

# User Manual

## Connection to 3S serial

Part Number: 80 860.631

Version: 2

Date: 25.11.2005

Valid for: TSwin .net 4.0x  
TSwin .net 4.1x

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| <b>Version</b> | <b>Date</b> | <b>Modifications</b>                                 |
|----------------|-------------|--|
| 1              | 04.07.2005  | First edition  |
| 2              | 25.11.2005  | Validation extended, chapter "Important Notes" added |

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# 1 Important Notes

## 1.1 Symbols

The symbols in this manual are used to draw your attention on notes and dangers.



### **Danger**

This symbol is used to refer to instructions which, if ignored or not carefully followed could result in personal injury.



### **Note**

This symbol indicates application tips or supplementary notes.



### **Reference to source of information**

This symbol refers to detailed sources of information on the current topic.

## 1.2 Safety Notes

- Read this manual carefully before using the operating device. Keep this manual in a place where it is always accessible to all users.
- Proper transportation, handling and storage, placement and installation of this product are prerequisites for its subsequent flawless and safe operation.
- This user manual contains the most important information for the safe operation of the device.
- The user manual, in particular the safety notes, must be observed by all personnel working with the device.
- Observe the accident prevention rules and regulations that apply to the operating site.
- Installation and operation must only be carried out by qualified and trained personnel.

## 1.3 Intended Use

- The device is designed for use in the industry.
- The device is state-of-the-art and has been built to the latest standard safety requirements. However, dangerous situations or damage to the machine itself or other property can arise from the use of this device.
- The device fulfills the requirements of the EMC directives and harmonized European standards. Any modifications to the system can influence the EMC behavior.

## 1.4 Target Group

All configuration and programming work in connection with the automation system must be performed by trained personnel only (e.g. qualified electricians, electrical engineers).

The configuration and programming personnel must be familiar with the safety concepts of automation technology.

## 2 3S serial

The protocol provides random read and write access to all global data objects of the controller.

The programming software adopts the data objects of the project\_name.SYM file which are created when the CoDeSys project is compiled.

The connected operating device uses the symbolic name to access a data object.

### 2.1 Data Types

The length of a variable is determined by the length defined in the programming software CoDeSys.

#### 2.1.1 Single Variables

You can access variables of the following type: BOOL, BYTE, WORD, DWORD, SINT, INT, DINT, USINT, UINT, UDINT, REAL, and STRING. Floating point numbers are interpreted in IEEE format. The variable type REAL is required for this purpose.

#### 2.1.2 String Variables

For string variables, the variable type STRING(N) is used, where N is the length of the string.

### 2.2 Programming

#### 2.2.1 Protocol Parameters

With the protocol parameters, you can adapt the communication of the controller used.

##### 2.2.1.1 Baud Rate

This parameter specifies the communication rate.

Table 2-1 Baud rate

| Configurable Values (Baud) | Default Value |
|----------------------------|---------------|
| 4800                       |               |
| 9600                       |               |
| 19200                      |               |
| 38400                      | X             |

**2.2.1.2 Parity**

This parameter specifies the parity used to control the communication.

Table 2-2 Parity

| Configurable Values | Default Value |
|---------------------|---------------|
| None                | X             |
| Even                |               |
| Odd                 |               |

**2.2.1.3 Data Bits**

This parameter specifies the number of data bits.

Table 2-3 Data bits

| Configurable Values | Default Value |
|---------------------|---------------|
| 5                   |               |
| 6                   |               |
| 7                   |               |
| 8                   | X             |

**2.2.1.4 Stop Bits**

This parameter specifies the number of stop bits.

Table 2-4 Stop bits

| Configurable Values | Default Value |
|---------------------|---------------|
| 1                   | X             |
| 1.5                 |               |
| 2                   |               |

**2.2.1.5 Waiting Time for Response**

Specify a waiting time for the Produced Data toggle bit monitoring.

Table 2-5 Waiting time for response

| Configurable Values     | Default Value |
|-------------------------|---------------|
| 0 ms, 50 ms to 65000 ms | 500 ms        |

**2.2.1.6 Delay until Connection Set-Up**

This parameter specifies the waiting time after which the operating device starts the communication.

Table 2-6 Delay until connection set-up

| Configurable Values | Default Value |
|---------------------|---------------|
| 5 s to 255 s        | 5 s           |

### 2.2.1.7 Byte Order

This parameter specifies the destination hardware's CPU type.

Table 2-7 Byte order

| Configurable Values | Default Value |
|---------------------|---------------|
| Intel               | X             |
| Motorola            |               |

### 2.2.1.8 Controllers

This parameter specifies the runtime system of the controller.

Table 2-8 Controllers

| Configurable Values | Default Value |
|---------------------|---------------|
| 16 Bit System       |               |
| 32 Bit System       | X             |

### 2.2.1.9 Path for Variable List \*.sym

This parameter specifies the directory in which the variable list \*.sym is stored.

To select a directory, click the Browse button.

The variable list \*.sym is created by the programming software **CoDeSys** when compilation takes place.

## 2.2.2 Polling Area

The poll area is used to manage the write coordination byte (WCB), the serial message channel and the LEDs in the function keys. This area is continuously polled by the operating device.

This protocol requires you to set up the poll area with three single variables.

## 2.2.3 Status Messages

Status messages are the static assignment of flags (bits) in the controller to plain text messages in the operating device. For status message addressing, use the data types ARRAY[1..N] OF BYTE or ARRAY[1..N] OF WORD.

Table 2-9 Length of the message system in bytes

| Data Type     | Length of the Message System in Bytes |
|---------------|---------------------------------------|
| ARRAY OF BYTE | N                                     |
| ARRAY OF WORD | N x 2                                 |

## 2.2.4 Date and Time

The variables for synchronizing the time and date must use the data type ARRAY [1..N] OF BYTE.

Table 2-10 Byte lengths for the date and time

| Variable                 | Length  |
|--------------------------|---------|
| Date with a 2-digit year | 3 Bytes |
| Date with a 4-digit year | 4 Bytes |
| Time                     | 3 Bytes |
| Weekday                  | 1 Byte  |

## 2.2.5 Variant Buffer

The variable for the variant buffer must use the data type BYTE or USINT.

## 2.2.6 Tables

The variable for representation of tables must use the data type ARRAY [1..N]. The ARRAY [1..N] has to be of one of the following base data types:

- BOOL,
- BYTE,
- WORD,
- DWORD,
- SINT,
- INT,
- DINT,
- USINT,
- UINT,
- UDINT,
- REAL or
- STRING.

## 2.2.7 Physical Connection

Plug-in connectors on the operating device for connection to the controller.

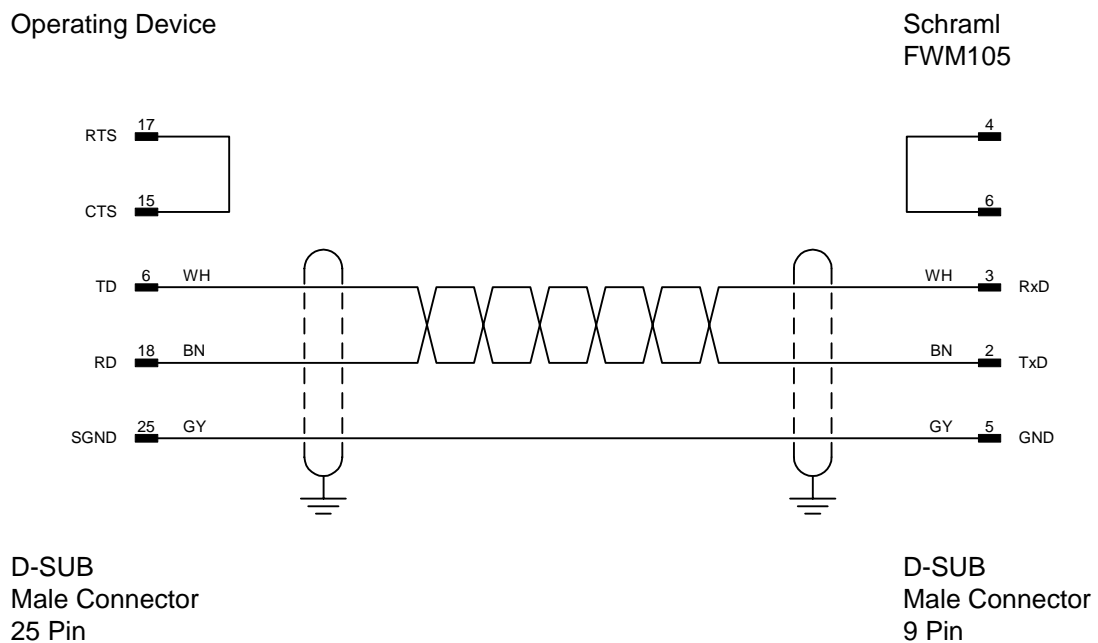
### 2.2.7.1 Pin Assignment for Operating Devices with an Universal Interface

Table 2-11 Pin assignment RS232

| Pin | Designation | Function         |
|-----|-------------|------------------|
| 6   | TD          | Transmitted Data |
| 15  | CTS         | Clear to send    |
| 17  | RTS         | Request to send  |
| 18  | RD          | Received data    |
| 25  | SGND        | Signal Ground    |

### 2.2.7.2 Cable SER1 RS232 - Schraml PLC FWM105

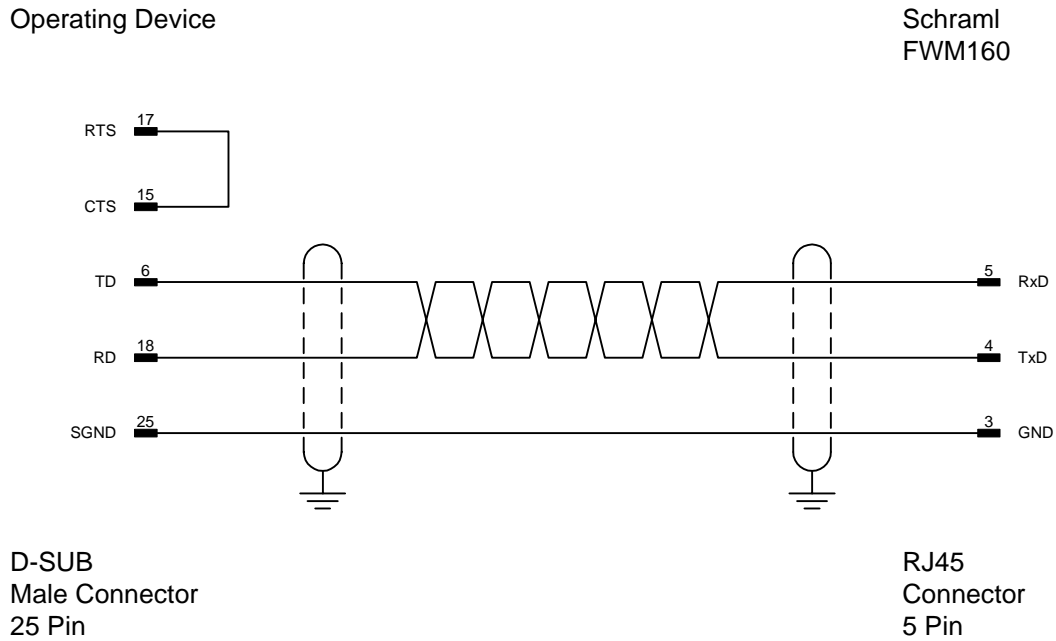
The following cabling diagram applies to operating devices with an universal interface **only**.



Both ends of the shield are connected to the metallic housing.

**2.2.7.3 Cable SER1 RS232 - Schraml SPS FWM160**

The following cabling diagram applies to operating devices with an universal interface **only**.



Both ends of the shield are connected to the metallic housing.

## 2.3 Error Messages

Error messages are displayed on the operating device along with a code and sub-code. Error messages are composed as follows:

Communication Error

Code           XXXXX

Subcode       XXXXX

Retries        XXXXX

Table 2-12 Error messages for 3S serial

| Code | Subcode | Error Type                         | Possible Cause  |
|------|---------|------------------------------------|---|
| 50   | 03      | Framing error on serial interface  |   |
|      | 05      | CRC error on serial interface      |   |
|      | 06      | Parity error on serial interface   |   |
| 60   | 10      | Wrong telegram length              |   |
|      | 20      | Wrong telegram Ident Number        |   |
|      | 30      | Wrong block number                 |   |
|      | 40      | Wrong checksum                     |   |
|      | 50      | Negative acknowledgement           |   |
|      | 60      | Waiting time exceeded: No response | Cable interruption,<br>connection cut-off,<br>wrong baud rate |
| 70   |         | Error from the controller          |   |

## 2.4 Applications

### 2.4.1 CoDeSys Version 2.2 or Higher

The programming software takes the global variables from the symbol file project\_name.SYM and inserts them into the variable list.

The symbolic names cannot be longer than 80 characters.

The entries in the variable list cannot be modified.

#### 2.4.1.1 Declaring Global Variables

To declare global variables in CoDeSys:

1. Select **Auto Declare** from the **Edit** menu.

The **Declare Variable** dialog opens.

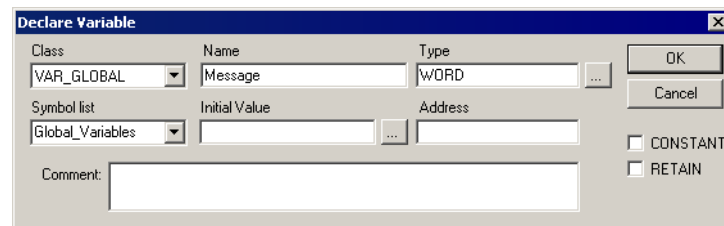


Figure 2-1 Example of a variable declaration for global variables

2. Select the VAR\_GLOBAL class from the **Class** field.
3. Enter a name (Message) and a type (WORD).
4. Repeat step 3 for all additional global variables.
5. Click **OK** to confirm your input.

The **Global\_Variables** window opens.

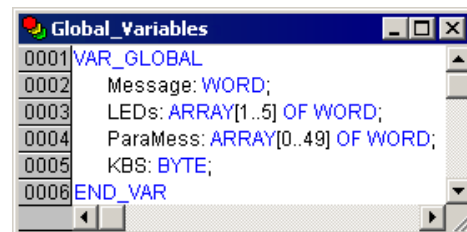


Figure 2-2 Window Global variables

#### 2.4.1.2 Activate Output into Symbol File

Specify the following settings in CoDeSys to write the global variables into a symbolic file.

1. Select **Options** from the **Project** menu.
2. Select **Symbol configuration**.

The **Options** dialog will look as follows:

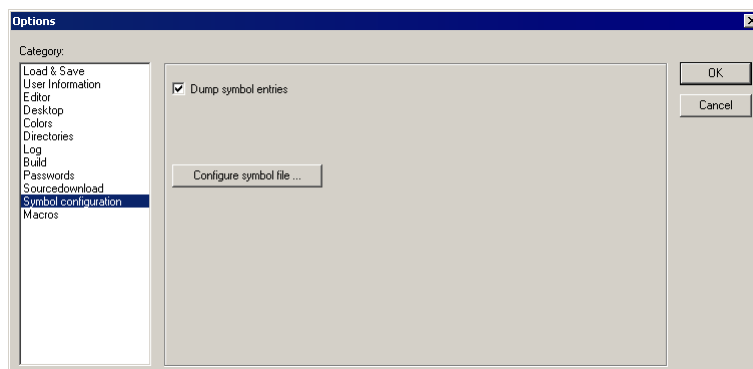


Figure 2-3 Dialog Options - symbol configuration

3. Select the **Dump symbol entries** check box.
4. Click the **Configure symbol file** button.

The **Set object attributes** window opens.

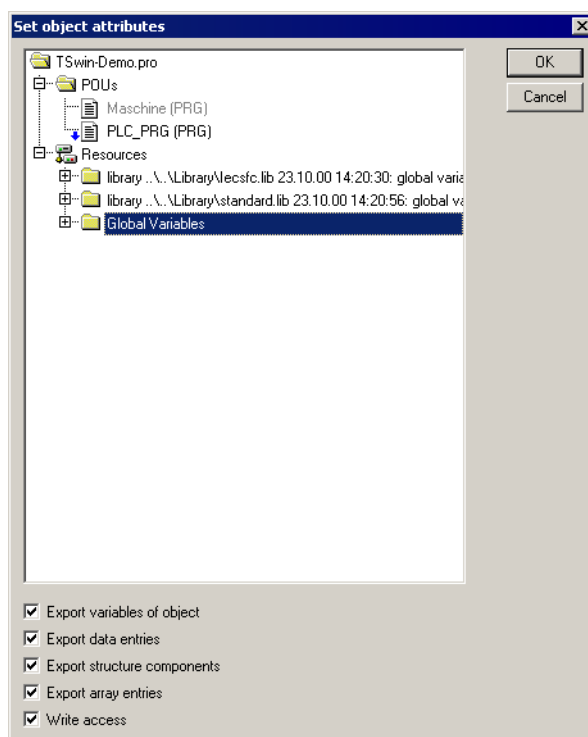


Figure 2-4 Dialog Set object attributes

5. Select the **Global variables** entry.
6. Click **OK** to confirm your selection.

You are returned to the **Options** dialog.

Now you need to specify the position where the symbol file is to be stored.

1. Select **Directories** from the **Options** dialog.

The **Options** dialog will look as follows:

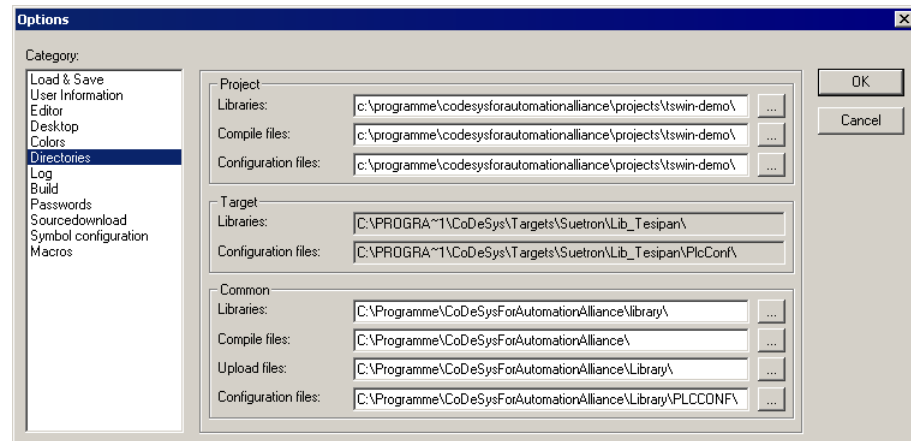


Figure 2-5 Dialog Options - directories

2. From the **Project** area, select a directory for the **compile files**.
3. Click **OK** to confirm your selection.

You are returned to the **Options** dialog.

The symbol file will not be created until a compilation process takes place and is stored in the same directory as the project!

### 2.4.1.3 Target System Settings

Select the following settings for the target system to ensure the symbol file is sent to the target system:

1. Open the **Resources** tab.
2. Double-click **Target settings**.

The **Target settings** dialog opens.

3. Open the **General** tab.
4. Select the **Download Symbol File** check box.

The **Target settings** dialog might look like the example below:

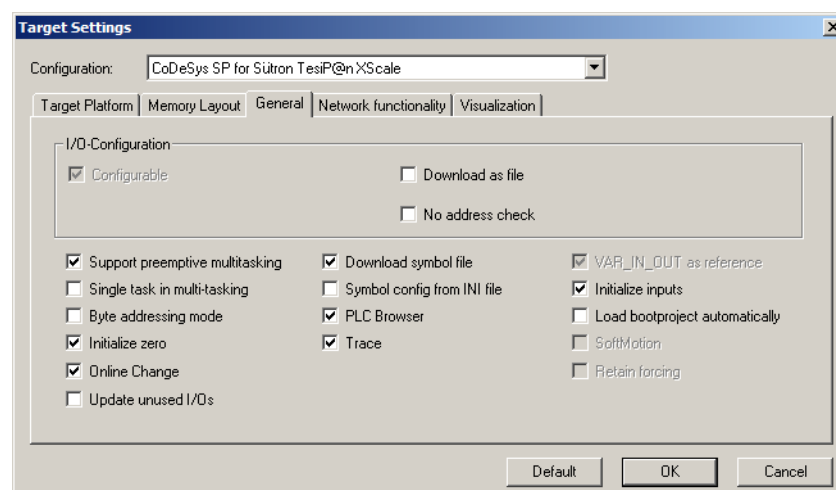
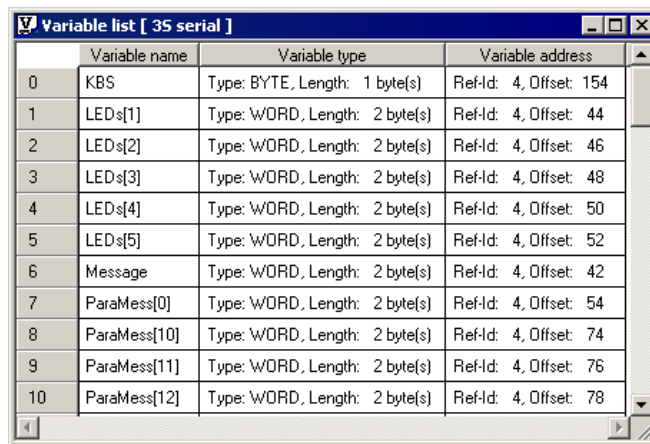


Figure 2-6 Dialog Target settings

#### 2.4.1.4 Variable List

The programming software automatically places the symbolic variable entries created in the example into the variable list if you specified the correct directory and name in the communications parameters.



|    | Variable name | Variable type                 | Variable address       |
|----|---------------|-------------------------------|------------------------|
| 0  | KBS           | Type: BYTE, Length: 1 byte(s) | Ref-Id: 4, Offset: 154 |
| 1  | LEDs[1]       | Type: WORD, Length: 2 byte(s) | Ref-Id: 4, Offset: 44  |
| 2  | LEDs[2]       | Type: WORD, Length: 2 byte(s) | Ref-Id: 4, Offset: 46  |
| 3  | LEDs[3]       | Type: WORD, Length: 2 byte(s) | Ref-Id: 4, Offset: 48  |
| 4  | LEDs[4]       | Type: WORD, Length: 2 byte(s) | Ref-Id: 4, Offset: 50  |
| 5  | LEDs[5]       | Type: WORD, Length: 2 byte(s) | Ref-Id: 4, Offset: 52  |
| 6  | Message       | Type: WORD, Length: 2 byte(s) | Ref-Id: 4, Offset: 42  |
| 7  | ParaMess[0]   | Type: WORD, Length: 2 byte(s) | Ref-Id: 4, Offset: 54  |
| 8  | ParaMess[10]  | Type: WORD, Length: 2 byte(s) | Ref-Id: 4, Offset: 74  |
| 9  | ParaMess[11]  | Type: WORD, Length: 2 byte(s) | Ref-Id: 4, Offset: 76  |
| 10 | ParaMess[12]  | Type: WORD, Length: 2 byte(s) | Ref-Id: 4, Offset: 78  |

Figure 2-7 Variable list

This makes the variables globally available in the programming software.



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Sütron electronic GmbH  
Kurze Straße 29  
D-70794 Filderstadt  
Phone: 0049 711 / 77098-0  
Fax: 0049 711 / 77098-60  
E-mail: [doku@suetron.de](mailto:doku@suetron.de)  
Internet: [www.suetron.com](http://www.suetron.com)

