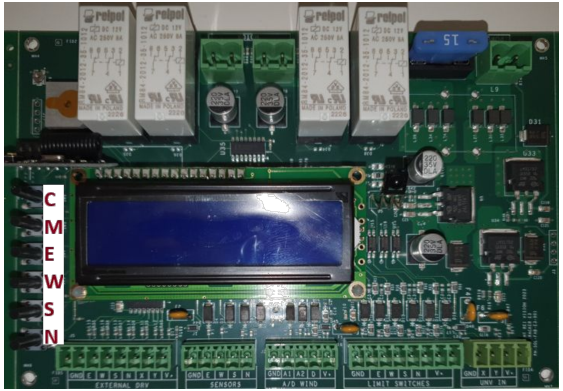
# REI Solar Tracker

Peripheral connection diagrams

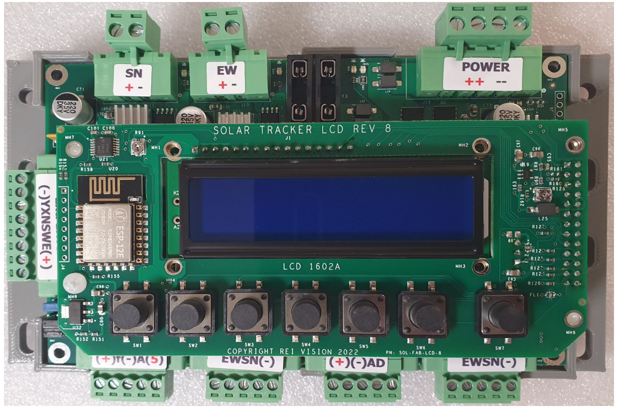
# REI Optimal

Universal controller for home photovoltaic installations




Possibility of remote control and extensive program modification.

# REI Farm




Professional controller for farm photovoltaic installations

Wi-Fi communication, PWM and DC current consumption control

| | **REI Optimal** | **REI Farm** |
|---|---|---|
| Algorithm | Hybrid | Hybrid |
| DC motor driver | Relays | H-Bridge(PWM) |
| Remote control | RC Pilot | Wi-Fi/Web |
| Analog/Digital inputs | 6/3 | 5/2 |
| Digital Outputs | 6 | 6 |
| **Price** | 190 USD | 290 USD |

REI controllers have the ability to work with structures;

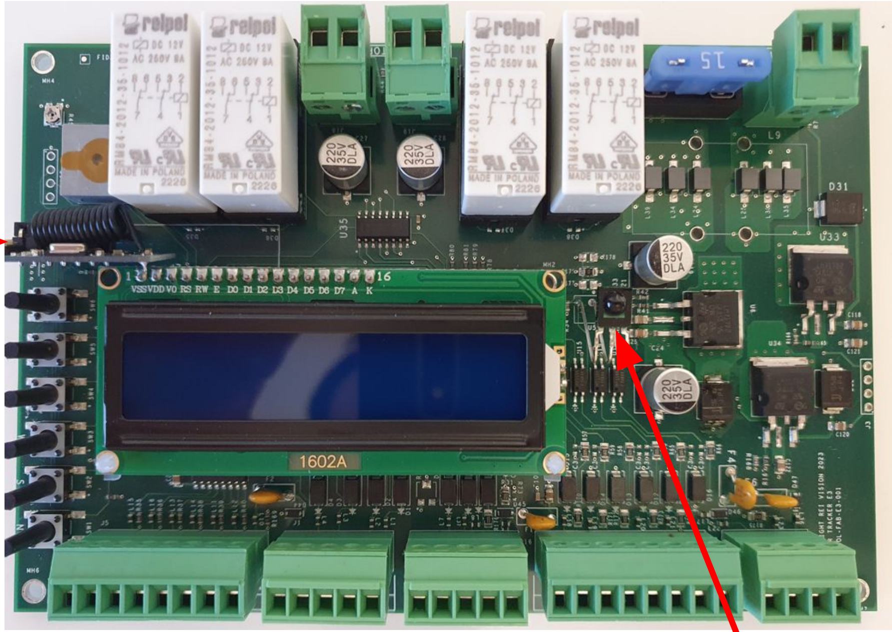
- rotary /tilt (E-W rotation, tilt (S-N)
- tilting in both axes
- single-axis (one tracker)
- double single-axis (two trackers)

Changing the operating logic is possible through configuration - there is no need to reprogram

# REI Optimal

1. Push any button to activate Remote Control


2. RF RC functions;
   - A - go “S” direction
   - B - go “E” direction
   - C - go “W” direction
   - D - go “N” direction




3. Long hold A - Unlock the tracker / return from Remote control to Automatic mode

4. ***Long hold D - start wind security procedure and lock the tracker

**"RCLK:"** parameter set Remote Clock x10 timer
(eg. RCLK == 10 after 10x10s=100s since any button has been pushed the controller will close Remote session and start Automatic tracking.

Radio frequency works better than infrared with obstacles but still;
The box/housing **can NOT** be made from ferromagnetic metal
eg. stainless steel.

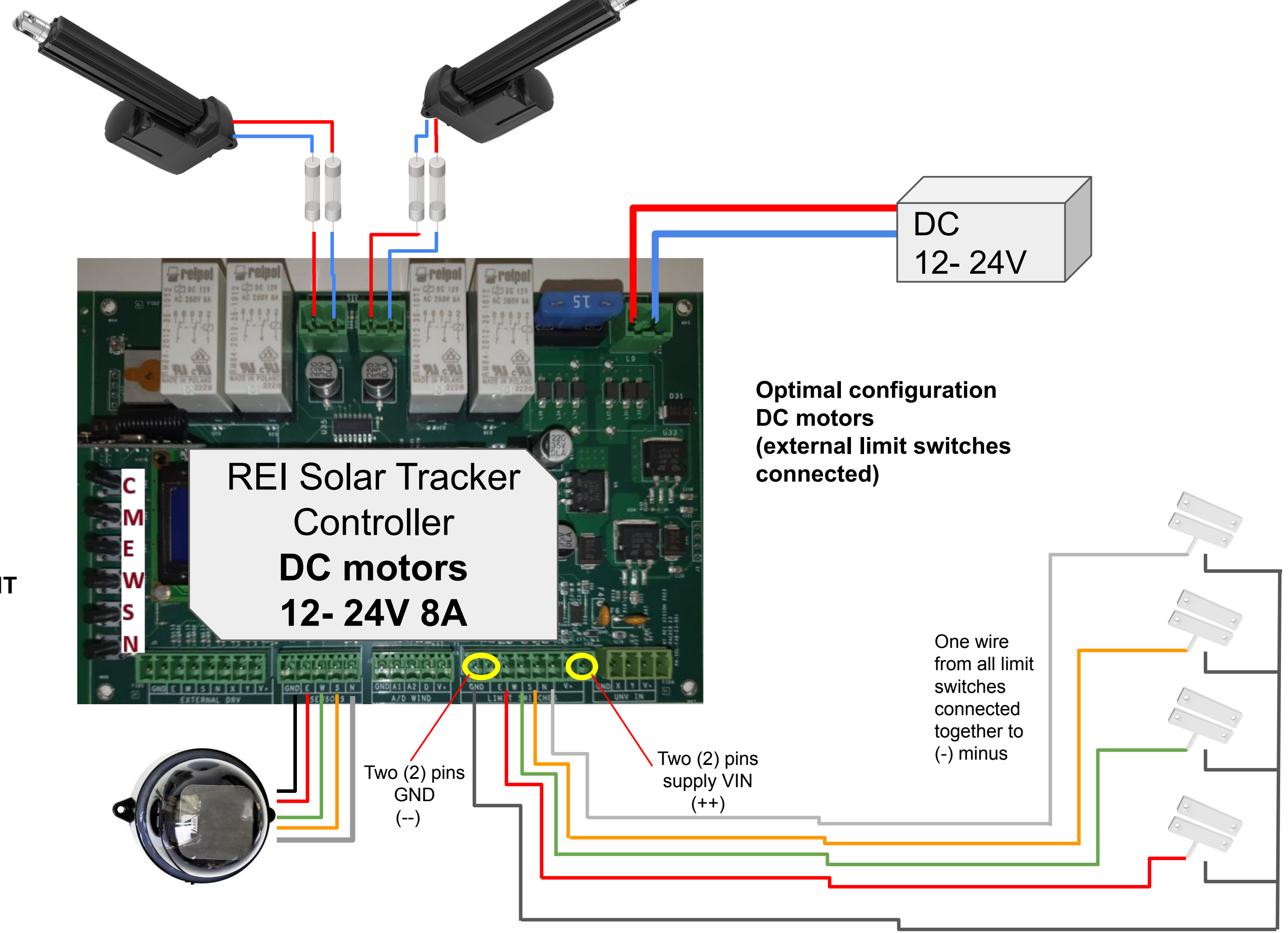
You can also use IR remote control

This module is not as flexible as Radio because infrared light does not penetrate obstacles (box, tree etc.)

Codes;
0x00FFA857; 0x00FF906F; 0x00FFC23D; 0x00FF02FD;
0x00FFB04F; 0x00FF22DD

Use fuses on both wires because of the polarity changes depending on the direction of rotation.

The fuse rating should not be greater than 25% of the TYPICAL MOTOR CURRENT



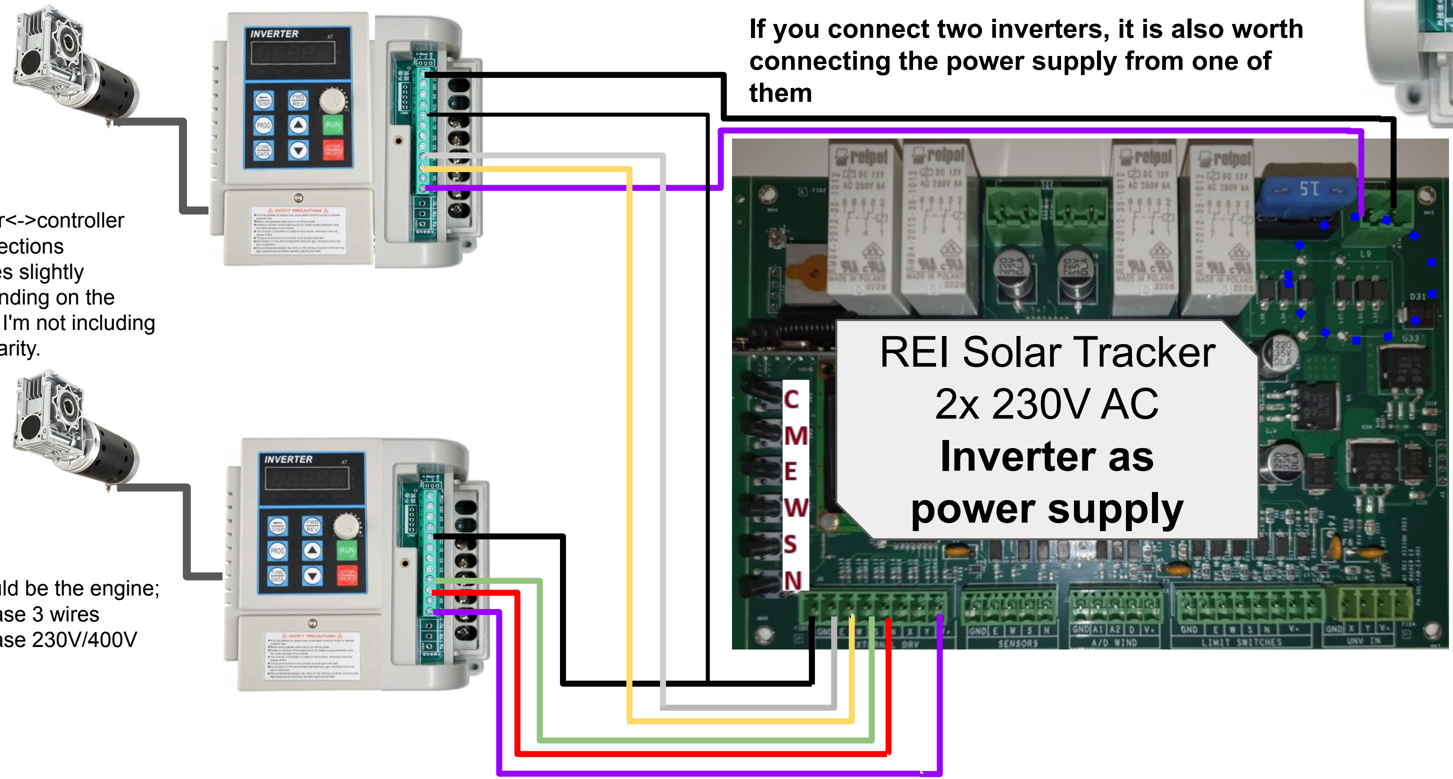

**Optimal configuration DC motors (external limit switches connected)**

If you use an inverter - remove the relays - they will not be needed

If you connect two inverters, it is also worth connecting the power supply from one of them


Motor<->controller connections varies slightly depending on the type. I'm not including for clarity.

It could be the engine;
1 phase 3 wires
3 phase 230V/400V



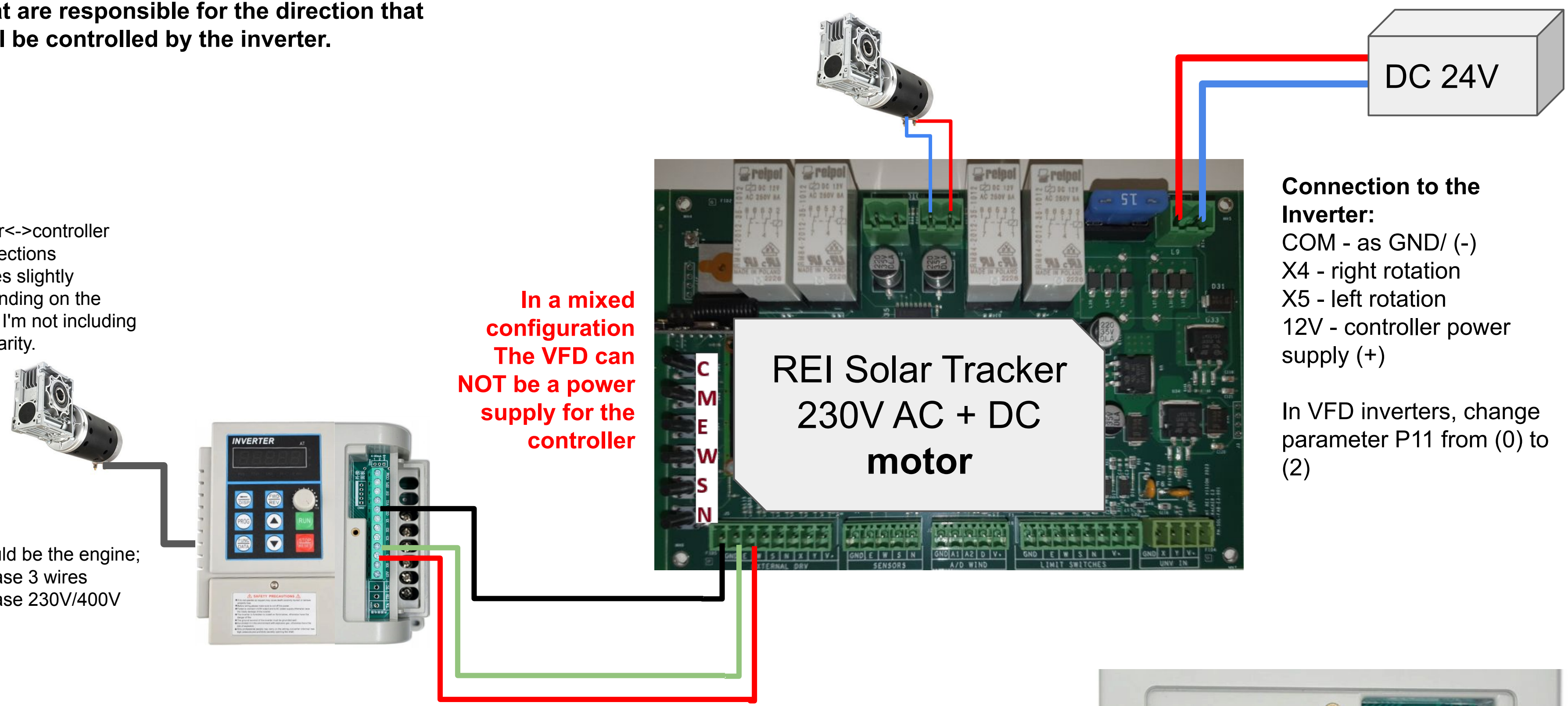

**Connection to the Inverter:**
COM - as GND/ (-)
X4 - right rotation
X5 - left rotation
12V - controller power supply (+)

In VFD inverters, change parameter P11 from (0) to (2)

The VFD is the power supply for the controller
Both inverters can be connected as power supply

**If you use an inverter - remove the relays that are responsible for the direction that will be controlled by the inverter.**

Motor<->controller connections varies slightly depending on the type. I'm not including for clarity.

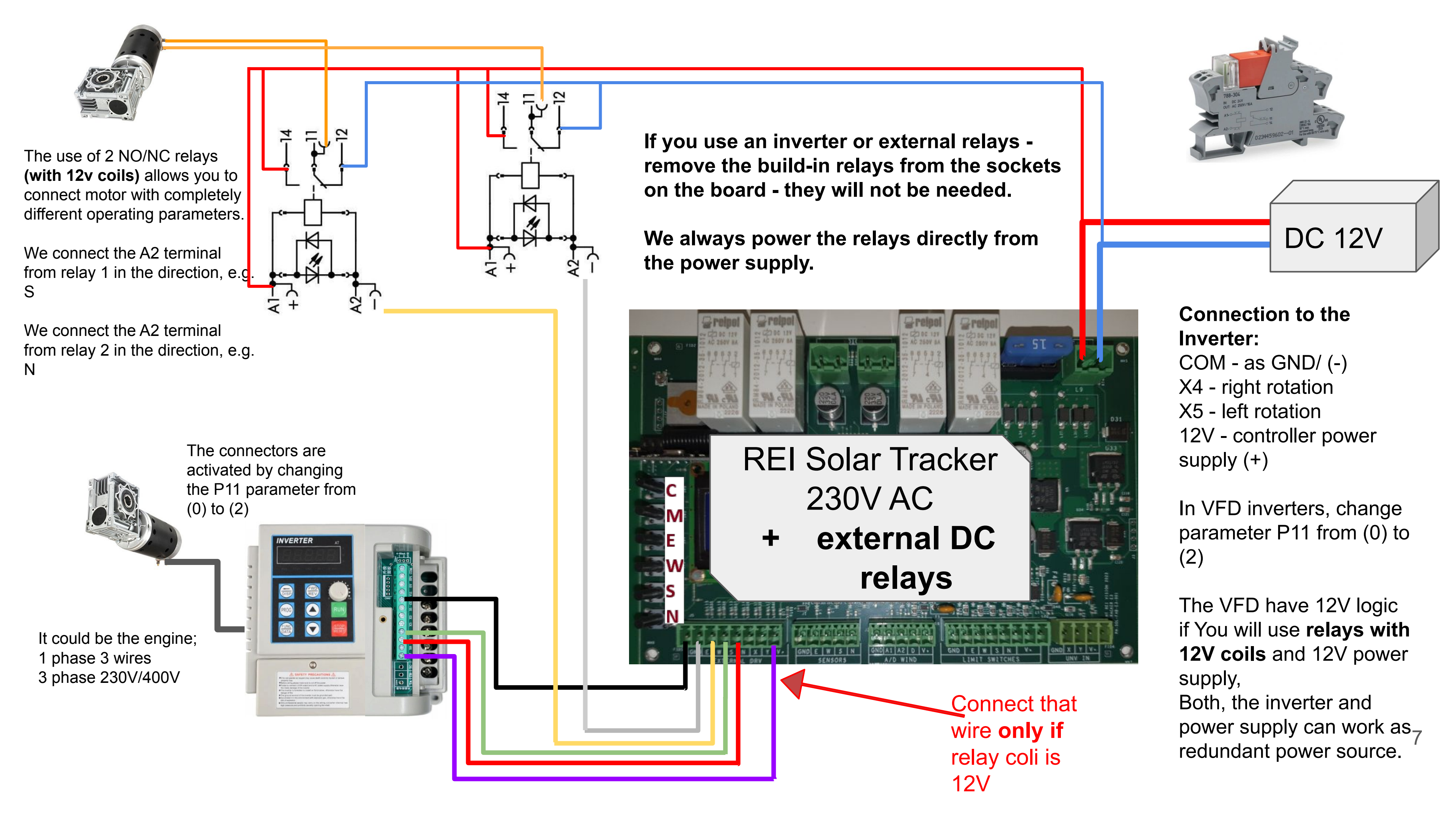



**In a mixed configuration The VFD can NOT be a power supply for the controller**

It could be the engine;
1 phase 3 wires
3 phase 230V/400V

**Connection to the Inverter:**
COM - as GND/ (-)
X4 - right rotation
X5 - left rotation
12V - controller power supply (+)

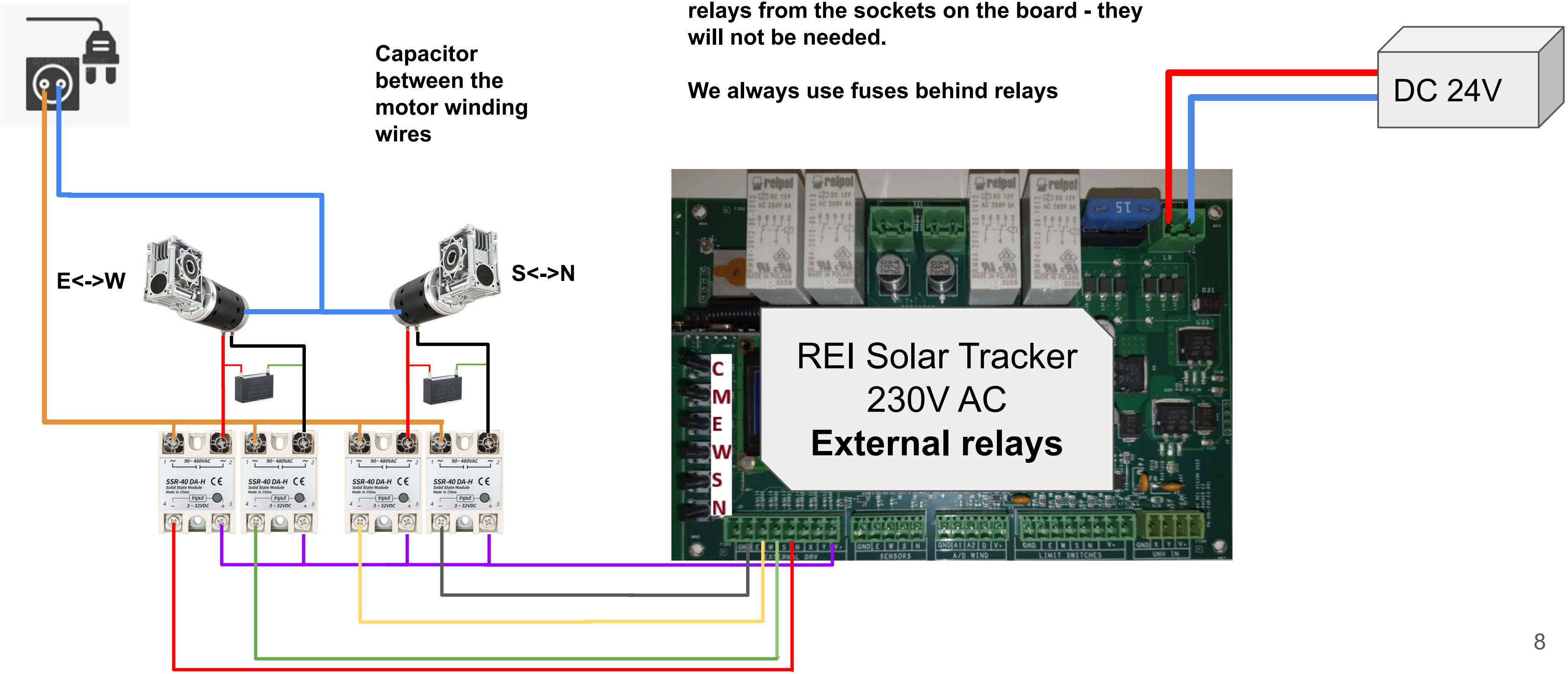
In VFD inverters, change parameter P11 from (0) to (2)


The use of 2 NO/NC relays **(with 12v coils)** allows you to connect motor with completely different operating parameters.
We connect the A2 terminal from relay 1 in the direction, e.g. S
We connect the A2 terminal from relay 2 in the direction, e.g. N
14
11
12
A1
+
A2
−
**If you use an inverter or external relays - remove the build-in relays from the sockets on the board - they will not be needed.**
**We always power the relays directly from the power supply.**
DC 12V
**Connection to the Inverter:**
COM - as GND/ (-)
X4 - right rotation
X5 - left rotation
12V - controller power supply (+)
In VFD inverters, change parameter P11 from (0) to (2)
The VFD have 12V logic if You will use **relays with 12V coils** and 12V power supply,
Both, the inverter and power supply can work as redundant power source.
REI Solar Tracker
230V AC
+ **external DC relays**
C
M
E
W
S
N
The connectors are activated by changing the P11 parameter from (0) to (2)
INVERTER
It could be the engine;
1 phase 3 wires
3 phase 230V/400V
Connect that wire **only if** relay coli is 12V

If you use external relays - remove the relays from the sockets on the board - they will not be needed.

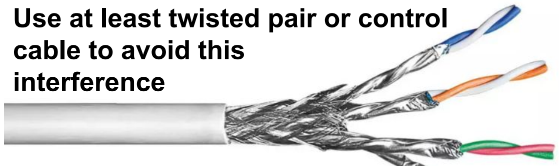
We always use fuses behind relays

Capacitor between the motor winding wires

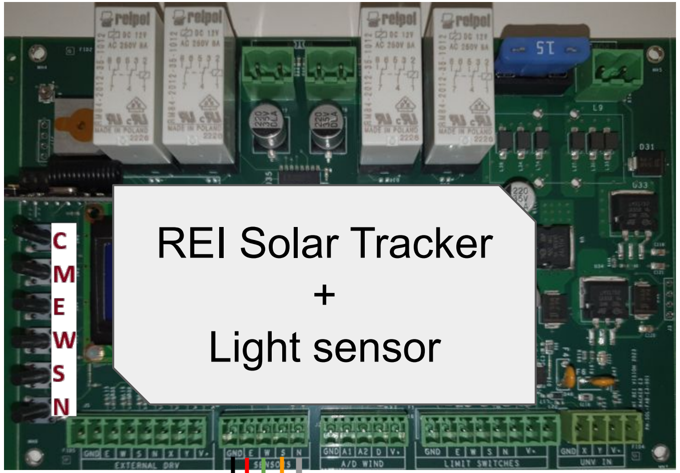


# The REI controller can support many types of light sensors

## Please note that LED light sensors are less accurate than micro solar panel versions.

**Use at least twisted pair or control cable to avoid this interference**




The sensor has an E direction marking for correct orientation - make sure it is mou

If you extend the cable, you may have different colors, but that's not a problem.
It is important to connect the direction correctly on the controller.

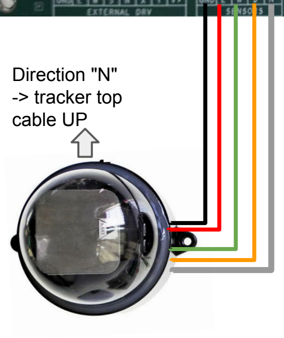
In automatic mode, by holding down the "N" button you will see the readings of all 4

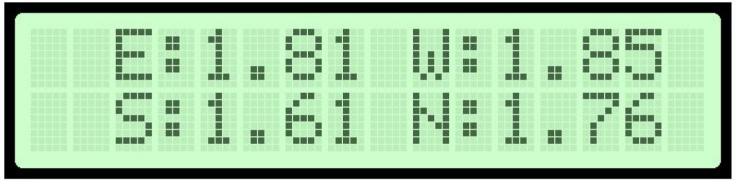
By connecting the wires one by one, you can see which wire corresponds to each c

So even if you install the sensor upside down, you don't have to disassemble it - jus terminals.
You might as well use a different type of sensor.

**TYPE 1**
**Red (E)**
**Green (W)**
**Yellow (S)**
**White (N)**
**Black (-)**

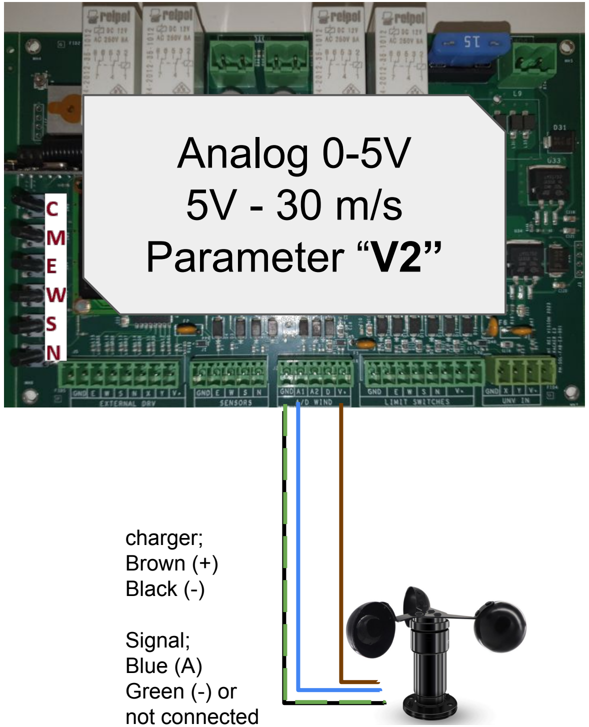
Direction "N"
-> tracker top
cable UP





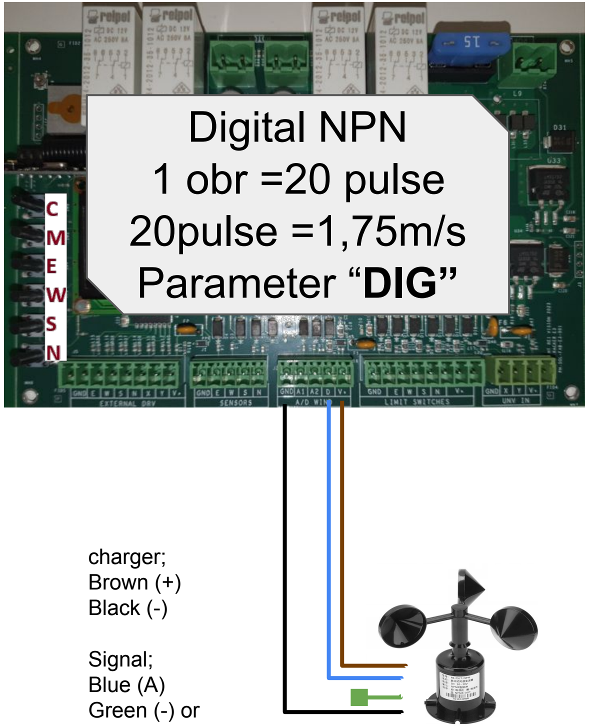
**The REI controller can operate 3 anemometers simultaneously (2x analog 0-5V and 1x digital 0-250 pps)]**


**The 3 most popular types of anemometers can be connected as below;**



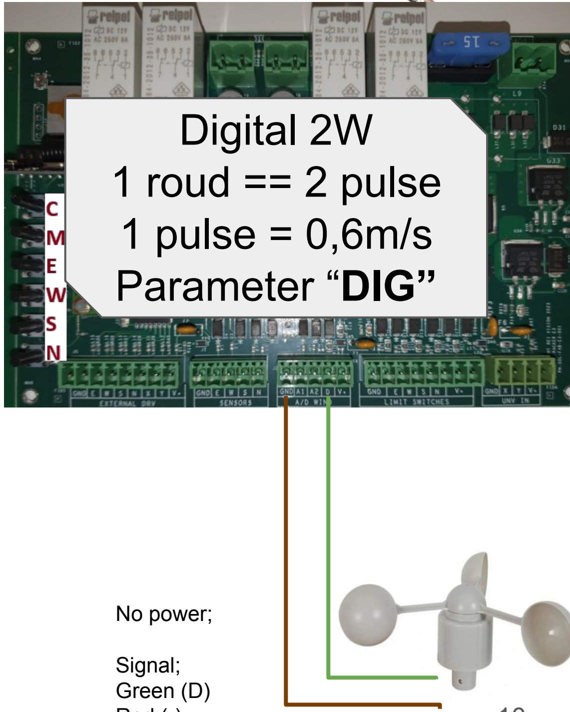

charger;
Brown (+)
Black (-)

Signal;
Blue (A)
Green (-) or
not connected




charger;
Brown (+)
Black (-)

Signal;
Blue (A)
Green (-) or
not connected

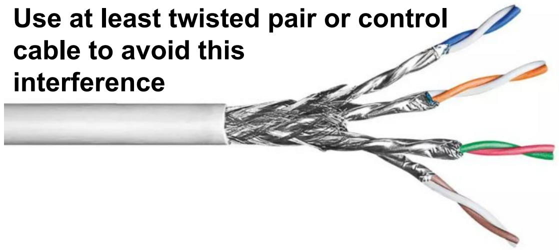



No power;

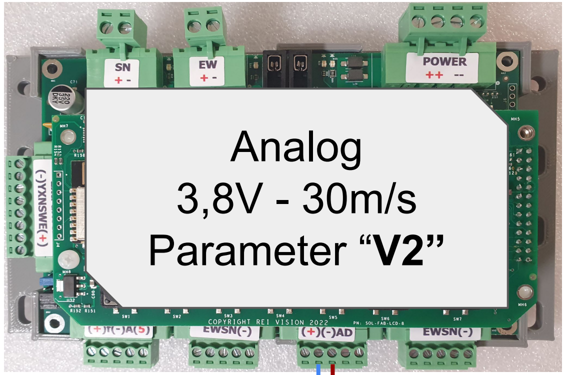
Signal;
Green (D)
Red (-)

**The REI controller can operate 3 anemometers simultaneously (2x analog 0-5V and 1x digital 0-250 pps)]**

**There is another analog type of anemometer where power supply is not needed**

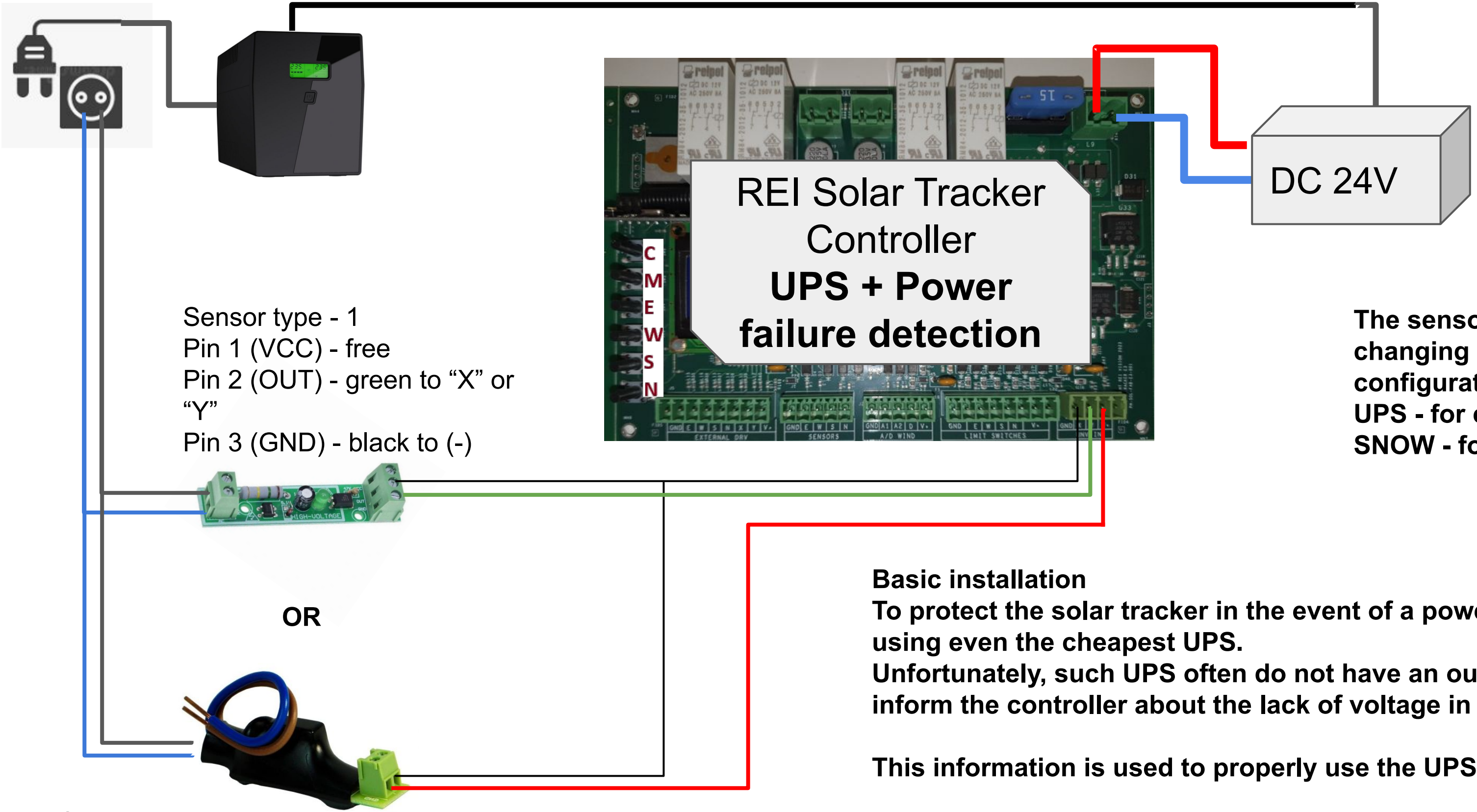



**Use at least twisted pair or control cable to avoid this interference**




No power supply;

Signal;
Brown (A)
Blue (-)




**The sensor is activated by changing the parameter configuration;**
**UPS - for channel X**
**SNOW - for Y channel**

Sensor type - 2

Pin 1 (GND) - black to (-)
Pin 2 (PM) - red to "X" or "Y"

**Basic installation**
**To protect the solar tracker in the event of a power outage, it is worth using even the cheapest UPS.**
**Unfortunately, such UPS often do not have an output that allows it to inform the controller about the lack of voltage in the network.**

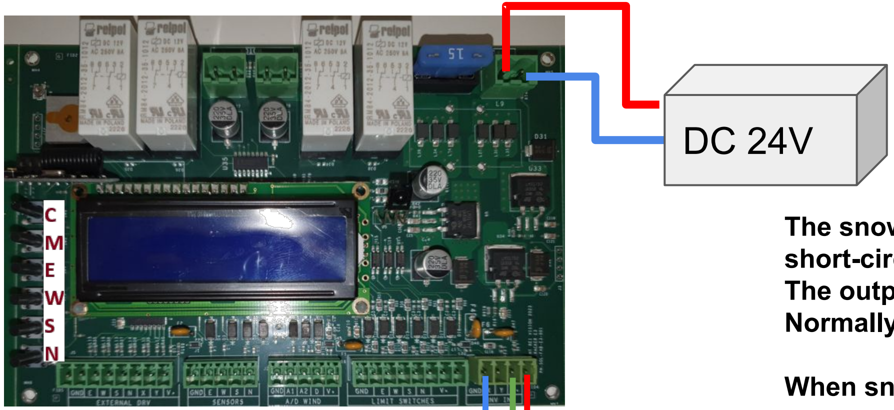
**This information is used to properly use the UPS batteries.**

**The basic need is to place the structure in a safe position in the event of strong winds - the Wind Locker procedure.**

**To achieve this, use one of the sensors available on the market.**

Connecting the snow/rain sensor to the first plug from the right;

Pin 1 (GND) - black to (-)
Pin 2 (f) - free
Pin 3 (Signal)
Pin 4 (VCC) - power supply



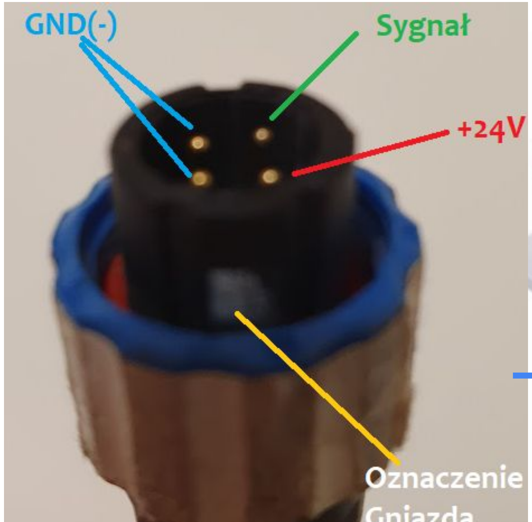

The snow sensor works to short-circuit the tracks.
The output has a relay that is in the Normally Open state.

When snow shorts the paths, the sensor closes the relay.

By connecting the relay wires to GND and to channel A in the first plug from the left, it allows you to detect snow.

In order for the controller to perform a procedure appropriate for snowfall - it dumped the snow

Parameter SNOW: must be set to 1




# Single-phase motor

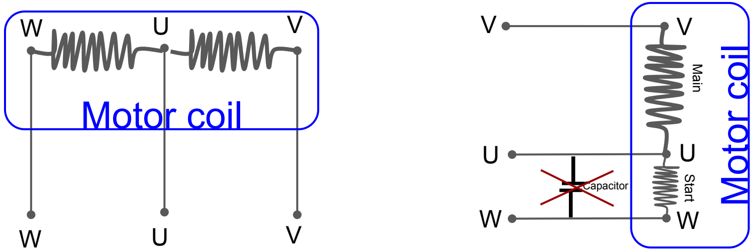
**So that the controller signal is supported by channels X1 and X2. The FMZ inverter is set by changing the parameter P 0.02 to 1**

**For a 3-phase motor P4.13 = 0, P5.18 = 2.00, the order of connecting the U-V-W coils only affects the direction of operation.**

**For 1-phase motor; P4.13 = 3, P5.18 = 0.00;**
**The common wire for both coils goes to U, the remaining 2 wires to V and W, there will be no need for a capacitor and the engine will run very smoothly.**

**P8.04 set to 3 allows you to start the engine with left rotation using the MF button**

Single-phase motor terminals 2 possibilities;



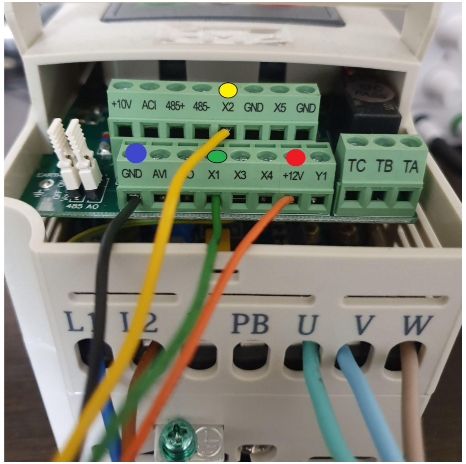

The Center Wire is to be connected to "U"

Disconnect the capacitor

How to determine the U wire in a single-phase motor when there is no access to the coil terminals?

The resistance between the V - W wire is equal to the sum of the resistances between the U - V and U - W wires

If we are dealing with an engine with a starting coil; the resistance between terminals U - V (main coil] is lower than between terminals U - W (starting coil)



# An exemplary configuration of the tilt sensor (crescent, trapezoid / triangle)

**Technical data:**
- 12-24V DC power supply
- current consumption approx. 100mA
- object detection distance in the range of 3 to 80 cm
- NPN digital output
- sensor diameter 18 mm
- sensor length 50 mm
- operating temperature range -25 to 50 degrees Celsius
- the sensor is normally open

**Description of the pins:**
- brown cable - VDC power supply
- blue cable - ground
- black cable - digital output