Bel-Halo

LED DENTAL LIGHT

MODEL
AL-901 Unit Mount
AL-902 Ceiling Mount
AL-905 Track Mount
AL-920X Swing Mount

INSTALLATION
and
OPERATION INSTRUCTIONS

⚠ **IMPORTANT**

After installation is completed, check all the bolts, screws and fastners to confirm that they are securely fastened.

▉Belmont®

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INSTALLATION INSTRUCTIONS

OPERATING INSTRUCTIONS

Intended Use of the Product

This product is intended for the exclusive use for diagnoses, treatments and relative procedures of dentistry, and must be operated or handled by the qualified dentists or by dental staffs under the supervision of the dentist. Such dentists or dental staffs should instruct and/or assist the patients to approach to and leave from the product. Patients should not be allowed to operate or handle the product unless he/she is so instructed.

⚠**WARNING**

Operation of a dental light under Electro Magnetic Interferences.

This equipment may malfunction by electromagnetic interferences.

Do not install dental light close to the equipment that generates electromagnetic interference (i.e. communication equipment, elevator)

Do not use the device that creates interference (i.e. cellular phone) near this equipment.

Do not use electric surgical knife or laser knife with dental light.

Light may turns on/off by itself due to malfunction of a sensor caused by electromagnetic interferences.

Symbols

⚠	Caution It means "caution, warnings, or possibility to danger".	🏭	Manufacturer

Environmental condition for Operation

Temperature : 41~104F (5 ~ 40°C)

Humidity : 10 ~ 80%

Pressure : 8.7~15.4 psi (600 ~ 1060 hpa)

Environmental condition for Storage

Temperature : -4~158F (-20 ~ 70°C)

Humidity : 10 ~ 80%

Pressure : 8.7~15.4 psi (600 ~ 1060 hpa)

Environmental condition for Transportation

Temperature : -4~158F (-20 ~ 70°C)

Humidity : 10 ~ 80%

Pressure : 8.7~15.4 psi (600 ~ 1060 hpa)

⚠WARNING

- To avoid the risk of electric shock, this equipment must only be connected to supply mains with protective earth.
- Position a light head by holding light handle(s).
- Installation and service work should be conducted by an authorized installation/service personnel only.

⚠WARNING: The followings are prohibited.

- To modify this equipment.
- To use the equipment under any failure condition.
- To use the equipment without doing the daily and periodical check-up.
- To wipe the plastic covers with any disinfectant or detergent that contains organic solvent.

Precautions for Installation

- Assure that the ceiling and/or framing can provide the 70 lb. (31.5kg) of dead weight capacity and the additional force of movement and positioning of the light.
- Keep the equipment away from water.
- Keep in circumstances safe from influence by temperature, humidity, wind, sun light, air containing salts and minerals.
- Care about stability such as inclination, vibration and impact, including handling and transportation.
- Do not keep the equipment in a place where chemicals are or where gas is emitted.
- During lifting and unpacking of the light, make sure to hold only the designated parts.
- Do not drop or hit the light.
- Do not connect to power supply other than AC120V 60HZ.
- Ground light properly prior to turning power on.
- When the installation process has been completed, verify that all the mechanical and electrical functions are working properly.
- Thick gloves are highly recommended at unpacking.
- Do not modify this equipment.

⚠️CAUTION

Before use

- Check connection of switches and make sure that the device functions properly.

- Make sure that grounding wire is connected.

- Make sure that cables are properly and perfectly connected.

During use

- Do not use the light longer than required for examination or treatment.

- Always watch the patient and the equipment to make sure nothing is wrong.

- If anything wrong is observed with the equipment or the patient, take a proper action, such as stopping the use of equipment as well as keeping the patient in safe.

- Keep an eye on the patient not to touch the equipment.

After use

- Turn off the light.

- Clean the equipment and get it ready for use.

⚠️CAUTION

Do not spray liquids directly onto light surfaces.

In order to prevent damage to electrical components and systems, do not apply excess cleaning solution onto light surfaces.

NOTE

Warranty does not cover damage to equipment caused by disinfectant solutions

[1] SPECIFICATIONS
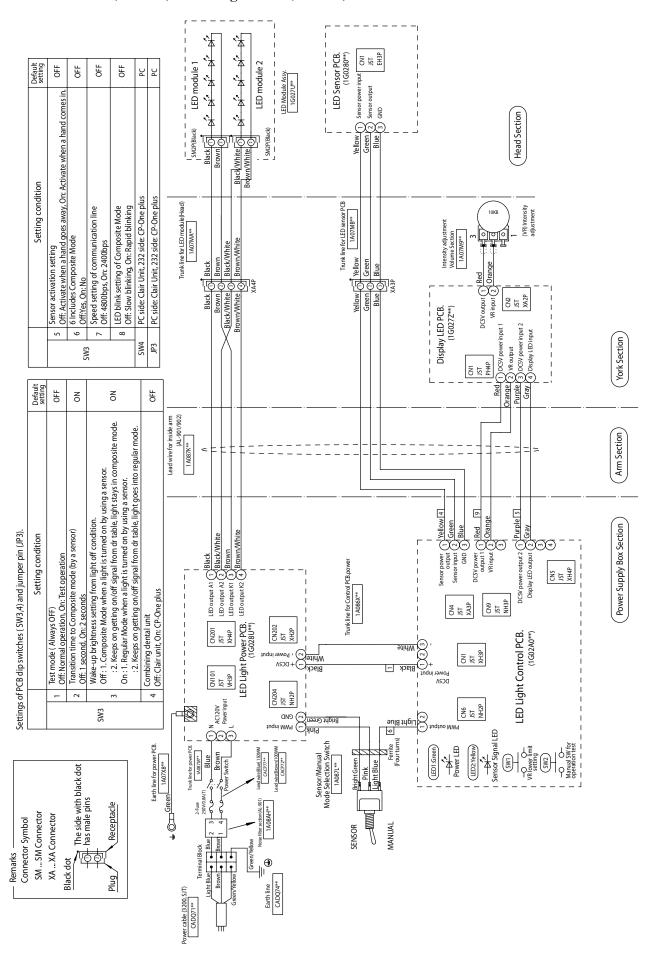
1. Focal Distance... 25.6" (650 mm)
2. Color Temperature .... 5000° Kelvin
3. Light Intensity

   Regular Operation Mode .... 4000 Lux / 370 FTC ~ 32000 Lux / 3970 FTC

   Composite Mode .... 5500 Lux / 510 FTC
4. Light Pattern.. 3.2" x 5.5" at 25.6"
5. Power Requirement.. AC. 120V / 60 Hz / 0.43A

[2] CLASSIFICATION

a. Protection against electric shock   : Class I Equipment.

b. Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.

[3] WIRING DIAGRAM

3-1. Unit Mount (AL-901) & Ceiling Mount (AL-902)

Settings of PCB dip switches (SW3,4) and jumper pin (JP3).

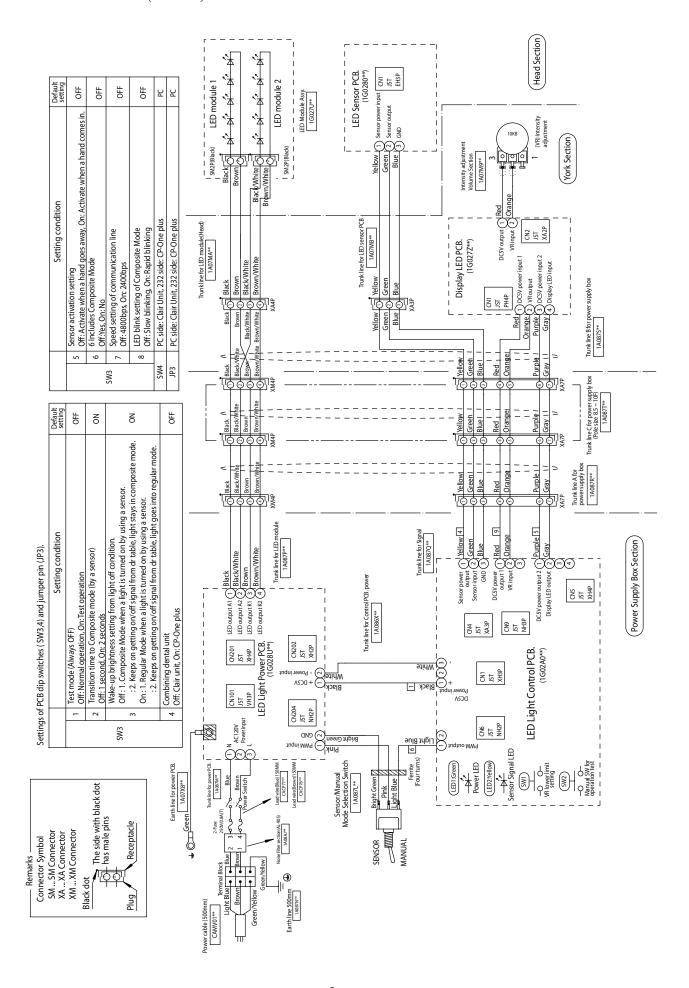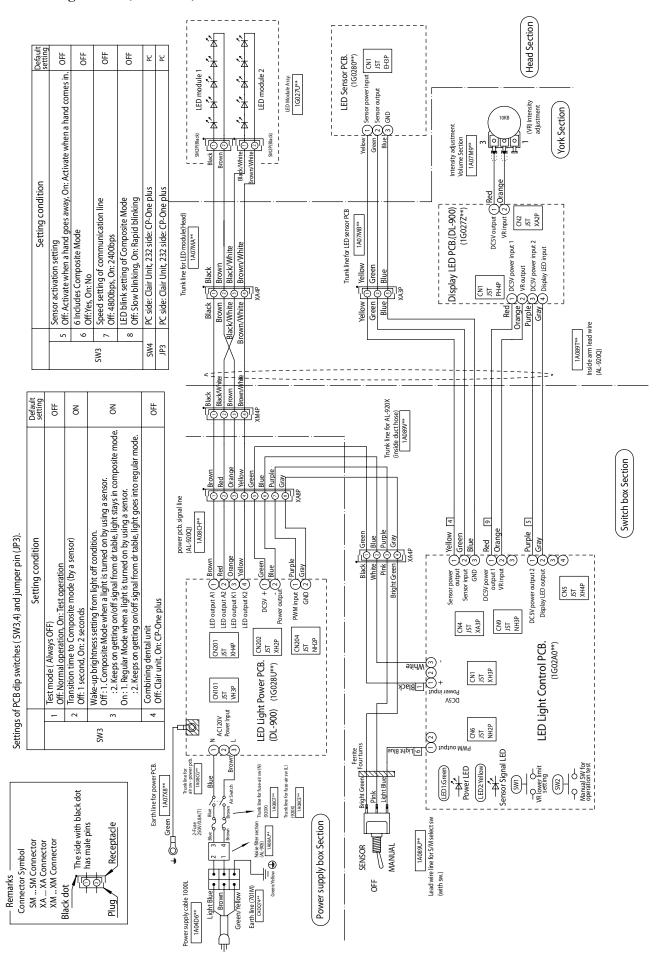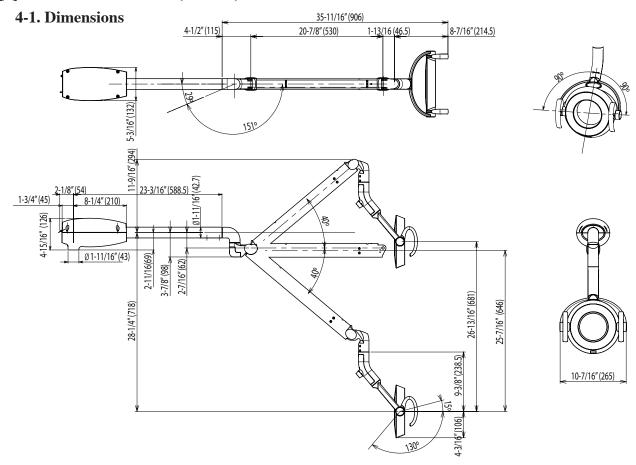|		Setting condition	Default setting
SW3	1	Test mode (Always OFF) / Off: Normal operation, On: Test operation	OFF
	2	Transition time to Composite mode (by a sensor) / Off: 1 second, On: 2 seconds	ON
	3	Wake-up brightness setting from light off condition. / Off :1. Composite Mode when a light is turned on by using a sensor. :2. Keeps on getting on/off signal from dr table, light stays in composite mode. / On :1. Regular Mode when a light is turned on by using a sensor. :2. Keeps on getting on/off signal from dr table, light goes into regular mode.	ON
	4	Combining dental unit / Off: Clair unit, On: CP-One plus	OFF

		Setting condition	Default setting
SW3	5	Sensor activation setting / Off: Activate when a hand goes away, On: Activate when a hand comes in.	OFF
	6	6 Includes Composite Mode / Off:Yes, On:No	OFF
	7	Speed setting of communication line / Off: 4800bps, On: 2400bps	OFF
	8	LED blink setting of Composite Mode / Off: Slow blinking, On: Rapid blinking	OFF
SW4		PC side: Clair Unit, 232 side: CP-One plus	PC
JP3		PC side: Clair Unit, 232 side: CP-One plus	PC

Remarks

Connector Symbol
SM ...SM Connector
XA ...XA Connector

Black dot — The side with black dot has male pins

Plug — Receptacle

LED module 1
LED module 2
LED Module Assy. 1G027U**

LED Sensor PCB. (1G0280**) — CN1 JST EH3P
Sensor power input — Yellow / Sensor output — Green / GND — Blue

Head Section

Trunk line for LED module(Head) 1A07MA**
Black — Black / Brown — Brown / Black/White — Black/White / Brown/White — Brown/White — XA4P

Trunk line for LED sensor PCB 1A07MB**
Yellow — Yellow / Green — Green / Blue — Blue — XA3P

(VR) Intensity adjustment — 10KB
Intensity adjustment Volume Section 1A07M9**

Display LED PCB. (1G027Z**)
CN2 JST XA2P — DC5V output 1 / VR input 2
CN1 JST PH4P — DC5V power input 1 / VR output 2 / DC5V power input 2 / Display LED input 4
Red / Orange / Purple / Gray

York Section

Arm Section

Lead wire for inside arm (AL-901/902) 1A087K**

Power Supply Box Section

LED Light Power PCB. (1G028U**)
CN201 JST XH4P — LED output A1 1 Black / LED output A2 2 Black/White / LED output K1 3 Brown / LED output K2 4 Brown/White
CN101 JST VH3P
CN204 JST NH2P
CN202 JST XH2P

Trunk line for Control PCB.power 1A086X**
White / Black

LED Light Control PCB. (1G02A0**)
CN4 JST XA3P — Sensor power output 1 / Sensor input 2 / GND 3
CN9 JST NH3P — DC5V power output 1 1 Red / VR input 2 Orange / 3
CN5 JST XH4P — DC5V power output 2 1 Purple / DC5V power output 2 2 Gray / Display LED output 3 / 4
CN1 JST XH3P — DC5V Power input
CN6 JST NH2P — PWM output / Light Blue
Yellow 4 / Green / Blue / Red 9 / Orange / Purple 5 / Gray

LED1:Green — Power LED
LED2:Yellow — Sensor Signal LED
SW1 — VR lower limit setting
SW2 — Manual SW for operation test

PWM input — Pink / Bright Green / GND 2
Bright Green / Pink / Light Blue
Ferrite (Four turns) 1A087L**

Sensor/Manual Mode Selection Switch
SENSOR / MANUAL

Trunk line for power PCB. 1A087M**
Blue 1 / Brown 2 / Green 3
Power Switch

Earth line for power PCB. 1A07X8**

Lead wire(Blue) 150MM CAC977*** / Lead wire(Brown)109MM CAC272***

Power cable (3200,SJT) CAD071**
Terminal Block — Light Blue / Brown / Green/Yellow
2-Fuse 250V/0.8A(T)
Noise filter section(AL-901) 1A08AH**
Earth line CAD074**
AC120V Power input — N / L

Settings of PCB dip switches (SW3,4) and jumper pin (JP3).

		Setting condition	Default setting
SW3	1	Test mode (Always OFF)	OFF
		Off: Normal operation, On: Test operation	
	2	Transition time to Composite mode (by a sensor)	ON
		Off: 1 second, On: 2 seconds	
	3	Wake-up brightness setting from light off condition.	ON
		Off :1. Composite Mode when a light is turned on by using a sensor.	
		On :1. Regular Mode when a light is turned on by using a sensor.	
		:2. Keeps on getting on/off signal from dr table, light stays in composite mode.	
		:2. Keeps on getting on/off signal from dr table, light goes into regular mode.	
	4	Combining dental unit	OFF
		Off: Clair unit, On: CP-One plus	

		Setting condition	Default setting
SW3	5	Sensor activation setting	OFF
		Off: Activate when a hand goes away, On: Activate when a hand comes in.	
	6	Includes Composite Mode	OFF
		Off:Yes, On:No	
	7	Speed setting of communication line	OFF
		Off: 4800bps, On: 2400bps	
	8	LED blink setting of Composite Mode	OFF
		Off:Slow blinking, On: Rapid blinking	
SW4		PC side: Clair Unit, 232 side: CP-One plus	PC
JP3		PC side: Clair Unit, 232 side: CP-One plus	PC

Remarks

Connector Symbol
SM…..SM Connector
XA…..XA Connector
XM…..XM Connector

Black dot
The side with black dot has male pins

Plug — Receptacle

3-3. Swing Mount (AL-920X)

Settings of PCB dip switches (SW3,4) and jumper pin (JP3).

		Setting condition	Default setting
SW3	1	Test mode (Always OFF) Off: Normal operation, On:Test operation	OFF
	2	Transition time to Composite mode (by a sensor) Off: 1 second, On: 2 seconds	ON

	3	Wake-up brightness setting from light off condition.
		Off : 1. Composite Mode when a light is turned on by using a sensor.
		    :2. Keeps on getting on/off signal from dr table, light stays in composite mode.
		On : 1. Regular Mode when a light is turned on by using a sensor.
		    :2. Keeps on getting on/off signal from dr table, light goes into regular mode.
			ON

	4	Combining dental unit Off: Clair unit, On: CP-One plus	OFF

		Setting condition	Default setting
SW3	5	Sensor activation setting Off: Activate when a hand goes away, On: Activate when a hand comes in.	OFF
	6	Includes Composite Mode Off:Yes, On: No	OFF
	7	Speed setting of communication line Off: 4800bps, On: 2400bps	OFF
	8	LED blink setting of Composite Mode Off: Slow blinking, On: Rapid blinking	OFF
SW4		PC side: Clair Unit, 232 side: CP-One plus	PC
JP3		PC side: Clair Unit, 232 side: CP-One plus	PC

Remarks
Connector Symbol
SM ...SM Connector
XA ...XA Connector
XM ...XM Connector
Black dot
The side with black dot
has male pins
Plug   Receptacle

Power supply box Section

Switch box Section

Head Section

York Section

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INSTALLATION INSTRUCTIONS

[4] UNIT MOUNT TYPE (AL-901)

4-1. Dimensions

4-2. Installation Instructions

* All necessary parts are included in the box.
- •M3 x 6 Painted Screw .... 2pcs.
- •M4 x 10 Painted Screw .... 2pcs.
- •Yoke Cover.......................... 1pce.

1) Install the light head to the balance arm
   with M4 x 10 painted screws.

2) Connect the wire harness
   3P connector : yellow / green / blue
   4P connector : black / black & white / brown /
                  brown & white
   Same color to be met at each side of connector
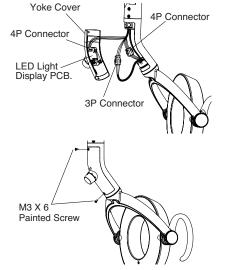
   4P connector : red / orange / purple / gray
       connec to LED Light display PCB of yoke cover.
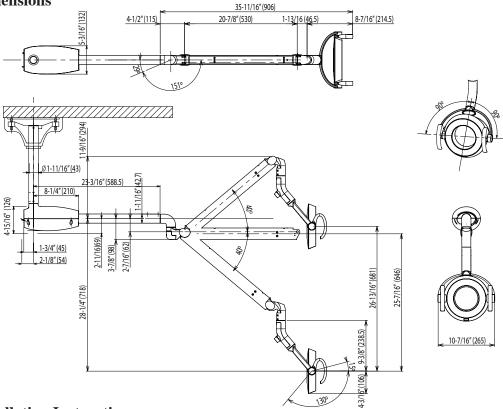
3) Attach the yoke cover with M3 x 6 painted screws.
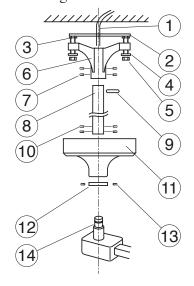
[5] CEILING MOUNT TYPE (AL-902)

5-1. Dimensions
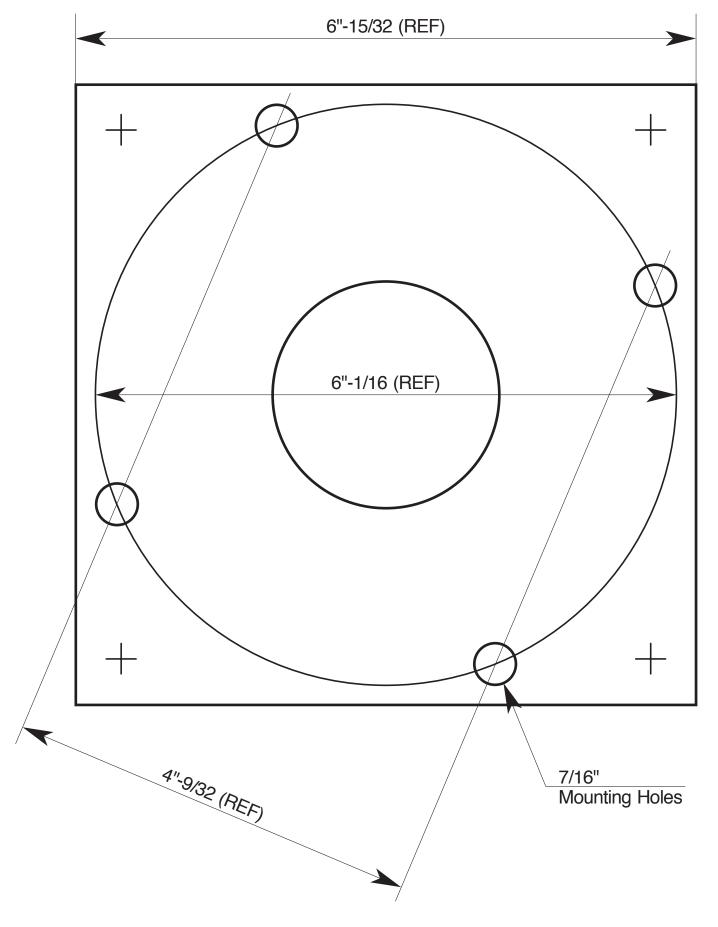
5-2. Installation Instructions

1) Secure mounting plate to the ceiling.
2) Route the power supply through the center of the mounting plate.
3) Install the leveling nuts between the mounting plate and the ceiling flange.
4) Install the ceiling flange to the mounting plate with washers and nuts supplied.
5) Insert the suspension tube into the ceiling flange and secure it with roll pin and set screws supplied.
6) Be sure the suspension tube is plumb.
7) Slide the flange cover and flange cover ring (flat side up) over the suspension tube and secure them about half way up the tube. Use only one set screw as you will be moving this on final installation.
8) Install the light assembly to the suspension tube running the 3 wire cord up through the tube to the ceiling flange. Secure it with 4 Allen set screws.
9) Connect the incoming power to the 3 wire cord from the light assembly. Be sure to follow the local electrical codes.
10) Test the light for proper operation.
11) Reposition the flange cover and secure it with the flange cover ring - Secure all set screws.
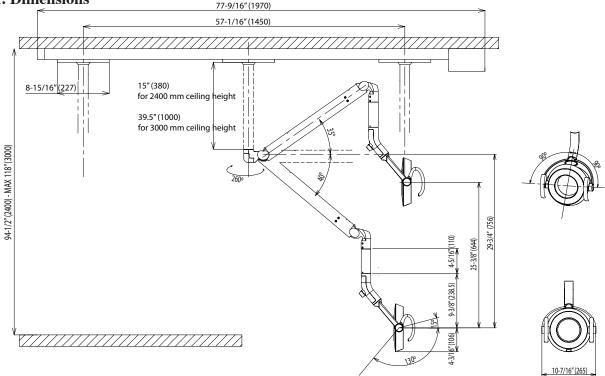
(1)	Power Supply Cable
(2)	Mounting Plate
(3)	Leveling Nut
(4)	Washer
(5)	Nut
(6)	Ceiling Flange
(7)	Socket Screw for Flange
(8)	Suspension Tube
(9)	Roll Pin
(10)	Socket Screw for Arm
(11)	Flange Cover
(12)	Cover Ring
(13)	Socket Screw for Ring
(14)	Suspension Tube of Arm

FULL-SIZE MOUNTING TEMPLATE

6"-15/32 (REF)

6"-1/16 (REF)

4"-9/32 (REF)

7/16"
Mounting Holes

[6] TRACK MOUNT LIGHT (AL-905)

6-1. Dimensions
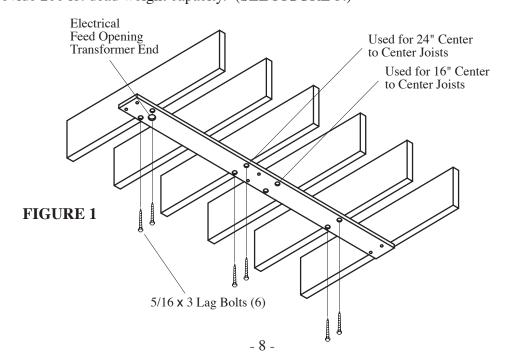
6-2. Ceiling Preparation
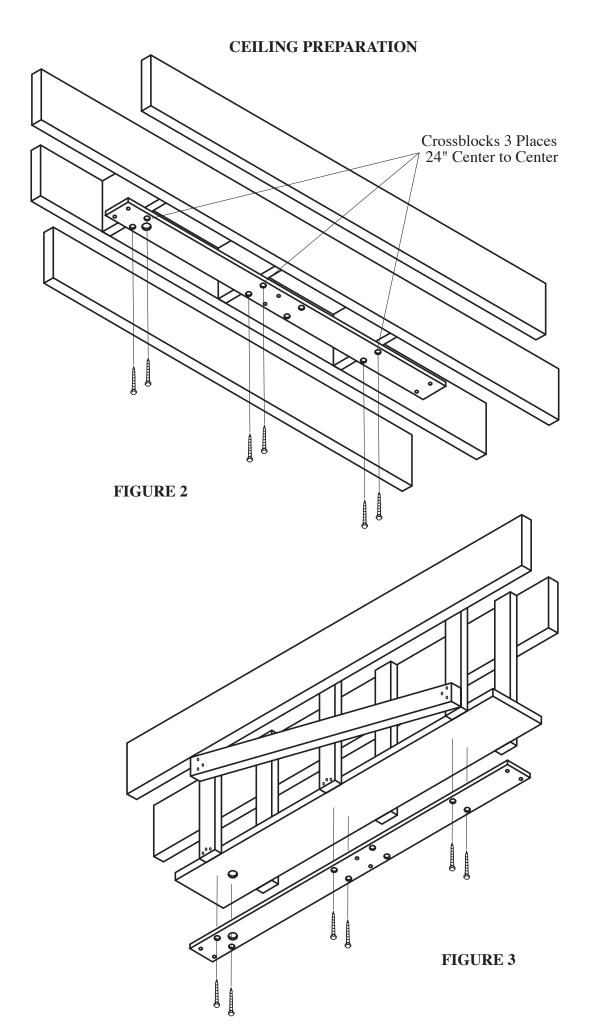
For safety in operation as well as stability of the light source, the importance of proper ceiling structure cannot be overemphasized. In general, a ceiling structure capable of supporting 200 lb. dead weight is required.

A) In conventional ceilings with **joists perpendicular** to the center line of the light, attach the pallet by **at least** 6 - 5/16 x 3" lag screws. Suitable holes are provided in pallet for most installations, utilizing 16" or 12" cc ceiling joists. For other spacings or locations, additional holes can be cut in pallet. (SEE FIGURE 1.)

IMPORTANT: Locate transformer end of track at headrest end of chair. - <u>Not</u> legrest.
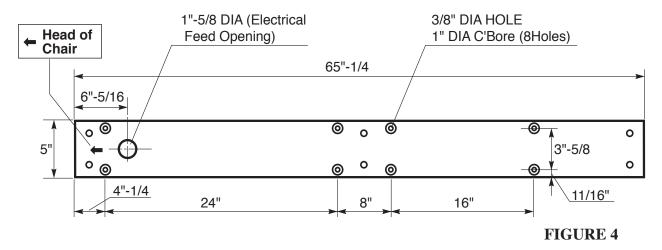
B) For conventional ceilings with **joists parallel** to the center line of the light, cross blocks must be installed in 3 places to allow mounting with **at least** 6 - 5/16 x 3" lag screws. (SEE FIGURE 2.)

C) For suspended ceilings, appropriate rigid structure must be attached to the ceiling framework to provide 200 lb. dead weight capacity. (SEE FIGURE 3.)

Electrical Feed Opening Transformer End

Used for 24" Center to Center Joists

Used for 16" Center to Center Joists

FIGURE 1

5/16 x 3 Lag Bolts (6)

CEILING PREPARATION

Crossblocks 3 Places
24" Center to Center

FIGURE 2

FIGURE 3
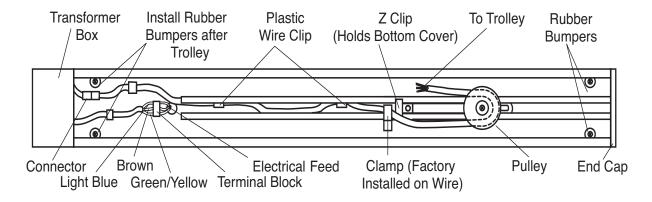
6-3. Electrical Preparation

Refer to **FIGURE 4** for the location of electrical feed opening in pallet, provide 3 wire, 120V, 60Hz circuit (15 amp. fuse or breaker) through flexible conduit with enough slack to protrude at least 2" below the pallet when installed. Terminate the conduit with 1/2" body box connector suitable for mounting through 3/16 thickness. A readily accessible shut-off switch for this circuit is recommended. Use wiring suitable for 90°C service.

FIGURE 4
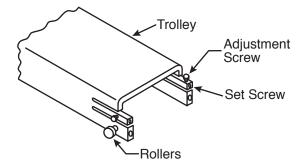
6-4. Installation Instructions
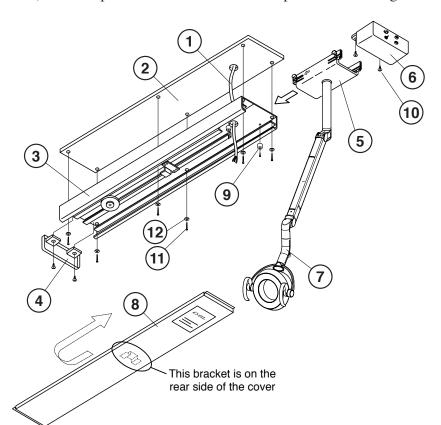
1) Lead out the power supply cable from the ceiling where the track light is mounted.
2) Run the power supply cable through the pallet and mount the pallet.
3) Place track against the pallet and slightly engage two mounting bolts at the end opposite to the electrical opening.
4) Allowing the free end to hang down slightly for access, install the conduit box connector to the track.
5) Finish bolting the track securely to the pallet.
6) Connect the wires from the feed to the terminal block.
7) Slide the trolley onto the track (end near electrical opening) with the arrow on the trolley oriented toward the pulley on the track.
8) Carefully guide the wire from the trolley, around the spring-loaded pulley and back toward the end of track.
9) Attach retainer clamp to small screw in track. Clip the free end of the trolley wire into the plastic clip near end.
10) Install rubber bumpers at the end of the track in the holes provided.

11) Check operation of the trolley. It is factory adjusted to provide smooth effortless travel, without play; however rollers can be readjusted if necessary. Loosen the set screw and adjust the socket cap screw to vary roller clearance.

12) Unpack the transformer / housing assembly and mount it to the track with screws provided.

13) Attach the pigtail leads to the corresponding power line wires at the terminal block. Retain the wires under the plastic clip.

14) Connect the plug-in connector to the trolley wire.

15) Carefully slide bottom cover onto the track from free end. Be sure to engage lip onto Z bracket.

16) Install the end-cap with the screws provided.

17) Slide the trolley back and forth, checking for binding or rubbing.

18) Confirm that the swing arm is properly adjusted to stay where it is placed. If necessary, move the head up or down to expose the appropriate cross drilled nut and adjust with the tool provided.

19) Turn on power and check electrical operation of the light.
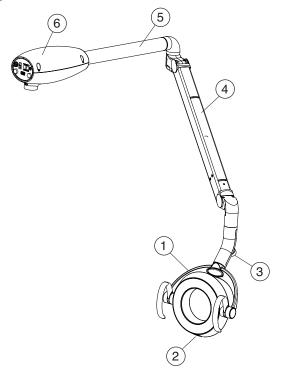
(1) Power supply cable
(2) Pallet
(3) Track
(4) End-cup
(5) Trolley
(6) Power Supply Box
(7) Light Assembly
(8) Bottom Cover
(9) Rubber bumper
(10) Screw with plain washer & spring washer M4x15(2 pcs)
(11) Hex Head Bolt M8x25(6 pcs)
(12) Spring Washer M8 (6 pcs)

This bracket is on the rear side of the cover

[7] SWING MOUNT LIGHT (AL-920X)

Wiring diagram and installation instractions , See the section in Dental Unit installation manual.

[8] OPERATING INSTRUCTIONS

8-1. Major Parts Identification

(1) LED Light Head

(2) Sensor Switch

(3) Intensity Control Volume

(4) Balance Arm

(5) Swing Arm

(6) Power Supply Box

8-2. Main Switch

Turn on the main switch to the side marked
with ' I ' .
  Power on : ' I ' Mark
  Power off : 'O' Mark

8-3. Mode Selection Switch

Switching modes can be changed by this switch.
This switch is located on power supply box.
  Sensor   : Touch-less ON/OFF and composite mode
  Manual : Manual Mode (ON only)

8-4. Touch-less Switch
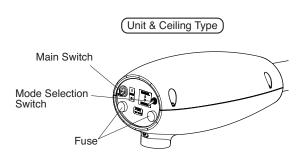
The light can be turned on/off with a touch-less
sensor switch. The intensities are regular operation
mode and composite mode.
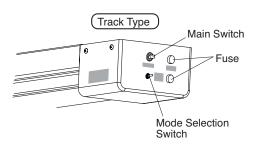
8-4-1. Confirmation of mode selection switch
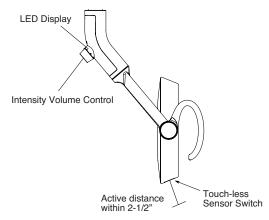
Make sure that the mode selection switch is at
sensor mode.

8-4-2. Turning on/off

The touch-less switch has a sensor. The sensor
activates within the distance of 2-1/2" from the
surface. Let your hand pass by within 2-1/2" from
the touch-less sensor to turn on the light.
Let your hand pass by again to turn off.

Unit & Ceiling Type

Main Switch

Mode Selection
Switch

Fuse

Track Type

Main Switch

Fuse

Mode Selection
Switch

LED Display

Intensity Volume Control

Active distance
within 2-1/2"

Touch-less
Sensor Switch

8-4-3. Switching to the composite mode

During normal treatment mode, while the light is on, place and hold your hand within 2-1/2" from the touch-less sensor for 2 seconds. The light intensity will be automatically reduced to the composite mode which has intensity of 5500 lux.
LED display under yoke blinks green on at composite mode.
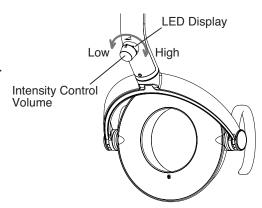To switch back to the normal treatment mode, place your hand by the touch-less sensor 2 seconds again.

	INTENSITY	LED Display
COMPOSITE Mode	5500 Lux	Blink

Note: by placing your hand for 2 seconds when the light is off. The light does not lit in the composite mode, but lit in normal treatment mode. Please make sure that the light is on before lighting in composite mode.

8-5. Selection of intensity for normal treatment mode

LED display under yoke turns green on at regular operation mode.
By turning intensity control volume, you can adjust intensity steplessly between 4000 - 32000 Lux.

Note: If light intensity is set below 510 FTC and in composite mode, light will Flash briefly when exiting composite mode.
This is a normal condition indicating return to standard mode.

[9] ADJUSTING TENSION of BALANCE ARM

9-1. Adjustment of the tension of the balance arm
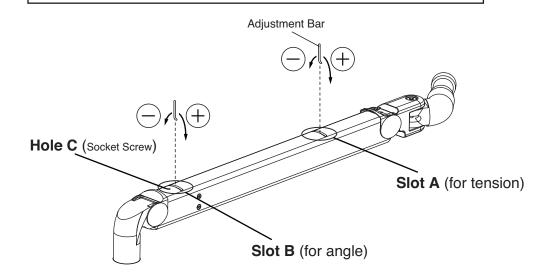
Position the angle of the balance arm so the tension adjustment nut becomes visible just under slot A.

Turn the nut and adjust the tension with the adjustment bar supplied with the light.
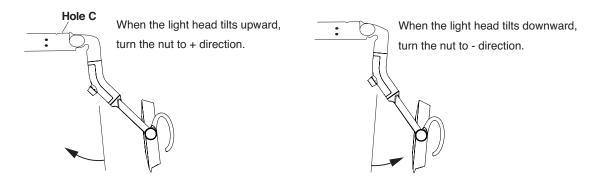
Direction of rotation of the nut

When the light head tends to go up, turn the nut to + direction.

When the light head tends to go down, turn the nut to – direction.

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9-2 Adjustment of the angle of the light head

1) Use a 2mm hex key wrench to loosen socket screw in front of Hole C.

2) Position the angle of the balance arm so the head angle adjustment nut becomes visible just under the slot B. Turn the nut and adjust the tension with the adjustment bar supplied with the light.

Hole C

When the light head tilts upward, turn the nut to + direction.

When the light head tilts downward, turn the nut to - direction.

3) After adjustment is done, re-tighten the socket screw.

Note : Unless this socket screw is re-tightened, the angle of the head will be changed during use.

[10] CLEANING,MAINTENANCE PARTS & DISPOSAL

10-1. Cleaning

⚠**CAUTION**

Allow light to cool prior to cleaning.

Use a soft cloth or cotton only to gently clean surfaces. Use of other materials can scratch and damage surfaces. Covers can be cleaned with a soft cloth or cotton moistened with alcohol. The reflector can be cleaned with a soft and dry cloth or cotton with extreme care.

10-2. Maintenance Parts

Fuse are maintenance parts.

Period for repair and supplying parts
We will supply parts of the equipment for 10 years, after the manufacturing of this equipment is discontinued.

10-3. Lifetime

Provided that the recommended and authorized care and maintenance are correctly performed, the working
lifetime of this equipment is 10 years from the date of initial shipment from the manufacturer.

10-4. Disposal

This is not an infectious device, but prior to disposal make sure that no parts of the device is infected. Follow the federal, state and local regulations for disposal.
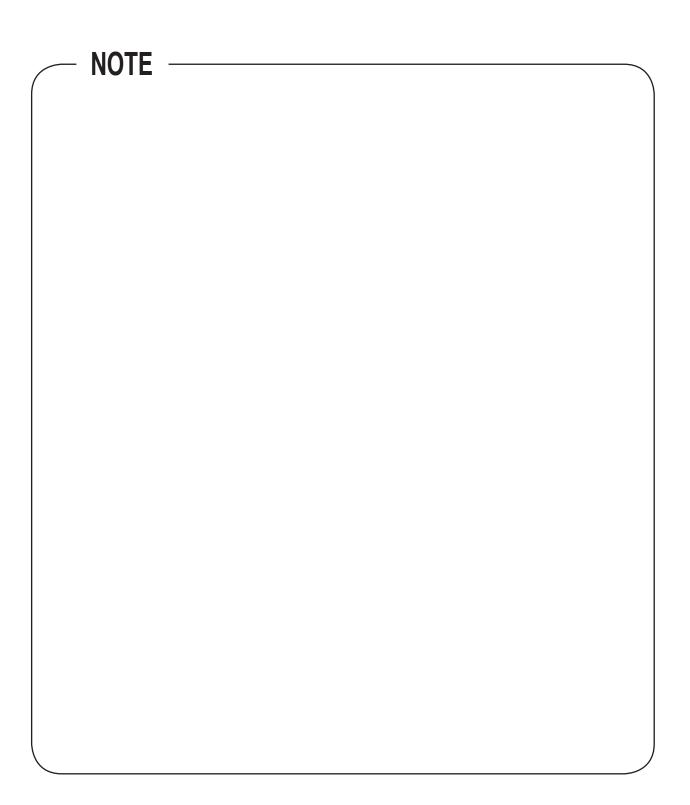
[11] MAINTENANCE AND INSPECTION

Guide for daily maintenance and inspection (Maintenance and inspection by user)

Management of maintenance and inspection of medical equipment should be implemented by the user (medical inspection). In case the user does not implement such management, it is permitted that such management is outsourced to a qualified entity such as a medical equipment repair company.

For safe use of this product, it is necessary that inspection should be conducted in the specified frequency on the items described below.

No.	Item	Frequency	Inspection Method and diagnosis	Influence if inspection is not conducted	Maintenance required in case of nonconformity
1	Appearance of Lens Cover	Before start	Check deformation, scratches by eyes	Deterioration of optical performance	Change a lens cover.
2	Light switch	Before start	Set Sensor/Manual switch to Manual. Confirms the light turns on.	Light doesn't function.	Replace a light bulb.
3	Touchless sensor	Before start	Set Sensor/Manual switch to Sensor. Confirms the light turns on.	Light doesn't function.	Clean the sensor surface.
4	Intensity switch	Before start	Change intensity.	It may cause the difficulty at dental practice.	Turn off the light. Call customer service.
5	Functionality of Balance Arm	Before start	Swing the balance arm up/down. Swing the balance arm right/left. Make sure the balance arm stops and holds its position.	Light head doesn't stay at the desired position.	Adjust the tension of the balance arm. Follow instructions on page 13.
6	Vertical rotation of the Light head	Before start	Rotate the light head up/down. Make sure the light head stops and holds its position.	Light head doesn't stay at the desired position.	Adjust the tension of vertical rotation. Follow instructions on page 14.
7	Light head angle	Before start	Confirms the light head is vertically aligned.	Light head doesn't stay at the desired position.	Adjust the angle of the light head.
8	Light head rotation	Before start	Rotate the light head right/left. Make sure the light rotate 160° to each direction.	Light head rotates freely. This may cause the snapping of a wire.	Call customer service.
9	Care exterior	Before start	Chemical and dirt on the product exterior must be cleaned.	Discoloration and deterioration to the exterior, and corrosion and rusting to metallic components may arise.	Executes wiping in accordance with "Cleaning Instructions"
10	Other 1	Once every week	Make sure that no abnormal noise occurs when the product is operated.	Light may not function right.	Turn off the light. Call customer service.
11	Other 2		If the light has not been used for a long time, make sure the light functions correctly and safely.		If the light malfunctions, call customer service.

NOTE