Bridge Manual and Start-Up Guide

Gateway

Open Modbus/TCP on System Field Bus Master

on the PKV 40

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Index	Date	Version	Chapter	Alteration
1	06.03.00	V1.000	all	new builded
2	20.02.01	V1.002	all	Expanded for PKV 40-MBP (Open Modbus/TCP to Modbus Plus)

Although this appliance has been developed with great care and intensively tested, Hilscher Gesellschaft für Systemautomation mbH cannot guarantee the suitability of this appliance for any purpose not confirmed by us in writing.

Guarantee claims shall be limited to the right to require rectification. Liability for any damages which may have arisen from the use of this appliance or its documentation shall be limited to cases of intent.

We reserve the right to modify our products and their specifications at any time in as far as this contributes to technical progress. The version of the manual supplied with the appliance applies.

1 Introduction

This manual describes the connection between devices with Open Modbus/TCP and the Master Field Bus systems based on the PKV 40 Gateway.

The PKV 40 is available with the following Field Bus Interface connections:

- Modbus Plus (PKV 40-MBP) (works as server on Modbus Plus)
- PROFIBUS-DP (PKV 40-PB) (works as master on PROFIBUS-DP)
- PROFIBUS-DP (PKV 40-DPS) (works as slave on PROFIBUS-DP)
- InterBus (PKV 40-IBM) (works as master on InterBus)
- CANopen (PKV 40-COM) (works as master on CANopen)
- DeviceNet (PKV 40-DNM) (works as master on DeviceNet)
- SDS (PKV 40-SDSM) (works as master on SDS)
- AS-Interface (PKV 40-ASIM). (works as master on AS-Interface)

The Open Modbus/TCP protocol works as a Server on the Gateway. It was implemented in accordance with the OPEN MODBUS/TCP Specification Release 1.0 of the Schneider Electric company. This specification has been publicized on the World Wide Web and is freely available to anybody.
(`http://www.modicon.com/openmbus/`).

The Gateway always works as **Master** for connection to the Field Bus. The PKV 40-MBP works as server on the Modbus Plus.

The exchange of process data occurs over a common process data image in the Gateway. The process data image corresponds with the input and output data of the Field Bus Master and is cyclically exchanged with the Field Bus Slaves.

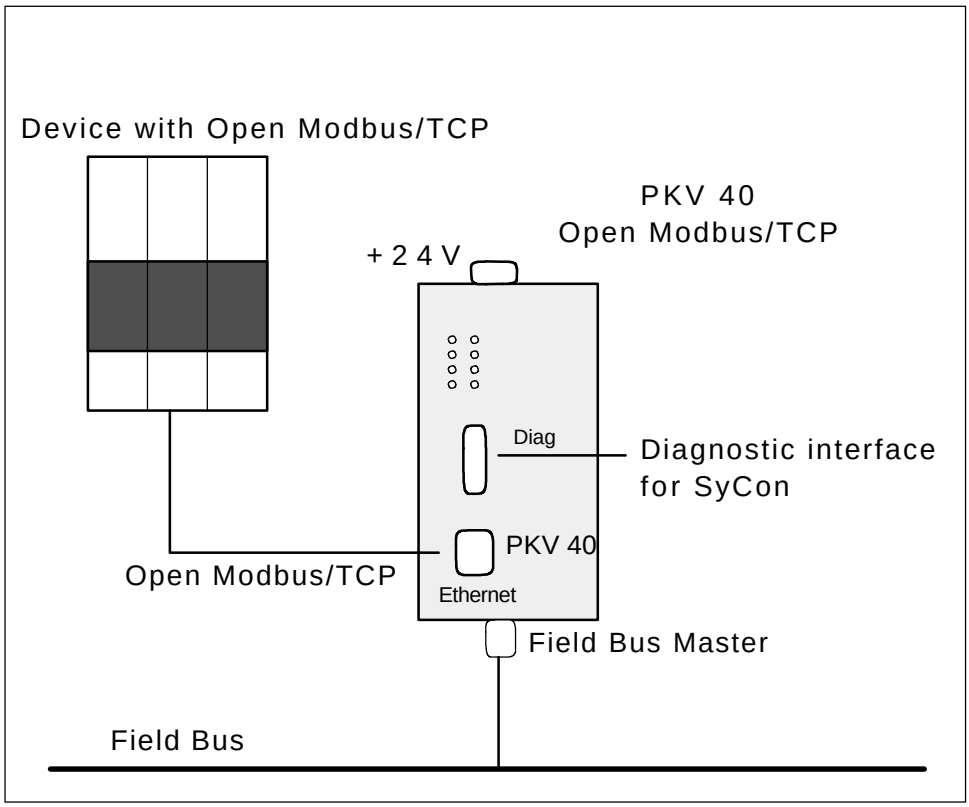
By means of the Open Modbus/TCP protocol, access can be had to the process data image via the function codes 1, 2, 3, 4, 5, 6 and 16. This corresponds to the function range of the Class 1 in the OPEN MODBUS/TCP specification. In addition, the function code 15 from Class 2 of the specification is also implemented. Furthermore, the Exception Status of the Gateway can be read with the function code 7.

The chapter *The process data image* describes with which function codes it is possible to access the input data of the Field Bus or its output data.

The Gateway is described in the *PKV 40 Device Manual*.

The SyCon system configurator is utilized for configuring the Gateway. This tool is also described in its own manual.

The following sketch shows the connection of the devices or the SyCon system configurator to the PKV 40 Gateway:



Connection of the devices to the PKV 40 Gateway

The system configurator can be connected via the Diag serial Diagnostic interface as well as via the Ethernet TCP/IP interface.

2 Process Data Image in the Gateway

The exchange of the process data is carried out via the process data image in the Gateway. This consists of:

Field Bus	max. number of data Words
Modbus Plus	10.000

Number of data Words in the process data image

Field Bus	max. number of input Words	max. number of output Words
PROFIBUS-DP	1.792	1.792
CANopen	1.792	1.792
DeviceNet	1.792	1.792
SDS	1.792	1.792
InterBus	256	256
AS-Interface	31	31

Number of input and output Words in the process data image

In contrast to the control of the Modicon family, the Registers and the Coils (Markers) in the Gateway in the process data image lies over each other. Thus, a Word-manner or Bit-manner access to the same data can be selected!

The process data image is processed in the **Motorola Format** (i.e. MSB-LSB). The following explanations thus refer to the Motorola-Format.

How much data is exchanged over the Bus depends on the configuration of the Field Bus system and is independent of the accesses on the part of the Open Modbus/TCP. Here the only check is whether the access lies within the data ranges. It is up to the user to configure the Field Bus in such a manner that relevant process data lie at the respective positions of the process data image.

2.1 Process Data Image from the Viewpoint of the Field Bus

2.1.1 Process Data Image for Modbus Plus

The input data and output data are located in a common process data image, which consists of 10.000 registers. The coils of the first 625 registers can be adressed seperately. The addressing of each area over Modbus/TCP begins at address **zero.**

Coil arrangement in the common process data image

Output- and input data of the Field Bus	Register 0	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	Register 1	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
	Register 1	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Register 624	9999	9998	9997	9996	9995	9994	9993	9992	9991	9990	9989	9988	9987	9986	9985	9984

Coil arrangement in the common process data image of PKV 40-MBP

2.1.2 Process Data Image for other Fieldbus-Systems

The meaning of input and output data must always be seen from the viewpoint of the Field Bus Master:

Input data	are always data that are received by the Field Bus Master from the Field Bus Slaves.
Output data	are always data that are issued by the Field Bus Master to the Field Bus Slaves.

The process data image consists of two independent regions, one region for input data and one region for output data. The addressing via Open Modbus/TCP of each region is begun with the address **zero.** The **data of the Field Bus Slaves** must be **assigned** in the process data image with the **SyCon** system configurator. The input and output data of the common process data image are exchanged right from the start. Only the data count is defined by the SyCon configuration. For the Open Modbus/TCP function codes 3, 4, 6 and 16 the assignment between Open Modbus/TCP Offset and a region of the process data image for the PKV 40 looks as follows:

	Byte addresses in the common memory		Open Modbus/TCP Offset	Word addresses in the common memory	Open Modbus/TCP-Offset
Inputs: Data from Field Bus to Gateway Read from Open Modbus/TCP Client	IB 0	IB 1	0	IW 0	0
	IB 2	IB 3	1	IW 1	1
	IB 4	IB 5	2	IW 2	2
	..	..	..	..	..
	IB 3.582	IB 3.583	1.791	IW 1.791	1.791
Outputs: Data from Gateway to Field Bus Write from Open Modbus/TCP Client	QB 0	QB 1	0	QW 0	0
	QB 2	QB 3	1	QW 1	1
	QB 4	QB 5	2	QW 2	2
	..	..	..	..	..
	QB 3.582	QB 3.583	1.791	QW 1.791	1.791

process data image of the Field Bus addresses on the Open Modbus/TCP Offsets as an example of the PKV 40 -PB

This means that the Open Modbus/TCP Offset **zero** is depicted on the first Word of a memory region for every access to the register (function codes 3, 4, 6 and 16)!

The access to the process data image is also possible in a Bit-wise manner (Markers, Coils) with the function codes 1, 2, 5 and 15. The following figure shows how the individual Bits are assigned to the memory regions.

Assignment of the Marker / Coils in the common memory

Input data of the Field Bus	IW 0	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	IW 1	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
	IW 2	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	IW 1.790	28655	28654	28653	28652	28651	28650	28649	28648	28647	28646	28645	28644	28643	28642	28641	28640
	IW 1.791	28671	28670	28669	28668	28667	28666	28665	28664	28663	28662	28661	28660	28659	28658	28657	28656
Output data of the Field Bus	QW 0	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	QW 1	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
	QW 2	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	QW 1.790	28655	28654	28653	28652	28651	28650	28649	28648	28647	28646	28645	28644	28643	28642	28641	28640
	QW 1.791	28671	28670	28669	28668	28667	28666	28665	28664	28663	28662	28661	28660	28659	28658	28657	28656

Assignment of the Markers in the common process data image as an example at the PKV 40-PB

This means that the Open Modbus/TCP Offset **zero** is depicted on the Bit 0 of the first Word of a memory region for every access to the Markers (function codes 1, 2, 5 and 15)!

2.2 The Process Data Image

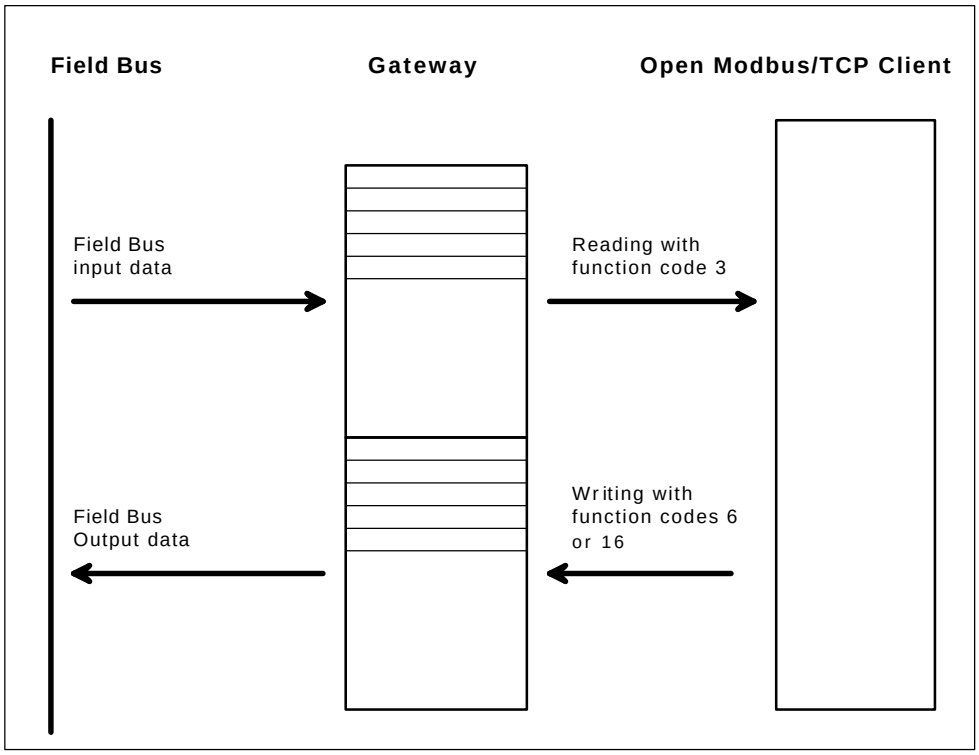
The following table describes the access to the process data image with the various function codes of the Open Modbus/TCP protocol as an example of the PKV 40-PB with a max. of 1,792 inputs and 1,792 output Words. The Offset regions is correspondingly reduced for Field Busses with smaller I/O data.

Function code	Open Modbus/TCP Offset region; PKV 40-PB in the process data image	Access to
1	0..28.671 (Bit Offset)	Inputs
2	0..28.671 (Bit Offset)	Inputs
3	0..1.791 (Word Offset)	Inputs
3	9.000..9.047 (Word Offset)	Diagnostic information
4	0..1.791 (Word Offset)	Inputs
4	9.000..9.047 (Word Offset)	Diagnostic information
5	0..28.671 (Bit Offset)	Outputs
6	0..1.791 (Word Offset)	Outputs
15	0..28.671 (Bit Offset)	Outputs
16	0..1.791 (Word Offset)	Outputs

Access to the process data image via Open Modbus/TCP

2.3 Process Data Image from the Viewpoint of the Open Modbus/TCP

The process data image between the addresses on the Field Bus and the Open Modbus/TCP is described in the following figure. In the example, the function codes 3, 6 and 16 are used for the process data.



Data transfer between Gateway and Open Modbus/TCP Client

2.4 The Open Modbus/TCP Protocol

The Open Modbus/TCP protocol is implemented on the Gateway for Server operation. It supports all function codes that are necessary for reading and writing of Registers and Markers. This corresponds to the function codes of Class 0 and Class 1 of the OPEN MODBUS/TCP Specification Release 1.0 of the Schneider Electric company. In addition to the function codes of the Class 1, the function code 15 can be utilized for writing several Bits. The following table provides an overview of the implementation.

Funktion code	Ab Class	Data type	Data count
1 - read coils	1	Marker	1..2.000
2 - read input discretes	1	Marker	1..2.000
3 - read multiple registers	0	Register	1..125
4 - read input registers	1	Register	1..125
5 - write coil	1	Marker	1*
6 - write single registers	1	Register	1*
7 - read exception status	1	Marker	8*
15 - force multiple coils	2	Marker	1..800**
16 - write multiple registers	0	Register	1..100

Overview of the function codes

Remarks:

* This data count is arrived at implicitly through the function code and is not checked

** Function code 15 corresponds to the Class 2 specification and was implemented additionally.

2.5 Diagnostic Information

2.5.1 Diagnostic Structure for PKV 40-MBP (Modbus Plus)

Diagnostic Information for the Gateway can be accessed with function code 3 and 4. These informations are located at the end of the process data image and contain informations about the previous telegram, the number of calls for each function code, and the current Node Address of the PKV 40-MBP.

Diagnostic Information for Open Modbus/TCP:

Offset	Diagnostic Information
9901 high Byte	Unit Identifier
9901 low Byte	Previous Function Code
9902	Previous Offset
9903 9904	Further informations, which depend on the the previous telegram. Refer to the following table.
9911	Number of calls of function code 1
9913*	Number of calls of function code 2
9915*	Number of calls of function code 3
9917*	Number of calls of function code 4
9919*	Number of calls of function code 5
9921*	Number of calls of function code 6
9923	reserved
9925*	Number of calls of function code 15
9927*	Number of calls of function code 16
9930	Node Address of PKV 40-MBP
9941 high Byte	Last faulty function code: 81 (hex): Function Code 1 82 (hex): Function Code 2 83 (hex): Function Code 3 84 (hex): Function Code 4 85 (hex): Function Code 5 86 (hex): Function Code 6 87 (hex): Function Code 7 8f (hex): Function Code 15 90 (hex): Function Code 16
9941 low Byte	Last Error: 1: Illegal Function Code 2: Illegal Data Address 11: Gateway Target Device failed to respond

PKV 40-MBP Diagnostic Information fro the Open Modbus/TCP Protocol

*The count is storted as long value

The function code depending Diagnostic informations have the following meaning:

Offset	Function Code	DiagnosticInformation
9903	1,2, 3, 4, 15, 16	Previous Bitcount respectively Wordcount
9904 high Byte	15, 16	Previous Bytecount

Function code depending Diagnostic informations

Function code 5 and 6 have no further Diagnostic informations.

Diagnostic Informations for Modbus Plus:

Register Address*	
49951	Prevoius Offset
49952	Prevoius Register- respectively Coilnumber
49953	Prevoius function code
49955**	Number of calls of function code 1
49957**	Number of calls of function code 2
49959**	Number of calls of function code 3
49961**	Number of calls of function code 4
49963**	Number of calls of function code 5
49965**	Number of calls of function code 6
49967	reserved
49969	reserved
49971**	Number of calls of function code 15
49973**	Number of calls of function code 16

PKV 40-MBP Diagnostic structure for the Modbus Plus Protocol

*Correspond to an Offset of 9950..9972 in the process data image

**The count is storted as long value

2.5.2 Meaning of the LED´s for PKV 40-MBP

On the PKV 40-MBP´s case are 8 LEDs. These have the following meaning:

LED	Meaning
SYS	Is turned on, after program start
CON	Is turned on, after PKV 40-MBP has been successfully initialized
ST1	Ist turned on, when an faulty Open Modbus/TCP telegram has been received. With the next correct Open Modbus/TCP telegram, LED will be turned off
ST2	Is shortly turned on, with every received Open Modbus/TCP telegram
RDY	Is not used with PKV 40-MBP
RUN	Is not used with PKV 40-MBP
ERR	Is turned on, if an interfacecrash or a timeout on Modbus Plus occurs
STA	Diagnostic LED

Meaning of the LED´s for PKV 40-MBP

The Diagnostic LED STA indicates Protocol Errors and also Parameter Assignment- and Hardware Errors. The diagnostic display corresponds to the definition of the Modicon manual:

Display Mode	Error	Meaning
1 time Twinkling 160ms break	no error	Interface works normally
1 time Twinkling 1sec break	Interface is in status MONITOR_OFFLINE	In this status, the Field Bus is heared for 5 seconds and an internal stationtable is build. During this time, no data may be transfered
2 times Twinkling 2sec break	Interface is permanent in status MAC_IDLE and gets no token	The interface recognizes Field Bus members, which exchange the bustoken, but gets self no token
3 times Twinkling 1,7sec break	Interface in not able to recognize further Field Bus members	The Interface is the only active Field Bus member, or the Interface transmitter is out of order
4 times Twinkling 1,4 sec break	Interface is in status DUPLICATE_OFFLINE	A Field Bus member with the same address has been detected. The Interface gets active, when for 5 seconds no double address is detected

Twinkle Codes of the STA LED on PKV 40-MBP

2.5.3 Diagnostic Information for other Fieldbus-Systems

Access can be had to the current Field Bus status via the function codes 3 or 4 with an Offset of 9.000...9.031. Access can be had to the current Firmware name and the current Firmware version with an Offset of 9.032...9.047.

Offset	Data
9.000...9.031	Diagnostic information
9.032...9.039	Firmware name
9.040...9.047	Firmware version

The Field Bus status and the Firmware information can be polled as well with the aid of the SyCon via the Diag serial Diagnostic interface as with the Ethernet TCP/IP interface.

The structure of the Field Bus Status can be taken from the Protocol Interface Manual of the respective Field bus system from the chapter *Protocol States - Direct read access in dual-port memory*. The 64 Byte large Field Bus status of the table *Global bus state field in area* `Task2State` is transparently filed by the Gateway from Offset 9.000.

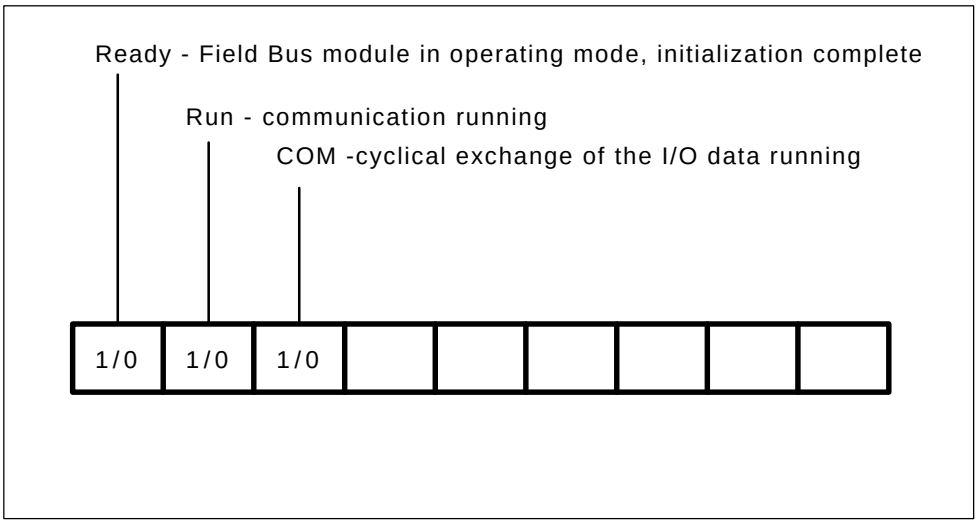
After each reading out of the Diagnostic information by the Modbus/TCP Client, the Diagnostic Bits of the Field Bus Slave are reset when the cause of the Diagnostic has been repaired.

The Firmware name is given by 8 Words in the ASCII format (ASCII-String) and can be read out via the Offsets 9.032..9.039 with the function codes 3 or 4. The Firmware version is also shown as 8 Words in the ASCII Format (ASCII-String) and can be read out via the Offsets 9.040...9.047.

2.5.4 Exception Status

A so-called Exception Status can be read out with the function code 7. This has nothing to do with an “Exception Response”, which is generated on the part of the Server for an incorrect command from the Client. PKV 40-MBP does **not** support function code 7.

Several stati of the Field Bus module can be read out with the function code 7. 8 Bits are sent back in response and these are described as in the following.



Bit structure of the answer on function code 7

3 Configuring

The transfer parameters of the two protocols are defined in the configuration:

Open Modbus/TCP	No parameters need be entered.
Field Bus	The whole configuration takes place via the SyCon system configurator.

4 Start-Up Guide

This guide describes the start-up of the Gateway as an example of the PKV40-PB. It serves for coupling of PROFIBUS-DP Slave devices to an Open Modbus/TCP communicating device. Here the Gateway at the PROFIBUS-DP is the Master. An analogous procedure is used for the other Field Busses.

4.1 Information on Validity

- This instruction describes the utilization of the PKV40-PB as an Open Modbus/TCP Server.
- A PC with the Windows 9x or Windows NT operating system is required for using the SyCon system configurator.
- The version of this instruction can be seen from the table in the Alteration Review on Page 2. The version number is the highest number in the Index column.

4.2 Referenced manuals

Manual	Title
Device Manual	PKV40
Operating instructions	SyCon

4.3 Working Steps

4.3.1 Configuring Hardware

No settings at the device itself are necessary for the PKV40 Gateway. The whole configuration (Field Bus, IP-Address, ...) is carried out via the Diag serial Diagnostic interface or the Ethernet TCP/IP interface.

4.3.2 Installing Configuration Software

Overview

The SyCon program is required.

Configuration for -->	Field Bus	PKV40 basic device
Program	System configurator	System configurator
Program name	SyCon	SyCon

SYCON

The installation of the SyCon system configurator is described in the manual:

Manual	Title	Chapter
Operating instructions	SyCon	Installation

4.3.3 Configuring the PKV with the Program SyCon

The loading of new files on to the Gateway or the setting of the IP address of the PKV is carried out with the tools contained in the SyCon from version 2.620.

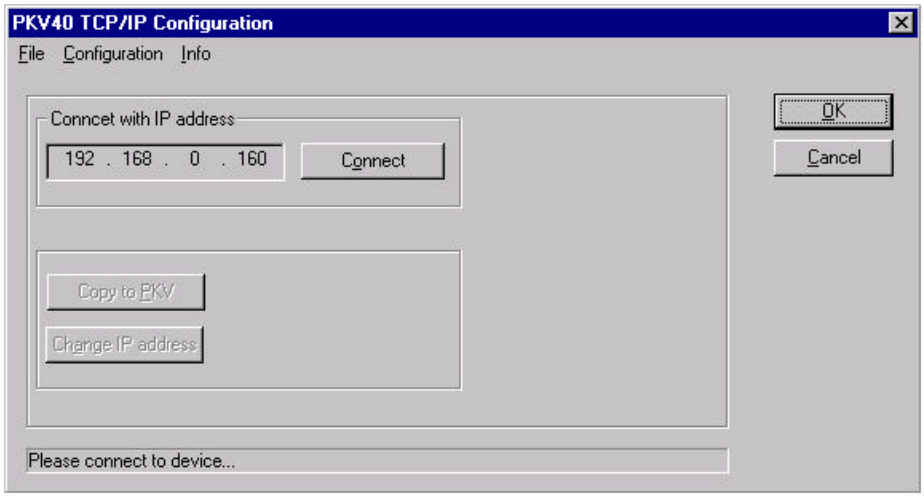
In order to be able to use the configuration tools in the SyCon, it is necessary to install a configuration with a PKV 40 in the SyCon and this must be selected. In the menu point **Tools** there will now appear the entry **PKV40-XX** (XX stands for the selected Field Bus system). There is a choice here between a serial RS-232 connection or a TCP/IP connection.

A crossed RS-232 cable is required for operation at the serial interface and this can be ordered from the Hilscher company (KAB-SRV).

The configuration via TCP/IP can also be carried out via a point-to-point connection with a crossed cable or, for example, via a Hub with commercially available Ethernet cables.

The PKV is supplied with a preset IP address (see Info sheet).

The procedure for the serial or the TCP/IP configuration is basically the same. First an IP address must be entered into the field provided for this purpose, or the number of the serial interface with which the PKV is connected must be selected. Then the **Connect** button must be activated.



Configuration dialog for PKV 40-XXX via TCP/IP

When a valid connection with the Gateway has been established, then the menu entries and the buttons for configuration become available.

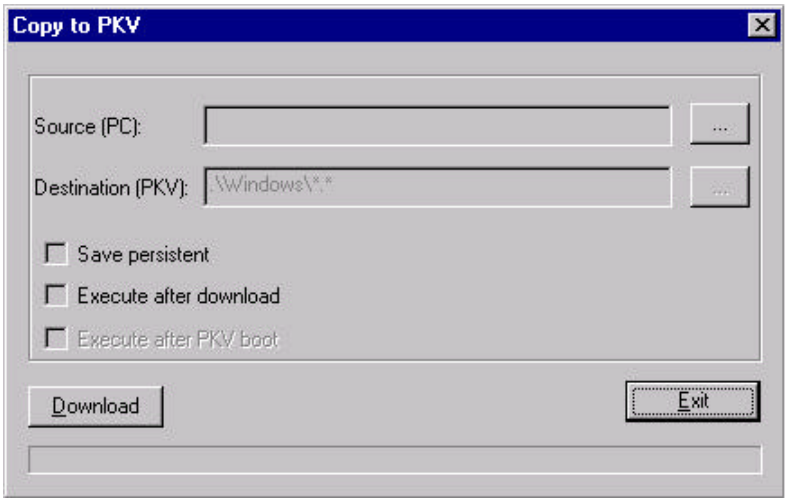
In order to ensure communication via TCP/IP, the TCP/IP must be so configured on the PC that a connection with the preset IP address is possible (see user manual for Windows NT).

4.3.3.1 Loading Files into the PKV

With this function it is possible to load data into the User FLASH or the RAM of the PKV and to process applications after the downloading or the starting of the operating system.

Before new applications or existing DLLs are downloaded, any possible running older versions of the application or programs that use the DLLs must be ended. For this purpose, corresponding running processes can be displayed with the **Configuration - View Running Tasks** menu entry. If an entry has been selected, then the **Stop Process** button can be activated and the selected process is stopped.

In order to transfer a new file, select the **File - Copy to PKV40** menu point or activate the **Copy to PKV** button. Select the file to be loaded in the dialog that now appears.



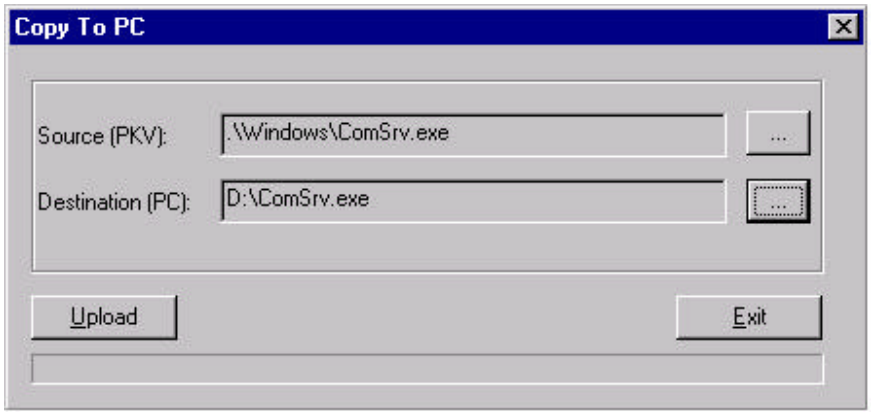
Dialog for loading files on to the PKV 40

The path and the name can be typed directly into the **Source (PC)** text box or the path and the file can be selected with the **...** button. The **Destination (PKV)** field cannot be edited at present. All the files to be copied are entered into the Windows directory of the PKV. Depending on requirements, now mark the **Save persistent, Execute after download** and **Execute after PKV boot** buttons. Then activate the **Download** button and the Software is transferred to the PKV.

4.3.3.2 Loading Files onto the PC

It is also possible to load files from the Gateway on to the PC. For this purpose the **Copy to PC** entry is selected under the **File** menu point.

The path of the file that is to be loaded can be entered directly into the **Source (PKV)** field or the contents of the FLASH memory can be viewed via the **...** button and a file can be selected. Files that are only stored in the RAM system of the PKV are not displayed and must be entered manually into the **Source** field. Please note that in Windows CE operating system there is no drive letter as is usual in other Windows operating systems. Instead of this, a single period is entered as a drive designation (e.g.: .\Windows\ComSrv.exe).



Dialog for loading files from the PKV 40 to the PC

The target place and target name can now be entered in the **Destination (PC)** field or selected via the **...** button.

After activating the **Upload** button, the file is loaded onto the Host PC.

4.3.3.3 Deleting Files

In order to delete files, the menu point **File - View Flash Dir** can be selected after successful building up the connection. A list of files that are permanently stored in the User FLASH memory is now displayed. Now previously selected files can be deleted with the **Delete** Button.

It must be noted that the files are only deleted from the file system of Windows but not actually out of the FLASH memory. For this reason also, this memory is not released for renewed writing to and with repeated copying it can occur that no more files can be permanently stored as the memory is full.

In order to release memory again, the complete User FLASH must be deleted and the **Delete All** button is provided for this purpose.

In order to prevent the deletion of important files necessary for operation, the `SaveFile.dat` file contains entries of all files that are not to be deleted. This file can be loaded on the PC and edited there and then returned to the PKV again in order to protect own files from inadvertent deletion. However, these files are only protected from deletion of the whole Flash memory. An individual deletion of the files is still possible.

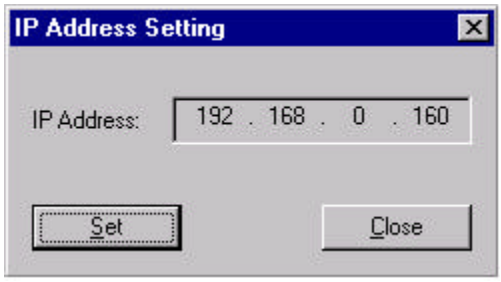
Caution: If the COM Server or a necessary DLL driver is deleted, then no configuration with the aid of SyCon is possible!!

4.3.3.4 Setting the IP Address

It is possible to allocate a new IP address to the PKV with the **Configuration - Setting IP address** menu point. For this purpose, a connection with the PKV is necessary, as described above.

Now enter the desired valid IP address into the corresponding field.

When the desired and valid address has been entered, press the **Set** button and the new address is allocated to the Gateway.



Dialog for setting the IP-Address

If the alteration of the IP was successful, it will be displayed. A request for restarting the PKV will appear.

Please note that the newly allocated IP address is only valid after a restart of the Gateway.

4.3.3.5 Starting the Applications

Applications that have already been entered on to the Gateway can also be started manually. For this purpose the **Configuration - Start Application** menu point is selected. Now enter the name of the application into the field provided for this purpose and press the **OK** button..

4.3.4 Cables and Connections

SUPPLY VOLTAGE

The supply voltage must be connected to plug X2. The supply voltage required by the Gateway, the pin assignment and further information can be found in

Manual	Title	Chapter
Device manual	PKV40	Connection of the supply voltage (X2)

OPEN MODBUS/TCP

The interface for the Open Modbus/TCP is plug X4. The pin assignment and further information can be found in

Manual	Title	Chapter
Device manual	PKV40	Ethernet Interface (X4)

FIELD BUS

The interface for the Field Bus is plug X6. The pin assignment and further information can be found in

Manual	Title	Chapter
Device manual	PKV40	Field bus Interface (X6)

DIAGNOSTIC/PARAMETER INTERFACE

The Diagnostic/parameter interface Diag is plug X3. The pin assignment and structure of the cable can be found in

Manual	Title	Chapter
Device manual	PKV40	Diagnostic interface (X3)

Remark:

- For the designation KAB-SRV, a cable of 3m length should be ordered from the Hilscher company, for the connection of the PKV 40 with the COM interface of a commercially available PC.

4.3.5 Configuring the Bus System

PROFIBUS-DP

For the configuration of the PROFIBUS-DP, GSD (device base data) files for each device connected to the network are required.

Starting SyCon-PB

Start the system configurator with a double click of the mouse on the icon of the system configurator or via the Windows 9x/NT start menu with the menu sequence **Program - SyCon System Configurator - SyCon**. Under the **File-New** menu point, open a new project. Select PROFIBUS from the list and confirm with **OK**.

GSD of the Master

The GSD file of the Master is already available in the device base database and is called P40_1662.GSD (PKV40-PB).

Add the GSD of the Slave

Add the GSD files of the Slaves to the device base database. With the **File - Copy GSD** sequence, the GSD files of other manufacturers are imported.

ConfigureMaster

Add the Master via the **Add - Master ...** menu sequence or directly via the icon. For this purpose select **PKV 40-PB** from the selection list. Click on the **Add >>** button. The 1 for the DP Master is typically utilized as the station address. Then click on the **OK** button.

Configure Slave

Slave type: Add the Slaves via the **Add - Slave ...** menu sequence or directly via the icon. Again a selection list opens, from which the corresponding Slaves can be selected.

Configure Slaves: Double click on the icon of every Slave and thus open the **Slave configuration** window. Now insert the desired module with a double click of the mouse on this module. The module appears in the lower table. Finally, confirm with **OK**.

Parameters for Slave: Some Slaves also require parameters besides the configuration. For this purpose, double click on the icon of the Slave and thereby open the **Slave configuration** window. Now click with the mouse on the **Parameter data ...** button. Now enter the required parameter data on the basis of the description of the Slave.

Address allocation

In the configuration of a PROFIBUS-DP Slave, input and output addresses are allocated to each module. These addresses are important for the Open Modbus/TCP Client, so that it can access the input or output addresses.

Settings

Bus parameters: The Baud rate is determined with the **Settings - Bus parameters...** .

Master Settings:

The following settings are defined with the **Settings - Master settings...** .

Parameters for user interface
- Start behavior after system initialization:
  - automatic release of communication by the system
- User program supervision
  - supervision time: 1000 ms

Parameters for process data interface
- Addressing mode: depending on application (see remarks)
- Memory format (Word module): depending on application
- Transfer procedure of the process data: **buffered, host controlled**

Important!

Hardware parameters: 88 kB Dual port memory (for PKV 40-PB)

Remarks: As the Open Modbus/TCP protocol addresses in a Word-wise (Register) manner, the Word-oriented saving of the DP module is recommended here (Addressing mode: Word address).

Device assignment:

Select the **Settings - Device Assignment ...** menu sequence. Then select the desired driver from the list. If the Gateway is to be parametrized via the serial interface of the PC, select the CIF Serial Driver. If , on the other hand, the Gateway is to be configured via Ethernet TCP/IP, select the CIF TCP/IP Driver from the list. With the serial driver, click the **Connect COM 1** or **Connect COM 2** button. When the Firmware name appears, select the device. Confirm with the **OK** button. When using the TCP/IP driver, enter the IP address of the Gateway in the field provided for it with the **Connect with the Server** button. If the Firmware name now appears, select the device and activate the **OK** button.

Save configuration

Save the data to the hard disk with the **File - Save** or **File - As ...** menu sequence

Download configuration

To carry out a download, the Gateway must be selected as current Master. Click the icon of the Master with the left mouse button. Load the configuration data into the Gateway with the **Online - Download...** menu sequence.

Control

Start the Debugger with **Online - Start Debug mode**. The Master and every Slave are displayed in green or red color. A Slave in green color shows that data exchange between the Master and this Slave is taking place. A Slave in red color shows an error. Typical causes of error are:

- Incorrect Bus address
- Incorrect configuration
- The Slave reports an error.

The causes of the error must be removed so that data exchange between the Master and the Slaves is possible.