

elf 2

Toolset for Phase Recognition

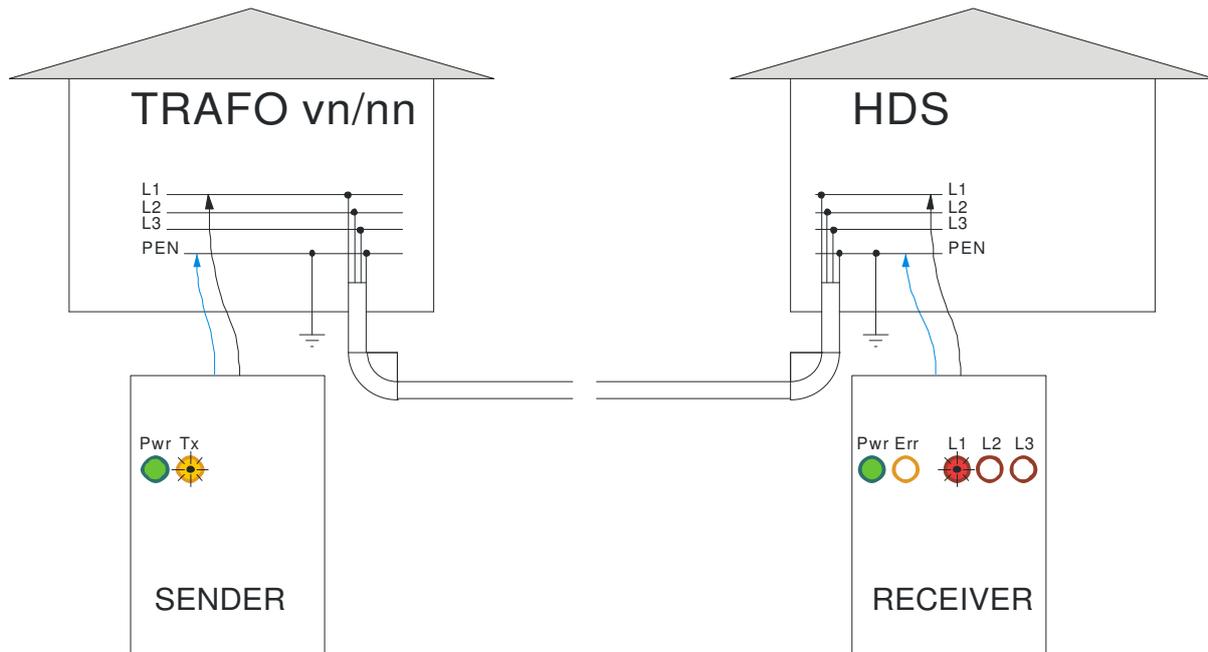
Version: 1.1



1. Introduction

The innovated toolset **elf 2** is used to determine phase order in low voltage networks (230/400V) with continuous uninterrupted operation. The set contains two devices for sending and receiving of synchronization signals. Both devices are powered directly from the measured network and do not need any additional setup to cooperate. With one sending unit, multiple receivers can cooperate at once. The correct operation is indicated with LED diodes.

Connection Diagram



2. Sender

Sender is connected with the blue connecting line wire with crocodile terminal to neutral wire **N** or **PEN** in HV/LV transformer station or at another equally suitable place on the low voltage side. After this the black connection wire can be connected to the **L1** phase (or the phase we will assign to be L1 if the phases are not yet assigned). If everything is correct the green LED (Pwr) will turn on which indicates measuring of the supply voltage (230V AC). If the LED is not lighting than either there is no voltage present or the internal fuse of the sender unit is blown, or the device is damaged. Consequently if everything is right, the yellow LED (Tx) starts flashing approximately once per second to indicate the synchronization pulses. When disconnecting, for security reasons first disconnect phase wire and than the neutral wire.

3. Receiver

Receiver is first connected with the blue wire to the **N** or **PEN** neutral wire in the place of detection in low voltage network. Than the black connection wire can be connected or contacted with the measured phase wire. If connection is correct and operating the green LED (Pwr) is lit. In approximately 1s second interval one of the red LEDs (L1, L2 or L3) starts flashing to indicate the detected phase. If the phase order can not be detected (if phase shift is bigger than $\pm 20\%$ from the senders phase) than short flash of all three LEDs occurs. If the signal is too weak than synchronization pulses are not received correctly. In this situation the yellow LED (Error) starts flashing in 2 second intervals. In this case it is recommended to move sender closer to the measured location where phases are already detected correctly. When disconnecting, for security reasons first disconnect phase wire and than the neutral wire.

4. Technical Parameters

Operating voltage	230V AC, +15/-20%, 50 Hz
Power	max. 2 VA
Fuse	T6A/1500
Overvoltage category	III in compl. with IEC664
Insulation voltage (t = 1 min.)	2500 Vef
Operating frequency of sender / receiver	132.5 kHz, EN 50065-1
Operation range	up to 1000 m
Protection	IP 40
Operation / storage temperature	-10 ÷ 50° C / -20 ÷ 70° C
Operation humidity	0 ÷ 95 %
Dimensions / mass	140 x 80 x 35 mm / 0.30 kg
Connection cable length	100 cm

