

## FUSIONSEEKER P6

HEAVY DUTY LIMIT SWITCH WITH INTEGRATED DIODE FOR SOLAR TRACKERS



## *INSTRUCTION MANUAL*

Revision 0

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# 1. INTRODUCTION

FUSIONSEEKER P6 is a universal heavy duty limit switch with integrated diode designed for protecting all types of single and dual axis solar trackers that use DC motors for moving.

All solar trackers are basically designed in the way they can rotate for a certain angle only because the sun moves in the way there is absolutely no need for trackers to rotate for more than 300 degrees by azimuth and 90 degrees by elevation. This is general rule for all solar trackers (regular PV solar panel trackers, solar water heating collectors, all types of concentrators,...). The purpose of a limit switch is to stop the solar tracker's motor (or any other drive system) slightly before tracker's mechanical limits are reached. This shall be done for both directions what means 2 limit switches are needed per tracking axis. In other words single axis solar tracker needs 2 limit switches and dual axis solar tracker needs 4 limit switches.

# 2. TECHNICAL SPECIFICATIONS

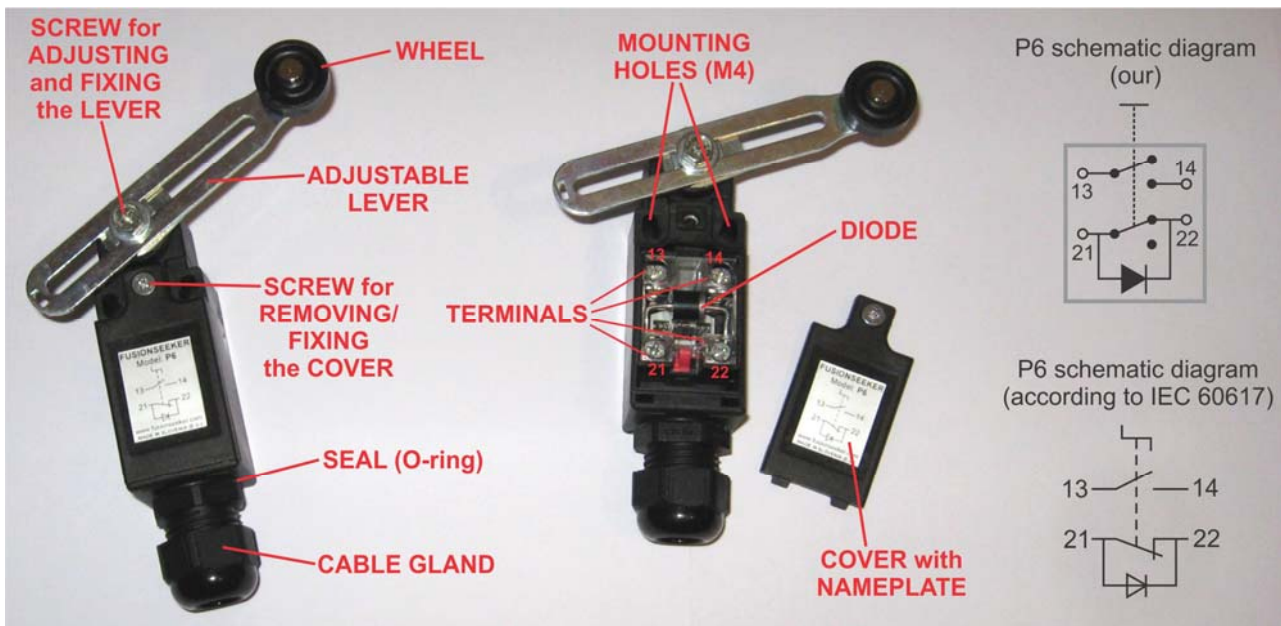
<b>✱FUSIONSEEKER P6 ✱</b>	
<b>Basic description:</b>	<b>Heavy duty limit switch with integrated diode</b>
<b>Contacts description:</b>	<b>1 normally closed (N/C) contact with parallel diode 1 normally open (N/O) contact</b>
<b>Electrical data:</b>	<b>Normally closed contact with parallel diode rating: I<sub>max</sub> = 6A at up to 100Vdc (it applies to contact and diode) Normally open contact rating: I<sub>max</sub> = 6A at 100Vdc I<sub>max</sub> = 0,4A at 250Vdc I<sub>max</sub> = 6A at 250Vac (50Hz...60Hz) I<sub>max</sub> = 4A at 400Vac (50Hz...60Hz) I<sub>max</sub> = 1A at 500Vac (50Hz...60Hz)</b>
<b>Mechanical endurance:</b>	<b>20 million open-close operations</b>
<b>Housing:</b>	<b>Material: glass-reinforced polymer, UV resistant, self-extinguishing, shock-proof thermoplastic resin Color: black IP class: IP 67 according to EN 60529</b>
<b>Cable gland:</b>	<b>Accepts any cable with outside diameter between 6mm and 12mm, UV resistant</b>
<b>Mounting position:</b>	<b>ANY</b>
<b>PLC compatibility</b>	<b>YES</b>
<b>Operating temperature range:</b>	<b>from -25°C to +80°C</b>
<b>Dimensions (switch together with cable gland):</b>	<b>width: 30mm, height: 30mm, length: 111mm</b>
<b>Dimensions (adjustable lever with wheel)</b>	<b>Length: 100mm, wheel: φ20mm</b>
<b>Weight:</b>	<b>108g</b>
<b>Maintenance:</b>	<b>It's maintenance free</b>
<b>Expected life time:</b>	<b>20 years +</b>

### 3. INSTALLATION INSTRUCTIONS

**WARNING!** Please read those instructions completely - before starting with installation!

**WARNING!** Installation can be performed by qualified Electrician only!

FUSIONSEEKER P6 limit switch consists of main body that encloses contacts, terminals and diode, adjustable lever with wheel and cable gland (see **Figure 1**).



**Figure 1: Components of the FUSIONSEEKER P6 limit switch**

Contacts switch over when the lever is revolved for **30 degrees or more (mechanical revolving limit is at +/- 75 degrees angle measured from center position) in one or the other direction**. When the lever is revolved back (by its return to center spring) towards center position contacts switch over to normal state **at 15 degrees angle from center position**. There are two contacts inside the first is normally closed with parallel diode and the other one is normally open. For the basic mechanical protection of the solar tracker the first normally closed contact with parallel diode has to be used (**terminals 21 and 22**). The second contact is spare and can be used for other purposes (indication, PLC input, etc.).

**Figure 2** (see next page) is showing a basic but complete FUSIONSEEKER P6 limit switch installation example with detailed wiring. The example is representing a single-axis tracker system that consists of a solar receiver (can be any type), a DC motor gear drive, our single-axis FUSIONSEEKER solar tracker controller that controls the DC motor and two FUSIONSEEKER P6 limit switches. In case of dual-axis solar trackers principle is the same.

During installation of the FUSIONSEEKER P6 limit switches S1 and S2 you have to be careful to set them in the way they will turn off the DC motor slightly before mechanical rotational limits of the tracker are reached. **If you don't have luck limit switches, although properly activated, won't turn off the motor. In this case immediately disconnect supply voltage, swap leads that are connected to limit switch S1 terminals 21 and 22 and/or swap leads that are connected to limit switch S2 terminals 21 and 22, connect supply voltage back and limit switches will work properly. We would tell you how to properly connect everything in the first "attempt" but it's impossible due to a very large number of different actuators/gear drives on the market.**

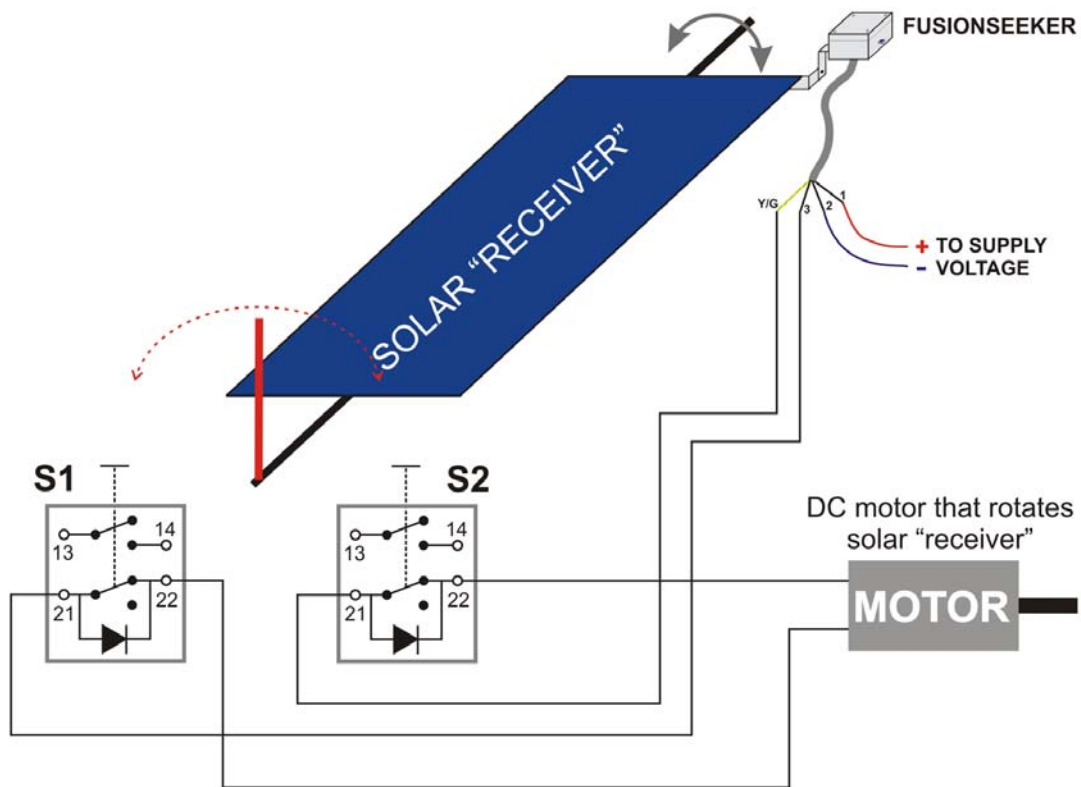


Figure 2: Typical example of limit switch installation - wiring diagram

### 3.1 Adjustable lever

Revolving lever of the FUSIONSEEKER P6 can be adjusted in 10 degrees steps for the whole 360 degrees range. The effective lever length can also be freely (steplessly) adjusted. See **Figure 3** below.



Figure 3: Fully adjustable lever of the Fusionseeker P6 limit switch

### 3.2 Rotating head

Another useful feature that increases installation flexibility of the FUSIONSEEKER P6 limit switch is its head that can be rotated in 90 degrees steps. See **Figure 4** below.



Figure 4: Rotating head of the Fusionseeker P6 limit switch

### 3.3 Grounding

The housing of FUSIONSEEKER P6 is made of electrical insulating material (glass reinforced polymer) and thus cannot be grounded.



## 5. WARRANTY

Fusionseeker Solar Tracker Controllers (*a division of Sončna energija d.o.o., Kidriceva ulica 25, 3000 Celje, SLOVENIA (E.U.)*) warrants its product to the original consumer purchaser that it will repair, or replace, any product that is determined to be defective for the following terms:

### **Five years from date of purchase on all components.**

To be eligible for repair or replacement under this warranty, the product in question must be sent to Fusionseeker Solar Tracker Controllers (to workshop – address is shown below) together with the Invoice per which it was purchased within the warranty period and the original consumer purchaser must comply with the following conditions:

- The product thereof must not have been modified or altered in any way by an unauthorized source.
- The product thereof must have been installed in accordance with the installation instructions.

### **This limited warranty does not cover:**

- Damage due to improper or installation;
- Accidental or intentional damage;
- Misuse, abuse, corrosion, or neglect;
- Product impaired by severe conditions, such as excessive wind, ice, storms, lightning strikes or other natural occurrences;
- Damage due to improper packaging on return shipment.

### **Any and all labor charges for troubleshooting, removal or replacement of the product are not covered by this warranty and will not be honored by Fusionseeker Solar Tracker Controllers.**

Return shipping is to be pre-paid by the original consumer purchaser. Fusionseeker Solar Tracker Controllers will pay the normal return shipping charges within the European Union countries only.

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THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES OF ANY KIND, EXPRESSED OR IMPLIED, INCLUDING (WITHOUT LIMITATION) ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND OF ANY NONCONTRACTUAL LIABILITIES BASED UPON NEGLIGENCE OR STRICT LIABILITY. IN NO EVENT SHALL FUSIONSEEKER SOLAR TRACKER CONTROLLERS BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING (WITHOUT LIMITATIONS) ANY DAMAGE FOR PERSONAL INJURY OR PROPERTY DAMAGE OR OTHER PRODUCT LIABILITIES BASED UPON ALLEGED NEGLIGENCE OR BREACH OF EXPRESS OR IMPLIED WARRANTIES OR STRICT LIABILITY. FUSIONSEEKER SOLAR TRACKER CONTROLLERS NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON TO ASSUME FOR IT ANY OTHER OBLIGATION IN CONNECTION WITH THE SALE OF ITS PRODUCTS. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU ALSO MAY HAVE OTHER RIGHTS THAT MAY VARY FROM COUNTRY TO COUNTRY. SOME COUNTRIES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY WILL LAST OR THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU.

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