

User Manual

GentleGrab™ Laboratory Tool



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Labdeers reserves the right to change or make corrections in this manual at any time without prior notice. The current version of operation manual is available on our websites under www.labdeers.com/support.

The visualizations in this manual are illustrative.

This manual is an integral part of the product and its accessories and must be always easily accessible.

Read the operation manual thoroughly before using the product for the first time.

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1. General information

GentleGrab is specialized laboratory tool dedicated for manipulation with dry and semi-dry samples starting on size of 150µm and reaching up to tens of millimeters. It presents a portable, battery-powered laboratory tool working on principle of suction tweezers. By generating of vacuum and pressure even the objects with micro-scale size and low weight are allowed to be noninvasively manipulated, without risk of sample damage. The GentleGrab is effectively used for soft precision and sensitive gripping and placing of seeds, tissues, crystals, tissue sections or for a routine work with invertebrates or insects followed by active air mediated sample layout. Silicone suction pads attached to nozzle are suited for manipulation with larger objects or for specimens mounting. GentleGrab special configuration makes GentleGrab optimal for sensitive laboratory work and ideal for versatile laboratory use as well.

All the functions are adequate to used nozzle, object weight shape and surface type.



1.1. GentleGrab versions

GentleGrab is provided in two basic LED versions.

GentleGrab GG 1.2	GentleGrab GG 1.3
Chassis: white LED lighting: cool white LED	Chassis: grey LED lighting: green LED

As an option other LED light versions are available

2. Safety

The safety instructions in this manual have the following danger levels:

DANGER	Will lead to severe injuries or deaths
WARNING	May lead to severe injuries or death
CAUTION	May lead to light to moderate injuries
NOTICE	May lead to product or material damage

2.1. Intended use

The GentleGrab laboratory tool is designed and constructed for solid dry/semidry samples: picking, holding, sorting, spreading and precise placing. GentleGrab operates on principle of noninvasive suction tweezers and thus suits applications intended for sterile and dirty laboratory work. It is exclusively intended for use in research.

The GentleGrab laboratory tool might be operated only by trained lab stuff and users based on careful reading of the user manual.

Warning for intended use

WARNING! – Damage to health due to toxic or pathogenic particles manipulation. When handling infectious, toxic or pathogenic materials it is needed to work with respect to national regulations and bio-safety rules. To protect health, wear personal protective equipment.

CAUTION! – Danger to individual persons due to careless use. Never use GentleGrab on or in human body. Never point the opening of the device toward yourself or others. Before you start to work ensure the work with samples is safe to do not endanger yourself and other persons.

CAUTION! – Decreased safety due to incorrect accessories use. Usage of accessories other than those recommended by Labdeers may impair the precision, functionality and safety of GentleGrab device.

NOTICE! – Contamination and incorrect sample handling. Use the GentleGrab tool with fitted nozzles only. Use adequate nozzle diameter for sample manipulation. To avoid potential sample and instrument contamination care about the appropriate nozzles purity and filters replacement.

NOTICE! – Damage to the GentleGrab due to penetration of particles or liquids. Always use the provided water stop - 10 micron filters to protect GantleGrab tool. Use only the protective filters supplied by Labdeers to prevent damage and contamination of laboratory tool by micro particles and

potentially by water aerosols. The GentleGrab laboratory tool may not come in direct contact with the liquid, only dry or semidry object manipulation is permissible.

2.3. Product liability

In the following cases, the designated protection of the device may be compromised. Liability for any resulting property damage or personal injury is then transferred to the customer:

- The GentleGrab laboratory tool is not used in accordance with user manual.
- The GentleGrab laboratory tool is used outside of its intended use
- In case of special laboratory applications which are not listed in product intended use, customer needs the express written permission of Labdeers, to use the device outside of its intended use.
- The GentleGrab laboratory tool is used with accessories which are not recommended by Labdeers.
- The device is maintained or repaired by individuals or not authorized persons.
- The user makes unauthorized changes to the device.

3. Product description

3.1. List of equipment

Carefully unpack the carton. You received following items:

Content	Quantity
GENTLEGRAB LABORATORY TOOL	1
BASIC WORKING SET	1
CHARGER	1
OPERATING MANUAL	1
LED LIGHT COVER	1
<i>Other accessories or optional features</i>	<i>according to your specific order</i>

Find detail list of currently available accessories at www.labdeers.com

3.2. Technical product overview

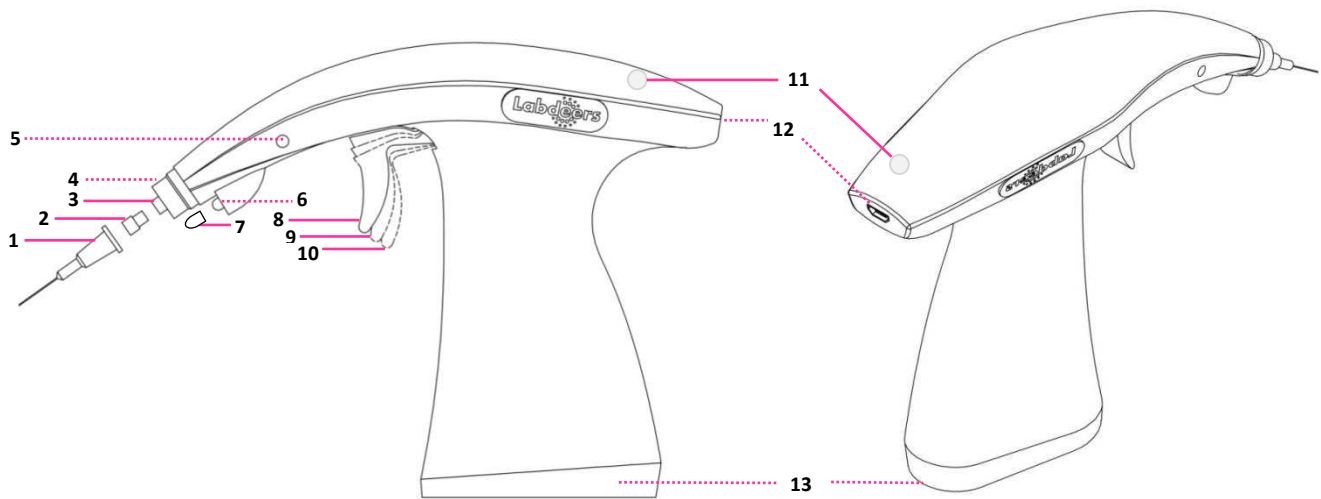


Figure 1 - Schematic technical overview of GentleGrab laboratory tool

- | | |
|--|--|
| 1. Nozzle | 8. Trigger – OFF |
| 2. Filter with fixation filter ring | 9. Trigger – ON / SUCTION operation mode |
| 3. Nozzle connector | 10. Trigger – ON / PREASURE operation mode |
| 4. Nozzle holder | 11. Charging indicator |
| 5. Holder for magnifier croco-clip | 12. Micro USB charging input |
| 6. Light emitting diod (LED) | 13. Serial number |
| 7. Cover for Light emitting diod (LED) | |

3.3. Instalation

Before the use of GentleGrab laboratory tool for the first time these steps needs to be carried out once.

1. Assamble the mains/power supply device (chapter - 3.5. Power supply)
2. Fully charge the rechargeable battery (chapter – 3.5.1. Charging)
3. Remove the transportation pin under the trigger

3.4. Operation

CAUTION! – Before use ensure the provided filter is fixed at the end of nozzle connector

CAUTION! – Before use ensure the appropriate nozzle is attached

The GentleGrab laboratory tool is type of electronic air-based tweezers manipulating the object by vacuum application followed by active air-pressure mediated sample layout. The GentleGrab can be only used if nozzle and protecting filter is attached. The sample picking, holding, sorting, spreading and precise placing is operated by using nozzles of various diameter and by changing the operating modes.

3.4.1. Working modes

By pressing the trigger - operator select the appropriate working mode:

SUCTION MODE - press the trigger to the 1st working position (Fig. 1, point 10). The vacuum is now provided until the working mode is changed. Samples can be sucked at the nozzle tip.

PRESSURE MODE - press the trigger to the 2nd working position (Fig. 1, point 11). The mild air pressure is produced until the working mode is changed. It is used to release sample from the nozzle tip surface, or for sample spreading on working area.

In both working modes additional LED light source is active. By the trigger releasing GentleGrab stop its function and the lighting function is inactivated as well.

Note: The changes of working modes are connected with slight change of the LED light intensity. This is mediated by the change of working current and does not influence the functionality of the device.

3.4.2. Observation of residual activity

In case of vacuum application it is possible to observe remaining suction activity, this residual activity is stronger in case of used nozzles with smaller inner diameter. Based on the pressure compensation this effect disappears. There may also be visible residual light based on the turning OFF the GentleGrab device. Above described residual activities are normal and do not affect the proper function of GentleGrab laboratory tool.

3.4.3. Filter mounting

To protect both your samples as well as the GentleGrab device prior damage or potential contamination must be used supplied original 10µm filter provided by Labdeers. These filters are coated by wax layer. Wax layer is important for the tight connection with the nozzle connector; this layer also prevents potential filter penetration in to the GentleGrab device causing its potential damage.

The pore size of 10µm and depth of filter 5mm is sufficient for sample protection against potential contamination (mechanical or bacterial). Inside of filter pores are disposed water adhesive molecules. These molecules ensure protection of potential GentleGrab damage in case of inappropriate usage and water aerosols. Based on water absorption the water adhesive molecules enlarge the volume and immediately stop the air flow in between the sample and GentleGrab.

NOTICE! - Avoid producing strong power to fix the filter in to the nozzle connector

3.4.4. Using the nozzles

The material to be handled is sucked at the tip of nozzles. We recommend using blunt end stainless steel nozzles or flexible polypropylene nozzles in length of 12.7mm (1/2"). For some of the special purposes and research applications the nozzles of 38,1mm (1,5") and some other special nozzles are available. Described nozzle types are available in various gauge, in non sterile packing.

Nozzles of gauge 18 (green) are compatible with suction silicone pads.

The selection of appropriate nozzle diameter is fully on the operator liability. We recommend using nozzle gauge with the inner diameter smaller than manipulated object.

In case of spreading function, the applied pressure changes adequately to the used nozzle diameter.

Nozzle attachment/release

1. To attach the nozzle, hold the nozzle hub and insert the nozzle straight to the nozzle connector (Fig. 1, point 3).
2. By slight rotation fix the nozzle in the nozzle holder (Fig. 1, point 4).
3. To attach sterile nozzle by hand, it must be handled in a way that prevents the nozzle contamination.
4. To release the nozzle repeat the procedure in the reverse order.

Nozzles can be used repeatedly based on the careful cleaning and maintenance.

NOTICE! - Avoid producing strong power to fix the needle in to the locking system.

The strength of locking does not influence the proper function of Gentlegrab laboratory tool.

3.4.5. Sample picking

1. For optimal sample picking of bulk materials it is recommended to spread this material on flat solid surface (Fig. 2A).

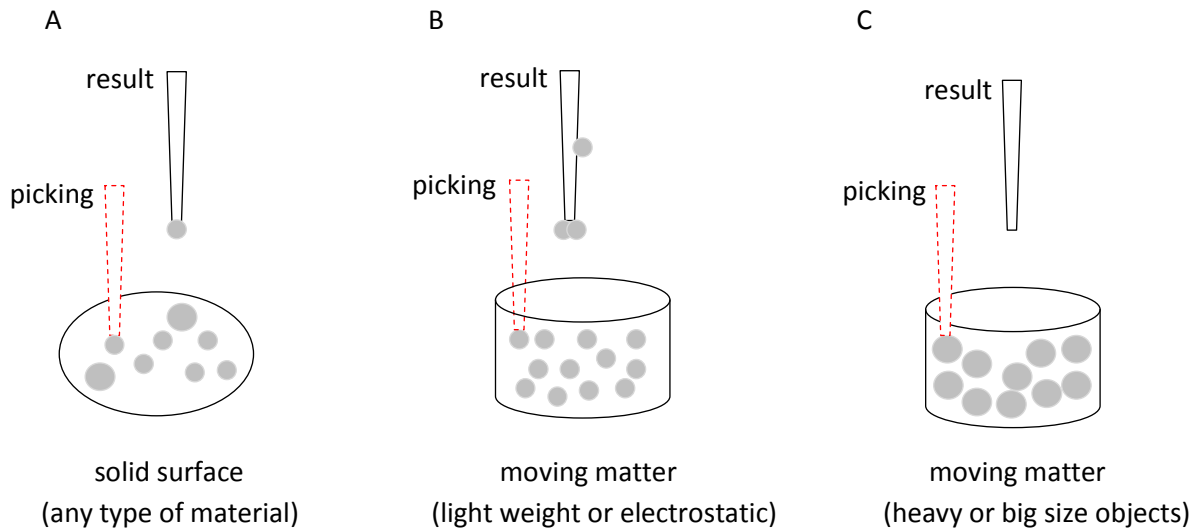


Figure 2. Picking of sample

Picking of bulk material directly from stock may lead to incorrect picking. For optimal sample picking spread this material on flat solid surface (A). In case of light weight and electrostatic material, more of the objects are usually attached based on picking from bulk (B). In contrast the fractional force of surroundings objects leads to failure, once heavy or large objects are manipulated (C).

2. Turn on the trigger in to the suction mode and by touching the object pick the object up.
3. Hold the trigger in suction mode until you decide to push the object

3.4.6. Sample placing/pushing

1. Push the object either by using the active pressure or by gravity. For a gravity pushing simply release the trigger to the initial position (trigger OFF).
2. To generate active pressure shortly push the trigger to pressure mode. The active pressure for object releasing is needed in case of micro scale samples, electrostatic samples or if the suction pad is used. In case of active push you need to count with trajectory of sample release based on the initial angle of nozzle (Fig. 3).

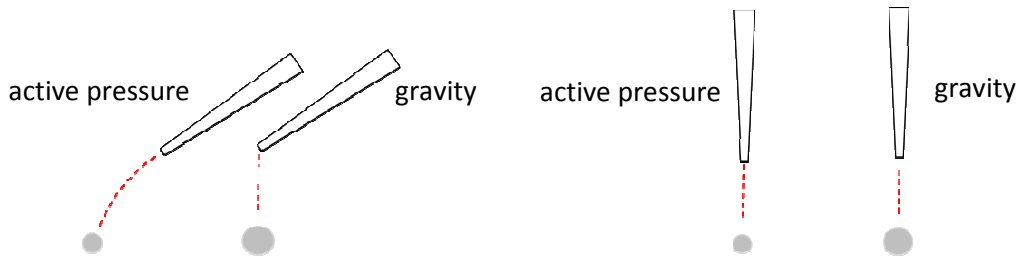


Figure 3. Sample placing trajectory

3.4.7. Sample spreading

We do recommend testing the spreading function with appropriate material and various nozzle diameters before run sensitive experiment.

1. In case of using the spreading function, the pressure changes adequately to the used nozzle diameter and the used nozzle to object distance.
2. Trigger on the GentleGrab to active pressure mode. Get slowly closer to the objects to be spread. By active nozzle movement spread samples on surface.

3.5. Power supply

The power supply is designed to power the electrical equipment from the 110-230V AC mains (Fig. 4).

Unit setup and operation

- Assembly the connector and power supply
- Plug the connector into the appropriate socket in the powered device.
- Plug the power supply to the 110-230V AC outlet.

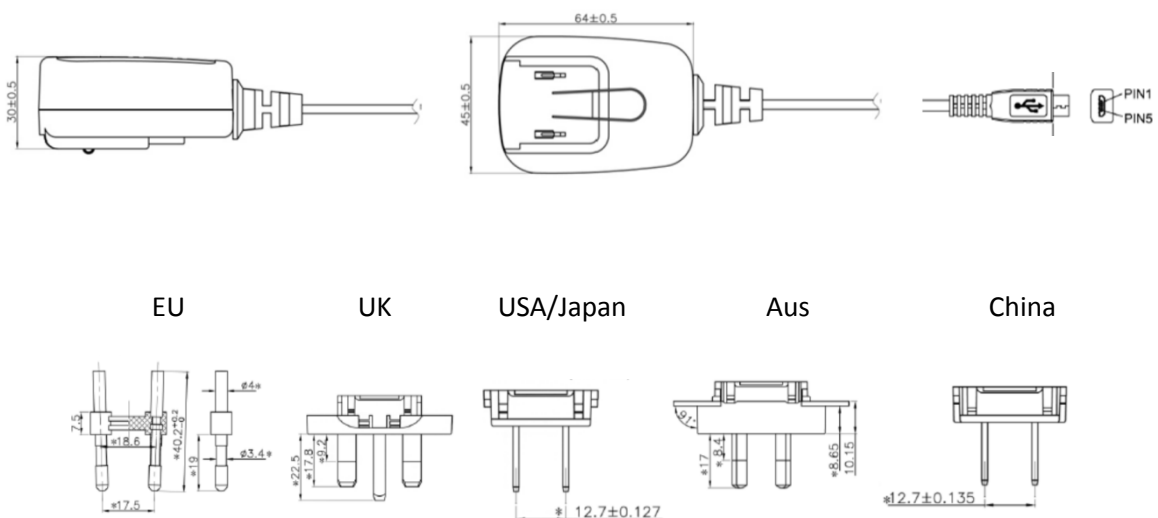


Figure 4. Charger and available plug connector type scheme (distance/mm)

WARNING! Incorrect or damaged mains/power supply devices can cause severe personal injury and damage to the device. Do not use damaged mains/power supply devices. Such devices may cause electric shock, overheat of the device, set it to fire, melt it, short-circuit it or cause other similar damage.

PRECAUTIONS

- Do not exceed the rated operating parameters.
- The device may interfere with sensitive equipment located nearby.
- There is a risk of a harmless electric shock, fire or equipment failure.
- Do not disassemble, repair, or modify the device and do not touch the interior parts of the device.
- Do not disassemble the housing.
- The power supply has no components including fuses that can be replaced by the user.
- Dangerous voltages may still exist in the power supply even after few minutes from turning off the power.
- Damaged power cord must be immediately replaced by a qualified technician.
- Do not use the device if it emits smoke, an abnormal smell or strange sounds.

3.5.1. Charging

The rechargeable battery has to be fully charged before the use at the first time.

1. Insert the provided mains/power supply device into the socket
2. Connect the charging micro USB plug to the connector socket of GentleGrab laboratory tool.
1. The charging process is indicated on a top of the chassis close to the connector socket of GentleGrab device.
2. Charging mode is indicated by red light, the blue light indicates fully charged device (Fig. 5).
3. Recharge the battery completely at least every two months, in case the device is for a longer period without operation.

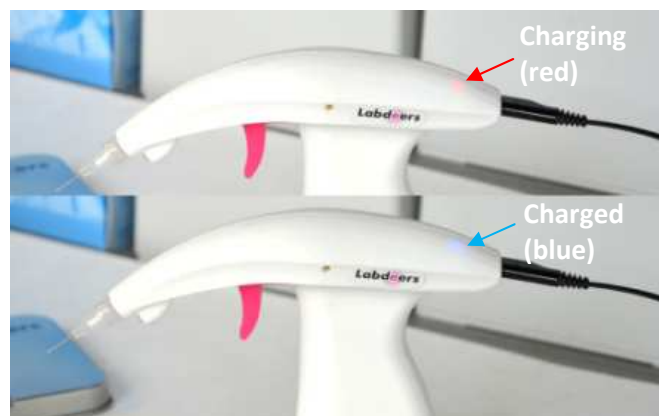


Figure 5. Charging status

NOTICE! – Loss of full charging capacity of rechargeable battery by incorrect charging. The supplied GentleGrab device is not fully charged. The rechargeable battery will reach its full capacity only after several discharging and charging cycles.

NOTICE! – Never charge the battery in environment reaching high temperatures (>60°C, over there where overheat is supposed - close to heater, sunny windows etc.)

NOTICE! – Material damage due to outdated rechargeable battery. The battery may become deformed or burst by exceeding its service life. Never use GentleGrab device with deformed or heating handle. This indicates outdated rechargeable battery and device should be serviced.

3.6. Basic working set description

Basic working set contains following accessory:

1/2" Straight stainless steel nozzles

1/2" Straight polypropylene nozzle

1x Magnifier

1x Magnifier clip

3x Silicone suction pads

5x Filters

Gauge	ID inch	ID mm	Color	Amount
14	0.063	1.60	Olive	1
15	0.054	1.37	Amber	1
16	0.047	1.20	Black	1
18	0.033	0.84	Green	3 (1x Polypropylene)
20	0.024	0.60	Pink	1
22	0.016	0.41	Blue	1
27	0.008	0.20	Clear	2
30	0.006	0.15	Lavender	2

Table 1 – Nozzles in Basic working set

4. Care and maintenance

4.1. Cleaning of GentleGrab

All parts of GentleGrab can be cleaned by following procedure.

1. Moisten a cloth with cleaning agent
2. Clean the device form external contamination
3. Moisten the cloth with clear water and wipe down the housing to remove rests of cleaning agents

NOTICE! – Damage due to penetration of liquids. The device itself is not waterproof and may not come into contact with the liquid, always use wet cloth for cleaning. Always use the water stop protection filter to avoid potential liquid penetration by nozzle input.

NOTICE! – Damage to device by unsuitable cleaning agents or by sharp objects. Do not clean the device by corrosive cleaning agents, strong solvents or abrasive polishes. Never use the organic solvents or acetone. Do not use sharp or pointed objects for cleaning. Check the compatibility and chemical resistance of materials before the use of cleaning agents.

4.2. Disinfection of GentleGrab

For disinfection of GentleGrab wipe the outer surfaces with decontamination agent or 70% isopropyl.

Sterilizing with UV light – GentleGrab can be temporarily subjected to the UV light at 254 nm.

NOTICE! – Damage due to incorrect handling. Do not use any additional desinfectants, decontamination agents during UV sterilization.

4.3. Maintenance of consumables

Filters maintenance

Replace the protective filter always after contact with liquid or in case there are signs of filter damage. Filters can be sterilized temporarily with UV light at 254 nm.

Nozzles maintenance

Nozzles can be used repeatedly based on the careful cleaning and maintenance.
Clean the nozzles immediately after use.

1. Use cleaning agent or decontamination agent or 70% isopropyl for cleaning of nozzles surface
2. Clean the inner parts by cleaning agent or decontamination agent or 70% isopropyl using the syringe.
3. Remove the rests of cleaning agents by clear water.
4. Use syringe mediated air flush to remove rests of water or disinfectants from inner parts of nozzles.

Nozzles can be sterilized temporarily with UV light at 254 nm.

Magnifier cleaning

Do not use sharp objects for cleaning of magnifier.

1. Use cleaning agent for cleaning of surface
2. Rinse the magnifier by clean water
3. Wipe the rest of water by dry cloth

Magnifier can be sterilized temporarily with UV light at 254 nm.

5. Technical data

The proper device functions were verified by employee of Labdeers. Each GentleGrab device was adjusted and tested in all the operation modes.

5.1. Technical Specifications

Objects - minimal object size*	150 µm
Objects - maximal object size*	Tens of milimetres
Objects – maximal object weight*	20g (using suction pads)
Objects – state*	Solid; dry/semidry
Nozzle conector	male luer lock
Operating conditions – temperature	5°C – 40°C
Operating conditions – relative humidity	10% - 95% RH
Operating conditions – Atmospheric pressure	795 hPa – 1060hPa
Height	117mm
Width	47mm
Depth	148mm
Weigh	approx. 160g
LED source	3mm LED (cool white/green)
Interface	Micro USB
Batery capacity	1000mAh
Battery type	Ni-MH
Nominal Voltage	3,5 V
Charging input	max. 2A
Overheating fuse	65°C

*NOTE – the object manipulation depends on used caliber of nozzle, object shape, surface and weight

5.2. Materials used

The components of GentleGrab laboratory tool, accessible to the user are made of the following material. Please check the chemical resistance before using organic solvents or aggressive chemicals which are in contact with GentleGrab. For cleaning please follow the cleaning instructions in part of maintenance.

NOTICE! – Aggressive chemicals may damage the GentleGrab laboratory tool or supplied accessories

Assembly	Material
GentleGrab chassis	Polyethylene (PET-G) Silicone
GentleGrab Trigger	Polyethylene (PET-G)
Nozzle conector	Polyvinilchloride (PVC)
Filters	Polypropylene (PP)
Nozzles	polypropylene (PP) hub stainless steel canula polypropylene (PP) canula
Suction pads	Silicone
Charger	Polycarbonate (PC)

Charger

Operating temperature	0°C -40°C
Weight	72g
Dimension	65 x 45 x 30 (mm)
Certified AC plugs	EU, UK, USA/Japan, Aus, China
Efficiency level	VI
Connector	micro USB
Voltage	5VDC
Loading	0-2.1A
Max . Power	10.5 W
Ripple/Noise	200(mV) p-p
Housing material	Polycarbonate (PC)
Protection class	II

5.3. Accessories - overview

Type	Description
Charger	Charger and selected plug variant EU, UK, USA/Japan, Aus, China
Working set	1/2" Nozzles (see tab. 1) Magnifier Magnifier clip Silicone suction pads - 3x Filters - 5x
Magnifier clip	Croc-clip 360° magnifier
Magnifier	3x magnifying
Stainless steel nozzles, 1/2" (tab.2)	Gauge 14, 15, 16, 18, 20, 21, 22, 23, 25, 26, 27, 30
Polypropylene nozzles, 1/2" (tab.2)	Gauge 14, 15, 18, 20, 25
Special nozzles	Bent and straight 1/4"; 1,2"; 1"; 1,5"
Filters	5X wax coated 10µm water stop filters
Suction pads	3x; silicone pads

Gauge	ID inch	ID mm	Color
14	0.063	1.60	Olive
15	0.054	1.37	Amber
16	0.047	1.20	Black
18	0.033	0.84	Green
20	0.024	0.60	Pink
21	0.020	0.51	Purple
22	0.016	0.41	Blue
23	0.013	0.33	Orange
25	0.010	0.25	Red
26	0.009	0.23	Beige
27	0.008	0.20	Clear
30	0.006	0.15	Lavender

Table 2 – 1/2" straight polypropylene (Gauge - 14, 15, 18, 20, 25) and stainless steel nozzles (all)

6. Statement of warranty

This Limited warranty applies for the period of 24 months for the instrument and charger; and 6 months for the battery (do not include capacity loss), valid from the date of the product purchase.

Contact directly Labdeers Ltd. in case of warranty claims. The warranty is return-to-base only.

No warranty is given in case of:

- normal wears and tears of the instrument
- misuse, abuse, negligence, or accident howsoever caused
- connected, installed, adjusted, or used product contrary than in accordance with the user manual
- instrument was modified, altered, repaired or opened by unauthorized persons
- defects or damage due to spillage of liquids or particles, corrosion, rust, or the use of wrong voltage

Excluded from the warranty are:

- reduced battery capacity
- instruments with defected or removed serial numbers
- instruments without any prove of purchase

If at any time within the warranty period the instrument does not function as warranted, the product will be repaired or replaced at no charge. The customer is responsible for shipping and for covering of insurance charges (for the full product value) to Labdeers company. Labdeers is responsible for shipping and insurance on return of the instrument to the customer. Returned instruments must be packaged sufficiently so as not to assume any transit damage. If damage is caused due to insufficient packaging, the instrument will be treated as an out-of-warranty repair and charged as such.

The Labdeers Ltd. offers out-of-warranty repairs. These are usually returned to the customer on a cash-on delivery basis. Labdeers repairs or replaces faulty instruments as quickly as possible. All replaced parts or equipment shall become to property of Labdeers.

7. Transport

CAUTION - Clean and decontaminate the product prior shipment. Perform cleaning of device before shipping as described in chapter 4. Maintenance. Hazardous substances may result in personal injuries or product damage.

NOTICE! - Device should never be turned ON within transportation! Pay the attention for trigger fixation in OFF position prior packing and shipping GentleGrab device.

8. Storage and disposal

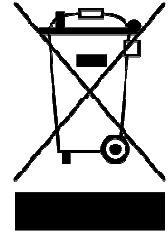
Store the device in secure storage location, where the device cannot be exposed to aggressive gases for an extended period. Do not store device with attached nozzles. It is recommended to charge the batteries fully in the period of two months, to sustain the optimal battery capacity.

Storage conditions

Ambient temperature: -5°C - 45°C

Relative humidity: 10% - 5%

Atmospheric pressure: 700hPa – 1060hPa



Disposal

Follow the relevant locally applicable legal regulations in case the product is to be disposed.

Product disposal in EU is regulated by EU Directive 2002/96/EC pertaining to waste electrical and electronic equipment. According to these regulations electrical and electronic equipment supplied in business-to-business sphere, may no longer be disposed of in municipal or domestic waste.