



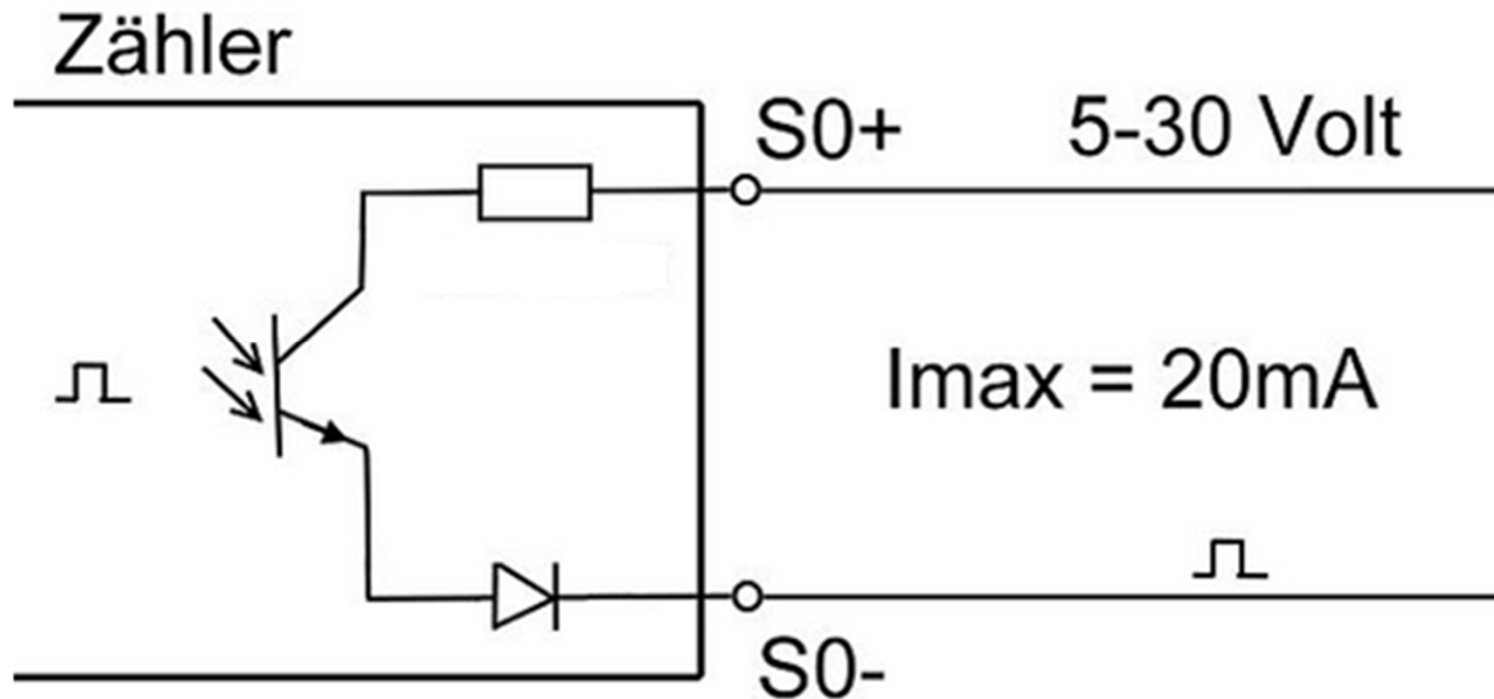
# Application instructions energy meter

## Topic: S0-pulse interface

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# The S0-output

The S0 interface is a hardware interface for the transmission of measurement values. The definition of the interface is described in standard EN62053-31. The S0-output is designed as a switch, often an open collector, and detects the two states ON/OFF. The number of pulses is proportional to the measured value. The statuses ON/OFF are defined via the current because the input voltage can be variable.

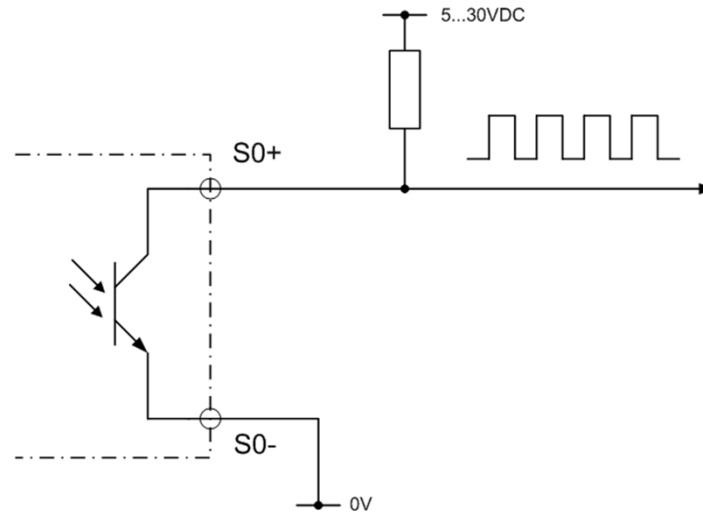


# Connection modes

The S0-outputs can have different wiring configurations.

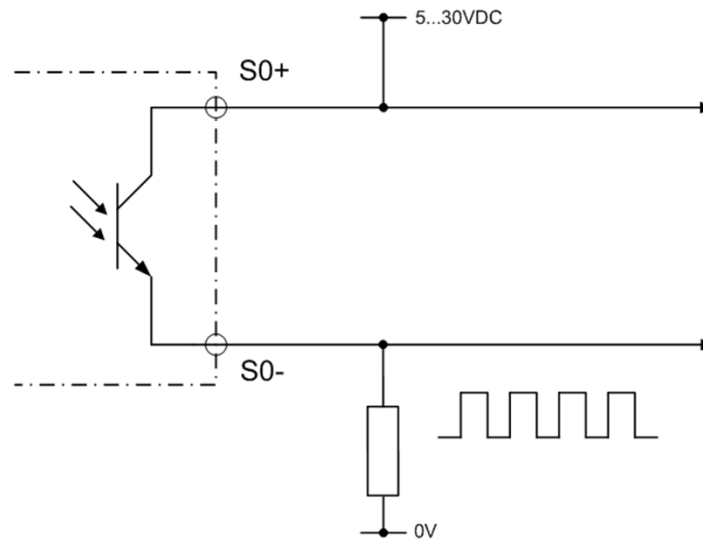
## Sink mode:

The S0+ pin is brought up to a voltage with a pull-up resistance, the connection S0- is brought up to 0V.



## Source mode:

The S0+ pin is brought up to a voltage, the connection S0- is brought down to 0V with a pull-down resistance.

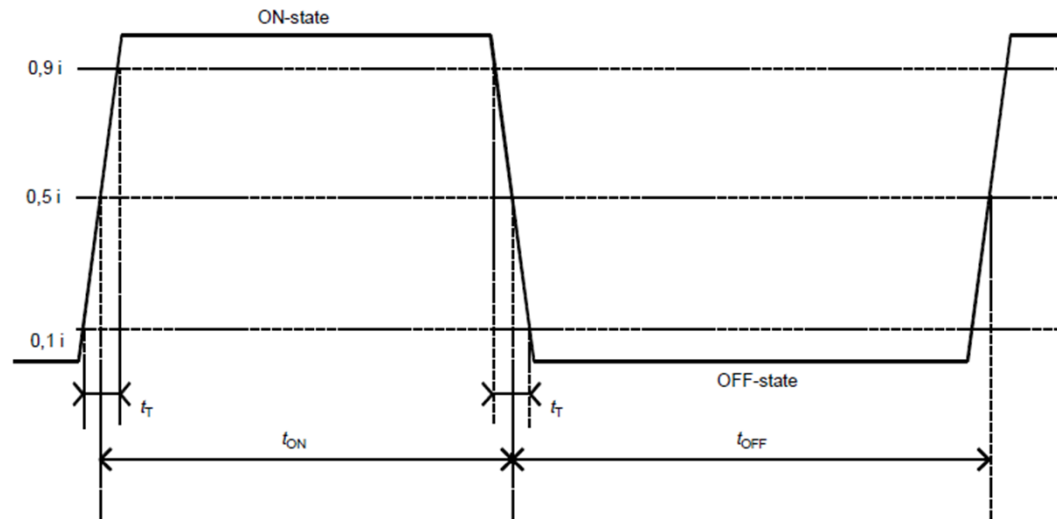


# Definition of the output

The S0 interface is divided into two classes: class A for long distances / class B for short distances:

Parameter	Class A device	Class B device
Max. voltage	27 VDC	15 VDC
Max. current ON state	27 mA	15 mA
Min. current ON state	10 mA	2 mA
Max. current OFF state	2 mA	0.15 mA

The duration of a pulse is at least 30 ms (ON/OFF state)

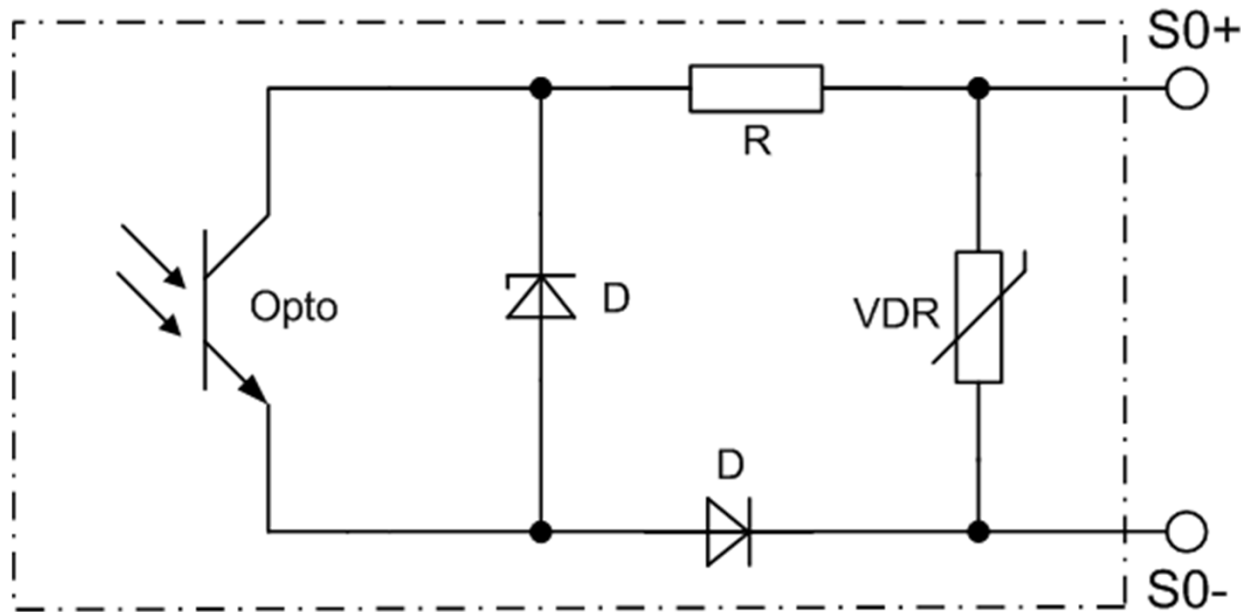


Requirements:

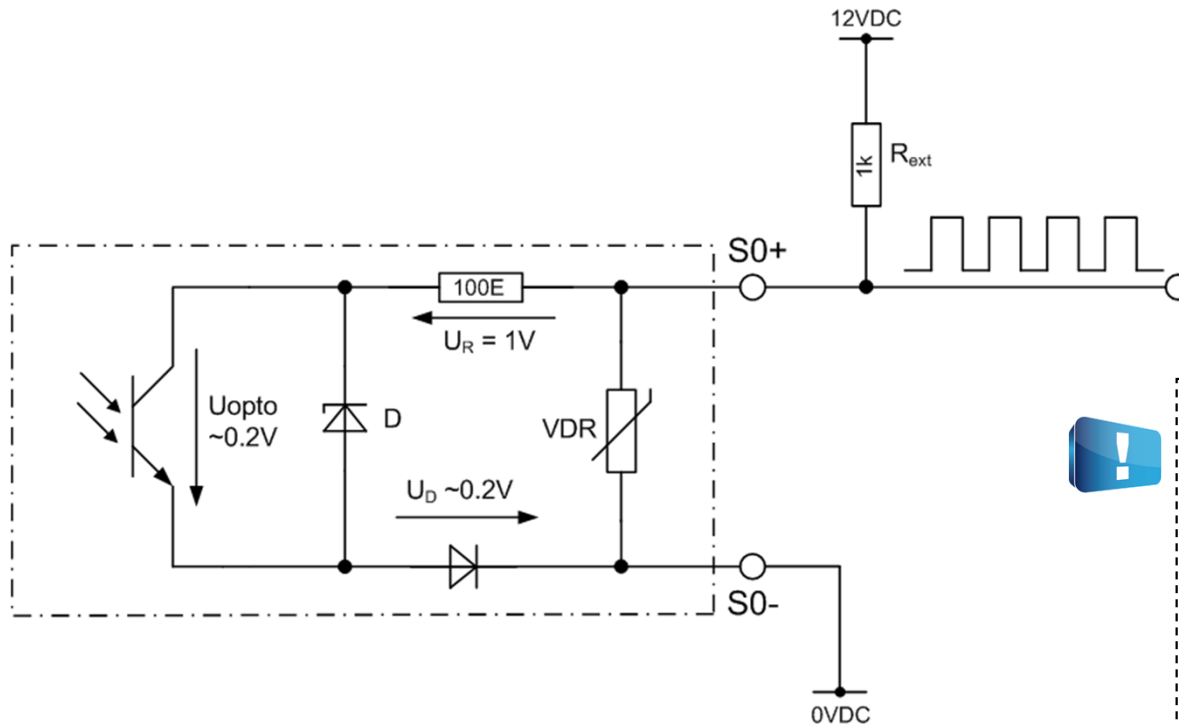
- $t_{ON} \geq 30 \text{ ms}$
- $t_{OFF} \geq 30 \text{ ms}$
- $t_r \leq 5 \text{ ms}$

# SBC S0-output

The S0 interface for the SBC energy meter is designed to provide protection of the switch against overloads with a varistor and a Zener diode. A serial power resistor is built in for current limit. In addition, it has a diode to protect against reverse polarity.



# Sample calculation



For data logger devices with digital current inputs, the logic level of the data logger should be precisely reviewed. If the logic level does not correspond to the voltage level, problems in pulse detection can result.

## Problem:

A current of 10 mA must flow with an activated S0-output.

## Solution:

$$U_R = R \cdot I = 100 \text{ E} \cdot 10 \text{ mA} = 1 \text{ V}$$

$$R_{\text{ext}} = (U - U_R - U_{\text{opto}} - U_D) / I = (12 \text{ V} - 1 \text{ V} - 0.2 \text{ V} - 0.2 \text{ V}) / 10 \text{ mA} = 1060 \text{ E}$$

$$U_{\text{S0+ ON State}} = U_R + U_{\text{opto}} + U_D = 1 \text{ V} + 0.2 \text{ V} + 0.2 \text{ V} = 1.4 \text{ V}$$

$$U_{\text{S0+ OFF State}} = 12 \text{ V}$$

# SBC S0-pulse meter

In order to integrate devices with a S0 interface into an automated system, SBC developed the PCD7.H104 devices. Up to four S0 interfaces per coupler module can be connected.

