Keyboard Unit TE 401-T

The TE 401-T keyboard unit has 40 buttons and 40 LEDs These buttons are read by the software and can then be used for any desired function. The LEDs indicate the operating status.

4 external switching elements can also be added.

Technical Data

Performance data

Interfaces	12-pin connector for 4 x 3 switching elements 2-pin power connector 1 x CAN with 2 connections
Control panel	40 x function buttons / 4 x switch recesses
Signal generator	No

Electrical requirements

Supply voltage	minimum +18 V DC	maximum +30 V DC
Current consumption Supply voltage	127 mA – 175 mA	

Terminal

Dimensions	240 mm / 220 mm / 40.1 mm (W x H x D)	
Material	housing: aluminum	front plate: aluminum

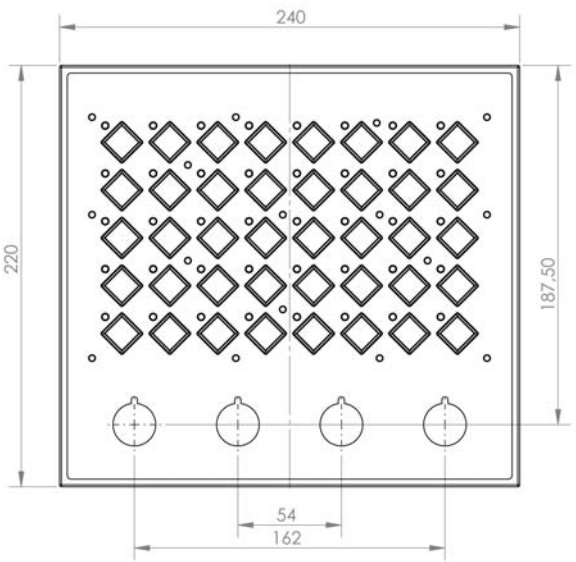
Miscellaneous

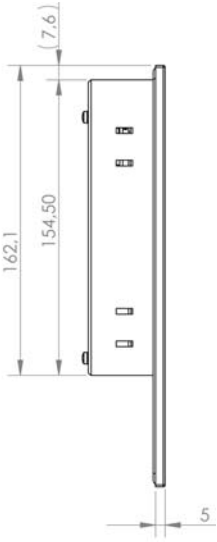
Article number	12-210-401-T
Hardware version	1.x

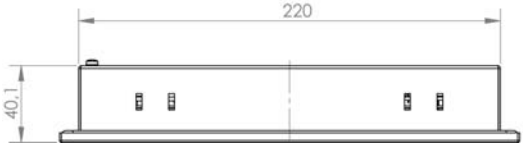
Environmental conditions

Storage temperature	-20 – +80 °C	
Operating temperature	0 – +60 °C	
Humidity	0 - 95 %, non-condensing	
EMC stability	in accordance with EN 61000-6-2:2001 (industrial area)	
Shock resistance	EN 60068-2-27	150 m/s²
Protection Type	IP20 in accordance with EN 60529	

Mechanical Dimensions





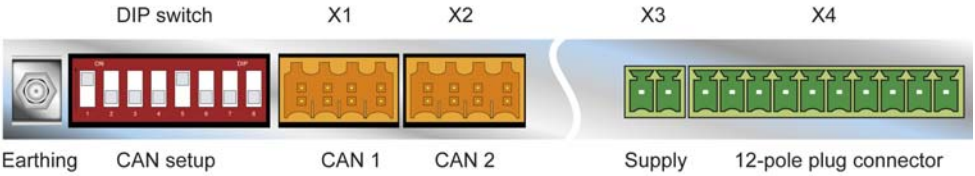


Interface

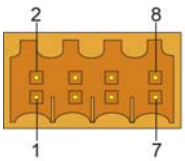
General

The connection to the display unit is made over the CAN bus, which has the +24 V supply integrated. An additional power supply connection is therefore not required.

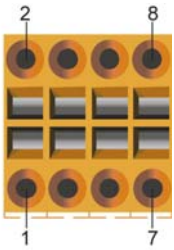
Rear Panel Layout



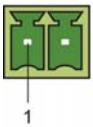
X1, X2: CAN (Weidmüller B2L 3.5/8)



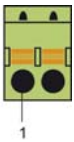
Pin	Function
1	CAN A (CAN LOW)
2	CAN B (High)
3	CAN A (CAN LOW)
4	CAN B (High)
5	GND
6	(+5 V)
7	GND
8	+24 V



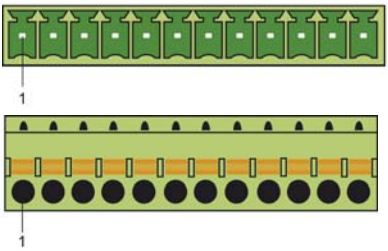
X3 +24 V supply (Phoenix MCV1.5/2-G-3.5 2-pin spring terminal connector)



Pin	Function
1	+24 V
2	GND

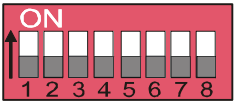


X4 Switching elements 1 – 4 (Phoenix MCV1.5/12-G-3.5 12-pin spring terminal connector)



	Pin	Function
Switching element 1	1	+24 V
	2	IN 1
	3	IN 2
Switching element 2	4	+24 V
	5	IN 1
	6	IN 2
Switching element 2	7	+24 V
	8	IN 1
	9	IN 2
Switching element 4	10	+24 V
	11	IN 1
	12	IN 2

DIP-SWITCH CAN-BUS Setup (8 x)



Switch 1 – 4	CAN-Station 0 – 15
Switch 5 – 6	Baud rate 0 – 3
Switch 7	no function
Switch 8	150R CAN termination

Additional Shipment

1 m CAN – cable with 2 x Weidmüller B2L 3,5/6)
2-pin connector plug (Phoenix 1939918)
12-pin connector plug (Phoenix 1942251)

CAN BUS Setup

This section explains how to configure a CAN bus correctly. The following parameters must first be set: Station number and data transfer rate.

CAN bus station number

Each CAN bus station is assigned its own station number (can be set from 0 to 15) With this station number, data can be exchanged with other stations connected to the bus. Up to 16 stations can be installed in a CAN bus system. In a CAN bus system however, each station number can only be assigned once.

SW 1	SW 2	SW 3	SW 4	Station
0	0	0	0	**0**
1	0	0	0	**1**
0	1	0	0	**2**
1	1	0	0	**3**
0	0	1	0	**4**
1	0	1	0	**5**
0	1	1	0	**6**
1	1	1	0	**7**
0	0	0	1	**8**
1	0	0	1	**9**
0	1	0	1	**10**
1	1	0	1	**11**
0	0	1	1	**12**
1	0	1	1	**13**
0	1	1	1	**14**
1	1	1	1	**15**

CAN Bus Transfer Rate

Various data transfer rates (baud rates) can be set on the CAN bus. The longer the bus line is, the lower the data transfer rate that must be selected.

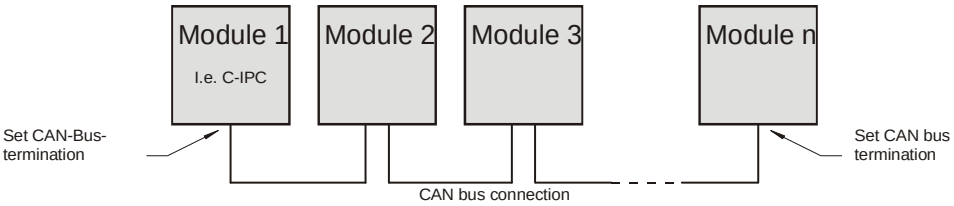
SW 5	SW 6	Value	Baud rate	Maximum length
0	0	0	615 kbit/s	60 m
1	0	1	500 kbit/s	80 m
0	1	2	250 kBit/s	160 m
1	1	3	125 kBit/s	320 m

These values are valid for the following cable: 120 Ω, Twisted Pair.

Note: For the CAN bus protocol: 1 kbit/s = 1 kBaud

CAN Bus Termination

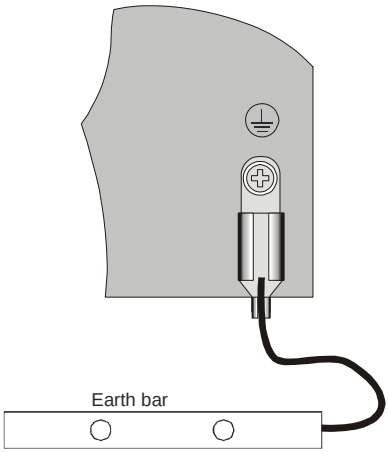
In a CAN bus system, both end modules must be terminated. This is necessary to avoid transmission errors caused by reflections in the line.



A switchable line termination is already built into the keyboard unit. If this unit is an end-module, SW8 on the DIP-switch must be set.

Ground

To ensure error-free function of the display, the blade terminal on the back must be connected to the earth bus.



Addressing

Data that can be sent over CAN:

1. PS/2-Keyboard (not used)
2. Machine keyboard initialization
3. Machine buttons
4. LED control
5. Display detection and settings

Items 1 and 5:

The following CAN objects are reserved for the PS / 2 keyboard area and display detection:

040 hex to 08F hex

Through the different station numbers, 16 independent terminals can be operated in one system. The station numbers are set using the DIP-Switch on the back. In addition, one terminal must be defined as a master, which answers global objects (e.g. NumLock or CapsLock).

Since there are a limited number of objects available in the CAN controller (max. 14 standard objects), the machine buttons are limited to 2 objects.

Items 2, 3 and 4:

Send object

Object number: $120-$12F (depending on station)
Object size: 2 bytes

Application for initialization, setting LEDs

	Initialization	All LEDs off	All LEDs on	All LEDs blink	One LED off	One LED on	One LED blinking
Data 0	CMD = $80	CMD = $00	CMD = $01	CMD = $02	CMD = $10	CMD = $11	CMD = $12
Data 1	Bit 0 – 2: Repetition rate	---	---	---	LED-Nr.	LED-Nr.	LED-Nr.

Receive object:

Object number: $130 - $13F (depending on station)
Object size: 4 bytes

Application for button codes, answering LEDs

	ACK for LEDs	Button Codes
Data 0	CMD = $00	CMD = $10
Data 1		Button code 1
Data 2		Button code 2
Data 3		Key switch

Button Layout