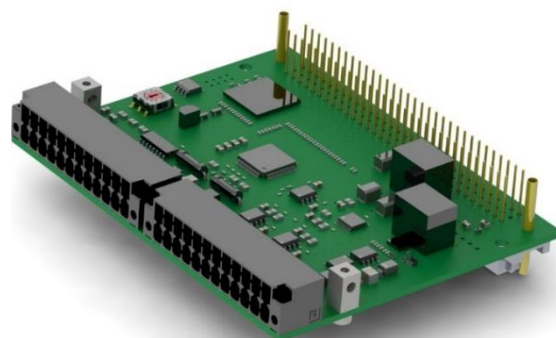# 29. COP-IT (Thermocouple/Pulsator/PWM/LVDT)

COP-IT   611144600

The COP-IT is a universal module which enables to operate and measure thermocouple elements, measuring bridges and LVDT sensors. At the PWM outputs LEDs can be controlled via PWM modulation to generate flashlights. The high-resolution pulsators are used, for example, for actuate dispensers.
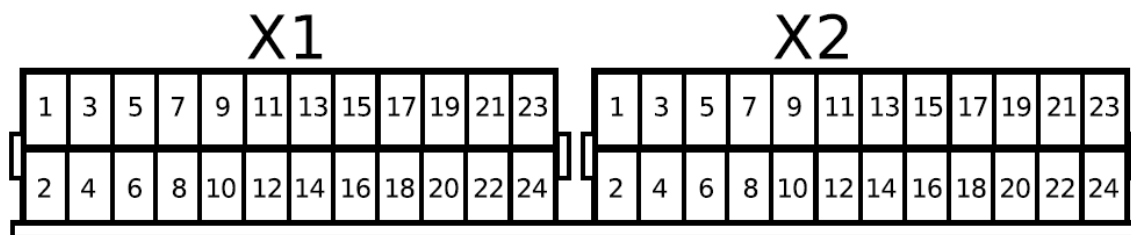
29.1. Technical Specifications

Pulsators		
Number of outputs	2	
Pulsator specifications	See section 18.3	
Maximum output current at 24V outputs [1] [2]	50	mA
ROUT output resistance	6.875	Ω
PWM		
Number of outputs	6	
IMAX output current per output	2.5	A
PWM frequency	20	kHz
Resolution	16	Bit
Protection	Internal current limitation, excessive temperature	
Type	Open drain output	
LVDT Sensors		
Number	2	
Supported LVDT types	Mahr	
Measuring range	± 0.01, ± 0.1, ± 1, ± 10	V
Measuring Bridge		
Bridge voltage	4.5	V
Number of measuring inputs	2	
Measuring range	± 0.01, ± 0.1, ± 1, ± 10	V
Resolution	16	Bit
Drift	50	ppm/K

Thermocouple Inputs		
Number of inputs	4	
Temperature adjustment	Internally or via PT100 sensor on the COP connector	
Voltage ranges	± 0.025, ± 0.25, ± 2.5	V
Configurable software filter	100	ms
Trigger Input		
Number of inputs	1	
Rated voltage	5	V_{DC}
Negative-going switching threshold	< 1	V_{DC}
Positive-going switching threshold	> 3	V_{DC}
Module		
Warm-up time	15	min
Maximum power consumption at 24V node power supply	300	mA

1) If no external Vcc PULS supply unit is connected, the PULS outputs are supplied with internal 5V power.
2) The PULS outputs are not short-circuit safe.

29.2. **Pin Assignment**

X1   X2

| 1 | 3 | 5 | 7 | 9 | 11 | 13 | 15 | 17 | 19 | 21 | 23 |
| 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |

| 1 | 3 | 5 | 7 | 9 | 11 | 13 | 15 | 17 | 19 | 21 | 23 |
| 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |

X1					
No.	Dir	Id.	Id.	Dir	No.
2	In	-PT100	+PT100	In	1
4		Shield	Shield		3
6	In	+TC 0	+TC 1	In	5
8	In	-TC 0	-TC 1	In	7
10		Shield	Shield		9
12	In	+TC 2	+TC 3	In	11
14	In	-TC 2	-TC 3	In	13
16	Out	-Vcc_MB0	-Vcc_MB1	Out	15
18	In	-MB 0	-MB 1	In	17
20	In	+MB 0	+MB 1	In	19
22	Out	+Vcc_MB0	+Vcc_MB1	Out	21
24		Shield	Shield		23

X2					
No.	Dir	Id.	Id.	Dir	No.
2	Out	-Vcc_LVDT0	-Vcc_LVDT1	Out	1
4	In	-LVDT 0	-LVDT 1	In	3
6	In	+LVDT 0	+LVDT 1	In	5
8	Out	+Vcc_LVDT0	+Vcc_LVDT1	Out	7
10		Shield	Shield		9
12	Out	PWM 0	+PULS_Ucc	In	11
14	Out	PWM 1	PULS 0	Out	13
16	Out	PWM 2	PULS 1	Out	15
18	Out	PWM 3	-PULS_Ucc	In	17
20	Out	PWM 4	GND	In	19
22	Out	PWM 5	Trigger	In	21
24		Shield	Shield		23

## 29.3. **Hardware Description**
PWM outputs

The PWM outputs can be controlled as DAC via software. Normally they are operated with 20kHz. However, the common frequency can also be adjusted.
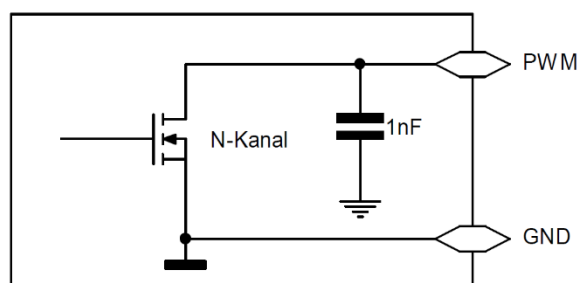
Pulse outputs

The two pulse outputs can be powered with 5...24V. Outputs PULS 0 and 1 are supplied from the Vcc PULS power unit. If no Vcc PULS power unit is connected, the outputs are supplied with internal 5V power. The wires of the pulse outputs must be shielded.

The shield should be applied to the mounting plate before the COP module using a fully contacting strap. Make sure that there is a good connection between the module's GND terminals and the earthing conductor of the 24V or Vcc PULS power supply.
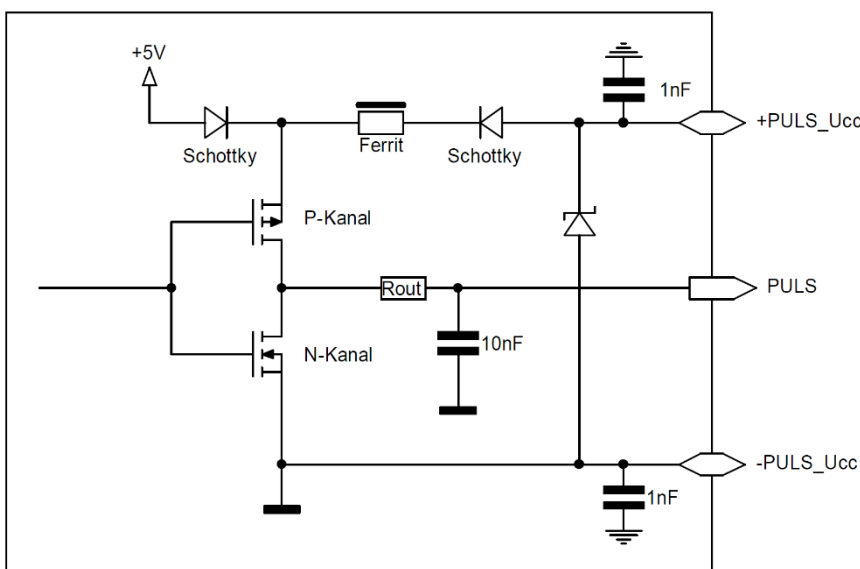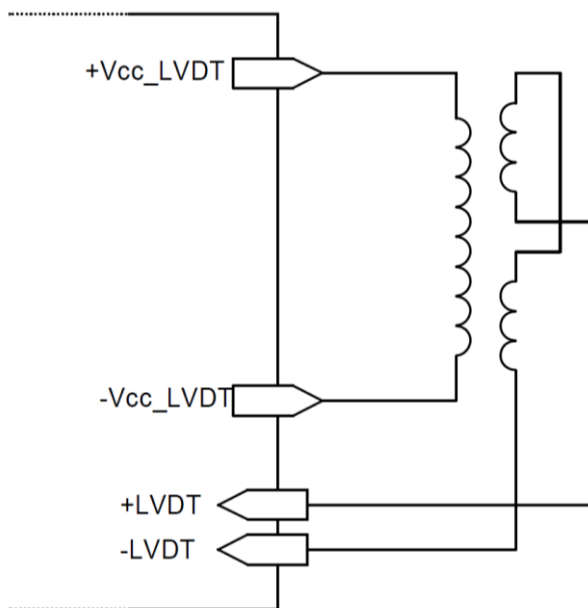

Thermocouple inputs
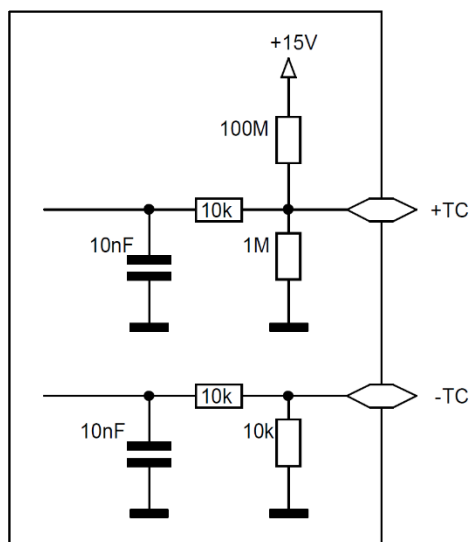
29.4. Connection Examples

Measuring bridge
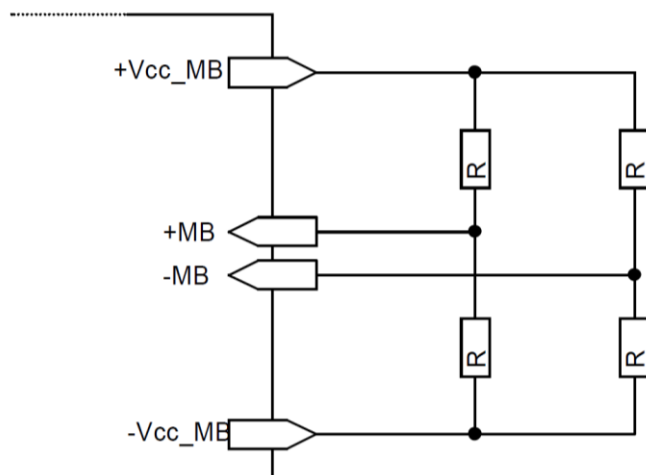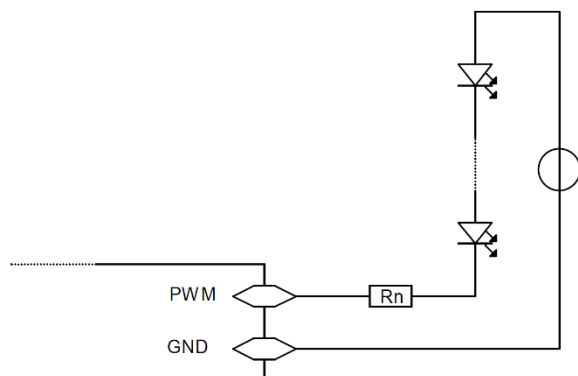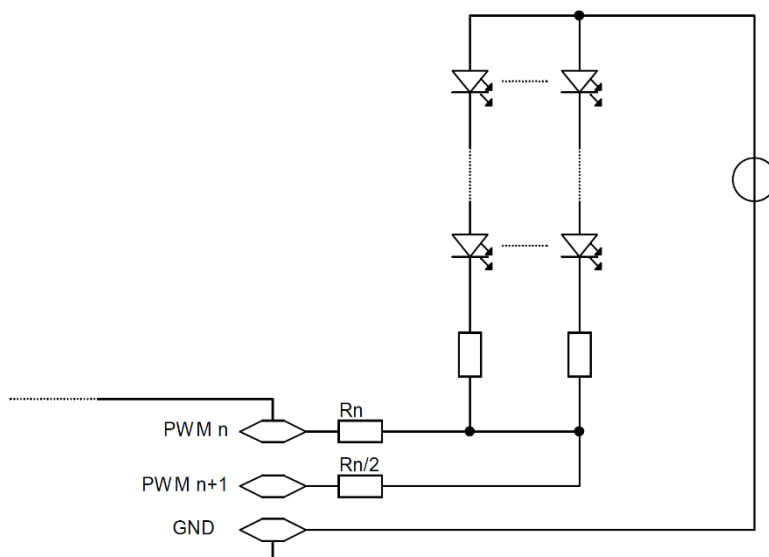

LVDT sensors

PWM output LED
Single line

PWM output LED
Dual line

29.5. Available Options

Item Number	Label	Option	Description
611144600	COP-IT		• 4 thermocouple elements with offset measurement • 2 LVDT sensors • 2 pulse outputs with 1us resolution • 6 PWM (LED)