

DENTAL LIGHT

iO 5000

INSTALLATION
AND
OPERATION INSTRUCTIONS

 **IMPORTANT**

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



 **Belmont**

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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.

Environmental condition for Operation

Temperature : 5 ~ 40°C

Humidity : 10 ~ 80%

Pressure : 600 ~ 1060 hpa

Environmental condition for Storage

Temperature : -10 ~ 50°C

Humidity : 10 ~ 80%

Pressure : 600 ~ 1060 hpa

Environmental condition for Transportation

Temperature : -10 ~ 50°C

Humidity : 10 ~ 80%

Pressure : 600 ~ 1060 hpa

Important Notes

In case of the troubles, please contact Takara Belmont offices or your dealers.

Do not disassemble or attempt to repair.

Disassembly, repair or modifications should only be done by a qualified repair technician.











Attempts at disassembly, repair or modifications may lead to abnormal operation and accidents.

In case of disposal of equipment

When disposing the dental light, appropriately dispose complying with all current applicable regulations and local codes.

In EU area, EU directive 2002/96/EC on waste electrical and electronic equipment (WEEE) is applied on this product. In this directive, environment conscious recycling/abandonment is obligated.

Symbols

	Alternating-current		Power ON		Power OFF		Non-ionizing radiation
	Authorized representative in the European community		Manufacturer		Date of manufacture		Caution It means "caution, warnings, or possibility to danger".
	Separate collection for electrical and electronic equipment		Refer to instruction manual/booklet				

 **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 turn on/off by itself due to malfunction of a sensor caused by electromagnetic interferences.

 **WARNING**

- To avoid the risk of electric shock, this equipment must only be connected to supply mains with protective earth.
- Lamp bulb cover becomes very hot during use. To avoid burning fingers, do not touch lamp cover.
- Always put a lamp cover on to avoid burning fingers.
- 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

- 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.
- 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

Replacement of parts (Except the Bulb and Lamp cover)

Replacement must be done by an professional technician(s) of our company or a company authorized by us.

[1] SPECIFICATIONS

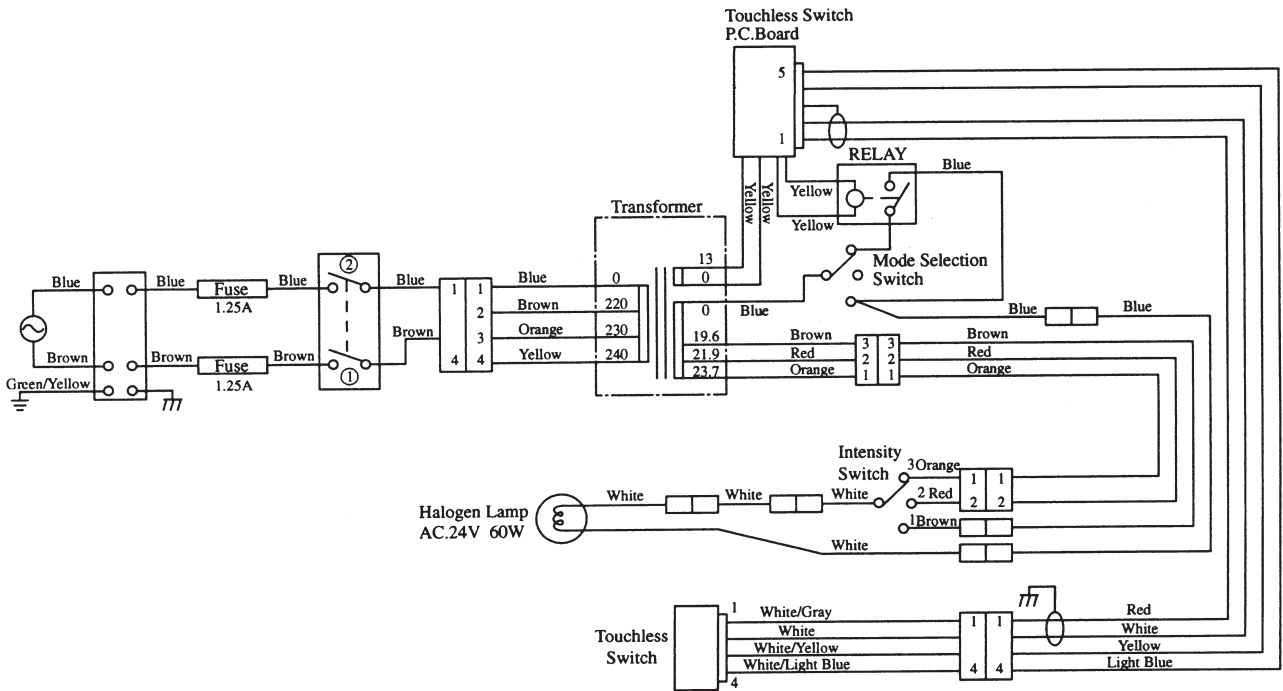
1. Focal Distance.....700 mm
2. Color Temperature.....5000° Kelvin at 28000 Lux
3. Light IntensityH : 28000 Lux
M : 22000 Lux
L : 15000 Lux
4. Light Pattern.....194 x 72 mm at 700 mm
5. Power Requirement.....AC. 230 V 50/60 Hz
6. Fuse1.25A/250V (Current Rating:35A at 250VAC)
Time-lag (Except for 520)
7. Bulb TypeTungsten Halogen Type (JA 24V 60W)
8. Service Life10 years

[2] CLASSIFICATION

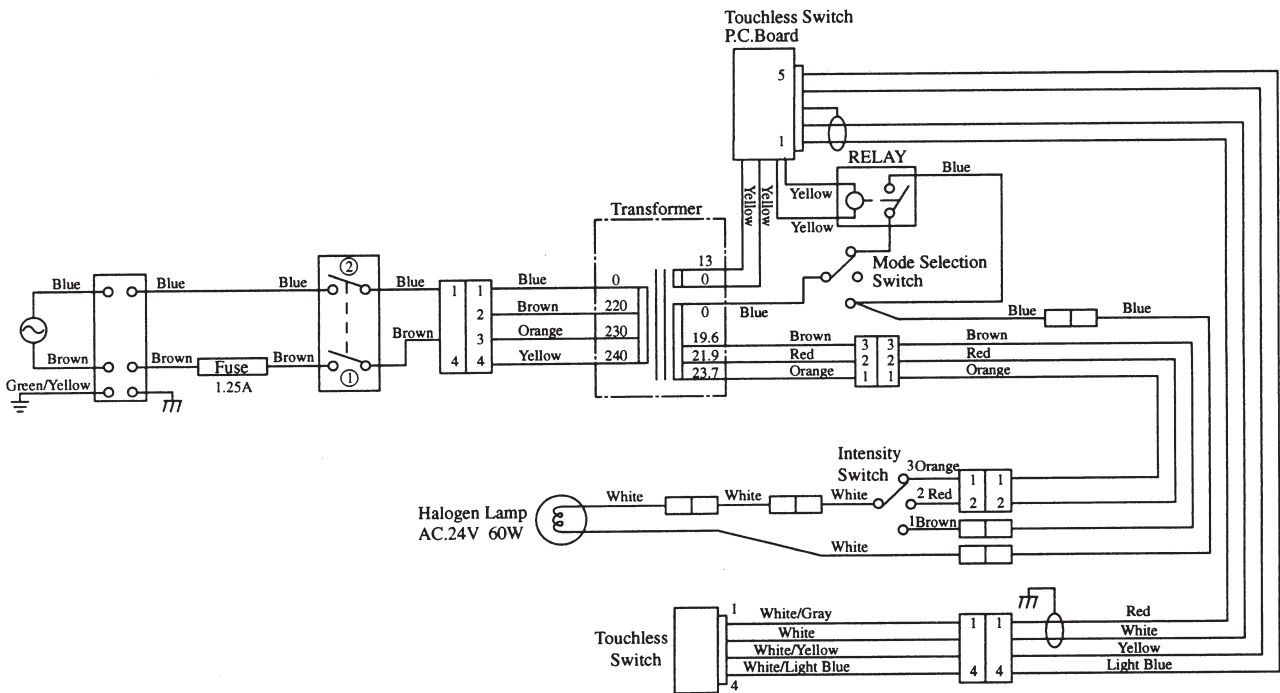
- a. Protection against electric shock : Class I Equipment.
- b. Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.

[3] WIRING DIAGRAM

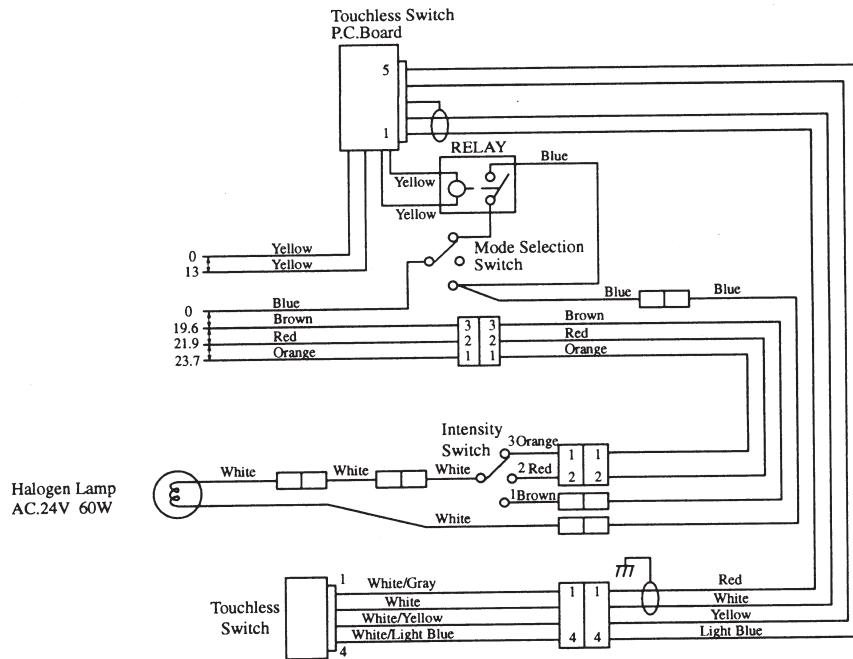
3-1. 501 Wiring Diagram



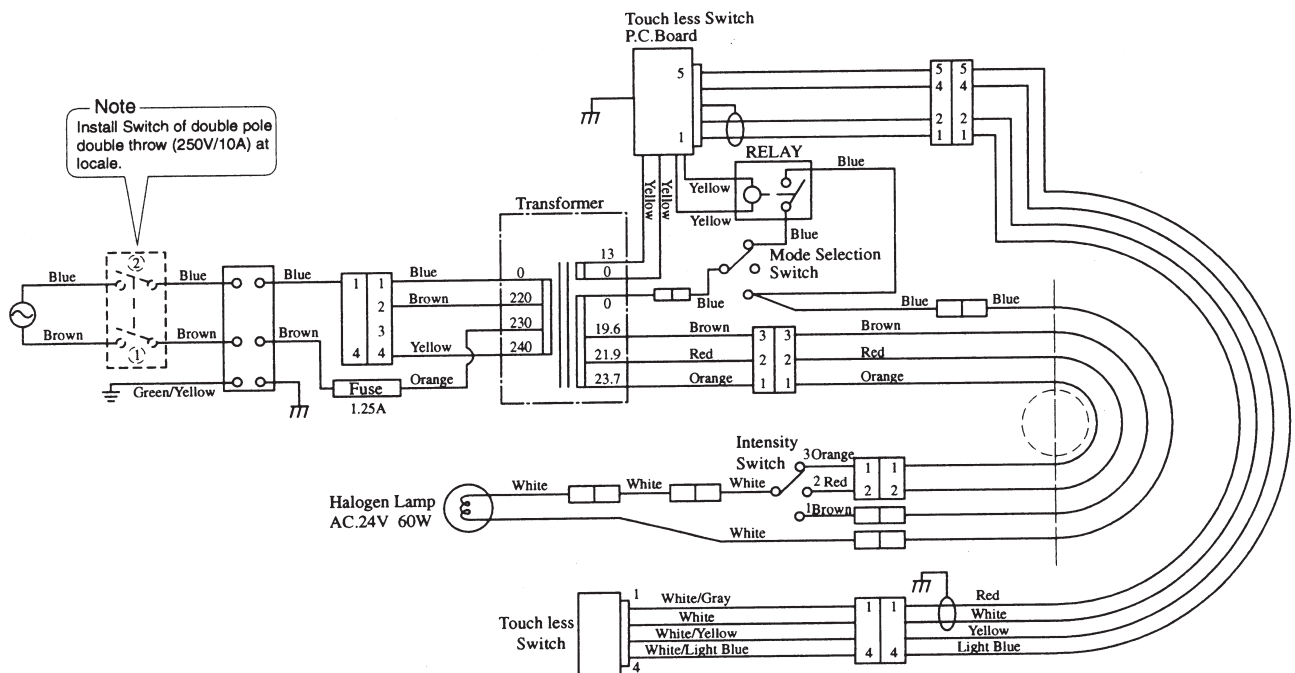
3-2. 502 Wiring Diagram



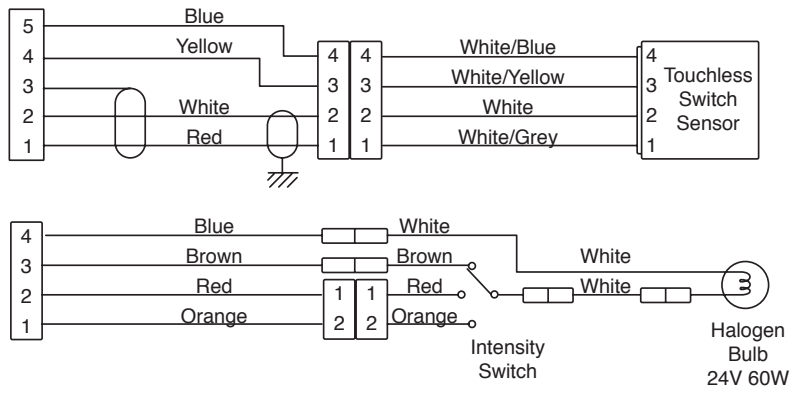
3-3. 504 Wiring Diagram



3-4. 505 Wiring Diagram



3-5. 520 Wiring Diagram

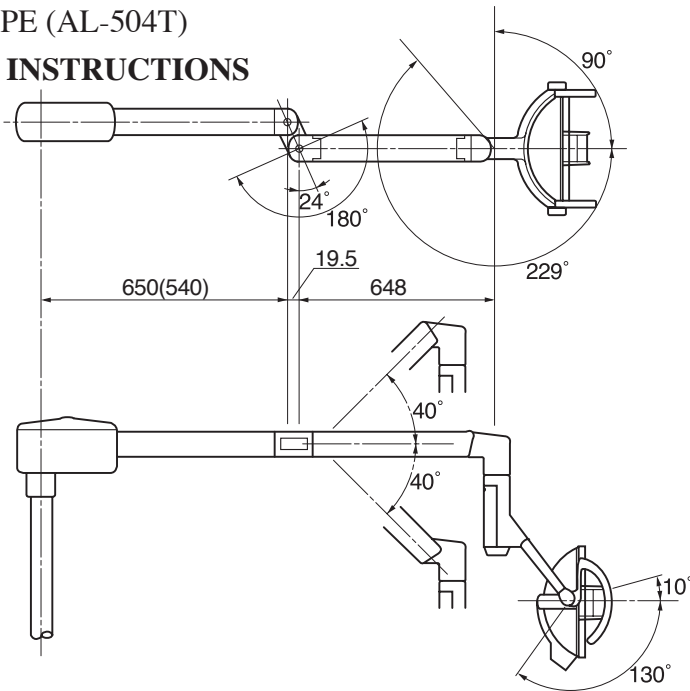


[4] UNIT MOUNT TYPE (AL-501)

4-1. DIMENSIONS

() : SP MOUNT TYPE (AL-504T)

4-2. INSTALLATION INSTRUCTIONS



* All necessary parts are included in the carton box.

- M3 x 6 Screw 2pcs.
- M4 x 8 Screw 1pc.
- M4 x 10 Painted Screw 2pcs.
- M5 x 8 Set Screw 2pcs.
- External Tooth Washer 1pc.
- Yoke Cover..... 1pc.
- Intensity Switch Knob..... 1pc.

1) Install the light head to the balance arm with M4 x 10 painted screws and M5 x 8 set screws.

2) Fix the ground wire to yoke post with M4 x 8 screw and washers.

3) Connect the wire harness.

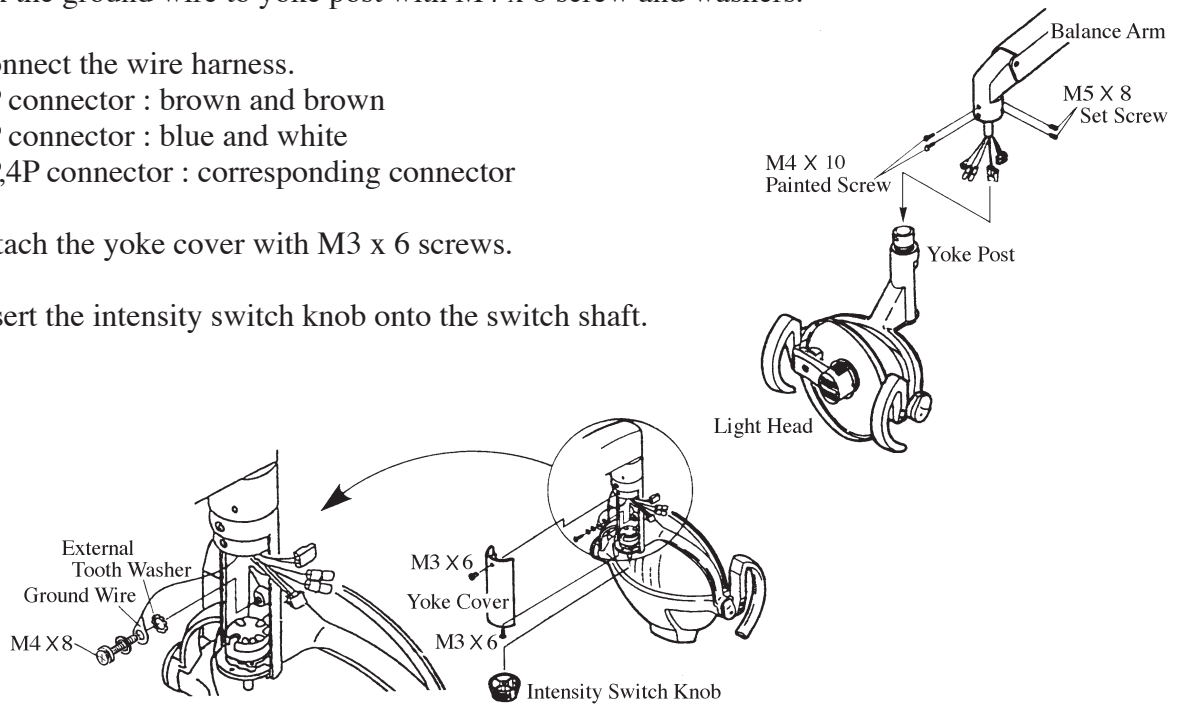
1P connector : brown and brown

1P connector : blue and white

2P,4P connector : corresponding connector

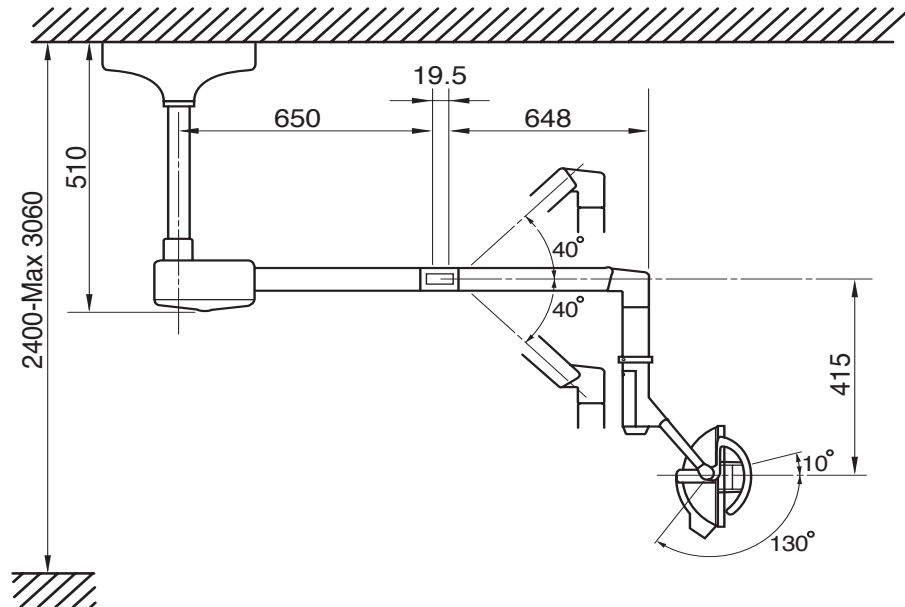
4) Attach the yoke cover with M3 x 6 screws.

5) Insert the intensity switch knob onto the switch shaft.



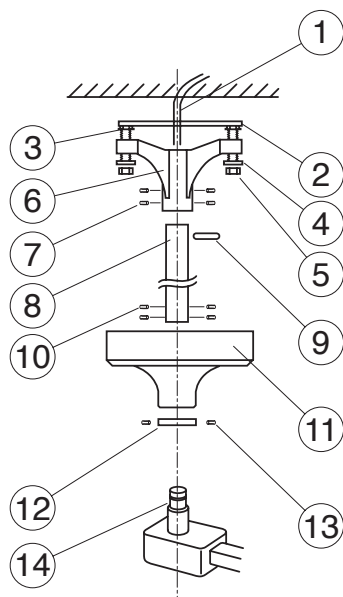
[5]CEILING MOUNT TYPE (AL-502)

5-1. DIMENSIONS



5-2. INSTALLATION INSTRUCTIONS

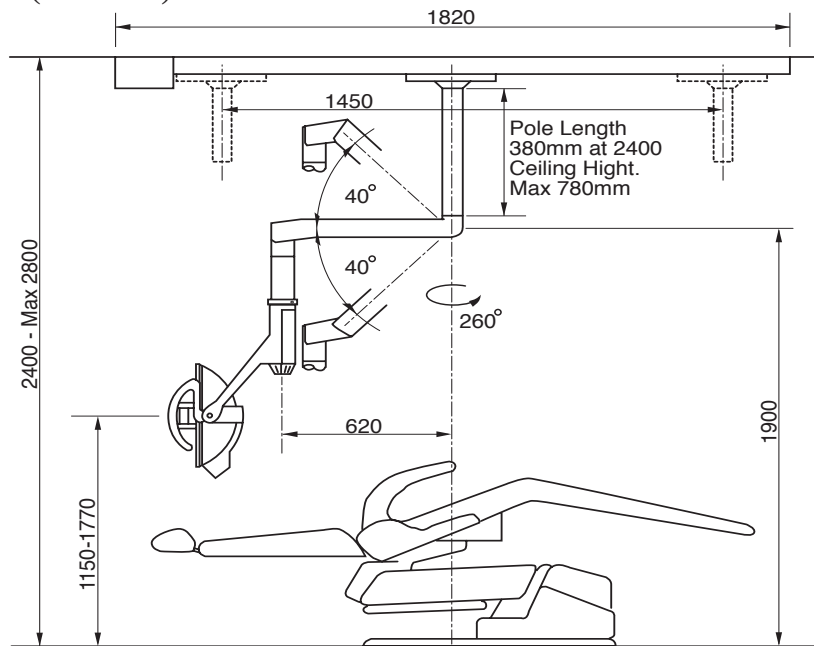
- 1) Lead out the power supply cable from the ceiling where the ceiling light is mounted.
- 2) Run the power supply cable through the mounting plate and attach the mounting plate to ceiling.
- 3) Insert the suspension tube to the ceiling flange and secure them with roll pin.
- 4) Run the power supply cable through the suspension tube and ceiling flange.
- 5) Insert adjusting nuts between mounting plate and ceiling flange, then fix the flange with 4 washers and nuts.
- 6) Make sure that suspension tube is perpendicular.
- 7) Slide the flange cover on the suspension tube up to the mounting plate. And hold it.
- 8) Slide the cover ring up to the cover - flat surface of ring must be flush against cover and tighten the 3 socket screws.
- 9) Connect wires of the power supply cable to the wires from suspension tube of arm.
- 10) Insert the suspension tube of transformer part to the suspension tube and tighten the 4 socket screws.



- (1) Power Supply Cable
- (2) Mounting Plate
- (3) Adjusting 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

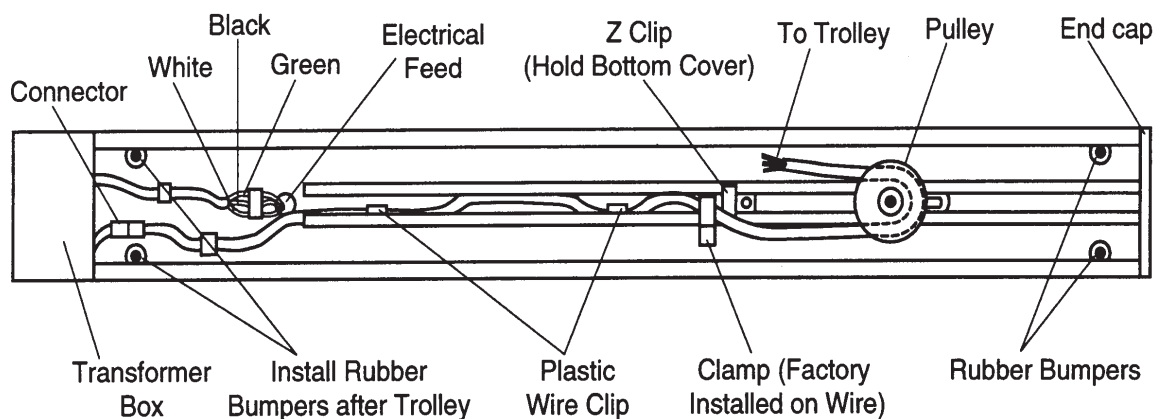
[6] TRACK LIGHT (AL-505)

6-1. DIMENSIONS

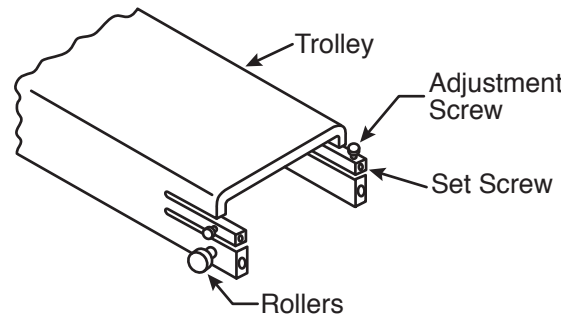


6-2. INSTALLATION INSTRUCTIONS

- 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 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 adjusted at factory 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.

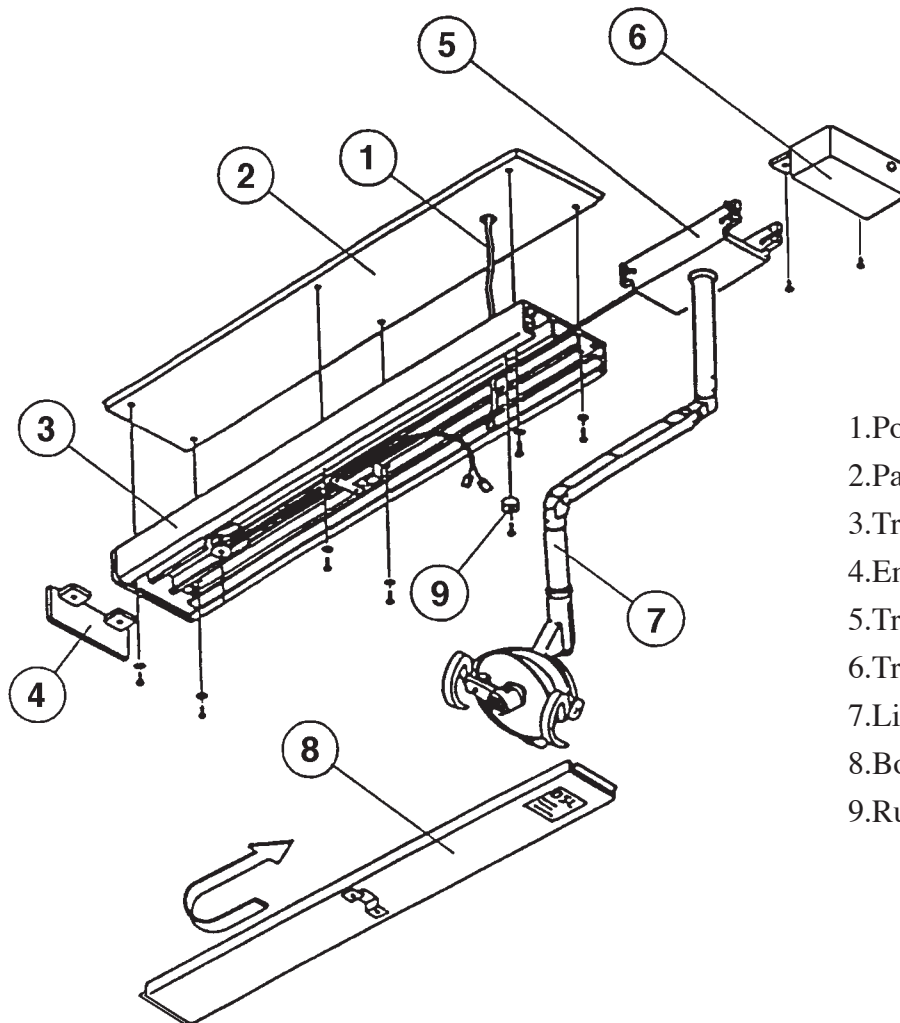
15) Carefully slide bottom cover onto the track from free end. Be sure to engage lip onto Z bracket.

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.

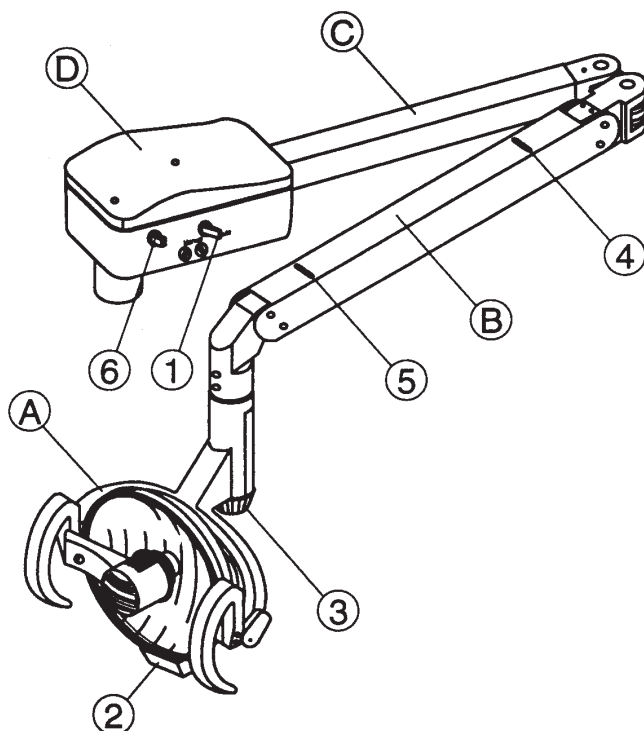
19) Turn on power and check electrical operation of the light.



- 1. Power supply cable
- 2. Pallet
- 3. Track
- 4. End-cap
- 5. Trolley
- 6. Transformer Box
- 7. Light Assembly
- 8. Bottom Cover
- 9. Rubber bumper

[7] OPERATING INSTRUCTIONS

7-1. Major Parts Identification

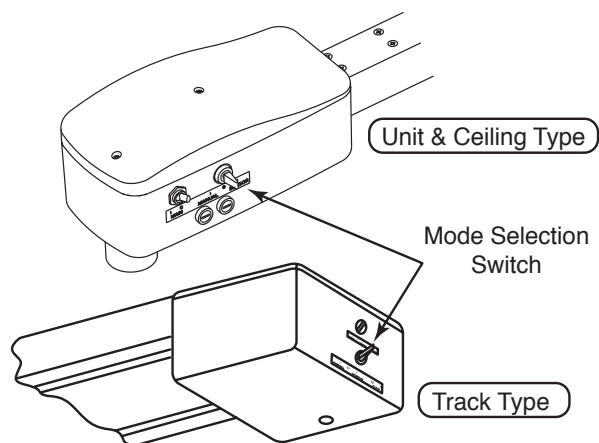


- (A) Head Assembly
- (B) Balance Arm Assembly
- (C) Swing Arm Assembly
- (D) Transformer Housing Assembly
- (1) Mode Selection Switch
- (2) Touchless Switch
- (3) Intensity Switch
- (4) Slot for Adjusting Tension of Balance Arm
- (5) Slot for Adjusting Angle of Head
- (6) Main Switch for Power

7-2. Mode Selection Switch

Mode can be changed by this switch.
 This switch is located on transformer housing.

Sensor	:	Touchless ON/OFF
Manual	:	Manual Mode (ON only)
○	:	OFF



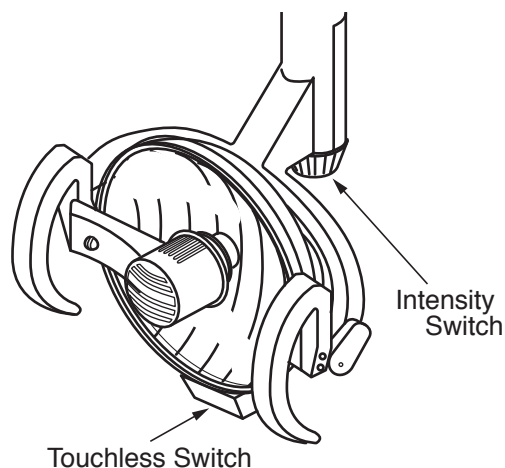
7-3. Touchless Switch

Touchless Switch is located on the lower part of head.
 Approach a hand to the Touchless Switch when turning on/off the light.
 Reaction zone : 0 ~ 60 mm

7-4. Intensity Switch

Intensity Switch is located on the lower part of yoke.

High : Turn the intensity switch to H position
 Medium : Turn the intensity switch to M position
 Low : Turn the intensity switch to L position



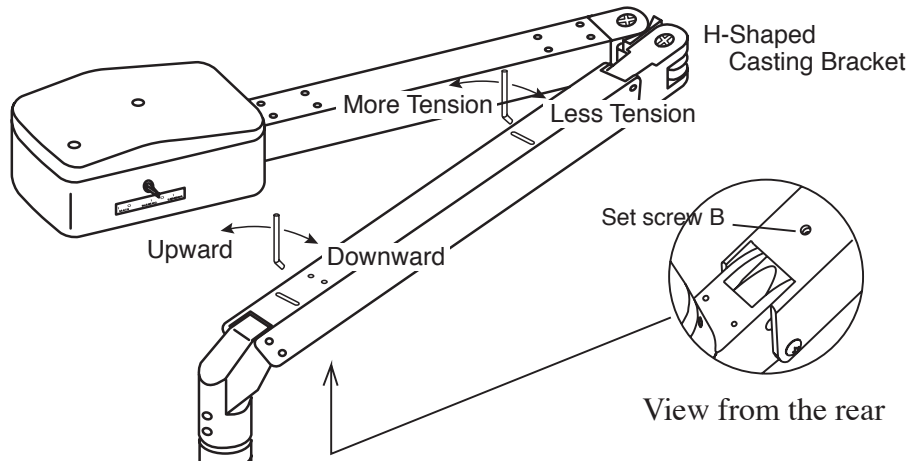
[8] ADJUSTING TENSION of BALANCE ARM

8-1. Adjusting tension of Balance Arm

Use the slot closest to the H-shaped casting bracket when making adjustment for drifting of balance arm. Insert adjusting bar into the slot on top of the balance arm, turn the spring adjustment nut clockwise for more tension; counterclockwise for less tension.

8-2. Adjusting Angle of Head

Use the slot closest to the head when adjusting angle of head. Loosen the set screw B shown in the figure below. Insert the adjusting bar into the slot on top of the balance arm, turn the spring adjustment nut clockwise for downward angle; counterclockwise for upward angle.

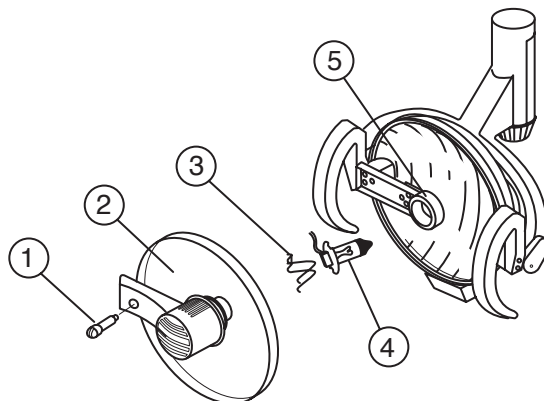


[9] HALOGEN BULB CHANGING

- 1) To install replacement halogen bulb, turn the light off and the turn lamp cover stopper counterclockwise (90°) to remove the lamp cover.
- 2) Remove the lamp cover and disconnect the electrical connector of halogen bulb.
- 3) Unlock the spring clip and pull the electrical wire of halogen lamp to remove the halogen bulb from the socket.
- 4) Attach the electrical wire and insert a new bulb into the housing.
- 5) After the new bulb is seated in the housing. Insert and lock the spring clip in position.
- 6) Reattach the lamp cover.



CAUTION
Halogen bulb and surrounding parts may be hot immediately after the lamp goes off. Wait until they get cool down.



- (1) Lamp Cover Stopper
- (2) Lamp Cover
- (3) Spring Clip
- (4) Halogen Bulb
- (5) Socket

[10] CLEANING INFORMATION

Use soft cloth or cotton only. Soak with Durr FD333 cleaner. Clean both side of the lens. Inside surface of the reflector can be cleaned with a soft damp or dry cloth. Back side of the reflector should be wiped gently with a soft cloth. Extreme care should be taken not to scratch the surface, or mar appearance of the painted surface. Exterior cleaning is all that should be necessary until after many months of use.

[11] MAINTENANCE AND INSPECTION

11-1. 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 Lamp Cover	Before start	Check deformation, scratches by eyes	Deterioration of optical performance	Change a lamp cover
2	Mirror cover is firmly attached or not	Before start	Pull the lamp cover. Make sure that the Mirror cover doesn't fall	Mirror cover may fall.	Reattach a Mirror cover
3	Light bulb	Before start	Check whether the light brinks or not due to the poor connection.	Light bulb turns very hot. This could shorten bulb life.	Securely insert a light bulb into the bulb holder
4	Light switch	Before start	Set Sensor/Manual switch to Manual. Confirms the light turns on.	Light doesn't function.	Replace a light bulb
5	Touchless sensor	Before start	Set Mode Selection switch to Sensor. Confirms the light turns on.	Light doesn't function.	Clean the sensor surface.
6	Intensity switch	Before start	Change intensity.	It may cause the difficulty at dental practice.	Turn off the light. Contact your dealer or our office
7	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.
8	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.
9	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.
10	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.	Contact your dealer or our office
11	Movement of the trolley (Track light)	Before start	Check the movement of the trolley. Make sure the trolley run smoothly.	Light head doesn't stay at the desired position.	Contact your dealer or our office.
12	Track section (Track light)	Before start	Make sure that no wobble the track section when the product is operated.	There is a possibility that the light falls.	Contact your dealer or our office.
13	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"
14	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. Contact your dealer or our office
15	Other 2	As needed	If the light has not been used for a long time, make sure the light functions correctly and safely.		If the light malfunctions, Contact your dealer or our office

11-2. Guide for Periodical Check-up

- Some parts and components of the products are degraded or deteriorated depending on the frequency of use. Annual check-up and maintenance, as well as replacement of consumable parts, are required.
- The required parts (including consumable parts) are listed below. It may be different from the following list depending on the option of the light.
- For check-up and repair, call a technician of our authorized dealer.

Parts and components that require periodical check-up

No.	Parts Description	Standard Lifetime	No.	Parts Description	Standard Lifetime
1	Moving part	7 years	3	Switches	5 years
2	Electric wiring of moving part	5 years	4	Control PCBs.	5 years

Consumable parts

No.	Parts Description
1	Bulb
2	Lamp Cover
3	Fuse



WARNING

Execute the maintenance in accordance with this instruction manual and operating manual attached to each individual equipment (Dental unit, Handpiece, etc.) .
Failure to maintain this product may lead to physical injury or property damage.

[12] BEFORE ASKING FOR REPAIRS

If any of phenomena described below has occurred, make the following checks before asking for repairs.

Phenomenon	Check point and result	Action to be taken
The light does not light up.	Unit main switch is not on.	Turn on the unit main switch.
	Dental light main switch is not on.	Turn on the dental light main switch to " I " mark.
	Light bulb had been burned out.	Replace with a new light bulb. Refer to halogen bulb changing section in this manual.
	Wrong light bulb is used.	Use specified light bulb described in specification section in this manual.
	Touchless sensor surface is dirty.	Clean the touchless sensor surface.
	Confirm distance of a touchless switch.	Hand must pass by within 70mm from the touchless sensor.

If the dental light does not normally work even if actions were taken upon checkup stated above, then stop using the unit, turn off the main switch and contact your dealer or our office.

[13] ELECTROMAGNETIC COMPATIBILITY(EMC)

Medical electrical equipment needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in this manual.

Portable and mobile RF communications equipment can affect medical electrical equipment.

The equipment or system should not be used adjacent to or stacked with other equipment. If adjacent or stacked use is necessary, the equipment or system should be observed to verify normal operation in the configuration in which it will be used.

Guidance and manufacture's declaration - electromagnetic emissions

The IO5000 is intended for use in the electromagnetic environment specified below. The customer or the user of the IO5000 should assure that it is used in such an environment.

Emissions test	Compliance	Electromagnetic environment - guidance
RF emissions CISPR 11	Group 1	The IO5000 uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	The IO5000 is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/ Flicker emissions IEC 61000-3-3	Complies	

Guidance and manufacture's declaration - electromagnetic immunity


The IO5000 is intended for use in the electromagnetic environment specified below. The customer or the user of the IO5000 should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) IEC 61000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for input/output lines	± 2 kV for power supply lines ± 1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	± 1 kV differential mode ± 2 kV common mode	± 1 kV differential mode ± 2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	$<5\% U_T$ ($>95\%$ dip in U_T) for 0.5 cycle $40\% U_T$ (60% dip in U_T) for 5 cycle $70\% U_T$ (30% dip in U_T) for 25cycle $<5\% U_T$ ($>95\%$ dip in U_T) for 5 s	$<5\% U_T$ ($>95\%$ dip in U_T) for 0.5 cycle $40\% U_T$ (60% dip in U_T) for 5 cycle $70\% U_T$ (30% dip in U_T) for 25cycle $<5\% U_T$ ($>95\%$ dip in U_T) for 5 s	Mains power quality should be that of a typical commercial or hospital environment. If the user of the IO5000 requires continued operation during power mains interruptions, it is recommended that the IO5000 be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

NOTE U_T is the a.c. mains voltage prior to applications of the test level.

Guidance and manufacture's declaration – electromagnetic immunity

The IO5000 is intended for use in the electromagnetic environment specified below. The customer or the user of the IO5000 should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
<p>Conducted RF IEC 61000-4-6</p>	<p>3 Vrms 150 kHz to 80 MHz outside ISM bands^a</p>	<p>3 Vrms</p>	<p>Portable and mobile RF communications equipment should be used no closer to any part of the IO5000, including cables, than the recommended separation distance calculated from the equation applications to the Frequency of the transmitter.</p> <p>Recommended separation distance</p> $d = 1.2 \sqrt{P}$
<p>Radiated RF IEC 61000-4-3</p>	<p>3V/m 80 MHz to 2.5 GHz</p>	<p>3 V/m</p>	$d = 1.2 \sqrt{P} \quad 80 \text{ MHz to } 800 \text{ MHz}$ $d = 2.3 \sqrt{P} \quad 800 \text{ MHz to } 2.5 \text{ GHz}$ <p>Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,^a should be less than the compliance level in each frequency range.^b</p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> <div style="text-align: center;">  </div>

NOTE 1 At 80 MHz and 800MHz, the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by adsorption and reflection from structures, objects and people.

a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the IO5000 is used exceeds the applicable RF compliance level above, the IO5000 should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the IO5000.

b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3V/m.

Essential performance (purpose of IMMUNITY testing)

There is no essential performance.

**Recommended separation distances between
Portable and mobile RF communications equipment and the IO5000**

The IO5000 is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the IO5000 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the IO5000 as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150 kHz to 80 MHz $d = 1.2 \sqrt{P}$	80 MHz to 800 MHz $d = 1.2 \sqrt{P}$	800 MHz to 2.5 GHz $d = 2.3 \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800MHz, the separation distance for the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by adsorption and reflection from structures, objects and people.



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