

# Multi Joystick

Multifunctional operable wheelchair joystick



Multi Joystick Omni (P002-61) - R-net (P002-62)

Or version for different wheelchair electronics connection

## Contact & Product

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## Multi Joystick User & Installation manual

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## Important information about this Manual

Congratulations for choosing a mo-Vis product! If you would like to learn more about mo-Vis and its products, we invite you to visit our website: [www.mo-vis.com](http://www.mo-vis.com).

Before you install or begin using this product, it is important that you read and understand the content of these installation and operating instructions, the safety instructions in particular.

The installation instructions will guide you as an installer through the options and possibilities with the mo-Vis product. The additional connection manual is considered as a comprehensive part of this manual. The mo-Vis product should be adjusted with the mo-Vis Configurator software.

The operating instructions are primarily intended to acquaint you with the functions and characteristics of the mo-Vis product and how you can use it in the best manner possible. They also contain important safety and maintenance information, as well as describe possible problems that can arise during use.

Always keep the operating instructions handy in connection with your wheelchair, since the need for important information can arise concerning its use, safety and maintenance.

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.

We reserve the right to make changes to the product without prior notice.

### ***Ordering documentation***

You can download additional copies of this User & Installation manual on the mo-Vis website: [www.mo-vis.com](http://www.mo-vis.com).

## Support, scrapping and spare parts

### *Technical support*

In case of technical problems, we advise you to contact your dealer. If the dealer is not available, or unknown, please contact mo-Vis bvba by email [support@mo-vis.com](mailto:support@mo-vis.com) or by phone +32 9 335 28 60. Always state the device serial number when contacting mo-Vis. This ensures you are provided with the correct information.

### *Spare parts and accessories*

Spare parts and accessories must be ordered by the dealer at mo-Vis bvba.

### *Scrapping & recycling*

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

# Warranty

mo-Vis bvba warrants the Multi Joystick to be free from defects in material and workmanship for a period of 2 years under proper use, care and service. All warranties only cover parts and do not extend beyond the initial purchaser from an authorised mo-Vis dealer.

## ***Start of the warranty period***

Each warranty shall begin on the date the product is first delivered to the customer.

## ***Repair and replacement***

For warranty service, we advise you to contact the dealer from whom the product was purchased. In the event of a defect in material or workmanship, the dealer must obtain a return authorisation (RA) number from mo-Vis and 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.

## ***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. pads,



joystick balls, batteries ...) are not covered in the warranty except as it applies to defects in material or construction.

### ***Amendments***

No person is authorised to alter, extend or waive the warranties of mo-Vis.

### ***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 authorised dealer. The Multi Joystick, integrated cabling and interface included, 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.

### ***Understanding usage***

The health care professional (authorised installer) is responsible for understanding the intended use of the mo-Vis equipment, the specifications and its programming parameters. mo-Vis cannot be held responsible for damage caused by incorrect installation or incorrect use of the product. Misuse, mishandling or storage is not covered by this warranty.

# Safety precautions

## *General*

The Multi Joystick is intended to be fitted on any power wheelchair with Omni (P002-61) or R-net (P002-62) connection. . Other versions for different wheelchair connections are available. Check the connection manual or contact your dealer or mo-Vis for more information.

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 instruction manual, paying particular attention to the safety instructions and warning texts.

Any unauthorised use of the product may lead to increased risk of accident. Carefully follow the recommendations in this manual in order to prevent accidents from use.

The Multi Joystick, integrated cabling and interface included, is considered as a non-serviceable part.

In case of doubt for alterations and adjustments, always contact a qualified service engineer.

## *Warning labels*

This manual contains the following warning labels, which are intended to draw attention to situations that could lead to

unwanted problems, e.g. personal injury or damage to the wheelchair.



**CAUTION!**

*Please use caution where the symbol appears.*



**WARNING!**

*Please use extreme caution where the symbol appears. Failure to observe warnings can lead to personal injury or property damage.*



**CAUTION!**

**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!**

**EMC Requirements**

*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).*

*The limit values for Electromagnetic Compatibility (EMC) with respect to power wheelchairs are set in the harmonised standards for the EU in the Medical Devices Directive, No. 93/42/EEC. Multi Joystick complies with these limit values.*



### **WARNING!**

#### **Assembly**

*The Multi Joystick should only be installed or adjusted by a qualified service engineer or someone with adequate knowledge to perform the adjustment in an expert manner.*

#### **Maintenance and service**

*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. All other service, alterations to and interventions on the Multi Joystick must be carried out by a qualified service engineer or someone with adequate knowledge to perform the adjustment in an expert manner. In case of doubt, contact a qualified service engineer or mo-Vis.*

*Use only spare parts or accessories approved or recommended by mo-Vis. All other use could lead to changes which might impair the function and safety of the product. It could also lead to the warranty becoming void.*



**CAUTION!**

**Testing**

*The Multi Joystick should always be tested without any person sitting in the wheelchair after every alteration of the physical installation or adjustment of the joystick parameters.*

# Design and function of the Multi Joystick

## *Purpose*

The Multi Joystick is a multifunctional operable joystick. Thanks to its flexibility, the joystick can easily be controlled by any body part, including finger, chin, lip... The joystick sits in the middle of our joystick series:

- **All-round Heavy Duty Joystick:** large size joystick, extreme force (ca. 650 gr – 22.93 oz)
- **All-round Joystick:** regular size joystick, regular force (ca. 250 gr – 8.81 oz)
- **All-round Joystick Light:** regular size joystick, medium force (ca. 120 gr – 4.23 oz)
- **Multi Joystick:** smaller size joystick, limited force (ca. 50 gr – 1.76 oz), operated with finger, chin, lip, ...
- **Micro Joystick:** very small sized joystick, minimal force (ca. 10 gr – 0.3 oz), operated with finger, chin, tongue, lip, ...

## *Recommended users*

The Multi Joystick is recommended for people with:

- Tetraplegia
- Neuro-muscular diseases (ALS, MS, ...)
- Limited muscular force

## ***Features***

The Multi Joystick is:

- Fully proportional, with reduced throw and force (ca. 50 gr – 1.76 oz)
- Built in a compact and discrete housing, with two 3.5 mm jacks for switch input
- Linkable with one or two switches (on/off and mode switch), with any 3.5 mm jack
- Fully adjustable to individual possibilities and needs with well-thought electronics
- Easily configurable with the free mo-Vis Configuration software: positioning of the joystick. For other parameters, the wheelchair software settings are used.
- Compatible with multiple types of wheelchair electronics . See the connection manual for more information.

## ***Mounting***

The Multi Joystick can be mounted at any location on the wheelchair.

- Use the Multi Swing Mounting arm to easily install the Multi Joystick as a chin joystick.
- Use the Quick-to-mount (Q2M) to install the Multi Joystick on any other location on the wheelchair.
- You can equally use any other mounting system.

### ***Multi Joystick package***

A Multi Joystick package consists of the following parts:

	Product description	Product code
 A black joystick with a coiled cable connected to a small green rectangular interface box. The box has a red and a black cable extending from it.	Multi Joystick set, with integrated cabling and interface (illustration: Omni version)	P002-61 (Omni) P002-62 (R-net) Or version for different connection
 A black circular mounting plate with a brass-colored threaded hole in the center. Four silver screws are shown next to it.	Multi Joystick mounting plate with 4 screws	M002-06
 A black L-shaped half clamp and a silver bolt with a hexagonal head.	Quick-to-mount half clamp with bolt 14 mm	M004-04



	Product description	Product code
	Quick-to-mount rod D6 50 mm	M004-70
	Multi Joystick ball	M002-05
	Multi Joystick manual	D-P002-61-70-00
	Connection manual	D-P002-81-70 (Onmi) D-P002-85-70 (R-net) Or version for different connection

### ***Multi Joystick unit detail***

The connections of the Multi Joystick unit have protective covers to avoid the intrusion of dust or moist during usage.



#### **CAUTION!**

*Before inserting a connector, remove the protective cover.*



### **CAUTION!**

*Always put or keep the protective cover in case the connections are not used.*



### **Ordering spare parts**

Spare parts and accessories must be ordered by the dealer at mo-Vis bvba.

Always mention Product code & Product description of items to be ordered.

## mo-Vis configurator software

The Multi Joystick positioning is adjustable with the mo-Vis Configurator software.

## *Software download*

- You can download the software on the mo-Vis website:  
[www.mo-vis.com](http://www.mo-vis.com).
- For all details on how to install and use the software, we advise you to consult the manual of the mo-Vis Configurator software (available in the support/download section of the mo-Vis website).

## *Profiles*

Depending on your profile (user, attendant, dealer, OEM), you will be able to configure a number of parameters for the Multi Joystick.

- For a user profile, no password is required.
- Attendant, Dealer and OEM profiles require a password.

## Intended use

The Multi Joystick is a joystick module which can be connected directly to the wheelchair electronics to control the wheelchair functions.

The Multi Joystick is a small, proportional joystick which requires significant less power and movement compared to a normal joystick.

## Safety precautions



### **CAUTION!**

*Protect the joystick against bumps.*



### **WARNING!**

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



### **WARNING!**

*Avoid hitting obstacles during driving.*



### **WARNING!**

*Mind damaging the unit and wiring. Make sure that cabling is mounted in such a way that excessive wear and tear is avoided.*

## Functioning

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

Common practice to navigate the wheelchair with the Multi Joystick is as follows:

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

## Safe driving

It is mandatory to have a wheelchair power on/off switch – which immediately shuts down the wheelchair power and electronics – within easy reach of the user while driving. This allows 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.*

In case the wheelchair responds in an unexpected way, the user must immediately release the joystick or use the power on/off switch.

## Connection options

You can connect one or two switches to the Multi Joystick or the interface unit. One connection is to control the power (pwr) on and off, one connection is to control a mode (in).

The connection interface depends on the joystick version. Please refer to the connection manual for more information on the connectivity

- Jack on/off (pwr) = red
- Jack mode (in) = yellow



# Installation instructions

## Preparations

### ***Qualified service engineer***

Only a qualified service engineer may install the Multi Joystick.



#### ***WARNING!***

*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 mo-Vis Quick-to-mount and Multi Joystick.



#### ***CAUTION!***

*Use the proper tools to install and adjust the Multi Joystick. The use of improper tools may cause damage to the device.*



#### ***CAUTION!***

*Do not tighten screws with an excessive force.*

## ***Installation plan***

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

- Where which part of the Multi Joystick should be placed.
- How the Multi Joystick will be operated: hand, chin or lip.
- A robust and reliable positioning. Hard or sudden movements of the wheelchair may not disorganise the installation.



### ***CAUTION!***

*Protect the joystick against bumps*



### ***WARNING!***

*Mind damaging the unit and wiring. Make sure that cabling is mounted in such a way that excessive wear and tear is avoided.*



### ***CAUTION!***

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

## ***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 preparation

1. 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 an according forward movement of the wheelchair.  
If needed, you can change this positioning in steps of 90° with the mo-Vis Configurator software.
2. Determine which of the 3 slots you will use to guide the cable.
3. Secure the Mounting Plate with the 4 screws to the base of the joystick housing.



### **CAUTION!**

*Tighten the screws firmly, but not excessively. Excessive force may damage the unit.*



## Joystick installation

1. Place the Quick-to-mount (Q2M) half clamp at the bottom of the unit.
  - Use an Allen wrench to mount the 14 mm bolt.
  - It is not advised, but you may mount the Multi Joystick without using the Q2M half clamp.
2. Slide the unit over a Q2M rod, or any other 6 mm rod, to position the Multi Joystick on the wheelchair.
  - A Q2M rod D6 50 mm is within your package
  - You can use any other Q2M rod, e.g. a C-rod or S-rod, which are included in the mo-Vis Multi Swing.
  - Contact your dealer or mo-Vis for more information.
3. Place and secure the Interface Unit and all cabling on the wheelchair.



### **WARNING!**

*Mind damaging the unit and wiring. Make sure that cabling is mounted in such a way that excessive wear and tear is avoided.*

4. If required, place a power on/off (pwr) and/or mode (in) switch, secure their cabling and insert their connections.

You can either use the connections on the Joystick unit or on the Interface unit.



**CAUTION!**

*Do not use the connections on the Joystick and Interface unit at the same time.*



**CAUTION!**

*Before inserting a connector, remove the protective cover.*



**CAUTION!**

*Always put or keep the protective cover in case the connections are not used.*

5. Connect the cabling to the wheelchair electronics



**WARNING!**

*All wheelchair electronics must be switched off.*

## Defining position (parameters)

If the Multi Joystick is not mounted with the jack connections are 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***

To define the parameter settings, proceed as follows:

1. Connect the Multi Joystick Unit to a pc. Use a standard mini-USB – USB cable.
2. Configure the parameters with the software.
3. Upload the configuration.
4. Test the configuration and adjust if necessary.

### ***Parameter settings***

Please see “Parameter Settings” for a list of all parameter settings.

## Testing

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

1. Check the Multi Joystick for intactness
2. Operational test

3. Test drive
4. Stop test

### ***Check the Multi Joystick for intactness***

Check whether:

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

### ***Operational test***



#### ***WARNING!***

*Execute this test only on a level surface, with at least one meter of free space around the wheelchair.*

1. Activate the wheelchair operating system.
2. Check for any error message.
3. Move the joystick slowly forward until you hear the parking breaks switch off.



#### ***CAUTION!***

*The wheelchair may start moving.*

4. Immediately release the joystick. You should hear the parking break react within a few seconds.

5. Repeat steps 3 and 4 three times, while slowly moving the joystick towards you, to the left and to the right.
6. Check whether the power on/off and mode Switch function properly.

### ***Test drive***

Make a test drive with the wheelchair.

- Check whether the wheelchair and all its functionalities function fully correctly in all positions the user may use the Multi Joystick and switches.
- Check no cabling or parts may get damaged or hindered in any possible position of the wheelchair.

### ***Stop test***

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

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

### *Dealer assistance*

During first time use by the user it is advised that the dealer or service engineer assists and explains the different possibilities to the customer (the user and/or his attendant).

If needed, the dealer can make final adjustments.

### *User testing*

It is important that the customer is fully aware of the installation, how to use it and what can be adjusted to optimise his experience.

As a dealer, proceed as follows:

1. Explain and show the customer how you have executed the installation, and explain the function of every (new) button.
2. Have the user test all positions of the Multi Joystick:
  - Are the Multi Joystick and switches within easy reach?
  - Can the user safely operate the wheelchair with the least effort?
  - Is the placement of the joystick and buttons in all available positions optimal for the user?
3. If needed, adjust the Multi Joystick.
4. Explain to the customer possible problems and how to address them.

# Using the Multi Joystick

## Conditions of use

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 engineer to the user and/or attendant during the first time use.

If the conditions of use change significantly, please contact your dealer or a qualified service engineer to avoid excessive wear and tear or unintended damage.

## Error codes

When a fault occurs, the LED of the Multi Joystick will start to flash. A long delay is followed by a number of flashes with a short delay.

The error message depends on the connection type. Count the number of flashes and look up the according error message in the Connection manual.

# Maintenance

## *Cleaning*

Clean all parts of the Multi Joystick on a regular basis (monthly), or whenever needed.

- Gently remove dust and dirt with a damp cloth
- Use only non-aggressive disinfectant cleaning agents



### ***WARNING!***

*Do not immerse in water or use excessive amounts of liquid.*



### ***CAUTION!***

*Do not apply additional lubricants to the moving parts.*

## *Joystick ball*

The ball on top of the Joystick can be removed without tools.

- You may shortly immerse the ball in warm water with a gentle cleaning agent.

Let the ball dry before putting it back on.

- If the ball is damaged, worn out or remains dirty, replace the ball. Contact your dealer or mo-Vis for spare parts (Multi Joystick ball = product code M002-05).

## *Monthly check*

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 check***

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

Contact your local dealer or mo-Vis for more information.

### ***Maintenance free***

The Multi Joystick is maintenance-free. Under regular use circumstances, the Joystick, Interface unit and different parts do not require additional maintenance.

## Parameter settings

With the mo-Vis Configurator Software you can change the parameters of the Multi Joystick. Depending on your profile (user, attendant, dealer, OEM) you will be able to change a number of parameters.

### Mounting Settings (User Level)

Setting	Description	Parameters	
Mounting direction	Sometimes it is easier to mechanically mount the joystick under an angle. This function swaps the joystick axis per 90 degrees clockwise. This parameter allows to compensate for the rotation of the joystick.	Default	0°
		Min.	0°
		Max.	270°
		Steps	90°

### Deadband

Setting	Description	Parameters	
Deadband	Neutral zone around the joystick center position. Prevents creeping of the wheelchair after releasing the joystick.	Default	5%
		Min.	5%
		Max.	10%

**Note:** Most wheelchair electronics have their own deadband setting. It is advised to keep the default setting.

## Compensation

Setting	Description	Parameters	
Compensation factor	<p>Lowers forward/backward (Y) driving speed on rough terrain.</p> <p>Wheelchair type and weight have an impact on this factor.</p> <ul style="list-style-type: none"> <li>— Heavy loaded wheelchairs may need to lower the setting to Weak.</li> <li>— Light wheelchairs may need to increase the setting to Strong.</li> <li>— If the joystick is mounted on a location that may multiply the value of a shock (e.g. on an arm), the setting should be lowered to Weak or Very weak.</li> <li>— Front wheel-driven wheelchairs are less affected by this factor than back wheel-driven ones.</li> </ul>	Very weak	almost no slow down
		Weak	slows down less compared to Normal
		Normal	<b>Default setting</b>
		Strong	slows down more compared to Normal
		Very strong	slows down more compared to Strong
X compensation		None	<b>No compensation</b>

Setting	Description	Parameters	
	<p>To limit the steering reaction if the wheelchair overreacts on steering commands. This may happen due to compensation on the X direction that unables the wheelchair to overcome an obstacle due to the loss of torque.</p> <p>The value is based on the compensation in Y direction.</p>	1/2 Y	X = 50% of Y level
		2/3 Y	X = 66% of Y level
		Equal Y	X = 100% of Y level
(de)activation pattern	<p>Active if compensation mode is set to Manual.</p> <p>To activate / deactivate: nudge the joystick Forward + Backward + Forward.</p> <ul style="list-style-type: none"> <li>— Agile users may be able to execute this pattern quite quickly.</li> <li>— Set this parameter according to the agility of the user.</li> <li>— <b>Caution:</b> "Slow" may cause the wheelchair to drive while executing the pattern.</li> </ul>	Fast	fast executing speed
		Normal	<b>normal executing speed</b>
		Slow	slow executing speed

## Tilt

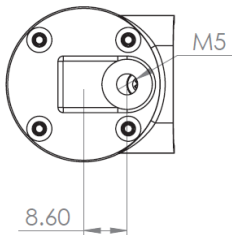
Setting	Description	Parameters
Enable	<p>The joystick can detect the joystick tilt referenced to the earth's gravitation.</p> <p>The wheelchair will stop driving when the parameter 'Enable' is set 'On' and the joystick is tilted more than 70 degrees, this in any direction. The Tilt sensor inhibit becomes inactive again - which means that the joystick is active again - if the angle becomes less than 60 degrees.</p> <p>The use of this functionality certainly makes sense when a mo-Vis joystick is integrated in a tray or other tilting surface / mounting aid. The default setting of the Tilt sensor is 'off'.</p> <p><b>Important:</b> the Tilt sensor response time is less or equal to 1s.</p>	

## Compensation mode

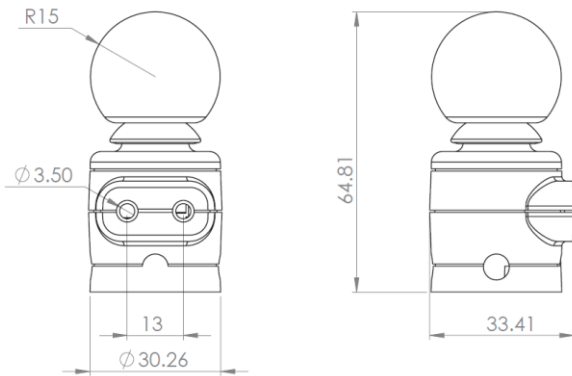
Setting	Description	Parameters	
Compensation mode	Defines activation of the compensation algorithm.  For R-net: can be set individually for each profile.	Off	always deactivated
		Manual	(de)activated manually by the user
		On	always activated

# Measurements

Bottom view



Side view



## ***Product description & Code***

- Multi Joystick Omni (P002-61), R-net (P002-62)
- Or version for different wheelchair electronics connection

## ***Interface connectors***

- 3.5 mm mono jack on/off (pwr)
- 3.5 mm mono jack mode (in)
- Mini USB
- Wheelchair connector, depending on the joystick version.

## ***Joystick connectors***

- 3.5 mm mono jack on/off and 3.5 mm mono jack mode

## ***Dimensions***

- Joystick            65 mm x 31 mm x 31 mm (HxWxD)  
                          2.55 in x 1.22 in x 1.22 in (HxWxD)
- Ball                26 mm x 30 mm x 30 mm (HxWxD)  
                          1.02 in x 1.18 in x 1.18 in (HxWxD)

## ***Required Force***

- Required force: ca. 50 gr (1.76 oz)

Installation date: . . / . . / . . . .

Dealer: . . . . .



***Dealer stamp:***

A large, empty rectangular box with a thin green border, intended for a dealer stamp.

***Serial number sticker***

A large, empty rectangular box with a thin green border, intended for a serial number sticker.