FINNDENT

FD-PHANTOM ACTA
Technical Manual
and Spare Parts Catalogue

March 2018
Document 8230110-1 Ver. 1.3

Table of Contents

1 INTRODUCTION

This manual describes how to maintain and repair Finndent Phantom dental training units. The Phantom unit consists of a table surface, instrument bridge, suction arm, Phantom torso and operating light. Installation may only be done under Finndent supervision.

Maintenance and repair may only be done by a certified Finndent Technician.

This manual is valid for the instrument bridge Q915 PCB firmware version "FD915_v1_00_02".

ACCOMPANYING DOCUMENT - USER MANUAL
For students, dental professionals and teaching staff. Contains use and regular care instructions for Phantom units. Also contains basic information on parts, trouble shooting and parts replacement.

ACCOMPANYING DOCUMENT – TECHNICAL AND SPARE PARTS MANUAL
For Finndent authorized dealers. Contains adjustment, repair, calibration, and replacement part information. Wiring and pneumatic diagrams are included.

1.1 Symbols and Abbreviations

V Voltage

A Ampere

W Watt

Hz Hertz

~ Alternating current

FI Approved by Fimko

| / O On / Off (IEC 60417-5007/5008)

IPX1 Protected against dripping water (IEC 60529)

PCB Printed Circuit Board

RPM Revolutions per minute

T5AL250V Fuse description: T = Slow blow / F = Fast blow
5A = number of amperes, for example, 5 amp
L = low breaking capacity glass fuse
250V = rated for 250 volts
35A BC = 35 A breaking capacity

 / L / N Protective Earth (IEC 60417-5019) / Line In / Neutral conductor connection.

Warning: Dangerous voltage (IEC60878).

Do not dispose in normal household waste (Directive 2002/96/EC)/

Date of manufacture (IEC 60529).

Type B equipment (IEC 60878).

Consult operators manual (ISO 7010).

1.2 Warnings and Safety

ELECTRICAL WARNINGS

This unit contains live mains voltage parts. Before attempting maintenance do all of the following:

- Turn off all units using the power switches on the unit towers.
- Turn OFF the table power supply switches in the table's end supply cabinet.
- Disconnect the live mains voltage by turning off the building circuit breaker that supplies the power. The building circuit breaker must be equipped with a locking device to prevent accidentally turning the power on.
- If the building circuit breaker is located outside the clinic, Finndent also recommends leaving a note of, "DO NOT SWITCH ON, WORKING ON LINE".
- Test that the unit is electrically isolated using an electrical testing device.

Turning the unit off from the power switches is not a guarantee that the mains power is off in all internal parts.

Always use the correct sized fuses.

Do not modify this equipment.

CAUTION – CIRCUIT BOARD HANDLING

Circuit boards may be damaged by static electricity. Finndent suggests the following handling guidelines:

It is recommended to wear wrist grounding straps and store the PCB in an anti-static bag.

If not using wrist straps, touch an exposed metal grounded part of the unit or chair before touching the PCB.

Always put PCBs in anti-static bags for handling and shipping.

PCBs only qualify for warranty repair of shipped in an anti-static bag.

Never place PCBs on a conductive surface or give it to a person without first touching the surface or person.

CAUTION – AIR AND WATER SUPPLY

A shut-off valve is mounted on each unit. **Always close the supply valves and relieve system pressure before doing maintenance.**

CAUTION – APPROVED ACCESSORIES

Only Finndent approved parts and accessories may be used with this equipment. The use of other accessories is not covered under warranty and may interfere with the electrical or mechanical properties of the equipment.

1.3 Technical Specification

Unit Manufacturer

Finndent Oy, Niittylänpolku 16, 00620 Helsinki, Finland.
Telephone: +358 20 743 5115
E-mail: info@finndent.com

Device Class According to Medical Devices Directive 93/42/EEC

Class I equipment. This simulation unit is not for clinical use, or use with a patient.

Electrical Protection Class / Grade

Class I Type B

Operational Safety Grade

Not suitable for use in an oxygen rich environment in which the concentration of oxygen is greater than 25%, including mixtures of inflammable anaesthesia, oxygen or laughing gas and air.

Protection Against Fluids (Standard EN 60529 +A1 Degrees of protection provided by enclosures)

IPXI for foot control

Backflow Prevention (Standard EN 1717 Protection against pollution of potable water in water installations and general requirements of devices to prevent pollution by backflow)

The unit is isolated from the mains water supply and takes water from a bottle system.

Allowable Temperature, Humidity and Pressure Ranges

	Temperature	Relative Humidity (no condensation)	Atmospheric Pressure
Operating Conditions:	15 – 40ºC	20 - 75%	80 kPa–110 kPa (0.8bar–1.1bar)
Storage Conditions:	0 - 50ºC	20 - 75% + Keep Dry	70 kPa–110 kPa (0.7bar–1.1bar)
Transportation Conditions:	-20 - +60ºC	5 - 95% + Keep Dry	70 kPa–110 kPa (0.7bar–1.1bar)

If the unit has been stored outside accepted operating conditions for more than a few hours, allow the unit to reach operating conditions before attempting to install or connect any part.

Electrical Features

Supply Voltage / Frequency:	230V / 50Hz or 60Hz
Unit power consumption:	500W (approx. maximum)
Volt-amperes of unit:	460VA
F1 (PCB Q900 mains fuse):	T6,3AL250V (T6,3A slow blow fuse, Schurter 0034.3125 / Littlefuse 021806.3MXP). Breaking capacity (BC) 35A
F2 (PCB Q900 mains fuse):	T1AL250V (T1A slow blow fuse, Schurter 0034.3117 / Littlefuse 0218001.MXP). Breaking capacity (BC) 35A
F3 (PCB Q900 mains microfuse):	T4A250V (T4A slow blow board mount radial microfuse, Schurter 0034.6621 / Littlefuse 37214000411). Breaking capacity (BC) 40A
F4 (PCB Q900 mains microfuse):	T1,25A250V (T1,25A slow blow board mount radial microfuse, Schurter 0034.6616 / Littlefuse 37211250411). Breaking capacity (BC) 40A
F1 (PCB Q915 Instrument Bridge Microfuse):	F5A125V (F5A fast blow board mount square end block microfuse, Schurter 3-101-056). Breaking capacity (BC) 50A
F2 (PCB Q915 Instrument Bridge Microfuse):	F5A125V (F5A fast blow board mount square end block microfuse, Schurter 3-101-056). Breaking capacity (BC) 50A

The power supply cord is non-detachable and may only be replaced by a technician.
The equipment is permanently installed.

Mode of Operation

Unit: Continuous operation with intermittent loading depending on feature use.
Typical intermittent instrument use of 10 minutes ON / 5 minutes OFF.

Torso Lift Motor:
Non-Continuous operation.
Duty cycle time in normal use: 10% of max. 2min motor ON/18min OFF.
Speed of motor: 33mm/sec (0.033m/sec) maximum speed.
Length of stroke: 250mm (0.25m).
Time to travel in one direction: 7.5 seconds.

Software

This unit contains no software and has no programmable parts.

Bottled Water Connection

Pressure range:	2,5 bar (250 kPa) maximum
Flow Rate:	≤ 4 l/minute maximum consumption
Quality of water:	particle size < 10µm
Bottle Connector	28PCO
Size:	1.5L maximum

Water lines are always GREEN or CLEAR/WHITE.
Water spray adjustment knob has a ring on the base.

Compressed Air Supply

Pressure on unit valve:	3 bar maximum (300kPa)
Flow Rate on unit:	≥ 55 l/minute maximum consumption
Quality:	dry, oil-free and hygienically clean (medical grade)
Hose Connector	10mm

Hygienic air lines are always blue.
Air spray adjustment knob is smooth on the base.

The turbine air supply and return lines are red in the instrument bridge and black in the unit.

Cooling / Power Fluid

The hoses for instrument air or water cooling or for air turbine rotation are white/clear.

Suction Connections

Vacuum range per unit:	150 – 170 mbar (15-17 kPa)
Required Flow Rate per unit:	≥ 500-800 l/minute consumption
Universal cannula on large suction hose:	250 – 350 l/min
Surgical suction cannula on small suction hose:	50 – 80 l/min
Saliva cannula on small suction hose:	30-60 l/min
Mains Suction Supply to Table:	50mm
2 x Central Table Suction Hoses:	32mm
Large Suction Hose	17.5mm
Small Suction Hose	11.5mm

Load Capacity

Foot Control Tray:	5kg
Instrument Tray:	1kg

Colour

White painted parts and plastics are RAL 9003 Signal White.
Grey plastic parts are RAL 9006.

Installation and Disassembly

The dental unit must be installed by a Finndent technician. Contact Finndent if the unit requires relocation or disassembly other than listed in this manual.

1.4 Disposal of waste

Finndent products have been designed and manufactured to be as safe as possible. Any waste materials must be recycled or disposed of in an environmentally friendly manner according to national regulations.

Hazardous materials requiring special waste collection must be disposed of in accordance with national waste and environmental regulations.

When handling waste materials, all precautions must be taken to reduce the associated risks.

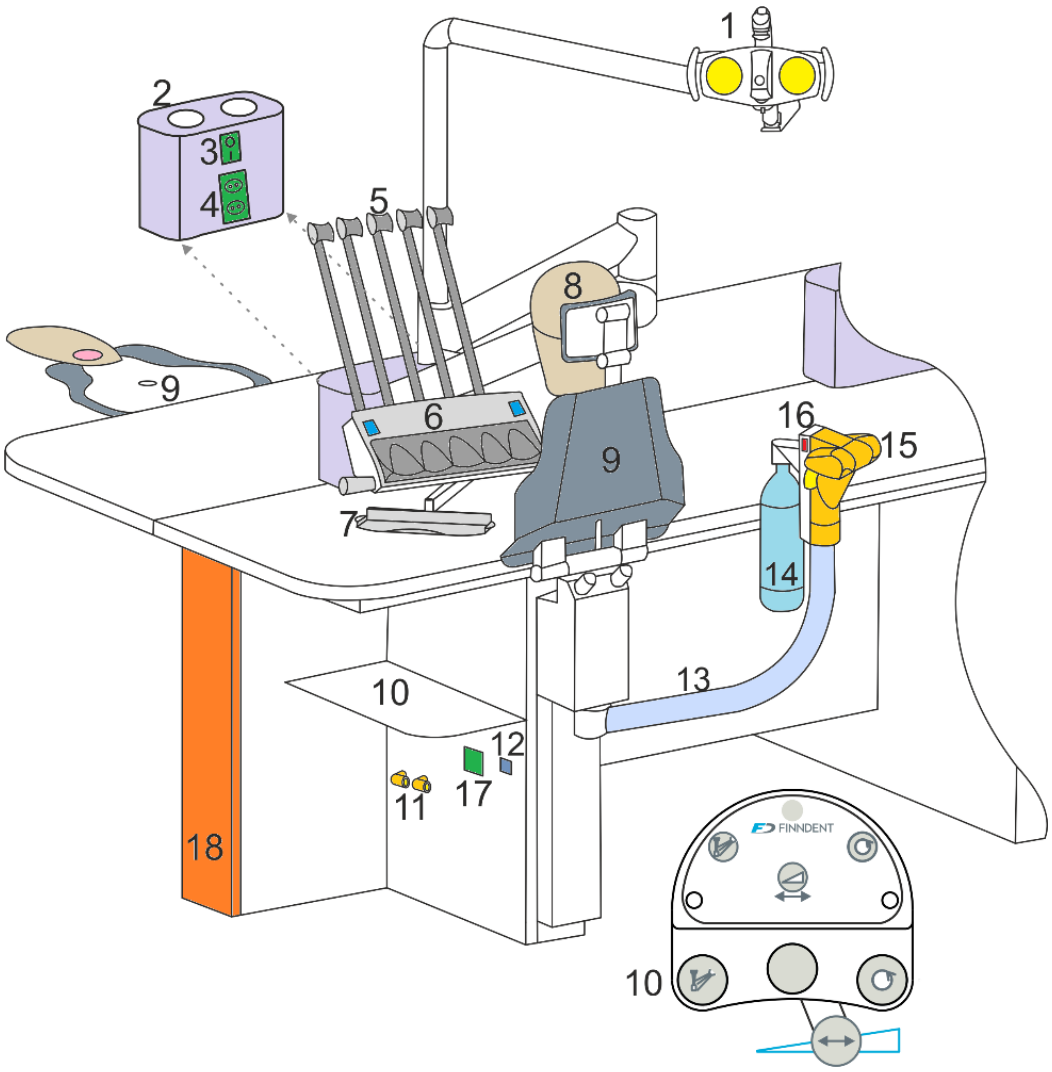
When the unit reaches the end of its service life, return it to your dealer for disposal.

Contact your local dealer or national governmental agency for more specific information.

Description	Main Materials	Recycle	Waste Disposal	Special Waste Collection
Unit frames	Aluminium Galvanized steel Particle board table top	X X X		
Electronics, PCBs, motors	Copper Steel PCBs, Motors, other	X X		X - EC directive 2002/96
Rubber			X	
Glass		X		
Cleaning products	Chemicals			X
Oil collector	Chemicals			X
Packaging	Wood Cardboard Paper Foam and SealedAir padding Other plastics	X X X X	 X	
Other accessories	See OEM Product Documentation	-	-	-

Table : Guideline for waste disposal

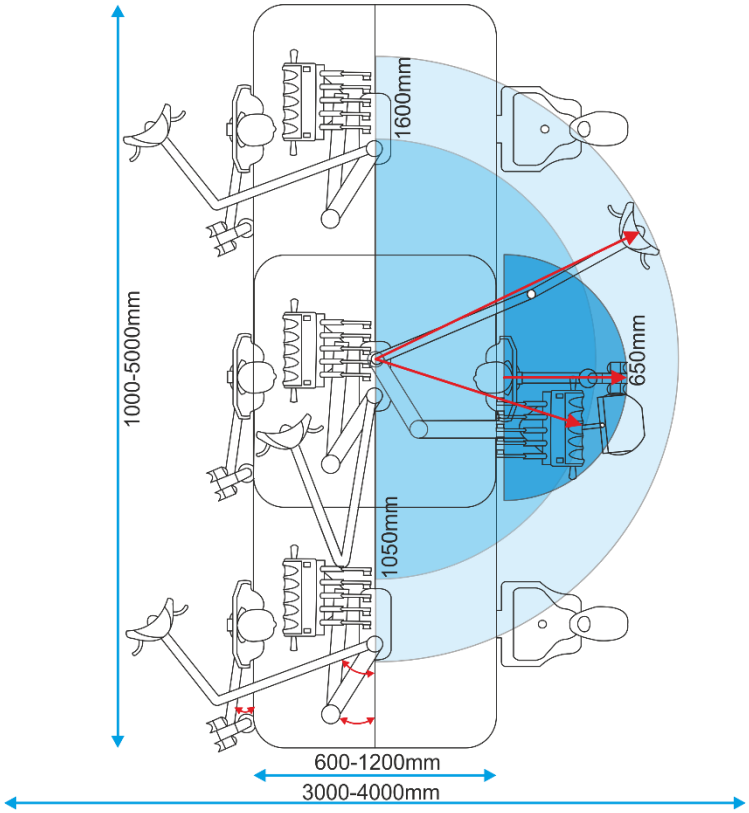
1.5 Main Parts



1. Dental lamp.
2. Tower.
3. ON / OFF switch.
4. Power socket.
5. Whip arms.
6. Instrument bridge.
7. Instrument tray.
8. Phantom head.
9. Torso.
10. Foot pedal.
11. Suction supply hoses.
12. Foot control plug.
13. Suction arm.
14. Water bottle for all water supply.
15. Suction holder (manifold).
16. Torso lift control (up-down).
17. Power socket.
18. Supply access for maintenance (air, water, suction, power).

1.6 Dimensions

Phantom dimensions depend on the number of units and lamp arm length:



Arm Motion Dimensions

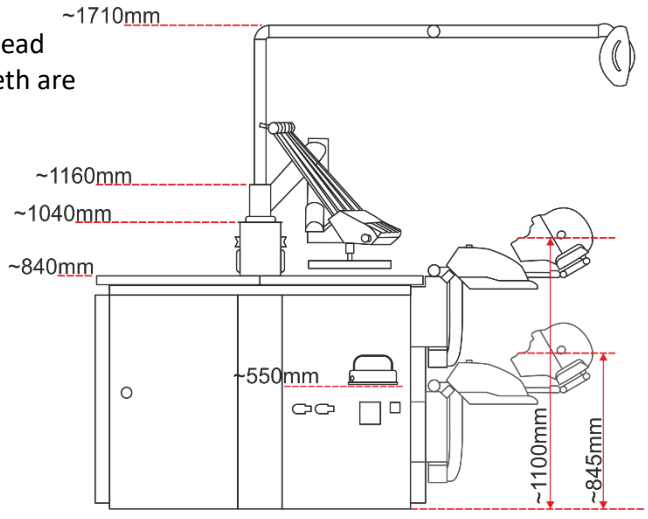
Radius of instrument bridge: ~1050mm adjustable.
Radius of Faro dental lamp: ~1600mm maximum.
Radius of suction arm: ~650mm.

Arm motion may vary depending on the motion blocks used.

Torso and Table Heights

Torso height measured when head is tilted at 30º, so the lower teeth are horizontal.

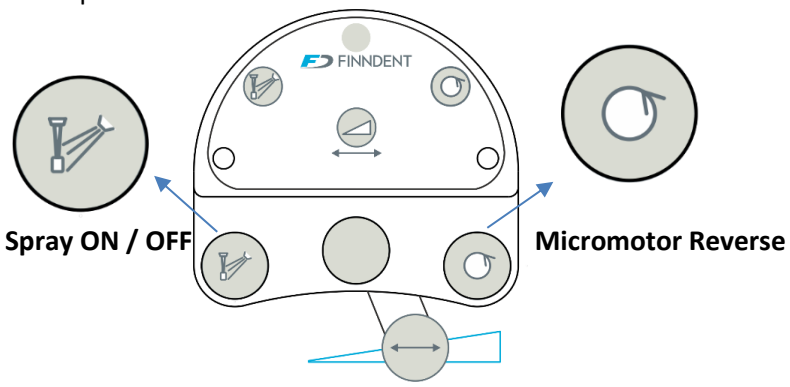
Heights may vary based on levelling feet use.



2 QUICK REFERENCE GUIDE

See User Manual for complete instructions.

Foot control



Instrument use and Basic Functions

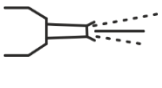
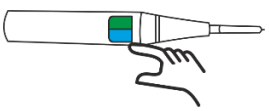
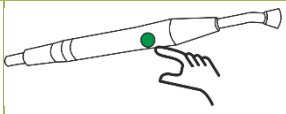
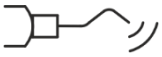
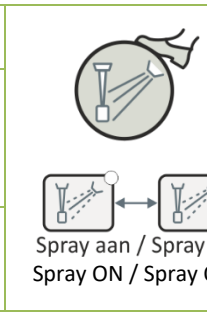
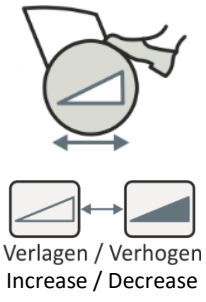
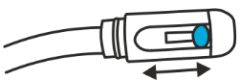
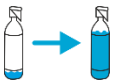
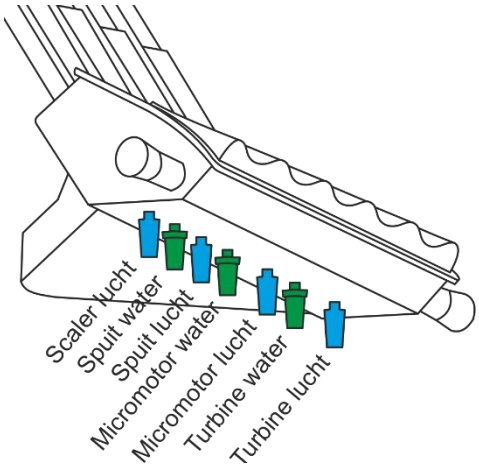
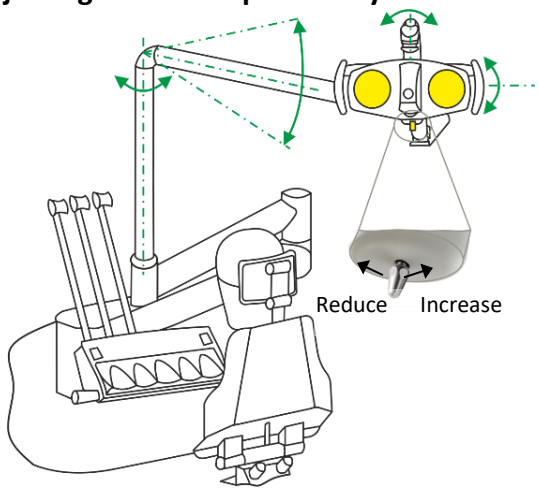
3F Syringe		 
Curing Light		
Scaler		-
Micromotor		
Turbine		-
		
		
Suction		 
Dental Lamp		
Water Bottle		

Table: Quick Reference instructions

Air and water spray adjustment



Adjusting dental lamp intensity

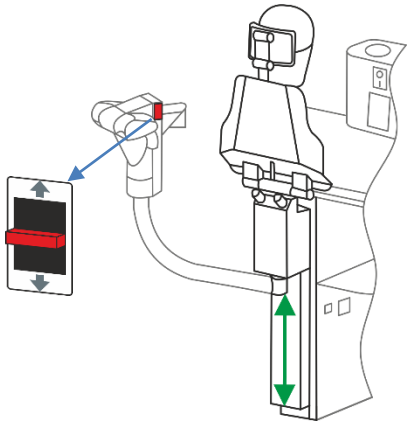


Turn knobs left to increase spray and right to decrease spray.

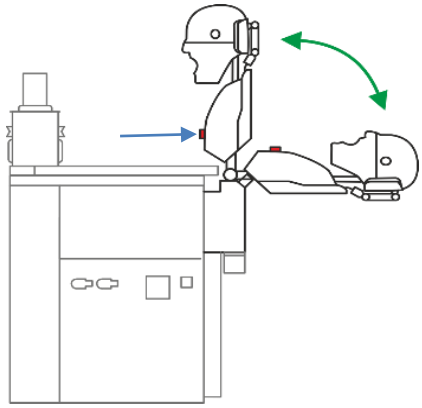
The AIR spray knob has a smooth knob.

The WATER spray has a ring on the base.

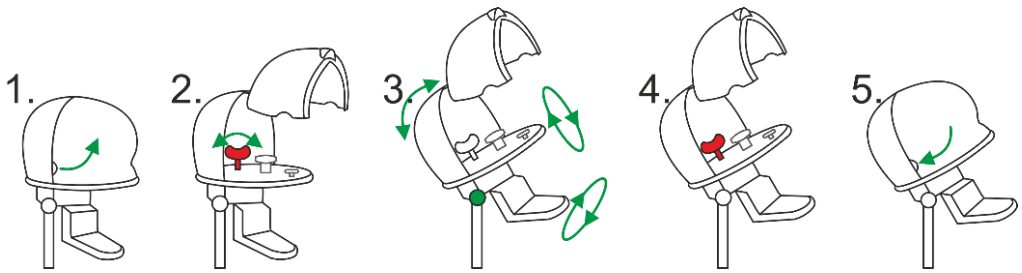
Raise or lower torso



Position torso

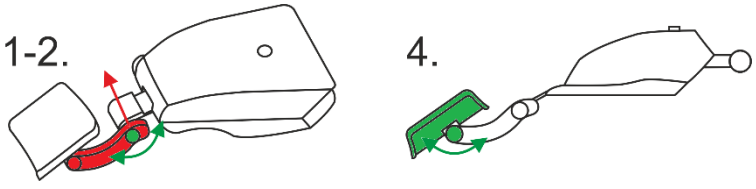


Position the Phantom Head



Position the headrest

1. Push the support bar inward.
2. At the same time, rotate the bar.
3. Release the bar to re-lock.
4. Tilt the head rest up and down.



3 MAINTENANCE AND CLEANING

See User Manual for complete preventative and maintenance instructions.

For instruments, lamps and suction manifolds, follow the OEM manufacturer's cleaning instructions.

The following are the basic maintenance required by Finndent. The Phantom Clinic Technicians may add to this list for clinic-specific maintenance and cleaning.

The dental unit must be serviced by a Finndent approved technician once per year. **Annual service and testing is mandatory.**

Part	Maintenance Description	Recommended Frequency			
		After Use	Weekly	Monthly	Yearly
Instrument bridge handles	Remove handles (P/N: 6203230) and clean any dirt from inside so the touch sensing stays sensitive.		X		
Syringe	Remove metal sleeve and clean inside.		X		
Scaler Micromotor Turbine	Measure tips to check for wear regularly and replace as needed. Follow the manufacturer's instructions!		X		
Micromotor Turbine	Clean and lubricate motors regularly. Follow the manufacturer's instructions!		X		
Syringe Micromotor Turbine	Check and replace O-rings regularly as needed. Follow the manufacturer's instructions!			X	X
Turbine	Check the turbine oil return cup regularly. When full, empty and replace the sponge.		X	X	
Faro light handles	Remove handles and thoroughly clean.		X		
Dental light parabola	Perflex spray or similar to polish surface as needed. Follow the manufacturer's instructions!	X	X		
Unit Exterior	Wipe, vacuum and clean the exterior of the unit.	X			
Phantom Head	Clean inside the head. Replace face mask as needed.	X	X		
Dürr Comfort suction manifold filter	Check and rinse coarse suction filter (P/N: 8900511) regularly. Replace filter as needed.	X			
Suction handpieces	Remove, disassemble and clean dirt from the inside so the volume control is clean.		X		
Suction hoses	Replace worn hoses.				X
Suction hoses	Clean and rinse hoses to prevent bio and dirt build-up.		X		
Suction hoses	Replace O-rings regularly, if suction handpieces are leaking.			X	X
Suction selection valve	Replace membrane (P/N: 5500310) as needed.				X
Water bottle	Replace water bottle when cracked or dirty.		X	X	
Water line cleaning	Before the weekend and before long holidays fill the water lines with BioFinndent.		X	X	
Unit foot control	Check cable for wear and breaks in the grey insulation. Replace as needed.			X	X
Main air pressure regulator filter	Replace air filter.				X

Table: Maintenance and cleaning schedule

4 UNIT TEST PROTOCOL

If a problem is suspected during inspection:

- Turn the mains power supply off at the mains fuse panel.
- Turn the clinic air supply off.
- Turn the clinic suction supply off.

It is now safe to investigate and repair.

4.1 Pre-Test Inspection

Check that all parts are installed on the unit (instruments, water bottle, and torso).

Visually check that the green/yellow grounding wires are attached to the frame.

Visually check that the cables and hoses are in place.

Visually check for leaks in the unit or on the floor.

Listen for the sound of leaking air.

Use a current/voltage detector to check that the power sockets have no voltage when the unit is OFF.

Turn the unit ON only if all inspections are OK.

Visually check that the power switch light is ON.

4.2 Electrical

Electrical safety tests are required for Class I equipment. Follow the guidance in IEC 62353:2014 ed2.0b Medical electrical equipment – Recurrent test and test after repair of medical electrical equipment.

Protective earth resistance test (IEC 62353:2014 Ch. 5.3.2)
The protective earth resistance shall not exceed 300mΩ.

Measure the resistance between the protective earth connector of the mains plug and the protectively earthed instrument bridge and torso backrest.

Touch current test (IEC 62353:2014 Ch. 5.3.4.4)
The touch current for accessible conductive parts shall not exceed 100µA.

Measure the touch current at the mains plug and at the instrument bridge and the torso backrest.

Power socket test
Use a current/voltage detector to check that the power sockets have 230V when the unit is ON.

4.3 Main Air and Suction Supply

When the unit and air supply are ON, the main air pressure regulator shall read between 6 – 8 bar.

Measure the suction of each hose:

- Universal cannula on large suction hose: 250 – 350 l/min.
- Surgical suction cannula on small suction hose: 50 – 80 l/min.
- Saliva cannula on small suction hose: 30-60 l/min.

4.4 Water Supply

The water bottle is pressurized with air when the unit is on.

Check the air pressure by gently squeezing the bottle. It should feel full / hard.

The water bottle pressure should be 2 bar.

4.5 Functional Test

A full functional test should be performed after installation and after annual maintenance.

A partial functional test can be performed after minor repairs to an individual system.

FINNDENT OY	FUNCTIONAL INSTALLATION TEST		PHANTOM UNIT
Table number:		**Test date:**	
Position number:		**Tested by:**	
Serial number:		**Page:**	1/2

Test Description	Verified	Observation, reading or description of repair done?
Visual inspection of electrical systems.		
Visual inspection of air, water and suction systems.		
Protective earth resistance test (300 mΩ maximum)		
Touch current test (100µA maximum)		
Power sockets tested with unit off and on		
Main air pressure regulator reading (6-8 bar)		
Large suction hose with universal cannula (250-350l/min)		
Surgical suction cannula on small suction hose (50-80 l/min)		
Saliva cannula on small suction hose (30-60 l/min)		
FARO LAMP TEST		
Turn the Faro lamp on. Test the half-intensity function. Test the dimming function. Leave the lamp on during the unit test.		
SUCTION ARM FUNCTION		
Move the suction arm left and right. Put the suction arm in a usable position. Check that the water bottle is pressurized. Lift the large suction hose and check for suction. Put it back. Lift the small suction hose and check for suction. Put it back.		
TORSO FUNCTION		
Move the torso and suction arm fully up and down using the motor (switch is on the suction arm). Move the torso to a usable height. Lower the torso to 30º. Check the position brake by pushing gently on the chest. Lower the torso to the horizontal position.		
PHANTOM FUNCTION		
Open the Phantom head. Unscrew the neck lock and move the head. Re-lock.		
INSTRUMENT BRIDGE AIR BRAKE CHECK		
Move the instrument bridge by holding the handle to unlock the arm air brake. Check that the air brake locks the arm motion when the handle is released.		
THIRD HAND CHECK		
Lift a suction hose and place in the third hand holder. Check that the third hand is firmly attached.		

Table : Functional test

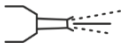
FINNDENT OY	FUNCTIONAL INSTALLATION TEST		PHANTOM UNIT
Table number:		**Test date:**	
Position number:		**Tested by:**	
Serial number:		**Page:**	2/2

Test Description	Verified	Observation, reading or description of repair done?
SYRINGE FUNCTION		
Lift the 3-function syringe. Spray water only in to the suction hose. Spray air only. Spray mixed air-water in to the suction hose. Lift the micromotor to select. Check that the syringe and micromotor sprays.		
CURING LIGHT FUNCTION		
Lift the LED curing light to select. DO NOT LOOK DIRECTLY AT THE LED. Run the A 10 second fast cycle. Run the 20 second slow-rise cycle.		
SCALER FUNCTION		
Lift the scaler to select. Use the unit foot control pedal to turn the scaler on. Slide the pedal left and right to change the power. With the scaler selected, press the foot control spray button to activate water spray. The display LED for spray should turn ON. Test spray. Turn the spray off and replace the scaler.		
MICROMOTOR FUNCTION		
Lift the micromotor to select. Use the unit foot control pedal to turn the micromotor on. Slide the pedal left and right to change the speed. With the micromotor selected, press the foot control spray button to activate mixed spray. The display LED for spray should turn ON. Test spray. With the micrmotor selected, press the direction button on the foot control to reverse direction. The display LED for reverse should turn ON. Test micromotor in this direction. Turn the spray off. Turn the reverse direction off. Replace the micromotor.		
TURBINE FUNCTION		
Lift the turbine to select. Use the unit foot control pedal to turn the turbine on. Slide the pedal left and right to change the speed. With the turbine selected, press the foot control spray button to activate mixed spray. The display LED for spray should turn ON. Test spray. Turn the spray off. Replace the turbine.		
WATER LINE RINSE PROGRAM TEST		
Pull all whip arms forward. The spray LED should flash. Replace the curing light handpiece. Put the instruments in a bucket to collect the spray. Press the foot control centre button to start rinsing. The test can be cancelled by pressing the foot control again. Or, allow the program to finish (may take 5-10 minutes).		

Table : Functional test

5 INSTRUMENT SERVICE

Follow the OEM manufacturer's instructions for service.
The supply requirements for air, water, suction and power are listed here.
The expected ranges for instrument outputs are given as generally acceptable values. For OEM specific information, see the OEM manufacturer's instructions.

5.1 Syringe 

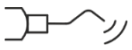
Inspect the tip and handpiece for calcium and biofilm build up.
Check and clean tip for blockages.
Check the air and water buttons for sensitivity (press harder to open valve and have more flow)
Check hose and handpiece for leaks.

Check the air and water inputs:
- Max- water input pressure: 2.5 bars
- Max. air input pressure: 4.5 bars
- Air flow rate: 10 Nl/min
- Water flow rate: 110 cc/min

5.2 Curing Light 

Measure the curing light intensity level annually with a radiometer.
- Light radiation: 440 - 480 nm

Check voltage supply to handpiece: 24 V AC ± 10 % or 33 V DC ± 10 %

5.3 Scaler 

Check voltage to scaler: 24 VDC.
Control voltage: 5V
Output frequency: 28 kHz minimum.
Water flow at the end of the handpiece: 5 – 40 mL/min

Check and replace O-rings twice yearly.
- Faulty o-rings can lead to leaks

Check tip threads on tip and handpiece – damaged threads can ruin any handpiece they are used on!

Check that tips are OEM parts from the same manufacturer as the scaler.
- Non-OEM parts can damage the tip and handpiece, and are not covered under Finndent or OEM Manufacturer warranties.

5.4 Micromotor 

Check voltage to micromotor: 36 VDC maximum
Check voltage to LED: 2.5-4 VDC
Check LED intensity: 15-40lux
Check cooling spray: 6-8 Nl/min
Check air spray supply: 0-3 bar, adjustable
Check water spray supply: 0-3 bar, adjustable

Check and replace O-rings yearly.

Check rotations per minute with a digital tachometer.
Run the motor at low speed and high speed.
Check for vibration or noise (subjective).
If bearing or mechanical wear is detected, send to Finndent for service.

5.5 Turbine 

Spray water pressure: 0-3 bar, adjustable
Spray air pressure: 0-3 bar, adjustable
Turbine air drive pressure: 2.5 - 3 bar
Return air pressure: 0.25bar
Check LED voltage: 3V

Check and replace O-rings yearly.
Lubricate.
Check and replace turbine oil return cup as needed.
Check rotations per minute with a digital tachometer.

5.6 Operating Lamp

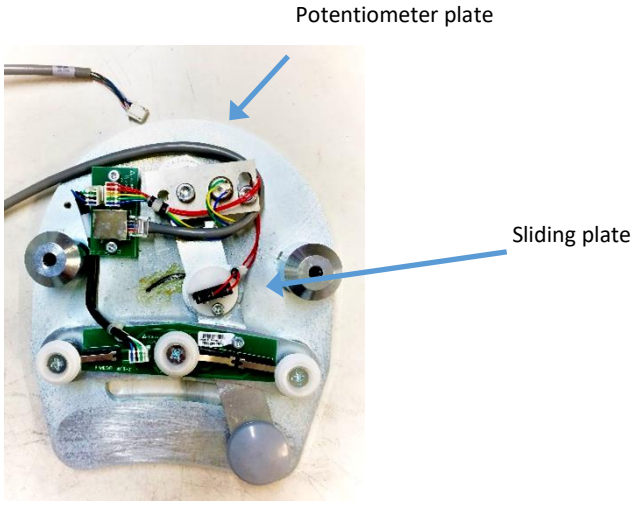
Gently wipe clean using a lint-free cloth and an alcohol free cleaner.
Check the light intensity: from 3.000 lux to 50.000lux at 700 mm of distance.
Check the light focus: 205 x 100 mm focal point at 700 mm of distance.

5.7 Water Bottle

Check water bottle pressure: 2,5 bar (250kPa) maximum
Check the bottle out flow rate: ≤ 4 l/minute maximum

5.8 Foot Control

Check cable for wear.
Check function and responsiveness.
If the internal sliding plates seem hard to slide, wipe them with paper towel and lubricate them with lithium grease.



Foot control cables are consumable goods and should be replaced if any wear is visible.

A step-by-step photo tutorial on how to re-build a Finndent foot control (repair kit 9801932) is available as a supplemental instruction: 2014.02.27 Technical Bulletin 8000 Foot Control V2.

6 SERVICE INSTRUCTIONS

The routine service procedures will be explained in this section (where an explanation is needed). For other service instructions and non-routine repairs contact Finndent.

Some procedures may be covered on the Finndent website - technical bulletins.

Always turn the Phantom unit power off before attempting any electrical service!
Check that the unit and chair are OFF with a multimeter before attempting any electrical service!

In case of disconnecting the live mains voltage by turning off the building circuit breaker, a locking circuit breaker must be used. Finndent recommends also leaving a note, “DO NOT SWITCH ON, WORKING ON LINE’ to prevent unexpected switching power on.

This technical manual include the annual and regular service instructions and details only. If more detail is required to repair an electrical component, please contact Finndent Support (support@finndent.com).

RELIEVE THE PRESSURE IN THE WATER LINES BEFORE STARTING SERVICE!
Close the main water valve.
Use the syringe to spray out the remaining water in the system.
The system is now de-pressurized.

TURN OFF THE BUILDING POWER CIRCUIT BREAKER BEFORE WORKING ON ELECTRONICS, WIRING, OPENING THE TRANSFORMER BOX OR WORKING ON MOVING PARTS!
Turn off the building circuit breaker to disconnect the live mains voltage from all components. Also make sure the Phantom units main power switches are off. The building circuit breaker should be equipped with a locking device to prevent accidentally turning the power on. In case of disconnecting the live mains voltage by turning off the building circuit breaker, use safety notes ‘DO NOT SWITCH ON, WORKING ON LINE’ of unexpected switching power on.

ASK BEFORE TURNING THE UNIT POWER ON DURING SERVICE!
Before activating the unit, make sure all other people are clear and ask if it is safe to turn the power on. There is no physical lock-out on the Phantom unit power switch.

READ ALL THIRD PARTY INSTRUCTION MANUALS FOR SPECIFIC SERVICE INSTRUCTIONS!
Finndent may provide general tips for servicing accessories, however, these are not the official service instructions and should only be used as reference.

STEP BY STEP INSTRUCTIONS MAY BE AVAILABLE FROM THE FINNDENT DOCUMENTS WEBSITE!
This technical manual assumes that service personnel have been trained by Finndent, are capable of all basic technical skills and can make direct replacements of all parts.
For more detailed and step-by-step photographs of procedures, check the Finndent documents page.

6.1 Instrument Selection and Whip Arms

Normal grey whip arm P/N: 9801715
Soft whip arm for scaler P/N: 9801714

For whip arms, pull instruments forward.

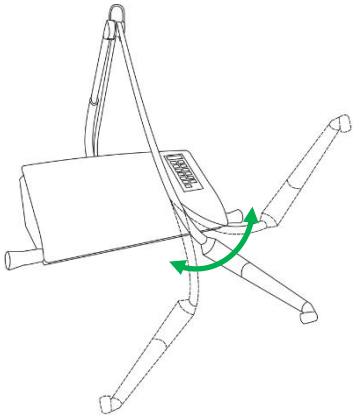
If the instrument selection is not working properly, clean around the holder and selection switch and try again.

If cleaning does not work, the selection microswitch P/N: 3200138 may need replacing.

To adjust the tension in the whip arm (make it lie back or bend forward), twist the brass nut at the base of the whip arm inside the instrument bridge.

The cable in the centre of the whip arm will tighten or loosen. Be careful not to pinch your fingers in the bottom opening.

6.2 Check the Instrument Hoses for Wear



Lift one instrument and press the foot pedal to start the instrument's function.

While the instrument is running, rotate and pull the handpiece in all directions.

Flex and rotate the instrument hose to check for internal wire wear.

Listen and watch the handpiece to see if the instrument continues to function normally in all positions.

If the instrument jumps, stops or loses power when the hose is moved, there is internal wear and the hose needs to be replaced.

If the handpiece is loud or vibrates, the rotary parts may need replacing. Contact Finndent.

Repeat the test for all instruments.

6.3 Replacing an Instrument Hose

Each instrument has a unique hose with different supply lines inside. When ordering a replacement, specify the make and model of the instrument.

Replacement hoses are supplied with no electrical connectors on the end. These must be added before installation. Check the old hose to see where and what type of plugs to install, or ask Finndent for support.

Examples of replacement hose connectors and internal wires/tubes:

			
8900373 Micromotor Dassym Hose HO-35	8900210 Satelec SP 4055	8900092 Turbine	8900246-3 Mectron Starlight SLER

Table : Replacement hoses for Phantom Table

The Luzzani 3F syringe is attached to the instrument hose. The handpice must be replaced at the same time as the hose.

Luzzani 3F Straight Syringe P/N: 8900199.

6.4 Check Instrument LED Lights

While checking the instrument hoses for wear, watch to see if the LED lights work. The LED may need to be activated with a separate button on the handpiece.

If the light never turns on, the LED bulb may be in need of replacing.
If the light stops and starts when the hose is moved, there is possibly internal damage.

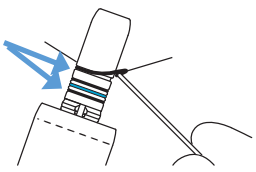
Remove the bulb and check the bulb voltage with a multimeter. Bulb voltages will vary, read the manufacturer's instructions for correct voltage.

If the voltage is 0, change the bulb and check again.

6.5 Instrument O-rings

Change all instrument O-rings twice yearly.
To check the O-rings, open the instrument handpiece.
Visually inspect the O-rings (turbine for example locations).
If an O-ring needs replacing, use a blunt, plastic tool to remove.
O-rings may need lubrication. Use the OEM recommended lubricant.
Incorrect lubricant can deteriorate or cause the rubber to swell.

For example,



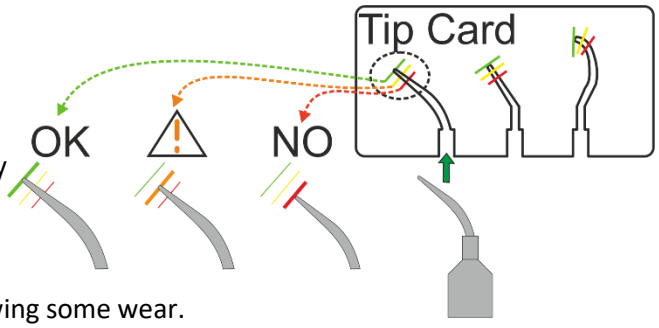
6.6 Check Instrument Tips for Wear

Instruments that use removable tips normally come with a card or instructions on how to check for wear. Follow the manufacturer's instructions for when to replace the tips.

Also check the instruments for signs of damage from improper care, such as:

- Rust or corrosion (cause: mixing carbon and stainless steel instruments)
- Chemical pitting (cause: improper cleaning products)
- Water spots or scum (cause: sterilizer not clean, ultrasonic bath not clean, insufficient rinsing or drying)

For example:



Green: No wear - Tip is OK.
Tip replacement not necessary

Orange: OK Wear - Tip is showing some wear.
Tip replacement is recommended.

Red: Unacceptable Wear - Tip is badly worn.
Tip replacement is necessary.

6.7 Clean the Syringe Tip

Follow the tip manufacturer's instructions for how to clean tips. Suggested methods may include an ultrasonic bath using a mild disinfection solution, steam autoclave and hand scrubbing.

While cleaning, inspect the tip for rust, chemical pitting and other signs of damage.

6.8 Lubricate the Contra-Angles

This is a generic instruction only. Follow the manufacturer's instructions for lubricating instruments. Use only approved lubricants.
Incorrect lubrication and cleaning can cause liquid to enter the bearings. This can cause corrosion, bearing damage and handpiece overheating.

Remove the handpiece from the instrument hose.
Insert the lubricant spray nozzle in to the open end of the handpiece.
Wrap a paper towel around the tip of the handpiece.
Spray for 2-3 seconds. Check the towel. If the oil is not clear, repeat spray until all debris is gone.
Using a smaller spray nozzle, spray in to the tip end of the handpiece.


Contra-angle end


Tip (chuck)

Grease left on the instrument can affect the dental treatment.
Make sure no grease remains on the outside of the handpiece.

6.9 Lubricate Turbine (Generic Instructions Only)

Follow the manufacturer's instructions for lubricating instruments. Use only approved lubricants.
Incorrect lubrication and cleaning can cause liquid to enter the bearings. This can cause corrosion, bearing damage and handpiece overheating.

Remove the turbine handpiece from the instrument hose.
Insert the lubricant spray nozzle in to the AIR intake of the handpiece only. The air intake is normally the smaller of the two intakes.
Wrap a paper towel around the tip of the handpiece, making sure to cover the air outlet.
Spray for 2-3 seconds. Check the towel. If the oil is not clear, repeat spray until all debris is gone.
Using a smaller spray nozzle, spray in to the tip end of the handpiece.


Air intake

6.10 After Lubrication (Generic Instructions Only)

Stand handpieces up on a towel so the extra grease can drain away.
Wipe away any grease.
Connect the handpiece and run for approximately 30 seconds over a towel.
Wipe away any grease that comes out.
Run the handpiece again until no grease comes out.


Stand upright

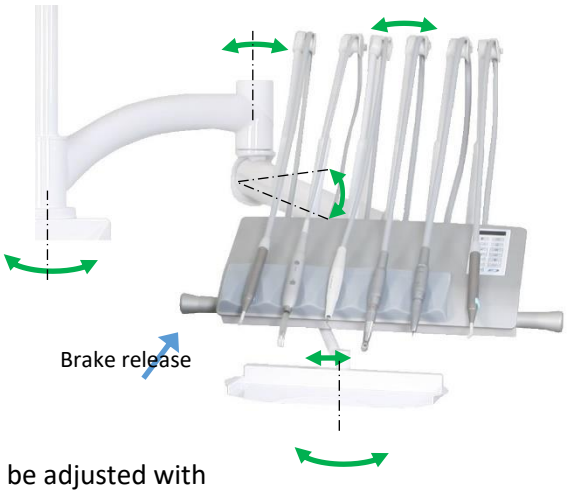
Grease left on the instrument can affect the dental treatment.
Make sure no grease remains on the outside of the handpiece.

6.11 Check Mechanical Functions of Instrument Bridge

Hold the instrument bridge handle and move the arm up. Release the handle and check that the pneumatic brake has activated to hold the arm in place. The pneumatic brake should make a quick air noise when activating and deactivating.

Rotate the instrument bridge head. Rotate the instrument tray. The joints should be easily moved and silent.

If the tray joint is worn, it may cause the tray to be not level. The plastic bearing may be replaced.



If the instrument bridge and tray are not level, they can be adjusted with screws in the instrument arm (see instrument arm section).

6.12 Check for Leaks Inside

Open the instrument bridge cover:

The hanging hose cover is held in place by screws on the left side. Use a 4mm hex key to remove.

The whip arm model is locked with a screw in the back centre of the cover.

Check inside the instrument bridge for air and water leaks.

6.13 Change Arm Brake Rubber of Horizontal Arm

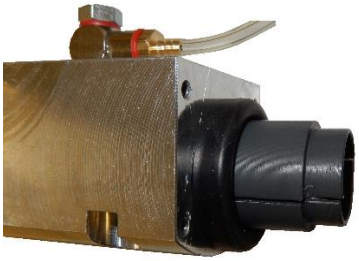
Brake rubber P/N: 6809730

For detailed, step-by-step instructions on how to disassemble the horizontal arm, see the arm brake technical bulletin (20140130 Technical Bulletin Arm Brake Repair v2). If the arm brake is not locking, and slowly moving out of place, the brake rubber may need changing. It is suggested to change the rubber yearly.

1. To remove the brake, the back axle, spring and brake screws must be removed.
2. Remove the brake end caps, pull out the plastic bushing and discard the old rubber.
3. Install the new rubber.
4. Re-assemble the horizontal arm.

Centre rubber in the brake body.

Fold rubber over the edge.

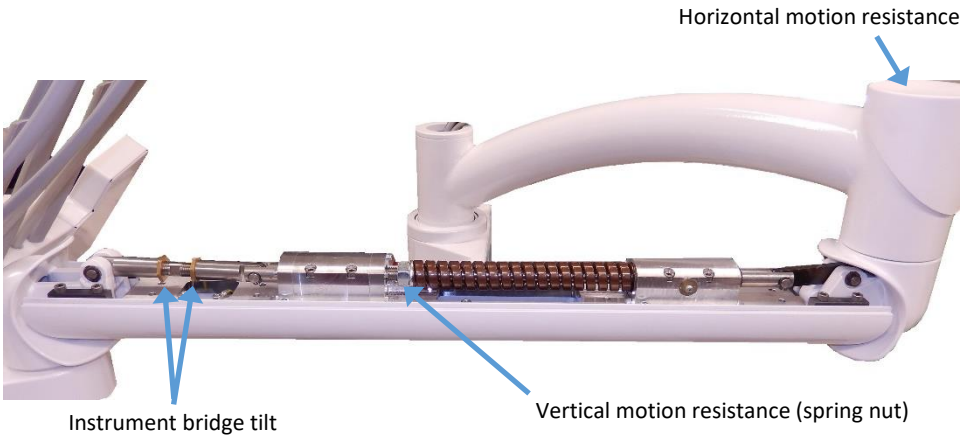


Slide in the plastic sleeve.

6.14 Calibrate the Horizontal Arm Motion

To adjust the tilt of the instrument bridge or make the tray level, use a 19mm wrench on the two front nuts to adjust the tilt alignment.

To adjust the up-down vertical resistance, use a 19mm wrench on the spring nut.



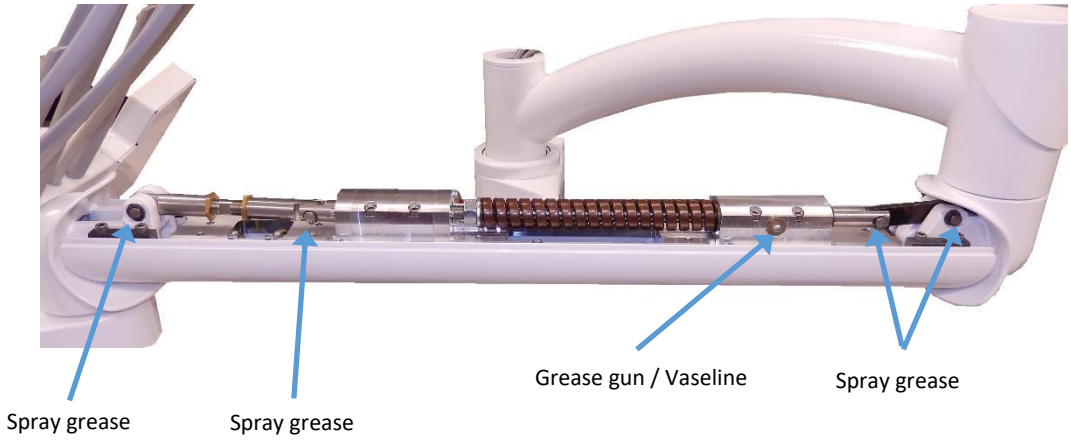
To adjust the horizontal motion resistance, use the Finndent arm wrench on the horizontal arm joint:

Finndent arm wrench

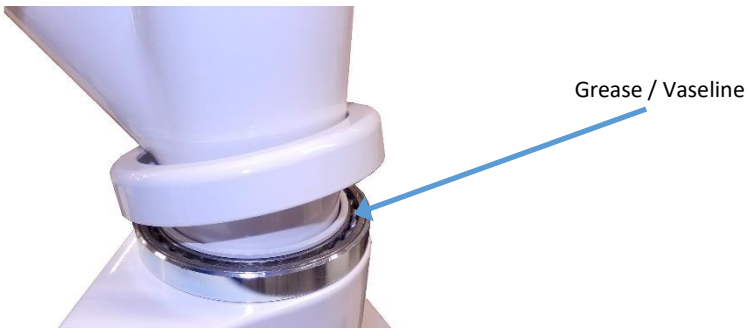
Lift the plastic cover and fit the teeth in to the bearing ring

6.15 Lubricate Arm Joints and Pneumatics

Every year, lubricate the horizontal arm axels and brake:



Every few years, lift the accessory post collar and grease the bearings:



6.16 Horizontal Arm Stop Adjustment

The adjustment is done by removing the side panels of the frame to expose the horizontal arm lower support. End stoppers are secured by two M6 screws (DIN912).

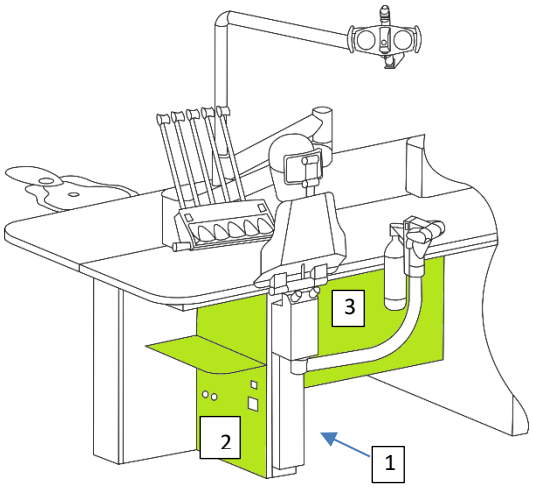
At the same time, the dental lamp mechanics may be adjusted.

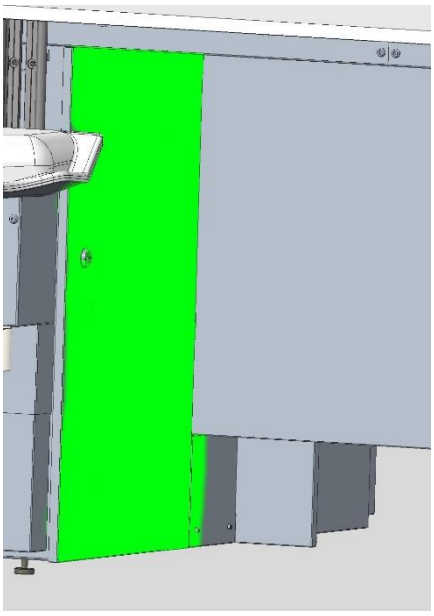
Tools required are:

- 3 mm Hexagon key
- 5 mm Hexagon key
- Phantom cabinet door key

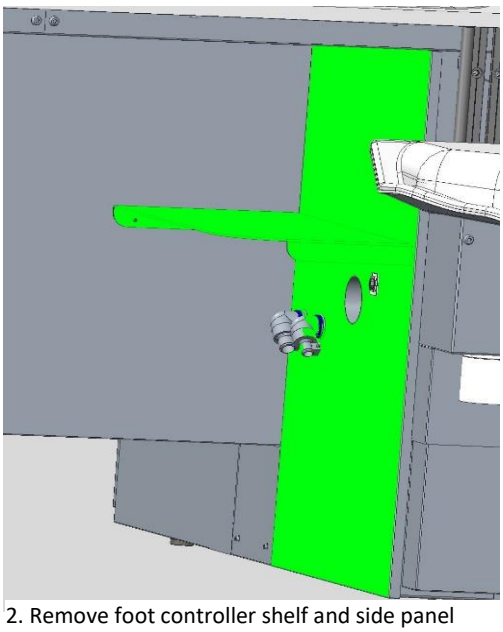
Process is done by:

1. Open and remove the cabinet door from the right side of the torso
2. remove the foot controller shelf and the side panel from the left side of the torso
3. remove the back panel to expose the horizontal arm lower support
4. Adjust the rear stopper so that the centerline of the horizontal arm does not pass the center line of the table. Adjust the front stopper so that the vertical arm and instrument bridge rotating joint does not go past the torso left side.

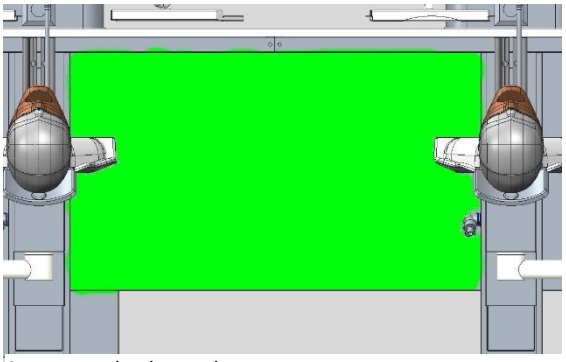




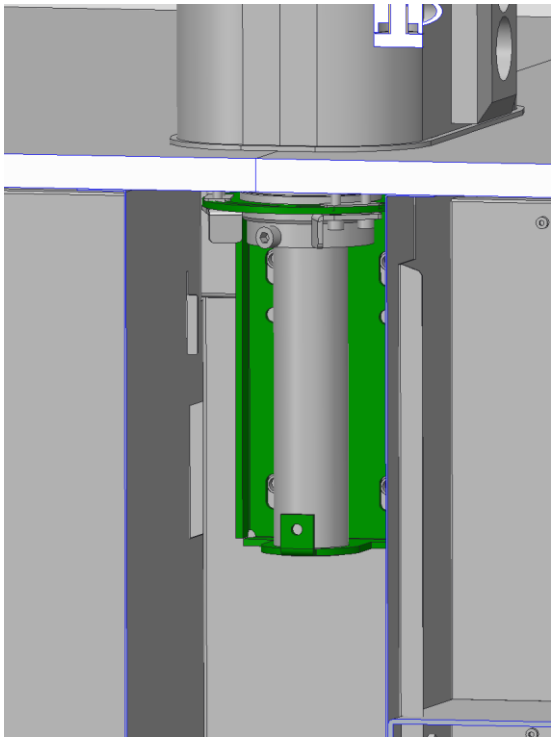
1. Open and remove cabinet door



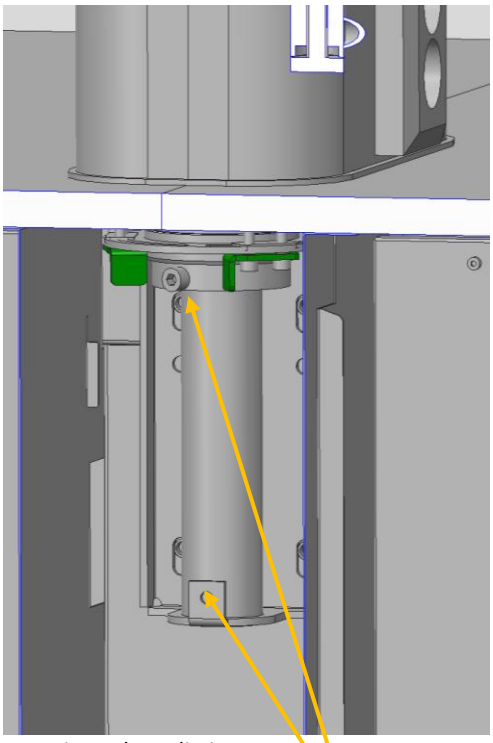
2. Remove foot controller shelf and side panel



3. Remove back panel

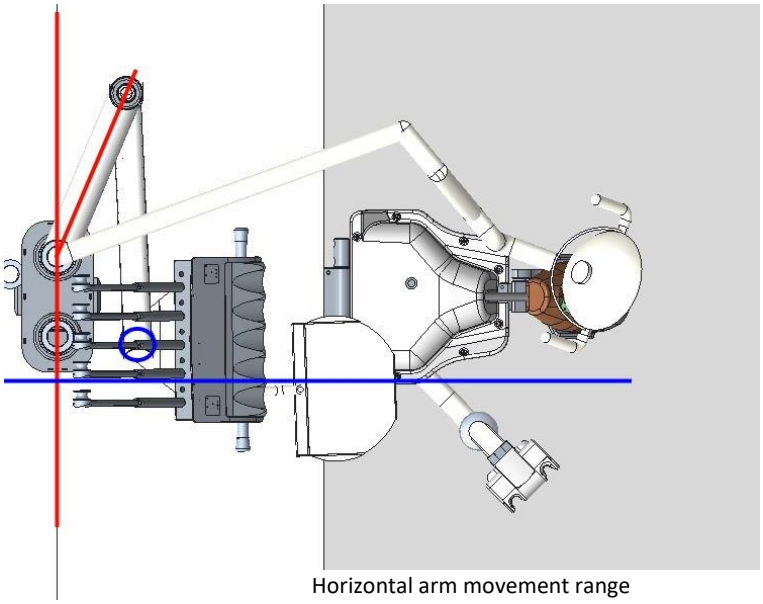


4. Horizontal arm lower support



5. Horizontal arm limiters

The light column is also available for adjustment. Loosen or tighten the set screws as needed.



Horizontal arm movement range

6.17 Water Bottle Cleaning

Rinse all bottles for the bottle once per week using hot water and a disinfectant solution. A bottle brush may be used to clean residue off the inside of the bottles.

6.18 Main Air Pressure Valve Filter

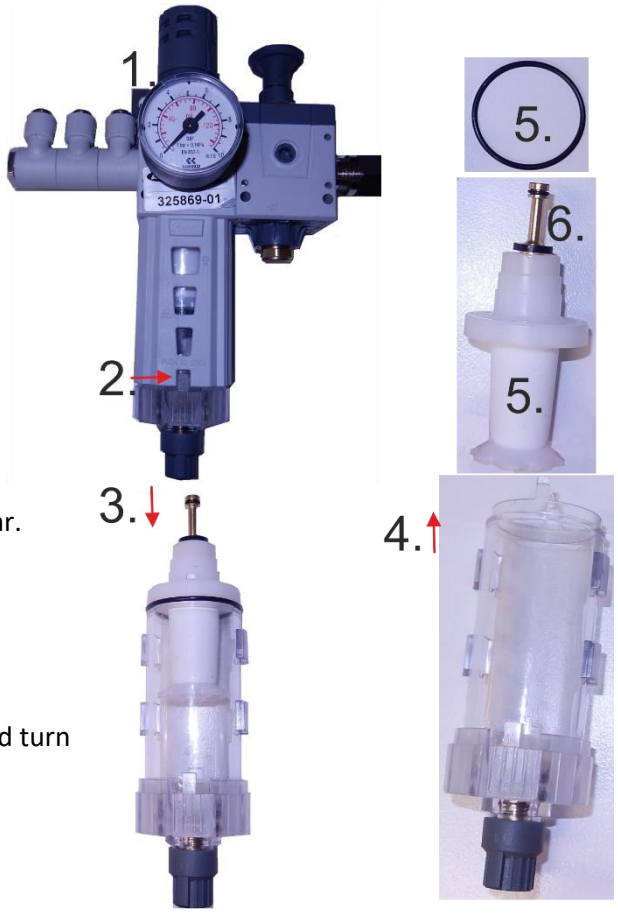
P/N: 9805531

Turn the main air supply off.

Turn the unit off.

1. Make sure the gauge reads 0 before opening.
2. Press the front tab in, and twist the lower half.
3. Pull the lower half down.
4. Pull the spindle, filter and O-ring up.
5. Replace the O-ring and filter once per year.
6. Replace the spindle if needed.
7. Reassembly the valve.

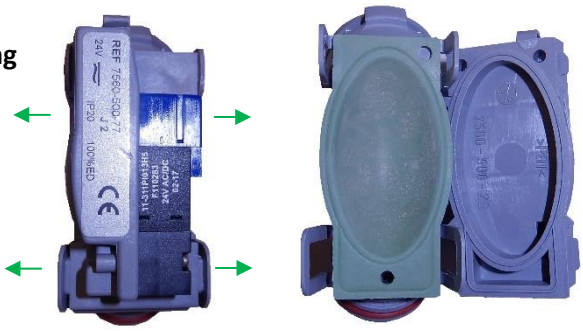
Turn the main air pressure on, and turn the unit on to check for air leaks.



6.19 Replace the Selection Valve Membrane

P/N: 8900255

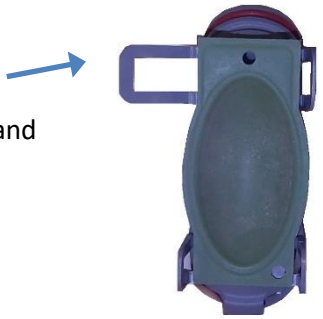
Wear protective gloves when handling used parts.



1. **Carefully pull out the side tabs.
2. Open the valve.
3. Replace the rubber membrane.
4. Make sure the membrane is pressed in to the valve's edge ring.
5. Close the valve and push the tabs in.

**If a tab is pulled too hard, it may half-break, or pull off completely.

A broken valve will not close tightly over the membrane and must be replaced.



7 PCB DIAGRAMS

The PCB diagrams for Q900, Q905 and Q915 are provided for troubleshooting only. Do not attempt to rebuild a PCB. Send damaged PCBs to Finndent for repair.

7.1 Q900 Power Supply PCB

Version 2 AB for use with 40VAC rectifier.

J1 – Input 230 VAC Connect power wires from the routing boxes in the supply cabinet. 1. P GND 2. N 3. L	J2 – Display out 230 VAC 1. P GND 2. N 3. L
J3 – Chair out 230 VAC 1. PGND 2. N 3. L	J4 – Display control (power switch) 1. L (Mains) 2. L (Display) 3. N (Mains) 4. N (Display)
J5 – Line filter out 1. N 2. P GND 3. P GND 4. L	J6 – Rectifier inputs 1. 40 VAC in (AC1) 2. 40 VAC in (AC1) 3. AC2 in 4. AC2 in
J7 – 36V DC out 1. GND 2. + DC	J8 – 36V DC out 1. GND 2. + DC
J9 – 36V DC out 3. GND 4. + DC	J10 – 24 VDC out 1. GND 2. 24 VDC
J11 – PGND 1. P GND (PE)	J12 – Motor output Connect to lift motor's own cable 1. Motor out 1 2. Motor out 2
J13 – Switch input 1. +5 VDC 2. Motor safety switch 3. Motor safety switch 4. N.C. 5. +5 VDC 6. TR1 gate 7. +5 VDC 8. TR2 gate	J14 – Suction valve power Connect to selection valve with cable 4801500 1. +24 VDC 2. GND via TR2
J15 – 24 VDC out 1. +24 VDC 2. N.C. 3. GND via TR1	J16 – PGND 1. P GND (PE)

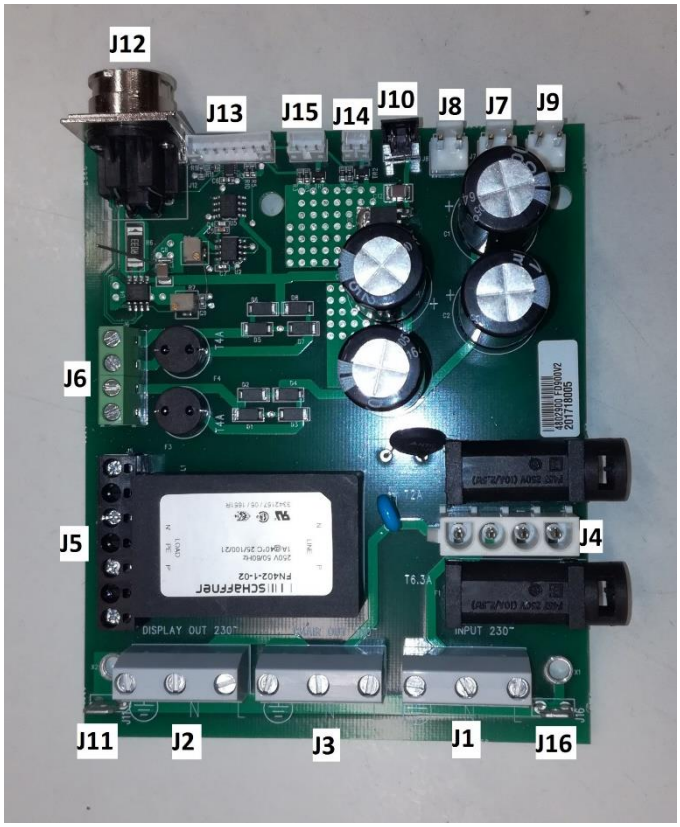


Table : Q900 pinout information

Connect the DC outs to:
4801495 – Main air pressure filter router power
4801480 – To Q915 power in, J32

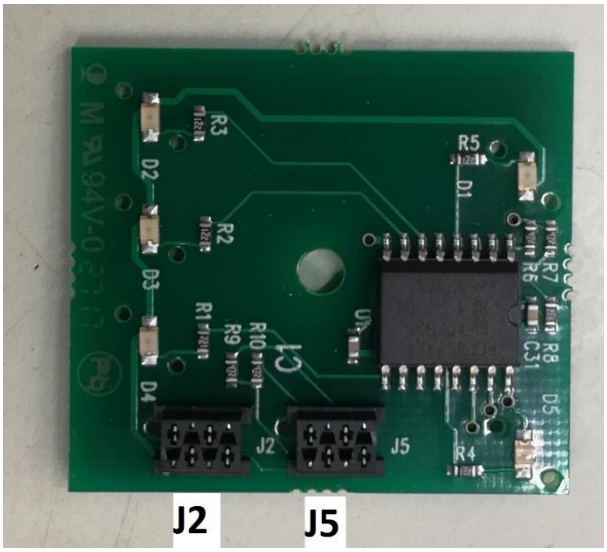
7.2 Q905 Phantom LED PCB

Version 1.

J2 – I2C	J5 – I2C
1. +3.3 VDC	5. +3.3 VDC
2. I2C SDA	6. I2C SDA
3. I2C SCL	7. I2C SCL
4. GND	8. GND

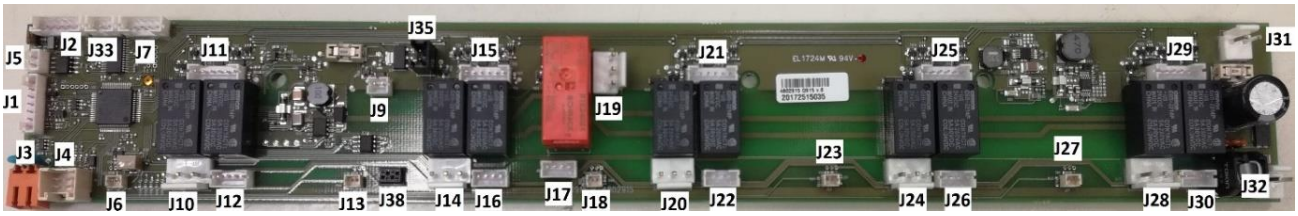
Table : Q905 pinout information

Connect display signal cable 4801490 from the Q905 J2 / J5 to Q915 J 38.

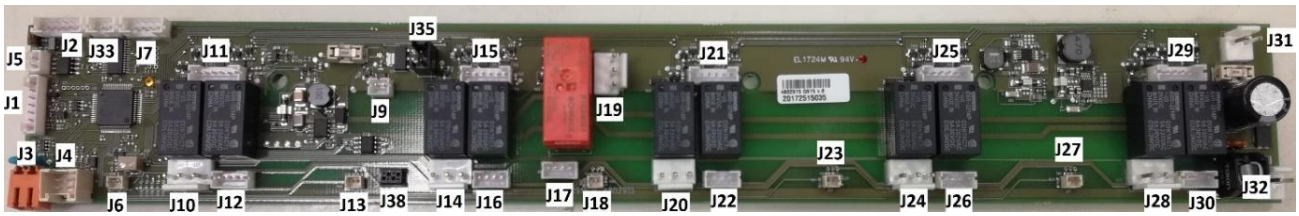


7.3 Q915 Phantom Instrument Control Board

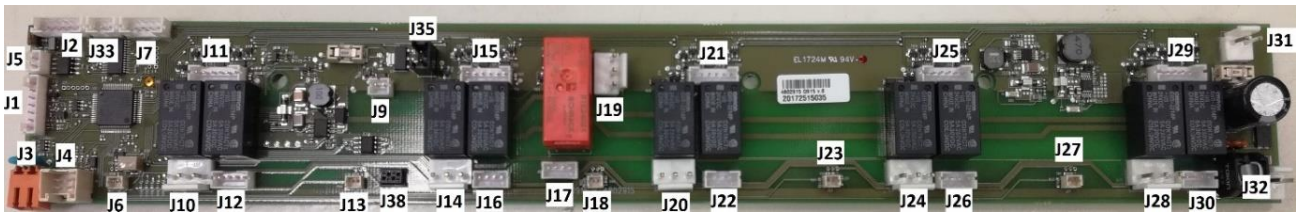
Version 6AD



J1 – Scaler connector 1. +32 VDC 2. GND 3. N.C. 4. Scaler on, floating/GND via TR1 5. GND 6. Scaler control voltage 7. GND	J2 – CAN 1. CAN L 2. CAN H 3. N.C. 4. Up safety, floating/GND via TR2 5. GND 6. +32 VDC
J3 – Arm air brake sensor 1. Bridge handle wiring 2. Bridge handle wiring	J4 – Foot control signals Connect foot control cable 4801409 to the Neutrik pass-through plug. Connect signal cable 4801465 from Neutrik plug to Q915 J4. 1. Button D (foot pedal pressed) 2. Button B (centre button) 3. Button A (left button, spray on-off) 4. Button E (potentiometer) 5. Button C (right button, motor reverse direction) 6. Control voltage input (from foot control) 7. Control voltage output (to foot control)
J5 – Up safety switch input 1. 3.3 VDC 2. TR2 gate (see J2)	J6 – Instrument selection 1 Connect to switch with cable 4801475 1. GND 2. Instrument selection signal input



J7 – UART1 1. UART1 RX 2. GND 3. UART1 TX 4. CTS 5. DSR	J8 – JTAG (For development, Not connected)
J9 – Arm air brake valve 1. +24 VDC 2. GND	J10 – Motor/scaler hand piece 1 1. Motor phase 3 2. Motor phase 2/scaler AC1 3. Motor phase 3/scaler AC2
J11 – Air / Cooling / Water Spray – Solenoid valves 1 Connect to solenoid valves with cable 4801470 1. +24 VDC (air valve) 2. GND (air valve) 3. +24 VDC (cooling air valve) 4. GND (cooling air valve) 5. +24 VDC (water valve) 6. GND (water valve)	J12 – Instrument 1 From instrument hose or controller 1. Fiberlight + 2. Fiberlight – 3. GND 4. Instrument 1 ID input
J13 – Instrument selection 2 Connect to switch with cable 4801475 1. GND 2. Instrument selection signal input	J14 – Motor/scaler hand piece 2 1. Motor phase 3 2. Motor phase 2/scaler AC1 3. Motor phase 3/scaler AC2
J15 – Air / Cooling / Water Spray – Solenoid valves 2 Connect to solenoid valves with cable 4801470 1. +24 VDC (air valve) 2. GND (air valve) 3. +24 VDC (cooling air valve) 4. GND (cooling air valve) 5. +24 VDC (water valve) 6. GND (water valve)	J16 – Instrument 2 From instrument hose or controller 1. Fiber optic light + 2. Fiber optic light – 3. GND 4. Instrument 2 ID input
J17 – Scaler handpiece AC input 1. AC1 2. N.C. 3. N.C. 4. AC2	J18 – Instrument selection 3 Connect to switch with cable 4801475 1. GND 2. Instrument selection signal input
J19 – Micromotor controller input 1. Motor phase 1 2. Motor phase 2 3. Motor phase 3	J20 – Motor/scaler hand piece 1. Motor phase 3 2. Motor phase 2/scaler AC1 3. Motor phase 3/scaler AC2
J21 – Air / Cooling / Water Spray – Solenoid valves 3 Connect to solenoid valves with cable 4801470 1. +24 VDC (air valve – blue wires) 2. GND (air valve – blue wires) 3. +24 VDC (cooling air valve – white wires) 4. GND (cooling air valve – white wires) 5. +24 VDC (water valve – green wires) 6. GND (water valve – green wires)	J22 – Instrument 3 From instrument hose or controller 1. Fiberlight + 2. Fiberlight – 3. GND 4. Instrument 3 ID input
J23 – Instrument selection 4 Connect to switch with cable 4801475 1. GND 2. Instrument selection signal input	J24 – Motor/scaler hand piece 1. Motor phase 3 2. Motor phase 2/scaler AC1 3. Motor phase 3/scaler AC2

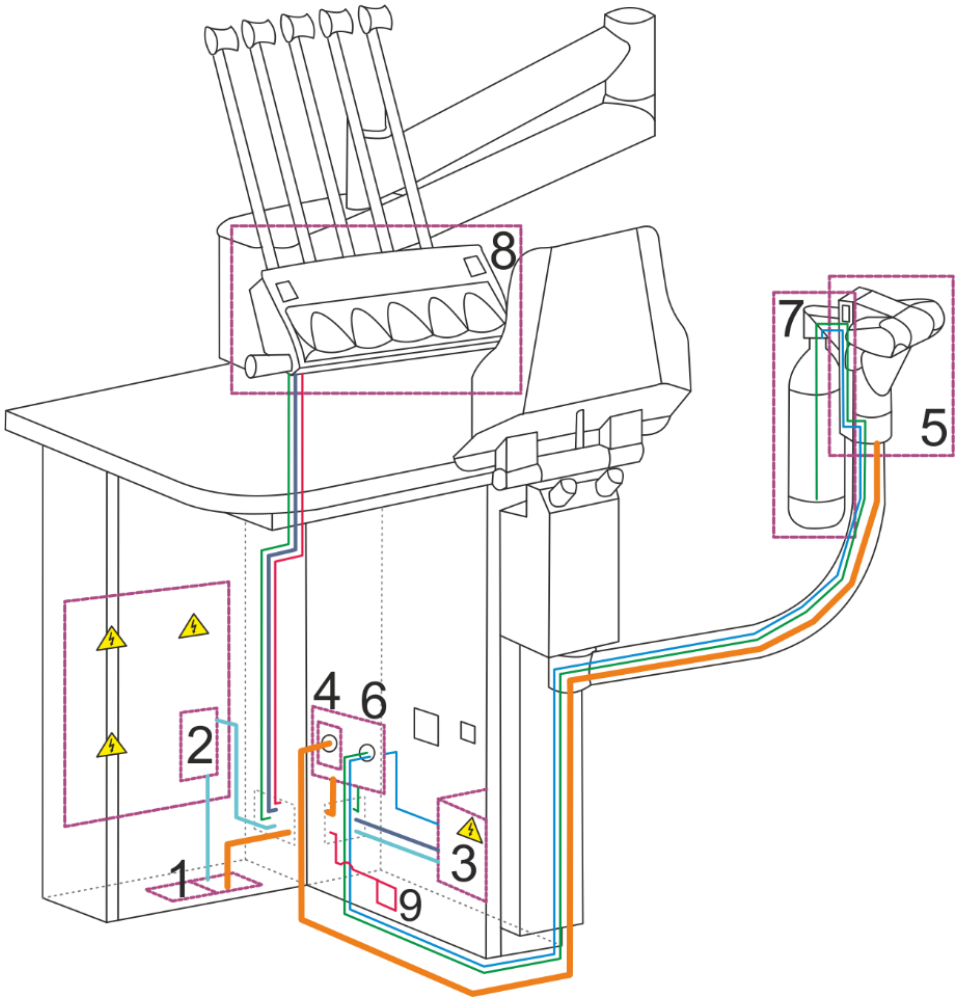


J25 – Air / Cooling / Water Spray – Solenoid valves 4 Connect to solenoid valves with cable 4801470 1. +24 VDC (air valve – blue wires) 2. GND (air valve – blue wires) 3. +24 VDC (cooling air valve – white wires) 4. GND (cooling air valve – white wires) 5. +24 VDC (water valve - green wires) 6. GND (water valve - green wires)	J26 – Instrument 4 From instrument hose or controller 1. Fiberlight + 2. Fiberlight – 3. GND 4. Instrument 4 ID input
J27 – Instrument selection 5 Connect to switch with cable 4801475 1. GND 2. Instrument selection signal input	J28 – Motor/scaler hand piece 1. Motor phase 3 2. Motor phase 2/scaler AC1 3. Motor phase 3/scaler AC2
J29 – Air / Cooling / Water Spray – Solenoid valves 5 Connect to solenoid valves with cable 4801470 1. +24 VDC (air valve – blue wires) 2. GND (air valve – blue wires) 3. +24 VDC (cooling air valve – white wires) 4. GND (cooling air valve – white wires) 5. +24 VDC (water valve – green wires) 6. GND (water valve - green wires)	J30 – Instrument 5 From instrument hose 1. Fiberlight + 2. Fiberlight – 3. GND 4. Instrument 5 ID input
J31 – Instrument power OUT 1. GND 2. +32 VDC	J32 – Q915 power IN Connect power cable 4801480 from Q900 1. GND 2. +32VDC
J33 – UART5 1. UART5 TX 2. GND 3. UART5 RX	J34 – SPI 1. +3.3 VDC 2. N.C. 3. TDO 4. SPI MISO 5. SPI MOSI 6. GND
J35 – Proportional valve output 1. GND 2. Variable voltage	J38 – I2C Display Connect cable 4801490 from Q915 to Q905 J2 / J5. 1. +3.3 VDC 2. I2C SDA 3. I2C SCL 4. GND

Table : Q915 pinout information

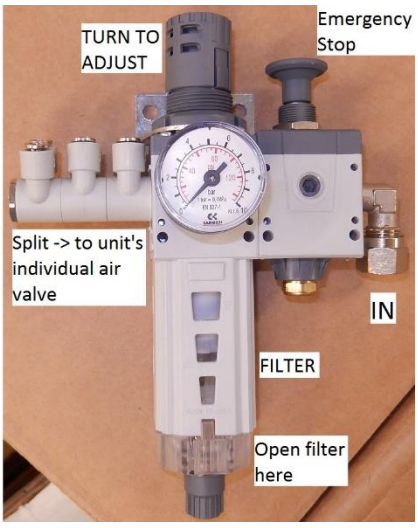
8 WIRING AND PNEUMATIC DIAGRAMS

8.1 Pneumatic Diagram



1. Clinic power, suction and air supply

2. 9805531 Air pressure filter-regulator with emergency off Camozzi 325869-01



3. Unit power supply, air and water regulation
   Q900 J1 – unit power IN
   Table Supply 9805531 Camozzi 325869-01 to Unit Supply SMC VT307-5DI-01F-Q

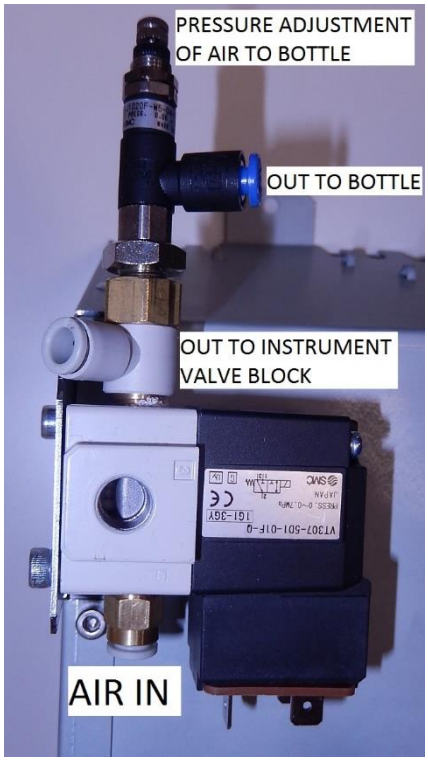
4. Suction to Dürr Comfort manifold via selection valve

5. Dürr Comfort Manifold - high and low volume suction

6. Air to water bottle / water from water bottle to instrument bridge

Unit air SMC VT307-5DI-01F-Q to instrument bridge valve block

Bottle water outlet to 9801580 instrument bridge valve block



7. Water bottle air supply to pressurize the water
Unit Air 5500404 SMC ARJ1020F-M5-04-1 to Bottle System Inlet

8. Instrument bridge air and water solenoid valve block:

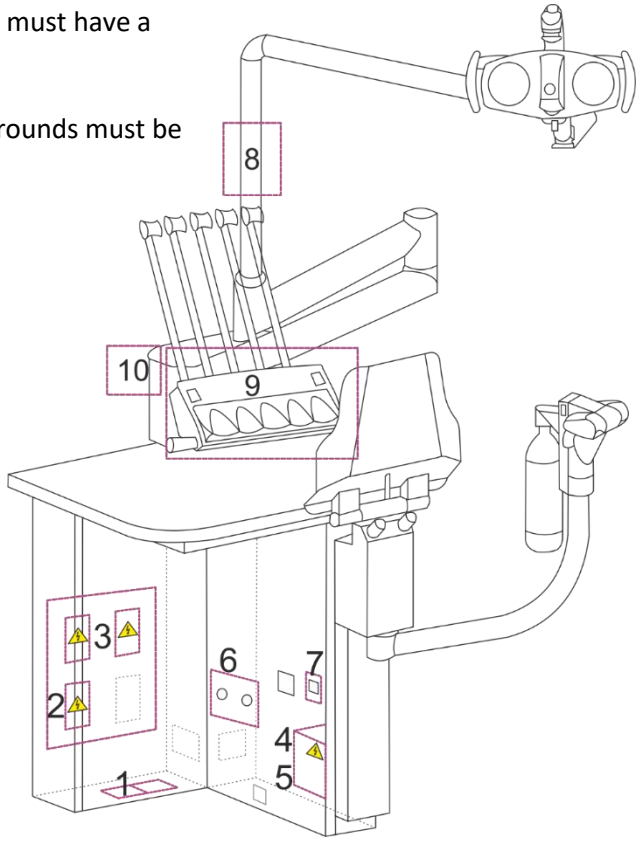
9. Turbine oil (”dirty air”) return to collection cup in unit. Red/ black hoses.

8.2 Wiring Diagram

The power panel and circuit breaker must have a lock-out system.

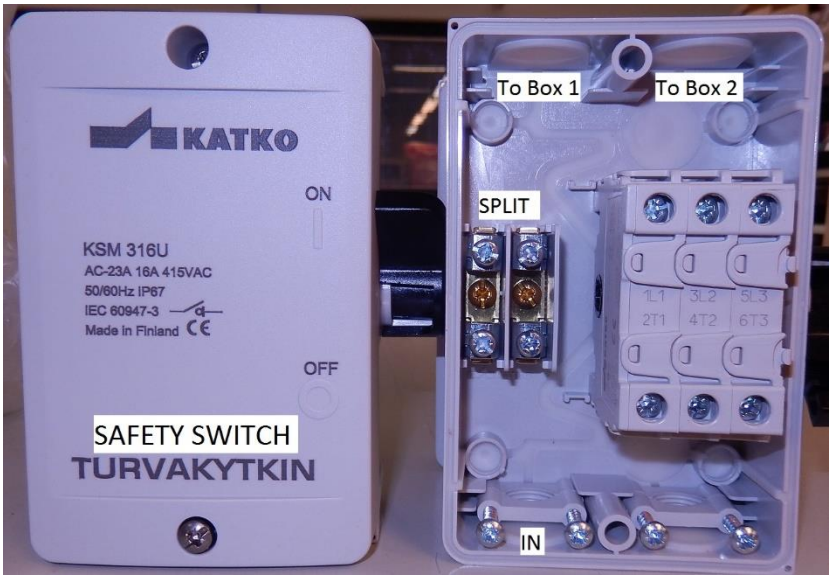
Q900 J11 and J16 Protective Earth grounds must be connected before use.

Warning: Dangerous voltage



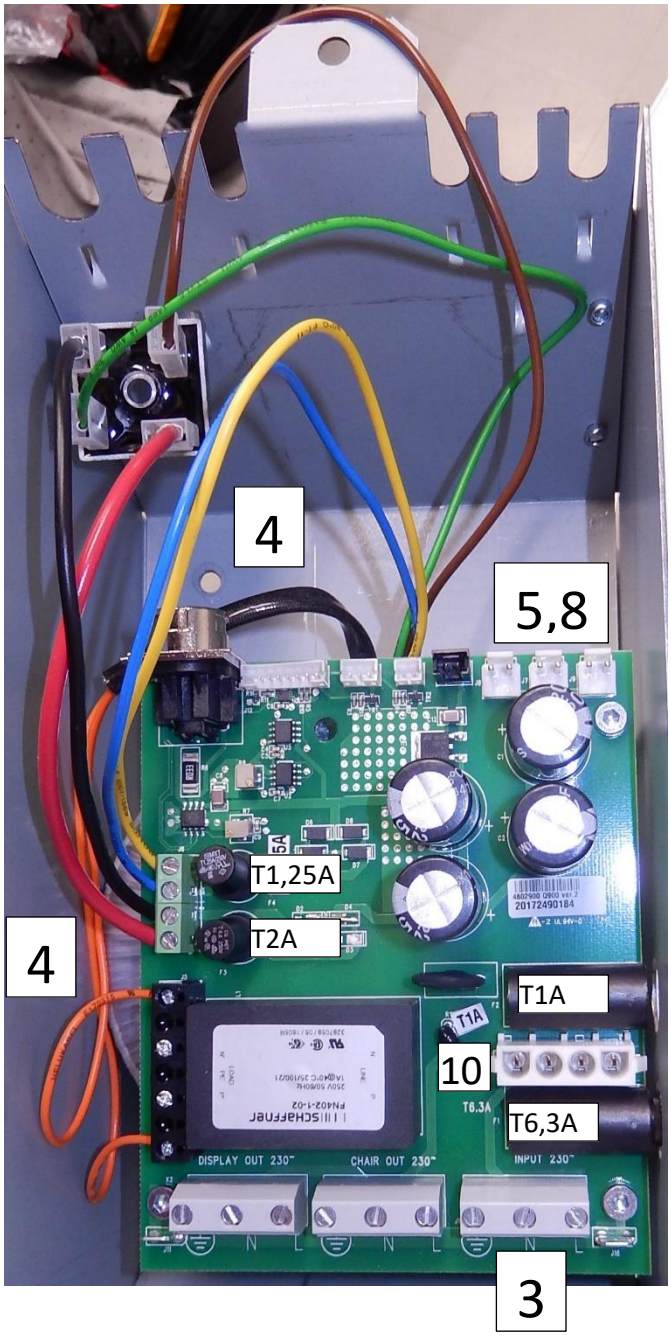
1. Building power supply 230V
   1.5mm^2 minimum core size, insulated power cable, per national regulation

2. Main power safety switch (3800405 Katko KSM 316U)
   1.5mm^2 minimum core size, insulated power cable, per national regulation



3. Electrical routing (570006 FiBox ABS) to Q900 J1
   1.5mm^2 minimum core size, insulated power cable, per national regulation

4. Power Supply System: Toroidal Transformer and Rectifier
Transformer orange to Q900 J5 1 and J5 4
Transformer yellow to Q900 J6 1
Transformer blue to Q900 J6 2
Transformer green to rectifier
Transformer brown to rectifier AC
Rectifier + red to J6 4
Rectifier black to J6 3



5. Power Out to Unit Systems:

4801495 Q900 J10 power to unit air solenoid valve
4801500 Q900 J14 power to selection valve
4801480 Q900 J7/8/9 power to Q915 J32
4801460 Q900 J13 to Durr Comfort Manifold
Lift motor cable to Q900 J12

6. Air, water and power to Durr Comfort Manifold

7. 4801409 Foot control cable to Neutrik plug
4801465 From Neutrik plug to Q915 J4

8. Faro lamp power to Q900 24VDC

9. Instrument bridge
4801470 Instrument bridge solenoid valves to instrument air spray (blue), cooling spray (white) and water spray (green)

4801475 Instrument selection cables from whip arm microswitch to Q915 J6, J13, J18, J23 and J27

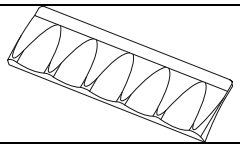
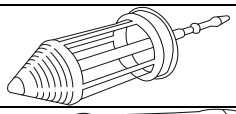
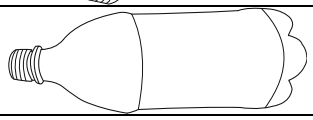
4801485 Q915 to micromotor controller
4801505 Q915 to Dassym micromotor controller
4801490 Q915 to Q905 display power and signal

10. Power switch and power sockets
Q900 J4 to power switch on tower
Q900 to power socket, wiring and socket per national regulation

9 SPARE AND CONSUMABLE PARTS

9.1 Consumable Parts

Some parts may need replacing before the next scheduled service. The following parts can be ordered from a Finndent dealer:

Type	Description	Part Number	Details
Consumable Goods	Silicone instrument rest - 5 place, whip arm	6809960	
	Instrument arm brake rubber	6809730	Gasket for the brake.
	Unit foot control cable	4801409	Only the cable.
	High volume suction handpiece 7600A010-00	8900582	
	High volume suction hose 7600A010-50	7700020	Replacement hose for large diameter suction
	Saliva ejector suction handpiece 7600A020-00	8900581	
	Saliva ejector hose 7600A020-50	7700015	Replacement hose for small diameter suction
	Coarse suction filter, Dürr 0725-041-11	8900511	
	Water bottle 1,5L	6000050	
	Turbine oil return cup	8900320	
	Linear slide bearings	5400075	The slide bearings on the Phantom torso lift slides
	Torso cover	6800100	Torso cover
	Headrest cover	6800105	Headrest cover
	P-G face mask with cheek, nose, mouth	6000201	
	1260M magnetic mounting plates for teeth	6000202	

This list includes the consumables that can be used with the FINNDENT Phantom unit. For proper use and maintenance please read carefully all the instructions supplied by the manufacturer of each specific item.

WARNING: Do not modify this equipment without authorization of the manufacturer.

9.2 Spare Parts

This list includes the spare parts that are used in the FINNDENT Phantom unit. For proper substitution and maintenance please read carefully all the instructions supplied by the manufacturer.

WARNING: Do not modify this equipment without authorization of the manufacturer.

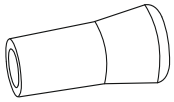
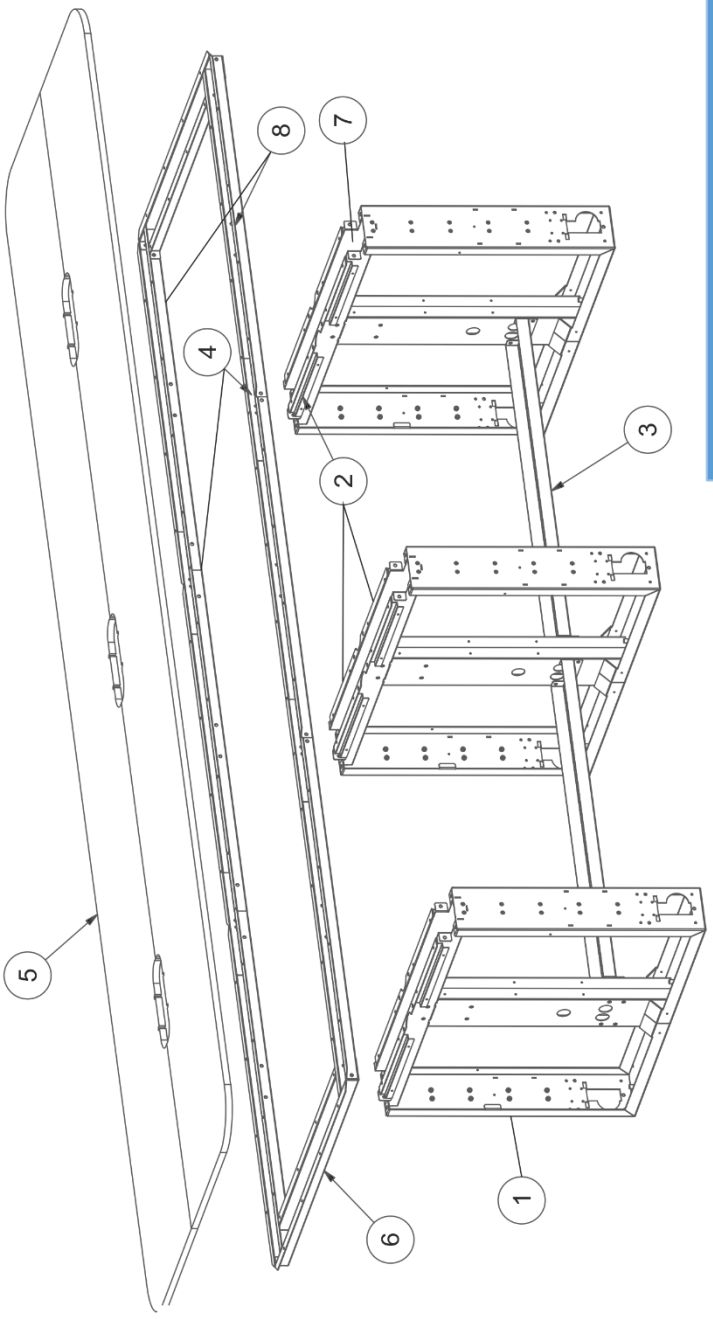
Description	Part Number	Details
Instrument bridge handle – 70mm	6203230	
Unit foot control refurbish kit	9801932	When the foot control begins to wear out, you can fix it rather than buying new.
Unit foot control	9801930-Student_Model	To buy an all-new foot control.
Dürr Selection valve	8900255	
Lift Motor FD20	3500075	The Phantom torso lift motor.
Tilt gas spring	5600025	Gas spring to position torso.
Tilt gas spring pneumatic cable	5600026	Pneumatic cable from gas spring to lock button.
Tilt release lock button Nr. BUCHSE39x25xM16x1.5	5600022	Lock button on chest of Phantom
Q900 v2ab PCB for power supply	4802900	Power PCB in the unit electrical box.
Q905 v1PCB used together with Q915	4802905	LED Display
Q915 v6ad PCB for instrument control	4802915	Instrument control in the instrument bridge.
Handpiece and hose	8900199	Luzzani 3-way syringe, straight assembly SMMSSG, Type B instrument.
Curing light handpiece and hose	8900321	Starlight S X5 05100003, Type BF instrument.
Curing light fibre optic	8900321-1	Fibre Optic for Starlight S X5 02750009.
Curing light optical protection	8900259	Optical Protection Starlight S / SLER 05100003.
Satelec Scaler Xinetic F55094	8900116	Satelec Scaler Xinetic with Newtron Handpiece, Type BF instrument.
Satelec Scaler Xinetic Hose F00187	8900210	
Micromotor control board 251.30.001	8900371	
Finndent micromotor hose 120.35.001	8900373	
Finndent brushless micromotor FD-33-LFA 106.05.000	8900374	
Turbine coupling assembly	9801266	
Midwest Lux turbine attachment 73001	8900092	

Table : Phantom spare parts

9.3 Assembly Drawings with Bills of Materials

FINNDENT

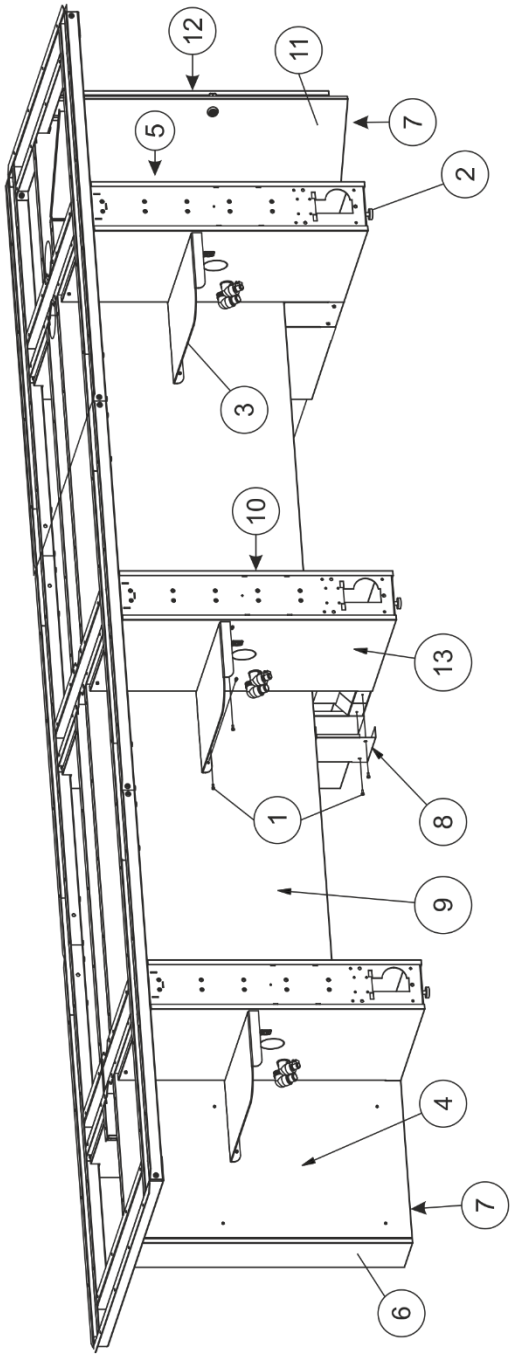
PHANTOM TABLE OF 6 UNITS 9890510 TABLE UNIT FRAMES



Part	Code	Name	QTY
1	6907065	TABLE SUPPORT MAIN FRAME, PHANTOM	3
2	6511235	TABLE SUPPORT BAR ON FRAME, PHANTOM	12
3	6313060	MIDDLE SUPPORT BAR FOR TABLE, PHANTOM	2
4	6313040	INSIDE CONNECTING U-BAR, PHANTOM	4
5	6001150	TABLE LAMINATE N:O 3	1
6	6313030	TABLE END SHORT BAR	2
7	6313045	TABLE SUPPORT MAIN FRAME TOP BAR	3
8	6313035	TABLE MIDDLE BAR, PHANTOM	6

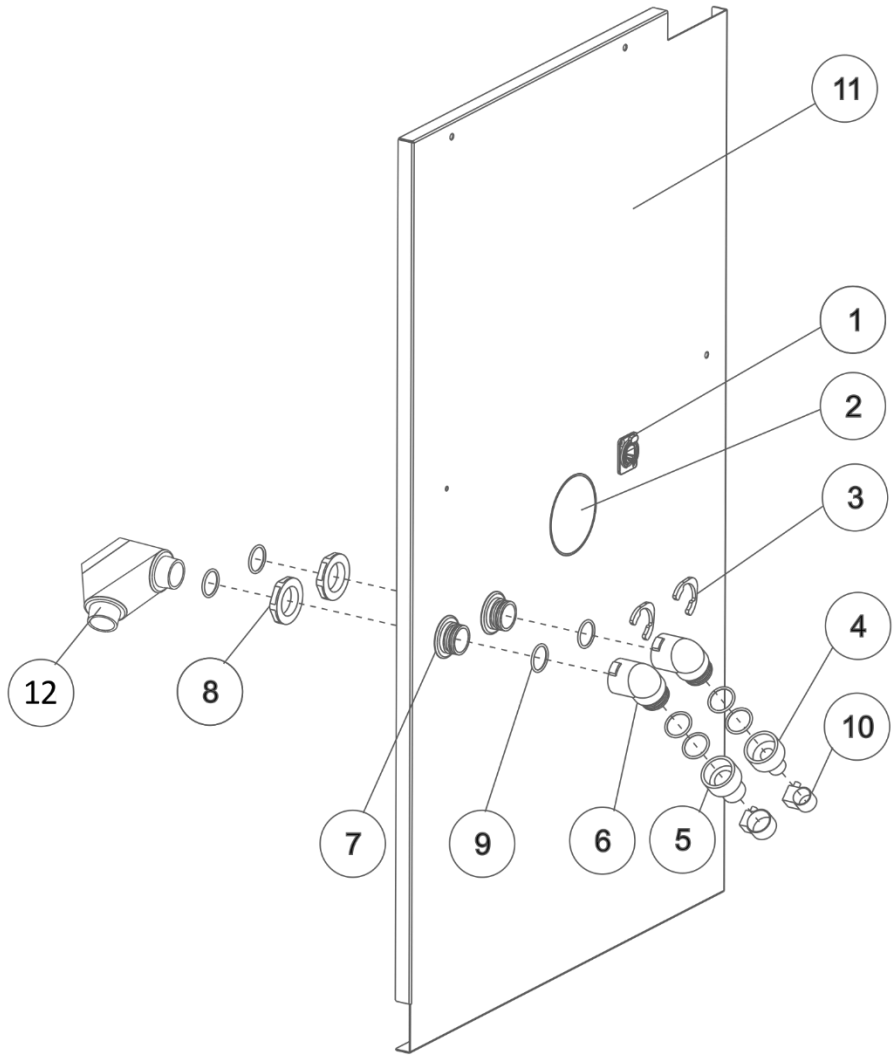
FINDENT

PHANTOM TABLE OF 6 UNITS 9890510 TABLE COVERS



Part	Code	Name	QTY
1		ALLEN SCREW 912/8.8ZN M4*10 AND M4*6	-
2	6000060	TABLE FOOT ACKURAT, PHANTOM	8
3	6313075	SHELF FOR FOOT PEDAL, PHANTOM	6
4	6511250	RIGHT END SIDE PLATE, PHANTOM	4
5	6511260	CONNECTION PLATE FOR SIDE DOOR, PHANTOM	2
6	6511270	END PLATE OF SUPPLY CABINETS	2
7	6511275	BOTTOM FLOOR PLATE OF END SUPPLY CABINETS	2
8	6511280	FLOOR COVER PLATE FOR UNIT CENTRES	4
9	6511285	CENTRE TABLE COVERS	4
10	9805560	DOOR TO TRANSFORMER BOX ASSEMBLED	6
11	9805555	BACK DOOR ASSEMBLED, PHANTOM	2
12	9805570	MAINS BOX ASSEMBLED	1
13	9805580	UNIT WALL WITH CONNECTIONS	6

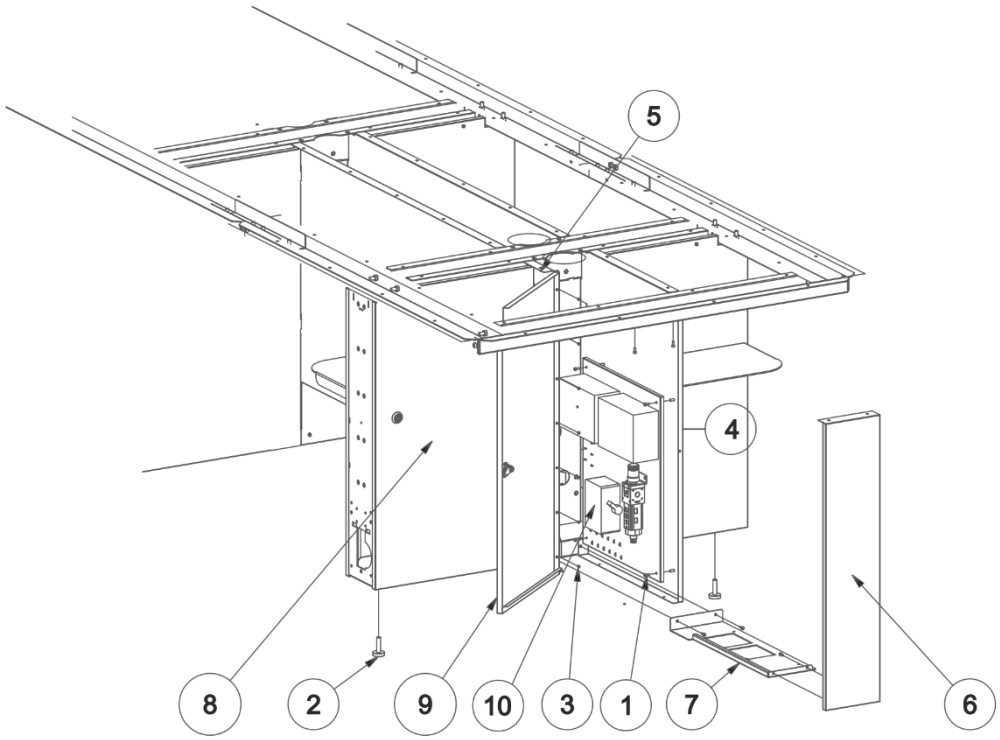
FINNDENT 9805580 UNIT CONNECTIONS WALL



Part	Code	Name	Qty
1	3800100	NEUTRIK RJ45 SOCKET	1
2	3800400	POWER SOCKET WALL BOX	1
3	5500276	SECURING RING DURR	2
4	5500277	HOSE SOCKET15 MM DURR	1
5	5500278	HOSE SOCKET20 MM DURR	1
6	5500287	ELBOW 90 DEGREE DURR	1
7	5500305	DURR DOUBLE CONNECTOR	2
8	5500306	RETAINING NUT DURR CONNECTOR	2
9	5901001	O-RING 20 X 2	6
10	6001005	TUBE CLAMP ABA 15-24	2
11	6511255	PHANTOM DESK COVER PLATE	1
12	8900255	SUCTION PLACE SELECTION VALVE	1

FINNDENT

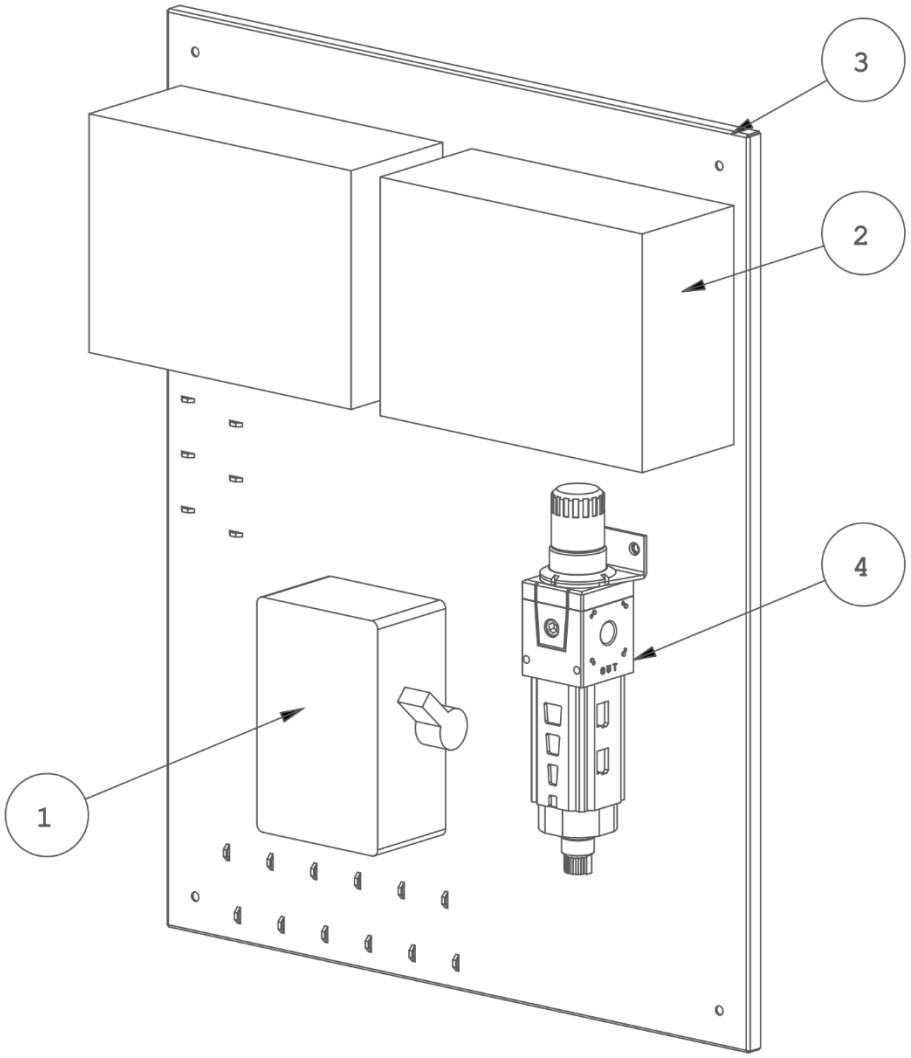
PHANTOM TABLE OF 6 UNITS 9890510 SUPPLY CABINET VIEW



Part	Code	Name	QTY
1	5000331	ALLEN SCREW 912/8.8ZN M3*10	4
2	6000060	TABLE FOOT ACKURAT, PHANTOM	8
3	5100004	M4 NUT	–
4	6511250	RIGHT END SIDE PLATE, PHANTOM	4
5	6511260	CONNECTION PLATE FOR SIDE DOOR, PHANTOM	2
6	6511270	END PLATE OF SUPPLY CABINETS	2
7	6511275	BOTTOM FLOOR PLATE OF END SUPPLY CABINETS	2
8	9805560	DOOR TO TRANSFORMER BOX ASSEMBLED	6
9	9805555	BACK DOOR ASSEMBLED, PHANTOM	2
10	9805570	MAINS BOX ASSEMBLED	1

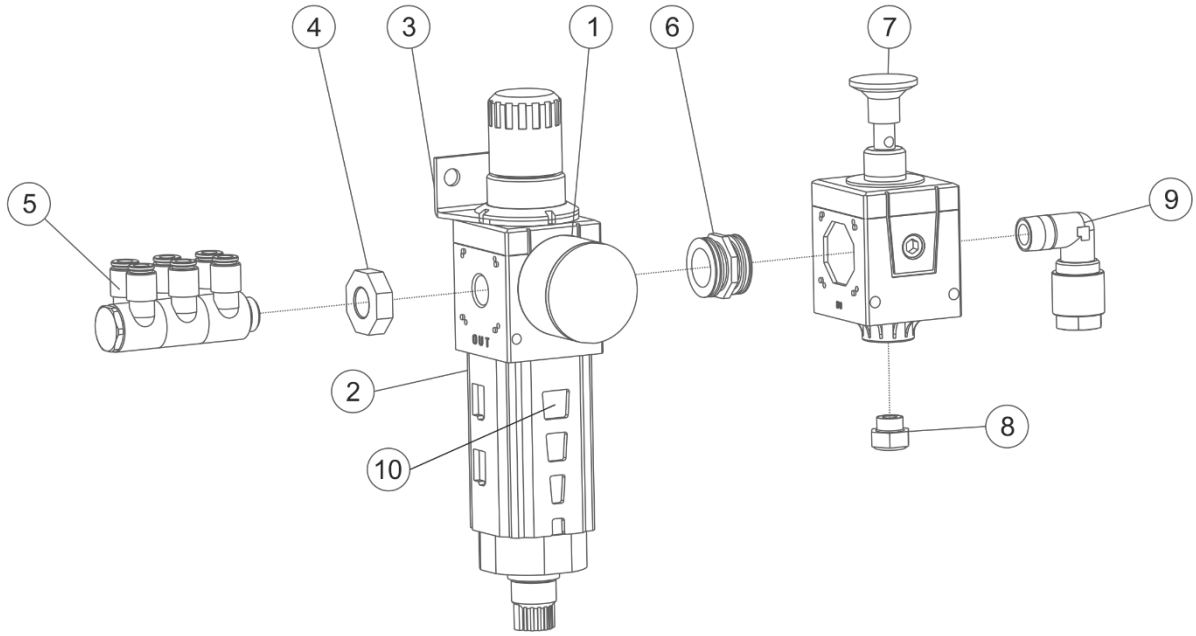
FINNDENT

9805570 SUPPLY CABINET MAINS BOX ASSEMBLY



Part	Code	Name	QTY
1	3800405	3-POLE SAFETY SWITCH KATKO IP67	1
2	5700006	TPE GASKET FIBOX ABS150/75HG	2
3	6511230	PHANTOM MAINS CONNECTION PLATE	1
4	9805531	FILTER CONTROLLER CAMOZZI ASSEMBLED	1

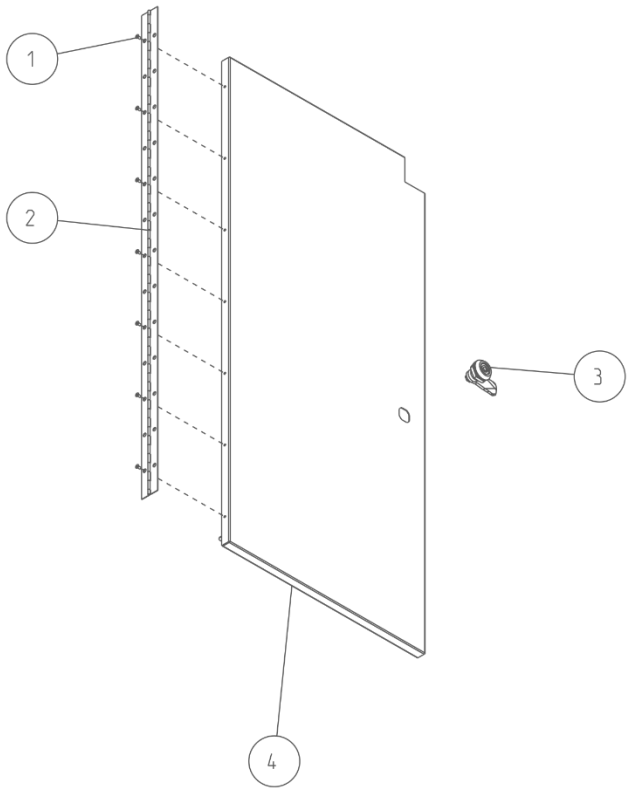
FINNDENT 9805531 MAIN AIR REGULATOR ASSEMBLY



Part	Code	Name	QTY
1	5500265	MANOMETER	1
2	5500383	FILTER REGULATOR CAMOZZI MD1-FR0000	1
3	5500384	MOUNTING BRACKET C114-ST CAMOZZI MD1-FR0000	1
4	5500385	THREADED CARTRIDGE MD1-A-1/4 CAMOZZI MD1-FR0000	1
5	5500386	TRIPLE DOUBLE BANJO CAMOZZI CL-7642-03-6-1/4	1
6	5500387	INTERMEDIATE JOINING CARTRIDGE CAMOZZI MD1-C	1
7	5500388	LOCKABLE ISOLATION VALVE 3/2 WAY CAMOZZI MD1-V01	1
8	5500389	SILENCER 3/2 VALVE CAMOZZI MD1-V01	1
9	5500390	PIPE COUPLER 34-BO11002 10MM-1/4UK	1
10	5500217	FILTER ELEMENT CAMOZZI	1

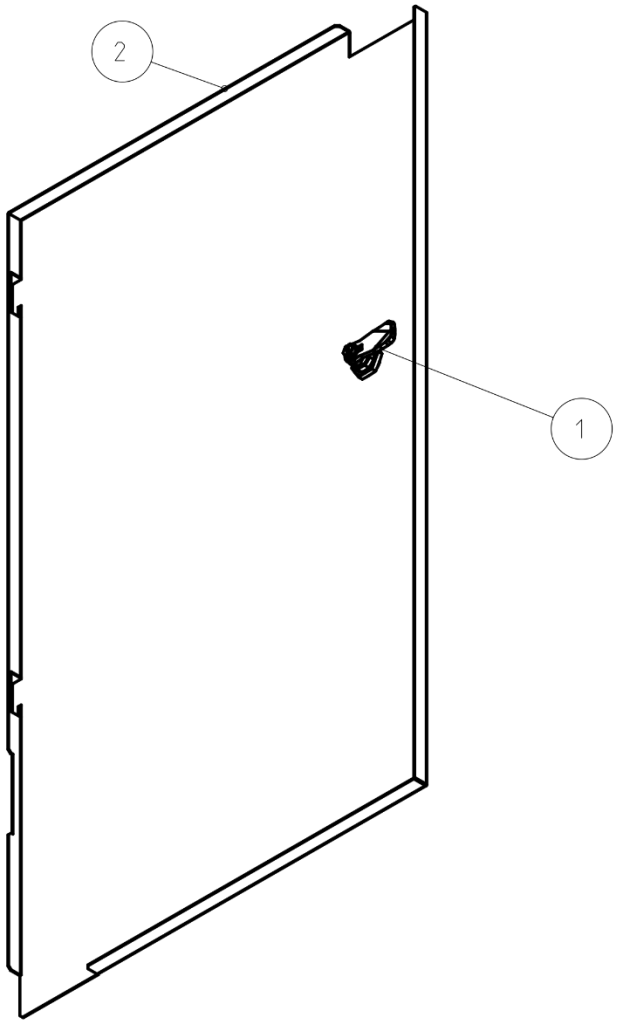
FINNDENT

9805555 UNIT SUPPLY CABINET ACCESS DOOR WITH LOCK (38CM WIDE DOOR)



Part	Code	Name	QTY
1	5000396	COUNTERSUNK HEAD SCREW M3X6 DIN965	7
2	6000025	HINGE	1
3	6000055	DOOR LOCK ESSENTRA 491479	1
4	6511265	SIDE DOOR	1
5	6000065	KEY FOR LOCK ESSENTRA 491487	1

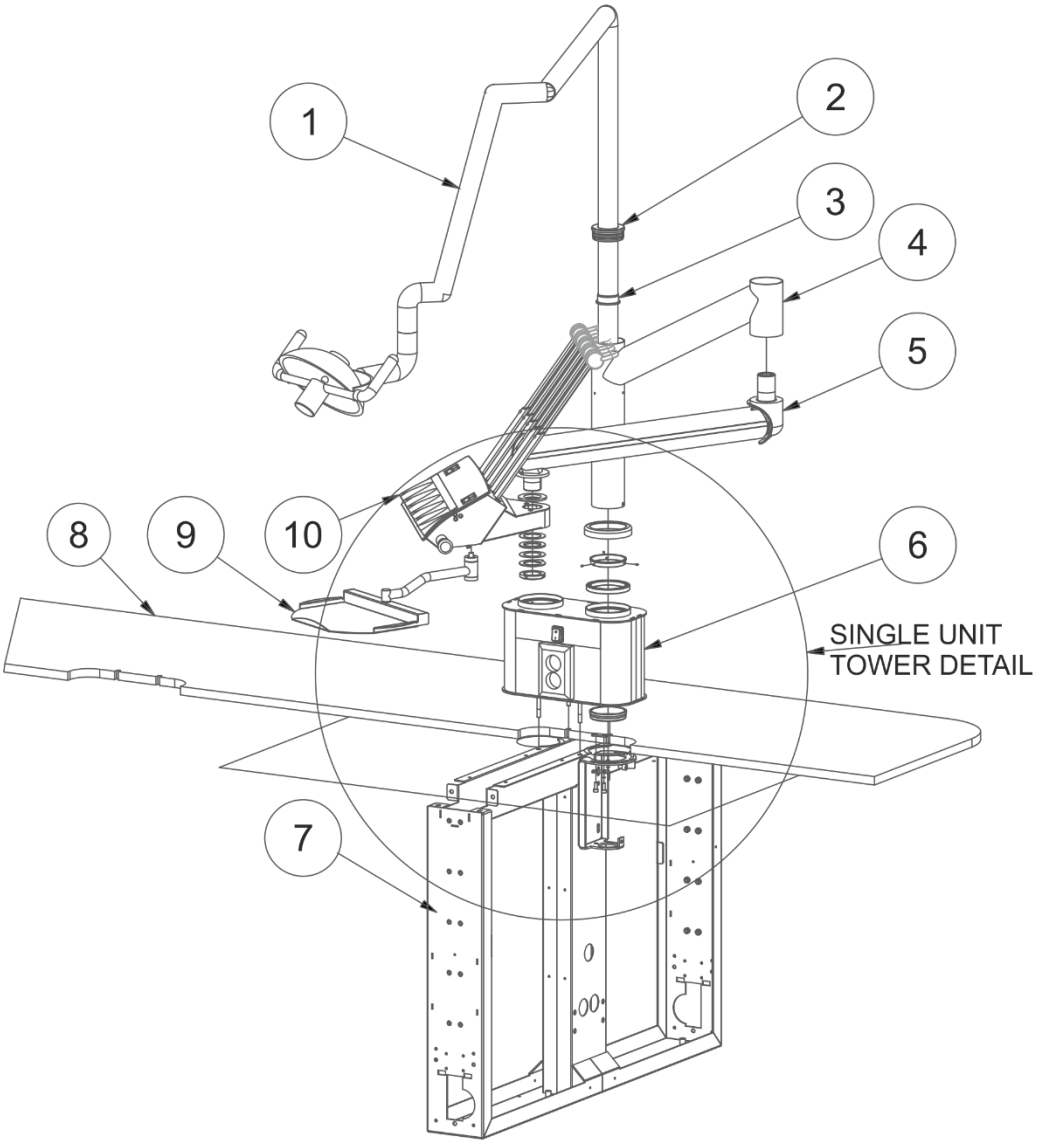
FINNDENT 9805560 UNIT DOOR WITH LOCK (47CM WIDE)



Part	Code	Name	QTY
1	6000055	DOOR LOCK ESSENTRA 491479	1
2	6511290	SIDE DOOR, 47CM WIDE	1
-	6000065	KEY FOR LOCK ESSENTRA 491487	1

FINNDENT

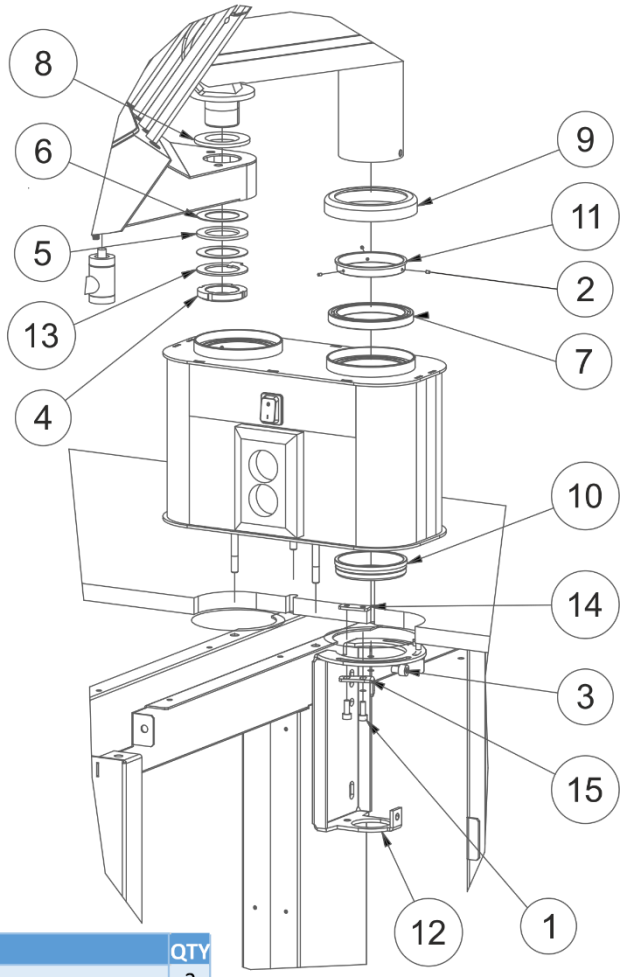
PHANTOM ACTA SINGLE UNIT ASSEMBLY



Part	Code	Name	QTY
1	8900307-20	FARO ALYA LAMP, ARM = 91CM	1
2	6203190	SUPPORT COLLAR FOR LIGHT COLUMN	1
3	6204030	BOTTOM BEARING TO LAMP SUPPORT COLLAR	1
4	6907030	HORIZINTAL ARM, PHANTOM	1
5	9802111	PARALLELOGRAM (BRAKE) ARM, ASSEMBLED	1
6	9805545	TOWER FOR 2 UNITS ASSEMBLED, PHANTOM	1
7	6907065	PHANTOM TABLE UNIT FRAME FOR 2 UNITS	1
8	6001150	TABLE TOP, 15MM THICK	1
9	9801992	Standard Tray assembly FD-8000	1
10	9890500	INSTUMENT BRIDGE ASSEMBLED, PHANTOM	1

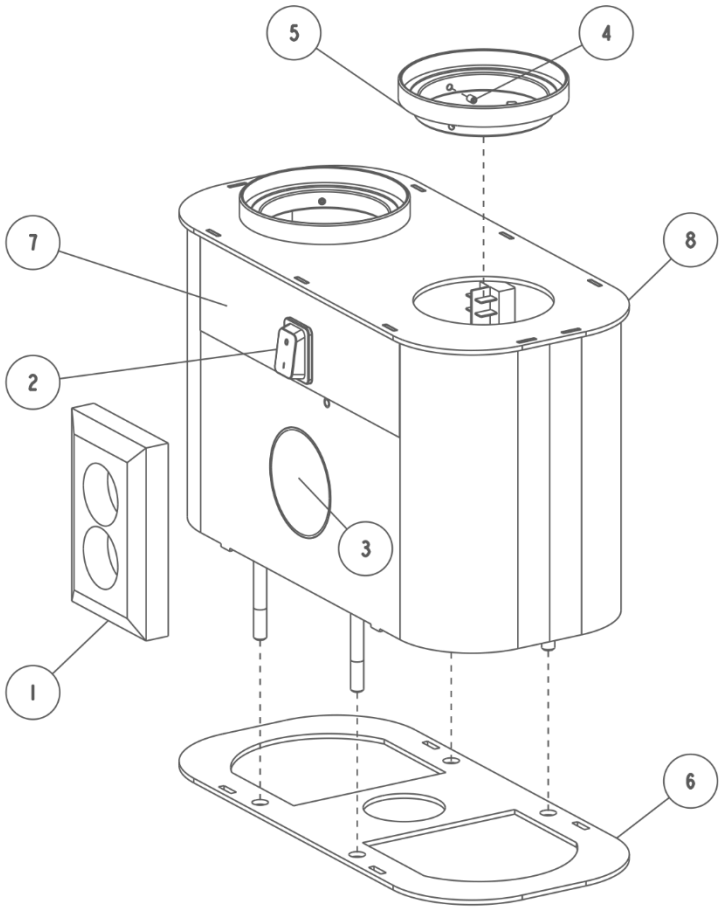
FINNDENT

SINGLE UNIT TOWER ATTACHMENT DETAIL



Part	Code	Name	QTY
1	5000028	ALLEN SCREW M6X16 DIN912	2
2	5000055	RETAINING SCREW 3X4 DIN916	3
3	5001071	ALLEN SCREW M8X10 DIN912 ZN	1
4	5100020	AXIS NUT KM 8	1
5	5400008	PRESSURE BEARING FOR BRIDGE ROTATION	1
6	5400011	PRESSURE PLATE FOR BRIDGE ROTATION	2
7	5400105	BALL BEARING FOR HORIZONTAL ARM	1
8	6809900	BOX BEARING FD-8000	1
9	6201350	PROTECTIVE BEARING COVER FD-8000	1
10	6201360	LOWER BEARING TO HORIZONTAL ARM FD-8000	1
11	6201370	SUPPORT COLLAR FOR HORIZONTAL ARM, FD-8000	1
12	6907075	ARM COLUMN BEARING SUPPORT PLATE	1
13	6410340	“Q” PIN COLLAR TO INSTRUMENT BRIDGE FD-8000	1
14	6420270	COUNTER PLATE FOR STOPPER	1
15	6420280	STOPPER TO HORIZONTAL ARM, PHANTOM	1

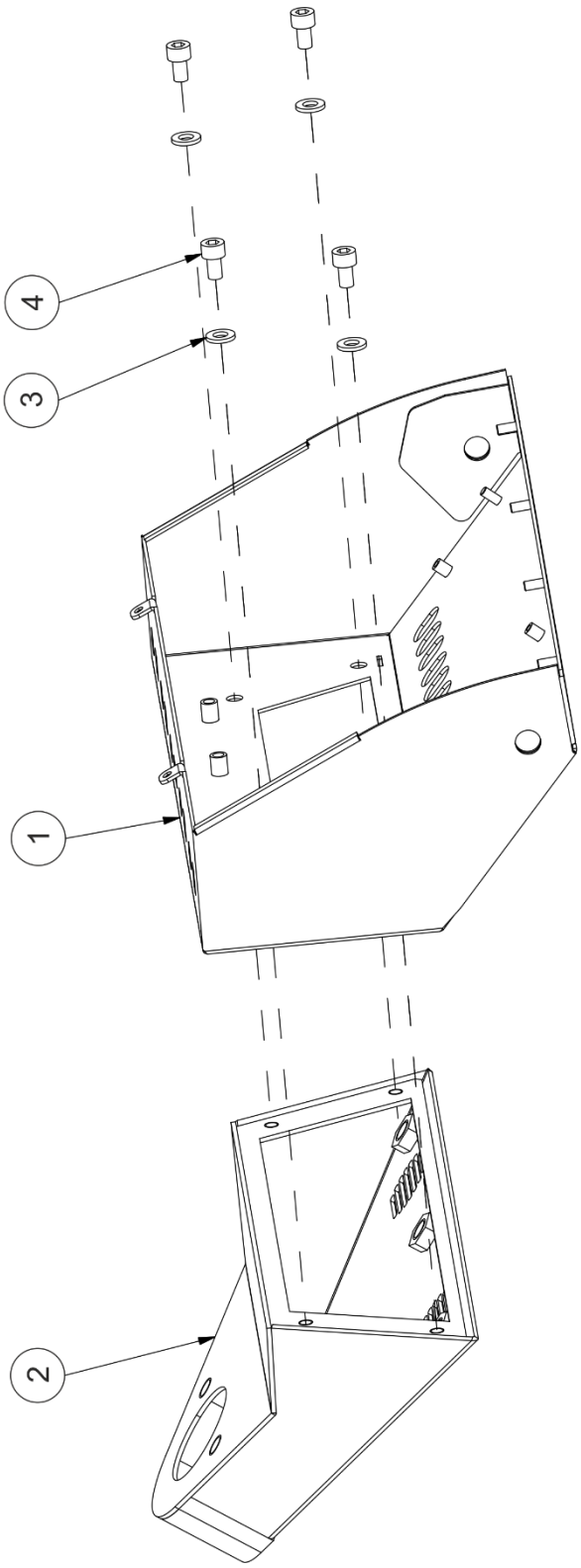
FINNDENT 9805545 Tower Assembled



Part	Code	Name	Qty
1		POWER SOCKET	1
2	3200129	MAIN SWITCH MARQUARDT 1805.7109	1
3	3800400	ASSEMBLY BOX ABB HW51-F	1
4	5000063	RETAINING SCREW HEX 4 * 6 DIN 916	3
5	6201380	BEARING FRAME FD-8000	1
6	6511240	OVAL TOWER BASE PLATE, PER 2 UNITS	1
7	6600000	PHANTOM LOGO STICKER	1
8	6907070	TOWER OVAL HOUSING, 2 UNITS	1

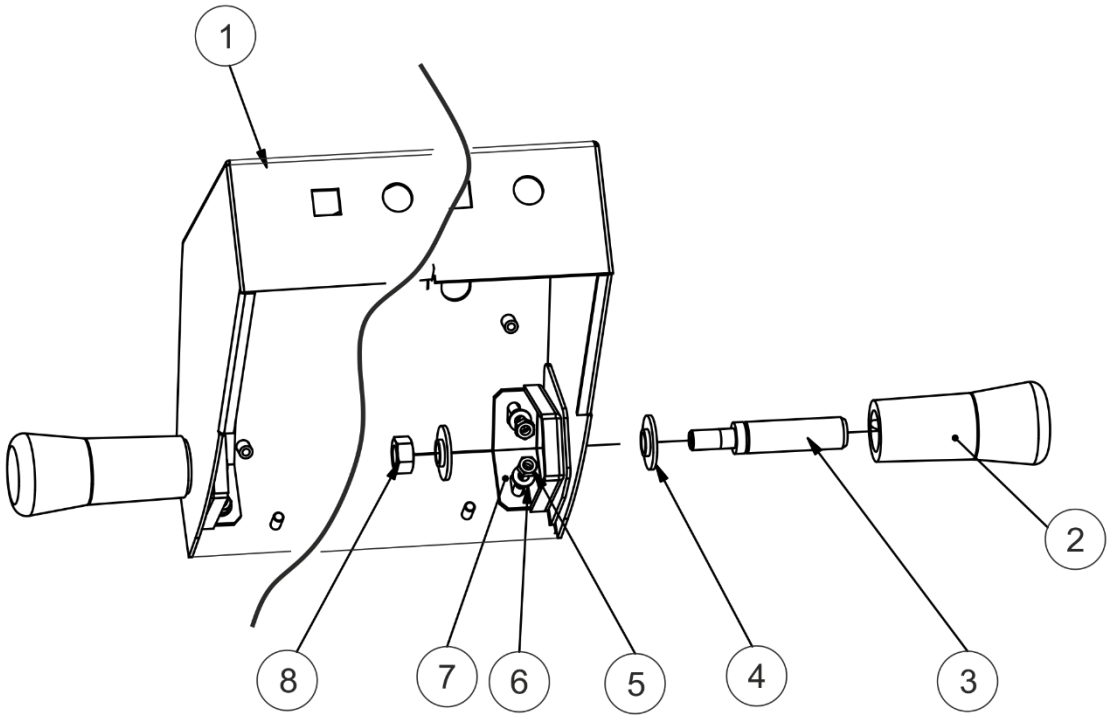
FINNDENT

BRIDGE AND ATTACHMENT BOX ASSEMBLY



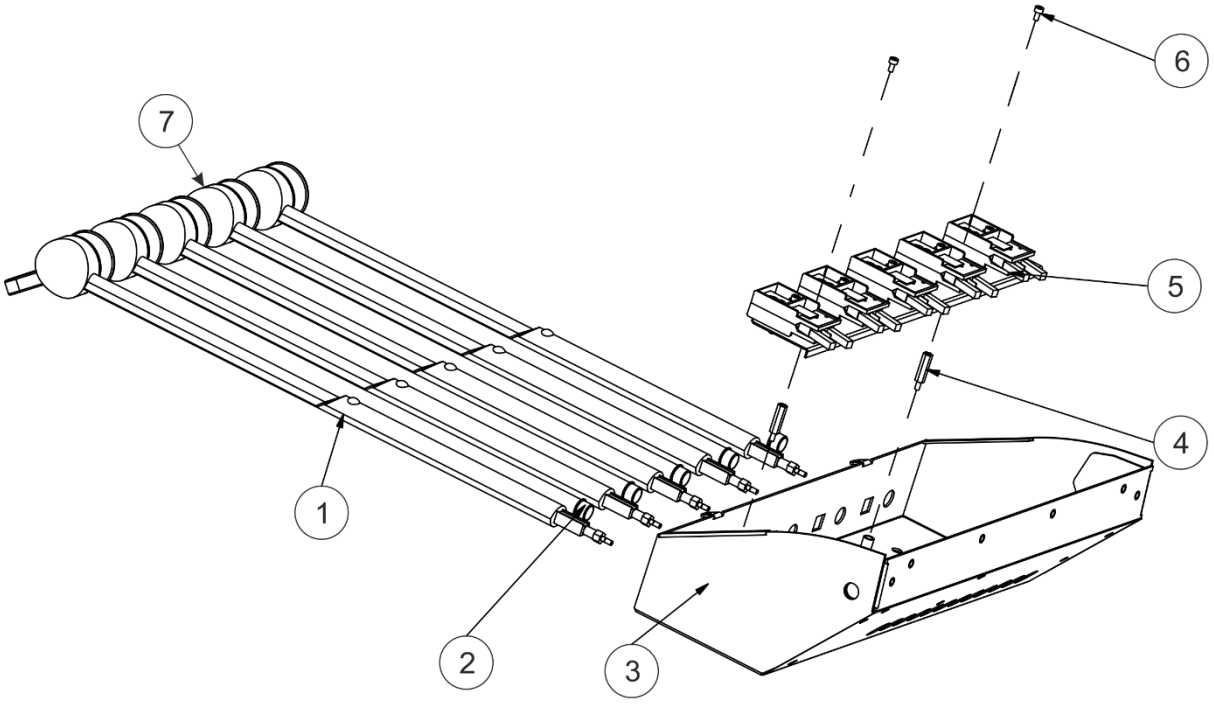
Part	Code	Name	QTY
1	6904250	PHANTOM BRIDGE ENCLOSURE	1
2	6903085	ATTCHMENT BOX	1
3	5200034	M6 DIN125 WASHER FRAME	4
4	5000027	M6 X 10 DIN 912 SCREW	4
	3901045	1.5MM YELLOW-GREEN GROUNDING WIRES	2

FINNDENT PHANTOM BRAKE HANDLE ASSEMBLY



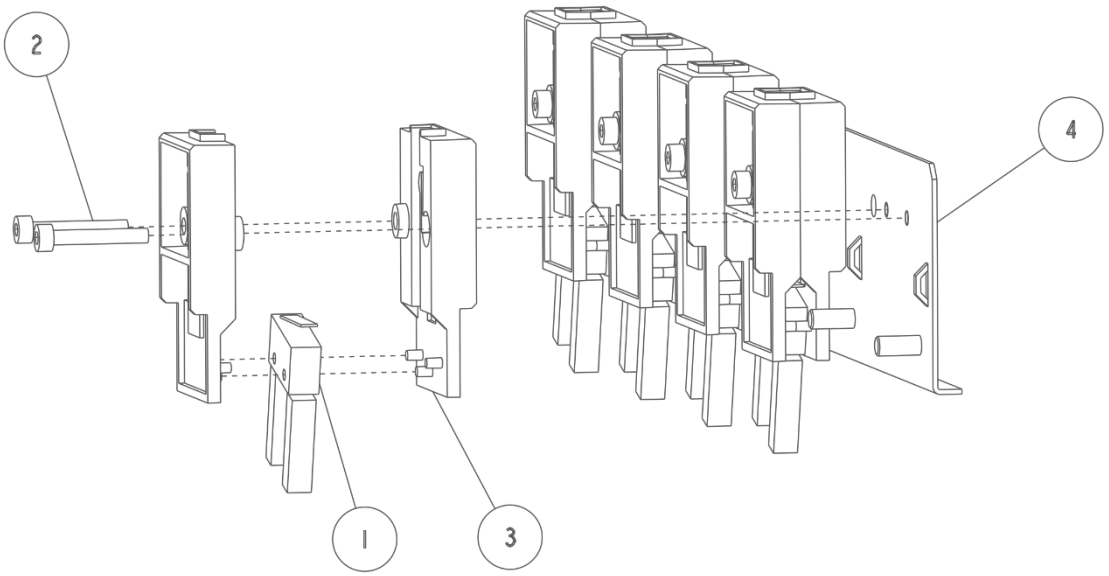
Part	Code	Name	QTY
1	6904250	PHANTOM BRIDGE ENCLOSURE	1
2	6810450	WHITE PLASTIC BUSHING	4
3	6102680	HANDLE FRAME	2
4	6400050	BRIDGE REINFORCEMENT PLATE	2
5	6203230	SHORT BRIDGE HANDLE	2
6	5001060	HEX SCREW M3X8 DIN913	2
7	5100062	NYLOCK NUT M8 DIN985	2
8	5100007	M8 DIN934 NUT	2
	3901002	BLACK EQUIPMENT WIRE, 1.5MM	2

FINNDENT WHIP ARM AND HOLDER ASSEMBLY



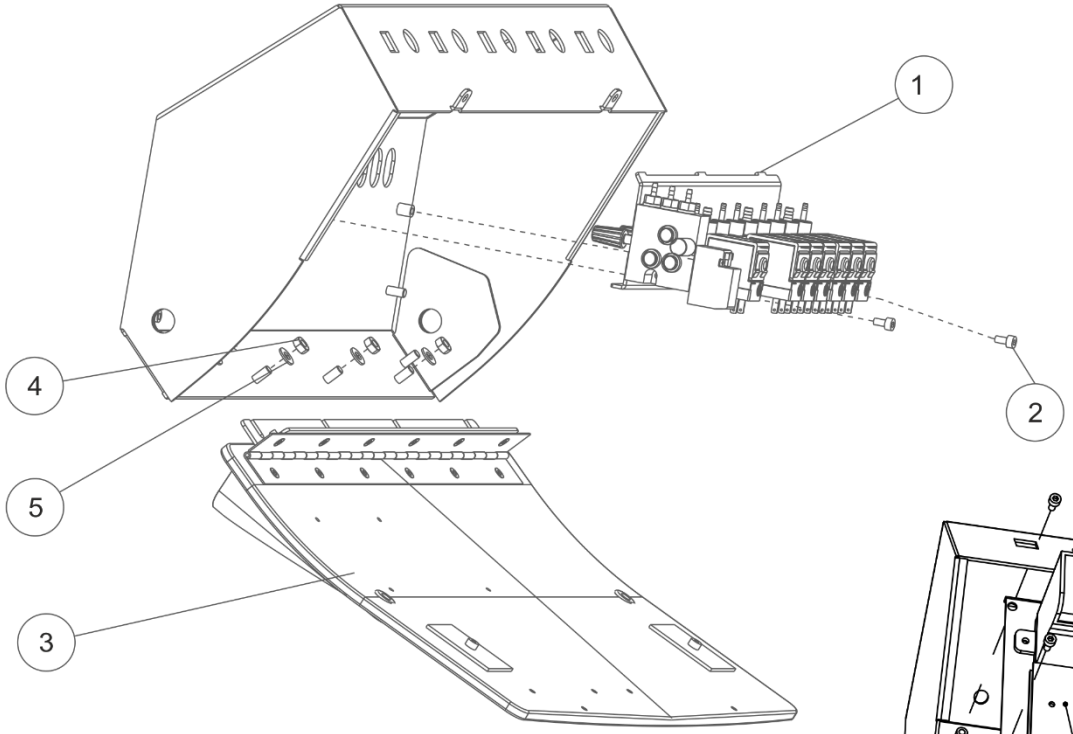
Part	Code	Name	QTY
1	9801715	DORIO ARMS, NORMAL, GREY	4
2	6809915	INSTRUMENT HOSE BUSHING	5
3	6904250	PHANTOM BRIDGE ENCLOSURE	1
4	5001094	HEX SCREW STANDOFF M3X20	2
5	9802200	WHIP ARM HOLDER ASSEMBLY	1
6	5000405	HEX SCREW M3X20	2
7	9801714	DORIO ARM, SOFT SILICONE, GREY	1

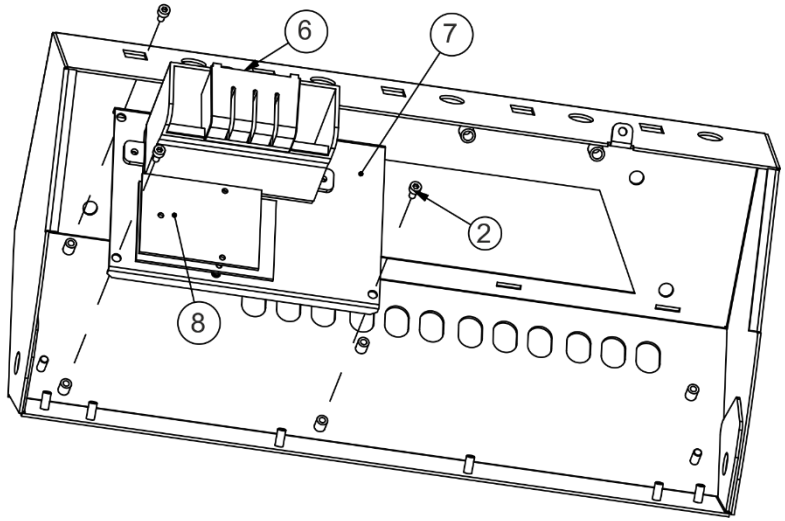
FINNDENT 9802200 Phantom holder for dorio arm assembled



Part	Code	Name	QTY
1	3200138	MICROSWITCH	5
2	5000405	ALLEN SCREW M3X20 DIN912	10
3	6801000	PLASTIC HOLDER FOR DORIO ARM FD-8000+	10
4	6904255	PHANTOM DORIO HOLDER SUPPORT PLATE	1
	4801401	SELECTION MICROSWITCH CABLE	5

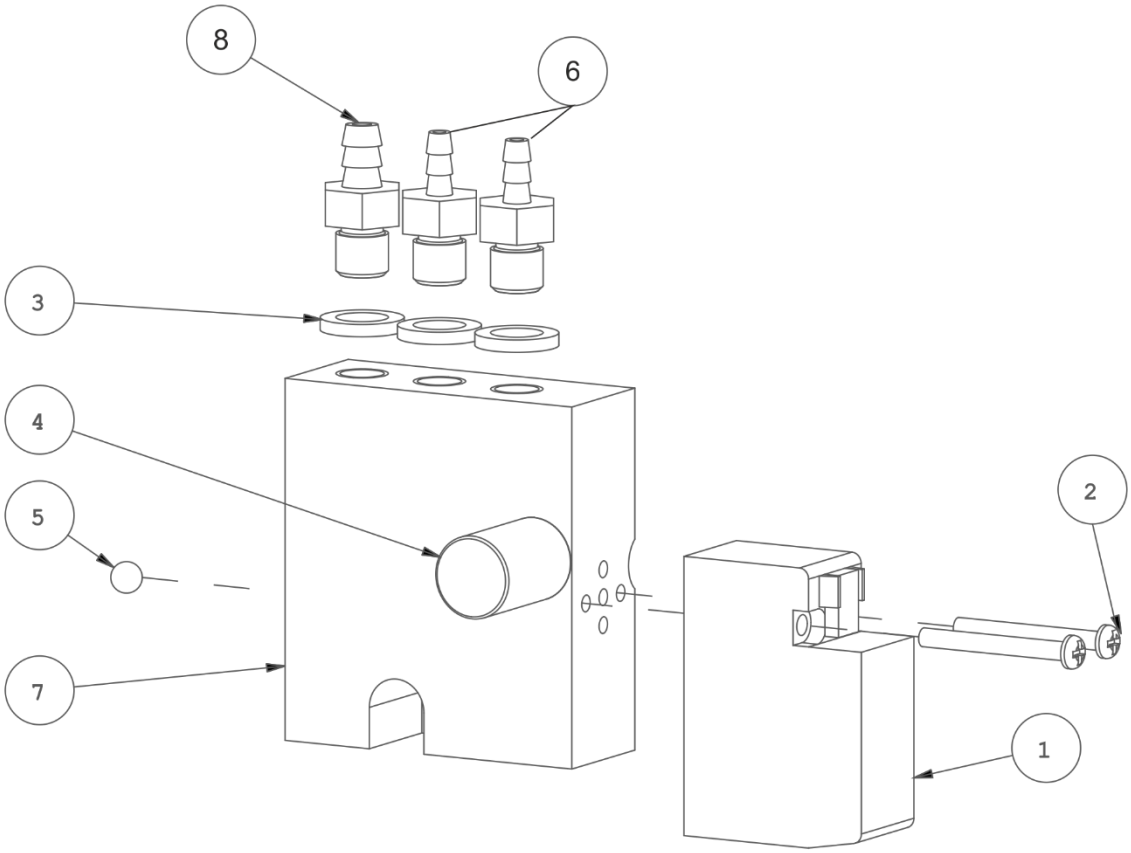
FINNDENT 9890500 Phantom Instrument box assembly





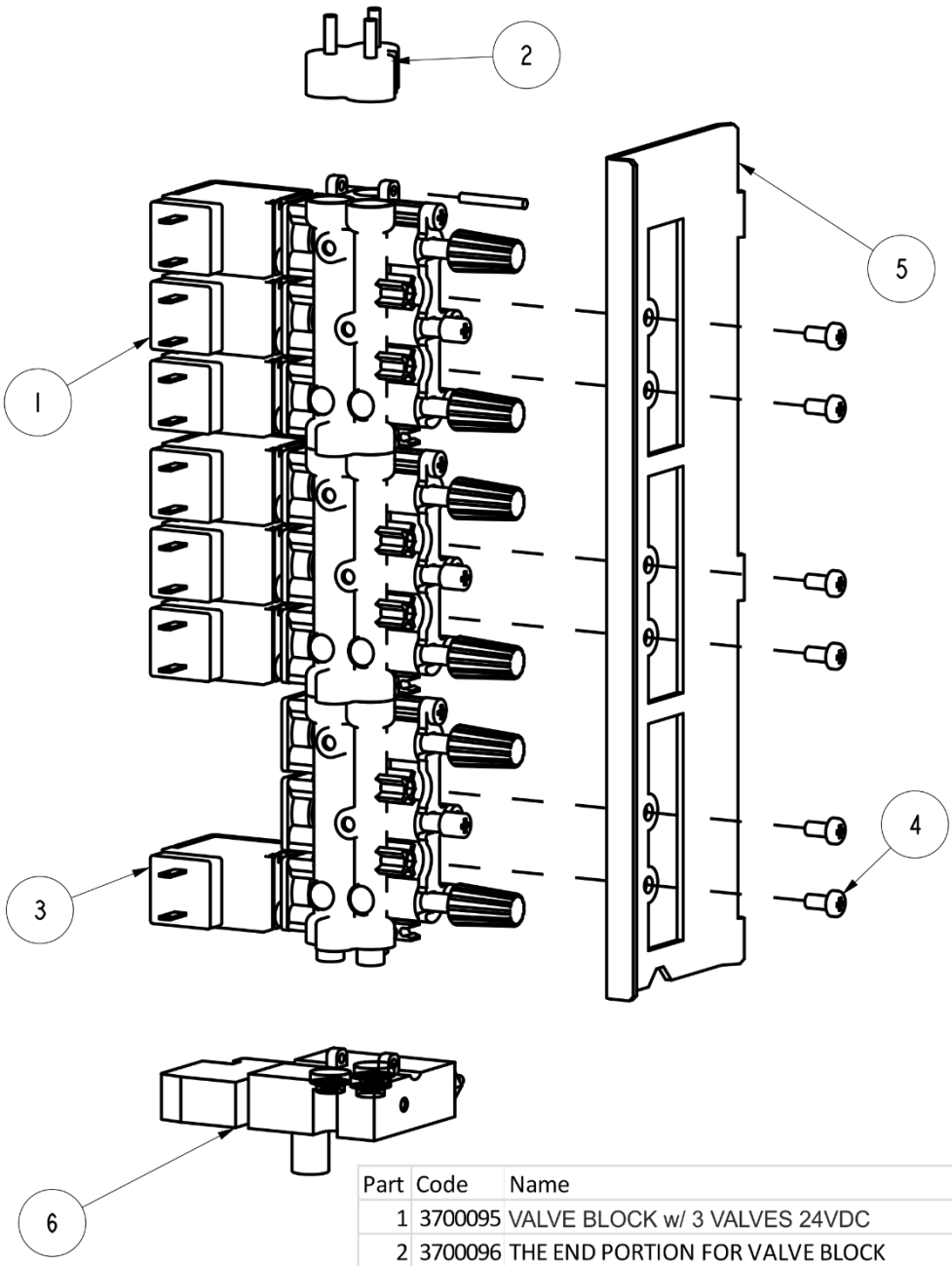
Part	Code	Name	QTY
1	9801580	PHANTOM VALVE BLOCK ASSEMBLY	1
2	5000408	HEX SCREW DIN 912 M3 X 6	5
3	9804240	PHANTOM BRIDGE COVER ASSEMBLY	1
4	5100004	NUT M4 DIN 934	3
5	5200034	WASHER	3
6	8900116	SCALER SATELEC XINETIC CONTROLLER	1
7	6518210	INSTRUMENT PCB MOUNTING PLATE	1
8	8900371	MICROMOTOR CONTROL PCB MX-30	1

FINNDENT 9802130 Air / Water Intake Block



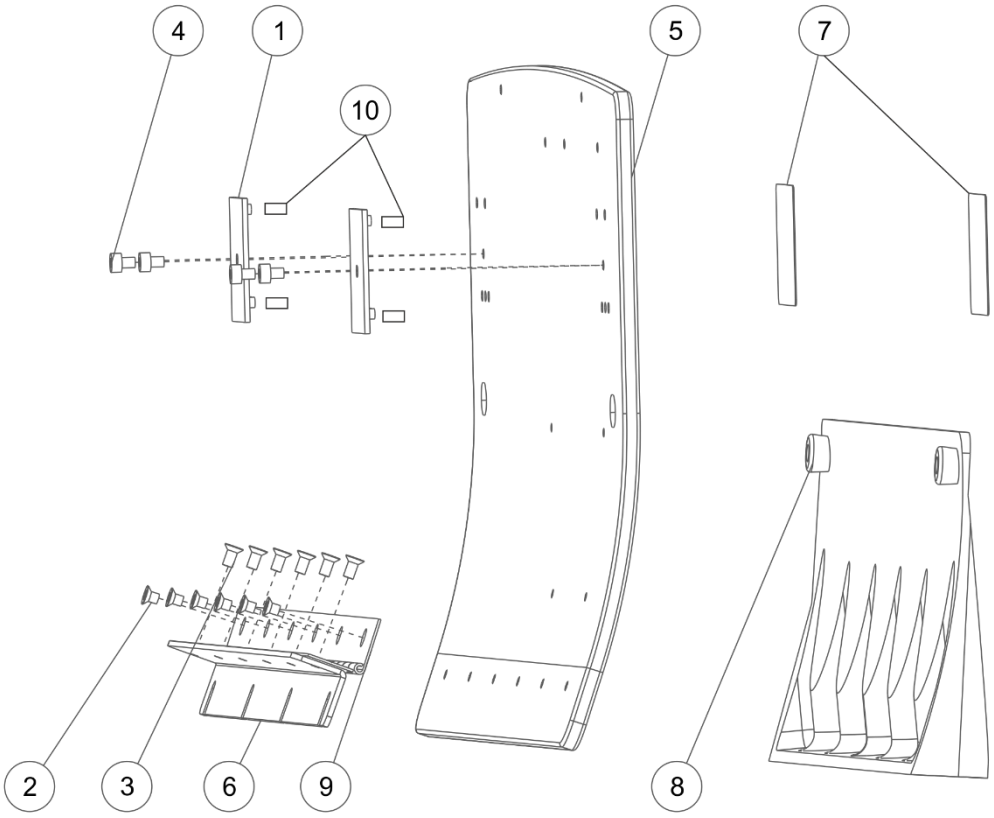
Part	Code	Name	QTY
1	3700099	VALVE SMC FOR AIR BRAKE	1
2	5000100	PLASCTIC SCREW PLASTOFAST 1,8x16	2
3	5500216	SEALING RING M5 AVS 2661-M5	3
4	5500303	SILENCER M5	1
5	6000020	STEEL BALL 3mm, RST	1
6	6307945	NIPPLE 1,2MM, M5	2
7	6800560	SIRAI MAIN BLOCK	1
8	6307940	NIPPLE 2,7MM, M5	1

FINNDENT 9801580 Valve plate assembled



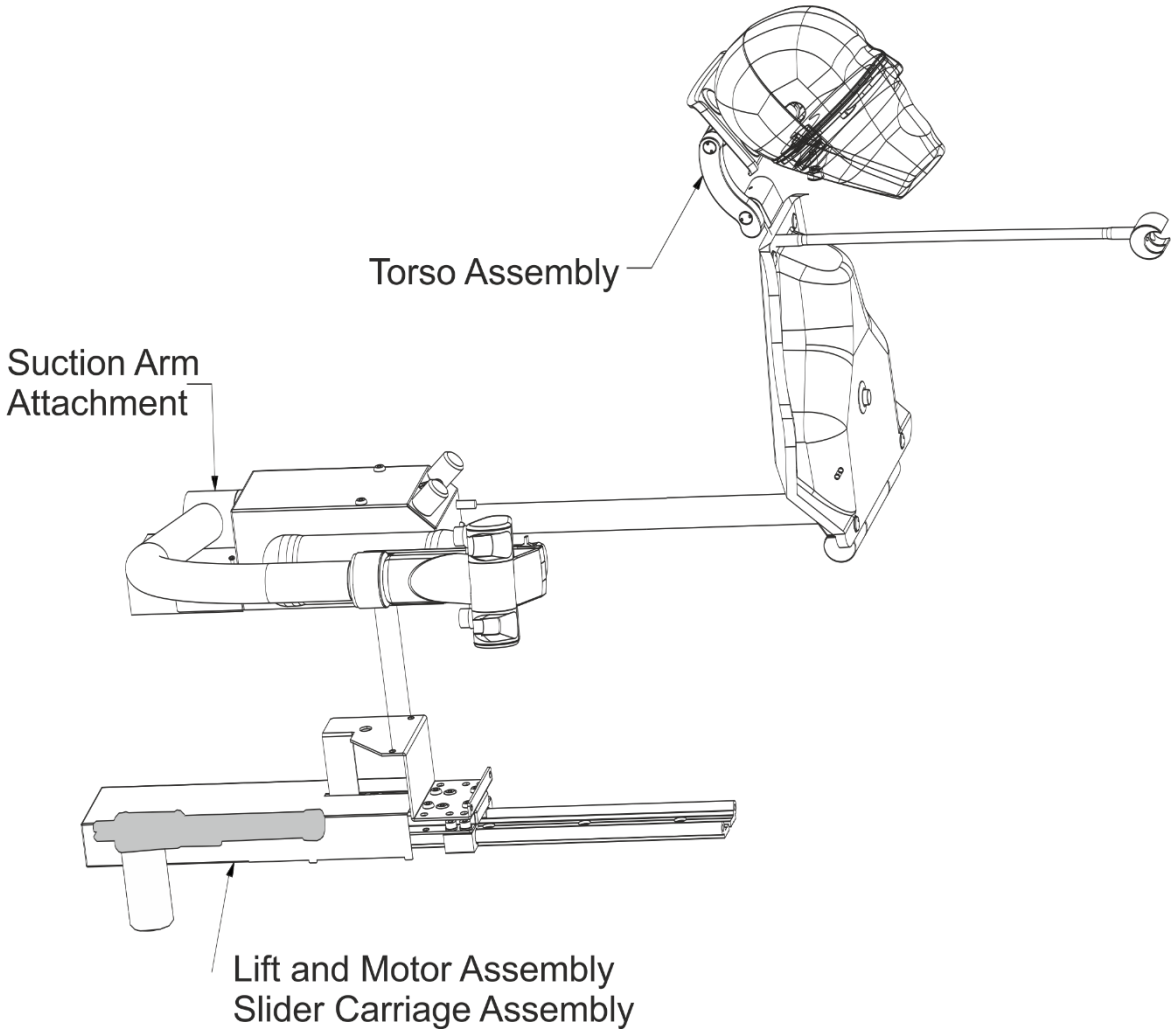
Part	Code	Name	Qty
1	3700095	VALVE BLOCK w/ 3 VALVES 24VDC	2
2	3700096	THE END PORTION FOR VALVE BLOCK	1
3	3700098	VALVE BLOCK w/ 1 VALVE 24VDC	1
4	5001126	SCREW PLASTOFAST WN 1412 M3X6	6
5	6410530	VALVE CONNECTION PLATE SIRAI	1
6	9802130	AIR/WATER INTAKE BLOCK ASSEMBLY	1

FINNDENT 9804240 PHANTOM BRIDGE COVER ASSEMBLY

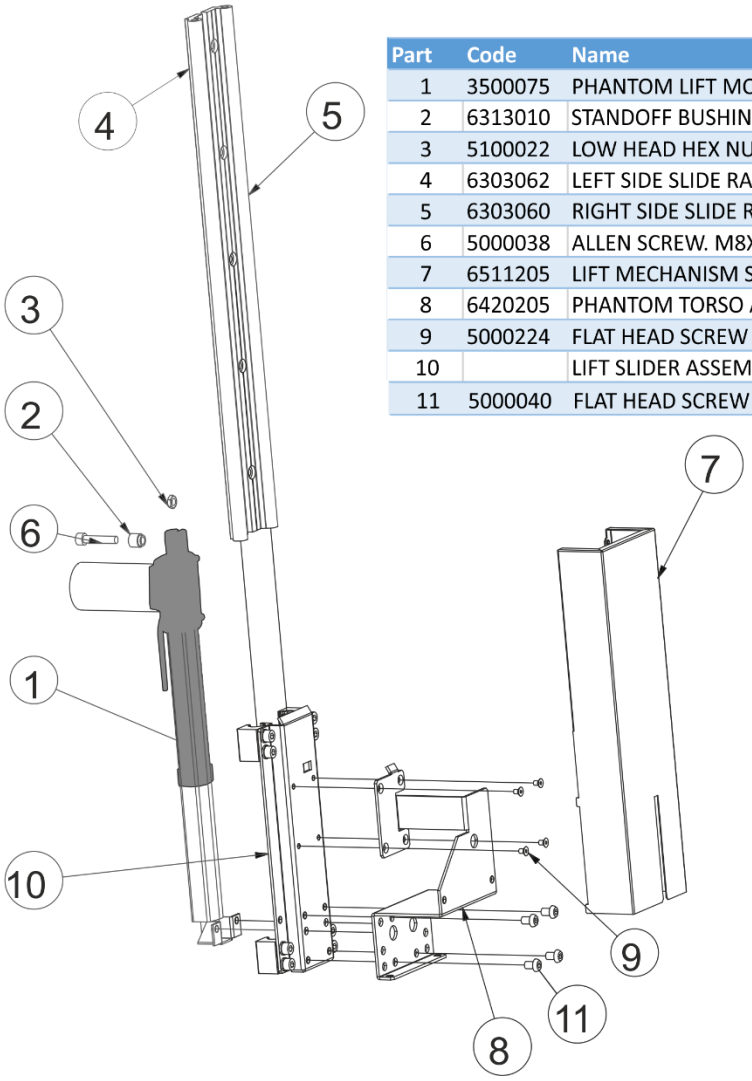


Part	Code	Name	QTY
1	4802905	Q905 LED DISPLAY PCB	2
2	5000395	COUNTERSUNK HEAD SCREW M3X4 DIN965	6
3	5000396	COUNTERSUNK HEAD SCREW M3X6 DIN965	6
4	5001113	ALLEN SCREW M3X4 DIN912	4
5	6301050	PHANTOM COVER FOR INSTRUMENT BOX	1
6	6400150	PHANTOM COVER SUPPORT, L-SHAPE	1
7	6600610	PHANTOM DISPLAY STICKER SET	2
8	6809960	INSTRUMENT PAD FD-8000, 5P	1
9	7700071	PIANO HINGE 600 x 32	1
10	4200015	LIGHT COLUMN FOR DISPLAY LED	4
	4801490	CABLE FROM Q915 TO Q905 DISPLAYS	2

FINNDENT 9805606 Complete Phantom Mechanism

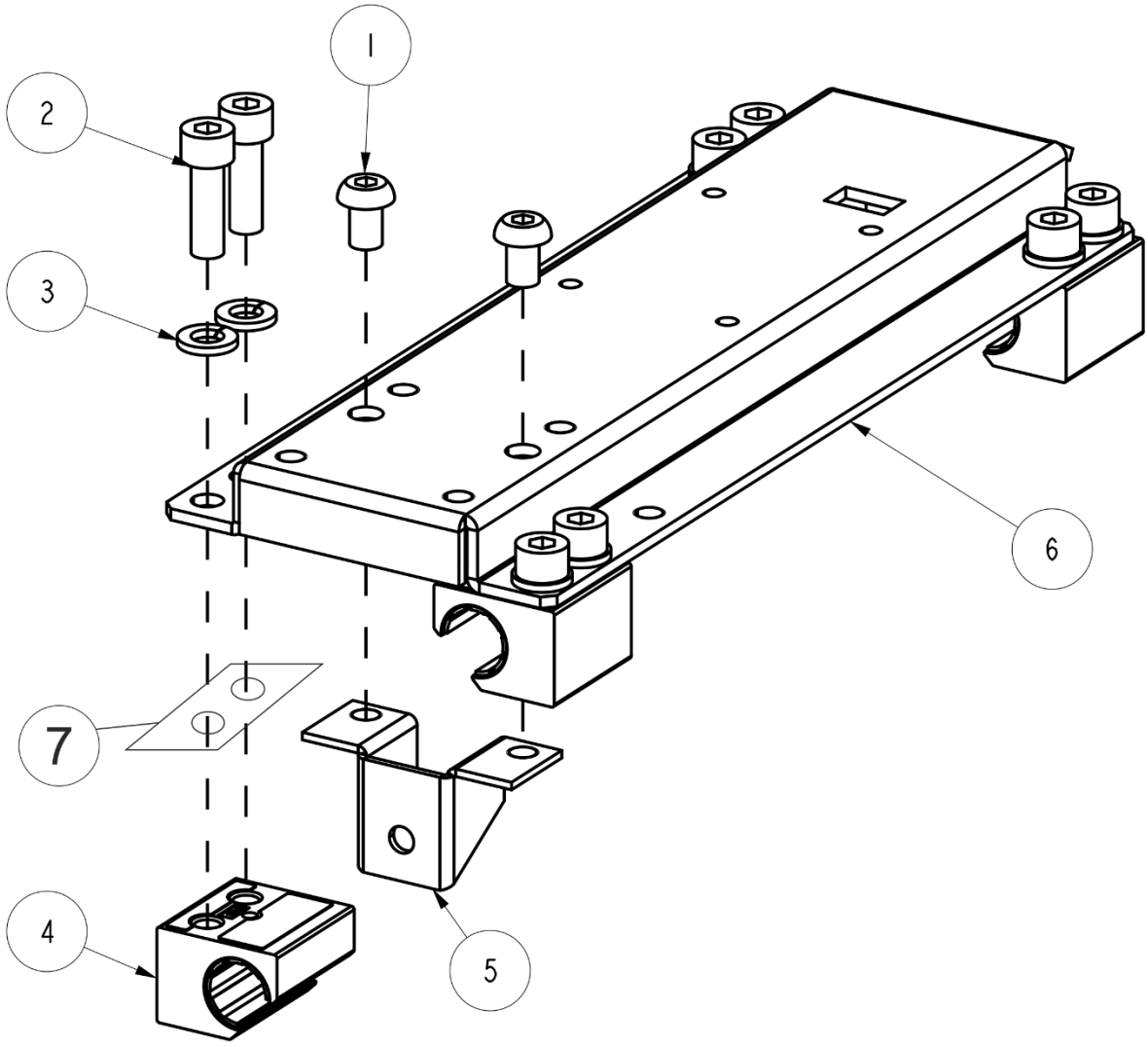


FINNDENT 9805606 Lift and Motor Assembly



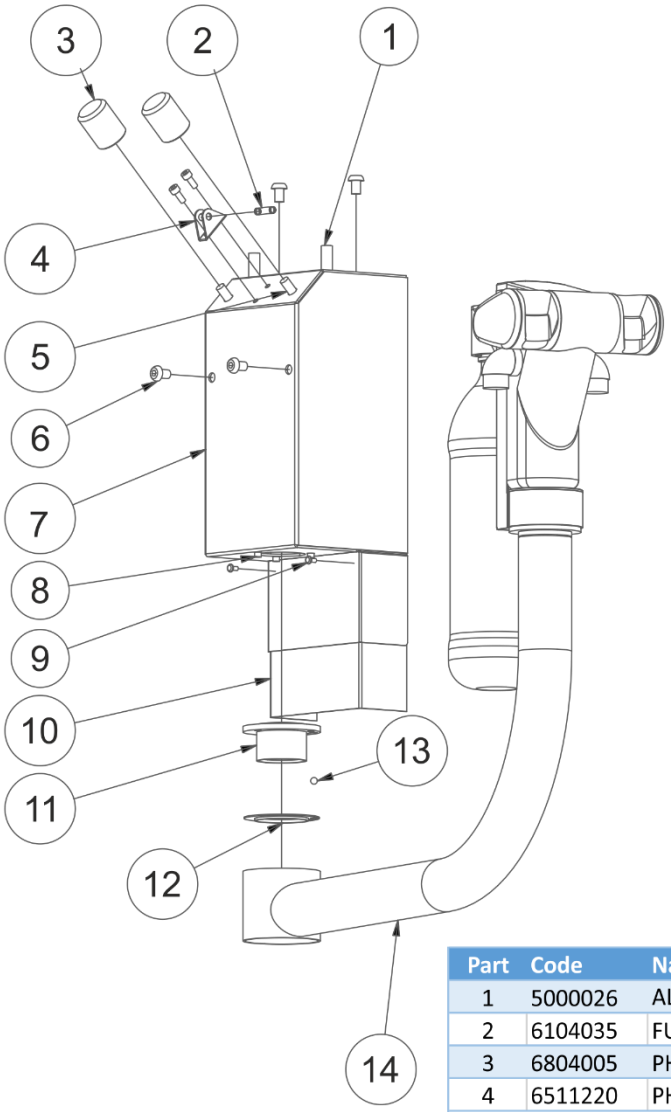
Part	Code	Name	QTY
1	3500075	PHANTOM LIFT MOTOR FD20 FOR TORSO	1
2	6313010	STANDOFF BUSHING	1
3	5100022	LOW HEAD HEX NUT DIN 439 M8	1
4	6303062	LEFT SIDE SLIDE RAIL	1
5	6303060	RIGHT SIDE SLIDE RAIL	1
6	5000038	ALLEN SCREW. M8X40 DIN912	1
7	6511205	LIFT MECHANISM SHIELD	1
8	6420205	PHANTOM TORSO ATTACHMENT PLATE	1
9	5000224	FLAT HEAD SCREW M5X8 DIN7991	4
10		LIFT SLIDER ASSEMBLY	1
11	5000040	FLAT HEAD SCREW ISO7380 AISI 304 M6	4

FINNDENT 9805606 Slider Carriage Assembly



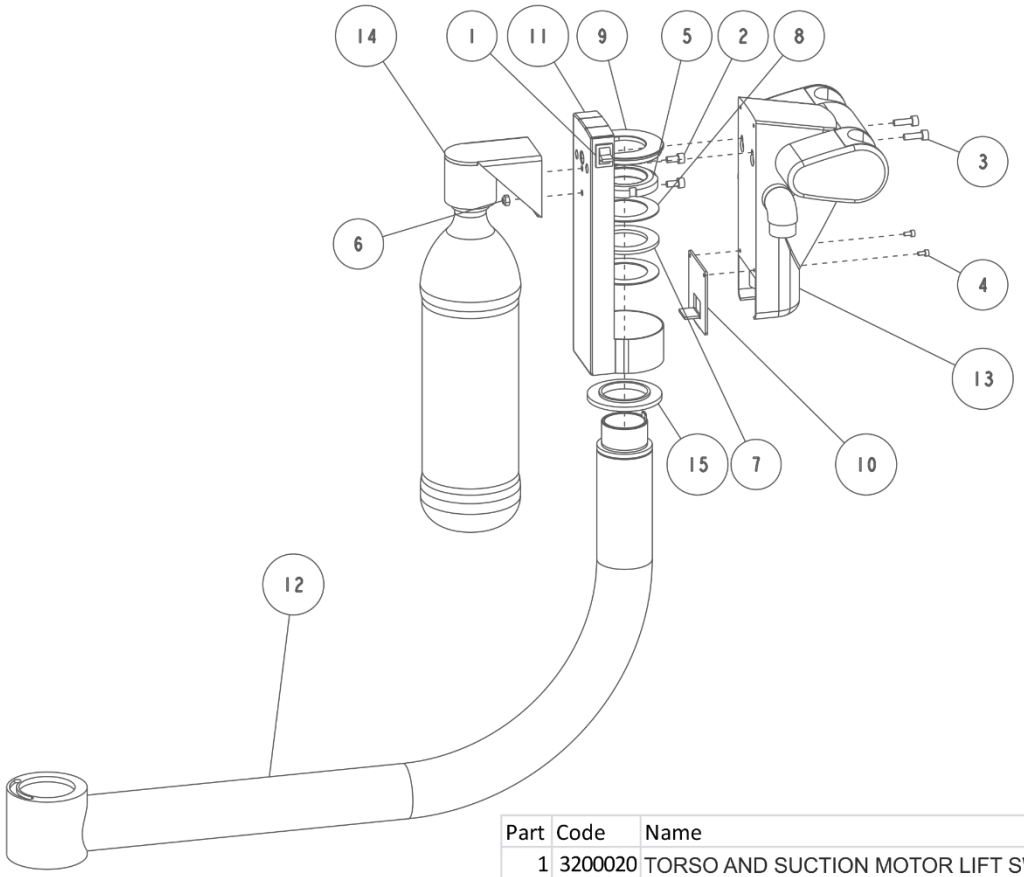
Part	Code	Name	QTY
1	5000040	ALLEN SCREW ISO 7390 AISI 304	2
2	5001070	ALLEN SCREWI M8X25 DIN912	8
3	5200137	SPRING PLATE M8 DIN 127	8
4	6001410	SLEDGE WJ200UM-01-16 DRYLIN	4
5	6420220	SLEDGE SUPPORT	1
6	6518230	SLEDGE BODY	1
7	—	SLEDGE CaRRIAGE SPACER	4

FINNDENT 9805606 Suction Arm Attachment



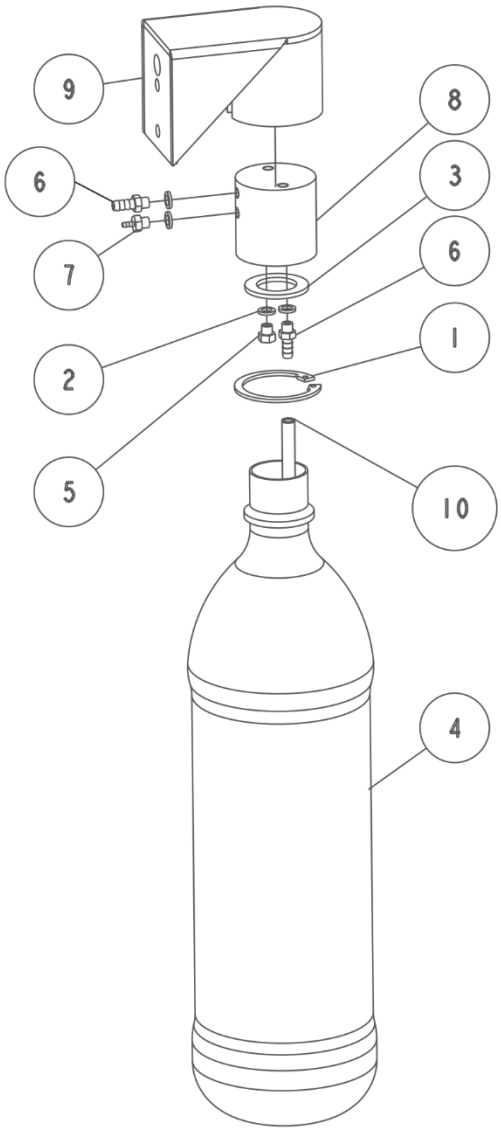
Part	Code	Name	QTY
1	5000026	ALLEN SCREW M10X25 DIN912	2
2	6104035	FURROW AXEL PIN	1
3	6804005	PHANTOM BACKREST SUPPORT FENDER	2
4	6511220	PHANTOM BRACKET FOR GAS SPRING	1
5	5000251	ALLEN SCREW M8 X 16 DIN912	6
6	5000042	ALLEN SCREW M5x8 ISO 7380	8
7	6902205	PHANTOM FIXING BODY	1
8	5000029	ALLEN SCREW DIN912 M6 X 6	3
9	5000025	SCREW DIN7981 3,5 X 6,5	2
10	6511305	PHANTOM COVER PLATE	1
11	6311350	FASTENING SOCKET FOR SUCTION ARM	1
12	6809680	PLASTIC BEARING FD-8000	1
13	6000015	BEARING BALL Q6, RB-6/G20W	1
14	9805521	PHANTOM SUCTION ARM ASSEMBLED	1
	-	–	

FINNDENT 9805521 Phantom suction arm assembled



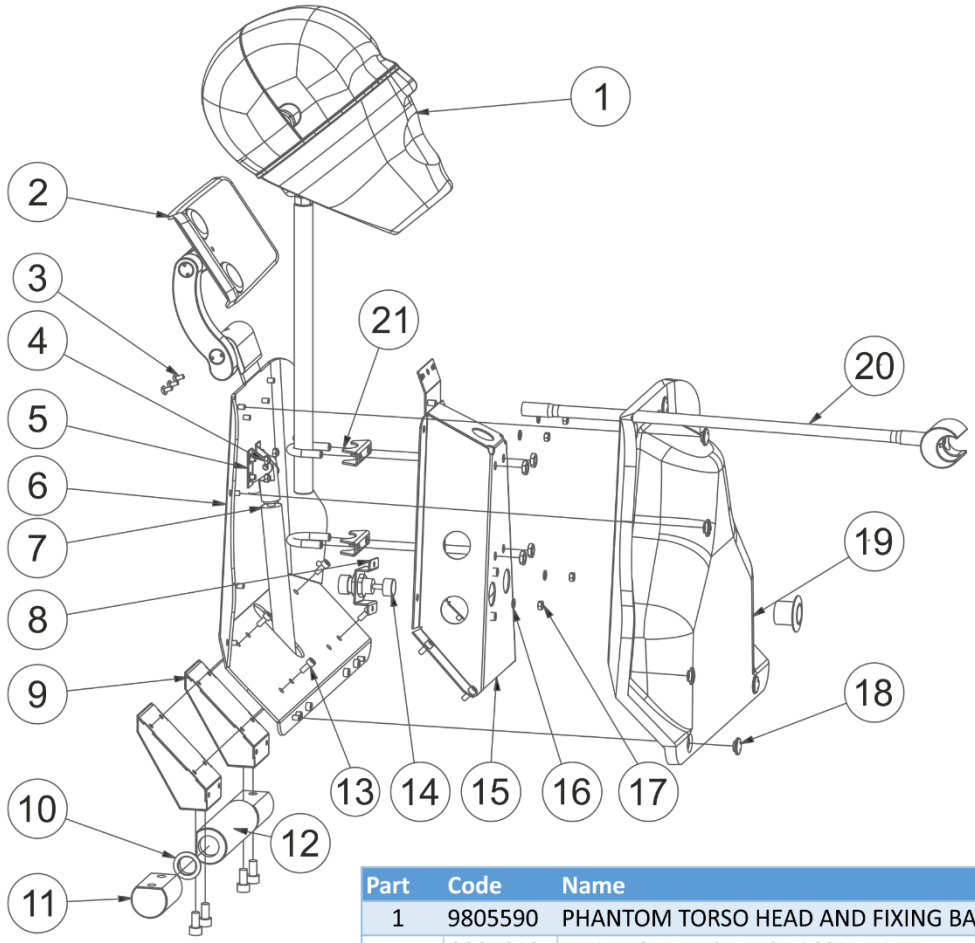
Part	Code	Name	Qty
1	3200020	TORSO AND SUCTION MOTOR LIFT SWITCH	1
2	5000010	ALLEN SCREW DIN912 M5X10	2
3	5000020	HEX SCREW CYLINDRICAL HEAD M5 X 16 DIN912	2
4	5000408	ALLEN SCREW M3 X 6 DIN 912	2
5	5100020	AXIS NUT KM 8	1
6	5100060	NYLOCK NUT M5 DIN985	2
7	5400008	PRESSURE BEARING AXK 4060	1
8	5400011	PRESSURE PLATE AS4060	2
9	6204035	COVER PLATE FOR DÜRR COMFORT HOLDER	1
10	6420150	SUCTION ARM UPPER STOPPER	1
11	6511011	DÜRR HOLDER PLATE	1
12	6900360	SUCTION ARM, TUBE	1
13	8900294	Suction hose holder comfort	1
14	9805595	PHANTOM BOTTLE ON SUCTION ARM ASSEMBLED	1
15	6809900	BOX BEARING FD-8000	1
	4801460	Q900 J13 to Durr Comfort Power	1
		Suction to Durr Comfort	
		Water hose from bottle to instrument bridge	
		Air hose from to water bottle	

FINNDENT 9805595 Water bottle assembled



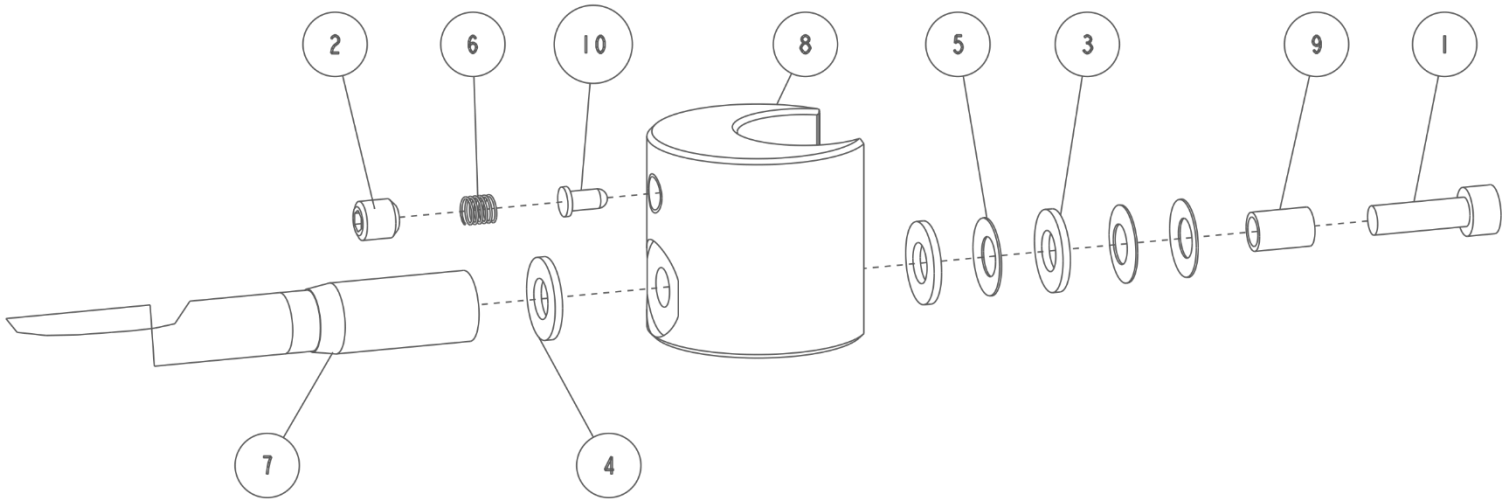
Part	Code	Name	QTY
1	5201028	RETAINING RING 38X1.5	1
2	5500216	SEALING RING M5 AVS 2661-M5	4
3	5901015	FLANGE SEALING 30 x 19 x 2	1
4	6000050	WATER BOTTLE 1,5 LTR CLEAR	1
5	6304370	AIR NOZZLE TO BOTTLE WATER FD-7000	1
6	6307940	NIPPLE 2,7/M5	2
7	6307945	NIPPLE 1,2/M5	1
8	6802010	WATER PRESSURE HEAD FD-7000/8000	1
9	6901865	BOTTLE HOLDER FD-7000	1
10	7700058	TUBE 1/4 CLEAR FOREST 0017-690	1

FINNDENT 9805606 Torso Assembly



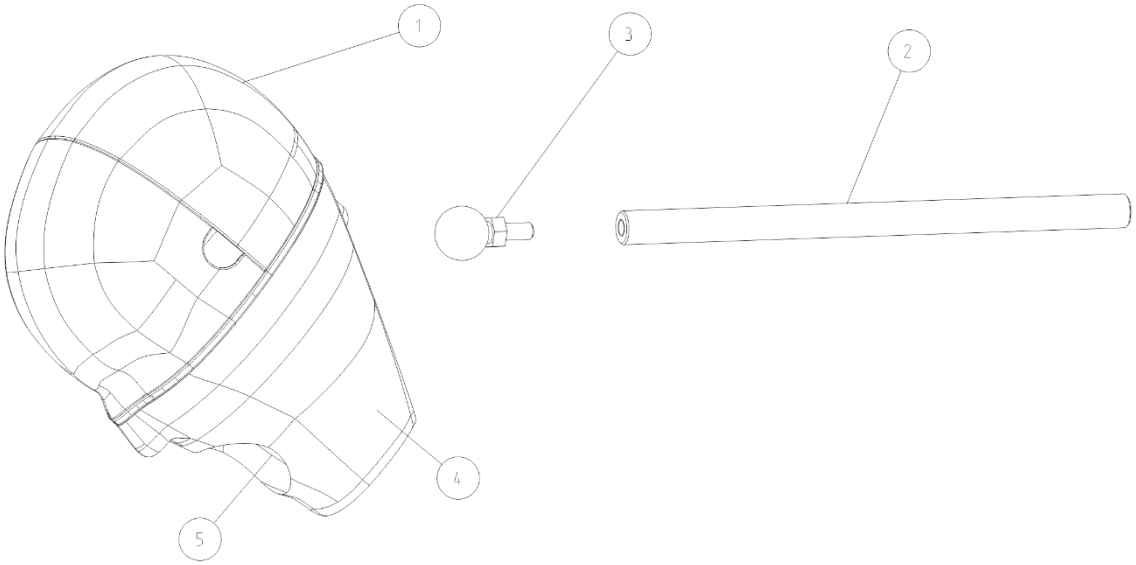
Part	Code	Name	QTY
1	9805590	PHANTOM TORSO HEAD AND FIXING BAR ASSEMBLED	1
2	9805610	PHANTOM NECK REST ASSEMBLED	1
3	5000042	ALLEN SCREW M5x8 ISO 7380	3
4	5100060	NYLOCK NUT M5 DIN985	4
5	6518215	GAS SRPRING FASTENER PLATE	2
6	6907045	PHANTOM BACK REST	1
7	5600025	GAS SPRING WOE2K-0-175-556-0XX	1
8	6518225	BUTTON SUPPORT	1
9	6907040	PHANTOM HINGE SUPPORT	2
10	5400098	SLIDING BEARING GFM-2023-7	2
11	6313005	PHANTOM BACKREST HINGE, SIDE	2
12	6313010	PHANTOM BACKREST HINGE, MID	1
13	5000019	ALLEN SCREW 912/8.8ZN M5 X 12	16
14	6001132	SNAP IN FASTENER RICHCO CS-113-3	1
15	6510210	PHANTOM BACK REST SUPPORT BASE	1
16	5200033	WASHER PLATE M5 DIN 125	4
17	5100005	HEX NUT M5 DIN934	4
18	6313095	BUTTON NUT TO PHANTOM TORSO	8
19	6800100	CHEST FRAME	1
20	9805600	PHANTOM SUCTION HOLDER ASSEMBLED	2
21	9805615	FASTENER U-SHAPE BOLT SET 26mm	1

FINNDENT 9805600 THIRD HAND SUCTION HOLDER



Part	Code	Name	QTY
1	5000023	ALLEN SCREW M6X20 DIN912	1
2	5000125	FATENING SCREW M8x8 DIN913	1
3	5200035	WASHER M8 DIN125	1
4	5201030	PLASTIC WASHER M8 DIN125 PA	2
5	5601038	DISC SPRING 16x8,2x0,4	3
6	5601039	COMPRESSION SPRING 0,4x5x10	1
7	6103105	FLEXIBLE TUBE FL-S 11/5,0 x 450 mm with M6 female	1
8	6313085	PHANTOM RACK SUCTION TUBE	1
9	6313090	PHANTOM SUCTION HOLDER BUSHING	1
10	6804025	PHANTOM MICRO PIN TO SUCTION HOLDER	1

FINNDENT 9805590 HEAD AND NECK FIXING ASSEMBLY



Part	Code	Name	QTY
1	6000200	PHANTOM HEAD PK-2 HGB 99-001	1
2	6313080	PHANTOM HEAD FIXING BAR	1
3	9805585	PHANTOM TORSO NECK NOINT	1
4	6000201	PHANTOM P-G FACE MASK	1
5	6000202	PHANTOM 1260M MAGNETIC TEETH MOUNTING PLATE	2