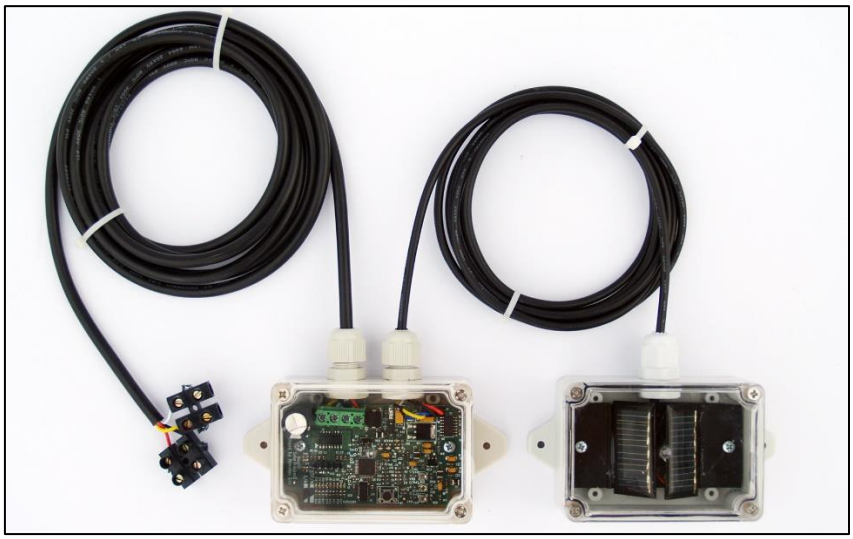
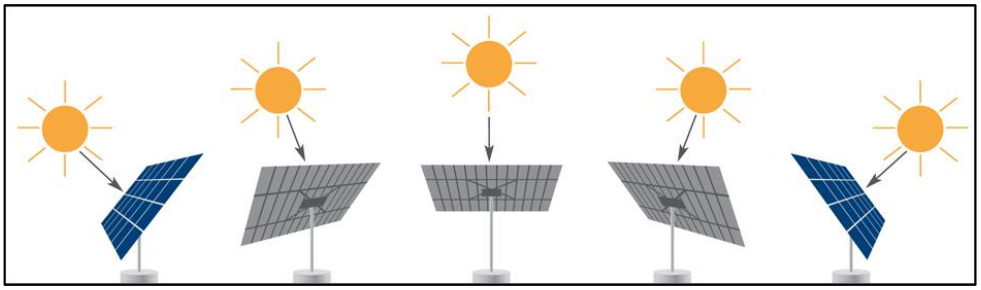
LoriSense

USER MANUAL

Basic Single Axis Solar Panel Tracking System



LoriSense Basic (Controller + Sensor)



Important

This User Guide is subject to periodic review, update and revision.

LoriSense™ is a brand wholly owned by Novodes Ltd:

The user of this product has sole responsibility for any malfunction that results from improper use, faulty maintenance, improper repair, unauthorized service, damage, or alteration by anyone other than Novodes Ltd.

The safety, reliability, and performance of this product can only be assured under the following conditions:

1. The product has been used according to the accompanying operating instructions.
2. All updates, extensions, readjustments, changes, or repairs have been carried out by Novodes' authorized representatives.

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PLEASE READ THIS USER GUIDE BEFORE OPERATING THE SYSTEM

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1. INTRODUCTION

1.1. ABOUT THIS USER GUIDE

This User Guide provides the information necessary to operate the LoriSense Basic System.
PLEASE READ THIS USER GUIDE BEFORE OPERATING THE SYSTEM. If any part of this User Guide is not clear, contact the product distributor for assistance.

1.2. THE LORISENSE BASIC SYSTEM

This system lets your solar panel follow the sun by controlling an actuator attached to it. The system includes a sensor and the control circuit within an IP65 grade enclosure. The sensor should be placed near the solar panel facing up and it allows the controller to "know" where the sun is and how to adjust the actuator in order to align the solar panel with the sun. Using this system, your solar panel is always facing the sun and is producing energy at its highest level. The product is not sold with an actuator.

1.3. FEATURES OF THE LORISENSE BASIC SYSTEM

- IP65 grade for all system components and accessories – complete protection against ingress of dust (dust tight) and is protected against low pressure water jets from any direction.
- This system receives a supply of 12V-24V and outputs a matching supply to the actuator.
- Max current to the actuator is 8A with 12V or 4A with 24V.
- Max controller Wattage is: 96W
- No configuration is required. Just plug everything correctly and you can use it immediately.
- Compact size of controller box and sensor.
- Ambient light sensor to detect sun location for single axis tracking.

1.4. ADVANTAGES OF THE LORISENSE BASIC SYSTEM COMPARED TO COMPETING SYSTEMS

1. All components including connectors meet IP65 grade or higher (complete protection against ingress of dust (dust tight) and is protected against low pressure water jets from any direction.). Many of the competitors have sensors that are entirely exposed or are in an enclosure that does not meet IP65 grade and as a consequence, their sensors suffer from corrosion and rust after a few weeks or months.
2. Our system has a warranty for three months. Competitors usually have no warranty.
3. Our system can receive any voltage between 12 and 24 volts. Only some competitors support 24 volts.
4. Safety, robustness, and reliability of the system:
    - Our system can support up to 3 amperes of continuous current at 12 volts to the actuator. In case of higher current up to 8 amperes, our system automatically regulates the delivery of the current to the actuator at timely bursts of current to prevent overheating and destruction of the controller. Above 8 amperes a fuse cuts off the current to prevent the destruction of the controller in which case requires servicing the circuit to replace the fuse (the fuse may only be replaced by us). The competitors only have (in the best case) a fuse but no overheating protection.
    - Our system has a dedicated IC driver for driving current to the actuator and has integrated protecting mechanisms for spikes that originate from the actuator and from switching the current on and off. The competitors usually have simple relays with no protection and that's why they die out after a while (usually a few weeks or a few months).
    - Our system has protection against ESD, external spikes and noise that originate from the power voltage line that powers the controller. The competitors usually have no such thing.

- The items listed above enable our customers to connect their own actuators with no worry, giving them more flexibility with their final application.

2. SAFETY

2.1. TYPES OF WARNINGS, CAUTIONS AND NOTES

Three types of special message appear in this User Guide:

Warning: A warning indicates precautions to avoid the possibility of personal injury or death.

Caution: A **caution** indicates a condition that may lead to damage to equipment, or a lower quality of performance.

Note: A **note** provides other important information.

2.2. GENERAL SAFETY INSTRUCTIONS

Warnings:

DO NOT USE BEFORE READING THIS USER GUIDE.

Power the system with accordance to the voltage and current ratings provided in this user manual.

When connecting or disconnecting the system make sure that the electricity is turned off.

Ensure that only LoriSense Basic authorized components are connected to the system.

Don’t operate the system with exposed wires or open enclosures.

Make sure the components of the system are properly secured in place before beginning operation.

Cautions:

If the system is not working correctly, discontinue use and refer servicing to qualified service personnel.

The device is not immersible in water – do not immerse in water.

Do not attempt to service the product yourself. This system is not user-serviceable.

Do not use the system if the one or more of the power indication LEDs are not working.

Do not use the system if the enclosure is cracked or broken in any way or if any conductors are exposed.

3. OVERVIEW OF SYSTEM COMPONENTS

3.1. DESCRIPTION OF THE SYSTEM

The LoriSense Basic System is an instrument for improving the efficiency of the power conversion of solar panels by aligning the solar panels along a single axis to face the sun at all times of the day. The system utilizes a sensor that recognizes the sun location on a single axis (East-West) and provides relevant feedback to the controller. The controller drives an actuator accordingly in order to align the solar panel with the sun. The system should be powered from a 12V power supply of the user's choice.

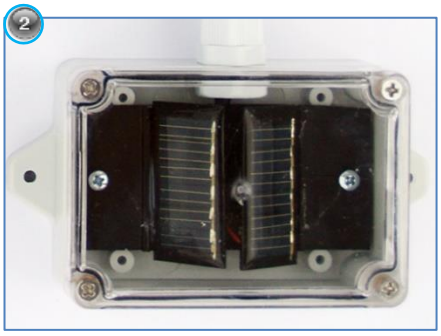
3.2. MAIN SYSTEM COMPONENTS

The system includes the following:

1. LoriSense Basic Single Axis Solar Tracking Controller.
2. LoriSense Basic Single Axis Solar Tracking Sensor.
3. One-meter cable connector between the sensor and the controller.
4. Two-meter cable for supply voltage to the controller + output to the actuator

The LoriSense Basic System consists of the following main components: **(1)** LoriSense Basic Single Axis Solar Tracking Controller, **(2)** LoriSense Basic Single Axis Solar Tracking Sensor. These items are shown below.

Controller Box



Tracking Sensor*

***Note:** *The tracking sensor image shown here is one possible option of how it might look. Several types of sensors have been made with different types of solar cells all providing the same quality of functionality. In any case, the encloser is the same for all sensor types.*

Caution: Ensure that the solar panel is free to move without any disturbance and verify that the axis of rotation on which the solar panel is mounted is free of debris and dirt.

Caution: Do not use the system if your actuator has malfunctioned.

4. SETTING UP THE DEVICE FOR THE FIRST TIME

4.1. CONNECT SYSTEM TO DC POWER

Connect the red wire to a voltage between 12V-24V and connect the black wire to 0V (Ground). While connecting the wires have the power turned off to avoid possible electrocution.

The Tracking sensor is already connected to the controller and, therefore, no special connection is required with regards to the sensor.

Don’t attempt to connect the system to power when the power is on in order to avoid electrocution.

4.2. CONNECT SYSTEM TO ACTUATOR

Connect the Two remaining wires to the actuator.

The polarity of the connection is not relevant. That is because if the direction the actuator is pushing is not correct, then simply rotate the tracking sensor by 180 degrees or simply switch the connection to the two wires of the actuator.

Actuator Illustration – it is not provided with the system

Don’t attempt to connect your actuator while the system is connected to power in order to avoid electrocution.

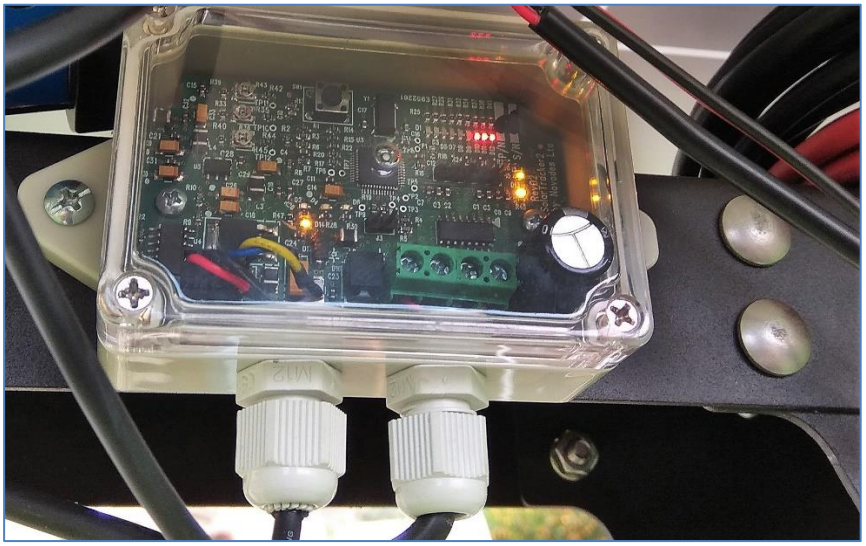
5. POSSIBLE INSTALLATION SETUP

The LoriSense Basic may be installed in your solar panel array fixture in various ways. The following is just one of the possible ways the LoriSense Basic solar tracker may be installed.

5.1. SOLAR PANEL POLE MOUNT INSTALLATION

5.1.1. CONNECTING THE CONTROLLER BOX

Drill two 6mm holes into the pole mount at a difference that matches the controller box profile holes. Connect the controller box to the solar panel pole mount by inserting two 6mm stainless steel screw bolts and securing them on the other side of the pole with two 6mm stainless steel nuts.
See the following image as an example:



5.1.2. CONNECTING THE TRACKING SENSOR

Screw the two stainless steel Z brackets to the solar panel frame with two 6mm bolts and 6mm washers and nuts.

Then connect the tracking sensor box to the two Z brackets, again, with two 6mm bolts and 6mm washers and nuts.
See the following images as an example:

5.1.3. ADJUSTING THE SENSOR SENSITIVITY

Technically, no configuration is required. Just plug everything correctly and you can use it immediately. However, if you want, you may configure the sensitivity of the sensor by turning the screw (potentiometer) on the controller board with a small screwdriver. As you turn the screw, the number of LEDs on the controller board that turn on increases or decreases. The less LEDs that are on, the more sensitive the sensor becomes. See image below:

6. REPAIR POLICY

When under warranty, repair and service must be performed only by Novodes Ltd or its authorized representatives.

Warning: Do not attempt to perform repair procedures yourself. Only perform maintenance procedures specifically described in this User Guide.

6.1. OBTAINING SERVICE

6.1.1. SERVICE QUESTIONS

For technical support or service, please, contact Novodes Ltd or its authorized representatives.

Novodes Customer Service and Technical Service:
Email: service@novodes.com
Telephone:+972-(0)52-4873130

Website: www.novodes.com

Additional product information may be found at: www.lorisense.com

6.1.2. SHIPPING INSTRUCTIONS

Please enclose the following items when shipping the system for service:

- Warranty information: device serial number, a copy of the invoice, or other applicable documentation
- *Ship to* and *bill to* information
- Purchase order number
- Name and phone number of the person to contact for questions
- A brief description of the problem encountered, or the repairs felt necessary.
- Pack the system and its accessories carefully with suitable protection to prevent shipping damage.

7. WARRANTY

Warranty Period

The warranty period of the LoriSense Basic System is for three months from the moment the product was received by the customer.

Service Support

Repairs of the LoriSense Basic System under warranty must be made by authorized repair centers. If the device needs repair, contact the product distributor.

Warranty Void

Any sign of misuse not in accordance with the instructions in the user manual may void all product warranty.