



# Computerized Dynamic Posturography (CDP) Installation Manual (97P-0036-15, 16)



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## System Components

Contents	Qty	Bertec Part #	Note
<b>CDP Base Crate Contents</b>			
CDP Base	1	35P-0056-9	Side rails attached
BP5046 Dual	1	03P-0116-2	Secured in base
E-Stop Pendant	1	36P-0179-1	
PC with video card	1	37P-0003-2	
Touch Screen Monitor	1	37P-0005	
Canon Projector	1	37P-0059-1	
Wireless Remote (Programmed/checked)	1	37P-0029	
Webcam	1		
Projector Power Cable 15'	1	32P-0013	W/Ferrite Attached 32S-0108
15' shielded ethernet cable	1	32S-0056	
Shielded HDMI 15' Cable	1	30S-0358	
CDP Base main power cable	1	30P-0283-1	
Power adapter cable	2		
USB A-B cable	1		
Circuit Breaker Cover	1	02P-0336-1	
Adjustable Foot Cover	1		
6-32 x 3/8 BSC SS	4		
5/16-18 x 1 FSC SS	8	04S-0122	**Bagged together**
3/4-10 Hex Jam Nuts	4	04S-0887	**Bagged together**
1/4-28 x 1.75 SSS	8	04S-0750	**Bagged together**
M5 x 16 FSC	3		--Bagged Together--
M5 T Nuts	3	04S-0759	--Bagged Together--
1/4-20 x 5/8 SHC (for projector)	12	04S-0101	--Bagged Together--
10-32 x 7/8 SHC	2	04S-0011	--Bagged Together--
Projector HDMI strain relief	1	30S-0804	--Bagged Together--
Outlet Cover	4	30S-0972	
3M Large Adhesive Zip Tie Mount	4		
Black Zip Ties	10	30S-0143	
Projector Mount Plate	1	02P-0626-2	
Bertec Logo Plate	1	02P-0661-1	
Projector Lens Cover Plate	1	02P-0659-1	
Harness structure upright (L)	1	03P-0132-1	
Harness structure upright (R)	1	03P-0133-1	
Harness structure crossbar	1	03P-0107-1	
Standard Harness	1	97P-0041	

Harness Drops	1	97P-0033-1	
Frame Legs	4	03P-0162-1	Size large by exception
Frame Feet	4	04S-0827	
Standard Balance Advantage Foam Assembly	1	97P-0076	
PC Cart Cable Harness	1		
Foot Covers for Clinical Systems	1	97P-0079-1	30 Covers per pack
Quick Reference Guide	1		
Manual	1		
Bertec Limited Product Warranty	1		
<b>CDP Screen Crate Contents</b>			
Screen on Assembled Frame	1	035P-0050-3	w/Castors, projector rails, cover installed
<b>CDP Dolly Crate Contents</b>			
Dolly	2		
<b>CDP PC Cart Crate Contents</b>			
PC Cart (assembled, with basket and shelf)	1	35P-0016	
Cart Cable Harness (USB, DVI, Monitor Pwr, Aud)	1		
USB Male to Female cable (hub connector)	1		Mounted on Cart
Wireless Printer	1	37P-0022	Domestic Only
Wireless Keyboard/Mouse	1		
PC Cart Hardware	1		
Touch Screen Monitor	1	37P-0005	

## Tools and Equipment

- Allen key
  - 1/16"
  - 5/32"
  - 3/16"
  - 1/4"
  - 4 mm
- Small flathead screwdriver
- 6 foot step ladder
- Rubber mallet
- Cordless 18-20V drill
  - T25 Torx bit
  - Bit for Dollies (packed in with dollies)

## Shipping Crates



A. Screen Crate



B. Base Crate



C. PC Cart Crate



D. Dolly Crate

## Unloading and Installing the CDP Screen

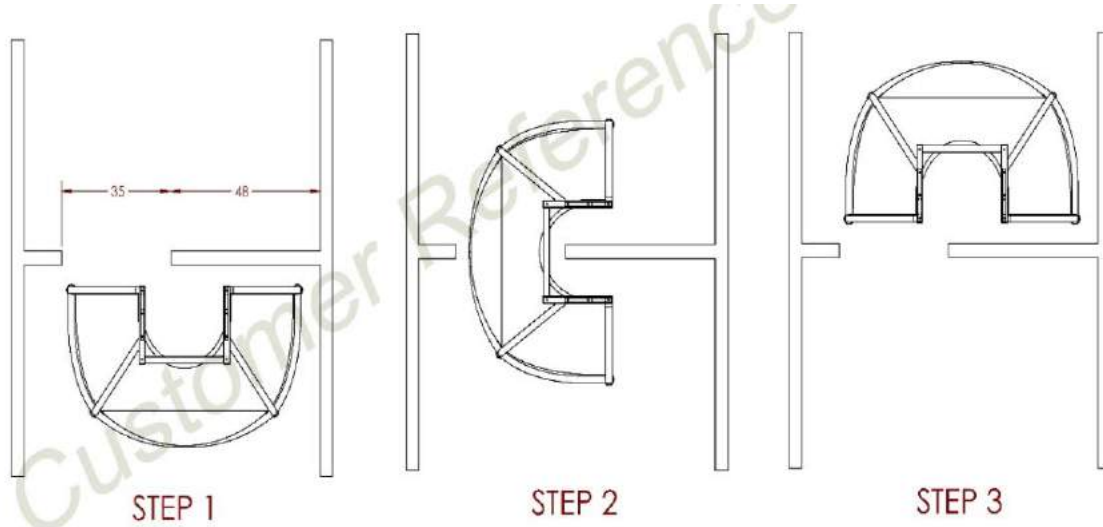
1. Unload the four crates from the truck
  - a. CDP Base Crate
    - i. Remove from truck and position the CDP Base crate so that it is accessible from all sides
    - ii. The CDP Base crate can be unloaded using a 48" liftgate



*Figure 1 - CDP Screen Crate*

- b. Screen crate
  - i. Only handle screen by touching the frame
    1. The inside surface of the screen is sensitive and should not be touched with bare hands
  - ii. The screen is delivered on casters to maneuver into position
    1. \*\* Casters are returned to Bertec in the crate
  - iii. The dome crate should be loaded at the very nose of the truck (closest to the cab) with the OPEN THIS SIDE ONLY sign facing toward the liftgate
  - iv. Liftgate delivery
    1. The Screen crate should not be unloaded via liftgate while the crate is full
    2. Carefully roll screen out of crate
    3. Unload screen using liftgate
      - a. 48" minimum liftgate
      - b. One person should stand inside the dome and hold onto the screen frame

- i. **\*\*Liftgate may initially jerk away from truck \*\***
    - c. Driver should operate the liftgate
    - d. Second person should be on the ground to help stabilize dome as coming down the liftgate. The empty crate can be removed on the liftgate if necessary
  - c. Remove PC Cart Crate from the truck
  - d. Remove Dolly Crate from the truck
    - i. Position close to CDP Base crate
2. Handling the Screen
- a. The inside screen is a gel coated surface, touching it should be completely avoided as it can be scratched
    - i. Scratches and marks on the screen will adversely affect the effectiveness of the equipment
  - b. The screen should be handled by 2 people while maneuvering through buildings
    - i. One person at the front ensuring the front face of the screen does not rub against hallway
    - ii. One person watching the rear of the screen
  - c. Hallways must be minimum width of 48" always
    - i. Use a drop cloth, plastic, or packing foam to protect the screen and screen frame from scratches while moving through narrow or tight spaces
  - d. Maneuvering the screen through a doorway (or into elevator)
    - i. Prepare by reviewing site discovery form
    - ii. The screen will maneuver through a 48" or wider doorway with no issue
    - iii. Doorways smaller than 48" must be at least 35 " wide with a four feet of clear space on both the exterior and interior wall on the side of the door that the screen will wrap around. (Image below for reference)
      - 1. A 4-foot-wide exterior and interior non-obstructed area must be clear of all permanent fixtures like shelves, tables, and sinks. It may be necessary for the customer to have these moved before installation begins.
      - 2. Remove Overhead automatic door closers to allow the door to fully swing open
      - 3. Doors may need to be removed



*Figure 2 – CDP Screen traveling through doorway*

- e. Breaking down screen frame (if required to traverse through tight doorways)
  - i. **NOTE: This process is NOT necessary if the screen can be transported to the final room with the frame attached**
  - ii. The screen frame can be broken down into small components that will fit into spaces with the absolute minimum required hallway and doorway space
  - iii. Lay screen down on its face in front of CDP base using white packing foam between screen frame and ground shown in Figure 3



*Figure 3 - Dome positioned in front of base*



- iv. Remove the Screen Frame Back
  - 1. Remove (8) 1/4-20 x 3/4" SHC using a 3/16" hex tool



*Figure 4 – Back section of split frame*

- v. Remove Screen Frame Top Bar
  - 1. (8) - 10/32 x 7/8" SHC (8) using a 5/32" hex tool



*Figure 5 - Top Section of split frame*

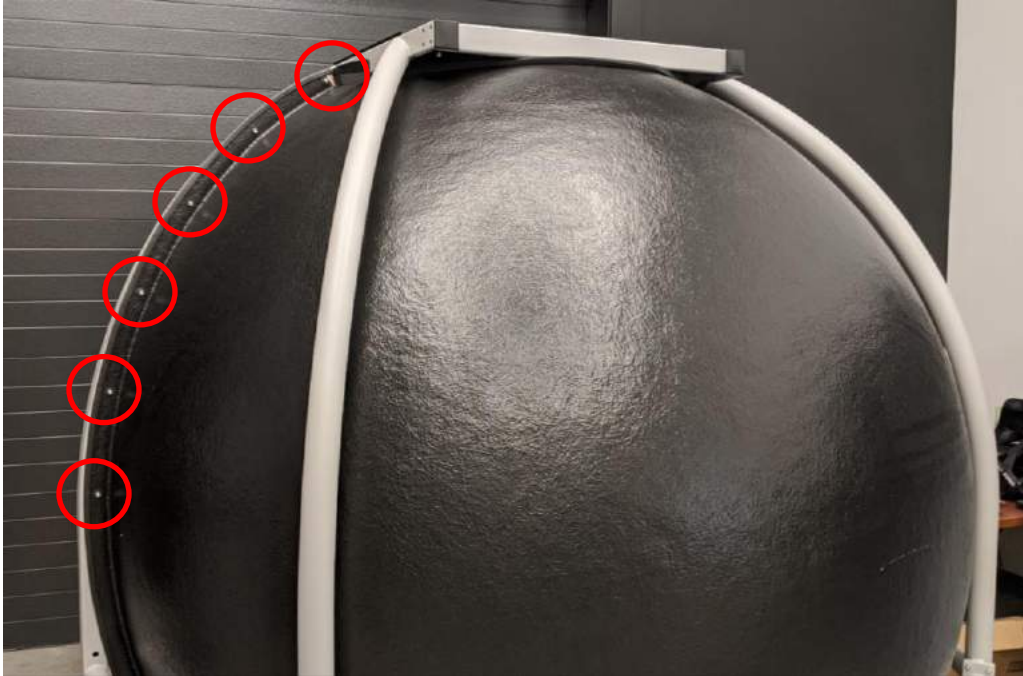
- vi. Remove Back Lens Cover Plate
  - 1. (2) - 10/32 x 7/8" SHC using a 5/32" hex tool



*Figure 6 - Bolt Location for back lens cover plate*

vii. Remove Screen Frame Sides

1. (12) – 1/4 x 1" SHC using a 3/16" hex tool
2. Place loose screen on foam to prevent scratching any surface finishes



*Figure 7 -Location of bolts that secure screen to screen frame*

viii. Carrying screen when not attached to screen frame

1. Carry only by the flange of the screen

f. Maneuvering up stairs

- i. Stairways must be a minimum of 48" wide
- ii. The screen can be lifted upstairs with two or more people (weight 181lbs)

## Unloading and Installing the CDP Base

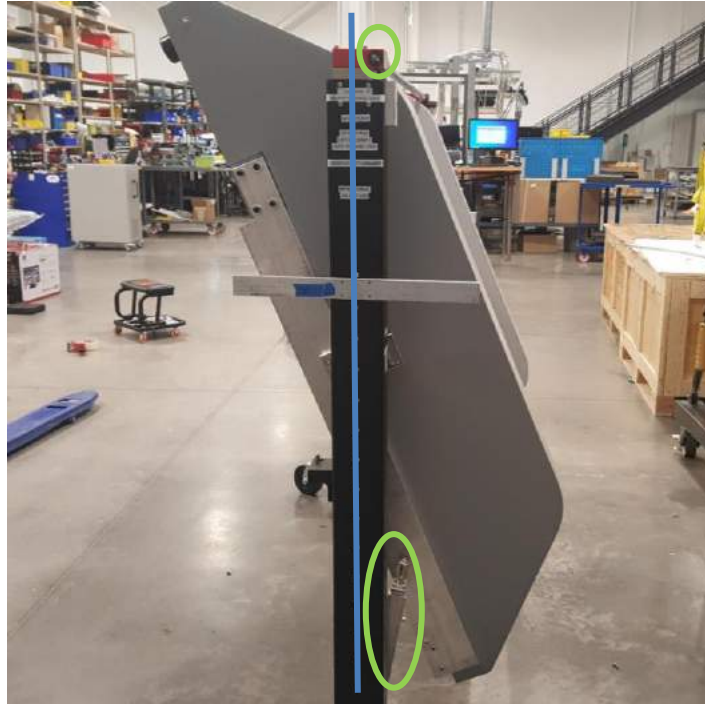


*Figure 8 - Base Crate*

3. Unload the base crate
  - a. Remove the top and all sides of the crates
    - i. Set crates screws aside to put the crate back together after the installation
  - b. Remove all the contents by hand excluding the base

4. Warnings of using the CDP Dollies to move the base
  - a. See videos shared by Bertec
  - b. **NOTE: Not following dolly instructions can lead to unsafe situations for both the installer and the equipment. Be careful, go slow especially when driving the dollies up or down**
    - i. **NEVER allow the dolly lifting shafts to touch the top or bottom of the window that they run in inside the dollies**
    - ii. **Follow instructions to initially attach the stabilizer bar to the top of the dollies initially while lifting, then moving it to the bottom of the dollies when the system is half way raised. NEVER roll the CDP system around without the stabilizer bar at the bottom of the dollies.**
  - c. Getting CDP Base into Optimal Vertical Position
    - i. These dolly instructions should be used IN ADDITION to the dolly instructional videos
    - ii. Attach dollies like normal, making absolutely sure to get the correct dolly on the correct side of the system. This means that the input shaft of the gearbox and the linkage arm at the bottom of the system are on the same side of the dolly, see below (the blue vertical line is the midline of the dolly). Both the input shaft at the top and the linkage arm at the bottom are on the RIGHT side of the dolly midline. As a note, on the other side of the system, they will both be on the LEFT. This should be true whether the system is in a raised position or a lowered position.

5. Attach Dollies to side rails as shown in Figures 9 - 13
  - a. The dolly frame up-rights are labeled as Left and Right, they should each be matched up to the corresponding side rail, also labeled Left and Right
  - b. Line the first dolly up so that the gear box shafts, and the linkage arm are on the same side of the dolly, note that in the picture below the CDP is already attached to the dollies, which won't be the case at this point in the guide



*Figure 9 - Linkage arm and gear box shafts locations*

- c. Roll dolly close to its side rail pair as shown in Figure 10
- d. If necessary, adjust height of lifting shaft if to line up with the bushing
  - i. In most cases the CDP base will be packed with the same set of dollies, so the lifting channel is already lined up vertically with the bushing
  - ii. If you need to raise or lower the lifting shaft refer to step 7b
- e. Lift the gate which partially covers the bushing and position the lifting shaft securely into the bushing as shown in Figure 11.
  - i. The lifting shaft should slide in far enough that the lifting shaft gate can drop back down and lock it in place as shown in Figure 13
- f. Ensure the bushing gate is securely locked down in the lifting shaft





*Figure 10- Initial lining up*



*Figure 11- Lifting gate on bushing*

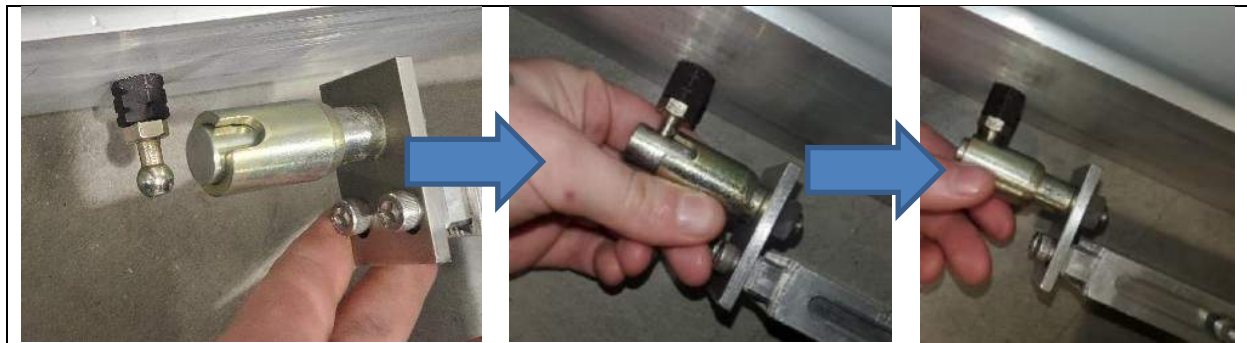


*Figure 12 - Positioning in bushing*



*Figure 13- Lock the gate on the bushing*

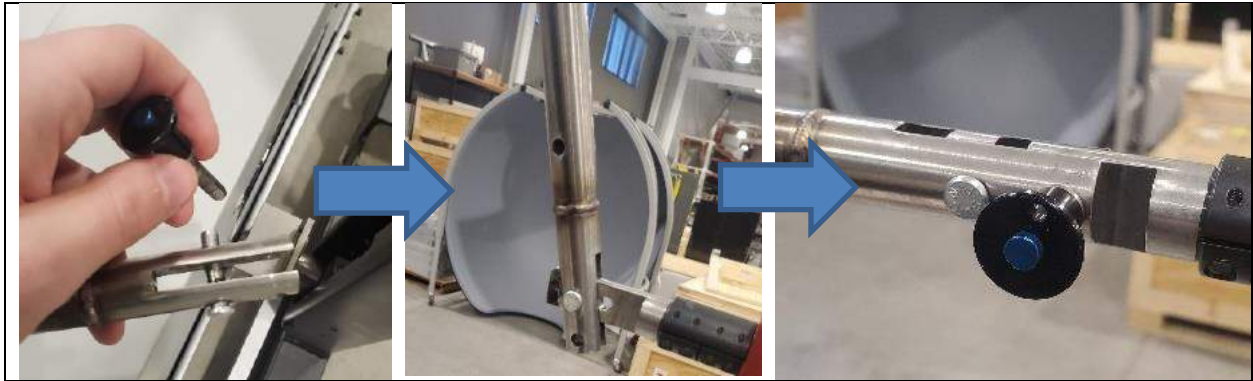
- g. Attached linkage arm to ball joint on side rail as shown in Figure 14
  - i. Slide back the sleeve on the linkage arm
  - ii. The ball end on the side rail will seat in the opening on the linkage arm
  - iii. After the ball is seated in the linkage arm slide the sleeve back in position



*Figure 14 - Connecting Linkage Arm*

- h. Repeat steps 5a – 5g for the other half of the dolly system

6. Connect Dollies to each other as shown in Figure 15
  - a. Attach drive shaft between dollies
  - b. Line the permanent pin on one side of the drive shaft up with the slot in the gearbox hook of one dolly then slide into place and rotate drive shaft down so it is in line with the gearbox hook
  - c. Place drive shaft pin through drive shaft and gearbox hook
  - d. Repeat for other dolly (though the drive shaft will not be able to go in vertically as shown below)
  - e. make sure that both drive shaft pins are fully locked in place



*Figure 15 - Connecting drive shaft*

- f. Attach stabilizer bar between dollies at top of dollies using (4) 10-32 screws with a 5/32" Hex Key as shown in Figure 16



*Figure 16*

7. Raise Dollies
  - a. Warnings
    - i. **DO NOT use a hammer drill or impact driver**
    - ii. Set drill driver on a mid-range torque setting, typically 8 or 9



- iii. Refer to dolly labeling to turn the input shaft the correct direction so that the system raises
- b. Use the included keyed-socket bit with a drill to drive one input shaft as shown in Figure 17



*Figure 17 – Gear box and keyed-socket bit*

- c. When the system is 1/3 of the way raised, move the stabilizer bar to the bottom of the dollies as shown in Figure 18



*Figure 18 – Stabilizer Bar connected to bottom of dollies*

- d. Continue to raise the system using drill
- e. Check frequently to ensure the lifting shafts, Figure 20, DO NOT come in contact with the top of the weldment window, Figure 19. NOTE: This is critically important, as contact between these two elements can lead to damage that could put the user or device in serious harms way



*Figure 19 – Top of Weldment Window*

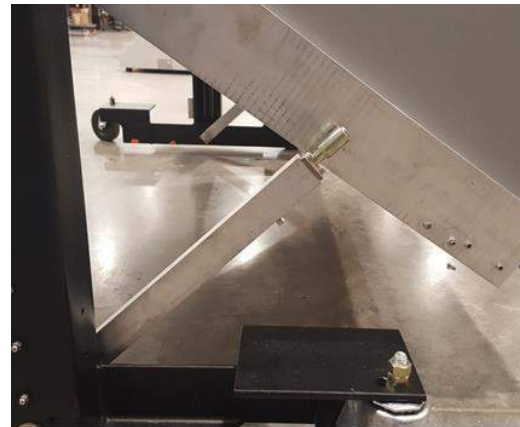


*Figure 20- Lifting Shaft*

- f. While raising, the linkage arm can extend and retract as shown in Figure 21 & 22
- g. The linkage arm should be full retracted to achieve the maximum vertical position
  - i. The linkage arm is retracted by pushing down on the lower end of the CDP Base



*Figure 21 - Linkage Arm Extended*



*Figure 22 - Linkage Arm Retracted*

- h. Continue to drive the system vertically until lifting shafts are close to top of weldment window and the CDP base is close to the drive shaft as shown in Figures 23 & 24



*Figure 23 – Lifting shaft at maximum*



*Figure 24 – Raised to max just before drive shaft interferes with base*

8. The system is now vertical as shown in Figure 25 and ready to safely transport to the installation space
  - a. Minimum opening the dolly can traverse through in this state is 35" wide
  - b. The system should **ONLY** be moved when the stabilizer bar is attached at the bottom of the dollies (reference step 4.c)
  - c. Be careful when moving over uneven ground
  - d. Using two people slowly roll the system into the installation area



*Figure 25 – CDP Base at maximum vertical stance*

9. Positioning in desired installation area
  - a. Position CDP attached to dollies in the desired area
  - b. Lower system using your drill until it is about 1/3 of the way from the bottom of its range of motion
  - c. Remove stabilizer bar and move it to the top of the dollies
  - d. Lower system so that the base is just above the floor and still supported by dollies
  - e. While the base is horizontal and connected to dollies adjust the base into final position
    - i. 4.5" minimum distance from rear of CDP to closest wall or obstruction
    - ii. 12" minimum distance from CDP sides to closest wall or obstructions
  - f. Lower dollies completely until base is firmly resting on the ground.



- i. Ensure the lifting shaft does not go past the end of the weldment window as shown in Figure 26



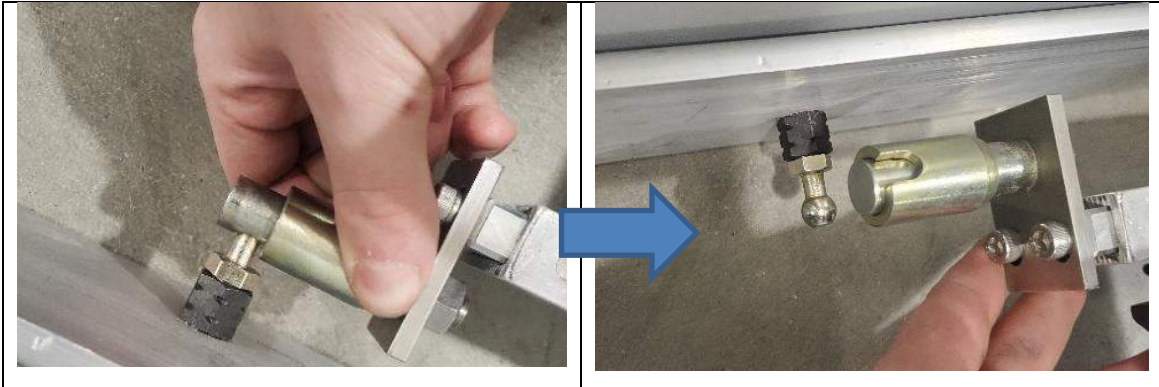
*Figure 26*

- 10. Remove Dollies from side rail
  - a. Remove stabilizer bar
  - b. Remove drive shaft, place pins back in holes at end of shaft for return shipment as shown in Figure 27



*Figure 27 – Drive Shaft ready for packing*

- c. Disconnect each linkage arm as shown in Figure 28



*Figure 28 - Disconnecting Linkage Arm*

- d. On one dolly, make slight adjustments to the height of the lifting shaft until there is just a small amount of weight on the dolly casters.
- i. The lifting shaft will move fairly close to the bottom end of the weldment window, make absolutely sure that it does not hit that end point (see Figure 26).
- e. Lift the locking gate and pull back on the dolly to disengage it from the side rail as shown in Figure 29
- i. You may need to make further adjustments to the height of the lifting shaft at this step.
  - ii. When disengaging the dolly, DO NOT pull on the very top of the dolly as this introduces a large moment on the lifting shaft guide and that should be avoided.
  - iii. Be careful at this step not to lose control of the dolly as it comes off of the side rail as it can tip into the CDP base and scratch the powdercoat



*Figure 29*

- f. Remove the second dolly in the same way

11. Remove side rails from CDP Base

- a. Remove the (4) 5/16-18 bolts using a ¼" Hex Key, circled in red in Figure 30
- b. Loosen the lock nut 2-3 turns to release the foot clamp, circled in red in Figure 31
  - i. DO NOT FULLY REMOVE LOCK NUT
  - ii. DO NOT REMOVE BOLTS AROUND LOCK NUT



*Figure 30 - Side rail bolts*



*Figure 31 - Side rail lock nut*

12. Pack the dollies and side rails

- a. The dollies must be packed the same way they arrived in the crate
  - i. **Not packing properly will result in damage to the dollies**
- b. Follow the pictures to properly package the dollies for return to Bertec.
- c. Never pack the dollies in such a way that would allow any loading on the gear box shafts or the lifting shaft of the dolly
- d. There should be no contact between the two dollies

## Positioning the System in Facility

### 13. Positioning CDP Base

- a. 4.5" minimum distance from rear of CDP to wall
- b. 12" minimum distance from CDP sides to closest wall or obstruction

### 14. Assembling the Screen

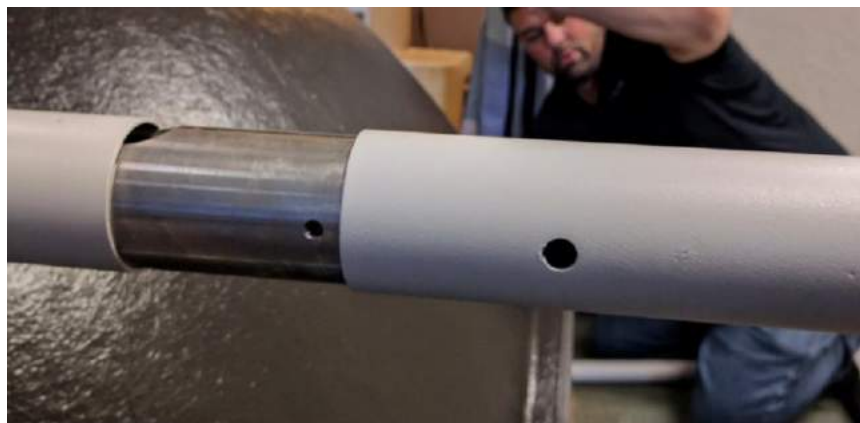
- a. The screen frame is delivered assembled. If broken down to deliver into the building reassemble following the previous steps
- b. Install Screen Frame legs
  - i. Remove casters by pulling them off from the screen frame while the screen is resting flat on the ground
  - ii. Install legs
    1. Screw the feet into the threaded holes on the base of the legs by hand
    2. Make each foot 4" tall



*Figure 32 - Measuring mount feet are screwed into the legs*

### iii. Connect legs to the screen frame

1. Slide feet onto the exposed slotted tube on the screen frame
2. Secure with (4) 1/4-28 x 1.75" SSS (4) using a 1/8" hex tool



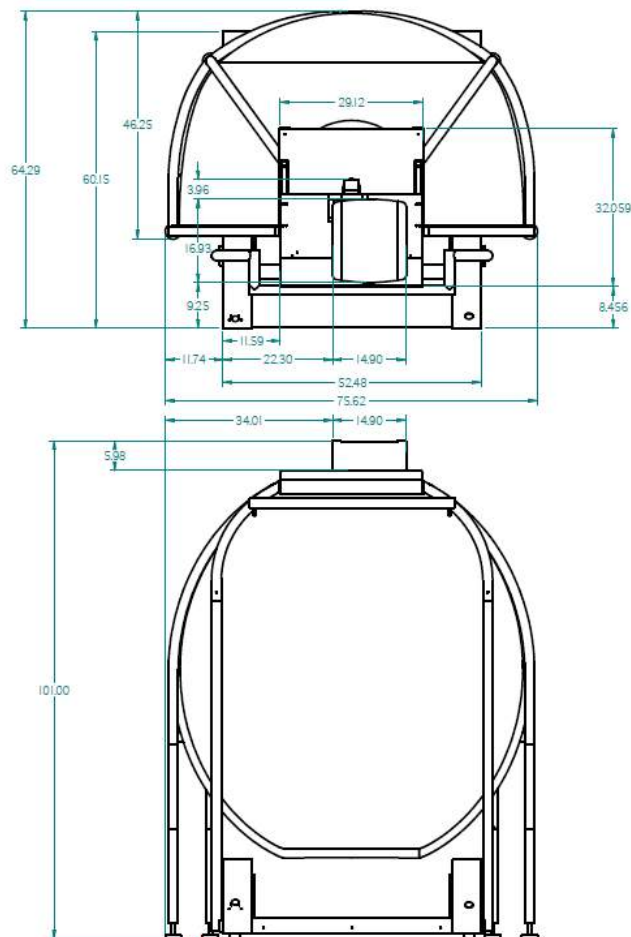
*Figure 33 - Line leg up with insert on screen frame*





*Figure 34 - Line leg up with insert on screen frame*

- c. Lift screen onto its feet and position over base



*Figure 35 - Dimensional Reference of CDP System*

### 15. Position Screen

- a. Distance from front face of dome to middle of overhead structure upright tube is 7.5"



*Figure 36 - Measurement from face of dome to center of overhead structure post*

- b. Distance from side of base to middle of screen frame legs is 9.75" nominal
  - i. There is a lot of play in the legs so small adjusting may need to be made



*Figure 37 - Measurement from side of base to center of overhead structure post*

## Projector Installation

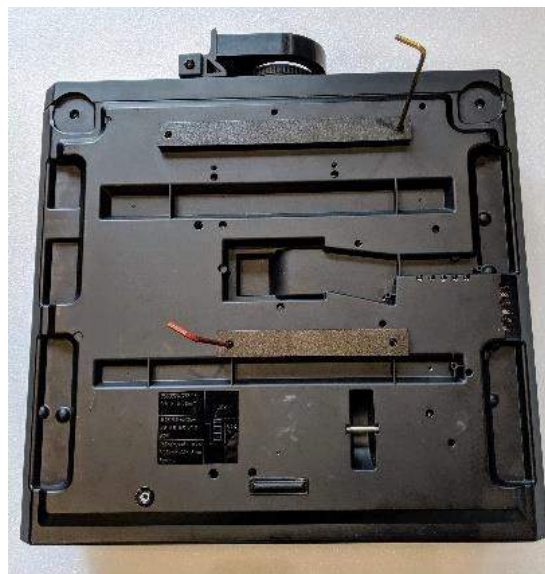
16. Install the projector

- a. Place projector onto foam pad so the lens opening is facing upward as shown in Figure 38



*Figure 38 Projector upside down on foam for preparation*

- b. Place the projector spacers, squared in red in Figure 38, on the projector as shown in Figure 39



*Figure 39 - Projector with spacers*

- c. Attach projector mounting plate to projector as shown in Figure 40
  - i. Secure with (4) M6-45 mm FHS using 4mm hex tool
    - 1. Before final tightening ensure projector mounting plate is square with the projector



*Figure 40 - Projector mounting plate attached to projector*

- d. Install the projector onto the screen frame
  - i. One installer on a ladder will lift the projector in place while the second installer supports from behind as shown in Figure 41
  - ii. The projector lens should be facing away from the screen as shown in Figure 41



*Figure 41 - Placing Projector assembly onto screen frame*

- iii. Slide the projector mounting plate on the rails until it hits the back stop screws as shown in Figures 42 & 43



1. The back stop screws, circled in red in Figures 42 & 43, will determine the initial position of the mounting plate

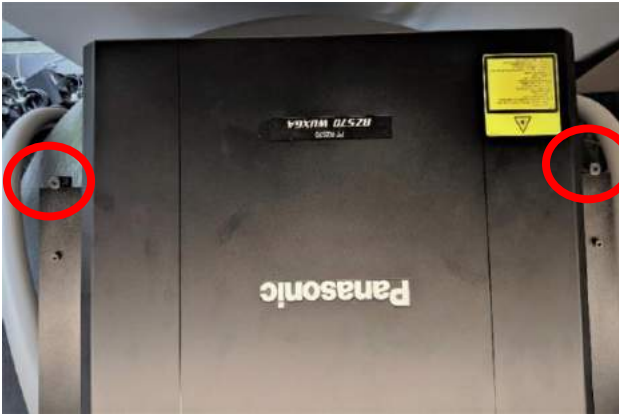


Figure 42 - Top down view of projector on screen frame



Figure 43 - Side view of projector on screen frame

- iv. Back off slightly from back stop screws until through-holes on projector plate align with threaded holes on projector mounting rails
- e. Secure Projector plate onto the rails as shown in Figure 44
  - i. (4) 1/4 - 20 x 5/8" SHC using a 3/16" hex tool



Figure 44 - Securing projector assembly to mounting rails

- f. Attach fisheye lens to projector as shown in Figure 45
  - i. Fisheye lens will self-align to projector lens port with magnetic contacts



*Figure 45 - Connecting fisheye lens to projector*

- g. Secure fisheye lens by lightly tightening the set screw shown in Figure 46.
  - i. **NOTE: Depending on the version of the lens mount, this may be a socket cap screw instead of a set screw. If so, there will be two socket cap screws on the outside of the lens mount, both should be tightened.**



*Figure 46 - Fisheye lens set screw location*

- h. Connect the project power as shown in Figure 47
- i. Connect HDMI cable as shown in Figure 47
  - i. Secure HDMI in place by using the strain relief



*Figure 47 - Projector connections*

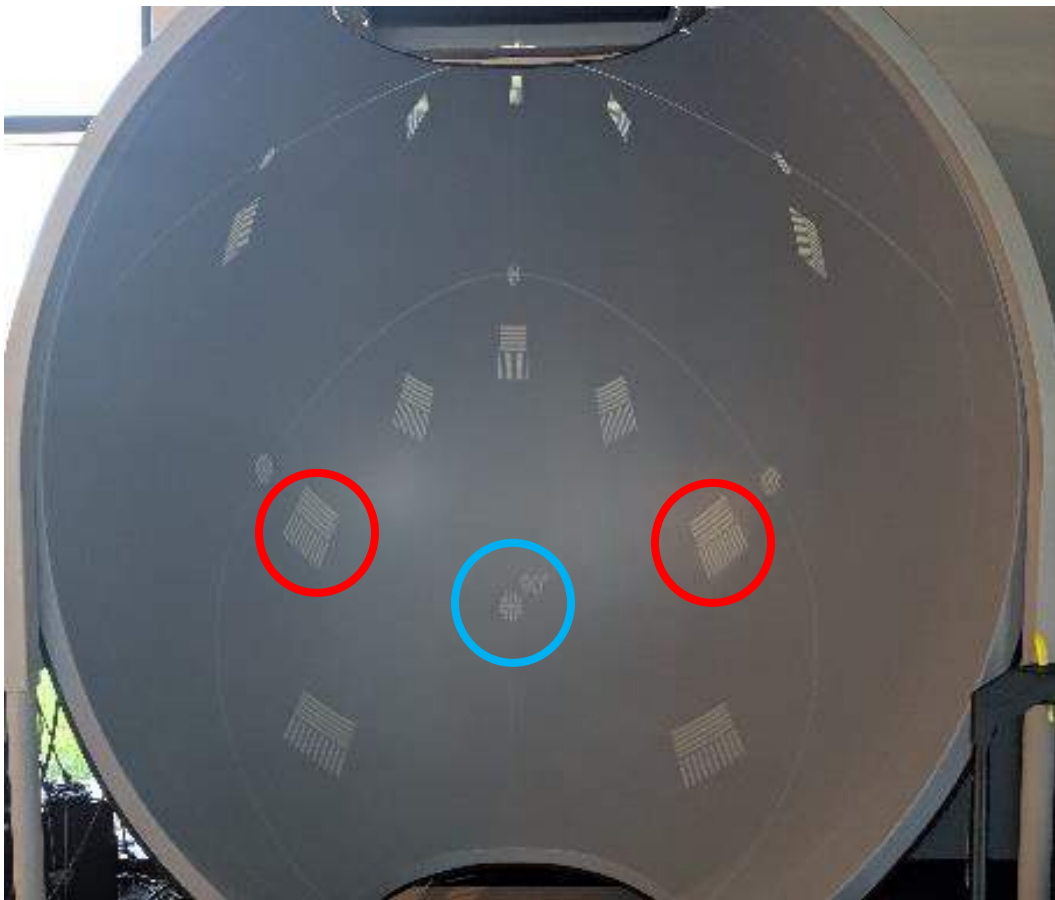
- 17. Attach Project Lens Cover Plate as shown in Figure 48
  - a. Using 3/16 Allen Hex key attach plate with (4) 1/4 -20 x 5/8" SHC



*Figure 48 - Position of Projector Lens Cover Plate*

## Projector Alignment

18. Align the projector image to the screen
  - a. Open Balance Advantage software
  - b. Open setting menu by clicking on the gear icon on the upper right-hand side of the window
  - c. Click Configure Dome projector
  - d. Check 1-meter dome with fisheye lens
  - e. Check Show Alignment pattern
    - i. The alignment pattern will be used as a reference tool to align the projector image to the screen
    - ii. The three key alignment annotations are circled in Figure 49
    - iii. Note: The alignment pattern can also be accessed by navigating to the Balance Advantage folder in Program Files and then setting it as the desktop background



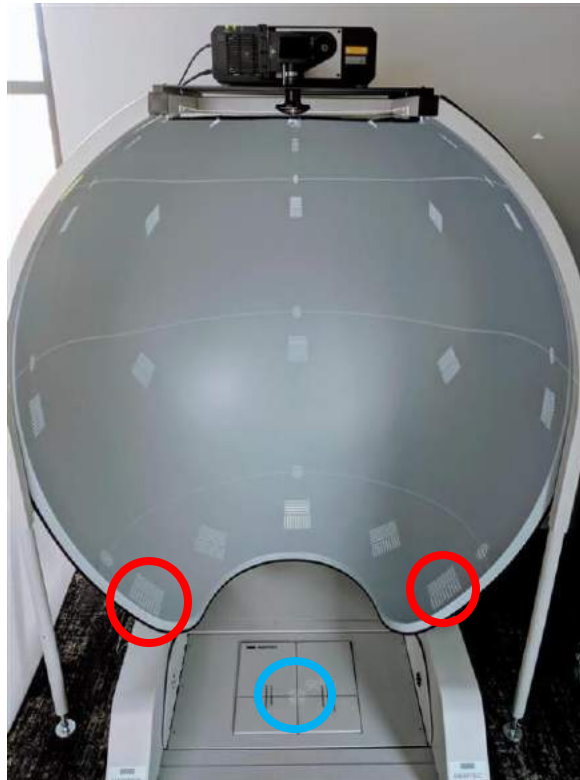
*Figure 49 - Alignment image prior to adjusting*



- f. Use the Joystick, Figure 50, on the projector to adjust the pattern relative to the screen
  - i. Unlock the joystick by turning counterclockwise
  - ii. Slowly move the joystick position downward until the annotations circled in Figure 33 are in the position shown in Figure 51
  - iii. Lock the joystick by turning clockwise



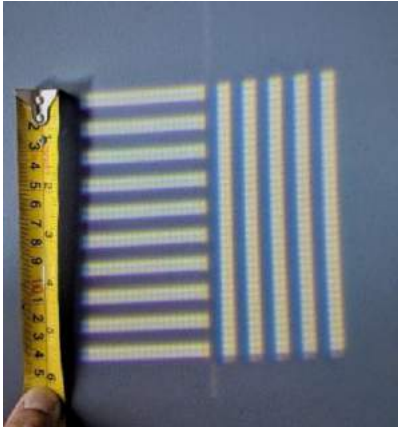
*Figure 50 - Image alignment joystick on projector*



*Figure 51 - Alignment image position*

- g. Measure the alignment annotation circled in red in Figure 51 as shown in Figure 52
  - i. Adjust zoom dial on projector until the measurement is 5.5"

1. The location of the zoom dial is shown in Figure 53

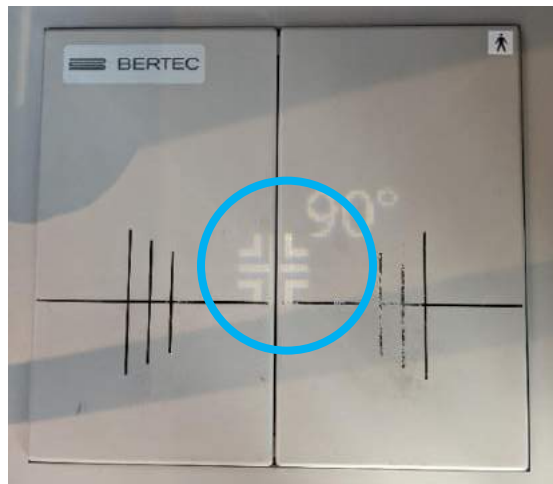


*Figure 52 - Measuring alignment annotation*



*Figure 53 - Zoom dial location on projector*

- h. Re-visit step vi.) and adjust the joystick until annotations are in the final position
  - i. The crosshairs final position is shown in Figure 54
    1. The base position can be adjusted slightly to make the crosshair align on the balance plate as shown in Figure 54
  - ii. The rectangular annotation final is shown in Figure 55
    1. Align both annotations as close to the edge of the screen as possible
    2. Generally, one rectangle pattern is slightly behind the other, the ideal resting place is just barely overlapping the edge of the screen



*Figure 54 - Final Alignment image crosshair placement*



*Figure 55 - Final placement of annotation just before they spill over the edge of the screen*

- i. Focus the projector
  - i. Adjust the focus dial on the projector until the alignment image is clear
  - 1. The location of the focus dial is shown in Figure 56



*Figure 56 – Focus dial on projector*

- j. Remove alignment image
  - i. Uncheck Show Alignment Pattern
  - ii. Ensure 1-meter dome with fisheye lens is still selected

## Computer Cart Assembly

19. Assemble computer cart
  - a. Attach Touchscreen monitor
  - b. Use thumb screen to attach to computer cart



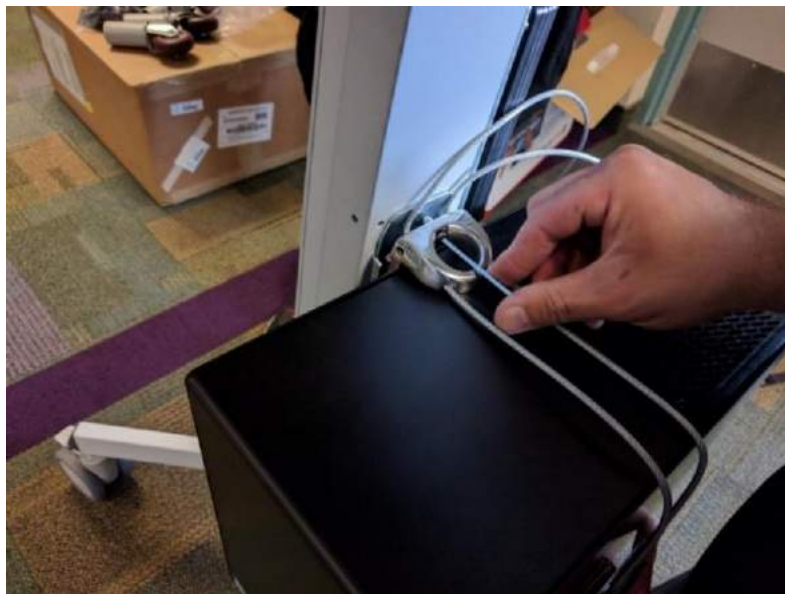
*Figure 57 - Touchscreen monitor attaches with the outermost set of 4 screw holes*

- c. Install computer
  - i. Place computer in harness
    1. Rear of computer should face the CDP base



*Figure 58 - Computer in harness*

- ii. Connect computer (in harness) to computer cart and secure with bolt



*Figure 59 - Securing computer to cart*

- d. Install printer
  - i. Attach Velcro to bottom section of computer cart
    - 3. Ensure the Velcro position will not hinder the printers' paper tray

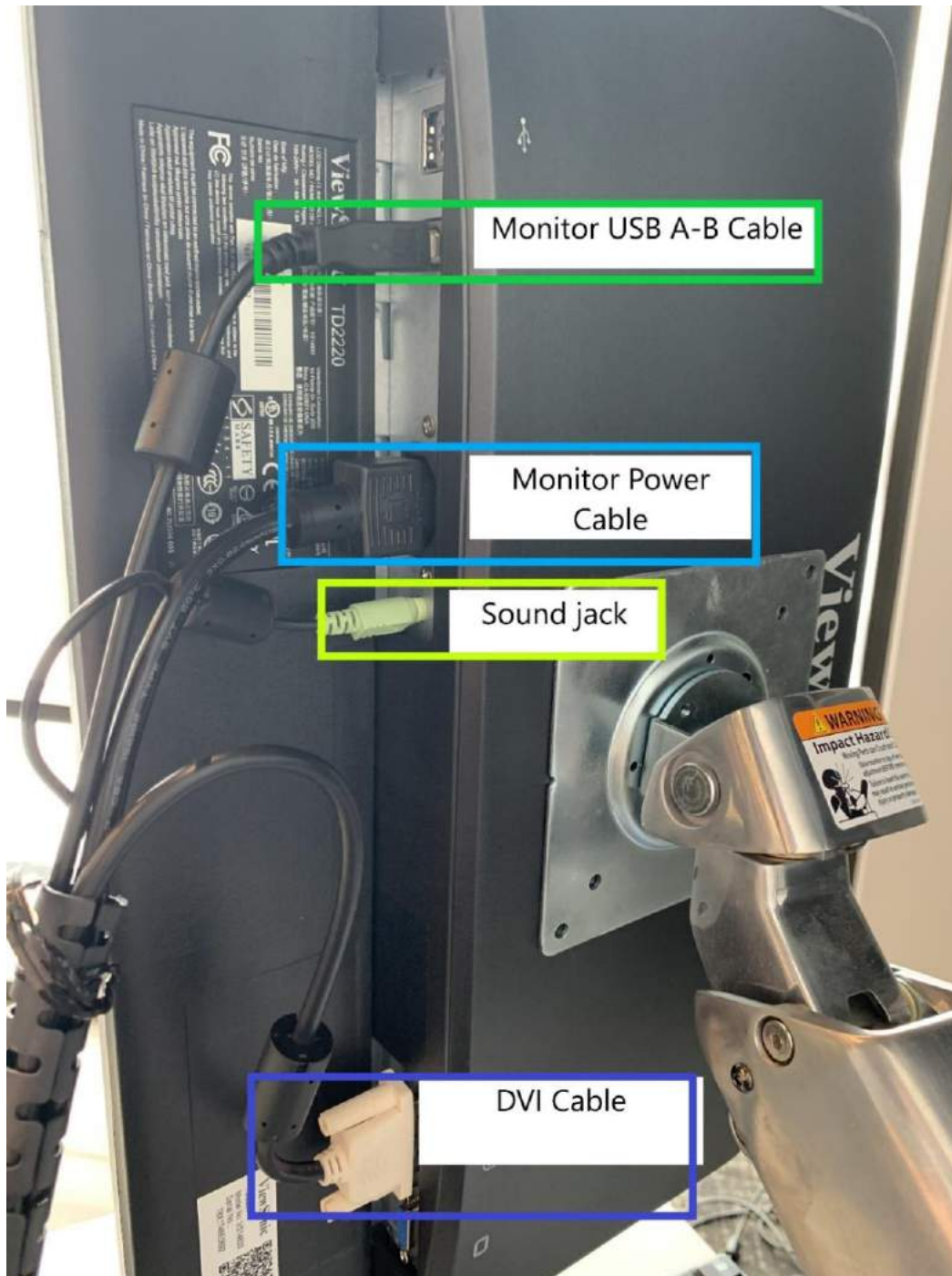




*Figure 60 - Velcro for printer on computer cart*

20. Cable connections

- a. Connect Touchscreen with cables from the DVI wire harness as shown in Figure 61



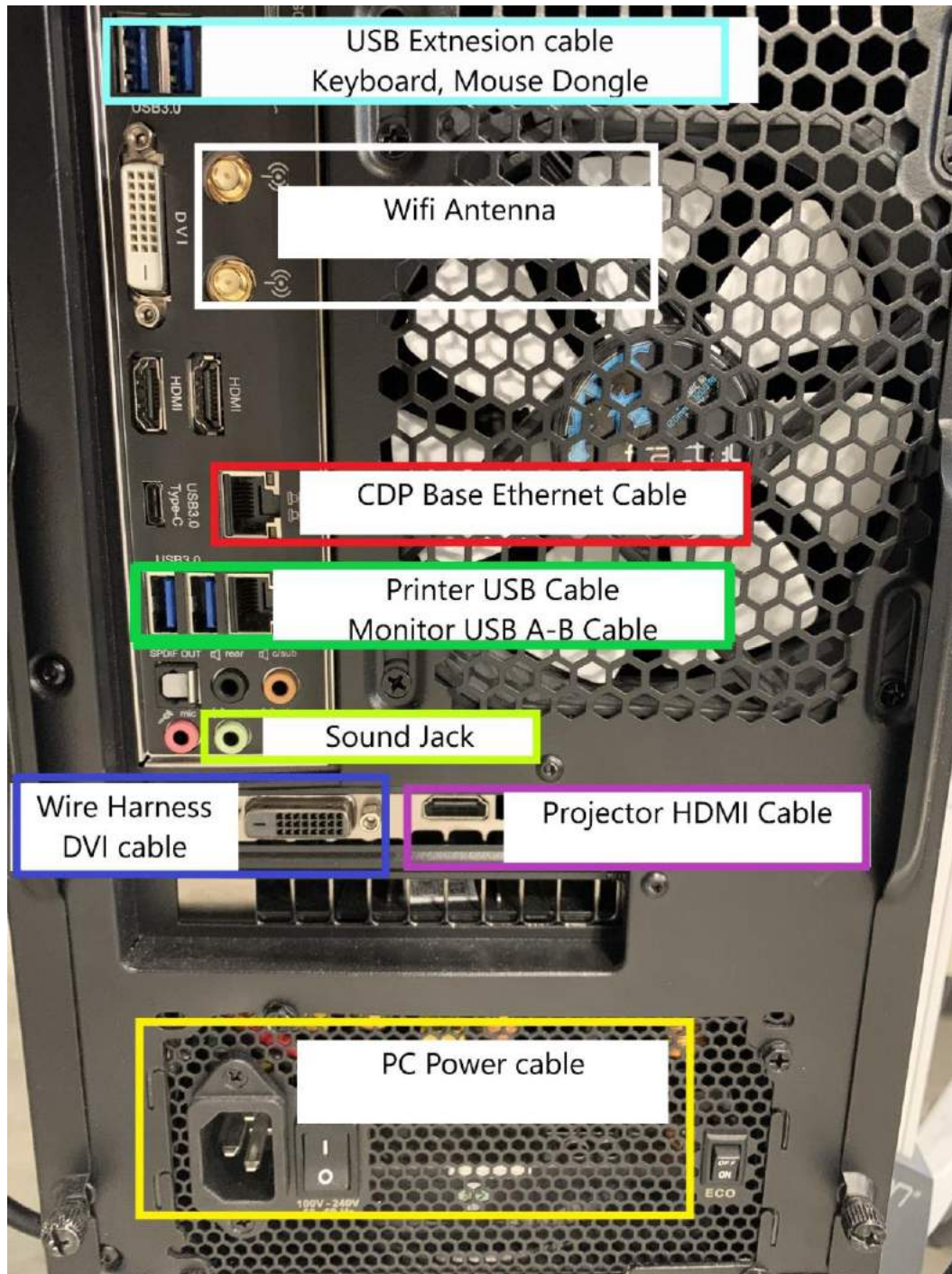
*Figure 61 - Connections on Monitor*

- b. Connect cables from Figure 62 to back of PC shown in Figure 63



*Figure 62 - Labeled cables*





*Figure 63 - PC Connections*

- c.
  - i. USB connection
  - ii. Power cable
- 21. Connections to base
  - a. Ethernet Cable

- i. "Input" on base to back of computer
- b. E-Stop Pendant
  - i. Connect to base
- c. Power cable for projector
- d. Power from base to the wall
  - i. Confirm dedicated circuit



*Figure 64 - Connection on Base Electrical Panel*

## System Installation Final Check

22. First power up of base
  - a. Display settings
    - i. Set touchscreen as main screen
  - b. Test Balance Advantage
    - i. Open Balance advantage
    - ii. Click to select Admin profile
      1. Password: password
  - c. Select test patient profile
  - d. Run test
    - i. Vision – flight
    - ii. Adaptation
    - iii. MCT
    - iv. SOT
  - e. Print one test report to ensure printer is working properly
23. Clean up
  - a. Things to return to Bertec in crates
    - i. Base crate
      1. Casters for Screen frame
      2. Ladders
      3. Trash
    - ii. Dolly crate
      1. Dollies
        - i. Pack in crate with machined threaded rod facing up
        - ii. A lot of foam in between the dollies
      2. Dolly side rails
        - iii. Pack around dollies
        - iv. Use plenty of foam

