

# INSTALLATION MANUAL

MANUFACTURED AND SOLD DIRECT BY  
**CPT AUTOPILOT INC.**

7960 B Soquel Drive, #114, Aptos, CA 95003 USA  
[www.cptautopilot.com](http://www.cptautopilot.com) email: [info@cptautopilot.com](mailto:info@cptautopilot.com)



# INSTALLING THE CPT AUTOPILOT

The CPT Autopilot has been installed in a large variety of sailing and motor vessels, in many different configurations. Mounting the CPT on a pedestal or bulkhead is normally a quick and easy installation. This manual also has advice for alternative installations, including slanted gear-driven wheels, wooden wheels, and large oversized wheels. This manual will help you choose the best installation method for your boat.

The CPT is an extra crew member to man the wheel, day or night, rain or shine. It is amazing to take your hands off the wheel and experience the freedom the CPT provides!

## WARNING!

- ▷ **Always remember to maintain a proper look-out.**
- ▷ **Do not use the CPT in traffic or in waters where navigation is restricted.**
- ▷ **An autopilot is NOT a substitute for good seamanship.**
- ▷ **Always maintain a permanent watch by the helm.**
- ▷ **Keep children and pets away from the autopilot belt.**

INTERNATIONAL REGULATIONS FOR PREVENTING COLLISIONS AT SEA, 1972 (72  
COLREGS)

Part B - Steering and Sailing Rules

Section 1 - Conduct of Vessels in any Condition of Visibility

Rule 5 - Lookout

Every vessel shall at all times maintain a proper look-out by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and risk of collision.

MANUFACTURED AND SOLD DIRECT BY

## **CPT AUTOPILOT INC.**

7960 B Soquel Drive, #114, Aptos, CA 95003 USA

Website: [www.cptautopilot.com](http://www.cptautopilot.com)

Email: [info@cptautopilot.com](mailto:info@cptautopilot.com)

Version: 22, Updated: April 2019

Applies to autopilots manufactured after June 2017  
(Serial number 100746 and higher)

# HOW TO USE THIS MANUAL

1. Review “Mounting the Motor Box” page 7 to decide how the CPT can best be mounted in your cockpit. The standard pedestal, bulkhead, or L-bracket mounts are the easiest, most straightforward installations.
2. Download installation templates from our website. Print the templates and use them to get the measurements for mounting the autopilot. Send us your measurements and order your autopilot through our website ([www.cptautopilot.com](http://www.cptautopilot.com)), over email ([info@cptautopilot.com](mailto:info@cptautopilot.com)), or by calling us at 831-687-0541.
3. When your autopilot arrives, follow the instructions for installing the CPT. Then perform the “Dockside Check-Out” and “Sea Trials” in the Operation Manual.
4. To become more familiar with the CPT, review the CPT Operation Manual.

If you have any questions or suggestions for improving this manual, please let us know. We are always pleased to receive photos of CPT installations and suggestions for improving the CPT.

How to Use this Manual ..... 2

Parts List..... 4

    Standard Parts..... 4

    Additional Parts (optional)..... 4

Installation Summary ..... 4

Mounting the Wheel Pulley..... 5

    Wheels with Metal Spokes ..... 5

    Wheels with Wooden Spokes ..... 6

    Wheel Pulley Hole Diagram ..... 6

Mounting the Motor Box..... 7

    Standard Pedestal Mount..... 8

        Pedestal Kit Parts Diagram ..... 9

    Standard Pedestal Mount with Dropdown Plate..... 10

        Dropdown Plate Parts Diagram ..... 11

    Reverse-Vertical Pedestal Mount..... 12

        Reverse-Vertical Pedestal Mount Diagrams, Starboard Side..... 13

        Reverse-Vertical Pedestal Mount Diagrams, Port Side..... 14

    L-Bracket Mount..... 15

        L-Bracket Parts Diagram..... 16

    Bulkhead or Square Pedestal Mount ..... 17

    Tilted or Angled Wheels ..... 19

    Oversize and Large Wheels..... 19

    Mounting Problems Not Addressed..... 19

Electrical Connection ..... 20

Splicing Control Box Cable ..... 20

Changing the Motor Rotation..... 20

Setting the Magnetic Reference..... 21

Control Box Orientation Restrictions..... 21

Mounting the Control Box ..... 22

    Control Box Mounting Requirements ..... 22

    Testing the Control Box before final mounting..... 23

Troubleshooting..... 24

How to Check for Magnetic Interference..... 24

## PARTS LIST

Before beginning the installation, unpack and identify all parts. Refer to the packing list for the complete list of parts for your order.

### Standard Parts

- Motor Box (larger box with clutch/gear on back) w/10' power cable
- Control Box w/heading controls, attached to motor box w/10' cable
- Wheel Pulley, 12.75" diameter (for clamping to steering wheel)
- Drive belt
- J-Bolts with nuts and washers (quantity and size to suit boat's wheel)
- Control Box Bracket (peel off white or grey plastic protective covering)
  - Short Control Box Bracket for pedestal rail and bulkhead mounting
  - Long Control Box Bracket for console and overhead mounting
  - Pipe Clamp for mounting to pedestal/guard rail pipe
- Motor Box Bracket for mounting motor box to bulkhead or pedestal kit (slotted aluminum bracket)
- Clamping lever with washers and knurled thumb nut for mounting motor box
- Spare shear pin set
- In-line fuse
- Installation Manual and Operation Manual

### Additional Parts (optional)

- Pedestal Mount Kit (deep or shallow) with hardware, hose clamps and anti-scratch foam pads
  - Peel off white plastic protective covering
- L-Bracket, Drop-down Plate, or Reverse-mount Plate for mounting motor box
- Shims for mounting motor box
- Spoke spacers for wheel pulley
- Waterproof plug and receptacle for 12-volt power supply

## INSTALLATION SUMMARY

1. Mount the large wheel pulley and belt onto the steering wheel (page 5)
2. Mount the motor box to the pedestal, bulkhead, console or deck (page 7)
3. Mount the control box. (page 22)
4. Run the power cable to the 12-volt power source (page 2020)
5. Test the autopilot: Dockside checkout and Sea Trials (Operation Manual)

This installation can normally be completed in an afternoon, depending on the particular boat, installer, and ease of wheel removal.

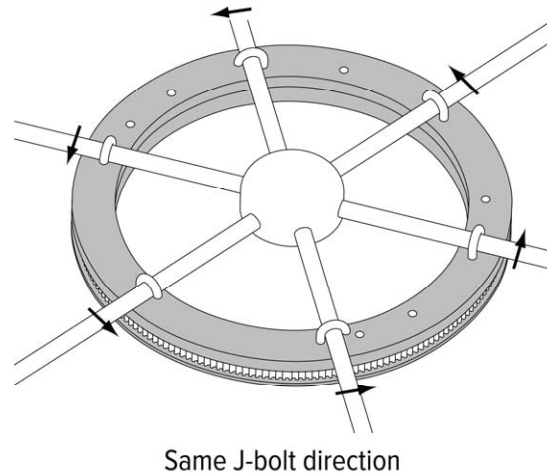
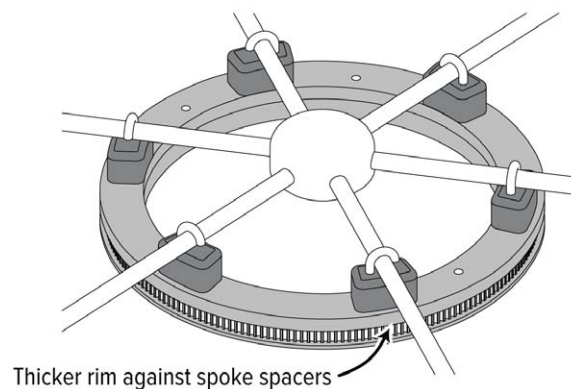
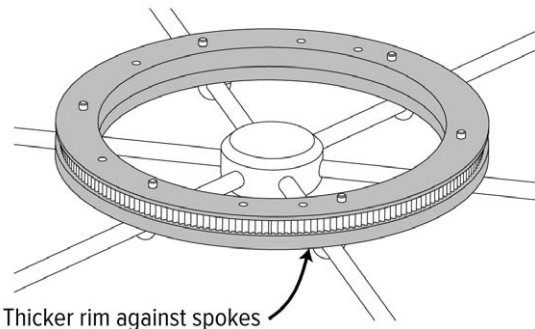
**The power cable and control box cable are not removable. The black cable glands are not removable plugs and should not be loosened or disturbed due to the watertight seals. Do not attempt to open the control box or motor box, there are no user serviceable parts inside. Loosening the black cable glands or opening the unit will void your warranty.**

Do not cut, splice or route the control box cable before sea trials. **Do not cut any wires or fit owner plugs until after successful sea trials**, when you are sure of the mounting location for the control box! The power cable must be completely disconnected from battery or power source before the cable is cut to avoid circuit damage. The cable can be cut at a point where the splice will be inside and dry. The standard cable length is 10 ft with an inline 1/2" diameter bayonet-style connector located 18" from the motor box. An extension cable is available to easily extend the length of the control cable without cutting the cable. The control cable is an unshielded jacketed cable with six 24ga color-coded wires. Solder and heat-shrink the splices, or use a terminal block with soldered lugs, keeping the splice or terminal block shielded. A waterproof connector may be used on the power cable. (See "Electrical Connection")

## MOUNTING THE WHEEL PULLEY

### Wheels with Metal Spokes

1. Remove the wheel and place it horizontally. (On older boats, this may require a gear puller. Grease shaft before replacing the wheel and you will have less trouble next time.)
2. Place the Wheel Pulley on backside of wheel with the thicker rim against the spokes. Hook the J-Bolts on the spokes, and pass them through the pulley holes. Refer to the hole diagram to find the holes for your spoke pattern. Put a drop of oil, flat washer and a nut on each J-bolt. Tighten nuts just enough to hold the pulley temporarily in place. Position pulley roughly in the center of the wheel.
  - Orient the J-bolts so they hook over the spokes from the same side. If the bolts are not hooked over in the same direction the pulley will not center on the wheel.
  - If spoke spacers are needed, install them between the spokes and the thicker rim of the pulley.
3. Inspect fit of the pulley against the spokes. If spokes are out of alignment or not in plane and show a gap or space with the pulley, the low spokes may need to be shimmed. **DO NOT** attempt to pull them into alignment by tightening the J-bolts—the pulley will warp. On dished wheels or tapered spokes: if the gap on the outside edge is large, use tapered shims between pulley and spokes to even the backing on the pulley.
4. Temporarily remount steering wheel (with mounted pulley).  
Overlong J-bolt stems can be cut off flush later or covered with black vinyl caps (included).
5. The wheel pulley will tend to self-center, but check centering:
  - As an indicator, mount a tool (a taped coffee stick, or coat-hanger taped to the pedestal, for example) with its tip close to pulley. Tape it solidly to pedestal so it does not move (refer to diagram on following page).
  - Rotate the wheel.
  - Use your hand to tap the pulley to adjust its center position until distance between pulley and pointer is fairly uniform,  $\pm\frac{1}{8}$ " is fine.
6. Tighten J-bolt nuts.
  - **Do not over-tighten J-bolts**, use a nut driver or small wrench: tighten the nut until the back of the J-bolt grips the spoke and begins to resist swinging, then **turn the nut only another  $\frac{1}{4}$  turn**.
  - The pulley may eventually warp or distort if the J-bolts are over-tightened.
7. Place the belt on the pulley and replace the wheel.

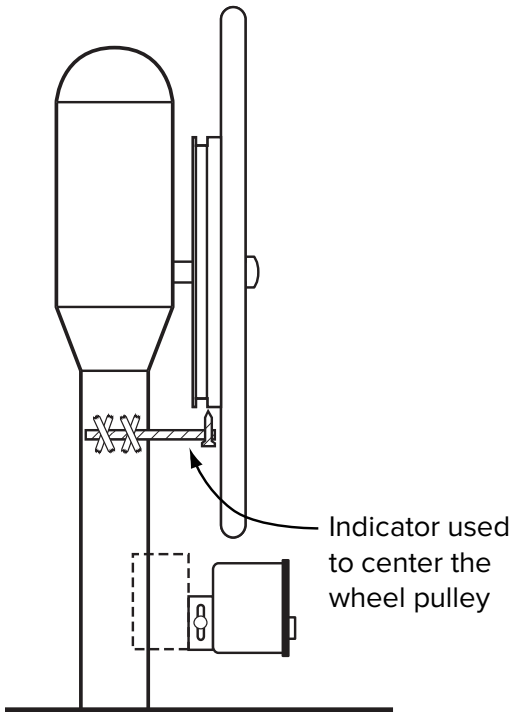


### Wheels with Wooden Spokes

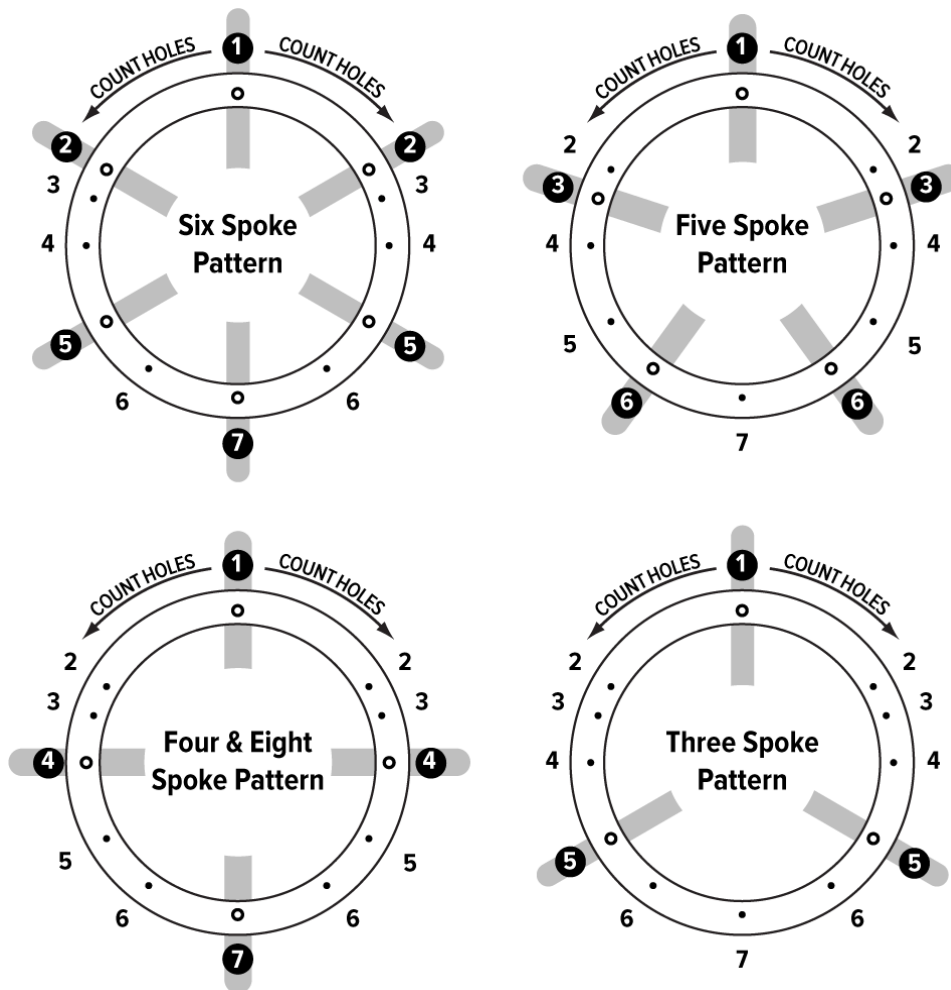
Proceed in the same general fashion as for metal-spoked wheels. If preferred the spokes can be padded to prevent crushing the wood or damaging the varnish under J-bolts. Clear vinyl tubing cut to length and slipped over J-bolt hooks works well.

If you prefer not to use J-bolts, you may screw the pulley directly to the wheel using self-tapping or wood screws (Use pan-head screws with washers, not flat-head screws):

1. Temporarily fasten pulley to wheel with tape or a lashing of light line.
2. Center pulley as described in step 5.
3. Mark and drill pilot holes in wooden spokes for fasteners.
4. If desired, use bedding compound in the holes to fill any gap with the fasteners used.



### Wheel Pulley Hole Diagram



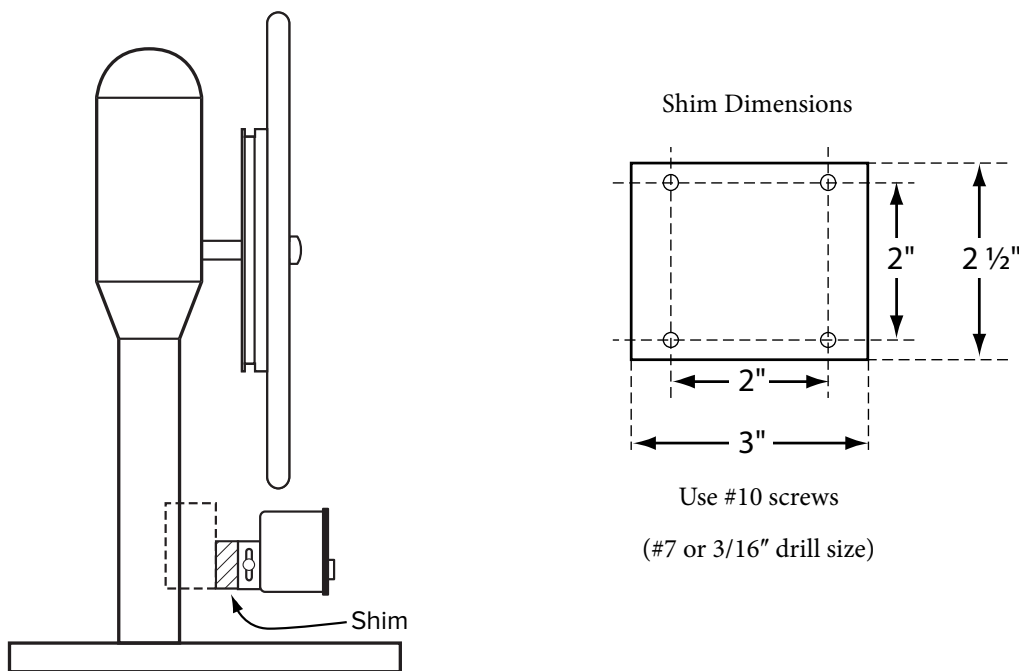


## MOUNTING THE MOTOR BOX

(Only after the wheel pulley is mounted)

- STANDARD PEDESTAL MOUNT (page 8): The Pedestal Bracket is designed to mount on most round (cylindrical) pedestals. It comes in two sizes (shallow bracket for spoke-to-pedestal clearances from 2-3/4" to 3-3/4", and deep bracket for spoke-to-pedestal clearances over 3-3/4").
- STANDARD PEDESTAL MOUNT WITH DROPDOWN PLATE (page 10): The dropdown plate lowers the motor box below the pedestal bracket so that bracket doesn't hit the base of the pedestal.
- REVERSE-VERTICAL PEDESTAL MOUNT (page 12): If there is limited room below or aft of the wheel, a vertical motor box is available that can be reverse-mounted forward of the wheel. The drive pulley faces forward instead of aft; the motor rotation is reversed. The motor box may also be mounted with the drive pulley inside the perimeter of the wheel if 1" spacers are used between the spokes and the wheel pulley. Due to increased leverage on the pedestal bracket, it may require screws for mounting instead of hose-clamps.
- L-BRACKET MOUNT (page 15): Mounting on a surface that is parallel to wheel shaft, such as a coaming, sidewall, deck or cabin sole requires the L-bracket.
- BULKHEAD MOUNT (page 17): The motor box bracket by itself can be used with appropriate shims to mount the motor box assembly directly onto a console or bulkhead parallel to the boat's wheel. Teak or marine-board shims are used to align the drive belt with the wheel.
- TILTED WHEELS (page 19): The L-bracket is used to mount motor box on cockpit sole or cockpit side-wall for boats with tilted wheels or slanted gear-driven wheels.
- OVERSIZED WHEELS (page 19): The L-bracket is used to mount motor box to deck or sidewall in boats with large wheels, or "deck-sweeper" wheels.

Shims can be used to obtain proper belt alignment between drive pulley and wheel pulley.



# Standard Pedestal Mount

## Install Motor Box onto Pedestal Bracket

1. Fasten the slotted motor box mounting bracket to the bottom of pedestal bracket using the four #10 screws and any needed shims.

If a shim is needed for aligning the belt with the wheel, the thickness is based on the clearance distance between your spokes and pedestal (measured 5" / 127mm out from the center of your wheel).

2. Mount the motor box onto the slotted bracket using the clamp lever, washers and knurled thumbnut. Lock the clamping lever when the slotted bracket is in the middle of its adjustment range—centered in the slots.
3. Hang assembly from belt and hose-clamp to pedestal.

Place the drive pulley of the motor box in the belt, and allow the box and bracket assembly to hang in the belt and rest snug against the pedestal while you support it.

## Align belt with wheel and tighten hose-clamps

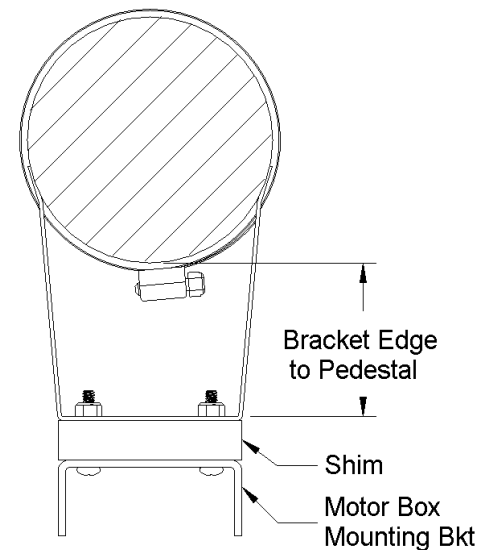
1. Attach the adhesive foam pads to the hose-clamps, not the pedestal. Pass the hose-clamps through the slots from the inside of the bracket around the pedestal and loosely tighten.
2. Adjust the clearance from the pedestal:
  - For the **Deep Pedestal Bracket**, the belt should align with the wheel when the edge of the stainless bracket is 2 ½" (64mm) from most pedestals using any required shims; see clearance chart below.
  - For the **Shallow Pedestal Bracket**, the belt should align with the wheel when the edge of the stainless bracket is 1" (25mm) from most pedestals using any required shims; see clearance chart below.
3. Temporarily tighten the hose-clamps enough to hold the assembly in position.
4. Check for alignment: hold a yardstick or straight-edge against the back of the wheel adapter; it should be fairly parallel with the belt when viewed from the side (clutch engaged; pushed in). Also look from above the wheel and from the side to be sure the motor box is square with the wheel from all directions and not at an angle. If the belt is not parallel you can squeeze the stainless bracket deeper or shallower onto the pedestal as needed, or add or remove a shim. If in doubt or your wheel is not uniform, favor the motor box being closer to the pedestal (rather than farther). The slight belt slant will pull the clutch in which will help keep the clutch engaged.

### Shallow Pedestal Bracket

	Spoke-to-pedestal clearance	Shim Thickness	Bracket edge to pedestal
<input type="checkbox"/>	2.25" (57mm)	0 (no shim)	0.75" (1.9mm)
<input type="checkbox"/>	2.5" (64mm)	0 (no shim)	1" (2.5mm)
<input type="checkbox"/>	2.625" (67mm)	0.125" shim (3mm)	1" (2.5mm)
<input type="checkbox"/>	2.75" (70mm)	0.25" shim (6mm)	1" (2.5mm)
<input type="checkbox"/>	2.875" (73mm)	0.375" shim (10mm)	1" (2.5mm)
<input type="checkbox"/>	3" (76mm)	0.5" shim (13mm)	1" (2.5mm)
<input type="checkbox"/>	3.125" (79mm)	0.625" shim (16mm)	1" (2.5mm)
<input type="checkbox"/>	3.25" (83mm)	0.75" shim (19mm)	1" (2.5mm)
<input type="checkbox"/>	3.375" (86mm)	0.875" shim (22mm)	1" (2.5mm)
<input type="checkbox"/>	3.5" (89mm)	1" shim (25mm)	1" (2.5mm)

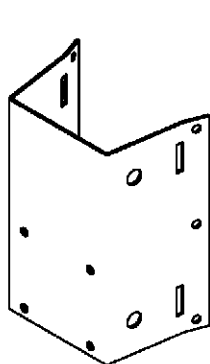
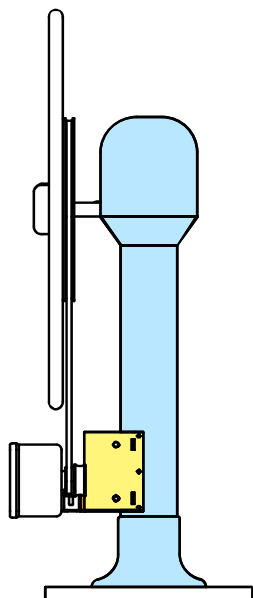
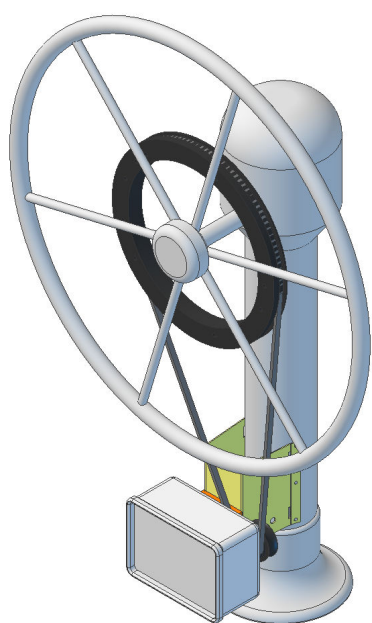
### Deep Pedestal Bracket

	Spoke-to-pedestal clearance	Shim Thickness	Bracket edge to pedestal
<input type="checkbox"/>	3.75" (95mm)	0 (no shim)	2.25" (5.7mm)
<input type="checkbox"/>	4" (102mm)	0 (no shim)	2.5" (6.4mm)
<input type="checkbox"/>	4.125" (105mm)	0.125" shim (3mm)	2.5" (6.4mm)
<input type="checkbox"/>	4.25" (108mm)	0.25" shim (6mm)	2.5" (6.4mm)
<input type="checkbox"/>	4.375" (111mm)	0.375" shim (10mm)	2.5" (6.4mm)
<input type="checkbox"/>	4.5" (114mm)	0.5" shim (13mm)	2.5" (6.4mm)
<input type="checkbox"/>	4.625" (117mm)	0.625" shim (16mm)	2.5" (6.4mm)
<input type="checkbox"/>	4.75" (121mm)	0.75" shim (19mm)	2.5" (6.4mm)
<input type="checkbox"/>	4.875" (124mm)	0.875" shim (22mm)	2.5" (6.4mm)
<input type="checkbox"/>	5" (127mm)	1" shim (25mm)	2.5" (6.4mm)

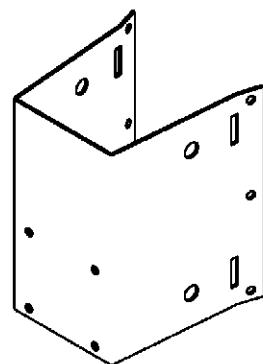


Top View

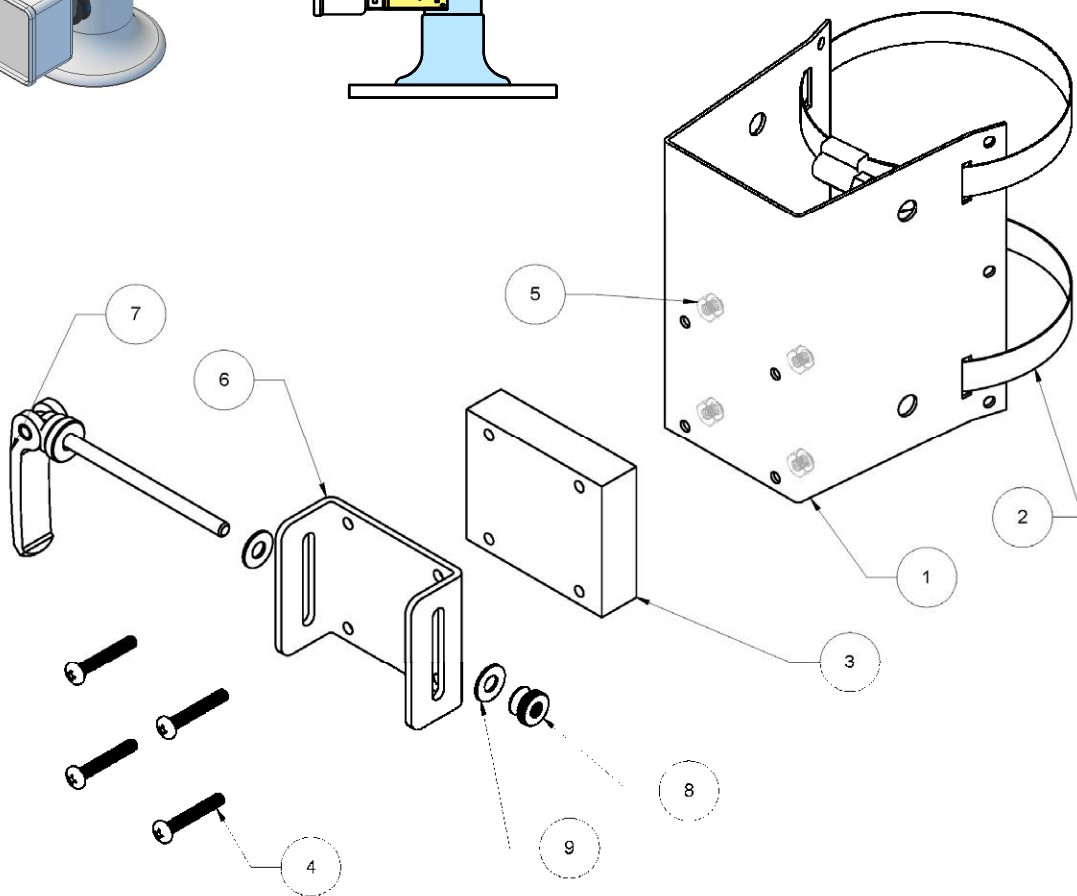
Pedestal Kit Parts Diagram



Shallow Bracket



Deep Bracket



Item #	Quantity	Part Name	Comment
1	1	Pedestal Bracket	
2	2	Hose Clamp	Apply adhesive foam pads to hose clamps
3	1	Shim	Thickness based on clearance distance between spokes and pedestal
4	4	10-24 Pan Head Machine Screw	
5	4	10-24 Nut	
6	1	Motor Box Mounting Bracket	
7	1	Clamping Lever	
8	1	Knurled Nut 1-4 x 20	
9	2	Washer 1/4	

## Standard Pedestal Mount with Dropdown Plate

The dropdown plate lowers the motor box below the pedestal base without the base obstructing the pedestal bracket.

### Install Motor Box onto Pedestal Bracket and Dropdown Plate

1. Fasten the slotted motor box mounting bracket to the bottom of the Dropdown Plate using any needed shims and the four #10 screws.

If a shim is needed for aligning the belt with the wheel, the thickness is based on the clearance distance between your spokes and pedestal (measured 5" out from the center of your wheel).

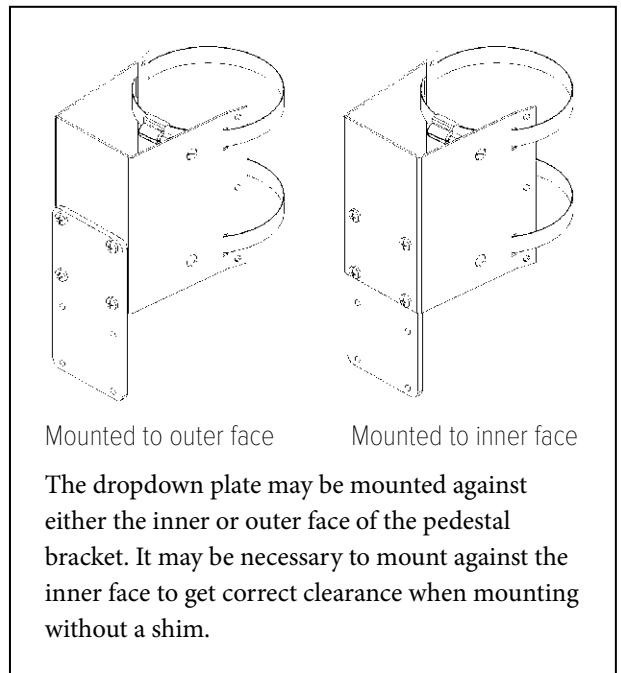
2. Fasten the Dropdown Plate to the Pedestal Bracket using four #10 screws.
3. Fasten the motor box to the slotted mounting bracket using the clamp lever, washers and knurled thumbnut. Lock the clamping lever when the slotted bracket is in the middle of its adjustment range—centered in the slots.

### Hang assembly from belt and hose-clamp to pedestal

Place the drive pulley of the motor box in the belt allowing the box and bracket assembly to hang in the belt and rest snug against the pedestal while you support it. Do not tighten the hose clamps yet.

### Align belt with wheel and tighten hose-clamps

1. Attach the adhesive foam pads to the hose-clamps, not the pedestal. Pass the hose-clamps through the slots from the inside of the bracket (start from the side with the two holes), around the pedestal and loosely tighten.
2. Adjust the clearance from the pedestal:
  - If using the **Deep Pedestal Bracket**, the belt should align with the wheel when the edge of the stainless bracket is 2 ½" (6.4mm) from most pedestals using any required shims; see clearance chart below.
  - If using the **Shallow Pedestal Bracket**, the belt should align with the wheel when the edge of the stainless bracket is 1" (2.5mm) from most pedestals using any required shims; see clearance chart below.
3. Temporarily tighten the hose-clamps enough to hold the assembly in position.
4. Check for alignment: hold a yardstick or straight-edge against the back of the wheel adapter; it should be fairly parallel with the belt when viewed from the side (clutch engaged; pushed in). Also look from above the wheel and from the side to be sure the motor box is square with the wheel from all directions and not at an angle. If the belt is not parallel you can squeeze the stainless bracket deeper or shallower on the pedestal as needed, or add or remove a shim. If in doubt or your wheel is not uniform, favor the motor box being closer to the pedestal (rather than farther). The slight belt slant will pull the clutch in which will help keep the clutch engaged.



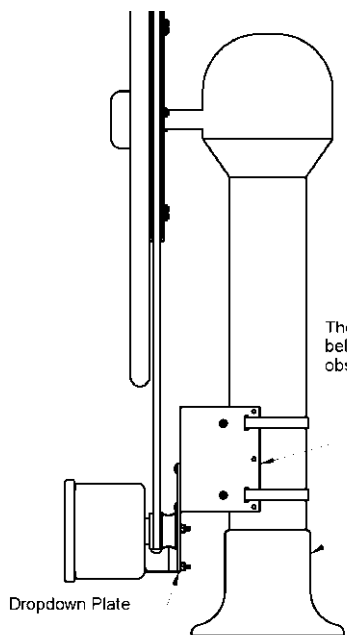
### Shallow Pedestal Bracket Clearance Chart

	Spoke-to-pedestal Clearance	Shim Thickness	Bracket edge to pedestal
☐	2.25" (57mm)	0 (no shim)	0.75" (19mm)
☐	2.375" (60mm)	0 (no shim)	0.875" (22mm)
☐	2.5" (64mm)	0 (no shim)	1" (25mm)
☐	2.625" (67mm)	0.125" shim (3mm)	1" (25mm)
☐	2.75" (70mm)	0.25" shim (6mm)	1" (25mm)
☐	2.875" (73mm)	0.375" shim (10mm)	1" (25mm)
☐	3" (76mm)	0.5" shim (13mm)	1" (25mm)
☐	3.125" (79mm)	0.625" shim (16mm)	1" (25mm)
☐	3.25" (83mm)	0.75" shim (19mm)	1" (25mm)
☐	3.375" (86mm)	0.875" shim (22mm)	1" (25mm)
☐	3.5" (89mm)	1" shim (25mm)	1" (25mm)

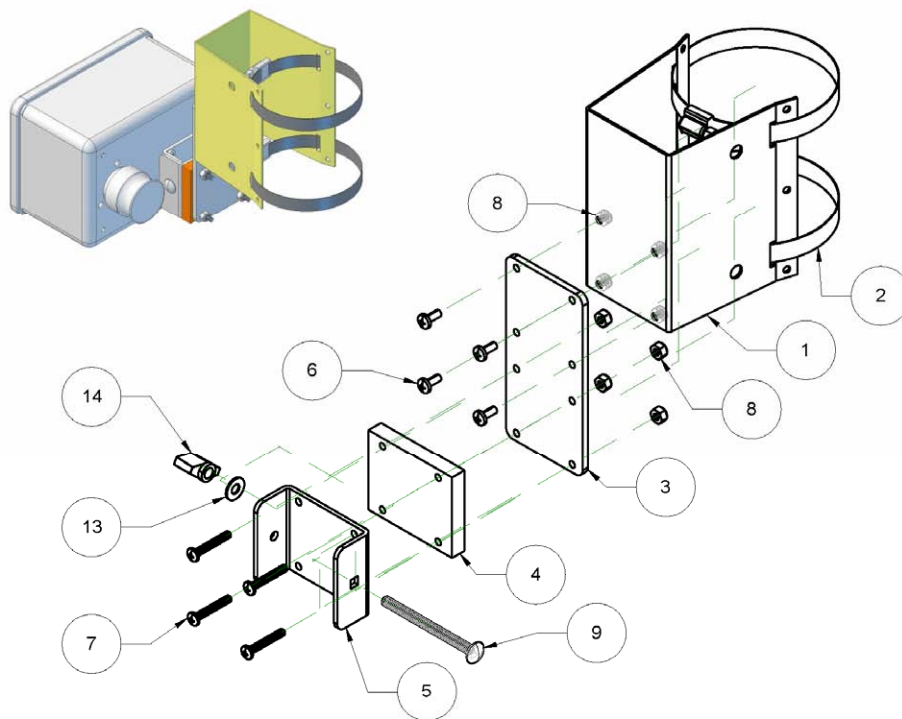
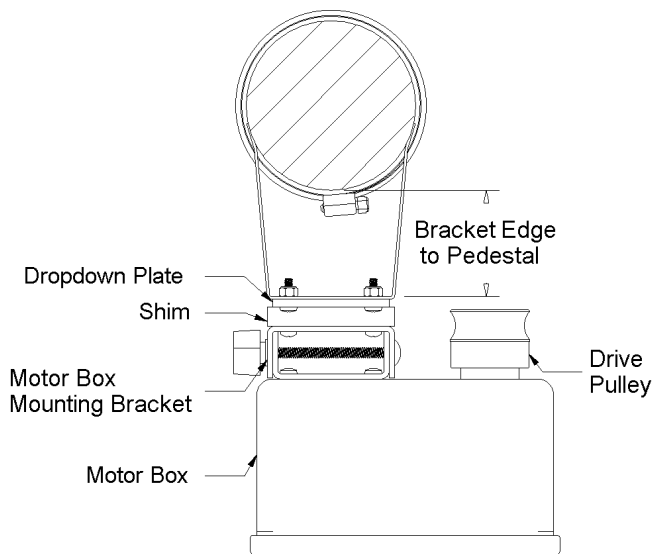
### Deep Pedestal Bracket Clearance Chart

	Spoke-to-pedestal Clearance	Shim Thickness	Bracket edge to pedestal
☐	3.75" (95mm)	0 (no shim)	2.25" (57mm)
☐	3.875" (98mm)	0 (no shim)	2.375" (60mm)
☐	4" (102mm)	0 (no shim)	2.5" (64mm)
☐	4.125" (105mm)	0.125" shim (3mm)	2.5" (64mm)
☐	4.25" (108mm)	0.25" shim (6mm)	2.5" (64mm)
☐	4.375" (111mm)	0.375" shim (10mm)	2.5" (64mm)
☐	4.5" (114mm)	0.5" shim (13mm)	2.5" (64mm)
☐	4.625" (117mm)	0.625" shim (16mm)	2.5" (64mm)
☐	4.75" (121mm)	0.75" shim (19mm)	2.5" (64mm)
☐	4.875" (124mm)	0.875" shim (22mm)	2.5" (64mm)
☐	5" (127mm)	1" shim (25mm)	2.5" (64mm)

Dropdown Plate Parts Diagram



The dropdown plate lowers the motor box below the pedestal base without the base obstructing the pedestal bracket.



Item #	Quantity	Part Name	Comment
1	1	Pedestal Bracket	
2	2	Hose Clamp	Apply adhesive foam pads to hose clamps
3	1	Dropdown Plate	
4	1	Shim	Thickness based on clearance distance between spokes and pedestal
5	1	Motor Box Mounting Bracket, Outside	
6	4	10-24 x 3/4" Pan Head Machine Screw	
7	4	10-24 Pan Head Machine Screw	Length dependent on shim size
8	8	10-24 nut	
9	1	Carriage Bolt 1/4-20 x 3.25	
13	1	Washer 1/4"	
14	1	Plastic Wingnut	

## Reverse-Vertical Pedestal Mount

The motor box can be mounted to sit on either the Port or Starboard side of the pedestal.

- If the pedestal diameter is more than  $3\frac{3}{4}$ " , the reverse plate must be at least  $8\frac{3}{4}$ " long for Port side mounting.
- If the drive pulley is inside the perimeter of the wheel, 1" spacers must be used between the spokes and the wheel pulley. Without the spacers, the drive pulley will hit the wheel spokes when the clutch is disengaged.

### Install Motor Box onto Pedestal Bracket and Reverse Plate

1. Fasten the motor box bracket to the Reverse Plate using the four shorter #10 screws. Fasten the Reverse Plate to the bottom of the Pedestal Bracket using any needed shims and the four longer #10 screws.

\* If a shim is needed for aligning the belt with the wheel, it has been provided based on the clearance between your spokes and pedestal (measured 5"/127mm out from the wheel center). Place the shim(s) between the reverse plate and pedestal bracket (see diagram on following page).

2. Mount the motor box onto the motor box mounting bracket using the clamp lever, washers and knurled thumbnut. Lock the clamping lever when the slotted bracket is in the middle of its adjustment range—centered in the slots.

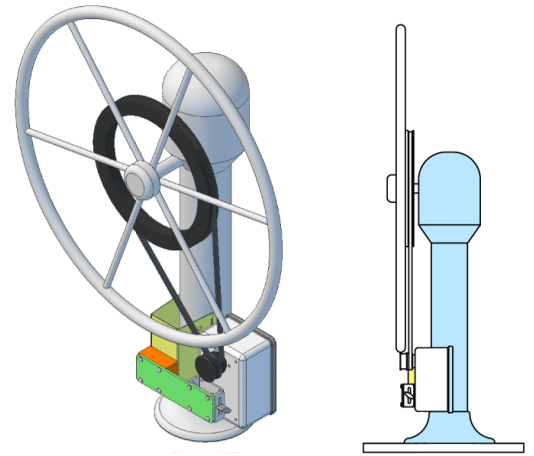
### Loosely attach Motor Box and Bracket assembly to Pedestal

1. Hang the Motor Box and Reverse Plate/Pedestal Bracket assembly from the belt and allow it to rest against the pedestal.
2. Attach the adhesive foam pads to the hose-clamps, not the pedestal. Pass the hose-clamps through the slots from the inside of the bracket, around the pedestal and loosely tighten. The hose clamps should face so that they can be tightened from the Port side.

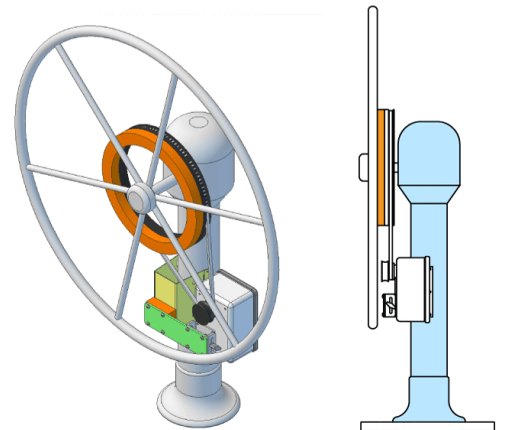
### Align belt with wheel and tighten hose-clamps

1. Adjust the clearance from the pedestal:
  - For the Deep Pedestal Bracket, the belt should align with the wheel when the top edge of the stainless bracket is  $2\frac{1}{2}$ " (64mm) from most pedestals using any required shims.
  - For the Shallow Pedestal Bracket, the belt should align with the wheel when the top edge of the stainless bracket is 1" (25mm) from most pedestals using any required shims.
  - The bottom edge of the pedestal bracket should be  $\frac{1}{8}$ " –  $\frac{1}{4}$ " closer to the pedestal than the top edge to slightly angle the bracket.
2. Temporarily tighten the hose-clamps enough to hold the assembly in position.
3. Check for alignment: hold a yardstick or straight-edge against the back of the wheel pulley; it should be fairly parallel with the belt when viewed from the side (clutch engaged; pushed in). Also look from above the wheel and from the side to be sure the motor box is square with the wheel from all directions and not at an angle. If the belt is not parallel you can squeeze the stainless bracket deeper or shallower onto the pedestal as needed, or add or remove a shim. If in doubt or your wheel is not uniform, favor the motor box being farther from the pedestal (rather than closer). The slight belt slant will pull in on the clutch which will help keep the clutch engaged.
4. With high wheel loads or a pedestal diameter less than 4", the hose clamps may not be enough to keep the bracket in place. In this case you may use six #10-24 x  $\frac{1}{2}$ " screws to fasten the pedestal bracket to the pedestal. Drill and tap the pedestal for the screws.

Before drilling the pedestal: test the autopilot and perform sea trials to be sure the belt size is appropriate and the bracket is in the desired location.

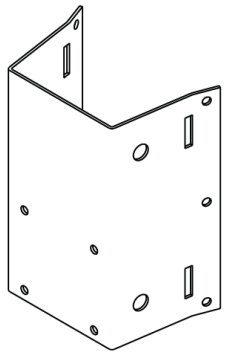
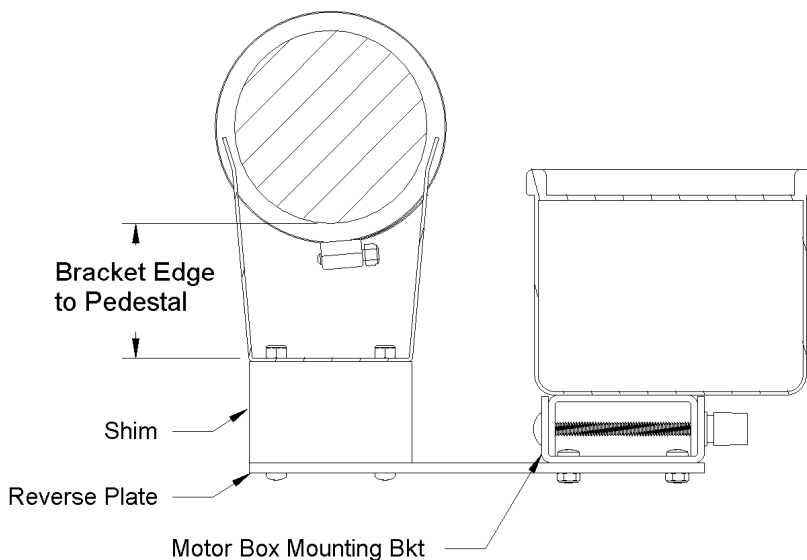


Reverse Mount, Vertical Motor Box  
Drive Pulley outside wheel perimeter

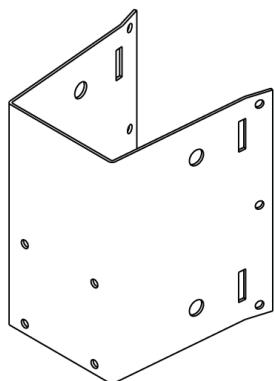


Reverse Mount, Vertical Motor Box  
Drive Pulley inside wheel perimeter  
Minimum  $2\frac{3}{8}$ " (60mm) distance needed  
between spokes and pedestal

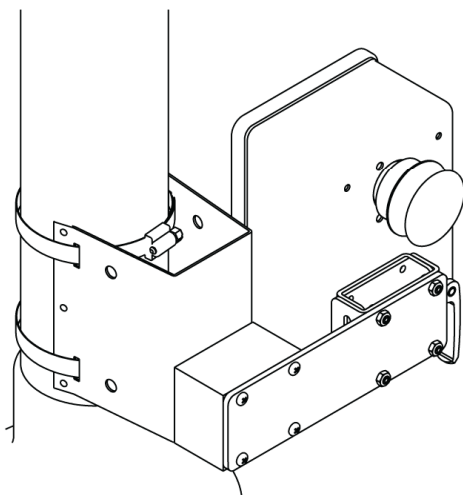
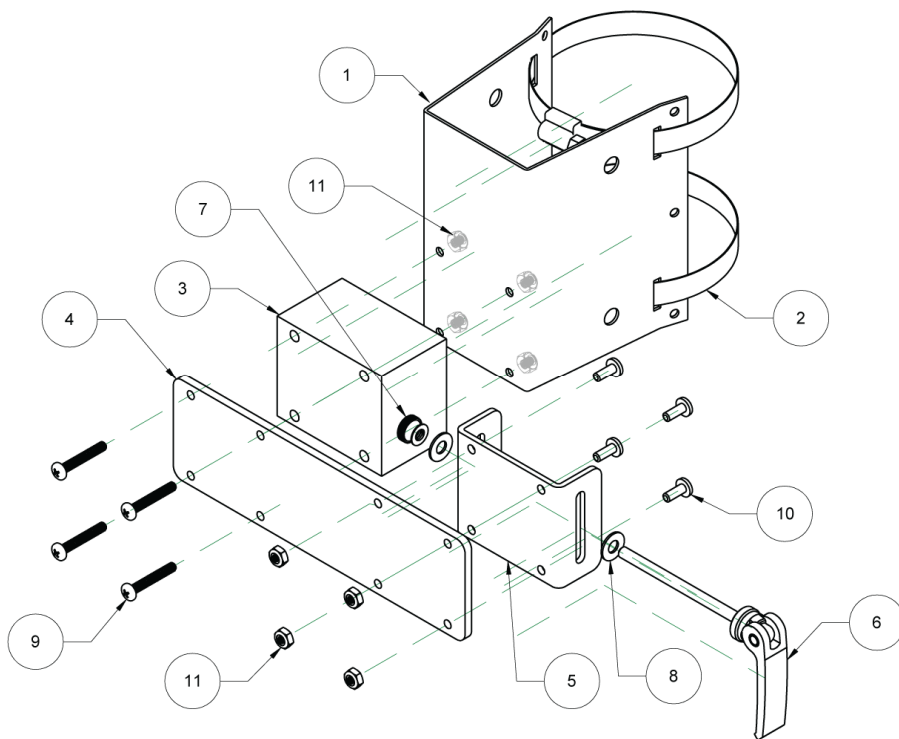
Reverse-Vertical Pedestal Mount Diagrams, Starboard Side



Shallow Bracket  
(edge 1" from pedestal surface)

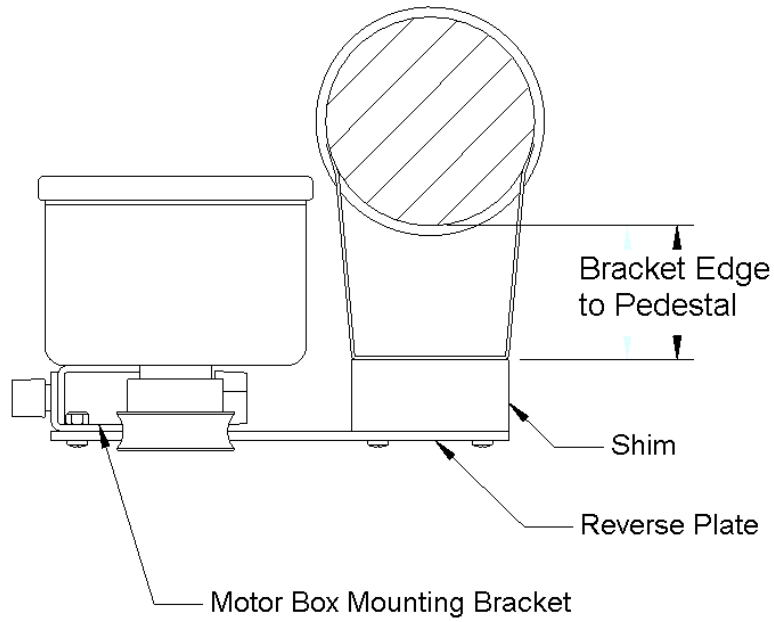


Deep Bracket  
(edge 2.5" from pedestal surface)

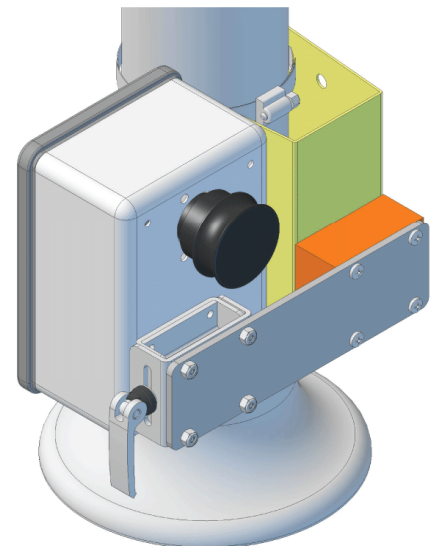
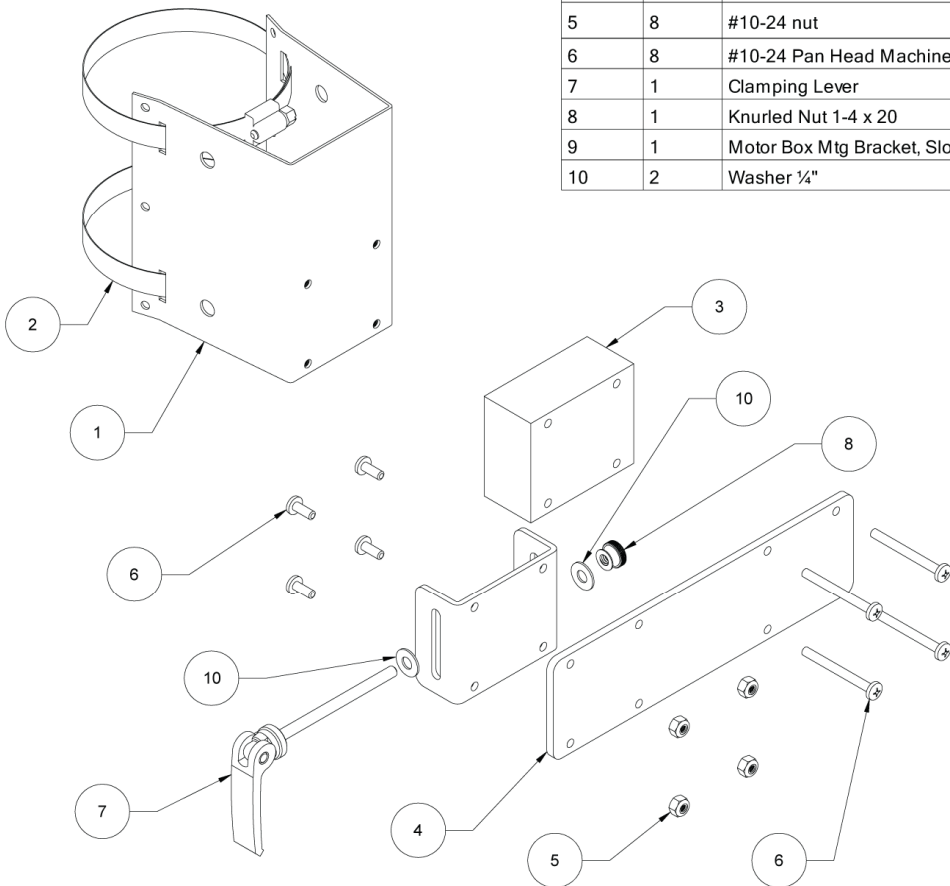


Item #	Qty	Part Name	Comment
1	1	Pedestal Bracket	
2	2	Hose Clamp	Apply adhesive foam pads to hose clamps
3	1	Shim	
4	1	Reverse Mount Plate	
5	1	Motor Box Mounting Bracket	
6	1	Clamping Lever	
7	1	Knurled Nut 1-4 x 20	
8	2	Washer 1/4"	
9	4	10-24 Pan Head Machine Screw	Size as necessary for shim
10	4	10-24 x 1/2" Pan Head Machine Screw	
11	8	10-24 nut	

Reverse-Vertical Pedestal Mount Diagrams, Port Side



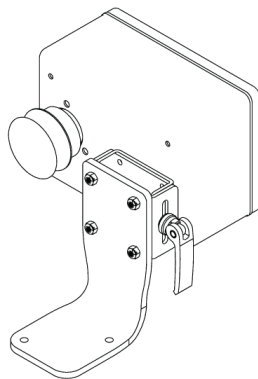
Item #	Qty	Part Name	Comment
1	1	Pedestal Bracket	
2	2	Hose Clamp	Apply adhesive foam pads to hose clamps
3	1	Shim(s)	
4	1	Reverse Mount Plate	
5	8	#10-24 nut	
6	8	#10-24 Pan Head Machine Screw	
7	1	Clamping Lever	
8	1	Knurled Nut 1-4 x 20	
9	1	Motor Box Mtg Bracket, Slotted	
10	2	Washer 1/4"	



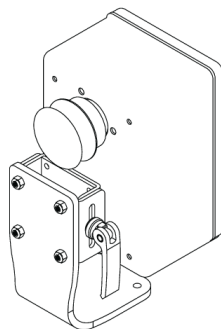


## L-Bracket Mount

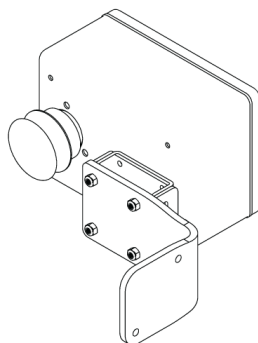
1. Determine if the L-bracket is to mount on a sidewall or deck. Use supplied bolts and nuts to attach the slotted motor box bracket so slots will be vertical.
2. Use the clamping lever, washers, and knurled thumb nut to attach the slotted motor box bracket to the fitting on back of motor box. Lock the clamping lever when the slotted bracket is in the middle of its adjustment range—centered in the slots.
3. Hold motor box roughly in position, and place the belt over the wheel pulley and drive pulley. Place tape over the L-bracket mounting area to enable marking. If any shims will be used, tape them to the L-bracket.
4. Position motor box so belt is snug and both pulleys are aligned. To check for alignment, hold a yardstick or straight-edge against the back of the wheel pulley; it should be fairly parallel with the belt when viewed from the side (clutch engaged and pushed in). Also look from above the wheel and from the side to be sure the motor box is square with the wheel from all directions and not at an angle. If in doubt or the wheel is not uniform, favor a slight belt slant that will help keep the clutch engaged.
5. Mark the location on sidewall or deck for the two 1/4" mounting holes and around the base of L-bracket.
6. Drill holes for 1/4" fasteners. Drill only one hole first and check fit before drilling the second hole.
7. Use a backing block if the mounting surface is not substantial or trustworthy.
8. If desired, use a mounting pad between the L-bracket and mounting surface to ease clamp lever operation or to permit easy removal of the L-bracket



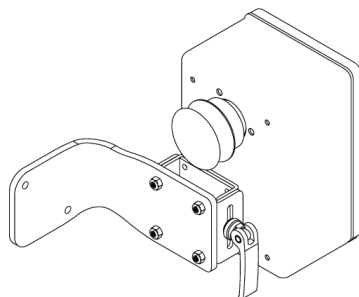
Horizontal Motor Box  
L-Bracket to Deck  
• Clamp handle only on side shown



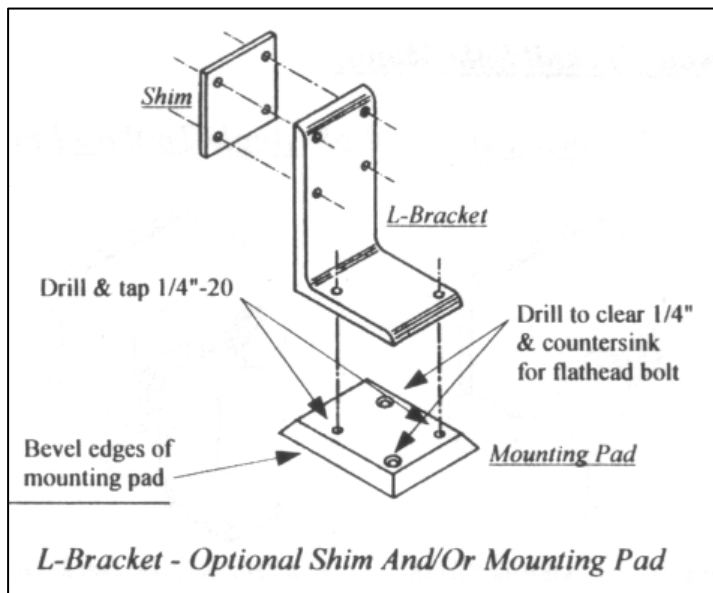
Vertical Motor Box  
L-Bracket to Deck  
• Clamp handle can be on either side of bracket



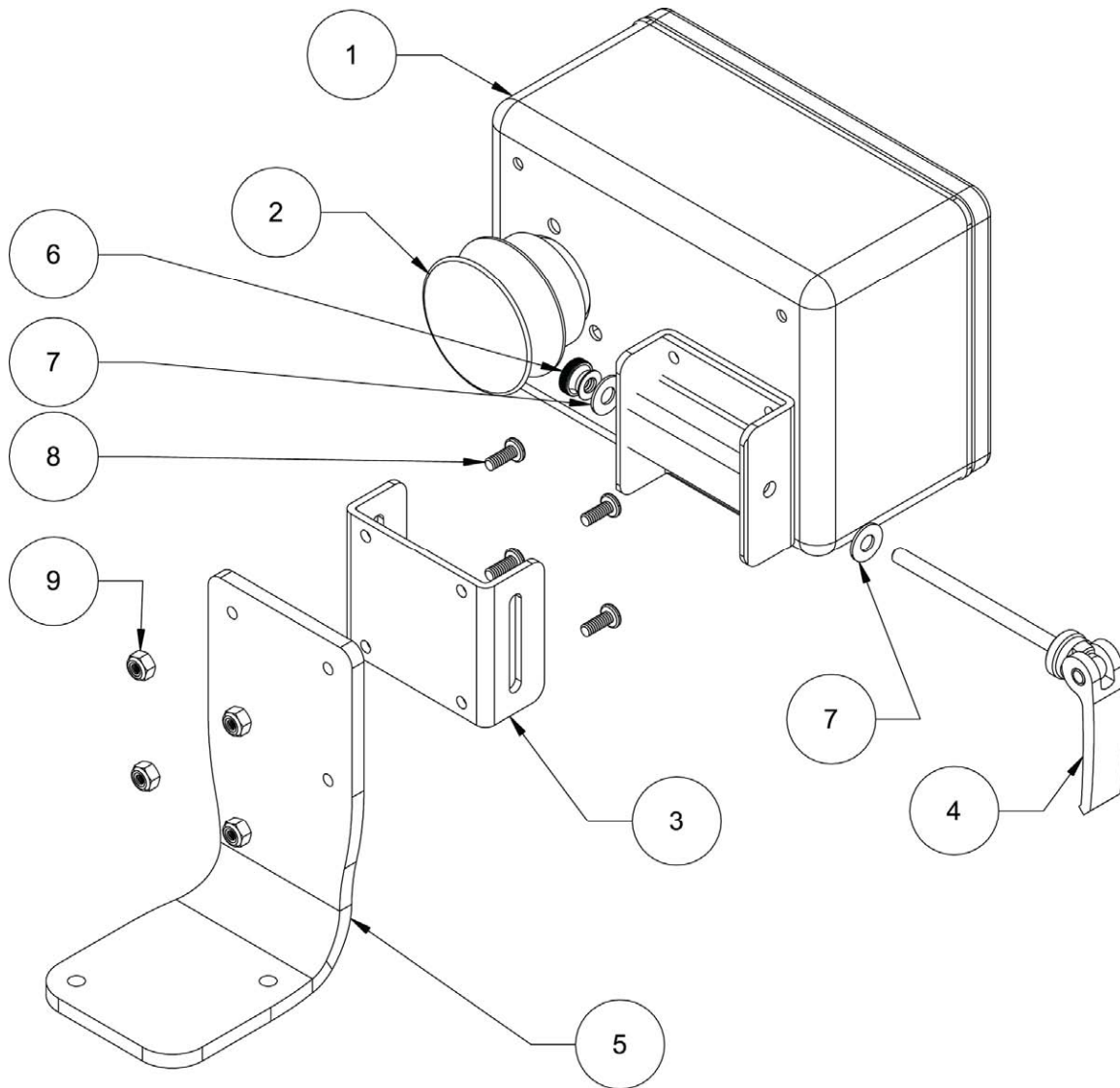
Horizontal Motor Box  
L-Bracket to Sidewall or Coaming  
• Not recommended due to limited clearance for clamp handle



Vertical Motor Box  
L-Bracket to Sidewall or Coaming  
• L-Bracket can mount to either sidewall  
• Clamp handle should be on opposite side from L-Bracket



L-Bracket Parts Diagram



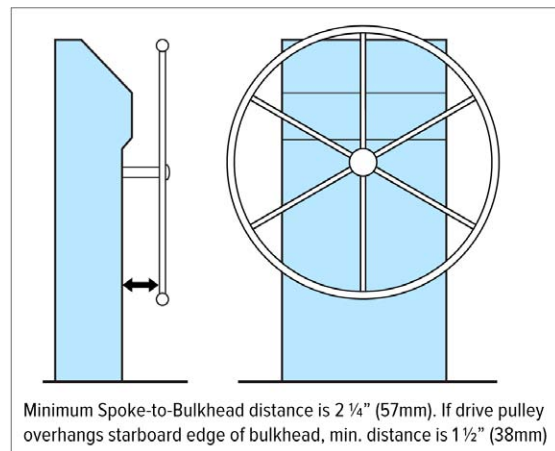
Item #	Quantity	Part Name
1	1	Motor Box
2	1	Drive Pulley
3	1	Motor Box Mounting Bracket, Slotted
4	1	Clamping Lever
5	1	L-Bracket
6	1	Knurled Nut 1/4-20
7	2	Washer 1/4"
8	4	10-24 x 5/8" Pan Head Machine Screw
9	4	10-24 nut

## Bulkhead or Square Pedestal Mount

The motor box may be mounted to a flat surface such as a bulkhead, console or square pedestal without any additional brackets. A minimum 2 ¼" clearance is needed between the wheel spokes and the bulkhead to allow room for the clutch to disengage. If the drive pulley overhangs the edge of the bulkhead, only 1 ½" of clearance is needed.

### Assemble Drivebox for Bulkhead or Square-Pedestal Mounting

See the “Spoke-to-Bulkhead” chart below. If shims are required for your installation, temporarily tape the slotted motor box bracket to the shims without using the 4-machine screws (the shims will be flat against the bulkhead face). Mount the taped bracket to the motor box using the clamp lever, washers and knurled thumb nut. Lock the clamping lever when the slotted bracket is in the middle of its adjustment range—**centered in the slots.**



### Hang Drive Box assembly from belt and let it rest firmly against bulkhead

With the belt on the wheel pulley, place the drive-pulley of the motor box in the belt. Allow the motor box and shim assembly to hang in the belt and rest snug and square against the pedestal face while you support and position it.

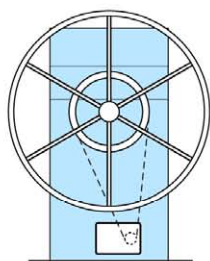
### Align belt with wheel & fasten mounting bracket to bulkhead

To check for alignment, view from the side, and hold a yardstick or straight-edge against the back of the wheel pulley; it should be fairly parallel with the belt when viewed from the side (**clutch engaged and pushed in**). If the belt is not quite parallel with the wheel, you can remove or add a shim if needed.

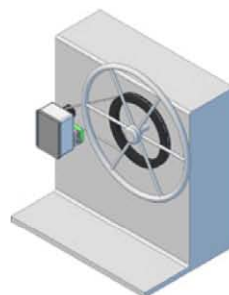
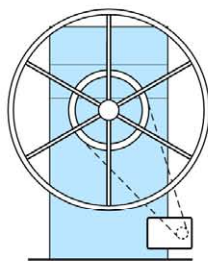
Tape the bulkhead area behind the shim for marking. While holding the motor box snug and square, mark the perimeter of the shim and slotted bracket. Remove the shim from the bracket and mark for the 4 holes on the bulkhead. Use a #10 drill for the four holes. Drill just one hole first; check the fit before drilling the remaining holes. Check the installation by disengaging the clutch (pull outward ¼") and turning the wheel.



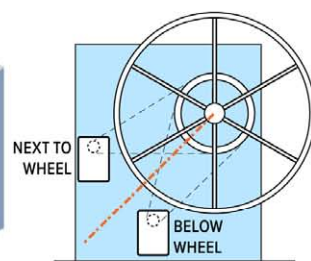
Horizontal Motor Box  
2 ¼" (57mm) minimum distance from spokes to bulkhead



Horizontal Motor Box  
Drive pulley overhangs bulkhead edge  
1 ½" (38mm) minimum distance from spokes to bulkhead



Vertical Motor Box  
2 ¼" (57mm) minimum distance from spokes to bulkhead  
Will mount on either port or starboard side



Spoke-to-Bulkhead Clearances

(If the wheel pulley mounts to a wood ring on a wood wheel, or to spoke spacers, use the clearance from the wood ring or from the spoke spacers when using the charts below)

**Full Bulkhead Mount Clearance Chart**

	Clearance	Shim Thickness
☐	2.25" (57mm)	0.75" shim (19mm)
☐	2.375" (60mm)	0.875" shim (22mm)
☐	2.5" (64mm)	1" shim (25mm)
☐	2.625" (67mm)	1.125" shim (29mm)
☐	2.75" (70mm)	1.25" shim (32mm)
☐	2.875" (73mm)	1.375" shim (35mm)
☐	3" (76mm)	1.5" shim (38mm)
☐	3.125" (79mm)	1.625" shim (41mm)
☐	3.25" (83mm)	1.75" shim (44mm)
☐	3.375" (86mm)	1.875" shim (48mm)
☐	3.5" (89mm)	2" shim (51mm)
☐	3.625" (92mm)	2.125" shim (54mm)
☐	3.75" (95mm)	2.25" shim (57mm)
☐	3.875" (98mm)	2.375" shim (60mm)
☐	4" (102mm)	2.5" shim (64mm)

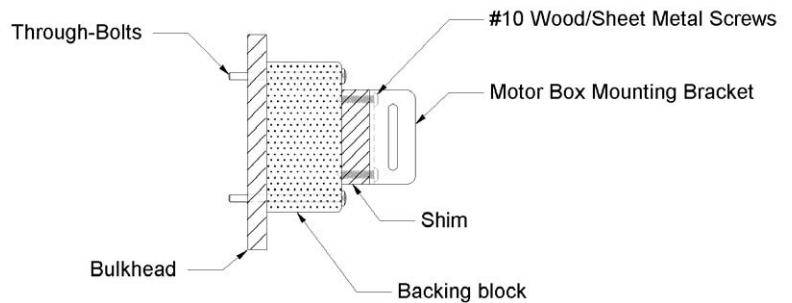
**Partial Bulkhead Mount Clearance Chart**  
(clutch extends past bulkhead starboard corner)

	Clearance	Shim Thickness
☐	1.5" (38mm)	no shim
☐	1.625" (41mm)	0.125" shim (3mm)
☐	1.75" (44mm)	0.25" shim (6mm)
☐	1.875" (48mm)	0.375" shim (10mm)
☐	2" (51mm)	0.5" shim (13mm)
☐	2.125" (54mm)	0.625" shim (16mm)
☐	2.25" (57mm)	0.75" shim (19mm)

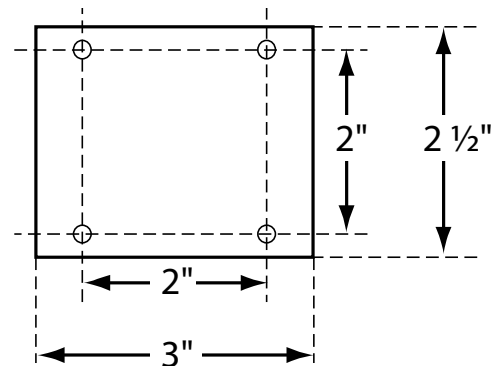
(refer to Full Bulkhead Mount chart for larger values)

Shims thicker than 2.5" are not advised due to the long bolts required. We recommend fastening a 2" backing block to the bulkhead and attaching a thinner shim to that in order to get the necessary clearance. See diagram at right.

	Clearance	Backing Block + Shim Thickness
☐	4.125" (105mm)	2" + 0.625" shim (51 + 16mm)
☐	4.25" (108mm)	2" + 0.75" shim (51 + 19mm)
☐	4.375" (111mm)	2" + 0.875" shim (51 + 22mm)
☐	4.5" (114mm)	2" + 1" shim (51 + 25mm)
☐	4.625" (117mm)	2" + 1.125" shim (51 + 29mm)
☐	4.75" (121mm)	2" + 1.25" shim (51 + 32mm)
☐	4.875" (124mm)	2" + 1.375" shim (51 + 35mm)
☐	5" (127mm)	2.5" + 1" shim (64 + 25mm)



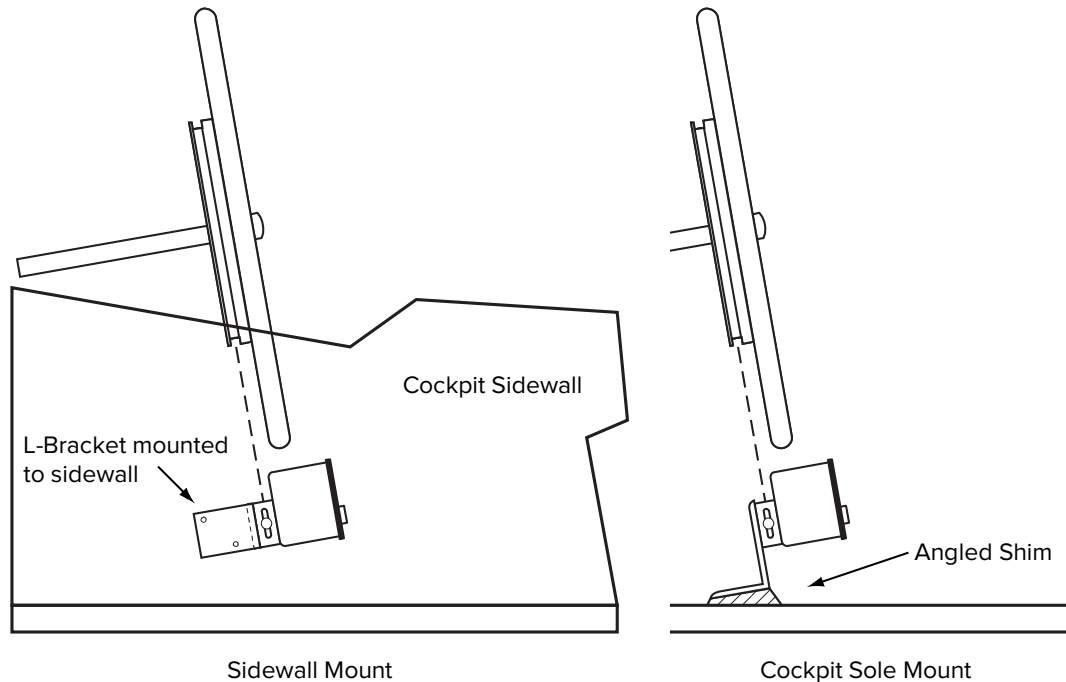
**Shim Dimensions**



Use #10 screws  
(#7 or 3/16" drill size)

## Tilted or Angled Wheels

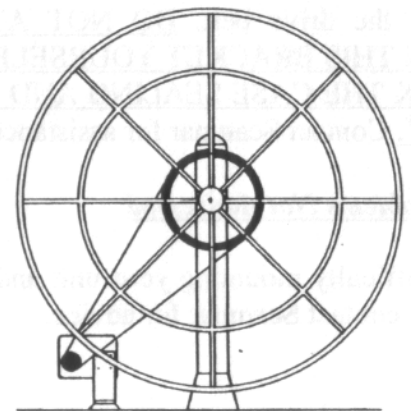
Angled or tilted wheels with worm gear or rack & pinion steering require use of the L-bracket. If the L-bracket is mounted on a coaming or sidewall, the entire motor box may be tilted at the same angle as the wheel. Proceed as per instructions in L-Bracket section. If L-bracket is sole or deck mounted, the L-bracket may be bent to match the tilt of the wheel or an angled shim can be used.



## Oversize and Large Wheels

If there is less than 7 3/4" between the bottom of wheel and the cockpit sole, an L-bracket can be used to mount the motor box to the cockpit sidewall or sole. If cockpit is too narrow to allow standard orientation, the motor box can be mounted facing forward (reversed).

1. Turn motor box so the drive pulley faces aft. See directions for reversing the direction of the drive pulley.
2. Mount motor box on the starboard side, or only slightly to the port side so that most of the box is forward of wheel and does not obstruct cockpit. Follow mounting instructions outlined in "B. L-Bracket Mount". The drive pulley can be located inside the perimeter of the wheel if 1" spacers are used between the spokes and wheel pulley.



*Looking Forward*

## Mounting Problems Not Addressed

If you have difficulty working out a mounting solution, please contact CPT Autopilot for advice.

## ELECTRICAL CONNECTION

The autopilot is turned On/Off by rotating the rudder-control knob from the off position. Keep the autopilot turned off when making electrical connections. Connect motor box power line to a good 12-volt power source with 12ga cable. Even though current draw is low, the CPT will compensate for voltage drop from small wires by increasing current draw. Be sure to use a good quality 10-amp circuit breaker, or attach the 10-amp inline fuse that is supplied. A 10-amp circuit breaker is recommended to avoid a slight 0.04 mA draw when the unit is off. If possible, use a circuit breaker directly from the battery or battery selector switch. If this is not possible, tie into 12 gauge wire minimum, with the shortest run. Do not tie into the ignition side of any source. It is important that good solid connections be made. A waterproof connector may be used on the power line, however do not use a push-in or cigarette-lighter type connector. Use a connector with a screw-down cap and plug, and a compression fitting to seal cable-jacket as it enters the cap, and tin the wire ends. The cable jacket should always be kept sealed; an open or damaged jacket can lead to water intrusion. The RED WIRE CONNECTS TO +12V. Do not leave supplied fuse holder out in the weather, it is not waterproof.

Size cable for 3% voltage drop or less. Use 12 AWG 12-2 cable for adding up to 10' of cable, use 10 AWG for adding 20', 8 AWG for adding 30'.

## SPLICING CONTROL BOX CABLE

**DO NOT** cut, splice, or route the control cable until the autopilot has been tested on all headings. Perform sea trials first with the cable in cockpit to make sure the mounting location is free of magnetic interference. The control cable is an unshielded jacketed cable with six 24ga color-coded wires. An extension cable is available to easily extend the length of the control cable without cutting the cable.

**AFTER SUCCESSFUL SEA TRIALS:** Be sure the power wires are completely disconnected from the battery or 12 volt source before cutting the control cable or damage will result. Damage resulting from cross-connecting wires during splicing or routing is not covered under the warranty.

## CHANGING THE MOTOR ROTATION

The motor rotation is preset at the factory for your installation but can be easily changed and re-set from the control box.

### Standard Rotation: Drive Pulley Facing Forward

1. Turn the CPT OFF (turn the Rudder control fully counter-clockwise). While off, push and hold the Starboard 1° and 10° buttons and the Port 10° button; hold all three buttons down at the same time.
2. Turn the pilot on while holding the three buttons down.
3. Release the buttons after five seconds.
4. If successful, the LED on the control box will blink red eight times.

### Reverse Rotation: Drive Pulley Facing Aft

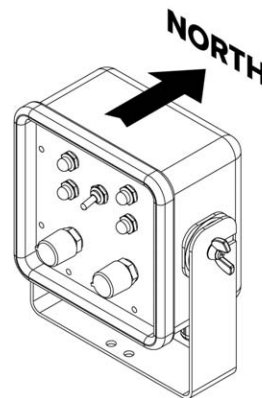
1. Turn the CPT OFF (turn the Rudder control fully counter-clockwise). While off, push and hold the Port 1° and 10° buttons and the Starboard 10° button; hold all three buttons down at the same time.
2. Turn the pilot on while holding the three buttons down.
3. Release the buttons after five seconds.
4. If successful, the LED on the control box will blink red eight times.

## SETTING THE MAGNETIC REFERENCE

Setting the magnetic reference aligns the autopilot compass to the local magnetic inclination (dip angle).

The autopilot comes from the factory set for the magnetic field inclination in California. If you are located significantly farther north or south, the magnetic reference should be set again on location. Magnetic field inclination differences will usually only start to become noticeable if you are located below 15-degrees North or above 55-degrees North.

- This procedure is best performed at the dock or in flat water.
- If at sea, only perform this procedure in calm seas while holding the control box to stabilize it. If the vessel is moving, maintain a steady heading during the procedure.
- If the control box is not kept level or is bumped during this procedure, the reference may be skewed resulting in poor autopilot performance.
- Make sure that power to the autopilot is not interrupted during the procedure and in the 15 seconds following the procedure.



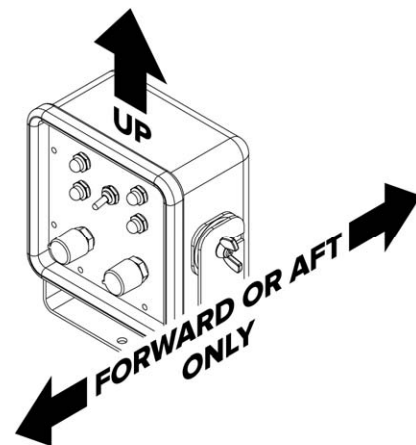
### Steps:

1. Turn on the autopilot and set the Rudder dial to 5.
2. Leave the autopilot on for 10 minutes or more to allow the temperature inside the control box to stabilize.
3. Turn the Rudder dial to OFF and remove the control box from its bracket.
4. Hold the control box so that it is pointed approximately due North and so the top is level and steady; hold it shoulder-height or rest it on a cockpit seat, but keep it away from metal objects and any possible magnetic fields. The center of the cockpit, about shoulder high is usually free from magnetic fields on most boats. If resting on a surface, make sure there are no metal fasteners nearby or metal equipment underneath.
5. While holding the control box steady, simultaneously press and hold both the Port 1° and Starboard 1° buttons then turn the Rudder dial on (past 1). Continue holding the buttons. The light will blink red 5 times and then remain solid: you can now release the buttons.
6. Wait 15 seconds more. Do not turn off power to the autopilot before 15 seconds have passed.

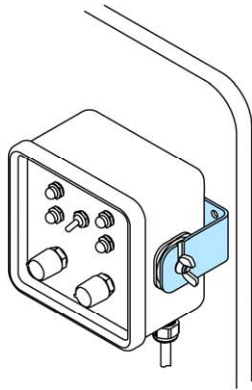
The Magnetic Reference is now set in memory and only needs to be set again if you move to a region with a significantly different magnetic inclination or recalibrate the autopilot compass magnetic sensors. The procedure for recalibrating the magnetic sensors in the autopilot compass is given in the Operation Manual.

## CONTROL BOX ORIENTATION RESTRICTIONS

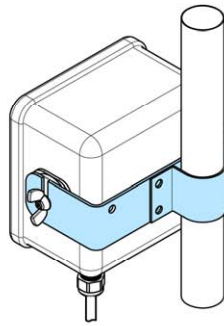
The control box must be oriented level and facing either the bow or the stern of the boat. The cable exits the bottom side of the box. If the control box does not face the bow or stern of the boat, the autopilot heading will be affected by the boat pitching and heeling.



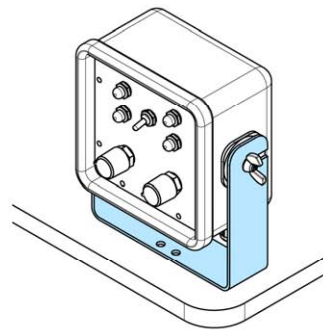
## MOUNTING THE CONTROL BOX



Bulkhead Mounting  
(short bracket)



Pipe Mounting  
(short bracket with pipe clamp)



Console Mounting  
(long bracket)

The control box **MUST NOT** be mounted too close to anything magnetic that will influence it, and the location should be checked with a handheld compass before placing an order. See “How to check for magnetic interference” below. Only use included 316 stainless fasteners for mounting the control box, other stainless alloys and fasteners can have a magnetic field. For easy removal and servicing, cutting and splicing the control box cable is not recommended. If routing is preferred, complete sea trials **BEFORE** cutting and routing the cable to make sure the mounting location is free of magnetic interference.

Mounting the control box on the pedestal guardrail below the binnacle compass and shift levers often works well. This location offers easy access and operation. It may also be mounted several inches above the ship’s compass card and to the side (also on the pedestal guardrail). It must be at least 12”-14” above, fore, or aft of the standard motor box; if using a vertical motor box it must be at least 18” above or 12”-14” to the side. The lower part of the binnacle compass where compensating magnets and engine levers are located will usually show a slight magnetic field.

Electric motors, radio speakers, tool boxes, winch handles, dive knives or fasteners can also cause interference if too close, even on the opposite side of a bulkhead. Instrument screens, tablets and other electronics are often magnetic as well.

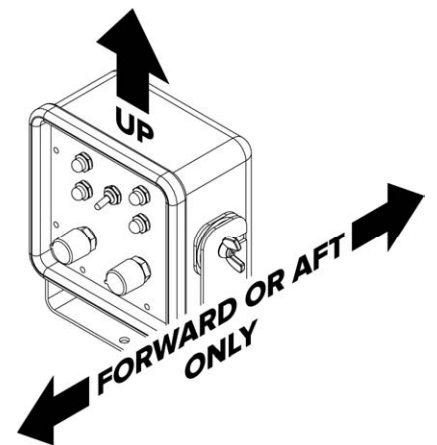
The control box must be oriented level and facing either the bow or the stern of the boat. The cable exits the bottom side of the box. If the control box does not face the bow or stern of the boat, the autopilot heading will be affected by the boat pitching and heeling.

The **short bracket** is used to mount it to the pedestal rail (it can be tightened firmly enough to allow swinging fore or aft during use if needed), or to a vertical bulkhead or sidewall. The **long bracket** is used to mount it to a horizontal shelf, console, or to hang from an overhead. Only one bracket is included, let us know which is preferred at time of ordering. Only use included 316 stainless fasteners.

### Control Box Mounting Requirements

**Note: Do not route cable until after successful sea trial**

Mount the control box a minimum 12 inches above motor box and minimum 8-10” below the binnacle compass or several inches above it. If mounting the control box to a cockpit sidewall, do not mount it directly to port or starboard of the motor box, mount it a minimum 12” fore or aft of the motor box; if using a vertical motor box at least 18” above it or 12” to the side; this is to avoid interference from the motor’s magnetic field. A common cause of magnetic interference is locating the control box too close to the motor box, ship’s compass, or engine control cables and parts that may have become magnetized over the years.





**NOTE REGARDING STEEL BOATS:**

We do not recommend the autopilot for steel boats. The control box must be located more than six feet from the nearest steel. If the magnetic field is too strong the autopilot will not be able to keep the boat on heading.

The CPT is able to steer on some steel boats but not all. The electronic sensor in the control box is more sensitive to magnetic fields than the older CPT models that used an optical compass. Every steel boat is different, and for the autopilot to operate successfully, any magnetic fields cannot cause more than five degrees of needle deflection from a hand-held compass. Some owners have mounted it on wooden boom gallows, aluminum or wooden mizzenmasts, under or on top of wooden coach roof, etc. Contact us for directions for performing a magnetic survey of your vessel before ordering a CPT.

**Testing the Control Box before final mounting**

Before the final tightening of the control box bracket to the pedestal pipe, or drilling any pilot holes to mount the bracket, do the following steps:

1. The CPT is set for the northern hemisphere at the factory. If you are in the southern hemisphere, set the magnetic reference (see Setting the Magnetic Reference). Temporarily mount the control box in its proposed location. Mount the control box in the bracket using the wing nuts, with rubber washers on the inside. (Only tighten wing-nuts finger tight; never use pliers as the bolts may break or strip.) Keep the top of the control box level; do not tilt out of plumb in the bracket.
  2. Slip the belt OFF the small motor pulley gear, and engage clutch. (Push the black pulley gear in while turning it until it snaps in.)
  3. Check to make sure that the 10 amp fuse is in place, and that power is available. The red wire must connect to +12V, the black wire to ground / battery negative.
  4. The motor rotation direction has been preset for your installation at the factory; you should not have to make any changes. The instructions for changing the motor rotation are on page 20, if needed.
  5. Flip toggle to STANDBY. Turn the autopilot on by turning Rudder dial to 5. Turn Deadband dial to 3. Allow **one minute for autopilot to warm-up**. (Do not toggle to Hold Heading until autopilot has been on for one minute.)
  6. After warm-up, flip the toggle to HOLD HEADING. The pilot will make a slight correction after 10 seconds, then periodically every 10-seconds. Push the 10-degree PORT button once: the small drive pulley should turn in the direction needed to turn the boat to port. It will make an initial rotation, then stop and wait, with repeated short pulses once/second in an attempt to change the boat's heading. Push the 10-degree Starboard button once: the small drive pulley should rotate back in the direction to turn the boat to starboard.  
**\*If, when toggled to Hold-Heading, the autopilot immediately makes corrections every second there is magnetic interference in the mounting location or inadequate warm-up time allowed.**
- \* When left on Hold Heading, it is normal for the pilot to make a small correction once every 10 seconds. If the belt is on DO NOT let the wheel corrections continue until the rudder-stops are reached, flip to Standby or turn power off or disengage clutch.
7. Follow the steps for the SEA TRIALS found in the OPERATION MANUAL before final installation of the control box. The vessel should be tested while motoring on North, South, East, and West headings.

## TROUBLESHOOTING

- If the light on the control box does not turn red or green when the autopilot is turned on (Rudder dial turned to 5), the autopilot is not getting power. Make sure the red wire is connected to 12 volts positive and the black wire is connected to battery negative. If you have poor wiring, bad connections, or small gauge wires the voltage may read 12 volts but there will not be enough current for the motor to operate. In these cases a voltmeter will show the voltage dropping when the motor attempts to run.
- Check the electrical connection by testing for motor torque and voltage drop: With the belt off and clutch engaged, set the rudder control to 10 and push a 10-degree button. Grip the clutch disk with your hand; the motor should show good torque and be difficult to slow. If the clutch is easily stopped there is voltage drop in the electrical connection and the pilot will not operate properly. The supply voltage level must be measured when the motor is operating to test the connections.
- If the drive pulley is not turning in the proper direction: follow the instructions for changing the motor rotation on page 20.
- If the drive pulley does not turn at all: be sure the clutch is engaged, check for proper wiring and that the red wire connects to +12V. If the power wires are connected incorrectly there will be no response from the control box controls or small drive pulley and the pilot will not operate.
- After 1 minute of warming up, if the pilot makes corrections once per second in the same direction while stationary:
  1. Flip the toggle to Standby and then back to Hold Heading.
  2. Keep the control box steady and observe the drive gear.
  3. If the autopilot makes corrections once per second in the same direction, flip the toggle to Standby, wait 30 seconds, and then flip toggle back to Hold Heading.
  4. If the autopilot continues to make corrections at least once per second in the same direction as before, this is an indication that:
    - the pilot was not allowed adequate warm-up time, or
    - the boat's heading is changing, or
    - there is magnetic interference, or
    - the magnetic reference was not set
- Magnetic interference: Try moving the control box further from the motor box, ship's compass or other magnetic influence, try holding it high above the pedestal, or to a cockpit seat or other area temporarily to test the pilot and find a suitable location. Mild interference may only become evident on some boat headings during sea trial. If another location for the control box needs to be found, forward an installation photo and contact CPT for advice.

## HOW TO CHECK FOR MAGNETIC INTERFERENCE

The CPT heading sensor is built into the control box so the control box mounting area must be free from magnetic influences. The helm area of most boats will be free of magnetic fields, but this should be checked. Use a hand-held compass, preferably a needle-bearing hiking compass, to check for magnetic fields near your pedestal. (Using magnets to see if they stick to something magnetic is not useful here at all.) Stereo speakers, dive knives, and winch handles should not be located near the control box, as well as high current cables, radar or LCD screens and electronic devices such as phones and tablets. Stainless fittings that are not 316 stainless or have welds can be magnetic. Pedestal guardrails made from dodger/bimini fittings are often magnetic.

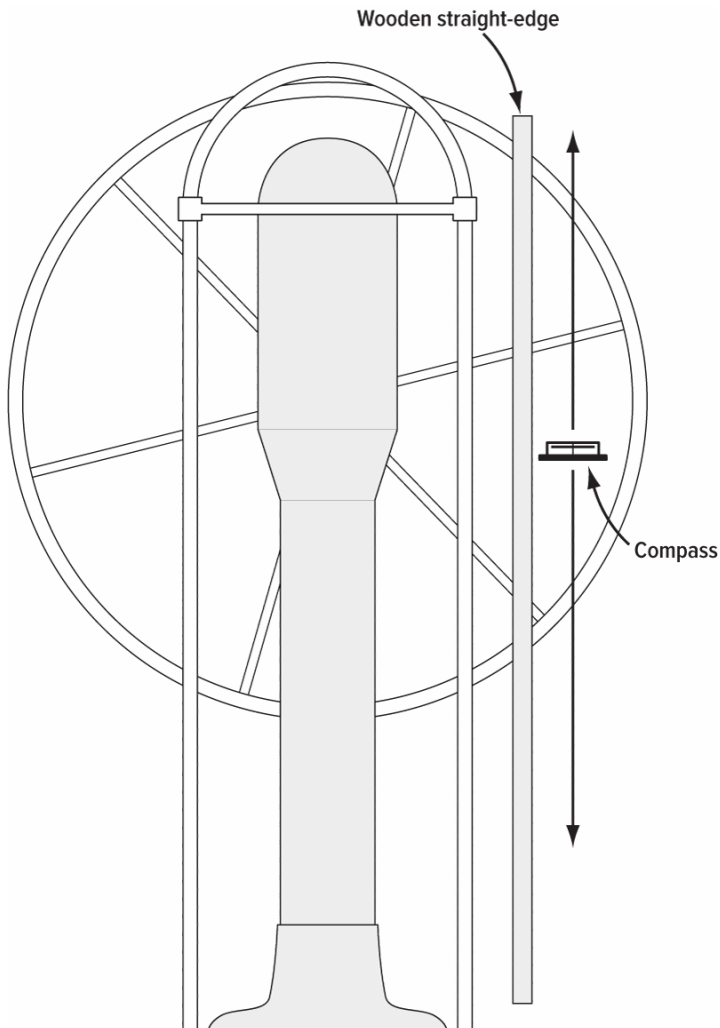
There is a short video on our website that demonstrates how to check for magnetic interference:

[www.cptautopilot.com/magnetic\\_interference\\_check.php](http://www.cptautopilot.com/magnetic_interference_check.php)

A handheld compass that uses a needle (a simple hiking compass) is usually more accurate and easier to use than one that uses a floating card. A marine handheld compass with a floating card is harder to read in this situation and not recommended. A cell phone compass app may be used, and the rectangular phone shape can make it easier to hold the phone square but there are some limitations:

- If the phone has been exposed to strong magnetic fields the compass will not read accurately due to magnetized metal inside the phone.
- The phone compass may not be sensitive enough to show changes of less than 3 or 4 degrees.

With your boat parallel to the dock, stand on the dock and check the dock's heading and the boat's heading with the magnetic compass. Step on the boat, hold the compass 3' above or away from the pedestal and take a reading. The two headings should be very similar. Keeping the compass oriented, approach the pedestal area and watch the needle to notice any deflection from magnetic fields. Next place a yardstick or a firm wooden straight-edge against the pedestal guardrail and rest it firmly on the deck. Hold the straight-edge steady, so it doesn't twist. While holding the compass firmly against the straight-edge to keep the compass from rotating at all, slowly slide it up and down the straight edge and notice the amount of needle movement or deflection. The needle must not be pulled or deflected more than 5-degrees near the mounting area.



Hiking compasses work well for observing small needle movements.

Apply a thin slice of tape as a marker on the face of the handheld compass. This will provide a reference that makes reading the compass needle or card movement easier.

1. Hold the compass edge firmly against the straight edge to keep compass oriented without movement or rotation.
2. Take readings from the deck level to above the pedestal, next to each guard rail. Repeat the readings forward and aft of each guardrail.
3. Note any compass needle deflection. Needle deflection should be less than 5 degrees.

You may notice some needle deflection as you pass the area just next to the ship's compass (there are compensating magnets in the case) and near the engine control levers. There is usually no needle deflection 6-10" below this area or 3"-4" above the ship's compass card. If the needle deflects more than 5°, a more suitable location will need to be found for the control box.

Some boats may have steel parts that have become magnetized over the years. Magnetism can come from steel in engine control cables and pins, steering cable fittings, any stainless bolts or dodger fittings that are not 316 SS, homemade guardrails, and fasteners used for pedestal tables. Welded joints or parts may also be magnetic. On a few boats, the boat's engine is located just inches under the pedestal which may cause a problem. Steel boats should do a careful magnetic survey, and have a mounting location at least 6 ft from the nearest steel.

If a suitable location is not available for the control box, use of the CPT is not recommended.









