2. Control mode and signals

Control principles

The UPM2, UPM GEO and UPM2K pumps are controlled via a digital low-voltage pulse-width modulation (PWM) signal which means that the speed of rotation depends on the input signal. The speed changes as a function of the input profile.

Control signals

Digital low-voltage PWM signal

The square-wave PWM signal is designed for a 100 to 4000 Hz frequency range.

The PWM signal is used to select the speed (speed command) and as feedback signal. The PWM frequency on the feedback signal is fixed at 75 Hz in the pump.

Duty cycle

d % = 100 x t/T

Example

T = 2 ms (500 Hz)
t = 0.6 ms
d % = 100 x 0.6 / 2 = 30 %
U_{iH} = 4-24 V
U_{iL} = < 1 V
I_{iH} = < 10 mA

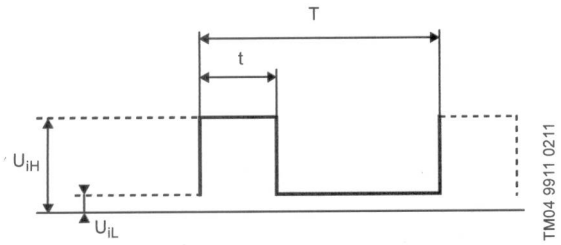

Fig. 4 PWM signal

Abbreviation	Description
T	Period of time [sec.]
d	Duty cycle (t/T)
U_{iH}	High-level input voltage
U_{iL}	Low-level input voltage
I_{iH}	High-level input current

Interface

The UPM2, UPM GEO and UPM2K interface consists of an electronic part connecting the external control signal to the pump. The interface translates the external signal into a signal type that the microprocessor can understand.

In addition, the interface ensures that the user cannot get into contact with dangerous voltage if touching the signal wires when 230 V is connected to the pump.

Note: "Signal ref." is a signal reference with no connection to protective earth.

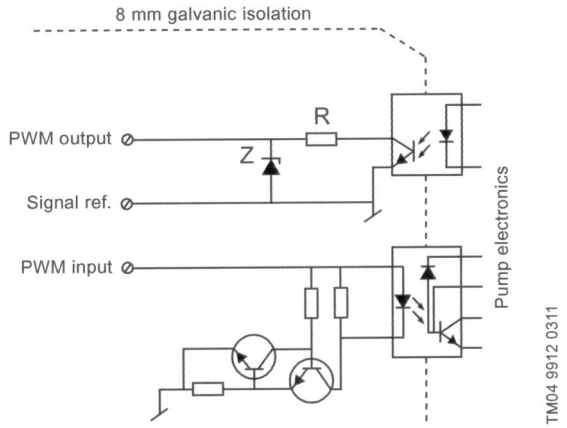

Fig. 5 Schematic drawing, interface