
2022 Megagen
Global Engineer Training
N2
The First Class

QM-QC-2022-0002

For Lifetime Smile

N2 Technical Service Manual

Version 2.0

MEGAGEN

MegaGen Implant Co., Ltd.

INDEX

For Lifetime Smile

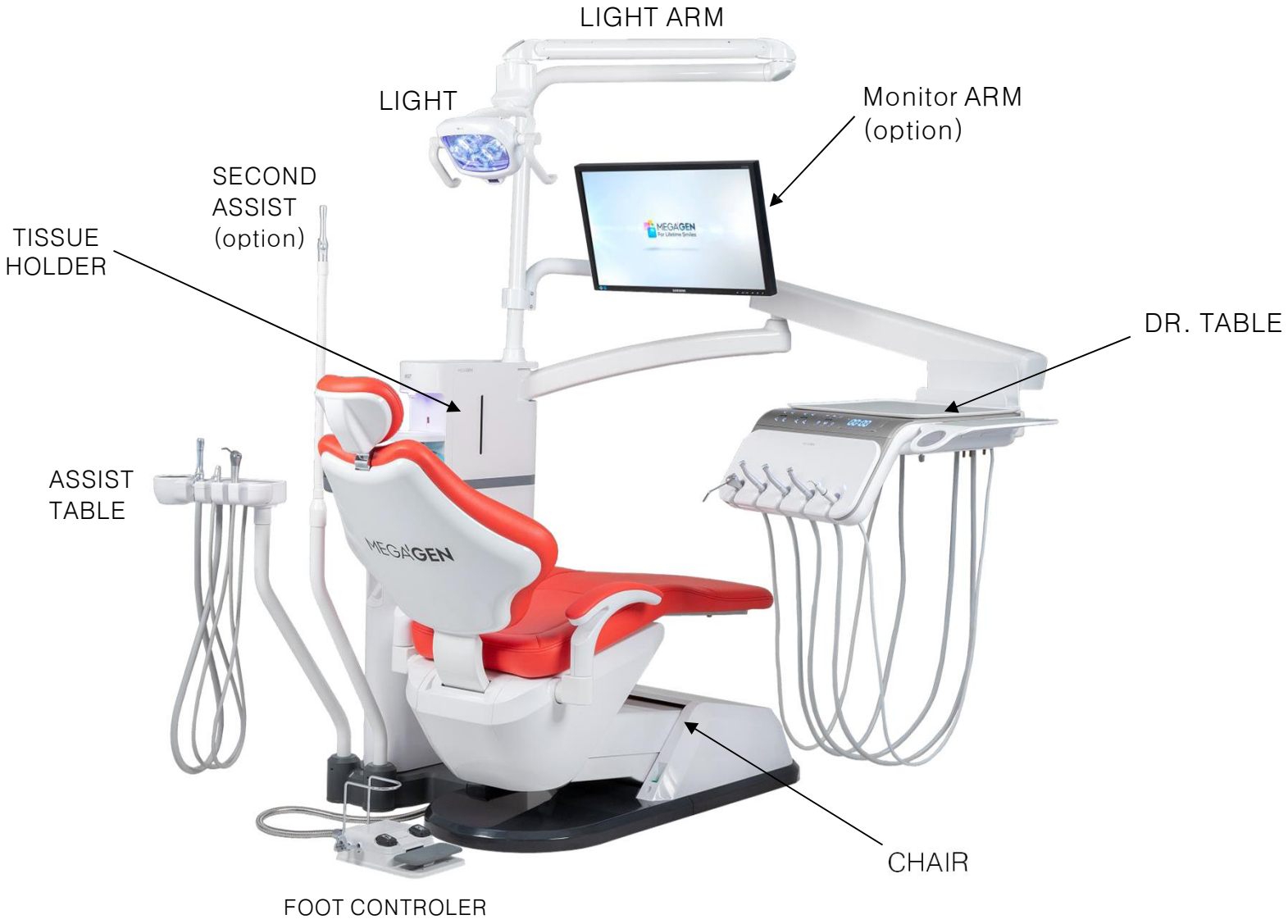
MEGAGEN

I Exterior Structure

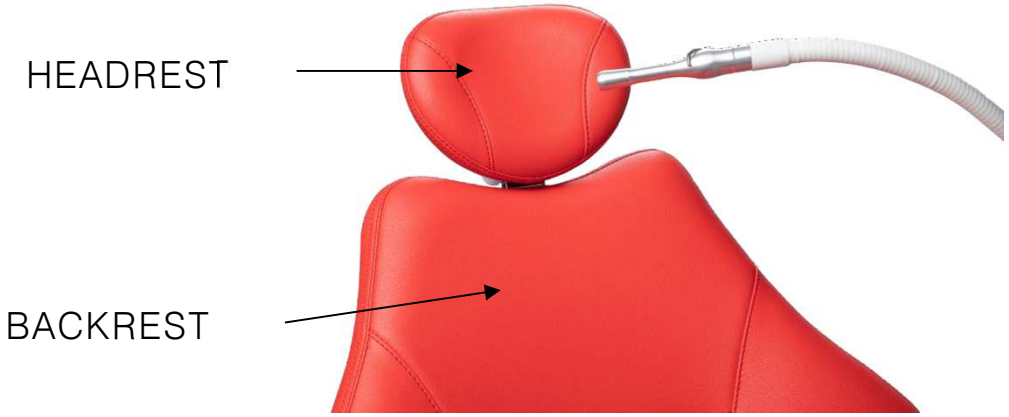
1. Unit & Chair N2
2. Patient Chair
3. Patient Unit
4. Dr. Table

MEGA'GEN

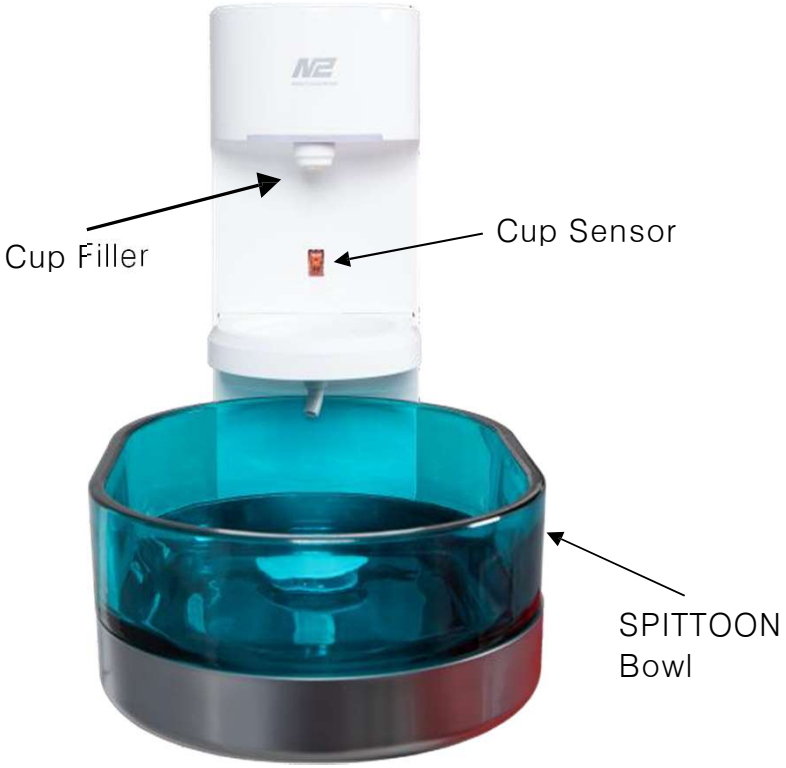
1. Unit and Chair N2



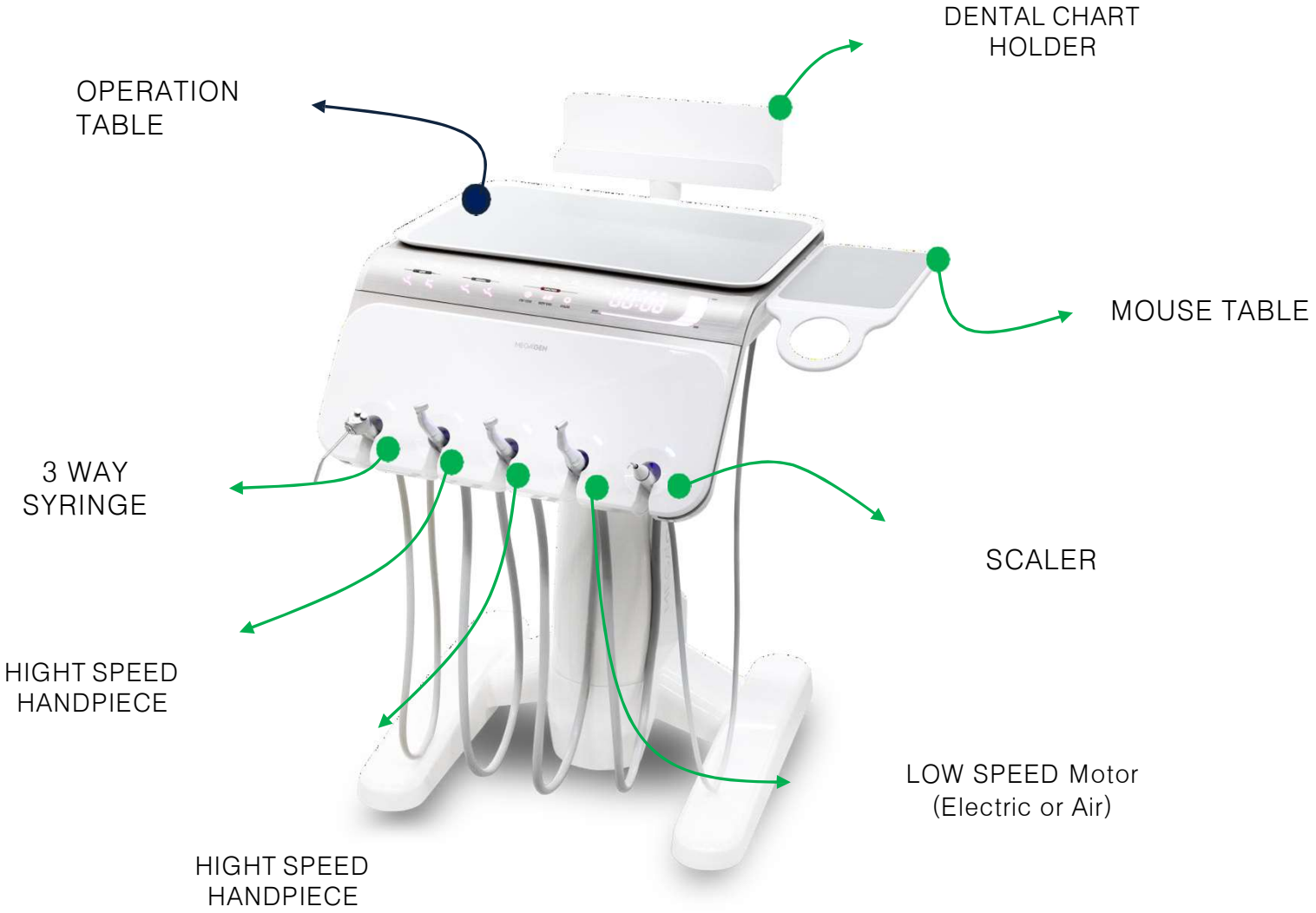
2. Patient Chair



3. Patient Unit



4. Dr. Table


DENTAL CHART HOLDER
OPERATION TABLE
MOUSE TABLE
3 WAY SYRINGE
SCALER
HIGHT SPEED HANDPIECE
LOW SPEED Motor (Electric or Air)
HIGHT SPEED HANDPIECE

Main Components

1. Chair part
2. Unit part
3. Dr. Table part

1. CHAIR Part

1.1. Chair part names and descriptions

No.	Image	Component name	Function
1		**Motor Pump**	Converts the mechanical energy supplied from the motor to compressive energy for the operating oil in the hydraulic system
2		**Cylinder**	Moves the backrest up/down by operating the piston with the pressurized oil
3		**Oil tank**	Stores the operating oil in the hydraulic system
4		**Solenoid valve**	When electricity flows through the coil, the plunger goes up and the valve is opened; if electricity is cut off, the valve is automatically closed by the weight of the plunger Controls the ascending/descending speed of the chair and its backrest

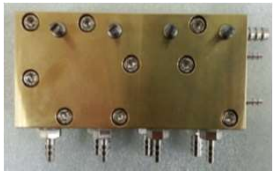
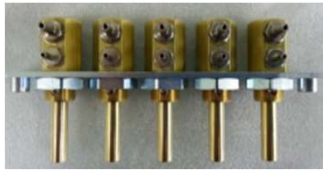
2. UNIT Part

2.1. Unit part names and descriptions

No.	Image	Component name	Function
1		**Water Filter**	Filters out foreign substances in the water
2		**Water Solenoid Valve**	Opens and closes the water outlet based on the electrical signal
3		**Warmer**	Warms the cold water for the patient to gargle
4		**Air Regulator**	Adjusts and reduces the air pressure coming from the outside

3. DR.TABLE Part

3.1. Table part names and descriptions

No.	Image	Component name	Function
1		**Solenoid valve-4**	Opens and closes the air supply tube based on the electric signal ➔ controls master block
2		**Master Block**	Distributes water and air to the handpiece and scaler
3		**Water Cutter Valve**	Controls the amount of water supplied to the device (handpiece, scaler, 3 way syringe)
4		**Water valve**	Controls valve(open & close) of water supplied to the device (handpiece, scaler)

Mechanical operating principle

1. Hydraulic System
2. Air System
3. Water System

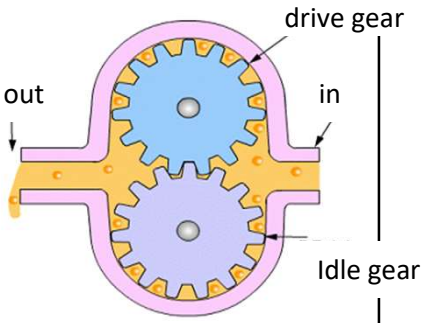
1. Hydraulic System

1.1. Hydraulic Motor Pump

- Main components of Hydraulic system #1

- **Converts the mechanical energy** supplied from the outside **to compressive energy** for the operating oil in the hydraulic system

- Hydraulic system plays the role of controlling chair motions as intended by the operator such as moving the chair and backrest seat up only(**not down**)

Gear motor operating principles	Product image	Features
		• Simple structure, low cost • Breakdowns from foreign substances in the hydraulic oil are rare • Short use life due to heavy load on the bearing • Heavy variation in torque

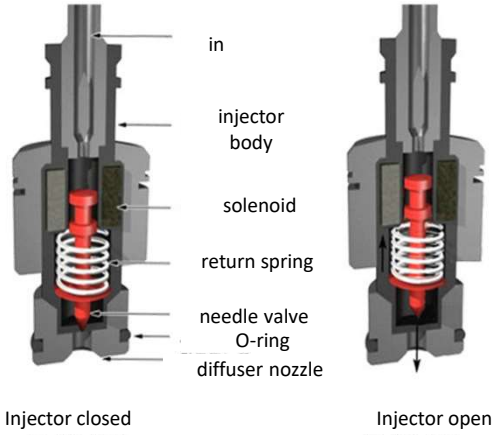
<Hydraulic pump description>

1. Hydraulic System

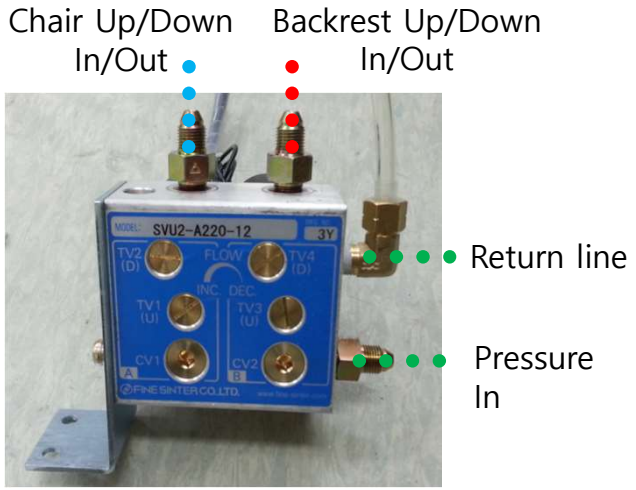
1.2. Hydraulic Solenoid Valve

- Main components of Hydraulic system #2

- When electricity flows through the coil, the plunger goes up and the valve is opened; if electricity is cut off, the valve is automatically closed by the weight of the plunger.
- Controls the ascending/descending speed of chair and backrest seat



<Hydraulic solenoid valve description>



<Chair operating solenoid valve>

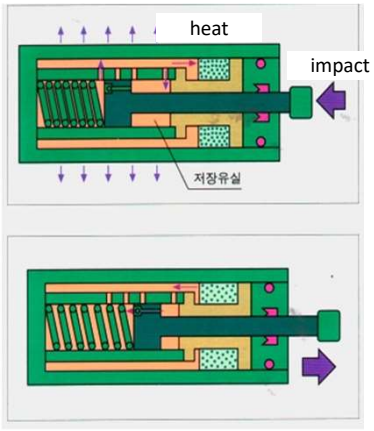
1. Hydraulic System

1.3. Hydraulic Cylinder

- Main component of Hydraulic system #3

- **Pressurized oil delivers the energy** to a power unit such as a piston to operate the device

- Currently a single acting hydraulic cylinder is applied to the hydraulic system of the N2 unit chair

Operating principles	Product image	Features
		• Features a single oil port, and operates unilaterally. • Backward stroke is achieved by gravity or spring force. • Saves power and is used for press or simple operating device

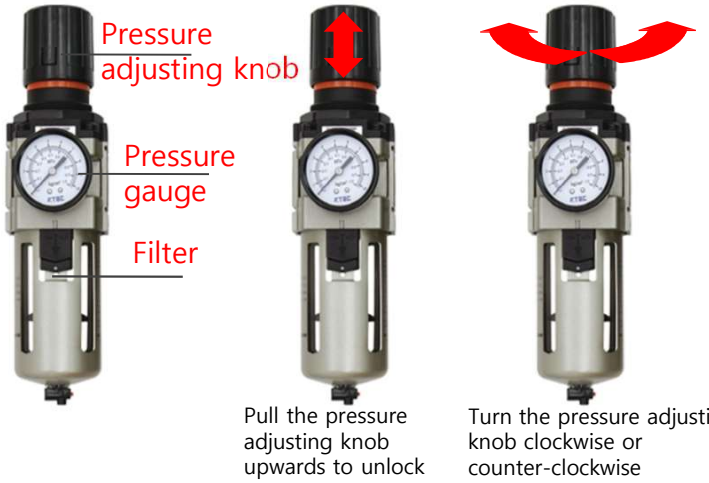
<Single acting hydraulic cylinder description>

2. Air System

2.1. Main Air Regulator

- Main components of air system #1

- Sets and adjusts the air pressure
- Adjusts the volume of air flowing inside the unit and controls the air pressure for each device

Product image and configuration	Features
	**Pressure adjusting knob** • Adjusts the pressure of outside air flowing in the unit **Pressure gauge** • Checks the pressure of outside air flowing in the unit **Filter** • Removes moisture in the outside air flowing in the unit

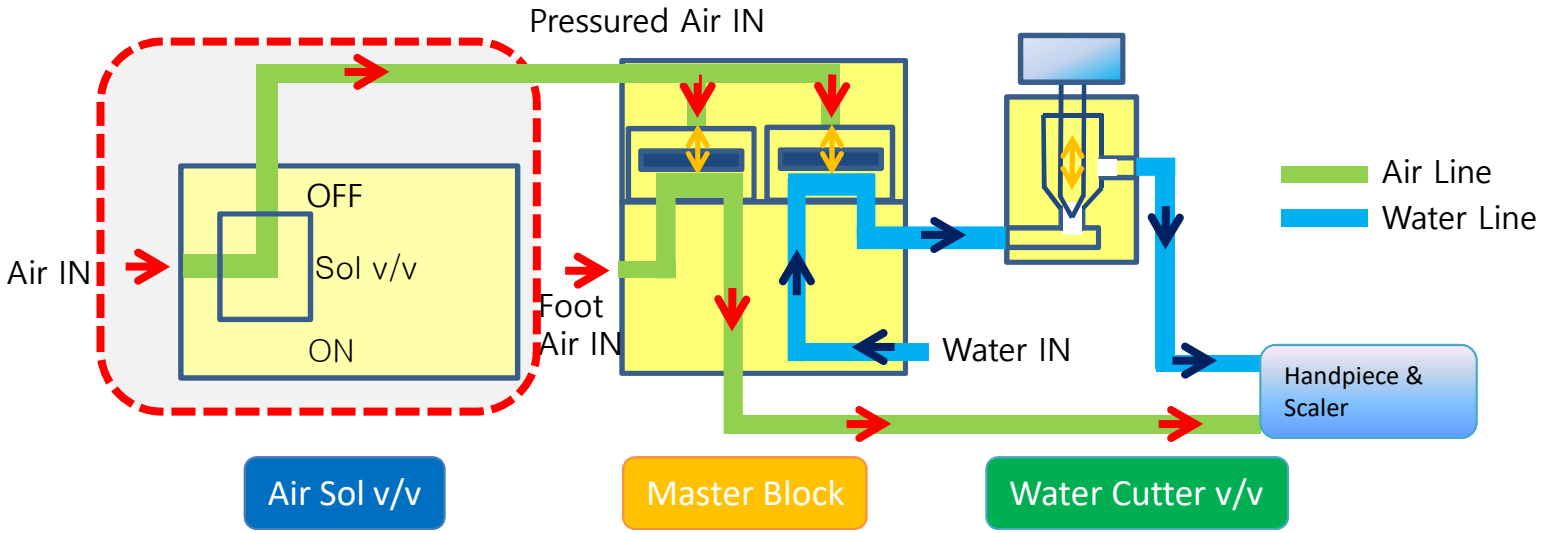
<Air Regulator description>

2. Air System

2.2. Solenoid Valve

- Main components of air system #2

- Opens/closes the air supply line through electrical signals
- Operates for each part, such as hand-piece or scaler



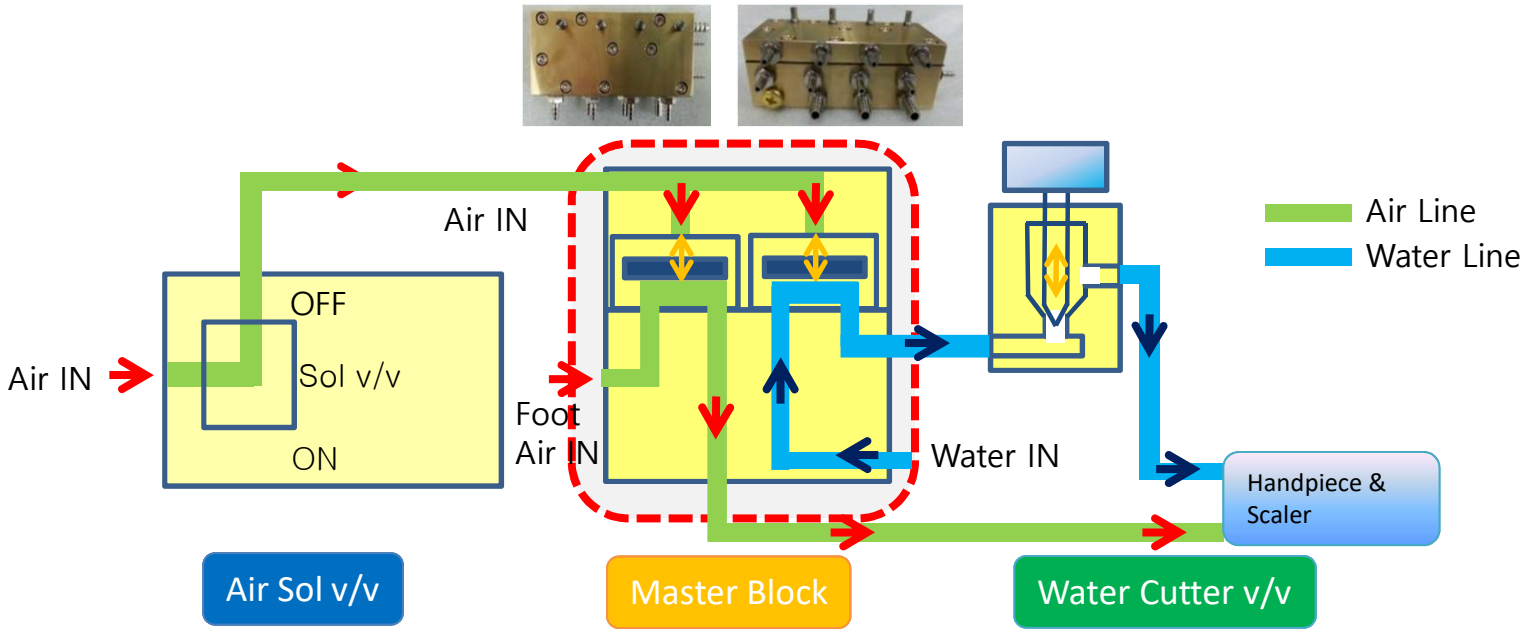
<Solenoid Valve description>

2. Air System

2.3. Master Block

- Main components of air system #3

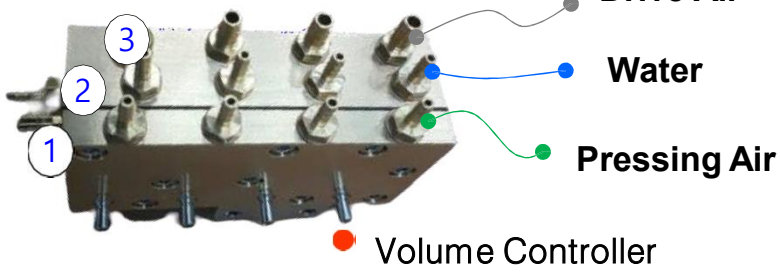
- Supplies water/air to the hand-piece or scaler; easy to control the supply volume
- It's made of brass which is corrosion resistant and highly durable



<Water Cutter Valve description>

2. Air System

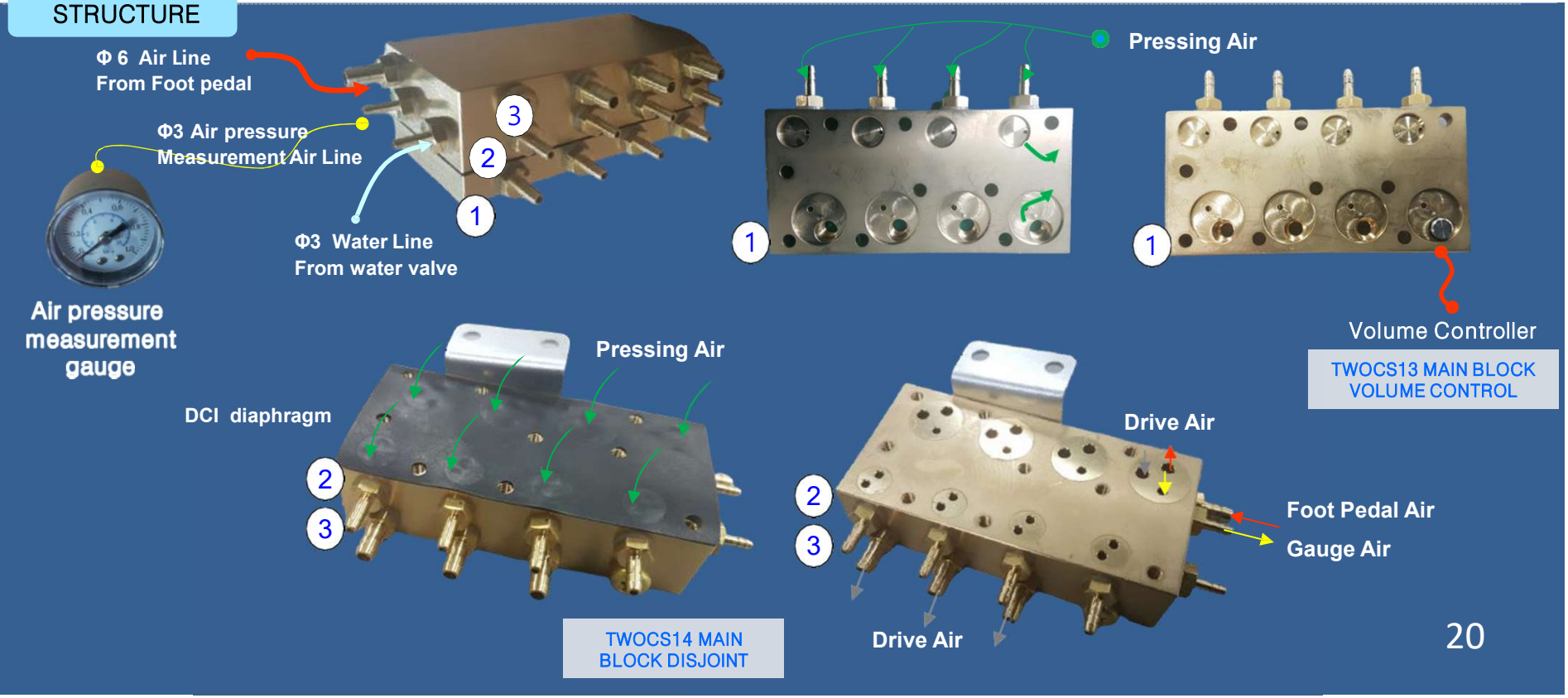
MASTER BLOCK



It is a component called 'main block' in the unit chair industry(Originally called as ‘double handpiece block’) It distributes air, chip air, and water to the handpiece.

The volume controller at dr. table’s right bottom can adjust air or water volume, and air pressure can be controlled by between 2.5kg/cm2 ~ 3.5cm2.

STRUCTURE

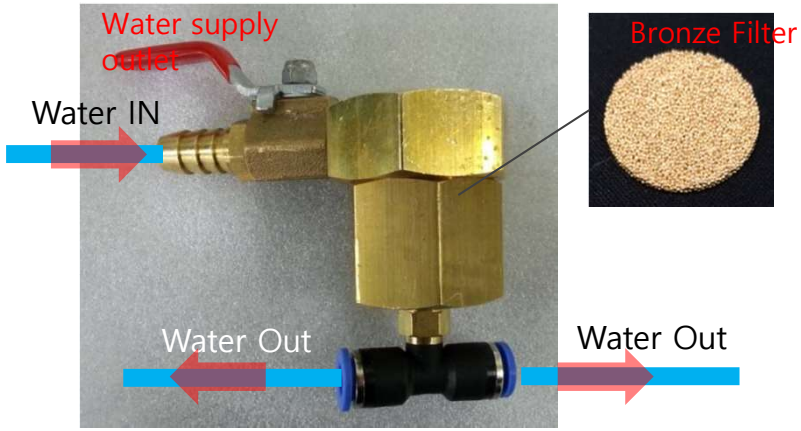


3. Water System

3.1. Main Water Filter

▪ Main components of water system #1

- Filters foreign substances from the water supplied from the outside
- Water filter is needed to ensure patient hygiene at the time of treatment and prevent damage to the device by foreign substances

Product image and configuration	Features
	**Bronze Filter** • Removes impurities in the liquid at temperatures ranging from high temperature to extremely low temperature using a filter to enable the mixture of liquids • Applied to remove impurities in the highly viscous liquid, liquid metal or general gas or vapor.

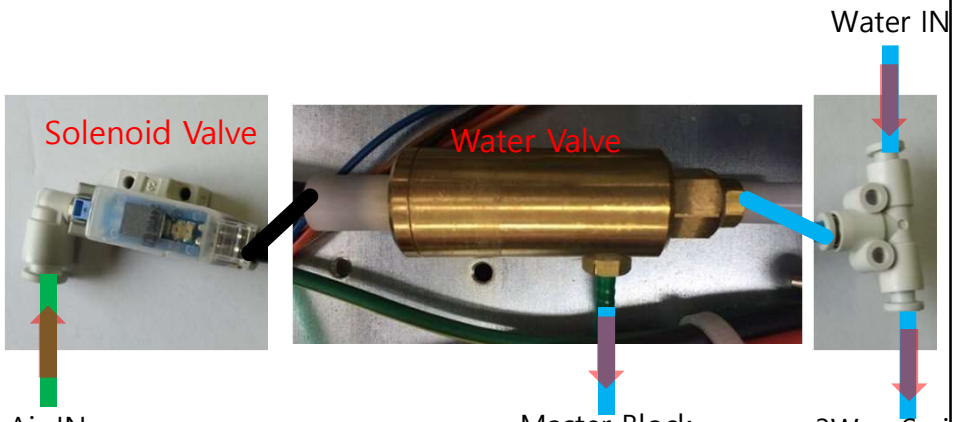
<Water Filter description>

3. Water System

3.2. Water Valve

▪ Main components of water system #2

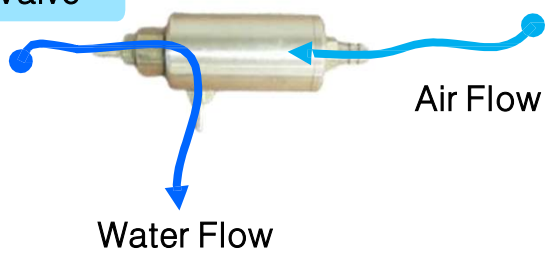
- Controlled by electrical signal; opens/closes the water valve by using the air
- Supplies required water to devices such as hand-piece or scaler

Product image and configuration	Features
	**Water Valve** • Although it is possible to open/close the water supply line manually, a solenoid valve is installed to enable automatic opening and closing by electrical signals

<Water Valve description>

3. Water System

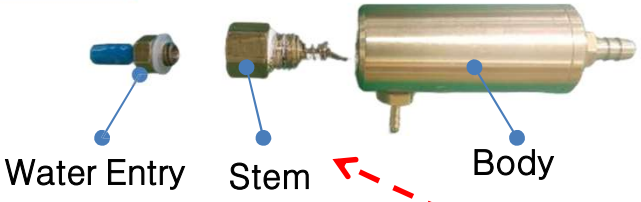
Water Valve



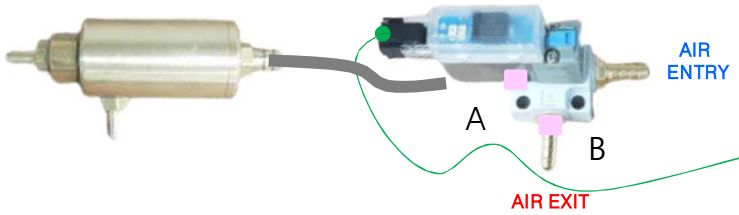
Water Relay Block is the device, which opens or closes water way going into Handpiece or Scaler with the stem. Plus, it has the core function. Water Relay Block sucks in the remaining moisture in water tubing after handpiece use.

When you do a maintenance to Water Relay Block, please remember that you only remove the extra particles in Water Relay Block. If the stem is damaged, whole Water Relay Block should be replaced due to its sharpness.

Structure



Solenoid Valve (for Water Relay Valve)



A: When A is open, air gets in and water is supplied.

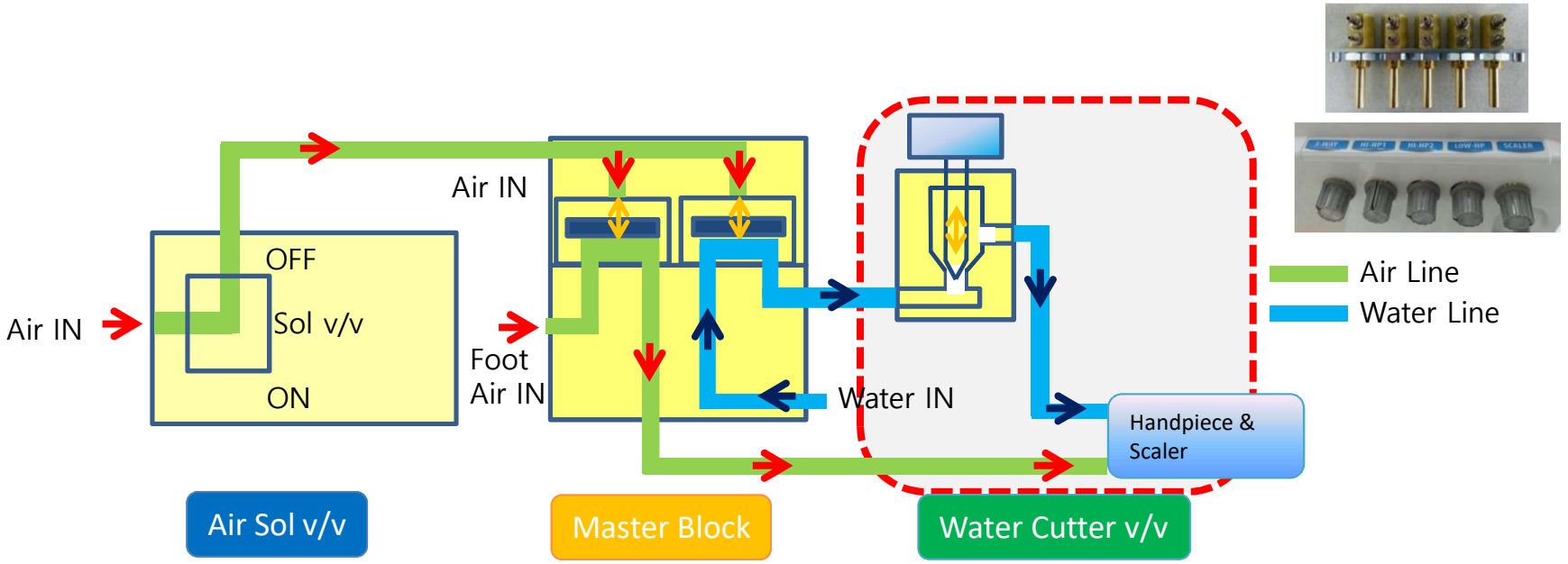
B: When A is closed, air goes out to B and water is blocked

3. Water System

3.3. Water Cutter Valve

- Main components of water system #3

- Water is supplied to the water cutter valve and controls the water volume supplied to the scaler and hand-piece
- Knob-type adjuster can be easily used to control the water supply volume



<Water Cutter Valve description>

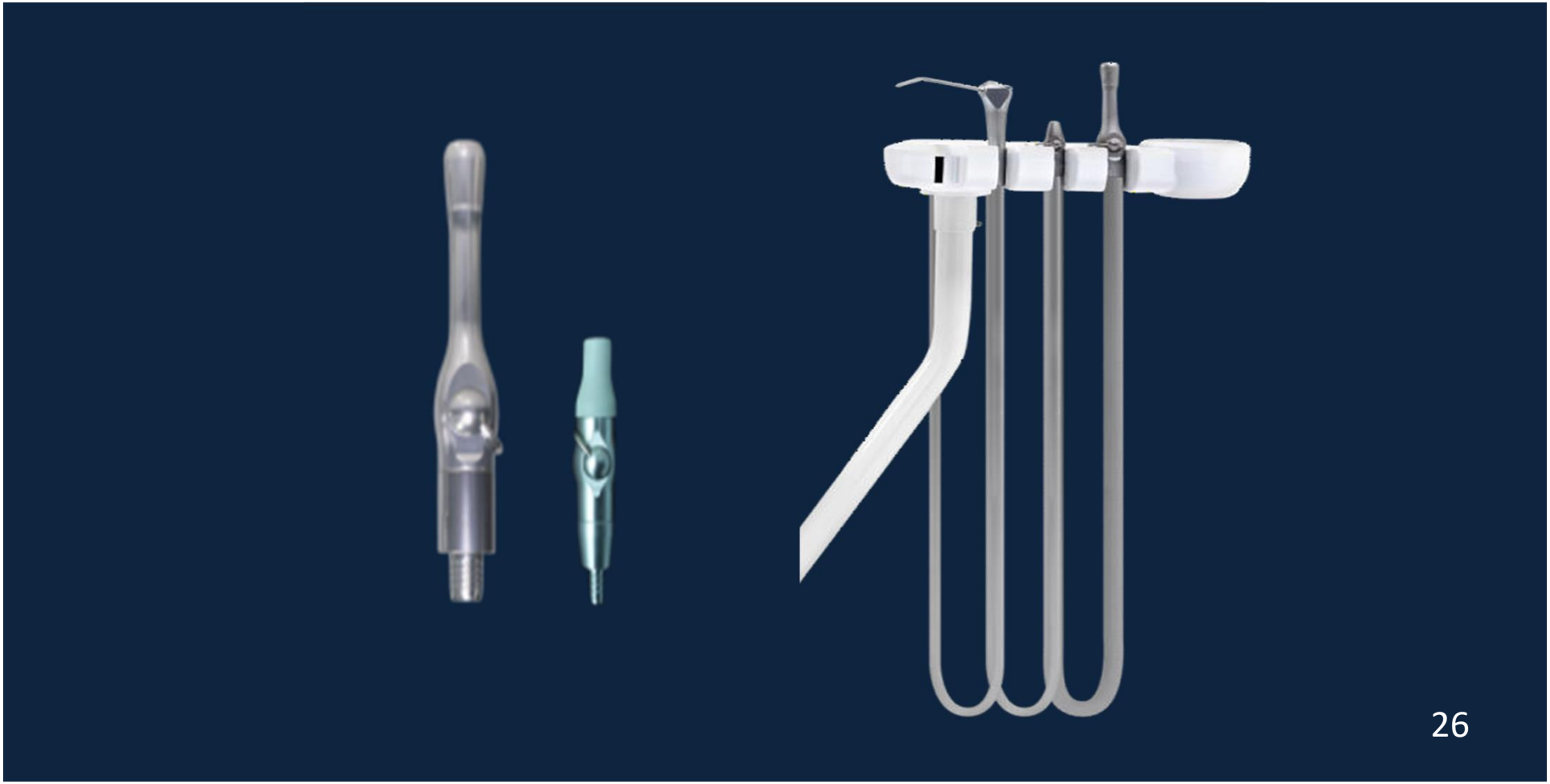
Suction System

1. HVE & Saliva Ejector
2. Second Assist Suction

1. HVE & Saliva Ejector

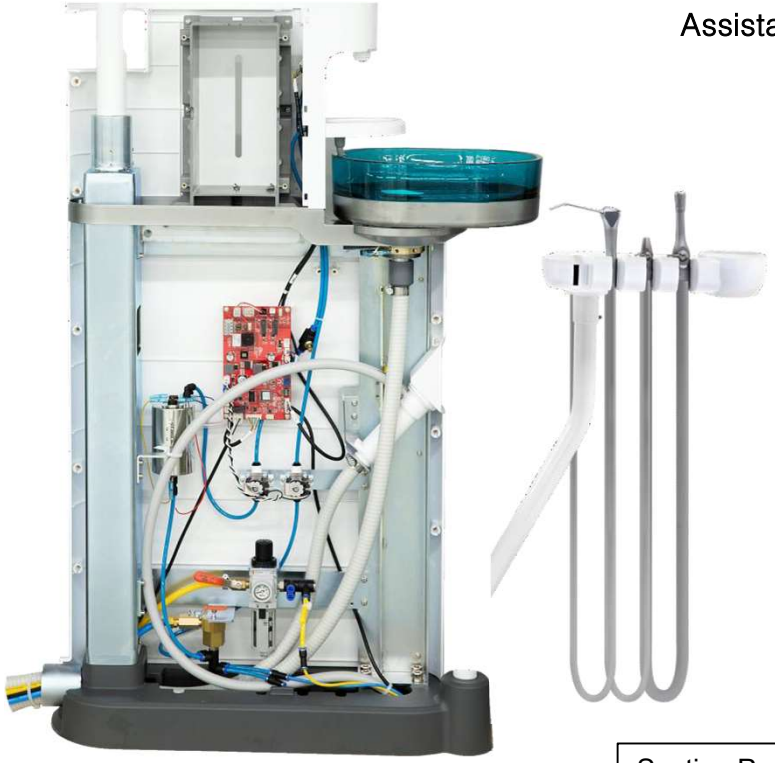
1.1 Unit Part

1.2. Assist Table Part



1. HVE & Saliva Ejector

Suction Motor



UNIT

Assistant Table

- Specification Anodized aluminum body
Easy removal lever & spool valve assembly
Resistant to cleaning solutions
All components are autoclavable (within 135℃)
Two hose nipple type (long/short)
Size&Weight:
L) Ø25×138mm, 72g (Nipple: 44mm)
S) Ø25×145mm, 62g (Nipple: 31mm)

SVE

HVE

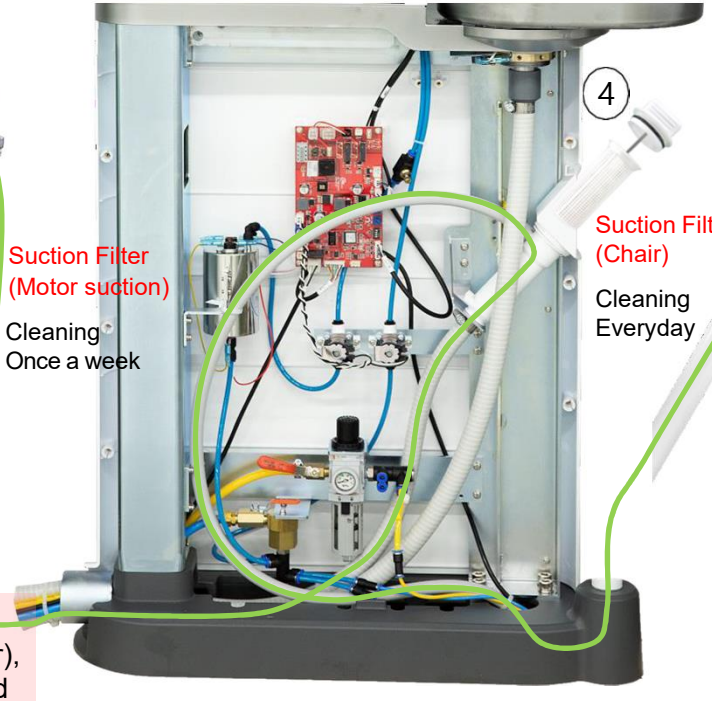
Suction Power: 0.25ℓ/min Vacuum Power: 120mmHG	Suction Power: 2.0ℓ/min Vacuum Power: 120mmHG

Wet-type suction motor has 320 L/min suction power and can supply pressed air 3 unit chairs.
SVE(saliva ejector) is used when a patient cannot breathe due to full mouth with abundant saliva during surgery.
High vacuum ejector(HVE) is used to suck large particle at once during surgery.

N2 has the option 'Second Assi', which holds HVE & SVE at the desired position without any staff's hand. Once 'Second Assi' is installed, you don't need to hold HVE & SVE during your surgery.

1. HVE & Saliva Ejector(Unit Part)

⑤ **Suction Motor**



Suction Filter
(Motor suction)

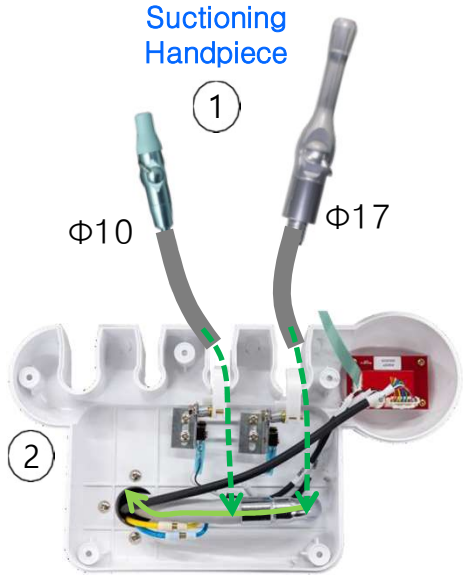
Cleaning
Once a week

Suction Filter
(Chair)

Cleaning
Everyday

UNIT

2. Assistant Table
After Φ16&10 suction hose, suction power is connected to HVE & SVE



5. Suction Motor
Via the suction filter (motor), the extra material is filtered again.
All other suctioned materials are drained out.

4. Suction Filter
It filters out the foreign material through the suction filter (chair) and it connects to Φ 24.5 hose.

3. Assistant Table
Via Φ17&10 suction hose, suction power is moved to assistant table.

1. HVE, SVE
Suction Power:
More than 2.0ℓ/min(HVE),
More than 0.25ℓ/min(SVE)

※ Important
Suction Filter (Chair)
1 time cleaning everyday

Suction Filter (Motor)
1 time cleaning every week

1. HVE & Saliva Ejector(Assist Table Part)

SIGNAL

i. Limited SW A

ii ASSI PCB B

iii. UNIT PCB C

iiii. SUCTION MORTOR

C

Signal Line to Suction motor

UNIT PCB

① When the suction is activated, the light will come up; Whether suction is working or not can be found out by this lights flicking.

TWOCS3 Suction Lamp

② Adjusting the limited switch is needed when the limited switch is not properly working.
Please kindly refer to video TWOCS4'.

TWOCS4 Limited Switch Readjustment

Membrane Connected

B Assist PCB

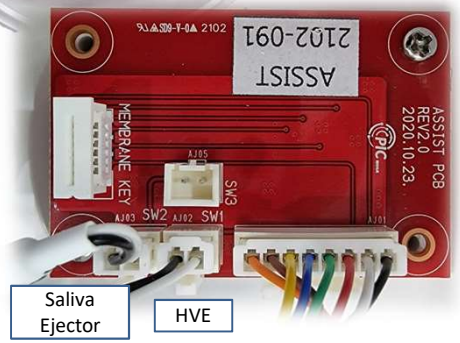
Limited Switch 1,2 - Assist PCB, Signal Movement

Assist PCB-Unit PCB, Signal Movement

Limited Switch[2] (SVE)

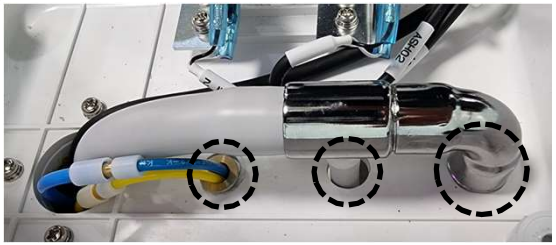
A

Limited Switch [1] (HVE)



Saliva Ejector

HVE



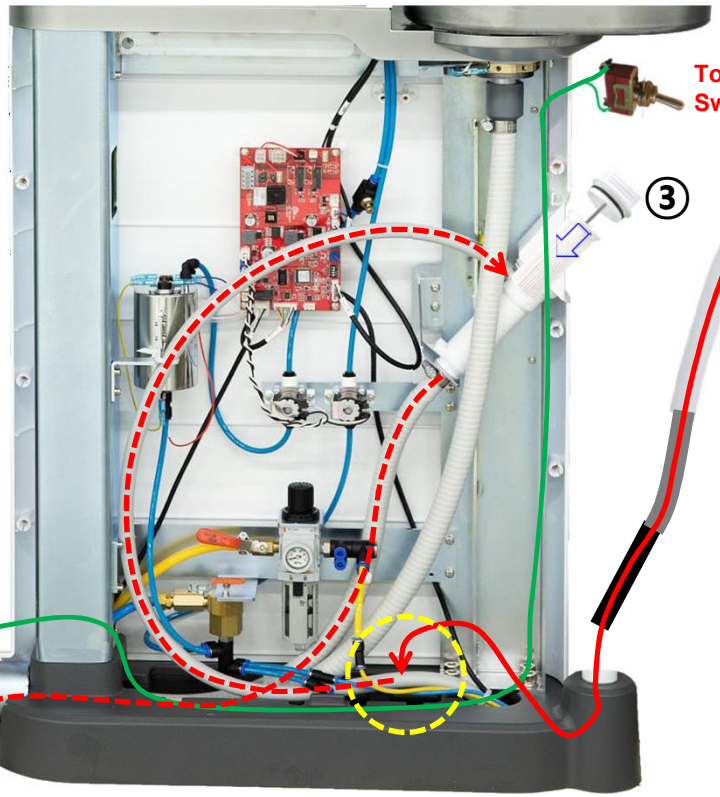
2. 2nd Assist Suction

2.1 Unit Part

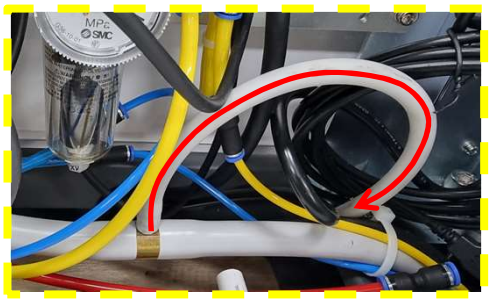
2.2. Assist Table Part

2.1 Unit Part

Suction Motor



UNIT



4. Suction Motor
Via the suction filter, the extra material is filtered again.
All other suctioned materials are drained out.

A. The suction switch line is connected to the toggle switch, with which a staff turns ON/OFF the suction power.

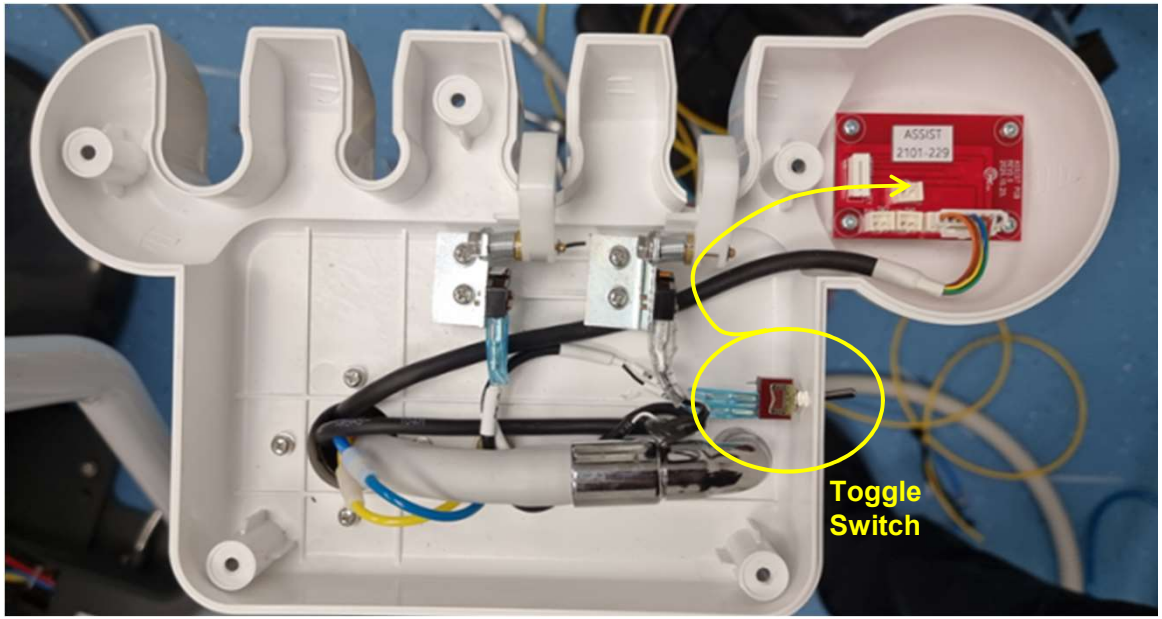
3. Suction Filter
It filters out the foreign material through the suction filter and it connects to Φ 22 hose.

2. 2nd Assi Pipe
Via Φ10 suction hose, suction power is moved to assistant table.

①

1. HVE, SVE
Suction Power :
More than 1.8ℓ/min(HVE),
More than 0.16ℓ/min(SVE)

2.2 Assist Table Part



SIGNAL

i. Toggle SW

↓

ii ASSI PCB

↓

iii. UNIT PCB

↓

iiii. SUCTION MORTOR

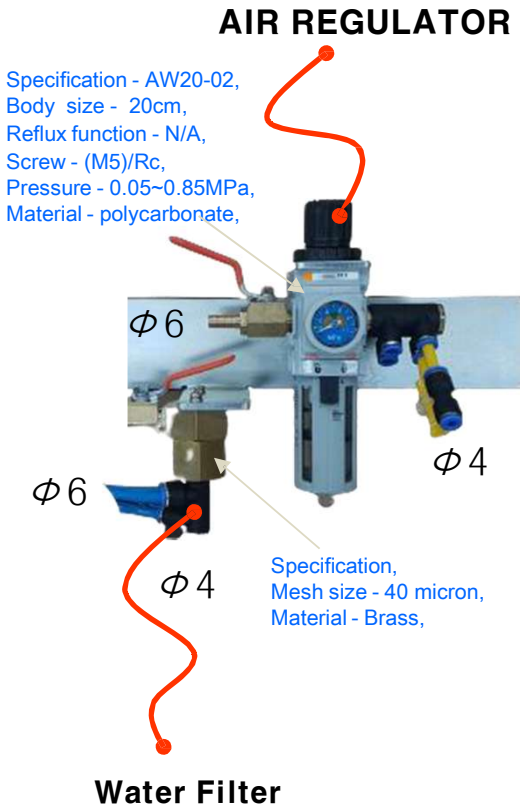
Water & Air Supply System

1. Unit Part
2. Dr. Table Part

1. Unit Part

1.1. Main Water and Air supply
1.2. 3-Function syringe
1.3. Water Supply System
1.4. Warmer Operation Principle

1.1. Main Water and Air supply



▶ Air Regulator

The device changes the air pressure 6~8bar into 4.5~5bar

Its role is filter.
In a process of supplying the compressed air to N2
1) The air which has moisture or
2) The damp environment makes water stacked in air compressor.
Even if the dry separator makes the pressed air as dry as possible , still water remains in compressor barrel. But the filter in regulator sorts out the remaining moisture before it goes into N2 chair.

▶ Water Filter

The device converts water pressure 2.5~4bar into 2.0bar through the filter

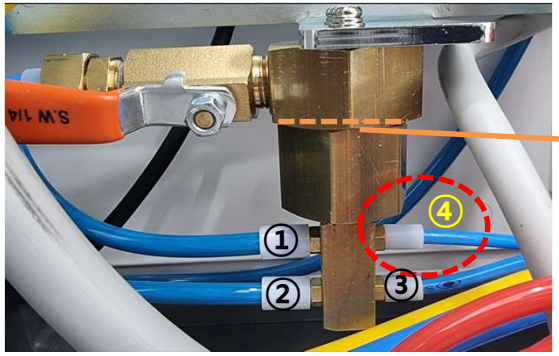
In its inside, the filter exists so clean water only get inside the Unit Chair; it prevents handpiece couplings from being clogged.

However, in areas where water quality is poor and Unit Chair is frequently used,
You should clean the brass filter every month or replace.

1.1. Main Water and Air supply

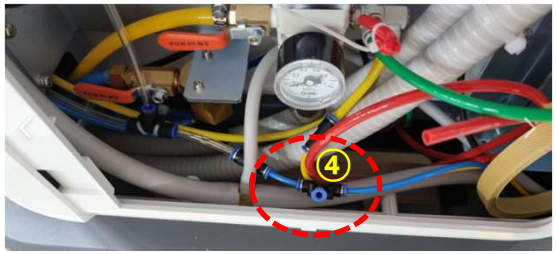
Water filter : City water is divided into 4 lines

① Auto cup gargling water : 6mm
② Spittoon rinsing water : 6mm
③ 3way syringe water for the assist table : 4mm
④ **Instruments spray water for the doctor table : 4mm**

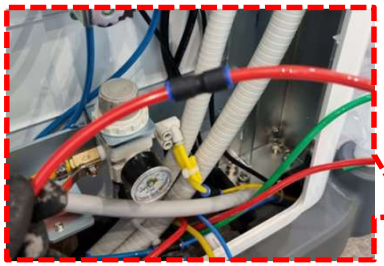


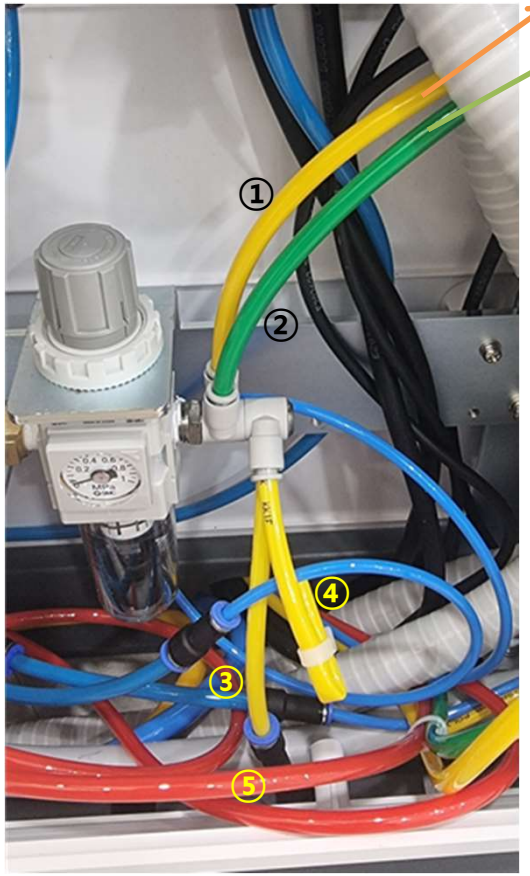
Without an water bottle

Bronze Filter



With an water bottle



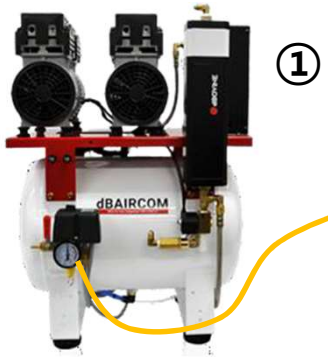


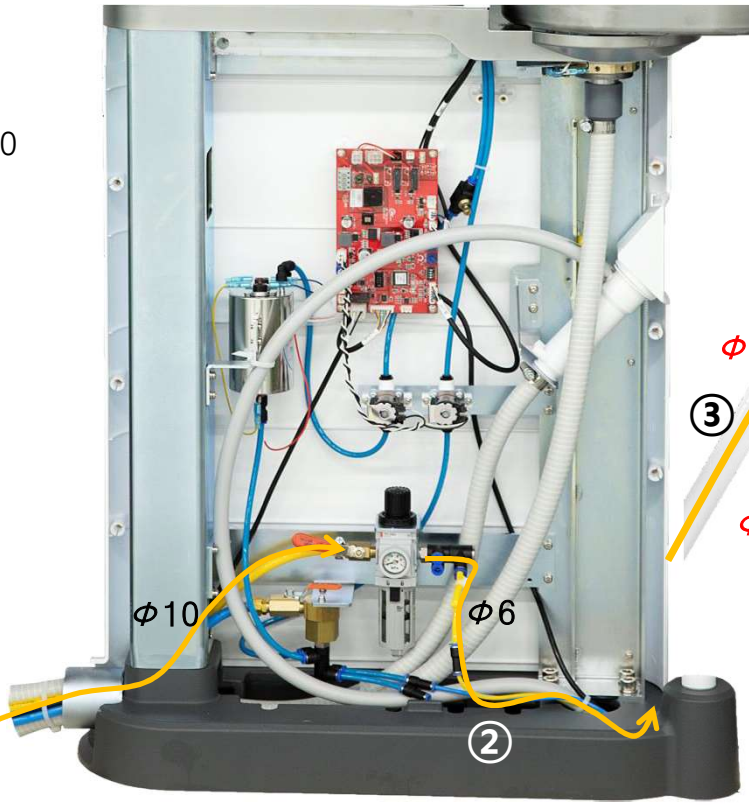
Air regulator: Compressed air is divided into 4 lines

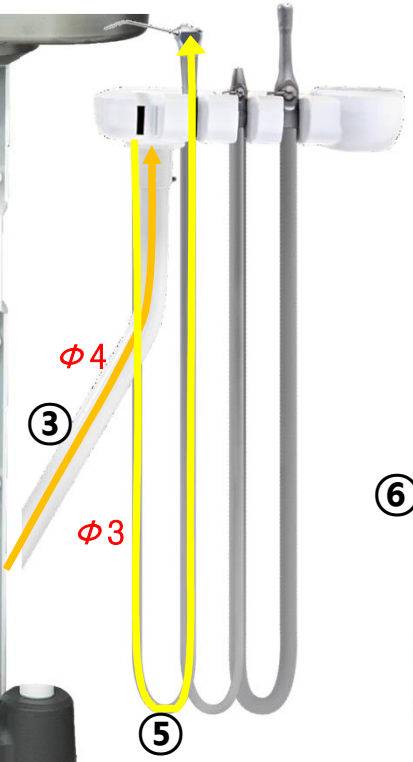
① System air for the doctor table : **Yellow 6mm**
② Turbine air for the foot control : **Green 6mm**
③ 3way syringe air for the assist table : **Yellow 6 to 4mm**
④ Spare for another device(ex, Spittoon valve) : **Yellow**
⑤ Turbine air for the instruments : **Red to Red 6mm**

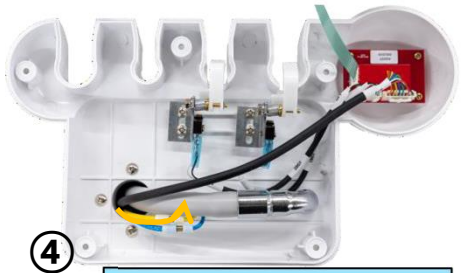
1.2. 3-Function Syringe(Air supply)

1.Air Compressor
Φ10
2. Regulator
Φ6
3. Converter
Φ4
4. Converter
Φ3
5. 3 way Syringe









4. Assistant Table
After Φ4 tubing is converted into Φ3 tubing,

6. 3 Way Syringe
After Φ 3 tubing,
syringe air is sprayed.

CS1 REGULATOR
(CONTROLLING PRESSURE)

1. Air Compressor 6~8kg/cm2 air Injects in to Φ10 tubing.
It arrives at regulator

2. Air Regulator (Pressure Reducers)
The air is converted into 4.5~5.5kg/cm2, and it moves to Φ6 tubing.

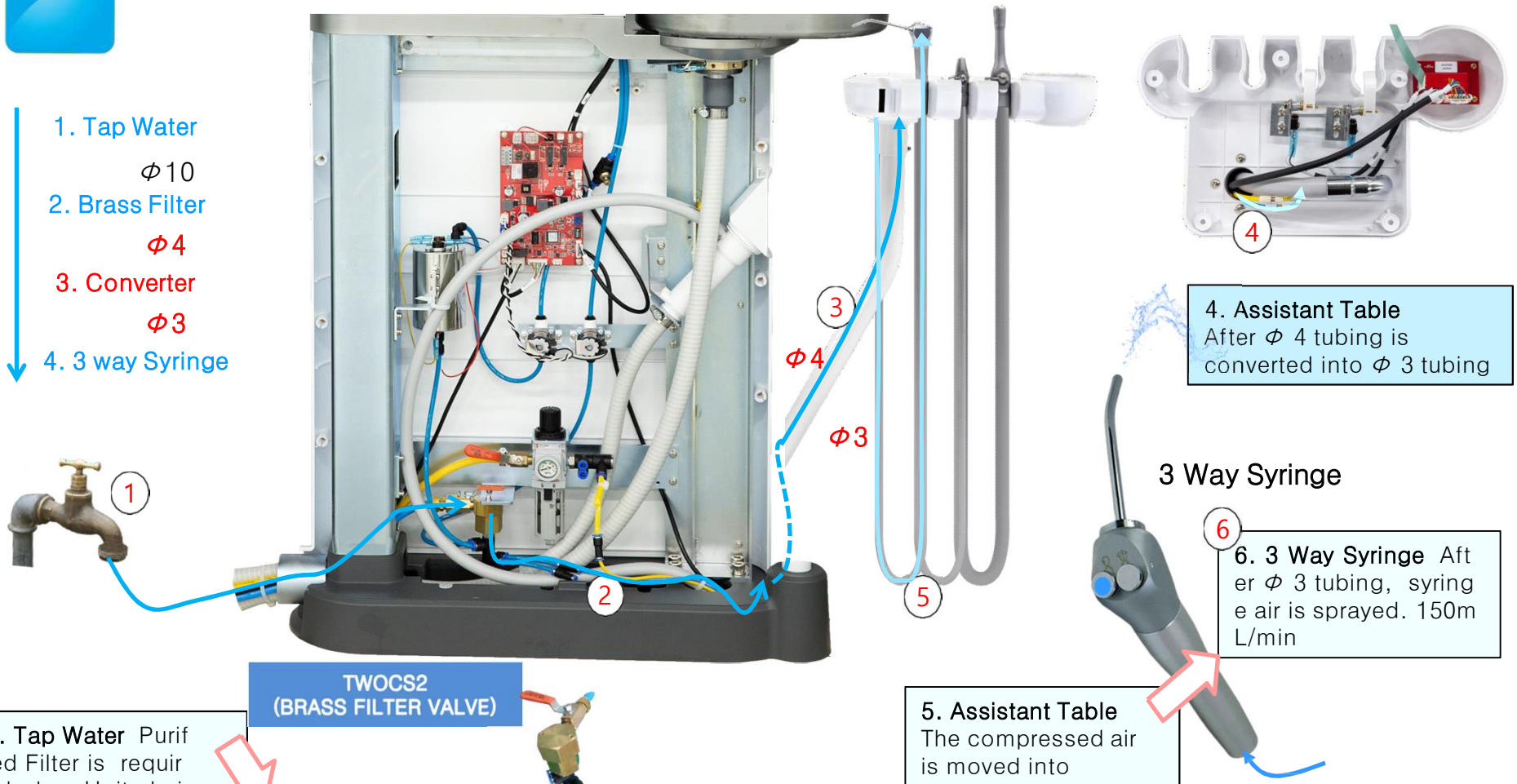
3. Assistant Table Pipe
After Φ6 tubing is switched into Φ4 tubing, the compressed air is moved into the Assist table

5. Assistant Table
The compressed air is moved into 3 way syringe hose Via Φ 3 tubing.

CS9 3WAY SYRINGE
(BUTTON CLEANING)

1.2. 3-Function Syringe(Water supply)

1. Tap Water
Φ10
2. Brass Filter
Φ4
3. Converter
Φ3
4. 3 way Syringe



4. Assistant Table
After Φ 4 tubing is converted into Φ 3 tubing

6. 3 Way Syringe After Φ 3 tubing, syringe air is sprayed. 150m L/min

TWOCS2
(BRASS FILTER VALVE)

1. Tap Water Purified Filter is required when Unit chair is Installed. 2.5~4kg/cm2 water is needed for chair operation. It goes through Φ10 tubing.

2. Water Filter
Via the brass filter, The extra particle is impurified.
Water pressure becomes 2.5 kg/cm2.

3. Assistant Table Pipe
After Φ4 tubing is switched into Φ4 tubing, The compressed air is moved into the Assist table

5. Assistant Table
The compressed air is moved into 3 way syringe hose Via Φ 3 tubing

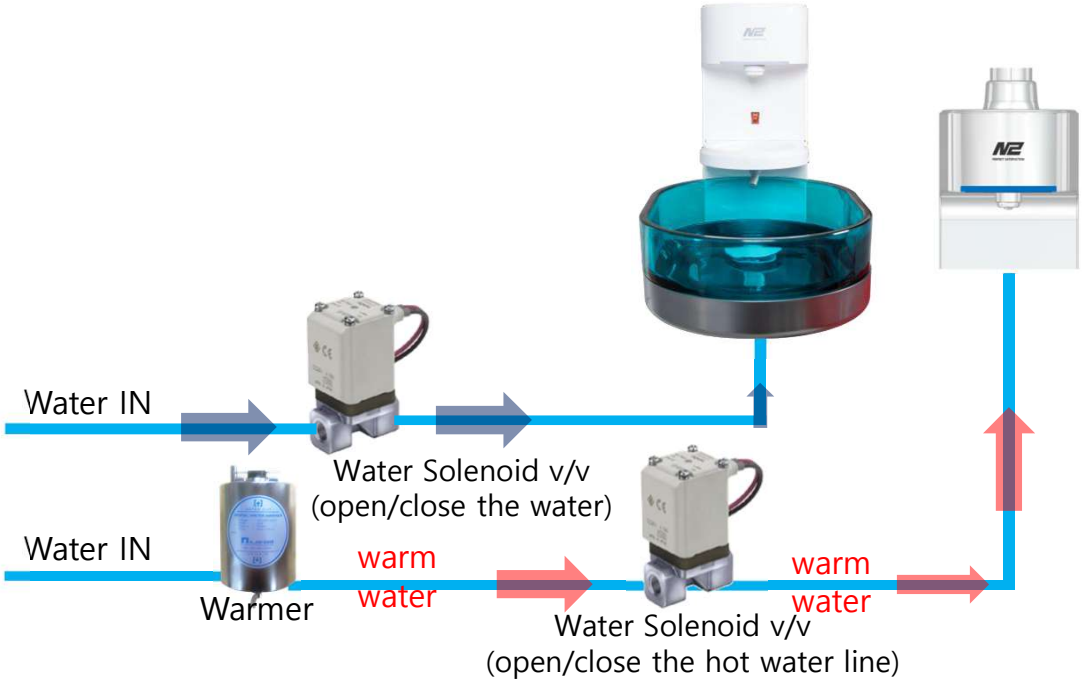
1.3. Water Supply System

1.3.1 Cup Filler & Rinsing Process

✓ Water Solenoid Valve

- Controlled by an electrical signal; delivers and cuts off the water supply

- N2 unit chair features a solenoid valve that opens and closes 2 water lines



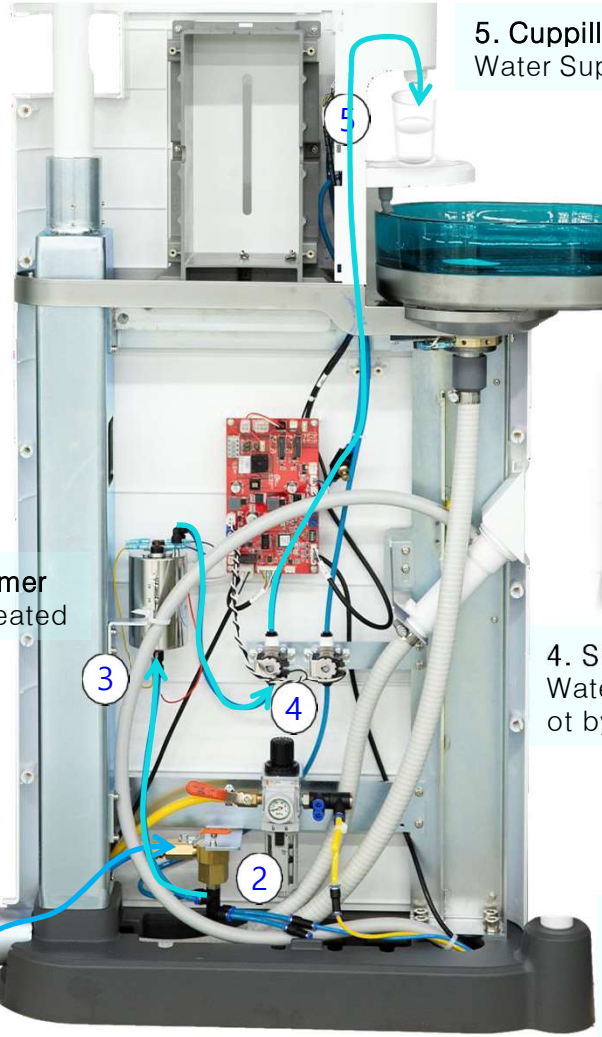
<Water Solenoid Valve description>

1.3. Water Supply System

1.3.2 Cup Filler(5steps)

The cup filler lamp is turned into red once the warmer button is pressed. After a while, hot water is supplied.

1. Tap Water
Filter is needed before Tap water,
About 2.5~4kg/cm2 water pressure is re quired, Φ 10 Hose



3. Warmer
35℃ heated

5. Cuppillar
Water Supply

4. Solenoid Valve
Water passes or n ot by valve on/off

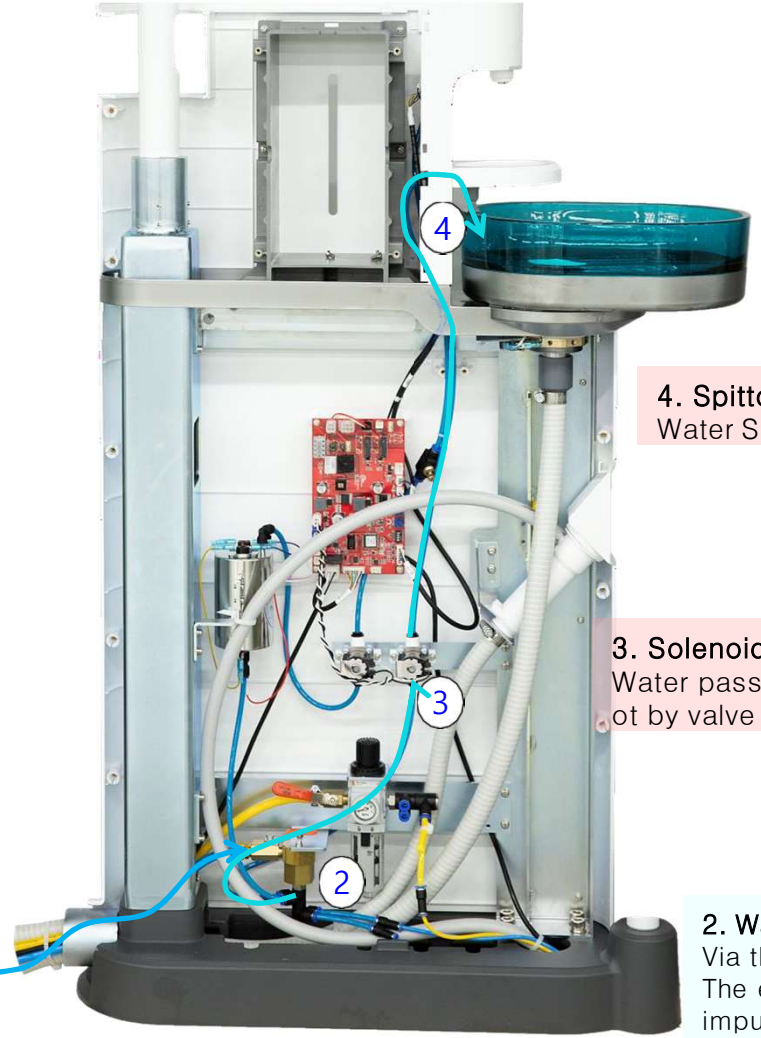
2. Water Filter
Via the brass filter, The extra particle is impurified.
Water pressure beco mes 2.5 kg/cm2

1. Tap Water
↓ Φ10
2. Water filter
↓ Φ6
3. Warmer
↓ Φ6
4. Solenoid valve
↓ Φ6
5. Cuppillar

1.3. Water Supply System

1.3.3 Rinsing(4steps)

1. Tap Water
↓ Φ10
2. Water filter
↓ Φ6
3. Solenoid valve
↓ Φ6
4. Spittoon



1. Tap Water
Filter is needed before Tap water,
About 2.5~4kg/cm2 water pressure is re quired, Φ 10 Hose

4. Spittoon
Water Supply

3. Solenoid Valve
Water passes or n ot by valve on/off

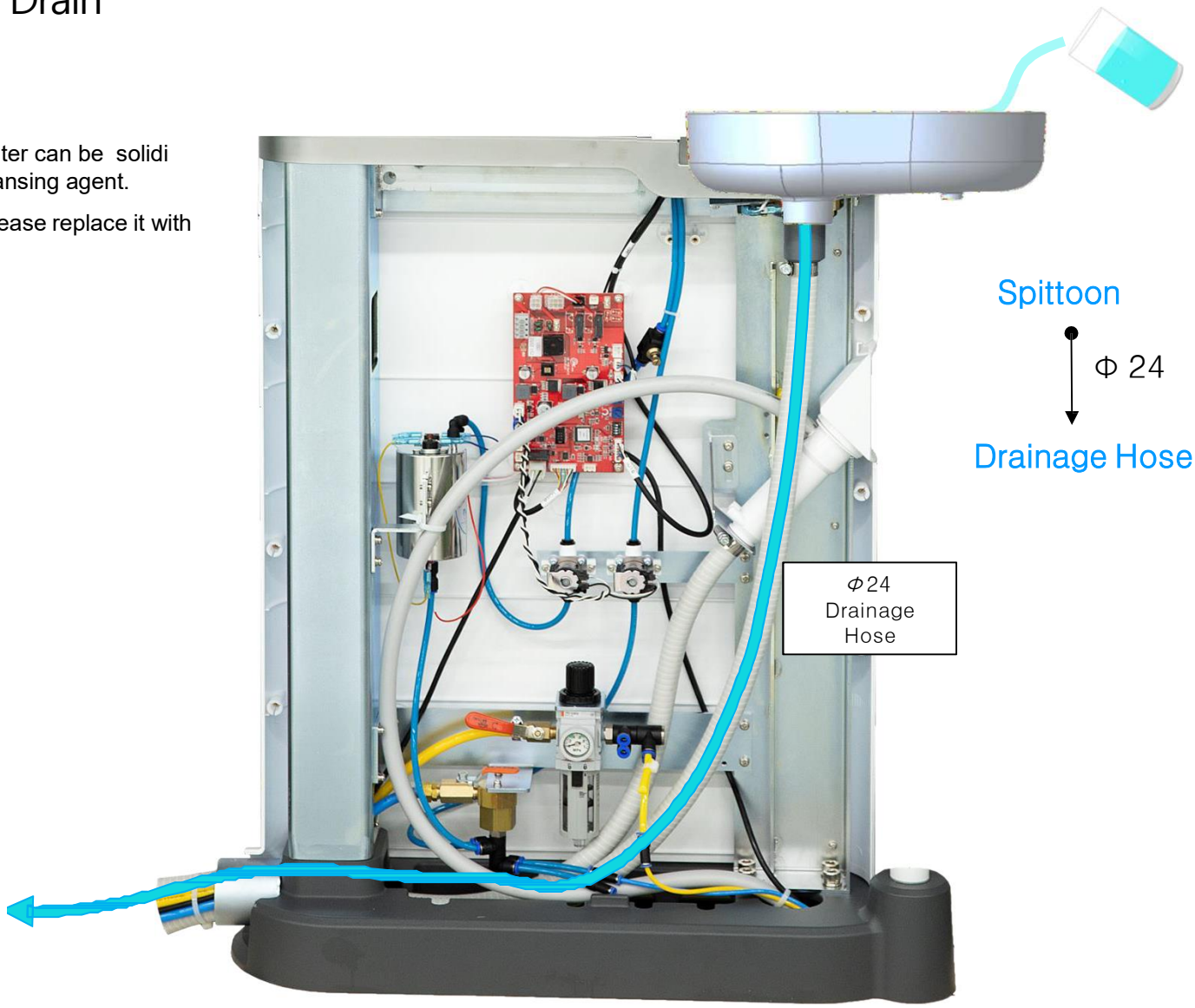
2. Water Filter
Via the brass filter, The extra particle is impurified.
Water pressure beco mes 2.5 kg/cm2

1.3. Water Supply System

1.3.4 Drain

The spittoon filter can be solidi fied due to cleansing agent.

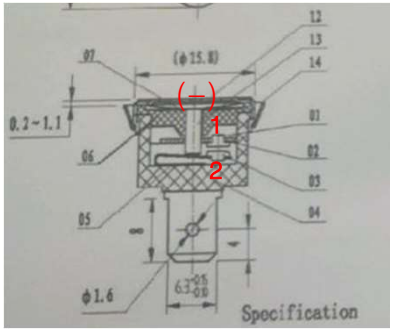
At that time, please replace it with new one.



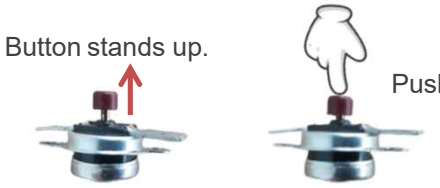
1.4. Warmer Operation Principle

WARMER BIMETAL: 2 EA

A (Left) B (Right)



Warmer Bimetal Inside



Button stands up when its temperature **goes beyond 45°C.**
Unless you push the button, warmer stays sleeping.

WARMER: A device that heats up water to provide 35~40℃ water with patients at 35 to 40 C. The temperature sensor 2EA are installed on top to control the temperature of heated water automatically.

Warmer's coil is made up of electricity resistors that hinder electricity from flowing well.

In this process, electric energy becomes the thermal energy to heat the water in the warmer.

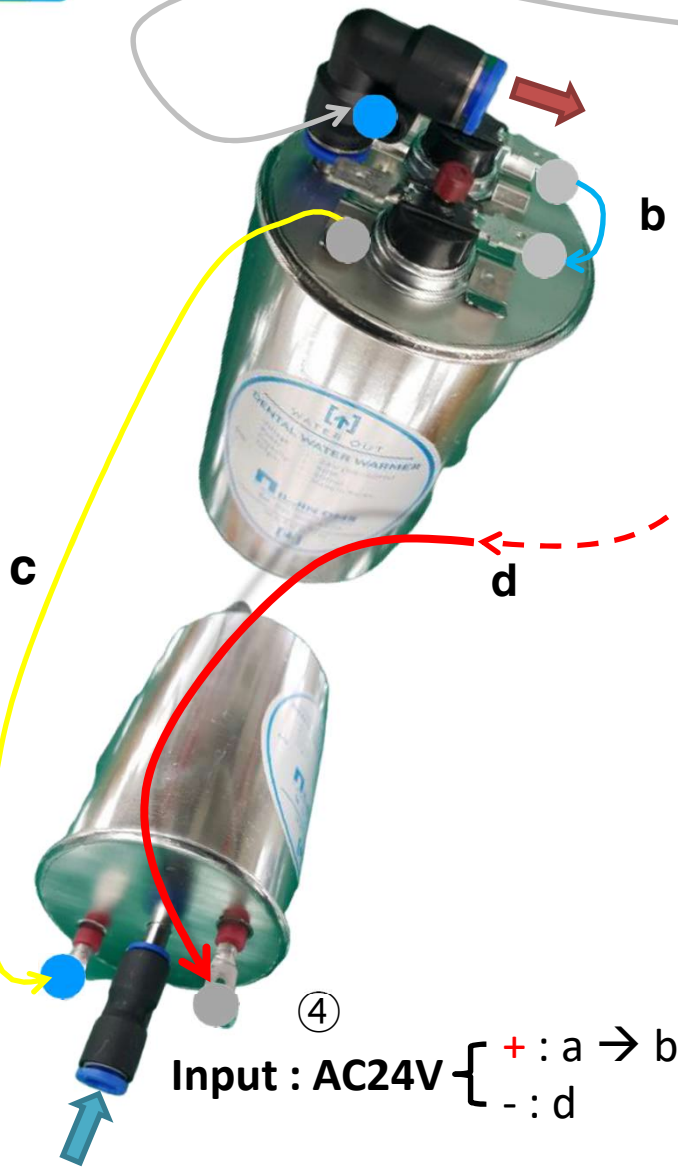
A warmer bimetal works with the same principle as boiler heating water.
There are 1 and 2 switches inside the warmer bimetal.
There's no.1 switch on a bendable bar.
There's no.2 switch on the normal bar.

If the temperature goes beyond 35℃, no 1 bar is bent. Accordingly, switch 1 and 2 are in contact, and the warmer stops. When it falls under 35℃, the bar returns to its original state and the warmer is back to normal operation.
(A warmer bimetal has no fuses)

B warmer bimetal starts working when the A warmer bimetal is not working anymore. That is, if the A bimetal doesn't work as mentioned above, so the temperature could go over 40℃.
In case that the warmer keeps working with above 45℃, the B bimetal is activated to shut down warmer operation.
B warmer bimetal works as a circuit breaker.

Warmers will be not working unless you press the fuse button.
When you push down the fuse button, warmer operate again.

1.4. Warmer Operation Principle



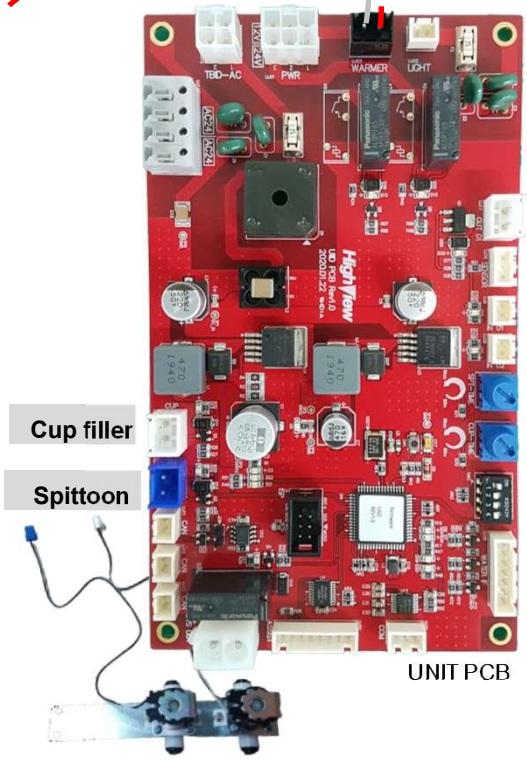
③ **Output** : AC24V

②

Warmer Relay s/w on

①

Warmer On assist Membrane

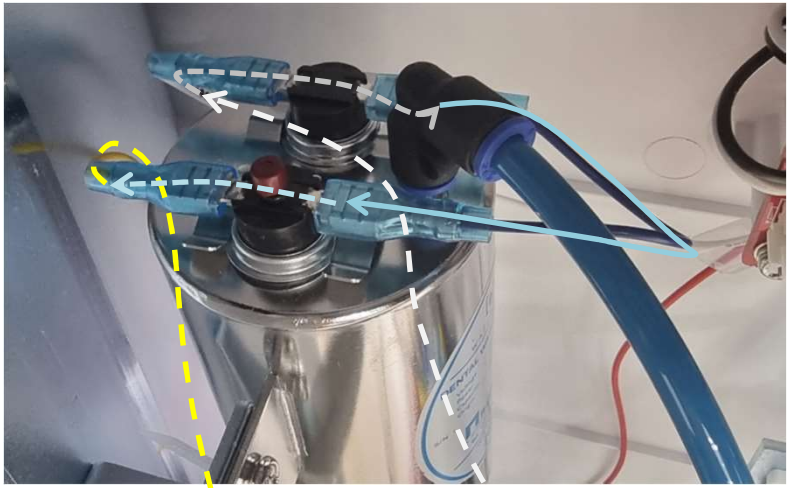


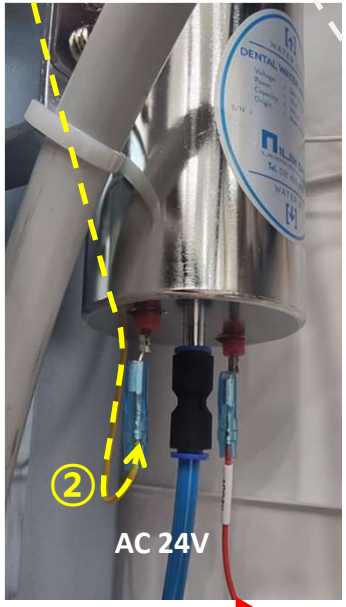
Cup filler Spittoon

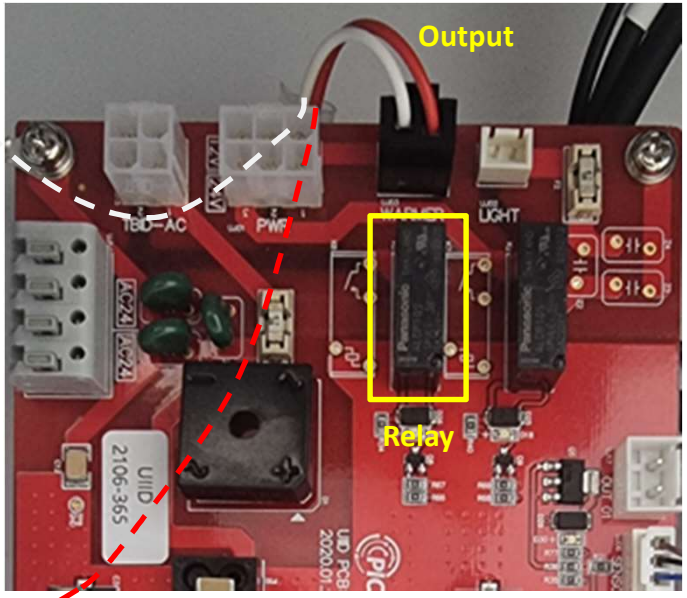
④

Input : AC24V { + : a → b → bimetal → c
- : d

1.4. Warmer Operation Principle





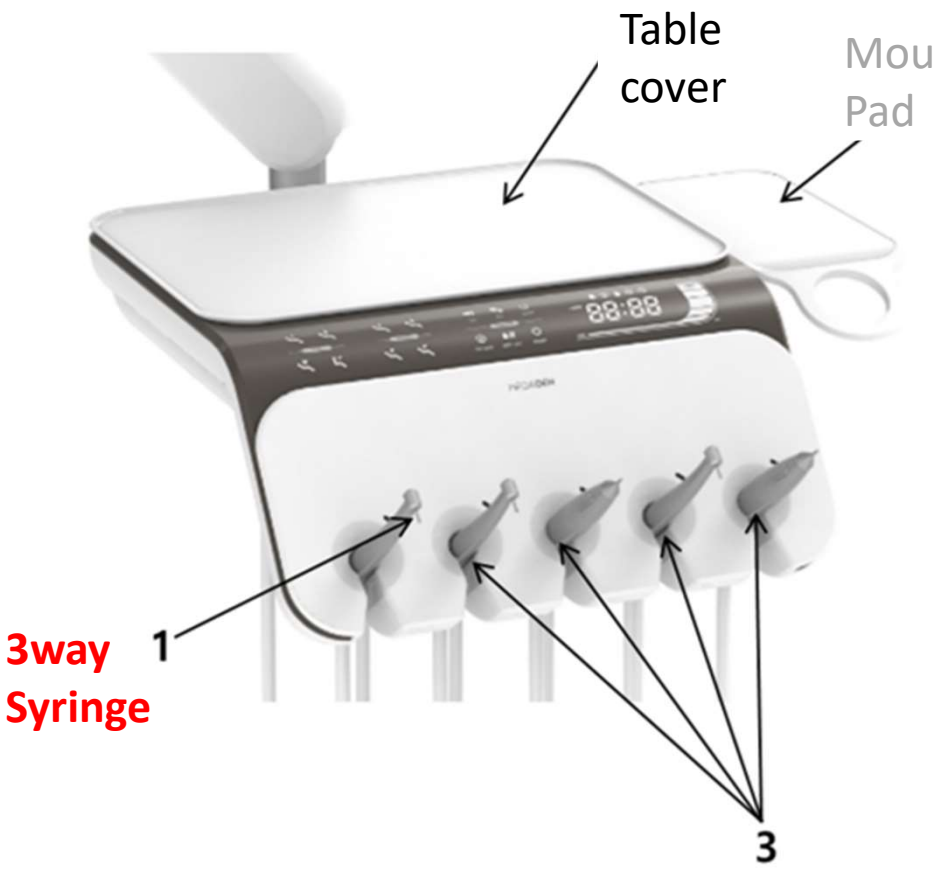


2. Dr. Table Part

2.1. Foot control

2.2. Dr. Table

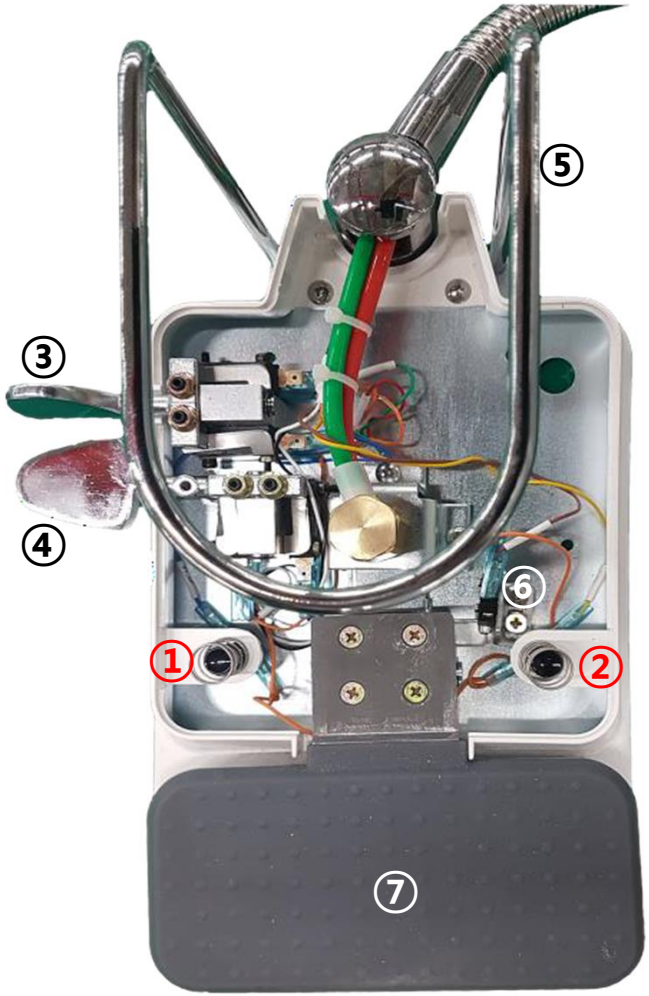
2.1 Instruments components



- ✓ SLOT #1 : 3 Function Syringe
- ✓ SLOT #2 : Air driven high speed
- ✓ SLOT #3 : Air driven high speed
- ✓ SLOT #4 : Air driven low speed
  Elec. driven low speed
- ✓ SLOT #5 : Scaler

2.2 Foot Control

2.2.1 Function



① P1 (LP): 1) Short Touch – Treatment Position,

2) Long Touch – Last Position

② P2 (RP): 1) Short Touch – Consulting Position,

2) Long Touch – Former Location

③ Backrest Control Lever : Backrest Movement

④ Chair Control Lever: Chair Movement

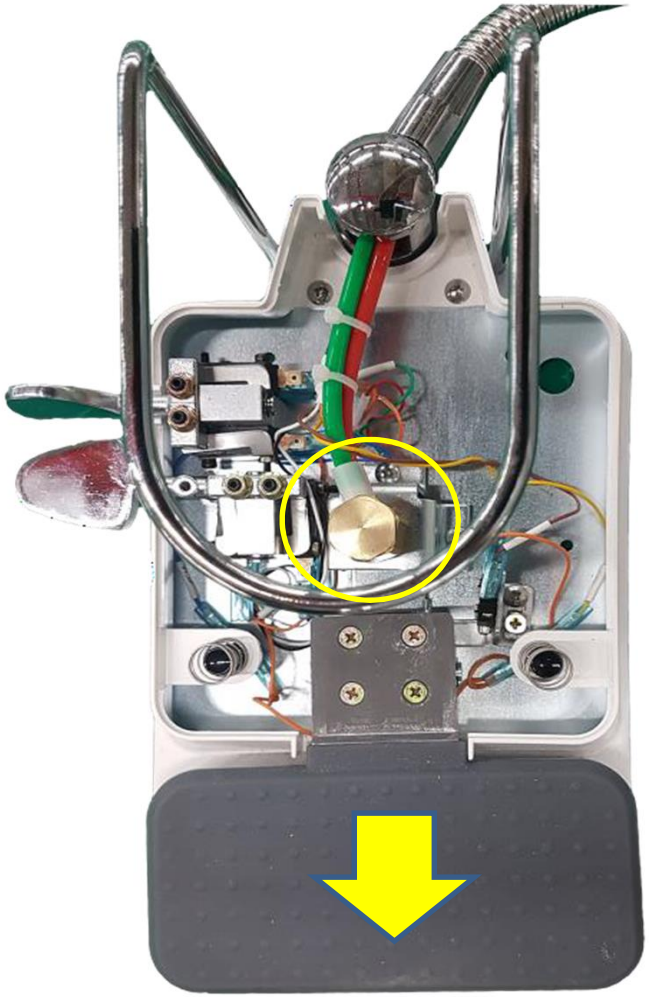
⑤ Foot Holder : To move it by foot

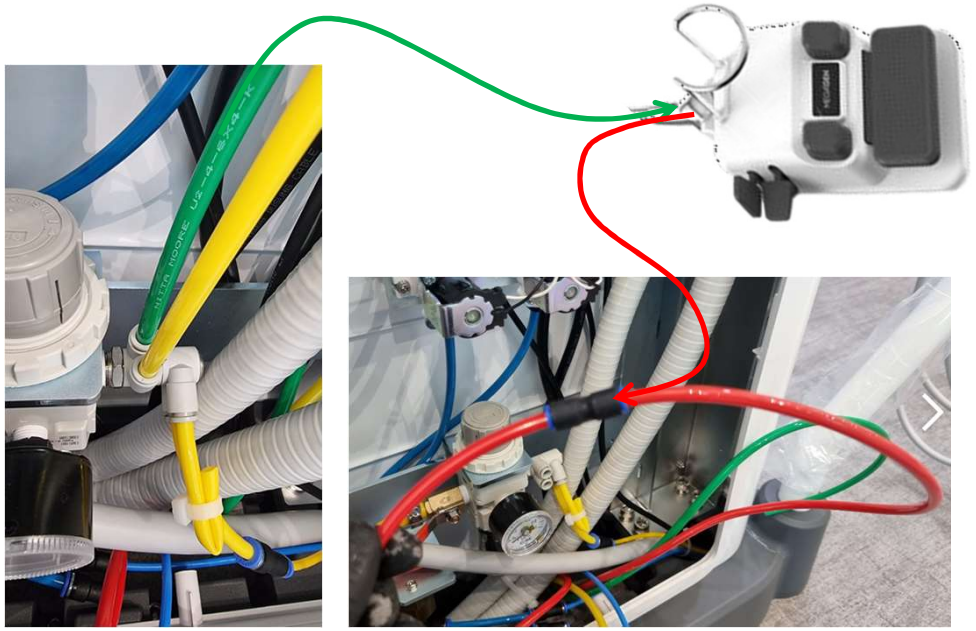
⑥ Micro Switch : 1) Emergency Stop
2) Spray Water
3) Scaler
4) Fiber optic

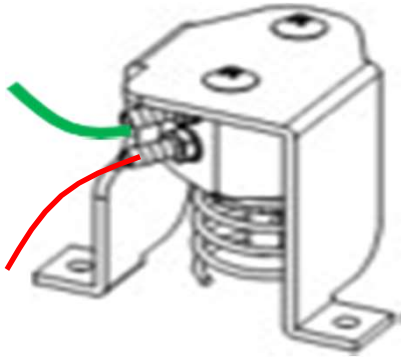
⑦ Foot Switch Pedal

2.2 Foot Control

2.2.2 **Air input & output**





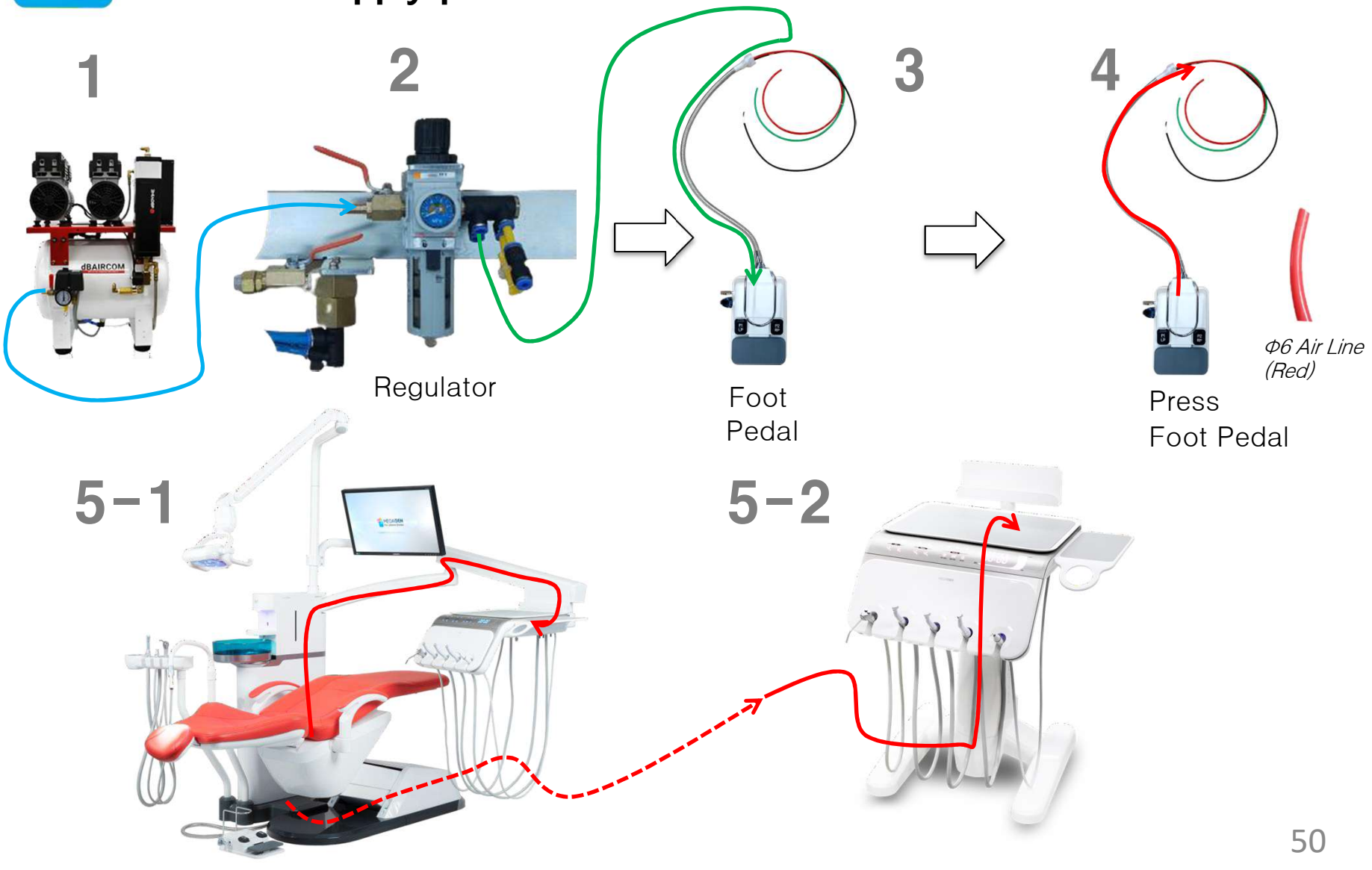


Green line : Air In
From Air regulator

Red line : Air Out
Goes to Dr.Table
For instruments air

2.2 Foot Control

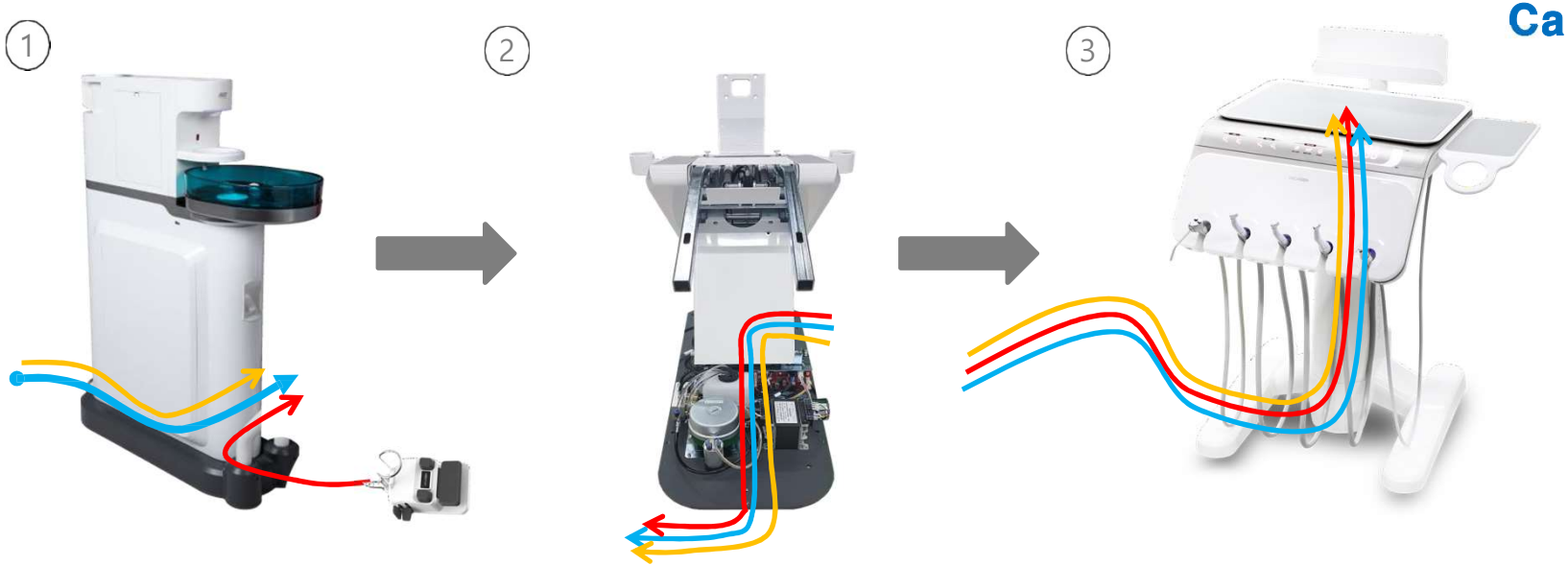
2.2.3 **Air supply process**



2.3 Main water and air supply line

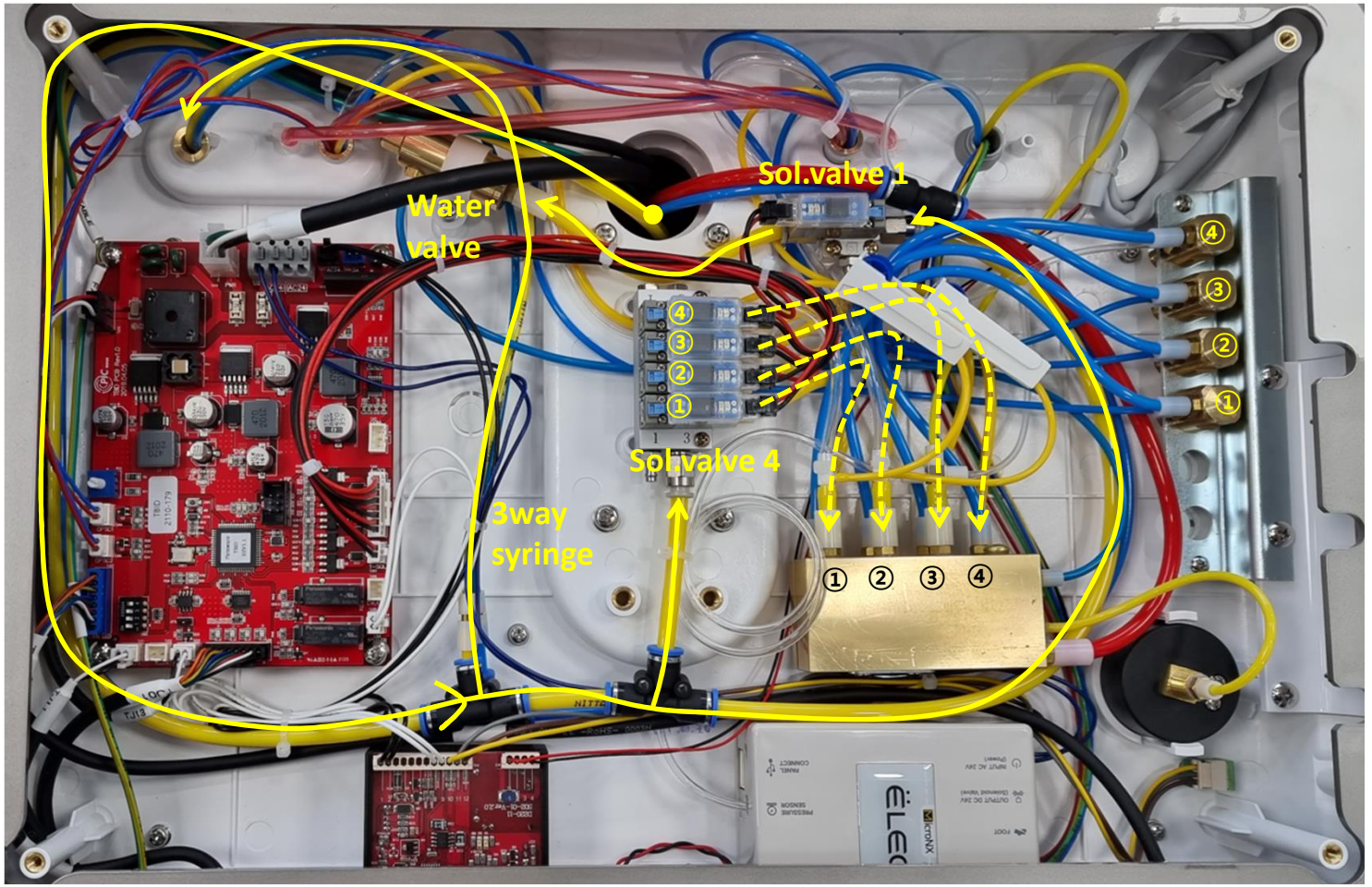
Balance Arm Type

Cart Type



2.4 Water and Air Diagram

2.4.1 System Air

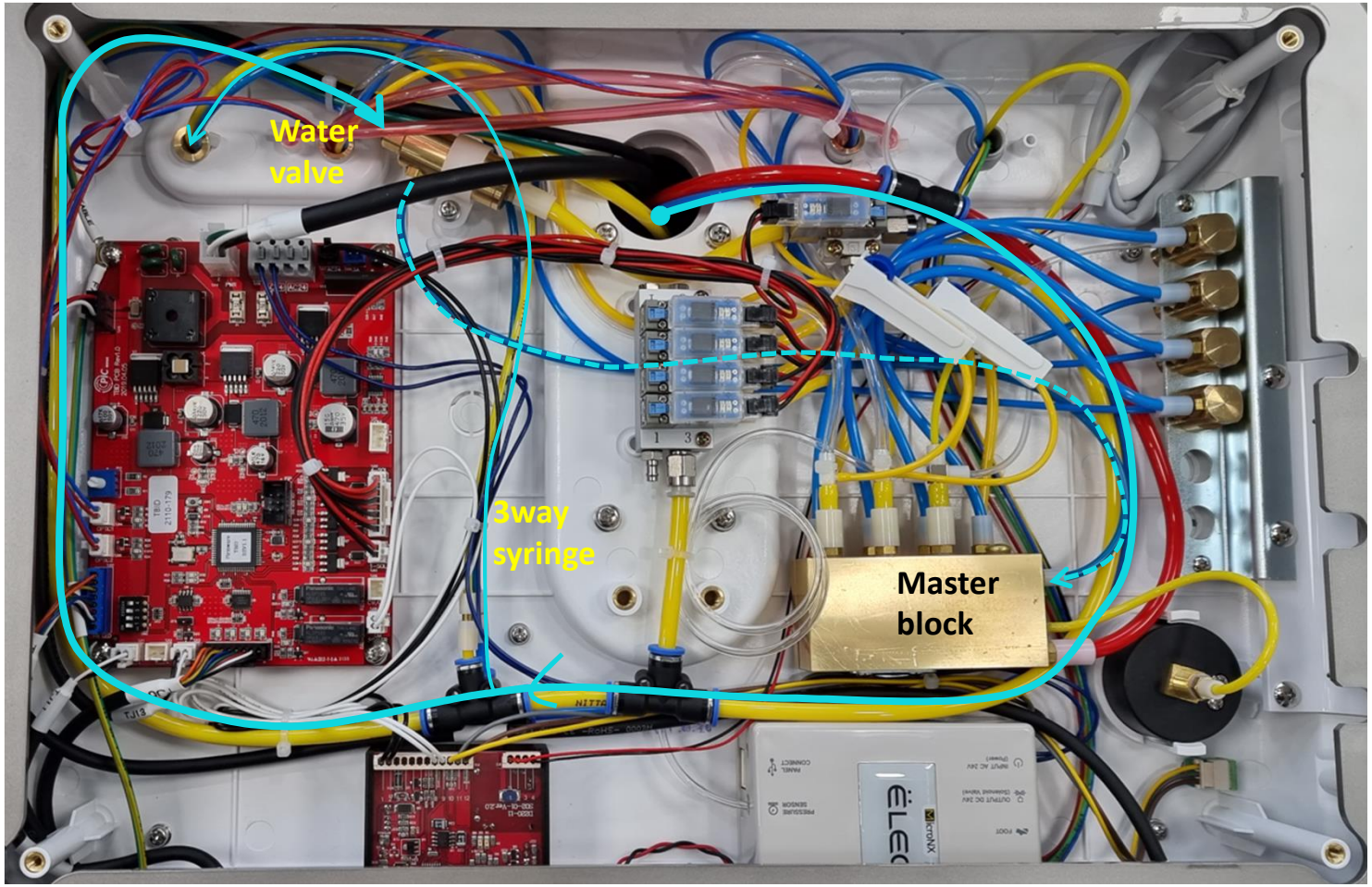


A. Φ6 Air Line: Unit > 4series Sol.Valve > Sol.valve for water valve > Water Valve

B. Φ4 –> 3 Air Line: T Disperser > 3 Way Syringe

2.4 Water and Air Diagram

2.4.2 **Main Water**



1. Φ4 Water Line: Unit > Dr. Table
2. Φ4 Water Line: Dr. Table > T Disperser > Water Valve > Master Block
3. Φ4 –> 3 Water Line: T Disperser > 3 Way Syringe

2.4 Water and Air Diagram

2.4.3 **Turbine & Chip Air**

A. When 1st handpiece is picked up,
B. 1st Solenoid is turned on and closed the valve
C. 1st Solenoid > Master Block, Pressing air is blocked
D. Master Block 1st line > Hand piece tubing

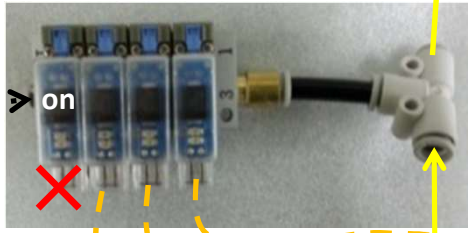
Table PCB

DC 24V

Air sol.valve
for spray water

Drain air

Air sol.valve for
Master block control



Control air

Turbine
air

High HP tubing

Drain air

Chip Air Volume
Controller

Chip air

6mm

3.0~3.5 bar

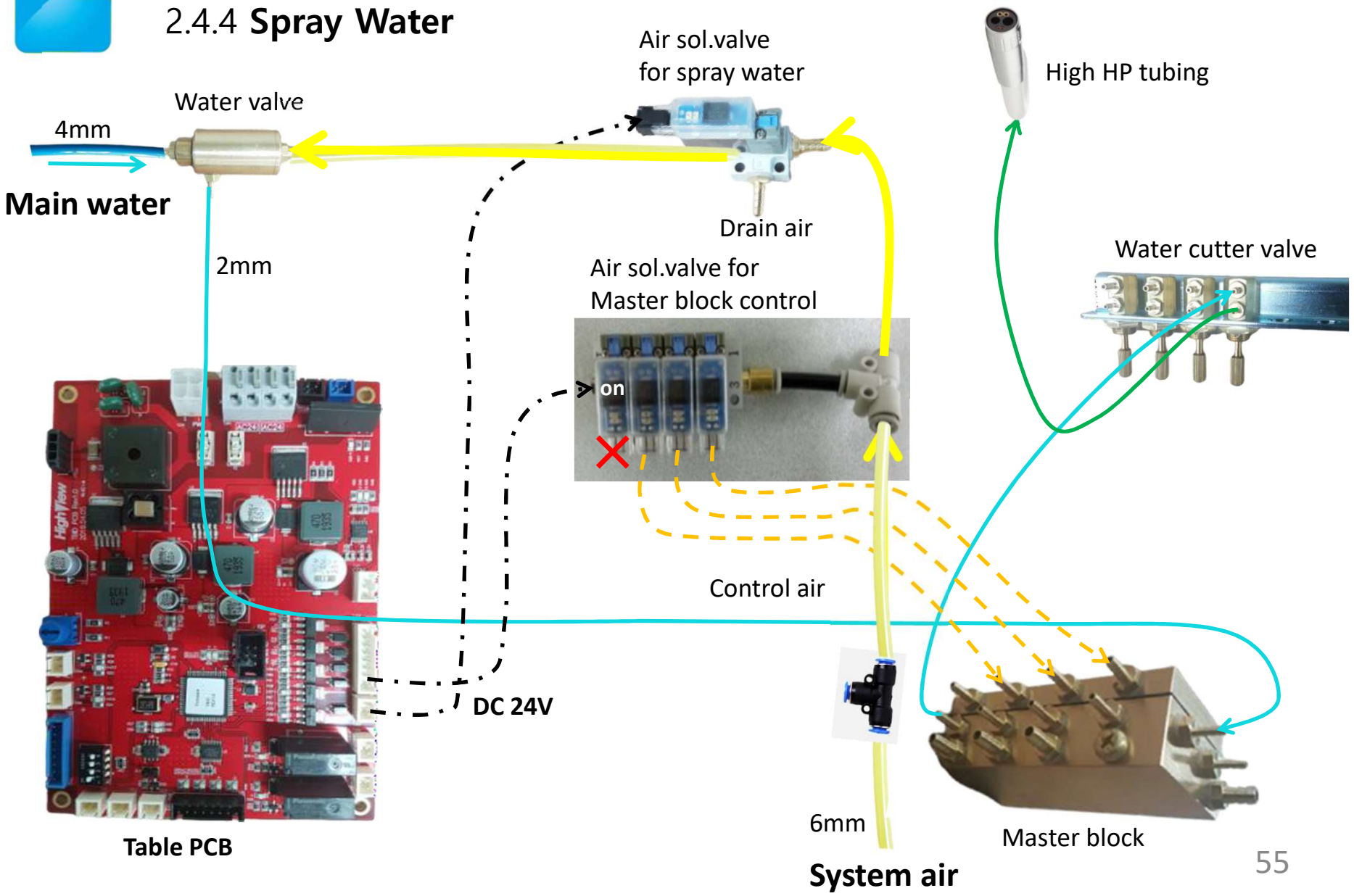
6mm

Main air

Master block

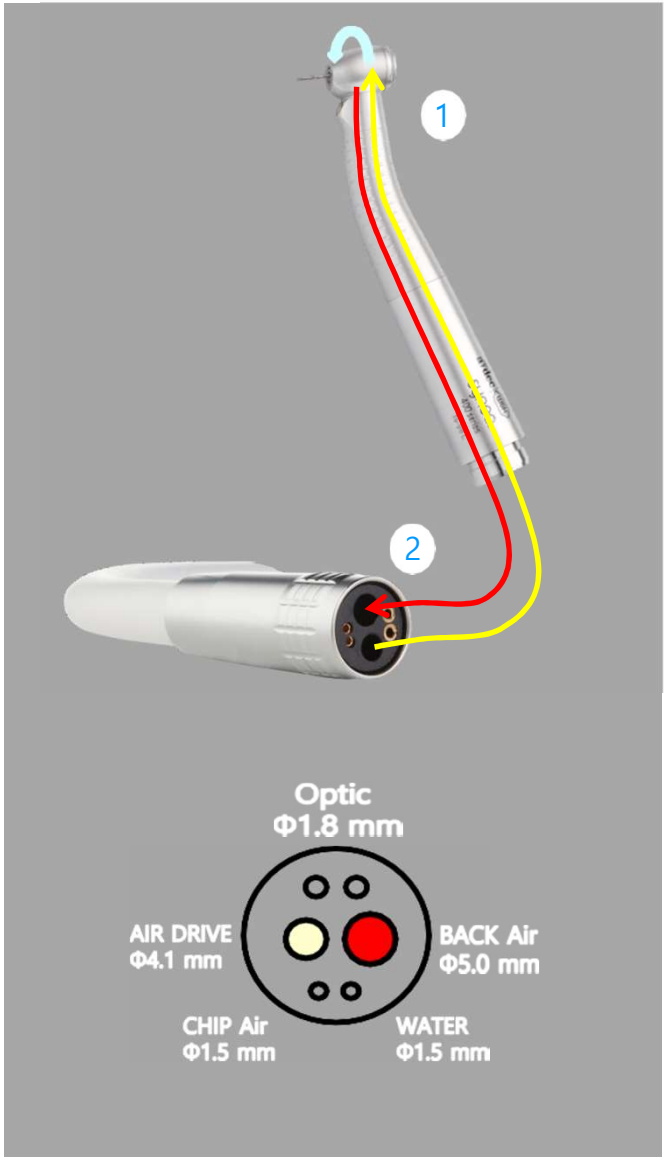
2.4 Water and Air Diagram

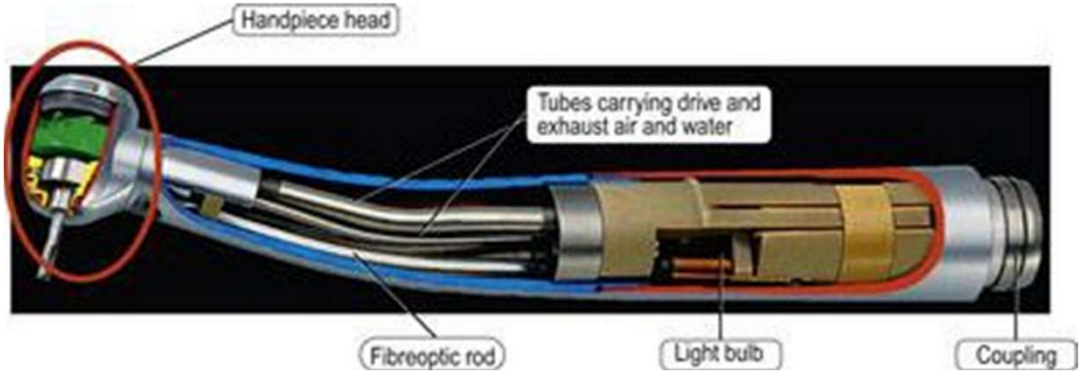
2.4.4 **Spray Water**

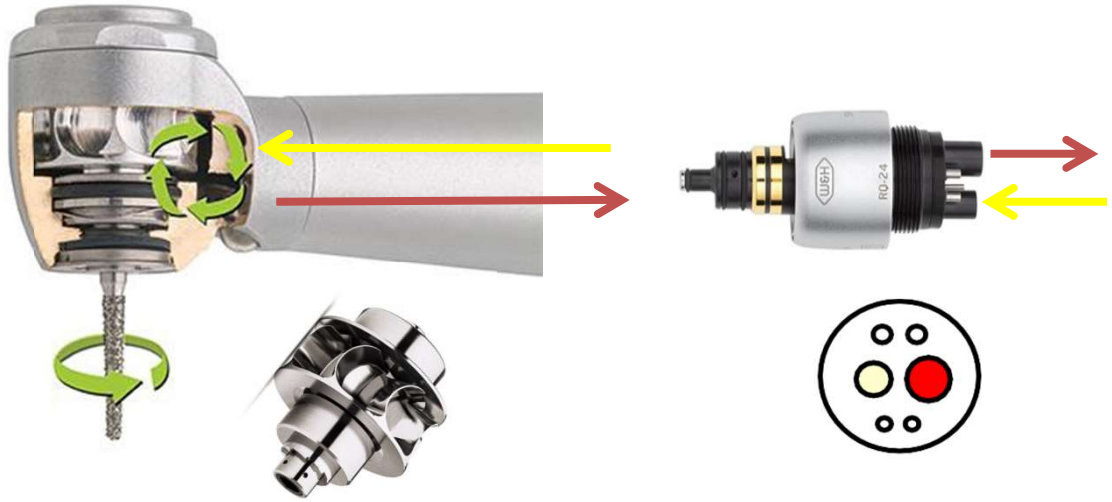


2.4 Water and Air Diagram

2.4.5 **Exhaust Air**

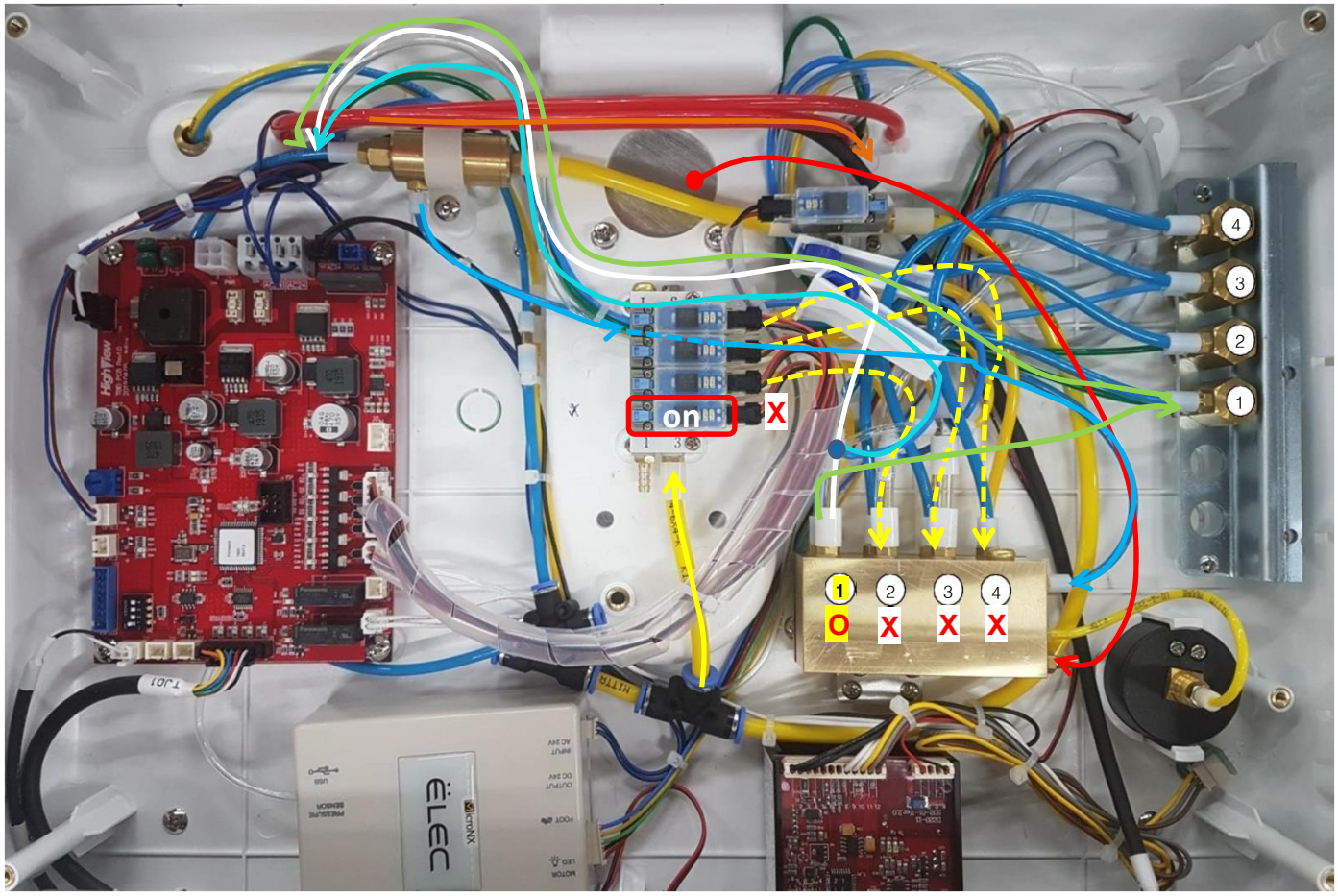






1. With the pressed air, The high speed handpiece is rotated up to 350,000 RPM
   The low speed one is rotated up to 40,000 RPM
2. After turning the impeller in cartridge, the residual air exits via the exhaust line,
3. Back Air is discharged at ventilation hole at Doctor Table

2.5 Summary



White : Turbine air

Sky : Chip air

Green : Spray water

Orange : Exhaust air

A. **When 1st handpiece is picked up, signal is transmitted.** 1st Solenoid Valve is closed (Master Block)

B. Φ6 Air Line (Yellow): Unit > 1st Solenoid Valve

C. Φ4 Pressing air line (Yellow): 1st Solenoid Valve > Master Block, **Pressing air is locked.**

D. Φ4 Water Line (**Blue**): Master Block > Water Cutter Valve

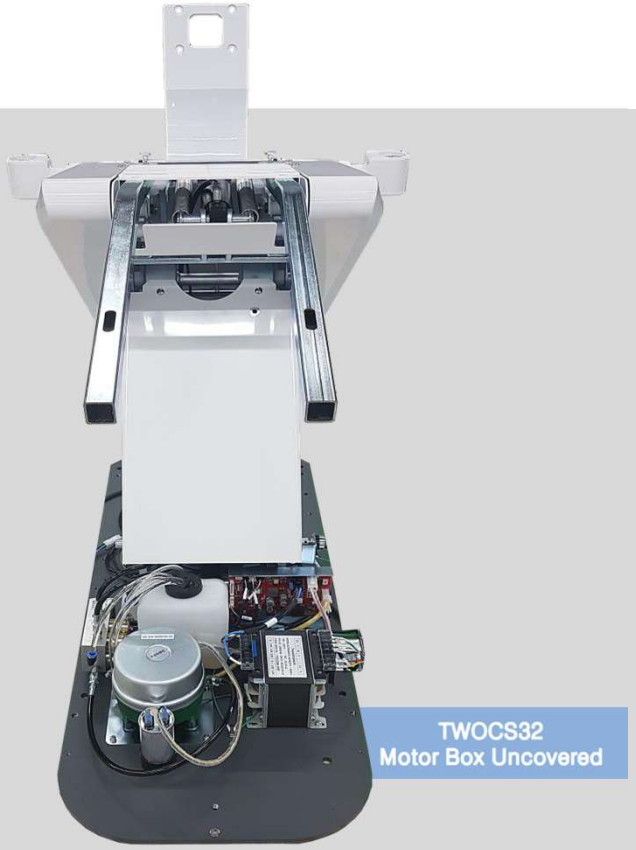
E. Φ2.5 Water Line (**Green**): Water Cutter Valve > Handpiece Coupling Water Line

VI Hydraulic System

1. Operating Power Source
2. Disassembly Procedure
3. Replacement Parts
4. Hydraulic Supply, Components
5. Hydraulic Movement Process
6. How to Speed control

VI. Hydraulic System

Chair



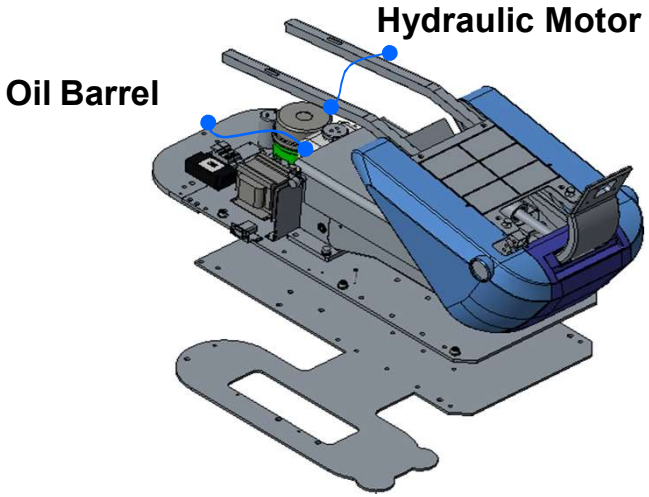
Motor Box Uncovered

1. OPERATING POWER SOURCE

The unit chair has over 100 year history.
These days, it becomes automatic. You can use foot switch nearby Unit Chair to move it up and down. But 30 years ago, a person just manually pedaled the foot switch to lift an Unit Chair.

In both past and today, the way in operating an unit chair is hydraulic. Since an oil has high viscosity and density, an oil pushed by the air can lift the heavy stuffs such as car and truck.

However, many companies such as **PLANMECCA, KAVO, CASTELLINI** have used electric motors, not hydraulics these days; Based on the improved stability which is an advantage of the modern electric motor, they are launching electrical unit chairs which do not need to worry about oil freezing in winter. But hydraulics still show better stability than electrics. N2 adopts hydraulic operation in this regards.



HYDRAULICS

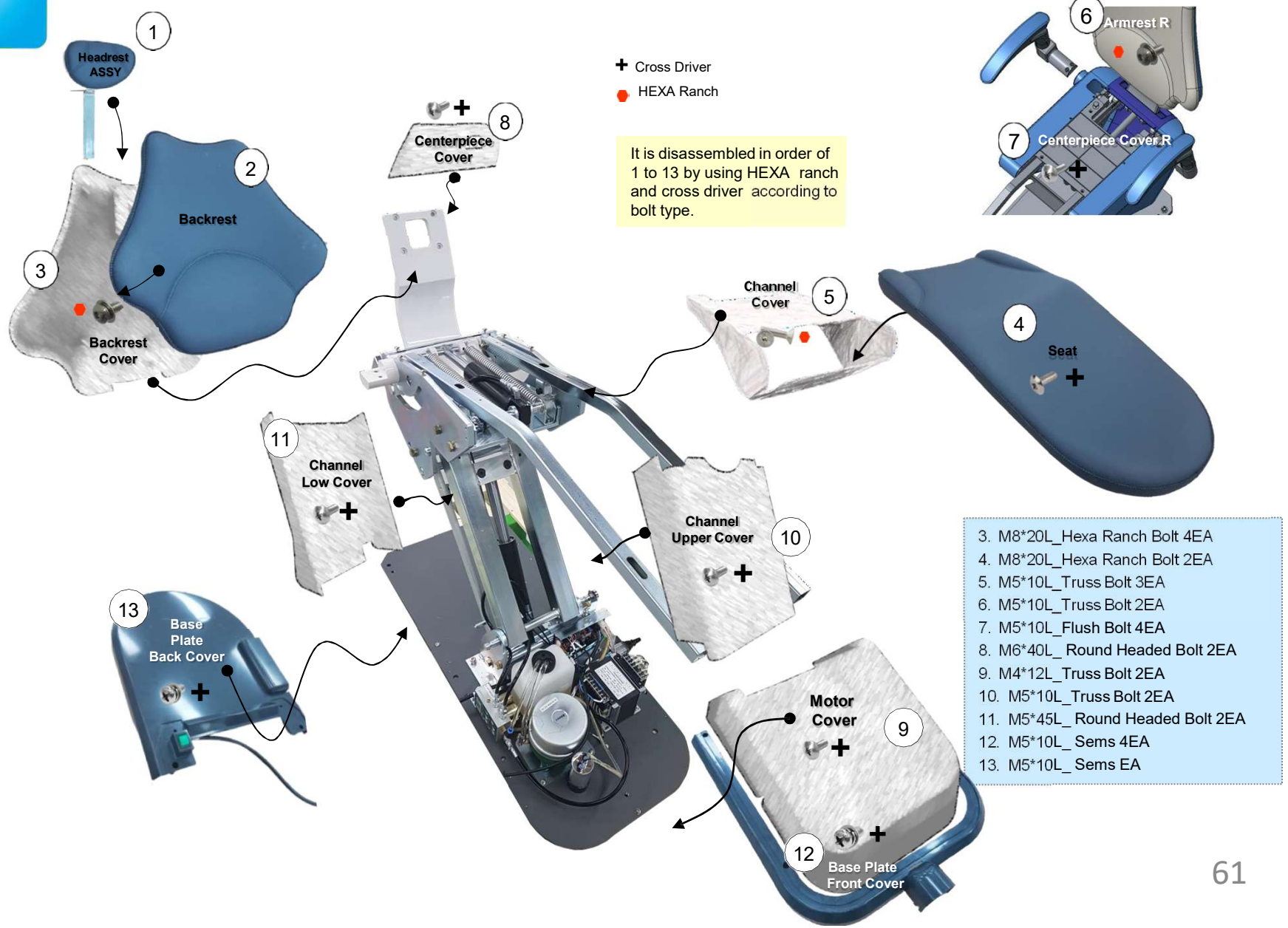
In this chapter, we learn how oil is flowed into supply line.

By reversing a supply line, an engineer finds the repairing spot.

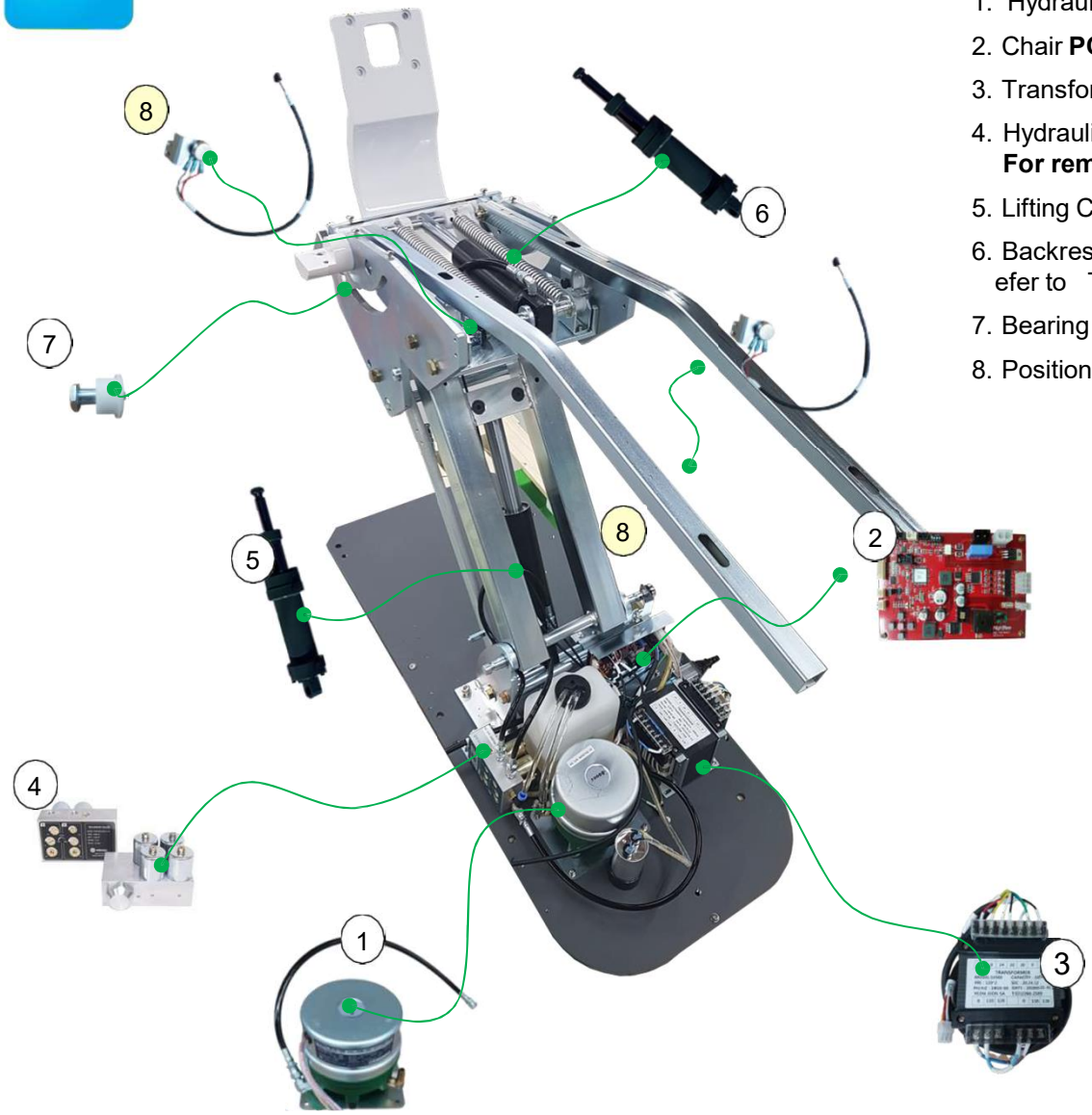
VS

ELECTRONIC MOTOR

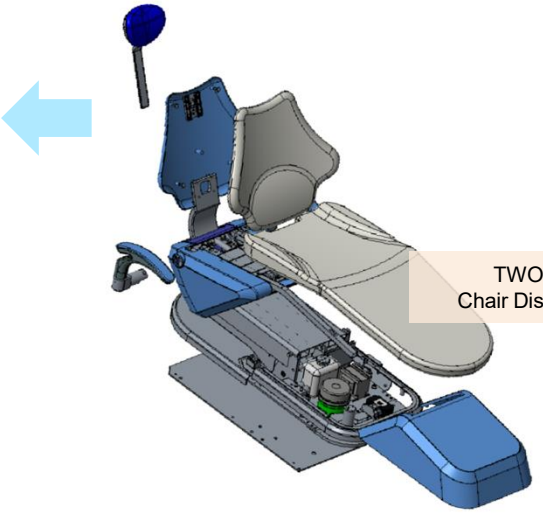
2. Disassembly Procedure



3. Replacement Parts



1. Hydraulic Motor Replacement (Refer to TWOCS24)
2. Chair **PCB** replacement (Skipped. Easy Level)
3. Transformer replacement (Refer to TWOCS25)
4. Hydraulic Solenoid Valve replacement (Refer to TWOCS26)
   For removing the particles inside (Refer to NEXTCS35)
5. Lifting Cylinder replacement (Refer to TWOCS28)
6. Backrest Cylinder replacement included spring change (R efer to TWOCS27)
7. Bearing replacement (TWOCS29)
8. Position Meta Replacement (TWOCS30)



TWOCS35
Chair Disassembly

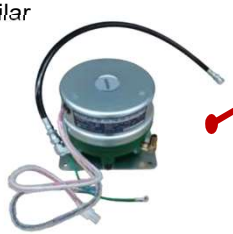
3. Replacement Parts

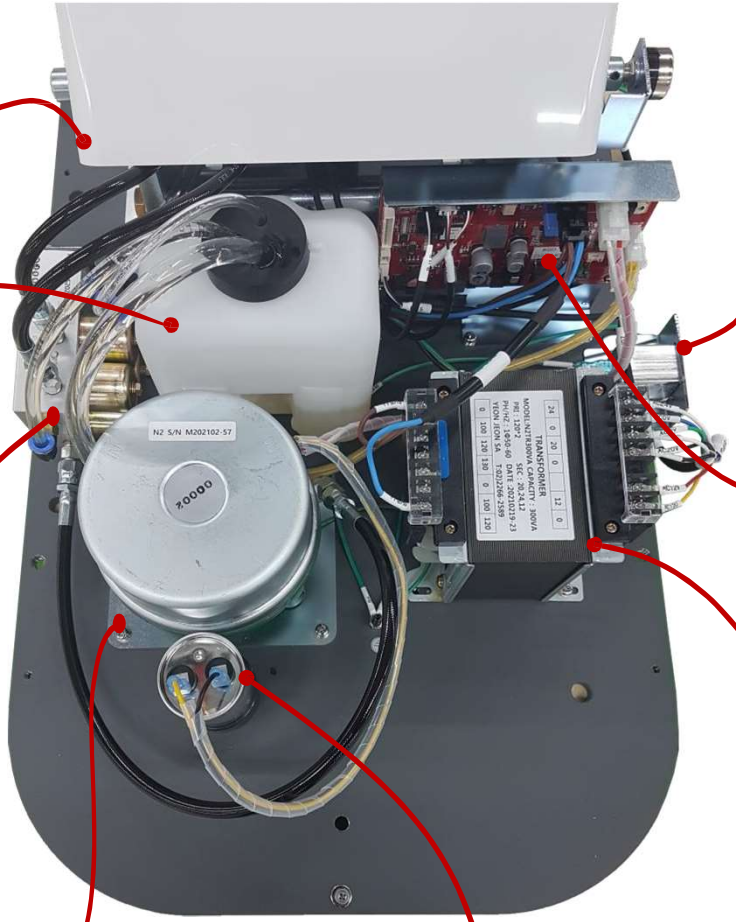
1. **Power Switch:** Power on/off

2. **Oil Barrel:**
Reserving oil at a spot.

3. **Hydraulic Solenoid Valve:**
Controlling oil which is flowed into the lifting and backrest cylinder according to the signal from the Chair PCB

4. **Hydraulic motor:**
Pushing viscous and dense oil int o cylinders *similar* to car engine





5. **Condenser**: The condenser is the storage battery helping the hy draulic motor start.

When it becomes abnormal, the hydraulic motor is not operating but the noisy sound only exists.

8. **Power Code**:
220 Voltage power is input for exporting unit chairs, the power code's shapes is varied from country to country.

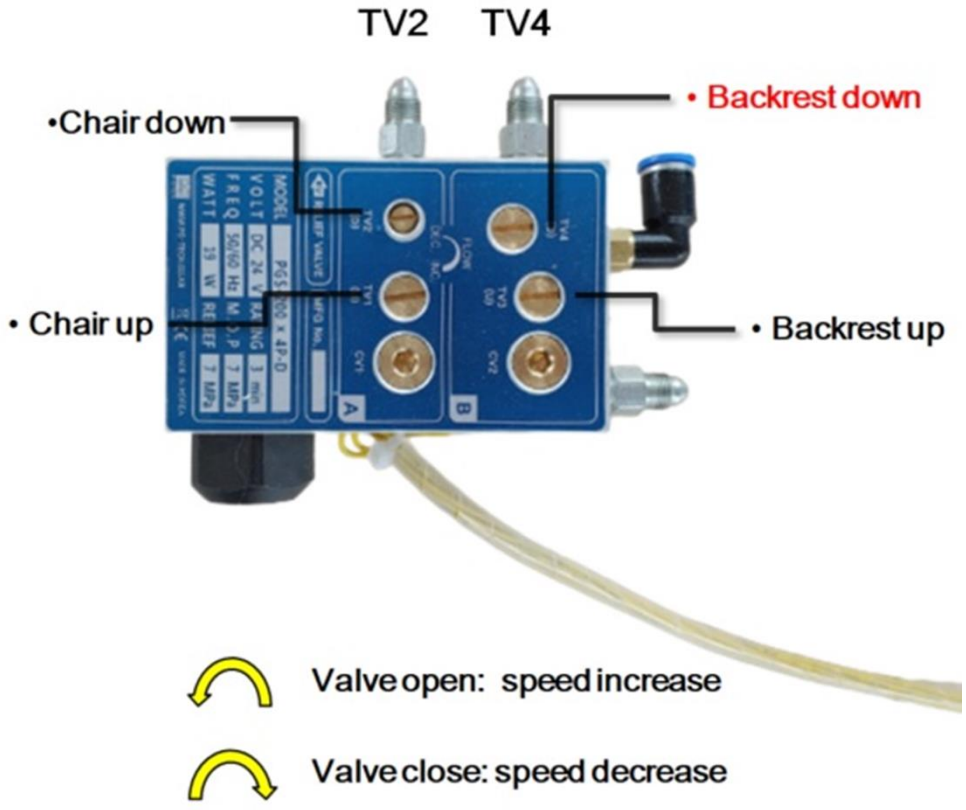
7. **BSID PCB (Chair Main):**
A circuit board which controls the chair operation by processing signals from components

6. **Transformer**:
Transforming 220 Voltage(or 110V) to 12, 20, 24

4. Hydraulic Supply, Component

4.1. Hydraulic Solenoid Valve

Solenoid Valve Specification		
Description	Unit	PGS-200 4P
Voltage	V	AC11.0, 220/ DC12, 24
Max. Pressure	MPs	6
	psi	853
Watt (AC/DC)	W	19~13/15
Orifice Dia	mm	1.2
Rated Time	min	10
Frequency	Hz	50/60
Weight	Kg/lbs	1.6/3.5
Dimension	mm	73 x 65 x 71



4. Hydraulic Supply, Component

4.2. Pump motor

Description	unit	PGM-CBC-5LP
Related Pressure	Mpa	7
	psi	996
Motor Output (110/ 220V AC)	KW	0.2
Frequency	Hz	50/60
Rated Voltage (AC)	VAC	110/220
Capacitor	uF	60/50
Operation Temperature Limits	℃/℉	20+5-5/248+41-41
Rated Time	Min	3
Current	A	1.8~4.3/2.0~3.9
Discharge (50/60 Hz)	L/ Min	0.8/0.95
/ At no load	gpm(US)	0.21/0.25
Discharge (50/60 Hz)	L/ Min	0.6/0.8
/ At rated pressure	gpm(US)	0.15/0.21
Weight	Kg/ lbs	5.5/12.0
Dimension	mm	132x126

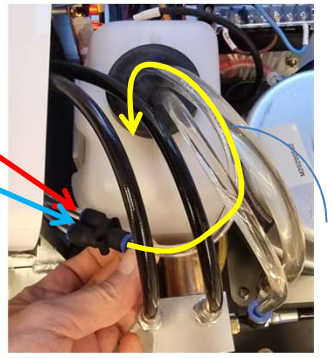
4. Hydraulic Supply, Component

4.3. Hydraulic Cylinder

Oil is injected into lifting cylinder, which makes chair rises.
Oil is drained into Oil barrel, which makes a unit chair descends.

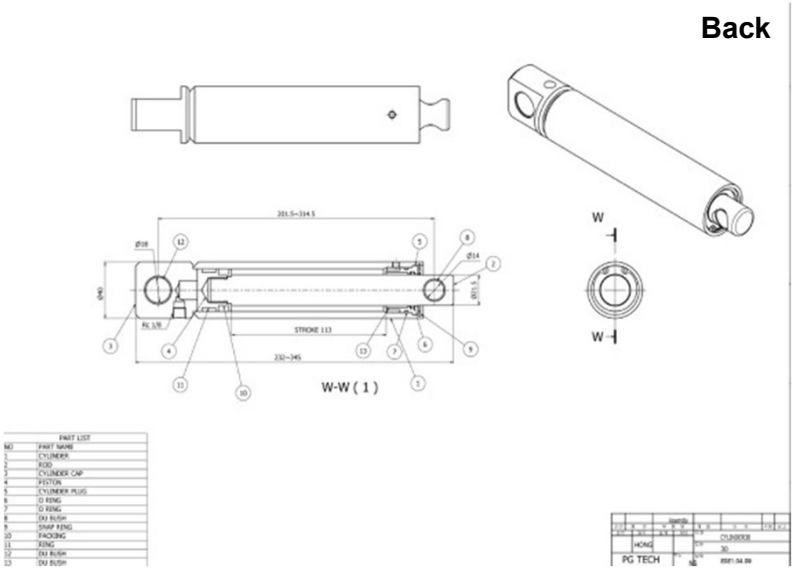
If Oil leaks inside lifting cylinder, **SCRAMBLE TUBING** is attached at the back side of the cylinder.

When **oil gets into the scrambled tubing**, **it is the special case**.
There is an O-ring on the cylinder's pole that lets the air pass but lets oil stay. 3~4 years passed. O-ring starts to loose oil little by little, and drains out through SCRAMBLE TUBING..

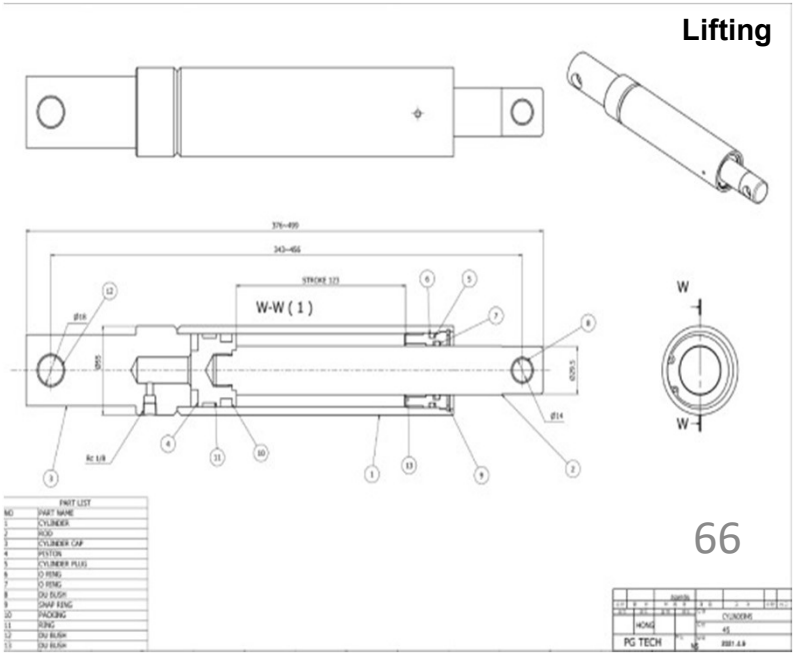


Path of the leaking oil from each cylinder

Back



Lifting



5. Hydraulic Movement Process

5.1. Operating Process

✓ Names and functions of main parts

- **Motor pump**

  Generates the pressure required for the cylinder operation

- **Solenoid Valve**

  Supplies pressure received from the motor pump to the cylinder
  Controls the cylinder speed by adjusting the flux of the operating oil

- **Oil Tank**

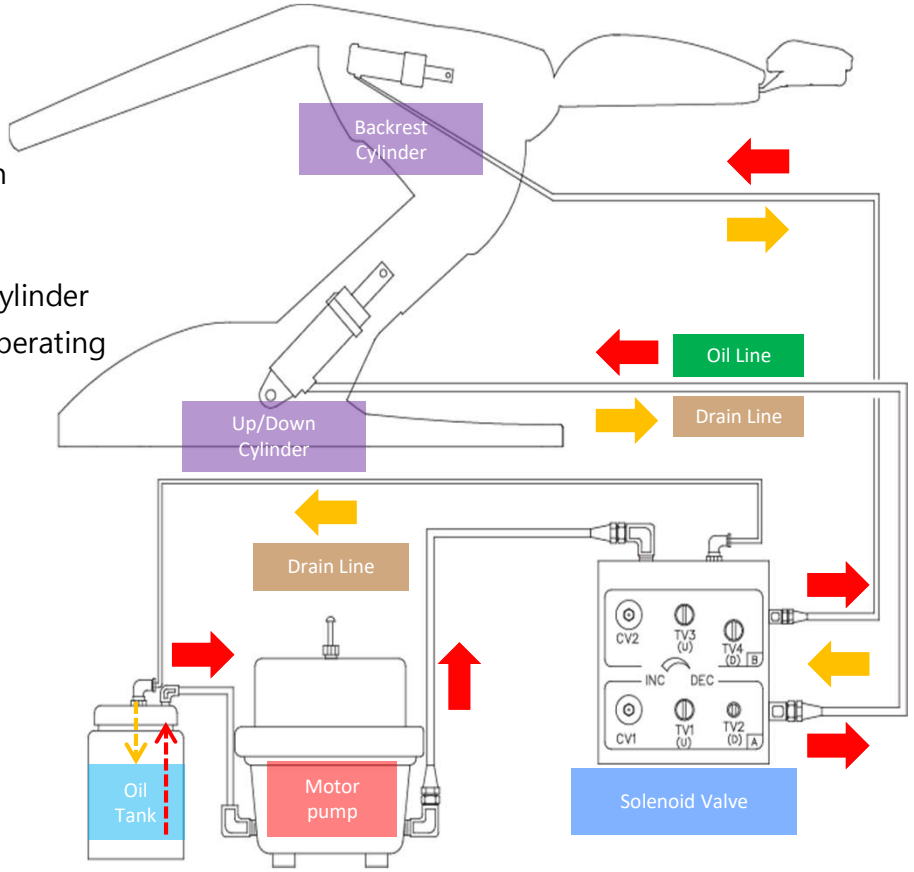
  Stores the energy source oil and removes impurities

- **Up/Down Cylinder**

  Moves the chair up/down

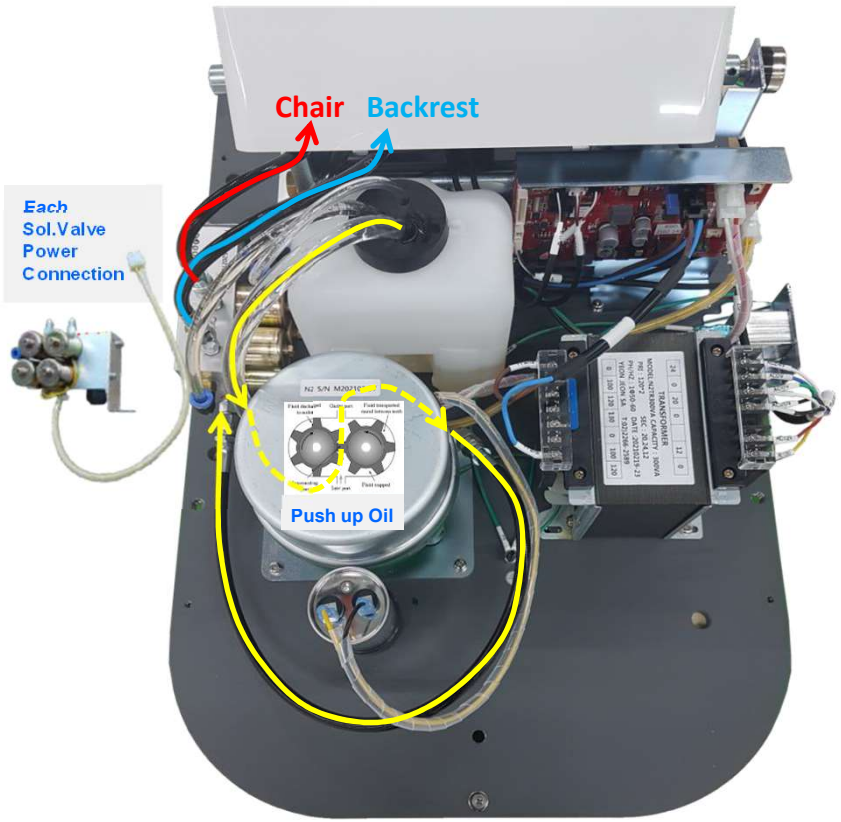
- **Backrest Cylinder**

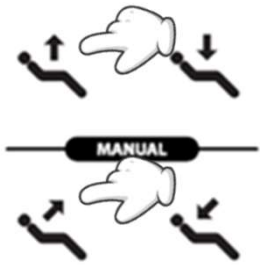
  Moves the backrest seat up/down



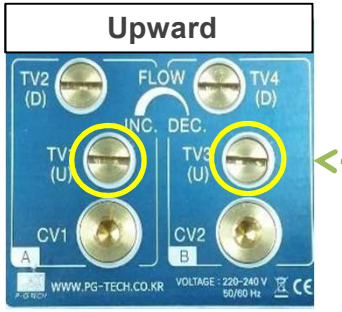
<Hydraulic system diagram>

6. Speed Control : Lift and Backrest Up

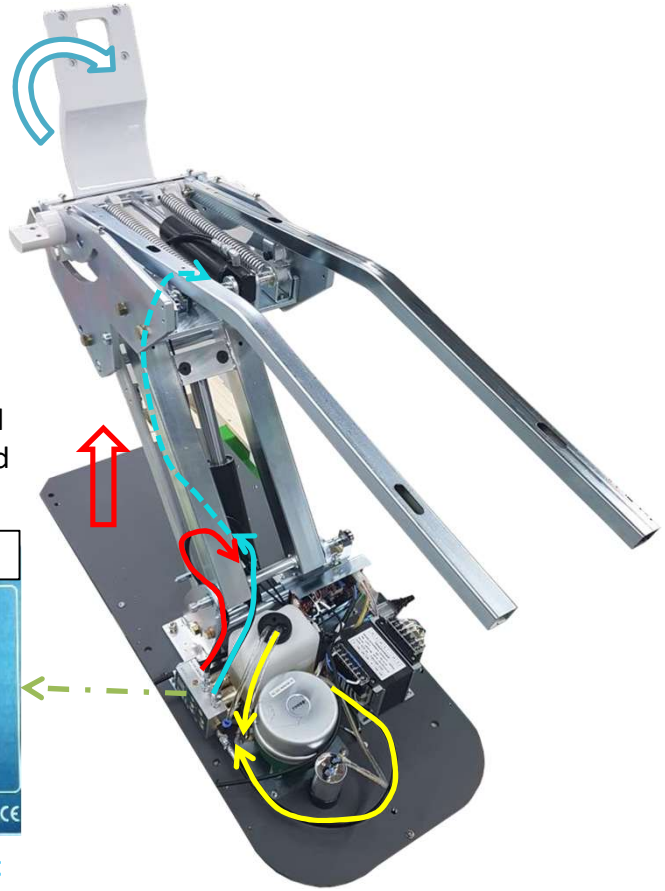




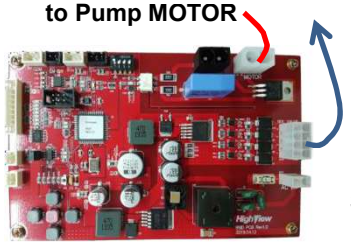
CW : Decrease the speed
CCW : Increase the speed
➔ **Normally not used**



Chair Backrest



AC 220V
to Pump MOTOR



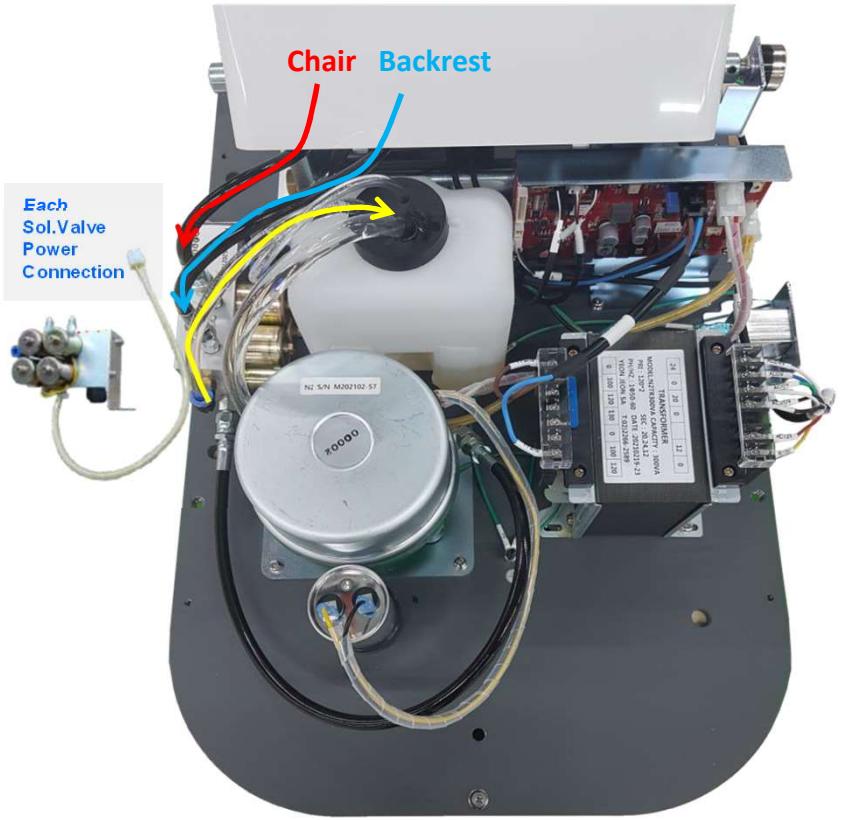
DC 24V to
HYDRAULIC
SOL.VALVE

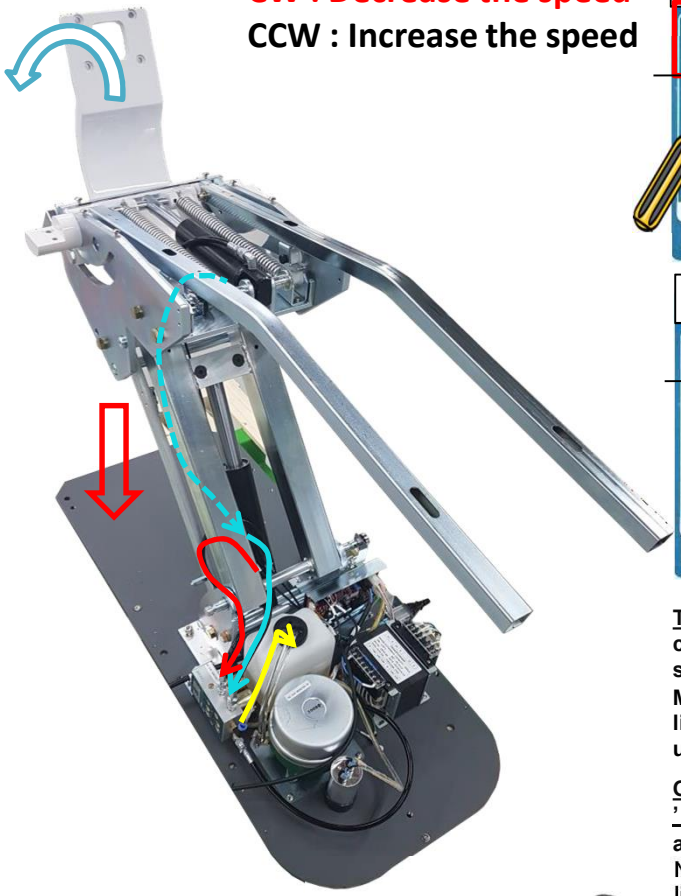
1) When chair and Backrest start to move up

1. Condenser : Strengthen Electricity to start hydraulic motor, **Hydraulic motor starts**
2. Oil barrel → Pump Motor : Pump Oil from Oil barrel
3. Pump Motor → Hydraulic Sol.Valve : Send to Hydraulic Sol.Valve which is opened
4. Hydraulic Solenoid Valve → Lifting & Backrest Cylinder : Supply oil to each cylinder

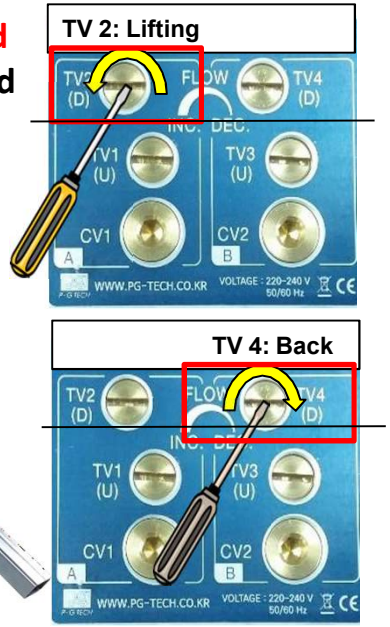
※ Warning(when replacing the cylinder or oil in the oil barrel)
When air exist in oil barrel, Oil is not moved into Cylinder due to air.
Air should be removed by letting it out from the exhaust hose

6. Speed Control : Lift and Backrest Down





CW : Decrease the speed
CCW : Increase the speed

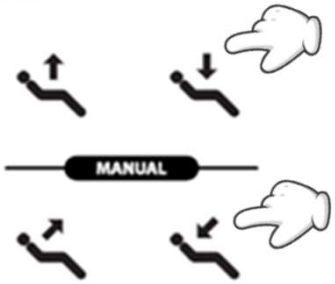


Turn the 'TV2(D)' to the left as mu ch as you can and fully open the solenoid valve.
Maximum oil passes through lifting cylinder. Unit chair moves up & down fastest.

On the contrary, turn the 'TV2(D) ' to the right as much as you can and fully close the solenoid valve No oil passes through lifting cylinder. Unit chair d oesn't make any movement.

(TV4 : Back cylinder is the same as)

As much as oil amount, unit chair mo ves slowly or fast. By handling 'TV4' or 'TV2', you can manage the speed of uni t chair.



2) When chair and Backrest start to move down

1. Condenser and Pump motor : Not work
2. Lifting & Backrest Cylinder → Hydraulic Sol.Valve open → Oil barrel : Oil Return

Lifting & Backrest Cylinder → Oil barrel : Leaking Oil return

Ⅶ Electricity & Signal movement

1. Chair PCB
2. Unit PCB
3. Table PCB
4. Earth line
5. Electric motor configuration
6. Scaler configuration

Ⅶ. Electricity & Signal movement

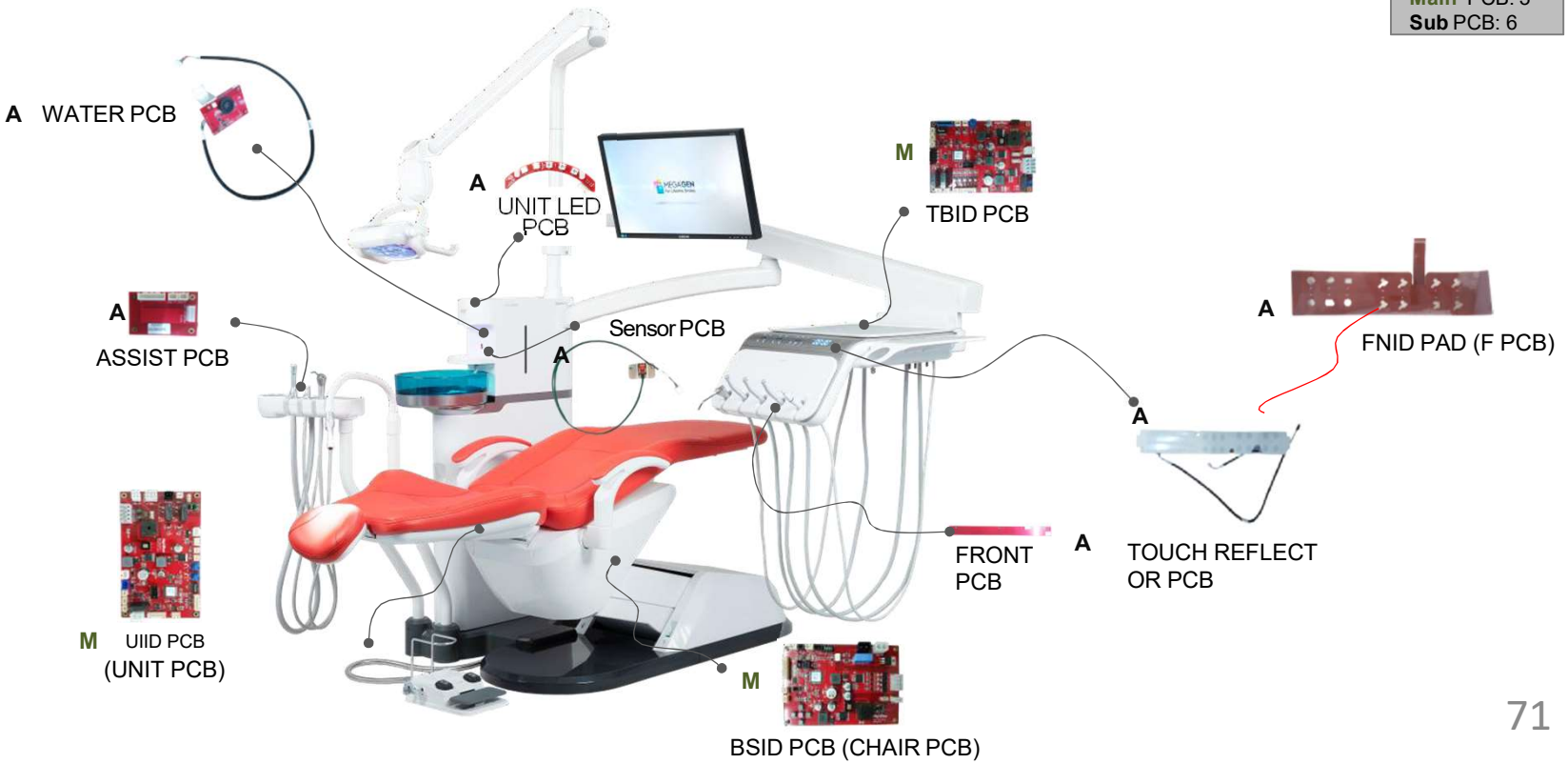
PCB is a plate which is made of the insulator. On this insulated place, the circuit is implanted for the specific purpose. (The circuit is the road that the electric signals drive along) The main parts are attached, and controlled by the orders previously programed at PCB.

※ Insulators are collectively referred to materials with properties that are difficult to transmit electricity or heat.

Simply, PCB is the insulated board with circuit, along which electricity and signal moves. The circuits are formulated on the special purpose to exchange various signals and power.

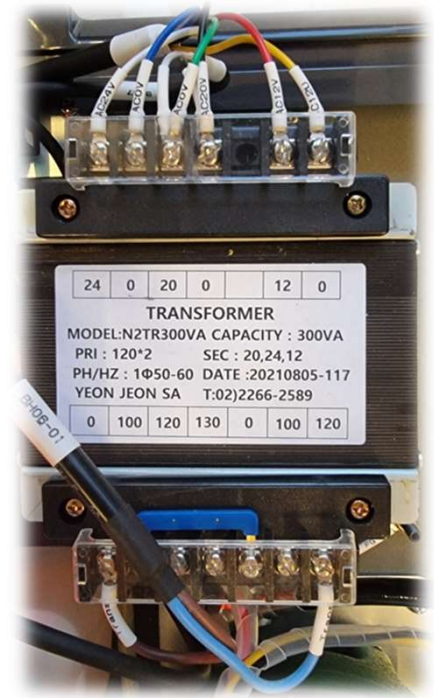
N2 is digitally controlled, and its PCB is double of N1 PCB number.

Main PCB: 3
Sub PCB: 6



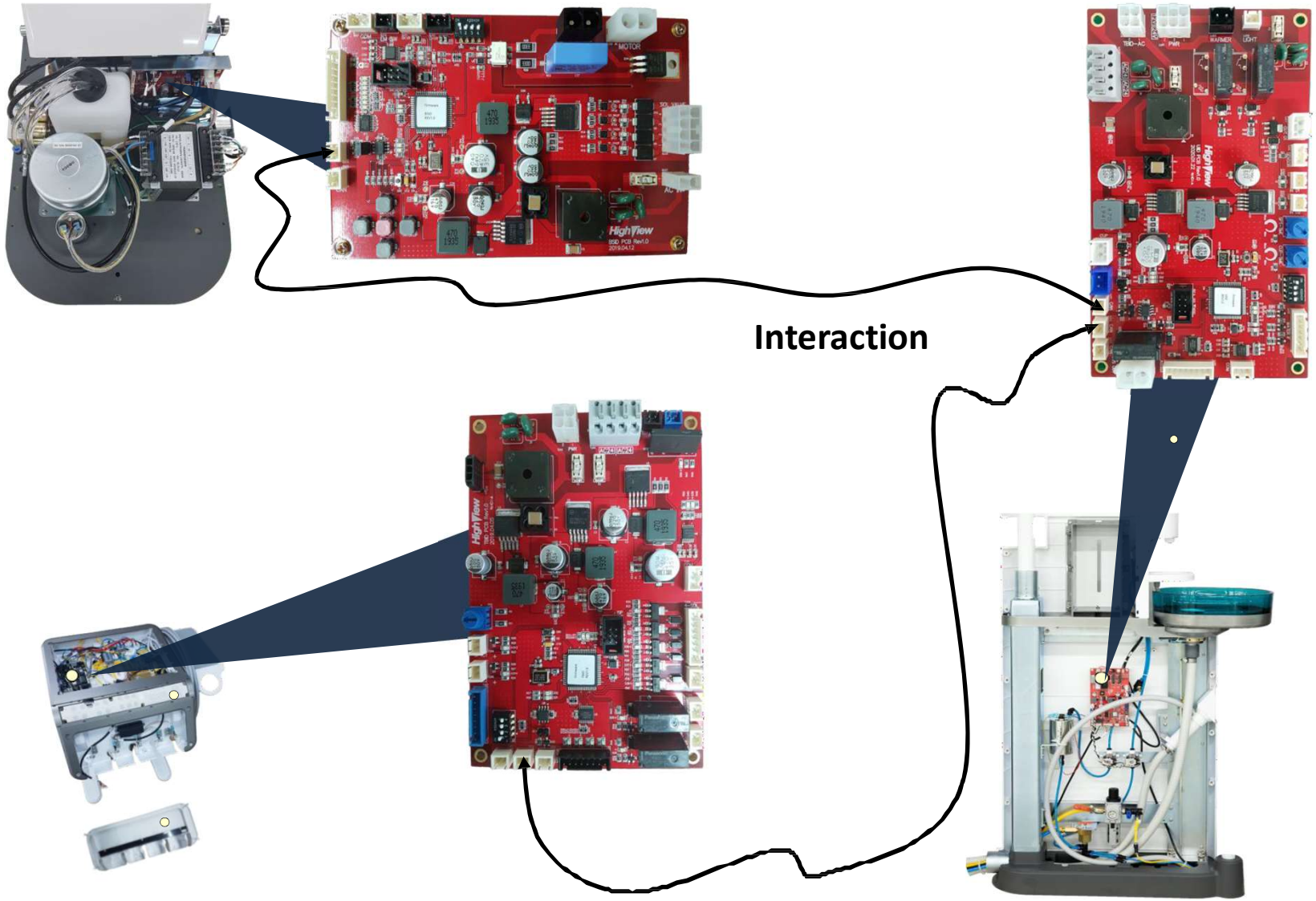
Ⅶ. Electricity & Signal movement

Power Diagram



Ⅶ. Electricity & Signal movement

CAN Communication between PCBs



1. Chair PCB

1.1 Configuration and Function

1.2 Dip Switch for Programing

1.3 Power supply components

1.4 Electricity Movement

1.5 Limited resistance(Potentiometer)

PCB

Electricity &
Signal Movement

1.1 Configuration and Function

6

5

7

At Channel Low Cover,
Collision Arising
Emergency Switch

Backrest position
Adjustment,
Position Limited
switch

Chair Lifting &
Descending,
Position limited
switch

2

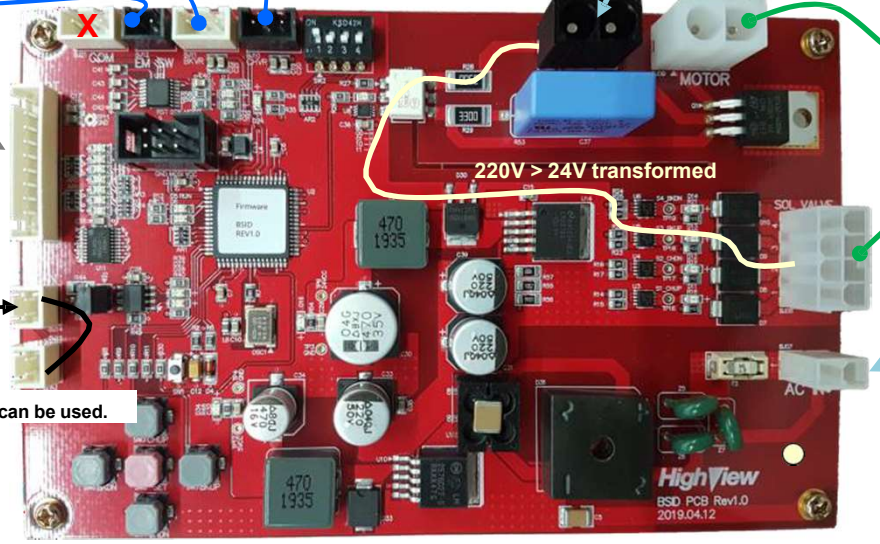
From power
Switch,
220V input

4

To Hydraulic Motor,
220V output

8

Foot Switch
(Elec Signal)



3

To Hydraulic
Solenoid Valve,
DC 24V output

9

Each can be used.

1

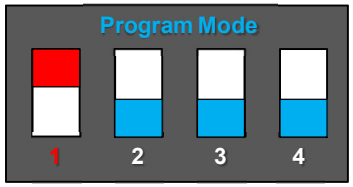
From Trans,
AC 20V
Electricity input

To Unit, CAN communication
(Signal, interaction)

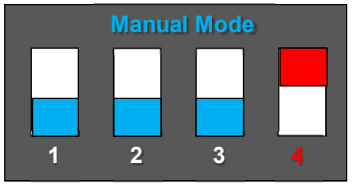
↔	INTERACTION
←	SIGNAL INPUT
→	SIGNAL OUTPUT
←	POWER INPUT P
→	OWER OUTPUT
X	SPARE

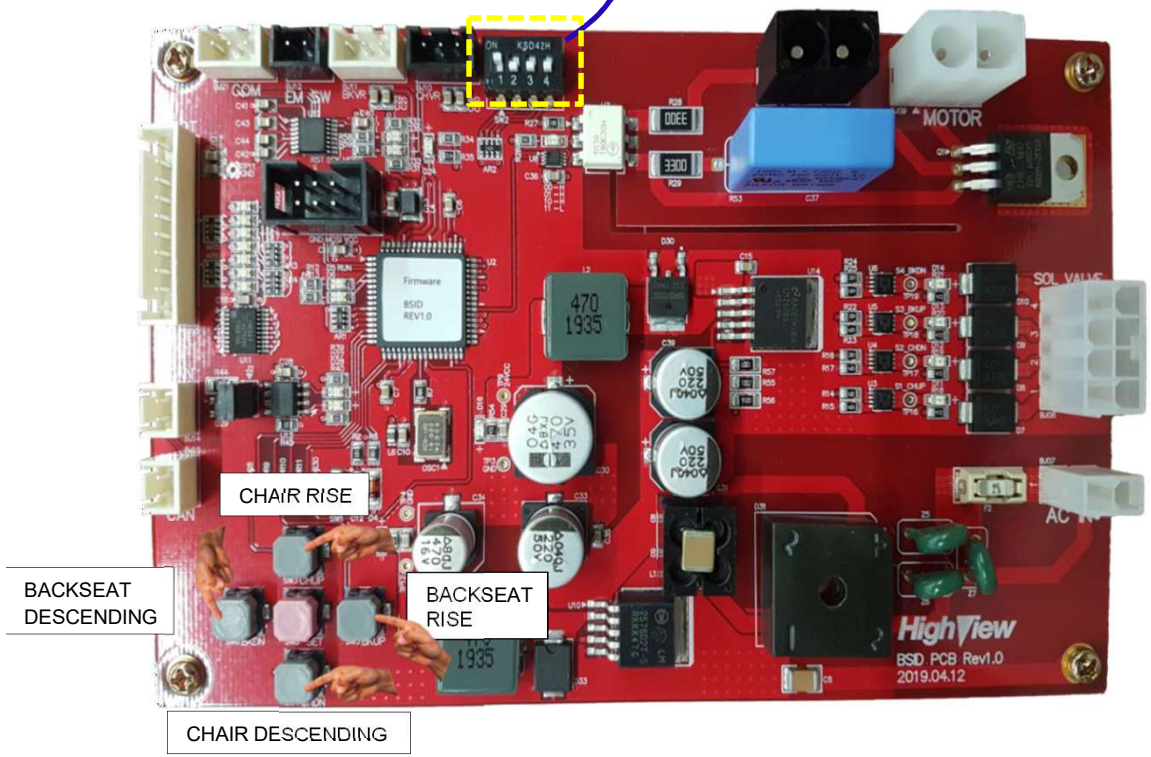
1) Power supply to PCB power on
2) Power supply to '4' hydraulic motor
3) From'2' to '3' 220v transformed into 24v,
   Power supply to hydraulic solenoid valve
4) '8' footswitch signal moving to '5', '6', '7'
5) '9'unit PCB & chair PCB itself interaction

1.2 Dip Switch for programing



Do it manually





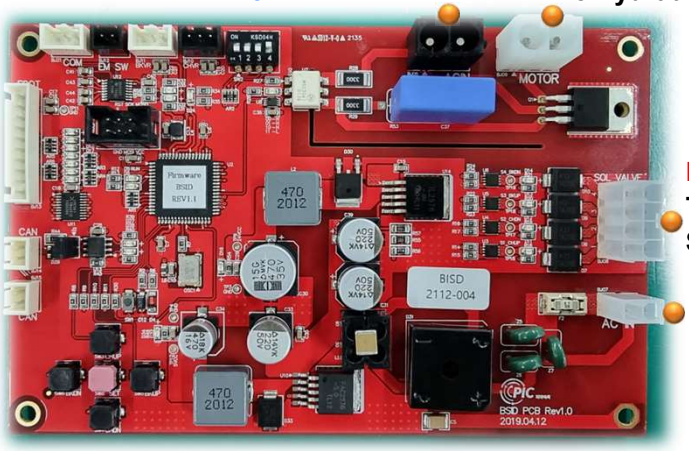
Move the chair:
From Program Mode to Manual Mode.

During installation:
Use Up or Down button in CHAIR PCB.

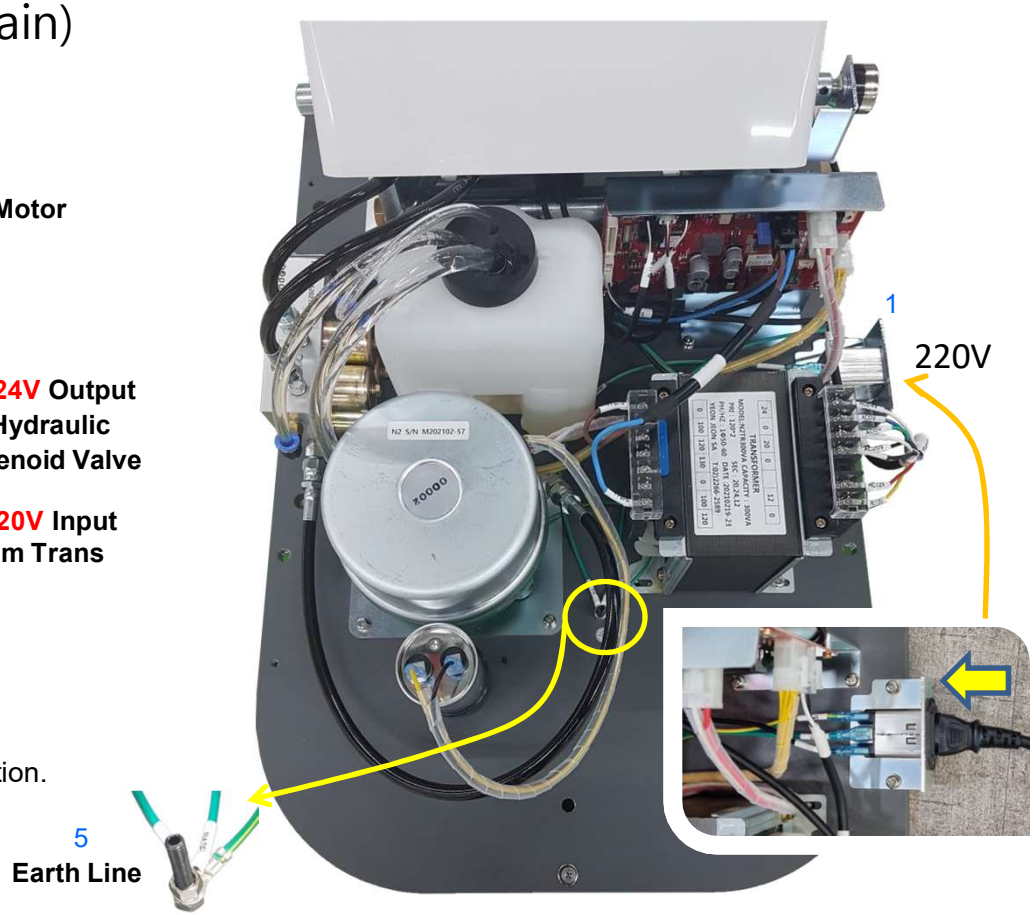
The chair can be controlled manually by the dip switch on chair PCB.

1.3 Power Supply Component

1.3.1. BSID PCB (Chair Main)

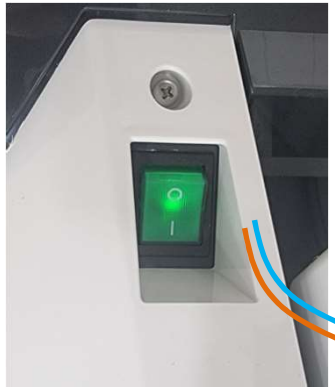


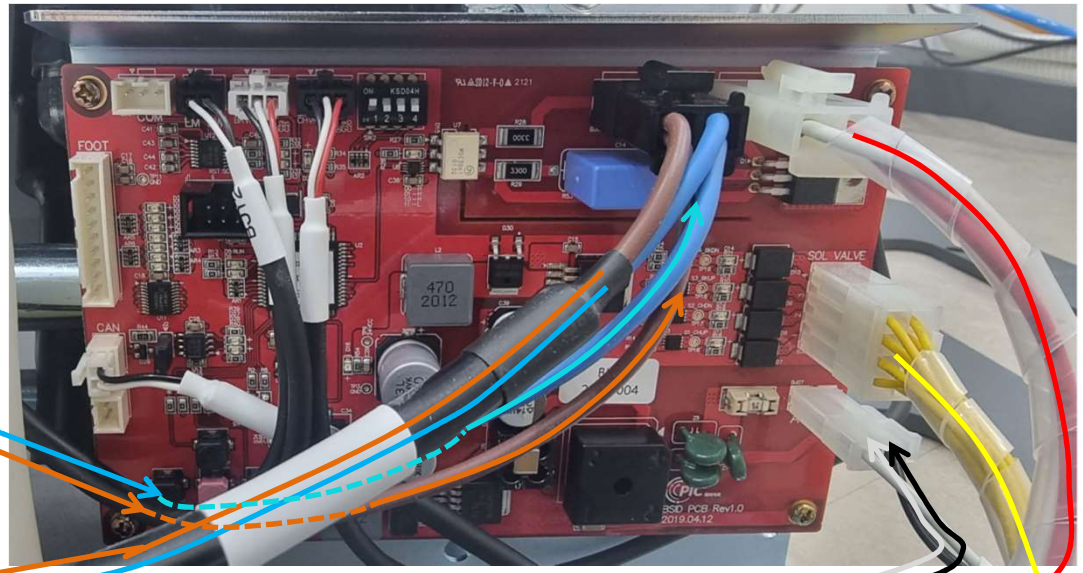
This is a description of how power is Supplied,
and hydraulic oil is mobilized according to unit chair operation.



1. Power Input (220V) – Power Switch: 220V is inserted
2. Power Switch – **BSID** PCB: 220V input into Chair PCB
3. **BSID** PCB – Transformer: 220V input into Trans
4. Trans - **BSID** PCB: AC20V input into PCB,
5. Power Input – Earth Post: Flowing unused Electricity
6. **BSID** PCB – Hydraulic Motor: 220V insertion,
7. **BSID** PCB – Hydraulic Solenoid Valve: DC24V insertion

1.4 Electricity Movement





220V to PCB

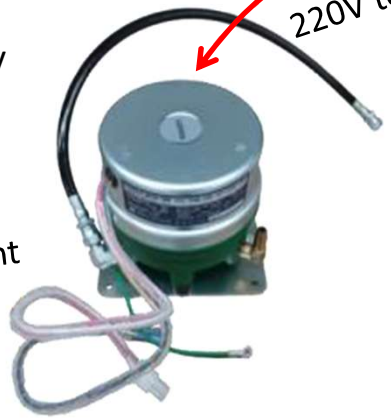
220V to trans

AC 24V to unit

AC 20V to PCB

AC 20V to unit

AC 12V to Light Bia unit

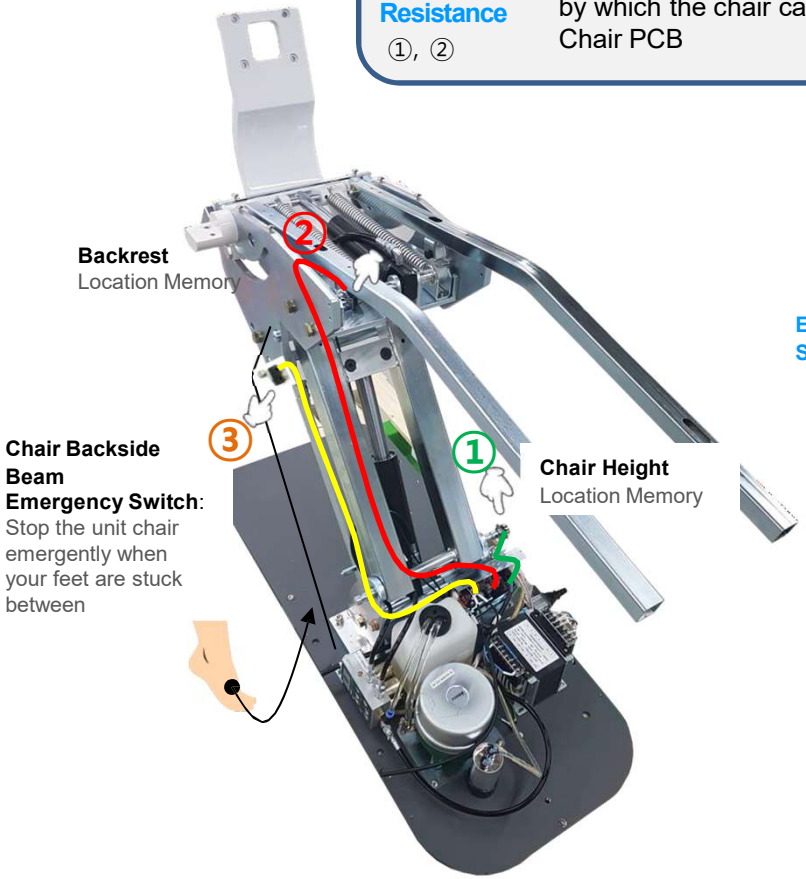


220V to Motor

DC 24V to Sol.valve

1.5 Limited Resistance(Potentiometer)

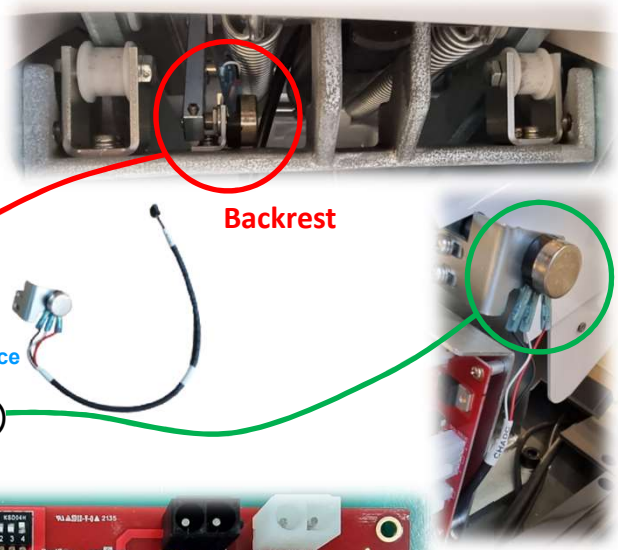
Emergency Switch ③	The limited switch is pressed, make unit chair no more operates.
Limited Resistance ①, ②	Position Meter Ruler becomes the barometer, by which the chair can go to the position that Chair PCB

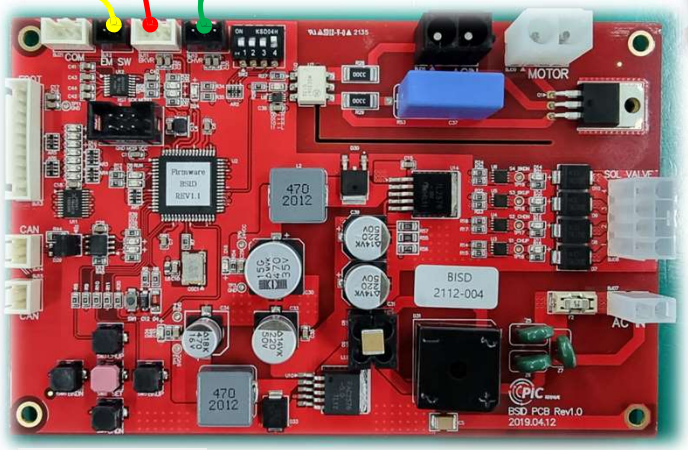


Backrest
Location Memory

Chair Backside Beam
Emergency Switch: Stop the unit chair emergently when your feet are stuck between

Chair Height
Location Memory



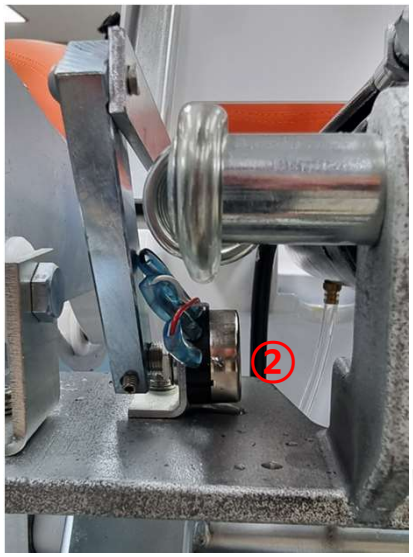


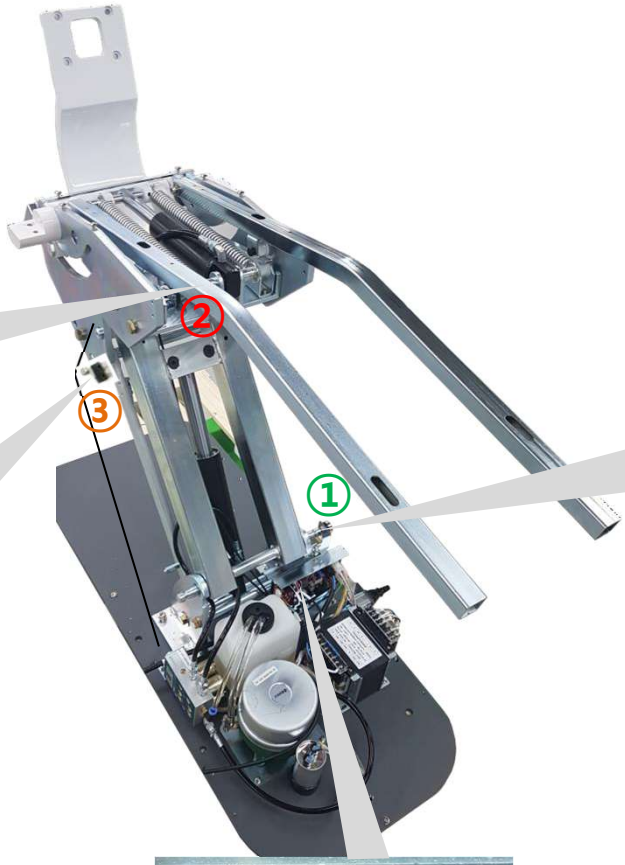
BSID PCB (Chair Main)

1. **Chair PCB** - 1st Position limited SW : Lifting Cylinder is operated by Chair Height Memory
2. **Chair PCB** - 2nd Position limited SW : Bacllrest Cylinder is operated by Back Height Memory
3. **Chair PCB** - Emergency Switch : Stop the unit chair emergently when your feet are stuck

1.5 Limited Resistance(Potentiometer)

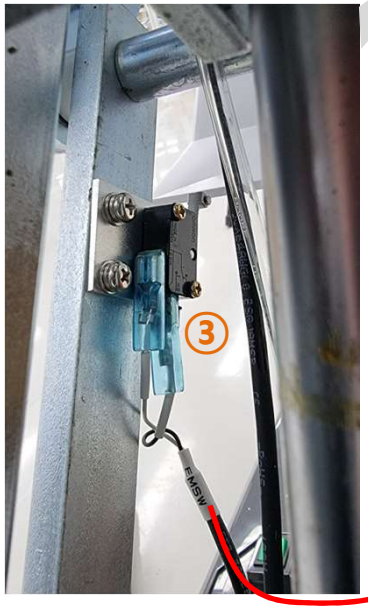
Backrest
Potentiometer





Chair
Potentiometer

Emergency
Switch



2. Unit PCB

2.1 Configuration and Function

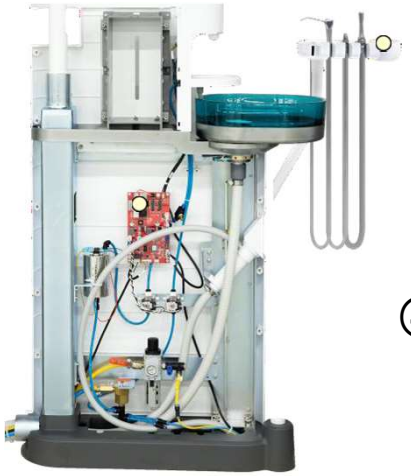
2.2 Unit PCB components

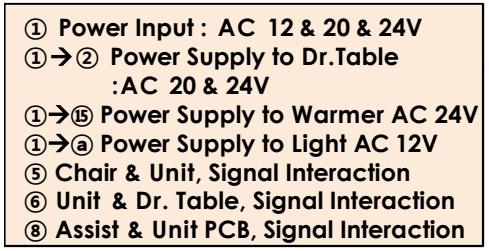
2.3 Relay PCB for the suction valve

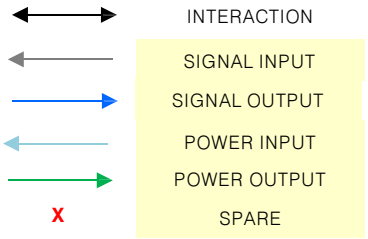
PCB

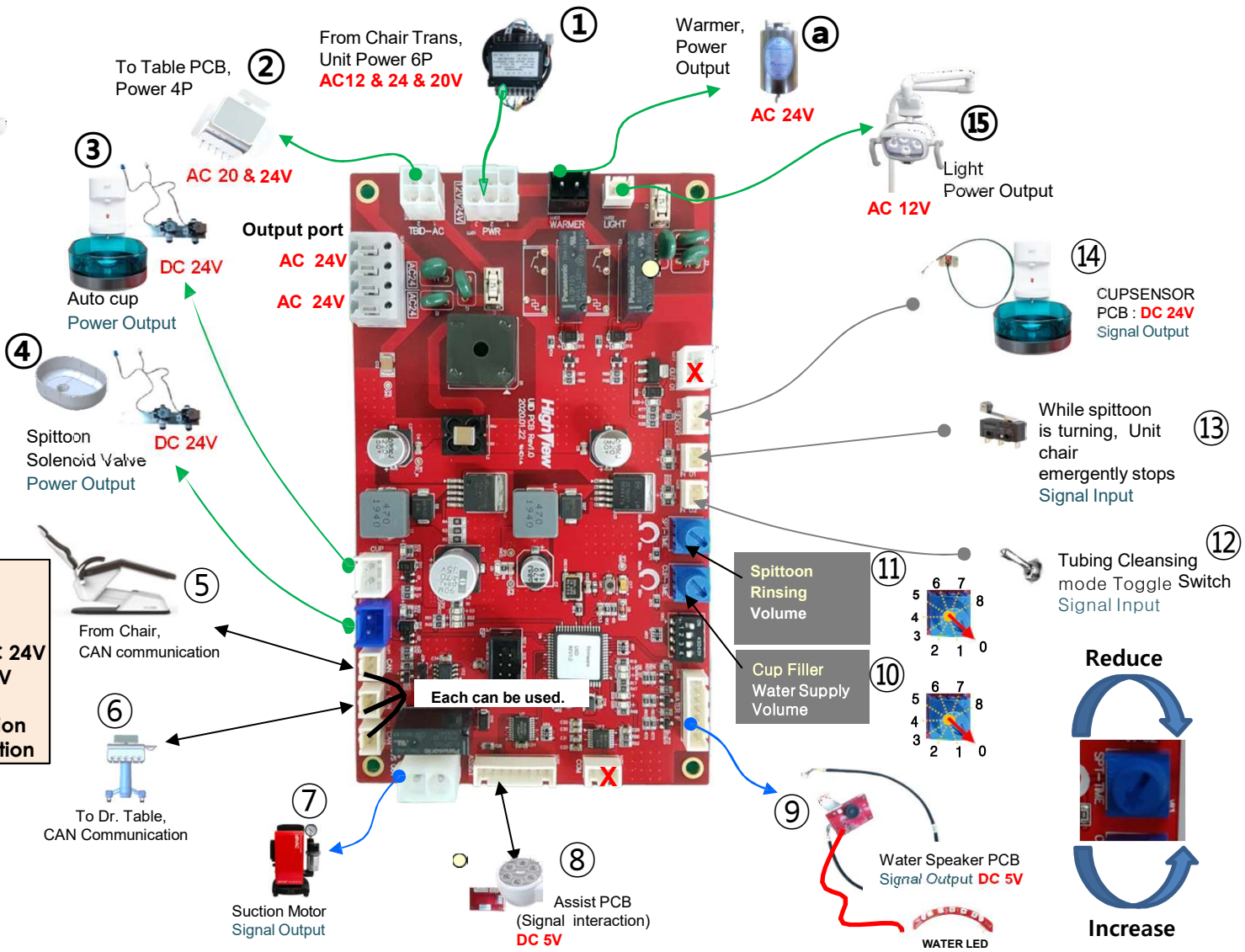
Electricity &
Signal Movement

2.1 Configuration and Function

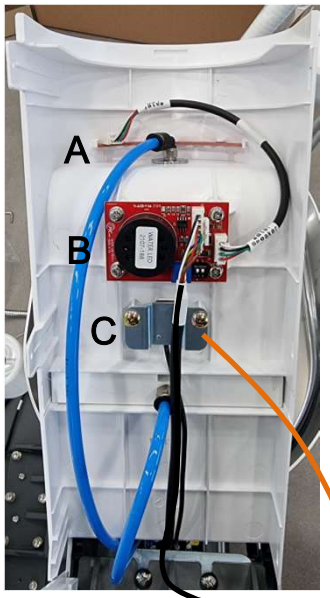




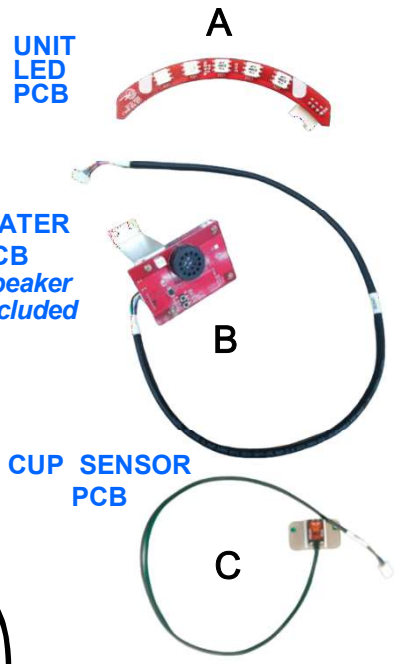




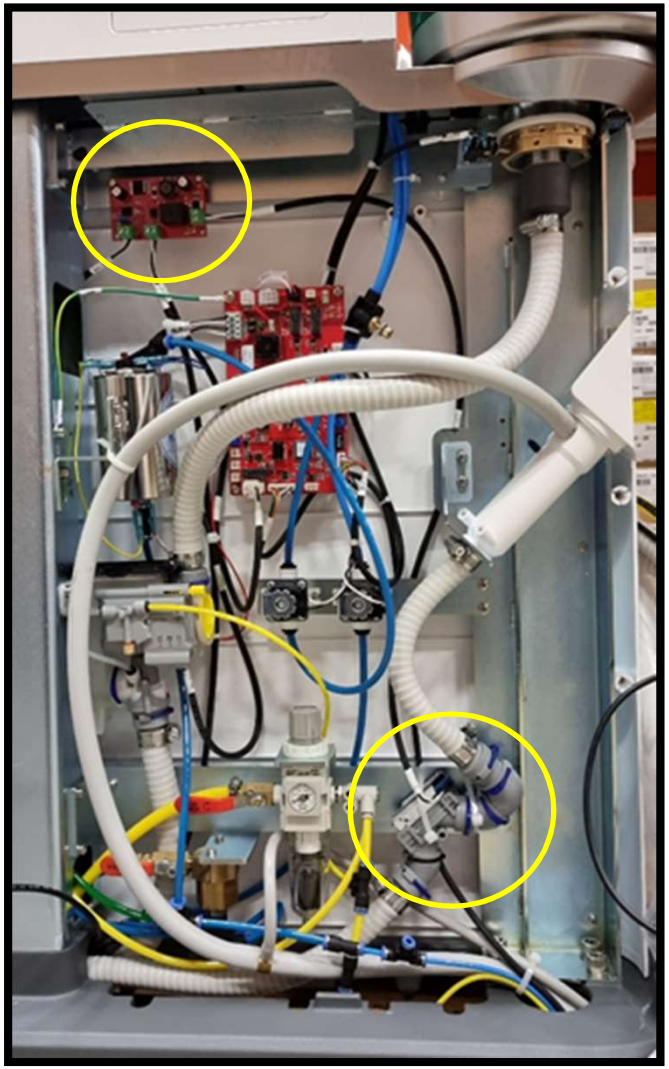
2.2 Unit PCB Components

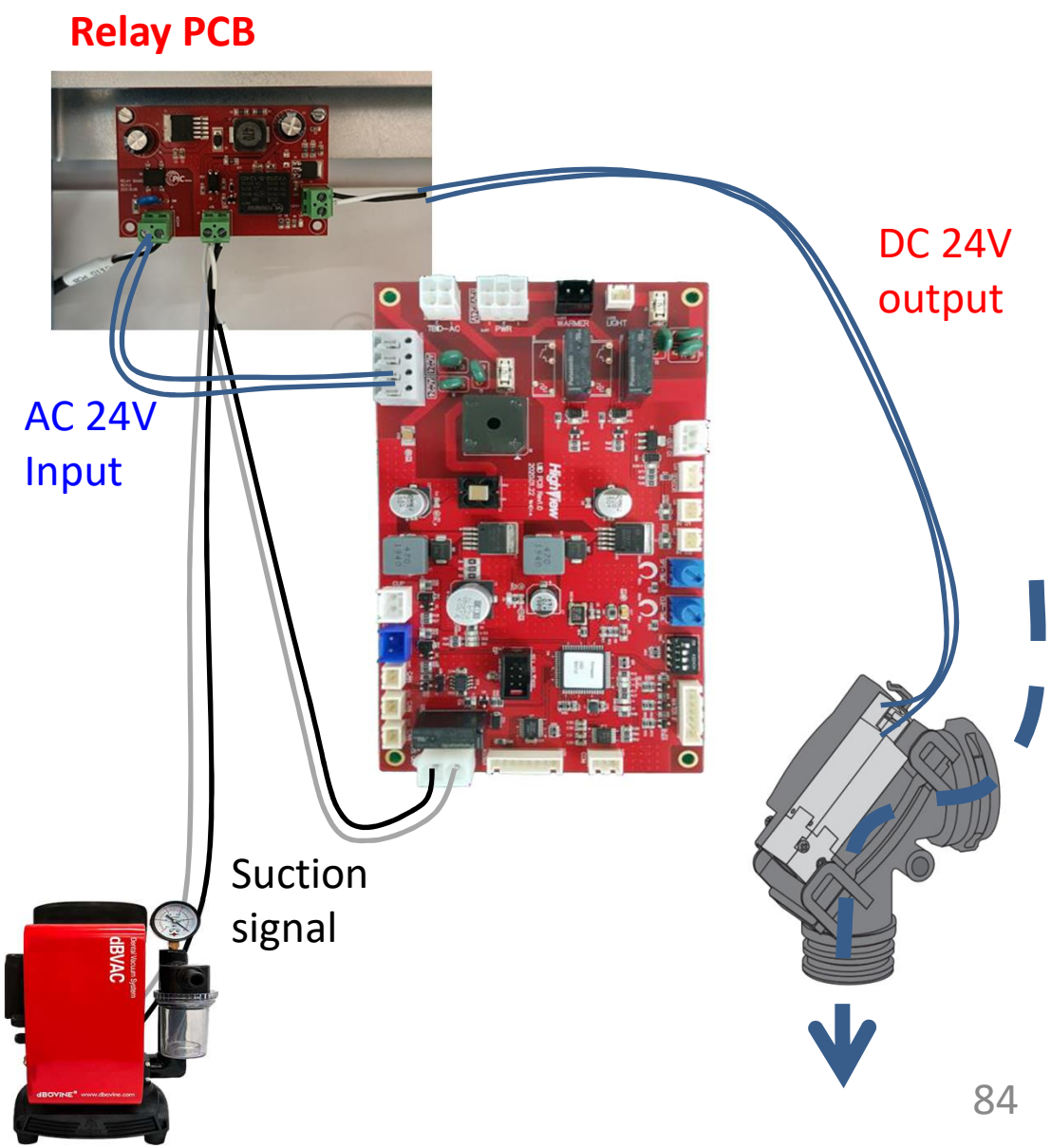


TWOCS6 Cuppillar pcb Replacement (UIID PCB)



2.3 Relay PCB for Suction valve





3. Table PCB

3.1 Configuration and Function

3.2 Holder micro switch

3.3 HP Solenoid valve LED indicator

PCB

Electricity &
Signal Movement

3.1 Configuration and Function

① Power Input From Unit : 20 & 24V

① > Power Supply to ②, ③, ④, ⑤, ⑫, ⑬

⑥Dr. table > Unit> Chair : Can Communication

⑦Dr. table > Unit : Can Communication

① From Unit, Power 4P Connector **AC20&24V**

⑬ Elec PCB Power Input **AC24V**

② Flexible PCB

Dr. table switch PCB (Back) Power Input: **DC 24V**

⑫ Scaler Power Input **AC24V**

③ LED VOLUME

⑪ Air Solenoid Valve **DC24V**

TWOCS15 Maintenance for Handpiece Optic

1st handpiece Power input

2.5~ 3.5V

④

2.5~ 3.5V

2nd handpiece Power input

⑩ For Water Valve Solenoid Valve **DC24V**

Each can be used.

⑤

⑨ Scaler Connected to PCB & Footswitch Signal

Relay switch for scaler

⑥ Handpiece Holder Power Input

Dr. TABLE (Front) **CAN Communication:**

⑦ UNIT: **CAN Communication**

⑧ Handpiece Limited Switch Signal & Input

INTERACTION

SIGNAL INPUT

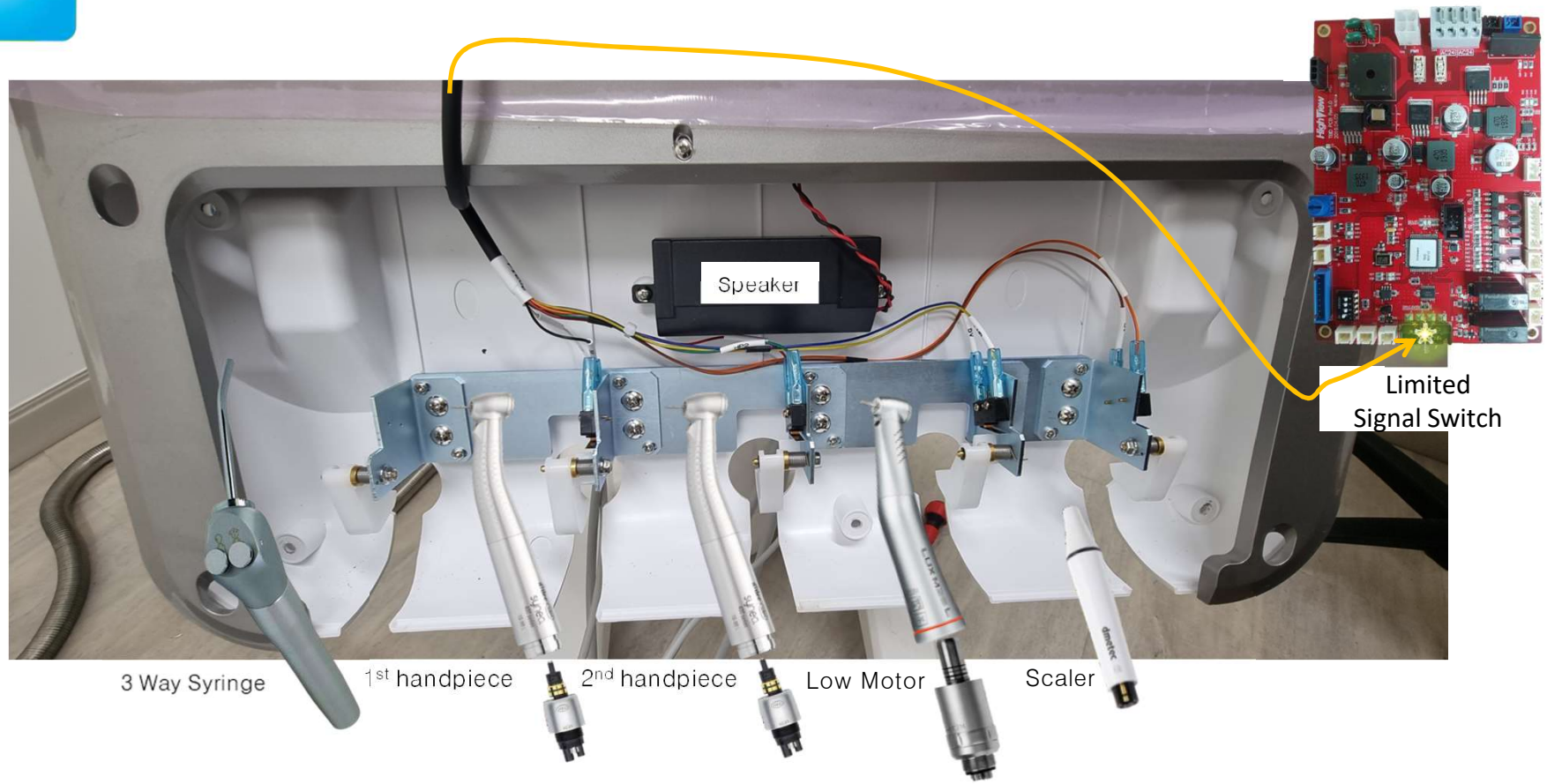
SIGNAL OUTPUT

POWER INPUT

POWER OUTPUT

X SPARE

3.2 Holder Micro Switch



3way syringe is directly connected from sources: Air & Water without passing through any other component such as a solenoid valve. If the handpiece's source is weak, you should take a look at 3-way syringe.

It is directly connected device.

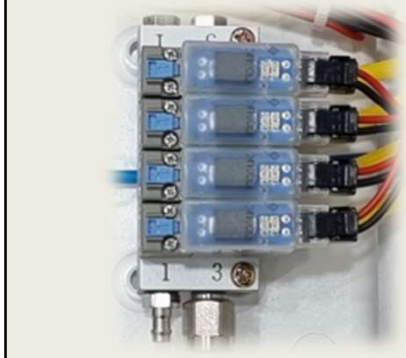
You can test whether Air compressor or Tap water is weak or broken by testing 3-way syringe

The 3-way syringe has the own buttons which are manually controlled by hands.

It is not linked with limited switch and solenoid valve.

3.3 HP Sol.valve LED Indicator

LED Indicator : Corresponding Instruments on the PCB & Solenoid valve

Standard	Turbine 1	Low Motor 3	Scaler 4
			
			

4. Earth Line (PROTECTION OF OVER ELECTRICITY)

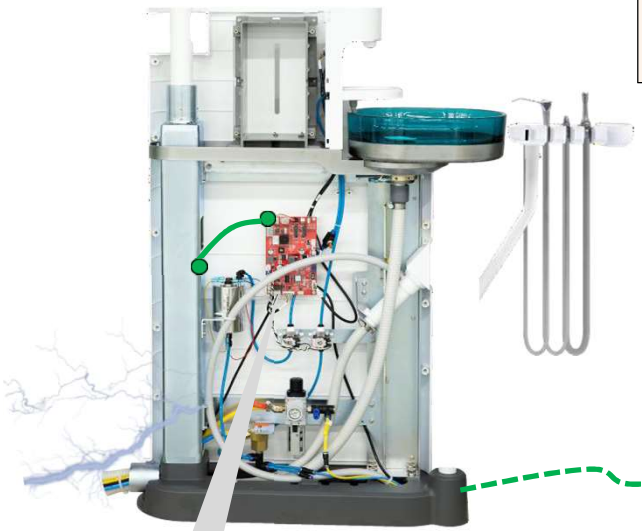
Since the unit chair is the medical equipment whic h a patient, a staff and a doctor always touch, **th e leak current can bring the electric shock to them**.

Also, it can cause the malfunction of han dpiece and scaler.

To prevent it, the earth line is connected among PCBs letting the leak current out to the ground.

When over-current flows into the chair, **it has the protection which let over-current out to the ground through Earth line.**

the leak current in

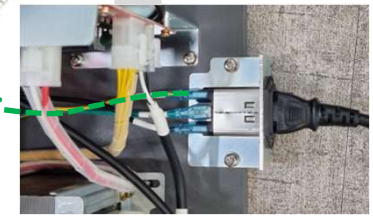


the leak current in

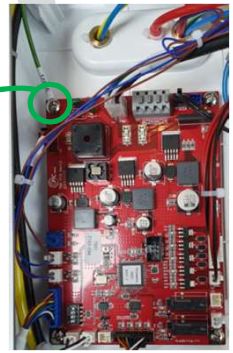
Earth Line

BSID PCB (CHAIR PCB)

letting the leak current out



Earth Line



TBID PCB

5. Electric Low Motor

5.1 Electric and Pneumatic HP Comparison

5.2 Micro NX Configuration

5.3 Diagram

Micro NX Electric Low Motor

5.1 ELEC VS PNEUMATIC HP Comparison

Elec Motor
–driven

Preparation (Prep.)

Cutting teeth in order to place prosthesis on it

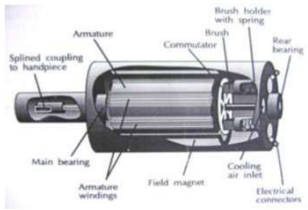
Margin Control

Cutting teeth which is located at the crown's bottom
Prep> Margin Control

Internal Oiling (Elec Handpiece AS)
https://youtu.be/BF5VtmWfHdo

Treatment Criteria	Control Panel Gear Ratio				Rotation speed (RPM)
	1:5	1:1	16:1	20:1	
Natural Tooth Prep.	●				200,000 (prep)
Removing High Strength Prosthetics (Zirconia)	●				
3rd Molar Extraction with Surgical bur	●				
Metal Crown Prep.	●				
Implant Ab. Prep.	●				
Post Prep.	●				
Implant Ab. Cutting	●				100,000~150,000
Tooth Margin Shaping	●				50,000~70,000 (margin)
Crown **margin** polishing	●				
Zirconia shoulder margin	●				
Ceramic inlay **margin**	●				
Apicoectomy	●				30,000~40,000
Polishing after resin filling		●			2,000
Gate drill bur fracture prevention		●			1,000
Decayed tooth extraction near pulp				●	100
Cyst extraction inside bone				●	100~1,000
Endo			●		250~300
Shaping Prosthetics		●			~40,000

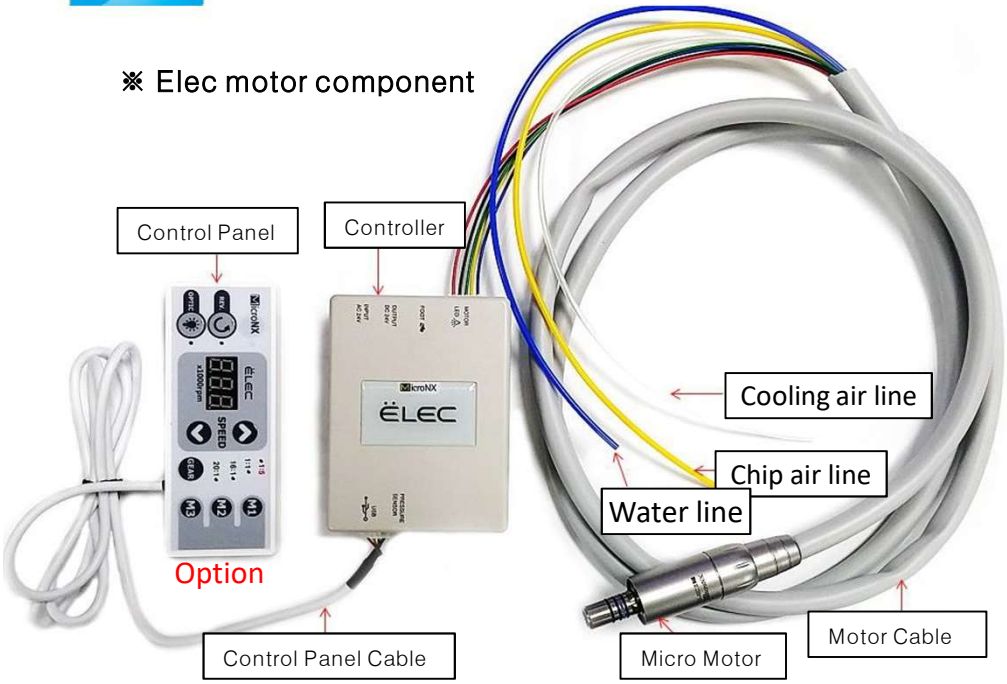
Air Motor VS Elec Motor
(Impeller Turbine) (Elec Coil)

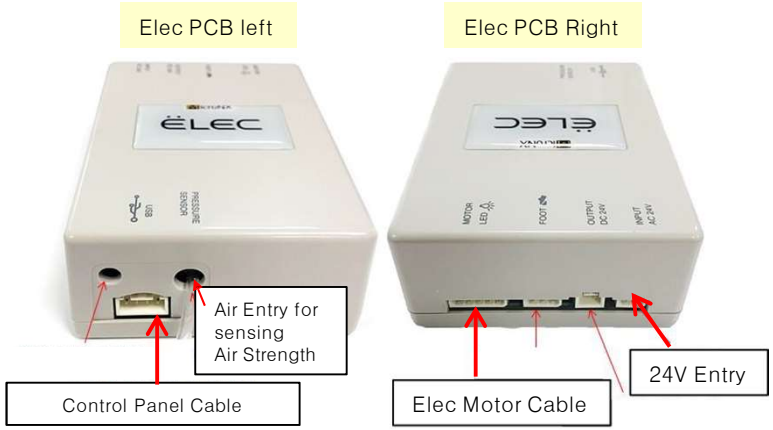


Air Motor Repair https://youtu.be/N-xr_P63Dn0

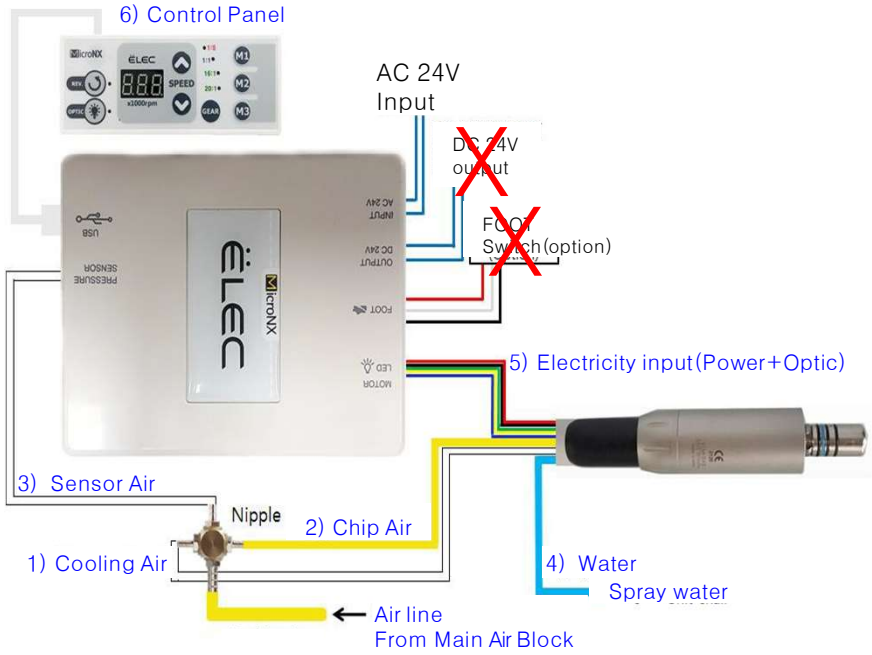
5.2 Micro NX Configurations

※ Elec motor component





※ Elec motor Structure

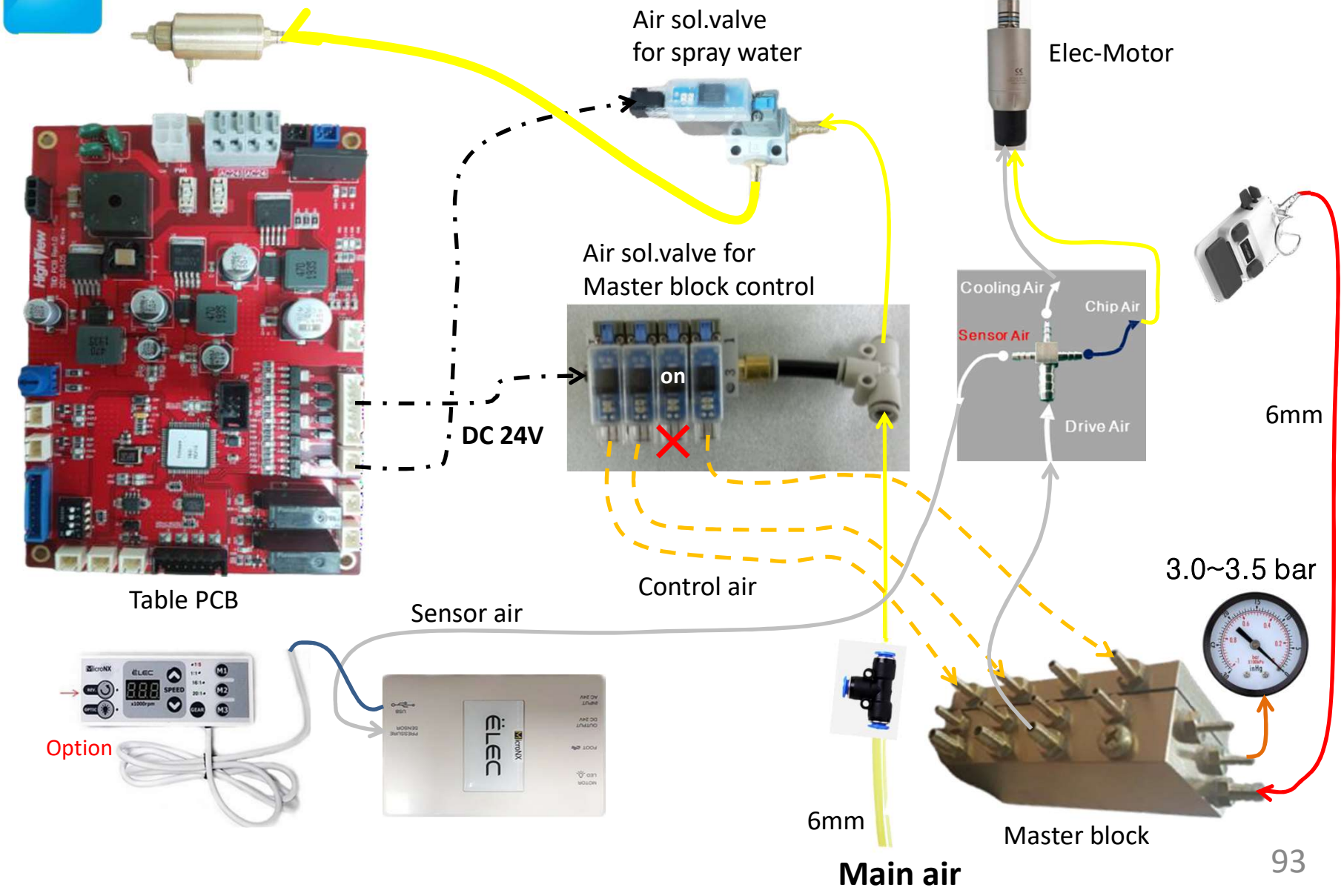


- Supply Line

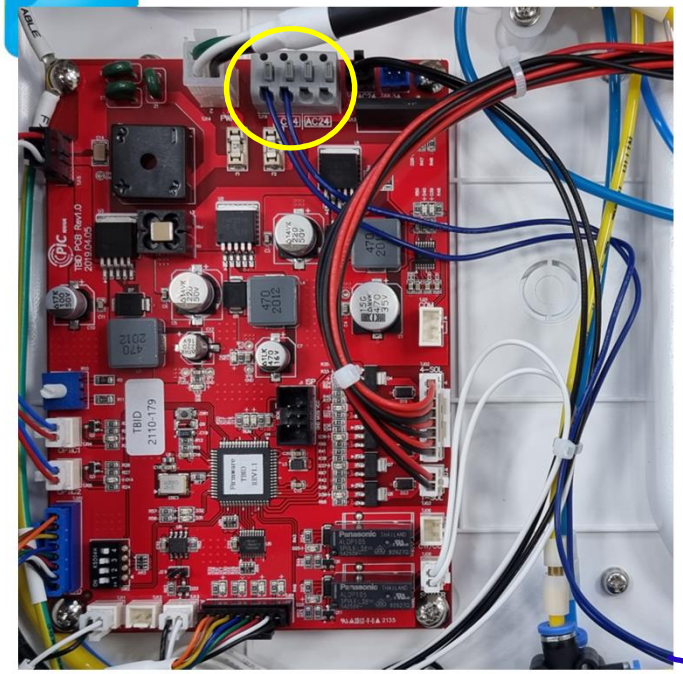
1) Motor Cooling Air,
2) Chip Air,
3) Air Entry for sensing Air Strength,
4) Water
5) Electricity Input (Motor +Optic),
6) Control Panel

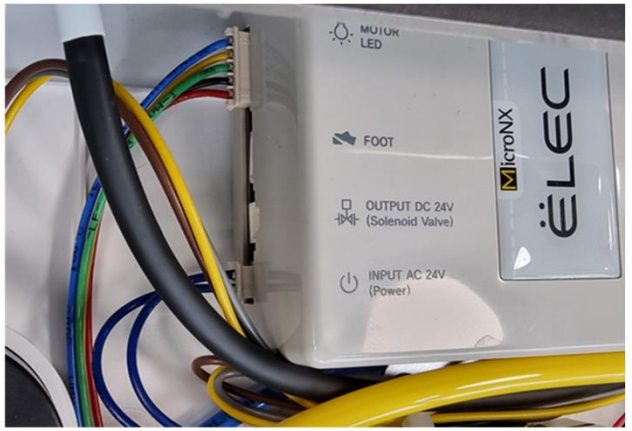
Unless 1~6 are supplied, Motor is not working.

5.3 Diagram(Chip & Cooling air)



5.3 Diagram(Sensor air & Power)

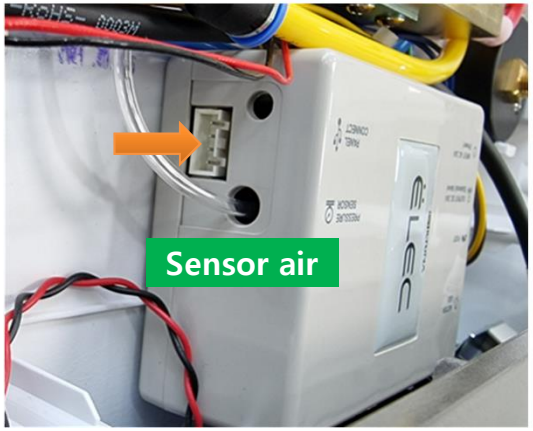


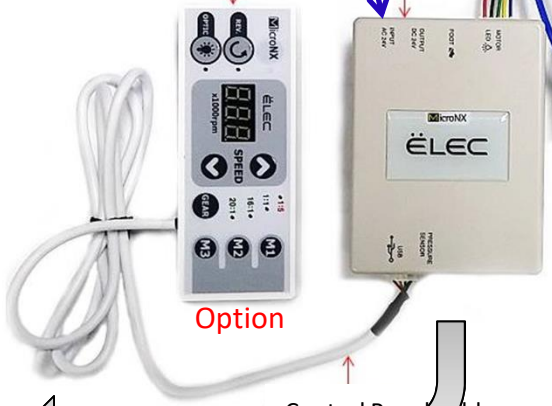


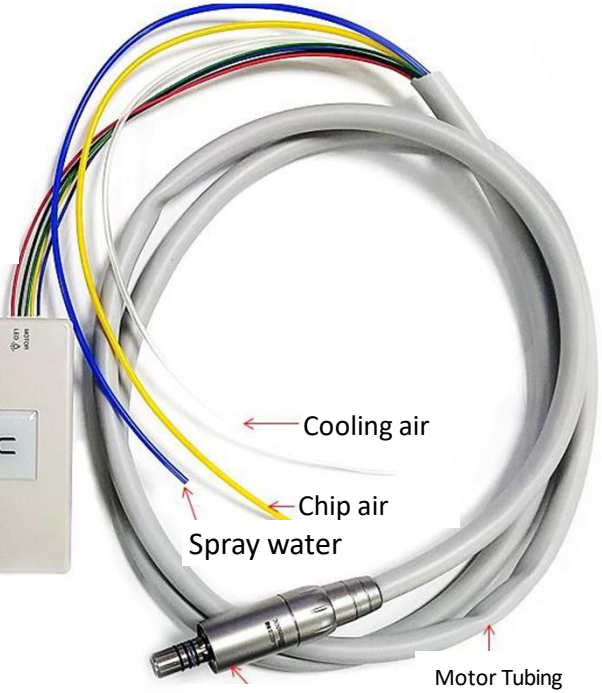
AC 24V

Control Panel

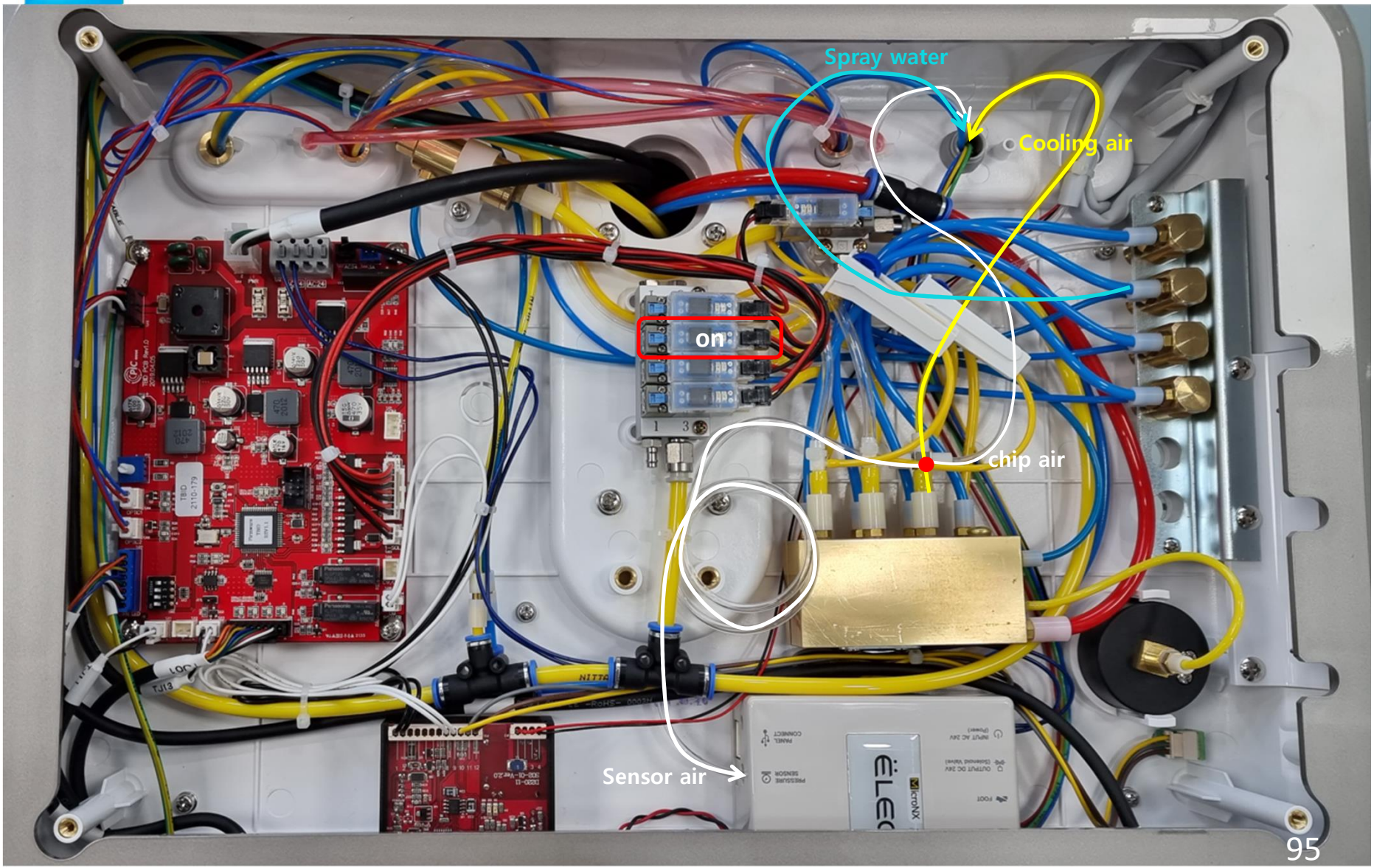
Controller







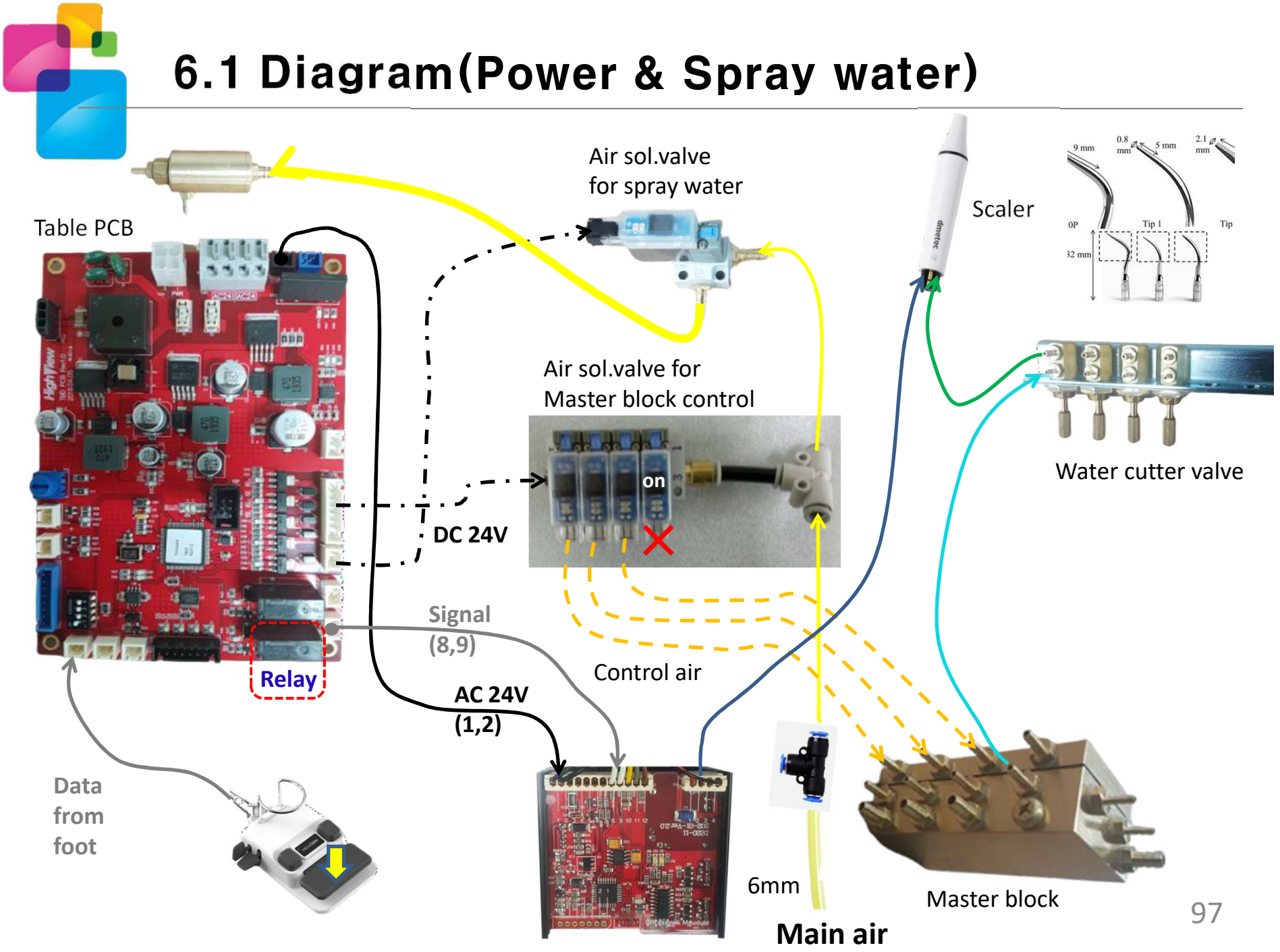
5.3 Diagram(Chip & Cooling & Sensor air)



6. Electric Scaler

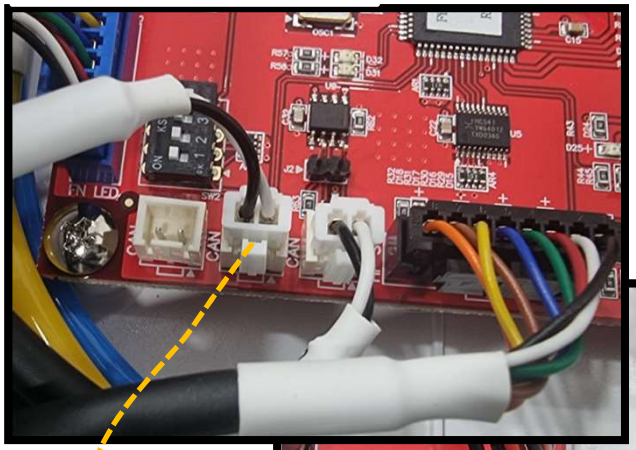
6.1 Diagram

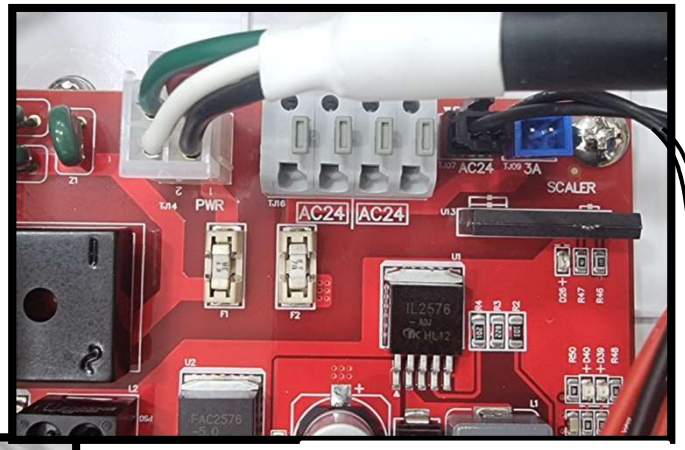
6.1 Diagram(Power & Spray water)



6.1 Diagram(Power)

CAN from Foot

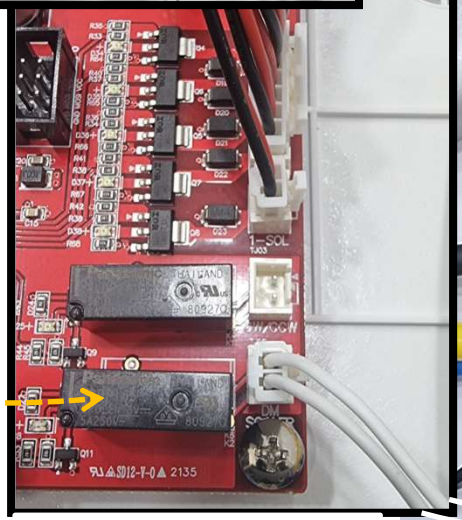




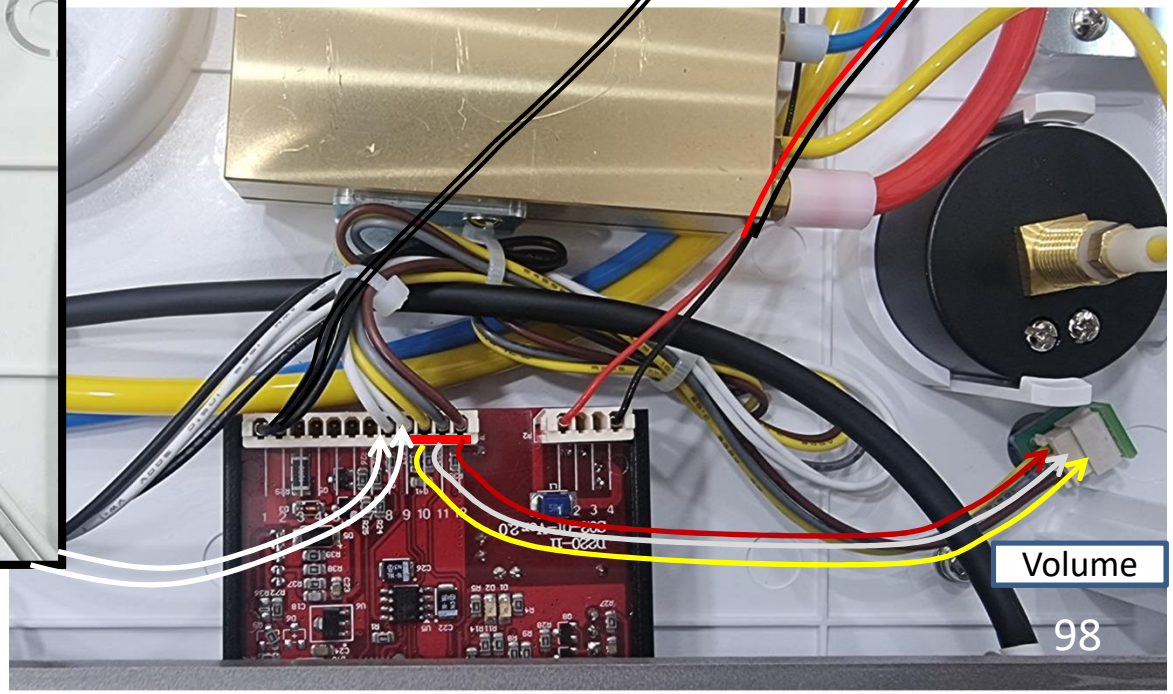
Power AC 24V

DC 18~23V

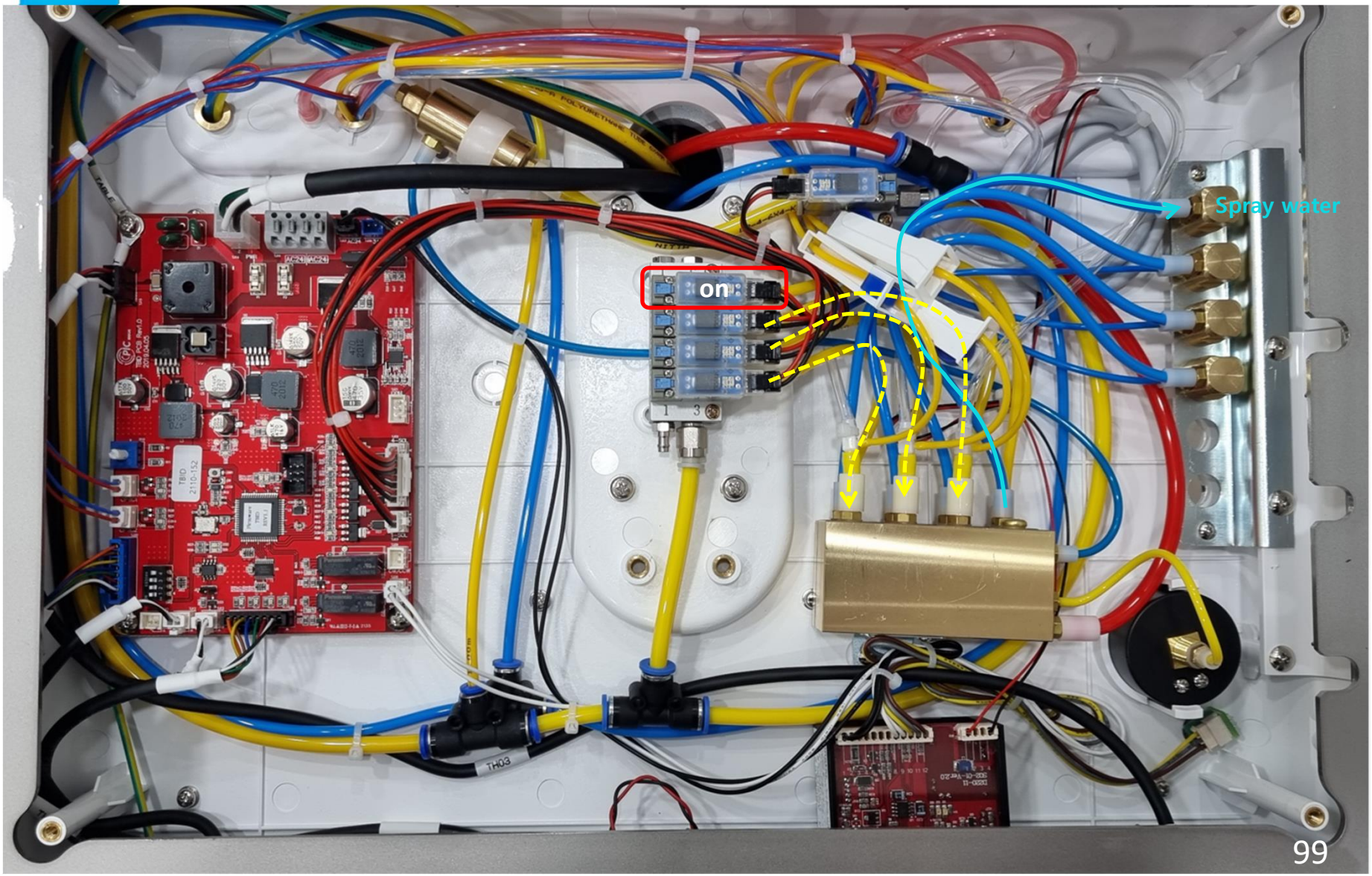
Signal
Transmission



Signal Line



6.1 Diagram(Spray water)



Ⅷ Dental Light

1. LUVIS C300
2. Dual Light ML100

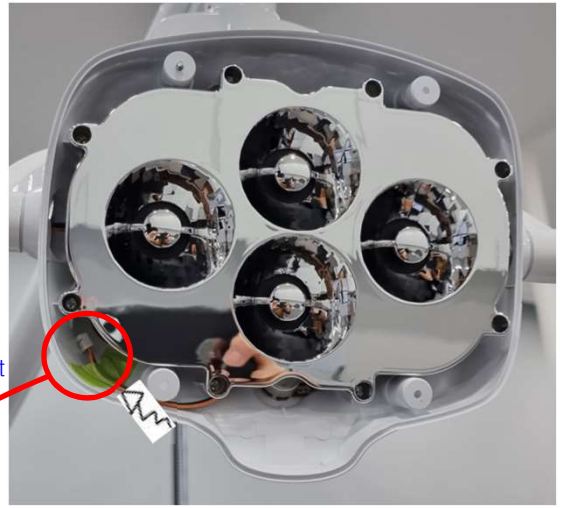
1. LUVIS C300

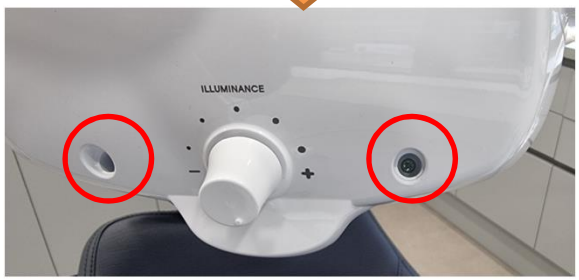
1. LUVIS C300

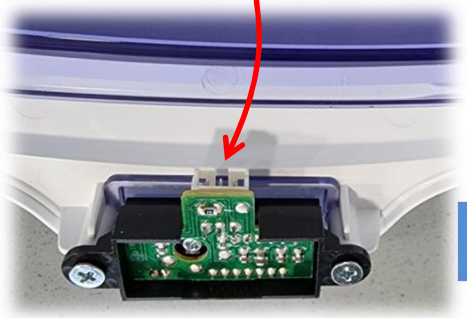
1.1. Sensor control

Remove back side cover

Sensor Connector Detachment







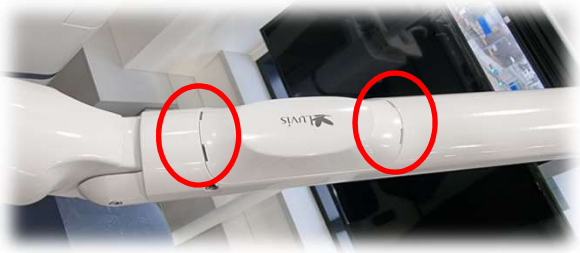
CS56
Light sensor detachment

1. LUVIS C300

1.2. Tension Control for Light Arm Movement By using 14mm spanner

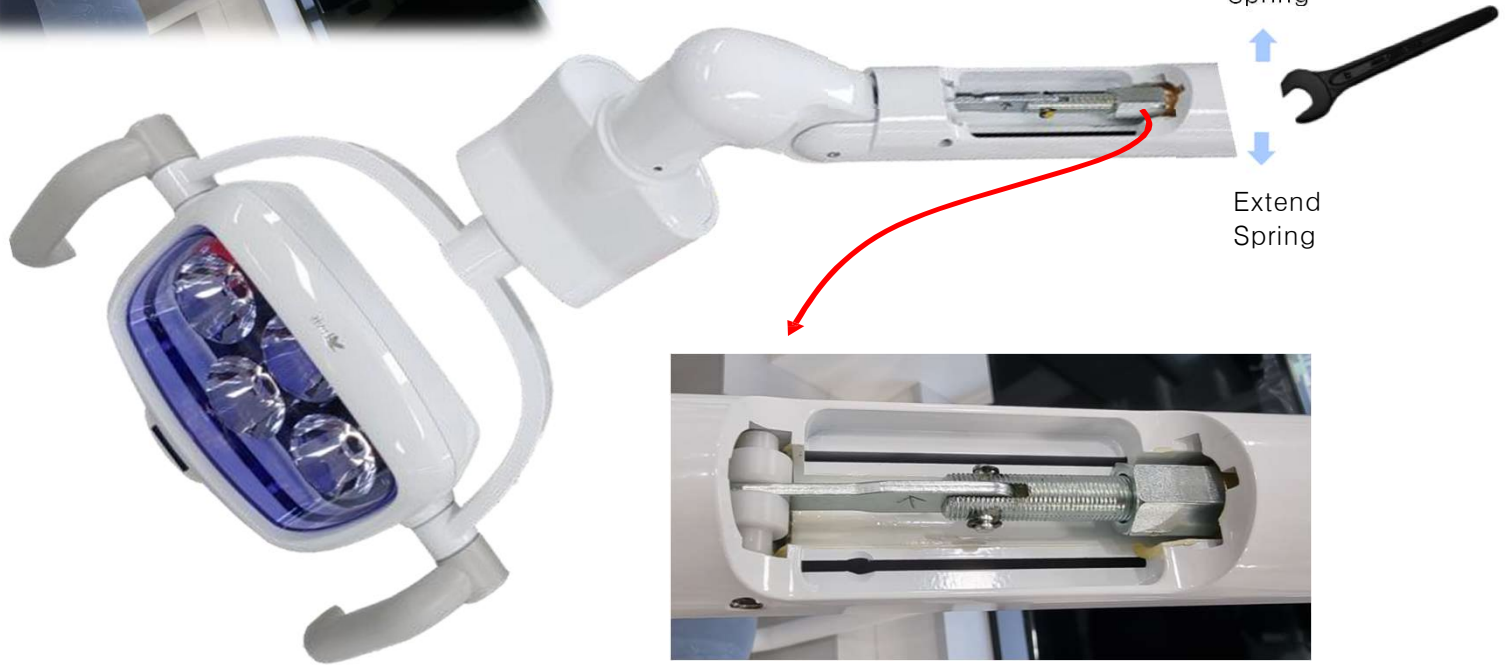
Reduce tension of the spring ➔ Weaken supporting against gravity

Extend tension of the spring ➔ Strengthen supporting against gravity



Open the cover using flat screw driver at the groove

Reduce Spring



Extend Spring

1. LUVIS C300

1.3. Light arm connection noise by rust and friction.
Brush the grease on connection.

2. Dual Light ML100

Dual Light ML 100A
(No Camera)

Dual Light ML 100B
(Camera included)

2. Dual Light ML100B(without Camera)

2.1. 3 Functions of color temperature

ⓐ Yellow Light
: Blue Cut Filter for composite resin

ⓑ White Light
: Shadow matching for Pros.

ⓒ Natural Light
: Normal LED

2. Dual Light ML100

2.2. Specification

Standard

Classification	Unit	Specification
Focal Distance	mm	650-850
Focal Pattern Size	mm	160 x 110
Cantre Intensity	LUX	16,000 (min)
		40,000 (Max)
CRI		Over 92
Color Temperature	K	3000/4700
LED Life time	Hour	50,000
Input Voltage	V	AC 12 - 18V
Output Voltage	V	DC 19V 1.8A (DC 19V 2.3A for Option)
Head Size	mm	590mm (W) x 330mm (D) x 150mm (H)
Weight	Kg	Head: 2.9 Kg
		Light Arm: 4.5KG

Option

Classification	Unit	Specification
Focal Distance	mm	650-850
Focal Pattern Size	mm	160 x 110
Cantre Intensity	LUX	16,000 (min)
		40,000 (Max)
CRI		Over 92
Color Temperature	K	3000/4700
LED Life time	Hour	50,000
Input Voltage	V	AC 12 - 18V
Output Voltage	V	DC 19V 2.3A
Head Size	mm	590mm (W) x 330mm (D) x 150mm (H)
Weight	Kg	Head: 2.9 Kg
		Light Arm: 4.5KG

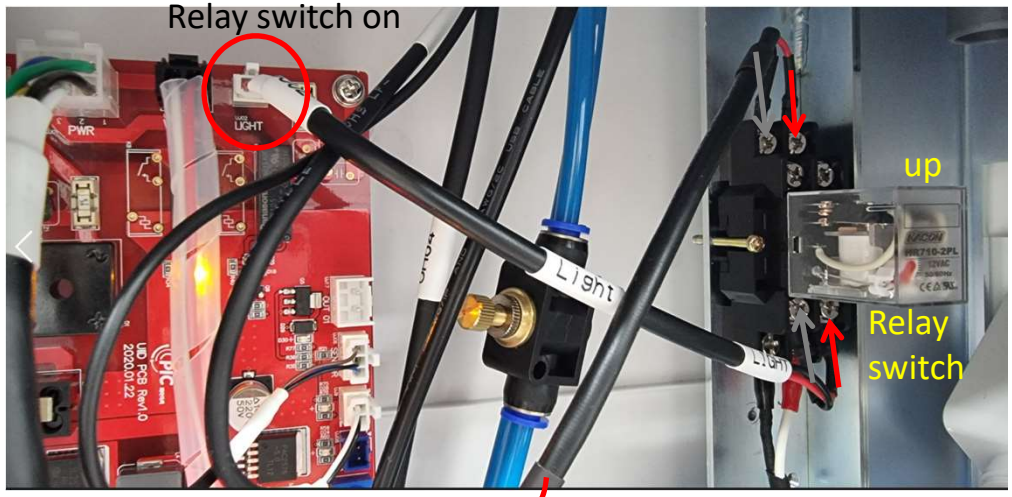
Camera

Model	Name	23x 2 MP 1/2.8" CMOS ICR D/N IP HD Zoom Module Camera
Camera	Sensor Type	1/2.8" Progressive Scan CMOS
	Min. Illumination	Color: 0.05Lux@(F1.5, AGC ON)
		B/W: 0.01Lux@(F1.5, AGC ON)
	Signal System	PAL/NTSC
	Day&Night	ICR Filter
	S/N Ratio	>52dB
	Shutter Speed	1/8 ~ 1/10000 sec
	Digital Zoom	x12
	Resolution	1920 x 1080@50fps, 1920 x 1080@25fps
		1920x1080@60fps, 1920x1080@30fps
	3D Noise Reductio	Support
Lens	Focal Length	f=5-117mm, x23 Optic Zoom
	Aperture Ratio	F1.5(Wide) + F3.8(Tele)
	Angle Of View	H: WIDE 58.5"±5% TELE 2.8" ±5%
		V: WIDE 33.2" ±5% TELE 1.5" ±5%
	Zoom Speed	Approx. 4 sec (Optica, Wide-tele)

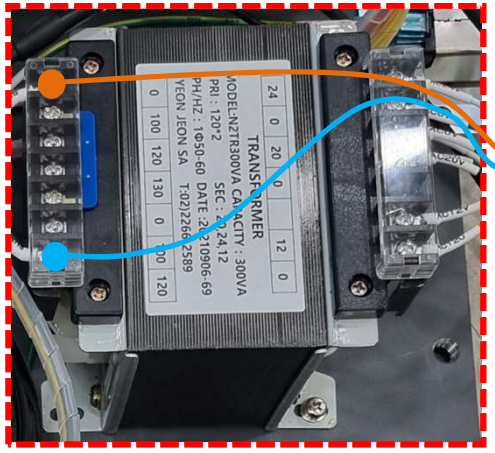
2. Dual Light ML100

2.3. Power Diagram

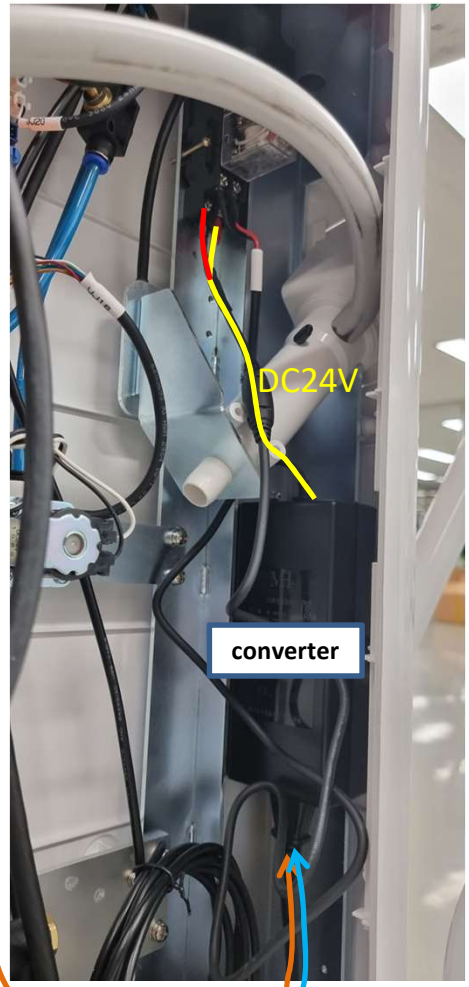
Input power for
Relay switch on



Output DC24V to light



220V



IX Table & Balance Arm Setting

1. Table : Back and Forth Tilting
2. Table : Up & Down position fixation
3. Balance Arm : Spring Tension Control
4. Balance Arm : Flow Control
5. Table : Left and Right Leveling

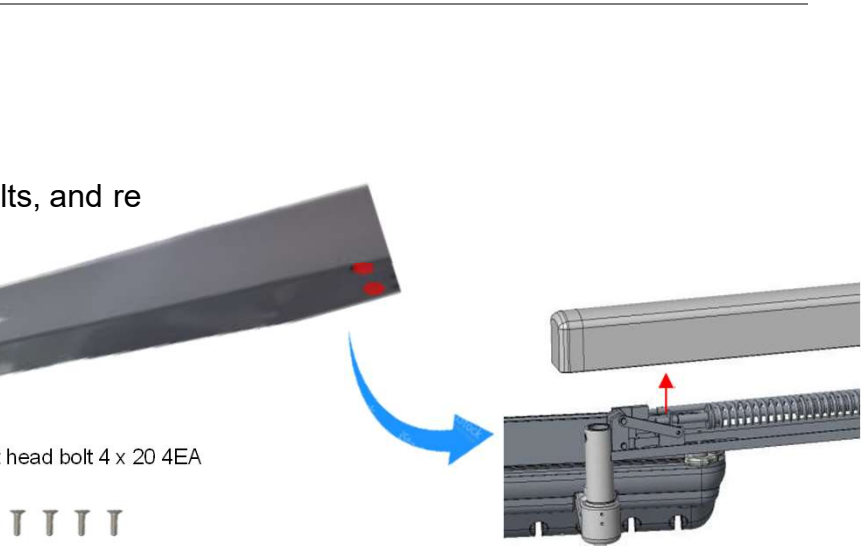
IX. Table & Balance Arm Setting

IX. Table & Balance Arm Setting

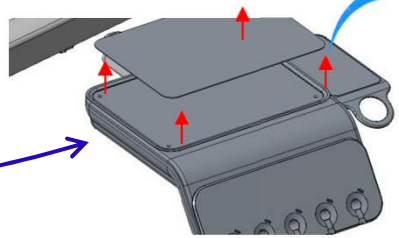
the process of dismantling balance arm

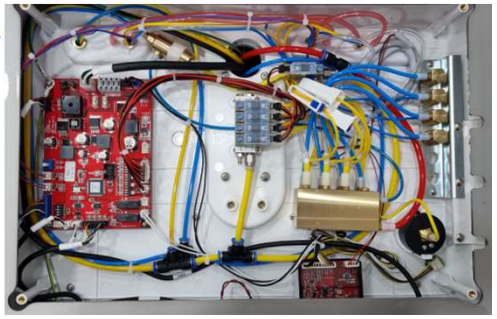
Disengage the top of the balance arm by releasing the flat head bolts, and re move the table tray, and prepare to repair the balance arm.

Flat head bolt 4 x 20 4EA



Use a cross driver
to put off the balance upper arm cover by
releasing 4 x flat head bolts.



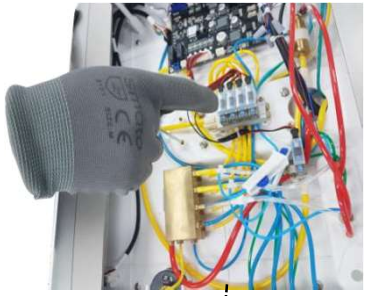


Use a cross driver to put off the
table tray by releasing
4 x flat head bolts.

Flat head bolt 4 x 10 4EA

IX. Table & Balance Arm Setting

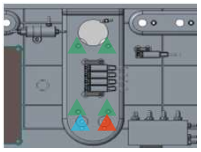
① Dr. Table Back & Forth Tilting



▲ Green Triangle: Table Fixing Bolt 4EA (**5x16 Sam's bolt**))

▲ Sky Triangle: Left Leveling (**Ranch Bolt 6*16L**) Re

▲ d Triangle: Right Leveling (**Ranch Bolt 6*16L**)

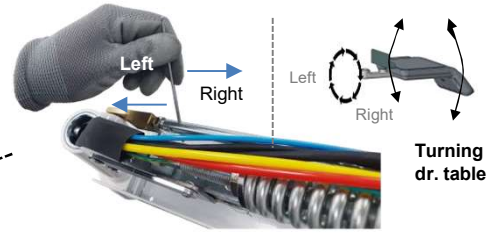


After releasing anchoring bolt slightly in the dr. table with a cross driver, ▲

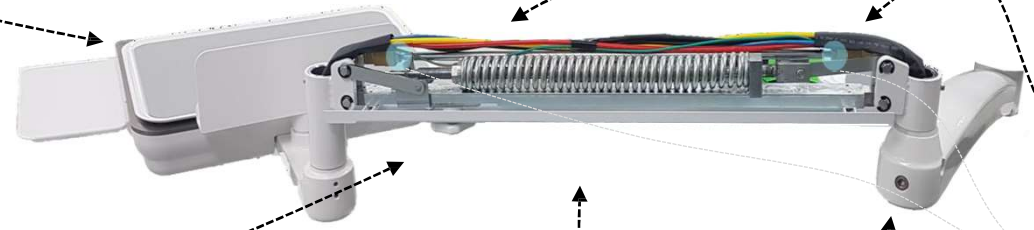
the left slope of dr. table is adjusted by using a hex ranch 3mm ▲

Then, tighten the anchoring bolt in dr. table again and com plete the leveling adjustment. ▲

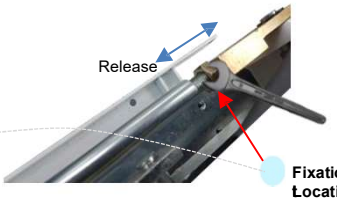
⑤ 2) Dr. Table left & right Leveling



By turning dr. table left and right, its bal ance is finally adjusted.

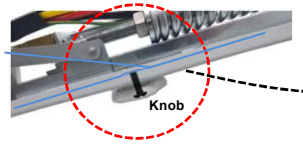


⑤ 1) Dr. Table left & right Leveling



By releasing the fixation nut,
you can start left & right turning movement
or you can seal left & right turning movement.

② Dr. Table Up & Down Position Fixation

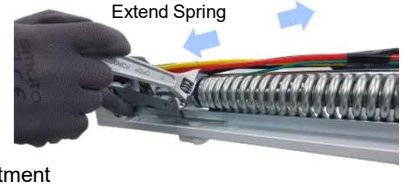


In the red circle, there is a steel frame, which makes the balance arm **move up and down safely**.

Under the frame,
there is knob to anchor the movement of the frame.

The more knob is tightened,
the more dr. table is hardly moved

③ Tension Control for Balance Arm Movement



Tension adjustment
By using 14mm spanner

Reduce spring= Reduce tension
= Weaken supporting against gravity
(Use this measure: The light goes up after user makes it standstill.

Extend spring= Extend tension
= Strengthen supporting against gravity
(Use this measure: The light goes down after user makes it standstill.

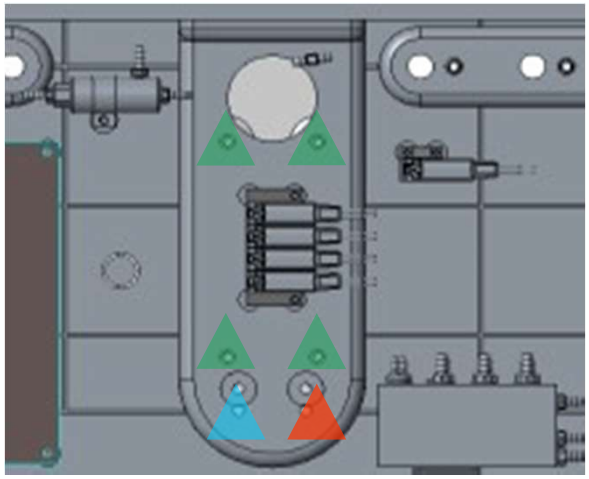
④ Balance Arm Flow Control

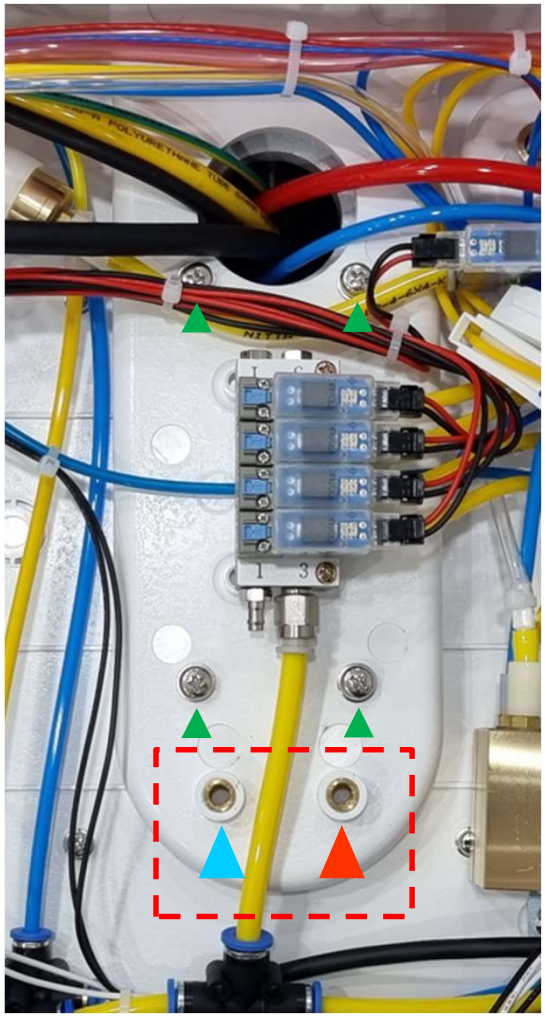
The more the anchoring bolt is screwed,
The more the balance upper arm is hardly moved.

This measure with the friction
prevents the running arm.

IX. Table & Balance Arm Setting

1. Dr. Table Back & Forth Tilting





▲ : Table Fixing Bolt 4EA (**5x16 Sam's bolt**))
▲ : Left Leveling (W**rench Bolt 6*16L**)
▲ : Right Leveling (W**rench Bolt 6*16L**)

1) After releasing the 4 anchoring bolts ▲light with a screw driver

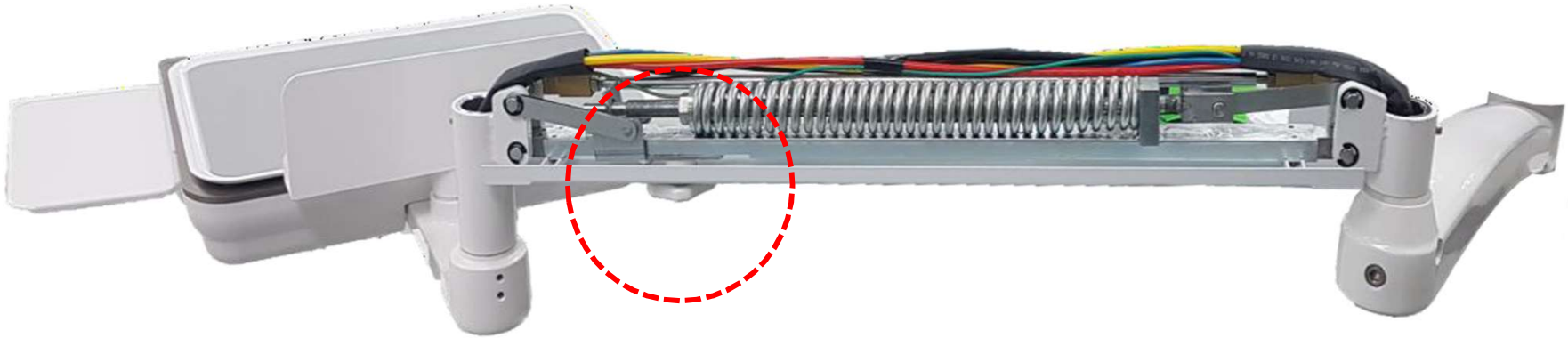
2) **Lift up back or forth by force to balance the tilting**

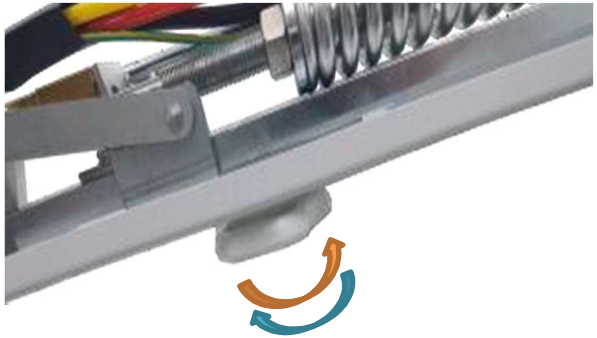
3) Tighten both leveling hex head bolts ▲▲ with a hex wrench 3mm

Then, tighten the anchoring bolt ▲ again.
complete the leveling adjustment.

IX. Table & Balance Arm Setting

2. Dr. Table Up & Down Position Fixation





CW : Fixing the balance arm
CCW : Releasing the balance arm

In the red circle, there is a steel frame which makes the balance arm **move up and down safely**.

Under the frame, there is knob to anchor the movement of the frame.

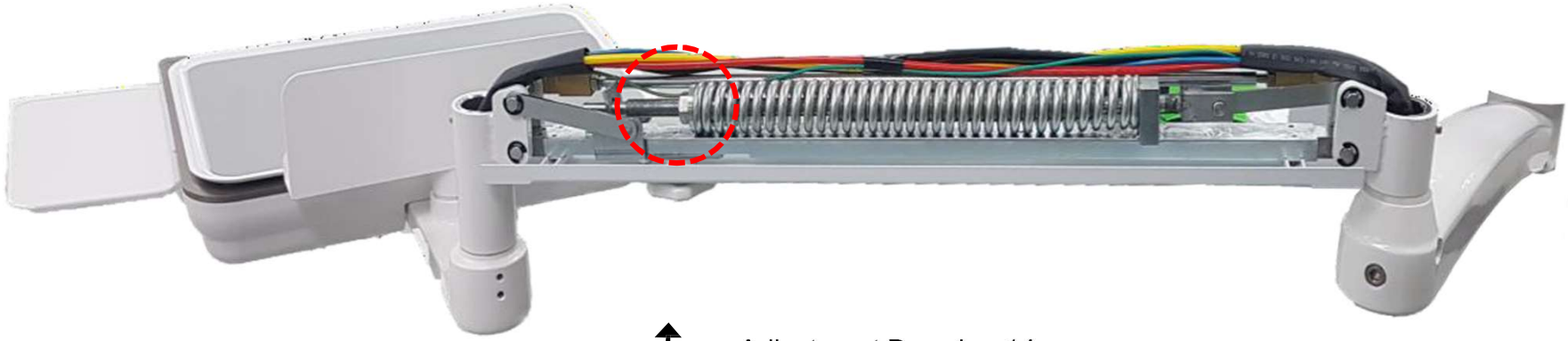
The more knob is tightened, the more dr. table is hardly moved

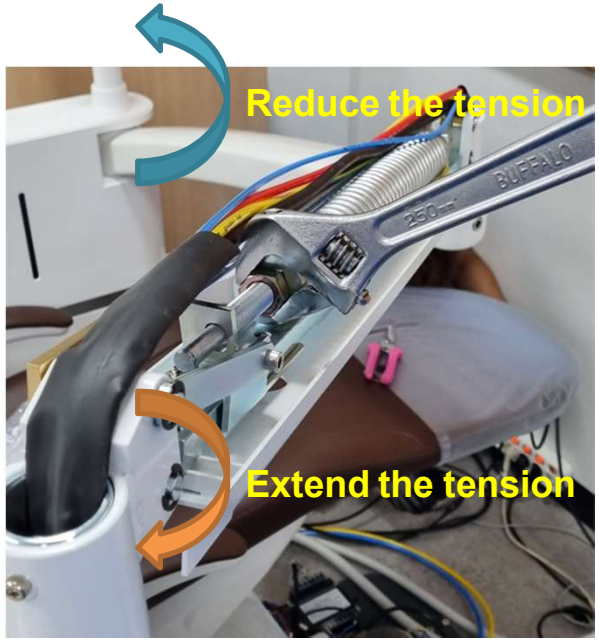
❖ ***Note***

Never try to move the balance arm up and down after locking the knob tight. The frame could be damaged

IX. Table & Balance Arm Setting

3. Balance Arm Spring Tension Control

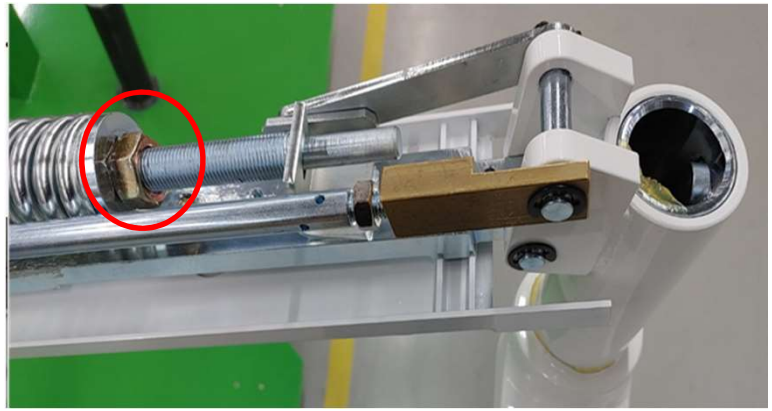




Adjustment By using 14mm spanner

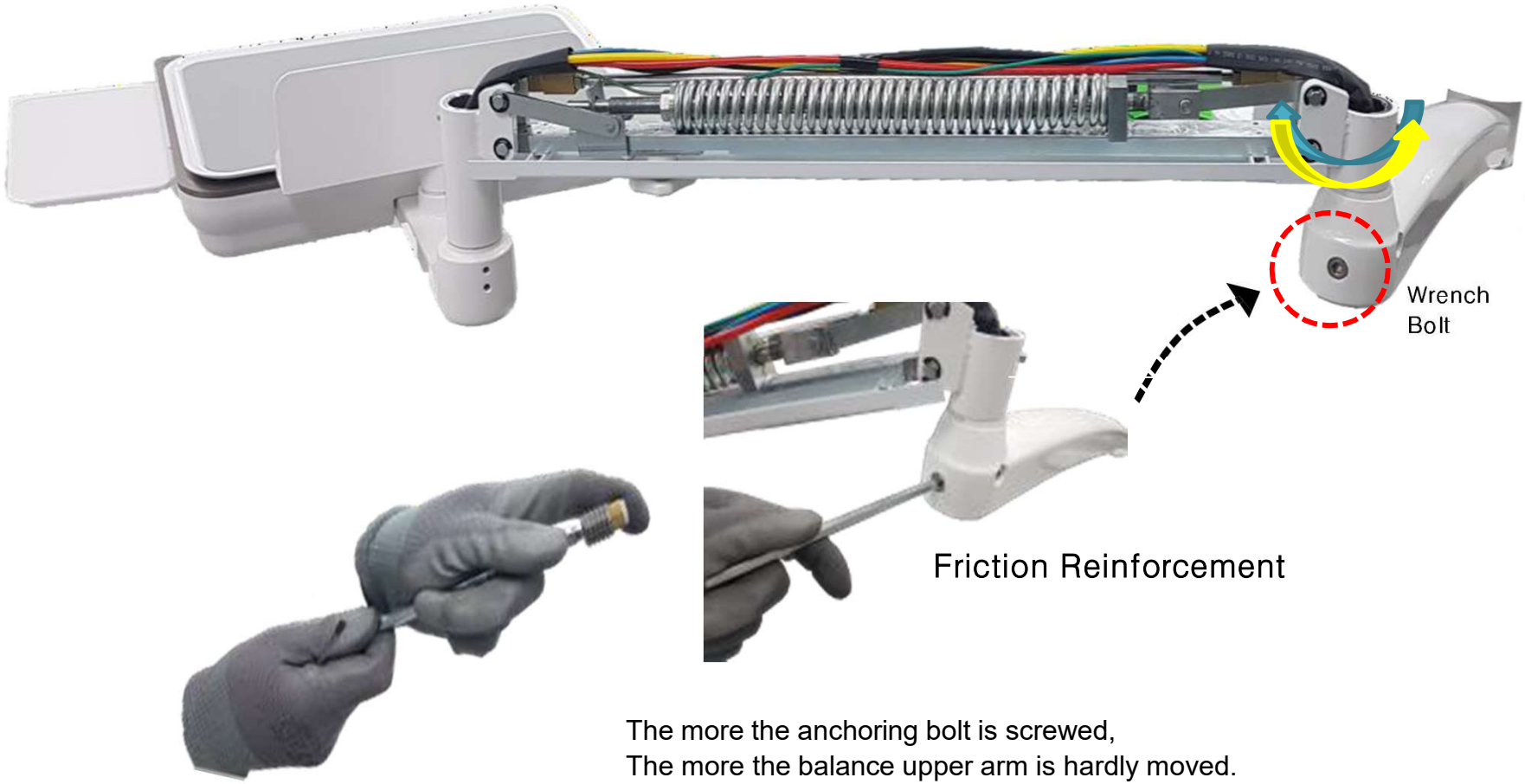
Reduce tension of the spring
➔ Weaken supporting against gravity

Extend tension of the spring
➔ Strengthen supporting against gravity



IX. Table & Balance Arm Setting

4. Balance Arm Flow Control

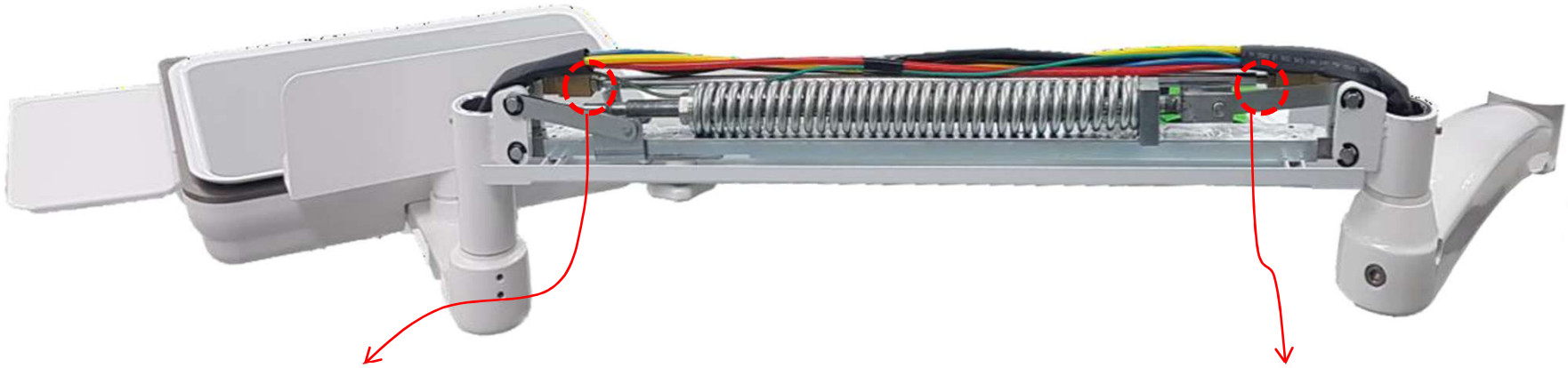


The more the anchoring bolt is screwed,
The more the balance upper arm is hardly moved.

This measure with the friction prevents the running arm.

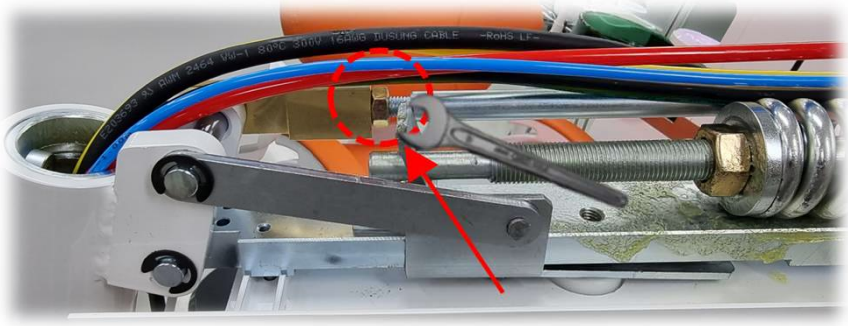
IX. Table & Balance Arm Setting

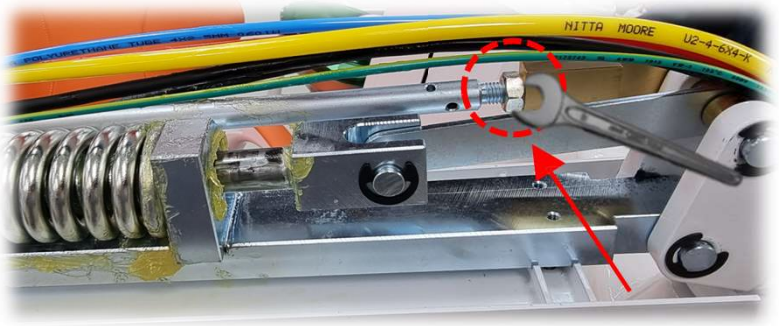
5. Dr. Table left & right Leveling



Release

Release





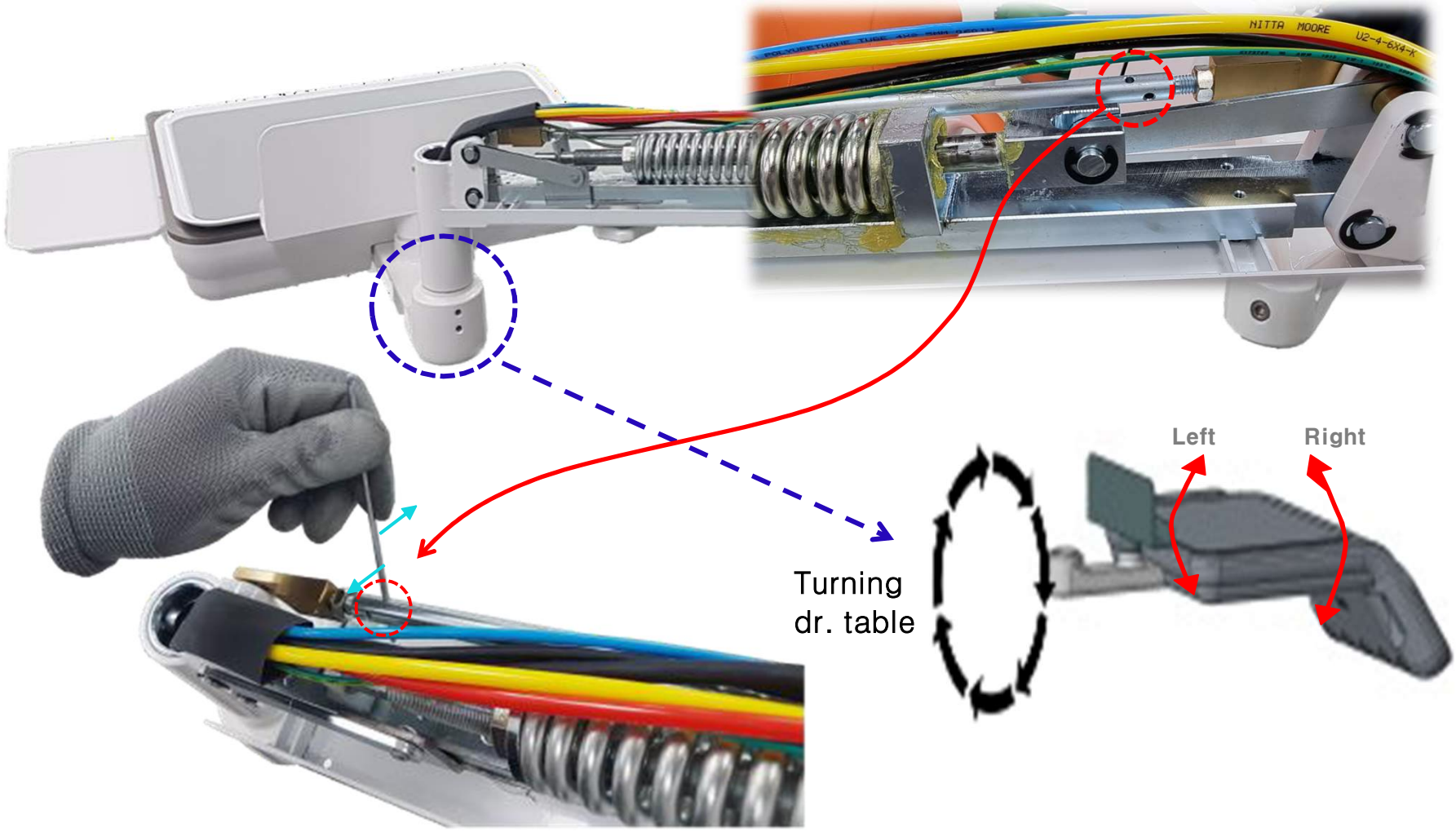
Fixation Nut

Fixation Nut

By releasing the fixation nut,
you can **start** left & right turning movement
or you can **seal** left & right turning movement.

IX. Table & Balance Arm Setting

5. Dr. Table left & right Leveling



Using L Hexagon wrench, put the L wrench into the hole of shaft.
By turning the shaft left and right, its balance is finally adjusted.

Clean and Sanitation System

1. Clean Water System
2. Water Sanitation System
3. Clean Water & Sanitation Contrast

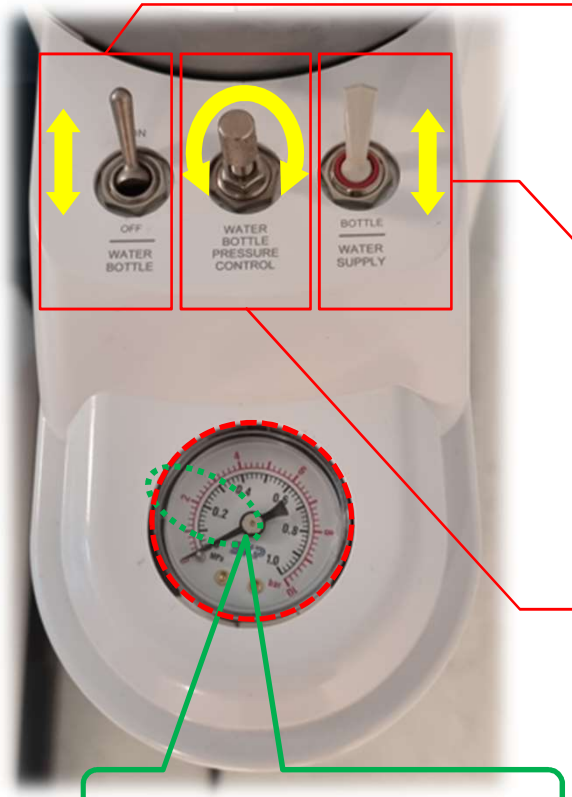
1. Clean Water System

1.1 Function of each valve

1.2 Operating Principles

1. Clean Water System

1.1. Function of each valve



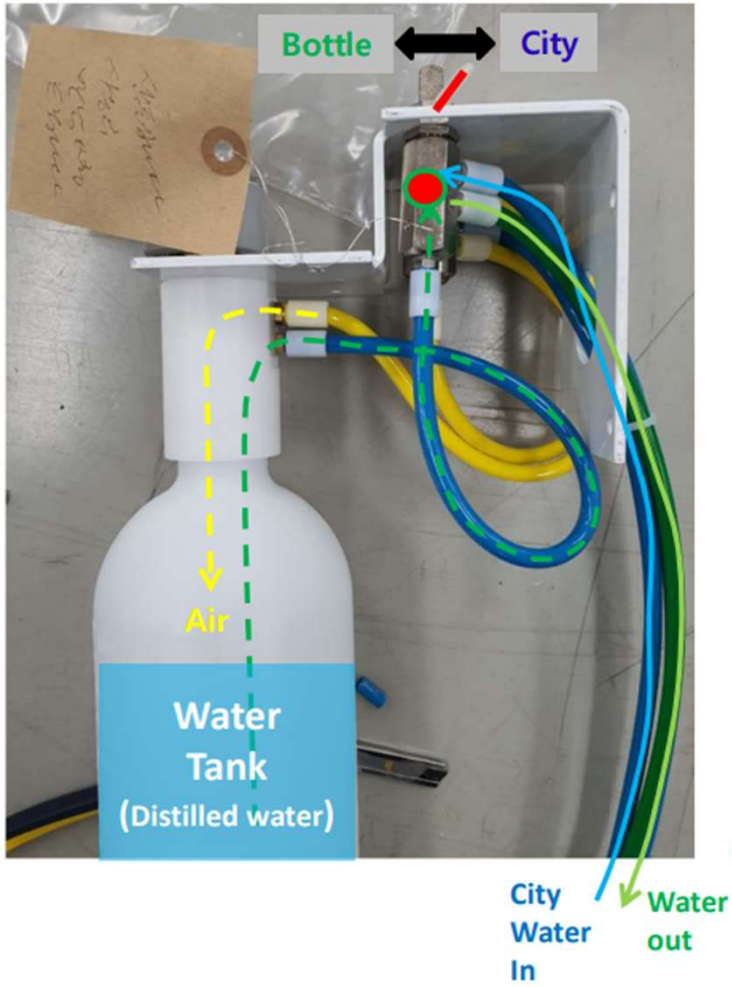
Distilled Water On/off	On : Supply the compressed air
	Off : Cut off the compressed air
Switching 2 Way	CITY : Tap water
	BOTTLE : Washing Solution or Distilled water
Air Pressure (1.8~2.0bar)	CW: Decrease Pressure(water weak)
	CCW : Increase Pressure(water strong)

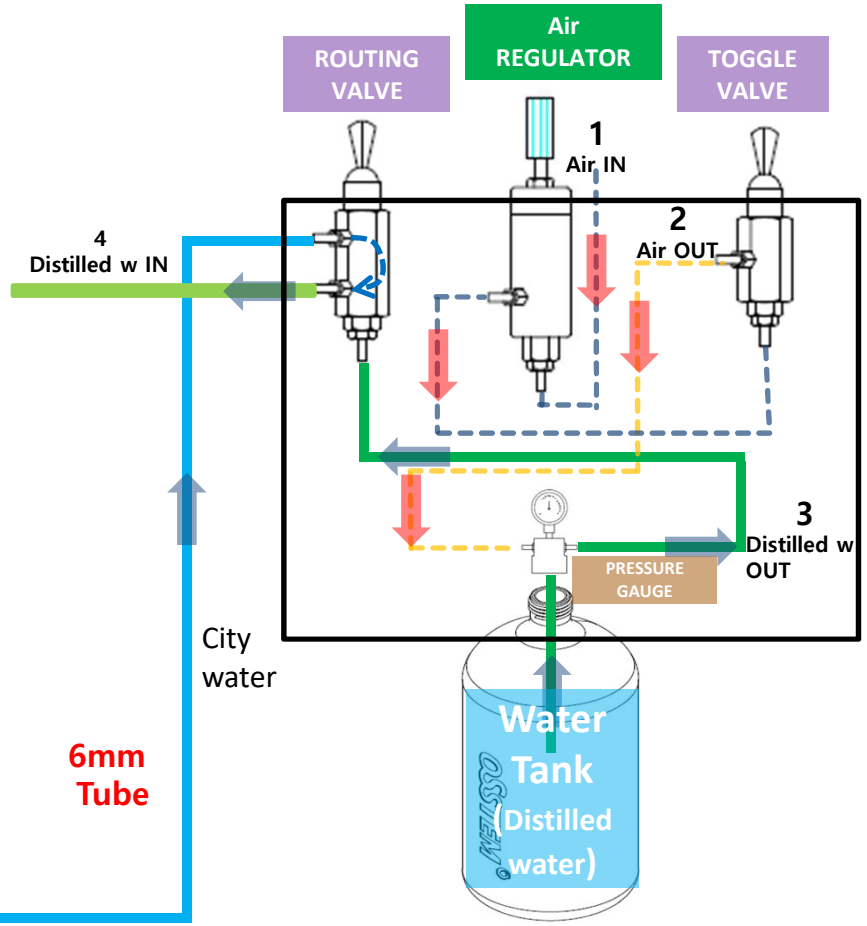
Recommended Air pressure : 2.0

1. Clean Water System

1.2. Operating Principles

❖ **Spittoon/Auto-cup ➔ City water**

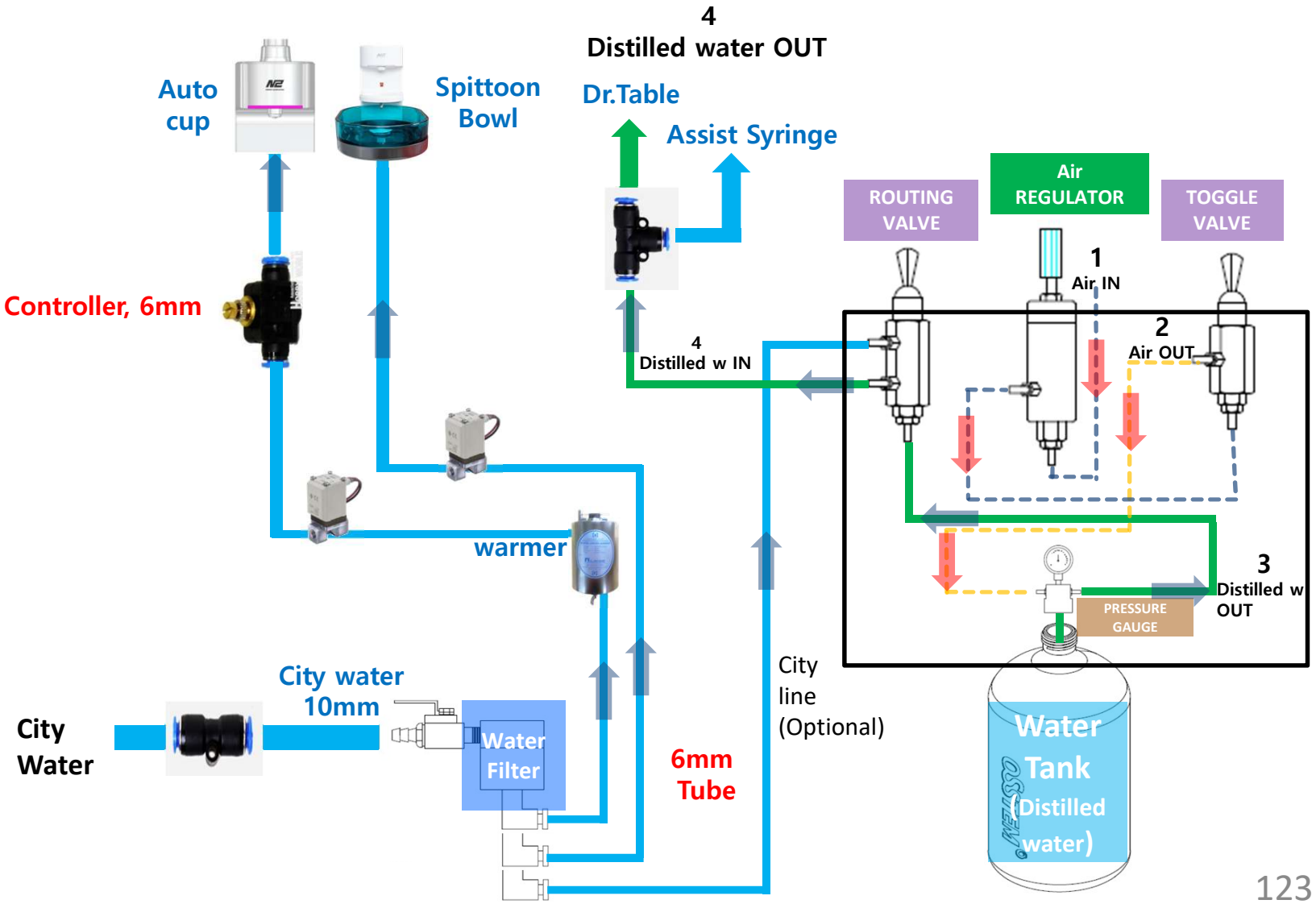




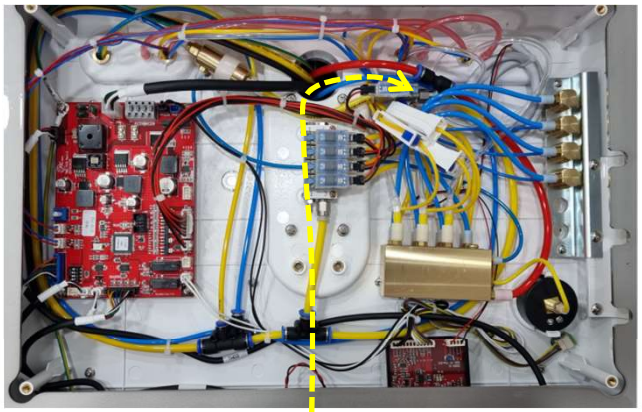
1. Clean Water System

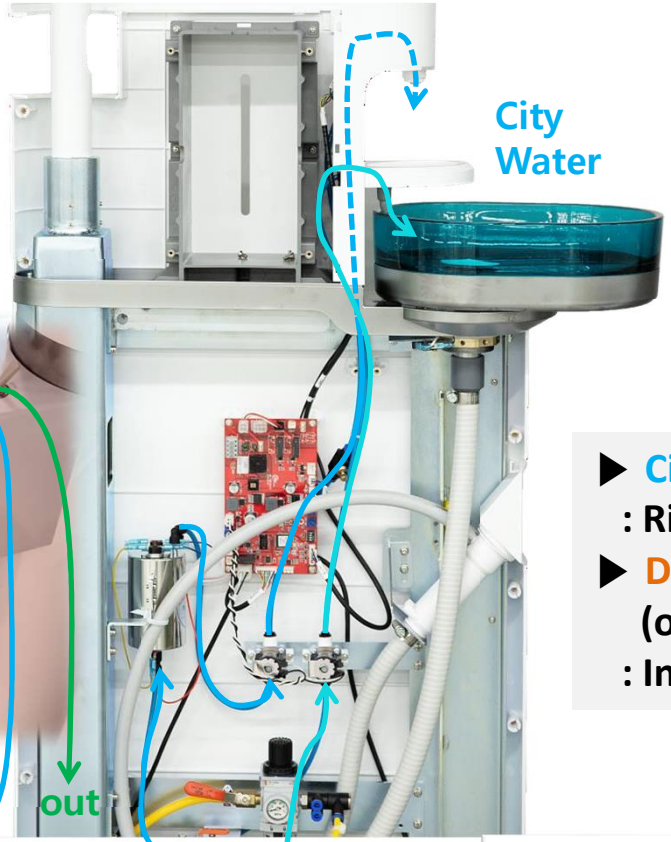
1.2. Operating Principles

❖ **Spittoon/Auto-cup ➔ City water**

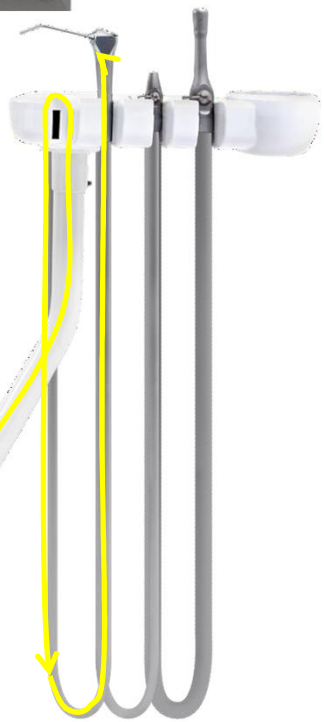


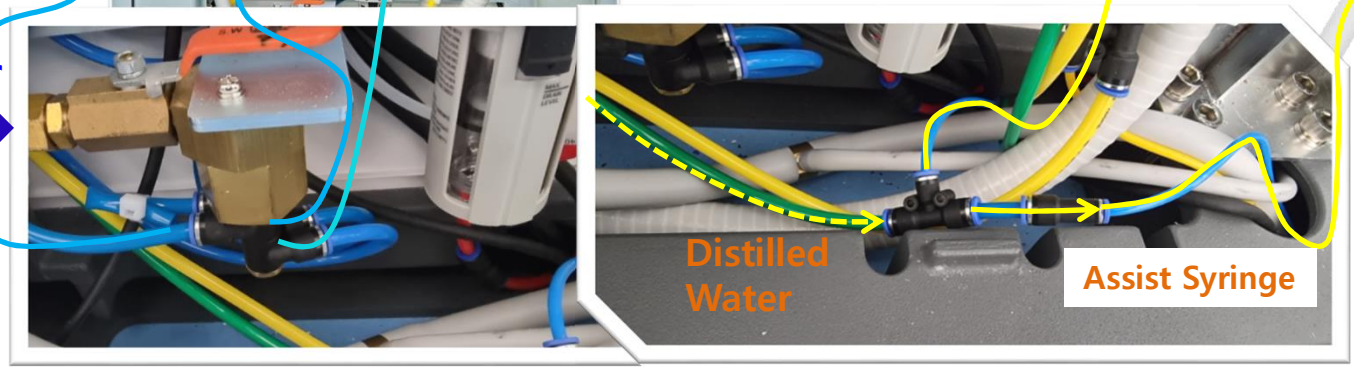
1. Clean Water System





▶ City Water only
: Rinsing & Cup filler
▶ Distilled Water
(or City Water)
: Instruments





2. Water Sanitation System

2.1 Definition
2.2 Characteristics
2.3 Operating Principles
2.4 Water Sanitation System Flow

2. Water Sanitation System

2.1. Definition

✓ Purpose

- To eliminate the Bio Film inside of Unit Chair Water Line, and prevent bacterial infection.

✓ What is Bio Film?

-A biofilm is any group of microorganisms in which cells stick to each other and often these cells adhere to a surface.

2. Water Sanitation System

2.2. Characteristics

✓ DUWL(Dental Unit Water Line) Cleaning System

Eliminate Bio Film in DUWL

Sterilize Bacteria

Prevents cross-infection

✓ Auto System

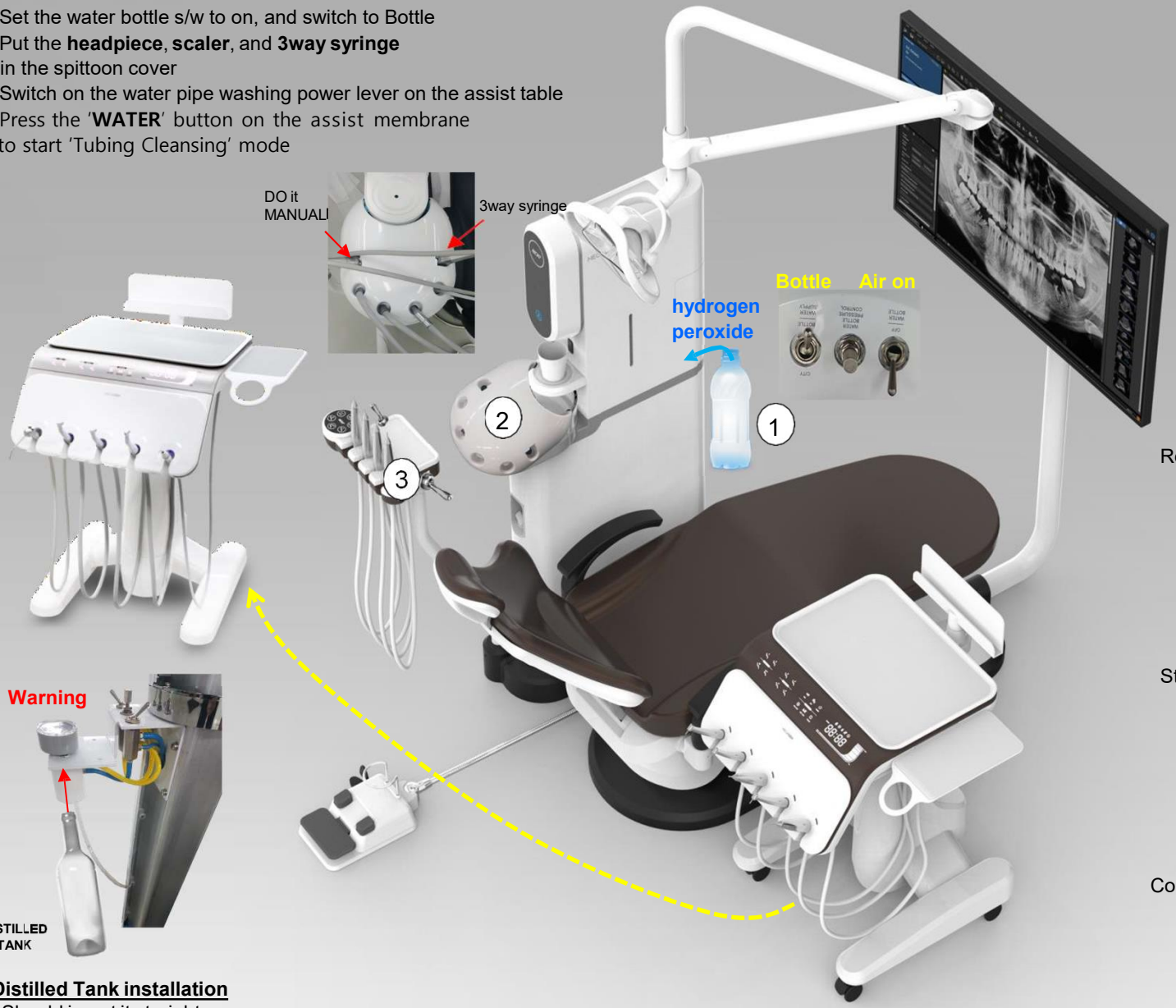
Set up all the instruments in the specialized container, and operates auto sanitize system

✓ Additional Feature

Able to use distilled water

Water Sanitation System

1. Set the water bottle s/w to on, and switch to Bottle
2. Put the **headpiece**, **scaler**, and **3way syringe** in the spittoon cover
3. Switch on the water pipe washing power lever on the assist table
4. Press the '**WATER**' button on the assist membrane to start 'Tubing Cleansing' mode



※ Warning

Distilled Tank installation

1) Should insert it straight
2) If it is not fit straight, air pressure blasts out distilled tank.

Next to the assistant table, there is a switch can be flipped with a finger.

Once you put it as 'ON', and UNIT chair system is turned into '**Tubing Cleansing**' mode.

At the same time, the cuppillar lamp is turned into **SKY**.

When it is **done**, the cuppillar lamp is turned into **WHITE**.

3

Ready

Sanitation Mode

4

Start

Completed

Tubing Cleansing Complete

2. Water Sanitation System

2.3. Operating Principles

✓ Names and functions of main parts

- ROUTING VALVE

  Controls the water supply ON/OFF from the water filter

  Supplies the chemical solution from the water tank to the chair

- MINI REGULATOR

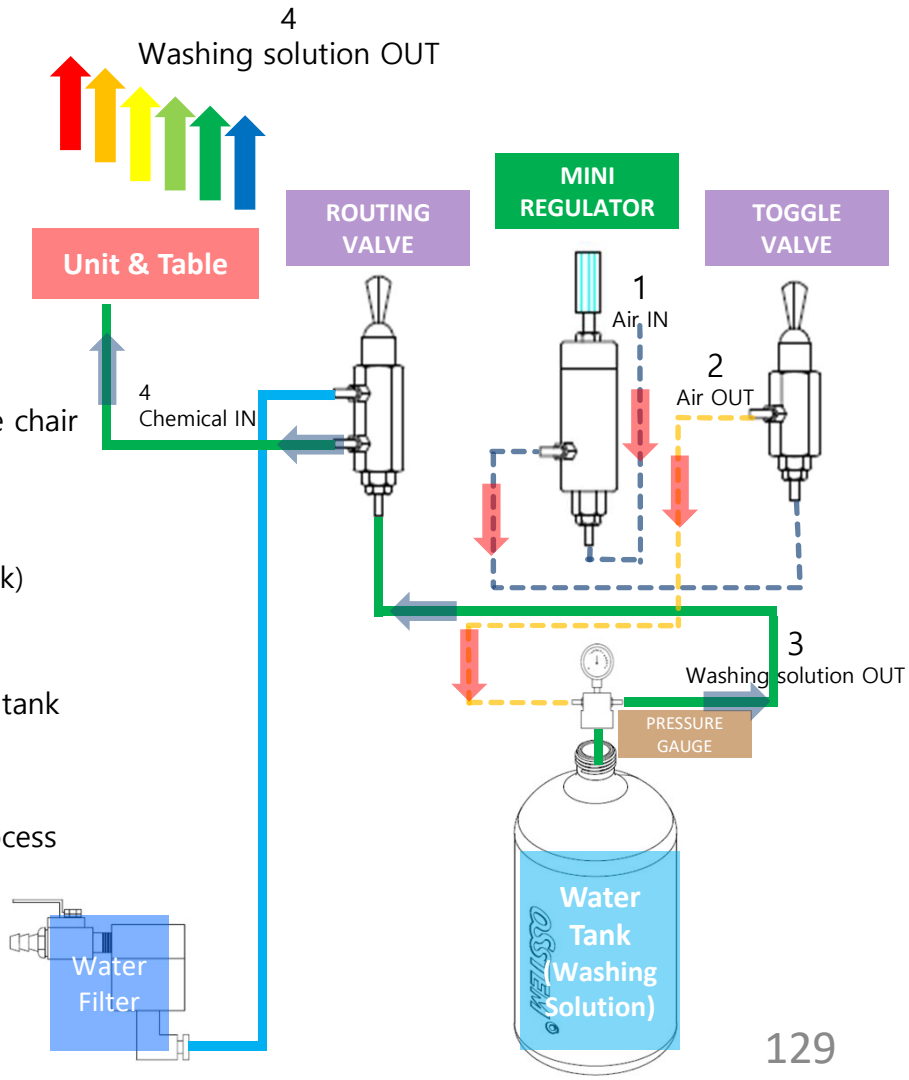
  Adjusts the volume of air flow
  (adjusts the speed of supply of chemicals to the water tank)

- TOGGLE VALVE

  Opens or closes the valve for the air injected in the water tank

- WATER TANK

  Contains the washing solution for the water sanitation process



2. Water Sanitation System

2.3. Operating Principles

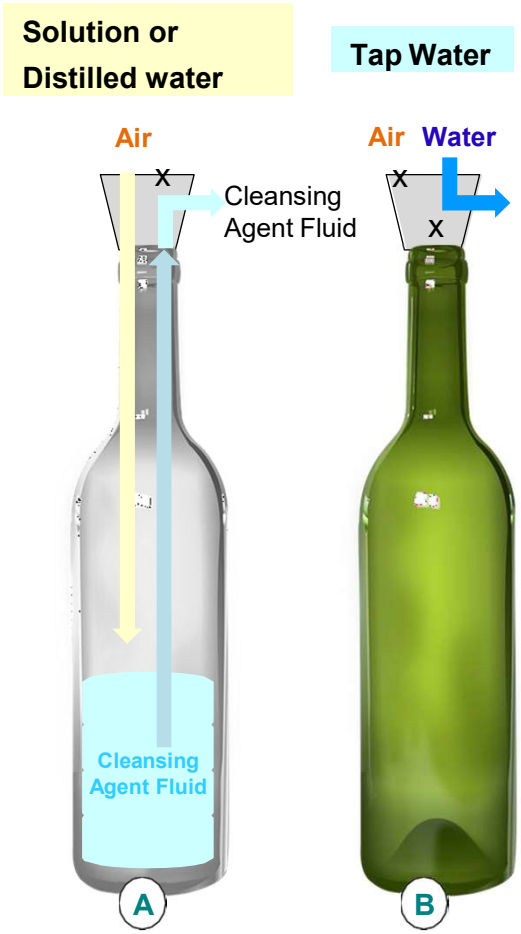
1. Solution or Distilled Water
① WATER BOTTLE – **ON**
② WATER SUPPLY – **Bottle**

2. Tap Water:
① WATER BOTTLE – **OFF**
② WATER SUPPLY – **City**

With Water bottle mode,
the compressed air pushes the washing solution in the bottle into the unit chair

To fill the bottle with the solution or distilled water
① WATER BOTTLE – **OFF**
③ Air Pressure – **Set to 0bar**

Then remove the bottle



※ 'Tubing Cleansing' mode lasts for 45 seconds.

Please flip 1st valve switch as '**ON**' and press '**WATER**' button. The compressed air starts to push out the washing agent in bottle as picture 'A'. Subsequently, 4 chain solenoid valves for cuppillar, handpieces, and scaler are opened by electric signals. After that, the washing agent wipes out internal tubing for 45 seconds and drain out.

However, **3 way syringe can be controlled manually**. Please press the syringe's water button right after WATER' button.

2. Water Sanitation System

2.4. Water Sanitation System Flow

Step 1 : Make a cleaning solution

1) Fill a WATER BOTTLE (1L) with hydrogen peroxide (3~5%) solution.
2) To identify the solution, dissolve food coloring (red 1g) in a WATER BOTTLE.

Step 2 : Clean with cleaning solution

1) Attach the water bottle to the unit.
2) Remove the handpiece (scaler) from the coupling.
3) Fix the removed handpiece to the cuspidor holder.
4) Set the WATER BOTTLE SWITCH to ON, and the WATER SUPPLY SWITCH to BOTTLE.
5) **Turn on the Water Pipe Washing Power Switch** on the Assist Table.
6) Check that the chair moves to the **LP position** and the unit panel color is **Mint**.
7) If the panel turns Mint, **Press the Water button** on the Assist Membrane Pad switch to start washing the water tube **(Drain button is stop).**
8) Mint light up during washing.
9) **After completion, the alarm sounds 5 times**, and the color of the unit panel changes to **White** at the same time.
10) When all the washing liquid (red) is discharged, set the WATER BOTTLE SWITCH to OFF and the WATER SUPPLY SWITCH to CITY.
11) **Turn off** the dental unit and wait **at least 8 hours** before proceeding with the water line cleaner.

Step 3 : Flush the waterline

1) Turn on the dental device and press the Assist Membrane Pad Water button to flush the solution with water. (Repeat twice)
2) **Turn off the Water Pipe Washing Power Switch** on the Assist Table and check that the unit panel is **Blue or Pink** as it was before cleaning.

2. Water Sanitation System

2.4. Water Sanitation System Flow

✓ Before leaving office(chemical cleaning)

1 Fill the solution

2 HOLDER/HP

3 Set switch

4 Start system

Switch on

5 Turns Mint To ready

Turns Mint

Press Water

6 Start sanitation system

2. Water Sanitation System

2.4. Water Sanitation System Flow

✓ Before leaving office(chemical cleaning)

7 Start chemical cleaning

Blinking

8 Chemical cleaning

9 Cleaning End

Turns White

10 Melody plays

11 Switch setting

Switch off

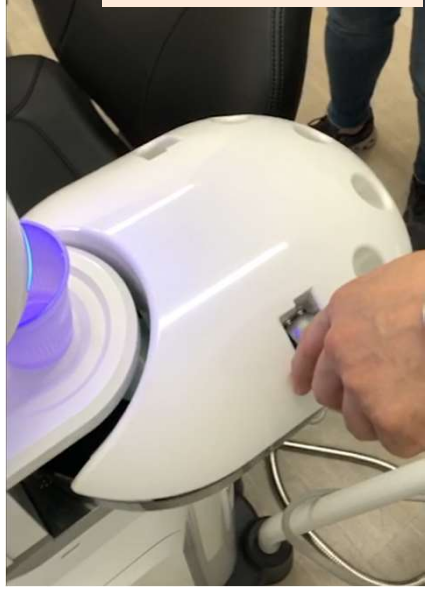
12 Main Power OFF

Dwelling time
➔1~8hours

Rinsing tube
➔ Repeat with water (Step1~11)

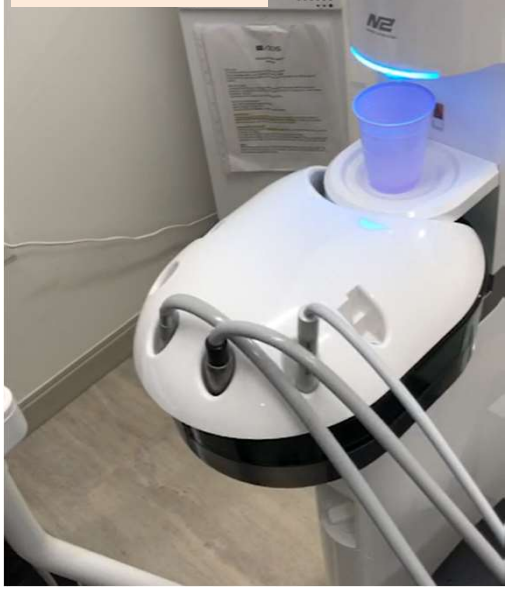
Prepare the Cover

Put the cover



Switch ON

Turns Mint



Hold 3way

Start button

Blinking LED

3. Clean Water & Sanitation Function Contrast

Impossible to switch

System switchable

Distilled Water System

Water Sanitation System

XI Connected Equipment(Option)

1. Water Separator
2. Spittoon Valve
3. Suction Valve
4. Air Suction

MEGAGEN

Ⅺ. Connected Equipment

No.	Image	Name	Function
1		**Water Separator (Internal)**	For dry suction only Foreign substance from suction is drained to drainage not suction motor's
2		**Spittoon Valve (Internal)**	Essential device at clinics where has no drainage Waste water from spittoon is drained to suction motor's drainage Etc, Cut the smell off coming from drainage
3		**Suction Valve (Internal)**	Independent suction valve for chairs over 2 units with just one suction motor

1. Water Separator

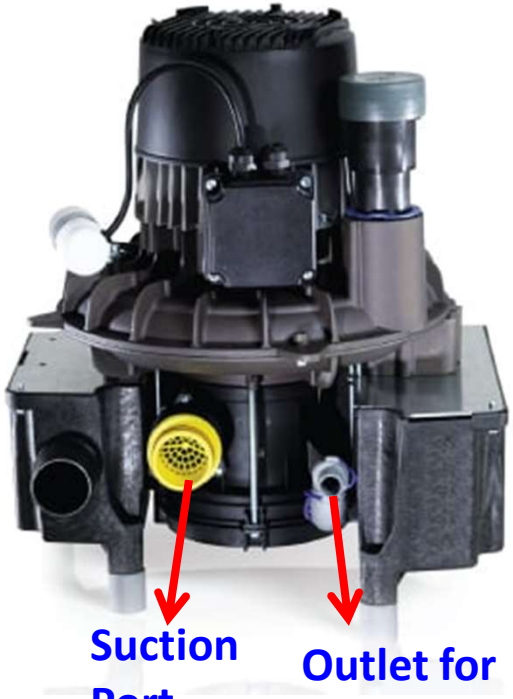
1.1. Understanding of Dry motor suction by drainage

Without Drainage

No drainage
Inhalation only

Vs

With Drainage



Suction Port

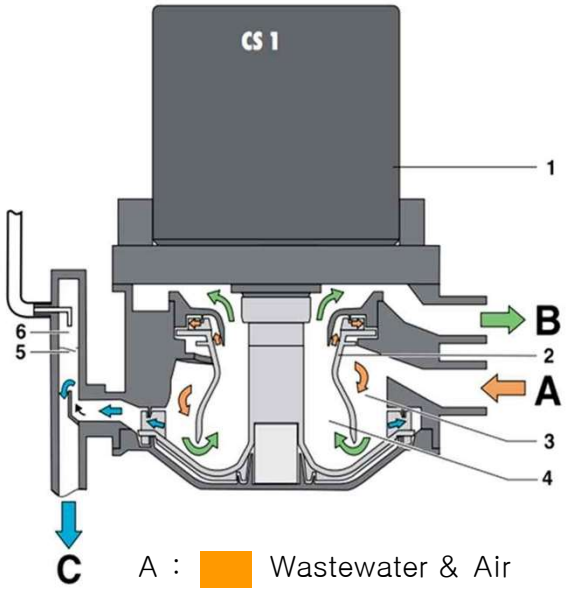
Outlet for drainage

1. Water Separator

1.2. Understanding of the water separator

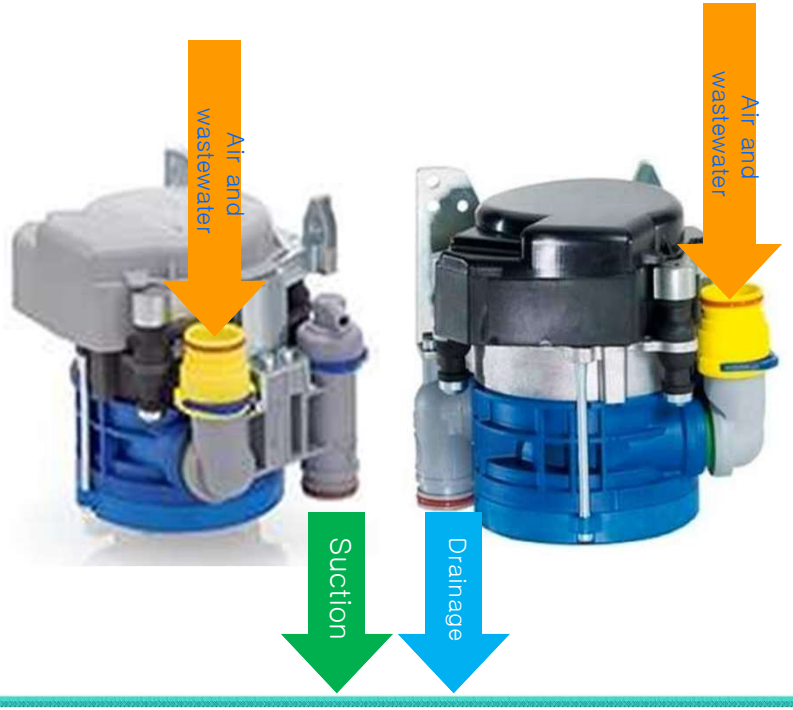
Device for separate wastewater(bloods and spit) and air form suction(Include Suction Valve)

CS1 Diagram



A : Wastewater & Air
B : Suction Unit(Motor Suction)
C : Drainage

Water Separator(CS1) Pipe Line

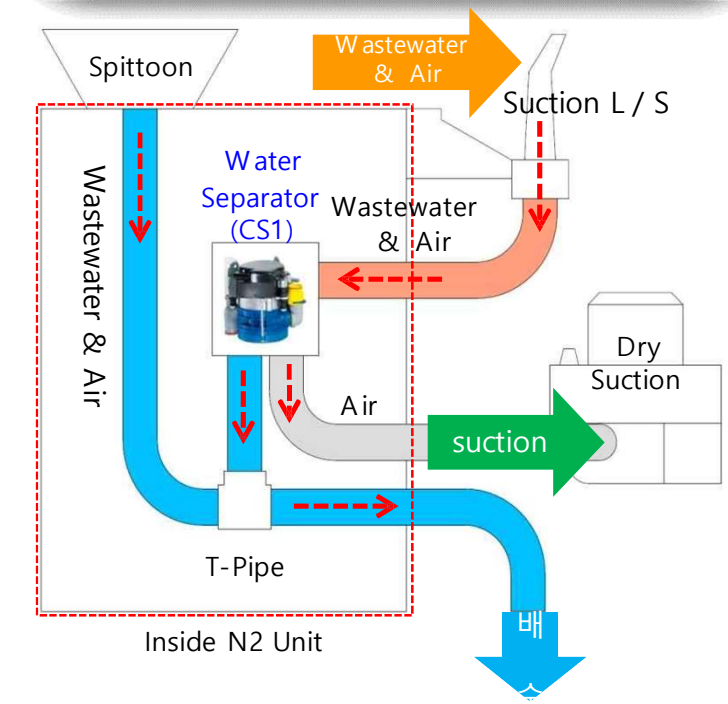


1. Water Separator

1.3. How to install the CS1 in the N2

N2 Unit + Water Separator(CS1)

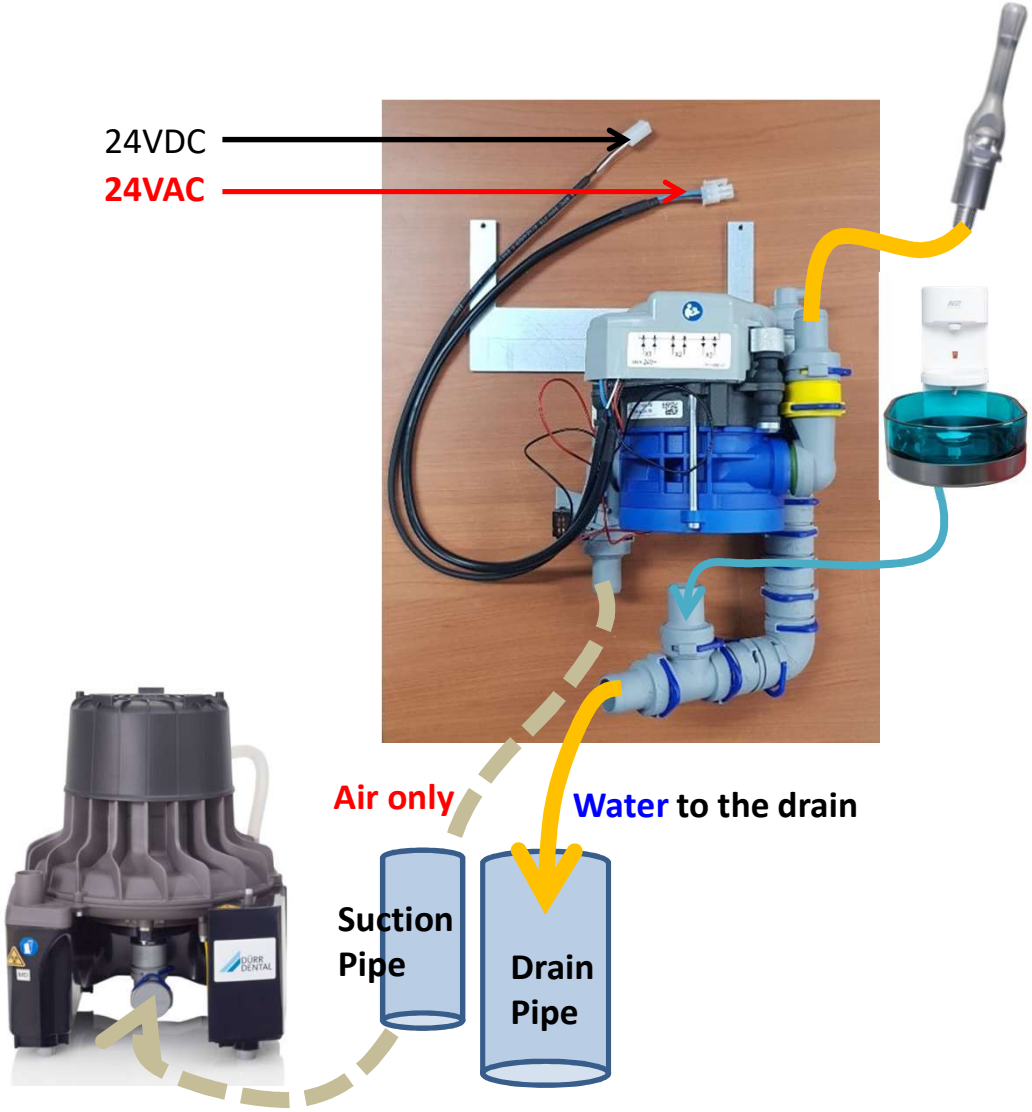
N2 Unit System Configuration



N2 Unit Internal Mounting

1. Water Separator Operating Process

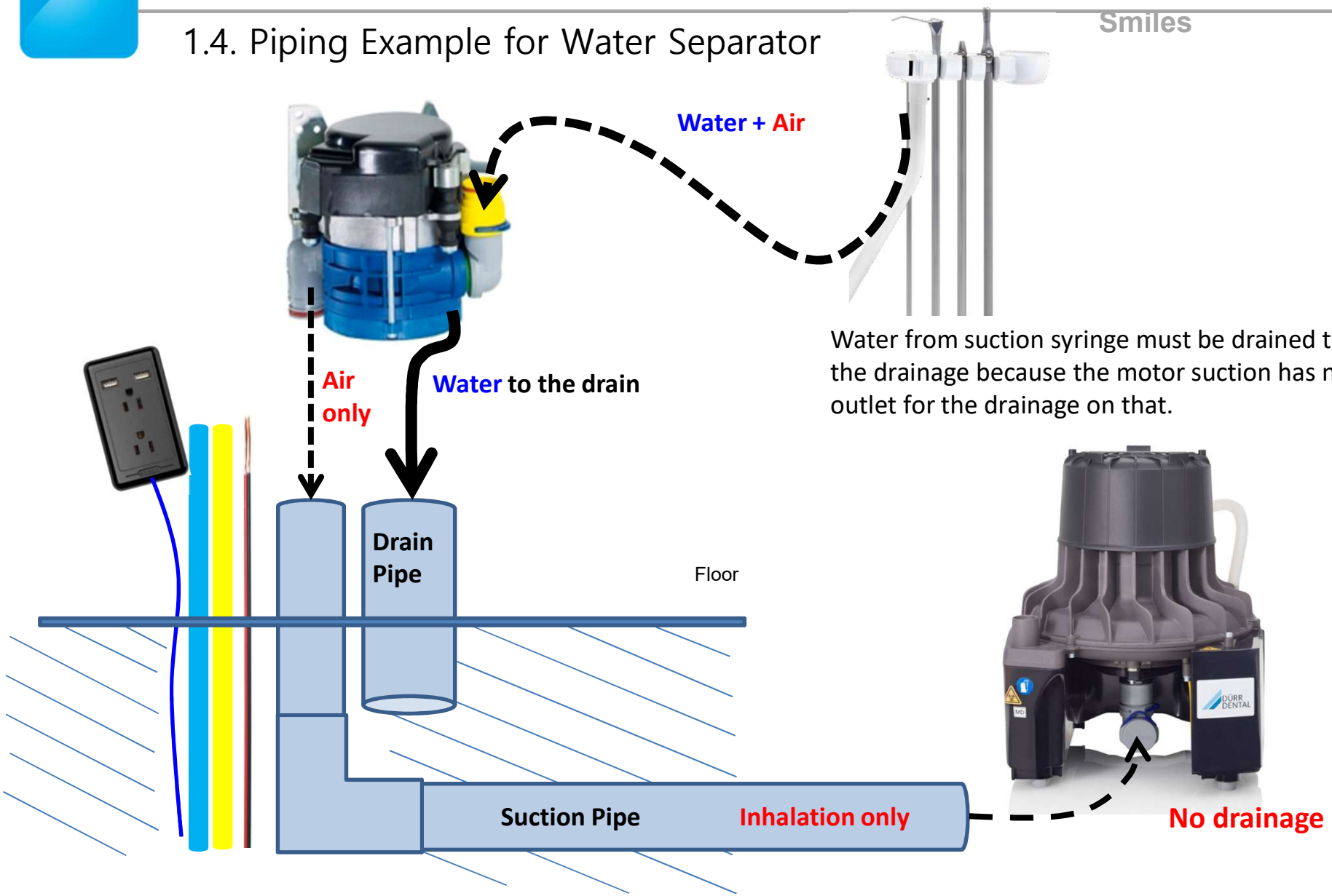
1.3. How to install the CS1 in the N2



1. Water Separator Operating Process

For Lifetime Smiles

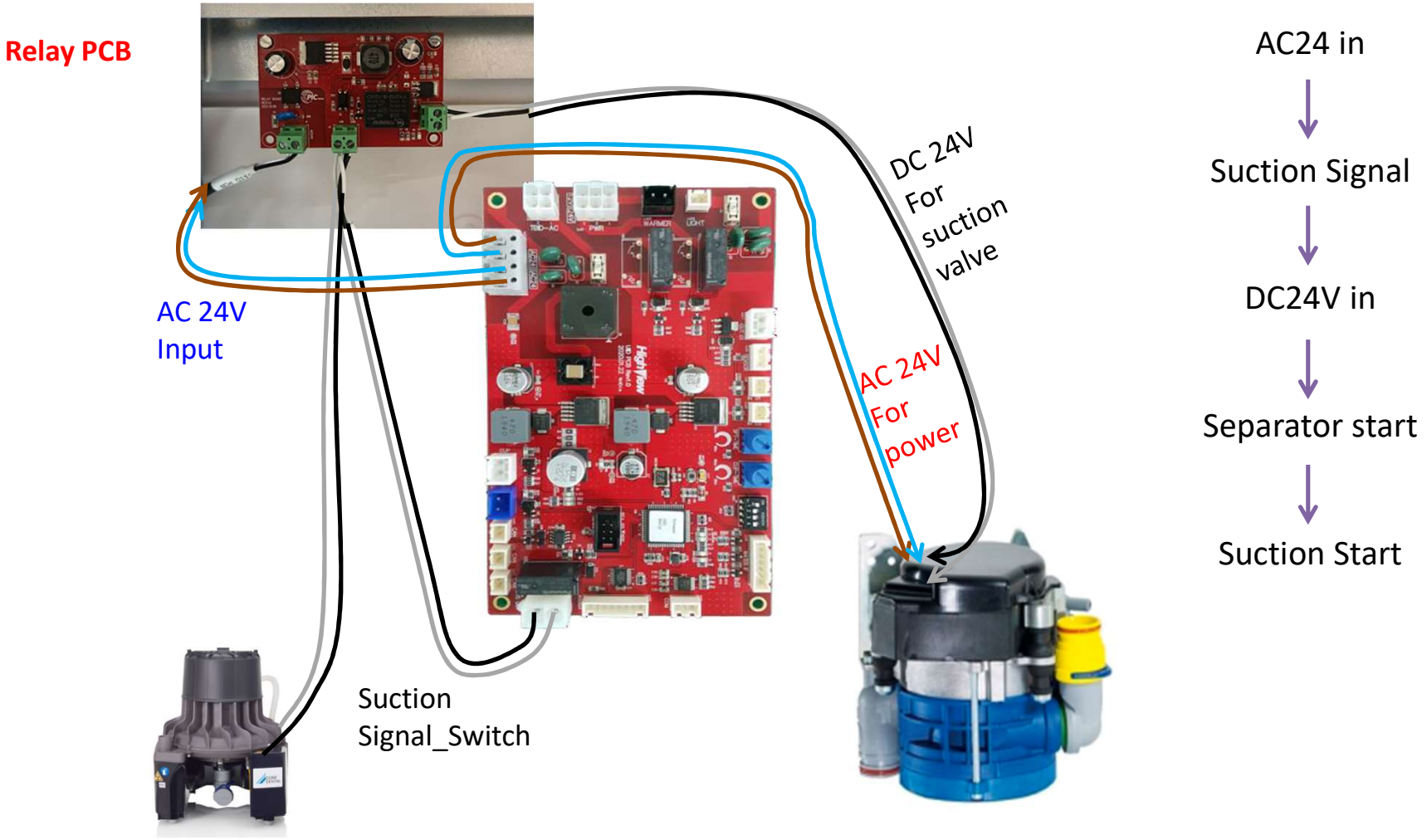
1.4. Piping Example for Water Separator



Water from suction syringe must be drained to the drainage because the motor suction has no outlet for the drainage on that.

1. Water Separator Operating Process

1.5. Electric Signal Process



AC24 in

↓

Suction Signal

↓

DC24V in

↓

Separator start

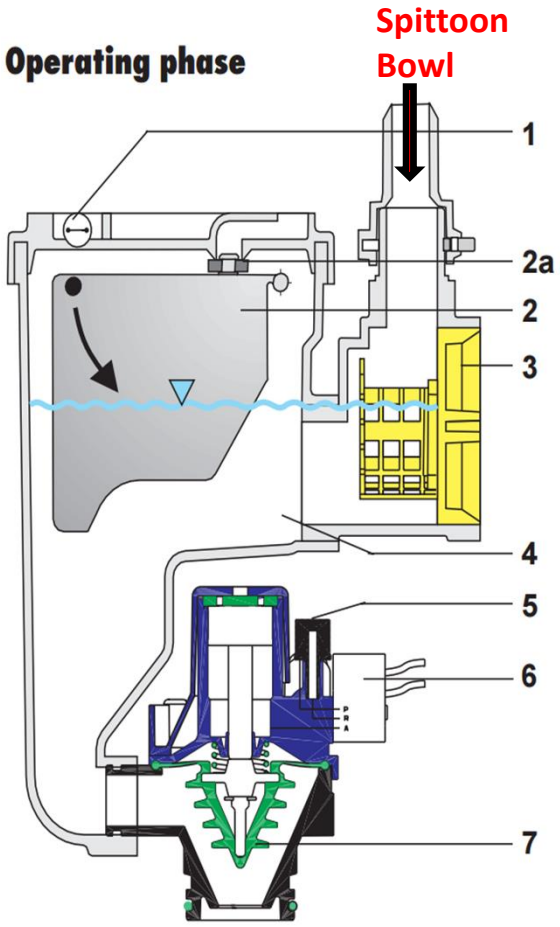
↓

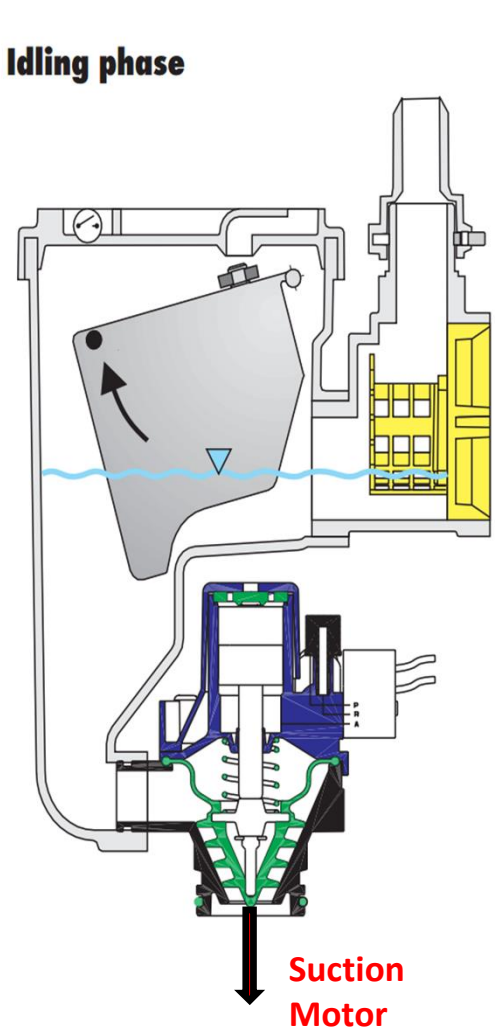
Suction Start

2. Spittoon Valve

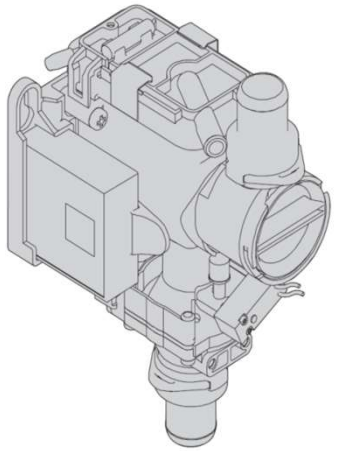
2.1. Define

Drain the waste water from spittoon to suction motor by compressed air



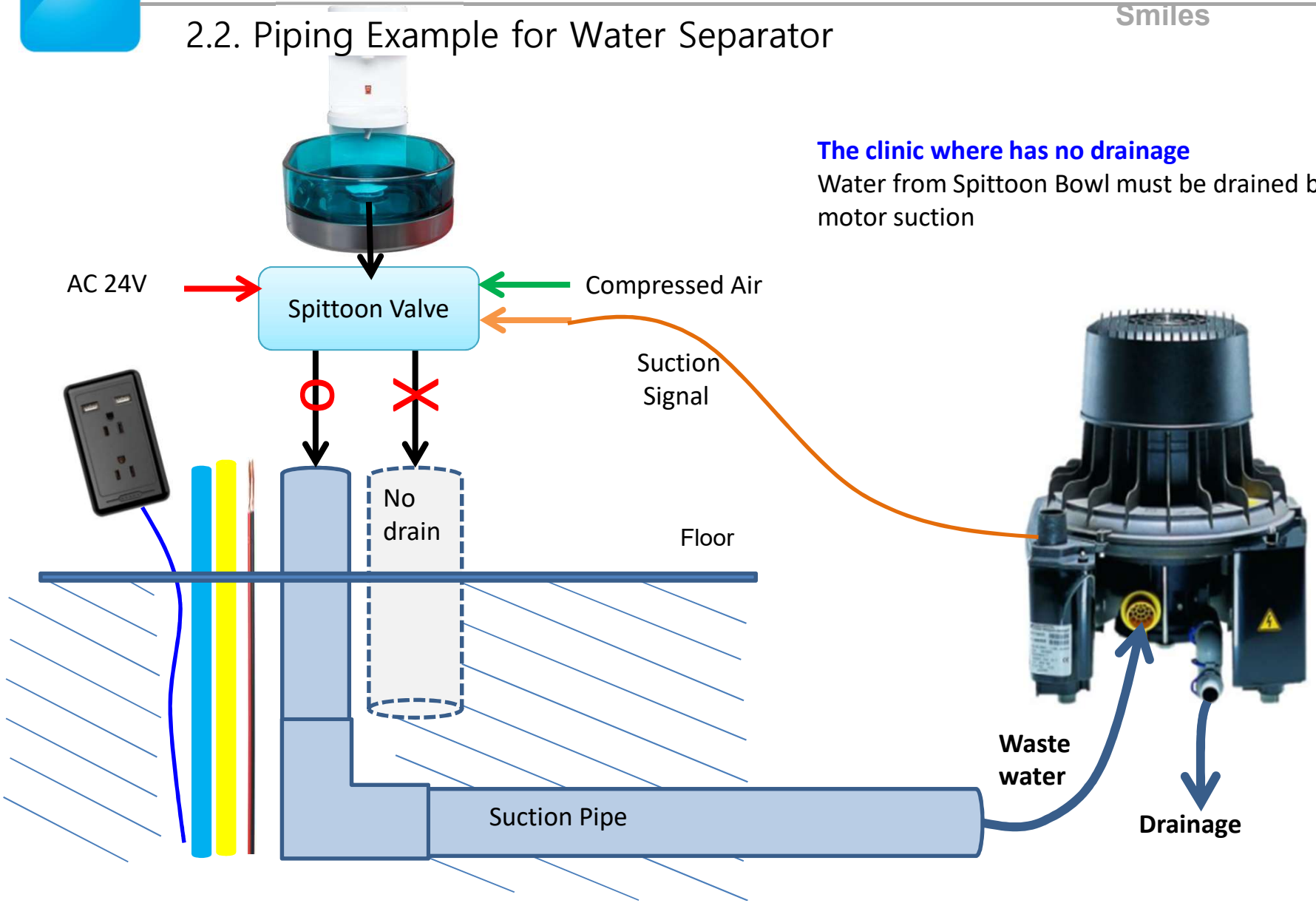


1. Reed Contact
2. Float
2a. Float Seal
3. Coarse Filter
4. Storage Container
5. Compressed Air Connections
6. Electrovalve
7. Cut-off Valve



2. Spittoon Valve

2.2. Piping Example for Water Separator

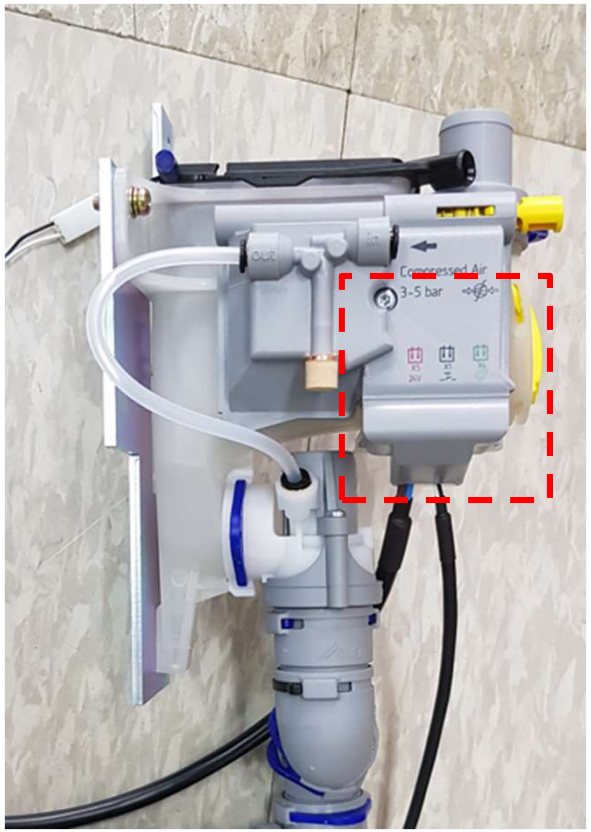


The clinic where has no drainage

Water from Spittoon Bowl must be drained by motor suction

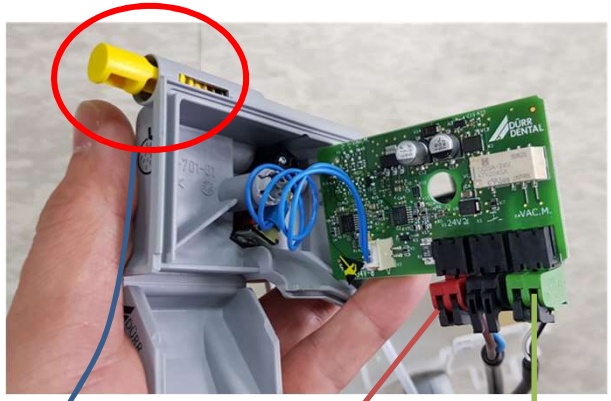
2. Spittoon Valve

2.3. Structure of the Spittoon Valve



AC 24V

Suction Signal



Drain button : Manual

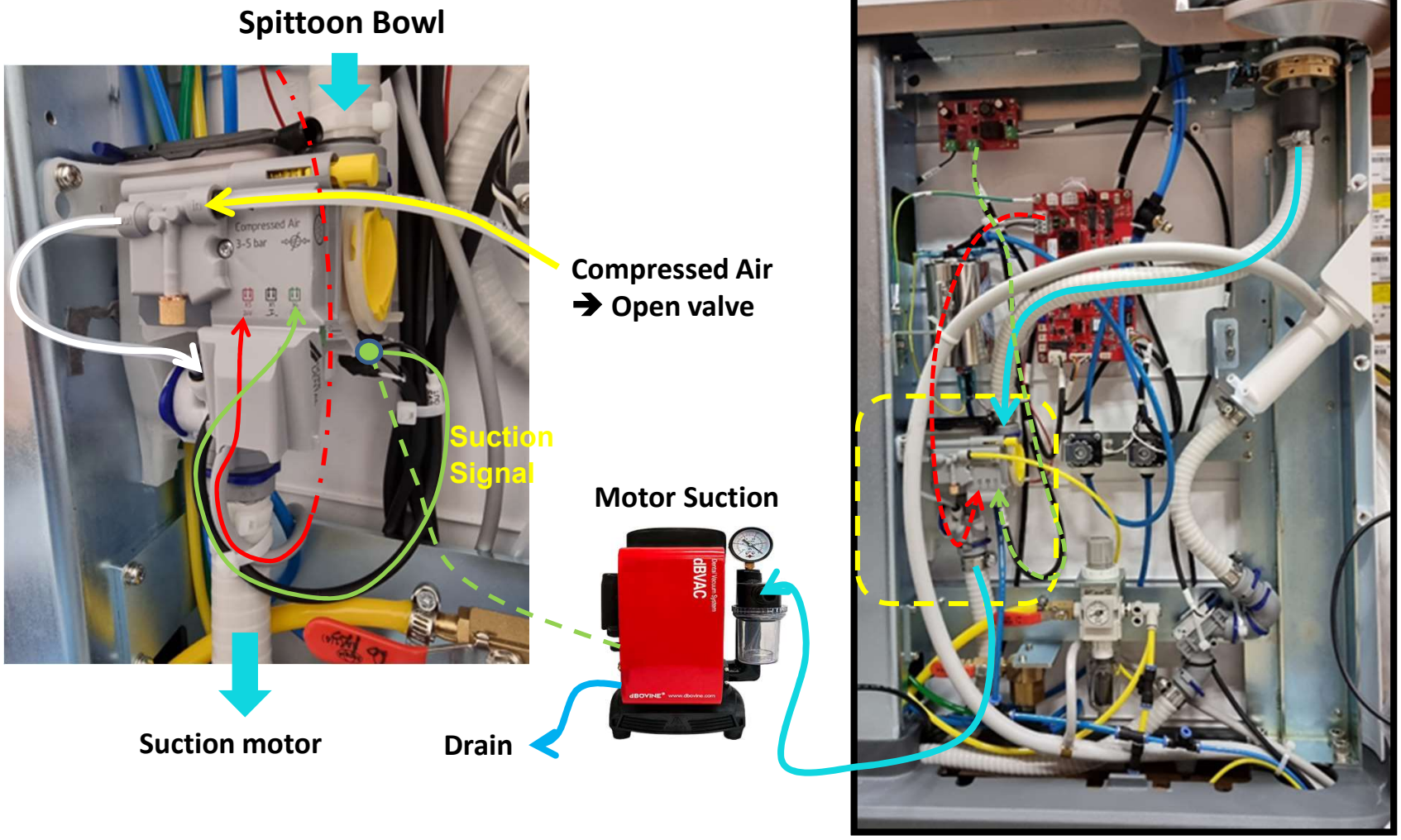
Red : AC 24V

Green : Suction Signal

Sensor : Suction and compressed air are activated

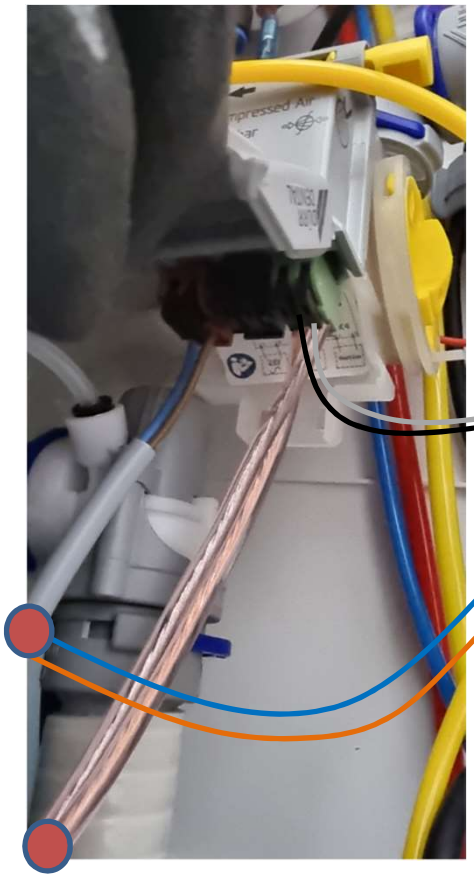
2. Spittoon Valve

2.4. Drain process



2. Spittoon Valve

2.5. Electric Signal Process



Suction Signal
From Relay PCB

Relay PCB

AC 24V
Input

Suction Signal

***Drain Process**

AC24 in

↓ **Water in**

Spittoon Reservoir

↓ **Sensor on**

Compressed Air

↓ **Open drain**

Suction s/w on

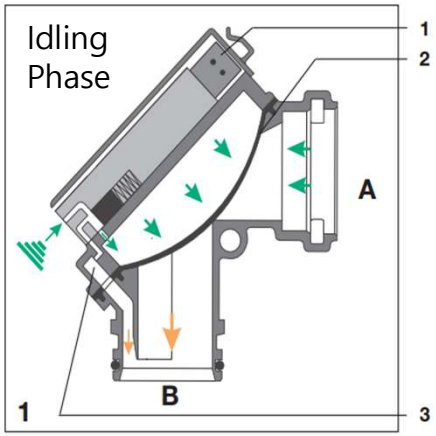
↓ **Suction start**

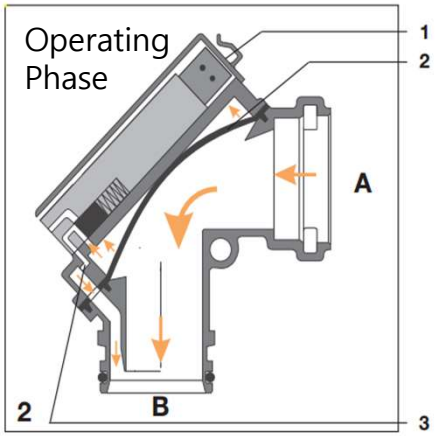
Drained by suction

3. Suction Valve

3.1. Define

The device increasing the efficiency of suction pump by opening of the Membrane





A. From hose holder

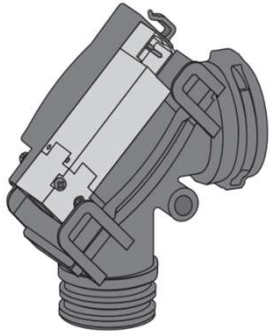
B. To suction unit

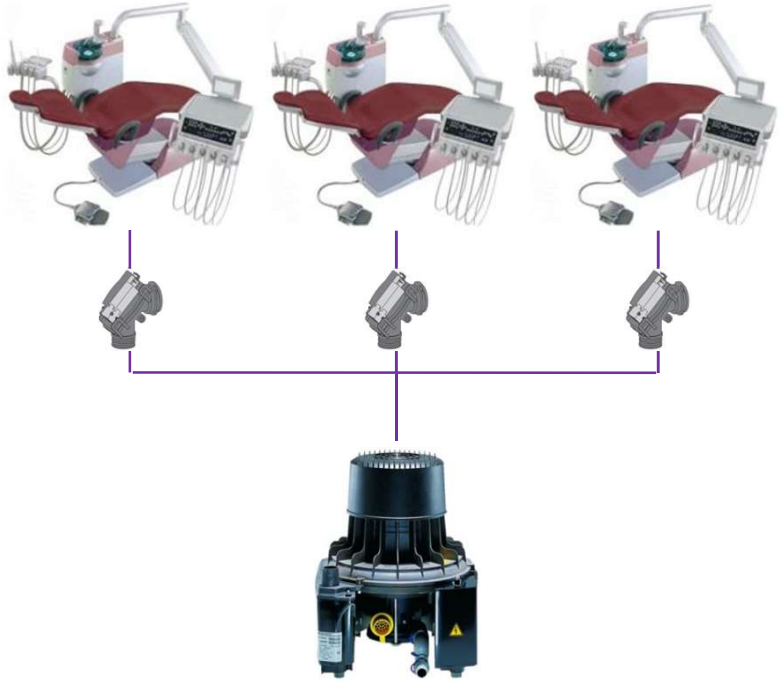
1. Magnet valve

2. Valve membrane

3. Air channel in suction valve

(Station selection valve)





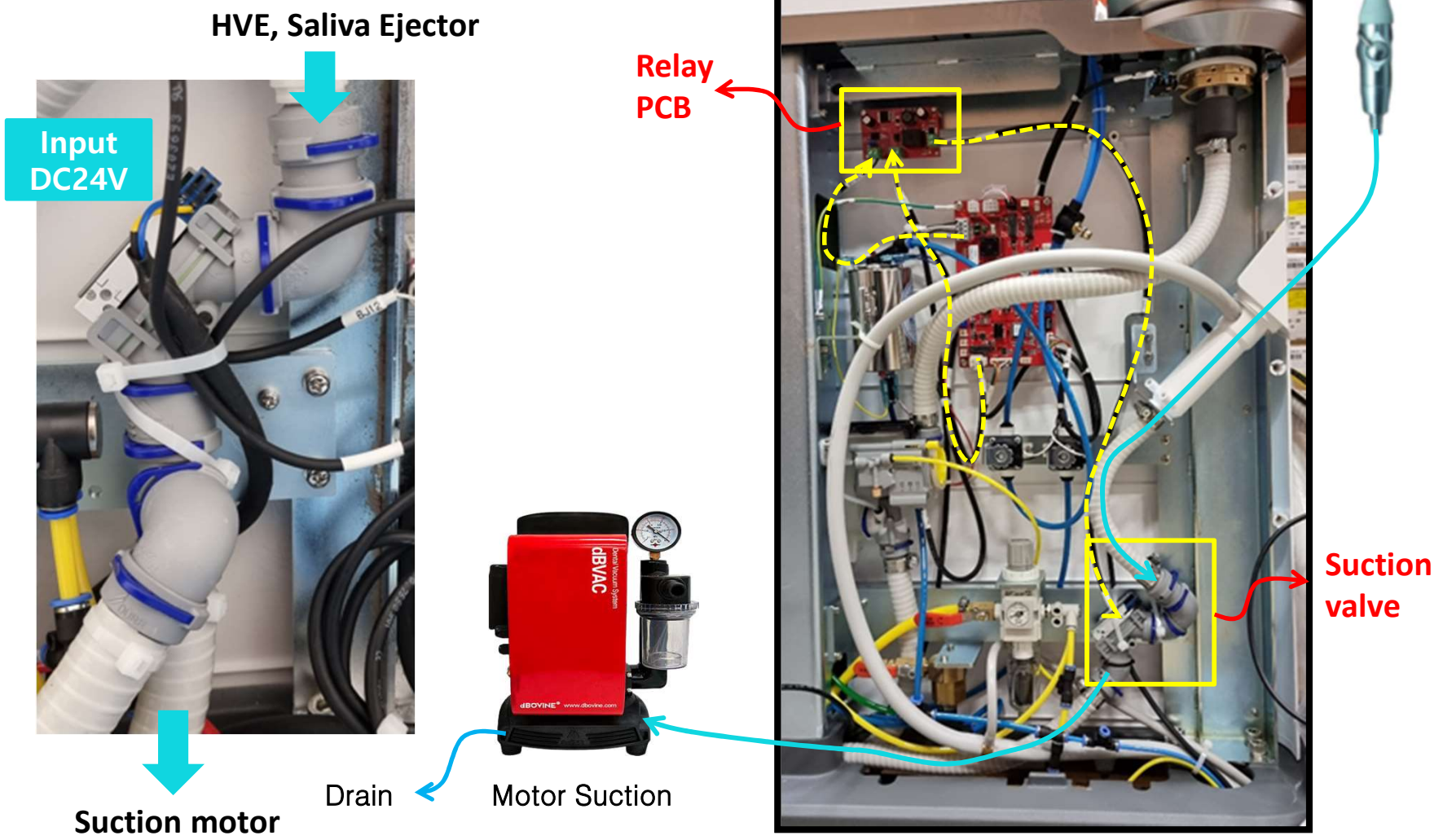
In a suction pump system with several unit chair,

Open just one suction line of the desired chair,

Increase the efficiency of suction pump.

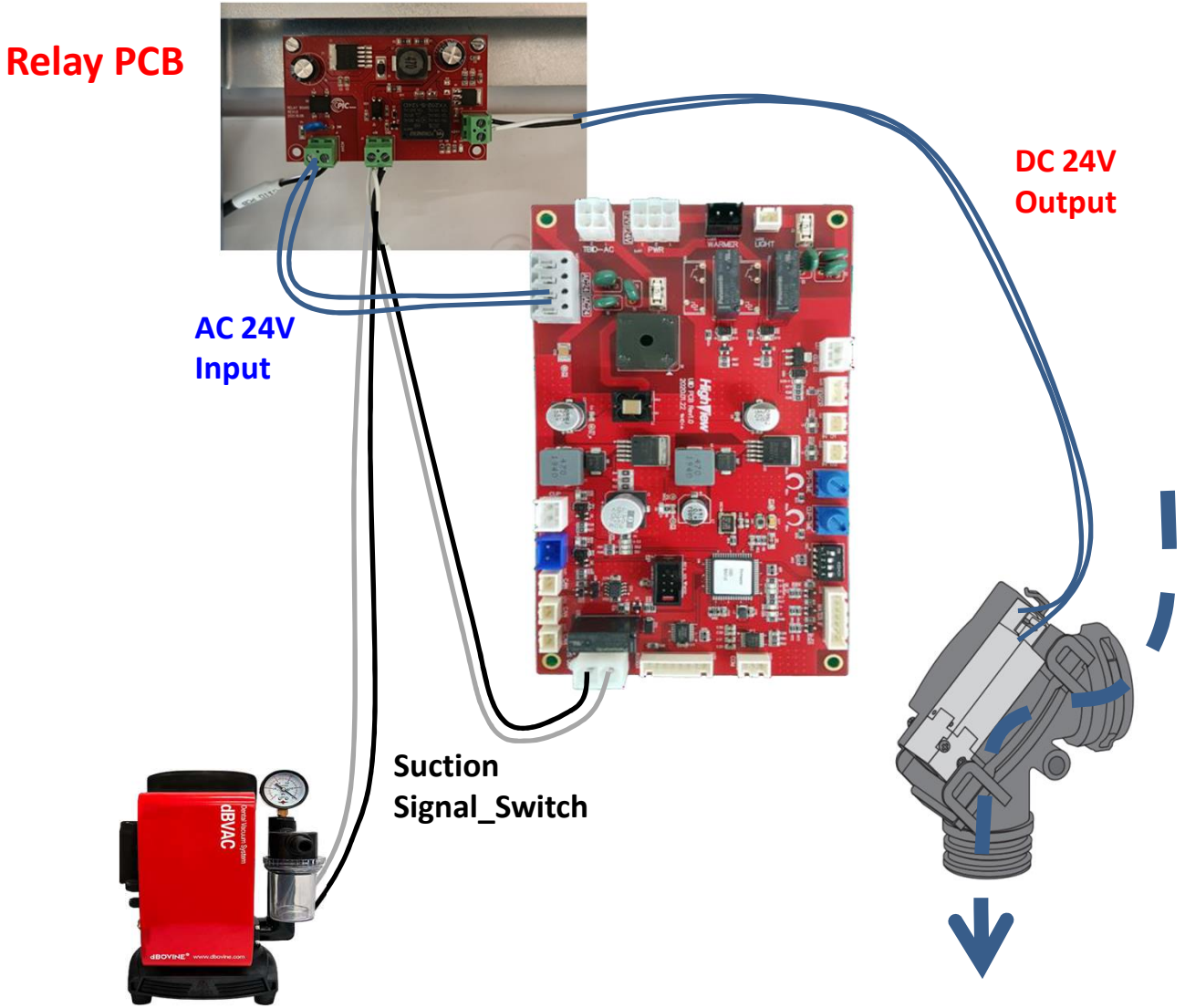
3. Suction Valve

3.2. Drain process



3. Suction Valve

3.3. Electric Signal Process



AC24 in

↓

Suction Signal

↓

DC24V out

↓

Suction Valve open

↓

Suction Start

Ⅻ Function setting

1. User mode
2. Engineer mode

1. User mode

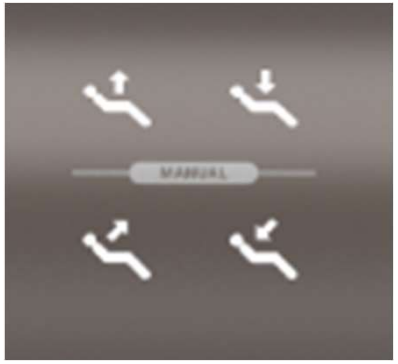
1-1 Desired position memory setting

The chair positions can be saved on two buttons; the standard setting is as follows:

1) Move the chair to the desired position using the manual button

2) Press and hold down P1 or P2 for 3 sec until you hear acoustic melody to memory the desired position

3) The chair position is saved on the button.



1. User mode

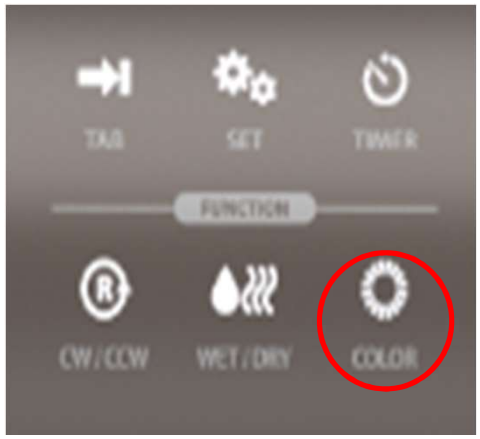
1-2 Touch pad color setting

The touch panel color can be changed to another; the standard setting is as follows:

1) Press and hold down the color button for 3 sec to change color.

2) Choose the desired color

3) Press and hold down again to save

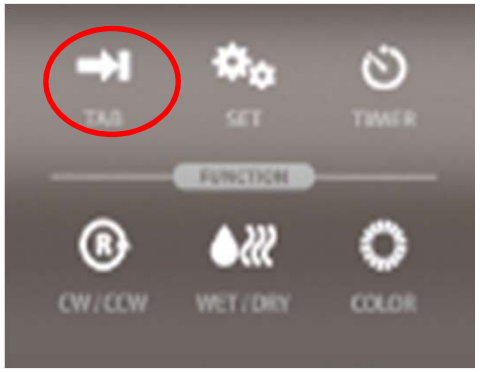


Note : if entered to setting mode, chair is not working at all(not malfunction)

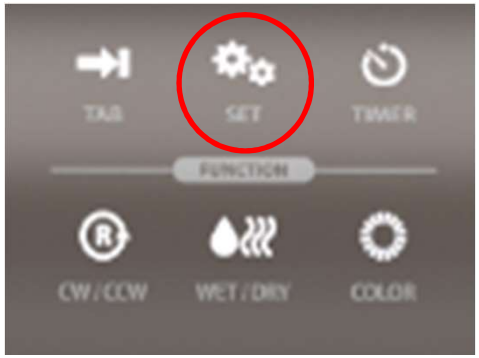
1. User mode

1-3 Timer setting

1.3.1 Set to 1min : Press and hold down TAP button for 3 sec

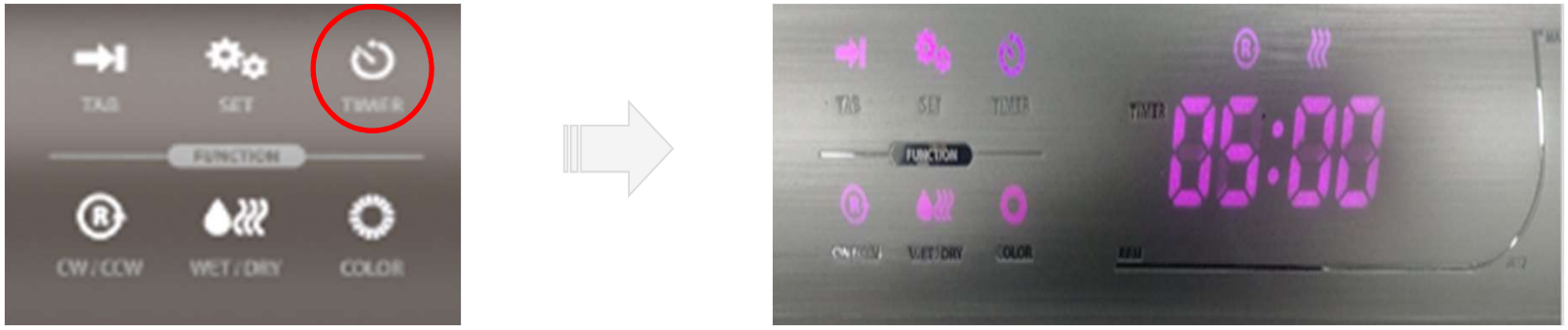


1.3.2 Set to 5min : Press and hold down SET button for 3 sec.

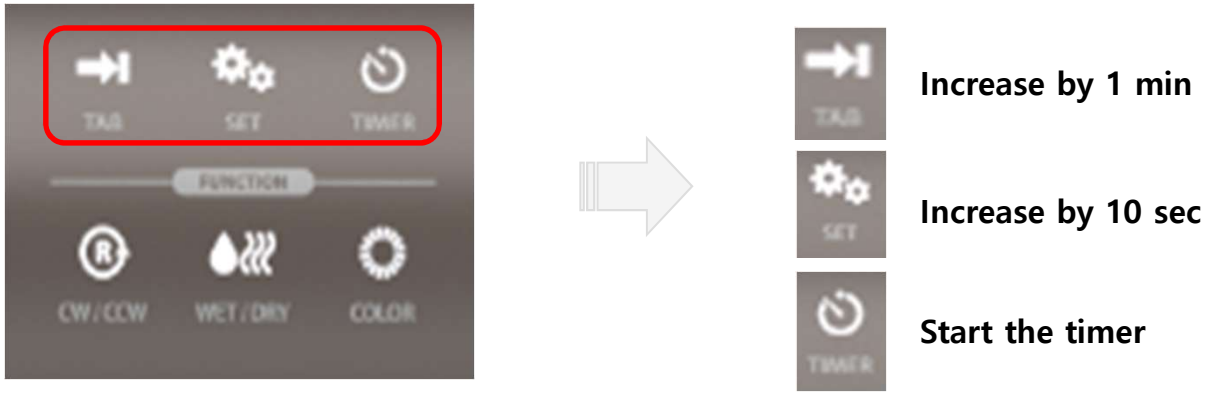


1. User mode

1.3.3 **Change to the time which user sets** : Press and hold down the TIMER button for 3 sec
Set to 0 sec : Press and hold down once again.



1.3.4 **Set to the desired time for user** : Touch each button light below to set the desired time.



Increase by 1 min

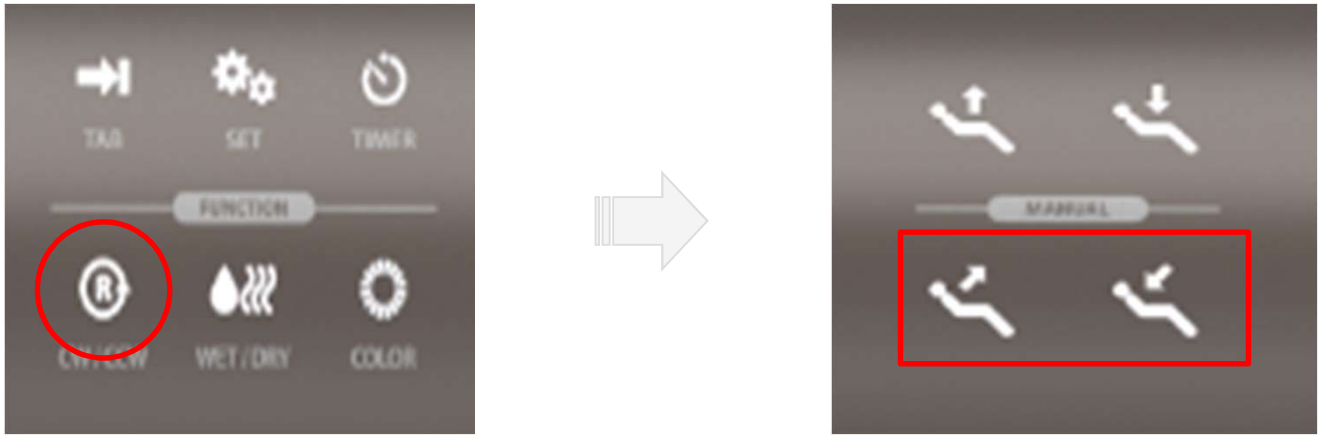
Increase by 10 sec

Start the timer

1. User mode

1-4 Touch sensitivity setting

1.4.1 Adjust the button sensitivity(6 steps) : Press and hold down CW/CCW button for 3 sec.



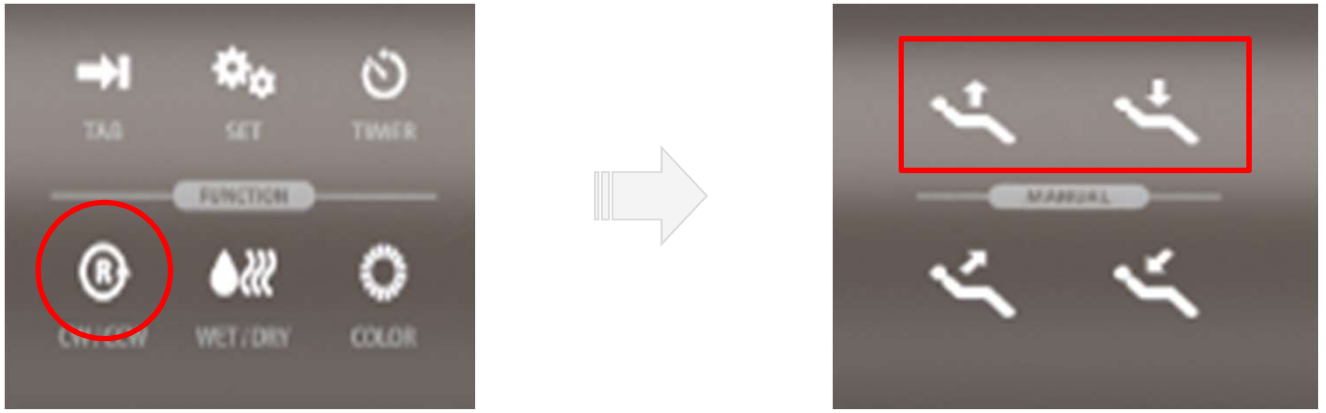
Sensitivity up whenever touching once(Reach to max step, no more beep)

Sensitivity down whenever touching once(Reach to min step, no more beep)

1. User mode

1-5 Touch button beep setting

1.5.1 Adjust beep of button(4 steps) : Press and hold down CW/CCW button for 3 sec



Beep Up whenever touching the button

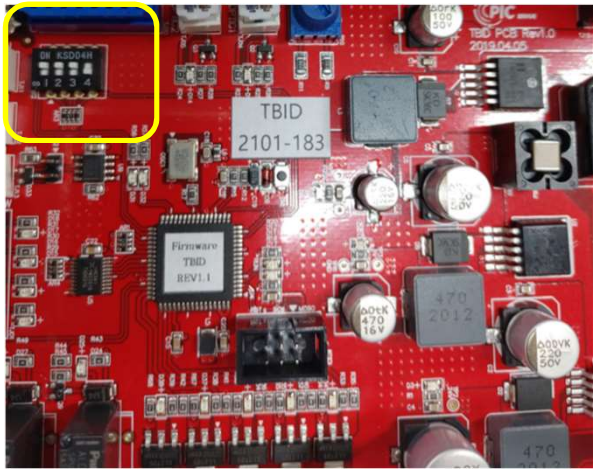
Beep down whenever touching the button

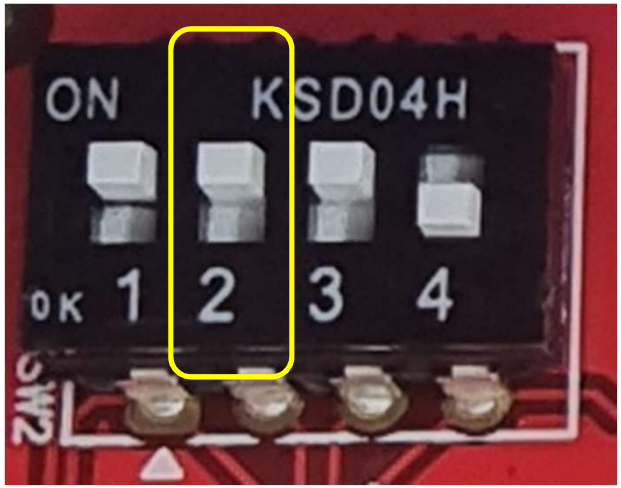
2. Engineer mode on Table PCB

2.1 How to set the spray water from each instrument

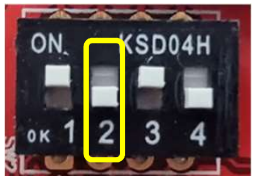
2.1.1 Slide the second dip SW up, you can save the spray water from each HP individually

(Note : Dip Switch 1 should be kept switch on always _ Program mode)





Doctor Table PCB



Slide the second dip switch downward ➔ Save Wet/Dry in all HP at the same time

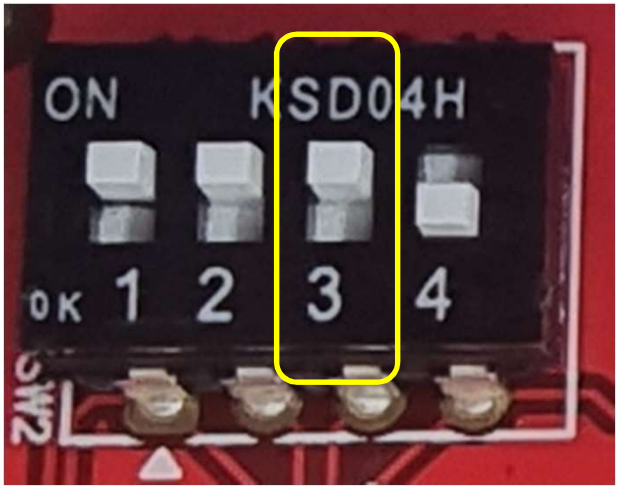
Slide the second dip switch upward(default) ➔ Save Wet/Dry in each HP individually

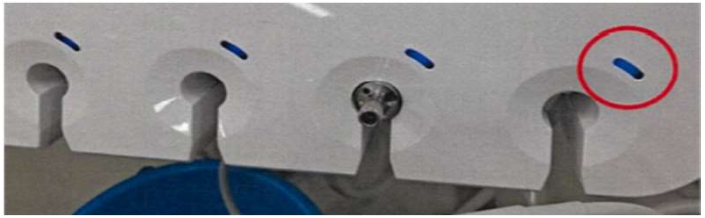
2. Engineer mode on Table PCB

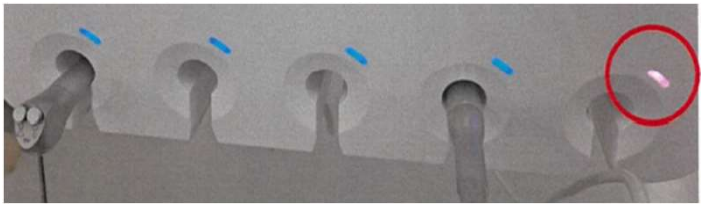
2.2 How to turn the LED on the holder to on and off

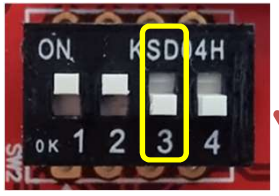
2.2.1 Slide the third dip SW up, you can change the LED indicator color status on the holder

(Note : Dip Switch 1 should be kept switch on always _ Program mode)









Slide the third dip switch downward ➔ All HP LED is always on

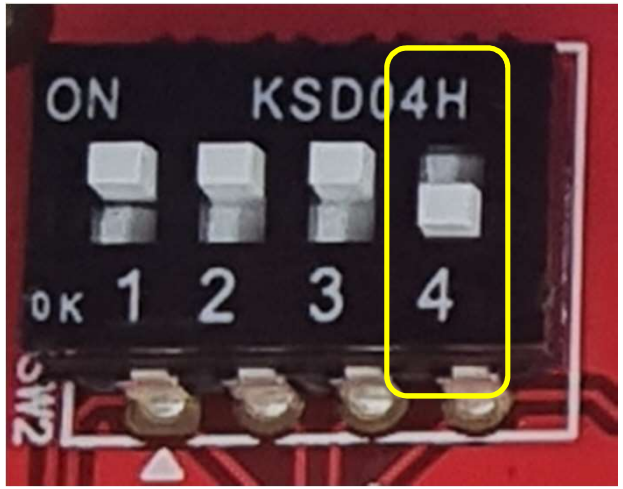
Slide the third dip switch upward(default)
➔ When you pick HP up, the LED turns Pink from blue

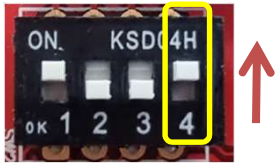
2. Engineer mode on Table PCB

2.3 How to set the scaler from auto to manual mode

2.3.1 Slide the fourth dip SW up, the scaler works only while you keep pressing the foot pedal on.

(Note : Dip Switch 1 should be kept switch on always _ Program mode)





Slide the fourth dip switch upward ➔ Manual Mode(Foot pedal should be kept pressing)

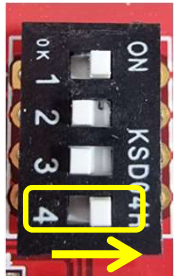
Slide the fourth dip switch downward(default) ➔ Auto Mode(Press and release the foot pedal)

3. Engineer mode on Unit PCB

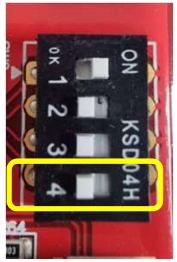
3.1 How to mute the button beep on the assist table

3.1.1 Slide the fourth dip SW up, you can mute the beep sound from the assist membrane when you press it on

(Note : Dip Switch 1 should be kept switch on always _ Program mode)



Slide the fourth dip *switch* upward ➔ Beep sound off



Slide the fourth dip switch downward(default) ➔ beep sound on

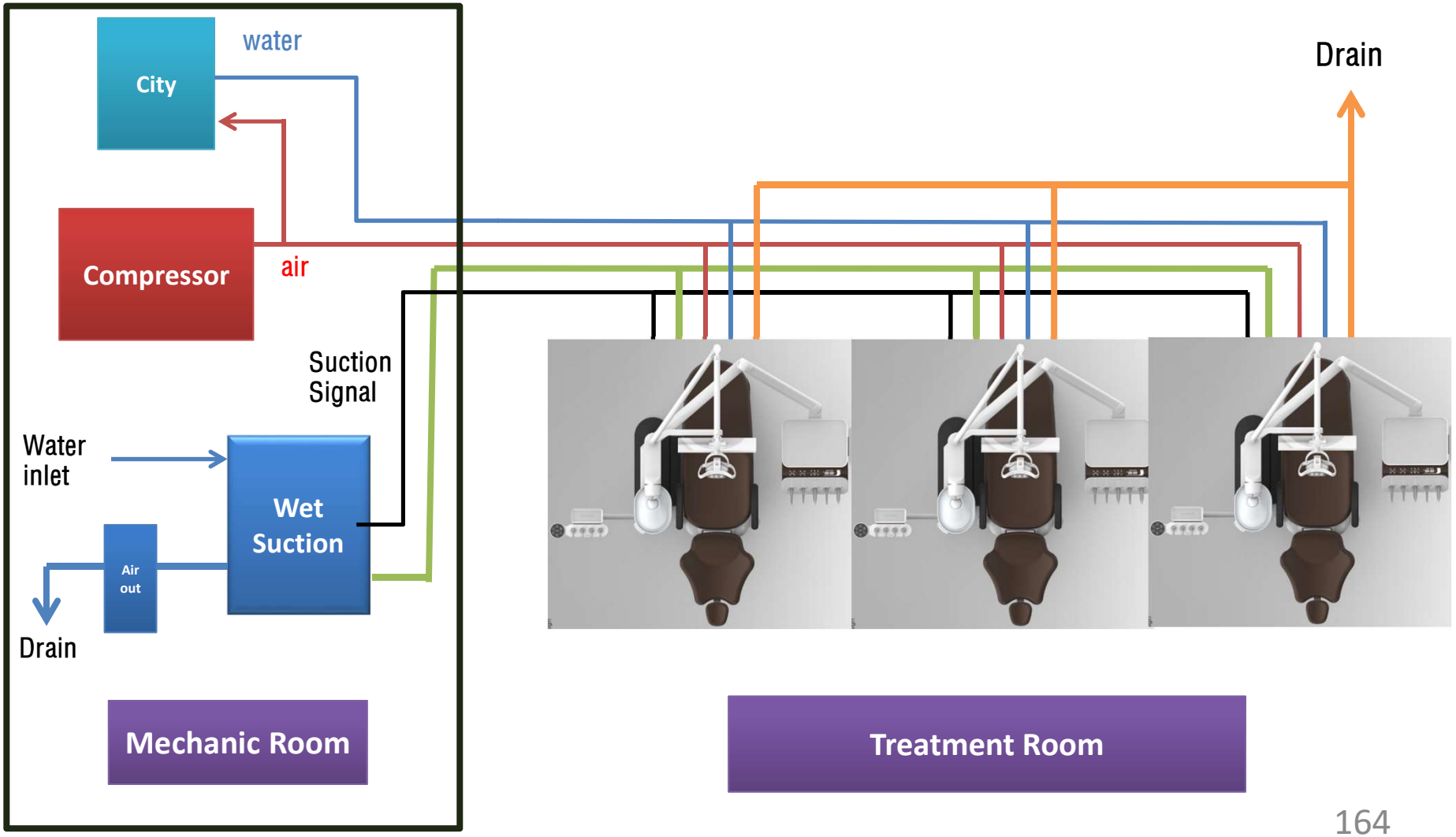
XIII How to install the connection

1. The Connection from Chair side
2. The Connection from Clinic side

MEGAGEN

1. The Connection from the chair side

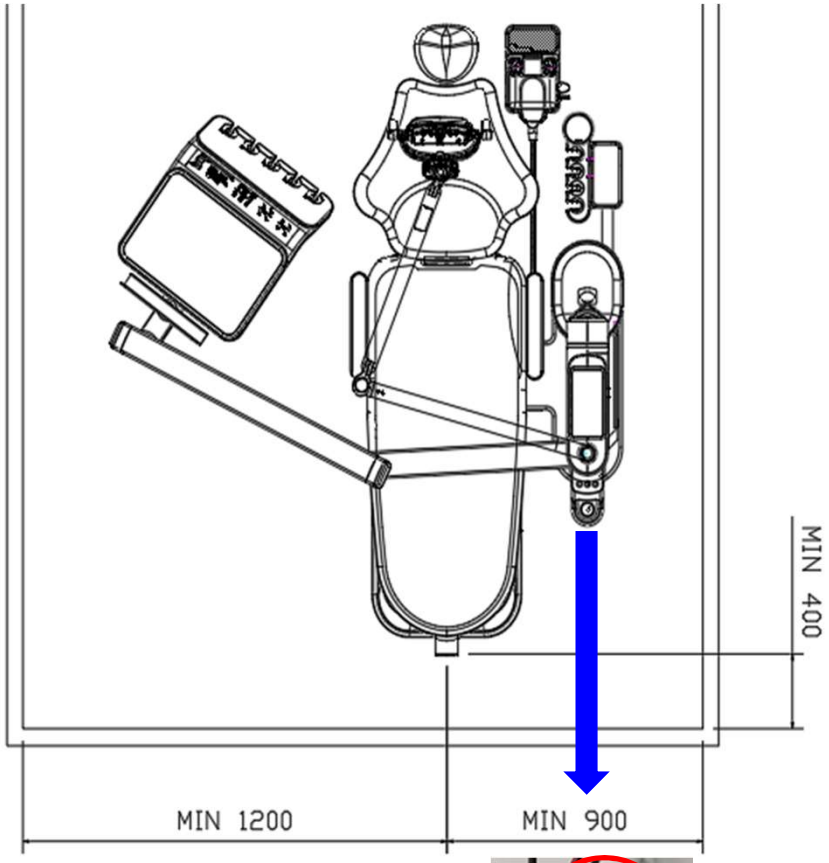
1-1 Diagram



1. The Connection from the chair side

For Lifetime Smiles

1-2 Connections configuration



1. Power : 220/110V(grounded)

2. Suction signal wires(2p)

3. Air line(10mm)

4. Water line(10mm)

5. Drain hose : 24.5mm

6. Suction hose : 22.1mm ➔ 24.5mm(5.2022)

7.etc
* In case of using Dry suction unit
  Needs Water separator

* In case there is no drainage system
  Needs Spittoon and Suction Valve

You have to order the customized junction cover to us in advance as needed.

1. The Connection from the chair side

1-3 Connections size

22.1mm ➔ 24.5mm

① Drainage

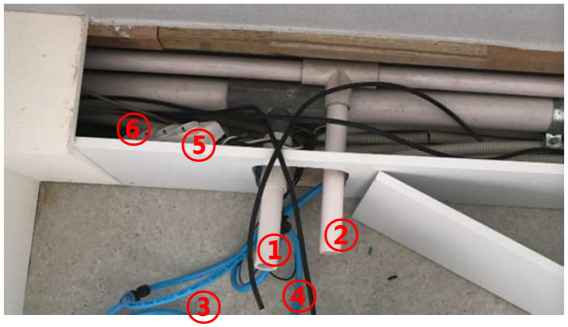
② Suction

③ Water

④ Air

⑤ Power cord

⑥ Suction signal

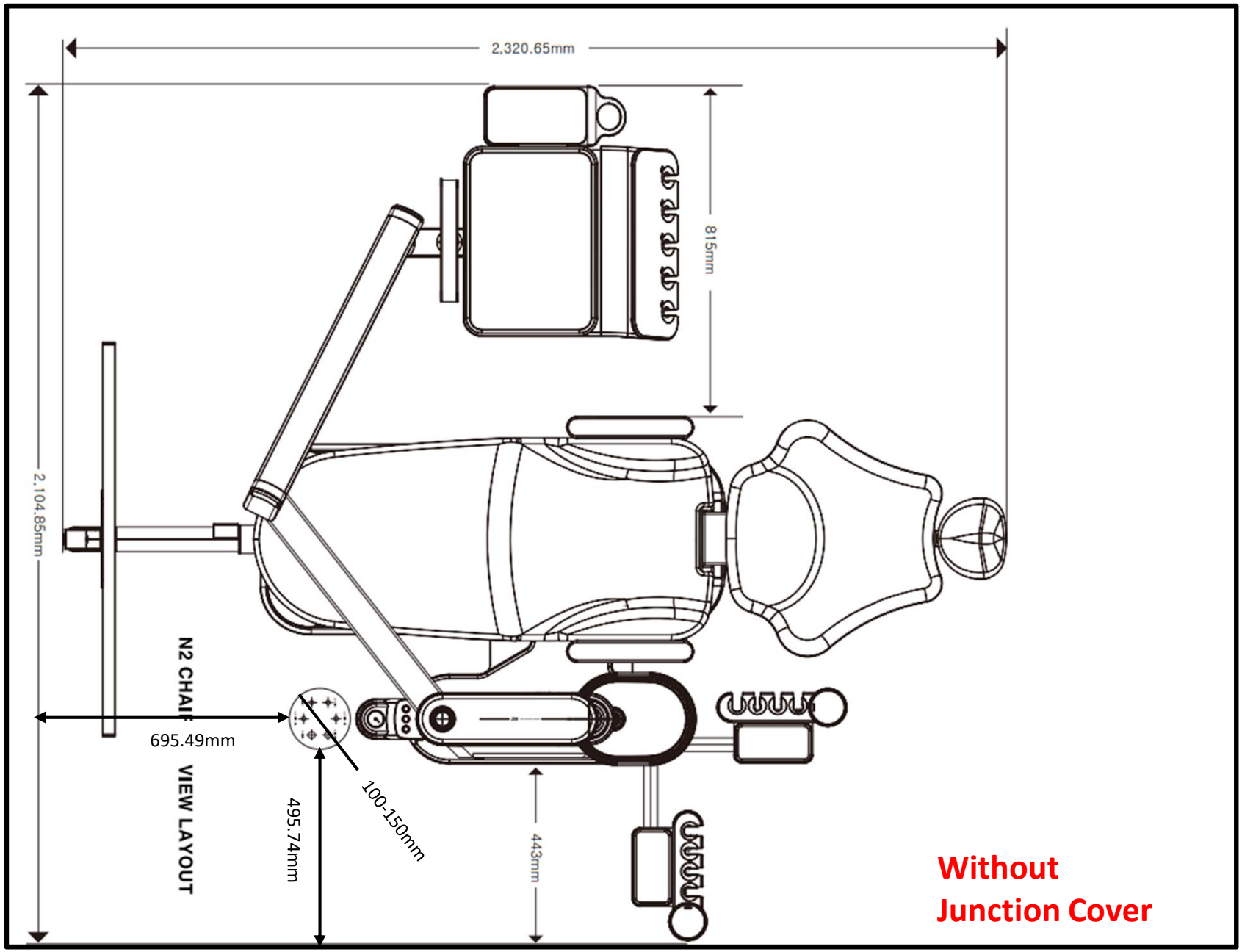


Wall type

Connection

2,850 ~ 3,200mm

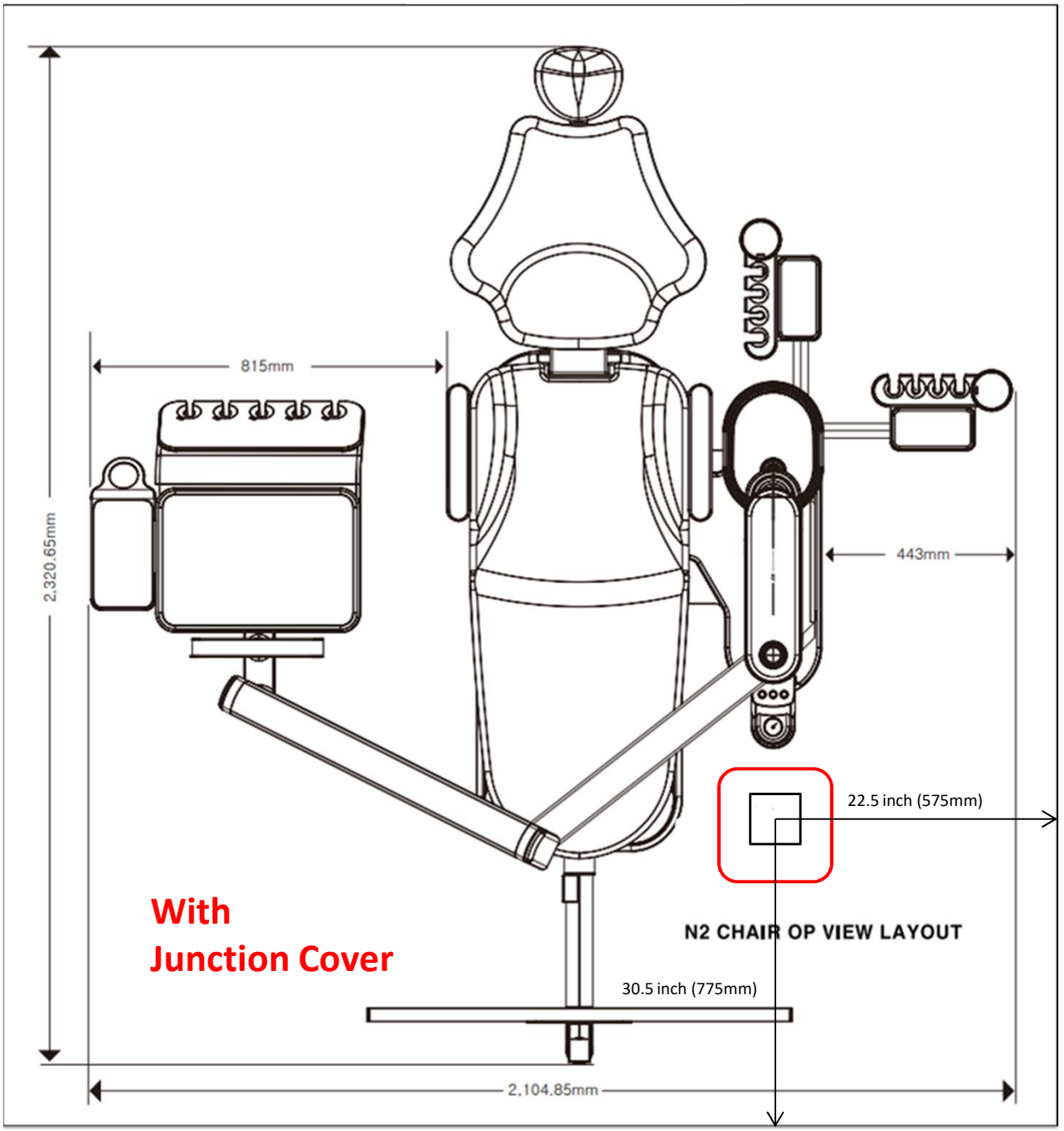
2,200 ~ 2,400mm



N2 CHAI

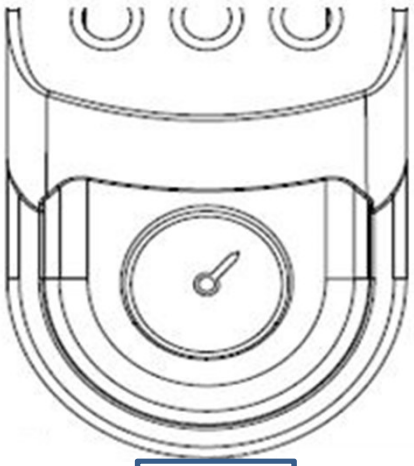
VIEW LAYOUT

86.5 inch (2,200mm)



114 inch (2,900mm)

N2 Junction Standard



- Clearance

- Suction, drain
1.5 inch (40mm)
- Others
1.2 inch (30mm)

- Suction, Drainage

- Inner 1 inch (25mm)
- Outer 1.25 inch (32mm)

- Water, Air

Angle Valve
½ to 3/8 inch

Hose

4 inch (100mm)

Suction

Drain

Water

Air

Etc

Electricity

6 inch (150mm)

6 inch (150mm)

- Junction Box

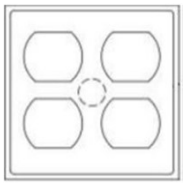
- Width
11.5 inch (293mm)
- length
13.5 inch (343mm)
- Height
10 inch (250mm)

- Etc

- LAN cable,
- Video cable
(RGB, HDMI)
- TV cable

- Electrical outlet

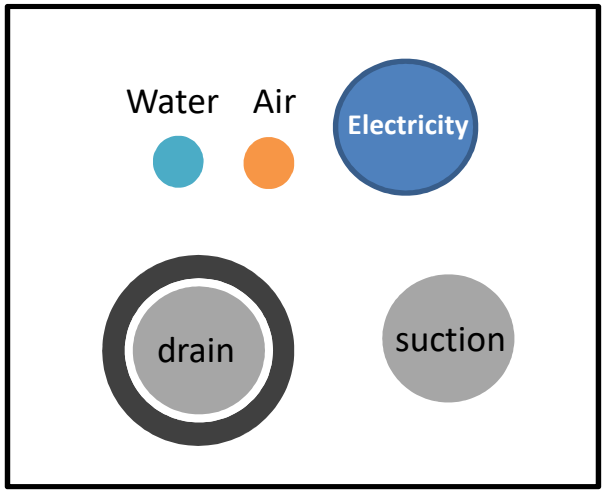
- 110~240v
- Grounded



2. The Connection from the clinic side

For Lifetime Smiles

2-2 Floor Connection composition from the clinic side



100~150mm

*Hose size from unit : outer(inner)

- Suction hose : 24mm(19mm)
- Drainage hose : 24mm(19mm)
- Air & Water : 10mm

1. Electricity-220/110V Earth grounding is mandatory for chair usage

2. Vacuum signal line (2p)

3. Air/ Water line(high pressure: 10mm**(0.39in diameter)**

(polyurethane): If you have a local specification, follow the specification

4. Vacuum pvc (size of main pipe) Decide what type to use

type of 1. Wet Type : 32mm**(1.25in)**

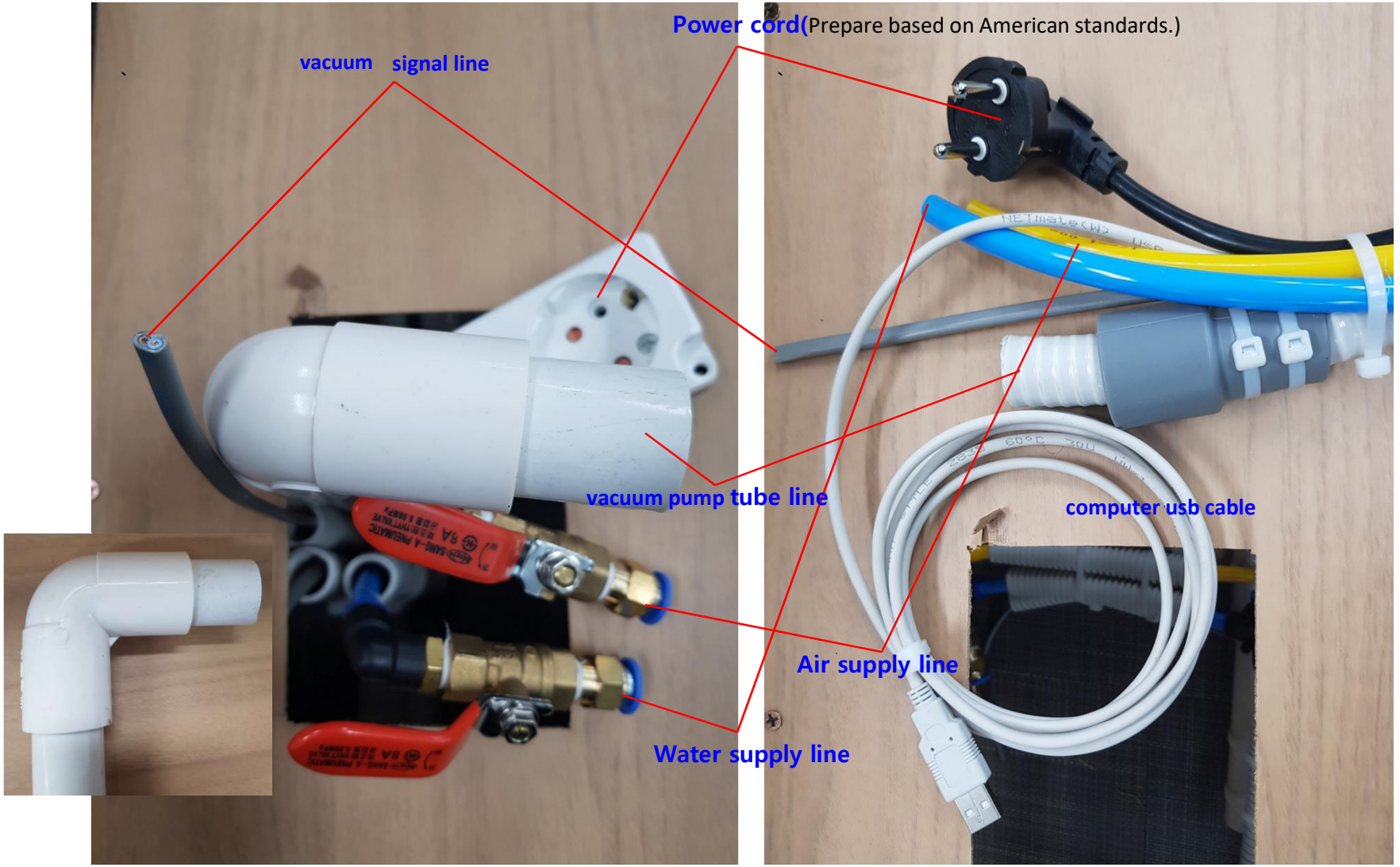
2. Dry Type : 48mm -> Size 32mm**(1.25in)**

5. Drainage pvc : 59mm(50mm) → 32mm(25mm)

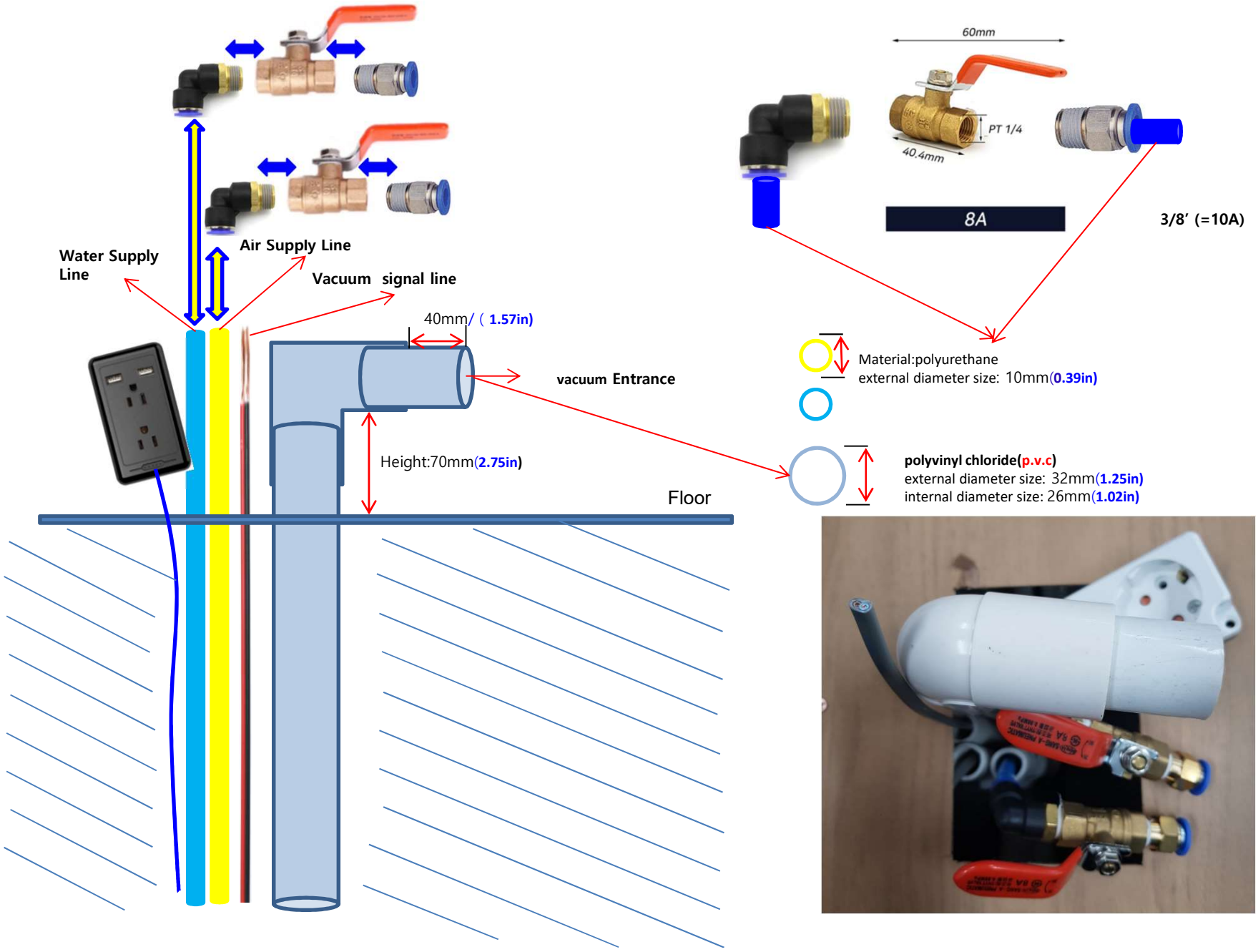
*all pipe and hose's diameter is based on outer diameter(inner size)

6. etc

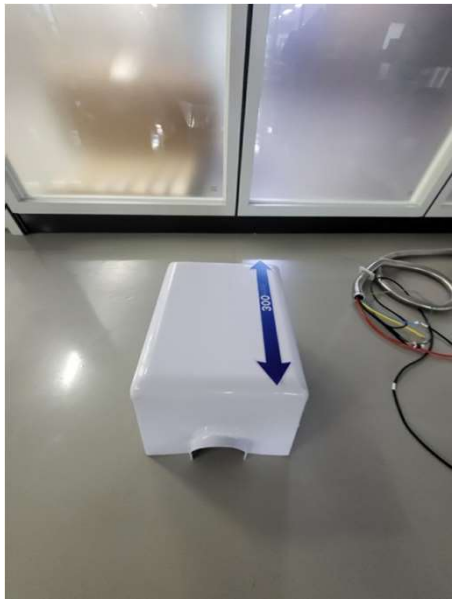
LAN cable *RGB/HDMI Monitor Cable *TV Wire(Coaxial cable)


Power cord(Prepare based on American standards.)
vacuum
signal line
vacuum pump tube line
computer usb cable
Air supply line
Water supply line

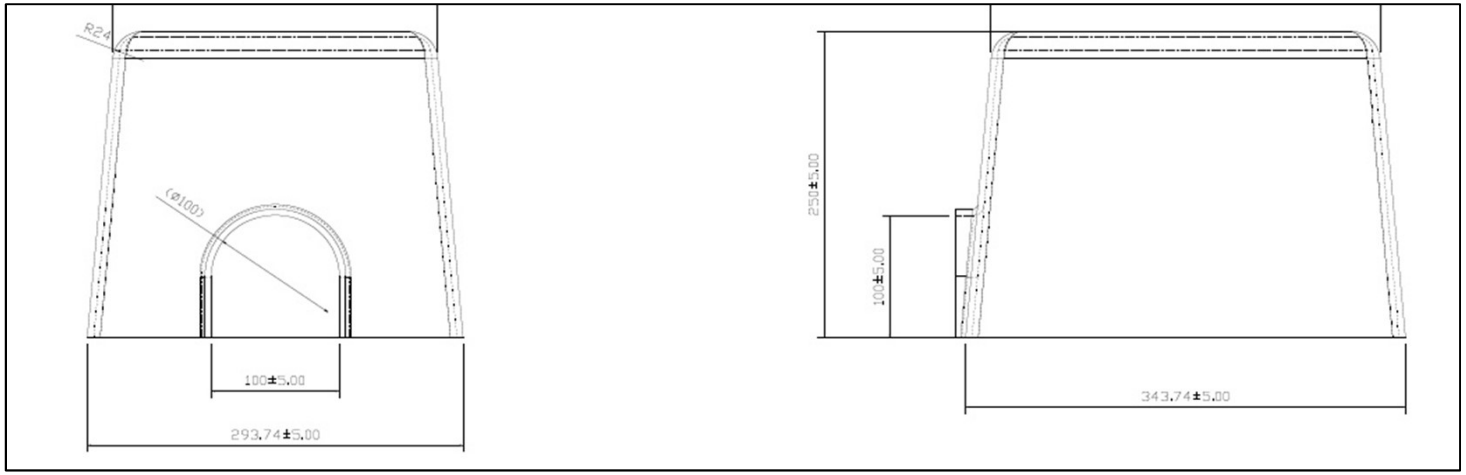
Piping Example – Floor Plan



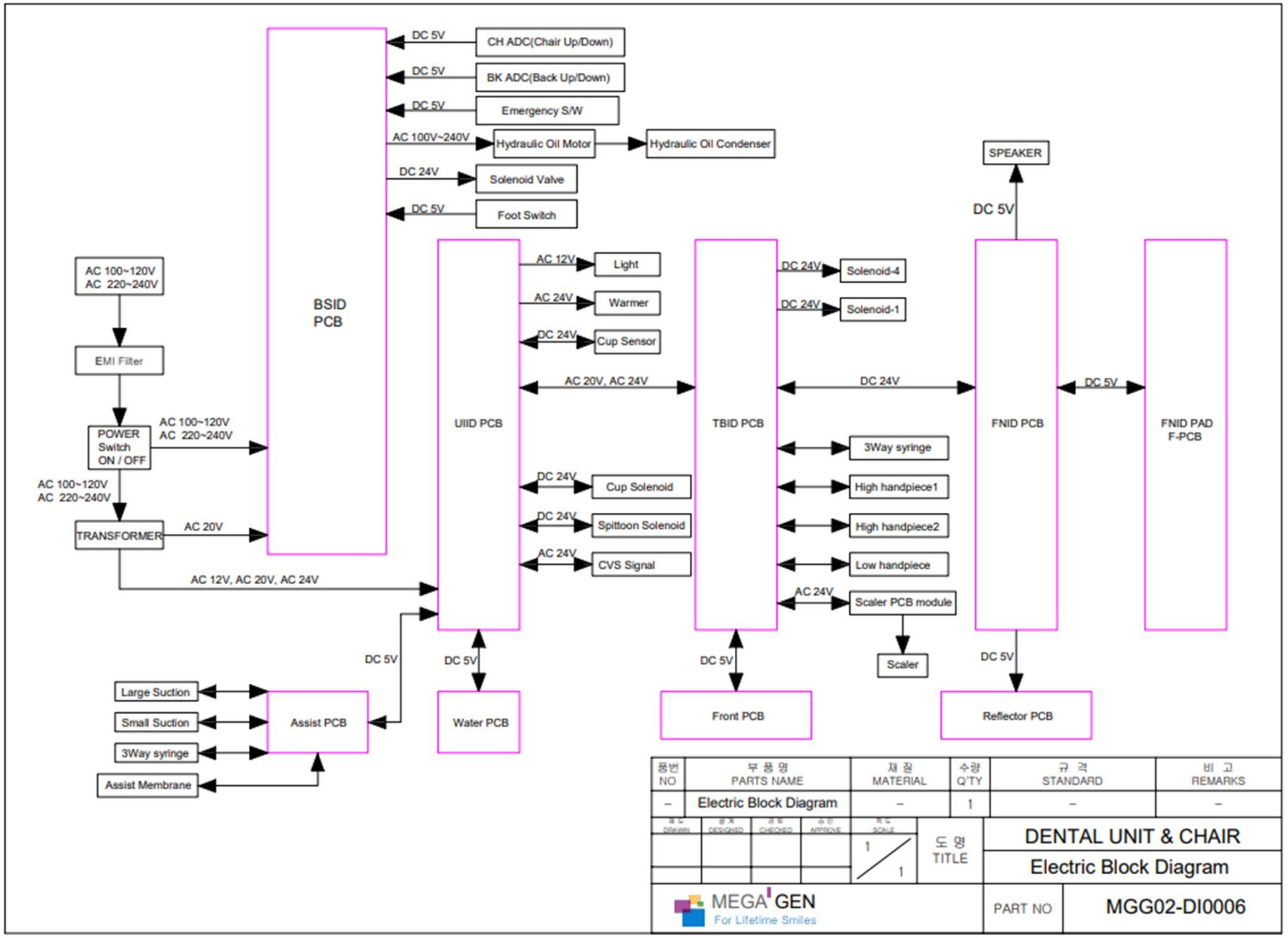
Junction Box



Standard Size



Junction Box location


DC 5V
CH ADC(Chair Up/Down)
DC 5V
BK ADC(Back Up/Down)
DC 5V
Emergency S/W
AC 100V~240V
Hydraulic Oil Motor
Hydraulic Oil Condenser
DC 24V
Solenoid Valve
DC 5V
Foot Switch
BSID PCB
AC 100~120V
AC 220~240V
EMI Filter
POWER Switch ON / OFF
AC 100~120V
AC 220~240V
AC 100~120V
AC 220~240V
TRANSFORMER
AC 20V
AC 12V, AC 20V, AC 24V
UIID PCB
AC 12V
Light
AC 24V
Warmer
DC 24V
Cup Sensor
AC 20V, AC 24V
DC 24V
Cup Solenoid
DC 24V
Spittoon Solenoid
AC 24V
CVS Signal
TBID PCB
DC 24V
Solenoid-4
DC 24V
Solenoid-1
DC 24V
3Way syringe
High handpiece1
High handpiece2
Low handpiece
AC 24V
Scaler PCB module
Scaler
SPEAKER
DC 5V
FNID PCB
DC 5V
FNID PAD F-PCB
DC 5V
DC 5V
DC 5V
DC 5V
Large Suction
Small Suction
3Way syringe
Assist Membrane
Assist PCB
Water PCB
Front PCB
Reflector PCB
품번 NO
부 품 명 PARTS NAME
재 질 MATERIAL
수량 Q'TY
규 격 STANDARD
비 고 REMARKS
–
Electric Block Diagram
–
1
–
–
DRAWN
DESIGNED
CHECKED
APPROVE
SCALE
1
1
도 명 TITLE
DENTAL UNIT & CHAIR
Electric Block Diagram
MEGA GEN
For Lifetime Smiles
PART NO
MGG02-DI0006

MEGAGEN
For Lifetime Smiles

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