Stealth Products®

Multi Switch

Owner's Manual for the mo-Vis Multi Switch

mo-vis
moving forward together

Stealth Products strives for 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.

You may reach us at:

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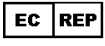

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CE

General

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

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.

Supplier Reference

Supplier:

Telephone:

Address:

Purchase Date:

Model:

The installation instructions will guide you through the options and possibilities with the product.

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.

Ordering Documentation

You can download additional copies of this user manual by accessing the **Stealth Products** website (*https://stlpro.site/stealth-docs*) and searching "*mo-Vis Multi Switch Owners Manual*" 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

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.

Warning Labels 6.1

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 6.2

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 6.3

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 7.1

The **Multi Switch** is intended to control up to four devices/technical aids with one input device (mechanical or proximity switch). The mechanical switch is only intended to support auxiliary wheelchair function. The Multi Switch offers the user greater freedom of operation and increased function control. The switch is USB powered and contains its own control electronics.
The **Multi Switch** is also available as part of a package which includes proximity sensors. The sensors can be used as input devices and require no force to activate. The addition of mo-Vis proximity sensors increases the level of autonomy afforded the chair user.

Multi Switch Features 7.2

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

- one 3.5mm stereo input jack, allowing a mechanical switch or proximity sensor input connection;
- two 3.5mm stereo output jacks, allowing up to four separate outputs (with splitter cables, sold separately);
- a LED for each output channel, indicating status and activity of the channel;
- clear, audible feedback;
- fully adjustable input and output parameters via configuration software; and,
- multiple mode settings.

Proximity Sensor Features 7.3

mo-Vis proximity sensors, sold separately from and compatible only with the **Multi Switch**, feature:

- two size options:
  - 12mm for installations with limited space; and,
  - 24mm for installations requiring increased sensitivity.
- sensitivity adjustment via configurator software; and,
- easy calibration and configuration.

⚠ **CAUTION**	Moisture (e.g., rain) is a conductive substance. While a negligible amount of liquid may not interfere with device operation, a coating of moisture can cause the sensors to constantly read as activated.

Multi Switch Package 8.1

Included in the **Multi Switch** package:

Product	Description
	Multi Switch Unit
	USB to Micro USB Connector Cable

For proximity sensor input, only mo-Vis proximity sensors (sold separately) are compatible with the **Multi Switch.** These are:

Product	Description
	Multi Switch Proximity Sensor (12mm)
	Multi Switch Proximity Sensor (24mm)

Optional: Splitter Cable

The 3.5mm stereo to 3.5mm mono splitter (sold separately) is required to convert a single output to a dual output.

Mounting the Multi Switch 8.2

Its exceedingly small size grants the **Multi Switch** nearly unlimited mounting options.
The use of hook-and-loop adhesive patches is recommended when mounting the switch.
(Note: Hook-and-loop adhesive patches are not included with the **Multi-Switch**.)

NOTICE	Only install this product on wheelchairs onto which the manufacturer allows the installation of third-party parts.
NOTICE	Ensure the user has unobstructed visual contact with the LEDs on the front of the Multi Switch, in order to check its status. Although every activation is able to trigger an auditory signal, it is not recommended to rely on this alone for activation confirmation.
NOTICE	The electronics of the **Multi Switch** can be affected by external electromagnetic fields (e.g., fields generated by mobile telephones). The electronics themselves can also emit electromagnetic fields that can affect electronics in their immediate surroundings (e.g., certain electronic alarm systems). The limit values for Electromagnetic Compatibility (EMC) with respect to this type of device are set in the harmonized standards for the EU in the Medical Device Directive, No. 93/42/EEC. The **Multi Switch** unit and its proximity sensors comply with these values.
⚠ **CAUTION**	Keep devices that emit radio frequencies (e.g., mobile phones) at least 30cm (12") from the sensor and its connecting cable.
⚠ **CAUTION**	The Multi Switch is not waterproof. While a few drops of water will not likely cause problems, the device should be mounted in such a way as to ensure that water cannot enter the device.
⚠ **CAUTION**	In case high sensitivities are utilized for sensors (70%), ensure the sensor is firmly fixed and its cables routed in a way that avoids kinks or obstructions. Moving the sensor or its cables can influence its sensitivity, possibly producing false activations.

USB Power Supply 9.1

The Multi Switch is powered by means of a micro USB connection. When the device is plugged into a USB power source, such as a USB charger, a laptop, or a power bank, the device will be powered and ready to use.

The Switch requires a minimal amount of energy. Some power sources are not designed to deliver minimal current over long durations. Accordingly, proper device functionality is not guaranteed with any power source.

Contact your dealer or mo-Vis for more information and for assistance with choosing the correct power source for the Multi Switch.

⚠ CAUTION

A ground loop can be introduced into the connection if the USB port and the input jack are plugged into circuits powered by the same battery. This can cause a grounded current to flow from one circuit to another through the Multi Switch, and if the current is too high, the Multi Switch can be over-stressed and may not function properly, leading to permanent damage to the device. One way to avoid introducing a ground loop to the connection is to connect the device to an isolated USB power supply.

Input 9.2

The **Multi Switch** has a single 3.5mm input jack, which is compatible with two types of switches:

Switch Type:	Input:
Mechanical	Use a switch equipped with a 3.5mm mono jack
Proximity	Use mo-Vis proximity sensors

Output 9.3

The **Multi Switch** is equipped with four green LEDs on the device's face that indicate its output. They indicate the channel currently selected, and shifts to select the desired channel.

A separate green LED on the face of the device indicates the device status.

When used with a splitter cable (sold separately), the **Multi Switch** is capable of four output functions.

Status:	LED Action:
Active	- Short blink, long pause
Fault	- Series of blinks, long pause (error, see *troubleshooting*)

Outputs:	Location:
1,2	Green mono jack
3,4	Yellow mono jack

Proximity Sensor Information

The mo-Vis proximity sensor is based on the principle of capacitive sensing. It is capable of measuring objects (e.g., a finger or metal stick) that approach the sensor. The larger the surface of the sensor, the more sensitive it will be (the 24mm being the most sensitive). The sensor is most sensitive at its front in the center. Its sides are slightly sensitive, and the underside is immune.

Sensitivity	24mm Sensor Distance (in mm)	12mm Sensor Distance (in mm)
100%	10.00	3.00
90%	8.50	2.00
80%	7.00	1.25
70%	5.00	0.50
60%	3.00	0.20
50%	2.00	0.10
40%	1.50	0.05
30%	1.00	<0.05
20%	0.50	<0.05
10%	0.25	<0.05
5%	0.05	<0.05

mo-Vis Configurator Software 9.4

mo-Vis provides a configurator software on its website (www.mo-vis.com) or **Stealth Products** website (https://www.stealthproducts.com/p/52/) that enables users to adjust and customize nearly every aspect of the **Multi Switch's** operation. For details on how to install and use the software, the user is advised to consult the configurator software manual, included in the software download.

- Windows 7, 8, or 10 is required to run the software.

With Dealer-level software access, you will be able to configure a number of parameters for the Multi Switch.

- Dealer-level access requires a password.

To obtain a password for the software, call Stealth Products at (512) 715-9995 or toll-free at (800) 965-9229 and speak to a customer service representative.

Output Operation Mode Selection 9.5

The user can change output operation modes on the **Multi Switch**. The 'Mode Select' feature is used to select one of the active outputs.

(***Note:*** If only one active output is available for selection, 'Mode Select' will automatically control Input 1.)

NOTICE	When power is removed from the Multi Switch, all its outputs will return to their open state.

Mode Select

Click Mode:

To generate one or more short clicks, quickly open and close (activate and deactivate) the input. (The period between the clicks has to be shorter than the 'Action Delay' time.)

After the clicks are input,

- The output will be closed for a set time (depending on the output's 'Close Time' setting), or
- the selected output will remain locked until released (depending on the output's 'Lock' setting).

Start Scan:

A quick click (input activation) will begin a scan of available active outputs.

- A number of beeps corresponding to the number of available active outputs will be generated, and
- a corresponding selection LED will be activated.

When the desired output is indicated, click (activate) the input again to select and activate the output. The output will react.

- The output will remain closed as long as the input is closed, or
- the output will remain locked until it is manually deselected (depending on the output's 'Lock' setting).

The scanning of the outputs is done at an interval of 'Select/Scan Time'.

(***Note:*** If too much time elapses without selecting and activating an output, the selection process will stop and no output will be activated. This is a built-in feature designed to allow any unwanted input to be canceled.

Hold and Scan:

Activating and holding the input will begin a scan of available active outputs.

- A number of beeps corresponding to the selected output will be generated, and
- a corresponding selection LED will be activated.

When the desired output is indicated, release the input to select and activate the output. The output will react.

- The output will remain closed as long as the input is closed, or
- the output will remain locked until it is manually deselected (depending on the output's 'Lock' setting).

(***Note:*** If too much time elapses without selecting and activating an output, the selection process will stop and no output will be activated. This is a built-in feature designed to allow any unwanted input to be canceled.)

Select Timed Click:

Selection in this mode is dependent on duration and number of clicks.

- For outputs 1 to 3, keep the input closed to scan the outputs. A number of beeps and corresponding LED will be activated.
  - Output 1: Short press (<*Select/Scan Time*)
  - Output 2: Medium Press (>*Select/Scan Time*)
  - Output 3: Long Press (>2x *Select/Scan Time*)
- For output 4, double click (within the *Select/Scan Time*)

When the desired output is indicated, release the input again to select and activate the output.

- The output will remain closed for a set time (depending on the output's 'Close Time' settings), or
- the output will remain locked until it is manually deselected (depending on the output's 'Lock' setting).

(***Note:*** If too much time elapsed without selecting and activating an output, the selection process will stop and no output will be activated. This is a built-in feature designed to allow any unwanted input to be canceled.

Continuous Scan:

In this mode the active outputs are scanned continuously.

When the desired output is indicated, close the input to select and activate the output.

- The output will remain closed as long as the input is closed, or
- The output is locked until released (depending on the output's 'Lock' setting)

Momentary/Timed or Switch Mode

Momentary/Timed:

- The output will remain closed as long as the input is closed, or
- the output will be closed for a set time.

Switched:

- the output will toggle between open and closed. This is useful to switch something on continuously.

Lock Mode

'Lock Mode' is designed to allow the user to control and activate a device for longer periods of time (e.g., with a communication or environmental device).

When 'Lock Mode' is set to active, it will be locked in the selected output. To unlock this mode, the input needs to be closed (activated) and held shorter/longer than the 'Quit Time', depending on the setting.

Lock Mode options are:

No (default): normal operation, after the input was operated, return to selection mode.

Timed Closed: the output will be locked in the selected output mode. To escape this mode (i.e. to break the lock), close the input continuously for longer than the 'Quit Time'. When working in this mode, the output will be closed when the input is closed. This means that when you break the lock, your output will react as well.

Timed Open: The output will be locked in the selected output mode. To break the lock, close the input continuously for a time longer than the 'Quit Time'. When working in this mode, the output will be closed when the input is released.

Nudge: The output will be locked in the selected output mode. To break the lock, close the input for a time shorter than the 'Quit TIme'. The output will be closed only if you hold longer than the 'Quit Time'.

Calibration Mode

Auto:

The system will make automatic adjustments over time. (***Note:*** This is only a usable setting for situations in which the user of the device is able to maintain a distance of at least 30mm (12") *from* the sensor when he/she is not operating it.)

Manual:

Have the user determine at what point he/she would like the input to be considered open/activated. *When that position is reached, press the push button on the front of the switch box, and the system will store that position as the open reference.*

When the calibration is successful, a continuous beep will sound. If the calibration has been unsuccessful (i.e., if 'Calibration Mode' is set to Auto or a mechanical switch is connected), a series of short beeps will sound.

Manual calibration mode is necessary when the activating part of the user's body remains constantly closer than 30mm (12") to the sensor. If this is the case, manual calibration should be undergone regularly.

⚠ **WARNING**	'Calibration Mode' can only be used to calibrate proximity sensors.

Troubleshooting 9.6

Flash Codes:

When a fault occurs, the output LED will begin to flash. There will be a long delay followed by a number of flashes with a short delay. *Count the number of flashes, then find the corresponding information in the table below.*

Flash Count:	Fault Reason	Required Action:
1	-	-
2	-	-
3	Power Supply (voltage under or over)	Check power connections
4	Sensor	Replace printed circuit board (PCB)
5	-	-
6	ADC (internal analog-to-digital converter)	Replace PCB
7	Failure of test flag or diagnostic	- Redo tests - Replace PCB
8	CPU fault	Replace PCB
9	Scheduler fault	- Update Software - Replace PCB
10	Coding error	

Should a problem persist after corrective action, please contact your local dealer or mo-Vis service engineer.

Error Codes:

The Multi Switch maintains a fault log with fault counters. Each time a specific fault occurs, its counter will be incremented by one. The fault log can be accessed by the configurator (Dealer-level profile access). This user can clear one or all of the errors from the fault log.

In the case of error codes, please contact mo-Vis to learn about the required actions.

Parameter:	Min.:	Max.:	Default/Options:	Description:
Select Mode	-		**Select by Click**	See *9.5 Output Operation Mode Selection* (Mode Select, p. 6)
			Start Scan	
			Hold and Scan	
			Select Timed Click	
			Continuous Scan	
Active Outputs	1	4	1	The number of outputs used (If set to '1', the switch will never enter Select mode)
Calibration Method (Proximity mode only)	-		**Auto**	See *9.5 Output Operation Mode Selection* (Calibration Mode, p. 9)
			Manual	
Sensitivity (Proximity mode only)	10	100	50	Proximity switch sensitivity (higher value = more sensitivity) (Reduce this value in case of false positives)
Output Sequence	-		**Tip - Tip**	Select sequence: Green Tip, Yellow Tip, Green Ring, Yellow Ring
			Tip - Ring	Select sequence: Green Tip, Green Ring, Yellow Tip, Yellow Ring
Action Delay	10	2500	50	(Time in ms)
Select/Scan Time	100	5000	1000	(Time in ms) This is also the scan time.
Input Beep	-		**None**	No sound (default)
			Short	Short beep
Select Beep	-		None	No sound
			Medium	Normal beep (default)
			Long	Long beep
Output Beep	-		None	No sound
			Short	Short beep (default)
			Medium	Normal beep
Quit Beep	-		None	No sound
			Medium	Normal beep
			Long	Long beep (default)

OUTPUT SETTINGS:

Parameter:	Min.:	Max.:	Default/Options:	Description:
Mode	-		***Momentary/Timed***	Output will remain closed at least as long as the *Close Time*, or longer.
			Switched	Output will toggle between open and closed
Close Time	20	60000	200	Time (in ms) output will remain closed (timed output only)
Lock	-	-	***No***	See *9.5 Output Operation Mode Selection* (Lock Mode, p. 8)
			Timed Closed	
			Timed Open	
			Nudge	
Quit Time	200	60000	5000	Time (in ms) needed to close the input to unlock parameter ('Lock' must be set to 'Yes')

Technical Dimensions and Specifications 9.7

Product Description and Codes:

Description	Product Code	
	mo-Vis	Stealth Products
Multi Switch Unit	*P014-40*	*IDM-MS*
Multi Switch Proximity Set		
P014-20	*IDM-MS-SS (sold as a set)*	
P014-23		

Multi Switch Unit Dimensions:

- 36mm x 40mm x 17mm (Height x Width x Depth)
- 1.42 in. x 1.57 in. x 0.67 in. (Height x Width x Depth)

Voltage Supply:

- MicroUSB = 5V

Power Consumption:

- 14 mA

Input:

- Mechanical switch (Closed = 200kOhm max.; Open = 150kOhm min.)
- mo-Vis proximity sensor (12mm or 24mm)

Output:

- Max. = 60V (75mA)

Sensor Cable Length:

- 120cm (3.93 ft.)

Relevant Testing:

- EN12182

Preparations 10.1

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

⚠ **WARNING**	An incorrect installation of the Multi Switch and its accessories may cause damage to the hardware and/or injury to the user.

Tools 10.2

Use the proper tools to install and adjust the Multi Switch to the desired position for the user.

⚠ **CAUTION**	The use of improper tools may damage the device.

Installation Plan 10.3

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

- where the **Multi Switch** will be placed;
- how the **Multi Switch** will be operated; and,
- **Multi Switch** parameter settings.

Installing the Multi Switch 10.4

Hook-and-Loop and Adhesive Installation

Step One: Determine the desired location for the **Multi Switch**. Make sure user has visual contact with indication LEDs on the front of the **Multi Switch**.

Step Two: Carefully remove the protective backing of one hook-and-loop patch; apply the patch, adhesive side down, to the desired location.

Step Three: Remove the protective backing of the other hook-and-loop patch and apply it, adhesive side down, to the underside of the **Multi Switch**, taking care that the patch does not hinder the movement of any attached cable.

Step Four: Firmly press the **Multi Switch** against the hook-and-loop patch at the desired location, ensuring the two patches are flush with one another and have created a secure bond.

Step Five: Secure all cables with straps or fasteners.

Dealer Assistance 11.1

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 11.2

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

1. Explain and show the customer how you have executed the installation and explain the function.
2. Have the user test the position of the **Multi Switch**.
    - Is the **Multi Switch** positioned in such a way that the user gets visual and/or auditory feedback?
    - Does the **Multi Switch** and its cabling not hinder the user?
3. Have the user test all possibilities of the button/proximity sensor:
    - Are they well positioned for the user's needs?
    - Can they safely operate them with the least effort?
4. Has the user tested all possible uses of the switch?
    - Is every function accessed by the switch understood by the user?
    - Is every function accessed by the switch functioning providing the least effort for the user?
5. If needed, adjust the Multi-Switch (with the Mo-Vis Configurator software) and retest until there's optimal position and functioning.
6. Explain to the customer possible problems and how to address them (see *Troubleshooting*)

Conditions of Use 11.3

The **Multi Switch** 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 12.1

These care and guideline instructions will keep the hardware in good condition for a longer period of time and prevent damage.

- Check and re-tighten all fasteners on a regular basis.
- Repair or replace parts as needed.
- Gently remove dust and dirt from hardware with a soft, damp cloth

Cleaning 12.2

- use a soft damp cloth to clean the device.
- Ensure that all cleaners are approved for finished steel, aluminum, plastic, and upholstered surfaces.

WARNING	Do not immerse **the Multi Switch** in water or allow excess moisture in and around the **Multi Switch**.
CAUTION	Always check all mounting hardware, making sure each fastener is properly tightened before using the **Multi Switch**.
SAFETY	Replace or repair parts as needed.
NOTICE	Improperly installing the device or altering it in any way will void its warranty.

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P120D657 Jan 20, 2021