



OPERATORS MANUAL

T-290 MRI Box Camera



MRI CONDITIONAL
TO 3 T.0 TESLA

Troyka Med Inc

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T-290 MRI Conditional Box Camera Op. Man. Pub. 022018 Pub. No: 0 Rev:0



ISO 13485:2016

Introduction

Thank you for purchasing the T-290 MRI Conditional Box Camera. This product is manufactured and tested to the highest standards and is guaranteed MR Conditional up to 3 Tesla.

This product is manufactured by Troyka Med Inc. at our factory based in Ankara, Turkey, to BS EN ISO 13485:2016

To ensure that you obtain maximum benefit from the T-290 MRI Box Camera, please take a few minutes to read the enclosed information regarding operation, service and maintenance. After reading this manual, store it in a safe place for future reference.







If you have any problems in the meantime or would like any advice about this or any other MR products from the Troyka Med range, please contact us at the following address

Troyka Med Inc.

Tel: +90 312 2650096

E-mail: info@troykamed.com

Website: www.troykamed.com

	Protect from direct sunlight		Protect from rain and humidity		MRI conditional up to 3 Tesla
	Read user manual		Manufacturer		ISO13485 ISO 9001 Class I medical devices

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MRI Safety Definition for MRI as Defined by International Standards ASTM F2503-13


	<p>MR SAFE An item that poses no known hazards resulting from exposure to any MR environment MR SAFE items are composed of materials that are electrically nonconductive, non-metallic, and nonmagnetic.</p>
	<p>MR CONDITIONAL An item with demonstrated safety in the MR environment within defined conditions. At a minimum, address the conditions of the static magnetic field, the switched gradient magnetic field and the radiofrequency fields. Additional conditions, including specific conditions of the item, may be required.</p> <p>Supplementary marking – additional information that, in association with marking as “ MR CONDITIONAL ” states via additional language the conditions in which an item can be used safely within the MR environment.</p>
	<p>MR UNSAFE An item with poses unacceptable risks to the patient, medical staff or other persons within the MR environment.</p>

1.2 General Safety Information and Intended Use

The MRI Box camera must only be operated by personnel property trained in MRI safety.









The MRI Box camera must only be operated by personnel properly trained in identifying interference problems such as artifacts, streaks and distortions in image data. It is required that as personnel handling the MRI Box camera are familiar with the safety instructions given in the manual and other documentation provided to ensure safe operation of the camera and associated equipment.

The system comes with a one-year warranty on all parts and labor, and a shelf life on one year starting from the day of its original installation. Troyka Med Inc. suggests a maintenance call every six months after the one-year original warranty period to check up on frequently used items such as connection cables and wall mounts. This way you will make the best use of this system for your facility.


	<p>Warning! If any of the components becomes damaged, stop using the system immediately and notify Troyka Med Inc. customer service for assistance. Use of broken components can cause injury to the clinician or the patient.</p>
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1.3 Electrical safety

	<p>Warning! Certain electric components in the device require several hundred volts to operate properly. In order to prevent potentially lethal electric shock it is essential to disconnect the device from its power source during installation, and prior to servicing or repair. Some capacitors will remain charged with dangerous voltage levels even after the power is off. In order to prevent any possible electric shock, please wait several minutes for all capacitors to become completely discharged before proceeding.</p>
	<p>Warning! Do not operate the device near the water, where it can become moist, or near excessive heat. Operation under such conditions could result in failure of the Box camera, possible electric shock, or fire. Don't handle the power cable with wet hands. High voltages present could cause lethal electric shock.</p>
	<p>Warning! Should any foreign substances enter the device such as liquid, metal chips or dust, immediately turn off power to the Interface Unit. Under no circumstances shall tools or foreign objects be inserted into the device, as this could result in failure of the device, electric shock or fire.</p>
	<p>Warning! If smoke, noxious odors or unusual noise should come from the device, immediately turn off power to the Box camera and contact your local distributor or Troyka Med service team.</p>
	<p>Warning! Do not damage the power cable of the device. Do not attempt to modify the power cable should it malfunction. Should the power cable become damaged or frayed, it must be replaced.</p>
	<p>Warning! Do not operate the camera system if any cables are damaged.</p>
	<p>Warning! Switch off and unplug the Sound System if it not be in use for 1 days or more.</p>
	<p>Warning! To avoid the risk of electric shock, this equipment must only be connected to supply mains with protective earth.</p>



	<p>Warning! Self-heating of cables due to improper cable routing! Injury to equipment and/or operating personnel. Cables should not be looped crossed inside MRI room.</p>
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1.4 Warnings for MRI

	<p>Caution! Installation of materials inside the MRI must be done with extreme caution.</p>
	<p>Caution! Take care that ferromagnetic materials be kept at least three meters away from the magnet and that no installation shall be done near the filter panel if a scan is in progress.</p>
	<p>Caution! In addition, no persons with ferromagnetic prosthetic devices, such as pacemakers or joints replacement, should enter the MRI suite at any time. Extreme, high magnetic fields inside the magnetic room have the potential to dislodge items at high velocities and can result in serious injury, or death.</p>
	<p>Caution! For questions regarding installation procedures or technical support, call Troyka Med Service team or contact via email at info@troykamed.com.</p>
	<p>Caution! Only system components explicitly designed for use inside the MRI suite should be placed inside the magnet room. Components not designed for MRI use may present a projectile hazard and can become airborne, causing serious injury, damage or death.</p>

2 General Information

2.1. Inspection of Delivered Goods

Each of MRI Box camera has been thoroughly tested prior to deliver and is ready for immediate use. Upon receipt, please report any transportation damage or missing accessories immediately. Troyka Med can only accept liability for such damages if it is claimed prior to initial operation. In case of transportation damage, please contact the Troyka Med service department. For faster support please have ready all shipment details



Box camera serial number and damage description. It is recommended to keep and store the original crate/box used to ship the com camera for all future transportation needs.

2.2 Power Connection Information

The MRI Box camera operates on the line voltages 90-250V AC and 50/60 Hz. It is not necessary to double check line voltages or change any fuses. The equipment should be near the power outlet in the technical room of MRI and the outlet should be easily accessible.

Stabilizing circuits ensures satisfactory performance within supply variations specified. If the supply voltage in your location is not 90-250V AC, please consult your Troyka Med Sales or Service office.

Always use the power supply cord supplied in the original shipping carton.

If the enclosed power cord could not be used due to a different standard in your country, use a power cord that conforms to the following regional standards:





United States (UL)	United KingBox (BASEC/BS)
Germany (VDE)	Switzerland (SEV)
Canada (CSA)	Japan (MITI)

In other regions, please use an AC power cord that complies with the country's safety regulations.

In order to prevent electrical hazard, the cord set must use a three-core cable of at least 6A/0.75mm², and have an earth ground contact on both the free socket and the plug. If the main cord is damaged, use only an original replacement cable.

3 System Overview and Installation Guide

3.1 Parts Included

1	MRI conditional Box camera	
2	MRI room power cable (10m cable) <i>Please contact for other length requirements.</i>	
3	MRI room coaxial cable (10 m cable) <i>Please contact for other length requirements.</i>	
4	MRI Filter: 9 Pin D-Sub LPF with EMI gasket	








5	MRI BNC filter	
6	Box camera interface box (with 30 m coaxial cable) <i>Please contact for other length requirements.</i>	
7	Power cable	
8	DVR unit	
9	Monitor: 17" LED monitor <i>Please contact for other options.</i>	

Table 1: MRI Box camera system list of components

3.2 System Overview

Our MRI compatible cameras are designed to view and record video images of objects in an MR scanner. The camera can be used to view patient in MRI scanner or overview MRI room.

The T-290 MRI Box Camera System is designed to be MRI conditional and is manufactured and tested to the highest standards. The camera system is designed to be used with all MRI scanners up to 3 Tesla magnetic field strength.

A picture of MRI conditional Box camera is given in Figure 1. The camera can be used both on the wall or ceiling mount position and the angle of view could be adjusted to any possible position. The camera has 5-50 lens. This high focus capability of the camera gives users an ability to focus camera to any desired position even from long distance. Embedded IR LED provide high image quality even in a low light environment. 2 MP sensor provides high image quality.



Figure 1: MRI Conditional Box Camera.

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3.3 Technical Specification

Camera	
Image Sensor:	2MP CMOS Image Sensor
Signal System:	PAL/NTSC
Effective Pixels:	1944(H)×1092(V)
Min. Illumination:	Color : 0.01 Lux @(F1.2,AGC ON) B/W : 0.001 Lux @(F1.2,AGC ON)
Shutter Time:	1/25(1/30) s to 1/50,000 s
Lens Mount:	C/CS Mount
Auto Iris:	DC Drive
Day& Night:	IR cut filter with auto switch
Wide Dynamic Range:	120dB
Video Frame Rate:	1080p@25fps/1080p@30fps
HD Video Output:	1 Analog HD output
Synchronization:	Internal Synchronization
CVBS Output:	1Vp-p Composite Output(75Ω/BNC)
S/N Ratio:	More than 62 dB
Up the Coax:	Support
General	
Operating Conditions:	-30 °C ~ 60 °C (-22 °F ~ 140 °F) Humidity 90% or less (non-condensing)
Power Supply:	12 VDC±15% -A: 12 VDC±15%, 24 VAC±15%
Power Consumption:	Max. 4W -A: Max. 6W
Communication :	Up the coax Protocol: HIKVISION-C(Coaxitron)
Dimension:	69.2×57.3×148.7mm(2.7" × 2.3" × 5.85")
Weight:	520 g

3.4 Installation

3.4.1 Installation Diagram of MRI Video Camera in Magnet Room

A representative drawing is showing the layout plan of the MRI video camera is given in Figure 2. The camera shown in Figure 2-1 depending on the customer requirement could be installed to any place inside MRI room. The video signal cable and 9 pin cable shown in the Figure 2-2 and 3 must be connected to the penetration panel. Most of the MRI scanners has BNC and 9 pin filters available on the penetration panel. If there is no available filter on your penetration panel use the ones included in your package (Table 1- 4 and Table 1-5).

The interface box must be placed in the cabinet room. The female 9 pin connector of the interface box must be connected to the male connector of the 9-pin filter (Figure 2-5) of the penetration panel the video signal cable must be connected to the BNC filter. The power cable of the interface box must be connected to the power outlet. The 30m video signal cable of the interface box must be connected to the video processing unit in operation room. Using VGA cable connects the video interface unit to the monitor and the system will be ready to use.



In order to power on the camera, turn on the power switch which is available on the interface unit (Figure 2-9).

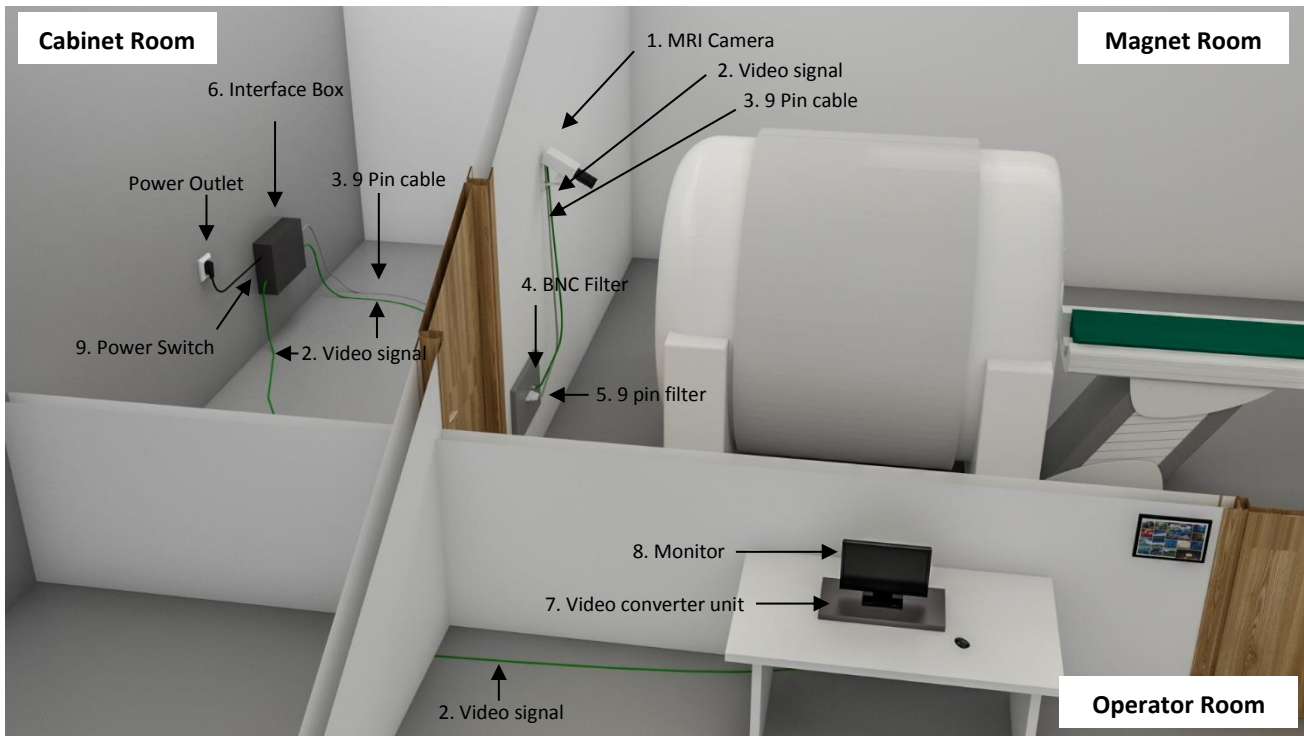


Figure 2: MR conditional Box type video camera installation diagram.

4. Maintenance and Disposal

4.1 Cleaning Information

Dust and other matter that collect on the camera may eventually degrade image quality. Such matter should be removed from the top of the camera with a damp cloth.



Warning

Unplug all power connections before cleaning.

4.1.1. Monitor Surface

Dampen (do not saturate) a clean, lint-free cloth with environmentally friendly glass cleaner. The cleaner contains spirit as an active substance (up to 98%) and tensides, which can be biologically recycled. Clean the monitor screen using circular motions with the cloth to avoid streams. Remove fingerprints, grease, dirt, and dust. Carefully dry the screen with a second, lint-free cloth.

4.1.2. Camera Surface and wires

Use a cloth with disinfectant to clean the camera body and wires. Remove fingerprints, dirt, grease and dust.



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