

The M031-Arm Assembly is composed of several elements, which have to be put together

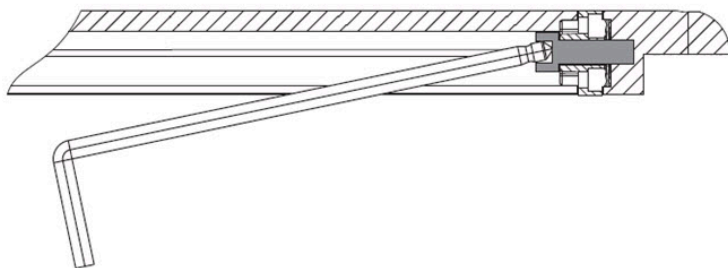
- 1 Remove the plastic cable covers.

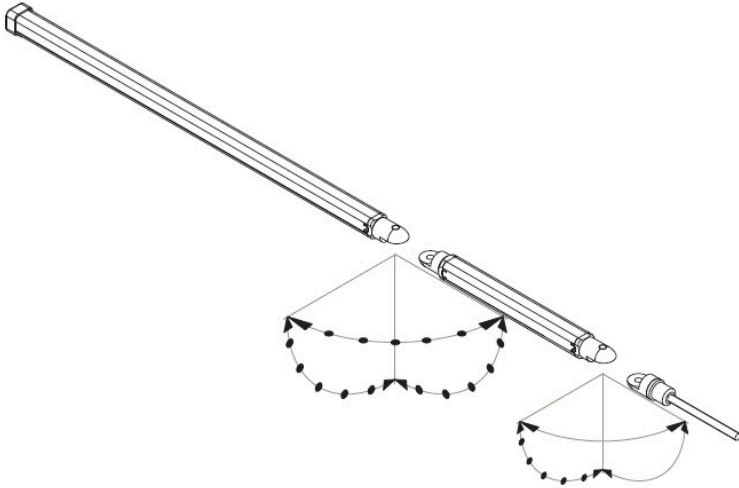


- 2 Connect the two parts to each other.



- 3 Adjust the angle of the Multi Swing 2G arm by loosening the bolt on the inside of the extrusion part. Both joints can be moved in steps of 15° .





Step 4: Preliminary fitting

Now, you can slide part B into part C. Don't forget to use part C1 at this point, to make sure that the Arm is tight inside the Adapter and that you can tighten it further without causing damage. Locate the pushplate between the Arm and the Adapter on the side of the setscrews. The setscrews should fall in the slots of the pushplate. Align the pushplate with the side of the Adapter.

Check visually how you will place the arm for the end-user.

Installation



CAUTION: Any connection must always be secured with all delivered screws. Only use the screws provided in the package.

Multi Swing Arm Bundle Q2M

To install the Multi Swing 2G motor unit with part D, proceed as follows


- 1 Place part D1 left or right on the wheelchair and secure it firmly.




NOTE: For optimal installation, mount part D1 with the insert for the square bracket to the outside of the wheelchair.

- 2 Place and secure part D3 in part D1.
- 3 Place part D4 on part D3, depending on how you want to place the motor unit.



 **NOTE:** Place it at the estimated optimal position for the user, but don't tighten the screws too much at this point. You can do so in [Finetuning on page 30](#).

 **NOTE:** Other configurations can be made, depending on the placement. If needed, additional mounting parts can be ordered at mo-vis.

- 4 Attach part D2 to part A, depending on the desired orientation.



- 5 Mount part A with D2 on to D3 or D4.



The Multi Swing 2G Motor Unit is now mounted firmly on the backside of the wheelchair.

Multi Swing Arm Bundle Rail

To install the Multi Swing 2G motor unit with part E, proceed as follows

- 1 Attach part E2 to the backrest of the wheelchair with set E5 or E6, depending on the type or rail system on the wheelchair. Keep the position of the axle (E1) and the motor unit (A) when doing so.
- 2 Slide E3 or E4 over E1.
- 3 Attach E3 or E4 to the motor unit with the delivered screws.





Installing a device on the Multi Swing 2G

You can use rod B4 or B5 which are included in the package of the Multi Swing 2G.

See [Accessories on page 15](#) for the different available mounting parts for the mo-vis joysticks.

You can lead the joystick cable and possible cables of switches through the extrusions. Use the plastic cable covers to close the arm.

Finetuning

Now, further tweaking of the Multi Swing 2G might be necessary to find an optimal position for the user.

- Make sure that the arm is in the optimal position for the user
- Make sure that the user can operate the arm and the mounted device as required
- Make sure that you have found a robust and reliable position

If you have found an optimal position, tighten all the screws, so that you have a stable position.

It is possible that you want to shorten the arm. You can do so with a hacksaw. Make sure you place part B3 back on the arm afterward.



NOTE: It is best to shorten the arm when it is not in a mounted position.



CAUTION: Do not connect the part A1 to the wheelchair battery or another battery source while installing or adjusting part A or B to avoid any unwanted movement.

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 or 11, 64 bit
- 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

The Multi Swing 2G movement, speed, angle and connections are fully adjustable with the mo-vis Configurator Software.

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



NOTE:



CAUTION: Before inserting a connector, 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.



NOTE: Don't forget to save your settings in time. While you can immediately test your settings, they will be lost if you don't save them into the device before disconnecting.

Parameter settings

Mounting settings

SETTING	DESCRIPTION	PARAMETERS	
Open angle	Choose how far the arm will open. The arm will automatically come to a stop, when the angle is reached.	180°	Default
		1°	Min.
		300°	Max.
		1°	Step
Mounting	By default, the Multi Swing 2G is set to be installed at the right side of the wheelchair and placed for a sideways (horizontal) movement of the arm. If the Multi Swing 2G is positioned in another way, you have to change this parameter.	Right horizontal	
		Right vertical	
		Left horizontal	
		Left vertical	

Input settings



NOTE: Parameters **Switch type**, **Direct action**, **Short press**, **Medium press** and **Long press** are the same for **Input tip** and **Input ring**



NOTE: You either use a direct action OR short/medium/long press. When a direct action is configured, the short/medium/long actions are ignored.

SETTING	DESCRIPTION	PARAMETERS	
Switch type	By default, we assume that you will use a normally open button (e.g. a mo-vis Twister). It is also possible to connect a Twister Pro and use its safety switch functionality. You can set the resistor values of the Twister Pro via the dip-switch in the bottom. In that case, the Multi Swing will detect when the Twister Pro is disconnected or when the cable is in short circuit. Please see Twister Pro on page 45 for the settings.	Normal open	Standard button
		Safety switch	Twister Pro

SETTING	DESCRIPTION	PARAMETERS	
Action - direct	A direct action, which means that the action is performed from the moment the input button is pressed until the button is released.	None	No action
		Open arm momentary	As long as you hold the button, the arm will open. When you release the button, the arm stops immediately.
		Close arm momentary	As long as you hold the button, the arm will close. When you release the button, the arm stops immediately.
		Open/close arm momentary	As long as you hold the button, the arm will open. When you release the button, the arm stops immediately. When you hold the button again, the arm will close. When you release the button, the arm stops immediately.

SETTING	DESCRIPTION	PARAMETERS	
		Operate output green	As long as you hold the button, output green will be active. When you release the button, output green becomes inactive.
		Operate output yellow	As long as you hold the button, output yellow will be active. When you release the button, output yellow becomes inactive.

SETTING	DESCRIPTION	PARAMETERS	
Short press	When you hold the button for a time shorter than the 'Short timer', the short press action will be executed as soon as the button is released.	None	No action
		Open arm to end	After a short press, the arm will automatically move to the end.
		Close arm to beginning	After a short press, the arm will automatically move to the beginning.
		Open/close arm to end/beginning	After a short press, the arm will automatically move to the end. After the next short press, the arm will automatically move to the beginning.
		Output green timed	After a short press, the output will be closed for a set time. See 'Output action timer'.
		Output green switched	The output acts as a switch. After a short press, the output will open. After the next short press, the output will close again.

SETTING	DESCRIPTION	PARAMETERS	
		Output yellow timed	After a short press, the output will be closed for a set time. See 'Output action timer'.
		Output yellow switched	The output acts as a switch. After a short press, the output will open. After the next short press, the output will close again.

SETTING	DESCRIPTION	PARAMETERS	
Medium press	When you hold the button for a time longer than the 'Short timer', but shorter than the 'Long timer', the medium press action will be executed as soon as the button is released.	None	No action
		Open arm to end	After a medium press, the arm will automatically move to the end.
		Close arm to beginning	After a medium press, the arm will automatically move to the beginning.
		Open/close arm to end/beginning	After a medium press, the arm will automatically move to the end. After the next medium press, the arm will automatically move to the beginning.
		Output green timed	After a medium press, the output will be closed for a set time. See 'Output action timer'.
		Output green switched	The output acts as a switch. After a medium press, the output will open. After the next medium press, the output will close again.

SETTING	DESCRIPTION	PARAMETERS	
		Output yellow timed	After a medium press, the output will be closed for a set time. See 'Output action timer'.
		Output yellow switched	The output acts as a switch. After a medium press, the output will open. After the next medium press, the output will close again.

SETTING	DESCRIPTION	PARAMETERS	
Long press	When you hold the button for a time longer than the 'Long timer', the long press action will be executed as soon as the button is released.	None	No action
		Open arm to end	After a long press, the arm will automatically move to the end.
		Close arm to beginning	After a long press, the arm will automatically move to the beginning.
		Open/close arm to end/beginning	After a long press, the arm will automatically move to the end. After the next long press, the arm will automatically move to the beginning.
		Output green timed	After a long press, the output will be closed for a set time. See 'Output action timer'.
		Output green switched	The output acts as a switch. After a long press, the output will open. After the next long press, the output will close again.

SETTING	DESCRIPTION	PARAMETERS	
		Output yellow timed	After a long press, the output will be closed for a set time. See 'Output action timer'.
		Output yellow switched	The output acts as a switch. After a long press, the output will open. After the next long press, the output will close again.
		Open arm momentary	As long as you hold the button, the arm will open. When you release the button, the arm stops immediately.
		Close arm momentary	As long as you hold the button, the arm will close. When you release the button, the arm stops immediately.

SETTING	DESCRIPTION	PARAMETERS	
		Open/close arm momentary	As long as you hold the button, the arm will open. When you release the button, the arm stops immediately. When you hold the button again, the arm will close. When you release the button, the arm stops immediately.



NOTE: When you have chosen 'output green/yellow timed' for any of your actions, please see **Output settings > Output action time** to set how long the output should be activated.




CAUTION: When your input tip or input ring switch is configured to exclusively operate the outputs and not a motor action, then this switch cannot stop a motor action! To stop the motor action, you need to use the switch linked to a motor functionality.





NOTE: You can create a configuration error when you plug a mono jack in your input, while an input ring action is configured. You will expect to perform the input tip action, but instead the input ring action will be executed. When plugging in a mono jack, always set **Input settings > Input Ring > Switch Type > None**.

SETTING	DESCRIPTION	PARAMETER	
Short timer	When you hold the button for a time shorter than the 'short timer', the short press action will be executed.	1000 mS	Default
		0 mS	Min.
		10000 mS	Max.
		100 mS	Step


SETTING	DESCRIPTION	PARAMETER	
Long timer	When you hold the button for a time longer than the 'long timer', the long press action will be executed.	2000 mS	Default
		0 mS	Min.
		10000 mS	Max.
		100 mS	Step
Debounce timer	Can be used for tremor damping, as it reduces the effects of a user's hand tremor. You have to hold the input button longer than the debounce timer, before it is seen as an input.	50 mS	Default
		50 mS	Min.
		2500 mS	Max.
		10 mS	Step

 **NOTE:** There is no parameter 'Medium timer': when you hold the button longer than the 'Short timer', but shorter than the 'Long timer', the medium press will be executed.


 **NOTE:** The 'Short timer' and 'Long timer' are only relevant parameters, when you program a short/medium/long press and NOT a direct action.

 **NOTE:** When a user wants to stop the arm movement, he/she will need to push the button for longer than the debounce timer. The user will have to anticipate when to stop the arm, especially when the Debounce timer has been set to a longer time.

Output settings

 **NOTE:** The parameters are the same for the green and yellow output.

SETTING	DESCRIPTION	PARAMETERS	
Output action timer	The output will be closed for a time set in this parameter	200	Default
		20	Min.
		5000	Max.
		10	Step

 **NOTE:** This parameter is only relevant when you have selected 'Output green/yellow timed' for your short/medium/long press action.

Auditive feedback

SETTING	DESCRIPTION	PARAMETERS	
Short timer	Beep when the 'Short timer' of the button action is expired.	None	No beep
		Short beep	You hear a short beep
Long timer	Beep when the 'Long timer' of the button action is expired.	None	No beep
		Long beep	You hear a long beep
Error/warning	Beep when there is an error or warning (see Error codes on page 48)	On	
		Off	

Motor settings

SETTING	DESCRIPTION	PARAMETERS	
Acceleration	The arm does not start its movement at full speed. Instead, the motor starts up slowly and accelerates until it reaches its final speed. With this parameter, you can set how fast the arm will reach its highest speed. The smaller this percentage, the slower the acceleration will be.	10%	Default
		5%	Min.
		100%	Max.
		5%	Step
Motor force	With this parameter, you can set the torque of the motor. The more powerful, the heavier the load that can be lifted.	50%	Default
		30%	Min.
		100%	Max.
		5%	Step



NOTE: A higher value for the motor force also means that it will take longer for the arm movement to stop when it senses an obstruction.

Inhibit

In general, the power module of the electric wheelchair contains inhibit connections. These connections can be used to limit speed, inhibit drive and/or inhibit actuator channels.

It can be interesting, to program an inhibit when the arm is not in the home position.

SETTING	DESCRIPTION	PARAMETERS	
Output inhibit	Choose which output you will connect with the inhibit of the power module of the wheelchair, if you want the inhibit of your wheelchair to be active as soon as the arm is opened > inhibit home angle .	None	Inhibit is not active
		Active output green	Physical connection between the green output of the Multi Swing 2G and the inhibit of the power module of the wheelchair.
		Active output yellow	Physical connection between the green output of the Multi Swing 2G and the inhibit of the power module of the wheelchair.
Inhibit home angle	This parameter allows you to link an inhibit from the wheelchair electronics to a position of the arm. When the arm is opened < inhibit home angle, then there is no inhibit and the user can drive the wheelchair. When the arm is opened > inhibit home angle, then the user cannot drive the wheelchair.	5°	Default
		5°	Min.
		30°	Max.
		1°	Step



NOTE: The inhibit has to be set in the electronics of the wheelchair itself. You have to make a physical connection, however, between the Multi Swing 2G and the power module of the wheelchair to make this functional. You link one of the outputs of the Multi Swing 2G with one of the inhibits of the power module.





NOTE: When the Multi Swing 2G is in powersave mode (see [Error codes on page 48](#)) and the arm is moved manually away from its position, the arm will react within 2 seconds.

Twister Pro



NOTE: When you connect a Twister Pro with safety switch resistor values, but your input is set to **Normally open**, then it is possible that your arm will start to move. When you use the Twister Pro with safety switch resistor values, your **Input tip** or **Input ring** has to be set to **Safety switch**.

Applicable dip switch values

POSITION	FUNCTIONALITY
	Default position: compatible with default systems which require a normally open connection.
	R-net resistor values: Compatible with Curtiss-Wright specifications for the CJSM II and Omni II and with this mo-vis device.

For more information and other dip switch values, please see the *Twister Pro Installation manual*.

Testing

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



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.

- 1 Connect the Multi Swing 2G motor unit to the wheelchair battery with the XLR cable.
- 2 Connect a button to the Multi Swing 2G motor unit (red input jack).
- 3 Push the button: if you haven't changed the default settings (see), then pressing that button will open/close the arm momentary.
- 4 Check the following things:
 - a Is the arm moving in accordance with the default settings.
 - b Can the arm move freely without hindering any wheelchair item or cable?
 - c Can the arm move without hindering a person in the wheelchair?
 - d Can all cables move freely while being securely attached?
- 5 If needed, adjust the positioning of the arm and Multi Swing 2G unit and secure functioning.



WARNING: Disconnect the Multi Swing 2G motor unit from the power source to avoid any unwanted movement.

- 6 Check that all screws are firmly secured.



CAUTION: Any connection must always be secured with all delivered screws. Only use the screws provided in the package.



CAUTION: Do not tighten the screws with excessive force.

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.
 - Is the arm moving in accordance with the settings?
 - Can the arm move freely without hindering the person in the wheelchair?
 - 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 orange or red 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.

Error codes

The LED shows the status of the device:

STATUS	COLOR	TIMING	COUNT	DESCRIPTION
Operational	Green	Continuously on	/	Normal operation
Powersave	Green	Heartbeat	/	Powersave



NOTE: After 1 minute, the Multi Swing 2G will go into powersave mode to draw less current from the battery. However, when an error occurs in the powersave mode, you will not see this via the LEDs. You will just notice that you cannot operate the arm anymore.

Warning	Orange	Flash	See <i>Installation manual</i>	Part of the functionality is disabled
Error	Red	Flash	See <i>Installation manual</i>	Something went wrong




NOTE: A warning will block certain functionality of the Multi Swing, while an error will block the arm and the outputs completely.

Warnings

The Multi Swing 2G will block certain functionality, in order to guarantee a safe operation of the device. The warning will be logged into the memory of the Multi Swing 2G. Connect the device to the mo-vis Configurator Software to read out the status. You can find more information on how to do that in the *Configurator Software User manual*.

The LED light will flash orange and the number of flashes indicates the warning. Depending on your settings, you will receive auditive feedback as well (see [Auditive feedback on page 43](#)).

FLASH COUNT	REASON	REQUIRED ACTION
2	All motor actions are blocked because motor current is too high OR because the arm cannot rotate	<ul style="list-style-type: none"> • Check if the arm is not physically blocked by an obstacle • Check if the motor is not disconnected • Contact mo-vis
3	<div>  NOTE: This warning can only occur when a switch of the input tip or ring is configured as safety switch. See Input settings on page 32 for more information. </div> <p>All actions from the defective safety switch are blocked</p>	<ul style="list-style-type: none"> • Check whether the Twister Pro is still connected • Check whether the cable of the Twister Pro is in short circuit • Contact mo-vis
4	All motor actions are blocked, because the battery voltage supply is either lower than 14V or higher than 34V	<ul style="list-style-type: none"> • Check the battery voltage supply • Contact mo-vis

Errors

The Multi Swing 2G will be blocked completely. The error will be logged into the memory of the Multi Swing 2G. Connect the device to the mo-vis Configurator Software to read out the status. You can find more information on how to do that in the *Configurator Software User manual*.

The LED light will flash red and the number of flashes indicates the error. Depending on your settings, you will receive auditive feedback as well (see [Auditive feedback on page 43](#)).



NOTE: It is possible that an error will resolve itself after 5 minutes, as the system will do an automatic reset. If the problem is not solved after 5 minutes, consult the table below.

FLASH COUNT	REASON	REQUIRED ACTION
5	ECODE_HALL_SENSOR_I2C_TIMEOUT	Contact mo-vis
5	ECODE_HALL_SENSOR_I2C_ERROR	
5	ECODE_HALL_SENSOR_WRONG_DEVICE	
5	ECODE_HALL_SENSOR_MISALIGNED	
5	ECODE_TASK_HALL	
6	ECODE_MOTOR_DRIVER_FAULT	
6	ECODE_MOTOR_DRIVER_FAULT_CURRENT	
6	ECODE_MOTOR_CURRENT_TOO_LOW	
7	ECODE_VREF	
7	ECODE_BIDIR_SW_SHORT	
7	ECODE_BIDIR_SW_OPEN	
7	ECODE_TASK_ADC	
8	ECODE_DOUBLE_WARN	<ul style="list-style-type: none"> • Check if you have not attached 2 Twister Pros • Contact mo-vis
9	ECODE_TEST_FLAGS	Contact mo-vis
10	ECODE_PREPARATION_FAILED	
10	ECODE_OPERATIONAL_FAILED	
10	ECODE_POWERSAVE_FAILED	

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.

Technical data

Product description & code

- Multi Swing 2G Arm (P031-61)
- Multi Swing 2G Arm Bundle Q2M (P031-62)
- Multi Swing 2G Arm Bundle Rail (P031-63)

Power supply

- Voltage: Nominal 25.2V (Min=14V Max=34V)
- Current
 - Active Arm not moving: 4mA
 - Active Arm is moving (10Nm), 300mA
 - Sleep, 1.3mA (Max=1.8mA, both outputs active)
- Load: Nominal Load 6Nm (Max=10Nm)
- Slip coupling 18Nm (disactivated at mechanical endstop)
- Mechanical endstop limit 40Nm (static load)

Interface connectors

- 3.5 stereo jack input
- 3.5 mono jack output yellow and green
- USB C connector

Other conditions

- Temperature
 - Use: Min. - 25°C - Max. 40°C
 - Storage: ambient
- Moisture: IPX4

Size & weight

Motor unit

- Weight: 840 gr - 1.85 lb
- Size: 137 x 82 x 58 mm - 5.39 x 3.23 x 2.28

Arm

- Weight: 400 gr - 0.88 lb
- Size: Arm: Section 18x18mm - 0.71x0.71 in, Length: 420mm - 16.54 in (lower part), 200mm - 7.87 in (upper part), 120mm - 4.72 in (C-rod)



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