# Quick Guide
# PC SOFTWARE
# S-Config 2

- Version: **2.0.6** or higher
- Designed for Simex devices provided with Modbus RTU



USB

RS-485 / MODBUS RTU
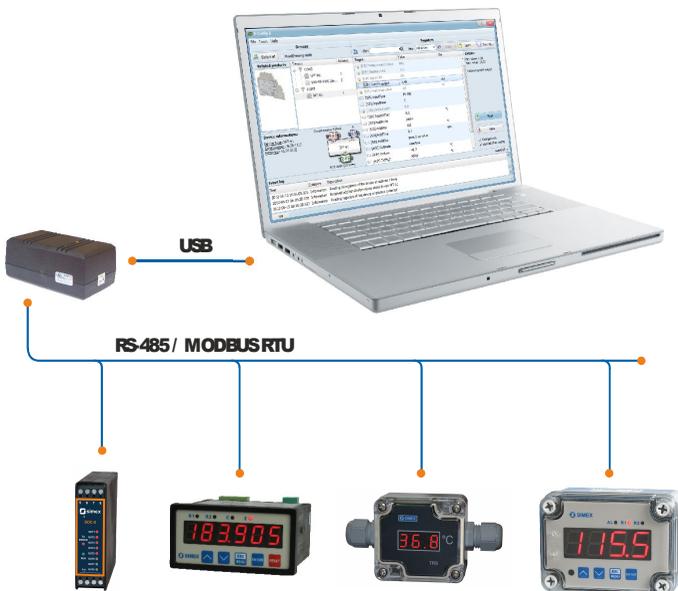
Read the user's manual carefully before starting to use the unit or software.
Producer reserves the right to implement changes without prior notice.

# CONTENTS

### Explanation of symbols used in the manual:

*This symbol denotes especially important characteristics of the software operation. Read any information regarding this symbol carefully.*

*This symbol indicates additional information that may help operate the program.*

# 1. GENERAL CHARACTERISTIC

The S-Config 2 program is used for the simultaneous detection of devices in multiple Modbus RTU networks. Each detected device may return additional information about its parameters, such as its type, what address it is located in the network and the additional parameters displays in the **Device information** (**4**).

In addition to detection devices manufactured by Simex, the program allows user to change the configuration of most of them. If the program can change the configuration of detected device, a list of its registers will show and the user can modify them.

Current list of configurable devices can be displayed from menu *Help > Supported devices... > Configurable devices*.

# 2. GRAPHICAL USER INTERFACE

The program consists of several areas for specific functions. Their explanation is shown on Figure 2.1.
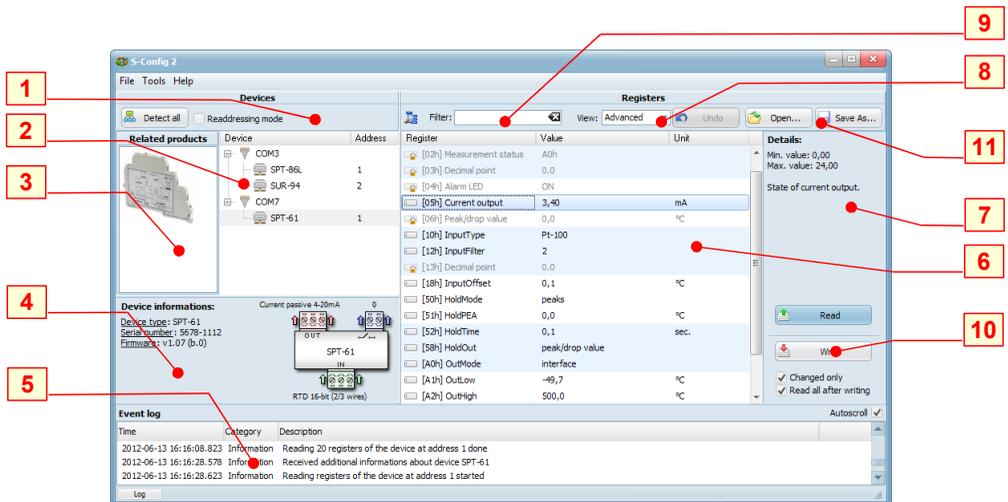


*Figure 2.1. View the program with the division into several areas*

Explanation the numbers from the picture above:

**1** – **Detection of devices** – an area with functions to detect devices simultaneously in many Modbus RTU networks;

**2** – **List of devices** – a list of detected devices with division to the COM ports;

**3** – **List of related products** – contains a list of products associated with selected device;

**4** – **Device information** – provides additional information read from the device;

**5** – **Area of event messages** – allows user to view events of the program;

**6** – **List of registers** – displays a list of registers for the selected device;

**7** – **Register information** – contains details of the selected register;

**8** – **List of views** – used for reduce the visibility of registers on the list **6** by chosen criterion;

**9** – **Filter** – allows user to quickly find a register by narrowing down the list **6** to items contain entered phrase in the name or description;

**10** – **Read/Write registers** – provides functions that allows user to perform read and write operations on the device;

**11** – **Read/Write value templates** – contains functions to perform operations on the value templates of registers (*.scg type files);


## 3. FIRST LAUNCH OF THE APPLICATION

When the program launch first time, the **List of devices** (**2**) contains only serial ports available in the computer. This list contains all COM ports physically located on the PC's motherboard and virtual COM ports created by the driver such as USB/RS-485 converter (Figure 3.1).
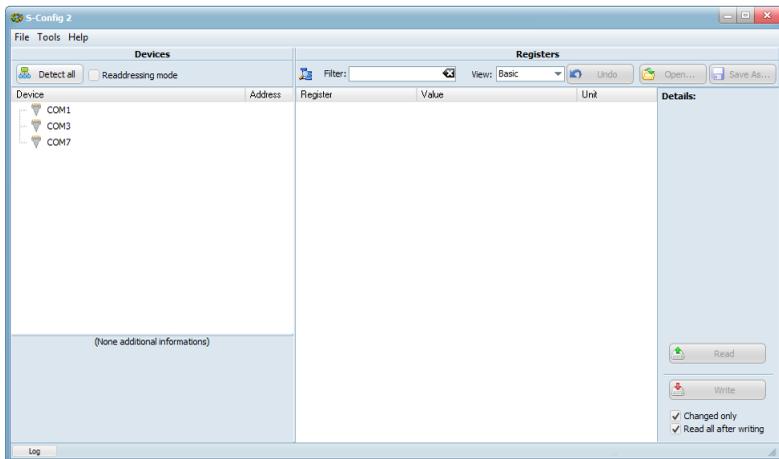


*Figure 3.1. The program state after the first launch*

The program doesn't have information what devices are available at any of the listed ports. The first thing that user should do is to set parameters of the COM ports to be scanned. To do this, go to the settings using the menu *Tools > Settings...*, select the position **Communication**, uncheck unused ports and adjust the parameters of the rest. For more information on port settings see section 10.1. . After completion and apply settings, the program is ready to start searching for devices. This process is discussed in section 4. .

## 4. SCANNING THE NETWORK OF DEVICES

The program has the ability to scan the network of devices in two modes. In detection mode the program searches networks on selected or all displayed COM ports by checking the availability of device at each address and if any is detected, the program will automatically recognize it and add to the list. In the readdressing mode the user can assign unique address in an automatic way to all devices on the network.

Regardless of the selected scan mode, after the completion of this process, the program will create a list of devices that will be saved to the time of next scan. Last saved devices list is also remembered if the program will restart.

### 4.1. DETECTION MODE

This mode allows the user to find all devices in one or more networks by scanning each address of Modbus RTU protocol. In order to accelerate the network scanning, this process is done independently for each COM port. The range of addresses that will be tested, user can specify in the settings described in section 10.2. . Regardless of settings, devices with addresses FEh (254) and FFh (255 or 0) are always tried to discover.

To start detection of devices on all available COM ports, click **[Detect all]** button (Figure 4.1).



*Figure 4.1. Detection of devices in multiple networks simultaneously*

It is also possible to detect devices on the selected port only. To do this, click one of the ports on the list, open its context menu and click **[Start detection**] command.

All detected devices are automatically saved. If some devices were not detected, it may mean that responses that they sends reach to the program too late, so user can try to increase the time for response of the quick detection or completely disable it. For detailed description of this feature see section 10.2. .

## 4.2. READDRESSING MODE

In this mode user can assign unique addresses to all devices on the network in the automatic way (Figure 4.2).



*Figure 4.2. List of devices during readdressing mode*

In this mode the program automatically searches devices on the network at FFh address. Once such a device is detected, program automatically assign it a new address. The program is not checking existing addresses and set them one by one of the range **Address range** specified in the settings (see section 10.2. ). For devices, where there is a possibility to set the address using its configuration menu (e.g. SIMPACT series devices), should set it to FFh (255) and wait until S-Config 2 detects such device. If it is impossible to set the device address to FFh, it can also achieved by set the address 00h. Once detected one device, the program is ready to detect another on FFh (or 00h) address. User must ensure that no more than one device at a time has address FFh (or 00h). Otherwise, none of the devices is detected and in extreme cases it can lead to damage their RS-485 interfaces.

Devices that don't have the keyboard, should have a special button that allows user to force set FFh address. Brand new devices of this type have set FEh address, which protects them from the automatic readdressing.

To readdress such device user must:
1. set the device in detection mode by pressing and holding for a few seconds (until LED lights up) button to force the address;
2. then release the button;
3. after about 1 second, that button was released, the device should return to its normal mode (running state) with new assigned address.

## 5. RELATED PRODUCTS

If computer is connected to the Internet and was selected one of the devices on the list, it will show a panel containing a list of related products (Figure 5.1).
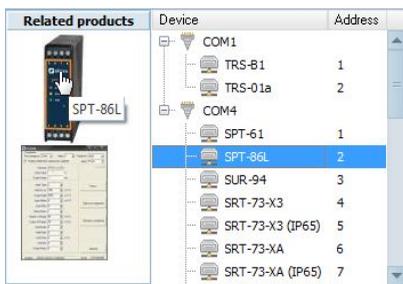


*Figure 5.1. List of related products*

These products relate to selected device and are products of the same type or cooperating products. Information about products is downloaded from the manufacturer's website. By clicking on the selected product, user can open informative web page with downloadable resources like manuals, software updates, etc. The language of the opened page depends on the settings of the manufacturer's website.

## *6. DEVICE INFORMATION*

Some devices can provide detailed information about their properties.

This information are in particular:

- device type
- serial number
- firmware version
- type of inputs
- type of outputs
- number of relays

If the device supports this information, it can be found in the **Product Information** area (**4**) (Figure 6.1).
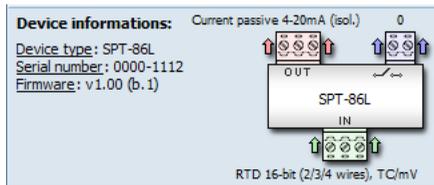


*Figure 6.1. Additional information returned by the device*

## *7. AREA OF EVENT MESSAGES*

Any information that the program doing are printed in the **Area of event messages** (**3**). This makes possible to identify any problems and anomalies in communication with devices. By default, this area is hidden. To show it, user can click the **[Log]** button on the lower left area of the program (Figure 7.1).



*Figure 7.1. Area of event messages*

If appears an event that requires the user attention, such as communication error, this area will show automatically.

Information appearing here are also saved into the "EventLog.txt" file, which is located in the main directory of the program.

# 8. THE LIST OF REGISTERS

After the network scan, user can select one of detected devices. If there is a device for which the program can change its configuration, that after selected it, the S-Config 2 program tries automatically read its current values of registers (Figure 8.1). This process may take a while because the program must read values of all registers available for the device, but later writing changes entered by the user may affect modified registers only, what is much faster process.
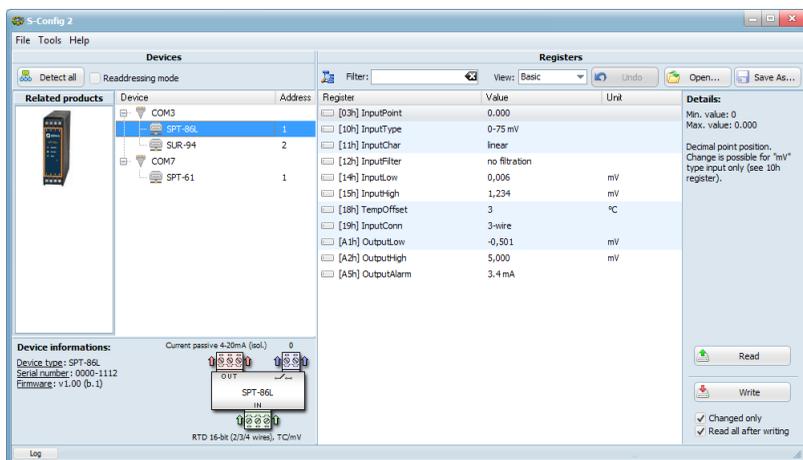


*Figure 8.1. List of registers and their values read from the selected device*

Each of the displayed register consists of a short name, which may include a register number compatible with the manual of the device. Displaying these numbers can be turned off from the program settings (see section 10.3. ). Besides the name, each register has a current value and unit. When the user selects any of them, he will see more detailed information, such as the scope for value changes and more extensive description of the function which it serves. It appears in the **Register information** (**7**).

## 8.1. THE LIST OF REGISTERS VIEWS

Devices often contain quite large number of registers. Most of them are rarely used. To help user set-up, the program has the ability to hide displaying much advanced registers or registers with other criteria. This is done by using the **List of views** (**8**).(Figure 8.2).
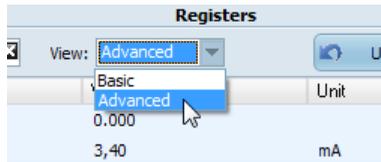
*Figure 8.2. The list of registers views*

The list of views contains predefined criteria which registers are displayed. The user can't define its own views.

## 8.2. SEARCHING REGISTERS

In order to easily find registers of interest to user, a program can narrow the list to only registers that contain typed phrase. Searching is done in the names of registers and their descriptions. The size of typed characters in the **Filter** field doesn't matter (Figure 8.3).
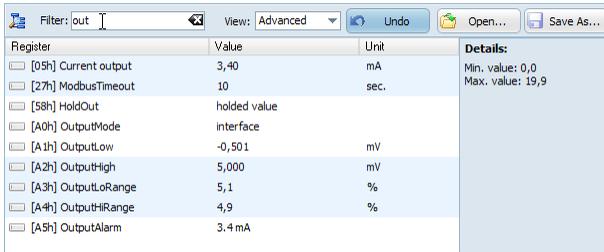


*Figure 8.3. Example of display registers which contain the "out" phrase*

## 8.3. CHANGING THE REGISTER VALUE

To modify the value of register user should click inside the **Value** column. This will open specific editor different for various types of registers (Figure 8.4).
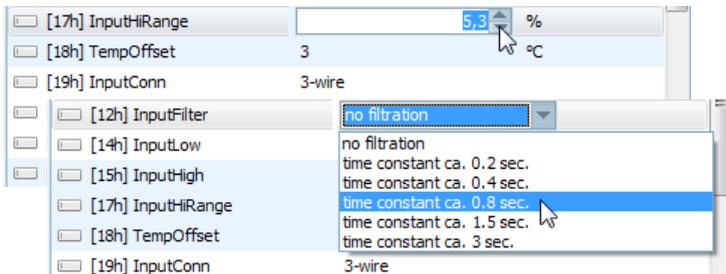


*Figure 8.4. Different editors for various types of registers*

Values possible to set are depending on the selected register. During modification of numerical values by using the keyboard, should pay attention to the possible range of changes, which is shown in the **Register information** (**7**).

If the register value is modified, the program changes its texts format. If user makes many changes and he change his mind, the program gives him possibility to restore them by clicking **[Undo]** button. Undo function works until the next read or write registers to the device.

## 8.4. READING FROM THE DEVICE

To read the entire device configuration in the form of the values of its registers, click the **[Read]** button located in the **Read/Write registers** (**3**) area (Figure 8.5). Executing this command will update values of all registers in the program regardless they are visible or not. Between values in various registers there are software connections and because to maintain their full synchronization, is not possible to read only selected ones.

*Figure 8.5. Reading values of registers from the device*

## 8.5. WRITING TO THE DEVICE

After modify values of selected registers, changes can be saved to the device. This can be done by clicking the **[Write]** button located in the **Read/Write registers** (**3**) area (Figure 8.6).
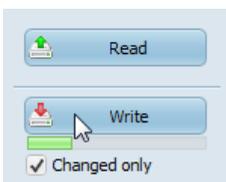
*Figure 8.6. Writing changed values of registers to the device*

Unchecked **Changed only** option cause that values of all registers will write to the device, regardless they have changed or not. Unchecking this option is especially useful if user wants to configure multiple devices of the same type using prepared template without read every time current values of every device. More information about templates of values can be found in section 9. .

Checking **Read all after writing** causes reading current values of all registers of the device after each write. This option is especially useful when the change of value in one register can affect on values in other registers.

## 9. TEMPLATES OF REGISTER VALUES

The S-Config 2 program supports templates of register values. This feature allows to save the device configuration as files from which user can quickly restore the registers settings at any time for the selected device. Access to management of templates can be obtained from the **Read/Write value templates** (**11**) area.

Template files have the \*.scg extension and are compatible with templates supported by the "SMConfig" program. It is convenient because if user has already made templates in this program, he can use them to modify registers of the device in the S-Config 2.

### 9.1. SAVING TO THE TEMPLATE

If user makes appropriate changes in registers of the device and would like to keep these values for the future, it can be done by saving the current state of registers as a template of values.

To do this, click the **[Save...]** button. A dialogue box appears for specify the template name and location to save it. Template name is suggested by the program and includes the device type and the date and time of saving, what protects user against accidental overwriting existing file.

> ⓘ  Automatically adding the date and time part to the filename can be disabled in the program settings (see section 10.4. ).

> ⚠  In the template are stored values of all registers that can be changed on the device, regardless that at the time of writing are shown on the list or not. It's also not required to write changes to the device before saving to the template file. Appropriate modifications of registers will be included.

### 9.2. READING FROM THE TEMPLATE

Register values of the selected device can be restored from previously saved or prepared template (see section 9.3. ). Register values loaded from the file are applied to the current displayed values.

### 9.3. STRUCTURE OF THE TEMPLATE

Templates created by the S-Config 2 are in the text format and can be modified in any text editor such as Notepad. A single file relates to a single device. General, the structure of the file consists of comments, register numbers and values assigned to them. Construction of sample template is shown in Figure 9.1, where comments are marked in green and numbers and values of the registers are marked in red.
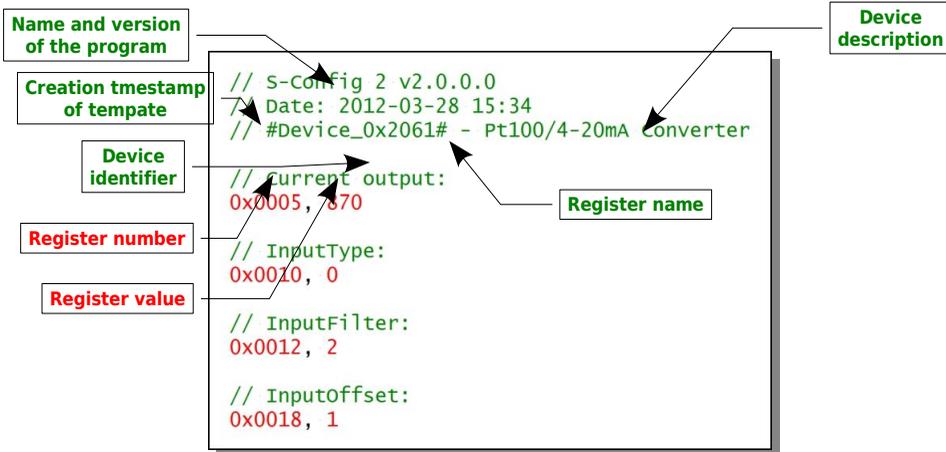
*Figure 9.1. Content of \*.scg file type created by S-Config 2*

From the perspective of read the template by the program, are important only rows with red values. Additionally is checked the device ID (if any exists) to alert the user when he try to open a template intended for another device.

Comments in the file may appear as separate lines or at the end of the line with data. Comment always begin with a double character "/" (slash) and is valid until the end of line.

Register number, comma and the register value are one command to execute. Any spaces between these elements are ignored. In one line can be at most one command.

Both – numbers of registers and their values – can be written in one of three formats:

- decimal: 1, 3, 35, 43975, 31886
- hexadecimal: 0x001, 0x3, 0x23, 0xABC7, 0x7c8E
- binary: 0b0001, 0b11, 0b100011, 0b1010101111000111, 0b0111110010001110

Below, there are some examples of lines in the \*.scg file type, which user can create himself, and then load the template to any device.

```
// This is an example of comment line
0x0010,1 // write 1 to the register 16 (10h)
0x0011,0x12 // write 18 (12h) to the register 17 (11h)
0x00A,0b11 // write 3 (11b) to the register 10 (0Ah)
```

During reading such file, the program will check each register number defined in the template and update only those values to registers, that occur in the target device.

## 10. PROGRAM SETTINGS

To adapt the program to the user needs, can enter to the program settings using the menu *Tools... > Settings...*. The settings window consists of several separate logical groups, which are discussed in subsections.

### 10.1. COMMUNICATION

In **Communication** group can be found settings of the COM ports parameters used by the program (Figure 10.1).
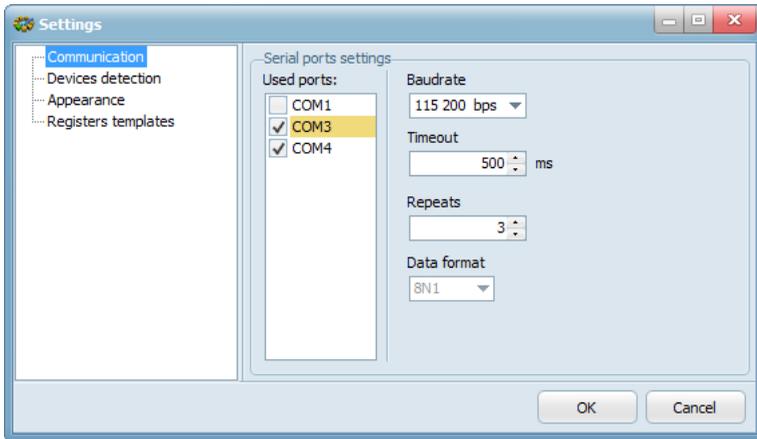


*Figure 10.1. Program settings – **Communication** group*

The **Used ports** list contains all available ports in the PC. Ports which are checked, will be used by the program. Each of them can have individual settings, such as:

- **Baudrate** – defines the speed of communication with devices on the network. Devices with set different speed will not be detected and configure them will not be possible.
- **Timeout** – the waiting time for a device response. In the case of devices detection may be replaced by setting **Quick detection of devices** discussed in section 10.2. .
- **Repeats** – the number of retries that the program should do if an error occurs in communication with a device.
- **Data format** – specifies a frame format of the data used for communication. This parameter is for information only.

### 10.2. DEVICES DETECTION

In **Devices detection** group can be found settings on various subjects of the program (Figure 10.2).
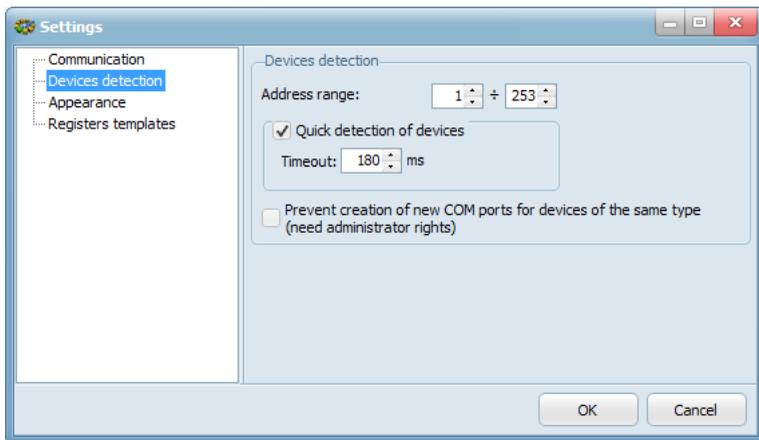
*Figure 10.2. Program settings – **Devices detection** group*

**Devices detection** section responsible for settings related to the detection of devices. You can find here the following settings:

- **Address range** – Specifies the range of Modbus RTU addresses to be tested during searching devices or will be used for automatic readdressing.

- **Quick detection of devices** – Enabling this option causes that the time for response the device in detection mode will be reduced to a fixed timeout set in the field below. This setting ignores some parameters of the COM port, such as the number of repeats (**Repeats**) and waiting for response (**Timeout**). Number of repeats will be fixed to 1. Set the proper response time affects for the speed of network scanning. If this time is too short, it may happen that not all devices are detected and in extreme cases nothing. The user should then increase the timeout or disable this option.

- **Prevent creation of new COM ports for devices of the same type** – When the user connects to the computer a new USB device or change its USB port, the system will recognize it as a device that had not been installed previously and will run the installation wizard of new drivers. It creates a new virtual COM port. Sometimes there is a need to configure in S-Config 2 multiple USB devices, one after the other, which creates a virtual COM port (e.g. SPT-61), installing drivers and create a new port number for each of them would be tedious. Checking this option causes the driver will be installed for the first device only.

Use this option carefully and only temporarily. Checking it cause lack of using multiple USB devices of the same type connected to a computer at the same time For example, several converters USB/RS-485 will be seen by the same number of virtual COM port, which can cause unexpected errors in communication or operation only one of them.

## 10.3. APPEARANCE

In the **Appearance** group can be adjust the settings of how to display the program elements (Figure 10.3).
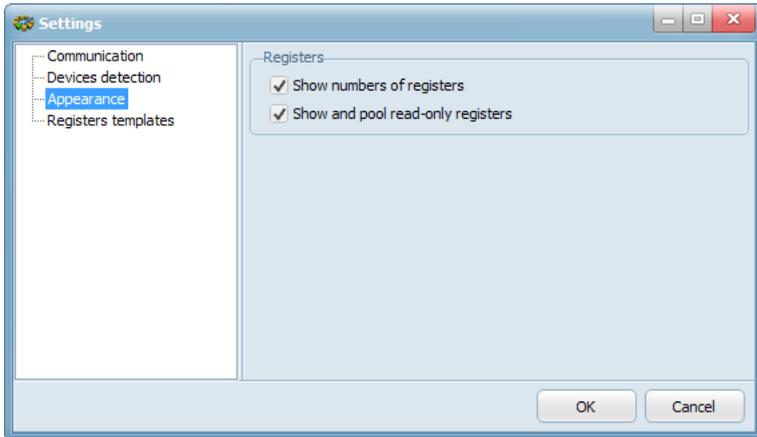


*Figure 10.3. Program settings – **Appearance** group*

The **Registers** section contains settings that affect appearance of the **List of registers** (**6**):

- **Show the numbers of registers** – turns on/off displaying of register numbers inside their names on the list of registers. If the user rarely reaches for the device manual, displaying the numbers of registers may be unnecessary, so they can be hidden.
- **Show and pool read-only registers** – enabling this option adds read-only registers to the list. Typically, the configuration does not necessary to display this type of registers. Adding them to the list causes increase of time to read the configuration from the device.

## 10.4. REGISTERS TEMPLATES

**Registers templates** group contains settings for templating register values (Figure 10.4) discussed in section 9. .
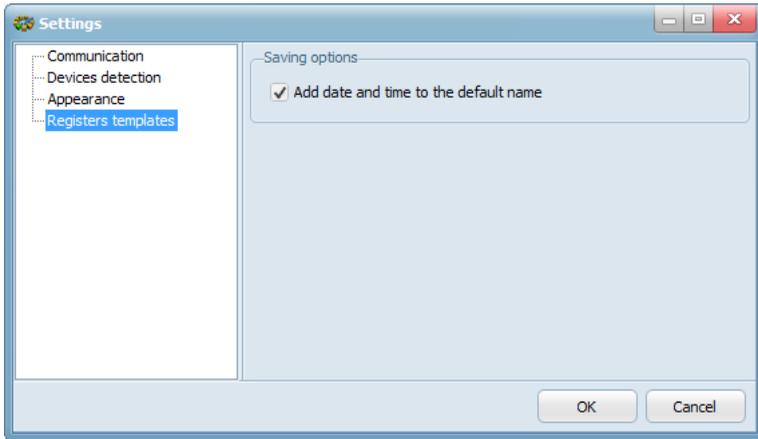


*Figure 10.4. Program settings – **Registers templates** group*

There is a setting **Add date and time to the default name**. Checking it causes, that during saving a template file, the current date and time will be appended to the suggested name. This option is useful when the user wants to create unique configurations and protects against accidental overwriting existing one.

### *System requirements:*

- Operating system: Windows XP (32-bit) or later
- processor Pentium/AMD 600 MHz or faster
- 128 MB of RAM or more
- 50 MB or more free disk space
- monitor with min. resolution SVGA (800x600)
- CD-ROM or DVD-ROM
- keyboard and pointing device (e.g. mouse)
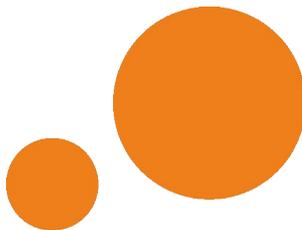
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