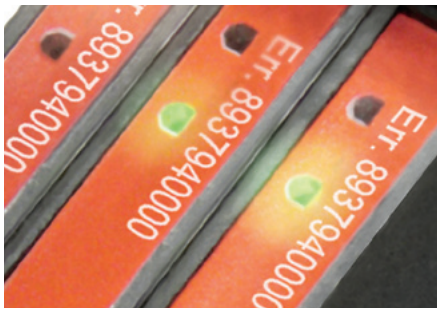
Short-circuit-proof switching amplifier for inductive loads up to 10 A

Powerful, compact solid-state relay with error signalling contact

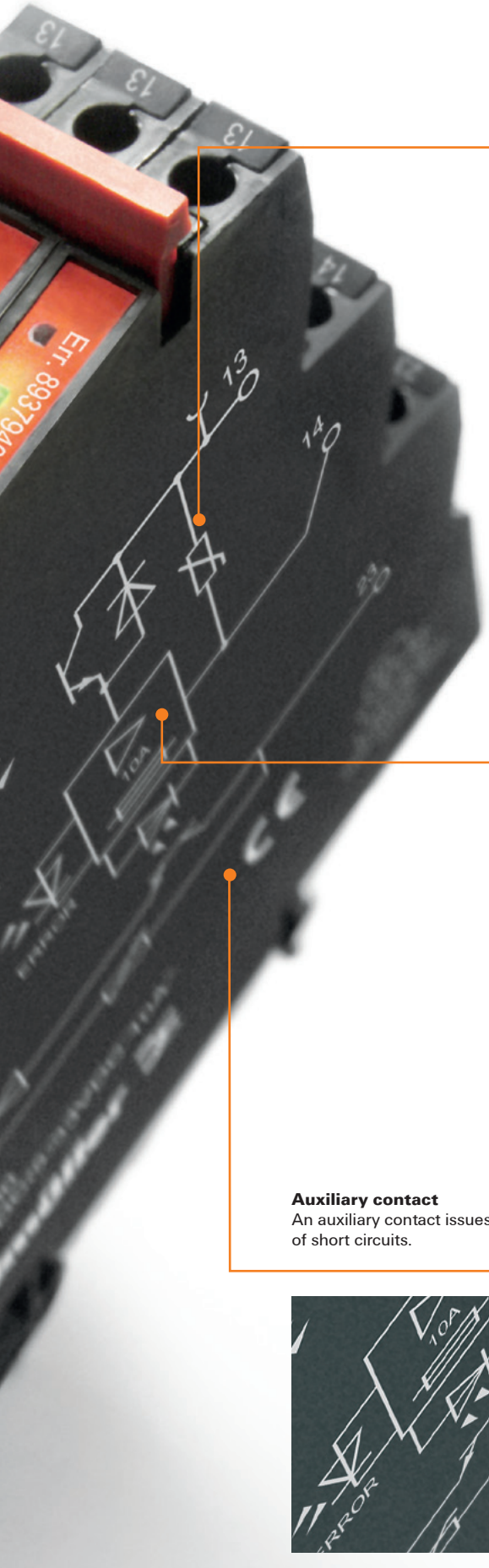
The MICROOPTO family offers the customer high-quality optos and solid-state relays for application-oriented problem solutions. All products are designed in the space-saving 6 mm terminal size. The new solid-state relay can be connected in the output circuits of control systems and feedback control modules for selective activation of inductive loads up to 24 V DC / 10 A, such as solenoid valves, contactors etc. The error controlled output monitors short-circuts and, if necessary, switched off; a potential-free signalling contact provides feedback to the control system – the system can be shut down in a controlled manner for error rectification.

The powerful output of the MICROOPTO SOLENOID switches 10 A at 55 °C. The product can be used worldwide thanks to international approvals: CE, cULus and GL.

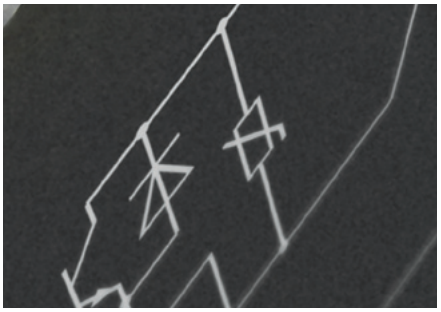
Alarm function
Clear condition display through status and error LEDs in the output.



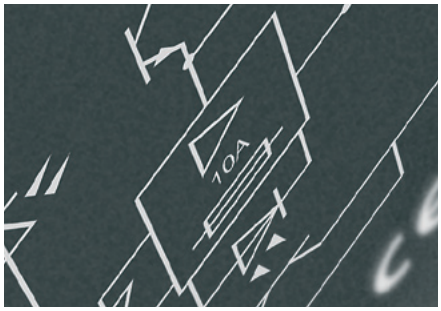
Space-saving
Space-saving 6 mm modular width.



Not sensitive
Protected by suppressor circuit on input and output circuits.



Tough and sturdy
With a short-circuit-proof output.

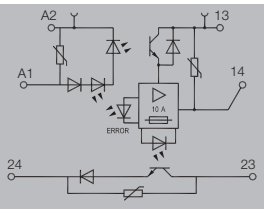


Auxiliary contact
An auxiliary contact issues alerts in event of short circuits.

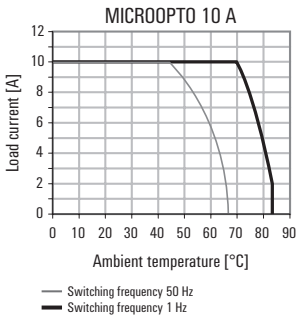
For switching valves up to 24 V DC 10 A

- Width only 6 mm
- Plug-in cross-connector
- For mounting on TS 35
- Status display and error signaling contact with an error in the output

24 V DC / 5-33 V DC 10 A



The **MICROOPTO SOLENOID** solid-state relay is used specifically as a switching amplifier for actuators up to 24 V DC and 10 A with inductive loads such as solenoid valves and contactors.
A potential-free signalling contact transmits errors, such as short circuits, to the controller.
The **MICROOPTO SOLENOID** solid-state relay is short-circuit-proof and protected against power-related transients and voltage peaks by extensive protective circuits. The closed housing also offers a high level of protection against contact.



Technical data

Control side	
Rated control voltage	24 V DC ±20 %
Power rating	400 mW
Cut-in (switch-on) voltage	> 18 V
Dropout voltage	< 13 V
Input frequency	50 Hz
Status indicator	Error LED red; Status LED green
Protective circuit	Varistor, rev. polarity protection
Load side	
Solid-state type	POWER MOS-FET
Rated switching voltage	5...33 V DC
Continuous current	10 A
Voltage drop at max. load	approx. 100 mV
Leakage current	< 1 mA
Short-circuit-proof / Protective circuit, load side	Resistance / Current sensor, Varistor, integrated free-wheel diode
Switch-on delay / Switch-off delay	typical. 250 µs / typical. 700 µs
Pulse load, max. current	
Load category	LC A
General data	
Alarm contact	5...48 V DC / 0.1 A
Ambient temperature (operational)	-25 °C...+60 °C
Storage temperature	-40 °C...+60 °C
UL 94 flammability rating	V-0
Humidity	40 °C / 93 % rel. humidity, no condensation
Approvals	CE; cULus; GL; GOSTME25
Insulation coordination (EN 50178)	
Rated voltage	300 V
Impulse withstand voltage	4 kV (1.2/50 µs)
Dielectric strength for control side - load side	1.2 kV_{eff} / 1 min.
Dielectric strength to mounting rail	1.2 kV_{eff} / 1 min.
Clearance and creepage distances for control side - load side	> 3 mm
Surge voltage category	III
Pollution severity	2

Dimensions		**Screw connection**
Clamping range (nominal / min. / max.)	mm^2	2.5 / 0.5 / 4
Depth x width x height	mm	98 / 6.1 / 88
Note		Suppressor circuitry for inductive loads, 10 cm installation clearance to inductive switching devices.

Ordering data

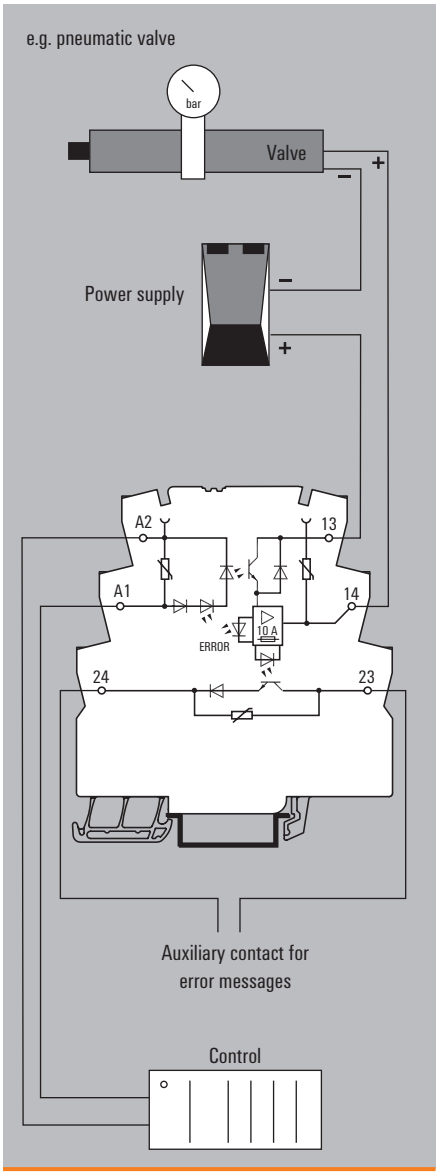
	Type	Qty.	Order No.
Screw connection	MOS 24VDC/5-33VDC 10A	1	**8937940000**

Note

Accessories

Note

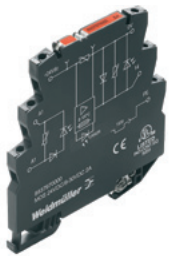
Accessories and dimensioned drawings: refer to the MICROOPTO Accessories page.

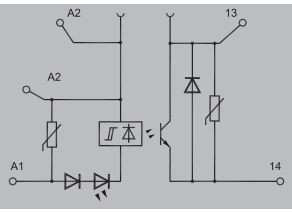


For DC loads up to 300 V DC and 1A

- Only 6 mm modular width
- Plug-in cross-connection
- Power Boost: 20 A / 20 ms, 5 A / 1 sec

12...300 V DC 1 A

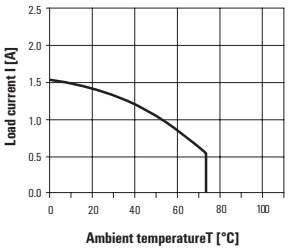




The solid-state relay **MICROOPTO 300 V DC** has been developed as a switching amplifier for high inductive loads up to 300 V DC and 1 A in motor brakes and contactors.

A power boost in the load circuit compensates transient overloads (20 A for 20 ms / 5 A for 1 s) such as making or breaking spikes. Additional protective circuits counter higher overloads.

derating curve

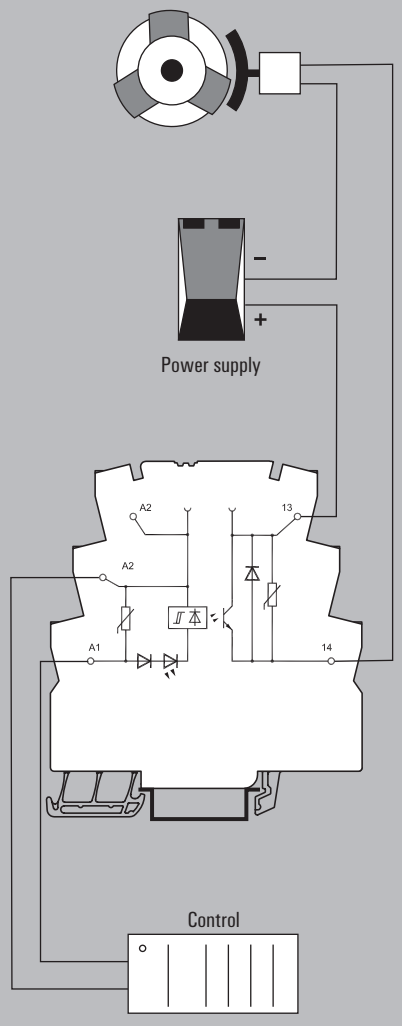


Technical data

Control side	
Rated control voltage	24 V DC ±20 %
Power rating	0.36 W
Cut-in (switch-on) voltage	> 18.8 V
Dropout voltage	< 14.7 V
Input frequency	50...60 Hz
Status indicator	Green LED
Protective circuit	Varistor, rev. polarity protection
Load side	
Solid-state type	POWER MOS-FET
Rated switching voltage	12...300 V DC
Continuous current	1 A
Voltage drop at max. load	≤ 0.4 V
Leakage current	< 1 µA
Short-circuit-proof / Protective circuit, load side	No / Varistor, integrated free-wheel diode
Switch-on delay / Switch-off delay	< 18 µs / < 1 ms
Pulse load, max. current	27 A (10 ms)
Load category	LC A
General data	
Alarm contact	
Ambient temperature (operational)	-20 °C... °C
Storage temperature	-40 °C...+80 °C
UL 94 flammability rating	V-0
Humidity	5–95% rel. humidity, T_u = 55°C, no condensation
Approvals	CE; cULus; GL; GOSTME25
Insulation coordination (EN 50178)	
Rated voltage	300 V
Impulse withstand voltage	2.5 kV (1.2/50 µs)
Dielectric strength for control side - load side	1.2 kV_{eff} / 1 min.
Dielectric strength to mounting rail	1.2 kV_{eff} / 1 min.
Clearance and creepage distances for control side - load side	> 3 mm
Surge voltage category	II
Pollution severity	2

Dimensions		**Screw connection**
Clamping range (nominal / min. / max.)	mm^2	2.5 / 0.5 / 4
Depth x width x height	mm	98 / 6.1 / 88
Note		

z. B. Example: motor brake



Ordering data

	Type	Qty.	Order No.
Screw connection	MOS 24VDC/12-300VDC 1A	1	**8937830000**

Note

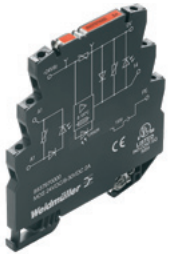
Accessories

Note	Accessories and dimensioned drawings: refer to the MICROOPTO Accessories page.

For direct connection of actuators up to 24 V DC, 2 A

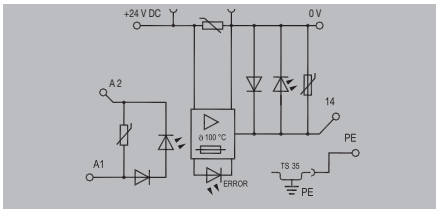
- Only 6 mm modular width
- Plug-in cross-connection
- PE connection direct to mounting rail
- Status display when error in output

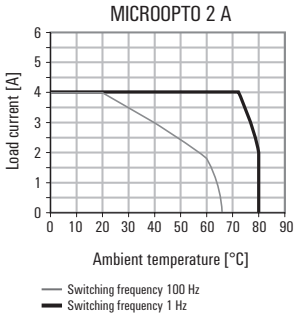
8...30 V DC 2 A



The solid-state relay **MICROOPTO ACTOR** has been specifically designed as a switching amplifier for actuators up to 24 V DC and 2 A with inductive loads such as solenoid valves and contactors. 3-wire actuators can be connected directly to the module.

This is short-circuit proof and protected against application-related transients and spikes by extensive protective circuitry.





Technical data

Control side	
Rated control voltage	24 V DC ±20 %
Power rating	≤ 170 mW
Cut-in (switch-on) voltage	> 13.8 V
Dropout voltage	< 13.6 V
Input frequency	125 Hz
Status indicator	Error indication LED red; status LED green
Protective circuit	Varistor, rev. polarity protection
Load side	
Solid-state type	Intelligent POWER MOS-FET
Rated switching voltage	8...30 V DC
Continuous current	2 A
Voltage drop at max. load	≤ 50 mV
Leakage current	< 10 µA
Short-circuit-proof / Protective circuit, load side	Yes (thermal cut-out) / Varistor, integrated free-wheel diode
Switch-on delay / Switch-off delay	0.1 ms / < 0.5 ms
Pulse load, max. current	
Load category	LC A
General data	
Alarm contact	
Ambient temperature (operational)	-20 °C... °C
Storage temperature	-40 °C...+80 °C
UL 94 flammability rating	V-0
Humidity	5–95% rel. humidity, T_u = 55°C, no condensation
Approvals	CE; cULus; GL; GOSTME25
Insulation coordination (EN 50178)	
Rated voltage	30 V
Impulse withstand voltage	500 V (1,2/50 µ)
Dielectric strength for control side - load side	350 V_{eff} / 1 min.
Dielectric strength to mounting rail	350 V_{eff} / 1 min.
Clearance and creepage distances for control side - load side	
Surge voltage category	II
Pollution severity	2

Dimensions		**Screw connection**
Clamping range (nominal / min. / max.)	mm²	2.5 / 0.5 / 4
Depth x width x height		98 / 6.1 / 88
Note		

Ordering data

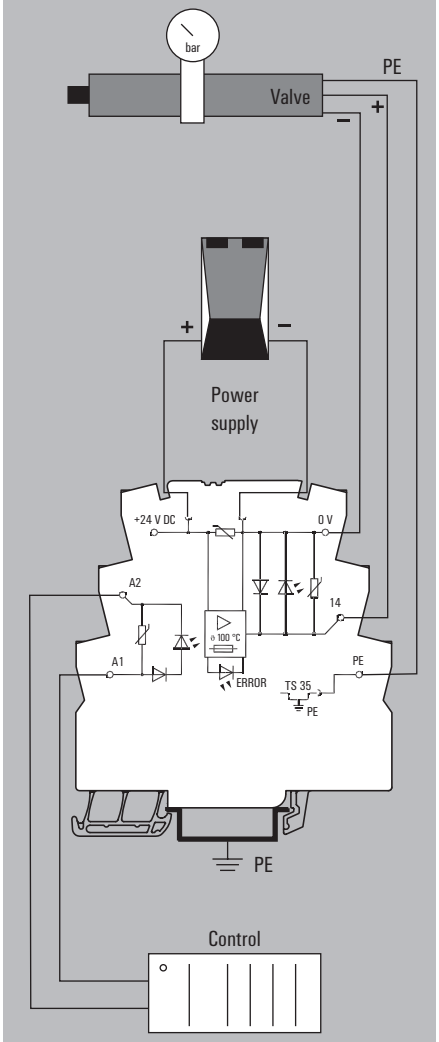
	Type	**Qty.**	**Order No.**
Screw connection	MOS 24VDC/8-30VDC 2A	1	**8937970000**

Note

Accessories

Note

Accessories and dimensioned drawings: refer to the MICROOPTO Accessories page.

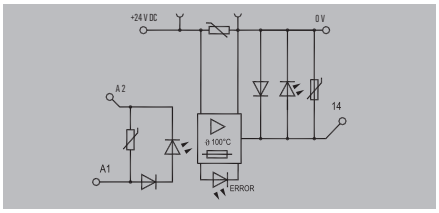


For direct connection of actuators up to 24 V DC 2 A

- Width only 6 mm
- Plug-in cross-connector
- Status display when error in output

24 V DC / 8-30 V DC 2 A E

The solid-state relay **MICROOPTO ACTOR** has been specifically designed as a switching amplifier for actuators up to 24 V DC and 2 A with inductive loads such as solenoid valves and contactors. 3-wire actuators can be connected directly to the module.
This is short-circuit proof and protected against application-related transients and spikes by extensive protective circuitry.



Technical data

Control side	
Rated control voltage	24 V DC ±20 %
Power rating	≤ 170 mW
Cut-in (switch-on) voltage	> 13.8 V
Dropout voltage	< 13.6 V
Input frequency	< 10 Hz
Status indicator	Error indication LED red; status LED green
Protective circuit	Varistor, rev. polarity protection
Load side	
Solid-state type	Intelligent POWER MOS-FET
Rated switching voltage	8...30 V DC
Continuous current	2 A
Voltage drop at max. load	≤ 50 mV
Leakage current	< 10 µA
Short-circuit-proof / Protective circuit, load side	Yes (thermal cut-out) / Varistor, integrated free-wheel diode
Switch-on delay / Switch-off delay	0.1 ms / < 0.5 ms
Pulse load, max. current	
Load category	LC A
General data	
Alarm contact	
Ambient temperature (operational)	-20 °C...+60 °C
Storage temperature	-40 °C...+80 °C
UL 94 flammability rating	V-0
Humidity	5–95% rel. humidity, T_u = 55°C, no condensation
Approvals	
Insulation coordination (EN 50178)	
Rated voltage	30 V
Impulse withstand voltage	500 V (1,2/50 µ)
Dielectric strength for control side - load side	350 V_{eff} / 1 min.
Dielectric strength to mounting rail	350 V_{eff} / 1 min.
Clearance and creepage distances for control side - load side	
Surge voltage category	II
Pollution severity	2

Dimensions		**Screw connection**
Clamping range (nominal / min. / max.)	mm²	2.5 / 0.5 / 4
Depth x width x height	mm	98 / 6.1 / 88
Note		

Ordering data

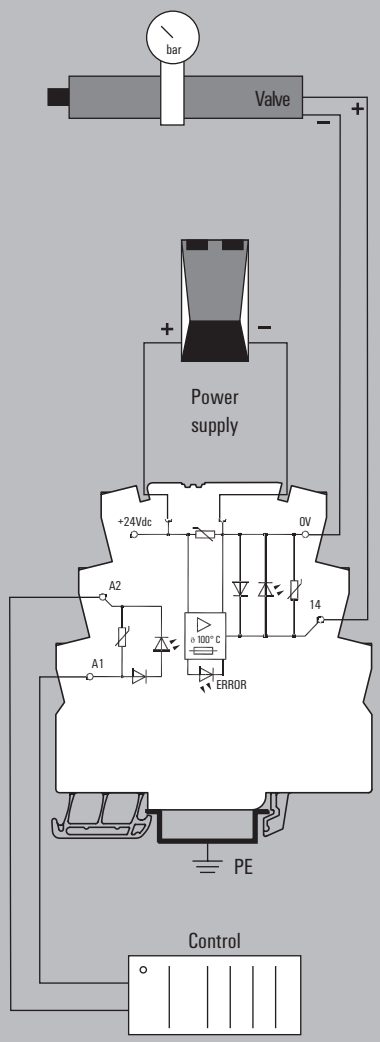
	Type	**Qty.**	**Order No.**
Screw connection	MOS 24VDC/8-30VDC 2A E	10	**1283230000**

Note

Accessories

Note	
	Accessories and dimensional drawings: refer to the MICROOPTO Accessories page

Example: pneumatic valve



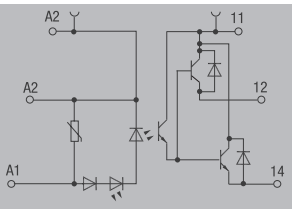
For electronically switching or inverting signals

24 V DC / 5-48 V DC 0.5 A

Electronic CO contacts are used anywhere output signals need to be changed over.

For this purpose, the input signal is directly switched through to the output side and inverted; as a result, the opto module can also be used as a pure inverter.

The advantage over electromechanical relays lies in the wear-free switching and the possibility of realising high switching frequencies.

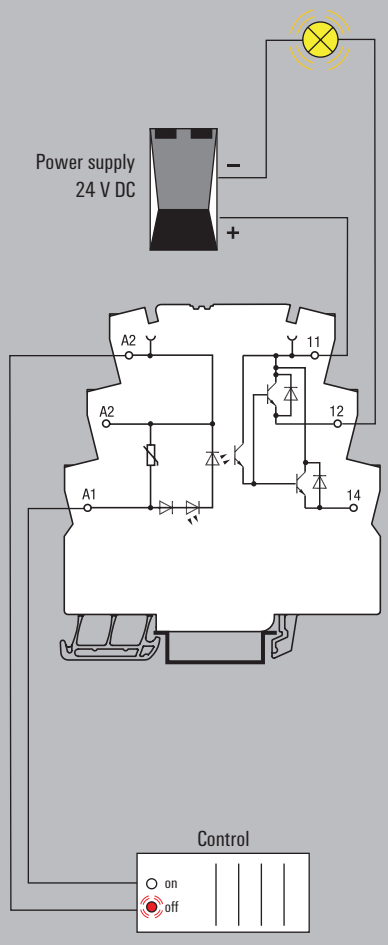


Technical data

Control side	
Rated control voltage	24 V DC ±20 %
Power rating	160 mW
Cut-in (switch-on) voltage	> 18.8 V
Dropout voltage	
Input frequency	1 kHz
Status indicator	Green status LED
Protective circuit	Varistor, rev. polarity protection
Load side	
Solid-state type	Transistor
Rated switching voltage	5...48 V DC
Continuous current	500 mA
Voltage drop at max. load	Max. 1 V
Leakage current	< 1.5 mA
Short-circuit-proof / Protective circuit, load side	No / Integrated free-wheel diode
Switch-on delay / Switch-off delay	< 30 µs / < 50 µs
Pulse load, max. current	
Load category	LC A
General data	
Alarm contact	
Ambient temperature (operational)	-25 °C...+60 °C
Storage temperature	-40 °C...+60 °C
UL 94 flammability rating	V-0
Humidity	40 °C / 93 % rel. humidity, no condensation
Approvals	CE; cULus; GL; GOSTME25
Insulation coordination (EN 50178)	
Rated voltage	300 V
Impulse withstand voltage	4 kV (1.2/50 µs)
Dielectric strength for control side - load side	1.2 kV_{eff} / 1 min.
Dielectric strength to mounting rail	1.2 kV_{eff} / 1 min.
Clearance and creepage distances for control side - load side	> 3 mm
Surge voltage category	III
Pollution severity	2

Dimensions		**Screw connection**
Clamping range (nominal / min. / max.)	mm^2	2.5 / 0.5 / 4
Depth x width x height	mm	98 / 6.1 / 88
Note		

e.g. Inverter



Ordering data

	Type	Qty.	Order No.
Screw connection	MOS 24VDC/5-48VDC 0,5A	1	**8937980000**

Note

Accessories

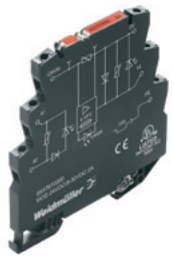
Note

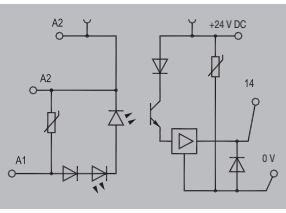
Accessories and dimensioned drawings: refer to the MICROOPTO Accessories page.

For high switching frequency up to 100kHz

- Width only 6 mm
- Plug-in cross-connector
- For mounting on TS 35

12...28 V DC 100 kHz

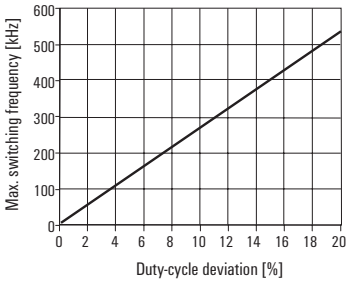




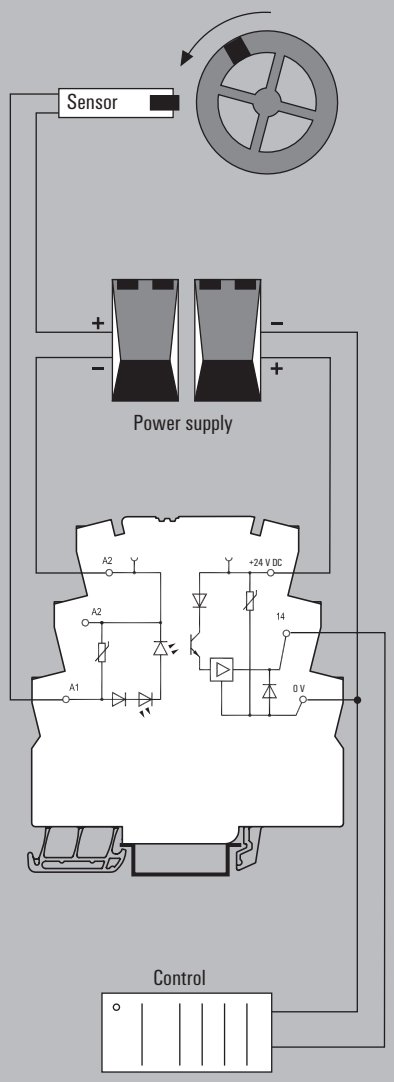
A special interior circuit in the opto module **MICROOPTO 100 kHz** ensures that rapidly transmitted signals are isolated from one another and that they can be transferred practically without delay. This allows switching frequencies up to 100 kHz to be achieved. Comprehensive suppressor circuits safeguard the module against conducted transients and voltage spikes.

Max. switching frequency is dependent on the duty cycle deviation

MOS 12-28 V DC 100 kHz (switching current 50 mA, ohmic load)



For example rotational speed measurement



Technical data

Control side	
Rated control voltage	12 V DC...28 V DC
Power rating	≤ 280 mW
Cut-in (switch-on) voltage	> 5.6 V
Dropout voltage	≤ 15 V DC
Input frequency	100 kHz
Status indicator	Green LED
Protective circuit	Varistor, rev. polarity protection
Load side	
Solid-state type	Transistor
Rated switching voltage	19.6...28.8 V
Continuous current	max. 50 mA
Voltage drop at max. load	≤ 2 V
Leakage current	< 1 µA
Short-circuit-proof / Protective circuit, load side	No / Varistor, rev. polarity protection
Switch-on delay / Switch-off delay	< 200 ns / < 400 ns
Pulse load, max. current	0.6 A (20 ms)
Load category	LC A
General data	
Alarm contact	
Ambient temperature (operational)	-20 °C...+60 °C
Storage temperature	-40 °C...+80 °C
UL 94 flammability rating	V-0
Humidity	5–95% rel. humidity, T_u = 55°C, no condensation
Approvals	CE; cULus; GL; GOSTME25
Insulation coordination (EN 50178)	
Rated voltage	30 V
Impulse withstand voltage	500 V (1,2/50 µ)
Dielectric strength for control side - load side	350 V_{eff} / 1 min.
Dielectric strength to mounting rail	350 V_{eff} / 1 min.
Clearance and creepage distances for control side - load side	
Surge voltage category	II
Pollution severity	2

Dimensions		**Screw connection**
Clamping range (nominal / min. / max.)	mm²	2.5 / 0.5 / 4
Depth x width x height	mm	98 / 6.1 / 88
Note		

Ordering data

	Type	**Qty.**	**Order No.**
Screw connection	MOS 12-28VDC 100kHz	1	**8937990000**

Note

Accessories

Note

Accessories and dimensioned drawings: refer to the MICROOPTO Accessories page.

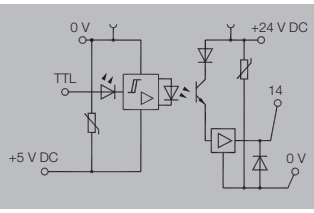
For adjusting TTL signals

5 V TTL / 24 V DC 0.1 A

To adjust sensitive TTL signals to the typical voltage level of 24 V DC used in industrial automation applications, the **MICROOPTO TTL** modules are used.

For the protection of the electronics, the sensitive TTL signals require electrical isolation from the 24 V world.

To control the optical coupler circuit via the 5 V TTL signal, an additional auxiliary voltage is fed in.



Technical data

Control side	
Rated control voltage	5 V TTL
Power rating	< 0.5 mW
Cut-in (switch-on) voltage	approx. 2 V
Dropout voltage	ca. 1 V
Input frequency	100 kHz
Status indicator	Green status LED
Protective circuit	Varistor, rev. polarity protection
Load side	
Solid-state type	TTL
Rated switching voltage	24 VDC ±20%
Continuous current	100 mA
Voltage drop at max. load	< 1 V
Leakage current	< 20 µA
Short-circuit-proof / Protective circuit, load side	No / Integrated free-wheel diode
Switch-on delay / Switch-off delay	< 1.3 µ / < 1 µs
Pulse load, max. current	
Load category	LC A
General data	
Alarm contact	
Ambient temperature (operational)	-25 °C...+60 °C
Storage temperature	-40 °C...+60 °C
UL 94 flammability rating	V-0
Humidity	40 °C / 93 % rel. humidity, no condensation
Approvals	CE; cULus; GOSTME25
Insulation coordination (EN 50178)	
Rated voltage	300 V
Impulse withstand voltage	4 kV (1.2/50 µs)
Dielectric strength for control side - load side	1.2 kV_{eff} / 1 min.
Dielectric strength to mounting rail	1.2 kV_{eff} / 1 min.
Clearance and creepage distances for control side - load side	> 3 mm
Surge voltage category	III
Pollution severity	2

Dimensions		**Screw connection**
Clamping range (nominal / min. / max.)	mm^2	2.5 / 0.5 / 4
Depth x width x height	mm	98 / 6.1 / 88
Note		

Ordering data

	Type	Qty.	Order No.
Screw connection	MOS 5VTTL/24VDC 0,1A	1	**8937920000**

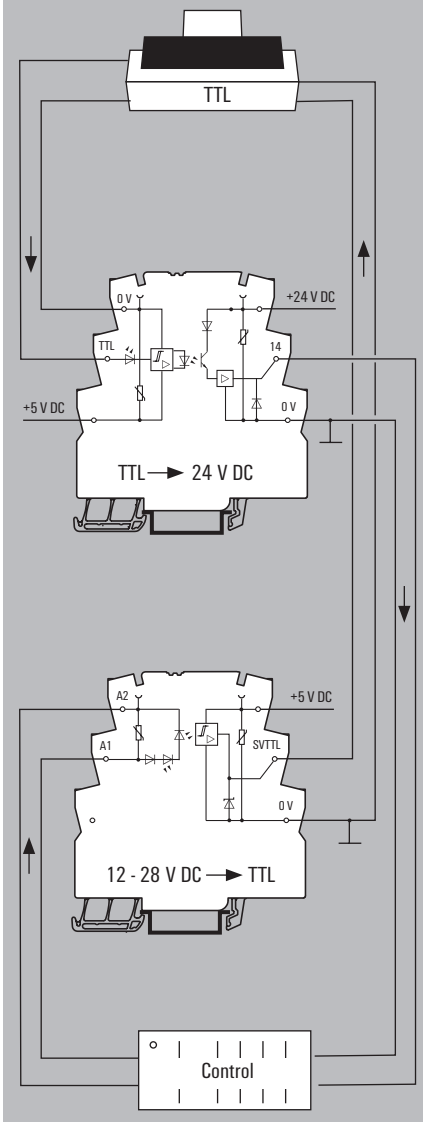
Note

Accessories

Note

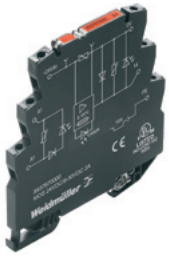
Accessories and dimensioned drawings: refer to the MICROOPTO Accessories page.

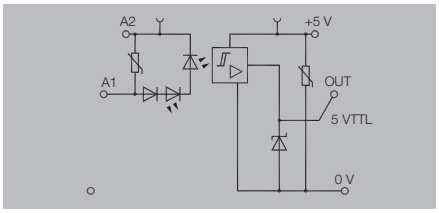
e.g. printer interface



For adjusting TTL signals

12-28 V DC / 5 V TTL





To adjust sensitive TTL signals to the typical voltage level of 24 V DC used in industrial automation applications, the **MICROOPTO TTL** modules are used.

For the protection of the electronics, the sensitive TTL signals require electrical isolation from the 24 V world.

To control the optical coupler circuit via the 5 V TTL signal, an additional auxiliary voltage is fed in.

Technical data

Control side	
Rated control voltage	12 V DC...28 V DC
Power rating	150 mW
Cut-in (switch-on) voltage	> 10.7 V
Dropout voltage	< 10.6 V
Input frequency	100 kHz
Status indicator	Green status LED
Protective circuit	Varistor, rev. polarity protection
Load side	
Solid-state type	TTL
Rated switching voltage	5 V TTL
Continuous current	max. 50 mA
Voltage drop at max. load	90 mV
Leakage current	< 1 µA
Short-circuit-proof / Protective circuit, load side	No / Varistor
Switch-on delay / Switch-off delay	typical. < 1 µs / typical. < 4 µs
Pulse load, max. current	
Load category	LC A
General data	
Alarm contact	
Ambient temperature (operational)	-25 °C...+60 °C
Storage temperature	-40 °C...+60 °C
UL 94 flammability rating	V-0
Humidity	40 °C / 93 % rel. humidity, no condensation
Approvals	CE; cULus; GOSTME25
Insulation coordination (EN 50178)	
Rated voltage	300 V
Impulse withstand voltage	4 kV (1.2/50 µs)
Dielectric strength for control side - load side	1.2 kV_{eff} / 1 min.
Dielectric strength to mounting rail	1.2 kV_{eff} / 1 min.
Clearance and creepage distances for control side - load side	> 3 mm
Surge voltage category	III
Pollution severity	2

Dimensions		**Screw connection**
Clamping range (nominal / min. / max.)	mm^2	2.5 / 0.5 / 4
Depth x width x height	mm	98 / 6.1 / 88
Note		

Ordering data

	Type	Qty.	Order No.
Screw connection	MOS 12-28VDC/5VTTL	1	**8937930000**

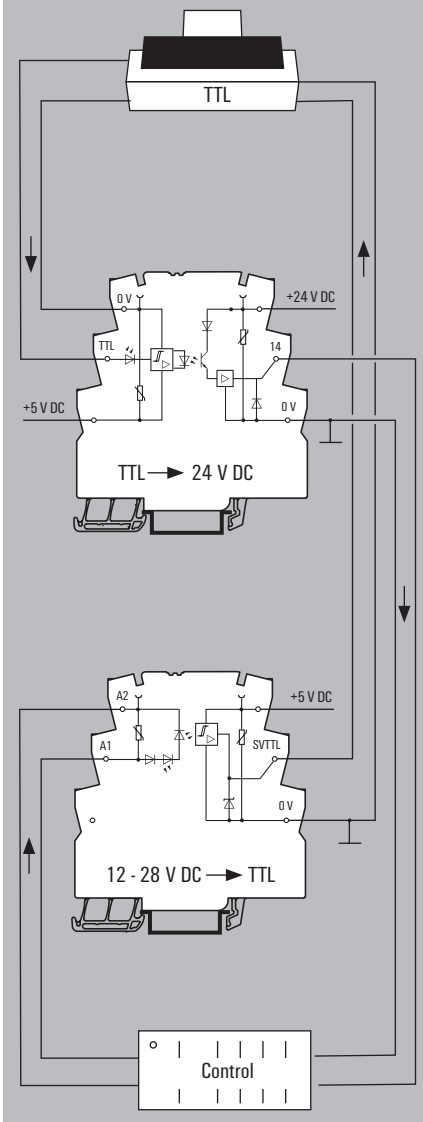
Note

Accessories

Note

Accessories and dimensioned drawings: refer to the MICROOPTO Accessories page.

e.g. printer interface



Accessories

General data – MICROOPTO

Plug-in cross-connection

Type	No. of poles	Qty.	Order No.
yellow			
ZQV 4N / 2 GE	2	60	**1758250000**
ZQV 4N / 3 GE	3	60	**1762630000**
ZQV 4N / 4 GE	4	60	**1762620000**
ZQV 4N / 10 GE	10	20	**1758260000**
ZQV 4N / 20 GE	20	20	**1909020000**
red			
ZQV 4N / 2 RT	2	60	**1793950000**
ZQV 4N / 3 RT	3	60	**1793980000**
ZQV 4N / 4 RT	4	60	**1794010000**
ZQV 4N / 10 RT	10	20	**1794040000**
ZQV 4N / 20 RT	20	20	**1909150000**
blue			
ZQV 4N / 2 BL	2	60	**1793960000**
ZQV 4N / 3 BL	3	60	**1793990000**
ZQV 4N / 4 BL	4	60	**1794020000**
ZQV 4N / 10 BL	10	20	**1794050000**
ZQV 4N / 20 BL	20	20	**1909100000**
black			
ZQV 4N / 2 SW	2	60	**1793970000**
ZQV 4N / 3 SW	3	60	**1794000000**
ZQV 4N / 4 SW	4	60	**1794030000**
ZQV 4N / 10 SW	10	20	**1794060000**
ZQV 4N / 20 SW	20	20	**1909120000**

Technical data

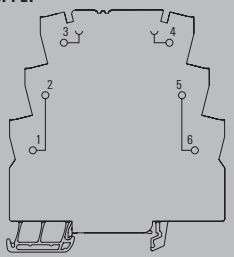
		Screw-connection
Conductor		
Solid H07V-U	mm²	0.5 ... 4.0
Stranded H07V-K	mm²	0.5 ... 2.5
"f" with wire end ferrules to DIN 46228-1	mm²	0.5 ... 1.5
"f" with wire end ferrules with plastic collar	mm²	0.5 ... 1.5
Max. clamping range	mm²	0.13 ... 4.0
Plug gauge to IEC 60947-1	Size	A 3
General technical data		
Nominal torque	Nm	0.6
Continuous current for 2-pole cross-connection	A	10
Continuous current for multi-pole cross-connection	A	10
Stripping length	mm	7
Ingress protection class		IP 20
Housing material		Wemid
UL 94 flammability rating		V-0
Nominal current	A	6
Nominal voltage	V	250

Other accessories

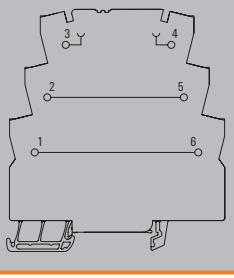
Type		Qty.	Order No.
Supply terminals			
MOS SUPPLY		1	**8973460000**
MOS FEED THROUGH		1	**8973450000**
Markers			
WS 12/6	12 x 6 mm	600	**1609900000**
Labels, Lasermark			
LM MT 300 15/6 ge	484 labels / sheet	10	**1686360000**
Screwdriver			
SD 0.6 x 3.5 x 100		10	**9008330000**
Cross-connector for plugging into the clamping point			
QB 75/6.2/15		10	**0535200000**
Coloured insulating profile for QB			
ISPF QB75 black		10	**0526700000**
ISPF QB75 blue		10	**0526780000**
ISPF QB75 red		10	**0526760000**
End bracket			
WEW 35/2		100	**1061210000**

Drawings: Supply terminals

8973460000
MOS SUPPLY



8973450000
MOS FEED THROUGH



Dimensions

Screw connection