

## Description

The E-T-A Solid State Remote Power Controller E-1071-128 is an electronic ON/OFF control module with protective and signalling functions. It is suitable for inductive loads (solenoids, magnetic brakes) when the load circuit supply cannot be increased to the voltage level required (e. g. DC 36 V). The operating status of the controller/load connected is continuously indicated and signalled via opto coupler.



**E-1071-128**

## Typical applications

Control of hydraulic and pneumatic systems in production lines and chemical plants where check-back signals for process control systems are needed.

## Features

- Overcurrent and short-circuit proof switching output with electronic current limitation
- Switch-off current largely independent of operating voltage
- Inrush current limitation
- Physical isolation between control and load circuit via opto coupler
- Low control power; control current indication by LED
- Solid state switching avoids contact arcing and welding
- 2-pole physical isolation upon overload or when tripped manually
- Opto decoupled ON and fault indication by LED
- Setting of minimum current on front of housing, with minimum current indication (set at approx. 50 % of the load current rating)
- Current measuring terminals on front of housing
- Reverse polarity protection in control and load circuit

## Ordering information

Type No.	
E-1071	SSRPC
	128
	Voltage rating of load DC 24 V
	Current rating 3.0 A
E-1071 - 128 - DC 24 V - 3.0 A ordering example	

## Technical data (T<sub>ambient</sub> = 25 °C, U<sub>B</sub> = DC 24 V)

Voltage rating U <sub>N</sub>	DC 24 V
Operating voltage U <sub>B</sub>	DC 20...48 V
Current rating I <sub>N</sub>	3 A
Current consumption (U <sub>B</sub> = DC 24 V, U <sub>S</sub> = "0")	typically 15 mA
Residual ripple for all voltages	max. 5 % (3 phase bridge)
Reverse polarity protection	U <sub>B</sub> (terminals 1 and 2)
Physical isolation	2-pole - by manual release (circuit breaker) - approx. 5 s after overload disconnection

Load circuit	
Load output	NPN transistor, minus switching
Load rating	DC 24 V/0.2...3 A
Voltage drop at I <sub>N</sub>	max. 2 V
Overload disconnection	approx. 1.1 x I <sub>N</sub>
Storage time t <sub>s</sub> (at 2xI <sub>N</sub> )	typically 20 ms (see storage time curve)
Short-circuit limitation	approx. 2.5 x I <sub>N</sub>
Short-circuit response delay	approx. 4 µs
Load current monitoring I <sub>min</sub> (MIN monitoring, to be set by potentiometer at 50 % of the load current rating)	GREEN LED lights at I <sub>load</sub> > 0.2 I <sub>min</sub> switch position I: 0.1...1.1 A switch position II: 1.1...2.1 A
Current measuring terminals	2 x 2 mm dia. (shunt 0.1 Ω ± 1 %)
Leakage current (U <sub>S</sub> = "0")	max. 3 mA
Free-wheeling diode	integral

Control circuit	
Control	opto coupler in control input
Control voltage U <sub>S</sub>	"0" = 0...5 V "1" = 8.5...35 V
Control current	typically 5 mA
Switching frequency f <sub>max</sub>	10 Hz
Control signal (U <sub>S</sub> = "1")	YELLOW LED lights (I <sub>S</sub> flowing)
Protection	reverse polarity protection (diode)

Status outputs	
2 signal outputs	ON indication/fault indication - physically isolated by opto coupler - transistor outputs plus switching - max. DC 33 V/100 mA per output - integral free-wheeling diode - 20 ms time delay (eliminating false signals before the minimum current is reached)
ON indication (terminal 8)	U <sub>S</sub> = "0": output non-conductive U <sub>S</sub> = "1": output connecting plus potential (terminal 10) to terminal 8
Fault indication (terminal 9)	no fault: output connecting plus potential (terminal 10) to terminal 9

## Technical data ( $T_{\text{ambient}} = 25\text{ }^{\circ}\text{C}$ , $U_B = 24\text{ V DC}$ )

### General data

Ambient temperature	0...+60 °C (without condensation)
Terminals	screw terminals 2 x 2.5 mm <sup>2</sup> to DIN 46288
Housing	clamping plate: polycarbonate GV, blue cover: polycarbonate, black
Mounting	symmetric rail to EN 50022-35
Burning behaviour (housing)	to UL 94: V = 0; VDE 0304: grade 1
Degree of protection	IP20 housing, terminals (IEC 529/DIN 40050)
Mounting dimensions	45 x 74 x 128 mm
Mass	approx. 320 g

## Technical description

In principle, the E-T-A SSRPC E-1071-128 operates like conventional electro-mechanical relays, with additional protective and signalling functions. The control input replaces the magnetic coil and the power transistor replaces the main contact. ON and fault indication outputs have more complex functions and may not be compared with auxiliary contacts.

### Control circuit

The control current flows through the LED and the opto coupler immediately a voltage higher than 8.5 V (= control signal "1") is applied at the input terminals (6 and 7). The opto coupler transmits the signal to the load circuit, at the same time switching the load transistor on. This signal is transmitted as a status signal to all monitoring circuits. The input protection diode protects the control voltage from incorrect polarization. Control current limitation is provided by a constant current diode.

### Load circuit

The load circuit is switched ON or OFF according to the control signal ("0" or "1"), with electronic circuits monitoring the load circuit for faults such as overload or short-circuit. Should one of these faults occur, the monitoring circuitry will immediately react, causing the load transistor to disconnect and the circuit breaker to trip. Transistor disconnection occurs according to the storage time characteristics. The storage time increases noise immunity avoiding disconnection of non-harmful peaks such as those caused by inrush currents from lamp load connection. Storage time is not a constant quantity but is inversely proportional to the overcurrent factor.

### Signal circuit

The signal circuit includes two opto couplers signaling either correct ON duty or a fault. These signals may be computer processed.

- The ON signal output indicates correct operating in the ON condition. This output is conductive

when control voltage is available

- AND the load current is higher than the set minimum current
- AND the circuit breaker has not tripped
- AND there is no wire break.

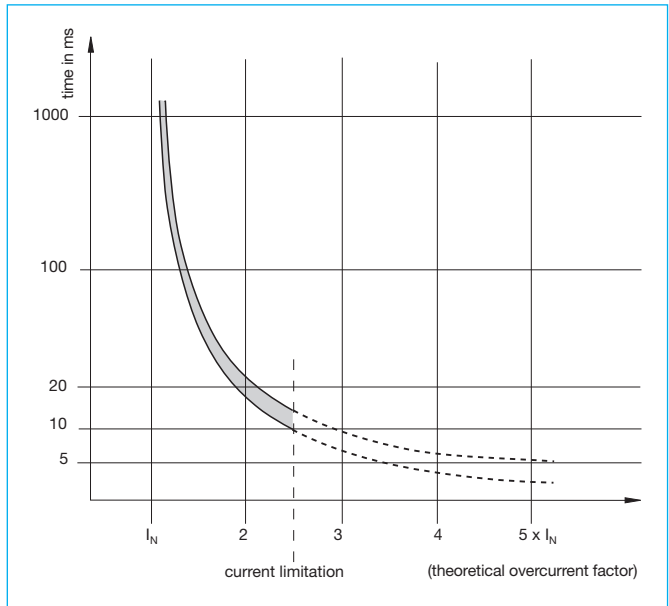
- The fault signal output signals the fault source which must be eliminated. This output is non-conductive when

the circuit breaker has tripped on overload or short-circuit

- OR there is a wire break
- OR control voltage is available AND the minimum current has not been reached
- OR no control voltage is applied although the load current is available.

The fault signal output operates on the closed-circuit principle, i.e. it carries plus potential during fault-free operation.

## Storage time characteristic curve $t_s$ ( $T_A = 25\text{ }^{\circ}\text{C}$ )



## Operating modes

Operating status	Fault-free operation		Short-circuit on the load		Wire break		Load current < minimum current	
	"0"	"1"	"0"	"1"	"0"	"1"	"0"	"1"
Control input $U_S$	0	1	0	1	0	1	0	1
YELLOW LED - control current	0	1	0	0	0	0	0	0
GREEN LED - min. current indication	0	1	0	0	0	0	0	0
GREEN LED - ON indication	0	1	0	0	0	0	0	0
RED LED - fault indication	1	1	1	0	0	0	1	0
Remarks	load OFF	load ON	phys. isolation after approx. 5 s		no load connected, wire break			

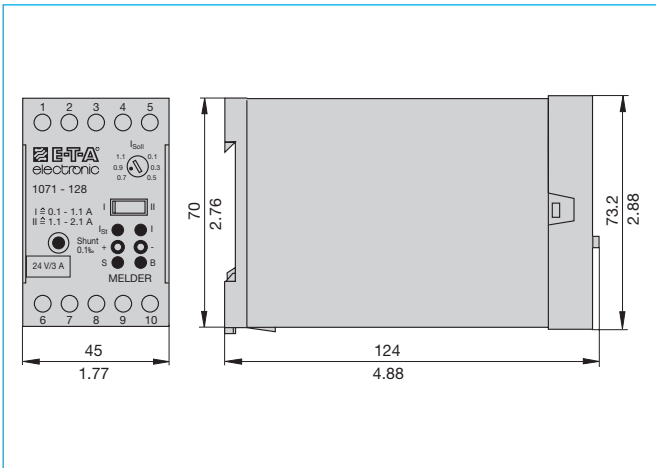
- 1 - LED indicates
- 0 - LED does not indicate

## Status outputs

ON Terminal 8	Fault Terminal 9	Remark
0	0	wire break or load current < minimum current (switched on) or short-circuit (switched on)
0	1	fault-free operation (switched off)
1	1	fault-free operation (switched on)

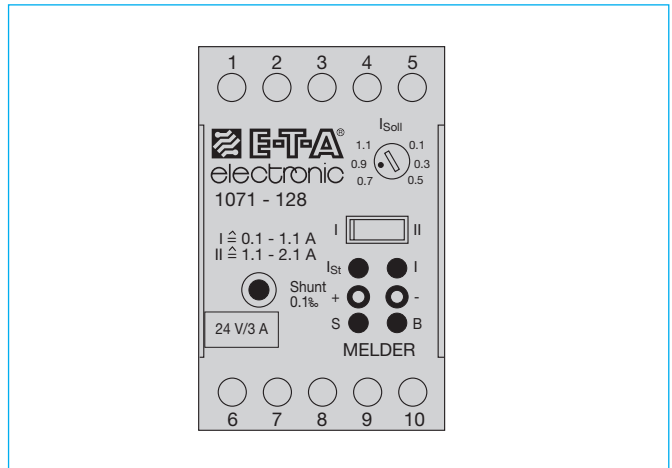
- 1 - status output carries plus potential
- 0 - status output carries minus potential

## Dimensions

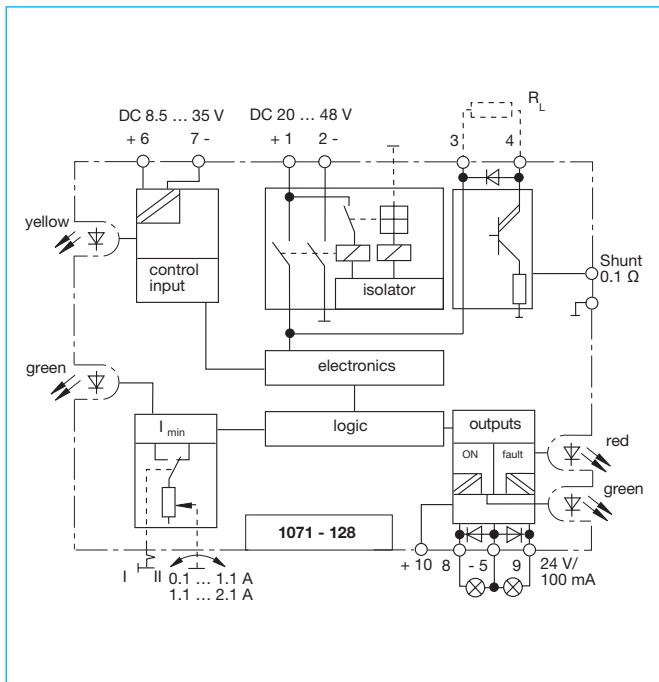


This is a metric design and millimeter dimensions take precedence ( $\frac{\text{mm}}{\text{inch}}$ )

## Terminal selection



## Basic circuit diagram



## Terminal

- 1 operating voltage  $+U_B$ : DC 20...48 V
- 2 operating voltage  $-U_B$
- 3 load (+)
- 4 load (-)
- 5 auxiliary voltage  $-U_A$  for status outputs
- 6 control voltage  $+U_S$ : max. DC 35 V
- 7 control voltage  $-U_S$
- 8 ON status output (max. 100 mA)
- 9 fault status output (max. 100 mA)
- 10 auxiliary voltage  $+U_A$  for status outputs: max. DC 33 V