

RFXPulse module

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2. RFXPulse module.

The RFXPulse module can be used to measure pulses from different sources.

The input source for the RFXPulse module can be:

- a relay contact,
- a blinking light source (for example the LED on an electricity meter)
- or by using a reflective-optical sensor for counting the pass by of an object. (for example the mirror on the 6-digit in the Dutch gas meter)

The RFXPulse module must be installed in the RFXMeter. The RFXMeter receives the output pulse from up to 3 modules and this device has an RF transmitter to transmit the counter values to an RFXCOM receiver.

The RFXPulse module has a 3 pin jack input for connecting a reflective-optical sensor, a photo transistor, a photo diode or a relay contact.

The RFXPulse module has a microcontroller installed to measure and compare the pulse levels and pulse lengths. The microcontroller will also take care for the debouncing of the pulse input to eliminate contact bouncing.

3. RFXPulse module installation in an RFXMeter.

Insert the RFXPulse module in a free slot of the RFXMeter starting at the location for module 0.

If an RFXPwr module is present then install this module always first starting at the location for module 0.

The modules in the RFXMeter will be detected automatically after they send a first pulse.

4. Powering the RFXPulse module.

The RFXPulse module is powered by the RFXMeter.

The RFXMeter has a power input connector for a power adaptor.

The adaptor output must be:

9V AC – 250mA

or 9 to 12V DC – 250mA (center pin = -, outer contact = +)

The center pin size is 2.1mm.

It is not necessary to use a power adaptor for the RFXMeter unit if an RFXPwr-module is installed at location for Module 0. In this case the 9V AC adaptor of the RFXPwr-module will be used to power the RFXMeter also.

5. Connecting the pulse input to the RFXPulse module.

Use a 3 pole 3.5 mm jack plug to connect the reflective-optical sensor, a photo transistor, a photo diode or a relay contact to the RFXPulse module.

Remark: don't use a 2 pole jack connector!

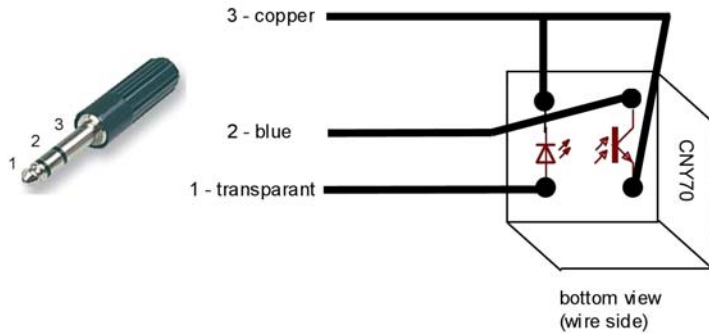
The top pin 1 is used to power the LED of a reflective-optical sensor (CNY70). The voltage for the LED can be adjusted with P2 on the RFXPulse module.

Don't use the pin 1 if the reflective-optical sensor is not used.

The middle pin 2 is the input for the RFXPulse module. This pin can be connected to the photo transistor of a CNY70, a "stand-alone" photo transistor or a relay contact.

Pin 3 is the ground.

5.1. Connecting and adjusting a reflective-optical sensor.



3-pole jack

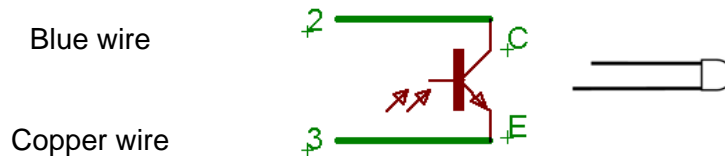
connection of the CNY70

Connect the CNY70 as indicated above. The CNY70 is drawn with bottom view so with the connection wires up and with the text "CNY70" on the right side.

Adjust the potentiometer P1 (Trigger Level) so that LED1 indicates to correct functioning and position of the sensor against the reflection area. Turn P1 CW to make the sensor more sensitive.

Normally the P2 potentiometer should be positioned at the middle position. If the distance from the reflective-optical sensor to the reflection area is bigger then turn the P2 potentiometer CW to higher the LED voltage. There are 25 turn potentiometers used. At the end of the 25 turns a small click can be heard.

5.2. Connecting and adjusting a photo transistor.



Blue wire

Copper wire

The connection of an NPN photo transistor is identical to the connection of the photo transistor in the reflective-optical sensor above. The collector (C) must be connected to pin 2 and the emitter (E) to pin 3 of the jack connector.

Adjust the potentiometer P1 (Trigger Level) so that LED1 indicates to correct switching at the right light level is exposed to the photo transistor. Turn P1 CW to make the sensor more sensitive. There is a 25 turn potentiometer used. At the end of the 25 turns a small click can be heard.

The potentiometer P2 and Pin 1 of the jack connector are not used.

5.3. Connecting and adjusting a photo diode.



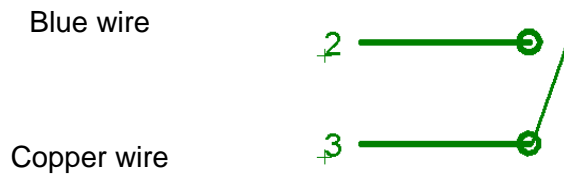
Blue wire

Copper wire

The anode (A) must be connected to pin 3 and the cathode (K) to pin 2 of the jack connector. Adjust the potentiometer P1 (Trigger Level) so that LED1 indicates to correct switching at the right light level is exposed to the photo diode. Turn P1 CW to make the sensor more sensitive. There is a 25 turn potentiometers used. At the end of the 25 turns a small click can be heard.

The potentiometer P2 and pin 1 of the jack connector are not used.

5.4. Connecting a relay.



Connect the relay contact to pin 2 and 3 of the jack connector.

Adjust the potentiometer P1 (Trigger Level) at the middle position (about 12.5 turns from each end). There are 25 turn potentiometers used. At the end of the 25 turns a small click can be heard. The potentiometer P2 and Pin 1 of the jack connector are not used.

Warning: the relay contact must be free from any voltage!

6. Adjusting the debounce time.

The RFXPulse module has an adjustable debounce option. This debounce option is to eliminate wrong pulses as a result of relay contact bouncing or light levels that change not fast enough to the photo transistors. The comparator voltage is adjusted with the potentiometer P1. See also the RFXPulse PCB at the end of this document. If the pulse level drops below the level of this comparator voltage the microcontroller will wait during the debounce time until the input level is constant. The debounce time can be tuned by connecting or disconnecting the jumpers JP3 and JP4.

The debounce time is:

JP3	JP4	debounce time
closed	closed	0ms (no debounce used)
open	closed	10ms
closed	open	30ms (default)
open	open	65ms

Important: A pulse will not be seen if the high or low period of a pulse is shorter than the chosen debounce time!

7. Configure the RFXPulse module in the software.

7.1. **Configure an RFXPulse module in Homeseer - RFXCOM.**

Use the RFreceiver program to find the RFXCOM-ID of the RFXPulse module(s).
The RFXCOM Device ID is the RFXMETER[????]M code.

In this example the Device ID for the RFXCOM plug-in is RFXMeter[2296]M.

```
3008F81B5E500C RFXMeter[2296]M RFXMeter addr:08F8 ID:2296 RFXMeter: 5249886; RFXPower: 52498,86 kWh; RFXPower-Module: 5249,886 kWh bits=48
```

Configure the RFXMeter sensor on the RFXCOM plug-in INPUT sensor tab. Assign a Device Name RFXPwr<number>, RFXGas<number>, RFXWater<number> or RFXPulse<number>, depending on the use. Where <number> is a decimal number from 00 to 99.

The counter value displayed for an RFXPulse installed represents the number of pulses.

7.2. **Configure an RFXPulse module in Homeseer - ACRF.**

Use the RFreceiver program to find the ACRF-ID of the RFXPulse module(s).

The ACRF Device ID is the decimal number behind the slash.

In this example the sensor Device ID for the ACRF is 2296.

```
3008F81B5E500C RFXMeter[2296]M RFXMeter addr:08F8 ID:2296 RFXMeter: 5249886; RFXPower: 52498,86 kWh; RFXPower-Module: 5249,886 kWh bits=48
```

Configure an RFXPwr sensor in the ACRF plug-in as an environmental sensor of type "RFX Custom Meter". Assign a Device Name RFXPwr<number>, RFXGas<number>, RFXWater<number> or RFXPulse<number>, depending on the use. Where <number> is a decimal number from 00 to 99.

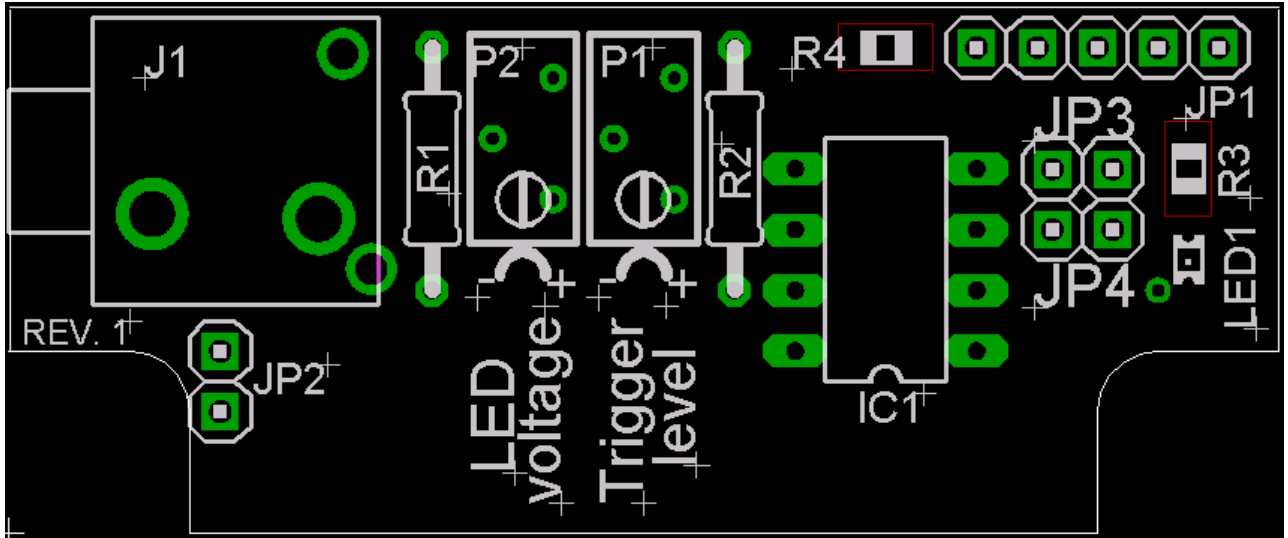
The counter value displayed for an RFXPulse installed represents the number of pulses.

7.3. **Configure an RFXPulse module in other software.**

If the RFXMeter is supported by a software product then check the documentation of this software how to configure the RFXMeter module.

If you want to write your own software to support the RFXMeter modules then have a look in the RFreceiver source how to decode the RFXMeter packets. This source file can be of help and can be found at the download page of www.rfxcom.com .

8. RFXPulse module PCB.



9. Warning:

RF signals are possible disturbed and it has not been justified for this equipment at uses in circumstances where life-threatening or dangerous situations are possible.

10. Copyright notice

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11. Revision history.

Version 4.0 – July 19, 2008

RFXCOM plugin added.

Version 3.0 – March 5, 2008

Phototransistor connection corrected.

Version 2.2 - August 14, 2007

Color codes added for sensor cable.

Version 2.1 - August 2, 2007

PCB changed

Version 2.0 - August 2, 2007

Debounce selection changed from DB0 and DB1 to JP3 and JP4.

Photo diode added.

Textual changes.

Version 1.0 - August 1, 2007

First document.