

# **PULSAR OBSERVATORIES MOTOR DRIVE INSTALLATION GUIDE**

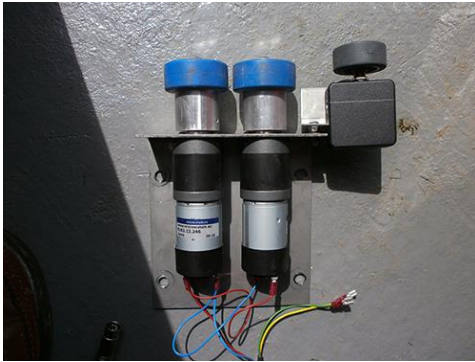
## **DOME ROTATION DRIVE INSTALLATION**

*The new style Rigel rotation drive unit allows you to control the dome rotation and 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. The unit will need to be powered up, with the USB cable connected to a PC before operation. **The software will need to be installed on the PC and the observatory dome will require calibration before using the drive unit for the first time.***

*The drive unit uses 3 drive motors driven by high torque 12V motors, powered by mains adaptor (supplied) or battery pack.*

- **INSTALLING THE DRIVE UNIT.**

*Install the rear drive motor unit to the dome wall first. Position the drive unit to the right side of one of the wall flanges, as shown in diagram below, please note that the encoder is now installed to the motor unit, and is spring loaded off the dome wall.*



*Mark and carefully drill the 4 fixing holes, as shown below. There is a pencil line on the encoder casing to help align the unit to its correct position. The pencil line should be level with the bottom of the dome flange. It is advisable to drill a small pilot hole from the inside first, then drill 8mm from the outside. This helps prevent the white gel coat from breaking out. Bolt the drive unit in position using the M8x30mm bolts and washers provided, secure with the standard M8 nuts supplied.*



- **FIXING THE ENCODER MAGNET.**

Align the dome top to face the shutter towards the south (the recommended home position to allow the solar panel to recharge the shutter battery), then mark and drill the position for the encoder magnet on the dome flange, using a 10mm drill as shown below. Push the magnet into the hole so that it is flush with the wall, and then cover the magnet with the square adhesive pad.



Attach the wires from the control box onto the rear drive motors, taking care to ensure that the wires are installed correctly to avoid damage to the motors, and to ensure that each motor rotates in the required direction (both rear motors clockwise, front motor anti-clockwise; change wires over if necessary). The number on each wire corresponds to a number below each motor terminal. This concludes the installation.

- **USING THE ROTATION DRIVE**

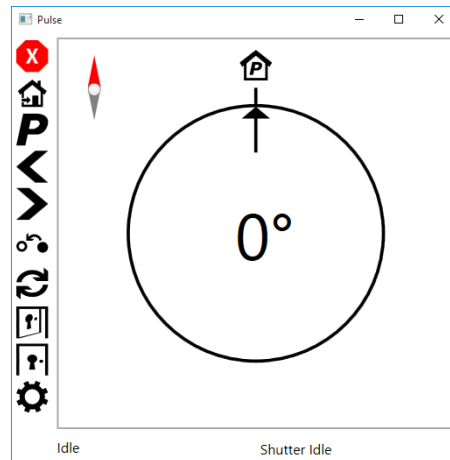
The 2 black knobs on the drive unit allow for adjusting the pressure against the drive rail. The top knob will increase the pressure against the rail but the lower knob has to be slackened off first and must never be more than lightly finger tight.

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.



LCD display



Software main screen

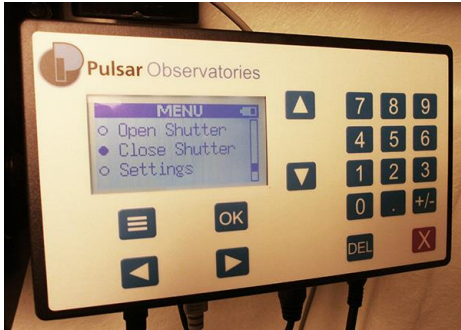
**Operation using LCD display:**

Before using the LCD display, the software will need to be installed as outlined below.

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 180 or due south, this will place the solar charging panel south (facing midday Sun) and the shutter aperture in the correct position for observing.

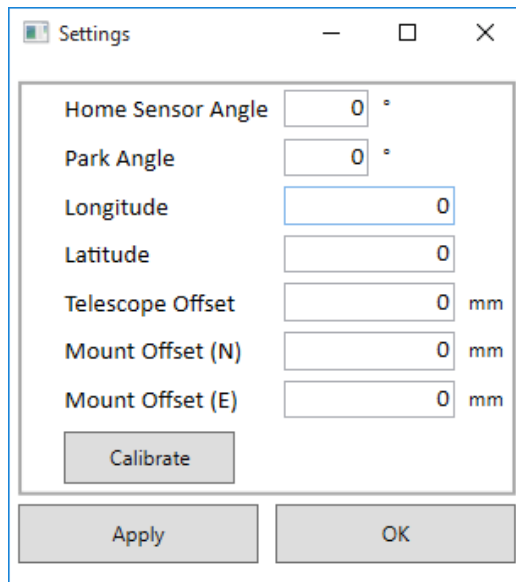
The LCD display is self-explanatory, the up / down arrows will scroll through the menu, left / right arrows to slew dome left or right, the number keypad is to set an angle to go to. The OK button will operate each command.



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 on keypad, press OK

**Operation using software:**

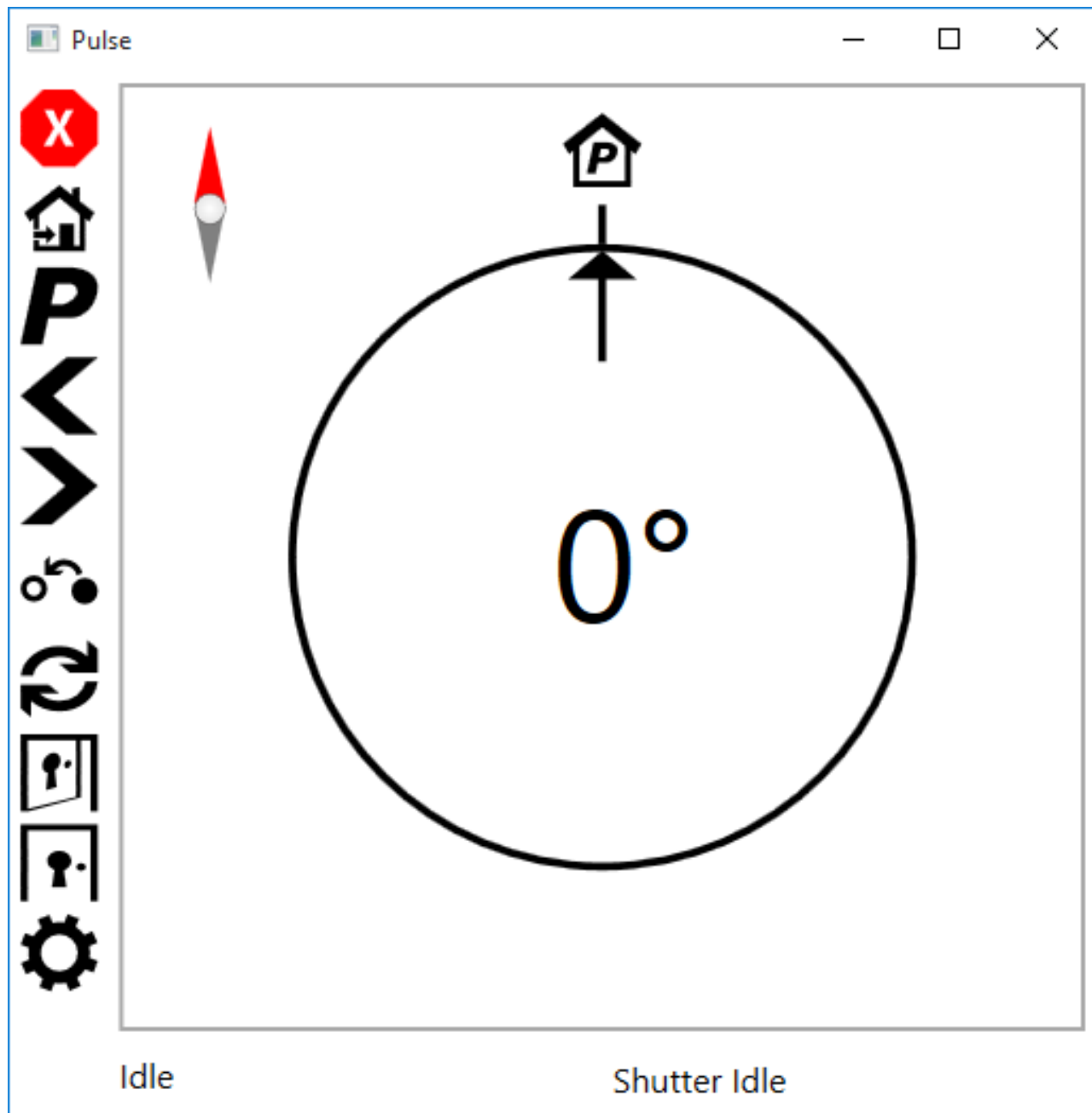
The CD provided will have the Pulsar remote dome software, along with an ASCOM driver for third party software. Open the CD and follow the instructions, when complete, plug in the USB cable from the rotation motor control box and connect the power supply. When using the software for the first time, go to the settings icon and click 'CALIBRATION', this action will calibrate the observatory dome to allow accurate alignment in the future. Once calibration is completed, the remote dome is ready for use. Enter the Park and Home position angle (180 recommended).



• **SOFTWARE CONTROLS**

The diagram below shows screenshots with explanations for the related icons.

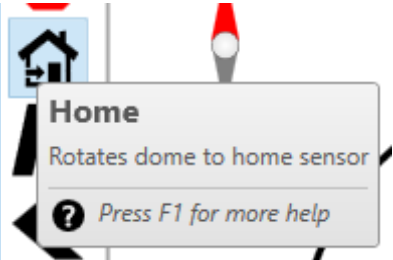
# Main Screen



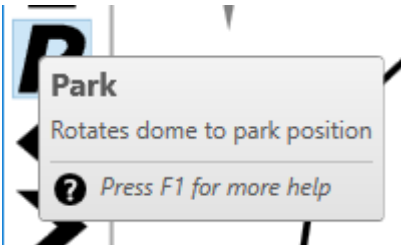
## Stop



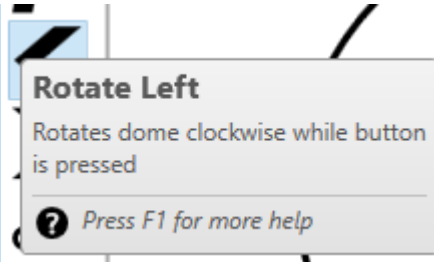
## Home



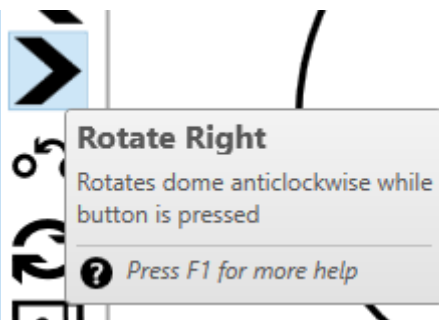
## Park



## Rotate Left



## Rotate Right



## Goto

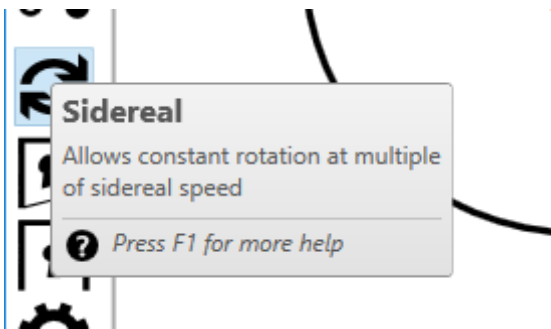


**Goto**  
Allows an angle to be entered to move the dome to


 *Press F1 for more help*

The screenshot shows a control panel with a blue 'Goto' button. A tooltip is displayed over the button, containing the text 'Goto' and 'Allows an angle to be entered to move the dome to'. Below the tooltip is a help icon and the text 'Press F1 for more help'.

## Sidereal



**Sidereal**  
Allows constant rotation at multiple of sidereal speed

 *Press F1 for more help*

The screenshot shows a control panel with a blue 'Sidereal' button. A tooltip is displayed over the button, containing the text 'Sidereal' and 'Allows constant rotation at multiple of sidereal speed'. Below the tooltip is a help icon and the text 'Press F1 for more help'.



**Sidereal**

Speed  x

Update

The screenshot shows a control panel with a blue 'Sidereal' button. A configuration dialog is open, titled 'Sidereal'. It contains a 'Speed' label followed by a text input field and the letter 'x'. Below the input field is an 'Update' button.

## Open



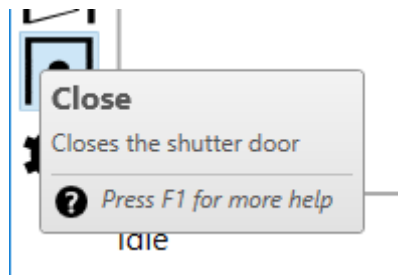
**Open**  
Opens the shutter door

 *Press F1 for more help*

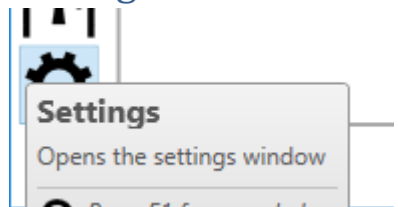
Idle

The screenshot shows a control panel with a blue 'Open' button. A tooltip is displayed over the button, containing the text 'Open' and 'Opens the shutter door'. Below the tooltip is a help icon and the text 'Press F1 for more help'. Below the button, the word 'Idle' is displayed.

## Close



## Settings



### *Future planned features (available as software upgrade)*

- RAC/DEC tracking
- Planet tracking
- Battery level and charging status of shutter
- Backlight timeout

*PC connected to dome acts as a server so other PCs on the same network can use the same software.  
iOS (will release before android) and Android app*

- **USEFUL HINTS**

*If security clamps fitted to the observatory wall, PLEASE ENSURE THAT THEY ARE RELEASED BEFORE ATTEMPTING TO ROTATE THE OBSERVATORY DOME.*

***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.***

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

***Visit us at [www.pulsarobservatories.com](http://www.pulsarobservatories.com)***

## **SHUTTER DRIVE INSTALLATION / USER GUIDE**

*The new style Rigel shutter drive is powered by an in built lithium battery and is permanently powered on. The battery is re-charged by the supplied solar panel. The red 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 quadrants prior to installing the aperture lid, whilst the dome top is partially assembled on the ground.*

*Also, the pulley system and latches will not need to be installed. Familiarize yourself with the different components, and study the images to see how the shutter system operates.*

- **INSTALLING THE CHAIN BRACKETS**

*It can be seen from the picture below that there are 3 side chain brackets on a 2.2m dome or 4 chain brackets if on a 2.7m dome, and one top bracket 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 also 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.*



*Once the position of the chain brackets are marked, offer the brackets over the dome edge, if they are too tight you will need to file the edge of the glassfibre 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. 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 chain bracket and pack with washers if necessary, to achieve the desired result. Position and mark the top bracket, paying attention to the position of the bracket as shown in the picture, making sure that it lines up with the other brackets, this is important to ensure that the drive chain moves smoothly. Also, make sure that the bracket is at the correct angle, by using additional washers as packing. Again, drill the fixing holes with a 6mm drill bit and secure the bracket with the 6mm bolts supplied. The hole nearest the outer edge will need to be drilled from outside, as it will not be accessible from below.*





***Rear bracket shown with shutter fully open***

- ***INSTALLING THE SHUTTER DRIVE UNIT***

*Install the chain through the rollers and rear bracket as shown in the pictures. Position the drive unit to the dome wall as shown; level with the top of the aperture opening, **ensuring that the drive sprocket is perfectly in line with the chain**, then mark the hole positions for attaching the drive casing. 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. Connect up the chain but **do not** fix it to the shutter at this stage.*

*Take the chain around the motor sprocket and remove necessary links to keep the chain as tight as possible. The links are easily snapped apart with a small flat screwdriver. An additional link may need to be removed once the motor has been tested. The chain can be tensioned further by loosening the tensioning knobs and pulling the motor down, please ensure that the sprocket remains square to the chain.*



***It is important that the chain is correctly in line through all the brackets, and with the drive sprocket, to ensure smooth operation.***

- **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 is already installed to the shutter motor unit, as shown in the picture. Position the bracket up to the lower limit 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.



With the shutter closed, overlapping the front of the dome by approx. 25mm, position the chain against the shutter, mark and drill the 6mm hole, and then attach the chain to the shutter with the 6mm bolt provided. The chain is spaced away from the shutter using the 6mm nuts supplied, ensure that the shutter does not bind on the brackets when opening and closing, by adding or removing a spacer nut (see picture below):



With the motor unit now in position, loosen the 2 black tensioning knobs on the motor casing and slide the motor up to the top of the slots and re tighten the knobs. 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. Be careful to insure 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 shortened again by removing a link from one side, or adjusting the motor further. The chain can be lubricated with a silicon spray; this will loosen the links and make operation smoother.

- **INSTALLATION OF SOLAR PANEL**

*The shutter drive unit is powered by the onboard lithium battery. This can be recharged using a power tank battery charger or by the supplied solar panel accessory. (The solar panel may differ from the one shown in the picture below).*

*Install the solar panel where shown on the picture below, using the bolts provided. Drill a hole under the rim of the dome wall, pass the cable through, and then plug the adaptor into the 12v socket on the shutter control unit.*



- **OPERATING THE SHUTTER DRIVE MOTOR**

*The shutter drive unit is powered by a pre-installed lithium battery. The battery is recharged by the supplied solar panel or by using a power tank battery charger. The shutter drive is permanently powered on and the shutter can be opened or closed using the red 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.*



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