idi
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Operator Manual

Monitor Cart with 32″ HD, 32″ 4K or 27″ Touch Monitor w/Recorder

The text of this manual was originally written, approved and published by the manufacturer in English.

Made in the USA with global components

Overview

This manual pertains to the specified devices only and does not intend to replace or substitute for certified training in the application of this equipment. The device is intended for qualified medical personnel who have been trained in the use of medical equipment.

Owner Responsibilities

The owner of this device is responsible to ensure system compatibility, the qualifications of the operator and maintenance personnel. The operator must be properly trained and have obtained credentials from the appropriate authorities.

This equipment must be installed in an area provided with the proper electrical power.

The owner of this device is responsible for verifying continued compliance with all applicable regulations and standards. Consult local, state, federal and/or international agencies regarding specific requirements and regulations applicable to the use of this equipment.

Image Diagnostics, Inc. certifies only the equipment. After-sale operating practices and safety are the responsibility of the owner and operator. Image Diagnostics, Inc. assumes no liability or responsibility for after-sale operating or safety practices; nor can it be responsible for personal injury or damage resulting from misuse.

Never make modifications or adjustments to the equipment unless directed by a qualified Image Diagnostics representative. This equipment, when properly assembled, meets US federal regulations and standards. Unauthorized modifications to the equipment may impact adherence to these standards and make the equipment unsafe to operate.

Customer Support

Image Diagnostics will make available, on request, circuit diagrams, component part lists, or other information which will assist the user's appropriately qualified technical personnel to repair those parts of equipment which are designated by the manufacturer as repairable.

For technical assistance, call IDI at (978) 829-0009. Be prepared to give the complete model and serial number found on the data plate on lower side of the Monitor Cart column at the time of contact.

Image Diagnostics, Inc.
310 Authority Drive
Fitchburg, MA 01420 USA

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1. Symbol Identification



Attention! Consult accompanying documents.
Failure to follow these instructions could cause serious personal injury or damage to equipment.



Read the Manual

IEC 60601-1

Intertek
60563

Intertek testing house

Alternating current.



Device Serial Number Label with UDI Barcode



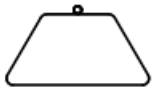
Warning! Information or instructions shown near this symbol must be adhered to in order to prevent a potentially hazardous situation which if not avoided, could result in death, personal injury or damage to the equipment.



Electric Shock hazard. Information or instructions shown near this symbol must be adhered to in order to prevent a potentially hazardous situation which if not avoided, could result in death, personal injury or damage to the equipment.



Recyclable material, some material can be recycled rather than discarded



Maximum allowable Weight Limits.

REF

Model of Monitor Cart.



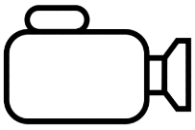
Serial Number of Monitor Cart.



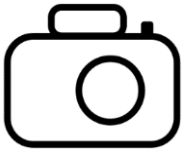
Date of manufacture of the device.



Location where device was manufactured.



Record Video.



Capture Image.

2. Intended Use

The Monitor Cart is intended to be used in the medical procedure room as a secondary monitor. It is intended to allow professional healthcare industry to connect their video output signal to the monitor on the cart. It has been designed to be a totally mobile solution for video display of images from C-arm fluoroscopy, endoscopy, patient monitoring, or similar devices. The Monitor Cart 27R version is equipped with a recording unit to capture video and photo images from the C-arm.

The Monitor Cart is **NOT** intended to contact patient. It is **NOT** intended to supply power to electrocautery equipment. The Monitor Cart has not been tested in an oxygen rich environment and should not be used in such an environment. The Monitor Cart has **NOT** been tested for use with HF surgical equipment, nor cardiac defibrillator.

3. Safety



Review the SAFETY HAZARDS and OPERATING INSTRUCTIONS before operating video transmission unit

- ✓ All persons using this equipment must fully understand its operation instructions, emergency procedures, capabilities be aware of all potential safety hazards.
- ✓ This manual should be accessible to all personnel installing, operating, or servicing this equipment.
- ✓ Only a qualified technician may install or service this equipment.



Failure to follow safety precautions may result in serious injury to patient or user or damage to equipment.

It is imperative that all personnel operating the Monitor Cart be familiar with the equipment operation, transport and all documentation supplied by IDI.

- The Monitor Cart is intended to be used in typical clinical or research environments in accordance with national standards.
- When transporting the Monitor Cart from room to room, it is imperative that the device be moved in the storage position which is with the monitor rotated to be parallel to the cart's column. Additionally, the monitor should face the same direction as the shelf during transport.
- When in use, the Monitor Cart should be plugged into a medical grade electrical outlet.
- The Monitor Cart does not have any essential performance functions that pose a risk due to failure or degradation of the unit or any of its components.

Comments and questions regarding safety should be addressed to:



Customer Support
Image Diagnostics, Inc.
310 Authority Drive
Fitchburg, MA 01420 USA



Or call IDI at (978) 829-0009.

4. Safety Hazards



CAUTION!
Do NOT store or place liquids on shelf or above any electrical devices.



WARNING!
Do NOT jump any curbs or steps over 3/8" (10mm) in height with this equipment. Approach all obstacles slowly. Operator must use a ramp to allow the casters to roll up and over the vertical edge for over 3/8" (10mm).



WARNING!
It is the user's responsibility to make sure the equipment is safe and operates properly prior to use.



WARNING!
Connecting any electrical equipment to the socket outlets of the Monitor Cart creates a new ME (Medical Electrical) Equipment unit possibly resulting in a reduced level of safety. Once this is done, the responsible organization must refer and comply to the standard IEC 60601-1.



WARNING!
Do not modify this equipment without authorization of the manufacturer.



CAUTION!
Caution should be used when moving the system over uneven or sloped surfaces.



WARNING!
To avoid the risk of electric shock, this equipment must only be connected to a supply main with protective earth.

EMC (Electromagnetic Compatibility) Statement

This equipment may generate and use radio frequency energy. The equipment must be installed and used according to this manual in order to avoid radio frequency interference.

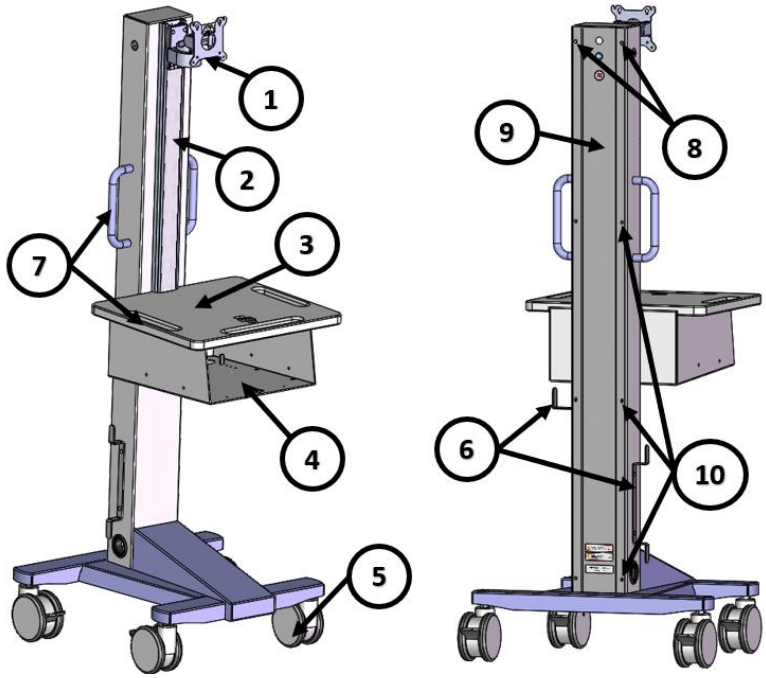
Portable and Mobile RF Communications Equipment can affect Medical Electrical Equipment including the Monitor Cart. Use special precautions regarding EMC when these carts are installed with any external accessories, maintained or operated adjacent or stacked with other equipment. The equipment or system must be observed to verify normal operation in the final configuration in which it will be used.



The use of accessories, transducers and/or cables other than those specified, with the exception of those sold by the manufacturer as replacement parts for internal components, may result in increased emissions or decreased immunity of the equipment or system.

If this equipment generates or receives interference, verify that the equipment is the cause by turning the system off and on.

5. Basic Setup Instructions



*(Monitor and Recorder hidden for clarity)

Item	Description	Qty
1	VESA mount	1
2	Cable Channel	1
3	Work Surface	1
4	Shelf	1
5	Locking Casters	4

Item	Description	Qty
6	Cable Wrap	2
7	Side Push Handles	2
8	Locking Screws	2
9	Rear Cover	1
10	Keyslot	6

Electronics Installation

The cart's power cord must be plugged into a hospital grade power outlet. The rear cover of the unit must be installed and secured prior to use. To remove cover, loosen the two screws on the back of the column and slide the cover upwards. To install cover, slide the cover into the 6 key slot holes then install the two screws to secure the cover to the column.

All electronic devices are to be installed according to their perspective manufacturer's user manuals. **The Monitor Cart 27R has an HD recorder that is installed and ready for use with a touch screen monitor.**

When installing electronic accessories or placing other items on the work surface, verify that the equipment is fully secured prior to moving the cart. Failure to secure equipment to the shelf may result in injury and/or damage to the equipment.



Do NOT plug cauterization device into cart. Plugging a cauterization device into the internal power strip may cause device malfunction. Plug a cauterization device into a separate wall outlet. A separate branch circuit may be needed.



Always position the cart in a way that the electrical outlet and its power cord it is plugged into can be easily accessed in the event that it needs to be disconnected quickly.

Video Cables

The Monitor Cart is equipped with an industry standard HDMI cable. A HDMI to DVI adapter is provided to assist with connecting to proper video output cables. When connecting video cables do NOT use excessive force to join cables. If there is a large resistance this means that the connectors are not compatible, as connections should be easily assembled.

Shelf capacity

The work surface and shelf have 20lb (9.1 kg) weight capacity each, do NOT overload these surfaces.

Moving and Positioning the cart

The cart is equipped with 4 locking casters that can be individually locked to prevent movement during use.

To move the cart, unlock all 4 casters then use the side push handles located on the main column or the work surface. Do NOT move the cart by pulling on the monitor.

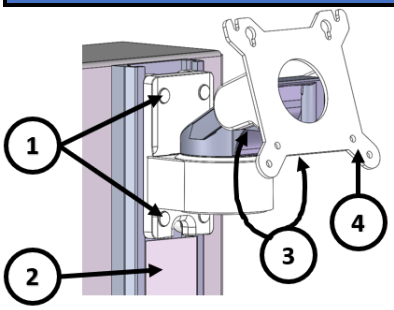


Do NOT move cart over cords or uneven, soft or sloping surfaces. Failure to comply may result in cart instability leading to equipment damage or personal injury.



Use handles to move cart with the help of an assistant to avoid collision with other equipment and walls.

6. Instructions for Operation



Item	Description	Qty
1	Set Screw	4
2	Cable Cover	1
3	VESA mount	1
4	Tension Screw	2

Adjusting Monitor height, rotation and tilt

The cart is equipped with a VESA mount plate that will accept either a 100mm x 100mm or 75mm x 75mm mounting hole pattern. The monitor is capable of tilting upward or downward. Additionally, the monitor is capable of rotating about its vertical axis.

When adjusting the vertical height of the monitor it is recommended to use two people to prevent the monitor from sliding, which may cause injury or damage to equipment. Items that are on the work surface are required to be removed prior to adjusting to prevent any possible injuries or damage to equipment. Verify that the casters have been locked before starting any adjustments to the monitor. To adjust the vertical height, hold the monitor while a second person removes the cable cover on the aluminum channel. To remove the cable cover, pull the top edge out, then gently squeeze the two sides until it starts to pull out of the channel. Work from top to bottom pulling the cable cover out of the channel. Loosen but do not remove the 4 set screws on the monitor bracket. Position the monitor to the desired height and re-tighten the 4 set screws on the monitor bracket. The monitor should be fully secured so that it does not move during transport. Verify that the monitor is secure by gently pulling downward on the monitor and verify that the monitor mount does not move. In most cases the cable cover will need to be cut to a shorter length, this can be done using a hacksaw. It is recommended to save any cut pieces for future use. Once the cable cover is cut to size, re install the cover by putting the left side of the cover into the left side of the channel slot then gently squeezing the right side and snapping into place. Start at the bottom and work your way up.

When adjusting the monitor, it is recommended to lock the casters in position so that the cart does not move inadvertently. To adjust the tilt of the monitor, grab the top and bottom of the monitor and gently tilt the monitor forward or backward to the desired position. To adjust the rotation of the monitor, grab the left and right side of the monitor simultaneously and gently adjust rotation to desired position.

Depending on monitor weight, the tension may need to be adjusted to allow for easier movement of the monitor. To adjust this, rotate the tension bolt clockwise to add tension, rotate counterclockwise to reduce tension. The tension must be enough to hold the monitor up by itself. Do NOT loosen the tension so that the monitor rotates down on its own. Move the cart around the room to verify the monitor still can hold itself up, otherwise add more tension to the bolts.

Using the touch screen monitor and recorder (27R version only).

The device is provided with a touch screen monitor. The touch screen is connected to the recorder so that commands entered on the screen will be sent directly to the recorder. Menu buttons are located on the lower right-hand corner of the monitor. Please refer to its user manual for additional instructions of menu keys.

It is the responsibility of the user to follow any and all local laws or regulations related to patient data stored on the device. If the unit is sent back for service, all data must be cleared on all storage mechanisms prior to shipping. Data can be cleared by referencing the instruction for use manual. IDI does not accept responsibility for units that are sent back with data stored at them and will be returned at the owners cost to properly remove data from all storage types.

The base unit with recorder is standard with a HD recorder. Some available options for upgrades include 4k recording, network connectivity, wireless keyboard, tablet. These upgrades can be purchased at any time, but it recommended to specify during initial purchase. Additionally, electronic kits are available to be compatible with SDI video inputs and 9800/9900 style C-arms. These can also be added on at any time.

Any device that is equipped with an HD recorder, will be capable of recording up to 1920x1080p 60 frames per second (fps). Optional upgrade to 4K recording will record up to 3840x2160p 30fps. Any devices without the 4K upgrade will record 4k input sources in a downscaled 1920x1080 format. Units with the network capability will allow the device to connect with the facilities patient network for easy download of patient information and upload of files to network.

To start using the recording device select the start button on the main page and enter in the patient data, press done to start case. To record video there are a few options: press the video record button on the front face of the recorder device, the left pedal on the footswitch, the record button on the remote, or the record button on the touchscreen monitor. To stop the recording press the record button a second time. A blinking light on the front face of the recorder will notify the user that the device is recording. To capture an image on the screen, press the Capture button on the recorder, the right pedal on the footswitch, the capture button on the remote or the capture button on the touchscreen. Each subsequent press of the button will capture a new image.

If two sources are connected to the recorder at the same time, the recorder can switch between the two video inputs via the manual switch button located on the left-hand side of the screen. When recording or doing image capture it will only capture the active video/image shown on the screen.

At the conclusion of the case press the end button located in the lower right-hand corner of the screen. This will bring the user to a new screen to review images and recordings or close the patient case.

To review images, press the review button. Each image capture can be reviewed. Video can be replayed. During replay, still images may be saved as its own image. Still images can then be

annotated by hand with hand drawn sketches and or annotation text. These annotations will need to be saved by pressing the save button in the right-hand side. Lastly still images can be zoomed in on by taking two fingers and pressing on the screen and swiping away from each other to zoom into specific areas. Zoomed in images can also be annotated and saved. When saving a image both the original and the annotated version will be saved.

At the conclusion of viewing images, press the finish button in the bottom right-hand side, and then hit finish. This will save all images videos, annotations to the patient's folder. To append a patients file, simply select the folder and press amend on the right-hand side. This will allow for additional images to be taken or adding notes to the existing images taken.

For additional specifications and directions please refer to the user manual provided with the recording unit, monitor or contact Image Diagnostics for more information.

7. General Cleaning

Tools: Soft cloth and approved cleaner:

- Sodium hypochlorite (generic household bleach) in a solution of 5.25% sodium hypochlorite diluted between 1:10 and 1:100 with water.
- Alcohol (generic).
- Envirocide. ™

Notes:

- For the cleaning of monitor or electrical equipment, please consult corresponding literature for these devices.
- NEVER use alcohol to clean the monitor.

Procedure:

1.1. Unplug the cart prior to the cleaning process.
1.2. Wipe clean the surfaces of the system with a diluted mixture of mild detergent (listed above) and water, using a soft cloth.
Use a soft cloth to dry any stainless-steel items.

Monitor Cleaning Only

Precautions

- Turn off monitor and unplug power cord.
- Take care not to damage or scratch the front filter or LCD panel.
- Be careful with rings or other jewelry that can touch the front filter.
- Do **NOT** apply excessive pressure on the monitor screen.
- Do **NOT** apply or spray liquid directly to the front filter, panel or cabinet as excess liquid may cause damage to internal electronics. Instead, apply the liquid to the cleaning cloth.
- Follow your hospital or clinical protocol for the handling of blood and body fluids.
- The display is not disinfected nor packed in sterile environment.
- Follow your hospital or clinical protocol in instances that need the display disinfected prior to installation.
- Cleaning guidelines for displays must only be carried out by medical professionals and must not be handled by patients.
- For complete cleaning instructions please reference the user manuals provided with the monitor and/or recorder units.

- The following products are tested and approved for FSN monitors and recorder:
    - Bohle Glass Cleaner
    - Cabinet Only - Precise Hospital Foam Cleaner disinfectant
    - Cabinet only - Virex Ready to use disinfectant cleaner
    - Household bleach (generic sodium hypochlorite, solutions of 5.25% sodium hypochlorite, solutions of 5.25% sodium hypochlorite diluted with water between 1:10 and 1:100)
    - Incidin Foam (Ecolab)
    - Isopropyl alcohol with concentration <5%
    - Klear Screen
    - Microzid
    - Mild Detergent
    - Misty Clear Lemon 10 Disinfectant
    - Screen TFT (Kontakt Chemie)
    - ZEP Heavy Duty glass & all surface Cleaner

DO NOT USE:

- Acid
- Alcohol/solvents at higher concentration >5%
- Cloth with steel thread
- Detergents with abrasives, ammonia or flouride
- Sponge with abrasives
- Steel blades
- Steel wool
- Strong alkalis lye, strong solvents
- Synthetic (polyester) cloth

Cart Chassis Cleaning

Proceed as follows:

1. Clean the chassis using a soft cotton cloth, lightly moistened with a recognized cleaning product for medical equipment.
2. Repeat with water only.
3. Wipe dry with a dry cloth.
4. Cabinet has been tested for resistance to the following products:
    - Virex Ready-to-use Disinfectant Cleaner
    - Misty Clear Lemon 10 Disinfectant
    - Bohle glass cleaner
    - Zep Heavy-duty glass & all surface cleaner
    - Klear Screen
    - Screen TFT (Kontakt Chemie)
    - Incidin Foam (Ecolab)
    - Microzid
    - Mild detergent
    - Isopropyl alcohol with concentration < 5%
    - Household bleach (generic sodium hypochlorite, solutions of 5.25% sodium hypochlorite diluted with water between 1:10 and 1:100)
    - Precise Hospital Foam Cleaner Disinfect

8. Service & Repair

On this device there are no serviceable parts.

For repairs or replacement of components, please contact Image Diagnostics for Service and Repair at:



Customer Support
Image Diagnostics, Inc.
310 Authority Drive
Fitchburg, MA 01420 USA



Or call IDI at (978) 829-0009.

9. Maintenance

All maintenance procedures should be done by an experienced and qualified technician with demonstrated knowledge and skills (electrical and mechanical) in the service of medical equipment.

- ✓ This individual must have access to this manual and the proper tools.
- ✓ Lubrication of this device is *not* required.

RECOMMENDED PERIODIC PERFORMANCE CHECKS

Daily (Prior to use)	***Inspect all external cables, and casters. Replace damaged cables promptly.***
Quarterly	***Check two tension bolts on VESA mount, adjust to monitor as needed.***

10. Disposal of Components



The Monitor Cart is constructed mostly of steel, aluminum and copper which are easily recycled. Some components can be disassembled before recycling.

COMPONENT	ITEM	RECYCLING GROUP
Chassis	Column and base	Metal (Steel and Aluminum)
Casters	Locking caster	Metal Plastic
Cables	Windings	Copper

11. Specifications

Mode of Operation

- For continuous use

Type of Equipment:

- Class I (as defined by IEC 60601-1, 3rd Edition)
- CENELEC EN 60601-1
- IEC60601-1 3rd Edition

Electrical:

- Supply Voltage:
- 120±5% Vac 60Hz through NEMA 5-15P Hospital Grade Plug
- 230±10% Vac 50Hz through country specific plug
- Output Voltage: 120 VAC 60Hz (1800VA) or 230 VAC 50 Hz (1800VA).
- Current Rating: Less than 7 Amps @ 120 Vac or 4 Amps @ 230 Vac

Environmental:

- Operating Temperature Range: +32°F to +104°F (0°C to +40°C)
- Operating Humidity Range: 30% to 75% relative humidity, noncondensing.
- Operating Pressure Range: 700 hPa to 1060 hPa.
- Transport & Storage Temperature Range: -4°F to 131°F (-20°C to +55°C).
- Transport & Storage Humidity Range: 10% to 85% relative humidity, noncondensing.
- Transport & Storage Pressure Range: 700 hPa to 1010 hPa.
- **NOT suitable for oxygen rich environment**
- **NOT suitable for flammable anesthetic mixtures**

Product features included with Monitor Cart:

- Medical grade outlet strip for monitor & ancillary power.
- Individual cables for monitor power and video input.
- Detachable 20-foot (6m) AC power cord.

Physical Characteristics:

- Steel Frame with height adjustable monitor
- 30" (76.2cm) wide x 27" (68.5cm) deep footprint of the base.
- The height of the unit from the floor to the top of the monitor at its lowest position for shipping is:

  32" 4K = 59.5" (151.1cm)

  32" HD = 62" (157.5cm)

  27" R = 60" (152.4cm)
- The height of the unit from the floor to the top of the monitor at its highest position is up to:

  32" 4K = 71.38" (181.3cm)

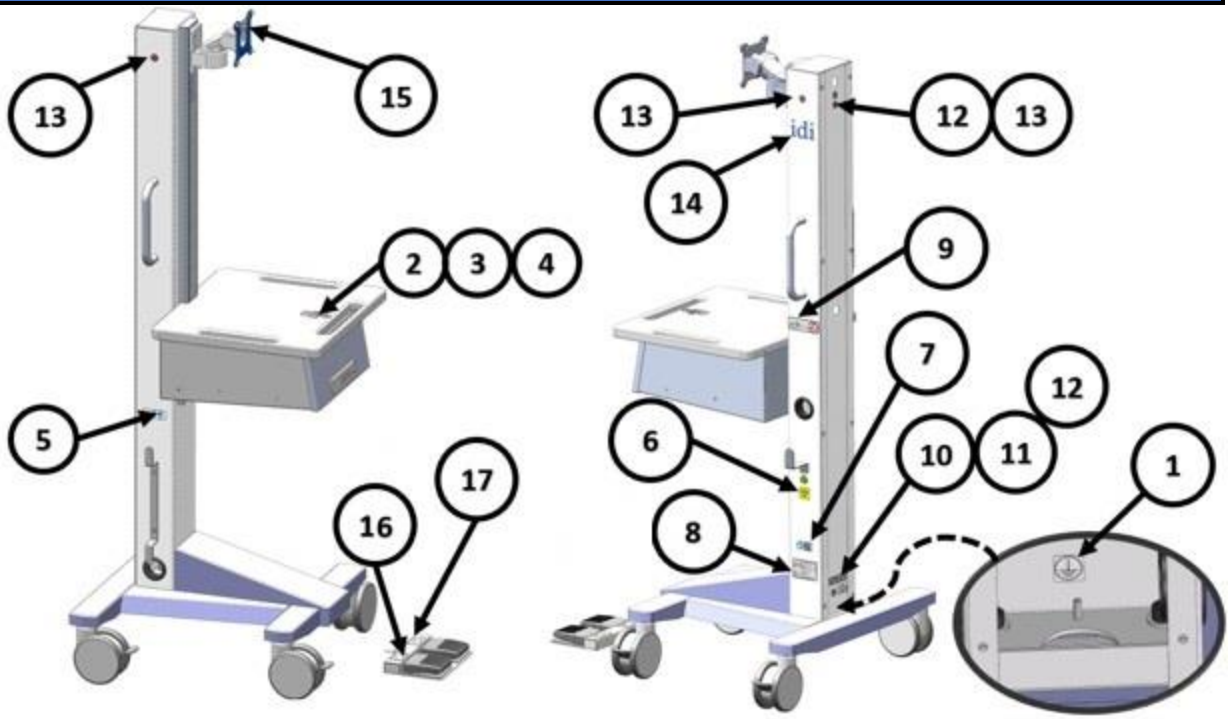
  32" HD = 70.63" (179.4cm)

  27" R = 70.63" (179.4cm)

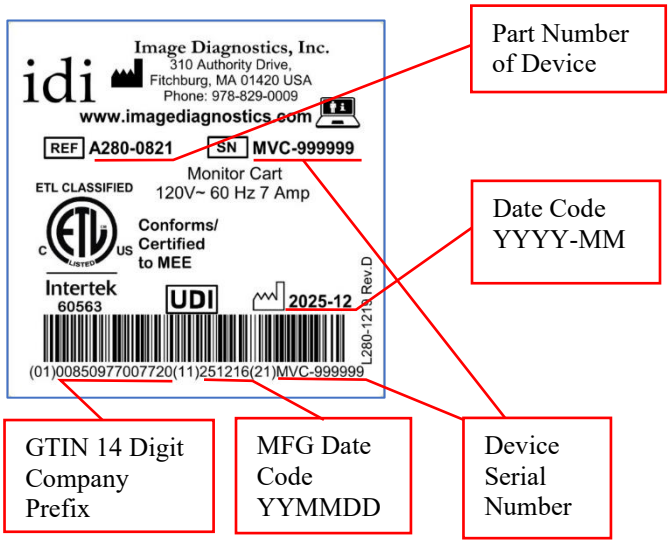
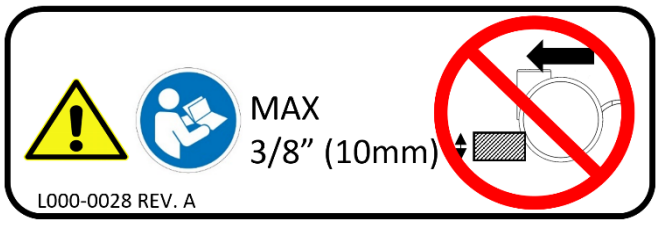
Typical Positions of Operator during use:

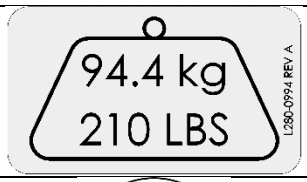
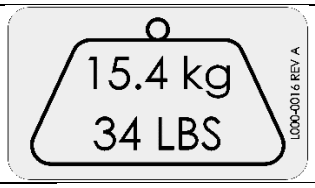
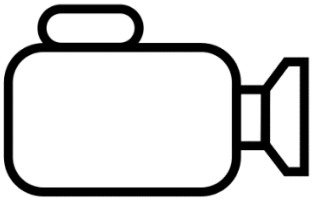
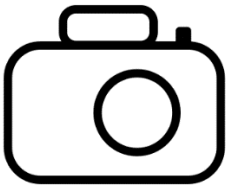
- In front or side of the cart to move monitor, accessing the shelves and operating any of the controls located on the front panel.
- On the side of the cart when transporting cart or locking/unlocking caster locking feature.

12. Label Identification



Item No.	Part No.	Description	Qty.	Label
1	D100-856	Protective Ground. This is the common tie point between the AC cord ground, and frame ground	1	
2	L000-0017	Maximum shelf capacity: 9.1KG (20lbs)	2 (32” only) 1 (27” only)	9.1 kg 20 LBS L000-0017 REV A
3	L000-0018	Consult manual Do not store or place liquids on this surface	1	L000-0018 REV. A
4	D100-1249	Do not sit on this surface	1	

5	L000-0029	Connect to properly grounded hospital grade outlet For safety and proper function of equipment, connect power cord to a properly grounded outlet.	1	
6	D100-1298	Equipotential Terminal	1	
7	L000-0035	Scan QR code to access operator manuals online	1	
8	L280-1219	Serial Number Label for Monitor Cart, IDI	1	
9	L000-0028	Warning Do not jump any steps or “Curbs” over 3/8” (10mm) in height with this equipment. Approach obstacles slowly. Operator must use a ramp to allow the casters to roll up and over the vertical edge.	1	
10	L000-0019	Warning Maximum Allowed Continuous Output	1	

11	L280-0994	Maximum system mass	1	
12	D000-1628	Consult manual for instructions for removing rear cover	1	
13	L000-0015	Do not push on this surface, located on 3 surfaces	3	
14	L280-1160	IDI LOGO	1	idi
15	L000-0016	Maximum load capacity for monitor	1	
16	L280-1203	RECORD VIDEO LABEL	1 (27” only)	
17		CAPTURE IMAGE LABEL	1 (27” only)	

13. ME Equipment and Systems

Table 1 per 5.2.2.1.c of IEC 60601-1-2: 2007 for CISPR 11 ME Equipment and ME Systems.

Guidance and manufacturer's declaration –electromagnetic emissions		
The Monitor Cart is intended for use in the electromagnetic environment specified below. The customer or the user of the Monitor Cart should assure that it is used in such an environment.		
Emissions test	Compliance	Electromagnetic environment – guidance.
RF emissions CISPR 11	Group 1	The Monitor Cart 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 A	The Monitor Cart is suitable for use in all establishments other than domestic 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	

Table 2 per 5.2.2.1.f of IEC 60601-1-2: 2007.

Guidance and manufacturer's declaration – electromagnetic immunity			
The Monitor Cart is intended for use in the electromagnetic environment specified below. The customer or the user of the Monitor Cart 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	±8 kV contact ±15 kV air	±8 kV contact ±15 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 (100 kHz repetition frequency)	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 % UT (>95 % dip in UT) for 0,5 cycle 40 % UT (60 % dip in UT) for 5 cycles 70 % UT (30 % dip in UT) for 25 cycles <5 % UT (>95 % dip in UT) for 5 sec	<5 % UT (>95 % dip in UT) for 0,5 cycle 40 % UT (60 % dip in UT) for 5 cycles 70 % UT (30 % dip in UT) for 25 cycles <5 % UT (>95 % dip in UT) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the Monitor Cart requires continued operation during power mains interruptions, it is recommended that the Monitor Cart be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	30 A / m 50 & 60 Hz	30 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 application of the test level.			

Table 4 per 5.2.2.2 of IEC 60601-1-2: 2007.

Guidance and manufacturer's declaration –electromagnetic immunity

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

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz outside ISM bands[a]	3 V	Portable and mobile RF communications equipment should be used no closer to any part of the [ME EQUIPMENT or ME SYSTEM], including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance** $d = \left[\frac{3.5}{V_1}\right]\sqrt{P}$
	6 V in ISM and amateur radio bands between 0,15 MHz and 80 MHz 0.15 MHz and 80 MHz	6 V	$d = \left[\frac{3.5}{V_2}\right]\sqrt{P}$ $d = \left[\frac{12}{E_1}\right]\sqrt{P}$ 80 MHz to 800 MHz
Radiated RF IEC 61000-4-3	10 V/m 80 MHz to 2.7 GHz 80% AM at 1kHz	10 V/m	$d = \left[\frac{23}{E_1}\right]\sqrt{P}$ 800 MHz to 2.5 GHz 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). 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] Interference may occur in the vicinity of equipment marked with the following symbol: 

NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.
NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption 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 Monitor Cart is used exceeds the applicable RF compliance level above, the Monitor Cart should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the Monitor Cart.

b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 1 V/m.

Recommended separation distances between portable and mobile RF communications equipment and the Monitor Cart

The Monitor Cart is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the Monitor Cart can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Monitor Cart 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	1.20	1.20	2.30
10	3.79	3.79	7.27
100	12.00	12.00	23.00

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 800 MHz, the separation distance for the higher frequency range applies.

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

14. Warranty

Warranty details for IDI Products can be obtained directly from Image Diagnostics, Inc.



Image Diagnostics, Inc.
310 Authority Drive
Fitchburg, MA 01420 USA



Or call IDI at (978) 829-0009.