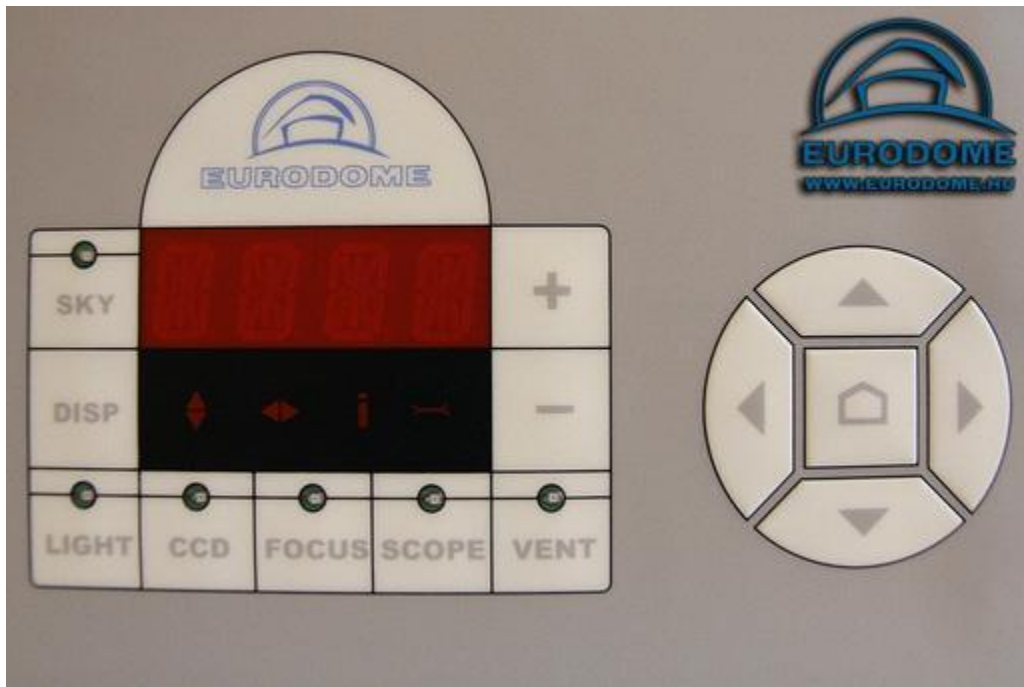
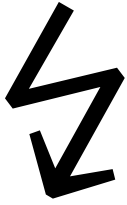


# Hardware User Manual

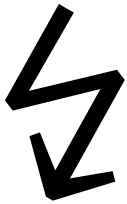
*EuroDome 2.0*



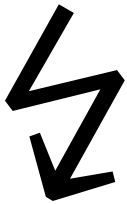


Before operating the EuroDome 2.0, check that the operating voltage of EuroDome 2.0 is identical with the operating voltage of your local power supply.

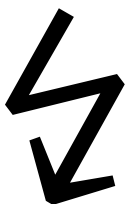
The operating voltage of EuroDome 2.0: 220 V AC, 50 Hz



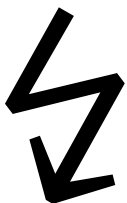
The unit is not disconnected from the AC power source (mains) as long as it is connected to the wall outlet, even if the unit itself has been turned off.



Completely disconnect the power cord (mains lead) from the wall socket (mains) if it is not going to be used for an extended period of time. When unplugging the unit, always grip the plug. Never pull the cord itself.



Should any solid object or liquid get into the system, unplug the system, and have it checked by qualified personnel before operating it again.



After turning on the unit or during operation the azimuth motor may start rotating the dome without any user intervention. Make sure, that the azimuth motor cannot make any injuries or damages. When fixing the mechanical parts of the dome, the unit must always be disconnected from the mains.

[Functional Chart](#)  
[Turning the EuroDome On or Off](#)  
[Emergency Stop](#)  
[Initial Configuration](#)  
    [Azimuth Rotation Direction](#)  
    [Teeth Count](#)  
    [North Direction](#)  
    [Geographical Position](#)  
[Changing the Settings](#)  
    [Latitude](#)  
    [Longitude](#)  
    [Date and Time](#)  
    [Teeth Number](#)  
    [North Direction](#)  
    [Sky Follow Direction](#)  
    [Sky Follow Gap Angle](#)  
    [Slowdown Angle](#)  
    [Fast Motor Speed](#)  
    [Slow Motor Speed](#)  
    [Shutter Moving Time](#)  
    [Using Sensor Unit](#)  
    [Sensor Light Sensitivity](#)  
    [Sensor Rain Sensitivity](#)  
    [Use GPS Time](#)  
[Rotating the Dome](#)  
[Operating the Shutter](#)  
[Automatic Star Follow](#)  
[Environment Sensors](#)  
[Switching External Units](#)  
[Wireless Remote Controller](#)  
[Technical Specification](#)

## Functional Chart



## Turning the EuroDome On or Off

The system can be turned on by turning the power switch clockwise. To turn the system off, turn the power switch counter-clockwise.

After turning on the unit the azimuth motor may start rotating the dome to find the home position. Make sure that the turning of the dome and the rotating of the azimuth motor do not make any injuries or damages.

## Emergency Stop

In case of emergency the system can be immediately shut down by pressing the big red mushroom-shaped button. After the emergency situation is over, the emergency button can be released by turning it clockwise.

The emergency stop button stops both the azimuth and shutter motors and cuts the power off. Note that the phase is still present in some cables inside the case, although the power of all electric units inside the case is cut off.

Before releasing the emergency button, turn the unit off by rotating the power switch counter-clockwise.

## Initial Configuration

The initial configuration can be performed after installation by using the console terminal of the system.

## Azimuth Rotation Direction

This option allows to define the rotation direction of the dome.

1. Press the DISP button until the i icon illuminates. The unit turns into initialization mode.
2. Press Up and Down buttons until the display shows AZIMUTH DIR.
3. Press Right button to start the initialization of the azimuth direction. The azimuth motor starts rotating the dome and the display shows PRESS AZIMUTH DIR.
4. Press either Left or Right button indicating the rotation direction of the dome. Press Left button if the dome rotates counter-clockwise, otherwise press Right button.

## Teeth Count

To determine the current direction of the dome, the unit counts the teeth of the cog of the azimuth motor during operation. For proper operation the exact number of the teeth has to be determined.

1. Press the DISP button until the i icon illuminates. The unit turns into initialization mode.
2. Press Up and Down buttons until the display shows TEETH NUMBER.
3. Press Right button to start teeth counting. The dome starts rotating, while counting the teeth of the dome. The display shows WAIT. Wait until the counting finishes and the dome stops.

## North Direction

The direction of the dome is presented to the user with respect to the geographical North direction.

1. Press the DISP button until the i icon illuminates. The unit turns into initialization mode.
2. Press Up and Down buttons until the display shows NORTH DIR.
3. Press Right button to set current dome direction to become the direction of North.

## Geographical Position

The geographical position of the unit is essential when using the automatic sky follow functionality, as the movement of the stars depend on the geographical position of the observer.

1. Press the DISP button until the i icon illuminates. The unit turns into initialization mode.
2. Press Up and Down buttons until the display shows SAVE GPS POS.
3. Press Right button to save the current GPS position as the geographical position of the system.

## Changing the Settings

### Latitude

This value stores the geographical latitude of the unit.

1. Press the DISP button until the wrench icon illuminates. The unit turns into settings mode.
2. Press Up and Down buttons until the display shows LATD.
3. Press Right button. The display shows the degree part of the currently stored latitude.
4. Press +/- buttons to change the value of the degree part of the latitude.
5. When finished press Left button.
6. Press Up and Down buttons until the display shows LATM.
7. Press Right button. The display shows the minute part of the currently stored latitude.
8. Press +/- buttons to change the value of the minute part of the latitude.
9. When finished press Left button.
10. Press Up and Down buttons until the display shows LATS.
11. Press Right button. The display shows the second part of the currently stored latitude.
12. Press +/- buttons to change the value of the second part of the latitude.
13. When finished press Left button.

## **Longitude**

This value stores the geographical longitude of the unit.

1. Press the DISP button until the wrench icon illuminates. The unit turns into settings mode.
2. Press Up and Down buttons until the display shows LOND.
3. Press Right button. The display shows the degree part of the currently stored longitude.
4. Press +/- buttons to change the value of the degree part of the longitude.
5. When finished press Left button.
6. Press Up and Down buttons until the display shows LONM.
7. Press Right button. The display shows the minute part of the currently stored longitude.
8. Press +/- buttons to change the value of the minute part of the longitude.
9. When finished press Left button.
10. Press Up and Down buttons until the display shows LONS.
11. Press Right button. The display shows the second part of the currently stored longitude.
12. Press +/- buttons to change the value of the second part of the longitude.
13. When finished press Left button.

## **Date and Time**

This value stores the current date and time of the unit.

1. Press the DISP button until the wrench icon illuminates. The unit turns into settings mode.
2. Press Up and Down buttons until the display shows YEAR.
3. Press Right button. The display shows the currently stored year.
4. Press +/- buttons to change the value of the year.
5. When finished press Left button.
6. Press Up and Down buttons until the display shows MON.
7. Press Right button. The display shows the currently stored month.

8. Press +/- buttons to change the value of the month.
9. When finished press Left button.
10. Press Up and Down buttons until the display shows DAY.
11. Press Right button. The display shows the currently stored day.
12. Press +/- buttons to change the value of the day.
13. When finished press Left button.
14. Press Up and Down buttons until the display shows HOUR.
15. Press Right button. The display shows the currently stored hour.
16. Press +/- buttons to change the value of the hour.
17. When finished press Left button.
18. Press Up and Down buttons until the display shows MIN.
19. Press Right button. The display shows the currently stored minute.
20. Press +/- buttons to change the value of the minute.
21. When finished press Left button.

## **Teeth Number**

This value stores the number of teeth on the collar of the dome.

1. Press the DISP button until the wrench icon illuminates. The unit turns into settings mode.
2. Press Up and Down buttons until the display shows TEETH NUMBER.
3. Press Right button. The display shows the currently stored teeth number.
4. Press +/- buttons to change the value of the teeth number.

## **North Direction**

This value stores the azimuth direction of the geographical North.

1. Press the DISP button until the wrench icon illuminates. The unit turns into settings mode.
2. Press Up and Down buttons until the display shows NORTH DIR.
3. Press Right button. The display shows the currently stored north direction.
4. Press +/- buttons to change the value of the north direction.

## **Sky Follow Direction**

This value stores the direction to be followed when two stars satisfy the conditions given by the declination and azimuth, one of which moves towards east, while the other one moves towards west.

1. Press the DISP button until the wrench icon illuminates. The unit turns into settings mode.
2. Press Up and Down buttons until the display shows AUTOFOLLOW DIR.
3. Press Right button. The display shows the currently stored sky follow direction.

4. Press +/- buttons to change the value of the sky follow direction to either EAST or WEST.

## **Sky Follow Gap Angle**

This value stores the azimuth angle between the star followed and the current azimuth direction of the dome, when the dome has to be moved. This variable is used to make the dome move fewer times.

1. Press the DISP button until the wrench icon illuminates. The unit turns into settings mode.
2. Press Up and Down buttons until the display shows AUTOFOLLOW GAP.
3. Press Right button. The display shows the currently stored sky follow gap angle.
4. Press +/- buttons to change the value of the sky follow gap angle.

## **Slowdown Angle**

When moving the dome to a given position (Home position or to a specific azimuth direction), and the angle between the azimuth direction of the dome and the target direction reaches the slowdown angle, the dome slows down for more accurate positioning.

1. Press the DISP button until the wrench icon illuminates. The unit turns into settings mode.
2. Press Up and Down buttons until the display shows SLOWDOWN ANGLE.
3. Press Right button. The display shows the currently stored slowdown angle.
4. Press +/- buttons to change the value of the slowdown angle.

## **Fast Motor Speed**

This value stores the speed of the dome when rotating fast. The value can be set between 50 and 100 percent of the maximum speed of the motor.

1. Press the DISP button until the wrench icon illuminates. The unit turns into settings mode.
2. Press Up and Down buttons until the display shows FAST SPEED.
3. Press Right button. The display shows the currently stored fast motor speed.
4. Press +/- buttons to change the value of the fast motor speed.

## **Slow Motor Speed**

This value stores the speed of the dome when rotating slow. The value can be set between 20 and 50 percent of the maximum speed of the motor.

1. Press the DISP button until the wrench icon illuminates. The unit turns into settings mode.
2. Press Up and Down buttons until the display show SLOW SPEED.
3. Press Right button. The display shows the currently stored slow motor seed.



4. Press +/- buttons to change the value of the slow motor speed.

## **Shutter Moving Time**

This value stores the seconds that is given to the shutter for fully opening or closing.

Note that over-opening and over-closing of the shutter is prevented by end position sensors. This value should be set to a value that is high enough to allow the shutter to fully open or close.

1. Press the DISP button until the wrench icon illuminates. The unit turns into settings mode.
2. Press Up and Down buttons until the display shows SHUTTER TIME.
3. Press Right button. The display shows the currently stored shutter moving time.
4. Press +/- buttons to change the value of the shutter moving time.

## **Using Sensor Unit**

This value can be set to allow or prevent using the optional sensor unit.

1. Press the DISP button until the wrench icon illuminates. The unit turns into settings mode.
2. Press Up and Down buttons until the display shows USE SENSOR UNIT.
3. Press Right button. The display shows the currently stored value.
4. Press +/- buttons to change the value to either YES or NO.

## **Sensor Light Sensitivity**

This value stores the sensitivity of the light sensor when the sensor unit is allowed. The sensitivity can be set between 0 and 100 percent. The lower the sensitivity, the more intense light is required to trigger an emergency event.

1. Press the DISP button until the wrench icon illuminates. The unit turns into settings mode.
2. Press Up and Down buttons until the display shows SENSOR LIGHT LIMIT.
3. Press Right button. The display shows the currently stored light limit.
4. Press +/- buttons to change the value of the light limit.

## **Sensor Rain Sensitivity**

This value stores the sensitivity of the rain sensor when the sensor unit is allowed. The sensitivity can be set between 0 and 100 percent. The lower the sensitivity, the more intense rain is required to trigger an emergency event.

1. Press the DISP button until the wrench icon illuminates. The unit turns into settings mode.
2. Press Up and Down buttons until the display shows SENSOR RAIN LIMIT.
3. Press Right button. The display shows the currently stored rain limit.

4. Press +/- buttons to change the value of the rain limit.

## Use GPS Time

When using GPS time is allowed and the sensor unit is allowed, the unit uses the GPS as a time source. Otherwise it uses the internal clock which is not very accurate, and can be set in the [settings menu](#).

1. Press the DISP button until the wrench icon illuminates. The unit turns into settings mode.
2. Press Up and Down buttons until the display shows USE GPS TIME.
3. Press Right button. The display shows the currently stored value.
4. Press +/- buttons to change the value of the value to either YES or NO.

## Rotating the Dome

Press the DISP button until the horizontal or the vertical arrows icon illuminated. To rotate the dome clockwise, press the Right button. To rotate the dome counter-clockwise, press the Left button.

To move the dome to the Home position, press the Home button.

Note, that when the horizontal arrows icon is illuminated the display shows the current azimuth direction of the dome with respect to the North direction.

## Operating the Shutter

Press the DISP button until the horizontal or the vertical arrows icon illuminated. To open the shutter, press the Up button. To close the shutter, press the Down button.

Note, that operating the shutter is only possible in the Home position of the dome. The opening and closing of the shutter is done by first rotating the shutter to the Home position, then opening or closing the shutter, and finally rotating the dome back to its original position.

## Automatic Star Follow

The automatic star following functionality continuously calculates the position of the given star so that the azimuth of the dome points always into the direction of the star. The declination of the star to be followed can be given by pressing DISP button until the vertical arrows icon is illuminated. The display shows the declination of the star that can be changed by pressing the +/- buttons. The actual star position is calculated by taking the current azimuth of the dome into account. In cases when two points of the sky satisfy the conditions given by the declination and the azimuth, one point moves towards east, the other one towards west. The one to be followed can be given in the [settings menu](#). After adjusting the initial parameters of the star to be followed, press the SKY button to start automatic star following. Note that if the given

parameters correspond to a real star position, the functionality starts and the LED of the SKY button illuminates.

Note, that for the automatic star following functionality to work properly the proper geographic position and North direction has to be set. On the other hand the exact time is not required.

## Environment Sensors

The environment can be continuously monitored by an optional external sensor unit. The unit has a GPS sensor, a rain sensor and a light sensor. The use of the sensor unit can be permitted or forbidden in the [settings menu](#). The sensitivity of the rain sensor can be set in the [settings menu](#). The sensitivity of the light sensor can be set in the [settings menu](#). The use of the GPS time source can be permitted in the [settings menu](#).

In case the light sensor or the rain sensor triggers, the unit turns into emergency mode. In emergency mode, the dome rotates into the Home position and the shutter closes.

## Switching External Units

The unit can switch 5 external units. One unit, a lamp is already shipped with the package and powered from the unit. The other 4 units are optional, and can be installed by the user. These units can be switched by pressing one of the CCD, FOCUS, SCOPE, VENT buttons. When the switch is closed, the LED of the button is illuminated.

Note, that these 4 units are only switched, no power is applied from inside the unit. See the Hardware Installation Manual for information on installing external units.

## Wireless Remote Controller

The wireless remote controller can be used to turn the dome left/right, and to open or close the shutter. Use the buttons with the left/right arrows to turn the dome left/right. Use the buttons with the up/down arrows to open/close the shutter.

## Technical Specification

Power requirement	220V AC 50Hz
Azimuth motor power	120W AC
Azimuth motor protection	IP55
Shutter motor power	12V DC
Main unit power	220V AC
Main unit protection	IP55
Shutter unit protection	IP55
Console unit protection	IP55
Camera unit protection	IP55
Main unit PC connection	USB 2.0
Camera unit PC connection	USB 2.0
Operation temperature	-10°C – +50°C
Operation Humidity	0% – 95%
Sensor unit protection	IP55
External unit connectors protection	IP55