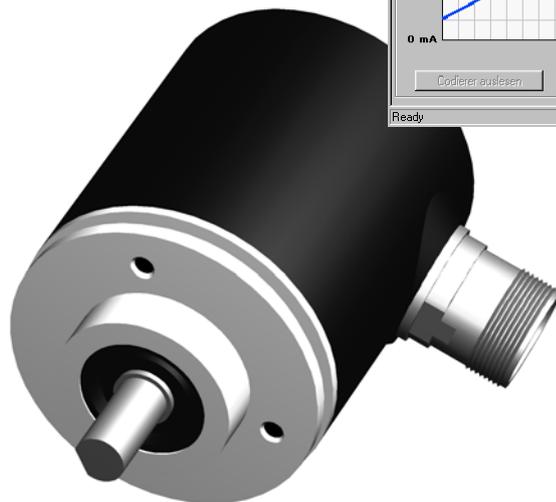
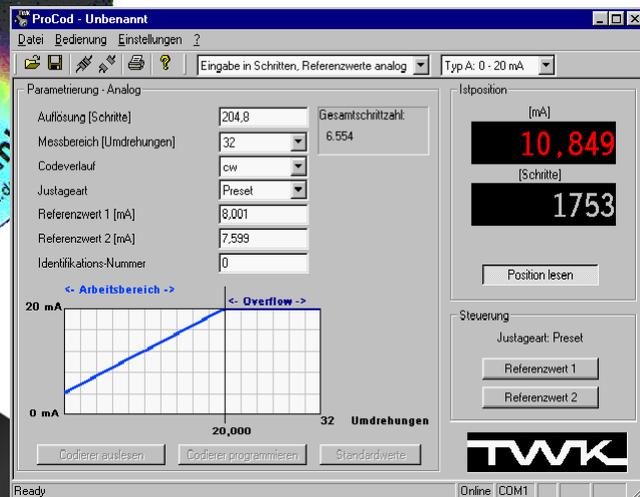
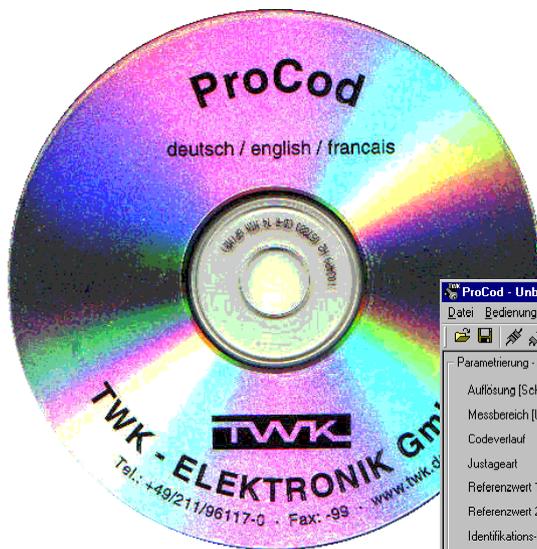


User Manual ProCod



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1. Introduction

The software ProCod serves to program the TWK-Encoders CRF (SSI, ASA, parallel output interface) and DAF (VDC or mA analogue output signal). In addition to the programming of the parameters it is possible to read the actual position continuously and set the reference values.

Each set of parameters can be stored in an individual file or printed out with additional project data.

When setting you can switch between the languages German, English and French.

2. Requirements

2.1 Hardware requirements

- Standard PC with at least 486-compatible processor and one free serial port COM1 or COM2.
- Converter module PF-K9UM0x from TWK, responsible for converting the RS232 interface of the PC into the encoders RS485 interface and for send/receive-switching, inclusive of connecting cable and Null-modem-cable.
- 24V power supply for the encoder and the converter module.

2.2 Software requirements

- Installed operating system Win9x, WinNt 4.0 (SP4), Windows 2000 or Windows XP.
- The software is not working under Win32s, in a Windows emulation of OS/2 or other operating systems or in virtual machines.

3. Install / Remove

Under Windows NT, 2000 and XP you must have administrator privileges to install ProCod.

To **Install** insert the ProCod-CD in your CDROM-Drive. The setup program will start automatically. If setup does not start, please execute the Setup.exe (from version 1.53 onwards: install.bat) file in the root directory of the ProCod-CD manually.

During the installation of ProCod a special serial driver is installed with the ProCod user program. This driver expands the functionality of the serial interface of ProCod specific functions. Afterwards you can find the program under „Start > Programs > TWK > ProCod“.

To **Remove** ProCod choose under „Control panel > Software > Install/Remove“ the line „ProCod“ and click on „Add/Delete“. The Driver „ProCod Driver Version x.x“ will be uninstalled automatically. (From Version 1.53 onwards the driver has to be uninstalled separately. Alternatively, the uninstall.bat can be started from the Installation CD). The specific interface driver is removed only after the restart from the system.

4. Connecting the encoder

Connect the encoder via the converter module, as shown in the following figure, with the PC and switch on power supply.

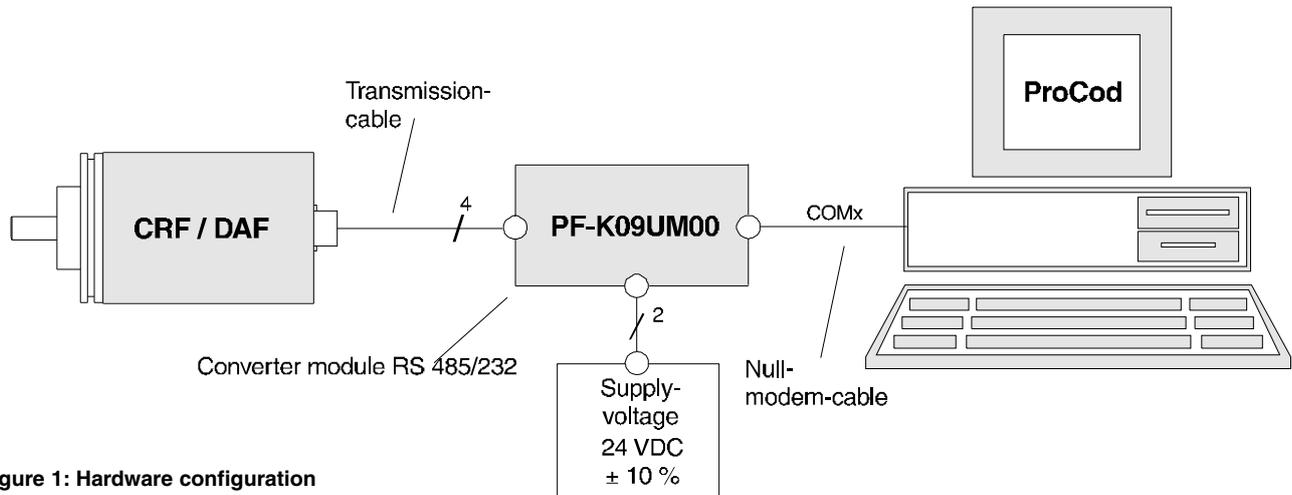


Figure 1: Hardware configuration

Note: The supply voltages for encoder and converter should not be separated (common signal ground).

The interface used for connection (COM1 or COM2) has to be selected in the program.

5. Basics to communication

The communication between PC and encoder is based on the following parameters:

Baudrate:	4800	Parity:	no
Databits:	8	Stopbits:	2

They will be adjusted by ProCod and can not be changed by the user.

Since for communication between converter module and encoder via RS422/485 only two wires are used, the communication direction has to be switched between sending and receiving to/from encoder in the converter module. For this switching the RTS-Signal of the RS232 interface of the PC is used.

If there are hard disk accesses by the PC during communication with the encoder the synchronous switching of send/receive direction will be disturbed and the connection to the encoder will break down. It can be re-established by the button „Online“ immediately.

Therefore the connection will be shift to offline bevor ProCod accesses the hard disk .

6. Operating ProCod

6.1 Starting the program

After installation you can find the program under „Start > Programs > TWK > ProCod“. After the first start it appears with the default settings: German, interface COM1, encoder type parallel.

6.2 Changing the language

You can choose between the languages German, English and French in the main menu under „Settings > Language“. After changing the language it is necessary to restart ProCod.

6.3 Changing the serial interface

In the main menu under „Settings > Interface“ you can choose between COM1 and COM2. A restart after changing is not necessary. The adjustment is only possible in the offline mode. The actual interface is shown in the status bar.

6.4 Changing the encoder type

ProCod is able to programme all programmable TWK encoders with the following types of interfaces:

- parallel
- SSI
- ASA
- analogue

You can set the type under „Settings > Encoder type“. After changing the type the parameter list is rebuilt with the default values and shows the relevant parameters for this type only. The type selected is displayed above the parameter field. (See figure 2)

6.5 Establishing connection

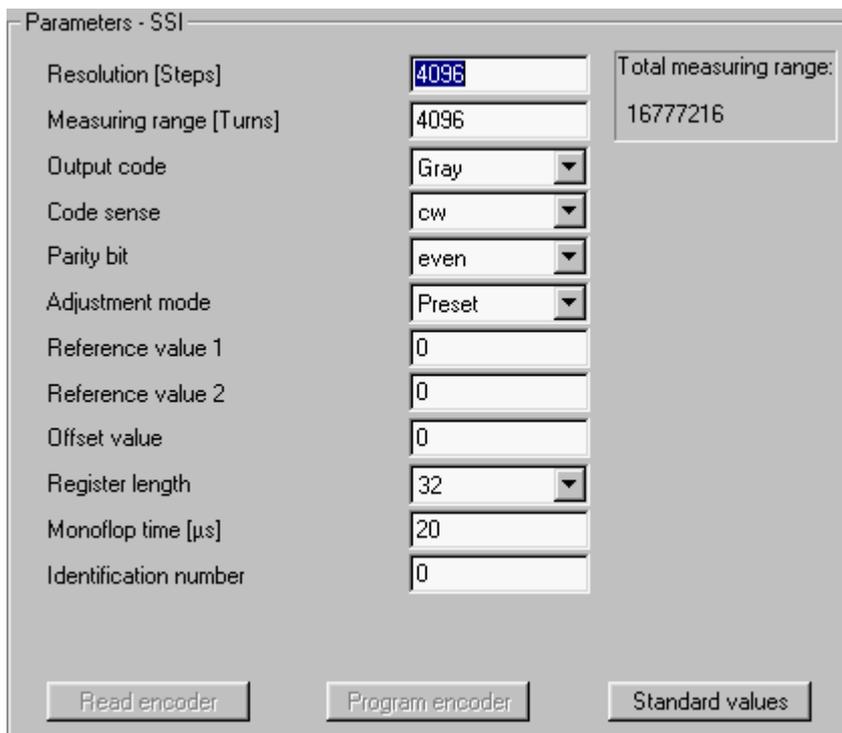
To programme or to read the parameters of the encoder, you have to establish the connection via the button „Online“ or via the main menu under „Operate > Online“ first. During connecting the encoder is set into the programming mode. After that the encoder type and additional hardware data, which are necessary to check the entered parameter values, are read.

If the type of the connected and the adjusted encoder do not agree, a message will appear to ask you to decide whether to accept the online type or to stay offline. If you select „Stay offline“, the encoder type will not be changed and the establishing of the connection will become interrupted.

After accepting the online type, the parameter list is rebuild with the default values and shows the relevant parameters for this type only. The type selected is displayed above the parameter field. (See figure 2)

After the online-state is reached, the entered parameters will be checked depending on the hardware data of the encoder.

In the online-state the buttons „Read encoder“, „Program encoder“ and „Read position“ are available.



Parameters - SSI		Total measuring range:
Resolution [Steps]	4096	16777216
Measuring range [Turns]	4096	
Output code	Gray	
Code sense	cw	
Parity bit	even	
Adjustment mode	Preset	
Reference value 1	0	
Reference value 2	0	
Offset value	0	
Register length	32	
Monoflop time [µs]	20	
Identification number	0	

Buttons: Read encoder, Program encoder, Standard values

Figure 2: Parameter list

6.6 Programming the encoder

Depending on the type of encoder different parameters are programmable. A list of all parameters for every type is located in the appendix and in the connector arrangement description which comes with every encoder.

The parameters can be entered offline and online. In the offline mode it is possible to print and save the parameter sets separately for every type of encoder.

The validity of the values will be checked during editing. Offline a range check with the default limits is done. Online the entered values will be checked against the hardware data of the encoder. They can be adjusted automatically to the valid highest or lowest value.

The fractional part of the resolution, the monofloptime of SSI and the baudrate of ASA can, depending on their hardware data, only accept certain values. In the online status non valid values will be recognized and automatically adapted.

To change individual parameters you should read out the actual encoder values first.

With the button „Program encoder“ always all parameters are send to the encoder. Before sending the parameters to the encoder the validation check of all values is done again.

6.7 Programming the encoder DAF

For the encoder DAF you can choose between three different possibilities of programming depending on the application. They differ in the parameters for resolution and reference values. In every of these cases a diagram illustrates the setted values.

1. Input in steps

Here you can program the parameters for resolution as number of steps per turn, for the measuring range as number of turns and for the reference values as number of steps. The parameters will be sent to the encoder without any conversion.

2. Input in steps, reference values analogue

Whenever you want to enter the reference values directy in form of Milliamps or Volts (and not to convert them into steps) than use this method. The resolution is entered as number of steps like before, but the reference values can be entered as analogue values directly. The program will make the conversion into steps in the background. The relationship between analogue value and number of steps is shown in the **datasheet 10295** on the CD.

The correct setting of the encoder type (A,B or C) is compulsory, otherwise the conversion from analogue into steps will be wrong.

3. Input in turns

If you want to programm the analogue measuring range in number of turns directly, e.g. to obtain 20mA after 17,5 turns of a spindel, take this method of programming. Instead of programming the resolution in number of steps you enter the working range (here:17,5 turns) in number of turns directly. The programm calculates the resolution per turn and suggests a measuring range in turns. If the desired working range is not a 2^n value, the next higher 2^n value is suggested for the measuring range. The difference between working range and measuring range is the overflow. The relation between working range and resolution is also explained in the **datasheet 10295**.

Using this method the reference values are equally entered analogue. Please pay attention of the setting of the correct encoder type.

6.8 Read position, Set reference values

With the button „Read position“ you can switch the continuous reading of the actual position value on and off. For the SSI and parallel types the parity error and the encoder error are displayed as well. The number displayed on the top shows always the position value converted to decimal. The number on the buttom shows the original position value coming from the encoder in hexadecimal.

Depending on the adjustment mode (Preset or Up-/Down) the buttons for setting the reference values or for the Up/Down-mode are made available.

Please note that in Up/Down mode, the value which is set by the Up/Down buttons is stored in the encoder after 6 seconds.

Parameter list

	Parallel	SSI	ASA	DAF	Default value	Range*
Resolution [steps per turn]	√	√	√	√	4096	0.0002...4096
Measuring range [turns]	√	√	√	√	4096	1...4096
Output code	√	√	√		gray	Gray, binary, BCD, Gray-tree, binary-tree
Code sense	√	√	√	√	cw	cw, ccw
Parity bit	√	√	√	-	even	even, odd
Logic polarity	√	-	-	-	positive	positive, negative
Adjustment mode	√	√	√	√	Preset	Preset, Up/Down
Reference value 1 [steps]	√	√	√	√	0	0...total measuring steps -1
Reference value 2 [steps]	√	√	√	√	0	0...total measuring steps -1
Offset value [steps]	√	√	√	-	0	± (total measuring steps -1) bzw. -32768...32767
Register length [bit]	-	√	-	-	32	13, 16, 25, 32
Monoflop time [µs]	-	√	-	-	20	1...682
Baudrate [Baud]	-	-	√	-	62500	1465...3000000
Identification number	√	√	√	√	0	0...65535

*The range may differ from the shown values depending on the encoder.

Parameter terms

- Resolution** - Specifies the number of steps per turn (revolution). For the output codes Gray, binary and BCD values behind the decimal point are possible. If the entered fractional part is not convertible into a binary value, it is automatically adjusted.
- Measuring range** - Total number of turns before switching again to zero.
- Total measuring range** - This value results from the parameters „resolution“ and „measuring range“ and is for reference only. It is not editable.
- Output code** - Output code of the position value.
- Code sense** - The code sense specifies the direction of revolution in which the output code increases.
 cw - increases values when turning clockwise
 ccw- increase values when turning counter clockwise
 (View on the shaft end)
- Parity bit** - Defines whether the encoder should output the even or odd parity.
- Logic polarity** - Only valid for parallel interface. Defines the assignment of logical value and voltage level.
- | | |
|-----------------------|-----------------------|
| positive Logic | negative Logic |
| H-Level = log. 1 | H-Level = log. 0 |
| L-Level = log. 0 | L-Level = log. 1 |
- Adjustment mode** - Defines the function of the multi-functional inputs.
 Preset: The reference values are setable via the multi-functional inputs or by ProCod.
 Up/Down: The output value is setable step by step via the multi-functional inputs or via ProCod.
- Reference value** - The reference value is the value which is output after the function „set reference value“ (via the multi-funcional pins or via ProCod).
- Offset value** - Shifts the output value by a preset amount.
- Register length** - Length (number of data bits) of SSI-protocoll.
- Monoflop time** - Serves for synchronisation of data transmission of the SSI-interface.
- Baudrate** - Transmission rate in Baud (Bit/s) of ASA-Interface.
- Id-Nummer** - The identification number can be allocated to each specific encoder.

Relevant datasheets

- Encoder CRF - CRF 10266
- Encoder DAF - DAF 10286 and DAF 10295
- Converter PF-K9UM00 - PF 10713