Operating instructions

Series SX502

Alphanumeric large size displays with parallel interface

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Chapter 1 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 are 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 are not complied with.

Safety

Components inside the units are energized with electricity during operation. For this reason, mounting and maintenance work may only be performed by professionally-trained personnel while observing the corresponding safety regulations.

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.

The units do not have a power switch. They are operative as soon as the operating voltage is applied.

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.

The units are to be mounted in such a way that they can be opened up while mounted. Sufficient space for the cables must be available in the unit near the cable infeed.

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. The relevant information must be heeded in the case of units ventilated by other means.

When the housing fasteners are opened, the front frame of the housing hinges out upward or downward (depending on the unit version) automatically.

Battery replacement

The units have a lithium battery used for data security of the real-time clock. The battery can explode if replaced improperly.

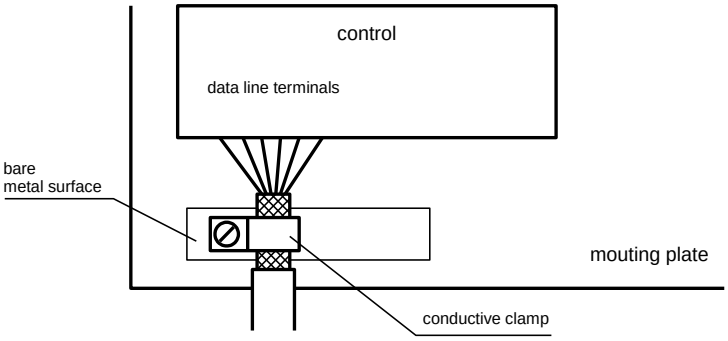
Grounding

All devices are equipped with a metal housing. They comply with safety class I and require a protective earth connection. The connecting cable for the operating voltage must contain a protective earth wire of a sufficient cross section (DIN VDE 0106 part 1, DIN VDE 0411 part 1).

EMV-Massnahmen

The devices comply with the EU Directive 89/336/EEC (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.
- The cable thickness must be properly assessed (DIN VDE 0100 Part 540).
- The cable lengths inside the units are to be kept as short as possible to prevent interference. This applies especially to unshielded operating voltage cables. Shielded cables are also to be kept short due to any interference which might be emitted by the shielding.
- Neither excessively long cables nor cable loops may be placed inside the units.
- The connection of the cable shielding to the functional ground (PE) must be as short and low-impedance as possible. It should be made directly to the mounting plate over a large area with a conductive clip:



- The cable shielding is to be connected at both cable ends. If equipotential bonding currents are expected due to the cable arrangement, electrical isolation is to be performed on one side. In this case, capacitive connection (approx. 0.1µF/600 V AC) of the shielding on the isolated side must occur.

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.

Model designation

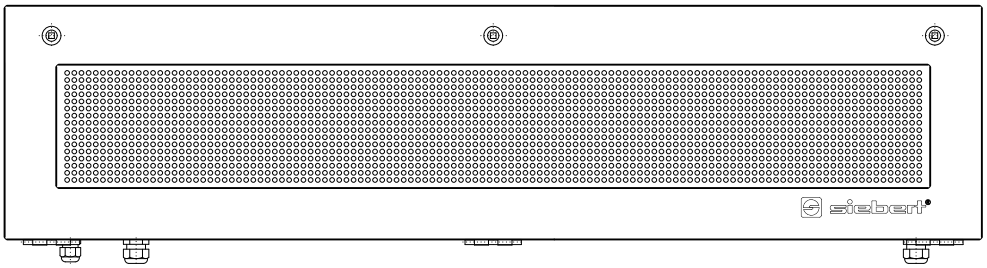
The model designation of the units is:

SX502-xxx/xx/xx-xxx/xx-P0

x = The 'x's in the model designation indicate the size and design of the units.

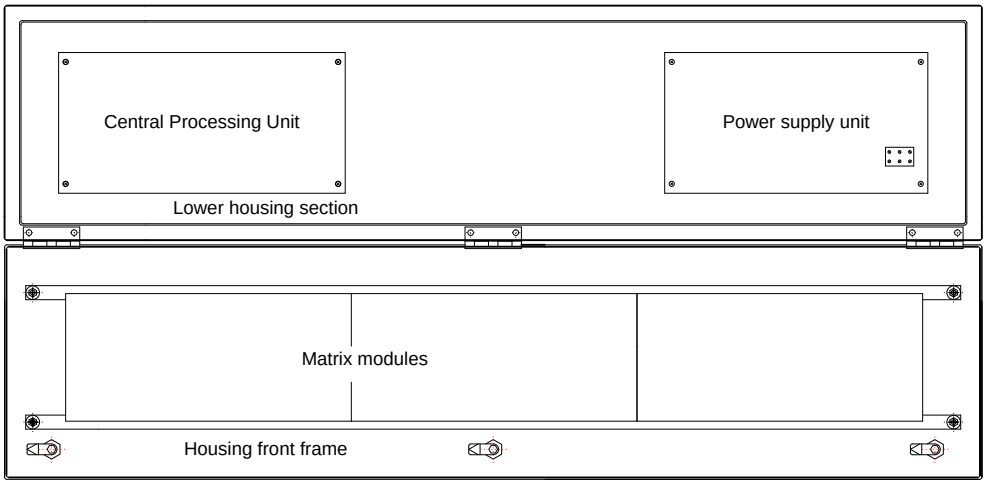
Unit construction

The following figure shows model type SX502-220/05/xx-xxx/xx-xx as example for the other model types. The front frame of the housing is locked with quick-action releases and can be hinged downward for opening the unit (exceptions to this are SX502-640/05/xx-xxx/xx-xx and SX502-840/05/xx-xxx/xx-xx: which open upward supported by gas-pressure springs).



The following figure shows the unit when open and reveals the modular construction of the units. All components, controls and connections are directly accessible.

The display modules (matrix modules) are found inside the housing front frame. The control computer and power supply unit are located in the lower housing section.

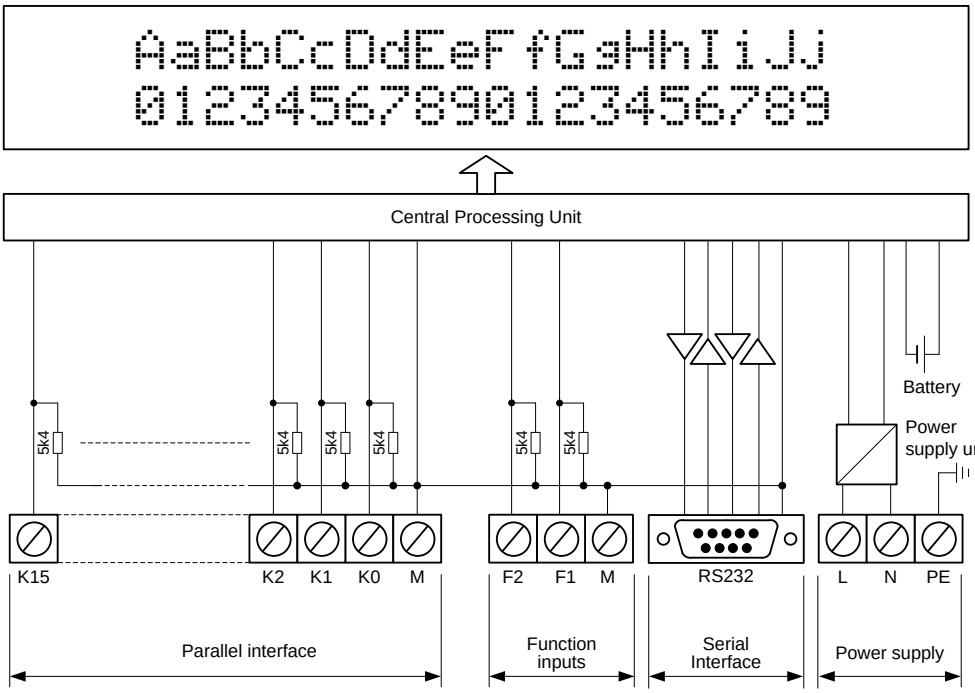


Display range

The series SX502 includes devices with a display range from 2x20 to 8x40 characters (see chapter 10).

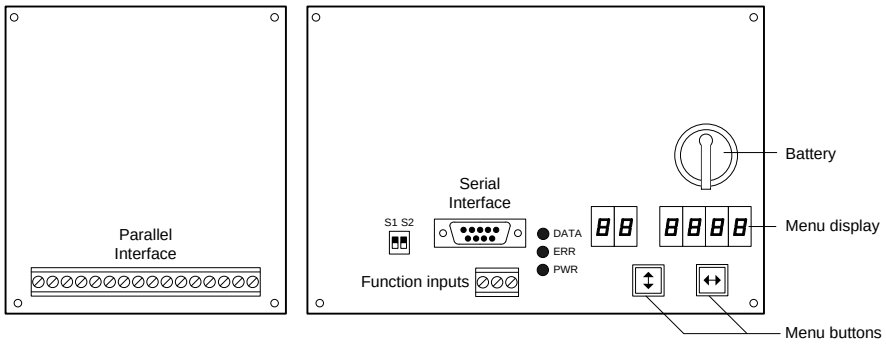
The devices with double-sided display (SX502-xxx/xx/xx-2xx/xx-xx) show the same information on the front and rear side.

Principle circuit diagram



Central Processing Unit

The following figure shows the Central Processing Unit:



Parameterization

The parameterization of the displays is done in a menu in the menu display.

Parallel interface

The parallel interface (data inputs K15...K0) is located on the screw type terminal of the control computer.

Function inputs

The function inputs enable the brightness reduction and the flashing of the display in case of a static text call, regardless of the commands of the parallel interface. With dynamic text calling, they serve as data inputs for inserting variables They are located on the screw type terminal of the control computer.

Signal voltage

The data inputs and the functional inputs are PLC-compatible and dimensioned for the following signal voltage:

Signal voltage: L = -3.5...+5 V (open input = L)
H = +18...30 V (active H), M = reference potential

Serial interface

The serial interface RS232 is determined for programming the device using a computer, for example for loading static texts in the text memory and for installing character sets by means of the PC tools 'DisplayManager' provided on data carrier.

The interface RS232 is located on a D-Sub connector with the following assignment:

Pin	1	2	3	4	5	6	7	8	9
Signal	–	RxD	TxD	–	COM	–	RTS	CTS	–

The PC connection is established using a standard null-modem cable.

The parameters of the interface are set (fixed setting) as follows: 9600 bauds, 8 data bits, no parity, 1 stop bit, RTS/CTS handshake, CR/LF protocol, no addressing

Menu display

The parameterization of the unit is done by means of a menu in the menu display (see chapter 5).

In normal operation, the following status messages appear in the menu display:

- - - - - - The device is in normal mode.

dAtA A static text is loaded from the text memory.

In programming operation, the following status messages appear in the menu display:

LoAd Static texts are loaded in the text memory.

rEAd Static texts are read from the text memory.

Status indicator

The status indicators of the control computer have the following meaning:

DATA Data receipt (serial interface)
ERR Communication error
PWR No meaning

Battery

The battery (lithium battery type CR2032) provides a power reserve for the real-time clock. It is located in a battery holder, and is to be replaced after three years.

Power supply

The srew terminals for the operating voltage are located in the power supply unit.

In devices for a power supply of 230 V AC SX502-xx/xx/xx-xxx/xA-xx) or 115 V AC (SX502-xx/xx/xx-xxx/xC-xx) the srew type terminal strips are defined with +, – und PE.

In devices for a power supply of 24 V DC SX502-xx/xx/xx-xxx/xB-xx) the screw type terminals are defined with +, – und PE.

Chapter 3	Character display

LED-matrix

The characters are displayed on an LED matrix. A matrix module is 16 LED dots (pixels) high and, depending on the unit version, the following number of pixels wide:

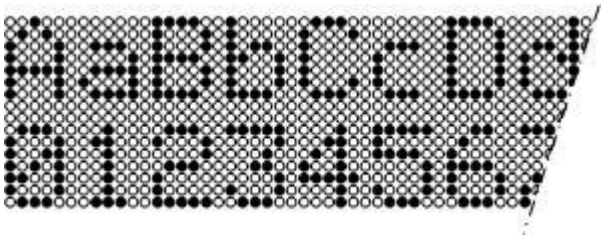
Unit versions SX502-x20/xx/xx-xxx/xx-xx:	120 pixels
Unit versions SX502-x40/xx/xx-xxx/xx-xx:	240 pixels

Character display

The units feature several different character sets, which will be elaborated on later. The following explanation is based on the Acala 7 character set.

With this character set, the character width is five pixels and the space between characters is one pixel. Units with a 120 pixel-wide matrix can therefore display 20 characters on a line and units with a 240 pixel-wide matrix can display 40 characters on a line.

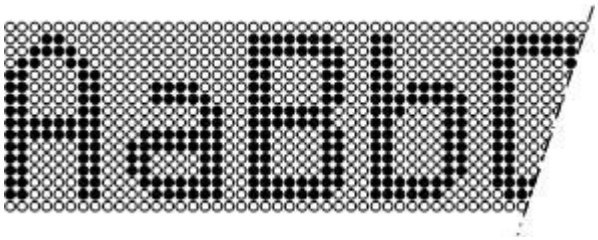
The character height is seven pixels. Thus two lines of seven pixel-high characters with a space between lines of two pixels can be displayed on a 16 pixel-high matrix module.



This means that two lines of 20 characters each can be displayed on a 120 x 16 pixel matrix and two lines of 40 characters each can be displayed on a 240 x 16 pixel matrix.

If the entire height of the matrix is used, characters with twice the character height, i.e. 14 pixels, can be displayed. The Acala 14 condensed character set, for example, is available for this. It uses a height of 14 pixels out of the 16 pixels available in the matrix.

With this character set, the character width is eight pixels and the space between characters are two pixels. Ten pixels are thus required for the width of each character. According to this, units with a 120 pixel-wide matrix can therefore display one line with 12 characters and units with a 240 pixel-wide matrix can display one line with 24 characters.



Character sets

The following pictured character sets are available. They differ in character height (seven, 14 or 16 pixels) and in character width (normal, extended or condensed).

The number of characters (number of lines x number of characters per line) which can be displayed on a 120 x 16 and 240 x 16 pixel matrix for each character set is noted in the table.

Charater set	Character display	120 x 16 pixels	240 x 16 pixels
Acala 7*	AaBbCcDdEeFfGgHhIiJj AaBbCcDdEeFfGgHhIiJj	2 x 20	2 x 40
Acala 7 extended*	AaBbCcDdEe AaBbCcDdEe	2 x 10	2 x 20
Acala 14 condensed*	AaBbCdDdEeFf	1 x 12	1 x 24
Acala 14	AaBbCcDdEe	1 x 10	1 x 20
Acala 14 extended*	AaBcDd	1 x 6	1 x 12
Acala 16 condensed	AaBbCcDdEeFf	1 x 12	1 x 24
Acala 16	AaBbCcDdEe	1 x 10	1 x 20
Acala 16 extended	AaBbCc	1 x 6	1 x 12

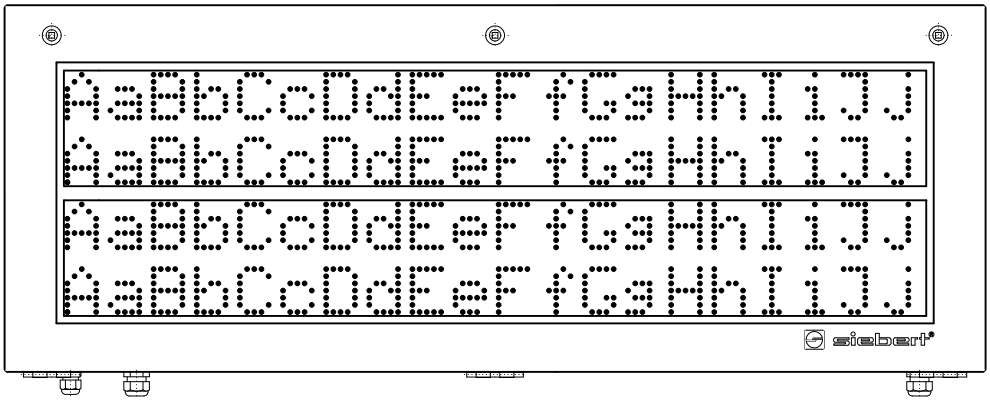
The character sets marked with * in the table are permanently installed in the units. The remaining character sets are delivered on data carriers.

The data carrier also contains the PC tool 'DisplayManager' for installing the character sets. In addition to that, the tool is used for creating user-defined character sets, for saving character sets on data carriers and for restoring the installed character sets.

Multi-line units

To display texts containing more characters than can be displayed with a 120 x 16 or 240 x 16 pixel matrix, we offer unit versions with a suitable number of matrix modules arranged vertically.

The following figure shows unit version SX502-420/05/xx-xxx/xx-xx with two vertically arranged 120 x 16 pixel matrix modules as an example. Character set Acala 7 allows 4 x 20 characters to be displayed, and 2 x 12 characters can be displayed with the character set Acala 14 condensed.



The physical distance between the matrix modules corresponds to a height of two pixels. Thus the distance between the first and second lines is the same as between the second and third lines.

The SX502 series also includes units with three or four vertically arranged matrix modules. They can display six or eight lines with the Acala 7 character set and three or four lines with the Acala 14 condensed character set.

Character height

The actual character height depends on the height of a character in pixels and the size of the pixel diameter and spacing.

The SX502-xxx/03/xx-xxx/xx-xx unit versions have a pixel diameter of approx. 3 mm and a pixel spacing of approx. 4.7 mm.

The SX502-xxx/05/xx-xxx/xx-xx unit versions have a pixel diameter of approx. 5 mm and a pixel spacing of approx. 7.6 mm.

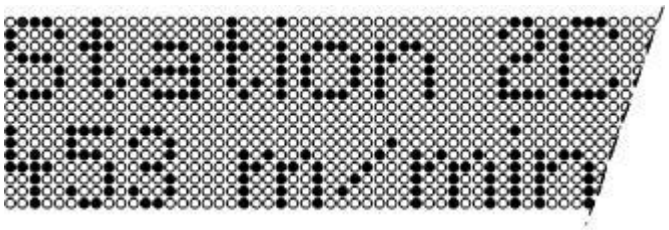
This results in the following actual character heights for the character sets, depending on the unit version:

Charater set	**03SX502-xxx/xx/xx-xxx/xx-M0**	**05SX502-xxx/xx/xx-xxx/xx-M0**
Acala 7	approx. 33 mm	approx. 50 mm
Acala 7 extended	approx. 33 mm	approx. 50 mm
Acala 14 condensed	approx. 66 mm	approx. 100 mm
Acala 14	approx. 66 mm	approx. 100 mm
Acala 14 extended	approx. 66 mm	approx. 100 mm
Acala 16 condensed	approx. 75 mm	approx. 120 mm
Acala 16	approx. 75 mm	approx. 120 mm
Acala 16 extended	approx. 75 mm	approx. 120 mm

Proportional lettering

The previously described character sets display the characters in non-proportional lettering. The same number of pixels is available for the width of each character.

The character sets Acala 7 P and Acala 14 P, which are included in delivery on data carrier, display the characters in proportional lettering. Each character uses the width it requires visually.



LED color

The device models SX502-xxx/xx/xR-xxx/xx-xx have a display with red fluorescent color. The fluorescent color cannot be changed.

The display of the device models SX502-xxx/xx/xM-xxx/xx-xx have a fluorescent color which can be switched between red, green and orange.

Character table

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
20		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	'	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
80	€	ü	é	ã	ä	à	å	ç	ê	ë	è	ï	î	ì	Ä	Å
90	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü		£			ƒ
A0	á	í	ó	ú	Ñ	ñ				⌐	¬	½	¼	¡	«	»
B0	▒	▒	▒									Ą	Ę	¢	Ł	Ė
C0	А	Б	В	Г	Д	Е	Ж	З	И	И	К	Л	М	Н	О	П
D0	Р	С	Т	У	Ф	Х	Ц	Ч	Ш	Щ	Ъ	Ы	Ь	Э	Ю	Я
E0	α	ß	Γ	π	Σ	σ	µ	τ	Φ	Θ	Ω	δ	∞	ϕ	∈	∩
F0	≡	±	≥	≤			÷	≈	°	∙	·			²		

Text memory

The text is compiled using the PC tool 'Text Manager' delivered on data carrier and loaded in the text memory via the serial interface. After that, they can be opened via their text number.

Function table

The control of the device is done acc. to the following table. The figures in [ ] refer to the corresponding lines in the table.

Data inputs		**K15**	**K14**	**K13**	**K12**	**K11**	**K10**	**K9**	**K8**	**K7**	**K6**	**K5**	**K4**	**K3**	**K2**	**K1**	**K0**	**F2**	**F1**
Static text call																			
Text numbers binary coded	[1]	X	X	2^{13}	2^{12}	2^{11}	2^{10}	2^{9}	2^{8}	2^{7}	2^{6}	2^{5}	2^{4}	2^{3}	2^{2}	2^{1}	2^{0}	X	X
Text numbers BCD coded	[2]	8000	4000	2000	1000	800	400	200	100	80	40	20	10	8	4	2	1	X	X
Text numbers 1-from-n coded	[3]	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	X	X
Dynamic text call																			
Text numbers binary coded	[4]	↑	X	2^{13}	2^{12}	2^{11}	2^{10}	2^{9}	2^{8}	2^{7}	2^{6}	2^{5}	2^{4}	2^{3}	2^{2}	2^{1}	2^{0}	L	L
Text numbers BCD coded	[5]	↑	4000	2000	1000	800	400	200	100	80	40	20	10	8	4	2	1	L	L
Text numbers 1-from-n coded	[6]	↑	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	L	L
Variables																			
Insert variables	[7]	↑	X	X	X	X	X	X	X	2^{7}	2^{6}	2^{5}	2^{4}	2^{3}	2^{2}	2^{1}	2^{0}	H	L
Position variables	[8]	↑	X	X	X	X	X	X	X	2^{7}	2^{6}	2^{5}	2^{4}	2^{3}	2^{2}	2^{1}	2^{0}	L	H
Deleate variablen	[9]	↑	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	H	H

X = Data input without function, ↑ = rising pulse edge

Static text call

A text appears in the display as long as its text number is present at the data inputs of the parallel interface [1 ... 3]

In menu item 51 the setting STAT has to be chosen.

Dynamic text call

A text appears in the display if its text number is present at the data inputs of the parallel interface and a rising pulse edge [4 ... 6] arrives at input K15. Text number and impulse must be at a minimum of 10 ms simultaneously and stably at the data inputs.

In menu item 51 the setting dYn has to be chosen.

Function inputs F2 and F1 must have an L signal.

Coding of text numbers

The text numbers can be binary, BCD or 1-out-n coded. The coding must be set in menu item 50.

With binary coding [1, 4] the text numbers 0 ... 9999 are possible.

With BCD coding [2, 5] the text numbers 0 ... 9999 (static text call) or 0 ... 7999 (dynamic text call) are possible. Invalid text numbers (not BCD coded) lead to an undefined display.

With 1-out-of-n coding [3, 6] the following text numbers are possible:

Static text call 0 ... 15 (data inputs K15 ... K0)

Dynamic text call 0 ... 14 (data inputs K14 ... K0)

The lowest data input with H signal has priority. With an L signal at the data inputs K15 (K14) ... K0, the display is cleared and an LED dot flashes in the upper left corner. If, instead, a start text should appear in the display (e.g. 'System trouble-free'), this must be stored in the text memory with the text number 0 and the display of the start text must be set in menu item 20.

Insert variables

In menu item 51 the setting dYn has to be chosen.

Texts into which variables are to be inserted are given placeholders for the variables (up to 256). After the text call [1 ... 6] the placeholders are dark.

The variables appear in the display when they are encoded in binary form at the data inputs K7 ... K0 of the parallel interface and an increasing pulse edge arrives at input K15 (H signal at function input F2, L signal at function input F1) [7]. The insertion position is then automatically increased by 1. Variables and impulse must be at a minimum of min. 10 ms simultaneously and stably at the data inputs.

The variables are inserted from left to right and start at the first placeholder. It takes place from another placeholder if its position is binary coded at the data inputs K7 ... K0 of the parallel interface and at the input K15 an increasing pulse edge arrives (L-signal at the function input F2, H-signal at the function input F1) [8]. Insert position and impulse must be at a minimum of 10 ms simultaneously and stably at the data inputs.

The variables are deleted and the current insertion position is reset if an H signal is applied to function inputs F2 and F1 and a rising pulse edge arrives at input K15 [9].

Brightness reduction

The brightness can also be reduced with a H signal level on function input F1.

Flashing

Flashing of the display can also be activated with a high signal level at function input F2.

Initial text

Once the operating voltage has been applied, an LED dot in the upper left-hand corner of the display illuminates to indicate that the unit is ready for operation. If an initial text is to appear in the display instead (e.g. 'System operational'), this text is to be saved in the text memory with text number 0, and displaying of the initial text is to be set in menu item 20.

Paging

If a text contains more characters than can be shown in the display, it is automatically displayed in paging mode. The page change interval can be set between 3 and 30 seconds in menu item 21.

Menu display

The parameterization of the devices is carried out in a menu of the menu display. In normal operation, the status messages appear in the menu display.

Menu operation

To start the menu, press both menu buttons simultaneously (approx. 1 sec.) until the first signal appears in the menu display. Now, you can navigate in the menu as follows:

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

The menu ends in menu item 99 with the button [↕]. The settings made are either saved (set), not saved (escape) or the factory settings, except for menu item 01, are reset, depending on the setting selected in menu item 99.

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

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

An LED dot illuminates in the upper left-hand corner of the display in menu mode. Control of the display is not possible in menu mode.

Menu table

The menu items are displayed in the following menu table. The factory settings are marked with an *. Individual menu items or settings can be suppressed in another menu item, depending on the unit version or setting.

Menu item		Settings	Menu display
20	Initial text	Not displaying initial text*	20 0
		Displaying initial text	20 1
21	Paging interval	3 seconds *	21 3
		↓	↓
		30 seconds *	21 30
22	Standard character set	Acala 7*	22 7
		Acala 7 extended	22 7E
		Not applicable	22 14C
		Not applicable	22 14E
		User-defined character set	22 U1
		Not applicable	22 U2

Menu item		Settings	Menu display
23	Language	German*	23 G
		French	23 F
		English	23 E
24	Display test	No display test at power-on *	24 0
		Display test at power-on	24 1
50	Coding of the text numbers	1 from n	50 1_n
		binary	50 bin
		BCD	50 bcd
51	Control	Static	51 StAt
		Dynamic	51 dYn
90	Setting date (year)	05	90 05
		↓	↓
		99	90 99
91	Setting date (month)	1	91 1
		↓	↓
		12	91 12
92	Setting date (day)	1	92 1
		↓	↓
		31	92 31
94	Setting time (hours)	0	94 0
		↓	↓
		23	94 23
95	Setting time (minutes)	0	95 0
		↓	↓
		59	96 59
99	Saving	Saving parameters* (Set)	99 SEt
		Not saving parameters (Escape)	99 ESC
		Resetting to the default settings (Default)	99 dEF

Initial text	Once the operating voltage has been applied, an LED dot in the upper left-hand corner of the display illuminates to indicate that the unit is ready for operation. If an initial text is to appear in the display instead (e.g. 'System operational'), this text is to be stored in the text memory with text number 0, and displaying of the initial text is to be set in menu item 20. If a display test is preselected in menu item 24, it appears in the display before the initial text.
Paging interval	If a text contains more characters than can be shown in the display, it is automatically displayed in paging mode. The page change interval can be set between 3 and 30 seconds in menu item 21.
Character set	In menu item 22, you can set the default character set used to display the texts. Character sets Acala 7, Acala 7 extended, Acala 14 condensed and Acala 14 extended are permanently installed in the units. A user-defined character set with a character height of seven pixels can be called up with the U1 setting. The Acala 7 P character set is preinstalled here. It can be replaced by a user-defined character set with up to 7 pixels character height. A user-defined character set with a character height of 14 pixels can be called up with the U2 setting. It can be replaced by a user-defined character set or an optional character set (Acala 14 P, Acala 16 condensed, Acala 16 or Acala 16 extended). The optional character sets and the PC tool 'DisplayManager' a tool for generating user-defined character sets are included in delivery on a data carrier. The tool is also used to install character sets, to save character sets on data carriers and to read back installed character sets.
Language	In menu item 23, you can set the language in which the weekday is displayed (abbreviated to two letters).
Display test	In menu item 24, you can set whether a display test is to be performed after the operating voltage is applied.
Coding of the text numbers	The text numbers can be coded binary, BCD or 1-out-of-n. The coding is set in menu item 50.
Text call	In menu item 51 you can set whether the text is called up static or dynamic.
Time/date	The year, month, and day of the real-time clock are set in menu items 90 – 92. The time at which the clock is to be started is set in menu items 94 – 95. Then select menu item 99 and select the setting SEt there. When the set time is reached, briefly press the left menu button [↕], now the clock is now set to the current time. If the settings in menu items 90 – 92 (date) and 94 – 95 (time) are not changed when the menu is run through, the current settings are retained when the menu is exited. Therefore, the clock only needs to be set when running through the menu if this is intended. Time and date can be set independently. Attention: Setting unrealistic date values, e.g. 31/02/09 can lead to unpredictable date displays and is therefore impermissible.

Fault messages

Serious faults due to improper operation or faulty operating conditions are indicated in the display. The following messages are possible:

Fault message	Cause	Elimination
No Text	The text called up is not saved in the fixed text memory.	The text is to be loaded into the fixed text memory.
Syntax Error	A faulty command was sent to the display .	The command must be corrected (see command table in chapter 6).

SX502 – [ ][ ][0] / [0][ ] / [ ][ ] – [ ][ ][ ] / [ ][ ] – [P][0]

Option	Code
2 lines	2
4 lines	4
6 lines	6
8 lines	8
20 characters/line*	2
40 characters/line*	4
Character height 33/66/75 mm	3
Character height 50/100/120 mm	5
Standard LED	0
LED for outdoor use	2
Character color red	R
Switchable red/green/orange character color	M
Display readable on one side	1
Display readable on both sides	2
Steel sheet housing, coated	0
Steel sheet housing, two-layer coating	1
Steel sheet housing V2A, coated	2
Steel sheet housing V2A, brushed	3
Steel sheet housing V4A, brushed	5
Protection type IP54	0
Protection type IP65	1
Protection type IP54 climate adjustment	2
Protection type IP54 climate adjustment and heating	4
Wall mounting, cable entry point from the bottom	0
Wall mounting, cable entry point from the top	1
Hanging installation, cable entry point from the bottom	2
Hanging installation, cable entry point from the top	3
Wall and hanging installation, cable entry point from the bottom	4
Wall and hanging installation, cable entry point from the top	5
Power supply 230 V AC ±15 %, 50 Hz	A
Power supply 24 V DC ±15 %	B
Power supply 115 V AC ±15 %, 60 Hz	C

* applies for Acala 7 character set

Housing colors	Front pane	RAL 5002 ultramarine
	Front pane	RAL 7035 light grey
Front frame	SX502-xxx/xx/xR-xxx/xx-xx	plastic, tinted red, non-reflective
	SX502-xxx/xx/xM-xxx/xx-xx	plastic, clear, non-reflective
Ambient conditions	Operating temperature	0…40 °C
	Storage temperature	30…85 °C
	Relative humidity	max. 95 % (non-condensing)

Max. power consumption

Units with character height of 33/66/75 mm

One-sided display		Double-sided display	
SX502-220/03/0R-1xx/xx-xx	approx. 40 VA	SX502-220/03/0R-2xx/xx-xx	approx. 75 VA
SX502-220/03/0M-1xx/xx-xx	approx. 65 VA	SX502-220/03/0M-2xx/xx-xx	approx. 130 VA
SX502-420/03/0R-1xx/xx-xx	approx. 75 VA	SX502-420/03/0R-2xx/xx-xx	approx. 140 VA
SX502-420/03/0M-1xx/xx-xx	approx. 130 VA	SX502-420/03/0M-2xx/xx-xx	approx. 265 VA
SX502-620/03/0R-1xx/xx-xx	approx. 105 VA	SX502-620/03/0R-2xx/xx-xx	approx. 220 VA
SX502-620/03/0M-1xx/xx-xx	approx. 205 VA	SX502-620/03/0M-2xx/xx-xx	approx. 390 VA
SX502-820/03/0R-1xx/xx-xx	approx. 140 VA	SX502-820/03/0R-2xx/xx-xx	approx. 290 VA
SX502-820/03/0M-1xx/xx-xx	approx. 265 VA	SX502-820/03/0M-2xx/xx-xx	approx. 525 VA
SX502-240/03/0R-1xx/xx-xx	approx. 75 VA	SX502-240/03/0R-2xx/xx-xx	approx. 150 VA
SX502-240/03/0M-1xx/xx-xx	approx. 130 VA	SX502-240/03/0M-2xx/xx-xx	approx. 265 VA
SX502-440/03/0R-1xx/xx-xx	approx. 140 VA	SX502-440/03/0R-2xx/xx-xx	approx. 290 VA
SX502-440/03/0M-1xx/xx-xx	approx. 265 VA	SX502-440/03/0M-2xx/xx-xx	approx. 525 VA
SX502-640/03/0R-1xx/xx-xx	approx. 210 VA	SX502-640/03/0R-2xx/xx-xx	approx. 425 VA
SX502-640/03/0M-1xx/xx-xx	approx. 390 VA	SX502-640/03/0M-2xx/xx-xx	approx. 775 VA
SX502-840/03/0R-1xx/xx-xx	approx. 280 VA	SX502-840/03/0R-2xx/xx-xx	approx. 560 VA
SX502-840/03/0M-1xx/xx-xx	approx. 515 VA	SX502-840/03/0M-2xx/xx-xx	approx. 1010 VA

Units with character height of 50/100/120 mm

One-sided display		Double-sided display	
SX502-220/05/0R-1xx/xx-xx	approx. 45 VA	SX502-220/05/0R-2xx/xx-xx	approx. 85 VA
SX502-220/05/0M-1xx/xx-xx	approx. 85 VA	SX502-220/05/0M-2xx/xx-xx	approx. 165 VA
SX502-420/05/0R-1xx/xx-xx	approx. 85 VA	SX502-420/05/0R-2xx/xx-xx	approx. 170 VA
SX502-420/05/0M-1xx/xx-xx	approx. 165 VA	SX502-420/05/0M-2xx/xx-xx	approx. 335 VA
SX502-620/05/0R-1xx/xx-xx	approx. 130 VA	SX502-620/05/0R-2xx/xx-xx	approx. 250 VA
SX502-620/05/0M-1xx/xx-xx	approx. 245 VA	SX502-620/05/0M-2xx/xx-xx	approx. 490 VA
SX502-820/05/0R-1xx/xx-xx	approx. 170 VA	SX502-820/05/0R-2xx/xx-xx	approx. 335 VA
SX502-820/05/0M-1xx/xx-xx	approx. 335 VA	SX502-820/05/0M-2xx/xx-xx	approx. 660 VA
SX502-240/05/0R-1xx/xx-xx	approx. 85 VA	SX502-240/05/0R-2xx/xx-xx	approx. 170 VA
SX502-240/05/0M-1xx/xx-xx	approx. 165 VA	SX502-240/05/0M-2xx/xx-xx	approx. 320 VA
SX502-440/05/0R-1xx/xx-xx	approx. 170 VA	SX502-440/05/0R-2xx/xx-xx	approx. 335 VA
SX502-440/05/0M-1xx/xx-xx	approx. 320 VA	SX502-440/05/0M-2xx/xx-xx	approx. 650 VA
SX502-640/05/0R-1xx/xx-xx	approx. 250 VA	SX502-640/05/0R-2xx/xx-xx	approx. 500 VA
SX502-640/05/0M-1xx/xx-xx	approx. 490 VA	SX502-640/05/0M-2xx/xx-xx	approx. 980 VA
SX502-840/05/0R-1xx/xx-xx	approx. 335 VA	SX502-840/05/0R-2xx/xx-xx	approx. 685 VA
SX502-840/05/0M-1xx/xx-xx	approx. 650 VA	SX502-840/05/0M-2xx/xx-xx	approx. 1295 VA

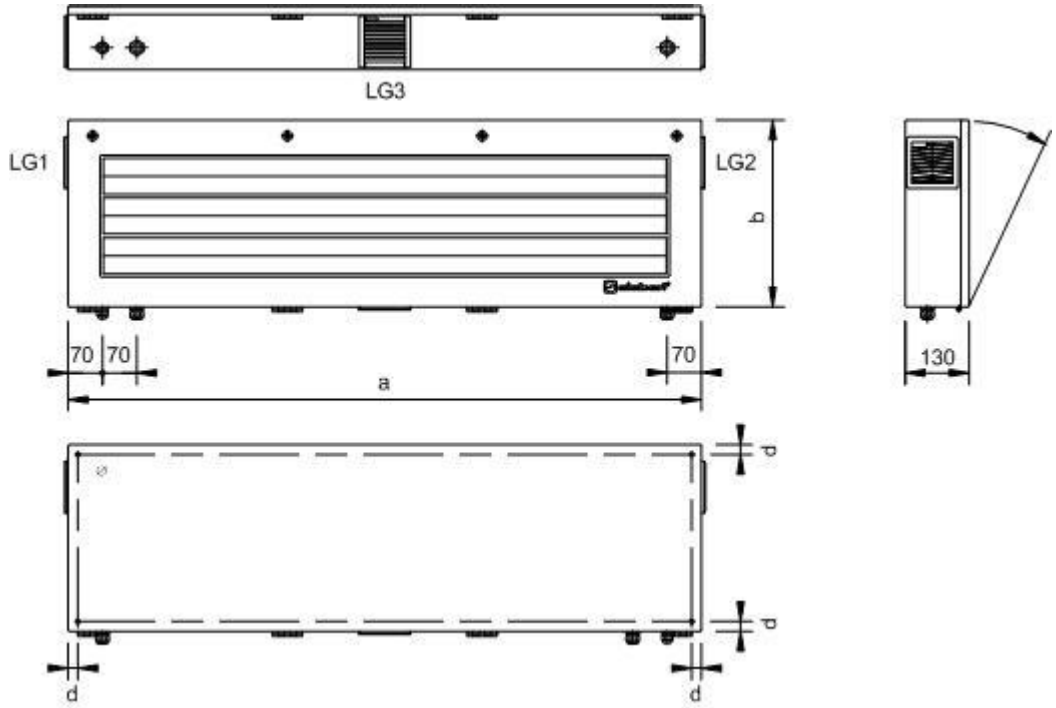
For units with built-in heating, the values for power consumption specified in the table increase by approx. 10 – 200 VA (exact values on request), depending on the unit size).

Screw type terminals	Control computer	Capacity of terminals 0,14…1,5 mm^2
	Power supply	Capacity of terminals 0,2…4 mm^2
Fixed text memory	Capacity	128 KBytes
	Number of texts	max. 10.000
	Length of texts	max. 2048 characters
Real–time clock	Precision	20 ppm
Marquee	Text length	max. 4000 display columns (pixel)

Units with character height of 33/66/75 mm and one-sided display

The following figure shows unit version SX502-640/03/0x-1xx/xx-xx, representing the other unit versions listed in the following table. All dimensions are in mm.

LG1, LG2 and LG3 are ventilation grates on units ventilated by other means. The ventilation grates and their arrangement are not displayed dimensionally. The following table specifies the ventilation grates of the individual unit versions.

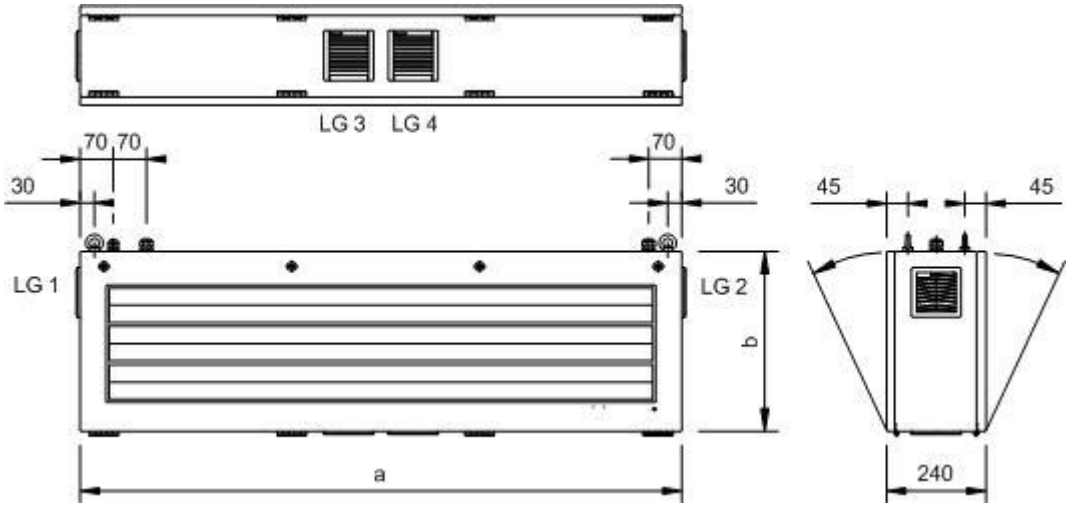


Unit version	a	b	d	Ø	LG1	LG2	LG3	Weight
SX502-220/03/0R-1xx/xx-xx	700	210	16	7	–	–	–	approx. 12 kg
SX502-220/03/0M-1xx/xx-xx	700	210	16	7	–	–	–	approx. 12 kg
SX502-420/03/0R-1xx/xx-xx	700	300	16	7	–	–	–	approx. 14 kg
SX502-420/03/0M-1xx/xx-xx	700	300	16	7	–	–	–	approx. 14 kg
SX502-620/03/0R-1xx/xx-xx	700	380	20	9	–	–	–	approx. 18 kg
SX502-620/03/0M-1xx/xx-xx	700	380	20	9	■	■	–	approx. 18 kg
SX502-820/03/0R-1xx/xx-xx	720	490	20	9	–	–	–	approx. 21 kg
SX502-820/03/0M-1xx/xx-xx	720	490	20	9	■	■	–	approx. 21 kg
SX502-240/03/0R-1xx/xx-xx	1270	210	20	9	–	–	–	approx. 18 kg
SX502-240/03/0M-1xx/xx-xx	1270	210	20	9	–	–	–	approx. 18 kg
SX502-440/03/0R-1xx/xx-xx	1270	300	20	9	–	–	–	approx. 22 kg
SX502-440/03/0M-1xx/xx-xx	1270	300	20	9	■	■	■	approx. 22 kg
SX502-640/03/0R-1xx/xx-xx	1270	380	20	9	–	–	–	approx. 28 kg
SX502-640/03/0M-1xx/xx-xx	1270	380	20	9	■	■	■	approx. 28 kg
SX502-840/03/0R-1xx/xx-xx	1290	490	20	9	–	–	–	approx. 34 kg
SX502-840/03/0M-1xx/xx-xx	1290	490	20	9	■	■	■	approx. 34 kg

Units with character height of 33/66/75 mm and double-sided display

The following figure shows unit version SX502-640/03/0x-2xx/xx-xx, representing the other unit versions listed in the following table. All dimensions are in mm.

LG1, LG2, LG3 and LG4 are ventilation grates on units ventilated by other means. The ventilation grates and their arrangement are not displayed dimensionally. The following table specifies the ventilation grates of the individual unit versions.

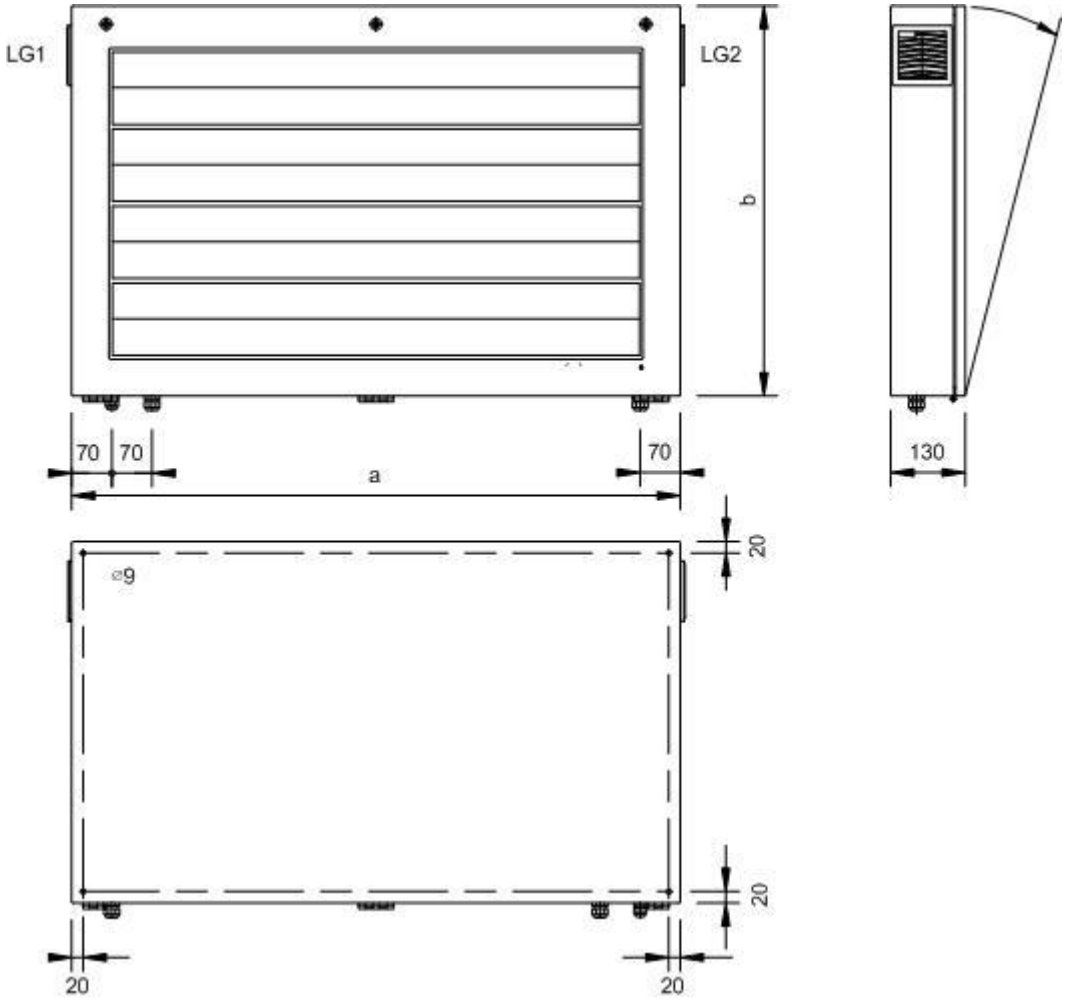


Unit version	a	b	LG1	LG2	LG3	LG4	Weight
SX502-220/03/0R-2xx/xx-xx	700	210	–	–	–	–	approx. 17 kg
SX502-220/03/0M-2xx/xx-xx	700	210	–	–	–	–	approx. 17 kg
SX502-420/03/0R-2xx/xx-xx	700	300	–	–	–	–	approx. 22 kg
SX502-420/03/0M-2xx/xx-xx	700	300	■	–	–	■	approx. 22 kg
SX502-620/03/0R-2xx/xx-xx	700	380	■	–	–	■	approx. 28 kg
SX502-620/03/0M-2xx/xx-xx	700	380	■	–	–	■	approx. 28 kg
SX502-820/03/0R-2xx/xx-xx	720	490	■	–	–	■	approx. 32 kg
SX502-820/03/0M-2xx/xx-xx	720	490	■	■	■	■	approx. 32 kg
SX502-240/03/0R-2xx/xx-xx	1270	210	–	–	–	–	approx. 26 kg
SX502-240/03/0M-2xx/xx-xx	1270	210	■	■	–	–	approx. 26 kg
SX502-440/03/0R-2xx/xx-xx	1270	300	■	–	–	■	approx. 34 kg
SX502-440/03/0M-2xx/xx-xx	1270	300	■	■	■	■	approx. 34 kg
SX502-640/03/0R-2xx/xx-xx	1270	380	■	–	–	■	approx. 42 kg
SX502-640/03/0M-2xx/xx-xx	1270	380	■	■	■	■	approx. 42 kg
SX502-840/03/0R-2xx/xx-xx	1290	490	■	■	■	–	approx. 50 kg
SX502-840/03/0M-2xx/xx-xx	1290	490	■	■	■	■	approx. 50 kg

Units with character height of 50/100/120 mm and one-sided display

The following figure shows unit version SX502-820/05/0x-1xx/xx-xx, representing the other unit versions listed in the following table. All dimensions are in mm.

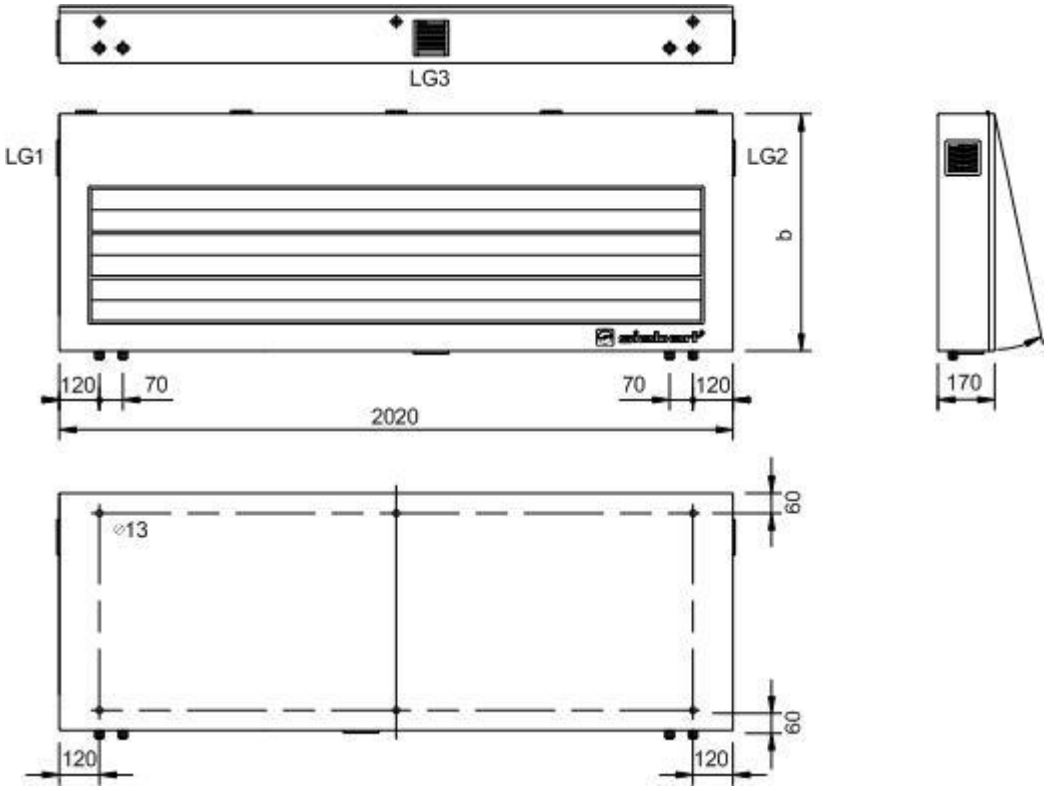
LG1, LG2, LG3 and LG4 are ventilation grates on units ventilated by other means. The ventilation grates and their arrangement are not displayed dimensionally. The following table specifies the ventilation grates of the individual unit versions.



Unit version	a	b	LG1	LG2	Weight
SX502-220/05/0R-1xx/xx-xx	1040	250	–	–	approx. 16 kg
SX502-220/05/0M-1xx/xx-xx	1040	250	–	–	approx. 16 kg
SX502-420/05/0R-1xx/xx-xx	1040	390	–	–	approx. 22 kg
SX502-420/05/0M-1xx/xx-xx	1040	390	–	–	approx. 22 kg
SX502-620/05/0R-1xx/xx-xx	1040	530	–	–	approx. 28 kg
SX502-620/05/0M-1xx/xx-xx	1040	530	–	–	approx. 28 kg
SX502-820/05/0R-1xx/xx-xx	1060	680	–	–	approx. 35 kg
SX502-820/05/0M-1xx/xx-xx	1060	680	■	■	approx. 35 kg
SX502-240/05/0R-1xx/xx-xx	1960	250	–	–	approx. 27 kg
SX502-240/05/0M-1xx/xx-xx	1960	250	–	–	approx. 27 kg
SX502-440/05/0R-1xx/xx-xx	1960	390	–	–	approx. 40 kg
SX502-440/05/0M-1xx/xx-xx	1960	390	–	–	approx. 40 kg

The following figure shows unit version SX502-640/05/0x-1xx/xx-xx, representing the other unit versions listed in the following table. All dimensions are in mm.

LG1, LG2 and LG3 are ventilation grates on units ventilated by other means. The following table specifies the ventilation grates of the individual unit versions.

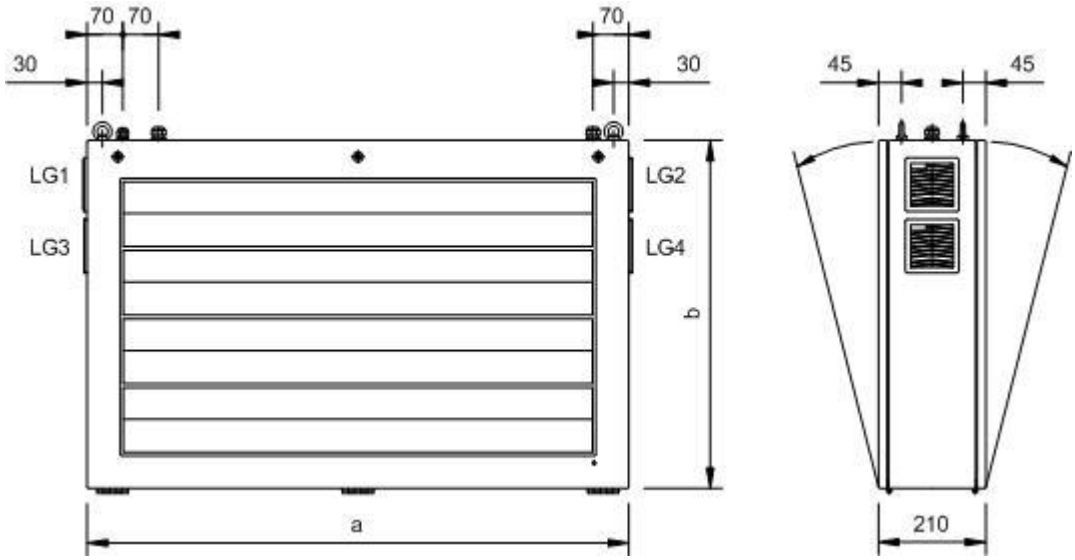


Unit version	b	LG1	LG2	LG3	Weight
SX502-640/05/0R-1xx/xx-xx	710	–	–	–	approx. 82 kg
SX502-640/05/0M-1xx/xx-xx	710	■	■	■	approx. 82 kg
SX502-840/05/0R-1xx/xx-xx	850	–	–	–	approx. 96 kg
SX502-840/05/0M-1xx/xx-xx	850	■	■	■	approx. 96 kg

Units with character height of 50/100/120 mm and double-sided display

The following figure shows unit version SX502-820/05/0x-2xx/xx-xx, representing the other unit versions listed in the following table. All dimensions are in mm.

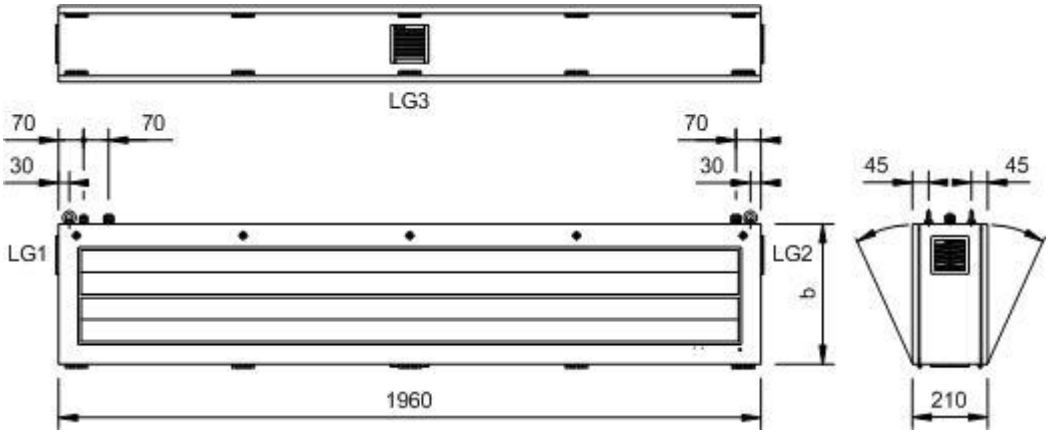
LG1, LG2, LG3 and LG4 are ventilation grates on units ventilated by other means. The ventilation grates and their arrangement are not displayed dimensionally. The following table specifies the ventilation grates of the individual unit versions.



Unit version	a	b	LG1	LG2	LG3	LG4	Weight
SX502-220/05/0R-2xx/xx-xx	1040	250	–	–	–	–	approx. 24 kg
SX502-220/05/0M-2xx/xx-xx	1040	250	–	–	–	–	approx. 24 kg
SX502-420/05/0R-2xx/xx-xx	1040	390	–	–	–	–	approx. 38 kg
SX502-420/05/0M-2xx/xx-xx	1040	390	■	■	–	–	approx. 38 kg
SX502-620/05/0R-2xx/xx-xx	1040	530	–	–	–	–	approx. 47 kg
SX502-620/05/0M-2xx/xx-xx	1040	530	■	■	–	–	approx. 47 kg
SX502-820/05/0R-2xx/xx-xx	1060	680	–	–	–	–	approx. 65 kg
SX502-820/05/0M-2xx/xx-xx	1060	680	■	■	■	■	approx. 65 kg

The following figure shows unit version SX502-440/05/0x-2xx/xx-xx, representing the other unit versions listed in the following table. All dimensions are in mm.

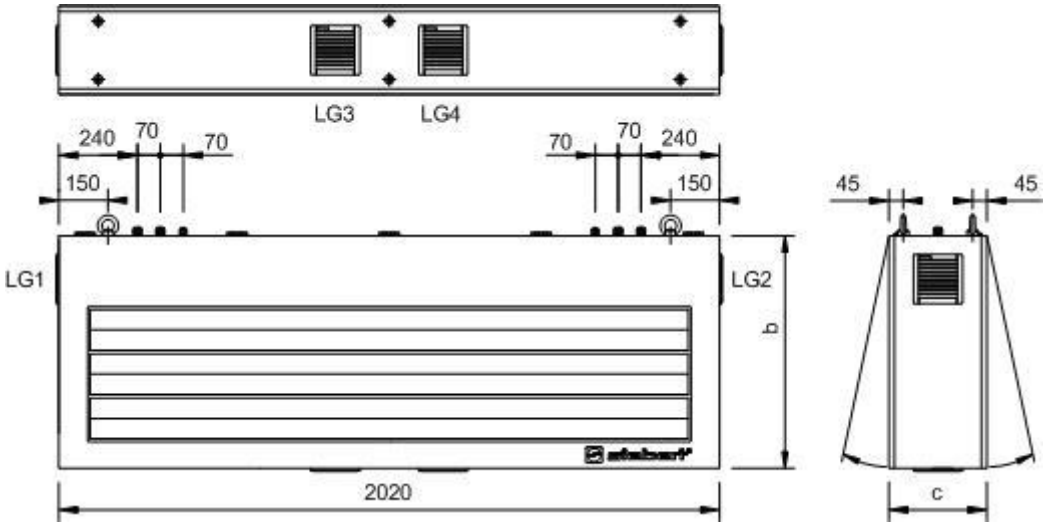
LG1, LG2 and LG3 are ventilation grates on units ventilated by other means. The following table specifies the ventilation grates of the individual unit versions.



Unit version	b	LG1	LG2	LG3	Weight
SX502-240/05/0R-2xx/xx-xx	250	–	–	–	approx. 45 kg
SX502-240/05/0M-2xx/xx-xx	250	–	–	–	approx. 45 kg
SX502-440/05/0R-2xx/xx-xx	390	–	–	–	approx. 66 kg
SX502-440/05/0M-2xx/xx-xx	390	■	■	■	approx. 66 kg

The following figure shows unit version SX502-840/05/0x-2xx/xx-xx, representing the other unit versions listed in the following table. All dimensions are in mm.

LG1, LG2 and LG3 are ventilation grates on units ventilated by other means. The ventilation grates and their arrangement are not displayed dimensionally. The following table specifies the ventilation grates of the individual unit versions.



Unit version	b	c	LG1	LG2	LG3	LG4	Weight
SX502-640/05/0R-2xx/xx-xx	710	270	–	–	–	–	approx. 136 kg
SX502-640/05/0M-2xx/xx-xx	710	270	■	■	■	■	approx. 136 kg
SX502-840/05/0R-2xx/xx-xx	850	300	■	■	–	■	approx. 160 kg
SX502-840/05/0M-2xx/xx-xx	850	300	■	■	■	■	approx. 160 kg