User Manual

Connection to 3S symbolic

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	TSwin .net 4.1x

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Version	Date	Modifications
1	04.07.2005	First edition
2	25.11.2005	Validation extended, chapter "Important Notes" added

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Overall Table of Contents

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 wich, if ignored or not carfully 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 person-nel 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 per-sonnel.

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 re-quirements. 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 Euro-pean standards. Any modifications to the system can influence the EMC behav-ior.

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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.

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2   3S symbolic

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

This parameter specifies how long the operating device waits for a response from the PLC.

Table 2-5   Waiting time for response

Configurable Values	Default Value
100 ms to 25500 ms	1000 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

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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	
Motorola	X

2.2.1.8 Controllers

This parameter specifies the runtime system of the controller.

Table 2-8   Controllers

Configurable Values	Default Value
Standard	X
PLCWinNT	

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.

Table 2-9   Data types for the poll area

Area	Valid Data Types
KBS (write coordination byte)	BYTE, USINT, WORD, UINT
Message Channel	WORD, UINT
Function Key LEDs	BYTE, USINT, WORD, UINT, DWORD, UDINT, ARRAY[1..N]

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 BYTE, USINT, WORD, UINT, DWORD, UDINT, or ARRAY[1..N]. The following applies when using ARRAY: The type size multiplied by N provides the size of the message system in bytes.

2.2.4 Date and Time

The variables for synchronizing the time and date must use the data types USINT or 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
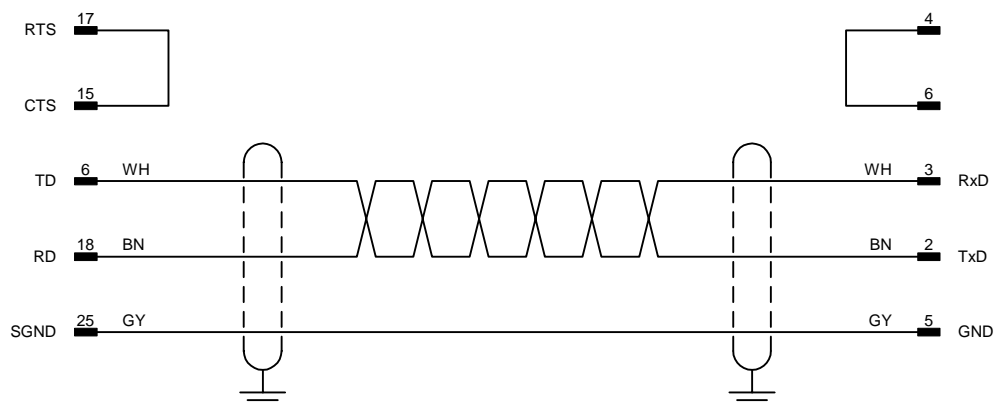
Table 2-11   Pin assignment RS232

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**.

Operating Device   Schraml
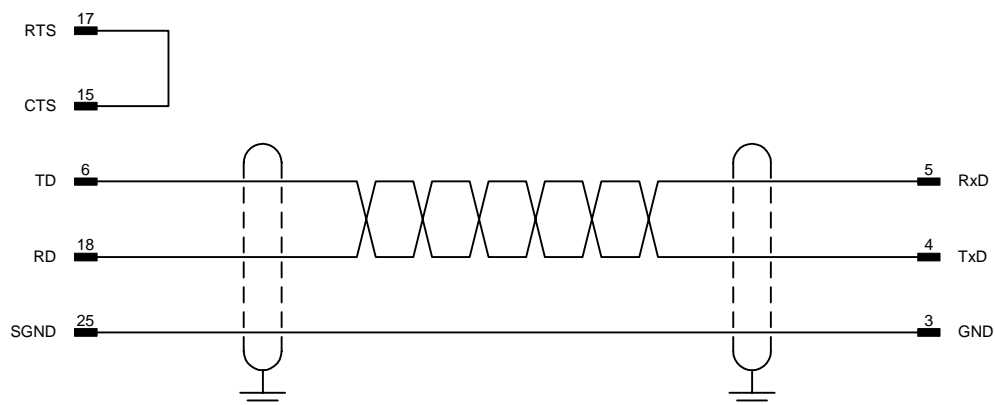   FWM105

D-SUB   D-SUB
Male Connector   Male Connector
25 Pin   9 Pin

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**.

Operating Device   Schraml
                                                                                       FWM160

D-SUB   RJ45
Male Connector   Connector
25 Pin   5 Pin

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 symbolic

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	
	10	Poll area error	No poll area defined
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, connection cut-off, wrong baud rate
70		Error from controller	
	50	No service	Wrong service code
	51	No variable list	Variable list in controller is missing
80	20	Variable types not the same	Recompile the project using the current symbol file and reload it into the operating device.
	30	Invalid symbol	
	40	Waiting time exceeded	There is no valid symbol list in the controller.Specify a higher value for Delay until Connection Set-Up

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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:

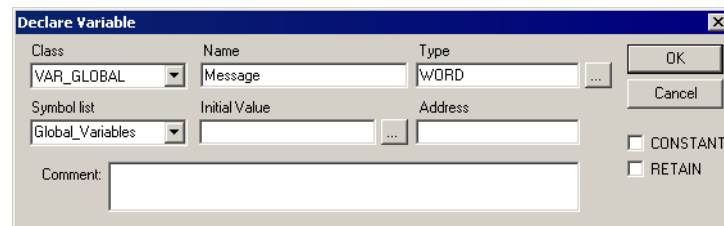1. Select **Auto Declare** from the **Edit** menu.

The **Declare Variable** dialog opens.

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

2. Select the VAR_GOBAL 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.
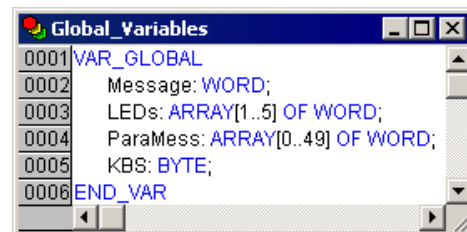
The **Global_Variables** window opens.

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**.

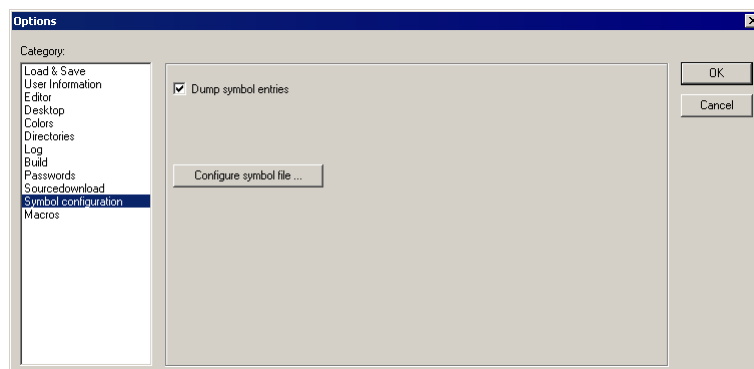The **Options** dialog will look as follows:

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.
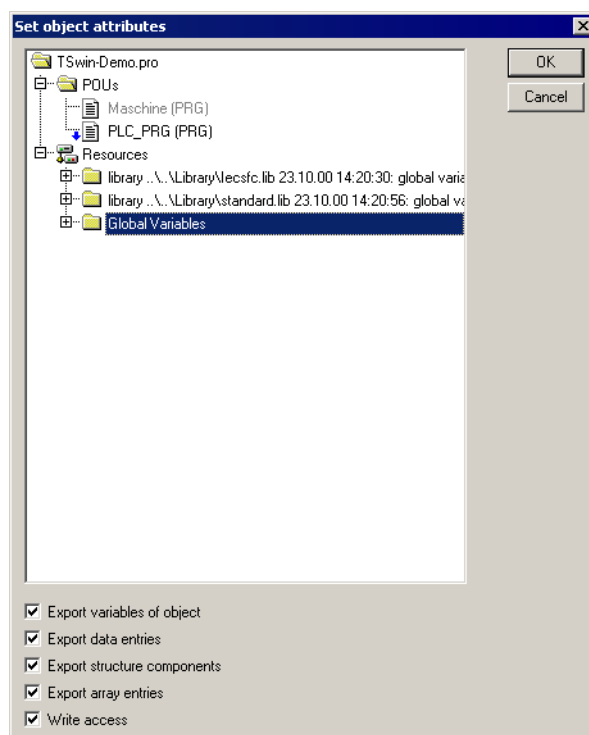

Figure 2-4   Dialog Set object attributes

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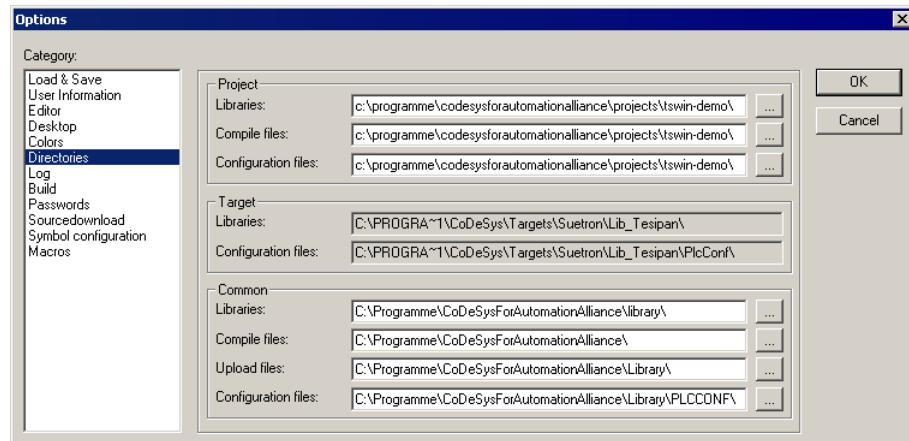
The **Options** dialog will look as follows:

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.

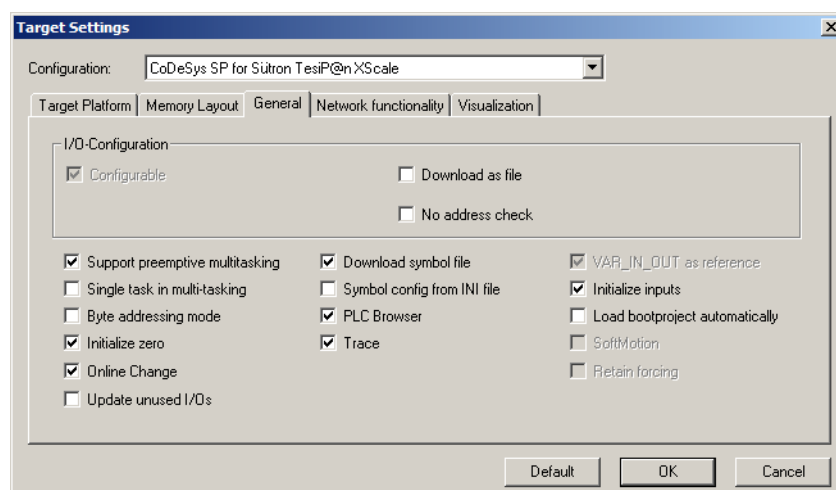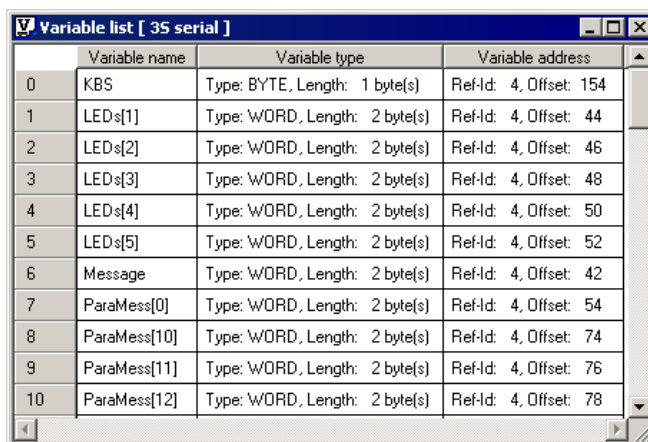The **Target settings** dialog might look like the example below:

Figure 2-6 Dialog Target settings

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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.

A Index

Numerics

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