

# PULSAR

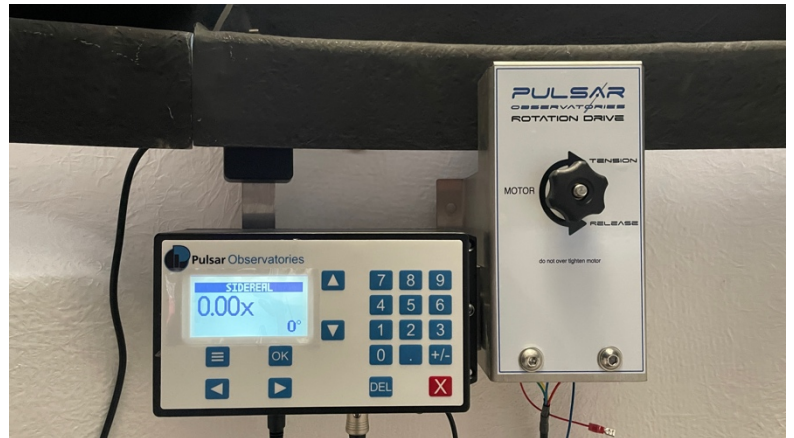
## OBSERVATORIES

### DOME ROTATION DRIVE INSTALLATION

The Pulsar rotation drive unit allows you to control the dome rotation and, if installed, shutter open / close using either the LCD control unit or through a computer using the supplied software.. The unit is powered from the supplied 12-volt adaptor.

### **INSTALLING THE DRIVE UNIT.**

The rotation drive can only be fitted to the wall panels adjacent to the door (the longer panels). The drive is attached to the wall by 2x M8x30 allen bolts. Making sure the drive housing is straight, measure down approximately 200mm from the top of the wall as shown below and mark the bottom holes. Drill using an 8mm drill bit. The drive can then be bolted to the wall with the plastic spacers placed in between the wall and the drive. Do not over tighten the Nyloc nuts when fixing in place.



The encoder can then be fitted to the wall next to the drive. Measure down 120mm from the inside top of the wall and drill 1x 8mm hole. The encoder bracket and spacer can then be bolted in place making sure the bracket is straight. It is a good idea to plug the encoder cable into the encoder at this point for ease of access.

### **FIXING THE ENCODER MAGNET.**

Align the dome top so that the shutter opening faces North (the recommended home position to allow the induction charger to recharge the shutter battery if fitted), then mark and drill the position for the encoder magnet on the dome flange, NOTE: the pickup sensor is to the right-hand side of the encoder housing and in line with the cable plug. Using a 10mm drill as shown below. Push the magnet into the hole with the yellow sticker facing away from you so that it is flush with the wall. It can be a good idea to cover the magnet with a small piece of tape. The hole should be very close to the bottom of the dome flange.

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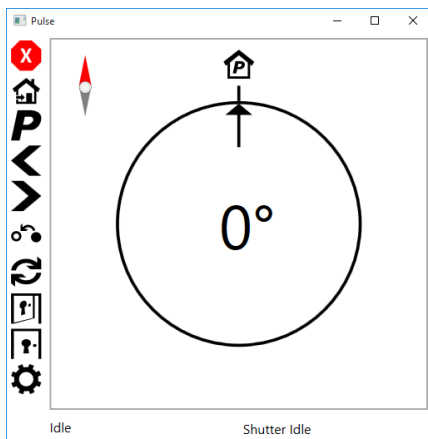
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### USING THE ROTATION DRIVE

The black knob on the drive unit allows for adjusting the pressure against the domes bottom rail. Switch on the power on the control unit.

The rotation drive can be operated with either the LCD onboard display menu or with the supplied software.

On first use the drive will need to be calibrated. From the drives LCD control panel, go to the SETTINGS menu and select 'CALIBRATE". The dome will then self-calibrate. The calibration routine will rotate the dome until it has seen the magnet at least twice. If the dome continues to rotate without stopping, check that the magnet is the right way round.



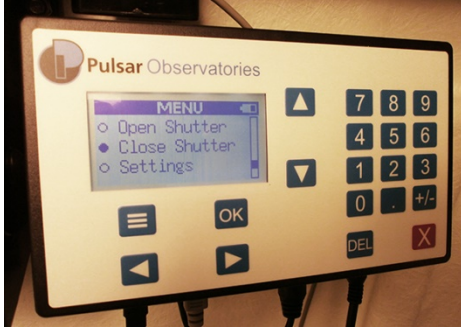
### OPERATION USING LCD DISPLAY:

The observatory must be calibrated first, and the Home and Park position angle is entered in the software. Home and Park can be the same angle reading, we recommend this angle to be 0 or due North as this will place the aperture close to the telescopes polar home position in most cases.

The LCD display is self-explanatory, the up / down arrows will scroll through the menu, left / right arrows to slew dome left or right, the number keypad is to set an angle to go to, or the tracking speed. The OK button will operate each command.

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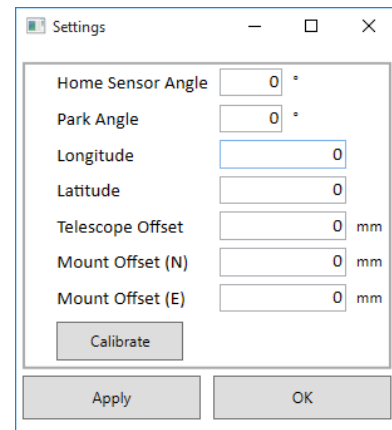
on keypad, press OK

- OPEN SHUTTER: scroll through the menu to Open Shutter, press OK
- CLOSE SHUTTER: scroll through the menu to Close Shutter, press OK
- SLEW DOME CLOCKWISE: press right-hand arrow
- SLEW DOME ANTI CLOCKWISE: press left-hand arrow
- GO TO HOME POSITION: scroll through menu to Home, press OK
- GO TO PARK POSITION: scroll through menu to Park, press OK
- CHANGE SIDEREAL SPEED: scroll through menu to Sidereal, enter speed on keypad, press OK
- SEND DOME TO ANGLE: scroll through menu to Angle, enter angle

### OPERATION USING SOFTWARE:

The drive is provided with the Pulsar remote dome software, along with an ASCOM driver for third party software. It is also available from our website. Run the .exe file and follow the instructions, when complete, plug in the USB cable from the rotation motor control box and connect the power supply. We recommend calibrating the dome from the LCD control panel prior to connecting to a PC. Once calibration is completed, the remote dome is ready for use.

Enter the Park and Home position angle (0 recommended).



The Pulsar App works the in the same way as the LCD control panel.

Also included is a fully compliant ASCOM driver for use with third party control software like SGPro, Maxim DL and N.I.N.A. These programs, using the ASCOM platform allow dome to be 'slaved' to the telescope. You will need the latest ASCOM platform installed on your PC. Note that the Pulsar app cannot be run at the same time as a third party control program as I will occupy the comm port and stop it connecting to the dome. On initial set up ASCOM will require some measurements from your observatory in order to correctly calculate the positional data used when slaving to the telescope. In most cases this is straightforward but sometimes some adjustment of the GEM offset figure is required to fine tune the pointing accuracy.

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### SHUTTER DRIVE INSTALLATION / USER GUIDE

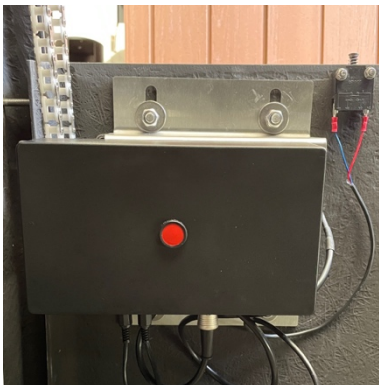
The Pulsar shutter drive is powered by an in built lithium battery and is permanently powered on. The drive is supplied in a 'shipping mode' to prevent damage. This mode is cleared by connecting both limit switches and connecting either the induction charger, the rotation drive's 12v supply or 12v battery. The battery is re-charged by either the optional induction charger or a 12v powertank. The single button on the front of the unit will open or close the shutter; there is also a Bluetooth connection to the rotation unit to allow the shutter to be open or closed from the rotation unit LCD display, or by using a PC and the supplied software.

### **PREPARING FOR THE INSTALL**

It is advisable to install the chain brackets to the dome prior to installing the aperture lid, whilst the dome top is partially assembled on the ground. Also, the pulley system and latches if supplied will not need to be installed. Familiarize yourself with the different components, and study the images to see how the shutter system operates. The chain is supplied pre-cut to fit a 2.2m dome, with an extension piece for a 2.7m which is fitted with a master chain link.

### **INSTALLING THE GUIDE BRACKETS**

There are 3 chain guides on a 2.2m dome or 4 chain guides on a 2.7m dome, and one top guide to be installed on the right hand rear dome quadrant, as viewed from the front. Position the brackets as shown, so that they are approximately equal distances apart from each other, and from the top bracket and drive unit position. The position of the chain brackets is calculated by measuring the curvature of the shutter opening and spacing them equally apart. (2.2m = 430mm centres x 3, 2.7m = 410mm centres x 4).



Once the position of the guides are marked, offer the them over the dome edge, if they are too tight you will need to file the edge of the glass fibre where the bracket needs to fit. When the bracket neatly slips over the dome edge, mark and drill the fixing holes for the chain brackets. Drill from the outside using a 6mm drill bit. With the brackets in position, bolt the brackets in place, from the outside and through the top roller, and secure with the 6mm nut supplied.

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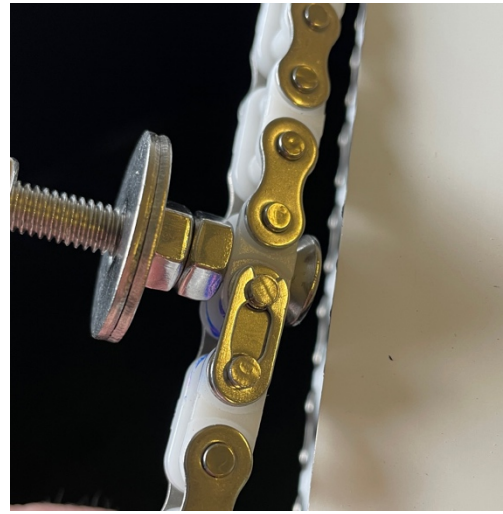
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Look at their alignment with each other, making sure that they are perpendicular and in line with each other. This is easier if the chain is partly installed over the rollers. Remove the lower bolt on the bracket and pack with washers if necessary, to achieve the desired result.

The rear guide can then be fitted. There will be markings on the top panel showing where to drill the holes to mount the guide. Paying attention to the position of the guide make sure that it lines up with the other brackets, this is important to ensure that the chain moves smoothly. Also, make sure that the bracket is at the correct angle, by using additional washers as packing if required. Again, drill the fixing holes with an 8mm drill bit and secure the bracket with the bolts supplied.



**Rear bracket shown with shutter fully open**



**Master Chain Link**

### **INSTALLING THE SHUTTER DRIVE UNIT**

The shutter drive is supplied in “shipping” mode”. This prevents the drive from running in transit. To exit shipping mode simply plug the rotation drive’s 12v power supply into the bottom of the shutter drive. The drive should then beep and this will signify the drive is now active.

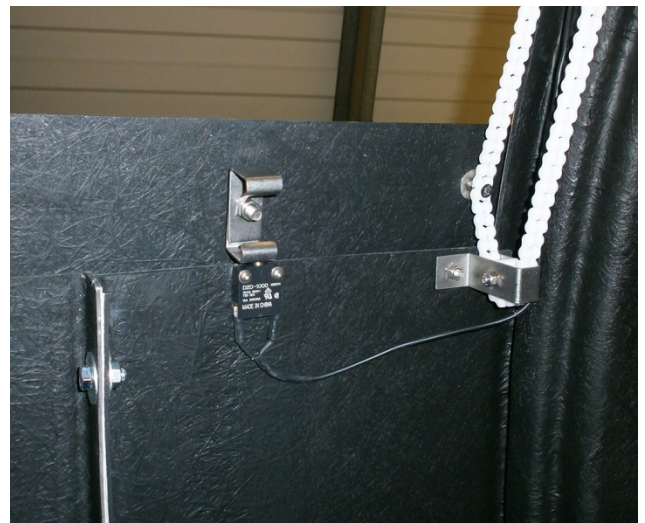
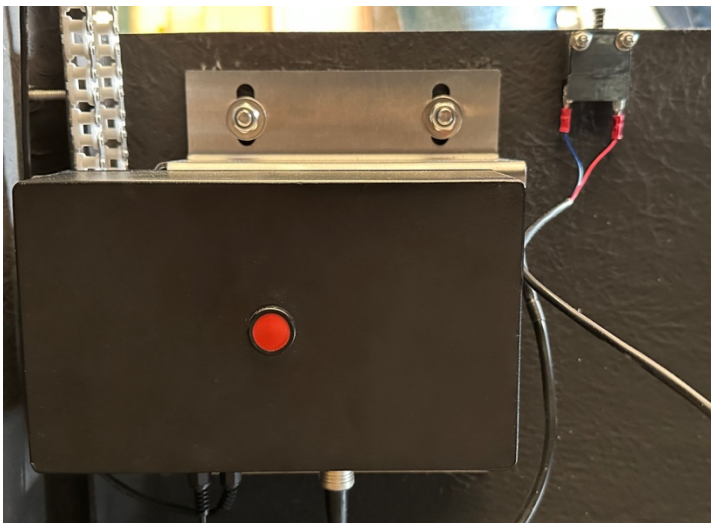
Install the chain through the rollers and rear bracket as shown in the pictures. The drive is supplied with the chain set to the correct length. The chain is clipped together using the master link at one end of the chain. This is a standard chain fitting and simply requires clipping into place with a small pair of pliers. Position the drive unit to the dome wall as shown; level with the top of the aperture opening, ensuring that the chain is in line with the guides, then mark the hole positions for attaching the drive casing using the bottom of the slot. Drill a small pilot hole first, then drill from the OUTSIDE using an 8mm drill. Fix the drive unit in position with the 8mm button head bolts supplied. stage.

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### INSTALLING THE LIMIT SWITCHES

The limit switches are used to stop the shutter at the correct open and closed positions. You will need to use the bracket supplied to operate the limit switches. **It is important that the limit switches and bracket operate correctly to prevent the shutter from over running.** The lower limit switch can be fitted approx. 15mm to the side of the drive unit using the 2xM4 bolts and Nyloc nuts provided. Position the bracket up to the lower limit switch so that it operates the switch, then mark the hole position and fix the bracket using the bolt provided. Fully open the shutter and install the upper limit switch, making sure that the switch is operated against the bracket before marking the hole positions.



Attaching the chain to the lid.

With the shutter fitted, and the chain in place with the chain bolt easily accessible, mark the lid and drill a 6mm hole. You can then insert the chain bolt through the hole and fit with a Nyloc nut.





Run the cable to the top limit switch by feeding it behind the chain brackets, and through a small hole that can be drilled to pass it through the dome flanges, taking care that it cannot be in contact with the chain. You can just tape the cable into position. Be careful to ensure that the limit switches operate in time to prevent the shutter from over running! After operating for the first time, the chain may need to be adjusted by loosening the clasp and puling one side of the belt through further. Be careful not to apply too much tension – the chain will operate perfectly well with some slack. Note that when the shutter first starts to open or close, the motor will sound like it is under more strain than when it is in the middle of its travel. This is normal.

## **OPERATING THE SHUTTER DRIVE MOTOR**

The shutter drive unit is powered by a pre-installed lithium battery. The battery can be charged by either a 12v powertank, the power supply for the rotation drive, or the Pulsar induction charger. The shutter drive is permanently powered on and the shutter can be opened or closed using the single button on the drive casing. Alternatively, the shutter can be opened or closed using the LCD display on the rotation drive unit, via a Bluetooth connection with the rotation drive, or remotely, using the installed software on a computer.

NOTE that the shutter control button must be pressed for 2 seconds to start the motor.

## **SHUTTER DRIVE INDUCTION CHARGER INSTALLATION**

The induction charger will fully charge the lithium battery when the observatory is placed in its park or home position when not in use.

This product represents a further remarkable use of technology to keep Pulsar Observatories way ahead of its competitors.

**Set the observatory to its home position before installing the induction charger components.**

The pictures below show the 2 charger components in position, the larger bracket fits to the top of the rotation drive unit using the 2 bolts provided, plug the cable into the socket directly adjacent to the power socket, beneath the rotation drive LCD display unit. The smaller bracket is fitted to the dome wall directly opposite the first component, using the bolt supplied, with the dome set in your preferred home position. Plug the cable into the socket beneath the shutter motor housing.

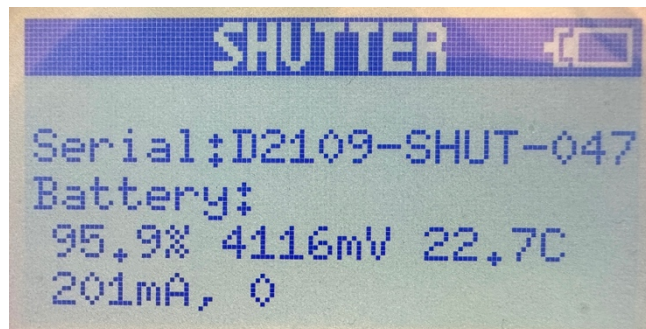
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Adjust the brackets to line up with a gap of approximately 5mm, carefully rotate the dome to make sure that the charger bracket does not come in to contact with any dome flanges.

When aligned with the dome in its park position, the LCD screen will display the current charge condition, as shown below. The induction charger can take a couple of minutes to engage.



**FOR TECHNICAL SUPPORT CALL +44(0)1366 315006**  
**Or email: [sales@pulsar-observatories.com](mailto:sales@pulsar-observatories.com)**





## ADDITIONAL NOTES

### **Home sensor and calibration**

If your dome does not calibrate, this is usually caused by either the magnet being round the wrong way or the magnet being mounted either too low or too high in the flange. Typically just tuning the magnet around will enable the dome to calibrate. The yellow sticker on the magnet must face the encoder.

### **Shutter Drive connection, battery and charging.**

The rotation drive will automatically look to connect to a shutter drive when powered on. The rotation drive will not connect to a shutter drive if it is in shipping mode, or if the battery is too low to power the Bluetooth module. The drive can be directly charged by the power supply for the rotation drive for a faster charge. The induction charging is a managed charging system that regulates the charging rates based on load and temperature. Once the drive is connected and the charger has initialized the battery will be managed by the rotation drive. The rotation drive must be kept powered on in order to charge the shutter. In the event of a connection or charging failure, the drive can be reset to factory settings by pressing the small reset button on the bottom of the drive and power cycling the rotation drive. See below:

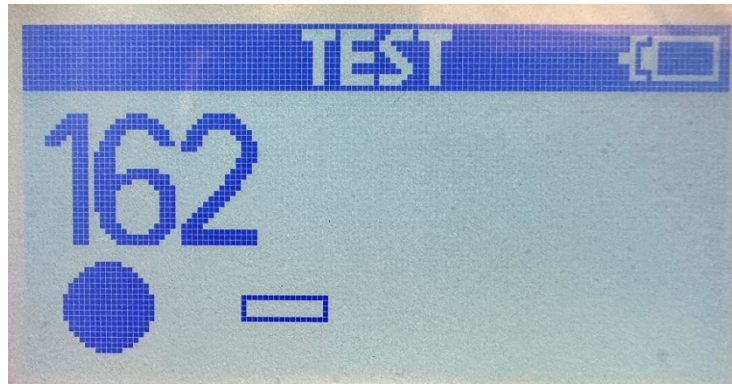


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### Troubleshooting the Rotation drive.

In the unlikely event of an issue with the rotation drive, there is a test screen on the LCD controller menu. After any mechanical obstructions or issues have been ruled out (usually by visual inspection) the function of the encoder and home sensor can be verified using the TEST screen in the settings menu. When you go into the TEST screen you will see the following:



The number displayed is the raw encoder readout. This is not an angle display. When the dome is moved left and right using either the motor or by hand the number should change. It should increase when the dome moves in one direction, and decrease in the other. If this is the case, it tells us that the dome can read its position. The circle represents the home sensor. When the magnet passes over the sensor, it will change state. If it does not change when the magnet passes over it, try turning the magnet around. The sensor is on the right hand side of the front of the encoder unit, in line with the cable plug.

The rectangle shows the shutter closure port. This is the small rectangular socket on the bottom of the rotation drive. Supplied with your drive will be a small plastic plug which can be connected to a good quality weather sensor to allow automatic closure of the shutter if rain is detected.

**FOR SAFETY REASONS IT IS ADVISABLE TO REPLACE THE SECURITY CLAMPS IF THE DOME IS UNUSED FOR A LONG PERIOD OR HIGH WINDS ARE EXPECTED.**

Pulsar Observatories are market leaders in the supply of glass fibre observatories and we have invested heavily over the years to ensure our products are of the highest quality. Our world leading innovative remote drive systems are by far the most technically advanced products of their type.

We are constantly looking at new ways to improve our products and encourage suggestions and customer feedback to help us stay ahead of the game. We also welcome pictures of your observatory setup to use in our website gallery.

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