Technical data sheet

Time relay module DC 24–110 V, programmable

Identification

Type	ZR 6-5000.00 DC 24-110V
Part No.	815000.00

Product version

Hardware revision	D
Firmware version	4.00
Datasheet version	03

Use/Application/Properties

Description	The programmable time relay consists of 2 changeover contacts, which are controlled synchronously. The relay can be parameterized with the PC configuration software “LÜTZE Time Relay Configurator” via a serial interface. Several operating modes can be selected for the time functions. Times (max. 1152 h) and additional functional settings can be set. The start behaviour of the control input can be configured via software as follows: 1.) Positive edge at B1. Supply voltage A1 must already be available. 2.) Simultaneous control of the supply voltage A1 and the control input B1 (A1 and B1 bridged)

Interfaces

UART Interface	µ-USB Typ B 5 pol. RX/TX mit TTL Pegel

Input

Rated voltage U_N	DC 24–110 V
Voltage range	DC 16.8 V – 137.5 V
Current Consumption	approx. 40 mA [@ DC 24 V / relay energized] approx. 7 mA [@ DC 24 V / relay de-energized] approx. 9 mA [@ DC 110 V / relay energized] approx. 3 mA [@ DC 110 V / relay de-energized]

Lütze Transportation GmbH
Postfach 12 24 (PLZ 71366) • Bruckwiesenstraße 17-19 • D-71384 Weinstadt
Tel. +49 (0)7151 6053-545 • Fax +49 (0)7151 6053-6545
www.luetze-transportation.com • sales.transportation@luetze.de

Voltage fluctuations	According to EN 50155 5.1.1.1 and 5.1.3 class C1: 0.6 U_N bis 1.4 U_N, < 0.1 s, Retaining the function
Voltage interruptions	According to EN 50155 5.1.1.2 class S2: interruption up to 10 ms
Protection device Input	Reverse voltage protection without fuse Overvoltage protection, bidirectional TVS diode

Output

Relays per module	1
Switching element	SPDT
Number of contacts	2
Accuracy of timing function	±2 ms or ±1 %
Boot time	340 ms – time after connection of power supply until the unit is ready
Shutdown delay	max. 25 ms
Contact material	AgNi 90/10 hard-gold-plated
Status display output	LED yellow
Switching voltage	AC/DC 1 V – 250 V
Switching current	Max. AC/DC 4 A, min. AC/DC 1 mA
Inrush current	max. 4 s, 10% duty cycle, 15 A
Switching capacity according to EN 60947-5-1	**AC 15:** 3 A @ 24 V / 3 A @ 125 V **DC 13:** 1 A @ 24 V / 0.1 A @ 125 V

Control signal

Signal evaluation	Analogue
Signal level	High level: >60% of the supply voltage Low level: <20% of the supply voltage

Diagnostics

Output monitoring	Read back of the coil control
Voltage control	Analog, measuring range DC 14.4–154 V
Controller monitoring	Watchdog
Diagnostic output	Clock 1Hz (±5%; duty cycle 35-75%) / constant
Diagnostic level	Low level: 0 V, < 10 % of the supply voltage High level: > 80 % of the supply voltage
Diagnostic output current	max.50 mA
Diagnosis indications	module active, LED green module error, LED red output active, LED yellow on output inactive, LED yellow off output error, LED yellow flashing (Firmware 2.0 and greater)
Startup time	Adjustable 200 ms – 25 s

General

Dimensions (w × h × d)	22.5 mm × 79.0 mm × 84.0 mm
Weight/unit	0.08 kg
Mounting	DIN rail mounting

Technical data

Connection type	Push-In single-wire 0.20 – 2.5 mm² AWG 20 – AWG 14 fine stranded 0.20 – 2.5 mm² AWG 20 – AWG 12 Stripping length: 8 mm Screwdriver: 3.5 × 0.6 mm
Rated insulation voltage	150 V
Mechanical service life	30 × 10^6 operations
Operation temperature range	-40 °C … +70 °C (+85 °C 10 min)
Storage temperature range	-40 °C … +85 °C

Environmental service conditions

Altitude	2000 m
Operating temperature class	OT4: -40 °C … +70 °C
Class of supply voltage interruption	S2: 10 ms
Supply change-over class	C1: 100 ms
Useful life class	L4: 20 years
Degree of pollution	2
Over voltage category	II
Socket and edge connector	K2: Sockets for ICs and/or edge connectors are not used
Protective coating class	PC2: lacquered on both sides
Degree of protection	IP20

Failure Rate Prediction (MTBF)

Standards	Electronic components – Reliability – Reference conditions for failure rates and stress models for conversion: EN/IEC 61709 Failure Rates of Components – Expected values: SN 29500
Failure rate at +45 °C	720 fit
Failure rate at +45 °C	1388216 h
	1 fit equals one failure per 10^9 component hours
	The indicated temperature is the mean component ambient temperature.
Comments	The results are valid under following conditions: Automotive environment or industrial areas without extreme dust levels and harmful substances Continuous operation 8760 h per year

Standards/Certifications

Standards	**EN 50155:2007:** Railway applications – Rolling stock – Electronic equipment **EN 50155:2017:** Railway applications – Rolling stock – Electronic equipment – only testing according to chapter 13.3 **EN 50121-3-2:2016:** Railway applications – Electromagnetic compatibility – Part 3-2: Rolling stock – Apparatus **EN 50124-1:2017:** Railway applications – Insulation coordination – Part 1: Basic requirements – Clearances and creepage distances for all electrical and electronic equipment **EN 61373:1999:** Railway applications – Rolling stock equipment – Shock and vibration tests **EN 61373:2010:** Railway applications – Rolling stock equipment – Shock and vibration tests **EN 45545-2:2013+A1:2015:** Railway applications – Fire protection on railway vehicles – Part 2: Requirements for fire behaviour of materials and components

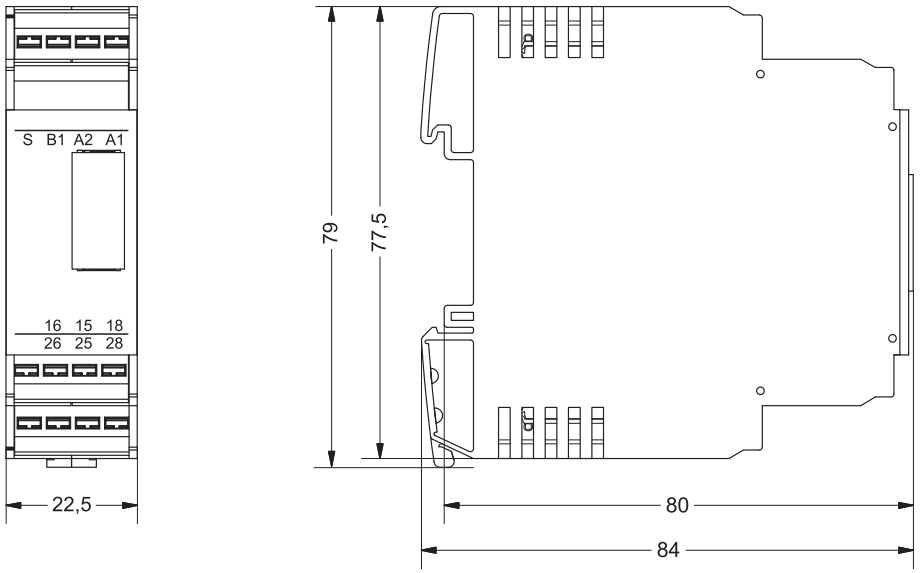
Equipment/Spare parts

Accessories	USB service cable, LCON ZB USB, part number 815900) Konfigurationssoftware "Lütze Time Relay Configurator" Version 4.0

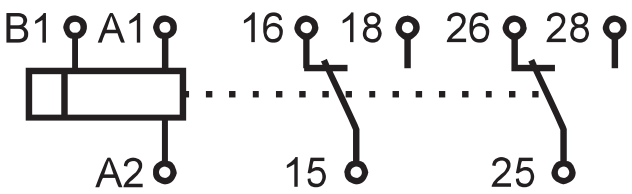
Notes and Comments

Comments	Inductive loads must be wired with a suitable suppressor element!

Dimensions



Circuit diagram

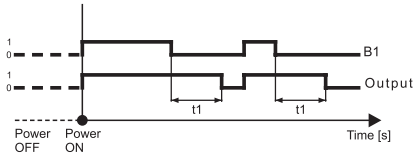


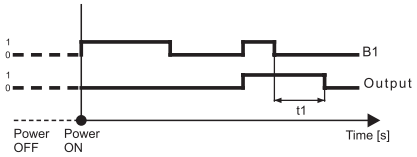
Operating mode

Cold Start Edge Detection
Checked

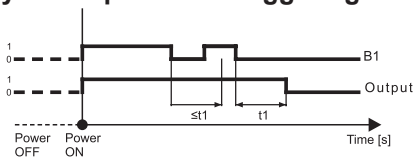
Cold Start Edge Detection
Unchecked

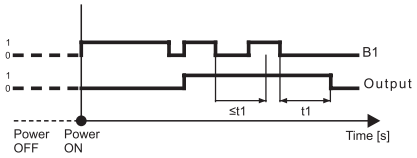
Off delay time



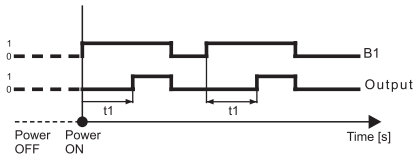


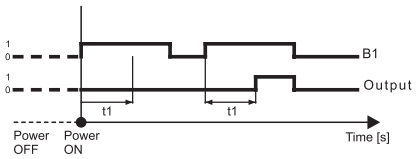
Off response delay: Example with retriggering



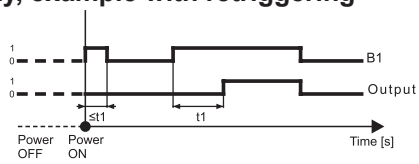


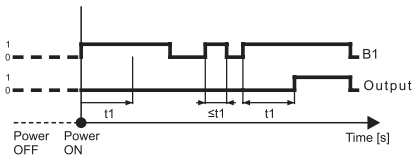
On delay time



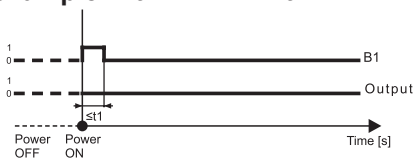


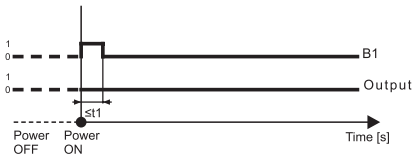
On response delay, example with retriggering



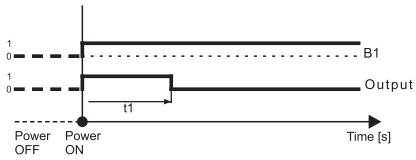


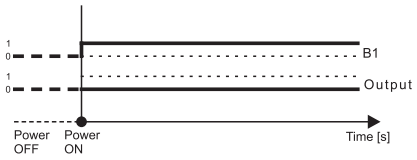
Response delay, example with "B1=H" <t1



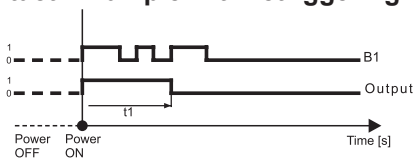


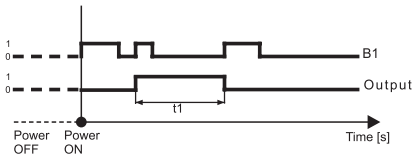
Fleeting contact





Fleeting make contact: Example with retriggering



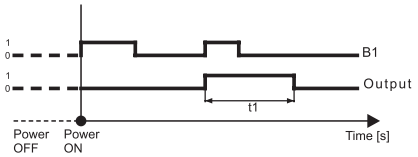


Operating mode

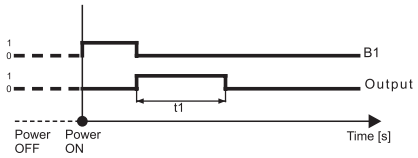
Cold Start Edge Detection
Checked

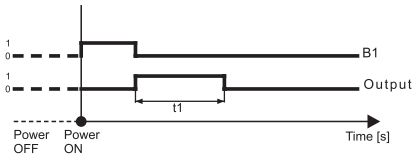
Cold Start Edge Detection
Unchecked

Fleeting make contact: Example with B1 < t1

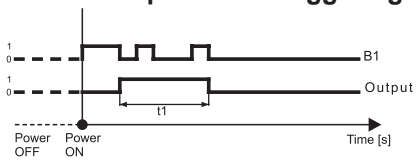


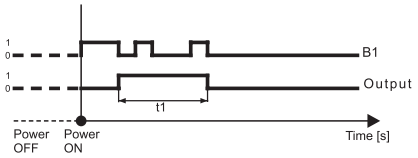
Fleeting break contact



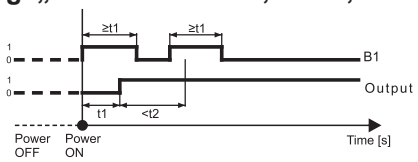


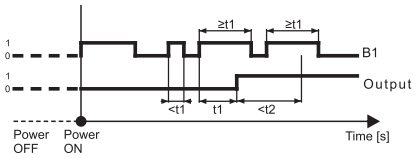
Fleeting break contact: Example with retriggering



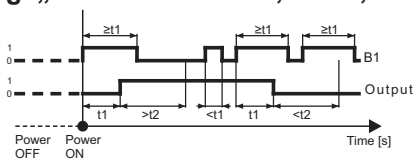


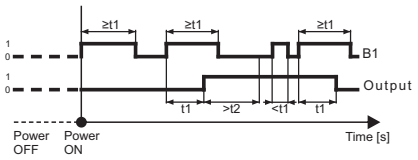
Impulse switch: e.g. „bounce free ON“, t3 = 0, t4 = 0



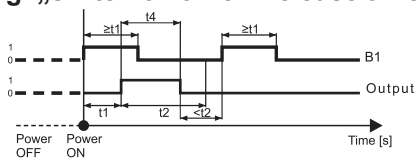


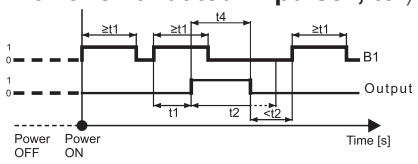
Impulse switch: e.g. „bounce free OFF“, t3 = 0, t4 = 0



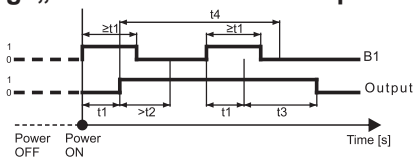


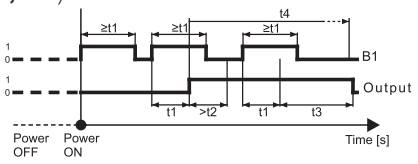
Impulse switch: e.g. „switch on time- / release time delay with one validated impulse“, t3 ≠ 0, t4 ≠ 0, t4 ≤ t2



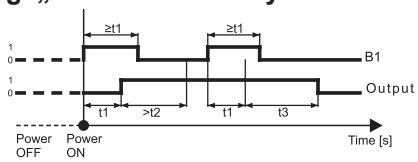


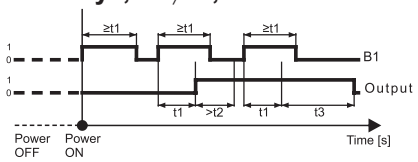
Impulse switch: e.g. „validated switch off impulse“, t3 ≠ 0, t4 ≠ 0





Impulse switch: e.g. „release time delay OFF with switch off delay“, t3 ≠ 0, t4 = 0



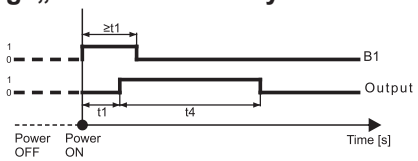


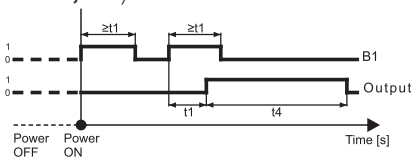
Operating mode

Cold Start Edge Detection
Checked

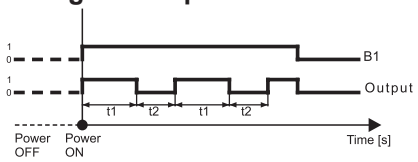
Cold Start Edge Detection
Unchecked

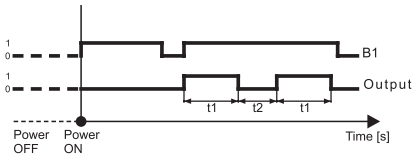
Impulse switch: e.g. „release time delay automatic OFF“, t3 = 0, t4 ≠ 0



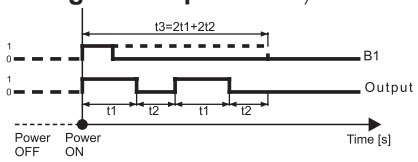


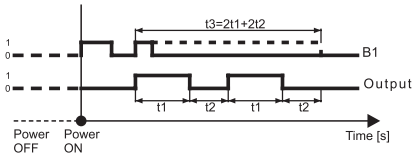
Clock generator starting with impulse: t3 = 0



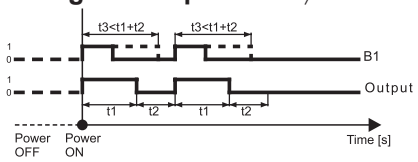


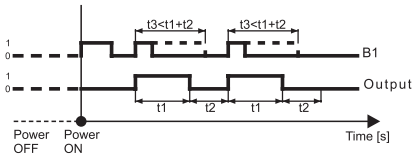
Clock generator starting with impulse: t3 ≠ 0 and t3 = 2t1 + 2t2



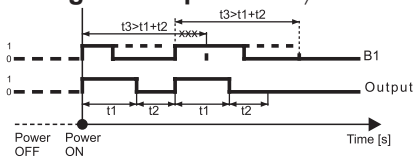


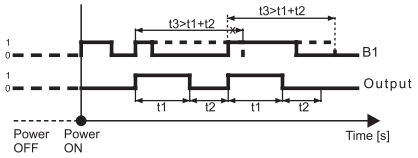
Clock generator starting with impulse: t3 ≠ 0 and t3 < t1 + t2



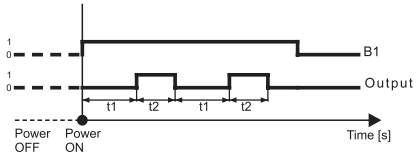


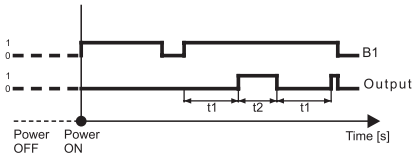
Clock generator starting with impulse: t3 ≠ 0 and t3 > t1 + t2



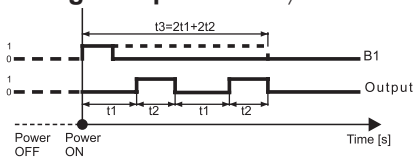


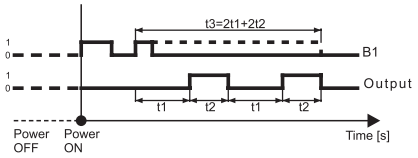
Clock generator starting with pause: t3 = 0



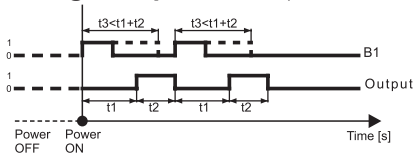


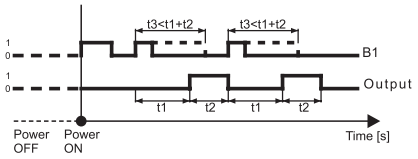
Clock generator starting with pause : t3 ≠ 0 and t3 = 2t1 + 2t2





Clock generator starting with pause : t3 ≠ 0 and t3 < t1 + t2



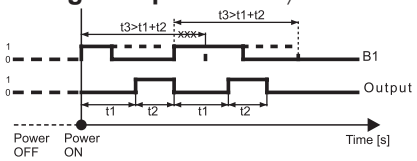


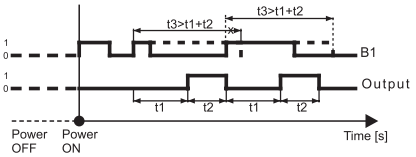
Operating mode

Cold Start Edge Detection
Checked

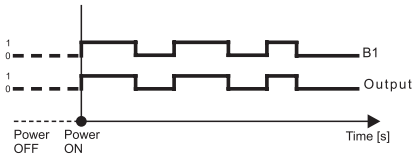
Cold Start Edge Detection
Unchecked

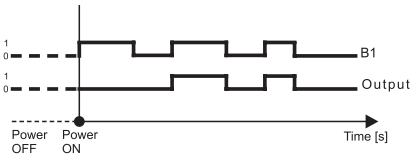
Clock generator starting with pause : t3 ≠ 0 and t3 > t1 + t2



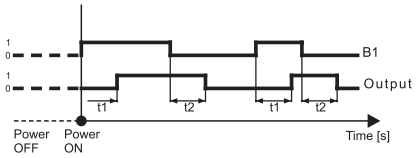


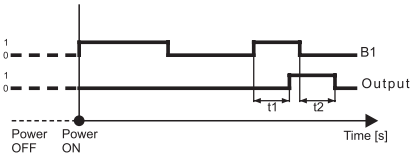
Instant contact



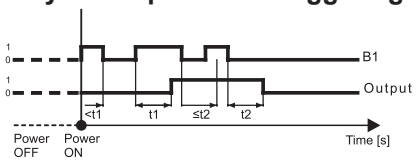


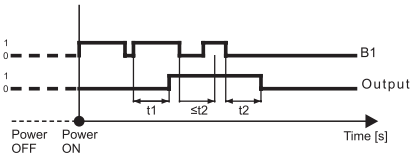
On/off delay time



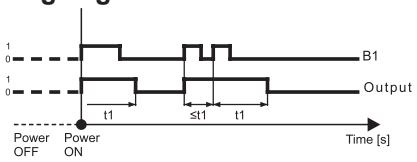


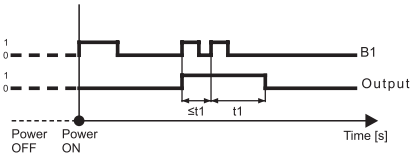
On/Off response delay: Example with retriggering



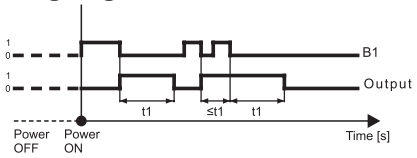


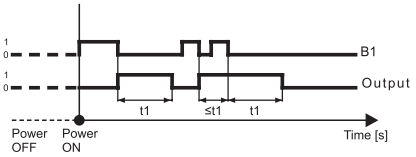
Edge-detection: rising edge





Edge-detection: falling edge





Edge-detection: rising/falling edge