



Operating instructions

Series S302

**Numeric large size displays
for clock**

Time base NTP network protocol

1 Contact

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2 Legal note

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Table of contents

1 Contact	2
2 Legal note	3
3 Safety precautions	6
Important information	6
Safety	6
Intended use.....	6
Mounting and installation.....	6
Grounding.....	6
EMC measures.....	7
Disposal.....	7
4 Unit description	8
Model designation	8
Unit construction.....	8
Principle circuit diagram	9
Central Processing Unit.....	9
Ethernet interface	10
Function inputs	10
Auxiliary voltage	10
Menu display	10
Menu buttons.....	10
Switching output	10
Status indicators	10
Power supply.....	10
5 Control	11
Time base.....	11
Time zone.....	11
Summertime	11
Display test.....	11
Flashing	11
Brightness.....	11
Power-on reset	11
6 Configuration	12
MAC address.....	12
Basic configuration	12
Static IP address	12
Configuration via Network	12
7 Parametrization	13

Menu.....	13
Menu operation.....	13
Menu table.....	14
8 Technical data	16
Unit properties	16
Max. power consumption	17
Screw-type terminals	17
Housing colors.....	17
Front frame	17
Ambient conditions	17
Measurements and Weights.....	18

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



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 entries.

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.

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).

EMC measures

The devices comply with the EU Directive 2004/108/EC (EMC Directive) and provide the required interference immunity. Observe the following when connecting the operating voltage and data cables:

Use shielded data cables.

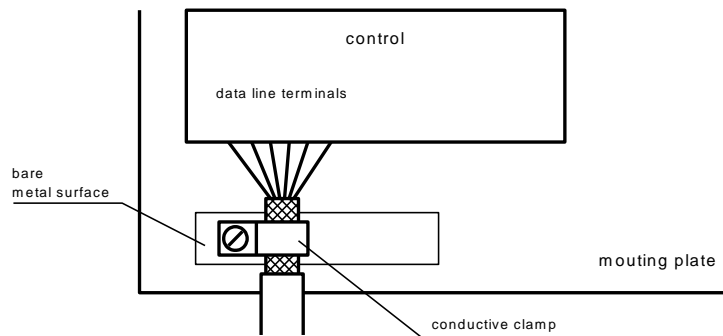
The data and operating voltage cables must be laid separately. They may not be laid together with heavy-current cables or other interference-producing cables.

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. $0.1\mu\text{F}/600\text{ V AC}$) 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.

4 Unit description

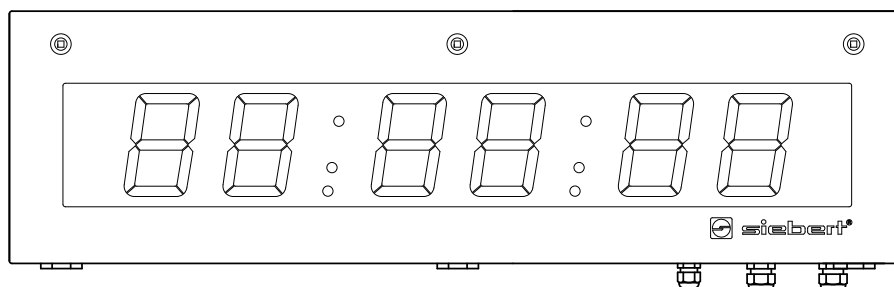
Model designation

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 (see Chapter 8):

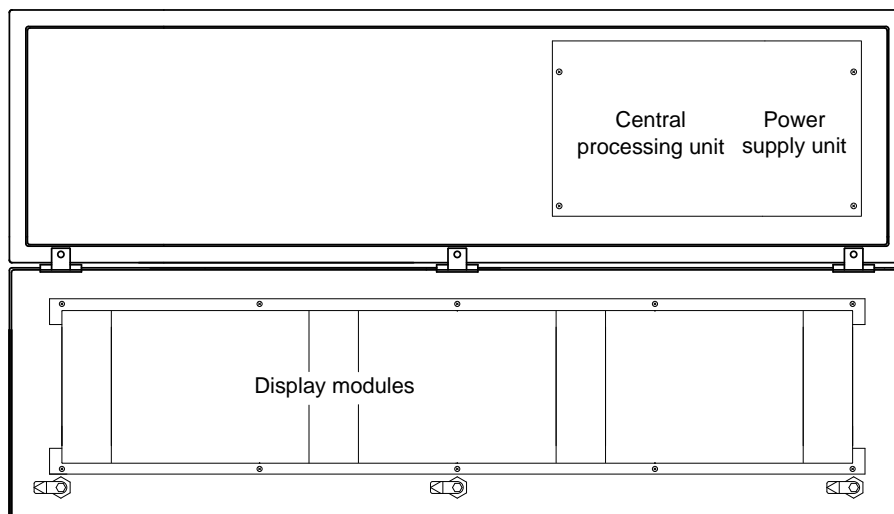
S302-xx/xx/xx-xxx/xx-U4

Unit construction

The following figure shows model type S302-06/10/0x-xxx/xx-xx as example for the other model types. The front frame of the housing is locked with quick-action releases. When opening the unit the front frame hinges downward.

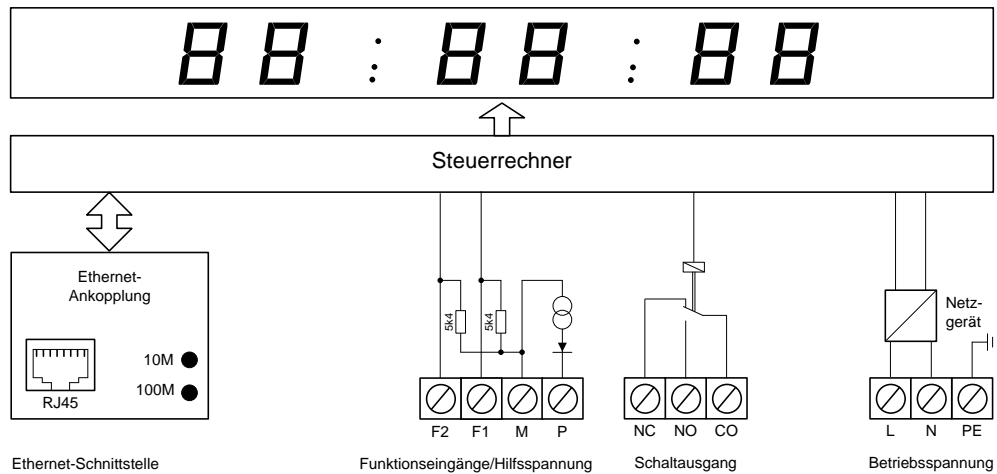


The following figure shows the unit when open.



Units with double-sided display show the same information on the front and on the rear side.

Principle circuit diagram



Ethernet-Schnittstelle

Funktionseingänge/Hilfsspannung

Schaltausgang

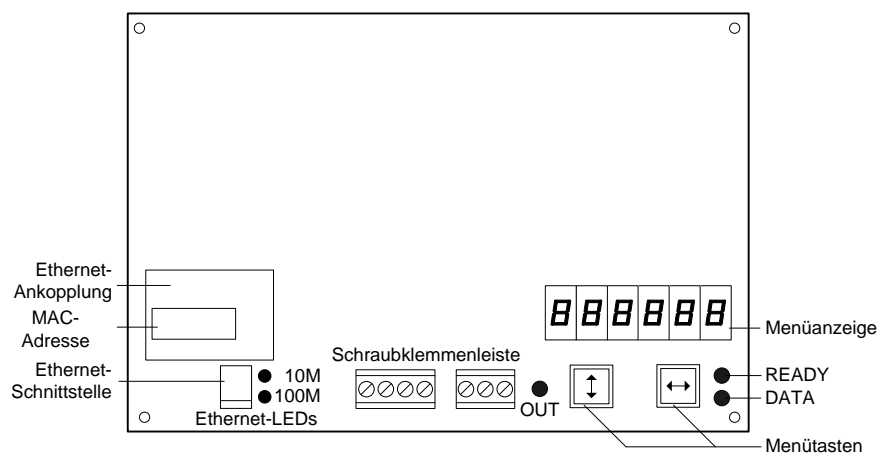
Betriebsspannung

Steuerrechner
Ethernet-Schnittstelle
Funktionseingänge/
Hilfsspannung
Schaltausgang
Netzgerät
Betriebsspannung

Central Processing Unit
Ethernet interface
Function inputs/
Auxiliary voltage
Switching output
Power supply unit
Power supply

Central Processing Unit

The following figure shows the Central Processing Unit, located in the lower part of the housing.



Ethernet-Ankopplung
MAC-Adresse
Ethernet-Schnittstelle
Ethernet-LEDs
Schraubklemmleiste
Menüanzeige
Menütasten

Ethernet coupling
MAC address
Ethernt interface
Ethernet LEDs
Screw-type terminal strip
Menu display
Menu buttons

Ethernet interface

The Ethernet interface is located on the RJ45 socket of the central processing unit. It has the following specifications:

Data rate	10/100 Mb/s, automatic detection
Galvanic isolation	1,5 kV
Operation mode	The devices are NTP or SNTP clients (UDP Port 123)
Configuration	The configuration can take place in the menu without external tools (see Chapter 7).

Function inputs

The function inputs are located on the screw-type terminal strip of the control computer. They allow reduction in brightness and flashing of the display (see Chapter 5).

The function inputs are designed for the following signal voltages:

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

Auxiliary voltage

The units supply terminal P with an auxiliary voltage galvanically isolated from the operating voltage (24 V \pm 20%, max. 50 mA, M = reference potential). It can be used for supplying power to the current loop or as H signal for the function inputs.

Menu display

The parameterization of the units is carried out in a menu of the menu display (see Chapter 7). In normal mode, the menu display corresponds to the main display. For devices with more than six positions, *Menu* is shown in the menu display in normal operation.

Menu buttons

The menu buttons are used to control the menu (see Chapter 7).

Switching output

Do not use switching output.

Status indicators

The status indicators (LED) of the control computer and the Ethernet coupling have the following meaning:

10M	Data speed 10 Mb/s (flickering = data traffic)
100M	Data speed 100 Mb/s (flickering = data traffic)
READY	Time information received by NTP server
DATA	No meaning
OUT	No meaning

Power supply

The screw-type terminals for the power supply are located on the power supply unit in the bottom section of the housing. They have the following designations:

Devices for a power supply 115 V AC or 230 V AC	L, N and PE
Devices for a power supply 24 V DC	+, – and PE

5 Control

Time base

The devices indicate the Coordinated Universal Time (UTC) received from a NTP server. They are NTP clients according to RFC1305 or SNTP clients according to RFC2030.

Due to the system the displayed time may differ from the UTC for a maximum of 1 second.

Time zone

If the local time is not the same as the Coordinated Universal Time (UTC) it is possible to set an offset from -12 up to + 12 hours (see Chapter 7).

For Germany and France p. e. the offset is + 1 hour.

Summertime

In menu item A it is selected, if an automatic switch from standard time to summertime is set (see Chapter 7).

The summertime starts on the last Sunday in March at 02:00 am and finishes on the last Sunday in October at 03:00 am.

Display test

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

Flashing

Flashing of the display can also be activated by application of the H signal to functional input F1.

For devices provided with an LRD[®] display flashing is not possible.

Brightness

The brightness can be reduced with an H signal on function input F2.

For units provided with a LRD[®] display brightness reduction is not possible.

Power-on reset

After power-on, minus signs are displayed until the unit has received time information from the NTP server. If a display test has been preselected in menu item F, it will run beforehand.

6 Configuration

MAC address

The MAC address of the unit can be found on the Ethernet coupling of the control computer (see label). It is needed for commissioning and should be written down on this operating manual before the unit is mounted on an inaccessible location.

Basic configuration

The basic configuration of the units is done without any external tools via the menu (see Chapter 7). In menu item IP you must select between DHCP (factory setting) and static IP address.

Static IP address

The static IP address is assigned by the system administrator. The static IP address is to be set in the following menu items:

I.1...I.4	IP address	Factory setting 192.168.127.254
S.1...S.4	Subnet mask	Factory setting 255.255.255.0
G.1...G.4	Gateway	Factory setting 192.168.127.1
t.1...t.4	IP address NTP server	Factory setting 192.168.127.1

Configuration via Network

Information is provided in the included documentation of the Ethernet coupling (Type Moxa NE-4100T). For more information visit www.moxa.com.

Restoring the factory settings in menu item U also restore the factory settings of the Ethernet coupling.

7 Parametrization

Menu

The parameterization of the devices is carried out in a menu in the menu display.

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 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 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.

In the menu mode the character Ξ appears in the main display. 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
IP	IP address	Static IP address	IP STAtE
		DHCP*	IP dHCP
I.1	IP address Byte 1 (xxx.-.-.-.-.-)	0	1.1 0
		↓ 192*	↓
		255	1.1 255
I.2	IP address Byte 2 (-.-.xxx.-.-.-)	0	1.2 0
		↓ 168*	↓
		255	1.2 255
I.3	IP address Byte 3 (-.-.-.-.xxx.-.-)	0	1.3 0
		↓ 127*	↓
		255	1.3 255
I.4	IP address Byte 4 (-.-.-.-.-.xxx)	1	1.4 1
		↓ 254*	↓
		254	1.4 254
S.1	Subnet mask Byte 1 (xxx.-.-.-.-.-)	0	5.1 0
		↓ 255*	↓
		255	5.1 255
S.2	Subnet mask Byte 2 (-.-.xxx.-.-.-)	0	5.2 0
		↓ 255*	↓
		255	5.2 255
S.3	Subnet mask Byte 3 (-.-.-.-.xxx.-.-)	0	5.3 0
		↓ 255*	↓
		255	5.3 255
S.4	Subnet mask Byte 4 (-.-.-.-.-.xxx)	0	5.4 0
		↓ 0*	↓
		255	5.4 255
G.1	Gateway Byte 1 (xxx.-.-.-.-.-)	0	6.1 0
		↓ 192*	↓
		255	6.1 255
G.2	Gateway Byte 2 (-.-.xxx.-.-.-)	0	6.2 0
		↓ 168*	↓
		255	6.2 255
G.3	Gateway Byte 3 (-.-.-.-.xxx.-.-)	0	6.3 0
		↓ 127*	↓
		255	6.3 255
G.4	Gateway Byte 4 (-.-.-.-.-.xxx)	1	6.4 1
		↓ 1*	↓
		254	6.4 254
t.1	IP address NTP server Byte 1 (xxx.-.-.-.-.-)	0	7.1 0
		↓ 192*	↓
		255	7.1 255
t.2	IP address NTP-Server Byte 2 (-.-.xxx.-.-.-)	0	7.2 0
		↓ 168*	↓
		255	7.2 255
t.3	IP address NTP server	0	7.3 0

	Byte 3 (- - - - - .xxx - - -)	↓ 127*	↓
		255	Ⓛ.3 255
t.4	IP address NTP server	1	Ⓛ.4 1
	Byte 4 (- - - - - .xxx)	↓ 1*	↓
		254	Ⓛ.4 254
A	Summertime	Inactive	Ⓜ 0FF
		Automatic*	Ⓜ dL5
C	Time zone	UTC -12h	Ⓛ - 12h
		↓	↓
		UTC*	Ⓛ 0h
		↓	↓
		UTC +12h	Ⓛ 12h
F	Display test	No display test at power-on*	Ⓜ - - - -
		Display test at power-on	Ⓜ 8888
U	Save	Save parameters* (Set)	Ⓜ 5EⓁ
		Not saving parameters (Escape)	Ⓜ E5Ⓛ
		Restore to factory settings (Default)	Ⓜ dEF

8 Technical data

Unit properties

The model designation is structured as follows:

S302	-	<input type="text"/>	<input type="text"/>	/	<input type="text"/>	<input type="text"/>	/	<input type="text"/>	<input type="text"/>	-	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
4 Digits		0	4																
2 Digits		0	6																
Character height 57 mm		0	6																
Character height 100 mm		1	0																
Character height 160 mm		1	6																
Character height 250 mm		2	5																
LED Standard		0																	
LED for outdoor use		2																	
LRD [®]		4																	
Character color red																			R
Character color green																			G
Character color white																			W
Display readable on one side																			1
Display readable on both sides																			2
Steel sheet housing, coated																			0
Steel sheet housing, bilayer painting																			1
Stainless steel housing V2A, coated																			2
Stainless steel housing V2A, brushed																			3
Stainless steel housing V4A, brushed																			5
Protection type IP54																			0
Protection type IP65																			1
Protection type IP54 with climate adjustment																			2
Protection type IP54 with 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 mounting and hanging installation, cable entry point from the bottom																			4
Wall mounting 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

Max. power consumption

Units with one-sided display		Units with double-sided display	
4 digits		4 digits	
S302-x4/06/0x-1xx/xx-xx	approx. 14 VA	S302-x4/06/0x-2xx/xx-xx	approx. 19 VA
S302-x4/10/0x-1xx/xx-xx	approx. 21 VA	S302-x4/10/0x-2xx/xx-xx	approx. 33 VA
S302-x4/10/4x-1xx/xx-xx	approx. 50 VA	S302-x4/10/4x-2xx/xx-xx	approx. 91 VA
S302-x4/16/0x-1xx/xx-xx	approx. 64 VA	S302-x4/16/0x-2xx/xx-xx	approx. 119 VA
S302-x4/16/4x-1xx/xx-xx	approx. 50 VA	S302-x4/16/4x-2xx/xx-xx	approx. 91 VA
S302-x4/25/0x-1xx/xx-xx	approx. 79 VA	S302-x4/25/0x-2xx/xx-xx	approx. 150 VA
S302-x4/25/4x-1xx/xx-xx	approx. 85 VA	S302-x4/25/4x-2xx/xx-xx	approx. 164 VA
6 digits		6 digits	
S302-x6/06/0x-1xx/xx-xx	approx. 16 VA	S302-x6/06/0x-2xx/xx-xx	approx. 23 VA
S302-x6/10/0x-1xx/xx-xx	approx. 26 VA	S302-x6/10/0x-2xx/xx-xx	approx. 43 VA
S302-x6/10/4x-1xx/xx-xx	approx. 50 VA	S302-x6/10/4x-2xx/xx-xx	approx. 91 VA
S302-x6/16/0x-1xx/xx-xx	approx. 91 VA	S302-x6/16/0x-2xx/xx-xx	approx. 173 VA
S302-x6/16/4x-1xx/xx-xx	approx. 50 VA	S302-x6/16/4x-2xx/xx-xx	approx. 91 VA
S302-x6/25/0x-1xx/xx-xx	approx. 113 VA	S302-x6/25/0x-2xx/xx-xx	approx. 217 VA
S302-x6/25/4x-1xx/xx-xx	approx. 85 VA	S302-x6/25/4x-2xx/xx-xx	approx. 164 VA

The power consumption for the unit version model S302-xx/xx/0x-xxx/xx-xx is also valid for the unit version S302-xx/xx/2x-xxx/xx-xx (LEDs for external use).

For units with built-in heating, the values for power consumption specified in the table increase by approx. 10 – 100 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

Housing colors

Case front	RAL 5002 ultramarine
Case rear part	RAL 7035 light grey

Front frame

S302-xx/xx/xR-xxx/xx-xx	Plastic, tinted red, non-reflective
S302-xx/06/xG-xxx/xx-xx	Plastic, tinted green, non-reflective
S302-xx/10/xG-xxx/xx-xx	Plastic, tinted green, non-reflective
Other model types	Plastic, clear, non-reflective

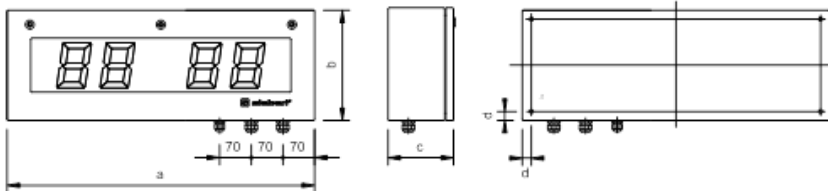
Ambient conditions

Operating temperature	0...55 °C
Storage temperature	-30...85 °C
Relative humidity	max. 95 % (non-condensing)

Measurements and Weights

Units with one-sided display

The following figure shows unit version S302-04/10/4x-1xx/xx-xx, representing the other unit versions listed in the following table.



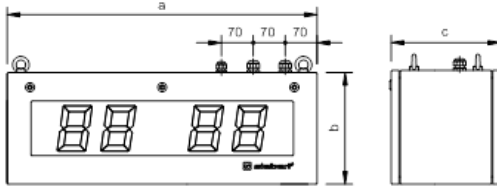
	a [mm]	b [mm]	c [mm]	d [mm]	Ø [mm]	Weight [kg] ¹⁾
4 digits						
S302-04/06/xx-1xx/xx-xx	400	185	110	16	7	6
S302-04/10/xx-1xx/xx-xx	680	245	110 (145)	16	7	10 (12)
S302-04/16/xx-1xx/xx-xx	960	300	110 (145)	20	9	14 (17)
S302-04/25/xx-1xx/xx-xx	1500	400	110	20	9	24
6 digits						
S302-06/06/xx-1xx/xx-xx	510	185	110	16	7	7
S302-06/10/xx-1xx/xx-xx	870	245	110 (145)	16	7	12 (14)
S302-06/16/xx-1xx/xx-xx	1100	300	110 (145)	20	9	16 (20)
S302-06/25/xx-1xx/xx-xx	1730	400	110	20	9	28

¹⁾ The figures shown for weight are approximate.

() Values in round brackets are valid for LRD[®] versions.

Units with double-sided display

The following figure shows unit version S302-04/10/4x-2xx/xx-xx, representing the other unit versions listed in the following table.



Units with character height of 57 mm
(S302-xx/06/xx-2xx/xx-xx) are provided with 2 eyes instead of 4

4 digits	a [mm]	b [mm]	c [mm]	Weight [kg] ¹⁾
S302-04/06/xx-2xx/xx-xx	400	185	170	8
S302-04/10/xx-2xx/xx-xx	680	245	170 (240)	15 (19)
S302-04/16/xx-2xx/xx-xx	960	300	170 (240)	21 (27)
S302-04/25/xx-2xx/xx-xx	1500	400	170	36
6 digits				
S302-06/06/xx-2xx/xx-xx	510	185	170	9
S302-06/10/xx-2xx/xx-xx	870	245	170 (240)	18 (23)
S302-06/16/xx-2xx/xx-xx	1100	300	170 (240)	24 (29)
S302-06/25/xx-2xx/xx-xx	1730	400	170	42

- ¹⁾ The figures shown for weight are approximate.
() Values in round brackets are valid for LRD[®] versions.