EN



SMI200

Programmable compact controller

User guide

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1 Overview

SMI200 is a programmable controller with 2-line 32-character LCD display designed for a wide variety of applications in industrial and building automation from simple display to complex process control functions.

The controller can operate as a master or slave in a Modbus network over RS485 interface. In order to be integrated in a Modbus network, the controller has to be configured and programmed with the akYtec ALP software included on the USB stick.

See ALP Help for further details about device configuration and programming.

The configuration can be carried out with device front buttons over the system menu as well (see sections 5, 6).

The connection with akYtec ALP running on the PC can be established over the USB interface (Fig. 1.1). When being connected to PC over USB, the device is powered by USB and does not need additional power supply.

User application includes the logic program created as a function plan as well as the device configuration.

1.1 Functions

The device has the following basic functions:

– 2-line 32-character LCD display
– 6 function buttons on the front panel
– Master or slave in a Modbus RTU/ASCII network over RS485 interface
– Easy mounting in Ø22.5 mm borehole
– Error indication
– Real-time clock
– Free programming with akYtec ALP software
– Micro-USB programming interface
– Quick replacement

1.2 Design

The device is designed in a plastic enclosure for panel mounting (see 4 “Installation”).

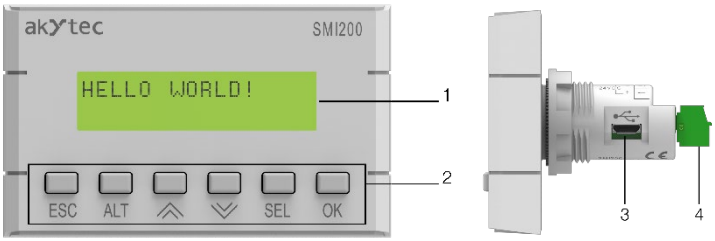


Fig. 1.1

1. LCD display
2. Function buttons
3. Micro-USB socket
4. 4-pole plug-in terminal block

For further details about using the display and function buttons see section 5 “Display and function buttons”.

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2 Specifications

Table 2.1

Power supply	
Supply voltage	24 (19…30) V DC
Power consumption, max.	2.5 W
Galvanic isolation	none
Galvanic isolation against RS485 circuits	1000 V
Reverse polarity protection	yes
Appliance class	III
Network	
Protocol	Modbus RTU/ASCII
Network mode	Master / Slave
Baud rate	9.6…115.2 kbit/s
Programming	
Software	akYtec ALP 1.9 or newer
Interface	Micro-USB 2.0
Stack	dynamic
RAM	32 kB
ROM	128 kB
Network variable memory *	512 Byte
Program cycle, min.	1 ms
Real-time clock	
Accuracy	±3 s/day (25°C)
Backup, min.	1.5 years
Backup battery	CR1025
Mechanical	
IP code	IP54 front / IP20 rear
Dimensions (with terminal block)	100 x 60 x 60 mm
Weight	approx. 150 g
EMC safety	
EMC immunity	conforms to IEC 61326-1 / A1
EMC emission	conforms to EN 55011 / A1

** The limitation applies only to the slave mode, in which all network variables are automatically declared as retain.*

2.1 Environmental conditions

The module is designed for natural convection cooling. It should be taken into account when choosing the installation site.

The following environment conditions must be observed:

- clean, dry and controlled environment, low dust level
- closed non-hazardous areas, free of corrosive or flammable gases

Table 2.2 Environmental conditions

Condition	Permissible range
Ambient temperature	-20…+55°C
Transportation and storage	-20…+55°C
Relative humidity	up to 80% (at +25°C, non-condensing)
Altitude	up to 2000 m above sea level

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3 Safety

3.1 Safety symbols and key words

Explanation of the symbols and keywords used:

DANGER — ***DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.***

WARNING — ***WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.***

CAUTION — ***CAUTION indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.***

NOTICE — ***NOTICE indicates a potentially harmful situation which, if not avoided, may result in damage of the product itself or of adjacent objects.***

3.2 Intended use

The device is provided only for the areas of application described in this user guide when all indicated specifications are observed.

The device can be used only according to the data given in the specification.

Improper use

Any other use is considered improper. Particular attention should be paid to:

– The device may not be used for medical appliances applied to maintain human life or health, its control or other effect on them.
– The device may not be used in explosive environment.
– The device may not be used in atmosphere in which there are chemically active substances.

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4 Installation

To mount the device, cut out two holes Ø22.5 mm and Ø4 mm in the panel, as shown in Fig. 4.2. Carefully position the supplied gasket on the device rear surface. Insert the cylindrical body of the device into the borehole and tighten the nut from the rear side of the panel (Fig. 4.3).

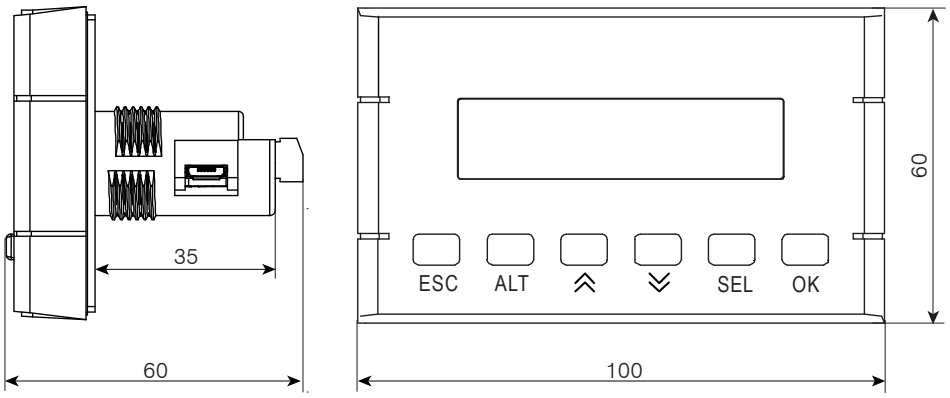


Fig. 4.1 Dimensions

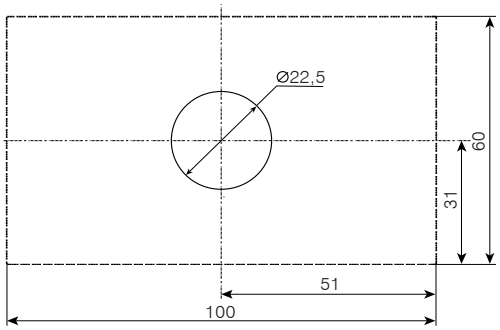


Fig. 4.2 Panel cutouts (front view)

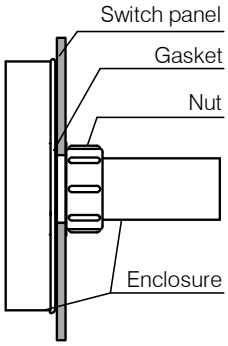


Fig. 4.3 Mounting

The safety precautions from the section 4.1 and the operating conditions from the section 2.1 must be observed.

4.1 Safety precautions

DANGER

Ensure that the mains voltage matches the voltage marked on the nameplate!
Ensure that the device is provided with its own power supply line and electric fuse!

NOTICE

Switch off the power supply before working on the device. Switch on the power supply only after completing the work.

EMC safety:

- Signal cables should be routed separately or screened from the supply cables.
- Shielded cable should be used for the signal lines.
- Connect the screen in the electrical cabinet in accordance with EMC requirements.

4.2 Wiring

Wire the detachable part of the included 4-pole terminal block according to Fig. 4.4 and connect it to the built-in part of the block on the rear side of the device.

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Maximum wire cross-section is 1.0 mm².

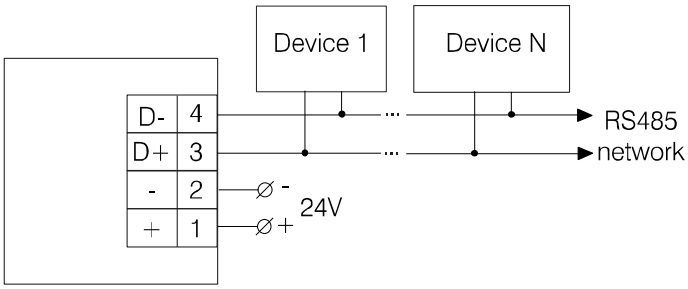


Fig. 4.4

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5 Display and function buttons

The device and process parameters can be viewed and edited (if available) on the display using the function buttons. For device parameters, see section 6 “System menu”.

To view or edit the process parameters, display forms have to be programmed with different display elements. Jump conditions have to be created to let an operator to switch between the display forms using the function buttons. Jump condition can be a button event of a variable event. For further details about display elements and jump conditions use Help in akYtec ALP.

There are editable and not editable display elements thus the display can be used in view or edit mode.

In the view mode (default):

– use [⩓] and [⩔] buttons to move between lines
– use [OK] button to enter the selected level, and [ESC] button to exit it

To edit the parameter, press the button [SEL]. The first editable element on the display starts flashing. Use [⩓] and [⩔] buttons to change the value. Use the button combinations to move between characters:

– [ALT] + [⩓] – one character to the left
– [ALT] + [⩔] – one character to the right

To save the new value and edit the next parameter, use the button [OK].

To reset the parameter to its previous value and exit the edit mode, use the button [ESC].

To save the new value staying in the edit mode, use the button [SEL]. The next editable parameter will be displayed selected.

The last changed parameter will be shown next time when the edit mode is active.

Note:

When assigning a jump condition to the function button, don't forget that the user function will have a higher priority than the system function.

Example:

If the [⩓] and [⩔] buttons are used as a jump condition for a certain display, it will be impossible to use them to scroll the lines inside this display.

Table 5.1 Function buttons

Button	View	Edit
[ALT]	open system menu (>3 s)	
[⩓]	one line up	increase value
[⩔]	one line down	decrease value
[SEL]	activate edit mode	save the new value and edit the next parameter
[ESC]	exit level / exit system menu (>3 s)	reset the parameter to its previous value and exit the edit mode
[OK]	enter selected level	save the new value and exit the edit mode
[ALT] + [⩓]		one character to the left
[ALT] + [⩔]		one character to the right

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6 System menu

The device parameters can be set in akYtec ALP or using the function buttons on the device. All parameters are over the system menu available.

Press the button ALT for 3 seconds to access the menu.

Press the button ESC for 3 seconds to exit the menu.

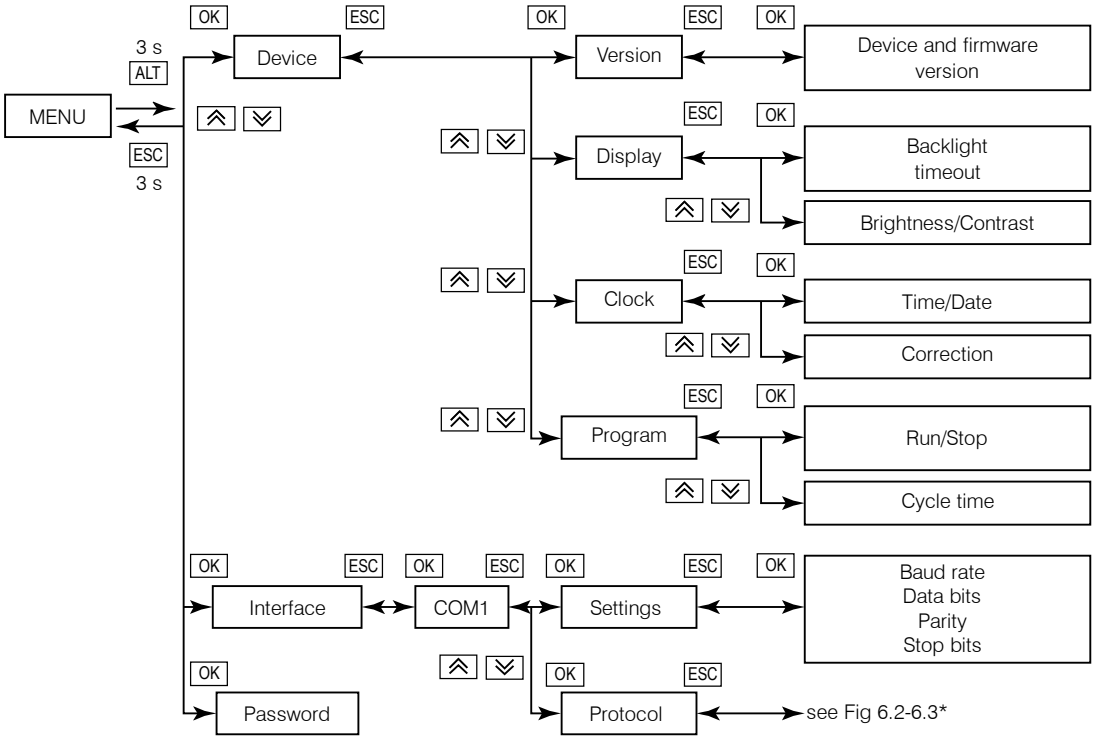


Fig. 6.1 System menu

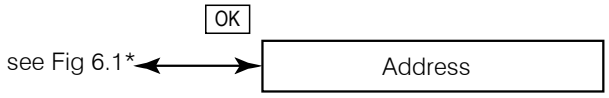


Fig. 6.2 Protocol - Modbus Slave

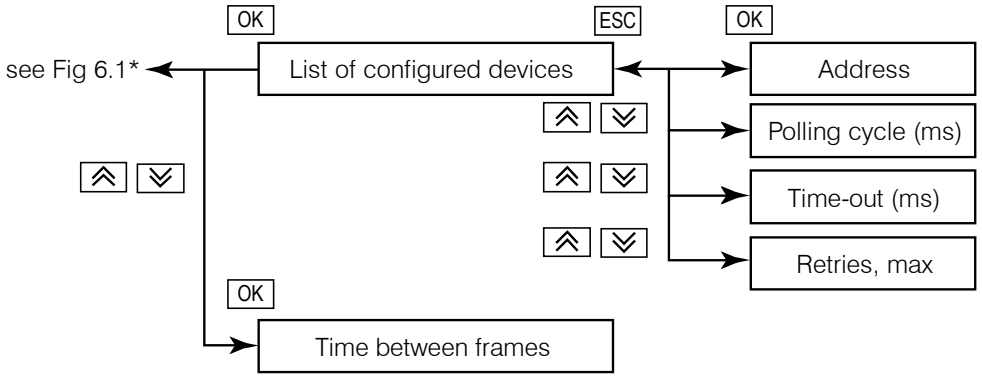


Fig. 6.3 Protocol - Modbus Master

** The structure of the system menu depends on the interface configuration in ALP as a master or a slave.*

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System menu

The application running on the device can be interrupted using the menu item ***Device > Program > Run/Stop***. The device must be restarted for the change to take effect.

The menu can be password protected, although there is no password by default. The password can be set or changed with ALP or using the system menu. If the password is lost, it can be changed or deactivated by loading a new application.

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7 Operation

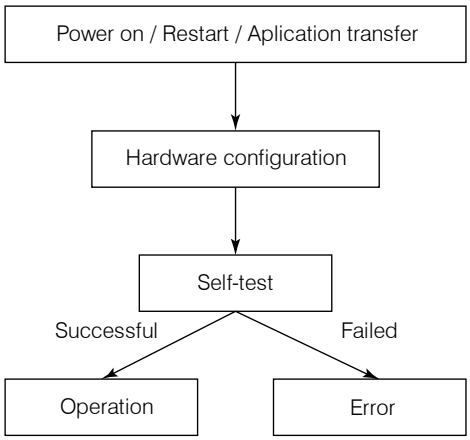
Once the application has been transferred to the non-volatile memory, the device restarts. On device startup, a self-test runs. If unsuccessful, the device goes to the error mode. Otherwise the application runs.

WARNING

Before transferring the application to device, ensure that all network devices are disconnected.

Operation mode is cycle oriented:

- Start (readiness test)
- Update of the input process image (input network variables)
- Running the application
- Update of the output process image (output network variables)
- Back to Start



.Fig. 7.1 Operation start

For error indication see table 7.1.

For Modbus registers see Table 7.2.

Table 7.1 Error indication

Indication	Cause	Remedy
LOGIC Program INVALID	Invalid application	Repair application in ALP
LOGIC Program STOPPED	Application stopped	Start the application using system menu and restart the device

Table 7.2 Modbus registers

Parameter	Data type	Address	Read function	Write function
Network variables	BOOL	0x2000 – 0x2FF0	0x01, 0x02	0x05, 0x0F
	INT16	0x0200 – 0x02FF	0x03, 0x04	0x06, 0x10
Seconds	INT16	0x0400	0x03, 0x04	0x06, 0x10
Minutes	INT16	0x0401	0x03, 0x04	0x06, 0x10
Hours	INT16	0x0402	0x03, 0x04	0x06, 0x10
Day	INT16	0x0403	0x03, 0x04	0x06, 0x10
Month	INT16	0x0404	0x03, 0x04	0x06, 0x10
Year	INT16	0x0405	0x03, 0x04	0x06, 0x10
Weekday	INT16	0x0406	0x03, 0x04	-
Week of month	INT16	0x0407	0x03, 0x04	-
Calendar week	INT16	0x0408	0x03, 0x04	-

7.1 RUN-STOP

In this mode, the execution of the user application is stopped. The RUN-STOP mode can be used to upload a new application to the device. It can be useful if the system menu is unavailable, e.g. the application is corrupted and / or leads to unstable operation.

To activate the RUN-STOP mode, power on the device with the button SEL pressed.

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7.2 Down.Mode

In this mode the firmware update can be forced. This mode is necessary to repair the firmware if the last firmware update was unsuccessful (power outage, transmission error etc.). See ALP Help for further details about firmware update.

To activate the Down.Mode, power on the device with the button ALT pressed.

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8 Maintenance

The maintenance includes:

- cleaning of the housing and terminal blocks from dust, dirt and debris
- checking the fastening of the device
- checking the wiring (connecting leads, fastenings, mechanical damage).

The device should be cleaned with a damp cloth only. No abrasives or solvent-containing cleaners may be used. The safety information in section 3 must be observed when carrying out maintenance.

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9 Transportation and storage

Pack the device in such a way as to protect it reliably against impact for storage and transportation. The original packaging provides optimum protection.

If the device is not taken immediately after delivery into operation, it must be carefully stored at a protected location. The device should not be stored in an atmosphere with chemically active substances.

Permitted storage temperature: -20...+55 °C

▶ **NOTICE**

Transport damage, completeness
The device may have been damaged during transportation.
Check the device for transport damage and completeness!
Report the transport damage immediately to the shipper and akYtec GmbH!

▶ **NOTICE**

Before powering on, make sure that the device was stored at the specified ambient temperature (-20 ... +55 °C) for at least 30 minutes.

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10 Scope of delivery

–	SMI200	1
–	Gasket	1
–	Mounting nut	1
–	Terminal block	1
–	Short guide	1

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