Multi Joystick

mo-Vis Series Multifunctional
Proportional Wheelchair Joystick

Table of Contents

Stealth Products is committed to 100% customer satisfaction. Your complete satisfaction is important. Please contact us with feedback or to suggest changes that may help us improve the quality and usability of our products.

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General 1.1

Read and understand all instructions prior to the use of this product. Failure to adhere to instructions and warnings in this document may result in property damage, injury, or death. Product misuse due to failure to adhere to the following instructions will void the warranty.

Immediately discontinue use if any function is compromised, if parts are missing or loose, or if any component shows signs of excessive wear. Consult your supplier for repairs, adjustments, or replacements.

Important Information 2.1

All persons responsible for fitting, adjustment, and daily use of the devices discussed in these instructions must be familiar with and understand all safety aspects of the devices mentioned. In order for our products to be used successfully, you must:

- read and understand all instructions and warnings;
- maintain our products according to our instructions on care and maintenance; and,
- ensure devices are installed and adjusted by a trained technician.

Disposal 2.2

For scrapping, please adhere to your local waste legislation. Dispose of obsolete electronic parts responsibly and in accordance with local recycling regulations.

Supplier Reference 2.3

Supplier:

Telephone:

Address:

Purchase Date:

Model:

The installation instructions will guide you through the options available for the product. The **Multi Joystick** should be adjusted with the mo-Vis Configurator Software.

Instructions are written with the expressed intent of use with standard configurations. They also contain important safety and maintenance information, as well as describe possible problems that can arise during use. For further assistance or more advanced applications, contact your supplier or **Stealth Products** at (512) 715-9995 or toll free at (800) 965-9229.

Always keep the operating instructions in a safe place so they may be referenced as necessary.

All information, pictures, illustrations, and specifications are based on the product information that was available at the time of printing. Pictures and illustrations shown in these instructions are representative examples and are not intended to be exact depictions of the various parts of the product.

⚠ **CAUTION**	This product is designed to be fitted, applied, and installed exclusively by a healthcare professional trained for these purposes. The fitting, application, and/or installation by a non-qualified individual could result in serious injury.

Ordering Documentation   3.1

Additional copies of this manual may be downloaded by accessing the **Stealth Products** website:

> ### *https://stlpro.site/stealth-docs*

and searching

> ### **"*mo-Vis Multi Joystick*"**

in the search bar at the top of the page.

Our products are designed, manufactured, and produced to the highest of standards. If any defect in material or workmanship is found, **Stealth Products, LLC** will repair or replace the product at our discretion. Any implied warranty, including the implied warranties of merchantability and fitness for a particular purpose, shall not extend beyond the duration of this warranty. **Stealth Products, LLC** does not warrant damage due to, but not limited to:

- ▪ misuse, abuse, or misapplication of products; and/or
- ▪ modification of product without written approval from **Stealth Products, LLC**.

Any lack or alteration of serial number, where applicable, will automatically void this warranty.

Stealth Products, LLC is liable for replacement parts only. **Stealth Products, LLC** is not liable for any incurred labor costs.

No person is authorized to alter, extend, or waive the warranties of **Stealth Products, LLC.**

Covers/Soft Goods: 2 years

Hardware: 5 years

Electronics: 3 years

In Case of Product Failure 4.1

In the event of product failure covered by our warranty, please follow the procedure outlined below:

1. Call Stealth Products at (512) 715-9995 or toll free at (800) 965-9229.
2. Request a Return Authorization form (RA) from the Returns Department and follow documentation instructions.

> **IN THE CASE OF ANY SERIOUS INCIDENT OCCURRING IN RELATION TO THIS PRODUCT, A REPORT TO STEALTH PRODUCTS, LLC SHOULD BE MADE IMMEDIATELY.**

Warning Labels 5.1

Warnings are included for the safety of the user, client, operator, and property. Please read and understand what the signal words **DANGER, WARNING, CAUTION, NOTICE**, and **SAFETY** mean, and how they could affect the user, those around the user, and property.

⚠ DANGER	Identifies an **imminent** situation which, if not avoided, may result in **severe injury**, **death**, and **property damage**.
⚠ WARNING	Identifies a **potential** situation which, if not avoided, may result in **severe injury**, **death**, and **property damage**.
⚠ CAUTION	Identifies a **potential** situation which, if not avoided, may result in **minor to moderate injury** and **property damage**.
NOTICE	Identifies important information not related to injury, but possible **property damage**.
SAFETY	Indicates steps or instructions for safe practices, reminders of safe procedures, or important safety equipment that may be necessary.

Limited Liability 5.2

Stealth Products, LLC 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.

Stealth Products LLC does not hold responsibility for final integration of final assembly of product to end user.

Stealth Products, LLC is not liable for user death or injury.

Testing 5.3

Initial setup and driving should be done in an open area free of obstacles until the user is fully capable of driving safely.

Intended Use 6.1

The **Multi Joystick:**

- is a joystick module which can be connected directly to the wheelchair electronics to control the wheelchair functions.
- is a small proportional joystick, which requires significantly less power and movement compared to a normal joystick.
- can easily be controlled by any body part, including finger, chin, lip ... thanks to its flexibility.
- is recommended for people with tetraplegia, neuromuscular diseases (ALS, MS...) and limited muscular force.

NOTICE	The joystick operates with high sensitivity. A good and controlled movement coordination and force control is required.

Features 6.2

mo-Vis' **Multi Joystick** features:

- full proportionality with reduced throw (8mm - 0.31 in) and force (49.89gf - 0.11 lbf);
- built-in compact and discrete housing;
- two 1/8" (3.5mm) jacks for switch inputs;
- the ability to be linked with one or two switches (on/off and mode switch), with any 1.8" (3.5mm) jack;
- full adjustability to individual needs with well-designed electronics;
- easy configuration with the free mo-Vis Configurator Software for positioning of the joystick; and,
- full R-net compatibility.

Mounting 6.3

The **Multi Joystick** can be mounted at any location on the wheelchair. By attaching the Power Chin Boom to the chair, the Multi Joystick can be used as a chin joystick*.

The **Multi Joystick** is compatible with Stealth joystick mounts, including:

- the SM600-661M for the ARMS260 Series Mounts;
- The SM661M for the swing-away chin control attached to a head support pad;
- The GAT461 mount for the Gatlin 400, 405, and 406 series; and,
- The IDCH series of chin controls.

* ***Note:*** *No tray option is currently available for the Multi Joystick*

1

Multi Joystick Package 7.1

The following is included in the **Multi Joystick** package:

Product Description:	Part Number:
Multi Joystick Set, with integrated cabling and interface.	IDM-MULTI-9

Multi Joystick Accessories 7.2

For mounting and further personalization, the following accessories are available:

Package Part Number	Product Description	Unit Part Number
IDM-40	Multi Joystick Mounting Ring	IDM-06
	Quick-to-Mount Half Clamp with 20mm bolt	IDM-15
	Quick-to-Mount Rod D6 50mm	IDM-03

The Multi Joystick Ball can be ordered separately, if needed:

Product Description	Unit Part Number
Multi Joystick Ball	IDM-07

Multi Joystick Protective Covers   **7.3**

The connections of the **Multi Joystick** unit have protective covers to avoid the accumulation of dust or moisture during use.

Covers can be removed individually if both inputs are not required.

Covers in place, inputs protected

When using the joystick, an LED on the Multi interface will indicate the unit is functioning properly. The LED will flash if an error occurs.

Please refer to the Fault Logs section of this manual for a list of errors indicated by a blinking LED on the **Multi Joystick.**

NOTICE	Before inserting a connector into the joystick, remove the protective cover from the desired input port.
NOTICE	Not all items in the Multi Joystick will be used to mount the Joystick onto a Stealth product. All of these items are compatible with the mo-Vis Power Chin Boom.
⚠ CAUTION	Keep the protective cover in its place when not using a specific port.

Stealth Products can customize mounting hardware configurations in order to create the best possible fit for a client.

Joystick Operation   8.1

The movements of the joystick translate accordingly into the motion of the wheelchair or the navigation of its menu. The wheelchair is most commonly controlled by the joystick in the following manner:

- **Direction:** The joystick is pushed in the direction the wheelchair is intended to move, and the wheelchair moves in that direction.

- **Speed:** The further the joystick is pushed in any direction from its default (center) position, the faster the wheelchair moves in that direction.

- **Stop:** When the joystick is released from being pushed in a direction, it returns to its default (center) position and the wheelchair comes to a stop.

⚠ WARNING	When the LED flashes to indicate an error and/or after every incident with the wheelchair or the mo-Vis device, contact Stealth immediately to perform a function test.
⚠ WARNING	The **Multi Joystick** operates with high sensitivity, requiring sufficient movement coordination and control of force. When operating the joystick, take care to avoid erratic or unsteady movements.
⚠ WARNING	When operating the **Multi Joystick**, always follow the instructions provided by the wheelchair manufacturer regarding safely operating the chair on different surfaces and angles of ascent and descent.
⚠ WARNING	Users should not use the **Multi Joystick** as the only support for a hand or limb, as irregular movements may disrupt controls.
⚠ CAUTION	Avoid hitting obstacles during driving.

Joystick Safety 8.2

Do not use the **Multi Joystick** if any of the following conditions apply:

- The joystick handle is damaged, cracked, or missing.
- The joystick does not return to its default (center) position independently.
- The joystick does not move to and from its default (center) position smoothly.

In order to change the joystick tip, gently pull on the tip until it lifts off the joystick's metal rod. Place the replacement tip on the metal rod until it sits firmly in place.

⚠ **WARNING**	Always power off the device when the user is no longer in the wheelchair to avoid unauthorized access or accidental movements.

SAFE OPERATION

It is mandatory to have an on/off switch on the wheelchair which immediately shuts down the chair power and its electronics. It must be within easy reach of the user while operating the wheelchair. This allows the user to instantly stop the wheelchair in case of problems or an emergency.

⚠ **WARNING**	The on/off switch must be available to the user at all times while operating the wheelchair.

⚠ **WARNING**	Do not cover or block the device to avoid uncontrolled behavior of the device or wheelchair.

If the wheelchair responds in an unexpected way during use, the user should immediately release the joystick and/or use the power on/off switch.

Connection Options   8.3

The **Multi Joystick** can connect one or two switches to either the joystick or the interface. One connection is to power the on/off function and the other is to act as an input or user switch for the wheelchair.

The interface has a cable with a 9-pin connector compatible with the wheelchair electronics. The joystick then controls the wheelchair and all of its functions, including driving, positioning, menu navigation, etc. It is also capable of powering the wheelchair on or off, as well as issuing mode commands.

red jack = on/off (power)
yellow jack = mode (input)

Electromagnetic Compatibility   8.4

The electronics of a power wheelchair and its options can be affected by external electromagnetic fields (for example, from mobile telephones). Similarly, the electronics of the wheelchair or options themselves can also emit electromagnetic fields that can affect the immediate surroundings (for example, certain alarm systems in businesses).

This product complies with the limit values for Electromagnetic Compatibility (EMC) with respect to power wheelchairs, as set out in the harmonised standards for the EU in the Medical Device Regulation, No. 2017/745.

Preparations 9.1

Only a qualified service technician should install the **Multi Joystick** and its accessories.

⚠ **WARNING**	An incorrect installation of wheelchair electronics may cause damage to the hardware and/or injury to the user.

⚠ **CAUTION**	Any connection must always be secured with all the delivered screws. Only use the screws provided with the device.

⚠ **CAUTION**	Before you begin the installation: Please check the packaging to verify all items have been included. Make sure you have all necessary documentation and knowledge to complete the installation. Check the condition of the device.

Tools 9.2

Use the proper tools to install and adjust the **Multi Joystick** to the desired mounting hardware.

⚠ **CAUTION**	The use of improper tools may damage the device. Do not over tighten the screws. Doing so may damage the joystick unit.

Installation Plan   9.3

Set up an installation plan before beginning the installation. This plan should take into account:

- ▪   where the **Multi Joystick** will be placed;
- ▪   how the **Multi Joystick** will be operated (i.e. by hand, chin or attendant); and,
- ▪   **Multi Joystick** parameter settings.

| ⚠ **CAUTION** | Any connection must always be secured with all the delivered screws. Only use the screws provided with the device. |

| ⚠ **WARNING** | Users should not use the **Multi Joystick** as the only support for a hand or limb, as irregular movements may disrupt controls. |

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

Serial Number Sticker

The additional serial number sticker, which can be found in the package, should be adhered to the back of this manual.

Joystick Installation   **9.4**

The **Multi Joystick** can be mounted on your wheelchair using several different mounting systems. The following instructions are for mounting to the Power Chin Boom. Please refer to the installation section of the manual for your specific mounting system to learn how to install the Micro Joystick on other Stealth products.

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

⚠ **CAUTION**	The **Multi Joystick** is a Class I Medical Device (MDR 2017/745). All accessories, including switches, must also be compliant with MDR 2017/745.

- Define the position of the joystick. When the jack connections are at the right hand side, a forward movement of the joystick will result in forward movement of the wheelchair.

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

- Place the Mounting Ring around the joystick housing.

- Secure the Quick-to-Mount (Q2M) Half Clamp to the Mounting Ring.

- Use an Allen wrench to mount the 20mm bolt.

- Slide the unit over the Q2M Rod provided with your package, or any other 6mm rod, to position the Micro Joystick on the wheelchair.

- Place and secure the Interface Unit and all cabling on the wheelchair.

⚠ **CAUTION**	Only install this product to wheelchairs onto which the manufacturer allows installation of third party parts.

⚠ **WARNING**	Install the interface unit with the connectors facing downwards. This alignment will help ensure that water does not enter the interface.

9

⚠ **WARNING**	Ensure all cabling is mounted in such a way as to avoid excessive wear and tear.

- If required, 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.

- Connect the cabling to the wheelchair electronics.

Defining Position (Parameters) 9.5

If the Multi Joystick is not mounted with the jack connections at the right hand side, you can adjust the joystick direction in steps of 90° with the mo-Vis Configurator Software.

- This software must be installed and ready to use on a PC.

- Depending on your profile (User, Attendant, Dealer, OEM), you will be able to change a number of parameter settings.

- To define the movements during the installation procedure, we advise having at least a dealer profile.

Defining Parameter Settings 9.6

To define the parameter settings, proceed as follows:

- Connect the Multi Joystick Unit to a PC. Use a standard mini-USB cable.

- Configure the parameters with the software.

- Upload the configuration.

- Test the configuration and adjust, if necessary.

Parameter Settings 9.7

Please see "Settings" for a list of all parameter settings. (Section 12.3, Page 28):

- The mo-Vis Configurator Software is optional to download. The joystick and its settings can be configured through the chair's display.

Connection Cable Installation 9.8

Ensure the pins in the 9-pin connector are straight and none are bent. Insert the connector into the jack on the chair and secure with the screws on the connector.   To disconnect the 9-pin connector, unscrew the retaining screws and pull gently to separate the connector from the jack.

⚠ **CAUTION**   Before inserting a connector, remove the input's protective cover.
Do not discard the protective cover.

Q-Logic Programmer Setup 10.1

Bookmark Buttons

Select *Options* in the main menu. Button actions are displayed on-screen above corresponding buttons. In other menus, hold button to bookmark settings, and press button to quickly go to a bookmark.

Navigation

Arrows navigate the main menu. *Up & Down* to navigate the menus, *Right* to open a menu item and *Left* to return to a previous menu.

Plus & Minus

Toggles settings or changes values of the highlighted parameter.

NOTE: Q-Logic Enhanced Display and Q-Logic Handheld Programmer required.

Help Button

Displays information about options selected on-screen.

12

NOTICE	For new chairs that have never been programmed, a power cycle will need to be completed after the joystick has been calibrated and before the joystick throw can be adjusted.

1. Disengage the brake then plug in the Q-Logic Handheld Programmer (Previous Page) to the Q-Logic ED (Enhanced Display) or the standalone joystick if SCIM (Specialty Control Input Module shown below) is in use.

2. On the Q-Logic Programmer, navigate to *Program Adjustments* ◁▷ *Enhanced Display (or SCIM)* ◁▷ *Input Configuration.*

3. Toggle *Input Configuration* to *Proportional or Mini Proportional* with the *Plus & Minus* ⊞⊟ buttons.

4. Turn the chair off, then unplug the Q-Logic Handheld Programmer. The chair should now be programmed to recognize the Multi Joystick. Be sure to re-engage the brakes before operation.

NOTICE	**If using Q-Logic™ Specialty Control Input Module (SCIM), a mechanical switch (any type) will need to connect to the on/off port of the joystick and the red jumper of the joystick to the on/off jack on the chair to power the chair on/off and ensure the SCIM as master control. Q-Logic programmer is required.**

9-Pin Connector
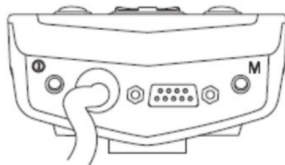
Q-Logic™ SCIM

Q-Logic™ Drive Control System
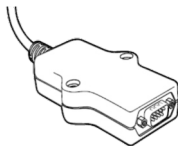
Q-Logic Proportional Joystick Setup 10.2

1. Plug in the Q-Logic Handheld Programmer (Previous Page) to the Q-Logic ED (Enhanced Display) or the standalone joystick if SCIM (Specialty Control Input Module shown below) is in use.

2. On the Q-Logic Programmer, navigate to *Program Adjustments* ⟨▷ *Enhanced Display* ⟨▷ *Proportional Input* ⟨▷. Here you can fine tune joystick performance and functionalities, such as:

    ▪ *Center Deadband*
    ▪ *Tremor Suppression*
    ▪ *Assign Direction*
    ▪ *Joystick Calibration and Throw*

Center Deadband 10.3

The Center Deadband parameter defines how far the joystick must be moved from neutral position to engage moving the power chair. The value corresponds to the diameter of a circle around the joystick center position. No drive or menu instruction will be executed unless the joystick is moved out of this circle.

▪ Select *m: Center Deadband* option with the navigation's *Up & Down* ⬆⬇ buttons, then press the *Right* ⟨▷ button.

▪ Use the *Plus & Minus* ➕➖ buttons to adjust the *Center Deadband*. Adjustment ranges from 5 to 50%. Press *Left* navigation button ⟨◁ to save.

Tremor Suppression 10.4

The *Tremor Suppression* parameter sets a neutral range that suppresses possible tremors (trembling of hand or drive surface conditions) on the joystick. Setting from 0% to 100%.

- ▪ Follow *Steps 1 & 2* from *Section 10.2*

- ▪ Select *m: Tremor Suppression* option with the navigation's *Up & Down* ⬆⬇ buttons, then press the *Right* ▷ button.

- ▪ Use the *Plus & Minus* ⊞⊟ buttons to adjust the *Center Deadband*. To turn suppression off, adjust the setting to 0%.

- ▪ Press *Left* navigation button ◁ to save.

NOTICE	When short command is used to operate the power chair, the Tremor Suppression should not be set over 90%, otherwise any short throw will be ignored.

Assign Direction Function 10.5

The Assign Direction function allows you to set the axis direction. For example, if you want to change Forward (X axis 0 to 100) to Reverse (X axis 0 to -100) or Left (Y axis 0 to -100) to Right (Y 0 to 100). If you switch Forward to Reverse, the system will automatically change Reverse to Forward. Same with Left and Right. Parameters are measured in percent (%).

- ▪ Follow *Steps 1 & 2* from *Section 10.2*

- ▪ Select *Assign Direction* option with the navigation's *Up & Down* ⬆⬇ buttons, then press the *Right* ▷ button.

- ▪ Follow the on-screen instructions. When finished, press OK to save.

Joystick Calibration 10.6

Calibrating your joystick will set the range of motion for the axes or re-center it to improve operation.

> ⚠ **CAUTION**   Calibration MUST be performed for the joystick. This is a new safety feature update included in Q-Logic Programmers.

- Follow *Steps 1 & 2* from *Section 10.2*
- Select *Calibrate* option with the navigation's *Up & Down* △▽ buttons, then press the Right ▷ button.
- Programmer will prompt for a calibration of the joystick. Follow directions and move the joystick around in two circles.
- Calibration will be complete. Press *OK*, and when successful, save. Exit the screen and power cycle the chair.

Joystick Throw 10.7

The Throw is the position where the joystick is stopped in a particular direction. Throw distance is the maximum distance/angle the shaft can be moved in a particular direction. The throw should be set to the maximum distance/force the individual utilizing it is capable of.

- Once the power cycle from Section 10.8 is complete, follow *Steps 1 & 2* from *Section 10.2*.
- Select *Throw* option with navigation's *Up & Down* △▽ buttons, then press the *Right* ▷ button.
- Have the user deflect the joystick with their maximum input force. Adjust the parameter by pressing the *Plus or Minus* +− buttons.
- When the adjustment is complete, you will be prompted to save the new configuration. Press *Yes* to save.

R-Net Omni Setup 11.1

Power Button

Settings Button

Sounder

LCD Screen

Profile Button

Mode Button

- Button

+ Button

Navigation Buttons

Display / Input Section Connector
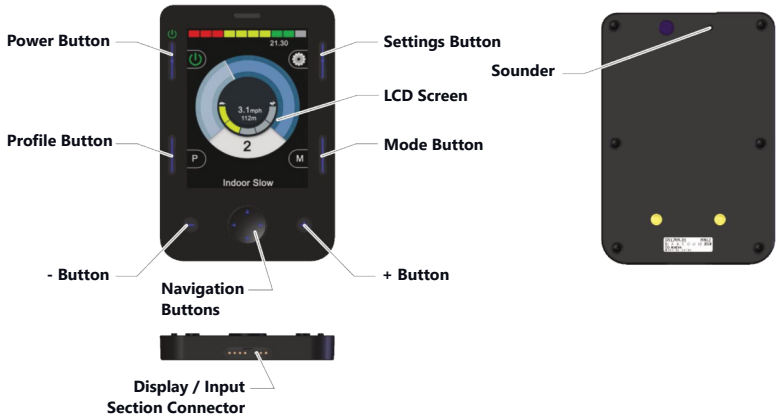
R-Net Programming Dongle

R-net Setup 11.2

For mo-Vis R-net joysticks to operate properly, some R-net parameters need to be set. For information about R-net parameters, please refer to the Curtiss-Wright manual *SK77981-14 | R-net Technical Manual | Chapter 3 -- Programming*.

- *R-Net Profile Management > Input Device Type (Ch. 3 - 4.4):* In most cases, this parameter needs to be set to *Universal* for all mo-Vis joysticks. In combination with certain other devices, it is advised to set this parameter to *JSM*. Please refer to the installation manual of the other devices for more information.

- *R-net Controls > Global > Profile Button (Ch. 3 - 7.5):* The default setting for this parameter is *Profiles*. To access the control modes for other wheelchair functions, such as seating positions, select *Profiles/Modes*.

Joystick Setup 11.3

1. Plug in the R-Net Programming Dongle (previous page) inline with the Omni display (previous page) and the chair's electronics.

2. Press the *Mode* button until you reach the OBP (On-Board Programming) menu. The OBP menu will appear as an hourglass while loading.

3. Navigate to the *Omni* menu, then navigate to *Omni ⊃ Port 1 (or Port 2 if the Micro Joystick is plugged into Port 2)*.

4. In the *Port* menu, toggle *SID* to *Prp* with the *Plus & Minus* ± buttons.

5. In the *Port* menu, navigate ± to *Switches*.

6. In the *Switch* menu, toggle *Switch Detect* to *Off* with the *Plus & Minus* ± buttons.

7. In the *Switch* menu, toggle *9-Way Detect* to *Off* with the *Plus & Minus* ± buttons.

8. Navigate *Back* ⊏ to the *Omni* menu, then navigate to *Profiled*.

9. In the *Profiled* menu, configure a profile to use the port for the Multi Joystick.

10. Power off the chair, remove the R-Net Programming Dongle, reconnect the Omni display and power on the chair.

• The chair should now be programmed to recognize the Multi Joystick. Be sure to re-engage the motors before operation.

Joystick Calibration 11.4

1. Plug in the R-Net Programming Dongle (previous page) inline with the Omni display (previous page) and the chair's electronics.

2. Press the *Mode* button until you reach the OBP (On-Board Programming) menu. The OBP menu will appear as an hourglass while loading.

3. With the navigation buttons, navigate to *System* $\sum$ *Joystick Calibration.*

4. The system will ask to set each direction independently by pressing towards that specific direction. For example, *Forward* (0 to 100), *Left* (0 to -100, *Reverse* (0 to -100), and *Right* (0 to 100) Figures are measured in percent.

5. Calibration will be successful when the axis in the referred direction reaches its maximum and its counterpart is close to 0. For example, *Forward* will look like:
forward/reverse 90% > left/right 3%
Left will look something like:
forward/reverse 5% > left/right -87%

6. When all four axes are calibrated, you will see a green check mark on screen.

7. Power off the chair, remove the R-Net Programming Dongle, reconnect the Omni display and power on the chair.

R-Net Proportional Joystick Setup 11.5

1. Plug in the R-Net Programming Dongle in line with the Omni display and chair's electronics, then power on your chair.

2. Press the *Mode* button until you reach the OBP (On-Board Programming) menu. The OBP menu will appear as an hourglass while loading.

3. With the navigation buttons, navigate to *Controls* $\sum$ *Joystick*. Here you can fine tune joystick performance and functionalities, such as:

    ▪   Active Throw Details
    ▪   Active Orientation and Orientation Details
    ▪   Deadband

Throw 11.6

The *Throw* is the place where the joystick is stopped in a particular direction. *Throw Distance* is the maximum distance/angle the shaft can be moved in a particular direction. The throw should be set to the maximum distance/force the person using it is capable of.

Active Throw

*   Follow the first three steps in *Section 11.4*.
*   Use the navigation's *Up & Down* $\bigcirc$ buttons to select *Active Throw* from the list and press the *Right* $\sum$ button. Select *Port* with *Up & Down* $\bigcirc$ button then *Right* $\sum$ again to set up.
*   System will guide you through the setup, following the on-screen instructions, have the end user move the joystick towards the defined direction with the maximum force possible. Press the *Plus* + button to save and proceed to the next step. Values range from 25% to 100%.

Throw Details

Throw Details will allow you to see all *Active Throw* setups for all profiles. To select profiles, use Navigation Buttons (*Left* or *Right*) $\square\square$ and to select axis use (*Up or Down*) $\bigcirc$. The selected profile/ axis can be adjusted in increments of 1 or 10, using the *Plus & Minus* ± buttons. For increments of 10, press and hold the *Plus* + or *Minus* - buttons. Values range from 25% to 100%.

Axis Orientation   11.7

Axis Orientation allows you to switch the axis behavior. For example, the X-axis *(Forward/Reverse)* can be switched, making the *Forward* direction *Reverse*, and vice versa.

Active Orientation

- Follow the first three steps in *Section 11.4*.
- Use the navigation's *Up & Down* ⭥ buttons to select *Active Direction* from the list and press the *Right* ⊃ button. Press *Plus +* for *Port 1* or *Minus -* for *Port 2* to select the port to set up.
- System will prompt you to set the *Forward (X-axis)* by angling the joystick. Automatically, *Reverse* will be set at the direction opposite the one selected. Values available are N (North/ Forward, W (West/Left), S (South/Reverse, or E (East/Right).
- The next prompt will ask you to set the *Left* (Y-axis) by angling the joystick. Automatically *Right* is assigned to the value opposite the one chosen. Values are the same as in the previous step.
- Power Cycle the Chair

Orientation Details

Orientation Details is similar to *Throw Details*, but it sets the direction of proportional controllers listed in each profile. Values are set as *Yes/No* to *Invert Forward/Reverse (InvFR)* or *Left/Right (InvLR)*. To swap axis, change value on SWAP row either *Yes/No*. Power cycle the chair when finished.

Center Deadband 11.8

The *Center Deadband* parameter defines how far the joystick must be moved from neutral position to engage the motors of power chair. The value corresponds to the diameter of a circle around the joystick center position. No drive or menu instructions will be executed unless the joystick is moved out of this circle.

- Follow the first three steps in *Section 11.4*.
- Use the navigation's *Up & Down* ⟳ buttons to select *Deadband* from the list and press the *Right* ⟳ button.
- Use the *Left & Right* ⟳⟳ buttons to select the port. When in the desired position, press *Plus* + or *Minus* - to increase or decrease the value. Values range from 10% to 50%.

Software Capabilities 12.1

The **Multi Joystick** is adjustable with the mo-Vis Configurator Software.

- ▪ The mo-Vis Configurator Software is compatible with Windows 7, Windows 8, and Windows 10 operating systems.
- ▪ The mo-Vis Configurator Software is not compatible with Android or iOS systems.

⚠ **WARNING**	Changes in the 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 chair,.

Software Download 12.2

The mo-Vis Configurator Software can be downloaded on Stealth Products' website (www.stealthproducts.com). For details on how to install and use the software, the user is advised to consult the software manual, included alongside the download.

Please contact your dealer for information about downloading the R-net PC Programming software.

mo-Vis Configurator Parameter Settings   12.3

The mo-Vis Configurator Software allows users to change the parameters of the **Multi Joystick**, depending on the level of profile assigned.

MOUNTING SETTINGS (DEALER LEVEL)

Setting	Description	Parameters	
Mounting Direction	Changes the joystick axis in 90-degree increments clockwise, providing compensation for joystick rotation.	Default:	0°
		Min.:	0°
		Max.:	270°
		Increments:	90°

DEADBAND SETTINGS

Setting	Description	Parameters	
Deadband	Neutral zone around the joystick's default (center) position	Default:	10%
		Min.:	10%
		Max.:	50%

(***Note:*** *Most wheelchair electronics have their own default deadband setting. It is recommended to keep the deadband at this setting.)*

TILT

The **Multi Joystick** unit is able to detect tilt (in reference to the gravitation of Earth). The wheelchair will stop driving when the *Enable* parameter is set to *On* and the joystick is tilted more than 70° in any direction. The joystick becomes active again if the angle of tilt falls below 60°.

(***Note:*** *the default setting for the tilt sensor is Off.)*

⚠ CAUTION	Incorrect programming of the wheelchair or device electronics may cause damage to the devices or injury to the user.

COMPENSATION MODE

Setting	Description	Parameters	
Compensation Mode	Defines the activation of the compensation algorithm	*Off*	Always deactivated
		Manual	(De)activated manually by the user
		On	Always activated

*(**Note:** Front wheel-driven wheelchairs are less affected by this factor than rear wheel-driven chairs.)*

Setting	Description	Parameters	
X Compensation	Limits the steering reaction if the wheelchair overreacts on steering commands. (This may happen due to compensation in the X direction that prevents the wheelchair from overcoming an obstacle due to torque loss.)	*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

*(**Note:** The values are based on the compensation in the Y direction.)*

Setting	Description	Parameters	
(De)activation Pattern	Active if Compensation Mode is set to Manual (to activate/deactivate, nudge the joystick forward, then backward, then forward.	*Fast*	Fast execution speed
		Normal	Normal execution speed

*(**Note:** Prevents the wheelchair from creeping after the joystick is released.)*

COMPENSATION FACTOR

Setting	Description	Parameters	
Compensation Factor	Lowers forward/backward (Y) driving speed on rough terrain. (Wheelchair type and weight impact the compensation factor.)	*Very Weak*	Almost no deceleration
		Weak	Decelerates less than *Normal*
		Normal	Default Setting
		Strong	Decelerates more than *Normal*

*(**Note:** If the joystick is mounted in a location susceptible to bumps and shocks, such as a wheelchair arm, the compensation setting should be set to 'Weak' or 'Very Weak'.)*

⚠ **WARNING** | After adjusting the joystick settings, always test the operation and functioning of the wheelchair before use.

Testing 13.1

After installing the **Multi Joystick**, execute the following tests, in order, before the wheelchair is delivered or put into service.

- ▪ a visual check to ensure that the joystick is intact;
- ▪ an operational test;
- ▪ a driving test; and,
- ▪ a test of the chair's stopping ability.

VISUAL TEST

Check to ensure:

- the joystick is not bent or damaged;
- none of the joystick's housing, cabling, or connectors are damaged; and,
- the joystick returns to its default (center) position upon release.

> ⚠ **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

OPERATIONAL TEST

To perform an operational test, complete the following steps:

1. Activate the wheelchair operating system.
2. Check for any error messages.
3. Gradually push the joystick forward until you hear the chair's parking brakes release (The wheelchair may start moving).
4. Immediately release the joystick. You should hear the parking brake activate within a few seconds.
5. Repeat steps 3 and 4 three times, each time moving the joystick forward, left, right, and backward.
6. Check to ensure the power switch and the mode switch are functioning properly.

DRIVING TEST

Test drive the wheelchair, ensuring that:

- the chair and all its operations are fully functional in all positions the user may use the **Multi Joystick** and any connected switches;
- no cabling or connectors are positioned in such a way that they may become damaged during operation; and,
- the joystick returns to its default (center) position upon release.

> ⚠ **WARNING** Only perform an operational test on a level surface, in an open area free of obstacles.

STOPPING TEST

Drive the wheelchair forward at full speed, then use the power on/off switch to shut the wheelchair down.

▪ The wheelchair should not stop abruptly, but should gradually slow to a stop.

Error Codes 14.1

When a fault occurs, the LED of the **Micro Joystick** will start to flash. A long delay is followed by a number of flashes with a short delay. Count the number of flashes and look up the corresponding 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 R-net 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
9	Scheduler Fault	Update Software or Replace PCB
10	Coding Error	Update Software or Replace PCB

Fault Logs 14.2

FAULTS

The configurator software maintains a fault log with fault counters. Each time a specific fault occurs, its counter will increase by one. (The maximum count value is 254.) The fault log can be accessed by the configurator (which requires Dealer-level profile access), which is then able to clear one or all of the fault counters. Reference the information presented in the following chart:

Fault:	Reason for Fault:	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. - Replace PCB.
Code Error: Framework		
Code Error: Application		
MSP Command Corrupt	Corrupt Command Received	Connection with PC (Configuration Software) went wrong, try again.
MSP Command Unknown	Unknown Command Received	Connection with PC (Configuration Software) went wrong. Update Firmware or Update Configurator Software. Try again.
MSP Sub Command Unknown	Unknown Sub Command Received	
MSP Argument Invalid	Invalid Argument Received	
MSP Device Not Ready	Device not ready to receive MSP command	
MSP Device Wrong State	Device unable to receive MSP command in current state	
PCB Test Failed	Factory test failed	A fault occurred during factory testing.
Assembly Test Failed		

Fault:	Reason for Fault:	Required Action:
Field Test Failed	Field test failed (Calibration).	A fault occurred during Field Testing (calibration).
Test Flag Check	One or More Test flags Not Set.	Redo test(s) and/or Replace PCB.
ADC	ADC Conversion error	- Check R-net Cable, Replace PCB Interface.
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 re-transmissions is reached.	
R-net Tx Overflow	Packet Transmit Buffer is Full.	
R-net Rx Overflow	Packet Receive Buffer is Full	
R-net Invalid Seq Nr	Received a Packet with an Invalid Sequence Number	
R-net Data Packet Error	Data Packet ACK mismatch	
R-net Descr Error	Invalid Packet Data Descriptor	
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 Chip 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 Sensor (joystick) cable. - Replace sensor (joystick).
Joystick (Sensor)	Faulty sensor (joystick)	
Accelerometer	Accelerometer failed	Replace PCB Interface.

Technical Data 15.1

JOYSTICK CONNECTORS

- 1/8" (3.5mm) mono jack input (on/off)
- 1/8" (3.5mm) mono jack input (mode)
- Mini USB
- SUB D9 Connector

JOYSTICK DIMENSIONS

- Joystick: 2.64 in. x 1.31 in. (67mm x 33mm) - [Height x Depth]
- Joystick Ball: 1.03 in. x 1.19 in. (26mm x 30mm) - [Height x Depth]

JOYSTICK DATA

- Operational Force: 49.89gf (0.11 lbf)
- Angle from Center to End: 15°
- Length of Joystick from Mechanical Pivot: 1.96 in. (50mm)
- Travel from Center: .31 in. (7mm)
- Maximum Vertical Load: 10197g
- Maximum Horizontal Load: 5098g
- Expected Life: over 2,800,000 rotations
- Mass: 315g
- Interface Cord Length: 70.9 in. (180cm)
- Operating Temperature: -13°F to 122°F (-25°C to 50°C)
- Storage Temperature: -40° to 149°F (-40°C to 65°C)
- Immunity Level (ISO7176-21): 20V/m (26MHz to 2.5GHz)
- Emission Level (ISO7176-21): CISPR 11, Class B
- ESD (ISO7176-21): 8kV Air (4kV Contact)

Dealer Assistance 16.1

During first time use by the client, it is advised that the dealer or service technician not only install the device, but also explains the configuration and different possibilities to the customer (i.e., the user and/or the attendant). If needed, the dealer can make final adjustments.

User Testing 16.2

It is important that the customer is fully aware of the installation of the **Multi Joystick**, how to use it, and how it can be adjusted to fit the client comfortably. As a dealer, proceed as follows:

▪ Explain and show the customer how you have executed the installation and explain the function.

Have the user test the position of the **Multi Joystick**.

▪ Is the hardware in the proper position for the client?
▪ Can the user safely operate all controls with minimal effort?

If needed, make any adjustments to the positioning.

Explain possible problems to the customer and how to address them.

Conditions of Use 16.3

The **Multi Joystick** is intended for use as installed by the dealer, in accordance to the installation instructions in this manual.

▪ The foreseen conditions of use are communicated by the dealer or service technician to the user and/or attendant during the first time use.

▪ If the usage conditions change significantly, please contact your dealer or a qualified service technician to avoid unintended damage.

Maintenance 17.1

The **Multi Joystick** is designed to be maintenance-free. Under the circumstances of regular use, the joystick, interface, and assembly parts do not require additional maintenance.

⚠ **CAUTION**	Always check all mounting hardware, making sure each fastener is properly tightened before using the Multi Joystick.
SAFETY	Replace or repair parts as needed.
NOTICE	Improperly installing the device or altering it in any way will void its warranty.

Cleaning 17.2

- use a soft damp cloth to clean the device.

- Ensure that all cleaners are approved for finished steel, aluminum, plastic, and upholstered surfaces.

- The ball or knob of the joystick is removable, and easy to clean:

    - You may briefly immerse the ball or knob in warm water with a gentle cleansing agent. Let the handle dry thoroughly before putting it back on the joystick.

    - If the ball or knob is damaged, worn out, or remains dirty, please contact Stealth Products to obtain a replacement.

Monthly Check   17.3

Monthly, or as needed, check to ensure:

- all bolts and screws are still tightened firmly;
- The wiring has sustained no damage; and,
- none of the joystick unit's parts have suffered excessive wear or tear.

A yearly check of the wheelchair and its operating systems by a qualified technician is recommended.

⚠ CAUTION	Do not immerse the device in water or use excessive amounts of liquid. Do not apply additional lubricants to the moving parts.

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

Warranty Information

Home Page

Online User Manual

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