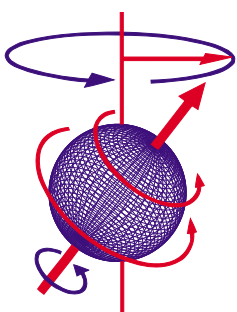


Installation / Operation Manual

Full HD MR Projector



Resonance Technology, Inc.

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Innovative MRI-Compatible Entertainment System

Table of Contents

1.	Introduction	1
2.	Safety Information	2
2.1.	Important Warnings for Patient and Operator Safety	2
2.2.	Precautionary Patient Conditions	2
2.3.	Use Restrictions	2
2.4.	MRI Environment Hazards	3
2.5.	General Warnings for Electronic Products	4
2.6.	Labeling Used to Indicate Device Safety.....	4
3.	Installation Materials	5
4.	Room Layout Overview for Installation.....	7
5.	Installation Procedure.....	9
5.1.	Stand Assembly.....	9
5.2.	Mounting/Connection on the Projector	10
5.3.	Position Projector	11
5.4.	Installing the MR Laser Link Cable / Cooling Tubes	12
5.5.	Running Cooling Tubes/Connection	16
5.6.	Power Pump Start Up.....	18
5.7.	Power Supply Pump Tank Refill	19
5.8.	Powering On Projector	20
5.9.	Projector Screen	21
5.10.	Video Source Connection	21
5.11.	Stand adjustment.....	22
6.	Operation.....	23
6.1.	Projector controls	23
6.2.	Focus Adjustment	23
6.3.	Maintenance & Cleaning	23
7.	Specifications	27
7.1.	Product Specifications	27
7.2.	Projector Display Specification	27
7.3.	Projection Image Features.....	27
7.4.	A/V Inputs	27
7.5.	Power	27
8.	Troubleshooting & Support Information	28

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1. Introduction

Congratulations on your purchase of the Full HD Projector system for visual stimulus during the MRI/fMRI procedure. We are confident this product will give you the research tools you need for visual stimulation paradigms for patient while undergoing MRI scans.

This installation/operation manual outlines how to properly install and operate the system.

Thank you for choosing to purchase this system from Resonance Technology, Inc., the leader in fMRI and MRI patient comfort systems.

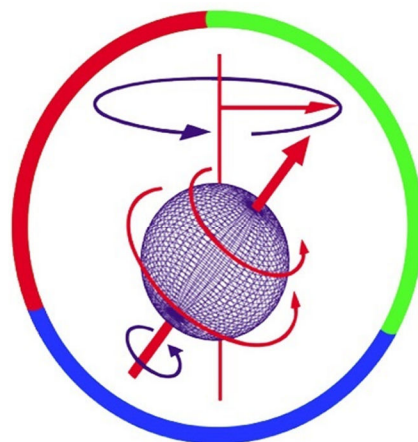
Suggestions on how to improve this system are always welcome.



Sincerely,

A handwritten signature in blue ink, appearing to read 'M Ziarati', with a stylized flourish at the end.

Mokhtar Ziarati
President and CEO
Resonance Technology, Inc.



2. Safety Information

At Resonance Technology, Inc., patient safety is our top priority. Please review this section completely as its contents are vital to the safety of the installer, the clinician/operator, and the patient.

2.1. Important Warnings for Patient and Operator Safety

WARNING

Prior to every use, inspect all system components that come in contact with the patient. Discontinue product usage immediately if any damage is evident or presents other potential hazards. Use of damaged components may cause injury to the clinician or the patient.

Examples of hazardous damage include but is not limited to the following:

- Physical damage to projector housing or stand
- Hardware missing from stand
- Any damaged potentially exposing wires

2.2. Precautionary Patient Conditions

Heart Disease / High Blood Pressure

If the patient has a history of heart disease or high blood pressure, instruct the patient to consult their doctor before using this system. If during viewing any increased anxiety is experienced, stop using this product immediately and instruct the patient to rest. If the symptoms persist after resting, instruct the patient to consult their doctor before continuing using this product.

Seizures

If the patient has a history of temporary spasms, unconsciousness, or epileptic seizures from light stimulation, instruct the patient to consult their doctor before using this system. Use of this product by such individuals may cause spasms, unconsciousness, or seizures. If the patient experiences such symptoms, stop using the product immediately and instruct the patient to consult their doctor.

Sickness / Headache / Nausea

If during use, the patient experiences any of the following symptoms, stop using this product immediately and rest. These symptoms may indicate misuse or overuse of the product or that you should not use the product for health reasons. If the following symptoms persist after rest, consult your doctor.

- Sore eyes, eye fatigue, or double vision
- Headache
- Inability to focus on the screen
- Stiff or sore shoulders or neck

2.3. Use Restrictions

Shelf-Life and System Maintenance Service Schedule

The Full HD Projector System comes with a one-year original manufacturer warranty and a shelf life of 2 ½ years (approx. 20,000 working hours) due to the average Projector lamp life-span. There is no periodic maintenance service for this Full HD Projector System, but Resonance Technology, Inc. recommends bi-monthly verification of coolant pump levels.

Restrictions on Using Non-RTC Components with the Full HD Projection system

The original manufacturer's warranty will become void if other non-RTC approved component are connect to the Full HD Projector system (i.e. power supplies). In addition, Resonance Technology, Inc. cannot be held responsible or liable for any unauthorized use of this equipment. If you have any questions about how to operate this system, or compatible components please read this user manual or call Resonance Technology, Inc. customer service at (818) 882-1997 or email support@mrivideo.com.

2.4. MRI Environment Hazards

Installation of materials inside the MRI suite must be done with extreme caution and only by authorized personnel. Care must be taken to keep ferromagnetic materials such as tools, filter plates, screws, etc. away from the MRI magnet and out of the MRI suite in general. Absolutely no work should be done near the filter panel or an open cabin door when a scan is in progress.

All cabling inside the MRI environment should either be connected or terminated properly. All cables should be run straight and never looped, as this may cause injury inside the MRI room.

In addition, no persons with ferromagnetic prosthetic devices such as pacemakers or joint replacements should enter the MRI suite at any time. Extremely high magnetic forces have the potential to dislodge ferrous items at high velocities that can result in serious injury or death.

Only system components explicitly designated for use in the MRI suite should be placed inside the MRI suite. Components not designated for use inside the MRI suite may present a projectile hazard and can become airborne, causing property damage, serious bodily injury, or death. Please refer to the installation block diagram to determine which components belong inside the MRI suite.

Resonance Technology, Inc. will not be held liable for any injuries or property damage which may occur as the result of improper use or installation of this product. By agreeing to this notice, users certify that they are familiar with basic safety procedures in an MRI room environment and that they have read and understand these safety precautions.

For questions regarding installation procedures or this manual, Resonance Technology, Inc. technical support staff may be reached Monday through Friday 8 a.m. to 5 p.m., Pacific Standard Time at (818) 882-1997, or by email at support@mrivideo.com.

2.5. General Warnings for Electronic Products

Electric shock

Failure to observe all operating and maintenance instructions may cause damage to this product and may result in property damage and/or injury or death from electric shock, fire, or other cause.

Do not disassemble this product.

Only Resonance Technology, Inc. trained and authorized personnel should perform all required service for this product. Failure to comply with this warning may result in property damage, injury and/or death from electric shock, fire, or other cause.

Avoid exposing this product to extreme environments.

This product may be damaged by high temperatures, direct sunlight exposure, by dropping this product, or by other mechanical shock. Do not expose this product to rain or excessive moisture.

Unplug/Power Off this product when not in use for long periods of time.

Always unplug this product power supply when not in use for extended periods of time or during MRI maintenance.

2.6. Labeling Used to Indicate Device Safety



MR-Safe Device

Device considered **safe** for use anywhere inside the magnet room.



MR Conditionally-Safe Device

Device considered **safe** in the MR room **under certain conditions**.



MR Unsafe Device

Device considered **unsafe** for use in the MR room. These items should not be taken inside the MR room due to being a projectile hazard in the magnetic field.

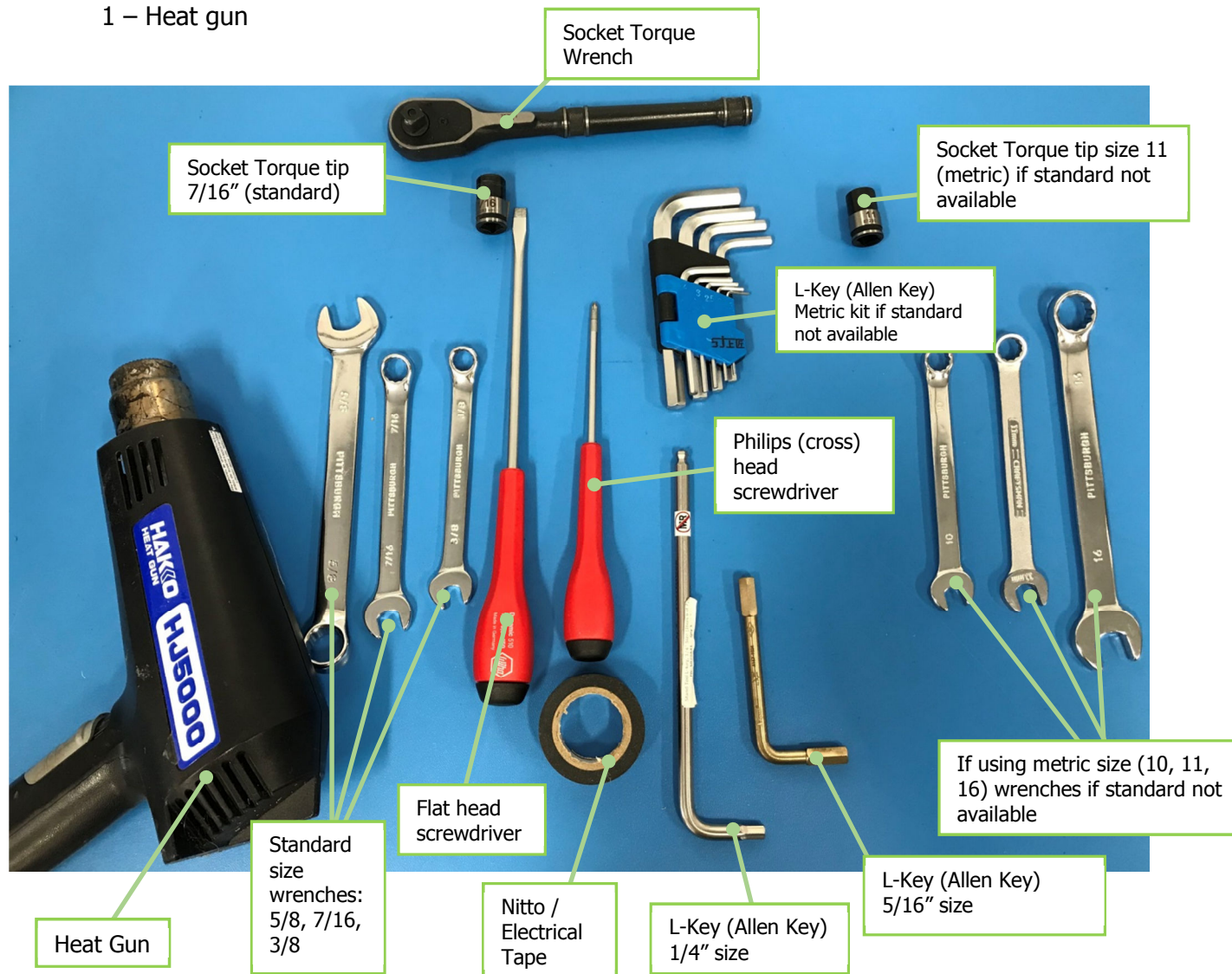
3. Installation Materials

Your Projection System comes complete with all the necessary components to complete the system installation at your facility. The following checklist is for the list of all materials sent by Resonance Technology, Inc. for proper installation:

Item	Picture	Item Description	Qty	RTC Part Number	MRI Safe	Installation location
1		HD Projector (Cooling tubes attached and looped) *prefilled with coolant liquid	1	RTC-411-351-1250-000		MRI Suite
2		Projector Stand Retainer	1	RTC-411-351-1196-A00		MRI Suite
3		Projector Stand Retainer Screw Phillips Flat 6-32 Thread Size, 5/8" Long	2	91771A150		MRI Suite
Resonance Technology, Inc. recommends unpacking and assembling the Projector Stand then mounting Projector outside the MRI Suite.						
4		Projector Stand Assembly (Components listed Below for 12 Items)	1	RTC-411-351-1245-000		MRI Suite
5		Coupling Tube (Item 1 of 12)	1	RTC-441-351-1197-A00		MRI Suite
6		Tube (Item 2 of 12)	1	RTC-441-351-1218-A00		MRI Suite
7		Projector Stand Clamp (Item 3 of 12)	1	RTC-411-351-1252-A00		MRI Suite
8		Central Disc (Item 4 of 12)	1	RTC-411-351-1212-A00		MRI Suite
9		Stand Arm (Item 5 of 12)	5	RTC-411-351-1214-A00		MRI Suite
10		Stand Wheels (Item 6 of 12)	5	RTC-411-351-1246-000		MRI Suite
11		Projector Stand Pan Cable Cover (Item 7 of 12)	1	RTC-411-351-1256-A00		MRI Suite
12		Pan Holder (Item 8 of 12)	5	RTC-441-351-1219-A00		MRI Suite
13		Base Hex Head Screw, 1/4"-20 Thread Size, 3/4" Long (Item 9 of 12)	6	93190A540		MRI Suite
15		Base External-Tooth Lock Washer for 1/4" Screw Size (Item 10 of 12)	6	95584A207		MRI Suite
16		Stand Arm Socket Head Screw, 5/16"-18 Thread Size, 1-1/8" Long (Item 11 of 12)	10	92196A584		MRI Suite
17		Pan Holder Screw Phillips Flat Head, 10-32 Thread Size, 1/2" Long (Item 12 of 12)	5	92480A829		MRI Suite
18		Projector Screen Assembly (attached feet components listed 4 Items)	1	RTC-330-030-633-001		MRI Suite
19		Projector Screen Foot (Item 1 of 4)	2	RTC-411-351-1255-A00		MRI Suite
20		Projector Screen Foot Hardware Screw 10-32 Thread Size, 1" Long (Item 2 of 4)	4	92480A833		MRI Suite
21		Projector Screen Foot Hardware Washer Number 10 Size (Item 3 of 4)	4	92916A345		MRI Suite
22		Projector Screen Foot Hardware Hex Nut 10-32 Thread Size (Item 4 of 4)	4	95130A160		MRI Suite
23		Projector Power Cable 6 pin 10 Meters	1	RTC-411-351-1257-A00		MRI Suite
26		Projector Power Cable 5 pin 2 Meters	1	RTC-411-351-1229-A00		Equipment Room
27		Filtered power cable assembly for penetration panel with mounting Screws	2	9011-100-1026		Penetration Panel
28		Fiber Optic Transmitter with Power Supply	1	RTC-411-351-1247-A00		Control Room
29		Single Fiber Optic Cable	1	RTC-411-351-1248-A00		MRI → Ctrl Room
30		Blu-Ray Player with Remote Control	1	RTC-550-010-478-002		Control Room
31		Blu-Ray Movie (Children's)	1	RTC-550-010-478-100		Control Room
32		Blu-Ray Movie	1	RTC-550-010-478-101		Control Room
33		Projector Pump (Long Clear & Blue Tubing attached and looped) *prefilled with coolant liquid	1	RTC-411-351-1240-000		Equipment Room
34		Pump Coolant Liquid	1	RTC-411-351-1251-A00		Stored in cool place
35		Plastic Bottle	1	RTC-411-351-1258-A00		Stored w/ Coolant
36		Pump 12v Power Supply	1	RTC-411-351-1240-000		Equipment Room
37		Monster Cable Bundlers (color may vary)	1	129712-00		MRI Suite
41		US Power Hospital Grade Power Cord *Other Country Hospital Grade Power Cord available upon request.	2	RTC-101-306-003-000		Equipment Room

Tool(s) required for Installation:

- 1 - L-Key Hex tool 5/16" size
- 1 - L-Key Hex tool 1/4" size
- 1 - Socket Torque Wrench
- 1 - Socket torque wrench tip/cap, 7/16" size (possibly with extension)
- 1 - Flat Head Screwdriver
- 1 - Philips (Cross) head screwdriver
- 1 - Nitto Tape
- 1 - Heat gun



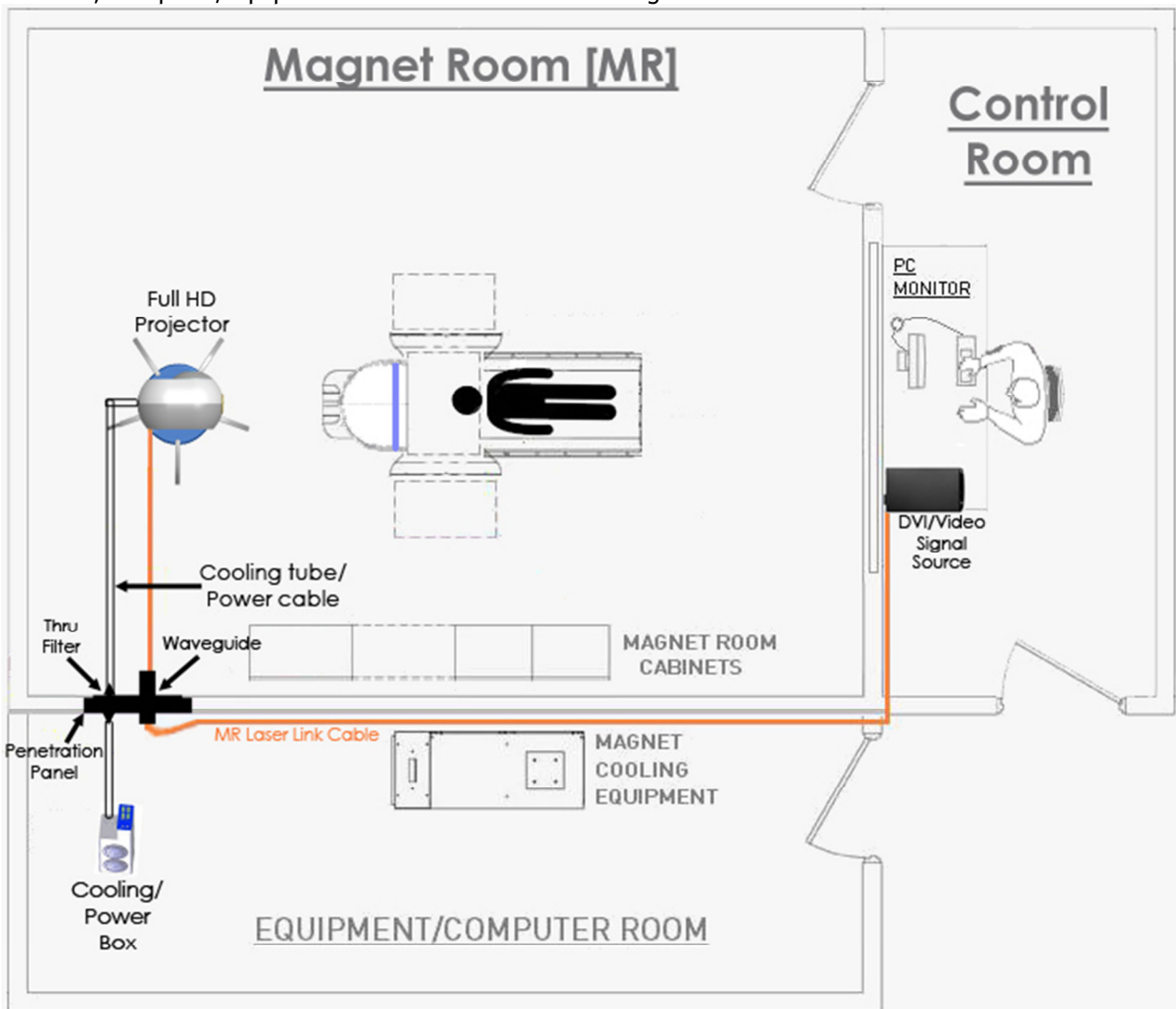
4 Room Layout Overview for Installation

4. Room Layout Overview for Installation

WARNING: Absolutely no ferromagnetic tools should be brought inside the MRI Suite!

While no tools, other than tie wraps, are required to install the system in the MRI suite, absolutely all ferromagnetic tools remain outside of, and away from the door leading to, the MRI suite.

Below is a typical MRI setup. Your individual installation may vary, but will generally be spaced into three areas: Control Room, Computer/Equipment Room and MRI Suite or Magnet Room.



The Control room setup consists of plugging in the HDMI fiber-optic transmitter to an HDMI video source such as a computer, laptop, DVD player, or satellite receiver.

The Magnet room setup includes three different cables. First, a single Laser Link cable that connects to a transmitter to the Full HD Projector image via filter panel wave-guide. Second, RTC Projector power cable to be ran from projector to the penetration panel. Third, Clear/Blue set of cooling tubes, which connect to the Cooling tubes coming from the Power Supply Pump. All three cables connect to the base of the projector. Once assembled and cables connected, the projector is then placed beyond the end of the bore so the patient has a view of the entire screen while inside the bore. Typically, such placement would be along the wall behind the magnet.

4 Room Layout Overview for Installation

Magnet Room

Control Room



DVI/Video Signal Source

Penetration Panel

Computer Room

MRLaserLink - 150 Feet (50 meters)

Waveguide

Coolant tubes

Power Cable

Power Supply

Hospital Grade Power Cord

Pass Through Filter

5/16" [7.8mm]

5/16" [7.8mm]

1/4" [6.35mm]

Holes needed to mount power filters and grounding cable

MRI Room Side

Equipment Room Side

Ground Cable

Ground Cable

Hex Nut
Star Lock Washer

Hex Nut
Star Lock Washer
Flat Washer

Star Lock Washer
Flat Washer
Pan Screw

More details on page 11-12

5. Installation Procedure

The installation procedure consists of five (5) major phases:

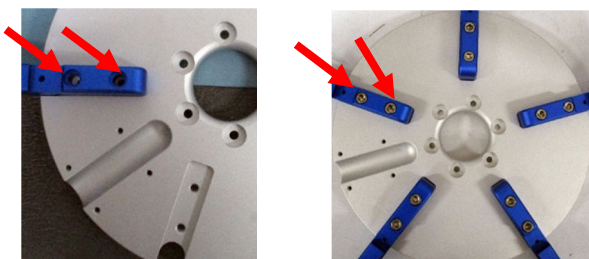
- Stand assembly (section 5.1)
- Mounting the projector to the stand (section 5.2)
- Installing the MR Laser Link Cable/Power Cables/Cooling Tubes (section 5.4)
- Connecting Coolant Tubes (section 5.5)
- Video Source Connection (section 5.10)

Before you begin the installation, determine the location where the projector will be set up. It should be a sufficient distance from the magnet such that a patient has an unobstructed view. This is typically next to the wall behind the magnet. Do not power on the power supply or cooling pump until installation is complete.

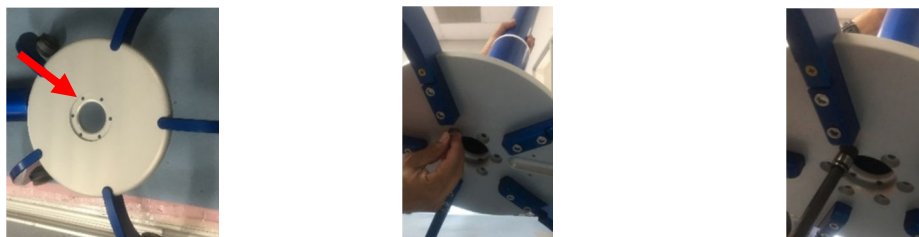
5.1. Stand Assembly

Resonance Technology, Inc. recommends completing this part of the assembly outside the MRI suite including utilizing two people during assembly. Locate the parts of the stand. This will be the base, five legs with MRI-safe wheels, the adjustable center pole, and hardware (screws).

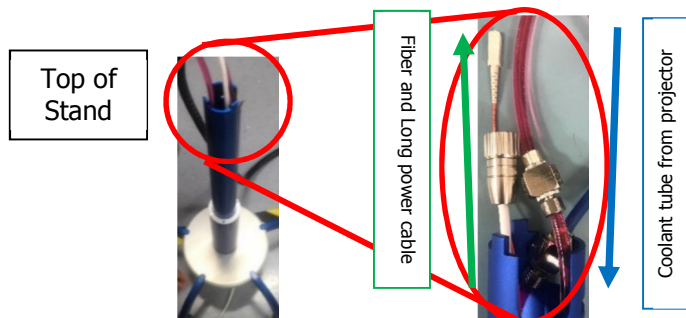
- 5.1.1.** Using the Socket Cap screws (PN: 92196A584) mount the blue legs to the silver round base.



- 5.1.2.** Using the (6) 3-inch hex screws (PN: 93190A540) attach the pole to the base using a 7/16" socket wrench. Please align the holes on the pole and base then with hand insert one screw before using the 7/16" socket wrench to tighten. For best results, hand insert two or three hex screws in order to make sure all holes aligned. Note there is no correct orientation.



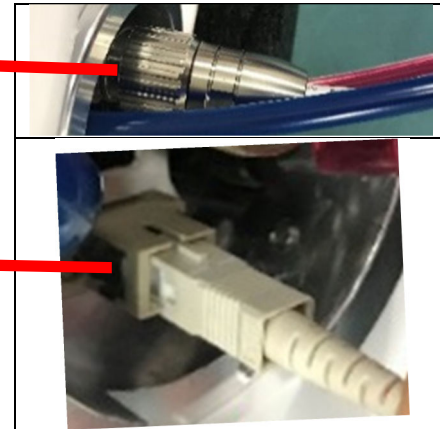
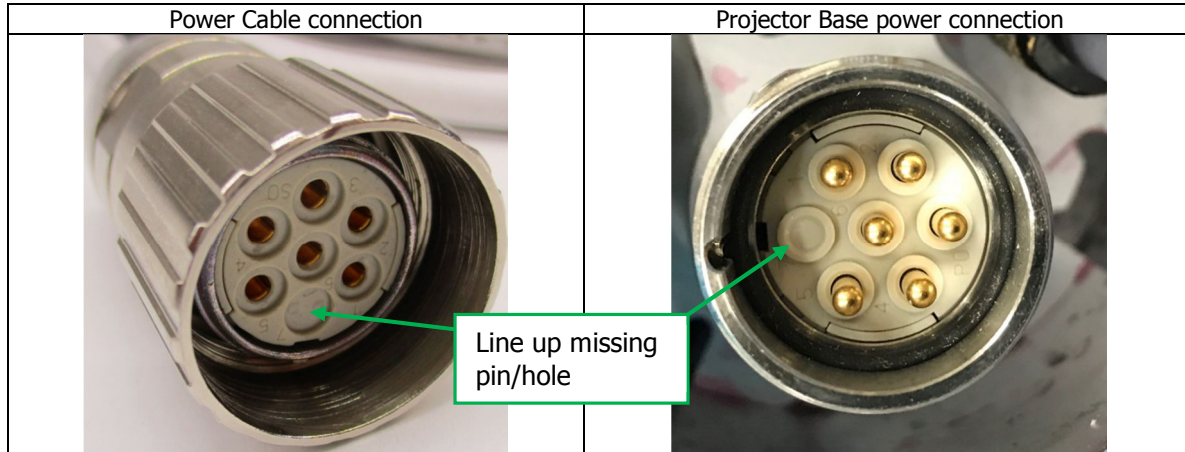
- 5.1.3.** Once stand pole mounted to the base, run the Fiber optic cable and power cable up from the base towards the top in order to connect to projector and run the coolant tubes attached to the projector down to the base. Please be sure that the coolant tubes are not pinched. **PLEASE BE AWARE THAT COOLANT TUBES AND PROJECTOR PUMP POWER SUPPLY CONTAIN/PRE-FILLED WITH COOLANT LIQUID; PLEASE HANDLE ACCORDINGLY.**



5.2. Mounting/Connection on the Projector

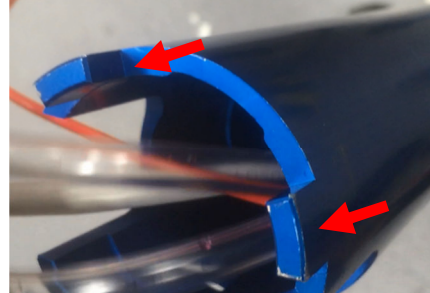
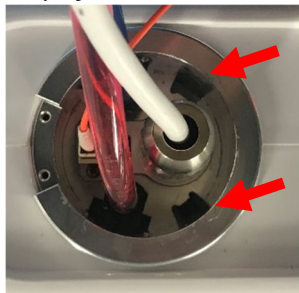
Make sure the cables are not pinched while mounting the projector to the stand. Simply connect the round power cable to the round connection at the base of the projector; turn threaded shell in order to lock in place.

Be Sure that the Power cable and Power Connector on the Projector light up. The clear way to see this is the missing pin see below.



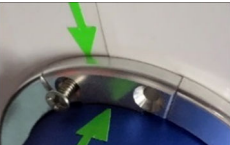
Then line up the fiber optic cable with the connector. Press firmly.

Once cables are secure, utilizing two or more persons to assist with this step is highly recommended: one to lift the projector and mount to the stand. The other to Run/pull the excess cables from the base of the stand. Please make sure that the cables are not caught/pinched between the projector and the stand. When mounting the projector on the stand make sure the holes at the base of the projector line up with the projector stand notches. Gently lower the assembly onto the stand pole.

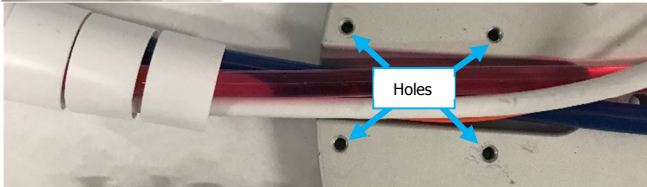
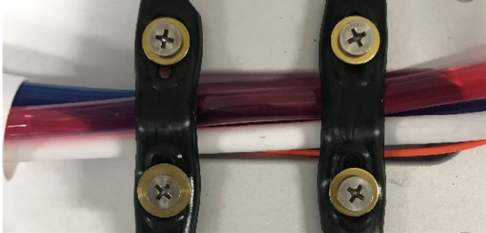


Due to the distance (mounting) of the projector stand, Resonance Technology, Inc. recommends at least two people to perform this step.

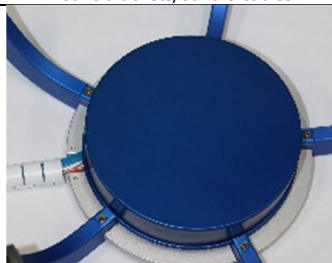
If properly mounted; when sliding the projector down onto the stand, locate the gap on the ring base of the projector lines up with the hole in the stand. The projector "L" shape stand retainer piece (PN: RTC-411-351-1196-A00) is to secure the projector stand to the base of the projector. Once the "L" shape stand retainer piece (PN: RTC-411-351-1196-A00) is in place, secured piece in place with two flat Philips screws (PN: 91771A150).

"L" shape stand retainer	Side View	Image of gap and hole in stand	"L" shape retainer in place	Secure with screws
				

Before mounting the pan cable cover (PN: RTC-411-351-1256-A00), the Cable restraint straps need to be screws into place. The projector can be tilted, but make sure the fiber optic cable is not excessively bent. Near the cable groove on the stand base plate, there are four holes in order to mount the cable straps.

Bundle all the cables together carefully	Then mount straps
 	

After securing Projector to stand and mounting cable restraint straps, mount stand base pan cable cover (PN: RTC-411-351-1256-A00). Be careful with this step to not damage cables (power cable, fiber optic cable and coolant tubes). On each leg, there is a place to mount the pan-holding bracket (PN: RTC-441-351-1219-A00) with brass flat head screws (PN: 92480A829) to secure pan cable cover in place. After all five (5) legs have the mount bracket be sure to use the cable wrap in order to organize the cables coming out of the stand.

Pan in place/secure with brackets	Mount brackets/bundle cables	Finished
		

5.3. Position Projector

- 5.3.1.** Once Stand assembly is complete and Projector is mounted. Roll the completed assembly into the MRI suite and position where desired. Then run fiber optic to and through wave-guide. White power cable has to be ran to penetration panel in order to make connection to power filters/grounding.



5.4. Installing the MR Laser Link Cable / Cooling Tubes

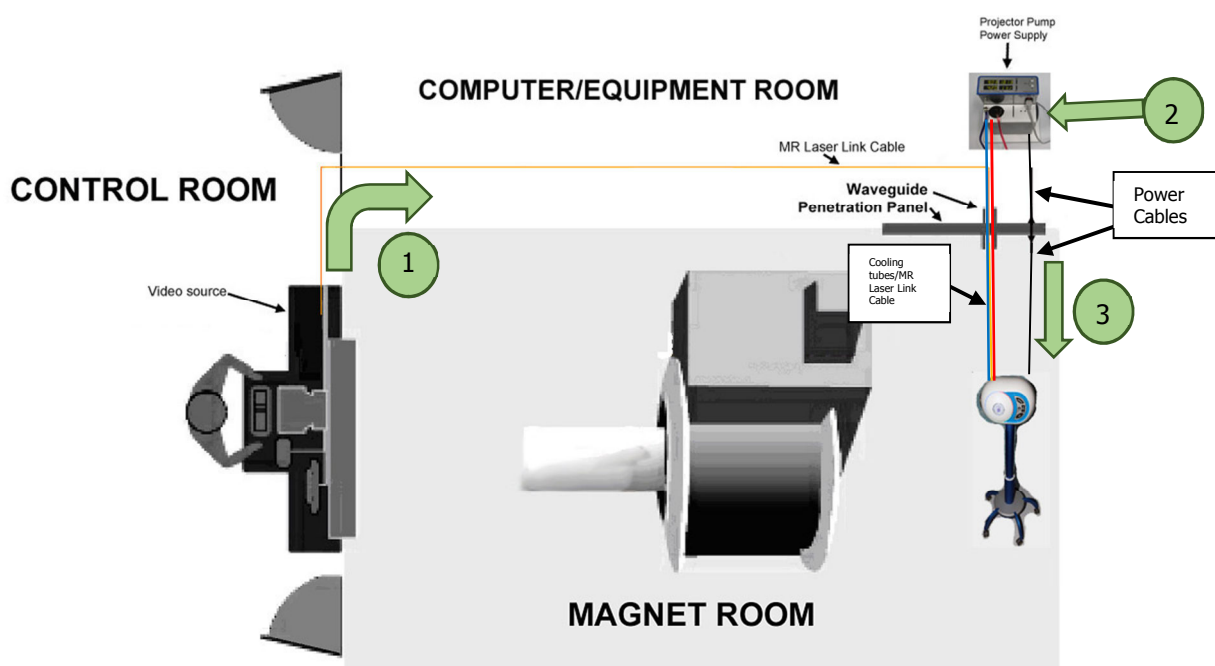
The preferred method of routing the fiber optic cable is to run the cable from the Magnet suite (projector stand) through the overhead ceiling drop tiles and down in front of the filter panel through the Fiber Optics Waveguide. It can run alongside the other MRI cables going to the magnet, and to the control room where the video source is located. The cable should end with enough slack to on both ends in order to move Projector around and in case video source changes.

RTC recommends installing the MR Laser Link Cable / Cooling Tubes and Power Cable in three sequential steps.

Step 1: The MR Laser link cable is ran from the control room to the equipment room first. It is recommended to have some extra fiber cable in the control room in the case where the video source is moved or if the fiber optic cable needs to be connected to another device in the same room/area.

Step 2: Connect the Cooling Tube extension to the Projector Power Supply pump and Connect Power Cable to penetration panels.

Step 3: Run the MR Laser Link Cable and Cooling Tubes thru the waveguide from the Equipment room to the MRI room. Connect The Cooling Tubes, MR Laser Link Cable and Power Supply cable to the Projector.



Note: Extra care taken to ensure the fiber cable not bent during installation in radius of less than 15cm (6 inches) or damage will occur.



The exact routing of the fiber-optic cable will vary somewhat depending on the facility layout and the magnet type.

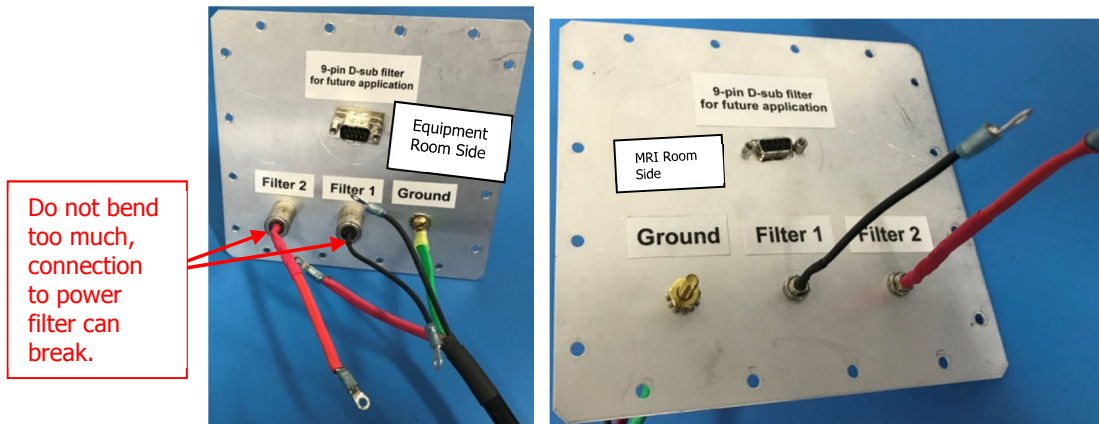
5.4.1. Running Projector Power Cables / Filter panel Connections

The Projector has a single power cable, where both ends have to meet at the penetration panel. One end is coming from the Power Supply Pump located in the Equipment room and the other end is coming from the Projector/Stand Assembly. Where the two meet, there is soldered connection made at the penetration panel in order for the power to the projector. Resonance Technology, Inc. shall provide the power filters required for the installation.

- 5.4.2.** The connection made at the power filters requires three holes in order to mount the power filters and grounding screw. The Longer power cable approx. 30 feet (10 meters) is for inside the MRI suite coming from the Projector stand base to the filter panel plate. The shorter power cable approx. 6.5 feet (2 meter) is for connecting to the Projector Power Supply Pump to the penetration panel.



Example below is the Siemens Filter plate. It is ideal to mount the power filters and ground cable before mounting the plate to the Penetration Panel.

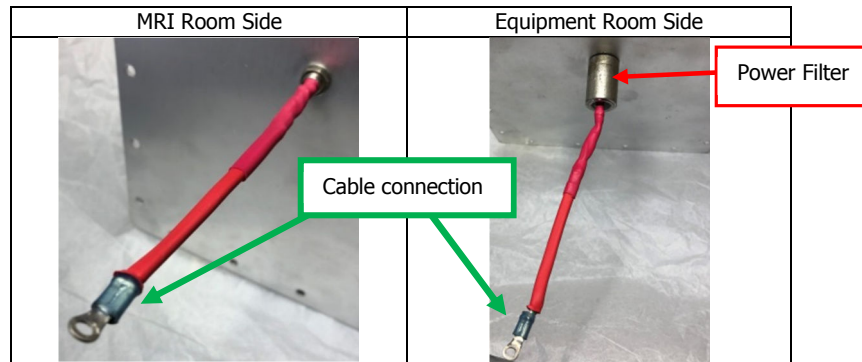


- 5.4.3.** It is ideal to mount the power filters to the penetration plate before attaching the power cables to the ends of the power filter cable assembly. The power filters have pre-soldered cable approx. 1 foot (304mm) in length with ring cable terminations, which will be connected with a screw, lock washer and covered with heat shrink tube. Remove the nut/lock washer in order to mount and use same nut/washer to secure it in place. The filter cylinder goes on the MR room side.

Power Filter cylinder goes on the MR Room side of the filter panel plate. Remove the flat washer and nut in order to mount cable assembly to the filter panel plate.	Remove washer and nut
Run the power filter cable assembly thru the penetration panel so that the filter cylinder is on the Control room side.	Penetration Panel Run cable thru.
Feed the cable all the way thru then using the washer and nut mount the filter in place on the penetration panel.	Lock washer then nut Leave no gap when mounting power filter use a hex wrench to hand tighten the nut.

Be sure to mount both Red and Black power filter cable assembly the same way (orientation) on the filter panel plate. Here is the example of the completion of the mounting of the power filter cable assembly (red).

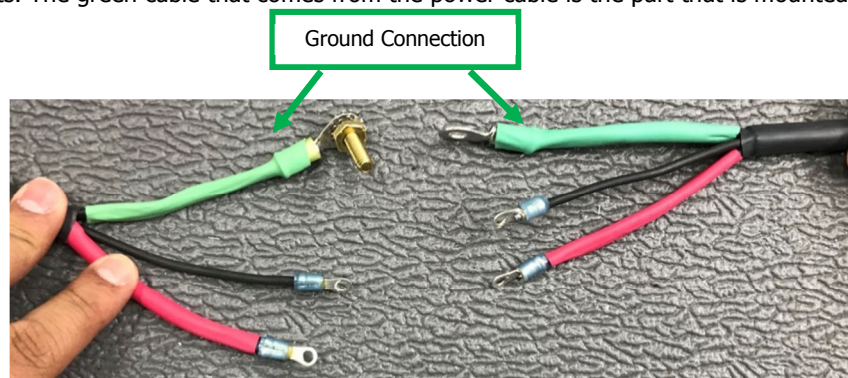
The photograph below is example of how the mounted filtered power cable assembly should look on the equipment room side and the MRI suite side.

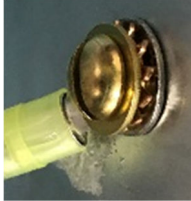


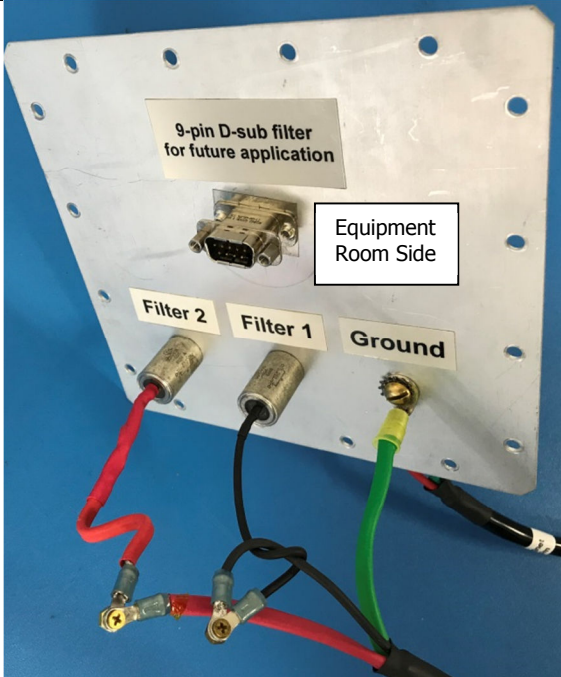
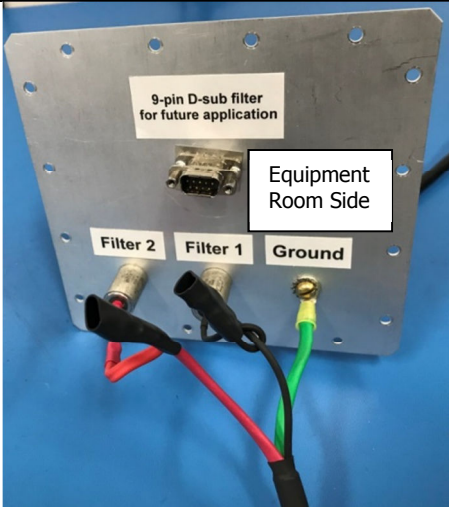
- 5.4.4.** Once the filter power cable assembly is mounted to the filter panel plate, attach the projector power cable on both sides. **DO NOT POWER ON THE POWER SUPPLY UNTIL CONNECTIONS HAVE BEEN COMPLETED.** The cables to be connected are color coated. Please be sure to use the heat shrink tube to cover the power cable connection to the power filtered cable assembly.

First slide on a piece of heat shrink tube in order to cover connection once the screw has been tightened.	Slide on a piece of heat shrink tubing Be sure to insert shrink tube before putting the screw
Connect the power cable to the filtered power cable assembly. The cable used on either side should match. Red to Red and Black to Black.	Cable from power cable Cable from filter power cable assembly Hand tighten screw Connection order: Screw, Star washer, ring termination, ring termination, star washer, nut
Slide heat shrink tube over the screw/nut connection of the two cables. Completely cover the metal connections of the two cables. Apply heat the tube in order to shrink and secure in place.	Slide heat shrink tube over the connection Completely cover the metal connections of the two cables. Apply heat to the tube in order to shrink and secure in place

- 5.4.5.** Mounting of the Ground (green) cable shall be near the power filters on the penetration panel by a series of lock-washers and nuts. The green cable that comes from the power filter cable is the part that is mounted onto the filter panel plate.



Equipment Room Side	Magnet Suite Side	Side View Completed
		
Order: Panel, Ground Cable, Star lock washer, Flat Washer, Screw	Order: Flat Washer, Star lock Washer, Hex Nut, Ground Cable, Star lock washer, and Hex Nut	

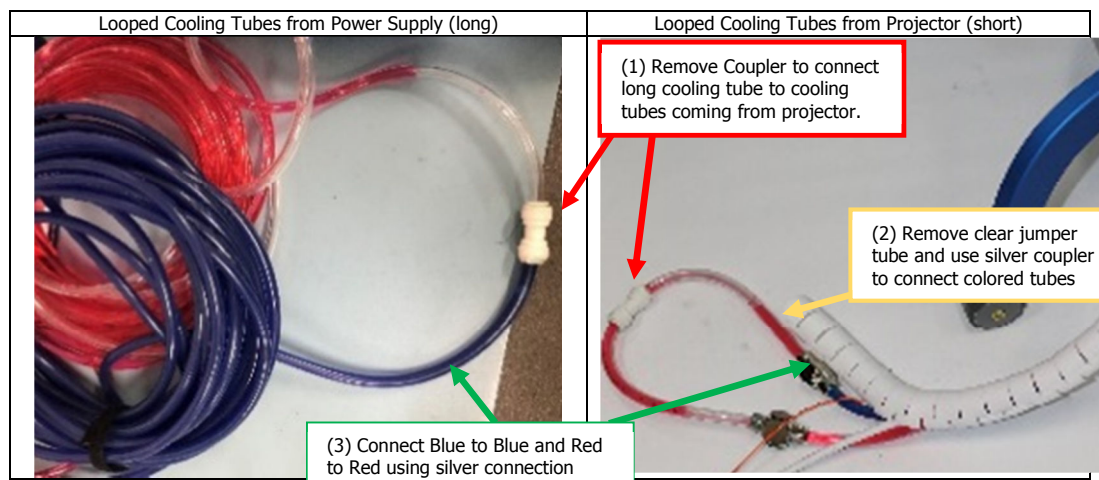
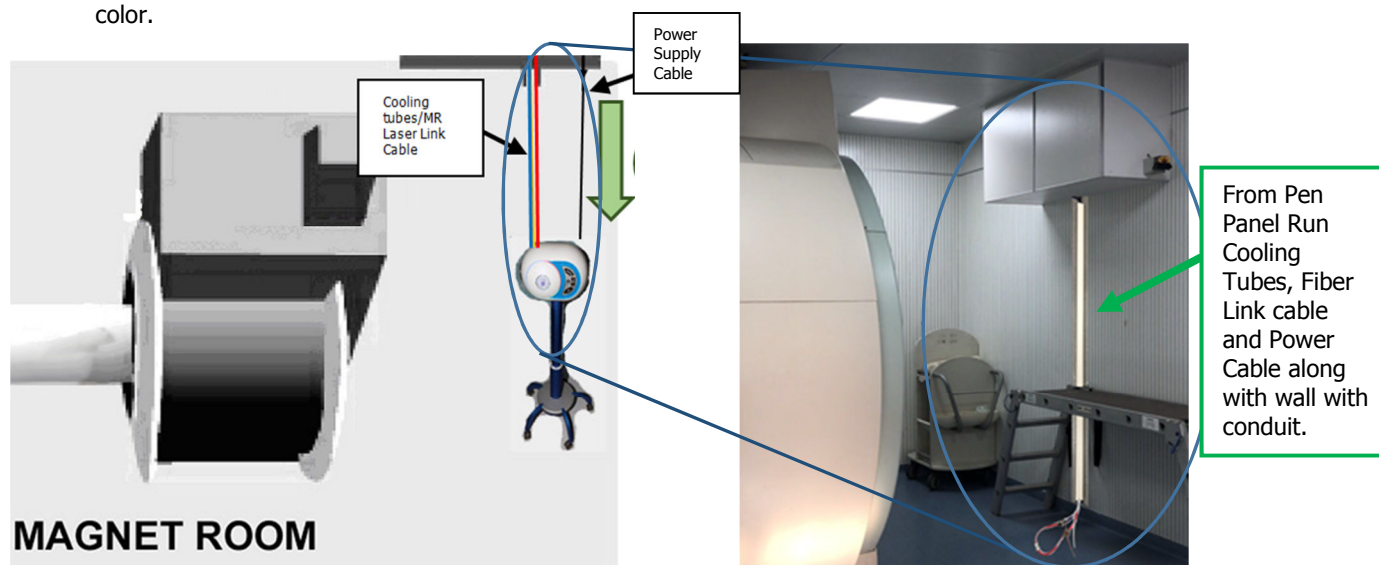
Example of Completed Filter Panel Connection	
Equipment Room Side	MRI Room Side
Example with Cables Connected	Example with Cables Connected
	
Example with Heat Shrink Cable in place and heated up	
	

5.5. Running Cooling Tubes/Connection

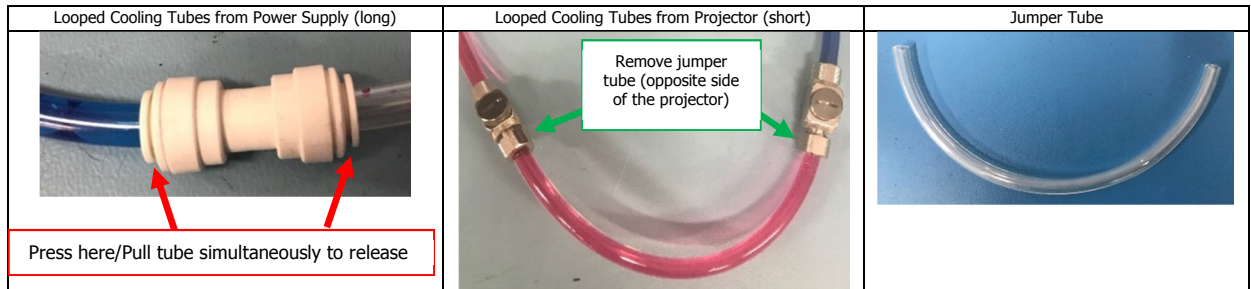
- 5.5.1.** **Do not power on Projector until connecting cooling tubes.** The Cooling Tubes that are attached to the Projector Power Supply Pump can be ran alongside the Fiber Optic, but be sure that the cable is not kinked or bend (short bend radius) or pulled with excessive force while installing since that will obstruct the flow or leak coolant liquid. The long cooling tube from the Projector Power Supply Pump are to be ran to the Projector/Stand Assembly to connect at the base of the Projector stand. Both cooling tubes on the Projector Power Supply Pump need to be ran. One is "Out-flow" and the other is the Return. The tubes are color coated: Blue and Clear.

Projector Power Supply Pump	Cables should be kept straight as possible	Do Not excessively bend Cooling Tubes
		

- 5.5.2.** The set of cooling tubes from Projector and Power Supply Pump are looped in order to contain the coolant liquid. The looped tubes from the projector base need to be disconnected from the loop and connected to the appropriate color.

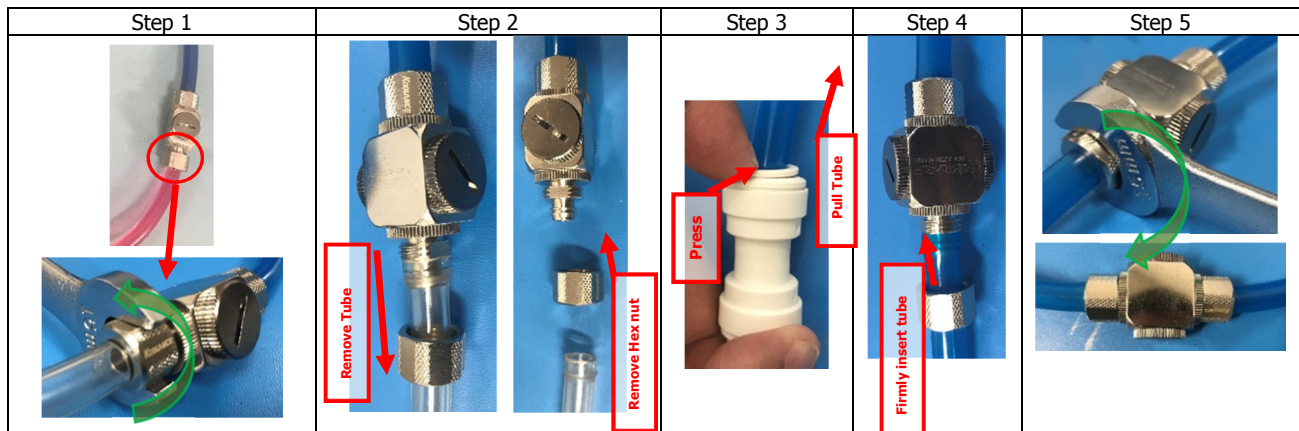


- 5.5.3.** The Coupling connector used on the Projector side (short) looped cooling cables side have a nut that need to be loosened/tightened with a MR-Safe tool. The coupling connector on cooling tubes coming from the Power Supply (long) are push release connection.



When removing jumper tube, the coolant liquid inside should be return to the coolant bottle supplied with the system. Be sure to save jumper tube in case projector needs to be sent in for servicing or disconnecting from power supply pump.

5.5.4. When removing tubes from the coupler be sure to hold the tubes upright to avoid spillage of the coolant liquid. If need be plug tube opening with finger. Be sure to have towel/rag in case of liquid spillage. Remove and re-connect the Cooling tube one side at a time.



Step 1: Start with the blue tube side of the loop cooling tubes coming from the Projector assembly. Loosen the silver nut attached the silver bridge opposite side of the projector to remove jumper tube.

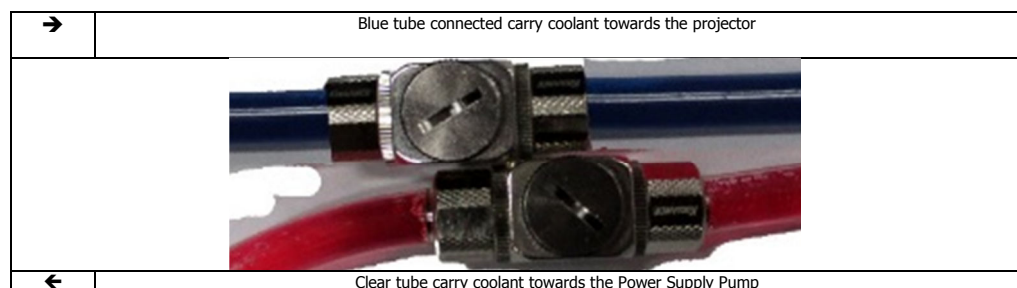
Step 2: Once Loosen with MR-Safe tool, use hands to remove silver hex nut. Carefully, unplug the clear jumper cable and remove silver hex nut hold on for later.

Step 3: Remove the blue tube from the long looped cooling tubes coming from the power supply. Mount the silver hex nut removed from the jumper cable. Make sure to hold up unterminated tubes to avoid liquid spillage.

Step 4: Firmly press the blue tube from the power supply (long) cooling tube into the nozzle on silver bridge where the jumper tube previously removed and screw on hex nut to secure in place.

Step 5: Using the MRI-safe tool, tighten the silver hex nut on the silver bridge coupler in order to avoid any leakage of the coolant liquid.

Repeat process on the other end in order to connect the clear tube from the power supply (long) to the Clear tube terminated at the projector (short) clear tube via silver bridge coupler connection. Please store the jumper tube in case of future use.



Do not power on Projector until confirming flow of coolant.

5.6. Flow sensor fiber connection

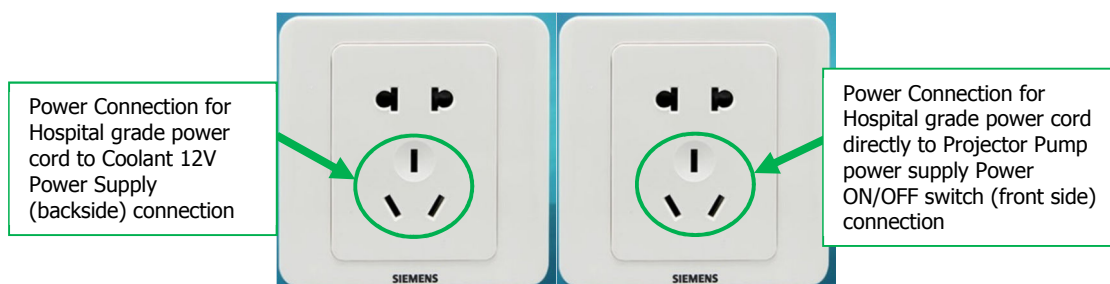
In order for the Projector power supply successfully utilizes the fail safe activated, the fiber connections on the power supply near the power switch need to be properly connected. There are two independent fiber optic connections from top portion of the Projector Pump Power Supply Unit to the base of the unit. TX to RX and RX to TX; this must be connected in order to the power sensor to function properly.



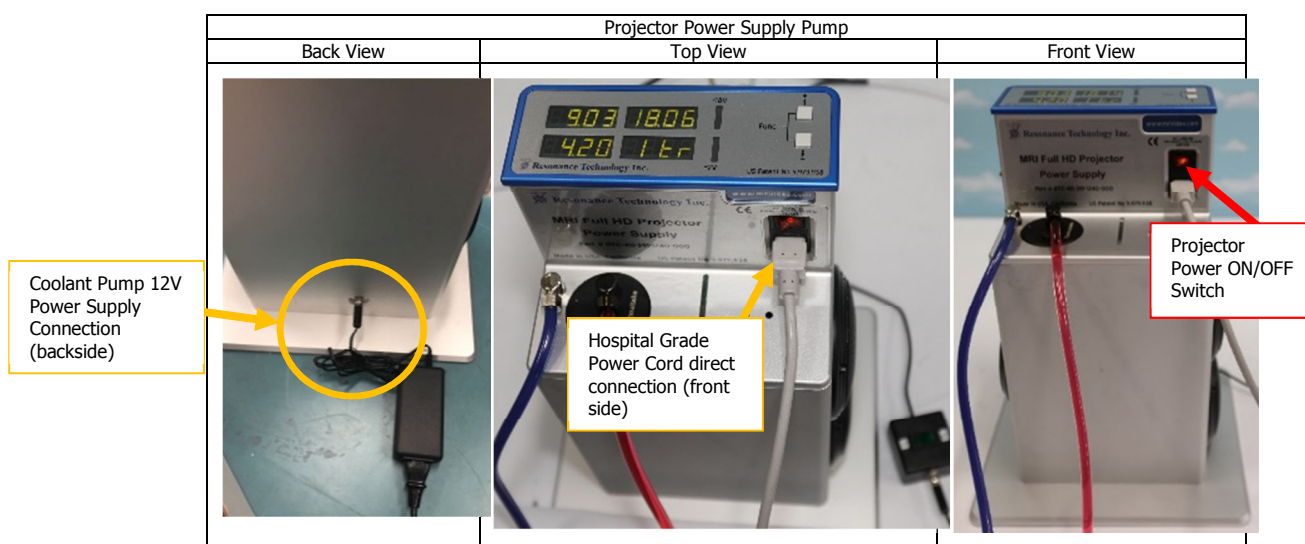
5.7. Power Pump Start Up

After removing the jumper tubes and direct connecting the Projector coolant tubes to the coolant tubes coming from the Projector Power Supply Pump, connect power to the Projector Power Supply Pump.

The Projector Power Supply pump needs two available wall AC output connections. Sample below is for a Siemens magnet Type I Power Connection.



The Projector Power Supply Pump has two sources of power and one power switch.

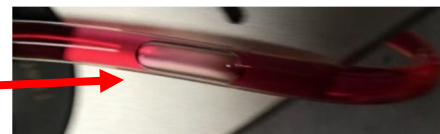


- 5.7.1.** Power to the Pump is by connecting the 12v power supply to the back of the Power supply. Supply power to the power supply then plug the power supply round connector to the connection on the back of the Power Supply housing. If the power is not present the light bar LED will not turn on and the projector will not turn on also.

12v Power Supply Connection	12v power Supply is connected and working properly	If 12v Power supply fails or is not connected properly	
		Message on Display "FLO OFF"	LED Bar are not on and FLO ERR on displays
			

- 5.7.2.** Once 12v power supply is connected, the coolant liquid should start circulating inside the tubes. There should be air bubbles in the tubes in order to show movement of liquid. If the air bubbles are not moving, there is an obstruction (kink/bent tube) in the tubing not letting the liquid circulate.

Air bubble example



- 5.7.3.** In order to eliminate air bubbles from the tubing, on the Front side of the Projector Power Supply Pump, User can access the Pump liquid reservoir/tank. **Please make sure liquid is flowing before opening reservoir/tank or liquid can be forced out of the tank.**

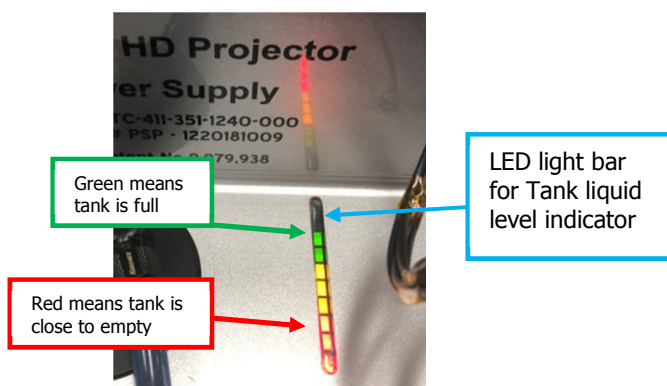
Remove cap with fingertips in order to eliminate air bubbles/refill reservoir/tank



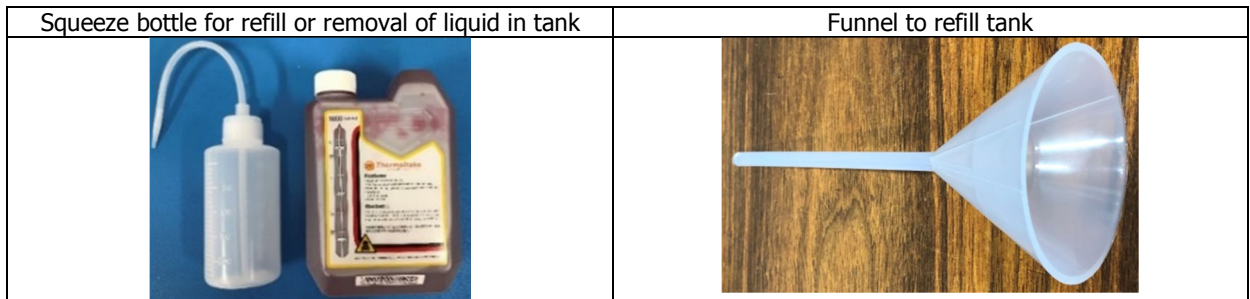
- 5.7.4.** While running the pump with the reservoir/tank cap removed, the air bubbles should dissipate in 5-10 minutes. Once air bubbles have disappeared be sure to replace the black reservoir/tank cap back into place only tightening with fingertips.

5.8. Power Supply Pump Tank Refill

- 5.8.1.** The Projector Power Supply comes with a liquid indicator on presented as a LED light bar. If the liquid in the tank becomes too low (Red Range) the power supply will shut off the projector as a safe precaution.



- 5.8.2.** The Projector Power Supply Pump will come with a refill bottle in order to add coolant liquid to the reservoir/tank. User must make sure that the tank maintains filled with coolant liquid. RTC recommends checking the liquid levels in reservoir/tank by referencing the LED light bar (section 5.8.1) at least twice a month in order to maintain the pump working properly. See example bottle and funnel below.

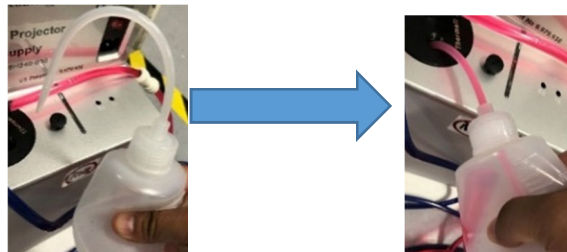


- 5.8.3.** Remove the reservoir/tank cap to add coolant liquid to the reservoir/tank. Add some coolant liquid into the clear refill bottle. Insert nozzle into the reservoir/tank and add desired amount of liquid.

Cooling liquid seen when full. Full is approx. 1/2 to 1" from the top.



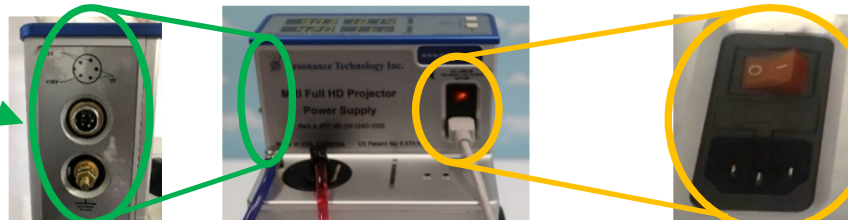
- 5.8.4.** To remove coolant liquid from the reservoir/tank, squeeze air out of the clear refill bottle and insert nozzle in order to extract the excess liquid.



5.9. Powering On Projector

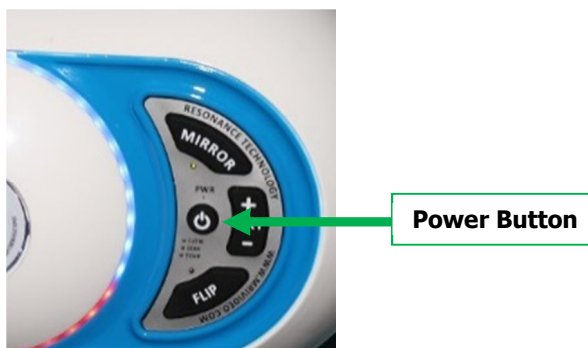
- 5.9.1.** Once the Coolant pump is properly working, the power switch for the projector power can be turned "On". The power switch is on the front of the Projector Power Supply Pump assembly. The connection of the power cable is on the side of the Power Supply Pump.

Power Cable connections that are connected from Power Supply to Penetration Panel



Be sure that the Connections at the penetration panel are completed on both sides before powering on the Projector Pump Power Supply unit.

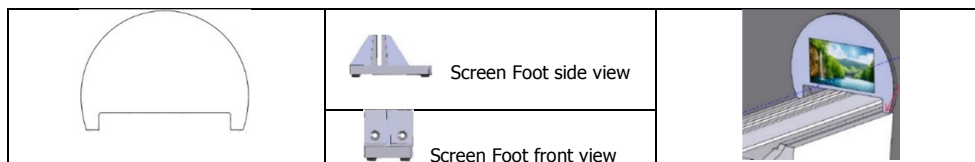
- 5.9.2.** When turned on the Projector is in standby mode, that means there is power to the unit but Projector has power button on the side panel of the Projector.



Around the Logo, there is a LED circle; when standby they are all red. When powered on ring is RED, BLUE, and GREEN. See page 23 in order to disable the LED Light ring when powering on the unit.

5.10. Projector Screen

- 5.10.1.** The Projection screen comes with plastic feet in order to mount and place on a flat surface. There are two plastic screen feet one on each side. The Screen Foot held in place with two Flat head screws and Hex nuts. Please take care handling the Projection screen since the side with the screen film is delicate; currently screen only comes in one side to sit on the edge of the MRI bed. Shiny surface side should be facing patient in order to get best results.



5.11. Video Source Connection

- 5.11.1.** In the control room, connect the signal cable (fiber optic) to the video source. If using the fiber optic cable, connect it to the HDMI fiber optic transmitter and connect the transmitter to an HDMI video source.

5.11.1.1. If fiber optic transmitter connected directly to the video source (i.e. Blu-Ray Player), the power supply is not required.

5.11.1.2. If fiber optic transmitter connected to an adaptor or converter (i.e. HDMI to RCA adaptor), the HDMI fiber transmitter needs power in order for it to function properly.

HDMI fiber extender connected with power supply connected at the base of the fiber connection end.



5.12. Stand adjustment

If the Projector needs adjustment higher than resting position in order to align with the projector screen, Power off the Projector to add silver the Projector stand clamp (PN: RTC-411-351-1252-A00). First measure how much adjustment needed on the projector. Then have one-person lift the projector with stand pole while another person mounts and tightens the ring on the Stand pole. Once in place, slowly lower Projector into position so the Projector stand clamp sits on the wider tube base of the stand pole.



Only need to loosen one screw (side) in order to slide bracket up or down to desired height. Then once set in correct location tighten screw again to hold in place.

6 Operation

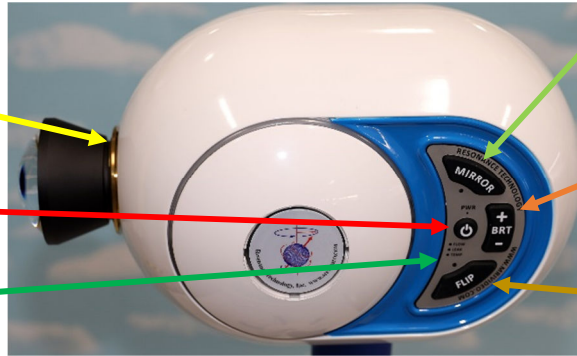
6. Operation

6.1. Projector controls

Removable projection lens
mount location/Focus
Adjustment knob/slider

Power button: ON/OFF

Projector functioning
indicators



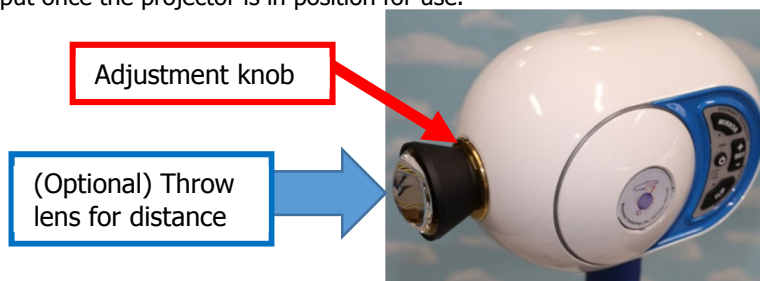
Mirror: Image mirror will enable the operator to invert the image displayed in order to reflect off a mirror properly.

Brightness control: will let the operator control the brightness of the projector.

Flip: Image flip will enable the operator to flip the image horizontal or vertical.

6.2. Focus Adjustment

The Projector comes with a built in focus adjustment knob. The knob can be slid side to side in order to focus the image output once the projector is in position for use.



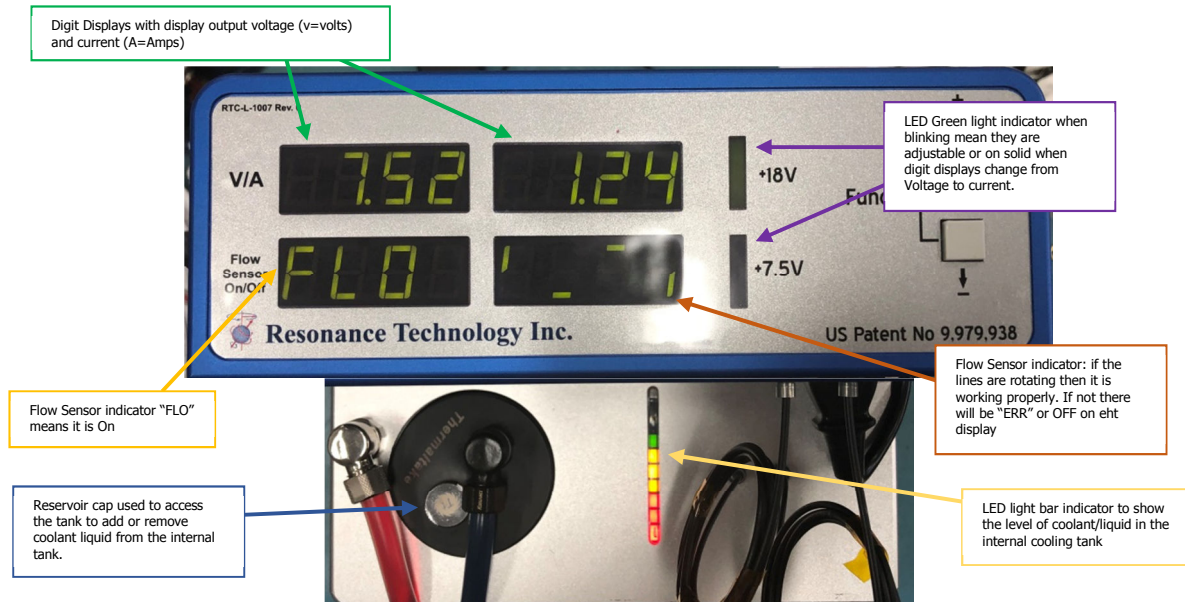
6.3. Turning off LED ring lights

To turn off LED ring lights on the projector, power off the projector. Press and hold the Brightness "+" then press the Power Button while holding the brightness "+" button and the LED ring will turn off during start up.



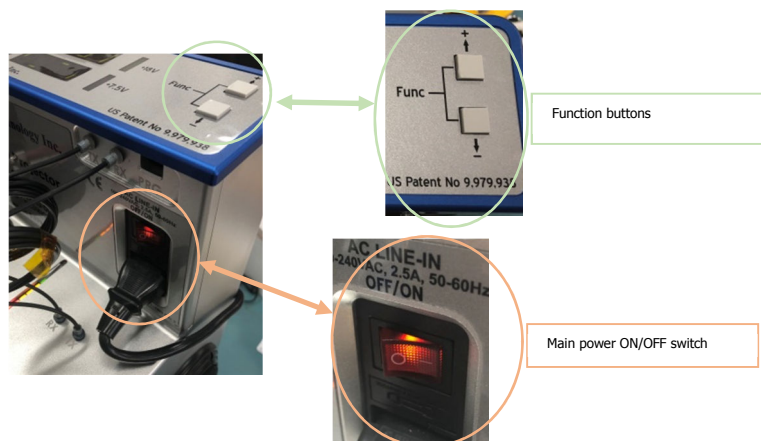
6 Operation

6.4. Projector Pump/Power Supply indicators



6.5. Projector Pump/Power Supply Controls

6.5.1. Projector Pump/Power Supply Controls include an ON/OFF power switch and two function buttons.



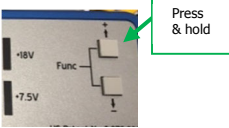
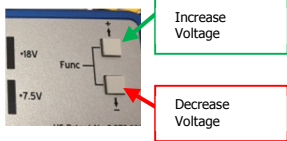
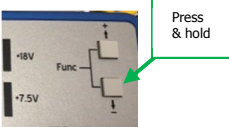
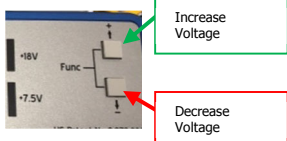
6.5.2. Voltage Output

The Projector pump has two voltage outputs for the projector; +7.5v and +18v. The label on the Projector Pump Power supply is to know pin configuration in case of trouble shooting the voltage outputs of the unit.



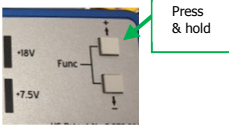
6 Operation

6.5.2.1. Voltage output adjustment: The digit display is to set read the power outputted by the Projector Power Supply Pump. The 18v output can be adjusted if need be. The adjust voltage press and hold the "Up" arrow until the +18V LED light turns on and the digit display starts blinking/flashing, then adjust voltage either up or down and leave it at desired voltage level. When the digit display stops flashing/blinking, the adjustment voltage either up or down and leave it at desired voltage level. When the digit display stops flashing/blinking, the voltage is set to the new value. RTC Default factory settings is +18.2v and +7.4V

To adjust the +18v	Press and hold the Function "+" (top) button for 3-5 seconds	The digit display will start blinking on and off	While it is blinking use the function "+" to increase and "-" to decrease voltage	Set to desired voltage and do not press button for 3-5 seconds and the voltage will be set and digit display become solid again
				
To adjust the +7v	Press and hold the Function "-" (bottom) button for 3-5 seconds	The digit display will start blinking on and off	While it is blinking use the function "+" to increase and "-" to decrease voltage	Set to desired voltage and do not press button for 3-5 seconds and the voltage will be set and digit display become solid again
				

6.6. Flow sensor by-pass feature

6.6.1. If the internal flow sensor fails the projector will shut off after 30 seconds without the flow sensor engaged. If you need to use the projector without the flow sensor or need to be by-passed for diagnostics purposes, simply turn off the power supply switch then press and hold the Function "+" button while turning the power switch back on and the display should read protect off which mean flow sensor fail safe is shut off.

During normal start up the Power Supply display should say "PROT ON"	Turn it off power supply by pressing the power switch OFF (O).	Press and hold the Function "+" (top) button	Then turn on power switch while holding down the Function "+" button.	If done properly, the bottom digit display will say "PROT OFF" which means the projection feature is OFF.
				

6 Operation

6.7. Maintenance & Cleaning

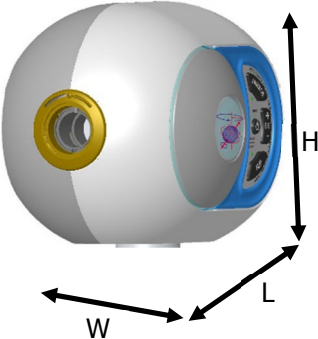
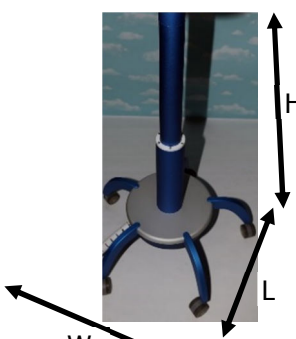
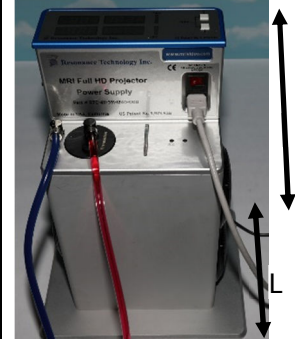
For cleaning purposes, Resonance Technology, Inc. recommends using a dry microfiber towel for cleaning the outside of the projector and when necessary an alcohol-free, non-flammable, and non-corrosive cleaning solution. Apply cleaning solution onto the towel and not directly on the device. Please be sure the projector is powered off when cleaning. Try to maintain Projector lens area and Projector Screen free of dust. In order to remove dust or light dirt, wipe the surface with a dry, clean, soft cloth. To remove major dirt, wipe the surface with a soft cloth dampened in clean water or a diluted mild detergent, then wipe immediately with a dry cloth.

Do not use any sharp objects, chemicals, or strong detergents. Do not spray liquid directly onto the projector. Any of these actions may result in permanent damage to the projector, or may result in malfunction, fire, or electric shock.

If you expect to leave the projector dormant for a long time (such as for vacation), it is a good idea to unplug the power cord to protect against possible damage from power surges.

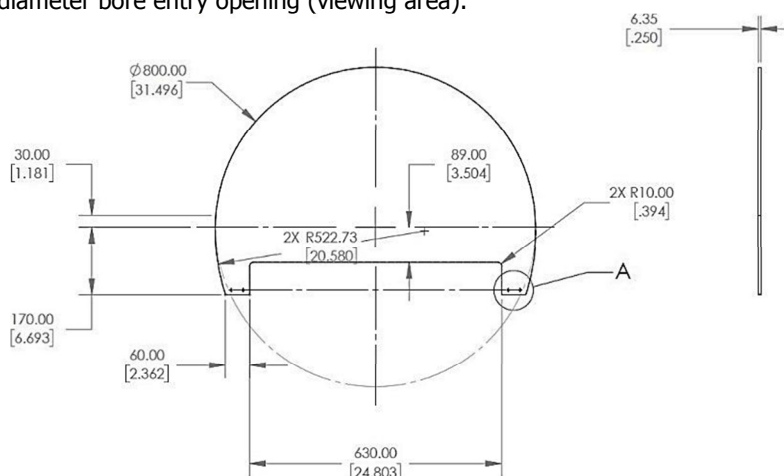
7. Specifications

7.1. Product Specifications

Projector Main Assembly	Projector Stand	Projector Power Supply Pump
		
Dimensions: Inches (MM)		
Projector without Distance Lens Length (L) = 14" (355.6mm) Width (W) = 9" (228.6mm) Height (H) = 9" (228.6mm)	Without wheels Length (L) = 22" (558.8mm) Width (W) = 22" (558.8mm) Height (H) = 33" – 44" (838.2 – 1117mm) Wheels add = 2.25" (57.15mm) to "H"	Length (L) = 10.5" (266.7mm) Width (W) = 13" (330.2mm) Height (H) = 18" (457.2mm)
Weight:		
26.5 lbs.	21 lbs.	31 lbs.

7.2. Projector Display Specification

Specifications (measurements) of the display screen below are the "Phillips" version. Screen can be custom made for longer, wider or smaller diameter bore entry opening (viewing area).



DIMENSIONS ARE IN mm [INCHES]

TOLERANCES:

HOLE-TO-HOLE: $\pm 0.05\text{mm}$ [± 0.002 "]

EDGE-TO-EDGE: $\pm 0.05\text{mm}$ [± 0.002 "]

ANGLES: $\pm 0.5^\circ$

7.3. Projection Image Features

- Image Mirror, Flip
- Resolution: 1920 x 1080p
- Lumens: 500

7.4. A/V Inputs

- SC-type fiber optic (carrying HDMI signal, HDCP-compliant)
- HDMI (HDCP-compliant)

7.5. Power

- Power supply input: 100V-240V, 50/60Hz
- Power switch internal power fuse rated at 2.5A

8 Troubleshooting & Support Information

8. Troubleshooting & Support Information

If you have any questions regarding the Full HD Projector system use or installation, please don't hesitate to call Resonance Technology, Inc. Customer Service Department. Service and technical support staff may be reached Monday through Friday 8 A.M. to 5 P.M., Pacific Standard Time (USA) at +1 (818) 882-1997, or e-mail to support@mrivideo.com.

Resonance Technology, Inc. Product Recycling Program:



Resonance Technology Inc. actively supports the protection of the environment by efficiently recycling all our electronic products. Our everyday pollution prevention activities reduce the need for electronic waste to go into landfills. At Resonance Technology Inc. we are committed to our customers, our communities and to everyone's environment. In light of the above, Resonance Technology, Inc. recommends that all our customers return their undesired, obsolete, or unused Resonance Technology, Inc. equipment to the following address for recycling:

Resonance Technology, Inc.
Attn: Product Recycling Program
18121 Parthenia Street
Northridge, CA. 91325

