



Series S102

Numeric displays in build-in housings
with analog interface

Operating instructions

1 Contact

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2 Legal note

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3 Safety precautions

Important information

Read these operating instructions before starting the unit. They provide you with important information on the use, safety and maintenance of the units. This helps you to protect yourself and prevent damage to the unit.



Information intended to help you to avoid death, bodily harm or considerable damage to property is highlighted by the warning triangle shown here; it is imperative that this information be properly heeded.

The operating instructions are intended for trained professional electricians familiar with the safety standards of electrical technology and industrial electronics.

Store these operating instructions in an appropriate place.

The manufacturer is not liable if the information in these operating instructions is not complied with.

Safety

Installation work may only be carried out by qualified personnel in compliance with the relevant safety regulations. Inside the housing there are no parts that must be accessible to the user during installation or operation of the device. The housing must never be opened.

The repair and replacement of components and modules may only be carried out by the manufacturer for safety reasons and due to the required compliance with the documented unit properties. .

Intended use

The units are intended for use in industrial environments. They may only be operated within the limit values stipulated by the technical data.

When configuring, installing, maintaining and testing the units, the safety and accident-prevention regulations relevant to use in each individual case must be complied with.

Trouble-free, safe operation of the units requires proper transport, storage, installation, mounting and careful operation and maintenance of the units.

Mounting and installation

The attachment options for the units were conceived in such a way as to ensure safe, reliable mounting.



The user must ensure that the attachment hardware, the unit carrier and the anchoring at the unit carrier are sufficient to securely support the unit under the given surrounding conditions.

Sufficient space is to be kept clear around the units to ensure air circulation and to prevent the build-up of heat resulting from use.

Grounding

All devices are equipped with a plastic housing and are operated with 24 V DV. They have a flat plug, which is connected to the shield of the PROFINET sockets and the metal back wall. A connection with the protective conductor is recommended.

EMC measures

The devices comply with the current EU Directive (EMC Directive) and provide the required interference immunity. Observe the following when connecting the operating voltage and data cables:

Use shielded data cables.

The data and operating voltage cables must be laid separately. They may not be laid together with heavy-current cables or other interference-producing cables.

Disposal

Units or unit parts which are no longer needed are to be disposed of in accordance with the regulations in effect in your country.

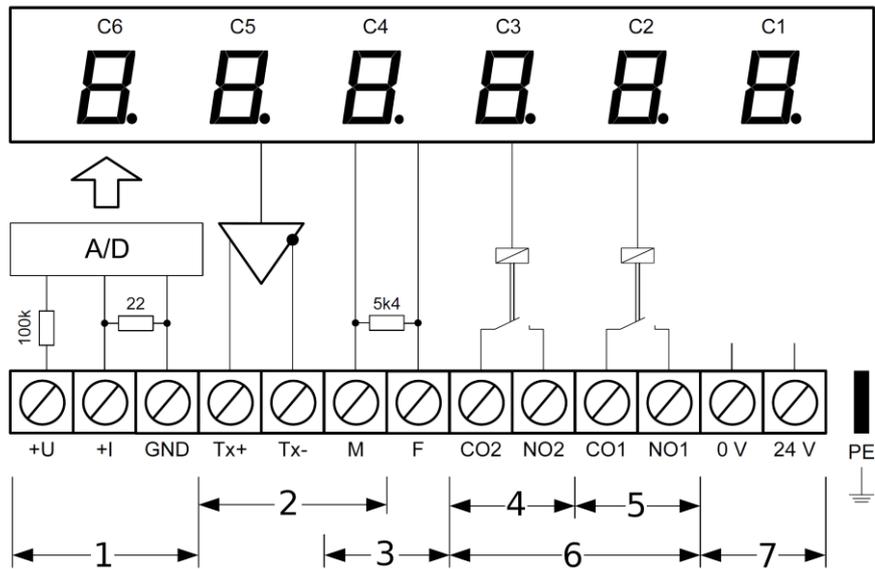
4 Model designation

This manual applies to units with the following model designation (x = the 'x's in the model designation indicate the size and design of the units).

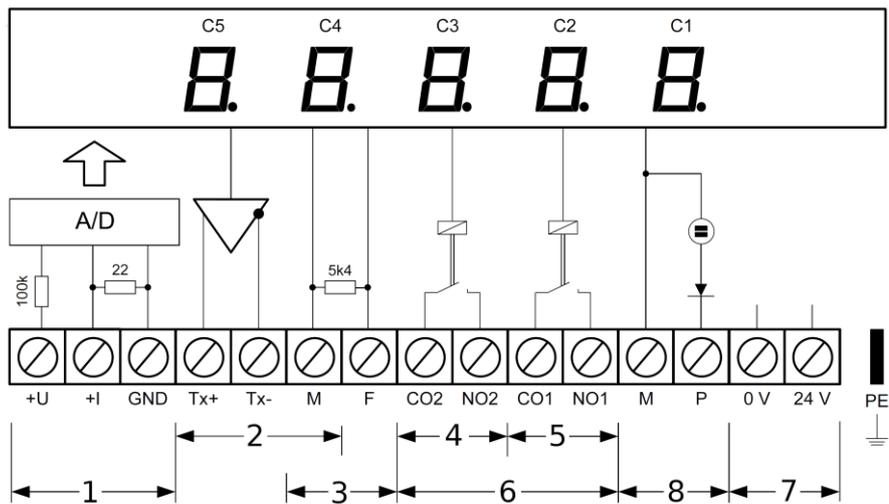
S102-x6/14/0x-00x/0B-A0 Character height 14 mm, 6 digits
S102-x5/25/0x-00x/0B-A0 Character height 25 mm, 5 digits

5 Principle circuit diagram

Units with 14 mm character height



Units with 25 mm character height



6 Features

Brilliant LED display
Bipolar signal inputs ± 20 mA / ± 10 V
Completely scalable display range
Programmable increments and averaging
Two programmable switching outputs with zero-voltage contacts
Wire-break detection
Serial signal output
Hold input
Parameterization via menu
Plug-in screw terminal strip

7 Signal input

The units must be parameterized before they can be controlled. Parameterization occurs in a menu (see 'Parameterization').

The units can be controlled with the normalized signals 0...20 mA, 4...20 mA, 0... 10 V and 2...10 V. In menu item 1 the input signals with which control is to be carried out are set.

The power supply as well as the analog inputs are galvanically isolated from the internal signal processing.

8 Display range

Start and end value of the display area can be set in menu items 2 and 3.

The number of the menu item and the current setting appear in turns under menu item 2 (start value) and 3 (end value). At the same time, the decimal points flash in turns. The digit in which the decimal point flashes can be set to the desired value by using the menu button [e]. The minus sign can be set in the left digit. It appears between 9 and 0.

If the display range is exceeded, o (overflow) appears in the display, and if it is not reached, u (underflow) appears in the display.

9 Step size

To be able to clearly read off the lowest digit even if the measurement signals are changing rapidly or with large scale values, the step size can be augmented in menu item 4.

With setting 5, digit C1 still only displays the digits 0 and 5. With setting 10, it displays an unchanging zero.

With setting 50, digit C1 displays an unchanging zero, and digit C2 still only displays the digits 0 and 5. With setting 100, digits C2 and C1 display an unchanging zero.

10 Averaging

The analog-digital converter has an integration time of approx. 0.25 s, so that fast measuring processes can also be recorded. In case of strongly superimposed measuring signals, however, it may be useful to display an average value over several integration intervals.

With setting 1 in menu item 5, no average value is formed over several integration intervals. With setting 2, 4 or 8, an average value is formed over 2, 4 or 8 integration intervals.

11 Switching outputs

The devices have two switching outputs (relays) with potential-free make contacts (output 1: CO1, NO1; output 2: CO2, NO2). The switching points can be set in menu items 6 and 7.

In menu items 6 (output 1) and 7 (output 2), the number of the menu item and the current setting appear alternately in the display. At the same time, the decimal points light up one after the other. The digit whose decimal point lights up can be set to the desired value with the menu key [e]. The minus sign can be set in the left digit. It is displayed between 9 and 0.

The relays switch on as soon as the measured value is equal to or greater than the switching point set in the menu. They switch off as soon as the measured value falls below the set switching point by the hysteresis set in menu item 8.

The pure display value is compared. A decimal point set in menu item A is not taken into account.

In menu operating mode, the switching functions are not defined.

12 Open-circuit detection

If the setting 4...20 mA is selected in menu item 1 and the input signal falls below the value of 3.6 mA, the device interprets this as a wire break and the display shows LooP.

The same applies if the setting 2...10 V is selected in menu item 1 and the input signal falls below the value of 1.8 V.

13 Serial interface

The serial interface RS422 sends the current display value as ASCII data telegram with six characters and concluding CR/LF (xxxxxx<CR><LF>) via the output TxD in intervals of approx. 0.25 s.

The six characters contain on the right the current display value including sign or, if applicable, overflow, underflow or wire break error. The leading zero suppression and a decimal point set in menu item A are not taken into account.

The data telegram always contains six characters, regardless of how many digits the device has. Characters that are not required are blank spaces.

The parameters of the serial interface are: 9600 Bd, no parity, 8 data bits, 1 stop bit.

14 Decimal point

In menu item A the decimal point can be set permanently.

15 Leading zero suppression

In menu item C it is set if leading zeros are to be displayed or suppressed.

16 Display test

In menu item F, you can set whether a display test is to be performed after the operating voltage is applied.

17 Demo operating mode

If the setting PLY (Play) is selected in menu item F, random characters are displayed. In this case it is impossible to control the unit.

18 Stop display

With an H signal on input F, the display can be stopped while the analog input signal continues to be evaluated.

Input F is PLC compatible and designed for the following signal voltages: L signal = -3.5...+5 V, H signal = +18...30 V (active H).

Open input = L signal, M = reference potential

19 Sensor power supply

The devices with 25 mm character height provide an auxiliary voltage, galvanically isolated from the operating voltage, at terminal P to supply a sensor (24 V \pm 20 %, max. 50 mA, reference potential = M).

20 Parameterization

Menu operation

To start the menu, press both menu buttons simultaneously (approx. 1 sec.) until the first menu item appears in the menu display. It is now possible to navigate in the menu as follows:

Next menu items forward	Press key [↕] long
Page menu items forward	Shortly press key [↕]
Previous menu item	Double-click on key [↕]
Page menu items backward	Double-click on key [↕] and keep it pressed
Next setting	Shortly press key [↔]
Page settings forward	Press key [↔] long
Previous setting	Double-click on key [↔]
Page setting backward	Double-click on key [↔] and keep it pressed

To exit the menu shortly press the key [↕] in menu item U. Depending on the setting in menu item U the settings made are either saved (set) or not saved (escape) or the factory settings are reset (default).

Canceling the menu without saving the settings made is possible by pressing both menu buttons simultaneously (approx. 1 sec.). It will occur automatically if 60 seconds pass without a menu button being pressed.

Once the menu is closed, the device behaves in the same manner as when the operating voltage was applied.

Control of the display is not possible in menu mode.

The menu is shown in the following menu table. The default settings are marked with *. Individual menu items or settings can be suppressed depending on unit version or setting in another menu item.

Menu item	Settings	Display
1 Input signal	0...20 mA*	1 0-20
	4...20 mA	1 4-20
	0...10 V	1 0-10
	2...10 V	1 2-10
2 Start value	-99999...000000*...999999	2 000000
	-9999...00000*...99999	2 00000
3 End value	-99999...000 00...999999	3 000000
	-9999...00000...99999	3 00000
4 Increment	1* (digit C1 = 0...9)	4 1
	5 (digit C1 = 0/5)	4 5
	10 (digit C1 = 0)	4 10
	50 (digit C2 = 0/5, digit C1 = 0)	4 50
	100 (digit C2 = 0, digit C1 = 0)	4 100
5 Average value	No averaging	5 1
	Averaging over 2 intervals	5 2
	Averaging over 4 intervals*	5 4
	Averaging over 8 intervals	5 8
6 Switching point	-99999...000000*...999999	6 000000
	-9999...00000*...99999	6 00000
7 Switching point	-99999...000000...999999	7 000000
	-9999...00000...99999	7 00000
8 Hysteresis	1% of the upper limit of the effective range *	8 1
	2% of the upper limit of the effective range	8 2
	5% of the upper limit of the effective range	8 5
	10% of the upper limit of the effective range	8 10
A Decimal point	No decimal point*	A 0
	Decimal point digit C1	A 1
	Decimal point digit C2	A 2
	↓	↓
	Decimal point digit C5	A 5
C Leading zeros	Leading zeros not displayed*	C 00
	Leading zeros displayed	C 0000
F Display test	No display test at power-on*	F ----
	Display test at power-on	F BBBB
	Demo operation mode	F PLAY
U Save	Save parameters* (Set)	U SET
	Not saving parameters (Escape)	U ESC
	Restore to factory settings (Default)	U DEF

¹⁾ Applies for units with 6 digits (S102-x6/14/0x-00x/0B-A0)

²⁾ Applies for units with 5 digits (S102-x5/25/0X-00x/0B-A0)

³⁾ Factory settings: 10000

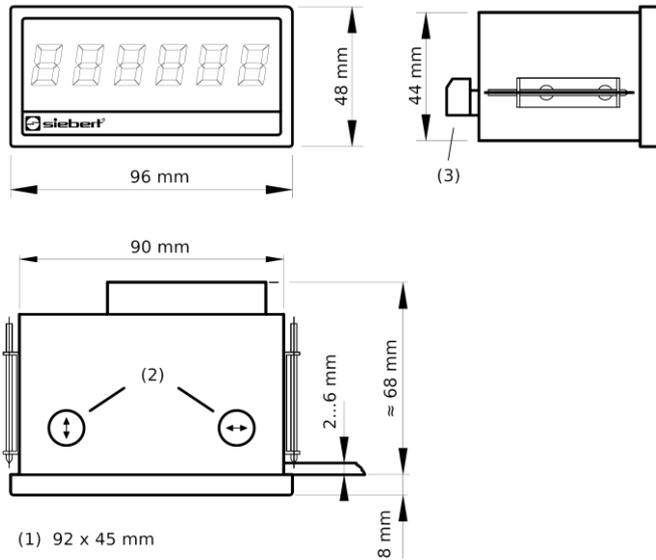
21 Technical data

Technical data

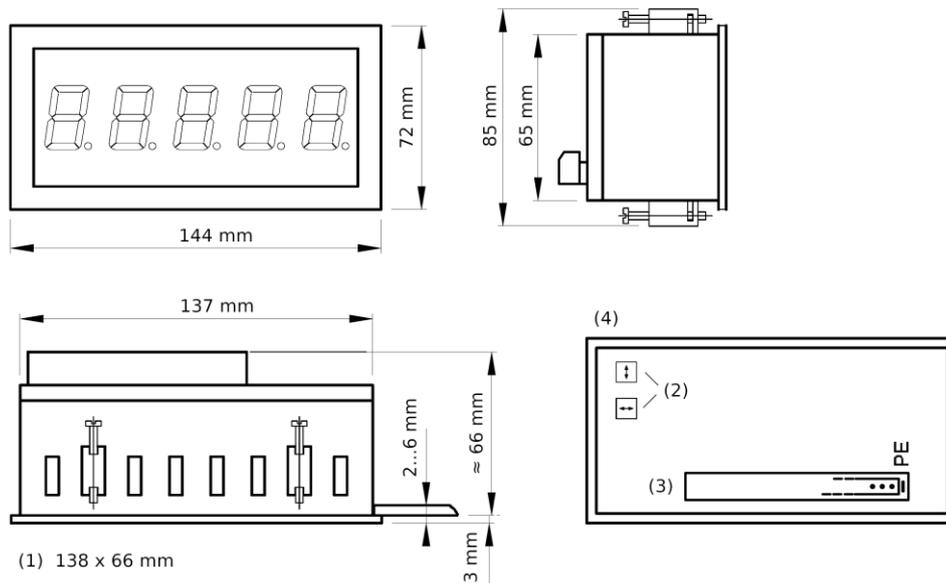
Analog signal input		
Resolution	16 Bit	
Measurement rate	approx. 4/s	
Measurement error	0,02% of end value ±1 digit (25 °C)	
Temperature coefficient	<50 ppm/°C	
Current measurement		
Input resistance	approx. 22 Ω	
Input range	0...±20 mA, max. ±100 mA	
Voltage measurement		
Input resistance	approx. 100 kΩ	
Input range	0...±10 V, max. ±40 V	
LED display	S102-xx/xx/0R-00x/0B-A0	red
	S102-xx/xx/0G-00x/0B-A0	green
Display range	S102-06/14/0x-00x/0B-A0	6 digits
	S102-05/25/0x-00x/0B-A0	5 digits
Character height	S102-06/14/0x-00x/0B-A0	14 mm
	S102-05/25/0x-00x/0B-A0	25 mm
Dimension symbol	S102-0x/xx/0R-00x/0B-A0	no dimension symbol
	S102-Fx/xx/0R-00x/0B-A0	with dimension symbol
Power supply	24 V DC ±15 %, galvanically isolated, protected against reserved polarity	
Power consumption	S102-06/14/0x-00x/0B-A0	approx. 4 VA
	S102-05/25/0x-00x/0B-A0	approx. 4,5 VA
Connection technology	Plug-in screw terminal strip	
Protection type (front)	S102-xx/xx/0x-000/0B-A0	IP40
	S102-xx/xx/0x-001/0B-A0	IP65
Operating temperature	0...50 °C	
Storage temperature	-20...70 °C	
Humidity	max. 95 % (non-condensing)	
Weight	S102-xx/14/0x-00x/0B-A0	approx. 170 g
	S102-xx/25/0x-00x/0B-A0	approx. 300 g

22 Dimensions

Units with 14 mm character height



Units with 25 mm character height



- (1) Panel cutout
- (2) Menu buttons
- (3) Screw terminal strip
- (4) Rear view